

Reliance 4

DEVELOPMENT ENVIRONMENT



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1 Reliance

1.1 About Reliance

Reliance is a modern **SCADA/HMI** system designed to visualize and control industrial processes. Data is acquired from control systems (most frequently from PLCs), logged to databases, and presented (i.e., visualized) to end users in a graphical form (schemes, charts, tables, etc.).

Other important features of the system are support for scripts, recipes and alarms, diagnostics, custom reports, Postmort, languages, access rights, OPC, SMS, email messages, and reciprocal communication with enterprise information systems. Visualization applications are also easily accessible to remote users using a Web browser or mobile devices (e.g., *PDA*).

1.2 Reliance Software Modules

The **Reliance 4** SCADA/HMI system consists of the following software modules:

- **Development Environment – Reliance Design**

Reliance Design is the development environment designed for creating and editing visualization projects (applications). It is available in two versions – **Desktop** and **Enterprise**.

Desktop

The *Desktop* version is intended for creating applications of type "1 computer – any number of devices". A device can be a PLC (Programmable Logic Controller), telemetry system, or another I/O device type. This version **does not allow** you to create network applications and applications intended for thin clients (*Reliance Web Client* and *Reliance Smart Client*). Thus, the resulting application only allows for communication between a single computer and any number of devices.

Enterprise

The *Enterprise* version contains all the features of the *Desktop* version. In addition, this version allows you to create projects (network applications) for any number of interconnected computers with "view-only" and/or "full control" access. *Enterprise* also enables you to export an existing application for thin clients (*Reliance Web Client* and *Reliance Smart Client*). Thus, the resulting application allows for communication between any number of computers and devices. Concurrently, it provides thin clients with data.

- **Runtime Software – Reliance View, Reliance Control, Reliance Server, Reliance Control Server**

Common features

Reliance's runtime software is a program designed to run a visualization project on the end user's computer. Among other things, it allows the acquisition of data from devices via *communication drivers* (native drivers, OPC and DDE servers), acquisition of data and alarms/events from other instances of the runtime software, generating and processing alarms/events, logging data and alarms/events, logging *Postmort* records, and executing scripts. The *runtime software* supports redundancy and it acts as DDE servers. These and more features are common to all instances of the runtime software (*Reliance View*, *Reliance Control*, *Reliance Control Server*, and *Reliance Server*). Besides, each runtime software has other extra features.

Reliance View and Reliance Control

In addition to the features common to all *runtime software types*, **Reliance View** allows displaying visualization windows with real-time data, displaying and acknowledging current alarms, displaying and printing historical alarms, displaying and printing historical data as trends and output reports. Visualization project diagnostics allows for detecting the cause of errors, e.g., in communication. The project and program languages can be switched during runtime. Reliance View **does not allow** you to control the visualized industrial process. It is intended for computers with "view-only" access, e.g., at workplaces of managers who need to view historical trends of process parameters and the current status of the process but have no need to control it.

In addition to the features common to all *runtime software types*, **Reliance Control** allows displaying visualization windows with real-time data, displaying and acknowledging current alarms, displaying and printing historical alarms, displaying and printing historical data as trends and output reports. Visualization project diagnostics allows for detecting the cause of errors, e.g., in communication. The project and program languages can be switched during runtime. Reliance Control **allows** you to control the visualized industrial process. It is intended for control workplaces and centers. Access rights may be required to control the process.

Reliance Server

In addition to the features common to all *runtime software types*, **Reliance Server** is a data server for other instances of the *runtime software* and *thin clients* (*Reliance Web Client*, *Reliance Smart Client*). It contains a built-in Web server. It provides clients with data and alarms/events, executes commands received from the clients and generates reports based on the clients' requests. It runs as a Windows service. Reliance Server cannot display visualization windows. Therefore, it is used as a non-visual data concentrator and a data server. It is especially suitable for unmanned computers.

Reliance Control Server

In addition to the features common to all *runtime software types*, **Reliance Control Server** includes all the features of *Reliance Control* and *Reliance Server*. It is intended for computers with enough performance to simultaneously handle users' requests and requests from client instances of the runtime software and thin clients (*Reliance Web Client*, *Reliance Smart Client*). For large applications, it is highly recommended that you use a separate server to handle the clients' requests. Thus, potential problems with the performance of the main control room's PC when connected to multiple clients will be avoided.

• Thin Clients – Reliance Web Client, Reliance Smart Client

Web Client – Reliance Web Client

Reliance Web Client is a program designed to run a visualization project over the Internet at remote user sites. It is based on the Java platform (JRE 6.0 and higher) and therefore independent of operating system and Web browser. It uses one of the data servers (*Reliance Control Server* or *Reliance Server*) as the data source. *Reliance Web Client* is a thin client – it only has some of the features of the runtime software. Among other things, it allows for displaying visualization windows with real-time data, controlling the visualized industrial process, displaying and acknowledging current alarms/events, displaying historical alarms/events, and displaying historical data as trends and/or reports.

For more detailed information, see the *Reliance Web Client* manual.

Reliance Smart Client

Reliance Smart Client is a client of the **Reliance** SCADA/HMI system intended for making visualization applications available to the user via Web pages. It is designed for use with smartphones and tablets and optimized for touch control.

Generally, the client can be used for any device equipped with a Web browser. Visualization and system windows are generated by **Reliance**'s data servers (*Reliance Control Server* or *Reliance Server*) as Web pages in HTML5. The client's modern and user-friendly interface is created by jQuery Mobile, a JavaScript framework that adjusts to the display size on a target device and allows for convenient touch control. jQuery Mobile is supported by many mobile devices. *Reliance Smart Client* is a thin client – it only has some of the features of the runtime software. Among other things, it allows for displaying visualization windows with real-time data, controlling the visualized industrial process, displaying and acknowledging current alarms/events, displaying historical alarms/events, supporting time programs, and displaying historical data as trends and/or reports.

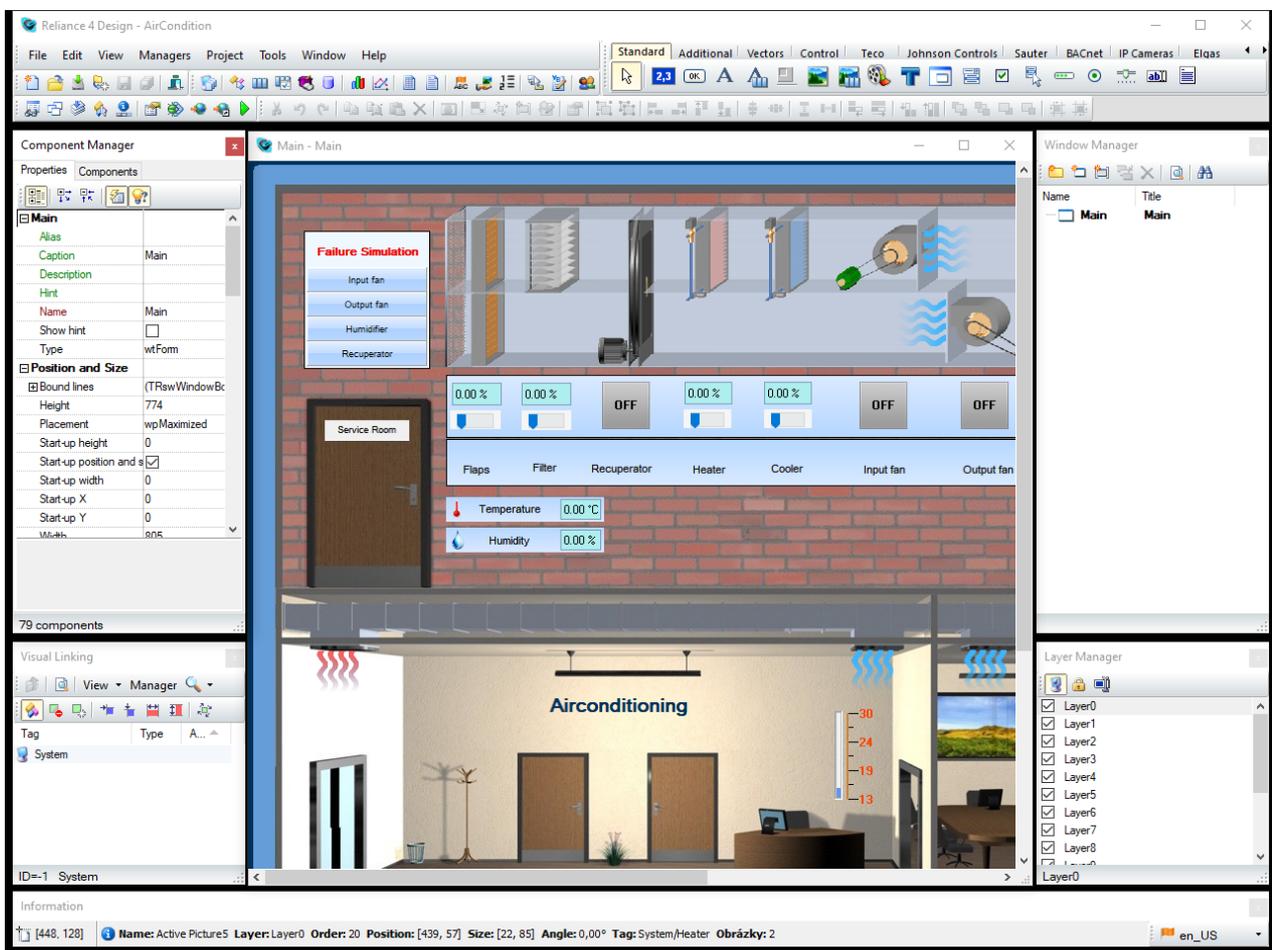
• Communication Drivers

Communication drivers are designed to provide data transmission from hardware devices to the runtime software and the transmission of commands from the runtime software to the devices in accordance with the device communication protocol. *Communication drivers* for some devices are part of **Reliance** (the so-called native communication drivers). These drivers require a license. The price of the license differs according to the type of the device that the driver is intended for. **Reliance** additionally allows for communication with any device for which an OPC or DDE server is available (**Reliance** is an OPC and DDE client).

Communication drivers are not stand-alone programs. They are DLLs hosted by *Reliance Driver Server* (*R_DrvSrv.exe*). If communication with devices is required, *Reliance Driver Server* is automatically launched at project startup. *Reliance Driver Server*, as well as *Reliance Server*, can run as a *Windows service*.

2 Reliance Design Development Environment

The **Reliance Design** development environment is a program designed for creating and editing visualization projects. Its user interface consists of several windows. The main window contains the **main menu**, **toolbars**, and the **Component Palette**. Other windows are: **Component Manager**, **Window Manager**, **Layer Manager**, **Visual Linking**, and **Information**. They can be easily shown and hidden. Each visualization window matches up with a separate design window. These windows can be managed through the *Window Manager*.



Reliance 4 Design – Air-conditioning Demo

Context-sensitive help is implemented in the development environment. After selecting a control and pressing the F1 key, the corresponding help topic is displayed.

Introduction

Main Menu

Tool Windows

Setting Up the Development Environment

Visualization Project

Components

Managers

Standard Dialog Boxes

Appendices

2.1 Introduction

Hardware and Software Requirements

The software modules of the **Reliance** SCADA/HMI system (with the exception of *Reliance Web Client* and *Reliance Smart Client*) can be run on MS Windows XP, Windows XP Embedded, Windows Vista, Windows 7, Windows 8, Windows 8.1, Windows 10, Windows Server 2003, Windows Server 2008, Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Windows Server 2016. *Reliance Web Client* can be run on all operating systems on condition that the Java Runtime Environment (JRE 6.0 and higher) is installed on the computer, *Reliance Smart Client* can run on any Web browser supporting HTML5 and the jQuery Mobile javascript framework.

To create or edit visualization projects, your computer must meet the following requirements: processor with a clock rate of 2 GHz, 512MB RAM for Windows XP and older versions, 1GB RAM for Windows Vista, 2GB RAM for Windows 7 and Windows 8, 4GB RAM for Windows 10, screen resolution 1024 x 768 with 24-bit or 32-bit color depth. [The complete installation](#) of the development environment including the graphics library and runtime software requires **approx. 400 MB** of free hard disk space. *Reliance Add-On Pack*, which contains the installers of software tools and third-party drivers, requires an additional **1 GB** of free space.

Starting the Development Environment

The *Reliance Design* development environment can be started by using a shortcut in the *Start* menu or on the *Windows* desktop. The shortcut allows you to run the executable file `R_Design.exe` located in the main directory of the **Reliance** SCADA/HMI system.

At the first start of the development environment, a dialog is displayed to find out whether files with an `.rp4` extension (the main **Reliance 4** project files) should be associated with the *Reliance Design* program. This allows for opening these files automatically without having to run the program in advance. The association of the `.rp4` files can also be done later using the *Environment Options* dialog (*Environment* > [File Types](#)).

Upon association, the files with an `.rp4` extension are marked as *Reliance Project* and they are assigned a specific icon. Thus, for example, a visualization project can be opened by double-clicking on the `.rp4` file in the visualization project directory.

Whenever you start the development environment, the availability of new versions of the **Reliance** SCADA/HMI system is being checked. The program connects to the www.reliance-scada.com server and users are notified of new versions, if they are available. Checking for new versions of **Reliance** can be enabled/disabled using the *Environment Options* dialog (*Environment* > *Update*).

Welcome Window

This window will appear whenever you start the *Reliance Design* program. The window contains the following commands: *Create New Project*, *Open Project*, *Open Recent Project*, *Show Help*, *Show Tutorial*, and *Reliance Website*.

The *Welcome* window can also be invoked by using the *Help > Show 'Welcome' Window* command at any time during working with the development environment.

2.2 Reliance Main Features

End-User-Intended Features

Systems Integrator-Intended Features

2.2.1 End-User-Intended Features

The benefits of using the Reliance SCADA/HMI system for end users, what and how to use it

Communication with Control Systems

Displaying Data as Trends

Data Overviews

Displaying Data as Mimic Diagrams

Logging Data

Controlling the Process

Alarms and Events

Multimedia

Multilanguage Project Support

User Profiles and Rights

Postmort

Built-in Web Server

Thin Clients

Receiving/Sending Text and Email Messages

System of Notes

Client-Server Architecture

Information Systems Interconnection

2.2.1.1 Communication with Control Systems

Communication with control systems (PLCs, telemetry systems, OPC, native drivers, Device Manager, tags, CoDeSys import)

The main function of SCADA systems, including the **Reliance** SCADA/HMI system, is to acquire data from subsystems (PLCs, telemetry systems, etc.). **Reliance** allows for reading/writing data in different formats from/to communication drivers (native drivers, OPC and DDE servers).

In most cases, each subsystem (connected hardware, PLC) corresponds to an object of type *device* defined within a visualization project. Devices can only be defined via the *Device Manager*. Within each device, you can define tags of different types. The list of tags can be easily imported from CoDeSys.

The basic properties for connecting to a subsystem can be configured directly from the *Device Manager*. To configure the properties of the communication drivers, use the *Communication Driver Manager*.

2.2.1.2 Displaying Data as Trends

Displaying data as trends (chart, real-time trend, real-time chart, trends in FastReport, trend configuration at runtime)

Quantities acquired from control systems can be easily displayed as trends and charts. The simplest form of chart within the **Reliance** SCADA/HMI system is represented by the *Real-Time Trend* component. Trend series are based directly on tags and defined via the *Real-Time Trend Manager*. The *Real-Time Chart* component can be used to create a common chart (when using the *Real-Time Trend* component, the horizontal axis always represents time).

Reliance also allows you to manage historical trends to display historical data. Trends can be defined via the *Trend Manager*; their series are based on *data table fields*. Trends can be displayed via the trend viewer. Every user can configure the appearance of a trend. The *Trend Manager* can also be accessible to the user during runtime. An unlimited number of trends with any number of series can be defined within a visualization project.

Trends can also be displayed in *custom reports* of type *FastReport*. To display historical data of a single tag, a tag trend is available. A tag trend can be displayed by choosing the *Show Trend* command from the popup menu of a *Display* component placed in a visualization window. A tag trend is only available if the tag displayed by the component is stored in a data table.

2.2.1.3 Data Overviews

Data overviews (reports, tables, data tree, custom reports, report configuration at runtime, filters, PDF, HTML)

In **Reliance**, data can also be displayed as tables and reports. A *Data Grid* component placed in a visualization window can be used to display the current value of an array-type tag. To display the current value of a single tag, use the *Data Tree* component.

Reliance allows you to manage historical *reports* to display historical data as text. Reports can be displayed at runtime via the report viewer. They can be defined via the *Report Manager*. The manager can also be accessible to the user during runtime. Individual report columns are based on data table fields.

Tag values can be used to build a user-readable output using *custom reports*. Custom reports are based on static templates where text, graphic elements, or special character strings can be included. The special strings are used to mark the place where the real-time value of a tag should occur in the template when generating a report. Custom reports of type *FastReport* allows for inserting, for example, trends and tables based on current and historical data.

2.2.1.4 Displaying Data as Mimic Diagrams

Displaying data as mimic diagrams (screens, windows, window switching, Component Palette, properties)

To visualize an industrial process and display its data, a vast range of graphical objects (components) are available to be placed into screens (visualization windows). An ordinary project contains several visualization windows with components between which you can switch using buttons. In many cases, buttons used for switching between windows are located in a separate window of type tray at the edge of the monitor. On the *Display* page of the respective computer's properties (in the *Project Structure Manager*), you can specify the visualization window to appear as the first window after project startup.

The Component Palette contains a group of *standard* components (*Display, Button, Text, Active Text, Picture, Active Picture, Check Box, Track Bar, etc.*). There are also several *other* components, such as *Data Tree, Data Grid, Real-Time Trend, or Real-Time Chart*. In addition, the Component Palette contains plenty of special components intended for devices of particular companies (*Teco, Johnson Controls, Sauter, Control, IP Cameras*).

To easily configure the component properties, invoke the respective component's property editor by double-clicking the left mouse button on the component area. To make multiple changes to the properties, you can also use the *Component Manager*. Many of the properties can be linked to tags defined within the visualization project, which allows you to change the tags' value at runtime using, for example, scripts.

2.2.1.5 Logging Data

Logging data (data tables, SQL, dBASE, Paradox)

Real-time data can be sampled and archive files can thus be created. The **Reliance** SCADA/HMI system supports logging data to a file-based database – *dBASE* and *Paradox* (used in the past) – or to a relational database of type *SQL* (*Microsoft SQL Server, MySQL, MariaDB, and PostgreSQL*). A group of tags is logged within a *data table*. Data tables and their properties (e. g., the sampling interval, the interval of logging data to a physical table, or the interval of creating archive files) can be defined via the *Data Table Manager*.

Historical data can be easily displayed as trends and reports.

2.2.1.6 Controlling the Process

Controlling the process (displays, recipes, time programs, level fill picture)

In addition to displaying data loaded from the connected devices (PLCs), the **Reliance** SCADA/HMI system allows for writing data to the devices. To change tag values (i.e., to control the visualized industrial process), the following components can be used: *Edit Box, Check Box, Track Bar, Display, etc.* You can also use scripts to change tag values automatically.

To control the process, recipes can be used, too. A recipe is a group of tags whose real-time values can anytime be stored to a disk file and then loaded from the file. Recipes can be defined via the *Recipe Manager*.

All the runtime software programs but *Reliance 4 View* ("view-only" software) allow you to control the visualized industrial process.

2.2.1.7 Alarms and Events

Alarms/events (generation, acknowledgment, various databases, viewers, alarm/event panel)

The **Reliance** SCADA/HMI system allows the user to be notified of errors by alarms/events. An alarm can be, for example, generated if the value of a tag lies outside the specified limits. Alarms/events can be defined via the *Device Manager* within the device whose tags are linked to the respective alarm/event. An alarm/event can be linked to a tag change and thus controlled, for example, from a script.

Alarms/events can be viewed in the runtime environment (and in thin clients) via two viewers. Those alarms/events that still persist or require acknowledgment by the operator and system messages can be displayed via the viewer of current alarms/events. The viewer window can be displayed automatically when an alarm/event is generated. The **Reliance** SCADA/HMI system allows displaying current alarms/events on a single line at the bottom of the runtime software's main window (the alarm/event panel).

All alarms/events (active, inactive, acknowledged, unacknowledged) can be displayed via the viewer of historical alarms/events. Alarms/events can be stored in a file-based or SQL-based database. The way archive files are created, interval of creating archive files, and many other properties can be configured via the *Project Options* dialog.

2.2.1.8 Multimedia

Multimedia (sounds, video, IP cameras, ActiveX, animation)

The **Reliance** SCADA/HMI system allows you to use multimedia. *Animation* (allows for animating a sequence of static pictures), *Media Player*, *Internet Explorer*, and other components can be placed into visualization windows. Other applications can be inserted via the *ActiveX Container* component. **Reliance** also supports using Axis and Vivotek IP cameras.

Sounds can be played when alarms/events are generated, end, or are active. They can be defined via the *Project Options* dialog.

2.2.1.9 Multilanguage Project Support

Support for multilanguage projects (Unicode, String Manager, switching between languages during runtime, aliases)

The **Reliance** SCADA/HMI system allows you to easily create multilanguage projects. The operator can switch between languages directly in the runtime environment or thin clients. As Unicode is supported by **Reliance**, the project and program languages can be independently switched during runtime.

The *program language* is the language of the GUI (main menu, viewers of alarms/events, trends, managers, etc.). At runtime, you can choose, for example, from the following languages: English, Russian, German, and Czech.

The *project language* is the language of most project-defined text strings. They are, for example, text strings displayed by components (*Button*, *Text*, *Check Box*, etc.), alarm/event text strings, names of trend series, and names of report columns. The language in which the visualization project will be accessible depends only on the author's decision. Visualization projects are usually designed for one language. Subsequently, other languages can be added via the *Project Options* dialog and the *String Manager*.

2.2.1.10 User Profiles and Rights

User profiles and rights (profiles, settings, access restrictions, user administration, biometric data)

Every user can log on to **Reliance** with his/her user name and password. Subsequently, any changes made to the settings of trends and reports are stored in a user profile so that they can be used when this user next time logs on to the program. A new user can be defined via the *User Manager*, which is accessible at both design-time and runtime. At runtime, however, the manager is accessible only to those who have sufficient access rights.

Every user can select a set of access rights. There are 30 access rights available (defined via the *User Manager*). Access rights allow you to control the access to specific operations. For example, if an access right is selected when defining a window, only those users with this right can access the window.

In the **Reliance** SCADA/HMI system, a BioLogon fingerprint reader can be used to verify the user's identity.

2.2.1.11 Postmort

Postmort (replaying the controlled process, analyzing the cause of a failure)

The *Postmort* function is designed for recording changes in process data of the controlled process on a real-time basis into special data files. Thus, for example, it is possible to analyze the cause of a technology failure. To activate *Postmort*, bring up the *Project Structure Manager* and activate the *Record postmort* property on the *Postmort* page of the selected computer (here, you can also specify the number of days recorded).

Postmort records can be played via the *Postmort Record Player*. When you start replaying the records, all tags' values are loaded from an archive file, not from devices. Due to the fact that real-time data is not available when replaying *Postmort* records, it is highly recommended to use a different computer for this activity.

2.2.1.12 Built-in Web Server

Built-in Web server (tag values, data overviews, alarms/events displayed as Web pages)

The programs designed for data sharing, i.e., *Reliance Control Server* and *Reliance Server*, contain a built-in Web server. The user can log on to the server via a common Web browser and, thus, be informed of tag values, generate reports and custom reports, or run Web Client or Smart Client.

Similarly to accessing components defined within a visualization project, access rights can be required to access the Web server.

2.2.1.13 Thin Clients

Thin clients (one visualization project, visualization on various platforms, Web Client, Smart Client, PDA)

Reliance's thin clients are designed for running visualization applications on remote devices connected to the Internet (e.g., computers, cell phones, PDAs). Both clients use one of **Reliance**'s data servers (*Reliance Control Server* or *Reliance Server*) as the data source. They only have some of the features of the runtime software. Although they allow for controlling the visualized industrial process, some features are not available (e.g., recipes, *ActiveX*, some time programs).

Reliance Web Client is a multi-platform application designed to run on devices where the Java Runtime Environment (JRE 6.0 and higher) is installed. The Web client can run as an applet or as a stand-alone application. Usually, no special configuration (project computer) is needed for the Web client. When starting the Web client, it is always checked whether a new version of the project file is available. If so, the new version is started automatically.

Reliance Smart Client is an application intended for making visualization projects available to the user via Web pages. It is designed for use with touchscreen smartphones and tablets.

Prior to using a thin client, the project must be exported using the *Export Project for Remote Users Wizard*.

2.2.1.14 Receiving/Sending Text and Email Messages

Receiving and sending text messages, sending email messages

The **Reliance** SCADA/HMI system allows sending and receiving text messages via a GSM device (modem). The settings related to sending text messages can be configured via the *Project Structure Manager* and data communication is realized via scripts. Sending and receiving text messages is demonstrated in the *Demos/SMS* example, which is supplied together with **Reliance**.

Sending email messages can be done in a similar way. The settings related to sending email messages (e.g., SMTP server and sender details) can be configured via the *Project Structure Manager* (on the *E-mail* page of the respective computer). Emails can only be sent from scripts. Sending email messages is demonstrated in the *Scripts/SendEmail* example. This project as well as other examples are available in the <Reliance>\Examples directory.

2.2.1.15 System of Notes

System of notes (notes related to alarms/events, windows, object comments, labels)

Within **Reliance**, there are many places where you can make notes or comments. Every object (component, trend, table, tag, etc.) contains properties named *Comment* and *Description*. Components also allow you to display bubble help (help hints).

Once you log on to the runtime environment, you can leave a comment related to visualization windows or alarms/events for your colleague, employee, etc. To delete notes, access rights can be required in the same way as for alarm/event acknowledgment.

2.2.1.16 Client–Server Architecture

Client–server architecture, redundancy, centralization, decentralization

The **Reliance** SCADA/HMI system has a client–server architecture. In most cases, the so-called data server (*Reliance Server* or *Reliance Control Server*) is the central module. The data server communicates with a PLC through a serial cable, LAN, OPC server, etc. The device's data can also be visualized using clients (*Reliance Control*, *Reliance View*, *Web Client*, *Smart Client*). The topology of the system can be defined via the *Project Structure Manager* (each computer defined via the manager usually corresponds to a single real workplace computer).

To make the system more resistant to failures, data server redundancy can be provided. In such a configuration, if a data server failure occurs, the runtime software on the client computer automatically attempts to connect to the other data server. PLC redundancy can also be provided. Primarily, communication can be carried out, for example, through a LAN. In the event of a communication failure, it can be redirected using a serial cable.

2.2.1.17 Information Systems Interconnection

Exchanging data with existing enterprise information and SCADA systems (OPC server, MES, ERP, etc.)

The **Reliance** SCADA/HMI system can exchange data with external applications and existing enterprise information systems. This can be done, for example, via the OPC or DDE protocol, a file, or the COM interface. For more information on how to exchange data with third-party applications, read the *Data Exchange Methods* manual.

2.2.2 Systems Integrator–Intended Features

The benefits of using the Reliance SCADA/HMI system for systems integrators, how it facilitates application development, what is hidden to the customer

Script Support

Graphics and Pictures

Quick Creation of Links to Tags

Open Format

Reuse of Function Units

Diagnostics and Navigation

Multiple Property Changes

Window Layers

Actions Invoked by Components

Backward Compatibility

Easy Topology Extension

Automatic Project Update

Virtual and System Tags

Quick Component Handling

Project Backup During Development

Project Security

Clear Licensing

2.2.2.1 Script Support

Support for scripts (VBScript, functionality enhancement, adjusting to less usual requests)

Although **Reliance** is designed to be handled with the maximum possible speed and simplicity without need for programming, more functions can be achieved by using the VBScript language. Scripts can be created via the *Script Manager*. Usually, scripts get executed periodically, but they can also get executed when a certain event occurs (e.g., when a button or a keyboard shortcut is pressed, alarm/event). Scripts can be used to perform basic operations (calculations or constant initialization), more complex operations (sending text messages or working with databases), but also to work with object-oriented programming and perform many other operations.

2.2.2.2 Graphics and Pictures

Graphics and pictures (central picture management, support for transparency, 32-bit color depth, various formats)

One of **Reliance**'s main advantages is that you can easily develop a good-looking application. The system supports both vector and raster pictures. As pictures can be easily edited in common graphic editors, you can benefit from the main advantages when using raster pictures (bitmaps). Pictures in **Reliance** SCADA can be shown in their natural colors (16.7 million colors). All common formats are supported (BMP, JPG, PNG, etc.). Pictures (or photographs) can represent the background of a visualization window, production machines, buttons and switches, animations, etc.

All pictures to be used in a visualization project must be first imported to the project's picture database via the *Picture Manager*. They are copied (in the same format) to the appropriate folder in the project's directory structure. Also, they can be renamed. A picture can be displayed in a window's background or via the following components: *Picture*, *Active Picture*, *Animation*, and *Level Fill Picture*. It can also be used to modify the appearance of the *Button*, *Gauge*, *Progress Bar*, and *Bevel* components.

In the **Reliance** SCADA/HMI system, vector graphics is represented by pictures in the *.wmf/emf format, which are imported and used in the same way as raster pictures. To draw basic shapes, you can use vector components, such as *Bar*, *Circle*, *Ellipse*, or *Grid*. Vector graphics can also be used to draw most components (*Pipe*, *Progress Bar*, *Scale*, *Clock*, *Real-Time Trend*, *Real-Time Chart*, *Bevel*, etc.).

2.2.2.3 Quick Creation of Links to Tags

Quick linking of tags to components (visual linking)

Most active components are controlled by a main tag. Their size, position, and visibility can also be controlled dynamically using tags. To specify the link to a tag, bring up the selected component's *Properties* dialog box and choose the desired tag via the *Select Tag* dialog box. If multiple components are to be linked to tags, the *Visual Linking* tool window can be used. To specify the link to the tag whose value is to control the desired property of the respective component, simply drag and drop the tag from the *Visual Linking* window onto the component.

2.2.2.4 Open Format

Open format (scripts in TXT, windows in XML, pictures in the original format, others in RDT tables, export to CSV)

A **Reliance** visualization project is stored on disk within a specific directory structure. The project itself consists of files in different, mainly open formats. Pictures are stored in the original format, the window structure (component layout) is stored in XML files, scripts' code is stored in a text file. Many other objects are stored in files in the RDT format (*Reliance Data Table*). These data tables can be edited via the *RDT File Editor* supplied together with **Reliance**).

Objects can also be exported from the *Reliance Design* development environment as plain text (in the CSV format). They can then, for example, be edited and imported back to the same or another visualization project. Data (of reports, alarms/events, trends, and custom reports) can also be exported from the runtime environment to CSV.

2.2.2.5 Reuse of Function Units

Reusing function blocks (windows on different computers, window templates, structured tags)

In **Reliance**, reusing objects and function blocks is supported at different levels. At the top level, you can repeatedly use a computer (the same computer configuration can be used for an unlimited number of client instances of the runtime software or Web clients). Within a visualization project, you can define objects, such as windows, scripts, reports, or trends. Subsequently, any combination of these objects can be connected to the project computers, which allows you to create different configurations for different workplaces.

At the level of visualization windows, you can group multiple components using a window template and embed this template into different windows through a *Container* component. Tags can be grouped via the *Data Structure Manager* and the created structured tag can be linked to a *Container* component. Within visualization windows, you can lock the relative position of the selected components by choosing the *Group* command.

2.2.2.6 Diagnostics and Navigation

Project diagnostics, navigation, finding object usages

By default, the *Reliance Design* development environment uses a tool named *Project Diagnostics*. It is intended for checking all objects within a visualization project and detecting issues. It also allows you to find unused objects. To make the diagnostics faster or ignore some issues, you can choose project scopes to diagnose.

Another useful feature is that you can find links to selected objects in specified parts of the project. For this purpose, the *Find Object Usages* command should be chosen from the selected object's popup menu. To search for an object by name, choose the *Find Object* command from the popup menu.

2.2.2.7 Multiple Property Changes

Multiple property changes (window, component, and manager properties)

In the *Reliance Design* development environment, there are several tools that allow you to change multiple properties at a time. To change the properties of multiple components, the *Component Manager* can be used. After selecting components, the manager displays the list of all properties you can change at a time (the intersection of the properties is displayed). The *Component Manager* allows you to change window properties, too.

Most managers allow changing the properties of multiple objects. First, select several objects (tags, reports, etc.). Then, change the properties using pages in the right pane.

For the purpose of changing multiple properties, the *Replace components' links to tags* property can also be used. This property can be activated via the *Duplicate Window* dialog. It can be used, for example, when several similar windows should be defined within a project to visualize data of several similar devices.

A useful way to change multiple properties can be provided by the function *Text replacement* of object properties. After selecting, for example, a component group or several windows, bring up the *Replace Object Properties Wizard* from the popup menu. The wizard lets you replace the properties of the currently selected objects by entering the text to be replaced and the new text.

2.2.2.8 Window Layers

Window layers (grouping components within a layer)

The **Reliance** SCADA/HMI system contains a system of layers that allows grouping components of a similar type. To make designing a visualization window clearer, you can move a component to a different layer via the *Layer Manager*. To avoid unintentionally changing the position and size of all the components located on a layer, the components can be locked. Each visualization window defined within a project has 16 layers.

2.2.2.9 Actions Invoked by Components

Performing actions related to various events (displaying Web pages, program startup, function activation)

In the **Reliance** SCADA/HMI system, actions are intended for easily executing one-shot commands. Actions can be performed after clicking or double-clicking individual mouse buttons on the area of most components. They can be defined via the *Action Manager*. Displaying trends, reports, or the Log On User dialog are the most often used actions. It is helpful to use actions, for example, when a visualization project runs without displaying the main menu, i.e., most of the menu's commands are accessible via actions. You can choose from about 40 actions. After defining an action, it can be chosen on the *Scripts/Actions* page of the selected component's *Properties* dialog box. The *Data Tree* component allows you to connect an action to individual nodes and cells.

2.2.2.10 Backward Compatibility

Backward compatibility and upgrading older versions of Reliance (regular updates, converting to a newer version)

While the development of **Reliance** is in progress, new features are added to fix potential bugs. Therefore, it is recommended to use the latest version of the system. Any upgrades within the current major version (**Reliance 4** or **Reliance 3**) are free of charge. Also, there is no problem with loading existing projects in a newer version – the system is backward-compatible. However, after editing a project in a newer version of *Reliance Design*, it may not be possible to use the project in an older version of the runtime software (the system is not forward-compatible).

There is also backward compatibility between adjacent major versions. For example, a **Reliance 3** visualization project can be run in **Reliance 4** after the original project is converted to the **Reliance 4** format by *Reliance 3 to 4 Project Converter*. In this case, license upgrades are charged.

2.2.2.11 Easy Topology Extension

Configuring project computers (topology extension, the same project on every computer, identification)

Creating more complex **Reliance** applications is based on the client–server architecture. A simple network application may consist of a data server (e.g., *Reliance Control Server*) and a client (e.g., *Reliance Control*). The data server communicates directly with PLC devices, logs historical data, and provides clients with data. Both server and client computers can be configured via the *Project Structure Manager*. The term *Computer* is a common name for such a configuration. When configuring the *server* computer, its IP address must be specified so that the *client* computer, upon its startup, knows with which computer to establish communication. Server connections can also be defined via the *Project Structure Manager* (see the *Network Applications* example projects). All computers defined within the *Project Structure Manager* must contain the same project. Network applications can be developed via the *Enterprise* version of the development environment (the *Desktop* version is intended for creating applications with 1 computer).

To add another client to your application, simply install the **Reliance** SCADA/HMI system on another computer and run the visualization project in the same way as on the original client computer. Data servers can be added to your application via the *Project Structure Manager* where the needed server connections should also be defined. Data servers can be configured so that they provide redundancy and load balancing or load data from different places (see the *Network Applications* example projects).

Reliance Server, which has no graphical interface and runs as a Windows service, can operate on computers that are only used as data servers. To extend the application topology, thin clients can also be used.

2.2.2.12 Automatic Project Update

Automatically updating a project from the specified directory

For smooth operation, each computer running **Reliance's** runtime software must have the current version of the project files installed. To avoid the need to manually copy the project to all computers each time it is updated, you can update the project automatically. If this function is active, the availability of a new version of the project is checked each time the project is started. The project can be automatically updated from the specified directory (usually within the computer network). This function can be used, for example, together with the program designed for the remote control of **Reliance's** runtime software (*Reliance Remote Control Center*), which, among other things, allows restarting a project from remote locations.

The automatic project update settings can also be configured for the thin clients (*Reliance Web Client* and *Reliance Smart Client*). The availability of a new version of the project is checked each time a thin client is run. The new version is then downloaded.

2.2.2.13 Virtual and System Tags

Virtual and system tags

In **Reliance**, tags can be divided into physical and internal. A physical tag is stored directly in the memory of a physical device (PLC). Its value is synchronized with the value of the tag stored on the computer running the runtime software.

The value of an internal tag is only stored in the memory of the computer. Tags defined within the *System* device are a special type of internal tag. These tags' values are not intended to be transferred between instances of the runtime software. For this reason, they do not affect the number of data points, i.e., they are free of charge. Internal tags, which do affect the number of data points and whose values can be transferred between instances of the runtime software, can be defined within virtual devices.

2.2.2.14 Quick Component Handling

Handling components (grouping, adjusting the size, aligning, guidelines, scaling, grid, lock)

At design-time, there are many useful tools available for working with components placed into a visualization window. The grid is very helpful when positioning components. The commands for editing components are accessible from the *Edit* menu. After selecting a single or multiple components, you can, for example, adjust their width, center them vertically/horizontally, or equally space them vertically/horizontally.

Another useful feature is scaling. The *Scale* command can be used to resize or move the currently selected components in a given ratio. This can be helpful, for example, if it is necessary to adjust an already designed visualization window to a new size. To avoid accidental changes, you can lock the active window to prevent the position and size of the components from being changed.

You can also decide whether to display guidelines when changing the position and size of a component with the mouse. These lines indicate the selected component's edges as they meet the edges of other components.

2.2.2.15 Project Backup During Development

Backing up a project at design-time (restoring the project from the backup file, choosing the backup file name)

At design-time, it is beneficial to periodically back up your project so that you can recover data from an earlier time. In the **Reliance** SCADA/HMI system, visualization projects can be easily backed up through a tool named *Project Backup* accessible from the *Project* menu. The *Backup Project Wizard* allows you to back up your visualization project as a file in the ZIP format, which is, by default, stored on disk. When choosing the backup file name, its time stamp can also be specified. This makes the orientation in the backup history easier and allows creating frequent backups. To recover data from the backup file, choose the *Restore Project from Backup* command from the *File* menu.

The tool for creating project backups can also be used to easily transfer a visualization project to other computers. You can specify project parts to be backed up (e.g., including data).

2.2.2.16 Project Security

Project security (safe communication, project files encryption)

To prevent the end user from editing a visualization project, a password should be used. This password will then encrypt your project. It will be required every time the project is being opened with *Reliance Design*, it will not be required at runtime.

By default, network communication between instances of the runtime software is encrypted to avoid monitoring by a third party. Communication between a data server and a thin client is also encrypted by default.

2.2.2.17 Clear Licensing

Clear licensing (based on the number of I/O tags – data points, license upgrade whose price is determined as the difference between the price of the new and the original license, software keys for small applications, hardware keys for large applications, licenses with an unlimited number of data points, time-limited licenses, trial version free of charge)

The number of data points is the main factor affecting the price of a license. The number of data points depends on the number and data type of tags defined within a visualization project. The number of tags defined within the *System* device (i.e., private internal tags) do not affect the price.

The license is stored in a license key of which there are two types: software key and hardware key. While a software key can only be used on the computer it is designed for, a hardware key is portable between computers and is intended for licenses with 250 and more data points. An already purchased license can be easily upgraded, only the difference between the price of the new and the original license has to be paid off. The upgrade process can take up to several hours (you'll be sent a license file that has to be stored into the current hardware key via *License Key Utility*). In the event of emergency or for testing purposes, we can also provide you with temporary licenses (both software and hardware).

If you run any software module without a license key, it acts as a *trial* version. In this case, the number of data points is limited to 25. If you happen to run a project requiring more data points than the license allows, no other tags are loaded. This fact is highlighted in the current alarm/event viewer.

3 Main Menu

The main menu is the menu bar located in the development environment's main window. The most frequently used commands are also available in the toolbars located in the main window. Some commands can be executed using a particular keyboard shortcut. Keyboard shortcuts can be configured by the user (see [Keyboard Shortcuts](#)).

[File Menu](#)

[Edit Menu](#)

[View Menu](#)

[Managers Menu](#)

[Project Menu](#)

[Tools Menu](#)

[Window Menu](#)

[Help Menu](#)

3.1 File Menu

The *File* menu contains commands for creating, opening, and closing visualization projects and commands for creating and saving visualization windows. The menu also contains a list of the most recently opened projects, which allows for a quick selection of a project. Some commands are available in the [Welcome](#) window, too.



New Project

Brings up the [Create New Project Wizard](#).



Open Project (Ctrl+O)

Displays the dialog box for selecting an existing visualization project. Here, it is possible to select files with an `.rp4` extension (the main project file in the **Reliance 4** format) or with a `.prj` extension (the main project file in the **Reliance 3** format). When selecting a file in the **Reliance 4** format, the project is opened and loaded. When selecting a file in the **Reliance 3** format, the [Project Conversion Wizard](#) is brought up. The wizard allows converting the project into the **Reliance 4** format.



Back Up Project

Brings up the [Back Up Project Wizard](#).

Restore Project from Backup

Brings up the [Restore Project from Backup Wizard](#).



Close Project

Closes the active project. If any modifications have been made, the user is prompted to save the changes before closing the project.



New Window

Brings up the [Create New Window Wizard](#).



New Window Template

Brings up the [Create New Window Template Wizard](#).

**Save Window** (Ctrl+S)

Saves changes in the active window.

**Save All Windows**

Saves changes in all open windows.

**Close Window** (Ctrl+F4)

Closes the active window and releases it from memory.

**Close All Windows**

Closes all active windows and releases them from memory.

Program Language

Brings up the *Select Program Language* dialog box.

**Exit**

Exits the program. If any modifications have been made to the open project without being saved, the user is prompted to save the changes before exiting the program.

3.2 Edit Menu

The *Edit* menu contains a set of commands for editing graphical objects (components) in the active window. They are commands intended for basic editing operations (Copy, Duplicate, Delete, etc.), organizing components (Group, Lock, etc.), locating components (Alignment, Center, etc.), resizing (Shrink to Smallest, Grow to Largest, etc.), changing the Z-order of components, scaling, rotating and aligning components to the grid, etc.

The commands for editing components use the internal clipboard, not the system one. As a result, the contents of the clipboard can only be used within one instance of *Reliance Design*. If you need to copy a component to another project, you can use the *Export* command in the *Window Manager* and then import the window into another project using the *Import* command in the *Window Manager*.



Undo (Ctrl+Z)

Reverses the last action taken and thus restores the components to their previous state. Up to 100 actions can be undone using the *Undo* command. To set the number of changes, use the [Environment Options](#) dialog (*Environment > Visualization Windows*). The change history allows for storing the operations of adding a component (including pasting it from the clipboard), deleting, sizing, rotating, and changing the position of a component.



Redo (Shift+Ctrl+Z)

Repeats the last action taken.



Cut (Ctrl+X)

Removes the currently selected components from the window and places it on the clipboard.



Copy (Ctrl+C)

Places a copy of the currently selected components on the clipboard.



Duplicate (Ctrl+D)

Copies the currently selected components and places them into the same window (horizontally and vertically shifted by 8 pixels).

**Paste** (Ctrl+V)

Places the contents of the clipboard into the active window.

**Delete** (Del)

Deletes the currently selected components from the active window.

Select All (Ctrl+A)

Selects all the components in the active window.

Unselect All (Esc)

Unselects all the currently selected components in the active window.

Select Next (Tab)

Selects the next component in the *Z-order* (ordering of overlapping components) after the currently selected component.

Select Previous (Shift+Tab)

Selects the previous component in the *Z-order* before the currently selected component.

**Group** (Ctrl+G)

Groups the currently selected components. You can move the component group as if it were one object. The position and size of the components in the group remain unchanged. The highlight style of the selected component group is different in color from the one of multiple selected individual components.

**Ungroup** (Ctrl+U)

Breaks the currently selected group into individual components.

▼ Alignment Menu

 **Left**

Aligns the left edge of each selected component with the left edge of the leftmost selected component.

 **Right**

Aligns the right edge of each selected component with the right edge of the rightmost selected component.

 **Top**

Aligns the top edge of each selected component with the top edge of the topmost selected component.

 **Bottom**

Aligns the bottom edge of each selected component with the bottom edge of the bottommost selected component.

 **Center Vertically**

Aligns the center of each selected component with the vertical centerline of the currently selected components. The vertical centerline runs midway between the left and right edge of the selected components.

 **Center Horizontally**

Aligns the center of each selected component with the horizontal centerline of the currently selected components. The horizontal centerline runs midway between the top and bottom edge of the selected components.

 **Space Equally, Vertically**

Equally spaces the currently selected components vertically keeping the same distances between the centers of the components.

 **Space Equally, Horizontally**

Equally spaces the currently selected components horizontally keeping the same distances between the centers of the components.

▼ Size Menu

 **Shrink to Smallest, Horizontally**

Adjusts the width of the currently selected components to the smallest selected component.

 **Grow to Largest, Horizontally**

Adjusts the width of the currently selected components to the largest selected component.

 **Shrink to Smallest, Vertically**

Adjusts the height of the currently selected components to the smallest selected component.

 **Grow to Largest, Vertically**

Adjusts the height of the currently selected components to the largest selected component.

▼ Order Menu

 **Bring to Front** (Shift+PgUp)

Moves the currently selected components to the front in the *Z-order* on top of all other components. The *Z-order* is designed to order overlapping components within a window. The most recently added component or the one on which the *Bring to Front* command was last applied is to be ordered last in the *Z-order* and therefore not overlapped by other components.

 **Bring Forward** (Ctrl+PgUp)

Moves the currently selected component forward by one level in the *Z-order*.

**Send to Back** (Shift+PgDn)

Moves the currently selected components to the back in the *Z-order* beneath all other components.

**Send Backward** (Ctrl+PgDn)

Moves the currently selected component backward by one level in the *Z-order*.

**Align Position to Grid**

Aligns the currently selected component's top left corner to the grid.

**Align Size to Grid**

Aligns the currently selected component's bottom right corner to the grid according to the grid spacing.

**Scale**

Opens the dialog box for relative change of the position and size of the selected components – [Scale](#). This command, for example, allows you to resize the currently selected components in a given ratio.

**Rotation Mode** (Ctrl+R)

Switches the currently selected component to the rotation mode. The rotation mode can be deactivated by unselecting the component.

**Create Window Template**

Brings up the [Create New Window Template Wizard](#).

**Replace Object Properties**

Brings up the [Replace Object Properties Wizard](#).

**Lock** (Ctrl+L)

Locks the active window to prevent the position and size of the components from being changed. The highlight style of the selected components in a locked window is different in color from the one of an unlocked window. To unlock the window, repeat the previous command.

**Component Properties** (Alt+Enter)

Opens the dialog box for editing properties of the currently selected component (see [Components](#)).

3.2.1 Scale

Relative change of position and size

X-coordinate, Y-coordinate

Allows for setting position ratios of a component (components).

Width, Height

Allows for setting size ratios of a component (components).

Rotate horizontally by 180°, Rotate vertically by 180°

This option is only used to change the orientation of a [Line](#) component (for other components, it is not active).

3.3 View Menu

The *View* menu allows for showing and hiding the tool windows of the development environment.



Component Manager (F11)

Shows or hides the [Component Manager](#) window.



Window Manager (F12)

Shows or hides the [Window Manager](#) window.



Layer Manager

Shows or hides the [Layer Manager](#) window.



Information Window

Shows or hides the [Information](#) window.



Visual Linking

Shows or hides the [Visual Linking](#) window.

3.4 Managers Menu

The *Managers* menu contains commands for showing the [managers](#) of visualization projects' objects.



Data Structure Manager

Brings up the [Data Structure Manager](#).



Device Manager

Brings up the [Device Manager](#).



Communication Driver Manager

Brings up the [Communication Driver Manager](#).



Recipe Manager

Brings up the [Recipe Manager](#).



Data Table Manager

Brings up the [Data Table Manager](#).



Trend Manager

Brings up the [Trend Manager](#).



Real-Time Trend Manager

Brings up the [Real-Time Trend Manager](#).



Report Manager

Brings up the [Report Manager](#).



Custom Report Manager

Brings up the [Custom Report Manager](#).

**String Manager**

Brings up the [String Manager](#).

**Picture Manager**

Brings up the [Picture Manager](#).

**State Manager**

Brings up the [State Manager](#).

**Action Manager**

Brings up the [Action Manager](#).

**Script Manager**

Brings up the [Script Manager](#).

**User administrator**

Brings up the [User Manager](#).

**Project Structure Manager**

Brings up the [Project Structure Manager](#).

3.5 Project Menu

The *Project* menu contains commands for working with the open visualization project.



Run (F9)

Starts the visualization project in the runtime software specified in the [Project Options](#) dialog box. When the runtime software is started, the development environment will be minimized to the taskbar. When the runtime software is exited, the development environment will be restored.

Create Shortcut

Brings up the [Create Shortcut to Project](#) dialog box.

Register As Service

Brings up the *Register Project As Windows Service* dialog box.



Perform Diagnostics

Brings up the [Project Diagnostics Wizard](#).

Perform Security Audit

Generates and opens a text file summarizing all **Reliance** project settings that affect security. The file also contains information about all server connections (remote IP addresses, open TCP port numbers) on the computers defined within the project.



Export for Remote Users

Brings up the [Export Project for Remote Users Wizard](#).



Re-export for Remote Users

Brings up the [Export Project for Remote Users Wizard](#) and goes to the final step before starting the export. The export is based on the settings used during the last export. If no export has been performed so far, the default settings are used.

**Encrypt**

Encrypts the project files. All project files will be encrypted except the main file. To encrypt the project, a password must be entered and then confirmed. In the runtime software, there is no difference between an encrypted and unencrypted project. However, the development environment requires a password to open the project.

Decrypt

Decrypts the project.

Information

Brings up the *Project Information* dialog box. Among other things, this dialog box contains information on the number of tags and [data points](#).

**Options**

Brings up the [Project Options](#) dialog box.

3.6 Tools Menu

The *Tools* menu contains commands for setting up the development environment (see [Environment Options](#)). These commands are accessible even if no project is open.

Configure Toolbars

Brings up the [Configure Toolbars](#) dialog box.

Configure Component Palette

Brings up the [Configure Component Palette](#) dialog box.



Environment Options

Brings up the [Environment Options](#) dialog box.

Server Web Page

Shows the main page of the built-in Web server in the default Web browser (a data server, i.e., Reliance Server or Reliance Control Server, must be running).

Open Log File Folder

Opens the [Logs](#) directory, in which log files are stored.

3.7 Window Menu

The *Window* menu contains commands for working with visualization windows.

Next (F6)

Activates the next window. It brings the next *open* window to the foreground (the windows are ordered in the order they were added to the project). A window is **open** if it is loaded into memory.

Previous (Shift+F6)

Activates the previous window. It brings the previous *open* window to the foreground.



Open Window List (Alt+O)

Brings up the *Open Window List*. It allows you to select and activate any window on the list. A window is **open** if it is loaded into memory. A window can be shown and loaded into memory via the *Window Manager*. A window stays in memory even if it's hidden (e.g., using the standard *Close* command in the title bar or the standard `Alt+F4` keyboard shortcut).



Properties (Alt+Enter)

Brings up the [Window Properties](#) dialog box, which allows for setting up the selected window (window type, loading, appearance, size, access rights, etc.).

3.8 Help Menu

The *Help* menu mainly contains commands for accessing the help system, license registration, and the Internet resources.



Contents

Allows you to access the help system.

Show 'Welcome' Window

Brings up the [Welcome](#) window that contains commands used for the startup of the development environment.



Reliance on Internet

Allows you to access the **Reliance** website (www.reliance-scada.com).

Check for Updates

Allows you to check for new versions of the **Reliance** SCADA/HMI system.

▼ License Menu

Activate

Brings up the *Activate License Wizard*. Every software key requires activation for a computer fitted with the **Reliance** SCADA/HMI system. Detailed activation instructions are described in the separate document *License Activation*.

Register

Allows you to register a license. Upon registration, the user's personal information (name and company) is saved. This information can be found in the **About Reliance 4 Design** dialog box. The user is prompted to select an *.rlr registration file.

Information

Brings up the *License Key Records* dialog box. This dialog can also be accessed via the *License Key Utility* application, which, by default, is located in the [Utils](#) directory.

About Reliance 4 Design

Allows you to view information about *Reliance Design*. This dialog box provides information about the version, license (serial number, data points), registration, and operating system. By clicking on the serial number, you can find out how the license is verified or display information about the connected license key (*License Key Records*).

4 Tool Windows

The tool windows are floating, modeless windows designed for working with visualization windows and components. These windows can be displayed or hidden using commands in the *View* menu or particular toolbar buttons. All tool windows can be customized using the following commands available from the standard local menu:

Large Buttons

Makes the toolbar buttons appear as large.

Small Buttons

Makes the toolbar buttons appear as small.

Transparency

Allows for setting five levels of a tool window's transparency (0%, 20%, 40%, 60%, 80%). The 0% transparency means that the window is opaque. The set transparency only applies if the window is not active.

Stay on Top

Makes the tool window always appear on top of the other windows (except for the windows in the same mode).

The development environment's tool windows include:

[Component Manager](#)

[Window Manager](#)

[Layer Manager](#)

[Visual Linking](#)

[Information](#)

4.1 Component Manager

The **Component Manager** is a tool window that allows for a quick and multiple change of selected components' properties or visualization windows. It also allows you to manage the list of components in the active visualization window.

The **Properties** page contains a list of component properties (either a single component's properties or the intersection of multiple components' properties). The properties can be sorted alphabetically or divided into groups. If a single component is selected, the properties of this component are displayed. If multiple components are selected, the page only displays the properties common to all the selected components (except the component name). A visualization window and components can only be selected and edited separately (not simultaneously). The properties can be edited in the second column of a particular row – you can activate or deactivate them, enter a value or text, or select an item in the combo box or in the special dialog box that can be displayed when clicking on the ellipsis button (three periods). To set colors, it is possible to use either the combo box with predefined colors or the [Select Color](#) dialog box, which can be displayed by double-clicking in the particular row.

On the **Components** page, there is a list of components contained in the active window. They can be sorted by various criteria (*Name, Type, Order, Group, and Layer*). Components can be selected by clicking the check box. This action also selects the component in the visualization window. This also works the other way around. So, if you select a component in the visualization window, it is also checked in the check box on the Components page. Selecting components using the *Component Manager* is especially useful when a component is hidden by another overlying component and it's therefore impossible to select it with the mouse.



Groups

Determines whether to arrange the properties into groups.



Expand Groups

Expands the properties (including the groups).



Collapse Groups

Collapses the properties (including the groups).



Localized Property Names

Determines whether to display the localized property names (aliases) or the real English programmatic names.

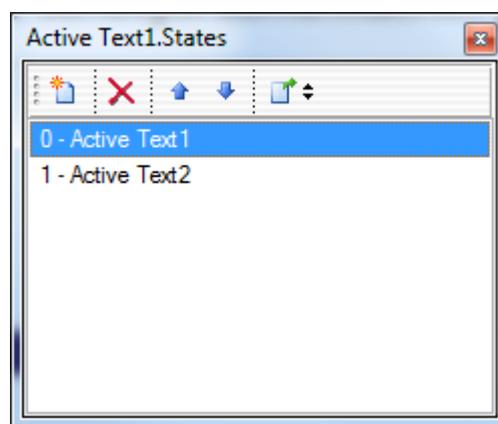


Help for Selected Property

Shows or hides the bottom help panel describing the selected property.

Collection Editor

Some components contain a special property called a **collection**; it is a list of items of the same type. Each item has its own properties. To view or edit these items, use the so-called *Collection Editor*. An example of a collection is a list of text states (the *States* property) of the *Active Text* component.



Active Text component – States

The *Collection Editor* allows you to add, delete, and select the items and change their order. If you select one or more items, the *Component Manager* will enable you to view and edit their properties. When you close the *Collection Editor*, the properties of the selected component will be displayed again in the *Component Manager*.

4.2 Window Manager

The **Window Manager** is a tool window that displays a list of all visualization windows. It is designed for managing the windows, i.e., it allows you to open/close the windows, add new windows or remove the windows from a project. The Window Manager is also used to switch between visualization windows, i.e., activate them.

The visualization windows on the list can be arranged in folders. The state of a visualization window, whether it is open, i.e., loaded into memory or closed, is indicated by the font style of the window's name (open – bold font, closed – regular font). Normal and dialog windows that are not loaded dynamically are indicated in blue (see the [Basic](#) page). The items on the list can be sorted by the *Title* and *Name* columns. The item's icon indicates the window's type (*normal*, *dialog*, *tray*, *template*).

The status bar displays the *ID* (identification number) and *name* of the window currently selected in the Window Manager. The *ID* corresponds to the order in which windows are added to the project.



New Folder (Alt+Ins)

Adds a new folder. Folders make managing multiple windows easier. From the perspective of hierarchy, folders can only be added on one level.



New Window (Ins)

Brings up the [Create New Window Wizard](#). When the wizard is finished, a new visualization window is added to the list.



New Window Template

Brings up the [Create New Window Template Wizard](#). When the wizard is finished, a new window template is added to the list. Window templates are intended to easily reuse graphic elements in visualization windows.



Open (Enter)

Opens the selected window.



Delete (Del)

Releases the selected window from memory and removes it from the hard disk. The user is prompted to confirm the action.

In addition to the commands contained in the toolbar, the *popup menu* of the window list also includes the following commands:

**Rename** (F2)

Allows you to rename the selected window. This can also be done by clicking on the already selected name of the window. You can only rename open windows.

**Duplicate** (Ctrl+D)

Displays the [Duplicate Window](#) dialog box, which allows you to make a copy of the currently selected window.

**Close**

Closes the currently selected windows. The windows are released from memory when closed. The user is prompted to save any changes that have been made to the windows.

**Close All Windows**

Closes all open windows.

**Find Object** (Ctrl+F)

Brings up the [Find Object](#) dialog box, which allows you to find a window by any part of its name.

Find Object Usages (Alt+F)

Brings up the [Find Object Usages Wizard](#), which will find the objects that reference the selected window.

**Perform Diagnostics**

Brings up the [Project Diagnostics Wizard](#), which will check the selected windows for errors.

Replace Object Properties

Brings up the *Replace Object Properties Wizard*.

Export

Exports the selected window. Due to subsequent import, the object IDs in the exported file (XML format) are replaced with names.

Import

Imports a window from an XML file. When the import is finished, the window is added to the project. During the import, the links to objects are resolved by name.

Import Content

Imports components from an XML file into the selected (existing) window. The original content of the window is removed. During the import, the links to objects are resolved by name. The command is intended for transferring components between windows from different projects.



Properties (Ctrl+Enter)

Brings up the [Window Properties](#) dialog box, which allows for setting up the selected window (window type, loading, appearance, size, access rights, etc.).

4.3 Layer Manager

The **Layer Manager** is a tool window that contains a list of the so-called *layers* of the active visualization window. The system of layers gives a 'third dimension' to visualization windows. Each window has 16 layers in which components can be arbitrarily located. Each component can only be located on one layer. The *Layer Manager* allows for locking and making layers (hence the relevant components) visible or hidden. A name can be assigned to each layer.



Visible

Changes the visibility status. If the *Visible* button is not pressed, all the components located on the layer are hidden. This makes working with components on other (displayed) layers easier. The layer visibility can also be set by clicking the check box next to the item's (layer's) name or by double-clicking the item itself.



Locked

Locks/unlocks the selected layer. If the *Locked* button is pressed, all the components located on the layer are locked. Once the components are locked, you cannot move them.



Rename

Allows you to rename the selected layer. This can also be done by clicking on the already selected name of the layer.

Warning: A new component (added to a window from the Component Palette) is automatically added to the layer selected in the *Layer Manager*. If you want to move a component to another layer, use the *Move to Layer* command in the popup menu of the selected component.

4.4 Visual Linking

The **Visual Linking** is a tool window that allows you to quickly link component properties to tags (the so-called linking). In the toolbar, you can select which component properties should be controlled by tags after they are linked. It is possible to perform linking for the following properties:



Main

The main tag of a component, the *Functions* page (e.g., tag displayed in a *Display* component).



Enable

Dynamically enables or disables a component, the *Dynamic* page.



Visible

Dynamically controls the visibility of a component, the *Dynamic* page.



Position X

Dynamically controls the horizontal position of a component, the *Dynamic* page.



Position Y

Dynamically controls the vertical position of a component, the *Dynamic* page.



Width

Dynamically controls the width of a component, the *Dynamic* page.



Height

Dynamically controls the height of a component, the *Dynamic* page.



Rotation angle

Dynamically controls the rotation angle of a component, the *Dynamic* page.

To perform the linking, use the mouse to drag a tag from the *Visual Linking* window to a component located in the visualization window. If multiple components are selected, all the selected components will be linked (this operation requires confirmation from the user). Confirmation is also required if the tag is dragged to other than the selected component. An orange blinking frame surrounding the component indicates the linking operation has been successful.

4.5 Information

The **Information** window is a tool window that acts as a status bar – it displays various information depending on the situation. When opening a visualization project, it displays the current status of the operation. If the project is open, the current cursor position in the visualization window is displayed in the left part of the **Information** window. If the mouse cursor is placed over a component, the middle part of the window displays the component's basic properties and their values: name, layer, order, position, size, angle, and names of objects related to clicking the component (script, action, window to be activated). When changing the position of a component with the mouse (change of position, size, rotation angle), relative change (the difference between the current and original value) is displayed.

To switch between the project languages, use the toolbar containing a dropdown button located on the right side of the window. This operation can be performed by using commands in the combo box or by repeatedly clicking on the command button (cyclic switching between all languages). When changing the active project language, all text strings in the visualization project are switched to the particular language.

To the right of the language button, there are buttons that allow you to quickly switch between the visualization windows loaded into memory. Each window loaded into memory corresponds to one button. If you click a button, the corresponding window is activated.

5 Setting Up the Development Environment

The **Reliance Design** development environment can be in many ways adjusted to the needs of users. It allows for placing and setting up the tool windows, arranging commands in the toolbars, or configuring the Component Palette. The *Environment Options* dialog box enables you to set up keyboard shortcuts, adjust the editor in the *Script Manager*, define paths, etc.

To configure the settings, use the dialog boxes that can be accessed via the *Tools* menu. Some settings are global, i.e., visualization project-independent. Therefore, they can be configured even if no project is open. The global settings are stored in the `R_Design.dsk` file, which is located in the **Reliance** program files directory. Some settings of the development environment are project-specific. These settings are stored in the `dsk` file, which is located in the main project directory.

[Configure Toolbars](#)

[Configure Component Palette](#)

[Environment Options](#)

5.1 Configure Toolbars

The **Configure Toolbars** dialog box allows you to arrange commands in the toolbars and change the toolbars' positions (including the Component Palette) in the main window. The main window of the development environment contains 5 toolbars. Any available commands can be added to each toolbar. To add a command, drag and drop the command onto a toolbar. Using the mouse, each toolbar can be moved (removed) from the main window to another place on the screen.

Toolbars

On the *Toolbars* page, there is a list of toolbars contained in the main window of the development environment. This list allows you to disable or enable the display of individual toolbars. Each toolbar's settings can be reset by clicking the *Restore Defaults* command. The *Themes* combo box enables you to choose the appearance of the toolbars.

Note: In addition to the main window, the selected theme applies to the toolbars in all other windows in the development environment.

Component Palette

This toolbar contains components – graphical objects, which are intended to be added by the user (systems integrator) to visualization windows at design-time. The components are divided into several pages. Each page of the Component Palette can be configured by using the [Configure Component Palette](#) dialog box.

Managers

This toolbar contains commands for opening managers (e.g., *Project Structure Manager*, *Picture Manager*, or *Device Manager*).

Standard

This toolbar contains commands for working with a visualization project, i.e., commands for creating, opening, saving, and closing the project. It also contains the command for exiting the *Reliance Design* development environment.

Edit

This toolbar includes commands for working with components selected in the active visualization window. They are commands contained in the *Edit* menu, which are, for example, intended for basic editing operations, aligning components, or changing the Z-order of components.

Project

This toolbar includes commands contained in the *View* menu, i.e., commands for showing and hiding the tool windows of the development environment – *Component Manager*, *Window Manager*, *Layer Manager*, *Visual Linking*, and *Information*. There are also some of the commands contained in the *Project* menu, i.e., commands for bringing up the *Project Options* dialog box, *Export Project for Remote Users Wizard*, *Back Up Project Wizard*, or the command for starting the visualization project in the runtime software.

Commands

On the *Commands* page, there is a list of all commands that can be added to a toolbar. The commands are divided into groups according to their function. To add a command, drag and drop the command onto a toolbar. To remove the command from the toolbar, drag it back to the command list.

Options

Show tooltips

Determines whether to show the name of the command after resting the mouse cursor on a toolbar button.

Show keyboard shortcuts on tooltips

Determines whether to show keyboard shortcuts on tooltips.

5.2 Configure Component Palette

The **Configure Component Palette** dialog box enables you to manage the list of pages in the Component Palette. It also allows for managing components in individual pages, i.e., moving components between the pages or adjusting their visibility (the *Show* command).

List of pages – commands

**Add** (Ins)

Adds a new page to the Component Palette.

**Rename** (F2)

Allows you to rename the selected page.

**Delete** (Del)

Allows you to remove the selected page from the Component Palette. The page can only be removed if it contains no components.

**Move Up** (Ctrl+Up)

Moves the selected page up by one position.

**Move Down** (Ctrl+Down)

Moves the selected page down by one position.

List of components in the selected page – commands

**Add** (Ins)

Brings up the dialog box for selecting a component file to be added (a file with a .dll extension). `Components` is the default directory for selecting component files.

**Show** (Space)

Shows or hides the icon of the selected component. The visibility status of the component is indicated in the *Show* column.

 **Delete** (Del)

Allows you to remove the selected component from the Component Palette. Consequently, visualization windows containing the unavailable type of component will not open.

 **Move Up** (Ctrl+Up)

Moves the selected component up by one position.

 **Move Down** (Ctrl+Down)

Moves the selected component down by one position.

Note: The page list also contains a fixed item called *All*. This item allows for displaying all component types you can work with in the development environment.

5.3 Environment Options

The **Environment Options** dialog box is designed for setting up the *Reliance Design* development environment in detail. The options are divided into several groups. Each group corresponds to an item in the tree view located on the left side of the dialog box.

General

Paths

Keyboard Shortcuts

Managers

String Manager

Picture Manager

Script Manager

Script Debugging

Visualization Windows

Window Layout

File Types

Windows Services

Connection

License

Update

Error Reporting

Confirmation

5.3.1 General

Show version number in title bar

Allows you to display/hide the version number in the title bar of the runtime software's main window (this option only applies to Pre-release versions).

5.3.2 Paths

The **Paths** group allows you to preset some of the frequently used locations of files and directories within the system. Choose the *Restore Defaults* command to restore the default settings of the paths.

Project directory

A default directory for creating or opening visualization projects. You can choose a path using the [Select Directory](#) dialog box.

Project backup directory

A default directory for storing project backups (see the [Back Up Project Wizard](#) for details).

Picture Library directory

A directory containing the picture library. When you import pictures into a visualization project through the [Picture Manager](#), this directory will be preset in the *Select File* dialog box.

Note: A separate installation program is used to install the picture library.

Log file directory

A directory for storing **Reliance** log files. They are files that contain detailed information on the computer, operating system, and the operation of individual **Reliance** modules. To configure the logging options, use the [Project Options](#) dialog (*Runtime > Logging*).

Store running project's log files in project directory

If this option is active, the log files of the runtime software and communication drivers will be stored in the running project's `History\Logs` directory.

5.3.3 Keyboard Shortcuts

The **Keyboard Shortcuts** group allows you to assign or customize keyboard shortcuts for selected commands. The command list is divided into several topic groups (the *All* group contains all the commands available in the main menu). To change the shortcut for the selected command, press the required key combination in the *Shortcut* field and then confirm by pressing the *Assign Shortcut* button. If the key combination has already been used for another command, a notification appears in the *Shortcut has already been assigned to* field.

Use the `Backspace` key to remove the shortcut. To reset the shortcuts to their default status, click the *Restore Defaults* command.

5.3.4 Managers

The **Managers** group contains settings for all the object managers available in the *Managers* menu.

Enter edit mode for name of new object

Determines whether to enter the edit mode for the name of a newly created object (same as when pressing the `F2` key), i.e., it allows you to enter a new name for the object immediately after creating it.

5.3.5 String Manager

Colors

Is used to set up colors for the text editor to differentiate types of text strings. Here, you can customize the foreground and background color for each string type (e.g., translated, verified, comment). The currently selected setting is shown in the preview area displaying sample text strings. For a quick setup, choose from several predefined color patterns.

Translator

Specifies the access to *Google Translate*, which is used by the *String Manager* to automatically translate text strings.

Google API key

Is a key used for accessing *Google Translate*.

5.3.6 Picture Manager

Editors

Associated external picture editors

Contains a list of external picture editors allowing you to edit individual types (formats) of pictures. An external picture editor can be activated using the *Edit Picture* command available in the [Picture Manager](#). After editing a picture using the editor, the changed picture is automatically updated in the *Picture Manager* (the picture is updated when the editor is closed). Choose the *Restore Defaults* command to restore the default settings of the external picture editor startup parameters.

Editor

Specifies the path where the executable file of the external picture editor is located.

Parameters

Specifies the command line parameters passed to the external editor at its startup. The `$(name)` parameter is used to pass the file name of the edited picture to the editor.

Working directory

A working directory of the external picture editor.

Thumbnails

Is used to configure settings for picture thumbnails displayed in the [Picture Manager](#). This applies to the *Thumbnails* display style. Here, you can specify a picture's *Thumbnail height* and *Thumbnail width*. In addition, the picture size and file size can also be displayed (*Display file size*, *Display picture size*).

5.3.7 Script Manager

General

Set cursor to beginning of new script

Determines whether to set the cursor to the beginning of a newly created script's source code displayed in the *Script Manager*.

Constrain cursor to text

Allows you to constrain the cursor to the script's text only. If this option is inactive, the cursor can be positioned anywhere within the script's window.

Insert header to new script

Determines whether to insert a header to the beginning of a newly created script's source code. The header contains the following information: project name, user name logged on to Windows, date and time of script creation. After the header, a line containing the `Option Explicit` command is automatically inserted. This command forces you to explicitly declare the script's tags. Therefore, `Option Explicit` is used to avoid typing errors, which often occur in scripts where automatic declaration is used (scripts without the `Option Explicit` command).

Display

Margins

The *Visible right margin* check box specifies whether to display a vertical line in the editor. This line can help you align a script's code. The distance between this line and the editor's left margin is determined by the *Position* combo box (80, 100, or 120 characters). The *Visible gutter* check box specifies whether to display a vertical gutter on the left side of the editor. Information displayed in the vertical gutter may vary depending on the settings (e.g., line numbers or tabs for easy navigation). The width of the gutter is determined by the *Width* combo box (30, 40, or 50 pixels). The *Visible line numbers* check box specifies whether to display line numbers in the vertical gutter. The width of the gutter can be changed only if line numbers are not displayed.

Font

Allows you to select a font style displayed in the script editor.

Size

Allows you to select a font size displayed in the script editor.

The selected font style and size can be viewed in the *Preview* pane.

Automatic Functions

Allows you to configure automatic functions used during editing a script's code.

Automatic functions

Code completion

Determines whether the script editor automatically displays the list of a predefined object's methods (a method is a procedure or a function of an object) after entering the object's name followed by a period. For example, when entering "R`Sys`.", the list of the `RSys` object's methods is displayed. The list can also be invoked using the `Ctrl+Space` shortcut if the cursor is positioned right after the object's name's period. The setting allows for changing the delay before the list will be displayed.

Function parameters

Determines whether the script editor automatically displays the list of a predefined method's parameters after entering the method's name followed by a left parenthesis. For example, when entering "R`Tag`.SetTagValue(", the list of the `RTag.SetTagValue` method's parameters is displayed. The list can also be invoked using the `Ctrl+Shift+Space` shortcut if the cursor is positioned right after the method's name's left parenthesis. The setting allows for changing the delay before the list will be displayed.

Reliance-defined objects

Automatically supply function and procedure parameters

Determines whether the script editor automatically displays a dialog box for selecting a **Reliance** project-defined object after entering a predefined object's method's name. For example, when entering the `RTag.SetTagValue` procedure name, the `Select Tag` dialog box is displayed. When confirmed, the selected tag will be entered as the procedure's parameter. If this option is not active, the procedure name will be entered without parameters.

Show hint for functions and procedures

Determines whether to show a help hint for the functions and procedures.

Colors

Is used to set up colors for the script editor to highlight code's syntax. Here, you can customize the *Foreground* and *Background color* and a *Font style* for each *element* of the code (e.g., keyword, identifier, operator, or comment). The currently selected setting is shown in the preview area displaying a sample script's code. The *Speed setting* property allows choosing from several predefined color patterns.

Surround With

Allows you to define user templates that can be applied to the already created statement block. After selecting the statement block and choosing the required template from the [Script Manager](#)'s popup menu (Source Block Tools), the chosen template is added before (*Head*) and after (*Tail*) the selected block.

List

Contains the list of created templates. The commands on the right side of the list allow you to handle the list. The controls below the list allow you to configure each item of the list.

Item

Caption

Defines the name of a template. The "-" (minus) character allows you to horizontally divide the popup menu.

Shortcut

Allows you to define a keyboard shortcut for invoking the selected command.

Block

Line Block Mode

Allows you to enter blocks of code on separate lines.

Indent Count

Defines the number of indents after a block of code is entered.

Head

Defines text to be entered before the selected block.

Tail

Defines text to be entered after the selected block.

Note: The "|" character allows you to position the cursor.

If the *Line Block Mode* option is active, you can also set up the following parameters for blocks of code to be entered:

Auto Indent

Allows the entered block of code to be automatically indented.

Relative Indent

Defines relative indent of the entered block of code.

Web Search

Allows you to configure the list of websites where the selected text is to be searched. For example, after selecting a keyword, a Web page, using the popup menu, can be quickly opened displaying the search results.

List

Contains the list of places where you can search for the selected text. The commands on the right side of the list allow you to handle the list. The controls below the list allow you to configure each item of the list.

Items

Caption

Defines the name of a template. The "-" (minus) character allows you to horizontally divide the popup menu.

Shortcut

Allows you to define a keyboard shortcut for invoking the selected command.

Search URL

Defines the address of the search engine that will be opened in the default browser. The selected text is used instead of the "%s" wildcard expression when a Web page is being opened.

5.3.8 Script Debugging

Enable script debugging with external tool (Just-In-Time debugger)

Enables [script debugging](#) using an external debugger.

5.3.9 Visualization Windows

Grid and bounds

Size X, Size Y

Specifies the grid size in pixels horizontally and vertically. The grid size is common to all windows. Later, for each window, you can choose whether the grid should be displayed and activate snapping components to the grid.

Show guidelines for aligning components

Determines whether to display guidelines when changing the position and size of a component with the mouse. These lines indicate the selected component's edges as they meet the edges of other components.

Display grid in newly created windows

Determines whether to display the grid in newly created windows.

Display grid on top in newly created windows

Determines whether to display the grid on top of the components in newly created windows.

Snap to grid in newly created windows

Determines whether the components should be automatically snapped to the grid in newly created windows.

Display bounds in newly created windows

Determines whether to display auxiliary lines delimiting the bounds in newly created windows. Depending on the settings, the window bounds indicate either a visible or manually defined area of the window.

Color

Specifies the color of the grid.

Note: The settings regarding newly created windows can later be configured for each window.

Undo and redo

History step count

Specifies the number of edit operations that can be canceled, i.e., re-performed. The following operations are stored in the history: adding and deleting components, changing their position, size, and Z-order.

Undo after save changes

Determines whether the edit operation history should be kept after saving the window. If this option is active, the *Undo* and *Redo* commands will be available after saving the window.

Other

Show window name in title bar

Determines whether to display both the title and the name of the window in the title bar.

Indicate transparent background

Determines whether to indicate a transparent background of the window template using the checkerboard pattern of the specified color.

5.3.10 Window Layout

Restore Defaults

Allows you to restore the default position of windows (not visualization windows) at design-time.

Use main window monitor

Determines whether to restore windows on the monitor where the **Reliance Design** development environment's main window is located.

5.3.11 File Types

Associated file types

Reliance 4 visualization projects

Allows you to associate main project files (files with an `.rp4` extension) with the *Reliance Design* development environment. Upon association, the files with an `.rp4` extension are marked as *Reliance Project* and they are assigned a project icon. Any visualization project can then be opened in a standard way, e.g., using Windows Explorer.

Reliance data tables

Allows you to associate **Reliance** data table files (files with an `.rdt` extension) with the *RDT File Editor* - `<Program>\R_DTEditor.exe`.

FastReport report templates

Allows you to associate FastReport-type report template files (`.rrt`) with the *FastReport Designer* application - `<Program>\R_FRDesigner.exe`.

FastReport reports

Allows you to associate FastReport-type report files (`.rrp`) with the *FastReport Viewer* application - `<Program>\R_FRViewer.exe`.

5.3.12 Windows Services

Allows you to manage all Windows services that are part of the **Reliance** SCADA/HMI system.

The following table lists Windows services available after the installation of **Reliance**.

Name	Default state
Reliance License Service	The service is running.
Reliance OPC DA Server Wrapper	The service is not running.
Reliance OPC UA Server	The service is running.
Reliance 4 Driver Server	The service is not installed.
Reliance 4 Server	The service is not installed.

For each Windows service, you can find out its state, *Path to executable file*, and *Startup type*.

The controls below the list are used to manage the Windows services.

Register

Registers the selected service to Windows.

Unregister

Unregisters the selected service from Windows.

Start

Starts the selected service.

Stop

Stops the selected service.

5.3.13 Connection

Proxy server

Allows you to set up a proxy server. This option can be used if your computer is connected to the Internet via a proxy server. It is necessary to enter the proxy server's *Address* and *Port*. If the proxy server *requires authentication*, it is also necessary to enter a *User name* and *Password*. In the development environment, proxy servers are used, for example, to check for available updates.

5.3.14 License

License detection method

Direct access to license key

The **Reliance** SCADA/HMI system acquires license information directly from the license key.

License Service

The **Reliance** SCADA/HMI system gets license information via the *License Service* program. This program runs as a Windows service, i.e., it is independent of the logged-on user. Communication between the **Reliance** SCADA/HMI system and the License Service is provided via the TCP/IP protocol. If the License Service is used, no problems with hardware key detection occur when starting the **Reliance** SCADA/HMI system from a remote desktop.

Repeat license key detection at program startup

Determines whether to repeatedly detect the license key. This option can be used if you run the **Reliance** SCADA/HMI system after Windows startup.

License key detection timeout (s)

Specifies the duration of the time period during which the license key is detected.

Time period after Windows startup (s) for which this feature is active

Specifies the duration of the time period after Windows startup during which the *Repeat license key detection at program startup* feature is active.

5.3.15 Update

Automatically check for new versions of Reliance 4

Determines whether to check for new versions of the **Reliance** SCADA/HMI system on the Internet at the startup of the development environment. The user is notified of available updates with a dialog box. This box offers to display a Web page containing links for downloads of the latest versions of the **Reliance** SCADA/HMI system.

Also notify of new Pre-release versions

Determines whether to check for new *Pre-release* versions of the system at startup. Usually, a testing version of the **Reliance** SCADA/HMI system is released prior to releasing the official one. This unofficial version is used to test new functions and check its compatibility with the existing projects. It is not recommended to run a *Pre-release* version at the end-user site. If you come across a problem in either the official or a *Pre-release* version of **Reliance**, you can contact us by sending an email to support@reliance-scada.com.

5.3.16 Error Reporting

Send detailed information about user interface

Determines whether the information on unhandled events that will be sent to the GEOVAP company's server should contain detailed information on the user interface (e.g., graphical data).

5.3.17 Confirmation

Contains a list of **Reliance**'s confirmation messages. Choose the *Restore Defaults* command to restore the default settings of the confirmation messages.

Message

Text

Shows the text of the selected confirmation message.

Show

Allows showing/hiding the confirmation message.

Result

Specifies the result of the confirmation message.

The list of confirmation messages:

- *Reliance 4 Project files (files with an .rp4 extension) are not associated with this program. Do you want to associate them now?*
- *Demonstration examples for Reliance 4 are available. Do you wish to delete the existing contents of the 'Examples' folder and replace them with the examples?*
- *You have chosen the 'Cancel' command. Do you really want to cancel all unsaved changes?*
- *All unsaved changes will be lost. Do you really want to perform this operation?*
- *New objects of type '%s' have been defined. In order for these objects to be accessible and functional during runtime, you must connect them to computer(s). Do you wish to perform this operation?*
- *Do you want to assign tag '%s' to component '%s'?*

6 Visualization Project

A **Reliance Design** visualization project is a group of files stored in a directory structure (see [Project Files](#)). All objects, object links, and other properties are defined in these files.

[Create New Project Wizard](#)

[Project Conversion Wizard](#)

[Creating a Project Shortcut](#)

[Project Diagnostics Wizard](#)

[Back Up Project Wizard](#)

[Restore Project from Backup Wizard](#)

[Find Object Usages Wizard](#)

[Replace Object Properties Wizard](#)

[Scale Windows and Components Wizard](#)

[Export Project for Remote Users Wizard](#)

[Project Information](#)

[Visualization Window](#)

[Project Options](#)

6.1 Create New Project Wizard

After choosing the *File > New Project* command, the user is prompted to specify the project name and paths for the project's subdirectory. The name of both the subdirectory and the main file will be automatically generated based on the project name entered (illegal characters will be replaced).

The user is successively prompted to specify the project graphical resolution, whether or not to encrypt the project, and to add a possible comment. After completing the wizard, the project's directory structure and files are created. Whenever needed, encryption can be activated or deactivated using commands in the *Project* menu. The project name and comment can also be changed at any time using the [Project Options > Project](#) dialog. Finally, you can change the project graphical resolution whenever you want by using the [Project Options > Windows > Resolution](#) dialog.

If the *Create a new visualization window* option is checked, the [Create New Window Wizard](#) will be brought up immediately upon generating the project.

6.2 Project Conversion Wizard

The **Project Conversion Wizard** is brought up automatically if the main file of the **Reliance 3** visualization project (the file with a `.prj` extension) is selected when opening the project. The project can also be converted without running the development environment by using *Reliance 3 to 4 Project Converter* (`R_3to4.exe`), which is located in the install directory of **Reliance 4**. Then, the *File > Conversion Wizard* command should be used to perform the conversion.

Source Project

Allows you to choose the main file of the **Reliance 3** visualization project (the file with a `.prj` extension) to be converted to the **Reliance 4** format.

Target Directory

Allows you to choose a directory in which the **Reliance 4** visualization project is to be stored. In this directory, the main file of the Reliance 4 visualization project (the file with an `.rp4` extension) and the project's file and directory structure will be located. The project name will not change.

Reliance 3 to 4 Project Converter

After completing the conversion, all steps performed during the conversion are listed in the main window of the converter. Finally, a dialog box is displayed to inform the user that the conversion of the project has been successfully completed.

6.3 Creating a Project Shortcut

The *Project > Create Shortcut* command is used to open a dialog box that allows you to quickly and easily create a shortcut to the open visualization project.

In the shortcut's command line, the following parameters, separated by spaces, will be displayed: name and full path to runtime software (*R_Design.exe*, *R_Ctl.exe*, *R_CtlSrv.exe*, or *R_View.exe*), name and full path to the project's main file, and as for the runtime software, the logical computer's name should also be displayed.

The command line's format is:

```
<software> <path_to_project_main_file> [ <computer_name>]
```

Software

Determines **Reliance's** program to open the project.

Computer to run project on

Determines the logical computer (defined in the visualization project) for which the shortcut is created.

Shortcut name

Determines the name of the shortcut as it will be displayed in *Windows*.

Shortcut location

Determines the folder to place the shortcut in. By default, the shortcut is located on the *Windows* desktop.

Comment

Specifies a description of the shortcut appearing as a tooltip when the mouse pointer is placed over the shortcut icon.

6.4 Project Diagnostics Wizard

The *Project > Perform Diagnostics* command is used to bring up the *Project Diagnostics Wizard*. Project diagnostics is intended for detecting issues caused, for example, by entering incomplete property values, using invalid links, or deleting project files used.

Step 1: Diagnostics options

Allows you to choose which issues should be detected.

Invalid links

Checks the validity of the links to the project files. An issue is detected when, for example, there are links to an object that has been deleted.

Missing links

Checks whether there are links between objects where required. An issue is detected when, for example, a link to a component's main tag is not defined.

Invalid property values

Checks whether objects' property values are within defined limits. An issue is detected when, for example, a tag's high limit value is below its low limit.

Missing property values

Detects whether property values are defined within objects where required.

Invalid data types

Detects whether valid data types are assigned to links. An issue is detected when, for example, a tag data type with existing links to a component is additionally changed and the new type is invalid for the component. At runtime, a yellow frame surrounding the component indicates the issue.

Invalid links to files and directories

Checks whether links to files and directories are valid. An issue is detected when, for example, there are links to a file that has been deleted.

Unused objects

Checks whether all objects of the project are employed, i.e., whether they are displayed or there are links to them. An issue is reported when, for example, there is a tag that is not used in any part of the visualization project. Unused objects can only be checked in a complete project. Therefore, this option does not allow you to define *Project scopes* on the next page.

Unconnected objects

Detects objects that are not connected to any computer. An issue is reported when, for example, there is a script that is not connected to any computer within the visualization project.

Project security

Evaluates the level of the security of access to a data server.

Other

Detects other types of issues that are different from the above listed types. Usually, they are less serious errors with no effect on the project's functionality. It is mainly focused on detecting text display-related errors, such as errors in the localization of text strings.

Step 2: Project scopes

Contains a list of project scopes arranged in a tree view. To make the diagnostics faster or ignore some issues, you can select project scopes to be checked. If the *Unused objects* option has been chosen on the previous page, all project scopes are selected and this selection cannot be changed.

Step 3: Diagnostics Results

In case any issues have been found, the *Diagnostics Results* window is displayed. On the left side of the window, there is a list of project scopes arranged in a tree view, in which scopes with the detected issues are highlighted. The number shown in parentheses indicates the issue count. On the right side of the window, there is a list of the issues with their detailed descriptions. To solve an issue, invoke the corresponding manager or dialog box by pressing the *Enter* key or double-clicking on the line describing the issue.

6.5 Back Up Project Wizard

The *Project > Back Up* command is used to bring up the *Back Up Project Wizard*. The wizard allows you to back up the open visualization project as a file in the ZIP format.

Step 1: Selecting target directory

Determines the directory where the project's backup file (the file with a .zip extension) will be stored. The default directory can be changed using the *Environment Options* dialog (Environment > [Paths](#)).

Step 2: Selecting project parts

Allows you to select [project parts](#) to be backed up. The dialog box contains a list of the visualization project's directories, in which the user can select directories to back up. By default, the [ThinClients](#) and [History](#) directories are not backed up.

Step 3: Choosing backup file name

Prefix

Specifies the fixed part of the file name. By default, it corresponds to the project name.

Time stamp

Specifies information contained in the time stamp. The time specification can be omitted depending on the backup frequency. If the file name already exists, the user is prompted whether to rewrite the existing file with the backup file.

Step 4: Summary

Here, you can check the specified information. If any information is incorrect, choose the Back button.

The wizard enables you to:

Send Backup File via E-mail

Is used to run the default email program, compose a new mail message, and attach the project backup file.

Open Project Backup Directory

Is used to bring up the Windows Explorer and open the project backup file.

6.6 Restore Project from Backup Wizard

The *File > Restore Project from Backup* command is used to bring up the *Restore Project from Backup Wizard*. The wizard allows you to create or restore the visualization project from the backup file that was created using the [Backup Project Wizard](#).

Step 1: Selecting backup file

Determines the path and name of the backup file.

Step 2: Project location

Determines the directory where the visualization project should be restored. By default, the restored project will be located in the directory for projects.

Place project files in another directory

Allows you to select another directory where the restored project is to be placed.

Step 3: Project restoration method

Complete restoration

Prior to restoring the project, all files of the current project will be deleted.

Restoration of backed up directories

Prior to restoring the project, all files of the backed up directories will be deleted. Files that were not stored in the backup file will be removed.

Restoration of backed up files

Only files stored in the backup file will be restored, the other files will remain unchanged.

Restoration at end user

Only files stored in the backup file will be restored except for the files defining users, trends, and reports.

6.7 Find Object Usages Wizard

The *Find Object Usages Wizard* can be accessed from managers' popup menus. The wizard is used to find links to selected objects in specified parts of the project.

Step 1: Project scopes

Allows you to choose project scopes to be scanned to find usages of the selected objects.

Step 2: Object Usage Search Results

Is used to display the search results. The left pane displays the project scopes in a tree view. The found object usages are highlighted. The number shown in parentheses indicates the object usage count. The right pane displays the list of usages. To open the corresponding manager or dialog box with the object's properties, press the *Enter* key or double-click on the list's item.

6.8 Replace Object Properties Wizard

The *Replace Object Properties Wizard* can be accessed from managers' or visualization windows' popup menus. The wizard allows you to textually replace the properties of the currently selected objects (e.g., windows or components). A text property can be a link to another object (e.g., a component's link to a tag), localizable text, or standard text. The replacement is always performed over the selected objects.

Step 1: Text replacement

Is used to specify the conditions of the replacement, i.e., enter the text to be replaced and the new text. Further, the *Case sensitive* option allows for distinguishing lowercase and uppercase letters when searching for the text. The *Show performed replacement count* option determines whether to display information on the number of performed replacements once the wizard is finished. If this option is inactive, the wizard closes automatically after the replacement is performed.

Step 2: Confirm text replacement

Listed here are properties of the selected objects to be replaced. For each property on the list, there is its full path, name, and altered text. If the property doesn't make sense after the text replacement (e.g., tag doesn't exist), the property's text is highlighted red. The check boxes on the list allow you to decide which properties' text should be replaced. The *Open in Standalone Window* button is used to display the list of properties in a separate window. This window can be maximized, which makes working with multiple properties more comfortable.

Step 3: Operation successfully completed

Upon completion, a summary showing the count of replacements performed is displayed. After closing the wizard, flags are displayed to mark all changed objects.

6.9 Scale Windows and Components Wizard

The *Scale Windows and Components Wizard* is accessible from the popup menu in visualization windows and the *Window Manager*. It allows you to proportionally change the position and size of windows and components. Scaling can also be applied to other component properties with the nature of size, fonts, etc.

Step 1: Scale factor

This is the basic scaling property. It is the ratio in which the size will be changed. A scale factor can be entered either as *Percentage* or as *Resolutions* (current and target). The latter option is suitable if you need to scale a visualization window to a screen with a different resolution.

Step 2: Advanced

Options

Scale component properties that have nature of size

Determines whether to apply scaling also to other component properties of such a type (e.g., a Display component's frame width or units zone size).

Scale fonts

Determines whether to also scale components' fonts.

Change picture layout to "Resize graphic"

Determines whether to change the layout setting from *Resize component* to *Resize graphic* for components displaying a picture (e.g., Picture, Animation).

Scale chart properties

Determines whether to also scale chart properties with the nature of size. This option applies to components displaying a chart (e.g., Real-Time Trend, Real-Time Chart).

Show result

Determines whether the wizard should show the result of the scaling operation immediately after its completion.

6.10 Export Project for Remote Users Wizard

The *Project > Export for Remote Users* command is used to bring up the *Export Project for Remote Users Wizard*. Remote users are users of **Reliance's thin clients** (*Reliance Web Client* and *Reliance Smart Client*). To export a project means to convert it into the format convenient for the thin clients. It is a format optimized in terms of file size and saving the transfer data capacity.

Note: For remote users, the project should be exported from the *Enterprise* version of the *Reliance Design* development environment; the *Desktop* version allows you to export the project for testing purposes only.

If thin clients are required to access the visualization project over the Internet/intranet, it is necessary to export the project prior to running it in the runtime software only if the project was modified. In case the project is to be exported more often, the *Project > Re-export for Remote Users* command can be used. This command exports the project including the previous export's wizard's settings. If no export for remote users has been performed so far, the default setting is applied.

The export results are stored in the `ThinClients` directory, which is one of the project directory structure's subdirectories. The `ThinClients` directory is also a root directory of the Web server built in the *data servers* (the *Reliance Server* and *Reliance Control Server* runtime software).

A detailed manual for the thin clients and data servers is available as separate user guides.

Step 1: Used thin clients and file location

Specifies types of thin clients that are to access the visualization project. The relevant files will be generated depending on the types of thin clients you intend to use. By default, the thin clients' files will be located in the `ThinClients` directory.

Step 2: Client configurations

Allows for creating the so-called *configurations*. Each configuration is based on properties and parameters of a project-defined computer. Thin clients can be started in each of the configurations. Thin clients will be able to access all objects (devices, tags, reports, trends, etc.) connected to the computer.

Determine data server address based on Web page

Determines whether the data server address written into the file used to run the Web client (JNLP) should be taken over from the Web page address from which this file is downloaded.

Publish configurations

Specifies whether to publish links to individual configurations on a Web page displaying the list of configurations. If only a selected configuration is available to the user of the thin clients, it is recommended to deactivate this option. If this option is not active, the Web page will be blank, i.e., no configurations will be displayed and the file names, as well as the Web links, will be encrypted.

Configuration

Data server

Specifies the Internet address or the name of the computer on which the data server is running. If multiple addresses (e.g., a local or public address) are available to access the data server, you can enter all these addresses and separate them by a semicolon. Each address can be entered including the port number (following a colon), which will overload the port number entered in the [Project Options](#) dialog box (e.g., 10. 0. 0. 146; www.firma.cz:81). The Web client only uses this parameter when it is run through *Java Web Start*. If the Web client runs as *Java Applet*, the address of the Web server from which the Web client (applet) is started will be used to connect to the data server. A separate user guide for Reliance Web Client offers you to see and understand the differences between the two ways of running the Web client – as Java Applet and through Java Web Start. The *Use computer address* option determines whether to take over the address of the data server from the project-defined computer's parameters.

Transfer System device's data and alarms/events

Determines whether to transfer data from the *System* device to the thin clients. The *System* device belongs to the data server to which the thin clients are connected. Thanks to this function, the restriction according to which the thin clients do not allow to execute scripts can be partly avoided: scripts can be run on a server, the resulting values can be stored in the *System* device on a server and provided to the connected thin clients.

Transfer internal alarms/events

Determines whether to transfer internal alarms/events to the thin clients from the data server to which they are connected.

Publish

Determines whether to display the selected configuration on the list of configurations. This option is useful in cases when only some configurations are to be displayed on the list.

Access code

Require access code

For each configuration, a list of the so-called *access codes* can be defined. Access codes are one of the security features of the thin clients. If this option is active, some of the entered access codes will be required by a thin client before displaying the visualization project.

Step 3: Project resolution

Is used to specify the graphical screen resolution for which the visualization project has been designed.

The Web client can be run on a screen with a different resolution. In such a case, before running the Web client, the user is prompted whether to preserve the size of graphical objects (windows and components) or to proportionally adjust the size of graphical objects to the screen resolution. The *Smart Client* module allows adjusting (increasing or decreasing) to the desired display size through the Web browser.

It is recommended that you activate the *Based on computer* option, which will take over the resolution from the computer (computers) corresponding to the configuration (configurations) in Step 2. The *Custom* option is only used for the purposes of backward compatibility with older projects. If you specify the resolution explicitly, it will be common to all configurations.

Step 4: Connection options

Data update interval

Interval (ms)

Specifies the time interval (ms) used by the thin clients for requesting new data (tags' real-time values, current alarms/events, etc.). Communication is optimized in terms of the data transferred. The data server only provides the thin clients with changes made since they last requested for new data.

Timeout (s)

Specifies the maximum time period between sending a request to and receiving a response from the data server by the thin client. If this time limit is exceeded, a "Can't connect" message is announced by the thin client.

Step 5: Security

A group of options allowing users of thin clients to perform selected actions. However, it is also necessary to configure access rights in the development environment (i.e., security settings used by the runtime software).

Enable sending commands to devices

Determines whether to allow users of thin clients to change tag values in the visualization project. This can be controlled by using a tag (the *Tag-controlled* option).

Enable forcing data to be updated

Determines whether to allow users of thin clients to force updating tag values using a command from some components' popup menu.

Enable acknowledging and notes related to alarms/events

Determines whether to allow users of thin clients to acknowledge alarms/events.

Enable concurrent user logon

Determines whether the data server should allow multiple thin clients logged on with the same user name to be connected concurrently. It does not matter what type of thin client it is.

Smart Client

Access rights

Specifies the access rights required for running the *Smart Client* module (displaying the client's Web pages).

Step 6: User inactivity options

Allows you to activate a thin client's automatic disconnection in case the *inactivity timeout* has been exceeded. User inactivity means the user has not worked with the client program for a specified time period. Upon disconnection, the license is available again on the server, which enables another user to be connected. This feature can prevent all licenses for thin clients from being engaged inappropriately.

Step 7: Web Client files

Allows you to automatically create a shortcut to the Web client when starting the software using Java Web Start. The shortcut can be placed on the Windows **desktop** or in the **Start** menu. Thus, the Web client can also be run using the created shortcut, i.e., without needing to open the data server's Web pages.

The **Use project and computer name for naming Web Client files** option specifies the way the files intended for running the Web client are named. If the option is active, the file will be named, for example, `Heating_PC1.jnlp`. Otherwise, it will be named `config_0.jnlp`.

Step 8: Checking for changes

This option determines whether, at project startup, to compare the checksum of the files of the running project and the project last exported for remote users. If the checksums differ, a warning will be displayed.

Step 9: Summary

Here, you can check the specified information before exporting the project for remote users. To start exporting the project, press the *Perform* button.

Step 10: Operation successfully completed

After completing the export, the data server (*Reliance Control Server*) can be run directly by pressing the *Run* button.

Show server Web page

Determines whether to concurrently show the data server's main page in the default Web browser.

Reliance Web Client

Determines whether to automatically start the Web client using Java Web Start. If more configurations are created in Step 2, the first configuration in order will be started.

Reliance Smart Client

Determines whether to automatically start *Smart Client* in the default Web browser. If more configurations are created in Step 2, the first configuration in order will be started.

6.11 Project Information

The *Project > Information* command is used to bring up the *Project Information* dialog box, which provides you with basic information on the visualization project.

Information

Contains information on the project name, path to the project's main file (the file with an .`rp4` extension), and comment. The project name and comment can be changed at any time using the [Project Options > Project](#) dialog.

Tags

Contains a list of computers defined in the project (in the *Project Structure Manager*). The list includes information on the number of tags used in the project and the number of [data points](#) required to start the visualization project in the runtime software running on an actual computer. This information is available to each computer defined in the project. The number of data points in the project requires a license with such a number of data points allowing you to run the project on individual computers.

There is also information on the total number of tags and data points used in the project. The total number of data points in the project requires a license with such a number of data points allowing you to work in the **Reliance Design** development environment.

6.12 Visualization Window

An ordinary visualization project always contains one or more visualization windows usually created shortly after a new project is generated. The first visualization window is automatically set as *Initial window*. If another window is required to be set as the default window, use the *Display* page of an object of type *Computer* in the *Project Structure Manager*.

A visualization window is intended to contain components from the Component Palette. Components are graphical objects that perform control and display functions when creating a visualization project. A window containing these components becomes a tool used by the end user to monitor and control industrial processes.

[Creating a New Window](#)

[Duplicating a Window](#)

[Designing a Window](#)

[Creating a Window Template](#)

[Embedding a Window Template](#)

[Window Properties](#)

6.12.1 Creating a New Window

When creating a new window, the *Create New Window Wizard* is brought up. The wizard prompts you to specify a *Name*, *Title*, and *Window type* for the new window. The wizard can be run by choosing the *File > New Window* command or using the *Window Manager*.

Name

Specifies the window's name that is unique within the project. It must not contain illegal characters. The window name can be used, for example, when working with the window in scripts; the window name is also displayed in controls containing a link to the window.

Title

Specifies any text to be displayed in the window's title bar (displaying the title bar is optional, see the *Basic* page in the [Window Properties](#) dialog box).

Window type

Specifies the window's type, which can be *Normal*, *Dialog*, or *Tray (Top, Bottom, Left, Right)*. Normal windows are usually displayed maximized, i.e., they fill the area of the runtime software's window. Also, they display the monitored industrial process. Dialog windows always display a title bar and have a fixed size. You can also move them. A dialog window can be displayed modally. In such a case, it is not added to the runtime software's window, i.e., it is stand-alone. As long as the dialog window is displayed modally, other visualization windows and commands of the runtime software are not accessible.

A *tray* has no title bar. It can be aligned with any edge of the runtime software's window (top, bottom, left, right). Its position and size cannot be changed. The *Size* property is used to specify the width of the tray as it will be displayed at runtime. The size can be changed on the *Position* page in the [Window Properties](#) dialog box. Most often, trays are used to create a panel containing buttons.

6.12.2 Duplicating a Window

To **duplicate a window** means to create its copy. The window can be duplicated either in the [Window Manager](#) by choosing the *Duplicate* command from the window list's popup menu or by pressing `Ctrl+D`, or using the *Duplicate Window* command from the window's popup menu. This command brings up the *Duplicate Window* dialog box.

Name

Specifies the newly created window's name.

Title

Specifies the newly created window's title.

Replace components' links to tags

Allows you to replace components' links to tags while duplicating the window. Components' links to tags will be replaced by links to same-named tags, but from another device. This feature simplifies and makes working on projects with multiple identical visualization windows significantly faster. Each of these visualization windows display industrial data from a different device.

Source device

Specifies the name of a device linked to components before the operation is performed.

Target device

Specifies the name of a device linked to components after the operation is performed.

Remove the original link if a tag with the same name does not exist in the target device

Specifies whether to remove the original link to a tag from the *source device* if a tag with the same name does not exist in the *target device*. In most cases, this option should be active. It is then very easy to find out which components' links were not replaced successfully.

6.12.3 Designing a Window

To create a new window, bring up the [Create New Window Wizard](#) by choosing the *File > New Window* command or the *New Window* command from the *Window Manager's* toolbar. Once created, the new window becomes active and is displayed blank on top of other open windows. Prior to designing the window, the *Snap to Grid* option should be activated from the window's popup menu (default settings for newly created windows can be configured using the [Environment Options](#) dialog (Environment > Visualization Windows)).

When designing a window, individual [components](#) (graphical objects) are added from the Component Palette to the window area. If a new window is to contain a large number of components, which, in addition, overlap one another, it is recommended that you use the layer system. Each window has 16 layers into which components can be placed. Using the [Layer Manager](#), a layer can be hidden (all components located on this layer will be hidden in the development environment) or locked (all components located on this layer will be locked to avoid changing their position and size) as required.

A component type can be chosen in the Component Palette by clicking the left mouse button. The selected component can be placed into a window with its default size (by clicking on the window area). The size can also be defined by dragging the component's corner within the window area (before releasing the mouse button).

To make adding multiple components of the same type easier, press the Shift key while selecting the component. This mode is not exited upon placing the component - the more times you click on the window area, the more components will be added to the visualization window. It is automatically terminated by clicking the arrow icon or by selecting another component on the palette.

The position or size of components (or component groups) can be changed not only by using the mouse and by specifying values directly in the *Component Manager* or in the component's property editor, but also by using [edit functions](#) – *centering, alignment, changing the Z-order, height and width modification, scaling, etc.*

To change the position or size of components (or components), the following keyboard shortcuts can be used:

- Arrows: grid movement (if the grid is enabled)
- Ctrl+arrows: shift by 1 pixel
- Ctrl+Shift+arrows: size by 1 pixel
- Alt+arrows: grid movement x 5 (if the grid is enabled)
- Alt+Shift+arrows: size by grid x 5 (if the grid is enabled)

Note: Ctrl takes precedence over Alt.

The *Undo* and *Redo* commands allow you to undo and redo up to the last 100 (depending on the settings) edit actions (this mainly applies to position and size changes and component deletion).

To select multiple components placed into a visualization window, it is recommended to use the left mouse button in combination with the Shift or Ctrl key. The Shift key is used to easily select (unselect) components by clicking the mouse. The Ctrl key is used to select a component group with a selection rectangle in case it is necessary to start the selection over an existing component (e.g., in case there is a picture in the background).

The last step when designing a window is configuring the properties of the components placed into a visualization window - customizing their appearance, behavior, and links to tags. The component's property editor can be invoked by double-clicking the left mouse button on the component area or by choosing the *Component Properties* command from the component's popup menu. The properties of individual components differ depending on their type. Their detailed description can be found in the chapter [Components](#). The component properties can also be configured using the [Component Manager](#).

To easily define components' links to tags, drag a tag from the [Visual Linking](#) window and drop it onto a component.

6.12.4 Creating a Window Template

A **window template** enables you to group and repeatedly use a component group in different parts of the visualization project. The components placed in a *window template* are usually linked to fields of the data structure assigned to the window template. Any subsequent change made to the window template will be reflected in all places where the template is used. A *window template* can be embedded into a visualization window via the [Insert Window Template Wizard](#) or by dragging it from the *Window Manager*.

When creating a new window template, the *Create New Window Template Wizard* is brought up. To run the wizard, choose the *File > New Window Template* command or use the *Window Manager*. A template can also be created through the *Data Structure Manager* depending on a selected data structure. In such a case, a *Button* component is automatically created for each *Bool*-type tag and a *Display* component for each *string* or *numeric*-type tag.

Select data structure

Allows you to select a *data structure* corresponding to a respective window template. This data structure's fields will be linked to components placed in the window template. If no data structure is selected, you cannot benefit from window templates' main advantage, which is that you can repeatedly use the same component group, each time linked to a different group of tags. In this case, the template can be used as a static graphic element (without links to data) or the components can be directly linked to tags (as in a standard window).

Window template name

Specifies the window template's name that is unique within the project. It must not contain [illegal characters](#).

6.12.5 Embedding a Window Template

To insert an existing [window template](#) into a visualization window, choose the *Insert Window Template* command from the visualization window's popup menu. This command will bring up the *Insert Window Template Wizard*.

Step 1: Choose how to insert window template

Insert 'Container' component

The template will be inserted into the visualization window through a [Container](#) component. This way of inserting templates keeps the link to the window template unchanged (possible subsequent changes made to the window template will be reflected in all places where the template is used).

Note: To insert templates quickly (without invoking the wizard), drag the template from the *Window Manager*.

Copy components

The components contained in the template will be inserted directly into the visualization window. This way of inserting templates can be used, for example, when it is required to subsequently customize properties of individual components. If the *Group components* option is active, the *Group* command will be automatically applied on the inserted components.

Note: To insert templates quickly (without invoking the wizard), drag the template from the *Window Manager* while pressing the Ctrl key.

Step 2: Window template and structured tag

Is used to select a window template that will be inserted in the same manner as defined in the previous step.

Structured tag

Allows you to select a structured tag. If the *Insert 'Container' component* option has been chosen in the previous step, a structured tag can be defined additionally.

6.12.6 Window Properties

To display the *Window Properties* dialog box, which allows you to view or edit the properties of a visualization window, double-click the window area or choose the appropriate command from the [Window Manager](#), or choose the *Properties* command from the main menu. Configuring some properties will not be reflected at design-time, but at runtime only.

▼ Basic

Common Object Properties

Title

Specifies any text to be displayed in the window's title bar (header) at runtime. In addition to the title, the window's name can also be displayed in the title bar in the development environment. To enable/disable displaying this option, use the [Environment Options](#) dialog (*Environment > Visualization Windows > Show window name in title bar*).

Window type

Specifies the window's type, which can be *Normal*, *Dialog*, or *Tray* (*Top*, *Bottom*, *Left*, *Right*). Normal windows are usually displayed maximized, i.e., they fill the area of the runtime software's window. Also, they display the monitored industrial process. Dialog windows always display a title bar and have a fixed size. You can also move them. A dialog window can be displayed modally. In such a case, it is not added to the runtime software's window, i.e., it is stand-alone. As long as the dialog window is displayed modally, other visualization windows and commands of the runtime software are not accessible. Most often, a *tray* is used for creating a toolbar (panel with buttons). A tray has no title bar. It can be aligned with any edge of the runtime software's window (top, bottom, left, right). Its position and size cannot be changed.

Options

Show title bar

Determines whether to display the window's title bar (header with a title). *Dialog* windows always display a title bar, whereas trays have no title bar.

Dynamic loading

Determines how to load the window into memory. The window is dynamically loaded into memory only before it is opened (displayed). If the window is closed or completely overlapped by other windows, it is released from memory (in fact, to increase performance, several most recently closed windows stay in memory). Otherwise, the window is loaded into memory right after starting the visualization project and it is not released from memory until the visualization project is terminated. The advantages of dynamic loading are faster project startup and less memory demands. It is recommended to use dynamic loading for all types of windows except for a *tray*.

Enable sizing

Determines whether to allow users to resize the window at runtime. It is recommended to consider whether or not this option should be activated. If you make the window smaller, some components may be hidden.

Enable closing

Determines whether to allow users to close the window at runtime (applies only to a window of type *Dialog*).

Stay on top

Determines whether to display the window on top of the other open windows - except for windows with the identical feature and trays.

Modal

Determines whether to display the window modally. The user is not allowed to switch to another window or to perform other operations in the visualization project until the window is closed. This option should be activated, for example, when you want to check the values of the components placed into the window. If the entered values are not correct, the user cannot close the window and continue working. A script can be used for checking the values.

Placement

Specifies the position and/or size of the window at runtime.

Maximized

The window fills the area of the runtime software's main window. If any trays are defined within the visualization project, the window fills the remaining area of the runtime software's window.

Centered

The window is positioned in the center with the same size as at design-time or with the size defined by the *Start-up position and size* property on the *Position* page.

In specified position

The window has the same position and size as at design-time, unless different values are defined by the *Start-up position and size* property on the *Position* page.

State

Locked

Allows you to lock all the components in the window. If this option is active, the position and size of the components cannot be changed by dragging the mouse and using the *arrow keys* (slight movement or size change).

▼ Position

Position and size

Specifies the position and size of the visualization window. The size defines the width and height of the window at design-time.

Start-up position and size

Specifies the window's position and size used at runtime. These properties are only applied if the *Centered* or *In specified position* option on the *Basic* page is active.

▼ Bounds

Display window bounds

Determines whether to display the window's *bounds*. The bounds are only displayed during design-time and mark the window area visible during runtime. This property enables the author of the visualization project to place components into the visible part of the window. The bounds are displayed as a vertical dashed line on the right side and as a horizontal dashed line (black and white) on the bottom side of the window.

Based on project resolution

The bounds' position indicates the visible area of the window. It is defined automatically based on the project resolution specified in the [Project Options](#) dialog (*Windows > Resolution*). When calculating the position, the following features are taken into account: width of the runtime software's main window's border, height of the title bar, height of the main menu, height of the toolbar, height of the alarm/event panel (shown at the bottom of the window), and size of *trays*.

Note: Some standard sizes of windows that influence the calculated bound position (height of the title bar, width of the border, etc.) depend on Windows' version or its settings. The bounds are always positioned depending on the current Windows configuration.

Custom position

The bounds can also be positioned manually (*Right* and *Bottom* coordinate).

▼ Background

Grid

Determines whether to display the window's grid and whether to align components to the grid. If this option is active, all newly added components are aligned to the grid (to align the existing components, it is necessary to choose the *Align Position to Grid* command from the components' popup menu or from the main menu (*Edit*). When changing the position or size by dragging the mouse, the components will move, i.e., they will change their size according to the grid spacing.

Background color

Specifies the window's background color. This command brings up the [Select Color](#) dialog box.

Picture

Allows you to specify the picture to be displayed in the background of the window. Any picture can be displayed (e.g., static process scheme or photograph). The picture must be added to the project via the [Picture Manager](#).

Placement

Specifies how the picture is to be displayed within the visualization window.

Tiled

If the picture is smaller than the window, it is drawn as tiles to fill up the whole window area.

Centered

The picture is centered vertically and horizontally to be drawn in the middle of the window.

In specified position

The position of the picture is specified by the **Position** property's parameters. The X and Y coordinates specify the position of the picture's top left corner.

Adjust size to picture

Determines whether to adjust the size of the window to the background picture. This operation can be performed only if the size is not specified on the *Position* page or the window is not maximized.

Preview

Displays the preview of the picture.

▼ Dynamic

Link to tag

Visible

Allows you to specify the link to the numeric-type tag whose value is used to dynamically (i.e., during runtime) change the window's visibility. The window is only visible when the value of the tag is non-zero (or equal to 0 if the *Negation* option is active).

X, Y, Width, Height

Allow you to specify the link to the numeric-type tag whose value is used to dynamically (i.e., during runtime) change these properties.

▼ Menu

Display popup menu on click

Determines whether to display the previously selected [Popup Menu](#) component. This option is available to visualization windows and most components. You can select a Popup Menu component added to any visualization window. If it is added to another window, it is necessary to make sure the window is loaded into the runtime software's memory (in such a case, it is recommended to disable the *Dynamic loading* option). The popup menu can be assigned to the *Left*, *Middle*, and *Right* (most commonly) mouse *button*.

▼ Scripts/Actions

Scripts - Window

These scripts can be executed after some of the following events in the window's "life cycle":

Load window

After the window is loaded into the runtime software's memory. Dynamically loaded windows can be loaded anytime during runtime (when the window is to be displayed). Other windows are loaded only once at project startup.

Activate window

After the window is activated (displayed on top of other open windows) using a Button component (the *Activate window* function is checked), action, script, or by clicking an inactive window.

Deactivate window

After the window is deactivated, i.e., after another window is activated.

Close window

After a dialog window is closed using the icon in the window's top right corner, script, or action. This event cannot occur in other types of windows.

Free window

After the window is freed from memory. A dynamically loaded window is released from memory if closed (only a dialog window can be closed; it is freed right after it is closed) or overlapped by other windows. The runtime software contains a cache that stores several most recently closed windows. Therefore, the window is not released each time it is completely overlapped by another window. Static loading does not allow you to execute scripts.

Scripts – Mouse

These scripts can be executed after clicking or double-clicking the window area.

Actions – Mouse

These actions can be performed after clicking or double-clicking the window area.

▼ Security

Access to window

Specifies the [access rights](#) required for activating the window. If the *Secure* option is not active, all users are allowed to access the window. If this option is checked, at least one of the given access rights is required to activate the window. If the user does not have sufficient access rights, an error message is generated and displayed on the list of current alarms/events, and the window is not activated. Running a script after the *window is loaded* will not be influenced by configuring the window's security properties. However, if the *Activate window* option on the *Scripts/Actions* page is active, the script can be run only if the user's access rights are sufficient enough to activate the window. All components have a similar security option that allows you to access them.

▼ Information

Show hint

Allows you to display a brief help hint when the mouse cursor is placed over the window area. The window's help hint is applied if the *Show hint* property of the components within the window area is active, but no text is specified.

Comment

An optional comment about the object used by the visualization project developer (systems integrator). It can be useful when configuring, debugging, and altering an application.

Description

An optional description of the object intended for the end user. In multilanguage projects, a description can be localized (i.e., translated into all project languages), which is in contrast to a *Comment*.

6.13 Project Options

Project

Runtime

Web

SQL

Languages

Security

Windows

Components

Objects

Device

Tags

Alarms/Events

Historical Data

Reports

Actions

Scripts

Timers

Telephone Service Providers

6.13.1 Project

Name

Allows you to change the project name specified when creating a new project.

GUID

Specifies a globally unique identifier of the project.

Comment

Allows you to change the comment specified in the [Create New Project Wizard](#).

6.13.2 Runtime

Start and Termination

Start

Runtime software

Specifies the type of the runtime software (*Reliance View*, *Reliance Control*, *Reliance Control Server*) in which the visualization project is to be started using the *Project > Start* command from the development environment. The default runtime software type depends on *Reliance Design*'s license used for creating the project; *Reliance Control* is the default software of the *Desktop* version, whereas *Reliance Control Server* is the default software of the *Enterprise* version.

Computer name

Specifies the logical computer whose settings (defined through the *Project Structure Manager*) will be used by the runtime software started from the development environment. The project consists, for example, of a control area containing two computers. Computer 1 (named `Server`) is connected to subordinated devices (PLCs) and logs the read data to a database. Computer 2 (named `Client`) is connected to Computer 1 through a server connection. When starting the project as `Server`, the runtime software runs a communication driver that will establish communication with the subordinated devices. The runtime software acquires data from the communication driver and logs it to a database. When starting the project as `Client`, the runtime software attempts to connect to `Server` and acquire data.

Control termination

Determines whether to terminate the visualization project at runtime using the specified `Bool`-type tag. When changing the control tag's value, an information message regarding the project termination is displayed. After the specified delay (in minutes) expires, the visualization project is terminated.

Leading edge

The runtime software is terminated when the tag value changes from logical 0 to logical 1.

Trailing edge

The runtime software is terminated when the tag value changes from logical 1 to logical 0.

Delay (min)

Specifies the duration of the time period in minutes during which the condition of the control tag's value for terminating the runtime software must be met.

Recovery

Check program running

To be added.

Response timeout (min)

To be added.

Check interval (min)

To be added.

Restart program if terminated unexpectedly

To be added.

Appearance

Main window background

Determines the appearance of the runtime software's main window's background displayed at project startup or in places where there are no visualization windows. The window can be filled with a selected *Color* or a *Gradient* (a smooth transition between two specified colors).

Date and time on toolbar

Allows displaying the current date and/or time in the toolbar of the runtime software's main window.

Language

Specifies the language version of the runtime software (the program language). Upon project startup, all menus and controls are displayed in the selected language. This option can be overridden on a logical computer's *Basic* page in the [Project Structure Manager](#) and a user's *Basic* page in the [User Manager](#).

Logging

Logging information to file

Communications

Determines whether to log information regarding communications between instances of the runtime software or between a data server and thin clients.

Errors

Determines whether to log errors that occur during runtime. They are, for example, errors that occur while accessing databases and files or executing scripts.

Handled exceptions

Determines whether to log exceptions (i.e., errors) directly handled in **Reliance**'s program code. They are errors that occur in places where a certain operation failure is likely to happen. This option allows you to get detailed information regarding the error. However, it overloads the computer's CPU and substantially slows down the program. For this reason, it is recommended that you only use this option for the time required to find the cause of a certain problem. It should not be used to constantly run the project at the end-user site.

Security

Determines whether to log information about security-related events (user log-on, thin-client connection, etc.).

Debug information

Determines whether to log information that can be useful when debugging the application, usually while putting it into operation or searching for the cause of errors.

System information

Determines whether to log memory status (the program's and operating system's memory) and CPU load information. It allows you to find out what the requirements for system resources are and how they change over time.

System information logging interval (min)

Specifies the interval at which system information is to be logged.

Level

To be added.

Max. file size (MB)

To be added.

Max. file age (number of days)

To be added.

Note: The log files are stored in the [Logs](#) directory.

The directory can be changed using the [Environment Options](#) dialog (*Environment > Paths*).

Syslog

Contains a list of syslog servers to which log records are to be sent. Each syslog server on the list will receive all the log records that satisfy the following two requirements:

- They belong among the types of records that are logged to a file (see [Project Options > Runtime > Logging](#))
- They belong among the types of records that are enabled for a given syslog server

Syslog server

Name

Specifies the syslog server's name.

Address

Specifies the syslog server's hostname or IP address.

Port

Specifies the syslog server's port number.

Protocol

Specifies the communication protocol for transferring messages to the syslog server.

Message format

Specifies the message format that is used for passing messages to the syslog server. For more information, refer to the following articles: <https://tools.ietf.org/html/rfc3164>, <https://tools.ietf.org/html/rfc5424>.

Use UTF-8 encoding

Determines whether the message text should be UTF-8 encoded.

Log

Specifies the types of log records that are to be sent to the syslog server (see [Project Options > Runtime > Logging](#)).

Data Export

Data export in CSV format

Encoding

Specifies the CSV file's encoding when exporting the list of alarms/events and when exporting data from reports.

User Inactivity

Inactivity timeout (s)

To be added.

On inactivity timeout

Log off user

To be added.

Run script

To be added.

On resume activity

Run script

To be added.

Other

Enable remote control

To be added.

Access rights

To be added.

6.13.3 Web

These options enable you to configure the Web server, Web service, and data servers' (*Reliance Server* and *Reliance Control Server*) Web pages to provide data to the thin clients (*Reliance Web Client* and *Reliance Smart Client*) or client applications of third parties.

Server

Allow gzip compression of transferred data

Enables you to optimize the size of HTTP messages using the gzip method.

Log information about thin clients getting connected and disconnected

Determines whether to activate generating alarms/events in case thin clients are connected/disconnected to/from the data server.

Run script on client request

Specifies the script to be run when requested from a thin client. The script will be run when there are any of the following requests: Connect, Disconnect, User Log-on, User Log-off. Information on a particular type of request and further information on the connected client is passed to the script. To acquire the information, the `RScr.GetCurrentScriptDataEx` function should be used.

HTTP headers

Contains a list of HTTP headers that the server sends to clients as part of every response. Each header is written on a separate line in the format `Name=Value`, e.g., `X-Frame-Origin=SAMEORIGIN`.

Pages

Default page

Specifies the data server's Web page to be displayed in the Web browser after you enter the server address that does not specify the page. For example: `http://reli:40000`

Content embedded into Welcome! page

The Welcome! page is the data server's home page. Any custom content can be embedded in this Web page. It may contain, for example, user instructions, information about the running application, company logo, links to documents. The content must be in the HTML format and will be embedded in a particular place on the Web page. Web pages are based on jQuery Mobile, whose standard CSS styles can be utilized when creating custom content.

An example of custom content:

```
<h3>This is a custom title</h3>
<p>
This is custom text embedded in the Welcome! window. Here, standard HTML tags and jQuery
Mobile styles can be used.
</p>
<a href="http://www.ourcompany.com" target="_blank">This is our company</a>
<br>
<br>

```

Security

Secure server Web page

Specifies the access rights required to access the data server's Web page. If the user is not logged on or does not have the access rights required to display a secure Web page, he/she is prompted to enter his/her user name and password.

Secure Project section

Specifies the access rights required to access the Project section on the data server's Web page.

Secure server administration

Specifies the access rights required to provide administration of the data server.

DoS Attack Protection

Denial of service (DoS) is a type of attack on Internet services or websites, the goal of which is to disrupt a service, making it unavailable to its intended users. This is accomplished by flooding the service with superfluous requests. In a *distributed denial-of-service* attack (DDoS), the service is flooded with traffic from many different computers.

The **Reliance** SCADA system's Web server has built-in support for detecting such attacks. This support is based on counting requests received by the Web server per unit of time. When an attack is detected, the system takes appropriate action.

Check number of requests received by Web server

Determines whether to activate DoS attack protection.

Single IP address request limit (1/s)

The number of requests received by **Reliance**'s Web server from one IP address per second. If this number is exceeded, an attack will be detected.

Total request limit (1/s)

The number of requests received by **Reliance**'s Web server from one or more IP addresses per second. If this number is exceeded, an attack will be detected.

On detect DoS attack

Generate alarm

An alarm message is displayed and recorded once a DoS attack is detected.

Temporarily stop Web server

If a DoS attack is detected, **Reliance**'s Web server will be stopped temporarily (for 10 minutes). During this time, the Web server will be responding to clients with an "HTTP 503 Service Unavailable" status code.

Block IP address

If a DoS attack is detected, the IP address that was the source of the attack will be blocked.

Run script

Determines whether to execute the specified script when a DoS attack is detected.

IoT

The **Reliance** SCADA system allows for communication with IoT (Internet of Things) devices. The Web server receives requests from an IoT gateway and passes it to the communication driver for processing. The system has support for devices communicating via the LoRa and Sigfox networks.

Enable receiving and handling messages

Determines whether the Web server should receive and process IoT requests.

Verify source (Basic Access Authentication)

Determines whether the Web server should verify IoT requests. If this option is active, the requests must contain the `Authorization` HTTP header. For example:

```
Authorization: Basic QWxhZGRpbjpvcGVuIHNlc2FtZQ==
```

where "QWxhZGRpbjpvcGVuIHNlc2FtZQ==" is an authentication string.

User name

Specifies the user's name for verification.

Password

Specifies the user's password for verification.

Authentication string

Specifies the string that must be part of the `Authorization` HTTP header contained in a request.

API

Enable connecting from custom applications

Specifies the *Password* used to access the data server using a client application of a third party (a custom application).

Show characters

Shows the characters entered for the password.

Enable SOAP API

Determines whether to allow accessing the data server using a client application of a third party through the SOAP interface.

Enable REST API

Determines whether to allow accessing the data server using a client application of a third party through the REST interface.

Secure REST API

Determines whether to secure the REST interface. HMAC-SHA256 authentication is required for this purpose.

Publish interface description and documentation

Determines whether to make the Web service interface's description and documentation available on the server's Web page.

Enable setting tag values

Determines whether to allow a third-party client application to set tag values.

Enable acknowledging alarms/events

Determines whether to allow a third-party client application to acknowledge alarms/events.

6.13.4 SQL

Any number of the so-called *SQL connections* can be defined in the project. Each SQL connection enables the runtime software to connect to one relational database. Currently, it is possible to connect to the following database systems: *Microsoft SQL Server*, *MySQL*, *MariaDB*, and *PostgreSQL*. A free version of *Microsoft SQL Server 2005 Express Edition* is part of *Reliance Add-On Pack* (the installer of **Reliance 4**'s add-on files).

Connection

Name

Specifies the SQL connection's name that is unique within the list.

Connection string

Specifies the SQL connection parameters (also called as *connection string*). Each parameter in the connection string is separated by a semicolon. The syntax for each parameter is `Parameter=Value`. The parameters can be defined as text or using the *Data Link Properties* dialog box that is displayed after pressing the *Edit Connection String* button. The *Data Link Properties* dialog box allows you to access a separate help system. When a new SQL connection is added, the connection string is preset so that the runtime software connects to a *Microsoft SQL Server* database (or, in case it does not exist yet, creates it). This assumes *Microsoft SQL Server* is installed on the same computer as part of **Reliance 4**. If *Microsoft SQL Server* has already been installed or runs on another computer, it is necessary to customize the connection string. To reset the connection string to its default status, click the *Restore Default Connection String* command.

Show

Determines whether to display the *Connection string*. For security reasons, it is hidden as it may include a password.

Note: This option is not saved – it only applies to the **Reliance Design** development environment.

Database name

Specifies the relational database name.

ODBC driver

Specifies the ODBC driver. The option is active if the *Microsoft OLE DB Provider for ODBC Drivers* is specified in the connection string. Choose the *ODBC Data Source Administrator* command to configure the drivers.

6.13.5 Languages

Specifies a list of languages used in the visualization project. To add/delete a language to/from the list, use the commands located in the toolbar. Subsequently, the [String Manager](#) allows you to translate text strings into the selected languages. At runtime, it is possible to switch between languages; thus, it allows, for example, users with different language requirements to work in a single workplace.

Language

Name

Specifies the language's name. This name will be displayed in all lists.

Details

Contains information on the abbreviation and code page of the language. The *Change* command is used to bring up a dialog box allowing you to change the existing language.

Status

Shows the status of the selected language (active, default, normal).

Set As Active

Allows you to activate the selected language. An active language is a language whose text strings are displayed at both design-time and runtime. If the active language differs from the default one, the user is, prior to modifying the text directly in a component's edit box, notified and asked whether to replace the text on the list or create a new one.

Set As Default

Allows you to set the selected language as the default one. A default language is a language whose text strings are used when creating a new language. By the time all new language's text strings are translated, they will have been set according to the default language's text strings.

Program language

Allows you to associate the program language with the project language.

Font

Specifies the font to be used in controls to display and enter text strings within the development environment and to be used as the default font for newly created components. This font will be used for each language defined in the project. For this reason, a font that is able to properly display text strings of all languages defined in the project should be chosen.

Preview

Displays the font's preview.

6.13.6 Security

Access Rights

Up to 30 access rights can be defined in a visualization project. By default (after a new project is created), they are named `Right1` to `Right30`. Access rights allow you to control the access to specific operations so that only an authorized user can perform them. Most often, access rights are required for the following operations: controlling the visualized industrial process, changing process values or parameters, using recipes, and acknowledging alarms/events. To control the access to an operation (e.g., changing a value), choose the appropriate access rights required to perform the operation. Each user can be assigned a list of available access rights. To perform the operation, at least one of the required rights must be assigned to the user.

There is no hierarchy among the access rights, i.e., it doesn't matter in which order they are listed. On the basis of operations for which the access rights are intended, it is strongly recommended to rename the rights prior to using them. The following examples can be used for renaming: `Control`, `Change Required Values`, `Change Process Parameters`, `Use Recipes`, `Acknowledge Alarms/Events`, etc.

Access right

Name

Specifies the access right's name.

Alias

Specifies the access right's alias.

Verify user identity

Determines whether to verify the identity of the logged-on user during operations for which the access right is required. The user proves his/her identity by entering a valid user name and password. The operation can be performed only if the user's identity is successfully verified. This feature can, for example, prevent the process from being accessed by unauthorized persons in case the logged-on user's workplace is left unattended.

Access right checking method

Determines how to check the access rights, i.e., whether to *require at least one or all specified access rights*.

Passwords

Enable password policy

Determines whether to check the below-mentioned requirements for a safe (strong) password when entering a new password. This applies both to user passwords and to other passwords entered in a project (e.g., a password for API or project encryption). In addition to the requirements stated below, the following conditions apply to passwords:

A password cannot be longer than 48 characters.

A password cannot begin or end with a space.

A password cannot contain control (non-printing) characters (e.g., tabulator).

Minimum length

Specifies the minimum number of characters that a password must have to be considered safe (strong).

Minimum digit count

Specifies the minimum number of digits that a password must have to be considered safe (strong).

Minimum special character count

Specifies the minimum number of special characters (e.g., at, exclamation mark) that a password must have to be considered safe (strong).

Maximum number of consecutive identical characters

Specifies the maximum number of consecutive identical characters that a password can have. If, for example, this property's value is set to 2, the password "Paswww123" is not considered safe (strong).

Password must contain letters in mixed case

Determines whether a password must contain at least one uppercase letter and one lowercase letter to be considered safe (strong).

Password must not match any property of user or project

In order for a password to be considered safe (strong), you must avoid guessing it from other accessible project or user properties (it must be different from the project's name, user's name, user's email address, user's phone number, etc.).

It cannot be well-known weak password

Determines whether to compare a new password with a dictionary of well-known weak passwords.

Enforce password history

Specifies the number of unique user passwords that must be created before the old password can be used again.

Set maximum password age

Determines whether a password should be temporary. If it expires, the user is prompted to enter a new password when logging on.

Number of days

Specifies the length of time during which the new password is valid.

6.13.7 Windows

Resolution

Project resolution

Specifies the project graphical resolution. At design-time, the resolution's bounds can be indicated by a dashed line – *Bound*. The bounds can be defined individually for each window in the project on the *Bounds* page of the [Window Properties](#) dialog box.

Automatic

The project resolution is set according to the current resolution of the primary monitor.

Custom

Specifies the project's user-defined resolution.

Window Records

At runtime, it is possible to make (write) operating records for each visualization window. A record can be either open (i.e., it can be followed by additional text) or closed (i.e., it cannot be changed). If one or more open records exist for the active window, the background color of the *Records Related to Active Window* command's icon in the standard toolbar is yellow. Otherwise, the icon's background is white. This feature is useful, for example, in premises with a shift operation. Individual operators can pass on information to one another through records. For example, if a failure occurs in a technology, a record of the failure removal can be made for the window in which the technology is displayed.

Enable window records

Determines whether to enable users to access window records (this option is valid for all windows).

Access rights required for record deletion

Specifies the list of access rights required for deleting records.

6.13.8 Components

Display

Mark components with invalid links to tags

Determines whether the components with *invalid links to tags* should be highlighted with the specified colored border. An invalid link (e.g., a link to a tag that was later deleted through the *Device Manager*) will be indicated by the border defined to surround the component.

Mark components linked to tags with invalid values

Determines whether the components *linked to tags with invalid values* should be highlighted with the specified colored border. An invalid value (e.g., a tag value that is not read by the communication driver due to a loss of connection) will be indicated by the border defined to surround the component.

Show error state if any tag has invalid value

Allows you to display the specified error state if any of the tags to which a component is linked has an invalid value.

Dynamic properties

Determines whether the **dynamic** component properties should be *relative* or *absolute*. If the *relative* size/coordinates are applied, the control tag's value is added to the size/coordinates defined at design-time. If the *absolute* size/coordinates are applied, the resulting size/coordinates are determined by the control tag's value only.

Position

Coordinates

Determines how the X and Z coordinates of the component will be calculated.

Size

Coordinates

Determines how the size (width and height) of the component will be calculated.

Height base

Determines where the component's height base will be located (*Top*, *Bottom*). This option affects the change of the component's size. If the *top* base is selected, the component extends downwards. If the *bottom* base is selected, the component extends upwards.

Rotation

Angle

Determines how the rotation angle of the component will be calculated.

6.13.9 Objects

Names

Full object names

Specifies the character used to separate the parts of the full name of an object.

For example, if the default separator (slash) is used, the full name of the tag `Temperature1` from the device `Tecomat1` is displayed as `Tecomat1/``Temperature1`. If the dot character "." is used as the separator, then the full name of the tag is `Tecomat1.``Temperature1`.

Warning: This character must not be part of the name of any object within a **Reliance** visualization project!

Export and Import

Export and import in CSV format

Encoding

Specifies the CSV file's encoding when exporting object properties.

Import key

Determines whether – when importing object properties – the objects are identified by name or by ID.

Import of tags and data structures

Import array elements as separate tags

Determines whether individual array elements are imported as separate tags when importing data structures and array-type tags. If this option is active, then, for example, the tag "Array: array[0..3] of Byte" is imported as Array[0], Array[1], Array[2], Array[3] of type Byte.

6.13.10 Device

System device

Specifies the *Alias* of the *System* device.

6.13.11 Tags

Input

Enter Value dialog

Contains options for displaying tags' and devices' aliases/names in the *Enter Value* dialog.

DDE Sharing

The runtime software acts as a *DDE* server (see the [tag properties' Sharing](#) page in the [Device Manager](#)).

Replace invalid values of tags

Replace with text

In case the value of a DDE-shared tag is not valid (e.g., due to a failure in communication with the device), the specified text will be provided to a client instead of the value.

Array element delimiter

Specifies the character to be used as an element delimiter for DDE-shared array-type tags (e.g., *Array of Byte*).

6.13.12 Alarms/Events

Database

File-based

Archive files/Deleting records

Determines how to handle the oldest alarms/events, i.e., whether to *Create archive files* or maintain a specific alarm/event count in the current file. If the default option (*Create archive files*) is active, the archive file settings can be further configured.

Archive files

Determines how to create archive files. Archive files can be created either periodically (every day, week, or month) or on the leading edge of a digital-type tag (in such a case, the *Reset tag* property determines whether to reset the control tag after detecting the leading edge).

Delete oldest archive files

Allows you to set the maximum archive file count (prevents the hard disk from being filled up).

Limit accessible archive file count

Allows you to limit the number of archive files accessible on the list of historical alarms/events.

SQL

Delete oldest records

Allows you to limit the number of SQL records according to their age.

Display

Alarm/event text font

Specifies the font of alarm/event text strings using the [Select Font](#) dialog box.

Time format

Allows displaying alarm/event times with milliseconds.

Colors

Custom alarm/event colors

Allows you to specify custom colors for *active* (*unacknowledged*, *acknowledged*, *not needing acknowledgment*) and *inactive* alarms/events and the alarm/event list's *Background color*.

Sounds

Allows you to select sounds to be played when an alarm/event starts, ends, or is active. The sound files must be located in the `<Project>\Main\MMedia` directory.

Default sounds

Specifies the default sounds in the `*.wav` format. These default sounds will be played when an *alarm/event* is *started* or *ended*.

Active alarm/event sound

If this option is active, it determines whether to play the *Standard sound* (beep) or a specified sound file in the `*.wav` format. The sound is played periodically if at least one active unacknowledged alarm/event exists.

Repeat interval (s)

Specifies the time interval at which the sound is repeatedly played during an active alarm/event.

Types

There are three predefined *alarm/event types* in each project. They are *alert*, *command*, and *system message*. You can also define as many custom types as you need.

Alarm/event type

Name

Specifies the alarm/event type's name.

Alias

Specifies the alarm/event type's alias.

Custom alarm/event colors

Allows you to specify custom colors for *active* (*unacknowledged*, *acknowledged*, *not needing acknowledgment*) and *inactive* alarms/events.

Group Types

There can be as many *alarm/event group types* defined in the project as needed.

Alarm/event group type

Name

Specifies the alarm/event group type's name.

Alias

Specifies the group type's alias.

Groups

Any number of *alarm/event groups* can be defined in the project. Subsequently, each alarm/event and user can be assigned a list of alarm/event groups. This specifies which users should receive information messages regarding alarms/events via email and/or text messages. To enable sending these messages, further properties must be configured for each user in the [User Manager](#) (*E-mail*, *Phone number*, *Notify via E-mail*, and *Notify via SMS*) and for the respective computer in the [Project Structure Manager](#) (*Notify via E-mail*, *Notify via SMS*, and the properties on the *E-mail* and *SMS* pages).

Alarm/event group

Name

Specifies the group's name that is unique within the list.

Alias

Specifies the group's alias.

Type

Specifies the alarm/event group's type.

Other

Allow users to disable alarms/events

Determines whether to allow users with relevant access rights to temporarily disable (suppress) generating alarms/events. This feature can be useful, for example, if a long-term failure of the equipment appears. Thus, alarms/events can be prevented from being triggered while repairing the equipment. At runtime, alarms/events can be disabled or enabled using the *View > Defined Alarms/Events* command.

Alarm/event delay

Start delay (ms)

To be added.

End delay (ms)

To be added.

End active alarm when disabled/inhibited

To be added.

Consolidate repeated alarm/event occurrences into one instance

To be added.

6.13.13 Historical Data

dBASE Data Tables

Data access method

To be added.

TDBF settings

To be added.

Table format

To be added.

Store numeric values as text

To be added.

BDE settings

To be added.

6.13.14 Reports

Numeric value format

Specifies how to format numeric values. You can choose between two options: *Based on tag*, which represents the display format defined for a tag, and *Based on report item*, which represents the *Value format* property defined for a report item.

6.13.15 Actions

Execute action

After run project

Specifies the action to be executed right after starting the visualization project.

6.13.16 Scripts

Threads

Up to 30 threads for script processing can be defined in a visualization project. By default (after a new project is created), they are named `Thread1` to `Thread30`. A thread is intended to provide script code processing. For each script, a thread in which the script will be run can be chosen. By dividing scripts into different threads, it is possible to achieve the parallel processing of multiple scripts. Scripts that run in different threads do not block one another. Prior to using multiple threads, it is strongly recommended to rename them depending on types of operations for which they are intended. For example: `Fast Operations`, `Lengthy Operations`.

Other

Run script

After run project

Specifies the script to be run right after starting the visualization project (can be used, for example, for initializing values). Before running this script, only scripts for initializing within a thread can be run – the *Run on thread initialization* option is active (see [Script Properties](#)).

Error handling

Terminate script on error

Determines whether to terminate a script if an error occurs in the script while working with a *Reliance-defined object*. When the script is terminated, a system (internal) message is generated; the message contains the script's name and the row (its number) where the error occurred. This option only relates to *Reliance-defined objects* (e.g., `RTag` and `RSys`), i.e., it does not affect other objects (e.g., "Scripting.FileSystemObject") and syntax errors of *VBScript*. If this option is not active, the emergence of the error can be detected by checking the `RError.Code` that will be non-zero. It is strongly recommended that you leave this option active both during project development and after installing the project at the end-user site (in a production environment) so that potential errors could be detected.

Functions for reading tag's value

Return value even if not valid

Determines whether the functions for acquiring tag values (`RTag.GetTagValue` and `RTag.GetTagElementValue`) should return a value even if it is not valid (the communication driver sets the tag quality to *Poor*). If this option is not active and the tag quality is set to *Poor*, the value is returned as `Empty`. For more information on scripts, see the *Scripts help* (the `IsEmpty` function of *VBScript*, the `RTag.GetTagValue` and `RTag.GetTagElementValue` functions of *Reliance-defined objects*).

Treat invalid tag value as error

Determines whether the functions for acquiring tag values (`RTag.GetTagValue` and `RTag.GetTagElementValue`) should terminate with an error in case the tag value is not valid. To detect such an error, check the `RError.Code` that will be non-zero. If both this option and the *Terminate script on error* option are active at the same time, the script execution will be terminated.

6.13.17 Timers

Contains a list of the project's timers. To add/delete a timer to/from the list, use the commands located in the toolbar. Timers are used to simultaneously trigger events. They can be used mainly in components to synchronously perform events, such as the blinking effect or component content update.

Timer

Name

Specifies the timer's name that is unique within the list.

Interval (ms)

Specifies the timer's repeat interval.

6.13.18 Telephone Service Providers

Up to 20 telephone service providers can be defined in a visualization project. By default (after a new project is created), they are named `Provider1` to `Provider30`. Prior to using the telephone service, it is strongly recommended to rename the providers (e.g., `Provider1` to `T-Mobile`). A telephone service provider can be chosen for objects of type *Modem* and

Communication Channel in the [Project Structure Manager](#). Thus, the link between these objects is defined. This link specifies which modems can be used to connect to a device through a specific communication channel.

7 Components

Components are graphical objects used to design visualization windows of a Reliance visualization project. They allow communication between the user and the computer. The components can be added to a [visualization window](#) from the Component Palette using the mouse (see the chapter [Designing a Window](#)).

To configure the properties of a component (components), you can use either the *Component Manager* or the *component's property editor*. After choosing the *Component Properties* command from the *Edit* menu or popup menu, or after double-clicking the component, the *Properties* dialog box of the selected component is brought up. Unlike the *Component Manager*, which allows you to configure the properties of multiple components, the property editor enables you to configure the properties of a single (selected) component only. Therefore, more emphasis is put on making the edit operations clear and simple. The properties are arranged in separate pages according to their functions.

Common Component Properties

Standard

Additional

Vectors

Control

Teco

Johnson Controls

Sauter

BACnet

IP Cameras

Elgas

AMiT

Wago

7.1 Common Component Properties

The *Basic*, *Alignment*, and *Dynamic* pages are common to all components' editors (the components have basic properties in common). The *Menu*, *Scripts/Actions*, and *Security* pages are common to most components (these pages allow you to configure the properties of most components and thus affect the behavior). If a component's properties have no function and cannot be configured, some properties (controls for editing the properties) on the page can be inaccessible (inactive).

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Menu](#)

[Scripts/Actions](#)

[Security](#)

7.1.1 Basic

Basic

Name

Specifies the component's name that is unique within the visualization window.

Alias

Specifies an alternative name for some components (e.g., for trends to make labels more user-friendly).

Position

Specifies the position of the component's top left corner relative to the top left corner of the visualization window. The position is defined using the X and Y coordinates that can be configured by choosing a new value or by moving the component with the mouse.

Size

Specifies the *Width* and *Height* of the component (in pixels).

Rotation

Specifies the clockwise rotation *Angle* of the component. The value range is between -360 and +360 degrees.

State

Visible

Determines whether to make the component visible at runtime.

Enabled

Determines whether to enable editing the component at runtime.

Behavior

Direct input

Determines whether to enter a tag value directly in the component, not in the standard *Enter Value* dialog.

Information

Show hint

Allows you to display a brief help hint when the mouse cursor is placed over the component. The text to be displayed is specified in the text box.

Comment

Specifies an optional description on the component. It is intended especially for the developers of the visualization project.

Description

Specifies an optional description on the component. It is intended especially for the end user of the visualization project.

7.1.2 Alignment

Alignment

The alignment mode allows you to automatically adjust the position and size of the component relative to other components within the visualization window.

Position

Specifies the position of the selected component. By default, the *None* position is set, which maintains the component's position and size. The *Top*, *Bottom*, *Left*, *Right* positions make the component a tray and position it to the selected place. If the *Client* option is chosen, the component is extended all over the free window area (other components can already be positioned at the *Top*, *Bottom*, *Left*, or *Right* of the window area).

Mode

Determines whether or not the components will be overlaid. It allows you to choose between two modes – *Non-overlaid* and *Overlaid*. The option is active only if the alignment position is set to *Top*, *Bottom*, *Left*, *Right*, or *Client*.

Margins

Specifies the distance between the edges of the component and other components' edges or between the component's and the visualization window's edges. The options are active only if the alignment position is other than *None*. The options specify the number of points that are to create the margins surrounding the component. For one component, they specify the distance from the window's edges. In case of multiple components aligned on the same side in the *Non-overlaid* mode, the values specify the distance between the components.

Anchors

Determines which edges of the component are to be anchored to the corresponding window edges. Configuring the anchors will take effect when the size of the window is changed. As the *Left* and *Top* anchors are active by default, the component will be fixed to the visualization window relative to its top left corner when the size of the window is changed. If the *Right* and *Bottom* anchors are also active, the size of the component changes when the size of the window is changed.

7.1.3 Dynamic

Link to tag

Visible, Enabled, X, Y, Width, Height, Angle

If these properties are active and linked to a tag, the basic component properties defined on the *Basic* page can be changed dynamically (during runtime). The configured values can be either relative or absolute depending on the setting in the [Project Options](#) dialog box.

7.1.4 Menu

Display popup menu on click

Determines whether to display the previously selected [Popup Menu](#) component. This option is available to visualization windows and most components. You can select a Popup Menu component added to any visualization window. If it is added to another window, it is necessary to make sure the window is loaded into the runtime software's memory (in such a case, it is recommended to disable the *Dynamic loading* option). The popup menu can be assigned to the *Left*, *Middle*, and *Right* (most commonly) mouse *button*.

7.1.5 Scripts/Actions

Allows you to specify scripts or actions to be executed by clicking or double-clicking a mouse button on the component.

Scripts – Mouse

Specifies links to the tags defined through the [Script Manager](#). At runtime, the specified script will be executed after clicking or double-clicking the respective mouse button on the component (executing the script can assigned to the right, left, or middle mouse button). You can pass a numerical parameter to the script (the parameter is accessible using the `RScr.GetCurrentScriptDataEx` function).

Actions – Mouse

Specifies links to the actions defined through the [Action Manager](#). Most components allow the specified action to be performed after clicking or double-clicking the respective mouse button.

7.1.6 Security

Functions, scripts, actions, menus

Secure

Determines whether to select access rights required for securing the interaction between the user and the component. If this feature is enabled, the component is only accessible to users with sufficient access rights. To specify the access rights required for accessing the component, bring up the [Select Access Rights](#) dialog box by clicking on the key icon. The user must have at least one access right selected on the list available.

7.1.7 Static

Appearance and behavior

Flat button

Allows displaying the button alternatively in idle status. The button's three-dimensional frame can be drawn only if the mouse cursor is placed over the component.

Graphical button

Allows displaying the button as a user-defined picture. Specific pictures corresponding to respective states of the button should be defined on the *States* page. Neither the button's frame nor text will be displayed.

Layout

Specifies the graphical button picture's layout. It can be one of the following: *Normal*, *Resize graphic*, *Resize component*, or *Tiled*. For a detailed description of the layout options, see [Picture](#).

Text

Word wrap

Determines whether to wrap the button's text. If the text (word) extends outside the viewable area of the component, it will be displayed on a new line.

Shade

Allows displaying the text's shade and configuring its *Depth* and *Color*.

Frame

Specifies the *Width* of the three-dimensional frame. It also determines whether to display the *Black frame* around the button. For more details, see the [Bevel](#) component.

Background

Determines whether the *button* should be displayed as *transparent*. A background picture (*Texture*) can also be chosen. Both the button's frame and text will be displayed.

7.2 Standard

[Display](#)

[Button](#)

[Text](#)

[Active Text](#)

[Bevel](#)

[Picture](#)

[Active Picture](#)

[Animation](#)

[Pipe](#)

[Container](#)

[Combo Box](#)

[Check Box](#)

[Popup Menu](#)

[Progress Bar](#)

[Radio Buttons](#)

[Track Bar](#)

[Edit Box](#)

[Notepad](#)

7.2.1 Display

This component allows for displaying and editing the current value of the tag to which the display is linked.

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

Scripts/Actions

▼ Menu

Display popup menu on click

Determines whether to display the previously selected [Popup Menu](#) component. This option is available to visualization windows and most components. You can select a Popup Menu component added to any visualization window. If it is added to another window, it is necessary to make sure the window is loaded into the runtime software's memory (in such a case, it is recommended to disable the *Dynamic loading* option). The popup menu can be assigned to the *Left*, *Middle*, and *Right* (most commonly) mouse *button*.

Display standard popup menu

Allows you to disable displaying the component's standard popup menu. If the *Right button* option is active, a custom popup menu is displayed, whereas displaying the standard popup menu is automatically disabled.

▼ Security

Functions, scripts, actions, menus

Secure

Determines whether to select access rights required for securing the interaction between the user and the component. If this feature is enabled, the component is only accessible to users with sufficient access rights. To specify the access rights required for accessing the component, bring up the [Select Access Rights](#) dialog box by clicking on the key icon. The user must have at least one access right selected on the list available.

Enable setting value

Allows you to enable editing the tag value shown on the display during runtime (at runtime, the *Enter Value* dialog box is invoked after clicking on the display area).

Prohibit violating bounds

Allows you to check the entered value and disables writing a tag value outside the limits set by the *Min* and *Max* values (in such a case, the warning "*Value is not within required range*" is displayed).

Require confirmation

Determines whether to display a confirmation dialog box prior to writing the new value into the main tag.

Alert to violating bounds

Allows you to check the value to be entered. If the tag value is not set within the required range, a warning dialog box will be displayed prior to entering the new main tag value. The *Query* edit box is intended for specifying a custom question (if the text "Value entered is greater/smaller than xxx. Do you really want to set this value?" is not suitable).

Enable setting limits

Allows users to change the main tag's limit values in case the component is linked to a tag for which dynamic limits are defined. The limits can then be changed by choosing the *Enter Limits for Tag* command from the component's popup menu. The *Secure* option allows you to select access rights required for entering the limits for tags.

▼ Functions

Link to tag

Specifies the tag to which the component is linked (main tag). To select the tag, use the standard [selection dialog box](#). The component allows changing the tag's value. When changing the tag, the value displayed by the component also changes.

Test value

Specifies the value to be displayed at design-time.

Limits

A group of properties that allow you to specify the display's color (value, background) if the tag's value is not within high and low limits (*warning* or *critical*).

▼ Static

The preview area (at the top of the page) displays the current font, alignment, and background color configurations. Configuring all properties will take effect at design-time directly in the visualization window after saving the changes made.

Value

Specifies the font and horizontal *Offset* of the display's value (text).

Alignment

Determines whether the value (text) should be aligned to the *Left* or *Right* of the display or whether it should be *Centered*.

Display style

Determines whether to display the value using the specified (*Normal*) or *LCD*-style font (one size). The *LCD* style is only used to display numeric values. Other characters are not displayed.

Number format

Determines whether to display numbers in the Windows-defined format (*Use locale settings*).

Shade

Determines whether to display the value's shade and its *Depth* and *Color*.

Frame

Allows displaying the component's frame and configuring the properties of the display's frame. The property specifies the *Width*, *Color*, *Black frame*, and the frame's *Outer style/Inner style*. For more details, see the [Bevel](#) component.

Background

Determines whether to display the component with no background (*Transparent*), or with the specified background *Color*.

▼ Eng. units

The preview area (at the top of the page) displays the current font, alignment, and background color configurations. Configuring all properties will take effect at design-time directly in the visualization window after saving the changes made.

Visible

Allows you to display a unit following the tag value. The unit can be specified for each tag through the [Device Manager](#) (tag properties).

Units zone

Allows you to place the unit separately on the right side of the display (in the development environment, the zone is separated by a vertical dashed line). For each unit, the following properties can be configured: *Font*, *Background Color*, horizontal *offset*, and *Alignment*. You can also *Hide shade* and *Hide units and leave zone blank*.

Zone size

Specifies the zone's width (in pixels) to display the unit.

Fine offset

Specifies a horizontal offset, i.e., the number of pixels by which the units are shifted to the right of the position specified by the *Alignment* property.

Alignment

Specifies the placement of the engineering units within the zone.

▼ Error

Link to tag

Error

Specifies the link to the numeric-type tag to be used to switch the component to the error state. The error state is activated if the tag's value is non-zero or logical 1 (true). If negated, it is activated when the tag's value is 0 or logical 0 (false).

Colors

These properties allow you to specify the display's color (*Value*, *Background*) in the error state.

7.2.2 Button

This component mainly allows for indicating and changing *Bool*-type tag values. In addition, the *Button* component can be used, for example, to activate another visualization window, execute scripts/actions, or change the main tag's value.

Properties

Basic

Alignment

Dynamic

Menu

Scripts/Actions

▼ Security

Functions, scripts, actions, menus

Secure

Determines whether to select access rights required for securing the interaction between the user and the component. If this feature is enabled, the component is only accessible to users with sufficient access rights. To specify the access rights required for accessing the component, bring up the [Select Access Rights](#) dialog box by clicking on the key icon. The user must have at least one access right selected on the list available.

Setting value

Query for state 0, Query for state 1

Upon clicking the button, a dialog box displaying the specified text will be shown prior to assigning a new value to the main tag.

Prohibit violating bounds

Disables entering a tag value that is not within the specified limits.

Require confirmation

Determines whether to display a confirmation dialog box prior to writing the new value into the main tag.

Alert to violating bounds

Allows you to check the value to be entered. If the tag value is not set within the required range, a warning dialog box or a dialog box with user-defined text will be displayed prior to entering the new main tag value.

▼ Functions

Link to tag

Main

Specifies the link to the component's main tag. The component allows changing the tag's value. When changing the tag, the value displayed by the component also changes.

Negation

Is used to negate the selected tag of type *Bool*. If this option is active, logical 0 is sent to the tag when pressing the button on and logical 1 when pressing it off. If the tag is of any type other than *Bool*, this property takes no effect.

Write const. value

Allows you to specify a constant to be written into the tag when pressing the button. If this option is not active, the value can be changed using the *Enter Value* dialog box that appears immediately after pressing the button. If the main tag is of type *Bool*, this property takes no effect.

Other functions

Activate window

Allows you to activate any window of the project (with the exception of the window into which the button has been placed).

▼ Static

Appearance and behavior

Flat button

Allows displaying the button alternatively in idle status. The button's three-dimensional frame can be drawn only if the mouse cursor is placed over the component.

Graphical button

Allows displaying the button as a user-defined picture. Specific pictures corresponding to respective states of the button should be defined on the *States* page. Neither the button's frame nor text will be displayed.

Momentary button

Upon pressing and releasing the mouse button, the button does not stay pushed in. This type of button is useful only if a digital tag is selected; the tag's value is logical 1 (or logical 0 when the *Negation* property is active) only if the mouse is used to press the button.

Set digital tag directly

Allows setting the digital tag's value according to the state of the button. If this option is active, logical 1 is sent to the tag upon pressing the button and logical 0 upon pressing it off (if the *Negation* property is active, the opposite values are sent to the tag).

Layout

Specifies the graphical button picture's layout. It can be one of the following: *Normal*, *Resize graphic*, *Resize component*, or *Tiled*. For a detailed description of the layout options, see [Picture](#).

Text

Word wrap

Determines whether to wrap the button's text. If the text (word) extends outside the viewable area of the component, it will be displayed on a new line.

Shade

Allows displaying the text's shade and configuring its *Depth* and *Color*.

Frame

Specifies the *Width* of the three-dimensional frame. It also determines whether to display the *Black frame* around the button. For more details, see the [Bevel](#) component.

Background

Determines whether the *button* should be displayed as *transparent*. A background picture (*Texture*) can also be chosen. Both the button's frame and text will be displayed.

▼ States

Specifies the appearance of the button's individual states. The **State 0** page allows you to configure the button's appearance when in idle status, the **State 1** page when the button is pressed, and the **Active** page when you place the mouse cursor over the component.

Text

Specifies the text to be displayed on the button. The text is displayed with the specified *Font*, *Button color*, and *Text alignment* (if State 1 has no text defined, the text of State 0 is used instead).

Picture

Allows you to select a picture and configure its position on the button (horizontal and vertical *Offset* and *Picture alignment* to the button's center and edges).

Preview

Displays the preview of the picture.

Active

3-state active button

Allows you to specify the button's and text's *color* to be displayed when the mouse cursor is placed over the button. The text to be displayed depends on the current state of the button.

7.2.3 Text

This component allows you to display static text. Usually, it is used to create labels and comments for other components.

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Menu](#)

[Scripts/Actions](#)

Security

▼ Static

Text

Font

Brings up the [Select Font](#) dialog box.

Autosize

Is used to adjust the size of the component to the length of the text. The *Width* and *Height* of the component are set to display the entire text on one line (without word wrapping).

Word wrap

Enables word wrapping depending on the component's *Width* and *Height*. The text is wrapped between words and where a line break is inserted.

Alignment

Determines whether the text should be aligned to the edges, or to the center of the component.

Vertical alignment

Determines whether the text should be vertically aligned to the top edge, to the bottom edge, or to the center of the component.

Shade

Determines whether to display the text's shade and its *Depth*, *Position*, and *Color*.

Frame

Allows displaying the component's frame and configuring the properties of the component's frame. The properties specify the *Width*, *Color*, *Black frame*, and the frame's *Outer style/Inner style*. For more details, see the [Bevel](#) component.

Orientation

Determines whether the text should be oriented *horizontally*, or *vertically*; vertical text can only be displayed using *TrueType* fonts.

Background

Determines whether to display the component with no background (*Transparent*), or with the specified background *Color*.

7.2.4 Active Text

This component allows you to display text depending on the current value of the tag to which the component is linked. If the current value of the control tag is within the interval specified for any of the defined text strings, the text is displayed on the component area.

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Scripts/Actions](#)

[Security](#)

▼ [Menu](#)

Display popup menu on click

Determines whether to display the previously selected [Popup Menu](#) component. This option is available to visualization windows and most components. You can select a Popup Menu component added to any visualization window. If it is added to another window, it is necessary to make sure the window is loaded into the runtime software's memory (in such a case, it is recommended to disable the *Dynamic loading* option). The popup menu can be assigned to the *Left*, *Middle*, and *Right* (most commonly) mouse *button*.

Display standard popup menu

Allows you to disable displaying the component's standard popup menu. If the *Right button* option is active, a custom popup menu is displayed, whereas displaying the standard popup menu is automatically disabled.

▼ Dynamic

Link to tag

Visible, Enabled, X, Y, Width, Height, Angle

If these properties are active and linked to a tag, the basic component properties defined on the *Basic* page can be changed dynamically (during runtime). The configured values can be either relative or absolute depending on the setting in the [Project Options](#) dialog box.

Advanced

Blinking

Blinking enabled

Defines the link to the tag to be used to control the blinking effect at the time interval specified by the selected *Timer* – at runtime, the component will blink when the tag value is non-zero.

▼ Functions

On the left side of the page, there is a list of the *Active Text* component's states that can be switched using a tag. The states can be added or removed. You can also change the state's priority. The right side is designed to configure the display settings for the specified state.

Link to tag

Specifies the link to the numeric-type tag that controls how the particular text is to be displayed. *Test value* is used to display the preview in the development environment.

Text

Specifies the text to be displayed for the actual state. At runtime, the text will be displayed if the current value of the control tag lies within the specified interval (*From value* – *To value*). If multiple states meet this condition, the text that is higher on the list of states is displayed. If no state meets this condition, the first state's text is displayed.

Font

Brings up the [Select Font](#) dialog box.

Blinking

Activates the blinking effect for the actual state at the time interval specified by the selected *Timer* (on the *Dynamic* page, a tag can also be used to control the blinking effect).

Alignment

Determines whether the text should be aligned to the edges, or to the center of the component.

Vertical alignment

Determines whether the text should be vertically aligned to the top edge, to the bottom edge, or to the center of the component.

Background

Determines whether to display the component with no background (*Transparent*), or with the specified background *Color*.

▼ Static

Text

Word wrap

Enables word wrapping depending on the component's *Width* and *Height*. The text is wrapped between words and where a line break is inserted.

Frame

Allows displaying the component's frame and configuring the properties of the component's frame. The properties specify the *Width*, *Color*, *Black frame*, and the frame's *Outer style/Inner style*. For more details, see the [Bevel](#) component.

Out-of-range value

Show

Specifies the display of the component in case the tag's value does not correspond to any of the states.

▼ Error

Link to tag

Error

Specifies the link to the numeric-type tag to be used to switch the component to the error state. The error state is activated if the tag's value is non-zero or logical 1 (true). If negated, it is activated when the tag's value is 0 or logical 0 (false).

Text

Specifies the text to be displayed if the component is in the error state.

Font

Brings up the [Select Font](#) dialog box.

Alignment

Determines whether the text should be aligned to the edges, or to the center of the component in the error state.

Vertical alignment

Determines whether the text should be vertically aligned to the top edge, to the bottom edge, or to the center of the component in the error state.

Background

Determines whether to display the component with no background (*Transparent*), or with the specified background *Color*.

7.2.5 Bevel

This is a static component allowing you to display other components as a component group using, for example, a line or a frame with plastic edges.

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

Menu

Scripts/Actions

Security

▼ Static

Shape

Box is a rectangular shape drawn with simple light and dark lines indicating the illuminated and shaded parts. If a line is used (bottom, left, right, top), only the corresponding edge of the rectangle is drawn. The *Frame* shape allows you to draw the rectangle with a more complex frame as defined by the **Frame** properties.

Bevel style

Determines whether to highlight the component's shapes *Box* and lines as *Lowered* or *Raised*.

Frame

Specifies the properties of the frame. The frame is made up of up to four lines of different width and color. The outer border of the frame is formed by a thin black line – *Black frame*. Next, the outer edge is formed by a thin light or dark line indicating the frame's shade. The frame itself is drawn with a line of the specified *Width* and *Color*. Similarly, the inner edge is formed. The edge's *Outer/Inner style* can be defined using radio buttons. The dark or light line is drawn so that it respects the shaded and illuminated parts of the frame using an imaginary light source located on the top left.

Background

Is used to specify the component's background *Color*. The background can be without any color – *Transparent*.

Picture

Specifies the picture to be displayed in the background of the component. The picture's *Layout* can be one of the following: *Normal* (original size), *Resize graphic* (picture's size is adjusted to the component), *Resize component* (component's size is adjusted to the picture), or *Tiled*.

7.2.6 Picture

This component is intended for displaying a selected static picture.

Properties

Basic

Alignment

Dynamic

Menu

Scripts/Actions

Security

▼ Functions

Picture

Static

At design-time, the picture that is to be displayed is imported from the project's picture database (managed through the [Picture Manager](#)).

Dynamic

Link to tag

A tag of type *String* is used to import the desired picture either from the project's picture database (*Source Project*) or from a file on disk (*Source File*) or from a file located on a URL (*Source URL*). *Test value* is used to specify the name of the picture (or the name of the picture's file) to be displayed at design-time.

Watch file changes

Allows you to watch changes made to the picture and automatically load a new picture into the visualization project. This option can only be used if the *File* source has been selected.

File download timeout

Specifies the duration of the time period during which the file must be downloaded from the URL. The timeout duration depends on the network transfer speed. If the timeout is too short, the component will not display the picture properly. This option can only be used if the *URL* source has been selected.

Automatic update

Allows you to specify the time period during which the picture is automatically downloaded and loaded into the visualization project. Depending on the place that checks the time interval, there are two types of timers: *Local* (the component checks the time interval), or *Global* (the project checks the time interval for all components). The project timers can be defined via the [Project Options](#) dialog. This option can only be used if the *URL* source has been selected.

▼ Static

Layout

Specifies how the selected picture will be displayed if its size is different from the size of the component.

Normal

The picture is displayed in its original size in the top right corner of the component.

Resize graphic

The picture's size is adjusted to the size of the component (the picture is drawn so that it fills the entire component area). If the picture is drawn in a size other than original, it may affect the drawing speed.

Resize component

The component's size is adjusted to the size of the picture (*Width* and *Height* of the component are changed so that they correspond to the size of the picture).

Tiled

The picture is drawn as tiles so that they fill the component area.

Preview

Displays the preview of the picture.

7.2.7 Active Picture

This component allows you to display a picture depending on the current value of the tag to which the component is linked. If the current value of the control tag is within the interval

specified for any of the defined pictures, the picture is displayed on the component area.

Properties

[Basic](#)

[Alignment](#)

[Scripts/Actions](#)

[Security](#)

▼ [Dynamic](#)

Link to tag

Visible, Enabled, X, Y, Width, Height, Angle

If these properties are active and linked to a tag, the basic component properties defined on the *Basic* page can be changed dynamically (during runtime). The configured values can be either relative or absolute depending on the setting in the [Project Options](#) dialog box.

Advanced

Blinking

Blinking enabled

Defines the link to the tag to be used to control the blinking effect at the time interval specified by the selected *Timer* – at runtime, the component will blink when the tag value is non-zero.

Error

Defines the link to the tag that bears information on an error. If the tag value is non-zero, the component will indicate an error at runtime.

▼ [Menu](#)

Display popup menu on click

Determines whether to display the previously selected [Popup Menu](#) component. This option is available to visualization windows and most components. You can select a Popup Menu component added to any visualization window. If it is added to another window, it is necessary to make sure the window is loaded into the runtime software's memory (in such a case, it is recommended to disable the *Dynamic loading* option). The popup menu can be assigned to the *Left*, *Middle*, and *Right* (most commonly) mouse *button*.

Display standard popup menu

Allows you to disable displaying the component's standard popup menu. If the *Right button* option is active, a custom popup menu is displayed, whereas displaying the standard popup menu is automatically disabled.

▼ Functions

On the left side of the page, there is a list of the *Active Picture* component's states that can be switched using a tag. The states can be added or removed. You can also change the state's priority. The right side is designed to configure the display settings for the specified state.

Link to tag

Specifies the link to the numeric-type tag that controls how the particular picture is to be displayed (specifies the state to be displayed). *Test value* is used to preview the chosen picture in the development environment.

Picture

Specifies the picture to be displayed for the actual state. The picture that is to be displayed must be contained in the project's picture database (managed through the [Picture Manager](#)). At runtime, the picture will be displayed if the current value of the control tag lies within the specified interval (*From value* – *To value*). If multiple states meet this condition, the picture that is higher on the list of states is displayed. If no state meets this condition, no picture is displayed.

Blinking

Activates the blinking effect for the actual state at the time interval specified by the selected *Timer* (on the *Dynamic* page, a tag can also be used to control the blinking effect).

Display popup menu on click

Allows you to define a link to a *Popup Menu* component separately for each state. The *Popup Menu* component must be added to the area of the same window. At runtime, the defined menu will be shown when clicking on the component in the actual state (this setting is preferred to the global setting – see the [Menu](#) page).

▼ Static

Layout

Specifies how the selected picture will be displayed if its size is different from the size of the component.

Normal

The picture is displayed in its original size in the top right corner of the component.

Resize graphic

The picture's size is adjusted to the size of the component (the picture is drawn so that it fills the entire component area). If the picture is drawn in a size other than original, it may affect the drawing speed.

Resize component

The component's size is adjusted to the size of the picture (*Width* and *Height* of the component are changed so that they correspond to the size of the picture).

Tiled

The picture is drawn as tiles so that they fill the component area.

Out-of-range value

Show

Specifies the display of the component in case the tag's value does not correspond to any of the states.

7.2.8 Animation

This component allows for animating a sequence of pictures. A tag can be used to start and stop the animation.

Properties

Basic

Alignment

Scripts/Actions

Security

▼ Dynamic

Link to tag

Visible, Enabled, X, Y, Width, Height, Angle

If these properties are active and linked to a tag, the basic component properties defined on the *Basic* page can be changed dynamically (during runtime). The configured values can be either relative or absolute depending on the setting in the [Project Options](#) dialog box.

Advanced

Interval

Defines the link to the tag whose value is used to specify the time interval at which individual pictures are to change. If this option is not active, a constant value (*Const.*) is used to specify this interval.

Error

Defines the link to the tag that bears information on an error. If the tag value is non-zero, the component will indicate an error at runtime.

Reverse

Defines the link to the numeric-type tag (or Bool) that is used to reverse the animation (show the pictures in reverse order) at runtime. Reverse can be activated if the tag value is non-zero (however, if the *Negation* option is active, it can be activated only if the value of the tag is equal to 0).

▼ Menu

Display popup menu on click

Determines whether to display the previously selected [Popup Menu](#) component. This option is available to visualization windows and most components. You can select a Popup Menu component added to any visualization window. If it is added to another window, it is necessary to make sure the window is loaded into the runtime software's memory (in such a case, it is recommended to disable the *Dynamic loading* option). The popup menu can be assigned to the *Left*, *Middle*, and *Right* (most commonly) mouse *button*.

Display standard popup menu

Allows you to disable displaying the component's standard popup menu. If the *Right button* option is active (and a custom popup menu is displayed) or the main tag is not used in the component, displaying the standard popup menu is automatically disabled.

▼ Functions

Link to tag

Main

Specifies the link to the tag to be used to control starting of the animation. To run the animation at runtime, the value of the main tag must be equal to the value specified by the *Starting value* property. If the *Main* property is not active, the animation is started right after the window is loaded into memory.

Run

Is used to run the preview of the animation at design-time.

Picture

Allows you to specify a picture for a selected image of the animation. To add images to the list on the left side of the dialog box, use the commands from the popup menu or toolbar.

New Item

Is used to add a new item to the list. A picture must be assigned to each item on the list.

Add Items

Brings up the *Select Picture* dialog box from which all pictures for the animation can be selected at a time.

▼ Static

Background

Static picture

Allows you to specify a static picture to be displayed if the animation is not running.

Layout

Specifies the animation pictures' layout. It can be one of the following: *Normal*, *Resize graphic*, *Resize component*, or *Tiled*. For a detailed description of the layout options, see [Picture](#).

Animation type

Determines whether to run the animation *Repeatedly* or only *Once*; the latter option allows you to force the starting picture to be displayed after the animation has ended by activating the *Rewind to start* option.

7.2.9 Pipe

This component is intended for displaying the pipe symbol in visualizations of industrial processes. Further, it allows for creating other visualization components, such as tanks or boilers. You can also use the component to dynamically change the pipe's color using the main tag.

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Scripts/Actions](#)

[Security](#)

▼ Menu

Display popup menu on click

Determines whether to display the previously selected [Popup Menu](#) component. This option is available to visualization windows and most components. You can select a Popup Menu component added to any visualization window. If it is added to another window, it is necessary to make sure the window is loaded into the runtime software's memory (in such a case, it is recommended to disable the *Dynamic loading* option). The popup menu can be assigned to the *Left*, *Middle*, and *Right* (most commonly) mouse *button*.

Display standard popup menu

Allows you to disable displaying the component's standard popup menu. If the *Right button* option is active (and a custom popup menu is displayed) or the main tag is not used in the component, displaying the standard popup menu is automatically disabled.

▼ Functions

Link to tag

Main

Specifies the numeric-type tag that is used to switch the component's color (select a state). If this option is not active, the color configuration specified on the *Static* page is used. *Test value* is used to specify the color scheme to be displayed at design-time.

State

At runtime, the specified state will be displayed if the current value of the control tag lies within the specified interval (*From value* – *To value*). If multiple states meet this condition, the state that is lower on the list of states will be displayed. If no state meets this condition, the first state will be displayed.

Blinking

Activates the blinking effect for the actual state at the time interval specified by the selected *Timer* (on the *Dynamic* page, a tag can also be used to control the blinking effect).

Colors

Allows you to specify the *Colors* and *Offset* used to display the component. The offset can be anywhere within the interval 0–255. It specifies the position of the middle color (e.g., value 128 indicates the middle color will be drawn in the center of the pipe). The area of the component is drawn as gradients (a gradual transition between the specified colors).

3-colored

Specifies the number of colors used to create a gradient. Three colors provide a better three-dimensional perception.

▼ Static

Width

Specifies the diameter (width) of the pipe. If this option is inactive, the spinner can be used to specify the pipe's diameter (in pixels). If the option is active, the diameter is dependent on the size of the component (this applies to *Straight pipe*).

Shape

Determines whether to draw the component as *Straight pipe* or as *Other shapes* (bend, T-shape, or cross).

Orientation

Determines whether to display the pipe *horizontally* or *vertically*.

Colors

Allows you to specify the *Colors* and *Offset* used to display the component. The offset can be anywhere within the interval 0–255. It specifies the position of the middle color (e.g., value 128 indicates the middle color will be drawn in the center of the pipe). The area of the component is drawn as gradients (a gradual transition between the specified colors).

3D

Specifies the number of colors used for drawing the area of the pipe. If this option is inactive, only the first color (*Color 1*) is drawn – the gradient providing the 3D effect is not used.

3-colored

Specifies the number of colors used to create a gradient. Three colors provide a better three-dimensional perception.

Borders

Allows you to display the pipe's borders and specify its *Width* and *Color*.

Ending

Specifies the shape of *Straight pipe's* ending (you can, for example, create tanks, reservoirs, reactors if the ending settings are configured appropriately). The *Right* and *Left* (or *Bottom* and *Top* if the pipe's *Vertical* orientation is chosen) ending can be defined independently of each other.

Flange

Specifies the *Width* and *Color* of the straight line used to separate the pipe's ending.

Shape selection

Enables you to select a particular shape for the pipe – *bend*, *T-shape*, or *cross*. If the *bend* shape is selected, the bend's *Inner radius* and *Segment count* can be specified (the lower the *Segment count*, the more angular the bend).

Out-of-range value

Show

Specifies the display of the component in case the tag's value does not correspond to any of the states.

▼ Error

Link to tag

Error

Specifies the link to the numeric-type tag to be used to switch the component to the error state. The error state is activated if the tag's value is non-zero or logical 1 (true). If negated, it is activated when the tag's value is 0 or logical 0 (false).

Colors

Specifies the colors to be displayed if the component is in the error state. For more information on individual properties, see the *Static* page.

7.2.10 Container

This component is intended for adding different parts of a visualization project to a visualization window. It allows you to insert, for example, a *window template* or *current alarms/events* (list) into the window.

Properties

Basic

Alignment

Dynamic

▼ Functions

Embedded object – Window template

This option is used to embed a window template into the container. A structured tag of the type that corresponds to the data structure assigned to the window template can be assigned to the container. Thus, the container enables you to repeatedly embed graphical elements of the visualization project with the option of central editing.

Options

Window template

Is a window template whose instance will be created (embedded into the container). The width of the *Container* component is determined by the right edge of the component for which the sum of the X coordinate and the width is the largest of the sums for all components placed in the [window template](#). The height of the *Container* component is determined by the bottom edge of the component for which the sum of the Y coordinate and the height is the largest of the sums for all components placed in the window template. If no component is placed in the window template, only the edge of the *Container* component is displayed.

Link to tag

Specifies the type of the link to a structured tag whose nested tags will be assigned to the components placed in the instance of the window template instead of the original data structure fields (the components' links to the data structure fields are automatically replaced with links to the nested tags). The link can be either *Static* (i.e., the structured tag is linked directly) or *Dynamic* (i.e., the link is indirect – the name of the structured tag is specified by the value of the selected string-type tag).

Embedded object – Current alarms/events

This option is used to embed the list of current alarms/events into the container.

Options

Filter by device

Is used to filter the displayed alarms/events depending on the device selected.

Filter by alarm/event type

Is used to filter the displayed alarms/events depending on the alarm/event type/types selected.

Filter by alarm/event groups

Is used to filter the displayed alarms/events depending on the list of alarm/event groups selected. There are two ways of how to link a group: Directly, i.e., via a *Static* link, or indirectly, i.e., via a *Dynamic* link using a string-type tag. The latter option means that the list of alarm/event groups is specified by the value of the string-type tag.

Show toolbar, status bar, and progress bar

Determines whether to display, alongside the list of alarms/events, the same bars as in the *Current Alarms/Events* window in the runtime software.

Share column settings with other containers

Determines whether to share the settings of the alarm/event list's columns with all *Container* components for which this option must be active. If the option is inactive, the columns' custom settings will be used. They are settings that can only be customized at runtime (not at design-time).

Embedded object – Historical alarms/events

This option is used to embed the list of historical alarms/events into the container.

Options*Filter by device*

Is used to filter the displayed alarms/events depending on the device selected.

Filter by alarm/event type

Is used to filter the displayed alarms/events depending on the alarm/event type/types selected.

Use custom filter

Allows selecting an alarm/event filter predefined through the alarm/event viewer in the runtime software.

Show toolbar, status bar

Determines whether to display, alongside the list of alarms/events, the same bars as in the *Historical Alarms/Events* window in the runtime software.

Share column settings with other containers

Determines whether to share the settings of the alarm/event list's columns with all *Container* components for which this option must be active. If the option is inactive, the columns' custom settings will be used. They are settings that can only be customized at runtime (not at design-time).

Embedded object – Trend

This option is used to embed a trend into the container.

Options

Link type

Specifies the link to the trend that is to be displayed on the component area at runtime. First, it is necessary to define trends through the [Trend Manager](#). The link to the trend can be either *Static* (direct) or *Dynamic* (indirect) – the name of the trend is specified by the value of the selected string-type tag.

Show toolbar, status bar

Determines whether to display, alongside the trend, the same bars as in the trend viewer in the runtime software.

Embedded object – Communication channel

This option is used to embed a control that displays an online packet list for a selected communication channel into the container.

Options

Channel

Specifies the link to the communication channel.

Filter by device

Is used to filter the displayed information of the communication channel depending on the device selected.

Show toolbar, status bar

Determines whether to display, alongside the packet list view for the communication channel, the same bars as in the communication channel's window in the runtime software.

Share column settings with other containers

Determines whether to share the settings of the packet list view's columns with all *Container* components for which this option must be active. If the option is inactive, the columns' custom settings will be used. They are settings that can only be customized at runtime (not at design-time).

Embedded object – Report

This option is used to embed a report into the container.

Options

Link type

Specifies the link to the report that is to be displayed on the component area at runtime. First, it is essential to define reports through the [Report Manager](#). The link to the report can be either *Static* (direct) or *Dynamic* (indirect) – the name of the report is specified by the value of the selected string-type tag.

Viewer

Show toolbar, status bar

Determines whether to display, alongside the report, the same bars as in the report viewer in the runtime software.

Share viewer settings with other containers

Determines whether to share the settings of the report viewer with all *Container* components for which this option must be active. If the option is inactive, the viewer's custom settings will be used. They are settings that can only be customized at runtime (not at design-time).

Embedded object – Custom report

This option is used to embed a custom report into the container.

Options

Link type

Specifies the link to the custom report that is to be displayed on the component area at runtime. First, it is essential to define custom reports through the [Custom Report Manager](#). The link to the custom report can be either *Static* (direct) or *Dynamic* (indirect) – the name of the custom report is specified by the value of the selected string-type tag.

Viewer

Show toolbar, status bar

Determines whether to display, alongside the custom report, the same bars as in the custom report viewer in the runtime software.

Share viewer settings with other containers

Determines whether to share the settings of the custom report viewer with all *Container* components for which this option must be active. If the option is inactive, the viewer's custom settings will be used. They are settings that can only be customized at runtime (not at design-time).

7.2.11 Combo Box

This component allows you to change the tag value according to the selection of an item from the list. The item's number or text can be assigned to the tag.

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Security](#)

▼ [Functions](#)

Link to tag

Specifies the link to the tag whose value is to be indicated and controlled using the *Combo Box* component.

Type

Specifies the type of the link to the tag that is to be linked. If the *Numeric* type is selected, the number specified by the **Value** property will be assigned to the tag. If the *Textual* type is chosen, the text specified by the **Text** property will be assigned to the tag of type *String*.

List

Allows you to select a type of the list of the items displayed in the combo box. If the *Static* type is chosen, the items will be specified by a fixed list. If the *Dynamic* type is selected, the items will be controlled by array-type tags.

Test value

Specifies the tag value to be displayed at design-time.

Text

Specifies the text displayed in the combo box. If the *Textual* type is chosen, the specified text is written directly into the tag when selecting the appropriate item from the combo box.

Value

Specifies the value of the item for the *Numeric* type. At runtime, the above specified text will be selected if the current value of the control tag is equal to this value, and vice versa – the corresponding value will be written into the main tag when selecting the appropriate item.

Query before setting value

Determines whether to display a confirmation dialog box prior to writing the new value into the control tag when the item is selected. You can enter custom text to be displayed in the confirmation dialog box.

Items

Allows you to dynamically control the list of items.

Texts

Defines the link to the tag of type *Array of String*, *Array of UTF8String*, or *Array of WideString (UCS-2)* whose value is to be used to specify the items' text strings. If the *Textual* type of link is chosen, the selected item's text is written directly into the tag.

Values

Defines the link to the integer array-type tag whose value is to be used to specify the values of items for the *Numeric* type of link. At runtime, an item (according to the element index in the combo box) will be selected if the current value of the control tag is equal to the value of the tag element, and vice versa – the corresponding value of the selected array element will be written into the main tag when selecting the appropriate item.

Count

Specifies the number of items displayed in the combo box. The value can be specified statically or it can be controlled dynamically using a tag. If the tag value is -1 (minus one), all items of the combo box will be displayed. In this case, the number of items is equal to the number of elements of the array-type tag that defines *Texts* or *Values*. If these arrays have a different number of elements, the number of items is equal to the lower number of elements.

▼ Static

Confirm button

Allows you to display the button on the right side of the component, thereby improving the security of writing values into the control tag. When changing a value during runtime, it is necessary to confirm the new state by pressing the button that will be activated after selecting an item from the combo box. If the change is not confirmed before the delay specified by the *Confirm timeout* property expires, the new value is not accepted and the item corresponding to the original value will be re-displayed in the combo box. The *Width* property is used to define the size of the *Confirm button*.

Setting value

Update timeout (ms)

Specifies the time period during which the component is not updated according to the main tag's value. The update timeout's value depends on how fast it is to write the tag into a device. Sometimes, right after the value is changed, the original value can be displayed for a short time if the update timeout's value is too short.

Displayed item count

Specifies the maximum number of items displayed when selecting from the combo box. If the box contains more items than specified by this property, a scroll bar is displayed.

Text

Specifies the font of the combo box's text using the [Select Font](#) dialog box.

Background

Specifies the background color of the combo box using the [Select Color](#) dialog box.

7.2.12 Check Box

This component allows you to easily set *Bool*-type tag values.

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

▼ [Security](#)

Functions, scripts, actions, menus

Secure

Determines whether to select access rights required for securing the interaction between the user and the component. If this feature is enabled, the component is only accessible to users with sufficient access rights. To specify the access rights required for accessing the component, bring up the [Select Access Rights](#) dialog box by clicking on the key icon. The user must have at least one access right selected on the list available.

Query before setting value

Query for state 0

Allows displaying a confirmation dialog box with the specified text to deselect the check box.

Query for state 1

Allows displaying a confirmation dialog box with the specified text to select the check box.

▼ Functions

Link to tag

Specifies the tag to which the component is linked (main tag). To select the tag, use the standard [selection dialog box](#). The component allows changing the tag's value. When changing the tag, the value displayed by the component also changes.

Test value

Specifies the value to be displayed at design-time.

Setting value

Update timeout (ms)

Specifies the time period during which the component is not updated according to the main tag's value. The update timeout's value depends on how fast it is to write the tag into a device. Sometimes, right after the value is changed, the original value can be displayed for a short time if the update timeout's value is too short.

▼ Static

Text

Specifies the text to be displayed by the *Check Box* component.

Text

Word wrap

Determines whether to wrap the check box's text. If the text (word) extends outside the viewable area of the component, it will be displayed on a new line.

Font

Specifies the font of the component's text using the [Select Font](#) dialog box.

Alignment

Determines whether the text should be aligned to the *Right* or *Left* edge of the component.

Background

Specifies the background color of the component using the [Select Color](#) dialog box.

7.2.13 Popup Menu

This component is used to define a popup menu for other components. It is a non-visual component that is not displayed during runtime. The component must be linked to a visual component (e.g., *Display*). To display the popup menu at runtime, click the [specified mouse button](#) on the area of the visual component. The structure of the popup menu is formed by items that can be used to execute scripts/actions or to set tag values.

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

▼ Functions

On the left side of the page, there is a list of the *Popup Menu* component's items that can be extended and customized using standard toolbar commands.

Item type

Determines whether the specified item should represent *Text* or *Separator*. At runtime, if the *Text* type is chosen, the specified action is performed and the popup menu is closed; the *Separator* type is used to draw a line separating other items.

Text

Specifies the text of the item.

Dynamic

Determines whether to control the *visibility* and *enabling* the popup menu's item at runtime by the specified tag. The item is only visible when the value of the numeric-type tag is non-zero (or equal to 0 if the *Negation* option is active).

Functions

Is used to select the operations to be performed after the specified item of the *Popup Menu* component is chosen.

Script

Allows you to select the script to be executed after the specified item is chosen. Scripts can be defined through the [Script Manager](#).

Tag

Specifies the link to the tag whose value is to be entered. The *Select Tag* dialog box is brought up to change the tag's value.

Action

Is used to select the action to be performed after the specified item of the *Popup Menu* component is chosen. Actions can be defined through the [Action Manager](#).

7.2.14 Progress Bar

This component allows for displaying the current value of the tag to which the progress bar is linked.

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Scripts/Actions](#)

[Security](#)

▼ [Menu](#)

Display popup menu on click

Determines whether to display the previously selected [Popup Menu](#) component. This option is available to visualization windows and most components. You can select a Popup Menu component added to any visualization window. If it is added to another window, it is necessary to make sure the window is loaded into the runtime software's memory (in such a case, it is recommended to disable the *Dynamic loading* option). The popup menu can be assigned to the *Left*, *Middle*, and *Right* (most commonly) mouse *button*.

Display standard popup menu

Allows you to disable displaying the component's standard popup menu. If the *Right button* option is active, a custom popup menu is displayed, whereas displaying the standard popup menu is automatically disabled.

▼ Functions

Link to tag

Specifies the link to the tag whose value is to be indicated. *Test value* is used to display the preview in the development environment.

Range

Allows you to set the *Minimum* and *Maximum* value to be displayed by the *Progress Bar* component (specifies the range of the indicator). The range of the indicator can also be controlled dynamically using a tag.

Limits

Allows you to specify the color of the indicator depending on the value of the control tag. You can use either the limits defined for the specified tag or the limits defined manually for the particular progress bar.

▼ Static

Orientation

Determines whether to display the indicator *horizontally* (left to right), or *vertically* (bottom to top).

Segmented

Allows you to divide the indicator into the specified number of segments (*Division count*). The segments are separated by spaces defined by the *Space width* property. If this option is not active, the indicator is smooth.

Style

Single-colored

If this option is active, the entire indicator is drawn in a single color depending on the current tag value and the color settings configured on the *Functions* page (the **Limits** property).

Multicolored

If this option is active, the indicator's parts are drawn in colors depending on the limits and colors configured on the *Functions* page.

Value

Allows you to select the color of the indicator if the value of the control tag is within the specified limits – normal state.

Frame

Allows displaying the component's frame and configuring the frame's properties. The properties specify the *Width*, *Color*, *Black frame*, and the frame's *Outer style/Inner style*. For more details, see the [Bevel](#) component.

Background

Specifies the background color of the component. The color is visible in places where the indicator is not displayed (and in spaces if the **Segmented** option is active).

7.2.15 Radio Buttons

This component is intended for indicating and selecting one of several values of the tag to which the *Radio Buttons* component is linked. It is also intended for indicating and setting several digital tags to which individual buttons of the component are linked. In the latter case, when changing the state of the component at runtime, the value of the selected button's tag is set to logical 1 and the other buttons' tag values are set to logical 0.

Properties

Basic

Alignment

Dynamic

Menu

Scripts/Actions

Security

▼ Functions

On the left side of the page, there is a list of radio buttons displayed by the component. The list can be extended and customized using commands from the toolbar or from the component's popup menu.

Link to tag

Specifies the link to the main tag that is used to control the component's state and whose value can be set by the radio buttons. *Test value* is used to display the preview in the development environment. If the *Main* option is inactive, individual radio buttons are expected to be linked to a tag of type *Bool*.

Text

Specifies the text to be displayed next to the particular radio button.

Value

Allows you to assign a numeric value to the selected radio button. The radio button will be displayed at runtime if the current value of the main tag is equal to the assigned number, and vice versa – the specified number will be assigned to the main tag when clicking on the radio button.

If the main tag is not defined, a *Bool*-type tag can be assigned to each radio button on the list. If the value of the assigned tag is set to logical 1, the radio button will be active, and vice versa – when clicking on the radio button, the value of the button's digital tag is set to logical 1 and the other buttons' tag values are set to logical 0.

Query before setting value

Upon clicking the button, a dialog box displaying the specified text will be shown prior to assigning a new value to the main tag (or digital tags).

▼ Static

Preview

The upper part of the page shows how a checked and unchecked radio button will look.

Text

Specifies the *Font* (for both checked and unchecked buttons) and its *Color* for normal (unchecked) buttons. A different color can be specified for the checked (active) button – other font attributes do not change.

Background

Specifies the background *Color* of the component. However, the background can be without any color – *Transparent*.

Frame

Allows displaying the component's frame (frame around the radio buttons) and configuring the frame's properties. The properties specify the *Width*, *Color*, *Black frame*, and the frame's *Outer style/Inner style*. For more details, see the [Bevel](#) component.

7.2.16 Track Bar

This component is intended for selecting a numeric value in the specified range. This value can be written into the linked tag. It is mostly used with other components displaying different lists (*Data Grid*, *Data Tree*).

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

▼ Security

Functions, scripts, actions, menus

Secure

Determines whether to select access rights required for securing the interaction between the user and the component. If this feature is enabled, the component is only accessible to users with sufficient access rights. To specify the access rights required for accessing the component, bring up the [Select Access Rights](#) dialog box by clicking on the key icon. The user must have at least one access right selected on the list available.

Query before setting value

Allows you to specify a query put prior to writing the track bar position into a tag.

▼ Functions

Link to tag

Specifies the link to the tag that is used to control the component's state and whose value can be set by the track bar. *Test value* is used to display the preview in the development environment.

Range

Allows you to set the *Minimum* and *Maximum* value to be displayed by the *Track Bar* component (specifies the range of the track bar). The range of the track bar can also be controlled dynamically using a tag. By default, the lower value is shown on the left or at the bottom. If the *Inverted range* option is active, it is shown on the right or at the top.

Setting value

On mouse drag

The position value of the track bar is written into the tag immediately after the position of the thumb is changed.

On mouse drop

The value is written into the tag once you stop dragging the thumb.

Update timeout (ms)

Specifies the time period during which the component is not updated according to the main tag's value. The update timeout's value depends on how fast it is to write the tag into a device. Sometimes, right after the value is changed, the original value can be displayed for a short time if the update timeout's value is too short.

▼ Static

Orientation

Determines whether to display the track bar *horizontally*, or *vertically*.

Thumb

Allows you to adjust the size of the track bar's thumb (*Thumb length*).

Show value on change

If this option is active, bubble help will appear displaying the current value when moving the thumb.

Background

Specifies the background color of the track bar using the [Select Color](#) dialog box.

Show scale

Determines whether to show the scale next to the track bar, allowing to specify its position.

Step

Specifies the step of the scale. The scale will display every *n*th value of the component's range.

7.2.17 Edit Box

The component is intended for displaying and editing the current value of a tag. The value can be edited directly from the visualization window. To write a new value into the tag, the Enter key can be used.

Properties

Basic

Alignment

Dynamic

▼ Security

Functions, scripts, actions, menus

Secure

Determines whether to select access rights required for securing the interaction between the user and the component. If this feature is enabled, the component is only accessible to users with sufficient access rights. To specify the access rights required for accessing the component, bring up the [Select Access Rights](#) dialog box by clicking on the key icon. The user must have at least one access right selected on the list available.

Setting value

Prohibit violating bounds

Allows you to check the entered value and disables writing a tag value outside the limits set by the *Min* and *Max* values (in such a case, the warning "*Value is not within required range*" is displayed).

Require confirmation

Determines whether to display a confirmation dialog box prior to writing the new value into the main tag.

Alert to violating bounds

Allows you to check the value to be entered. If the tag value is not set within the required range, a warning dialog box will be displayed prior to entering the new main tag value. The *Query* text box is intended for specifying a custom question (if the text "*Value entered is greater/smaller than xxx. Do you really want to set this value?*" is not suitable).

▼ Functions

Link to tag

Specifies the tag to which the component is linked (main tag). To select the tag, use the standard [selection dialog box](#). The component allows changing the tag's value. When changing the tag, the value displayed by the component also changes.

Test value

Specifies the value to be displayed at design-time.

Setting value

Update timeout (ms)

Specifies the time period during which the component is not updated according to the main tag's value. The update timeout's value depends on how fast it is to write the tag into a device. Sometimes, right after the value is changed, the original value can be displayed for a short time if the update timeout's value is too short.

On change focus after edited

This option allows for writing the value into the tag if the component loses focus.

▼ Static

Input box

Alignment

Specifies the alignment of the edit box's text.

Text

Specifies the font of the edit box's text using the [Select Font](#) dialog box and its properties.

Background

Specifies the background color of the edit box using the [Select Color](#) dialog box.

Editing

Look change

Allows the user to change the font and background color when editing the edit box. The *Look change* combo box allows activating the **Text** and **Background** properties so that you can customize the colors during runtime.

Password character

In addition, the edit box can also be used by users to enter passwords. When writing a password, the text must not be displayed on the monitor. This option allows you to specify the wildcard character that is to be displayed. If no password character is specified, the standard text is displayed.

Border style

Specifies the style of the input box's border.

Label

Show label

Determines whether to display the edit box's label.

Position

Specifies the position of the edit box's label. The label can be placed on the *Left*, on the *Right*, *Above*, or *Below* the edit box.

Offset

Specifies a horizontal offset of the label's text from the edit box.

Alignment

Specifies the alignment of the label's text. The text's alignment depends on the position of the label. If the label is positioned on the *Right* or *Left* of the edit box, the alignment will not work.

Text

Specifies the font of the label's text using the [Select Font](#) dialog box and its properties.

Background

Specifies the background color of the label using the [Select Color](#) dialog box.

7.2.18 Notepad

The component is intended for displaying and editing multi-line text data. The component's text document can be stored in a file or in a tag of type *String*. The following commands of the component allow working with the text document's contents: *Clear Contents*, *Save*, *Print*, *Import Contents*, *Export Contents*. The *Page Setup* command is used to configure the properties of the page.

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Security](#)

▼ Functions

Data - Saving - Internal

The text document is stored in the file with an `.rdt` extension in the `<Project>\Settings\Components` directory.

Edit Document

Brings up the *Edit* dialog box allowing you to edit the contents of the text document. Any changes made in this editor will be saved on disk once the project's window has been saved.

Data - Saving - Selected file

The text document is stored in a text file.

Link to file

Specifies the file in which the text document is to be stored.

File name

Specifies the tag of type *String* containing the name of the file in which the text document's contents are to be stored. Thus, it is possible to change the file name at runtime.

Watch file changes

Determines whether to watch changes made to the contents of the file on disk. If the component is not being edited, the text document's contents are automatically updated when changed.

Data - Saving - Main tag

The text document is stored in a tag of type *String*.

Link to tag

Specifies the tag of type *String* in which the text document is to be stored. *Test value* is used to display the preview in the development environment.

Setting value

Update timeout (ms)

Specifies the time period during which the component is not updated according to the main tag's value. The update timeout's value depends on how fast it is to write the tag into a device. Sometimes, right after the value is changed, the original value can be displayed for a short time if the update timeout's value is too short.

On change focus after edited

This option allows for saving the text document if the component loses focus.

Keep caret at end of text on data change

Determines whether to position the caret after the last character when the text document has changed.

▼ Static

Alignment

Specifies the alignment of the notepad's text.

Text

Specifies the font and color of the component's text. The command brings up the [Select Font](#) dialog box and its properties. By clicking on the colored square, the [Select Color](#) dialog box is brought up and the text's color can then be directly changed.

Word wrap

Enables word wrapping depending on the width of the component.

Background

Specifies the background color of the component. The command brings up the [Select Color](#) dialog box in which the required color can be specified.

Editing

The options specify how to highlight the component if it's being edited.

Look change

Allows the user to change the font and background color when editing the text document. The *Look change* combo box allows activating the **Text** and **Background** properties so that you can customize the colors during runtime.

Scroll bars

Determines whether to display a horizontal scroll bar and/or a vertical scroll bar. The scroll bars only make sense when the written text is too long and therefore cannot be displayed by the component.

Border style

Specifies the style of the component's border.

Appearance

Show toolbar

Determines whether to display the component's toolbar.

Show popup menu

Determines whether to display the component's popup menu when pressing the right mouse button on the component area.

Commands

Allows you to select commands to be displayed in the component's toolbar and popup menu.

Command	Description	Keyboard shortcut
Clear Contents	deletes the document's contents	Ctrl+N
Save	saves changes made to the document	Ctrl+S
Page Setup	sets up the page's properties	
Print	prints the document's contents	
Import Contents	imports the document's contents from the selected text file into the component	
Export Contents	exports the document's contents from the component into the selected text file	

7.3 Additional

[Scale](#)

[Gauge](#)

[Clock](#)

[Internet Explorer](#)

[Media Player](#)

[ActiveX Container](#)

[Real-Time Chart](#)

[Real-Time Trend](#)

[Level Fill Picture](#)

[Data Grid](#)

[Data Tree](#)

[Progress Wheel](#)

7.3.1 Scale

This is a static component representing a horizontal or vertical scale. The component consists of the main axis, divisions (division lines), and numbers. For example, it is used in combination with the *Progress Bar* component, which can display the surface of a liquid in a tank.

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Menu](#)

[Scripts/Actions](#)

[Security](#)

▼ Functions

Range

Specifies the range of the scale (the *Maximum* and *Minimum* displayed value) and the number of decimal places (*Dec. place count*) that are used when displaying the numbers.

▼ Static

Text

Specifies the font of the scale's numbers and their *Offset* from the ends of the scale's *Big Divisions* (in pixels).

Orientation

Specifies the direction of the divisions from the main axis.

Bases

Specifies the place that the scale's values will start to be drawn from (corresponds to the minimum of the range).

Background

Is used to specify the component's background *Color*. The background can be without any color – *Transparent*.

Visible divisions

Specifies which divisions of the scale are to be displayed. Only the following divisions can be displayed: *Big*, *Big and medium*, or *Big, medium and small*. If the *None* option is chosen, the scale won't be displayed at all.

Main Axis, Big Divisions, Medium Divisions, Small Divisions

These pages contain properties for displaying the main axis, divisions, and the scale's numbers. You can specify the *Color* and *Width* for the main axis (and activate its *visibility*) and the *number of divisions*, the *length* and *width* of the division line, and the division lines' *Color* for the divisions. You can also specify whether to *Show numbers*.

7.3.2 Gauge

This component is intended for displaying an analog (pointer) device; the position of the pointer depends on the current value of the tag to which the gauge is linked.

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Scripts/Actions](#)

[Security](#)

▼ Menu

Display popup menu on click

Determines whether to display the previously selected [Popup Menu](#) component. This option is available to visualization windows and most components. You can select a Popup Menu component added to any visualization window. If it is added to another window, it is necessary to make sure the window is loaded into the runtime software's memory (in such a case, it is recommended to disable the *Dynamic loading* option). The popup menu can be assigned to the *Left*, *Middle*, and *Right* (most commonly) mouse *button*.

Display standard popup menu

Allows you to disable displaying the component's standard popup menu. If the *Right button* option is active, a custom popup menu is displayed, whereas displaying the standard popup menu is automatically disabled.

▼ Functions

Link to tag

Specifies the tag whose value is to be indicated by the position of the gauge's dial pointer. *Test value* is used to display the preview in the development environment.

Range

Specifies the range of the gauge's scale (the *Maximum* and *Minimum* displayed value). If the *Dynamic* option is chosen, the range of the scale is specified by the tag's value.

Other

Operating angle

Specifies the scale's opening *Angle* in degrees. The minimum angle is 5 degrees, the maximum angle can be 360 degrees. For reflex angles, change the *Orientation* of the gauge's axis by choosing the *Center* option or adjust the *Offset* on the *Static > Dial pointer* page so that the entire gauge can be displayed.

▼ Static

Dial pointer

Axis

The axis is a rotary shaft to which the gauge's dial pointer is anchored (for example, a circular gauge has its axis in the center).

Visible

Determines whether to display the axis and specifies its *Size* (diameter) and *Color*.

Orientation

Specifies the position of the gauge (*Bottom*, *Top*, *Left*, *Right*, or *Center*). If the gauge is positioned at the top or in the center, it is displayed as an upper sector. If it is necessary to display the gauge in other parts of the circle, the bottom, right, or left orientation can be used.

Offset

Specifies the offset of the gauge from the edge of the component (does not apply to the *Center* option).

Ending

Specifies the *Style* of the dial pointer's ending. The dial pointer can be without any ending (*None*) or it can be ended with an *Arrow* or *Full arrow*. The following properties can be defined for the arrow: *Color*, *Size*, and *Sharpness*.

Line

Specifies the *Width* and *Color* of the gauge's dial pointer.

Background

Background

Is used to specify the component's background *Color*. The background can be without any color – *Transparent*.

Frame

For more details, see the [Bevel](#) component.

Scale

Show scale

Determines whether to display the scale.

Divisions

Specifies the *number of small and big divisions* and the *Color* of the scale's divisions.

Show numbers

Determines whether to display the scale's numbers and specifies their position (*Inside* or *Outside*).

Dial

Determines whether to display the dial's *Background* and *Border* and specifies its *Colors* and *Width*.

Limits

Determines whether to display the limits (**High warning, Low warning, High critical, Low critical**) and specifies their *Colors*. The limits are displayed in the area of the gauge's scale. The limits' values correspond to the limits of the tag.

7.3.3 Clock

This component is intended for displaying an analog clock. It can display either system time or the value of a tag of type *DateTime* (in such a case, changing the tag value can be enabled).

Properties

[Basic](#)

[Alignment](#)

Dynamic

Menu

Scripts/Actions

▼ Security

Functions, scripts, actions, menus

Secure

Determines whether to select access rights required for securing the interaction between the user and the component. If this feature is enabled, the component is only accessible to users with sufficient access rights. To specify the access rights required for accessing the component, bring up the [Select Access Rights](#) dialog box by clicking on the key icon. The user must have at least one access right selected on the list available.

Enable setting value

After clicking on the clock area, this command brings up the *Enter Value* dialog box allowing you to enter the required time. At runtime, the command is active only if the clock is controlled by a tag.

▼ Functions

Link to tag

Specifies the tag of type DateTime or DoubleFloat whose value is to be displayed. If no tag is assigned, the current system time is displayed.

▼ Static

Hands

Hour hand

Specifies the *Width*, *Length*, and *Color* of the hour hand.

Minute hand

Specifies the *Width*, *Length*, and *Color* of the minute hand.

Second hand

Determines whether to display the second hand and specifies its *Width*, *Length*, and *Color*.

Marks

Hour marks

Specifies the *Size, Length, Shape, and Color* of the hour marks on the dial.

Only 4 marks

Determines whether to display only the marks indicating 3, 6, 9, and 12 o'clock.

Numbers

Determines whether to display a number for each hour mark. The *Offset* specifies the position of the numbers toward the center.

Minute marks

Specifies the properties for the minute marks. The functions of the minute marks' properties are identical to those of the hour marks.

Appearance

Dial

Specifies the dial's background *Color*. The background can be without any color – *Transparent*.

Background

Is used to specify the component's background *Color*. The background can be without any color – *Transparent*.

Border

Specifies the appearance of the dial's border.

7.3.4 Internet Explorer

This component allows you to add a Web browser (Internet Explorer) to a visualization window.

Properties

Basic

Alignment

Dynamic

Security

▼ Functions

Link to tag

Specifies the address of the contents displayed by the Web browser. The address can be specified dynamically using a tag of type *String* or statically by directly entering the address.

Main

Specifies the tag of type *String* that contains the address of the displayed contents. It can be an Internet address (<https://www.reliance-scada.com>) or the path to a local file (`file:///C:/Reliance/Documentation/DataExchange_ENU.pdf`).

URL

Allows you to enter the address of the contents displayed by the Web browser.

7.3.5 Media Player

This component allows you to add a media player to a visualization window.

Properties

Basic

Alignment

Dynamic

Security

▼ Functions

Link to tag

Control playing

Specifies the tag used to start playing a file. The player is started when the tag value is set to non-zero (you can also play the record after the window is loaded into memory if the tag value is non-zero).

File to play

Specifies the file (e.g., avi, mpg) or link (e.g., <http://www.server.com/stream.asf>) to be played.

File name

Allows you to specify the tag of type *String* that contains the file name or the link.

Options

Allows you to select a type of player – *Internal player (MCI)*, *Windows Media Player*, or *VLC Media Player*.

Playing mode

Determines how to play the file – *Repeatedly*, or *Once*.

Show toolbar

Determines whether to display the player's toolbar.

7.3.6 ActiveX Container

This component allows you to add *ActiveX* controls to visualization windows. An *ActiveX* control is a visual or non-visual object installed in Windows. It provides a specific functionality – it can be a control or a component designed to communicate with a device.

Properties

Basic

Alignment

Dynamic

Security

▼ Functions

ActiveX control

Specifies the ActiveX identifier (the so-called ProgId). It allows selecting from the list of ActiveX controls installed in Windows.

Storing ActiveX control properties

Some ActiveX controls allow for storing and loading their configuration in a custom format. In such a case, the option *Properties stored by ActiveX control* can be used. The other option, *Properties stored by component*, is used to store all published ActiveX control properties in a similar way as with other components of the Reliance system.

Properties

Brings up a dialog box allowing you to configure the *Properties* and *Events* of the ActiveX control. Each property of the ActiveX control can be configured statically (manually, at design-time) or can be linked to the value of a tag during runtime. An event invoked by the ActiveX control can be operated using scripts (a script can be linked to an event). When the ActiveX control's event is invoked, the linked script is run.

In the dialog box's main menu (*File*), there are standard commands for the configuration of ActiveX controls.

Property Pages

Brings up a dialog box that allows you to configure the selected properties of the ActiveX control (the so-called *Property Pages*).

About ActiveX

Allows you to view information about the ActiveX control.

Note: Not all ActiveX controls support these commands.

Properties

On the left side of the dialog box, there is a list of the ActiveX control's properties. The right side allows you to configure the value of the selected **Property**.

Syntax

Contains a brief help description of the selected property. The description's text is part of the ActiveX control.

Value

Allows you to manually enter a value. The type of the control for entering the value corresponds to the property's data type.

Link to tag

Allows you to link the property to the tag in the visualization project. The property's value can be transferred to/from the tag in *one* or *both* directions. For the two-way transfer, its *Priority* can be specified.

Events

On the left side of the dialog box, there is a list of the ActiveX control's events. The right side allows you to run a script when the required **Event** is invoked.

Syntax

Contains a brief help description of the selected event. The description's text is part of the ActiveX control.

Run script

Specifies the script to be run if the ActiveX control's event is invoked.

Preview

Displays the ActiveX control in a preview window.

7.3.7 Real-Time Chart

This component is intended for displaying a common XY chart. Each chart is formed by series that consist of points. The X and Y coordinates of the points are defined as constants or values of the linked tags. A series can also be formed by a point linked to an array-type tag or by a sequence of values with a constant interval.

Properties

Basic

Alignment

▼ Dynamic

Link to tag

Visible, Enabled, X, Y, Width, Height, Angle

If these properties are active and linked to a tag, the basic component properties defined on the *Basic* page can be changed dynamically (during runtime). The configured values can be either relative or absolute depending on the setting in the [Project Options](#) dialog box.

Advanced

Update type – Periodic

Specifies the fixed *interval for updating* the real-time chart's data.

Update type – Tag-controlled

Specifies the link to a tag of type *Bool* used to update the data when changing the value from logical 0 to logical 1.

▼ Security

Functions, scripts, actions, menus

Secure

Determines whether to select access rights required for securing the interaction between the user and the component. If this feature is enabled, the component is only accessible to users with sufficient access rights. To specify the access rights required for accessing the component, bring up the [Select Access Rights](#) dialog box by clicking on the key icon. The user must have at least one access right selected on the list available.

Allow customizing chart

Enables the user to customize the graphical appearance of the component at runtime. If this option is active, the [Editing...](#) dialog box can be brought up by using the Customize Trend command from the component's popup menu.

Secure

If this feature is enabled, the trend is only accessible to users with sufficient access rights.

▼ Series

Contains a list of the chart's series and their settings. The series to be displayed are contained in the list on the right side of the page. The list's items (chart's series) can be added, deleted, or exported using standard toolbar commands.

▼ Properties

Name

Specifies the series' name to be displayed in the legend.

Type

Specifies the [type of the series](#) (chart) used to display the series (*Line, Bar, Horizontal bar, Area, Point, Pie, Fast line*).

Color

Allows you to specify the color of the series (chart).

Point count

Specifies the number of the series' points to be displayed.

Show point names on X axis

Determines whether to display the names of the points on the horizontal axis.

Control point colors

Allows you to specify a custom color for each point on the *Data* page.

▼ X Axis

Special axis

Determines whether to display the special horizontal axis of the selected series.

Visible

Determines whether to really display the axis or whether to only control displaying the chart according to the configuration of the axis.

Inverted axis

Determines whether to display the values on the axis in reverse order.

Min

Specifies the lower axis limit.

Max

Specifies the upper axis limit.

Start

Specifies the beginning of the axis with respect to its range in %.

End

Specifies the end of the axis with respect to its range in %.

Position

Specifies the position of the axis with respect to its range in %.

▼ Y Axis

Special axis

Determines whether to display the special vertical axis of the selected series.

Visible

Determines whether to really display the axis or whether to only control displaying the chart according to the configuration of the axis.

Inverted axis

Determines whether to display the values on the axis in reverse order.

Min

Specifies the lower axis limit.

Max

Specifies the upper axis limit.

Start

Specifies the beginning of the axis with respect to its range in %.

End

Specifies the end of the axis with respect to its range in %.

Position

Specifies the position of the axis with respect to its range in %.

▼ Data

Allows you to specify the list of points for the selected series. The series' points can be added and deleted using standard toolbar commands. One item on the list can also represent a group of points (using the *Array of values* option).

Name

Specifies the name of the selected point (can be displayed in the point's label).

X-value, Y-value

Allows you to specify the point's X and Y coordinates – *Constant* (a constant value), *Tag value* (the link to a tag), *Array of values* (the link to an array-type tag), *Const. interval* (a sequence of values from 0 with a specified constant interval).

Color

Specifies the color of the point. On the *Properties* page, the *Control point colors* option must be enabled.

Note: The types of values can be generally combined. For proper display of the chart, the total number of values on the X axis must correspond to the number of values on the Y axis. We recommend that you always use the same type of value for the coordinates of one point, or arrays with the same number of elements for the X and Y coordinates.

▼ Static

Properties

By clicking on the *Advanced* button, the *Editing...* dialog box is brought up. This dialog box allows you to change the graphical appearance of a chart component (TeeChart). For more details, see the chapter [Trend Properties](#).

Preview

Displays the real-time chart's preview.

7.3.8 Real-Time Trend

This component is intended for displaying *real-time trends* (trends of tag values) with no link to a *data table* (database). To define a real-time trend, use the *Real-Time Trend Manager*. Sampled data is logged to RAM only (even if the window is not loaded).

Properties

Basic

Alignment

Dynamic

Security

▼ Functions

Link to real-time trend

Specifies the link to the real-time trend that is to be displayed on the component area at runtime. First, it is necessary to define real-time trends through the [Real-Time Trend Manager](#).

▼ Static

Properties

By clicking on the *Advanced* button, the *Editing...* dialog box is brought up. This dialog box allows you to change the graphical appearance of a chart component (TeeChart). For more details, see the chapter [Trend Properties](#).

Use properties configured via Manager

Determines whether to use the properties defined through the [Real-Time Trend Manager](#).

Title

Determines whether to display the trend's name (or alias if it is specified) in the header.

Preview

Displays the real-time trend's preview. The values for the preview are generated at random.

7.3.9 Level Fill Picture

This component is intended for creating indicators of a general shape (e.g., an indication of a liquid's surface in a container). In order for the component to function properly, a picture with a color-filled delimited area (**Active area**) must be available. The color must not be used in any other part of the picture. This area will be filled with a **Medium** depending on the value of the linked tag.

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Scripts/Actions](#)

▼ [Menu](#)

Display popup menu on click

Determines whether to display the previously selected [Popup Menu](#) component. This option is available to visualization windows and most components. You can select a Popup Menu component added to any visualization window. If it is added to another window, it is necessary to make sure the window is loaded into the runtime software's memory (in such a case, it is recommended to disable the *Dynamic loading* option). The popup menu can be assigned to the *Left*, *Middle*, and *Right* (most commonly) mouse *button*.

Display standard popup menu

Allows you to disable displaying the component's standard popup menu. If the *Right button* option is active, a custom popup menu is displayed, whereas displaying the standard popup menu is automatically disabled.

▼ Security

Functions, scripts, actions, menus*Secure*

Determines whether to select access rights required for securing the interaction between the user and the component. If this feature is enabled, the component is only accessible to users with sufficient access rights. To specify the access rights required for accessing the component, bring up the [Select Access Rights](#) dialog box by clicking on the key icon. The user must have at least one access right selected on the list available.

Enable setting value

Allows you to enable editing the tag value shown on the display during runtime (at runtime, the *Enter Value* dialog box is invoked after clicking on the display area).

Prohibit violating bounds

Allows you to check the entered value and disables writing a tag value outside the limits set by the *Min* and *Max* values (in such a case, the warning "*Value is not within required range*" is displayed).

Require confirmation

Determines whether to display a confirmation dialog box prior to writing the new value into the main tag.

Alert to violating bounds

Allows you to check the value to be entered. If the tag value is not set within the required range, a warning dialog box will be displayed prior to entering the new main tag value. The *Query* edit box is intended for specifying a custom question (if the text "*Value entered is greater/smaller than xxx. Do you really want to set this value?*" is not suitable).

Enable setting limits

Allows users to change the main tag's limit values in case the component is linked to a tag for which dynamic limits are defined. The limits can then be changed by choosing the *Enter Limits for Tag* command from the component's popup menu. The *Secure* option allows you to select access rights required for entering the limits for tags.

▼ Functions

Link to tag

Specifies the link to the main tag whose value is used to indicate the level of filling the picture's active area using a medium (similarly to the [Progress Bar](#) component). *Test value* is used to display the preview in the development environment.

Base

Specifies the side of the active area from which the picture is to be filled according to the selected range. The base setting affects the direction of filling the active area with the chosen medium.

Range

Allows you to set the *Minimum* and *Maximum* value corresponding to the minimum and maximum fill of the active area with the medium. The *Minimum* value corresponds to 0 % and the *Maximum* value corresponds to 100 % of the active area filled with the medium. If the value of the linked tag is less or equal to the *Minimum* value, the active area will not be filled with any medium. If the tag's value is greater or equal to the *Maximum* value, the entire active area will be filled.

Active area

Specifies the color of the picture's area that is to be filled depending on the value of the linked tag. To choose the color, bring up the [Select Color](#) dialog box and, preferably, use the *Pick Color* feature (Capture) by dragging and dropping it onto the picture in the *Preview* area.

▼ Static

Background

Picture

Specifies the picture with a single-colored area that delimits the active area. For example, a thermometer's active area is represented by a tube filled with mercury (to choose the color to be replaced, use the *Active area* property on the *Functions* page).

Layout

Specifies the picture layout within the component area. It can be one of the following: *Normal*, *Resize graphic*, *Resize component*, or *Tiled*. For a detailed description of the layout options, see the [Picture](#) component.

Fill

Medium

Specifies the color of the *medium* used for filling the *active area*. It allows you to choose between the *Full* (single color) and *Gradient* (color transition) style to indicate the surface height. If the Gradient style is selected, you can specify one or two more colors used for making the color transition. Two types of orientation can be selected for the gradient – *Vertical* or *Horizontal*.

Background

Specifies the background color of the *active area* – the color of the area that is not filled with a *medium* (e.g., showing the air above the surface).

Limits

High critical, High warning, Low warning, Low critical

These options allow, for example, indicating an error by changing the color of the *active area's* fill if the main tag's value is not within the specified range.

7.3.10 Data Grid

This component is intended for displaying or editing array-type tags. The tags are displayed in columns to form a grid. To enter a new value, double-click the data grid's cell that you want to change (if it is enabled).

Properties

[Basic](#)

[Alignment](#)

▼ Dynamic

Link to tag

Visible, Enabled, X, Y, Width, Height, Angle

If these properties are active and linked to a tag, the basic component properties defined on the *Basic* page can be changed dynamically (during runtime). The configured values can be either relative or absolute depending on the setting in the [Project Options](#) dialog box.

Advanced

Rows

Specifies the number of rows to be displayed in the data grid. The value can be specified statically or it can be controlled dynamically using a tag. If the tag value is *-1* (minus one), all rows of the data grid will be displayed. In this case, the number of rows is equal to the number of elements of the array-type tag with the greatest number of elements.

Offset

Specifies the offset of the first row to be displayed within the array. Together with the previous option, the data grid's extract can be displayed. The value can be specified statically or it can be controlled dynamically using a tag.

Selected row

Allows you to specify the selected row. The value *0* (zero) corresponds to the selection of the first row. The linked tag enables you to specify the row to be selected or to find out which row in the data grid has been selected by the user. The value *-1* (minus one) cancels the selection in the data grid.

Selected column

Allows you to specify the selected column. The value *0* (zero) corresponds to the selection of the first column. The linked tag enables you to specify the column to be selected or to find out which column in the data grid has been selected by the user.

Element index

Specifies the tag allowing you to find out (by column) what the element index corresponding to the selected row is.

▼ Menu

Display popup menu on click

Determines whether to display the previously selected [Popup Menu](#) component. This option is available to visualization windows and most components. You can select a Popup Menu component added to any visualization window. If it is added to another window, it is necessary to make sure the window is loaded into the runtime software's memory (in such a case, it is recommended to disable the *Dynamic loading* option). The popup menu can be assigned to the *Left*, *Middle*, and *Right* (most commonly) mouse *button*.

▼ Scripts/Actions

Allows you to specify scripts or actions to be executed by clicking or double-clicking a mouse button on the component.

Scripts – Mouse

Specifies links to the tags defined through the [Script Manager](#). At runtime, the specified script will be executed after clicking or double-clicking the respective mouse button on the component (executing the script can assigned to the right, left, or middle mouse button). You can pass a numerical parameter to the script (the parameter is accessible using the `RScr.GetCurrentScriptDataEx` function).

Actions – Mouse

Specifies links to the actions defined through the [Action Manager](#). Most components allow the specified action to be performed after clicking or double-clicking the respective mouse button.

▼ Security

Functions, scripts, actions, menus

Secure

Determines whether to select access rights required for securing the interaction between the user and the component. If this feature is enabled, the component is only accessible to users with sufficient access rights. To specify the access rights required for accessing the component, bring up the [Select Access Rights](#) dialog box by clicking on the key icon. The user must have at least one access right selected on the list available.

Enable setting values

Allows you to change the values of the data grid's items (cells). To change the value, bring up the *Enter Value* dialog box by double-clicking the data grid's cell. This setting applies to the entire data grid. You can also disable entering values for certain columns of the data grid on the *Functions* page.

▼ Functions

On the left side of the page, there is a list of the data grid's columns sorted by order. The data grid's columns can be added, deleted, moved, and exported/imported using commands from the toolbar or from the component's popup menu. By selecting an item from the list, the following column properties can be configured:

Link to tag

Specifies the array-type tag whose values are to be displayed in the selected column.

Column

Name

Specifies the text displayed in the column header.

Width

Specifies the width of the selected column in pixels.

Enable setting value

Determines whether to enable editing tag values in the selected column. This feature is enabled only if the global option is active on the *Security* page.

Alignment

Specifies the alignment of the selected column's items.

Text

Brings up the [Select Font](#) dialog box that allows you to specify the font, font style, size, and other font attributes.

Background

Brings up the [Select Color](#) dialog box that allows you to specify the column's background color.

State*Visible*

Allows you to specify the link to the numeric-type tag whose value is used to dynamically (i.e., during runtime) change the column's visibility. The column is only visible when the value of the tag is non-zero.

Control color

The text and background color can be specified separately for each cell of the column using tags of type *Array of LongInt*.

Text

Specifies the link to the tag of type *Array of LongInt* that allows you to configure the font color separately for each cell of the column.

Background

Specifies the link to the tag of type *Array of LongInt* that allows you to configure the background color separately for each cell of the column.

▼ Static

Rows*Row height*

Specifies the height of all rows of the data grid in pixels.

Selection*Color*

Allows you to specify the background color of the currently selected row or cell. The color can be specified using the [Select Color](#) dialog box.

Select whole row

Determines whether to highlight the whole row that contains the selected cell.

Division

Show vertical division

Determines whether to display the vertical grid lines.

Show horizontal division

Determines whether to display the horizontal grid lines.

Different color for even rows

Allows for highlighting the even rows with a different background color, which simplifies reading values within a single row.

Color

Specifies the background color of the even rows.

Scroll bars

Specifies the scroll bars to be shown in case not all data can be displayed by the component. The following scroll bars can be chosen: *None*, *Horizontal*, *Vertical*, and *Horizontal and vertical*.

Show column header

Determines whether to display the column header and the column settings.

Header height

Specifies the height of the header in pixels.

Allow changing column width

Determines whether to allow the user changing the width of individual columns by dragging with the mouse.

Allow changing column order

Determines whether to allow the user changing the order of individual columns by dragging with the mouse.

Allow changing sorting

Determines whether to allow the user sorting the data grid by the selected column. To activate the sorting, click on the column header. Another click on the column header changes the sorting direction (A-Z, Z-A).

Allow hiding columns

Determines whether to allow the user to temporarily hide the data grid's columns. The columns can be hidden or displayed using the column header's popup menu.

Text

Brings up the [Select Font](#) dialog box that allows you to specify the font, font style, size, and other font attributes of the header's text.

Automatic sorting

If this option is active, the data grid is sorted by the specified column after it is displayed at runtime. The user may still change the sorting direction manually if it is enabled by the previous option.

Sort by column

Specifies the column by which the data grid should be automatically sorted. The column numbering starts from 0.

Sorting direction

Specifies the following two sorting directions – *Ascending* or *Descending*.

Number format

Use locale settings

Specifies how to format the displayed numeric values (decimal separator). If this option is active, the operating system formatting is used. Otherwise, the **Reliance** default formatting is applied.

7.3.11 Data Tree

This component is intended for organizing and displaying data in the form of a tree view. Each item in the tree is called "node" and is displayed in a separate row. It consists of a picture (icon) and text. The tree's nodes can be organized into a hierarchical tree structure. The child nodes can be collapsed [-] or expanded [+]. Each node's row can contain several items of

types *Display*, *Text*, *Picture*, *Active text*, and *Active picture* and thus make up a table with options to collapse and expand the rows. Click the row to select it, double-click it to perform an action or another operation (depending on the type of item).

Properties

Basic

Alignment

▼ Dynamic

Link to tag

Visible, Enabled, X, Y, Width, Height, Angle

If these properties are active and linked to a tag, the basic component properties defined on the *Basic* page can be changed dynamically (during runtime). The configured values can be either relative or absolute depending on the setting in the [Project Options](#) dialog box.

Advanced

Selected node

Specifies the tag to be used to find out which of the tree's nodes has been selected (marked) or to specify which node is to be marked as selected.

▼ Security

Functions, scripts, actions, menus

Secure

Determines whether to select access rights required for securing the interaction between the user and the component. If this feature is enabled, the component is only accessible to users with sufficient access rights. To specify the access rights required for accessing the component, bring up the [Select Access Rights](#) dialog box by clicking on the key icon. The user must have at least one access right selected on the list available.

Allow editing structure

Allows the user to change the tree structure and insert or delete nodes.

Secure

If this feature is enabled, only users with sufficient access rights are allowed to edit the tree structure.

[Cells](#)

[Nodes](#)

[Tree](#)

[Edit Tree](#)

[Columns](#)

7.3.11.1 Cells

▼ Basic

Name

Specifies the name of the selected cell. The name is used when defining the tree's node and is displayed in the component's status bar.

Alias

An optional alternative name of the object usually used in the GUI during runtime. Therefore, it should be descriptive and understandable to the user. In multilanguage projects, an alias can be localized (i.e., translated into all project languages), which is in contrast to a *Name*.

Type

Specifies the type of data displayed by the cell. The cell contents can be one of the following types:

Display

Allows displaying the value of any tag within the cell. A particular tag is linked to the cell when editing the tree structure.

Text

Allows displaying any text within the cell. A particular text string is specified for each cell when editing the tree structure.

Picture

Allows displaying a picture within the cell. The size of the picture must correspond to the size specified by the *Pictures – Size* property on the *Tree* page. The picture is specified below on this page and cannot be changed for a particular cell when editing the tree structure.

Active text

Allows displaying the text that is dependent on the value of the linked numeric-type tag. The items of the *Active text* and the value range determining when the selected item is to be displayed can be specified on the *Items* page. It is necessary to link the control tag to each cell when editing the tree structure.

Active picture

As with the [Active Picture](#) component, this type allows displaying the picture that is dependent on the value of the linked tag. The size of the picture must correspond to the size specified by the *Pictures – Size* property on the *Tree* page.

Progress bar

As with the [Progress Bar](#) component, this type allows displaying the current tag value. A particular tag is linked to the cell when editing the tree structure.

Check box

As with the [Check Box](#) component, this type allows displaying and editing the tag value. A particular tag is linked to the cell when editing the tree structure.

Picture

Specifies the particular picture if the chosen *Type* is *Picture*.

Text

Specifies the font using the [Select Font](#) dialog box.

Background

Specifies the background color of the item's cell using the [Select Color](#) dialog box.

Eng. units

Allows you to display a unit following the tag value. The unit can be specified for each tag through the [Device Manager](#) (tag properties).

▼ Additional

Progress bar**Orientation**

Determines whether to display the indicator *horizontally* (left to right), or *vertically* (bottom to top).

Range

Allows you to set the *Minimum* and *Maximum value* to be displayed by the *Progress bar* (Basic > type) (specifies the range of the indicator).

Value

Allows you to select the color of the indicator if the value of the control tag is within the specified limits – normal state.

Background

Determines whether to display the cell with no background (*Transparent*), or with the specified background *Color*. The color is visible in places where the indicator is not displayed.

▼ Security

Enable operations

If this option is not active, the user is not allowed to edit the cell's contents, nor can he/she run the action assigned to the cell.

Secure

If this feature is enabled, only users with sufficient access rights are allowed to edit the cell's contents and run the actions assigned to the cell.

Enable setting value

Allows you to enable editing the tag value assigned to the cell. To change the value, bring up the *Enter Value* dialog box by double-clicking the data tree's cell.

▼ Limits

If the chosen cell *Type* is *Display* or *Progress bar*, the cell's *Value* and *Background* color can be specified when warning or critical limits are reached.

▼ Items

The list contains items between which you can switch depending on the value of the control tag. Depending on the type of cell, the items can be either text strings (for the *Active text* type) or pictures (for the *Active picture* type).

From value

Specifies the beginning of the value range for which the selected item is displayed. If the range for multiple items overlaps, the item that is higher on the list is selected.

To value

Specifies the end of the value range for which the selected item is displayed.

Text

Specifies the item's text. This option is displayed only if the *Type* of cell is set to *Active text*.

Font

Specifies the font of the item's text using the [Select Font](#) dialog box.

Background

Specifies the background color of the item's cell using the [Select Color](#) dialog box.

Picture

Specifies the item's picture. This option is displayed only if the *Type* of cell is set to *Active picture*.

7.3.11.2 Nodes

On the left side of the page, there is a list of the data tree's nodes. The nodes contained in the list are organized into a tree structure through the *Tree Structure Editor*. Each row will contain the cells (columns) specified in the *Cells* list.

Name

Specifies the name of the selected node. The name is used in the *Tree Structure Editor* and is displayed in the component's status bar at runtime.

Alias

An optional alternative name of the object usually used in the GUI during runtime. Therefore, it should be descriptive and understandable to the user. In multilanguage projects, an alias can be localized (i.e., translated into all project languages), which is in contrast to a *Name*.

Picture

Specifies the picture (icon) to be displayed in front of the node name in the tree view. The icon makes it clearer to handle the tree. The size of the picture must correspond to the size specified by the *Pictures – Size* property on the *Tree* page.

Cells

Specifies the list of cells that pertain to the selected node.

Cell

Specifies the name of the node's cell.

7.3.11.3 Tree**Rows***Row height*

Specifies the height of the row in which the tree's node and cells are contained.

Selection*Color*

Specifies the background color of the currently selected (marked) part of the tree. To change the color, use the [Select Color](#) dialog box.

Select whole row

If this option is active, the whole row (i.e., the tree's node and cells) are marked when selecting any part of the component.

Division

Show vertical division

Determines whether to display the gray vertical lines separating the cells of the tree.

Show horizontal division

Determines whether to display the gray horizontal lines separating the cells of the tree.

Different color for even rows

Allows for highlighting the even rows with a different background color, which simplifies reading values within a single row.

Color

Specifies the background color of the tree's even rows.

Nodes

Text

Specifies the font of the node's text using the [Select Font](#) dialog box.

Pictures

Size

Specifies the size of the pictures used within the tree. The value specifies the length of the side of the square picture (icon) displayed in the tree's nodes. It also specifies the size of the pictures used in the cells of type *Picture* and *Active picture*. The value can be adjusted only if the tree contains no pictures.

Number format

Use locale settings

Specifies how to format the displayed numeric values (thousands separator, decimal separator, etc.). If this option is not active, neither any separator nor the decimal point.

Appearance

Show tree lines

Determines whether to display the lines connecting the child nodes to the parent nodes.

Show toolbar

Determines whether to display the component's toolbar at runtime.

Show status bar

Determines whether to display the bottom information area of the component – the status bar.

Scroll bars

Specifies the scroll bars to be shown in case not the whole tree is displayed by the component. The following scroll bars can be chosen: *None*, *Horizontal*, *Vertical*, and *Horizontal and vertical*.

Edit Tree

Brings up the *Tree Structure Editor* (see below).

7.3.11.4 Edit Tree

The *Tree Structure Editor* allows you to build up the tree from individual nodes and thus create a hierarchical structure of the tree. The tree structure can also be edited at runtime.

New Tree

Deletes the edited tree. The user is prompted whether to perform this operation.

Save (Ctrl+S)

Saves the changes made to the tree structure.

Import

Allows loading the tree structure that has already been exported to a file and saved on disk.

Export

Allows saving the tree structure to a disk file. The structure can be re-imported in the future.

New Node

Insert Node (Ins)

Brings up the *Node – Properties* dialog box. The new node is then inserted before the currently selected position in the tree view. This option also allows the user to change the name of the node, select a type of node, or assign an action to the node (the action is to be executed by double-clicking on the node).

Insert Node After (Shift+Alt+Ins)

Brings up the *Node – Properties* dialog box. The new node is then inserted after the currently selected position in the tree view. This option also allows the user to change the name of the node, select a type of node, or assign an action to the node (the action is to be executed by double-clicking on the node).

Insert Child Node (Shift+Ctrl+Ins)

Brings up the *Node – Properties* dialog box. The new node is then created as the currently selected node's child node. This option also allows the user to change the name of the node, select a type of node, or assign an action to the node (the action is to be executed by double-clicking on the node).

Copy Nodes (Ctrl+C)

Is used to copy the currently selected object(s) to the clipboard.

Paste Nodes (Ctrl+V)

Is used to paste the contents of the clipboard into the structure. The contents of the clipboard remain unchanged.

Duplicate Node (Ctrl+D)

Is used to duplicate the currently selected object(s). The contents of the clipboard remain unchanged.

Delete Nodes

Is used to delete the currently selected object(s) from the structure.

Move Up (Ctrl+Up)

Changes the position of the currently selected row by moving it one position upwards. Only the position of the nodes at the same level in the hierarchy can be changed (the nodes have one parent node in common).

Move Down (Ctrl+Down)

Changes the position of the currently selected row by moving it one position downwards. The position is changed at the same level in the hierarchy.

Collapse All

Is used to collapse all nodes.

Expand All

Is used to expand all nodes.

Properties (Alt+Enter)

Brings up the *Node – Properties* or *Cell – Properties* dialog box. If a node is selected, the displayed dialog box allows for choosing the type of node and selecting an action (same as when creating a new node). If a cell is selected, the displayed dialog box allows for choosing an action by double-clicking the cell, specifying the link to a tag (for cells of type *Display*, *Active text*, *Active picture*, and *Progress bar*), and changing the text for a cell of type *Text*.

Close

Closes the *Tree Structure Editor*.

Enter Tag Value (Enter)

Brings up the dialog box for changing the value of the tag linked to the cell. The command is accessible only at runtime. If the cell allows for editing the tag's value, the command can also be invoked by double-clicking on the desired cell.

Execute Action (Ctrl+Enter)

Is used to execute the action linked to the cell or node. The command is accessible only at runtime. If the cell does not allow for editing the tag's value or if the editing is disabled, the command can also be invoked by double-clicking on the desired cell.

Edit (F4)

Puts the component into the edit mode. The command is accessible only at runtime.

7.3.11.5 Columns

Definition

On the left side of the page, there is a list of the data tree's columns. The first column on the list (indexed by 0) contains the tree itself (nodes arranged in a hierarchical tree structure). The other columns on the list are formed by cells that pertain to individual nodes of the data tree.

Title

Specifies the text displayed in the column header.

Text alignment in column

Specifies the alignment of the column's and header's text.

Width

Specifies the width of the selected column.

Background

Specifies the background color of the column using the [Select Color](#) dialog box.

Show column header

Determines whether to display the header row (whether to display the column headers).

Header height

Specifies the height of the header in pixels.

Text

Specifies the font using the [Select Font](#) dialog box.

Allow changing column width

Determines whether to allow the user to change the width of the tree's columns by dragging with the mouse.

Allow changing column order

Determines whether to allow the user to change the order of the tree's columns by dragging with the mouse.

Allow changing sorting

Determines whether to allow the user to sort the tree by the selected column.

Allow hiding columns

Determines whether to allow the user to temporarily hide the tree's columns. The columns can be hidden or displayed using the column header's popup menu.

Automatic sorting

If this option is active, the tree's cells are sorted by the specified column after they are displayed at runtime. The user may still change the sorting direction manually if it is enabled by the previous option.

Sort by column

Specifies the column by which the data tree should be automatically sorted. The column numbering starts from 0.

Sort direction

Specifies the following two sorting directions – *Ascending*, or *Descending*.

7.3.12 Progress Wheel

This component allows for displaying the current value of the tag to which the progress wheel is linked. It is a modern progress bar in the shape of a circle.

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Scripts/Actions](#)

[Security](#)

▼ [Menu](#)

Display popup menu on click

Determines whether to display the previously selected [Popup Menu](#) component. This option is available to visualization windows and most components. You can select a Popup Menu component added to any visualization window. If it is added to another window, it is necessary to make sure the window is loaded into the runtime software's memory (in such a case, it is recommended to disable the *Dynamic loading* option). The popup menu can be assigned to the *Left*, *Middle*, and *Right* (most commonly) mouse *button*.

Display standard popup menu

Allows you to disable displaying the component's standard popup menu. If the *Right button* option is active, a custom popup menu is displayed, whereas displaying the standard popup menu is automatically disabled.

▼ Functions

Link to tag

Specifies the link to the tag whose value is to be indicated. *Test value* is used to display the preview in the development environment.

Range

Allows you to set the *Minimum* and *Maximum* value to be displayed by the *Progress Wheel* component (specifies the range of the indicator). The range of the indicator can also be controlled dynamically using a tag.

Limits

Allows you to specify the color of the indicator depending on the value of the control tag. The limits defined for the specified tag are used.

▼ Static

Value

Allows you to select the color of the indicator if the value of the control tag is within the specified limits – normal state.

Style

If the *Single-colored* option is selected, the entire indicator is drawn in a single color depending on the current tag value and the color settings configured on the *Functions* page (the *Limits* tab).

If the *Color based on value* option is selected, the entire indicator is drawn in a single color that is a mixture of the colors defined by the *Color 1* and *Color 2* properties. The resulting color depends on the current tag value and the color settings configured on the *Functions* page (the *Limits* tab).

The *Gradient* option allows you to draw the indicator as a gradient (a gradual transition between the specified colors). The resulting display of the indicator depends on the current tag value and the color settings configured on the *Functions* page (the *Limits* tab).

Initial angle

Specifies the angle according to which the beginning of the indicator is displayed.

Segmented

Allows you to divide the indicator into the specified number of segments (*Division count*). The segments are separated by spaces defined by the *Space width* property. If this option is not active, the indicator is smooth.

Active area background

Specifies the background color of the indicator. The color is visible in places where the indicator is not displayed (and in spaces if the **Segmented** option is active).

Background

Specifies the background color of the component. The color is also visible in places where the indicator is not displayed (if the **Active area background** > *Transparent* option is active) and in spaces (if the **Segmented** and **Active area background** > *Transparent* options are active).

Inner circle size (%)

Specifies the size of the progress wheel's inner space (expressed as a percentage).

7.4 Vectors

Vectors

Line

7.4.1 Vectors

Vectors are a component group representing basic shapes (*Bar*, *Round Bar*, *Circle*, *Ellipse*, *Grid*, and *Line*). Their appearance (**Fill** and **Border**) can be specified statically on the *Static* page. You can also switch between different appearances using a numeric-type tag, which can be specified on the *Functions* page.

The property configuration options on the *Functions*, *Static*, and *Error* pages are common to editors of all the shapes except the *Line* shape. The *Static* page of the *Round Bar* and *Grid* components' property editor contains some more properties.

Bar

Represents a right-angled quadrilateral with options to independently specify its **Border** and **Fill**. The size of the bar is determined by the size of the component (*Width* and *Height* specified on the *Basic* page).

Round Bar

This component is similar to the *Bar* component, but the difference is that the corner **Rounding** can be specified for the round bar.

Circle

Represents a circle with options to independently specify its **Border** and **Fill**. The circle's diameter is specified as a lower value of the *Width* and *Height* of the component.

Ellipse

Represents an ellipse with options to independently specify its **Border** and **Fill**. The shape and size of the ellipse depends on the component's *Width* and *Height*.

Grid

This component is similar to the *Bar* component, but the difference is that the grid can be **divided horizontally** and **vertically**. Also, a **Different color for even rows** can be set.

Line

See the [Line](#) component.

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Scripts/Actions](#)

[Security](#)

▼ Menu

Display popup menu on click

Determines whether to display the previously selected [Popup Menu](#) component. This option is available to visualization windows and most components. You can select a Popup Menu component added to any visualization window. If it is added to another window, it is necessary to make sure the window is loaded into the runtime software's memory (in such a case, it is recommended to disable the *Dynamic loading* option). The popup menu can be assigned to the *Left*, *Middle*, and *Right* (most commonly) mouse *button*.

Display standard popup menu

Allows you to disable displaying the component's standard popup menu. If the *Right button* option is active (and a custom popup menu is displayed) or the main tag is not used in the component, displaying the standard popup menu is automatically disabled.

▼ Functions

Link to tag

Specifies the link to the *Main* tag that allows you to dynamically change the fill and border of the vector shape. If the main tag is not used, the appearance of the component is specified by the properties on the *Static* page. *Test value* is used to display the preview in the development environment.

On the left side of the page, there is a list of states that can be added and deleted using commands from the toolbar. On the **Fill** and **Border** pages, it is necessary to configure the display settings for each **State** on the list. The selected state is active if the value of the main tag is within the range specified by the *From value* – *To value* properties. If multiple states meet this condition, the state that is higher on the list of states will be selected. If no state meets this condition, the first state will be selected.

Blinking

Specifies the *Timer* that controls the blinking effect for the selected state.

Fill

This is a group of properties allowing you to specify the *Style* and *Colors* of the vector shape's fill for each state (see the *Static* page). Activating the **Visible** option will display the fill.

Border

This is a group of properties allowing you to specify the *Line style*, *Width*, and *Color* of the vector shape's edges for each state (see the *Static* page). Activating the **Visible** option will display the border.

▼ Static

Fill

Style

Specifies how the component's fill will be displayed. **Solid** – the component is filled with a continuous color (*Color 1*). **Gradient** – the area of the component is drawn as a color transition specified by other properties. **Horizontal**, **Vertical**, **Diagonal 1**, and **Diagonal 2** – the component is hatched with 1 pixel wide lines whose spacing is 8 pixels. The color of the lines is specified by the *Color 1* property. **Grid** and **Diagonal grid** – the component is hatched either with *horizontal* and *vertical* lines or with both types of *diagonal* line.

Gradient

Allows you to select a second color (*Color 2*) and the *Orientation* of the gradient. The orientation can be of the following types: **Horizontal** (the first color – *Color 1* – is drawn at the top of the component), **Vertical** (on the left), **Diagonal 1** (on the top left), **Diagonal 2** (on the top right), or **Centered** (in the center).

3-colored

Allows you to select a third color for the gradient: *Color 3*.

Offset

Specifies the position of the color transition's middle color. The position of the color is within the range 0–255. If the offset value is set to 127, the second color (*Color 2*) will be positioned in the center between the other colors. The lower the number, the closer the middle color is to the first color (*Color 1*) and vice versa – the higher the number, the closer it is to the third color (*Color 3*).

Border

A group of properties allowing you to specify the *Line style*, *Width*, and *Color* of the vector shape's edges.

Line style

Specifies how the vector component's border will be displayed.

Width

Specifies the width of the line.

Color

Specifies the color of the border line using the [Select Color](#) dialog box.

Out-of-range value

Show

Specifies the display of the component in case the tag's value does not correspond to any of the states.

Rounding

Specifies the corner rounding of the component (applies to the *Round Bar* component only).

Horizontal division

Specifies the following properties of the component: *Row count*, *Line width*, and *Color* (applies to the *Grid* component only).

Vertical division

Specifies the following properties of the component: *Column count*, *Line width*, and *Color* (applies to the *Grid* component only).

▼ Error

Link to tag

Specifies the link to the numeric-type tag that is used to indicate an error state. The *Error* is indicated if the tag value is non-zero.

Fill

The properties are used to specify the fill's *Style* and *Color* for the error state (see the *Static* page).

Border

The properties are used to specify the *Line style*, *Width*, and *Color* of the vector component's border for the error state (see the *Static* page).

7.4.2 Line

This component is intended for creating a line or arrow. The line's *Style*, *Color*, and **Ending** can be changed dynamically depending on the current value of the control tag (for details, see [Vectors](#)).

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Scripts/Actions](#)

[Security](#)

▼ Menu

Display popup menu on click

Determines whether to display the previously selected [Popup Menu](#) component. This option is available to visualization windows and most components. You can select a Popup Menu component added to any visualization window. If it is added to another window, it is necessary to make sure the window is loaded into the runtime software's memory (in such a case, it is recommended to disable the *Dynamic loading* option). The popup menu can be assigned to the *Left*, *Middle*, and *Right* (most commonly) mouse *button*.

Display standard popup menu

Allows you to disable displaying the component's standard popup menu. If the *Right button* option is active (and a custom popup menu is displayed) or the main tag is not used in the component, displaying the standard popup menu is automatically disabled.

▼ Functions

Link to tag

Specifies the link to a tag (see [Vectors](#), the *Functions* page).

State

The selected state is active if the value of the control tag is within the range specified by the *From value* – *To value* properties. If multiple states meet this condition, the state that is higher on the list of states will be selected. If no state meets this condition, the first state will be selected.

Blinking

Specifies the *Timer* that controls the blinking effect for the selected state.

Line

Specifies the line's *Style* and *Color* for the selected state (see the *Static* page).

Ending

Specifies the ending's *Color* for the selected state (see the *Static* page).

▼ Static

Type

Specifies the position of the line with respect to the component: *Normal* (any direction), *Horizontal*, or *Vertical* (the line will be drawn in the center of the component).

Line

Specifies the *Style*, *Width*, and *Color* of the line, if the main tag is not defined (see [Vectors](#), the *Static* page).

Ending

Allows you to specify the *Color* and shape of the arrows on either ends of the *Line* component.

Size

Specifies the length of the segments (in pixels) that make up the arrow.

Sharpness

Specifies the angle (in degrees) between the line and the arrow's segment. If the *Full arrow* ending is selected, it specifies half of the arrow's vertex angle.

Out-of-range value

Show

Specifies the display of the component in case the tag's value does not correspond to any of the states.

▼ Error

Link to tag

Specifies the link to the numeric-type tag that is used to indicate an error state. The *Error* is indicated if the tag value is non-zero.

Line

Specifies the line's *Style* and *Color* for the error state.

Ending

Specifies the *Color* of the line's ending for the error state.

7.5 Control

[Simple Time Program](#)

[Time Program](#)

[Equithermal Curve](#)

7.5.1 Simple Time Program

Simple Time Program is a component designed for configuring a data structure that is used for two-state control (on – off) of a device at hourly intervals during one week. In a visualization window, the component is displayed as a standard button. By pressing the button, a dialog box allowing you to configure *Simple Time Program*'s properties is invoked (it can be stored into a file on the hard disk and reloaded).

The component works with array-type tags of length 22 bytes (e.g., *Array of Byte* or *Array of Word*). The function of each byte is as follows:

Byte number	Function
1–21	Device status (7 days x 24 hours)
22	Device status change delay in minutes

Properties

The properties on the [Static](#) and **States** pages allow you to configure the appearance of the component displayed in the visualization window. They are the same as in the [Button](#) component.

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Menu](#)

[Scripts/Actions](#)

[Security](#)

▼ Functions

Link to tag

Specifies the link to the tag of type *Array of Byte*, *Array of Word*, *Array of DoubleWord*, *Array of ShortInt*, *Array of SmallInt*, *Array of LongInt*, *Array of LargeInt*, or *DataBlock*. *DataBlock* is a special type of tag that can only be accessed using time programs of the **Reliance** system. This special tag is always represented by **one data point**. The minimum size of the tag is 22 bytes.

Editor options

Caption

Specifies the text displayed in the title bar of the component's settings window at runtime.

Pushed button background

Specifies the *Color* indicating the ON state in the time program.

▼ States

Specifies the appearance of the button's individual states. The **State 0** page allows you to configure the button's appearance when in idle status, the **State 1** page when the button is pressed, and the **Active** page when you place the mouse cursor over the component.

Text

Specifies the text to be displayed on the button. The text is displayed with the specified *Font*, *Button color*, and *Text alignment* (if State 1 has no text defined, the text of State 0 is used instead).

Picture

Allows you to select a picture and configure its position on the button (horizontal and vertical *Offset* and *Picture alignment* to the button's center and edges).

Preview

Displays the preview of the picture.

Active

3-state active button

Allows you to specify the button's and text's *color* to be displayed when the mouse cursor is placed over the button. The text to be displayed depends on the current state of the button.

7.5.2 Time Program

Time Program is a common component designed for setting a quantity depending on time. Each day of the week can be divided up into 24 time intervals, for each of which a value from a defined range can then be set. Unlike *Simple Time Program*, the time intervals can start and end at a common time.

The component works with array-type tags (e.g., *Array of Byte* or *Array of Word*). The array element count is specified by the configuration of the component. The array size is dependent on the properties *Time slots > Count* and *Data type* of the controlled quantity.

The function of each byte for a time program that controls a quantity of type *Byte* and is divided into two day time intervals:

Byte number	Day of the week
1-3	Monday
4-6	Tuesday
7-9	Wednesday
10-12	Thursday
13-15	Friday
16-18	Saturday
19-21	Sunday

The function of each byte for a day time program is as follows:

Byte number	Function	Value range
1	Hour	0-23

2	Minute	0-59
3	Desired value (setpoint)	Specified by <i>Minimum</i> and <i>Maximum</i>

Hour and minute specify the time of day from which a desired value of the controlled quantity should be set.

Properties

The properties on the [Static](#) and **States** pages allow you to configure the appearance of the component displayed in the visualization window. They are the same as in the [Button](#) component.

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Menu](#)

[Scripts/Actions](#)

The [Security](#) page is the same as in the *Teco – Time Program* component.

▼ Functions

Link to tag

Specifies the link to the tag of type *Array of Byte*, *Array of Word*, *Array of DoubleWord*, *Array of ShortInt*, *Array of SmallInt*, *Array of LongInt*, *Array of LargeInt*, or *DataBlock* in which the time program's data is stored.

Time program

Basic

Basic

Name

Specifies the name of the time program displayed in the time program's window and used when saving configurations.

Time slots

Count

Specifies the number of time slots into which one day is divided. Between 2 and 24 slots can be selected. The greater the number of slots, the longer the tag is required.

Grouping

Determines how to group time slots in the time program's data. The time slots can be grouped either by their order within a day and by the order of days in the week (*By order of time slots in day and order of days in week*) or only by their order within a day (*By order of time slots in day*).

Data transfer

Timeout (ms)

Specifies the length of the interval within which reading the time program's data from a device is not enabled in the time program editor. The data transfer timeout's value depends on how fast it is to write the time program's data into the device. If the data transfer timeout's value is too short, it may happen that the time program's data read from the device immediately after it is written into the device corresponds to the original data before the write operation.

Time slot

Time

Determines how to store time values in the time program's data.

Units

Specifies the time values' units in the time program's data. The time values determine the time of day in the time program. Either one value (*Milliseconds*) or two values (*Hours and minutes*) can be used to determine the time of day.

Data type

Specifies the data type of the time values. You can only change the data type if the units are set to *Hours and minutes*.

Value

Determines how to store desired values (setpoints) in the time program's data.

Name

Specifies the name of the value. The name is shown in the time program editor's daily table header.

Data type

Specifies the data type of the value (e.g., the data type of the quantity representing the required temperature for the specified day interval).

Value range

Allows you to customize the value range. You can either select the range according to the value's data type (the *Data type* option) or use a predefined state list (the *State list* option).

State list

Specifies the link to the state list.

Minimum

Specifies the minimum value that can be set in the time program editor.

Maximum

Specifies the maximum value that can be set in the time program editor.

Editor

Basic

Caption

Specifies the text displayed in the time program settings window's title bar at runtime.

Appearance

Specifies the appearance of the time program settings window at runtime. The component displays the time program's data either in bar charts (the *Daily bar charts* option) or in tables (the *Daily tables* option).

Edit

Method

Specifies how to enter tag values for individual time intervals of the day. The *Exact specification* option requires entering the value from the keyboard. The *Through levels* option allows you to enter the tag value with the mouse.

Exact specification

Dec. place count

Specifies the number of decimal places of the quantity.

Through levels

Level count

Specifies the number of levels when entering the tag value with the mouse.

Increment

Specifies the increase at one mouse click on the tag area (the space between two time stamps).

▼ States

Specifies the appearance of the button's individual states. The **State 0** page allows you to configure the button's appearance when in idle status, the **State 1** page when the button is pressed, and the **Active** page when you place the mouse cursor over the component.

Text

Specifies the text to be displayed on the button. The text is displayed with the specified *Font*, *Button color*, and *Text alignment* (if State 1 has no text defined, the text of State 0 is used instead).

Picture

Allows you to select a picture and configure its position on the button (horizontal and vertical *Offset* and *Picture alignment* to the button's center and edges).

Preview

Displays the preview of the picture.

Active

3-state active button

Allows you to specify the button's and text's *color* to be displayed when the mouse cursor is placed over the button. The text to be displayed depends on the current state of the button.

7.5.3 Equithermal Curve

This component is intended for the monitoring and configuration of the radiator equithermal control parameters. The equithermal control parameters allow you to adjust the temperature of the heating water depending on the outside temperature (*Functions*, the *Main* page). The appearance and contents of the information panel is based on the RegoLib library's function blocks of the *Mosaic* environment. It is used for the monitoring and configuration of other parameters from the *Ekviterm1* or *Ekviterm2* function blocks. For general use of the component, there is no need to display the information panel.

Properties

Basic

Alignment

Dynamic

▼ Security

Functions, scripts, actions, menus

Secure

Determines whether to select access rights required for securing the interaction between the user and the component. If this feature is enabled, the component is only accessible to users with sufficient access rights. To specify the access rights required for accessing the component, bring up the [Select Access Rights](#) dialog box by clicking on the key icon. The user must have at least one access right selected on the list available.

Enable setting value

Allows you to change the values of the properties *Min. equithermal temperature on output*, *Output temperature falloff*, *Falloff operation start and end delay*, or to change the curve's point position if the properties are linked to tags. At runtime, the tag's values can be changed in the information panel. The values of the tags that define the position of the equithermal curve's points can also be changed from the chart by dragging the mouse.

Allow customizing chart

Enables the user to customize the graphical appearance of the component at runtime. If this option is active, the [Editing...](#) dialog box can be brought up by using the *Customize Trend* command from the component's popup menu.

Secure

If this feature is enabled, the trend is only accessible to users with sufficient access rights.

▼ Functions

Main

Setting value

Update timeout (ms)

Specifies the time period during which the component is not updated according to tags' values. The update timeout's value depends on how fast it is to write a tag into a device. Sometimes, right after the value is changed, the original value can be displayed for a short time if the update timeout's value is too short.

Equithermal points

On the left side of the page, there is a list of points that define the equithermal curve.

Outside temperature (°C)

The required outside temperature and the corresponding temperature of the heating water can be specified for each point on the list.

Equithermal temperature (°C)

The temperature of the heating water can be either specified as a constant or linked to a tag that can be changed at runtime.

Information panel

Displayed information

Information that cannot be changed directly.

Heating operation

Specifies the heating state (On or Off). The parameter is usually linked to a tag of type *Bool*.

Outside temperature (°C)

Specifies the value of the outside temperature.

Output equithermal temperature (°C)

Specifies the value of the heating water temperature.

Configuration

Min. equithermal temperature on output (°C)

The calculated equithermal temperature can be reduced by the set falloff, but not less than specified by this parameter.

Output temperature falloff (°C)

Is used for the configuration of the equithermal control temperature falloff.

Falloff operation start and end delay (min)

If the value of the input parameter *Heating operation* is set to logical 0, the calculated equithermal temperature is gradually reduced, depending on the ramp length, to the value of the equithermal temperature reduced by the specified *Output temperature falloff*. If the value of the *Heating operation* parameter changes from logical 0 to logical 1, then again, the output temperature increases, depending on the ramp length, to the value of the calculated equithermal temperature. The time interval within which this value is achieved is specified by this parameter.

▼ Static

Chart properties*Advanced*

Brings up the *Editing...* dialog box that allows you to change the graphical appearance of the component (TeeChart). For more details, see the chapter [Trend Properties](#).

Appearance*Show toolbar*

Controls displaying the equithermal curve's toolbar. The panel contains commands for saving and reading information from the device and a command for showing or hiding the information panel on the right side.

Show information about eq. curve

The information panel on the right side of the component contains the values specified on the *Functions* page. If the values are not specified as constants, they can be changed.

Indicate allowed point edit directions

If the coordinates of the equithermal curve's points are linked to tags, the position of the selected point can be changed directly by dragging the mouse. When positioning the cursor in the neighborhood of the point, the directions in which the point can be moved are indicated by arrows.

Chart preview

Displays the equithermal curve's preview.

7.6 Teco

Teco – IRC

Teco – Time Program

7.6.1 Teco – IRC

This component is intended for configuring one end module of the Tecoreg IRC control system. It allows for monitoring operating data, setting up weekly time programs, changing selected functions of the end module, and configuring the module in detail (PID control parameters, sensor correction, etc.).

Tecoreg IRC (or *Tecoreg TR100*) is a modular control system by *Teco* designed for distributed building automation (particularly for the control of heating, cooling, and lighting systems and the control of various appliances) for individual rooms. This method of control is called Individual Room Control (abbreviated to *IRC*).

The *Tecoreg IRC* system has a two-level topology. To provide a secure connection between a control room and end modules, *TR101* communication modules are connected to the control room's PC. One *TR101* communication module can handle up to 32 end modules. Some monitoring, control, and security functions common to the whole building (e.g., air-conditioning, boiler room, and exchange station control) are provided by programmable *Tecoreg* controllers.

The control and monitoring of building interior installations are carried out separately for individual rooms via *TR111* and *TR112* end modules. According to their own control algorithm and time program, the end modules control radiator valves, or electrical appliances and lighting. The *TR141* end module is designed to control a fan coil unit (it controls its heating and cooling mode and the fan speed level).

The end module can be accessed in three levels:

Monitoring operating data

No configuration of the end module is allowed.

Editing time programs

Allows for setting up time programs and logging the configuration to the end module.

Service access

Allows you to fully configure the end module (including PID control parameters).

The component works with a special data structure (Array of Byte of length 7169) implemented by the tag of type [IRC](#). After clicking on the component at runtime, the module's configuration data is non-repeatedly read and the module management window is opened. As a result, the entire data structure does not have to be covered by communication zones (the zones are used to read the operating data area for on-line data update only).

Properties

The properties on the [Static](#) and **States** pages allow you to configure the appearance of the component displayed in the visualization window. They are the same as in the [Button](#) component.

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Menu](#)

[Scripts/Actions](#)

▼ Security

Functions, scripts, actions, menus

Secure

Determines whether to select access rights required for securing the interaction between the user and the component. If this feature is enabled, the component is only accessible to users with sufficient access rights. To specify the access rights required for accessing the component, bring up the [Select Access Rights](#) dialog box by clicking on the key icon. The user must have at least one access right selected on the list available.

Access rights are required to *edit time programs*.

Service

Allows you to select access rights required for *service access*.

▼ Functions

Link to tag

Specifies the link to the tag that contains the time program structure. The tag should be of type [IRC](#).

Module options

Address

Specifies the address of the end module that is to be configured (0–31).

Editor dialog caption

Specifies the text displayed in the title bar of the component's settings window at runtime.

Choose module type

Allows the user to specify the type of end module in the *Tecoreg IRC* system. Working with the component during runtime depends on the type of module selected. It is specified using constants. If this option is not active, the type of module is specified automatically when communicating with the device.

Module type	End module name
11	TR111
12	TR112
15	TR115
16	TR116
21	TR121
22	TR122
41	TR141

▼ States

Specifies the appearance of the button's individual states. The **State 0** page allows you to configure the button's appearance when in idle status, the **State 1** page when the button is pressed, and the **Active** page when you place the mouse cursor over the component.

Text

Specifies the text to be displayed on the button. The text is displayed with the specified *Font*, *Button color*, and *Text alignment* (if State 1 has no text defined, the text of State 0 is used instead).

Picture

Allows you to select a picture and configure its position on the button (horizontal and vertical *Offset* and *Picture alignment* to the button's center and edges).

Preview

Displays the preview of the picture.

Active

3-state active button

Allows you to specify the button's and text's *color* to be displayed when the mouse cursor is placed over the button. The text to be displayed depends on the current state of the button.

7.6.2 Teco – Time Program

This component is intended for configuring time programs' function blocks from Mosaic's RegoLib library and time programs in the iNELS electrical installation system. Time programs are used for setting up electrical installation time-dependent control (*Two-state program*, *TProg1*, *TProg2*, *TProg31*, *TProg41*) or heating and air-conditioning control (the *Heating/Air-conditioning program*).

iNELS is a sophisticated system of intelligent electrical installation developed by the *ELKO EP* company. It is mainly used for the control of lighting and shutters and for the monitoring of states in buildings.

Properties

The properties on the [Static](#) and **States** pages allow you to configure the appearance of the component displayed in the visualization window. They are the same as in the [Button](#) component.

Basic

Alignment

Dynamic

Menu

Scripts/Actions

▼ Security

Functions, scripts, actions, menus

Secure

Determines whether to select access rights required for securing the interaction between the user and the component. If this feature is enabled, the component is only accessible to users with sufficient access rights. To specify the access rights required for accessing the component, bring up the [Select Access Rights](#) dialog box by clicking on the key icon. The user must have at least one access right selected on the list available.

Changes in settings

Allow select configuration

Determines whether to allow changing the time program configuration using a ready-prepared list. Access rights can be specified to *Secure* this feature.

Edit configurations

Determines whether to edit configurations and create a list of the time program configurations. Access rights can be specified to *Secure* this feature.

Auto-save configuration changes

Specifies how to save, at runtime, the list of the time program configurations prior to closing the editor.

▼ Functions

Link to tag

Specifies the link to the tag of type *Array of Byte*, *Array of Word*, *Array of DoubleWord*, *Array of ShortInt*, *Array of SmallInt*, *Array of LongInt*, *Array of LargeInt*, or *DataBlock*. The array size specifies the type of time program.

Time program	Array size (bytes)
Heating/Air-conditioning	184
Two-state program	336
TProg1 - weekly schedule with one ON/OFF interval a day	56
TProg2 - weekly schedule with two ON/OFF intervals a day	112
TProg31 - weekly schedule with one operating time	56
TProg41 - weekly schedule with two operating times	112

Time program

Name

Specifies the name of the time program.

Type

Allows you to select a type of time program. A time program of type *Heating/Air-conditioning* enables you to specify 8 time sections for each day of the week with the following settings: *Comfort*, *Normal*, *Falloff*, or *Minimum*. The range of temperatures for cooling and heating corresponds to each level. A time program of type *Two-state program* enables you to divide each day of the week into 16 sections and to select the *On* or *Off* state of the device in each section. Time programs of type *TProg1* and *TProg31* allow you to set one time section for each day of the week. Time programs of type *TProg2* and *TProg41* allow you to set two time sections for each day of the week. The time programs' function blocks are defined in Mosaic's RegoLib library.

Data transfer

Timeout (ms)

Specifies the length of the interval within which reading the time program's data from a device is not enabled in the time program editor. The data transfer timeout's value depends on how fast it is to write the time program's data into the device. If the data transfer timeout's value is too short, it may happen that the time program's data read from the device immediately after it is written into the device corresponds to the original data before the write operation.

Time program settings window

Caption

Specifies the text displayed in the title bar of the component's settings window at runtime.

▼ States

Specifies the appearance of the button's individual states. The **State 0** page allows you to configure the button's appearance when in idle status, the **State 1** page when the button is pressed, and the **Active** page when you place the mouse cursor over the component.

Text

Specifies the text to be displayed on the button. The text is displayed with the specified *Font*, *Button color*, and *Text alignment* (if State 1 has no text defined, the text of State 0 is used instead).

Picture

Allows you to select a picture and configure its position on the button (horizontal and vertical *Offset* and *Picture alignment* to the button's center and edges).

Preview

Displays the preview of the picture.

Active

3-state active button

Allows you to specify the button's and text's *color* to be displayed when the mouse cursor is placed over the button. The text to be displayed depends on the current state of the button.

7.7 Johnson Controls

[Johnson Controls – Holiday Program](#)

[Johnson Controls – Time Program](#)

[Johnson Controls – ON/OFF Time Program](#)

7.7.1 Johnson Controls – Holiday Program

This component allows you to specify the dates of holidays (exception days) in *Johnson Controls* devices and, together with a time program, allows you to control the on and off states of the device within the specified time intervals. For more detailed information on the setup options, see the *Reliance 4 Runtime* user guide.

Properties

The properties on the [Static](#) and **States** pages allow you to configure the appearance of the component displayed in the visualization window. They are the same as in the [Button](#) component.

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Menu](#)

[Scripts/Actions](#)

[Security](#)

▼ [Functions](#)

Link to tag

Specifies the link to the tag of type *Array of Word* (the size of which is 60 elements) that is read from the *Johnson Controls* device.

Editor dialog caption

Specifies the text displayed in the title bar of the component's settings window at runtime.

Data transfer

Timeout (ms)

Specifies the length of the interval within which the component displays the currently changed value. Sometimes, right after the value is changed, the original value can be displayed for a short time if the timeout's value is too short.

▼ States

Specifies the appearance of the button's individual states. The **State 0** page allows you to configure the button's appearance when in idle status, the **State 1** page when the button is pressed, and the **Active** page when you place the mouse cursor over the component.

Text

Specifies the text to be displayed on the button. The text is displayed with the specified *Font*, *Button color*, and *Text alignment* (if State 1 has no text defined, the text of State 0 is used instead).

Picture

Allows you to select a picture and configure its position on the button (horizontal and vertical *Offset* and *Picture alignment* to the button's center and edges).

Preview

Displays the preview of the picture.

Active

3-state active button

Allows you to specify the button's and text's *color* to be displayed when the mouse cursor is placed over the button. The text to be displayed depends on the current state of the button.

7.7.2 Johnson Controls – Time Program

This component allows you to configure the properties of a time program in *Johnson Controls* devices. For more detailed information on the setup options, see the *Reliance 4 Runtime* user guide.

Properties

The properties on the [Static](#) and **States** pages allow you to configure the appearance of the component displayed in the visualization window. They are the same as in the [Button](#) component.

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Menu](#)

[Scripts/Actions](#)

[Security](#)

▼ Functions

Link to tag

Specifies the link to the tag of type *Array of Word* (the size of which is 29 elements) that is read from the *Johnson Controls* device.

Editor dialog caption

Specifies the text displayed in the title bar of the component's settings window at runtime.

Data transfer

Timeout (ms)

Specifies the length of the interval within which the component displays the currently changed value. Sometimes, right after the value is changed, the original value can be displayed for a short time if the timeout's value is too short.

▼ States

Specifies the appearance of the button's individual states. The **State 0** page allows you to configure the button's appearance when in idle status, the **State 1** page when the button is pressed, and the **Active** page when you place the mouse cursor over the component.

Text

Specifies the text to be displayed on the button. The text is displayed with the specified *Font*, *Button color*, and *Text alignment* (if State 1 has no text defined, the text of State 0 is used instead).

Picture

Allows you to select a picture and configure its position on the button (horizontal and vertical *Offset* and *Picture alignment* to the button's center and edges).

Preview

Displays the preview of the picture.

Active

3-state active button

Allows you to specify the button's and text's *color* to be displayed when the mouse cursor is placed over the button. The text to be displayed depends on the current state of the button.

7.7.3 Johnson Controls – ON/OFF Time Program

This component allows you to configure the properties of an on/off time program in *Johnson Controls* devices. For more detailed information on the setup options, see the *Reliance 4 Runtime* user guide.

Properties

The properties on the [Static](#) and **States** pages allow you to configure the appearance of the component displayed in the visualization window. They are the same as in the [Button](#) component.

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Menu](#)

[Scripts/Actions](#)

[Security](#)

▼ Functions

Link to tag

Specifies the link to the tag of type *Array of Word* (the size of which is 29 elements) that is read from the *Johnson Controls* device.

Editor dialog caption

Specifies the text displayed in the title bar of the component's settings window at runtime.

Data transfer

Timeout (ms)

Specifies the length of the interval within which the component displays the currently changed value. Sometimes, right after the value is changed, the original value can be displayed for a short time if the timeout's value is too short.

▼ States

Specifies the appearance of the button's individual states. The **State 0** page allows you to configure the button's appearance when in idle status, the **State 1** page when the button is pressed, and the **Active** page when you place the mouse cursor over the component.

Text

Specifies the text to be displayed on the button. The text is displayed with the specified *Font*, *Button color*, and *Text alignment* (if State 1 has no text defined, the text of State 0 is used instead).

Picture

Allows you to select a picture and configure its position on the button (horizontal and vertical *Offset* and *Picture alignment* to the button's center and edges).

Preview

Displays the preview of the picture.

Active

3-state active button

Allows you to specify the button's and text's *color* to be displayed when the mouse cursor is placed over the button. The text to be displayed depends on the current state of the button.

7.8 Sauter

[Sauter – Holiday Program](#)

[Sauter – Time Program](#)

7.8.1 Sauter – Holiday Program

This button-like looking component is intended to be used in projects with one or more devices of type *Sauter* (EY2400). After clicking on the component at runtime, the window for specifying holidays (exception days) is displayed. This window allows you to read and edit the specified holidays from the *Sauter* device and write them into the device, or read the holidays from the hard disk or save them on disk.

A holiday is saved in the *Sauter* device so that it occupies the memory space of one word. Up to 16 holidays can be specified. The main tag to which the component is linked must be of type *Array of Word*. The number of array elements specifies the maximum size of the occupied memory of the *Sauter* device when editing the holidays at runtime (concurrently, the current information on the occupied and remaining free memory is displayed). The data transfer *Timeout* property provides access to the settings window if data transfer from/to the device has not been successfully completed in the specified time period.

Properties

The properties on the [Static](#) and **States** pages allow you to configure the appearance of the component displayed in the visualization window. They are the same as in the [Button](#) component.

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Menu](#)

[Scripts/Actions](#)

[Security](#)

▼ Functions

Link to tag

Specifies the link to the tag of type *Array of Word* that contains data of the specified holidays.

Editor dialog caption

Specifies the text displayed in the title bar of the component's settings window at runtime.

Data transfer

Timeout (ms)

Specifies the maximum time period to be used to transfer data from/to the computer to/from the *Sauter* device.

▼ States

Specifies the appearance of the button's individual states. The **State 0** page allows you to configure the button's appearance when in idle status, the **State 1** page when the button is pressed, and the **Active** page when you place the mouse cursor over the component.

Text

Specifies the text to be displayed on the button. The text is displayed with the specified *Font*, *Button color*, and *Text alignment* (if State 1 has no text defined, the text of State 0 is used instead).

Picture

Allows you to select a picture and configure its position on the button (horizontal and vertical *Offset* and *Picture alignment* to the button's center and edges).

Preview

Displays the preview of the picture.

Active

3-state active button

Allows you to specify the button's and text's *color* to be displayed when the mouse cursor is placed over the button. The text to be displayed depends on the current state of the button.

7.8.2 Sauter – Time Program

This button-like looking component is intended to be used in projects with one or more devices of type *Sauter* (EY2400). After clicking on the component at runtime, the window for editing time programs is displayed. This window allows you to read and edit time programs from the *Sauter* device and write them into the device, or read the time programs from the hard disk or save them on disk.

A time program is saved in the *Sauter* device so that it occupies the memory space of one or more words. Up to 128 time programs can be specified. The main tag to which the component is linked must be of type *Array of DoubleWord*. The number of array elements specifies the maximum size of the occupied memory of the *Sauter* device when editing the time program at runtime (concurrently, the current information on the occupied and remaining free memory is displayed). The time program is defined by the so-called machine fine address (*MFA*) and a group of commands available when editing. A command represents a numeric value that is written to the specified address in case of meeting time requirements. The data transfer *Timeout* property provides access to the settings window if data transfer from/to the device has not been successfully completed in the specified time period.

Properties

The properties on the [Static](#) and **States** pages allow you to configure the appearance of the component displayed in the visualization window. They are the same as in the [Button](#) component.

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Menu](#)

[Scripts/Actions](#)

[Security](#)

▼ Functions

There is a list of programs on the left side of the page. The list's items can be added and deleted using commands from the toolbar or from the component's popup menu. On the right side of the page, you can configure the properties of the selected program.

Link to tag

Specifies the link to the tag of type *Array of DoubleWord* that contains data of the time programs.

Editor dialog caption

Specifies the text displayed in the title bar of the component's settings window at runtime.

Data transfer

Timeout (ms)

Specifies the maximum time period to be used to transfer data from/to the computer to/from the *Sauter* device.

Basic

Text

Specifies the name of the time program.

MFA

Specifies the machine fine address to which the resulting command of the time program is written.

Commands

Contains a list of the selected program's commands. The list's items can be added and deleted using standard commands.

Text

Specifies the text of the selected command.

Value

Specifies the value of the selected command.

▼ States

Specifies the appearance of the button's individual states. The **State 0** page allows you to configure the button's appearance when in idle status, the **State 1** page when the button is pressed, and the **Active** page when you place the mouse cursor over the component.

Text

Specifies the text to be displayed on the button. The text is displayed with the specified *Font*, *Button color*, and *Text alignment* (if State 1 has no text defined, the text of State 0 is used instead).

Picture

Allows you to select a picture and configure its position on the button (horizontal and vertical *Offset* and *Picture alignment* to the button's center and edges).

Preview

Displays the preview of the picture.

Active

3-state active button

Allows you to specify the button's and text's *color* to be displayed when the mouse cursor is placed over the button. The text to be displayed depends on the current state of the button.

7.9 BACnet

BACnet – Time Program

7.9.1 BACnet – Time Program

This button-like looking component is intended to be used in projects with one or more devices of type *BACnet*. After clicking on the component at runtime, the window for editing a weekly time program is displayed. This window allows you to read and edit the time program from the *BACnet* device and write it into the device.

Within the *BACnet* device, a time program is saved in an object of type *Schedule*, property *weekly-schedule*. The main tag to which the component is linked must be of type *DataBlock*. In fact, it is an array-type tag whose length should be chosen so that all time periods defined within the time program fit in this array. Every change of the time program's command/state represents 6 bytes. There will be an extra 2 bytes of overhead for every single day. There will also be an extra 2 bytes of overhead for the entire time program.

Examples:

One event for a single day specified by two states – *on at 6:00* and *off at 19:00* – occupies 12 bytes + 2 bytes of overhead/day + 2 bytes of overhead/program. 16 bytes in total.

So, two events for a single day specified by two states occupy 2 x 12 bytes + 2 bytes of overhead/day + 2 bytes of overhead/program. 28 bytes in total.

One event specified for two different days occupies 2 x 12 bytes + 2 x 2 bytes of overhead/day + 2 bytes of overhead/program. 30 bytes in total.

One event specified for each day of the week occupies 7 x 12 bytes + 7 x 2 bytes of overhead/day + 2 bytes of overhead/program. 100 bytes in total.

Two events for a single day specified by three states – *heating at 6:00*, *falloff at 16:00*, and *off at 19:00* – occupy 18 bytes + 2 bytes of overhead/day + 2 bytes of overhead/program. 22 bytes in total.

The data transfer *Timeout* property provides access to the settings window if data transfer from/to the device has not been successfully completed in the specified time period.

Properties

The properties on the [Static](#) and **States** pages allow you to configure the appearance of the component displayed in the visualization window. They are the same as in the [Button](#) component.

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Menu](#)

[Scripts/Actions](#)

[Security](#)

▼ [Functions](#)

Link to tag

Specifies the link to the tag of type *DataBlock* that contains data of the weekly time program.

The left side of the page also contains a list of the time program's active states/commands. The list's items can be added and deleted using commands from the toolbar or from the component's popup menu. On the right side of the page, you can configure the properties of the selected state/command.

Defining active states:

Text

Specifies the name of the time program's active state/command as it will be displayed in the window for editing the time program (e.g., on, cooling, heating).

Value

Specifies the value of the selected state/command.

Background

Specifies the color in which to display the state/command in the window for editing the time program.

Default value

Specifies the value that corresponds to the state/command when the time program is inactive.

Default data type

To be added.

Data transfer

Timeout (ms)

Specifies the maximum time period to be used to transfer data from/to the computer to/from the *BACnet* device.

▼ States

Specifies the appearance of the button's individual states. The **State 0** page allows you to configure the button's appearance when in idle status, the **State 1** page when the button is pressed, and the **Active** page when you place the mouse cursor over the component.

Text

Specifies the text to be displayed on the button. The text is displayed with the specified *Font*, *Button color*, and *Text alignment* (if State 1 has no text defined, the text of State 0 is used instead).

Picture

Allows you to select a picture and configure its position on the button (horizontal and vertical *Offset* and *Picture alignment* to the button's center and edges).

Preview

Displays the preview of the picture.

Active

3-state active button

Allows you to specify the button's and text's *color* to be displayed when the mouse cursor is placed over the button. The text to be displayed depends on the current state of the button.

7.10 IP Cameras

[Axis IP Camera](#)

[Vivotek IP Camera](#)

[Pelco IP Camera](#)

[Digifort](#)

7.10.1 Axis IP Camera

This component is used to integrate videos from Axis IP cameras into a visualization application. It allows you to:

- Place a video into the visualization window
- Control the connection with the camera using a tag
- Record a video into a file
- Control the recording using a tag
- Perform other functions that depend on the camera type used: rotating the camera, zooming, etc.
- Configure the appearance of the player (toolbar, status bar, and context menu options)

The component uses the original *AXIS Media Control* supplied together with the IP camera. It is designed for all types of Axis IP cameras that are compatible with this control. Today, all Axis IP cameras are compatible. *AXIS Media Control* and its SDK are part of the *Reliance Add-On Pack* installer.

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

▼ Functions

Link to tag

Control connection

Allows you to specify the link to the tag that is to control the connection with the IP camera. The tag's non-zero value signifies the connection will be established.

Connection and login

Address

Specifies the camera's IP address or network name.

Port

Specifies the camera's TCP port number.

Media type

Specifies the type of media intended for the transfer of the video information from the IP camera (codec).

Name

Specifies the name used when logging on to the IP camera (can be changed using the IP camera's configuration Web page).

Password

Specifies the password used when logging on to the IP camera (can be changed using the IP camera's configuration Web page).

▼ Video

Recording video

Never

The video will not be recorded on disk.

Always (if connected)

The video will be recorded into the selected directory if the connection with the IP camera is established (video can be viewed).

Tag-controlled

The video will be recorded into the selected directory if the connection is established and the control tag's value is non-zero.

Directory for saving video files

Specifies the directory in which the video files will be stored. The file name contains the date and time of the video's start (for each connection, a separate file will be created). The directory can also be specified using a string-type tag (*Tag-controlled*).

▼ Static

Appearance

User interface mode

Specifies the user interface mode. For details, see *AXIS Media Control's SDK documentation*.

Show toolbar

Determines whether to display the toolbar of the IP camera's user interface.

Toolbar configuration

Allows you to specify the toolbar configuration. For details, see *AXIS Media Control's SDK documentation*.

Show status bar

Determines whether to display the component's status bar.

Enable context menu

Determines whether to enable displaying the component's context menu.

Maximize/restore on double-click

Determines whether to enable maximizing the video to full screen by double-clicking on the component area.

7.10.2 Vivotek IP Camera

This component is used to integrate videos from Vivotek IP cameras into a visualization

application. It allows you to:

- Place a video into the visualization window
- Control the connection with the camera using a tag
- Record a video into a file
- Control the recording using a tag
- Perform other functions that depend on the camera type used: rotating the camera, zooming, etc.
- Read external digital inputs or control digital outputs (if the connected IP camera disposes of external inputs or outputs)
- Configure the appearance of the player (toolbar, status bar, and context menu options)

The component uses the original *Vitamin Control* supplied together with the IP camera. It is designed for all types of Vivotek IP cameras that are compatible with this control. Today, all Vivotek IP cameras are compatible. *Vitamin Control* is part of the *Reliance Add-On Pack* installer.

Properties

[Basic](#)

[Alignment](#)

[Dynamic](#)

▼ Functions

Link to tag

Control connection

Allows you to specify the link to the tag that is to control the connection with the IP camera. The tag's non-zero value signifies the connection will be established.

Connection and login

Address

Specifies the camera's IP address or network name.

HTTP port

Specifies the camera's HTTP port number.

Server

Specifies the type (series) of the IP camera.

Protocol

Specifies the protocol used for communication with the IP camera (*UDP, TCP, HTTP*).

Name

Specifies the name used when logging on to the IP camera (can be changed using the IP camera's configuration Web page).

Password

Specifies the password used when logging on to the IP camera (can be changed using the IP camera's configuration Web page).

▼ Video

Recording video*Never*

The video will not be recorded on disk.

Always (if connected)

The video will be recorded into the selected directory if the connection with the IP camera is established (video can be viewed).

Tag-controlled

The video will be recorded into the selected directory if the connection is established and the control tag's value is non-zero.

Directory for saving video files

Specifies the directory in which the video files will be stored. The file name contains the date and time of the video's start (for each connection, a separate file will be created). The directory can also be specified using a string-type tag (*Tag-controlled*).

▼ External I/O

External inputs and outputs

Input

Allows for reading the state of the IP camera's external input and transfer it to the selected tag (if the IP camera disposes of an external input).

Output

Allows you to control the IP camera's external output using the selected tag (if the IP camera disposes of an external output).

▼ Static

Appearance

Show toolbar

Determines whether to display the component's toolbar.

Show border

Determines whether to display the component's border.

Show title bar

Determines whether to display the component's title bar.

7.10.3 Pelco IP Camera

This component is used to integrate videos from Pelco IP cameras into a visualization application. It allows you to:

- Place a video into the visualization window
- Control the connection with the camera using a tag
- Perform other functions that depend on the camera type used: rotating the camera, zooming, etc.
- Configure the appearance of the player (toolbar and status bar options)

The component uses the original *Pelco Viewer* supplied together with the IP camera. It is designed for all types of Pelco IP cameras that are compatible with this control. Today, all Pelco IP cameras are compatible. *Pelco Viewer* is part of the *Reliance Add-On Pack* installer.

Properties

Basic

Alignment

Dynamic

▼ Functions

Link to tag

Control connection

Allows you to specify the link to the tag that is to control the connection with the IP camera. The tag's non-zero value signifies the connection will be established.

Connection and login

RTSP URL

Specifies the camera's RTSP URL.

Address

Specifies the camera's IP address or network name.

Name

Specifies the name used when logging on to the IP camera.

Password

Specifies the password used when logging on to the IP camera.

▼ Static

Appearance

Show toolbar

Determines whether to display the toolbar of the IP camera's user interface.

Show status bar

Determines whether to display the component's status bar.

7.10.4 Digifort

This component is used to integrate the Digifort IP surveillance system into a visualization application. It allows you to:

- Place a video into the visualization window
- Place the so-called Screen View into the visualization window
- Control the connection using a tag
- Perform other functions that depend on the camera type used: rotating the camera, zooming, etc.

Digifort is an IP surveillance system that allows integrating an unlimited number of IP cameras and analog cameras from different manufacturers into a single whole and working with them in the same way.

Any Digifort camera can be integrated into the **Reliance** SCADA/HMI system by the *Digifort* component. The component is compatible with Digifort 7. Older versions are not supported. The computer on which the camera should be accessible in the visualization project must be equipped with the original drivers. To install the drivers, run *Plugins.exe* (which installs the drivers for the integration of the video into the visualization project) or *Clients.exe* (which, in addition, installs a client instance of the Digifort system).

www.digifort.com

Properties

Basic

Alignment

Dynamic

▼ Functions

Link to tag

Control connection

Allows you to specify the link to the tag that is to control the connection with the Digifort system. The tag's non-zero value signifies the connection will be established.

Connection and login

Address

Specifies the IP address or network name of the server on which the Digifort system is running.

Server name

Specifies the name of the server defined in the Digifort system.

Version

Specifies the version of Digifort.

Port

Specifies the Digifort system's TCP port number.

Name

Specifies the user name used when logging on to the Digifort system.

Password

Specifies the password used when logging on to the Digifort system.

Contents

Object type

Specifies the type of the object that is to be embedded into the visualization window. You can embed video cameras, for which the *Camera* and *Screen View* (i.e., multiple cameras arranged in a matrix) options can be used. In the Digifort system, the *Screen View* can be defined as *public* (i.e., common to all users), which corresponds to the *Screen View* option, or *nonpublic* (i.e., available to some users only), which corresponds to the *Screen View (user)* option.

Object name

Specifies the name of the object that is to be embedded into the visualization window (e.g., the name under which the camera is registered in the Digifort system).

Screen Style

Specifies the numeric identifier describing how the cameras are arranged in the matrix (e.g., 6278 corresponds to four cross-separated cameras). You can also define a custom arrangement (see the Digifort manual). This property is active only if the *Object type* property is set to *Screen View* or *Screen View (user)*.

7.11 Elgas

Elgas – Gas Composition

7.11.1 Elgas – Gas Composition

This button-like looking component is intended to be used in projects with one or more devices of type *Elgas2*. After clicking on the component at runtime, the window for editing gas composition is displayed. This window allows you to read the gas composition from the *Elgas2* device, edit it, and write it into the device.

The gas composition is read/written from/into the device via a communication function for reading/writing parameters for SCADA systems. The main tag to which the component is linked must be of the *Special physical* tag kind and of the *Gas composition* tag data type. Internally, the tag is of type *DataBlock* with its length fixed and providing gas composition reading in accordance with the Elgas communication protocol, version 2, edition 15.

The data transfer *Timeout* property provides access to the settings window if data transfer from/to the device has not been successfully completed in the specified time period.

Properties

The properties on the [Static](#) and **States** pages allow you to configure the appearance of the component displayed in the visualization window. They are the same as in the [Button](#) component.

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Menu](#)

[Scripts/Actions](#)

[Security](#)

▼ [Functions](#)

Link to tag

Specifies the link to the tag of type *DataBlock* that contains gas composition data.

Editor dialog caption

Specifies the text displayed in the time program settings window's title bar at runtime.

▼ States

Specifies the appearance of the button's individual states. The **State 0** page allows you to configure the button's appearance when in idle status, the **State 1** page when the button is pressed, and the **Active** page when you place the mouse cursor over the component.

Text

Specifies the text to be displayed on the button. The text is displayed with the specified *Font*, *Button color*, and *Text alignment* (if State 1 has no text defined, the text of State 0 is used instead).

Picture

Allows you to select a picture and configure its position on the button (horizontal and vertical *Offset* and *Picture alignment* to the button's center and edges).

Preview

Displays the preview of the picture.

Active

3-state active button

Allows you to specify the button's and text's *color* to be displayed when the mouse cursor is placed over the button. The text to be displayed depends on the current state of the button.

7.12 AMiT

AMiT – Time Program

7.12.1 AMiT – Time Program

This component allows you to configure the properties of a time program in *AMiT* devices.

Properties

The properties on the [Static](#) and **States** pages allow you to configure the appearance of the component displayed in the visualization window. They are the same as in the [Button](#) component.

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Menu](#)

[Scripts/Actions](#)

▼ [Functions](#)

Link to tag

Specifies the link to the tags containing the configuration of the time program. The time program's data is stored in two tags – *Times matrix* and *Values matrix*. The *Times matrix* tag must be of type *Array of LongInt* while the *Values matrix* tag can be of type *Array of SmallInt*, *Array of LongInt*, or *Array of Float*. The size of the tags' element matrix must be set properly. For both tags, the size of the element matrix must be identical. The number of matrix rows determines the number of daily time programs. The allowed number of matrix rows is 7 (daily time programs' configuration for a week) or 8 (in addition to daily time programs' configuration for a week, it contains a daily time program's configuration for holidays). The number of matrix columns in a daily time program determines the number of time program breakpoints.

Time program

Basic

Basic

Name

Specifies the name of the time program. The name is displayed in the time program settings window's title bar at runtime.

Allow holidays

Allows displaying and editing a daily time program intended for holidays. The option is enabled only if the number of matrix rows of the *Times matrix* and *Values matrix* tags is 8.

Data transfer

Timeout (ms)

Specifies the length of the interval within which reading the time program's data from a device is not enabled in the time program editor. The data transfer timeout's value depends on how fast it is to write the time program's data into the device. If the data transfer timeout's value is too short, it may happen that the time program's data read from the device immediately after it is written into the device corresponds to the original data before the write operation.

Time slot

Value

Name

Specifies the name of the value. The name is shown in the time program editor's daily table header.

Minimum

Specifies the minimum value that can be set in the time program editor.

Maximum

Specifies the maximum value that can be set in the time program editor.

Editor

Basic

Caption

Specifies the text displayed in the time program settings window's title bar at runtime.

Appearance

Specifies the appearance of the time program settings window at runtime. The component displays the time program's data either in bar charts (the *Daily bar charts* option) or in tables (the *Daily tables* option).

Edit

Dec. place count

Specifies the number of decimal places of the quantity.

▼ States

Specifies the appearance of the button's individual states. The **State 0** page allows you to configure the button's appearance when in idle status, the **State 1** page when the button is pressed, and the **Active** page when you place the mouse cursor over the component.

Text

Specifies the text to be displayed on the button. The text is displayed with the specified *Font*, *Button color*, and *Text alignment* (if State 1 has no text defined, the text of State 0 is used instead).

Picture

Allows you to select a picture and configure its position on the button (horizontal and vertical *Offset* and *Picture alignment* to the button's center and edges).

Preview

Displays the preview of the picture.

Active

3-state active button

Allows you to specify the button's and text's *color* to be displayed when the mouse cursor is placed over the button. The text to be displayed depends on the current state of the button.

7.13 Wago

Wago – Time Program

7.13.1 Wago – Time Program

This component allows you to configure the properties of a time program in *Wago* devices. For more detailed information on the setup options, see the *Reliance 4 Runtime* user guide.

Properties

The properties on the [Static](#) and **States** pages allow you to configure the appearance of the component displayed in the visualization window. They are the same as in the [Button](#) component.

[Basic](#)

[Alignment](#)

[Dynamic](#)

[Menu](#)

[Scripts/Actions](#)

[Security](#)

▼ [Functions](#)

Link to tag

Specifies the link to the tag of type *DataBlock* (the size of which is 29 elements) that is read from the *Wago* device.

Editor dialog caption

Specifies the text displayed in the title bar of the component's settings window at runtime.

Data transfer

Timeout (ms)

Specifies the length of the interval within which the component displays the currently changed value. Sometimes, right after the value is changed, the original value can be displayed for a short time if the timeout's value is too short.

▼ States

Specifies the appearance of the button's individual states. The **State 0** page allows you to configure the button's appearance when in idle status, the **State 1** page when the button is pressed, and the **Active** page when you place the mouse cursor over the component.

Text

Specifies the text to be displayed on the button. The text is displayed with the specified *Font*, *Button color*, and *Text alignment* (if State 1 has no text defined, the text of State 0 is used instead).

Picture

Allows you to select a picture and configure its position on the button (horizontal and vertical *Offset* and *Picture alignment* to the button's center and edges).

Preview

Displays the preview of the picture.

Active

3-state active button

Allows you to specify the button's and text's *color* to be displayed when the mouse cursor is placed over the button. The text to be displayed depends on the current state of the button.

8 Managers

Managers are tools allowing you to view, create, and configure objects that are the building blocks of visualization projects. Objects are visual components, windows, devices, databases, trends, reports, custom reports, recipes and others.

The [Window Manager](#), [Component Manager](#), and [Layer Manager](#) are described in the chapter [Tool Windows](#). The common features of other managers are their appearance and the way you work with them (except for the *String Manager*, *Script Manager*, and *Picture Manager*). To bring up a manager, invoke the corresponding command from the *Managers* menu or from the toolbar.

Toolbar

Contains commands for working with objects. Most of the commands in the toolbar are common to all managers (see the chapter [Common Toolbar Commands](#)).

Top left pane

The top left pane displays the objects in a hierarchical tree diagram in order to show the subordination of one object to another.

Bottom left pane

The bottom left pane displays the objects on a list. These are the objects subordinated to the object selected in the top left pane. The list allows you to select and edit multiple objects at a time. When you select an object on the list, the manager displays the object's properties in the right pane. If multiple objects are selected on the list, the manager displays the properties of the selected object that has the input focus or the first object in the selection (if no object in the selection is focused).

Right pane

The right pane displays properties of the object(s) selected in the top left or bottom left pane. The properties can be edited as needed. When you edit a property, the corresponding control changes its color to yellow. This status is also indicated by a yellow exclamation mark displayed beside the edited object(s) in the top left and bottom left pane. When the selection is about to change, the manager checks all the edited properties to see if they are correct. If so, the manager assigns the edited properties to the selected object(s) and the yellow exclamation mark changes its color to blue. Otherwise, the selection remains unchanged. If the edits have been assigned to the selected object(s), they can later be saved to the appropriate files by the *Save All* command or canceled by invoking the *Close* command and choosing not to save the changes. Naturally, you can also edit a property and use the *Save All* command immediately. The manager checks all the edited properties to see if they are correct. If so, the manager assigns the edited properties to the selected object(s) and saves the object(s) to the appropriate files.

Data Structure Manager
Device Manager
Communication Driver Manager
Recipe Manager
Data Table Manager
Trend Manager
Real-Time Trend Manager
Report Manager
Custom Report Manager
String Manager
Picture Manager
State Manager
Action Manager
Script Manager
User Manager
Project Structure Manager

8.1 Common Object Properties

Name

A name of the object that must be unique within the project or the parent object (e.g., a tag name within a device); it is case-insensitive.

Alias

An optional alternative name of the object usually used in the GUI during runtime. Therefore, it should be descriptive and understandable to the user. In multilanguage projects, an alias can be localized (i.e., translated into all project languages), which is in contrast to a *Name*.

Comment

An optional comment about the object used by the visualization project developer (systems integrator). It can be useful when configuring, debugging, and altering an application.

Description

An optional description of the object intended for the end user. In multilanguage projects, a description can be localized (i.e., translated into all project languages), which is in contrast to a *Comment*.

External ID

The object's identifier suitable when exchanging data with third-party systems that use their own ID.

8.2 Common Toolbar Commands



New Folder (Alt+Ins)

Is used to create a new folder. The type of the newly created folder depends on the object selected when invoking the command.



View

Is used to change the view style of the objects listed in the bottom left pane of the manager. The *Picture Manager* allows for displaying pictures as thumbnails.



Sort

Is used to sort the objects directly subordinated to the object selected in the tree diagram by the selected column of the bottom left pane.



One Level Up (BkSp)

Is used to move the selection one level up in the tree diagram.



Quick Filter (Ctrl+F)

Allows you to quickly search for an object by name. The *Match Beginning of String*  command is used when searching for objects whose names start with the specified text and the *Match Any Part of String*  command when searching for objects whose names contain the specified text. The *Close*  command closes the quick filter.



Find Object (Ctrl+Shift+F)

Is used to bring up the *Find Object* dialog box to search for an object by its name. To speed up searching the object, specify the type of the object to be searched and select the *Subtree of selected object only* option. Also, the *Whole strings only* and *Case sensitive* options are available. The search results are displayed in a separate window; select (mark) the found object in the respective manager by double-clicking it.



Options

Is used to bring up the *Options* dialog box to view or configure the settings related to the manager (e.g., to *Alphabetically sort object in the tree*). On the *Link replacement* page of the dialog, you can configure the options used while duplicating objects in the manager. The manager can [replace links to tags](#) (when duplicating data tables, real-time trends, custom reports, and recipes) and [links to data table fields](#) (when duplicating trends and reports). In addition, the *Options* dialog of the *Trend Manager* enables you to configure the options related to adopting user settings of trends when the *Adopt trend user settings* property is used.

Undo (Ctrl+Z)

Is used to cancel the edits that have not yet been assigned to the selected object(s) (yellow background).

Copy (Ctrl+C)

Is used to copy the currently selected object(s) to the clipboard.

Cut (Ctrl+X)

Is used to delete the currently selected object(s) from the structure and place it to the clipboard.

Paste (Ctrl+V)

Is used to paste the contents of the clipboard into the structure. The contents of the clipboard remain unchanged.

Duplicate (Ctrl+D)

Is used to duplicate the currently selected object(s). The contents of the clipboard remain unchanged.

Delete (Del)

Is used to delete the currently selected object(s) from the structure.

8.2.1 Replacement of Links to Tags

Replace links when duplicating an object

Determines whether to replace the links to tags when an object is duplicated based on the same tag name in the source and the target device.

Remove the original link if a tag with the same name does not exist in the target device

Determines whether to remove the original link when the target device doesn't contain a tag with the same name.

8.2.2 Replacement of Links to Data Table Fields

Replace links when duplicating an object

Determines whether to replace the links to data table fields when an object is duplicated based on the same field name in the source and the target data table.

Remove the original link if a field with the same name does not exist in the target data table

Determines whether to remove the original link when the target data table doesn't contain a field with the same name.

8.3 Data Structure Manager

The **Data Structure Manager** is a tool intended to define and configure *data structures*. In the context of **Reliance**, *data structures* are user-defined structured data types. They are similar to data structures that are commonly used in tools for PLC programming and high level programming languages (e.g., *struct* type in C, *record* type in Pascal). A data structure serves as a model whereby structured tags (instances of data structures) can be created (defined).

A data structure consists of *members/fields*. A data structure field can be of a simple data type (e.g., *Byte*) or a data structure type. This allows embedding of one structure into another. The number of levels of which the data structure consists is not limited. Data structures in combination with window templates significantly save time. Data structures should also be used in many other situations where it is desirable to group the tags.

The *Data Structure Manager* window consists of three panes and the toolbar that are described in detail in the chapter [Managers](#). In addition to the [common toolbar commands](#), the toolbar contains the following commands:



New Data Structure

Is used to create a new *data structure* intended for the selected device type.



New Data Structure Field

Is used to bring up the [Add New Data Structure Field Wizard](#) that allows you to specify the new field's tag kind and tag data type.



Add Data Structure Fields

Allows you to add a whole data structure as a data structure field. Data structures can be nested in one another.



Create Window Template

Is used to create a [window template](#) depending on the currently selected data structure.

If the tree root (the *data structure* node) or a folder are selected in the top left pane, the *Subordinated object count* and the *Folder count* are displayed in the right pane. You can also *Export* and *Import* the data structures in the CSV format or import the data structures of *Teco*, *Wago*, and *OPC* devices from a file in the *.exp format of the CoDeSys development environment in accordance with IEC 61131-3.

[Data Structure Properties](#)

Data Structure Field Properties

8.3.1 Data Structure Properties

Common Object Properties

Device type

Displays the type of the device that the structure is intended for.

Field address

The field address is a relative address with respect to the beginning of the data structure. The following options are available:

Unused

The field address will not be used. For all tags generated based on the data structure fields, the address must be configured additionally through the *Device Manager*. However, it is a very laborious way of setting up the address that is used only if the tags generated based on the data structure fields do not lie in a continuous memory area (registers) of a PLC. For example, some tags are located on the digital input card, some are on the digital output card, and the rest of the tags are in user registers.

Fixed

The field address is defined by the value of the *Address* property.

Based on order

The field address depends on its order within the structure. Based on the order, the value of the *Address* property is automatically calculated (it cannot be changed directly because the respective control is disabled).

Field order

Specifies the field order within the data structure. You can change the order by clicking the arrows above. It can be used only if the *Order* option for the *Field address defined by* property is active.

8.3.2 Data Structure Field Properties

▼ Basic

Common Object Properties

In addition to the [common object properties](#), a data structure field contains several other properties that may be inaccessible depending on other options (e.g., on the *Field address defined by property*).

General

Eng. name

Specifies an optional engineering name for the field.

Eng. units

Specifies the field's unit of measurement.

Tag kind

Displays the kind of the tag to be created based on the data structure field. The tag kind can be selected only once when creating a new data structure field. You can choose from the following tag kinds: *Internal*, *Physical* (a tag defined within a PLC), *Special* (e.g., a tag defined within an *Elcor* device, see [Tag Kinds and Tag Data Types](#)), or *User-defined* (another structured tag).

Tag data type

Displays the data type of the tag to be created based on the data structure field. The list of data types depends on the type of the device that the structure is intended for. The *String character count* property is available to tags of type *String* or *Array of String*, the *Array element count* property is available to array-type tags (*Array of...*). The *Matrix row count* and *Matrix column count* properties allow you to specify the size of the element matrix for array-type tags (*Array of...*) defined within some types of devices (*AMiT*).

Address

Specifies the relative address of the field within the data structure. This property can be directly specified only if the *Offset* option for the *Field address defined by property* is active. If a bit tag (a *Bool*-type tag within physical devices, e.g., a *Teco* PLC) is used, the bit number needs to be entered. This number specifies the ordinal number of the bit starting with 0.

▼ Advanced

Automatically generate tags on synchronization

Determines whether to automatically define nested tags (based on the data structure field) within all instances of the data structure through the *Device Manager*. This option is active by default. If it is inactive, it makes sense only if a nested tag should only exist in some tags of type *data structure*. In such a case, the nested tag must be added to the particular instance of the data structure by using the *Add Nested Tags* command via the *Device Manager*.

Display

Text for state 'Logical 1'

Allows you to specify a user-defined name for the logical 1 state for *Bool*-type tags.

Text for state 'Logical 0'

Allows you to specify a user-defined name for the logical 0 state for *Bool*-type tags.

8.3.3 Add New Data Structure Field Wizard

The first step of the *Add New Data Structure Field Wizard* allows you to specify the **kind** of the **tag** (usually internal, physical, or user-defined).

In the second step, you can select the **data type** of the **tag**. The options available in this step are dependent on the option chosen in the previous step and the type of the device that the data structure is intended for.

8.4 Device Manager

The **Device Manager** is a tool that is used to define devices and *tags* and *alarms/events* within these devices. Devices can be generally divided into *physical* and *virtual*.

A physical device is a *PLC*-type controller, *telemetry system* (remote autonomous device for data capture ordinarily connected over a modem), or other I/O device. The tag values of these devices are stored in the memory of the device, the computer only keeps their image (copy). Data transmission between the device and the **Reliance** runtime software is implemented by communication drivers (see the [Communication Driver Manager](#)) or OPC and DDE servers. The so-called *virtual devices* are designed for *internal tags* of the visualization project. These devices' tags only exist in the memory of the computer and you can work with them freely.

Each device can be connected (via the [Project Structure Manager](#)) to the computer. Its tags and alarms/events can thus be provided to other computers within the network.

A device named *System* is a special type of virtual device. It's a predefined virtual device that is part of every visualization project. This device is automatically connected to each computer running **Reliance**'s runtime software. It is intended for defining private internal tags (with the exception of providing thin clients with the *System* device's data). It cannot be shared among the computers in the network (i.e., cannot be provided through a server connection).

In addition to *physical tags* (stored in the memory of the device), the physical device can also contain *internal tags* that are only stored in the memory of the computer. This is useful especially for better organization of functionally related physical and internal tags.

From the perspective of a visualization project, a device defined via the *Device Manager* is a specific unit containing a list of *tags* and *alarms/events*. The so-called *communication zones* are also included in some types of devices. These zones allow you to create rules for reading data from the device over integrated units.

[Toolbar](#)

[Device Properties](#)

[Import and Export of Tags and Alarms/Events](#)

[Tag Properties](#)

[Alarm/Event Properties](#)

[Communication Zone Properties](#)

8.4.1 Toolbar

In addition to the [common toolbar commands](#), the toolbar contains commands to create additional objects and to add them to the tree and commands to synchronize tags with data structures.



New Device

Brings up the *Select Device Type* dialog box to specify the type of the device to be created.



New Communication Zone

Builds up a new communication zone. The command is available only if the *Communication Zones* folder is selected (the folder is only available to the types of devices allowing communication over communication zones).



New OPC Group

Builds up a new OPC group. It is only available within devices of type OPC.



New Tag

Creates a new tag. The command is only available if the *Tags* folder or another tag are selected. The command (within OPC-type devices) is only available if an OPC group is selected.



New Structured Tag

Brings up the *Select Data Structure* dialog box to select a data structure. A structured tag will be created according to the selected data structure. *Data structures* can be defined via the [Data Structure Manager](#). Data structures and structured tags can later be synchronized by the *Synchronize With Data Structures* command.



New Alarm/Event

Creates a new *alarm/event* in the *Alarms/Events* folder. *Alarms/events* within the selected device can only be linked to tags from this device.



Synchronize With Data Structures

Synchronizes structured tags with the corresponding data structures at sub-levels of the tree. Any changes (e.g., deletion or addition of tags) implemented in data structures will reflect on structured tags within a device.



Add Nested Tags

Allows you to manually add tags in a structured tag, e.g., after their deletion. The command's function is similar to the *Synchronize With Data Structures* command. However, it allows you to independently add specific tags on the basis of data structure fields.

8.4.2 Device Properties

Common Object Properties

Device type

Displays the type of the selected device.

▼ Advanced

Tag quality determination method

Assume quality from communication driver

Determines that the quality of the tag is provided by the communication driver alongside the tag value and its time stamp.

Determine quality based on time stamp

The tag quality is determined on the basis of the time stamp. The tag value is marked invalid if the time stamp is older than it is defined by the *Max. age of valid data* property. This option can solve, for example, the problem with invalid data (components with a colored border) after the start of a visualization project when tags are read from devices with a long duration (e.g., telemetry systems).

Time stamp base

A proper setting of the time stamp base is particularly important for a device from which the time stamp is read along with the tag value (e.g., telemetry systems). In such an event, it must be the same as in the device. It affects the display of time stamps in visualization windows, charts, etc. It also affects the function of *time synchronization* in the device (see the [Project Structure Manager](#)).

UTC

The time stamp of the tag value is in UTC (Coordinated Universal Time). Thus, it is a time independent of the time zone. UTC is identical to Greenwich Mean Time (GMT).

UTC + offset (hours)

The time stamp of the tag value is in UTC (Coordinated Universal Time). Thus, it is a time independent of the time zone and shifted by the specified time interval (e.g., standard time).

Local time

According to the operating system settings, the time stamp of the tag value depends on the time zone and time of year.

Processing of data newer than current computer time

Max. time difference (min)

To be added.

Null-terminated String tags

Determines whether the string-type tags defined within the device are null-terminated. If this option is active, the string has a variable length when displayed (up to the maximum specified by the *String character count* property). Otherwise, the string's length is always equal to the value of the *String character count* property. From the right, printable characters are followed by spaces up to the total length. This affects the alignment of a displayed tag value in components (e.g., *Display*, if the *Right* or *Centered* alignment is selected). It is recommended that you leave this option enabled (default value).

Generate alarms/events from archive data

To be added.

Other device properties (e.g., address) differ depending on the type of device. The most common device types' properties are described as follows:

▣ Defining AMiT Device

Miscellaneous

Address

Specifies the address of the device to be identified within multiple devices on a single bus. The value can be overloaded with the *Address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

▣ Defining BACnet Device

Miscellaneous

Address

Specifies the address of the device to be identified within multiple devices on a single bus. The value can be overloaded with the *Address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

Write priority

Specifies the communication driver's priority of accessing the tags when writing a new value. The lower the value, the higher the priority. If there is a value with higher priority (lower number) stored in the tag, the new value is not written. The default value of the property is 8 – Manual Operator.

Maximum APDU size

Specifies the maximum size of the communication packet in bytes.

COV activation interval (s)

Specifies the time (in seconds) at which the communication driver activates the spontaneous sending of changes of tag values (COV – Change Of Value). Once this time expires, the device will stop sending these changes. At this time interval, the communication driver periodically activates the spontaneous sending of data. This ensures the device terminates communication at the specified time interval after the visualization project is terminated.

Require acknowledged COV messages

Determines whether to spontaneously send data with a request for an acknowledgment of its receipt. If the communication driver does not acknowledge the receipt of the data, the device will repeat the spontaneous sending of the data.

Supported communication functions

Listed below are the *BACnet* communication functions supported by the communication driver. It determines which communication functions the I/O device supports.

Read Property Multiple

To be added.

Defining DDE Device

Miscellaneous

DDE server

Specifies the text identifier for a DDE server. It represents the name of the DDE server's exe file without the path and extension. For example, if *C:\Program Files\MyDDEServer\MyDDEServer.exe* is the DDE server, the property value will be *MyDDEServer*.

Defining Generic Device

Generic Driver is designed for data exchange between the **Reliance** SCADA/HMI system and any device for which a native driver or OPC server is not available. This universal driver allows for communication with a device via any user protocol. In the **Reliance** SCADA/HMI system, the device is represented by a device of type **Generic**.

Communication with the *Generic* device is realized via scripts through tags. These tags must be defined within the device. After the tags are defined, it is necessary to set the tag kind to **Special** and the tag data type for the required function (e.g., *Output buffer*). Standard communication protocols based on the request-response principle can be easily implemented using these tags.

When communicating, it is first necessary to fill the tag of type *Output buffer* with individual bytes that make up a communication message. Then, set the length of the message to be sent (in bytes) for the tag of type *Number of bytes to send*. To send the message, set the value of the *Connection control* tag to "1".

The receipt of the response is indicated by the change of the *Number of bytes received* tag's value. The individual bytes of the received message are stored in the tag of type *Input buffer*. Beware of setting an insufficient length of the receiving buffer. To process the received data, functions for transferring the data from array-type tags to tags of the basic type *MoveTagElementValuesToSimpleTag* are available in the *RTag* object.

If the device does not receive any queries, only sends data (i.e., only a one-way communication is required), then the whole process of creating and sending the communication query can be omitted. Upon the startup of the runtime software, the communication channel is automatically opened and it is ready to receive data. If the *Release communication port when idle* option is activated through the *Communication Driver Manager*, it is first necessary to open the communication channel. To open the communication channel without sending data, set the value of the *Connection control* tag to "1" and the value of the *Number of bytes to send* tag to "0".

Defining IEC104 Device

Miscellaneous

ASDU address

Specifies the address of the device to be identified within multiple devices on a single bus. The value can be overloaded with the *Address* property of the connected device's communication channel (see the [Project Structure Manager](#)). If the device has no ASDU address defined, it can be defined for tag folders or for individual tags.

Device/Model

Specifies the device's model. If your device model is not on offer, choose the *Not specified* option.

ASDU address size (byte count)

Specifies the size of the ASDU address. For the *IEC104* device, the size is always 2 bytes.

Tag address size (byte count)

Specifies the size of the tag address (information object address). For the *IEC104* device, the size is always 3 bytes.

Transfer cause size (byte count)

Specifies the transfer cause size. For the *IEC104* device, the size is always 2 bytes.

Send general query after connect

To be added.

Reset message counters when data transfer interrupts

To be added.

Check real-time data time stamp sequence

To be added.

Defining IEC62056 Device

Miscellaneous

Address

Specifies the address of the device to be identified within multiple devices on a single bus. The address is a text string with a maximum length of 32 characters. It can contain the characters (0..9), (A..Z), (a..z), and the space character. It is case-sensitive. An address only containing one or more 0 characters is considered a common address that should be used by each device to send a response regardless of the device's address.

Complete readout of device

Determines whether to read the device's data via the so-called Data readout mode in case the device uses a communication protocol in the "C" mode. If this option is not active, the communication driver switches from the "C" mode to the so-called Programming mode and reads tag values one by one.

Wake up device before connecting

Determines whether to send the so-called wakeup packet prior to sending the communication packet for establishing communication with the device. This property should be activated for the devices whose communication interface is not active in case the line is idle, for example, due to battery powering. If this property is active, the communication driver sends 50 zero characters prior to establishing communication.

Defining Johnson Controls Device

Miscellaneous

Address

Specifies the address of the device to be identified within multiple devices on a single bus. The value can be overloaded with the *Address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

Enable block reading

Determines whether data block reading is enabled when communicating with the device. Some types of the *Johnson Controls* device do not support block reading (see the [Project Structure Manager](#)).

Defining Modbus Device

Miscellaneous

Address

Specifies the address of the device to be identified within multiple devices on a single bus. The value can be overloaded with the *Address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

IP address

Specifies the device's IP address on the Ethernet network. The value can be overloaded with the *IP address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

Device/Model

Specifies the device's model. If your device model is not on offer, choose the *Not specified* option.

Access code

To be added.

Swap bytes

Determines whether the communication driver should exchange (swap) the byte order within the data of tags defined in User registers and Input registers when the data is read/written from/into the I/O device. This property must be active if the I/O device stores the most significant byte first (big-endian form), as defined in the Modbus protocol, since **Reliance** stores the least significant byte first (little-endian form). In the latter case, the option should not be active.

Swap words

Similarly to the *Swap bytes* option, it determines whether the communication driver should exchange (swap) the word order within the data of tags of type *DoubleWord*, *LongInt*, *Float*, and *DoubleFloat* when the data is read/written from/into the I/O device. This property must be active if the I/O device stores the most significant word first (big-endian form) since **Reliance** stores the least significant word first (little-endian form). In the latter case, the option should not be active.

Swap doublewords

To be added.

Supported communication functions

Listed below are the *Modbus* communication functions supported by the communication driver. It determines which communication functions the I/O device supports.

Read Coil Status 01

Is a communication function for reading coils (digital outputs).

Read Input Status 02

Is a communication function for reading inputs.

Read Holding Registers 03

Is a communication function for reading holding registers (user registers).

Read Input Registers 04

Is a communication function for reading input registers.

Read General Reference 20

Is a communication function for reading the extended memory.

Force Single Coil 05

Is a communication function for writing a single coil (digital output). If this function is not enabled, the communication driver will try to use the *Force Multiple Coils 15* function.

Preset Single Register 06

Is a communication function for writing a single holding register (user register). If this function is not enabled, the communication driver will try to use the *Preset Multiple Registers 16* function.

Force Multiple Coils 15

Is a communication function for writing multiple coils (digital outputs). If this function is not enabled, the communication driver will try to use the *Force Single Coil 05* function.

Preset Multiple Registers 16

Is a communication function for writing multiple holding registers (user registers). If this function is not enabled, the communication driver will try to use the *Preset Single Register 06* function.

Mask Write 4X Register 22

Is a communication function for writing a digital value into a user register using a mask.

Extended memory

Enable reading extended memory

Determines whether to enable the communication driver to read/write data from/to the device's extended memory. To function properly, the *Read General Reference 20* function for reading the extended memory must be activated on the *Basic* page.

File

Specifies the link to the integer-type tag whose value is to be used to control the data file to be read.

Address

Specifies the link to the integer-type tag whose value is to be used to control the initial address of the data block to be read from the device.

Length

Specifies the link to the integer-type tag whose value is to be used to control the number of registers to be read.

Control

Specifies the link to the integer-type tag whose value is to be used to control the reading. The reading starts on the leading edge of the tag (the off-to-on transition). It may contain the following values:

0	ready
1	reading data block

Buffer

Specifies the link to the array-type tag whose value is to be used to store the data block read from the extended memory.

Status

Specifies the integer-type tag whose value is to be used to store the current status of the reading operation. It may contain the following values:

0	ready
1	the read operation in progress
2	the read operation completed successfully
3	the read operation failed

Defining Motorola Device

Miscellaneous

Address

Specifies the address of the device to be identified within multiple devices on a single bus. The value can be overloaded with the *Address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

IP address

Specifies the device's IP address on the Ethernet network. The value can be overloaded with the *IP address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

Device/Model

Specifies the device's model. The communication driver has only been tested on devices configured for Zorlu.

Read archives

Hourly

This option enables reading an hourly archive and, at the same time, specifies the link between this archive and a data table. The reading of the archive is activated either periodically or by using a tag depending on the data table settings.

Daily

This option enables reading a daily archive and, at the same time, specifies the link between this archive and a data table. The reading of the archive is activated either periodically or by using a tag depending on the data table settings.

Defining M-Bus Device

Miscellaneous

Address

Specifies the address of the device to be identified within multiple devices on a single bus. The value can be overloaded with the *Address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

IP address

Specifies the device's IP address on the Ethernet network. The value can be overloaded with the *IP address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

Device/Model

Specifies the device's model. If your device model is not on offer, choose the *Not specified* option.

Supported communication functions

SND_NKE

To be added.

Defining OPC Client Device

An **OPC** device allows the **Reliance** SCADA/HMI system to connect to any OPC server that meets the OPC DA specification (1.0 or 2.0). OPC (OLE for Process Control) is a worldwide standard for exchanging process data between computer programs. It means that if the manufacturer of a hardware device (or a third-party company) develops an OPC server for the device, then Reliance (which is an OPC client) can use the OPC server to obtain process data from the device and send commands to the device.

Every OPC server has two unique identifiers within the Windows operating system – the so-called **Prog ID** and **GUID**. *Prog ID* contains an identification string of the program (e.g., `Matrikon.OPC.Simulation.1`). *GUID* contains a unique identification number generated by every OPC server manufacturer and this number should be unique throughout the world (no other program should use this number as *GUID*).

Miscellaneous

OPC server Prog ID

Specifies a unique identifier of the OPC server. It is supplied automatically after selecting the OPC server. To select an OPC server, bring up the *Select OPC Server* dialog box by clicking on the respective button.

OPC server GUID

Specifies a unique identifier of the OPC server. It is supplied automatically after selecting the OPC server.

Import tags from remote computer

Allows you to configure importing tags from an OPC server running on a different computer or device.

ItemID prefix

Specifies the prefix of the *ItemID* property for all tags defined within this device. The *ItemID* of a group of tags often begins with the same string of characters and only differs at the end. In such a case, the *ItemID prefix* property can be specified as the initial part of the *ItemID* property that is identical for all tags defined within the device. It allows reducing the value of the *ItemID* property, which can then be specified more easily and displayed more clearly.

Automatically generate ItemID for nested tags

Determines whether to automatically generate the value of the *ItemID* property for the tags nested in structured tags. This feature significantly simplifies defining structured tags. You just need to enter an *ItemID* only for a structured tag. For all nested tags, it is supplied automatically according to their names (it consists of the *ItemID* of the parent tag, the specified delimiter, and the tag's name). When defining data structures (see the [Data Structure Manager](#)), their properties must be configured in the same way as the OPC server to function properly.

Add OPC groups to OPC server as inactive

Specifies in which state **Reliance**'s runtime software should add OPC groups to the OPC server. If this option is turned on (recommended), OPC groups will be added to the OPC server as inactive and will be activated immediately after project startup (if the *OPC group state* property is set to *Active*). This method is recommended because the behavior of some OPC servers is not correct when adding OPC groups as active. When creating a new OPC group through the *Device Manager*, this option is turned on. If you open a project created with version 4.6.1 or older, this option is turned off. This allows you to preserve the original behavior when upgrading to a newer version of the **Reliance** SCADA/HMI system.

Data type conversion

Determines whether data type conversion is performed by the OPC client or the OPC server.

Defining Promos Device

Miscellaneous

Address

Specifies the address of the device to be identified within multiple devices on a single bus. The value can be overloaded with the *Address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

IP address

Specifies the device's IP address on the Ethernet network. The value can be overloaded with the *IP address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

Device/Model

Specifies the device's model (*RT* or *PL2*). Each model requires a different communication protocol. Tag linking of both models also differs. For this reason, the correct model must be chosen to function properly.

Defining Rittmeyer WSR3000 Device

Miscellaneous

Address

Specifies the address of the device to be identified within multiple devices on a single bus. The value can be overloaded with the *Address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

Group address

Specifies the group address to be used to identify the device within multiple groups.

Island address

Specifies the island address to be used to identify the device within multiple islands.

Remote device

Determines whether the device is remote or not.

Defining Sauter EY2400 Device

Miscellaneous

Address

Specifies the address of the device to be identified within multiple devices on a single bus. The value can be overloaded with the *Address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

Defining Sevbus Device

Miscellaneous

Address

Specifies the address of the device to be identified within multiple devices on a single bus. The value can be overloaded with the *Address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

IP address

Specifies the device's IP address on the Ethernet network. The value can be overloaded with the *IP address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

Device/Model

Specifies the device's model. The communication driver has only been tested on Taiga devices.

Two-channel device

If this option is active, two measuring channels are available to the device.

Read archives

Hourly

This option enables reading an hourly archive and, at the same time, specifies the link between this archive and a data table. The reading of the archive is activated either periodically or by using a tag depending on the data table settings.

Daily

This option enables reading a daily archive and, at the same time, specifies the link between this archive and a data table. The reading of the archive is activated either periodically or by using a tag depending on the data table settings.

Hourly extr.

This option enables reading an hourly extreme archive and, at the same time, specifies the link between this archive and a data table. The reading of the archive is activated either periodically or by using a tag depending on the data table settings.

Daily extr.

This option enables reading a daily extreme archive and, at the same time, specifies the link between this archive and a data table. The reading of the archive is activated either periodically or by using a tag depending on the data table settings.

Defining Siemens Device

Miscellaneous

Device/Model

Specifies the device's model.

IP address

Specifies the device's IP address on the Ethernet network. The value can be overloaded with the *IP address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

Rack

Specifies the rack number. This property is required by the models S7-300 and S7-400.

Slot

Specifies the slot number. For communication with a SIMATIC S7-1200 PLC, set this property to 1. This property is required by the models S7-300 and S7-400.

TSAP PC

Specifies the so-called Transport Service Access Point of the communication driver. This property is required by the models S7-200 and LOGO!

TSAP PLC

Specifies the so-called Transport Service Access Point of the connected device. This property is required by the models S7-200 and LOGO!

Defining Tecomat and Tecoreg Devices

Miscellaneous

Address

Specifies the address of the device to be identified within multiple devices on a single bus. The value can be overloaded with the *Address* property of the connected device's communication channel (see the [Project Structure Manager](#)). If the device is connected via the Ethernet network, the address value must be equal to 0. If the address is non-zero and the device is connected via the Ethernet network, then another central unit is connected via an extended communication channel.

IP address

Specifies the device's IP address on the Ethernet network. The value can be overloaded with the *IP address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

Model

Specifies the device's model. All Teco device's models communicate via the same communication protocol. However, some of them have limited functions (e.g., NS 946 does not fully support all communication functions) while others have advanced functions (e.g., TC700 supports redundancy). Therefore, the respective model must be selected to function properly. If your device model is not on offer, choose the *Not specified* option.

Databox

Enable reading/writing Databox

Determines whether to enable the communication driver to read/write data from/to the Databox (extended memory of Tecomat devices).

Offset

Specifies the link to the integer-type tag whose value is to be used to control the initial address (byte number) of the data block to be read/written from/to the device.

Length

Specifies the link to the integer-type tag whose value is to be used to control the length of the data block to be read/written from/to the device (in bytes).

Control

Specifies the link to the digital-type tag whose value is to be used to control the reading/writing. The reading/writing starts on the leading edge of the tag (the off-to-on transition). It may contain the following values:

0	ready
1	reading data block
2	writing data block

Buffer

Specifies the link to the array-type tag whose value is to be used to store/write the data block read/written from/to the Databox.

Status

Specifies the integer-type tag whose value is to be used to store the current status of the reading operation. It may contain the following values:

0	ready
1	the read operation in progress
2	the read operation completed successfully
3	the read operation failed
11	the write operation in progress
12	the write operation completed successfully
13	the write operation failed

Defining Wago Device

Miscellaneous

IP address

Specifies the device's IP address on the Ethernet network. The value can be overloaded with the *IP address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

Defining Modicon Device

Miscellaneous

Address

Specifies the address of the device to be identified within multiple devices on a single bus. The value can be overloaded with the *Address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

IP address

Specifies the device's IP address on the Ethernet network. The value can be overloaded with the *IP address* property of the connected device's communication channel (see the [Project Structure Manager](#)).

8.4.3 Import and Export of Tags and Alarms/Events

Tags

The **Reliance** SCADA/HMI system allows users to *import* public tags from external files (exported, for example, from development tools used for PLC programming). If an already existing (same-named) tag is found during the import procedure, its properties are changed according to the imported tag. After the import is completed, information on the total number of imported and new tags is provided.

TECO

Tags of Tecomat and Tecoreg devices can be imported from a file in the *.pub (xPro, Mosaic), *.tdr (Merkur, Epos for Windows), or *.exp (based on IEC61131-3 – Mosaic, CoDeSys) formats. Tags declared with the {PUBLIC} directive are imported from the Mosaic development environment. A structure-type tag defined via the Merkur or Epos development environments is imported as a group of tags corresponding to the data structure fields. The names of the tags are generated according to the syntax `StructureName_FieldName`. An array-type tag defined via Mercur or Epos is imported as a group of tags corresponding to the elements of the array. The names of the tags are generated according to the syntax `ArrayName_ElementIndex`.

OPC

To import tags into the current OPC group from an OPC server, click the *Import from OPC Server* button. However, the server must support the `IOPCBrowseServerAddressSpace` interface. Tags may be imported to the current OPC group also from a file in the *.csv format or exported in this format. The file must be in a text format. Each line must have the following structure:

```
ItemID; Tag name; Tag data type; Comment
```

WAGO

Tags of a Wago device can be imported from an output file in the *.exp format of CoDeSys, Mosaic, or other development environments in accordance with IEC 61131-3. To create this file, export the unit containing a declaration of tags. Then, all tags whose declarations lie between the directives (*SCADA*) and (*END_SCADA*) are imported to the **Reliance** SCADA/HMI system.

SIEMENS

Tags of a Siemens device can be imported from a file in the *.xlsx format exported from the TIA Portal development environment.

Alarms/events

The **Reliance** system also enables users to export or import *alarms/events* in a text format.

Export

Is used to export all *alarms/events* of a device to a text file (its format is in the header).

Import

Is used to import *alarms/events* from a text file. The *alarms/events* are distinguished by name when imported. If an already existing (same-named) *alarm/event* is found during the import procedure, its properties are changed according to the imported alarm/event. If it doesn't exist yet, a new *alarm/event* is added. The tag to which the *alarm/event* is linked is searched within the device based on its name.

8.4.4 Tag Properties

If a tag is selected in the tree view, its properties can be edited in the right pane. In addition to the [common object properties](#), you can configure the following properties, some of which depend on the type of the device in which the tag is contained.

[Basic](#)

[Advanced](#)

[Range](#)

[Correction](#)

[Limits](#)

[Scripts](#)

[Security](#)

[Sharing](#)

8.4.4.1 Basic

General

Eng. name

Specifies an optional engineering name for the tag. At runtime, it is displayed, for example, in the *Information on Tag* dialog box.

Eng. units

Specifies the tag's unit of measurement.

Tag kind

A tag can be of the following kinds: *Physical*, *Internal*, *Special*, *Special internal*, *Derived*, or *User-defined*.

A **physical** tag is the most common kind of tag stored directly in the memory of a physical device (PLC). The tag is read through the device's communication driver.

An **internal** tag is another common kind of data tag. However, its value, quality, and time stamp are only stored in the memory of the computer. It can also be created within a physical device. Its value cannot be written and read through the communication driver, though.

A **special** tag is a tag of specific significance. It represents a specific physical or internal tag with a specific importance within the device.

A **special internal** tag is a tag of specific significance. The sources of its value are as follows: system information, project information, information on the project's current status, etc.

A **derived** tag is a tag whose value is determined based on the source tag.

A **user-defined** tag is a structure-type tag. It is formed by a structure that consists of basic or structure-type tags. These tags can be internal or physical.

Tag data type

Specifies the data type for the tag, e.g., *Word*, *SmallInt*, *IRC*, or *DataBlock*. The data types to be supported depend on the type of device.

Update interval

Specifies the time interval used for updating the device's data. It is only used by physical tags. For other tag kinds, the property is disabled.

Data structure

Specifies the data structure to be represented by the tag. It is enabled only if the *Tag kind* property is set to *User-defined* (structured tag).

Allow use at runtime

Determines whether to disable using the tag during runtime. If the tag is disabled, it won't be available to the runtime software and to the thin clients either. The link between the tag and any existing components will be invalid, which will be indicated by the border defined to surround the components. The current state of the property affects the total number of data points used in the project (any disabled tag is not counted).

Allow reading

Determines whether to disable reading the tag value from the device.

Allow writing

Determines whether to disable setting the tag value.

Defining AMiT Device Tag

WID

Specifies the tag's address that must be unique within *AMiT* devices.

Bit

Specifies a digital tag's bit number.

Defining BACnet Device Tag

Object type

Specifies the type of the object in which the tag is located.

Object number

Corresponds to the selected object type as defined by ASHRAE. It is shown here for informational purposes only.

Instance number

Specifies the object instance number. It is a unique identifier of the selected object type within the device.

Property identifier

Specifies the object property that the tag represents.

The *priority-array* identifier is an array of 16 elements that contains commands specified for a given object and sorted by priority. The tag can be of type *Bool*, *Word*, or *Array of String*. If the tag is of type *Bool*, its value determines whether the value whose position within the array corresponds to the specified priority is non-NULL. If the tag is of type *Word*, its value is a bitmask of all sixteen array elements. Although this property is only intended for reading, writing the tag is also possible. When writing any value, the command for a given object is freed and NULL is stored in the respective position within the array. If the tag is of type *Array of String*, individual array elements are commands in the form of text strings specified for a given object and sorted by priority.

Property number

Corresponds to the selected object property as defined by ASHRAE. It is shown here for informational purposes only.

Use COV function

Determines whether to send the tag's value only when changed (COV – Change Of Value) via spontaneously sent data.

Minimum change of value

Specifies the value that is passed to the device as a minimum change needed to spontaneously send data. The *Use COV function* property must be active.

Defining DDE Device Tag

DDE Item

Specifies the tag's unique identifier within the DDE server.

Defining IEC104 Device Tag

ASDU address

Tags with different ASDU addresses can be defined within a single *IEC104* device. This option is accessible if the ASDU address is not defined for the parent tag folder or device.

Read address

Specifies the read address.

Write address

Specifies the write address.

Type identifier

Specifies the structure, type, and format of the tag value.

Qualifier

Specifies the qualifier.

Defining IEC62056 Device Tag

Address

Specifies the tag's address that must be unique within the device. The address is a text string with a maximum length of 16 characters. It can contain all printable characters except for '(', ')', '/', and '!'.
Example of an address: '1.8.0'

Defining Johnson Controls DX9100 Device Tag

Ref

Specifies the type and number of reference as part of the tag's unique identifier within the device memory.

SubRef

Specifies the type and number of sub-reference as part of the tag's unique identifier within the device memory.

Address

Specifies the address where the tag is stored in the device. For digital tags, the bit number is also indicated.

Defining Johnson Controls SC9100 Device Tag

Ref

Specifies the type and number of reference as part of the tag's unique identifier within the device memory.

SubRef

Specifies the type and number of sub-reference as part of the tag's unique identifier within the device memory.

Address

Specifies the address where the tag is stored in the device. For digital tags, the bit number is also indicated.

Defining Johnson Controls FX15 Device Tag

Ref

Specifies the type of reference as part of the tag's unique identifier within the device memory.

Address

Specifies the address where the tag is stored in the device. For digital tags, the bit number is also indicated.

The address of a tag of type *Time program*, *ON/OFF time program*, and *Exception days* must be entered in the same way as it is stored in the file with an `.apd` extension of the PLC application program. The address can be found according to the reference point under which the time program in the file with an `.apd` extension is stored. For display purposes, it is recommended that the extension be changed from `.apd` to `.xml` and that the file be opened, for example, in a Web browser.

In the file with an `.apd` extension below, which contains a time program named "OccEvent" and an ON/OFF time program named "OnOffEvent", the following definitions can be found:

```
<ApplicationProfile>
  <ApPoint Key="P1" Name="OnOffEvent" ...
</ApPoint>
  <ApPoint Key="P2" Name="OccEvent" ...
</ApPoint>
</ApplicationProfile>
<NetworkProfiles>
```

```

<N2Profile>
  <Records>
    <Record PointKey="P1" PointReference="C800"/>
    <Record PointKey="P2" PointReference="6001"/>
  </Records>
</N2Profile>
</NetworkProfiles>

```

In this file with an .apd extension, the ON/OFF time program is stored as P1 and its address has a hexadecimal value of C800 (which is equal to a decimal value of 51200), and the "OccEvent" time program is stored as P2 in the application program and its address is 6001 (hexadecimal), which is equal to 24577 (decimal). Use decimal values to enter the addresses of time programs.

Defining Modbus Device Tag

Register type

Specifies the type of register where the tag is stored in the device. A *Modbus* device has the following types of registers: *Outputs (Coils)*, *Inputs*, *Holding Registers*, *Input Registers*, and *Extended Memory*.

Address

Specifies the register address where the tag is stored in the device. For digital tags, the bit number is also indicated.

Note: In the **Reliance** SCADA/HMI system, the address of a tag defined within a Modbus device consists of a register type and an address. While memory areas of a different type in a Modicon device are addressed using an offset, tags in the Reliance system are addressed from zero for each register type (see the example and the table below).

Example of addressing:

In the **Reliance** system, a tag at 40010 will be addressed as follows: Register type: Holding registers; Address: 9.

Addressing tags in a Modbus device		
Memory area	Modicon addressing	Reliance addressing

		Register type	Address
Discrete outputs (Coils)	from 00001	Outputs (Coils)	from 0
Discrete inputs	from 10001	Inputs	from 0
Input registers	from 30001	Input registers	from 0
Holding registers	from 40001	Holding registers	from 0

Defining M-Bus Device Tag

Addressing

Specifies the method of identifying a tag in the MBus data packet.

By quantity

The tag is specified by the value of the VIB (VIF, VIFE) parameter and by the *Storage number*, *Tariff*, and *Subsystem* properties.

By order

The tag is specified by the order in the data message. If the *Order* property's value is 0, the tag's value occupies the first position in the data message.

Storage number

Specifies the number on which the measured data is stored in the memory. 0 is the current value, higher numbers are used to specify other values back in order.

Tariff

Specifies the data tariff.

Subsystem

Specifies the subsystem number.

Value type

Specifies the type of value (*Instantaneous value*, *Maximum*, *Minimum*, *Value on failure*).

Data length and encoding

Specifies the data type (e.g., integer or floating-point) and its encoding.

The properties *Storage number*, *Tariff*, *Subsystem*, *Value type*, and *Data length and encoding* together specify the value of the *DIF* or *DIFE* parameters that are updated whenever any of the properties is changed. *DIF* and *DIFE* are a direct part of the M-Bus communication protocol.

Edit value of DIB

Allows you to directly edit the value of the *DIF* and *DIFE1..DIFE5* parameters. The values of the *Storage number*, *Tariff*, *Subsystem*, *Value type*, and *Data length and encoding* properties are calculated retrospectively.

DIF

Specifies the value of the *DIF* parameter.

DIFE1..DIFE5

Specifies the value of the *DIFE1..DIFE5* parameter.

Quantity (VIF)

Specifies the quantity (value of the *VIF* parameter). The available quantities are listed in basic units.

Quantity (VIFE1)

Is used to supplement the quantity defined by the *VIF* parameter.

Edit value of VIB

Allows you to directly edit the value of the *VIF* and *VIFE1..VIFE5* parameters. The values of the *Quantity (VIF)* and *Quantity (VIFE1)* properties are calculated retrospectively.

VIF

Specifies the value of the *VIF* parameter.

VIFE1..VIFE5

Specifies the value of the *VIFE1..VIFE5* parameter.

Defining OPC Device Tag

Tags defined within an *OPC* device cannot be added directly into the *Tags* folder. First, you have to add a special folder called **OPC group**. This folder then allows you to define new tags within the group or import tags to the group from an *OPC* server. For the *OPC group*, the update interval and the way the tags added to the group are updated are defined.

Import of tags

Import from OPC Server

Brings up the *Import Tags from OPC Server* tool that is used to import tags from the specified *OPC* server and define new *OPC* groups. The command is active only if the *OPC* server is specified on the *Basic* page of the *OPC* device's properties.

Import from OPC CSV

Allows you to import tags from the specified text file.

Export to OPC CSV

Allows you to export tags from the *OPC* group to the specified text file.

OPC group properties

Update interval

Specifies the time interval used for updating the tags defined within the group. Some update intervals are not available to all *OPC* servers. Therefore, we recommend that you read through the manual for the respective *OPC* server and use the nearest supported interval (for example, if the runtime software requires a 70 ms update interval and the server supports 50 ms and 100 ms intervals, the *OPC* server will use the 100 ms interval for updating the tags).

Deadband

Specifies the percentage of change in the value of each tag defined within the group in order for the *OPC* server to send the new value of the tag to the runtime software. If a value of 0 is given, any change of the tag value will be immediately updated in the runtime software.

OPC group state

Allows you to activate/deactivate reading the tags defined within the *OPC* group. A tag can also be used to control the state.

OPC Device Tag Properties

Eng. name

Specifies an optional engineering name for the tag.

Eng. units

Specifies the tag's unit of measurement.

Tag kind

Specifies the kind of the tag. The tag can be of the following kinds: *Physical*, *Internal*, or *data structure*. A physical tag is stored directly in the memory of a physical device (PLC). You can switch between the *Physical* and *Internal* tag kinds.

Tag data type

Specifies the data type for the tag. For tags of input and output registers, only the *Bool* format is supported, tags of user and system registers use, for example, the *Bool*, *Word*, *SmallInt*, and *String* formats.

Update interval

Specifies the time interval used for updating the device's data. It is only used by physical tags. For other tag kinds, the property is disabled.

Data structure

Specifies the data structure to be represented by the tag. It is enabled only if the *Tag kind* property is set to *User-defined* (structured tag).

OPC

ItemID

Specifies the identifier used for the tag within the OPC server.

Update value after write

Allows updating the tag value after the write operation.

Defining Promos RT Device Tag

Memory bank

Specifies the memory bank (its number) from which the tag is read.

Address

Specifies the memory bank address where the tag is stored in the device. For digital tags, the bit number is also indicated.

Defining Promos PL2 Device Tag*Object*

Specifies the object (its number) from which the tag is read.

Instance

Specifies the instance (its number) from which the tag is read.

Item

Specifies the address where the tag is stored in the device. For digital tags, the bit number is also indicated.

Defining Rittmeyer WSR3000 Device Tag*Address*

Specifies the address where the tag is stored in the device.

Connection timeout

Specifies the maximum time period for the communication driver to connect to the tag. The communication driver attempts to establish a connection with both the device and individual tags. If the connection is not confirmed within the specified time period, the communication driver makes another attempt to establish the connection.

Pre-write priority

Specifies the communication driver's priority of accessing the tag when attempting to edit its value. In case the priority was higher when the value was last edited, the value cannot be overwritten. Otherwise, a new value is written. Another tag's value can be used to control the priority.

Post-write priority

Specifies the communication driver's priority of allowing the tag value to be overwritten. Only those with the same or higher priority can access the tag to edit its value. Another tag's value can be used to control the priority.

▣ Defining Sauter EY2400 Device Tag

Data word

Specifies the text identifier of the register where the tag is stored in the device. In a way, it specifies the type and the way the tag is used.

Fine address

Together with the data word, it forms a complete address of the tag within the device's memory. It can be defined in the following ranges: 0–31 (primary addresses) and 40–71 (secondary addresses).

Byte

Specifies the upper or lower byte within the 2-byte address of the *Sauter* device. LSB is the least significant byte, MSB is the most significant byte.

Bit

Specifies a digital tag's bit number.

Card code

Is a code that specifies the type of card. Its value is written to the device when initializing it.

Response category

Specifies the priority of sending spontaneous data. It can be defined in the range 0..3, where 0 represents the highest priority, i.e, the most significant event, and 3 represents the lowest priority, i.e., if the tag value is changed, the data is not sent at all. Its value is written to the device when initializing it.

Hysteresis

Specifies the measurement hysteresis. If the difference between the current value and the last value sent to the communication driver is greater than the specified hysteresis, a new spontaneous report with the current value is sent. Its value is written to the device when initializing it.

Defining Siemens Device Tag

Symbol/Data block

Specifies the type of the address space in which the tag is located. For the address space of type *DB – Data Block*, the data block number can also be entered.

Data type

Specifies the tag's data type in which the tag is stored in the device. If changed, the tag data type within **Reliance** is changed accordingly.

Address

Specifies the tag's address within the selected address space.

Defining Tecomat and Tecoreg Devices Tag

Register type

Specifies the type of register where the tag is stored in the device. A *Teco* device has the following types of registers: X (input), Y (output), S (system), R (user), and M (databox).

Address

Specifies the register address where the tag is stored in the device. For digital tags, the bit number is also indicated.

Defining Wago Device Tag

Addressing

Determines how to address tags within the *Wago* device. Considering the *Modbus* protocol is used to transfer tag values, the *Modbus* option can also be chosen. In such a case, it is essential to know how to convert the address of the tag in the *Wago* device to the *Modbus* address. If the *Wago* address is chosen, the conversion is performed automatically.

Register type

Specifies the type of register where the tag is stored in the device.

Address unit length

Specifies the length of the data type.

Address

Specifies the register address where the tag is stored in the device. For digital tags, the bit number is also indicated.

8.4.4.2 Advanced

String character count

Specifies the number of characters for *string*-type tags.

Dec. place count

Specifies the number of decimal places displayed by floating point-type tags. It is the number of decimal places to which the value will be rounded. For integer-type tags, the option is active only if the *Analog value correction* option on the *Correction* page is active.

Array element count

Specifies the number of elements of array-type tags. *Matrix row count* and *Matrix column count* allow you to specify the number of matrix rows and matrix columns. These properties are only used for array-type tags defined within AMiT devices.

Save last value

Determines whether to save the latest value of the tag before terminating the visualization project. The value is saved periodically during runtime (by default, it is saved every 30 s). When the project is started next time, the saved value is used to initialize the tag in the memory of the runtime software (not the physical device's memory). The values are stored in a file in the <Project>\Settings\Data directory. The file is named VarTagDataN.rdt, where N represents the computer ID in a decimal format (e.g., VarTagData1.rdt).

Initial value

Determines whether to initialize the tag with the specified value when starting the visualization project. If the previous property is active, this value may later be replaced with the value saved as the last. The specified value is only used when starting the project for the first time or deleting the file that contains the saved value.

Log write commands to alarm/event database

Determines whether to log information about all "write" operations performed on the tag to the alarm/event database. Identical values are also logged.

Custom text

Allows you to define a custom text string to be displayed in the alarm/event database together with information about a "write" operation. The text string can contain special characters that will be replaced with a respective value during runtime. The characters are case-insensitive. The meaning of individual characters is as follows:

\$(Device)	The alias/name of the device in which the tag is defined.
\$(Tag)	The alias/name of the tag.
\$(TagValue)	The value written into the tag.
\$(PriorTagValue)	The previous tag value.
\$(User)	The alias/name of the user who wrote the value, or of the user who was logged on when the value was being written (e.g., if the value was written from a script).
\$(Computer)	The alias/name of the computer from which the value was written.
\$(ActionSource)	The write command source (component, script, etc.).

For compatibility with older projects, the following special characters are also supported:

%V	See \$(TagValue).
%C	See \$(Computer).
%U	See \$(User).
%S	See \$(ActionSource).

If the *Custom text* option is inactive, the standard text will be automatically generated. This text contains the name of the tag (including the device), the written value, the alias/name of the computer from which the value was written, the alias/name of the user, and the write command source (component, script, etc.).

Log unsuccessful write commands to alarm/event database

Allows logging information about all unsuccessful "write" operations performed on the tag.

Display

Text for state 'Logical 1'

Allows you to specify a user-defined name for the logical 1 state for *Bool*-type tags.

Text for state 'Logical 0'

Allows you to specify a user-defined name for the logical 0 state for *Bool*-type tags.

Integer format

For integer-type tags (*Byte*, *Word*, *DoubleWord*, *ShortInt*, *SmallInt*, *LongInt*, *LargeInt*) and derived array-type tags, the *Decimal*, *Hexadecimal*, or *Binary* representation can be used.

Time format

Allows displaying the tag value with milliseconds.

Time stamp precision

To be added.

Alarms/Events

Alarm/event start delay (ms)

Specifies the time interval for which the condition for invoking an alarm/event must be met to generate a new alarm/event.

Alarm/event end delay (ms)

Specifies the time interval for which the condition for invoking an alarm/event must not be met to terminate the active alarm/event.

8.4.4.3 Range

Value range

Allows you to customize the range of the tag's values. You can either select the range according to the tag's data type or define the range using the value list.

Value list

Specifies the link to the tag of type *Array of String*, *Array of UTF8String*, or *Array of WideString (UCS-2)* whose value is to be used to specify the value range.

Value count

Specifies the number of the value list's items. The value can be specified statically or it can be controlled dynamically using a tag. If the value is *-1* (minus one), the number of the value list's items is equal to the number of elements of the array-type tag that defines the *Value list*.

8.4.4.4 Correction**Analog value correction**

Determines whether to use one of the two types of analog correction. The correction is used when reading the tag value. When writing the tag value, it is computed the other way around before it is sent to the communication driver.

$k * x + q$

A formula for computing the tag value according to the equation $y = kx + q$ with given coefficients. The corrected value is used by the runtime software.

Min, Max

Allows for correcting the value from the input range to the output range according to the formula $y = (x - \text{Min1}) * (\text{Max2} - \text{Min2}) / (\text{Max1} - \text{Min1}) + \text{Min2}$.

Negate value if digital

If this property is active, the runtime software uses the negated value and the original value is not available anymore.

8.4.4.5 Limits

Allows you to define critical and warning limits for the tag. The value of a *dynamic* limit is controlled by the value of the specified tag. A limit can be used to generate an alarm/event when the tag's value reaches, exceeds, or falls below the limit. Also, some components (*Display, Progress Bar, Gauge, Level Fill Picture*) can change the background color (possibly even the font color) when the tag's value reaches, exceeds, or falls below the limit.

For numeric-type tags, the following limits can be defined by the **Reliance** SCADA/HMI system: *High critical*, *High warning*, *Low warning*, and *Low critical*.

8.4.4.6 Scripts

Run script on

On this page, you can select scripts to be run when the tag's value, quality, or time stamp change and when receiving data from the communication driver. Information on the tag, change, or received data is passed to the script. To acquire the information, the `RScr.GetCurrentScriptDataEx` function should be used.

Once you run the project and establish communication with devices (e.g., a PLC), the communication driver starts passing current data to the runtime software. For each tag, its quality, time stamp, and value (respectively) are set. In the same order, the specified scripts get executed (if a particular property has changed). Once the tag properties are first set after successfully reading data from the device, the quality always changes from bad to good and, in most cases, the time stamp and value change. If the connection with the device is all right, only the time stamp changes (or the time stamp and value respectively) next time the tag is updated. There should never be a situation when only the value changes (each value change must correspond to a particular time stamp). If a failure in communication with the device occurs, the quality usually changes to bad, but the time stamp and the value do not change (the runtime software retains the last time stamp and value the quality of which was good).

Value change

Determines whether to execute the specified script when the tag's value changes.

Quality change

Determines whether to execute the specified script when the tag's quality changes.

Time stamp change

Determines whether to execute the specified script when the tag's time stamp changes.

Receive archive data from driver

Determines whether to execute the specified script when receiving archive data from the communication driver. This option is only available in devices that provide archives (e.g., telemetry systems, such as QMD, DMB, Elcor, Elgas 2, Motorola MOSCAD).

8.4.4.7 Security

Bounds for setting value by user

Prohibit violating bounds

Allows you to check the entered value and disables writing a tag value outside the limits set by the values of the tags defined for the *Minimum* and *Maximum* properties (in such a case, the warning "Value is not within required range" is displayed).

8.4.4.8 Sharing

The **Reliance** SCADA/HMI system's runtime software allows sharing tag values through various interfaces (e.g., OPC or DDE). The runtime software acts as a server and provides values to clients.

Sharing options

Share with thin clients

Determines whether the data server and all connected thin clients have a common tag value.

Transfer between server and thin clients

Determines whether to transfer the tag value between the server and a client. If this option is active, the data server keeps a separate tag value for each connected client. Otherwise, the value written into this tag is not transferred to the server, it is only stored in the thin client's internal memory.

For more information about this option, refer to the article titled [Data specific to the thin clients](#).

Share with OPC clients

Determines whether to share the tag via OPC, i.e., whether **Reliance OPC Server** and **Reliance OPC UA Server** should provide the tag to OPC clients. If the property is not active for the specified tag, the OPC clients won't be able to even import the tag (the OPC server will not pass the tag to the OPC clients within the list of tags that can be imported).

Share with custom applications through Web service

Determines whether the tag should be made available through the Web service (*Project Options > API*).

Share with DDE clients

Determines whether the value of the tag should be made accessible using the DDE (Dynamic Data Exchange) standard. DDE is now an obsolete technology by Microsoft designed for interprocess communication. MS Excel and MS Word are examples of programs that support this communication.

DDE Item

To dynamically interconnect the runtime software and a DDE client program, the following syntax should be used:

```
{=runtime| DdeServer! DdeItem}
```

`runtime` - the runtime software's file name without an extension (`R_Ctl`, `R_CtlSrv`, `R_Srv`)

`DdeItem` - the name for the dynamic interconnection

For example, to acquire the value of the `Control` tag defined within the `Tecomat1` device from *Reliance Control*, the following syntax will be used:

```
{=R_Ctl| DdeServer! Tecomat1_Control}
```

8.4.5 Alarm/Event Properties

To add an *alarm/event* to the tree diagram, you can either click the *New Alarm/Event* button in the toolbar, or press the `Insert` key, or choose the corresponding command from the tree diagram's popup menu. In addition to the [common object properties](#), there are other alarm/event properties that are available on three pages.

▼ Basic

Text

Specifies the text of the alarm/event. The value is compulsory. In multilanguage projects, the text can be localized (i.e., translated into all project languages). The text string can contain special characters that will be replaced with a respective value during runtime. The characters are case-insensitive. The meaning of individual characters is as follows:

\$(Device)	The alias/name of the device in which the tag is defined.
\$(Tag)	The alias/name of the tag.
\$(Type)	The type of the alarm/event.
\$(Condition)	The condition or state that generates the alarm/event.
\$(Priority)	The priority of the alarm/event.
\$(TagValue)	The value of the tag that generated the alarm/event.
\$(StartTimeStamp)	The date and time of the alarm/event start (in local time); its format is dependent on the operating system's regional settings.

For compatibility with older projects, the following special characters are also supported:

%V	See \$(TagValue).
%D	The date of the alarm/event start (in local time); its format is dependent on the operating system's regional settings.
%T	The time of the alarm/event start (in local time); its format is dependent on the operating system's regional settings.

Tag

Specifies the link to the tag whose value is to be used to activate the alarm/event. The tag must belong to the same device as the alarm/event.

Condition

Specifies the condition or state that generates the alarm/event.

Value change

The alarm/event is generated when the value of the tag is changed in one of the following ways: *Any change*, *Increase*, *Decrease*.

Leading edge

The alarm/event is generated when the value of the digital-type tag changes from logical 0 to logical 1 (the off-to-on transition).

Trailing edge

The alarm/event is generated when the value of the digital-type tag changes from logical 1 to logical 0 (the off-to-on transition).

High critical limit

The alarm/event is generated if the value of the tag is equal to or greater than the tag's high critical limit.

High warning limit

The alarm/event is generated if the value of the tag is equal to or greater than the tag's high warning limit.

Low warning limit

The alarm/event is generated if the value of the tag is equal to or less than the tag's low warning limit.

Low critical limit

The alarm/event is generated if the value of the tag is equal to or less than the tag's low critical limit.

Value in range

The alarm/event is generated if the value of the tag lies within the interval specified by the **Range** property. To define the range (including the limits), the *From value* and *To value* limits must be specified.

Miscellaneous

Specifies the *Type* and *Priority* of the alarm/event.

Type

An alarm/event can be of one of the following types: *Alert*, *Command*, and *System message*. Different icons are used to distinguish the types on the list of alarms/events.

Priority

Specifies the order in which the sounds triggered by the start or end of the alarm/event should be played. The alarm/event with a higher value of this property has higher priority.

▼ Advanced

Options*Log to alarm/event database*

Determines whether to log the alarm/event to the alarm/event database.

Show in current alarms/events

Determines whether to display the alarm/event on the list of current alarms/events.

Require acknowledgment

Determines whether to require acknowledgment for the alarm/event before it can be removed from the list of current alarms/events. Only the user with sufficient access rights can acknowledge the alarm/event. If no access right is selected, the alarm/event can be acknowledged by any user.

Verify user on acknowledge

If this property is active, the alarm/event can only be acknowledged after the operator's identity is successfully verified. The user proves his/her identity by entering a password in the *Acknowledge Alarm/Event...* dialog box. If a fingerprint scanner is used, the user's identity is verified after his/her fingerprint is taken.

Require note before acknowledgment

If this property is active, the alarm/event cannot be acknowledged until the user writes a note related to the alarm/event. The note can contain, for example, a description of the measures taken to solve the problem. If the user attempts to acknowledge the alarm/event with no note (no note is written), he/she is prompted to write a note.

Inhibitor tag

Determines whether the specified tag can be used to inhibit the alarm/event from being generated. If the tag is set to logical 1, the alarm/event is not invoked even though the *Condition* defined on the *Basic* page is met.

Related objects*Window*

Determines whether the specified window can be brought up from the list of current or historical alarms/events if the alarm/event is selected.

Digital tag

Determines whether the specified digital-type tag is related to the alarm/event. The tag is set to logical 1 and kept on this value by the runtime software while the condition that generated the alarm/event persists. If the condition is not present, the tag is set to logical 0 and kept on this value by the runtime software.

Alarm/event groups

Defines the list of alarm/event groups to which the alarm/event belongs.

▼ Actions

On start

Run script

Determines whether to run the specified script when the alarm/event is generated. Information on the alarm/event is passed to the script. To acquire the information, the `RScr.GetCurrentScriptDataEx` function should be used.

Play sound

Determines whether to play the specified sound file (in the *.wav format) when the alarm/event is generated. The sound file must be located in the `<Project>\Main\MMedia` directory.

Show current alarms/events

Determines whether to display the list of current alarms/events when the alarm/event is generated.

Start Maatrix service

Determines whether to run the Maatrix service when the alarm/event is generated.

Online print

Determines whether to print the alarm/event on the printer defined in the *Printers* folder of the respective computer via the *Project Structure Manager* (see the chapter [Defining Printers](#)).

On end*Run script*

Determines whether to run the specified script when the condition that generated the alarm/event ceases to exist. Information on the alarm/event is passed to the script. To acquire the information, the `RScr.GetCurrentScriptDataEx` function should be used.

Play sound

Determines whether to play the specified sound file (in the *.wav format) when the condition that generated the alarm/event ceases to exist. The sound file must be located in the `<Project>\Main\MMedia` directory.

On acknowledge*Run script*

Determines whether to run the specified script when the alarm/event is acknowledged. Information on the alarm/event is passed to the script. To acquire the information, the `RScr.GetCurrentScriptDataEx` function should be used.

Notification (E-mail, SMS, Maatrix)*Limit frequency of notifications*

If this option is active, the next notification of the same type (start, end, acknowledgment) will not be sent until the specified *Min. interval* has expired.

8.4.6 Communication Zone Properties

Communication zones allow the user to fully control the communication with I/O devices, i.e., reduce the time required for transferring data from the devices. However, defining them is optional (communication zones are not required for communication). Considering that each defined tag has its own update interval value, the communication driver does not need communication zones to read the values of the tags at specified intervals.

On the other hand, if a communication zone is defined in the visualization project, the reading of the tag values conforms to the following rules: The values of all the tags that lie in the area read by the communication zone and whose update interval is identical to the one of this communication zone are read by this communication zone. All other tag's values are read individually, i.e., by dynamically compiled communication packets.

Should the communication be provided via the defined communication zones only, the *Communicate only via zones* property must be activated through the *Communication Driver Manager*. In such a case, the values of all the tags located in the communication zones are read regardless of the update interval specified for each tag. The values of the tags lying outside the communication zones won't be read.

Common Object Properties

General

Control reading

Determines whether to control reading the zone by the specified digital-type tag. The tag can be automatically reset when the zone is read if the *Reset tag after reading finished* property is active.

▣ Tecomat and Tecoreg Devices Communication Zone Properties

Register type

Specifies the type of register where the zone is located. A *Teco* device has the following types of registers: X (input), Y (output), S (system), R (user), and M (databox).

Address

Specifies the register address where the zone begins.

Length (byte count)

Specifies the number of bytes to be read.

Reading interval

Specifies the time interval used for reading the zone by the communication driver.

▣ Modbus Device Communication Zone Properties

Register type

Specifies the type of register where the zone is located.

File number

To be added.

Address

Specifies the register address where the zone begins.

Length (element count)

Specifies the length of the zone in elements.

Reading interval

Specifies the time interval used for reading the zone by the communication driver.

8.5 Communication Driver Manager

The **Communication Driver Manager** is a tool intended to configure the properties of the communication drivers. The *Communication Driver Manager* window has the same layout as other managers – see the chapter [Managers](#). In addition to the [common toolbar commands](#), the toolbar contains the *New Communication Driver*  command that is used to add a new communication driver to the tree diagram.

Several instances of each type of communication driver can be defined to provide different configurations for the devices connected to different computers. Similarly to other objects, communication drivers are connected to the actual computers via the [Project Structure Manager](#).

[Basic](#)

[Communication](#)

8.5.1 Driver Basic Properties

[Common Object Properties](#)

Log information to file

Determines whether to log information about the operation of the communication driver to a file.

Log communications

Determines whether to log information about the received and sent communication messages.

Log errors

Determines whether to log information about errors that occurred during the operation of the communication driver (for example, "Failed to open the required communication port", "Failed to process the received data").

Log debug information

Determines whether to log debug (auxiliary) information. It helps the **Reliance** SCADA/HMI system's developers when detecting and removing errors.

8.5.2 Communication

Elgas, Inmat, Johnson Controls, Modbus, Promos, Sauter, Teco, IEC104, IEC62056, WSR3000, M-Bus, BACnet, Siemens

Interval between reception and transmission

Specifies the time interval between receiving a communication message and sending a new request. An optimal configuration of this property is especially suitable when communicating using the RS-232/485 converter's RTS signal.

Maximum communication error count

Exceeding this number will be evaluated as an error in communication with the device.

Elgas, Johnson Controls, Modbus, Promos, Sauter, Teco, IEC104, WSR3000, M-Bus, BACnet, Siemens

Maximum packet count for writing into one device

Specifies the maximum number of unsent communication packets for writing into the device. If requests for writing into the device from the runtime software are generated faster than they are sent to the device by the communication driver, these requests are added to a queue. This property limits the number of pending requests and thus prevents the occupied memory from growing uncontrollably. The reaching of the limit specified by this property is indicated in the respective communication channel's diagnostics.

Elgas, Inmat, Johnson Controls, Modbus, Promos, Teco, M-Bus, IEC104, IEC62056, BACnet, Siemens

Release communication port when idle

If no communication packets are available to be sent and this property is active, the communication driver will release a serial communication port. Another communication driver can then use this port.

Elgas, Inmat, Johnson Controls, Modbus, Promos, Teco, QMD

Maximum communication packet length

Specifies the maximum length of the communication message to send.

Communication error count before reset comm. channel

Exceeding this number results in terminating all communications on the respective communication channel, closing the communication channel, and deleting all unsent messages. Subsequently, the communication channel is reopened and the communication restarted.

Elgas, Inmat, Johnson Controls, Modbus, Promos, Teco, IEC104, IEC62056, M-Bus, Generic, BACnet, Siemens

Maximum TCP socket count

Specifies the maximum number of TCP sockets simultaneously opened by the communication driver. If communicating with multiple devices, these are equally divided into individual sockets. After the communication with a single device is processed, the socket is closed and, prior to communicating with another device, reopened with different parameters.

Maximum UDP socket count

Specifies the maximum number of UDP sockets simultaneously opened by the communication driver. If communicating with multiple devices, these are equally divided into individual sockets. After the communication with a single device is processed, the socket is closed and, prior to communicating with another device, reopened with different parameters.

Johnson Controls, Promos, Teco, QMD, AMiT, IEC104

Communication driver address

Specifies the source address used in messages sent by the communication driver to the child device.

Sauter, WSR3000

Communication warm start

Specifies the behavior of the communication driver when starting the communication. When the so-called warm start is used, the initial set of operations is skipped.

Sauter

Max. spont. response request count in response category

Specifies the number of repeatedly sent spontaneous response requests with the same response category. After reaching this number, the response category is automatically reduced so that data with higher priority is received urgently.

Device initialization period

Specifies the time interval at which the child devices' initialization is periodically repeated.

Device synchronization period

Specifies the time interval at which the child devices' synchronization is periodically repeated.

Spontaneous response frequency statistics length

Specifies the time period at which the spontaneous response frequency is retrospectively evaluated. The statistics is used, for example, to reveal whether data is sent too often, which can cause overloading the communication.

SMS

Received SMS message check interval

Specifies the time interval at which it is checked whether the modem has received a new SMS message.

AT commands for modem initialization

Specifies the sequence of AT commands for modem initialization. The initialization is performed at project startup and at modem reset (e.g., in the event of a communication failure). In some commands, there may be the key `$(Value)` that will be replaced with the corresponding value before sending an AT command to the modem.

Teco

Secure communication by different length of communication packets

Determines whether to secure communication against receiving communication messages from a single device in the wrong order. If this option is active, the communication driver will secure that no response to any two successive messages is of the same length. The length is checked when receiving a response.

Secure communication by reading time stamp

Determines whether to secure communication against receiving communication messages from a single device in the wrong order. If this option is active, the communication driver adds a request for the time stamp contained in the child device to all messages. The time sequence is checked according to the received time stamp when receiving a response.

Teco, Modbus

Communicate only via zones

The values of all the tags located in the communication zones are read regardless of the update interval specified for each tag. The values of the tags lying outside the communication zones won't be read. Communication with the child devices is provided via the defined communication zones only.

WSR3000

Maximum number of Check packets

Specifies the maximum number of sent "Check" packets. A restriction that prevents from overloading the communication at project startup.

Maximum number of Init packets

Specifies the maximum number of sent "Init" packets. A restriction that prevents from overloading the communication at project startup.

Communication packet preparation period

Specifies the time period needed for preparing the communication packets. It prevents from overloading the communication at project startup and enables receiving data from individual child devices.

8.6 Recipe Manager

The **Recipe Manager** is a tool that is used to define groups of tags (recipes) whose real-time values can be read and stored to a disk file. They can later be loaded from the file and transferred to the respective devices.

Recipes are typically used in the single production-line manufacture of various products (glass press, dye and chemical manufacturing, etc.). The configuration settings (tag values) for a particular type of product are then stored in a specific recipe that can later be loaded from the file and transferred to the device.

The *Recipe Manager* window has the same layout as other managers (see the chapter [Managers](#)). In addition to the [common toolbar commands](#), the toolbar contains the *New Recipe Type* , *New Recipe Item* , and *Add Recipe Items*  commands.

[Recipe Properties](#)

[Recipe Item Properties](#)

8.6.1 Recipe Properties

[Common Object Properties](#)

Secure

Allows you define [access rights](#) required for working with the recipe.

Using

Specifies the access rights required for using the recipe type (i.e., transferring a stored recipe to the device).

Saving

Specifies the access rights required for saving the recipe type to a disk file (i.e., creating a stored recipe).

Deleting

Specifies the access rights required for deleting a stored recipe (i.e, deleting the file containing the stored recipe).

Control loading recipe into devices

Control

Specifies the link to the digital-type tag to be used to control the automatic transfer of a stored recipe to the device (the operator's command is not required). The transfer is performed on the leading edge of the tag, i.e., when the value of the tag changes from logical 0 to logical 1 (the off-to-on transition). If it is required to set the value back to 0 after the operation is performed, the *Reset tag* option must be active.

Recipe name

Specifies the link to the string-type tag whose value is to be used to control the recipe name.

Acknowledge loading recipe into devices

Specifies the link to the digital-type tag whose value is to be set to logical 1 if the stored recipe has been successfully transferred to the device.

Stored recipes

Specifies the link to the tag of type *Array of String*, *Array of UTF8String*, or *Array of WideString (UCS-2)* whose value contains a list of stored recipes' names.

8.6.2 Recipe Edit

Use different tags for editing recipe

Allows you to select a tag for editing the stored recipe separately for each recipe item (the *Editing tag* property).

Control loading recipe

Control

Specifies the link to the digital-type tag to be used to control the automatic loading of the stored recipe. The loading is performed on the leading edge of the tag, i.e., when the value of the tag changes from logical 0 to logical 1 (the off-to-on transition). If it is required to set the value back to 0 after the operation is performed, the *Reset tag* option must be active.

Recipe name

Specifies the link to the string-type tag whose value is to be used to control the recipe name.

Control saving recipe

Control

Specifies the link to the digital-type tag to be used to control the automatic saving of the stored recipe. The saving is performed on the leading edge of the tag, i.e., when the value of the tag changes from logical 0 to logical 1 (the off-to-on transition). If it is required to set the value back to 0 after the operation is performed, the *Reset tag* option must be active.

Recipe name

Specifies the link to the string-type tag whose value is to be used to control the recipe name.

Control deleting recipe

Control

Specifies the link to the digital-type tag to be used to control the automatic deletion of the stored recipe. The deletion is performed on the leading edge of the tag, i.e., when the value of the tag changes from logical 0 to logical 1 (the off-to-on transition). If it is required to set the value back to 0 after the operation is performed, the *Reset tag* option must be active.

Recipe name

Specifies the link to the string-type tag whose value is to be used to control the recipe name.

8.6.3 Recipe Item Properties

[Common Object Properties](#)

Name

Can be *synchronized* with the tag's name.

Alias

Can be *synchronized* with the tag's alias.

Tag

Specifies the link to the tag whose value is to be stored in the recipe.

Editing tag

To be added.

8.7 Data Table Manager

The **Data Table Manager** is a tool that is used to create *data tables* and configure databases. A **data table** is an object allowing you to log historical data in a time sequence. The *Data Table Manager* allows you to define data tables. **Trends** and **reports** are used to display their contents.

The *Data Table Manager* window has the same layout as other managers (see the chapter **Managers**). In addition to the **common toolbar commands**, the toolbar contains the *New Data Table* , *New Data Table Field* , and *Add Data Table Fields*  commands.

[Data Table Properties](#)

[Data Table Field Properties](#)

8.7.1 Data Table Properties

▼ Basic

[Common Object Properties](#)

Physical table name

Specifies the data table's **name**. For file-based databases (*Paradox* and *dBASE*), it specifies the first part of a filename.

Data acquisition method

▼ Not specified

If this option is active, the runtime software will not sample data.

▼ Sample real-time data

If this option is active, data for the data table is acquired by sampling (logging) real-time data.

Sampling

Periodic

If this option is active, the sampling is performed periodically (in seconds) using the specified *Sampling interval*.

Tag-controlled

Allows you to specify the link to the digital-type tag whose value is to be used to control the sampling. The sampling is performed when the value of the tag changes from logical 0 to logical 1, i.e., on the leading edge of the tag (the off-to-on transition). If it is required to set the value back to 0 after the operation is performed, the *Reset tag* option must be active.

Script-controlled (by RDb.AppendRecord procedure)

Allows you to perform the sampling by calling the `RDb.AppendRecord` procedure from a script.

Time stamp source

Computer time

If this option is active, the time stamp is determined by the current time of the computer.

Tag

If this option is active, the time stamp is determined by the current value of the specified tag of type *DateTime*.

Blocking tag

Determines whether to use the specified tag of type *Bool* to block the sampling. If the value of the tag is set to logical 1, the sampling is disabled. Otherwise, it is enabled.

Block sampling if one or more tags have invalid value

Determines whether to block the sampling if the *quality* of one or more tags is bad (e.g., when communication with the device is interrupted).

▼ Read time-stamped data from device

If this option is active, data for the data table is acquired at periodic intervals. It is sampled within a physical device and logged by the runtime software at longer intervals (e.g., telemetry systems).

Reading

Periodic

If this option is active, data is read periodically (in minutes) using the specified *Reading interval*.

Tag-controlled

Allows you to specify the link to the tag of type *Bool* whose value is to be used to control the reading. The reading is performed if the value of the tag is set to logical 1, i.e., on the leading edge of the tag (the off-to-on transition). If it is required to set the value back to 0 after the operation is performed, the *Reset tag* option must be active.

Max. age of data read from device (h)

Specifies the maximum age of the data to be read from the device.

Logging of data newer than current computer time

Max. time difference (h)

Any data newer than the current time of the computer + the *Max. time difference* is not logged to the data table. This provides protection for situations in which data with a nonsensical time stamp is read from the physical device (e.g., 10 years newer than the current time). This occurs when the physical device has the wrong system time. If such data would be logged to the data table and the system time would be corrected in the physical device, the correct data would not then be logged to the data table because the data's time stamp would be older than the last record in the data table.

▼ Advanced

Database type

dBASE

Allows you to use the *dBASE* (*.dbf) format for the data table.

Paradox

Allows you to use the *Paradox* (*.db) format for the data table. This type of database was used in the past. The database file is indexed by default to make working with the stored data faster. However, this can cause damage to the database (e.g., when the program is not safely terminated). Therefore, this option is not recommended. If the file is not to be indexed, activate the *Not indexed* option.

Note: To avoid losing data, it is recommended that you make the *Not indexed* option active.

SQL

Allows you to use SQL (relational) databases.

Store time stamp also as date and time

This option is active only if the SQL database type is selected.

Archive files

Specifies the period at which archive files are created for the data table. An archive file is a copy of the data table's current file stored in the data table's archive directory and renamed.

Monthly

Archive files are created with a period of one calendar month (the current file is copied to the data table's archive directory and its suffix "XXXX" is replaced by a date).

Daily

Archive files are created with a period of one day (the current file is copied to the data table's archive directory and its suffix "XXXX" is replaced by a date).

None

Archive files are not created. In this case, data is only logged to the data table's current file; an archive file can be created manually by moving the current file from the current directory where a new current file will be created automatically.

Time stamp base

UTC

UTC = Coordinated Universal Time, i.e., time independent of the time zone (UTC is identical with GMT). This option is recommended.

UTC + offset (hours)

Time shifted by an offset from UTC (e.g., standard time).

Local time

Time dependent on the time zone and season (standard/daylight saving time based on the operating system settings). It is identical with the time of the operating system. This option is not recommended due to inconsistencies in dates when changing from/to daylight saving time.

Logging

Logging interval

Specifies the time interval at which time-stamped data is logged to a physical table.

Last logged record

Write time stamp to tag

Determines whether to log the time stamp of the latest record made by the runtime software to the specified tag.

Convert to local time

Determines whether to convert the latest record's time stamp to the operating system's time.

▼ Other

Redundancy

Redundant table

This option only applies when data server redundancy is used. If this option is active, both the primary server and the secondary server create and maintain their own copy of the table. Otherwise, it is assumed that the table is common to both servers. Data is only logged by the active server.

Data delay

If this option is active, the archive files' data delay can be configured (*Days, Hours, Minutes*). It is only used in some very specialized applications.

8.7.2 Data Table Field Properties

Data tables consist of *data table fields*. Each field represents a tag whose value is to be logged to the data table.

Common Object Properties

Name

Can be *synchronized* with the tag's name.

Alias

Can be *synchronized* with the tag's alias.

Tag

Specifies the link to the tag whose value is to be logged to the data table.

Physical field name

Specifies the field's (column's) **name** used in the physical database table.

Generate automatically

If this option is active, the **Reliance** SCADA/HMI system generates the physical field name automatically.

Use tag's engineering name

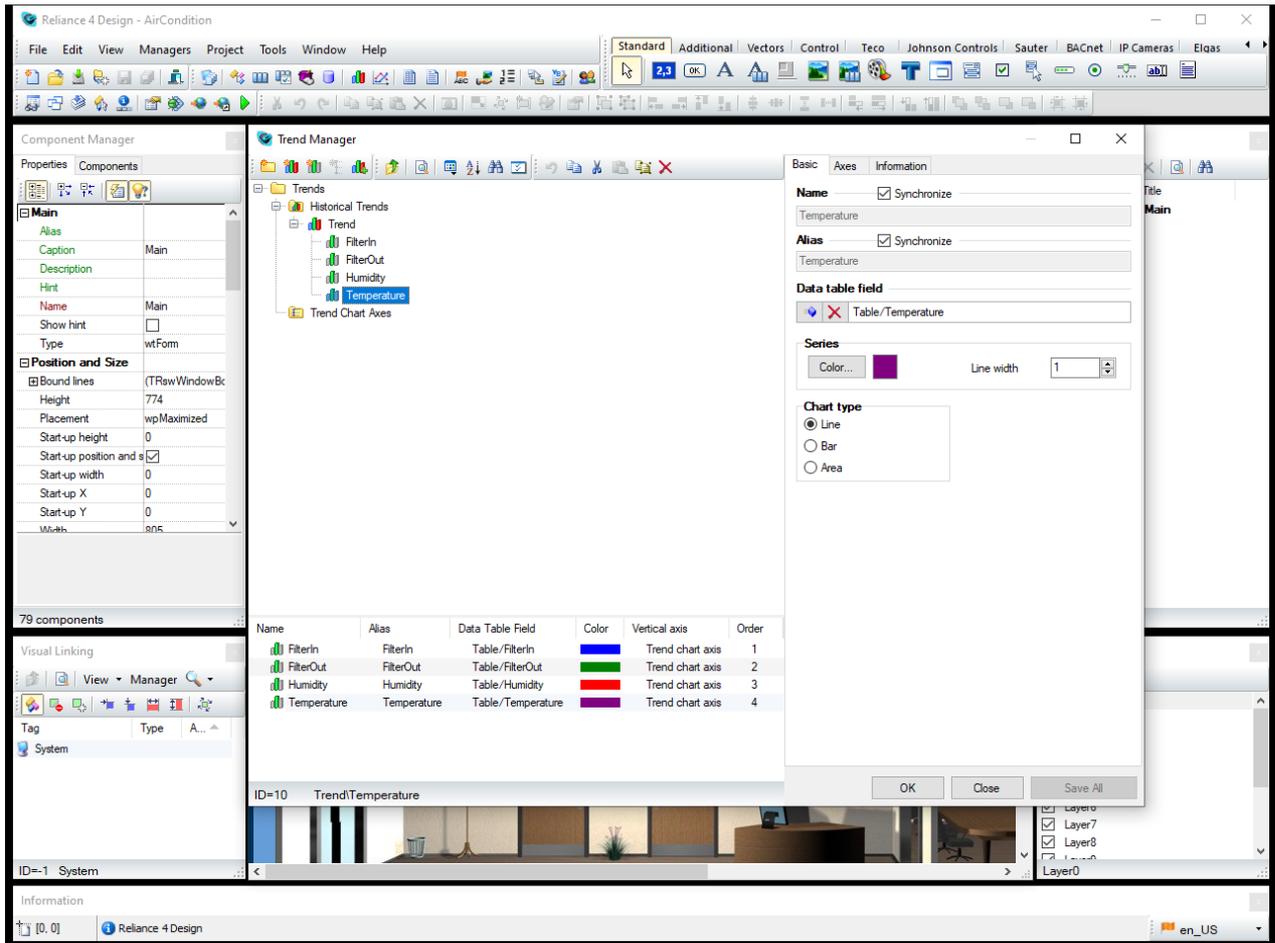
If this option is active, the physical field name is specified by the tag's eng. name, if defined.

Custom name

If this option is active, the physical field name can be specified manually.

8.8 Trend Manager

The **Trend Manager** allows you to define and configure *trends*. In the context of Reliance, a trend is an object used for the graphic presentation of the data stored in a data table(s) (i.e., historical data). Trends can be displayed at runtime via the trend viewer.



Reliance 4 – Trend Manager

The *Trend Manager* window has the same layout as other managers (see the chapter [Managers](#)). In addition to the [common toolbar commands](#), the toolbar contains the *New Trend* , *New Trend Series* , *New Chart Axis* , and *Add Trend Series*  commands.

The options of the *Trend Manager* at runtime and design-time are identical. After a new trend is added, you have to select the computer(s) to which the trend should be connected.

Trend Properties

[Trend Series Properties](#)

[Trend Axis Properties](#)

8.8.1 Trend Properties

[Common Object Properties](#)

Title

Specifies the text to be displayed as the title of the trend using the specified font. If the *Use trend alias or name* option is active, the trend's alias (or name if an alias is not specified) is used as the title.

Text

Specifies the *Font* of the title.

Background

Specifies the background *Color* of the trend. The color should contrast with colors used for individual series.

Ruler/Cross

Specifies the *Color* and *Width* of the ruler/cross. It is a tool designed for the accurate reading of values of individual series at the crossing point of the ruler/cross and the series. The color of the ruler/cross should contrast with the background color. The width is specified in pixels.

Paging

Determines the time range displayed on a single page of the trend. If the *Point count* option is active, the trend viewer always attempts to display the specified number of series points on a single page, which represents the number of records stored in the data table (i.e., the *Point count* property is independent of the number of trend series). In this case, it is required that all the series be linked to the same data table so that each series displays points with the same time stamps. If the *Time range* option is active, the trend viewer always displays the specified time range on a single page regardless of the amount of series points.

Axes

Vertical axis

Title

Allows you to specify the title of the trend's vertical axis.

Hidden

If this option is active, the actual axis will not be displayed, but its setting will be used.

Scale

The *Automatic* property determines whether the axis automatically adjusts its minimum and/or maximum to the series' values within the current time range. If the axis' minimum and/or maximum are not automatic, they must be specified as the *Minimum* and/or *Maximum* properties.

Position relative to chart

Start (%)

Positions the axis' maximum with respect to the original position.

End (%)

Positions the axis' minimum with respect to the original position.

Horizontal position (%)

Positions the axis with respect to the beginning of the chart.

Series vertical axes

Position automatically

Determines whether the position of the vertical axes is generated automatically or according to the position defined for the series' vertical axes. The axes can be automatically positioned either *Side by side* or *Above each other*.

Series

Contains the list of trend series. You are enabled to change the order of the series using the arrows above the list. The specified order will take effect, for example, in the trend's legend.

8.8.2 Trend Series Properties

Common Object Properties

The name of a series can be synchronized with a data table field name.

Data table field

Specifies the link to the *data table field* whose values (time samples) are to be displayed by the series. If the *Paging* property is set to *Time range*, the series can be linked to different data table fields, i.e., the trend can display data stored in different data tables.

Series

Specifies the series' *Color*. It should contrast with the background color of the trend. The series' *Line width* can also be specified.

Chart type

Determines how to graphically represent the series' values. The series can be displayed as a *Line* chart, *Bar* chart, or *Area* chart.

Axes

Vertical axis

Specifies the series' vertical axis. The series can use the trend's vertical axis (the *Trend chart axis* option), the predefined axis (the *Selected axis* option), or a vertical axis intended only for this series (the *Custom axis* option – this option is suitable if the series' value range is completely different from that of the other series).

Title

Allows you to specify the title of the series' vertical axis. If the *Use series alias or name* option is active, the series' alias (or name if an alias is not specified) is used as the title.

Hidden

If this option is active, the actual axis will not be displayed, but its setting will be used.

Scale

The *Automatic* property determines whether the axis automatically adjusts its minimum and/or maximum to the series' values within the current time range. If the axis' minimum and/or maximum are not automatic, they must be specified as the *Minimum* and/or *Maximum* properties.

Position relative to chart

Start (%)

Positions the axis' maximum with respect to the original position.

End (%)

Positions the axis' minimum with respect to the original position.

Horizontal position (%)

Positions the axis with respect to the beginning of the chart.

8.8.3 Trend Axis Properties

Common Object Properties

Axis

Title

Allows you to specify the title of the trend's axis. If the *Use axis alias or name* option is active, the axis' alias (or name if an alias is not specified) is used as the title.

Hidden

If this option is active, the actual axis will not be displayed, but its setting will be used.

Scale

The *Automatic* property determines whether the axis automatically adjusts its minimum and/or maximum to the series' values within the current time range. If the axis' minimum and/or maximum are not automatic, they must be specified as the *Minimum* and/or *Maximum* properties.

Position relative to chart

Start (%)

Positions the axis' maximum with respect to the original position.

End (%)

Positions the axis' minimum with respect to the original position.

Horizontal position (%)

Positions the axis with respect to the beginning of the chart.

8.9 Real-Time Trend Manager

The **Real-Time Trend Manager** allows you to define and configure *real-time trends*. In the context of **Reliance**, a real-time trend is an object used for the graphic presentation of a sequence of the most recent values (time samples) of the selected tags. The values are only stored in the memory, not in a data table (which is in contrast to *trends* – see the chapter [Trend Manager](#)). A real-time trend can be displayed at runtime by a [Real-Time Trend](#) component placed into a visualization window.

The *Real-Time Trend Manager* window has the same layout as other managers (see the chapter [Managers](#)). In addition to the [common toolbar commands](#), the toolbar contains the *New Trend* , *New Trend Series* , and *Add Trend Series*  commands.

[Real-Time Trend Properties](#)

[Real-Time Trend Series Properties](#)

8.9.1 Real-Time Trend Properties

[Common Object Properties](#)

Update

Determines how to update the trend's series (tag sampling).

Periodic

If this option is active, the trend is updated periodically at the specified *Update interval*.

Tag-controlled

If this option is active, the trend is updated on the leading edge (the off-to-on transition) of the specified digital-type tag, i.e., when the value of the tag changes from logical 0 to logical 1. If it is required to set the value back to 0 after the operation is performed, the *Reset tag* option must be active.

Update interval

Specifies the time interval (ms) at which the trend series' values will be sampled.

Automatic time axis

Determines whether to change the range of the time axis according to the current number of samples in the trend's series.

Visible point count

Specifies the number of points (time samples) to be displayed on the trend's horizontal axis. For example, 60 points with the update interval of 1000 ms will display the tag values for the last minute.

Control deleting chart data

Determines whether to use the specified *Bool*-type tag to control deleting the values. The *Reset tag* property determines whether to reset the control tag after detecting the leading edge.

Blocking tag

Determines whether to use the specified *Bool*-type tag to block the sampling. If the value of the tag is set to logical 1, the sampling is disabled. Otherwise, it is enabled.

Axes

Vertical axis

Title

Allows you to specify the title of the trend's vertical axis.

Hidden

If this option is active, the actual axis will not be displayed, but its setting will be used.

Scale

The *Automatic* property determines whether the axis automatically adjusts its minimum and/or maximum to the series' values within the current time range. If the axis' minimum and/or maximum are not automatic, they must be specified as the *Minimum* and/or *Maximum* properties.

Position relative to chart

Start (%)

Positions the axis' maximum with respect to the original position.

End (%)

Positions the axis' minimum with respect to the original position.

Horizontal position (%)

Positions the axis with respect to the beginning of the chart.

Control

Allows you to control the vertical axis' *Minimum* and *Maximum* using a tag.

Series vertical axes

Position automatically

Determines whether the position of the vertical axes is generated automatically or according to the position defined for the series' vertical axes. The axes can be automatically positioned either *Side by side* or *Above each other*.

Series

Contains the list of trend series. You are enabled to change the order of the series using the arrows above the list. The specified order will take effect, for example, in the trend's legend.

8.9.2 Real-Time Trend Series Properties

A real-time trend is formed by series of values (samples). Each series represents a sequence of a single tag's most recent values.

[Common Object Properties](#)

Tag

Specifies the link to the tag whose values are to be displayed by the series.

Series

Specifies the series' *Color* and *Line width* in pixels. The color of the series should be in contrast with the background color of the trend – see the [Trend Properties](#) of the [Real-Time Trend](#) component (*Static > Properties > Chart > Panel > Panel Color*).

Axes

Vertical axis

Specifies the series' vertical axis. The series can use either the trend's vertical axis (the *Trend chart axis* option) or a vertical axis intended only for this series (the *Custom axis* option – this option is suitable if the series' value range is completely different from that of the other series).

Title

Allows you to specify the title of the series' vertical axis. If the *Use series alias or name* option is active, the series' alias (or name if an alias is not specified) is used as the title.

Hidden

If this option is active, the actual axis will not be displayed, but its setting will be used.

Scale

The *Automatic* property determines whether the axis automatically adjusts its minimum and/or maximum to the series' values within the current time range. If the axis' minimum and/or maximum are not automatic, they must be specified as the *Minimum* and/or *Maximum* properties.

Position relative to chart

Start (%)

Positions the axis' maximum with respect to the original position.

End (%)

Positions the axis' minimum with respect to the original position.

Horizontal position (%)

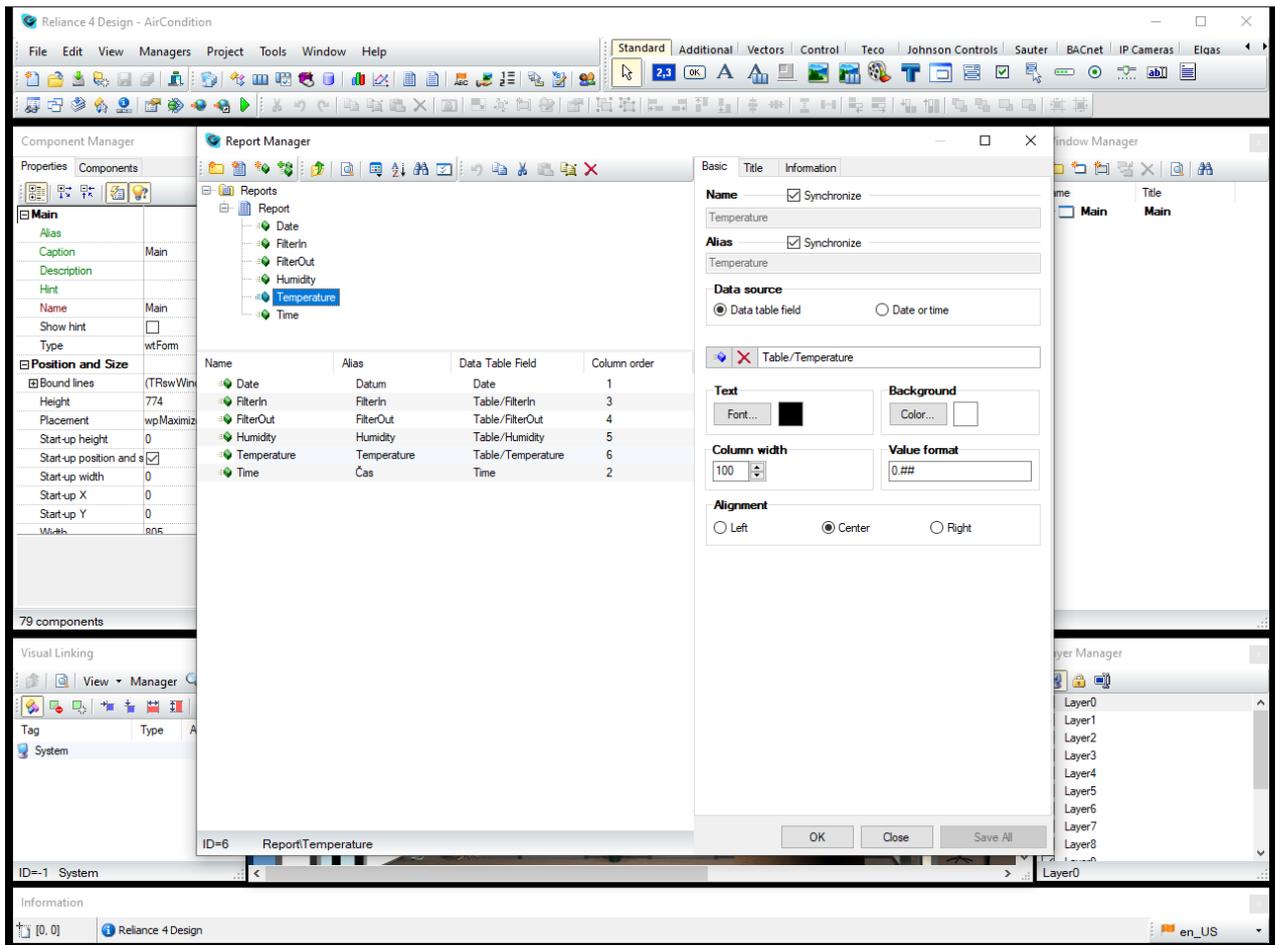
Positions the axis with respect to the beginning of the chart.

Control

Allows you to control the vertical axis' *Minimum* and *Maximum* using a tag.

8.10 Report Manager

The **Report Manager** allows you to define and configure reports. In the context of Reliance, a report is an object used for the graphic presentation of the data stored in a data table (i.e., historical data) in a tabular format. Reports can be displayed, printed, exported, and sent by e-mail at runtime via the report viewer.



Reliance 4 – Report Manager

The *Report Manager* window has the same layout as other managers – see the chapter [Managers](#). In addition to the [common toolbar commands](#), the toolbar contains the *New Report* , *New Report Item* , and *Add Report Items*  commands. The last mentioned command brings up a dialog window for the selection of field(s) of a data table. New fields are added to the selected report after one or more data table fields are selected (*Shift* + left mouse button allows for the selection of multiple fields in a row, *Ctrl* + left mouse button allows for the selection of fields one by one).

The options of the *Report Manager* at runtime and design-time are identical. After a new report is added, you have to select the computer(s) to which the report should be connected.

[Report Properties](#)

[Report Actions](#)

[Report Title](#)

[Report Column Header](#)

[Report Page Footer](#)

For **data table fields**, the following settings can be edited:

[Report Item Properties](#)

[Report Item Title](#)

8.10.1 Report Properties

[Common Object Properties](#)

Data table

Specifies the link to the data table whose contents are to be displayed by the report.

Report elements

Determines which elements to include in the report: *Title*, *Column header*, *Page footer*.

Grid

Determines whether to display grid lines in the background. The *Horizontal* and *Vertical lines* can be displayed independently.

Row height

Specifies the height (in pixels) of a single row of the report. It may affect the number of rows displayed on a single page of the report.

Column order

Contains a list of the specified *report items*. To change the order of a column, change the respective item's position on the list by using the arrow buttons in the toolbar above the list.

Navigation

Day start

Allows you to specify the day start using hour and minute values.

Selected record

Write time stamp to tag

Allows storing the selected record's time in a tag. The record was carried out by the user in the active report viewer at runtime.

Convert to local time

Determines whether to convert the selected record's time stamp to the operating system's time.

8.10.2 Report Actions

Action list

Specifies the list of actions that can be executed from the report viewer.

8.10.3 Report Title

Specifies the title printed on the first report page. The title is printed only if it is enabled on the report properties' *Basic* page (the *Title* option must be active).

Use report alias or name

Determines whether to use the report's alias (or name if an alias is not specified) as the title. If this option is deactivated, any title can be entered.

Text

Specifies the *Font* of the title.

Background

Specifies the background *Color* of the title. The color should contrast with the text color.

Frame

Determines whether to frame the report header with a line of the specified *Color* and *Width* (in pixels).

Bar height

Specifies the height (in pixels) of the report header bar. The height should correspond to the size of the title's font.

Alignment

Specifies the alignment of the title within the report header.

Preview

Displays the report title's preview.

8.10.4 Report Column Header

Specifies the text printed on top of every page of the report. The text is printed only if it is enabled on the report properties' *Basic* page (the *Column header* option must be active).

Frame

Determines whether to frame the column header with a line of the specified *Color* and *Width* (in pixels).

Height

Specifies the height (in pixels) of the column header.

Preview

Displays the report column header's preview.

8.10.5 Report Page Footer

Specifies the text printed on the bottom part of every report page. The text is printed only if it is enabled on the report properties' *Basic* page (the *Page footer* option must be active).

Text on footer

Determines whether to display the specified text on the footer using the specified *Font* and *Alignment*.

Page numbers

Determines whether to display the page number on the footer using the specified *Font* and *Alignment*.

Page numbers and text on separate rows

Determines whether to print the page number and the footer text on separate rows. If this option is not active, the footer is printed on a single line.

Background

Specifies the background *Color* of the footer. The color should contrast with the text color and the page number color.

Height

Specifies the height (in pixels) of the footer. The height should correspond to the size of the fonts.

Preview

Displays the report footer's preview.

8.10.6 Report Item Properties

[Common Object Properties](#)

The *Name* of an item can be *synchronized* with a *data table field* name.

Data source

Specifies the link to a data source. The data source can be a *Data table field* or *Date or time* of a data table record. For the most part, the first two report items are linked to date and time, the other report items are linked to *data table fields*.

Text

Specifies the *Font* of the item's text. The size of the font should correspond to the report's row height.

Background

Specifies the background *Color* of the item's text. The color should contrast with the text color.

Column width

Specifies the width (in pixels) of the item's column.

Value format

Specifies the format string to be used when converting the item's value to text for display purposes. It is only used for the report items linked to numeric data table fields.

Alignment

Specifies the alignment of the item's text within the item's column.

Preview

Shows how the value of the report's records will be displayed.

8.10.7 Report Item Title

Use item alias or name

Determines whether to use the item's alias (or name if an alias is not specified) as the column title. If this option is deactivated, any title can be entered.

Text

Specifies the *Font* of the item's column title.

Word wrap

Determines whether to wrap the column title's text.

Background

Specifies the background *Color* of the item's column title. The color should contrast with the text color.

Alignment

Specifies the alignment of the item's column title within the column.

Preview

Displays the report item title's preview.

8.11 Custom Report Manager

The **Custom Report Manager** allows you to define and configure *custom reports*. Among other things, it determines which template is to be used for printing the custom report and specifies links between tags and custom report items. Custom reports can be displayed, printed, exported, and sent by e-mail at runtime via the custom report viewer.

The *Custom Report Manager* window has the same layout as other managers – see the chapter [Managers](#). In addition to the [common toolbar commands](#), the toolbar contains the *New Report* , *New Report Item* , and *Add Report Items*  commands. The toolbar also contains the following commands for working with a template: *Load Report Items* , *Preview Report* , *Edit Report* .

The **Reliance** SCADA/HMI system enables you to define custom reports via a tool named *FastReport* (*.rrt). It is a complex tool that provides you with a wide range of options for using format and graphic elements. It is a third-party application integrated into the *Reliance Design* environment. For more information on designing templates in the *FastReport* format, see the `CustomReports_ENU.pdf` (or `CustomReports.chm`) manual.

A custom report template can also be prepared in the HTML (*.html), MHTML (*.mhtml), or text (*.txt) formats. The template can be in any of the formats. For the HTML format, graphic elements, for example, can be included in the template. To mark the place where the real-time value of a tag should occur in the template, use a special character string that is to be recognized by the **Reliance** SCADA/HMI system. When printing the report, the real-time value of the tag is located in place of the *string*. The *string* is in the following format: `{ $Item_name } .`

[Custom Report Properties](#)

[Custom Report Export](#)

[Custom Report Item Properties](#)

8.11.1 Custom Report Properties

[Common Object Properties](#)

Use custom template

Determines whether to use the specified file containing a custom report template.

Watch template file changes

Determines whether to watch changes made to the contents of the report template file on disk. If a change is made to the template file, the template is reloaded in the report before displaying or editing the report.

Operation

Show Report

Allows you to display the custom report. After pressing the button, the items' strings within the template will be replaced with test values and the custom report will be displayed.

Edit Report

Opens the *FastReport Designer*. It is active only if the report is of type *FastReport*. To edit custom reports in the TXT or HTML format, you can use any external editor.

Import Report Items from Template

Allows you to import report items from the template. Subsequently, you can assign tags to the custom report items.

8.11.2 Custom Report Export

Allows you to customize saving a custom report of type *FastReport* to a file (using the *RSys.SaveCustomReport* procedure).

The file's extension type determines the format of the document. The following table lists the **supported document formats**.

Document format	Extension
<i>FastReport</i>	rrp or fp3
<i>Portable Document Format</i>	pdf
<i>Microsoft Excel 97-2003</i>	xls
<i>Microsoft Excel 2007 XML</i>	xlsx
<i>Microsoft Excel 2003 XML</i>	xml
<i>Microsoft Word 2007 XML</i>	docx
<i>OpenDocument Text</i>	odt
<i>OpenDocument Spreadsheet</i>	ods
<i>Hypertext Markup Language</i>	htm or html
<i>dBASE</i>	dbf
<i>Text</i>	txt
<i>Rich Text</i>	rtf
<i>CSV Text</i>	csv
<i>Portable Network Graphics</i>	png
<i>JPEG</i>	jpg or jpeg
<i>Windows Bitmap</i>	bmp
<i>Graphics Interchange Format</i>	gif
<i>Tag Image File Format</i>	tiff
<i>Enhanced Windows Metafile</i>	emf

General

Continuous

Allows generating a continuous document. The document will have no page header or footer.

Page breaks

Determines how to insert page breaks. Page breaks are used to separate a document into individual pages when printing. If the option is not active, Excel creates page breaks automatically. When activated, they are set based on the report of type *FastReport*.

Styles

Allows exporting the styles of the report of type *FastReport*.

Background

Allows exporting background pictures of the report's pages (the *BackPicture* property).

OEM codepage

Activates a character encoding according to an OEM code page.

WYSIWYG

Allows exporting the exact contents of the report of type *FastReport*.

PDF files

PDF/A

Activates [document compression](#). The option reduces the size of a document, but increases the time needed for its generation.

Embedded fonts

Allows embedding fonts used in the report in a document. To properly display the report on all computers, all fonts used in the report must be part of the document. If the document only contains the [standard PDF fonts](#), you can reduce the size of the resulting document by deactivating this option.

Print optimized

Determines whether to optimize printing high-resolution images. This option only makes sense if a document contains graphics and is to be printed. If active, it significantly increases the size of the document.

Background

Allows exporting background pictures of the report's pages (the *BackPicture* property).

Page navigator

Determines whether to show a special pane in the upper part of a document's page. It allows you to quickly switch from one page to another.

HTML files

Multipage

Allows saving each page of the report to a separate file.

Page navigator

Determines whether to show a special pane in the upper part of a document's page. It allows you to quickly switch from one page to another.

Fixed width

Allows you to block automatically adjusting the width of a document page when changing the size of the browser window.

All in one folder

Specifies the location of other report files. The files will be located in a folder together with the main file.

Save pictures as

Allows setting picture conversion to a uniform format. The following options are available: *None*, *JPG* (default), *BMP*, and *GIF*. If *None* is chosen, no picture will be converted to an HTML document.

Excel files*As text*

Allows converting values to text.

Merge cells

Allows merging text from multiple objects into a single cell.

Fast export

Allows the fast export of the report.

Picture files*Separate files*

Allows exporting each page of the report to a separate file.

Monochrome

Allows converting pictures to monochrome.

Crop pages

Allows changing the picture size based on the report's contents.

Resolution (DPI)

Specifies the number of picture elements (pixels) per inch.

JPG quality (%)

Specifies the compression of JPEG images.

Text files*Frames*

Allows exporting object frames.

Empty lines

Allows exporting empty lines.

Pictures

Allows exporting graphic images.

Separator

Specifies the item separator. You can choose a semicolon, comma, or tab.

Page header/footer

Determines whether and how to export the page header and footer. The header and footer can be exported (*Header/Footer*), converted to normal text (*Text*), or you can choose to not perform any export (*None*).

8.11.3 Custom Report Item Properties

Each custom report item is represented by the *string (mark)* contained in the template for the custom report.

Common Object Properties

Tag

Specifies the link to the tag whose value is to be displayed on the places marked in the template.

Value format

Specifies how to format values. You can choose between two options: *Based on tag*, which represents the display format defined for a tag, and *Based on report*, which represents the display format defined within the report.

Show eng. units

Determines whether to display units of measurement after the tag value. These can be defined via the [Device Manager](#) (*Tag > Basic > Eng. name*).

Test value

Specifies the value of the item that is to be used to preview the custom report.

8.12 String Manager

The **String Manager** is a tool that contains a list of all text strings used in a visualization project. If multiple languages are defined within the project ([Project Options](#) > *Languages*), the *String Manager* facilitates translating and verifying the text strings in each language.

The *String Manager* window consists of the toolbar and the list of text strings. Each column of the list corresponds to one language. In addition to the [common toolbar commands](#), the toolbar contains the following commands:



New String (Ins)

Adds a new text string to the list.



Edit (F2)

Enables you to edit the selected cell (string).



Multi-line Editor (Ctrl+E)

Brings up the *Multi-line Editor*, which allows you to edit the selected cell (string).



Add Comment

Adds a comment for the selected text string. Comments can, for example, specify details on the text string. They are added in the same way as subordinated objects are added to a tree structure (they can be collapsed and expanded).



Find Next

Is used to search for and replace another occurrence of the desired text string.



Translate by Google (Alt+G)

Allows you to automatically translate the text string using the Google translator (*Google Translate*).



Revert to Default (Alt+D)

Reverts the text string to the state it had been in before it was translated.



Languages

Brings up the [Project Options](#) dialog box.



Options

Brings up the [Environment Options](#) dialog box.



Expand

Expands all comments.



Collapse

Collapses all comments.



Filter

Allows you to filter the text strings according to their state (*All*, *Translated*, *Untranslatable*, *Not Translated*, *Verified*).

Each text string defined within the visualization project (alarm/event text, text displayed on a component placed into a visualization window, etc.) is automatically added to the list of text strings in the *String Manager* window. If the text you want to enter is already contained in the list, the link to the existing text is used. This is especially helpful when editing a text string used in multiple places within the visualization project. The *String Manager* allows you to edit the text string from one place. After making certain changes to the visualization project (e.g., deleting an alarm/event), text strings that are no more used in the project can remain on the list. They can later be detected and deleted using the [Project Diagnostics Wizard](#).

Each text string can be accompanied by a flag that helps the systems integrator or translator to arrange and filter the list of text strings. All new text strings are added to all columns representing individual languages. For the active language, the text string is marked as *Translated* (black). For other languages, the text string is marked as *Not Translated* (red). After translating it, you can choose the *Translated* command from the popup menu to mark the text string as *Translated*. You can also choose the *Verified* command from the popup menu to mark individual text strings as *Verified* (green).

Note: To quickly enter a text string (e.g., to select a text string for an alarm/event via the *Device Manager*), use the `Ctrl+Space` shortcut. This shortcut brings up the *Select String* dialog box where you can select the desired text string.

8.13 Picture Manager

The **Picture Manager** is a tool that is used for importing pictures to a visualization project and for their administration.

Graphic elements are used in visualization projects for better illustration and more precise appearance. They can be divided into raster and vector graphics formats, i.e., bitmaps and vectors. The **Reliance** SCADA/HMI system supports raster pictures in the `PNG`, `BMP`, `JPEG`, and `GIF` formats as well as vector pictures in the `SVG`, `WMF`, and `EMF` formats.

Bitmaps are raster pictures with fixed resolution (size in pixels). However, if you change their size, deformations or loss of picture information occur. Vector pictures, on the other hand, are saved as mathematically defined curves and no quality loss occurs if the size is changed. In practice, bitmaps are used more often due to higher availability.

Bitmaps and vectors in **Reliance** are commonly called *pictures*. Every picture to be used in a visualization project must be first imported to the project via the *Picture Manager*. When importing pictures (using the *Add Pictures* and *Add Picture Folders* commands), these are copied to the appropriate folder in the project's directory structure.

The *Picture Manager* window consists of three panes and the toolbar. In addition to the [common toolbar commands](#), the toolbar contains the commands described below. The left pane is used to display imported pictures in a tree view (it is handled in the same way as other managers). The middle pane enables you to view the list of pictures contained in the corresponding folder. The right pane contains the properties of the selected picture (its function is the same as of other managers).



Add Pictures (Alt+A)

Brings up the *Select Picture* dialog box allowing you to import pictures from graphic files (`*.bmp`, `*.gif`, `*.jpg`, `*.png`, `*.wmf`, `*.emf`) to the picture database. One or more files can be selected at a time.



Add Picture Folders

Brings up the [Select Directory](#) dialog box allowing you to import picture folders. One or more folders can be selected at a time. Pictures can only be imported to a single level of the folder structure. Pictures contained in subfolders will not be imported. A new folder is created for all imported directories at the top level of the tree view.



Edit Picture

Is used to run an external picture editor associated with the corresponding file type (extension) to edit the picture. The editor can be defined via the [Environment Options](#) dialog box (*Picture Manager > Editors*). After editing the picture, it is necessary to refresh the list of pictures by choosing the *Refresh Pictures* command.



Refresh Pictures

Is used to load a picture from a disk file. It can be used, for example, after editing the picture in an external editor. The changes can be seen immediately after executing this command.



Replace Picture

Brings up the *Select Picture* dialog box. It allows you to replace the current picture with a new one.

[Common Object Properties](#)

The following properties are available in the right pane of the *Picture Manager* window.

Transparent color

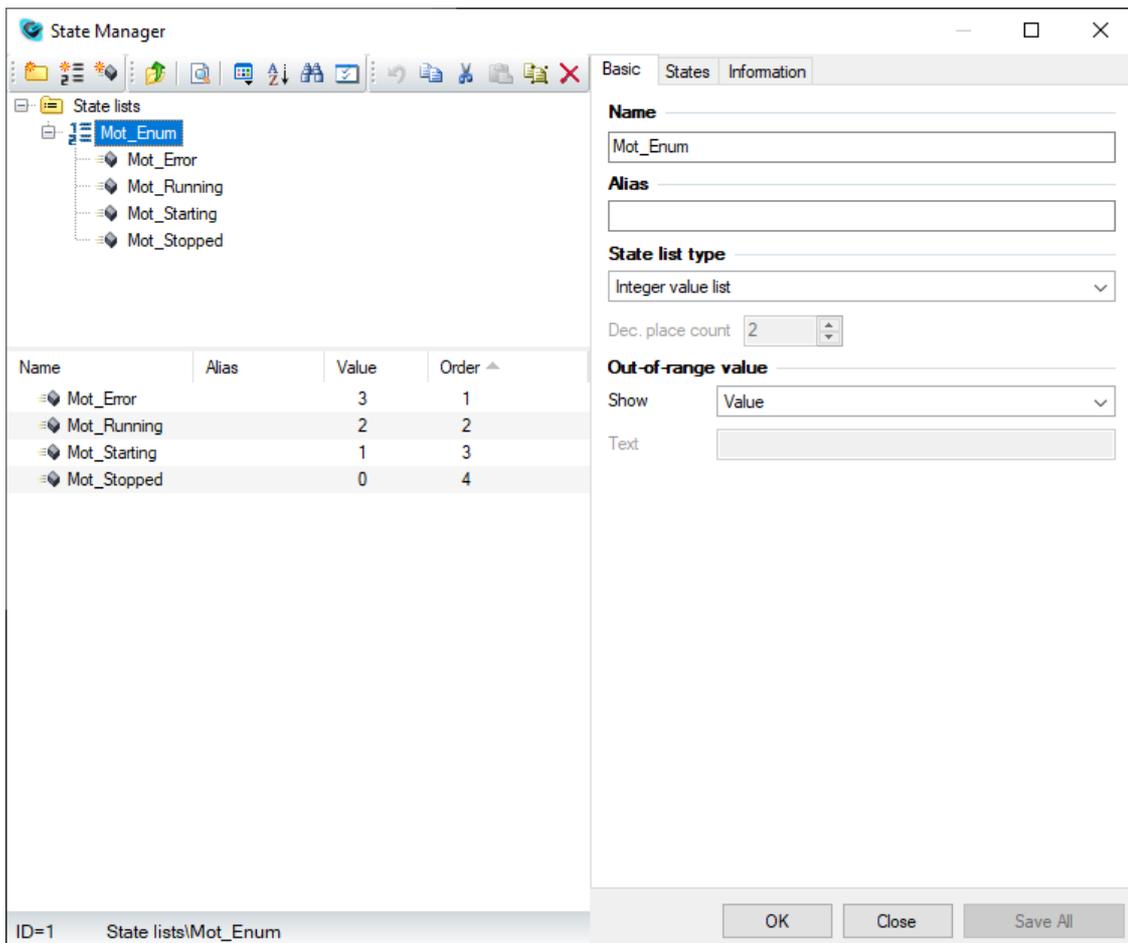
Allows you to choose a transparent color for the selected picture (i.e., the color will not be drawn). When you click the *Color* button, the [Select Color](#) dialog box is brought up. This dialog helps you select the desired transparent color using, for example, the *Pick Color* feature (*Capture*). This property is not active for bitmaps because they directly support transparent colors (PNG).

Use 24-bit color depth

Determines whether to convert the picture to 24-bit color depth for display purposes. In some cases, it can prevent transparent pictures from being wrongly displayed.

8.14 State Manager

The **State Manager** allows you to define and configure *state lists*. Each list contains an enumeration of values and the corresponding text.



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The *State Manager* window has the same layout as other managers (see the chapter [Managers](#)). In addition to the [common toolbar commands](#), the toolbar contains the *New State List*  and *New State*  commands.

[State List Properties](#)

[State Properties](#)

8.14.1 State List Properties

Common Object Properties

State list type

Allows you to choose the type of state list. The state list can be defined either as a list of values (*Integer value list*) or by choosing a value range (*Integer value range list* or *Floating-point value range list*).

Dec. place count

Specifies the number of decimal places (the option is active if the **State list type** is set to *Floating-point value range list*).

Out-of-range value

Specifies what will be shown in case the tag's value does not correspond to any of the defined states. You can choose from the following options: *Tag value*, *Nothing*, or *Specified text*.

Text

Specifies the text to be shown when the tag's value does not correspond to any of the defined states (the property is enabled if the *Show* property is set to *Specified text*).

States

Contains the list of all defined states. You are enabled to change the order of the states using the arrows above the list.

8.14.2 State Properties

Common Object Properties

For each state list type, a value range representing a state can be defined.

Value

Specifies the range of state values by selecting a value (the **State list type** must be set to *Integer value list*).

Range

Specifies the range of state values by using the *From value* and *To value* properties (the **State list type** must be set to *Integer value range list*). If the *Floating-point value range list* option is chosen, the range can be specified *Including limits*.

8.15 Action Manager

The **Action Manager** is a tool that is used to define and configure *actions*, i.e., objects describing specific commands. Actions are intended for executing predefined commands. Displaying trends, reports, or the *Log On User* dialog are examples of actions. Actions are related to various events, e.g., double-clicking a component (in such a case, the required action is defined on the *Scripts/Actions* page of the component's *Properties* dialog box).

The *Action Manager* window has the same layout as other managers (see the chapter [Managers](#)). In addition to the [common toolbar commands](#), the toolbar contains the *New Action*  command.

Common Object Properties

Keyboard shortcut

Specifies the keyboard shortcut that is to be used to execute the action. If the desired key (key combination) is not available, you can define it by typing the key as text directly in the box (e.g., Left, Right, Ctrl+Shift+Left).

Action type

Execute actions

Is used to execute the listed commands.

- *Languages*

Activate project language

Activates the selected project language.

Activate program language

Activates the selected program language.

Show list of project languages

Brings up the *Select Project Language* dialog box.

Show list of program languages

Brings up the *Select Program Language* dialog box.

- *Users*

Log on user

Brings up the *Log On User* dialog.

Log off user

Logs off the currently logged-on user.

Change user password

Brings up the dialog for changing the currently logged-on user's password.

Show logged-on user information

Displays information about the currently logged-on user.

- *Trends*

Show trend

Displays the selected trend in a separate window. The link to the trend can be either *Static* (direct) or *Dynamic* (indirect) – the name of the trend is specified by the value of the selected string-type tag. To display the selected trend in the runtime software's main window, the *Insert trend into runtime software's main window* option must be active.

Show tag trend

Displays the selected tag's values as a trend. The command is enabled only if the tag value is logged to a data table.

Show list of trends

Brings up the *Select Trend* dialog box.

- *Reports*

Show report

Displays the selected report. The link to the report can be either *Static* (direct) or *Dynamic* (indirect) – the name of the report is specified by the value of the selected string-type tag. To display the selected report in the runtime software's main window, the *Insert report into runtime software's main window* option must be active.

Show custom report

Displays the selected custom report. The link to the report can be either *Static* (direct) or *Dynamic* (indirect) – the name of the report is specified by the value of the selected string-type tag. To display the selected custom report in the runtime software's main window, the *Insert report into runtime software's main window* option must be active.

Show list of reports

Brings up the *Select Report* dialog box.

Show list of custom reports

Brings up the *Select Custom Report* dialog box.

Edit custom report

Opens the *FastReport Designer*. The command is enabled only if a custom report of type *FastReport* is selected. The link to the report can be either *Static* (direct) or *Dynamic* (indirect) – the name of the report is specified by the value of the selected string-type tag.

- *Alarms/Events*

Show current alarms/events

Displays the list of current alarms/events.

Show historical alarms/events

Displays the list of historical alarms/events.

Acknowledge all alarms/events

Acknowledges all unacknowledged alarms/events.

Select alarm/event groups

Brings up the *Select Alarm/Event Groups* dialog box and stores the names of the selected alarm/event groups in the defined tag.

Select alarm/event types

Brings up the *Select Alarm/Event Types* dialog box and stores the names of the selected alarm/event types in the defined tag.

- *Windows*

Activate window

Activates the selected visualization window. The link to the window can be either *Static* (direct) or *Dynamic* (indirect) – the name of the window is specified by the value of the selected string-type tag.

Activate previous window

Activates the most recently opened visualization window. It corresponds to the *Previous Window* command.

Activate next window

Activates the next visualization window. It corresponds to the *Next Window* command (after executing the *Previous Window* command).

Close window

Closes the active (visualization) window.

Show list of windows

Brings up the *Select Window* dialog box and activates the selected window.

Show records related to active window

Brings up the *Records Related to Window...* dialog window.

Show records related to all windows

Brings up the *Records Related to All Windows* dialog window.

Print main window

Allows you to print the runtime software's main window. Brings up the *Print* window that is used to configure the print settings and print the runtime software's main window.

Minimize main window

Minimizes the runtime software's main window.

- *Tags*

Set tag value

Allows you to set the value of the selected tag. The value can be set upon executing the action (using the *Enter Value* dialog), or at design-time (the *Write constant value* option).

Set tag limits

Brings up the *Enter Limits for Tag* window. The values of individual limits can be displayed only if they are defined by the tag. They can be entered only if the limits are dynamic (i.e., another tag is used to specify the limit value). The command can be disabled depending on the settings.

Update tag value

Adds a request for acquiring the real-time value of the selected tag to a queue of the connected device's communication driver.

Show information on tag

Brings up the *Information on Tag* window that displays, for example, the name, data type, and address of the selected tag.

Set tag value in multiple devices

Allows you, in the defined devices, to set the tag's value based on the specified name of the tag. The value can be set at design-time (the *Set constant value* option), upon executing the action using the *Enter Value* dialog box (the *Enter value at runtime* option), or according to the value of another tag (the *Set value from another tag* option).

The *Automatically write to all selected devices* option determines whether to disable (suppress) displaying the *Select Device* dialog box upon executing the action and automatically write a new value to all defined devices.

Copy tag value to Windows clipboard

Allows you to copy the value of the selected string-type tag to the Windows clipboard.

Paste from Windows clipboard to tag

Allows you to paste the contents of the Windows clipboard (text) into the value of the selected string-type tag.

- *Managers*

Show Trend Manager

Brings up the [Trend Manager](#).

Show Report Manager

Brings up the [Report Manager](#).

Show User Manager

Brings up the [User Manager](#).

Show Project Manager

Brings up the *Project Manager*. The *Project Manager* allows you to view the list of objects defined within the visualization project as well as their properties and diagnostic information.

- *Thin Clients*

Show Custom Trend dialog box

Displays the dialog box for managing (creating, editing, removing) custom trends. This action is only supported by the Web client.

Show Options dialog box

Displays the dialog box for setting up the thin client.

Connect to data server

Connects the thin client to the data server. This action is only supported by the Web client.

Disconnect from data server

Disconnects the thin client from the data server. This action is only supported by the Web client.

- *Other*

Run script

Runs the selected script. The *Parameter* property specifies the value passed to the script. The value can be obtained from the script's code using the `GetCurrentScriptData` function of the `RScr` object.

Run application

Runs an external application (program). You can specify the program directly (the `exe`, `com`, `bat`, and `cmd` extensions), the file associated with the program (`.doc`), the shortcut (`.lnk`, `.url`), the command prompt command, etc.

Select file

Brings up the *Select File* dialog box and stores the selected file's name in the defined tag.

Select directory

Brings up the *Select Directory* dialog box and stores the selected directory's name in the defined tag.

Select device

Brings up the *Select Device* dialog box and stores the selected device's name in the defined tag.

Select trend

Brings up the *Select Trend* dialog box and stores the selected trend's name in the defined tag.

Select real-time trend

Brings up the *Select Real-Time Trend* dialog box and stores the selected real-time trend's name in the defined tag.

Select report

Brings up the *Select Report* dialog box and stores the selected report's name in the defined tag.

Select custom report

Brings up the *Select Custom Report* dialog box and stores the selected custom report's name in the defined tag.

Select window

Brings up the *Select Window* dialog box and stores the selected window's name in the defined tag.

Terminate program

Terminates the operation of the runtime software.

Show picture

Displays the specified picture in a separate window. You can choose the picture defined via the *Picture Manager* or from a disk file. The picture can be *Maximized* within the runtime software's window. You can also display the window's *Title* and the *Close* button.

Show Recipe Editor

Brings up the *Recipe Editor*.

Show Postmort Record Player

Brings up the *Postmort Record Player* if any records are available. It puts the runtime software in the mode for playing Postmort records.

www link

Brings up a window with a built-in Web browser (Internet Explorer) in the runtime software's main window. However, the toolbar and other controls are not displayed on the selected address. If the address is an Internet address without a protocol, the `HTTP` protocol is used automatically. Other protocols, such as `https`, `file`, or `ftp`, can also be used. The *Title* property allows the specified title to be displayed in the browser window's title bar. The Web browser can be displayed on top if needed (activate the *Stay on top* option). You can also use the operating system's *Default Web browser* instead of the built-in browser.

Show virtual keyboard

Brings up the *Virtual Keyboard* dialog window.

Show system information

Brings up the *System Information* dialog window. The window contains basic information on the system, connected devices, data tables, and network connections.

Show server Web page

Brings up the data server's Web page in the default browser.

Play sound

Plays the selected sound file (a file with a .wav extension). The sound file must be located in the <Project>\Main\MMedia directory.

Show application help contents

Brings up the application (program) help contents.

Show application's About box

Brings up the *About box* containing information on the application (program).

Security

Require confirmation

Determines whether to display a confirmation dialog box prior to executing the action by the user.

8.16 Script Manager

The **Script Manager** is a tool that is used to define and configure scripts.

In the **Reliance** SCADA/HMI system, it is possible to configure most of the properties and behavior of the runtime environment by setting visualization project options and the properties of individual components directly in the graphical user interface (GUI). For special actions that cannot be realized this way, **Reliance** is equipped with a possibility to write pieces of program code in the *VBScript* language – the so-called scripts.

VBScript allows scripts to perform various calculations, work with strings and logical operators, and use conditions and cycles. The **CreateObject** function allows, for example, working with files and directories or communicating with external programs (e.g., MS Word or MS Excel) through a COM/DCOM-based interface.

VBScript is extended with a number of **Reliance**-defined objects that are used to access tags, read/write data from/to data tables, acknowledge alarms/events, send e-mail or text messages, etc. **Reliance**-defined objects are described in detail in the [Scripts](#) manual.

The *Script Manager* window consists of a main *menu*, *toolbar*, and *pane for editing* individual scripts' codes. In addition, the following panes are available: *Scripts*, *Code Templates*, *Properties*, and *Outputs*. The panes can be switched on and off as needed.

The *Script Manager* also provides some advanced functions – macros and script checking – which are accessible from the menu and the toolbar.

[Toolbar](#)

[Code Edit Window](#)

[Code Templates](#)

[Object Properties](#)

[Macro Usage](#)

[Script Check](#)

[Script Debugging](#)

[Source Block Tools](#)

8.16.1 Toolbar

In addition to the [common toolbar commands](#), the toolbar contains the following commands:

**New Script**

Creates a new script.

**Save All**

Saves all changes made to edited scripts.

**Print**

Allows you to print the active script

**Close**

Terminates the *Script Manager*.

**Find in Scripts**

Brings up the *Find Text* dialog that is used to search in multiple scripts at a time. The following *Search* options are available: *All scripts in project*, *Open scripts*, *Edited scripts*.

**Find Next**

Is used to search for another occurrence of the desired text string.

**Replace**

Brings up the *Replace Text* dialog that is used to replace the desired text string in the specified script (scripts).

**Check Scripts**

Checks the scripts (parameters and syntax) defined in the project. See the chapter [Script Check](#).

**Run Project**

Runs the runtime software without closing the *Script Manager* window. Any changes made to the scripts are automatically saved before the project is started.



Insert Parameter

Allows you to insert the name of an object defined in the project (e.g., device, tag) or the name of a selected file or directory in the place where the cursor is positioned.

Macro commands

The following commands are available: *Record Macro* , *Pause Recording Macro* , *Stop Recording Macro* , *Replay Macro* . See [Macros](#).



Help Contents

Brings up the *Scripts* manual that describes the basic *VBScript* functions and procedures and contains detailed information on **Reliance**-defined objects.

Note: The toolbar commands can also be accessed via the main menu. In addition to the toolbar commands, the main menu contains the following commands: *Duplicate*, *Delete*, *Select All* (*Edit* menu), *Control Characters* (*View* menu), and [Options](#) (*Tools* menu).

8.16.2 Code Edit Window

The pane in the middle of the *Script Manager* window is intended for editing scripts (creating their codes). *VBScript* keywords are displayed in bold characters, strings in quotes and comments are different in color. Several smart and very useful features simplify writing scripts' code in the editor. Here are the most important ones: code completion (Ctrl+Space), automatic supplement of function and procedure parameters, display of function parameters (Ctrl+Shift+Space), and highlighting pairs of parentheses.

8.16.3 Code Templates

If a specific construction is often used in scripts, it may be beneficial to save it as the so-called template. Templates simplify and speed up scripts' code. Thanks to the possibility to format text strings, they also make scripts clearer. The templates contained in the *Code Templates* pane are divided into the following three groups:

VBScript

VBScript functions, operators, and keywords.

Reliance-defined Objects

Methods and properties of objects for working with a visualization project.

User-defined Templates

Predefined templates with the possibility to be edited and to add new templates.

Each user-defined template is specified by its name and source code and, optionally, by its description and shortcut. If a shortcut is defined, you just need to write this shortcut when writing a script's code, press Ctrl+J, and the shortcut will then be replaced with the respective template's source code. If a text string corresponding to the shortcut of some of the user-defined templates is not inserted before the cursor when pressing Ctrl+J, all available templates are displayed.

When editing a user-defined template's source code, the "|" sign can help you determine where to position the cursor after the template's source code is added to the script's code. If this is not specified, the cursor is positioned at the beginning of the line after the code inserted via the template.

8.16.4 Script Properties

There are several types of scripts available that differ in terms of execution. The type of a script can be specified by the *Type* property that is located on the *Basic* page in the *Properties* pane.

Common Object Properties

Basic

General properties

Type

Specifies the type of the selected script, i.e., the way the script gets executed. Scripts can be of the following types: *Time*, *Event*, *Key*, *Data change*, *Condition*, or *Periodic*.

Enable execution

Determines whether to enable executing the script upon project startup. However, the script can be repeatedly disabled or enabled at runtime by calling the `DisableScript` and `EnableScript` methods of the `RScr` object. This property is active by default. It must not be active, for example, for periodic scripts that are to be executed during runtime under certain conditions.

Enable running from thin clients

Determines whether to enable executing the script from the thin clients (*Reliance Web Client*, *Reliance Smart Client*). The thin clients cannot process scripts. However, they can execute them at the server side. For example, if a *Button* component is connected to a script that has this property configured as active, the script gets executed at the server side after clicking on the component in the Web client. From the thin clients, it makes no sense to execute scripts that work with the visualization project's user interface. For example, if a script is used to activate a visualization window (by calling the `ActivateWindow` method of the `RSys` object), the window is always activated on the server computer, not on the client computer.

Enable running from embedded Web browser

Determines whether to enable executing the script by the *external.ExecScript* function from a page in an embedded Web browser.

Security

Require confirmation

Determines whether to display a confirmation dialog box prior to executing the script by the user.

Advanced

Thread

Specifies the thread of execution in which the script is to be processed. The thread names can be changed via the *Project Options* dialog ([Scripts > Threads](#)).

Run on thread initialization

If this option is active, the script is executed at thread startup even if the conditions for executing the script are not met. The script can be executed at project startup or when terminating and restarting the thread, i.e., in case the *Max. execution time* for the script has been exceeded (see the next property).

Terminate after exceeding max. execution time

Max. execution time

Specifies the maximum execution time for the script. If the time is exceeded, the thread is restarted (i.e., the script is forcibly terminated).

Priority

Affects the order of processing scripts. The scripts with a higher value of this property are processed earlier. For example, if scripts with a lower value of this property are waiting in a queue, the script with higher priority is given preference (i.e., this script is executed right after the currently executed script is processed). The scripts related to user actions (e.g., clicking on a component) are sorted in a special queue and given preference to other scripts.

Logging

Log execution

Determines whether to record information on the script's execution. It allows you to find out whether the script has been executed and processed successfully. Logging is only functional if the *Log debug information* option in the [Project Options](#) dialog is also active. The log files are contained in the [Logs](#) directory.

▼ Time Script

Time scripts get executed daily at the specified time with the possibility of periodic repetition at the specified time interval. The time of execution is derived from the current time of the computer.

Time script properties

Execute every day at (hh:mm:ss)

Specifies the time of the first execution of the script within a day.

Execution options

Execute repeatedly

Determines whether to execute the script repeatedly at the specified *Repeat interval* within the time specified by the *Execute every day at* and *Repeat end* properties.

▼ Event Script

Event scripts are related to various events, such as pressing a button, opening a window, project startup, or a failure in communication with a device.

There are no special execution properties available because these scripts can be executed when clicking or double-clicking individual mouse buttons on the respective component (object). The required script can be specified, for example, on the *Scripts/Actions* page of the component's *Properties* dialog box.

▼ Key Script

Key scripts get executed when the specified keyboard shortcut is pressed.

Key script properties

Execute on pressing keys

Specifies the keyboard shortcut that is to be used to execute the script. If the desired key (key combination) is not available, you can define it by typing the key as text directly in the box (e.g., Left, Right, Ctrl+Shift+Left).

▼ Data Change Script

Data change scripts get executed when the specified tag changes its value or quality (validity). They also get executed always at project startup (in case they are not disabled) or when enabling them.

Data change script properties

Execute on change in data value of tag

Specifies the link to the tag whose value is to be used to execute the script when changed.

Execute even when data becomes valid

Determines whether to execute the script even when the tag quality becomes valid (although the tag's value remains unchanged).

▼ Condition Script

Condition scripts get executed when the specified logical condition is met (periodic repetition at the specified time interval is also possible).

Condition script properties

Compare tag value with

Determines whether to compare the value of the control tag with the value of a *Constant* or with *Another tag's* value.

Condition

Tag

Specifies the link to the control tag whose value is to be compared with the value of a constant or another tag (specified by the *Compare with* property).

Condition

Specifies the logical condition that is to be used to execute the script. You can choose from the following options: less-than sign, greater-than sign, equal-to sign, or not-equal-to sign (<, >, =, or <>).

Compare with

Specifies the constant or link to another tag whose value is to be used for comparison.

Execution options

Execute repeatedly

Determines whether to execute the script repeatedly at the specified *Repeat interval* if the specified logical condition is met.

▼ Periodic Script

Periodic scripts get executed periodically at the specified time interval immediately after project startup. The interval of execution is independent of the computer time.

Periodic script properties

Repeat interval (hh:mm:ss:fff)

Specifies the time interval at which the script is to be executed periodically.

First time execute only after specified interval

If this option is active, the script gets executed for the first time only after the expiration of the specified time interval. Otherwise, the script gets executed for the first time right after project startup.

8.16.5 Macro Usage

When writing scripts' code, macros are very useful. A macro is a sequence of edit operations that can be performed by choosing a single command named *Replay Macro* (Ctrl+Shift+P).

Edit operations can be, for example, typing, deleting, selecting, copying, or inserting a text string. To save a sequence of operations as a macro, choose the *Record Macro* command (Ctrl+Shift+R), perform this sequence in the window for editing scripts' code, and choose the *Stop Recording Macro* (Ctrl+Shift+R).

8.16.6 Script Check

The *Script Manager* allows the author of the visualization project to check scripts' code syntax and parameters. Any errors, warnings, and messages are displayed in the **Outputs** pane.

When checking parameters, any unspecified or invalid link to a tag will be detected for a script of type *Data change*.

Syntax checking applies to *VBScript* only (e.g., syntax of the following statements: `If`, `For`, `Select Case`). Therefore, it cannot detect, for example, a wrong count or argument values when calling the `RTag.GetValue` method.

You can also check any subset of scripts: *Active Script*, *Open Scripts*, *Edited Scripts*, *Whole Project*.

8.16.7 Script Debugging

The **Reliance** SCADA/HMI system allows debugging scripts via an external debugger. For this purpose, any *Just-In-Time* debugger must be installed. In addition, script debugging must be enabled through the *Environment Options* dialog box (*Tools > Environment Options > Script Debugging*).

For ordinary purposes, the *Microsoft Script Debugger* can be used. It can be freely downloaded from the Internet (`sacd10en.exe`). You can also use the *Microsoft Visual Studio Debugger* that offers some more advanced features (*Microsoft Visual Studio Express* is a freeware product that can be used for non-commercial purposes only). Both tools can be installed simultaneously. You can decide which one to use right before the debugging process itself.

If script debugging is enabled and the debugger installed, the script debugger will be brought up automatically when any of the following events occurs:

- When an error occurs in scripts.
- When *VBScript*'s `stop` statement is used in a script.

Once the debugger is started, you can start debugging the script that have caused the event.

Note: If the *Enable script debugging with external tool* option is active, other programs on your computer may be affected. Thus, the debugger can be started not only from the **Reliance** SCADA/HMI system, but also from other programs. When debugging scripts, processing all scripts in a thread is paused. It is therefore strongly recommended to disable debugging scripts when operating **Reliance** at the end-user site (in a production environment). The user is periodically notified via system messages whether script debugging is enabled.

8.16.8 Source Block Tools

Source Block Tools are a powerful set of tools for editing scripts in the **Reliance** SCADA/HMI system. They can be used for working with a selected block of text (code) and are accessible from the editor's popup menu or after clicking on the icon displayed in the place of the line numbers.

Insert

Contains commands for inserting various **Reliance's** objects. When you invoke a command, a standard selection dialog box is displayed. It also contains commands for selecting disk files, colors, etc.

Edit

Contains commands for copying, cutting, duplicating, deleting, and saving blocks of code to an external file. It also contains the following commands:

Copy & Append

Copies the selected block of code to the clipboard whose existing contents remain unchanged.

Cut & Append

Cuts the selected block of code and appends it to the clipboard whose existing contents remain unchanged.

Format

Allows you to configure the appearance of the code by inserting spaces.

Indent

Indents the selected block of code to the right by inserting two spaces.

Indent Columns

Indents the selected block of code to the right by inserting any number of spaces.

Unindent

Removes the indent by deleting two spaces at the beginning of each line in the selected block of code.

Unindent Columns

Removes the indent by deleting any number of spaces.

Convert Case

Allows you to convert the characters of the selected block of code to uppercase or lowercase letters.

Comment

Comment Code

Adds a comment (apostrophe) to the beginning of each line in the selected block of code. The character can be inserted repeatedly.

Uncomment Code

Removes the comment (apostrophe).

Toggle

Inverts the comments.

Surround With

Allows you to add the code defined in the specified template before and after the selected block of code. Other templates can be defined via the [Environment Options](#) > *Script Manager* > *Surround With* dialog that is accessible from the popup menu by choosing the *Editor Options* command.

Search the Web

Allows you to search for the selected text through the specified search engine. Other search engines can be defined via the [Environment Options](#) > *Script Manager* > *Web Search* dialog that is accessible from the popup menu by choosing the *Editor Options* command.

Other

Convert to String

Converts the selected text to text of type *String*, which means the text is surrounded with quotes and special strings are added in case the selected text stretches over multiple lines.

Delete Blank Lines

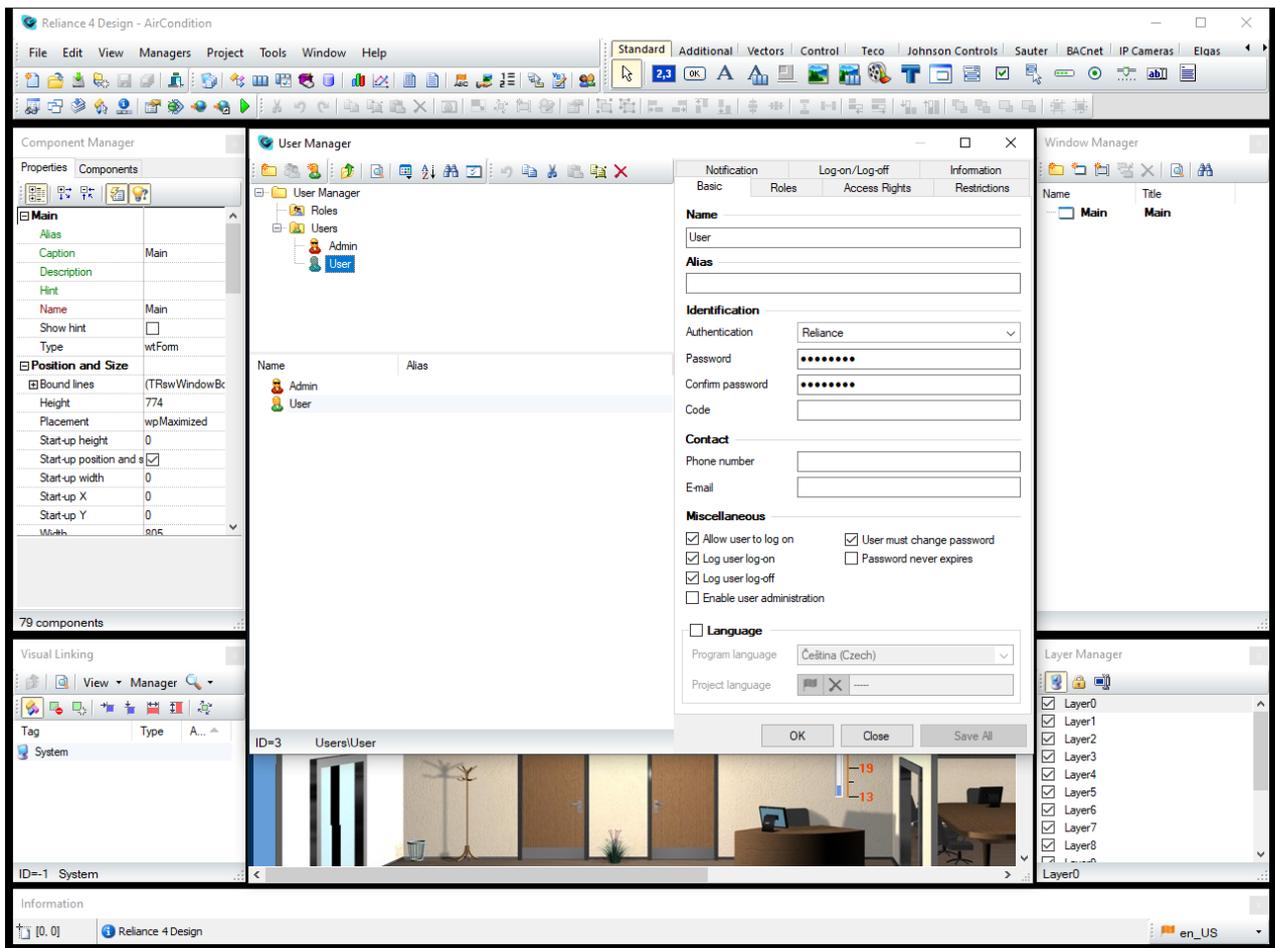
Removes all blank lines from the selected block of code.

Sort Selected Lines

Sorts the selected lines in alphabetical order. A comment added to the beginning of any of the selected lines does not affect the sorting.

8.17 User Manager

The **User Manager** allows you to define and configure users. In the context of **Reliance**, a *user* is an object representing an end user (usually operator) allowed to log on to the program.



Reliance 4 – User Manager

The *User Manager* window has the same layout as other managers (see the chapter [Managers](#)). In addition to the [common toolbar commands](#), the toolbar contains the *New User*  command.

The options of the *User Manager* at runtime and design-time are identical. After a new user is added, you have to select the computer(s) to which the trend should be connected.

Common Object Properties

User Properties

User Access Rights

Access Restrictions

8.17.1 Basic

Note: The name is entered by the user when logging on to the program.

Identification

Authentication

Specifies the user's authentication method. To verify the user's identity, you can use either project-defined data (the *Reliance* option) or Windows data (the *Windows* option).

Password

Specifies the password that is entered by the user when logging on to the program. It is *case-sensitive*.

Confirm password

Must have the same value as the *Password* property.

Domain

Specifies the Windows user's domain.

Windows user

Specifies the user's name used for his/her identification in Windows.

Code

Specifies the code assigned to the user if logging on by a hardware code sensor is used. Otherwise, the value is ignored. For more information, see the chapter *Logging on/off using a hardware code reader* in the *Runtime Software* manual.

Contact

A *Phone number* and *E-mail* can be specified.

Miscellaneous

Allow user to log on

Determines whether the user's account is active. It allows you to temporarily enable or disable the user to log on to the program.

Log user log-on

Determines whether to log the information about logging the user on to the program to the alarm/event database.

Log user log-off

Determines whether to log the information about logging the user off of the program to the alarm/event database.

User administrator

Determines whether to allow the user to administer users at runtime. If the property is active, the user can add new users and modify or delete existing users via the *User Manager*.

Language

Program language

Allows you to specify the language of the GUI, which is to be set after the user logs on (labels in menus, toolbars, etc.).

Project language

Allows you to specify the language of project-defined text strings, which is to be set after the user logs on (labels of components in visualization windows, alarm/event text strings, etc.).

8.17.2 Access Rights

These properties specify the user's access rights to the program. For example, if the *Control process right* is required for switching on a pump by a *Button* component, it can only be done by a user(s) who has been assigned this access right.

Servicing right

Determines whether the user has a special right that ensures the user cannot be modified or deleted at runtime via the *User Manager* by a user administrator that has not been assigned the *Servicing right*. This right can only be activated through this property in the development environment. This feature enables **Reliance** systems integrators to secure certain parts of the application from other users.

Check All

Is used to select all the rights on the list.

Uncheck All

Is used to unselect all the rights on the list.

Edit...

Is used to bring up the *Project Options* dialog box to rename the rights. This command can only be executed at design-time.

8.17.3 Restrictions

These properties determine the access restrictions applied when the user logs on to the program. After logging the user off of the program, the default restrictions configured for the computer are restored.

Disable 'Start' menu

Determines whether to disable using the Windows *Start* menu.

Hide task bar

Determines whether to hide the Windows task bar.

Hide icons on desktop

Determines whether to hide icons on the Windows desktop.

Disable minimizing main window

Determines whether to disable minimizing the main window of the runtime software.

Disable moving main window

Determines whether to disable moving the main window of the runtime software.

Disable resizing main window

Determines whether to disable resizing the main window of the runtime software.

Disable closing main window

Determines whether to disable closing the main window of the runtime software using the *Close* command from the system menu and the corresponding icon on the title bar. This options does not affect the *File > Exit* command.

Disable printing alarms/events, trends, reports...

Determines whether to disable printing alarms/events, trends, and reports at runtime.

Disable customizing trends

Determines whether to disable the commands for changing, loading, and saving the settings in the trend viewer at runtime.

Disable customizing reports

Determines whether to disable the commands for changing, loading, and saving the settings in the report viewer at runtime.

Disable Trend Manager

Determines whether to disable the *Trend Manager* command at runtime.

Disable Report Manager

Determines whether to disable the *Report Manager* command at runtime.

Disable Project Manager

Determines whether to disable the *Project Manager* command at runtime.

Disable entering tag values in Project Manager

To be added.

Disable Postmort Record Player

Determines whether to disable the *Postmort Record Player* command at runtime.

8.17.4 Notification

Alarm/event notifications

Notify via E-mail

Determines whether to notify the user of alarms/events via an email message.

Notify via SMS

Determines whether to notify the user of alarms/events via a text message.

Alarm/event groups

Enumerates the groups of alarms/events that the user should be notified of. The user will be notified of an alarm/event only if the enumeration of the groups selected for the alarm/event is a subset of the enumeration of the groups selected for the user.

Example 1:

An alarm belongs to groups A, B.

The user belongs to groups A, B, C.

The user will be notified of the alarm.

Example 2:

An alarm belongs to groups A, B, C.

The user belongs to groups A, B.

The user will not be notified of the alarm.

8.17.5 Log-on/Log-off

On log on user

Run script

Allows for specifying the script to be executed after the user logs on. You can pass a numerical parameter to the script (the parameter is accessible using the `RScr.GetCurrentScriptDataEx` function).

Execute action

Allows for specifying the action to be executed after the user logs on.

On log off user*Run script*

Allows for specifying the script to be executed after the user logs off. You can pass a numerical parameter to the script (the parameter is accessible using the `RScr.GetCurrentScriptDataEx` function).

Execute action

Allows for specifying the action to be executed after the user logs off.

8.18 Project Structure Manager

The **Project Structure Manager** is a tool designed to define the structure of an entire visualization project. It enables you to define the structure consisting of *control areas*, *computers*, *server connections*, *devices*, *data tables*, *users* and other objects so that it corresponds to a real plant site. To make the objects accessible to a computer, they must be connected to the computer. The manager is also used to configure the properties of individual computers (*Initial window*, *Restrictions*, *Update*, etc.).

The *Project Structure Manager* window has the same layout as other managers (see the chapter [Managers](#)). In addition to the [common toolbar commands](#), the toolbar contains the following commands: *New Object*  (an object can be a control area, computer, communication channel, printer, modem, server connection group, or server connection depending on the selection in the tree view), *Connect Objects*  (the type of object depends on the selection in the tree view), and *Connect Multiple Objects*  (connects selected objects, such as data tables, to multiple computers at a time).

[Control Area](#)

[Computer Properties](#)

[Connecting and Defining Devices](#)

[Communication Channel Properties](#)

[Connecting Data Tables](#)

To connect a *trend*, *report*, *custom report*, *recipe*, *script*, *user*, and *communication driver*, choose the *Connect Objects* or *Connect Multiple Objects* commands from the toolbar or the corresponding command from the popup menu. The *Project Structure Manager* does not allow you to configure the properties of these objects. To do so, use the corresponding manager.

[Defining Printers for Printing Alarms/Events](#)

[Defining Modems](#)

[Server Connections and Their Groups](#)

8.18.1 Control Area

In the context of **Reliance**, a **control area** is an independent unit representing a separate locality where a single or multiple computers designed for running the visualization project

are located. It contains the [common object properties](#). Computers can be defined within a control area.

8.18.2 Computer Properties

In the context of Reliance, a **computer**, also referred to as logical computer, is an object representing the actual computer on which the visualization project will be running at the end-user site. To make the orientation in the visualization project easier, it is recommended that computers grouped in a single workplace be defined within a single control area.

[Basic](#)

[Redundancy](#)

[Display](#)

[Screen](#)

[Alarms/Events](#)

[Notification](#)

[Log-on/Log-off](#)

[Restrictions](#)

[E-mail](#)

[SMS](#)

[Maatrix](#)

[Postmort](#)

[Update](#)

[Web](#)

[Other](#)

8.18.2.1 Basic

[Common Object Properties](#)

Identification on network

Address

Specifies the actual computer's IP address or name within the computer network. If possible, use fixed IP addresses.

Hardware configuration

Can be used to specify the computer's hardware configuration.

Language

Program language

Specifies the program language to be used after starting the visualization project on the actual computer (runtime software's language).

Project language

Specifies the project language to be used after starting the visualization project on the actual computer.

8.18.2.2 Redundancy

The properties on this page allow you to activate and configure data server (*Reliance Control Server* and *Reliance Server*) redundancy. The aim of redundancy is to allow the project's most important computers to operate in hot standby mode. Usually, the data server providing communication with devices (e.g., PLC), logging historical data and alarms/events to databases, providing data to clients, or performing other important functions runs on these computers. For each important computer in the project (hereinafter referred to as *primary server*), a *secondary server* can be added. A data server with the same project version must be running on both computers. Each of the servers has its own copy of databases intended for logging historical data and alarms/events.

Only the server that has the active role (the server that is active) provides the following functions: communication with devices, historical data acquisition, alarm/event generation, sending alarm/event information via e-mail and/or SMS.

Under normal circumstances (i.e., if both servers are running and connected with each other), the primary server has the active role. The secondary server has the standby role, i.e., it does not communicate directly with devices, all data (current and historical) and alarms/events are acquired from the primary server (it acts as a client towards the primary server). As a result, the time stamps of data and alarms/events on both servers are identical.

In the event of a primary server failure, the secondary server will assume the active role. It will thus start communicating directly with devices, generating alarms/events, and acquiring historical data. Once the connection with the primary server is reestablished, the secondary server will again assume the standby role and the servers will start synchronizing with each other. When the synchronization of current data and alarms/events is completed, the primary server assumes the active role again. After that, historical data (data tables) is synchronized.

Synchronization means data exchange between the servers in a way as to supplement the databases with the missing data and make the latest data available to both servers. The same applies to alarms/events. Specifically, when the operation of the primary server is restored after a previous failure, the primary server's databases are supplemented with the missing data and alarms/events. Synchronization is performed automatically each time the connection between the servers is established (for example, a failure in communication between the servers may have occurred or the project may have been restarted in the primary or secondary server due to maintenance reasons, i.e., not necessarily emergency reasons).

Historical data is synchronized for individual data tables in a step-by-step manner. Data acquisition (most frequently by current data sampling) for a data table is enabled as soon as the synchronization of this data table is completed. This means data for the data table is acquired independently of the completion of the synchronization of all data tables.

Secondary server

Determines whether this computer should be used as a secondary server for the selected primary server (see below) and allows you to switch on/off data server redundancy. For running the project on this computer, *Reliance Control Server* or *Reliance Server* must be used. On the respective physical computer, a license key with the same number of points and the same licenses (e.g., for communication drivers) as on the primary server must be available.

Once you activate and save the *Secondary server* option, this computer's child folders are hidden in the object tree view. The reason is the list and properties of all connected objects (devices, data tables, etc.) are adopted from the primary server. This makes them identical.

The property pages and controls corresponding to secondary server properties adopted from the primary server will also be hidden. See the *Adopt primary server properties* option below.

Primary server

Specifies the project computer to be used as the primary server. For running the project on this computer, *Reliance Control Server* or *Reliance Server* must be used. There can be any number of primary server – secondary server pairs defined within the project.

For mutual communication between the primary server and the secondary server, you don't have to define any server connection. It is created automatically at project startup. If you define such a server connection, it will be ignored.

Alternative primary server address

Allows you to use an address other than the one specified by the primary server computer's *Address* property. It is useful, for example, when there are two different server addresses used for access from an inside and outside network.

Adopt primary server properties

Determines whether the secondary server should adopt the properties of the primary server and allows you to select computer property groups to be adopted. When this option is saved, the property pages and controls corresponding to secondary server properties adopted from the primary server will be hidden. This makes them identical. It is recommended that you adopt as many primary server properties as possible, if there is no reason to configure them for the secondary server in another way.

Run script when

Servers connect

Determines whether to execute the specified script when the connection between the data servers is established. This script will run in both data servers.

Servers disconnect

Determines whether to execute the specified script when the connection between the data servers is interrupted. This script will run in both data servers.

Server role changes (active/standby)

Determines whether to execute the specified script when the server role changes (active/standby). This script will run in both data servers. It can be used, for example, for storing information about the current server role in a tag defined within the *System* device (in this case, it cannot be in another device). This information can be retrieved in the script by calling the `RSys.IsActiveServer` method. In the script, you can also find out whether it is executed in the primary server (by calling the `RSys.IsPrimaryServer` method), or in the secondary server (by calling the `RSys.IsSecondaryServer` method).

Transition to active role

The following options affect how quickly the server assumes the active role (after running the project, when the primary server becomes unavailable, etc.):

Connection timeout

This property is used in both the primary server and the secondary server. It specifies the maximum time period to be available for establishing the connection between the data servers (after running the project or loss of connection). If the connection is not established within the specified time period, the server assumes the active role. Hypothetically, if both servers were running, but the connection between them was blocked (e.g., by a firewall), both servers would assume the active role. Such a situation is obviously undesirable. For proper operation, it is of the essence that connection between the servers be always available.

Alarm/event synchronization timeout

This property is only used in the primary server. It specifies the maximum time period to be available for the synchronization of alarms/events (after the connection between the servers is established). If the synchronization of alarms/events is not completed within the specified time period, the server assumes the active role.

Data table synchronization timeout

This property is only used in the primary server. It specifies the maximum time period to be available for the synchronization of data tables (after the connection between the servers is established). If the synchronization of only some data tables is completed within the specified time period, the primary server allows the remaining data tables to acquire data (most frequently by current data sampling).

Primary server response timeout

This property is only used in the secondary server. It specifies the maximum time period for the primary server to start responding (from the moment the secondary server detects the primary server is not responding). It is the situation when the servers are still connected (without any interruption). Most likely, this is caused by the primary server being engaged in another activity (perhaps in processing a request from the secondary server). Despite the fact it is not responding, it is probably still performing functions running in the background, such as communicating with devices (e.g., a PLC) and logging historical data to databases. If the primary server does not start responding within the specified time period, the secondary server assumes the active role. If the primary server later starts to respond, it will again assume the active role and the servers will get synchronized.

Max. server connection loss count during synchronization

This property is only used in the primary server. If the primary server loses the connection with the secondary server during the synchronization (more than x times, where x is the value of this property), it assumes the active role without the synchronization being completed.

Other

Servers use same alarm/event table

Determines whether the data servers use the same alarm/event table. If this option is active, alarms/events are logged to the table by the active server only. If that is the case, the data servers needn't synchronize historical alarms/events. The same alarm/event table can be used only if the alarm/event database type is set to SQL.

8.18.2.3 Display

Windows

Initial window

Specifies the visualization window to appear as the first window after starting the visualization project on the computer.

Save window position and size

Determines whether to save the position and size of visualization windows within the runtime software's main window. The position and size are common to all users of the actual computer. The values are stored in a file in the `<Project>\Settings\Desktop` directory. The file is named `PC_N.ini`, where N represents the computer ID in a decimal format (e.g., `PC_1.ini`).

Disabled windows

Specifies a list of visualization windows that should not be accessible to the user at runtime.

Show event log while starting/terminating project

Determines whether to display the *System Information* window that lists the operations being performed while starting and terminating the project.

Show toolbar

Allows you to display/hide the standard toolbar in the runtime software's main window.

Show main menu bar

Allows you to display/hide the menu bar in the runtime software's main window.

Show title bar

Allows you to display/hide the title bar in the runtime software's main window.

Show window border

Allows you to display/hide the border of the runtime software's main window.

Show virtual keyboard for editing

Allows you to use the virtual keyboard on the actual computer.

Keyboard size

Specifies the size of the virtual keyboard.

Show automatically

Determines whether to automatically display the virtual keyboard if the keyboard is required to be used at runtime (e.g., when entering a user name and password).

Position automatically

Determines whether to automatically position the virtual keyboard below the dialog that requires using the virtual keyboard.

8.18.2.4 Screen**Resolution**

To be added.

Main window position and size

To be added.

Custom position and size

To be added.

Multiple monitors

To be added.

Monitor count next to each other

To be added.

Monitor count above each other

To be added.

Visualization windows

To be added.

Alarms/Events

To be added.

Trends

To be added.

Reports

To be added.

Monitor layout diagram

To be added.

8.18.2.5 Alarms/Events**Alarm/event database***Database type*

To be added.

Table name

To be added.

Directory

Specifies the directory for storing the alarm/event database. The default value of the property is `$(HistoryAlarmsEvents)\`, which is the so-called relative path representing the `<Project>\History\AlarmsEvents\` directory. The advantage of using the relative path is that you can move the visualization project to another place on disk without the necessity of customizing the path (the path is relative to the project directory).

SQL connection

To be added.

Log alarm/event text

To be added.

Project language

To be added.

Current alarms/events

Show alarm/event panel

Determines whether to display the alarm/event panel at the bottom of the runtime software's main window when an alarm/event is generated. The panel contains information on the alarm/event.

Auto-hide panel after all alarms/events acknowledged

Determines whether to automatically hide the alarm/event panel after acknowledging all current alarms/events.

Show device name

Determines whether the alarm/event panel should display the name of the device to which the currently displayed alarm/event belongs.

Show current alarms/events on start alarm/event

Determines whether to automatically display the list of current alarms/events when an alarm/event is generated. The list is shown only if the alarm/event's *Show current alarms/events* option is active. If you want to prevent the list of current alarms/events from being accessed by an operator who is not responsible for dealing with errors, do not activate this property.

Play alarm/event sounds

Determines whether to play all sounds related to alarms/events. They are sounds triggered by alarms/events' start and end and by an active alarm/event.

Alarm/event text font

To be added.

8.18.2.6 Notification

Alarm/event notifications

Notify via E-mail

Determines whether the runtime software running on the computer should notify of alarms/events via an email message.

Notify via SMS

Determines whether the runtime software running on the computer should notify of alarms/events via a text message.

Run script

To be added.

On start

Determines whether the runtime software should send the specified message to notify of alarm/event start.

On end

Determines whether the runtime software should send the specified message to notify of alarm/event end.

On acknowledge

Determines whether the runtime software should send the specified message to notify of alarm/event acknowledgment.

Note: The text string can contain special characters that will be replaced with a respective value during runtime. The characters are case-insensitive.

8.18.2.7 Log-on/Log-off

On log on user

Run script

Allows for specifying the script to be executed after the user logs on. You can pass a numerical parameter to the script (the parameter is accessible using the `RScr.GetCurrentScriptDataEx` function).

Execute action

Allows for specifying the action to be executed after the user logs on.

Play sound

Allows for specifying the sound to be played after the user logs on.

On log off user

Run script

Allows for specifying the script to be executed after the user logs off. You can pass a numerical parameter to the script (the parameter is accessible using the `RScr.GetCurrentScriptDataEx` function).

Execute action

Allows for specifying the action to be executed after the user logs off.

Play sound

Allows for specifying the sound to be played after the user logs off.

Automatically log on user

Determines whether to enable the user to automatically log on to the program.

Log on by HW code sensor

Determines whether to enable the user to log on to the program using a hardware code sensor (Alcor Proxy Hex RS 232) connected through the specified COM port.

Log on by a biometric sensor

Determines whether to enable the user to log on to the program using a biometric sensor (Identix Biologon Security System v. 2 – Fingerprint Reader).

8.18.2.8 Restrictions

Restrictions applied when no user is logged on

For each computer defined within the visualization project, you can choose security restrictions to be activated when no user is logged on to the program.

Disable 'Start' menu

Determines whether to disable using the Windows *Start* menu.

Hide task bar

Determines whether to hide the Windows task bar.

Hide icons on desktop

Determines whether to hide icons on the Windows desktop.

Disable minimizing main window

Determines whether to disable minimizing the main window of the runtime software.

Disable moving main window

Determines whether to disable moving the main window of the runtime software.

Disable resizing main window

Determines whether to disable resizing the main window of the runtime software.

Disable closing main window

Determines whether to disable closing the main window of the runtime software using the *Close* command from the system menu and the corresponding icon on the title bar. This options does not affect the *File > Exit* command.

Disable printing alarms/events, trends, reports...

Determines whether to disable printing alarms/events, trends, and reports at runtime.

Disable customizing trends

Determines whether to disable the commands for changing, loading, and saving the settings in the trend viewer at runtime.

Disable customizing reports

Determines whether to disable the commands for changing, loading, and saving the settings in the report viewer at runtime.

Disable Trend Manager

Determines whether to disable the *Trend Manager* command at runtime.

Disable Report Manager

Determines whether to disable the *Report Manager* command at runtime.

Disable Project Manager

Determines whether to disable the *Project Manager* command at runtime.

Disable entering tag values in Project Manager

To be added.

Disable Postmort Record Player

Determines whether to disable the *Postmort Record Player* command at runtime.

Project termination

Access rights

Determines the access rights required for terminating the visualization project at runtime (one access right is enough for the user to terminate the project).

8.18.2.9 E-mail

Outgoing E-mail configuration

For each computer defined within the visualization project, you can configure the settings related to sending email messages by the runtime software and SMTP server.

SMTP server (name or address)

Specifies the name or IP address of the SMTP server to be used for sending email messages.

Port number

Specifies the SMTP server's port to be used for sending email messages.

Connection timeout

Specifies the maximum time period (in milliseconds) for the runtime software to connect to the SMTP server.

Sender address

Specifies the sender's email address.

Sender name

Specifies the sender's name.

SMTP server requires authentication

Allows you to configure the connection settings when authentication is required by the SMTP server.

Account name

Specifies the name of the account used for authenticating the SMTP server's user.

Password

Specifies the password for the account used for authenticating the SMTP server's user.

8.18.2.10 SMS

For each computer defined within the visualization project, you can configure the settings related to sending and receiving SMS messages via a GSM device (modem) using scripts.

Start SMS driver

Determines whether to launch the SMS driver when starting the visualization project.

Communication options

Allows you to configure the connection to the computer using the RS-232 interface. The following properties can be configured: *COM port*, *Communication speed*, *Data bit count*, *Stop bit count*, and *Parity*.

PIN

Allows you to specify a PIN for your SIM card. If a PIN is required for authentication, it must be specified.

Outgoing message encoding

Specifies the encoding for outgoing messages, which affects the character set and the maximum message length. The following encoding options are available: *7-bit* (max. 160 characters, no diacritics), *8-bit* (max. 140 characters, data), and *16-bit* (max. 70 characters, Unicode).

Note: The *8-bit* encoding is used to transfer data (Smart Messaging). It is not suitable for transferring text. Most cell phones do not support this type of encoding.

Send multipart messages

Determines whether to send a multipart message if the maximum message length is exceeded. Otherwise, the message will be divided into several messages depending on the specified encoding.

SMS service center number

Specifies the telephone number of the SMS service center depending on the provider (Vodafone, T-Mobile, etc.).

Run script on receive message

Specifies the script to be executed each time the communication driver receives a message. Information on the message is passed to the script as a parameter. To acquire the information, the `RScr.GetCurrentScriptDataEx` function should be used.

Run script on send message successfully

Specifies the script to be executed each time the communication driver sends a message successfully. Information on the message is passed to the script as a parameter. To acquire the information, the `RScr.GetCurrentScriptDataEx` function should be used.

Run script on error in sending message

Specifies the script to be executed each time an error occurs when the communication driver attempts to send a message. Information on the message is passed to the script as a parameter. To acquire the information, the `RScr.GetCurrentScriptDataEx` function should be used.

Detect signal quality

Determines whether to pass GSM signal quality information to the selected tag. A value of 0 signifies no signal is available. Values of 1 to 100 signify a signal is available (1 is the weakest signal, 100 is the strongest signal).

8.18.2.11 Maatrix

Maatrix is an emergency communication service designed to quickly inform users of both unexpected and expected events. The **Reliance** SCADA system allows initiating Maatrix (starting the communication process) when, for example, an alarm/event (incident) is generated.

Connect to Maatrix service

Determines whether the computer should connect to Maatrix at project startup.

Service ID

Specifies a unique identifier of Maatrix. The service can be created and managed at <https://maatrix.eu/cs/>.

Password

Specifies the password for Maatrix.

Run script on service complete

Specifies the script to be executed after the service (communication process) is completed on the Maatrix server.

8.18.2.12 Postmort

These properties allow you to configure the **Postmort** function. **Postmort** is a unique function designed for recording and replaying a controlled process. We can say it is similar to a video recorder. If the function is activated, the runtime software records changes in process

data of the controlled process on a real-time basis into special data files. Later, the operator can switch from the online mode to the *Postmort* mode and replay the process. Thus, for example, it is possible to analyze the cause of a technology failure.

During the replaying of the records, most program functions will be stopped (e.g., reading real-time data, logging historical data, executing scripts, or processing recipes). It is highly recommended to use different computers for storing and viewing *Postmort* records because both cannot be done at the same time.

Record postmort

Allows you to activate recording the process for the selected computer.

Max. record length (day count)

Specifies the maximum record length. Any records older than the specified value will be deleted.

Complete data recording interval (min)

Specifies the time interval used for recording complete data, i.e., real-time data from all devices. The instant when complete data is recorded can be chosen from the *Postmort Record Player* window (at runtime) as the *Replay start time*. Only changes in process data are recorded at this interval.

Directory

Specifies the directory where the files containing *Postmort* records will be located. The default value of the property is `$(HistoryPostmort)\`, which is the so-called relative path representing the `<Project>\History\Postmort\` directory. The advantage of using the relative path is that you can move the visualization project to another place on disk without the necessity of customizing the path (the path is relative to the project directory).

8.18.2.13 Update

For each computer defined within the visualization project, you can configure the automatic project update settings. This function is especially useful when multiple computers are defined, which makes controlling the visualization project more complicated when changing it. The **Reliance** SCADA/HMI system allows you to automatically update the project from the specified directory (can be only within the computer network). You can only update the project files changed.

Automatically update project

Determines whether to update the visualization project on the specified computer before it is started. The project must be copied to the computer before it gets launched for the first time. It will then be automatically updated each time it is started. To avoid overwriting potential changes, the project is not automatically updated when starting it from the *Reliance Design* development environment.

Location of source project

Specifies the location where the source project is to be updated. The following options are available:

Source computer (Web server)

Specifies the source project's location on the computer's Web server (within the project). The project will be updated via either HTTP or HTTPS. The Web server must be running on the source computer.

Source computer + shared directory name

Specifies the source project's location as a combination of the computer (within the project) and shared directory names on the actual computer. It is necessary to enter the address of the computer (IP address or hostname).

Complete path to shared directory

Specifies the complete path to the shared directory that contains the source project.

Directories to update

Specifies the directories to be updated when starting the visualization project. In most cases, the default settings can be used. Special attention should be paid to the settings of only some of the directories on the list.

By default, the `<Project>\Settings\Recipes\` directory is not to be updated. It is assumed that recipes are stored locally on the computer where they are created (not necessarily the source computer from which the current version of the project is downloaded), or they can be stored in a central location, such as file server. The location files can be set separately for each recipe connected to the computer.

By default, the `Settings\Profiles\` subdirectory of the visualization project in which user profiles (settings) are located is not to be updated. It is assumed that the settings of trends, reports, alarm/event viewers, etc., will be customized and the updated settings will be stored locally on the respective computer. Therefore, the settings must not be overwritten by the source computer's settings. However, it is desirable to update the so-called default settings (e.g., default settings of trends), which are usually supplied by the author of the visualization project (systems integrator). For this reason, the `Settings\Profiles\Default\` option is activated so that it will be updated. Updating this directory does not overwrite user profiles. The other option is to store user profiles in a central location (e.g., a file server). In such a case, the `Settings\Profiles\Default\` option won't be activated either. The path where user profiles will be located can be specified on the *Other* page. The advantage is that the user has his/her settings available when working on any computer.

8.18.2.14 Web

Start Web server and Web service

After starting the visualization project in *Reliance Server* or *Reliance Control Server*, this option enables running the Web server and Web service to communicate with thin clients.

HTTP

Determines whether to open an insecure connection (HTTP) on the specified TCP port. The standard port number of the HTTP protocol is 80. The default value 40000 is used if there is a conflict between ports and another Web server.

Port number

Specifies the TCP port number on which the Web server runs. Thin clients and client applications of third parties communicate with the data servers using this port. It is essential to enable port access in the firewall. If there is no other Web server running on the computer (or is not planned to be installed), the port value can be changed to 80 (standard value). (In case of a conflict between ports and another Web server, the default value 40000 is applied.)

HTTPS

Determines whether to open a secure connection (HTTPS) on the specified TCP port. If this option is active, a secure connection will take precedence over an insecure connection (HTTP) when opening a Web page. The standard port number of the HTTPS protocol is 443. The default value 40363 is used if there is a conflict between ports and another Web server.

SSL version

Specifies the version of the SSL protocol that provides communications security through encryption and the authentication of the communicating parties. SSL's successor is the Transport Layer Security (TLS) protocol. Using SSL 2.0 is not recommended.

Certificate

Allows inserting a certificate.

Key

Allows inserting a certificate key.

Root certificate (CA)

Allows inserting a root certificate (certificate authority).

Password

Specifies the password for the certificate.

For more information on SSL certificates, refer to the Data Servers manual.

8.18.2.15 Other

User profiles

Directory

Specifies the directory where user profiles will be located. In the context of Reliance, a user profile is a set of personal settings of a certain user (settings of trends, reports, alarm/event viewers, etc.). The default value of the property is `$(SettingsProfiles)\`, which is the so-called relative path representing the `<Project>\Settings\Profiles\` directory. The advantage of using the relative path is that you can move the visualization project to another place on disk without the necessity of customizing the path (the path is relative to the project directory). If the visualization project runs on multiple computers (i.e., it is a network application), it can be useful to store the application in a central location (e.g., on a file server). The advantage is that the user has his/her settings available when working on any computer.

Window records

Directory

Specifies the directory where the window record database will be located. The default value of the property is `$(HistoryWindowRecords)\`, which is the so-called relative path representing the `<Project>\History\WindowRecords\` directory.

Export project to SQL database

SQL connection

To be added.

Logging

Log information to file

Determines whether to write log records to a file on the computer.

Send information to Syslog servers

Log records are sent to the syslog servers specified here.

8.18.3 Connecting Devices

Devices previously defined via the *Device Manager* can be connected to each computer defined within the visualization project. The properties related to connecting a device to a computer can be configured on the pages described below. The *System* device is always connected to the computer. However, it is not displayed in the *Project Structure Manager*.

▼ Basic

Common Object Properties

The selected device's *Name* and *Alias* can be edited via the [Device Manager](#).

Enable

Determines whether to make the device accessible to the computer at runtime. If the property is not active, the runtime software acts as if the device were not connected to the computer (i.e., as if it were not contained in the *Devices* folder). This device and its subordinated objects (tags, communication zones, and alarms/events) will be ignored by the runtime software when loading the visualization project. It allows you to temporarily disconnect the device, e.g., for debugging purposes. The advantage over removing it from the *Devices* folder is that the value of other properties remains unchanged.

Online

Determines whether the communication driver should communicate with the device (establish a connection, read/write data, etc.). Otherwise, the device is in offline mode and the quality of its tags is good. If a value is written from the visualization into the device's tag in such a state, the command is not passed to the communication driver. The new value is written directly into the device's memory image in the runtime software.

After starting the visualization project, the communication driver reads information neither on devices in offline mode nor on their tags and communication zones. If all devices of a specific type are offline, the respective communication driver is not launched at all.

Active channel choice

Not implemented yet. Specifies how the active channel should be chosen to connect the device to the computer. There are two options available: *Automatic* and *Tag-controlled (Index)*.

Index

Not implemented yet. Allows you to define the link to the tag whose value is to be used to specify the active channel's index.

Status

Not implemented yet. Allows you to specify the link to the tag that is to contain information on the connection status.

Channel list

Is a list that enables you to specify the order of the defined communication channels and thus their priority. The priority should be reflected in the future when the *Automatic* active channel choice is selected. Because the *Active channel choice* property is not implemented yet, only the channel with the highest priority is used. Some communication drivers (e.g., *Teco*) support using a secondary (backup) communication channel (another channel on the list sorted by priority).

▼ MEM file

In most cases, the runtime software obtains data of the device through a server connection from another instance of the runtime software. An alternative way to transfer real-time data is to use the so-called MEM file, which contains a binary image of the device's memory. Thus, the runtime software running on a client computer can obtain real-time data of the device by periodically reading the MEM file (MEM file data transfer to thin clients is no more supported). However, MEM files cannot be used for transferring alarms/events and sending commands from the client runtime software.

Log data to MEM file

Determines whether the runtime software should periodically save real-time data of the device to the MEM file.

File name

Specifies the path and name of the MEM file.

Logging interval

Specifies the time interval used for saving the MEM file.

Offset in file

Specifies the position in the MEM file at which to write the device's memory image. To use a single file to log data from multiple devices, the device's memory image is shifted by the offset dependent on the offset and data amount of the previously saved device. If two devices have the same offset configured, it would result in overwriting one device's data with the other device's data.

8.18.4 Communication Channel Properties

In the context of **Reliance**, a *communication channel* is an object used for configuring the connection to the device. If multiple communication channels are defined for the device, the

runtime software only uses the channel with the highest priority (switching between channels has not been implemented yet). One communication channel is automatically generated for each device connected to the computer. To add a new channel, choose either the *New Object* command from the toolbar or the *New Communication Channel* command from the popup menu.

Common Object Properties

Data transfer

Specifies the way in which the device's data and alarms/events are transferred to the runtime software (or also vice versa). The following transfer options are available: *Direct*, *Indirect*, and *MEM file*.

Direct

Indirect

MEM file

8.18.4.1 Direct Data Transfer Properties

The direct data transfer is a primary way to obtain the device's data. If the Data transfer property is set to Direct, the runtime software obtains data of the device through the device's communication driver. When a command is sent from the runtime software (a tag's value changes), it is passed directly to the communication driver. In most cases, the driver runs on the same computer. For virtual devices and the *System* device, no communication driver exists (data is stored directly in the memory of the runtime software). The *System* device is automatically connected to each computer defined within the visualization project. However, it is not displayed in the *Project Structure Manager*. The runtime software always obtains data of the *System* device directly.

Basic

Channel type

Specifies the type of channel to be used for communication with the device. The communication channel properties depend on the type of channel selected. Some types are only accessible to devices of a certain type.

▼ Serial (COM port)

This type of channel is used for communication with serial devices through a serial cable (RS-232 or RS-485/422 interface).

Address

Allows you to override (substitute) the device's address specified via the *Device Manager*. If it is not needed, do not activate this option.

COM port

Specifies the serial port (its number) used for communication with the device.

Parity

Specifies the parity used for communication with the device (detecting errors).

Comm. test interval

Specifies the time interval used for testing communication with the device on an inactive communication channel. This value is used by some communication drivers (e.g., *Teco*) when multiple communication channels are defined.

Comm. timeout

Specifies the time period between sending a request to and receiving a response from the device by the communication driver. If the device does not respond to the request within the specified timeout, the communication is considered faulty (Err-timeout) and the request is sent again. If there is still no response from the device, it is recognized as a failure in communication with the device.

Comm. speed

Specifies the speed used for communication with the device.

▼ Network (Ethernet)

This type of channel is used for communication with the device via Ethernet.

Address

Allows you to override (substitute) the device's address specified via the *Device Manager*. If it is not needed, do not activate this option.

IP address/URL

Allows you to override (substitute) the device's IP address specified via the *Device Manager*. If it is not needed, do not activate this option. The other option is to specify the URL of the device. It is useful, for example, when an IP address is assigned dynamically.

TCP/UDP port

Specifies the device's TCP or UDP port number.

Comm. test interval

Specifies the time interval used for testing communication with the device on an inactive communication channel. This value is used by some communication drivers (e.g., *Teco*) when multiple communication channels are defined.

Comm. timeout

Specifies the time period between sending a request to and receiving a response from the device by the communication driver. If the device does not respond to the request within the specified timeout, the communication is considered faulty (Err-timeout) and the request is sent again. If there is still no response from the device, it is recognized as a failure in communication with the device.

Communication protocol

Specifies which of the two protocols (TCP/IP, or UDP) should be used for communication with the device. Some device types support only one of them (e.g., *Teco* devices only support UDP). In such a case, this property is inaccessible.

Accept connection in server mode only

If this option is active, the communication driver acts as a server towards the device. It does not attempt to establish communication with the device, but it waits until the device itself attempts to do so. The *IP addresses* property allows you to select an IP address from the list of local addresses (in case there are several network cards installed on the server).

Serial communication mode

If this option is active, the communication driver communicates with devices in the same way as if they are on a single serial line. This means only one request can be sent to one device by the communication driver at a time. Once the request is sent, the driver waits for a response. Only then it continues to send a request to another device.

▼ Network (Ethernet)/serial (RS-232, RS-485)

This type of channel is used for communication with the device via Ethernet using the Ethernet/RS-232, RS-485 converter. This type of channel is used for devices that do not support Ethernet communication.

Address

Allows you to override (substitute) the device's address specified via the *Device Manager*. If it is not needed, do not activate this option.

IP address/URL

Allows you to override (substitute) the converter's IP address (the device itself has no IP address) specified via the *Device Manager*. If it is not needed, do not activate this option.

TCP/UDP port

Specifies the converter's TCP or UDP port number.

Comm. test interval

Specifies the time interval used for testing communication with the device on an inactive communication channel. This value is used by some communication drivers (e.g., *Teco*) when multiple communication channels are defined.

Comm. timeout

Specifies the time period between sending a request to and receiving a response from the device by the communication driver. If the device does not respond to the request within the specified timeout, the communication is considered faulty (Err-timeout) and the request is sent again. If there is still no response from the device, it is recognized as a failure in communication with the device.

Communication protocol

Specifies which of the two protocols (TCP/IP, or UDP) should be used for communication with the converter.

Accept connection in server mode only

If this option is active, the communication driver acts as a server towards the device. It does not attempt to establish communication with the device, but it waits until the device itself attempts to do so. The *IP addresses* property allows you to select an IP address from the list of local addresses (in case there are several network cards installed on the server). In this case, the IP address belongs to the converter.

Control serial link parameters via NVT protocol

If this option is active, the following properties of the converter's serial link can be configured via the NVT protocol: *Parity*, *Communication speed*, *Data bits*, and *Stop bits*. It is required to use the converter that supports this functionality.

▼ Dial-up (modem)

This type of channel is used for communication with the device via a modem.

Address

Allows you to override (substitute) the device's address specified via the *Device Manager*. If it is not needed, do not activate this option.

Repeat call count

Specifies the maximum number of repeated attempts to establish a dial-up connection.

Comm. test interval

Specifies the time interval used for testing communication with the device on an inactive communication channel. This value is used by some communication drivers (e.g., *Teco*) when multiple communication channels are defined.

Comm. timeout

Specifies the time period between sending a request to and receiving a response from the device by the communication driver. If the device does not respond to the request within the specified timeout, the communication is considered faulty (Err-timeout) and the request is sent again. If there is still no response from the device, it is recognized as a failure in communication with the device.

Limit connection time

Allows you to limit the duration of a single dial-up session.

Provider

Allows you to select the telephone service provider to be used to establish a dial-up connection. To edit the provider, use the *Project Options* dialog.

Phone number

Specifies the telephone number (static or dynamic) to be used to establish a dial-up connection. If the *Dynamic* property is active, the telephone number can be changed at runtime using the selected tag of type *String*.

▼ Advanced

Control

Allows you to specify the link to the tag whose value is to be used to control communication with the device. It is based on bit flags. The function of individual bits is stated in the table below (the values are in hexadecimal format).

\$0001	establish communication with the device
\$0002	automatically terminate communication after reading data
\$0004	activate secondary (backup) connection

Status

Allows you to specify the link to the tag whose value is to indicate the communication status. It is based on bit flags. The function of individual bits is stated in the table below (the values are in hexadecimal format).

\$0001	communication in progress
\$0002	communication established
\$0004	communication error
\$0008	secondary (backup) connection activated
\$0010	controlled data reading in progress
\$0020	controlled data writing in progress
\$0040	controlled data reading/writing completed without errors
\$0080	controlled data reading/writing completed with one error
\$0100	dial-up connection – the device awaits calling
\$0200	dial-up connection – calling
\$0400	dial-up connection – connection established
\$4000	secondary (backup) connection error

Run script on

Allows you to specify scripts to be run at various communication events.

Establish communication

Determines whether to run the specified script after communication with the device is established for the first time.

Communication error

Determines whether to run the specified script after an error occurs in communication with the device.

Restore communication

Determines whether to run the specified script after communication with the device is restored.

Do not log communication events (error, restore)

Allows you not to log information about communication-related events (errors, restorations) to the alarm/event database.

Do not show communication events (error, restore)

Allows you not to display information about communication-related events (errors, restorations) on the list of current alarms/events.

Communication error timeout

Specifies the time period between the moment an error in communication with the device is detected by the communication driver for the first time and the moment the Communication error event is generated by the runtime software.

▼ Driver

Computer*Connect to driver*

Specifies where the communication driver is to start. If the *Locally* option is active, the communication driver will run on the same computer as the runtime software. If the *On remote computer* option is active, another computer defined within the visualization project must be selected to run the communication driver. It is not recommended to use this option. If you do so anyway, make sure the *Reliance 4 Driver Server* program and the respective driver are installed on the remote computer. Also, the *DCOM* service must be configured for *Reliance 4 Driver Server*. It is necessary to configure security settings for the driver in Windows, too.

Computer name

Specifies the computer on which the communication driver is to run. For this computer, the *Address* property's value must be specified.

▼ Time

Regular synchronization

Allows you to periodically synchronize the system time of the device with the system time of the computer (the property is only accessible to some device types, e.g., Teco and QMD). The synchronization is performed daily at the specified time.

Tag-controlled synchronization

Allows you to synchronize the system time of the device with the system time of the computer (the property is only accessible to some device types, e.g., Teco and QMD). The synchronization is performed on the leading edge of the specified tag (the off-to-on transition). The *Reset tag* property determines whether to reset the control tag after detecting the leading edge.

▼ Other

AMiT*Password*

Specifies the access password.

Offset

Specifies tags' address offset.

Interval between two sent packets

Specifies the interval between two sent packets.

Elgas2

Use Modbus tunnel

For communication with the device, the Modbus protocol is used by the communication driver.

User ID

Specifies the number used for authenticating access to the device's data when establishing communication with the device.

Password

Specifies the user's access password for accessing the device's data.

IEC104

Received I-frame acknowledgment timeout (t2)

Specifies the maximum received I-frame acknowledgment timeout if other received messages contain no data. If this time is reached, the communication driver sends an acknowledgment even if the maximum unacknowledged received I-frame count is not reached.

Maximum unacknowledged received I-frame count (w)

After receiving the specified number of I-frames, the communication driver sends an acknowledgment even if the maximum received I-frame acknowledgment timeout is not reached.

Maximum unacknowledged sent I-frame count (k)

After sending the specified number of I-frames, the communication driver waits until the successful receipt of the I-frames is acknowledged.

Teco

CPU status (active/standby) check interval (only for TC700, CP7005)

Specifies the time period during which it is checked whether the CPU operates in the active mode or in the standby mode. This property is only accessible to Tecomat TC700 devices with the CP-7005 central unit that allow for implementing a redundant control system with two processors.

8.18.4.2 Indirect Data Transfer Properties

If the *Data transfer* property is set to *Indirect*, the device's data is transferred between instances of the runtime software running on different computers via a server connection. In this case, the client runtime software obtains data of the device from another instance of the runtime software (data server). When a command is sent from the runtime software (a tag's value changes), it is passed to the data server via a server connection. This way of transferring data cannot be used for the *System* device. The runtime software always obtains data of the *System* device directly. The *System* device is automatically connected to each computer defined within the visualization project. However, it is not displayed in the *Project Structure Manager*.

Server connection group

Specifies the link to the server connection group that is to be used to transfer data. See the chapter [Server Connections and Their Groups](#) describing how to create and configure such connections.

Enable sending commands

Determines whether to enable sending commands from the client runtime software to the device (i.e., changing this device's tag values) through the server connection.

8.18.4.3 MEM File Data Transfer Properties

The MEM file data transfer is an alternative to the indirect transfer. If the *Data transfer* property is set to *MEM file*, the runtime software running on a client computer obtains real-time data of the device by periodically reading a MEM file that contains a binary image of the device's memory. However, this type of transfer can be used for viewing purposes only. It does not allow you to transfer alarms/events and send commands from the client runtime software.

To log data to the MEM file, you must activate the corresponding property on the device's *MEM file* page (see the chapter [Connecting Devices](#)).

File name

Specifies the path and name of the MEM file.

Update interval

Specifies the time interval used for reading the MEM file's data.

Offset in file

Specifies the position in the MEM file from which to read the device's memory image.

8.18.4.4 Specific Properties

Sauter

Response first byte timeout

Specifies the maximum time period between sending a request and receiving the first byte (character) of a response. If the first byte is received within the specified timeout period, the communication driver will wait until the rest of the data is received. Otherwise, the driver will not consider the message received and will continue communicating.

Response last byte timeout

Specifies the maximum time period between sending a request and receiving the last byte (character) of a response. If the last byte is received within the specified timeout period, the communication driver will start processing the received data. Otherwise, the driver will consider the message received erroneously and will continue communicating.

8.18.5 Connecting Data Tables

[Common Object Properties](#)

To edit the *Name* and *Alias* of the selected data table, use the [Data Table Manager](#).

Data tables previously defined via the *Data Table Manager* can be connected to each computer defined within the visualization project. To connect a data table to a computer, you can configure the following properties:

SQL connection

Specifies the SQL connection defining the SQL server and database where a physical data table will be stored. This property can only be accessible to SQL-based data tables. SQL connections can be defined via the *Project Options* dialog.

Primary directory

Specifies the primary directory for storing the data table's files. The default value of the property is `$(HistoryData) \`, which is the so-called relative path representing the `<Project>\History\Data\` directory. The advantage of using the relative path is that you can move the visualization project to another place on disk without the necessity of customizing the path (the path is relative to the project directory). This property can only be accessible to file-based data tables (*Paradox* and *dBASE*).

Secondary directory

Specifies the directory in which the runtime software will search for the data table's files in case they could not be found in the primary directory. The runtime software never logs the data table's files to this directory (it is intended for viewing purposes only). The default value of the property is `$(HistoryData) \`. If you do not intend to use the secondary directory in the way described above, specify the same value as for the *Primary directory* property. This property can only be accessible to file-based data tables (*Paradox* and *dBASE*).

Example:

Sometimes, the secondary directory is used in network applications. A data server (*Reliance Server* or *Reliance Control Server*) usually runs on a server computer. The data server logs historical data and alarms/events to a local disk. The runtime software (mostly *Reliance Control* or *Reliance View*) runs on client computers. The runtime software downloads a limited number of the data tables' archive files from the data server to a local disk (e.g., files for the last 30 days). The complete historical data (i.e., all the data tables' archive files) is always on the server computer. The principle is based on the fact that users most frequently view the latest or recent data that is stored locally on a client computer, so the access to the data is faster than to the data stored on the server computer. For a data table connected to a client computer, the primary directory is set to a local disk and the secondary directory is set to a shared directory on the server computer that contains the complete historical data. When the user on a client computer views historical data via the trend viewer, the trend viewer preferentially searches for the data table's files in the primary directory (i.e., on a local disk). As far as data up to 30 days old is concerned, the respective files will be found in the primary directory. If the user wants to view older data, the respective archive files won't be found in the primary directory. Instead, the secondary directory (i.e., server) will be used by the trend viewer to search for them.

Temporary data directory

Specifies the directory where temporary data will be located. It is data that the runtime software didn't manage or couldn't save to a physical table (e.g., when terminating the project). The default value of the property is `$(HistoryData)\`.

Connection

Specifies the way in which the runtime software accesses the data table.

▼ Direct

The *Direct* connection is a primary way to access the data table. As far as a file-based data table is concerned, the runtime software accesses the data table's files directly. It opens the files and reads the data. It can also log data to the files. As for an SQL-based data table, the runtime software accesses the SQL server to obtain the data table's data or to pass data that is to be logged to the data table. This option is always selected for a computer that has the *Log data* property active. It can also be selected for a client computer that only views the data table updated by another instance of the runtime software (running on another computer).

Log data

Determines whether the runtime software running on the computer should sample real-time data and log the samples to the data table. If a single physical data table (i. e., file-based, or SQL-based) is accessed by multiple instances of the runtime software, the property can only be active for one of the computers accessing the data table. In most cases, it is the one acquiring the device's data directly from the communication driver.

Create archive files

Determines whether the runtime software running on the computer should create archive files. If a single physical data table (file-based, or SQL-based) is accessed by multiple instances of the runtime software, the property can only be active for one of the computers accessing the data table.

Delete oldest archive files

Determines whether to delete the oldest archive files. If the number of archive files exceeds the value specified by the *Max. archive file count* property, the oldest files will be deleted when creating a new archive file.

▼ Indirect

If the *Connection* property is set to *Indirect*, the runtime software accesses the data table through a server connection. In this case, the client runtime software does not directly access the data table's files located on a server computer. Instead, the client computer creates a copy of the data table's files in the primary directory. The data table is updated by another instance of the runtime software (data server running on a server computer) through a server connection. It can then use this copy to open the files and view the data. The primary directory should be located on a local drive (it is recommended to use the default directory `$(HistoryData) \`).

Delete oldest archive files

Determines whether to delete the oldest archive files. If the number of archive files exceeds the value specified by the *Max. archive file count* property, the oldest files will be deleted when creating a new archive file.

Server connection group

Specifies the link to the server connection group that is to be used to transfer data (see [Server Connection Groups](#)).

Limit downloaded archive file count

Determines whether to limit the number of archive files transferred from the server computer to the client computer. It is recommended that this option be active and the *Max. archive file count* property be configured according to the end user's (customer's) requirements. If this option is not active and there is no local copy of the data table on the client computer, the complete data of the data table (all files) will be downloaded from the server computer, which can take a long time.

Max. archive file count

Specifies the maximum number of archive files downloaded to the client computer.

Data update interval (s)

Specifies the time interval used by the client runtime software to request the data server for updates of the data table (i.e., new data).

Run script on

Receive data from server

To be added.

Parameter

To be added.

▼ Direct/Indirect

The *Direct/Indirect* connection is a combination of the previous two ways of accessing the data table. Data between instances of the runtime software running on different computers is transferred through a server connection. In this case, both instances of the runtime software are data servers (*Reliance Server* or *Reliance Control Server*). Two server connections are defined between them (each data server is both a server and a client with respect to the other data server). Each data server maintains a copy of the data table's files. The copy can be used to store data acquired, for example, directly from the device or from the other data server. The data servers continuously synchronize (update) their copies of the data table. This connection option is only used in some very specialized applications, such as applications with telemetry systems that can establish a connection with any of the two computers (data servers) and pass historical data to them. It is also required that the telemetry system's historical data be stored on both computers.

The functions of the properties are identical to those of the indirect connection.

8.18.6 Connecting Printers

For each computer defined within the visualization project, you can configure printers to be used to print alarms/events. It is necessary that the respective printer support printing a single text line without ejecting the paper. For example, a dot matrix printer can be used. On the other hand, in most cases, laser printers and regular ink printers cannot be used for this purpose!

Common Object Properties

The **Name** property specifies the name of the printer within the Windows operating system.

Alarms/event online print

Specifies the type of alarms/events to print.

8.18.7 Connecting Modems

For each computer defined within the visualization project, you can configure modems to be used by communication drivers to establish a telephone (dial-up) connection to I/O devices.

▼ Basic

Common Object Properties

Provider

Specifies the telephone service provider used by the modem (see also [Channel type](#)).

Edit...

Allows you to rename the telephone service provider via the *Project Options* dialog ([Project > Telephone Service Providers](#)).

Control

Determines whether to enable/disable (block) using the modem by the specified integer-type tag. If the value of the tag is set to logical 0, the modem will not be used to communicate with the device.

Only for callbacks

Determines whether the modem should be used for callbacks only.

Connection type

To be added.

COM port

Specifies the serial port (its number) used for communication with the modem.

Comm. speed

Specifies the speed used for communication with the modem.

TCP port

To be added.

IP address

To be added.

▼ **Advanced***Process DCD signal*

Determines whether the modem should process the DCD signal.

Dial timeout

Specifies the maximum timeout for the communication driver to connect to the dialed number.

Command timeout

Specifies the timeout between sending a command to and receiving a response from the modem.

Initialization string no. 1

Specifies the first string to be used to initialize the modem (optional).

Initialization string no. 2

Specifies the second string to be used to initialize the modem (optional).

Dial command

Specifies the command to be used for dialing the connection.

Hang-up command

Specifies the command to be used for hanging up the connection.

Reset command

Specifies the command to be used for resetting the modem.

Command mode transition delay

Specifies the time delay before switching to the command mode.

Idle period between dialing

Specifies the minimum idle period between two dial-up connections.

8.18.8 Server Connections and Their Groups

In the context of **Reliance**, a **server connection** is used to transfer data between instances of the runtime software running on different computers (i.e., between two computers defined within the visualization project). In addition to transferring both real-time and historical data and alarms/events from a server computer to a client computer, it also includes sending commands in the opposite direction. A server connection always involves two computers: a client computer (*Reliance View*, *Reliance Control*, *Reliance Server*, or *Reliance Control Server*) and a server computer (*Reliance Server* or *Reliance Control Server*). A server computer has data available directly from a communication driver or from other data servers. A client computer is the one that needs to get data from a server computer. The data is transferred through the so-called socket using the TCP/IP protocol.

A server connection is defined within the **Server Connection Groups** folder, which allows backing up communication channels (redundancy). One or more server connections can be added to each server connection group. Their priority is determined by the order of these server connections (the first connection, i.e., primary connection, is the one with the highest priority). If a communication failure occurs (network failure, server failure, etc.), the runtime software on the client computer automatically attempts to re-establish communication on a connection with lower priority (while it repeatedly checks for the availability of the original connection at a specified interval). As soon as a connection with higher priority is available again, the runtime software on the client computer terminates communication on the lower-priority connection and the higher-priority connection is used for communication again (i.e., within each group, there is never more than one server connection being used for communication).

Note: Objects of type *server connection group* and *server connection* can be created and configured via the *Enterprise* version of the *Reliance Design* development environment only.

▼ Server Connection Group – Basic

[Common Object Properties](#)

Connection priority

Specifies the list of connections sorted by priority. In the event of a communication failure, the client runtime software attempts to activate a connection with lower priority.

Miscellaneous

Higher priority connection test interval

Specifies the time interval at which the client runtime software attempts to re-establish communication on a connection with higher priority if a secondary (backup) connection is active.

▼ Server Connection – Basic

[Common Object Properties](#)

Server computer

Specifies the server computer with which the client computer is to communicate.

Alternative server address

Allows you to use an address other than the one specified by the server computer's *Address* property. It is useful, for example, when there are two different server addresses used for access from an inside and outside network.

Control connection

Determines whether to control the connection by the specified tags of type *Bool* on the *Client* and *Server* computers.

Run script on

Connect

Determines whether to execute the specified script when the connection between the two computers is established. This script will run in both instances of the runtime software.

Disconnect

Determines whether to execute the specified script when the connection between the two computers is interrupted. This script will run in both instances of the runtime software.

Real-time data transfer

Data update interval

Specifies the minimum time interval at which the server computer sends updates of the devices' real-time data to the client runtime software. This is done automatically, i. e., the client computer does not have to request it. The update frequency can be reduced so that the client computer does not become overloaded with too frequent updates.

Transfer alarms/events

Determines whether to transfer alarms/events generated by the server computer to the client computer. If the property is active, alarms/events of the devices provided through this server connection are not generated on the client computer, but alarms/events generated on the server computer are accepted. This prevents, for example, alarms/events from being lost in the event of a communication failure (all alarms/events generated during the failure are transferred to the client computer after communication is restored). Another advantage is that the same alarms/events of all computers are generated and end at the same time (they are generated by the server computer and accepted by the client computer through the server connection; the only difference is the receipt time of the alarms/events). This option should always be active.

Limit downloaded archive file count

Determines whether to limit the number of the alarm/event database's archive files transferred from the server computer to the client computer. This property has a decisive influence on the speed of the alarm/event synchronization between the computers. Considering that, in most cases, it is not necessary that the complete archive files of the alarm/event database be stored on the client computer, we recommend to activate this option.

Max. archive file count

Specifies the maximum number of the alarm/event database's archive files downloaded to the client computer. The property's value should be chosen with respect to the type of archive files (i.e., frequency of creation: daily, weekly, monthly, or it can be controlled by a tag). The default value of the property is 2 (it is suitable for monthly archive files).

Transfer window records

Determines whether to transfer (synchronize) window records through this server connection.

▼ Server Connection – Advanced

Communication (server connection) between instances of the runtime software is started at the client side. If communication at the client side is not controlled by a tag, the client runtime software attempts to establish a connection immediately after starting the visualization project; otherwise, only in case the control tag's value is logical 1.

Any of the following situations may occur while establishing communication on a server connection:

1. The server computer has not been found within the network.
2. The server computer has been found within the network, but the runtime software (data server) with which communication should be established is not running on it.
3. The server computer has been found within the network, the runtime software (data server) with which communication should be established is running on it, but communication at the server side is currently disabled (this may occur in case communication at the server side is controlled by a tag).
4. The server computer has been found within the network, the runtime software (data server) with which communication should be established is running on it, and communication at the server side is enabled. In this case, communication is established successfully.

The first situation might be caused by an incorrectly specified address (IP address or hostname) of the server computer in the visualization project, or by the fact that this computer is not running. Immediately after attempting to establish communication, the client runtime software qualifies this situation as an unsuccessful attempt to find the server computer within the network.

Another attempt to establish communication will be made after the expiration of the time period specified by the *Idle delay after failure to find the server computer on the network* property.

If this situation is repeated more than x times (x is specified by the *Number of failed attempts to find the server computer on the network before using a secondary connection* property), a secondary (backup) connection defined in the same server connection group is activated (according to the priority order).

The second and third situation will be qualified as an unsuccessful attempt to establish communication after the expiration of the time period specified by the *Connection timeout* property. After that, the attempt will be repeated.

If these situations are repeated more than x times (x is specified by the *Connection timeout count before using a secondary connection* property), a secondary (backup) connection defined in the same server connection group is activated (according to the priority order).

TCP port

Shows the TCP port (its number) used for communication through this server connection. This value is unique for each server connection defined within the visualization project and is automatically generated based on the server connection ID.

Internal system messages

Generate internal system messages

Determines whether to generate internal system messages containing information about the connection status, remote computer status, alarm/event synchronization progress, etc.

9 Standard Dialog Boxes

Standard dialog boxes are common to all **Reliance** visualization projects. They are used for selecting various objects (e.g., tags) or for configuring some properties (e.g., color or font).

[Select Color](#)

[Select Font](#)

[Selection Dialog Box](#)

[Select Access Rights](#)

[Select Directory](#)

[Find Object](#)

9.1 Select Color

The *Select Color* dialog box is used for selecting and configuring objects' colors. In **Reliance** visualization projects, the color-type property is stored in 24-bit color depth (RGB format). Thus, it can represent more than 16 million colors.

The dialog box is divided into two panes: the top pane is designed for selecting predefined colors or for selecting colors using color space coordinates; the bottom pane contains the list of *Custom Colors* and the *Selected Color* indicator.

The top pane contains the following pages:

Web Palette

Contains 216 colors commonly used for designing Web pages (the so-called Web-safe colors). Web-safe colors' advantage is that they can be precisely displayed even on devices with lower (8-bit) color depth, such as PDAs and cell phones.

Named Colors

Contains 16 basic and 122 additional colors with their commonly used English names. The name of a color is displayed either in the bottom pane or in the help hint (bubble help) when positioning the mouse cursor over the color.

System Colors

Contains the list of Windows-defined colors (color scheme). If these colors are to be used in a visualization project, they will be adjusted to the Windows color settings on the computer running the project.

Note: Information on a system color is stored on a separate (fourth) byte.

Mixed Color

Allows you to define a color by combining red, green, and blue (additive mixing of RGB colors) or cyan, magenta, and yellow (subtractive mixing of CMY colors). The mixing is performed by positioning the three sliders or by directly entering the values of individual coordinates (0–255).

The bottom pane contains 16 squares for *Custom Colors*. To add a color to the list of custom colors, drag and drop the color selected from the palette of predefined colors or from the *Selected Color's* indicator. Custom colors get stored with the visualization project. Therefore, when you next time bring up the *Select Color* dialog box, they will be available. The *Selected Color* property contains an edit box (displaying the RGB/CMY value) and the selected color's preview and name (in case a *Named Color* is selected). The *Capture* tool is used to select a color on any image opened on your screen. The color can be chosen by pressing the left mouse button over the *Capture* icon and releasing it over the required color.

9.2 Select Font

The *Select Font* dialog is a standard Windows dialog box used for selecting and configuring fonts.

Font

Specifies the font (font family). It allows you to select the font from the list of fonts shipped with Windows.

Font style

Specifies the font style, i.e., font variants. The following font styles are usually available: *Regular*, *Oblique*, *Bold*, and *Bold Oblique*.

Size

Specifies the font size in pixels.

Effects

Specifies the font effects (*Strikeout* and *Underline*).

Select Color

Specifies the color of the font. The command brings up the [Select Color](#) dialog box.

Script

Specifies the character set of the font. Different fonts support different character sets. Character sets can be selected only if the text value displayed by this font is not supported by the extended Unicode character set (e.g., the value of a string-type tag within a device). Otherwise, the options have no effect if the text value is supported by Unicode (e.g., text strings managed by the [String Manager](#)).

9.3 Selection Dialog Box

It is a multiple-purpose **Reliance**-defined dialog box designed for selecting one or more objects of a certain type. If you want to select a tag, the *Select Tag* dialog box is brought up; if a script is to be chosen, the *Select Script* dialog box is opened, etc. All object types are handled in the same way.

This dialog box contains several functions that make selecting an object easier. For example, it allows for filtering objects based on the specified filter (asterisk convention) or selecting object types to be displayed.



One Level Up

Is used to display the objects on the immediate superior level (e.g., tag level changes over to device level).



Quick Filter (Ctrl+F)

Allows you to quickly search for an object by name. The *Match Beginning of String*  command is used when searching for objects whose names start with the specified text and the *Match Any Part of String*  command when searching for objects whose names contain the specified text. The *Close*  command closes the quick filter.



Display Folders

Determines whether to display folders on the list. If the objects are arranged in folders, you can decide whether or not the list should display the folders.

Note: Empty folders are ignored.

View

Specifies how to display the list of objects. The *List* option is used to display the object names in multiple columns. The *Details* option is used to display other data (e.g., a tag's type and address). In this case, only one column is displayed.

Manager

Brings up the respective manager. For example, the [Device Manager](#) can be brought up from the *Select Tag* dialog box. Any changes made through the manager will take effect in the dialog box after closing the manager. This command is especially useful if the required object has not yet been defined and, thus, it can be defined immediately.



Show or Hide Tags

Displays all available tag data types. It allows you to filter the list of tags by data type. This command is only available when selecting a tag.

Note: The *Select Picture* dialog box contains the **Preview** command instead of the *Show or Hide Tags* command. It determines whether to preview the selected picture at the bottom of the dialog box.

9.4 Select Access Rights

The *Select Access Rights* dialog box is used for selecting a set of access rights required for certain operations (e.g., setting a tag's value) or for accessing an object (e.g., access to a visualization window).

Servicing right

Is a special access right intended for systems integrators (authors of visualization projects) to secure certain parts of the application. Usually, these parts contain settings for managing the application. This right can be activated at design-time only.

Check All

Selects all the access rights on the list.

Uncheck All

Unselects all the access rights on the list.

Edit...

Brings up the [Project Options](#) > *Access Rights* dialog to rename the rights and verify the user's identity.

To define and configure users (their names, passwords, access rights, etc.), use the [User Manager](#).

9.5 Select Directory

The *Select Directory* dialog box is used to comfortably select the path to a folder/directory (e. g., from the [Environment Options](#) dialog box or from the [Picture Manager](#)). The selected path is shown below the toolbar and the folder tree view is located on the right side of the dialog box. On the left side, there is a list of favorites.



New Folder (Alt+Ins)

Creates a new folder.



Rename Folder (F2)

Allows you to rename the selected folder.



Remove Folder (Del)

Moves the selected folder to the Recycle Bin (if you press the `Shift` key at the same time, the folder is deleted permanently).



Explore Folder

Runs the *Windows Explorer*.



Update (F5)

Updates the directory structure in the tree view.

9.6 Find Object

The *Find Object* dialog box is used to search for an object by name. The dialog box is accessible from the popup menu and toolbar of most [managers](#). The search results are displayed in a separate window; select (mark) the found object in the respective manager by double-clicking it.

Object name

Allows you to enter all or part of the name of the object to search for.

Consider object type

Allows you to specify the list of objects to consider and, thus, speed up the search process.

Options

Whole strings only

Determines whether to search for the object by its exact name.

Case sensitive

Determines whether to distinguish uppercase letters from lowercase letters when searching for the object.

Subtree of selected object only

Allows you to search for the object only within its subtree and, thus, speed up the search process.

10 Appendices

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[Environment Variables](#)

[File and Directory Structure](#)

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10.1 Installation

The complete installation of **Reliance 4** consists of three separate, mutually independent installers:

- Reliance 4 Installer (the main installer of **Reliance**'s program files)
- Reliance 4 Library Installer (the graphics installer)
- Reliance *Add-On Pack* Installer

The complete installation is available on an installation DVD together with a license key. After inserting the DVD into the optical drive slot, the Welcome screen appears with the following commands:

Install Reliance 4

Performs the complete installation of **Reliance 4** by gradually running all the three installers. If necessary, you can stop the installation process and proceed to the next installer in order. The installers can also be launched from the `Setup` directory on the installation DVD.

Install HW Key Driver

Is used to install the driver for HASP hardware keys that are used by **Reliance**. The installer can be launched from the `HASP` directory on the installation DVD. This installer is also part of *Reliance Add-On Pack*.

The latest version of **Reliance 4** can also be downloaded from the website www.reliance-scada.com, sections *Download* or *Members Section*. For security reasons, the executable installers are stored in ZIP archives.

When installing a newer version, the previous version is automatically detected or uninstalled. Then, the installation of the new version is completed.

In order for the program to be fully functional, complete the following steps: If the license is stored in a hardware key, install the *HASP HW Key Driver*. If it is stored in a software key, the hardware key driver is not required, but the license must be activated. For details on how to activate the license, see the *License Activation* manual.

Reliance 4 Installer (the main installer of Reliance's program files)

This installer is intended for installing **Reliance**'s program files and other components: development environment, runtime software, communication drivers, Borland Database Engine (BDE), auxiliary tools and utilities, documentation, and example projects. The installation requires about 200 MB of free hard disk space. In addition to the installation of the above listed components, the installer adds a folder to the *Start* menu and shortcuts to the desktop, registers services, and associates file types with the respective programs (. *rp4* – the main file of a **Reliance 4** visualization project, . *rdt* – **Reliance**'s data table).

The latest version of the program files can also be downloaded separately from the *Members Section* on the website www.reliance-scada.com (the installer is not contained in the ZIP archive). This can be done by simply replacing the files stored in the *Reliance4* folder on disk with the archive files. This way of installing the program files should only be used by experienced users.

Note: If the BDE is already installed on your computer, it will not be reinstalled, i.e., the original installation will be used by **Reliance**. Otherwise, the BDE will automatically be installed to the directory `C:\Program Files\Common Files\Borland Shared\BDE`.

Reliance 4 Library Installer (the graphics installer)

This installer is intended for installing *Reliance 4 Library*, which can be used at design time. The library contains various pictures, such as controls, containers, and devices. By default, the library is installed to the *Library* folder. The installation requires about 100 MB of free hard disk space.

Reliance Add-On Pack Installer

This installer contains a pack of add-on components for Reliance 4 that are supplied by third parties. They are different runtime environments, drivers, and other auxiliary tools. However, it will *not install* the components, it will only place their installers to the computer. You can start installing the components using shortcuts from the *Start* menu. The installation requires about 950 MB of free hard disk space. Additional free space is required for each component.

The following components are part of *Reliance Add-On Pack*:

Adobe Reader

The installer of *Adobe Reader X* (a PDF file viewer).

Microsoft .NET Framework

The *Microsoft .NET Framework* installers (versions 1.1, 2.0, 2.0 SP2, 3.5) required for running MS SQL Server (2005) and the hardware key utility.

Borland Database Engine

The installer of the *Borland Database Engine (BDE)* drivers.

Microsoft SQL Server 2000 Desktop Engine

The installer of *Microsoft SQL Server 2000 (MSDE)*.

Microsoft SQL Server 2005 Express Edition

The installer of *Microsoft SQL Server 2005 (Express Edition)*.

Microsoft SQL Server Management Studio Express

The installer of *SQL Server Management Studio Express* (a tool for managing all components within *Microsoft SQL Server*).

Microsoft SQL Server 2008 R2 Express Edition

The installer of *Microsoft SQL Server 2008 R2 Express x86*.

The installer of *Microsoft SQL Server 2008 R2 Express x64*.

Microsoft Script Debugger

The installer of *Microsoft Script Debugger*.

Microsoft Windows CE 5.0 Device Emulator

The installer of the *Microsoft Windows CE 5.0 Device Emulator*.

AXIS IP Cameras

AXIS IP camera drivers required for the [Axis IP Camera](#) component to be fully functional.

Pelco IP Cameras

Pelco IP camera drivers required for the [Pelco IP Camera](#) component to be fully functional.

Vivotek IP Cameras

Vivotek IP camera drivers required for the [Vivotek IP Camera](#) component to be fully functional.

AMiT Driver

The *AMiT AtouchX Library* installer required for the *AMiT* communication driver to be fully functional.

HASP Device Driver

The installer of the driver for *HASP* hardware keys that are used by **Reliance**.

Java

The installer of the Java Runtime Environment (JRE 6.0 and higher) by Sun Microsystems required for the Web client to be fully functional.

10.2 License

In order for each module of **Reliance 4** to be fully functional, a license is required. The license is stored in the so-called license key. There are two types of license key:

- Hardware key
- Software key

A *hardware key* is a small piece of hardware containing license information. It is available in two versions – *LPT* and *USB*. Both of them can be connected to the respective port of a computer. A hardware key is portable between computers. A device driver is required to be installed before the hardware key can be used. The price of a hardware key is included in the license price (this applies to licenses with 250 and more [data points](#)). The required type of hardware key (*LPT* or *USB*) should be specified when ordering a license. A hardware key with a **Reliance 4** license can also be used with older versions of **Reliance**.

A *software key* is a special file containing license information and information on the computer it is designed for. For this reason, a software key cannot be used on another computer (it is not portable between computers). A software key with a **Reliance 4** license cannot be used with older versions of **Reliance** (older versions do not support using a software key).

If you run the development environment or the runtime software without a license key (or the respective license is not found in the license key), it acts as the so-called *trial version*, which is limited to 25 data points, but has no time limit. The *trial version* is intended for testing purposes only.

- The trial version of the development environment includes all features of the *Desktop* version.
- The trial version of *Reliance Server* and *Reliance Control Server* can be used as a data server for 1 thin client only. Other features are not limited.
- The trial version of the runtime software cannot be used as the runtime environment for a real application at the end-user site and it is protected against such a usage.

The license for thin clients is part of the license key for a data server (i.e., *Reliance Server* or *Reliance Control Server*) and specifies the maximum number of clients that can be connected to the data server at the same time. The required number of thin clients should be specified when ordering the license for the data server. A thin client is not limited in terms of the number of data points.

The license for communication drivers is part of the license key for the runtime software. The price of the license differs depending on the type of the device that the driver is intended for, but does not depend on the number of [data points](#). The license for communication drivers should be ordered along with the license for the runtime software.

The license key for the *Reliance Design Desktop* development environment also contains the license for *Reliance View* and *Reliance Control* with the same number of data points to be used for debugging purposes only (i.e., it cannot be used for the runtime software running permanently at the end-user site).

The license key for the *Reliance Design Enterprise* development environment also contains the license for *Reliance View*, *Reliance Control*, *Reliance Server*, and *Reliance Control Server* with the same number of data points and the license for 3 thin clients to be used for debugging purposes only (i.e., it cannot be used for the runtime software running permanently at the end-user site).

A license key can later be *upgraded*. Thus, it is possible to additionally increase the number of [data points](#), increase the number of thin clients, extend the functionality of the respective module (e.g., upgrade *Reliance Design* from the *Desktop* version to the *Enterprise* version), change the type of module (e.g., upgrade from *Reliance Control* to *Reliance Control Server*), or add a license for other modules (e.g., communication drivers). The upgrade price is determined as the difference between the price of the new and the original license.

To get detailed information on the currently used license, generate the registration file, or upgrade license keys, use the *License Key Utility* application. The utility is located in the [Utils](#) directory and can also be run by choosing the *Help > License > Information* command from the **Reliance** [main menu](#).

10.2.1 Data Points

One of the main factors affecting the price of the licenses for the development environment and the runtime software is the size of a visualization project. The size is determined by the number of *data points*, which depends on the number and data type of tags defined within the project:

- Each tag of a simple data type (e.g., *Bool*, *Byte*, *Word*, *String*) uses **one** data point.
- Each array-type tag uses one or more data points. The number of data points is equal to the array element count divided by **five** (the result is rounded down, but its value is not less than 1).
- Each tag of type *DataBlock* uses **one** data point.

Examples:

A 2-element array-type tag uses one data point.

An 8-element array-type tag uses one data point.

A 100-element array-type tag uses 20 data points.

- One tag of type *IRC* does not use any data points; every additional tag of type *IRC* uses 1000 data points.
- Tags defined within the *System* device (i.e., private internal tags) **do not use any** data points.

The number of data points does not depend on the number of visualization windows, type of used components, etc.

The license for the development environment and the runtime software required for a specific visualization project may differ in the number of data points (in some cases, the runtime software does not use all tags defined within a project). To view the number of data points used in a project at design-time, choose the *Project > Information* command.

10.3 Illegal Characters

The names of objects defined within a visualization project must not contain the separator character (by default, the slash character "/") defined via the [Project Options > Objects](#) dialog. *Unicode* is fully supported in the names of objects defined within the project. The name of an object must not begin or end with a non-printable character (e.g., space). If any project text string is not displayed correctly, it is necessary to check whether the *Font* specified via the [Project Options > Languages](#) dialog box (or on the *Static* page of the respective component's *Properties* dialog box) supports the required language and whether the language is specified via the *Windows Region and Language* dialog box. To correctly display all text strings in a desired language (e.g., Russian), the visualization project must run on the corresponding version of *Windows*.

The names of some files that are part of the project are automatically generated based on user-defined names. They are, for example, the main project file (*. *rp4*), window files (*. *xml*), script files (*. *txt*), and picture files (with an extension according to the image file format). When generating the name of a file, some characters (space and dot) are replaced with an underscore, national characters (e.g., characters with diacritics) are replaced with the corresponding English characters (based on the rules specified in the <Reliance4>\Config\NationalChars. *txt* file), and the remaining characters are omitted. To make the file name unique within a specific folder, an object's (window, script, picture, etc.) ID (numeric identifier) in hexadecimal format is also attached to it. This strict file-naming convention makes the visualization project easily transferable between different language versions of *Windows*.

10.4 Tips and Tricks

This chapter provides you with several tips and tricks to help you develop your application more easily and efficiently.

[Adding Multiple Components of the Same Type to a Window](#)

[Fine Moving and Sizing Components](#)

[Selecting Multiple Components](#)

[Quick Opening Associated Visualization Windows](#)

[Defining a Link to an Object](#)

[Starting a Project Automatically After Turning on a Computer](#)

[Safe Project Termination During a Power Outage](#)

[Optimizing Computer Workload](#)

[Optimizing Communication With Subordinated Devices](#)

[Interconnecting Reliance and Mosaic](#)

10.4.1 Adding Multiple Components of the Same Type to a Window

To add multiple components of the same type to a visualization window, press the `Shift` key while selecting the component on the Component Palette. To place the component, click the left mouse button on the window area. This mode allows you to place the component into the window area as many times as needed (every additional mouse click adds a new component of the same type to the window). To exit this mode, click the arrow icon on the Component Palette or select the same (or another) type of component from the palette.

10.4.2 Fine Moving and Sizing Components

To slightly move the components selected in a visualization window, press and hold the key combination `Ctrl+arrow` (*left, right, up, down*). The components change their position in the selected direction by one pixel (i.e., one move is equal to one pixel).

To slightly resize the components selected in a visualization window, press and hold the key combination `Shift+arrow` (*left, right, up, down*). The components get resized in the selected direction by one pixel (i.e., one move is equal to one pixel).

10.4.3 Selecting and Deselecting Multiple Components

To select or unselect multiple components in a visualization window, press and hold the `Shift` key while clicking individual components.

10.4.4 Quick Opening Associated Visualization Windows

To quickly open a visualization window linked to a *Button* component using the *Activate window* property at design-time, click the middle mouse button on the component area. Similarly, a window template can be opened.

10.4.5 Quick Selecting Objects When Creating Links

When invoking a [selection dialog box](#) to specify a link to an object, such as a tag or item, you can influence which object on the list is initially selected (by default, it is the object defined by the existing link). To preselect the first object at the top level of the object hierarchy, press and hold the `Ctrl` key while invoking the dialog box.

To preselect the object most recently selected via the [selection dialog box](#), press and hold the `Shift` key while invoking the dialog box.

To preselect the same object that has so far been assigned for the respective purpose, you should not press `Shift` or `Ctrl` while invoking the [selection dialog box](#). If no object has been specified so far, the first object at the top level of the object hierarchy is preselected.

10.4.6 Starting a Project Automatically After Turning on a Computer

In order to start a visualization project automatically after turning on a computer, it is necessary that the user be automatically logged on after starting the operating system and the project be automatically started after user log-on.

1. Automatic user log-on in Windows after starting the operating system

By configuring the Windows Registry (see as follows), manual user log-on is not required after starting the operating system. This means that the specified user can be logged on automatically. The user must have administrator access rights and a password longer than 4 characters.

- Start the `regedt32.exe` (located in the `System32` subdirectory) or `regedit.exe` application.

- In the `HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon` hive, find the `DefaultDomainName`, `DefaultUserName`, `DefaultPassword` keys (if the `DefaultPassword` key does not exist, it must be created – its data type is `REG_SZ`), and supply information on the specified user as the values of these keys (domain, name, password).
- Enter "1" (one) as the value of the `AutoAdminLogon` key (if the key does not exist, it must be created – its data type is `REG_SZ`).
- Save the changes and restart the system. If everything is specified correctly, Windows no more requires manual user log-on, i.e., the user is logged on automatically.

Note: To configure automatic user log-on in Windows 2000/XP, the Control Panel can also be used.

Warning:

If the specified user has no password or the password is shorter than 4 characters, the value of the `AutoAdminLogon` key automatically changes to "0" at startup and manual user log-on is required again.

2. Starting a project automatically

To automatically start a visualization project after user log-on, a shortcut to the runtime software (`R_Ctl.exe`, `R_CtlSrv.exe`, or `R_View.exe`) must be placed to the Windows *Startup* folder. You can also create a shortcut to the project by choosing the *Project > Create Shortcut* command. For a delayed start of the visualization project, the `R_Start` utility can be used (it is located in the `Utils` directory on the installation DVD).

Note: To start *Reliance Server* (a Windows service) after turning on a computer, see the *Data Servers* user guide.

10.4.7 Safe Project Termination During a Power Outage

The basic assumption is that the computer running the visualization project is powered by a UPS (Uninterruptible Power Supply). In case of a power outage, the project (runtime software) should be safely terminated before shutting down the operating system. This prevents data from being lost or damaged. If the UPS driver is available, it must be configured to run the `R_Termin.exe` utility before shutting down the operating system (the utility is located in the `Utils` directory on the installation DVD). Then, the project can be safely terminated.

10.4.8 Optimizing Computer Workload

The computer's load at runtime is affected by the following factors:

- Project Size
- Databases
- Scripts
- Data Transfer
- Windows

Project Size

The project startup speed and the computer's load can be affected by the size of the visualization project. The project size is determined by the number of objects defined within managers and the number of objects connected to the computer via the [Project Structure Manager](#). It is recommended to remove all unused objects from the project. To find the unused objects, [project diagnostics](#) should be performed. Also, only those objects required by the respective computer should be connected to it via the *Project Structure Manager*. The other objects should be disconnected.

Databases

To reduce the computer's load, it is recommended to minimize the number of requests for reading/writing data from/to databases. To achieve this, the [Logging interval](#) property of the respective data table must be customized. If an SQL server is used, a separate computer can be assigned to this server.

Scripts

To reduce the computer's load, it is recommended to minimize the number of executed scripts or customize the [Repeat interval](#) property. However, the demand factor of script operations has the greatest effect. Therefore, scripts' code should be as much effective as possible. Repeated code should always be placed into procedures (`sub`) or functions (`function`) so that the scripting engine translates it only once (at project startup). For working with array-type tags, the `RTag.SetTagElementValues` and `RTag.MoveTagElementValues` procedures should be used. Basically, it is not recommended to use wait loops based on "infinite" cycles. If possible, we recommend that time-consuming scripts be moved to another thread to enable the parallel processing of these scripts.

Data Transfer

To minimize the computer's load, it is recommended to minimize the amount of data transferred between instances of the runtime software, between the runtime software and communication drivers, and between thin clients. The computer's load can also be affected by the interval at which data is updated. For tags defined within physical devices, it is recommended to maximize their update interval. If server connections are used, it is recommended to limit the number of downloaded archive files of alarms/events and data tables. For communication channels of devices connected through server connections, their update interval should be maximized. The data update interval specified via the *Export Project for Remote Users Wizard* should also be maximized.

Some types of devices support using communication zones. If communication zones are used, you should follow the rules stated in the chapter [Optimizing Communication With Subordinated Devices](#).

Windows

The computer's load at runtime is significantly affected by how visualization windows are designed. To increase the application's performance at startup, dynamic loading of visualization windows should be used (the window is loaded into memory only before it is activated). Another factor affecting the computer's load is graphical operations performed in visualization windows. If you want to improve you visualization project by, for example, animations or changing the size or position of components, you should keep to the following rules:

Each picture used in the visualization project should have its color depth and total size optimized. Ideally, you should edit the picture in a graphic editor allowing you to save the pictures only with the color palette used. The graphics format of the picture (*.bmp, *.gif, *.jpg, *.png, etc.) does not directly affect the application's performance. However, it affects the disk space occupied by the picture.

Windows raster (*.bmp)

This is an uncompressed format whose main disadvantage is a direct proportion between the picture size and the file size. This format is suitable for small pictures only.

CompuServe raster (*.gif)

This is a compressed format suitable for pictures with a small number of colors (it supports 256 colors only) and for pictures used as transparent.

JPEG raster (*.jpg)

This is a compressed format suitable, for example, for photographs. Because this compression is lossy, the format is not suitable for pictures used as transparent.

PNG raster (*.png)

The PNG (Portable Network Graphics) format is designed for lossless data compression of images with sharp edges. Its compression ratio is worse than of JPG, but there are no artifacts and it does not degrade images.

Windows metafile (*.wmf), extended Windows metafile (*.emf)

These are vector formats with no loss of quality when changing the size of images.

To create moving images (the *Animation* and *Active Picture* components), the above stated rules apply, too. There are also several other factors affecting the computer's load caused by drawing graphics in the visualization project:

Speed

The shorter the interval (the *Interval* property of the *Animation* component) of switching between individual pictures, the heavier the graphical load. Though stated first, this property should be edited last due to optimization purposes. The animation speed should also be chosen so that the simulated phenomenon looks real.

Transparency

It is recommended to avoid using transparent colors if possible. Instead, use the same color for the animation's background as used for the window's background.

Display

For components that draw pictures (*Picture*, *Active Picture*, *Animation*, etc. – the *Layout* property), it specifies the way the pictures are drawn (i.e., it determines whether the picture is drawn in its original size or not). In terms of dynamic drawing, the *Normal* and *Resize component* layouts are the least demanding options. When designing the animation, its position and size should be taken into consideration.

Position of components

The graphical load increases if multiple components overlap with one another. It is recommended that *Animation* components be placed into the visualization window without being overlapped with the other components.

10.4.9 Optimizing Communication With Devices Using Zones

When defining tags or communication zones for a device, you should keep to the following rules:

When assigning an address to tags within a subordinated system (i.e., device), the user should choose the addresses so that the tags with an identical update interval lie in a continuous memory area. When defining a communication zone for the device, the zone should cover as many tags as possible (at best, all of them).

There are, at least, two basic operations required for updating each communication zone – a request to be sent and a response to be received (i.e., two communication packets). To read the communication zone, there must be some time to send a request and receive a response (for example, the timeout between the request and the response depends on the device's communication properties and can take up to hundreds of milliseconds). Generally, the fewer the communication packets, the less time is needed for updating the data.

If the user cannot assign an address to tags within a device, communication zones should be appropriately specified to optimize communication. And again, the fewer the zones, the better. For example, it is much better to define a small number of long zones than a large number of short zones (even if they contain redundant data). If it is necessary to define a large number of short zones, the configuration of the reading interval must be considered. For example, if the value of data changes once a minute, it is useless to set the interval to 1000 ms.

10.4.10 Interconnecting Reliance and Mosaic

If no real PLC is available, you can connect to a simulated PLC via the Mosaic development environment.

First, bring up the *Project Structure Manager*. Then, on the *Basic* page of the respective device's communication channel, set the *Channel type* property to *Network (Ethernet)*.

If both **Reliance** and Mosaic run on the same computer, set the *IP address/URL* property to 127.0.0.1. If Mosaic runs on a different computer, enter this computer's IP address.

Finally, in the Mosaic development environment, bring up the *Project Manager*, set the *Connection type* property to *Simulated PLC*, and activate the *Mosaic PLC* option.

10.5 Trend Properties

Chart

Series

10.5.1 Chart

Series

General

Axis

Titles

Legend

Panel

Walls

3D

10.5.1.1 Series

Specifies the list of the trend's (chart's) existing series. For each series, its type, visibility, color, and title are displayed. By clicking on a symbol on the list, you can configure individual properties. The range of possible changes to the configuration of the series depends on the trend's position. For example, the *Real-Time Chart* component does not allow you to edit the [series' type](#) and *title* via the trend editor. These properties can only be edited via the component's property editor or the *Component Manager*.

10.5.1.2 General

Export

Allows you to save the trend's appearance to a file or to the clipboard. The following options are available: as *Bitmap*, as *Metafile*, as *Enhanced Metafile*, as **.TEE file*, as *JPEG*.

Print with transparent background

Allows you print the trend with a transparent background, i.e., no background color will be drawn. This option is available at runtime only.

Clip Points

Determines whether to clip the series' ticks and labels so that they do not reach outside the trend.

Margins

Specifies the margins between the component's edge and the trend itself. The values can only be specified separately for the top, bottom, right, and left margins using the text boxes (expressed as a percentage of the component's size).

Zoom

Trends allow you to select their parts that are to be displayed all over the trend's area. To select any part of the trend, drag the mouse from the top left corner to the bottom right corner while pressing the left mouse button. If you drag the mouse in the opposite direction, the trend will be displayed in its original size.

Allow Zoom

Determines whether the user is enabled to use the zoom functionality.

Animated Zoom

Activates a gradual transition between the normal and magnified size of the trend in steps as defined by the *Steps* property. This option is especially useful for large-sized trends.

Allow Scroll

Determines whether the user is enabled to scroll in the specified directions. To scroll, move the mouse while pressing the right mouse button.

10.5.1.3 Axes

The right pane displays the list of axes. The following five axes are always available to each chart: left, right, top, bottom, and depth. The *Visible* option determines whether to display the selected axis. The other axis properties can be configured via the pages located to the right of the list of axes.

▼ Scales

Auto

Determines whether to automatically set the range of the axis. If this option is active, the following two options are disabled while set to the automatic setting of the upper and lower limits of the axis range.

Maximum

Specifies the maximum value displayed on the axis. The maximum value can be set automatically according to the value of the series' point.

Minimum

Specifies the minimum value displayed on the axis. The minimum value can be set automatically according to the value of the series' point.

Desired Increment

Specifies the increment between two points of the series.

Change

Allows you to change the increment.

Logarithmic

Determines whether the axis scale should be logarithmic or linear.

Inverted

Determines whether the axis scale should be displayed inverted.

▼ Title

Title

Specifies the title of the selected axis.

Angle

Specifies the rotation angle of the title's text from the horizontal plane.

Font

Specifies the font and font style of the title.

Size

Extends the space for the title so that the entire text can be displayed when a larger font is used.

▼ Labels

The following properties determine how the axis labels are to be displayed.

Visible

Determines whether to show the labels.

Multi-line

Activates support for multi-line labels.

Label On Axis

Determines whether to show the labels even on the points of intersection of the selected axis and the other axes, which is usually the axis' maximum and minimum.

Round First

Determines whether the first label is to be rounded up to the nearest value.

Font

Specifies the font and font style of the labels.

Min. Separation %

Specifies the separation distance between individual labels.

Values Format

Sets the template for formatting the labels.

Size

Extends the space for the labels so that the entire text can be displayed when a larger font is used.

Angle

Specifies the rotation angle of the labels' text from the horizontal plane.

Style

Auto

Is used to select the appropriate style automatically.

None

If this option is active, no labels are displayed.

Value

If this option is active, all values between the maximum and minimum of the range are displayed.

Mark

Is used to show the labels of the displayed points only.

Text

To be added.

▼ Ticks

Axis Border

Specifies the style and width of the selected axis. By pressing the button, the [Border Color Editor](#) is brought up.

Grid Border

Specifies the style and width of the grid lines perpendicular to the selected axis. By pressing the button, the [Border Color Editor](#) is brought up.

Centered

If this option is active, the grid lines are displayed between the main ticks.

Ticks

Specifies the style, width, and length of the main ticks on the outer side of the axis. By pressing the button, the [Border Color Editor](#) is brought up.

At Labels Only

Determines whether to show the ticks depending on whether the labels are displayed.

Inner

Specifies the style, width, and length of the main ticks on the inner side of the axis. By pressing the button, the [Border Color Editor](#) is brought up.

Minor

Specifies the style, width, length, and number of minor ticks on the outer side of the axis. By pressing the button, the [Border Color Editor](#) is brought up.

▼ Position

Position %

Positions the axis with respect to the beginning of the chart.

Start %

Positions the axis' maximum with respect to the original position.

End %

Positions the axis' minimum with respect to the original position.

Reset position

Resets the position to its default settings.

10.5.1.4 Titles

The properties available on the *Titles* page allow you to insert a title to the **header** or **footer** of the chart.

Visible

Determines whether to display the specified title.

Adjust Frame

Determines whether to adjust the size of the frame to the size of the title. If this option is not active, the frame is spread out over the entire width of the chart.

Font

Specifies the font, color, and font style of the selected title.

Border

Specifies the border line of the frame. By pressing the button, the [Border Color Editor](#) is brought up.

Back Color

Specifies the background color of the frame.

Pattern

Specifies the pattern of the frame's background. By pressing the button, the [Pattern Color Editor](#) is brought up.

Alignment

Specifies the alignment of the title within the chart: *Left*, *Center*, and *Right*.

10.5.1.5 Legend

The following properties determine whether and how the chart's legend is to be displayed.

Visible

Determines whether to display the legend.

Legend Style*Automatic*

If this option is chosen, one of the following three options is automatically selected:

Series Names

If this option is chosen, there is an icon displayed next to the series names in the legend. The icon shows the shape of the chart's points and the color of their connecting line.

Series Values

If this option is chosen, the list of the chart's series values is displayed.

Last Values

If this option is chosen, the last values of the chart's series are displayed.

Text Style

Plain

This is a standard option when the *Legend Style* property is set to *Series Names*.

Left Value

The value is positioned on the left side of the space intended for the value. This option only makes sense if the *Legend Style* property is set to *Series Values* or *Last Values*.

Right Value

The value is positioned on the right side of the space intended for the value. This option only makes sense if the *Legend Style* property is set to *Series Values* or *Last Values*.

Left Percent

The values are expressed as a percentage and positioned on the left. This option only makes sense if the *Legend Style* property is set to *Series Values* or *Last Values*.

Right Percent

The values are expressed as a percentage and positioned on the right. This option only makes sense if the *Legend Style* property is set to *Series Values* or *Last Values*.

X Value

For each point of the chart, its horizontal axis value is shown. This option only makes sense if the *Legend Style* property is set to *Series Values* or *Last Values*.

Font

Specifies the font, color, and font style of the legend.

Back Color

Specifies the background color of the legend.

Frame

Specifies the style, width, and color of the legend's border. By pressing the button, the [Border Color Editor](#) is brought up.

Resize Chart

If this option is active, the size of the chart is adjusted to the position of the legend so that the legend is not overlapped with the chart.

Inverted Order

Determines whether to display the list of series in the legend in reverse order.

% Top Pos

Specifies the position of the legend's upper border as a percentage of the chart's height. It is only used if the legend is positioned on the left or on the right.

% Color Width

Specifies the width of the marks in the legend.

Dividing Lines

Specifies the style, width, and color of the lines separating individual items of the legend. By pressing the button, the [Border Color Editor](#) is brought up.

Position

Specifies the position of the legend with respect to the chart. You can choose from the following options: *Left*, *Right*, *Top*, and *Bottom*.

Margin

Allows you to increase the space between the chart and the legend.

Shadow

Color

Specifies the color of the legend's shadow.

Size

Specifies the distance between the bottom right corner of the shadow and the bottom right corner of the legend.

10.5.1.6 Panel

The following properties determine how the chart's (component's) panel is to be displayed.

Bevel Inner

Determines how the component's inner bevel (frame) is to be drawn. You can choose from the following options: *None*, *Lowered*, *Raised*.

Width

Specifies the distance between the inner bevel and outer bevel. The color of this space is the same as the *Panel Color*.

Bevel Outer

Determines how the component's outer bevel (frame) is to be drawn. You can choose from the following options: *None, Lowered, Raised*.

Width

Specifies the width of both bevels.

Panel Color

Brings up the *Select Color* dialog box allowing you to specify the background color of the component.

Border

If this option is active, a dark-colored border around the component is drawn.

Back Image

Any picture loaded from a file can be displayed in the background of the chart/component.

Browse/Clear

Allows you to load or delete the selected picture.

Inside

If this option is active, the picture only fills up the chart area. If it is inactive, it fills up the entire component area.

Style

Specifies how the image is to be displayed within the component. You can choose from the following options: *Stretch, Tile, Center*.

Gradient

In addition to a single color or picture, a gradient (a gradual transition between two colors) can be drawn in the component's background.

Visible

Determines whether to display the gradient.

Start Color

Specifies the start color of the gradient.

End Color

Specifies the end color of the gradient.

Direction

Specifies the direction and way in which the gradient is to be drawn. You can choose from the following options: *Top Bottom*, *Bottom Top*, *Left Right*, *Right Left*, *To Center*, *From Top Left*, *From Bottom Left*.

10.5.1.7 Walls

The following properties determine how the walls of a three-dimensional chart are drawn. The base-point of the chart is its bottom left rear corner of the cuboid. The *Left Wall*, *Bottom Wall*, and *Back Wall* pages allow you to configure the appearance of the walls adjacent to the corner.

The **Visible Walls** option determines whether to display the walls as cuboids or whether the left wall and bottom wall should not be displayed at all while the back wall is only displayed as a rectangle.

If the **3 Dimensions** option on the **3D** page is inactive, the back wall is displayed as a rectangle and the options on the *Left Wall* and *Bottom Wall* pages have no effect.

Background

Specifies the color of the selected wall.

Border

Determines whether and how the border lines of the wall (cuboid) are to be displayed. By pressing the button, the [Border Color Editor](#) is brought up.

Pattern

Specifies the pattern of the wall's sides. By pressing the button, the [Pattern Color Editor](#) is brought up.

Transparent

If this option is active, no color is used to fill the wall's sides. The wall's border specified by the **Border** property remains unchanged.

Size

Specifies the width of the wall in pixels.

Dark 3D

If this option is active, the 3D effect is increased.

10.5.1.8 3D

The following properties determine how the chart is displayed in a three-dimensional format.

3 Dimensions

If this option is active, the chart is displayed as a three-dimensional image.

3D %

Specifies the depth of the chart as a percentage of its width.

Orthogonal

If this option is active, the chart's left axis is parallel to the component's left edge and the chart's bottom axis is parallel to the component's bottom edge. By selecting this option, the *Rotation*, *Elevation*, and *Perspective* options are automatically disabled. If you want to look at the chart from a different angle, this option must be disabled.

Zoom Text

Determines whether to increase/decrease the font size of the labels when zooming in/out the chart through the *Zoom* feature.

Zoom

Allows you to zoom in/out the chart.

Rotation

Specifies the angle of rotation around the chart's vertical axis (this axis passes through the center of the chart).

Elevation

Specifies the angle of rotation around the chart's horizontal axis (this axis passes through the center of the chart).

Horiz. Offset

Allows you to change the horizontal position of the chart.

Vert. Offset

Allows you to change the vertical position of the chart.

Perspective

Allows you to change the perspective of the chart.

10.5.2 Series

The first control on this page is a drop-down list of the chart's series. After selecting the desired series, its properties can be configured on the following pages: *Format*, *Point*, *General*, and *Marks*.

[Format](#)

[Point](#)

10.5.2.1 Format

The following properties determine how the chart's series (i.e., connecting lines between the chart's points) is to be displayed.

Border

Specifies how the series' border is to be drawn. By pressing the button, the [Border Color Editor](#) is brought up.

Color

Specifies the color of the series' fill or pattern.

Dark 3D

If this option is active, the 3D effect is achieved.

Color Each

If this option is active, individual connecting lines between the points are drawn in different colors so that they are easily distinguished from one another.

Line Mode*Stairs*

If this option is active, each connecting line is formed by one *horizontal* and one *vertical* line (or plane in case of a 3D chart).

Inverted

If you want to activate this option, the previous one (*Stairs*) must also be enabled. In such a case, the first line is *vertical* and the other line is *horizontal*.

Pattern

Specifies the pattern of the series' fill. The following options are available: *Solid*, *Clear*, *Horizontal*, *Vertical*, *Diagonal*, *B.Diagonal*, *Cross*, *Diag.Cross*.

10.5.2.2 Point

The following properties determine how the series' points are to be drawn.

Visible

Determines whether to show the points.

3D

Determines whether to display the points as plane or three-dimensional objects. This option can only be used for the following point styles: *Square*, *Triangle*, *Down Triangle*.

Inflate Margins

Determines whether to automatically increase the axis range so that the series' points are displayed inside the chart.

Dark 3D

If this option is active, the faces of the objects representing the points are shaded so that the 3D effect is achieved. This option can only be used for the following point styles: *Square*, *Triangle*, *Down Triangle*.

Width

Specifies the width of the objects representing the series' points.

Height

Specifies the height of the objects representing the series' points.

Style

Specifies the shape of the objects representing the series' points. The following options are available: *Square*, *Circle*, *Triangle*, *Down Triangle*, *Cross*, *Diagonal Cross*, *Star*, *Diamond*, *Small Dot*.

Background

Specifies the color of the objects representing the series' points.

Default

If this option is active, the color of the points is the same as the color of the line specified on the *Format* page.

Border

Specifies how the edges of the objects representing the series' points are to be drawn. By pressing the button, the [Border Color Editor](#) is brought up.

10.5.2.3 General

The following properties determine how the points' values on the trend's axes are to be displayed.

General*Show In Legend*

Determines whether to show the points' values in the legend.

Cursor

Specifies the appearance of the mouse cursor when placed over the points.

Formats*Values*

Specifies how to format the numeric value displayed by the marks.

Percents

Specifies how to format the percent value displayed by the marks.

Horizontal Axis

Specifies the axes to be used to display the points' x-values.

Date and Time

If this option is active, the numeric x-values are converted to text values that are to show time. To specify the way in which time is to be displayed, use the [Values Format](#) property.

Vertical Axis

Specifies the axes to be used to display the points' values.

Date and Time

If this option is active, the numeric values are converted to text values that are to show time. To specify the way in which time is to be displayed, use the [Values Format](#) property.

10.5.2.4 Marks**Visible**

Determines whether to display the points' marks.

Format*Back Color*

Specifies the color of the marks' background.

Transparent

If this option is active, no color is used to fill the mark's background. The marks' border specified by the *Border* property remains unchanged.

Font

Specifies the font, color, and font style of the marks.

Border

Specifies the visibility, style, width, and color of the marks' border. By pressing the button, the [Border Color Editor](#) is brought up.

Clipped

If this option is active, the marks lying outside the trend area will be clipped. The trend area is determined by the size of the horizontal and vertical axes.

Arrows

Color

Specifies the visibility, style, width, and color of the marks' arrows. By pressing the button, the [Border Color Editor](#) is brought up.

Length

Specifies the length of the arrows. It is the distance between the center of the points and the marks' border.

Style

Specifies the text of the marks.

Value

If this option is active, the points' values will be displayed.

Percent

If this option is active, the percentage of a single point's value out of the total sum of all values will be displayed.

Label

If this option is active, the points' text will be displayed.

Label and Percent

If this option is active, the points' text and the percentage of a single point's value out of the total sum of all values will be displayed.

Label and Value

If this option is active, the points' text and values will be displayed.

Legend

If this option is active, the marks' text is specified by the [Text Style](#) property.

Percent Total

If this option is active, the percentage of a single point's value out of the total sum of all values and the total sum of all values will be displayed.

Label & Percent Total

If this option is active, the points' text, the percentage of a single point's value out of the total sum of all values, and the total sum of all values will be displayed.

X Value

If this option is active, the points' x-values will be displayed.

10.5.3 Border Color Editor

The editor allows you to specify the visibility, style, width, and color of a line. If the selected width is greater than 1, only a solid line can be drawn.

10.5.4 Pattern Color Editor

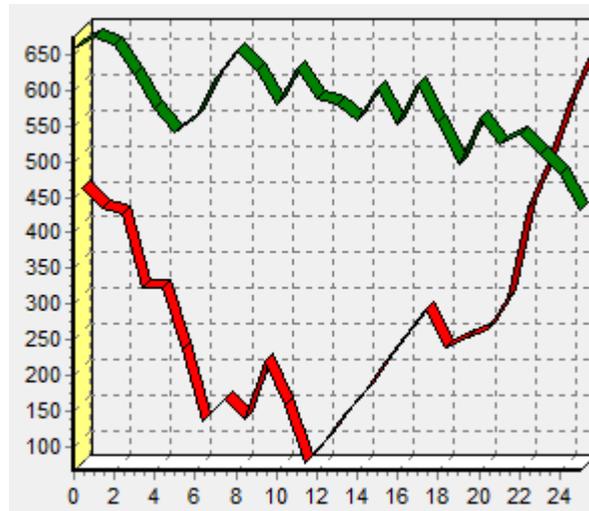
The editor allows you to specify the style and color of a fill pattern. There are several hatch patterns available. These can then be drawn with the selected color.

10.5.5 Trend Series Types

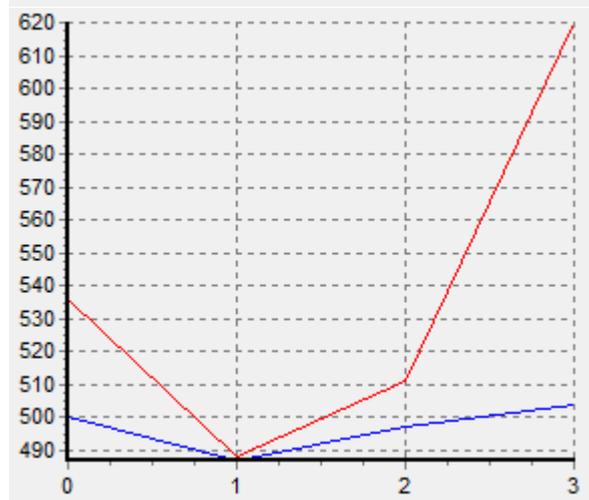
Series type

Picture

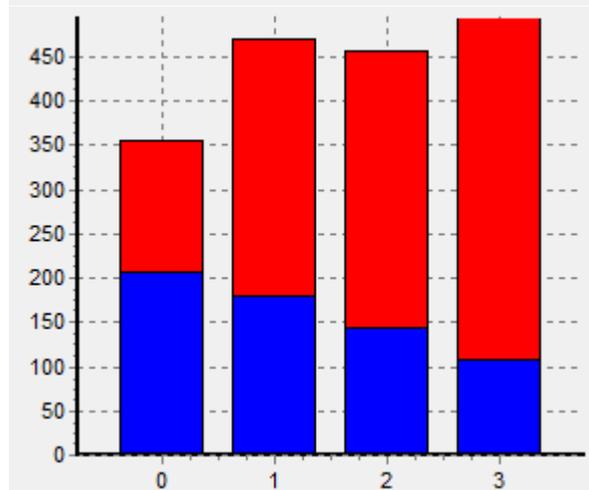
Line



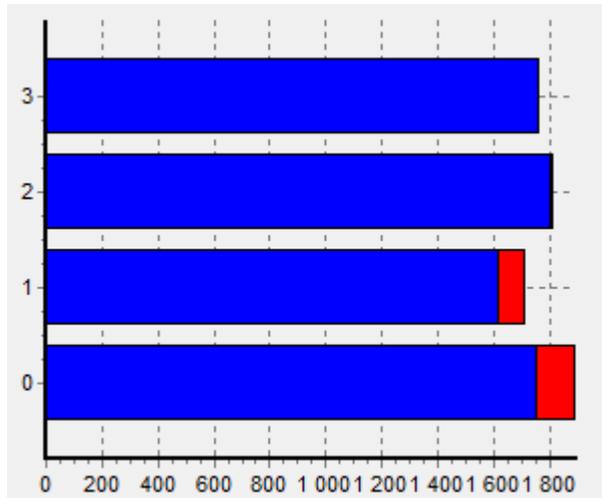
Fast line



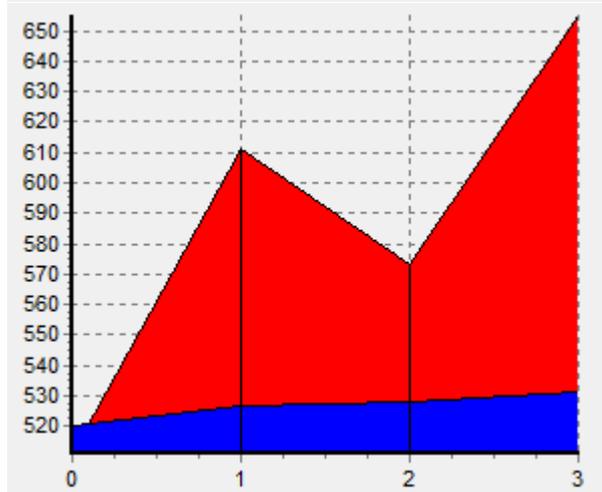
Bar



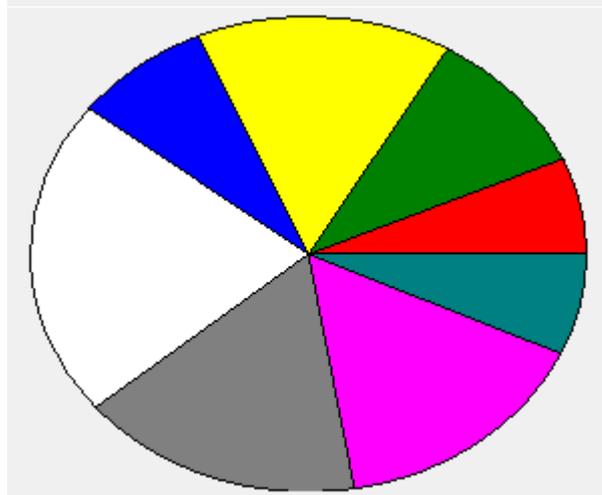
Horizontal bar



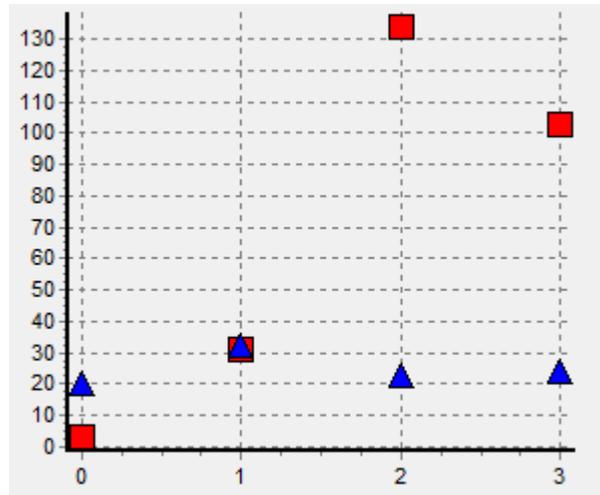
Area



Pie



Point



10.6 Environment Variables

Tag	Value
\$(ProjectName)	Project name
\$(Reliance)	The <Reliance4>\ directory, i.e., directory of the Reliance 4 program files
\$(Components)	The <Reliance4>\Components\ directory, i.e., directory of the Reliance 4 components (graphical objects)
\$(Drivers)	The <Reliance4>\Drivers\ directory, i.e., directory of the Reliance 4 communication drivers
\$(Project)	The <Project>\ directory, i.e., directory of a Reliance 4 visualization project
\$(CustomReports)	The <Project>\Main\CustomReports\ directory
\$(SettingsProfiles)	The <Project>\Settings\Profiles\ directory
\$(SettingsComponents)	The <Project>\Settings\Components\ directory
\$(SettingsRecipes)	The <Project>\Settings\Recipes\ directory
\$(HistoryAlarmsEvents)	The <Project>\History\AlarmsEvents\ directory
\$(HistoryData)	The <Project>\History\Data\ directory
\$(HistoryPostmort)	The <Project>\History\Postmort\ directory
\$(HistoryWindowRecords)	The <Project>\History\WindowRecords\ directory
\$(UserDocuments)	The %USERPROFILE%\Documents\, i.e., directory containing user data
\$(ApplicationData)	The %PROGRAMDATA%\, i.e., directory containing application data

10.7 File and Directory Structure

Directories and Files

[Program Files](#)

[Public Documents](#)

[User Documents](#)

[User Settings](#)

[Project Files](#)

10.7.1 Program Files

Reliance 4 directory structure.

[LicenseService Directory](#)

[Reliance4 Directory](#)

[BatchFiles Directory](#)

[Cert Directory](#)

[Components Directory](#)

[Config Directory](#)

[Doc Directory](#)

[Drivers Directory](#)

[Help Directory](#)

[Languages Directory](#)

[ThinClients Directory](#)

[Utils Directory](#)

[WebServer Directory](#)

[RelianceAddOnPack Directory](#)

[RelianceOPCServer Directory](#)

[Doc Directory](#)

Help Directory

10.7.1.1 LicenseService Directory

Main Program Files

LicenseService. Server.exe	Reliance License Service
-------------------------------	--------------------------

Other Program Files

*.dll	other software components and libraries
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Batch Files

install.bat	registers and runs Reliance License Service
uninstall.bat	stops and unregisters Reliance License Service

10.7.1.2 Reliance4 Directory

Main Program Files

R_Ctl.exe	Reliance Control
R_CtlSrv.exe	Reliance Control Server
R_Design.exe	Reliance Design
R_DrvSrv.exe	Reliance Driver Server
R_Srv.exe	Reliance Server
R_View.exe	Reliance View

Reliance Tools and Utilities

R_3to4.exe	Reliance 3 to 4 Project Converter. A tool used to convert visualization projects created with Reliance 3 to the format of Reliance 4 .
------------	--

R_RCC.exe	Reliance Remote Control Center. A program designed for the remote control of Reliance 's runtime software through a TCP/IP-based computer network.
R_DTEditor.exe	RDT File Editor (Reliance Data Table). In Reliance visualization projects, some configuration and data files are stored in an rdt table (a list of tags, component properties, etc.).
R_FRDesigner.exe	FastReport Designer. A program used for creating FastReport-type templates.
R_FRViewer.exe	FastReport Viewer. A program used for viewing reports of type FastReport.

Other Program Files

*.dll, *.bpl	other software components and libraries
--------------	---

Other Files

R_VersionInfo.ini	information on updates of the Reliance SCADA/HMI system
-------------------	--

10.7.1.2.1 BatchFiles Directory

Batch Files

R_DrvSrv_RegServer.bat	registers Reliance Driver Server as a COM server
R_DrvSrv_RegService.bat	registers Reliance Driver Server as a service
R_DrvSrv_StartApp.bat	runs Reliance Driver Server as an application
R_DrvSrv_StartService.bat	runs Reliance Driver Server as a service
R_DrvSrv_StopService.bat	stops the Reliance Driver Server service
R_DrvSrv_UnRegService.bat	unregisters the Reliance Driver Server service

R_Srv_RegService.bat	registers Reliance Server as a service
R_Srv_StartApp.bat	runs Reliance Server as an application
R_Srv_StartService.bat	runs Reliance Server as a service
R_Srv_StopService.bat	stops the Reliance Server service
R_Srv_UnRegService.bat	unregisters the Reliance Server service

10.7.1.2.2 Cert Directory

Certificate files for a secure connection to Reliance's data servers

cert.pem	certificate
key.pem	private key
root.pem	root certificate
pass.txt	contains a password for unlocking a certificate

10.7.1.2.3 Components Directory

Component Program Files (DLLs)

ActivePicture.dll	Active Picture
ActiveText.dll	Active Text
ActiveXContainer.dll	ActiveX Container
AmitTimeProgram.dll	AMiT – Time Program
Animation.dll	Animation
AxisIPCamera.dll	Axis IP Camera
BACnetTimeProgram.dll	BACnet – Time Program
Bar.dll	Bar
Bevel.dll	Bevel
Button.dll	Button
Circle.dll	Circle
Clock.dll	Clock

ComboBox.dll	Combo Box
Container.dll	Container
DataGrid.dll	Data Grid
DataTree.dll	Data Tree
Digifort.dll	Digifort
Display.dll	Display
EditBox.dll	Edit Box
EditMemo.dll	Notepad
ElgasGasComposition.dll	Elgas – Gas Composition
Ellipse.dll	Ellipse
EquithermalCurve.dll	Equithermal Curve
Gauge.dll	Gauge
Grid.dll	Grid
CheckBox.dll	Check Box
InternetExplorerer.dll	Internet Explorer
JohnsonControlsHolidays.dll	Johnson Controls – Holiday Program
JohnsonControlsTimeProgram.dll	Johnson Controls – Time Program
JohnsonControlsTimeProgramOnOff.dll	Johnson Controls – ON/OFF Time Program
LevelFillPicture.dll	Level Fill Picture
Line.dll	Line
MultimediaPlayer.dll	Media Player
PelcoIPCamera.dll	Pelco IP Camera
Picture.dll	Picture
Pipe.dll	Pipe
PopupMenu.dll	Popup Menu
ProgressBar.dll	Progress Bar
ProgressWheel.dll	Progress Wheel
RadioButtons.dll	Radio Buttons

RealTimeChart.dll	Real-Time Chart
RealTimeTrend.dll	Real-Time Trend
RoundedBar.dll	Round Bar
SauterHolidays.dll	Sauter – Holiday Program
SauterTimeProgram.dll	Sauter – Time Program
Scale.dll	Scale
SimpleTimeProgram.dll	Simple Time Program
TecoIRC.dll	Teco – IRC
TecoTimeProgram.dll	Teco – Time Program
Text.dll	Text
TimeProgram.dll	Time program
TrackBar.dll	Track Bar
VivotekIPCamera.dll	Vivotek IP Camera
WagoTimeProgram.dll	Wago – Time Program

10.7.1.2.4 Config Directory

IPBlackList.txt	a list of IP addresses ignored by the data server; the data server does not respond to requests from these addresses
IPWhiteList.txt	a list of IP addresses accepted by the data server (the others are ignored); the data server responds to requests from these addresses (does not respond to requests from other addresses)
Languages.txt	a list of world languages
MIME.txt	Web server media types (Internet Media Type, MIME)
MobileUserAgents.txt	a list of identifiers of Web browsers (the so-called User Agents) in mobile devices
NationalChars.txt	a conversion table for removing national characters (characters with diacritics)
Scripts.txt	the syntax of procedures and functions in VBScript and the definition of Reliance -defined objects for working with scripts
ScriptsLocStrings.txt	a language localization file for Scripts.txt

SMSCN.txt a list of telephone numbers of GSM short message service centers

10.7.1.2.5 Doc Directory

Documentation

BuildingAutomation_<LANG>.pdf Building Automation

CustomReports_<LANG>.pdf FastReport Designer (the original help)

DataExchange_<LANG>.pdf Data Exchange Methods

DataServers_<LANG>.pdf Data Servers (Reliance Server, Reliance Control Server)

Design_<LANG>.pdf Reliance Design Development Environment

FirstSteps_<LANG>.pdf First Steps (basic functions of the Reliance Design development environment)

LicenseActivation_<LANG>.pdf License Activation

LicenseKeyUtil_<LANG>.pdf License Key Utility

Runtime_<LANG>.pdf Runtime Software (Reliance View, Reliance Control, Reliance Server, Reliance Control Server)

Scripts_<LANG>.pdf Scripts (functions and procedures in VBScript and **Reliance**-defined objects for working with scripts)

Tutorial_OPC_<LANG>.pdf OPC Servers (tutorial)

WebClient_<LANG>.pdf Reliance Web Client

where <LANG> represents the language identifier

Other

History_<LANG>.html History of changes to **Reliance**

History_Old_<LANG>.html

where <LANG> represents the language identifier

10.7.1.2.6 Drivers Directory

Communication Driver Program Files (DLLs)

R_DrvAllenBradley.dll	Allen-Bradley device
R_DrvAmit.dll	AMiT device
R_DrvBACnet.dll	BACnet device
R_DrvCimon.dll	CIMON device
R_DrvDLMS.dll	device communicating via DLMS
R_DMB.dll	DMB device
R_DNP3.dll	device communicating via DNP3
R_DrvElgas.dll	Elcor94 and Elgas2 devices
R_DrvGeneric.dll	Generic device
R_DrvIEC104.dll	IEC101 and IEC104 devices
R_DrvIEC62056.dll	IEC62056 device
R_DrvInmat.dll	Inmat device
R_DrvIoT.dll	IoT device
R_DrvJohnson.dll	Johnson Controls DX9100, SC9100, and FX15 devices
R_DrvKNX.dll	device in the KNX/IP network
R_DrvMbus.dll	Mbus and Mbus Sensonic Plus devices
R_DrvMitsubishi.dll	device communicating via MELSEC A
R_DrvModbus.dll	Modbus and Wago devices
R_DrvMQTT.dll	device communicating via MQTT
R_DrvOmron.dll	Omron device
R_DrvPromos.dll	Promos device
R_DrvQMD.dll	QMD device
R_DrvSauter.dll	Sauter EY2400 device
R_DrvSiemens.dll	Siemens SIMATIC device
R_DrvSMS.dll	sending and receiving text messages
R_DrvTeco.dll	Teco device
R_DrvWSR3000.dll	Rittmeyer wsr3000 device

Other Program Files

Reli_Comm.exe Reliance – External Communicator

Other Files

*.ini driver configuration

10.7.1.2.7 Help Directory

Help (HTML Help)

CustomReports.chm	FastReport Designer (the original help)
Design_<LANG>.chm	Development Environment
Scripts_<LANG>.chm	Scripts (functions and procedures in VBScript and Reliance -defined objects for working with scripts)
Runtime_<LANG>.chm	Runtime Software (Reliance View, Reliance Control, Reliance Control Server)
VBScript5.chm	Visual Basic Scripting (the original help)
WindowsScript56.chm	Windows Script Technologies (the original help)

where <LANG> represents the language identifier

10.7.1.2.8 Languages Directory

The `Languages` directory is contained in Reliance 4 Library. The library is not part of **Reliance's** installer. A separate [installer](#) is used to install the library. The location of this directory can be changed using the [Environment Options](#) dialog box.

Directories

*.lng, *.ENU, *.DEU, *. other software components and language libraries
 ELL, *.ESP, *.FRA, *.
 HUN, *.LTH, *.PLK, *.
 RUS, *.SKY, *.SLV, *.
 TRK, *.ARA

10.7.1.2.9 ThinClients Directory

Thin Client Files

These files are used (the files' contents are unpacked) to export a visualization project for remote users. The contents of the `*Custom.zip` file are unpacked at the very end, i.e., the files have the highest priority. They are designed to overwrite the default files with custom files.

<code>WebClient.zip</code>	program files and other files of Reliance Web Client
<code>WebClientCustom.zip</code>	an archive containing custom files of Reliance Web Client (see the description in the <code>ReadMe.txt</code> file)
<code>WebClientLib.zip</code>	Web Client libraries
<code>ReadMe.txt</code>	instructions for creating custom files

10.7.1.2.10 Utils Directory

Reliance Auxiliary Tools and Utilities

`R_AppKill.exe` Terminates an external application specified in the `R_AppKill.ini` file. The name of the `ini` file can also be passed as a parameter to the utility. The **Reliance** SCADA/HMI system usually runs the utility from a [script](#) (`RSys.ExecApp`) or using an [action](#).

The first two parameters of the `ini` file are used to identify the window of the application to terminate (only one of the parameters can be specified). The `Delay` parameter specifies the interval (in seconds) between the attempt to correctly terminate the application and a forced termination of the application.

`R_AppRun.exe` Runs an external application with parameters according to the settings in the `R_AppRun.ini` file. The name of the parameter block (in the `ini` file, it is placed inside brackets) should be passed as a parameter to the `R_AppRun.exe` program at its startup (usually from a [script](#) or using an [action](#)).

`R_DTWriter.exe` A program designed to write data to a file with an `rdt` extension from the command prompt. Four parameters are required by the program: `rdt` table's name, row number, column number, and cell's new value. If the program is run without the parameters, a brief help is displayed.

<code>R_Start.exe</code>	Allows you to run an external application with a time delay. Usually, it runs the runtime software after computer startup . The application, including parameters and the time delay (in seconds), is specified in the <code>R_Start.ini</code> file.
<code>R_Termin.exe</code>	Correctly terminates all instances of the runtime software running on the current Windows session. Usually, the computer running the program is powered by a UPS (Uninterruptible Power Supply) during a power outage.

The `LicenseKeyUtil` file contains the *License Key Utility* application (`LicenseKey.Util.exe`), which is designed for acquiring detailed information on licenses (the list of purchased modules, communication drivers, thin clients, data points, etc.) stored in a license key (hardware key or software key). It also allows for upgrading the key using a license file and storing key backups to the license file. Microsoft .NET Framework, which is part of the [Reliance Add-On Pack](#) installer, is required to run the utility.

10.7.1.2.11 WebServer Directory

Files Used by the Web Server

<code>Pages.zip</code>	templates of html pages used by the Web server built in the data servers
<code>PagesCustom.zip</code>	custom templates of html pages used by the Web server built in the data servers
<code>Filter_WhiteList.txt</code>	IP filter settings – a list of enabled IP addresses
<code>Filter_BlackList.txt</code>	IP filter settings – a list of disabled IP addresses
<code>ReadMe_<LANG>.txt</code>	instructions for creating custom files of html page templates

where `<LANG>` represents the language identifier

10.7.1.3 RelianceAddOnPack Directory

The `RelianceAddOnPack` directory contains the installers of add-on components for **Reliance** that are supplied by third parties. They are, for example, different runtime environments, database engines, or drivers installed by the [Reliance Add-On Pack](#) installer.

10.7.1.4 RelianceOPCServer Directory

Main Program Files

OPC.Monitor.Client.exe Reliance OPC Server Monitoring Client
OPC.Systray.exe

Other Program Files

*.exe, *.dll other software components and libraries

Batch Files

RegServer.bat registers and runs the Reliance OPC Server service
UnregServer.bat stops and unregisters the Reliance OPC Server service

10.7.1.4.1 Doc Directory

Documentation

OPCServer_<LANG>.pdf

where <LANG> represents the language identifier

10.7.1.4.2 Help Directory

Help (HTML Help)

OPCServer_<LANG>.chm

where <LANG> represents the language identifier

10.7.2 Public Documents

Reliance public documents' directory structure.

[Licenses Directory](#)

[Reliance4 Directory](#)

[RelianceLicenseService Directory](#)

[RelianceOPCServer Directory](#)

10.7.2.1 Licenses Directory

The `Licenses` directory contains license keys of the **Reliance** SCADA/HMI system.

10.7.2.2 Reliance4 Directory

Examples

This directory contains **Reliance** sample projects.

Help

Help Provided by the Data Servers (HTML)

`DataServers_<LANG>` a directory with help for a data server

`WebClient_<LANG>` a directory with help for Reliance Web Client

where `<LANG>` represents the language identifier

Library

The `Library` directory contains *Reliance 4 Library*. The library is not part of **Reliance's** installer. A separate [installer](#) is used to install the library. The location of this directory can be changed using the [Environment Options](#) dialog box.

Directories

`Pictures` contains pictures of the graphics library

Logs

The `Logs` directory contains records of the operation of **Reliance**'s runtime software and communication drivers.

PostInstallFiles

The `PostInstallFiles` directory contains files processed after the installation of the **Reliance** SCADA/HMI system at the first startup of some of the modules. When it is started for the first time, the files are extracted to the specified directory and the string "_backup" is added to the name of the directory. If the string is removed, the file will again be processed when you next time run the module (it can also be used to restore the original state).

Files

<code>Examples.zip</code>	examples; at the first startup of some of the Reliance modules, the archive is extracted to the <code><Reliance>\Examples</code> directory
<code>Examples_Backup.zip</code>	contains the backup of example projects supplied together with Reliance
<code>WebHelp.zip</code>	documentation files for the Web server; at the first startup of some of the Reliance modules, the archive is extracted to the <code><Reliance>\Help</code> directory
<code>WebHelp_Backup.zip</code>	contains the backup of the Web server documentation

SDK

The `SDK` directory contains examples of connections to a data server via a Web service.

Settings

Initialization Files

<code>R_3to4.ini</code>	Reliance 3 to 4 Project Converter settings
<code>R_CmpLib.ini</code>	Component Palette settings
<code>R_Ctl.ini</code>	Reliance Control settings
<code>R_CtlSrv.ini</code>	Reliance Control Server settings

R_Design.ini	Reliance Design settings
R_DrvSrv.ini	Reliance Driver Server settings
R_DTEditor.ini	RDT File Editor settings
R_FRDesigner.ini	FastReport Designer settings
R_FRViewer.ini	FastReport Viewer settings
R_Options.ini	Reliance 4 SCADA/HMI settings
R_RCC.ini	Reliance Remote Control Center settings
R_Srv.ini	Reliance Server settings
R_View.ini	Reliance View settings
Reli_Comm.ini	External Communicator settings

Other

ScriptTemplates.txt contains script templates

10.7.2.3 RelianceLicenseService Directory

Settings

Configuration Files

settings.config

10.7.2.4 RelianceOPCServer Directory

Logs

The Logs directory contains runtime records of **Reliance OPC Server**.

Settings

Configuration Files

Client.config

Server.config

Systray.config

10.7.3 User Documents

Reliance user documents' directory structure.

[Projects Directory](#)

[ProjectsBackup Directory](#)

10.7.3.1 Projects Directory

This directory is intended for storing new **Reliance** visualization projects. The location of this directory can be changed using the [Environment Options](#) dialog box.

10.7.3.2 ProjectsBackup Directory

This directory is intended for storing **Reliance** visualization project backups. The location of this directory can be changed using the [Environment Options](#) dialog box.

10.7.4 User Settings

Reliance user settings' directory structure.

[Reliance4 Directory](#)

[RelianceLicenseKeyUtil Directory](#)

10.7.4.1 Reliance4 Directory

Settings

Files with User Settings

R_3to4.dsk

Reliance 3 to 4 Project Converter settings

R_Ctl.dsk	Reliance Control settings
R_CtlSrv.dsk	Reliance Control Server settings
R_Design.dsk	Reliance Design settings
R_DTEditor.dsk	RDT File Editor settings
R_FRDesigner.dsk	FastReport Designer settings
R_FRViewer.dsk	FastReport Viewer settings
R_RCC.dsk	Reliance Remote Control Center settings
R_View.dsk	Reliance View settings

Other Files

R_Design.kst	keyboard shortcut settings
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10.7.4.2 RelianceLicenseKeyUtil Directory

Settings

Configuration Files

settings.config

10.7.5 Project Files

It is the directory structure of a **Reliance** visualization project.

Project Folder

[History Directory](#)

[Main Directory](#)

[Settings Directory](#)

[ThinClients Directory](#)

10.7.5.1 Project Folder

<code>*.rp4</code>	the main file of a visualization project; it contains the project's basic properties
<code>*.dsk</code>	project configuration settings of the development environment
<code>Info.txt</code>	project structure information

10.7.5.2 History Directory

AlarmsEvents

The `AlarmsEvents` directory is the default directory for storing tables with historical alarms/events. Archive files can be stored in subdirectories and named according to their type ([Project Options](#) > *Project* > *Alarms/Events* > *Database* > *File-based* > *Archive files*).

<code>AE.rdt</code>	the current file of the alarm/event database
---------------------	--

Data

The `Data` directory is the default directory for storing tables with historical data. Archive files can be stored in subdirectories and named according to their type ([Data Table Manager](#) > *Advanced* > *Archive files*).

<code>*.dbf</code>	a table with historical data in the dBASE format
<code>*.mb</code>	a table with historical data in the Paradox format

Postmort

The `Postmort` directory is the default directory for storing Postmort records. The location of the directory can be changed via the *Project Structure Manager* (*Computer* > [Postmort](#)).

WindowRecords

The `WindowRecords` directory is the default directory for storing window records. The location of the directory can be changed via the *Project Structure Manager* on the computer properties' [Other](#) page.

10.7.5.3 Main Directory

Apps

This is a directory intended for the files of external applications run from a visualization project.

CustomReports

This is a directory intended for files containing custom report templates used in a visualization project. Each file's name consists of two parts. The first part corresponds to the name of the respective custom report, the other part corresponds to the custom report ID in hexadecimal format. They are files in the XML format with support for Unicode.

MMedia

This directory is intended for multimedia files used in a visualization project (e.g., *.wav files for assigning sounds to different operations).

Pictures

This directory is intended for picture files imported to a visualization project. Each file's name consists of two parts. The first part corresponds to the name of the respective picture, the other part corresponds to the picture ID in hexadecimal format. They are files in the image file formats supported by **Reliance**.

Scripts

This is a directory intended for files containing scripts written in VBScript used in a visualization project. Each file's name consists of two parts. The first part corresponds to the name of the respective script, the other part corresponds to the script ID in hexadecimal format. They are text files (.txt) with support for Unicode.

Strings

This directory is intended for files containing localizable text strings used in a visualization project. Each file's name consists of three parts. The first part corresponds to the language code, the second part corresponds to the country code, and the third part corresponds to the object ID in hexadecimal format. They are text files (.txt) with support for Unicode.

System

This directory is intended for files with tables of individual objects defined within a visualization project and their mutual relations. They are files in the RDT format (**Reliance** Data Table).

Objects_00000001. rdt	Table of objects of type "Control Area"
Objects_00000002. rdt	Table of objects of type "Computer"
Objects_00000003. rdt	Table of objects of type "User"
Objects_00000004. rdt	Table of objects of type "Printer"
Objects_00000005. rdt	Table of objects of type "Window"
Objects_00000006. rdt	Table of objects of type "Alarm/Event"
Objects_00000007. rdt	Table of objects of type "Script"
Objects_00000008. rdt	Table of objects of type "Communication Zone"
Objects_00000009. rdt	Table of objects of type "Tag"
Objects_0000000A. rdt	Table of objects of type "Connected Device"
Objects_0000000B. rdt	Table of objects of type "Communication Channel"
Objects_0000000C. rdt	Table of objects of type "Device"
Objects_0000000D. rdt	Table of objects of type "Connected Data Table"
Objects_0000000E. rdt	Table of objects of type "Data Table"
Objects_0000000F. rdt	Table of objects of type "Data Table Field"

Objects_00000010. rdt	Table of objects of type "Connected Trend"
Objects_00000011. rdt	Table of objects of type "Trend"
Objects_00000012. rdt	Table of objects of type "Trend Series"
Objects_00000013. rdt	Table of objects of type "Real-Time Trend"
Objects_00000014. rdt	Table of objects of type "Real-Time Trend Series"
Objects_00000015. rdt	Table of objects of type "Connected Report"
Objects_00000016. rdt	Table of objects of type "Report"
Objects_00000017. rdt	Table of objects of type "Report Item"
Objects_00000018. rdt	Table of objects of type "Connected Custom Report"
Objects_00000019. rdt	Table of objects of type "Custom Report"
Objects_0000001A. rdt	Table of objects of type "Custom Report Item"
Objects_0000001B. rdt	Table of objects of type "Connected Recipe Type"
Objects_0000001C. rdt	Table of objects of type "Recipe Type"
Objects_0000001D. rdt	Table of objects of type "Recipe Item"
Objects_0000001E. rdt	Table of objects of type "Server Connection Group"
Objects_0000001F. rdt	Table of objects of type "Server Connection"
Objects_00000020. rdt	Table of objects of type "Modem"
Objects_00000021. rdt	Table of objects of type "Picture"

Objects_00000022.rdt	Table of objects of type "Connected Script"
Objects_00000023.rdt	Table of objects of type "Data Structure"
Objects_00000024.rdt	Table of objects of type "Data Structure Field"
Objects_00000025.rdt	Table of objects of type "Connected User"
Objects_00000026.rdt	Table of objects of type "Action"
Objects_00000027.rdt	Table of objects of type "Communication Driver"
Objects_00000028.rdt	Table of objects of type "Connected Communication Driver"
Objects_00000029.rdt	Table of objects of type "State List"
Objects_0000002A.rdt	Table of objects of type "State"
Objects_0000002C.rdt	Table of objects of type "State List Folder"
Objects_0000002D.rdt	Table of objects of type "State Folder"
Objects_0000002E.rdt	Table of objects of type "Connected Device Folder"
Objects_0000002F.rdt	Table of objects of type "Connected Communication Driver Folder"
Objects_00000030.rdt	Table of objects of type "Device Folder"
Objects_00000031.rdt	Table of objects of type "Communication Zone Folder"
Objects_00000032.rdt	Table of objects of type "Tag Folder"
Objects_00000033.rdt	Table of objects of type "Alarm/Event Folder"
Objects_00000034.rdt	Table of objects of type "Connected Data Table Folder"

Objects_00000036.rdt	Table of objects of type "Data Table Folder"
Objects_00000037.rdt	Table of objects of type "Data Table Field Folder"
Objects_00000038.rdt	Table of objects of type "Connected Trend Folder"
Objects_00000039.rdt	Table of objects of type "Trend Folder"
Objects_0000003A.rdt	Table of objects of type "Trend Series Folder"
Objects_0000003B.rdt	Table of objects of type "Real-Time Trend Folder"
Objects_0000003C.rdt	Table of objects of type "Real-Time Trend Series Folder"
Objects_0000003D.rdt	Table of objects of type "Connected Report Folder"
Objects_0000003E.rdt	Table of objects of type "Report Folder"
Objects_0000003F.rdt	Table of objects of type "Report Item Folder"
Objects_00000040.rdt	Table of objects of type "Connected Custom Report Folder"
Objects_00000041.rdt	Table of objects of type "Custom Report Folder"
Objects_00000042.rdt	Table of objects of type "Custom Report Item Folder"
Objects_00000043.rdt	Table of objects of type "Connected Recipe Type Folder"
Objects_00000044.rdt	Table of objects of type "Recipe Type Folder"
Objects_00000045.rdt	Table of objects of type "Recipe Item Folder"
Objects_00000046.rdt	Table of objects of type "Connected Script Folder"
Objects_00000048.rdt	Table of objects of type "Script Folder"

Objects_00000049.rdt	Table of objects of type "Window Folder"
Objects_0000004B.rdt	Table of objects of type "Computer Folder"
Objects_0000004C.rdt	Table of objects of type "User Folder"
Objects_0000004D.rdt	Table of objects of type "Printer Folder"
Objects_0000004E.rdt	Table of objects of type "Modem Folder"
Objects_00000051.rdt	Table of objects of type "Picture Folder"
Objects_00000052.rdt	Table of objects of type "Data Structure Folder"
Objects_00000053.rdt	Table of objects of type "Connected User Folder"
Objects_00000054.rdt	Table of objects of type "Action Folder"
Objects_00000055.rdt	Table of objects of type "Communication Driver Folder"

Windows

This directory is intended for files containing information on the contents of a visualization window (window properties, list of components). Each file's name consists of two parts. The first part corresponds to the name of the respective window, the other part corresponds to the window ID in hexadecimal format. They are files in the XML format with support for UTF-8.

*.xml window file

Each window file consists of three parts. The first part describes the window properties, the second part contains information on the default properties of the components used in the window, and the third part contains a list of components placed in the window (differences compared to the default properties in the second part).

10.7.5.4 Settings Directory

AlarmsEvents

This directory is intended for files containing the settings of the alarm/event viewer and the list of alarm/event filters. They are `INI` files.

Components

This directory is intended for components' configuration and data files.

Component	File type	Extension
Simple Time Program	Simple Time Program	.tpr
Notepad	Reliance Data Table	.rdt
Data Tree	Reliance Data Table	.rdt
Time Program	Reliance Data Table	.rdt
Teco – Time Program	Reliance Data Table	.rdt

Data

This directory is intended for files containing the last tag values for individual computers. They are files in the `RDT` format (**R**eliance **D**ata **T**able). The files are named `VarTagDataN.rdt`, where `N` represents the computer ID in a decimal format (e.g., `VarTagData1.rdt`).

Desktop

This directory is intended for files containing the settings of the runtime software's user interface for a visualization project. They are `INI` files.

Profiles

This is a directory intended for files containing the settings of selected properties (alarm/event viewer, trend viewer, report viewer, etc.) for individual users. Each user's settings are stored in a separate directory. The settings in the `Default` directory are used in case when no user is logged on. They are `INI` files.

Recipes

This directory is intended for files containing stored project recipes. The files are in the `RDT` format (**Reliance** Data Table).

10.7.5.5 ThinClients Directory

This is a root directory of the Web server built in **Reliance's** data servers (*Reliance Server*, *Reliance Control Server*). The directory also contains the thin clients' files (*Reliance Web Client*, *Reliance Smart Client*). The directory has the following subdirectories:

WebClient

This subdirectory contains the program files of *Reliance Web Client* and project files exported for the Web client's purposes using the [Export Project for Remote Users Wizard](#).

WSDL

This subdirectory contains files with a description of the Web service (Web Services Description Language) built in **Reliance's** data servers.

10.8 Tag Kinds and Tag Data Types

Tag Kinds and Tag Data Types

Internal

Physical

Special Internal

Special Physical

Derived

10.8.1 Internal

	Tag data type	Range	Size (bits)	Note
	Bool	0, 1	1	false, true
	Byte	0 to 255	8	
	Word	0 to 65535	16	
	DoubleWord	0 to 4294967295	32	
	ShortInt	-128 to 127	8	
	SmallInt	-32768 to 32767	16	
	LongInt	-2147483648 to 2147483647	32	
	LargeInt	-2^{63} to $2^{63} - 1$	64	-9.22×10^{18} to 9.22×10^{18}
	Float	1.5×10^{-45} to 3.4×10^{38}	32	
	DoubleFloat	5.0×10^{-324} to 1.7×10^{308}	64	
	DateTime	internally as DoubleFloat	64	see the description below the table
	Date	internally as DoubleFloat	64	see the description below the table
	Time	internally as DoubleFloat	64	see the description below the table
	TimeSpan (amount of time)	internally as DoubleFloat	64	see the description below the table

	String	max. 2 ³¹ characters	max. 2 GB	string is terminated with the ASCII code "0"
	UTF8String	max. 2 ³¹ characters	max. 2 GB	
	WideString (UCS-2)	max. 2 ³⁰ characters	max. 2 GB	

	Tag data type	Element range	Size (bits)	Note
	Array of Bool	0, 1	1 x n	
	Array of Byte	0 to 255	8 x n	
	Array of Word	0 to 65535	16 x n	
	Array of DoubleWord	0 to 4294967295	32 x n	
	Array of ShortInt	-128 to 127	8 x n	
	Array of SmallInt	-32768 to 32767	16 x n	
	Array of LongInt	-2147483648 to 2147483647	32 x n	
	Array of LargeInt	-2 ⁶³ to 2 ⁶³ - 1	64 x n	-9.22 x 10 ¹⁸ to 9.22 x 10 ¹⁸
	Array of Float	1.5 x 10 ⁻⁴⁵ to 3.4 x 10 ³⁸	32 x n	
	Array of DoubleFloat	5.0 x 10 ⁻³²⁴ to 1.7 x 10 ³⁰⁸	64 x n	
	Array of DateTime	internally as DoubleFloat	64 x n	see the description below the table
	Array of Date	internally as DoubleFloat	64 x n	see the description below the table
	Array of Time	internally as DoubleFloat	64 x n	see the description below the table
	Array of TimeSpan (amount of time)	internally as DoubleFloat	64 x n	see the description below the table
	Array of String	max. 2 ³¹ characters	8 x n (max. 2 GB)	
	Array of UTF8String	max. 2 ³¹ characters	8 x n (max. 2 GB)	
	Array of WideString (UCS-2)	max. 2 ³⁰ characters	16 x n (max. 2 GB)	

where n represents the number of array elements

Tag of type DataBlock

A tag of type *DataBlock* contains a user-structured memory block. In the **Reliance** SCADA/HMI system, you can specify the length of the block (number of bytes). In terms of license, a tag of this type uses one data point independently of its length. However, you can't work with the memory as you do with arrays of byte (using indexes). The way data is arranged in the memory block depends on how it is used. For example, if you use a tag of type *DataBlock* to save and configure a time program of type *Heating/Air-conditioning* in a *Teco - Time Program* component, it will contain a data structure of the `_TTP4_` function block.

	Tag data type	Range	Size (bytes)	Note
	DataBlock	max. 2^{31} bytes	max. 2 GB	indexes can't be used to work with the tag

Tag of type DateTime

A tag of type *DateTime* is a real number whose digits to the left of the decimal point indicate the number of days that have passed since 12/30/1899. The decimal part indicates the part of the day that has passed since midnight.

Examples:

Value	Date and time
0	12/30/1899 12:00 am
2.75	1/1/1900 6:00 pm
-1.25	12/29/1899 6:00 am
35065	1/1/1996 12:00 am

10.8.2 Physical

OPC

	Tag data type	Range	Size (bits)	Note
	Bool	0, 1	1	false, true
	Byte	0 to 255	8	

Word	0 to 65535	16	
DoubleWord	0 to 4294967295	32	
ShortInt	-256 to 255	8	
SmallInt	-32768 to 32767	16	
LongInt	-2147483648 to 2147483647	32	
Float	1.5×10^{-45} to 3.4×10^{38}	32	
DoubleFloat	5.0×10^{-324} to 1.7×10^{308}	64	
DateTime	internally as DoubleFloat	64	see the description in the chapter Internal
String	max. 2^{31} characters	max. 2 GB	string is terminated with the ASCII code "0"

	Tag data type	Element range	Size (bits)	Note
	Array of Bool	0, 1	1 x n	
	Array of Byte	0 to 255	8 x n	
	Array of Word	0 to 65535	16 x n	
	Array of DoubleWord	0 to 4294967295	32 x n	
	Array of ShortInt	-256 to 255	8 x n	
	Array of SmallInt	-32768 to 32767	16 x n	
	Array of LongInt	-2147483648 to 2147483647	32 x n	
	Array of Float	1.5×10^{-45} to 3.4×10^{38}	32 x n	
	Array of DoubleFloat	5.0×10^{-324} to 1.7×10^{308}	64 x n	
	Array of DateTime	internally as DoubleFloat	64 x n	see the description in the chapter Internal
	Array of String	max. 2^{31} characters	8 x n (max. 2 GB)	

where n represents the number of array elements

DDE

	Tag data type	Range	Size (bits)	Note
	Bool	0, 1	1	false, true

☒	Byte	0 to 255	8	
☒	Word	0 to 65535	16	
☒	DoubleWord	0 to 4294967295	32	
☒	SmallInt	-32768 to 32767	16	
☒	LongInt	-2147483648 to 2147483647	32	
☒	Float	1.5×10^{-45} to 3.4×10^{38}	32	
☒	DoubleFloat	5.0×10^{-324} to 1.7×10^{308}	64	
☒	DateTime	internally as DoubleFloat	64	see the description in the chapter Internal
☒	String	max. 2^{31} characters	max. 2 GB	string is terminated with the ASCII code "0"

Teco

	Tag data type	Range	Size (bits)	Note
☒	Bool	0, 1	1	false, true
☒	Byte	0 to 255	8	
☒	Word	0 to 65535	16	
☒	DoubleWord	0 to 4294967295	32	
☒	ShortInt	-256 to 255	8	
☒	SmallInt	-32768 to 32767	16	
☒	LongInt	-2147483648 to 2147483647	32	
☒	Float	1.5×10^{-45} to 3.4×10^{38}	32	
☒	DoubleFloat	5.0×10^{-324} to 1.7×10^{308}	64	
☒	DateTime	internally as DoubleFloat	64	see the description in the chapter Internal
☒	String	max. 2^{31} characters	max. 2 GB	string is terminated with the ASCII code "0"

	Tag data type	Element range	Size (bits)	Note
☒	Array of Bool	0, 1	1 x n	
☒	Array of Byte	0 to 255	8 x n	

☒	Array of Word	0 to 65535	16 x n	
☒	Array of DoubleWord	0 to 4294967295	32 x n	
☒	Array of ShortInt	-256 to 255	64 x n	
☒	Array of SmallInt	-32768 to 32767	16 x n	
☒	Array of LongInt	-2147483648 to 2147483647	32 x n	
☒	Array of Float	1.5×10^{45} to 3.4×10^{38}	32 x n	
☒	Array of DoubleFloat	5.0×10^{-324} to 1.7×10^{308}	64 x n	
☒	Array of DateTime	internally as DoubleFloat	64 x n	see the description in the chapter Internal
☒	Array of String	max. 2^{31} characters	8 x n (max. 2 GB)	

where n represents the number of array elements

	Tag data type	Range	Size (bytes)	Note
☒	DataBlock	max. 2^{31} bytes	max. 2 GB	indexes can't be used to work with the tag
☒	IRC	-	7169 B	indexes can't be used to work with the tag; the tag's register type must be R, the tag's address must be 100

AMiT

	Tag data type	Range	Size (bits)	Note
☒	Bool	0, 1	1	false, true
☒	SmallInt	-32768 to 32767	16	
☒	LongInt	-2147483648 to 2147483647	32	
☒	Float	1.5×10^{45} to 3.4×10^{38}	32	

	Tag data type	Element range	Size (bits)	Note
☒	Array of SmallInt	-32768 to 32767	16 x n	
☒	Array of LongInt	-2147483648 to 2147483647	32 x n	

☒	Array of Float	1.5×10^{-45} to 3.4×10^{38}	32 x n	
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where n represents the number of matrix elements (columns x rows)

Modbus

	Tag data type	Range	Size (bits)	Note
☒	Bool	0, 1	1	false, true
☒	Byte	0 to 255	8	
☒	Word	0 to 65535	16	
☒	DoubleWord	0 to 4294967295	32	
☒	ShortInt	-256 to 255	8	
☒	SmallInt	-32768 to 32767	16	
☒	LongInt	-2147483648 to 2147483647	32	
☒	LargeInt	-2^{63} to $2^{63} - 1$	64	-9.22×10^{18} to 9.22×10^{18}
☒	Float	1.5×10^{-45} to 3.4×10^{38}	32	
☒	DoubleFloat	5.0×10^{-324} to 1.7×10^{308}	64	
☒	DateTime	internally as DoubleFloat	64	see the description in the chapter Internal
☒	String	max. 2^{31} characters	max. 2 GB	string is terminated with the ASCII code "0"

	Tag data type	Element range	Size (bits)	Note
☒	Array of Bool	0, 1	1 x n	
☒	Array of Byte	0 to 255	8 x n	
☒	Array of Word	0 to 65535	16 x n	
☒	Array of DoubleWord	0 to 4294967295	32 x n	
☒	Array of ShortInt	-256 to 255	8 x n	
☒	Array of SmallInt	-32768 to 32767	16 x n	
☒	Array of LongInt	-2147483648 to 2147483647	32 x n	
☒	Array of LargeInt	-2^{63} to $2^{63} - 1$	64 x n	-9.22×10^{18} to 9.22×10^{18}
☒	Array of Float	1.5×10^{-45} to 3.4×10^{38}	32 x n	

☒	Array of DoubleFloat	5.0×10^{-324} to 1.7×10^{308}	64 x n	
☒	Array of DateTime	internally as DoubleFloat	64 x n	see the description in the chapter Internal
☒	Array of String	max. 2^{31} characters	8 x n (max. 2 GB)	

where n represents the number of array elements

Wago

	Tag data type	Range	Size (bits)	Note
☒	Bool	0, 1	1	false, true
☒	Byte	0 to 255	8	
☒	Word	0 to 65535	16	
☒	DoubleWord	0 to 4294967295	32	
☒	ShortInt	-256 to 255	8	
☒	SmallInt	-32768 to 32767	16	
☒	LongInt	-2147483648 to 2147483647	32	
☒	LargeInt	-2^{63} to $2^{63} - 1$	64	-9.22×10^{18} to 9.22×10^{18}
☒	Float	1.5×10^{-45} to 3.4×10^{38}	32	
☒	DoubleFloat	5.0×10^{-324} to 1.7×10^{308}	64	
☒	DateTime	internally as DoubleFloat	64	see the description in the chapter Internal
☒	String	max. 2^{31} characters	max. 2 GB	string is terminated with the ASCII code "0"

	Tag data type	Element range	Size (bits)	Note
☒	Array of Bool	0, 1	1 x n	
☒	Array of Byte	0 to 255	8 x n	
☒	Array of Word	0 to 65535	16 x n	
☒	Array of DoubleWord	0 to 4294967295	32 x n	
☒	Array of ShortInt	-256 to 255	8 x n	
☒	Array of SmallInt	-32768 to 32767	16 x n	
☒	Array of LongInt	-2147483648 to 2147483647	32 x n	

☒	Array of LargeInt	-2^{63} to $2^{63} - 1$	64 x n	-9.22×10^{18} to 9.22×10^{18}
☒	Array of Float	1.5×10^{-45} to 3.4×10^{38}	32 x n	
☒	Array of DoubleFloat	5.0×10^{-324} to 1.7×10^{308}	64 x n	
☒	Array of DateTime	internally as DoubleFloat	64 x n	see the description in the chapter Internal
☒	Array of String	max. 2^{31} characters	8 x n (max. 2 GB)	

where n represents the number of array elements

Sauter EY2400

	Tag data type	Range	Size (bits)	Note
☒	Bool	0, 1	1	false, true
☒	Byte	0 to 255	8	
☒	Word	0 to 65535	16	
☒	DoubleWord	0 to 4294967295	32	

	Tag data type	Element range	Size (bits)	Note
☒	Array of Word	0 to 65535	16 x n	
☒	Array of DoubleWord	0 to 4294967295	32 x n	

where n represents the number of array elements

Rittmeyer WSR3000

	Tag data type	Range	Size (bits)	Note
☒	Bool	0, 1	1	false, true

	Tag data type	Range	Size (bits)	Note
☒	Counter	-2147483648 to 2147483647	32	LongInt
☒	Analog	-2147483648 to 2147483647	32	LongInt

Johnson Controls DX9100

	Tag data type	Range	Size (bits)	Note
☒	Bool	0, 1	1	false, true
☒	DoubleWord	0 to 4294967295	32	

	Tag data type	Range	Size (bits)	Note
☒	Counter	0 to 65535	16	Word
☒	Analog	1.5×10^{-45} to 3.4×10^{38}	32	Float
☒	Real time clock	5.0×10^{-324} to 1.7×10^{308}	64	DateTime

	Tag data type	Element range	Size (bytes)	Note
☒	Daylight saving	2 array elements	16 B	Array of DateTime
☒	Time program	29 array elements	58 B	Array of Word
☒	Exception days	60 array elements	120 B	Array of Word

Johnson Controls SC9100

	Tag data type	Range	Size (bits)	Note
☒	Bool	0, 1	1	false, true
☒	DoubleWord	0 to 4294967295	32	

	Tag data type	Range	Size (bits)	Note
☒	Counter	0 to 65535	8	Word
☒	Analog	1.5×10^{-45} to 3.4×10^{38}	32	Float
☒	Real time clock	5.0×10^{-324} to 1.7×10^{308}	64	DateTime

	Tag data type	Element range	Size (bytes)	Note
☒	Daylight saving	2 array elements	16 B	Array of DateTime

<input checked="" type="checkbox"/>	Time program	29 array elements	58 B	Array of Word
<input checked="" type="checkbox"/>	Exception days	60 array elements	120 B	Array of Word

Johnson Controls FX15

	Tag data type	Range	Size (bits)	Note
<input checked="" type="checkbox"/>	Bool	0, 1	1	false, true
<input checked="" type="checkbox"/>	Byte	0 to 255	8	
<input checked="" type="checkbox"/>	Word	0 to 65535	32	

	Tag data type	Range	Size (bits)	Note
<input checked="" type="checkbox"/>	Analog	1.5×10^{-45} to 3.4×10^{38}	32	Float

Elcor

	Tag data type	Range	Size (bytes)	Note
<input checked="" type="checkbox"/>	Instant temperature	1.5×10^{-45} to 3.4×10^{38}	32 B	Float
<input checked="" type="checkbox"/>	Instant pressure	1.5×10^{-45} to 3.4×10^{38}	32 B	Float
<input checked="" type="checkbox"/>	Volume	1.5×10^{-45} to 3.4×10^{38}	32 B	Float
<input checked="" type="checkbox"/>	Standard volume	1.5×10^{-45} to 3.4×10^{38}	32 B	Float
<input checked="" type="checkbox"/>	K value	1.5×10^{-45} to 3.4×10^{38}	32 B	Float
<input checked="" type="checkbox"/>	Z value	1.5×10^{-45} to 3.4×10^{38}	32 B	Float
<input checked="" type="checkbox"/>	Standard flow	1.5×10^{-45} to 3.4×10^{38}	32 B	Float

Elgas2

	Tag data type	Range	Size (bits)	Note
<input checked="" type="checkbox"/>	Bool	0, 1	1	false, true
<input checked="" type="checkbox"/>	Byte	0 to 255	8	
<input checked="" type="checkbox"/>	Word	0 to 65535	16	

☑	DoubleWord	0 to 4294967295	32	
☑	SmallInt	-32768 to 32767	16	
☑	LongInt	-2147483648 to 2147483647	32	
☑	Float	1.5×10^{-45} to 3.4×10^{38}	32	
☑	DoubleFloat	5.0×10^{-324} to 1.7×10^{308}	64	
☑	DateTime	internally as DoubleFloat	64	see the description in the chapter Internal
☑	String	max. 2^{31} characters	max. 2 GB	string is terminated with the ASCII code "0"

QMD

	Tag data type	Range	Size (bits)	Note
☑	Digital input	0, 1	1	false, true
☑	Digital output	0, 1	1	false, true
☑	Analog input	1.5×10^{-45} to 3.4×10^{38}	32	Float
☑	Analog output	1.5×10^{-45} to 3.4×10^{38}	32	Float

Inmat

	Tag data type	Range	Size (bits)	Note
☑	SmallInt	-32768 to 32767	16	
☑	LongInt	-2147483648 to 2147483647	32	
☑	Float	1.5×10^{-45} to 3.4×10^{38}	32	
☑	String	max. 2^{31} characters	max. 2 GB	string is terminated with the ASCII code "0"

Promos

	Tag data type	Range	Size (bits)	Note
☑	Bool	0, 1	1	false, true
☑	Byte	0 to 255	8	
☑	Word	0 to 65535	16	

<input checked="" type="checkbox"/>	DoubleWord	0 to 4294967295	32	
<input checked="" type="checkbox"/>	SmallInt	-32768 to 32767	16	
<input checked="" type="checkbox"/>	LongInt	-2147483648 to 2147483647	32	
<input checked="" type="checkbox"/>	Float	1.5×10^{-45} to 3.4×10^{38}	32	
<input checked="" type="checkbox"/>	String	max. 2^{31} characters	max. 2 GB	string is terminated with the ASCII code "0"

	Tag data type	Element range	Size (bits)	Note
<input checked="" type="checkbox"/>	Array of Byte	0 to 255	8 x n	
<input checked="" type="checkbox"/>	Array of Word	0 to 65535	16 x n	

where n represents the number of array elements

	Tag data type	Range	Size (bits)	Note
<input checked="" type="checkbox"/>	3-Byte-Float		24	

	Tag data type	Element range	Size (bits)	Note
<input checked="" type="checkbox"/>	Array of 3-Byte-Float		24 x n	

where n represents the number of array elements

IEC104

	Tag data type	Range	Size (bits)	Note
<input checked="" type="checkbox"/>	Bool	0, 1	1	false, true
<input checked="" type="checkbox"/>	Byte	0 to 255	8	
<input checked="" type="checkbox"/>	Word	0 to 65535	16	
<input checked="" type="checkbox"/>	DoubleWord	0 to 4294967295	32	
<input checked="" type="checkbox"/>	SmallInt	-32768 to 32767	16	
<input checked="" type="checkbox"/>	Float	1.5×10^{-45} to 3.4×10^{38}	32	

	Tag data type	Element range	Size (bits)	Note
	Array of Byte	0 to 255	8 x n	

where n represents the number of array elements

10.8.3 Special Internal

	Tag data type	Range	Size (bits)	Note
	Current alarm/event count		32	LongInt
	Date		64	DateTime
	Time		64	DateTime
	Date/time		64	DateTime
	Project start date/time		64	DateTime
	Project uptime		64	DateTime
	Random value		32	LongInt
	Sawtooth wave		32	LongInt
	Sine wave		64	DoubleFloat
	Free disk space		64	DoubleFloat
	Memory used by program		64	DoubleFloat
	Program CPU load		64	DoubleFloat
	Program version	10 characters	10 B	String
	Project name	200 characters	200 B	String
	Main project file	1000 characters	1000 B	String
	Project directory	1000 characters	1000 B	String
	Logged-on user	200 characters	200 B	String
	Current program language	100 characters	100 B	String
	Current project language	100 characters	100 B	String
	Web server – connected thin client count		16	Word

	Server status (redundancy)		1	Bool
	Last script run	200 characters	200 B	String
	Last run script date/time		64	DateTime
	Current device's physical tag date/time		64	DateTime
	Current device's historical data date/time		64	DateTime
	Current device's valid physical tag count (%)		64	DoubleFloat
	Computer	200 characters	200 B	String
	Active window	1024 characters	1024 B	String
	Serial number	20 characters	20 B	String
	Last records from log file	100 array elements 1024 characters	102400 B	Array of String
	Memory used by Driver Server		64	DoubleFloat
	Driver Server CPU load		64	DoubleFloat
	Specified software is running		1	Bool
	Project update is available		1	Bool
	Web server – received data (kB/s)		32	LongInt
	Web server – sent data (kB/s)		32	LongInt
	Web server – GET, HEAD requests (count/s)		32	LongInt
	Web server – POST requests (count/s)		32	LongInt
	Program thread count		32	LongInt
	Driver Server thread count		32	LongInt
	Program GDI object count		32	LongInt
	Driver Server GDI object count		32	LongInt
	Program User object count		32	LongInt
	Driver Server User object count		32	LongInt
	Any user is logged on		1	Bool
	Logged-on user has specified access rights		1	Bool

10.8.4 Special Physical

DMB

	Tag data type	Range	Size (bits)	Note
☒	Connection control tag	0, 1	1	Bool
☒	Manual call	0, 1	1	Bool
☒	Permanent connection request	0, 1	1	Bool
☒	Connection status	0 to 65535	16	Word
☒	Call ordinal number	0 to 255	8	Byte
☒	Data validity flag	0 to 255	8	Byte
☒	Latest call date		64	DateTime
☒	Next call date		64	DateTime
☒	Modem COM port number	30 characters	30 B	String
☒	Transfer data level	30 characters	30 B	String
☒	Data transfer percentage	0 to 255	8	Byte
☒	Global alarm	0, 1	1	Bool
☒	Device communication log			Array of String

Elgas

	Tag data type	Range	Size (bits)	Note
☒	Gas composition		103 B	DataBlock
☒	System date/time		64	DateTime
☒	System status	64 array elements		Array of Bool
☒	Serial number		32	DoubleWord
☒	Firmware version		32	String
☒	Device name		32	String
☒	Gas composition – CO2		32	Float

<input checked="" type="checkbox"/>	Gas composition – N2		32	Float
<input checked="" type="checkbox"/>	Gas composition – H2		32	Float
<input checked="" type="checkbox"/>	Gas composition – H2S		32	Float
<input checked="" type="checkbox"/>	Gas composition – He		32	Float
<input checked="" type="checkbox"/>	Gas composition – H2O		32	Float
<input checked="" type="checkbox"/>	Gas composition – O2		32	Float
<input checked="" type="checkbox"/>	Gas composition – Ar		32	Float
<input checked="" type="checkbox"/>	Gas composition – CO		32	Float
<input checked="" type="checkbox"/>	Gas composition – C1H4		32	Float
<input checked="" type="checkbox"/>	Gas composition – C2H6		32	Float
<input checked="" type="checkbox"/>	Gas composition – C3H8		32	Float
<input checked="" type="checkbox"/>	Gas composition – iC4H10		32	Float
<input checked="" type="checkbox"/>	Gas composition – nC4H10		32	Float
<input checked="" type="checkbox"/>	Gas composition – iC5H12		32	Float
<input checked="" type="checkbox"/>	Gas composition – nC5H12		32	Float
<input checked="" type="checkbox"/>	Gas composition – C6H14		32	Float
<input checked="" type="checkbox"/>	Gas composition – C7H16		32	Float
<input checked="" type="checkbox"/>	Gas composition – C8H18		32	Float
<input checked="" type="checkbox"/>	Gas composition – C9H20		32	Float
<input checked="" type="checkbox"/>	Gas composition – C10H22		32	Float
<input checked="" type="checkbox"/>	Gas composition – standard of compressibility		8	Byte
<input checked="" type="checkbox"/>	Gas composition – calorific value		32	Float
<input checked="" type="checkbox"/>	Gas composition – relative density		32	Float
<input checked="" type="checkbox"/>	Gas composition – pressure base		32	Float
<input checked="" type="checkbox"/>	Gas composition – temperature base		32	Float
<input checked="" type="checkbox"/>	Device communication log			Array of String

Generic

	Tag data type	Range	Size (bits)	Note
☒	Connection control tag	0, 1	1	Bool
☒	Number of bytes to send	0 to 65535	16	Word
☒	Output buffer			Array of Byte
☒	Number of bytes received	0 to 65535	16	Word
☒	Input buffer			Array of Byte
☒	Input string			String
☒	Communication packet name			String
☒	Communication speed	0 to 255	8	Byte

M-Bus

	Tag data type	Range	Size (bits)	Note
☒	Serial number	8 characters	8 B	String (the Identification Number parameter's value contained in the data message header)
☒	Manufacturer			String
☒	System status	0 to 255	8	Byte (the Status byte's value contained in the data message header)
☒	Version	0 to 255	8	Byte
☒	Medium	0 to 255	8	Byte
☒	Access number	0 to 255	8	Byte
☒	Signature	0 to 65535	16	Word
☒	Device communication log			Array of String

Motorola

	Tag data type	Range	Size (bits)	Note
☒	System date/time		64	DateTime

☒	Device communication log			Array of String
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Teco

	Tag data type	Range	Size (bits)	Note
☒	Device communication log			Array of String

10.8.5 Derived

	Tag data type	Range	Size (bits)	Note
	Copy			
	Array element			
☒	Bit		1	Bool
☒	Array element bit		1	Bool
☒	Logical product		1	Bool
☒	Logical sum		1	Bool

10.9 Data Tables

Data Table Definition

[Physical Table Name](#)

[Physical Data Table Field Name](#)

10.9.1 Physical Table Name

Physical Table Name Length Limitation

Database type	Database version	Character count
Paradox		
dBASE		260
Microsoft SQL Server		128
MySQL		63
MariaDB		63
PostgreSQL		63
Oracle	12.1	30
Oracle	12.2	128

10.9.2 Physical Data Table Field Name

Physical Data Table Field Name Length Limitation

Database type	Database version	Character count
Paradox		25
dBASE	4	10
dBASE	7	31
Microsoft SQL Server		128
MySQL		64

MariaDB		64
PostgreSQL		64
Oracle		30

10.10 Keyboard Shortcuts

Keyboard Shortcuts

[Script Manager](#)

10.10.1 Script Manager

File Menu

<i>New Script</i>	Ins
<i>New Script Folder</i>	Alt+Ins
<i>Save All</i>	Ctrl+S
<i>Print</i>	Ctrl+P
<i>Close</i>	Alt+F4

Edit Menu

<i>Undo</i>	Ctrl+Z
<i>Redo</i>	Shift+Ctrl+Z
<i>Cut</i>	Ctrl+X
<i>Copy</i>	Ctrl+C
<i>Paste</i>	Ctrl+V
<i>Duplicate</i>	Ctrl+D
<i>Delete</i>	Del
<i>Select All</i>	Ctrl+A

Find Menu

Find Ctrl+F

Find Next F3

Replace Ctrl+R

View Menu

Properties F11

Control Characters Ctrl+F10

Project Menu

Run F9

Check Scripts > Whole Project Ctrl+F9

Help Menu

Contents F1

Editor commands

Display Templates Ctrl+J

Add New Line Ctrl+N

Delete Word Ctrl+Backspace

Delete Line Ctrl+Y

Delete Text to End of Line Ctrl+Shift+Y

<i>Indent Block</i>	Ctrl+Shift+I
<i>Outdent Block</i>	Ctrl+Shift+U
<i>Select All</i>	Ctrl+A

Commands for working with macros

<i>Replay</i>	Ctrl+Shift+P
<i>Record/Stop Recording</i>	Ctrl+Shift+R

Commands for working with bookmarks

<i>Toggle Bookmark 0</i>	Ctrl+Shift+0
<i>Toggle Bookmark 1</i>	Ctrl+Shift+1
<i>Toggle Bookmark 2</i>	Ctrl+Shift+2
<i>Toggle Bookmark 3</i>	Ctrl+Shift+3
<i>Toggle Bookmark 4</i>	Ctrl+Shift+4
<i>Toggle Bookmark 5</i>	Ctrl+Shift+5
<i>Toggle Bookmark 6</i>	Ctrl+Shift+6
<i>Toggle Bookmark 7</i>	Ctrl+Shift+7
<i>Toggle Bookmark 8</i>	Ctrl+Shift+8
<i>Toggle Bookmark 9</i>	Ctrl+Shift+9
<i>Go to Bookmark 0</i>	Ctrl+0
<i>Go to Bookmark 1</i>	Ctrl+1

<i>Go to Bookmark 2</i>	Ctrl+2
<i>Go to Bookmark 3</i>	Ctrl+3
<i>Go to Bookmark 4</i>	Ctrl+4
<i>Go to Bookmark 5</i>	Ctrl+5
<i>Go to Bookmark 6</i>	Ctrl+6
<i>Go to Bookmark 7</i>	Ctrl+7
<i>Go to Bookmark 8</i>	Ctrl+8
<i>Go to Bookmark 9</i>	Ctrl+9

Source Block Tools commands

<i>Insert Color</i>	Shift+Ctrl+C
<i>Insert Script Header</i>	Shift+Ctrl+H
<i>Convert To Lower Case</i>	Ctrl+Alt+L
<i>Convert To Upper Case</i>	Ctrl+Alt+U
<i>Comment/Uncomment Text</i>	Ctrl+'

10.11 Help and Documentation

The **Reliance** SCADA/HMI system contains many help and documentation files. Most documents are available in several language translations and in two different formats. The documents contained in the <Reliance>\Doc folder are print friendly (the PDF format). The documents contained in the <Reliance>\Help folder are usually displayed as context help in various parts of the **Reliance** SCADA/HMI system (CHM files).

First Steps ([FirstSteps](#))

A short tutorial designed for new users of **Reliance 4**. The user is introduced to the steps required to create a simple visualization project in the development environment – **Reliance 4 Design**.

License Activation ([LicenseActivation](#))

A short tutorial that describes how to activate a license for **Reliance 4**. The activation is required only if your license is stored in a software key.

Development Environment ([Design](#))

A reference guide for the **Reliance 4 Design** development environment.

Runtime Software ([Runtime](#))

A user's guide for the runtime software (*Reliance 4 View*, *Reliance 4 Control*, and *Reliance 4 Control Server*).

Data Servers ([DataServers](#))

A manual that describes how to configure and run **Reliance**'s data servers (*Reliance 4 Control Server* and *Reliance 4 Server*). The document also includes a detailed description of the Web pages provided by a built-in Web server.

Web Client ([WebClient](#))

A reference guide for *Reliance 4 Web Client*, which is based on the Java platform. The document describes how to run and work with *Reliance 4 Web Client*.

Scripts ([Scripts](#))

A reference guide for VBScript and **Reliance** objects used to access elements of a visualization project from scripts.

OPC Tutorial (Tutorial_OPC)

A short tutorial that shows how to connect to an OPC server from a **Reliance** project. The document describes the process of creating a new project with an OPC device and importing tags from an OPC server.

Data Exchange Methods (DataExchange)

A document describing various methods of data exchange between a **Reliance** project and an external application (CSV, SQL, DDE, COM, OPC, External Communicator, Web service).

Change Log (History)

An HTML document containing the list of new features and changes made to the **Reliance** SCADA/HMI system by version.

FastReport – Custom Reports ([CustomReports](#))

A user's manual for the FastReport 4.0 tool, which is integrated in the **Reliance** SCADA/HMI system. It is an original document that is only available in the English language.

Visual Basic Scripting (VBScript5)

An original Microsoft document containing a tutorial and a reference guide for VBScript.

Microsoft Windows Script Technologies (WindowsScript56)

An original Microsoft document containing user's guides for VBScript and JScript.

10.12 Frequently Asked Questions

A list of the most frequently asked questions and the most commonly occurring problems (FAQ) with links to the Reliance SCADA/HMI system's website

	Question/problem
01	Why does a red or yellow border appear around visual components during runtime?
02	The runtime software does not communicate with a device defined via the Device Manager.
03	The runtime software does not create a data table defined via the Data Table Manager.
04	Can visual components' properties be accessed (read/written) from scripts?
05	Cannot define a network connection group and a network connection in Reliance Design.
06	How to create a shortcut to run a visualization project.
07	The operating system is configured to launch a visualization project at startup. However, the visualization project is not started properly. The runtime software cannot connect to communication drivers.
08	Changes made to a visualization project in Reliance Design are not present during runtime.
09	The "Text" component does not display its content when the orientation is set to "Vertical".
10	Using parentheses to enclose parameters passed to a procedure or function.
11	What does the message "The detected HW key is not designed for permanent running of the runtime software.", displayed during runtime, mean?
12	At runtime, the "License key not found." message appears.
13	How to configure communication options for a Teco device physically connected to Ethernet via an Ethernet/RS-232 converter.
14	How to communicate with a device for which a native communication driver is not available with Reliance.
15	How to configure Windows XP (Service Pack 2) or a newer Windows operating system in order for Reliance to be able to communicate with an OPC server on a remote computer.

16	How to connect a Siemens SIMATIC PLC to Reliance.
17	Incorrect data is sometimes logged when a tag from a Tecomat PLC is used to control data logging.
18	How to address tags in Modbus devices.
19	How to connect a device to Reliance via a DDE server.
20	How to configure DCOM in order for Reliance to be able to connect to a communication driver on a remote computer.
21	How to configure Windows NT/2000/XP not to require logon at startup.
22	Cannot open dBASE database tables (DBF) from another program (e.g., MS Access, MS Excel).
23	Cannot install the HW key driver from a remote computer's CD-ROM.
24	An error occurs while opening a visualization project's databases under Windows XP.
25	Cannot install the HW key driver. The installer displays the message: "Failed to start the Aladdin Device Driver. Failed to start a service in the Service Control Manager Database0x2008007 0x200007 0x0".
26	Cannot open Reliance project databases when multiple Reliance modules are running at the same time (e.g., Reliance Design and Reliance Runtime).
27	Can Reliance be operated under Microsoft Windows Vista and Windows 7?
28	Problem with file-based databases (Paradox, dBASE) under Windows Vista and Windows 7.
29	How to deactivate disk write caching to minimize data loss due to a power outage.
30	Cannot detect the connected HW key. License Key Utility displays the message: "HASP Error: Terminal Server was found".
31	How to troubleshoot problems when detecting a hardware key in Reliance.
32	A component rotated by a specified angle is not displayed correctly or is not displayed at all.
33	How to use multithreaded scripting in Reliance 4.
34	How to debug Reliance scripts with an external debugger.

35	How to import tags of a Wago device from the CoDeSys development environment.
36	How to log historical data and/or alarms/events to a database in Microsoft SQL Server.
37	How to add a Web page in IE8 (or later) standards mode to a visualization window.
38	How to display a KML file on Google Maps in a visualization window.
39	How to rename a project.
40	How to open an external file in Reliance SCADA using a Button component.
41	How to edit a file with an .rp4 extension.
42	Problem with the translation of text strings using the Translate by Google command.
43	How to set up the default size and position of the runtime software's main window.
44	How to configure logging options and where to find log files.
45	What do the messages "Cannot use the license service to verify the license...", displayed during runtime, mean?
46	Problem with launching Reliance 4 Web Client using Java Web Start.
47	Problem with Web Client's temporary files.
48	Scripts do not work in the thin clients.
49	How to interconnect the Reliance 4 system and the Mosaic development environment.
50	How to define a digital tag in an AMiT device.
51	Reliance SCADA connects to an OPC server but does not receive valid data.
52	How to troubleshoot problems with license detection upon Windows startup in a server module.
53	How to define the address of a time program in a Johnson Controls FX device.
54	How to configure Siemens SIMATIC S7-1200 and S7-1500 in TIA Portal to communicate with Reliance SCADA.
55	How to register a license for Reliance.
56	How to download, install, and uninstall the Reliance 4 SCADA system.
57	What are the minimum HW and SW requirements for Reliance 4?

58	Cannot play Reliance training video recordings.
59	How to resolve a problem when switching between keyboard languages.
60	Can a license stored in a SW key be transferred to another computer?
61	How to install the Reliance 4 SCADA/HMI system on Windows Server 2012 R2.
62	How to access the “Public Documents” folder from Windows 10 file dialogs.

10.13 Technical Articles

A list of technical articles with links to the Reliance SCADA/HMI system's website

	Technical article
01	How to display tag values in custom reports of type FastReport
02	Integration of IP cameras and the Digifort IP surveillance system into Reliance SCADA
03	What's new in Reliance 4.8.1
04	Reliance Web Client Launcher (Web Client and Java 11)
05	Consolidating repeated alarm occurrences into one instance
06	What's new in Reliance 4.8.0
07	What's new in Reliance 4.7.3
08	How to switch between languages in a multilanguage project
09	State Manager – displaying numeric-type tags' values as text
10	Reliance Mobile Client will no longer be developed
11	Dynamic links to objects
12	Data specific to the thin clients
13	What's new in Reliance 4.7.2
14	Advice on how to run the Reliance SCADA system on an SSD
15	Reliance SCADA has support for the Maatrix emergency communication service
16	Reliance SCADA and a direct driver for Siemens SIMATIC S7 PLCs
17	Reliance Web Client certificate validity
18	VBScript tip: Converting alarm/event text to speech
19	How to connect Arduino to Reliance SCADA
20	Lots of improvements in Reliance 4.7
21	Reliance SCADA/HMI and Siemens LOGO!

22	VBScript tip: Web service client
23	VBScript tip: Working with an object list
24	VBScript tip: Changing the locale settings
25	Native support for PostgreSQL in the Reliance 4 SCADA/HMI system
26	New text message events and GSM signal quality detection
27	Native support for MySQL and MariaDB in the Reliance 4 SCADA/HMI system
28	Date, Time, TimeSpan (amount of time): new tag data types in the Reliance SCADA/HMI system
29	Support for multi-monitor applications in the Reliance SCADA/HMI system
30	Java 7 security prompts when running Reliance Web Client
31	Project diagnostics can help you find issues and inconsistencies in a visualization project
32	Releasing of the Reliance SCADA/HMI system's versions
33	Reliance 4 data server redundancy
34	Connecting the Reliance SCADA/HMI system to a Siemens SIMATIC S7 PLC using the Deltalogic OPC server
35	Support for SVG in the Reliance SCADA/HMI system
36	Important changes in Reliance 4.6.0
37	Reliance is compatible with Windows 8
38	Lots of improvements in Reliance 4.5
39	Reliance 4 Smart Client – Visualization on mobile devices (iPhone, iPad, Android)
40	Reliance's data servers – Server Usage Statistics
41	Reliance's data servers – Secure connection support
42	WideString and UTF8String tag data types
43	String Manager – Translating project-defined strings using Google Translate
44	Web Client – Improved IP camera support
45	Web Client – Data Tree component

46	Controlling serial link parameters via NVT
47	M-Bus Communication Driver
48	Text replacement of object properties
49	License Service
50	Intelligent features for working with the source code of scripts
51	Reliance OPC Server
52	Generic Driver

10.14 Examples

An extensive collection of sample projects is part of the **Reliance** SCADA/HMI system. The projects are available in the <Reliance>\Examples directory (the projects are contained in the directory after the development environment or the runtime software is started for the first time).

Note: In case a project file is unintentionally changed or deleted from the directory, you can restore it from the <Reliance>\PostInstallFiles\Examples_Backup.zip archive.

10.14.1 Demos

AirCondition demo project

AirCondition is an interactive visualization project designed to demonstrate functions of basic graphical components. Simple scripts are also used in the project to simulate the environment in an office. The project is translated into several languages (English, Russian, Czech, Dutch, and Turkish).

You are enabled to control the input and output fan, recuperator, cooler, heater, humidifier and to simulate the cleanliness of both the input and output filter or errors. A simple physical model of the office environment (temperature and humidity) is simulated with three scripts.

BoilerRoom demo project

BoilerRoom is an interactive project designed to demonstrate functions of basic components, such as Button, Display, Active Picture, Pipe, Progress Bar, and Real-Time Trend, for the visualization of the water-heating process in a central heating gas boiler. The project also demonstrates how to use alarms, trends, reports, and event and periodic scripts. Within the project, several users with different access rights are defined through the User Manager (you can log on with an empty password). A similar visualization project is created step by step during the Reliance 4 training courses.

Factory demo project

Factory is an interactive project designed to demonstrate functions of basic components, such as Button, Display, Pipe, Picture, Progress Bar, for the visualization of a simple chemical production process. Four basic chemicals are mixed together in a boiler (the mixing ratio can be defined manually or via recipes). The final product is stored in a tank and fed to moving tank trucks. A truck is represented as a picture and a progress bar grouped together. The movement of the truck is achieved by dynamically changing the X coordinate using scripts.

At runtime, the project starts in the automatic mode (script-controlled), but you can switch the mode by clicking on the Manual mode button located on the bottom part of the visualization window. Based on the data table (database) to which all important process values are logged, you can easily create a trend or report.

Tannery demo project

Tannery is a project designed to demonstrate how to use the Reliance SCADA/HMI system for the control of the chemical process of leather tanning. The project contains about 250 tags and is based on a real industrial process.

After the project is started, select the top left drum to run the process visualization. The visualization window contains a set of tanks interconnected via pipes with valves and pumps. The toolbar contains control (Pause, Restart, Recipe) and configuration commands (Settings). The Time shrink option allows you to specify the speed of the simulation. The visualization runs in an automatic mode (script-controlled).

SMS demo project

SMS is a project designed to demonstrate sending and processing text messages via scripts. To successfully run the project, it is required that SMS Driver be installed and a GSM modem connected (e.g., Siemens M20 Terminal).

The project contains the periodic script StatusSMS and two event scripts – RecievedSMS and SendSMS. To select a type of GSM modem and specify the communication options including the SMS service center number, bring up the Project Structure Manager and choose the SMS page for the selected computer.

10.14.2 Components

Using the Data Grid component

DataGrid is a simple project designed to demonstrate basic features of the Data Grid component. There are several tags defined within the System device that are displayed in the data grid's columns (Array_Value, Array_FgColor, and Array_BgColor) and tags that control the global behavior of the component (Offset, Position, and RowCount). The Array_FgColor tag controls the font color. The Array_BgColor tag controls the background color. These tags are initialized in scripts.

After the project is started in the runtime software, you are enabled to set values in the data grid's cells.

Using the Data Grid component in the Select Item dialog box

DataGrid_SelectItemDialog is a project designed to demonstrate how to use the Data Grid component when selecting an item from the list available in the Select Item dialog box. To bring up the dialog, click the Select Item button located in the main window (MainWindow). After closing the dialog, the main window displays whether an item has been selected or not (Yes/No – the System/SellItemFromList tag's value; the item's name – the System/SellItemName tag's value).

The Select Item dialog is a dialog window named SelectItemDialog. This window is displayed in exclusive mode (modally). A Data Grid component and two buttons (OK and Cancel) are placed into the SelectItemDialog window. The Data Grid component consists of a single column that is linked to the System/ItemNames tag of type Array of String containing the list of items. The System/ItemNames tag is filled with values in the BeforeSelectItemDialog script executed by pressing the Select Item button. The selection results, i.e., the values of the System/SellItemFromList and System/SellItemName tags, are set in the AfterSelectItemDialog script executed by pressing the OK button.

Using the Data Tree component

DataTree_ControlArea is a project designed to demonstrate how to use the Data Tree component for the visualization of the control area tree structure. Tags of all basic data types listed in the tree structure (the Tags subtree) are defined within the System device. Two data tables are defined via the Data Table Manager to log the System device's tags. Two trends and two reports are also defined via the Trend Manager and the Report Manager to visualize historical data. In addition, actions to display current and historical alarms/events, tables, and trends are defined via the Action Manager. These actions are connected to the data tree nodes. The Data Tree component's structure simulates the structure of the control area.

The Display cell is used to view the tag parameters (the Tags subtree). At runtime, you can also edit tag values using the displays located to the right of the tree. To activate commands or change the structure of the Data Tree component, it is required to log on. If you log on as the Edit user, you are allowed to edit the Data Tree structure (no password is required). If you log on as the Command user, you can execute actions, such as view trends, reports, or alarms/events list.

Using localizable text strings in the Data Tree component

DataTree_Localized is an example project designed to demonstrate how to use text strings in the Data Tree component that are translated into several languages.

The component is used to display the list of actions. For individual tree nodes, aliases are specified to be localized into different languages.

The tree nodes are connected to actions. At runtime, an action can be executed by double-clicking on the alias (the node description).

Using the Data Tree component to display data in a tabular format

DataTree_Grid is a project designed to demonstrate how to use the Data Tree component to display non-array tags in a tabular format. The project contains ten virtual devices defined via the Device Manager. All virtual devices contain the identical set of tags. For each virtual device, one data table is defined via the Data Table Manager to log the tag values. The same number of trends are defined via the Trend Manager to display historical data.

An action is defined for each trend via the Action Manager. These actions are connected to the data tree nodes. Within the Data Tree component, a node is defined to display all tag values. For each tag displayed in the node's row, a cell is defined.

At runtime, you are enabled to change the tag values and to show trends via actions (a trend can be displayed by double-clicking on the trend icon).

Using the Real-Time Chart component to display a stacked bar chart

RealTimeChart_Stacked is a project designed to demonstrate how to configure the Real-Time Chart component to show a horizontal stacked bar chart. Each bar of the chart consists of two differently colored parts whose size can be changed separately using a Display component. The total bar size is the sum of each part's size.

The component is configured in the following way:

1. Bring up the component's Properties dialog box and select the Horizontal bar type (Series > Properties > Type).
2. According to the example, the X/Y-value property must be specified for each point of the chart (Series > Data > X/Y-value).
3. Select the Stacked property as follows: Static > Properties > Series > Format > Multiple Bar.

Using the Simple Time Program component

SimpleTimeProgram is a project designed to demonstrate how to use the Simple Time Program component. Within the System device, the DataArray tag is defined to store the time program's configuration data. The remaining tags (auxiliary tags – stored in folders) are used to display this data in the visualization window.

The DecodeData event script is defined via the Script Manager to extract the data from the DataArray tag to the auxiliary tags. To configure the time program at runtime, click on the Configuration button. Upon configuration, the data from the DataArray tag is automatically decoded and displayed in the visualization window. The DataArray tag values are displayed in the table on the left side of the visualization window.

Using the Axis IP Camera component

IPCamera_Axis is a project designed to demonstrate how to use the Axis IP Camera component to display and record data received from the Axis IP camera connected to the computer. To successfully run the project, it is required to have IP camera drivers installed on your computer (they are part of the Reliance Add-On Pack installer).

Within the System device, the record and standby tags of type Bool are defined. The visualization window contains an Axis IP Camera component and two Button components. Before you run the project, the camera's URL or IP address and login information for the connected IP camera must be specified on the Functions page of the component's Properties dialog box.

Using the Pelco IP Camera component

IPCamera_Pelco is a project designed to demonstrate how to use the Pelco IP Camera component to display data received from the Pelco IP camera connected to the computer. To successfully run the project, it is required to have IP camera drivers installed on your computer (they are part of the Reliance Add-On Pack installer).

Within the System device, a tag of type Bool named standby is defined. The visualization window contains a Pelco IP Camera component and a Button component. Before you run the project, the camera's RTSP URL must be specified on the Functions page of the component's Properties dialog box.

Using the Vivotek IP Camera component

IPCamera_Vivotek is a project designed to demonstrate how to use the Vivotek IP Camera component to display and record data received from the Vivotek IP camera connected to the computer. To successfully run the project, it is required to have IP camera drivers installed on your computer (they are part of the Reliance Add-On Pack installer).

Within the System device, the Input and Output tags of type Word and the Record and Standby tags of type Bool are defined. The visualization window contains a Vivotek IP Camera component and four Button components. Before you run the project, the camera's URL or IP address and login information for the connected IP camera must be specified on the Functions page of the component's Properties dialog box.

10.14.3 Devices

Connecting to the AMiT device

AMiT is a project designed to demonstrate basic features of the AMiT PLC connected to the visualization application, i.e., reading/writing tag values, logging values to a data table, bit access, etc. Within the AMiT1 device, a group of tags containing current values (Sawtooth_1, Sawtooth_2, Sine, ARC_index) and current digital values (Bit1, Bit2, Bit3), and a group of array-type tags used to display the Real-Time Trend component are defined via the Device Manager. The current tag values are logged to the Database1 data table and can be displayed in Trend1 defined through the Trend Manager. Via the Real-Time Trend Manager, Trend1_RT is defined to be displayed directly in the visualization window.

The main visualization window contains several Display components connected to the Sawtooth_1, Sawtooth_2, and Sine tags whose values can be changed even if the AMiT1 device is not in the online mode, i.e., the Online property is not enabled (Project Structure Manager > PC1 > AMiT1 > Basic > Online), e.g., for testing purposes. If the device is not in the online mode, tag values can be set, but a connection with the device is not made.

Communicating with a PLC via the BACnet communication driver

BACnet is a project designed to demonstrate how a device is connected via the BACnet communication driver. BACnet is not only used for defining communication services. Among other things, it is also used to define a number of objects and their properties through which data is presented. In this project, there are tags representing the properties of all Reliance-supported objects.

A device named BACnet1 is defined via the Device Manager. Within the device, several tags are defined and divided into folders based on individual BACnet objects. Each folder contains tags whose value allows you to read or write the properties of an object.

The type of object is specified by the Object type option, the property is specified by the Property identifier option. The Instance number option is used to distinguish the objects. The data type of a tag is changed automatically depending on the selected property. However, it can be changed subsequently. To test the example with a real BACnet device, it is necessary to configure these properties based on the real program of the device. Not all objects need to be used within the program and the Instance number option can differ for each object. Not all properties within BACnet objects are compulsory. Thus, some tags might not be updated successfully.

Upon project startup, the tray-type window on the left side contains several buttons used to switch between the windows defined within the project. Individual project windows contain displays and data grids showing objects' data based on tag data types.

Defining an alarm for a device communication error

DeviceCommErrorAlarm is a project designed to demonstrate how to replace the alarm automatically triggered by a device communication error with a custom alarm defined through the Device Manager. This alarm will remain active for the duration of the communication error. This is the difference from the alarm that is automatically triggered by Reliance when an error in the communication with a device occurs. It is an "event" type of alarm – it is triggered, but it does not remain active; Reliance does not check to see if the error condition still exists – this is a drawback).

Within the Modbus1 and Modbus2 devices, the CommError tag of type Bool is defined via the Device Manager. It is an internal tag (not a physical tag from a PLC). In addition, the CommError alarm defined within the same devices is linked to the CommError tag. The alarm is triggered by the leading edge of the tag value (the off-to-on transition).

The Modbus1 and Modbus2 devices are connected to the PC1 computer via the Project Structure Manager. The communication options are defined through the Channel1 object that represents a communication channel. On the Advanced page of the channel properties, there are links to scripts to be executed when communication with the respective device is started, interrupted due to an error, and restored. The full name of the communication channel (device name/channel name, e.g., Modbus1/Channel1) is automatically passed to these scripts. This information is available in the scripts as the value of the SenderName property. This allows you to choose the same scripts for both devices' communication channels.

The Define script, which contains the definition of the SetDeviceCommError procedure, is defined via the Script Manager. On the Advanced page of the script's Properties pane, the Run on thread initialization option is active to execute the script prior to any other script supposed to run in the same thread of execution. The SetDeviceCommError procedure is called from a script named DeviceCommError, which executes every time that an error in communication with the device occurs, and from a script named DeviceCommStarted, which executes every time that communication with the device is started or restored. The SetDeviceCommError procedure has the following parameters:

FullChannelName: the full name of the communication channel (device name/channel name, e.g., Modbus1/Channel1)

CommError: the value of True or False (determines whether there is an error in communication)

The SetDeviceCommError procedure first splits the value of the FullChannelName parameter into the device name and the channel name and then writes the value of the CommError parameter to the internal tag CommError in the respective device by calling the RTag.SetTagValue method. This results in triggering a new alarm or ending the existing one.

Reading data from a device as text

Generic_SimpleText is a project designed to demonstrate how the Generic device is used to read data from any device in the form of a text string. A device named Generic1 is defined via the Device Manager. Within the device, several special tags whose values are used for the communication are defined.

The InCount tag's value specifies the number of characters (bytes) received by the tag of type Input buffer.

The InBuffer tag is an array of bytes containing received data.

The InString tag is a string containing received data in a text format.

The OutCount tag's value specifies the number of characters (bytes) sent from the tag of type Output buffer.

The OutBuffer tag is an array of bytes containing data to send.

The Control tag's value is used to control sending data.

In this example project, no data is sent, the Control and OutCount control tags are only used to open the communication port.

The main visualization window contains a button used to open the communication port. To do so, the Control tag's value is set to logical 1 and the number of bytes to send in the OutCount tag is set to 0 via a script.

The two Display components are used to show the received character count and received data in the form of a text string.

The other button is used to reset the received character count and delete the input buffer.

Communicating with a Tecomat PLC via the Generic communication driver

Generic_Teco is a project designed to demonstrate how a communication protocol is implemented and how a device is connected via the Generic communication driver. In this example project, the EPSNET protocol of the Tecomat PLC is chosen.

A device named Generic1 is defined via the Device Manager. Within the device, several special tags whose values are used for the communication are defined.

The InCount tag's value specifies the number of characters (bytes) received by the tag of type Input buffer.

The InBuffer tag is an array of bytes containing received data.

The OutCount tag's value specifies the number of characters (bytes) sent from the tag of type Output buffer.

The OutBuffer tag is an array of bytes containing data to send.

The Control tag's value is used to control sending data.

The PacketName tag provides an easy way to identify the communication packet in the communication statement or in the log file. If this tag is not used, its default name Packet is displayed in the statement.

In addition, an internal tag named Ethernet is defined. Its value determines whether a serial cable or Ethernet is used for communication. The value should be reflected when creating custom communication packets.

The main visualization window contains several controls intended for configuring and controlling the communication itself. The following communication packets can be sent: a packet for establishing communication, a packet for reading a data block from any register and address, a packet for reading/writing data from/to a tag of the selected data type from any address. By pressing the respective button, a communication packet will be created via a script according to the specified configuration settings and sent to the communication channel.

In the middle part of the window, sent and received data is displayed in a tabular format. In the top right corner, the control and status tags' values are shown.

In the bottom right corner, the checking tags' values read from the PLC by the Teco native communication driver are displayed (these tags lie on randomly selected addresses).

In order for the example project to be fully functional, it is necessary that the Ethernet option's value be set in compliance with the channel type specified through the Project Structure Manager.

Connecting to an OPC server on a remote computer

OPC_RemoteServer is a project designed to demonstrate how to connect Reliance's runtime software to an OPC server that is not running locally. The OPC1 device of type OPC is defined via the Device Manager. The OPC server Prog ID property allows you to select the OPC server for the device (e.g., from the local network). The PC1 computer, to which OPC1 is connected, is defined via the Project Structure Manager. On the Driver page of the device's Channel1, the Connect to driver property is set to On remote computer. Also the computer name is specified (RemotePC). The RemotePC computer is the second computer defined via the Project Structure Manager. This computer's only purpose is to identify the remote computer on which the OPC server is running. It holds the IP address of the OPC server (the Basic page).

Note: This type of connection to a remote OPC server is not advised because of certain drawbacks. The recommended way to connect to an OPC server is via Reliance's runtime software running on the remote computer. This means that the Reliance data server is running on the same computer as the OPC server and connection to other computers of the visualization project is provided via Server Connection Groups or via thin clients.

Periodic OPC device status testing

OPC_DeviceCommStatus is a project designed to demonstrate how to use a script to determine the state of an OPC server by testing the quality of a tag. Via the Device Manager, you have to configure the OPCDevice1 device according to your local OPC server. The OPC group of this device contains an internal tag that is periodically tested in the script (if the tag quality is not 'Good', it means that the OPC server is not connected). For this purpose, the Random_UInt1 tag is used in the project. The project also contains the OPCDevice1Connected tag that, after the script is evaluated, contains information regarding the OPC device connection status and is linked to the Active Text component placed in the visualization window.

In addition, the Define script, which is executed at the thread initialization, is defined via the Script Manager. This script defines the procedure that evaluates the tag quality (it is more effective to define a procedure than to write the code directly into the script's body). The script reads the Random_UInt1 tag value with the RTag.GetTagValue method. Each method of the Reliance objects sets the value of the RError.Code property. If the value of this property is not equal to zero, an error occurs. To ensure that 'Bad' quality of the value is considered an error, the Treat invalid tag value as error option must be enabled (Project Options > Scripts > Other). The procedure is called from the UpdateOPCDeviceCommStatus script with the period of one second.

Access to the Teco device databox

Teco_Databox is a project designed to demonstrate how to transfer data from/to the Databox memory of the Teco device. Via the Device Manager, the Tecomat1 device of type Teco and its IP address are defined. On the Databox page, the Enable reading/writing Databox option is active and the links to the respective tags defined within the System device are specified. The following tags are defined within the System device: The Control of type Byte tag is used to control the data transfer from/to the databox (0 – ready, 1 – read, 2 – write). The Status tag of type LongInt is connected to the Active Text component placed in the visualization window and indicates the activity that is being performed with the databox (Ready/Reading/Reading completed/Read error/Writing/Writing completed/Write error). The DataLength and DataOffset tags are used to define the range of data to be transferred from/to the databox. The current data range is accessed via the DataBuffer tag of type Array of Byte.

The visualization window contains a Data Grid component (Databox data) that displays the values of the DataBuffer tag and the corresponding index of the data in the databox (the IndexArray tag). The latter tag is automatically updated in the InitIndexArray script every time the databox is accessed (read or written).

Connecting to the Teco device via a modem

Teco_ModemComm is a project designed to demonstrate how to make a connection to the Teco PLC via a modem connected to the computer's serial port. Within the System device, several tags of type Word are defined to monitor and control the state of the modem and the PLC device. The Modem1Control tag is used to control Modem1 – it connects the Combo Box component placed in the visualization window and the Modem1 object defined via the Project Structure Manager (on the Basic page, the Control property must be active and the tag specified). The Tecomat1Control tag is used to control Tecomat1 (allows selecting one of the following commands: Disconnect, Connect, 'Connect, read data and disconnect') – it connects the Combo Box component placed in the visualization window and the Channel1 object defined via the Project Structure Manager. The Tecomat1Status tag, which is also connected to the Channel1 object, is processed in the Tecomat1StatusChanged script and the result is shown in the visualization window. The Tecomat1Status tag is linked to the Status property via the Project Structure Manager (Tecomat1 > Channel1 > Advanced). Similar tags exist for Modem2 and Tecomat2. Also, the Tecomat1 and Tecomat2 devices and the required tags are defined via the Device Manager.

Through the Project Structure Manager, the Channel type of the Tecomat1 device is set to Dial-up (modem), the required Phone number is specified, and the Tecomat1Control and Tecomat1Status tags are connected on the Advanced page. In the Modems folder, the Modem1 object is defined and the Modem1Control tag is connected to the Control property of this object. The Tecomat1StatusChanged script is defined via the Script Manager. The script uses bit masking to extract information about the Tecomat1 device's state from the Tecomat1Status tag. Similar objects are defined for the Tecomat2 device.

10.14.4 Network Applications

Network application of type 1 server + 1 client

BoilerRoom_ClientServer is a project that adds the network functionality to the BoilerRoom demo. A new computer named Client1 has been created through the Project Structure Manager. The already defined users, trends, and reports are connected to this computer (objects are only accessible from a specific computer if they are connected to it). In addition, a new server connection group with a new server connection (named Server1) have been created. The Server computer property of the server connection is set to Server1. This connection is used to connect the BoilerRoom1 and BoilerRoom2 devices and the same-named data tables to the Client1 computer (the Data transfer property is set to Network instead of Direct and directories for the data tables are set to \$(HistoryData)\Client1\). The Address property (Server1 > Basic) is set to 127.0.0.1, which is the local address (if you want to run the project on different computers over the network, set this property to a real IP address or hostname).

To run the project, create shortcuts by using the Project > Create Shortcut command (for Client1, use Reliance Control, for Server1, use Reliance Control Server).

Network application with redundant servers (2 servers + 2 clients)

BoilerRoom_RedundantServers is a project that adds a second server computer (Server2) and a second client computer (Client2) to the BoilerRoom_ClientServer project. The computers are defined through the Project Structure Manager.

The Server1 and Server2 computers are redundant servers. Server2 is a secondary server to Server1 (primary server). The respective settings have been configured on the Redundancy page of Server2 (redundancy can be switched on/off through the Secondary server option). Only the server that has the active role provides (in this project) the following functions: simulation of tag data using scripts (analogy to communication with devices in a real project), historical data acquisition, alarm/event generation. Under normal circumstances (i.e., if both servers are running and connected with each other), the primary server has the active role. The secondary server has the standby role, i.e., it does not simulate data, all data (current and historical) and alarms/events are acquired from the primary server (it acts as a client towards the primary server). In the event of a primary server failure, the secondary server will assume the active role. Once the connection with the primary server is reestablished, the secondary server will again assume the standby role.

The Client2 computer has been created by duplicating Client1. A second server connection (pointing to Server2) has been added to the server connection group (named Servers) of the Client1 and Client2 computers. The connection priority is set so that Client1 is primarily connected to Server1 and Client2 is primarily connected to Server2. This setup provides load balancing. If one of the servers is not available (e.g., Server1 is terminated), its client automatically connects to the other server. If a client is not connected to its preferred server, the availability of the server with a higher priority is periodically tested. At runtime, you can view the connection status on the Network connections page in the System Information window.

Network application with multiple servers (2 servers + 1 client)

BoilerRoom_MultipleServers is a project that adds a second server computer (Server2) to the BoilerRoom_ClientServer project. Server2 communicates to the BoilerRoom2 device. In this case, Server1 only communicates to the BoilerRoom1 device. This project demonstrates how to configure a client computer to access data from both servers at the same time. Each server provides the client with the data and alarms/events from a different device. The most important thing is creating two server connection groups for Client1 through the Project Structure Manager. Each group contains one server connection (Server1, Server2). To avoid displaying the top tray on the Server1 and Server2 computers, the TopTray window is disabled on the Display page (Disabled windows).

To run the project, create shortcuts by using the Project > Create Shortcut command (for Client1, use Reliance Control, for Server1 and Server2, use Reliance Control Server).

Accessing the list of thin clients from a script

ThinClientListFromScript is a project designed to demonstrate how to access the list of connected thin clients from a script. After the project is started in the runtime software, the main window contains a Display component with the number of connected thin clients (the ThinClients_Count tag) and a Data Grid component with detailed information about all connected thin clients. The Data Grid component is connected to array-type tags that are periodically updated in the GetThinClientList script. The script is started every 5 seconds and uses the RWS.GetThinClientList method to load the information about the thin clients to the ClientList array. Subsequently, this information is transferred to the array-type tags (ThinClients_xxxx) to be displayed by the Data Grid component.

Handling thin client requests

ThinClientRequestHandlingFromScript is a project designed to demonstrate how to handle requests from thin clients (Reliance Web Client or Reliance Smart Client). In the Web section of the Project Options dialog box, there is the HandleThinClientRequest script set to be executed when a thin client request is received by a data server (Reliance Server or Reliance Control Server). The client's request information (request type, unique session identifier, client IP address, etc.) is obtained using the RScr.GetCurrentScriptDataEx function. This information is written to the corresponding tags in the System device. The values of these tags are shown in the Display components in the visualization window.

10.14.5 Reports

Custom report example – text template

CustomReport_Text is a project designed to demonstrate how to use a text custom report. Within the System device, five tags that contain water level values in tanks are defined. The TextReport custom report is defined via the Custom Report Manager. The custom report contains five items linked to the corresponding tags from the System device. The file Template.txt (custom report template) is located in the <Project>\Main\CustomReports folder. At runtime, you can set the tag values and generate the text report based on the current values.

Custom report example – Web page template

CustomReport_HTML is a project designed to demonstrate how to use a Web page as a template for the custom report. The project contains several sets of tags organized to folders according to the technological unit (see the Device Manager). A Web custom report named WebReport is defined via the Custom Report Manager. The custom report contains items connected to the corresponding tags from the System device. The custom report template files are located in the <Project>\Main\CustomReports folder. This folder also contains a Microsoft Office Word document, which is a source for the custom report template. The visualization window contains several components forming a table. You can set the tag values via this table.

Custom report used to print a simple form

CustomReport_Form is a project designed to show how to use a custom report of type FastReport to print a simple form. The main visualization window contains a form assembled of several Edit Box components. The components are linked to the corresponding tags defined within the System device. The CustomReport_CertificateOfPosting object is defined through the Custom Report Manager and contains items corresponding to the tags from the System device. At runtime, you are enabled to enter values to the form. To switch among the Edit Box components, use the Tab button. To preview and/or print the form, press the Display button. The project also demonstrates the use of multilanguage support. It is localized into Czech and English. If you switch the language of the project, the language is also changed in the text strings of the custom report.

Custom report containing a data grid based on the data from a dBASE data table

CustomReport_dBASE is a project designed to demonstrate how to use a custom report of type FastReport to visualize data from a dBASE database in the form of a data grid. Within the System device, the DatabaseName tag of type String is defined via the Device Manager. It is an auxiliary tag that is used to store the dBASE data table's directory. A script named Init is defined via the Script Manager. The script is used for setting the dBASE data table's directory in the DatabaseName tag. The script is run after project startup. A custom report named Report is defined via the Custom Report Manager. It contains an item named DatabaseName linked to the same-named tag from the System device. The BDETable component is used to make a link between the custom report and the data table. BDETable's DatabaseName property can be set using the DatabaseName custom report item. The data table's file name is set in the TableName property.

At runtime, the custom report can be displayed by clicking on the Show Report button.

Custom report containing a trend based on the data from an SQL database

CustomReport_ADOChart is a project designed to demonstrate how to use a custom report of type FastReport to access an SQL database and to draw a trend based on this data. The TimeRange_From and TimeRange_Till tags (used to specify the time range) are defined via the Device Manager. A sample tag of type Word is also defined. The SQL-type data table defined via the Data Table Manager is used to log the values of the sample tag. The SQL server is named (LOCAL)\SQLEXPRESS. It is a standard name set when Microsoft SQL Server 2005 Express Edition is installed with setup.bat.

A custom report named `TemperatureReport` is defined through the Custom Report Manager. The `ADODatabase` component is used to make a link between the custom report and the SQL database. You have to set the database parameter of this component in the same way as the Connection string in the Project Options > Project > SQL dialog. The values from the data table are accessed via a dynamically generated SQL query (the query is generated in the `FastReport` script).

After the SQL connection is properly configured, you can start the project in the runtime software. Log some records in the database (the value of the word-type tag is logged to the data table every 6 seconds). Select the Time range and display the custom report via the Show Report button.

Custom report containing a data grid based on the data from an SQL database

`CustomReport_ADODatabase` is a project designed to demonstrate how to use a custom report of type `FastReport` to visualize data from an SQL database in the form of a data grid. The project contains three virtual devices defined via the Device Manager. Each of these devices contains five tags (`Tag1`, ..., `Tag5`). Also, three SQL-type data tables are defined via the Data Table Manager. Each of these tables contains items corresponding to the tags in the virtual devices and has different settings of the Time stamp base property.

The SQL server is named `(LOCAL)\SQLEXPRESS`. It is a standard name set when Microsoft SQL Server 2005 Express Edition is installed with `setup.bat`.

Three custom reports designed to display data from the corresponding virtual devices are defined via the Custom Report Manager. The reports differ in the way the time stamp is decoded. Depending on the way a time stamp is logged, the `Int64TimeToDateTime` or `UTCDateTimeToLocalDateTime` conversion function is used. The `ADODatabase` and `ADOTable` components are used to make a link between a custom report and an SQL database. You have to set the database parameter of the `ADODatabase` component in the same way as the Connection string in the Project Options > Project > SQL dialog.

At runtime, you can set the tag values logged to the database and preview the reports via the corresponding buttons.

Custom report used to display hourly average data

`CustomReport_AVG` is a project designed to demonstrate how to use a custom report of type `FastReport` to access an SQL database and to display a data grid containing hourly average values based on this data. A sample tag named `ActFlow` is defined via the Device Manager. The SQL-type data table defined via the Data Table Manager is used to log the values of the sample tag. The SQL server is named `(LOCAL)\SQLEXPRESS`. It is a standard name set when Microsoft SQL Server 2005 Express Edition is installed with `setup.bat`.

Two custom reports are defined through the Custom Report Manager. The CustomReport_RealData object is used to display all historical data. The CustomReport_AVG object is used to calculate and display the sample tag's hourly average values for the last 24 hours. The ADODatabase component is used to make a link between a custom report and the SQL database. You have to set the database parameter of the ADODatabase component in the same way as the Connection string in the Project Options > Project > SQL dialog. The values from the data table are accessed via a dynamically generated SQL query (the query is generated in the FastReport script).

At runtime, you can change the tag value logged to the database and preview the reports via the corresponding buttons.

Custom report containing a trend of an equithermal curve

CustomReport_EquithermalCurve is a project designed to demonstrate how to print an equithermal curve via a custom report of type FastReport. To define the equithermal curve, fourteen tags are defined via the Device Manager. A custom report of type FastReport named Report1 is defined through the Custom Report Manager – the items of this report correspond to the tags defined within the System device. You can edit the report template via the Edit Report command. The template file is located in the <Project>\Main\CustomReports folder. At runtime, you can change the tag values in the visualization window using the Equithermal Curve or Display components.

The following script is used to draw the trend in the FastReport template:

with ECChart do

begin

```
SeriesData[0].XSource :=VarToStr(<TempA$6>)+';'+VarToStr(<TempB$7>);
```

```
SeriesData[0].YSource :=VarToStr(<TempEkvA$10>)+';'+VarToStr(<TempEkvB$11>);
```

end;

Custom report used to print a picture

CustomReport_DynamicPicture is a project designed to show how to use a custom report of type FastReport to print a picture selected from the list. The available pictures are not stored in the custom report, but they are loaded dynamically from a file when generating the custom report. In the visualization window, there is a Combo Box component in which the pictures are specified. The picture files are located in the <Project>\Pictures folder.

Tags named PictureFileName, PictureName, and PictureDir are defined via the Device Manager. They are used to build up the picture file names. Two scripts are defined through the Script Manager. The Init script is used to set the picture file directory in the PictureDir tag. The PictureFileName script is used to build up the path to the selected picture's file.

The visualization window contains two Display components that display the values of the PictureDir and PictureFileName tags. The Combo Box component is used to select a picture from the list. The Picture component allows you to show the selected picture.

A custom report of type FastReport is defined via the Custom Report Manager. For this report, an item named PictureFileName is defined. This item is linked to the PictureFileName tag. In the report design work space, a picture object is inserted. A script is then used to load the selected picture to this object when generating the report.

Custom report used to display alarms/events stored in a file-based database

CustomReport_AlarmsEvents_File is a simple project designed to show how to use a custom report to display alarms/events stored in a file-based database. Within the System device, a main tag named Level and an auxiliary tag named RAEFileName are defined. The Level tag has its operating limits fixed. The RAEFileName tag is used for storing the path to the current file of the alarm/event database. There are also four alarms defined within the System device. The alarms are triggered when the main tag's operating limits are exceeded. A script named Init is defined via the Script Manager. The script is used for setting the file path in the RAEFileName tag. The script is run after project startup. A custom report named Report – basic is defined via the Custom Report Manager. It contains an item named RAEFileName linked to the same-named tag from the System device.

To retrieve data from the database, an object named RAETable is used in the FastReport Designer. Using a FastReport script, the RAETable object's FileName property is set to the value of the RAEFileName item. The appearance of the alarm/event table is specified through two bands. The top band named PageHeader specifies the column header and the bottom band named MasterData specifies the data to display. To display data in the bands, objects of type TfrxRAEMemoView are used (Alarm/Event Table Column Text object). To configure the displayed table, there are two important properties named RAEDataField and RAETitle in those objects. The RAEDataField property specifies the data field (column) of an alarm/event's record, the RAETitle property determines whether to display the data field's title instead of data. The RAETitle property is active in the PageHeader band.

At runtime, you can change the main tag's value in the visualization window.

Custom report used to display alarms/events stored in an SQL database

CustomReport_AlarmsEvents_SQL is a simple project designed to show how to use a custom report to display alarms/events stored in an SQL database. Within the System device, a tag named Level is defined. This tag has its operating limits fixed. There are also four alarms defined within the System device. The alarms are triggered when the Level tag's operating limits are exceeded. A custom report named Report - basic is defined via the Custom Report Manager.

To retrieve data from the database, objects named ADODatabase1 and ADOQuery1 are used in the FastReport Designer. The connection to the SQL database defined in the ADODatabase1 object is automatically synchronized with the setting defined via Reliance's Project Options dialog box. The appearance of the alarm/event table is specified through two bands. The top band named PageHeader specifies the column header and the bottom band named MasterData specifies the data to display. To display data in the bands, objects of type TfrxRAEMemoView are used (Alarm/Event Table Column Text object). To configure the displayed table, there are two important properties named RAEDataField and RAETitle in those objects. The RAEDataField property specifies the data field (column) of an alarm/event's record, the RAETitle property determines whether to display the data field's title instead of data. The RAETitle property is active in the PageHeader band.

At runtime, you can change the Level tag's value in the visualization window.

10.14.6 Embedded Objects

Window template and data structure example

BoilerRoom_WindowTemplate is a project designed to demonstrate how to use data structures and window templates. The visualization project represents a boiler room with a gas boiler. Information related to individual devices (e.g., pump and burner), measured quantities (water and air temperature), and control parameters is arranged into data structures (Pump, Burner, MeasuredTemperature, ControlParameters – see the Data Structure Manager). These elementary structures are then contained in more complex data structures: Boiler and BoilerRoom. Based on the BoilerRoom data structure, structured tags named Data are defined within the BoilerRoom1 and BoilerRoom2 devices (see the Device Manager). Then, there are window templates corresponding to the Pump, Burner, MeasuredTemperature, and ControlParameters data structures. These elementary templates are then contained in more complex templates (Boiler and BoilerRoom). Subsequently, the BoilerRoom template is repeatedly used in the normal visualization windows (BoilerRoom1, BoilerRoom2). Each time the template is used, the respective structured tag of type BoilerRoom must be specified.

Using window templates for displaying motor information

MotorDetails_WindowTemplate is another project designed to demonstrate how to use data structures and window templates. The main visualization window (MotorOverview) is an overview window displaying 4 engine symbols. By double-clicking a symbol, detailed information on the respective motor (ID, status, speed) and its controls (speed setpoint, start/stop button) is displayed.

Information on the device of type motor is arranged in the Motor data structure through the Data Structure Manager. This data structure corresponds to the same-named window template defined via the Window Manager (the Templates folder). Based on the Motor data structure, structured tags named Motor1, Motor2, Motor3, and Motor4 are defined within the System device (see the Device Manager). Subsequently, the Motor template is repeatedly used in the modal visualization windows Motor1, Motor2, Motor3, and Motor4 defined via the Window Manager (the Motors folder). Each time the template is used, the respective structured tag of type Motor must be specified.

10.14.7 Alarms/Events

Sending alarm/event information based on groups

SendAlarmsUsingGroups_Simple is a project designed to demonstrate how to send alarm/event information to certain users based on the alarm/event group defined in the project. The alarm/event information can be sent via E-mail or SMS (text messages) as the alarms/events occur, end, get acknowledged.

In the Project Options dialog box, an alarm/event group named AlarmsToSend is defined (Project > Alarms/Events > Groups).

A device named PLC1 is defined via the Device Manager. In the device, alarms named TrivialAlarm1, SeriousAlarm1, and CriticalAlarm1 are defined to be simulated through the buttons in the visualization window. On the Advanced page, each alarm's Alarm/event groups property determines whether the alarm belongs to the AlarmsToSend group depending on its severity (TrivialAlarm1 does not belong to this group because it is not severe).

Four users are defined via the User Manager. On the Notification page, each user's Alarm/event groups property determines whether the user should receive information on the alarms/events that belong to the AlarmsToSend group. The method of sending the information is specified by the Notify via E-mail and Notify via SMS options (the Notification page). Some users (technicians) are notified via E-mail and SMS, others (the directors and technical managers) are only notified via E-mail. For the users to be notified via E-mail, it is necessary to enter a valid E-mail address (the Basic page, the E-mail property). For the users to be notified via SMS, it is necessary to enter a valid phone number (the Basic page, the Phone number property).

A computer named PC1 is defined via the Project Structure Manager. On the Notification page, the Notify via E-mail, Notify via SMS, On start, and On end options are active. The Message text property contains the necessary information and doesn't have to be altered.

To send information via E-mail, it is necessary to configure the options on the E-mail page, especially the SMTP server address.

To send information via SMS, it is necessary to activate the Start SMS driver option on the SMS page and configure the other properties.

Sending alarm/event information based on groups (two areas)

SendAlarmsUsingGroups_TwoAreas is a project designed to demonstrate how to send alarm/event information to certain users based on the alarm/event groups defined in the project. The alarm/event information can be sent via E-mail or SMS (text messages) as the alarms/events occur, end, get acknowledged.

In the Project Options dialog box, 5 alarm/event groups are defined (Project > Alarms/Events > Groups). The groups are defined based on two criteria: alarm severity (the TrivialAlarms, SeriousAlarms, CriticalAlarms groups) and alarm area (Area1, Area2).

The Area1 and Area2 folders are defined through the Device Manager to represent the areas where particular devices (PLCs, telemetry systems, etc.) are located. In each folder, one device is defined. In each device, alarms named TrivialAlarm1, SeriousAlarm1, and CriticalAlarm1 are defined to be simulated through the buttons in the visualization window. Each alarm has an enumeration of the groups it belongs to (the Advanced page, the Alarm/event groups property) based on alarm severity and the area where the respective device is located.

Users are defined within the Area1 and Area2 folders via the User Manager. Each user has an enumeration of the groups of alarms/events (the Notification page, the Alarm/event groups property) that he/she should be notified of. The group enumeration depends on alarm severity and the area that the user belongs to. The alarms that belong to the TrivialAlarms group are not sent to any users. The method of sending the information is specified by the Notify via E-mail and Notify via SMS options (the Notification page). Some users (technicians) are notified via E-mail and SMS, others (the directors and technical managers) are only notified via E-mail. For the users to be notified via E-mail, it is necessary to enter a valid E-mail address (the Basic page, the E-mail property). For the users to be notified via SMS, it is necessary to enter a valid phone number (the Basic page, the Phone number property).

A computer named PC1 is defined via the Project Structure Manager. On the Notification page, the Notify via E-mail, Notify via SMS, On start, and On end options are active. The Message text property contains the necessary information and doesn't have to be altered.

To send information via E-mail, it is necessary to configure the options on the E-mail page, especially the SMTP server address.

To send information via SMS, it is necessary to activate the Start SMS driver option on the SMS page and configure the other properties.

10.14.8 Scripts

Accessing a DLL from a script

AccessDLLFromScript is a project designed to show how to call functions exported by DLL (dynamic-link library) from a script. The VBScript language, which is used for writing scripts in Reliance projects, does not itself support calling DLL functions. This limitation can be worked around by using a utility called DynaCall, which can, at runtime, create an object-like wrapper around any DLL so that its functions could be called even from VBScript code.

DynaCall utility installation instructions:

1. Unpack the ZIP archive named DynaCall.zip (located in AccessDLLFromScript\Main\Apps) to any directory, e.g., c:\Program Files (the following directory will be created: c:\Program Files\DynaCall).
2. From the command prompt (cmd.exe), register the file c:\Program Files\DynaCall\dynwrap.dll by the following command: `regsvr32.exe "c:\Program Files\DynaCall\dynwrap.dll"`.

Note: If the above command ends with an error, it is necessary to use the following steps:

3. Create a shortcut to cmd.exe.
4. From the context menu of the shortcut, choose the Run as Administrator command and confirm launching the program.
5. Repeat step 2.

The project contains a script named Example1_user32.dll_MessageBox, which makes it clear how to call DLL functions from scripts. The script demonstrates calling the MessageBoxA function from user32.dll (one of the fundamental DLLs of Windows) and can be run by clicking a button located in the main window of the project.

In the script, the below steps are used:

1. Create the DLLWrapper object by the following statement: `Set DLLWrapper = CreateObject("DynamicWrapper")`.
2. Register the respective function by calling the Register method.
3. Call the function as a method of the DLLWrapper object, e.g., `Result = DLLWrapper.MessageBoxA`.

The steps taken to register the MessageBoxA function must be repeated for all other functions that are to be called.

Important:

1. The object variable DLLWrapper must be declared as local (inside a procedure) in the same way as in the example. If it were declared as global and the DLLWrapper object were not freed (by using `Set DLLWrapper = Nothing`) before ending the project, the runtime software would hang during ending the program.
2. The DynaCall utility is free of charge and its authors deny any responsibility for damage caused by possible malfunctions of the utility.

Automatically logging off the user

AutomaticUserLogOff is a project designed to demonstrate how to automatically log off the current user from the runtime software after a certain time of mouse and keyboard inactivity.

The LogoffUser script defined via the Script Manager is used to log off the current user by calling the RUser.LogoffUser method. In order for the script to be run after a certain time of inactivity, some parameters in the project's main file (the one with an .rp4 extension) must be altered. The project's main file is a file in the RDT format that can be opened with the RDT File Editor. The parameters are stored in section 50 and have the following meaning:

Param0 – the inactivity time period (in milliseconds) after which the script specified by Param2 should be run

Param1 – determines whether to run the script specified by Param2 (0 – disabled, 1 – enabled)

Param2 – the ID of the script to be run

Note: The script ID is displayed in the bottom left corner of the Select Script dialog box.

Custom recipe editor

CustomRecipeEditor is a project designed to demonstrate how to use visualization windows and scripts to implement the features of the Recipe Editor, which is available at runtime. This should be done in cases where a customer requires to edit recipes through a form (not by editing values on the list of recipe items through the Recipe Editor).

A recipe type named Product01 is defined via the Recipe Manager. This recipe type contains 4 items named Param01, Param02, Param03, and Param04. Each item is connected to the corresponding same-named tag defined within the PLC1 device. When loading a stored recipe into the PLC1 device, the value of the respective item is written into these tags. To edit the recipe through visualization windows, one auxiliary tag must be defined for each recipe item (this auxiliary tag is of the same type as the corresponding tag in PLC1). The auxiliary tags are called editing tags. They are defined within the System device with the same names as the tags in PLC1. Each recipe item is connected to the corresponding editing tag. Also, each editing tag is connected to the corresponding Display component located in the EditRecipe_Product01 window. The Display components allow you to edit the values of the recipe items. To show the EditRecipe_Product01 window, click on the Edit Recipe button in the main visualization window (Product01). The EditRecipe_Product01 window can be used to choose a recipe from the list of already stored recipes, edit it, and save it under the specified name. The Product01 window can also be used to load or delete the selected recipe by clicking on the respective buttons.

Local and global array definition example

DeclareArrayVar is a project showing how to define and use global and local array variables. The main visualization window contains two buttons that start the UseGlobalArrayVar and UseLocalArrayVar scripts.

An event script named Define used to declare the global variable GlobalArrayVar1 is defined via the Script Manager. This script is executed only once and prior to all other scripts, because the Run on thread initialization property on the Advanced page is enabled. The script is also executed upon a possible forcible termination of the thread. Each global array variable has to be declared only once to avoid the Type mismatch error.

The UseGlobalArrayVar script writes data to the global variable GlobalArrayVar1, whereas the UseLocalArrayVar script modifies only a local variable named LocalArrayVar declared inside the DoSomethingWithLocalArrayVar procedure.

Logging information to a text file

LogMessage is a project designed to demonstrate how to log a text string to a file from a script. The button located in the main visualization window is used to start the LogMessageTest script that contains the LogMessage procedure. This procedure is defined within the Define script (also the functions for custom date and time formatting are defined within this script). Access to the file is done via an object named "Scripting.FileSystemObject" (the OpenTextFile method of this object is used). If this method is called with the filename as a parameter, a new object is created (the numerical parameter defines the opening method, 1 – read only, 2 – write, 8 – append, and the logical parameter defines whether the file should be created if it doesn't exist). Now, you can call the WriteLine method of this object and write an arbitrary text string to the file.

If the button located in the main visualization window is pressed at runtime, a new directory named Logs is created in the <Project> directory. The ScriptLog.txt file is created in this directory. The file contains lines with a current date, time, and example text string.

Downloading and saving a file from the network

DownloadAndSaveFile is a project designed to show how to download and save a file defined by a URL to a local computer. The project's main functionality is done in the DoDownloadAndSaveFile script. This script downloads the file based on the string values of the FileURL and FileName tags. The FileURL tag is linked to the corresponding Display component in the visualization window and defines the source file name and address (the URL has to be entered with the leading http://). The FileName tag is linked to the second Display component and defines the target file. To execute the script, press the Download File button.

The CreateObject command is used to create an instance of the MSXML2.XMLHTTP object. The open and send methods of this object are used to make the connection. The file is saved to the disk via the methods of the "ADODB.Stream" object.

Extracting bits from an integer tag

ExtractBits is a project designed to demonstrate how to use scripts to extract bits from an integer tag and store the bit values in tags of type Bool.

Within the System device, the following tags are defined via the Device Manager: Status01 and Status02 of type Byte, Bits_Status01 and Bits_Status02 of type StatusBits, which is a data structure (defined via the Data Structure Manager). The Bits_Status01 (or Bits_Status02) tag is a structured tag that contains several nested tags of type Bool to which a script will write the value of the respective bits of the Status01 (or Status02) tag.

The Define script, which contains the definition of the ExtractBits procedure, is defined via the Script Manager. On the Advanced page of the script's Properties pane, the Run on thread initialization option is active to execute the script prior to any other script supposed to run in the same thread of execution. The ExtractBits procedure is called from the StatusChanged procedure that is called from the same-named script. The StatusChanged script executes every time the value or quality (validity) of the Status01 tag (or Status02) changes. This is ensured by linking the Status01 and Status02 tags to this script on the Device Manager's Scripts page. The quality (validity) is always changed upon project startup.

The following parameters are passed to the ExtractBits procedure:

The name of the device in which the source tag is defined: System

The name of the source tag: Status01 (or Status02)

The name of the device in which the target tag is defined: System

The name of the target tag (including the character used to separate the structured tag and its nested tags): StatusBits01/ (or StatusBits02/)

The array containing the numbers of bits to extract: BitNumbers_StatusBits = Array(0, 1, 4, 5)

The array containing the names of the fields of the StatusBits data structure (in the same order as bit numbers in the BitNumbers_StatusBits array): BitTagNames_StatusBits = Array("ManualMode", "EmergencyMode", "CheckDevice", "Error")

To display the data of the structured tags of type StatusBits, the same-named window template is used (see the Window Manager). This template contains Display components linked to particular fields of the StatusBits data structure. The template is embedded into the window named MainWindow through a Container component. The window also contains a Display component that is used to display the value of the Status01 (or Status02) tag and enables you to change it.

The solution described above has proven to be very convenient. There may be many tags like Status01 each of which contains status information on a machine used in the industrial process being visualized. It is very easy to add a new status tag. Simply duplicate the Status02 and Bits_Status02 tags. There is no need to modify the existing scripts and add new scripts.

Passing parameters to a script

GetCurrentScriptDataEx is a project designed to show how to pass a parameter from the Reliance SCADA/HMI system to a script and how to access it inside the script. A tag of type LongInt named ScriptParamValue is defined via the Device Manager. It is linked to the Display component. A script named EventScript defined through the Script Manager is linked to the three buttons located in the visualization window. If you click a button, the number associated with the button is passed to the script, accessed inside the script, stored in the ScriptParamValue tag, and shown in the Display component located below.

Listing the contents of a selected directory

GetFolderContents is a project designed to demonstrate how to list the contents of a directory. The main visualization window contains a Display component (enter the name of the directory you want to list), a Button component (which starts the GetFolderContents script), and two Data Grid components. After the script is finished, the left data grid displays the list of subdirectories and the right one shows the file list.

The GetFolderContents script defined via the Script Manager uses an object named "Scripting.FileSystemObject" to get the directory listing. The SubFolderNames and FileNames array tags are populated with the names of subfolders and files in this script. The SubFolderCount and FileCount tags hold the length of the corresponding lists.

Copying array values in a script

MoveTagElementValues is a project designed to demonstrate how to use an event script (started via a button in the visualization window) to copy the first 10 elements from the WordArray20 array to the positions 50–59 in the WordArray100 array. The RTag.MoveTagElementValues method is used to copy the values of the array-type tags.

Copying tag values in a script

MoveTagValue is a project designed to demonstrate how to copy a tag value between two devices. The project contains the AfterStartProject script that is run after project startup (Project Options > Scripts > Other > After run project). This script initializes the DateTime1 tag. In addition, there are several scripts defined in the project used to copy tags from the System device to the Virtual1 device. They are event scripts linked to the buttons in the main visualization window; the window contains Display components that display the values of source and target tags. To copy the tags of a different type, the RTag.MoveTagValue method is used.

Script Debugging

ScriptDebugging is an example project that requires a debugging tool installed on your computer. You can use the Microsoft Script Debugger application (it is part of the Reliance Add-On Pack installer). The visualization window contains two buttons that enable/disable the script debugging function. This is done in the Windows Registry via actions that execute the ScriptDebuggerEnabled.reg and ScriptDebuggerDisabled.reg files. The runtime program has to be restarted before the change takes place. Since Reliance 4.1.3, you can also enable/disable the script debugging function via the Environment Options dialog box in the development environment. If the debugging is enabled and the Run Script button is pressed, the debugging tool is opened.

Types of scripts available in Reliance

ScriptTypes is a project designed to demonstrate how to use different script types. The main visualization window contains five panes, each demonstrating features of one script type. The first pane introduces the Periodic script – the angle value is periodically incremented. The second pane introduces the Data change script – if you change the value of A, B, or C, the result is automatically recalculated. The third pane introduces the features of the Key script – if you press the F5 button, a dialog window is shown (all scripts run in the same thread and, therefore, other scripts are paused if the dialog is shown).

The fourth pane introduces the Condition script – if you enter a number greater than 10 into the Display component, a dialog window is shown. The last pane introduces the Event script – the buttons are linked to the digital tags. An alarm/event is defined and starts if the tag value changes from logical 0 to logical 1. The Alarm script is linked to the event of alarm/event start. The script reads the text of this alarm and shows it in a dialog window.

Sending email messages

SendEmail is a project designed to demonstrate how to send an email message from a script. Before any email can be sent, you have to set the information about the SMTP server. This can be done via the Project Structure Manager on each project computer's E-mail page. The main visualization window of the project contains Display components where the email's recipient, subject, attachments, and body can be specified. The Send Email button is used to activate the script that sends the email. The core part of the script is the RInet.SendMail method.

Elapsed time measuring

Stopwatch is a project designed to demonstrate how to measure the amount of time elapsed from a particular time (similarly as done by a stopwatch). The main visualization window contains two buttons named Start Measuring Time and Stop Measuring Time. After clicking on the Start Measuring Time button, the amount of elapsed time begins to be displayed by the Display components. It is displayed in two ways:

1. As a single piece of data in milliseconds.
2. In hours, minutes, and seconds.

To measure the amount of elapsed time, a periodic script named MeasureTime is used. By default, this script is disabled (the Enable execution property is inactive). Upon clicking on the Start Measuring Time button, the StartMeasuringTime script gets executed. This script enables the MeasureTime script to get executed periodically at the specified Repeat interval. Upon clicking on the Stop Measuring Time button, the StopMeasuringTime script gets executed. This script disables the MeasureTime script.

Binding a project to the computer

CheckHDSerialNumber is an example project designed to demonstrate how to easily protect a project from being launched on an unauthorized computer. After the protection is activated, the project is bound to the hard disk serial number and cannot be run on another computer. Two tags named HDSerialNumber and CheckEnabled are defined through the Device Manager. The first one contains the serial number, the other one is used to activate/deactivate the protection.

Three scripts are defined through the Script Manager. The UpdateHDSerialNumber script is intended for updating the disk serial number in the HDSerialNumber tag. The ExitRuntimeModule script is used to terminate the project. The ProjectRun script is used to compare the current disk serial number to the value of the HDSerialNumber tag. If the numbers do not match, theDlg_ProjectCannotRun dialog window is displayed. After the dialog is confirmed by clicking the OK button, the project is terminated.

All instructions listed below are also shown in the visualization window.

Disk check activation instructions:

1. Start the runtime software.
2. Save the current hard disk serial number to the HDSerialNumber tag (click on the Save HD serial number button).

3. Terminate the runtime software.
4. Bring up the Device Manager. On the Advanced page of the CheckEnabled tag's properties, activate the Save last value option.
5. Start the runtime software.
6. Start checking the hard disk serial number (click on the Check serial number check box).
7. Terminate the runtime software.

Disk check testing instructions:

1. Start the runtime software.
2. Change the saved value of the HDSerialNumber tag (using the Display component).
3. Terminate the runtime software.
4. Start the runtime software.

Disk check cancel instructions:

1. Bring up the Device Manager. On the Advanced page of the CheckEnabled tag's properties, deactivate the Save last value option.

10.14.9 Databases

Script-controlled data logging to a data table (1 record)

AppendRecordToDb is a project designed to demonstrate how to use the RDb.AppendRecord method to add a new record into a data table.

Tags named LongInt, String, and Word are defined within the System device. The values of these tags will be logged to the data table. The following tags are also defined: RecordTimeStamp, which contains the current time (the RSys.Now method), and BlockSamplingData, which is linked to a button in the visualization window (you can enable/disable data logging with this button).

The Data1 data table contains three fields connected to the three tags mentioned above. The sampling method is set to Script-controlled (by RDb.AppendRecord procedure). The Time stamp source property is set to Tag (RecordTimeStamp) and Blocking tag is set to BlockSamplingData. The SaveRecord event script is defined via the Script Manager. This script sets the RecordTimeStamp tag to the current time and calls the RDb.AppendRecord method. To start the script, press the Save record button.

Script-controlled data logging to a data table (group of records)

AppendRecordsToDb is a project designed to demonstrate how to use the RDb.AppendRecord method to add a group of records into a data table. One record (row) in the Data1 data table contains the values of the following tags (columns): RecordTimeStamp, LongInt, String, and Word.

The data that will be logged to the data table is stored in array-type tags named LongArray5, StringArray5, and WordArray5. The RecordTimeStamp value is assembled from the tags MinuteArray5, HourArray5, DayArray5, and the constants c_Month and c_Year before the record is logged to the data table. The BlockSamplingData tag is connected to the Blocking tag property of the data table and to the corresponding button in the visualization window.

The sampling method of the data table is set to Script-controlled (by RDb.AppendRecord procedure) – this means the data can be logged only from a script by calling the RDb.AppendRecord method. The time stamp source is linked to the RecordTimeStamp tag – records don't have to be logged in a chronological sequence.

The InitArrays script is defined via the Script Manager and initializes the array-type tags. This script is executed at project startup via the AfterStartProject script. The SaveArray script is started by pressing the Save array of records button in the visualization window and performs the logging of records to the data table. The values of the RecordTimeStamp, Word, LongInt, and String tags are set and the RDb.AppendRecord method is called inside the "for" statement (this sequence is performed five times). You can view the data logged in the data table via the trend or report viewer.

Random access to data table records

RandomAccessToDataTable is a project designed to demonstrate how to manually (randomly) read/write data from/to a data table of type dBASE. The Records data table is defined via the Data Table Manager. The Data acquisition method property of this data table is set to Not specified and the Archive files property on the Advanced page is set to None. The table contains the following fields: Number, Length, Color, and Material. The fields are linked to the same-named tags of different types defined through the Device Manager. The records in the data table are accessed manually from a script. You can view the records stored in the data table via the record viewer (the Report1 report).

The Init script defined via the Script Manager contains the procedure and function definitions and is executed only once before all other scripts in a thread. The RDb.CreateTableObject command is used to create an instance of an object that will be used to access the Records data table. For example, to add a new record to the data table (the AppendRecord procedure), the following methods of the object are called: OpenTable, Append, SetFieldValue, Post, and CloseTable. For more information on the TTable object used to access data tables, see the Scripts help file.

Logging data to an SQL database

LogDataToSqlServer is a project designed to demonstrate how to log tag values to an external SQL server and how to visualize this data in the trend viewer. The example requires access to an SQL server (MS SQL Server is part of the Reliance Add-On Pack installer).

Four tags of type Word are defined within the System device. The tag values are logged with a period of 5 seconds to the Pressures and Temperatures data tables defined via the Data Table Manager (the Database type property is set to SQL). The SqlServer connection is defined on the SQL page of the Project Options dialog box (you may have to update some of the parameters). Notice that the defined SQL connection is selected in the Project Structure Manager as a parameter for the connected data tables (the SQL connection property on the Basic page).

The main visualization window contains four Edit Box components connected to the Word-type tags and two Button components that display trends.

Accessing an SQL database from scripts

SQLFromScript is a project designed to demonstrate how to read and write (update, insert) data from/to an SQL database via methods of the "ADODB.Connection", "ADODB.Command", and "ADODB.Recordset" objects. The ReadDataFromSQLTable, InsertRecordIntoSQLTable, UpdateRecordInSQLTable, and Define scripts are defined in the project. The first three scripts are event scripts calling the procedures defined within the Define script (the script is started only once before all other scripts at the thread initialization). The Define script also contains the definition of the Connection string for connecting to Microsoft SQL Server running on the same computer. The usage of the SELECT, INSERT, and UPDATE SQL commands is demonstrated in the procedures.

Accessing an ODBC database from scripts

ODBCFromScript is a project designed to show how to access the ODBC databases in the Reliance 4 SCADA/HMI system via scripts. The Define script defined in the project contains the ReadDataFromSQLTable and WriteDataToSQLTable procedures. The procedures work with the "ADODB.Connection" object and related objects. The procedures are called from the ReadDataFromSQLTable and WriteDataToSQLTable scripts with the parameters defined by the constants c_ConnectString and c_TableName.

You have to alter these constants according to your database. To help you construct the c_ConnectString constant, see the Connection string text box (Project Options > SQL). Configure the connection via the Edit Connection String command before you copy the string.

10.14.10 Data Exchange

Exporting historical data from a relational database to a text file

ExportHistDataToCSV is a project designed to show how to export historical data from a relational database to a text file in the CSV format. It is assumed that the computer on which this project runs is equipped with Microsoft SQL Server with its instance named SQLEXPRESS and credentials preset when installing SQL Server from Reliance Add-On Pack. In case SQL Server has been installed in another way, it is necessary to customize the connection string (Project Options > SQL) and the value of the constant c_ConnectionString in the Define_DataExport script. A data table named IncrementalData is defined through the Data Table Manager. The Reliance SCADA system logs the table's data to the table named IncData contained in the database R_ExportHistDataToCSV in Microsoft SQL Server running on the same computer (both the database and the table will be created with Reliance once the project is started for the first time).

To export the historical data to the file, scripts defined through the Script Manager are used. The export itself is performed by calling the ExportHistDataToCSV procedure, whose definition is contained in the Define_DataExport script. The name of a physical table (in this case, it is "IncData", see the ExportHistDataToCSV script) is passed as a parameter to the procedure. In the same way, it would be possible to export historical data from any other table if multiple tables were contained in the database (it would be enough to pass the name of this table as a parameter to the procedure).

You can export either all the data logged to the table or data from a specific time period (time range). This can be configured in the visualization window named MainWindow. To export all data, deactivate the options Start and End. Otherwise, activate the options Start and/or End and enter the time range's start and/or end. Data export can be invoked by clicking on the Export button (this will run the ExportHistDataToCSV script).

Importing data from a text file

ImportFromCSV is a project designed to demonstrate how to use scripts to import data from a text file (CSV). The project contains the following tags: RoomNumber, Occupied, Date, and Time. The ImportCsvFile event script is designed to load the data from a file to these tags. The visualization window contains a Button component used to start the script and four Display components that display the imported data after the script is finished. The values are imported from the <Project>\Import.csv file.

Export and import to/from MS Excel

ExportImportXLS is a project designed to demonstrate how to access MS Excel files via the COM interface (the MS Excel application has to be installed on the same computer as the Reliance SCADA/HMI system). The Var_Float, Var_Int, and Var_Str tags defined through the Device Manager are linked to the corresponding Display components in the main visualization window (the Enable setting value option is active). The values of these tags are exported/imported from/to an *.xls or *.xlsx file. The ExportToExcel and ImportFromExcel event scripts (activated by pressing the respective button in the visualization window) are defined through the Script Manager. The Excel file named Values is located in the <Project> folder.

At the beginning of the ExportToExcel script, an instance of the "Excel.Application" object is created. Afterward, a new workbook (WorkBook) and a new worksheet (WorkSheet) are successively created. The Cells method is used to write the data to the required cells. The workbook is stored by calling the SaveAs method and all created objects are released from memory.

At the beginning of the ImportFromExcel script, an instance of the "Excel.Application" object is created and the Values file is opened with the Open method of this object. The values stored in the file are loaded via the Cells method.

Communication via DDE – client

DDE_Client is a project designed to show how to use the DDE protocol to exchange data between two Reliance projects. The DDE_Client project needs to be started in the Reliance Control software (and, simultaneously, the DDE_Server project needs to be started in the Reliance Control Server software). If both projects are running successfully, you can set a value in the DDE_Server project and the change is instantly visible in the DDE_Client project (and vice versa).

A DDE device named R_CtlSrv_DDEServer is defined through the Device Manager. The DDE server property is set to R_CtlSrv (it is the DDE server's filename without an extension). Within the DDE device, there are tags defined in the Tags folder. These tags correspond to the tags defined in the DDE_Server project. For clarity's sake, the tags are divided into the T0 and T1 folders. For each tag, the DDE Item property is configured so that it corresponds to the configuration of the same property in the DDE_Server project. The R_CtlSrv_DDEServer device is connected to the DDEClient computer via the Project Structure Manager. The DDE topic property is set to DdeServer (this is if the DDE server is the Reliance runtime software, i.e., Reliance View, Reliance Control, Reliance Server, or Reliance Control Server).

Communication via DDE – server

DDE_Server is a project designed to show how to use the DDE protocol to exchange data between two Reliance projects. The DDE_Server project needs to be started in the Reliance Control Server software (and, simultaneously, the DDE_Client project needs to be started in the Reliance Control software). If both projects are running successfully, you can set a value in the DDE_Server project and the change is instantly visible in the DDE_Client project (and vice versa).

Two virtual devices (T0_Server and T1_Server) defined through the Device Manager contain internal tags (in the Tags folder within each device). The tags are configured for DDE sharing (the Sharing page). The two virtual devices are connected to the DdeServer computer via the Project Structure Manager.

Communication with an external program via COM

CommWithExternalProgram is a project designed to demonstrate how to transfer data between the Reliance system and an external application via the COM interface. The RandomValue and Seconds tags defined in the project are used to hold the data received from the external application. The project also contains the RelianceValue tag, which is used to send the data to the external program (you can set its value in the visualization window). The external application is located in the <Project>\Main\Apps folder and it is automatically started upon project startup (the Project Options > Scripts > Other > After run project property specifies the Create_GlobalObject script, which is to run the program). Before the project is started for the first time, the external program needs to be started manually to register the COM object.

The project's main visualization window contains two buttons connected to the scripts that are used to start or terminate the external application. The window also contains three Display components linked to the RandomValue, Seconds, and RelianceValue tags. The Create_GlobalObject and Free_GlobalObject event scripts defined through the Script Manager are designed to start and terminate the external application (the CreateObject method is used to start the external application). The SendNewValue script is designed to send the value of the RelianceValue tag to the external application (this can be achieved by calling the SetValue method of the external application). The last object defined via the Script Manager is a periodic script named Read_ObjValues (its period is 0.3 seconds), which is used to read the values from the external program (the GetRandomValue and GetSeconds methods of the external program are used to read the values).

The external application, which is part of the example project, shows the current values of the two dynamically generated tags and the list of values received from the visualization application. The external program is written in Borland Delphi (Pascal) and supplied including the source code (the source code is located in the <Project>\Main\Apps\Source\External.zip directory).

Script-controlled data logging to a file and database

LogDataToFileAndDb is a project designed to show how to log tag values to a file and database via a script. The main visualization window contains three Display components (displaying the sine and cosine of a periodically incremented angle) and two Button components used to activate/deactivate data logging to the file or data table. The data will be logged to the <Project>\History\Data\AngleData.txt file and/or to the AngleData data table (the sampling method of the data table is set to Script-controlled (by RDb.AppendRecord procedure)). You can view the data logged to the data table via the report viewer (the AngleData report).

An event script named Define is defined via the Script Manager. The script starts before all other scripts and sets the constants (the Run on thread initialization option on the Advanced page is enabled). A periodic script named Calc_and_log calculates the sine and cosine and increments the Angle tag by one degree every 200 ms. The script contains the Log_to_file procedure, which uses the "Scripting.FileSystemObject" object to log the data to the file, and the Log_to_database procedure, which uses the RDb.AppendRecord method to log the data to the AngleData data table.