

# Valve island VS18/VS26 with PROFINET Interface

## Operation & Service Manual

Engineering GREAT Solutions







#### Change history:

The Change history reflects all changes of the Operation & Service Manual, which were done after the initial release.

Index	Chapter	Change description	Date	Name
001	All	Set up initial version	27/03/2017	
002	2	New chapter added	31/05/2017	
003	2.3, 9	ISEM description added, valve island extension added	03/11/2017	
004	2.4	Max. number of valve slices for ATEX valve islands added	04/12/2017	
005	2, 4.6, 9.1, 9.11, 11.2, 11.3	Power-up description updated, ATEX Note added, Mounting kit added, FW version and serial number added, New 2 station SPI board added, soft start valve rules added, technical data corrected	13/09/2018	

This Operation & Service Manual makes no claims of being complete as it does not cover all variants of the VS18/VS26 valve islands series at the moment.

Therefore this document is subject to extensions or changes.

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## **1** About this documentation

This Operation & Service Manual contains the information to set up and operate the VS18/VS26 valve island with PROFINET interface and to detect and resolve problems.

#### Note:

In addition to the specific information for the PROFINET variants, all data sheets for the VS18/VS26 valve island series are applicable and remain valid. The difference between the both variants consists of the sizes of valves and the resulting maximum flow rate. All electrical connections and parameterization are the same for both variants.

Refer also to the data sheets on the following web links:

- http://cdn.norgren.com/pdf/en\_5\_1\_250\_VS18.pdf
- http://cdn.norgren.com/pdf/en\_5\_1\_350\_VS26.pdf

Refer also to the installation video on the following web link:

https://player.vimeo.com/video/256919181

Further information about PROFINET is available on PI website.

- http://www.profinet.com
- http://www.profibus.com/download/

Basic information about PROFINET could be found in the following document:

"PROFINET Technology and Application – System"

Installation Guidelines could be found in the following documents:

- "PROFINET Guideline for Cabling and Assembly"
- "PROFINET Guideline for Commissioning"

## 2 Important hints

## 2.1 Grounding and equipotential bonding

Proper grounding and equipotential bonding are very important to protect against electromagnetic interferences in PROFINET networks. In order to reduce potential impact, grounding of the PROFINET cable screen should be done at both ends of every cable (i.e. at each device). Equipotential bonding ensures that the ground potential is identical throughout the entire PROFINET network and is essential to avoid equipotential bonding currents, which could otherwise flow through the PROFINET cable screen. Please refer for further details to the "PROFINET Installation Guideline for Cabling and Assembly" provided by the PROFINET user organization (http://www.profinet.com).

Ground connection needs to be established using the M4 thread on the rear of the connection module. Its location shows the red arrow on the following picture.



## 2.2 Intermediate supply/exhaust module (ISEM)

In cases where the channel diagnostics is activated on the valve island, the channel diagnostics setting should be disabled at the position of each ISEM. This needs to be done in order to avoid any misleading failure indication due to missing electronic components in the ISEM.

## 2.3 ATEX Note

Please refer to the corresponding ATEX installation instructions and the maximum permissible operating conditions for valve islands in an ATEX zone.

The maximum allowed power consumption is 20W. This corresponds to 16 simultaneously energized pilot valves. If a configuration consists of more than 16 pilot valves the user must undertake external actions (e.g. power-limited power supplies) to make sure that the power consumption of 20W is not exceeded.

For further details, please refer to the corresponding ATEX installation instructions or contact your Technical Support.

### 2.4 Power-up and initialization phase of the VS18/VS26 valve island

It is possible to read the actual installed firmware release using the TIA portal. Please refer to chapter 4.6 for more details.

#### 2.4.1 Firmware release V1.0.10 and lower

The valve island initializes automatically after power-up. During initialization the number of available valve stations is also evaluated, which requires that at this point also the power supply for the valves (VA) is already available during initialization start. Otherwise not all valve stations might be detected and initialization of the valve island fails. This failure case is indicated by the following permanent Status LED states:

- ⇒ P1 off
- ⇒ P2 off
- ⇒ BF off
- SF red
- VB green
- VA Green

#### 2.4.2 Firmware release V1.0.11 and higher

The above requirement is not applicable for the firmware release V1.0.11 and higher.

#### Note:

Before any changes are made on the hardware of the valve islands (i.e. adding or removing valve stations), the power supply must be completely disconnected by unplugging the power supply connector.

After the hardware change is completed, an automatic reinitialization is performed upon repowering of the station (VB voltage) again.

Any change of the valve island size requires a reconfiguration of the PLC / Hardware configuration for proper functioning and diagnosis.

### 2.5 Mounting kit 2-in-1

Every valve island delivery contains the mounting kit 2-in-1 (part number VS2672971-KG00) as shown in the below figure. This mounting kit can be used to mount the valve island either to the DIN rail or directly to the mounting panel.

- 1. Mounting nut DIN rail
- 2. Cylinder screw M4 x 8
- 3. Mounting bracket
- 4. Cylinder screw M4 x 25
- 5. Cylinder screw M4 x 36



#### 2.5.1 DIN-rail assembly without mounting bracket

- Insert screw M4 x 25 (4) into the left end plate (bus node) and position below the mounting nut (1)
- Insert screw M4 x 36 (5) into the right end plate and position below the mounting nut (1)
- Place the valve island on the DIN-rail
- Orientate straight flange of the mounting nuts towards the DIN rail
- ➡ Push the valve island on the DIN-rail and tighten screws with the torque of 1.0 1.1 Nm
- Check the fit of the valve island



DIN-rail assembly without mounting bracket

#### 2.5.2 Mounting panel assembly without mounting bracket

- Insert screw M4 x 25 (4) into the left end plate (bus node)
- Insert screw M4 x 36 (5) into the right end plate
- Place the valve island on the panel / wall
- ➡ Tighten screws with the torque of 1.0 1.1 Nm
- Check the fit of the valve island





#### 2.5.3 DIN-rail assembly using the mounting bracket

- Hook the mounting bracket (3) into the left end plate (bus node)

- Place the valve island on the DIN-rail
- Orientate straight flange of the mounting nuts (1) towards the DIN rail
- ➡ Push the valve island on the DIN-rail and tighten screws with the torque of 1.0 1.1 Nm
- Check the fit of the valve island



DIN-rail assembly using the mounting bracket



#### 2.5.4 Mounting panel assembly using the mounting bracket

- **C** Hook the mounting bracket (3) into the left end plate (bus node)
- Solution Solutio
- Solution ⇒ Insert screw M4 x 36 (5) on the right end plate
- Place the valve island on the mounting panel/ wall
- ➡ Tighten screws with the torque of 1.0 1.1 Nm
- Check the fit of the valve island



Mounting panel assembly using the mounting bracket



## 3 Electrical connections of the VS18/VS26 valve island



Top view VS18 with 8 stations

1. Port 1 bus connector for PROFINET

(4 pins M12 D-coded female connector)

2. Port 2 bus connector for PROFINET

(4 pins M12 D-coded female connector)

3. Power supply connector

(5-pins M12 A-coded male connector)

- 4. Status LEDs
- 5. Valve status LEDs

## 3.1 PROFINET Bus connectors Port 1 & Port 2



M12 / 4 pins / female / D-coded				
Pin no.	Function			
1	Transmission Data + (TD+)			
2	Receive Data + (RD+)			
3	Transmission Data - (TD -)			
4	Receive Data - (RD -)			
Housing	FE (functional earth)			

## 3.2 POWER supply connector



M12 / 5 pins / male / A-coded	
Pin no.	Function
1	L1 (VB+) 24V electronics power supply
2	N2 (VA-) 0V valves power supply
3	N1 (VB-) 0V electronics power supply
4	L2 (VA+) 24V valves power supply
5	FE (functional earth)

## 4 Commissioning

The method of PROFINET module installation strongly depends on the configuration software. Please refer to the configuration software manual.

All the examples in this document are made with Siemens TIA Portal V13.

### 4.1 **GSDML** file installation

A device description file (GSD-file) is needed for configuration of the valve island. The GSD-file is in XML Format (GSDML) and could be used for both variants VS18 and VS26:

SGSDML-V2.32-IMI\_Norgren-Vx\_IMI-JJJJMMDD.XML

Note: "JJJJMMDD"(JJJJ- year, MM-month, DD-day) is date of release

The GSDML file has to be installed inside the engineering tool of the PROFINET controller.

The symbol file is used to visualize the device in the engineering tool. XML files are provided by the device vendor and can be downloaded from:

https://www.imi-precision.com/uk/en/technical-support/software

Open GSDML-file Import editor:

"Options" -> "Manage general station description files"

Manage general station description files Source path: C:\Users\sieglej\Desktop\GSD	ML			×
Content of imported path				
File	Version	Langu	Status	Info
GSDML-V2.32-IMI_Norgren-Vx_IMI-201704	V2.32	Englis	Not yet installed	Bus Co
<				>
			Delete Install	Cancel

After the successful installation of the GSDML-file the VS18/26 is listed in the Hardware catalog.



#### 4.2 Hardware configuration: Select valve island

After successful GSDML installation the valve island appears in category "Other field devices >...>  $Vx_IMI$ ".

Drag the Vx\_IMI valve island entry and drop it into the PROFINET-IO system.

Hardware catalog	
Options	
✓ Catalog	
<search></search>	init init
Filter	
Controllers	
🕨 🛅 HMI	
PC systems	
Drives & starters	
Network components	
🕨 🫅 Detecting & Monitoring	
Distributed I/O	
Field devices	
👻 🛅 Other field devices	
- Im PROFINET IO	
Drives	
Encoders	
🕨 🧰 Gateway	
▶ 🛅 1/O	
Ident Systems	
Sensors	
✓ I Valves	
<ul> <li>IMI Norgren</li> </ul>	
✓ Im IMI Vx Series	
Vx_IMI	
Vx_IMI_PN	
PROFIBUS DP	

Hardware catalogue after installation of the XML file

1	Vy-IMI
315F-2 PN/	

View after adding the valve island

😥 IMI NORGREN

As a next step the valve module has to be assigned to slot 1. The following table shows which valve module has to be chosen for which physical configuration.

Please check the correct number of valve slices on the valve island. An empty slice is also counted as a valve slice.

Number of valve slices	Module Name
4	"VS with 04 slices"
6	"VS with 06 or 08 slices "
8	"VS with 08 or 10 slices "
10	"VS with 10 or 12 slices "
12	"VS with 10 or 12 slices "
14	"VS with 14 or 16 slices "
16	"VS with 14 or 16 slices "
18	"VS with 18 or 20 slices "
20	"VS with 18 or 20 slices "

Table: Device name assignment



**Device selection** 



cait view insert Unline Options loais window	felp	Totally Integrated Automatic
Save project 📓 🐰 🗄 🕞 🗙 🍤 🕯 🖓 🖽	🛛 🖳 🕼 🌽 Goonline 🖉 Gootline 🛔 🔃 🔯 🛪 🔄 🛄	POT
ct tree 🔲 🕻	PROFINET Board + PLC_1 [CPU 315F-2 PN/DP] + Distributed I/O + PROFINET IO-System (100): PN/IE_1 + Vx-IMI	Hardware catalog
rices	🖉 Topplagy view 👘 Network view 🕅 Device vie	ew Options
	t Valid Professional Control C	
	The second secon	
	Kindule     K	Catalog
Add appudquice	VelM     0     0     2042*     Vx IM     M Vx	_ Gearch>
Pada new device	Interface 0 0 X1 2041* VxHM	Filter
m Dic 1 (chi 2155.2 ph/pb)	VS with 10 or 12 slices_1 0 1 02 VS with 10 or 12 slices	→ Tead module
IN Device configuration	- IMI	MUXV M
V. Online & diagnostics		✓ Module
Program blocks		
Technology objects		VM10 with OB slices
Se External source files	0 6	VM10 with 10 slices
PLC tags		VM10 with 12 slices
PLC data types		VM10 with 16 slices
Watch and force tables		▼ III VSix
Q Online backups		VS with 04 slices
E Device proxy data		V5 with 06 or 08 slices
212 Program info	0 12	VS with 10 or 12 slices
PLC alarms	0 14	VS with 14 or 16 slices
Text lists	0 15	VS with 18 or 20 slices
Local modules	0 16	
Distributed NO		
2 Unassigned devices		
talls your		
		2
	VS with 10 or 12 sizes 1 (Module)	
	General 10 tage Sustant construits Tagte	-
	General IO Lags System constants 1 exts	12
	General     Module parameters	-
	Catalog internation	
	No diversities General Parameters	
	IU addresses	
	Carbie voltage diagnostics	
	Value Diagnostice	
	Enable valve diagnostics	
	Discontribution and a state to a final state	
	Disginadus verve or side im Dosauleu	
	Diagnostics valve 01 side 17 Disabled	
	Diagnostics valve 02 side 4: Disabled 🔹	
	Diagnostics valve 02 side 12: Disabled	
	Diagnostics valve 03 use 14: Disabled	
	Descente on a 2 data 32 Dischlad	
	ulaginostics vaive us ide izz. Una soled	
	Diagnostics valve Of side 14: Disabled	X Intermetica
	Diagnostics valve 04 side 12: Disabled	• Innormation

Device overview						
1 Module	 Rack	Slot	I address	Q address	Туре	Article number
Vx-IMI	0	0	2042*		Vx_IMI	IMI Vx
<ul> <li>Interface</li> </ul>	0	0 X1	2041*		Vx-IMI	
VS with 10 or 12 slices_1	0	1		02	VS with 10 or 12 slices	
	0	2				
	0	3				
	0	4				
	0	5				

View after adding VS device with 10 or 12 valve stations

## 4.3 Identifying devices in the network "Blink Test"

PROFINET devices are identified by using their MAC address and device type. Use the configuration tool to identify all PROFINET modules in the network.

"Online" -> "Accessible devices"

ccessible devices					
	Arressible podes of th	Type of the PG/PC interfa PG/PC interfa	ce: 🖳 PN/IE ce: 🔝 ASIX	AX88178 USB2.0 to Gig	abit Ethernet Ad 💌 💎 🞑
			-		luce of the
	Device	Device type	Туре	Address	MAC address
	Accessible device	SCALANCE X-200	ISO		00-1B-1B-CF-D3-69
	pic_1	CPU 315F-2 PN/DP	PN/IE	192.168.0.1	28-63-36-2F-D7-8C
💽 Flash LED					
Online status informatio	on:				<u>S</u> tart search
	nformation				~
Scan and informat	ion retrieval completed.				
Display only error n	nessages				
					<u>Show</u> <u>C</u> ancel

Mark an available valve island and enable checkbox "Flash LED". This activates the LEDs: BF, SF, VB and VA flashing in green color for 3 seconds.

PORT2
O P1
OP2
O BF
● SF
O VB
O VA
PORT1

#### 4.4 Assignment of device name

Before the PROFINET communication between PROFINET controller and valve island is able to start, a unique device name has to be assigned. The device name is stored on the valve island.

#### Note:

Several engineering- and service tools are able to assign PN device names (E.g. PROFINET Commander, PRONETA, TIA). There are also different ways to assign the device name in TIA Portal.

Right Click on the valve island in the "Network View" of TIA opens its context menu in "Onlinemode". Press "Assign device name" item to open the "Assign PROFINET device name" dialog.

U:           Vx-IMI           Vx_IMI           PLC_1	Device configuration Change device Write IO-Device name to Micro M Start device tool	lemory Card
	K Cut	Ctrl+X Ctrl+C
	📋 Paste	Ctrl+V
	X Delete	Del
	Rename	F2
	🚽 Go to topology view	
	Compile	)
	Download to device	•
	💋 Go online	Ctrl+K
	💋 Go offline	Ctrl+M
	Q Online & diagnostics	Ctrl+D
	Assign device name	
	Receive alarms	
	Update and display forced opera	ands
	Cross-reference information	Shift+F11
	Roperties	Alt+Enter
	Export module labeling strips	

Enter a unique device name for the valve island in the "PROFINET device name" field. Push the "Assign name" button to assign the entered device name.

ssign PROFINET devic	e name.						>
		Configured PRO	FINET devi	ce			
		PROFINET devic	ce name:	vx-imi		•	
4		Dev	vice type:	Vx_IMI			
		Online access					
		Type of the PG/PC	interface:	PN/IE		•	
		PG/PC i	interface:	ASIX AX88178 USB2	.0 to Gigabit Ether	rnet Ad 💌 🖲 ⊴	
طي		Device filter					
<b>2</b>		🛃 Only show	devices of th	e same type			
		Only show	devices with	bad parameter setting:	;		
		Only show	devices with	out names			
	a. 0.1248-12						
	Accessible de	vices in the network:	Device type	PROFINET device name	Ctatur		
	0.0.0.0	00-11-82-00-FF-30	IMI Vx Ser	-	No device r	name assigned	
<b></b>							
🔲 Flash LED							
	<						>
					Update list	Assign name	
Online status informatio	n:						
6 Search complete	d. 1 of 3 devices v	vere found.					
<			111.5				>
						Close	-
						1 11 15 14	_

Assign PROFINET device name dialog

After successful name assignment the status of the valve island in the device list will change to OK.

	IP address	MAC address	Device type	PROFINET device name		Status	
	0.0.0.0	00-11-82-00-FF-30	IMI Vx Ser	vximi	0	ок	
Flash LED	-						
	<			III			ľ

List with accessible devices in the network

#### 4.5 Parameterization

During system startup a parameter set is loaded to the valve island by the PROFINET controller. The parameter set of the valve module is divided into the sections "General Parameters", "Valve Diagnostics" and "Substitute behavior".

Those parameters are accessible on the "Properties" page of the valve module using the "Device view" of TIA.

Vx-IMI_1		• • • • • • • • • • • • • • • • • • •	Device overview	l					
		-	Module		Rack	Slot	I add		
	~		▼ Vx-IMI_1		0	0			
	AT 181		Interface		0	0 X1			
		The local data in the	VS with 04 sli	ces_1	0	1			
			-		0	2			
	-				0	3			
		IMI	-		0	4			
		Presidee Ergineeing			0	5			
					0	6			
			_		0	7			
* I.m.	1 750				0	8			
< [ III ]	/5%						100		
VS with 04	slices_1 [Module]								
General	IO tags Sy	stem constants Texts							
✓ General Catalog i	nformation	Module parameters							
Module par	ameters	General Paramete	ers						
I/O address	es								
	1		Enable voltage diagnostics						

#### 4.5.1 General Parameters

It is possible to enable/disable the voltage monitor of the valve module.

If disabled, in case of over/under voltage no PROFINET diagnostic alarm appears and the relating LEDs on the valve island don't change from green to red color as well. Otherwise, a PROFINET module diagnostic alarm appears (error code see chapter 7) and the relating LEDs on the valve island change to red (see also chapter 6.1).

x-IMI [Mod	ule]				
General	IO tags	System of	constants	Texts	
General Catalog i	nformation		Module	parameters	
PROFINET int	terface [X1] n & Maintenand	e	Genera	al Parameters	
Module para	imeters				Enable voltage diagnostics
Diagnostics	addresses				
Shared Devi	ce				

Default configuration: Voltage diagnostic is enabled

#### 4.5.2 Valve Diagnostics

It is possible to enable/disable the valve diagnostics (channel diagnostic) in general or for each single solenoid. If disabled, in case of a wire break or a short circuit of a solenoid no PROFINET diagnostic alarm appears and the SF LED remains green as well. Otherwise a PROFINET channel diagnostic alarm appears (with error code and channel number) and the SF LED changes state (see also chapter 6.1).

<	> 75%			<		III
VS with 04	slices_1 [Mode	ule]				
General	IO tags	System constants	Texts			
✓ General Catalog	information	Modu	le parameters			
Module par	rameters	Gei	neral Parameter	s		
I/O address	ses					
Hardware i	dentifier				Enable voltage diagnostics	
		Val	ve Diagnostics			
					Enable valve diagnostics	
			Diagnostics valve (	0 <mark>1 side 1</mark> 4:	Enabled	
			Diagnostics valve (	01 side 12:	Disabled	F
			Diagnostics valve (	02 side 14:	Disabled	•
			Diagnostics valve (	02 side 12:	Disabled	
			Diagnostics valve (	03 side 14:	Disabled	•
			Diagnostics valve (	)3 side 12:	Disabled	
		•	Diagnostics valve (	04 side 14:	Disabled	F
			Diagnostics valve (	04 side 12:	Disabled	

Default configuration: Valve diagnostic is disabled

#### 4.5.3 Substitute behavior

It is possible to define the behavior of the outputs in case of "IOPS = Bad" (PLC stopped) or broken PROFINET communication. The following states could be defined by the outputs:

- Clear output
- Set output
- ➡ Freeze output

VS with 04 sli	ices_1 [Mod	lule)				
General	IO tags	System constants	Texts	1		
General Catalog inf	formation	Dia	nostics valve	04 side 12:	Disabled	-
Module paran	neters	Substi	tute behavi	our		
		Rea	ction to CPU/M	laster STOP:	Switch to substitute value	•
		Sub	stitute value \	/01 side 14:	All valves off Switch to substitute value	
		Sub	stitute value \	/01 side 12:	Frezze last value	
		Sub	stitute value \	/02 side 14:	Off	
		Sub	stitute value \	/02 side 12:	Off	
		Sub	stitute value \	/03 side 14:	Off	
		Sub	stitute value \	/03 side 12:	Off	
		Sub	stitute value \	/04 side 14:	On	
		Sub	stitute value \	/04 side 12:	On	

Default configuration: All valves off

#### 4.6 Firmware version and serial number

It is possible to read the actual installed firmware version and serial number of the device using the TIA portal.

Connect to the PLC by clicking the "Go Online" button.

🖥 🛄 🌆 🚆 🞇 💋 Go online 💋 Go offline

Double click the Vx Module on Slot 0 in the "Device View"



Tab "General" shows the Module and Manufacturer information such as the Firmware version or Serial number.

Labor_01  Ungrouped device	ces VSxx_8Station [Vx_IMI]	
<ul> <li>Diagnostics</li> </ul>	General	
General		
Chappel diagnostics	Module	
PROFINET interface [X1]	Short designation:	Vx IM
Functions	ârticle pumbori	DALV6
	Aracle number.	
	Hardware:	2
	Firmware:	V 1.0.11
	Firmware expansion:	
	Rack:	0
	Slot:	0
	Modulo information	
	Module name:	VSxx_8Station
	Plant designation:	
	Location ID:	
	Installation data:	
	instandion dete.	
	Additional Information:	
	Manufacturer information	
	Manufacturer description:	
	Serial number:	B7432A0001
	Copyright entry:	
	Profile	16#0000
	rionie.	1010000



**4.7 Compilation and download** After finished configuration please compile the project and download it to the PROFINET controller (PLC).



## 5 Output data

## 5.1 Address assignment

To calculate the length of the used output data (in bytes) for the VS18/VS26 valve configuration please use the following formula:

$$B(Bytes) = \frac{V * 2 + ((V * 2)MOD8)}{8}$$

 $V \in \{4,6,8,10,12,14,16,18,20\}.$ 

Whereby 'V'= number of valve slices and 'MOD' = Modulo-Operator





The picture shows VS valve island with 6 valve slices

byto	Bit						Bit total valve number										
Dyte	7	6	5	4	3	2	1	0	4	6	8	10	12	14	16	18	20
0	V 04		V 03		V 02		V 01		V	$\checkmark$	$\checkmark$	$\vee$	$\vee$	$\vee$	$\vee$	V	$\vee$
	S 12	S 14	S 12	S 14	S 12	S 14	S 12	S 14	^	^	^	^	^	^	^	^	^
1	V 08		V 07		V 06		V 05			$\vee$	$\vee$	V	V	V	V	V	$\sim$
	S 12	S 14	S 12	S 14	S 12	S 14	S 12	S 14		X	X	×	X	X	X	X	~
2	V 12		V 11		V 10		V 09					V	V	V	V	X	X
	S 12	S 14	S 12	S 14	S 12	S 14	S 12	S 14				X	X	X	X	X	X
3	V 16		V 15		V 14		V 13							V	V	X	X
Ŭ	S 12	S 14	S 12	S 14	S 12	S 14	S 12	S 14						X	X	X	X
4	V 20		V 19		V 18		V 17									X	
	S 12	S 14	S 12	S 14	S 12	S 14	S 12	S 14								Х	Х

The table below shows the assignment for maximum configuration of 20 valve slices. For every valve two bits will be reserved – one bit for solenoid 14 and one bit for solenoid 12.

(V = Valve no., S = Solenoid side, X = Bytes reserved )

## 5.2 Output behavior at power up and in fault condition

At power up all outputs are cleared. The initialization phase of the valve island is indicated by a one by one activation of the status LEDs BF, SF, VA, VB and the status LEDs of the valve stations.

In case of fault condition (broken communication, "IOPS = bad") the outputs switch to those values which are configured in the "substitute behavior" parameter set (see also chapter 4.5.3).

## 6 Diagnostics and LEDs

## 6.1 Status LEDs

#### 6.1.1 Status LEDs description

LED Name	Description
P1	Link Port 1 (TX/RX & Link)
P2	Link Port 2 (TX/RX & Link)
BF	Bus Error
SF	System Error
VB	Electronic Power Supply Status
VA	Valve Power Supply Status



#### 6.1.2 Link states for Port P1 and Port P2

Link Status	LED State
Link connection established	yellow
Link communication active	flashing yellow / green
Link connection not established	off

#### 6.1.3 Bus Error Status LED (BF)

Bus Status	LED State
No error	green
Device is offline	red
Hardware configuration and parameterization is not plausible	flashing, red
IOPS = BAD	tripple flashing, red
PROFINET Software is not initialized	off

## 6.1.4 Error Status LED (SF)

System-Status	LED State
No error	green
Solenoid, short circuit or open circuit	flashing, red
Error, internal communication	double flashing, red
Fatal error	tripple flashing, red
Hardware configuration is not plausible	red
Device is not initialized	off

#### 6.1.5 Electronics Power Supply Status, LED (VB)

Status	LED State
Voltage OK	green
Undervoltage	flashing red
Overvoltage	permanent red

#### 6.1.6 Valve Power Supply Status, LED (VA)

Status	LED State
Voltage OK	green
Undervoltage	flashing red
Overvoltage	red
Overvoltage	red

## 6.2 Valve slice Status LEDs



Valve LEDs Side 14

Each valve slice has one or two separate status LEDs depending on its configuration, which indicate the control states "14" and "12" for the corresponding pilot valve solenoids.

Status	LED State
Valve not powered	off
Valve powered	on

### 6.3 Online diagnostics with Siemens TIA Portal

Use the "Network View" or "Device View" and "Go online" for PROFINET diagnostics of the network or device.

#### 6.3.1 Wrong module

In case of a mismatch between configured module and physically module on slot 1 the module is marked with a parameter error symbol in the "Device overview" of the "Device view".

Vx-IMI		💽 🖽 🕊 🛃 🗄 🍳 ±		Gerät	eübersicht			
			^	1	augruppe	 Baugr	Steck	I
				6	<ul> <li>Vx-IMI</li> </ul>	0	0	
	12-1241				Interface	0	0 X1	
	*			0101	VS mit 18 oder 20 Ventilstationen_1	0	1	1
		194 	-			0	2	
			•			0	3	
		10.01				0	4	
			<u>•</u>			0	5	
		Pression of Control				0	6	
						0	7	
						0	8	
						0	0	

Double click the symbol to change into diagnostics view of the module. Highlight the "Diagnostic status" line to get detailed information about the pending module diagnostics.

<ul> <li>Diagnostics</li> </ul>	Diagnostic status	
General		
Diagnostic status	Status	
Channel diagnostics		
	Module exists. Input/output data not available.	
	· · · · · · · · · · · · · · · · · · ·	
	Message	
	Parameter error	
	Show help	
	Diagnostics in hexadecimal	
	The module has detected a parameter assignment error.	

#### 6.3.2 Module diagnostics (e.g. under/overvoltage)

In case of pending module diagnostics of the valve island (e.g. under/overvoltage) the module is marked with a red symbol in the "Device overview" of the "Device view".

dt-	Vx-IMI	• 🖽 🖾 🐔		Devi	ce overview			
			^	1	Module	 Rack	Slot	I add
					▼ Vx-IMI	0	0	204
	AND IN THE REAL OF				Interface	0	0 X1	204
					VS with 04 slices_1	0	1	
	1					0	2	
						0	3	
		10.01				0	4	
						0	5	
						0	6	
						0	7	
			-			0	8	
			7			0	9	

Double click the red symbol to change into diagnostics view of the module. Highlight the "Diagnostic status" line to get detailed information about the pending module diagnostics.

biognostics	Diagnostic status						
General							
Diagnostic status	Status						
Channel diagnostics							
	Error						
	Standard diagnostics						
	Message						
	Overvoltage Valve Power Supply						
	Overvoltage Valve Power Supply Overvoltage Power Supply						
	Overvoltage Valve Power Supply Overvoltage Power Supply						
	Overvoltage Valve Power Supply Overvoltage Power Supply						
	Overvoltage Valve Power Supply     Overvoltage Power Supply	>					
	Overvoltage Valve Power Supply     Overvoltage Power Supply     Vervoltage Power Supply     Show help     Diagnostics in hexadecimal	•					
	Message       Overvoltage Valve Power Supply       Overvoltage Power Supply       Im       Diagnostics in hexadecimal       Overvoltage Valve Power Supply	•					
	Message       Overvoltage Valve Power Supply       Overvoltage Power Supply       Im       Diagnostics in hexadecimal       Overvoltage Valve Power Supply	•					

#### 6.3.3 Channel diagnostics (e.g. wire break of solenoid)

In case of pending channel diagnostics of the valve island (e.g. wire break or short circuit of a solenoid) the module is marked with a red symbol in the "Device overview" of the "Device view".

de Vx-IMI	• • • •		Device overview			
		^	Module	 Rack	Slot	I add
			🗹 🔻 Vx-IMI	0	0	204
A STATE			🛛 🖌 🕨 Interface	0	0 X1	204
			VS with 04 slices_1	0	1	
		1		0	2	
				0	З	
	10.01			0	4	
				0	5	
	Trease in the local of the	1		0	6	
				0	7	
		-		0	8	
		7		0	9	

Double click the red symbol to change into diagnostics view of the module. The channel number and the error reason are shown in the "Channel diagnostics" table.

<ul> <li>Diagnostics</li> <li>General</li> </ul>	Channe	l diagnostics	;
Diagnostic status			
Channel diagnostics			
	-	Channel no.	Error
		5	Wire break
		7	Short-circuit
	-		
		<	

The allocation between channel number and solenoid is shown in the following table:

Valve 14	V04-12	V04-14	V03-12	V03-14	V02-12	V02-14	V01-12	V01-14
Channel number	8	7	6	5	4	3	2	1
Valve 58	V08-12	V08-14	V07-12	V07-14	V06-12	V06-14	V05-12	V05-14
Channel number	16	15	14	13	12	11	10	9
Valve 912	V12-12	V12-14	V11-12	V11-14	V10-12	V10-14	V09-12	V09-14
Channel number	24	23	22	21	20	19	18	17
Valve 1316	V16-12	V16-14	V15-12	V15-14	V14-12	V14-14	V13-12	V13-14
Channel number	32	31	30	29	28	27	26	25
Valve 1720	V20-12	V20-14	V19-12	V19-14	V18-12	V18-14	V17-12	V17-14
Channel number	40	39	38	37	36	35	34	33

## 7 **PROFINET error codes**

Error code	Error description	Associated LED
(hexadecimal)		
0x00	OK, no errors	"SF" LED, green
0x01	Solenoid, short circuit	"SF" LED, flashing red
0x06	Solenoid, open circuit	"SF" LED, flashing red
0x100	Undervoltage VB electronic supply	"VB" LED, flashing red
0x101	Overvoltage VB electronic supply	"VB" LED, red
0x102	Undervoltage VA valve supply	"VA" LED, flashing red
0x103	Overvoltage VA valve supply	"VA" LED, red

## 8 **Properties PROFINET interface**

Requirements		Comments
Number of ports	2	
Transfer speed	100Mbit/s	
Duplex mode	Full Duplex	
RT mode	supported	Real Time Protocol
IRT mode	supported	Isochronous Real Time Protocol
MRP mode	supported	Media Redundancy Protocol (possible to switch between redundant transmission paths)
PROFINET (certification by PNO)	Compliant to IEC61158, Conformance Class C according to IEC61784	
Adressing mode	DCP, LLDP + SNMP (Device exchange by the same topology)	
GSD Language	EN + DE	

## 9 Valve island extension

Valve islands can be extended using the 2- and 4-station PCBs as described in this chapter. The following PCBs are available for the extension:



VS2672762-KG00 4 station PCB



VS2672761-KG00 2 station PCB

shall only be mounted at the end in below configurations



VS2672764-KG00 (new) 2 station PCB

## 9.1 Overview – preferred combinations SPI boards

Below illustration shows an overview of the preferred combinations of existing PCBs in order to build the required number of valve stations.



#### Note:

It is generally possible to use the new 2 station PCBs (VS2672764-KG00) on all positions but it is recommended to use the above combinations.

In special cases with increased modularity requirements, the product support should be contacted.

The below sections show the preferred combinations of the existing SPI boards for various valve island configurations.



## 9.2 Valve island with 4 stations



## 9.3 Valve island with 6 stations





## 9.4 Valve island with 8 stations





## 9.5 Valve island with 10 stations





## 9.6 Valve island with 12 stations



## 9.7 Valve island with 14 stations



## 9.8 Valve island with 16 stations



## 9.9 Valve island with 18 stations



## 9.10 Valve island with 20 stations



## 9.11 Usage of Soft-start valves

Soft-start valves are only available for VS26.

Maximum number of soft-start valves in one valve island is 4.

Use always 2 single blank PCBs (VS2672763-KG00) with 1 soft-start valve (VS2672530-KG00).



VS2672530-KG00

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VS2672763-KG00

Up to 4 soft-start valves may be added at even positions (0, 2, 4, ...20, 22, 24).

See below some configurations as examples when using the soft-start valve. Only number/ positions of valve slices + blanking plates + ISEM plates are counted with respect to station numbering in below configurations.

Note: Only the new 2-station PCB (VS2672764-KG00) should be used in the below configurations.



## 10 Electrical data

Details	Comments		
Valve voltage range (VA) Electronics voltage range (VB)	24VDC +/-10% 24VDC +/-25%	PELV PELV	
Maximal currents:	VA: 150mA + n x 30mA VB: 400mA	n = number of activated valves	
Voltages are galvanic decoupled	Yes		
Protection against polarity reversal	VA, VB		
Overcurrent protection VB, VA	irreversible	Protection against overload and short-circuit currents, fused with 2A slow-acting fuse	
PE/FE/Ground connection	M4 thread on the rear of the connection module	Reference section 2.1	
Electrical power supply connection	M12 / 5-pin / A-coded / male connector	M12-1: L1 (VB+) M12-2: N2 (VA-) M12-3: N1 (VB-) M12-4: L2 (VA+) M12-5: FE	
Bus connection	M12 / 4-pin / D-coded / female connector	M12-1: TD+ M12-2: RD+ M12-3: TD- M12-4: RD-	

## 11 Technical data

## 11.1 Technical data VS18 and VS26

#### Medium:

Compressed air, filtered to 40µm, lubricated and non - lubricated

#### Operation: VS18G / VS26G: Glandless spool valve, solenoid pilot actuated

VS18S / VS26S: Softseal spool valve, solenoid pilot actuated

Mounting: Sub-base

#### Operating pressure: Maximum pressure 10 bar VS18S / VS26S models and VS18G / VS26G solenoid pilot actuated valves with internal pilot supply 16 bar VS18G / VS26G solenoid pilot actuated valves with external pilot supply

Ambient temperature: -15°C to +50°C

#### Medium temperature: -5°C to +50°C (Consult our Technical Service for use below +2°C)

Materials: Body/sub-base:	die-cast aluminium
Glandless spool & sleeve:	Aluminium, hard anodized, Teflon coated
Softseal spool:	Aluminium with HNBR seals
Plastic parts:	POM, PA, PPA
Mounting sheets / srews:	Steel, zinc coated
Springs:	Stainless steel
Sandwich plates:	Aluminium bar materials, PA
Electrical contacts:	Brass, tin coated
PCB:	Glass epoxy



## 11.2 Technical data VS18

#### Ports 2+4: G1/8, NPTF 1/8, PIF 8 mm, PIF 6 mm, PIF 1/4

Valves: ISO 15407-2 - 18 mm

Flow – values measured at 6 bar inlet pressure and with a pressure drop of 1 bar:

Series	Function	Q <sub>N</sub> [L/min]	C∨ [US Gal/min]	K <sub>v</sub> [m³/h]
VS18G	5/2	550	0,56	0,48
VS18G	5/3	550	0,56	0,48
VS18S	2x2/2	550	0,56	0,46
VS18S	2x3/2	600	0,61	0,52
VS18S	5/2	650	0,66	0,57
VS18S	5/3	650	0,66	0,57

## 11.3 Technical data VS26

Ports 2+4: G1/4, NPTF 1/4, PIF 10 mm, PIF 8 mm, PIF 3/8

Valves: ISO 15407-2 - 26 mm

Flow – values measured at 6 bar inlet pressure and with a pressure drop of 1 bar:

Series	Function	Q <sub>N</sub> [L/min]	C <sub>v</sub> [US Gal/min]	K <sub>v</sub> [m³/h]
N/0000	5/0	4000	4.00	0.07
VS26G	5/2	1000	1,02	0,87
VS26G	5/3	1000	1,02	0,87
VS26S	2x2/2	1150	1,17	1,00
VS26S	2x3/2	1250	1,27	1,09
VS26S	5/2	1350	1,37	1,18
VS26S	5/3	1350	1,37	1,18



### **Customer support**

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