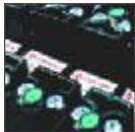


Manual instruction

Valve island VS18/VS26 M with Siemens ET200pro



7503552.05.06.08 / Version 1.1 march 2009

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1 ABOUT THESE INSTRUCTIONS

These instructions contain important information required for safe and proper installation, operation and simple repair of VS18/26 MODULAR valve islands in combination with the SIEMENS ET200pro field bus system (referred to as VSxxM in the following).

Read these instructions and especially the section 2 "For your safety" before starting up or working with the VSxxM system.

Additional documentation:

VSxxM is a component of an overall system. Observe the instructions and system documentation of other manufacturers. For documentation about Siemens ET200Pro go to www.automation.siemens.com

2 FOR YOUR SAFETY

VSxxM has been manufactured according to current technical standards and recognised safety-related regulations. Non-compliance with the general safety instructions, warnings and procedural instructions contained in these instructions could result in personal injury and property damage.

- Therefore you should read these instructions thoroughly before working with the VSxxM. Store the instructions so that they are available to all users at all times.
- Always provide third parties with these instructions together with the VSxxM.

2.1 INTENDED USE

- VSxxM is intended to be used to control electronic sensors and actuators as well as controlling and regulating compressed air in pneumatic systems.
- Only use VSxxM in industrial pneumatic systems.
- Operating medium: Filtered compressed air (40µm), oiled or oil-free

Intended use includes having read and understood these instructions and especially the section 2 "For your safety".

2.2 NON-INTENDED USE

- VSxxM shall not be used in hydraulic systems.
- VSxxM shall not be used to conduct aggressive gases.
- VSxxM shall not be used to conduct liquids.
- VSxxM shall not be used in EX areas.
- Non-intended use includes any use of the VSxxM
 - o not listed in these instructions.
 - o under conditions other than those described in these instructions.

2.3 QUALIFICATION OF PERSONNEL

Installation, removal, startup and operation require basic pneumatic and electrotechnical knowledge as well as familiarity with the respective special terminology. In particular, knowledge of field bus technology is required. Installation, removal, start-up and operation must therefore only be performed by a pneumatics specialist or a trained person with instructions and supervision from a specialist. Specialists are capable of assessing the work assigned to them, detecting possible hazards and performing the appropriate safety measures based on their professional training, their knowledge and experience as well as their knowledge of the relevant specifications. The specialist has to observe the relevant regulations pertaining to the specific area.

2.4 WARNINGS IN THESE INSTRUCTIONS

These instructions include warnings beside procedural instructions for procedures with risk of personal injury or property damage. The described hazard prevention measures are to be observed. Warnings are indicated as follows:



The following signal words are also used:

CAUTION

Indicates a **potentially dangerous situation**, which could result in property damage and injuries.

WARNING

Indicates **possible danger**, which could result in property damage and serious injuries

DANGER

Indicates **possible danger**, which could result in serious property damage and injuries or death

2.5 YOU MUST OBSERVE THE FOLLOWING

General safety information



DANGER: Non-observance of the following notes and procedural recommendations could result in hazards due to uncontrolled system operating conditions. System components are exposed to high pressure. Hoses that become disconnected could cause injury.

- Please note that systems, lines, valves and other components under pressure cannot be disassembled.
- The surface of the pilot valves can become very hot during continuous use and result in burns.
- Valves with NO function (zero flow setting) are opened without voltage. Safety measures have to be implemented to prevent unintentional leakage of the medium upon startup.

- Voltage must always be switched off prior to installing or removing electrical connections
- Prevent sharp bends in the connection lines and cables to avoid short circuiting and interruptions in the power supply.
- The valve islands must never be used as levers or steps.
- Please note the instructions pertaining to power supply and ground connections
- Please pay attention to the regulations for accident prevention and environmental protection in the country of use and at the workplace. Always observe country-specific regulations.
- Use the VSxxM exclusively in the performance range specified in the technical data.
- Never expose the VSxxM to bending or torsion. Protect the VSxxM from falling objects
- Check to make sure valve island classification and labeling on the device are suitable for the application
- Perform the appropriate measures to prevent unintentional activation or impermissible impairment.

Prior to installation

- Make sure all relevant system components are free from pressure and voltage before installing the VSxxM.
- Before connecting the device, it should be ensured that the specified technical data such as air properties, operating pressure, voltage, current type, power input, operating temperature and ambient temperature match the existing operating conditions.
- Make sure no impurities enter the system after removing the packaging.

During installation

- Only use suitable hoses and accessories
- Make sure the seals are not damaged.
- Make sure all the connections of the VSxxM are properly connected.
- The specified torques have to be observed to prevent damage to the product.
- VSxxM contains electronic assemblies that can be damaged by electrostatic discharge. Therefore you should make sure that you are grounded when working on the VSxxM.

Prior to startup

- It is to be ensured that there is no risk due to the medium leaking from unsealed openings the first time the device is electrically started.

During operation

- Only use compressed air with the properties specified in the technical data as a medium.
- Never disconnect electrical or pneumatic connections during operation or under pressure

Removal and replacement

- Make sure all relevant system components are free from pressure and voltage before removing and replacing the VSxxM.

During disposal

- Dispose of the VSxxM according to the requirements of the country in which it is used.

3 VSxxM MODULAR VALVE ISLAND

Function only in combination with Siemens ET200pro

Configuration includes Norgren valve island VS18M/VS26M and Siemens ET200pro. (Figure1: VSxxM valve island)



Figure1: VSxxM valve island

- Customised configuration includes Norgren valve island VS18M/VS26M and Siemens ET200pro.
- Configuration, assembly, functional testing and delivery by Norgren with an article number.



Figure2: VSxxM valve island, pneumatic part

3.1 PNEUMATICS

- Designed according to ISO15407-2
- profile rail or panel mounting
- Isolated power supplies to valve and control electronics
- Visual LED diagnosis display
- Individual diagnostics of solenoid valves using SIEMENS SIMATIC Step7 controller
- Protection class IP65

3.2 SOFT START DUMP VALVE

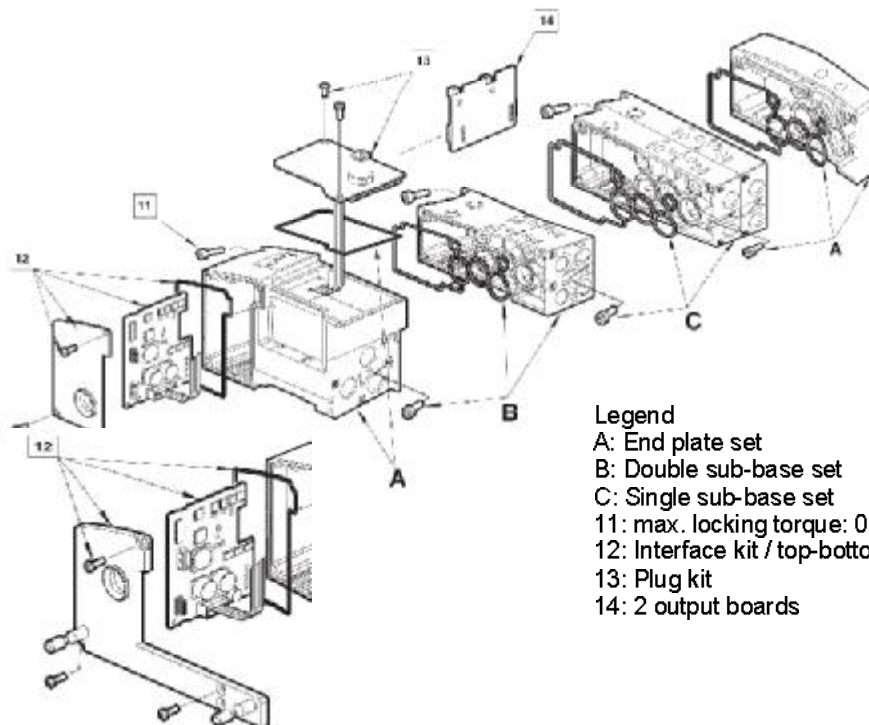
- This soft start dump valve is suitable for use in safety systems up to SIL1 and inspected by TÜV according to IEC61508.
- Design of the intermediate plates
- integrated safety silencer
- Lockable manual auxiliary operation
- Soft start dump valve can be added at any point even multiple times



Figure3: Soft start dump valve

3.3 MODULAR SETUP

- Valve islands can be universally configured.
- Variable valve arrangement in steps of two, from 2 to 16 valves using the same modules
- Designed for easy expansion and self-assembly



Legend

- A: End plate set
- B: Double sub-base set
- C: Single sub-base set
- 11: max. locking torque: 0,8..0,9Nm
- 12: Interface kit / top-bottom
- 13: Plug kit
- 14: 2 output boards

3.4 ELECTRICAL COMPONENTS

- Siemens ET200pro electrical components
- Modular system
- Protection class IP67 (in combination with VSxxM IP65)
- Vertical wiring (module replacement possible without disconnecting the plugs)
- Replacement of electronics possible during operation with power on
- Encoding element prevents confusion
- Various field bus protocols

- Field bus nodes for Profibus DP

- Field bus nodes for Profinet



- Various field bus connections using standard and fibre optic technology
 - Digital input modules max. 8 DI (digital inputs)
 - Digital output modules max. 8 DO (digital outputs)
 - Analog input modules with current or voltage input
 - Analog output modules with current or voltage output
 - Standard modules with module diagnosis
 - High feature modules with channel diagnosis
 - Visual LED error display
 - Failsafe modules for Profi DP and Profinet
 - Mixture of standard and TV modules possible
 - Patented connection to ET200pro via interface module
 - Communication carried out via infrared interface
 - Galvanically separated communication interface.
- No mechanical and electrical connection with the ET200pro



3.5 INTERFACE MODULE

- Extension of existing ET200pro with interface module and valve island possible at any time
- No further GSD file or special software required
- In combination with the ET200pro, automatic detection of the valve islands via the SIEMENS SIMATIC Step7



4 ASSEMBLY AND INSTALLATION

The VSxxM is delivered as a fully assembled system. All components of VSxxM are mounted on a SIEMENS profile rail and are functional following parameterisation.

4.1 FASTENING TO THE SIEMENS PROFILE RAIL

Firmly fasten the VSxxM to the surface using the oblong holes intended for this purpose (Figure4: SIEMENS module rail with mounting holes).

Only use M8x18 mm screws according to DIN 912.

Use a maximum torque of 14 Nm to tighten the screws.

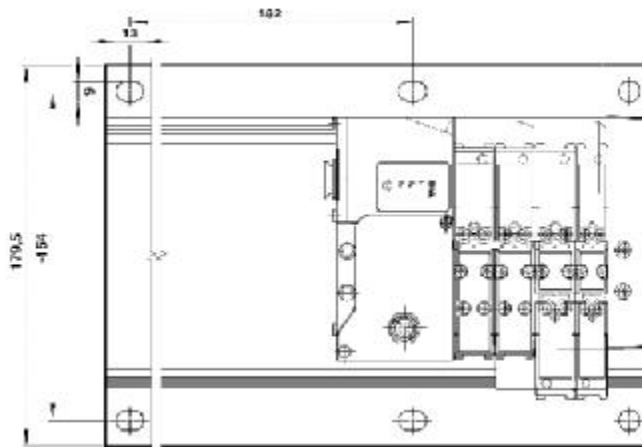


Figure4: SIEMENS module rail with mounting holes

NOTE: Tighten the screws evenly and staggered to avoid warping.



WARNING: Risk due to loose module carriers. Make sure the VSxxM is firmly fastened to the surface. Only use suitable screws.



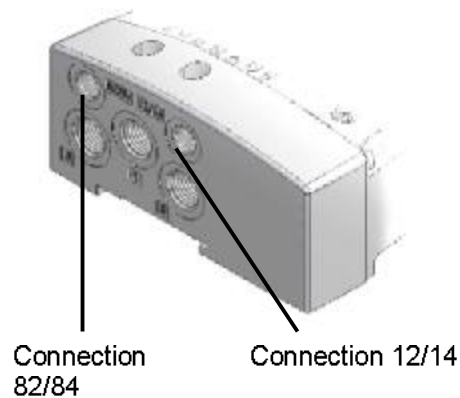
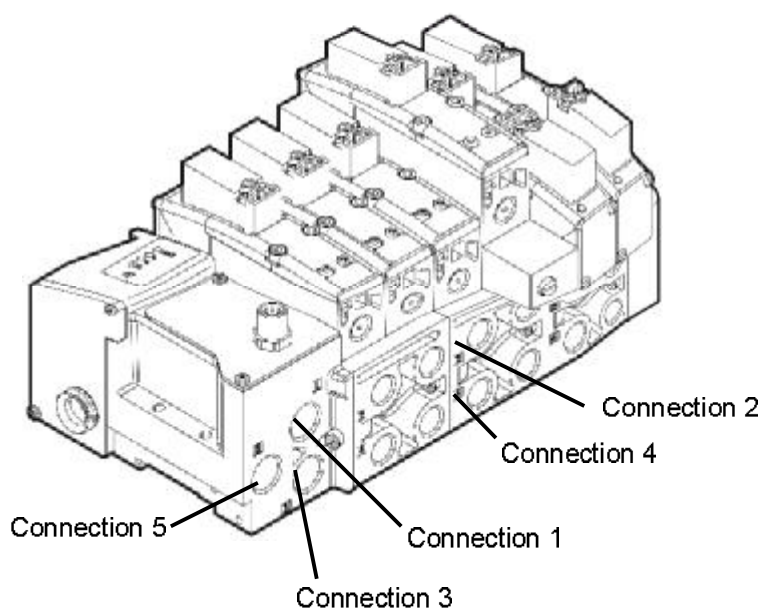
WARNING: Never exceed the shock and vibration loads of 1g.

4.2 PNEUMATIC CONNECTIONS

4.2.1 Labeling of the pneumatic connections

All connections are indicated as follows:

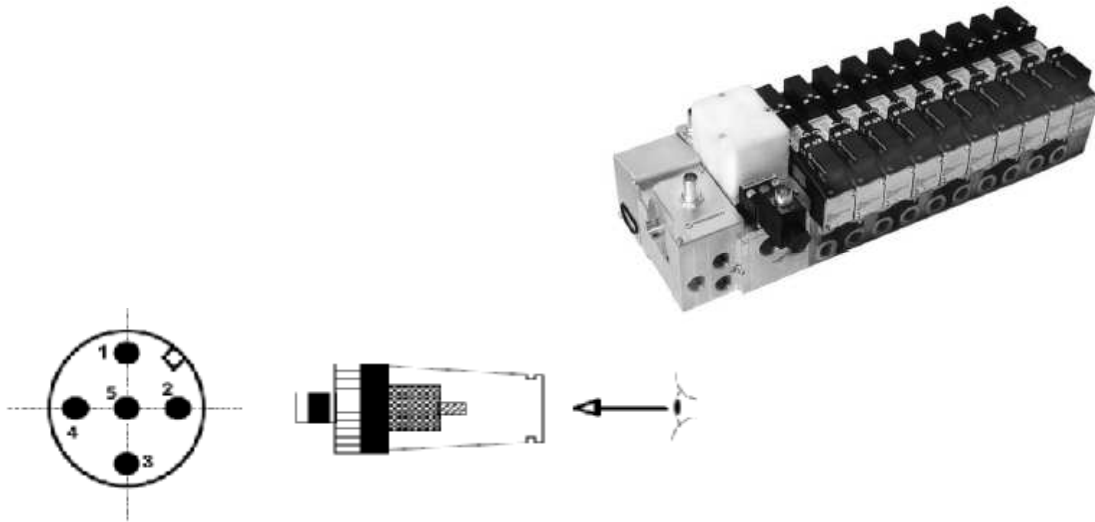
Function	Connection/label
Compressed air input / internal pilot air	1
Exhaust	3 + 5
Working connections	2 + 4
External pilot air (if used)	12/14
Collected pilot valve exhaust	82/84



Caution: Never close connection 82/84 because this would result in malfunctioning of the valve.

4.3 ELECTRICAL CONNECTIONS

4.3.1 Valve island voltage supply connection wiring



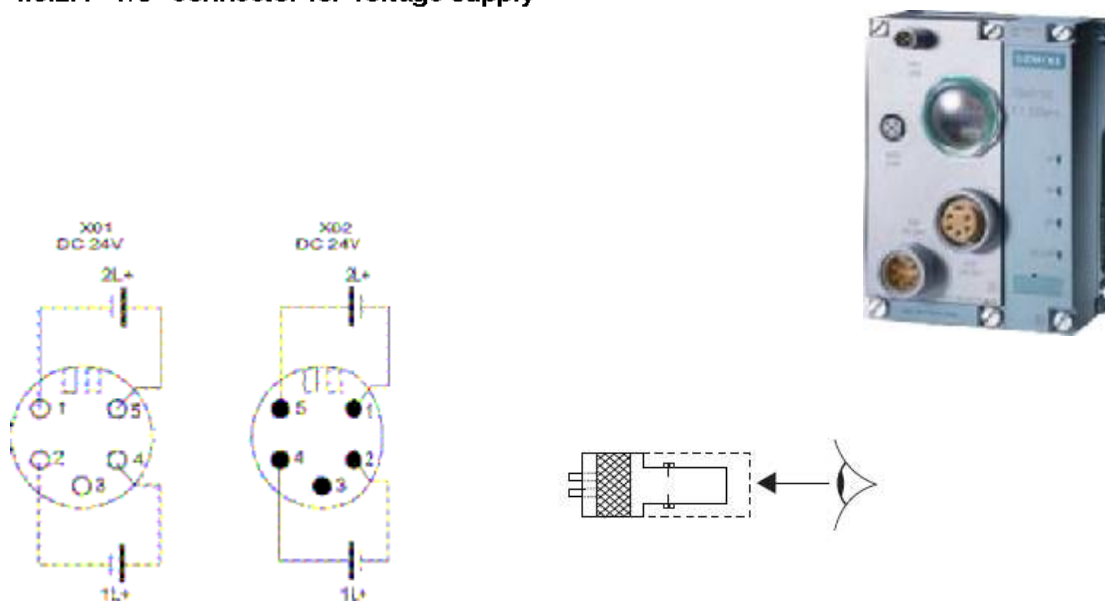
M12 5-pin male connector, A-coded			
Terminal	Operating principle	Tolerance	Max. current
1	24 V DC electronics	+/- 20%	150 mA
2	24 V DC valves	+/- 10%	*1)
3	Electronics ground		
4	Valves ground		
5	FE (functional earth)		

*1) number of pilot valves x 70 mA

NOTE: Isolated power supplies to valve and control electronics.

4.3.2 Profibus modules connection wiring

4.3.2.1 7/8" connector for voltage supply



X01: 7/8" connector for supply			
Terminal	Operating principle	Tolerance	Max. current
1	2M load voltage supply ground		
2	1M electronics/sensor supply ground		
3	FE (functional earth)		
4	1L+ 24 V DC electronics/sensor supply	+20%, -15%	*1)
5	2L+ 24 V DC load voltage supply	+20%, -15%	*2)

X02: 7/8" connector for routing			
Terminal	Operating principle	Tolerance	Max. current
1	2M load voltage supply ground		
2	1M electronics/sensor supply ground		
3	FE (functional earth)		
4	1L+ 24 V DC electronics/sensor supply	+20%, -15%	*1)
5	2L+ 24 V DC load voltage supply	+20%, -15%	*2)

*1) The supply current is calculated based on the sum of currents of the individual modules.

*2) The supply current is calculated based on the sum of all load currents of the individual modules

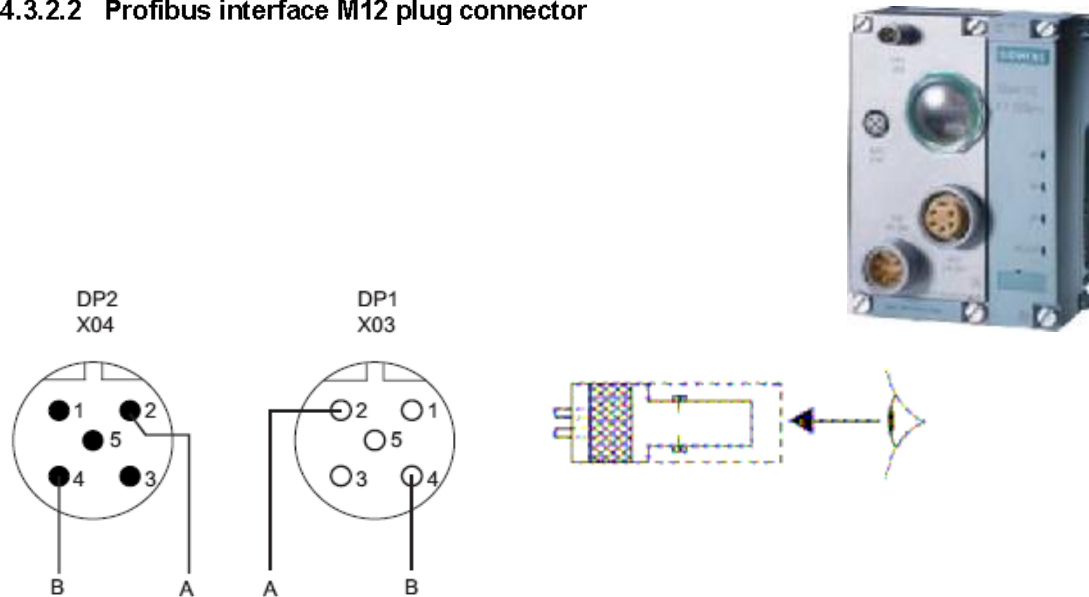


Notice: In general it is to be ensured that the internal conductor bars in the ET 200pro do not exceed the following values:

- for 1L+ 5 A
- for 2L+ 10 A

In addition to this description, please refer to Siemens' documentation. This is available in the documentation section of the <http://www.automation.siemens.com>.

4.3.2.2 Profibus interface M12 plug connector



DP1 X03: M12 connecting plug (pin, B-coded) for supply [Bus In]	
Terminal	Operating principle
1	Supply plus (P5V2) *3)
2	Data line A
3	Data reference potential (M5V2) *3)
4	Data line B
5	FE (functional earth)
Thread	FE (functional earth) *4)

DP2 X04: M12 connecting plug (pin, B-coded) for routing [Bus Out]	
Terminal	Operating principle
1	Supply plus (P5V2) *3)
2	Data line A
3	Data reference potential (M5V2) *3)
4	Data line B
5	FE (functional earth)
Thread	FE (functional earth) *4)

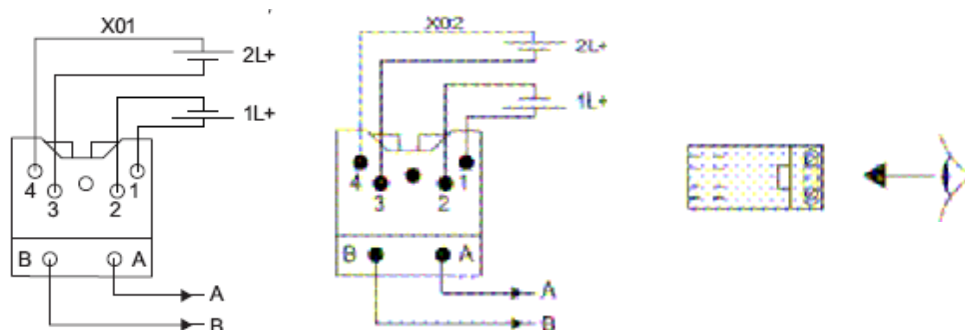


CAUTION:

*3) Routing the voltage to the next connector via a cable is not permissible

*4) We recommend connecting the functional earth via the M12 thread.

4.3.2.3 ECOFAST voltage supply connector plug



X01:ECOFAST connection plug for supply			
Terminal	Operating principle	Tolerance	Max. current
1	1L+ 24 V DC electronics/sensor supply	+20%, -15%	*1)
2	1M electronics/sensor supply ground		
3	2M load voltage supply ground		
4	2L+ 24 V DC load voltage supply	+20%, -15%	*2)

X02:ECOFAST connection plug for routing			
Terminal	Operating principle	Tolerance	Max. current
1	1L+ 24 V DC electronics/sensor supply	+20%, -15%	*1)
2	1M electronics/sensor supply ground		
3	2M load voltage supply ground		
4	2L+ 24 V DC load voltage supply	+20%, -15%	*2)

*1) The supply current is calculated based on the sum of currents of the individual modules.

*2) The supply current is calculated based on the sum of all load currents of the individual modules

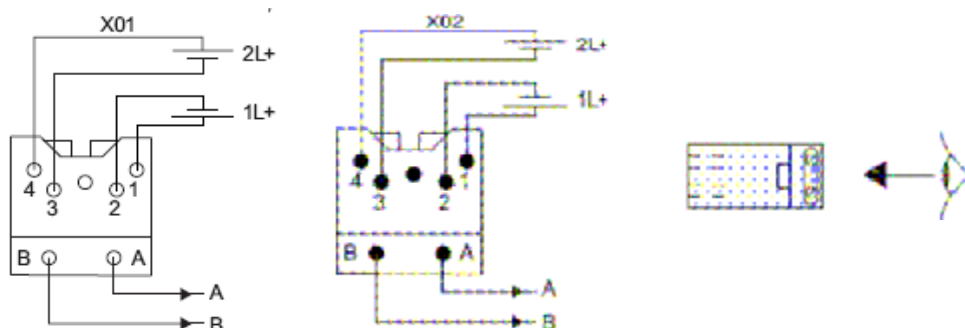


Please note: In general it is to be ensured that the internal conductor bars in the ET 200pro do not exceed the following values:

- for 1L+ 5 A
- for 2L+ 10 A

In addition to this description, please refer to Siemens' documentation. This is available in the documentation section of the <http://www.automation.siemens.com>.

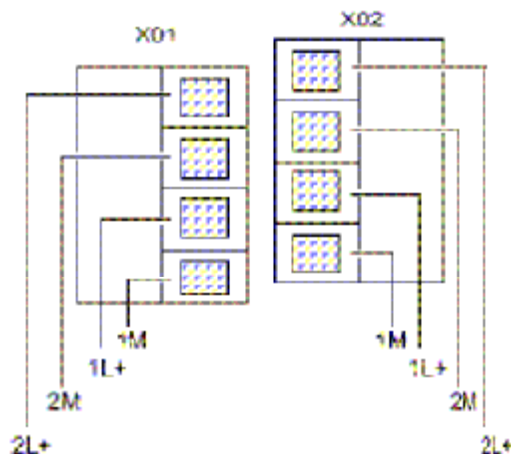
4.3.2.4 ECOFAST Profibus interface



X01:ECOFAST connection plug for supply	
Terminal	Operating principle
A	Profibus DP data line A
B	Profibus DP data line B

X02:ECOFAST connection plug for routing	
Terminal	Operating principle
A	Profibus DP data line A
B	Profibus DP data line B

4.3.2.5 Direct voltage supply connection



X01: Screw terminal for supply			
Terminal	Operating principle	Tolerance	Max. current
1L+	24 V DC electronics/sensor supply	+20%, -15%	*1)
1M	Electronics/sensor supply ground		
2L+	24 V DC load voltage supply	+20%, -15%	*2)
2M	Load voltage supply ground		

X02: Terminal for routing			
Terminal	Operating principle	Tolerance	Max. current
1L+	24 V DC electronics/sensor	+20%, -15%	*1)
1M	Electronics/sensor ground		
2L+	24 V DC load	+20%, -15%	*2)
2M	Load voltage supply ground		

*1) The supply current is calculated based on the sum of currents of the individual modules.

*2) The supply current is calculated based on the sum of all load currents of the individual modules

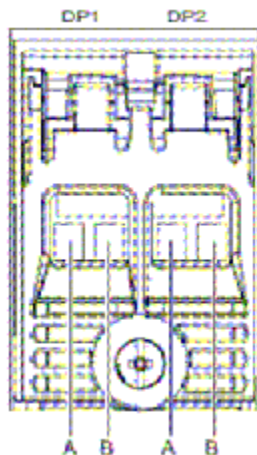


Please note: In general it is to be ensured that the internal conductor bars in the ET 200pro do not exceed the following values:

- for 1L+ 5 A
- for 2L+ 10 A

In addition to this description, please refer to Siemens' documentation. This is available in the documentation section of the <http://www.automation.siemens.com>.

4.3.2.6 Direct connection Profibus interface

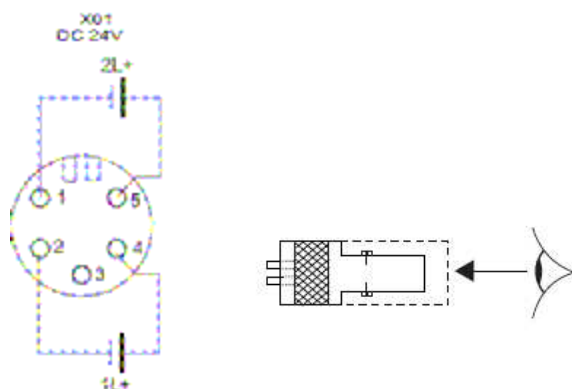


DP1: Insulation displacement connection for supply	
Terminal	Operating principle
A	Profibus DP data line A
B	Profibus DP data line B
Shielding	

DP2: Insulation displacement connection for routing	
Terminal	Operating principle
A	Profibus DP data line A
B	Profibus DP data line B
Shielding	

4.3.3 Profinet modules connection wiring

4.3.3.1 7/8" connector for voltage supply



X01: 7/8" connector for supply			
Terminal	Operating principle	Tolerance	Max. current
1	2M load voltage supply ground		
2	1M electronics/sensor supply ground		
3	FE (functional earth)		
4	1L+ 24 V DC electronics/sensor supply	+20%, -15%	*1)
5	2L+ 24 V DC load voltage supply	+20%, -15%	*2)

*1) The supply current is calculated based on the sum of currents of the individual modules.

*2) The supply current is calculated based on the sum of all load currents of the individual modules

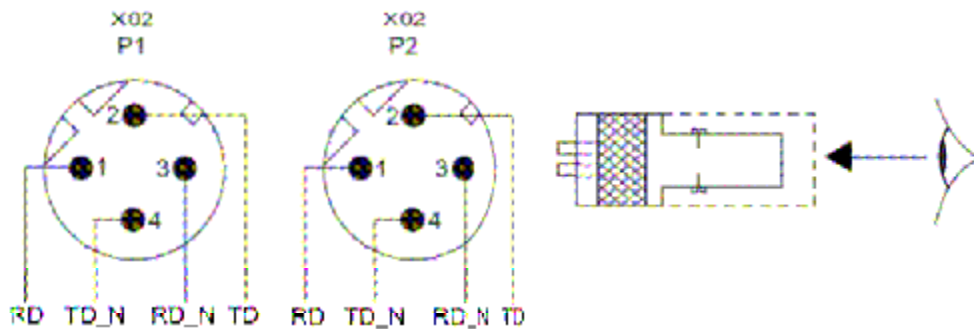


Notice: In general it is to be ensured that the internal conductor bar in the ET 200pro does not exceed the following values:

- for 1L+ 5 A
- for 2L+ 10 A

In addition to this description, please refer to Siemens' documentation. This is readily available in the documentation section of the <http://www.automation.siemens.com>.

4.3.3.2 Profinet interface M12 plug connector



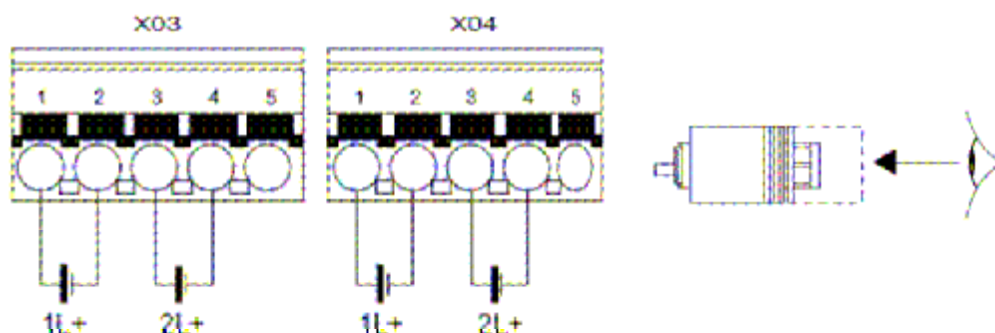
PN1 X02: M12 connecting plug (D-coded) for supply

Terminal	Operating principle
1	Transmit Data+ TD
2	Receive Data+ RD
3	Transmit Data- TD_N
4	Receive Data- RD_N
Thread	FE (functional earth)

PN2 X02: M12 connecting plug (D-coded) for routing

Terminal	Operating principle
1	Transmit Data+ TD
2	Receive Data+ RD
3	Transmit Data- TD_N
4	Receive Data- RD_N
Thread	FE (functional earth)

4.3.3.3 Push-Pull power plug (AIDA) voltage supply



X03: Push-pull connection plug for supply			
Terminal	Operating principle	Tolerance	Max. current
1	1L+ 24 V DC electronics/sensor supply	+20%, -15%	*1)
2	1M electronics/sensor supply ground		
3	2L+ 24 V DC load voltage supply	+20%, -15%	*2)
4	2M load voltage supply ground		
5	FE (functional earth)		

X04: Push-pull connection plug for routing			
Terminal	Operating principle	Tolerance	Max. current
1	1L+ 24 V DC electronics/sensor supply	+20%, -15%	*1)
2	1M electronics/sensor supply ground		
3	2L+ 24 V DC load voltage supply	+20%, -15%	*2)
4	2M load voltage supply ground		
5	FE (functional earth)		

*1) The supply current is calculated based on the sum of currents of the individual modules.

*2) The supply current is calculated based on the sum of all load currents of the individual modules



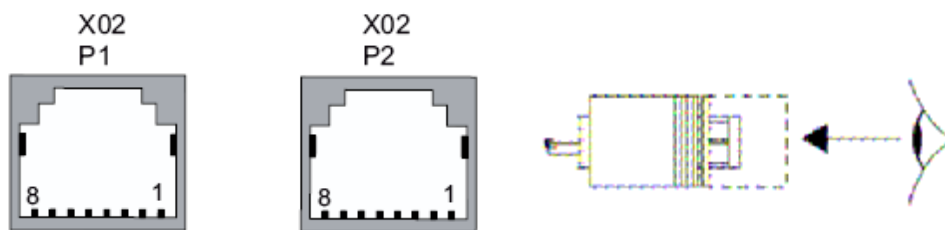
Please note: In general it is to be ensured that the internal conductor bars in the ET 200pro do not exceed the following values:

- for 1L+ 5 A
- for 2L+ 10 A

In addition to this description, please refer to Siemens' documentation. This is readily available in the documentation section of the <http://www.automation.siemens.com>.

4.3.3.4 Profinet interface

Standard push-pull connection plug (RJ45, AIDA)

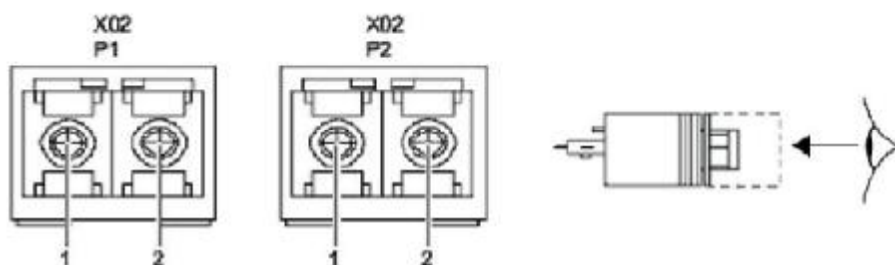


P1 X02: Push-pull connection plug (RJ45) for PROFINET supply	
Terminal	Operating principle
1	Receive Data+ RD
2	Receive Data- RD_N
3	Transmit Data+ TD
4	Ground GND
5	Ground GND
6	Transmit Data- TD_N
7	Ground GND
8	Ground GND

P2 X02: Push-pull connection plug (RJ45) for PROFINET routing	
Terminal	Operating principle
1	Receive Data+ RD
2	Receive Data- RD_N
3	Transmit Data+ TD
4	Ground GND
5	Ground GND
6	Transmit Data- TD_N
7	Ground GND
8	Ground GND

4.3.3.5 Profinet interface

fibre optic push-pull connection plug (SC RJ, AIDA)

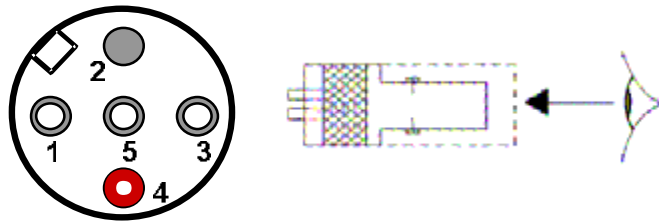


P1 X02: Push-pull connection plug (SC RJ) for PROFINET supply	
Terminal	Operating principle
1	TX (Transmit Data)
2	RX (Receive Data)

P2 X02: Push-pull connection plug (SC RJ) for PROFINET routing	
Terminal	Operating principle
1	TX (Transmit Data)
2	RX (Receive Data)

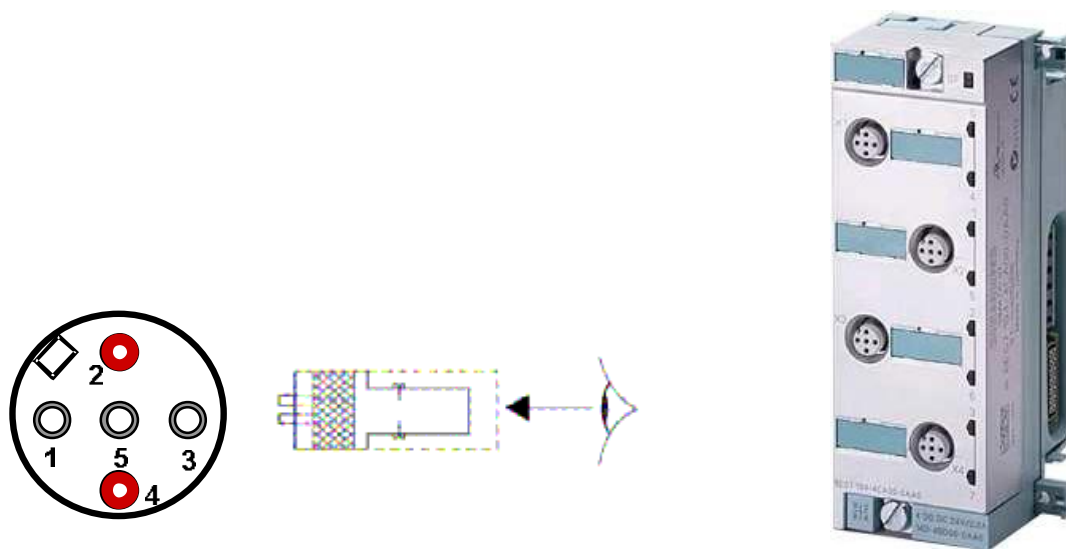
4.3.4 Input/output modules connection wiring

4.3.4.1 Digital input module: 8xM12 socket (single assignment)



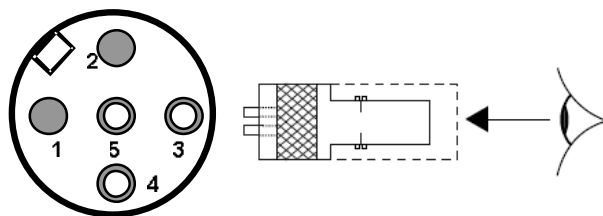
Assignment for 8 DI digital input, 8 x M12 socket	
Terminal	Operating principle
1	24 V DC electronics/sensor supply (1L+)
2	unassigned
3	Electronics/sensor supply ground (1M)
4	DI input signal
5	FE (functional earth)

4.3.4.2 Digital input module: 4 x M12 socket (double assignment)



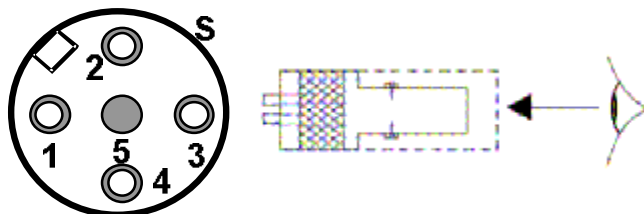
Assignment for 8 DI digital input, 4 x M12 socket	
Terminal	Operating principle
1	24 V DC electronics/sensor supply (1L+)
2	DI input signal
3	Electronics/sensor supply ground (1M)
4	DI input signal
5	FE (functional earth)

4.3.4.3 Digital output module: 4 x M12 socket



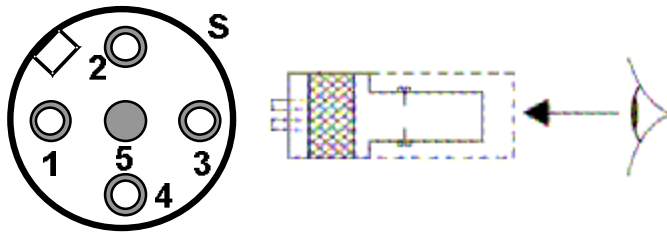
Assignment for 4 DO digital output, 4 x M12 socket	
Terminal	Operating principle
1	unassigned
2	unassigned
3	Load voltage supply ground (2M)
4	DO output signal
5	FE (functional earth)

4.3.4.4 Analog input module: 4 x M12 socket



Assignment for 4 AI analog inputs, 4 x M12 socket	
Terminal	Operating principle
1	24 V DC electronics/sensor supply (1L+)
2	Input signal (+)
3	Electronics/sensor supply ground (1M)
4	Input signal (-)
5	FE (functional earth)
S	Shielding

4.3.4.5 Analog output module: 4 x M12 socket



Assignment for 4 AO analog outputs, 4 x M12 socket	
Terminal	Operating principle
1	24 V DC electronics/sensor supply (1L+)
2	Output signal (+)
3	Electronics/sensor supply ground (1M)
4	Output signal (-)
5	FE (functional earth)
S	Shielding

5 PARAMETERISATION

NOTE: When using in combination with the ET200pro F modules or on the ET200pro module IM154-8, the VSxxM can only be parameterised via HSP.

In order to operate the VSxxM in combination with the ET200pro, this has to be configured in the Hardware Manager of the SIMATIC Step7. The VSxxM can be configured in two ways

- GSD/GSDML (Generic Station Description, only module diagnosis possible)
- HSP2029 (Hardware Support Package, required for channel diagnosis)

Selection of parameterisation begins with selection of the respective head assembly. If parameterisation is to be performed using GSD/GSDML, then the head assembly in the Step7 hardware catalog has to be used from the GSD directory.

Both configuration types allow for the same settings for the VSxxM.

The GSD/GSDML and the HSP2029 files are provided on the accompanying CD or are available for download on the Norgren web site as well as the Siemens web site using the following link:

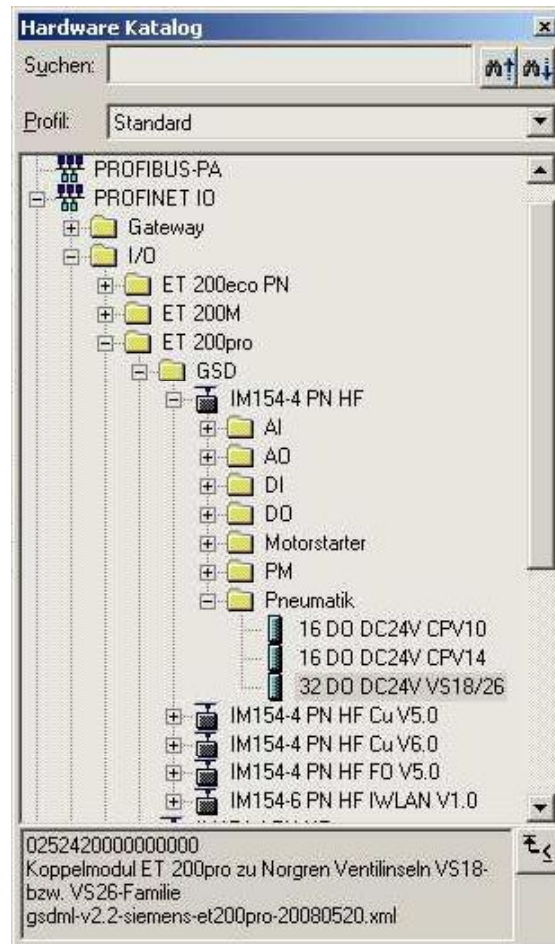
<http://support.automation.siemens.com/WW/llisapi.dll?func=cslib.csinfo2&aktprim=99&lang=de>

In addition to this description, please refer to the "SIMATIC, configuring hardware and connections with STEP7" manual for the SIMATIC STEP7 software provided by Siemens.

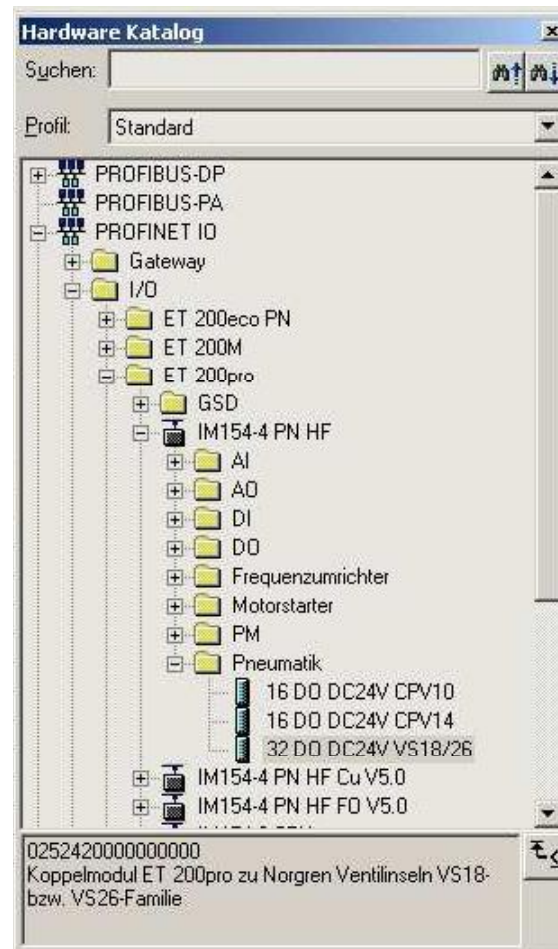
This is readily available in the documentation section of the <http://www.automation.siemens.com/> web site.

5.1 HARDWARE CONFIGURATION: PROFINET

After installing the GSDML file, you will find the VSxxM as **32DO DC24V VS18/26** in the hardware catalog in the following directory: *PROFINET IO\O\ET200pro\GSD\...\Pneumatik*

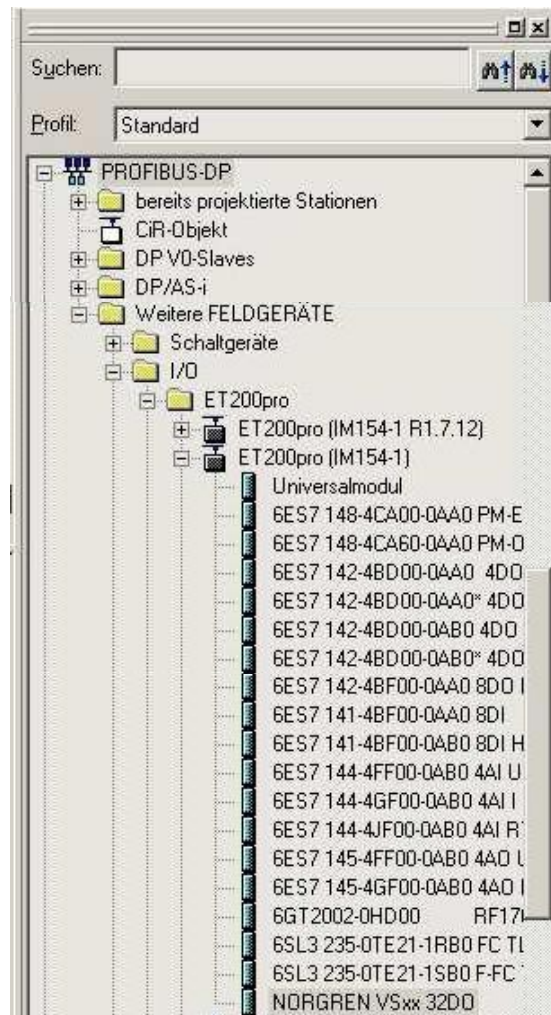


If you have installed the HSP2029, then the VSxxM can be found as **32DO DC24V VS18/26** in the directory *PROFINET IO\O\ET200pro...\Pneumatik*



5.2 HARDWARE CONFIGURATION: PROFIBUS

After installing the GSD/GSG file, you will find the VSxxM as **NORGREN VSxx 32DO** in the hardware catalog in the following directory: *PROFIBUS-DP\Weitere FELDGERÄTE\O\ET200pro*



5.3 HARDWARE CONFIGURATION: ET200PRO CPU

NOTE: Installation of the HSP2029 is absolutely necessary to operate the VSxxM in combination with a ET200pro CPU.

After installing the HSP2029, you will find the VSxxM as **32DO DC24V VS18/26** in the hardware catalog in the following directory: *PROFINET-IOV\OI\IM154-8 CPU\Pneumatik* (see Figure 5) or *PROFIBUS-DP\IM154-8 CPU\Pneumatik* (Figure 6).

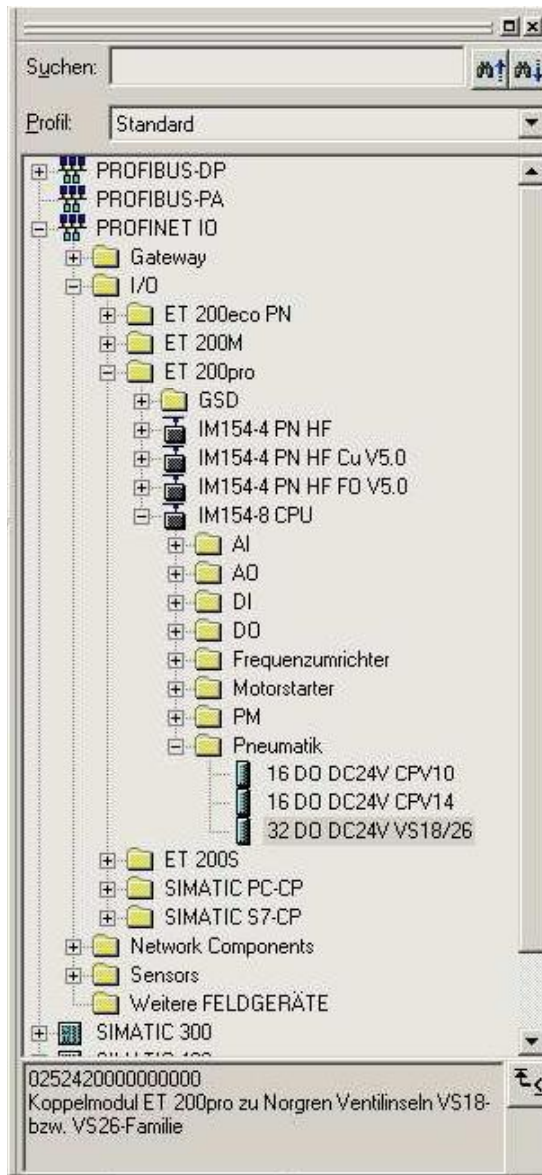


Figure 5

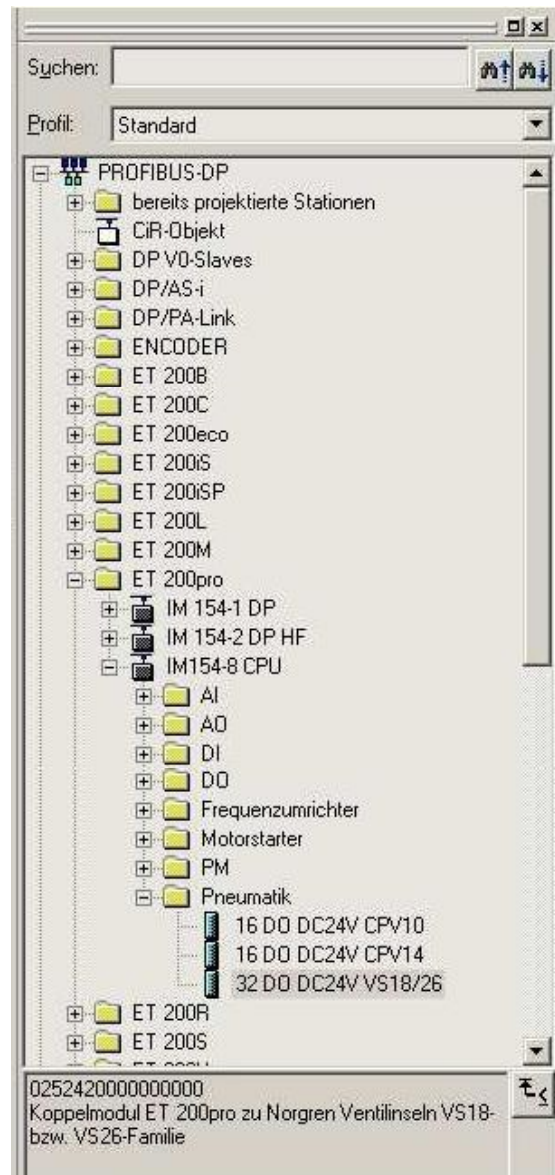


Figure 6

5.4 SUBSTITUTE VALUE BEHAVIOR AND DIAGNOSTICS

The system interface module with the VSxxM valve island provides the following diagnostic messages:

- Shared diagnostics
- Interface module diagnostics
- Valve island diagnostics
- Individual valve island diagnostics

These can be activated in the SIMATIC Step7 Hardware Manager. Double-click on the entry for the interface module (valve island) to activate/parameterise it. Open the *Parameters* tab to access the subdirectories for the configuration parameters (see Figure 7).

The substitute value behavior of the valve islands can also be configured here. The following states can be configured:

- all valves off
- Activate substitute value (can be explicitly parameterised for each coil)
- Keep most recent value

The substitute values are output if the CPU stops or the IR path is broken (not relevant in the case of emergency shutoff or missing supply voltage to the solenoid coils).

The gray fields cannot be changed.

The interface settings are used as information for transfer between the interface module and valve island.

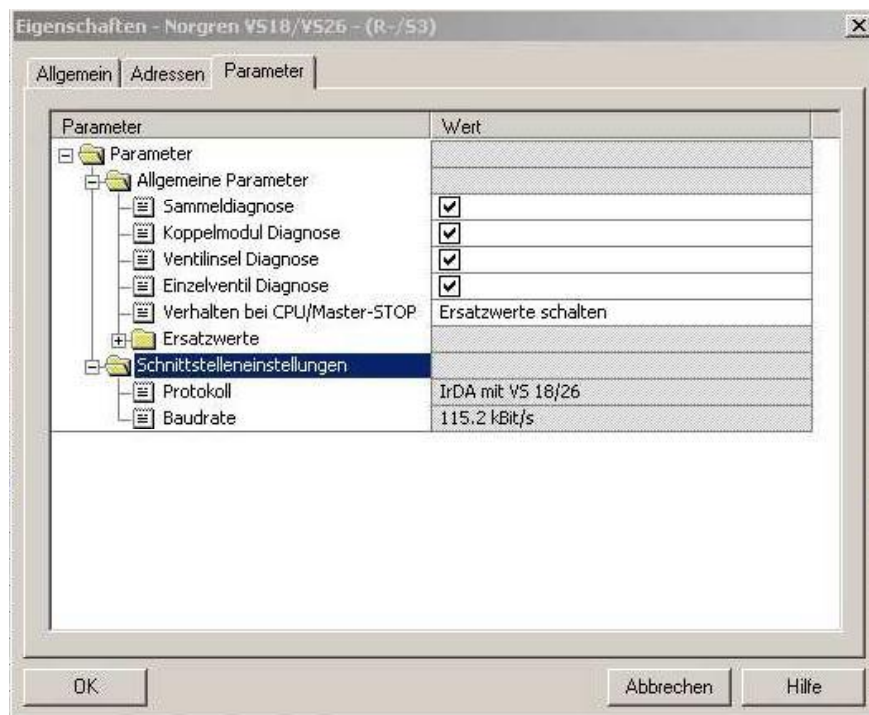


Figure 7

NOTE: All diagnostics events are entered in the DS10 regardless of activation.

5.4.1 Shared diagnostics

If shared diagnostics is deactivated, then no diagnosis is displayed except a parameterisation error during startup.

If shared diagnostics is activated, then the assembly triggers a diagnostics alarm in the case of a diagnostics event.

This results in the following standard diagnostics messages in the central controller (PLC CPU):

- "Assembly defective"
- "External error"
- "Channel error"

If no other diagnostics is activated, then only the message "Error" will be displayed in channel specific diagnostics.

5.4.2 Interface module diagnostics

If interface module diagnostics is deactivated, then only the diagnostics message "Error" will be generated in addition to the standard diagnostic messages.

If interface module diagnostics is activated, then the assembly outputs the respective diagnostic message in the case of a interface module error.

Possible error	Diagnostics message
<ul style="list-style-type: none">• Wrong valve island response to a data telegram from the interface module• Incorrect data length of the response telegram• Checksum error in the response telegram• No response from the valve island (receipt time-out)	Slot not addressable

5.4.3 Valve island diagnostics

If valve island diagnostics is deactivated, then only the diagnostics message "Error" will be generated in addition to the standard diagnostic messages.

If valve island diagnostics is activated, then the assembly outputs the respective diagnostic message in the case of a valve island error.

Possible error	Diagnostics message
<ul style="list-style-type: none">• Overvoltage in electronics power supply• Undervoltage in electronics power supply• Overvoltage in valve power supply• Undervoltage in valve power supply	<ul style="list-style-type: none">• Undervoltage or overvoltage

5.4.4 Individual valve island diagnostics

If individual valve diagnostics is deactivated, then only the diagnostics message "Error" will be generated in addition to the standard diagnostic messages.

If individual valve diagnostics is activated, then the assembly outputs the respective diagnostic message in the case of a individual valve error.

Possible error	Diagnostics message
<ul style="list-style-type: none">• Short circuit• Valve not connected!	Short circuit, valve not connected

NOTE: The listed individual valve errors remain active until the next startup even after they have been remedied!

5.4.5 Data record 10

All information pertaining to the interface module and the valve island (status and diagnostics data) is compiled in data record 10. The data record comprises 16 Bytes and is structured as follows:

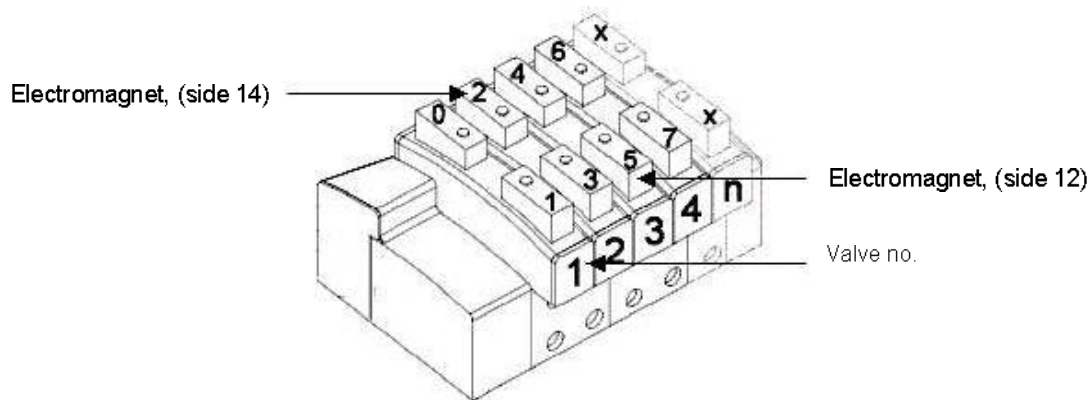
Byte	Bit								Comments
	7	6	5	4	3	2	1	0	
0	DIAG KM								Diagnostics interface module / communication
	reserved						0	0	switched off (not possible)
							0	1	No connection to valve island
							1	0	Establishing connection
1	DIAG VS								Diagnostics valve island
	KS	LB	HV PS	LV PS	HV PS	LV PS	res	res	
2	IHWREL								Hardware version of the valve island
3	IFWREL								Firmware version of the valve island
4	ITYP = 0h								Module type of the valve island (fixed 0h)
5	VANZ (02h ... 10h)								Number of valves: 2, 4, ..., 16
6	reserved								
7	reserved								
8	Valve 2				Valve 1				Individual diagnostics for valves 2 – 1
	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	
9	LB	KS	LB	KS	LB	KS	LB	KS	Individual diagnostics for valves 4 – 3
	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	
10	LB	KS	LB	KS	LB	KS	LB	KS	Individual diagnostics for valves 6 – 5
	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	
11	LB	KS	LB	KS	LB	KS	LB	KS	Individual diagnostics for valves 8 – 7
	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	
12	LB	KS	LB	KS	LB	KS	LB	KS	Individual diagnostics for valves 10 – 9
	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	
13	LB	KS	LB	KS	LB	KS	LB	KS	Individual diagnostics for valves 12 – 11
	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	
14	LB	KS	LB	KS	LB	KS	LB	KS	Individual diagnostics for valves 14 – 13
	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	
15	LB	KS	LB	KS	LB	KS	LB	KS	Individual diagnostics for valves 16 – 15
	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	

5.4.6 Productive data / bit allocation

Regardless of the valve island design, the VSxxM is always treated as a 32-bit output module. The current number of valves is returned in the DS10.

The address of the VSxxM is automatically generated during parameterisation. However, you can write over the automatic address assignment during configuration.

Allocation of the four output bytes to the solenoid coils is shown below.




Byte	Bit							
	7	6	5	4	3	2	1	0
0	Valve 4		Valve 3		Valve 2		Valve 1	
	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14
1	Valve 8		Valve 7		Valve 6		Valve 5	
	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14
2	Valve 12		Valve 11		Valve 10		Valve 9	
	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14
3	Valve 16		Valve 15		Valve 14		Valve 13	
	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14	Side 12	Side 14

6 LEDs

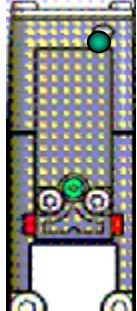
6.1 VALVE ISLAND LEDs

The status LEDs are positioned within the valve island's window.

LED	LED state	Description	Troubleshooting
DIAG Valve diagnosis			
	Off		No error
	Red	Valve diagnosis "Error" present (valve island sum error)	<ul style="list-style-type: none"> - Make sure all valves are connected - Ensure that any empty slots are closed using the module intended for this purpose - Read out valve island diagnostics and individual valve diagnostics if activated - Briefly switch off the supply voltage for the valves after removing and evaluating individual valve errors (individual valve errors remain until the next startup of the valve supply voltage).
I_R IR communication			
	Green	IR communication present	No error
	Red	IR communication not present / defective	<ul style="list-style-type: none"> - Ensure the IR transmission path is not broken - Check the ET200pro supply voltages
V_A Supply voltage valves			
	Off	Valve supply voltage not present	<ul style="list-style-type: none"> - Check voltage supply - Check wiring of the power supply plug
	Green	Valve supply voltage present	No error
	Red	Valve supply voltage outside the tolerance range (overvoltage/undervoltage)	<ul style="list-style-type: none"> - Check electronics supply voltage - Please take voltage drop into consideration in the case of long supply lines
V_B Electronics supply voltage			
	Off	Electronics supply voltage not present	<ul style="list-style-type: none"> - Check voltage supply - Check wiring of the voltage supply plug

	Green	Electronics supply voltage present	No error
	Red	Electronics supply voltage outside the tolerance range (overvoltage/undervoltage)	<ul style="list-style-type: none"> - Check valve supply voltage - Please take voltage drop into consideration in the case of long supply lines

In addition to this, there is a status LED on the side of every solenoid valve that indicates the status of the solenoid.


	Status LED	Solenoid valve
	Off	Solenoid coil without current
	Green	Solenoid coil with current

6.1.1 Serious errors

If a serious error occurs, which fundamentally impairs the functioning of the valve island, then it stops communication and issues the following error code with red flashing LEDs:

Error	LED			
	V _B	V _A	I _R	DIAG
Inconsistent firmware versions	Blinking	Off	Off	Off
Internal program sequence error	Blinking	Blinking	Blinking	Off
Too many output modules connected or serious error during output module initialisation	Blinking	Blinking	Blinking	Blinking

6.2 INTERFACE MODULE LEDs

	LED	LED state	Description	Troubleshooting
	SF	System error		
		Off		No error
		Red	Diagnostics message present Missing or incorrect parameterisation	<ul style="list-style-type: none"> - If the Diag LED is red: see troubleshooting for DIAG LED red - Check the hardware configuration in the engineering tool and make sure the VSxxM is inserted as the last module of the ET200pro

7 TECHNICAL DATA

VS18M

Operating medium:

Filtered compressed air (40 µm), oiled or oil-free

Mode of functioning:

VS18G: Glandless valves, electropneumatic actuation
with internal and external pilot air

VS18S: Softseal valves, electropneumatic actuation
with internal and external pilot air

Attachment:

Base plates

2+4 connections:

G1/8, NPTF 1/8, PIF 8 mm, PIF 6 mm, PIF 1/4

Operating pressure:

VS18S and VS18G: 10 bar max.

VS18G (with external pilot air): 16 bar max.

Flow:							
Series production	Operating principle	C	b	A	l/min	CV	Kv
VS18G	5/2	2.30	0.20	8.83	550	0.56	0.87
VS18G	5/3	2.30	0.20	8.83	550	0.56	0.87
VS18S	2 x 2/2	2.30	0.20	8.82	550	0.56	1.00
VS18S	2 x 3/2	2.20	0.26	9.67	600	0.61	1.09
VS18S	5/2	2.58	0.29	10.51	650	0.66	1.18
VS18S	5/3	2.58	0.29	10.51	650	0.66	1.18

Ambient temperature:

-15°C to +50°C

Fluid temperature:

-5°C to +50°C (at temperatures under +2°C,
please observe air quality)

Material:

Housing, base plates: die cast aluminum
piston, socket: hard-anodised aluminum
Teflon coated (VS18G)
Aluminum with HNBR seals (VS18S)
Plastic parts: POM, PA and PPA
Static seals: NBR
End covers and screws: Galvanised steel
Spring: Stainless steel
Intermediate plates: aluminum, PA
Electrical contacts: Tin/gold plated brass
PCBs: Glass epoxy

VS26M

Operating medium:

Filtered compressed air (40 µm), oiled or oil-free

Mode of functioning:

VS26G: Glandless valves, electropneumatic actuation
 with external and internal pilot air

VS26S: Softseal valves, electropneumatic actuation
 with external and internal pilot air

Installation:

Base plates

2+4 connections:

G1/4, NPTF 1/4, PIF 10 mm, PIF 8 mm, PIF 3/8

Operating pressure:

VS26S and VS26G: 10 bar max.

VS26G (with external pilot air): 16 bar max.

Flow:							
Series production	Operating principle	C [dm ³ / s · bar]	b	A	Q _N [l/min]	c _v	k _w
VS26G	5/2	4.27	0.16	16.04	1000	1.02	0.87
VS26G	5/3	4.27	0.16	16.04	1000	1.02	0.87
VS26S	2 x 2/2	4.88	0.17	18.40	1150	1.17	1.00
VS26S	2 x 3/2	5.21	0.20	20.05	1250	1.27	1.09
VS26S	5/2	5.63	0.20	21.67	1350	1.37	1.18
VS26S	5/3	5.63	0.20	21.67	1350	1.37	1.18

Ambient temperature:

-15°C to +50°C

Fluid temperature:

-5°C to +50°C (at temperatures under +2°C,
 please observe air quality)

Material:

Housing, base plates: die cast aluminum
 piston, socket: hard-anodised aluminum
 Teflon coated (VS26G)
 Aluminum with HNBR seals (VS26S)
 Plastic parts: POM, PA
 Static seals: NBR
 End covers and screws: Galvanised steel
 Spring: Stainless steel
 Intermediate plates: aluminum, PA
 Electrical contacts: Tin/gold plated brass
 PCBs: Glass epoxy

8 SOFT START DUMP VALVE

8.1 APPROVAL

This soft start dump valve is suitable for use in safety systems up to SIL1 and inspected by TÜV according to IEC61508. The start-up valve is pressureless in the safety state.

Ambient temperature: -5°C up to 50°C

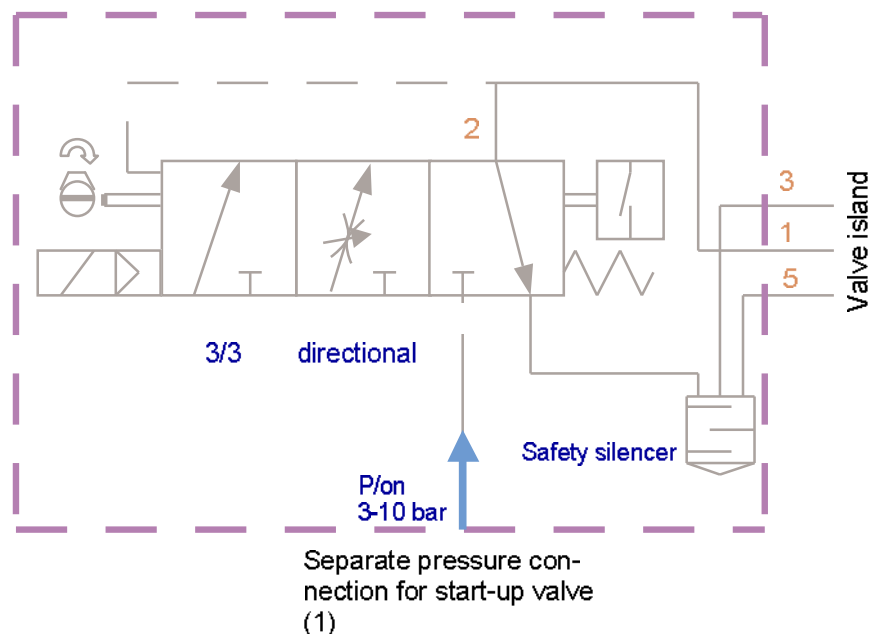
8.2 SETUP

- Intermediate plate device with two valve widths of 26 mm
- Separate G1/2 air input
- Pressure range from 3 to 10 bar
- Internal pilot air supply
- Control solenoid with M12 x 1 connection technology
- Switched position monitoring with M12 x 1 connection technology
- Integrated silencer with safety exhaust
- Lockable manual auxiliary operation
- Adjustable start-up time using choke valve
- Insertion in the connection block does not result in alteration of the address space
- Inquiry of main valve switched position

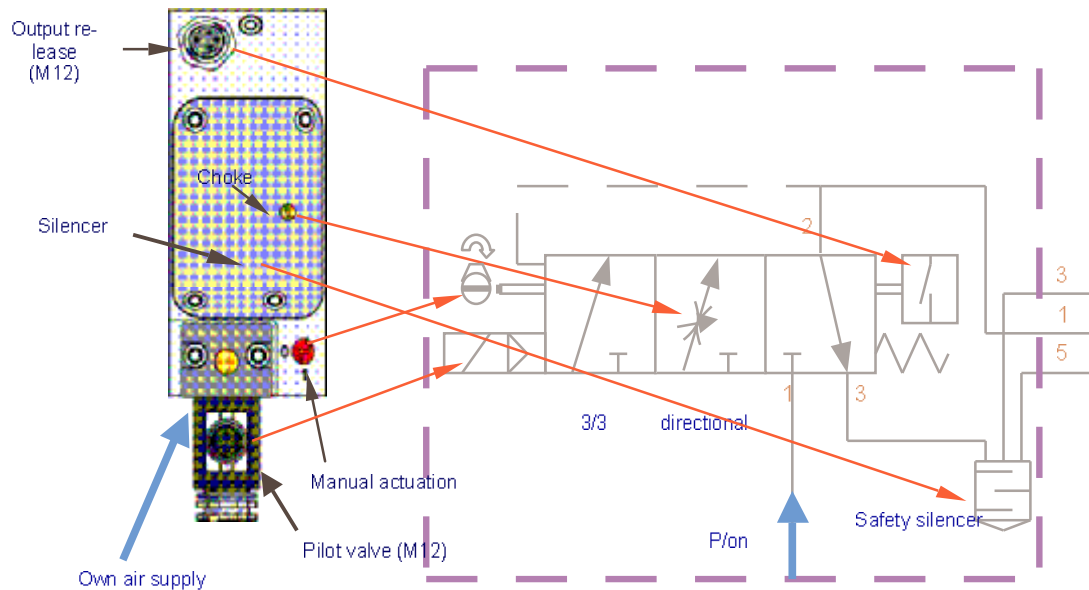


8.3 WIRING DIAGRAM

The drive valve is an indirect, piloted 3/3 way solenoid valve with lockable manual auxiliary operation, slide piston inquiry and safety silencer.



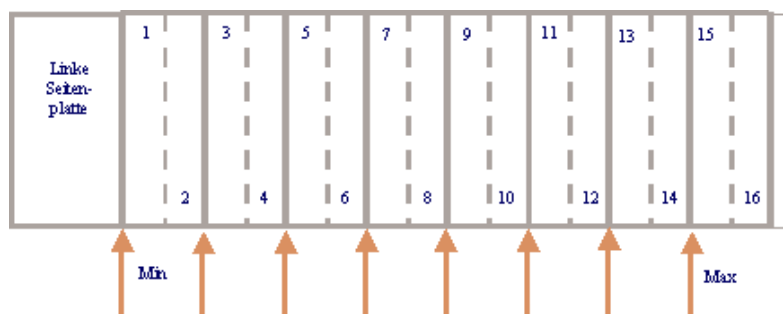
8.4 ARRANGEMENT



8.5 EQUIPMENT

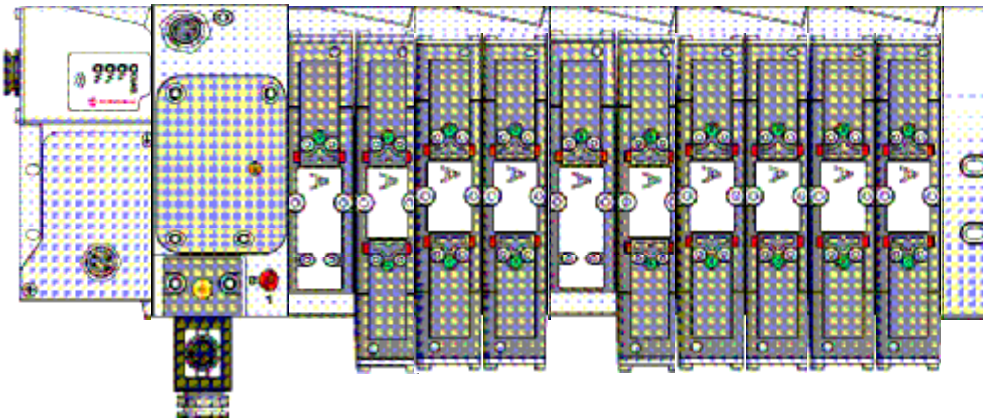
The soft start dump valve can be inserted in any evenly numbered place in the sub-base. Multiple insertion is also possible (see following arrangement). Only the places to the right are supplied and secured by the soft start dump valve. The valve is closed on the left side.

Sub-bases and valve spaces

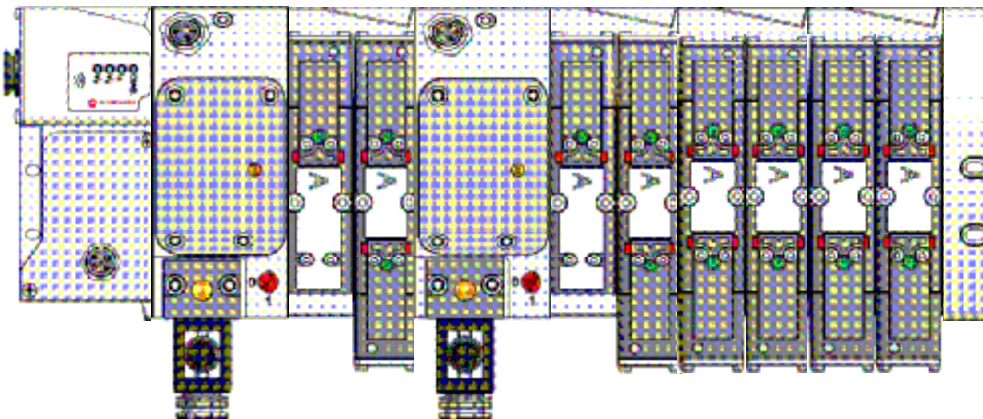


Insertion option for soft start dump valve

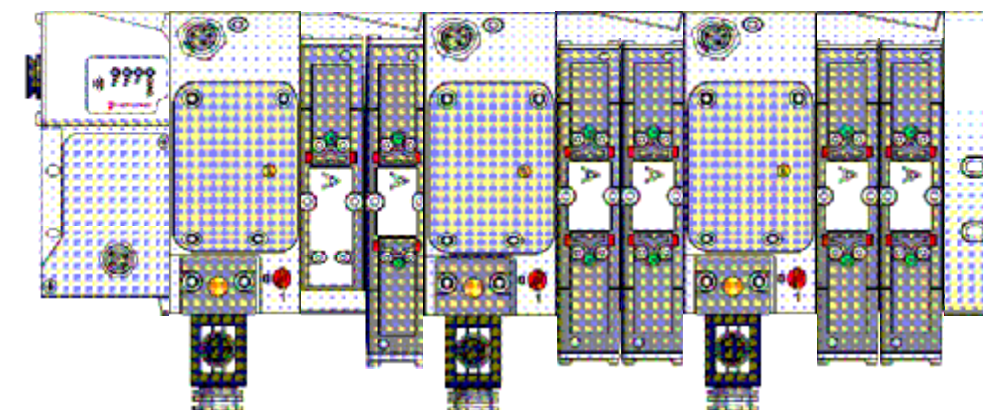
Arrangement before place 1



Arrangement before place 1 and before place 3



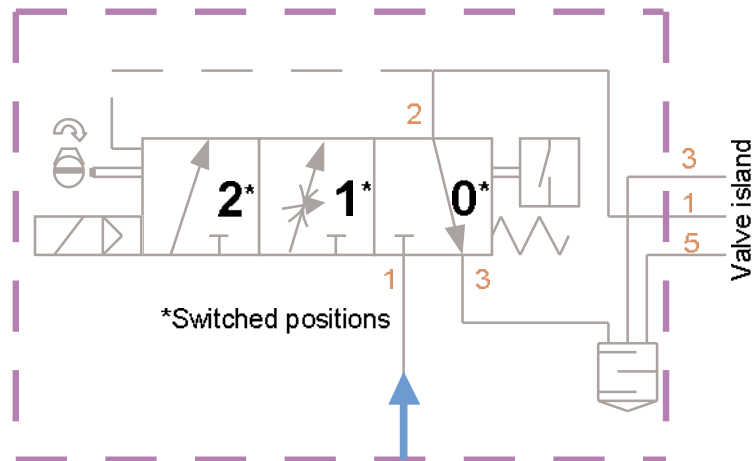
Arrangement before place 1, before place 3 and before place 5



8.6 FUNCTIONAL DESCRIPTION

8.6.1 Normal position (switched position 0)

Solenoid without current
Switched position 0 "load relief of all connections".
All valve island air connections "1", "3", "5" are relieved with shared silencers.
No output signal on release connection.



8.6.2 Start-up position (switched position 1)

Solenoid with current
Switch to switched position 1 "filling via choke".
Switching the piston to reduced air flow to valve connection "2" to the air channel "1" of the valve island. Filling time for the volume can be set using choke.
No output signal on release connection.

8.6.3 Operating position (switched position 2)

Solenoid with current
At 60% of the input pressure in valve connection "2", the main piston is pneumatically switched to full air flow from the pressure connection of the start-up valve to air channel "1" of the valve island (switched position 2).
An output signal is simultaneously triggered at the release connection.

8.6.4 Emergency shutoff (switched position 0)

Solenoid without current
Switching to switched position 0 "load relief of all connections".
All valve island air connections "1", "3", "5" are relieved with shared silencers.
The silencer has a forced opening to relieve connection "1". This guarantees exhaust emission (no malfunction due to contaminants).
The output signal is removed at the release connection.

8.6.5 Start-up position with manual actuation (switched position 1)

Manual actuation via 90° rotation with screwdriver to position "1".
Switch to switched position 1 "filling via choke".
Switching the piston to reduced air flow to valve connection "2" to the air channel "1" of the valve island. Filling time for the volume can be set using choke.

8.6.6 Operating position with manual actuation (switched position 2)

At 60% of the input pressure in valve connection "2", the main piston is pneumatically switched to full air flow from the pressure connection of the start-up valve to air channel "1" of the valve island (switched position 2).

8.6.7 Forced removal of manual actuation

Manual actuation is removed by via 90° rotation with screwdriver to position "0".


Start-up valve is in normal position and functional again.

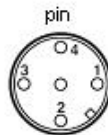
If locking of manual actuation is mistakenly not removed, then the valve remains in main position with full airflow to air channel "1" of the sub-base.

Forced removal via the electrical control is available for this operating error.

If current is applied to the solenoid again, then the locked manual actuation is automatically mechanically reset to position "0".

8.7 ELECTRICAL CONNECTION

pin	function
1	 by-passed in magnet, for Desina analysis
2	
3	0V
4	+24V DC valve



enable signal:M12, 4-pin
a-coded

pin	function
1	+ (plus)
2	free
3	free
4	- (minus)

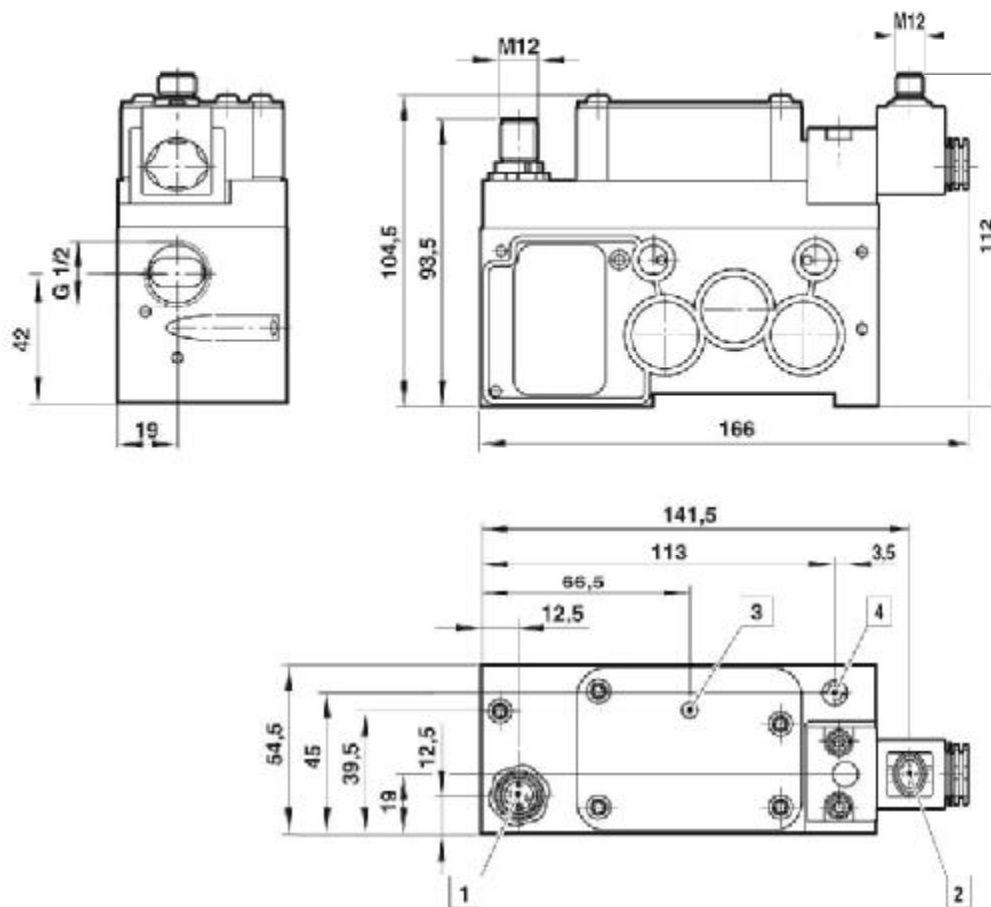


8.8 TECHNICAL DATA

8.8.1 Technical specifications

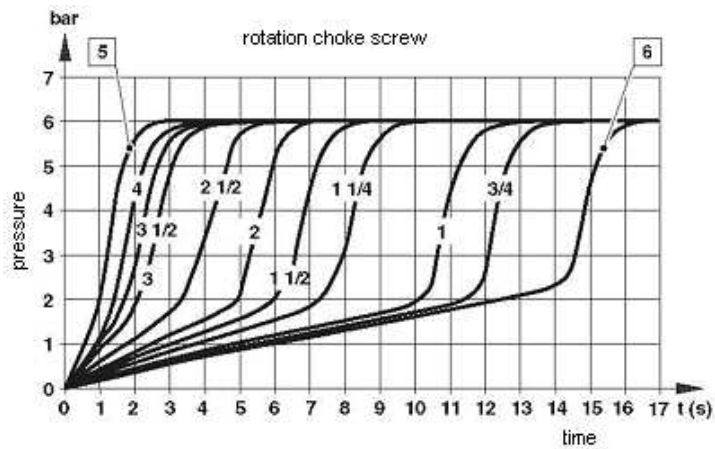
Operating pressure: 3 to 10 bar
Flow rate max.: 3000 l/min
Flow curves: see chart
Voltage: 24 V DC +/- 10%
Performance: 6.0 Watts

8.8.2 Dimensions

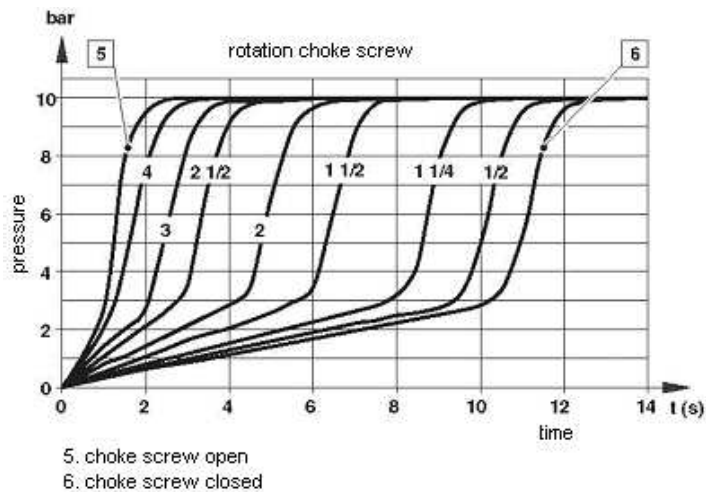


8.9 FILLING/UNLOADING CURVES

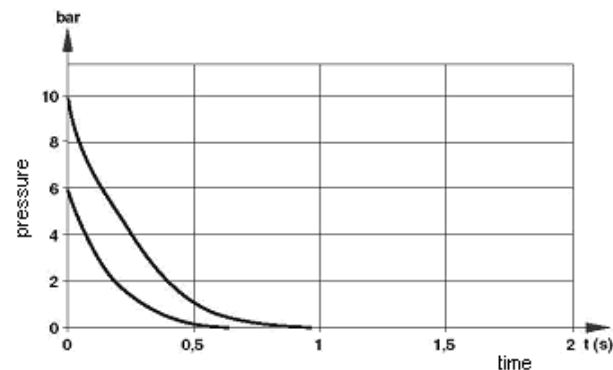
Filling curves at 6 bar for 3 liter volumes



Filling curves at 10 bar for 3 liter volumes



Exhaust emission of 3 volumes at 6 and 10 bar



9 SERVICE CONTACTS

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