WAGO I/O SYSTEM 750

Modular I/O System

Quick-Start Manual for ETHERNET Fieldbus Controller 750-872

Version 1.0.0

WAGO® INNOVATIVE CONNECTIONS

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Every conceivable measure has been taken to ensure the accuracy and completeness of this documentation. However, as errors can never be fully excluded, we always appreciate any information or suggestions for improving the documentation.

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We wish to point out that the software and hardware terms as well as the trademarks of companies used and/or mentioned in this manual are generally protected by trademark or patent.

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1 Important Notes

To ensure fast installation and start-up of the units described in this manual, we strongly recommend that the following information and explanations are carefully read and adhered to.

1.1 Legal Principles

1.1.1 Copyright

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1.1.2 Personnel Qualification

The use of the product described in this manual is exclusively geared to specialists having qualifications in PLC programming, electrical specialists or persons instructed by electrical specialists who are also familiar with the appropriate applicable standards. WAGO Kontakttechnik GmbH & Co. KG declines any liability resulting from improper action and damage to WAGO products and third-party products due to non-observance of the information contained in this manual.

1.1.3 Intended Use

For each individual application, the components are supplied from the factory with a dedicated hardware and software configuration. Modifications are only admitted within the framework of the possibilities documented in the manuals. All other changes to the hardware and/or software and the non-conforming use of the components entail the exclusion of liability on the part of WAGO Kontakttechnik GmbH & Co. KG.

Please direct any requirements pertaining to a modified and/or new hardware or software configuration directly to WAGO Kontakttechnik GmbH & Co. KG.

1.2 Symbols

DANGER
Always observe this information to protect persons from injury.

NOTICE
Always observe this information to prevent damage to the device.

NOTE
Marginal conditions that must always be observed to ensure smooth operation.

ESD (Electrostatic Discharge)
Warning of damage to the components through electrostatic discharge. Observe the precautionary measure for handling components at risk of electrostatic discharge.

Note
Routines or advice for efficient use of a device and software optimization.

Additional Information
References to additional literature, manuals, data sheets and INTERNET pages.

1.3 Number Notation

Number code	Example	Note
Decimal	100	Normal notation
Hexadecimal	0x64	C notation
Binary	'100' '0110.0100'	In inverted commas, nibbles separated by dots (.)

1.4 Safety Information

NOTICE
Switch off the power before replacing any components!

In the event of deformed contacts, the module in question is to be replaced, as its functionality can no longer be ensured on a long-term basis.

The components are not resistant against materials having seeping and insulating properties. Belonging to this group of materials are: e.g., aerosols, silicones, triglycerides (found in some hand creams).
If it cannot be ruled out that these materials appear in the component environment, then additional measures are to be taken:
- Installation of the components in an appropriate enclosure.
- Handling of the components only with clean tools and materials.

NOTE
Soiled contacts may only be cleaned with ethyl alcohol and a leather cloth. In doing so, attention must be paid to the ESD information.

Do not use contact sprays, which in extreme cases could impair the operation of the contact.

The WAGO-I/O-SYSTEM 750 and its components are an open system. It must only be assembled in housings, cabinets or in electrical operation rooms. Access must only be given via a key or tool to authorized, qualified personnel.

The relevant valid and applicable standards and guidelines regarding the installation of switch cabinets must be observed.

ESD (Electrostatic Discharge)
The modules are equipped with electronic components that may be destroyed by electrostatic discharge. When handling the modules, ensure that the items in the environment (personnel, workplace and packaging) are well grounded. Do not touch conducting parts; e.g., gold data contacts.

1.5 Scope of Validity

This quick-start manual describes the programming of the 750-872 controller as the master of an outstation as defined by IEC 60870-5-101 and -104 with some basic modules from the WAGO-I/O-SYSTEM for telecontrol.

Detailed information relating to handling, assembly and start-up is described in the "Ethernet TCP/IP 750-872" and "WAGO-I/O-PRO CAA" manuals. This documentation is therefore only valid in conjunction with the appropriate manuals.

Additional Information:

You will find the "Ethernet TCP/IP 750-872" and "WAGO-I/O-PRO CAA" manuals on the "WAGO-I/O-PRO CAA" CD (759-911), on the "ELECTRONICC Tools & Docs" CD (Item No.: 0888-0412/0001-0101) and on the Internet at: www.wago.com

2 Quick-Start Guide

2.1 Hardware Design

Build up the node as follows (from left to right):

750-872; 750-400; 750-501; 750-461; 750-600.

Connect the 24V DC power unit to the supply (24V and 0V) for the controller and for the power contacts (see Fig. 1).

For the application used in the example, it is sufficient to connect a jumper between "24V" and "+" and between "0V" and "-".

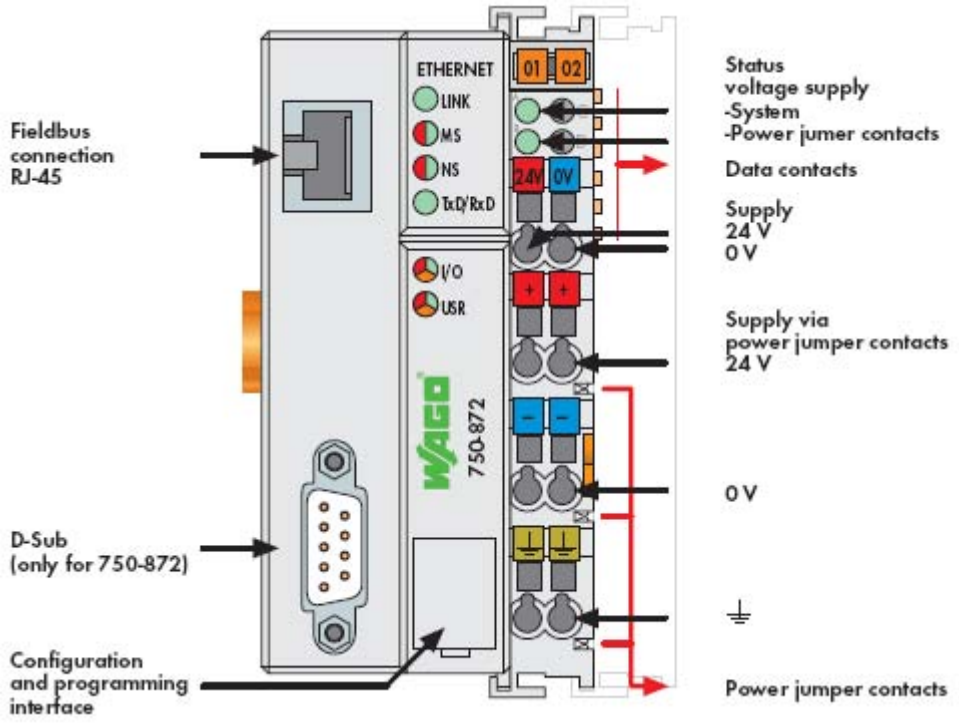

Fig. 1: Connections for the 750-872 controller

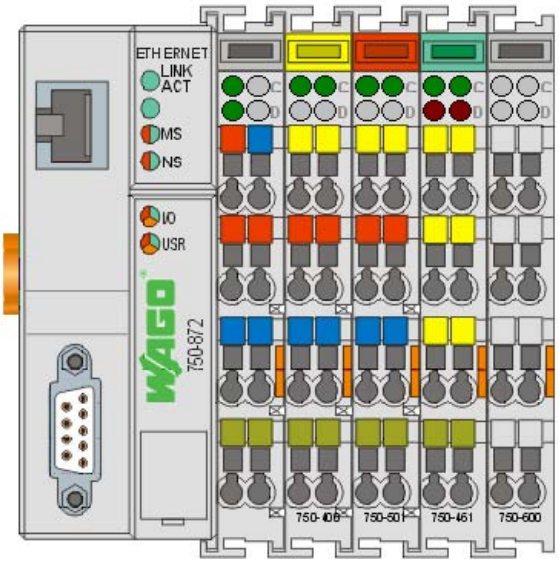

Fig. 2: Node with the 750-872 telecontrol fieldbus controller

2.2 Ethernet Network Start-Up

The IP address is conveniently assigned using the serial programming cable provided and the "WAGO Ethernet Settings" program. Connect your PC to the node's configuration and programming interface. Install the "WAGO Ethernet Settings" program. You will find it on the "Tools & Docs" CD as well as on the WAGO website under Service Downloads Software. After starting, the program will determine the current node settings.

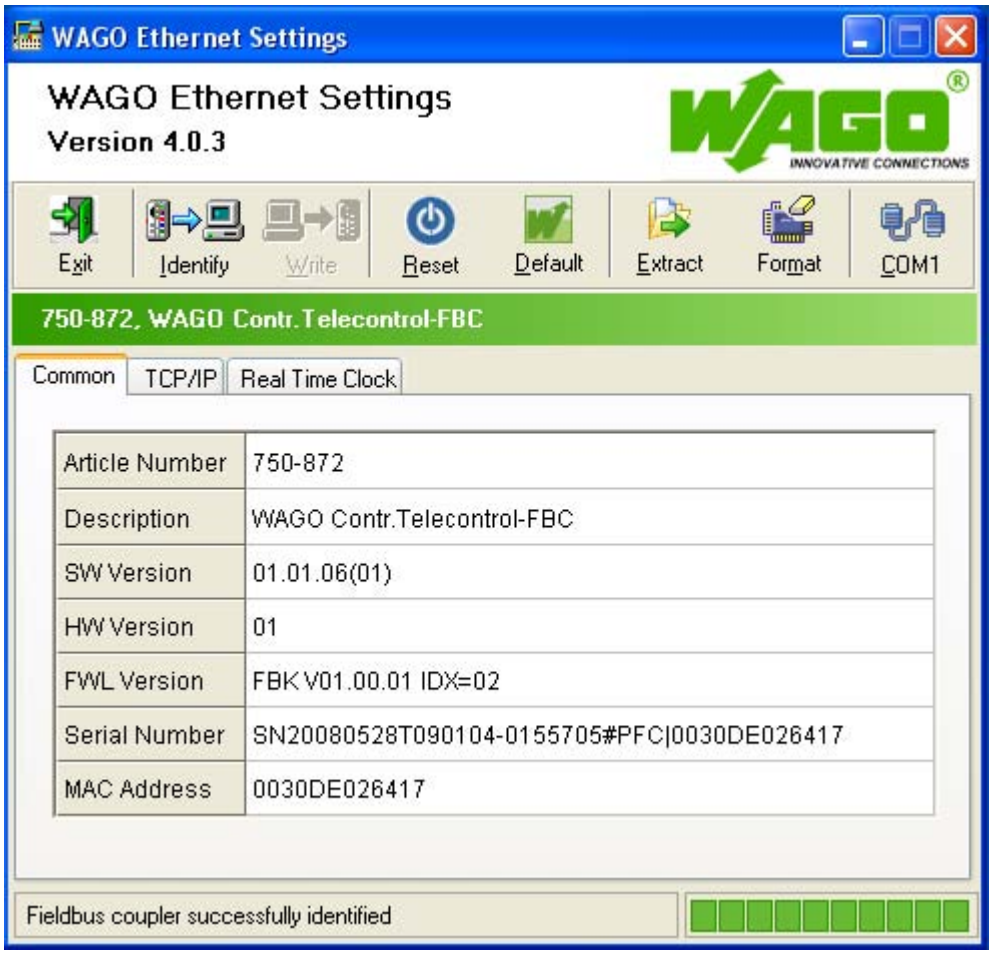

Fig. 3: WAGO Ethernet Settings

If the connection should time out, you can force the display to update with "Identify". If the problem should persist, check the COM port setting and the cabling.

An IP address always consists of a network and a computer address; the network mask determines which bits belong to the network address and which do not.

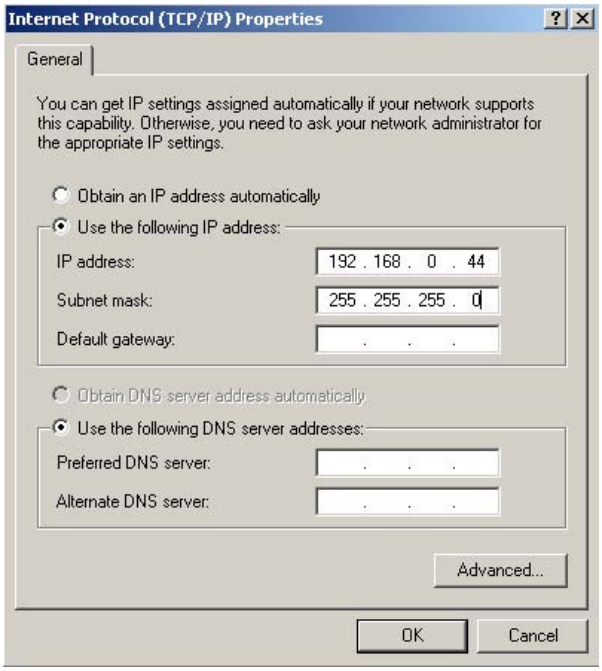

Fig. 4: Setting the PC network address under Windows

IP address : 192.168. 0. 44

SubNetMask : 255.255.255.0

Network address : 192.168. 0. Computer address: 44

Select a free computer address from the local network. You can identify the network address of your PC under "Start" → "Settings" → "Network and Dial-up Connections" → "LAN Connection" → "Properties".
To do this, highlight the Internet protocol (TCP/IP) in the drop-down list box and press the "Properties" button.

NOTE:
The double assignment of IP addresses can lead to serious network errors.

Switch to the "TCP/IP" tab and enter an IP address for the node. Then transfer the change to the node with "Write".

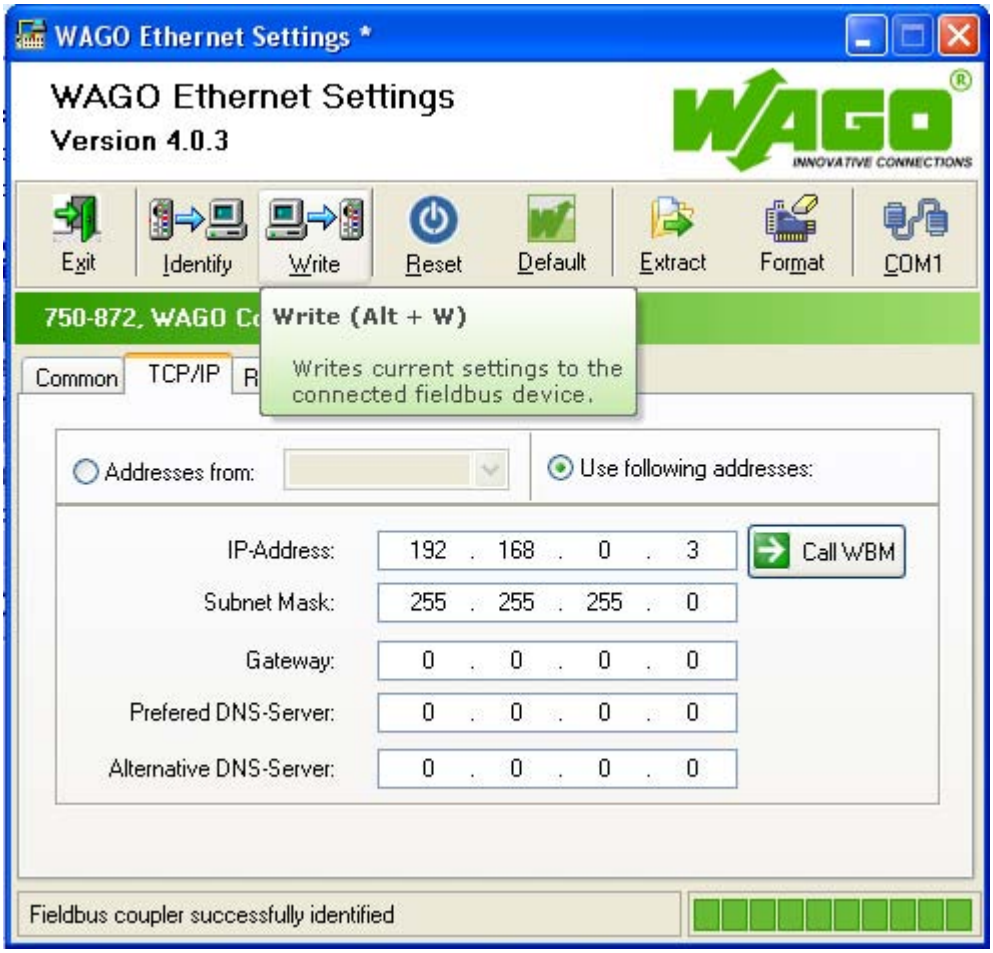

Fig. 5: IP address settings for the 750-872 controller

Now connect the node to the Ethernet network. Either directly with a crossover cable to a PC or with a 1-to-1 patch cable to a hub or switch.

NOTE:
Alternatively, the IP address for the controller can also be assigned with the "WAGO BootP Server" instead of with "WAGO Ethernet Settings". The address is assigned via the Ethernet interface on the device. A separate serial cable is not then necessary. However, the transferred IP address is only used temporarily. To save this permanently, the BootP protocol must also be deactivated in the Web-Based Management (WBM).

To test the connection, open the "DOS Shell" with "Start" → "Programs" → "Accessories" → "Input prompt" and set off a PING on the IP address of the node.

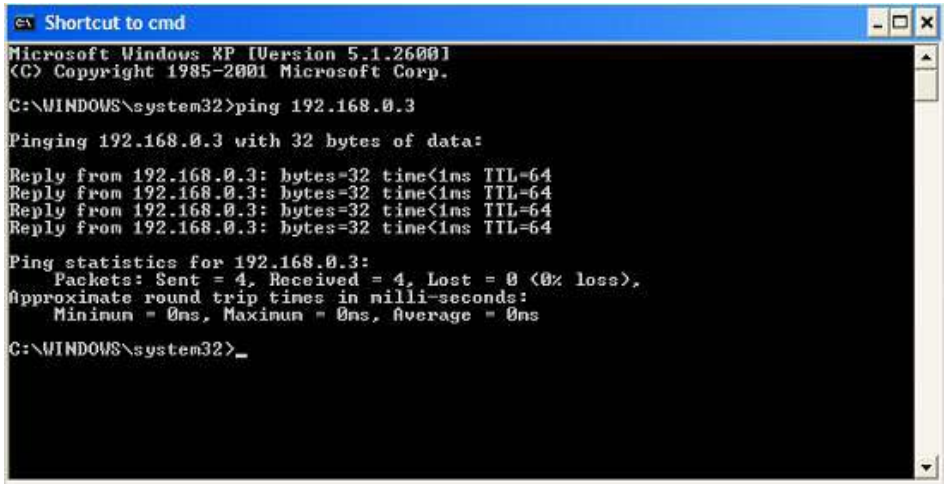

Fig. 6: Testing the connection to the 750-872 telecontrol controller with "PING"

If the node does not answer, please contact your network administrator.

All settings can be viewed and changed using **W**eb-**B**ased **M**anagement (WBM). To use this, start your browser and enter http:// in the URL line, followed by the IP address of the node (for example: http://192.168.0.3).

The integrated web server will then return the following website.

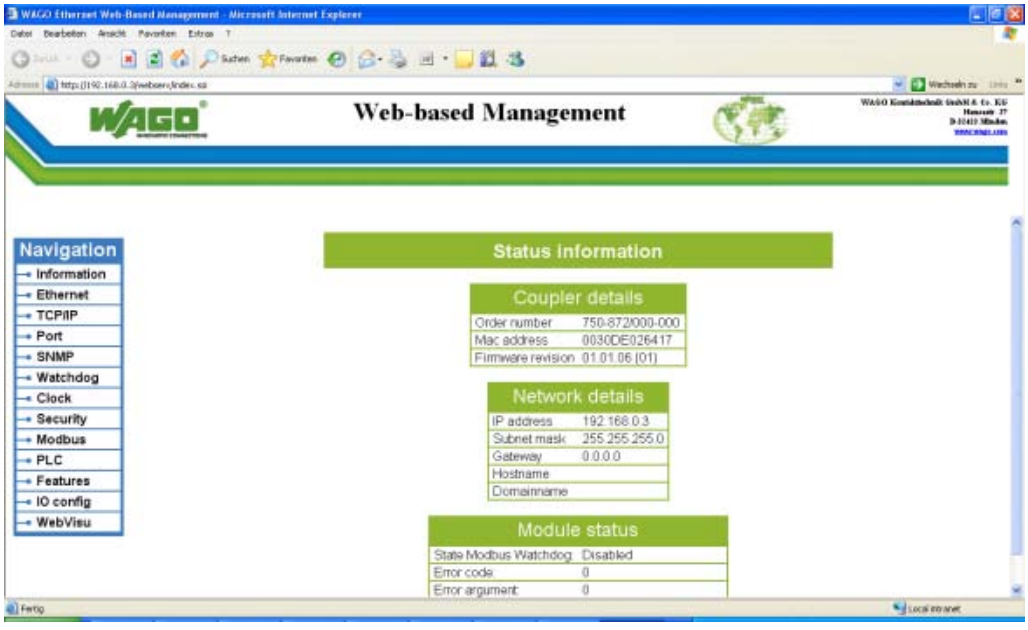

Fig. 7: WEB server homepage

When a proxy server is used, this must be bypassed for local addresses. You will find information on bypassing the proxy server for local addresses in your browser Help under Proxy servers or LAN settings.

The configuration sites linked via Hyperlinks require a login. In the default state the following users are defined:

User	Password
admin	wago
user	user
guest	guest

Fig. 7: Users and passwords of the 750-849 controller's web server

2.3 Installing the WAGO Target System for CoDeSys

The following installation is only to be carried out when a CoDeSys version below 2.3.9.7 is used. From CoDeSys Version 2.3.9.7, the WAGO target system is already included in the installation.

To install the WAGO target system, the installation file (Customer.exe) must first be downloaded and saved in any folder. The installation program must then be run by double-clicking on Customer.exe.

The installation will start and the following two windows will be seen one after the other; when neither of the two windows is displayed, the installation is complete.

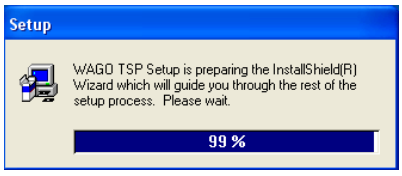

Fig. 8: Installation of WAGO target system for CoDeSys 1/2

Fig. 9: Installation of WAGO target system for CoDeSys 2/2

Create a copy of the link to CoDeSys and open the "Properties" from the context menu (right mouse button).

In the newly opened window you must enter a "space" and "–remote" in the "Target" box after (…\CoDeSys V2.3\Codesys.exe“).

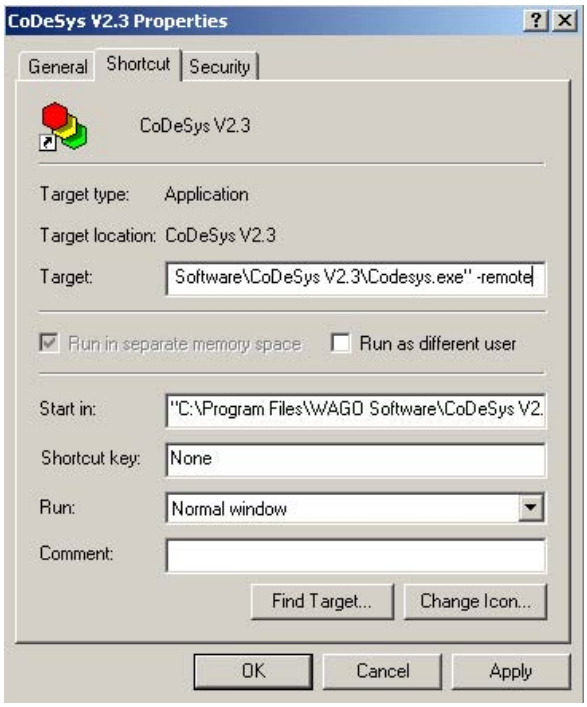

Fig. 10: Properties for the copy of CoDeSys V2.3

The settings are saved by clicking "Apply" and the window is closed by clicking "OK".

2.4 Telecontrol with CoDeSys 2.3

Prerequisite: The WAGO-I/O-PRO CAA software (CoDeSys) and the WAGO target system must be installed correctly.

You can start a new project with "File" → "New".

A brief example is shown below:

Before programming the 750-872, the controller must be selected in the "Target system settings" dialog window.

Fig. 11: Target system settings

Please select "WAGO_750-872" as the target system.

In the next dialog window, the selected target system must be confirmed with "OK".

If you do not want to write your own program as an addition to the program generated by the configurator (to IEC 60870), as is the case in this example, you can press "Cancel" in the next window.

In this example, you must press "OK" in the next dialog window and select the programming language "FUP" in the following window and accept it with "OK".

Switch to the "Resources" tab and here go to "PLC configuration".

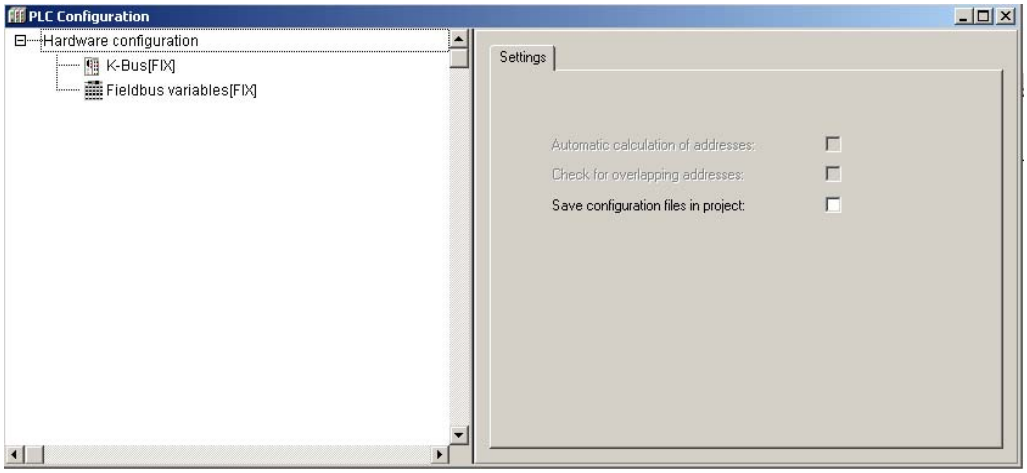

Fig. 12: WAGO-I/O-PRO CAA, PLC Configuration

Highlight the entry "K-Bus[FIX]" in the PLC configuration, open the context menu with the right mouse button and select "Add sub-module". This will open the I/O configurator.

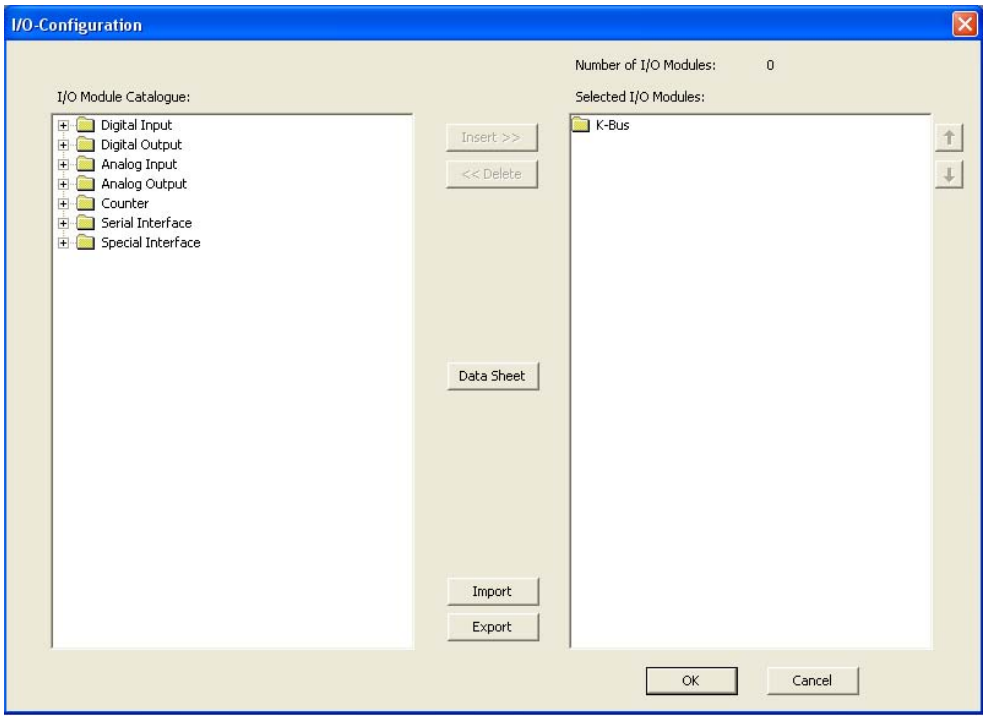

Fig. 13: WAGO-I/O-PRO CAA, I/O configuration

In the example application, as described in section 2.1, only one digital input module 750-400, one digital output module 750-501 and one analog input module 750-461 have been plugged into the 750-872 controller. The 750-600 end module is plugged in at the extreme right.

Consequently, now first select the module 750-400 from the "I/O Module Catalog" under “Digital Input” on the left-hand side and transfer it to the right-hand side in your selection using the "Insert" button.

Then select the module 750-501 from the "I/O Module Catalog" under “Digital Output” on the left-hand side and likewise transfer it to the right-hand side in your selection using the "Insert" button.

Then select the module 750-461 from the "I/O Module Catalog" under “Analog Input” on the left-hand side and likewise transfer it to the right-hand side in your selection using the "Insert" button.

If you want to delete modules from your selection, then highlight the module concerned on the right-hand side and press "Delete".

You can change the position of a module in your selection by highlighting the module and moving it up or down with the arrow buttons on the right-hand side of the window.

The 750-600 end module is not specified in the "I/O Configuration".

Next confirm your selection with "OK".

For each I/O module, under module parameters, you can now assign whether the module outputs are to be written by the controller (PLC) or by a specified Ethernet protocol (Fieldbus 1 = Modbus/TCP or Fieldbus 2 = Ethernet/IP) (Fig. 11).

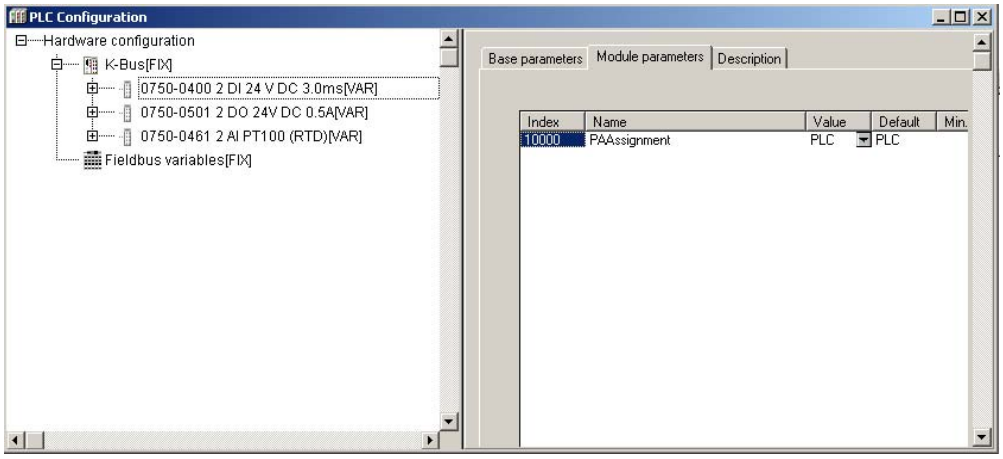

Fig. 14: WAGO-I/O-PRO CAA, I/O configurator

In the example, the value "PLC" is to be used for the moment.

The I/O configurator now shows the addresses of each channel on the module, that is to say each individual bit/word.

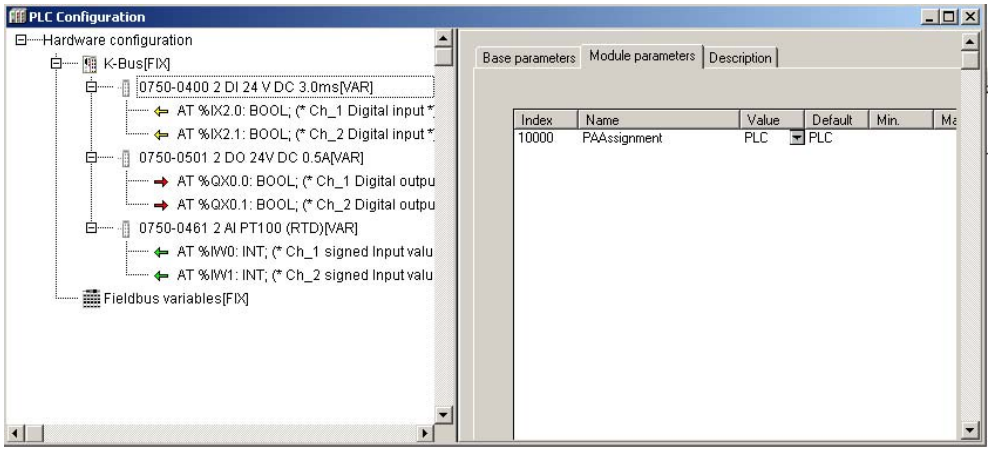

Fig. 15: WAGO-I/O-PRO CAA, I/O configurator with 750-400, 750–501 and 750-461

If you click the address designation in front of the word "AT" with the left mouse button, a label will open in which a variable name can be entered (Fig. 13).

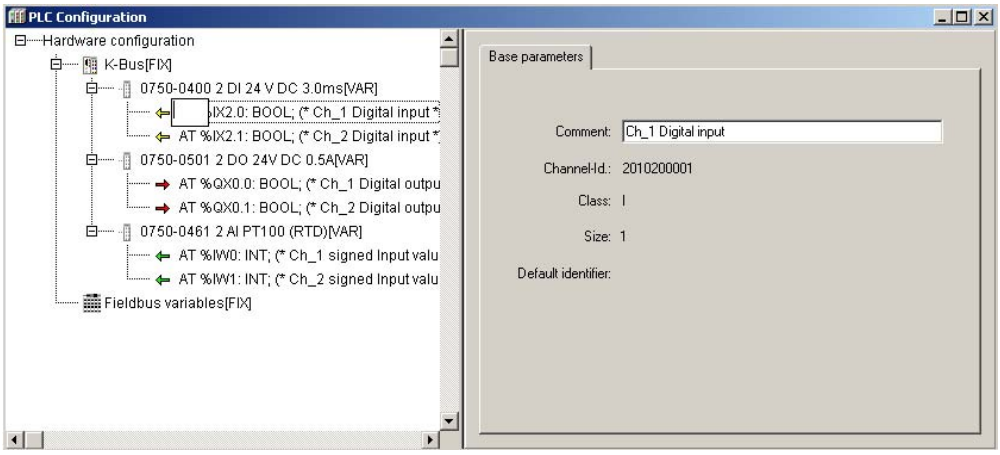

Fig. 16: WAGO-I/O-PRO CAA, Variable declaration in the I/O configurator

Now enter the following variable names:

Start (for address %IX2.0)
Valve1_closed (for address %IX2.1)
Valvel1_open (for address %QX0.0)
Valvel2_open (for address %QX0.1)
Temperature1 (for address %IW 0)
Temperature2 (for address %W 1)

The configuration generator for telecontrol according to IEC 60870-5 can be activated by clicking with the right mouse button on "Hardware configuration" and selecting "Add IEC 60870-5 config" from the context menu.

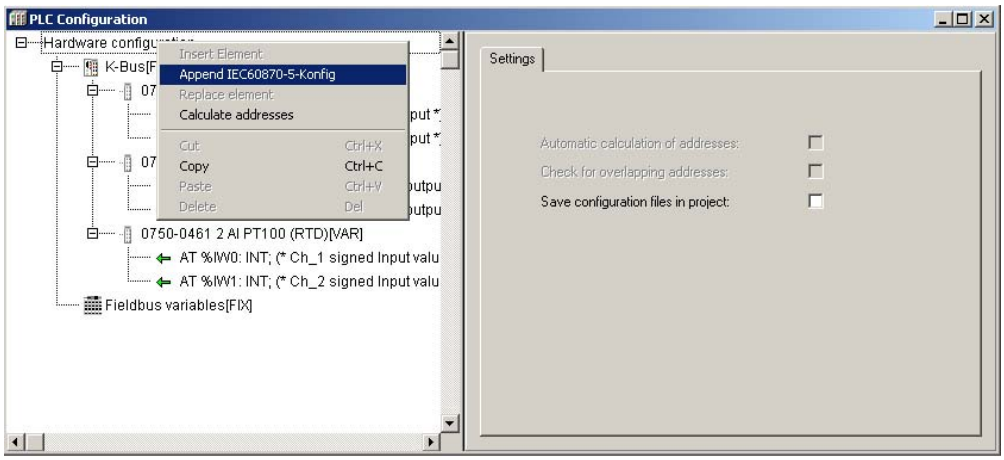

Fig. 17: Adding IEC 60870-5 Config

This produces another sub-item "IEC 60870-5-Config[VAR]" in the system configuration. Clicking this item opens a new window in which 2 tabs are shown. Now open the "IEC 60870 - Config" tab.

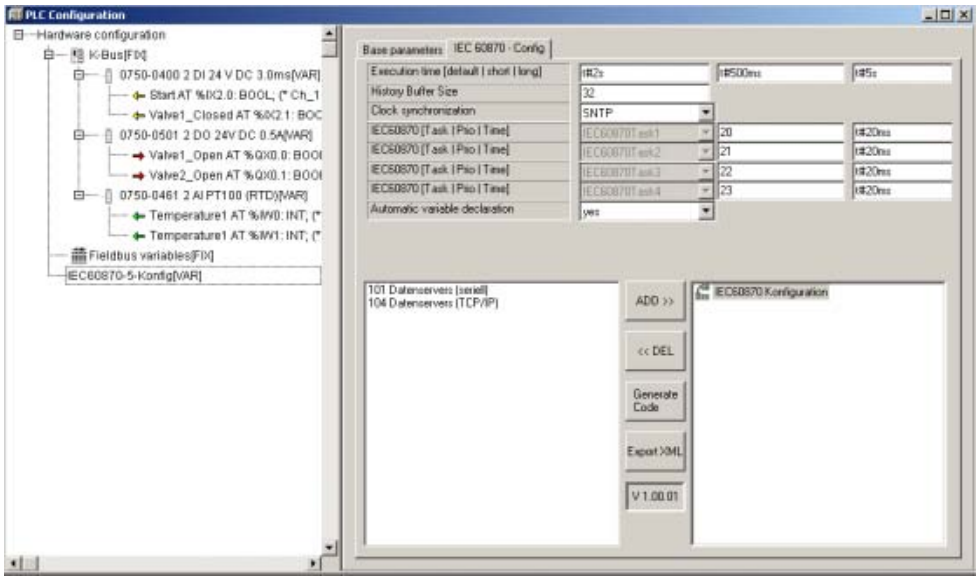

Fig. 18: PLC configuration

The basic settings for telecontrol according to IEC 60870-5 can now be made in this window. Set the "Create variables automatically" option to "no". This window must also be used to define the communications protocol with which communication is to be set up with the data server.

A choice can be made from the following communications protocols:
101 via the serial interface [Serial]
104 via the RJ-45 interface [TCP/IP]

2.4.1 Communication via the RJ-45 Interface [TCP/IP]

Highlight the required interface to the data server in the bottom left-hand box, in this case "104 Data servers [TCP/IP]", and click the "ADD>>" button between the bottom two boxes in order to select the communications interface. The interface "IEC60870_Server104 [001.000 = 1]" will appear in the bottom right-hand box under "IEC60870 configuration“.

To remove an interface which appears in the right-hand window, the interface can be selected in this window and removed by clicking the "<<DEL" button between the two windows.

Settings can be adjusted by highlighting the interface in the bottom right-hand window. These are not relevant for this Quick-Start manual.

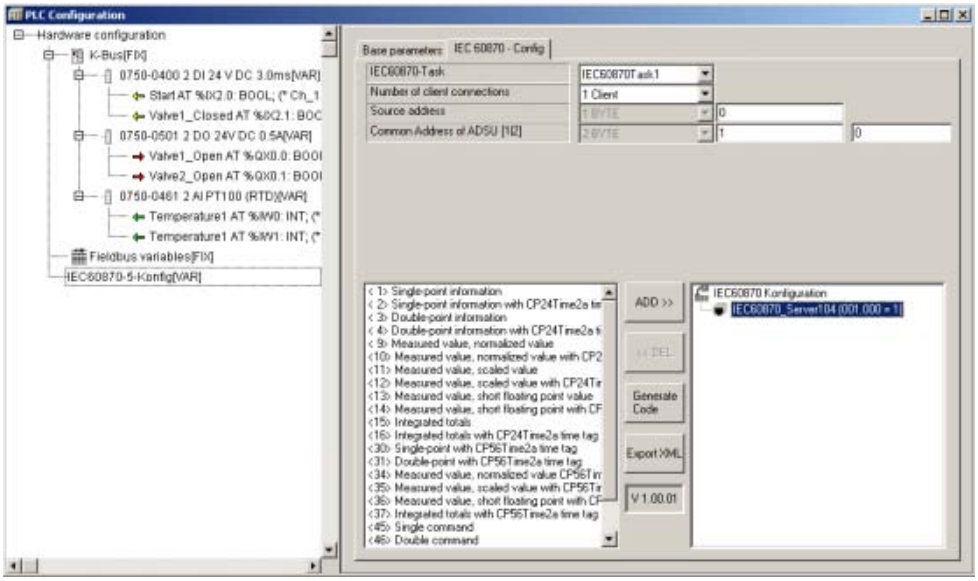

Fig. 19: IEC 60870 settings – Config Ethernet

The various information objects can now be selected by highlighting the appropriate information object and adding it by clicking the "ADD>>" button between the two bottom windows. In this example, the information object "<1> Individual message" is selected. The message then appears in the right-hand window as "IEC870_01M_SP_NA [0001.001.001 = 65793]". In order to assign a variable to the message it must be highlighted.

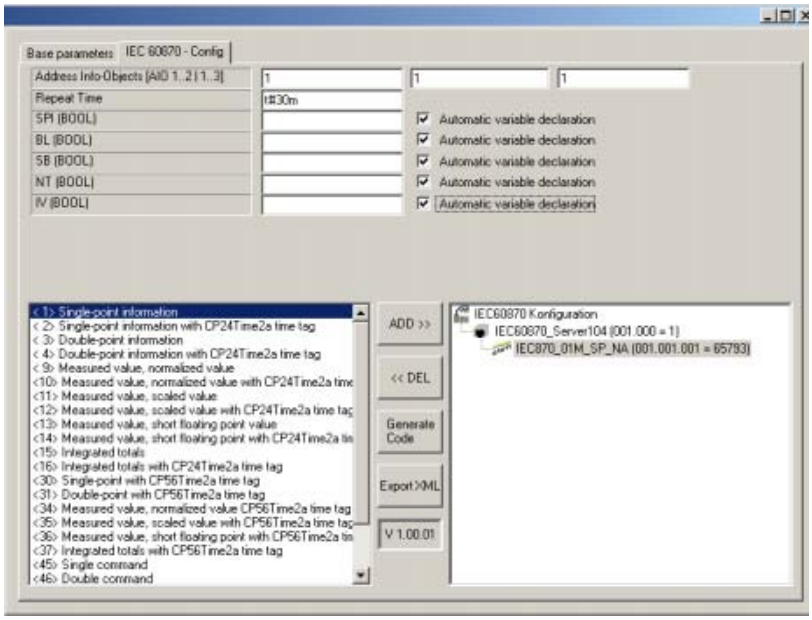

Fig. 20: Message settings - Ethernet

The variable is assigned to the message under the item SPI [BOOL]. Any variable or an input or output module variable can be declared here. If a variable has not yet been created, a tick must be placed after the name of the variable against "Create variables automatically". As no further variables are

to be interrogated for this message, no variables must be ticked after the following items:
BL [BOOL], SB [BOOL], NT [BOOL] and IV [BOOL].

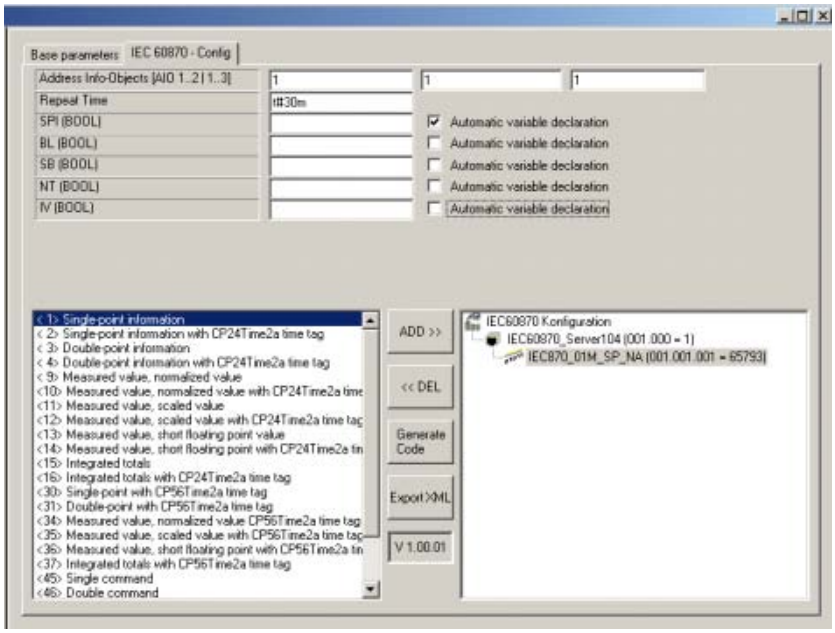

Fig. 21: Setting the variables for Ethernet messages

In the case of the message setting for "< 9> Measurement, normalized", the variable for an analog input; e.g., "Temperature", must be specified after the item NVA[INT]. An individual command "<45> Individual command" should also be included with the "SCD (BOOL)" variable "Valve2_open".

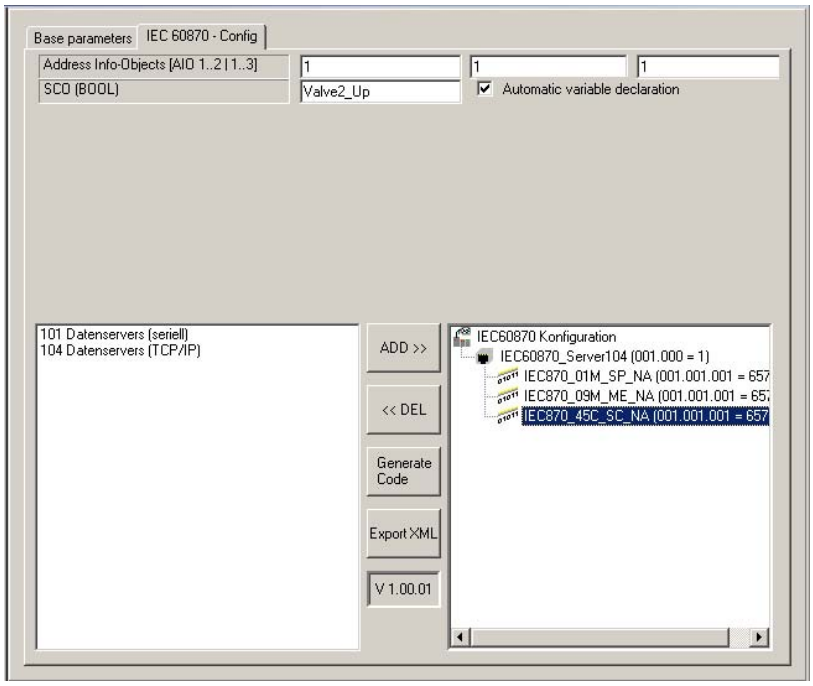

Fig. 22: Settings - Ethernet commands

The finished functions can now be generated from the stored entries using the "Generate Code" button between the two bottom windows.

The priority and the cyclic interval for calling the programs generated by the configuration generator ("IEC60870_ServerPRG_1_104 (PRG)" and "InitAction") can be set under "Task configuration" on the "Resources" tab.

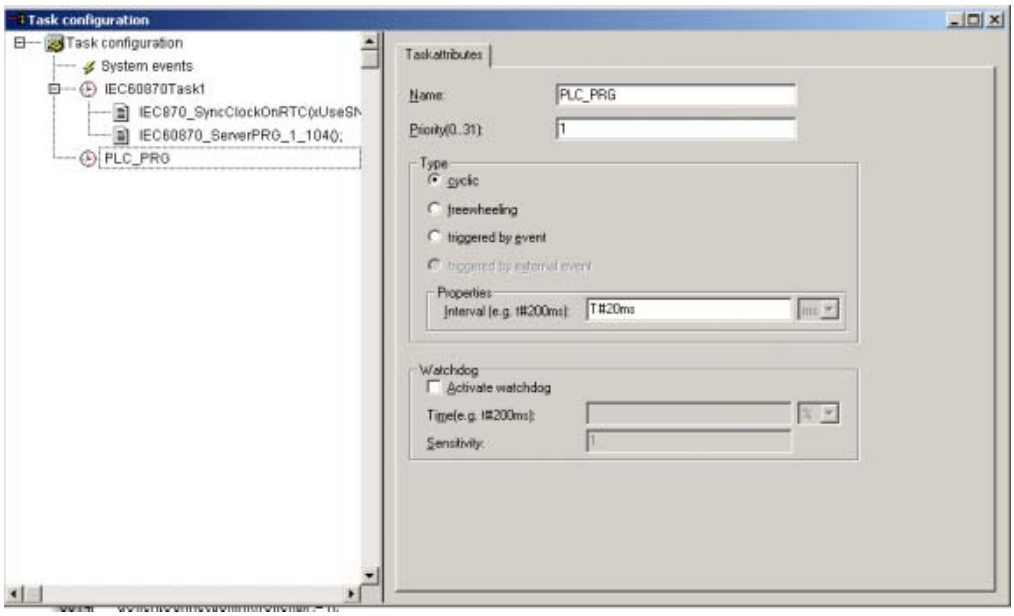

Fig. 23: Task configuration

By automatically creating the new task, the normal program "PLC_PRG (PRG)" will no longer be called/processed. To rectify this, an additional task must also be generated for the "PLC_PRG (PRG)".
To do this, click on "Task configuration" with the right mouse button and select "Add task" from the context menu. A new task will now be created and immediately opened for the settings to be made. The name PLC_PRG, for example, can be entered under Name in Task Properties. The call interval should be set to "Cyclic" with a time of "t#20ms".
Now click on the newly created task with the right mouse button and select "Add program call". The appropriate program (PLC_PRG) can now be selected by clicking on the button with the three dots.

Please continue with section 2.5 "Creating a program" for PLC_PRG.

2.4.2 Communication via the Serial Interface

Highlight the required interface to the data server in the bottom left-hand box, in this case "101 Data servers [serial]", and click the "ADD>>" button between the bottom two boxes in order to select the communications interface. The interface "IEC60870_Server101 [001]" will appear in the bottom right-hand box under "IEC60870 configuration“.

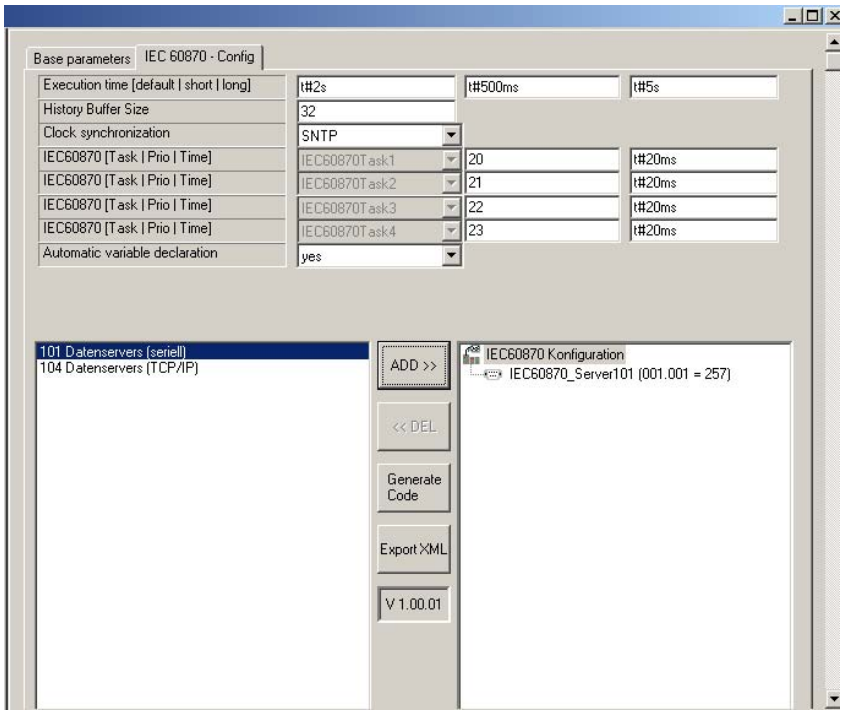

Fig. 24: IEC 60870 settings - Config with serial

To remove an interface which appears in the right-hand window, the interface can be selected in this window and removed by clicking the "<<DEL" button between the two windows.

Highlight the interface in the bottom right-hand window. The various information objects will now be displayed in the left-hand window, and at the top there will be several setting options, which must be set as can be seen in Fig. 25.

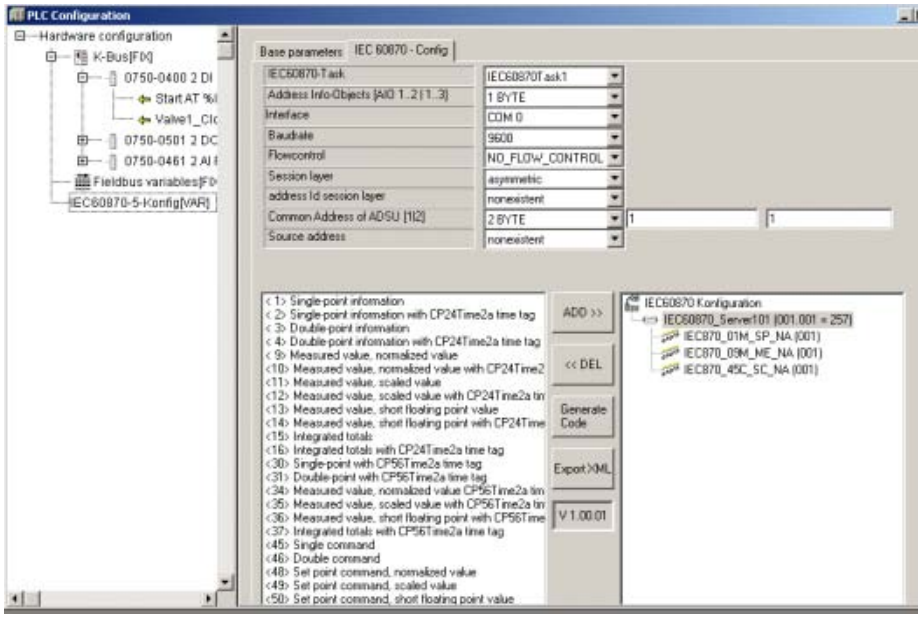

Fig. 25: Settings for the serial interface in CoDeSys

Now add the appropriate message type by highlighting and clicking the "ADD>>" button between the two bottom windows.

In this example, the information object "<1> Individual message" is selected. The individual message then appears in the right-hand window as "IEC870_01M_SP_NA [001]".

Also add the message "< 9> Measurement, normalized" and the individual command "<45> Individual command".

If you now highlight the message "IEC870_01M_SP_NA [001]" in the bottom right-hand window, a variable for the message can be created after the item "SPI [BOOL]". Name the variable "Product_Request“.

In this example no further variables are to be interrogated for this message, so the ticks must be removed after the following items:
BL [BOOL], SB [BOOL], NT [BOOL] and IV [BOOL].

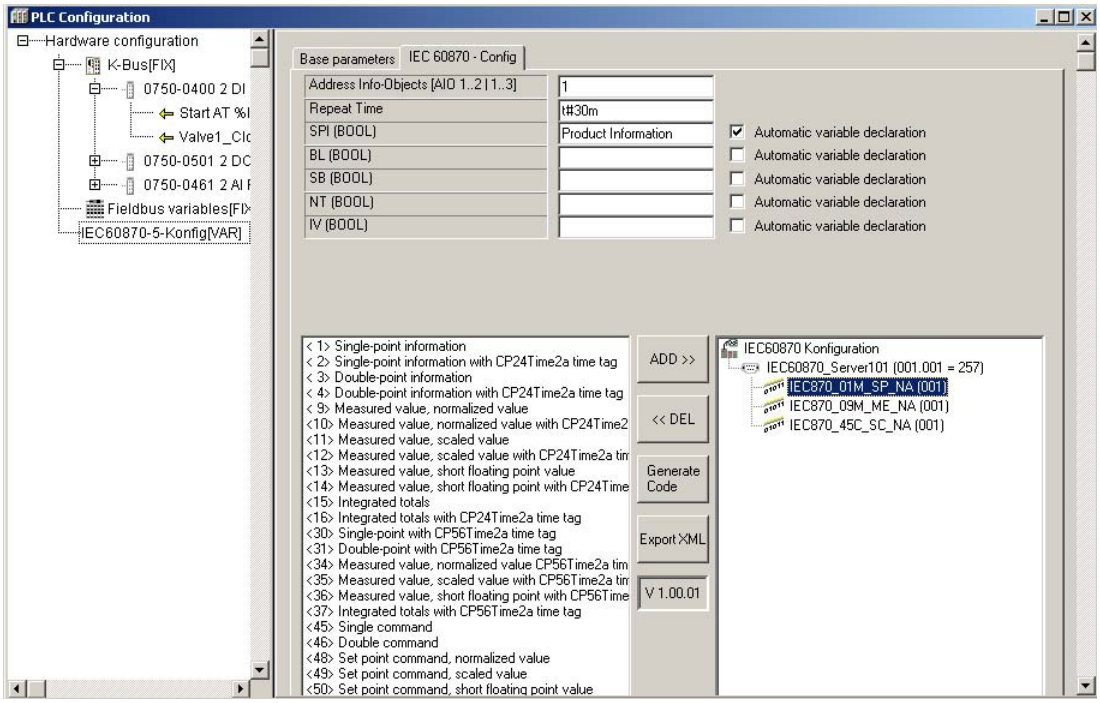

Fig. 26: Message settings - serial

In the case of the information object settings for "< 9> Measurement, normalized", the variable for an analog value, e.g. "Temperature", must be specified after the item NVA[INT]. In this example the other options for entering variables can be ignored and the ticks removed.

The variable "Valve2_open" must be entered in the command settings for the individual command "<45> Individual command" in the box "SCD (BOOL)" variable.

The commands and messages are automatically generated in a new module by pressing the "Generate Code" button.

Changes must be made in the task configuration so that the standard program module (PLC_PRG) is also called and processed for the newly generated module. The task configuration can be found on the "Resources" tab.

The priority and the cyclic interval (call) for programs generated by the configuration generator ("IEC60870_ServerPRG_1_104 (PRG)" and "InitAction") can also be set here.

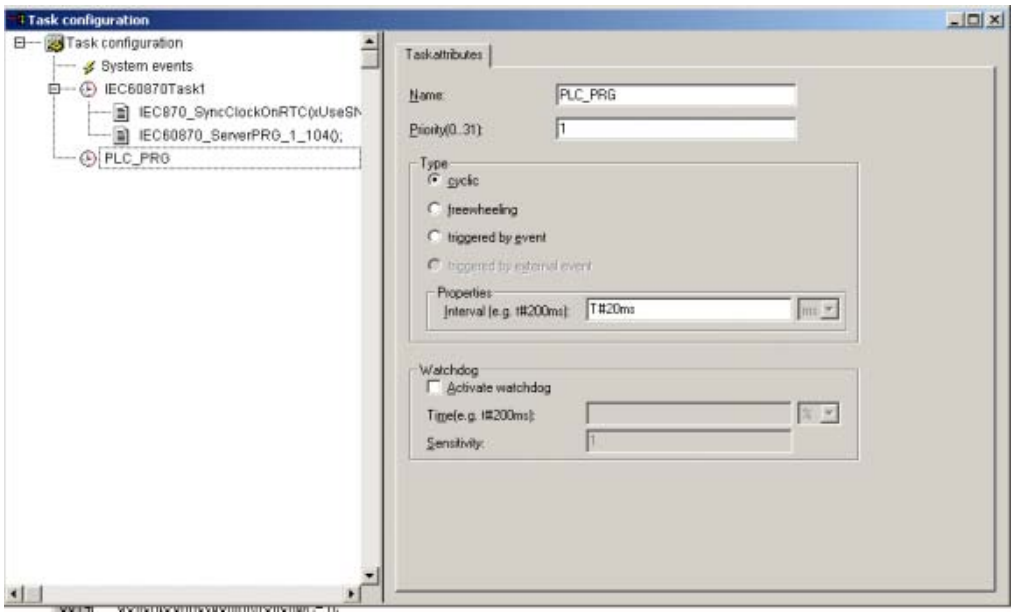

Fig. 27: Task configuration serial

Next create a new task. To do this, click on "Task configuration" with the right mouse button and select "Add task" from the context menu. A new task will now be created and immediately opened for the settings to be made. The name "PLC_PRG", for example, can be entered under Name in Task Properties. The call interval "Cyclic" can be selected and a time of "t#20ms" set.
Click on the newly created task with the right mouse button and select "Add program call" from the context menu.
The new task will be created. The program (PLC_PRG) can now be selected in the input box on the right with the help of the button with the three dots.

2.5 Creating a Program

The program "PLC_PRG" must now be opened from the "Modules" tab and a simple program created in the instruction section; e.g., as shown below.

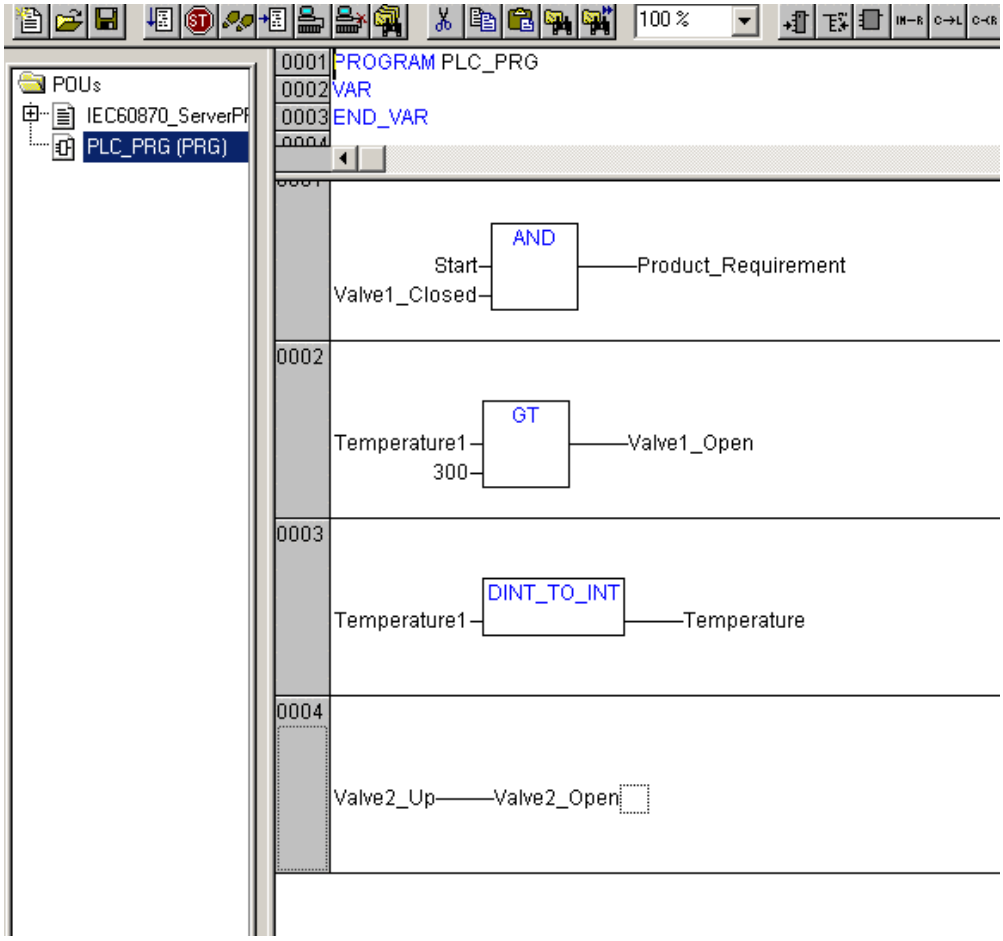

Fig. 28: The program

When the test program has been compiled without errors, it can now be loaded into the PLC.

The compilation is started via "Project → Translate all".

The project can now be saved under "File" → "Save"

2.6 Downloading the Program to the 750-872 Controller

Click "Online" → "Communications parameters" in the menu and create a new communications channel. Select "TCP/IP" (3S TCP/IP driver).

Enter the IP address of your coupler (e.g., 192.168.0.3) under “Address“. Enter 2455 as the port. The transport protocol is TCP. Confirm your entry by clicking "OK".

Make sure *that the simulation is deactivated.*

You can now transfer the program via "Online" → "Login".

Start the program via "Online" → "Start".

3 Simulation

Load the demo version of WinPP101 and WinPP104 from the website http://www.ppfink.de/ → "Products" and then select the tool.

After downloading, install the software according to the instructions which are also available on the website.

The central processor and/or the outstations can be simulated using the tool. The communication can also be logged with this tool.

3.1 Simulating Telecontrol via Ethernet (TCP/IP) with the WinPP104 Program

Start the WinPP104 program.

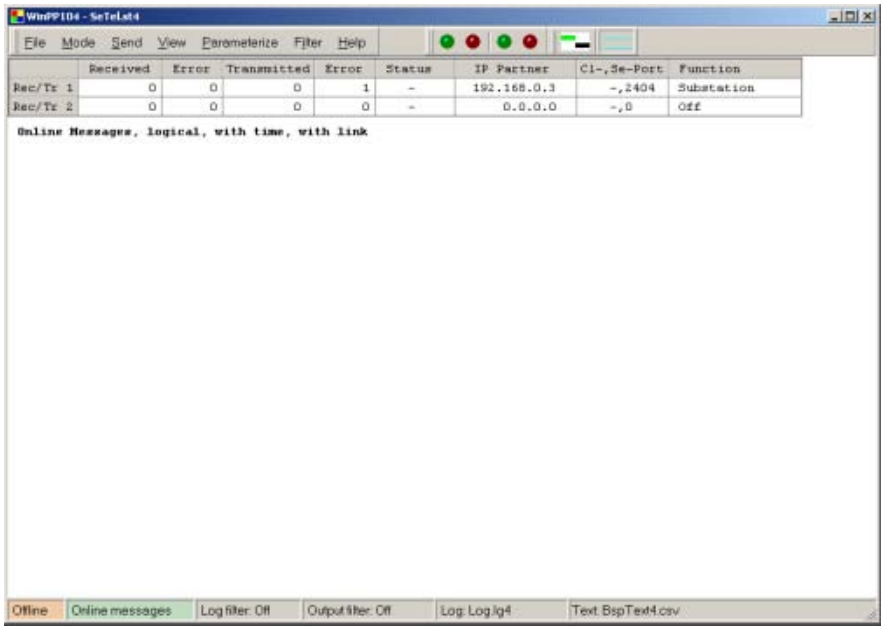

Fig. 29: WinPP104 start screen

The following settings must first be transferred under "Parameter setting" → "General parameters" as can be seen in Fig. 29.

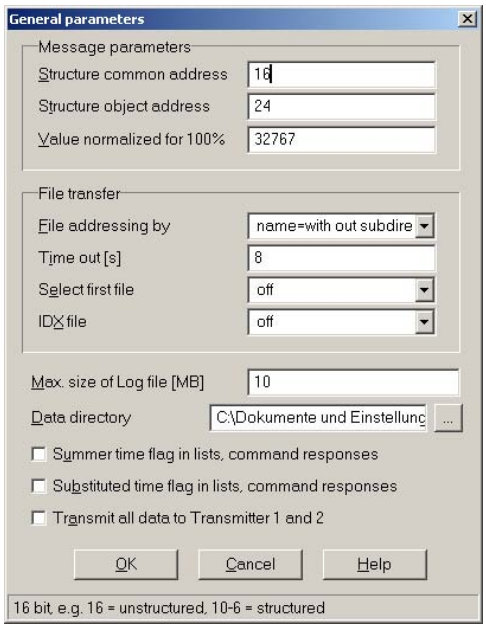

Fig. 30: General settings WinPP 104

When these general parameters have been entered, the parameters for the appropriate partner can be specified. These are reached via "Parameter setting" → "Receiver/Transmitter1…".

First of all, the function of the PC must be defined. In this example, the program is intended to simulate the central processor, so "Central processor" must be selected after the item "Function". The IP address will be added automatically. The IP address of the 750-872 controller (192.168.0.3) must be entered after the item "IP address of partner station". The other values can remain unchanged as can be seen in the illustration below.

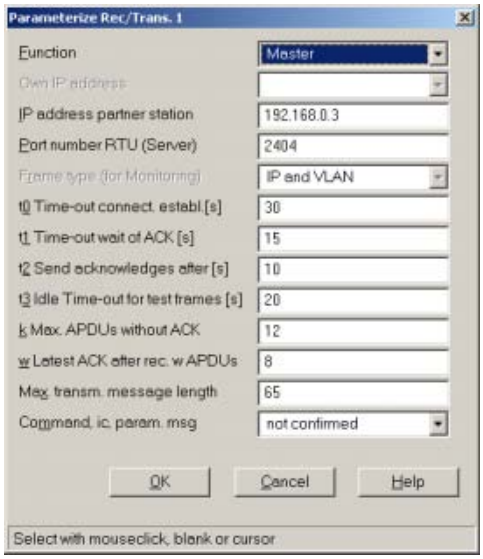

Fig. 31: Receiver/Transmitter settings WinPP104

The settings are incorporated into the program by pressing the "OK" button.

The simulation can be started by clicking the  button.

All signals from the outstation (WAGO Controller 750-872) to the central processor (PC) are now displayed when their values change.

Commands from the central processor to the station can be simulated. These can be executed under "Parameter setting" → "Telegrams“ → "B individual command with date ...".

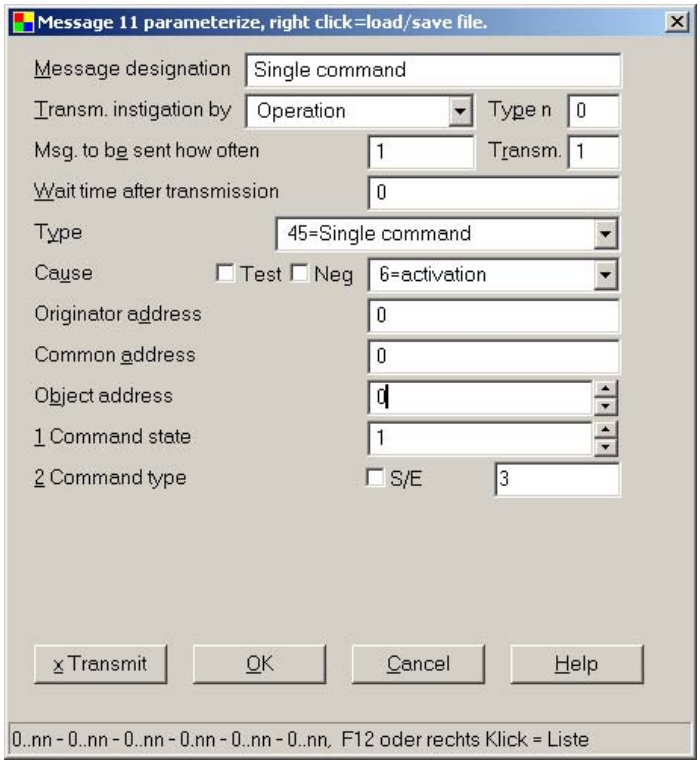

Fig. 32: Parameterizing a command WinPP104

In the newly started window the "Type" must be set to "45=Individual command“ and "2 Command recognition" must be set to "3" (continuous command).
Command recognition can be set from "0" - "31". The values "1" = short, "2" = long and "3" = continuous are of interest for individual commands. The time is set in CoDeSys on the "Resources" tab under "Controller configuration“ → highlight "IEC 60870-5 config [VAR]“ → highlight "IEC 60870 configuration" on the right-hand side under "Execution time".

The station and object address can be seen from CoDeSys on the "Resources" tab under "Controller configuration“ → highlight "IEC 60870-5 config [VAR]“ on the right-hand side.

In this case it is the No. 65793 from the command "IEC870_45C_SC_NA (001.001.001 = 65793)".

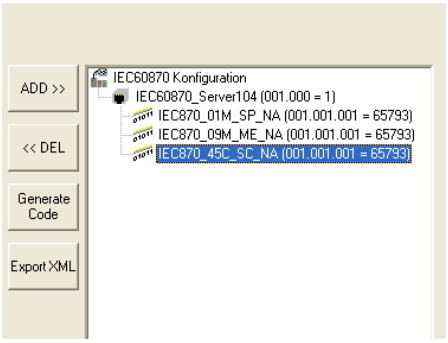

Fig. 33: Detail of system controller

The command is sent to the station (Controller 750-872) by clicking Send and the digital output 2 is permanently energized.

3.2 Simulating Telecontrol via the Serial Interface with the WinPP101 Program

Start the WinPP101 program.

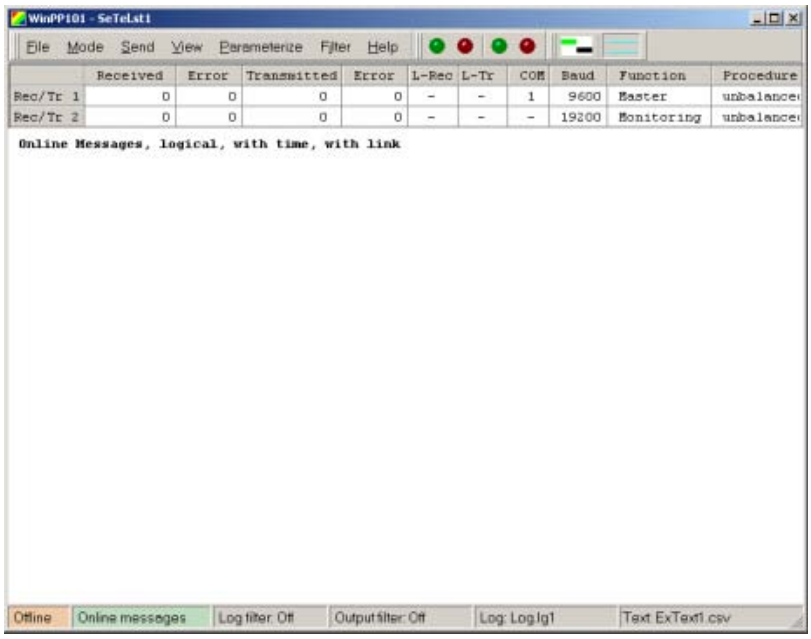

Fig. 34: WinPP101 start screen

The General Parameters must be set first. To do this, go to "Parameter setting" → "General…".

The settings can be made in the new window as can be seen in Fig. 34.

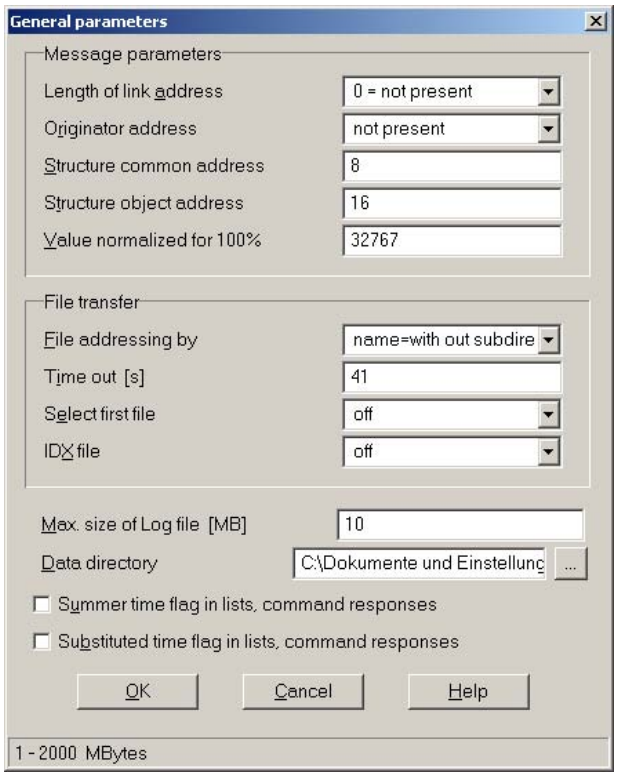

Fig. 35: General parameters WinPP101

Next the parameters for the function of the central processor must be entered. The window for setting the parameters is reached via "Parameter setting" → "Receiver/Transmitter1…".

The illustrations show the settings necessary for this example.

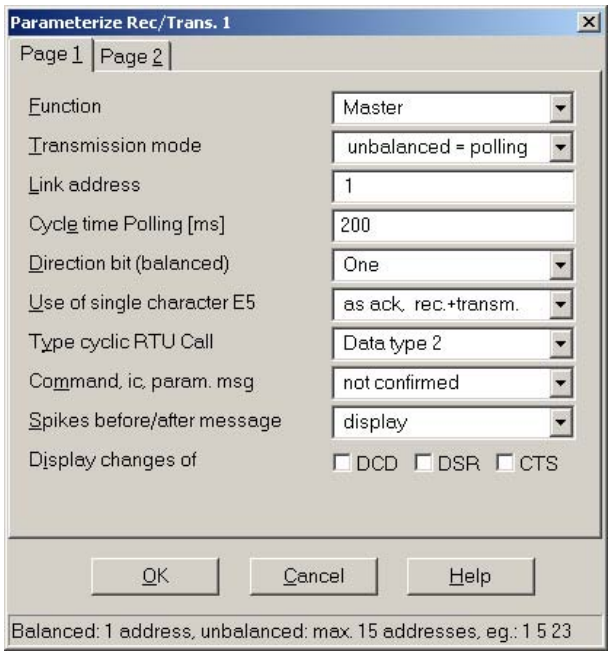

Fig. 36: Receiver / Transmitter settings Page 1 WinPP101

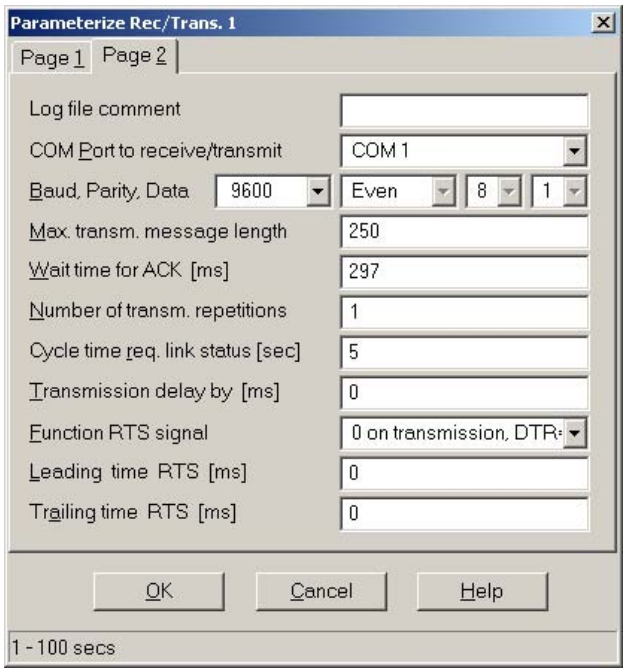

Fig. 37: Receiver / Transmitter settings Page 2 WinPP101

The settings are incorporated into the program by pressing the "OK" button.

The simulation can be started by clicking the  button.

All signals from the outstation (WAGO Controller 750-872) to the central processor (PC) are now displayed when their values change.

Commands from the central processor to the station can be simulated. These can be executed under "Parameter setting" → "Telegrams“ → "B individual command with date ..."

In the newly started window the "Type" must be set to "45=Individual command“ and "2 Command recognition" must be set to "3" (continuous command). The object address can be seen from CoDeSys on the "Resources" tab under "Controller configuration“ → highlight "IEC 60870-5 config [VAR]“ on the right-hand side.

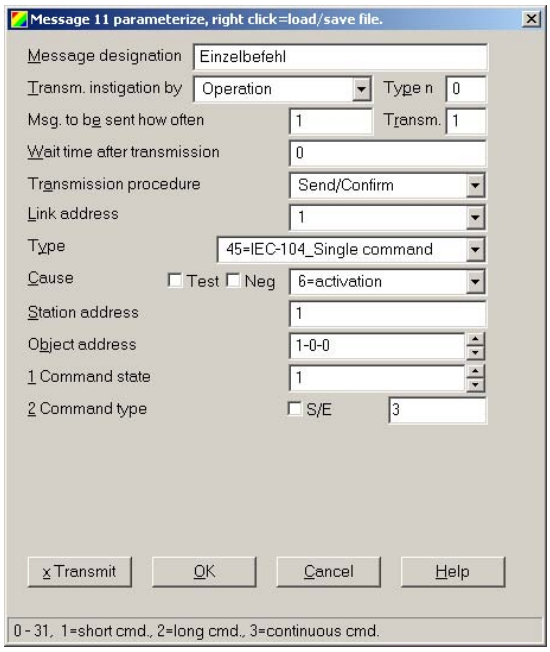

Fig. 38: Command specification and confirmation that the command has arrived at the controller

!!! Important !!!

All entries made in the parameter settings must be identical to the data in the CoDeSys program!!!

4 Appendix

4.1 Application Data Structure

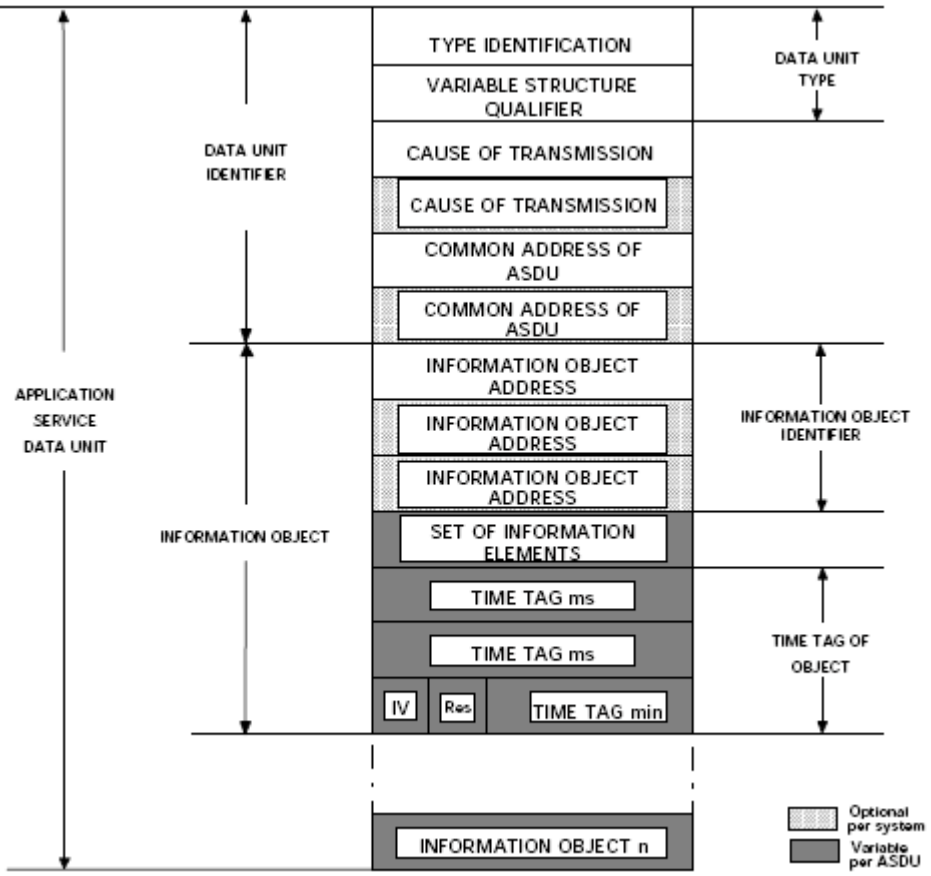

Fig. 39: Application data structure

ASDU:
Telegram data unit

Common ASDU address:
The ASDU station address consists of an address part and one or more information objects

4.2 Difference between Symmetrical and Asymmetrical Transmission Procedures

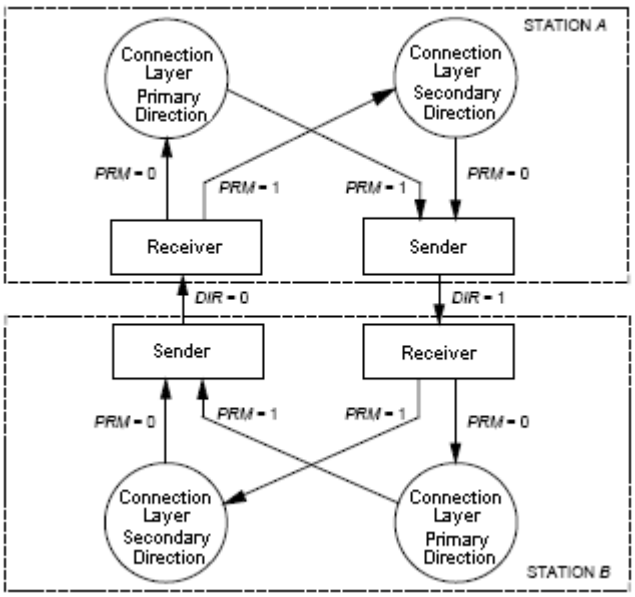

Fig. 40: Symmetrical transmission procedures of the primary and secondary connection layer

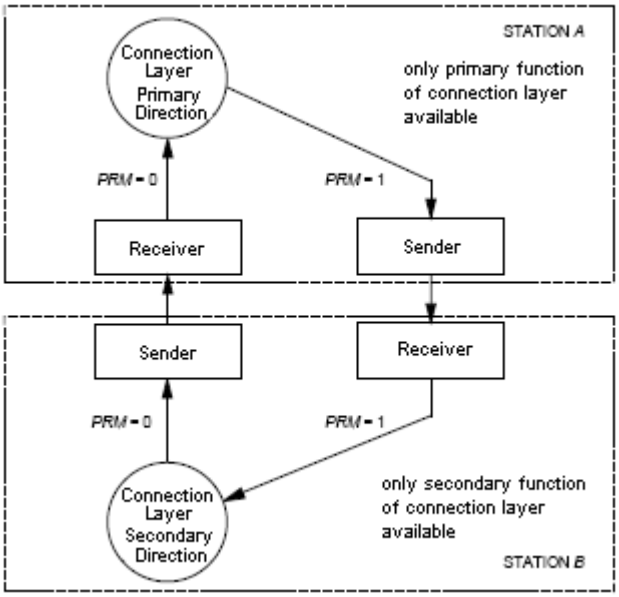

Fig. 41: Asymmetrical transmission procedure, primary and secondary station

4.3 Explanation of the Set-Up Options for an Information Object

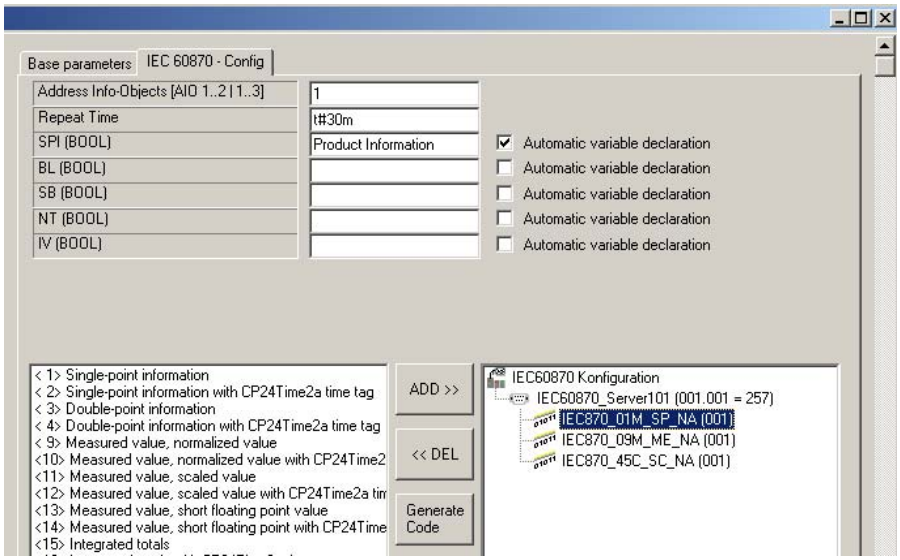

Fig. 42: Information object settings

Address Info Object [A|01|..2|..3]:
Is the message address, which can be up to 3 bytes long

Repeat Time:
Is the time when the master polls the se message in order to check whether it is still working and what the current value is.

SPI (BOOL) = single point information:
Specifies the function variable.

BL (BOOL) = Blocked / Not blocked:
The value of the information object is blocked for the transmission; the value retains the state that was detected before it was blocked. A block may be applied and removed by a local interlock or automatic system, for example.

SB (BOOL) = Substituted / Not substituted:
The value of the information object is specified by an operator's input (load distributor) or by an automatic system.

NT (BOOL) = Not Topical / Topical:
A value is topical when the most recent update was successful. It is not topical if it has not been updated or made available in a defined time period.

IV (BOOL) = A value is valid when it has been correctly measured. If the measuring function detects abnormal conditions at the information source (missing or non-functional measuring units), the value is identified as being invalid. The value of the information object is not defined under these

conditions. The identification "invalid" is used to inform the target that the value may be wrong and must not be used.

OV = Overflow / No overflow:
The value of an information object is outside a predetermined range (used mainly for analog values)

Intermediate equipment may change the quality identifiers BL, SB, NT and IV.

e.g.:

BL: If an intermediate device blocks the transmission of an information object, it must set the quality identifier BL. Otherwise it must pass on the quality identifier BL as received from the lower level.

SB: If an intermediate device replaces the value of an information object, it must set the quality identifier SB. Otherwise it must pass on the quality identifier SB as received from the lower level.

4.4 Finding Incorrect Address Information with CoDeSys

The visualization produced in CoDeSys records the data traffic between the central processor and the outstation.

If the communication does not work, for example, no values will be displayed in the visualization. If only one information object is wrongly addressed or if it does not answer, this can be easily traced.

List of Figures

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