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UR67-PN-HP-8IOL-12-60M

Quick Start Guide for configuration of UR67-PN-IO-Link master

Abstract:

This Quick Start Guide shows the configuration procedure of a topGUARD station via IO-Link with acyclic data. For this the Weidmueller UR67-PN-HP-8IOL-12-60M IO-Link master is used. This can be done either by using a Siemens PLC in TIA Portal and for PLC without acyclic data, TMG tool can be used.

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Hardware reference

No.	Component name	Article No.	Hardware / Firmware version
1	TGD FIM-C	2625000000	-
2	PRO COM IO-LINK	2587360000	-
3	TGD ELM	-	-
4	Dragline Cable, PROFINET, M12 D-Code	1044470030	-
5	UR67-PN-HP-8IOL-12-60M	2426260000	-
6	Siemens PLC	-	-
7	M12 A-coded socket 3-pole cable with one open end for the IO-Link connection	-	-

Software reference

No.	Software name	Article No.	Software version
1	TIA Portal	-	V15
2	TMG Tool	-	-

File reference

No.	Name	Description	Version
1	-	-	-

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Content

1 Warning and Disclaimer

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In order to protect equipment, systems, machines and networks against cyber threats, it is necessary to implement (and maintain) a complete state-of-the-art industrial security concept. The customer is responsible for preventing unauthorized access to his equipment, systems, machines and networks. Systems, machines and components should only be connected to the corporate network or the Internet if necessary and appropriate safeguards (such as firewalls and network segmentation) have been taken.

2 Setup

2.1 Hardware Setup
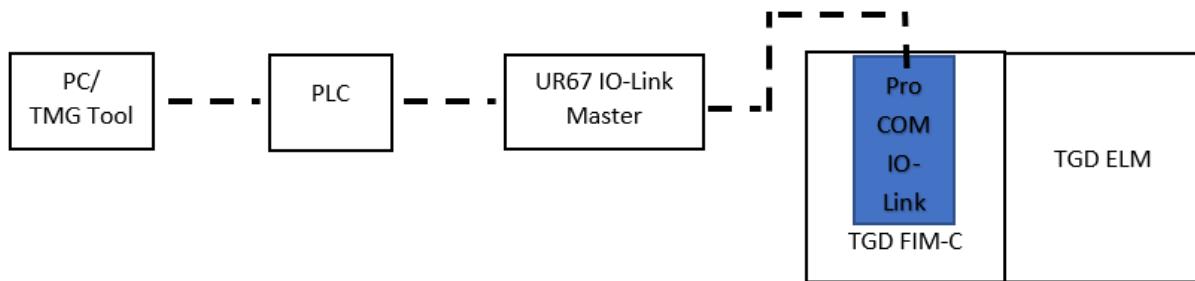
2.2 Pro COM IO-Link Module

▶ For communication to topGUARD the device ID **must be** set to 2 (ID 1 is for ProTOP).

Caution:
Switch off the supply voltage of the communication module before you set a new value to the rotary switch. The setting is correct when the LED "ON/Fail" is blinking slow green and the "IOL State" is blinking green.

LED "ON/Fail"	Operational status
off	not in operation
green slow blinking [1]	normal operation
green fast blinking [2]	initialisation of communication between base unit and communication device
red slow blinking [1]	communication error between base unit and communication device
red fast blinking [2]	error in the communication device

1) Duration ≥ 6 s with f = 1.5 Hz, D = 50 %
2) Duration ≥ 6 s with f = 13 Hz, D = 50 %

LED "IOL State"	Operational status
off	not in operation
green blinking	normal operation with IO-Link communication running
green	normal operation without IO-Link communication

3 TIA Portal

3.1 Start behavior

This part explains how the Process works with a Siemens PLC.

   1) Install the actual **GSDML** file for the UR67-PN-HP-8IOL-12-60M in the TIA Portal.

The **GSDML** file can be found in the Online Catalogue in the download section of the Product.

   2) To Install go to **Options-> Manage general station description files.**
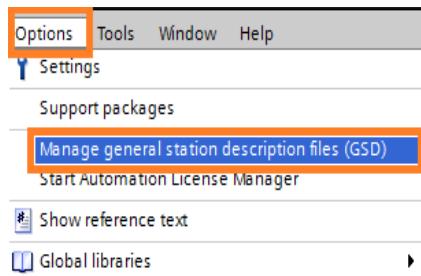
   3) If the **GSDML** file was installed successfully, then the IO-Link master can be connected to the PLC.
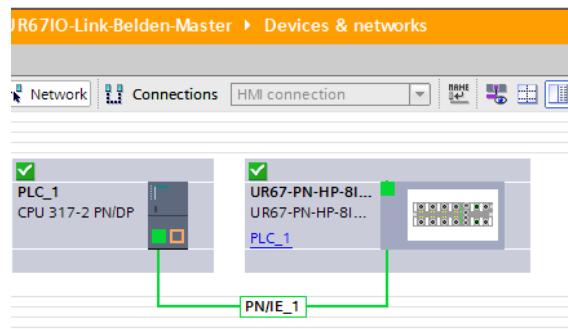
4) In the "Device Overview" the corresponding channel (where the PRO COM IO-Link is connected) **must be** set as an IO-Link channel.

▶ For doing this, delete the digital input from the slot and place one of the IO-Link submodules from the hardware catalogue.
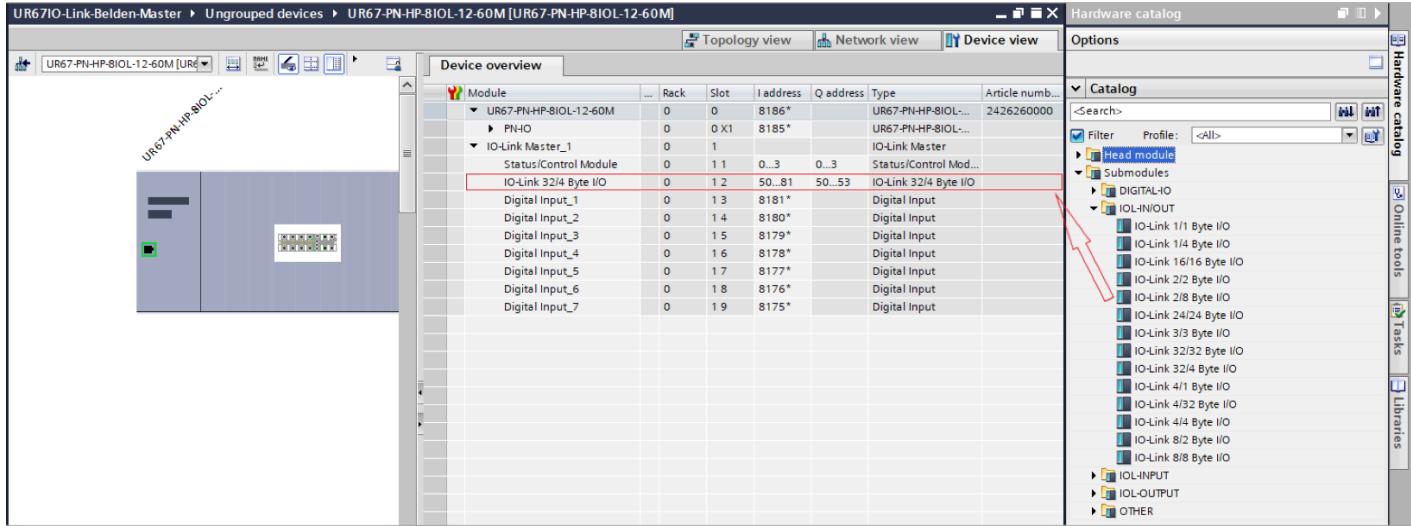
3.2 PLC

When hardware setup is done, you can now start creating a program to access the data of the connected IO-Link device. IO-Link data is divided into Cyclic process data and Non-Cyclic parameter data or Non-Cyclic device data.

3.3 Process Data

▶ To read or write process data, you first need to find out the address range of the UR67-PN-HP-8IOL-12-60M module.

The total process data length for PRO COM IO-Link in combination with topGUARD is 32 Bytes of Input data and 0 Bytes of Output data.

In this case the following addresses for the IO-Link process data are valid:

- Input address –> 50…81
- Output address -> 50…53 (not used)

Based on these addresses you can start to create Tags.

🔧 Module	...	Rack	Slot	I address	Q address	Type	Article number
▼ UR67-PN-HP-8IOL-12-60M		0	0	8186*		UR67-PN-HP-8IOL-12-60M	2426260000
▶ PN-IO		0	0 X1	8185*		UR67-PN-HP-8IOL-12-60M	
▼ IO-Link Master_1		0	1			IO-Link Master	
Status/Control Module		0	1 1	0…3	0…3	Status/Control Module	
IO-Link 32/4 Byte I/O		0	1 2	50…81	50…53	IO-Link 32/4 Byte I/O	
Digital Input_1		0	1 3	8181*		Digital Input	
Digital Input_2		0	1 4	8180*		Digital Input	
Digital Input_3		0	1 5	8179*		Digital Input	
Digital Input_4		0	1 6	8178*		Digital Input	
Digital Input_5		0	1 7	8177*		Digital Input	
Digital Input_6		0	1 8	8176*		Digital Input	
Digital Input_7		0	1 9	8175*		Digital Input	

▶ Please refer the Register Description in the topGUARD manual.

4.1 Process data in

No. of top Guard Fuse	Parameter	Type	Bit-Off-set	Length [Bits]	Comment/ Description
N=31	TGD-ELM Load Alarm Warning	Bool	127	1	See below!
	TGD-ELM Load Pre-Warning	Bool	126	1	See below!
	TGD-ELM Short Circuit Switch Off	Bool	125	1	See below!
	TGD-ELM Device Failure	Bool	124	1	See below!
...	TGD-ELM Load Alarm Warning	Bool	...	1	See below!
	TGD-ELM Load Pre-Warning	Bool	...	1	See below!
	TGD-ELM Short Circuit Switch Off	Bool	...	1	See below!
	TGD-ELM Device Failure	Bool	...	1	See below!
N=2	TGD-ELM Load Alarm Warning	Bool	7	1	See below!
	TGD-ELM Load Pre-Warning	Bool	6	1	See below!
	TGD-ELM Short Circuit Switch Off	Bool	5	1	See below!
	TGD-ELM Device Failure	Bool	4	1	See below!

Table 1: Process data in for topGuard IO-LINK

The process data begins with the ELM module that has the highest address, meaning that the first byte contains module 31 and 32 and the last byte contains the module 1 and 2.

TGD-ELM Device Failure(31)	Bool	%I50.0		☑	☑	☐ FALSE	
TGD-ELM Short Circuit Switch Off(31)	Bool	%I50.1		☑	☑	☐ FALSE	
TGD-ELM Pre-Warning(31)	Bool	%I50.2		☑	☑	☐ FALSE	
TGD-ELM Load Alarm Warning(31)	Bool	%I50.3		☑	☑	☐ FALSE	
TGD-ELM Device Failure(32)	Bool	%I50.4		☑	☑	☐ FALSE	
TGD-ELM Short Circuit Switch Off(32)	Bool	%I50.5		☑	☑	☑ TRUE	
TGD-ELM Pre-Warning(32)	Bool	%I50.6		☑	☑	☐ FALSE	
TGD-ELM Load Alarm Warning(32)	Bool	%I50.7		☑	☑	☐ FALSE	
TGD-ELM Device Failure(1)	Bool	%I65.0		☑	☑	☐ FALSE	
TGD-ELM Short Circuit Switch Off(1)	Bool	%I65.1		☑	☑	☑ TRUE	
TGD-ELM Pre-Warning(1)	Bool	%I65.2		☑	☑	☐ FALSE	
TGD-ELM Load Alarm Warning(1)	Bool	%I65.3		☑	☑	☐ FALSE	
TGD-ELM Device Failure(2)	Bool	%I65.4		☑	☑	☐ FALSE	
TGD-ELM Short Circuit Switch Off(2)	Bool	%I65.5		☑	☑	☐ FALSE	
TGD-ELM Pre-Warning(2)	Bool	%I65.6		☑	☑	☐ FALSE	
TGD-ELM Load Alarm Warning(2)	Bool	%I65.7		☑	☑	☐ FALSE	

Download the Project to the PLC. After switching to the Online view, you should see the current process data values.

3.4 Parameter

1) Install the IO_LINK_DEVICE function block.

To read or write Non-Cyclic data Siemens provides a function block called "IO_LINK_DEVICE" which is part of the Siemens IO-Link library, available on their website.

https://support.industry.siemens.com/cs/document/82981502/acyclic-read-and-write-with-the-io-link-library?dti=0&lc=en-WW

▶ If you use a PLC without acyclic communication, you may skip this step and go to Chapter 4 (TMG Tool).

2) If the Library is installed successfully, then you can drag the IO_LINK_DEVICE function block from the Library into the "Program blocks" folder of the project tree.
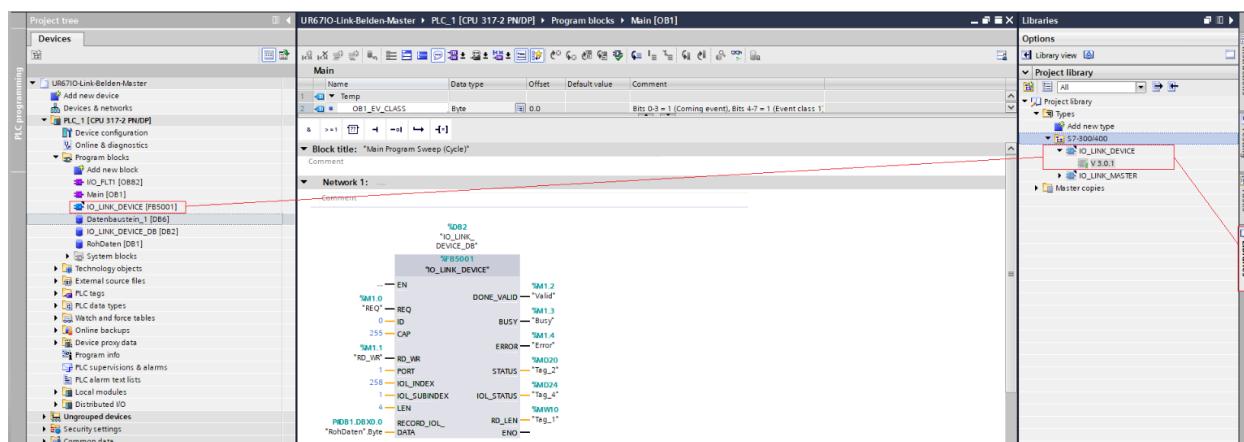
Example for reading Parameter

A description of the index and its length can be found in the topGUARD manual under "IO-Link Addressing & Register Description".

> The ID depends on the PLC, for 1200/1500 use the Hardware identifier and for 300/400 use value of the logical address of the input process data of the "Status/Control module" slot. In this example the ID is 0x00.
>
> The CAP depends on the IO-Link master, for the Weidmueller UR67 master use "255" and for UR20-4COM-IO-Link Module "227"
>
> The data is written to an DB which contains an Array of Bytes, in this example to Record_IOL_DATA.

3) The Output Voltage is read, and, in this case, it is 23,62V.

1	"RohDaten".Byte[0]	%DB1.DBB0	DEC	0	☐	
2	"RohDaten".Byte[1]	%DB1.DBB1	DEC	0	☐	
3	"RohDaten".Byte[2]	%DB1.DBB2	Hex	16#09	☐	
4	"RohDaten".Byte[3]	%DB1.DBB3	Hex	16#3A	☐	
5	"Byte1+2"	%MW50	Hex	16#0000	☐	
6	"Byte3+4"	%MW52	DEC	2362	☐	

3.5 System Commands

The system commands can be written with the IO_LINK_DEVICE_DB.
Follow these steps:

1) The values for the command must be set to the Bytes in the RECORD_IOL_DATA DB.
2) Change the value at the LEN interface depending on the number of Bytes which are used
3) Set RD_WR to TRUE.
4) Finally, write process is performed by triggering REQ.
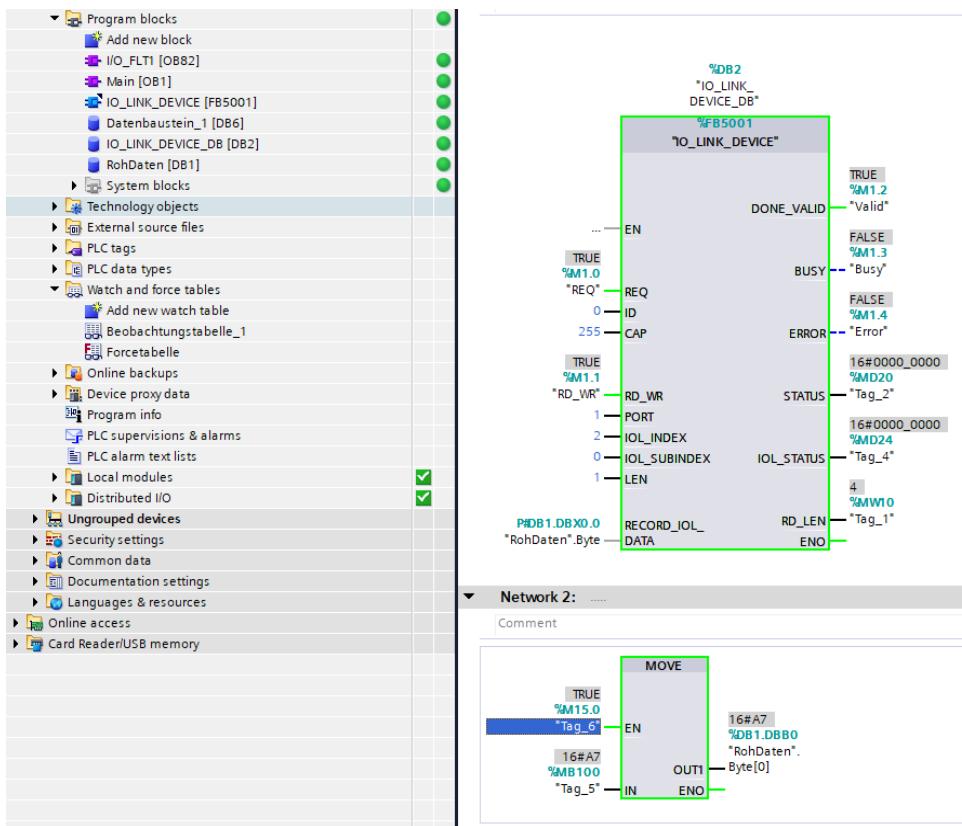
In the example, a CIOL Restart Command 167(0xA7) is performed.

Table 3: System Commands for top Guard IO-LINK		
Command Name	**Command Number**	**Comment/ Description**
Combi Restart Command	160	After the CIOL device gets the command it executes a soft restart the following steps are executed. (1) Soft restart of all TGD-ELMs (2) Soft restart of the FIM (3) Soft restart of the CIOL
FIM Restart Command	161	After the FIM device gets the command it executes a soft restart.
FIM Set Factory Default Command	164	After the FIM device gets the command it configures its parameters to the defined default values.
CIOL Restart Command	167	After the CIOL device gets the command it executes a soft restart.
CIOL Set Factory Default Command	168	After the CIOL device gets the command it configures its parameters to the defined default values.

3.6 Events

To read events the RDREC DB and the OB82 are needed.
When an event occurs, the OB82 is executed. Here a bit can be set to true for triggering the REQ of the RDREC:
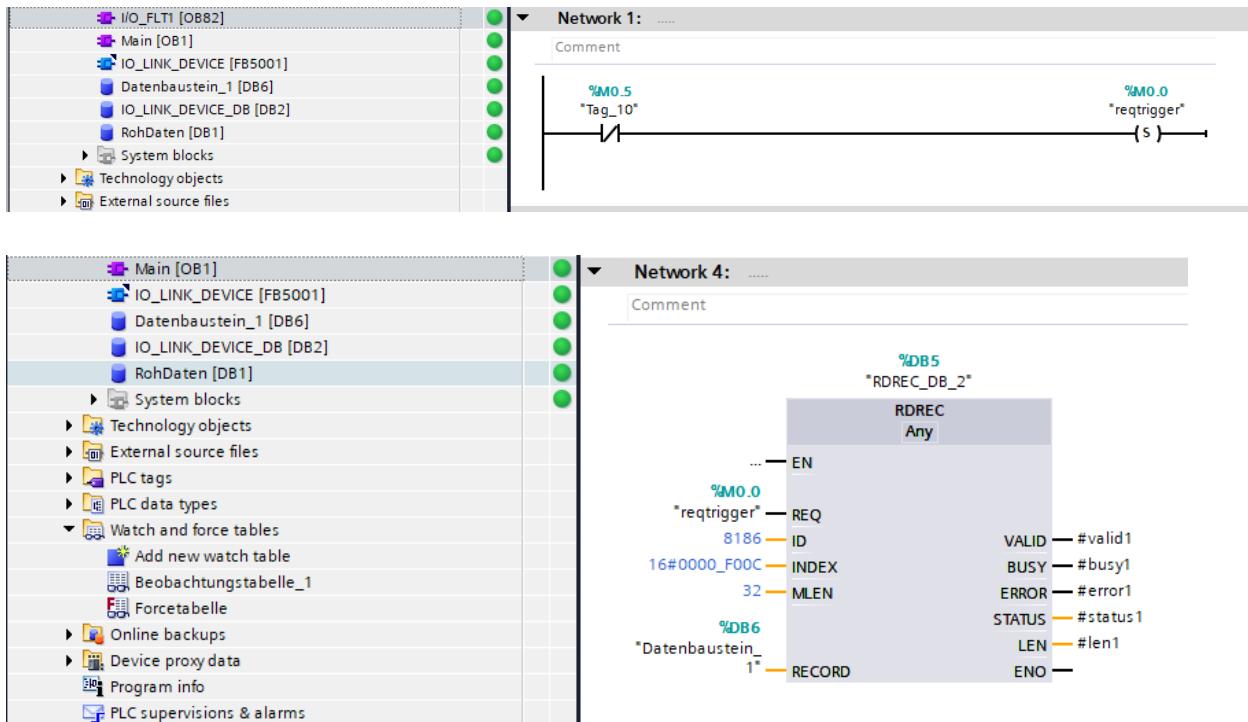
The ID is the Start address of the Diagnostics address for slot 0 of the UR67 IO-Link master.
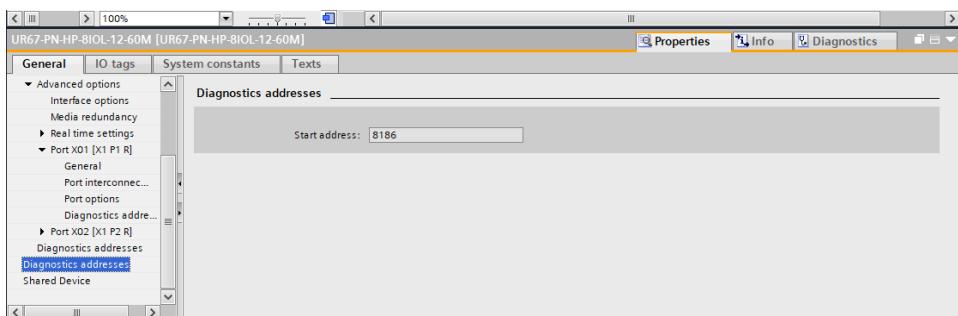
The INDEX must be set on 16#0000_F00C if the UR67-IO-Link master is used and MLEN could be set to 30.
After the RDREC was executed, the event codes can be found in byte 29 and 30.

In this sample the third TGD-ELM is switched on.

	36064 + N-1	Information	Singleshot	1 bit	Signals, that the TGD-ELM State of the corresponding ELM device is switched to " device on"
TGD-ELM <N> - On					Switch to state "device off" via push button or after start up regarding to the "TGD-ELM State Select" configuration.

4 TMG Tool

Start with importing the Master Description files.

1) Click on "Options"
2) Click on "Import IOLM"
3) Choose the needed master files.
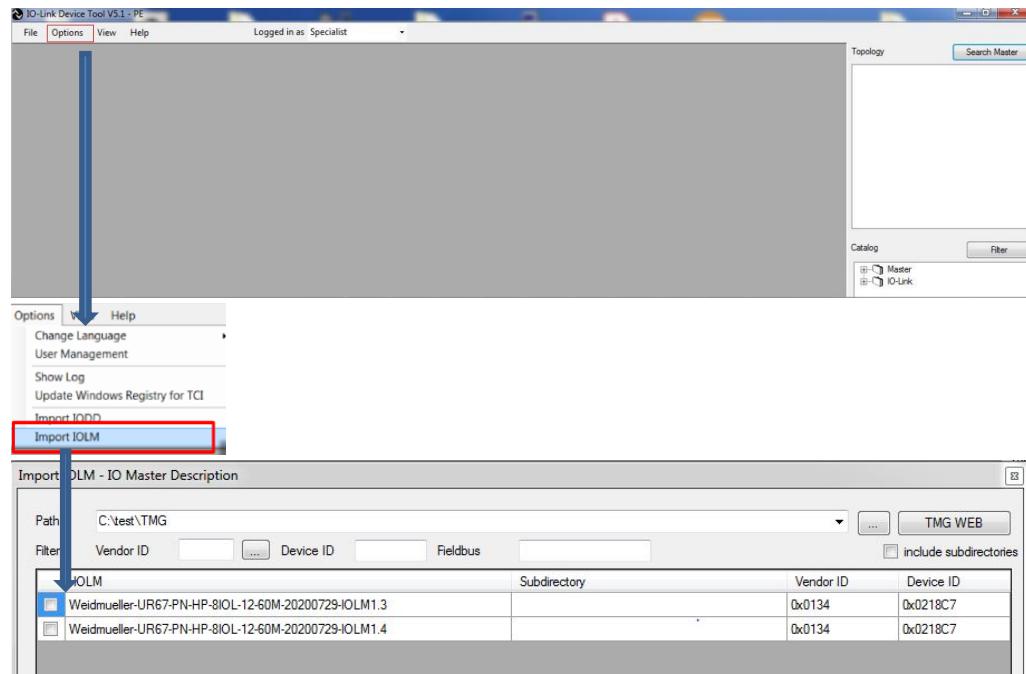
4) Import the IO-Link Device Description

The IODD can be found in the download area under the PRO COM IO-LINK in the Online Catalogue.

▶ Make sure that an IP address is assigned to the UR67 master.

5) Click on "Search Master" to search for IO-Link masters in the network.
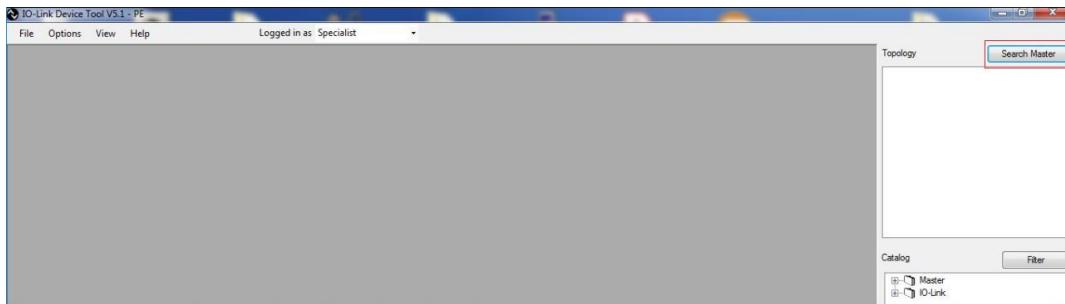
IO-Link master should be shown with the correct description.

6) Double click on the master to open the control view of the master.
Following window should be visible.
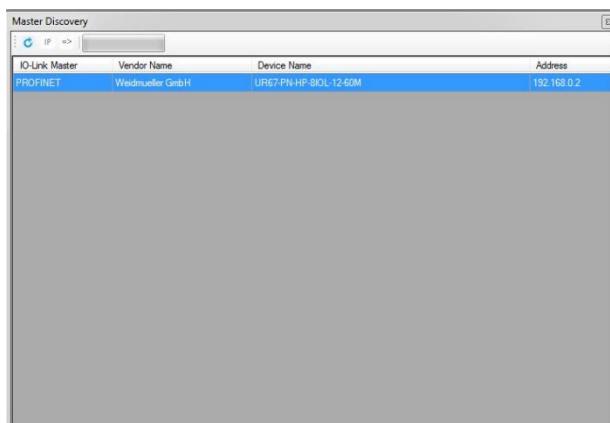

7) Click on "Port Config".
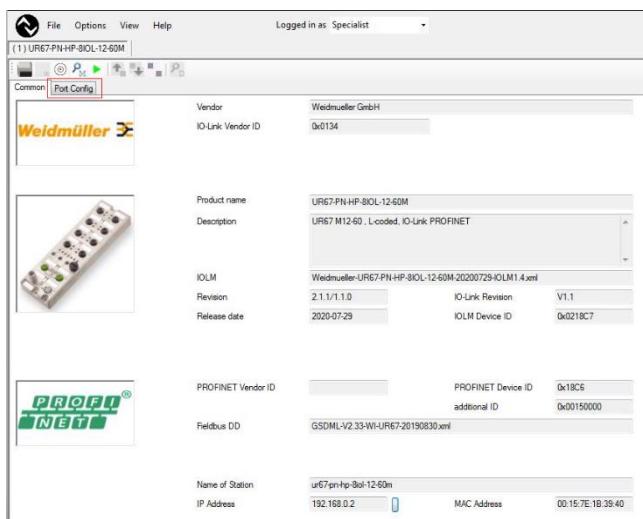
8) To go online click on the green triangle.
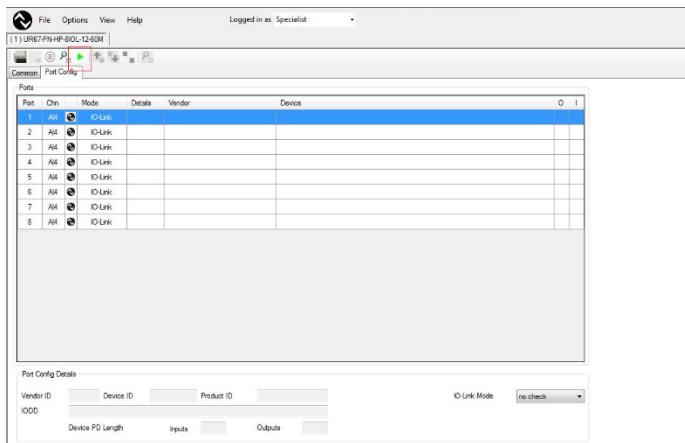
After having clicked on a port that is used, you should see the connected device, in this case topGUARD.

9) Select topGUARD and click on "Exit".
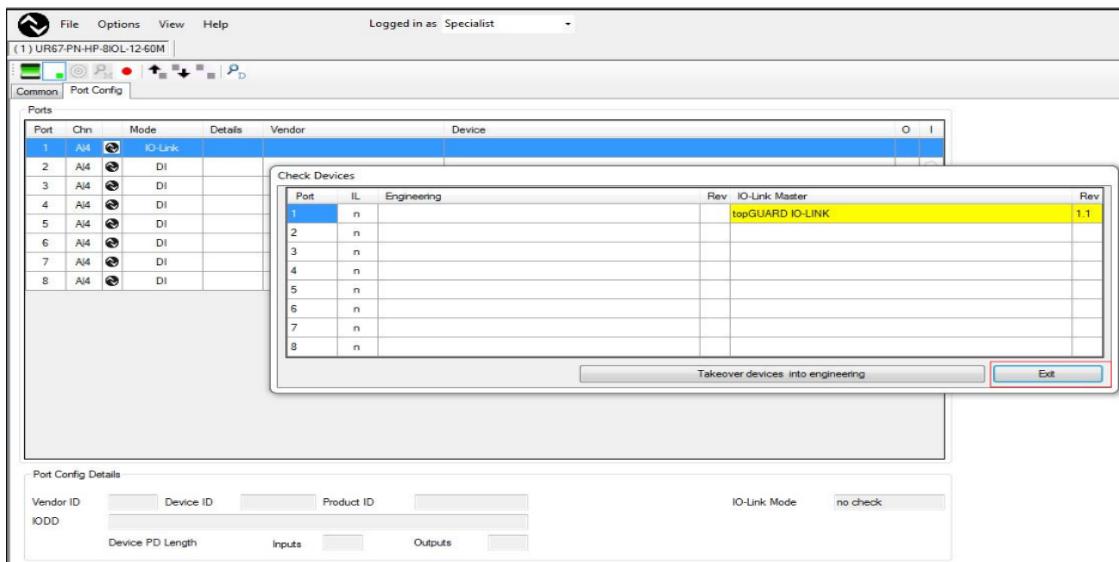
10) Now the parameters which are present in the IODD of topGUARD can be edited and transferred to the device.