XV100 MICRO PANEL





## Imprint

#### Manufacturer

Eaton Automation AG Spinnereistrasse 8-14 CH-9008 St. Gallen Schweiz www.eaton-automation.com www.eaton.com

#### Support

Region North America Eaton Corporation Electrical Sector 1111 Superior Ave. Cleveland, OH 44114 United States 877-ETN-CARE (877-386-2273) www.eaton.com

#### **Original instructions**

The German version of this document is the original instructions.

Editor Ivo Hengartner

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# 1 General

This documentation should facilitate the introduction to the handling of the XV100 touch panels from Eaton Automation. In order to ensure a fast commissioning of the device it is necessary to follow the explanations and references carefully.

The commissioning of the device, communication, PC program usage and project generation with GALILEO and XSoft-CoDeSys-2 will be described step by step.

For the description in this documentation the following versions of GALILEO and XSoft-CoDeSys-2 were used:

- GALILEO V7.2.2
- XSoft-CoDeSys V2.3.9 SP2

The illustrated pictures and described functions can differ if newer or different versions of the programs are used.

Furthermore for the print screens a 3.5" device (color) was used. For other device variants no changes in functionality apply.

# 1.1 Document Index

	Торіс	Document	Doc. Number
[1]	Hardware manual	User Manual MICRO PANEL XV-102 or User Manual MICRO PANEL XV-152	MN04802004Z MN04802006Z
[2]	Windows CE	System Description Windows CE It is also part of the GALILEO help	MN05010007Z
[3]	Network	System Description Networks in Brief	MN05010009Z

(The index is not exclusive)

These helpful documents can be downloaded from our home page (<u>www.eaton-automation.com</u>), «DOWNLOADS» section.

### 1.2 Device Variants

The devices of the product class XV100 are available in different variants. Please find further information on our homepage <u>www.eaton-automation.com</u> or ask your local contact about possible device versions.

1 General

# 2 Commissioning of the Device

# 2.1 General Remarks to Wiring

Cabling should be carried out with special care in order to ensure interference-free operation.

The EMC values stated in the technical data can only be guaranteed if the connections and cables are prepared according to the specifications stated. The cabling must be laid separately from low-voltage cables or isolated with double or reinforced insulation.

→ Further information, see Document [1] «Operating Instructions MICRO PANEL XV-1x2», Chapter «Installation».

# 2.2 Starting the device

Energize the device.  $\rightarrow$  The device will boot. If the device does not boot up and/or if an error message appears while starting (booting) the device, see Document [1] «Operating Instructions MICRO PANEL XV-1x2», Chapter «Troubleshooting»).

There is no runtime software for the visualization or optional PLC installed on the device. From the respective software package e.g. visualization (GALILEO) and optional PLC (XSoft-CoDeSys-2) you can install the runtimes on the device.

# 2.3 Switching off the device

De-energize the device.

The lifespan of the backlight can be increased by reducing the brightness, see Document [2] «MN05010007Z System Description Windows CE».

## 2.4

## Ethernet

The Ethernet interface of the device is used for engineering the visualization "GALILEO" as also programming the PLC with "XSoft-CoDeSys-2". To commission the communication between the device and the PC follow the next described steps.

An IP-Address always consists out of a network and computer address. The network mask specifies which bits belong to the network and which do not.

Eigenschaften von Internetprotokoll (TCP/IP)		
Allgemein		
IP-Einstellungen können automatisch z Netzwerk diese Funktion unterstützt. W den Netzwerkadministrator, um die gee beziehen.	/enden Sie sich andernfalls an	
O I <u>P</u> -Adresse automatisch beziehen	1	
Folgende IP-∆dresse verwenden:		— II
IP-Adresse:	192.168.0.71	
S <u>u</u> bnetzmaske:	255 . 255 . 255 . 0	
Standardgateway:	· · ·	
C DNS-Serveradresse automatisch	beziehen	
Folgende DNS-Serveradressen <u>v</u>	erwenden:	- 1
Bevorzugter DNS-Server:		
Alternativer DNS-Server:		
	<u>E</u> rweitert.	
	OK Abbre	echen

Select for the device a free computer address from the local network. You can determine the network address of your PC under *start*  $\rightarrow$  *setting*  $\rightarrow$  *network and telecommunications connections*  $\rightarrow$ *properties*  $\rightarrow$  *characteristics.* Select out of the list Internet protocol (TCP/IP) and press the button "*properties*".

Einstellungen der Netzwerkkarte des PCs

Example:	IP-Address PC: IP-Address: SubNetMask:	192.168.0.71 255.255.255.0
	This means: Network-Address: Computer-Address:	192.168.0 71
	Select an IP-Adresse for th Network-Address: Computer-Address:	<b>te device:</b> 192.168.0 72 (Number between 1-254 and not any already used in the local network)
	→ IP-Address device: IP-Address: SubNetMask:	192.168.0.72 255.255.255.0



The usage of the same address twice can cause critical network problems.

## Examining and Adjusting of the IP-Address of the Device

Power up the device.

2.4.1

If an information window appears after booting please close it.

After Windows CE has booted press the S*tart* button and change to the menu *Programs*  $\rightarrow$  *Control Panel.* 

My Device				
	Communication + System +			
🕞 Settings 🔹 📴	Command Prompt Control Panel Windows Explorer	<u>File V</u> iew	8 7	? ×
2001		BootDevice D	ateTime Display	InputPanel
		٢	License Network	Owner

Double-click the icon "Network".

Connection
Make New ONBOARD1 Connection
Nstart D.C 14:37 🕑

Double-click the icon "ONBOARD1".

Conr	'FEC Ethernet Driver' OK 🗙
	IP DNS WINS
Make Conne	Obtain an IP address via DHCP           IP address:         192         168         0         72           Subnet mask:         255         255         0         0           Gateway:         0         0         0         0
Sta	rt 🗗 C 🔍 C 🕹 🚰 12:54

A window 'FEC Ethernet Driver' will open. Select the desired IP address and subnet mask. Use the gateway only when needed then push OK.

The IP address and subnet mask must be consistant to the network configuration of the PC respectively the company network. In doubt ask your network administrator.

## 2.4.2 Wiring

2.4.3

Connect the device directly to the PC with an ethernet crossover cable. If you use an ethernet hub or switch us a 1-to-1 patch cable.

#### Test the Ethernet Connection

To test the connection open the "Dos-Shell" on your PC over *Start*  $\rightarrow$  *Programs*  $\rightarrow$  *Accessories* and ping the IP address of the device. (ping 192.168.0.72).

🖾 Eingabeaufforderung	
Microsoft Windows 2000 [Version 5.00.2195] (C) <u>Copyright 1985-2000</u> Microsoft Corp. L:\\ping 192.168.0.72	
Ping wird ausgeführt für 192.168.0.72 mit 32 Bytes Daten: Antwort von 192.168.0.72: Bytes=32 Zeit=1ms TTL=128	
Antwort von 172.168.0.72: Bytes=32 Zeit=1ms IIL=128 Antwort von 192.168.0.72: Bytes=32 Zeit=1ms IIL=128 Antwort von 192.168.0.72: Bytes=32 Zeit=1ms IIL=128 Antwort von 192.168.0.72: Bytes=32 Zeit=1ms IIL=128	
Ping-Statistik für 192.168.0.72: Pakete: Gesendet = 4. Empfangen = 4, Verloren = 0 (0% Verlust), Ca. Zeitangaben in Millisek.: Minimum = 1ms, Maximum = 1ms, Mittelwert = 1ms	
L:\>_	<b>•</b>

If the device does not answer then contact your network administrator.

→ Further information, see Document [1] «Operating Instructions MICRO PANEL XV-1x2», Chapter «Installation».

→ Further information, see Document [2] «MN05010007Z System Description Windows CE».

# 3 The first PLC Program

If you would like to use the device without the internal PLC functionality then please jump over this chapter and continue with Chapter «4 The First GALILEO project».

This chapter consists of a basic application which shows the programming with XSoft-CoDeSys-2 and the special communication between PLC and HMI in a touch panel XV100.

## 3.1 PLC License Point on the Device

The PLC runtime needs additional license points on the device. The XV100 devices of the classification type XV-1x2-...-PLC, XV-1x2-...-TVRC... and XV-1x2-...-TWRC... are delivered with 240 license points and are intended for operation as HMI devices and as control devices (HMI-PLC).

### 3.2 Installation of the PLC Runtime System on the Device

The XV100 devices do not contain the PLC runtime. The PLC runtime can be transferred to the device with the tool "TargetFirmwareWinCE". This tool can be started from the windows environment or from inside the XSoft-CoDeSys-2 development environment (see Chapter 3.4).

Requirement : The XSoft-CoDeSys-2 Software (CoDeSys) must be installed correctly on the PC. You can find the current XSoft-CoDeSys-2 software on our homepage (www.eaton-automation.com) under <DOWNLOADS → SOFTWARE → XSoft-CoDeSys-2>. For unrestricted operation of XSoft-CoDeSys-2 you need a license code. Please contact your sales vendor for this.

#### Perform the Installation from the Windows Surface:

Start the tool "TargetFirmwareWinCE\_V2.4.8" on your PC through clicking:

Start  $\rightarrow$  Programs  $\rightarrow$  Eaton  $\rightarrow$  CAA-Targets  $\rightarrow$  XC-XV-Targets V2.3.9 SP2  $\rightarrow$  Firmware  $\rightarrow$  XV-1xx

After starting the setup the follow the dialog until the following window appears.

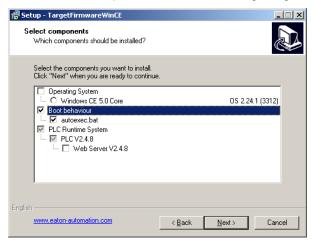


Select the desired installation type and execute the next steps:
 FTP Installation (suggested routine):

The installation of the PLC runtime is done over FTP.

Required steps:

- Ensure that the device is connected to your PC via ethernet.
- Start the device.
- Start the FTP-server on the device by clicking *Start* → *Programs* → *Communications* → *FTP Server*.
- Continue the setup on the PC until the following dialog window appears.



- Select "*Boot behaviour*". Please note, that the operating system is not selected. For the installation of the operating system, see Chapter 5.2.
- Click on the button "Next>".

🚏 Setup - TargetFirmwareWinCE		_ 🗆 🗙
Destination Select destination		Ð
Select the destination, where you want to in =Click "Next" when you are ready to contin		
Internal storage (Destination: VinternalS)	(torage)	
Removable drive (Destination: \Storage	eCard)	
English	< <u>B</u> ack <u>N</u> ext >	Cancel

- Select the destination: *"Internal storage"* if the PLC runtime and PLC project should be stored internally on the device. Select *"Removable drive"* if the PLC runtime and PLC project should be stored on the SD-card and should also be started from the SD-card (also see Chapter 5). Click the button *"Next>*".

🚰 Setup - TargetFirmwareWinCE	
FTP Parameters What are the FTP parameters?	
Please specify the login information and click "Next" t	o continue.
IP Address:	
192.168.0.72	
Username:	
anonymous	
Password:	
guest	
English Kenglish	ck Next > Cancel

- Enter the IP-address of the target device. Continue the setup procedure.
- After finishing the installation restart the device to start the PLC runtime.

Installation to a Removable drive (for operation from SD Card (see Chapter 5):

The installation of the PLC runtime applies directly to the Removable drive (SD card) on the PC.

Required steps:

- Connect the Removable drive to your PC.
- Continue the setup routine on your PC until the following dialog appears.

🛃 Setup - TargetFirmwareWinCE	
Select removable drive Select the root directory of the removable drive	
English	Back Next > Cancel

- Select the Removable drive root in the directory through selecting the disk (disk character).
- Continue with the setup.

🕞 Setup - TargetFirmwareWinCE		×
Select components Which components should be installed?		Ì
Select the components you want to install. Click "Next" when you are ready to continue	e	
Operating System     O Windows CE 5.0 Core     Boot behaviour	OS 2.24.1 (3312)	
<ul> <li>▶ Boorcensylour</li> <li>▶ autoexec.bat</li> <li>▶ PLC Runtime System</li> <li>▶ ▶ PLC V2.4.8</li> <li>▶ ▶ Web Server V2.4.8</li> </ul>		
English www.eaton-automation.com	< <u>B</u> ack <u>N</u> ext > Cancel	

- Select "*Boot behaviour*". **Please note, that the operating system is not selected.** For the installation of the operating system, see Chapter 5.2.
- Click on the button "Next>".
- After completing the installation, put the removable drive back in the device. (The device has to have power off).

- Restart the device to start the PLC-runtime.

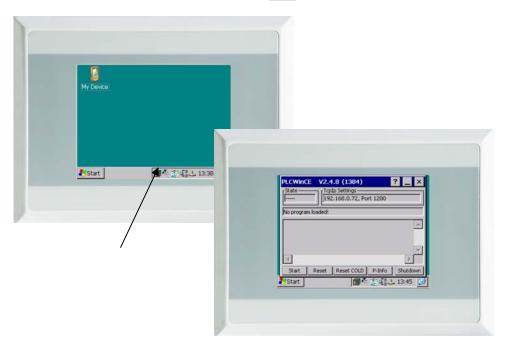
#### Installation to a local Directory:

All files of the PLC runtime will be installed to a local directory on your PC.

Required steps:

- Fully complete setup.
- Copy the whole contents of the directory "...\XV-1xx\" (you can find it in the newly created directory on you PC) manually on the device under \InternalStorage\ or on the SD-card depending on the boot operation type (see Chapter 5)
- Restart the device to start the PLC-runtime.

After successfully installation of the PLC runtime and reboot of the device, a status display for the PLC runtime will appear on the device (after clicking in the taskbar).



If a visualization is already installed on the device and if this visualization hides the status display, you can stop the visualization by pressing the CTRL button of the device.

3.3

# Programming the PLC–Programs with XSoft-CoDeSys-2

**Requirement**: The XSoft-CoDeSys-2 software (CoDeSys) must be installed correctly on your PC and started. On the device the PLC runtime must be installed correctly.

Over menu *File*  $\rightarrow$  *New*, you can start a new project

Before you can start programming you have to select the device type in the Dialog window "Target Setting".

XSoft-CoDeSys-2 - (Untitled)*  File Edit Project Insert Extras Online Window Help	
Target Settings     XI       Configuration:     None       XV-     XV-       XV-     XV-	T
	NE INV BEAD

Please select the target "XV-1xx-V2.3.9 SP2

Target Settings		×
Configuration: XV-1xx-V2.3.9 SP2		
Target Platform Memory Layout Ger	eral Network functionality Visualizati	on]
Elatform: Intel StrongARM	Ţ	
Eirst parameter register (integer):	Last parameter register (integer):	Register for return value (integer):
RO	R3 💌	RO
Intel byte order		
		Default OK Cancel

In the dialog window that appears acknowledge with "OK".

In the following dialog window you can now generate a programming unit. In the shown example the new POU "PLC\_PRG" in the programming language "ST" is generated.

New POU		×
Name of the new POU:	PLC_PRG	ОК
Type of POU	Language of the POU	Cancel
Program	⊂ <u>I</u> L	
C Function <u>B</u> lock	⊂ <u>L</u> D	
C Function	○ FB <u>D</u>	
<u>R</u> eturn Type:	© <u>s</u> fc	
BOOL	• s <u>i</u>	
	© <u>C</u> FC	

After that you can open the POU "PLC\_PRG" in the register "POUs" and write a basic line of code:

hmiCounter:=hmiCounter+1;

🥺 PLC_PRG (PRG-ST)	
0001 PROGRAM PLC_PRG	
0002VAR	
0003END_VAR	
	Þ
0001 hmiCounter:=hmiCounter+1;	
0002	
0003	
0004	
	•

After entering *"hmiCounter:=hmiCounter+1;"* and pressing *"Return"* a dialog window for variable declaration appears. Select the variable type *"INT"* and press OK.

Declare ¥ariable			×
Class VAR Symbol list Global_Variables	Name hmiCounter Initial Value	Ivpe INT	Cancel
Comment:			☐ C <u>O</u> NSTANT ☐ <u>B</u> ETAIN ☐ <u>P</u> ERSISTENT

In the declaration field the variable *"hmiCounter"* is displayed.

😓 PLC_PRG (PRG-ST)	
0001 PROGRAM PLC_PRG	
0002VAR	
0003 hmiCounter: INT;	
0004 END_VAR	
	•
0001 hmiCounter:=hmiCounter+1;	
0002	
0003	
	Þ

Select in the menu *Project*  $\rightarrow$  *Rebuild All* to compile the project. If the test program compiles error free then it is ready to be downloaded.

## 3.4

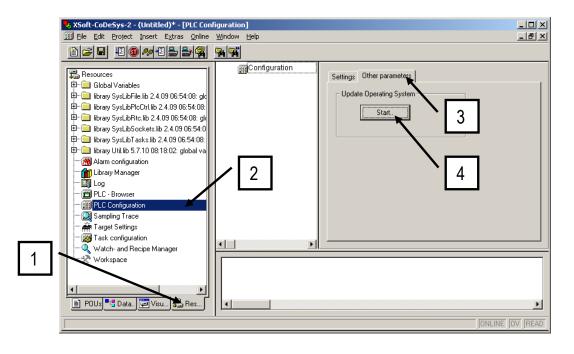
# Installation of the PLC runtime starting out of XSoftCoDeSys-2

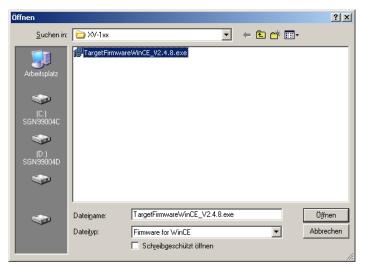
The XV100 devices do not contain the PLC runtime. The PLC runtime can be transferred to the device with the tool "TargetFirmwareWinCE" This tool can be started from the windows environment or from inside the XSoft-CoDeSys-2 development environment (see Chapter 3.2).

### Perform the Installation from the XSoft-CoDeSys-2 Development Environment:

Requirements: The target system in target system setting is correct.

- 1. Change to the register "Resources" in the object organizer window of your XSoft-CoDeSys-2 project
- 2. Select "PLC Configuration"
- 3. Select the register "Other parameters"
- 4. Start the installation of the runtime system by pressing the start button





Select in the following dialog the desired version (min V2.4.8) of the runtime system.

After the start of the setup (by double-click) follow the installation instructions in the dialog. For further explanations, see Chapter 3.2.

## Download of the program to the Device

Select in the menu Online  $\rightarrow$  Communication Parameters and generate a new communication channel (New...).

⊡- 'localhost' via Tcp/Ip	1	1		
	Name	Value	Comment	Cancel
				New
				Remove
	-	-:	eters: New Channel	Gateway .
	Lommu	nication Param	eters: new unannel	
	Name			ОК
		MyPanel		OK Cancel
	Name Device Name	MyPanel e	Info	Cancel
	Name Device Name	MyPanel e		Cancel
	Name Device Name	MyPanel e	Info	Cancel

Select "*TCP/IP (Level 2 Route")* from the possibilities and give the communication connection a name e.g. "MyPanel" and Acknowledge the dialog with *OK*.

Channels		
⊟- <sup>t</sup> locałhost via Tcp/lp └ MyPanel	Top/Ip (Level 2 Route)       Name     Value     Comment       Address     localhost     IP address or hostname       Port     1200       TargetId     0       Motorola byteorder     No	<u>QK</u> <u>Cancel</u> <u>New <u>R</u>emove <u>G</u>ateway <u>U</u>pdate</u>
nmunication Paramete Channels ⊡ Tocalhost' via Top/Ip ⊡ MyPanel	Tcp/Ip (Level 2 Route)           Name         Value         Comment           Address         1921 168.072         IP address or hostname           Port         1200         TargetId         0           Motorola byteorder         No         100         100	X QK Cancel New Remove

Enter in the field "Address" the IPaddress of your device (e.g. 192.168.0.72). To do this you have to double click on "localhost" and put in the IP-address and press the "return-key" to end the input. Acknowledge the dialog with OK.

Make sure that in the menu Online  $\rightarrow$  Simulation Mode is deactivated (no checkmark should be set).

Afterwards you can download the program on the device via *Online*  $\rightarrow$  *Login*. You can start the program with *Online*  $\rightarrow$  *Run*.

To have the PLC permanent on the device, you have to generate a boot project on the device. If this is not done then the program is lost when the power is turned off. To save a boot project on the device, make sure you are logged in (*Online*  $\rightarrow$  *Login*) and then select *Online*  $\rightarrow$  *Create boot project*.

Further topics to the PLC can be found in the helpful documentation to XSoft-CoDeSys-2.

## 3.6 Symbol-File Configuration

The communication between controller and a possible visualization is done over a symbolic address of the variables. To be able to do that a symbol configuration has to be generated. Furthermore the through this process generated symbol file can also be used as a variable import file for the visualization. Through the import of the symbol file in the visualization all generated variables name (symbols) in the PLC are known to the visualization and do not have to be entered again.

The symbol file is used as the basis of communication. The contents of the symbol file are configured in the PLC-development platform. When compiling the symbol file is then generated and when downloading the program to the PLC also the symbol file is downloaded.

Out of performance reasons it is suggested that only variables that are needed in the visualization should be exported to the symbol file. Thus the variable field should be structured. This can be applied as example by defining a global variable area where the variables are separated between variables for visualization and variables that are not used in the visualization.

### Procedure:

In case you have not saved the PLC project yet, save the project via the menu File  $\rightarrow$  Save as... on your PC.

Speichern u	nter		<u>?</u> ×
Spejchern	C Projects	) 🖻 🔶 💌	* 🎟 •
Datei <u>n</u> ame:	MyFirstPlcProgram		<u>S</u> peichern
Datei <u>t</u> yp:	MXpro Projekt (*.pro)	•	Abbrechen
		Lizenzinfo b	pearbeiten

Generation of a new variable list:

- Under the project tree click on the register "Resources".
  - The resource-project tree will open.
- In the resource-project tree open the directory "Resource/Global Variables".

Soft-CoDeSys-2 - MyFirstPLCProgram.pr		
Sile Edit Project Insert Extras Online		_ 8 ×
1 🖆 🖬 📲 🚳 🗫 📲 🚔 🙀	X 🗈 🛍 🙀 🙀	
Image: Second constraints         Image: Second constraints	Coding library 'C:Programme\Gemeinsame Dateien\CAA-Targets\Eaton Automation' Loading librar	W2.3.9 W2.3.9
📄 POUs 🌄 Data 📴 Visua 📰 Reso		
Adds a new object to the list on the left side.	Lin.: 1, Col.: 1 ONLINE	DV READ

Click with the right mouse button the entry "Global Variables" and select "Add Object...".

In the dialog window that appears enter the desired name of the variable list and confirm with pressing OK.

Properties	<u>? ×</u>
Global Variable List	
Name of the global variable list:     HMI_Variables       Link to file	
Import before compile     C Export before compile	
OK	Cancel

Set up the symbol configuration for the symbol file: Ensure that the function "Simulation Mode" in

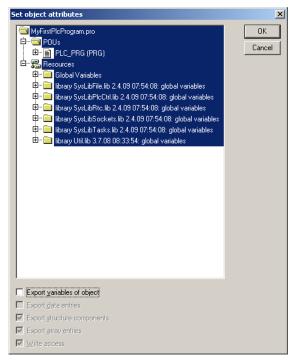
Ensure that the function *"Simulation Mode"* in the menu *"Online"* is not active (no checkmark is to be seen)

-1

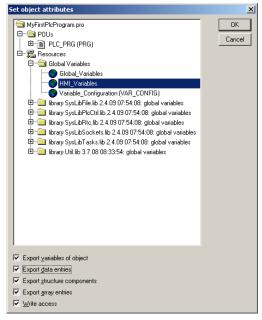
- Click in the menu *Project* → *Options…* and select the category *"Symbol configuration"* and activate the point *"Dump symbol entries"*.
  - With the function "Dump symbol entries" a symbol file will be generated every time the project is compiled.

Category:     Load & Save     OK       User Information     ✓ Dump symbol entries     OK       Editor     Dump ≤ML symbol table     Cancel       Colors     Dump ≤ML symbol table     Cancel       Directories     Log     Source download       Source download     Configure symbol file     Configure symbol file
D atabase-connection Macros

- Define from which objects the variables should be taken to export into the symbol file:
  - Click on the button "Configure symbol file...".
  - In general all objects are selected. That is why you should deactivate for all objects the option *"Export variables of object".*



- In the object tree open the subdirectory "Resources | Global Variables".
- Select the variable list that you would like to export.
- Activate the option "Export variables of object" and confirm with OK.



Confirm the project options with OK.

Allocate the needed variables for the visualization to the global variables specified for visualization:

In the POU-project tree double click on the programming unit in which are the variables that you would like to allocate to the variable list.

Soft-CoDeSys-2 - MyFirstPLCProgram.pro	- [PLC_PRG (PRG-ST)]	- O ×
🎭 Eile Edit Project Insert Extras Online V	<u>V</u> indow <u>H</u> elp	_ 8 ×
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
POUS L PRG (PRG)	0001 PROGRAM PLC_PRG 0002 VAR 0003 hmilCounter: INT; 0004 END_VAR 0000 0001 hmiCounter:=hmiCounter+1; 0001 0002 0003 0004 0005 0006 0006 0006 0006 0006 0006	<u>}</u>
📄 POUs 🍕 Data 💭 Visua 🟭 Reso	Loadinn library 'C IProgrammel Gemeinsame Dateien (CAA-Targets) Eaton Automation	IV7.3 C
<u></u>	Lin.: 3, Col.: 9 ONLINE	OV READ

• Put the cursor in the variable that you would like to allocate.

- Click in the menu Edit → Auto Declare...
  - The window "Declare Variable" will open.
- Select the class, Class", VAR\_GLOBAL".

Declare ¥ariable			×
Class VAR_GLOBAL ▼ VAR_OUTPUT ▲ VAR_IN_OUT VAR_GLOBAL ▼	<u>N</u> ame hmiCounter Initial Value	<u>Ivpe</u> INT	OK Cancel
Comment:	) <u></u> ) <u></u>		☐ C <u>O</u> NSTANT ☐ <u>R</u> ETAIN ☐ <u>P</u> ERSISTENT

Select under "Symbol list" the variables list you would like to allocate to.

Declare ¥ariable			×
Class VAR_GLOBAL	<u>N</u> ame hmiCounter	Type INT	OK Cancel
Symbol list Global_Variables Global_Variables	Initial Value	Address	CONSTANT
HMI_Variables			EETAIN

Confirm the adjustments with OK.

Compile and download the PLC project to the device:

- Click in the menu *Project*  $\rightarrow$  *Rebuild all* to compile the project.
- Click in the menu *Online*  $\rightarrow$  *Login* to log into the device.
- Click in the menu  $Online \rightarrow Run$  to start the PLC project on the device.
- Click in the menu Online  $\rightarrow$  Create boot project to save the project on the device.
- Click in the menu *Online*  $\rightarrow$  *Logout* to log off of the device.
- The performance of visualization (Refresh cycle) can be increased by grouping the individual SPS variables in data structures "Struct" or data fields "array". The data structures and data fields are transferred in a communication package between the XSoft-CoDeSys-2 runtime system and GALILEO runtime system, individual variables are sent in individual packages behind each other.

Further topics to PLC you may find in the helpful XSoft-CoDeSys-2 documentation.

# 3 The first PLC Program

# The first GALILEO Project

4

It consists of a simple application which should show the projecting of the connection of the HMI to the PLC of the touch panel XV100.

Requirements: The GALILEO visualization software must be installed correctly. You can find the current GALILEO software on our homepage (<u>www.eaton-automation.com</u>) under <DOWNLOADS → SOFTWARE → GALILEO>. The XV100 devices are supported from GALILEO version V7.0.3 onward. For unrestricted operation of GALILEO you need a license code. Please contact your sales vendor for this.

# 4.1 Generate new Project

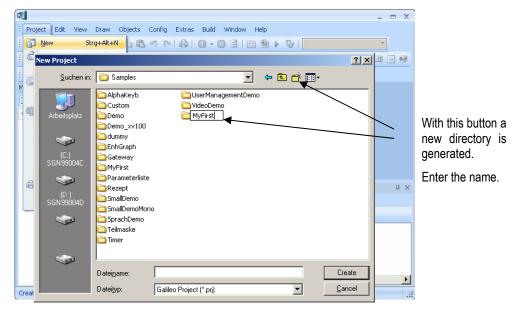
Start the GALILEO software. The first step is to generate a new HMI project.

Menu Project  $\rightarrow$  New.

In the now appearing window "New Project" you should first create a new project directory.

Example : MyFirst

This is used to generate a hierarchical overview when have more than one project.



Hereupon the folder must be opened. Following this you should enter in the input field the desired file name.

Example : MyFirst

## 4.2 Select D

# Select Device

The window "*Panel Selection*" is opened automatically when a new project is generated. It can also be opened via the menu *Config*  $\rightarrow$  *Panel Type* and at a later time edited.

Click "Panel Selection" and select the device type:

Panel Selection		<u>? ×</u>
Filter:		
GALILEO OPEN GALILEO OPEN GALILEO OPEN Color Co	Display Size: Resolution: Portrait/Landscape: Number of Colors: Monochrome: Operating System: Interfaces: CAN Ethernet Local System Port	3.5 " 320 × 240 65536 Windows CE
	OK	Cancel

Confirm the adjustments with OK.

Panel Type	<u>?</u> ×
Panel Type	
Panel Selection	
The project is compatible for following p	anels:
XV-102-B5-35TQR-10	
- Colors	Operating System
65536 💌	Windows CE 5.0
Resolution	Format
X-Resolution: 320	Eandscape
Y-Resolution: 240	C Portrait
,	
	OK Cancel

For the selection field *"Format"* the option *Landscape* is chosen whereby the device will be used in horizontal operation.

# Select PLC

4.3

The window "Select PLC" will also be opened automatically when a new project is generated. It can be opened over the menu Config  $\rightarrow$  Select Communication and edited later.

Depending on the device type CAN, MPI or RS232 different communication types are available. Select under "Add" the communication to the PLC.

The following example uses the integrated PLC as controller type. Also more than one controller can be selected. So that one PLC can be connected over MPI (Onboard) and another one to the internal PLC over *CoDeSys MXpro*. To keep in mind is the different types of addressing the variables.

Select PLC	×	
Firm / Model   Info   PLC Data		
Communication		Selection of
No. Port Board Co Model	Description	integrated
0 Ethernet CoDeSys	M×pro	CoDeSys MXpro
Add Remove Modify	Meta Data	
Status Refresh [s]:	10	
break[ms]:	0	
Startup Delay[s]:	0	
IP Address or Hostname:	localhost	
<u> </u>	<u>Cancel H</u> elp	

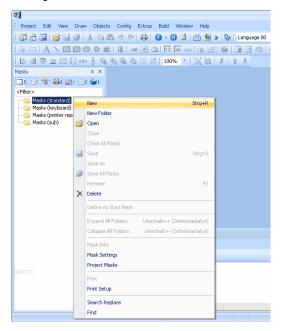
With OK the new project is configured.

the PLC:

### 4.4

### Generate Mask

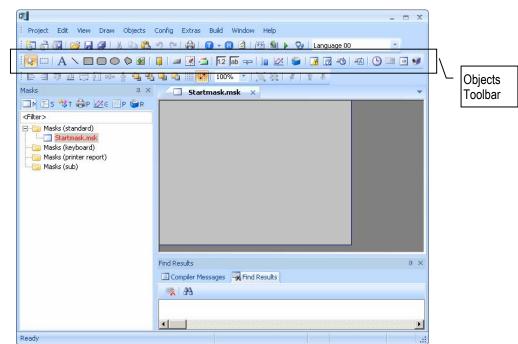
The first step is to generate an empty mask (picture). Register card *Masks, Masks (standard)*  $\rightarrow$  select right mouse button *"New"*.

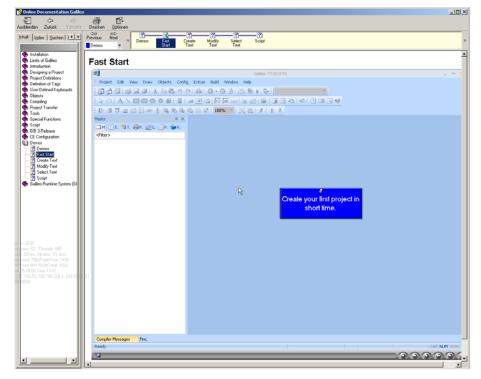


Give the mask a name e.g.: "Startmask".

The mask can be given specific properties like screen saver, colour, type, etc. These can be configured under the sub menu "Mask Settings"

Following this you can insert objects into the mask using the Objects Toolbar. Please use the help-menu to inform yourself about the single objects and their capability.





GALILEO help system with detailed examples and instructions to every object.

As an example you can find under: <Content / Demos / Fast Start> an animated guideline for your first GALILEO project.

## 4.5

### **Generate Variable Structure**

In our small example we are displaying a numeral value of the PLC. For this we must first generate the used variables. This is accomplished over the register card *Tags*.

Tag Import

	A		
Tags		0 	× Startmask.msk ×
(Fiker>	2×	nn   . A tels   Alakura 100 a.m. (* ) kum (* ) kern	
t by byto w wor dw dwo f floa		Kew Tag New Array Dypicate Strot-O Ensure F2	
ab strie −st stru E sy syst	20 60	Cug Grovy Poste Delote	
		Expanditage Unischall++ (Zehnentastahur) Collapse tage Unischall++ (Zehnentastahur)	
		Properties	
	23	Find tag Find/replace address Find/move address Howe address Search StripeF	Find Results a Complex Messages A Find Results A 93

If the integrated PLC is used and the symbol file of the PLC was compiled right the variables names can be imported.

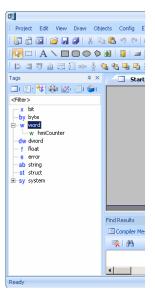
Change to the register card "Tags"; move the mouse cursor to any variable type e.g. "bit" and press the right mouse button. A dialog will open where you have to select "Import".

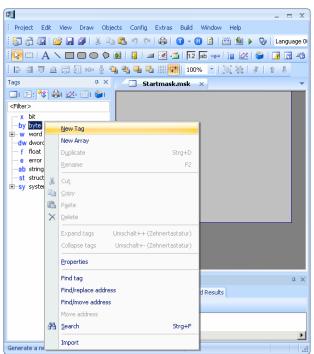
<u>?</u>×

Select the symbol file of the PLC program as the Import file. You can find the symbol file in the same directory where the PLC program is saved on the PC. Confirm the dialog with pressing the "Start" button. Also see Chapter 3.6.

0 CoDeSys MXpro	
Import File	:\MyFirstPlcProgram.SYI ▼
Import in Structure	
Import all tags in this structure:	
Name of structure:	

Through the import of the PLC variable *"hmiCounter"* from Type *WORD* the variable is inserted into the tag list. The green marking of the variable shows that a addressing to the PLC has already occurred.

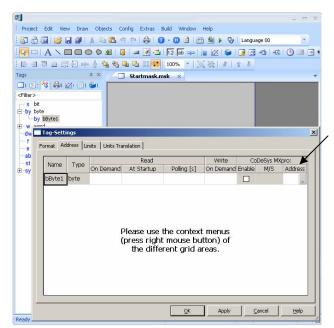




To use variables from another controller type or to use variables without using the import function you have to use the following procedure:

#### E.g. a byte variable:

Position the mouse cursor on the variable type "byte" and press the right mouse button and select "New Tag". Then enter the variable name. Thus the variable is generated but marked blue. The colour blue means that the variable has no address and has possible thus no communication to as PLC. This is how you generate a local visualization variable. With a double click on the variable a Tag Settings window to the variable will open.



In the *Tag Settings* dialog under the register card "Address" you can click on the Address "..." button and enter the address of the PLC. This address depends on the type of PLC selected. If you are communicating to the internal PLC you must also enter the name of the symbol file. (This only applies to global PLC variables.)

<b>11</b>			Galleo 7.0.3(7879	) - myfirst.p	rj*			- = x
: Project Edit View	Draw Obje	ects Config	Extras Build	Window	Help			
i 🗗 👌 🖬 💕 🗖	Tag-Settings	5						x
	Format Addres	ss Limits	Jnits Translation					
응 김 후 교				and	1	140sito	Siemens -	MPI:
Tags	Name T	ype On D	Setting add	ress		?	≥ ple M/S	Address
🗆 ( 🗄 : 🥸 🏟 (	bByte1 by	te	DB%d.DBB%d				-	
<filter></filter>			DB%d.DBB%d MB%d					
— x bit			AB%d					
⊟-by byte by bByte1			EB%d ST%d:DB%d.D	BB%d				
E w word			ST%d:MB%d					
dw dword			ST%d:AB%d ST%d:EB%d					
— f float			-					
e error ab string								
st struct			r					
i sy system								
			Clear Add	ress	Cancel	OK		
		33					11.	
-				_	ov	Analy	1 court	1 114
					ОК	Apply	Cancel	Help

When communicating to another controller the address has to be entered specific to the protocol. In the dialog "Setting address" you can see and select the possible nomenclature needed. According to the desired nomenclature the following input fields for addressing the variables are possible.

Setting address         DB%d.DBB%d         DB       12         .DBB       144         DB12.DBB144	04095	<u>?</u> ×	The displayed example shows the address of a variable for a S7 controller over MPI. The nomenclature of a variable is selected out of the data block of the controller. The address is herewith select as DB12 byte 144.
Clear Address	s Cancel	ок	
[]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]	Draw Objects Config Extras ag-Settings mat Address Limits Units Tra Type On Demand At Star byte 🔀 🔀	nslation	Virite Siemens - MPI: On Demand Enable M/S Address
<pre></pre> <pre>&lt; Filter&gt;</pre>		press right mo	context menus ouse button) of t grid areas.
			OK Apply Cancel Help
Ready			

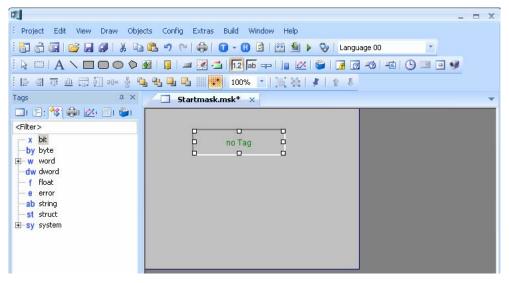
1

After following the address the variable in the variables list is marked green (=addressed).

4.6 Generate Display Object

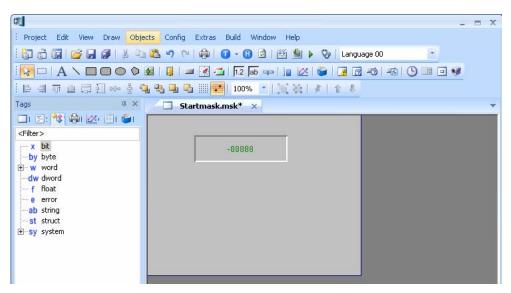
Insert an object of the type "Value Entry / Display" in the start mask:

To do this you have to click in the object list on <u>1.2</u> and then draw via mouse and pressed mouse button the object in the desired size and position on the Startmask.



Through a double click on the new generated object field the property window appears. Select from the Tag list the desired variable and confirm the dialog with *OK*.

Address:	Tag:	w hmiCounter			 🗖 🗖 Delay
Unit:     -dw dword     32767       Uk     -f float     32767       Keyboard:     -e eror     32767       -ab string     -st struct     0       B-sy system     -st struct	Address:				🗖 Double Click
Unit:     - f float     32767       Keyboard:     - e error     32767       - ab string     - 0       - st struct     0		T	r		
	Unit:				32767
	Keyboard:				32767
					0
				Lowert	

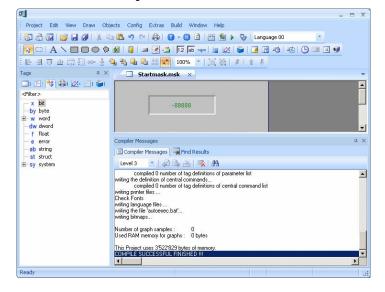


Value Entry / Display object with linked variable. (-88888)

We have finished our small project and now want to go to the next step of the project; compiling and downloading to the device.

#### Compile Project

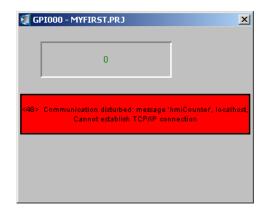
Via the menu *Build*  $\rightarrow$  *Compile* or over the button if the project will be compiled. The compiling procedure is protocolled in a display window. Eventual errors will be displayed red. Through scrolling the detailed error message can then be read.



4.7

# 4.8 Simulate Project on the PC

Via menu *Build*  $\rightarrow$  *Start Project Inspector* or over the button  $\triangleright$  you can start the simulation of the project on your PC.



PC Simulation of the project (*Project Inspector*)

# 4.9 Download Project to the Device

Now the generated project should be downloaded to and started on the device.

#### 4.9.1 Start FTP-Server on the Device

To get a connection between the PC and the device you must start the FTP server on the device. Select on the device: Start  $\rightarrow$  Programs  $\rightarrow$  Communication  $\rightarrow$  FTP Server

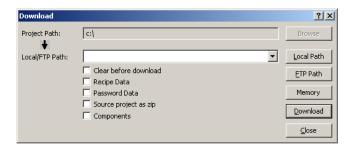
My Device	1				
FTP Server	Communication				_
Remote Server			FTP Server V2.	and the second design of the s	
	Control Panel	My		Stop Hide	
🗆 <u>R</u> un	Nindows Explorer		9 9 Port: 21	Password Settings	
Start	<b>国</b> 本语代上				
			•	•	
			Start F	The figure 12:23	

- The FTP server can also be started automatically when the device is booted. To change the Window CE start up behavior please look in the GALILEO help "Micro Panels with Windows CE Topics".
- → Further information, see Document [2] «MN05010007Z System Description Windows CE».
- → Further information, see Document [3] «MN05010009Z System Description Networks in Brief ».

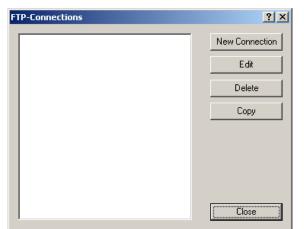
4.9.2

#### Setup FTP Path in GALILEO

To be able to download the project to the device the parameters for the project transfer to the device must be generated. Change to the download dialog via the menu *Build*  $\rightarrow$  *Download (local, FTP)* or over the button



In the window "Download" click on the button "FTP path". The window "FTP Connections" will appear.



Click on "*New Connection*". The window "*Properties : FTP-Connection*" will appear.

Properties: FTP-Connec	tions	<u>? ×</u>
Title :	MyPanel	
Server / IP-Address :	192.168.0.72	
User Name :	anonymous	[
Use Password :		
Path :	\InternalStorage	Browse
	ОК	Cancel

Enter a title, the IP-address of the device and the path for the download to the device. With a click on *"Browse"* you should already find the path of the \InternalStorage of the device. But for this an active connection and the IP-address of the device must exist. Alternatively you can switch to the directory \StorageCard (SD card) (see Chapter 5)

Click on "OK" to save the new parameters.

The connection with its title should now be selectable. Click on the desired connection and confirm with "*Close*".

with " <i>Close</i> ".				
FTP-Connections	?	×		
MyPanel	New Connection			
	Edit			
	Delete			
	Сору			
		The selec	ted ETP nath a	an now be seen
			d "Local/FTP pa	
I	Close			
Demolecul			9 V	1
Download			? ×	
Project Path:	c:\		Browse	
+	· · · · · · · · · · · · · · · · · · ·			
Local/FTP Path:	FTP: MyPanel	<b></b>	Local Path	
	Clear before download		ETP Path	
	Recipe Data		Memory	
	Source project as zip		- Homory	
			Download	
			⊆lose	
				]

#### 4.9.3

#### **Download of a Project**

After the visualization project has been generated and compiled and the target settings have been completed you can now start the project download to the device. For this select the menu *Build*  $\rightarrow$ 

Download (local , FTP) or press the button

The Download dialog appears.

Download		<u>?</u> ×
Project Path:	c:\	Browse
Local/FTP Path:	FTP: MyPanel	<u>L</u> ocal Path
	Clear before download     Recipe Data	ETP Path
	Password Data	Memory
	Source project as zip     Components	Download
		⊆lose

Start the project download over the button "Download". During the project transfer you can see the progress. Eventual you will be asked if you want to also download updates of the operating system or visualization runtime (GRS) over dialogs.

Transfering project
/InternalStorage/appl/fonts/Tahoma.ttf 25%
Cancel

If the project transfer is completed the following dialog will be displayed. Select now "*Start GRS*" (GRS = GALILEO Runtime System) to start the visualization project on the device.

Galileo	×
Project 'myfirst' transfered to /InternalStorage/ !	
Do you want to reboot the HMI panel or restart the Runtime GRS?	
HMI reboot Start GRS Cancel	1.



While the GRS starts status information will be displayed. Following that your designed mask will be displayed.

Display of the start mask from the project *MyFirst*. When the PLC program is started on the device the value must be constantly changing.

If there is no connection to the PLC then a cyclic error message will be displayed with the information which variables are without communication.

	0	_	
	ununication disturbed m		
focally	ed, Cannel establish TCF	MP connection	

# Operation from the Internal Flash or SD-Card

XV100 devices which are equipped with an optional SD-card can optionally operate from internal flash as also from SD-card.

Operation from the SD-card:

- The OS that is stored on the SD-card is loaded
- The runtime for HMI and PLC are started from the SD-card
- The HMI and PLC project is stored on the SD-card

## 5.1

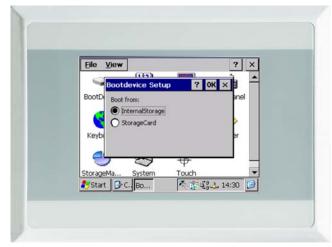
5

Switch between Booting from the Internal Flash or SD-Card

Turn on the power of the device. If an info-window appears after booting, close it.

As soon as Windows CE has booted press the *Start button* and change to the menu *Programs*  $\rightarrow$  *Control Panel.* 





Double-click the icon *"BootDevice"*.

You can select from the following settings:

#### Boot from: InternalStorage

Herewith the device boots from the device internal stored OS. → Further information, see Document [2] «MN05010007Z System Description Windows CE», Chapter «Startup behavior».

#### Boot from: StorageCard

Herewith the device boots from the SD-card stored OS. → Further information, see Document [2] «MN05010007Z System Description Windows CE», Chapter «Startup behavior».

5.2

## Version Change of the Operating System

The operating system of the XV100 is stored on the internal flash memory in delivery condition. The usage of newer function can require a version change of the operating system. In general this is done through the programming software GALILEO or XSoft-CoDeSys-2. GALILEO (from version V7.2.0 onward) checks while downloading a project the operating system version and offers over a dialog a download of a different version of operating system.

Older version of the software such as (Version of GALILEO previous to V7.2.0 or MXpro versions) must not be used for an operating-system download. Exceptions are XV102 3.5" devices.

➔ For a manual change of the operating system, see Document [2] «MN05010007Z System Description Windows CE», Chapter «Startup behavior».

# File Update via SD-Card (Autolaunch)

XV100 devices (OS Version V2.24.0 and upwards) can run an update automatically via an SD card. The SD card must be configured to this end.

In the case of an update-from-file the following functions can be fulfilled:

- Update of the Windows CE OS Version
- Installation or update of the GALILEO and XSoft-CoDeSys-2 runtime software.
- Project installation or update of visualization and SPS projects.
- Installation and update of any files

6

The device recognizes the insertion of an SD card and executes the configuration actions. In order to configure the update, the file AutoLaunch.inf is used. This file also enables configuration of whether the actions should be executed on insertion of the SD card or only on starting the device. For file-update or copying of the files a separate .BAT file is started. In this .BAT file the command-line instructions for the desired actions can be defined.

- → Further information, see Document [2] «MN05010007Z System Description Windows CE»:
  - Chapter« AutoLaunch»
  - Chapter «Extended Copy (ExtCopy)»

We wish you lots of success and fun with your XV100.