Your Global Automation Partner



excom I/O System Integrating the excom System in DeltaV

Integration Manual

Hans Turck GmbH & Co. KG | T +49 208 4952-0 | F +49 208 4952-264 | more@turck.com | www.turck.com



Contents

1	About Thi	s Manual	5
	1.1	Target groups	5
	1.2	Explanation of symbols used	5
	1.3	Other documents	6
	1.4	Feedback about these instructions	6
2	Notes on t	the System	7
	2.1	System identification	7
	2.2	Manufacturer and service	7
3	For Your S	Safety	8
	3.1	General safety notes	8
	3.2	Notes on Ex protection	8
4	Integratin	g the excom System in DeltaV via PROFINET	9
	4.1	Requirements	9
	4.1.1	Requirements – hardware	9
	4.1.2	Requirements – software	10
	4.2	excom – assigning the IP address and PROFINET name	10
	4.2.1	Accigning a DPOEINET dovice name	10
	4.2.2		1 1 1 2
	4.5	Creating an GSDML me	12
	4.4	Creating an excom station	15
	4.5	Setting up the Deltav controller	10
	4.6	Connecting the excom station to a virtual PROFINET card	20
	4.7	Setting excom PROFINET parameters	34
	4.8	Parameterizing excom communication	35
	4.9	Parameterizing excom modules	37
	4.9.1	Example: DM80	3/
	4.9.2	Example: DO40	39 40
	4.9.4	Example: AOH40	42
	4.10	Configuring I/O data	43
	4.11	PROFINET diagnostics	49
5	Redundar	ncy Strategies	51
	5.1	Topology	51
	5.2	Redundancy setup	51
	5.3	System redundancy	52



1 About This Manual

This manual describes the integration of the excom system in the DeltaV control system via PROFINET.

Read this manual and the applicable documents carefully before the integration. This will prevent the risk of personal injury and damage to property. Keep this manual safe during the service life of the product. If the product is passed on, hand over this manual as well.

The manual describes the possibilities for the GSDML-based integration, from the installation of the GSDML right through to the handling of the I/O data and the associated diagnostics. Other applications of the excom system are described in addition to the general integration:

- Setting up redundancy
- Changing parameters during operation
- Changing configurations during operation

1.1 Target groups

These instructions are written for suitably qualified and trained personnel and must be read carefully by anyone entrusted with the mounting, commissioning, operation, maintenance, disassembly or disposal of the device.

When using the device in Ex circuits, the user must also have an additional knowledge of explosion protection (EN 60079-14 etc.).

1.2 Explanation of symbols used

The following symbols are used in these instructions:

	DANGER DANGER indicates a dangerous situation with high risk of death or severe injury if not avoided.
	WARNING WARNING indicates a dangerous situation with medium risk of death or severe in- jury if not avoided.
	CAUTION CAUTION indicates a dangerous situation of medium risk which may result in minor or moderate injury if not avoided.
!	NOTICE NOTICE indicates a situation which may lead to property damage if not avoided.
i	NOTE NOTE indicates tips, recommendations and useful information on specific actions and facts. The notes simplify your work and help you to avoid additional work.
	CALL TO ACTION This symbol denotes actions that the user must carry out.
⇔	RESULTS OF ACTION This symbol denotes relevant results of actions.

1.3 Other documents

Besides this document the following material can be found on the Internet at www.turck.com:

- Data sheets
- Quick start guides
- excom manuals
- GEN... Getting Started
- Approvals

1.4 Feedback about these instructions

We make every effort to ensure that these instructions are as informative and as clear as possible. If you have any suggestions for improving the design or if some information is missing in the document, please send your suggestions to **techdoc@turck.com**.



2 Notes on the System

2.1 System identification

This manual applies to the Turck excom system.

2.2 Manufacturer and service

Hans Turck GmbH & Co. KG Witzlebenstraße 7 45472 Mülheim an der Ruhr Germany

Turck supports you with your projects, from initial analysis to the commissioning of your application. The Turck product database contains software tools for programming, configuration or commissioning, data sheets and CAD files in numerous export formats. You can access the product database at the following address: www.turck.de/products

For further inquiries in Germany contact the Sales and Service Team on:

- Sales: +49 208 4952-380
- Technology: +49 208 4952-390

Outside Germany, please contact your local Turck representative.

3 For Your Safety

The product is designed according to state-of-the-art technology. However, residual risks still exist. Observe the following warnings and safety notices to prevent damage to persons and property. Turck accepts no liability for damage caused by failure to observe these warning and safety notices.

3.1 General safety notes

- The device may only be assembled, installed, operated, parameterized and maintained by professionally-trained personnel.
- The device may only be used in accordance with applicable national and international regulations, standards and laws.
- The device only meets the EMC requirements for industrial areas and is not suitable for use in residential areas.

3.2 Notes on Ex protection

- Only use the device in Ex areas when installed in the appropriate protective housing.
- Observe national and international regulations for explosion protection.
- When using the device in explosion-protection circuits, the user must have a working knowledge of explosion protection (EN 60079-14 etc.).
- Use the device only within the permissible operating and ambient conditions (see approval data and Ex approval specifications).
- Fit blank modules (BM1) on unused slots on the module rack.
- Cables and terminals with intrinsically safe circuits must be indicated use light blue for color-coding. Separate cables and terminals from non-intrinsically safe circuits or isolate accordingly (EN 60079-14).
- Perform "Proof of intrinsic safety".
- Never connect equipment to intrinsically safe circuits if this equipment was previously used once in non-intrinsically safe circuits.



4 Integrating the excom System in DeltaV via PROFINET

The integration of the excom system in the DeltaV control system is GSDML-based. The following describes all the steps required for the GSDML installation right through to the handling of I/O data and diagnostics.

- 4.1 Requirements
- 4.1.1 Requirements hardware

This example uses the following hardware:

DeltaV hardware

- DeltaV MD controller
- DeltaV virtual I/O module 2 of the M Series (VIM2)

Turck hardware

- MT08-N module rack
- Gateway GEN-N
- DM80-N digital input/output module
- DO40-N digital output module
- AIH401-N analog input module
- AOH401-N analog output module
- Ethernet cable



Fig. 1: Example setup of the excom station

4.1.2 Requirements – software

This example uses the following software:

DeltaV software



NOTE VIMNet Explorer V9.4 or higher is required to set up the virtual I/O module with PROFINET.

- DSC DeltaV V11.3.1 (DeltaV Explorer)
- VIMNet Explorer V9.6.1.5

Turck software

- GSDML file V2.3
- Gateway firmware V1.3.0
- Turck Service Tool

4.2 excom – assigning the IP address and PROFINET name

4.2.1 Setting the IP address

The device is factory set to IP address 192.168.1.254. A PROFINET device name has not yet been assigned. The IP address can be set via the Turck Service Tool, the DTM or the web server. The following example shows the setting of the IP address via the Turck Service Tool. The Turck Service Tool can be downloaded free of charge at www.turck.com.



The PC and the gateway must be located in the same IP network.

- Connect the device to a PC via the Ethernet interface.
- Launch the Turck Service Tool.
- Click Search or press [F5].
- ⇒ The Turck Service Tool displays the connected devices.

💳 Turck	Service Tool, Vers. 3	.2.2														- 🗆 X
Yc	our Global Aut	tomation	Partner											-	'UF	ск
Search (I	F5) Change (F2)	Wink (F3) A	ctions (F4)	ipboard Langu	N - C	t view ON St	art DHCP (F6) Configura	P tion (F7)	ARGEE (F8) -	BEEP (F9	, - -	X lose				රටා Columns
No	MAC address	Name	IP address	Netmask	Gateway	Mode	Device	Version	Adapter	A	Pr	Ke	BE	Turck,		
- 1	00:07:46:84:08:4F		10.17.110.138	255.255.255.0	10.17.110.1	PGM_DHCP	TN-UHF-Q300-EU-CDS	1.1.1.9	10.17.110.25	-			-	Turck		
= 2	00:07:46:84:19:07		<u>192.168.1.254</u>	255.255.255.0	0.0.0.0	PGM_DHCP	GEN-N	1.2.6.0	192.168.1.95	-			-	Turck		
Found 2 D	evices.															

Fig. 2: Turck Service Tool



- Click the gateway (example: **GEN-N**).
- Click Change or press [F2].
- Set the IP address and if necessary the network mask and gateway.
- Accept the changes by clicking **Set in device**.

Change device cont	figuration	×
Device name:		
IP configuration		
MAC address	IP address	
00:07:46:84:19:07	192.168.1.25	
Netmask	Gateway	,
255.255.255.0	0.0.0.0	
Set IP configuration	n temporarily	
Status messages:		
Set in device	Cancel	

Fig. 3: Setting the IP address

4.2.2 Assigning a PROFINET device name

A PROFINET device name must be assigned in order to identify the excom system. The PROFINET device name is set in the Turck Service Tool.

Observe the following requirements for assigning the PROFINET name:

- Numbers between 0...9
- Lower case letters from a...z
- Dashes "-" and dots "."
- Max. 63 characters in succession without permissible special characters "-" and "."
- Max. 127 characters
- Spaces not allowed
- "Port (0...999)" not allowed
- Starting with a number not allowed
- Number (sequences) similar to IP addresses not allowed (n.n.n.n (n = 0 to 9))
- Dashes "-" and dots "." at the beginning or end not allowed

Alternatively, the PROFINET device name can be set at **Gateway Configuration** in the web server.

- Click the empty field under Name in the Turck Service Tool.
- Assign a device name.
- Click Set in device.

Turc	: Service Tool, Vers. 3	1.2.2														-	
	our Global Aut	tomation	Partner	(<u>)</u> . E1	N .		EI	P				×			UI	ZC	
No 1 2	MAC address 00:07:46:84:08:4F 00:07:46:84:19:07	Name	IP address 10.17.110.138 192.168.1.25	Netmask 255.255.255.0 255.255.255.0	Gateway 10.17.110.1 0.0.0.0	Mode PGM_DHCP PGM_DHCP	Device TN-UHF-Q300-EU-CDS GEN-N	Version 1.1.1.9 1.2.6.0	Adapter 10.17.110.25 192.168.1.95	A -	Pr	Ke	BE - -	Turck, Turck Turck			Columns

Fig. 4: PROFINET device name

4.3 Installing an GSDML file

The GSDML file is available as a Zip file free of charge for download from www.turck.com.

• Unpack the zip file.

Proceed as follows to install the GSDML file:

- Open DeltaV Explorer.
- ► Choose Applications → VIMNet Explorer.
- Alternatively: Click the **VimNet Explorer** icon in the toolbar.



Fig. 5: Open VimNet Explorer

⇒ The **New VIO Document** window opens.



- Right-click **PROFINET Definition Library**.
- Click Add Connection Definition.

🔋 New VIO Document - VIMN	et Explorer
<u>File View H</u> elp	
🗅 🖉 🔚	
VIMNet Serial Card Ethernet DeviceNet Ethernet PROFINET Definition PROFINET Definition PROFINET Definition Profinet DeviceNet Profinet DeviceNet Profinet DeviceNet Profinet DeviceNet Profinet DeviceNet	IP Definition Library IP Definition Library I library Add Connection Definition What Is This?

Fig. 6: PROFINET Definition Library – Add Connection Definition

 \Rightarrow A window opens, in which the GSDML file can be selected.

- Select the GSMDL file.
- Click Open.

Definition Name				Vendor ID	0×0000	Device ID	0×0000	Phys	sical Slots	
/ersion 2019-09-23 12:29:00		Name						Fixe	d In Slot	
Access Pt	•	Vendor						Allov	ved In Slot	
		Order Number			Far	nily				
	🖶 Select PROFIN	ET GSD device	definition to in	nport			×			
- Available Modules	Look jn:	GSDML			<u> </u>	. ≝ ≣-				
Category All Modules	(27)		3-Turck-Excom//2	-20100420-01	0607	 Date modified 29.04.2019.1 	I → Турс			
Module Description	Recent Places		5 TOPCK EXCOUNT	2017012701	5007	29.01.20191	1.10 0.16			
								IOCS Le	ength	
	Desktop							0	Format	
	Administrator									
1	Computer									
Allowed Slots	· 👘									
,	Network	•					•			
SubModule Description	·	File <u>n</u> ame:	GSDML-V2.3	-Turck-Excom	/2-20190429-01	060 -	<u>O</u> pen			
		Files of type:	GSDML - XM	L Files (*.xml)		-	Cancel			
			🗌 Open as <u>r</u>	ead-only						
								1		
					Consistenc	У		Consiste	ncy	
		Diagnostics								

Fig. 7: Opening the GSMDL file

- \Rightarrow The GSDML file is installed.
- ⇒ The excom modules and their parameters appear in the GSDML_Edit window → VIM Mapping.



4.4 Creating an excom station

The excom station must be configured. For this map the physical setup of the excom station in DeltaV. The order of the slots must match the order of the modules in the excom station.



NOTE

A template name can be assigned at **Definition Name**. If no name is assigned, the template contains the name of the GSDML file.

- Open the GSDML_Edit window \rightarrow press VIM Mapping.
- Select the required module type at Available Modules \rightarrow Category.
- Select the relevant excom gateway variant at Access PT.
- Search for the modules of the excom station.
- At Selected Modules drag the modules to the appropriate slot.

GSDML Definition VIM Mapping Definition Name Vendor ID 0x013D Device ID 0x7100 Physical Slots 024 Version 2020-03-26 13:58:31 Name excom GEN-N Fixed In Slot 0 Access Pt DAP_excom GEN_N Vendor Turck Fixed In Slot 0 OAP_excom GEN_SG Order Number 100000129 Family I/O Turck	
Definition Name Vendor ID 0x013D Device ID 0x7100 Physical Slots 024 Version 2020-03-26 13:58:31 Name excom GEN-N Fixed In Slot 0 Access Pt DAP_excom GEN N vendor Turck Vendor Turck Vendor Turck Vendor Turck Vendor	
Version 2020-03-26 13:58:31 Name excom GEN-N Fixed In Slot 0 Access Pt DAP excom GEN N Vendor Turck Vendor Turck Vendor Turck Vendor Vendor Turck Vendor Vendor <td></td>	
Access Pt DAP_excom_GEN_N Vendor Turck DAP_excom_GEN_N Order Number 100000129 Family I/O Turck	
DAP excom GEN 3G DAP_excom GEN 3G DAP_excom GEN V	
DAP_excom_GEN_N Order Number 100000129 Family I/O Turck	
Description Remote I/O System	
Available Modules	
Category All Modules	
Module Description	
AI40. AI40. 0 excom GEN-N	
AI41 AI41 I DM80 I DPS Length 1 IOCS Length 1	
AI43 AI43 2 DO40.	
AIH40. AIH40. 3 AIH40.4H O Field Name O Field Name Form	hat
AIH40. 1H AIH40. 1H 4 AOH40. 4H	
AIH40. 4H AIH40. 4H 5	
AIH40. 8H AIH40. 8H 6	
AIH41 AIH41 7	
AIH41 1H AIH41 1H 8	
12	
Allowed Slots	
SubSlot SubModule	
SubModule Description	
Consistency Item consistency Item consistency Item consistency	су
	·
Provide 1	
Diagnostics	
Help Carrel	OK
Language PrimaryLanguage	

Fig. 8: Mapping the virtual excom station in DeltaV

4.5 Setting up the DeltaV controller

The DeltaV controller must be set up in order to configure the excom station as a slave. The DeltaV controller must be integrated in the physical network of the VIMNet Explorer.



NOTE

The devices are identified by the controller name.

- Assign the same controller name for the same device (here: CTLR-011290) in both software environments.
- ► Choose Physical Network → Right-click I/O Net.
- Click New Controller.

New VIO Document - VIMNet Explorer
<u>File View Help</u>
🖃 📲 VIMNet
Serial Card EthernetIP Definition Library
PROFINET Definition Library
GSDML-V2.3-Turck-ExcomV2-20190429-010607
🗄 🚽 🛱 Physical Network
Decommissioned VIMs
Simulation Net
<u>N</u> ew Controller
<u>W</u> hat Is This?

Fig. 9: Clicking New Controller

⇒ The **Controller** window is opened.



- Assign the controller name. (The controller must have the same name as in the DeltaV Explorer.)
- 👱 Exploring Delta¥ <u>File E</u>dit <u>View O</u>bject <u>Applications T</u>ools <u>H</u>elp 🔽 😹 💑 X 🗈 û I X 🖓 💷 🇉 🖬 🖬 🖗 🖇 🕺 🔽 E Test_BL20 Contents of 'Test_BL20' All Containers E Test_BL20 📗 New VIO Document - VIMNet Explorer E- Library System Configuration File View Help 🗅 📂 🔚 🕀 📲 Setup 🗄 💸 Control Strategies - K VIMNet Controller Name Physical Network ÷.... Serial Card EthernetIP Definition Library Decommissioned Nodes DeviceNet EthernetIP Definition Library Control Network PROFINET Definition Library GSDML-V2.3-Turck-ExcomV2-20190429-010607 🗄 🛶 Assigned Modules 🗄 📲 Physical Network Hardware Alarms ÷ 📲 Decommissioned VIMs \delta 1/0 ÷. 🚟 Simulation Net ÷.... - 🛐 C01 📲 C03 ÷... 🍝 I/O Net **1** C04 ÷ 🍯 C05 Controller × ÷ ÷ 🌄 C06 CTRL-011290 ÷ 🁣 C07 Name 👣 C08 Ē • 1 Number Assigned I/O Ē. 5 DEMH-DELTAV-1 ÷ I/O Network ÷ Cancel OK
- Confirm the entry with **OK**.

Fig. 10: Assigning the controller name

⇒ The controller appears in the project tree (here: **CTRL-011290**).

Adding a VIM-PROFINET master

- Right-click the controller (here: **CTRL-011290**).
- Click New IO VIM.

🔋 New VIO Document - VIMNet Explorer								
<u>File View H</u> elp								
🖃 - 🎬 VIMNet								
📶 Serial Card EthernetIP Definition Library								
DeviceNet EthernetIP Definition Library								
🖻 📶 PROFINET Definition Library								
🗄 🛗 GSDML-V2.3-Turck-ExcomV2-20190429-010	6(
🗄 🖉 🧝 Physical Network								
🐶 Decommissioned VIMs								
📅 Simulation Net								
📩 👆 I/O Net								
CTRL-011000								
New 10 VIM								
Delete Controller								
Properties								
<u>W</u> hat Is This?								

Fig. 11: Clicking New IO VIM

⇒ The ADD PROFINET Virtual I/O Module window opens.



- Set up the PROFINET master.
- Confirm the settings with **OK**.

New VIO Docum	nent - VIMNet Explor	er						- 🗆 ×
UIMNet			Name		Туре		IP Address	MAC
Serial C	Card EthernetIP Definition	on Library						
	Net EthernetIP Definitio	n Library						
· · · · · · · · · · · ·	dd PROFINET Virtual	I/O Module						
⊡	Type: I/O VIM - P	ROFINET	M-Series IO	VIM 2		onfiguration Ver	sion	
			PK Controller	4-Wides		0.0.0	Edit	
i i i i i i i i i i i i i i i i i i i	Virtual Cards: Card	IS 57-6U]					
i	VIM Properties			IM B (Even Card	ls) Properties			
	Name:	VIM01	ſ	lame:				
	IP Address: 10	. 4 . 0 . 1	I	P Address:				
	Subnet Mask: 255	. 254 . 0 . 0	9	ubnet Mask:				
	GateWay:	. 0 . 0 . 0	0	iateWay:				
	· ·			L				
	NIC Specified							
	Ping				Cano	:el	ОК	
 Ready							CAP NUM	

Fig. 12: Setting up the PROFINET master

4.6 Connecting the excom station to a virtual PROFINET card

To connect the excom station to the PROFINET master it must be set up using the GSDML file.

- Right-click the appropriate virtual PROFINET card (here: $C57 \rightarrow P01$).
- Click Add Connection.



Fig. 13: Clicking Add Connection

⇒ The **PROFINET Connection** window is opened.



• Select the excom station configured with the GSDML file in the drop-down menu via Library Definition \rightarrow Name.

PROFINET Connection				
Description:				
Library Definition				
Name GSDML-\	2.3-Turck-ExcomV2-2	0190429-010607 - 2019	-09-23 14:17:09	-
New GSDML-V	2.3-Turck-ExcomV2-2	0190429-010607 - 2019-	09-23 14:17:09	
Edit GSD	GSDML-V2.3-Turck-	ExcomV2-20190429-010	607.×ml	
	·			
Device Instance				
	Name			
	Add	Ip Address	0.0.0.	0
	Edit	SubNet Mask	0.0.0.	0
		Gateway	0.0.0.	0
			Cancel	ОК

Fig. 14: PROFINET Connection window

Click Add in the PROFINET Connection window.

PROFINET Con	nection				
Description:					
Library Defini	ition				
Name	GSDML-\	/2.3-Turck-ExcomV2-20)190429-010607 - 2019-	-09-23 14:17:09	•
New	Device	excom V2 Profinet IC	>		
Edit	GSD	GSDML-V2.3-Turck-E	xcomV2-20190429-010	607.×ml	
		·			
Device Instar	nce				
		Name			
		Add	Ip Address	0.0.0.	0
		Edit	SubNet Mask	0.0.0.	0
			Gateway	0.0.0.	0
				Cancel	ОК

Fig. 15: Opening the **PROFINET Device Definition** window

⇒ The **PROFINET Device Definition** window is opened.

In order for the excom station to communicate with the DeltaV PROFINET master, it must be assigned a PROFINET name and an IP address [> 11].

- ► Enter the PROFINET name (here: "turck-excom").
- Enter the IP address: (here: 10.4.0.2).
- Entering the subnet mask (here: 255.254.0.0).
- Confirm entries with **OK**.

PROFINET Devic	e Definition						
Device Number	1 💌	Name	turck-ex	com / PB Device Map Name Ma	ask		
Ip Address SubNet Mask Gateway	10 . 4 255 . 254 0 . 0 VLAN Assigned Connection Library Definition	. 0 . 0 . 0	. 2	Send Clock Time (us) Reduction Factor Send Cycle Time (ms) Msg Per Second Device Interval (ms)	32 (1) 64 64 15.625 64	Total Devices	0 Reset
	GSDML Name	Γ				Cancel	

Fig. 16: PROFINET – Assigning an IP address and name

The other parameters do not have to be set and are explained below:

Parameter	Meaning
Send Clock Time (ms)	The parameter (here:1 ms) is determined by the Send Clock Time (here: 32 μ s) multiplied by the basic time unit of 31.25 μ s defined in the PROFINET specification.
Reduction Factor	Reduction factor (see: Send Cycle Time (ms))
Send Cycle Time (ms)	The transfer interval is the product of Send Clock Time × Re- duction Factor. A Send Clock Time of 1 ms and a Reduction Factor of 64 means that IO data is sent every 64 ms.
Msg Per Second	Number of messages per second, which the excom station adds to the total message overhead of the VIM. The total message overhead is the right value at Total Devices.
Device Interval (ms)	Time between two messages from the excom station, the left value and between two messages for the VIM, the right value.
VLAN	VLAN-ID Only 0 is permissible for devices with the PROFINET IO specification V2.3.



Commissioning VIM

- Right-click VIM (here: VIM01).
- Click Commission.

📲 New VIO Document - VIMNet Explorer					
<u>File View H</u> elp					
🗅 🖾 🖬					
🖃 📲 VIMNet					
Serial Card Ether	netIP Definition Library				
DeviceNet Ethern	netIP Definition Library				
🖻 🎁 PROFINET Definit	tion Library				
庄 🛗 GSDML-V2.3	-Turck-ExcomV2-20190429-010607				
🖻 👷 Physical Network					
🔤 👫 Decommissio	ned VIMs				
Simulation Ne	et				
🗄 👆 I/O Net					
⊡ CTRL-01	🖻 🖕 CTRL-011290				
E	Enable VIM Status Updates				
	Reconcile VIM				
	Delete				
🛨 🛽 Export FHX File					
	+ Properties				
+	Device Scan Times				
	What Is This?				

- Fig. 17: Opening the Commission VIM window
- ⇒ The Commission VIM window opens.

• Confirm with **OK**.

	_		
ecommissioned VIMs			OK
VIM-0022E524A9E1 00-22-E5-2	4-A9-E1 PROFINET		Cancel
		Assign to IP Addre	ss
		10 . 4 .	0.1
			Ping
		Identify VIM	Refresh
		C Start Flashing	
		Stop Flashing	
Accepted VIM-0022E524A9E1 (firmv	vare type PROFINET,	, IPAddr=0.0.0.0, Requested:	=PROFINET)
Dieplay all VIM's			

Fig. 18: Commission VIM window



Adding an excom station as a slave

The configuration must be loaded in the VIM:

- ► Right-click VIM (here: VIM01).
- Choose Upload Configuration to VIM.

New VIO Document - V	/IMNet Explorer				
<u>File ⊻iew H</u> elp					
🗅 🗅 🚔 🔛					
🖃 📲 VIMNet					
🦷 🎁 Serial Card Ethe	ernetIP Definition Library				
	rnetIP Definition Library				
🕀 🎁 PROFINET Defi	nition Library				
🖃 🧝 🙀 Physical Netwo	rk				
- 📝 Decommiss	ioned VIMs				
Simulation I	Net				
📄 🔶 I/O Net					
⊡- CTRL-0	011290				
	🚊 🚽 Upload Configuration to VIM				
	Decommission				
Diagnose					
	Enable VIM Status Updates				
	Ping VIM				
	<u>R</u> econcile VIM				
2 R	Delete				
Export FHX File					
	Properties				
	Device Scan Times				
What Is This?					

Fig. 19: Loading the configuration in the VIM

- Save changes to New VIO Document?

 Yes

 No

 Cancel
- Save the document: Confirm the **PPV** window with **Yes**.



• Confirm the VIM Configuration Upload window with OK.

Simplex VIM Upload	VIM Configuration Upload
Wait for VIM response	Successfully uploaded configuration!
100%	
	ОК

Fig. 21: Upload of the configuration completed

Exporting the FHX file

After the configuration has been successfully uploaded, the FHX file must be exported. This can be done in two ways:

- 1. Exporting an individual virtual card (here: C57).
- 2. Export all four virtual cards.

To export the individual virtual card:

- ▶ Right-click C57.
- Choose Export FHX File.



Fig. 22: Right-clicking an individual card



- Define the file name and memory location in the **Save As** window.
- Save the setting with **Save**.

🚦 Save As	5				×
00	🍌 🔹 De	ltaV 🕶 DVData 👻 Import-Export	- 🛃	5earch	
	File <u>n</u> ame:	CTRL-011290_VIM2_57			
Sa	ave as <u>t</u> ype:	Import/Export Files (*.fhx)			
<u>Browse</u>	e Folders			<u>S</u> ave	Cancel

Fig. 23: Defining the file name and memory location

• Confirm the prompt in the **Configure FHX Export Parameters** window without changes with **OK**.

Configure FHX Export Parameters	×
C Enter the name of the DeltaV OPC serv local machine to obtain vesion number f	er, or blank for rom DeltaV.
Manually Select Version Number	x
User Name ADMINISTRATOR Export Registers Export Modules	
	Cancel OK

Fig. 24: Confirming the window

To export all four virtual cards:

- ► Right-click VIM (here: VIM01).
- Choose Export FHX File.

New VIO Document - VIMNet Explorer					
<u>File View H</u> elp					
🗅 😅 🖬					
🖃 🎬 VIMNet					
Serial Card Ether	netIP Definition Library				
DeviceNet Etherr	netIP Definition Library				
🗄 🎁 PROFINET Definit	tion Library				
🖻 👷 Physical Network					
	ned VIMs				
Simulation Ne	et				
	1000				
	1290				
Line Line Upload Configuration to VIM					
Ė	Decommission				
± 🖪 _	Diagnose				
	Enable VIM Status Updates				
	Ping VIM				
	<u>R</u> econcile VIM				
	Delete				
Export FHX File					
	Properties				
	Device Scan Times				
	What Is This?				

Fig. 25: Right-click VIM01

- Define the file name and memory location in the **Save As** window.
- Save the setting with **Save**.







 Confirm the prompt in the Configure FHX Export Parameters window without changes with OK.

Configure FHX Export Paran	neters	×
C Enter the name of the D local machine to obtain	DeltaV OPC server, or blank for vesion number from DeltaV.	
Manually Select Version	Number	
User Name ADMINISTRA	ATOR	
	Cancel	

Fig. 27: Confirming the prompt

The file must then be loaded in the DeltaV Explorer.

• Choose File \rightarrow Import \rightarrow Standard DeltaV Format... in the DeltaV Explorer.



Fig. 28: Import in the DeltaV Explorer

• Select the required file in the **Import** window.

Click Open.



Fig. 29: Importing a file



The new configuration must be loaded in the controller.



NOTE

Reload the configuration in the controller after each new configuration.

- Right-click Physical Network.
 - Choose **Download** \rightarrow **Physical Network** in the context menu.

📓 Exploring Delta¥	
<u>File Edit View Object Applications Tools Help</u>	
崖 Test_BL20 💌 🖧 🕯	****0°0'× ∻ ≡≡≡
All Containers Contents of	of 'Test_BL20'
Test_BL20 Name Library System Configuration System Configuration System Control Strategies Unassigned I/O References Unassigned I/O References Update Download Status Download Update Download Status Download Uplagnose Create Station Configuration File Upload Upload Check Licensing Print Export Cut Copy Paste Delete Rename What's this? Add ShortCut Properties	/ n Configuration Physical Network Setup Data Changed Setup Data Controller Cold Restart Memory Re-send Last Known Good Download

Fig. 30: Loading the configuration in the controller

- ⇒ The configuration is loaded in the DeltaV controller.
- ⇒ The excom station is created as a slave.



NOTE

A configured excom station can be used as a template. Copy the station from the DeltaV Explorer and at C57, for example, insert \rightarrow P01.

Exporting an excom station

The excom station can be exported for future applications.

- Right-click the excom station (here: EXCOM_02).
- Click Export.



Fig. 31: Exporting an excom station



- Assign memory location, name and file type.
- Click Save.

📡 Export		×
🕜 🕢 🕨 🕨 DeltaV 🕶 DVData 🕶 Import-Export	👻 🔂 Search	2
File name: EXCOM_02 Save as type: Import/Export Files (*.fhx)		•
Browse Folders	Save	Cancel

Fig. 32: Saving an export

⇒ The **Export complete** window appears.

4.7 Setting excom PROFINET parameters

The VIM mapping must be opened in order to set the gateway or module parameters:

- Open VIMNet Explorer.
- Right-click the excom station.
- Click Properties.
- Click Edit at Library Definition.
- Choose excom GEN-N under Module.
- Click DAP v3.1 under SubModule.

DIOC 1	Module	IO Data Records	
)	excom GEN-N		
		Index	Length 2
2		5116 510	
		aTId 661	Sequence 1
· .			
J			
3		Field	Data
		Deactivate all diagnostics	no
0		Deactiv. load voltage diagn.	no
.1		Deactivate I/O-ASS, Force Mode	DO
			110
12			
•			
ubSlot	SubModule		
2 ubSlot	SubModule		
2 ubSlot 2768	SubModule DAP v3.1 PN-IO		
2 SubSlot 2768 2769	SubModule DAP v3.1 PN-IO Port 1		
2 ubSlot 2768 2769 2770	SubModule DAP v3.1 PN-IO Port 1 Port 2		
2 iubSlot 2768 2769 2770	SubModule DAP v3.1 PN-IO Port 1 Port 2		
2 iubSlot 2768 2769 2770	SubModule DAP v3.1 PN-IO Port 1 Port 2		
2 iubSlot 2768 2769 2770	SubModule DAP v3.1 PN-IO Port 1 Port 2		
2768 2769 2770	SubModule DAP v3.1 PN-IO Port 1 Port 2	2F 40	

Fig. 33: General PROFINET parameters

- Click the **Data** window on the right of the relevant parameters under **Records**.
- Select the parameter from the drop-down menu.

The index "gTld_510" consists of the general PROFINET parameters that are still without function:

Parameter	Value	Meaning	
Deactivate all	No	Diagnostics messages and alarms are generated.	
diagnostics	Yes	Diagnostics messages and alarms are not generated.	
Deactiv. load voltage diagn.	No	The monitoring of the field power supply (from the gateway and the supply modules) is activated.	
	Yes	Overshoots or undershoots of the field power supply are not indicated.	
Deactivate I/O-ASS.	No	_	
Force Mode	Yes	The DTM cannot access the gateway via Force mode.	



4.8 Parameterizing excom communication

The VIM mapping must be opened in order to set the gateway parameters:

- Open VIMNet Explorer.
- ▶ Right-click the excom station.
- Click Properties.
- Click Edit at Library Definition.
- Click Index \rightarrow gTld_661.
- The general settings appear under **Field** and **Data**.

Module	IO Data Records	
excom GEN-N		
	Index	Length 5
	aTId 510	Longth
	aTId_661	Sequence 2
	19110_001	Deddence -
	•	•
	Field	Data
	module parameterization	activate
	line frequency	50 Hz
	analog data format	Status MSB
	CAN redundancy	on
	redundancy mode	off
ot SubModule	power supply	simple
DAP v3.1		
PN-IO		
Port 1		
Dort 2		
Purc 2		
Port 2		
POR 2		

Fig. 34: Gateway parameters

- Click the **Data** window on the right of the relevant parameters under **Records**.
- Select the parameter from the drop-down menu.

The index "gTld_661" consists of the following PROFINET parameters:

Parameter name	Value	Meaning
Module parameterization	Activate	The parameter is currently without function.
	Deactivate	If the parameter is activated, the module receives the para- meter settings, e.g. from the controller, the IO supervisor or the DTM. Previous parameter settings are overwritten. If the parameter is deactivated, the module uses the saved para- meters.
Line frequency	50 Hz 60 Hz	Select the filter for suppressing superimposed power supply interference with analog input signals.
Analog data format	Status MSB Status LSB No status	 Select position of the status bit for analog input signals Status MSB: Status bit at bit position 2¹⁵ Status LSB: Status bit at 2⁰ No status: Measured value without status bit
CAN redundancy	Off On	Activate or deactivate redundancy of internal communica- tion between gateways and I/Os.
Redundancy mode	Off System redundancy	 No redundancy Two gateways operate autonomously with the associated master.
Power supply	Single Redundant	Activate or deactivate diagnostic message of the redundant power supply.



4.9 Parameterizing excom modules

Different specific settings can be made via the parameter functions.

The VIM mapping must be opened in order to set the gateway or module parameters:

- Open VIMNet Explorer.
- ▶ Right-click the excom station.
- Click Properties.
- Click Edit at Library Definition.
- Select the appropriate module.
- Click the **Data** window on the right of the relevant parameters under **Records**.
- Select the parameter from the drop-down menu.

4.9.1 Example: DM80

The DM80 digital module is parameterized in the following example. The **Module parameterization** parameter is still without function.

lot Module excom GEN-N		
DM80	Index	Length 6
	dTId 699741	
		Sequence 0
	-	
	Field	Data
	module parameterization	deactivate
	Polarity - Channel pair CH1	normal
	 Direction - Channel pair CH1 	Output
	Dumping - Channel pair CH1	off
	Failsafe mode - Channel pair CH1	Min. value
hSlot SubModule	Open line detection - Channel pair C	H1 on
	Short circuit detection - Channel pair	r CH1 on
DM80	Channel deactivated CH1	active
	Channel deactivated CH2	active
	Polarity - Channel pair CH3	normal
	Direction - Channel pair CH3	Output
	Dumping - Channel pair CH3	off 🗾 👻
	40 08 08 00 00 00	

Fig. 35: DM80 parameters

Parameter overview – DM80

The parameters are set in pairs for the particular two channels (1/2, 3/4, 5/6, 7/8).

The default parameter values are shown in the following table in **bold** type.

Parameter name	Value	Meaning
Short circuit detection	On Off	Activate or deactivate the short circuit monitoring in pairs The output signal can only be monitored if the output is ac- tivated.
Open line detection	On Off	Activate or deactivate the wire-break monitoring in pairs The output signal can only be monitored if the output is activated.
Failsafe mode	Min. value Max. value Last valid value	Set substitute value per channel: minimum (0), maximum (1) or last valid value (0 or 1)
Direction	Input Output	Activate or deactivate input or output
		Input: The channels of the module are switched in groups as inputs (1/2, 3/4, 5/6, 7/8). The DM80-N S and DM80-N S81 variants provide one status.
		Output: The channels of the module are switched as outputs in groups (1/2, 3/4, 5/6, 7/8). The DM80-N S variant on the other hand also provides a status for the outputs.
Polarity	Normal Inverse	Activate or deactivate signal inversion
Dumping	Off 10 ms 20 ms 50 ms	Activate or deactivate additional input signal damping
Channel 18	Active Inactive	Activate or deactivate channel 18 If a channel is not used it can be switched off to prevent unwanted error messages.



4.9.2 Example: DO40

The DO40 digital module is parameterized in the following example. The parameters are presented individually for each channel. The **Module parameterization** parameter is still without function.

blot	Module	IO Data Records	
)	excom GEN-N		
	DO40.	Index	Length 6
2		ATTA 600741	
3		3110_079711	Sequence 0
ł			Sequence 1-
5			and the second
i i			P
1			
}		Field	Data
L		module parameterization	activate
0		Polarity CH1	normal
1		Failsafe mode CH1	Min. value
1		Open line detection CH1	on
-		Short circuit detection CH1	on
- 	t SubModule	Polarity CH2	normal
		Failsafe mode CH2	Min. value
	DO4U.	Open line detection CH2	on
		Short circuit detection CH2	on
		Polarity CH3	normal
		Failsafe mode CH3	Min. value
		Open line detection CH3	on

Fig. 36: DO40 parameters

Parameter overview - DO40.

The default parameter values are shown in the following table in **bold** type.

Parameter name	Value	Meaning
Short circuit detection	On Off	Activating or deactivating the short circuit monitoring The output signal can only be monitored if the output is activated.
Open line detection	On Off	Activating or deactivating the wire-break monitoring by channel The output signal can only be monitored if the output is activated.
Failsafe mode	Min. value Max. value Last valid value	Set substitute value per channel: minimum (0), maximum (1) or last valid value (0 or 1)
Polarity	Normal Inverse	Activate or deactivate signal inversion

4.9.3 Example: AIH40

The AIH40 analog module is parameterized in the following example. The **Module parameterization** parameter is still without function.

excom GEN-N AIH40.		Length 6
	dTId_699741	Sequence 0
	Field	Data 🔺
	module parameterization	activate
	HART status/meas, range CH1	on / 420 mA
-	Filter(PT1) CH1	0.1 s
	Failsafe mode CH1	Min. value
	Open line detection CH1	on
	Short circuit detection CH1	on
	HART status/meas. range CH2	on / 420 mA
AIH4U.	Filter(PT1) CH2	0,1 s
	Failsafe mode CH2	Min. value
	Open line detection CH2	on
	Short circuit detection CH2	on
	HART status/meas. range CH3	on / 420 mA 🗸 🗸

Fig. 37: AIH40 parameters



Parameter overview – AIH40

The default parameter values are shown in the following table in **bold** type. The module can be configured with 1, 4 or 8 HART values. Further information on this is provided in the excom manual for the non-Ex area.

Parameter name	Value	Meaning
Short circuit detection	On Off	Activate or deactivate short circuit monitoring
Open line detection	On Off	Activate or deactivate wire-break monitoring
Failsafe mode	Min. value Max. value Last valid value	Set substitute value per channel: minimum, maximum or last valid value
HART status/meas. range	Off/020 mA Off/420 mA On/420 mA	Off/020 mA: Dead zero without HART status query; diagnostics for wire break and measuring range undershoot not possible
		Off/420 mA: Live zero without HART status query; diagnostics for wire break and measuring range undershoot active
		On/420 mA: Live zero with HART status query; diagnostics for measuring range undershoot and overshoot as well as wire break and short circuit monitoring active
Filter (PT1)	Off 0,1 s 2,6 s 29,2 s	Activate or deactivate software filter for generating an average value

4.9.4 Example: AOH40

The AOH40 analog module is parameterized in the following example. The **Module parameterization** parameter is still without function.

ot	Module	IO Data Records	
	excom GEN-N		
	AOH40.	Index	Length 6
		dTId 600741	congan j
		0110_099741	Sequence 0
			Dednence 1.
		•	E F
		Field	Data
		module parameterization	activate
		HART status/meas, range	CH1 on / 420 mA
		Failsafe mode CH1	Min. value
		Open line detection CH1	on
_		Short circuit detection CH1	on
.cl.	a Colonada	HART status/meas. range	CH2 on / 420 mA
510	ic SubModule	Failsafe mode CH2	Min. value
	AOH40.	Open line detection CH2	on
		Short circuit detection CH2	2 on
		HART status/meas. range	CH3 on / 420 mA
		Failsafe mode CH3	Min. value
_		Open line detection CH3	on 💂

Fig. 38: AOH40 parameters

Parameter overview – AOH40

The default parameter values are shown in the following table in **bold** type. The module can be configured with 1, 4 or 8 HART values. Further information on this is provided in the excom manual for the non-Ex area.

Parameter name	Value	Meaning
Short circuit detection	On Off	Activate or deactivate short circuit monitoring
Open line detection	On Off	Activate or deactivate wire-break monitoring
Failsafe mode	Min. value Max. value Last valid value	Set substitute value per channel: minimum, maximum or last valid value
HART status/meas. range	Off/020 mA Off/420 mA On/420 mA	Define HART status / measuring range Off/020 mA: Dead zero without HART status query and wire break inactive
		Off/420 mA: Live zero without HART status query and wire break active
		On/420 mA: Live zero with HART status query (HART diagnostics active) and wire break active



4.10 Configuring I/O data

The **VIMNet Explorer** configures the PROFINET mapping independently. The GSDML file defines how the data from the PROFINET device is to be interpreted. During the configuration of the excom system the GSDML file automatically creates signals for each I/O module. The following figure shows the automatic configuration of the I/O signals using the example of a DM80 module:

- Open VIMNet Explorer.
- Click VIM Mapping.
- Select the module at **Selected Modules** (here: **DM80**).
- Click IO Data.

finition Name	Test				Vendor ID	0×013D	Devi	ce ID 0x7100	Physical Slots	024
rsion	2019-10-22 12:34:35		Name	excom GEN-N					Fixed In Slot	0
cess Pt	DAP_excom_GEN_N	~	Vendor	Turck					_	
			Order Number	100000129			Family I/O	Tur	ck	1
			Description	Pemote I/O Sur	tem		. ,			
Available Modul	ler.		Description	Remote t/o by:	com.					
Category A	Modules	H	Selected Modules -	·						
Module	Description		Slot Module			IO Dat	a Records			
AI40.	AI40.		0 excom GE	N-N						
AI41	AI41		1 DM80			IOPS	Length 1		IOCS Length 1	
AI43	AI43		2 DO40.				- ,		- ,	
AIH40.	AIH40.		3 AIH40. 4ł	1		0	. Field N	Format	0 Field N	Format
AIH40.1H	AIH40. 1H		4 AOH40. 4	н		0:0	Value CH1	Bit	0:0 Value CH1	Bit
AIH40.4H	AIH40. 4H		5			0:1	Value CH2	Bit	0:1 Value CH2	BR
AIH40, 8H	AIH40, 8H		6			0:2	Value CH3	Bit	0:2 Value CH3	Bit
AIH41	AIH41		7			0:3	Value CH4	Bit	0:3 Value CH4	Bit
ATH41 1H	AIH41 1H	-1	8			0:4	Value CH5	BP	0:4 Value CH5	BR
41			9			0.5	Value CH6	RP	0:5 Value CH6	BR
		<u> </u>	10			0.6	Value CH7	RF	0:6 Value CH7	Bit
			11		-1	0:7	Value CH8	Bit	0:7 Value CH8	BR
			12				1000 010	-	on raide en	, en
Allowed Slots			•							
			SubSlot SubM	odule						
			1 DM80							
SubModule	Description									
										-
							-			
							-			-
						Cons	istency Item	consistency	Consistency Item	consistency
l			Disgoaties							
			Diagnostics							

Fig. 39: Configuring I/O data



NOTE

The PROFINET buffer consists of the I/O data and the IOCS and IOPS together. The IO Consumption Status (**IOCS**) reports to the module that generated the I/O data whether it was used or not. The IO Production Status (**IOPS**) is used by the producing module to monitor the quality of the associated I/O data.

The VIMNet Explorer uses the GSDML file to map the PROFINET data automatically in the excom system. The PROFINET device is mapped in the signals of the PROFIBUS device. Each PROFIBUS device in DeltaV contains a set of slots that each contain a set of signals. The description for each PROFINET device is part of the associated GSDML file. The GSDML files also describe the arrangement of the data in the I/O buffer.

The VIM virtual I/O module maps the I/O buffer in a series of PROFIBUS devices in DeltaV. The maximum size of a PROFINET buffer is 1440 bytes. One buffer is provided for the input data and one for the output data.

The I/O buffer of a PROFINET device mapped in DeltaV can take a maximum of 512 bytes (256 inputs and 256 output bytes), which are divided up into 128-byte slots with 64 inputs and 64 outputs. The VIM virtual I/O module divides up the PROFINET buffer automatically and assigns all parts of the PROFINET data buffer to a PROFIBUS slot. The buffer is distributed so that a specific signal (defined in the GSDML file) is not split by the slot boundaries.



Adding an I/O signal manually

A signal can also be added manually. This is illustrated here using the DM80 as an example. The DeltaV Explorer must be opened:

- ▶ In the project tree under System Configuration \rightarrow Physical Network \rightarrow Control Network \rightarrow CLTR-011290 \rightarrow open C57.
- Choose C57PB42 \rightarrow SLOT001 in the subtree.
- ▶ Right-click **SLOT001**.
- Click New Profibus Signal.
- Set the **Signal direction** to **Input** in the **New Profibus Signal** window.
- Select the data type under **Data type**.
- Confirm selection with **OK**.



Fig. 40: Creating the I/O signal manually

Placing a tick next to **Use diagnostic channel** makes it possible to link a signal to a channel-specific diagnosis.

New Profibus Signal	<u>?</u> ×
Object type:	OK
Modified:	Cancel
Modified by:	
Description:	
SLOT01 DM80 CH1	
Use diagnostic channel:	Signal Tag: C57PB42S001039
	Browse
Data Mapping	
Standard network by	te order
Signal direction:	Byte offset:
Input 💌	7 🕂
Data type:	
Boolean	•
Use Scaling	
0% of scale:	100% of scale
Bit Pattern	
First bit used:	Number of used bits:
0 +	1
Sample bit pattern:	
, []]]]]0	

Fig. 41: Linking a signal to channel-specific diagnostics



The changes must be loaded in the DeltaV controller. The DeltaV Explorer displays a blue triangle if this is necessary. If changes were made to the setup data, this is indicated at the nodes. Proceed as follows in order to load the configuration in DeltaV:

- ► Right-click Physical Network.
- ► Choose **Download** → **Physical Network**.

📩 🔥 💁 Physical Network		- II.	
Decommissior	Explore		
🖻 🛕 📜 Control Ne	Update Download Status		
	Download		Physical Network
	Verify without download		Setup Data
⊨ <u>4</u> <u>1/</u> 0	Diagnose		Changed Setup Data
Ē	Create Station Configuration File		Controller Cold Restart Memory
	Upload		Re-send Last Known Good Download
	Check Licensing	П	
	Print	Ш	
±	Export	Ш	
	Evbour	11	
	Cu <u>t</u>	Ш	
	⊆opy	Ш	
ē	P <u>a</u> ste		
	Delete	Ш	
±	Rena <u>m</u> e		
±	<u>W</u> hat's this?		
	<u>A</u> dd ShortCut		
H. K. K.	Properties		

Fig. 42: Loading changes in the controller

• Confirm the **Confirm Total Download** window with **Yes**.

Confirm Total Download	? ×
WARNING: Performing a Total download may affect the control of your process.	of
You should ensure that all safety precautions have been followed before downloading and that the desired options are checked below. Note that downloading will distribute some set-up data to all workstations.	
This will download 'Physical Network' and any subordinate objects.	
Download Options	
Are you sure you want to download? Yes	

Fig. 43: Confirming a download

Click Close to close the **Download complete** window.



4.11 PROFINET diagnostics

Diagnostics options are available for the VIM card, the DeltaV I/O card as well as for the field devices. This example shows diagnostics for the VIM card:

- ► Right-click VIM (here: VIM01).
- Click Diagnose.

File View Help VIMNet Serial Card EthernetIP Definition Library DeviceNet EthernetIP Definition Library PROFINET Definition Library PROFINET Definition Library Physical Network Simulation Net VIO Net CTLR-011290 Upload Configuration to VIM Diagnose Diagnose Diagnose Export FHX File Export FHX File	📲 New VIO Document - V	IMNet Explorer						
Image: Serial Card EthernetIP Definition Library DeviceNet EthernetIP Definition Library PROFINET Definition Library Physical Network Image: Decommissioned VIMs Simulation Net Image: Decommissioned VIMs Image: Decommission Image: Decomm	<u>File View H</u> elp							
VIMNet Serial Card EthernetIP Definition Library DeviceNet EthernetIP Definition Library PROFINET Definition Library Physical Network Decommissioned VIMs Simulation Net CTLR-011290 Upload Configuration to VIM Decommission Diagnose Disable VIM Status Updates Reconcile VIM Delete Export FHX File Properties DeviceNet EthernetIP Definition Library PROFINET Definition Library Properties Properties Properties	🗅 🖻 🖬							
Serial Card EthernetIP Definition Library DeviceNet EthernetIP Definition Library PROFINET Definition Library Physical Network Physical Network Simulation Net CTLR-011290 CTLR-011290 Decommission Diagnose Disable VIM Status Updates Reconcile VIM Delete Export FHX File Properties Properties	⊡- 🛱 VIMNet							
DeviceNet EthernetIP Definition Library PROFINET Definition Library Physical Network Decommissioned VIMs Simulation Net I/O Net I/O Net CTLR-011290 Upload Configuration to VIM Decommission Diagnose Disable VIM Status Updates Reconcile VIM Delete Export FHX File Properties DeviceNet EthernetIP Definition Library	Serial Card Ethe	ernetIP Definition Library						
PROFINET Definition Library Physical Network Decommissioned VIMs Simulation Net I/O Net CTLR-011290 Upload Configuration to VIM Decommission Diagnose Disable VIM Status Updates Reconcile VIM Delete Export FHX File Properties Properties Decide Status Updates	DeviceNet Ether	rnetIP Definition Library						
Physical Network Decommissioned VIMs Simulation Net I/O Net I/O Net OCTLR-011290 Decommission Decommission Decommission Disable VIM Status Updates Reconcile VIM Delete Export FHX File Properties Decommission	🗄 🎁 PROFINET Defin	nition Library						
Decommissioned VIMs Simulation Net I/O Net CTLR-011290 Upload Configuration to VIM Decommission Diagnose Disable VIM Status Updates Reconcile VIM Delete Export FHX File Properties Decommission	🗄 📲 Physical Networ	k						
Simulation Net I/O Net CTLR-011290 CTLR-011290 Upload Configuration to VIM Decommission Diagnose Disable VIM Status Updates Reconcile VIM Delete Export FHX File Properties Properties	📝 Decommissi	oned VIMs						
I/O Net I/O Net <t< td=""><th>Simulation N</th><td>Vet</td></t<>	Simulation N	Vet						
□ □ Upload Configuration to VIM □ □ □ □ □	🖃 🔷 🖣 I/O Net							
□ □		11290						
<u>Decommission</u> <u>Diagnose</u> <u>Disable VIM Status Updates</u> <u>Properties</u> <u>Properties</u>		Upload Configuration to VIM						
⊡ ⊡ □		Decommission						
Diagnose Disable VIM Status Updates ••••• •••••• •••••• ••••••• •••••••••••••••••••••••••••••								
⊕… ∎ Disable VIM Status Updates Beconcile VIM Delete Export FHX File Properties Decide Group Time		Diagnose						
Econcile VIM Delete Export FHX File Properties Decide Group Time		Disable VIM Status Updates						
Delete Export FHX File	÷ I	. <u>R</u> econcile VIM						
Export FHX File Properties Device State		Delete						
Properties	South to the	Export FHX File						
Device Gree Times		Properties						
Device Scan Times		Device Scan Times						
<u>W</u> hat Is This?		<u>W</u> hat Is This?						



- Right-click the VIM again in the new window that appears (here: VIM01).
- Click Enable VIM Communications in the context menu to switch to Online View.

👢 DEMH-DELTAV-1	- VIMNET Diagnostics
<u>File View H</u> elp	
🖃 👆 🐴 I/O Net	
🗄 🛛 📕 CTLR-01	11290
ė 🖡 💴	Enable VIM Communications
	Display Network Statistics
E	Display Log <u>B</u> ook
	Display Alarm Log
	Reset All Statistics
	Display Sla <u>v</u> e Statistics
	Start Logging
	Search for <u>D</u> atasets
	C58
	C59
	100.00

Fig. 45: Enable VIM Communications

 \Rightarrow The diagnostics are displayed for the individual slots (here: Slot 3 \rightarrow SubSlot 1).



Fig. 46: Diagnostics window

AR in the diagnostics window displays the status of the PROFINET Application Relation. **CR** displays the Connection Relations status.



5 Redundancy Strategies

5.1 Topology

The general topology of the Turck-specific system redundancy with the Ethernet protocols EtherNet/IP, Modbus TCP and PROFINET is structured as follows:





Fig. 47: System redundancy with one master and two gateways

Fig. 48: System redundancy with two masters and two gateways

The system redundancy with one master and two gateways is a Turck-specific, parameterizable redundancy function of the excom system. The two gateways are provided here with separate IP addresses. The separate IP addresses are used to set up independent communication. The gateways communicate the input data and receive the output data via the IP addresses. One gateway is the primary gateway while the second gateway acts as a backup. If the primary gateway fails, a bumpless switchover to the backup gateway is carried out automatically. The redundancy function makes it possible to implement interruption-free communication. The output word of the gateway enables the forcing of a redundancy switchover.

When system redundancy is implemented with two masters and two gateways, two independent Ethernet masters communicate with the associated gateway. Both masters can be controlled via one or two process control system controllers. There are two independent Ethernet connections to the excom system, in order to process the process data.

5.2 Redundancy setup



Both gateways must have the same configuration, parameterization and firmware.

The Redundancy mode gateway parameter must be set for system redundancy.

5.3 System redundancy



NOTE

Both gateways must have the same configuration, parameterization and firmware.

If the **Redundancy mode** parameter is set to **system redundancy** in the DTM, web server or control system, the excom station operates in system redundancy mode. Both gateways communicate with their respective master. The PRIO LED is lit on the active gateway. The active gateway takes over the output data transferred by the master and sends this to the output modules.

The gateway communicating with the secondary master ignores the received output data as the secondary module does not have write access to the output modules.

If the gateway is configured in the controller as "GEN... C", the gateway is provided with an input word as well as an output word for monitoring redundancy. The input word describes the current state of the gateway.

The output word is used for the manual redundancy switchover in the master. It is possible to switch in the process control system from the primary gateway to the secondary gateway. A switchover is carried out in response to the following events:

- The primary gateway was removed.
- Communication to the primary gateway was interrupted.

After a switchover, an automatic switchover to the former primary gateway is no longer carried out.

When the excom system is started, the gateway on the left starts to operate as the primary gateway. If communication with the left gateway fails, the gateway on the right tries to establish primary communication.



Assignment of gateway process data bits

The input word of the gateway process data is used to view the gateway and system redundancy of the excom station:

	Bit	Bit						
Byte	7	6	5	4	3	2	1	0
0	Not used			Left power supply unit	Right power supply unit	Gateway redundancy	Slot	Active/ passive
1	Not used							

Meaning of the gateway process data bits

Designation	Meaning
Left power supply unit	0: Left power supply unit not present
	1: Left power supply unit fitted
Right power supply unit	0: Right power supply unit not present
	1: Right power supply unit fitted
Gateway redundancy	0: Redundant gateway or redundant communication not available
	1: Redundancy available
Slot	0: Gateway is located on the right slot (GW2)
	1: Gateway is located on the left slot (GW1)
Active/ passive	0: Gateway is passive
	1: Gateway is active

Assignment of the command bits

	Bit	Bit						
Byte	7	6	5	4	3	2	1	0
0	Not used					Control bit	Redund- ancy switchover is initiated for edge	Activation of the right or left gateway
						change		
1	Not used							

The output word of the gateway enables the forcing of a redundancy switchover in the "Red switching" web server:

Meaning of the command bits

Designation	Meaning
Bit 2 = 0 Redundancy switchover is initiated	11 \rightarrow 01: Receiver is the passive gateway. The passive gateway requests control from the active gateway and becomes active.
	11 \rightarrow 10: Receiver is the active gateway. The active gateway gives control to the passive gateway and becomes passive.
Bit 2 = 1 Activation of the right or left gateway	11 $ ightarrow$ 01: Receiver is the left gateway. The left gateway requests control from the right gateway and becomes active.
	11 \rightarrow 10: Receiver is the right gateway. The right gateway requests control from the left gateway and becomes active.





104



www.turck.com