

INTERFACE DESCRIPTION

MULTICON Profinet- Schnittstellbeschreibung



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1 About this documentation

This document explains how to use the Profinet interface of the MULTICON and is intended to enable the user:

- Create the necessary prerequisites
- Successfully integrate the MULTICON into the TIA Portal application
- Transfer and display data correctly

Version note

This document was created and tested on the basis of TIA Portal Version V17 with a CPU S7-1200.

2 Certification

Status	: in approval
Protocol	: PROFINET IO (RT)
Class	: CC-A (topology detection possible)
Connection	: Ethernet 1 port, 4-pin,
Single wire	: max.100MB/s
Topology	: Terminal device
Available values	: Process values, diagnostic data, I&M

3 Request

3.1 Wiring, switch

As an end device, the MULTICON does not contain an internal switch.

We recommend the use of Profinet-certified switches.



Caution! Clear network configuration

The device should not be connected directly to an internal company network via an Ethernet cable.

This can result in duplicate IP addresses being assigned, which can lead to long-term faults.

For permanent use, inform the IT department.

The device is only suitable for connection to a defined Profinet.

Before connecting a configured MULTICON to another Profinet, the device name and IP address should first be deleted.

This can be done using the command: Reset Profinet to factory settings in the menu
→ Configuration/MULTICON/Profinet interface menu (alternatively: TIA Portal).

4 Electrical connection

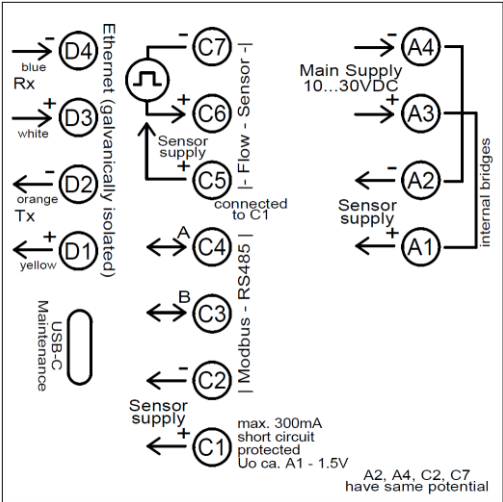


Fig. 4-1: Connection diagram terminal strip A...D

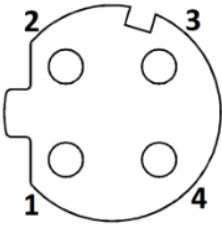


Fig. 4-2: Connection diagram socket M12x1, 4-pin (D-coded)

Terminal	Assignment	Terminal Description
Terminal strip D or connection socket M12 (external): Ethernet connection		
D1 / Pin 1	Tx+ (yellow)	Transceive Data +
D2 / Pin 2	Tx- (orange)	Transceive Data -
D3 / Pin 4	Rx+ (white)	Receive Data -
D4 / Pin 3	Rx- (blue)	Receive Data +

Table 1: Terminal assignment

5 Working with TIA

5.1 Integrating the MULTICON into the TIA hardware catalog

- Menu: Options/Manage general station description files (GSD)
- The required GSDML file can be downloaded from the Internet at www.senseca.com, can be downloaded.
- Select and "install" the GSDML file

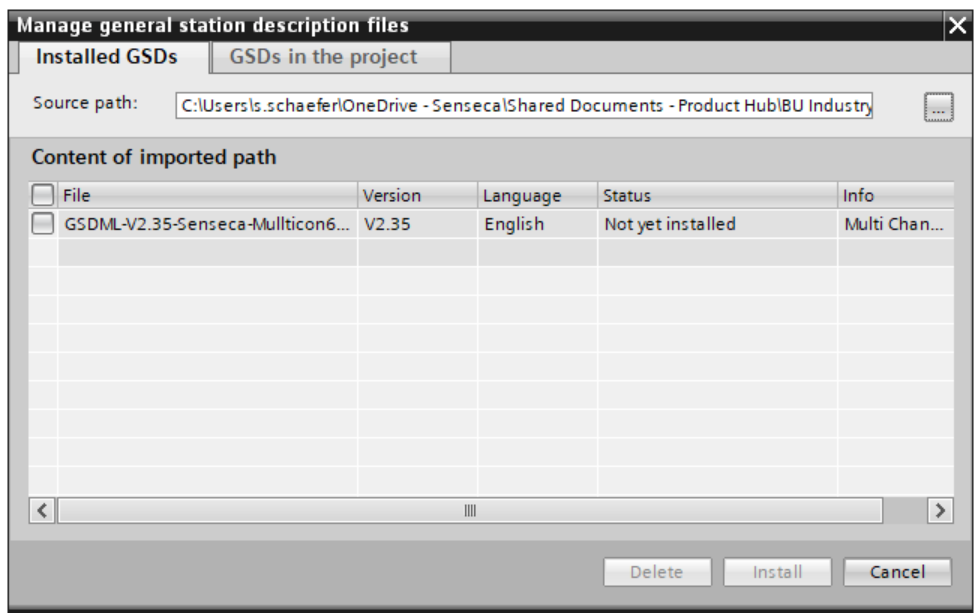


Fig. 1 TIA dialog: Extras - Manage general station description files



Caution! Changes to the GSDML

We accept no liability for subsequent changes to the GSDML file by the user.

5.2 Using the MULTICON in a project

- Drag and drop the MULTICON from the hardware catalog into the
- Devices & Networks interface
- Virtually wire the Ethernet port to your PROFINET controller and enter the Ethernet address data

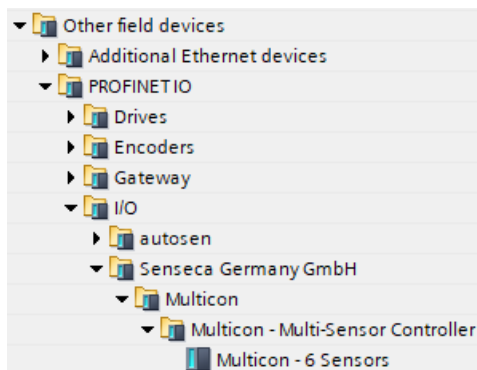


Fig. 2TIA hardware catalog tree view

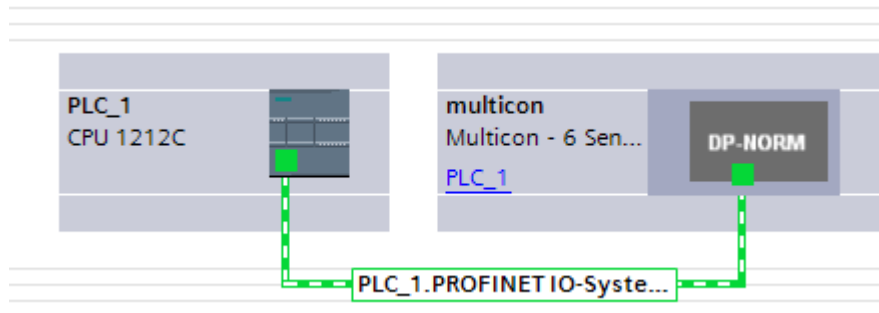


Fig. 3TIA "Devices & networks" window view

- Now adjust the sensors used in the device overview of the MULTICON.
To do this, select a Sensor 1 or Sensor 2, 3, 4, 5 or 6 module from the hardware catalog and drag it to a free slot in the device overview.

The values for the main and secondary measured values and their unit, the status message and the device name are addressed as hardware IO.

Device overview

...	Module	Rack	Slot	I address	Q address	Type	Article...
	multicon	0	0			Multicon - 6 Sensors	000000
	Interface	0	0 X1			multicon	
	RJ45 10/100 MBit/s	0	0 X1 P1			RJ45 10/100 MBit/s	
	Sensor 1_1	0	1			Sensor 1	
	Measure 1	0	1 1			Measure 1	
	Unit 1	0	1 2			Unit 1	
	Measure 2	0	1 3			Measure 2	
	Unit 2	0	1 4			Unit 2	
	State	0	1 5			State	
	Sensor Name	0	1 6			Sensor Name	
	Sensor 2_1	0	2			Sensor 2	
	Measure 1	0	2 1			Measure 1	
	Unit 1	0	2 2			Unit 1	
	Measure 2	0	2 3			Measure 2	
	Unit 2	0	2 4			Unit 2	
	State	0	2 5			State	
	Sensor Name	0	2 6			Sensor Name	
		0	3				
		0	4				
		0	5				
		0	6				

Catalog

Filter

<All>

Head module

Module

Sensor 1

Sensor 2

Sensor 3

Sensor 4

Sensor 5

Sensor 6

Catalog	
Filter	<All>
Head module	
Module	
Sensor 1	
Sensor 2	
Sensor 3	
Sensor 4	
Sensor 5	
Sensor 6	

Fig. 4TIA "Devices & networks / Device overview"

Note

The order of the sensors in the individual slots reflects the arrangement in the MULTICON system, i.e. the display sequence on the process data overview. See also "Bus configuration" in the MULTICON.

The naming of the sensors and actual values originates from the GSDML file and is therefore static. A designation of the measuring points/sensors that can be set on the Multicon can therefore not be displayed here, but can only be determined in the process via the *Sensor Name* variable.

5.3 Device identification

Device identification is possible on the basis of the globally unique MAC address specified ex works.

This means that the device name or IP address does not have to be assigned yet.

The "LED flashing" function can be used for this purpose; the function is signaled via the Ethernet symbol in the MULTICON HMI.

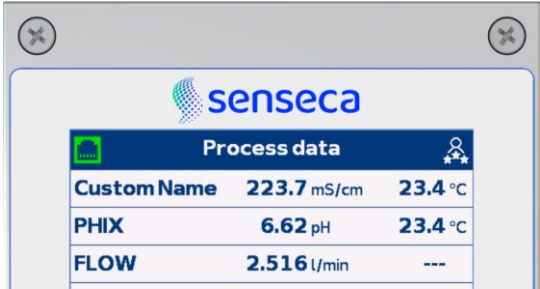


Fig. 5 Ethernet symbol

Icon	Color	Meaning
	Frame white / not filled in	No active Ethernet connection
	Orange	Ethernet connection active
	Flashing orange	Ethernet connection active with LED flashing request via Profinet DCP
	Green	Profinet connection with active cyclic data exchange
	Flashing green	as green with LED flashing request via Profinet DCP
	Red / flashing red	Communication or parameterization error

Table 1 Ethernet symbol legend

5.4 Assigning ProfiNet device names

According to the specifications of the PN user organization, the device names of Profinet devices may only contain certain characters.

According to EN IEC 61158-6-10, the following are permitted:

- Lower case letters "a" to "z"
- Digits "0" to "9"
- Hyphen or period

The device name must not...

- ... begin or end with a hyphen.
- ... begin with the character string "port-xyz" (x, y, z = 0 to 9).
- ... have the form of an IP address n.n.n.n (n = 0 to 255).

Siemens generates a converted name from the device name if non-standard-compatible names are used. Instead of the characters not permitted under Profinet, this name contains a sequence of several control characters (the converted name can also be displayed in TIA).

As the rules used by Siemens for name conversion are not published in full, only the converted name is displayed in the system information of the MULTICON (possibly with limited readability).

If Profinet-compliant device names are assigned, the name is displayed correctly.

Each MULTICON is delivered ex works with the device name "multicon".

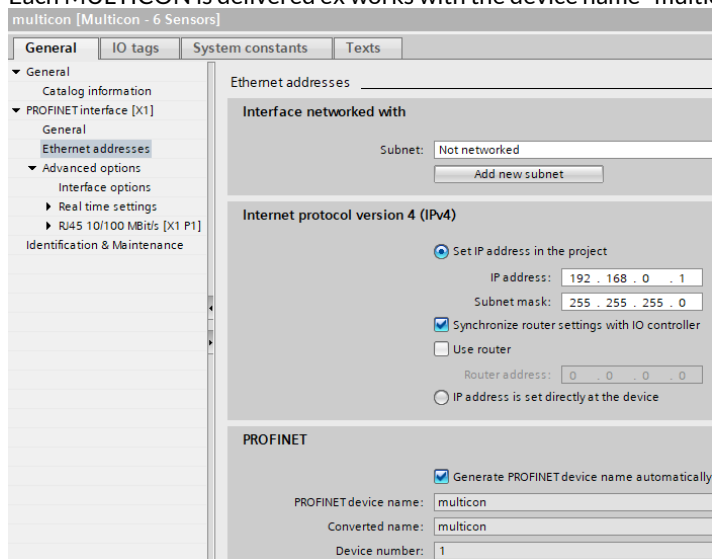


Fig. 6TIA device configuration / Ethernet addresses

Caution! Device names used more than once

It is strongly recommended to change these names in the project.

Otherwise, a failure may occur when connecting a new MULTICON to a system that is already in operation

5.5 Assigning IP addresses

IP addresses can be assigned directly during device configuration.

When "Set IP address in project" is selected, the IP address entered there is automatically checked for uniqueness.

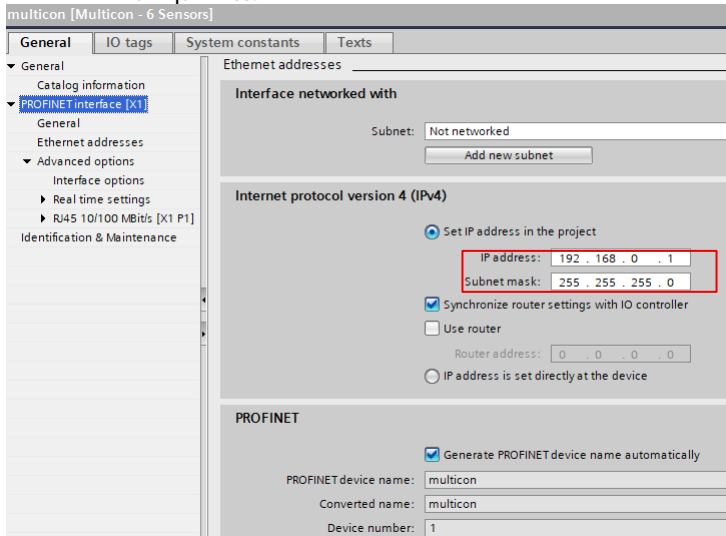


Fig. 7 Device configuration

The IP addresses assigned here are then temporarily assigned by the PLC when the system is started. Any fixed IP addresses (including the IP address 0.0.0.0) are temporarily overwritten. This mode is usually the easiest to handle.

The PLC reassigns the address even if the power supply to the MULTICON is interrupted during the automatic Profinet initialization procedure.

This address is only no longer visible if the MULTICON is started without a PLC connection.

Alternatively, the setting "Adapt the IP address directly from the device" can be selected.

In this case, there is no need to assign a temporary IP.

Although the address cannot then be set on the MULTICON itself, the IP address can be permanently specified, e.g. via online access.

An IP address specified in this way is then static.

There is then a risk of IP addresses being assigned twice.

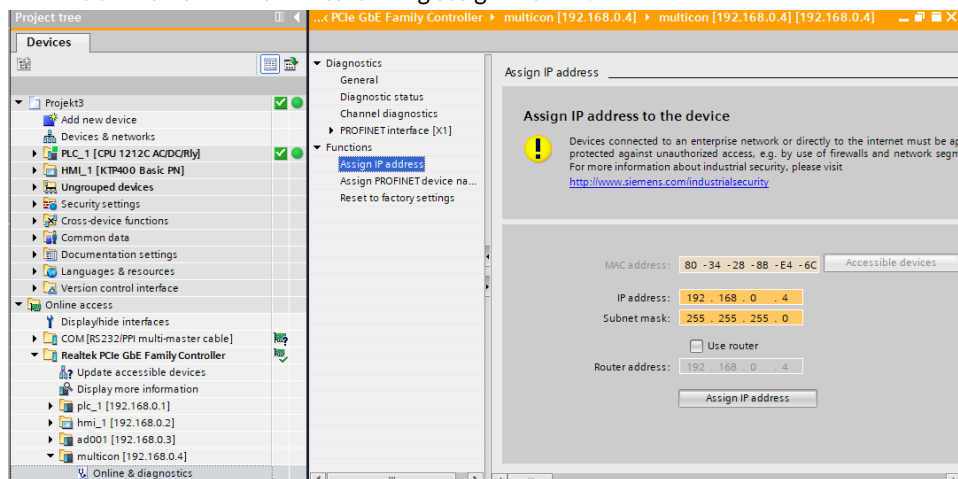


Fig. 8TIA window view Devices / online accesses

The additional option of assigning an IP address via a DHCP server is not enabled.

5.6 Creating a PLC variable

The device overview shows the available values with their hardware addressing. The data type and format can be found in the properties of the respective value.

The values can be assigned to variables as usual.

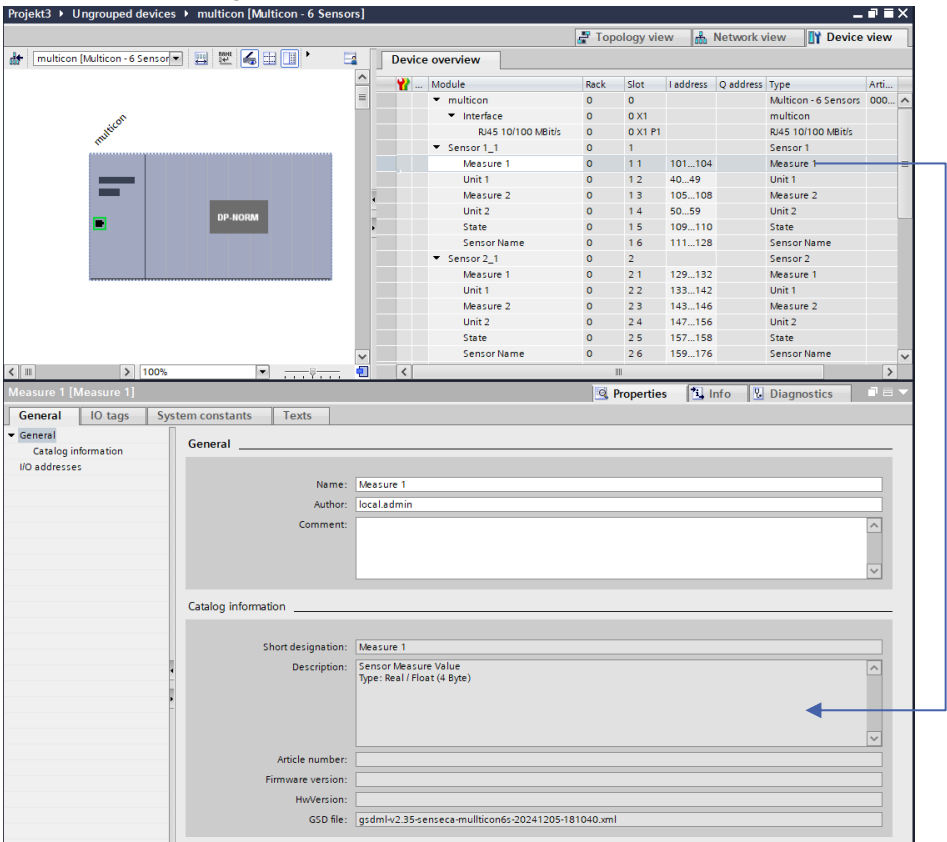


Fig. 9"Devices & networks / Device overview"

Note

TIA assigns the addresses for the first placement in type-related order. For the second placement (up to V20) in chronological order

If chronological addressing is required for use in structure variables, the device can be placed twice and the first placement deleted.

5.7 Cyclical and acyclical data

MULTICON provides the sensor data cyclically according to the following table. The data is independent of the connected sensor type and is therefore universal. Acyclical data is not provided.

5.7.1 Available cyclical data

Name	Name Description	Type	Byte length
Measure 1	Main process value	Real / Float	4 bytes
Unit 1	Unit Main process value	S7-string	10 Byte - Byte 0 max length (8) - Byte 1 actual length - Byte 2..9 text (For string lengths of less than 8 bytes, the string is terminated with ASCII zero)
Measure 2	Secondary process value	Real / Float	4 bytes
Unit 2	Unit Secondary process value	S7-string 2+n Byte	10 byte - Byte 0 max length (8) - Byte 1 actual length - Byte 2..9 text
State	Status bytes Transmission of the enumeration (for assignment, see sensor instructions, status byte)		2 bytes For interpretation, see 5.7.2Assignment of the status bytes
Sensor name	Name of the sensor	S7-string 2+n Byte	18 Byte - Byte 0 max length (16) - Byte 1 actual length - Byte 2..17 text (For string lengths of less than 16bytes, the string is terminated with ASCII zero)

Table 2Available cyclic data

5.7.2 Assignment of the status bytes

The assignment depends on the sensor, see also the operating instructions for the respective sensor.

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Hex
No error	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000
Underflow Process value																1	0001
Overflow Process value															1		0002
Underflow Temperature														1			0004
Overflow Temperature													1				0008
Electronics Temperature												1					0010
Internal Auxiliary voltage											1						0020
Compensation										1							0040
Sensor break									1								0080
Short circuit								1									0100
Clock not set							1										0200
Error Calibration timer					1												0400
Calibration expired				1													0800
UART Noise			1														2000
Fatal mistake	1																8000

Table 3 Assignment of the status bytes

5.8 Identification & Maintenance

The MULTICON supports the data blocks IM0...IM4, which can be accessed via the function blocks RDREC and WRREC.

Alternatively, a definition via the TIA portal in the device configuration is also possible.

Note

Requires that the setting "Download data for identification & maintenance (I&M)" is activated in the TIA settings "Hardware configuration/overwrite & download".

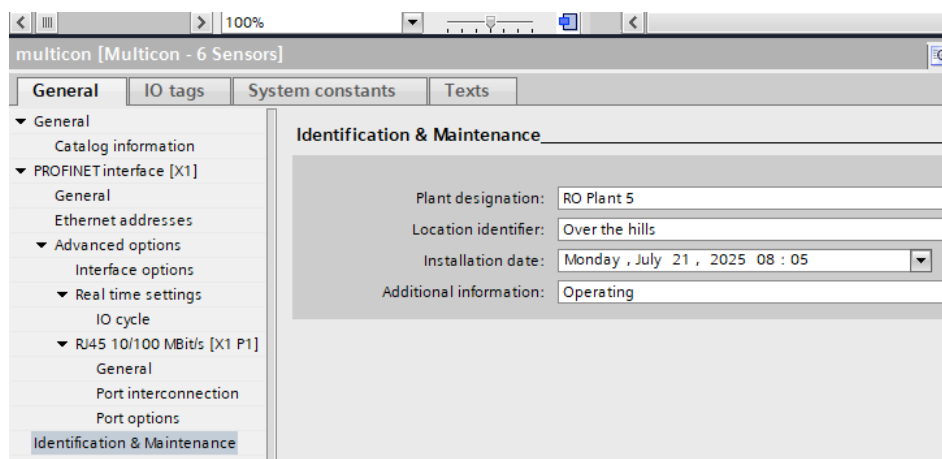


Fig. 10 TIA window view "Device configuration / Identification & Maintenance"

The information used there can also be transferred to the connected IO devices via the *Download to device* function for the PLC.

It should first be ensured that the PLC software is up to date.

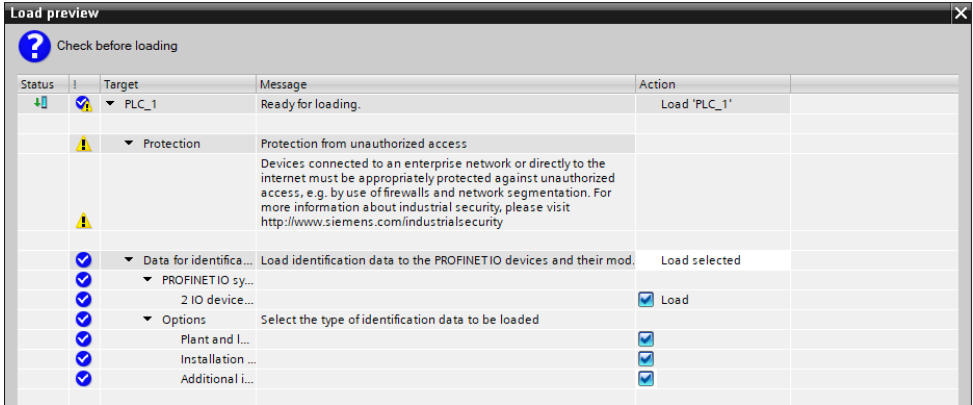


Fig. 11 "Download to device" dialog

The I&M entries can then be checked via the Online&Diagnosis function under Online accesses for the individual Profinet devices.

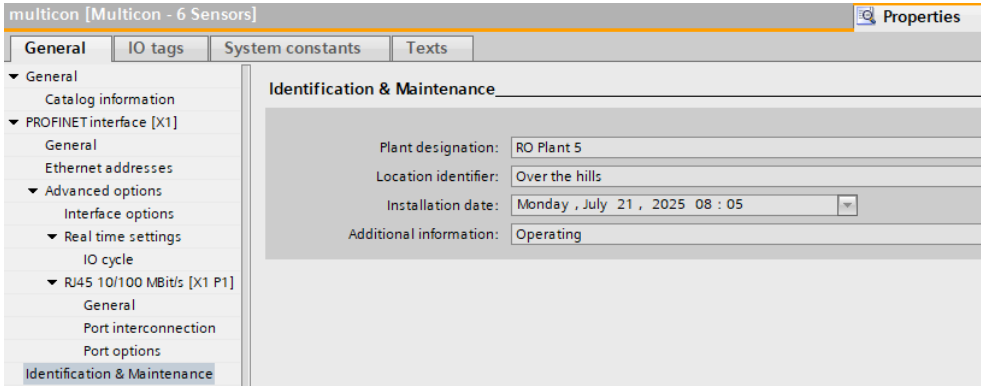


Fig. 12 TIA window view Devices / Online accesses / Online & diagnostics

With online access to the entire project, however, the TIA portal does not display the I&M1...4 data of GSD devices.

Notes

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