HAFNER Pneumatika Kft.
H-9228 Halászi
Püski út 3.

MODULAR VALVE ISLAND (HBS) ASSEMBLY AND USER'S MANUAL

Dear Partner,

Congratulations on choosing our product. For safe operation and your own safety, please read the instructions carefully before using the appliance. If you have any questions, please contact our customer service.

Phone: +36-30-657-4848
E-Mail: ertekesites@hafner-pneumatika.com
Web: http://www.hafner-pneumatika.com

The warranty conditions for HAFNER Pneumatika products are available at the following link:
http://www.hafner-pneumatika.com/dokumentumok/pdf/hafner-garancialis-feltetelek.pdf

Valves manufactured by HAFNER Pneumatika are subject to the general operating conditions, which can be found at the following link:
http://www.hafner-pneumatika.com/hafner-szelepek-uzemeltetes

The Declaration of Conformity for products manufactured by HAFNER Pneumatika is available at the following link:
http://www.hafner-pneumatika.com/dokumentumok/pdf/hafner-gyartoi-megfelelosegi-nyilatkozat.pdf

The general instructions for Hafner valves are available here:
https://www.hafner-pneumatika.com/dokumentumok/pdf/HAFNER_Altalanos_hasznalati_utasitas_utvalto_szelepekhez.pdf

General information

Non-compliance with the instructions for use or unprofessional tampering with the appliance will invalidate the warranty. The warranty for the device and all accessories will be terminated at the same time. It is also compulsory to observe the operating methods described in this document and the labels and instructions on the product.
Follow the general technical rules when choosing and using the right appliance.
Take care to prevent unintentional operation or movement of the appliance.
It is forbidden to disassemble pressurised connections, wiring and systems.
Consider the relevance of all national and international regulations.
HAFNER Pneumatika's directional control valves are intended for the operation of pneumatic devices using compressed air. Their use in liquids and gases is considered to be misuse.

Installation

Once the packaging has been removed, make sure that no dirt gets into the device.
Only use connectors that ensure secure pipe connections and proper sealing. Use only clean connectors and piping.
The installation position is arbitrary.
Install the valves so that they are easily accessible for regular cleaning. Avoid sharp breaks in the air ducts.
Appliances should only be installed by a qualified technician in accordance with the relevant regulations.
Prevent static build-up on connected devices, pipes and connectors.
If necessary, connect and earth all conductive metal parts, including accessories, to equipotential bonding.
When installing the electrical system, follow the instructions for the magnetic system. Only connect terminals when the power is switched off!
Always ensure that the valve is wired according to the wiring diagram on the valve.

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Operation

The pressure range of the valves is available in the HAFNER Pneumatika online catalogue:

http://www.hafner-pneumatika.com/hafner-szelepek

Attention! Overpressure may result in the valve becoming inoperable.

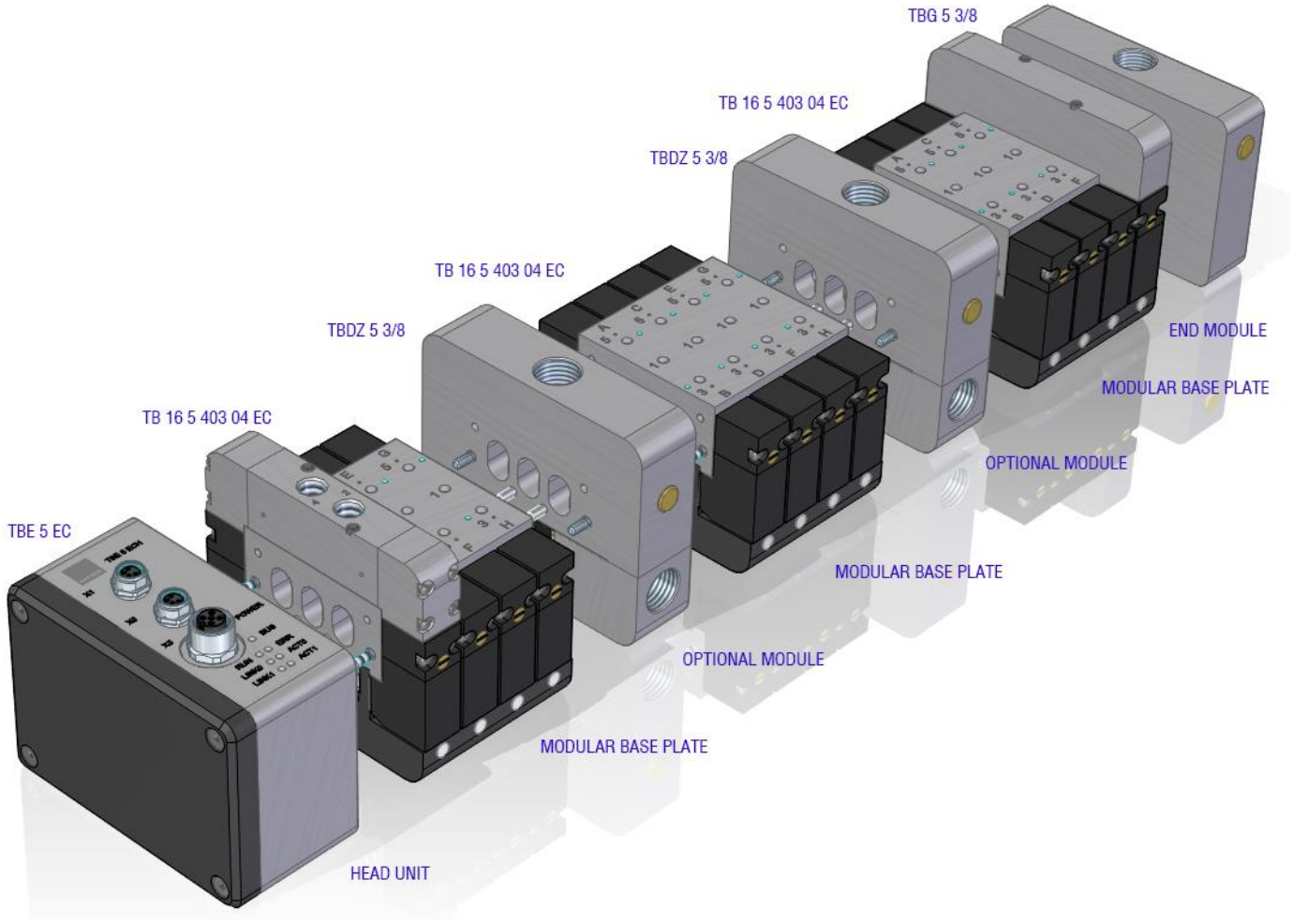
Only cleaned and lubricated or oil-free compressed air of ISO 8573-1 [7:4:4] quality grade may be used as medium. When using lubricated air, when draining the system and blowing off the used air generated during operation, ensure that lubricated air is not released into the environment.

The rise of the device temperature depends on the medium used and the rise in magnet coil temperature. The ambient and controlled medium temperature is generally between -10 °C and +50 °C. If the valve is operated at temperatures below 4 °C, it must be ensured that

the dew point of the controlled medium is 15 °C lower than the ambient temperature, ensuring that no condensate is precipitated from the controlled medium.

The air must be dried in the appropriate way!

The new modular valve island family from Hafner Pneumatika is available in multi-pin direct (D-Sub) and bus version. Fieldbus systems with the following standard industrial bus protocols (IEC61158) EtherCAT, Profinet, Ethernet/IP are possible.



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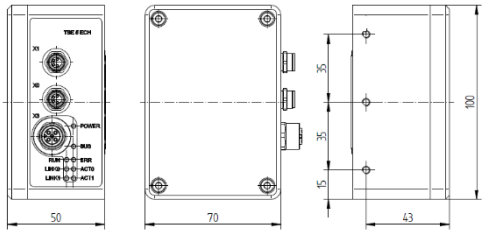
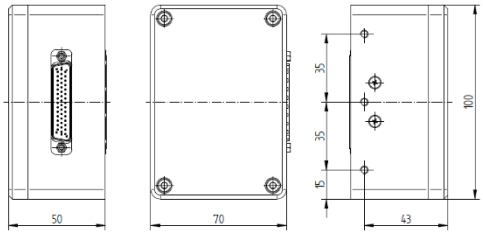
How to build a valve island

The valve islands are made up of 4 valve bases, of which up to 4 modular manifolds (max32pcs) for a multi-pin directional control system and up to 8 modular manifolds (max64pcs) for a bus control valve island can be controlled by one head unit.

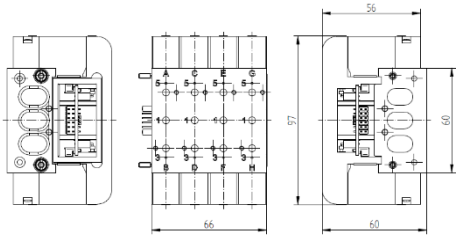


- **TBE 5 EC** - EtherCAT
- **TBE 5 ECH** – EtherCAT
- **TBE 5 PN** – Profinet
- **TBE 5 EIP** – Ethernet/IP



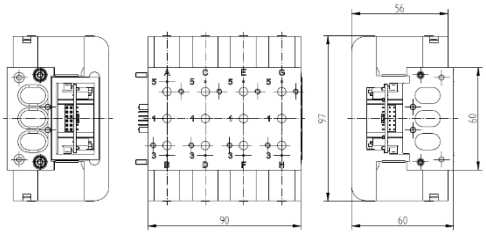
- **TBE 5 HD44 –** Direct control (D-SUB)

Modular bases are capable of flow rates up to 450 NL/min (16 mm valves and base modules to accommodate them) or 650 Nl/min (22 mm valves and base modules to accommodate them) depending on the maximum flow rate. Select the appropriate base plates for the air volume required for the controlled application. By default, the bases contain 8 solenoid actuators, allowing the use of double monostable or bistable directional control valves. A base can be used to transmit both air volumes within one valve island. Unused empty ports on the bases must also be closed using VTB 16 BP or VTB 22 BP, selecting the appropriate one for the base type.



- **TB 16 5 403 04 EC** – Modular base

  (16 mm wide for VTB ... 403 type directional valves with flow rate 450 Nl/min)



- **TB 22 5 503 04 EC -** Modular base
  (22 mm wide for VTB ... 503 type directional valves with a flow capacity of 650 Nl/min)

Both the end modules and the intermediate feeds have ventilation holes and compressed air inlet. If you want to use more than 2 of the base modules in a valve island, it is recommended to use an intermediate power supply to ensure the right amount of compressed air. By using the intermediate supply TBZ 5 3/8 type, it is possible to use different pressures on the directional control valve blocks installed on the base to the right of the intermediate supply (receiving air supply from the end module) and on the directional control valve blocks installed on the base to the left of the intermediate supply (receiving air supply from the intermediate supply). The TBDZ 5 3/8 intermediate supplies, on the other hand, are designed only to ensure a constant flow of air.

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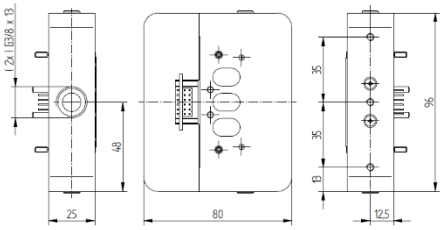
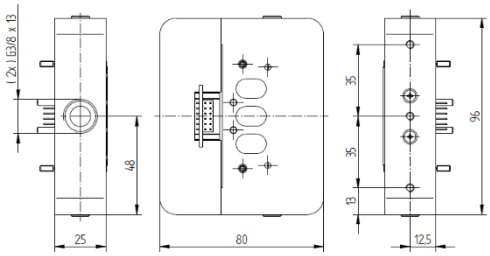
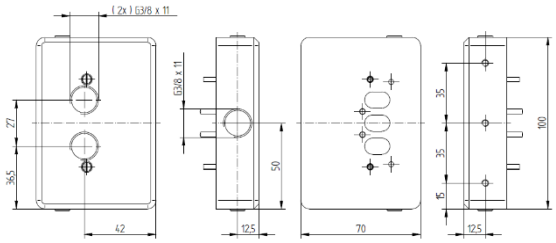


- **A TBZ 5 3/8** - Ventilation and extra air supply are also possible with the optional module. Allows for sectionalization of compressed air pressure upstream and downstream.

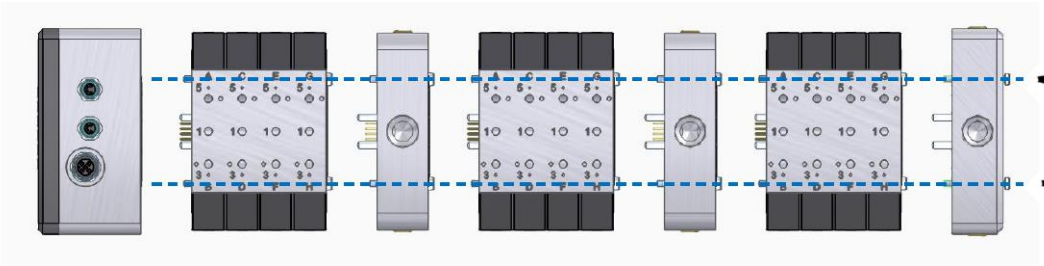


- **TBDZ 5 3/8** - Ventilation and extra air supply are possible with the optional module.



- **TBG 5 3/8** - End module is used to seal the end of the island. Basically, this is where compressed air can be introduced and vented.

By using M4 holes on TBE, TBG, TBZ, TBDZ modules, it is possible to use F1-VTB and DIN W35 KLEMME type fasteners.



Fixing each module to the other using the corresponding special slotted head alignment screw.

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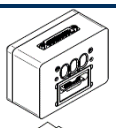
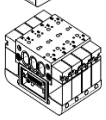
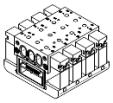
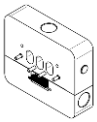
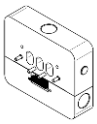
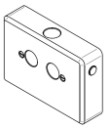
D-SUB SYSTEM (MULTI-PIN) VALVE ISLAND ELEMENTS

(WITHOUT DIRECTIONAL VALVES)

ARTICLE NUMBER	CATALOGUE NUMBER	NAME	CONNECTION	FLOW RATE	WORKING PRESSURE	AMBIENT TEMPERATURE	
TBE 5 HD44	035-256	Mounted modular base head unit - DSUB	G 3/8"	2500 l/min	3 ... 10 bar	-10°C ... +80°C	
TB 16 5 403 04 HD44	035-257	Mounted modular base - DSUB 16 mm allows the use of 4 VTB ___ 403 valves. (e.g. VTB 231 403)	4mm	450Nl/min	3 ... 10 bar	-10°C ... +80°C	
TB 22 5 503 04 HD44	035-258	Mounted modular base - DSUB 22 mm allows the use of 4 VTB ___ 503 valves. (e.g. VTB 231 503)	5mm	650Nl/min	3 ... 10 bar	-10°C ... +80°C	
TBDZ 5 3/8 HD44	035-259	Mounted modular base intermediate inlet - through - G 3/8" Extra air supply and ventilation options.	G 3/8"	2500 l/min	3 ... 10 bar	-10°C ... +80°C	
TBZ 5 3/8 HD44	035-260	Mounted modular base with intermediate inlet - open left - G 3/8" Extra air supply and ventilation options. Also differential pressure on the valves between the two sides of the intermediate supply..	G 3/8"	2500 l/min	3 ... 10 bar	-10°C ... +80°C	
TBG 5 3/8	035-053	Mounted modular base end module With air supply and ventilation option.	G 3/8	2500 l/min	3 ... 10 bar	-10°C ... +80°C	

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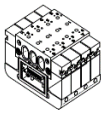
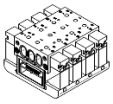
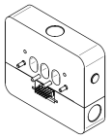
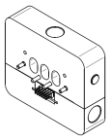
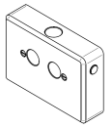
BUS SYSTEM VALVE ISLAND ELEMENTS

(WITHOUT SHUTTLE VALVES)

ARTICLE NUMBER	CATALOGUE NUMBER	NAME	CONNECTION	FLOW RATE	WORKING PRESSURE	AMBIENT TEMPERATURE	
TBE 5 EC	035-052	Mounted modular base head unit - EtherCAT	G 3/8"	2500 l/min	3 ... 10 bar	-10°C ... +80°C	
TBE 5 ECH		Mounted modular base head unit - EtherCAT					
TBE 5 EIP		Mounted modular base head unit - Ethernet/IP					
TBE 5 PN		Mounted modular base head unit - Profinet					
TB 16 5 403 04 EC	035-048	Mounted modular base - DSUB 16 mm allows the use of 4 VTB ___ 403 valves. (e.g. VTB 231 403)	4mm	450Nl/min	3 ... 10 bar	-10°C ... +80°C	
TB 22 5 503 04 EC	035-049	Mounted modular base - DSUB 22 mm allows the use of 4 VTB ___ 503 valves. (e.g. VTB 231 503)	5mm	650Nl/min	3 ... 10 bar	-10°C ... +80°C	
TBDZ 5 3/8	035-050	Mounted modular base intermediate inlet - Through - G 3/8" Extra air supply and ventilation options.	G 3/8"	2500 l/min	3 ... 10 bar	-10°C ... +80°C	
TBZ 5 3/8	035-051	Mounted modular base with intermediate inlet - open left - G 3/8" Extra air supply and ventilation options. Also differential pressure between the valves on the two sides of the intermediate supply.	G 3/8"	2500 l/min	3 ... 10 bar	-10°C ... +80°C	
TBG 5 3/8	035-053	Mounted modular base end module. With air supply and ventilation option.	G 3/8	2500 l/min	3 ... 10 bar	-10°C ... +80°C	

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DIRECTIONAL CONTROL VALVES THAT CAN BE MOUNTED ON THE MODULAR BASE

ARTICLE NUMBER	CATALOGUE NUMBER	NAME	CONNECTION	PRESSURE	TEMPERATURE
VTB 231 403	035-054	Double pneumatic actuated 3/2 valve - with base - NC-NC - G 1/8" (16 mm)	G 1/8"	3 ... 10 bar	-10°C ... +50°C
VTB 232 403	035-055	Double pneumatic actuated 3/2 valve - with base - NC-NO - G 1/8" (16 mm)	G 1/8"	3 ... 10 bar	-10°C ... +50°C
VTB 233 403	035-056	Double pneumatic actuated 3/2 valve - with base - NO-NO - G 1/8" (16 mm)	G 1/8"	3 ... 10 bar	-10°C ... +50°C
VTB 510 403	035-057	Pneumatic actuated 5/2-way monostable valve - with base - G 1/8" (16 mm)	G 1/8"	3 ... 10 bar	-10°C ... +50°C
VTB 520 403	035-058	Pneumatic actuated 5/2 bistable valve - with base - G 1/8" (16 mm)	G 1/8"	3 ... 10 bar	-10°C ... +50°C
VTB 531 403	035-059	Pneumatic actuated 5/3 valve - with base - closed by default - G 1/8" (16 mm)	G 1/8"	3 ... 10 bar	-10°C ... +50°C
VTB 532 403	035-060	Pneumatic actuated 5/3 valve - with base - vented by default - G 1/8" (16 mm)	G 1/8"	3 ... 10 bar	-10°C ... +50°C
VTB 533 403	035-061	Pneumatic actuated 5/3 valve - with base - open by default - G 1/8" (16 mm)	G 1/8"	3 ... 10 bar	-10°C ... +50°C
VTB 231 503	035-062	Double pneumatic actuated 3/2 valve - with base - NC-NC - G 1/8" (22 mm)	G 1/8"	3 ... 10 bar	-10°C ... +50°C
VTB 232 503	035-063	Double pneumatic actuated 3/2 valve - with base - NC-NO - G 1/8" (22 mm)	G 1/8"	3 ... 10 bar	-10°C ... +50°C
VTB 233 503	035-064	Double pneumatic actuated 3/2 valve - with base - NO-NO - G 1/8" (22 mm)	G 1/8"	3 ... 10 bar	-10°C ... +50°C
VTB 510 503	035-065	Pneumatic actuated 5/2-way monostable valve - with base - G 1/8" (22 mm)	G 1/8"	3 ... 10 bar	-10°C ... +50°C
VTB 520 503	035-066	Pneumatic actuated 5/2 bistable valve - with base - G 1/8" (22 mm)	G 1/8"	3 ... 10 bar	-10°C ... +50°C
VTB 531 503	035-067	Pneumatic actuated 5/3 valve - with base - closed by default - G 1/8" (22 mm)	G 1/8"	3 ... 10 bar	-10°C ... +50°C
VTB 532 503	035-068	Pneumatic actuated 5/3 valve - with base - vented by default - G 1/8" (22 mm)	G 1/8"	3 ... 10 bar	-10°C ... +50°C
VTB 533 503	035-069	Pneumatic actuated 5/3 valve - with base - open by default - G 1/8" (22 mm)	G 1/8"	3 ... 10 bar	-10°C ... +50°C
VTB 16 BP	035-070	VTB mounted blind plug - 16 mm - with base - (16 mm)	-	3 ... 10 bar	-10°C ... +50°C
VTB 22 BP	035-071	VTB mounted blind plug - 22 mm - with base - (22 mm)	-	3 ... 10 bar	-10°C ... +50°C

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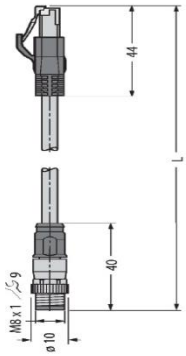
Other accessories

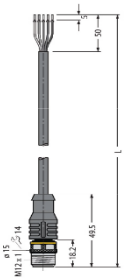
ETHERCAT CABLES

ARTICLE NUMBER	CATALOGUE NUMBER	NAME	MAX. CURRENT	CONNECTION	WIRE LENGTH (L)	CONDUIT	AMBIENT TEMPERATURE
ST EC M8M-RJ45-2M	035-072	EtherCAT M8M-RJ45 connection cable - 2 m		RJ45	2 m	PUR	-25°C ... +80°C
ST EC M8M-RJ45-0,2M	035-074	EtherCAT M8M-RJ45 connection cable - 0.2 m		RJ45	0,2 m	PUR	-25°C ... +80°C
ST EC M8M-RJ45-0,5M	035-075	EtherCAT M8M-RJ45 connection cable - 0.5 m		RJ45	0,5 m	PUR	-25°C ... +80°C
ST EC M8M-RJ45-1M	035-076	EtherCAT M8M-RJ45 connection cable - 1 m		RJ45	1 m	PUR	-25°C ... +80°C
ST EC M8M-RJ45-4M	035-077	EtherCAT M8M-RJ45 connection cable - 4 m		RJ45	4 m	PUR	-25°C ... +80°C
ST EC M8M-RJ45-5M	035-078	EtherCAT M8M-RJ45 connection cable - 5 m		RJ45	5 m	PUR	-25°C ... +80°C
ST EC M8M-RJ45-6M	035-079	EtherCAT M8M-RJ45 connection cable - 6 m		RJ45	6 m	PUR	-25°C ... +80°C
ST EC M8M-RJ45-10M	035-080	EtherCAT M8M-RJ45 connection cable - 10 m		RJ45	10 m	PUR	-25°C ... +80°C
ST EC M8M-RJ45-15M	035-081	EtherCAT M8M-RJ45 connection cable - 15 m		RJ45	15 m	PUR	-25°C ... +80°C
?		Ethercat M8M - M8M serial cable					



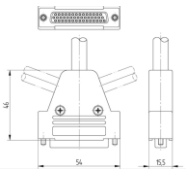
NETWORK CABLES

ST PS M12M-5P-2M	035-073	Power cable - M12M - 2 m	4 A	M12 plug A-coding (5-pin)	2 m	PUR	-25°C ... +80°C
ST PS M12M-5P-5M	035-082	Power cable - M12M - 5 m	4 A	M12 plug A-coding (5-pin)	5 m	PUR	-25°C ... +80°C
ST PS M12M-5P-10M	035-083	Power cable - M12M - 10 m	4 A	M12 plug A-coding (5-pin)	10 m	PUR	-25°C ... +80°C



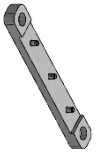
D-SUB CABLES

ST HD44 P32 L3000	035-261	Electrical multi-pin connector, universal design - 44 pins - 3 m cable					



FIXING ADAPTERS

F1-VTB	035-262	VTB valve island mounting adapter					
DIN W35 KLEMME	**?**	Fork clamp for 35 mm rail system					



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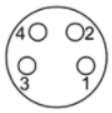
Electrical connections for EtherCAT system

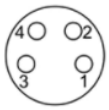
For **TBE 5 EC** head unit:

X61 EtherCAT IN: M8 4pin nut



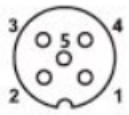
1: TX+
2: RX+
3: RX-
4: TX-

X71 EtherCAT OUT: M8 4pin nut

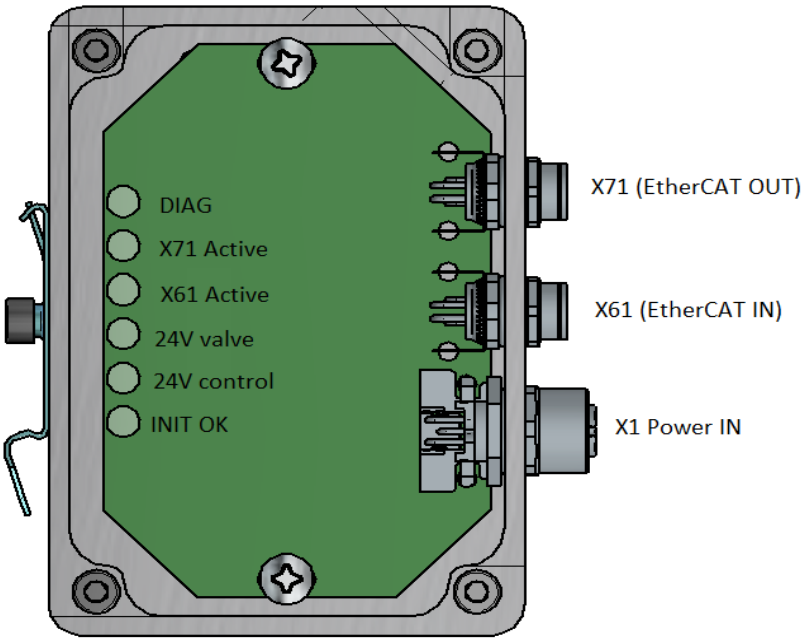


1: TX+
2: RX+
3: RX-
4: TX-

X1 Power IN: M12 5pin nut



1: 24V for valve
2: 24V for valve
3: GND
4: GND
5: 24V EtherCAT interface power supply.



It is recommended to energise X1,1 and X1,2 only after the emergency circuit has been activated, and to de-energise the emergency circuit.

EtherCAT (X61, X71)	
Connection	2 x M8 4pin nut
Electrical isolation	500V
Power supply (X1)	
Connection	M12 5pin, A coding, nut
Power supply	24V DC (+5% / -10%)
Maximum consumption	6A
Idle consumption	max. 100mA
Outputs	
Consumption of coils	100mA
Coil voltage	24V DC
Update outputs	3ms
Maximum number of outputs	64 valve

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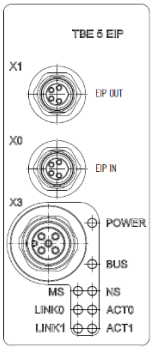
For **TBE 5 ECH** type head unit:



X1: EtherCAT OUT: M8 4pin female

1: TX+
2: RX+
3: RX-
4: TX-

X0: EtherCAT IN: M8 4pin female

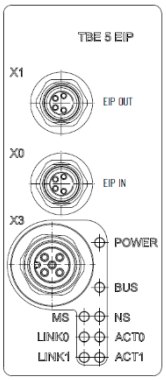
1: TX+
2: RX+
3: RX-
4: TX-

X3: Power IN: M12 5pin female

1: 24V Power Supply
2: 24V Power Supply
3: GND
4: GND
5: 24V Power Supply

TECHNICAL DATA		
Supply voltage	VDC	24 (+/- 10%)
Min. operating voltage	VDC	21,6
Max. operating voltage	VDC	26,4
Drive		PNP
Max. Admissible current [A]	A	3A per pins
Protection		Short circuit protection
Temperature range	°C	-10 ... +80
Electrical connection	24VDC	M12 connector - X3: Power M8 connector - X0: EtherCAT IN M8 connector - X1: EtherCAT OUT
Max. number of valves		64
Maximum current at 24VDC	A	5

Electrical connections for **Ethernet IP** systems:



X1: Ethernet/IP OUT: M8 4pin female

1: TX+
2: RX+
3: RX-
4: TX-

X0: Ethernet/IP IN: M8 4pin female

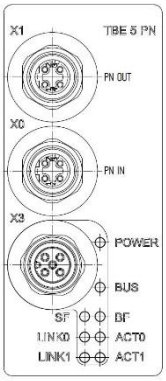
1: TX+
2: RX+
3: RX-
4: TX-

X3: Power IN: M12 5pin female

1: 24V Power Supply
2: 24V Power Supply
3: GND
4: GND
5: 24V Power Supply

TECHNICAL DATA		
Supply voltage	VDC	24 (+/- 10%)
Min. operating voltage	VDC	21,6
Max. operating voltage	VDC	26,4
Drive		PNP
Max. Admissible current [A]	A	3A per pins
Protection		Short circuit protection
Temperature range	°C	-10 ... +80
Electrical connection	24VDC	M12 connector – X3: Power M8 connector – X0 Ethernet/IP IN M8 connector – X1 Ethernet/IP OUT
Max. number of valves		64
Maximum current at 24VDC	A	5

Electrical connections for **Profinet** systems:



X1: Profinet OUT: M12 D-coded 4pin fem.

1: TX+
2: RX+
3: TX-
4: RX-

X0: PROFINET IN: M12 D-coded 4pin fem.

1: TX+
2: RX+
3: TX-
4: RX-

X3: Power IN: M12 A-coded 5pin fem.

1: 24V for valves
2: 24V for valves
3: GND
4: GND
5: 24V PROFINET pov

TECHNICAL DATA		
Supply voltage	VDC	24 (+/- 10%)
Min. operating voltage	VDC	21,6
Max. operating voltage	VDC	26,4
Drive		PNP
Max. Admissible current [A]	A	3A per pins
Protection		Short circuit protection
Temperature range	°C	-10 ... +80
Electrical connection	24VDC	M12 connector – X3: Power M8 connector – X0 PROFINET IN M8 connector – X1 PROFINET OUT
Max. number of valves		64
Maximum current at 24VDC	A	5

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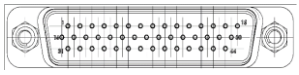
Electrical connections for D-Sub system:

COLOUR LAYOUT			
	VALVE	PIN	COLOUR
1	1A	1	white
2	1B	2	grey-red
3	2A	3	green-blue
4	2B	4	white-black
5	3A	5	grey-brown
6	3B	6	red-blue
7	4A	7	pink
8	4B	8	brown-blue
9	5A	9	blue
10	5B	10	white-green
11	6A	11	white-pink
12	6B	12	brown-black
13	7A	13	yellow-blue
14	7B	14	pink-blue
15	8A	15	red-black
16	8B	16	blue-black
17	9A	17	green-black
18	9B	18	green-red
19	10A	19	grey-green
20	10B	20	pink-brown
21	11A	21	brown-green
22	11B	22	red
23	12A	23	brown
24	12B	24	grey
25	13A	25	grey-pink
26	13B	26	white-grey
27	14A	27	brown-red
28	14B	28	yellow-pink
29	15A	29	yellow-black
30	15B	30	pink-black
31	16A	31	grey-black
32	16B	32	grey-blue
	GND	33	pink-green
	GND	34	white-red



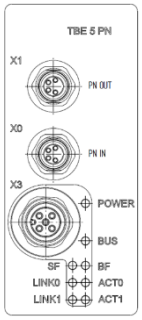
44 pin's D-SUB connections colour layout

TECHNICAL DATA		
Supply voltage	VDC	24 (+/- 10%)
Min. operating voltage	VDC	21,6
Max. operating voltage	VDC	26,4
Drive		PNP
Max. Admissible current [A]	A	3A per pins
Protection		Short circuit protection
Temperature range	°C	-10 … +80
Electrical connection	24VDC	M12 connector – X3: Power M8 connector – X0 PROFINET IN M8 connector – X1 PROFINET OUT
Max. number of valves		64
Maximum current at 24VDC	A	5

Description of LED status and error messages for **Profinet**:

MEANING OF DEVICE STATUS LEDS			
LED name	Colours	State	Description
POWER	Green	ON	Supply and Control voltage is present. OK!
		OFF	Supply and Control voltage is not present. NOK! Maintenance required.
BUS	Green	ON	PROFINET Device OK!
		OFF	PROFINET Device NOK! Contact the supplier!

MEANING OF LEDS – PROFINET				
LED name		Colours	State	Description
SF SYSEM FAILURE	Bicolor	Red	ON	Maintenance required. At least one diagnosis exists.
			OFF	No bus error is present
		Green	ON	Connection established
			OFF	Not connected
BF BUS FAILURE	Bicolor	Red	ON	ERROR. Bus error occurred; the connection was deleted. An alarm was issued
			OFF	No error is present
		Green	BLINK	DCP blink
			OFF	No DCP service



MEANING OF LINK/ACTIVITY LEDS							
		X0 – Port 0				X1 – Port 1	
Link 0	Act 0	State	UA Code	Link 0	Act 0	State	UA Code
ON	OFF	Port Open	ON	ON	OFF	Port Open	ON
ON	ON	Port Open	Flickering	ON	ON	Port Open	Flickering
OFF	N/A	Port Closed	OFF	OFF	N/A	Port Closed	OFF

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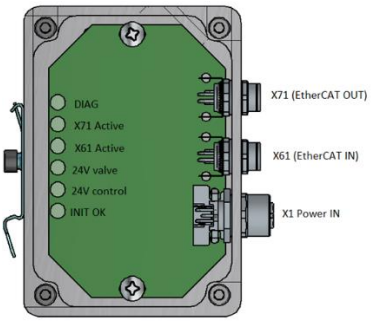
Description of LED status and error indications for **EtherCAT TBE 5 EC**:

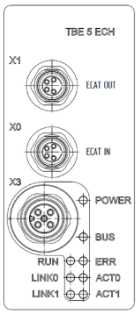
MEANING OF LEDS – EtherCAT TBE 5 EC			
LED name	Colours	State	Description
DIAG	Red	IN	BUS State: Config mode
		OUT	BUS State: Run mode
X61 and 71 LED connected	Red	OUT	No communication
		Blinking	Communication
24V Valve	Red	OUT	Valve power error
		IN	Valve power OK
24V Control	Red	OUT	Control power error
		IN	Control power OK
Init OK	Red	Flickering	During booting
		IN	Successful connection between controller and connector
		Blinking	Unsuccessful connection between controller and connector



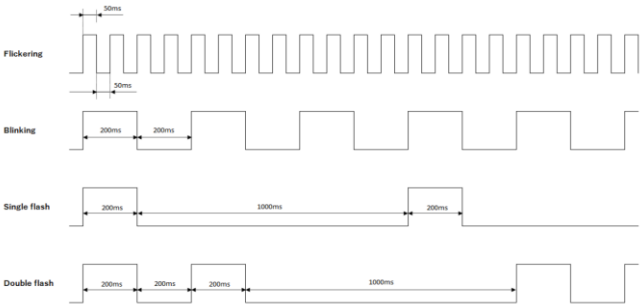
Description of LED status and error indications for **EtherCAT TBE 5 ECH:**

MEANING OF DEVICE STATUS LEDS			
LED name	Colours	State	Description
POWER	Green	ON	Supply and Control voltage is present. OK!
		OFF	Supply and Control voltage is not present. NOK! Maintenance required.
BUS	Green	ON	EtherCAT Device OK!
		OFF	EtherCAT Device NOK! Contact the supplier!

MEANING OF LEDS - ETHERCAT			
LED name	Colours	State	Description
RUN	Green	OFF	The Device is in state INIT
		Blinking	The device is in state PRE-OPERATIONAL
		Single Flash	The device is in state SAFE-OPERATIONAL
		ON	The device is in state OPERATIONAL
ERROR	Green	OFF	No error. The EtherCAT communication of the device is in working condition
		Blinking	General Configuration Error
		Single Flash	Synchronization Error
		Double Flash	Sync Manager Watchdog timeout
		Flickering	Booting Error
		ON	PDI Error.



MEANING OF LINK/ACTIVITY LEDS							
X0 – Port 0				X1 – Port 1			
Link 0	Act 0	State	L/A Code	Link 0	Act 0	State	UA Code
ON	OFF	Port Open	ON	ON	OFF	Port Open	ON
ON	ON	Port Open	Flickering	ON	ON	Port Open	Flickering
OFF	N/A	Port Closed	OFF	OFF	N/A	Port Closed	OFF



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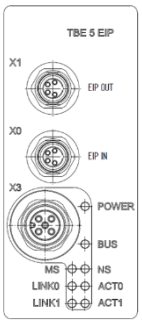
Description of LED status and error messages for **Ethernet/IP**:

MEANING OF DEVICE STATUS LEDS			
LED name	Colours	State	Description
POWER	Zöld	ON	Supply and Control voltage is present. OK!
		OFF	Supply and Control voltage is not present. NOK! Maintenance required.
BUS	Zöld	ON	Ethernet/IP Device OK!
		OFF	Ethernet/IP Device NOK! Contact the supplier!

MEANING OF LEDS – Ethernet/IP				
LED name	Colours		State	Description
MS Module Status	Bicolor	Red	ON	Major unrecoverable fault
			Flashing	Major recoverable fault: Incorrect or inconsistent configuration
		Green/Red	Flashing	Self-test: After completion goes to normal operational state.
			OFF	No power supplied to the device.
		Green	ON	Device is in normal operational state.
			Flashing	Standby. The device has not been configured.
NS Network Status	Bicolor	Red	Flashing	Connection timeout
		Green/Red	Flashing	Self-test: After completion goes to normal operational state.
			OFF	Not powered or no IP address has been configured.
		Green	Flashing	An IP address configured but no CIP connections have been established.
			ON	Connected: IP address configured and at least one CIP connection has been established.



MEANING OF LINK/ACTIVITY LEDS							
X0 – Port 0				X1 – Port 1			
Link 0	Act 0	State	L/A Code	Link 0	Act 0	State	UA Code
ON	OFF	Port Open	ON	ON	OFF	Port Open	ON
ON	ON	Port Open	Flickering	ON	ON	Port Open	Flickering
OFF	N/A	Port Closed	OFF	OFF	N/A	Port Closed	OFF

The device description file is available at www.hafner-pneumatika.com:

EtherCAT https://www.hafner-pneumatika.com/images/catalog/LPTECS.zip

PROFINET https://www.hafner-pneumatika.com/images/catalog/GSDML-V2.43-HAFNER-TBE5PN-20221208.zip