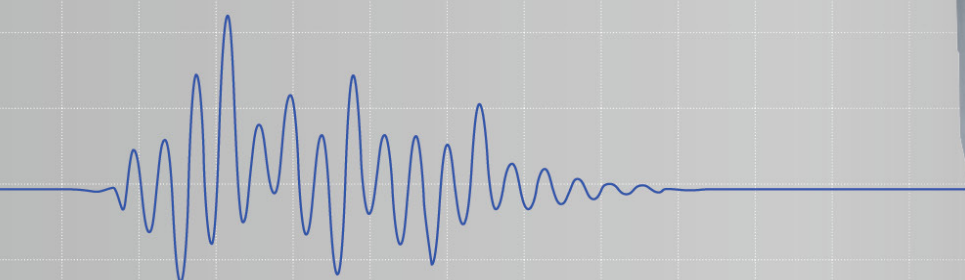


e.series

Manual

e.gate / e.pac



Vers.-Nr. 01



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1. ABOUT THIS MANUAL

This manual describes the installation and setup of the **Data Acquisition Module e.gate and e.pac** from Gantner Instruments Test & Measurement GmbH. The e.gate is a concentrator terminal and the e.pac is a programmable automation controller. The family they are part of is called “test controller”.

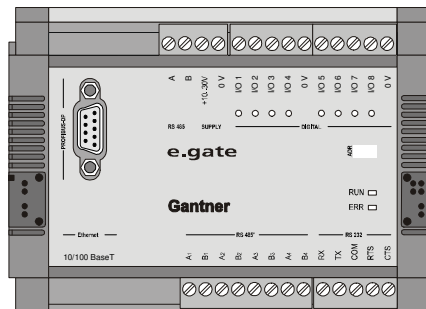
The following information can be found in this manual:

- Description of the e.gate / e.pac system with detailed information on the hardware and module features.
- A start-up guide which describes how the e.gate / e.pac is put into operation.
- Installation description of the e.gate /e.pac and how the modules are connected to the power supply and bus lines.
- An introduction on how the e.gate e.pac modules are configured with the Configuration Software test.commander. This software has an integrated help including a detailed description of the configuration process.
- Introduction into the software test.con, which is used to define the functionality of an e.pac.
- Technical specifications of the e.gate / e.pac.

2. SYSTEM DESCRIPTION

The **Data Acquisition Module e.gate / e.pac** are Test Controllers, used for the industrial and experimental testing technology, especially for the multi-channel measurement of electrical signals of thermal or mechanical data at test beds and test sites.

The e.gate / e.pac provide the advantages of a remote structure and at the same time high precision, dynamic and flexible PAC (programmable automation controller) functionality. These modules provide 4 slave interfaces to connect up to 30 additional e.bloxx modules per slave interface, a Profibus-DP interface and an Ethernet interface. The IP version of the e.gate / e.pac does not include the Profibus-DP interface (hardware available but not activated). With the e.pac a DL version is available as well. This e.pac is equipped with a real time clock and can be used as a data logger. This version has no Profibus-DP protocol available.



**Bild 2.1 - Front View of the e.gate Module-
e.pac looks equal, but different front plate**

The following instruction will show the simple setup of an e.gate / e.pac system:

1. Installation, chapter 3.1
2. TCP/IP-Setup, chapter 3.3
3. Configuration, chapter 5
4. Read online measurement values, chapter 3.7 and measurement buffer, chapter 3.8
5. test.con application (with e.pac), chapter 6

For several applications the system will be connected to a superior system. Therefore the e.gate / e.pac provides several interfaces such as the Profibus-DP (gsd-files are available, DP version only), Modbus TCP/IP and it can be connected to any SCADA package using one of the standardised interfaces such as TCP/IP (Ethernet interface).

For more details on the test.commander software please refer to chapter 3.2

3. START-UP

This chapter describes how the module e.gate / e.pac is set into operation, the way it is set-up and which way measurement values can be read by using the configuration software test.commander.

The chapter will just give a short introduction so it is possible to check the correct function of the e.gate / e.pac module. Detailed information on the installation, set-up, the test.commander and test.con software can be found later in this manual.

In order to work with an e.gate / e.pac module you need the following parts:

- e.gate / e.pac module
- Configuration software test.commander
- Graphic programming tool test.con (for e.pac only)
- RS 232 connection cable ICL106 which is delivered with the e.gate / e.pac module (if the IP address of the e.gate / e.pac has to be changed set) – the latest firmware and test.commander provides a functionality which does not require this cable any more.
- Ethernet cable, cross wire for direct connection to PC or normal one for connection to a network

3.1 Supply and Connection of the e.gate / e.pac



Use the e.gate / e.pac module only within the allowed environmental conditions (see technical data). The protective system is IP 20 (not water-proof) and the allowed temperature range for operation is -20 up to +60 °C.

An e.gate / e.pac module can be connected either to a local network or directly to a PC/laptop via RS 232 and Ethernet. The standard operation is to connect the e.gate / e.pac to Ethernet for integration into a local network.

After connection the e.gate / e.pac has to be supplied with a DC voltage in the range of +10 to +30 VDC. The power input of the e.gate / e.pac is protected with an internal fuse (reversible) against excessive voltage and polarity connecting error. The power supply cables are connected to the screw terminals "10..30V" and "0 V".

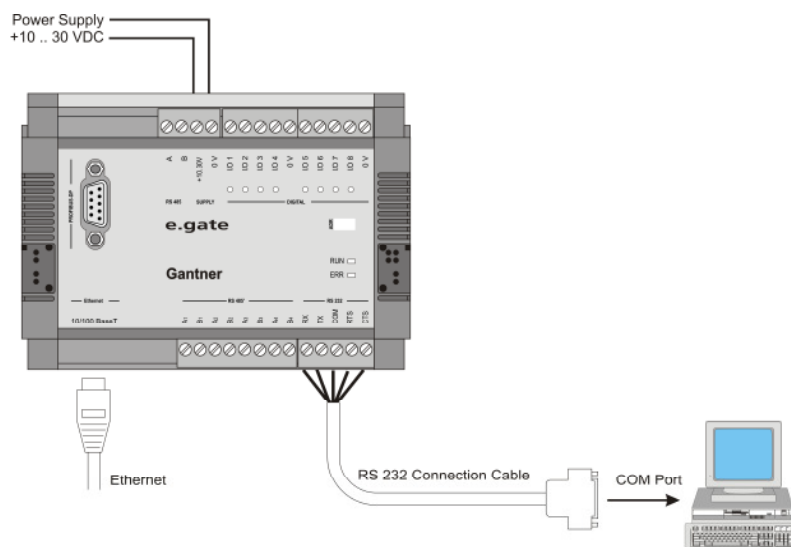


Figure 3.1 - Power Supply and Bus Connection of the e.gate / e.pac

When turning on the power supply the LEDs of the e.gate / e.pac will start blinking a few seconds and afterwards the LED "Run" on the front of the e.gate / e.pac will light up in green colour. The LED function is being described in chapter 7.5.2.

3.2 Installation of the Configuration Software "test.commander"

The test.commander software is used to define all settings of an e.gate / e.pac, like the interface settings and internal settings for the memory (circlebuffer), synchronization and life time. This software also includes the Configuration Software ICP 100 for configuration of e.bloxx measurement modules and the visualization tool Green Eye Writer to evaluate measurement data.

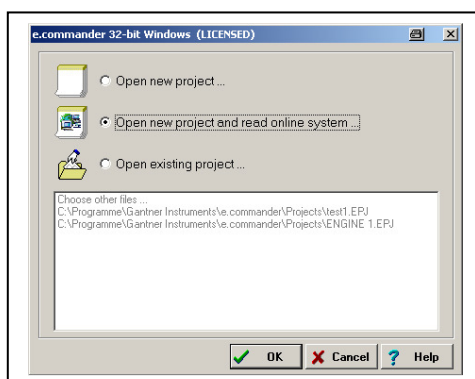
Minimal System Requirements for test.commander

- PC with Windows 98 or higher
- Min. 20 MByte of free disc space to store all projects and history data
- Connected Ethernet Interface

Install the test.commander software from the installation CD. The installer will guide you through the process. Afterwards start the test.commander. An icon will be generated on the desktop and the test.commander can also be found in the Start-Menu of Windows, section "Programs" -> "Gantner Instruments".

At the first start-up of test.commander you have to select the language you want to use. The language can be changed later on if required. Therefore edit the test.commander ".ini" file in the test.commander directory and change the number of the language (0=English, 1=French, 2=German). Now the test.commander software has to be licensed, otherwise the test.commander will work in demo mode (one e.gate / e.pac with up to 3 single channel modules will work). The language selection and licensing has to be done only once when starting this software the first time.

Now the following window will open (this will be the first window when starting the test.commander next time).



Having connected the e.gate / e.pac to the local network or to the PC via a cross cable, select the option "Open new project and read online system..." and press "OK". The test.commander will scan the network for connected controllers (see chapter 3.3).

In case you have connected a new e.gate / e.pac directly to the PC/laptop via the RS 232 interface you can select the option "Open new project" and press the "OK" button to proceed in setting the correct IP address (see chapter 3.4). Otherwise this functionality is being used

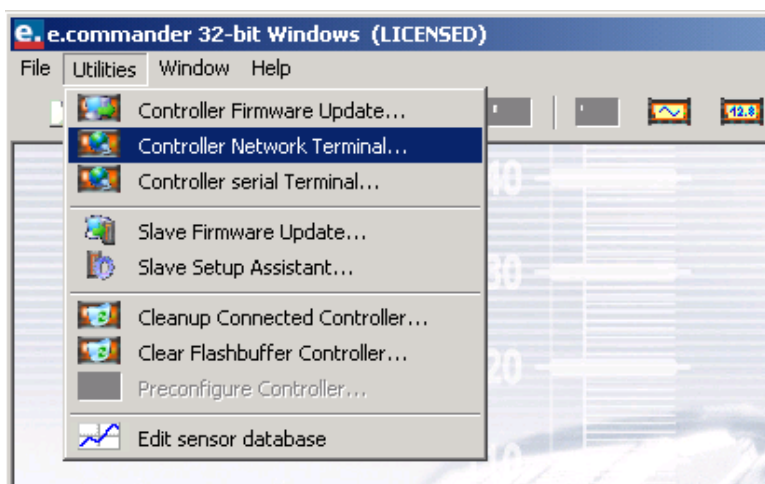
to define an offline project.

The third possibility (Open existing project...) is being used when changing an existing project offline.

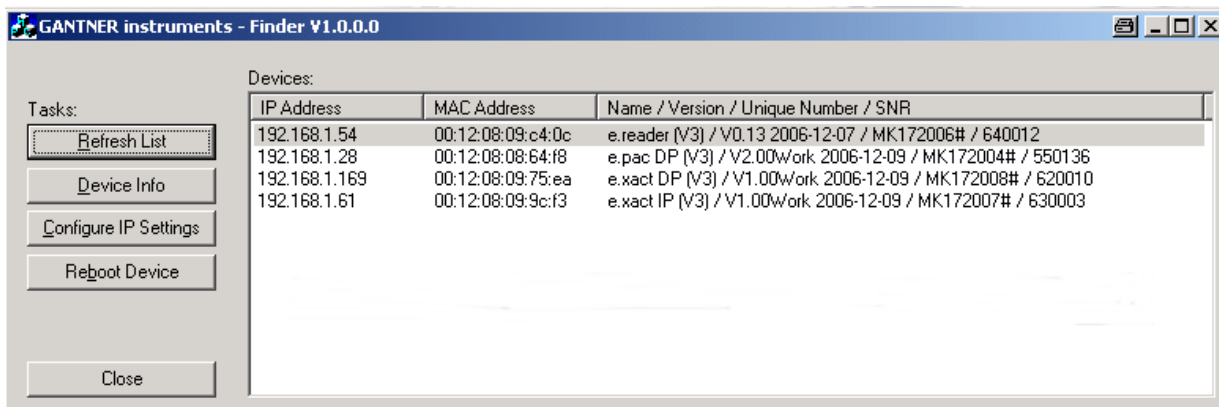
3.3 Network Scan for connected controller

All e.gate / e.pac units are being delivered with a certain default setting (IP-address: 192.168.1.18, DHCP active). But in some cases it is necessary to handle an e.gate / e.pac you do not know the settings in detail. Therefore the

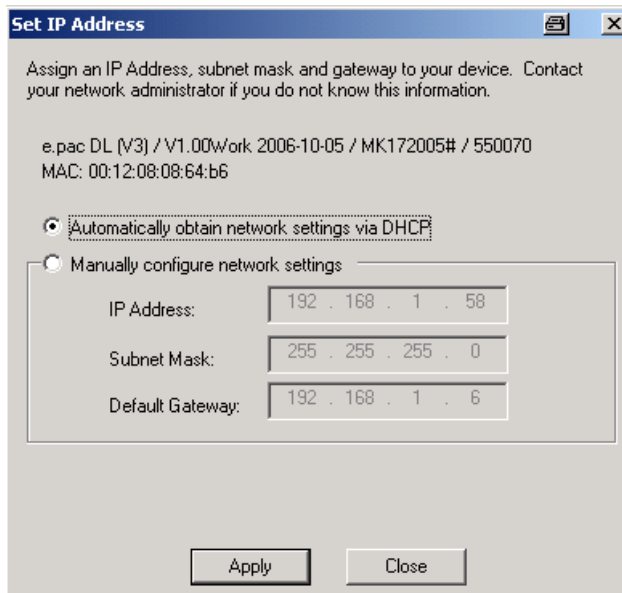
test.commander provides a very comfortable tool (not available with e.gate / e.pac V2!) to find the required modules in the network. From the toolbar select Utilities → Controller Network Terminal...



This network scan will find any units being connected to the Ethernet, independent from its IP-Address, its type (e.gate / e.pac / e.reader / e.xact) or if DHCP is activated or not. The scan will provide the following information to be able to adapt the unit for the network it has to be placed into.



To get the required information on the controller select the unit and click the button "Configure IP Settings". The window opening enables the user to activate DHCP or to set the correct IP address:



Set IP Address

Assign an IP Address, subnet mask and gateway to your device. Contact your network administrator if you do not know this information.

e.pac DL (V3) / V1.00/work 2006-10-05 / MK172005# / 550070
MAC: 00:12:08:08:64:b6

☒ Automatically obtain network settings via DHCP

☐ Manually configure network settings

IP Address: 192 . 168 . 1 . 58

Subnet Mask: 255 . 255 . 255 . 0

Default Gateway: 192 . 168 . 1 . 6

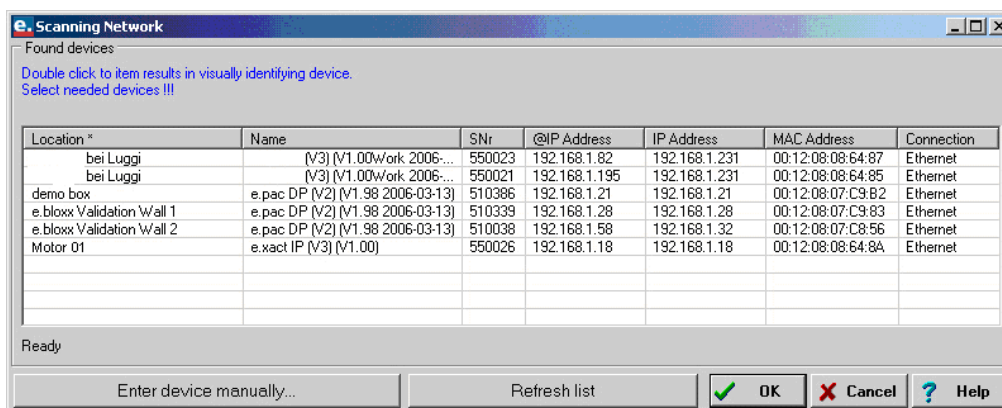
Apply Close

Beside this very comfortable way there is another possibility available to find an e.gate / e.pac on the Ethernet. This procedure will be described in the following section:

Finding an e.gate / e.pac on the Ethernet

Each device on an Ethernet has a unique address. These addresses are used to find and communicate with the corresponding devices. On delivery the address of an e.gate / e.pac is set to 192.168.1.18 as default, with DHCP set to ON.

After selecting the option field "Open new project and read online system..." in the start-up window the test.commander will search the network for all connected test controllers and show them in a new window.



Scanning Network

Found devices

Double click to item results in visually identifying device.
Select needed devices !!!

Location *	Name	SNr	@IP Address	IP Address	MAC Address	Connection
bei Luggi	[V3] [V1.00/work 2006-...	550023	192.168.1.82	192.168.1.231	00:12:08:08:64:87	Ethernet
bei Luggi	[V3] [V1.00/work 2006-...	550021	192.168.1.195	192.168.1.231	00:12:08:08:64:85	Ethernet
demo box	e.pac DP (V2) [V1.98 2006-03-13]	510386	192.168.1.21	192.168.1.21	00:12:08:07:C9:B2	Ethernet
e.bloxx Validation Wall 1	e.pac DP (V2) [V1.98 2006-03-13]	510339	192.168.1.28	192.168.1.28	00:12:08:07:C9:83	Ethernet
e.bloxx Validation Wall 2	e.pac DP (V2) [V1.98 2006-03-13]	510038	192.168.1.58	192.168.1.32	00:12:08:07:C8:56	Ethernet
Motor 01	e.xact IP (V3) [V1.00]	550026	192.168.1.18	192.168.1.18	00:12:08:08:64:8A	Ethernet

Ready

Enter device manually... Refresh list OK Cancel Help

If the e.gate / e.pac could not be found there might be one of the following problems:

1. Connection problem: Check that the e.gate / e.pac is connected correctly to the Ethernet and the power is supplied to the module (LED "RUN/ERROR" is on).
2. The IP address of the e.gate / e.pac does not fit to the network it is connected to.
3. Wrong DHCP settings: By default the DHCP setting of an e.gate / e.pac is set to ON. In this case the e.gate / e.pac will wait for a DHCP server in the network to get an IP address assigned. If there is no DHCP server in the network or the e.gate / e.pac is directly connected to the PC/laptop via an Ethernet cross-cable, then the DHCP setting must be set to OFF (see chapter 3.4).
4. The IP address of the e.gate / e.pac conflicts with another device on the network: In this case refer to the next chapter 3.5.1 to change the IP address.

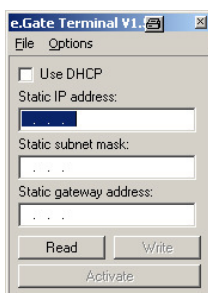
Select the e.gate / e.pac you have to work with and click "OK". The test.commander will read the configuration of the e.gate / e.pac module and it will be displayed on the screen (see 3.5).

Note: By double-clicking on an e.gate / e.pac the "RUN/ERROR" LED of the e.gate / e.pac will start blinking fast for a few seconds. This indicates if this is the system you are going to work with.

Setting the Ethernet Address of an e.gate / e.pac Module via the RS 232 interface (with e.gate / e.pac V1 & V2):

An e.gate / e.pac can be connected directly to a COM port of a PC/laptop via the serial RS 232 interface cable that is included in the scope of supply. This way it is possible to change the IP address and the DHCP setting of the e.gate / e.pac.

In the test.commander software select the menu item "Concentrator Terminal..." in the menu "Utilities". The following window will open.



The e.gate / e.pac, that is connected at the COM port, will be read and the address information of it will be displayed in the window. If no module is found check the interface settings (correct COM-Port) in the "Options" Menu and click on "Read".

The actual settings of the e.gate / e.pac will be shown in the window. The settings can be changed here. Enter an IP address which is not yet used in the network the e.gate / e.pac shall be used later on. Also check if the field "use DHCP" is set correctly. If there is a DHCP server in the Ethernet, where the e.gate / e.pac shall be used, mark this field. Otherwise keep it unmarked. A DHCP server is used to assign an IP address dynamically to the devices in the network.

Note: No leading zeros are to be entered in the IP-address (valid = 192.168.1.18, invalid = 192.168.001.018).

3.4 Read Configuration from an e.gate / e.pac

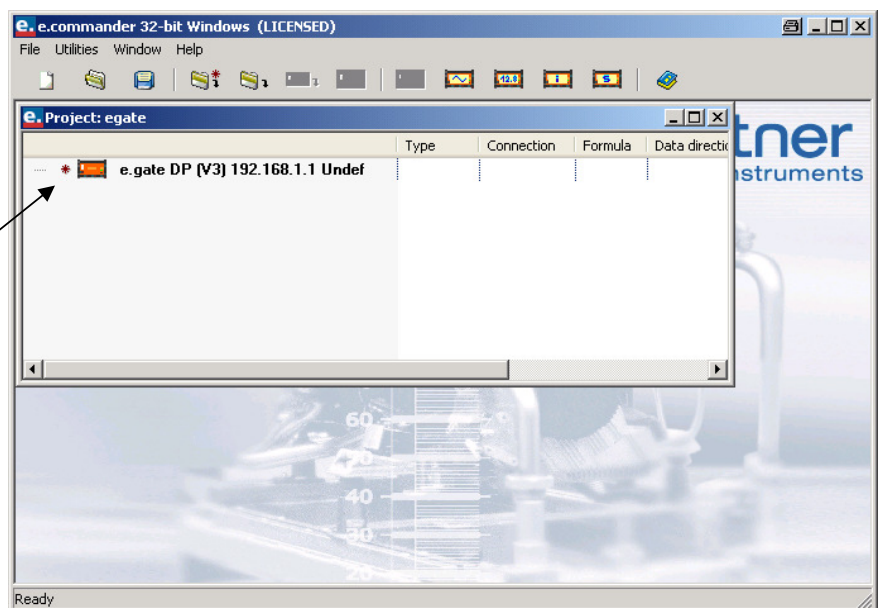
To see the configuration of an existing e.gate/e.pac module add the module to a project. Therefore press the right mouse button in the project window and select "Add Online Concentrators..." from the pop-up menu. The test.commander will search the network and display all test controllers on the network in a list as described in the chapter 3.3.

Select the desired e.gate / e.pac and press "OK".

During the next few seconds the communication between the PC and the e.gate / e.pac is checked, the configuration of the system is checked to see if the configuration correlates with the hardware, to verify the e.gate / e.pac, to test the communication aso.

As a positive result of the above mentioned system check the project is displayed in a window with a list of all the defined variables.

e.gate / e.pac - The red star indicates that the displayed configuration is not yet loaded into the e.gate / e.pac module

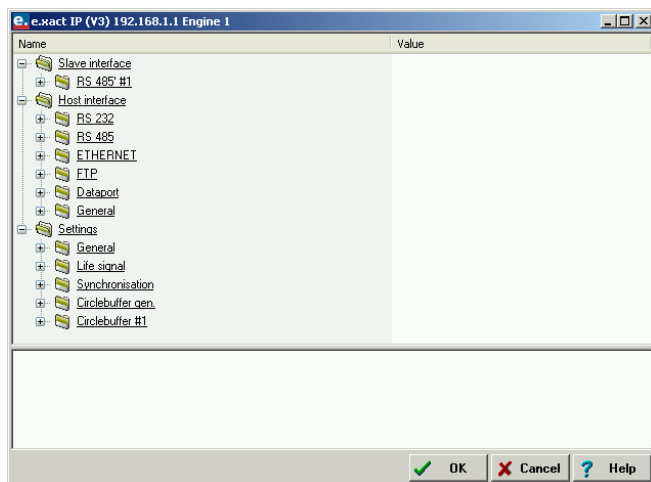


By double-clicking the e.gate / e.pac its settings can be changed. See the chapter 5 "Configuration" for more information on that.

3.5 Edit a Configuration

3.5.1 Configuration of e.gate / e.pac

To configure the settings of an e.gate / e.pac double-click onto the e.gate / e.pac module in the project window. A new window like the following one will open.



Here all the settings for the e.gate / e.pac are listed in a tree view. You can change all the settings directly in this window. Beside the interfaces and setting the logging functionalities can be defined as well.

3.6 Sensor Connection

The e.gate / e.pac themselves do not accept any sensors directly. Therefore it is required to add e.bloxx modules to the UARTs of the e.gate / e.pac. Up to 4 UARTs per e.gate / e.pac are available, each one can support a maximum of 30 addresses. Information on how to connect sensors to the e.bloxx modules is available in the e.bloxx manuals.

The following picture provides an overview on an e.gate / e.pac system structure:

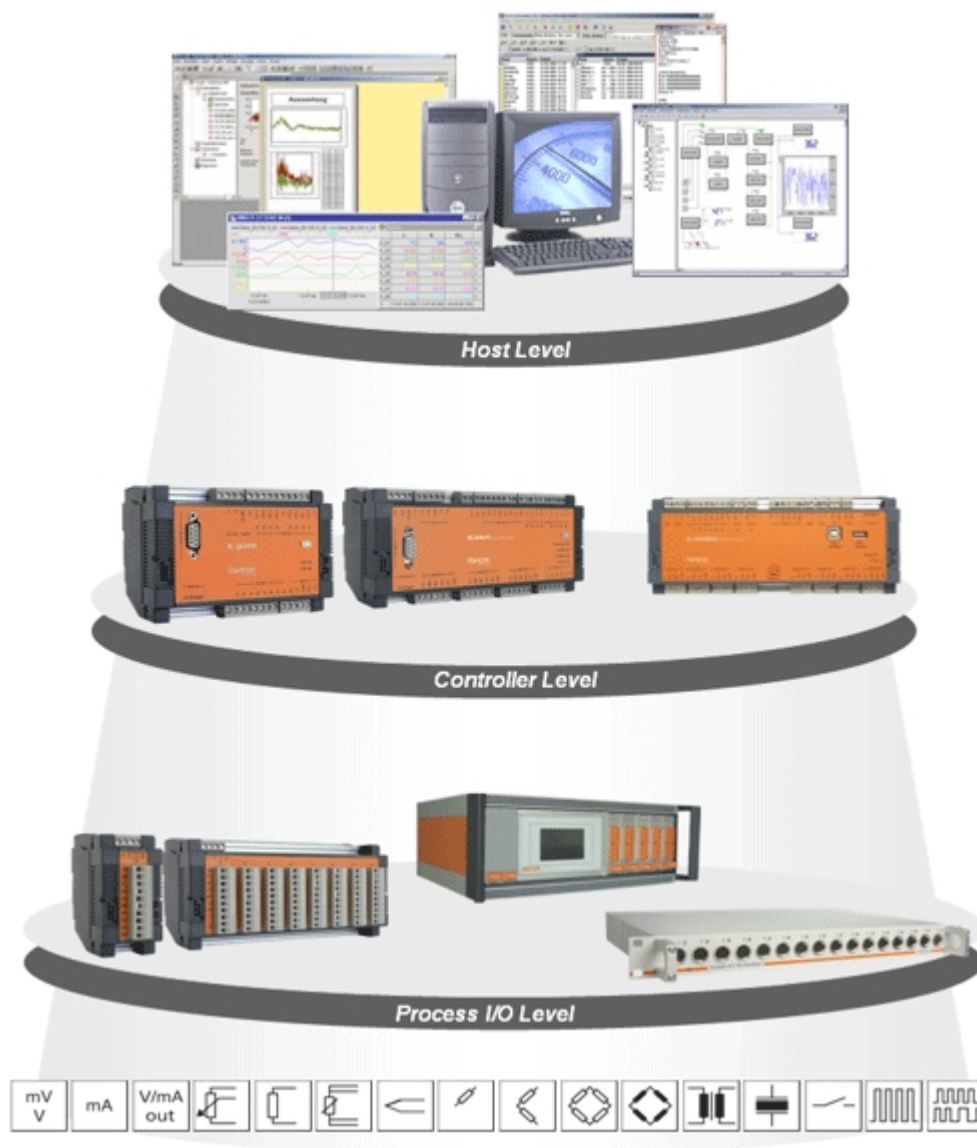

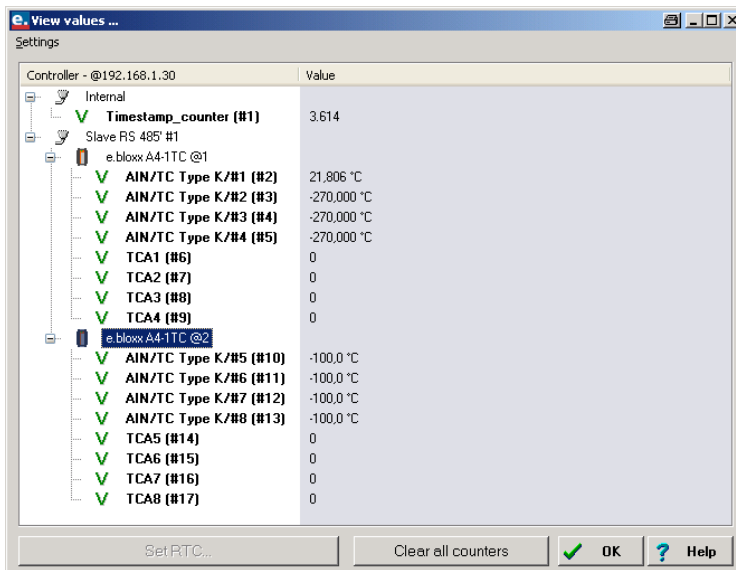


Figure 3.2 – System structure for sensor connection

3.7 Display Measurement Values

After configuration and correct sensor connection the actual values of each variable can be displayed and monitored on screen in real time.

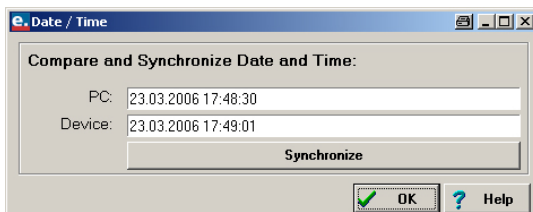
To display the real time values click on the icon  "Read Online Values from Concentrator". The test.commander will scan the network and display all connected test controllers in a window. Select the desired e.gate / e.pac module and press "OK". The e.gate / e.pac will be read and the defined variables with their actual values will be displayed in a new window.



In the left part of the window all defined variables are listed. On the right side you can see the measurement values of each variable.

With the button "Clear all counters" all counter values of the e.gate / e.pac can be reset to zero.


The e.gate / e.pac DP and IP do not provide any real-time clock. With these modules a time stamp counter is available only. If a real-time clock is required for the application an e.pac DL has to be selected. This clock can deviate after longer time of operation. In order to check the clock press the button "SetRTC". A window will be opened where you see the time of the e.pac DL and the local time of your PC/laptop.



With the button "Synchronize" you can set the clock of the e.pac DL to the PC/laptop time. Pay attention that this time is set correctly before you set the RTC of the e.pac DL.

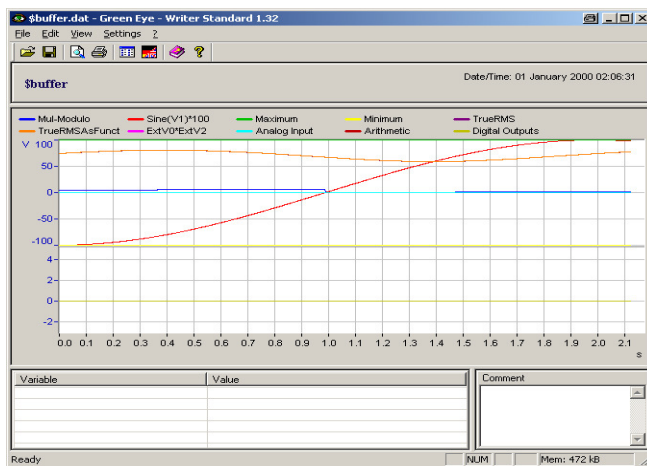
3.8 Read Memory

The e.gate / e.pac saves all measured values in its internal memory, which is a ring buffer. If some data only have to be logged at a reduced speed this has to be programmed with the test.con software.

In order to read out the buffer of an e.gate / e.pac click on the icon  "Read Online Buffer from Concentrator". The test.commander will scan the network and display all connected test controllers in a window. Select the desired e.gate / e.pac module and press "OK". The buffer of the e.gate / e.pac will be read. If you want to store the data locally on the PC/laptop for later evaluated and processing, select "Yes". You will be prompted to enter a file name for the data. If data have to be displayed only, press "No".

Attention: Reading data from the e.gate / e.pac deletes all measurement data – data can be read only once! Therefore always store data if you need them for further processing!

To display data the test.commander starts the integrated tool "Green Eye" and displays data in a new window.



The licensed version of Green Eye Writer provides helpful features such as difference measurement, zoom function, many scaling and design tools etc. With an unlicensed version of Green Eye it is only possible to view the measurement data.

Note: A detailed description about the evaluation of measurement with Green Eye can be found in the description of the test.commander software.

4. SIGNAL CONNECTION

4.1 General

The e.gate / e.pac has no integrated measurement functionality, it only provides eight digital in-/outputs for status information, trigger and synchronization purposes.

4.2 Digital Inputs

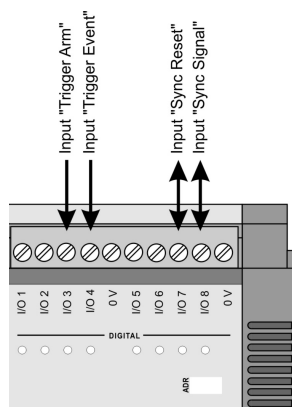
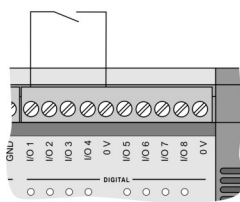


Figure 4.1 - Digital Inputs of the e.gate / e.pac

The digital inputs I/O 3, 4, 7 and 8 of the e.gate / e.pac can be used for triggering and synchronization purposes. The functions of the inputs are shown in the figure 4.8. I/O 7 and I/O 8 are used as in- and outputs.

Connection Scheme



Circuit

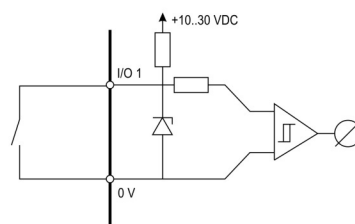


Figure 4.2 - Digital Input Connection

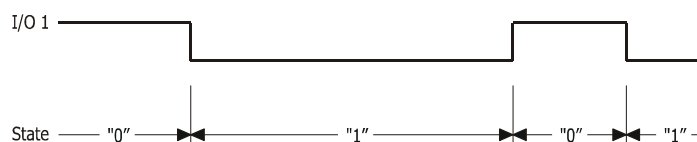


Figure 4.3 - Signal Diagram of Digital Inputs

The digital input is set (switch closed) as long as the applied signal voltage remains under the threshold value of 1 V. The digital information can be scanned as I/O information via bus.

4.3 Digital Outputs

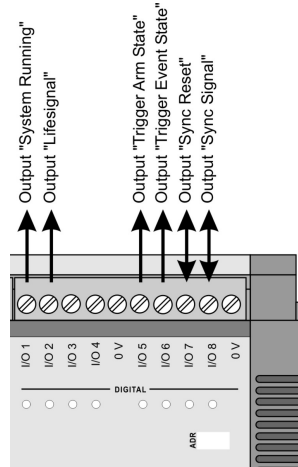


Figure 4.4 - Digital Outputs of the e.gate / e.pac

The digital outputs I/O 1, 2, 5, 6, 7 and 8 of the e.gate / e.pac can be used for output digital signals for information about the system and synchronization purposes. The functions are shown in the figure 4.11. I/O 7 and I/O 8 are used as in- and outputs.

Connection Scheme

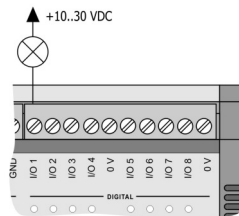


Figure 4.5 - Digital Output Connection

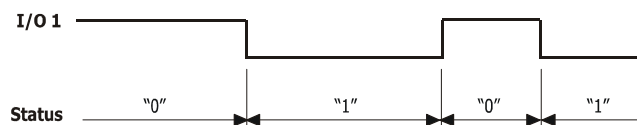


Figure 4.6 - Signal Diagram of Digital Outputs

The distribution voltage for the digital outputs can range from 10 to 30 VDC. It has to be either supplied externally or be picked up by the power supply of the sensor modules.

The status of the digital output can be scanned as I/O information via bus.

5. CONFIGURATION

To configure an e.gate / e.pac and read the measured and logged values from the e.gate / e.pac the Configuration Software test.commander is used. This chapter will give you an overview on how to configure an e.gate / e.pac module. A more detailed description about the test.commander software can be found in the test.commander manual.

The configuration can be divided into the following processes:

- Definition of module-specific settings for the interfaces, logging, synchronization, etc.
- Configuration of the measurement variables
- Definition of the functionality of the e.pac by using the test.con software

There are two possibilities for configuring an e.gate / e.pac. With the first possibility the settings and configuration of an e.gate / e.pac will be read from the e.gate / e.pac, adjusted and transmitted back to the e.gate / e.pac.

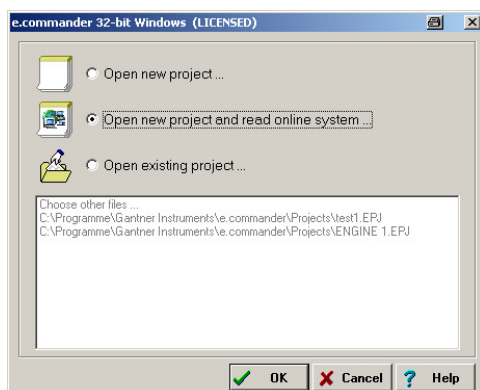
Another possibility is to define the configuration locally on the PC/laptop without the necessity that the e.gate / e.pac is already connected or present in the network. The configuration can be saved and loaded into the e.gate / e.pac at any time.

The entire configuration of an e.gate / e.pac or a whole system of test controllers is saved in a project. Projects can be saved and loaded for further processing.

The standard way of configuring an e.gate / e.pac module is to connect the e.gate / e.pac into the Ethernet first. Then the e.gate / e.pac will be added to a project, which will read out the actual configuration of the e.gate / e.pac and the configuration is being display on the screen. Now it is possible to reconfigure the module and finally update the e.gate / e.pac with the new configuration.

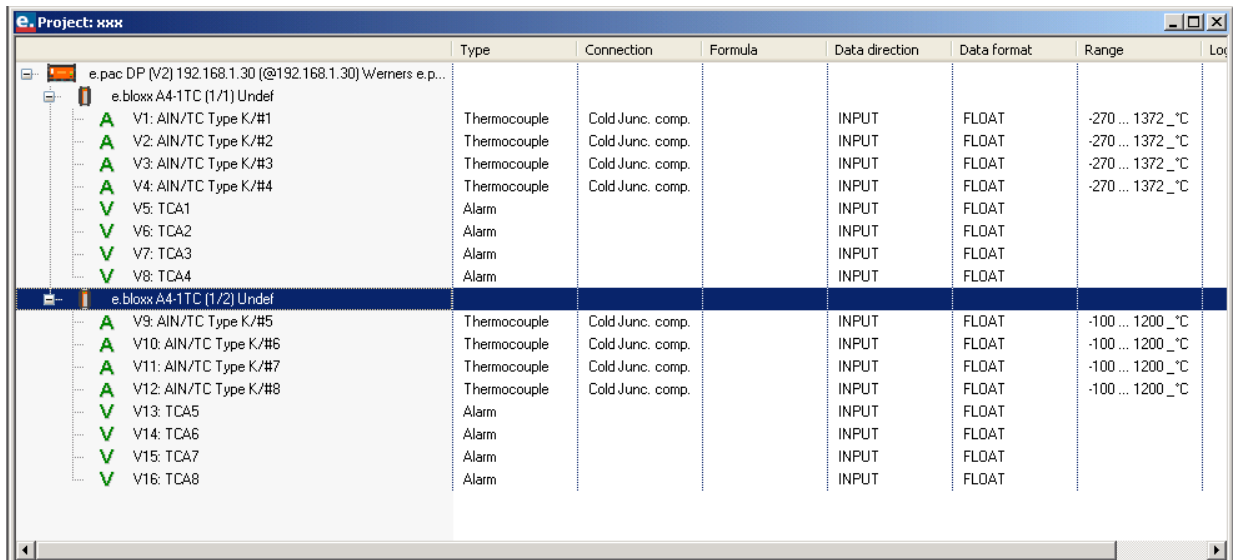
5.1 Open a Project

Start the test.commander software. First you have to open a project. Therefore select one of the three options in the window that will be opened after start-up of test.commander.



- With "Open new project..." you can open a new, empty project.
- Selecting "Open new project and read online system..." will open a window where test.commander displays all test controllers found on the Ethernet. You can select the e.gate / e.pac you want to work with and press "OK". This will open a new project and add the selected e.gate / e.pac with its actual configuration.
- With the option "Open existing project..." you can open a previously saved project.

You can also open several projects at the same time. Each project will be displayed in a separate project window in test.commander.

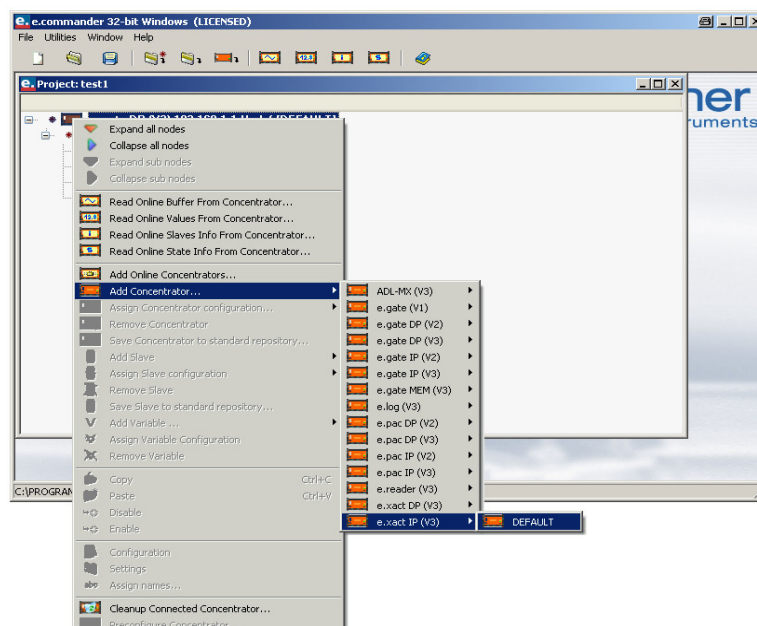


	Type	Connection	Formula	Data direction	Data format	Range	Loc
e.pac DP (V2) 192.168.1.30 (@192.168.1.30) Werners e.p...							
e.bloxx A4-1TC (1/1) Undef							
V1: AIN/TC Type K/#1	Thermocouple	Cold Junc. comp.		INPUT	FLOAT	-270 ... 1372 _°C	
V2: AIN/TC Type K/#2	Thermocouple	Cold Junc. comp.		INPUT	FLOAT	-270 ... 1372 _°C	
V3: AIN/TC Type K/#3	Thermocouple	Cold Junc. comp.		INPUT	FLOAT	-270 ... 1372 _°C	
V4: AIN/TC Type K/#4	Thermocouple	Cold Junc. comp.		INPUT	FLOAT	-270 ... 1372 _°C	
V5: TCA1	Alarm			INPUT	FLOAT		
V6: TCA2	Alarm			INPUT	FLOAT		
V7: TCA3	Alarm			INPUT	FLOAT		
V8: TCA4	Alarm			INPUT	FLOAT		
e.bloxx A4-1TC (1/2) Undef							
V9: AIN/TC Type K/#5	Thermocouple	Cold Junc. comp.		INPUT	FLOAT	-100 ... 1200 _°C	
V10: AIN/TC Type K/#6	Thermocouple	Cold Junc. comp.		INPUT	FLOAT	-100 ... 1200 _°C	
V11: AIN/TC Type K/#7	Thermocouple	Cold Junc. comp.		INPUT	FLOAT	-100 ... 1200 _°C	
V12: AIN/TC Type K/#8	Thermocouple	Cold Junc. comp.		INPUT	FLOAT	-100 ... 1200 _°C	
V13: TCA5	Alarm			INPUT	FLOAT		
V14: TCA6	Alarm			INPUT	FLOAT		
V15: TCA7	Alarm			INPUT	FLOAT		
V16: TCA8	Alarm			INPUT	FLOAT		

Below each test controller in a project the configured e.bloxx modules with its configuration will be shown in list form. It is possible to add new test controllers and slave modules and to define the variable and device settings.

5.2 Adding an e.gate / e.pac to a Project

To add an e.gate / e.pac to a project click with the right mouse button below the last line of the project. A context menu appears.

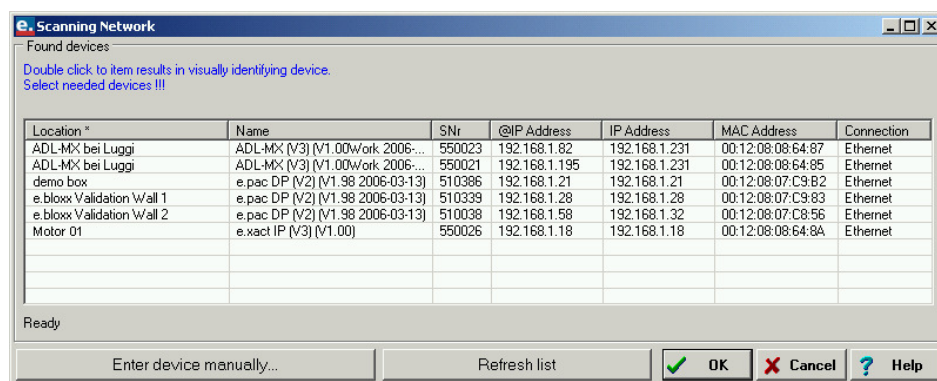


Now you have the possibility to add an e.gate / e.pac which is already working and present at the Ethernet or to add a new e.gate / e.pac module which is not available yet but you want to make its configuration already.

- In case you want to add a new e.gate / e.pac which is not yet available on the Ethernet select the menu item "Add Concentrator..." and select the corresponding type of test controller you want to add (e.g. "e.gate"). The letters "IP" behind the e.gate / e.pac indicate that the module is using Ethernet for communication. The letters "DP" indicate that the e.gate / e.pac is also equipped with a Profibus-DP interface, "DL" with the e.pac stands for data logger.

Note: The indications (V2) and (V3) behind the test controller types correspond to the device generation. Select the correct one, else the concentrator cannot be found on the Ethernet.

- If you want to add an e.gate / e.pac which already exists on the Ethernet select the menu item "Add Online Concentrators...". The test.commander will then search the network and display all test controllers on the network in a list.

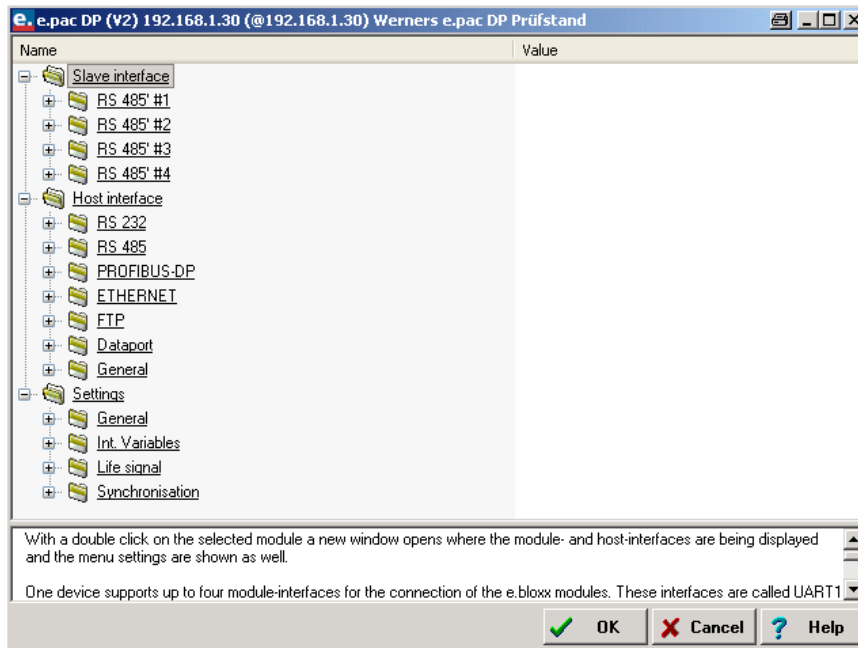


With "Enter device manually..." you can enter the IP-address of an e.gate / e.pac directly. With "Refresh list" the network will be scanned again and the list of modules will be updated. Double clicking one of the e.gate / e.pac in the list makes the LEDs of the e.gate / e.pac blinking for a few seconds very fast. This indicates the position of the e.gate / e.pac you are going to work with. Mark the desired e.gate / e.pac and press "OK".

After one of the two possibilities just mentioned the project window will be shown again and the e.gate / e.pac will be added to the configuration list in that window.

5.3 Configuration of the e.gate / e.pac

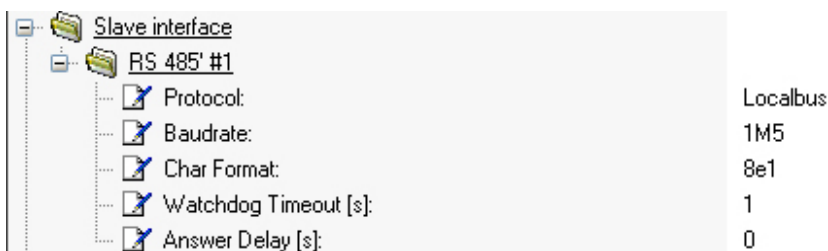
To change the settings of an e.gate / e.pac double-click the mouse onto the e.gate / e.pac or click on it with the right mouse button and select "settings" from the context menu. The window to define the settings will be opened.



The settings are arranged in a group for the "Slave Interfaces" (connection of e.bloxx sensor modules), the "Host Interface" and the e.gate / e.pac specific settings.

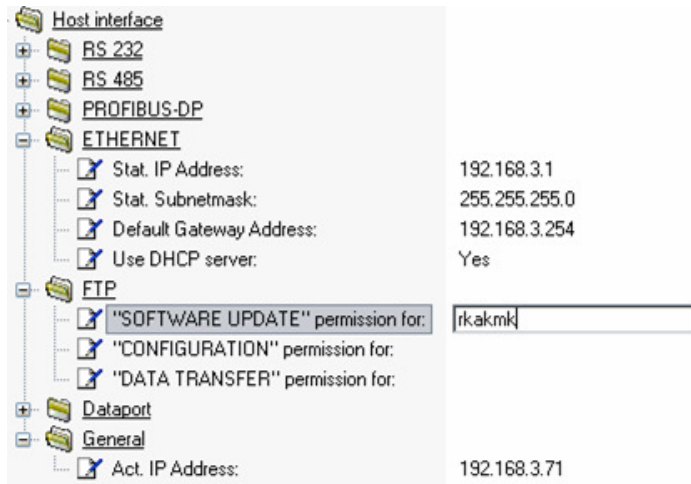
Following is a short overview of the setting possibilities. By clicking with the mouse on a setting a help text for the selected setting will be shown in the lower area of the window.

5.3.1 Slave Interface



The e.gate / e.pac provides four slave interfaces for the connection of additional e.bloxx modules via the screw terminals A1 and B1 ... A4 and B4 of the e.gate / e.pac. See chapter 5.4 for information on how to add an e.bloxx to the slave interface. The settings like baud rate and delay time are selectable. The protocol is fixed to Localbus, 8e1. This setup will overwrite the setups in the module to ensure a communication.

5.3.2 Host Interface



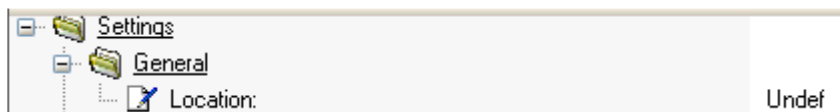
To connect the e.gate / e.pac to a host there are several interfaces available. The most important interfaces are Profibus-DP and Ethernet.

By using DHCP it is necessary that the Static IP Address and the Default Gateway Address fit together. The actual dynamic IP address can be displayed in the *General* selection.

Within the function *FTP* a password protection can be activated. It is necessary to work without or with all 3 passwords. In case of forgotten passwords please contact Gantner Instruments at office@gantner-instruments.com to unlock the password protection.

5.3.3 e.gate / e.pac Settings

The e.gate / e.pac settings are separated into 5, resp. 4 sections:



In the section "General" a designation can be assigned to the e.gate / e.pac. With this name it will be indicated when searching for test controllers on the Ethernet and also in the project window.

Note: When you change a setting, the setting will be marked in bold text. When closing the setting window the changes will be written to the project file of your PC/laptop. To activate the new configuration in the e.gate / e.pac the configuration file has to be sent to the e.gate / e.pac module as well.

Int. Variables	
<input checked="" type="checkbox"/> Timestamp counter generation:	On
<input checked="" type="checkbox"/> System States generation:	None
<input checked="" type="checkbox"/> Set points generation:	None
<input checked="" type="checkbox"/> Write controlled set points generation:	None
<input checked="" type="checkbox"/> Bus diagnostics generation:	None

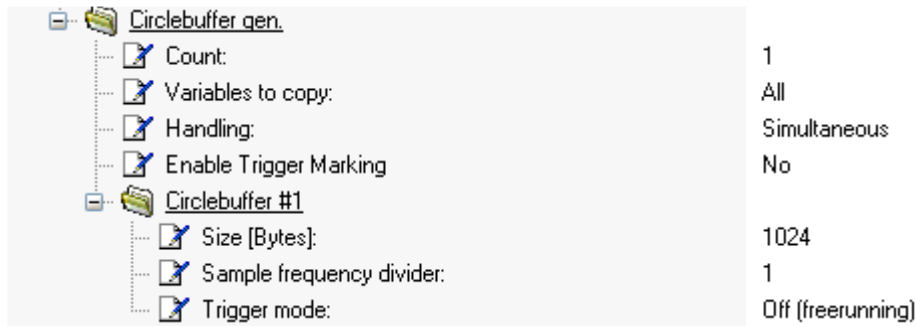
Internal variables are being used e.g. for the time stamp counter. Set point generation and write controlled set points generation are available with e.pac only.

Life signal	
<input checked="" type="checkbox"/> Signal type	Dynamic (Conditions AND combined)
<input checked="" type="checkbox"/> I/O toggle time [s]:	1
<input checked="" type="checkbox"/> Condition "ON NO ERROR ACTIVE":	Yes
<input checked="" type="checkbox"/> Condition "ON HOST DATAPORT ACTIVE":	No
<input checked="" type="checkbox"/> Condition "ON HOST PACKERNEPORT ACTIVE":	No
<input checked="" type="checkbox"/> Condition "ON HOST HIGHSEEDPORT UDP ACTIVE":	No
<input checked="" type="checkbox"/> Condition "ON HOST HIGHSEEDPORT TCP/IP ACTIVE":	No
<input checked="" type="checkbox"/> Condition "ON HOST DISTRIBUTORPORT ACTIVE":	No
<input checked="" type="checkbox"/> Condition "ON HOST FTP ACTIVE":	No
<input checked="" type="checkbox"/> Condition "ON HOST PROFIBUS-DP ACTIVE":	No
<input checked="" type="checkbox"/> Condition "ON HOST RS 232 ACTIVE":	No
<input checked="" type="checkbox"/> Condition "ON HOST RS 485 ACTIVE":	No

In the section "Life signal" different watchdog conditions can be defined. With "Signal type" you can select if the different error conditions set below shall be combined with logic "AND" or logic "OR". The condition "ON HOST PACKERNEPORT ACTIVE" is available with the e.pac only.

Synchronisation	
<input checked="" type="checkbox"/> Use I/O's:	Yes
<input checked="" type="checkbox"/> Use as master:	Yes
<input checked="" type="checkbox"/> Sync. sample frequency:	100 Hz
<input checked="" type="checkbox"/> System synchronisation time:	None
<input checked="" type="checkbox"/> Synchronisation RS 485' #1	activated
<input checked="" type="checkbox"/> Synchronisation RS 485' #2	activated
<input checked="" type="checkbox"/> Synchronisation RS 485' #3	activated
<input checked="" type="checkbox"/> Synchronisation RS 485' #4	activated

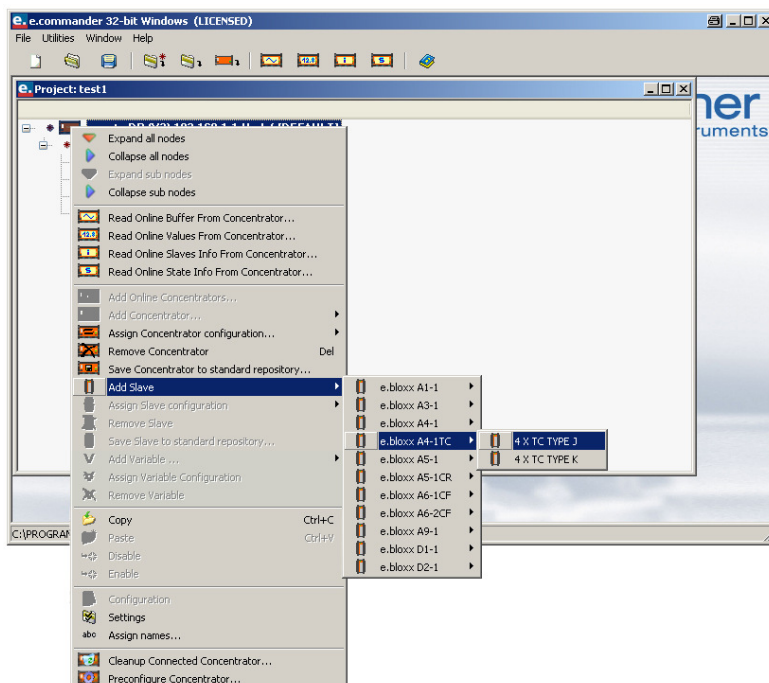
Here the synchronization of several e.gate / e.pac modules in a network can be defined. One e.gate / e.pac will act as a master, all the other e.gate / e.pac modules have to be defined as slaves. To synchronize e.gate / e.pac modules with each other an additional wiring will be required.



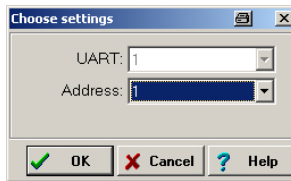
The circlebuffer in the e.gate (not available with e.pac) stores measured values for later read-out and evaluation. It is possible to select the number of circle buffers (1 ... 5) and set the number of variables to be stored (simultaneous or sequential storing), the buffer size, sample divider (e.g. a fast and a slow buffer), trigger mode and trigger position (pre-trigger).

5.4 Adding e.bloxx modules to an e.gate / e.pac

To add a new e.bloxx sensor module (slave) to an e.gate / e.pac click with the right mouse button on the icon of the e.gate / e.pac. From the context menu that appears select "Add Slave" and select the required module with one of the predefined configurations.



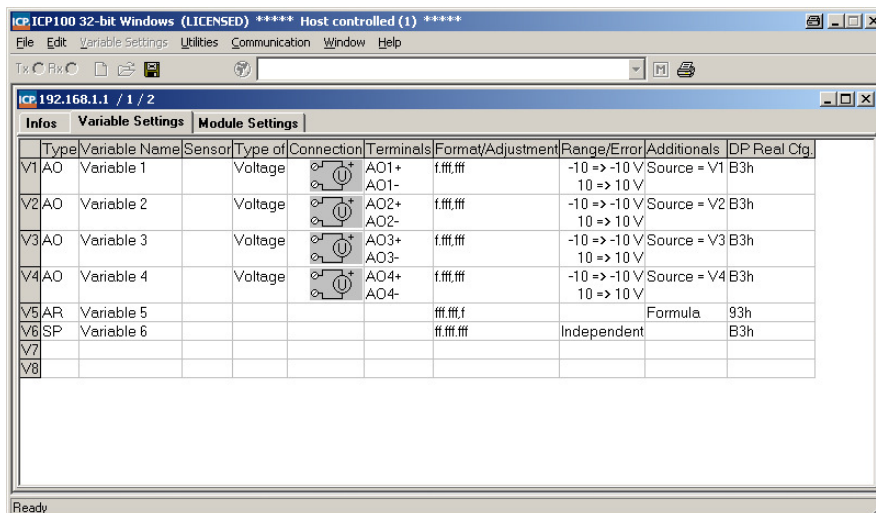
In the following window you have to define the UART interface of the test controller, where the e.bloxx module has to be connected to and the address of the e.bloxx.



Now the module is added to the e.gate / e.pac in the project with standard measurement settings for its in-/outputs.

5.4.1 Configuration of e.bloxx variables


Now configure the measurement functions of every variable of the just added e.bloxx. Therefore double-click on the e.bloxx module or a variable or click with the right mouse button and select "Configuration". The Configuration Software ICP 100, which is integrated in test.commander, will be opened. You will see the predefined variable definition.



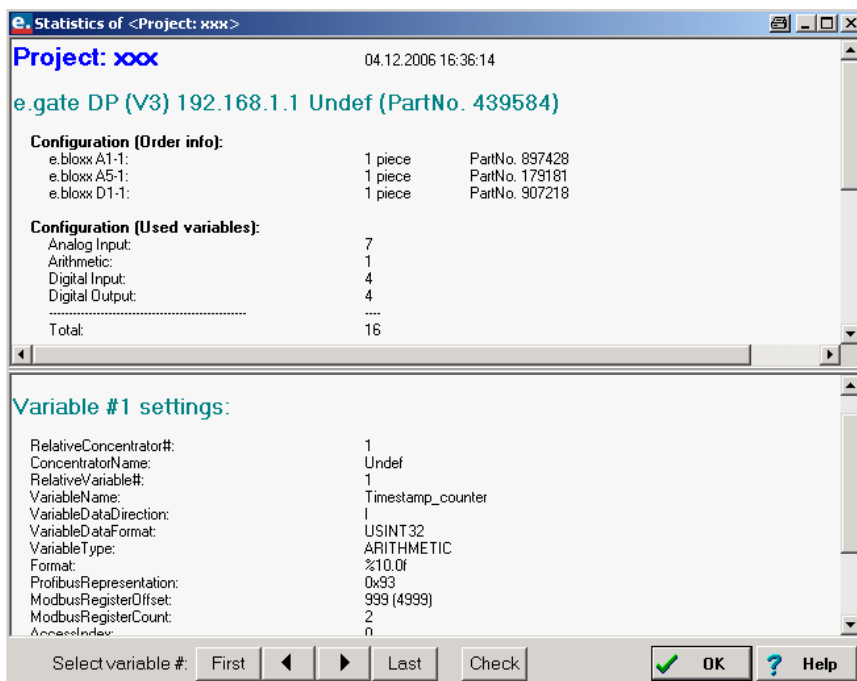
Every variable is displayed in a row. You can set a name for the variable (name will be shown in the project window and especially with the e.pac it is necessary to define unique names within one project, test.con handles the variable names!) and you can select the type of measurement, the measurement range, format settings and more different settings depending on the type of variable. Click on the corresponding field (column and row) of the setting you want to change. For a more detailed description see the online help of the Configuration Software ICP 100.

After configuration close the ICP 100 Configuration Software by pressing the icon "Save to File and Exit". You will return to the test.commander project window and the variable settings will be updated.

5.5 Statistics

Another very useful tool is the statistics functionality. This feature can be accessed when clicking the button  in the menu bar.

This functionality provides the following information:



The first part of the window shows an overview on the whole project with:

- Project name, date and time
- IP-address, name/location, part number of the e.gate / e.pac
- Type and number of e.bloxx modules connected to the e.gate / e.pac with its part number(s)
- The number of each type of variable like alarm, analog input, analog output,... being defined for this project.

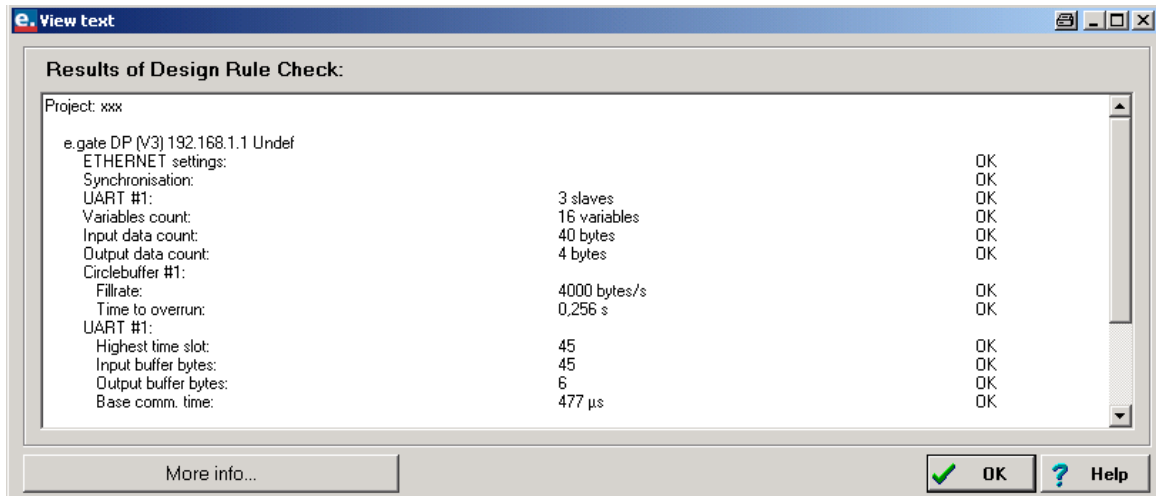
If there are several e.gate / e.pac modules in one system, you will find this information for each single test controller.

The second part describes all variables being defined in the project with its most important information in the order as they are configured. With the buttons "First", "Last" and the arrows you can search for the variable you are interested in.

5.5.1 Design Rule Check

The performance of the system depends on the numbers of variables, number of variables, transfer rate, data format, active interfaces, etc.

So it is very helpful to check a configuration after the first setup or after having reconfigured the system by clicking the "Check" button.



The result of the test will be explained by the background colors:


- WHITE: Configuration is fine and will run after downloading.
- RED: Configuration will not run, a download is not possible.
- YELLOW: It is not definitely possible to say ok or not ok. In this boarder range it is necessary to test the setup. It is possible to download the configuration.

In praxis mostly the error state will be generated by:

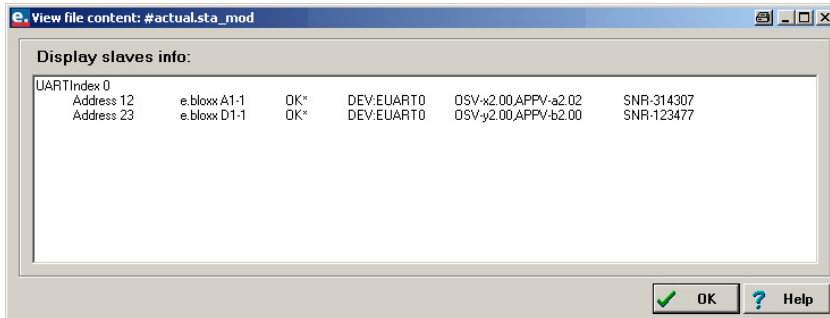
- connecting too many modules to one UART.
- defining too many variables (Att.: difference between Profibus-DP vs. Ethernet).
- selected sample rate could not be reached.
- no unique variable names when using e.pac with test.con

5.6 Display of Slave Information

Slaves are the e.bloxx measurement modules connected to an e.gate / e.pac. Information about those slaves can be displayed on screen.


To read out and display the slave information click on the icon  "Read Online Slaves Info from Concentrator". The test.commander will scan the network and display all connected test controllers in a window (see chapter 5.2).

Select the desired concentrator and press "OK". The concentrator will be read out and the information about the slave modules connected to the test controller will be displayed in a new window.

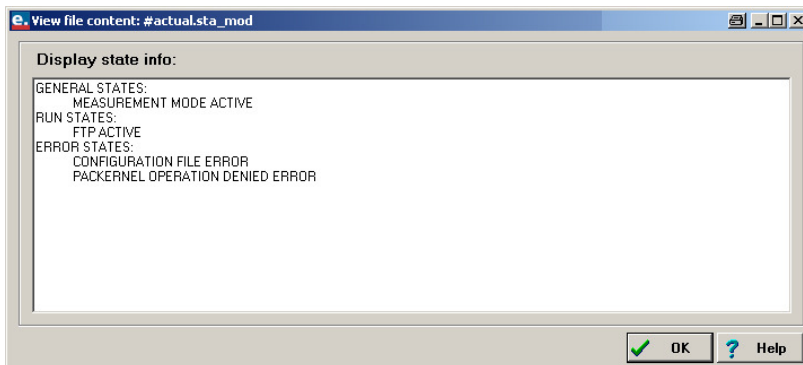


5.7 Display of Status Information from e.gate / e.pac

The actual state of a test controller can be read. These information include run states, error information and general states like if the measurement mode is active, etc.

To read the status information from a concentrator click on the icon  "Read Online State Info from Concentrator". The test.commander will scan the network and display all connected test controllers in a window (see chapter 5.2).

Select the desired e.gate / e.pac and press "OK". The concentrator will be read out and the status information will be displayed in a new window.



In case the e.pac configuration does not fit with the PAC programming (names and types of variables, data format,...) an error will be generated after downloading the configuration and this window will appear. After reprogramming the PAC function with test.con the error state will disappear.

6. FUNCTIONALITY WITH TEST.CON (E.PAC ONLY)

The e.pac permits complex control functionality such as PID controller, state machine, arithmetic, numeric and logical operations, transmission terms, function generators, time functions as well as visualization and additional functionality.

The software test.con is an easy-to-handle graphical programming system to define the functionality of an e.pac. As only graphical blocks are used for the definition, time to get familiarized with the system is minimized. The presentation of graphical blocks follows existing specification and technical languages. Structure blocks permit a hierarchic structure of projects. Linked projects and export mechanisms facilitate the reuse of structure blocks that have been created earlier.

The software test.con combines programming, simulation, testing and running in one tool. Special blocks and additional tools permit online observation of signals and signal tracing as well as run-time measurements.

Note: This chapter will give a short overview of the test.con software. A more detailed description can be found in the test.con software manual and the online help of test.con.

6.1 Overview of the test.con User Interface

After installation of test.con from the CD start the software and the main window of test.con will open.

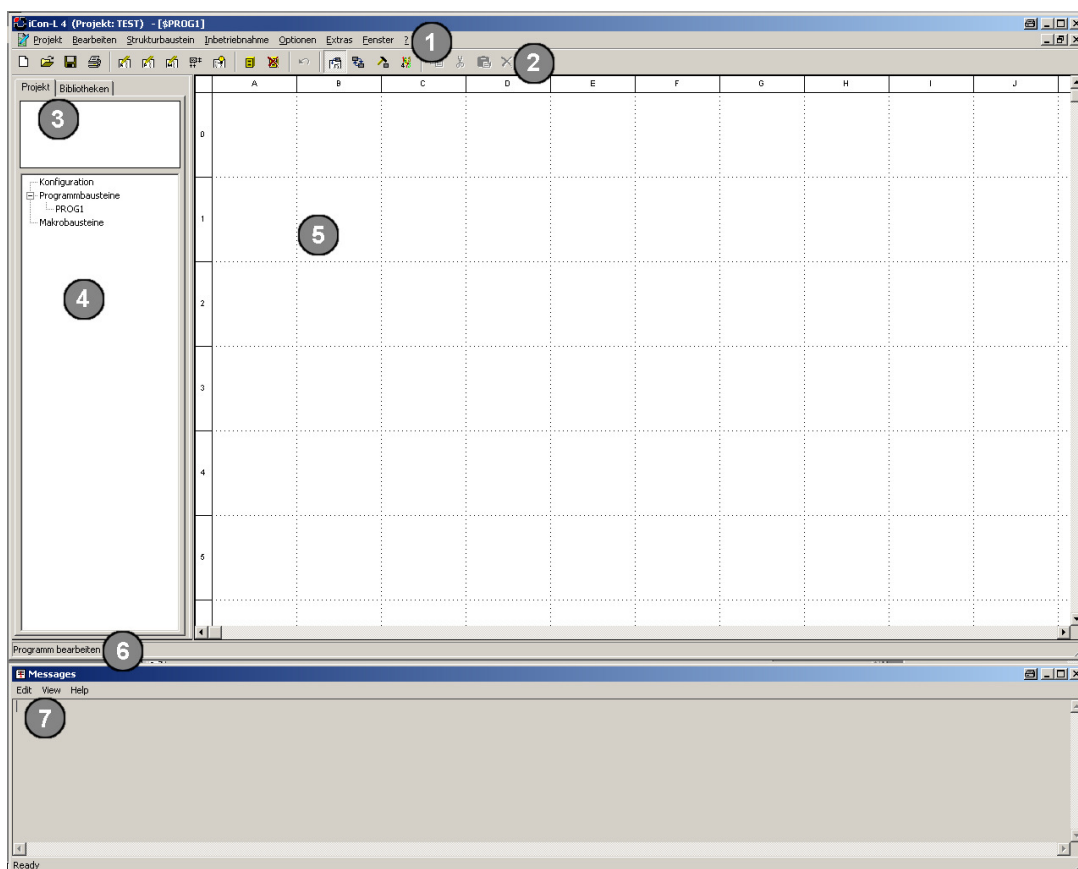


Figure 6.1 - Main Window of test.con

Commands for working with the system can be selected from the Menu ①, the Toolbar ②, the Quickstart Window, and Context Menus as well as by using Keyboard Shortcuts. The structure of the project is presented in the Project Tree ④ which is displayed when you click on the tab "Project" on top of the tree. A number of operations can also be carried out from the project tree. By selecting a structure block in the project tree a graphical preview of it will be shown in the preview area ③. From there it is possible to drag the structure block into the working area ⑤, which contains the worksheet with the presentation of the blocks and their connections. Instructions, status information and messages are displayed in the Status Line ⑥ and the Messages Window ⑦.

The whole functionality of the function blocks of the system is defined in the e.pac. The software test.con is just a tool for combining and "wiring" the single blocks.

6.2 Projects

A project can be subdivided into any number of hierarchic structures. However, it always comprises not less than two levels, i.e. its configuration and program blocks. A project is processed by arranging the desired structure blocks (program and macro blocks) and connecting them graphically.

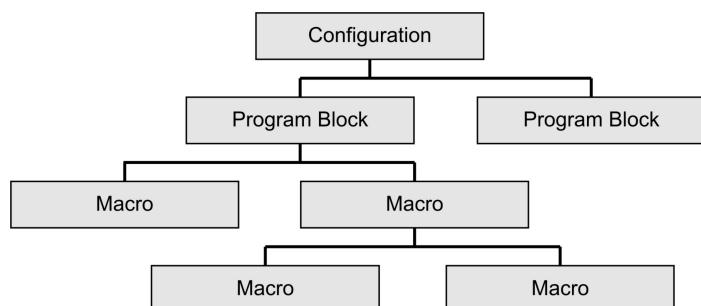


Figure 6.2 - Structure of test.con

The top level of a project is the configuration (&Main). It allows the graphical configuration of the target system tasks.

Program blocks are added to the configuration. They form the second level of the project where the functions are called and their sequence is established. Program blocks are flagged with a \$ symbol preceding its designation. By determining the priority and cycle time of program blocks the task management parameters are defined. Connections between the program blocks facilitate the asynchronous data exchange via the e.pac. The number of program blocks is limited by the number of the parallel tasks in the target system (usually 15).

Programs are structured by using macro blocks. They make it easier to call functions which are used repeatedly. Macro blocks can be inserted into program blocks and other macro blocks. However, recursive calling is not permitted. Macro blocks contain sub functions of the programs and relating local parameters. These are no subprograms. During code generation they generate the complete target code for each call.

All project levels may contain visualization blocks (without target function). For exchanging data between project levels, the Input and Output blocks from the Standard Library are used. The Enable block from the same library is used for conditional processing operations of program and macro blocks.

6.3 Classes and Instances

When a project is processed, there is a difference between classes and instances. Classes are generated during editing operations by combining certain structure blocks and they contain preset values. Instances are formed when changing to the "Run" mode and can be parameterized there. So it is possible to define a special functionality (class) in the "Edit" mode which can be used in different programs/macros with different parameters.

During editing operations only preset values are defined in the parameter dialogs of the blocks. During the first change to the *Run* mode they are copied into instance parameters. Thereafter, the instance parameters can be modified in the *Run* mode. However, these modifications have no effect on the preset values in the structure block classes. When returning to *Edit* and modifying preset values, the instance parameters remain unaffected. The instances of newly inserted structure blocks contain the preset values as instance parameters.

Note: When changing a parameter in the *Run* mode (instance parameter) it is necessary to download them into the e.pac to ensure that the new parameter is still valid in the e.pac after a power off/on, otherwise the old parameter are loaded after a new start.

To facilitate easier differentiation between structure block instances, they can be assigned to different names. The context menus for structure blocks in the *Run* mode contain the *Instance Name* command. Upon opening the dialog a designation may be entered which afterwards in the symbol of the structure block and in the project tree.

Instance names are only indicated in the *Run* mode. An exception is the configuration where the instance name of the programs remains visible even during editing operations.

6.4 The Four States of the test.con Software

The software test.con facilitates creating, changing, testing and running projects by using one tool only. The program distinguishes between the following 4 system states:

- Edit
- Design
- Run
- Online Observation

Each state can be obtained by using the menu, the toolbar or partly the context menu.

6.4.1 Edit State

"Edit" is the basic state of the system. It is the state where a project is mainly processed. The structure of a project is determined by loading and removing libraries, defining and deleting structure blocks, and inserting, removing and connecting structure blocks. In the edit mode the classes of structure blocks are processed. The values entered in the parameter dialogs of the blocks only serve as presetting for the instances visible in the run mode.

Upon entering one of the first three commands of the edit menu or closing all work sheet windows, the system changes to the edit state. This state can be easily identified through the appearance of the project tree. There, the defined structure blocks and loaded libraries are listed in two views. In addition, the grid for block positions and connections are indicated by means of dotted lines in the work sheet windows.

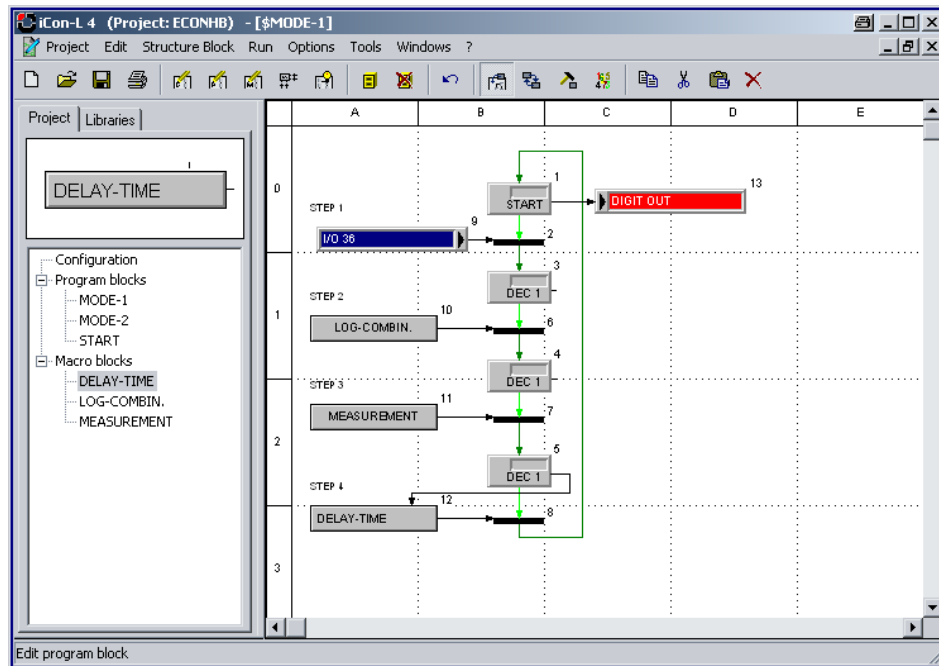


Figure 6.3 - Worksheet Edit State

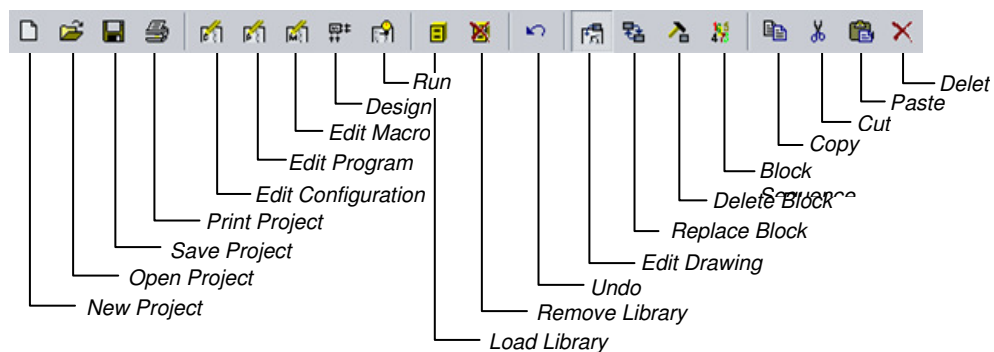


Figure 6.4 - Toolbar Edit State

6.4.2 Design State

Apart from the operations described above, i. e. inserting and deleting objects, also the structure block design ("Design Structure Block") can be used. From a specific work sheet window and by means of an additional toolbar, label positions, the appearance of symbols and the presentation in the work sheet window can be changed.

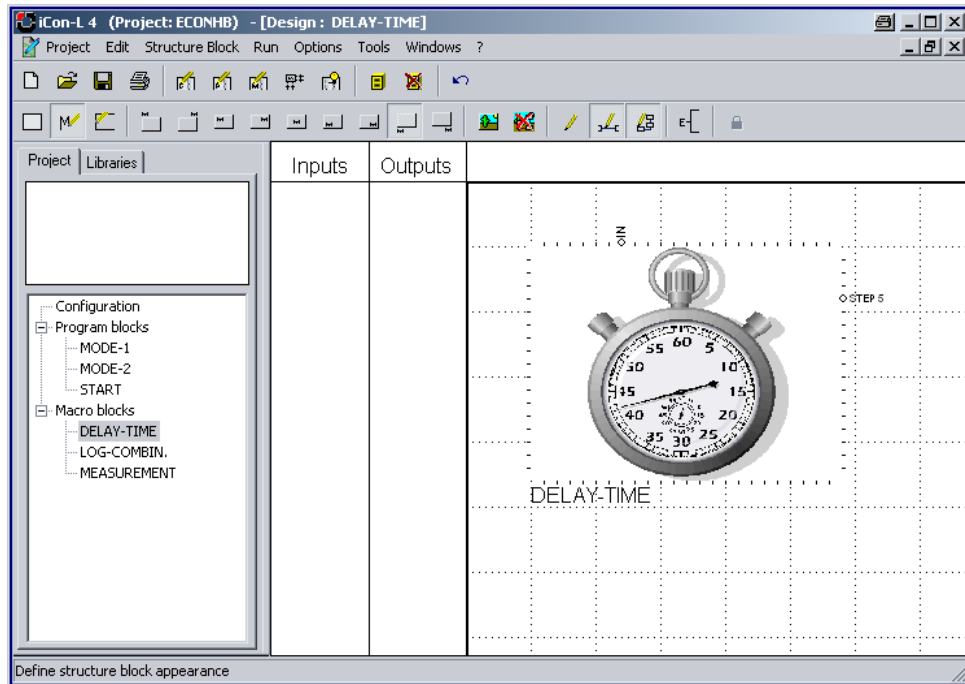


Figure 6.5 - Worksheet Design State

Additionally to the already mentioned toolbar there are some more functions available to design the appearance of the project, the programs and the macros.

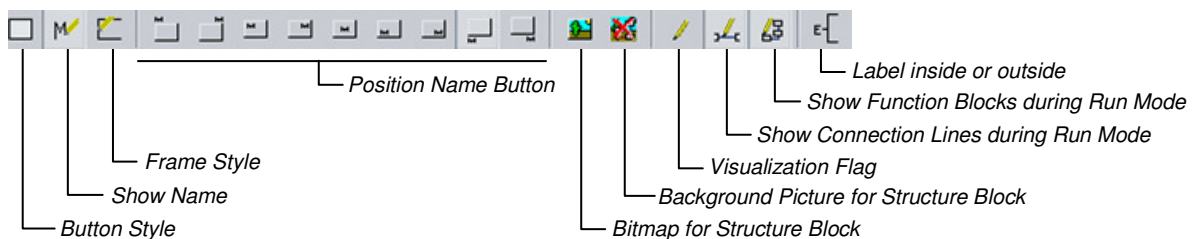


Figure 6.6 - Toolbar Design State

6.4.3 Run State

When using the Enter command from the "Run" submenu the program turns from the edit to the run state. During this changeover the program performs an instantiation. Instances are formed from the classes established during editing operations (refer to chapter 6.3 - Classes and Instances). When this option is chosen, a new work sheet window is opened, indicating the configuration. In contrast to the work sheet windows in the edit mode, the work sheet windows in the Run state does not contain a grid. The project tree offers one view only, presenting the hierarchic structure of the project.

The run mode serves to assign instance parameters used by the blocks later on in the e.pac. Commands for importing and exporting parameter files (refer to the submenus "Structure Block" and "Run") support this work. In addition, cycle times of tasks can be defined. In the run state structural changes of the project are no longer possible. The other commands in the run submenu serve to start simulation, establish target system connections as well as to create, load and start the program and change to online observation.

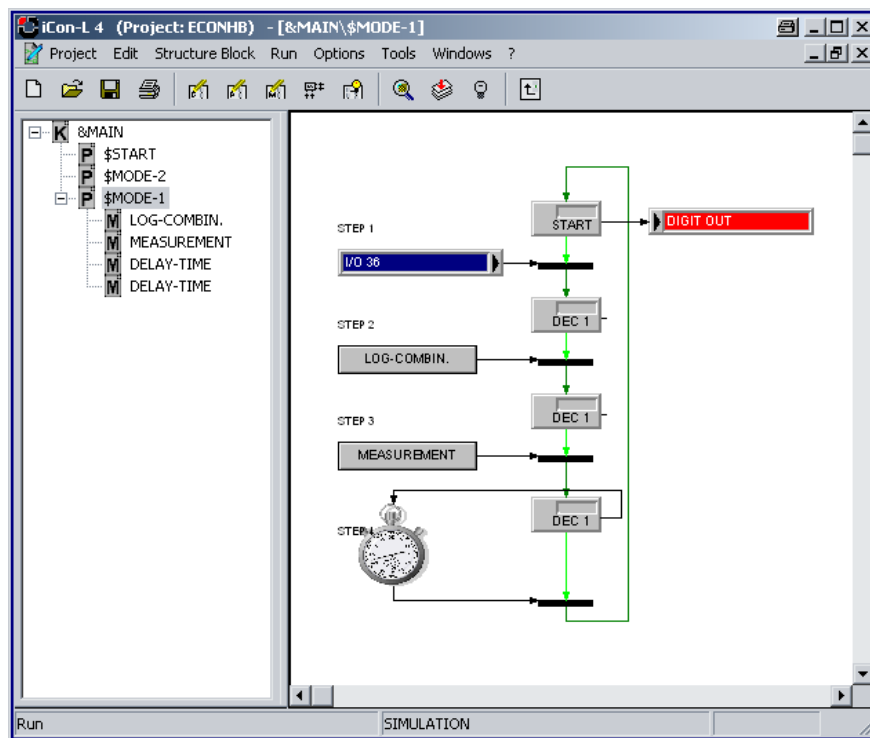


Figure 6.7 - Worksheet Run State

The toolbar of the run state is similar to that one of the edit state. The difference is shown in the next picture.

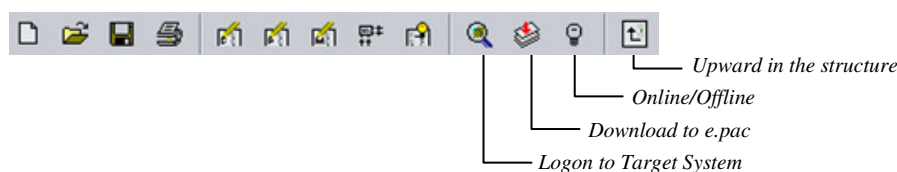


Figure 6.8 - Toolbar Run State

6.4.4 Online Observation State

When a program has been successfully loaded into simulation or e.pac, online observation starts automatically. For switching from the run mode without performing a download before directly, the "online" command in the "Run" submenu is being used.

For online observation the visualization blocks indicate the current values of connected signals. Clicking the connection lines by means of the left mouse button opens a window displaying the current signal value. Via parameter blocks and signal editors values are being changed online. However, they only influence the volatile memory (RAM). For transferring the values into the nonvolatile memory of the e.pac, the "Parameter" command in the "Logon Target System" dialog is used.

If the project uses archive blocks, they record signal patterns in the e.pac. Signal patterns can be read out and displayed by means of an additional tool iTrend.

The refresh rate of value representation can be defined in the "Work Sheet Settings" dialog. The online observation can be stopped by using the "Offline" command/button or by exiting test.con.

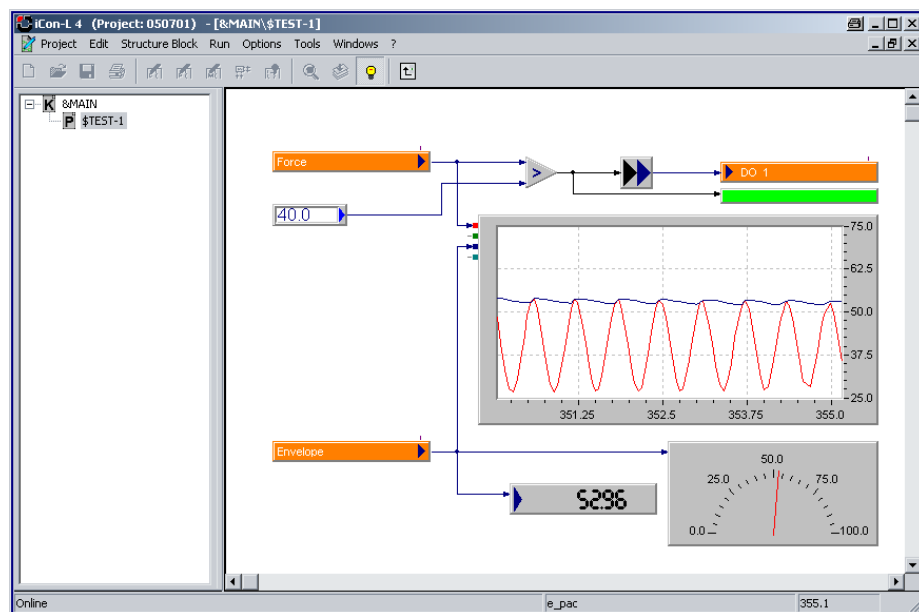


Figure 6.9 - Worksheet Online Observation State

6.5 Starting a Project

After the program test.con had been started it is possible

- to start a new project,
- to open an existing project,
- to upload the project from a connected e.pac or
- to load a project from the restore directory.

Start a new project:

Click on the button *Create a New Project* or select the menu *File - New Project* and the following window will appear:

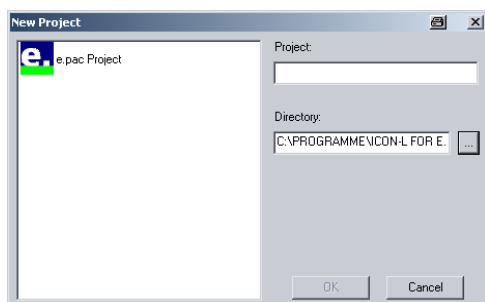


Figure 6.10 - Window New Project

Enter a project name and confirm/modify the directory where the project shall be stored.

Open an existing project:

Select the project and open the xxx.MDL file

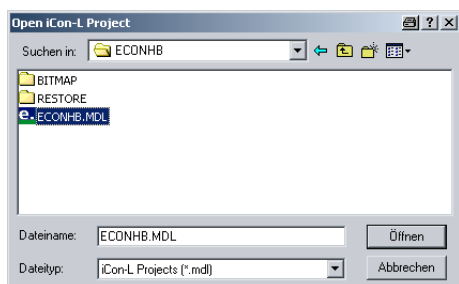


Figure 6.11 - Window Open Project

Upload a project from e.pac:

The window for the selection of the so called *target system* will open. There all selected e.pac modules and the PC-simulation are offered. By clicking the relevant e.pac the color will change from red to green.

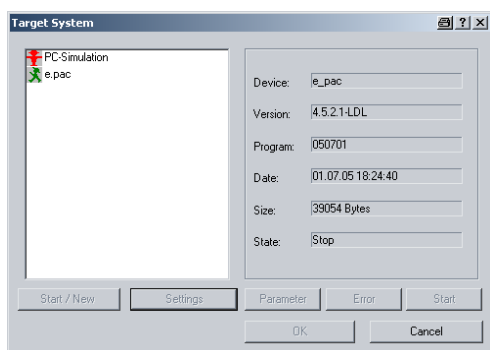


Figure 6.12 - Window Upload from e.reader

In case the icon color is yellow the settings (IP address) have to be checked.

Load a project from restore directory (zipped file):
Selection of the file to be opened.

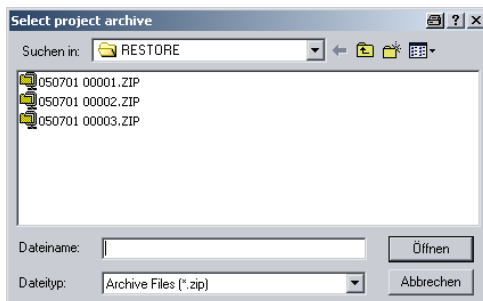


Figure 6.13 - Window Load from Restore file

6.6 Connecting e.pac and test.con

In a new or an already existing project open the test.con has to be selected first by using the menu *Tool - Select Device*:
Now it is possible to select *Online* or *Offline*. In case *Offline* is selected a browser will open to select a #summary.sta file.

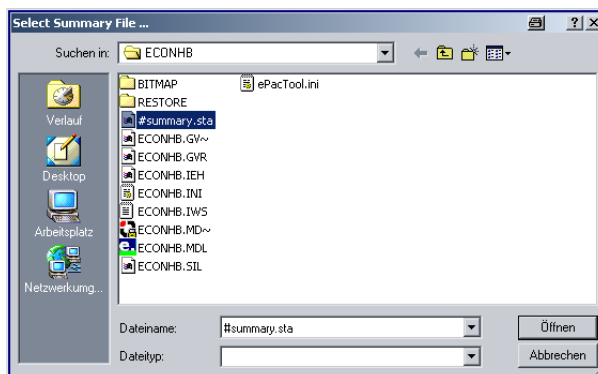


Figure 6.14 - Selection Online/Offline and Browser to choose a #summary.sta file

Selecting *Online* a network scan will be done. After selecting the e.pac the successful selection has to be confirmed.



Figure 6.15 - Successful selection of an epac

Now the software test.con will work with all the variables defined in the measuring and I/O system.

6.7 Practical Use of the Structuring

In the practical use the combined measurement, automation and control tasks consist of many sub tasks, which themselves consist of different sequences, flow parameter and evaluations resp. decisions. This chapter gives an introduction on how to layout a project. More information can be found in the online help of test.con and the test.con instruction manual.

In a first step we recommend the definition of the process inputs and the process outputs. This could be done in a macro "Inputs" and in a macro "Outputs". Due to the use of global parameter these signals will then be available in any further program and macro block.

In the next step the total function of the project should be partitioned in logical function such as Test Mode 1 and Test Mode 2. The block "START" will enable/disable the different Test Modes.

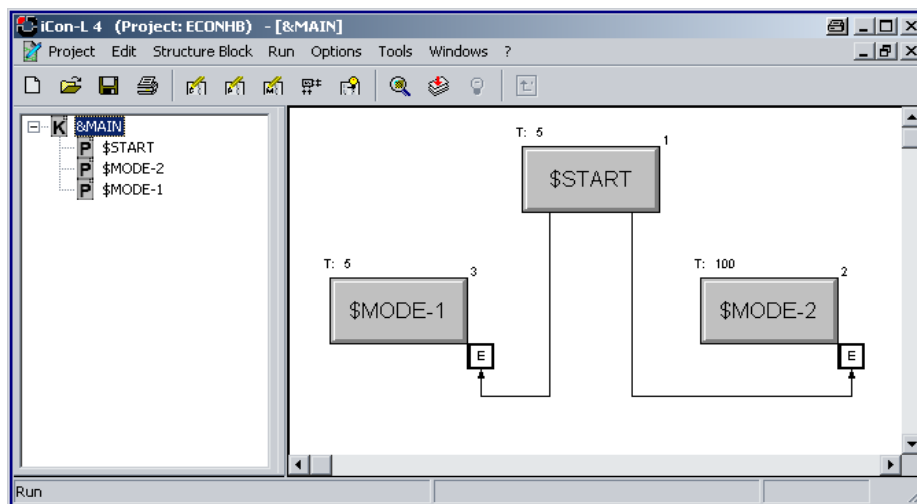


Figure 6.16 - Example: Project with Test Mode 1 and Test Mode 2

A Test Mode consists of different steps; each step can be controlled by a process I/O (host or process controlled) or by a decision made in the e.pac. The program MODE-1 could contain e.g.:

- Step 1: Proceed at an external I/O signal
- Step 2: Proceed by a combination of events which have happened
- Step 3: Proceed when a measurement signal exceeds a set point limit
- Step 4: Proceed after a special time (delay)

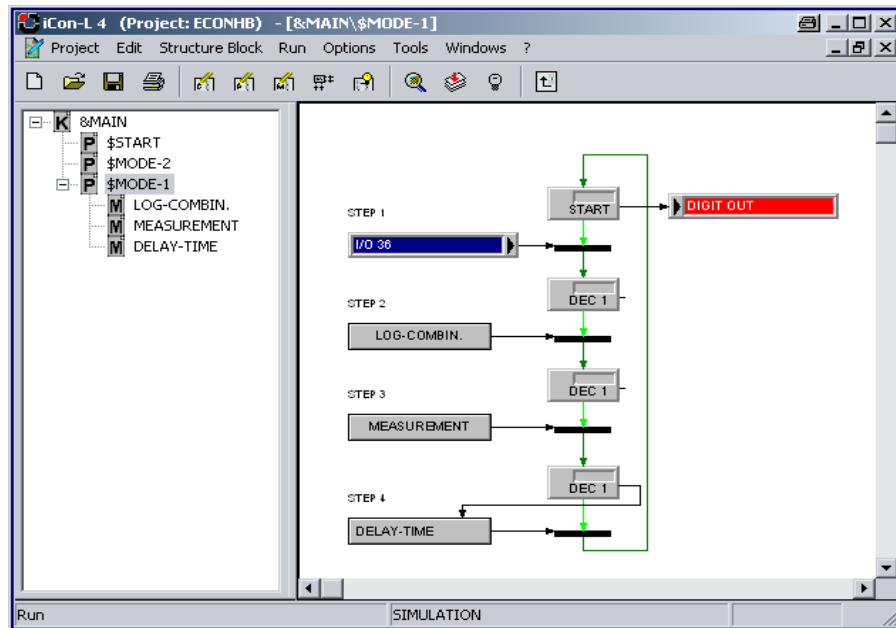


Figure 6.17 - Example: Function of Test Mode 1

In the example the macros LOG-COMBIN, MEASUREMENT and DELAY TIME have the following function:

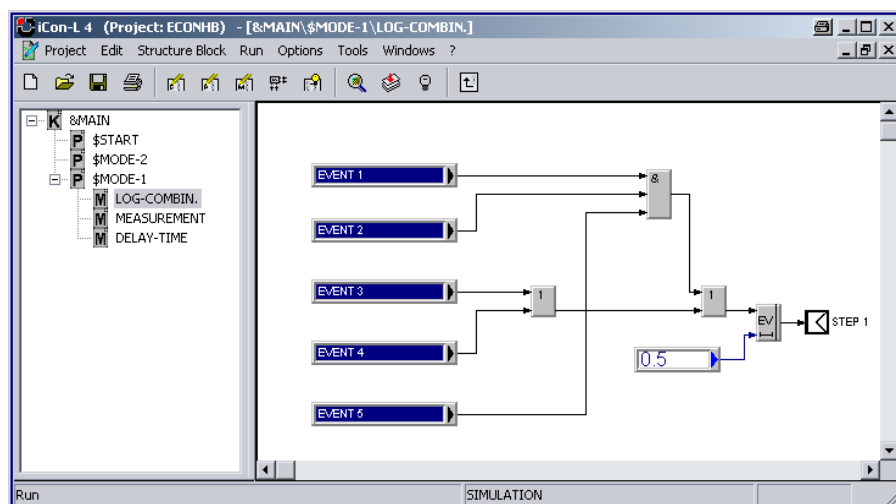


Figure 6.18 - Example: Function of macro LOG-COMBIN

Providing the events according to the logical combinations as a “true” signal at the output STEP 1, the condition is fulfilled and the next condition is required.

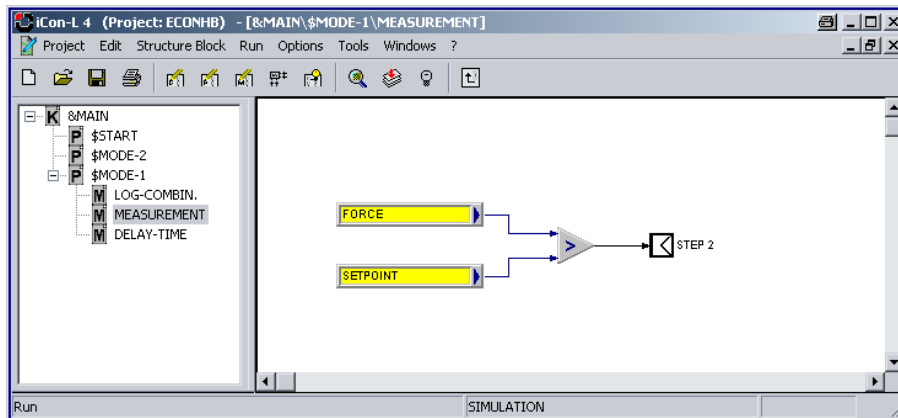


Figure 6.19 - Example: Function of macro *MAESUREMENT*

If *FORCE* exceeds the *SETPOINT* the output of *STEP 2* will be “true” and the next macro is in charge.

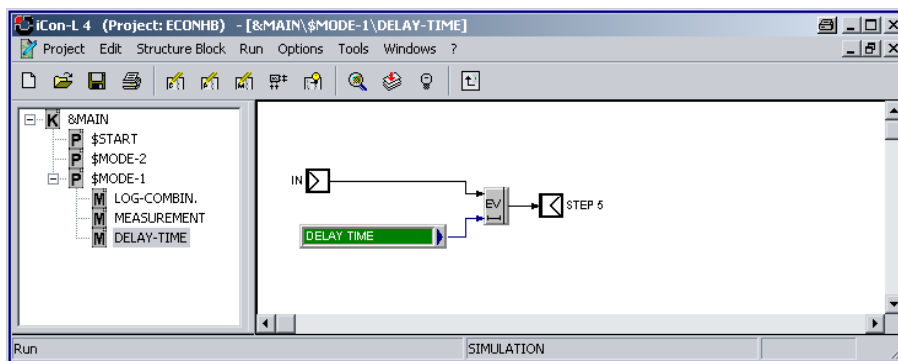


Figure 6.20 - Example: Function of macro *DELAY-TIME*

After a selectable *DELAY-TIME* the input will be switched to the output *STEP 3* and all three conditions are fulfilled.

This example shows how a structure can be used to setup a clear functionality by using different program and macro

7. HARDWARE INSTALLATION

7.1 Environmental Conditions

The e.gate / e.pac is protected against water and dirt according IP 20. If required by the conditions of the operating site the modules have to be installed accordingly, e.g. in a water-resistant or water-proof case, compliant with the regulations of electrical engineering.

For the allowed ambient temperatures for the e.gate / e.pac see the Technical Specifications at the end of this manual.

7.2 Mounting

The e.gate / e.pac has a snap-on mounting for installation on standard profile rails 35 mm (1.4 inch) according to DIN EN 50022. The mounting on the DIN rail is performed by four straps on the reverse side of the module. First you push the two lower straps behind, the lower notch of the DIN rail and then you press the module on the DIN rail until the two upper straps snap in to the upper notch.

In order to take the module off the DIN rail either slide the module side-wards off the rail or, if it is not possible, lift the module slightly so that the straps on the top are released from the notch and the module can be taken off easily by tipping it forwards and removing it from the DIN rail.

7.3 Module Parts

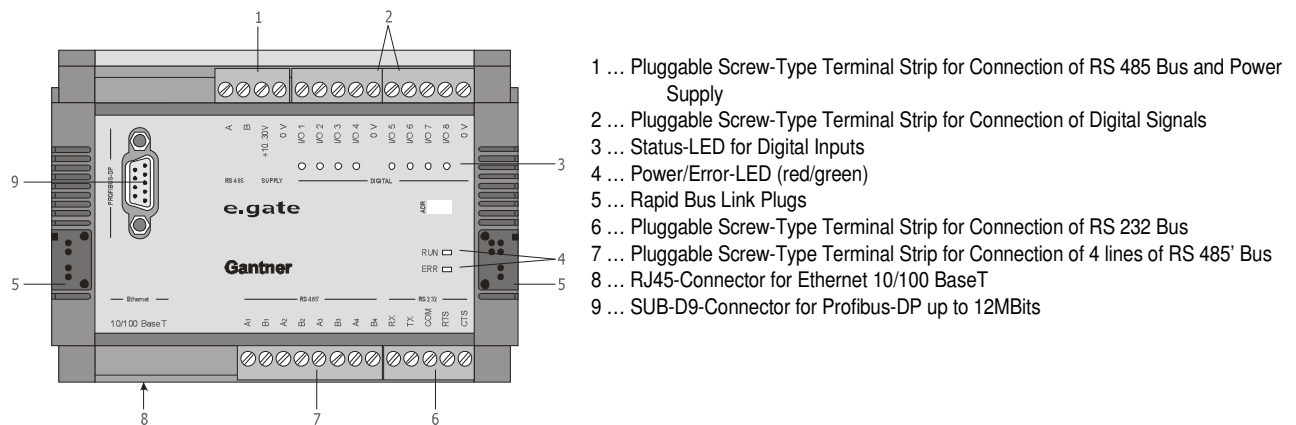


Figure 7.1. – Module Parts of the e.gate / e.pac

Terminal Strip for RS 485 and Power Supply

Terminal	Description
A	RS 485 Bus Interface A (Only Used for Service)
B	RS 485 Bus Interface B (Only Used for Service)
+10..30VDC	Power Supply +
0V	Power Supply -

Table 7.1. - Description of Terminal Strip for RS 485 Bus and Power Supply

Terminal Strip for Digital Signals

Terminal	Description	
I/O 1	Digital Input/Output 1	Output "System running"
I/O 2	Digital Input/Output 2	Output "LifeSignal"
I/O 3	Digital Input/Output 3	Input "Trigger arm"
I/O 4	Digital Input/Output 4	Input "Trigger event"
0V	Digital Ground	
I/O 5	Digital Input/Output 5	Output "Trigger arm state"
I/O 6	Digital Input/Output 6	Output "Trigger event state"
I/O 7	Digital Input/Output 7	I/O "Sync. Reset"
I/O 8	Digital Input/Output 8	I/O "Sync. Signal"
0V	Digital Ground	

Table 7.2. - Description of Terminal Strip for Digital Signals

Terminal Strip for four lines of RS 485' (Slave Buslines)

Terminal	Description
A1	RS 485 Bus Interface A – UART 0
B1	RS 485 Bus Interface B – UART 0
A2	RS 485 Bus Interface A – UART 1
B2	RS 485 Bus Interface B – UART 1
A3	RS 485 Bus Interface A – UART 2
B3	RS 485 Bus Interface B – UART 2
A4	RS 485 Bus Interface A – UART 3
B4	RS 485 Bus Interface B – UART 3

Table 7.3. - Description of Terminal Strip for RS485'

Terminal Strip for RS 232

Terminal	Description
RX	Receive Data
TX	Transmit Data
COM	Common/Ground
RTS	Request to Send
CTS	Clear to Send

Table 7.4. - Description of Terminal Strip for RS 232

7.4 DC Isolation

The power supply, bus interface and digital inputs are DC-isolated from each other with 500 V. Each interface is isolated from each other as well.

7.5 LED Indication

The e.gate has 8 yellow LED's, which are indicating digital I/O's status.

I/O 1 ... Output "System running": set when application has started
I/O 2 ... Output "Lifesignal": toggles when set conditions are fulfilled
I/O 3 ... Input "Trigger arm": needed for circle buffer handling
I/O 4 ... Input "Trigger event": needed for circle buffer handling
I/O 5 ... Output "Trigger arm state": needed for circle buffer handling
I/O 6 ... Output "Trigger event state": needed for circle buffer handling
I/O 7 ... Input or output "Sync reset": needed for synchronization of e.gate / e.pac
I/O 8 ... Input or output "Sync signal": needed for synchronization of e.gate / e.pac

For indication of the states of an e.gate / e.pac a red (ERR) and a green (RUN) LED are used.

7.5.1 Indication of General States

- Application Init:
Both blinking with at about 1 Hz alternating
- Running In (until all slaves are found or timeout):
Both blinking with at about 2 Hz alternating
- Configuration mode active:
Both blinking with at about 5 Hz alternating

7.5.2 Indication of RUN and ERROR States

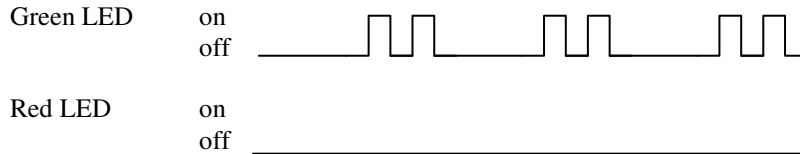
RUN Host connections active (RUN LED)
ERROR ... Error types active (ERR LED)

Each different state increases the number of blinks. One blink means that the LED is switched on for 200 ms and off for 200 ms. At the start of an indication sequence there will be a period of 1000 ms during which the LED is switched off.

Example:

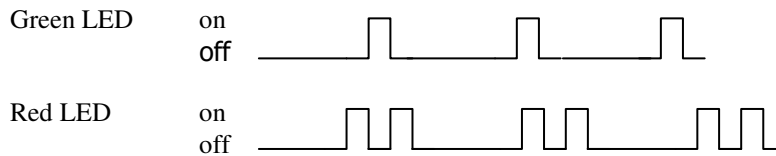
If there are e.g. 2 active RUN conditions and no ERROR, the LEDs blink like this:

Green LED: 1000 ms OFF -> 200ms (1st) ON -> 200ms (1st) OFF -> 200ms (2nd) ON -> 200ms (2nd) OFF restart
Red LED: OFF



If there are e.g. 1 active RUN condition and 2 ERROR, the LEDs blink like this:

Green LED: 1000 ms OFF -> 200ms ON -> 200ms OFF -> restart
Red LED: 1000 ms OFF -> 200ms (1st) ON -> 200ms (1st) OFF -> 200ms (2nd) ON -> 200ms (2nd) OFF restart



RUN states:

- | | |
|-------------------------------|-------------------------------------|
| - DATAPORT ACTIVE | ... TCP/IP data port activated |
| - PACKERNELPORT ACTIVE | ... e.pac kernel port activated |
| - HIGHSPEEDPORT UDP ACTIVE | ... UDP highspeed port activated |
| - HIGHSPEEDPORT TCP/IP ACTIVE | ... TCP/IP highspeed port activated |
| - DISTRIBUTORPORT ACTIVE | ... UDP distributor port activated |
| - FIELDBUS ACTIVE | ... Fieldbus activated |
| - FTP ACTIVE | ... FTP activated |
| - CONFIGBUS RS232 ACTIVE | ... RS 232 configbus activated |
| - CONFIGBUS RS485 ACTIVE | ... RS 485 configbus activated |

ERROR states:

- | | |
|---|--|
| - SLAVE ERROR | ... Slave error (not found, data type mismatch,...) |
| - SLAVE LINE x INSTABLE ERROR | ... Bad line |
| - CONFIGURATION FILE ERROR | ... Error in configuration file(s) |
| - DATA FLASH FILE SYSTEM ERROR | ... Data FLASH error (full,...) |
| - FIELDBUS COMMUNICATION ERROR (xx%) | ... Error percentage (line quality) |
| - FIELDBUS CONFIGURATION ERROR | ... Wrong set master configuration |
| - FIELDBUS PARAMETER ERROR | ... Wrong set master parameters |
| - REDUCED PERFORMANCE ERROR (1000.0 Hz -> 500.0 Hz) | ... due to health is too low |
| - PACKERNEL OPERATION DENIED ERROR | ... due to e.pac kernel operation is denied (e.g. configuration has changed) |
| - DISTRIBUTORPORT SYNC ERROR | ... due to distributor port thread has too less time to be synchronized to the slave communication |
| - SOCKET OVERLOADED ERROR | ... due to socket has no time to work proper |
| - EXTENSION BOARD ERROR | ... due to unknown extension board found |

7.5.3 Permanent LED

In case the green LED is shining permanently no RUN and no ERROR state is active, (no communication). Is the red LED shining permanently a fatal error is existing. In this case the e.gate / e.pac has to be shipped to a Gantner Instruments service station.

7.6 Connection Technique

The wires for the power supply, serial interfaces RS 232 and RS 485, digital I/Os and slave modules are connected to the e.gate / e.pac via screw-type terminals. The captive terminal screws are part of the terminal strips. All terminal strips are of a plug-in type and can be detached from the e.gate / e.pac.

Not more than 2 leads should be connected with one clamp. In this case both leads should have the same conductor cross section. For the precise clamping of stranded wire we recommend the use of wire-end ferrules.

Notice: Connecting wires respectively the plugging-in and -out of the terminal strip is only allowed with an e.gate / e.pac in power-off status.

In order to prevent interference with signals and modules, shielded cables have to be used for the power supply, bus connection and signal lines.

The PROFIBUS-DP cable is connected to the DB-9 plug on the front of the e.gate / e.pac – DP-versions only!

For the connection of the Ethernet a standard RJ 45 connector is provided by the e.gate / e.pac.

7.7 Power Supply

Non-regulated DC voltage between +10 and +30 VDC is sufficient for the power supply of the modules. The input is protected against excess voltage and polarity connecting error. The power consumption remains approximately constant over the total voltage range, due to the integrated switching regulator.

Due to their low current consumption the modules can also be remotely supplied via longer lines. Several modules can be supplied in parallel within the permissible voltage range and drop in the lines. If required, the supply lines together with the bus line may be incorporated in one cable.

In order not to overload the module power supply needlessly and to avoid unnecessary line troubles, a separate power supply is recommended for sensors with a large current drain.

The distribution voltage for the e.gate / e.pac modules has to be protected by a fuse with maximum 1 A (inert). The modules have an internal fuse (reversible) for protection against excess voltage, excess current and wrong polarity.

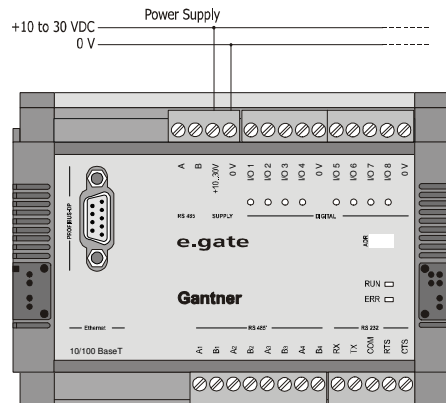


Figure 7.2. - Power Supply of the e.gate / e.pac

7.8 Connection of e.bloxx Modules

e.bloxx modules are connected to the RS 485 slave interface (screw terminals "A₁" and "B₁" ... "A₄" and "B₄") at the e.gate / e.pac

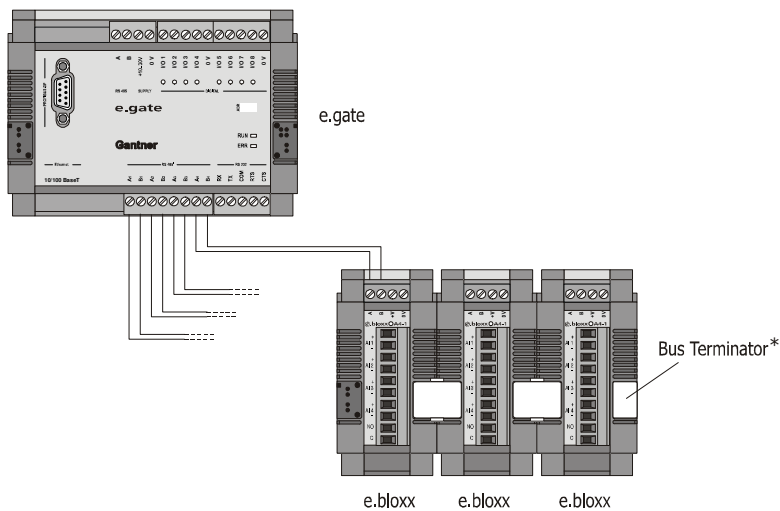


Figure 7.3. – e.bloxx Modules connected to e.gate / e.pac

* ... If the e.bloxx are used together with an e.gate / e.pac, which is used to collect the data of all connected e.bloxx modules and process them for fast transmission via the further network, a bus termination must be connected to the last e.bloxx in each bus line.

The max. cable length between the e.gate / e.pac and the e.bloxx modules may not increase 50m @ 1,5MBaud.

7.9 Connection to Ethernet

The e.gate / e.pac is supported with a connector 10/100 BaseT to connect the e.gate / e.pac into an Ethernet. The IP address and DHCP setting must be set-up correctly (see chapter 3 "Start-Up"). Then it is possible to communicate with the e.gate / e.pac via the Ethernet.

It is also possible to connect the e.gate / e.pac to a PC directly via the 10/100 BaseT connector. In this case a cross-wire Ethernet cable must be used.

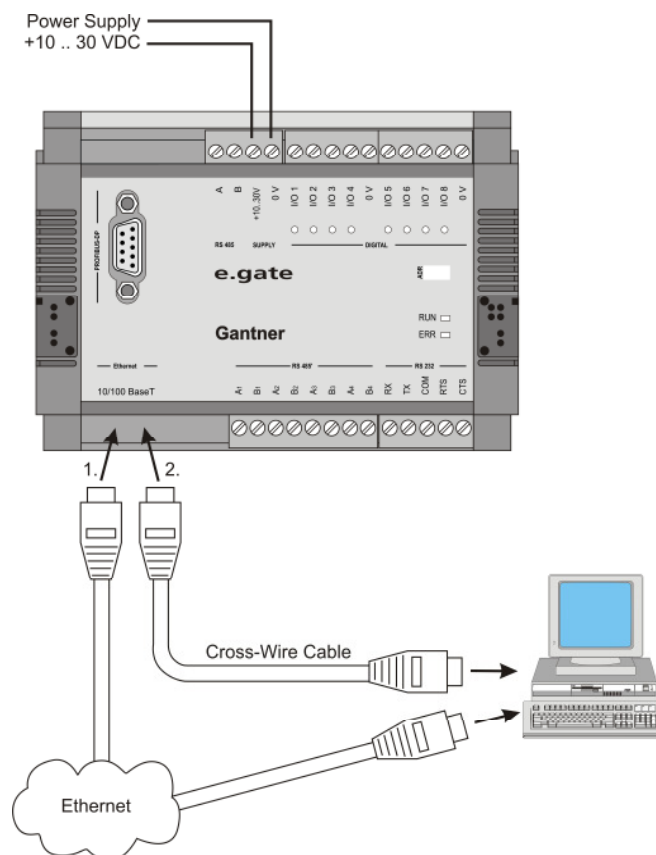


Figure 7.4. - Connection to Ethernet

7.10 Connection to Profibus-DP

The Profibus-DP interface of the e.gate DP / e.pac DP is used for fast online data transmission to an automation system. A detailed description of the Profibus-DP communication with the e.gate / e.pac can be found in the manual "e.bloxx System Guide" (Part No. 159078).

7.10.1 Bus Plug

For the installation of the bus cable and bus interface for PROFIBUS-DP 9-channel D-subminiature plugs and sockets are used. The pin assignment for the RS 485 connection according to PROFIBUS is given in Table 7.1.

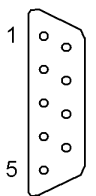
Plug	Pin	RS 485 Notation	Signal	Identification
 DB 9	1	-	Shield	Shield, Protective Ground
	2	-	RP	Reserved for Power
	3	B / B'	RxD/TxD-P	Receive/Transmit-Data-P
	4	-	CNTR-P	Control-P
	5	C / C'	DGND	Data Ground
	6	-	VP	Voltage Plus
	7	-	RP	Reserved for Power
	8	A / A'	RxD/TxD-N	Receive/Transmit-Data-N
	9	-	CNTR-N	Control-N

Table 7.5. - Pin Assignment D-Subminiature Plug According to PROFIBUS

The signal leads A and B (and Shield) are mandatory for a (shielded) connection. Additional signal leads may be installed if required.

7.11 Shielding RS 485

In case of increased interference, such as in industrial areas, we recommend a shielding of the power supply, bus, and signal cables. In general, the shield should be connected to the protective earthing (not Data ground!) at each bus connection. If necessary, the shield should also be applied along the course of the cable several times. For shorter distances, e.g. with stub cables, the interference response is often improved if the shielding is only applied to the stub cable exit.

Bus users such as controllers (PLCs), computers (PCs), repeaters and interface converters (ISK), etc., generally feature the possibility of applying the shield directly to the appliance or to separate shield rails. Shield rails offer the advantage of preventing possible interfering signals from reaching the appliance. The shields which are connected to protective earthing conduct interference signals off before reaching the module.

The e.gate / e.pac does not have a direct shield connection at the module. Here the shield of the bus cable can be connected to earth e.g. by so-called shield clamps.

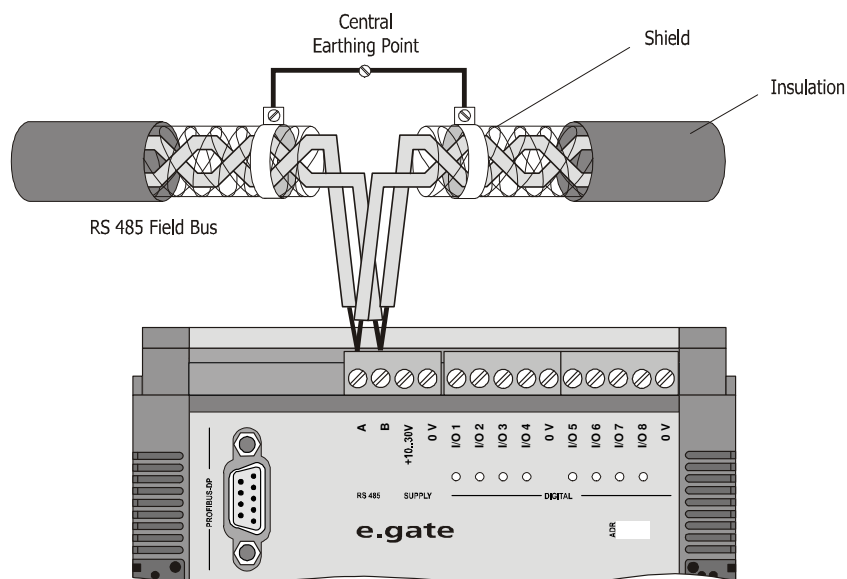


Figure 7.5. - Earthing of the Bus Line Shield at an e.gate / e.pac

Notice: The shielding screen must not be connected to the ground (0V) of the power supply and it should always be connected to earth with a large surface and low-inductance.

8. PERFORMANCE EXAMPLES

The performance of the e.gate / e.pac is shown in the tables below:

e.gate:

Performance Examples	Slave	Input data	Output data	Mode	Rate
Input data	UART 1	12 modules, 1 var. 4 Byte	-	synchr.	1000/s
Profibus-DP active	UART 2	12 modules, 1 var. 4 Byte	-	synchr.	1000/s
Ethernet active	UART 3	12 modules, 1 var. 4 Byte	-	synchr.	1000/s
	UART 4	12 modules, 1 var. 4 Byte	-	synchr.	1000/s
Total		48 modules, 1 var. 4 Byte	-	synchr.	1000/s
Input and output data	UART 1	8 modules, 1 var. 4 Byte	4 modules, 1 var. 4 Byte	synchr.	1000/s
Profibus-DP active	UART 2	8 modules, 1 var. 4 Byte	4 modules, 1 var. 4 Byte	synchr.	1000/s
Ethernet active	UART 3	8 modules, 1 var. 4 Byte	4 modules, 1 var. 4 Byte	synchr.	1000/s
	UART 4	8 modules, 1 var. 4 Byte	4 modules, 1 var. 4 Byte	synchr.	1000/s
Total		32 modules, 1 var. 4 Byte	16 modules, 1 var. 4 Byte	synchr.	1000/s

At lower data rates the limitation of the transmission is the principle maximum number of values.
Profibus-DP: 120 integer or 60 real values, Ethernet: 304 integer values or 196 real values.

e.pac:

Performance Examples (no. of hannels at data rate)

In each case: Read variables - run function - write variables

Function	Rate 1000/s	Rate 500/s
Controller type PID	20	44
FIR Filter, 100 coefficients	4	20
Alarm and limit control	30	60
Linearization, 16 pole interpolation	20	40
Arithmetic	90	180

9. SPECIFICATIONS

9.1 Digital Inputs/Outputs

Inputs

Function	fix defined (synchronization, triggering)
Input voltage	max. +30 VDC
Input current	max. 1.5 mA
Upper switching threshold	>3.5 V (high)
Lower switching threshold	<1.0 V (low)

Outputs

Function	fix defined (synchronization, triggering, monitoring)
Type of Output	open collector
Output voltage	max. 30 VDC
Output current	max. 100 mA
Output frequency	max. 100 Hz

9.2 Interfaces

Host Interface RS 232

Data format:	8E1 / 8O1 / 8N1
Protocol	ASCII, MODBUS-RTU (parts)
Baud rates	9.6 kbit/s to 115.2 kbit/s
Connections	RX, TX, COM, RTS, CTS

Host Interface RS 485

Data format:	8E1 / 8O1 / 8N1
Protocol	ASCII, MODBUS-RTU (parts)
Baud rates	9.6 kbit/s to 115.2 kbit/s
Connectable devices	Up to 32 at one line
Isolation voltage	500 V

9.2.1

Host Interface PROFIBUS-DP

Standard	RS 485
Data format	8E1
Baud rates	From 9.6 kbit/s to 12 Mbit/s
Connectable devices	Up to 32 without repeater Up to 127 with repeater on one single line
Isolation voltage	500 V

Host Interface Ethernet

Protocols:	TCP/IP, UDP, PING, ASCII, MODBUS-TCP/IP
Services:	DHCP, FTP-Server
Baud rates:	10/100 Mbit/s
Number of simult. clients	max. 10
Isolation voltage	500 V

Slave Interfaces RS 485 (4 x per e.gate / e.pac)

Standard	RS 485, 2-wire
Data format	8E1
Protocol	GANTNER LOCAL-BUS
Baud rates	9.6 kbit/s to 1.5 Mbit/s
Connectable devices	Up to 32 at one line
Isolation voltage	500 V

9.3 Power Supply

Power supply	10 VDC to 30 VDC overvoltage and overload protection
Power consumption	approx. 5 W

9.4 Mechanical

Case	Aluminium and ABS
Dimensions (W x H x D)	129 x 90 x 83 mm (5.1 x 3.5 x 3.3 mm)
Weight	500 g
Protective system	IP 20
Mounting	DIN EN-Rail

9.5 Connection

Plug-in screw terminals	wire cross-section up to 1.5 mm ²
PROFIBUS-DP	Sub-D9 plug
Ethernet	RJ 45 plug

9.6 Environmental

Operating temperature	-20 °C to + 60 °C (-4 °F to +140 °F)
Storage Temperature	-30 °C to +85 °C (-22 °F to +185 °F)
Relative humidity	0% to 95% at +50 °C (+122 °F), non-condensing

10. DECLARATION OF CONFORMITY



Konformitätserklärung – Declaration of Conformity – Déclaration de Conformité

The undersigned, representing:

Gantner Instruments Test & Measurement GmbH
Montafonerstr. 8 – A-6780 Schruns /Austria
tel: +43/5556-73748-410 – www.gantner-instruments.com

herewith declares, that the product:

e.gate DP

Certificate Ref No: 041012WG-02

is in conformity with the following EC directive(s), including all applicable amendments:

Directives	Short Title
X 89 / 336 / EEC	EMC Directive
99 / 5 / EEC	R&TTE Directive
73 / 23 / EEC	Low Voltage Directive
98 / 37 / EEC	Machinery Directive
99 / 519 / EEC	Limitation of human exposure to electromagnetic Fields

Only "X"-marked directives are relevant for the product and for this declaration of conformity !

and that the standards and/or technical specifications referenced below have been applied:

Standards	Short Title
EMC	EN 61000-6-1 : 2001 Generic immunity standard for residential, commercial and light-industrial environments
	X EN 61000-6-2 : 1999 Generic immunity standard for industrial environments
	EN 61000-6-3 : 2001 Generic emission standard for residential, commercial and light-industrial environments
	X EN 61000-6-4 : 2001 Generic emission standard for industrial environments
	X EN 61326: 1997+A1+A2 Electrical equipment for measurement, control and laboratory use – EMC requirements
R&TTE	EN 300220-1/3 : 2000 Electromagnetic compatibility for Short Range Devices (SRDs) from 25 to 1000 MHz
	EN 300330-1/2 : 2001 Electromagnetic compatibility for Short Range Devices (SRDs) from 9 kHz to 25 MHz
	EN 301489-1/3 : 2001 Electromagnetic compatibility for Short Range Devices (SRDs) from 9 kHz to 40 GHz
Safety	EN 61010 : 2001 Safety requirements for electrical equipment for measurement, control and laboratory use
	EN 60950 : 2000 Safety requirements for information technology equipment
	EN 60335 : 2002 Safety of household and similar electrical appliances
	EN 60601 : 1988 Safety requirements for medical electrical equipment
Machinery	EN 292-1/2: 1991 Safety of machinery – Basic concepts, general principles for design
	EN 954-1: 1996 Safety of machinery – Safety-related parts of control system
	EN 60204-1:1997 Safety of machinery – Electrical equipment
Human Expos.	EN 50364 : 2001 Limitation of human exposure to electromagnetic fields
	EN 50371 : 2002 Limitation of human exposure to electromagnetic fields (10MHz-300GHz) – Generic Standard

Remarks: Only "X"-marked standards are relevant for the product and for this declaration of conformity! Concerning safety aspects, the general and the product specific warning and safety instruction in the product accompanying documents must also be regarded!

This declaration is based upon the respective technical documentation held by the manufacturer.



Schruns, 12th October 2004

Gantner Instruments

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Notice:

Information in this manual are valid from December 05th 2006 until revocation.
Further changes and completion of the manual are reserved and possible without notice.

Part No.

———— www.gantner-instruments.com ————

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