MITSUBISHI ELECTRIC

E-Designer for the E1000-series

Reference manual

MA00759A 2005-03

English

Manual for E-Designer

Foreword

This manual is a description of E-Designer, the configuration tool used to create applications for the operator terminals in the E1000-series. Further on in the manual we refer to the configuration tool.

Please see the E-Designer User's Guide MA00760 for function-based descriptions.

The manual assumes that the most recent versions of the system program (firmware) and configuration tool are used.

The configuration tool can also be used to create and edit projects for the operator terminals in the E-series. Programming of operator terminals in the E-series is described in the manual MA00552D.

For specific controller details and the connected controller, we refer to the driver help file for the respective controller. The functionality in the operator terminals is the same, regardless of which controller is connected to the operator terminal.

The operator terminal can be connected to many types of automation equipment, such as PLCs, servo and drives. In this document the expression "the controller" is used as a general term for the connected equipment.

Contents

1 Installation

1.1 The configuration tool

The configuration tool is a software package used for developing projects for operator terminals in the E1000-series. The functions in the configuration tool depend on which operator terminal model is used.

In the configuration tool a project is created with graphic blocks and text blocks, which are then transferred to the operator terminal. The configuration is described in the chapter *Configuration with the Configuration Tool*.

Help texts are available for all functions. The help text for the current function is displayed by pressing the F1 key. By clicking the help button in the toolbar and then clicking on a function, information is shown about that function.

System requirements

To use the configuration tool, a PC with at least 100 MB of available memory and Microsoft Windows 2000/XP Professional is required. The configuration tool can be used on either a color or monochrome screen. Microsoft Internet Explorer version 5.0 or later must be installed on the computer.

Installing the configuration tool

The configuration tool is supplied on a CD. When placing the CD in the CD-ROM drive, the installation will start automatically. If not, select **Run** on the **Start** menu and enter D:\setup.exe (if D: is the CD-ROM drive). Select to install the configuration tool by clicking on the name and following the instructions.

The installation creates an icon for the configuration tool in the E-Designer group. Clicking **Start** and selecting **All Programs/E-Designer/E-Designer** starts the configuration tool.

2 General

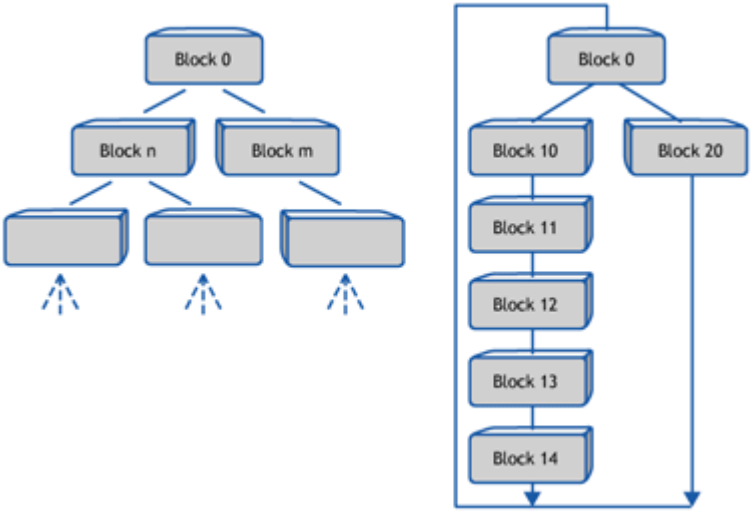
This chapter describes the structure of an application project in the operator terminal. There is also an explanation of the general principles, object parameters, and joint functions applicable in the operator terminal.

2.1 Method for creating a project

The graphical structure of the application in the operator terminal constitutes a well-arranged monitoring tool for the operator. It is important to organize the application well and to consider which functions are necessary. Start with the overall view, and then work down to the detailed level.

The application is built up of blocks, graphic blocks and/or text blocks. Values from the controller are shown and changed in the blocks. Each function becomes one or more blocks, depending on how complex the function is. A project can contain both graphic and text blocks, and each block can contain static and dynamic objects. The blocks should be arranged in hierarchies to achieve a structured application, and to simplify work procedures for the machine operator. The application can also be organized as sequence controls.

It is possible to test the complete application, or parts of it, before it is downloaded to the operator terminal.



2.2 Blocks

Each block has a number between 0 and 989 allocated by the developer. The blocks 990-999 are reserved for special purposes, so-called system blocks. The operator terminal is object-orientated, which means that a block can contain all the signals linked to an object for the control and monitoring of, for example, a pump.

Block properties, such as block number and type of block, are defined for each block.

The functions Alarms, Time channels, System Monitor, E-mail and Contrast Properties can also be invoked as blocks. These are designated system blocks. Text blocks are used for report printouts and e-mail, and cannot be displayed to the operator. The maximum number of blocks in a project is 990.

Note:
The block type cannot be changed for a defined block.

2.3 Signal format

The following signal formats are available in the dialog for each object, on the assumption that the selected driver supports the signal format.

Format type	Area
Signed 16-bit	-32,768 – +32,767
Unsigned 16-bit	0 – +65,535
Signed 32-bit	-2147483648 – +2147483647
Unsigned 32-bit	0 – +4294967295
Float with exponent, 32-bit	±3.4E38 Numbers larger than 1,000,000 are shown with exponent.
Float without exponent, 32-bit	Parameters Positions (including decimal point and characters) and Decimals indicate the available area. E.g. 8 positions and 3 decimals result in ±999.999.
BCD Float	0 – 9999,9999.
BCD 16-bit	0 – 9999
BCD 32-bit	0 – 99999999
HEX 16-bit	0 – FFFF
HEX 32-bit	0 – FFFF FFFF
Seconds 16-bit	The object Analog numeric can present the time format. Syntax: <hours:minutes:seconds>. Example: The register value in D0=3661, the object Analog numeric linked to D0 and defined as Seconds 16-bit will then show <1:01:01>.
Seconds 32-bit	The object Analog numeric can present the time format. Syntax: <hours:minutes:seconds>.
String	Character string which can be used in the dynamic function for graphic objects. Example: In the object Static symbol, Digital symbol and Multiple symbol, the dynamic property Symbol can be linked to a register with the format String.
Array 16-bit	Table format which can be used for an Event in the dynamic function for graphic objects. Example: A group of registers is to be allocated different values when "Value entered" is equal to 99. The first value in the field Value will then be entered to register D21 in the field Signal. If the field Value appears as follows, <1,2,3,4> the value 2 will be entered in next subsequent register (D22), etc.

2.4 Efficient communication

To make the communication between the operator terminal and the controller quick and efficient the following should be noted about how the signals are read and how the reading can be optimized.

Signals affecting communication time

Only signals to objects in the current block are read continuously. This also includes signals for object dynamics. Signals to objects in other blocks are not read, thus the number of blocks does not affect the communication time.

Besides the signals to objects in the current block, the operator terminal reads the following signals from the controller continuously:

Display signals (Block Properties)
Print signals (Block Properties)
LED registers
Alarm signals
Remote acknowledge signals on alarms and alarm groups
Login signal (Passwords)
Logout signal (Passwords)
Registers for trend curves
Bar graph registers if using min/max indicators
New display register
Buzzer register
Backlight signal
Cursor control block
Recipe control block
Library index register
Index Registers
Controller clock register if the controller clock is used in the operator terminal
List erase signal (Alarm Properties)
No protocol control register
No protocol on signal

Signals not affecting the communication time

The following signals do not affect the communication time:

– Signals linked to function keys

– Time channels

– Objects in the alarm messages

How to make the communication more efficient

Group controller signals consecutively

Signals from the controller are read most rapidly if all signals in the list above are consecutive. If for example, 100 signals are defined, the quickest way to read these is to link them, for example, M0.0-M11.7. If the signals are spread (e.g. I0.4, Q30.0, M45.3 etc.) the updating is slower.

Efficient block changes

Block changes are carried out most rapidly and efficiently through the block jump function on the function keys or through a jump object. **Display** signals in block properties should only be used when the controller is to force the presentation of another block. The **New display** register can also be used if the controller is to change the block. This does not affect communication as much as a larger number of **Display** signals.

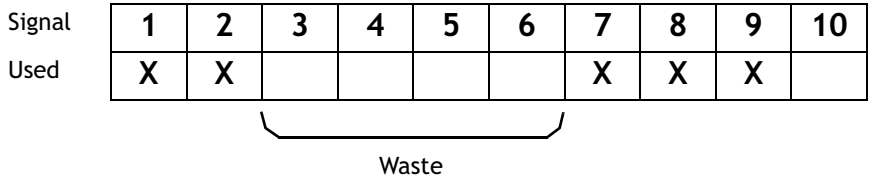
Use the clock in the operator terminal

An extra load is put on communication if the clock in the controller system is used, since the clock register must be read up to the operator terminal. Downloading of the clock to the controller also creates an extra load. The interval between downloads should therefore be as long as possible.

Packaging of signals

When signals are to be transferred between the operator terminal and controller, they are not all transferred at the same time. They are divided into packages, each containing a number of signals, instead. The number of signals in each package depends on which driver is used.

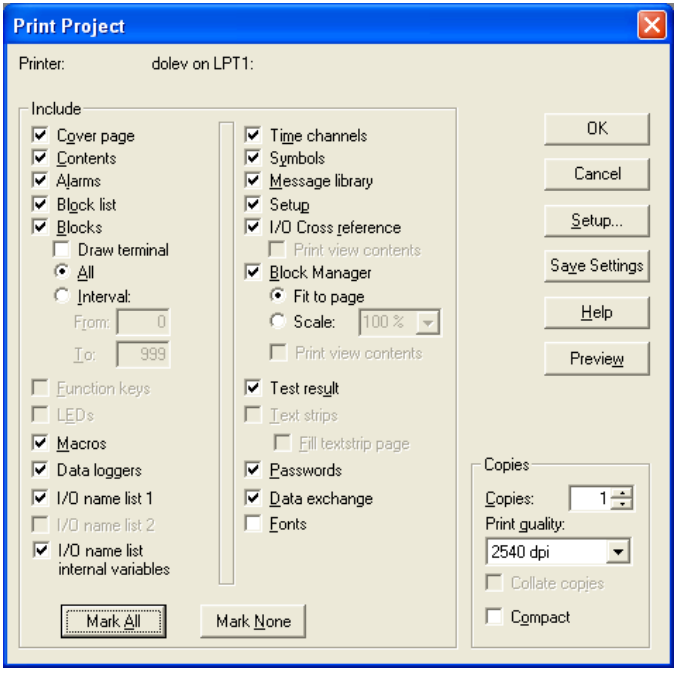
To make communication as fast as possible the number of packages has to be minimized. Consecutive signals require a minimum number of packages, but it is perhaps not always possible to program it this way. In such cases there is a “waste” between two signals. This gap in the maximum distance between two signals which can still be kept in the same package. The size of the gap depends on which driver is used.



2.5 Project documentation

Project printouts

Select **File/Print...** to print the project.

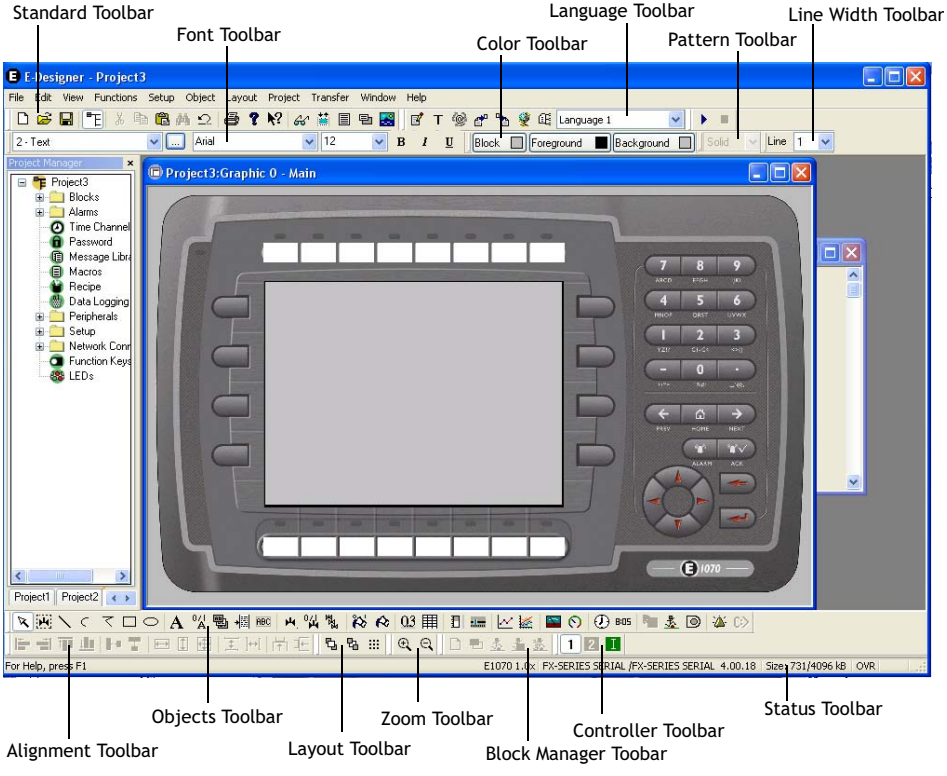


The project documentation is generated automatically by selecting the options in the Print Project dialog. Choose which parts to include by clicking the boxes. The project documentation can include a table of contents and a cover page (Document Header) with the option to include the desired logo and text. Select **File/Document Header** to define the contents. Click **Preview** to view the printout before sending it to the printer. Select **Setup** to configure the printer.

3 Configuration with the Configuration Tool

This chapter describes how to configure the operator terminal using the configuration tool. How to install the software is explained in the chapter *Installation*.

The configuration can be performed using the menus, additionally, many functions can be reached easily by right-clicking on a component in the Project Manager or from different toolbars. Select **View/Toolbars** to display or hide different toolbars.



Toolbars in the configuration tool.

3.1 Starting the configuration tool

Click on **Start/All Programs/E-Designer/E-Designer**.

The menus **File**, **View**, **Properties** and **Help** are displayed in the menu bar when the configuration tool is started.

The Standard Toolbar

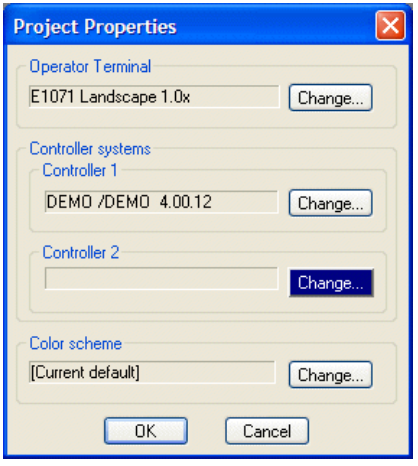
The **Standard Toolbar** is used for functions such as opening and saving projects, copying and pasting objects, and undoing the latest actions. One button is used to display/hide the Project Manager, and another to print the current project. See chapter *Printouts from the operator terminal* for further information. It is also possible to display the relevant help topic for a selected object or menu alternative by clicking the button to the very right, and then clicking on an object or menu alternative in the configuration tool.

3.2 Selecting menu language

Select in which language to present the configuration tool under **Settings/Menu language**. This language will be used for menu texts, object names etc. In this manual we assume that **English** has been selected.

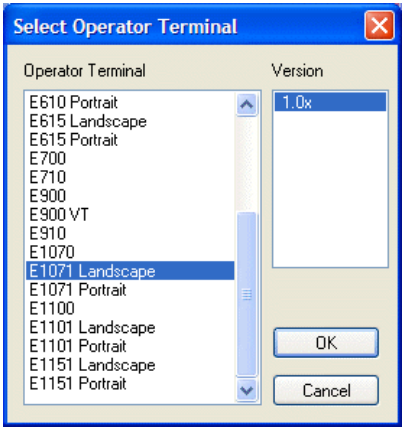
3.3 Creating a project

A new project is created under **File/New**. Select the type of operator terminal, controller and color scheme to use in the project in the **Project Properties** dialog. All the alternatives are not available for every type of operator terminal. Click **OK** to create a new project.



Operator Terminal

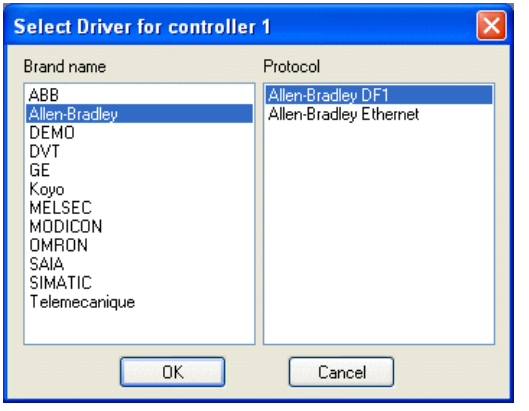
Click **Change**.



Select operator terminal model and version (system program) for the operator terminal used.

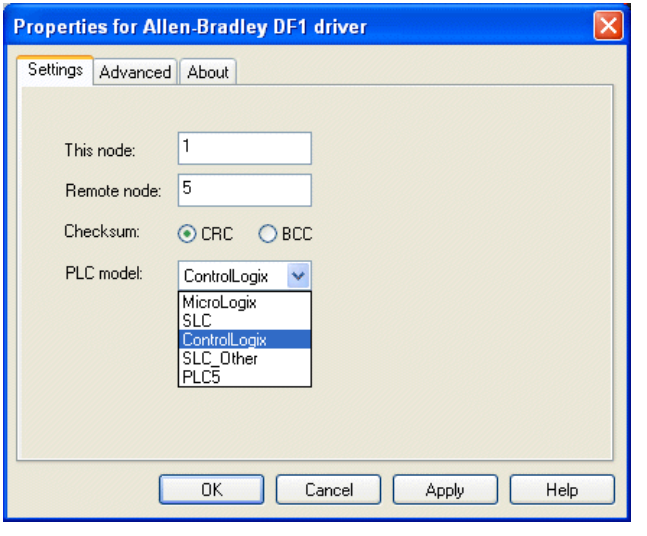
Controller systems

Select the controller the operator terminal is to be connected to. Click the **Change** button to display the list of installed drivers. Select brand name and protocol. Click **OK** to finish. If you do not want to make any changes, click **Cancel**.



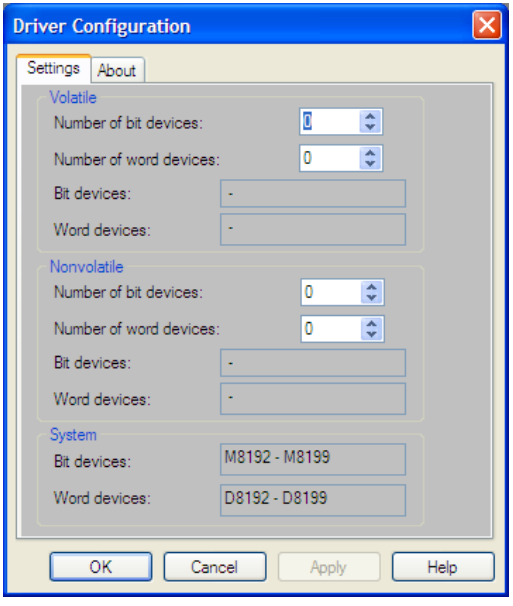
Two drivers can be used in the same project, i.e. the operator terminal is capable of using two drivers. The driver for the second controller is selected in the same way as for the first. For further information about using two drivers in the project, see the section *Communication with two controllers (Dual drivers)* in the chapter *Communication*.

When selecting a protocol that can be used by several controller models, the model is chosen by right-clicking on the protocol in the **Peripherals** dialog, and selecting **Properties**.



Internal variables

Internal variables can be used and selected in the same way as different drivers. A number of volatile and non-volatile user-defined variables can be selected. When a value is changed, the non-volatile variables are saved in the flash memory to be read at the next start-up. The system variables are fixed. These can be used to display e.g. poll intervals and for toggle functions. By clicking **Properties & Help** in the **I/O Browser** or selecting **Functions /I/O Configuration/Internal Variables** the following window is displayed.



Variable type	Addressing area, bit	Addressing area, memory cell
Volatile	M0 - M4095	D0 - D4095
Non-volatile	M4096 - M8191	D4096 - D8191
System	M8192 - M8199	D8192 - D8199

The system variables are used according to the tables below:

Bit	Description
M8192	Always ON
M8193	Toggles between OFF and ON every second
M8194 - M8199	Not used

Memory cell	Description
D8192	Poll interval driver 1 (ms)
D8193	Poll interval driver 2 (ms)
D8195 - D8199	Not used

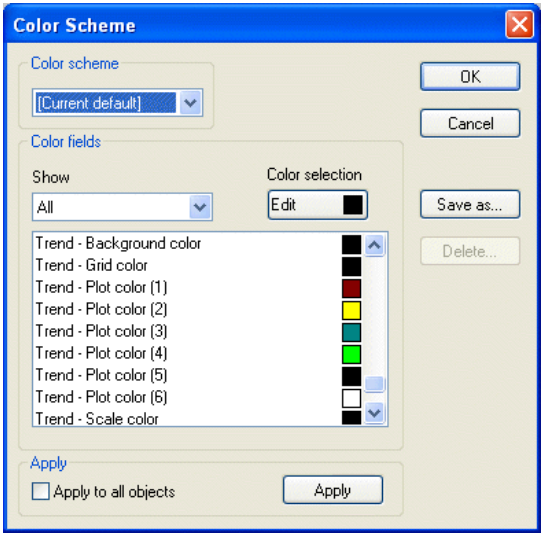
The Controller Toolbar

The driver for a selected object can be selected from the **Controller Toolbar**. Using internal variables is selected by clicking the **I**-symbol.

Color scheme

You can create your own color scheme and save it under a separate name. The color scheme determines the color of the background, menus, dialogs, and objects, etc. When you select an object in the toolbox or the menu the colors of the object are shown in the colors defined in the selected color scheme.

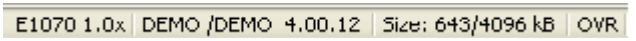
Click **Change** to display the dialog below. You can change an existing color scheme or create a new one.



The button **Apply** updates all colors in the project, with the exception of lines, circles, rectangles and arcs.

Once a project is opened or created, the Project Manager is displayed, containing all components included in the current project. Functions in the project can be added and edited from the Project Manager, from different toolbars or from menus.

The Status bar



The **Status bar** is shown at the bottom of the window in the configuration tool.

The left part of the status bar describes the function of the selected menu, or presents a short description of the object that the cursor points at in the toolbar. The coordinates, line and column in the block manager, are also shown.

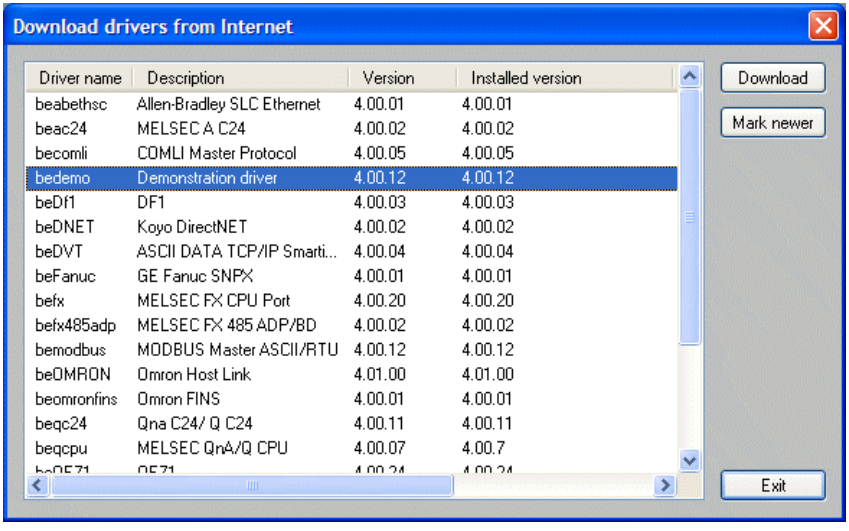
The right part of the status bar displays operator terminal model and driver version in the current project, and how much memory is available in the operator terminal once the project is transferred. **OVR** indicates that the **Insert** key (overwrite) is activated.

3.4 Updating drivers

Drivers can be updated from the Internet or from disk. To implement the downloaded drivers, the configuration tool must be restarted.

Updating drivers from the Internet

Select **File/Update E1000 Drivers From/Internet** to update available drivers to the latest version, or to install new drivers. The computer has to have access to the Internet, but a web browser is not required. A list of all drivers that can be downloaded from the Internet is displayed when the connection is established.



The list shows the version number of the available drivers and the version number of the installed drivers. Select which driver(s) to install in the configuration tool. The function **Mark newer** selects all drivers available in newer versions than the ones installed, including all drivers that are not installed. Click **Download**. Each driver takes up approximately 500 kB and can be used as soon as downloading is complete.

Updating drivers from disk

Select **File/Update E50-E910 Drivers From/Disk** to update available drivers to the latest version, or to install new drivers from disk. Browse to the folder where the driver files are is located. A list of all drivers that can be installed is now shown. Then follow the instructions above.

3.5 Changing project properties

Both the selected operator terminal and controller can be changed for the project. Double-click on the project name in the Project Manager to display the Project Properties dialog. Click **Change** for the parameter **Operator Terminal** and/or **Controller systems**.

Changing operator terminal version

If the system program in the operator terminal is updated to a newer version, the operator terminal version in the **Project Properties** dialog has to be changed also. Otherwise, the new functionality in the new operator terminal version cannot be utilized.

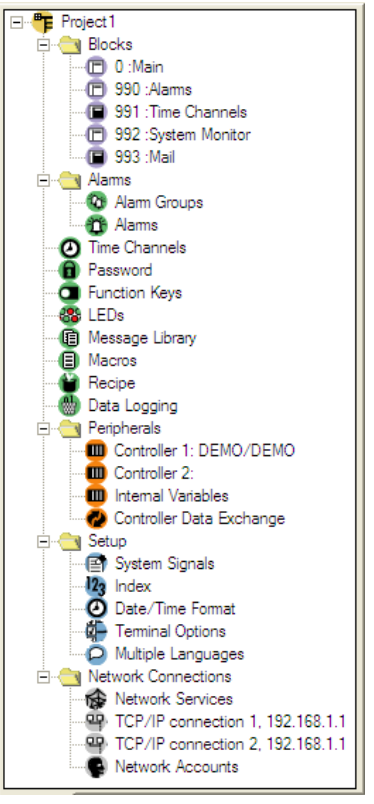
Changing controller

If the controller in the project is changed to a system with another name for the signals used, these must be changed. This is easily done by using the internal name list. See the section *The Name List*.

1. Select **View/Name List**.
2. Click on the button **Undefined** to insert all I/Os used in the project in the name list.
3. Click on the button **Export** to export the name list to a text file. Enter a name and click **Save**. Define how the text file is to be separated.
4. Open the text file in a text editor, e.g. Wordpad.
5. Change all I/Os to signals used in the new controller, and save the file as a text file.
6. Double-click on the project name in the Project Manager to display the Project Properties dialog. Click **Change** for **Controller**.
7. Select the new controller to be used and click **OK** twice.
8. Click on the button **Import** in the dialog Name list, and click **No** to the question if invalid I/Os should be removed.
9. Click on the **Rebind** button to update all new I/Os in the project with the new names.

3.6 The Project Manager

When a project is created, the Project Manager is displayed, with all blocks and components included in the application. Expand the folders in the Project Manager, by clicking on the +, to display the contents of the folders.



The Blocks folder

Some blocks in the **Blocks** folder are created automatically. The **Main** block, block 0, must always be used in the project. The system blocks **Alarms**, **Time Channels**, **System Monitor** and **Mail** cannot be deleted. A new block can be created by right-clicking on the folder and selecting **New**. Double-clicking on the **Blocks** folder displays *The Block Manager*.

The Alarms folder

Alarm Groups and **Alarm Messages** are automatically created in the **Alarms** folder. See chapter *Alarm Management* for information.

The Peripherals folder

Right-click on **Controller 1** or **Controller 2** to select another driver, to change the port the controller is connected to or to display the controller properties. See also section *Controller systems*.

Right-click on **Internal Variables** and select **Properties** to display the Internal Variables properties. See also section *Internal variables*.

Controller Data Exchange is described in section *Data exchange between controllers*.

The Setup folder

Properties for the operator terminal can be made from the **Setup** folder.

See sections *System Signals*, *Index Addressing*, *Country/Language*, *Date/Time Format* (for **Clock Properties**), *Terminal Options* and *Multiple Languages* for information.

The Network folder

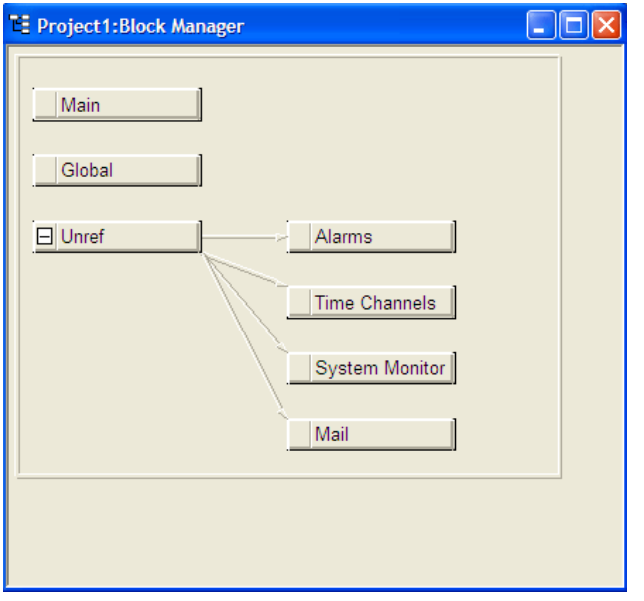
The properties that can be made under the **Network** folder are described in the sections *Network services*, *Network communication through Ethernet* (**TCP/IP Connection 1** and **TCP/IP Connection 2**) and *Network accounts*.

Other Project Manager components

The functions *Time Channels*, *Passwords*, *Function Keys*, *LEDs*, *Message Library*, *Macros* and *Recipes* are described in separate chapters.

3.7 The Block Manager

Double-clicking on the **Blocks** folder displays the Block Manager, with an overview of all blocks in the project.



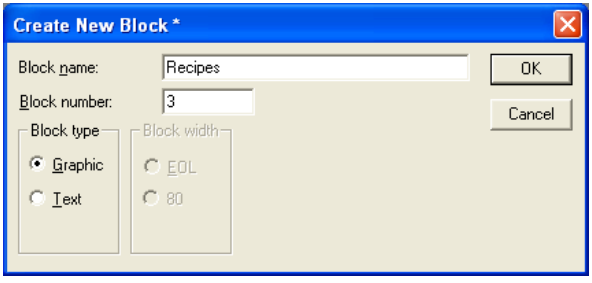
When the Block Manager is displayed, the *The Block Manager Toolbar* and the *The Zoom Toolbar* are highlighted.

The Block Manager Toolbar

The buttons in the **Block Manager Toolbar** are used to add blocks and to display the properties dialog for the selected block. Additionally, regular block jumps can be added, as well as function key and touch key block jumps.

Creating blocks

Right-click on the Block Manager and select **New Block** to add a block in the project. A dialog with basic properties for the block is displayed.



Block name:

A name for the block can be entered here. The block name is shown in the Block Manager, in the Project Manager and in the Block List.

Block number:

The number of the block. Block 0 is created automatically, and must always be used in a project.

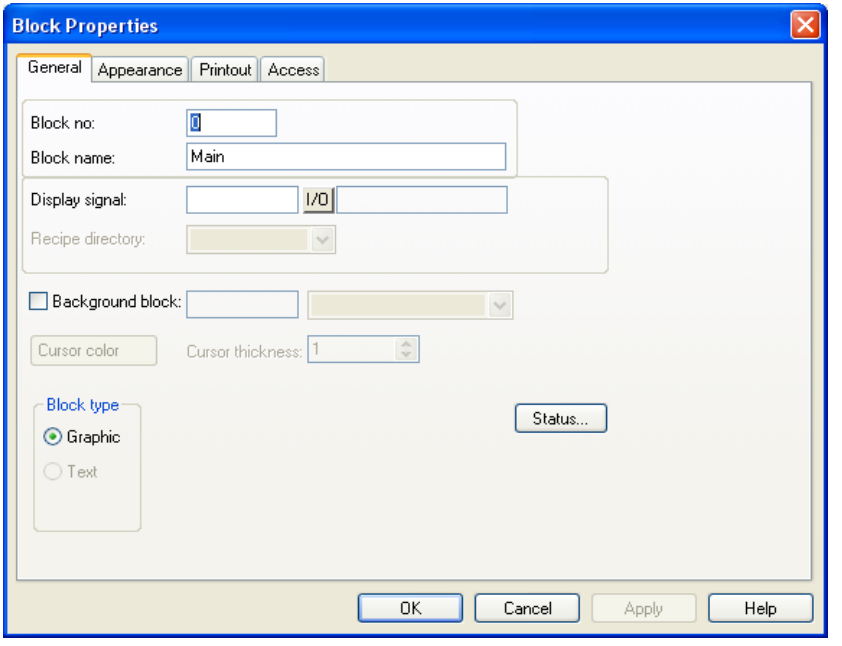
Block type

Select block type; graphic or text.

When clicking **OK**, the block is opened.

Block properties

Right-click on a block in Project Manager or in the Block Manager and select **Properties** to enter more detailed information about the block.



The appearance of the properties dialog differs depending on the selected block type.

General

The following properties are defined under the **General** tab:

Block no:

The number of the block.

Block name:

A name for the block can be entered here. The block name is shown in the Block Manager, in the Project Manager and in the Block List.

Display signal:

A digital signal which, when activated, results in the block being shown on the operator terminal's display. To change blocks as quickly as possible, display signals in consecutive order should be used. This field is not filled in if another method of changing blocks is used.

Recipe directory

Select a recipe directory in which all recipes created in the block will be saved. See the chapter *Recipes*.

Background block:
Only applicable for graphic blocks. It is possible to select another block as the background block, to, for example, use the same background in more than one block. Select **View/Options/Show Background Block** when the Graphic Block Manager is active to show the background block when the actual block is edited.

Cursor color:
Only applicable for graphic blocks. Select the color of the cursor in the operator terminal.

Cursor thickness:
Only applicable for graphic blocks. Select the thickness of the cursor in the operator terminal.

Block type
The block type was selected when the block was created, and cannot be changed.

Status
Clicking the **Status** button opens the Block Options dialog, with the following properties for the status of the display in the operator terminal. The properties do not affect system blocks.

> **Disable main menu key:** Disables the [MAIN] key in the operator terminal when the current block is visible on the display.
>
> **Disable alarm list key:** Disables the [LIST] key in the operator terminal when the current block is visible on the display.
>
> **Auto data entry:** Moves the cursor automatically to the next maneuverable object after an input. The cursor can only be placed on maneuverable objects in this position.
>
> **Disable PREV function:** Disables the [PREV] key and the function "Return to previous block" for the function keys in the operator terminal when the current block is visible on the display.
>
> **Disable ENTER function:** Disables the [ENTER] key in the operator terminal when the current block is visible on the display. Only valid for digital objects.

Appearance
Different colors and gradient styles can be selected under the **Appearance** tab.

Printout
The following properties are defined under the **Printout** tab:

Print signal:
A digital signal which, when activated, results in the block being printed out on a connected printer. **Display signal** and **Print signal** can be the same. Print signals in consecutive order should be used to obtain the fastest possible printouts.

Completion signal:
A digital signal activated by the operator terminal when the printout is ready. The signal is normally set to one. If the box **Reset** is marked, the signal will be reset when the printout is ready.

E-mail

The E-mail tab is available for text blocks only. The following properties can be defined:

Send mail signal:
The text block is sent as an e-mail message when the given digital signal is set to one. The block name corresponds to the e-mail message subject.

Note:
Only text blocks can be sent as e-mail messages.

Mail completion signal:
A digital signal activated by the operator terminal when the message has been sent. The signal is normally set to one. If the box **Reset** is marked, the signal will be reset when the message has been sent.

Mail to address:
The address of the e-mail recipient is given here. Select up to 8 recipients from the list shown when clicking the **...** button. The list of e-mail addresses is defined under **Setup/Network/Services/SMTP Client**. See section *SMTP Client* for information.

Attach file:
The name of a trend or recipe file to be attached with the message is given here. If there is a trend file or a recipe file with the same name, the trend file will be sent.

Access

The following properties are defined under the **Access** tab:

Security Level:
A security level (0-8) for the block is defined. If a security level other than 0 is stated, the operator must log in with a password corresponding to the given security level or higher.

Local function keys

Local function keys for the block can be defined under the **Local function keys** tab. See the chapter *Function Keys* for information. See also section *The Block List*.

3.8 Showing operator terminal around the working area

When double-clicking on a block in the **Blocks** folder in the Project Manager, an image of the current operator terminal is drawn around the working area of the active block. Function keys, LEDs and text fields in the image can be edited by double-clicking on the image. This function can be turned off by unchecking the option **View/Options/Show Terminal**.

Defining function keys

Double-click on a function key to create a local or global function key. The **Function Keys** tab in the Block Properties dialog is displayed. For a definition of function keys, see the chapter *Function Keys*.

Defining LEDs

Double-click on an LED to configure it. For definition of LEDs, see the chapter *LEDs*.

Creating text strips

Double-click on a text strip to display a dialog where text can be entered and adjusted, and background color and font can be selected. This function enables complete text strips to be designed and then printed out on plastic film, to be used on the operator terminal.

3.9 Configuration of blocks

Double-click on a block in the **Project Manager**. The working area for the block and the Objects Toolbar are now shown. The working area is the Graphic Block Manager or the Text Block Manager, depending on whether a graphic block or text block is opened. All objects that can be created in the block are available from the Objects Toolbar.

The Objects Toolbar

The objects available differ depending on the selected operator terminal and on the block type.

An object is selected by clicking on it in the **Objects Toolbar** and placing the object in the working area using the cursor. Click to open the properties dialog for the selected object. Fill in the parameters, and click **OK**. The object is now shown in the working area. Static text or graphics are drawn directly in the working area.

The static graphic objects line, arc, ellipse, rectangle, symbol and text are used to draw background graphics. When static graphic objects are created signals can be linked to the objects under **Dynamics**, and in so doing make them dynamic.

The dynamic objects are linked to signals to create control and monitoring functions.

General parameters for the objects are described in the chapter *General*. The chapters *Graphic Presentation and Maneuvering* and *Text-based Presentation for Printouts and Reports* describe graphic and text objects.

In addition to the different objects, a button for selecting symbols and a marking pointer are also available, located to the very left on the toolbar.

See also section *Static symbols*.

The Alignment Toolbar

The **Alignment Toolbar** makes it easy to arrange multiple objects on the screen neatly. Objects can be aligned vertically and horizontally, and their size can be adjusted according to the last selected/created object (the reference object). Objects can also be distributed evenly, and tiled, using the buttons in the toolbar. When placing the cursor on a button in the toolbar, a short description is displayed as a tooltip, as well as a closer description in the **Status bar** at the bottom left of the screen.

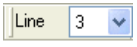
The Layout Toolbar

The buttons in the **Layout Toolbar** are used to send objects to the front or back of each other, and to show or hide a grid.

The Color Toolbar

The **Color Toolbar** shows the foreground color and background color of a selected object, as well as the block color. Clicking on the buttons allows selecting other colors from the palette.

The Line Width Toolbar



Select a line width used for lines, arcs, poly lines, rectangles and circles. The line width can also be selected from the object's properties dialog.

The Font Toolbar

The Font Toolbar is used to select a pre-defined text style or to create user-defined styles. The text style is defined for the currently selected object. Selecting another font, font size or font style for an object creates a new text style in the drop-down list to the very left.

The Zoom Toolbar

The buttons in the **Zoom Toolbar** are used to zoom into or out from the working area or the Block Manager.

Selecting several objects

Several objects in the working area can be selected at the same time by drawing a frame around them with the marking pointer. Alternatively, click on several objects while keeping the **Shift**-key pressed.

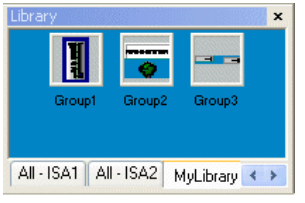
Grouping objects

After marking some objects on the working area, these can be grouped by selecting **Layout/Group**. Grouped objects are treated as one object, the size of which can be changed. The color and font can be changed individually for the objects in a grouped object. When clicking on an object in a grouped object, the editing dialog for that object is displayed.

Select **Layout/Ungroup** to ungroup a grouped object.

The Library

The Library contains a number of catalogues with different symbol objects. It is also possible to define user-created catalogues by right-clicking on the Library and selecting **Catalogue/New**.



Grouped objects and symbols can be saved in the Library for reuse later, or in other projects. Right-click on a grouped object or symbol on the working area, select **Copy**, and then right-click in the Library and select **Paste**. A library object can be dragged from the Library to the working area.

By right-clicking on the Library, it is possible customize the look of the Library. Library catalogues can be closed by right-clicking on the catalogue and selecting **Catalogue/Close**.

The Library can be hidden by selecting **View/Toolbars/Library**.

Symbol objects that are used in a project are saved in the project folder. These symbols can also be selected from the **Select Symbol** dialog, described in chapter *Static symbols*.

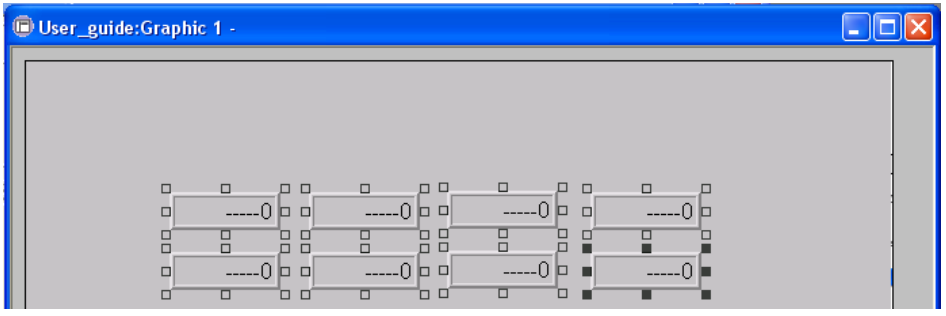
Saving symbols to the Library

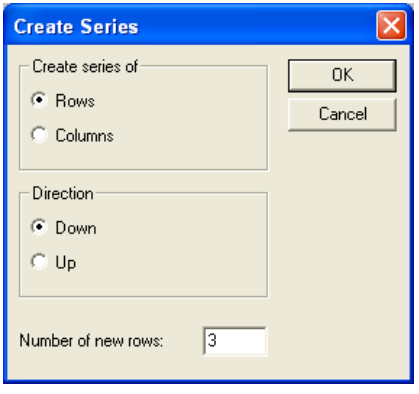
Select one or several objects (grouped or ungrouped) on the working area with the cursor. Right-click on the selection and select **Copy**. Right-click in the Library and select **Paste**.

Creating series

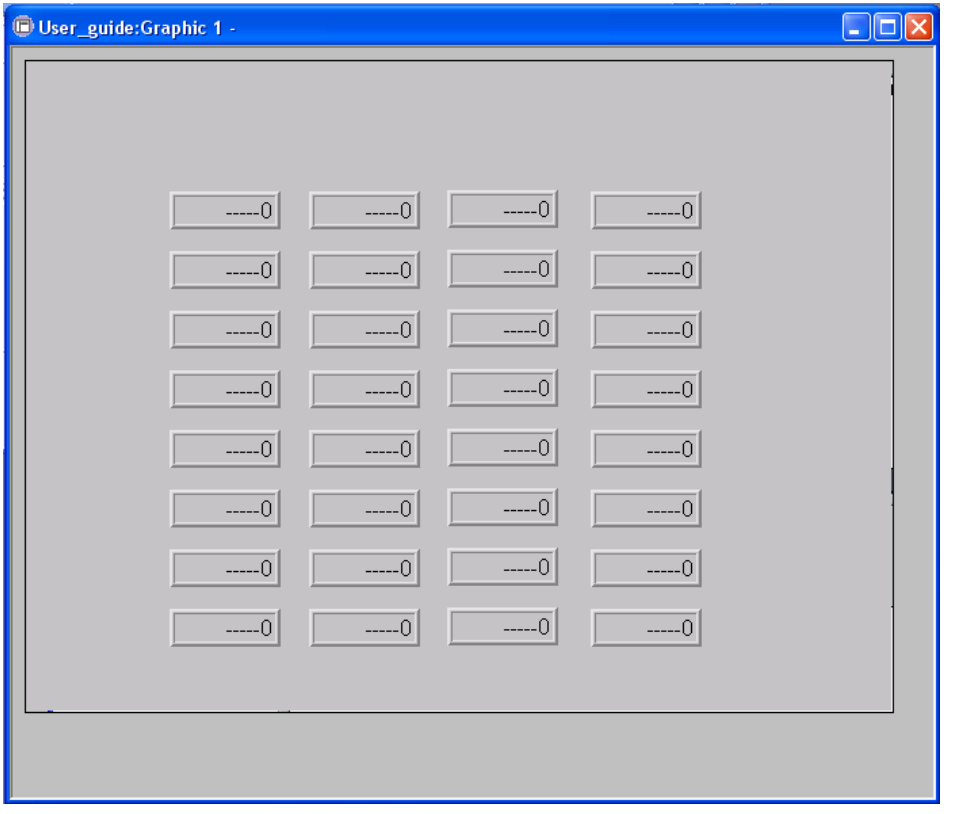
Series of objects can be created in graphic blocks. Line up objects in a row or columns with the same object.

Then select the objects (not text objects), and choose **Object/Create Series**.





Select to create rows or columns, the number of rows/columns, and in which direction the series should be expanded. Click **OK** for the configuration tool to create a table with the specified number of lines or columns.



Note:
The lead text must end in a number for the table to be created.
The Alarm banner object cannot be included in a table.

3.10 Using text blocks

For information of how to use text block, see the chapter *Text-based Presentation for Printouts and Reports*.

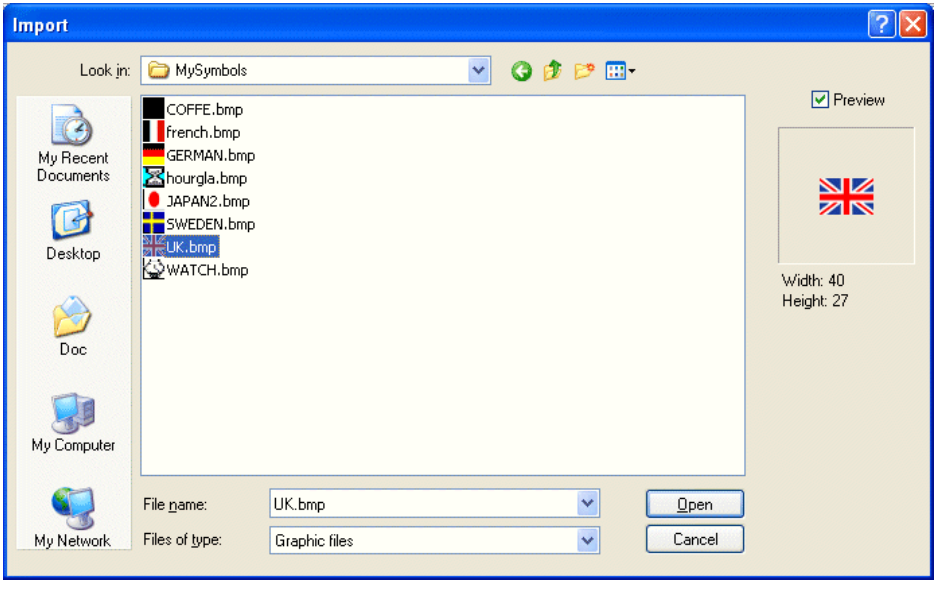
3.11 Static symbols

Static symbols can be imported to the project, either from the bitmap library, where a number of buttons, pump symbols etc. are located, or by browsing the PC for graphic files. Graphic files in the formats .bmp, .jpg, .gif and .wmf can be imported to the bitmap library from another Windows program, e.g. Paint. A maximum of 30 characters can be used for symbol names. Country specific characters are allowed.

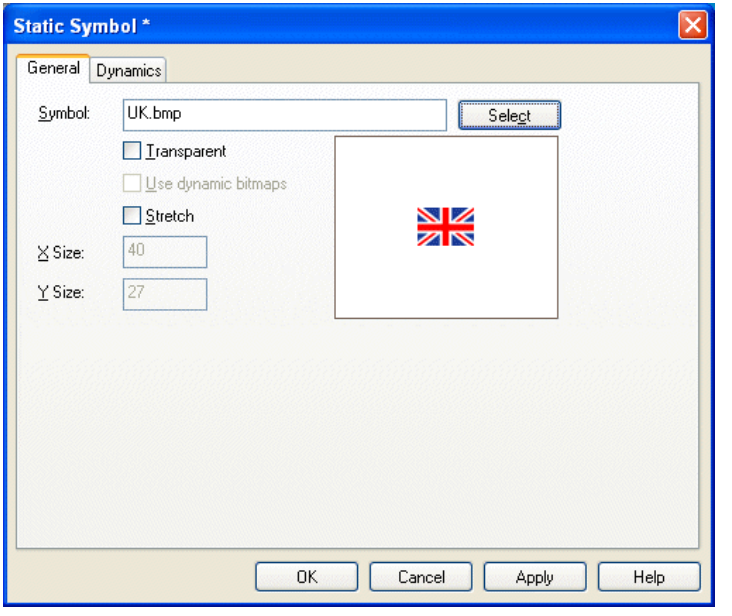
Adding a symbol

Click on the **Symbol** button in the Objects Toolbar to display the Static Symbol dialog. Type the name of the symbol to add, or click **Select** to display the Select Symbol dialog. Click **Library** to select a static symbol from the bitmap library, or click **Browse** to select a graphic file from any location in the PC.

A selected symbol can be displayed in the **Preview**-window. All symbols in bmp-format are displayed as thumbnails in the window.



Click **Open** and **OK** to select a symbol. The symbol is now visible in the Static Symbol dialog.



General

Parameter	Description
Symbol	The symbol name of the selected symbol.
Select	Button used to select symbols from the library or browse for graphic files in the PC.
Transparent	Makes the background of a symbol transparent. The color of the top left pixel in the image controls which color will be transparent.
Stretch	When selected, the object's X and Y size can be changed.

Dynamics

The functions under the **Dynamics** tab are described in the section *General parameters* in chapter Graphic presentation and maneuvering.

Copying graphics from other programs

Use the copy function in the other program (e.g. Paint). Right-click in the Library and select **Paste**. Enter a name for the symbol.

The symbol is now saved in the symbol library with the given name.

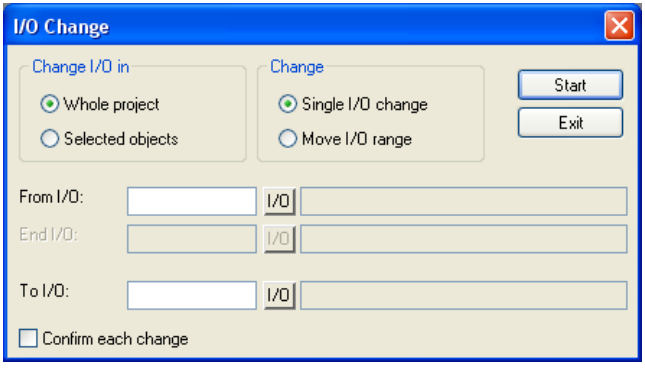
With the copy and paste functions in the configuration tool it is possible to copy graphics and symbols between blocks and between projects.

Note:
When a user-defined symbol is copied between projects, the actual symbol is only copied if the symbol is not already used in the target project.

3.12 Changing I/Os

The function **Change I/O** allows you to change an I/O to another, or move a complete I/O area. I/Os can be changed in the entire project, or only in the objects marked when the function is selected.

Select **Edit/I/O Change**.



Change I/O in

Select whether you want to change I/Os in the entire project or for selected objects.

Change

Select whether one I/O is to be changed, or whether if the complete I/O area is to be moved.

From I/O, End I/O, To I/O

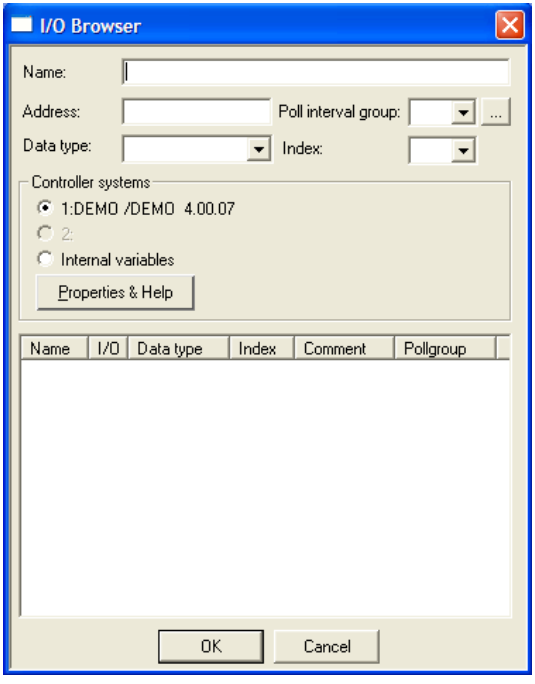
State which I/O is to be changed, and to what or which I/O area it is to be moved.

Confirm each change

Select whether you want to confirm changing the I/O for each object.

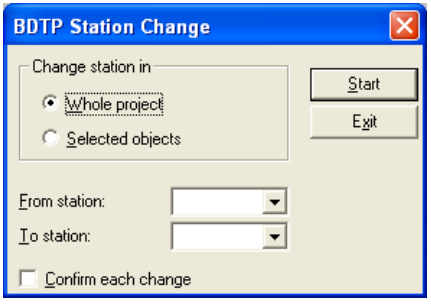
3.13 The I/O Browser

If a local name list is created in the project, I/O signals can be selected from the list, using the button **I/O** when objects are defined. The button **I/O** is included in all dialogs where an address can be stated. The I/O Browser has incremental searching. This means that searching begins immediately when you start entering in the characters in the **Name/Address** field. The I/O list can be sorted by different properties.



3.14 Changing BDTP station

This function allows you to change the index numbering in a BDTP client project included in a BDTP network, e.g. from station 1 to station 3. Select **Edit/BDTP Station Change**.



Change station in

Select whether to change the index numbering in the entire project, or for marked objects.

From station, To station

The index number to be changed is indicated here, and to which BDTP station index number it is to be changed to.

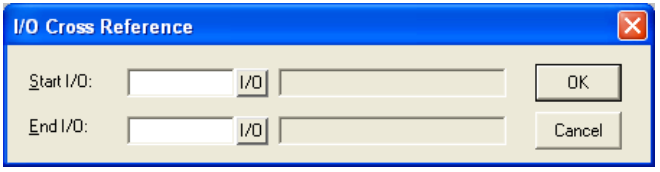
Confirm each change

Select if you want to confirm changing the BDTP station for each object.

See the section *BDTP* for information about BDTP.

3.15 I/O Cross Reference

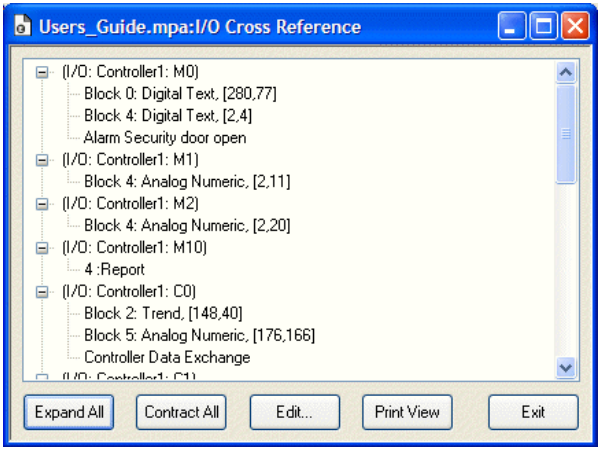
The I/O cross reference function is used to document I/Os in a well-arranged way. Select **View/I/O Cross Reference**.



Start I/O and **End I/O** can be stated in the dialog. If the **Start I/O** field is left blank all I/Os to the value in the **End I/O** field will be included. If the **End I/O** field is left blank all I/Os from the value in the **Start I/O** field will be included. If both fields are left blank all I/Os will be included in the list.

The results are presented in a list with two levels. The first level shows which I/Os are used and how many objects refer to each respective I/O.

The second level is displayed by clicking on the + character to the left of the I/O. The objects containing the I/O you have clicked on will now be shown. The + character becomes a - character



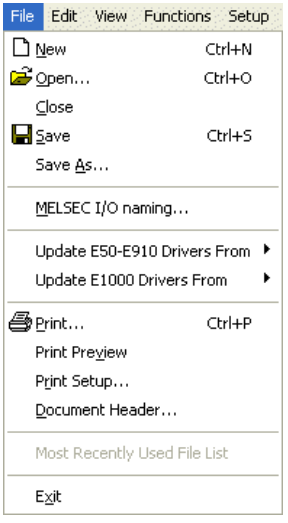
A line in the list can be marked and copied to the clipboard, from where it can be pasted into, for example, a Microsoft Word document.

3.16 Other managers/editors

The configuration tool also has managers/editors for e.g. alarms, passwords, time channels, message libraries, macros and data logging. These are activated by double-clicking in the Project Manager and are handled similarly. The managers are described in the respective chapters.

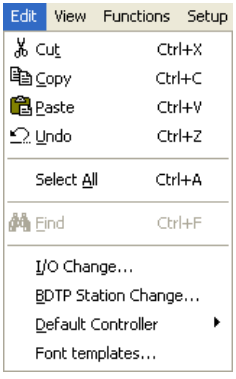
3.17 The File menu

The **File** menu contains functions for creating, opening, saving and closing projects, also available from the Standard Toolbar. Printout options are also accessed from this menu. With the functions **Update E50-E910 Drivers From** and **Update E1000 Drivers From** you can update the drivers from the Internet and from disk, see the section *Updating drivers*.



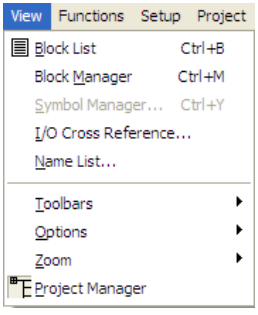
3.18 The Edit menu

The **Edit** menu contains functions for cutting, copying, pasting, undoing and selecting all, also available from the Standard Toolbar. The **Find** function is accessible when editing multiple language texts. The menu also includes the functions *Changing I/Os*, *Changing BDTP station*, selection of default controller and font templates.



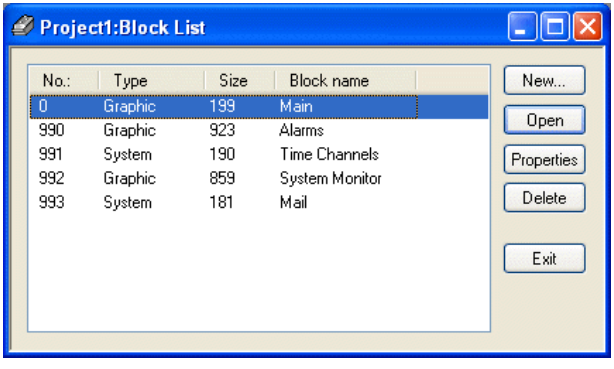
3.19 The View menu

Different managers, tools, toolbars and features can be displayed/hidden from the **View** menu.



The Block List

The Block List lists the blocks included in the application. New blocks can be created using the **New**-button, and existing blocks are opened with **Open**. Block properties are displayed when clicking **Properties**. Selected blocks can be removed using the **Delete**-button.



Block Manager

The Block Manager shows which blocks are included in the application graphically. You can create new blocks here, define the block header and define jumps with the functions in the toolbox. See the section *The Block Manager*.

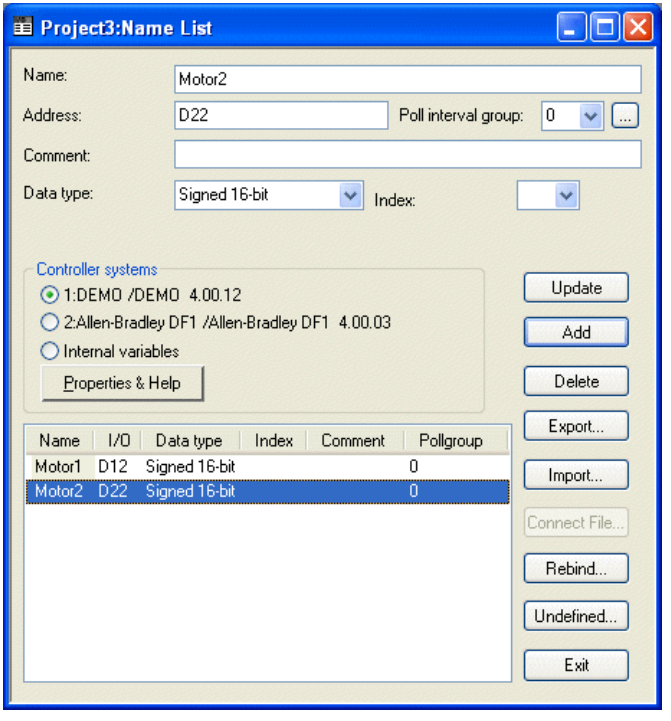
I/O Cross Reference

Under **I/O Cross Reference** you can document I/Os in a well-arranged way. See the section *I/O Cross Reference*.

The Name List

A local name list for the signals used can be created using the Name List. Signals in the project which are not named can be inserted in the name list with the function **Undefined**. New signals can be added and existing names can be edited and updated. The function **Update** updates the project with the changes made in the name list.

A name list can be exported to a text file, and a text file can be imported to a name list. The contents of the file can be separated either with a semicolon, comma or space. An internal name list can be sorted. The text file should not contain national characters.



Toolbars

All toolbars can be shown/hidden.

Options

Show Terminal
See section *Showing operator terminal around the working area* for information.

Show Background Block
Only applicable for graphic blocks. Background blocks are shown when editing in the Graphic Block Manager.

Show Language Index
Displays the index number for the texts used in the application.

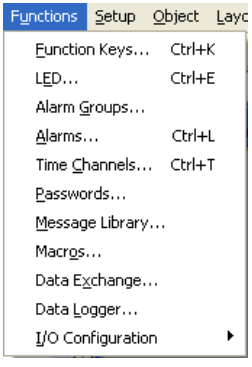
Tool Tips
Shows lead texts for the function or object that the cursor points to.

Choose Unicode Font
Choose a Unicode font in the object dialog.

Project Manager
Choose whether to show the Project Manager or not under **View/Project Manager**.

3.20 The Functions menu

In the **Functions** menu there are managers for function keys, LEDs, alarm groups, alarms, time channels, passwords, message libraries, macros, data exchange, data logger and I/O configuration.



Function Keys
Global function keys can be defined by selecting **Function Keys**. See the chapter *Function Keys*.

LED

LED functions can be defined by selecting **LED**. See the chapter *LEDs*.

Alarm Groups

Alarms can be grouped, e.g. according to degree of seriousness, by selecting **Alarm Groups**. See the chapter *Alarm Management*.

Alarms

Alarm messages and which signals are to activate the alarms can be defined by selecting **Alarms**. See the chapter *Alarm Management*.

Time Channels

Time Channels can be used to control events in the process at special times. See the chapter *Time Channels*.

Passwords

Passwords for the different security levels in the application can be defined by selecting **Passwords**. See the chapter *Passwords*.

Message Library

Message tables, where values between 0 and 65,535 are linked to texts can be created by selecting **Message Library**. See the chapter *Message Library*.

Macros

Events to influence all function keys and touch keys can be created by selecting **Macros**. See the chapter *Macros*.

Data Exchange

By selecting **Data Exchange** conditions for data exchange between selected controllers can be defined. See the chapter *Communication*.

Data Logger

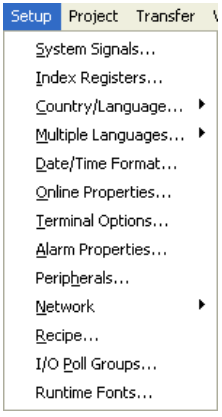
Data can be logged and saved to file on different intervals or depending on changed values. See the chapter *Data Logger*.

I/O Configuration

The properties for the driver of the connected controller or for internal variables are displayed by selecting **I/O Configuration**.

3.21 The Setup menu

The operator terminal can be configured using the **Setup** menu.



Many properties can also be made from the **Setup** and **Peripherals** folders in the Project Manager.

System Signals

Current display register

Data register in the controller, which when the operator terminal is running contains the number of the block shown on the display. The data register is updated automatically by the operator terminal when changing blocks. This register does not affect the selection of blocks.

New display register

A data register in the controller, which controls which block is to be shown on the display.

Buzzer register

A register value to determine the sound of the buzzer. See the table of tones and scales below. The buzzer is off if the value is 0. The units in the table are in Hz.

	C	D	E	F	G	A	H
Contra	33	37	41	44	49	55	62
Large	65	73	82	87	98	110	123
Small	131	147	165	175	196	220	247
One	262	294	330	349	392	440	494
Two	523	587	659	698	784	880	988
Three	1046	1174	1318	1397	1568	1760	1975
Four	2093	2348	2636	2794	3136	3520	3950
Five	4186						

Backlight signal

Digital signal which controls whether the display is to be switched on or off.

Cursor control block:

Only applicable for key pad models:

Start register in a control block which enters the current cursor position in the graphic block to the register in the controller

Register	Description
Ctrl.reg. 0	Current graphic cursor position X (in pixels).
Ctrl.reg. 1	Current graphic cursor position Y (in pixels).
Ctrl.reg. 2	Status register 0 Normal 1 The user tries to move down, but there is no object below. 2 The user tries to move up, but there is no object above. 3 The user tries to move to the left, but there is no object to the left. 4 The user tries to move to the right, but there is no object to the right.

Only applicable for touch display models:

Start register in a control block which enters the current pointer position in the graphic block to the register in the controller.

Register	Description
Ctrl.reg. 0	X co-ordinate (in pixels), 0-319.
Ctrl.reg. 1	Y co-ordinate (in pixels), 0-239.
Ctrl.reg. 2	Status register 0 Not pressed 1 Pressed

Cursor move register

The position of the cursor in a graphic block can be controlled through a register. The values in the register have the following implications. The register must be allocated the value 0 between the same command for Move. To optimize the function it is recommended to use it together with the function Cursor. Ctrl block.

Register value	Description
1	Moves the cursor to the first maneuverable object.
2	Moves the cursor to the next maneuverable object.
3	Moves the cursor one step up.
4	Moves the cursor one step down.
5	Moves the cursor one step to the left.
6	Moves the cursor one step to the right.

Printer status register

Not applicable in E1000 series.

Library index register

Used for indexing of the message libraries. The number of the library the texts are to be collected from is indicated in the message object. If an index register is defined, the contents of the index register are added to the number given in the object. This makes it possible to control from which library the texts are to be taken with a register.

Dim backlight reg:

Controller register which controls the dimming of the backlight (0-100%).

Commands

On the commands line it is possible to give one or more of the following commands. The commands are typed with all capital letters. The commands are separated by a space.

Command	Description
AKx	Activates Joystick function. See the section *Joystick function*.
AUCR	AlwaysUpdateCurrentRecipe Register. Updates the Current recipe register when saving a recipe. It's not necessary to load the recipe again.
BCTO	Displays message "BDTP comm. Error" the first time only that a BDTP client tries to reconnect to an unavailable BDTP server.
BFF	Block Form Feed. Adds page breaks after each block when printing.
DBKL	Deactivates locking of keys and touch screen if background lighting requires replacement. With the default setting, keys and touch screen are locked if background lighting is inoperable.
DD	Disable Delete of alarms on alarm list. When specified, inactive and acknowledged alarms cannot be deleted from the alarm list.
DGP	Deletes the alarm group from alarm printouts.
DNBW	Deactivates warning message "No block x". The message is otherwise displayed if a block jump is configured to a block number that does not exist or when the function **New picture register** is used to permit a data register in the controller to control the block that is presented on the display.
FTNO	Deletes rows with OFF flags in trend files when FTP is used.
LOBx	Sets the digital signal **x** when the real-time clock's battery requires replacement. Example: **LOBM0** will set M0 when the battery requires replacement.
NHD	The command enables graphic blocks to be printed on laser printers without headers (which contain block names, block numbers, dates and times).
NMAN	Activates warning message "Not maneuverable" for an object in operator terminals with touch screens.
NTx	Timeout in **x** number of ms for messages in No protocol mode.
PDxxxxxxxx	Password that protects access to TRANSFER menu. See the chapter *Passwords*.
PSxxxxxxxx	Password that overrides all other password levels. Useful for support and maintenance, for example. See the chapter *Passwords* for more information.
SJAFx	Displays the text "Remote access" in the upper right corner when a VNC client is connected. **x** = character size.

Command	Description
TBUP	Used for backup of trend files. See the chapter *Trends*.
TCFx	Divisor to regulate the temperature compensation of the operator terminal's contrast. Default value is set according to testing, but may require adjustment in environments with large and frequent temperature variations. To decrease the temperature compensation, increase the divisor (x). The divisor "0" shuts off the temperature compensation.
TESOSn	Storage of one trend sample. See the chapter *Trends*.
TMBx	Trend Multi Backup. See the chapter *Trends*.

Index Registers

Index addressing of dynamic objects. For further information, see the chapter *Index Addressing*.

Country/Language

Character set:

The selection of the character set will influence the character table used in the operator terminal and the national characters that will be available.

System languages:

Selection of menu language; British/English, German, Swedish or American/English. The default properties for the operator terminal is British-English menu texts.

Multiple Languages

New Language

Start the wizard to create multiple languages for an application.

Edit

Translated texts in the application languages can be edited.

Setup

The tree structure is displayed for the languages in the application. For information about the properties that can be made, see the chapter *Language Management*.

Export

This function exports the user texts to a text file in Unicode format. Choose to export user texts. After making your choice, the **Export Multiple languages text** dialog box is displayed. Here you can specify where the file will be saved and its format.

Import
This function imports a language that can subsequently be used in the operator terminal. Choose to import user texts. After making your choice, the **Import Multiple languages text** dialog box is displayed. Indicate the name of the text file that you want to import.

Show Index
This function is for displaying the language index instead of texts in the object. You may enter text even when the language index is shown. The new text will then receive a new language index.

Cross Reference
Shows a cross reference list of the indexes for the various blocks in the application.

Reuse Index
If this function is active when an object is copied, a new object is created with the same index.

Choose Unicode Font
Choose the Unicode font that will be used in the configuration tool.

Date/Time Format
Setting of the date and time format.

Date format:
The format can be YY-MM-DD, YYMMDD, DD.MM.YY, DD/MM/YY or MM/DD/YY where Y=year, M=month and D=day.

Time format:
The format can be HH:MM:SS or HH:MM where H=hour, M=minute and S=second.

Clock used:
Terminal means that the operator terminal's built-in clock is used, and controller 1 or 2 means that the clock in controller 1 or 2 is used.

Clock→Controller system 1/2:
Select if the clock in the operator terminal is to be transferred to a data register in the controller 1 or 2.

Note:
In those cases where the controller has an activated real-time clock and the operator terminal clock is to be transferred to the same data register, the controller clock has precedence.

Update interval:
Indicate how often the operator terminal is to transfer the clock data to the controller. The value is given in seconds, and 60 seconds is recommended. A shorter updating interval will make communication between the operator terminal and the controller slower.

Controller register:
Enter the start address for storage of the date/time in the controller.

When this function is used, the operator terminal clock will be written to 7 consecutive registers according to the table below.

Controller Register CR	Clock Part
CR	Seconds
CR+1	Minutes
CR+2	Hours
CR+3	Day
CR+4	Month
CR+5	Year
CR+6	Day of week (1-7 where 1 is Sunday)

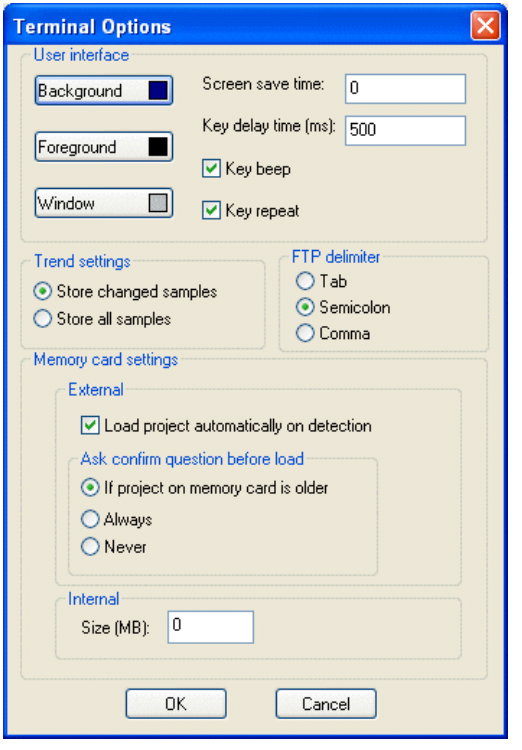
Daylight saving:
The start and end of summer or daylight saving time are defined here. State the Day of week, Week In Month, Month, Hour and Adjust. You can choose between European and US standard.

To disable the function for summer time leave both fields for the month blank.

Online Properties
Permits changing of the selected function in the operator terminal.

Terminal Options

The operator terminal options include functions for the user interface, trend properties, selection of FTP delimiter and memory card settings.



Background:

Select the background color in the operator terminal.

Foreground:

Select the color of the text in the operator terminal.

Window:

Select the color of the windows shown on the operator terminals' display.

Screen save time:

The time in minutes after the last event on the display when it will switch off. The default setting is 0 which means that the display never switches off. This function optimizes the service-life of the display.

Key delay time (ms):
The time interval in ms between pressing the same key on the operator terminal before the cursor automatically moves to the next position. Used for input of ASCII characters (A-Z etc.).

Key beep:
Indicates whether the operator terminal will beep when a key is pressed.

Key repeat:
Indicates if a function will repeat as long as the key on the operator terminal is pressed. Function keys and input of alphanumeric characters (A-Z etc.) are not repeated.

Trend settings:
General properties for all trends. See the chapter *Trends* for more information.

FTP delimiter
The operator terminal can save the contents in files created in the operator terminal. These can be reached through FTP or be accessed on an external memory card with different types of delimiter characters (separators). The content in files, e.g. recipe and trend files, can be separated with Tab or the characters semicolon or comma. If the FTP delimiter is changed, all recipes that are saved internally will be checked and the separator will be replaced. See the chapter *Network Functions in the Operator Terminal* for further information.

Memory card settings
External
Either a Compact Flash card or a USB Flash drive can be used externally. The external memory can be used for project backup, recipe files etc., but not for expansion of the project memory. Using two external memories simultaneously is not supported, and if two memories are connected, the Compact Flash card is used prior to the USB Flash drive.

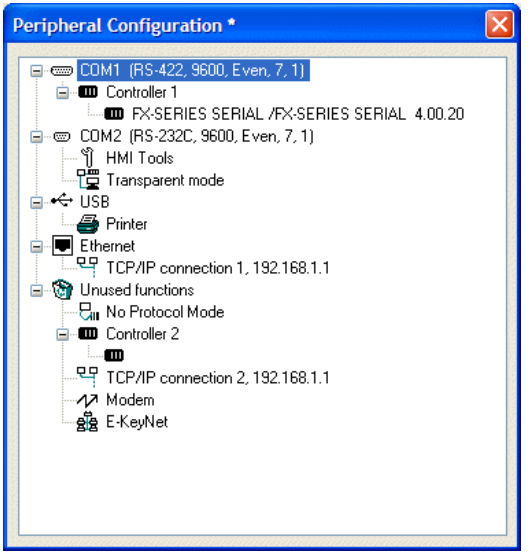
See also the section *Updating projects with external memory cards*.

Internal
If an internal Compact Flash memory card is used for expansion of the project memory, the size of the card must be entered here.

Alarm Properties
General properties for the alarm list. For further information, see the chapter *Alarm Management*.

Peripherals

Communication configuration can be made under **Setup/Peripherals**, or by double-clicking the **Peripherals** folder in the Project Manager. Devices can be moved by drag-and-drop.

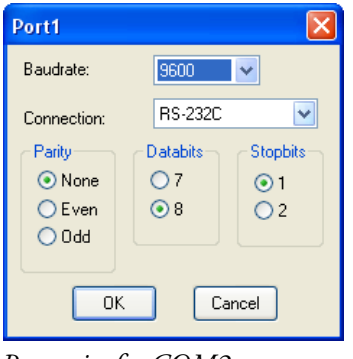


Port properties

Select the appropriate port and right-click to view current configurations or to change the configuration for a port.

COM1 and COM2

COM1 and COM2 in the Peripheral configuration window represent the physical ports on the terminal. When right-clicking on **COM1** or **COM2**, and selecting **Properties**, the following dialog is displayed. Select the transfer speed, connection, parity, number of data bits and stop bits for the port.



Properties for COM2.

COM1 can be configured as an RS422 or as an RS485 port.

Parameter	Description
Baud rate	Select baud rate for the communication; it should be the same as for the external unit.
Parity	Select parity; it should be the same as for the external unit.
Data bits	Select number of data bits; it should be the same as for the external unit.
Stop bits	Select number of stop bits; it should be the same as for the external unit.

USB

External devices such as a USB hub, Flash drive, mouse or keyboard can be connected to the USB Host port.

Ethernet

The operator terminal has a built-in Ethernet port for connection to a TCP/IP network.

Printer

Select **Printer** and right-click to display the dialog box for printer properties. For more information, see the chapter *Printouts from the operator terminal*.

No protocol mode

No protocol mode is described in the section *The operator terminal as a communication interface (No protocol mode)*.

Controller 1 and Controller 2

Right-click on **Controller 1** or **Controller 2** and select **Properties** to change the selected protocol.

TCP/IP Connection 1 and TCP/IP Connection 2

Right-click on **TCP/IP Connection 1** or **TCP/IP Connection 2** and select **Properties** to make TCP/IP settings. TCP/IP Connection 1 has to be used before TCP/IP Connection 2 can be used.

Modem

Refer to the section *Modem connection* for information.

Transparent mode

Refer to the section *Transparent mode* for information.

E-KeyNet

Refer to the manual MA00644A for information.

Network

The network properties are described in the sections *Network services*, *Network accounts* and *Network communication through Ethernet* (TCP/IP Connections).

Recipe

Properties for recipe handling are made here. See the chapter *Recipes*.

I/O Poll Groups

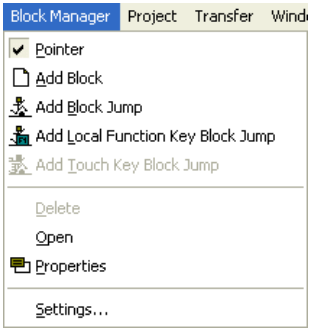
The I/O poll interval groups are used to set individual poll intervals for each group of signals (in ms). Values 0-65535 ms can be stated. If no I/O poll interval group is specified for the signal it will be polled instantaneously. The I/O poll interval group for a signal is specified using the button **I/O** when objects are defined. The button **I/O** is included in all dialogs where a signal can be stated. See also the section *The I/O Browser*.

Runtime Fonts

Runtime Fonts are fonts attributes and effects for menus, e.g. system texts, and input dialogs, e.g. the alphanumeric keyboard in touch screen models, in the operator terminal when it is running. Forms are not applicable for the E1000 series.

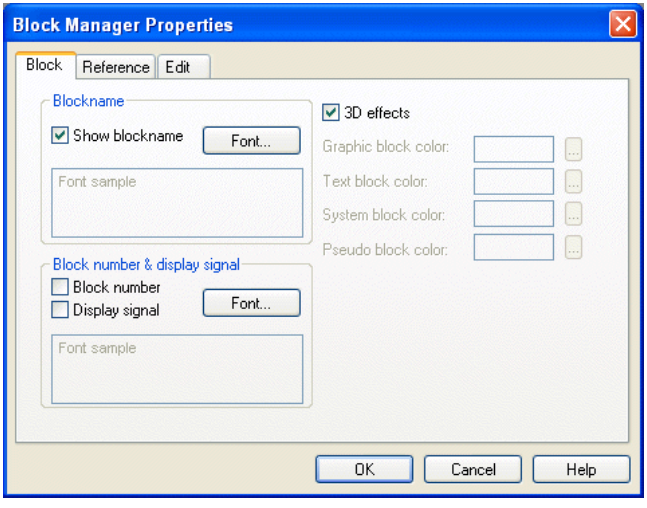
3.22 The Block Manager menu

The Block Manager menu is available when the Block Manager is activated/ displayed. The functions in the **Block Manager** menu correspond to those in *The Block Manager Toolbar*.



Properties for the Block Manager

Properties for presentation in the Block Manager can be made under **Block Manager/Settings**, or by right-clicking on the Block Manager and selecting **Settings**.



Block

Select how data for the block is to be presented, including the layout of the Block Manager, under the **Block** tab.

Reference

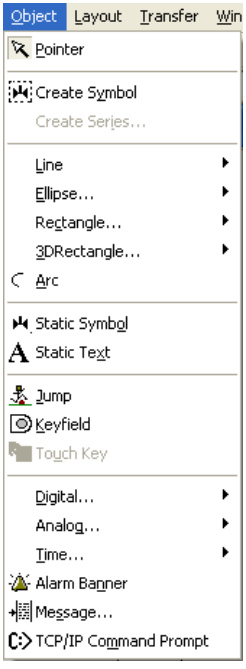
Select overview layout for the Block Manager under the **Reference** tab.

Edit

Select special functions for the presentation in the Block Manager under the **Edit** tab.

3.23 The Object menu

The **Object** menu is displayed when a block is opened, and includes all objects available for the block. The number of objects varies depending on the type of operator terminal. See description of each object in the chapters *Graphic Presentation and Maneuvering* and *Text-based Presentation for Printouts and Reports*.



3.24 The Layout menu

The **Layout** menu is displayed when a block is opened and includes functions to adapt and adjust the objects, also available from *The Alignment Toolbar* and *The Layout Toolbar*.

3.25 The Project menu

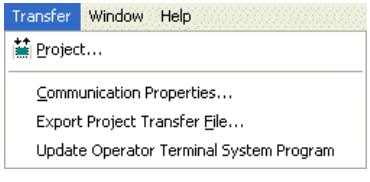
The **Project** menu provides functions for testing the project and changing project properties, as well as a function for simulating the project.

The Simulator

The Simulator is used to run the project on a personal computer. Save the project and select **Project/Run**. Now, a new window is shown, acting as the operator terminal. Press **Esc** to end the simulator and return to the configuration tool.

3.26 The Transfer menu

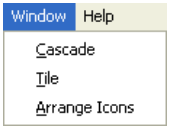
The **Transfer** menu provides functions for transferring projects or selected blocks, and communication properties for transfer between the PC and the operator terminal. See the chapter *Project Transfer* for information.



The function **Export Project Transfer File** is used to export projects to a format used by Compact Flash cards and USB Flash drives for temporary storage. This function can be useful for moving projects between operator terminals when performing project updates, for example. For more information, see the chapter *Project Transfer*.

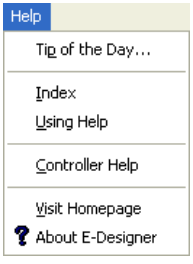
3.27 The Window menu

Properties for how program windows are to appear in the configuration tool are made from the **Window** menu.



3.28 The Help menu

Via the **Help** menu, help texts for the configuration tool as well as for the controller can be displayed. Additionally, program version information is available, and showing the Tip of the Day can be turned on or off.



4 Graphic Presentation and Maneuvering

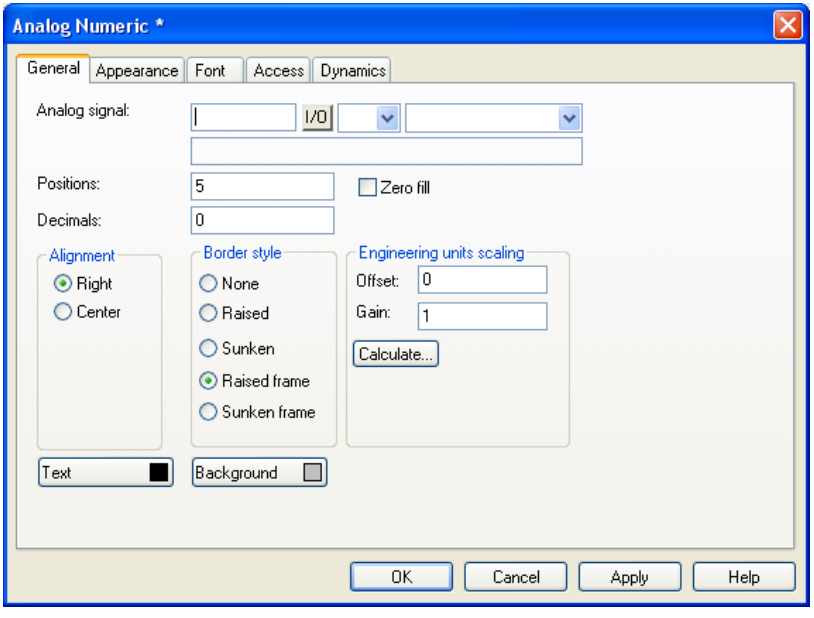
This chapter presents the graphic objects in tabular form and then describes each object separately.

4.1 General parameters

The Properties dialog for the selected object is displayed by double-clicking on the object on the working area.

The General tab

The properties under the **General** tab vary for the different objects, and are described for each object.



All dynamic objects can be connected to a digital or analog signal.

Engineering units scaling

The parameters **Offset** and **Gain** are used to change the scale of the controller value to a value shown in accordance with the following equation.

Panel value = Offset+Gain*Controller value

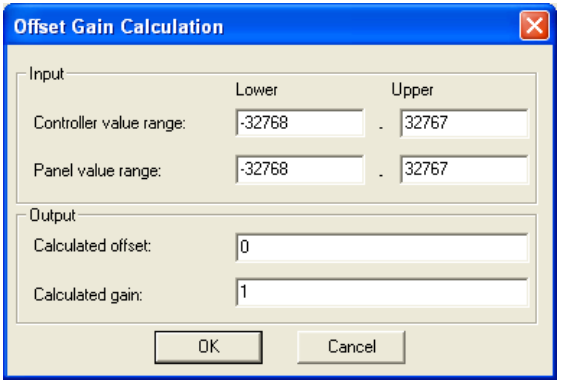
When the value for an object is changed from the operator terminal, the scale is changed to the value shown in accordance with the following equation:

Controller value = (Panel value-Offset)/Gain

Scaling does not affect the defined maximum and minimum values, or the number of decimal places.

Offset Gain Calculation

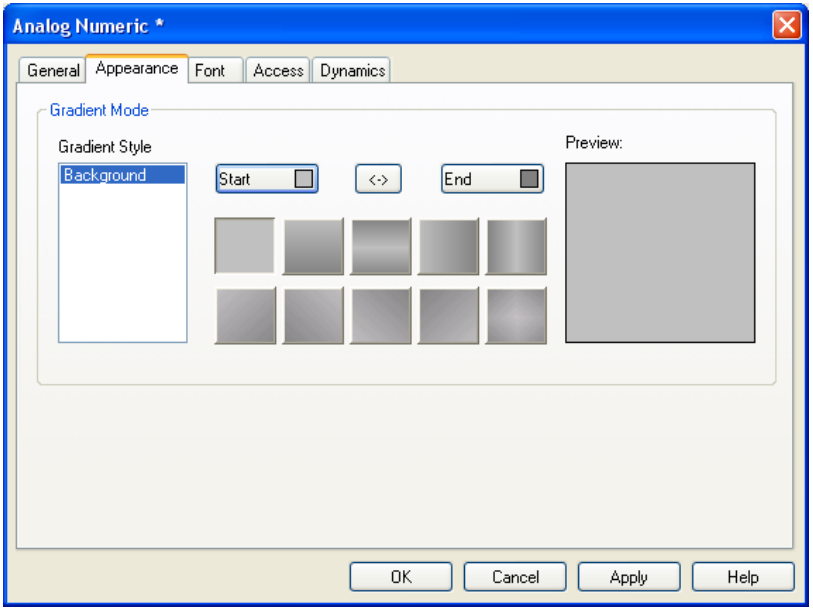
The function **Offset Gain** calculation is a tool to calculate the offset and gain parameters. Specify the value of **Offset** and **Gain** under the **General** tab for the object and click on **Calculate** to display the following dialog.



Enter the range for the controller value and panel value. The correct values for the parameters **Offset** and **Gain** are calculated.

The Appearance tab

The properties under the **Appearance** tab vary slightly between different objects.

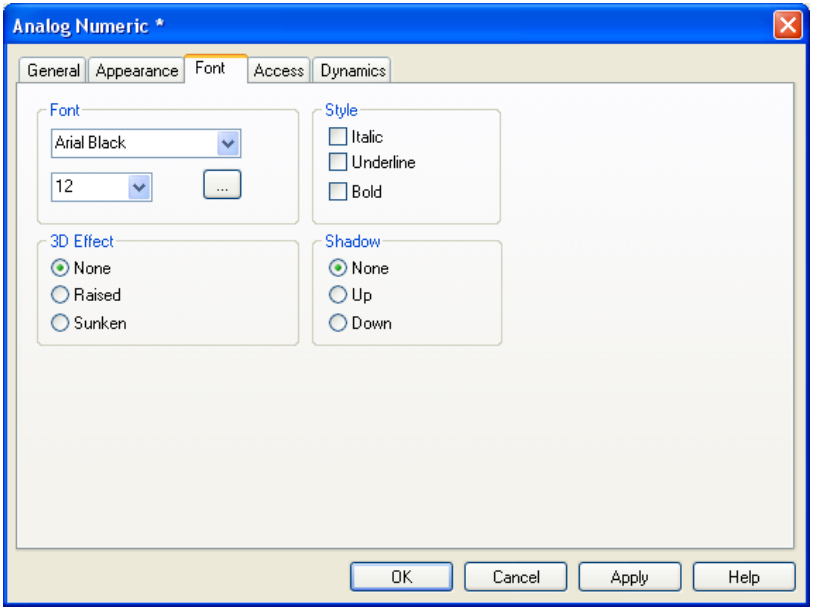


The operator terminals support using 64k colors for objects and bitmap images.

Colors allow more realistic objects with 3D effects and shadowing to be created. Apart from background and foreground colors for the blocks, different gradient styles for objects can also be selected. Additionally, it is possible to select colors for scales, curves etc. in graphic objects.

Clicking the **Start**- and **End**-buttons opens the Color Palette, where also custom colors can be defined. Clicking the <->-button inverts the coloring for the gradient style. Click on the different buttons with gradient styles to find a style that suits your preferences. The result is displayed in the **Preview**-window.

The Font tab



Font

Select a font and a font size from the drop-down menus. Alternatively, click the ...-button to make a selection from the Windows fonts dialog.

Style

An italic, underlined or bold style can be selected for the text. The style stays regular if all the boxes are left unchecked.

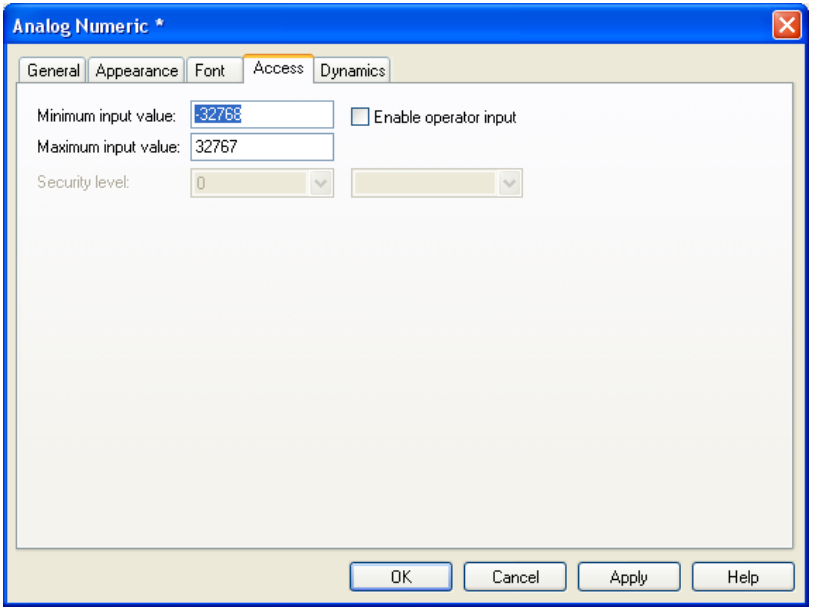
3D Effect

A 3D effect for the text can be selected.

Shadow

A shadowing of the text can be selected.

The Access tab

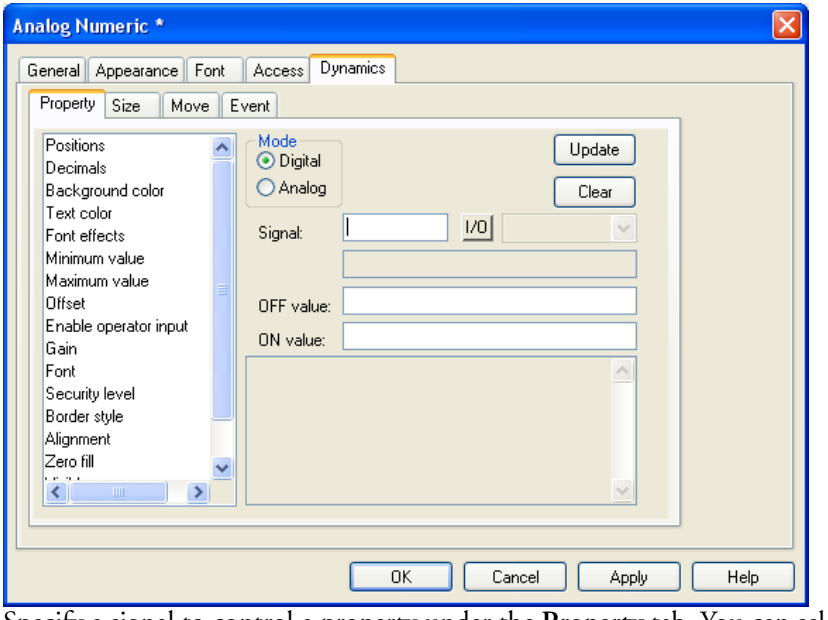


The **Minimum** and **Maximum input value** for the object is specified under the **Access** tab. Checking **Enable operator input** makes the object maneuverable for the operator, according to the specified security level. Security levels can be defined by double-clicking the **Password** folder in the Project Manager. See the chapter *Passwords* for further information.

Dynamics

Dynamics increases the number of signals that must be updated in the block, which affects the updating time for the block. The dynamic functions are described below.

Property



Specify a signal to control a property under the **Property** tab. You can select digital or analog control.

Select a property to be controlled by the controller from the list. The property can only be used once per object/signal. A used property is marked in red. Enter a signal or click on the button **I/O** to select the signal using the I/O Browser.

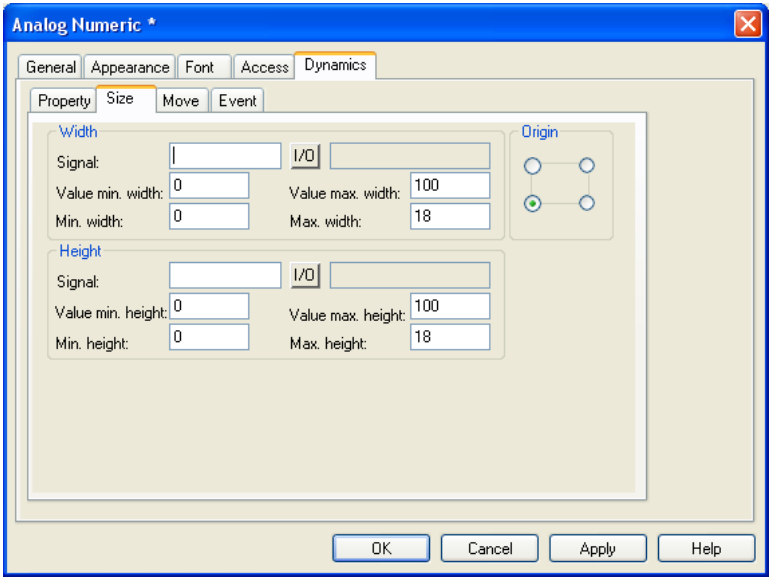
For digital signals, **OFF** and **ON** values can be specified. If no OFF/ON values are given, the OFF value is set to 0 and the ON value to 1.

For analog signals, the length can be specified if the format is of the type string.

Note:
If analog controlling is selected for a property which can only assume digital values, On and Off, the property will be On as long as the signal does not have the value 0.

Note:
In order to be able to influence **Offset/Gain** in an object, offset/gain must be defined to something other than 0/1 in the object from the beginning.

Size



Values for **Width**, **Height** and **Origin** can be entered under the **Size** tab. Two analog signals are defined, where the value of the signals determines the size of the object in X-axis (width) and Y-axis (height).

Note:
If an unreasonable value is given, e.g. a value which means that the object cannot be drawn on the display, the value will be ignored.

Signal
Specify an analog signal.

Value min. width/height
Specify the analog signal's minimum value.

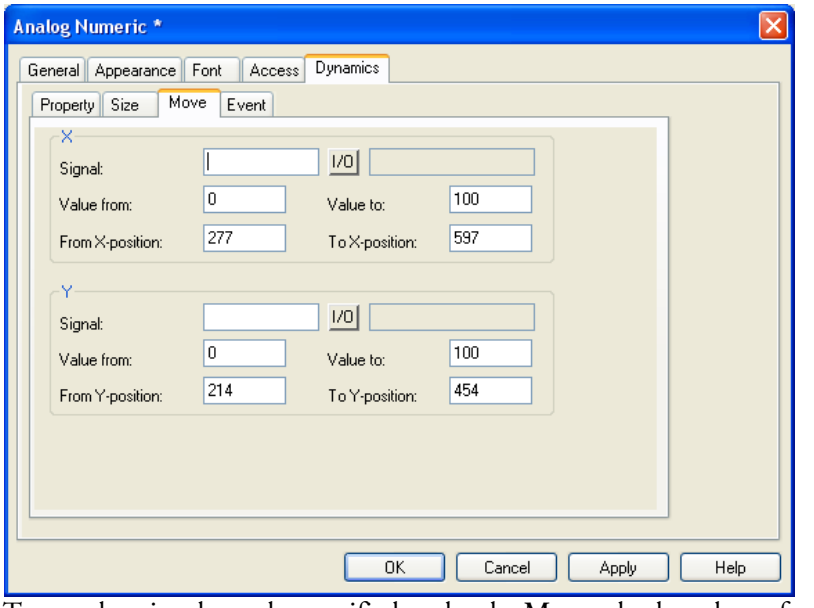
Value max. width/height
Specify the analog signal's maximum value.

Min. width/height
Specify the object's minimum width/height in pixels when the **Minimum value** = defined value.

Max. width/height
Specify the object's maximum width/height in pixels when the **Minimum value** = defined value.

Origin
You select the starting point for the object when it is drawn on the display.

Move



Two analog signals can be specified under the **Move** tab, the values of which correspond to the X- and Y-coordinates (width and height) for the object.

Note:
If an unreasonable value is given, e.g. a value which means that the object cannot be drawn on the display, the value will be ignored.

Signal
Specify an analog signal.

Value from
Specify the analog signal's minimum value.

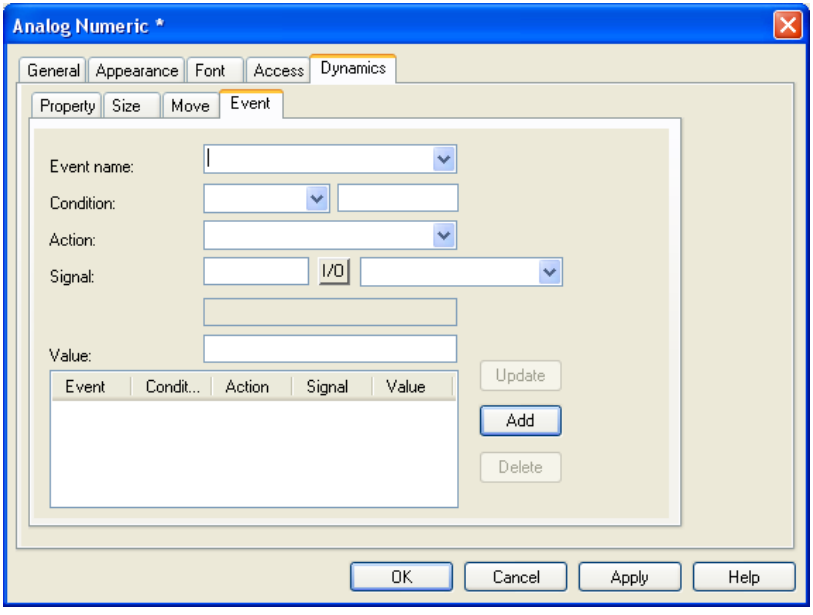
Value to
Specify the analog signal's maximum value.

From X-/Y-position
Specify the object's X- and Y-coordinates, i.e. the pixel value on the display, when the value in the parameter **Value from** = defined value.

To X-/Y-position
Specify the object's X- and Y-coordinates, i.e. the pixel value on the display, when the value in the parameter **Value to** = defined value.

Note:
The property **Visible** must not be used together with the property **Positions**.

Event



Under **Event** the following parameters can be specified. Existing events can be updated, new events can be added, and events can be deleted using the buttons in the dialog.

Event name

Select an optional event name from the list.

Condition

Select one of the following conditions from the list:

Conditions	Description
Equal to	The event takes place on the given signal when the value of the object is the same as the value defined for the **Value** parameter. The value must be entered by the operator.
Not equal to	The event takes place on the given signal when the value of the object is NOT the same as the value defined for the **Value** parameter. The value must be entered by the operator.
Greater than	The event takes place on the given signal when the value of the object is greater than the value defined for the **Value** parameter. The value must be entered by the operator.
Less than	The event takes place on the given signal when the value of the object is less than the value defined for the **Value** parameter. The value must be entered by the operator.

Action
Select what is to be affected; a digital I/O, an analog I/O, or if a macro is to be run. A maximum of 30 macro events can be linked to the same signal.

Signal
Select the signal to be influenced when the condition is fulfilled.

Value
Select the value the influenced signal is to assume when the condition is fulfilled.

4.2 Graphic objects

Static/dynamic graphic objects

Static graphic objects are used to draw graphics. Graphic objects can be given dynamic properties under **Dynamics**.

Note:
Static objects are always positioned behind dynamic objects during presentation.

Symbol	Object
	Line
	Arc
	Rectangle
	Symbol See section *Static symbols* in the chapter Configuration with the configuration tool.
	Static text Maximum length is 64 characters.
	Ellipse
	Key field
	Poly line

Dynamic handling of bitmap

If you check the box **Use dynamic bitmaps** for a static symbol object, the operator terminal will collect the specified bitmap file (name.bmp) from the library IMAGES in its file system. The bitmap image is presented on the display when the operator terminal is running. The image to be presented must be transferred to the library IMAGES in the operator terminal via FTP transfer. It will then be possible via FTP to add, replace, or remove dynamic bitmap images on the display by writing over, entering or deleting bmp files in the library IMAGES. The image for a dynamic bitmap image object is only displayed when the operator terminal is running. The bitmap images in the library are not shown in the configuration tool. See section FTP server in the chapter *Network Functions in the Operator Terminal*.

Dynamic digital graphic objects

Digital graphic objects are always linked to digital signals in the controller.

Symbol	Object	Description
	*Digital Text*	Switches between two texts depending on the status of a digital signal.
	*Digital Symbol*	Switches between two symbols depending on the status of a digital signal.
	*Digital Fill*	Fills a framed area in one or two colors, depending on the status of a digital signal.

Dynamic analog graphic objects

Analog graphic objects are linked to registers in the controller.

Symbol	Object	Description
	*Analog Numeric*	Input and presentation of values in numeric form.
	*Bar Graph*	Presents values in the form of a bar graph.
	*Diagram*	Displays X/Y diagrams based on the content in data registers.
	*VU Meter*	Creates a graphic VU meter on the display.
	*ASCII*	Handles ASCII strings in graphic blocks.

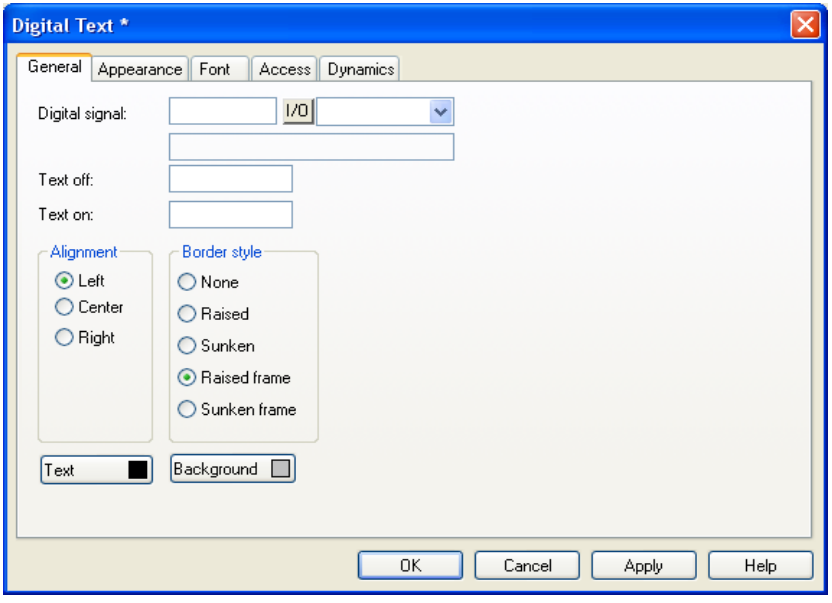
Symbol	Object	Description
	*Slide*	Enables the value of an analog signal to be increased or decreased.
	*Trend*	Presents values collected from data registers in curve form.
	*Speedometer*	Creates a graphic speedometer on the display.
	*Analog Fill*	Fills a framed area, depending on the value of a register.
	*Multiple Symbol*	Shows one of up to eight different symbols, depending on the value in a data register. Also allows symbols to be moved over to the display.
	*Multiple Choice*	Links to a data register, which can assume up to eight different states. A text of up to 30 characters can be linked to each state.
	*Message*	Shows texts from a message library.
	*Analog Numeric Table*	Creates a table with numeric objects.

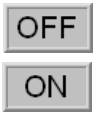
Other objects

Symbol	Object	Description
	*Jump*	Creates a jump to another block.
	*Alarm Banner*	Shows a line from the alarm list.
	*Analog Clock*	Shows an analog clock.
	*Digital Clock*	Shows a digital clock.

Digital Text

The **Digital text** object is used to switch between two texts, of a maximum of 30 characters, depending on the status of a digital signal.





General

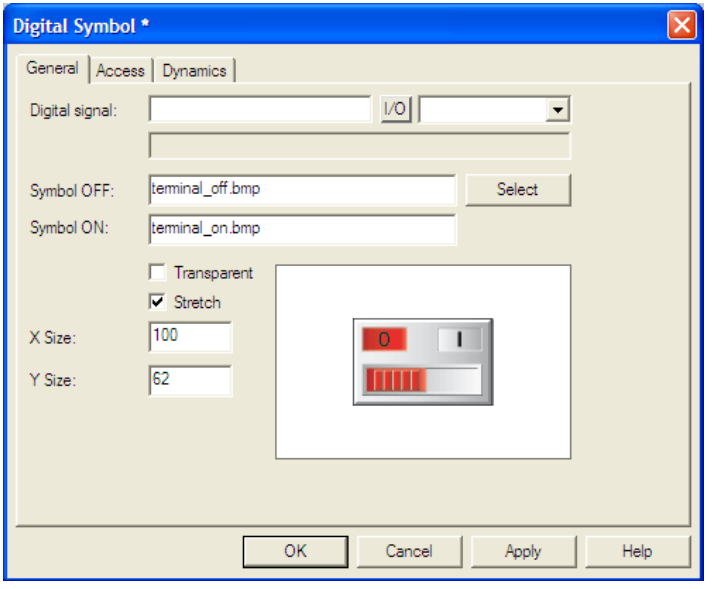
Parameter	Description
Digital signal	The address of the digital signal.
Text off	The text to be shown when the signal is 0.
Text on	The text to be shown when the signal is 1.
Alignment	Select whether the text is to be left-aligned, right-aligned or centered.
Border style	Select whether a frame is to be drawn around the object.
Text	The color of the text in the object.
Background	The background color for the object.

Other tabs

The functions under **Appearance**, **Font**, **Access** and **Dynamics** are described in the section *General parameters*.

Digital Symbol

The **Digital symbol** object is used to switch between two selected symbols depending on the status of a digital signal.



General

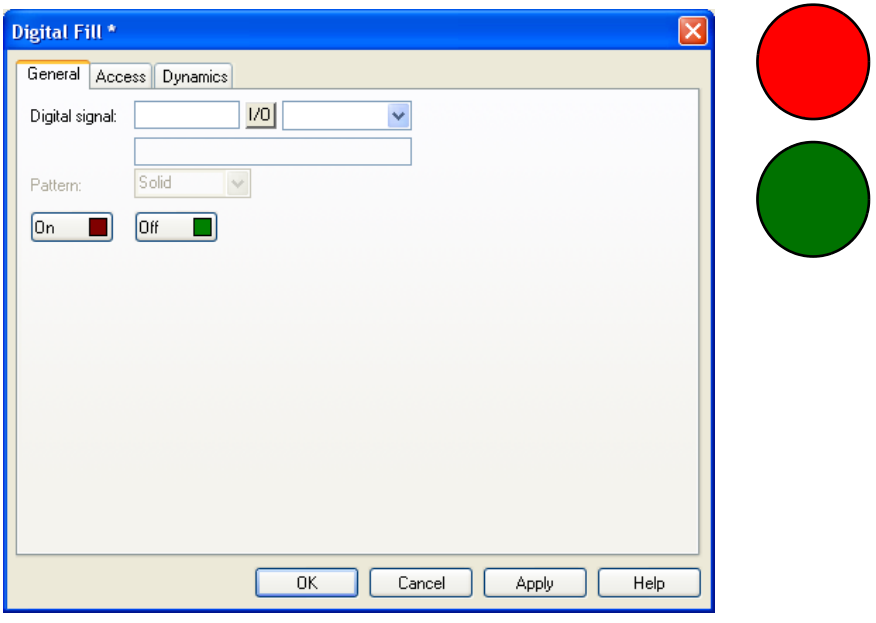
Parameter	Description
Digital signal	Address of the signal.
Symbol OFF	Select the symbol to be shown when the signal is 0.
Symbol ON	Select the symbol to be shown when the signal is 1.
Transparent	Checking the box makes the symbol transparent. The color of the top left pixel in the image controls which color will be transparent.
Stretch	When selected, the object's X and Y size can be changed, using the X and Y size-boxes, or using the cursor on the working area.

Other tabs

The functions under **Access** and **Dynamics** are described in the section *General parameters*.

Digital Fill

The **Digital fill** object is used to fill a framed area with one of two colors depending on the status of a digital signal.



Note:
Filling an excessively irregular area when the operator terminal is running can cause system errors. In certain cases filling can slow down the image.

General

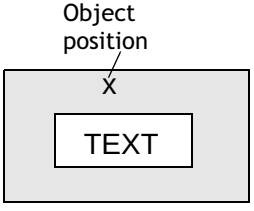
Parameter	Description
Digital signal	The address of the digital signal.
On	Select color of the object when the signal is 1.
Off	Select color of the object when the signal is 0.

Other tabs

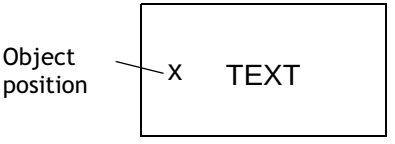
The functions under **Access** and **Dynamics** are described in the section *General parameters*.

Positioning of the object

The program calculates what should be filled in the area. It is therefore important that the object is positioned correctly. Incorrectly positioned objects can result in errors in the application when the operator terminal is running. The area to be filled is only limited by static objects and static parts of dynamic objects. Filled objects can be replaced by Digital symbol objects or Multisymbol objects to improve performance in the project.



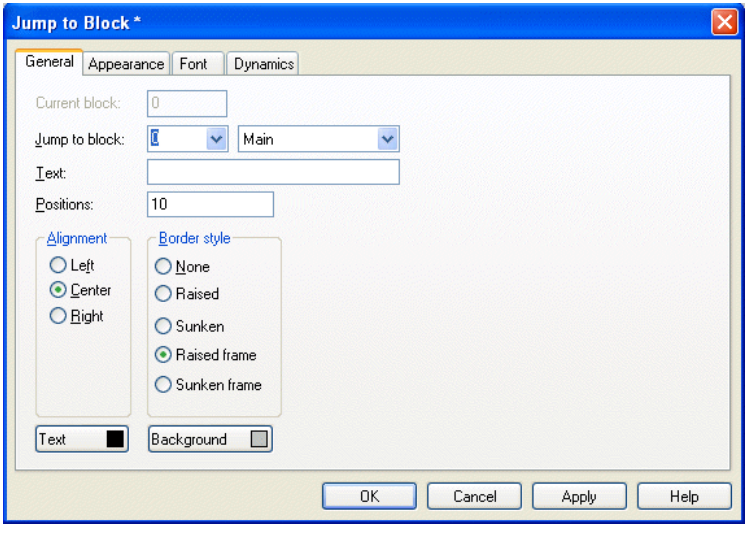
Correct! Draw a frame round the text in the area to be filled to improve performance in the image.



Incorrect! The image becomes slow since the program has to make a lot of calculations to fill the area between the letters.

Jump

The **Jump** object is used to create a jump to another block, to enable a menu hierarchy in the project. By pressing the key [PREV] on the operator terminal it is possible to return to previous blocks (nine levels backwards). See the chapter *Function Keys* for further information.



General

Parameter	Description
Current block	The number of the current block is shown here. Cannot be changed.
Jump to block	The number or name of the block to which the jump is to be made.
Text	An optional text to be shown in the object.
Positions	The maximum number of positions the text is to occupy.
Alignment	Select whether the text is to be left-aligned, right-aligned or centered.
Border style	Select whether a frame is to be drawn around the object.
Text	The color of the text in the object.
Background	The background color for the object.

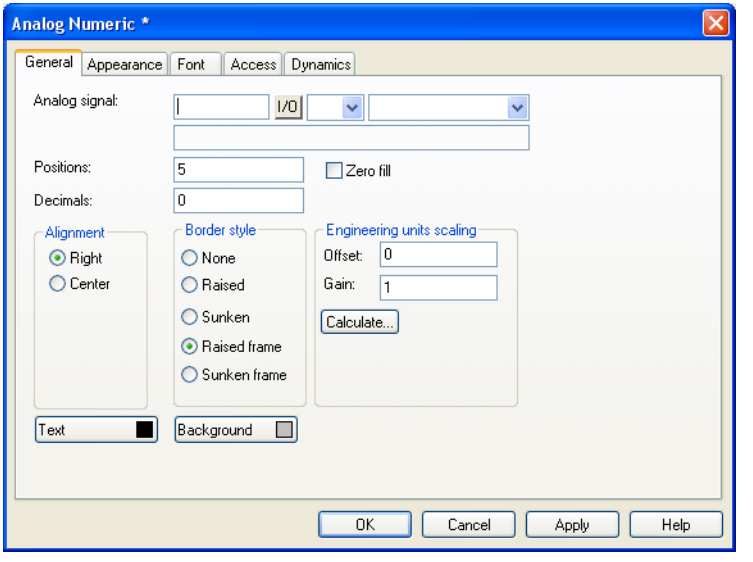
Note:
An error message is displayed if a jump to a block that does not exist is made when the operator terminal is running.

Other tabs

The functions under **Appearance**, **Font** and **Dynamics** are described in the section *General parameters*.

Analog Numeric

The **Analog numeric** object is used to create an input field and to present values in numeric form.



General

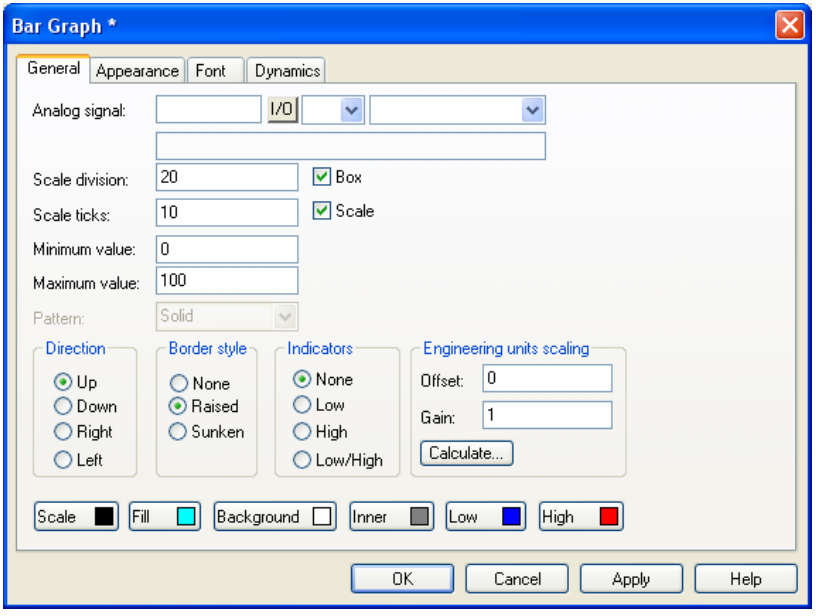
Parameter	Description
Analog signal	The address of the signal.
Positions	The number of positions the entered value should be given, including comma and minus characters.
Zero fill	Select whether zeros are to be written in empty positions.
Decimals	The number of decimals the object is to be presented with.
Alignment	Select whether the input field is to be right-aligned or centered.
Border style	Select whether a frame is to be drawn around the object.
Engineering units scaling	Used to scale register value. See the section *General parameters*.
Text	The color of the text in the object.
Background	The background color for the object.

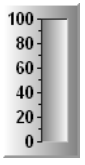
Other tabs

The functions under **Appearance**, **Font**, **Access** and **Dynamics** are described in the section *General parameters*.

Bar Graph

The **Bar graph** object presents whole or decimal numbers in the form of a bar graph.





General

Parameter	Description
Analog signal	The address of the signal.
Scale division	How the scale is to be divided.
Box	Select whether a box is to be drawn around the bar.
Scale ticks	The interval between scale ticks shown.
Scale	Select whether the scale is to be shown on the bar graph.
Minimum value	The minimum value the signal can assume.
Maximum value	The maximum value the signal can assume.
Direction	Select whether the bar graph is to be presented to the right, left, upwards or downwards.
Border style	Select whether a frame is to be drawn around the object.

Parameter	Description
Indicators	Select whether the maximum and/or minimum values for the signal are to be shown on the axis. The indicators are reset when the operator terminal is started. Resetting can also be carried out in the operator terminal by selecting the bar graph and clicking ENTER (pointing to the bar graph touch screen operator terminals). The indicators only function for signed 16-bit numbers.
Engineering units scaling	Used to scale the register value. See the section *General parameters*.
Scale	The color of the scale in the object.
Fill	The fill color.
Background	The background color for the object.
Inner	Color of the bar when not filled.
Low	Indicator color low.
High	Indicator color high.

Other tabs

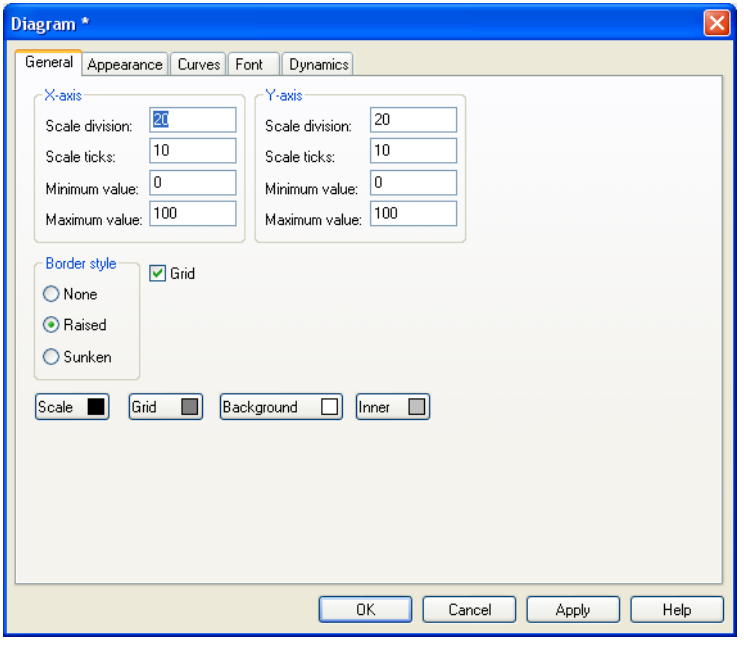
The functions under **Appearance**, **Font** and **Dynamics** are described in the section *General parameters*.

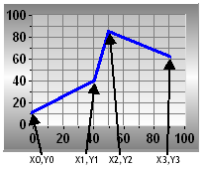
Diagram

The **Diagram** object is used to draw X/Y diagrams based on the contents of controller registers. This is a real-time function. The object is normally used for non-time-based presentations. Time-based displaying with a sample time of <1 second can be shown if the controller handles the collection of data.

In the following example the value in the register 0 has been selected for the first X-coordinate, and the value in the register 10 for the first Y-coordinate. The number of register pairs is set to 4. The table and the figure below illustrate the example.

X-coordinate	Register	Value	Y-coordinate	Register	Value
X0	0	0	Y0	10	11
X1	1	41	Y1	11	40
X2	2	51	Y2	12	85
X3	3	92	Y3	13	62

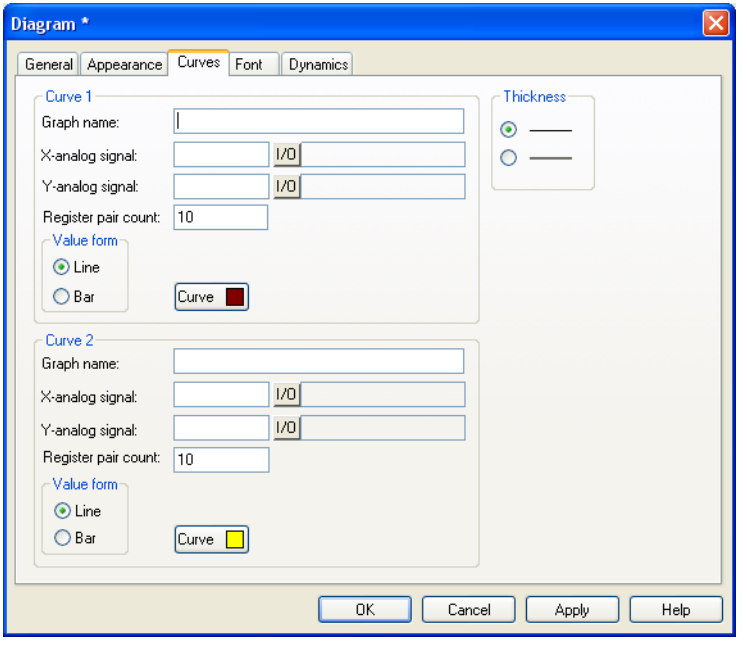




General

Parameter	Description
Scale division	The interval between scale numbers on the X- and Y-axis.
Scale ticks	The interval between the scale ticks shown on the X- and Y-axis.
Minimum value	The minimum value for the X- and Y-coordinates.
Maximum value	The maximum value for the X- and Y-coordinates.
Border style	Select whether a frame is to be drawn around the object.
Grid	Checking the box shows a grid in the diagram.
Scale	The color of the scale in the diagram.
Grid	The color of the grid in the diagram.
Background	The background color for the object.
Inner	The inner color for the object.

Curves



Parameter	Description
Graph name	Specify a name for each curve.
X-analog signal	The data register containing the first X-coordinate for each curve.
Y-analog signal	The data register containing the first Y-coordinate for each curve.
Register pair count	The number of register pairs to be drawn either as dots or bars. A maximum of 49 register pairs can be used.
Value form	Select whether the diagram is to be a bar graph or curve diagram. In the bar graph a bar is drawn for each register pair. In curve diagrams the X-/Y-coordinates are drawn as points between which a line is drawn.
Curve	The color of each curve.
Thickness	The thickness of the curve lines.

Access

Only applicable for key pad models.

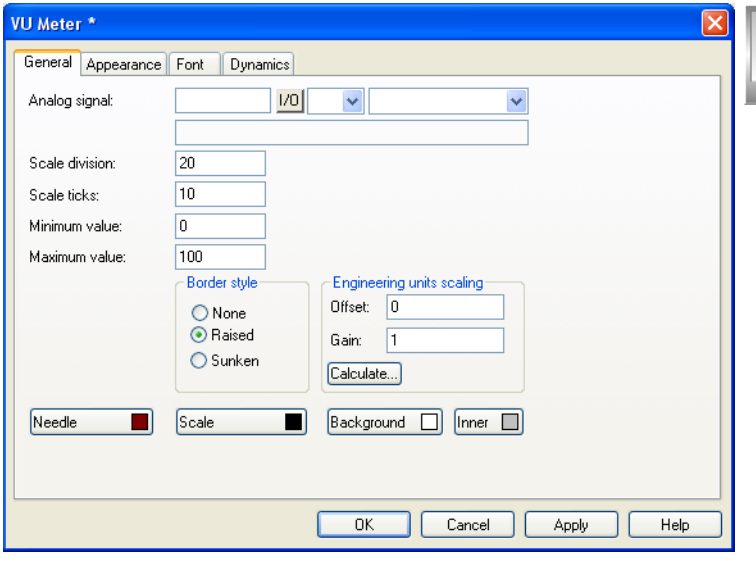
Parameter	Description
Current graph signal	Register, the value of which determines which curve is to be edited in the operator terminal.
Current cursor signal	Register, the value of which determines which point on the curve is to be edited in the operator terminal.
X Edit step	Indicates the interval between the steps when you press the arrow keys in the operator terminal.
Y Edit step	Indicates the interval between the steps when you press the arrow keys in the operator terminal.
Enable operator input curve 1-2	Select for respective curve if it can be maneuvered in the operator terminal.

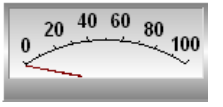
Other tabs

The functions under **Appearance**, **Font** and **Dynamics** are described in the section *General parameters*.

VU Meter

The **VU meter** object creates a graphic VU-meter on the display.





General

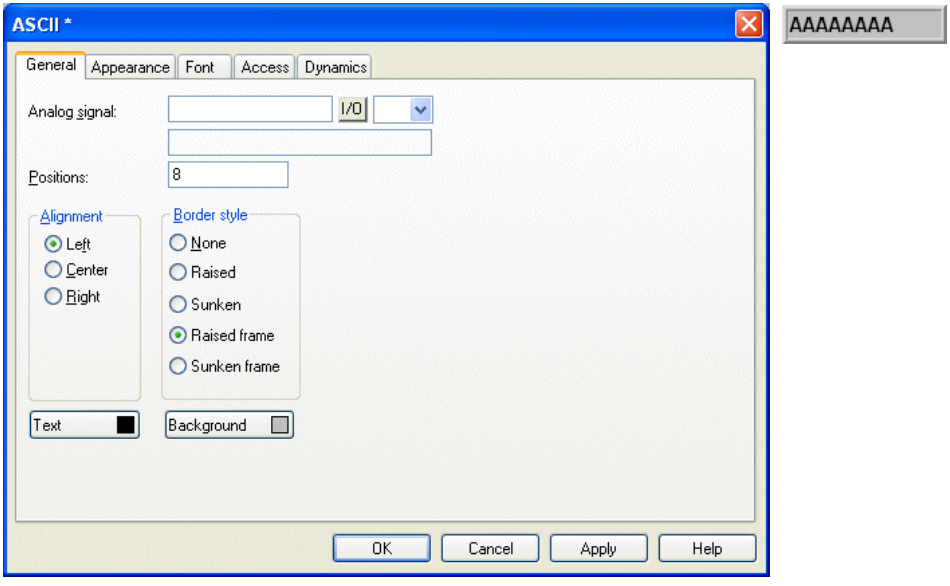
Parameter	Description
Analog signal	Address of the signal.
Scale division	How the scale is to be divided.
Scale ticks	The interval between scale ticks.
Minimum value	The minimum value the signal can assume.
Maximum value	The maximum value the signal can assume.
Border style	Select whether a frame is to be drawn around the object.
Engineering units scaling	Used to scale the register value. See the section *General parameters*.
Needle	The color of the needle in the object.
Scale	The color of the scale in the object.
Background	The background color for the object.
Inner	The inner color of the object.

Other tabs

The functions under **Appearance**, **Font** and **Dynamics** are described in the section *General parameters*.

ASCII

The **ASCII** object handles ASCII strings in graphic blocks. In ASCII objects it is possible to present texts stored in the controller's data register. The texts should be in IBM extended ASCII format.



General

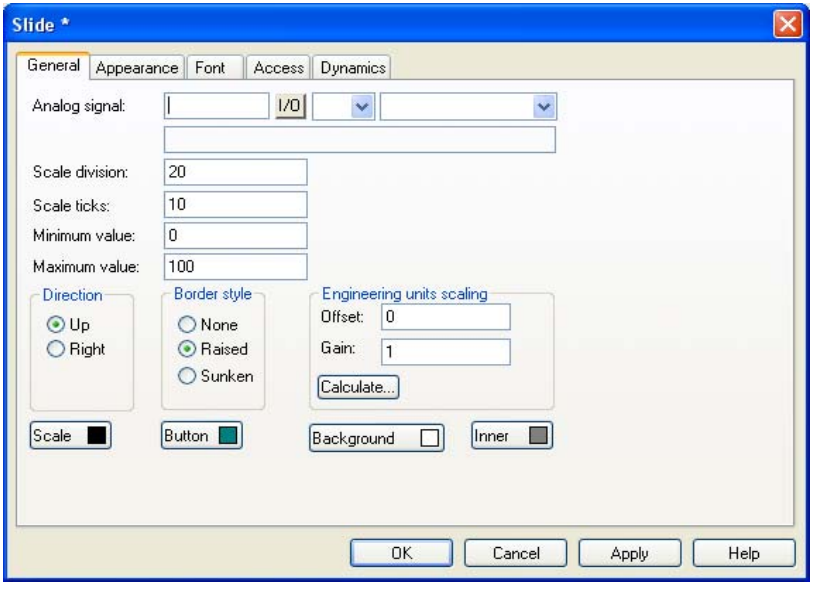
Parameter	Description
Analog signal	The data register where the text for the first position is stored.
Positions	The number of positions the text is to occupy on the display.
Alignment	Select whether the text is to be right-aligned, left-aligned or centered.
Border style	Select whether a frame is to be drawn around the object.
Text	The color of the text in the object.
Background	The background color for the object.

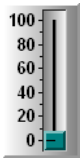
Other tabs

The functions under **Appearance**, **Font**, **Access** and **Dynamics** are described in the section *General parameters*.

Slide

The Slide object shows the value of an analog signal in a slider, where the value of the analog signal can be increased or decreased.





General

Parameter	Description
Analog signal	The address of the signal.
Scale division	How the scale is to be divided.
Scale ticks	The interval between scale ticks.
Minimum value	The minimum value the object can assume.
Maximum value	The maximum value the object can assume.
Direction	Select whether the slider is to be presented vertically or to the right.
Border style	Select whether a frame is to be drawn around the object.
Engineering units scaling	Used to scale register value. See the section *General parameters*.
Scale	The color of the scale.
Button	The color of the indicator button.
Background	The background color of the slider.
Inner	The inner color of the slider.

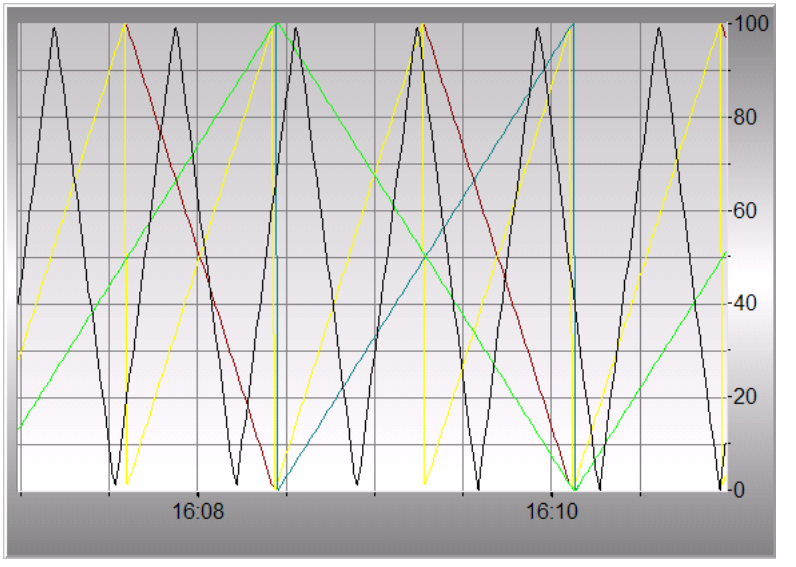
Note:
The data type formats BCD float and Float without exponents cannot be used in slider objects.

Other tabs

The functions under **Appearance**, **Font**, **Access** and **Dynamics** are described in the section *General parameters*.

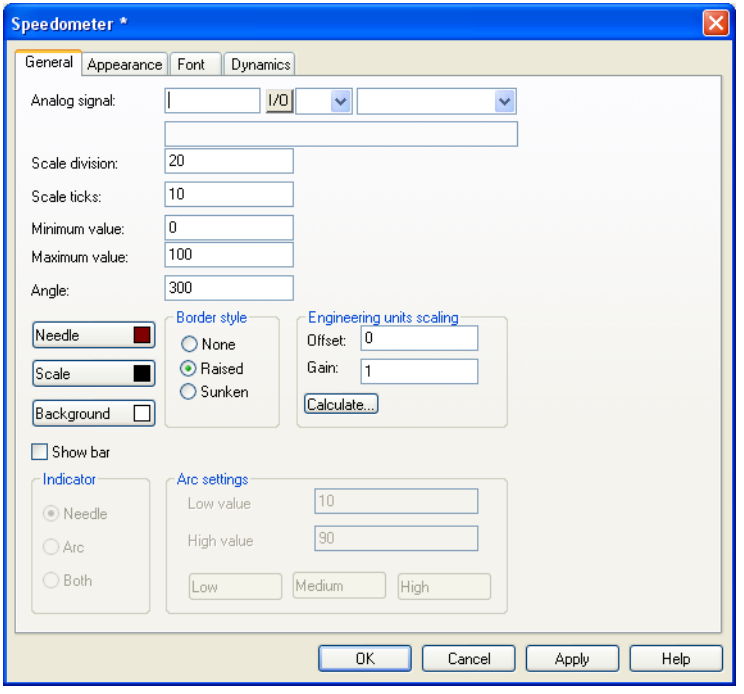
Trend

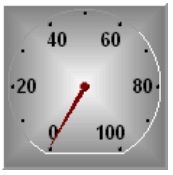
The **Trend** object presents values collected from analog signals. See the chapter *Trends* for information.



Speedometer

The **Speedometer** object creates a graphic speedometer on the display.





General

Parameter	Description
Analog signal	Address of the signal.
Scale division	How the scale is to be divided.
Scale ticks	The interval between scale ticks.
Minimum value	The minimum value the speedometer can show.
Maximum value	The maximum value the speedometer can show.
Angle	The angle (working area) for the object. 10 -360 degrees.
Engineering units scaling	Used to scale register value. See the section *General parameters*.
Border style	Select whether a frame is to be drawn around the speedometer.
Needle	The color of the needle.
Scale	The color of the scale.

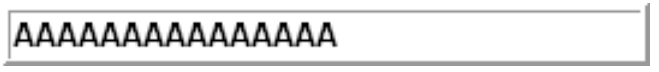
Parameter	Description
Background	The background color of the speedometer.
Show bar	When selected, an arc is shown around the speedometer. It is possible to change the properties when selected.
Indicator	Select to show Needle, Arc or Both.
Arc properties	Low and High value, and the colors to be shown for the different intervals.

Other tabs

The functions under **Appearance**, **Font** and **Dynamics** are described in the section *General parameters*.

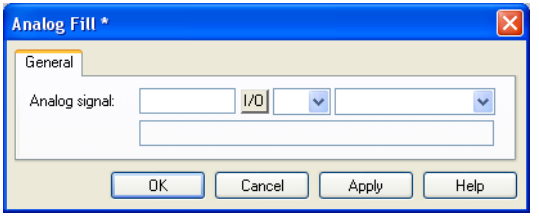
Alarm Banner

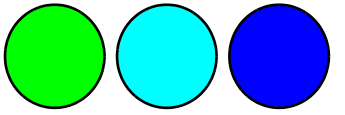
The **Alarm banner** object displays a line from the alarm list. See chapter *Alarm Management* for more information.



Analog Fill

The **Analog fill** object fills in a framed area with a color, depending on the value of a register. The colors are determined in accordance with the following table:





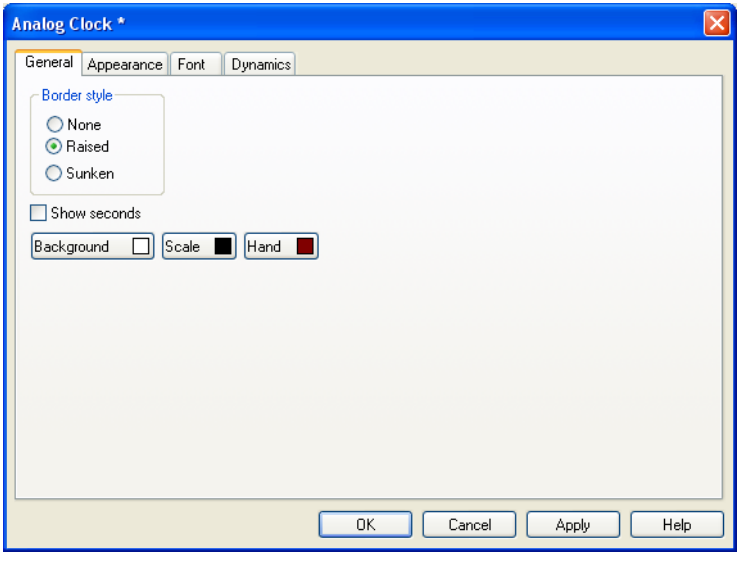
Parameter	Description
Analog signal	The data register, the value of which determines the color of the object. See table below.

Register value	Color	Register value	Color
0	Black	8	Grey
1	Blue	9	Light blue
2	Green	10	Light green
3	Cyan	11	Light cyan
4	Red	12	Light red
5	Magenta	13	Light magenta
6	Yellow	14	Light yellow
7	Light grey	15	White

For limitations and positioning of the object, refer to the section *Digital Fill*.

Analog Clock

The **Analog clock** object is used to present an analog clock.



General

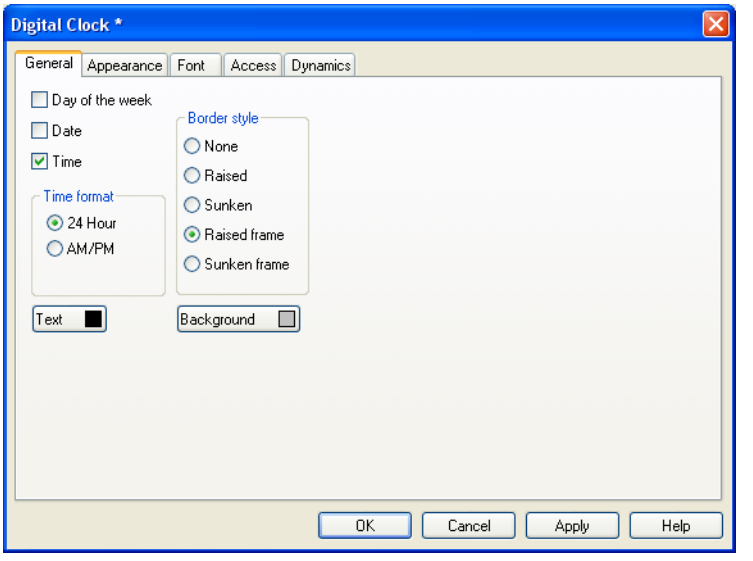
Parameter	Description
Border style	Select whether the clock is to be shown with a frame.
Show seconds	Select whether the clock is to be shown with a seconds hand.
Background	The background color of the clock.
Scale	The color of the scale.
Hand	The color of the hands.

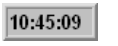
Other tabs

The functions under **Appearance**, **Font** and **Dynamics** are described in the section *General parameters*.

Digital Clock

The **Digital clock** can be used to present a digital clock, day of the week and date.





General

Parameter	Description
Day of the week	Select whether the day of the week is to be shown.
Date	Select whether the date is to be shown.
Time	Select whether the time is to be shown.
Time format	The time can be presented in the 24 hours or AM/PM format.
Border style	Select whether a frame is to be drawn around the object.
Text	The color of the text.
Background	The background color of the digital clock.

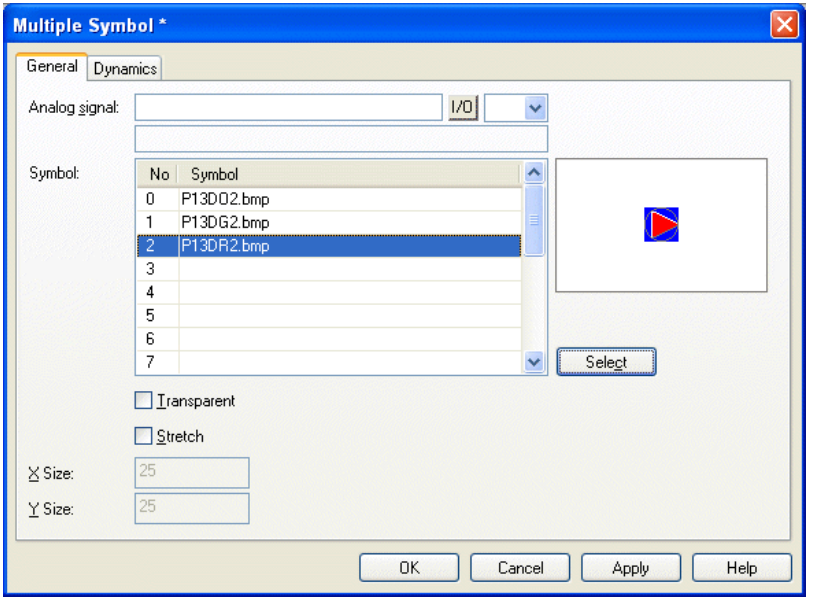
Other tabs

The functions under **Appearance**, **Font**, **Access** and **Dynamics** are described in the section *General parameters*.

Note:
To set the operator terminal clock in the operator terminal a maneuverable Date/Time object (Digital clock) must be defined.

Multiple Symbol

The **Multiple symbol** object can show one of up to 16 different symbols, depending on the value in a data register.



General

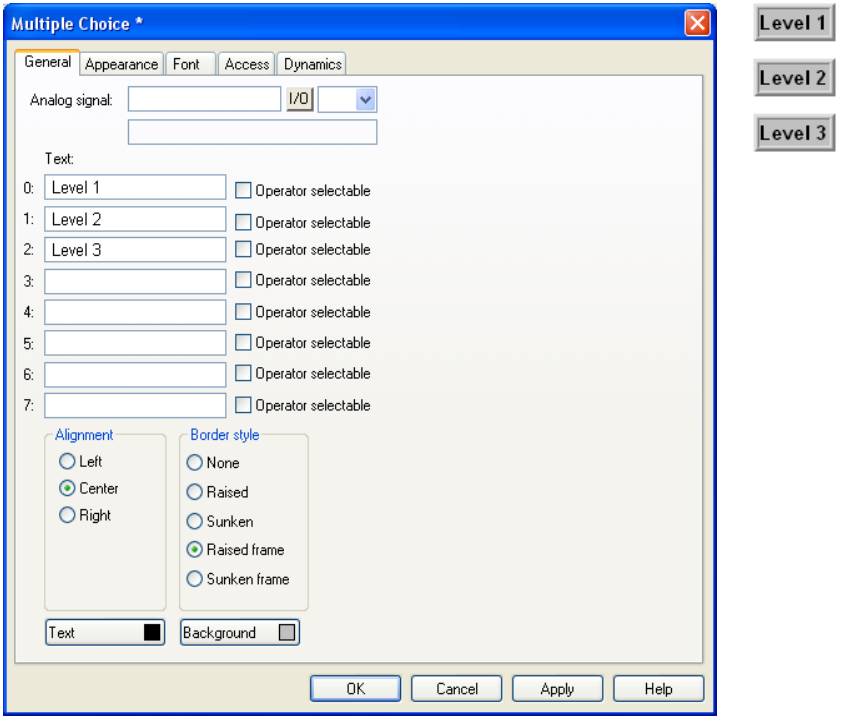
Parameter	Description
Analog signal	Data register that determines which symbol is to be shown. If the register contains the value 1, the symbol 1 will be shown, etc.
Symbol 0-15	Select which symbol to show for each register value.

Dynamics

The functions under **Dynamics** are described in the section *General parameters*.

Multiple Choice

The **Multiple choice** object can show one of up to eight different texts, depending on the value of a data register. The texts can contain a maximum of 30 characters.



General

Parameter	Description
Analog signal	The data register that determines which text is to be shown. If the register contains the value 1, text 1 will be shown, etc.
Text 0-7	Type a text to show for each register value.
Operator selectable 0-7	When checked, the operator can select this text when the operator terminal is running.
Alignment	Select whether the text is to be left-aligned, right-aligned or centered.
Border style	Select whether a frame is to be drawn around the object.
Text	The color of the text.
Background	The background color of the multiple choice object.

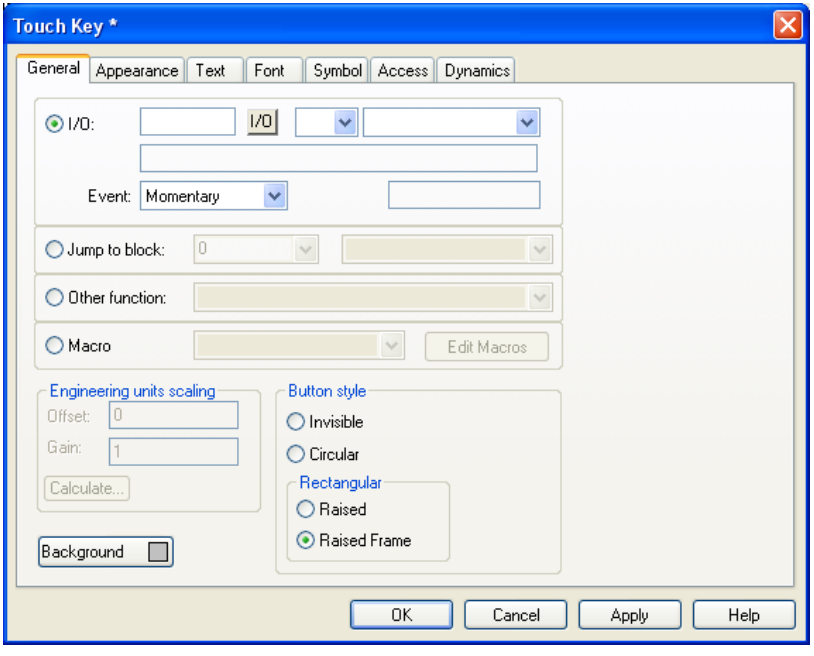
Others

The functions under **Appearance**, **Font**, **Access** and **Dynamics** are described in the section *General parameters*.

Touch Key

Only applicable for E1071, E1101 and E1151. See the section *Maneuvering objects using the touch screen* and the chapter *Function Keys*.

The **Touch key** object is a pressure-sensitive surface with functions similar to those for a function key. It can be used to change images and control memory cells, etc. Up to five rows of text can be used together with a symbol when creating touch keys.



General

Parameter	Description
I/O	Signal to be influenced when pressing the touch key.

Parameter	Description
Event	How the signal is to be influenced by the touch key. **Set** means that the signal is set high when the touch key is pressed. **Grouped** means that all signals, except the one activated, belonging to a touch key with the relevant group number are reset. The group number is given under **Group**. A maximum of 8 touch keys can be included in a group. **Decrements analog** means that the analog signal linked to the touch key will decrease its value by the value given under Value. **Momentary** means that the signal is set high as long as the touch key is pressed. **Reset** means that the signal is set low when the touch key is pressed. **Sets analog** means that the analog signal linked to the touch key is allocated the value given under **Value**. **Toggle** means that the signal is alternately set high or low when the touch key is pressed. **Increments Analog** means that the analog signal linked to the touch key will increase its value by the value given under **Value**. **Inputs analog** can be used to affect an analog object. A touch keyboard is displayed where the value can be entered.
Jump to block	Jumps to another block when the touch key is pressed. State the number or name of the block to which the jump is to be made.
Other function	For a description of these functions, see the chapter *Function Keys*.
Macro	For a description of macros, see the chapter *Macros*.
Button style	Type of button: circular, rectangular or invisible.
Background	The background color of the touch key.

An invisible, pressure-sensitive surface can be used to define the area for block changes in an overview image, e.g. a machine. The detailed images are linked to invisible, pressure-sensitive surfaces placed on selected parts of the machine. The detailed image is shown when the operator clicks on one of these surfaces.

Text

A maximum of five rows of text can be entered. The placement of the text can be adjusted. The font size stays intact even if the size of the touch key is changed.

Symbol

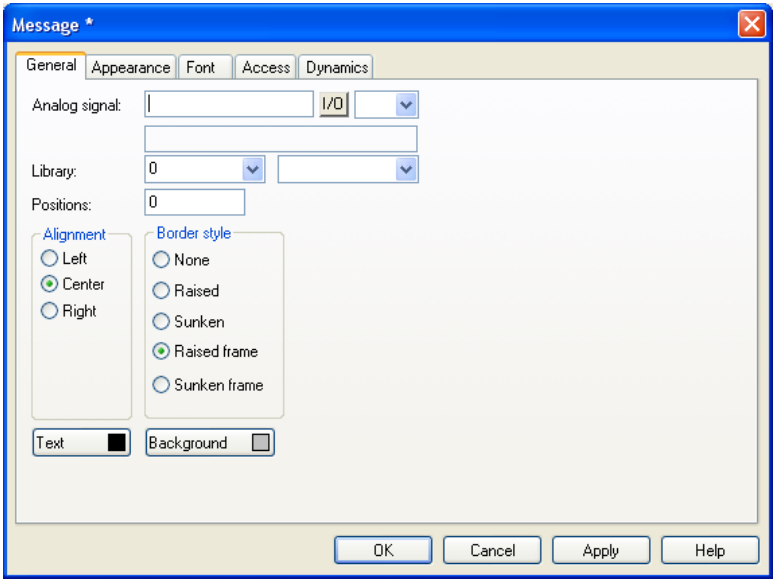
A symbol can be selected to enhance the touch key. The placement of the symbol can be adjusted. Selecting **Stretch** under the **Symbol** tab will make the symbol fill the touch key entirely.

Other tabs

The functions under **Appearance**, **Font**, **Access** and **Dynamics** are described in the section *General parameters*.

Message

The **Message** object presents texts from message libraries.



General

Parameter	Description
Analog signal	Analog signal that controls which text selected from message libraries is to be shown.
Library	The number of the required message library. Defined under **Functions/ Message Library.**
Positions	The number of positions the text is to be presented with. 0 = automatic length adjusting.
Alignment	Select whether the text is to be left-aligned, right-aligned or centered.
Border style	Select whether the text is to be shown with a frame.
Text	The color of the text.
Background	The background color of the message object.

Access

The required **Input range** area is set under the **Access** tab. An area of a maximum of 64 texts can be maneuvered in the operator terminal. State the number of the first and last text in the area.

Note:
The number of positions should not be 0 when the function Library index register is used. See the section *Library index register*.

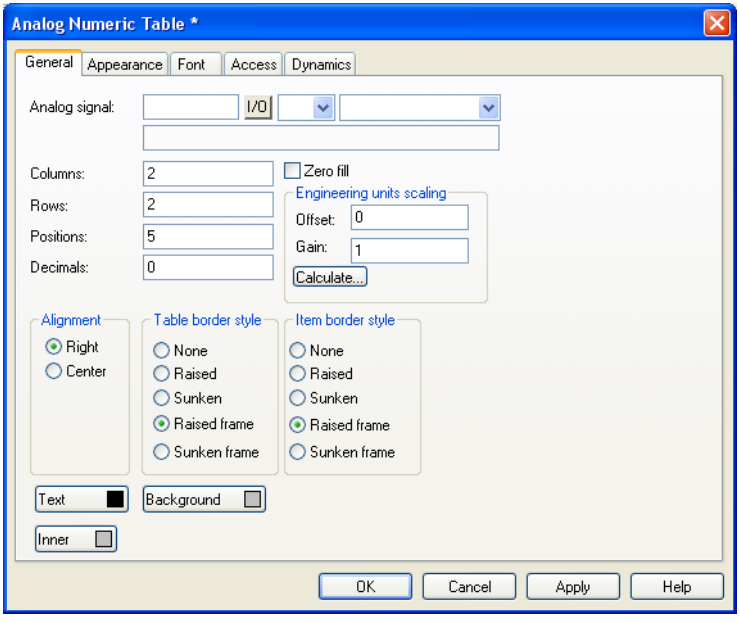
For further information, see the chapter *Message Library*.

Other tabs

The functions under **Appearance**, **Font** and **Dynamics** are described in the section *General parameters*.

Analog Numeric Table

The **Analog numeric table** object is used to create a table of analog numeric objects.



General

Parameter	Description
Analog signal	The first signal to be presented in the table. Only 16-bit registers are supported.
Columns	The number of columns in the table.
Zero fill	Select whether zeros are to be written in empty positions.
Rows	The number of rows in the table.
Positions	The number of positions the entered value should be given.
Decimals	The number of decimals the entered value should be given.
Alignment	Select whether the input field is to be right-aligned or centered.
Table border style	Select whether a frame is to be drawn around the table.
Item border style	Select whether a frame is to be drawn around each separate cell in the table.
Text	The color of the text.
Background	The background color of the analog numeric table.

Parameter	Description
Inner	The inner color of the analog numeric table.
Engineering units scaling	Used to scale register values. See the section *General parameters*.

Access

The input direction of the table is specified under **Access**. The signals in the table are calculated according to the given direction.

Other tabs

The functions under **Appearance**, **Font** and **Dynamics** are described in the section *General parameters*.

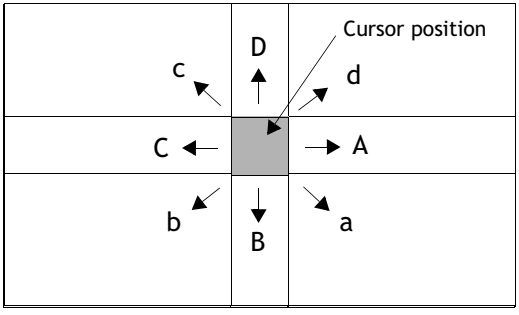
Note:
The minimum and maximum value are only used when the object is maneuverable.

4.3 Maneuvering graphic blocks using the key pad

Step between the maneuverable objects with the arrow keys. Selected objects are highlighted with a blinking frame.

Select maneuverable objects

The arrow keys are used to jump between maneuverable objects. Objects are selected according to the following principle: The position of the cursor is assumed to be the centre of a cross. When pressing the right arrow, the first object found in area A according to the diagram below will be selected. If the system cannot find an object in the narrow field to the right it will search in area a. The down arrow searches in area B and b, the left arrow in area C and c, and the up arrow in area D and d.



Operate Digital objects

Digital objects; text, symbol and filled objects, switch status when [ENTER] is pressed. If the **Increment** and **Decrement** functions have been linked to function keys, the signal linked to the object with these function keys will be set to one or reset.

Operate Analog objects

The ASCII object

Move the cursor to the object and press [ENTER]. Enter the required text and finish with [ENTER].

The Message object

Place the cursor on the object and press [ENTER]. A list of options will now be shown with all maneuverable statuses. Stepping to the required status and pressing [ENTER] will set the analog signal linked to the object to this status.

The Multiple choice object

Place the cursor on the object and press [ENTER]. A list of options will now be shown with all maneuverable statuses. Stepping to the required status and pressing [ENTER] will set the analog signal linked to the object to this status.

The Analog numeric object

Enter the value and press [ENTER] to maneuver numeric objects. If the value entered is too high or too low, the indicated maximum or minimum values for the object will be shown. This information is also shown if pressing [ENTER] when the object is maneuverable.

The Analog numerical table object

Pressing [ENTER] when the table object is selected will select the first cell in the table. Use the arrow keys to move the cursor between cells. Change the value for the marked cell and press [ENTER].

The Slide object

The object is maneuvered with the arrow keys by placing the cursor on the object and pressing [ENTER]. The value can now be increased or decreased with the arrow keys. Finish with [ENTER]. The value is increased/decreased with the number corresponding to the Scale ticks in the object. Finish with [ENTER].

The object can also be maneuvered with the functions **Increment** and **Decrement**, on the assumption that they are linked to the function keys, see the chapter *Function Keys*.

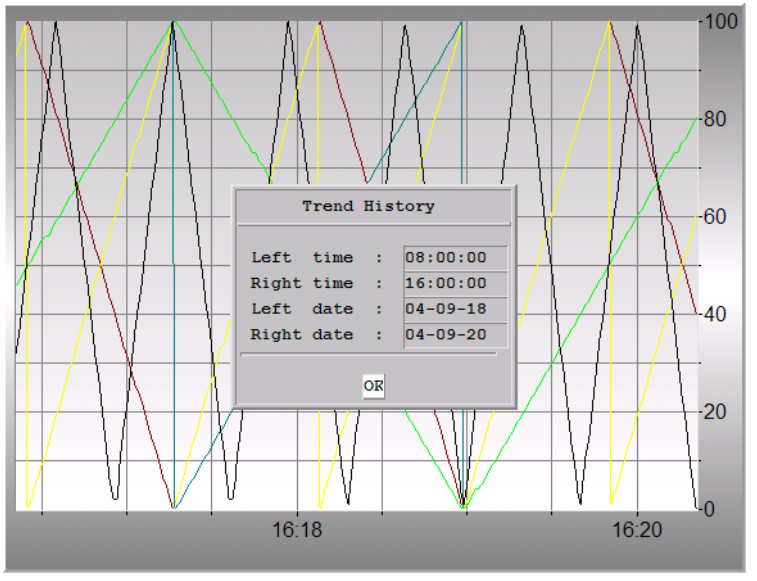
The Bar Graph object

The min/max indicators for bar graphs can be set to the current value (reset) by pressing [ENTER] when the cursor is placed on the object.

For operator terminals with touch screens the min/max indicators are reset when pointing at the bar graph.

The Trend object

Trend curves can show historical data when the operator terminal is running. Mark the appropriate trend object and press [ENTER]. A dialog box will now be shown, where the time interval and date for the data to be presented can be selected. At the bottom of the box, ”History” is shown. To return to real-time display, press [ENTER] again. Trend data is stored in files, the names of which are indicated when the trend objects are defined.



Other objects

The Digital clock

The digital clock (real-time clock) is changed by marking the object and typing the correct time. Finish with [ENTER].

The Jump object

Mark the object and press [ENTER].

4.4 Maneuvering objects using the touch screen

Operator terminals with touch screens do not have a built-in keyboard. All maneuvering is done with the touch screen by pressing distinctly with a finger for more than 30 ms. Because of the screen's sensitivity you should only press one point on the display at once. If you press two points at the same time the display will interpret this as a point midway between the two points.

Note:
Pressing an object that is not maneuverable displays the text *Not maneuverable*.
Pressing an object that is password-protected displays the text *Access denied*.

Digital objects

Digital objects; text, symbol and filled objects, switch status when pressing them with a finger.

Analog objects

The ASCII object

Press on the object to display an alphanumeric keyboard on the display. Enter a text by using this keyboard, and finish with [ENTER].

The Multiple choice object

Press on the object to display a list of options. Select an object by touching it.

The Analog numeric object

Press on the object to display a numeric keyboard. Enter a value by using this keyboard, and finish with [ENTER].

The Analog numerical table object

Press on a cell in the table object to display a numeric keyboard. Enter a value by using this keyboard, and finish with [ENTER].

The Slider object

The object is maneuvered by pressing on the button in the object and dragging it.

The Bar graph object

The min./max. indicators can be reset by pressing on the bar graph.

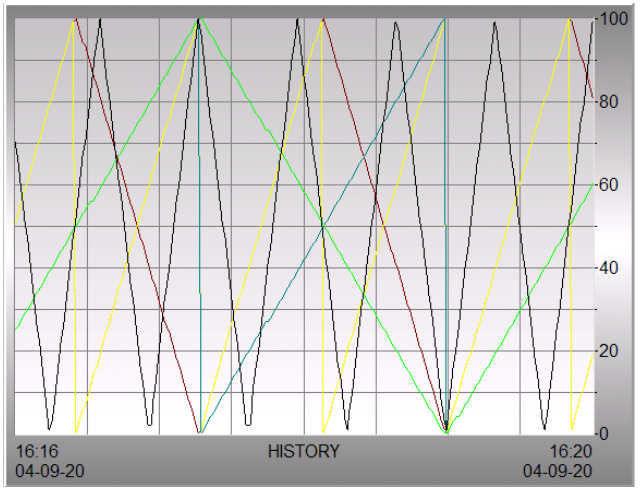
The Trend object

Trend curves can show historical data when the operator terminal is running. A row of buttons is shown under the trend when pressing the object.

Double arrowMoves the trend one time interval sideways.
Single arrowMoves the trend 1/4 time interval sideways.

- \- Zooms up the trend.
- \+ Zooms down the trend.
- ^ Returns to the default setting.

Return to real-time display by pressing the object again.



Other objects

The Digital clock object

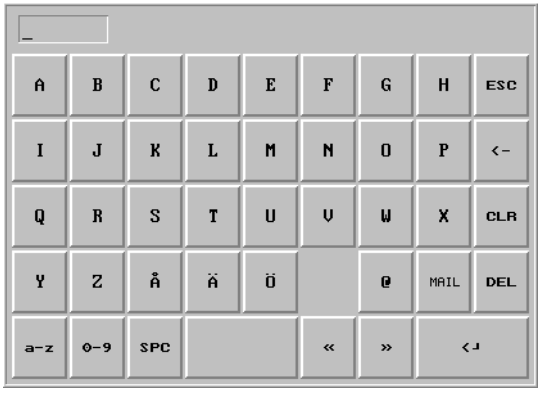
A numeric keyboard is shown when pressing the object. Enter the time by using this keyboard, and finish with [ENTER].

The Jump object

Touch the object to perform the jump.

The alphanumeric keyboard

The alphanumeric keyboard is shown when an ASCII object is maneuvered, for example.



The alphanumeric keyboard.

Key	Description
A-Ö	Used to enter required text.
ESC	Closes down the keyboard and returns to previous level.
←	Deletes a character to the left.
CLR	Deletes all written characters.
@	Used to enter the @ character.
MAIL	Opens a list with e-mail addresses.
DEL	Deletes the character the cursor is placed on.
↵	Confirms the properties made and closes the keyboard.
»	Moves the cursor to the right.
«	Moves the cursor to the left.
a-z	Alternates between upper and lower case letters.
0-9	Alternates between letters, numbers and special characters.
SPC	Opens a selectable list of special characters.

A numeric keyboard is displayed when a numeric object is maneuvered, for example.

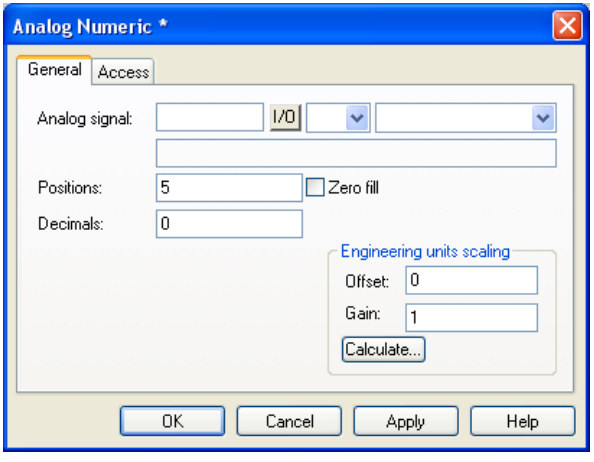
5 Text-based Presentation for Printouts and Reports

Text blocks are only used for printouts and reports, and cannot be displayed in the E1000-series operator terminals. Text-based presentation is used to create different types of report printouts and e-mail. These can be daily reports or status reports etc. Reports are built up of text blocks, which can contain both static and dynamic text. For examples of what a report can look like, please see the chapter *Printouts from the operator terminal*. This chapter presents text objects in table form. Every object is then described separately.

5.1 General parameters

The **Properties** dialog for the selected object is displayed by double-clicking on the object on the working area.

The properties vary for the different objects and are described for each object.



Scaling

The scaling function is available for several text objects.

The parameters **Offset** and **Gain** are used to change the scale of the controller value to a value shown in accordance with the following equation.

Panel value = Offset+Gain*Register value

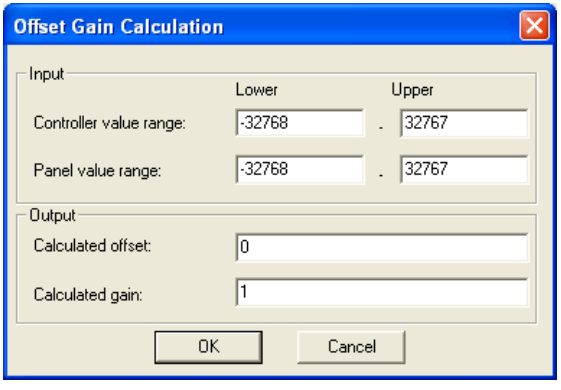
When the value for an object is changed from the operator terminal, the scale is changed to the value shown in accordance with the following equation.

RegisterValue = (PanelValue-Offset)/Gain

Scaling does not affect the defined maximum and minimum values, or the number of decimal places.

Offset Gain Calculation

The function **Offset Gain** calculation is a tool to calculate the offset and gain parameters. Specify the value of **Offset** and **Gain** under the **General** tab for the object and click on **Calculation**. The following dialog is now shown.



Enter the range for the controller value and panel value. The correct values for the parameters **Offset** and **Gain** are calculated.

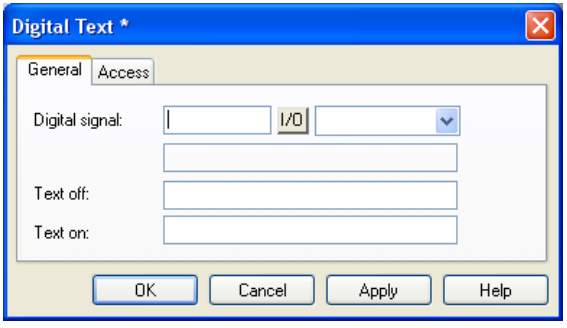
5.2 Text objects

Dynamic text objects

Symbol	Object	Description
	*Digital Text*	Switches between two texts depending on the status of a digital signal.
	*Multiple Choice*	Links to a data register, which can assume eight different states. A text of up to 30 characters can be linked to each state.
	*Analog Numeric*	Input and presentation of values in numeric form.
	*Bar Graph*	Presents values in the form of a bar graph.
	*ASCII*	Handles ASCII strings.
	*Date and Time*	Setting of date and time.
	*Message*	Shows texts from a message library.

Digital Text

The **Digital text** object is used to switch between two texts, of a maximum of 30 characters, depending on the status of a digital signal.

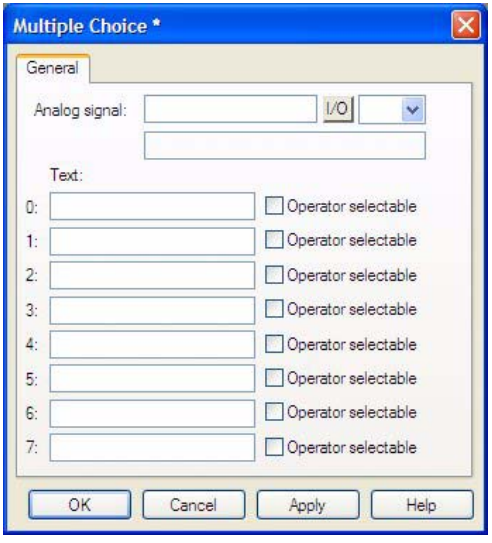


General

Parameter	Description
Digital signal	The address of the digital signal.
Text off	The text to be shown when the signal is 0.
Text on	The text to be shown when the signal is 1.

Multiple Choice

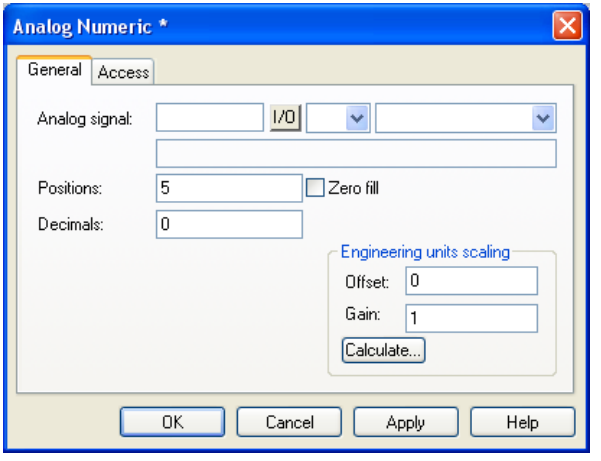
The **Multiple choice** object can show one of up to eight different texts, depending on the value in a data register. The texts can contain a maximum of 30 characters.



Parameter	Description
Analog signal	The data register which determines which text is to be shown. If the register contains the value 1, text 1 will be shown etc.
Text 0-7	Type a text to show for each register value. Selecting **Operator selectable** makes the object maneuverable for the operator.
Operator selectable 0-7	When checked, the operator can select this text when the operator terminal is running.

03 Analog Numeric

The **Analog numeric** object is used to create an input field and present values in numeric form.

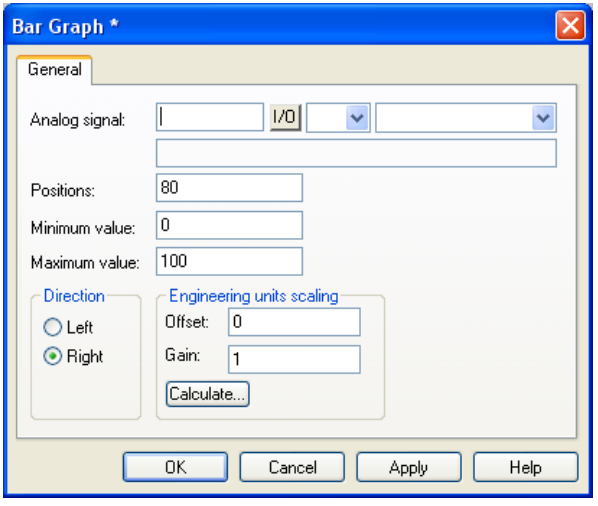


General

Parameter	Description
Analog signal	The address of the signal.
Positions	The number of positions the entered value should be given, including comma and minus characters.
Zero fill	Select whether zeros are to be written in empty positions.
Decimals	The number of decimals the object is to be presented with.
Engineering units scaling	Used to scale register value. See the section *General parameters*.

Bar Graph

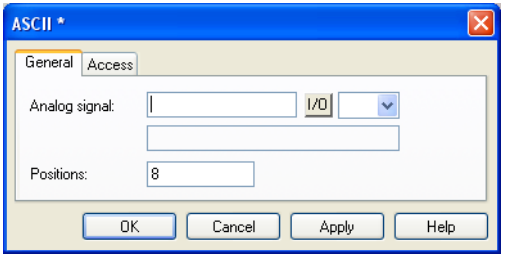
The **Bar graph** object presents whole or decimal numbers in the form of a bar graph. The bar will be shown horizontally so that the maximum number of positions are marked when the value has assumed its maximum level.



Parameter	Description
Analog signal	The address of the signal.
Positions	The number of positions the signal uses.
Minimum value	The minimum value for the object.
Maximum value	The maximum value for the object.
Direction	Select whether the bar is to be presented to the right or left.
Engineering units scaling	Used to scale the register value. See the section *General parameters*.

ABC ASCII

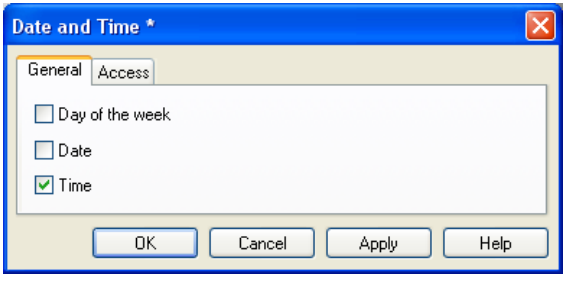
The ASCII object handles ASCII strings. It is possible to present texts stored in the controller's data register. The texts should be in IBM extended ASCII format. The texts can be changed from the operator terminal by opening and closing the input field with [ENTER].



Parameter	Description
Analog signal	The register where the text for the first position is stored.
Positions	Each register contains two characters (assumes two positions). The default setting is 8 positions, which corresponds to four registers.

8:05 Date and Time

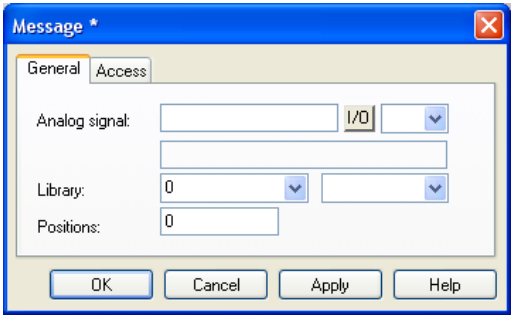
The Date and time object can be used to present at digital clock, day of the week and date. The Date and time collects data from the real-time clock in the operator terminal or the controller.



Parameter	Description
Day of the week	Select whether the day of the week is to be shown. Requires two positions.
Date	Select whether the date is to be shown. Use the format set under **Date/Time Format** in the **Setup** menu.
Time	Select whether the time is to be shown. Use the format set under **Date/Time Format** in the **Setup** menu.

Message

The **Message** object presents texts from message libraries.



Parameter	Description
Analog signal	Analog signal that controls which text selected from message libraries is to be shown.
Library	The number or name of the required message library. Defined under **Functions/Message Library**.
Positions	The number of positions the text is to be presented with. 0 = automatic adjusting.

Note!
The number of positions should not be 0 when the function Library index register is used. See the section *Library index register*.

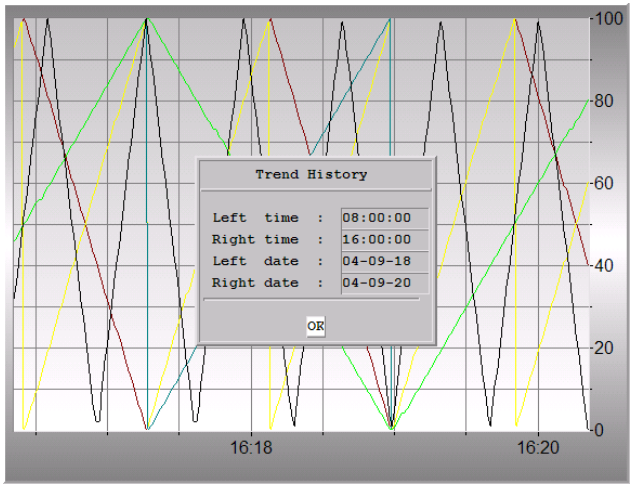
For further information, see the chapter *Message Library*.

6 Trends

This chapter describes the functions trends, real-time trends and historical trends. Trends are used to store data from the controller. There is no limitation regarding the number of trends in a project, it is only limited by the total operator terminal memory.

Presentation in the operator terminal

Trend curves can show historical data when the operator terminal is running. Mark the appropriate trend object and press [ENTER]. A dialog box will now be shown, where the time interval and date for the data to be presented can be selected. At the bottom of the box, ”History” is shown. To return to real-time display, press [ENTER] again. Trend data is stored in files, the name of which are indicated when the trend objects are defined.



6.1 Historical trend

These functions mean that analog values from the controller can be collected and presented in a trend object in the operator terminal. The presentation is in curve form. The collected values are stored in the operator terminal's project memory.

It is possible to define several independent trend curves in the same or different blocks. The number is limited by the size of the project memory and its degree of utilization.

The time interval between the collection of data and how many values are to be stored are defined in the trend object.

Calculation of trend size

It is possible to calculate how much space trend data will take up in the project memory with the following equation.

*S = TOS + AK (28 + (645 * ((AS / 100) + 1)))*

TOS = TrendObjectSize; if all parameters for a trend object are changed, TOS = 320 bytes.

AK = Number of defined curves in the trend object.

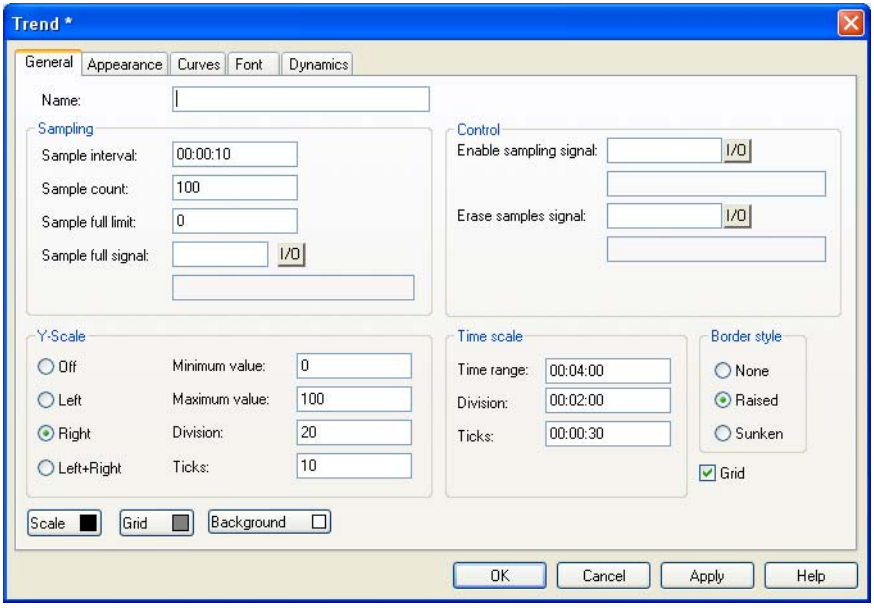
AS = Number of Samples rounded-off to the nearest hundred.

S = Number of bytes.

The data types signed and unsigned 32-bit are supported in trend objects, but trend curves in 32-bit format take up more memory than curves in 16-bit format.

6.2 Defining trend objects

Trend objects are defined as other dynamic objects in a block. The object can be linked to up to six analog signals. As opposed to other objects, the trend object must be named with a name of 1-8 characters. The first character must be a letter or a number. Trend names may contain the characters A-Z, 0-9 and _. Otherwise, the standard for file names in MS-DOS is followed. The following parameters are defined for trend objects. Double-clicking **Setup of terminal options** in the **Setup** folder in the Project Manager allows selecting whether trends are to be stored when changed, or if all samples are to be stored. For further information, see the section *Terminal Options*.

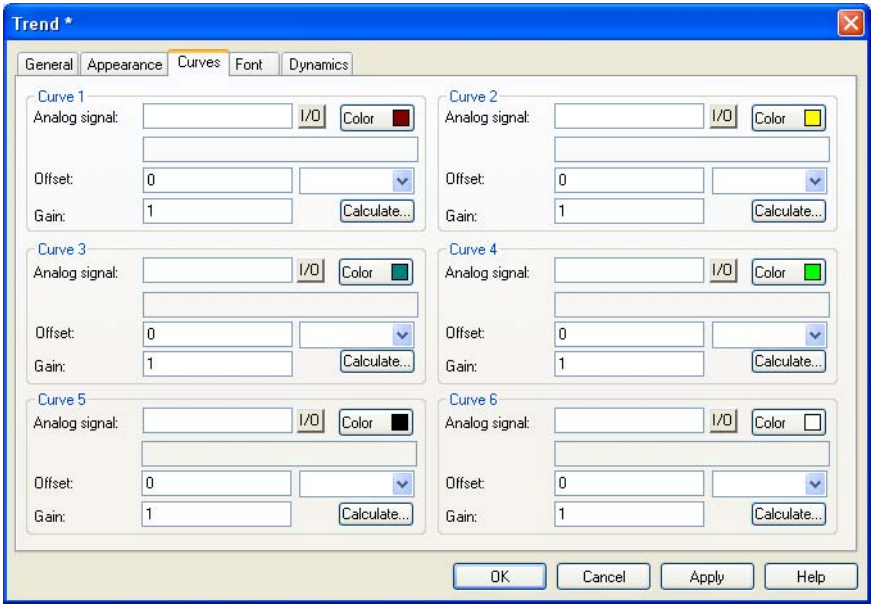


General

Parameter	Description
Name	The name of the trend object (mandatory parameter). The name must be unique for each object, with a maximum of 8 characters. Only the characters A-Z, 0-9 and _.
Sample interval	The interval in time between the collection of data. The minimum value is 1 second.
Sample count	The number of values to be stored. The maximum number of values is 65,534.
Sample full limit	The number of samples when **Sample full signal** is to be set to 1.

Parameter	Description
Sample full signal	A digital signal which is set to 1 when the number of samples indicated under **Sample full limit** is reached.
Enable sampling signal	A digital signal which, when it is set to 1, starts collecting data. If the signal is reset, the collecting stops. The parameter is optional.
Erase samples signal	A digital signal which, when it is set to 1, deletes all historical trend data.
Y-scale	Select whether the Y-scale is to be invisible, seen to the left, the right, or both.
Minimum value	The minimum value that is displayed in the trend object.
Maximum value	The maximum value that is displayed in the trend object.
Division	How the scale on the Y-axis is to be divided.
Ticks	The interval between scale ticks.
Time scale	The time scale to be shown in the trend diagram.
Division	How the scale on the X-axis is to be divided.
Ticks	The interval between scale ticks.
Border style	Select whether a frame is to be drawn around the object.
Grid	Select whether a grid is to be shown in the object.
Scale	The color of the scale.
Grid	The color of the grid.
Background	The background color of the trend object.

Curves



Parameter	Description
Analog signal	The analog signals which the object is to collect and present the values of.
Color	The color of each curve.
Offset and Gain	Used to scale the register value. See the section *General parameters*.

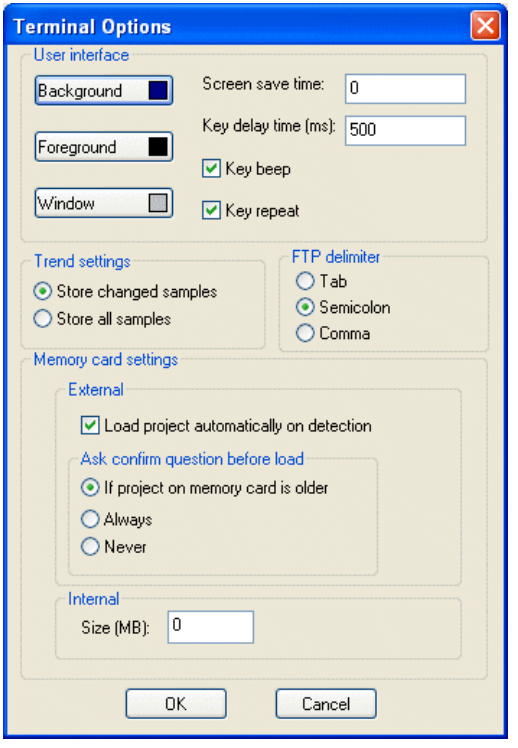
Other tabs

The functions under **Appearance**, **Font**, **Access** and **Dynamics** are described in the section *General parameters*.

Note:
If a block containing a trend object is copied, the name of the trend object must be changed. Two trend objects cannot have the same name.

Trend Settings

Select **Setup/Terminal Options** to make the general settings for all trends.



Store changed samples

Select to only store samples in trends if the value has been changed since the last sample.

Store all samples

Select to store all samples in trends even if the value has not been changed since the last sample. The parameters are valid in general for all defined trends.

6.3 Transfer of trend data

With the program HMI Tools File Transfer (icon in the program group HMI Tools) installed on the PC, it is possible for trend data, recipes and alarm lists to be transferred to/from the PC for statistical calculations and other types of presentation and storage.

It is also possible via FTP to transfer trend data, recipes, alarm lists, html files, operator terminal applets and bitmap images between an operator terminal and a PC. A FTP client program must be installed in the PC. In the program group HMI Tools there is a program, FTP Transfer, which functions as a standard FTP client.

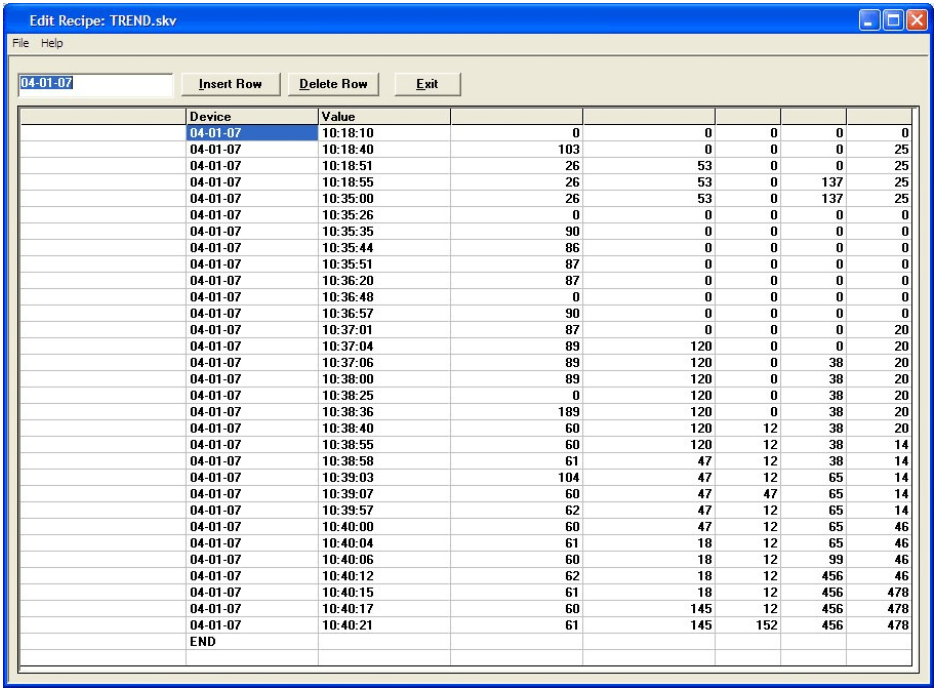
Trend files can be opened directly in Excel for statistical calculations. See separate manual for HMI Tools.

Trend files

The names of trend files are specified for each trend when the trend object is defined. Files will be allocated the extension .skv. The format for each line in the trend file is the following: DDDD;TTTT;AAAA;BBBB;CCCC;DDDD;EEEE;FFFF:

Format	Description
DDDD	Date format specified in Setup.
TTTT	Time format specified in Setup.
AAAA	Trend curve 1.
BBBB	Trend curve 2 (if defined).
CCCC	Trend curve 3 (if defined).
DDDD	Trend curve 4 (if defined).
EEEE	Trend curve 5 (if defined).
FFFF	Trend curve 6 (if defined).

The oldest value is shown on the first line in the file, and the most recent on the last line. The format .skv can be imported directly to Microsoft Excel. In Excel, the diagram manager can be used to create statistical diagrams. It is not possible to make changes in the file and then send it back to the operator terminal. The following diagram shows an example of how a trend can appear in Excel.

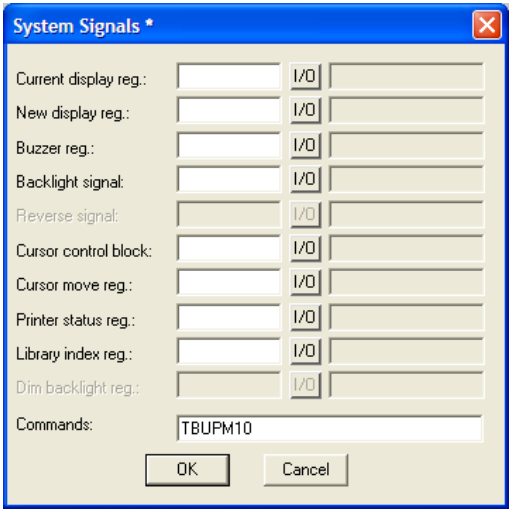


	Device	Value					
	04-01-07	10:18:10	0	0	0	0	0
	04-01-07	10:18:40	103	0	0	0	25
	04-01-07	10:18:51	26	53	0	0	25
	04-01-07	10:18:55	26	53	0	137	25
	04-01-07	10:35:00	26	53	0	137	25
	04-01-07	10:35:26	0	0	0	0	0
	04-01-07	10:35:35	90	0	0	0	0
	04-01-07	10:35:44	86	0	0	0	0
	04-01-07	10:35:51	87	0	0	0	0
	04-01-07	10:36:20	87	0	0	0	0
	04-01-07	10:36:48	0	0	0	0	0
	04-01-07	10:36:57	90	0	0	0	0
	04-01-07	10:37:01	87	0	0	0	20
	04-01-07	10:37:04	89	120	0	0	20
	04-01-07	10:37:06	89	120	0	38	20
	04-01-07	10:38:00	89	120	0	38	20
	04-01-07	10:38:25	0	120	0	38	20
	04-01-07	10:38:36	189	120	0	38	20
	04-01-07	10:38:40	60	120	12	38	20
	04-01-07	10:38:55	60	120	12	38	14
	04-01-07	10:38:58	61	47	12	38	14
	04-01-07	10:39:03	104	47	12	65	14
	04-01-07	10:39:07	60	47	47	65	14
	04-01-07	10:39:57	62	47	12	65	14
	04-01-07	10:40:00	60	47	12	65	46
	04-01-07	10:40:04	61	18	12	65	46
	04-01-07	10:40:06	60	18	12	99	46
	04-01-07	10:40:12	62	18	12	456	46
	04-01-07	10:40:15	61	18	12	456	478
	04-01-07	10:40:17	60	145	12	456	478
	04-01-07	10:40:21	61	145	152	456	478
	END						

6.4 Backup of trend data

It is possible to copy trend data files from the ordinary project memory in the operator terminal to an external memory card placed in the operator terminal. The memory card in the operator terminal must be formatted as a backup card. It can then be accessed in the operator terminal via FTP, or brought to an arbitrary operator terminal, to upload trend data via FTP transfer from the memory card to a PC for further processing. Trend files which have been backed-up can be found in the catalog (library) "backup" in the operator terminal's catalog structure. To read/write trend data files from/to the operator terminal to the PC, there must be a FTP client program installed on the PC e.g. HMI Tools FTP Transfer program.

Backup of trend files from the operator terminal's project memory to the external memory card placed in the operator terminal is done with the help of the command TBUP and a memory cell entered on the command line in the configuration tool. Double-click on **System Signals** under the **Setup** folder in the Project Manager.



TBUP	Trend Backup. Used for backup copy of trend files on external memory card.
TESOSn	Storage of one trend sample only when the signal **Activate** is set to 1. If **n=*,** all trend objects are affected. If **n=T,** only trend objects that begin with T are affected.
TMBx	Trend Multi Backup. Used together with the system command TBUP to create more backup libraries on the backup card (x is the number of libraries with backup files on the card. When the defined number is exceeded, the oldest library is replaced. Default value is 1).

Enter the command TBUP followed by a digital signal e.g. M10. The digital signal can now be connected to a function or touch key. When the digital signal is activated from the key, all trend files from the operator terminal's project memory will be backed-up on the external memory card. When the backup is ready, the operator terminal will reset the digital signal specified on the command line.

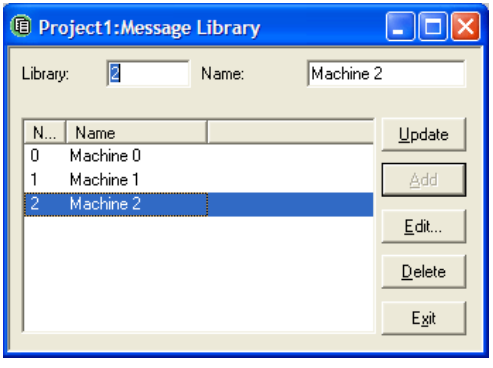
Note:
On an external memory card, only one version of a trend can be stored in each library. If a trend which already exists on the memory card is backed up, the trend will be deleted and replaced by the new trend. Create more libraries with the command TMBx.

---

7 Message Library

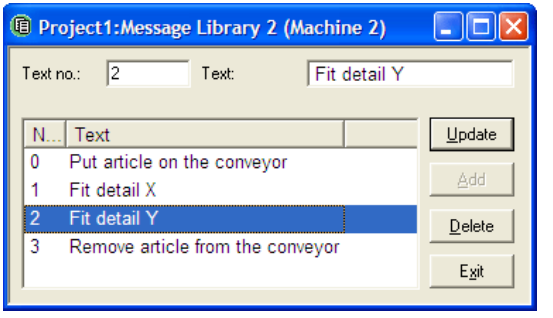
With the message library function, text tables can be created, where values between 0 and 65,535 are linked to texts. The message library function can be used for presentation of each sequence step in sequence control. Another possible application is to present error codes. An analog signal generates error codes connected to texts in a text library. This function can also be used to give analog values specific values, depending on the selected texts.

The message library is one of several text tables, each containing up to 512 text strings. Each text string can be 40 characters long. The function is activated by double-clicking **Message Library** in the Project Manager.



Parameter	Description
Library	Specify a number for the message library.
Name	Specify a name for the message library.

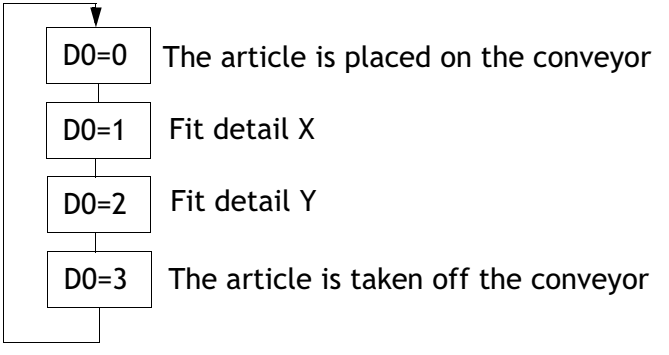
A message library is edited by selecting a library and clicking **Edit**. Several editing windows can be displayed at the same time.



Parameter	Description
Text no.	Specify a number for the text, 0 - 65,535.
Text	The text presented when the current signal assumes the text number for the text.

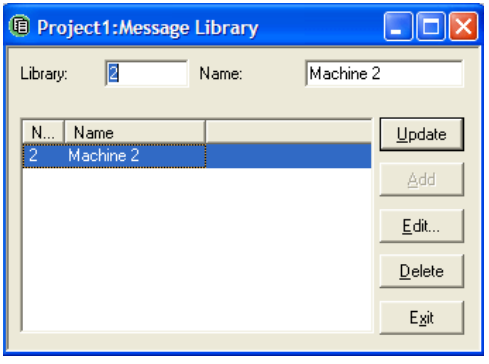
Example

The following example, with a sequence control where each step in the sequence is to be presented by a text, illustrates how the message library function can be used.



Start by creating a message library called Machine 2.

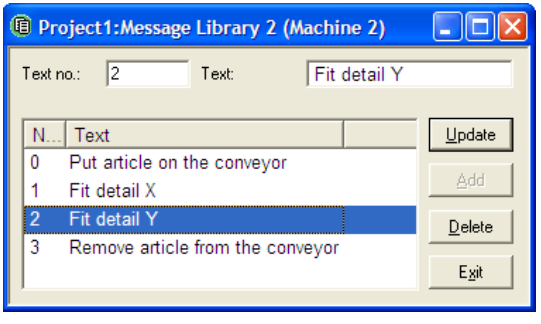
1. Double-click on **Message Library** in the Project Manager.
2. Specify a number for the library, in this case **2**; and a name for the library, in this case **Machine 2**.
3. Click on **Add**.



A message library called Machine 2 is now created. The next step is to define the different texts in the library.

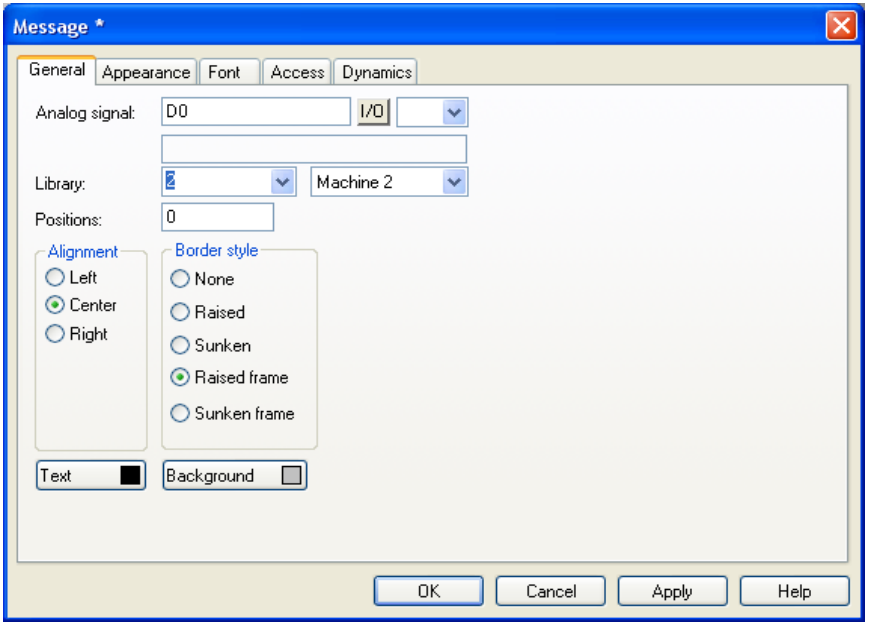
4. Select the library and click **Edit**.

In this dialog, the parameters **Text number** and **Text** are defined. **Text number** is the value of the analog signal linked to the message object, and **Text** is the text shown in the message object.



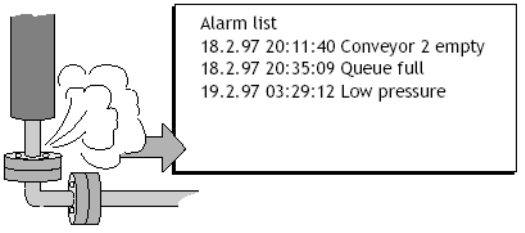
After finishing the configuration of the message library, a message object in the application is to be created. The message object can be created in both text blocks and graphic blocks.

5. Select the **Message** object from the Objects Toolbar, and click on the working area.
6. Specify the analog signal that is to control which text is to be displayed.
7. In the field **Library**, select the message library from which the texts are to be collected.
8. Select whether the object is to be maneuverable, and between which texts it can be switched during maneuvering, under the **Access** tab.



8 Alarm Management

This chapter describes the alarm management, a function that is used to call the operator's attention to events in the process requiring immediate action. Alarms can be divided into groups to create an order of priority, alarm texts can display texts and dynamic data in the alarm list, and the object Alarm Banner can call the attention to an alarm in any block in the application.

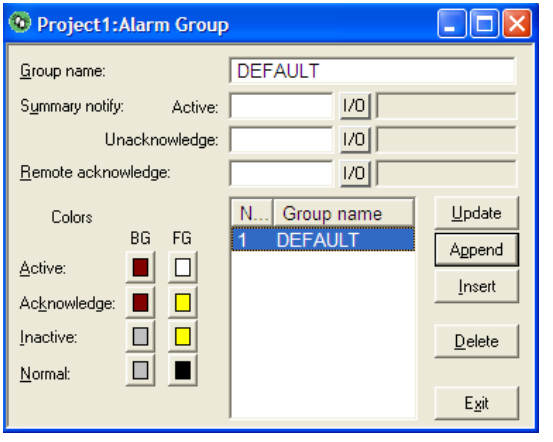


8.1 Alarm groups

In the operator terminal alarms can be divided into different groups, for example to indicate the priority of the alarms. Depending on the selected character size, up to 16 groups can be created. Each group can be allocated different color attributes. Alarms can be sorted in group order in the alarm block. It is not necessary to define alarm groups.

Defining alarm groups

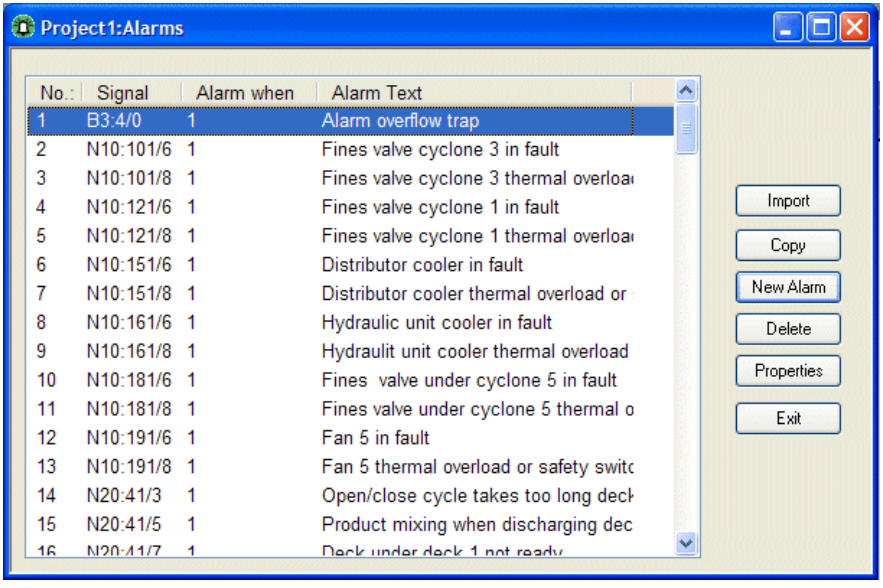
Alarm groups can be defined under **Alarm groups** in the **Alarms** folder in the Project Manager. The attributes for the alarms in the group are determined in the following dialog box.



Parameter	Description
Group name	An optional name for the alarm group.
Summary notify	**Active** - Digital signal which is set to one when there are active alarms in the group. **Unacknowledge** - Digital signal which is set to one when there are unacknowledged alarms in the group. **Remote acknowledge** - Digital signal which when it is set to one acknowledges all alarms in the group simultaneously.
Colors	Indicates colors for active, acknowledged, inactive alarms, and for the normal status of the alarm.

8.2 Alarms

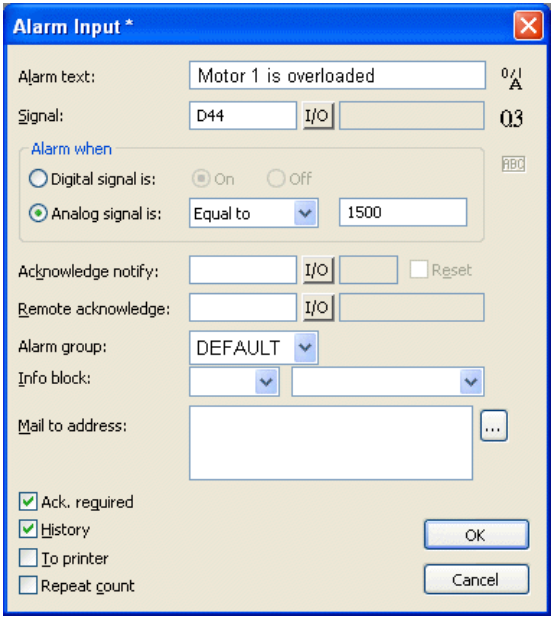
Alarms are defined under **Alarms** in the **Alarms folder** in the **Project Manager**.



Button	Description
Import	See the section *Alarm import*.
Copy	Copy the alarm.
New Alarm	Define new alarm.
Delete	Delete alarm.
Properties	Shows the individual alarm's properties.

Defining alarms

A new alarm is defined by clicking **New Alarm** in the **Alarms dialog**. A maximum of 300 alarms is recommended.



Parameter	Description
Alarm text	An optional alarm text that will be shown in the alarms page. Maximum 78 characters in total. Can contain the objects: **Digital Text** Switches between two texts depending on the status of a digital signal. **Analog Numeric** Presentation of values in numeric form.
Signal	The signal (digital or analog) which when it assumes the specified status generates the alarm.

Parameter	Description
Alarm when	**Digital signal is: On/Off** - Select **On** if a signal set to one is to generate an alarm, and select **Off** if a reset signal is to generate an alarm. **Analog signal is: Equal to** - An alarm is generated when the value of the given analog alarm signal is equal to the value specified in the subsequent field. **Not equal to** - An alarm signal is generated when the given value of the analog alarm signal is not equal to the value specified in the subsequent field. **Less than** - An alarm signal is generated when the given value of the analog alarm signal is less than the value specified in the subsequent field. **Greater than** - An alarm signal is generated when the given value of the analog alarm signal is greater than the value specified in the subsequent field.
Acknowledge notify	Digital signal activated when the alarm is acknowledged. The signal is normally set to one.
Reset	If the **Reset** box is checked, the above signal will be reset when the alarm is acknowledged.
Remote acknowledge	Digital signal which acknowledges the alarm when it is activated.
Alarm group	Indicates the alarm group for the definition (the alarm).
Info block	A block number or block name for a text or graphic block can be stated here. This makes it possible to display a "help page" to the operator with, for example, information about the alarm and requisite procedures. If the field is left empty this means that no block is linked to the alarm. See the section *Alarms in the operator terminal* and SMTP client.
Mail to address	Alarms can be sent as e-mail messages to pre-defined recipients. The alarm text will then be the subject of the message. See the sections *Alarm Properties* and *SMTP client*.
Ack. required	Indicates whether the alarm is to be acknowledged or not. Checking the box means that the alarm must be acknowledged, leaving it unchecked means that the alarm functions as an event alarm, e.g. information.
History	When the alarm is to be removed from the alarm list. Checking the box means that the alarm will remain in the list until the list is full. Leaving it unchecked means that the alarm will be removed from the list when it is acknowledged and no longer active. If the box **Ack. required** is not checked, the alarm will be removed from the list as soon as it is no longer active.
To printer	Checking the box prints the alarm message directly on the printer if the alarm status changes.

Parameter	Description
Repeat count	If the box is checked, a counter for the alarm in the alarm list will be shown, that counts the number of times the alarm has been generated. The alarm must be acknowledged for it to be presented as a new alarm message in the alarm list.

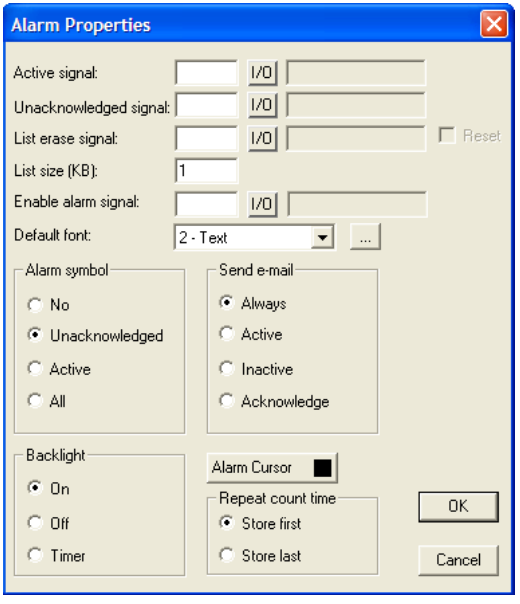
Note!
The value defined for an analog alarm signal cannot be controlled from a register. An alarm is logged on a fixed value, logging on intervals is not supported. Only 16-bit values are supported.

8.3 Alarm Properties

Right-click on the **Alarms** folder in the Project Manager and select **Properties** to make general settings alarms and alarm lists. Alarms take up a different amount of space in the alarm list, depending on the length of the alarm text and the number of objects included. The space an alarm takes up can be calculated with the following formula:

S = 42 + NC

S = Number of bytes
NC = Number of characters in the alarm text



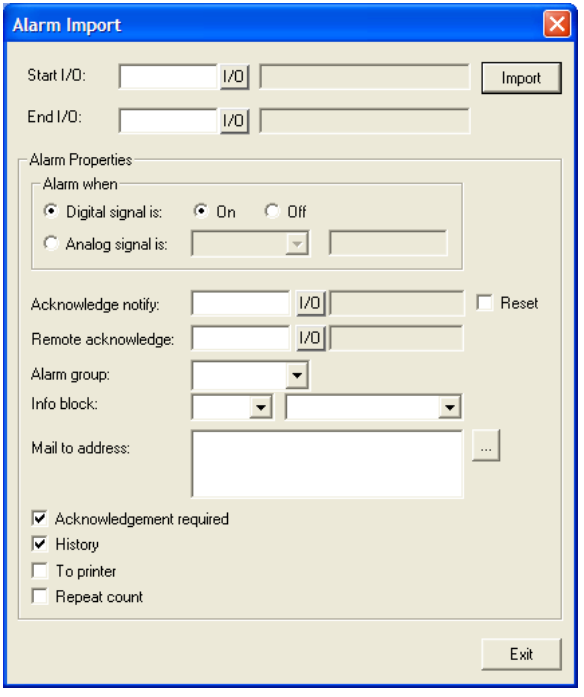
The alarm list is re-written when it is full. 25% is deleted, so that only 75% remains. Example: An alarm text of 38 characters, where each alarm takes up 80 bytes in the alarm list, resulting in 1024 (list size =1 kbytes)/80 → Max. 12 alarms in the alarm list. When the 13th alarm is generated the alarm list will be re-written and only the last 9 alarms will remain in the list.

Parameter	Description
Active signal	The digital signal the operator terminal sets to one when there is an active alarm.
Unacknowl-edged signal	The digital signal the operator terminal sets to one when there is an unac-knowledged alarm.
List erase signal	A digital signal which, when set to one, deletes non-active alarms in the list.

Parameter	Description
Reset	Checking the box resets the signal given in the **List erase signal** field when the alarm list is deleted.
List size	The list size in kB. Note that when the system allocates memory equal to that which is specified for **List size**, the actual size of the alarm list is twice the indicated size. The performance of the project is adversely affected if the list size is over 10 kB.
Enable alarm signal	A digital signal which, when set to one, activates alarm handling in the operator terminal. This parameter makes it possible to switch on/off alarm handling in the operator terminal. The parameter should not be used if alarm handling is to be active all the time.
Default font size	The default font size in the alarm list. The default font size in the alarm list is always shown after restart or start-up, and after switching between operation modes.
Alarm symbol	When the alarm symbol is to be shown. In text blocks ■ALARM■ is shown, and in graphic blocks a bell is shown in the top right-hand corner of the display. **No** means that the alarm symbol is never shown. **Unacknowledged** means that the alarm symbol is shown when there are unacknowledged alarms in the alarm list. **Active** means that the alarm symbol is shown when there are active alarms in the alarm list. **All** means that the alarm symbol is shown when there are active and/or unacknowledged alarms in the alarm list.
Send e-mail	When alarms are to be sent as e-mail messages. **Always** means that an e-mail message is always sent when the status of the alarm changes. **Active** means that an e-mail message is sent when the alarm is activated. **Inactive** means that an e-mail message is sent when the alarm is inactivated. **Acknowledge** means that an e-mail message is sent when the alarm is acknowledged.
Backlight	If the background light is to be affected during an alarm. On means that the light is switched on when the alarm symbol is shown (default setting). Off means that the background light is not affected by alarms. Timer means that the light is switched on when a new alarm is activated, and switched off when the time for the screensaver has run out.
Alarm Cursor	The color of the cursor in the alarm list.
Repeat Count Time	**Store first** means that when the alarm is acknowledged the time for the first activated alarm will be stored in the alarm list. **Store last** means that when the alarm is acknowledged the time for the last activated alarm will be stored in the alarm list.

8.4 Alarm import

It is possible to import alarm texts from name lists (generated from the configuration tool for the controller). The project in the configuration tool must be linked to a name list before alarm importing can be carried out. Select the relevant name list under **View/Name List**. Then double-click on the **Alarms** folder in the Project Manager, and click on the button **Import** to define the alarm import.



Start I/O

State the address for the first I/O of the import from the name file. The start I/O can be an analog or a digital signal.

End I/O

State the address for end of the import from the name file. The end I/O has to be of the same type as the start I/O.

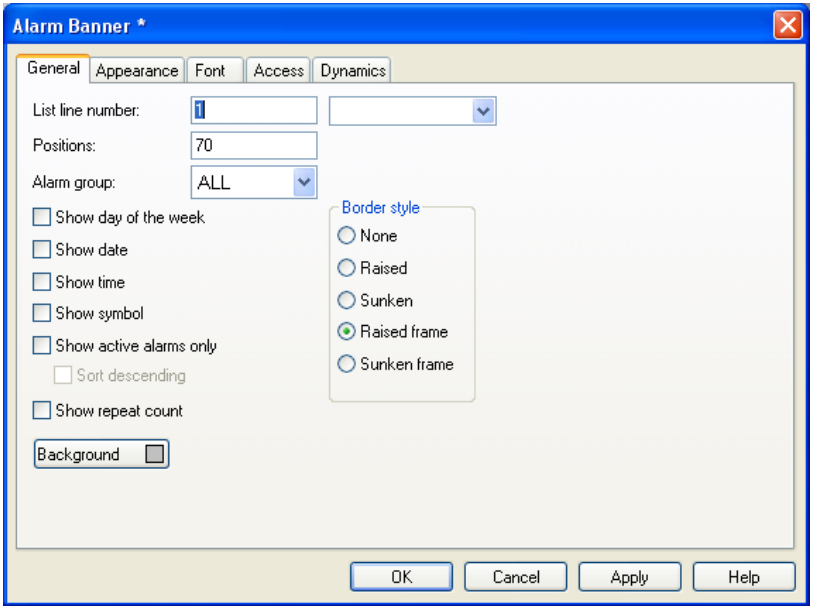
Alarm properties

All alarms imported (start I/O to end I/O) when clicking on the button **Import** will have the same properties corresponding to the properties defined under **Alarm Properties**. For a description of the parameters, please see the section *Alarms*.

The parameters, signal type, analog or digital and alarm group must be specified before an alarm import can be made.

8.5 Alarm Banner

The **Alarm Banner** object displays a line from the alarm list.



General

Parameter	Description
List line number	The number of the line in the alarm list which the information is to be collected from (1 = first line, 2 = second line, etc.) if the indicated alarm group is shown in the alarm list.
Positions	The number of positions to be shown. Maximum total length (date, time and alarm text) is 101 characters.
Alarm group	Which alarm group to be shown in the alarm banner. The alarm banner will be shown in the color specified for the alarm group.
Show day of the week	Select whether the weekday is to be shown in the alarm banner.
Show date	Select whether the date is to be shown in the alarm banner.
Show time	Select whether the time is to be shown in the alarm banner.
Show symbol	Select whether alarm symbols are to be shown in the alarm banner.

Parameter	Description
Show active alarms only	Select whether only active alarms are to be shown on the alarm banner. If no alarm is active the alarm banner will be empty. The alarm must be inactive, not acknowledged, before the next alarm can be shown in the alarm banner.
Sort descending	Displays active alarms descending, i.e. the latest active alarm is displayed. Only available if **Show Active alarms only** is selected.
Show repeat count	How many times the alarm has been repeated.
Border style	Select whether a frame is to be drawn around the alarm banner.
Background	The background color of the alarm banner.

Note:
An alarm can be acknowledged in the alarm banner by selecting the box **Enable acknowledge** under **Access**.

Note:
The foreground color of the alarm text is determined by the alarm group definition.

Other tabs

The functions under **Appearance**, **Font**, **Access** and **Dynamics** are described in the section *General parameters*.

8.6 Alarms in the operator terminal

In graphic blocks a bell flashes in the upper-right corner of the display when an alarm is activated. Indication can be deselected by right-clicking the **Alarms** folder and selecting **Properties** in the Project Manager.

Alarms are presented in an alarm list with predefined alarm texts. The alarm list contains the latest alarms and is arranged in alarm group order according to definition, so that the latest alarms are shown at the top of the list. The list can also be sorted descending. See section *Alarm Banner* for further information. The size of the alarm list is determined by right-clicking the **Alarms** folder and selecting **Properties** in the Project Manager. If there is a jump to an alarm block (system block no. 990), the alarm list will be shown.

The number of times the alarm has been generated (if selected), the status of the alarm, the time it was activated, became inactive or was acknowledged, is shown for every alarm, depending on the chosen display format.

The counter for the alarm in the alarm list is displayed according the following table, provided that the box **Repeat count** is checked for the alarm in the Alarms dialog.

Display format	Explanation
(12)	Means that the alarm has been generated 12 times. The alarm must be acknowledged for it to be presented as a new alarm message in the alarm list.
>999)	Means that the alarm has been generated more than 999 times without being acknowledged. The counter counts to a maximum of 999 alarms.

Alarms can assume the following statuses.

Symbol	Status
*	Active, Unacknowledged
$	Inactive, Unacknowledged
-	Active, Acknowledged
<blank>	Inactive, Acknowledged

Alarm times can be shown in the following format.

Display format	Explanation
S	The time when the alarm was activated. The time the alarm was first activated is shown for repeated alarms.
E	The time when the alarm was inactivated. The time the alarm was last inactive is shown for repeated alarms.
A	The time when the alarm was acknowledged.

The alarm block can be accessed either by defining a jump to system block 990 in a block, by pressing [LIST], or by allowing the controller to present the list through a Display signal for block 990.

An alarm can be acknowledged by placing the cursor on the line with the alarm and clicking [ACK], by pointing at the alarm symbol or by acknowledging it with a function key. If a printer is connected, alarms can be printed out as they occur, or as their status changes. This is specified when the alarm is defined. Alarms will be printed with the number of events, date, time, status, and alarm text.

Historical inactive acknowledged alarms can be deleted by pressing [←] (BACK SPACE). By entering the command DD on the command line, available by double-clicking **System Signals** in the **Setup** folder in the Project Manager, the function will be disabled.

Return to the previous block by pressing [PREV] or pointing to [ESC] on the operator terminal.

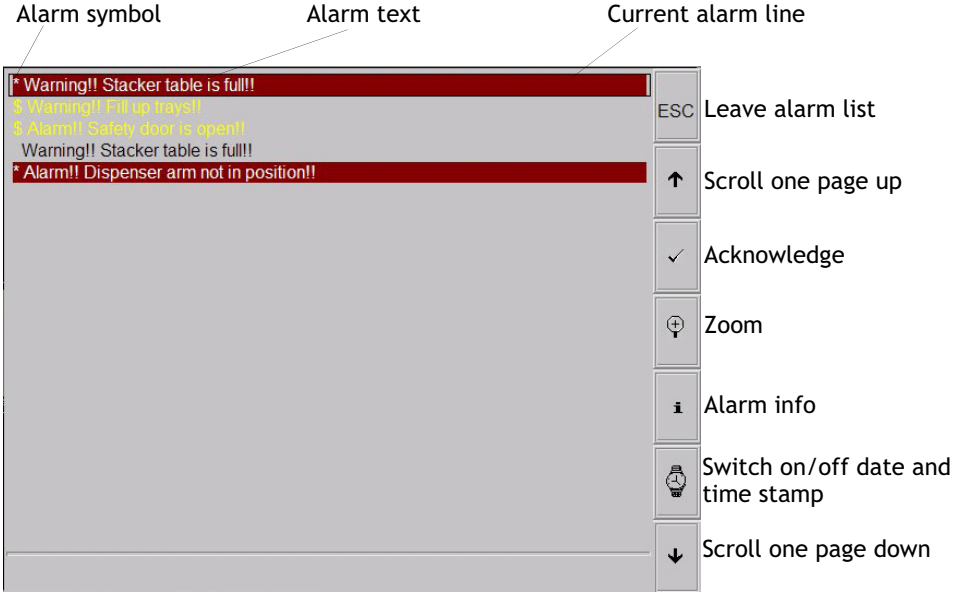
By selecting **Print signal** for block 990 it is possible to print the current content in the alarm list.

Block linked to alarm

Text or graphic blocks can be linked to alarms. This means that when the operator presses the INFO button for an alarm in the list, the block linked to the alarm will be shown. This block can contain information about the alarm and suggestions for possible procedures. It is only possible to press the INFO key if the currently selected alarm is linked to a block. Return to the alarm list by pressing [PREV].

8.7 Graphic alarm page

This page is graphic and can be modified by the user. Function keys or touch keys are linked to functions to enlarge or reduce the text on the alarm page, including page browsing functions. There is also a function to select whether the date and time are to be shown. Alarms can be sorted by group, and the group shown is optional. Status is shown with different colors, i.e. the colors defined when setting the alarm groups.



Note!
The graphic alarm page (alarm list) is printed as a text printout.

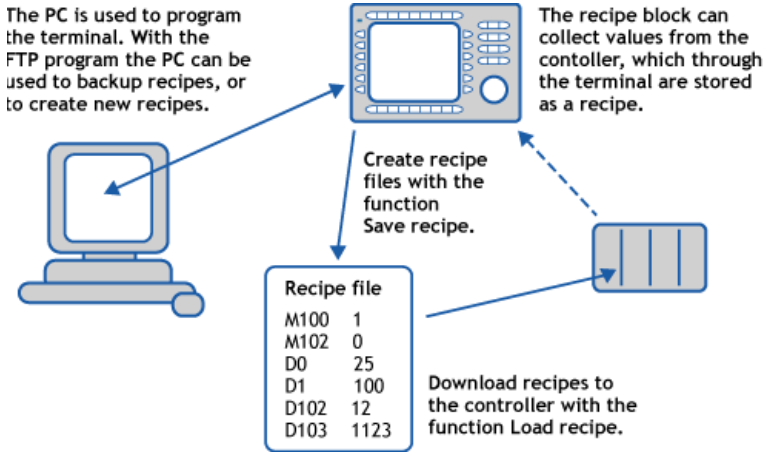
9 Recipes

This chapter describes the function for recipe management, which enables all the dynamic data in one or more blocks, i.e. the signals and their values, to be saved to a file in the operator terminal. The operator can then download the files to the controller, which will start working with the new values. By using the function for recipe handling it is possible to reuse large sets of parameters. The user can create recipe libraries consisting of files containing different sets of parameters. This function improves the efficiency of time-critical productions where the exchange of similar products must be done quickly, such as in the manufacturing of units in different colors. Recipe files can be created from the operator terminal, the controller, or from a PC with the program HMI Tools.

Recipe files are stored in the operator terminal. To use recipe handling the functions for storing, loading, deleting and adding, recipes must be linked to function or touch keys. See the chapter *Function Keys* for information.

Recipe files can be sent as attachments with the e-mail function.

The drawing below illustrates the principle of the recipe handling function.



9.1 Calculation of recipe size

To calculate how much space a recipe requires in the project memory, the following equation is used. (The equation is not exact in view of the file system's complexity in the operator terminal.)

$S = 90 + \Sigma (2 * IOG_i + 28)$

S = number of bytes. If S is calculated to be less than 360, then S is set to 360.

Σ = number of I/O series.

IOG_i = number of I/O in each I/O series

Note:
The maximum number of I/Os in a recipe is 1000.

Example

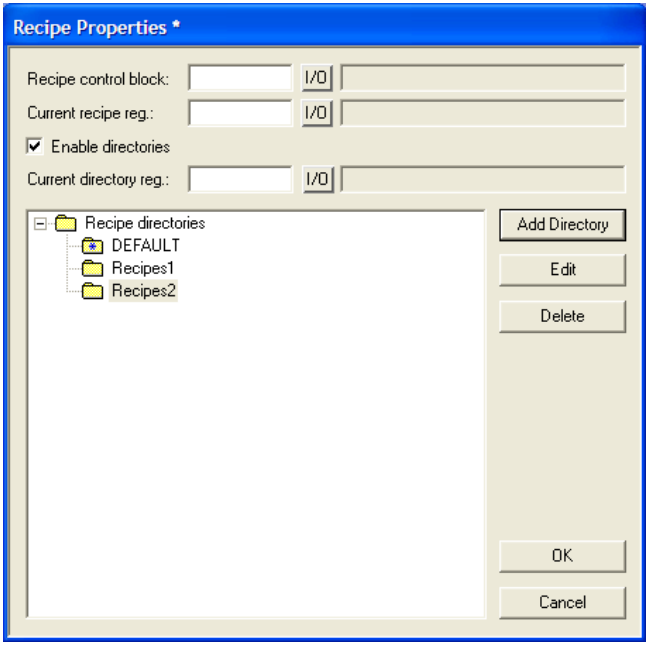
The recipe consists of 3 I/O series: D0-D109 (110), D200-D499 (300) and M0-M99 (100).

The calculation is made i two steps.

1. Calculate the subtotals of the different series:
   1104 = (2 * 110 + 28) + (2 * 300 + 28) + (2 * 100 + 28)
2. Then calculate the total:
   S = 90 + 1104
   S = 1194 bytes

9.2 Recipe properties and recipe directory

Double-click on **Recipe** in the Project Manager to make properties for recipe handling and to create, edit and delete recipe directories.



Parameter	Description
Recipe control block	Control block to save/read/delete recipes through the controller. See the section *Creating and transferring recipes with the controller program*.
Current recipe reg.	The first of four 16-bit registers where the operator terminal inserts the name of the last loaded recipe to the controller. The name can then be presented in an ASCII object. The function always uses 4 registers (8 characters) irrespective of the length of the recipe name.
Enable directories	Checking the box allows creating recipe directories in the operator terminal. See the section *Recipe directories*.
Current directory reg.	The first of four 16-bit registers where the operator terminal inserts the name of the recipe directory specified for the block. The name can then be presented in an ASCII object. The function always uses 4 registers (8 characters) irrespective of the length of the recipe directory. See the section *Recipe directories*.

Recipe directories

Recipes created in the operator terminal can be saved in different recipe directories (folders) in the operator terminal's memory or on an external memory card if it is used in the operator terminal. The use of recipe directories ensures a better structure and easier handling of recipes in applications with a large number of recipes. It is possible to create 32 different recipe directories in one level. Recipe directories are saved under the directory RECIPE in the root directory in the operator terminal's memory. A recipe directory is linked to one or more blocks under block properties for the block. All recipes created in the block will then be saved in the selected recipe directory.

Recipe directories are created, edited and deleted by double-clicking on **Setup of recipe signals** in the Project Manager. Defined recipe directories are shown in a list, according to the structure in the directory. New recipe directories are added by clicking the button **Add Directory**. The name of recipe directories has to consist of 1-8 characters. The first character must be a letter or digit, and can only contain the characters A-Z, 0-9 and _. Otherwise, the standard for file names in MS-DOS is followed.

Change a recipe directory by selecting it and clicking **Edit**. Click **Delete** to delete the selected recipe directories.

Recipe directories in the operator terminal

Recipe directories can be created and deleted with the functions **Make recipe directory** and **Delete recipe directory**, linked to function keys or touch keys, when the operator terminal is running. With the function **Change recipe directory** for function keys or touch keys it is possible to change/select recipe directories for the current block. A list of options for available recipe directories is shown when the function key or touch key for **Change recipe directory** is pressed. Select one and press [ENTER]. The recipe in the block will now be saved in the selected recipe directory. See the section *Function Keys* for further information.

Note:
Recipe directories created in the configuration tool cannot be deleted with a function key or touch key linked to the function **Delete recipe directory**.

Recipe handling between operator terminal and PC is performed with the program HMI Tools File Transfer and HMI Tools FTP Transfer. See the section *Using recipes in a PC* and the manual for HMI Tools.

9.3 Creating a recipe with the operator terminal

When the application is programmed, blocks can be used to save recipes, or alternatively the function **Append recipe** can be used when the operator terminal is running. All signals to be included in the recipe are defined in the recipe block. All dynamic values in the block are stored in the recipe file. All digital and analog objects, with the exception of trend objects, can be used as recipe parameters.

When the operator terminal is running, a jump is made to the block containing the recipe parameters. Enter the required values in the dynamic objects and press the function or touch key linked to **Save recipe**. The name has to consist of 1-8 characters. The first character must be a letter or digit, and can only contain the characters A-Z, 0-9 and _. Otherwise, the standard for file names in MS-DOS is followed.

Recipe files are stored in the operator terminal, either in the recipe directory specified for the block, or in one and the same recipe directory if no separate recipe directories have been created by double-clicking on **Recipe** in the Project Manager.

9.4 Appending recipes

The function **Append recipe** can be linked to function and touch keys and makes it possible to add signals and their values from the current block to an existing recipe in the operator terminal. This entails that the operator can save signals and their values from several different blocks in a joint recipe. New signals are added to a recipe, and signals already existing in the recipe will be updated when the function is activated. The name of the recipe to which the current block's signals and their values are to be added is specified when the function or touch key for **Append recipe** is pressed. If the function is activated and there are no recipes saved in the operator terminal, a new recipe will be created in the operator terminal. Similarly, a new recipe will be created if the same recipe directory for the block is not given. To add signals from another block to a recipe the same, or no recipe directory, must therefore be given for both blocks.

Note:
If a string is added to an existing recipe with strings, the strings must be separated by address space. Otherwise the previous near string will be increased.

9.5 Transferring recipes to the controller

Recipes are transferred to the controller with the function **Load recipe** when the operator terminal is running. This function means that the signals and their values stored in the file are transferred to the controller. A list of options for available recipe directories is shown when the function or touch key for **Load recipe** is pressed. Select one, and press [ENTER]. The controller will then run with the downloaded values.

9.6 Deleting recipes

A selected recipe can be deleted from the operator terminal memory with the function **Delete recipe**. Press the function or touch key linked to **Delete recipe**. A list of options will now be shown with the available recipe files. Select the file to be deleted, and press [ENTER]. Confirm with [ENTER] or press [PREV] to abort.

9.7 Using recipes in a PC

The PC can be used to make backup copies of files in the operator terminal, e.g. recipe files. New recipes can be created in the PC and transferred to the operator terminal. Recipes saved in the operator terminal can be transferred and edited in a PC.

Recipe files are stored in the PC in .skv format, and can be displayed and edited in Microsoft Excel. Edited files can then be used in the plant again. The files must end with the instruction END, according to the example below:

```
M100   ;1
M102   ;0
D0     ;25
D50    ;12
END
```

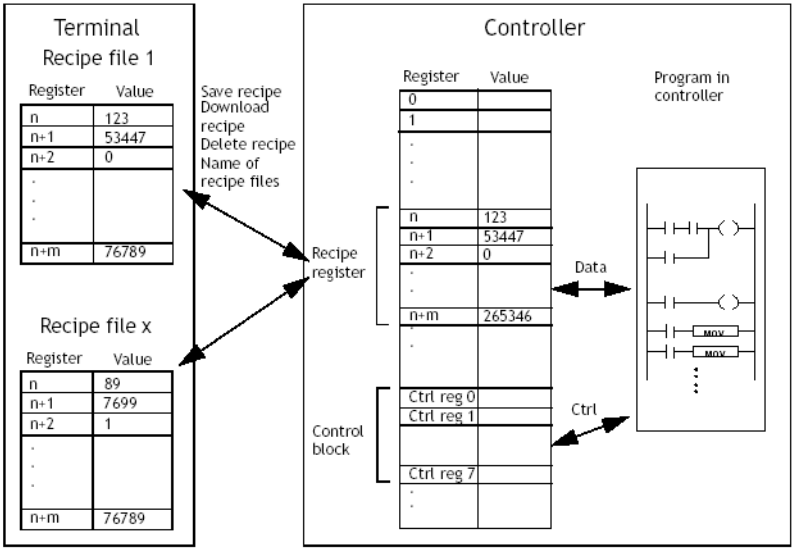
It is also possible to transfer recipe files between the operator terminal and the PC through FTP with the program HMI Tools FTP Transfer (standard FTP client). For further information, refer to the manual for HMI Tools.

Files will be saved to a Compact Flash memory card or USB Flash drive by means of the function *saves recipe on memory card* via a function key/touch key. The recipe will be copied to the external memory card, from the operator terminal's internal memory.

When the operator terminal is running, a selected recipe can be deleted from the operator terminal memory with the function *Delete recipe*. Press the function or touch key linked to *Delete recipe*. A list of options will now be shown with the available recipe files. Select the file to be deleted, and press [ENTER]. Confirm with [ENTER] or press [PREV] to abort.

9.8 Creating and transferring recipes with the controller program

Through a control block in the controller recipes can be created, transferred and deleted in the operator terminal. Files created from the controller program are compatible with recipe files created from the operator terminal. This means that recipe files created in the controller program can be downloaded into the operator terminal, and vice versa. The control block appears as follows.



By double-clicking **Setup of recipe signals** in the Project Manager the first register in the control block is defined. This and the 7 following registers are used as control registers. The control block is described in the following table.

Register	Content	Description
Control register 0	Command	Command register set by the controller. Available commands: 0: No command. 1. Save recipe to operator terminal. 2. Read recipe from operator terminal. 3. Delete recipe from operator terminal. 4. Create recipe directory. 5. Change recipe directory. 6. Delete recipe directory.
Control register 1	Handshake	Handshake register set by operator terminal. 0. Ready for new command. 1. OK 2. Recipe file write error. 3. Recipe file not found.
Control register 2	File name characters 1-2	Name of recipe file/recipe directory in the operator terminal.
Control register 3	File name characters 3-4	
Control register 4	File name characters 5-6	
Control register 5	File name characters 7-8	
Control register 6	Start data register	The first data register to be read/written to/from recipe file.
Control register 7	Number of registers	Number of registers to be read/written to/from recipe file.

The following procedure must be carried out:

1. The result code register must be 0. If not, reset the command register to 0.
2. Enter the command in the command register.
3. Wait for the ready signal or error code in the handshake register.
4. Set the command register to 0. The operator terminal will now set the handshake register to 0.

Limitations

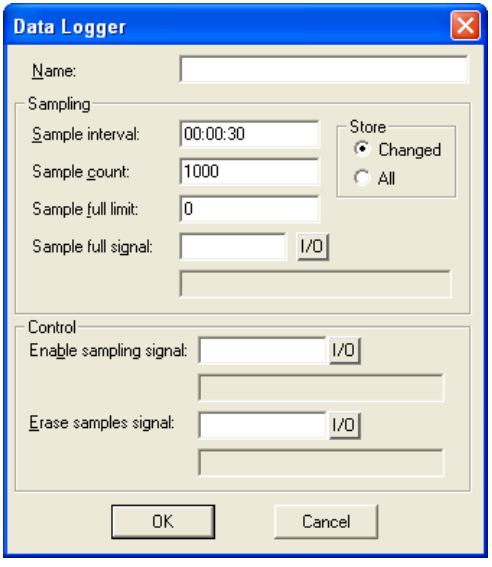
Recipes created in the controller can contain a maximum of 1000 registers. Only data registers can be used.

Recipe names can only contain the characters A-Z, 0-9 and _.

10 Data Logger

Data can be logged and saved to file similar to trend (but without operator terminal display). Logging of data can be made at different intervals or depending on changed values. 16 signals can be connected to each data logger. 16-bit, 32-bit and Real (Float) values can be logged. Be aware that logging of data consumes system resources and memory.

Double-click on **Data logging** in the Project Manager. Right-click on **Data logging** in the window that is displayed, and select **Add**. Double-click on **Data logger** to display the dialog below.



The following properties can be made:

Parameter	Description
Name	State a name for the data logger. The name, that has to be unique for each logger, can consist of a maximum of 8 characters. Only the characters A-Z, 0-9 and _ are supported.
Sample interval	State the interval for data logging. The minimum value is 1 second.
Sample count	State the number of values to be saved. The maximum value is 65,534.

Parameter	Description
Sample full limit	State by which number of samples **Sample full signal** is to be set, and which signal to set.
Sample full signal	
Store	Select **Changed** to store only values that are different from the last sampling. Select **All** to store all values.
Enable sampling signal	State a digital signal that, when set, starts logging data. The logging is stopped if the signal is reset. The parameter is optional.
Erase samples signal	State a digital signal that, when set, erases logged data. The parameter is optional.

For information about Data Logger backup and transfer, please see the respective section in chapter *Trends*.

11 Passwords

This chapter describes the handling of security levels and passwords in the operator terminal. It is a function which makes it possible to create a security system for the plant. The operators can easily be assigned different authorizations in the plant.

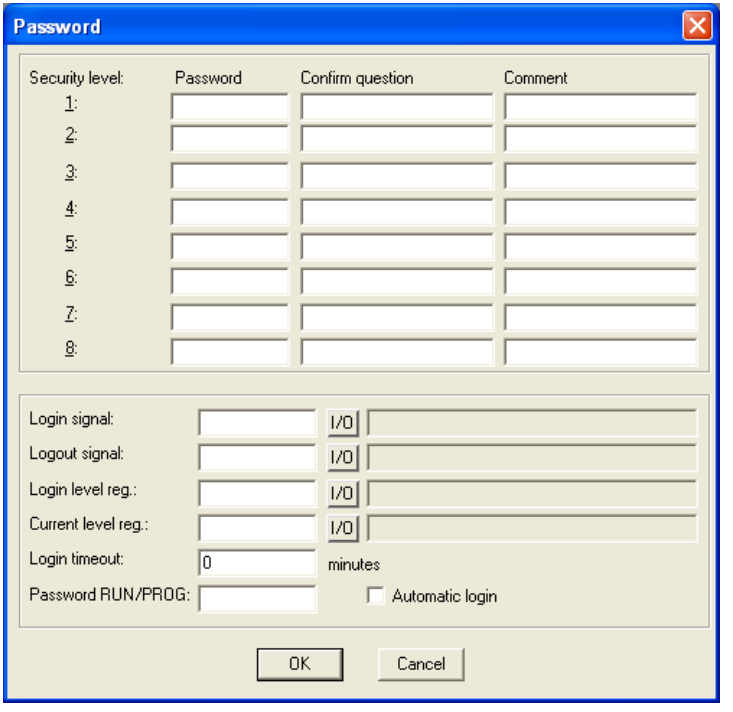
Blocks, function/touch keys and maneuverable objects can be allocated security levels. Each security level is associated to a password. To access the different levels the user must login with a password for the relevant security level, or higher. It is not necessary to use this function.

11.1 Defining security levels

Blocks, function/touch keys and maneuverable objects can, when they are defined, be allocated a security level. A security level (0-8) is specified in the dialog for the object under the **Maneuvering** tab after checking **Enable operator input**. If security level 0 is specified, the object will be available to everyone, i.e. login will not be requested.

11.2 Defining passwords

Passwords for the security levels 1-8 are defined by double-clicking the **Password** folder in the Project Manager.



Parameter	Description
Password 1-8	The password for security level 1-8.
Confirm question 1-8	An optional question, with a maximum of 20 characters, to be displayed when a password protected object is maneuvered by a logged-in user, e.g. "Change parameter?" The confirm question cannot be used if a function- or touch key has been defined with the security level.
Comment 1-8	Used to facilitate selecting a password level for the object using a name, e.g. Supervisor or Operator.
Login signal	A digital signal which, when it is set to one, generates a login dialog. The login dialog can also be linked to a function or touch key. See the chapter *Function Keys* for further information.

Parameter	Description
Logout signal	A signal which, when it is set to one, logs out the current user. The function can also be linked to a function or touch key. See the chapter *Function Keys* for further information.
Login level reg.	A register in the controller to control the security level can be specified here. The value in the register determines the current security level, value 0 = no security level, 1 = security level 1, etc.
Current level reg.	Specify a register from where the operator terminal can present the current security level (0-8).
Login timeout	Specify the time in minutes which the operator terminal can remain inactive before the user is automatically logged out. If 0 is given there will be no logout.
Password RUN/ PROG	This function is not used for the E1000 operator terminals.
Automatic login	Specify if the login window is to be automatically shown when trying to access password-protected blocks or keys. For touch screen operator terminals, the function is also applicable for objects.

11.3 Logging in

If the box for automatic login in the Password dialog is not checked, the login will either be controlled from a function or touch key, or through a digital signal from the controller (**Login signal**). If the function key linked to the function **Login to specified security level** is pressed, or the digital signal is activated, the input field for login will be shown. Specify password. The password is linked to a security level, see above.

11.4 Password for project transfer

Commands can be entered on the command line by double-clicking on **System Signals** in the **Setup** folder in the Project Manager. By entering the command PDxxxxxxxx, where xxxxxxxx represents the password, this password must be given to access the functions in the TRANSFER menu in the operator terminal. When transferring projects from the configuration tool to the operator terminal this password must be given in the operator terminal. Only capital letters can be used on the command line.

11.5 Overriding password

Commands can be entered on the command line by double-clicking on System Signals in the Setup folder in the Project Manager. By entering the command PSxxxxxxxx, where xxxxxxxx represents the password, this password can be used to override all other password levels, and the user gains access to everything in the operator terminal. This can be useful, for example, in performing support and maintenance. Only capital letters can be used on the command line.

Note!
The PS password does not override the PD password.

11.6 Changing password in the operator terminal

The password can be changed in the operator terminal with the function **Change login password** for function or touch keys. When a function or touch key linked to **Change login password** is pressed a dialog box is shown, where the passwords for security levels below or at the same level as the in-logged person can be changed. See the chapter *Function Keys* for further information.

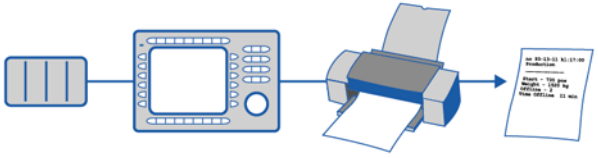
Note:
It is not possible to select a security level on block 0.

Note:
After logging out, the [PREV] key and the function **Return to previous block** for function and touch keys are ignored, to prevent unauthorized persons from accessing blocks protected by passwords.

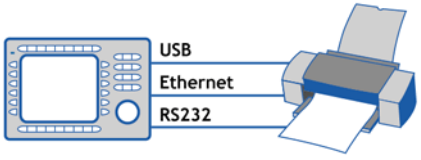
---

12 Printouts from the operator terminal

This chapter describes how report printouts are made in the operator terminal. Different types of reports, e.g. daily reports and event reports, can easily be created for production follow-up. The following picture shows the principle for generating daily reports.



12.1 Connection to printer



The printer should have serial or USB interface. A serial printer must support IBM character set (850). A USB printer must support the USB printer class and PCL 5 or higher. To print out via Ethernet, the network printer must use Windows network services. The properties for the printer are made in the dialog under **Setup/ Peripherals**. For configuration of the printer, refer to the printer manual.

Examples of printer:

Serial printerPanasonic KX-P1092

USB printersHP Laser Inkjet
HP Laser Deskjet

12.2 Text block reports

Reports are created as text blocks with static and dynamic text. Dynamic objects has to be defined to print values from the process. The width of the reports is a maximum of 150 characters. The printer must support an IBM expanded ASCII character set.

When to print reports can be determined through time channels, for example. See the chapter *Text-based Presentation for Printouts and Reports* and *Time Channels* for further information.

12.3 Graphic block printouts

Graphic blocks can be printed via Ethernet using a PC server. Alternatively, a printer can be connected to the operator terminal's USB port. The USB printer has to be HP PCL5/PCL5C/PCL6 compatible. Graphic blocks can only be printed when they are displayed on the screen (screen dump).

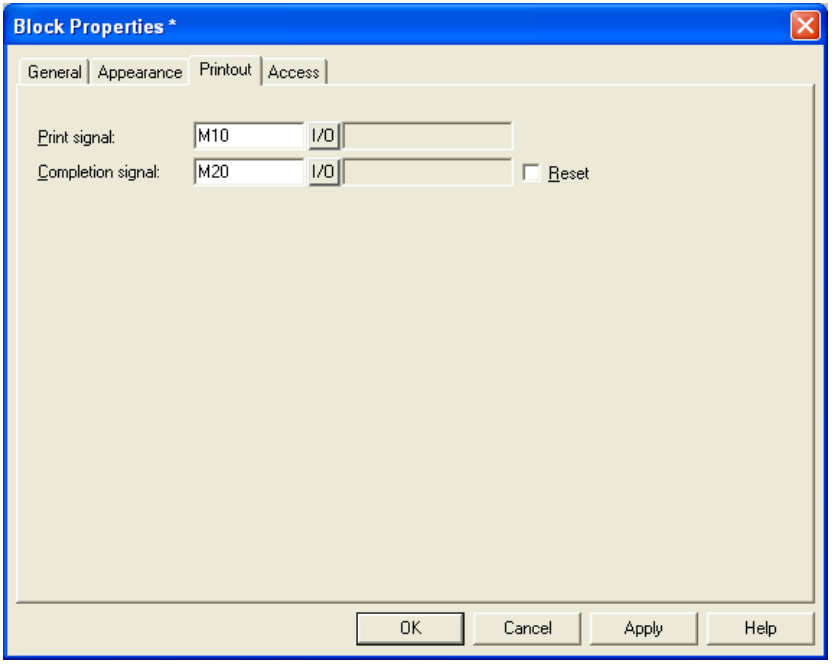
Commands can be entered on the command line by double-clicking on **System Signals** in the **Setup** folder in the Project Manager. By entering the command **NHD** graphic blocks will be printed on a laser printer without header (which normally includes block name, block number, date and time).

Note:
For graphic block printouts the printer's internal memory should be at least 5 MB, if point-to-point.

Note:
The alarm block, i.e. the graphic block which contains the alarm list is printed out as a text printout.

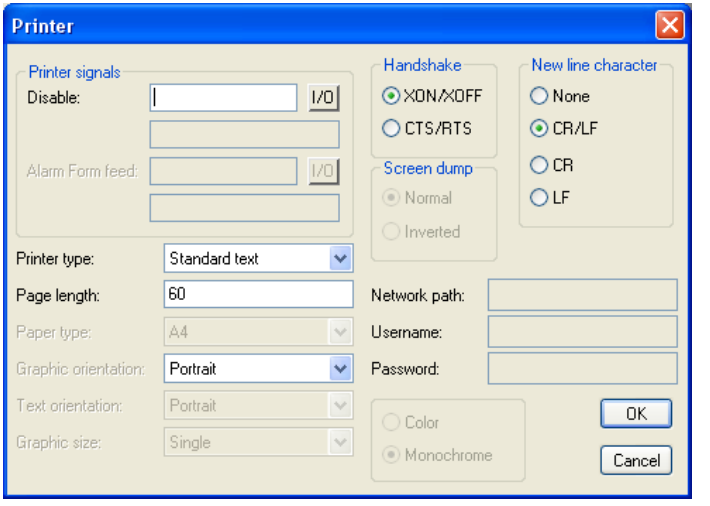
12.4 Defining the printout

The printout is defined under the **Printout** tab in the block properties dialog, displayed by right-clicking on a block and selecting **Properties**. The parameter **Print signal** indicates the digital signal, which, when it is set to one, activates the printout of the block. A digital **Completion signal** is also indicated here, which is set to one by the operator terminal when the printout is completed. If the box **Reset** is selected, the signal will be reset instead.



12.5 Printer Properties

Printer settings can be made by double-clicking on the **Peripherals** folder in the Project Manager, right-clicking on **Printer** and selecting **Properties**.



Parameter	Description
Printer Signals	**Disable:** A digital signal, which when set to one, stops the printout. The port where the printer is connected can then be used for other communication, e.g. Transparent mode. **Alarm Form Feed:** A signal that sends a form feed to the printer. When using "To Printer" for alarms, a form feed will only be sent when the page length is full, not after every single alarm. Only used for Laser and InkJet printers.
Printer type	Select standard text or installed printer, e.g. PCL Inkjet or PCL Laser.
Page length	The number of lines to be printed out before form feed. If the page length is set 0 there will be no form feed.
Paper type	Select the paper type according to the installed printer.
Graphic orientation	Select whether the graphic printout is to be vertical or horizontal.
Text orientation	Select whether the report printout is to be vertical or horizontal if a PCL5 compatible printer is used.
Network path	Search path to network printer.
Username	Username to printer server.
Password	Password to printer server.

Parameter	Description
Handshake	Select whether handshaking between printer and operator terminal is to be with XON/XOFF or CTS/RTS.
New line character	Select line end character; CR/LF, CR, LF or none.
Color/ monochrome	Select if printout should be black/white or color.

For information concerning printers, see the manual for the printer.

Note!
The printer properties are used for parameters such as character set, character size and margins.

12.6 Control codes to printer

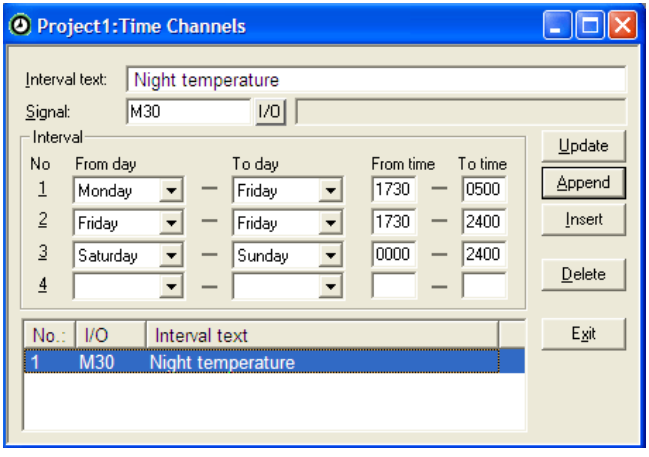
In text blocks control codes to the printer can be used. Enter %% followed by a number between 1 and 31. 1 to 31 are control codes to the printer. For example, entering %%12 means paper feed. See the printer manual for a description of the control codes. A command must be followed by a space. Page feed (%%12) is specified at the end of the line. The characters %% must not be used in the text. It is possible to have more than one command on a line.

13 Time Channels

Time control is a function for setting and resetting digital signals in relation to the real-time clock. This function is used to control events in the process at special times, e.g. starting and stopping motors, through the operator terminal.

13.1 Defining time channels

Time channels can be defined by double-clicking **Time channels** in the Project Manager.

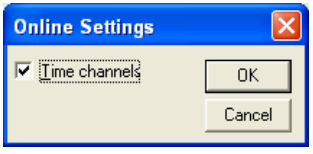


Parameter	Description
Interval text	An optional text for the time channel.
Signal	A digital signal, which is set to one during the specified time interval.
Interval	The days and times for the interval. Four different intervals can be defined for each time channel.

In the previous example, one time channel was defined. This time channel has the text **Night temperature**, and is linked to the signal **M30**. The signal will be set to one Monday to Friday between 17.30 and 05.00, Friday 17.30 to 24.00, and Saturday to Sunday between 00.00 and 24.00. During these periods, the temperature in the building will be reduced.

13.2 Presentation in the operator terminal

The time channels are shown when system block 991 is activated, either through a jump object or through a digital signal linked to the block. The values of the time channels can be read and/or changed. To change the value of the time channels when the operator terminal is running, the box **Time channels** under **Setup/Online Properties** must be checked.



To read or change the values for a time channel, place the cursor on the desired line and press [ENTER], or point at the desired line if the operator terminal has a touch screen. Press [OK] to exit the definition of the time channels. Exit the time channel menu with [PREV] or press **Cancel** if the operator terminal has a touch screen. The block from which the time channel block was activated will then be shown.

14 Language Management

The configuration tool supports several language applications for the E1000-series' operator terminals. We advise that the entire application be created in one language in the configuration tool. Using the multiple language support function, you can later easily translate all texts in the application to other languages. Translation can be performed directly in the configuration tool or the text can exported as a text file and translated in other software. The translated file is later imported back into the configuration tool. A maximum of 10 languages can be created for an application.

Each text in the application is allocated an arbitrary index. To optimize the function and reduce the total number of texts, a text can be used several times in the application, copied and reused. These texts are linked to the same index.

The application language contains user texts and is linked to a system language that contains system texts. User texts are those texts that are entered when the project is created and system texts are those texts that already exist when a new project is created as well as texts that already exist in the operator terminal's system program.

14.1 Unicode in the operator terminal

Unicode is a global standard for character encoding where 16-bit values are used to represent the characters from many of the world's languages. The E1000 operator terminals only support Unicode based character sets. The Unicode characters can be used in projects and/or system texts.

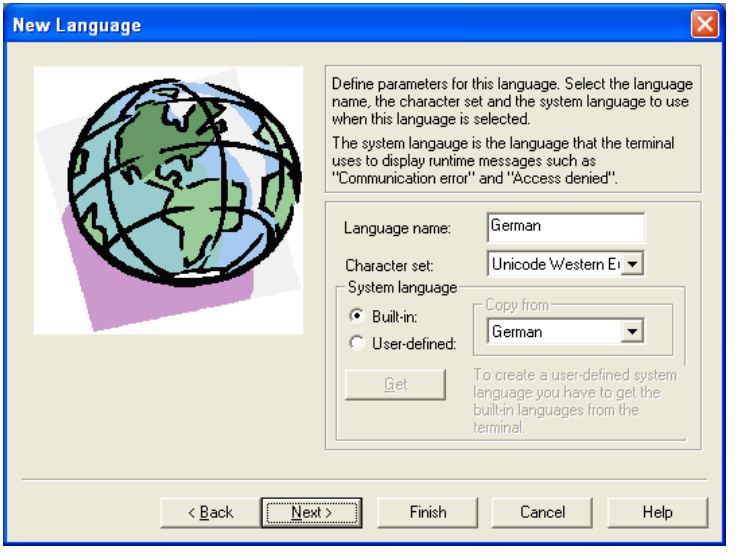
Unicode has built-in support in Microsoft Windows XP and Windows 2000.

The configuration tool uses a Unicode character set to display Unicode characters in the computer's dialog boxes.

14.2 Creating additional application languages

Double-click on **Multiple Languages** under **Setup** in the Project Manager. Right-click on **User Language** and select **New language**. This starts the Multiple Languages wizard, a self-descriptive sequence of dialog boxes for creating additional application languages. Follow the instructions in the respective dialog boxes and select or type the desired parameter values or name(s).

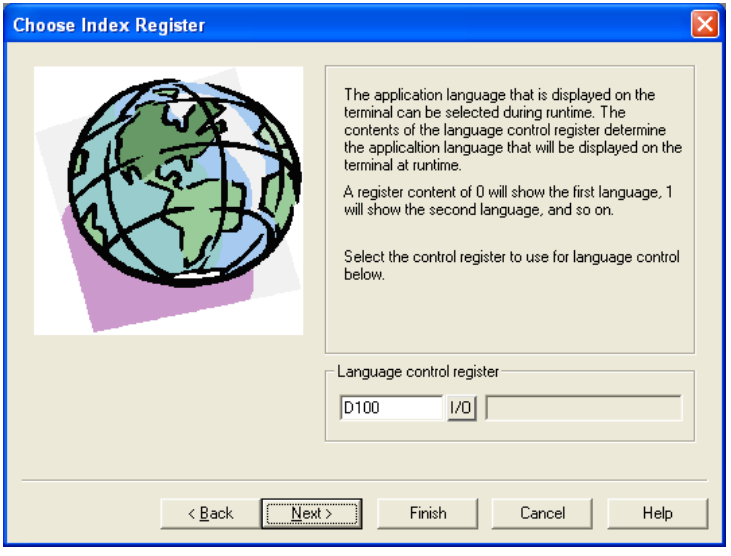
Select the number of languages to use in the application and click **Next**.



The software suggests language names. To clarify matters for the user, the name should be changed.

Under **Character set**, select the character set that will be used on the operator terminal and the national characters that will be available. See the section *Country/ Language*.

Under **System language**, **Built-in** or **User-defined** can be chosen. **Built-in** entails that the system texts in the operator terminal are displayed in the chosen language. **User-defined** entails that you can translate a built-in system language and link the new system language to the application language (requires that the appropriate terminal be connected to the PC in accordance with the chapter *Project Transfer*.).

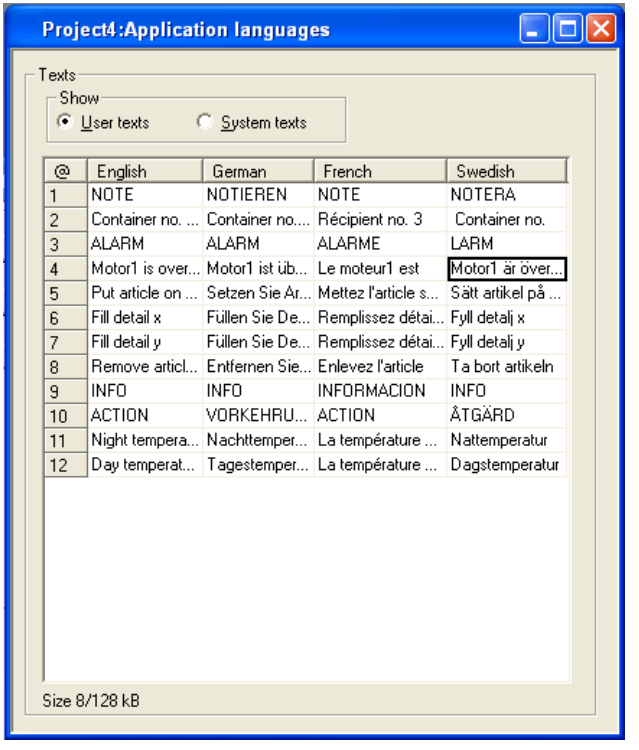


This is where the Language control register is specified. Its value (0-9) during runtime determines the application language (0-9) that the operator terminal will use.

Click **Finish** to close the wizard. A structure tree is now displayed with the languages you have created.

14.3 Translating/editing texts in the configuration tool

Choose **Setup/Multiple Languages/Edit**, or click the **Edit**-button,  , in the Language Toolbar.



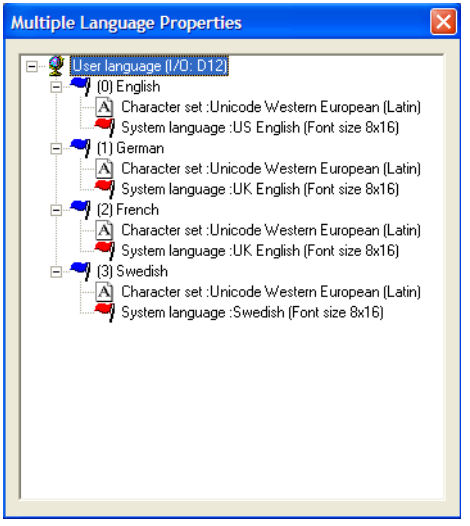
This is where the translations for the various languages are entered in the respective table cells. Move the cursor between the rows and columns with the arrow keys. You can search within the text list with the menu command **Edit/Find**.

An application language can also be exported as a text file and translated in another program, such as Excel or Notepad. The text file is thereafter imported back to the application. See the sections *Export* and *Import*.

Note!
When importing the translated texts, pay attention to make sure that the imported text length does not exceed the limit in the object.

14.4 Properties for the application language

Click  or double-click on **Multiple Languages** under **Setup** in the Project Manager.



Right-click on **User Language** and select **Properties** to change the register that determines the displayed language.

When right-clicking on the language name, you can choose between the following menu commands:

Menu command	Description
New language	Creates a copy of the selected language
Character set	Chooses/edits character set
System language	Chooses system language
Delete language	Deletes the selected language
Rename	Changes name of selected language
Properties	Specifies data register with the value that determines the displayed language

Select **Character set** to change the character set for the language.

Select **System language** to change the selected system language.

User-defined system languages

To create a user-defined system language, choose **User-defined**, choose the language that would like to copy from and click **Get**. The **Language Transfer** dialog box opens. Click **Receive** to retrieve the built-in system language from the operator terminal. System texts are now accessible for editing under **Setup/Multiple Languages.../Edit**. You can also choose to export the texts as a text file and edit them in another program.

All system texts in the operator terminal (passwords, time channels, etc.) support the multiple language application. You can use the predefined system languages or create your own (new). All types of characters that exist in the character set can be used in the application language. A text string is linked to several different objects. The maximum number of text strings for each language depends on available project memory in the operator terminal.

At the bottom left of the **Application Language** dialog box, information is displayed on memory size for selected languages (language file). The information is displayed in the format X/Y. X is the utilized memory and Y is the available memory for each language (for example, 7/128).

14.5 Export

You can choose to export a language to Excel, for example, translate it there, and then import it back to the configuration tool.

Choose **Setup/Multiple Languages/Export**, or click the **Export**-button,  , in the Language Toolbar. Choose **User texts** (or **System texts**). In the displayed dialog box, specify the name of the file to be exported and indicate if it is to be an Unicode text file.

14.6 Import

Choose **Setup/Multiple Languages/Import**, or click the **Import**-button,  , in the Language Toolbar. Choose **User texts** (or **System texts**). The **Import multiple languages texts** dialog box is displayed. Choose the name of the text file that you would like to import. The existing language in the project is in Unicode format.

14.7 Show Index

Each object that displays text in a multiple language application is linked to an index. An index can be linked to different objects with the same texts. Choose **Setup/ Multiple Languages/Show Index**, or click the **Show Index**-button,  , in the Language Toolbar, to display the index number for the object texts.

14.8 Cross Reference

Choose **Setup/Multiple Languages/Cross Reference**, or click the **Cross Reference**-button,  , in the Language Toolbar. On the displayed cross reference list you can right-click an object to edit it. The cross reference list has support for incremental searching when you specify an index number.

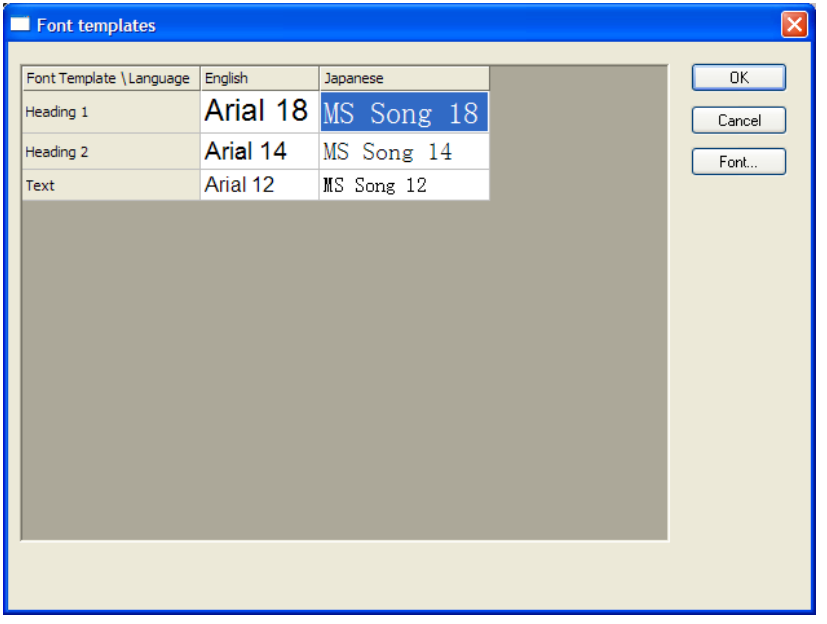
14.9 Reuse Index

Choose **Setup/Multiple Languages/Reuse Index**, or click the Reuse Index-button,  , in the Language Toolbar. When **Reuse Index** is active and an object is copied, the copy will be assigned the same index. This entails that objects with the same index need only be translated once. Changes made to a text will be seen at all locations where the same index number exists.

Note:
If an object is deleted that has copies with the same index number, only the selected object is deleted.

14.10 Font Templates

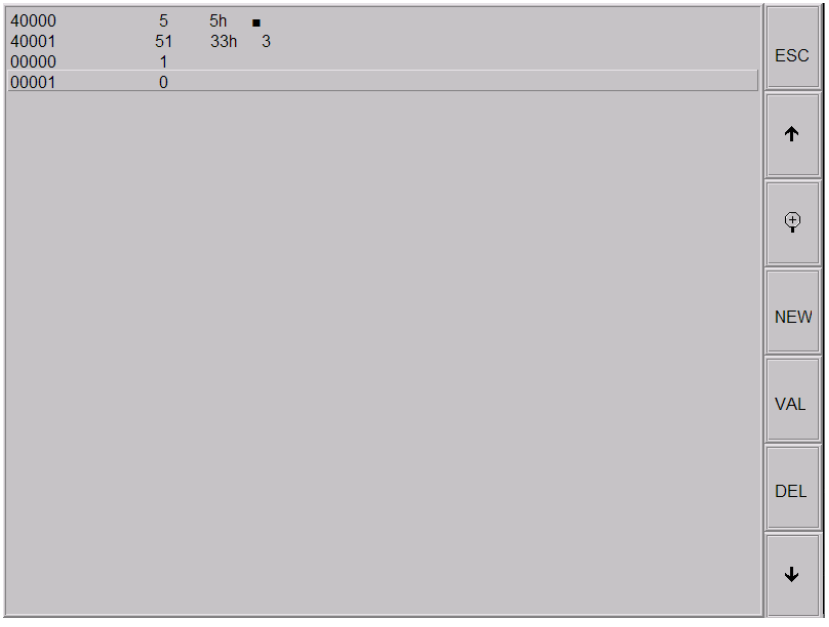
The Font Template controls which font will be applied for the different text objects and languages. Choose **Edit/Font Templates** for a summary of all the fonts used in the project. If a language is used that requires characters which are not available in the Windows True Type fonts (e.g. Arial or Times New Roman), the desired font must be selected for the affected language. Changes in the Font Template affect all the text objects connected to the particular font.



Note!
The size of the font files is added to the used project memory.

15 System Monitor

The system monitor is a block where the operator can view or change the values for control signals when the operator terminal is running. The values are presented as decimal, hexadecimal and ASCII values. The system monitor is always available in the operator terminals. To use the system monitor when the operator terminal is running, a block jump from another block to the system monitor block is created. The editing box is needed to add on control signals. This is shown when you press [ENTER] or alternatively point to the button NEW on the operator terminal when the system monitor is active.



16 Index Addressing

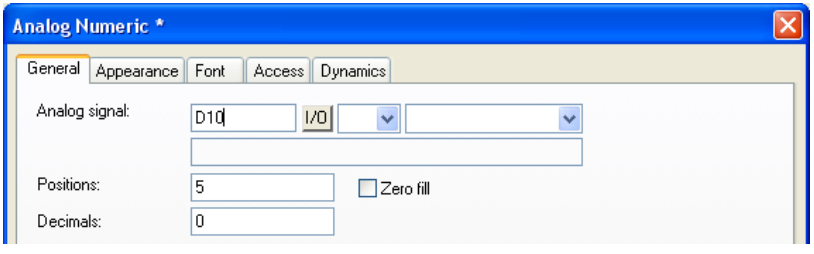
With index addressing, it is possible for the operator to select from which register an object is to collect the shown value. Without index addressing an object is always connected to the same register, and only the value in this register can be shown in the object. Index addressing is set up by adding the value in the index register to the address of the register which is the analog signal in the object. In general this can be formulated as:

Display value=the content in Register(the Object's address+the content in the Index register)

If the content in the index register is 2 and the address of the register specified in the object is 100, the value shown in the object will be collected from address 102. If the value in the index register is changed to 3, the value in the object will be collected from address 103 instead.

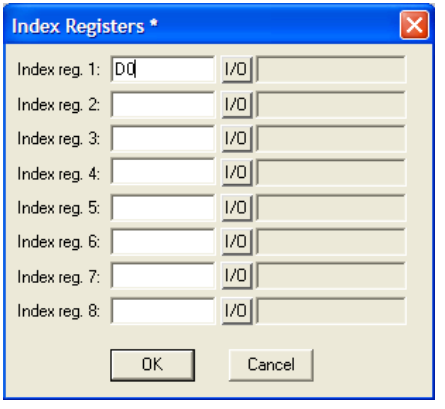
Which register is to be used as the index register is defined in **Index** under the **Setup** folder in the Project Manager. Up to eight different index registers can be used in each project, and each index register can be used for more than one object.

The objects used in the project will specify whether index registering is to be used, and if so, which index register. This is done by selecting in the dialog for the object I1 to I8 in the box to the right of the indicated address signal for the object. In the example below, D10 is the analog signal and I1 is the index register used.

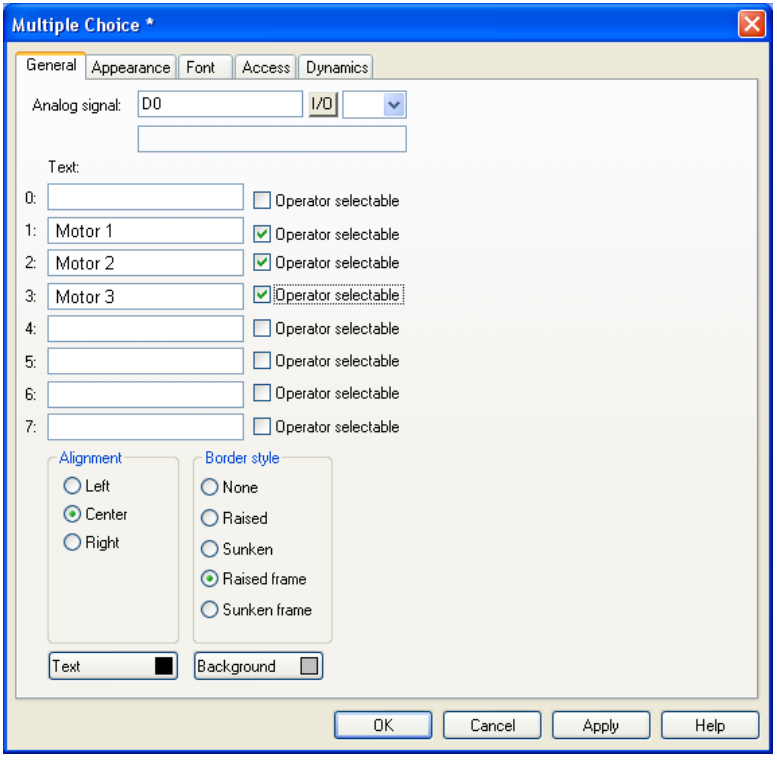


In the following example, three motors are to be controlled from one block. The torque and speed for the three motors are stored in six different registers. One of the motors will be selected in one block, and then only the current torque and speed for this motor will be shown in the block. If another motor is selected, the current torque and speed will be shown for this motor instead. This is possible with index registering.

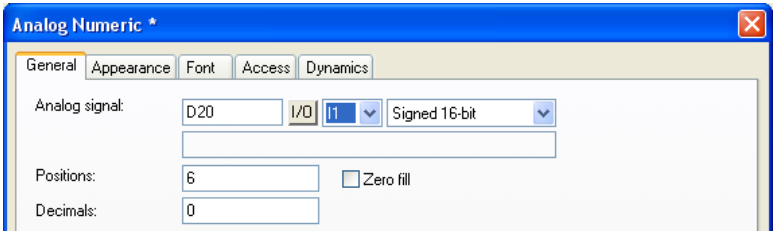
Register D0 is defined as Index register 1 by double-clicking on **Index** under the **Set-up** folder in the Project Manager. The value in the register will determine for which motor the torque and speed are to be shown.



If the value is 1 in D0, the torque and speed for Motor 1 will be shown. If the value is 2 the values for Motor 2 are shown, and if the value is 3 the values for Motor 3. The value in register D0 is controlled with a Multiple choice object, where the texts Motor 1, Motor 2 and Motor 3 are shown. These three choices are also made maneuverable.

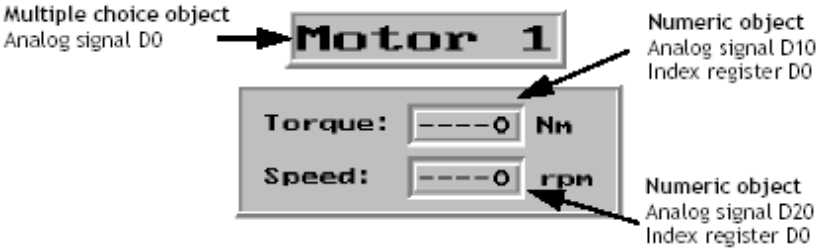


The torque and speed are shown in two numerical objects. In the object for torque, D10 is specified as the analog signal and I1 as the index register.



In the object showing the speed, D20 is specified as the analog signal and also here I1 as the index register.

With the maneuverable Multiple choice object it will then be possible to select the alternatives Motor 1, Motor 2 and Motor 3 in the operator terminal. Depending on this choice, the values will be set to 1, 2 and 3 in register D0. The value in D0 is added to addresses for the objects which show the torque and speed. These can show the values in register D11, D12 or D13, and D21, D22 or D23.



Note:
If the operator terminal is connected to a BDTP network, the same index register must be stated in the server and the client because the indexing is made in the server driver.

17 Communication

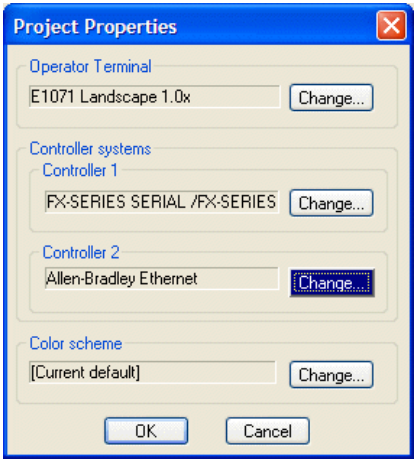
This chapter describes communication with two controllers, the communication modes Transparent, Passthrough, No Protocol and modem connection.

17.1 Communication with two controllers (Dual drivers)

It is possible to use two different drivers in the operator terminal, which means that the operator terminal can communicate with two different controllers simultaneously. The controllers can be connected in series to the serial ports on the operator terminal and to the Ethernet via the Ethernet port.

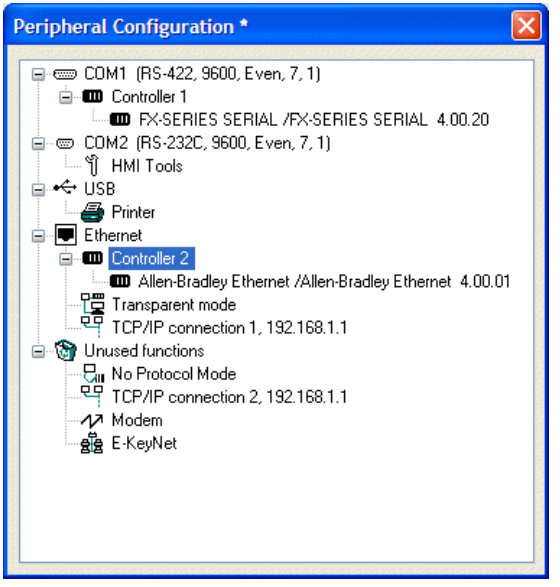
Addressing of the signals in the controllers is carried out as normal for each respective controller in accordance with the manual for the driver.

Double-click on the project in the Project Manager to display the Project Properties dialog.



Select **Controller** by clicking on **Change** for **Controller 1** or **Controller 2**. If the selected driver for **Controller 1** does not support dual drivers, a driver for **Controller 2** cannot be selected. Click on **OK**.

Double-click on the **Peripherals** folder in the Project Manager. Drag **Controller 1** and **Controller 2** to the connection ports where the respective controllers are connected. It is possible to use RS232C, RS422, RS485 and the Ethernet port. For further information on the connection of controllers to the operator terminal, see the manual for respective drivers.



Addressing

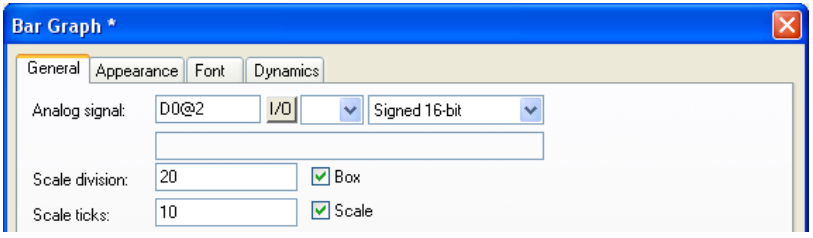
Addressing of the signals in the controllers is carried out as normal for each respective controller in accordance with the manual for the driver. The controller to which a created object is to be linked is selected by clicking the button corresponding to the desired controller (1 or 2) in the Controller Toolbar. Controller 1 is pre-set when a project is created or opened.

If button **1** is clicked, the signal is linked to an object created for **Controller 1**, and if button **2** is clicked, the signal is linked to an object created for **Controller 2**. Clicking the I links the signal to the internal variables. See section *Internal variables* for further information.

It is also possible to click on the **I/O** button in the object created and select which controller the object is to be connected to from the I/O Browser.

To address a signal in controller 2 when controller 1 is preset, the signal must be given the addition @2 and correspondingly @1 for controller 1 if controller 2 is preset.

Example:
Controller 1 is preset. Register D0 in controller 2 is to be connected to a Bar Graph. D0@2 is entered in the field **Analog signal** in the dialog for the bar graph.



I/O Cross Reference

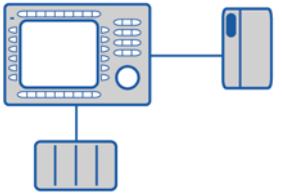
The I/O cross reference function can be used to show I/Os in a well-arranged manner for both **Controller 1** and **Controller 2**. The cross reference shows the preset controller.

Name list

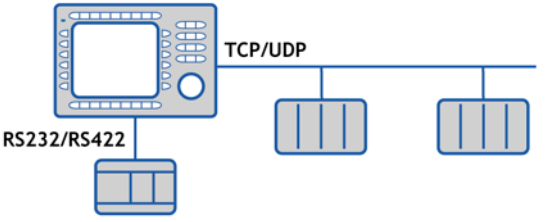
The name list with attendant functions is supported for both **Controller 1** and **Controller 2**.

Note:
If communication with a controller is lost, the operator terminal will continue to communicate with the other system. The operator terminal will try to connect to the disconnected system every tenth second, which can affect communication with the operable controller. The interval can be changed in the parameter off-line station in the driver properties.

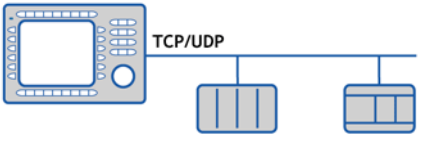
Examples of configurations where dual drivers are used in the operator terminal



Operator terminal communicating with one controller and one frequency converter.



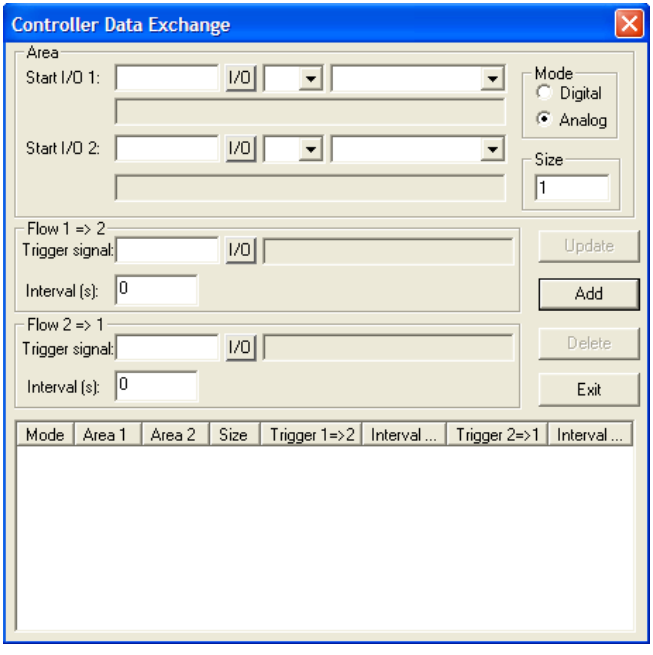
Operator terminal communicating in series with one controller via the Ethernet, and with controllers of another make.



Operator terminal communicating with two controllers of different makes via the Ethernet.

17.2 Data exchange between controllers

When two controllers are connected to one and the same operator terminal (dual drivers are used in the operator terminal) it is possible to exchange data (analog and digital signals) between the controllers. Likewise, two controllers can each be connected to an operator terminal and still exchange data when the operator terminals are connected in a BDTP network. For addressing, see the section *BDTP*. The signals do not have to be of the same type in the two controllers. The exchange of data takes place in a virtual data channel between controller 1 and 2. Eight different data channels can be defined. The transfer of data can take place at intervals or during events. The conditions for how the transfer is made and which interval of signals are to be transferred for each data channel are specified by double-clicking on **Controller data exchange** under the **Peripherals** folder in the Project Manager.



Parameter	Description
Area	**Start I/O 1** and **Start I/O 2** - Start address for the data channel for controller 1 and controller 2. (The subsequent fields are used to specify an index register and signal format. See the chapters *Index Addressing* and *Signal format*.)
Mode	Select if the signals for the data channel are digital or analog.

Parameter	Description
Size	The number of signals to be transferred (start address + subsequent) in the data channel. The maximum number of signals for is 255.
Flow 1 => 2	**Trigger signal** - A digital signal which controls the data transfer from controller 1 to controller 2 for the data channel. The signal status has the following implications: 0 - Inactive 1 - Transfer - The operator terminal resets the signal when the transfer is completed. **Interval** -The time in seconds between cyclical transfers of data channels. The interval parameter should be zero if it is not used. If the value is greater than 0 the parameter has a higher priority than the Trigger signal, and therefore a trigger signal cannot trigger transfers. The maximum number of seconds is 65,535.
Flow 2 => 1	**Trigger signal** - A digital signal which controls the data transfer from controller 2 to controller 1 for the data channel. The signal status has the following implications: 0 - Inactive 1 - Transfer **Interval** - The time in seconds between cyclical transfers of data channels. The interval parameter should be zero if it is not used. If the value is greater than 0 the parameter has a higher priority than the trigger signal, and therefore a trigger signal cannot trigger transfers. The maximum number of seconds is 65,535.

Click **Add** when the properties for a data channel have been defined.

Note:
Data exchange is given the same priority as other functions in the operator terminal. This means that if the operator terminal is occupied (with performing other functions) and a request for data exchange is made, this will affect the transfer time, and the exchange of data between the controllers will take longer than usual.

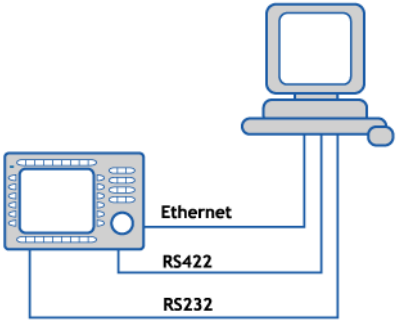
17.3 Transparent mode

In Transparent mode a communication port (programming/printer port) on the operator terminal which is not connected to the controller can be used to connect additional units working in parallel with the controller. These units can be operator terminals, a PC with configuration tools for the controller, or a master operator system.

For information about whether Transparent mode will function together with the connected controller, please see the driver manual for the current driver.

Connection of PC or other computer system

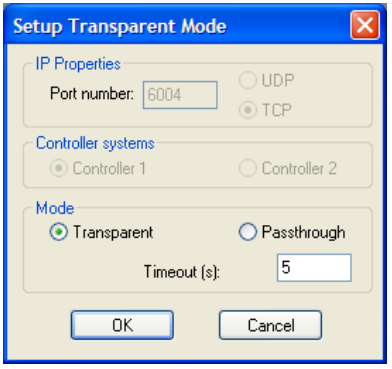
A PC with a configuration tool or another computer system is connected directly to a communication port on the operator terminal, in this case the programming/printer port.



Operator terminal connected to the programming port.

Properties in the operator terminal and PC

The properties for Transparent mode are made by double-clicking on the **Peripherals** folder in the Project Manager. Drag the unit **Transparent mode** to the communication port where the PC is to be connected to the operator terminal. Right-click on **Transparent mode** and select **Properties**. Select **Transparent mode** (if this is supported by the driver; see the manual for the driver). The properties for the port where the PC is connected must correspond with the properties in the program in the PC (the configuration tool for the controller).



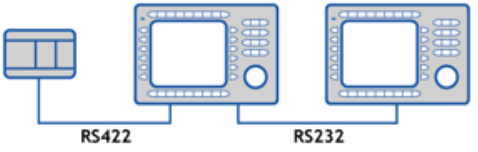
Parameter	Description
IP Properties	Only used for communication in Transparent/Passthrough mode via Ethernet. The Transparent mode unit must then be connected to a TCP/IP connection. Port number 6004, does not normally need to be changed. The required protocol, TCP or UDP, is also selected here.
Controller systems	Only used for communication in Transparent/Passthrough mode via Ethernet. The Transparent mode unit must then be connected to a TCP/IP connection. Select if Transparent/Passthrough mode is to be connected to Controller 1 or Controller 2.
Mode	Select communication mode **Transparent** or **Passthrough**. See the section *Passthrough mode* for information about Passthrough mode. **Timeout** – Specify a time in seconds after which the operator terminal will return to RUN mode from the Passthrough mode if no Passthrough communication has occurred.

Connection of two operator terminals in Transparent mode

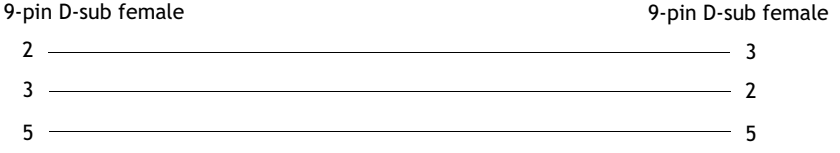
Additional operator terminals can be connected to the same controller with Transparent mode. How to connect two or three operator terminals is described below. Additional operator terminals are connected in a similar way.

Cable connections

When two operator terminals are to be connected to one controller the first operator terminal is connected to the controller, the second to the operator terminal. A cable is connected between the two operator terminals as shown in the following illustration. The cable is connected between the free port on the first operator terminal and the corresponding port on the second operator terminal.



Cable between two operator terminals for RS232 communication



Cable between two operator terminals for RS422 communication

Settings in the first operator terminal

In the configuration tool the communication settings are made under **Setup/Peripherals**. The properties for the port connected to the controller are set as normal. The settings for the port connected to the other operator terminal are optional.

Settings in the second operator terminal

In the configuration tool the communication settings are made under **Setup/Peripherals**. The controller should be placed on the port used to connect the second operator terminal to the first operator terminal. The settings for this port should be the same as for the first operator terminal on the port where the second operator terminal is connected.

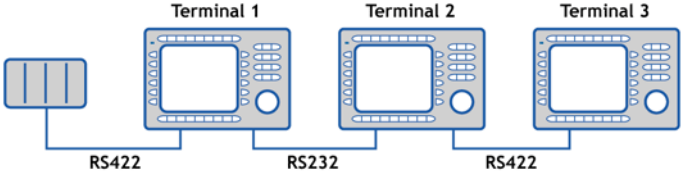
Transfer speed

The transfer speed can vary between 600 and 115,200 baud. It is recommended to use the highest possible transfer speed between the operator terminals to achieve optimal performance. The communication speed decreases with the number of connected operator terminals according to the following table.

Number of operator terminals	Access time to controller			
	Operator terminal 1	Operator terminal 2	Operator terminal 3	Operator terminal 4
1	100%	-	-	-
2	50%	50%	-	-
3	50%	25%	25%	-
4	50%	25%	12,5%	12,5%

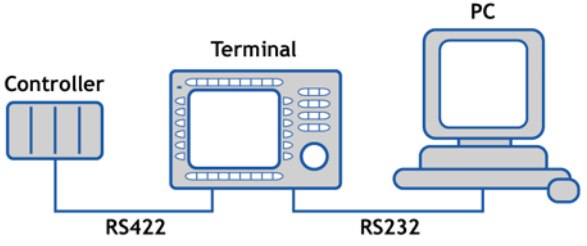
Connection of three operator terminals in Transparent mode

A third operator terminal can be connected with a cable to Terminal 2 in the network as shown in the below diagram. The properties for the third operator terminal should be the same as the properties in the second operator terminal.



17.4 Passthrough mode

With the Passthrough mode function it becomes possible to set the operator terminal in a mode which enables communication between the configuration tool for the connected controller on a PC and the controller to be established through the operator terminal. This is a joint function with the Transparent mode function and in similarity with Transparent mode only supports one controller. This means that Transparent or Passthrough mode can only be used on one of the operator terminal's communication ports. When Passthrough mode is activated and the PC communicates with the controller through the operator terminal, communication between the operator terminal and connected controller will stop. This is the difference between Passthrough and Transparent mode. An operator terminal where communication in Passthrough mode is in progress becomes locked for the operator, and only shows an empty display with the text Passthrough.

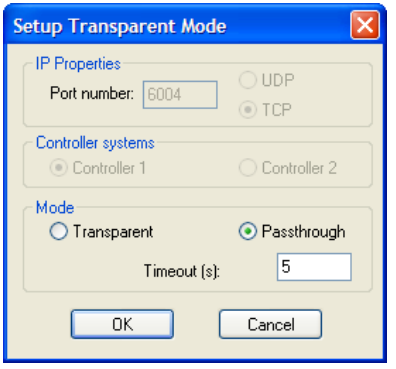


Operator terminal connected to the programming port.

Passthrough mode for one of the connected controllers is activated and deactivated from the program HMI Tools Connect, which is available as an icon in the program group HMI Tools. See the manual for HMI Tools.

Properties in the operator terminal and PC

The properties for Passthrough mode are made by double-clicking on the **Peripherals** folder in the Project Manager. Drag the unit **Transparent mode** to the communication port where the PC is to be connected to the operator terminal. Right-click on **Transparent mode** and select **Properties**. Select **Passthrough mode** (if this is supported by the driver; see the manual for the driver). The properties for the port where the PC is connected must correspond with the properties in the program in the PC (the configuration tool for the controller).

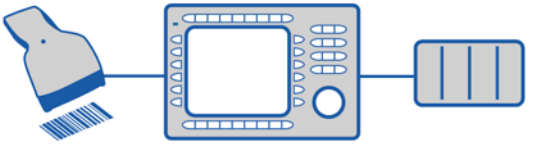


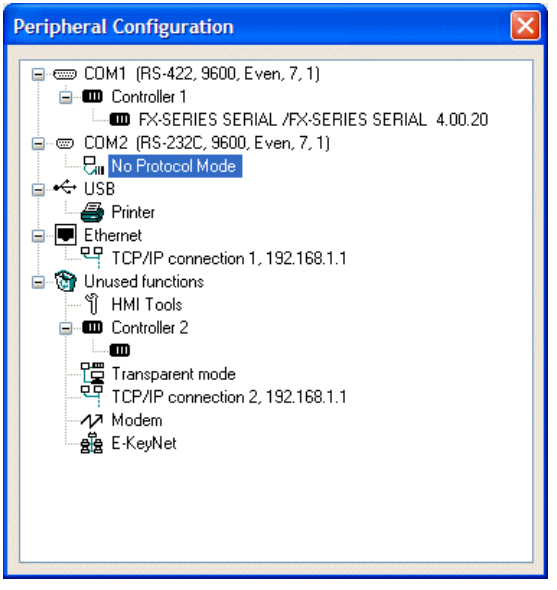
Parameter	Description
IP Properties	Only used for communication in Transparent/Passthrough mode via Ethernet. The Transparent mode unit must then be connected to a TCP/IP connection. Port number 6004, does not normally need to be changed. The required protocol, TCP or UDP, is also selected here.
Controller system	Only used for communication in **Transparent/Passthrough** mode via Ethernet. The Transparent mode unit must then be connected to a TCP/IP connection. Select if **Transparent/Passthrough** mode is to be connected to **Controller 1** or **Controller 2**.
Mode	Select communication mode **Transparent** or **Passthrough**. **Timeout** - Specify a time in seconds after which the operator terminal will return to RUN mode from the Passthrough mode if no Passthrough communication has occurred.

Passthrough mode can be used both through serial and Ethernet communication.

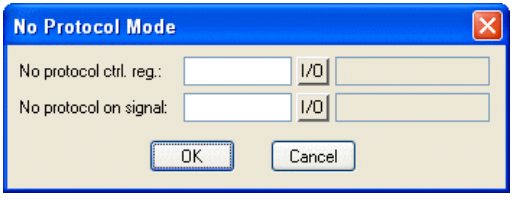
17.5 The operator terminal as a communication interface (No protocol mode)

No protocol mode is used to connect different controllers, or to connect external units such as barcode scanners or weighing instruments to the controller. The controller controls what is to be sent to the communication port. Data entering the communication port is entered directly in the controller register. Communication takes place with the transfer of the data register area according to the following control block.





Double-click on **Peripherals** in the Project Manager. Right-click on **No Protocol Mode** and select **Properties**.



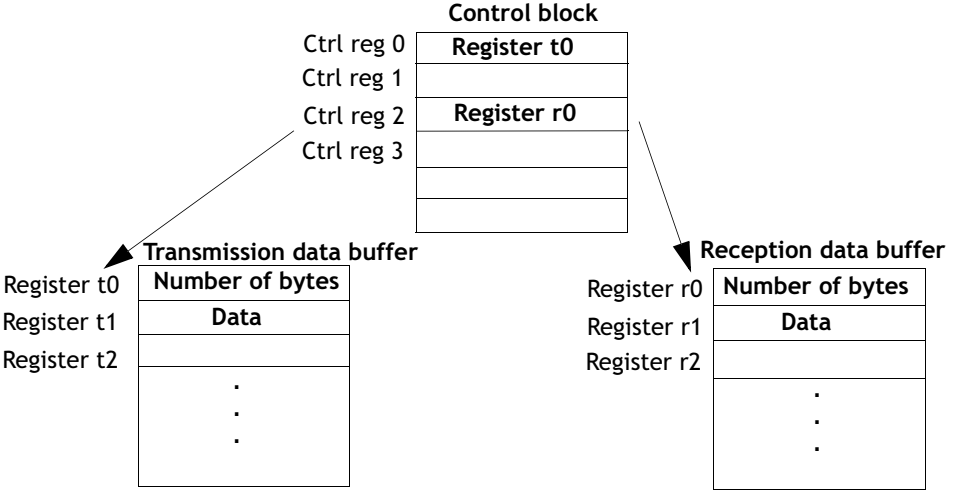
No protocol ctrl. reg.
The first control register used in No protocol mode.

Register	Description
Ctrl. reg. 0	*Start register for the transmission data buffer.* The first register in the buffer area contains the total number of bytes to be sent. The following registers contain the data to be sent. The maximum buffer size is 127 registers = 254 bytes.
Ctrl. reg. 1	*Command register for transmission.* Set to 1 by the controller when transmission is requested. Set to 0 by the operator terminal when transmission is completed.
Ctrl. reg. 2	*Start register for the reception data buffer.* The first register in the buffer area contains the total number of bytes received. The following registers contain the received data. The maximum buffer size is 127 registers = 254 bytes.
Ctrl. reg. 3	*Command register for reception.* - Set to 0 by the controller when it is ready to receive. - Set to 1 by the operator terminal when the message is available. - Set to -1 (FFFF) on error message (e.g. too short). - Set to 2 by the controller when clearing of the port buffer is required. - Set to 3 by the operator terminal when clearing of the port buffer is completed. The port buffer is automatically cleared on start up and when switching between Transparent mode and No protocol mode, i.e. the register receives the value 3.
Ctrl. reg. 4	*End code* (1 or 2 bytes) on the received message.
Ctrl. reg. 5	*Length* of the received message. If 0, the end code is used.

No protocol on signal
A digital signal for switching between No protocol mode and Transparent mode, for example to dial up a computer and send a message.

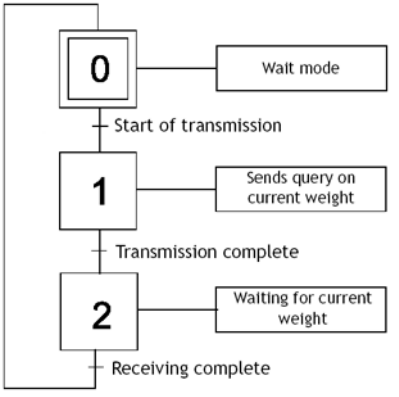
In the **Peripherals** dialog, drag the unit **No protocol mode** to the communication port to use. Right-click on **No protocol mode** and select **Properties** to define which register is to be the first control register in the transfer area. This and the five following registers are used as control registers.

The controller can switch between No protocol mode and Transparent mode while operating. Specify a digital signal for the parameter **No protocol signal**.



Example of using No Protocol mode

The following example describes how No Protocol mode can be used for a weighing system. The diagram below shows a three-stage block diagram for the communication.



The operator terminal functions as a master system for the weighing system, i.e. it continuously asks for the current weight.The protocol appears as follows.

Operator terminal

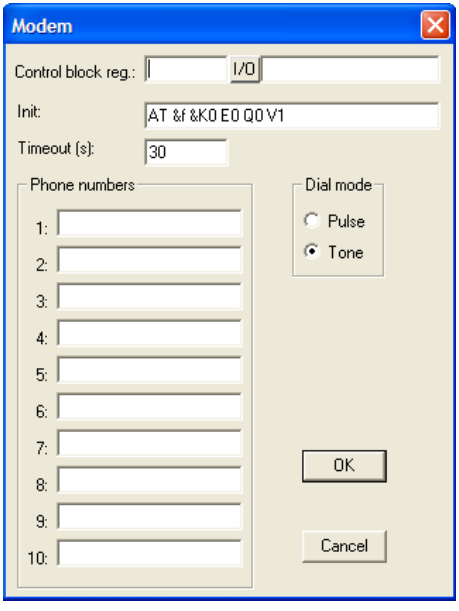
|STX|?|CR|LF|

Weighing system

|STX|Weight in kg|CR|LF|

17.6 Modem connection

A modem can be used to create a dial-up connection to a PC. The properties for the connection are made by double-clicking **Peripherals** in the Project Manager. Right-click on **Modem** and select **Properties**.



Control block reg.

The communication is established with three control registers in a control block. The first register in the control block is defined in the **Control block reg.** in the dialog. The functions of the control registers are described in the following table.

Register	Description
Ctrl. reg. 0	Contains commands describing how the controller is to dial up and establish communication. 0 Wait for command. 1-10 Dial up with the phone number entered in the field Phone No 1-10. Maximum of 40 characters. 11 Dial up with a phone number stored in the controller. This number is stored as an ASCII string, which begins in the third control register and the following registers. The string can contain a maximum of 40 characters, i.e. 20 registers. It is not necessary to use all the registers. The last register read must contain the ASCII code 0. 101-110 An initiation string is sent to the modem. Enter Hayes modem command commands in the field Phone No 1-10. Command 101 sends the string in the field Phone No 1, etc. 111 An initiation string stored in the controller is sent to the modem. Enter Hayes modem commands beginning in the third control register. See command 11 for details. 255 Hang up command.
Ctrl. reg. 1	The second control register is used as a status register. It contains the results of the modem commands. The status register can contain the following: Status codes 0 Command executed successfully. 1 Dialling in progress. 2 Modem has established connection. 3 Modem detected a ring signal. Error codes 101 No connection. 102 Modem detected lost carrier. 103 Unspecified error from modem. 104 Modem gets no dial tone. 105 Busy when dialling. 106 No answer when dialling. 107 No reply from modem. 255 Unknown error/status.
Ctrl. reg. 2	The operator terminal can dial up with a phone number stored in the controller. This number is stored as an ASCII string, which begins in the third control register and the following registers. The string can contain a maximum of 40 characters, i.e. 20 registers. It is not necessary to use all the registers. The last register read must contain the ASCII code 0.

Init:
Modem initiation string

Timeout
The number of seconds before the line is disconnected when idle. The default value is 30 seconds. A value between 5 and 600 seconds can be given.

Dial mode:
Choose between pulse and tone.

Phone numbers 1-10:
Complete phone number for the dial-up.

18 Network Communication

This chapter describes how operator terminals communicate in a network via TCP/IP (Transmission Control Protocol/Internet Protocol). TCP/IP is a standardized set of protocols which enable sharing with other systems and units. The operator terminals can be connected in a network in many different ways, through Ethernet or serially.

The operator terminal's built-in Ethernet port can be used for TCP/IP connections. Connections are made according to Ethernet standards.

The operator terminal network is a client/server network. Only clients can access data in the network. Servers only supply data to clients. An operator terminal can be both a client and server at the same time, in order to both supply data and access data from other operator terminals. A maximum of 20 different clients can access data from the same server. A client can access data from up to 16 different servers.

All operator terminals must be assigned an IP address. IP addresses from 192.168.0.0 to 192.168.254.254 are recommended for internal networks.

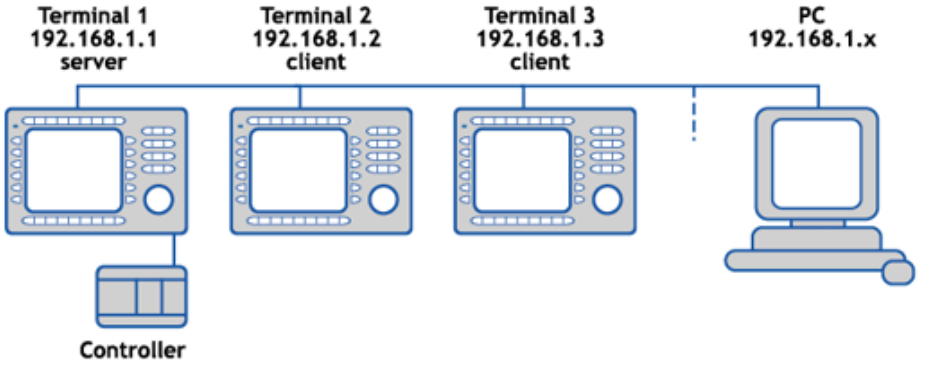
It is possible to use standardized Internet tools, such as a web browser, an e-mail server, an FTP client and a VNC client, with the operator terminal. A web page can be created in the PC and downloaded to the operator terminal. The web page can contain real-time data from the controller or the operator terminal. Values can be changed, signals can be set, alarms can be acknowledged etc. through scripts, via Internet, using a web browser. The operator terminal can be accessed and controlled remotely by using a VNC client.

The operator terminal can also send e-mail for special events such as alarm and status reports.

18.1 Examples of possible networks

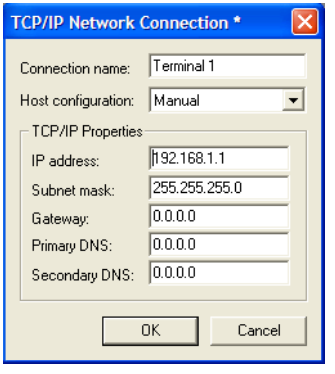
Example 1

This Ethernet network is designed for one controller with several operator terminals.

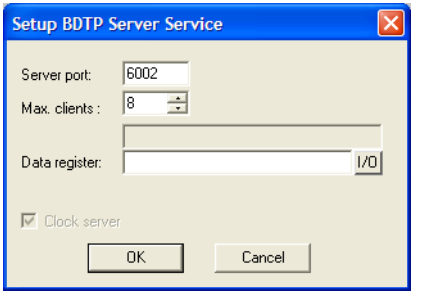


Terminal 1 (192.168.1.1)

Operator terminal 1 must be a server. Clients have access to the controller through the server.



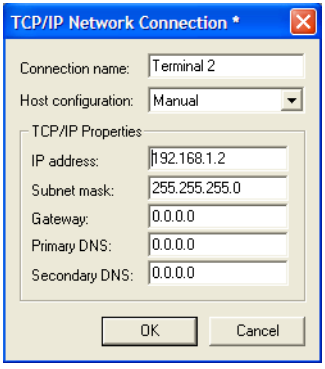
Setup/Network/TCP/IP Connections



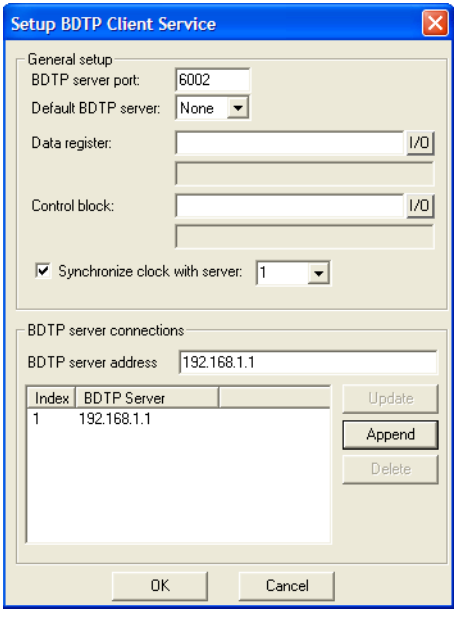
Setup/Network/Services
Select BDTP server and click Edit...

Terminal 2 (192.168.1.2)

Operator terminal 2 must be a client. A client has access to the controller connected to the server.



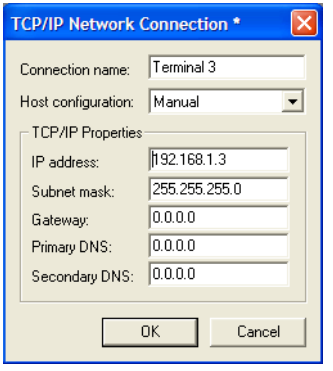
Setup/Network/TCP/IP Connections



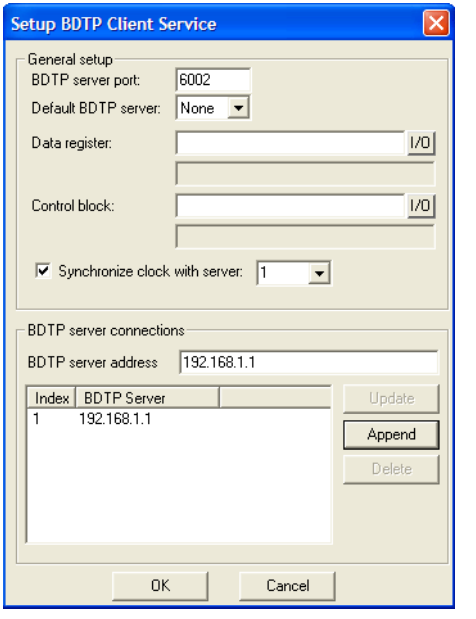
Setup/Network/Services
Select BDTP client and click Edit...

Terminal 3 (192.168.1.3)

Operator terminal 3 must be a client. A client has access to the controller connected to the server.



Setup/Network/TCP/IP Connections

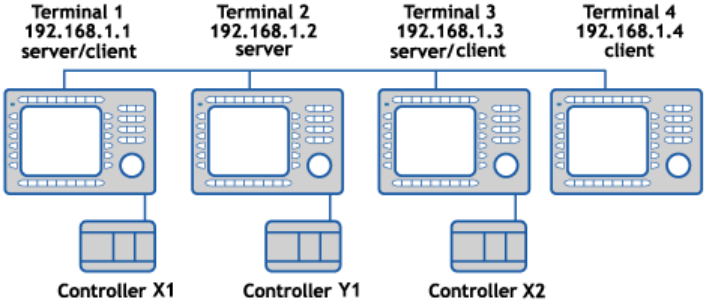


Setup/Network/Services
Select BDTP client and click Edit...

A PC can be connected to transfer projects to the operator terminals. The PC can be connected either through the Ethernet port, or to one of the serial ports on one of the operator terminals. Using the Ethernet port is recommended.

Example 2

This Ethernet network is designed for several controllers and operator terminals in a network. The controllers in this example use different drivers, driver X and driver Y.



Terminal 1 (192.168.1.1)

The operator terminal 1 is a server/client with the driver X and therefore has access to data from all servers with the same driver, as well as being able to provide data to other clients with the same driver. The operator terminal 1 can access the connected Controller X1. The operator terminal 1 cannot access the operator terminal 2 due to different driver, and neither can it access the operator terminal 4 which is set up as a client, not a server. This means that the operator terminal 1 can access the controllers X1 and X2.

Terminal 2 (192.168.1.2)

The operator terminal 2 is a server with the driver Y, which can provide data to clients with the same driver. The operator terminal 2 also has access to the connected Controller Y1. However, the operator terminal 2 cannot access any other operator terminals since it is only set up to be a server, not a client. This means that the operator terminal 2 only has access to the local Controller Y1.

Terminal 3 (192.168.1.3)

The operator terminal 3 is a server/client with the driver X and therefore has access to data from all servers with the same driver, as well as being able to provide data to other clients with the same driver. The operator terminal 3 has access to the connected Controller X2. The operator terminal 3 cannot access the operator terminal 2 due to the different driver, and neither can it access the operator terminal 4 which is set up as a client, not a server. This means that the operator terminal 3 can access the controllers X1 and X2.

Terminal 4 (192.168.1.4)

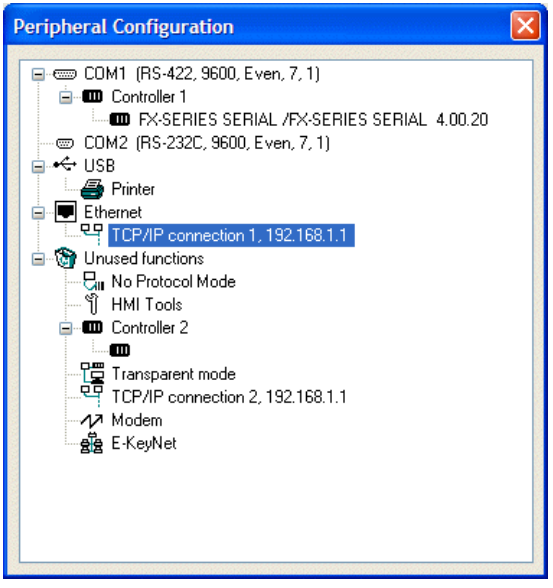
The operator terminal 4 is a client with the driver Y, which can access data from all servers with the same driver. This means that the operator terminal 4 can access the Controller Y1.

Data can be exchanged between the controllers by using control registers. See the sections *BDTP Client* and *BDTP Server*.

The function for data exchange are also used for data exchange between two controllers as described in the section *Data exchange between controllers* in the previous chapter.

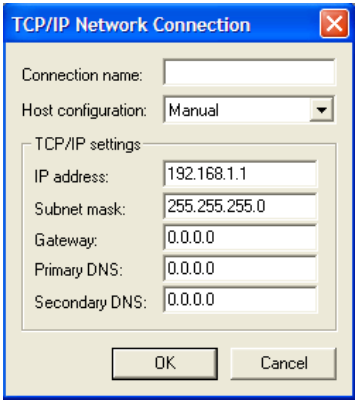
18.2 Network communication through Ethernet

Double-click on **Peripherals** in the Project Manager to open the Peripheral Configuration dialog.



Properties

Select **TCP/IP Connection 1**, right-click and select **Properties** to enter the properties for the TCP/IP network.



Setup/Network/TCP/IP Connections

Connection name

Enter a name for the connection. The parameter is optional.

Host configuration

Select **Manual** to use the TCP/IP properties made in the dialog. Select the other alternatives when a server provides the operator terminal with one or several of the TCP/IP parameters.

IP Address and Subnet mask

State the node's network identity. Connection in a network is made according to Ethernet standards. For a local network between the operator terminals, using the addresses 192.168.0.0 – 192.168.254.254 is recommended.

Gateway

Specify the network device in the local network that can identify other networks.

Primary DNS and Secondary DNS

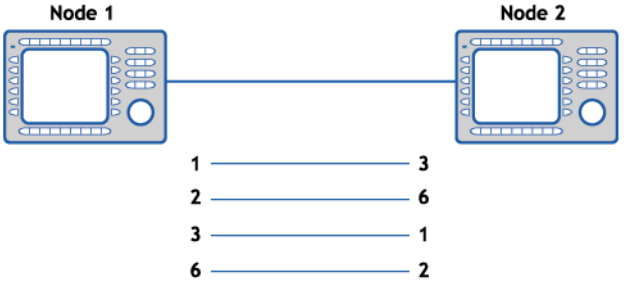
State the servers containing information on a part of the DNS database.

Click **OK** after all properties have been made.

Ethernet connections

The section below shows two examples of Ethernet connections.

Connection between two operator terminals with twisted pair cable (TP)

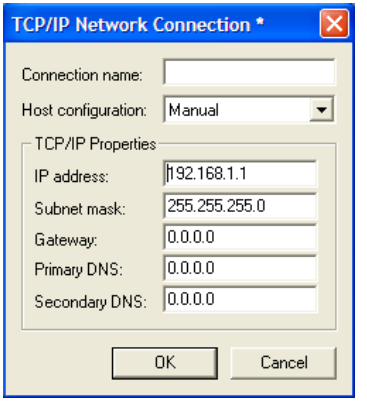


The maximum length between the operator terminals is 100 m. The cable is a CAT5 (cross-coupled) pair twisted cable, screened or not screened, equipped with RJ45 connectors.

Note:
If the communication does not work properly and the green LED does not light up, then connections 3 and 6 are probably switched.

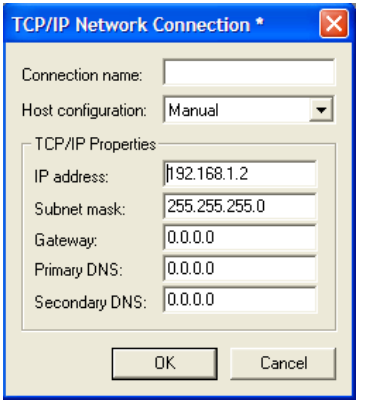
TCP/IP properties in the nodes

Node 1



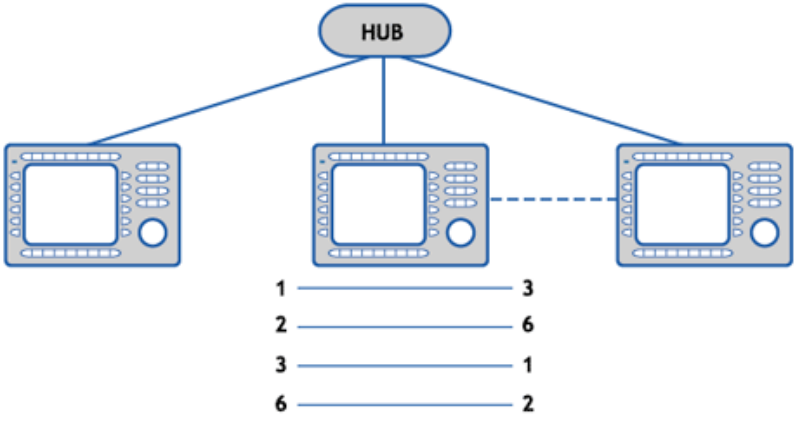
Setup/Network/TCP/IP Connections

Node 2



Setup/Network/TCP/IP Connections

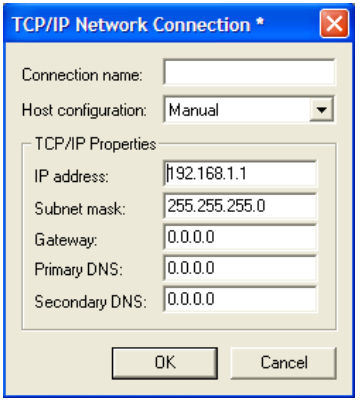
Connection of two or more operator terminals with twisted pair cable



The maximum length between the operator terminal and hub is 100 m. The number of operator terminals per hub is limited by the number of connections to the hub. The cable is a CAT5 pair twisted cable, screened or not screened, equipped with RJ45 connectors.

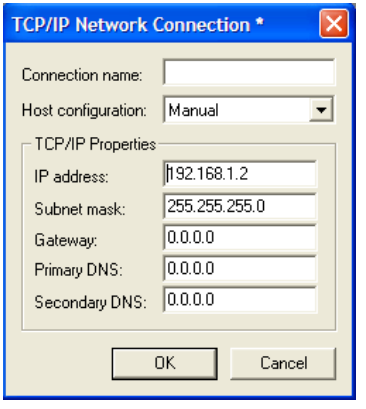
TCP/IP settings in the nodes

Node 1



Setup/Network/TCP/IP Connections

Node 2

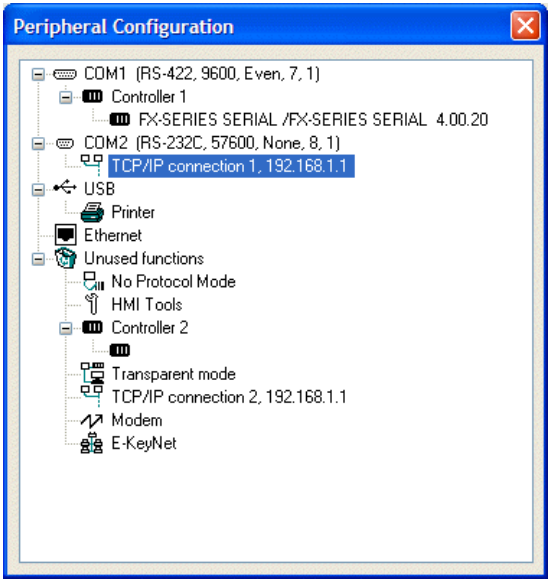


Setup/Network/TCP/IP Connections

18.3 Serial network communication/PPP

How to make a connection

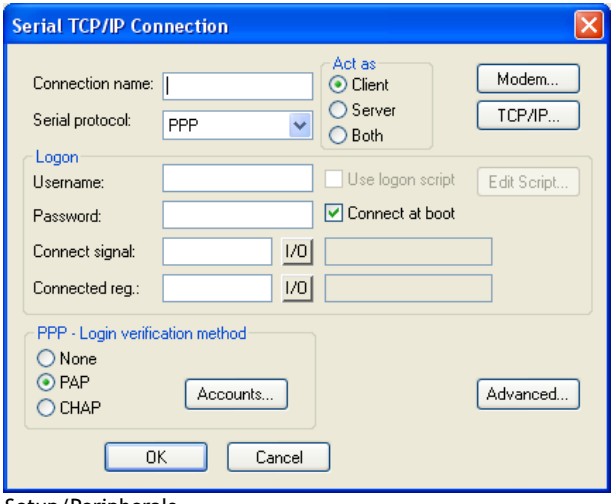
Double-click on **Peripherals** in the Project Manager. Drag TCP/IP Connection 1 to COM1 or COM2. The blinking arrows indicate where it is possible to drop it. **TCP/IP Connection 1** must be used before **TCP/IP Connection 2** can be used.



Note:
The parity setting on the port connected to the TCP/IP connection must be NONE.

Setup

Select **TCP/IP Connection 1**, right-click and select **Properties** to enter the properties for the TCP/IP network.



Setup/Peripherals
Right-click on TCP/IP Connection placed on serial port and select **Properties**.

Connection name

Enter a name for the connection. The parameter is optional.

Serial protocol

The protocol PPP is used for serial communication.

User name

State the user name to use when logging in to remote network.

Password

State the password to use when logging in to remote network.

Connect signal

The digital signal which establishes the connection when it is set to one and disconnects when it is reset.

Connected reg

Analog register, which can have the following status.

0	Disconnected (PPP Client)
1	Waiting for a connection (PPP Server)
2	Connected as a PPP Client
3	Connected as a PPP Server
7	Connection error

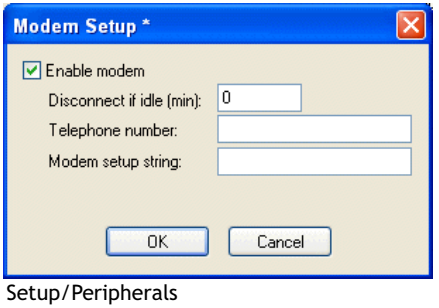
Connect at boot
For PPP connections, the operator terminal can automatically connect to another operator terminal or PC at start-up.

PPP - Login verification method
Select method to validate the user identity. Does not normally need to be changed.

Accounts
Define who is allowed to access the services. See the section *Network accounts* for more information.

Act as
Select if the operator terminal is to act as a PPP client and/or PPP server, i.e. if the operator terminal is to dial up a remote network or be dialed into from a remote host.

Modem
The parameters under **Modem** are indicated if the connection is made through a modem. Use a standard modem cable to connect to the modem.



Setup/Peripherals
Select TCP/IP Connection placed on serial port and click **Edit**.
Now click the button **Modem...**

Enable modem
Check if a modem is used.

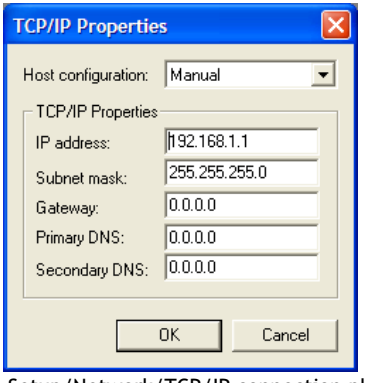
Disconnect if idle (min)
Disconnects if the connection has been idle for the given number of minutes. 0 means that the connection is never disconnected.

Telephone number
State the telephone number to be dialed.

Modem setup string
String which initiates the modem. For further information, refer to the documentation for the modem.

TCP/IP

Parameters for TCP/IP connection. When the operator terminal is connected to a remote host, the parameters IP address, Subnet mask and Gateway are overwritten by the settings under **Advanced...**.



Setup/Network/TCP/IP connection placed on serial port
Click on the button TCP/IP...

Host configuration

Select **Manual** to use the TCP/IP properties made in the dialog. Select the other alternatives when a server provides the operator terminal with one or several of the TCP/IP parameters.

IP Address and Subnet mask

State the node's network identity. Connection in a network is made according to Ethernet standards. For a local network between the operator terminals, using the addresses 192.168.0.0 – 192.168.254.254 is recommended.

Gateway

Specify the network device in the local network that can identify other networks on the Internet.

Primary DNS and Secondary DNS

State the servers containing information about a part of the DNS database.

Advanced

By selecting **Advanced** it is possible to define additional parameters.

Use VJ compression of IP headers

Compression of IP headers. Does not normally need to be changed.

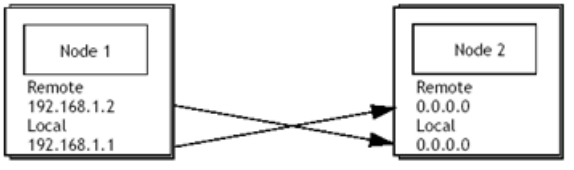
Request/provide remote address

The request/providing of the remote node's IP address. Should be 0.0.0.0 if you want the IP address provided from the remote node.

Use remote address as gateway
Checked to let the remote node's IP address be the gateway, i.e. the connection port to another network. The default setting is OFF.

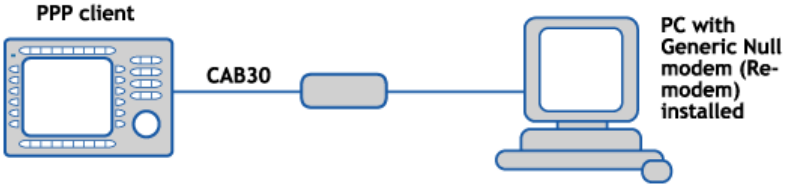
Note:
If the parameter **Use remote address as gateway** is not checked and a sub network is used, the communication with the network will not function. This also means that e-mail cannot be sent from the operator terminal, but that it is possible to login to the operator terminal from the outside, e.g. with a FTP client or web browser.

Request/provide local address
The request/providing of the remote node's IP address. Should be 0.0.0.0 to use the IP address provided from the remote node.

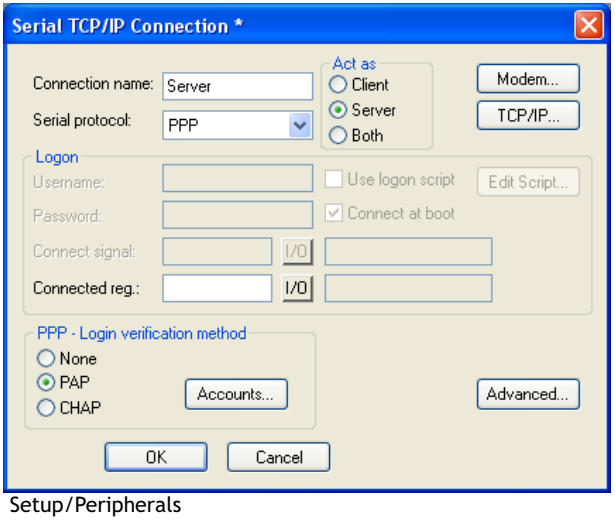


Serial connection

PPP connection between an operator terminal and a PC



Properties in the operator terminal



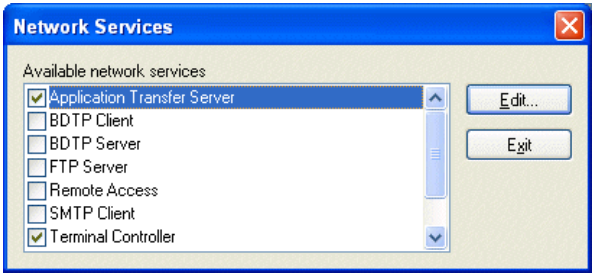
Properties under TCP/IP (IP Address, Subnet mask and Gateway) are of no importance in this case. PPP will change the parameters.

Setup/Peripherals
Select TCP/IP Connection placed on serial port.

Please refer to the PC's operating system manual for PC instructions.

18.4 Network services

Double-click on **Network Services** in the **Network Connections** folder in the Project Manager to select the services the operator terminal is to provide in the network. Checking a service activates it. To enter properties for the selected service, click **Edit**.



Application Transfer Server

Transfer of projects through TCP/IP. Select **Application transfer server** in the list and click **Edit** to enter the number of the port to enable the transfer. Does not normally need to be changed.

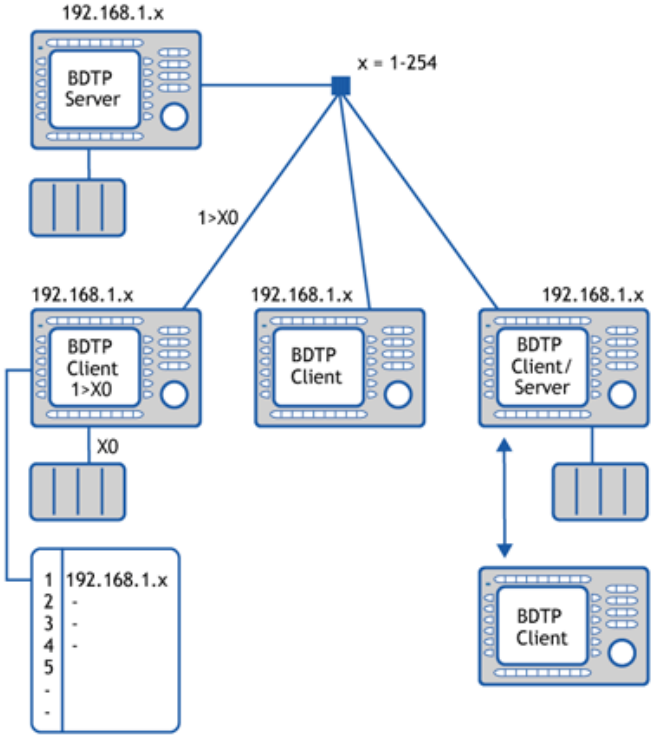
BDTP

BDTP is a protocol which uses client/server communication. A client asks for information and a server provides clients with information. The BDTP server listens to the I/O request from the BDTP client. The operator terminal can be client, server, or both. The client can collect data from a maximum of 16 servers. The server IP addresses are specified in the BDTP client. Each server can provide 20 clients with information.

Network communication via BDTP is used to connect two or more E1000 operator terminals to one or two controllers or several operator terminals to two or more controllers, with retained performance. One example is production lines with one operator terminal at each work station.

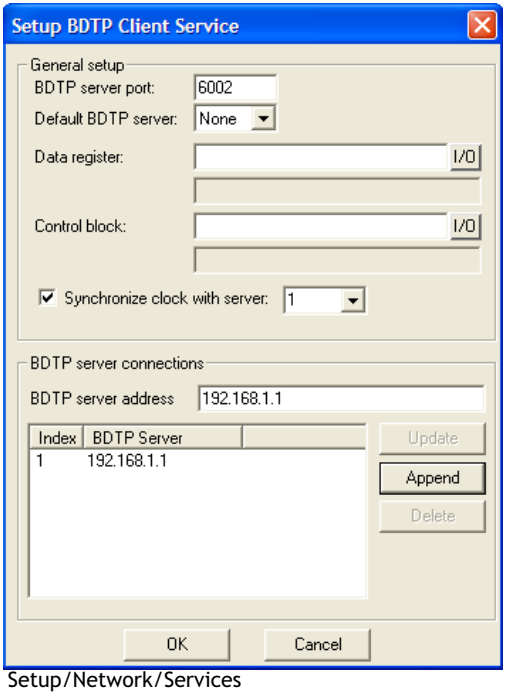
If the BDTP server fails, the client will continue to work with the system to which it is physically connected. The client will not restart when it tries to connect to the server. When the server becomes active, BDTP communication will continue as previously.

The figure below shows an example of a network.



BDTP Client

For the network service BDTP Client, the IP Addresses for the BDTP Servers in the network from which the client is to collect information are defined. Select **BDTP Client** in the list and click **Edit** to enter the properties.



Setup/Network/Services
Select BDTP Client and click Edit...

BDTP Server port

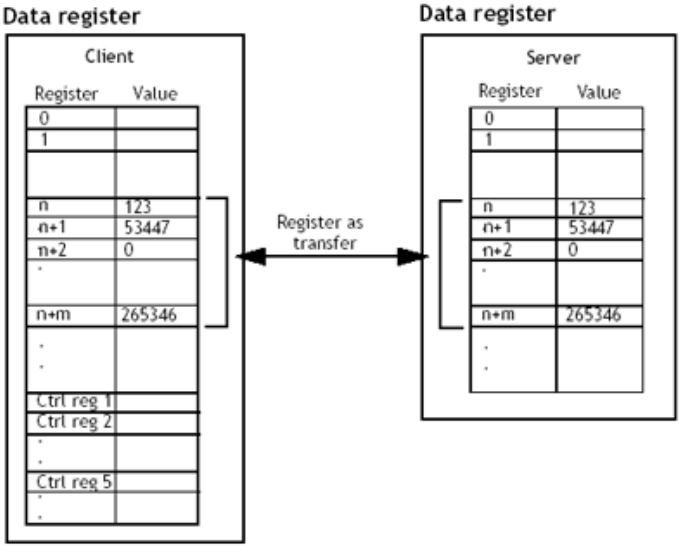
State the communication port the BDTP server/network is connected to. Does not normally need to be changed.

Default BDTP Server

A server can be specified as the default server, which means that if nothing else is specified when entering the I/O, signals are assumed to be collected from this server.

Data register

Values in data registers can be transferred between a client and different servers in a network. The first register in the register block in the client which is to be transferred to/from the indicated server is stated under **Data register**. The type of register does not have to be the same in client and server.



Control block

Under **Control block** the first register in the control block in the client is stated. A total of five registers are used as follows.

Register	Content	Description
Ctrl reg 1	Command	Command register set in the client. Available commands: 0: No command. 1: Transfer values in register from client to server indicated in control register 3. 2: Transfer values in register from server indicated in control register 3 to client.
Ctrl reg 2	Handshake	Handshake register set by client. 0: Ready for new command. 1: OK 2: Transmission error.
Ctrl reg 3	Server index	The number of the server in the network the transfer is to be made with.
Ctrl reg 4	Index register	The value in the index register is added to the address of the register indicated under Data register. If zero is given, the register block will start with the address given under Data register.
Ctrl reg 5	Number of registers	The number of registers, the values of which are to be transferred to/from the given server.

The transfer must be handled as follows:

1. The handshake register must be 0. If not, reset the command register to 0.
2. Enter the command in the command register.
3. Wait for the ready signal or error code in the handshake register.
4. Set the command register 0. The operator terminal will now set the handshake register to 0.

Synchronize clock with server

Indicate if the client clock is to be synchronized with a selected server (operator terminal). The server is selected by giving the number of the server in the entry field. If the clock in the client is changed locally, the change will also be transferred to the selected server.

BDTP Server Address

Under **BDTP Server Address**, indicate the IP addresses to the servers from which the client will be able to retrieve data. The addresses will be indexed in the order they are entered.

When objects are programmed in the project you must indicate from which server the address is to be taken. In the address field in the object dialogs, you specify the following:

server index>device

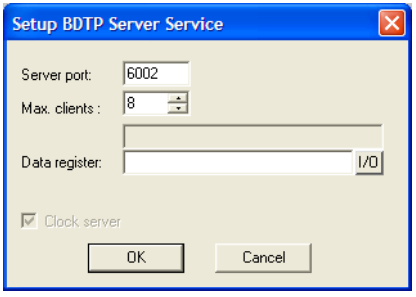
If, for example, 2>D15 is indicated in the address field, the value for the object will be collected from register D15 in the server with index 2.

It is possible to change the server index in a client program with the function BDTP Station change. See the section *Changing BDTP station*.

Note:
If there is no controller connected to the BDTP Client (the operator terminal,) the units **Controller 1** and **Controller 2** must be moved from **RS-232C/RS-422/RS-485** to **Unused functions** in the **Peripheral configuration** dialog.

BDTP Server

Handles requests from clients, i.e. provides clients (operator terminals) with information on requests from the client (operator terminal). Select **BDTP Server** in the list and click **Edit** to enter the properties.



Setup/Network/Services
Select BDTP Server and click Edit...

Server port

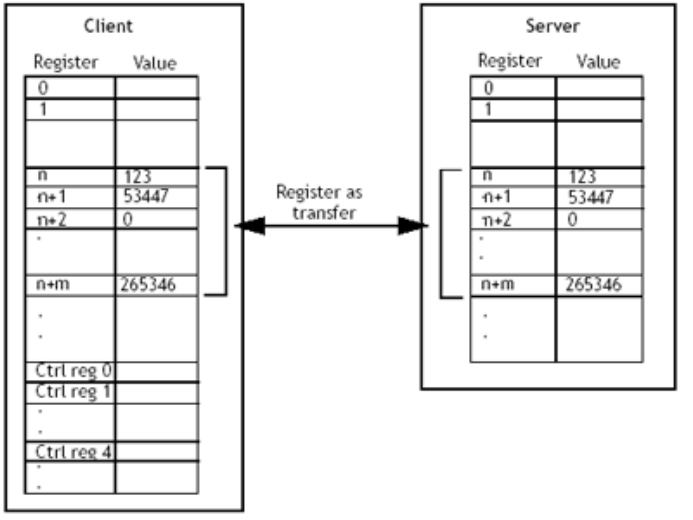
Communication port for the BDTP server. Does not normally need to be changed.

Max Clients

The maximum number of BDTP clients (operator terminals) in the network.

Data register

Values in data registers can be transferred between a server and different clients in a network. The first register in the register block in the server which is to be transferred to/from the indicated client is given under Data register. The type of register does not have to be the same in client and server. For more information on transferring data, see the section *BDTP Client*.

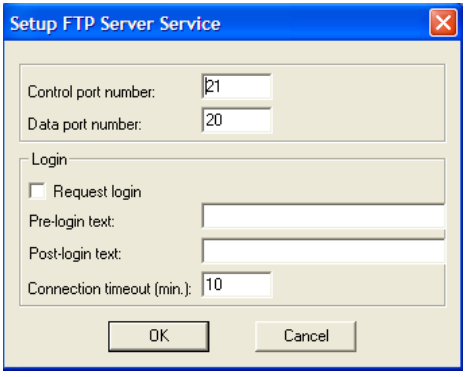


Note:
It is only possible to control the transfer of data from clients.

FTP Server

This function makes it possible to collect or submit files to/from the operator terminal from a PC. The FTP server in the operator terminal allows transfers in passive mode (PASV). Passive mode should be used if the operator terminal is **not** connected Point-to-Point. You will not always know in advance what is used between the client and server, e.g. router-based fire walls or gateways. By using passive mode, further errors are avoided. Web browsers always use this mode. National characters in file names are not supported. Operator terminals do not use dates on files. For more information on the FTP server in the operator terminal, refer to the chapter *Network Functions in the Operator Terminal*.

Select **FTP Server** and click **Edit** to enter properties.



Setup/Network/Services
Select FTP Server and click Edit...

Control Port number
The default value is 21 and should not be changed.

Data Port number
The default value is 20 and should not be changed.

Request login
You indicate here whether the user must login to access the FTP server (the operator terminal). Users are defined under **Setup/Network/Accounts**, see the section *Network accounts*. If you select that users do not need to login, all users will have full access to the FTP server.

Pre Login Text
Text shown before request for the user to login. E.g. “The operator terminal requires login, specify login information”.

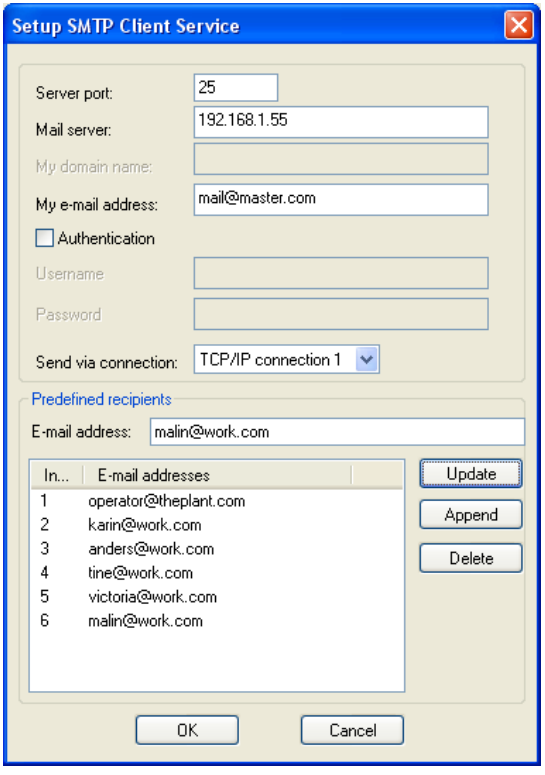
Post Login Text
Text shown when user has logged in. E.g. “You are now logged in”.

Connection Timeout (min)
The time the FTP connection is allowed to be inactive before the FTP server (the operator terminal) breaks the connection. The default value is 10 minutes.

Remote Access
This function makes it possible to access, reflect and control an operator terminal from a PC by using the free VNC client program Remote Access Viewer together with the built-in VNC server in the operator terminal. For more information about Remote Access, refer to the documentation for Remote Access and Remote Access Viewer.

SMTP Client

This function allows e-mail to be sent from the operator terminal. An e-mail server is needed to use the function SMTP client, where messages are sent by the operator terminal. The recipient then collects the message. You can use your Internet provider's e-mail server or a local e-mail server. Trend and recipe files can also be attached with a message. The attached files can be read with HMI Tools. A maximum of 20 messages can be sent at the same time. Select **SMTP client** under **Setup/Network/Services** and click **Edit...** The following properties are entered here.



Setup/Network/Services
Select **SMTP client** and click **Edit...**

Server port

Connection port 25. Does not normally need to be changed.

Mail Server

The IP address to the e-mail server or the alias name (DNS server) for the SMTP e-mail server. If you specify an alias name, the IP address to the DNS server must be given under **Setup/Network/TCP/IP Connections**.

Authentication

Used if the mail server demands SMTP Authentication (With SMTP Authentication, a user has to identify itself and, after a successful authentication, the reception of e-mails is granted.
Username: Username for the SMTP Authentication
Password: Password for the SMTP Authentication

My Mail Address

Enter your e-mail address. The name is shown as sender for the recipient. It should preferably be a genuine address, which the mail server can return error messages to.

Send via Connection

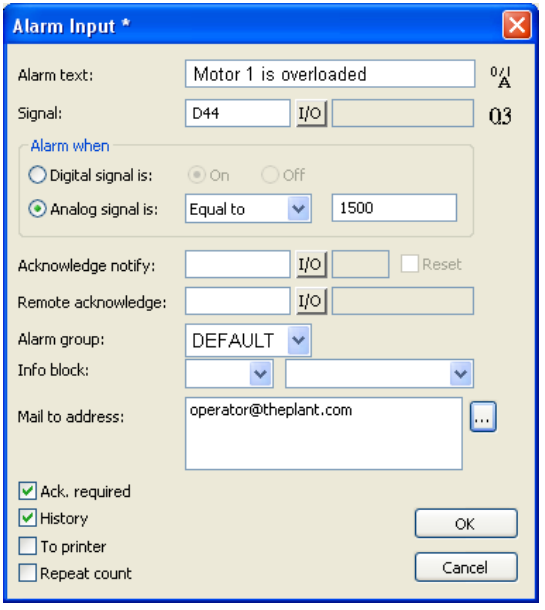
Indicate which TCP/IP connection should be used to send. Note that TCP/IP connection 1 must be used before TCP/IP connection 2 can be used.

Predefined Recipients

A pre-defined list of a maximum of 16 recipients, e-mail addresses which the operator terminal is to send e-mail to. A recipient address can contain a maximum of 60 characters.

Alarm through e-mail

In the same way as alarms can be printed on a printer, they can also be sent as e-mail. The complete alarm list can be sent by sending block 990 (see the section *Report through e-mail*). Each alarm can be connected to one or more of the e-mail addresses as in the configuration of the SMTP client. Under **Setup/Alarm Properties** you enter a general setting for which status of alarms are to be sent as e-mail. See the chapter *Alarm Management*.



Functions/Alarms/New Alarm

Info block

If an information block is indicated, and it is a text block, it will be included in the message. For further information, see the chapter *Alarm Management*.

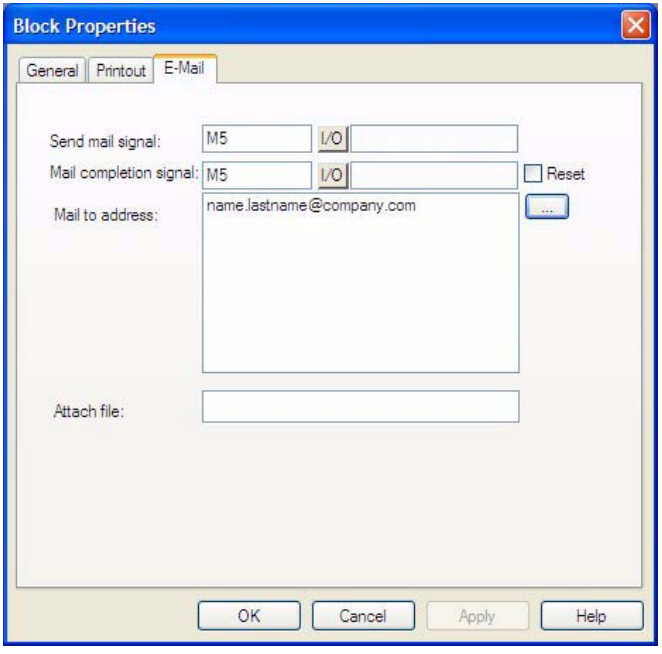
Mail to address:

You indicate here who is to receive the message. Select up to 8 recipients from the predefined list in the dialog **Setup SMTP Client service**.

Report through e-mail

In the same way as text blocks can be printed on a printer, they can also be sent as e-mail. Alarm block, block no. 990, can also be sent as e-mail.

Note:
Only text blocks can be sent. Only the alarm block 990 can be sent as e-mail from the system blocks. Trend and recipe files can be sent as attached files.



Block Properties for a text block

Send mail signal:
The message is sent when the given digital signal is set to one.

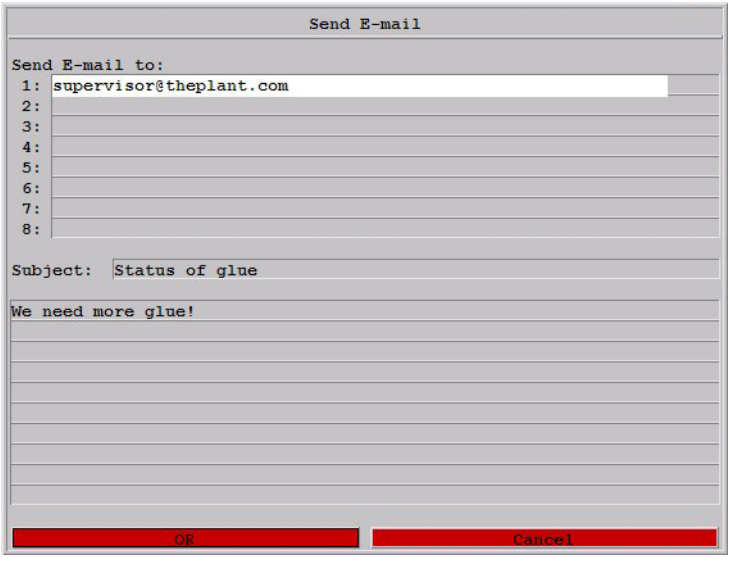
Mail completion signal:
A digital signal activated by the operator terminal when the message has been sent. The signal is normally set to one by the operator terminal. If the box Reset is selected, the signal is reset when the message has been sent.

Mail to address:
The address of the e-mail recipient is given here. Select up to 8 recipients from the list shown when you click the … button. The list of e-mail addresses is defined in the dialog box **Setup SMTP Client** under **Setup/Network/Services**.

Attach file:
The name of a trend or recipe file to be attached with the message is given here. If there is a trend file or a recipe file with the same name, the trend file will be sent. The text file should not contain national characters such as Å, Ä and Ö.

E-mail through system block

By making a block jump to the system block Mail, 993, you can write and send messages while the operator terminal is running.



Send E-mail to

Enter the recipient here. You can write in the address or select it from the global list shown when you click on the button LIST on operator terminals with keyboards, and on the MAIL button on operator terminals with touch screens.

Subject

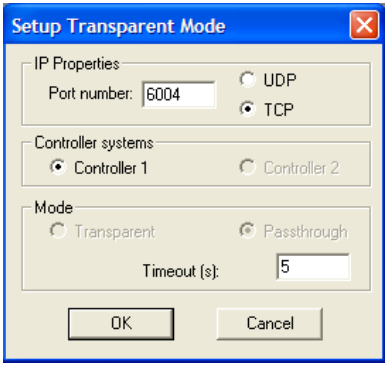
You enter the subject message here (maximum of 50 characters). The text in the message can be a maximum of 10 lines with 50 characters.

Terminal Controller

Used for switching between run and transfer project mode through TCP/IP. Click **Edit** and enter the number of the port to be given to enable the transfer. The port number does not normally need to be changed. Check the box Request authentication if the user name and password must be given before the transfer. Users are defined under **Setup/Network/Accounts**.

Transparent Mode

Used for communication in Transparent/Passthrough mode (see also the chapters Communication and Network functions) in operator terminal networks through Ethernet. Click **Edit Transparent mode**. The unit must then be connected to a **TCP/IP Connection** in **Setup/Peripherals**.



IP Properties

Port number 6004. Does not normally need to be changed. Select required protocol, UDP or TCP.

Controller

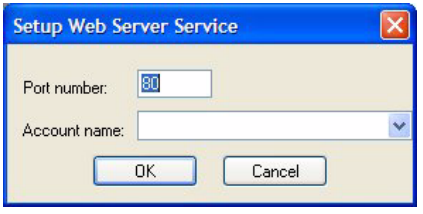
Select if Transparent/Passthrough mode is to be connected to **Controller 1** or **Controller 2**.

Mode

Select communication mode Transparent or Passthrough. In the field **Timeout** the number of seconds is specified, after which the operator terminal will return from the Passthrough status and start functioning normally again if no Passthrough communication has occurred.

Web Server

This a function to configure the www server in the operator terminal. A web server is a program, which, by using the client/server model and Hypertext Transfer Protocol (HTTP,) handles files building web pages for Internet users (who have computers which have HTTP clients). See the chapter *Network Functions in the Operator Terminal*.

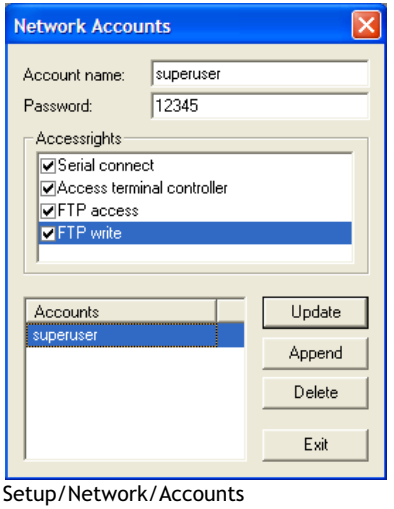


Port number

The default setting is 80 and does not normally need to be changed.

Account name

Selecting an account name protects the HTML pages in the operator terminal with a password. The accounts are defined under **Setup/Network/Accounts**.



Setup/Network/Accounts

Account name

The account name you entered in the previous dialog is shown here.

Password

Enter a password. All HTML pages are protected with this Account name/Password.

The following are added to the HTML page header to protect a separate page with another Account name/Password.

<HTML>
<HEAD>
<META name=”superuser” content=”12345”>*
</HEAD>

The rest of the HTML code is placed here.

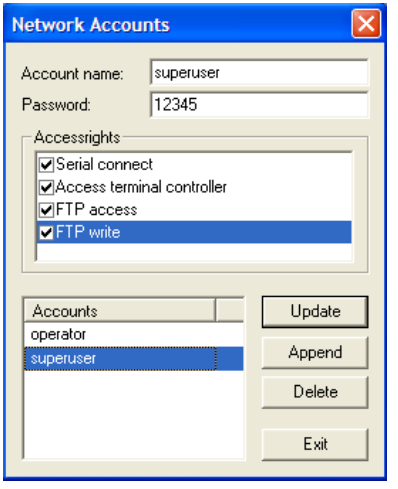
</HTML>

* “superuser” is the account name and “12345” is the password.

Note:
The above must be used in the header. The parameters **Name** and **Content** must correspond to an account name and password.

18.5 Network accounts

Under **Setup/Network/Accounts,** you define who is allowed to access the services in the operator terminals which require login. The function is used to create an authorization check, i.e. you create a name and password for different users who are to have access to different services in the network. Account names and passwords must not contain national characters.



Setup/Network/Accounts

In accordance with the image, the account name Superuser is authorized for all network functions requiring login. You can update, add on, and remove accounts from the list with the buttons.

Account name

Enter a name (user name) for the account.

Password

Enter a password for the account.

Accessrights

Serial connect

The user can use serial connection (PPP). Should be checked.

Access operator terminal controller

The user can implement RUN/TRANSFER switching through TCP/IP. Should be checked.

FTP Access (read)

The user can read from the FTP server (the operator terminal).

FTP Write rights

The user can write to the FTP server. Also requires FTP Access.

18.6 Recommendations and limitations for network communication

To make the communication between operator terminals and controllers in a operator terminal network (BDTP network) quick and efficient, it is important to optimize the transfer of signals in the network. Read the chapter *Efficient communication* and carefully follow the recommendations to optimize the network functionality in the operator terminal. The maximum number of signals that can be transferred in an operator terminal network is 3,000.

Example 1

An operator terminal network consists of three clients and one server. Each client has access to 1,000 signals, i.e. the server can handle (transfer to the different clients) 3,000 signals. This is also the case even if the address areas for the signals in the clients correspond. Accordingly, it is not possible to transfer more signals in the operator terminal network.

Example 2

The server's task is to collect together the addresses the clients are asking for. Thereafter the server asks for the status in the controller, which is then distributed to respective clients.

Example

An operator terminal network (BDTP network) consists of 1 server and 5 clients. Each operator terminal contains 50 alarms with the same address. For the server, this means that 50 addresses must be checked with the controller, but the server will then also distribute 50 alarms to the respective client (5x50). The server therefore has 250 alarms to distribute.

Transparent mode through Ethernet

For the function **Transparent mode** (see the chapter *Communication*) to function with communication through Ethernet (the TCP/IP protocol,) the following requirements must be fulfilled.

– The driver and its configuration tool must support communication in Transparent mode. For information, see the manual for respective driver and controller.

– If the configuration tool for the controller does not support project transfer through TCP/IP, a PC program to convert the COM port to TCP/IP must be used in the PC to communicate with the controller in Transparent mode through the TCP/IP network.

Passthrough mode through Ethernet

With the program HMI Tools Connect (an icon in the program group HMI Tools) it is possible to activate/deactivate a communication port for communication in Passthrough mode (Transparent mode if this is supported by the drivers, see the chapter *Communication*). For the function Passthrough mode (see the chapter *Communication*) to function with communication through Ethernet (the TCP/IP protocol), the following requirements must be fulfilled.

– If the configuration tool for the controller does not support project transfer through TCP/IP, a PC program to convert the COM port to TCP/IP must be used in the PC which is to communicate with the controller in Transparent mode through the TCP/IP network.

For further information, please see the sections *Transparent mode* and *Passthrough mode*, the manual for HMI Tools and the manuals for the used drivers.

No protocol mode

The function **No protocol mode**, when one or more operator terminals are used as communication interface (see the chapter *Communication*), is not recommended in a large operator terminal network (BDTP network). A large network refers to a BDTP network, where a large number of signals are transferred between server and clients. Control registers and control signals are transferred when the operator terminal is used as a communication interface, and these influence the communication time and adversely affect the performance of the network. See the *Efficient communication*.

Packaging of signals

To make the communication between operator terminals and controllers quick and efficient, e.g. in a network, it is important to optimize the transfer of signals in the network. Read the chapter *Efficient communication* and carefully follow the rules described there to optimize the network functionality in the operator terminals. This applies to all stations in the operator terminal network. If the packing of signals is not used, this may result in an increase in the updating times.

Alarm handling

The operator terminal network is a client/server network. Servers provide data, e.g. alarm signals, to clients. A large number of different signals influence the communication time between operator terminals and controllers in the network, which means that the number of these signals should be limited. For further information, see the chapter *Efficient communication*. The number of alarm signals the network receives must not exceed the number the server can handle in the complete network. One server can handle up to 300 alarms, depending on the application and operator terminal. This means that the network must not contain more than a total of 300 alarms.

Index in network client

Index addressing, which makes it possible to select from which register an object is to collect the shown value, see the chapter *Index Addressing*, cannot be used in operator terminals functioning as BDTP clients. BDTP clients only use the BDTP server's index register. If, however, an operator terminal which is a BDTP client also has a local controller, normal handling of index addressing is applicable in accordance with the chapter *Index Addressing*.

19 Network Functions in the Operator Terminal

This chapter describes operation of the functions for the FTP server, SMTP client, operator terminal applet and Web server function in the operator terminal. For further information about the different functions, please see the chapter *Network Communication*.

19.1 FTP server

FTP (File Transport Protocol), a standard Internet protocol, is the easiest way of exchanging files between computers on the Internet. FTP is an application protocol which uses the Internet's TCP/IP protocols. FTP is normally used to transfer web pages from their creators to the server where everybody on the Internet can access them. It is also suitable for downloading programs and other files from another server (operator terminal) to your own computer.

When the operator terminal functions as an FTP server it is possible to upload/download files to/from the operator terminal. To upload/download files, an FTP client program is required in the PC, e.g. HMI Tools, Internet Explorer, Windows Commander or some other standard FTP program.

Some libraries show files with a length of 0. This means that the file contains dynamic data, i.e. the size of the file changes. This also means that even if the length is 0 the file may not be empty. The operator terminal does not use the date on the files, which means that the time shown is not relevant. The operator terminal can save the contents in all files, which can be reached through FTP or accessed on a Compact Flash memory card with different types of delimiter characters (separators). The contents of the files can be separated either with → [TAB] or the characters ; or :. The properties for FTP delimiter characters are made under **Setup/Terminal Options** in the configuration tool. The file name must not contain national characters. The operator terminal's FTP server can handle a maximum of three connected clients at the same time.

Note:
Files in the different directories use up the project memory. Information on the available project memory is included in the file info.txt in the root directory.

Root library

The root directory (current operator terminal name) contains the following directories, ALARMS, HTML, RECIPES, TRENDS and IMAGES directory. See the section *The IMAGES directory* for further information. Only the directories the user (account) has access to are shown. There is also a text file, info.txt, containing information about the operator terminal.

The file info.txt

The file info.txt contains information on the operator terminal in accordance with the following example:

E1070
Firmware version: V1.00
Build number: 35
Driver1: Modbus Master 4.00.06
Driver2: DEMO 4.00.10
Dynamic memory:13107200 bytes free
Project memory: 1717867 bytes free
IP address:192.168.98.145

Nothing can be deleted from the root directory, not even by a user with write access. If the directories HTML or RECIPE are deleted, the contents of the directories will be deleted, but the directories will remain.

The ALARMS directory

The directory is only shown if there is an alarm defined in the operator terminal and the operator terminal is running. The alarm groups are shown as .skv files with 0 length. This does not necessarily mean that there are no alarms. The files can only be read. To read a file it must be opened with the attribute READ. The attribute READ-WRITE will cause an error.

File format

Each alarm is stored on a line ending with [carriage return][linefeed].

The file contains the following information:

status;activedate;activetime;inactivedate;inactivetime;ackdate;acktime;alarmtext

All fields are always there. If the alarm is not acknowledged, the fields for date and time will be empty.

The file ends with END [carriage return][line feed].

The HTML directory

The data files handled by the web server are stored here. Subdirectories can be created. The start file (the HTML page shown as the first web page in the web browser) must always be called index.html.

By default, the operator terminal's diagnostic page is set as index.html. If another start page is required, replace the index.html file.

File format

The file format depends on the type of file. A standardized file format such as HTML etc. is used here.

The RECIPE directory

The different recipes in recipe directories are shown as .skv files . It is possible to both read and write files in this directory.

File format

Each recipe value is stored on a line ending with [carriage return][linefeed].

The file contains the following information:

device;value;datatype;length

The file ends with END[carriage return][linefeed].

If the data type is array (AR), one value will be shown on each line. The first line will be shown as above. The following lines will only contain:

;value

Data types for analog signals

Type	Explanation
empty	Signed 16-bit
+	Unsigned 16-bit
L	Signed 32-bit
L+	Unsigned 32-bit
RB	BCD format float
RF	Float with exponent
SB	BCD format 16-bit
LB	BCD format 32-bit
SH	Hexadecimal 16-bit
LH	Hexadecimal 32-bit
RD	Float
AR	Array of signed 16-bit
ST	String of characters
BI	Bit 0 or 1

The TRENDS directory

The directory is only available if there are trends and/or data loggings defined in the operator terminal and the operator terminal is running. The trend objects are shown as .skv files with 0 length. It is only possible to read files. To read a file it must be opened with the attribute READ. The attribute READWRITE will cause an error. Curve 1 must be used for a trend to be valid.

File format

Each sampling is stored on a line ending with [carriage return][linefeed].

The file contains the following information:

date;time;value1;value2;value3;value4;value5;value6;OFF

The file ends with END[carriage return][linefeed].

Only the number of curves in the trend are transferred, i.e. no empty fields.

OFF is included in the sampling in the following cases, and indicates a pause in the sampling.

– When the operator terminal enters run mode, a copy of the last stored sampling is added. The copy is marked with OFF. As soon as valid values reach the operator terminal, new values are stored without OFF marking.

– When the Trend-enable signal is used, should the signal go low the sample is marked with OFF. When the signal goes high a new value is stored without OFF marking.

– When stored trend values are transferred through FTP, a sample with OFF marking will be stored. When the transfer is ready a new sample is stored without OFF marking.

The IMAGES directory

Images in the format BMP can be saved in the IMAGES directory. The bitmap images are presented in Static symbol objects in the operator terminal when it is running. It is only possible to write, replace and delete files in this library. However, it is not possible to create sub-directories.

If you check the box **Use dynamic bitmaps** for a static symbol object, the operator terminal will collect the specified bitmap file (name.bmp) from the directory IMAGES in the operator terminal's file system. The bitmap image is presented on the operator terminal's display when it is running.

The image to be presented must be transferred to the directory through FTP. It will then be possible through FTP to add, replace, or remove dynamic bitmap images on the operator terminal's display by writing over, entering or deleting BMP files in the IMAGES directory.

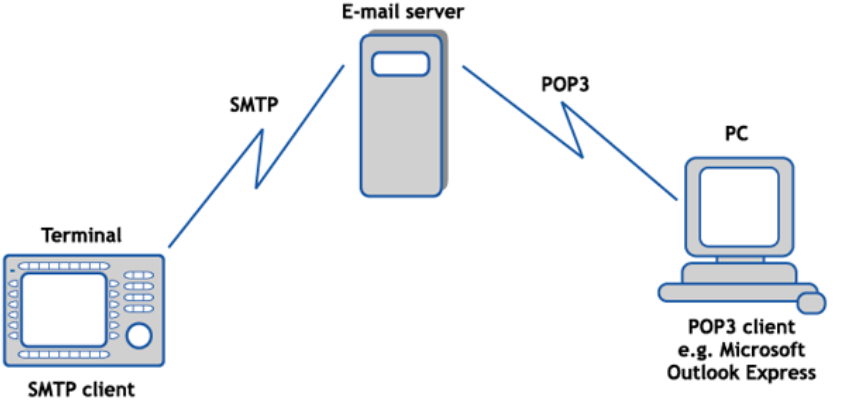
The image for a dynamic bitmap image object is only shown in the operator terminal when it is running. The bitmap images in the IMAGES directory are not shown (available) in the configuration tool.

Note:
Define the same X and Y size for the BMP image in the directory as for the symbol object defined in the configuration tool. It is not possible to read (collect) files from the IMAGES directory.

Note:
When transferring a BMP file to the IMAGES directory, the transfer will stop for a short moment when the operator terminal converts the standard BMP format to the operator terminal's own BMP format.

19.2 SMTP client

SMTP (Simple Mail Transfer Protocol) is a TCP/IP protocol used to send and receive e-mail. Since SMTP has limited functions to store received messages it is normally used together with one or two other protocols, POP3 or IMAP. These protocols allow the user to save messages in a server mailbox from where they can be collected later. This means that SMTP is normally used to send e-mail, and POP3 or IMAP to receive messages stored in the local server. The operator terminal can function as an SMTP client, i.e. send e-mail. To use the SMTP client function it is necessary to have access to an e-mail server. You can use your Internet provider's e-mail server, or use a local e-mail server. See also the section *Network services* in the chapter *Network Communication*.



19.3 Web Server

A web server is a program which handles files that are to be displayed in a web browser, e.g. Internet Explorer. Each computer on the Internet containing a web page must have a web server program.

SSI script

An SSI (server-side include) is a variable value (e.g. a file) which a server can include in an HTML file before it is sent. If you create a web page you can add on a file in the HTML file as follows:

```
<!--#echo var="LAST_MODIFIED"-->
```

The following SSI scripts are supported in order to be able to show certain values from the operator terminal in HTML pages.

Name	Parameters	Explanation	Example
get_ipaddr.fn	None	Shows the WWW server's IP address. Used in the CGI script.	<!--#exec cgi= "get_ipaddr.fn"-->
get_domainname.fn	None	Shows the WWW server's domain name.	<!--#exec cgi= "get_domainname.fn"-->
get_date.fn	Date format e.g. MM/DD/YY YY-MM-DD The operator terminal properties are used if none are given.	Shows the date in the operator terminal.	<!--#exec cgi= "/get_date.fn MM/DD/YY"-->
get_time.fn	Time format, e.g. HH:MM:SS HH:MM The operator terminal properties are used if none are given.	Shows the time in the operator terminal.	<!--#exec cgi= "/get_time.fn HH:MM"-->

Name	Parameters	Explanation	Example
get_device.fn	X, Y, Z X=device Y=presentation format (see separate table) Z=length	Shows the device value (a signal's value) from the controller.	<!--#exec cgi= "/get_device.fn D5"--> <!--#exec cgi= "/get_device.fn D5LH"--> <!--#exec cgi= "/get_device.fn M7"--> <!--#exec cgi= "/get_device.fn D9ST,30"--> <!--#exec cgi= "/get_device.fn D0AR,10"-->
get_diag.fn	None	Shows the operator terminal's diagnostic page.	<!--#exec cgi= "/get_diag.fn"-->
get_mode.fn	None	Shows which operation mode the operator terminal is in: RUN/PROG/SETUP/TRANSFER	<!--#exec cgi= "/get_mode.fn"-->

Presentation format for **get_device.fn**

Name	Length	Explanation	Example
None	None	Shows the value as signed 16-bit.	<!--#exec cgi=/get_device.fn D1"-->
+	None	Shows the value as unsigned 16-bit.	<!--#exec cgi=/get_device.fn D3+"-->
L	None	Shows the value as signed 32-bit.	<!--#exec cgi=/get_device.fn D7L"-->
L+	None	Shows the value as unsigned 32-bit.	<!--#exec cgi=/get_device.fn D2L+"-->
RB	None	Shows the value as 32-bit float BCD	<!--#exec cgi=/get_device.fn D10RB"-->
RF	None	Shows the value as 32-bit IEEE float	<!--#exec cgi=/get_device.fn D8RF"-->
RD	None	Shows the value as 32-bit IEEE float without exponent.	<!--#exec cgi=/get_device.fn D1RD"-->
SB	None	Shows the value as 16-bit BCD.	<!--#exec cgi=/get_device.fn D3SB"-->

Name	Length	Explanation	Example
LB	None	Shows the value as 32-bit BCD.	<!--#exec cgi=/get_device.fn D7LB”-->
SH	None	Shows the value as 16-bit HEX.	<!--#exec cgi=/get_device.fn D2SH”-->
LH	None	Shows the value as 32-bit HEX.	<!--#exec cgi=/get_device.fn D1LH”-->
AR	The number of values to be shown.	Shows the values as signed 16-bit.	<!--#exec cgi=/get_device.fn D5AR,10”-->
ST	Number of characters in the string.	Shows a number of registers as a string.	<!--#exec cgi=”/get_device.fn D9ST,30”-->

Automatic updating

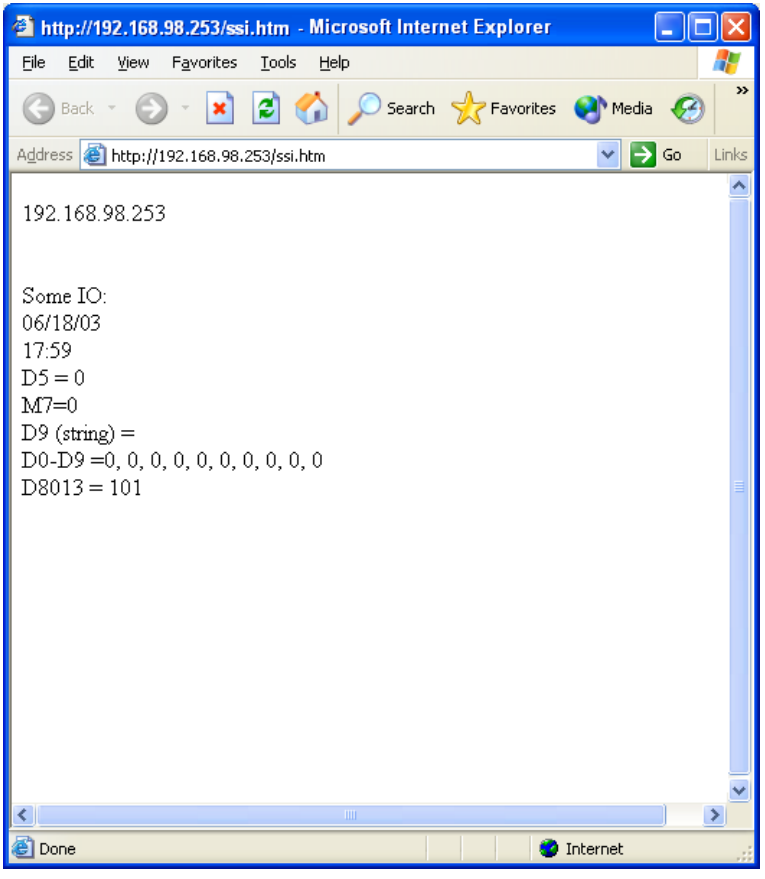
The HTML page is not normally updated automatically, but by adding the following code in the HTML page this creates automatic updating.

```
<meta http-equiv=”Refresh”CONTENT=”5”>
```

CONTENT indicates how often the page will be updated (in seconds).

Example of HTML page with SSI script

```
<HTML>
        <HEAD>
             <meta http-equiv=”Refresh”CONTENT=”5”>
        </HEAD>
        <!--#exec cgi=”/get_ipaddr.fn”--><BR>
        <!--#exec cgi=”/get_domainname.fn”--><BR>
        <BR>
        Some IO:<BR>
        <!--#exec cgi=”/get_date.fn MM/DD/YY”--><BR>
        <!--#exec cgi=”/get_time.fn HH:MM”--><BR>
        D5 = <!--#exec cgi=”/get_device.fn D5”--><BR>
        M7=<!--#exec cgi=”/get_device.fn M7”--><BR>
        D9 (string) = <!--#exec cgi=”/get_device.fn D9ST,30”--><BR>
        D0-D9 =<!--#exec cgi=”/get_device.fn D0AR, 10”--><BR>
        D8013 = <!--#exec cgi=”/get_device.fn D8013”--><BR>
</HTML>
```



CGI script

CGI (Common Gateway Interface) is a standard method for a web server to handle data to and from the user. When the user requests a web page (by clicking on a link or entering the address in the web browser) the server sends back the required page. If you fill in a dialog on the web page and send it, it is normally received by an application program. The server sends a confirmation. The method of sending data between server and application is called CGI, and is part of the HTTP protocol.

The following CGI script is supported in order to change values in the operator terminal:

Name	Parameters	Explanation	Example
set_date.fn	Date format, e.g. MM/DD/YY YY-MM-DD The operator terminal properties are used if none are given.	Used together with FORM to set the date in the operator terminal.	<FORM ACTION="http://<!-- #exec cgi="/get_ipaddr.fn"-->/ set_date.fn" METHOD="POST"> <INPUT SIZE=10 MAXLENGTH=10 NAME="YY:MM:DD"> <INPUT TYPE="submit" VALUE="Submit"> </FORM>
set_time.fn	Time format, e.g. HH:MM:SS HH:MM The operator terminal properties are used if none are given.	Used together with FORM to set the time in the operator terminal.	<FORM ACTION="http://<!-- #exec cgi="/get_ipaddr.fn"-->/ set_time.fn" METHOD="POST"> <INPUT SIZE=10 MAXLENGTH=10 NAME="HH:MM:SS"> <INPUT TYPE="submit" VALUE="Submit"> </FORM>
set_device.fn	XY X = device Y = presentation format (see separate table) e.g. D0L+D5SH	Used together with FORM to set a device (a signal) in the controller.	<FORM ACTION="http://<!-- #exec cgi="/get_ipaddr.fn"-->/ set_device.fn" METHOD="POST"> <INPUT SIZE=10 MAXLENGTH=10 NAME="D0L"> <INPUT TYPE="submit" VALUE="Submit"> </FORM>

Name	Parameters	Explanation	Example
push_key.fn	(see separate table)	Used to simulate pressing a key in the operator terminal.	<FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/push_key.fn" METHOD="POST"> <SELECT NAME="F2"> <OPTION VALUE="SET">Set <OPTION VALUE="RESET">Reset <OPTION VALUE="TOGGLE">Toggle </SELECT> <INPUT TYPE="submit" VALUE="Submit"> </FORM> <FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/push_key.fn" METHOD="POST"> <INPUT SIZE=1 MAXLENGTH=1 NAME="Key"> <INPUT TYPE="submit" VALUE="Submit"> </FORM>

Presentation format for **set_device.fn**

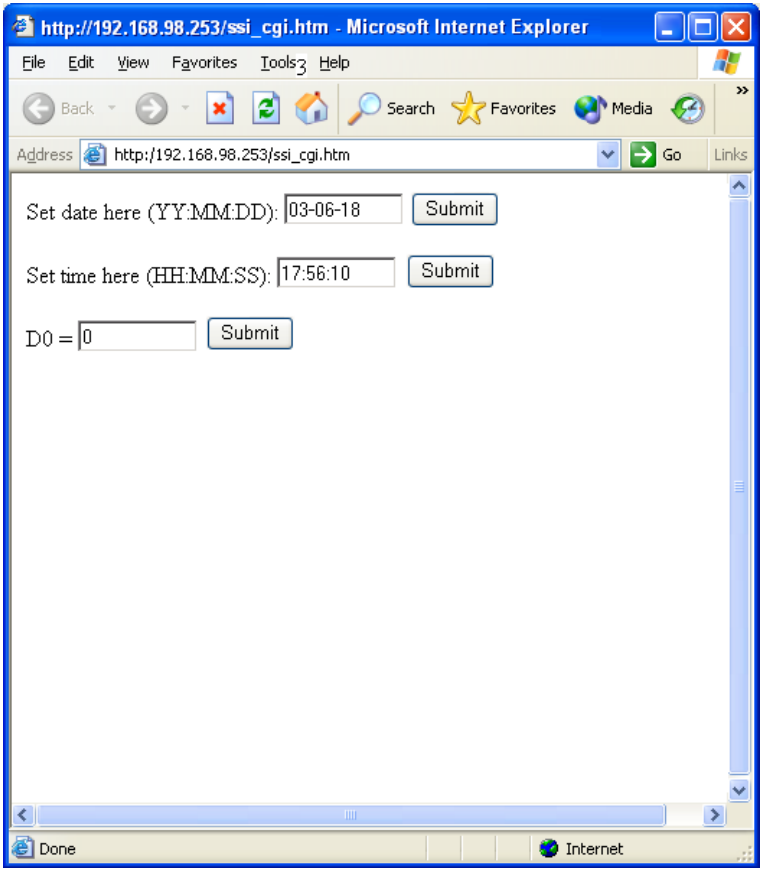
Name	Explanation
None	Sets the value as signed 16-bit.
+	Sets the value as unsigned 16-bit.
L	Sets the value as signed 32-bit.
L+	Sets the value as unsigned 32-bit.
RB	Sets the value as 32-bit float BCD
RF	Sets the value as 32-bit IEEE float
RD	Sets the value as 32-bit IEEE float without exponent.
SB	Sets the value as 16-bit BCD.
LB	Sets the value as 32-bit BCD.
SH	Sets the value as 16-bit HEX.
LH	Sets the value as 32-bit HEX.
ST	Sets a number of registers as a string.

Parameters for **push_key.fn**

Parameter	Explanation	Example
KEY	Can assume the values: A-Z 0-9 ACK LIST MAIN PREV BACKSPACE ENTER UP DOWN LEFT RIGHT	<FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/push_key.fn" METHOD="POST"> Key = <SELECT NAME="Key"> <OPTION VALUE="ENTER">Enter <OPTION VALUE="A">A <OPTION VALUE="B">B <OPTION VALUE="1">1 <OPTION VALUE="2">2 <OPTION VALUE="3">3 <OPTION VALUE="UP">Up <OPTION VALUE="DOWN">Down <OPTION VALUE="LEFT">Left <OPTION VALUE="RIGHT">Right <OPTION VALUE="PREV">Prev </SELECT> <INPUT TYPE="submit" VALUE="Submit"> <P> </FORM>
F1-F22	Can assume the values: SET RESET TOGGLE	<FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/push_key.fn" METHOD="POST"> <SELECT NAME="F2"> <OPTION VALUE="SET">Set <OPTION VALUE="RESET">Reset <OPTION VALUE="TOGGLE">Toggle </SELECT> <INPUT TYPE="submit" VALUE="Submit"> </FORM>

Example of HTML page with SSI and CGI script:

```
<HTML>
        <FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/
             set_date.fn" METHOD="POST">
             Set date here (YY:MM:DD):
             <INPUT SIZE=10
                  MAXLENGTH=10
                  NAME="YY:MM:DD"
                  VALUE="<!--#exec cgi="/get_date.fn"-->">
             <INPUT TYPE="submit" VALUE="Submit"> <P>
        </FORM>
        <FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/
             set_time.fn" METHOD="POST">
             Set time here (HH:MM:SS):
             <INPUT SIZE=10
                  MAXLENGTH=10
                  NAME="HH:MM:SS"
                  VALUE="<!--#exec cgi="/get_time.fn"-->">
             <INPUT TYPE="submit" VALUE="Submit"> <P>
        </FORM>
        <FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/
             set_device.fn" METHOD="POST">
             D0 =
             <INPUT SIZE=10
                  MAXLENGTH=10
                  NAME="D0"
                  VALUE="<!--#exec cgi="/get_device.fn D0"-->">
             <INPUT TYPE="submit" VALUE="Submit">
        </FORM>
</HTML>
```



Save HTML files with FTP

To transfer HTML files to the operator terminal, a standard FTP client program is used (See the section *FTP server*).

The files transferred to the HTML directory in the operator terminal's file system.

The name of the files should be in DOS 8.3 format, i.e. a maximum of 8 characters and the extension htm.

Note:
The file INDEX.HTML must always be used (must be available in the operator terminal).

---

20 LEDs

This chapter is applicable for operator terminals with LEDs.

The operator terminals have built-in LEDs, connected to a register defined by double-clicking **LEDs** in the Project Manager. The contents of the register determine the color and blinking frequency of the LEDs according to the following table.

Register value (Hex)	Register value (Dec)	Blinking frequency (Hz)	Color
00	0	-	None
01	1	-	Green
02	2	-	Red
11	17	5	Green
12	18	5	Red
21	33	2.5	Green
22	34	2.5	Red
31	49	1.2	Green
32	50	1.2	Red
41	65	0.6	Green
42	66	0.6	Red

21 Function Keys

This chapter describes how function keys are used, and how to convert the arrow keys on the operator terminal to function keys.

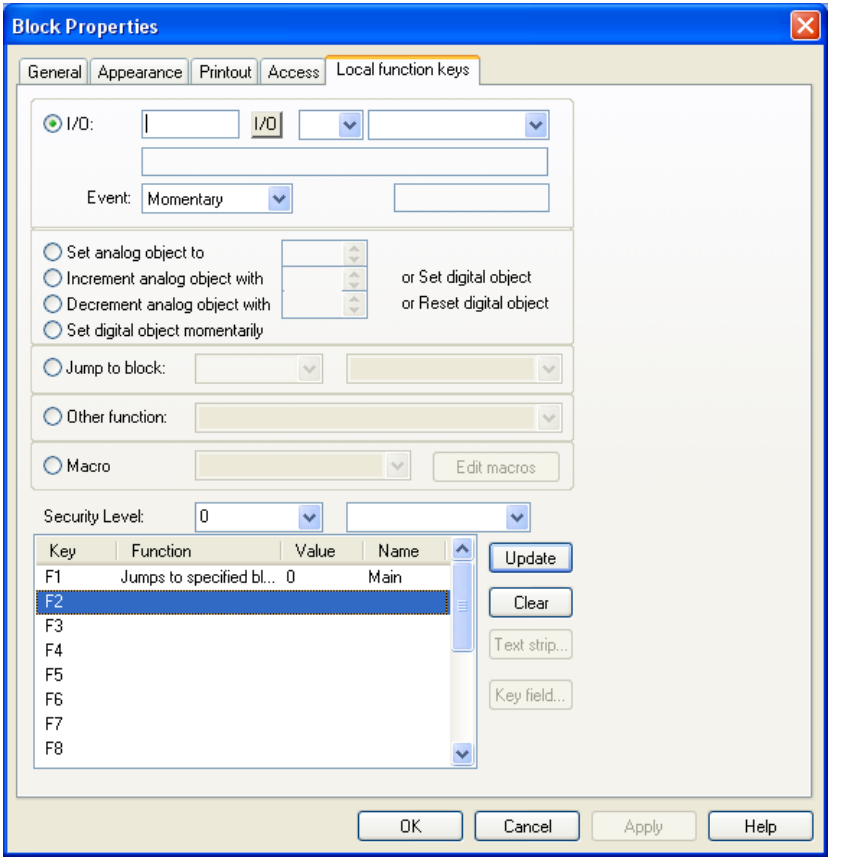
A function key can be configured to control and change the values of devices in the PLC. The function key can also be assigned to switch block, start a Macro or other functions like load recipe, login and log out.

Note:
It is only possible to activate two signals connected to function keys at the same time. This means that if more than two function keys are pressed at the same time, only the first two will be activated.

The operator terminals have a different number of built-in function keys, depending on the operator terminal model. Start numbering the function keys on the left hand side (from the top downwards), continue with the keys on the right hand side and finally use the function keys at the bottom (from left to right).

21.1 Definitions

There are two ways of defining function keys; *globally* and *locally*. Global function keys are defined and used in the complete application, i.e. they are valid in all blocks. Local function keys are defined and used in one block. A global definition can always be accessed when the operator terminal is running, provided that the current block does not have any local definitions for that function key. Local definitions have higher priority than global definitions. Global definitions are defined by double-clicking **Function keys** in the Project Manager. Local function keys are defined under the **Local function keys** tab in the block properties dialog for the current block.



Function	Description
I/O	The signal activated by the function key. The subsequent field is used to specify an index register and signal format. See the chapters *Index Addressing* and *Signal format*.
Event	By selecting **Event** it is possible for the key to influence the given signal according to the following alternatives: **Momentary** means that the signal is set to one as long as the key is pressed. **Toggle** means that the signal is set to one or reset alternately when the key is activated. **Set** means that the signal is set when the key is activated, and remains set. **Reset** means that the signal is reset when the key is activated, and remains reset. **Grouped** means that all signals belonging to a function key with the relevant group number are reset. The group number is stated in the **Group** field. A maximum of 8 function keys can be included in a group. **Sets analog** means that the analog signal linked to the function key is allocated the value given in the field **Value**. **Increments analog** means that the analog signal linked to the function key will increase the value by the value given in the **Value** field. **Decrements analog** means that the analog signal linked to the function key will decrease the value by the value given in the **Value** field.
Set analog object to	Allocates maneuverable analog object selected with the cursor for the specified value.
Increment analog object with or Set digital object	Increases the value for the selected maneuverable analog object with the specified value or sets the selected maneuverable digital object.
Decrement analog object with or Reset digital object	Decreases the value for the selected maneuverable analog object with the entered value or resets the selected maneuverable digital object.
Set digital object momentarily	Sets the selected digital object to one as long as the key is pressed.
Jump to block	Jumps to block with the specified name/number.
Other function	The function or touch key is linked to one of the functions in the list of options according to the table *Other functions for function and touch keys*.

Function	Description
Macro	The selected macro is run. See the chapter *Macros*. With the button **Edit macro** the name of the selected macro or the macro event for the selected event can be changed.
Security Level	Function keys can be defined with a security level, which means that the operator must log in with a password for the same or higher security level to be able to use the function key.

Other functions for function and touch keys

Function	Description
Load recipe	Collects recipe from the memory in the operator terminal.
Save recipe	Saves recipe to the memory in the operator terminal.
Delete recipe	Deletes recipe from the memory in the operator terminal.
Append recipe	Adds signals and their values from the current block to an existing recipe. See the chapter *Recipes*.
Login to specified security level	Login. See the chapter *Passwords*.
Logout	Logout.
Change login password	Changes password.
Scroll one page up	Scrolls the page in alarm list.
Scroll one page down	Scrolls the page in alarm list.
Increase text size	Increases the text size in the alarm list.
Decrease text size	Reduces the text size in the alarm list.
Save recipe to memory card	Saves recipe to a memory card defined for backup.
Load recipe from memory card	Collects recipe from a memory card defined for backup.
Erase recipe on memory card	Deletes recipe from a memory card defined for backup.
Load project from memory card	Collects project from a memory card defined for backup.
Acknowledge alarm	Acknowledges alarm in the alarm list.
Show alarm list	Shows the alarm list (block 990).
Jump to info block connected to the alarm	Jumps to a block linked to the alarm. Applies to the selected alarm line or in the alarm list. See the chapter *Alarm Management* for further information.

Function	Description
List alarm groups	Selects from which alarm group the alarm should be shown in the alarm list.
Return to previous block	Shows "previous block" functions in nine levels backwards. When block 0 is shown it is not possible to jump to the previous block with this function. Block jumps cannot be made with this function if logon is made at a higher security level than the current level.
Jump to main block (block 0)	Shows the start block, block number 0.
Enter	Corresponds to pressing the Enter key.
Show diagnostic page	Shows the diagnostic page for the operator terminal.
TCP/IP Connect	Initiates connection during serial TCP/IP connection.
TCP/IP Disconnect	Disconnects serial TCP/IP connection.

21.2 Jump to block with function keys

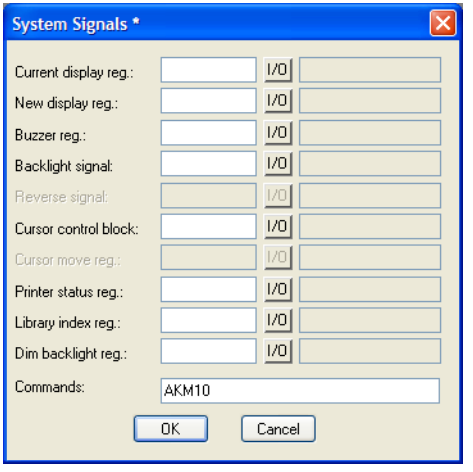
This function makes it possible to use function keys to jump to blocks without having to use a **Display signal**. Select **Jump to block** from the list when a local or global key is defined.

Changing blocks using function keys is the quickest way of changing blocks, and does not occupy digital signals in the controller.

21.3 Joystick function

Only applicable for key pad models.

The joystick function makes it possible to use the arrow keys as function keys. Double-click on **System Signals** under the **Setup** folder in the Project Manager, and type the command AK and an address on the command line, for example, AKM10 (command AK and memory cell M10).



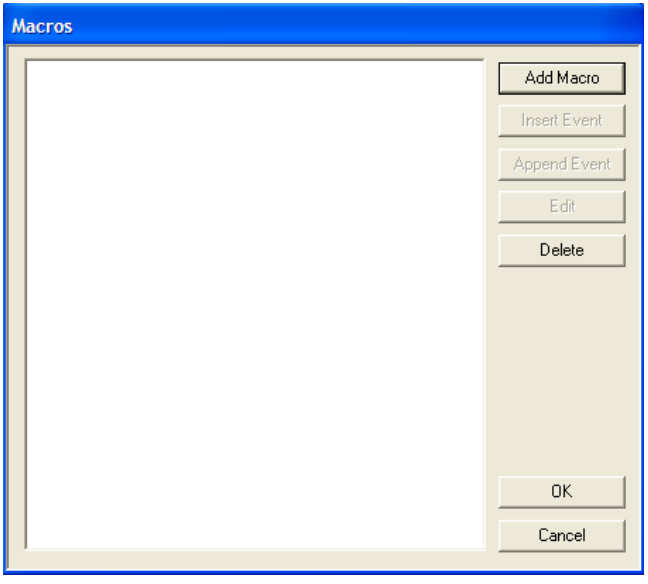
Memory cell M10 is the enable signal, and the following four memory cells have functions according to the following control blocks.

Memory cell	Description
Mn0	Activated. The arrow keys are deactivated. Deactivated=normal function.
Mn1	Left arrow
Mn2	Down arrow
Mn3	Up arrow
Mn4	Right arrow

If an arrow key is pressed when the enable signal is on, the memory cell corresponding to that key will be set to one. When the enable signal is set to one the arrow keys will not have their normal functions.

22 Macros

This chapter describes how macros are used to link several events in the operator terminal together to one single command. If you often perform the same commands and properties in the operator terminal you can use macros to automate these maneuvers, i.e create a macro for them. A macro is activated from local and/or global function and touch keys. Macros are defined by double-clicking **Macros** in the Project Manager.



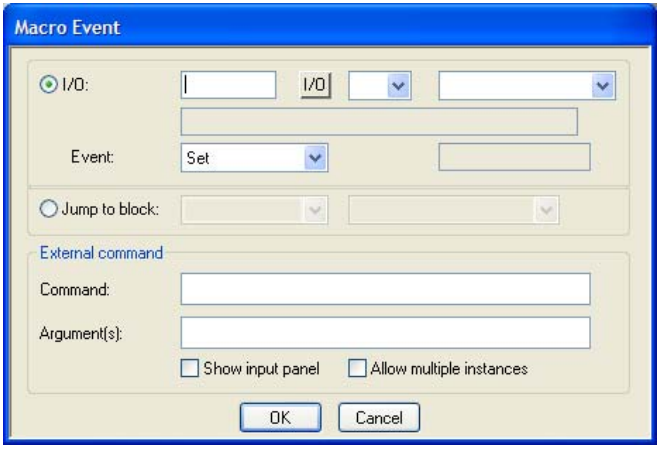
Add macro

Click **Add Macro** to display the following dialog. There is no limitation to the number of macros that can be defined.

Specify an arbitrary name for the macro; the name must be unique. When clicking **OK**, the macro is shown on the list with the specified name.

Insert event or Append event

Click **Insert Event** or **Append Event** to display the following dialog. Each macro can contain a maximum of eight different events (lines).



Parameter	Description
I/O	The signal to be linked to an event in the macro. In the field **Event**, select which of the following events to be linked to the signal in the macro: **Set** - means that the digital signal is set to one and remains set to one when the macro is activated from a key. **Dec analog** - means that the analog signal will decrease the value by the value indicated in the field **Value** when the macro is activated from a key. **Reset** - means that the digital signal is reset and remains reset when the macro is activated from a key. **Set Analog** - means that the analog signal is given the value by the value indicated in the field **Value** when the macro is activated from a key. **Toggle** - means that the digital signal is set to one and reset alternately when the macro is activated from a key. **Inc analog** - means that the analog signal will increase the value by the value indicated in the field **Value** when the macro is activated from a key.
Jump to block	Indicate the number of the name of the block to which a block jump is to be made when the macro is activated from a key. A block jump can only be the last event in a macro, since a block jump ends the macro.

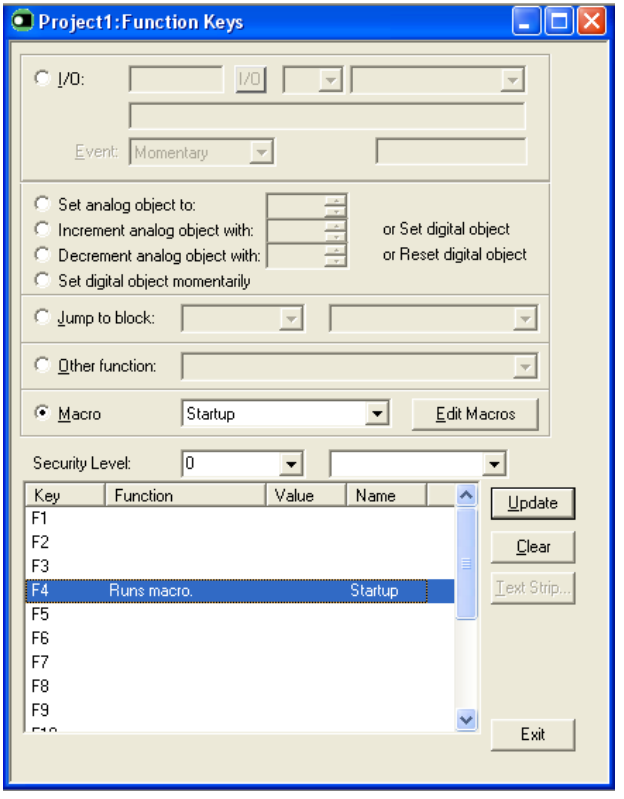
Parameter	Description
Command	The command that should be activated: **IPCONFIG** Collects and shows current IP Address for the terminal. **PING** Checks if a host is available. **ROUTE** Shows/adds/deletes routes
Argument	Text field that give the argument for the command i.e. 192.168.1.1 for the command PING.
Show input panel	Yes/No (only touch) if an input panel should be displayed while the program is running.
Allow multiple instances	Yes/No if it is possible to run multiple instances of the program at the same time.

Edit

Click **Edit** to change the name of the selected macro or change the macro event for the selected event, or double-click on the macro or macro event to edit.

Activate macros

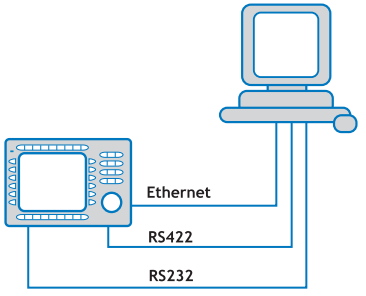
Macros are activated from function or touch keys. Each key (global or local) can be linked to a macro. The desired macro for the key is selected in the dialog for local and global function and touch keys.



23 Project Transfer

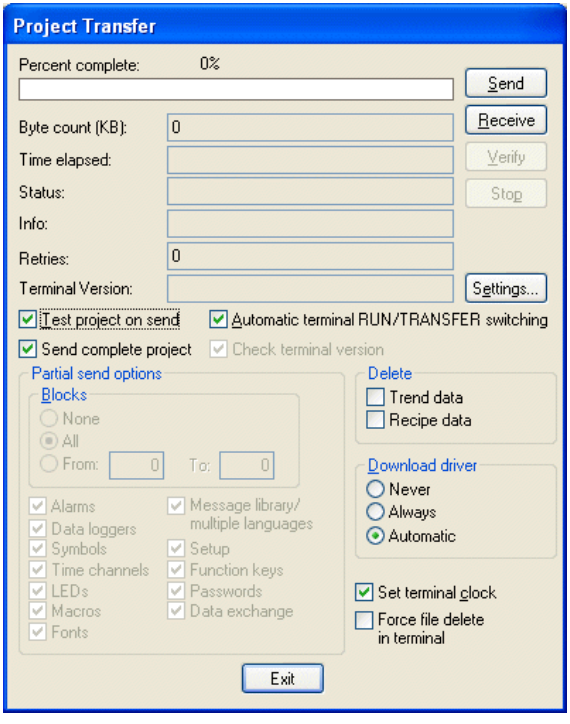
To use a project in the operator terminal, it has to be transferred from the PC where it is created to the operator terminal.

Connect the PC with the configuration tool to the operator terminal.



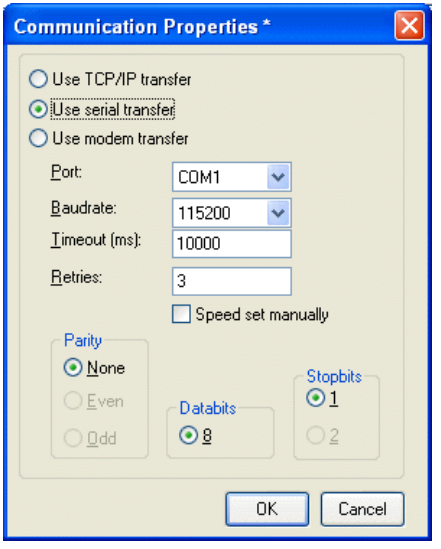
23.1 Transfer properties

The transfer of projects is controlled from the configuration tool. In the configuration tool under **Transfer/Project** you can select what is to be transferred.



Parameter	Description
Percent complete	Shows how much of the project has been transferred during the transfer.
Byte count (kb)	Shows how many kilobytes have been transferred during the transfer.
Time elapsed	Shows how much time has elapsed since the functions Send, Receive or Verify were activated.
Status	Shows the transfer status and which part of the project is being transferred. E.g. properties, individual blocks, alarm groups, individual symbols and function keys.
Info	Shows the defined driver to be transferred to the operator terminal.
Retries	In the event of transfer problems, the configuration tool makes a number of retries before the transfer shuts down.
Terminal Version	When contact has been established with the operator terminal, the current operator terminal type and its system program version number are shown.
Test project on send	Automatically tests the project before transfer.
Automatic terminal RUN/TRANSFER switching	The operator terminal is automatically set in transfer mode and returns after transfer to the mode the operator terminal was in before the transfer.
Check terminal version	Compares the system program version in the operator terminal with the installed version for the project in the configuration tool.
Send complete project	Select whether the complete project is to be transferred.
Partial send options	Block None: No blocks to be sent to operator terminal. All: All blocks to be sent to operator terminal. From To: Specify an interval of blocks to be sent to the operator terminal. Alarms: Select if alarms are to be sent to the operator terminal. Data Loggers: Select if data loggers ar to be sent to the operator terminal. Symbols: Select if symbols are to be sent to the operator terminal. Time channels: Select if time channels are to be sent to the operator terminal. LEDs: Select if LEDs are to be sent to the operator terminal. Macros: Select if macros are to be sent to the operator terminal. Fonts: Select if fonts are to be sent to the operator terminal. Message library: Select if message library is to be sent to the operator terminal. Setup: Select if configurations under Properties are to be sent to the operator terminal. Function keys: Select if function keys are to be sent to the operator terminal. Passwords: Select if passwords are to be sent to the operator terminal. Data exchange: Select if data transfer is to be sent to the operator terminal.

Parameter	Description
Delete	Trend data: All stored trend/data logger data in the operator terminal is deleted. Recipe data: All stored recipe data in the operator terminal is deleted.
Download driver	Never: Driver never downloaded. Always: Driver always downloaded. Automatic: Driver will be downloaded to the operator terminal when the driver in operator terminal and the defined driver in the current project are not the same, or the same version.
Set terminal clock	The clock in the PC is transferred to the operator terminal.
Force file delete in terminal	All the files will be deleted in the terminal and replaced by the new, i.e. the file structure in the terminal will be remade.
Send	Transfer the project to the operator terminal with the current properties.
Receive	The configuration tool imports the project from the operator terminal. The current project in the configuration tool is overwritten. There must be an active project in the configuration tool if you are to upload a project from the operator terminal.
Stop	Interrupts the transfer in progress.
Settings	Setup of communication parameters.



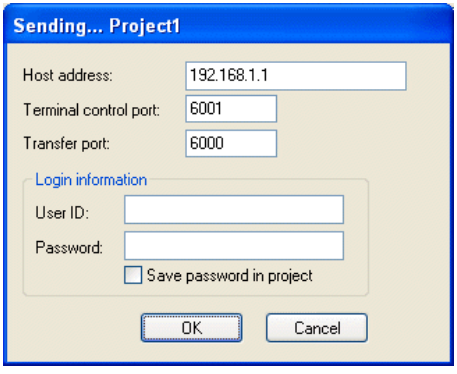
The communication parameters are set under **Transfer/Communication Properties** or by selecting **Settings** in the dialog **Project Transfer**.

Parameter	Description
Use TCP/IP transfer	Select if the project is to be transferred through TCP/IP. See the section *TCP/IP transfer*.
Use serial transfer	Select if serial transfer of the project is to be used. See the section *Serial transfer*.
Use modem transfer	Select if modem transfer of the project is to be used. See the section *Modem transfer*.
Port	Select communication port for the PC.
Baudrate	Transfer speed (bits/second).
Timeout (ms)	Indicate the number of milliseconds between retries.
Retries	Indicate the number of retries before the transfer shuts down.
Speed set manually	Only used for older operator terminal versions during modem communication. The transfer speed must then be set manually in the operator terminal and in the configuration tool, they must be the same. The operator terminal must also be manually set in transfer mode.
Parity	Select type of parity control.
Databits	Number of databits for the transfer. Must be 8 bits.
Stopbits	Select the number of stopbits for the transfer.

Note:
Running other Windows programs at the same time as a project is transferred can lead to communication errors. This is avoided by closing other programs. Links to signals will be included when transferring blocks.

23.2 TCP/IP transfer

When transferring through TCP/IP, you must select **Use TCP/IP transfer** under **Transfer/Communication Properties**. When you click **Send** in the dialog **Project Transfer** the following dialog is shown.



Host address
Indicate the IP address of the operator terminal you want to transfer to.

Terminal control port
Specify the TCP/IP port number for RUN/TRANSFER switching. Does not normally need to be changed. The default setting is 6001.

Transfer port
Specify the TCP/IP port number for the transfer (project transfer server). Does not normally need to be changed. The default setting is 6000.

User ID
Specify a user name to be used to verify RUN/TRANSFER switching. Not used if the operator terminal is already in transfer mode.

Password
Specify a password to be used to verify RUN/TRANSFER switching. Not used if the operator terminal is already in transfer mode.

Save password in project
Saves the password and user name so that you will not need to give them next time.

23.3 Serial transfer

For serial transfer, you select **Use serial transfer** under **Transfer/Communication Properties**. When you click **Send** in the dialog **Project Transfer,** the project will be transferred to the operator terminal.

23.4 Modem transfer

To transfer by modem, you select **Use modem transfer** under **Transfer/Communication Properties**. When you click **Send** in the dialog **Project Transfer,** the project will be transferred to the operator terminal.

Modem Properties

The properties on the modem connected to the operator terminal should be set as follows:

AT &F &D0 &K0 &C1 E0 Q0 V1 S0=1 &W

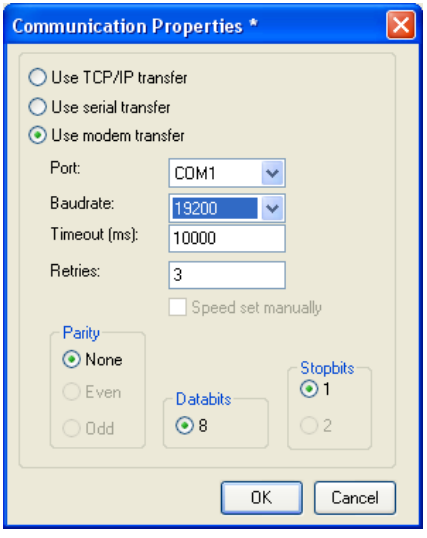
The properties on the modem connected to the PC should be set as follows:

AT &F &D0 &K0 &C1 E0 Q0 V1 S0=1 &W

For more information regarding the modem string, refer to the manual for the modem.

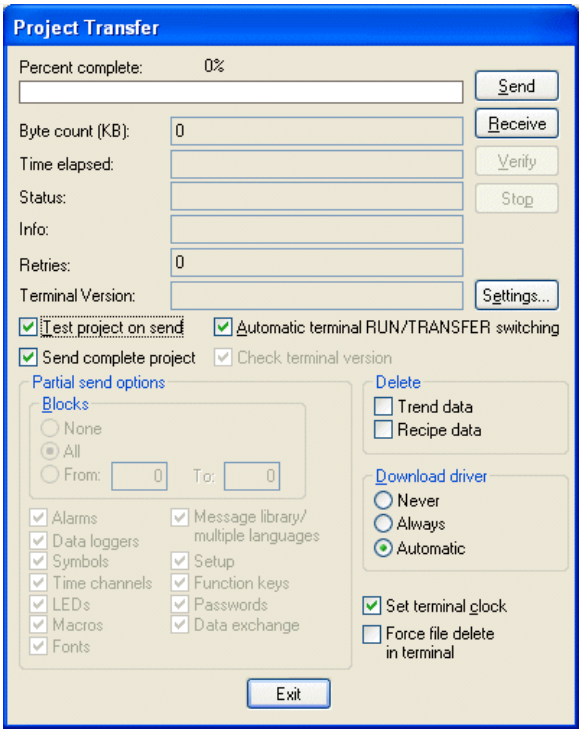
Communication properties

1. Configure the modem.
2. Set the communication properties under **Transfer/Communication Properties** in the configuration tool. Select **Use modem** transfer.



3. Select port and set the transfer speed (baud rate), parity and stop bits.
4. Use the program HMI Tools Connect to dial up.

5. Select **Send** in the configuration tool.



23.5 Updating projects with external memory cards

In order to export the project to a Compact Flash memory card or USB Flash drive, select **Transfer/Export Project Transfer File**.

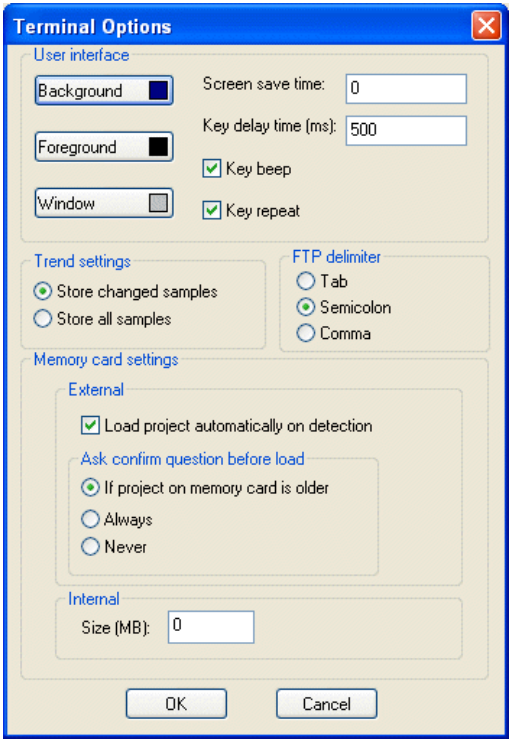
Load project from memory card

Save the project to the library BACKUP/PROJECTS on the external memory card. The file structure is automatically created when formatting the card in the operator terminal. If no operator terminal is available, the library structure must be created manually.

Load project automatically on detection

Save the project file to the root of the external memory card. Only one project is supported in the root for automatic detection and loading of project.

Settings for loading the project to the operator terminal are made by selecting **Setup/ Terminal Options**.



Memory card settings

Ask confirm question before load

The question that will be displayed in the operator terminal before loading the project.

If project on memory card is older

A question will be displayed if the date of the project is older than the existing project in the operator terminal.

Always

A question will always be displayed when a project is detected on the external memory card.

Never

The project on the external memory card will automatically be loaded to the operator terminal, without displaying a question.

24 Updating the operator terminal

In the operator terminal, there is a system program (operating system), which is stored in the operator terminal's memory on delivery.

24.1 Downloading the system program via PC

The system program can be exchanged, e.g. to update to newer versions. Transferring the system program to the operator terminal requires the following:

– PC with the configuration tool.

– Transfer cable between the PC and the operator terminal.

– File with new system program (OPSys_b*.cab).

Transfers are made in the following steps

1. Connect the cable between the PC and the operator terminal.
2. Open a project or create a new project with the desired operator terminal type.
3. Select **Transfer/Update Operator Terminal System Program**.

No settings are required in the operator terminal.

Under **Options/Communication Properties,** communication port and transfer speed are set.

Note:
When updating an operator terminal, it is important to ensure that power is not interrupted during the transfer.

24.2 Downloading the system program via external memory card

1. Save the system program file (OPSys_b*.cab) in the root of the external Compact Flash memory card or USB Flash drive.
2. Place the memory card in the operator terminal, or connect the USB Flash drive, and start the operator terminal to update the system program automatically.