PROCESS AUTOMATION

Freelance 2019

Engineering Manual
Trend Server

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Trend Server

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About this book

Use of warning, caution, information, and tip icons

This publication includes **Warning**, **Caution**, and **Information** icons where appropriate to point out safety related or other important information. It also includes **Tip** to point out useful hints to the reader. The corresponding symbols should be interpreted as follows:

Electrical warning icon indicates the presence of a hazard which could result in *electrical shock.*

Warning icon indicates the presence of a hazard which could result in *personal injury.*

Caution icon indicates important information or warning related to the concept discussed in the text. It might indicate the presence of a hazard which could result in *corruption of software or damage to equipment/property.*

Information icon alerts the reader to pertinent facts and conditions.

Tip icon indicates advice on, for example, how to design your project or how to use a certain function

Although **Warning** hazards are related to personal injury, and **Caution** hazards are associated with equipment or property damage, it should be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process performance leading to personal injury or death. Therefore, comply fully with all **Warning** and **Caution** notices.

Terminology

You will find a complete and comprehensive glossary at the end of the ***Engineering Manual System Configuration***. This glossary contains terms and abbreviations that are unique to ABB or have a usage or definition that is different from standard industry usage. Please become familiar with the terminology.

Document conventions

The following conventions are used for the presentation of material:

- The words in names of screen elements (for example, the title in the title bar of a window, the label for a field of a dialog box) are initially capitalized.
- Capital letters are used for the name of a keyboard key if it is labeled on the keyboard. For example, press the ENTER key.
- Lowercase letters are used for the name of a keyboard key that is not labeled on the keyboard. For example, the **space bar**, **comma key**, and so on.
- Press **CTRL+C** indicates that you must hold down the **CTRL** key while pressing the **C** key (to copy a selected object in this case).
- The names of push and toggle buttons are boldfaced. For example, click **OK**.
- The names of menus and menu items are boldfaced. For example, the **File** menu.
  - The following convention is used for menu operations: MenuName > MenuItem > CascadedMenuItem. For example: select **File** > **New** > **Type**.
  - The **Start** menu name always refers to the **Start** menu on the Windows Task Bar.
- System prompts/messages are shown in the **Courier** font, and user responses/input are in the boldfaced **Courier** font. For example, if you enter a value out of range, the following message is displayed:

  ```
  Entered value is not valid. The value must be 0 to 30.
  ```

  You may be told to enter the string TIC132 in a field. The string is shown as follows in the procedure:

TIC132

Variables are shown using lowercase letters.

sequence name

Related Documentation

Refer to ***Getting Started***.

1 Introduction

1.1 Overview

A trend display can be used to show the time curve of analog and binary process variables. A graphical representation of up to 6 process variables can be shown simultaneously in a trend display. The operator has the facility to zoom, fade out and move the images of measured values.

There are two types of trend data acquisition: Very fast changes of process data can be acquired directly in the process station by means of a Trend Data Acquisition function block. Here, the acquisition time is the same as the task cycle time. The Trend Server can be used to acquire any variables even in a trend from various different process stations. The minimum acquisition time in this case is 1 second. Data acquisition without a trend data acquisition function block is referred to below as a ‘free trend’ or ‘free trend display’.

To configure a free trend display, any variables (up to a maximum of 6 in number) from the Freelance process stations may be specified. For each process variable an additional variable of data type Date&Time can be configured. The value of this variable is used as a time stamp for the process value. The time value of this variable is interpreted as a GMT time, GreenwichMeanTime, timezone = 0h.

In order to use a free trend display, a gateway station of type TRN gateway must be configured in the Project tree.

When a Trend gateway is configured, read access rights through this gateway are configured automatically for all the tags in the project. In the same way, read access rights over the Trend gateway are assigned to all variables from the process stations. Variables which have been imported into the project from other OPC servers are read by the trend display direct from the OPC server. No access rights need be configured for the Trend gateway. The access rights and links between trend server and process stations may need to be configured and checked.

1.2 Trend Gateway

To make all the data from a project available without using a trend data acquisition function block, a Trend Gateway must be configured in the Freelance Engineering project. To do this, a gateway resource of type TRN gateway must be created in the project tree.

The Freelance Trend Server software must be installed on the Trend Gateway Station. This software communicates with the process stations and supplies the data to the Freelance Operation stations.

When Freelance Engineering is in commissioning mode, the Trend Gateway is loaded from the project tree. Immediately after this, the data can be accessed through the Freelance Trend interface.

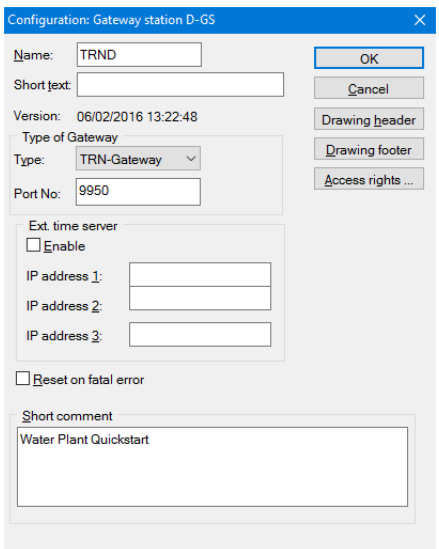
1.3 Prerequisites and Requirements

The Freelance Trend Server can only be installed on a PC running the Windows operating system as specified in the release documentation. This PC must be linked with the stations from the Freelance Engineering project using TCP/IP-Ethernet.

2 Project Configuration

2.1 Adding a trend gateway station

1. Add the station resource **Gateway station D-GS** in Project tree.
2. Select the type to **`TRN gateway`**



trn004us_1.png

Name Name of the gateway station, max. 4 characters.

Short text max. 12 characters

Version date and time the object was created

Drawing header / drawing footer
Enter the drawing footer or header. For more information, refer to

the subchapter Footer in ***Engineering Manual System Configuration.***

Access rights — Read rights for the process stations in the project can be enabled or disabled.

Type — Type of gateway station, select **`TRN gateway`**

Port No — Port number for the OPC tunnel communication. The default value is 9950.

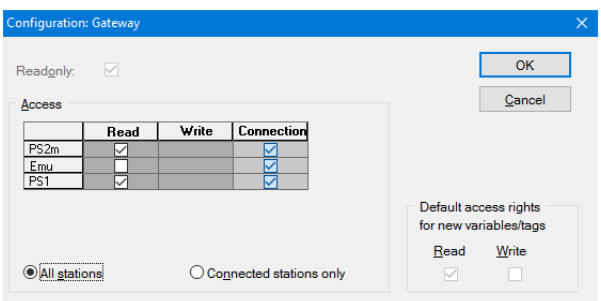
Ext. time server

External Process stations of the project which are connected through modem can be time synchronized from the Trend server PC. For details refer to ***Engineering Manual System Configuration.***

Short comment

Enter the short comment. For details refer to ***Engineering Manual System Configuration.***

2.2 Access rights of the Trend Gateway to a Controller



trn005us.png

Read-only — The Trend gateway is allowed read-only access to the process variables. This parameter cannot be changed.

Access — Only read-only rights, not write rights, can be assigned. For each process station that is already configured in the project, a parameter is set which specifies whether read access through the Trend gateway station is allowed. In the communication matrix (CONF

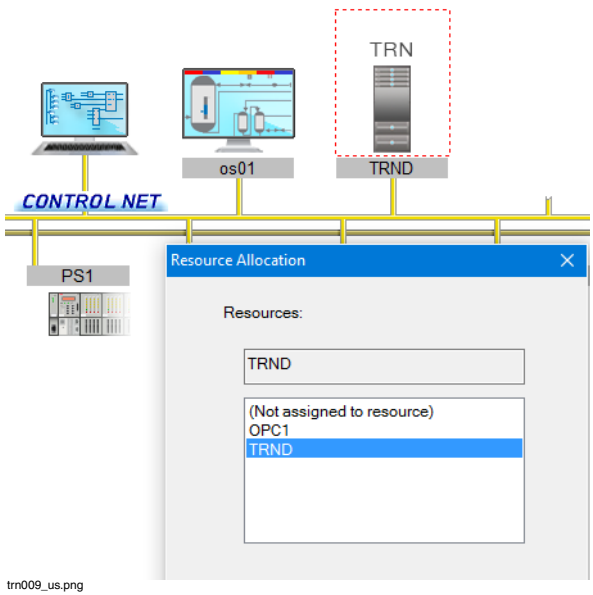
node in the Project tree) the connections to the Process stations must be configured correctly.

Default access for new variables/tags

All newly-created variables and tags are by default assigned the access rights defined here for this gateway. This parameter cannot be changed.

2.3 Adding the Trend Gateway Station to the Hardware Structure

A free space within the control level must be selected in the hardware editor's system view, and this must be assigned to a Trend gateway resource that has already been created in the Project tree.



trn009_us.png

2.4 Network addresses

The IP addresses and resource IDs of the stations are configured in the hardware editor under **Network**. The values specified here for the Trend gateway must correspond to the parameters defined during the installation of the Trend server software.

2.5 Access Rights for Tags and Variables

When a Trend Gateway is configured, read access rights through this gateway are configured automatically for all the tags in the project. In the same way, read access rights over the Trend Gateway are assigned to all variables from the process stations. Variables which have been imported into the project from other OPC servers are read by the trend display direct from the OPC server. No access rights need be configured for the Trend gateway.

The access rights are displayed in the station view for the tags or variable list, see ***Engineering Manual IEC 61131-3 Programming***.

2.6 Initiating Communication

The Trend server is started automatically when requested by a Freelance Operations PC.

2.7 Configuring a free Trend Display

To configure a free trend display, any variables (up to a maximum of 6 in number) from the process stations may be specified. For each process variable an additional variable of data type Date&Time can be configured. The value of this variable is used as a time stamp for the process value. The time value of this variable is interpreted as a GMT time, GreenwichMeanTime, timezone = 0h.

If no separate time stamp variable is specified, for variables from a process station the associated system variable `<ressource_name>.DateTime` is used, corrected by the time zone of the project (local time - time zone = GMT time). With variables which are read from the OPC server into the Freelance system, the accompanying time stamp from the OPC server is used (GMT).

2.7.1 Create Trend Display

A trend display is created and edited in the Project tree at the level below resource operator station. For details, refer to the subchapter ***Project Tree*** in ***Engineering Manual System Configuration.***

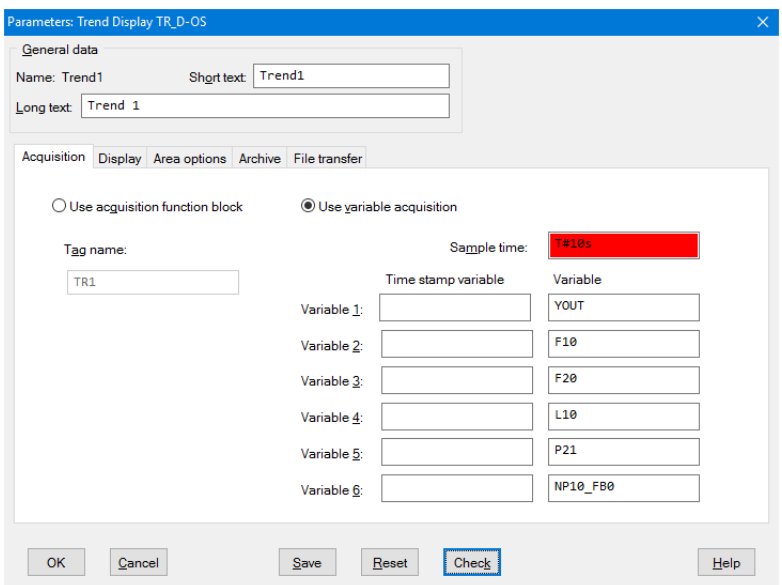
1. Select resource operator station

2. **Edit > Add next level**
3. Select **Trend** display

2.7.2 Parameter Input Dialog for the Trend Display

1. Select the Trend display in the Project tree
2. Double-click on Trend display

Configuration of the Trend display consists of a parameter input dialog with five tabs.



trn0430_us.png

General data

Name The name of the trend display.

Short text Free text up to a maximum of 12 characters in length.

Long text Free text up to a maximum of 30 characters in length.

Acquisition

Use acquisition function block, or *Use variable acquisition*
Parameter specifying whether the trend display is based on data

from an acquisition function block or on independent process variables.

In order to configure a free trend display, 'Use variable acquisition' should be selected.

Sample time The process variables are transferred to the trend display with the time interval as configured here. Any value can be entered. Minimum time = 1 second.

Only changed values are sent by the trendserver to the operator station. Even if the values change faster than the time input here, the values are transferred in the time interval configured.

Two independent time intervals are processed in the Trend server. The requested values are read out of the process station cyclically once per second, and transferred to the operator station with the cycle time configured here.

Variable 1-6 The following two entries Time stamp variable and Variable will specify up to six trend variables.

Variable Name of the trend variable. You can select the offered variables, I/O components and process components that the system knows about by pressing the **F2** function key.

The significance of the I/O components is described in the engineering manuals for the process stations.

The significance of the process components is described in the ***Engineering Manual Functions and Function Blocks***.

Time stamp variable

Name of the process variable whose value is used as the time stamp for the variable entered under value. The time value of this variable is interpreted as system time = GMT time, GreenwichMeanTime, timezone = 0h.

If no separate time stamp variable is specified, for variables from a process station, the associated system variable <ressource_name>.DateTime is used and corrected by the time

zone of the project (local time - time zone = GMT time). In the case of variables which are read into the Freelance Control System from an OPC server, the time stamp which the OPC server provides along with it is used (GMT time).

Function key **F2** should be used to display a list of all variables of data type Date&Time that are known in the system.

If the system variable `<ressource_name>.DateTime` is used as a time variable, then the trend is displayed in Freelance Operations shifted by the value of the time zone. The variables used must contain a system time.

The configuration of the remaining tabs is identical to the configuration of a trend display with a trend data acquisition function block. For more information, refer to the subchapters ***Standard Displays*** and ***Trend Display*** in ***Operator Station Configuration Manual.***

3 Commissioning

3.1 Loading Project Data to the Trend Gateway Station

Like the process stations, the Trend Gateway Station must also be commissioned.

After the project has been checked for plausibility and all the process stations loaded, the project data must also be loaded onto the Trend Gateway Station. When a gateway is commissioned for the first time, **Load**, **Whole Station** must be performed. Configuration changes are transferred to the gateway station by means of **Load**, **Changed objects**.

In the course of the loading project from Freelance Engineering, the Trend Gateway Station receives notification about all variables and tags that can be accessed through this gateway.

3.2 Loading Project Data to the Freelance Operator Station

As part of the operation of loading data onto an operator station, the configured free trend displays are also transferred into the Freelance Operations database.

The maximum of configured protocols and trend displays which can be loaded into Freelance operator station depends on the performance of the PC.

The practical experience shows that a maximum of 125 trend displays and configured protocols per Freelance operator station is a good limit.

4 Free Trend Display on Freelance Operations

4.1 Introduction

In a Freelance operator station there is no difference in principle between displays for trend data acquisition function blocks and the free trend displays.

Make sure that the connection between Freelance Operations and the Trend server is established.

For details on how to call up and operate a trend display refer to the subchapter ***Trend Display*** in ***Manual Freelance Operations Manual.***

4.2 Data Acquisition and Communication

If the same variable is used in two free trend displays, then this variable is communicated to Freelance Operations twice. The same applies even if the same cycle time is configured for both trend displays.

A cyclical acquisition time has been configured in the trend display configuration. The trend server does not send the data cyclically to the trend display in the Freelance operator station, but sends only changed values.

As well as the transfer of values, the link between the trend server and trend display is also checked every 5 seconds. If there is a connection present but the trend display does not receive any new data, then constant values are generated and stored in the trend display. Only if the connection is disrupted, do the gaps in the data acquisition will be resulted.

The connection status is checked every 5 seconds, and so the smallest detectable data gap in a free trend display is 10 seconds.

If no value for gap detection was defined during configuration of the trend display, then, as with the trend data acquisition module, 3-times the cycle time is used as the default value for data gaps.

4.3 Archive Files

The operator can define in the configuration process whether or not the trend data should be archived in files. The file size is determined by the configuration of archival period.

In a free trend display, data from various different devices with different time variables can be displayed together. The different time variables enable the trend display to receive data whose time stamps are older than those of the most recently received data. In this case the current archive file is closed and a new file created.

The configuration of a trend display can be modified in a current project. In most cases, this is will lead to a change of the size of data stored and thus of the archive file. Each change to the archive file results in the current archive file being closed and a new file being created.

In Freelance Operations, only the data from the current archive file can be shown. Older archive files can only be displayed with the help of the add-on package Archive Browser.

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