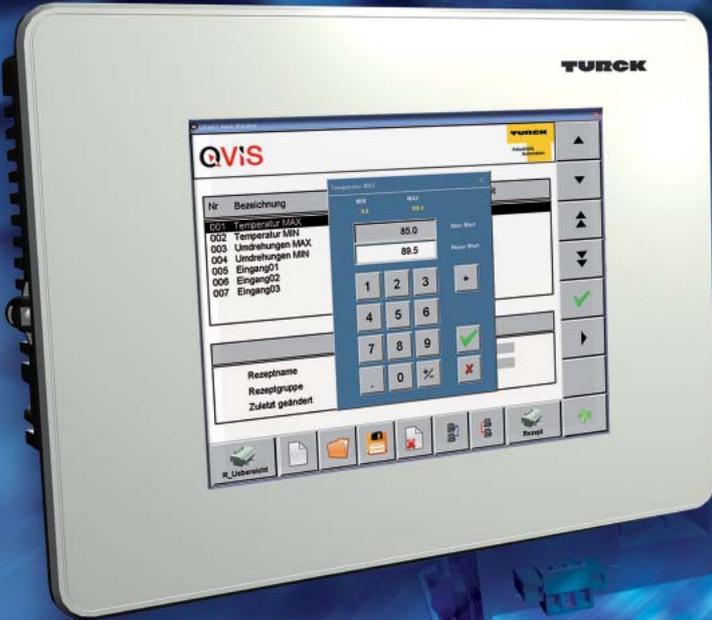




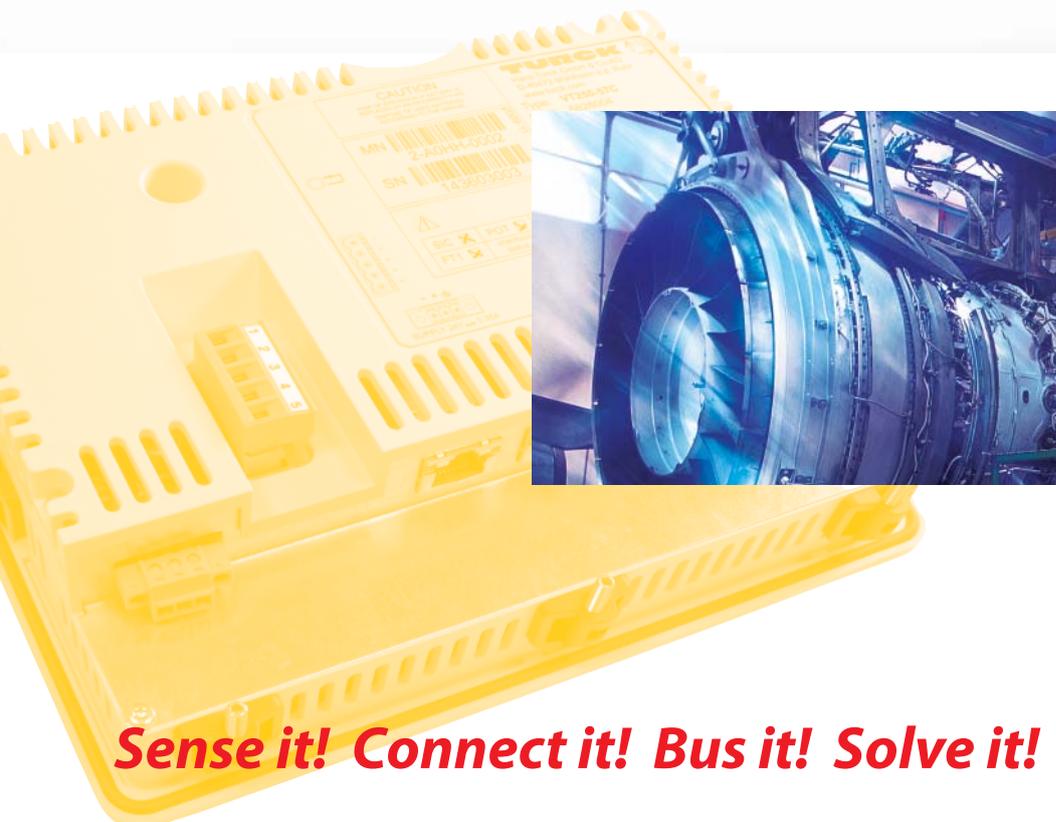
TURCK

**Industrial
Automation**



**GETTING
STARTED**

**VT250-57x -
QViS with
Modbus TCP driver**



Sense it! Connect it! Bus it! Solve it!

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Edition 08/2010

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Subject to alterations without notice

Warning!

Before commencing the installation

- Disconnect the power supply of the device.
- Ensure that devices cannot be accidentally restarted.
- Verify isolation from the supply.
- Earth and short circuit.
- Cover or enclose neighboring units that are live.
- Follow the engineering instructions of the device concerned.
- Only suitably qualified personnel in accordance with EN 50 110-1/-2 (VDE 0 105 Part 100) may work on this device/system.
- Before installation and before touching the device ensure that you are free of electrostatic charge.
- The functional earth (FE) must be connected to the protective earth (PE) or to the potential equalization. The system installer is responsible for implementing this connection.
- Connecting cables and signal lines should be installed so that inductive or capacitive interference do not impair the automation functions.
- Install automation devices and related operating elements in such a way that they are well protected against unintentional operation.
- Suitable safety hardware and software measures should be implemented for the I/O interface so that a line or wire breakage on the signal side does not result in undefined states in the automation devices.
- Ensure a reliable electrical isolation of the low voltage for the 24 volt supply. Only use power supply units complying with IEC 60 364-4-41 (VDE 0 100 Part 410) or HD 384.4.41 S2.
- Deviations of the mains voltage from the rated value must not exceed the tolerance limits given in the specifications, otherwise this may cause malfunction and dangerous operation.
- Emergency stop devices complying with IEC/EN 60 204-1 must be effective in all operating modes of the automation devices. Unlatching the emergency-stop devices must not cause restart.
- Devices that are designed for mounting in housings or control cabinets must only be operated and controlled after they have been installed with the housing closed. Desktop or portable units must only be operated and controlled in enclosed housings.
- Measures should be taken to ensure the proper restart of programs interrupted after a voltage dip or failure. This should not cause dangerous operating states even for a short time. If necessary, emergency-stop devices should be implemented.
- Wherever faults in the automation system may cause damage to persons or property, external measures must be implemented to ensure a safe operating state in the event of a fault or malfunction (for example, by means of separate limit switches, mechanical interlocks etc.).
- The electrical installation must be carried out in accordance with the relevant regulations (e. g. with regard to cable cross sections, fuses, PE).
- All work relating to transport, installation, commissioning and maintenance must only be carried out by qualified personnel. (IEC 60 364 and HD 384 and national work safety regulations).
- All shrouds and doors must be kept closed during operation.

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About this manual

General

This Getting Started describes how to establish Modbus TCP communication between a VT250-57x HMI used as Modbus Client and connected Modbus TCP Servers using QViS.

Additional documentation

- [D301191](#) "VT250 - Hardware-description"
- [D301189](#) "Getting Started - VT250-57P HMI PLC with PROFIBUS-DP"
- [D301195](#) "Getting Started - VT250-57P HMI PLC with CANopen"
- [D301218](#) "Getting Started - VT250-57x Visualization of Step7®-projects"

Description of symbols used



Warning

This sign can be found next to all notes that indicate a source of hazards. This can refer to danger to personnel or damage to the system (hardware and software) and to the facility.

This sign means for the operator: work with extreme caution.



Attention

This sign can be found next to all notes that indicate a potential source of hazards.

This can refer to possible danger to personnel and damages to the system (hardware and software) and to the facility.



Note

This sign can be found next to all general notes that supply important information about one or more operating steps.

These specific notes are intended to make operation easier and avoid unnecessary work due to incorrect operation.

Overview



Attention

Please read this section carefully. Safety aspects cannot be left to chance when dealing with electrical equipment.

This manual includes all information necessary for the prescribed use of TURCK HMIs. It has been specially conceived for personnel with the necessary qualifications.

Prescribed use

Appropriate transport, storage, deployment and mounting as well as careful operating and thorough maintenance guarantee the trouble-free and safe operation of these devices.



Warning

The devices described in this manual must be used only in applications prescribed in this manual or in the respective technical descriptions, and only with certified components and devices from third party manufacturers.

Notes concerning planning /installation of this product



Warning

All respective safety measures and accident protection guidelines must be considered carefully and without exception.

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Installing Modbus TCP-communication with QViS

Used hard-/ software

Hardware

- VT250-57x with Firmware VT250-57x-L1-OMB V 1.0.5.0
- BL67-PG-EN (IP-address 192.168.1.12)
with:
 - BL67-8DO-0.5A-P

Software

- CoDeSys 2.3.6.4
- QViS Version 3.0.11.0
- Microsoft® .NET Framework 3.5

CoDeSys-project

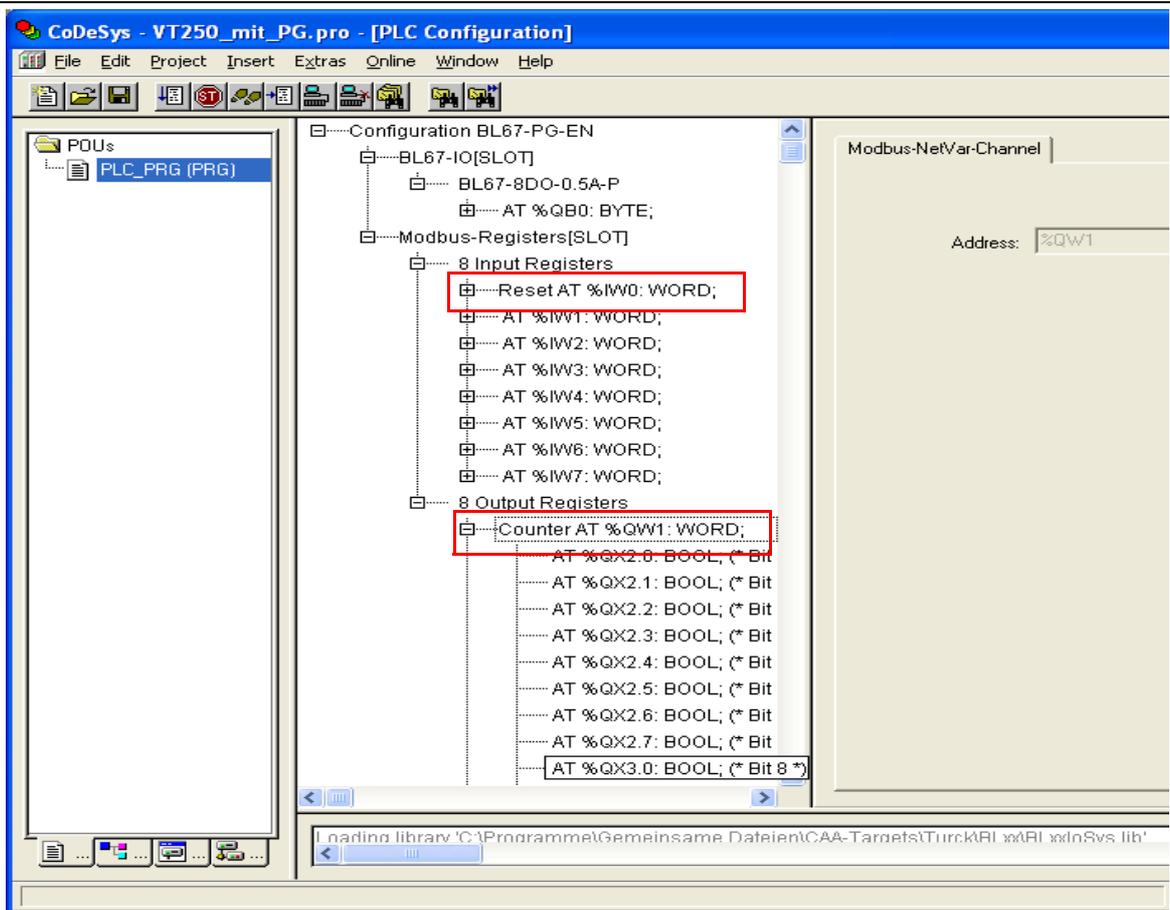
PLC configuration

The PLC configuration consists of a BL67-PG-EN (IP-address 192.168.1.12) with a local I/O-module (BL67-8DO-0.5A-P) and 8 input- as well as 8 output-Modbus-application registers (see [Figure 1: PLC configuration of the example application](#)).

Global variables

The variable "Reset" is assigned to the Modbus input register %IW0, the variable "Counter" is assigned to the Modbus-Output-Register %QW1.

Figure 1:
PLC
configuration of
the example
application



Small example program

In the program PLC_PRG a counter is simulated via "Counter := Counter + 1".
 A counter reset is done, if the variable "Reset" (%IW0) = 1.

Figure 2:
 PLC-PRG in the
 example
 application

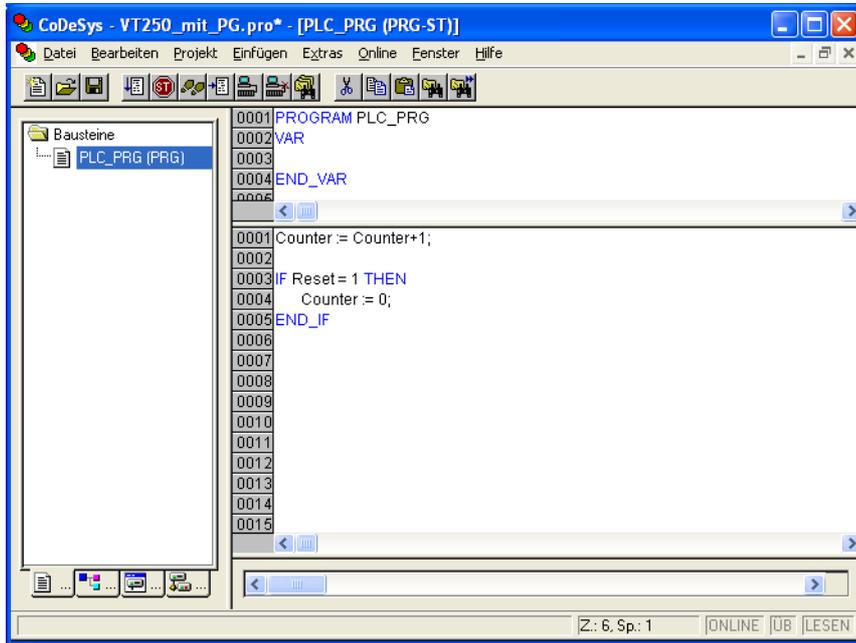


Figure 3:
 Register-
 assignment

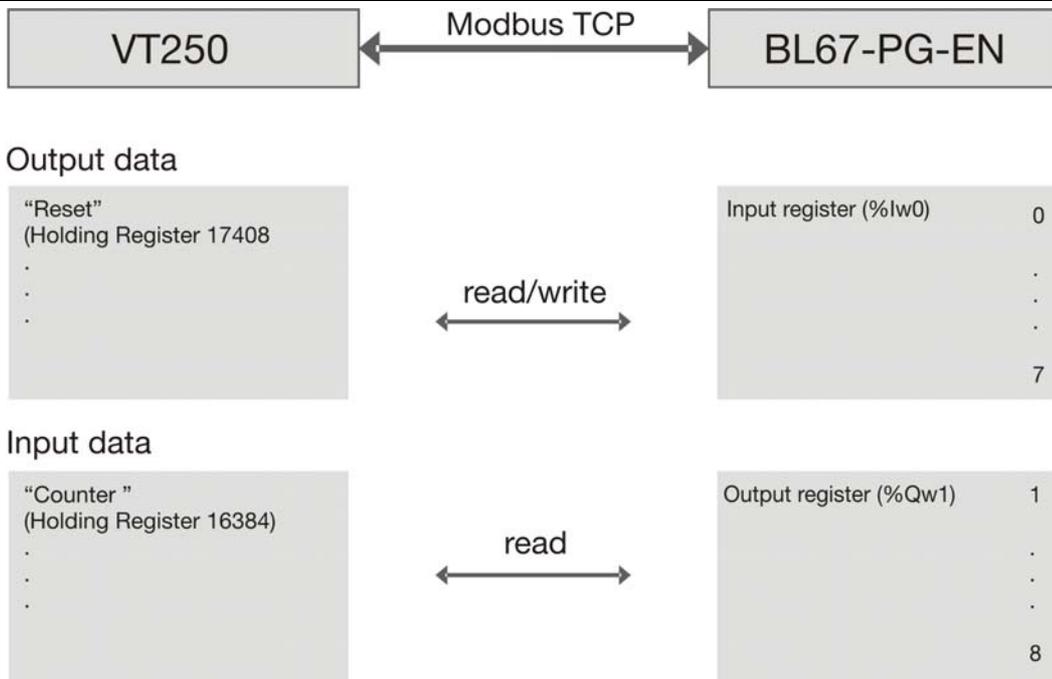


Figure 4:
 Excerpt from
 D301033,
 Modbus-
 registers

Implementation of Modbus TCP

Table 6:
 Modbus registers
 of the gateway

A ro = read only
 rw = read write

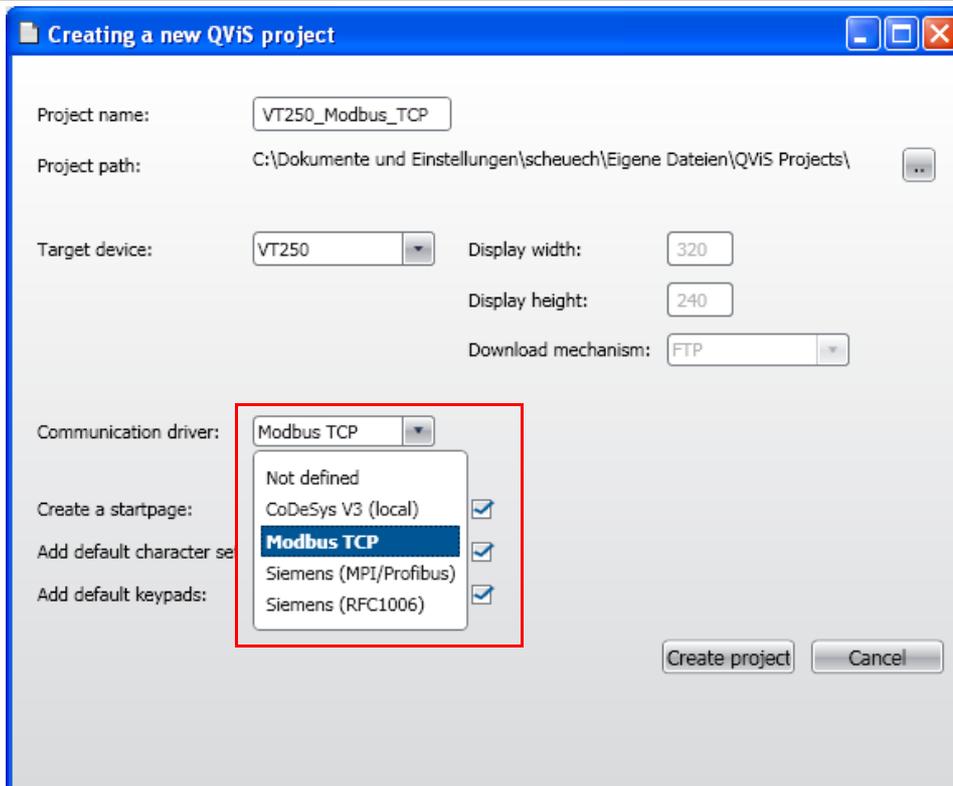
Address (hex.)	Access A	Description
0x2A00 to 0x2A20	ro	actual module list (32 × 4 bytes per module-ID)
0x4000 to 0x43FF	rw	Modbus input registers (SPS application-registers, see also "Mapping of the Modbus Registers", page 5-17).
0x4400 to 0x47FF		Modbus output registers Modbus-communication of the program- mable gateway with a higher-level Modbus-client (i.e. PLC or OPC-server). See also Figure 29: "Mapping the Modbus registers" or SPS application- registers, "Mapping of the Modbus Registers", page 5-17

QViS with Modbus-TCP

Create a new project

- 1 Create a new project via "File →New". In the new dialog box, assign a project name and define the storage location of the project.
- 2 The following settings have to be done:
 - As "Target device" please select "VT250" the VT250-57x. The display size is automatically set to 320×240.
 - The visualization-download to the HMI is done via FTP-access. This is also automatically set under "Download mechanism".
 - Under "Communication driver" select the Modbus TCP driver

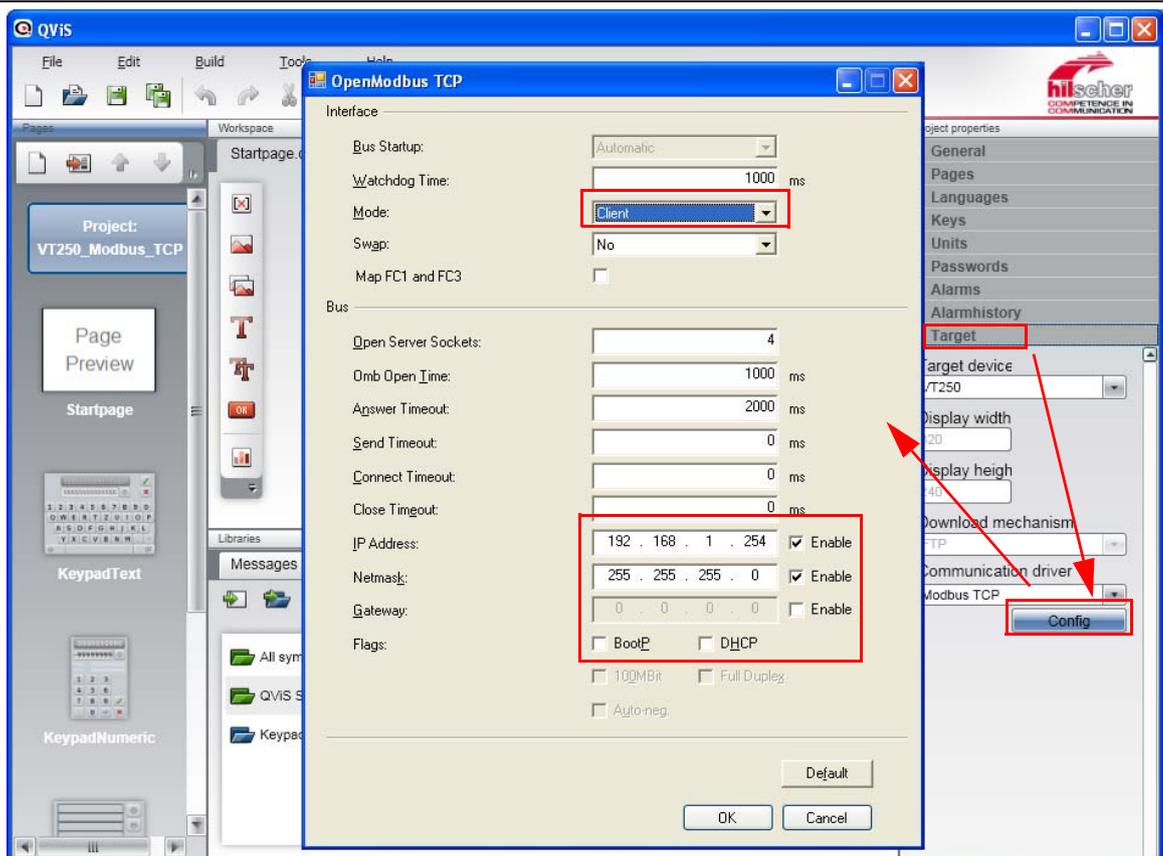
Figure 5:
New
QViS-project
with Modbus
TCP-driver



Configuration of the communication driver

- 1 A click onto "project" opens the "Project properties" (right side of the window), see below [Figure 6: Configuration of the communication driver](#).
- 2 Under "Target" you can find amongst others the settings done before
- 3 The Modbus driver has to be configured. Use the "Config" button:
 - Under "Mode", define the QViS as Modbus-Client,
 - deactivate the assignment of the IP-address etc. via BootP or DHCP and enter the IP-address and the netmask of the VT250-57x (here 192.168.1.254, 255.255.255.0).

Figure 6:
Configuration
of the
communication
driver



Setup of the Modbus-communication

The Modbus-Communication between Modbus-Client (VT250) and Modbus-Servers (here: BL67-PG-EN) is done via defined communication channels.

In doing so, an own Modbus Function Code (command) can be assigned to each communication channel.

Please observe the overview in [Table 2: Function Codes in QViS, page 1-10](#) referring to this.

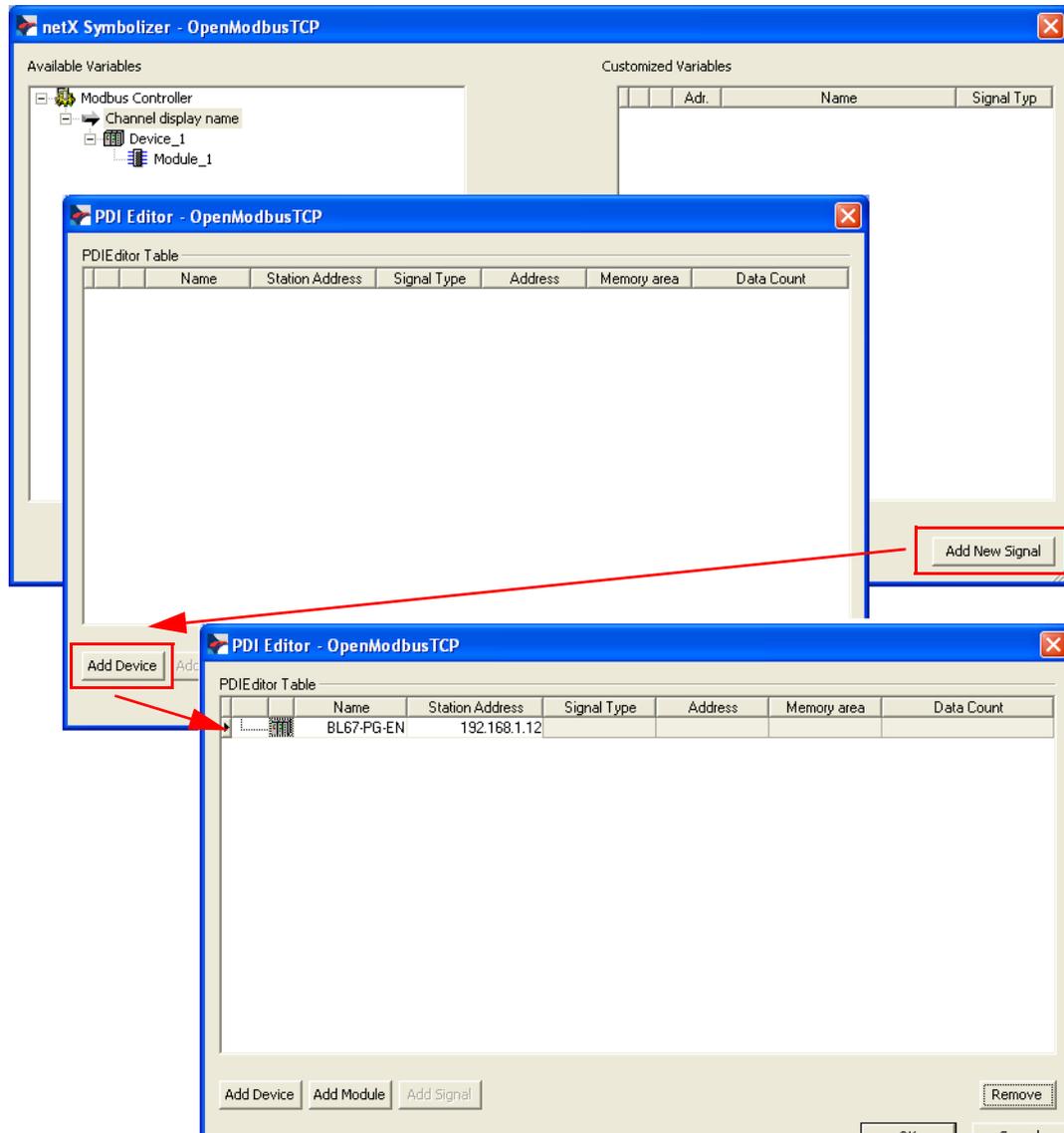
The communication channels are set-up using the QViS-Symbolizer.

Open it using "Tools →Symbolizer...".

Installing Modbus TCP-communication with QViS

- 1 In the netX Symbolizer select "Add New Signal" and in the PDI Editor now opening select "Add Device".
- 2 This "Device" corresponds to the Modbus-Server to be accessed and therefore contains its IP-address (here: BL67-PG-EN, 192.168.1.12). If necessary, assign a unique name.

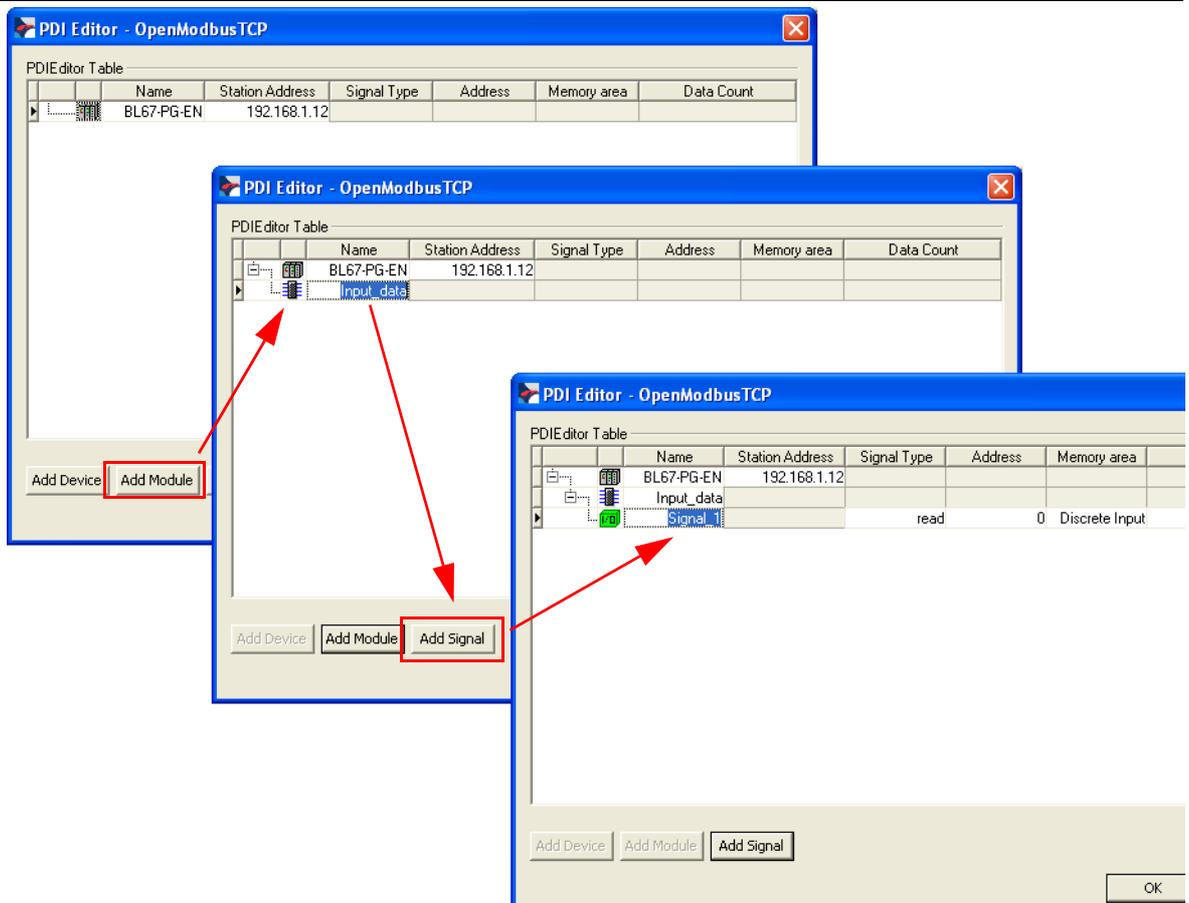
Figure 7:
Setting the
Modbus-
channels (1)



- 3 Now, select "Add Module" and add at least one module to the device.
If necessary, the communication channels can be split up into different "Modules" in order to structure the communication channels (see also [Figure 9: PDI Editor and netX Symbolizer - setting of Modbus-channels](#)).

4 Now, select "Add Signal" to setup a Modbus channel.

Figure 8:
Setting the
Modbus-
channels (2)



- 5 Please assign, if necessary, a project related name and define the following parameters for the channel:
- "Signal type": access (read, write or read/write),
 - "Address": Start address in the Modbus-Server from which on the Modbus data (data types see [Table 1: Function Codes in QViS, page 1-10](#)) have to be read or written.



Note

The address has to be entered in decimal format, Modbus address have to be converted, if necessary!

- "Memory area": Memory area in which the data to be read or written are located.
- "Data Count": Number of the data to be read or written.



Note

In the "netX Symbolizer/PDI Editor", the Modbus Function Code is defined via the parameter "Memory area" (see below [Figure 9: PDI Editor and netX Symbolizer - setting of Modbus-channels](#)).

Table 1:
Function Codes
in QViS

Function Code	Access	Data type	Meaning
Discrete input	r	BOOL, 1 bit	read digital input/ bit
Coil	r/w		write digital input/ bit
Input registers	r	WORD, 16 bit	read input registers
Holding Registers	r/w		write output registers

Figure 9:
PDI Editor and
netX Symbolizer
- setting of
Modbus-
channels

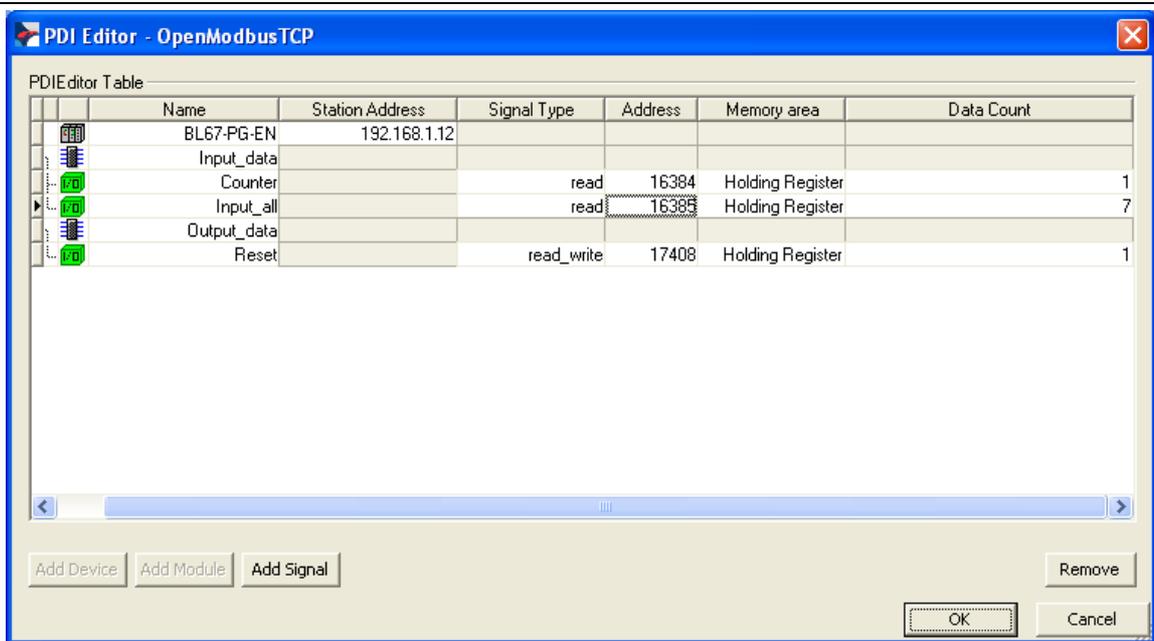
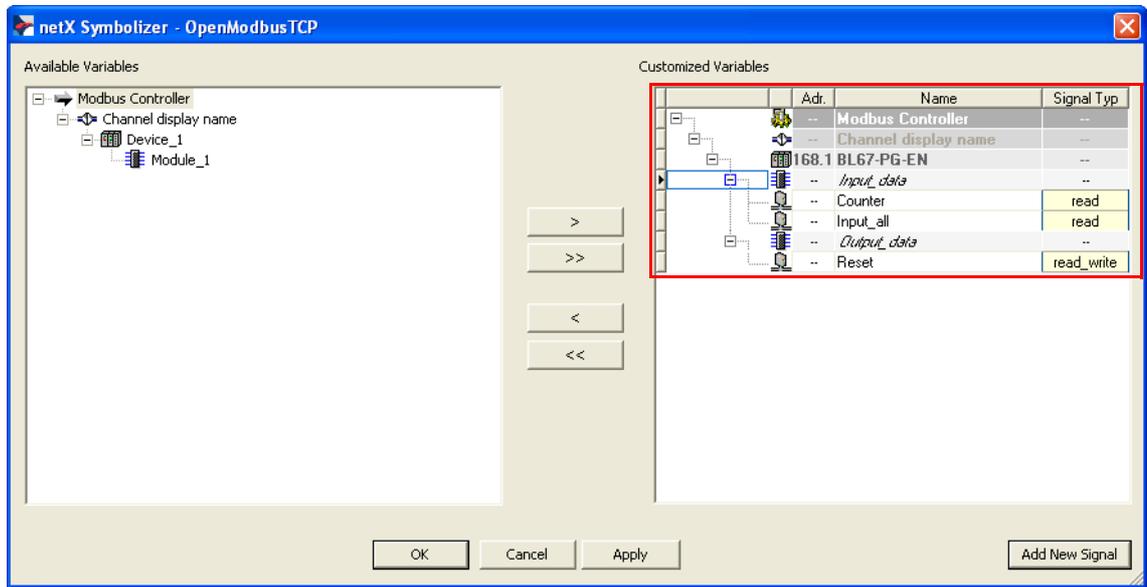


Table 2:
Communication
-channels in the
example

"Name"	"Signal type"	"Address"	"Memory area"	"Data Count"	Description
Counter	read	16384 (0x4000) (see below Figure 4: page 1-5)	Holding Registers	1	Read counter value with "Counter", (read the output register %QW1 of BL67-PGEN, see page 1-3)
Input_all	read	16385 (0x4001) address of the following register	Holding Registers	7	Reading the rest of output registers of BL67-PGEN as a block
Reset	read/write	17408 (0x4400) (see below Figure 4: page 1-5)	Holding Registers	1	Reset the counter with "Reset" (writing the input register %IW1 of BL67-PGEN (see page 1-3))

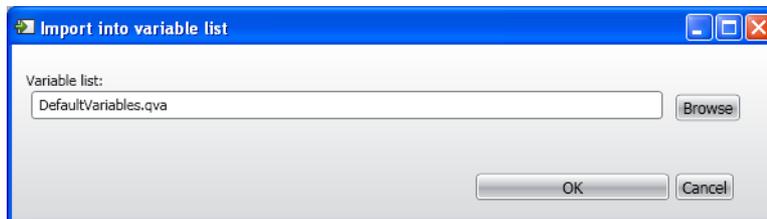
- After having installed all necessary communication channels, they are shown as follows under "Customized Variables" in the netX-Symbolize

Figure 10:
netX-
Symbolizer with
defined
Modbus-
channels



- Take over the variables to the favored variable list (here in this example "DefaultVariables.qva") using the "OK" button.

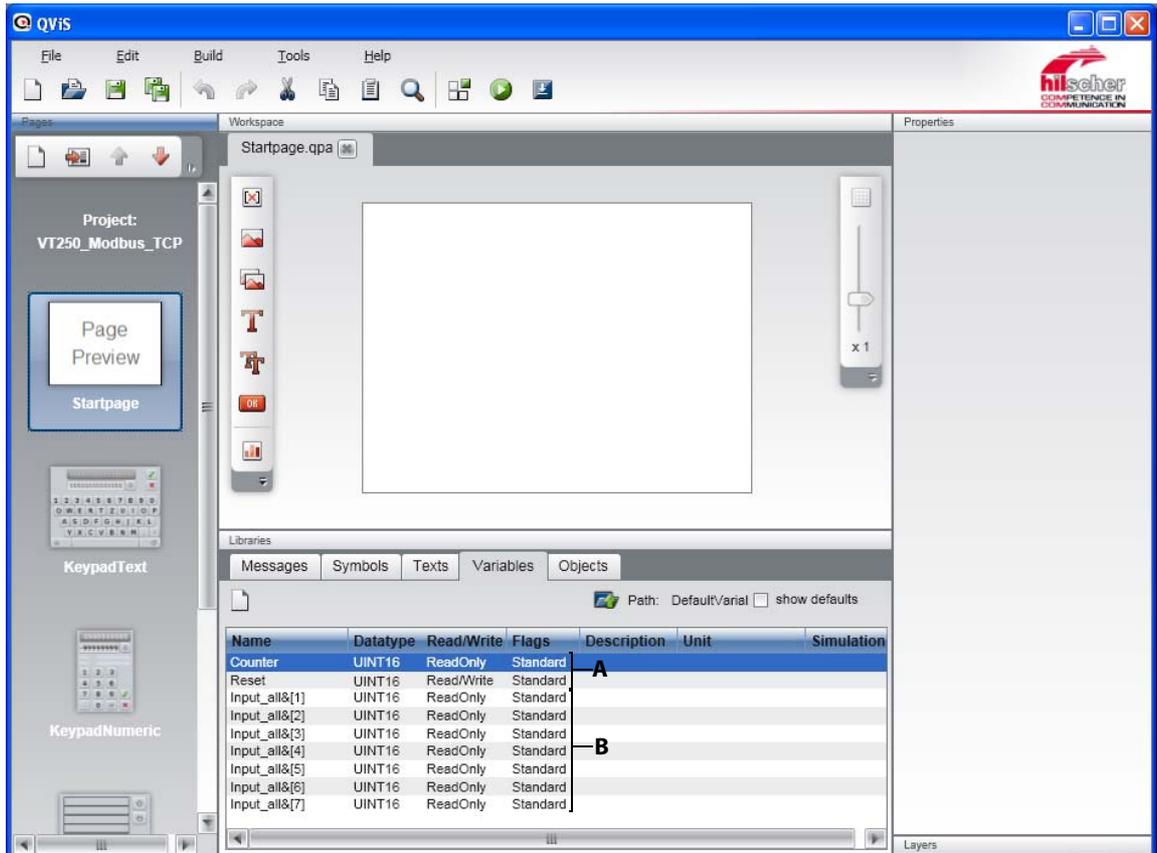
Figure 11:
Definition of the
variable list for
the variable
import



Installing Modbus TCP-communication with QViS

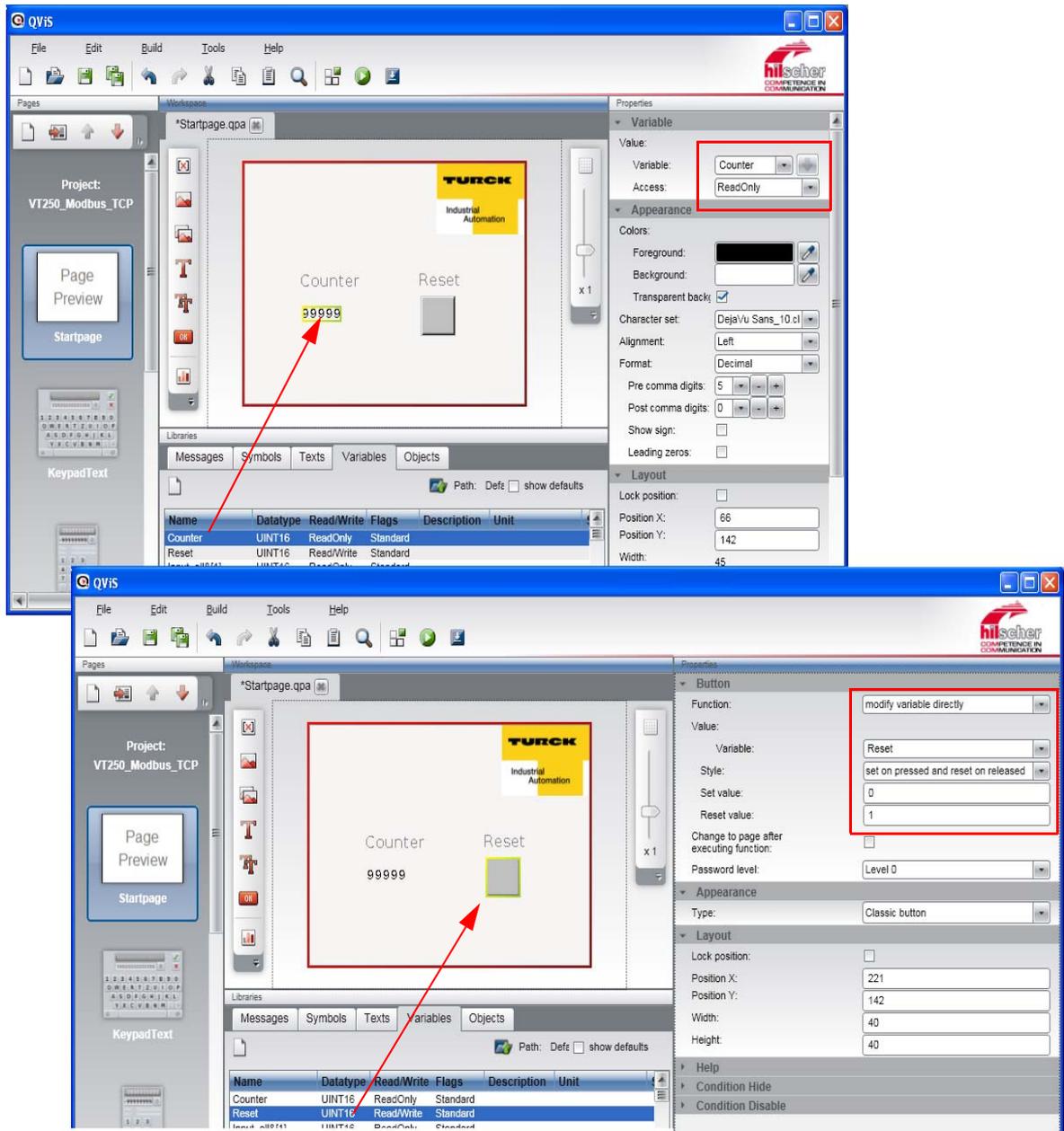
Figure 12:
Imported variables/
communication
channels

- A** Data count =1
- B** Data count >1
(see also [page 1-10](#))



- 8 In QViS, the variables are listed in the register "Variables" and can now be linked to elements of the visualization.

Figure 13:
Imported
Variables in
QViS



Completion of the project

After designing the visualization surface and the assignment of the variables, buttons etc. with the imported variables or respectively the installed Modbus channels, the QViS-project is compiled and downloaded to the VT250.

Compiling the project

Save the project and compile it using the "Build"-button.

Downloading the project

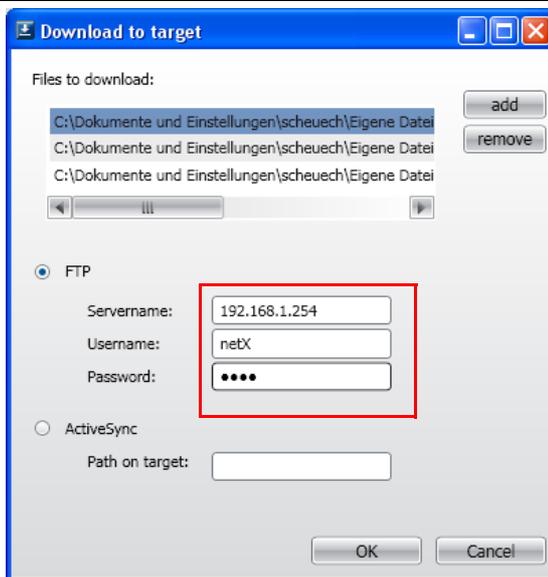
In the following, the project is downloaded to the VT250-57x using the "Download"-button.



Note

Please observe, that the listed files are the project files.

Figure 14:
Downloading
the QViS-project
files to the
VT250



- 1 Mark the download via FTP and enter the following settings
Server name: P address VT250-57x (default: 192.168.1.254)
Username: netX
Password: netX
- 2 Confirm the settings with OK.
- 3 The download is started.
- 4 Confirm the successful project-download with OK in order to execute a restart at the device.
- 5 The visualization is now running on the VT250-57x.

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