Fieldbus modules CTEU/Installation system CTEL

FESTO

Fieldbus modules CTEU/Installation system CTEL

Key features

The system

- CTEU fieldbus modules for valve terminals
- Festo-specific interface (I-Port)
- Input modules CTSL for detecting sensor signals
- Connection for the installation system CPI from Festo
- Direct and easy networking of valve terminals and other devices via a bus connection
- Wide range of applications thanks to high degree of protection to IP65/67
- Universal connection technology (Sub-D, M12, terminal strip)
- Optional decentralised installation of bus node for connecting two valve terminals
- Basic diagnostics: undervoltage, short circuit

CTEU for the universal use of valve terminals. The Festo-specific, uniformly defined interface (I-Port) enables the fieldbus modules to be used for different types of valve terminal.

The following protocols are currently supported:

- CANopen
- DeviceNet
- CC-LINK
- PROFIBUS
- EtherCAT
- AS-Interface
- PROFINET
- EtherNet/IP
- VARAN

Valve terminal configurator

Online via: ➔ www.festo.com

A valve terminal configurator is available online to help you select a suitable valve terminal.
Select the valve terminal with I-Port interface and order the associated CTEU bus nodes. The bus nodes then only need to be placed on the valve terminal.
The ident. code for the valve terminals specifies the valve functions, the number of valves and unused valve positions, as well as the additional functions and the type of compressed air supply.
As is the case with all Festo products, all valve terminals are supplied:

- Fully preassembled
- Equipped with fittings on request
- Tested for electrical function
- Tested for pneumatic function
- Securely packaged
- User documentation can be downloaded free of charge

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Key features

Fieldbus systems with CTEU

CANopen
CANopen was originally developed for the automotive industry by a joint venture led by Bosch. It has been maintained by the organisation CiA (CAN in Automation) since 1995, and at the end of 2002 it was standardised as European standard EN 50325-4.

DeviceNet
DeviceNet is an open fieldbus standard that was developed by Rockwell Automation on the basis of the CAN protocol.
DeviceNet is standardised in European standard EN 50325.

CC-Link
"Control and Communications Link" (CC-Link) was developed by Mitsubishi Electric and has been available as an open fieldbus network since 1999.

PROFIBUS
Process Fieldbus (PROFIBUS) is a fieldbus that was developed by Siemens and has been standardised in the IEC 61158 series of international standards. It enables communication between devices without the need for any specific adaptations to the interface.

EtherCAT
EtherCAT is a bus with real-time capability; it was developed by Beckhoff and the EtherCAT Technology Group (ETG). EtherCAT is an open technology and has been standardised in international standards IEC 61158 and IEC 61784 and in ISO 15745-4.

AS-Interface
AS-Interface is a manufacturer-independent, easy and robust installation system. It was developed and represented by the AS-International Association, a loose association of diverse companies from different sectors.
AS-Interface has been standardised by IEC 62026-2 and EN 50295.

PROFINET
PROFINET by PROFIBUS and PROFINET International (PI) is the open industrial Ethernet standard for automation and is based on Ethernet TCP/IP and IT standards. PROFINET technology is developed by Siemens and the PROFIBUS user organisation.
PROFINET is standardised in IEC 61158 and IEC 61784.

EtherNet/IP
EtherNet/IP was developed by Allen-Bradley (Rockwell Automation) and the ODVA (Open DeviceNet Vendor Association). EtherNet/IP is an open standard (technology based on Ethernet TCP/IT and UDP/IP) for industrial networks and is standardised in the IEC 61158 series of international standards.

VARAN
VARAN (Versatile Automation Random Access Network) is a real-time-capable Ethernet bus system that meets the highest requirements when it comes to flexibility and availability. It is an open bus system developed by Austrian company Sigmatek.

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Key features

Integration of the I-Port interface/IO-Link

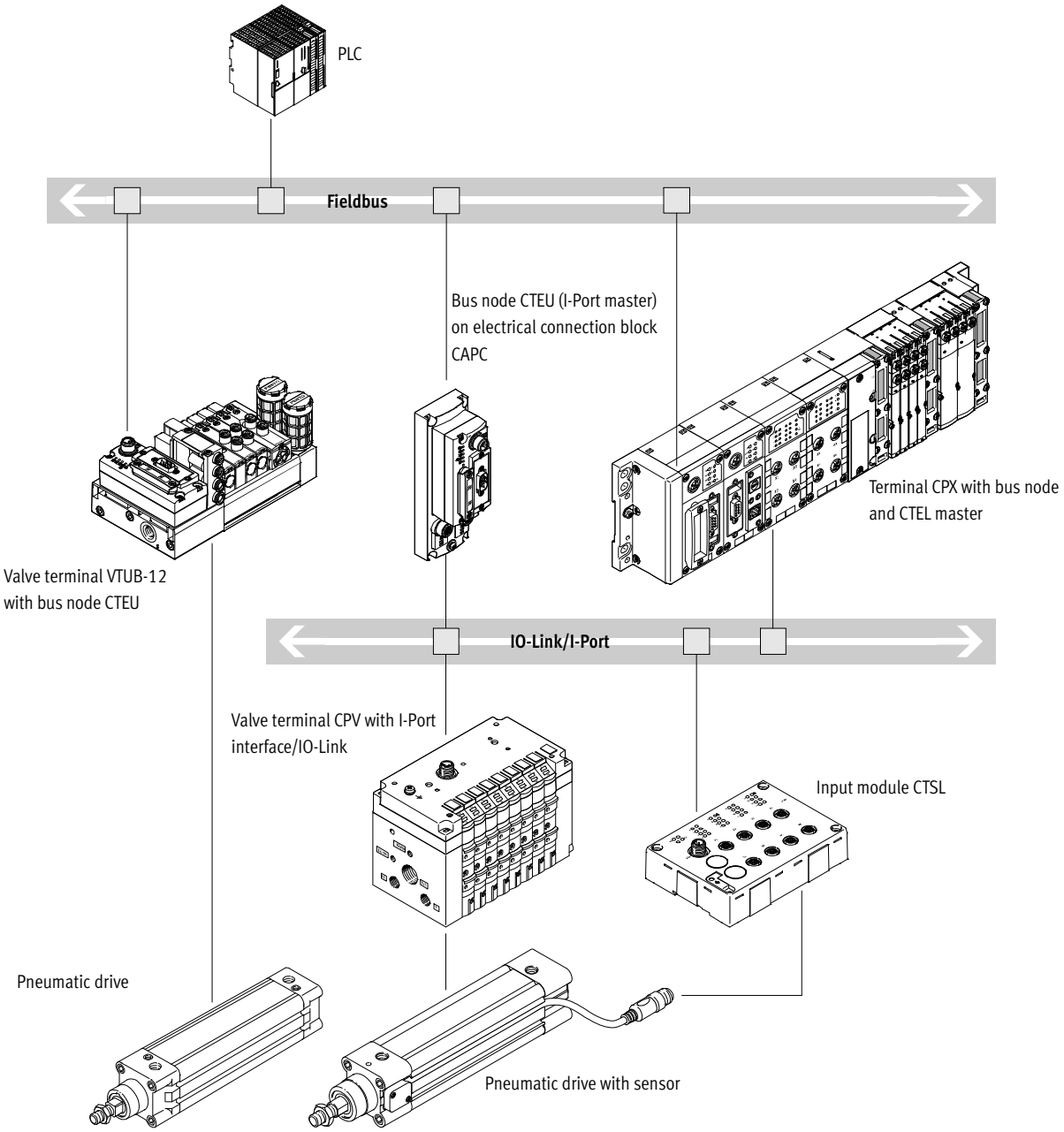
Different bus nodes are used for integration in the control systems of various manufacturers.

The following protocols are supported with the compatible bus node CTEU:

- CANopen
- DeviceNet
- EtherCAT
- CC-LINK
- PROFIBUS
- AS-Interface
- PROFINET
- EtherNet/IP
- VARAN

A second valve terminal can be connected via a connecting plate (decentralised adapter). (➔p.6)

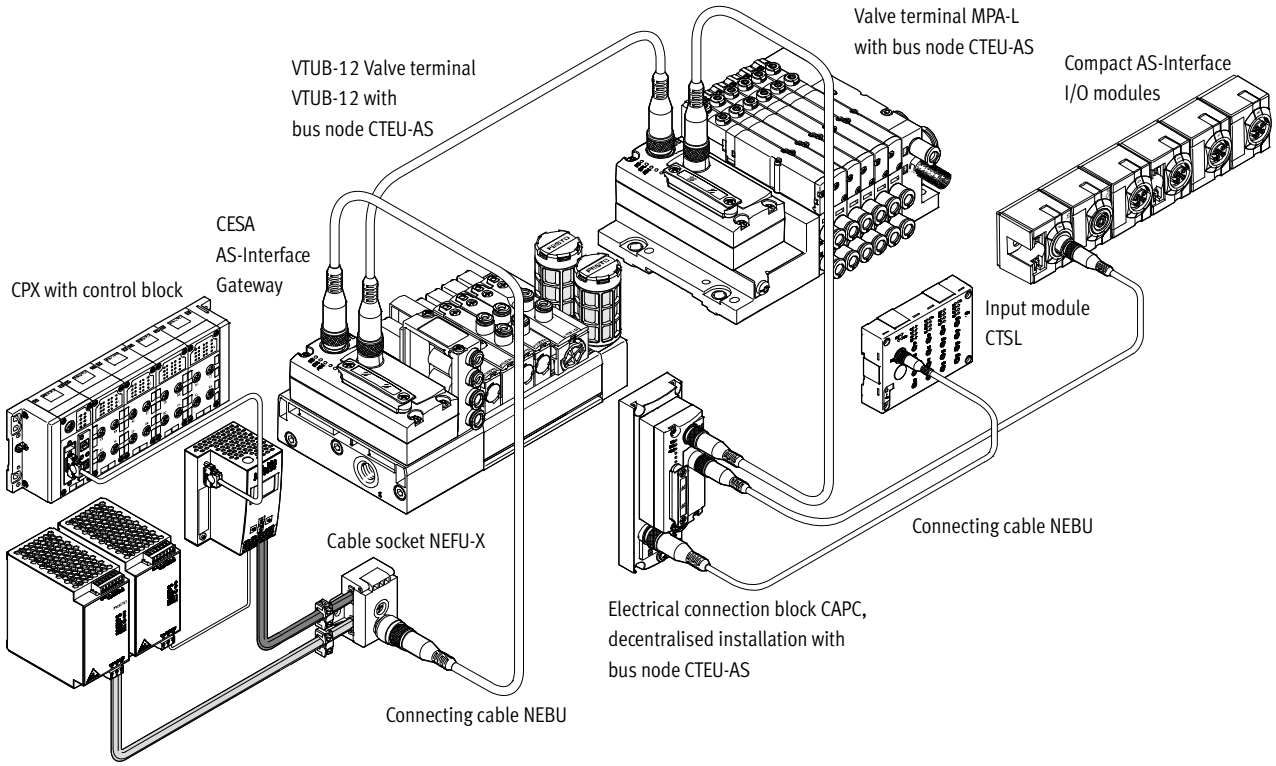
System overview, example



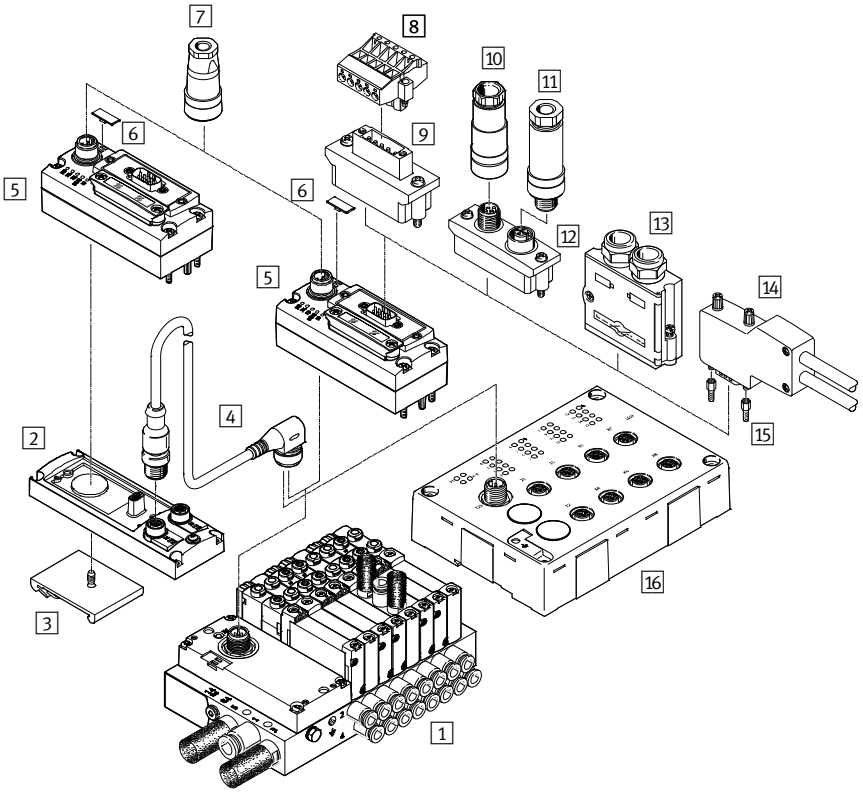
- Communication with the higher-order controller via fieldbus
- Use a bus node CTEU compatible with the fieldbus protocol
- Up to 64 inputs/outputs (solenoid coils), depending on the valve terminal

System overview

Example CTEU-AS interface



Overview of CTEU with valve terminal VTUG



Accessories				
		Type	Brief description	➔ Page/Internet
1	Manifold rail	VABM	With I-Port interface, for connecting max. 35 valves	vtug
2	Electrical connection block	CAPC	For connecting a further terminal (2x I-Port interface)	13
3	H-rail adapter	CAFM	For electrical connection block CAPC	13
4	Connecting cable	NEBU	For IO-Link	11, 13
5	Bus node	CTEU	–	15, 19, 29, 34, 43, 48, 52
6	Inscription label	ASLR	For bus node	aslr
7	Power supply socket	NTSD/FBSD	For power supply	18, 23, 28, 33, 38
8	Terminal strip	FBSD-KL	For Open Style connection	18, 23
9	Bus connection	FBA-1	Open Style for 5-pin terminal strip	18, 23
10	Fieldbus socket	FBSD-GD, NECU	For Micro Style connection, M12, 5-pin	18, 23, 33
11	Plug connector	FBS, NECU	For Micro Style connection, M12, 5-pin	18, 23, 33
12	Bus connection	FBA-2	Micro Style, 2xM12, 5-pin	18, 23, 33
13	Plug connector	FBS-SUB-9-BU	Sub-D	18, 23, 33
14	Plug connector	FBS-SUB-9-WS	Sub-D, angled	18, 33
15	Threaded sleeve	UNC	Sub-D mounting bolts	18, 23, 28, 33
16	Input module	CTSL-D-16E	–	81

System diagnostics CTEU

Diagnostics LED on the bus node CTEU

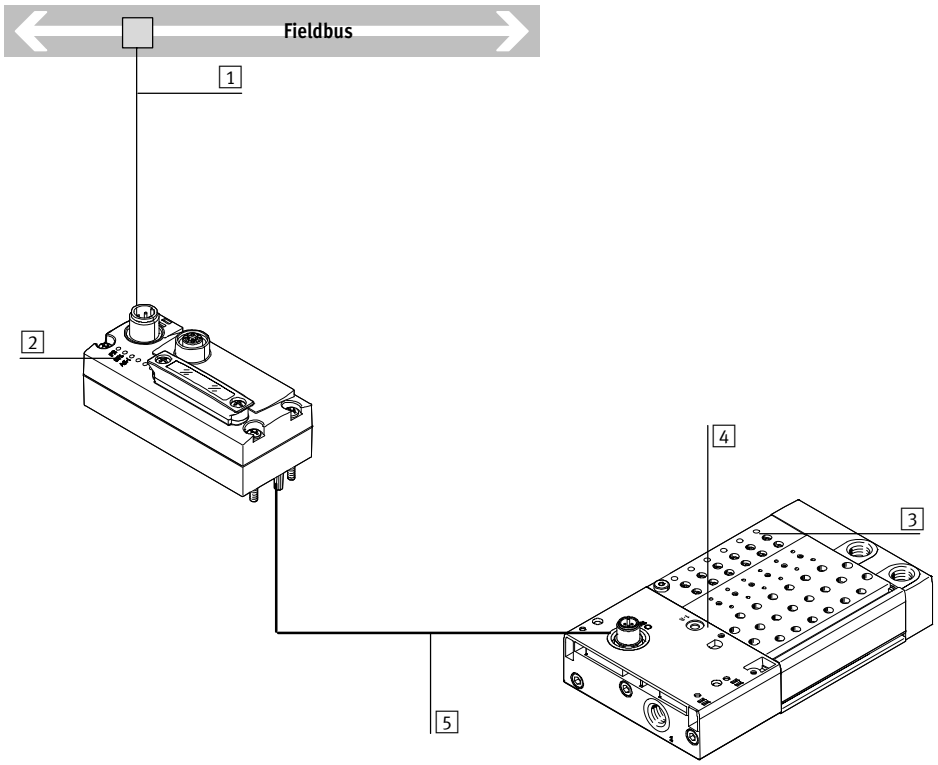
The fieldbus-specific LEDs indicate the communication status and the fieldbus function.

A further LED indicates the status of the power supply:

- Undervoltage/short circuit
- Power supply ensured
- Interruption of voltage

Diagnostic messages via the fieldbus

- Configuration error
- Short circuit/overload of an output module
- Short circuit/undervoltage
- Undervoltage/load voltage of the valves



1 Diagnostics via fieldbus
2 Bus-specific LEDs
3 Switching status display using LEDs (one per valve on the manifold rail)
4 Additional communication and voltage status LED for decentralised installation
5 I-Port interface to the fieldbus module

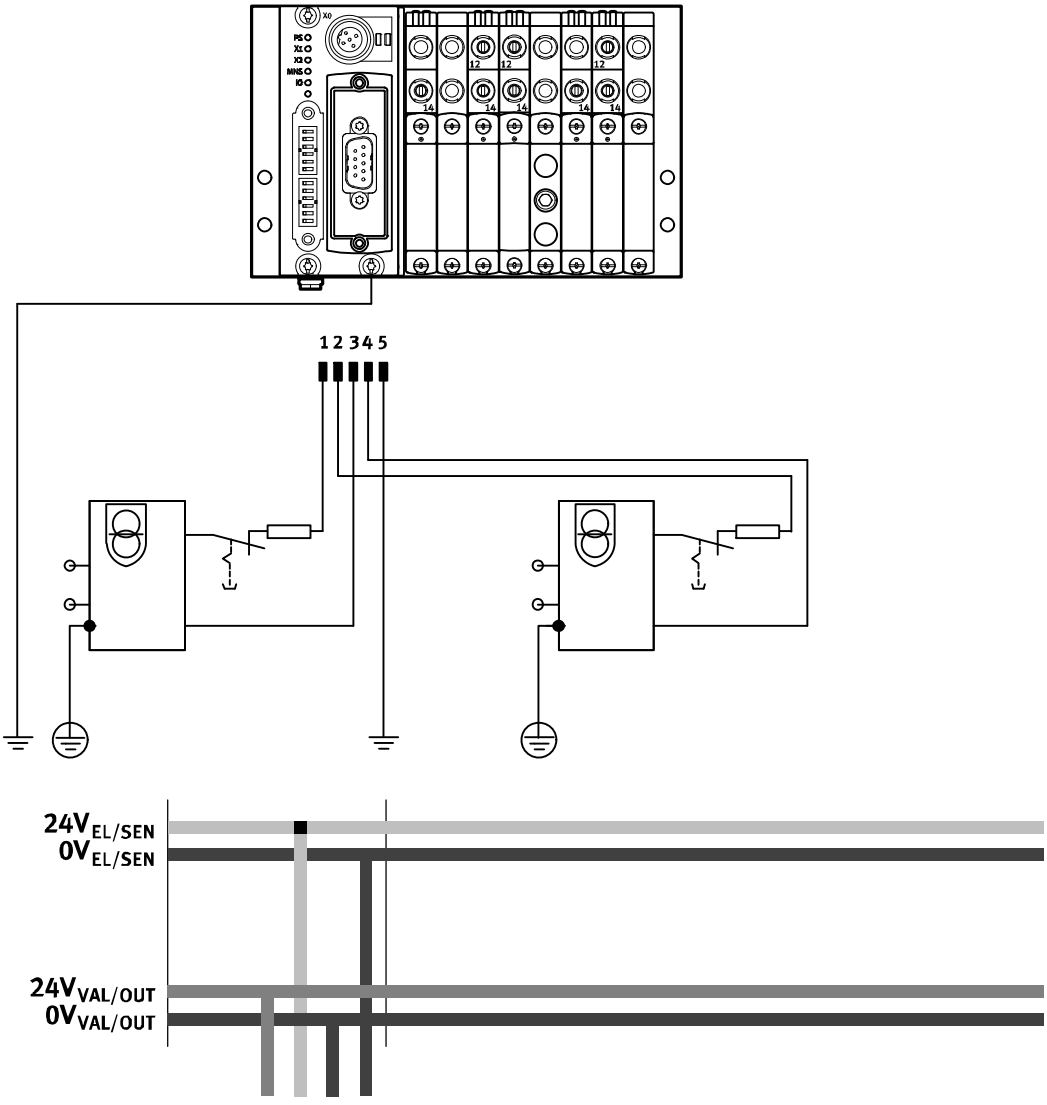
Operating voltage and load current supply

The operating voltages for the valve terminal with I-Port interface are centrally connected to the bus node via a 5-pin M12 plug connector.

The operating voltages are required for the bus node electronics and the load supply to the valves (supplied separately from the electronics supply).

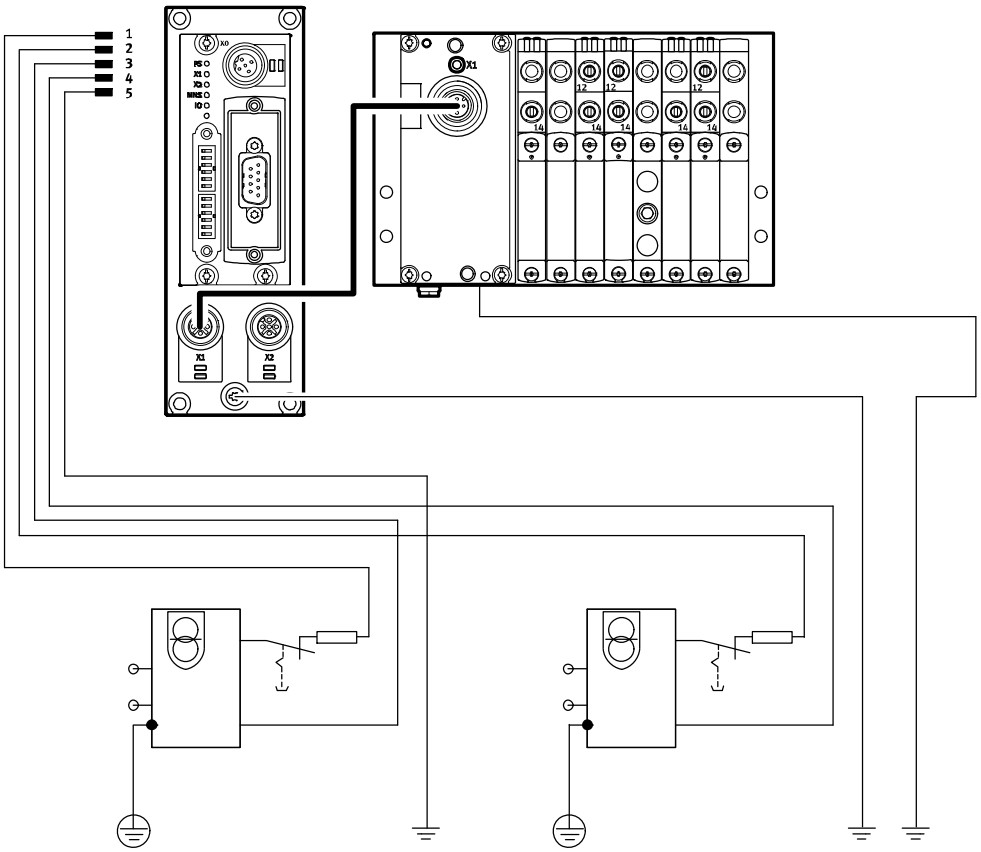
The power supplies do not have a common 0V line and are thus completely galvanically isolated from one another.

Example power supply concept CTEU with valve terminal VTUG

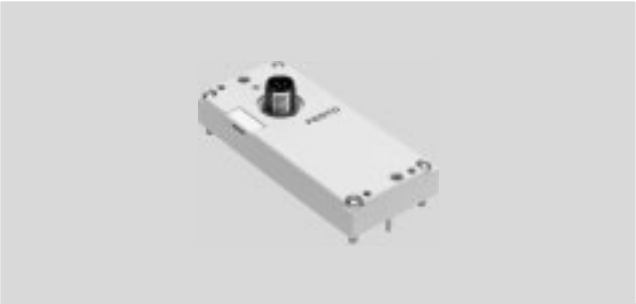


Power supply concept

Example power supply concept CTEU with electrical connection block (decentralised adapter) CAPC and valve terminal VTUG



Festo-specific, standardised interface for direct connection to the fieldbus by mounting the bus node CTEU or to an IO-Link master via a cable (in IO-Link mode).



I-Port interface/IO-Link

Versions:
- I-Port interface for bus nodes (CTEU)
- IO-Link mode for direct connection to a higher-order IO-Link master

The electrical supply/transmission of communication takes place via an M12 plug connector.

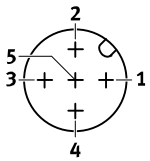
General technical data

Communication types			IO-Link
Electrical connection			• M12 plug connector, 5-pin • A-coded • Metal thread for screening
Baud rates	COM3	[kbps]	230.4
	COM2	[kbps]	38.4
Intrinsic current consumption, logic supply PS		[mA]	30
Intrinsic current consumption, valve supply PL		[mA]	30
Max. number of solenoid coils	VAEM-L1-S-8-PT		16
	VAEM-L1-S-16-PT		32
	VAEM-L1-S-24-PT		48
Max. no. of valve positions	VAEM-L1-S-8-PT		8
	VAEM-L1-S-16-PT		16
	VAEM-L1-S-24-PT		24
Ambient temperature		[°C]	–5 … +50
Degree of protection to EN 60529			IP67

LED display

	Colour	Status	Function
Status LED X1	Red/green	Off	No 24 V logic
	2	Status green	Everything OK
	3	Flashing green	Communication error (in the I-Port or IO-Link protocol)
	4	Flashing red/green	Load supply error (undervoltage or no load supply)
	5	Static red	Load supply error and communication error

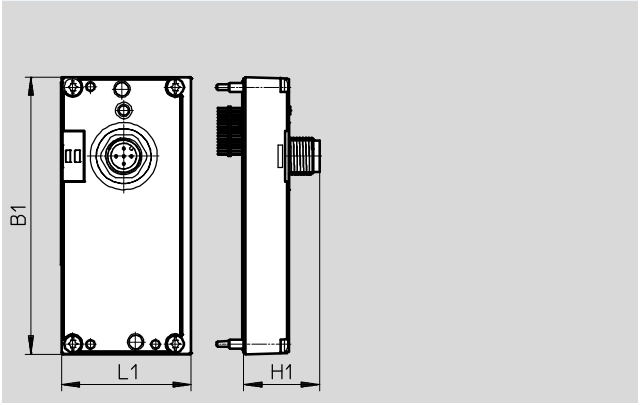
Pin allocation I-Port interface/IO-Link



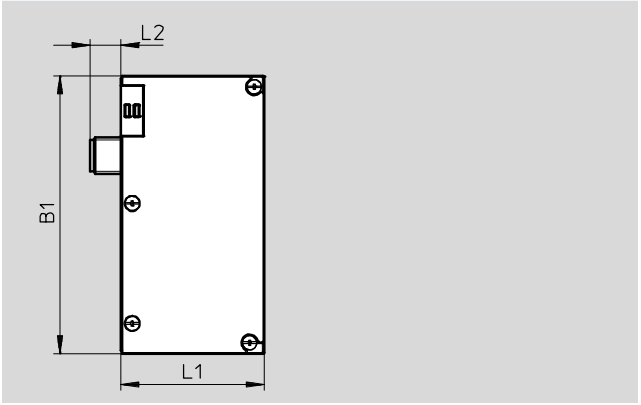
Pin	Allocation	Description
1	$24V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
2	$24V_{VAL/OUT}$	Load voltage supply (valves/outputs)
3	$0V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
4	C/Q	Data communication
5	$0V_{VAL/OUT}$	Load voltage supply (valves/outputs)

Dimensions Download CAD data ➔ **www.festo.com**

Outlet on top

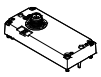
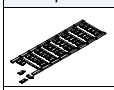


Outlet on the side



Type	Outlet on top			Outlet on the side		
	B1	L1	H1	B1	L1	L2
VAEM-L1-S-...	91	47.1	25	91.5	47.1	10

Accessories – I-Port interface/IO-Link

	Description			Part No.	Type
Electrical interface for I-Port interface/IO-Link, outlet on top					
	Actuation of up to 8 double solenoid valve positions			**573384**	**VAEM-L1-S-8-PT**
	Actuation of up to 16 double solenoid valve positions			**573939**	**VAEM-L1-S-16-PT**
	Actuation of up to 24 double solenoid valve positions			**573940**	**VAEM-L1-S-24-PT**
Electrical interface for I-Port interface/IO-Link, outlet on the side					
	Actuation of up to 8 double solenoid valve positions			**574207**	**VAEM-L1-S-8-PTL**
	Actuation of up to 16 double solenoid valve positions			**574208**	**VAEM-L1-S-16-PTL**
	Actuation of up to 24 double solenoid valve positions			**574209**	**VAEM-L1-S-24-PTL**
Connection technology for I/O-Link					
	T-adapter M12, 5-pin for IO-Link and load supply			**171175**	**FB-TA-M12-5POL**
Straight plug connector, for I-Port/IO-Link					
	Straight plug connector, M12, 5-pin (in combination with adapter for separate load supply)			**175487**	**SEA-M12-5GS-PG7**
Inscription label for I-Port/IO-Link					
	40 pieces in frame			**565306**	**ASLR-C-E4**
Connecting cable					
	Straight - angled	Suitable for use with energy chains	5 m	**574321**	**NEBU-M12G5-E-5-Q8N-M12G5**
			7.5 m	**574322**	**NEBU-M12G5-E-7.5-Q8N-M12G5**
			10 m	**574323**	**NEBU-M12G5-E-10-Q8N-M12G5**
	Angled - angled	Standard	0.5 m	**570733**	**NEBU-M12W5-K-0.5-M12W5**
	Straight - angled			**8003617**	**NEBU-M12G5-K-0.5-M12W5**
	Angled - angled		2 m	**570734**	**NEBU-M12W5-K-2-M12W5**
	Straight - angled			**8003618**	**NEBU-M12G5-K-2-M12W5**

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Technical data – Electrical connection block CAPC

Function

The electrical connection block CAPC enables decentralised installation of bus nodes CTEU on a valve terminal or input modules with I-Port interface.

Scope of application

- M12 connection technology (two interfaces)
- Enables the installation of valve terminals or other devices over a distance of 20 metres
- By using the accessory CAFM the electrical connection block can be installed on an H-rail

General technical data		
Type		CAPC-F1-E-M12
Dimensions W x L x H	[mm]	50x148x28
Fieldbus interface		2 x M12 socket, 5-pin, A-coded
Operating voltage range	[V DC]	18 ... 30
Max. power supply	[A]	2
Nominal operating voltage	[V DC]	24
Product weight	[g]	85
Cable length	[m]	20

Materials	
Housing	PA reinforced
Note on materials	RoHS compliant

Operating and environmental conditions		
Degree of protection to EN 60529		IP65, IP67
Ambient temperature	[°C]	–5 ... +50
Storage temperature	[°C]	–20 ... +70
Corrosion resistance class CRC		2[1)]
CE marking (see declaration of conformity)		To EU EMC Directive[2)]

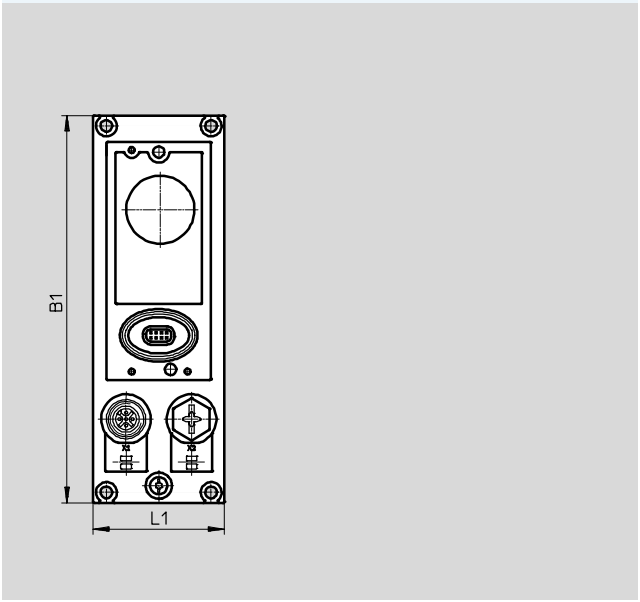
1) Corrosion resistance class 2 according to Festo standard 940 070
Components subject to moderate corrosion stress. External visible parts with primarily decorative surface requirements which are in direct contact with the surrounding industrial environment or media such as coolants or lubricating agents.

2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

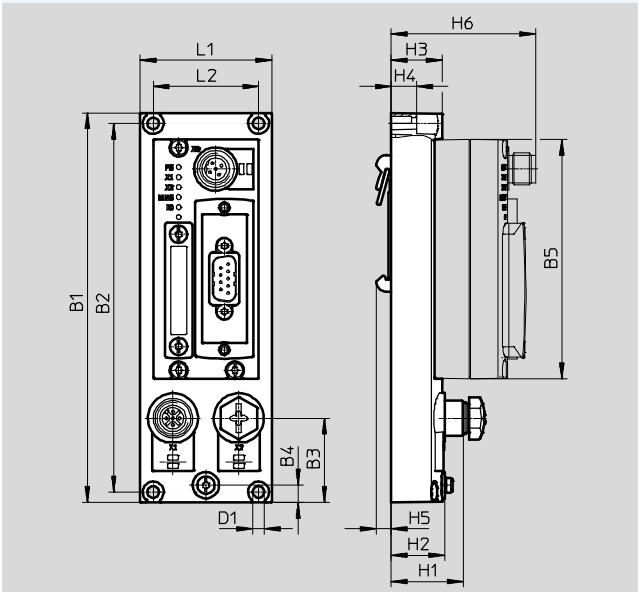
Dimensions

Download CAD data ➔ **www.festo.com**

CAPC

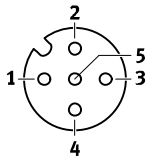


CAPC with mounted bus node CTEU-CO



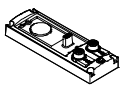
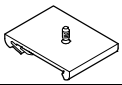
Type	B1	B2	B3	B4	B5	D1-Ø	H1	H2	H3	H4	H5	H6	L1	L2
CAPC	148	140	32	6.6	91	4.4	27.3	20.3	19.3	9.6	5.7	54.8	50	40

Pin allocation I-Port interface/IO-Link



Pin	Allocation	Description
1	$24V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
2	$24V_{VAL/OUT}$	Load voltage supply (valves/outputs)
3	$0V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
4	C/Q	Data communication
5	$0V_{VAL/OUT}$	Load voltage supply (valves/outputs)
Housing, FE		Functional earth

Accessory CAPC

	Description			Part No.	Type
Electrical connection block					
	–			**570042**	**CAPC-F1-E-M12**
H-rail mounting					
	–			**570043**	**CAFM-F1-H**
Connecting cable					
	Straight - angled	Suitable for use with energy chains	5	**574321**	**NEBU-M12G5-E-5-Q8N-M12G5**
			7.5	**574322**	**NEBU-M12G5-E-7.5-Q8N-M12G5**
			10	**574323**	**NEBU-M12G5-E-10-Q8N-M12G5**
	Angled - angled	Standard	0.5 m	**570733**	**NEBU-M12W5-K-0.5-M12W5**
	Straight - angled			**8003617**	**NEBU-M12G5-K-0.5-M12W5**
	Angled - angled		2 m	**570734**	**NEBU-M12W5-K-2-M12W5**
	Straight - angled			**8003618**	**NEBU-M12G5-K-2-M12W5**

The bus node handles communication between the valve terminal and a higher-level CANopen® master.

The module has basic diagnostic functions. It has 5 integrated LEDs for on-site display. A maximum of 8 byte inputs and 8 byte outputs are transmitted in the cyclic process image.

Application

Fieldbus interface

The bus connection is established via a 9-pin Sub-D plug as per the CAN in Automation (CiA) specification DS 102 with additional 24 V CAN transceiver supply (option as per DS 102).

The bus connector plug (with IP65/IP67 degree of protection from Festo or IP20 degree of protection from other manufacturers) facilitates the connection of an incoming and an outgoing bus cable.

There are 4 contacts each available for the conductors (CAN_L/CAN_H and 24 V/0 V optional) of the incoming and outgoing bus cables.

The fieldbus parameters and the basic device parameter settings are set on the bus node via DIL switches.

Implementation

Protocol chip used:
- CAN transceiver 82C251

Possible transmission rate:
- 125 kbps
- 250 kbps
- 500 kbps
- 1 Mbps

Max. CANopen cable length (trunk cable):
- 40 m at 1 Mbps
- 100 m at 500 kbps
- 250 m at 250 kbps
- 500 m at 125 kbps

Max. branch cable length (drop cable):
- 0.30 m at 1 Mbps
- 0.75 m at 500 kbps
- 2.00 m at 250 kbps
- 3.75 m at 125 kbps

The following variants can be realised using an adapter:
- 2 x micro style M12, degree of protection IP65, 5-pin, plug connector and socket
- Open style plug, degree of protection IP20, 5-pin, pin

General technical data		
Fieldbus interface		
Protocol		CANopen
Function		Bus connection incoming/outgoing
Transmission rate	[kbps]	125, 250, 500 and 1000
Type		CAN bus
Connection type		Plug
Connection technology		Sub-D
Number of pins/wires		9
Galvanic isolation		Yes
Internal cycle time		1 ms per 1 byte of user data
Note: Optional connection technology with accessories:		Micro style (plug/socket M12x1 A-coded, 5-pin, degree of protection IP65)
		Open style (terminal strip, 5-pin, degree of protection IP20)
		Open style (screw terminal, 5-pin, degree of protection IP20)
Inputs/outputs		
Max. address volume for inputs	[byte]	8
Note on inputs	[byte]	Expandable to max. 16
Max. address volume for outputs	[byte]	8
Note on outputs	[byte]	Expandable to max. 16

General data		
Device-specific diagnostics		System diagnostics
		Undervoltage
		Communication error
Parameterisation		Diagnostic behaviour
		Fail-safe reaction
Additional functions		Emergency message
		Acyclic data access via SDO
Configuration support		EDS files
Control elements		DIL switch
LED display	Product-specific	PS: Operating voltage for electronics and load supply
		X1: System status of module at I-Port 1
		X2: System status of module at I-Port 2
	Fieldbus-specific	MNS: Network status
		IO: I/O status

Technical data – Electrical components		
Nominal operating voltage	[V DC]	24
Operating voltage range	[V DC]	18 ... 30
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 65
Max. power supply	[A]	4
Power supply		
Function		Electronics and load
Connection type		Plug
Connection technology		M12x1, B-coded to EN 61076-2-101
Number of pins/wires		5

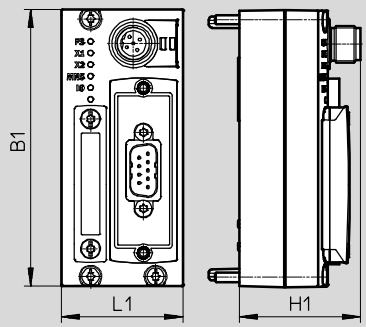
Technical data – Mechanical components		
Type of mounting		On electrical sub-base
		On electrical interface
Product weight	[g]	90 (without fieldbus connector and without interlinking module)
Grid dimension	[mm]	40
Dimensions W x L x H	[mm]	40 x 91 x 50

Materials	
Housing	PA
Note on materials	RoHS-compliant
	Contains paint-wetting impairment substances

Operating and environmental conditions		
Ambient temperature	[°C]	–5 … +50
Storage temperature	[°C]	–20 … +70
Corrosion resistance class CRC[1)]		2
CE mark (see declaration of conformity)[3)]		To EU EMC Directive[2)]
KC mark		KC EMC
Certification		c UL us listed (OL)
		RCM mark
Degree of protection		IP65/IP67
Note on degree of protection		In assembled state
		Unused connections sealed

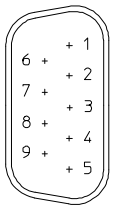
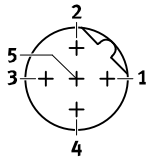
1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.
3) Additional information www.festo.com/sp ➔ Certificates.

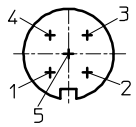
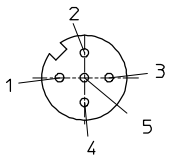
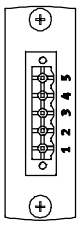
Dimensions Download CAD data ➔ **www.festo.com**

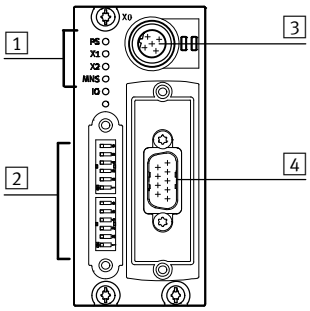


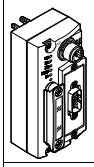
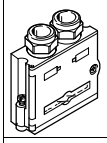
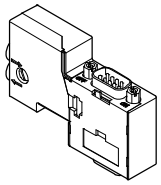
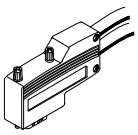
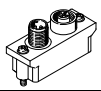
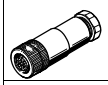
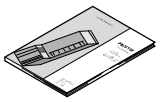
Type	B1	H1	L1
CTEU-CO	91	39.8	40

Pin allocation

	Pin	Assignment	Manual
Sub-D, 9-pin, CANopen interface			
	1	n.c.	Not connected
	2	CAN_L	Received/transmitted data low
	3	CAN_GND	0 V CAN interface (connected to pin 6)
	4	n.c.	Not connected
	5	CAN_SHLD	Optional shielded connection
	6	GND	0 V CAN interface, optional (connected to pin 3)
	7	CAN_H	Received/transmitted data high
	8	n.c.	Not connected
	9	CAN_V+	24 V DC supply CAN interface
	Housing		Cable shielding, connection to functional earth FE
Power supply, M12, B-coded			
	1	$24V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
	2	$24V_{VAL/OUT}$	Load voltage supply (valves/outputs)
	3	$0V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
	4	$0V_{VAL/OUT}$	Load voltage supply (valves/outputs)
	5	FE	Functional earth

Pin allocation of the CANopen interface			
	Pin	Assignment	Description
Micro style bus connection (M12)			
Incoming 	1	Shielded	Connection to FE (functional earth)
	2	CAN_V+	24 V DC supply CAN interface
	3	CAN_GND	0 V CAN interface
	4	CAN_H	Received/transmitted data high
	5	CAN_L	Received/transmitted data low
Outgoing 	1	Shielded	Connection to FE (functional earth)
	2	CAN_V+	24 V DC supply CAN interface
	3	CAN_GND	0 V CAN interface
	4	CAN_H	Received/transmitted data high
	5	CAN_L	Received/transmitted data low
Open style bus connection			
	1	CAN_GND	0 V CAN interface
	2	CAN_L	Received/transmitted data low
	3	Shielded	Connection to FE (functional earth)
	4	CAN_H	Received/transmitted data high
	5	CAN_V+	24 V DC supply CAN interface

Connection and display components	
	1 Status LED (operating status/diagnostics) 2 DIL switch 3 Power supply for bus node and connected devices (valve terminal) 4 Fieldbus interface (Sub-D plug)

Ordering data				
			Part No.	Type
Bus node				
	CANopen bus node		**570038**	**CTEU-CO**
Bus connection				
	Sub-D socket, straight		**532219**	**FBS-SUB-9-BU-2x5POL-B**
	Sub-D socket for CANopen with terminating resistor and programming interface		**574588**	**NECU-S1W9-C2-ACO**
	Sub-D socket, angled		**533783**	**FBS-SUB-9-WS-CO-K**
	Micro style bus connection, 2xM12, 5-pin, A-coded		**525632**	**FBA-2-M12-5POL**
	Socket for micro style connection, A-coded		**18324**	**FBSD-GD-9-5POL**
	Plug connector for micro style connection, M12, 5-pin, A-coded		**175380**	**FBS-M12-5GS-PG9**
	Open style bus connection		**525634**	**FBA-1-SL-5POL**
	Terminal strip for open style connection, 5-pin		**525635**	**FBSD-KL-2x5POL**
Fitting				
	Threaded sleeve for Sub-D		**533000**	**UNC4-40/M3X8**
Plug socket				
	For power supply		**538999**	**NTSD-GD-9-M12-5POL-RK**
Manual				
	User documentation – bus node CTEU-CO	German	**573767**	**P.BE-CTEU-CO-OP+MAINT-DE**
		English	**573768**	**P.BE-CTEU-CO-OP+MAINT-EN**
		Spanish	**573769**	**P.BE-CTEU-CO-OP+MAINT-ES**
		French	**573770**	**P.BE-CTEU-CO-OP+MAINT-FR**
		Italian	**573771**	**P.BE-CTEU-CO-OP+MAINT-IT**
		Chinese	**573772**	**P.BE-CTEU-CO-OP+MAINT-ZH**

The bus node handles communication between the valve terminal and a higher-order DeviceNet® master.

The module has basic diagnostic functions. It has 5 integrated LEDs for on-site display. Up to 8 byte inputs and 8 byte outputs are transmitted in the cyclic process image.

Application

Fieldbus interface

The bus connection is established via a 9-pin Sub-D plug with a typical allocation (to EN 50170).

The bus connector plug (with degree of protection IP65/IP67 from Festo or IP20 from other manufacturers) facilitates the connection of an incoming and an outgoing bus cable.

The fieldbus parameters and the basic device parameter settings are set on the bus node via DIL switches.

Implementation

Protocol chip used:
- CAN transceiver 82C251

Possible transmission rate:
- 125 kbps
- 250 kbps
- 500 kbps

Max. DeviceNet cable length (trunk cable):
- 100 m at 500 kbps
- 250 m at 250 kbps
- 500 m at 125 kbps

Max. branch cable length (drop cable):
- 6 m at 500 kbps
- 6 m at 250 kbps
- 6 m at 125 kbps

The following variants can be realised using an adapter:
- 2 x micro style M12, degree of protection IP65, 5-pin, plug connector and socket
- Open style plug, degree of protection IP20, 5-pin, pin

General technical data		
Fieldbus interface		
Protocol		DeviceNet
Transmission rate	[kbps]	125, 250, 500
Type		CAN bus
Connection type		Plug
Connection technology		Sub-D
Number of pins/wires		9
Galvanic isolation		Yes
Internal cycle time		1 ms per 1 byte of user data
Note: Optional connection technology with accessories:		Micro style (plug/socket M12x1 A-coded, 5-pin, degree of protection IP65)
		Open style (terminal strip, 5-pin, degree of protection IP20)
		Open style (screw terminal, 5-pin, degree of protection IP20)
Inputs/outputs		
Max. address volume for inputs	[byte]	8
Max. address volume for outputs	[byte]	8

General data		
Device-specific diagnostics		System diagnostics
		Undervoltage
		Communication error
Parameterisation		Diagnostic behaviour
		Fail-safe and idle response
Additional functions		Acyclic data access via "Explicit Message"
		QuickConnect
		System status can be displayed using process data
Configuration support		EDS files
Control elements		DIL switch
LED display	Product-specific	PS: Operating voltage for electronics and load supply
		X1: System status of module at I-Port 1
		X2: System status of module at I-Port 2
	Fieldbus-specific	MNS: Network status
		IO: I/O status

Technical data – Electrical components		
Nominal operating voltage	[V DC]	24
Operating voltage range	[V DC]	18 ... 30
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 65
Max. power supply	[A]	4
Power supply		
Function		Electronics and load
Connection type		Plug
Connection technology		M12x1, B-coded to EN 61076-2-101
Number of pins/wires		5

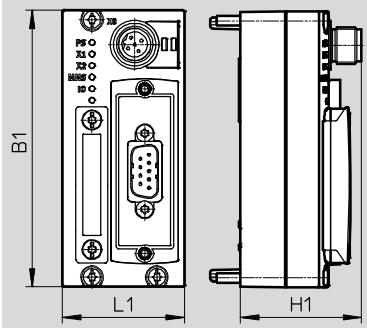
Technical data – Mechanical components		
Type of mounting		On electrical sub-base
		On electrical interface
Product weight	[g]	90 (without fieldbus connector and without interlinking module)
Grid dimension	[mm]	40
Dimensions W x L x H	[mm]	40 x 91 x 50

Materials	
Housing	PA, PC
Note on materials	RoHS-compliant
	Contains paint-wetting impairment substances

Operating and environmental conditions		
Ambient temperature	[°C]	–5 … +50
Storage temperature	[°C]	–20 … +70
Corrosion resistance class CRC[1)]		2
CE mark (see declaration of conformity)[3)]		To EU EMC Directive[2)]
KC mark		KC EMC
Certification		c UL us listed (OL)
		RCM mark
Degree of protection		IP65/IP67
Note on degree of protection		In assembled state
		Unused connections sealed

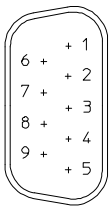
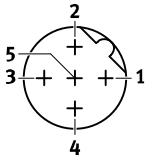
1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.
3) Additional information www.festo.com/sp ➔ Certificates.

Dimensions Download CAD data ➔ **www.festo.com**

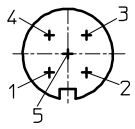
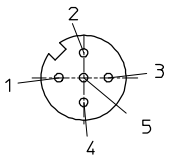
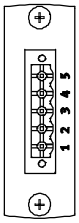


Type	B1	H1	L1
CTEU-DN	40	39.8	91

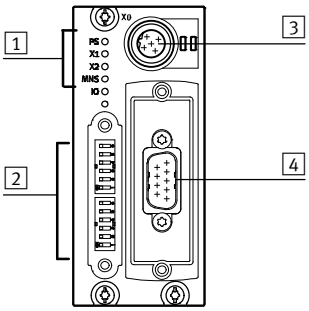
Pin allocation

	Pin	Assignment	Manual
Sub-D, 9-pin, DeviceNet® interface			
	1	n.c.	Not connected
	2	CAN_L	Received/transmitted data low
	3	CAN_GND	0 V CAN interface (connected to pin 6)
	4	n.c.	Not connected
	5	CAN_SHLD	Optional shielded connection
	6	GND	0 V CAN interface, optional (connected to pin 3)
	7	CAN_H	Received/transmitted data high
	8	n.c.	Not connected
	9	CAN_V+	24 V DC supply CAN interface
	Housing		Cable shielding, connection to functional earth FE
Power supply, M12, B-coded			
	1	$24V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
	2	$24V_{VAL/OUT}$	Load voltage supply (valves/outputs)
	3	$0V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
	4	$0V_{VAL/OUT}$	Load voltage supply (valves/outputs)
	5	FE	Functional earth

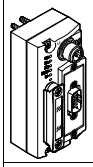
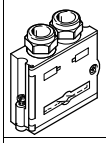
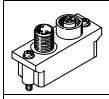
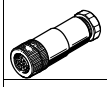
Pin allocation

	Pin	Assignment	Description
Micro style bus connection (M12)			
Incoming 	1	Shielded	Connection to FE (functional earth)
	2	CAN_V+	24 V DC supply CAN interface
	3	CAN_GND	0 V CAN interface
	4	CAN_H	Received/transmitted data high
	5	CAN_L	Received/transmitted data low
Outgoing 	1	Shielded	Connection to FE (functional earth)
	2	CAN_V+	24 V DC supply CAN interface
	3	CAN_GND	0 V CAN interface
	4	CAN_H	Received/transmitted data high
	5	CAN_L	Received/transmitted data low
Open style bus connection			
	1	CAN_GND	0 V CAN interface
	2	CAN_L	Received/transmitted data low
	3	Shielded	Connection to FE (functional earth)
	4	CAN_H	Received/transmitted data high
	5	CAN_V+	24 V DC supply CAN interface

Connection and display components



1 Status LED (operating status/diagnostics)
2 DIL switch
3 Power supply for bus node and connected devices (valve terminal)
4 Fieldbus interface (Sub-D plug)

Ordering data				
			Part No.	Type
Bus node				
	DeviceNet® bus node		**570039**	**CTEU-DN**
Bus connection				
	Sub-D socket, straight		**532219**	**FBS-SUB-9-BU-2x5POL-B**
	Micro style bus connection, 2xM12, 5-pin, A-coded		**525632**	**FBA-2-M12-5POL**
	Socket for micro style connection, M12, 5-pin		**18324**	**FBSD-GD-9-5POL**
	Plug connector for micro style connection, M12, 5-pin		**175380**	**FBS-M12-5GS-PG9**
	Open style bus connection		**525634**	**FBA-1-SL-5POL**
	Terminal strip for open style connection, 5-pin		**525635**	**FBSD-KL-2x5POL**
Fitting				
	Threaded sleeve for Sub-D		**533000**	**UNC4-40/M3X8**
Plug socket				
	For power supply		**538999**	**NTSD-GD-9-M12-5POL-RK**
User documentation				
	User documentation – bus node CTEU-DN	German	**573744**	**P.BE-CTEU-DN-OP+MAINT-DE**
		English	**573745**	**P.BE-CTEU-DN-OP+MAINT-EN**
		Spanish	**573746**	**P.BE-CTEU-DN-OP+MAINT-ES**
		French	**573747**	**P.BE-CTEU-DN-OP+MAINT-FR**
		Italian	**573748**	**P.BE-CTEU-DN-OP+MAINT-IT**
		Chinese	**573779**	**P.BE-CTEU-DN-OP+MAINT-ZH**

The bus node handles communication between the valve terminal and a higher-order master for Control & Communication Link (CC-Link®).

The module has basic diagnostic functions. It has 5 integrated LEDs for on-site display. A maximum of 8 byte inputs and 8 byte outputs are transmitted in the cyclic process image.

Application

Fieldbus interface

The bus connection is established by a screw terminal with IP20 protection, a 9-pin Sub-D socket with IP65/IP67 protection from Festo or a Sub-D socket with IP20 protection from other manufacturers.

The module has a system and load supply, a fieldbus connection and a connection to the valve terminal with serial I-Port interface.

Both connection types have the function of an integrated T-distributor and thus support the connection of an incoming and outgoing bus cable.

The integrated interface with RS485 transmission technology is designed for the typical CC-Link 3-wire connection technology (in accordance with CLPA CC-Link Spec. V1.1).

Implementation

Protocol chip used:
- MFP3 from Mitsubishi

Maximum CC-Link cable length (minimum 0.2 m between devices):
- 100 m at 10 Mbps
- 150 m at 5 Mbps
- 200 m at 2.5 Mbps
- 600 m at 625 kbps
- 1200 m at 156 kbps

When using branch lines: maximum branch line length 8 m, maximum 6 stations per branch line
Length of main string:
- 100 m at 625 kbps, total length of branch line 50 m
- 500 m at 156 kbps, total length of branch line 200 m

Higher baud rates not permitted with a branch line.

The following variants can be realised using an adapter:
- Spring-loaded terminal in/out with IP65 degree of protection (adapter 532220)
- Screw-in clamping connector with IP20 degree of protection (adapter 197962)

General technical data		
Fieldbus interface		
Protocol		CC-Link
Function		Bus connection incoming/outgoing
Transmission rate	[kbps]	156 ... 10000
Type		Serial interface
Connection type		Socket
Connection technology		Sub-D
Number of pins/wires		9
Galvanic isolation		Yes
Internal cycle time		1 ms per 1 byte of user data
Note: Optional connection technology with accessories:		Open style (screw terminal, 5-pin, degree of protection IP20)
Inputs/outputs		
Max. address volume for inputs	[byte]	16
Max. address volume for outputs	[byte]	16

General data		
Device-specific diagnostics		System diagnostics
		Undervoltage
		Communication error
Parameterisation		Activating diagnostics
		Fail-safe and idle response
Additional functions		System status can be displayed using process data
Control components		DIL switch
LED display	Product-specific	PS: Operating voltage for electronics and load supply
		X1: System status of module at I-Port 1
		X2: System status of module at I-Port 2
	Fieldbus-specific	Err: Data transmission error
		Run:Bus active

Technical data – Electrical components		
Nominal operating voltage	[V DC]	24
Operating voltage range	[V DC]	18 ... 30
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 70
Max. power supply	[A]	4
Power supply		
Function		Electronics and load
Connection type		Plug
Connection technology		M12x1, A-coded to EN 61076-2-101
Number of pins/wires		5

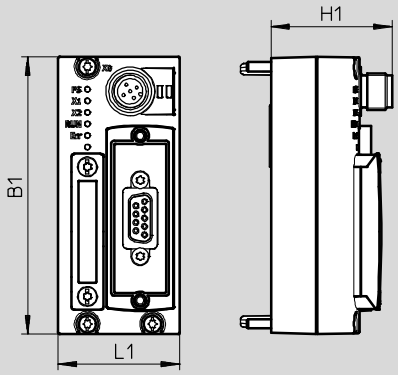
Technical data – Mechanical components		
Type of mounting		On electrical sub-base
		On electrical interface
Product weight	[g]	90 (without fieldbus connector and without interlinking module)
Grid dimension	[mm]	40
Dimensions W x L x H	[mm]	40 x 91 x 50

Materials	
Housing	PA
Note on materials	RoHS-compliant
	Contains paint-wetting impairment substances

Operating and environmental conditions		
Ambient temperature	[°C]	–5 … +50
Storage temperature	[°C]	–20 … +70
Corrosion resistance class CRC[1)]		2
CE mark (see declaration of conformity)[3)]		To EU EMC Directive[2)]
KC mark		KC EMC
Certification		c UL us - Listed (OL)
		RCM mark
Degree of protection		IP65/IP67
Note on degree of protection		In assembled state
		Unused connections sealed

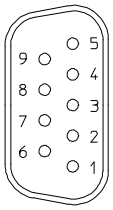
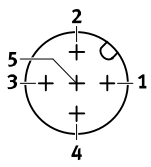
1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.
3) Additional information www.festo.com/sp ➔ Certificates.

Dimensions Download CAD data ➔ **www.festo.com**

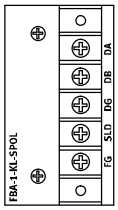
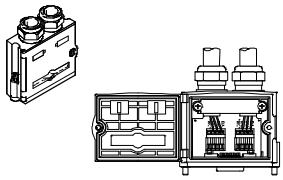


Type	B1	H1	L1
CTEU-CC	91	39.8	40

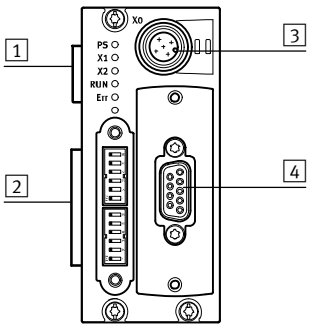
Pin allocation

	Pin	Allocation	Description
Sub-D, 9-pin, CC-Link interface			
	1	n.c.	Not connected
	2	DA	Data transmission line A
	3	DG	Data transmission line ground (data reference potential)
	4	n.c.	Not connected
	5	n.c.	Not connected
	6	n.c.	Not connected
	7	DB	Data transmission line B
	8	n.c.	Not connected
	9	n.c.	Not connected
	Housing		Cable shielding, connection to functional earth FE
Power supply, M12, A-coded			
	1	24 $V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
	2	24 $V_{VAL/OUT}$	Load voltage supply (valves/outputs)
	3	0 $V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
	4	0 $V_{VAL/OUT}$	Load voltage supply (valves/outputs)
	5	FE	Functional earth

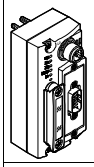
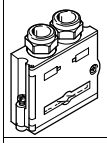
Pin allocation

Pin allocation	Pin	Description
Bus connection with terminal strip, FBA-1-KL-5POL		
	FG	Functional earth
	SLD	Cable shielding
	DG	Data transmission line ground (data reference potential)
	DB	Data transmission line B
	DA	Data transmission line A
Bus connection, FBS-SUB-9-GS-24XPOL-B		
	DA	Data transmission line A
	DB	Data transmission line B
	DG	Data transmission line ground (data reference potential)
	n.c.	Not connected
	FE	Connected to the housing of the Sub-D plug with a clamping bracket

Connection and display components

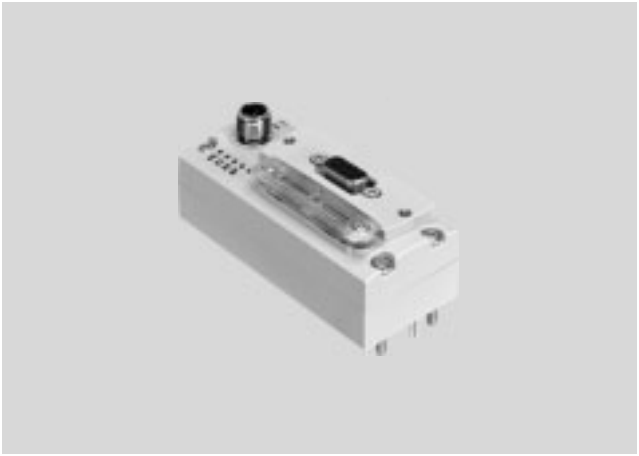


1 Status LED (operating status/diagnostics)
2 DIL switch
3 Power supply for bus node and connected devices (valve terminal)
4 Fieldbus interface (Sub-D socket)

Ordering data			
		Part No.	Type
Bus node			
	CC-Link bus node	**1544198**	**CTEU-CC**
Bus connection			
	Sub-D plug, straight	**532220**	**FBS-SUB-9-GS-2x4POL-B**
	Screw terminal bus connection	**197962**	**FBA-1-KL-5POL**
Fitting			
	Threaded sleeve for Sub-D	**533000**	**UNC4-40/M3X8**
Plug socket			
	For power supply, M12x1, 5-pin	**18324**	**FBSD-GD-9-5POL**

The bus node handles communication between the valve terminal and a higher-order master for PROFIBUS DP®.

The module has basic diagnostic functions. It has 4 integrated LEDs for on-site display. A maximum of 8 byte inputs and 8 byte outputs are transmitted in the cyclic process image.



Application

Fieldbus interface

The bus connection is established via a 9-pin Sub-D socket with the typical PROFIBUS allocation (to EN 50170).

The bus connector plug (with IP65/IP67 degree of protection from Festo or IP20 degree of protection from other manufacturers) facilitates the connection of an incoming and an outgoing bus cable.

An active bus terminal can be connected using the DIL switch integrated in the plug.

The Sub-D interface is designed for controlling network components with a fibre-optic cable connection.

Transmission rate/overview of cable lengths

- RS 485 transceiver used: Analog Devices ADM 2485
- PROFIBUS Slave Controller used: Profichip VPC+S

Possible transmission rate:	Maximum fieldbus length:	Maximum branch line length:
9.6 kbps	1200 m	500 m
19.2 kbps	1200 m	500 m
93.75 kbps	1200 m	100 m
187.5 kbps	1000 m	33.3 m
500 kbps	400 m	20 m
1.5 Mbps	200 m	6.6 m
3 Mbps ... 12 Mbps	100 m	–

General technical data		
Fieldbus interface		
Protocol		PROFIBUS DP
Function		Bus connection incoming/outgoing
Transmission rate	[kbps]	9.6, 19.2, 93.75, 187.5, 500
	[Mbps]	1.5, 12
Type		PROFIBUS
Connection type		Socket
Connection technology		Sub-D
Number of pins/wires		9
Electrical isolation		Yes
Internal cycle time		1 ms per 1 byte of user data
Note: Optional connection technology with accessories:		Plug/socket M12x1 B-coded, 5-pin, degree of protection IP65
Inputs/outputs		
Max. address volume for inputs	[byte]	16
Max. address volume for outputs	[byte]	16

General data		
Device-specific diagnostics		System diagnostics
		Undervoltage
		Communication error
Parameterisation		Diagnostic behaviour
		Fail-safe reaction
Additional functions		Emergency message
		System status via diagnostic test
Configuration support		GSD file
Control elements		DIL switch
LED display	Product-specific	PS: Operating voltage for electronics and load supply
		X1:System status of module at I-Port 1
		X2: System status of module at I-Port 2
	Fieldbus-specific	BF: Bus fault

Technical data – Electrical components		
Nominal operating voltage	[V DC]	24
Operating voltage range	[V DC]	18 ... 30
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 100
Max. power supply	[A]	4
Power supply		
Function		Electronics and load
Connection type		Plug
Connection technology		M12x1, A-coded to EN 61076-2-101
Number of pins/wires		5

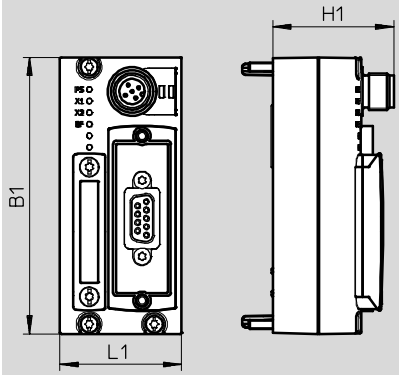
Technical data – Mechanical components		
Type of mounting		On electrical sub-base
		On electrical interface
Product weight	[g]	90 (without fieldbus connector and without interlinking module)
Grid dimension	[mm]	40
Dimensions W x L x H	[mm]	40 x 91 x 50

Materials	
Housing	PA
Note on materials	RoHS-compliant
	Contains paint-wetting impairment substances

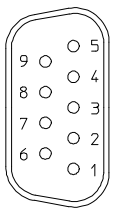
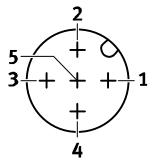
Operating and environmental conditions		
Ambient temperature	[°C]	–5 … +50
Storage temperature	[°C]	–20 … +70
Corrosion resistance class CRC[1)]		2
CE mark (see declaration of conformity)[3)]		To EU EMC Directive[2)]
KC mark		KC EMC
Certification		c UL us - Listed (OL)
		RCM mark
Degree of protection		IP65/IP67
Note on degree of protection		In assembled state
		Unused connections sealed

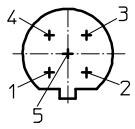
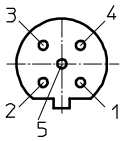
1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.
3) Additional information www.festo.com/sp ➔ Certificates.

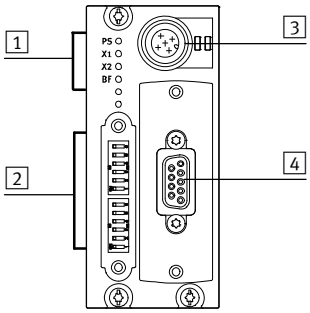
Dimensions Download CAD data ➔ **www.festo.com**

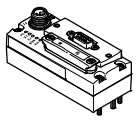
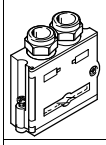
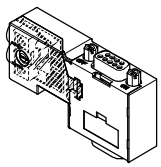
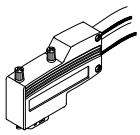
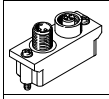
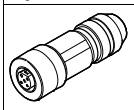
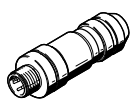
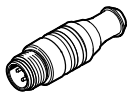
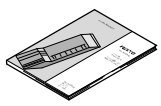


Type	B1	H1	L1
CTEU-PB	91	39.8	40

Pin allocation			
	Pin	Allocation	Description
Sub-D, 9-pin, PROFIBUS interface			
	1	Shield	Functional earth
	2	n.c.	Not connected
	3	RxD/TxD-P	Received/transmitted data positive
	4	CNTR-P	Repeater control signal
	5	DGND	Data ground
	6	VP	Supply voltage positive (+ 5 V)
	7	n.c.	Not connected
	8	RxD/TxD-N	Received/transmitted data negative
	9	n.c.	Not connected
	Housing		Cable shielding, connection to functional earth FE
Power supply, M12, A-coded			
	1	24 $V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
	2	24 $V_{VAL/OUT}$	Load voltage supply (valves/outputs)
	3	0 $V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
	4	0 $V_{VAL/OUT}$	Load voltage supply (valves/outputs)
	5	FE	Functional earth

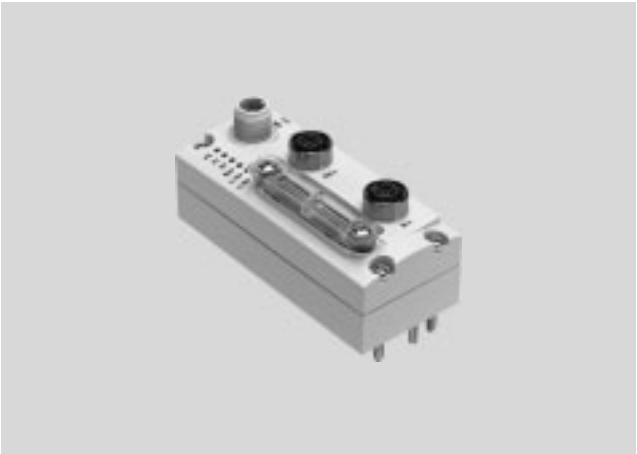
Pin allocation			
	Pin	Allocation	Description
Bus connection M12 adapter (B-coded)			
Incoming 	1	n.c.	Not connected
	2	RxD/TxD-N	Received/transmitted data N
	3	n.c.	Not connected
	4	RxD/TxD-P	Received/transmitted data P
	5 and M12	Shield	Connection to FE
Outgoing 	1	VP	Supply voltage (P5V)
	2	RxD/TxD-N	Received/transmitted data N
	3	DGND	Data reference potential (M5V)
	4	RxD/TxD-P	Received/transmitted data P
	5 and M12	Shield	Connection to FE

Connection and display components	
	1 Status LED (operating status/diagnostics) 2 DIL switch 3 Power supply for bus node and connected devices (valve terminal) 4 Fieldbus interface (Sub-D socket)

Ordering data				
			Part No.	Type
Bus node				
	PROFIBUS bus node		**570040**	**CTEU-PB**
Bus connection				
	Sub-D plug, straight		**532216**	**FFBS-SUB-9-GS-DP-B**
	Sub-D straight plug with terminating resistor and programming interface		**574589**	**NECU-S1W9-C2-APB**
	Sub-D plug, angled		**533780**	**FBS-SUB-9-WS-PB-K**
	Bus connection M12 adapter, B-coded		**533118**	**FBA-2-M12-5POL-RK**
	Straight socket, M12x1, 5-pin, for assembling a connecting cable compatible with FBA-2-M12-5POL-RK		**1067905**	**NECU-M-B12G5-C2-PB**
	Straight plug M12x1, 5-pin, for assembling a connecting cable compatible with FBA-2-M12-5POL-RK		**1066354**	**NECU-M-S-B12G5-C2-PB**
	Terminating resistor, M12, B-coded for PROFIBUS		**1072128**	**CACR-S-B12G5-220-PB**
Fitting				
	Threaded sleeve for Sub-D		**533000**	**UNC4-40/M3X8**
Plug socket				
	For power supply, M12x1, 5-pin		**18324**	**FBSD-GD-9-5POL**
User documentation				
	User documentation – bus node CTEU-PB	German	**575392**	**P.BE-CTEU-PB-OP+MAINT-DE**
		English	**575393**	**P.BE-CTEU-PB-OP+MAINT-EN**
		Spanish	**575394**	**P.BE-CTEU-PB-OP+MAINT-ES**
		French	**575395**	**P.BE-CTEU-PB-OP+MAINT-FR**
		Italian	**575396**	**P.BE-CTEU-PB-OP+MAINT-IT**
		Chinese	**575397**	**P.BE-CTEU-PB-OP+MAINT-ZH**

The bus node handles communication between the valve terminal and a higher-order master for EtherCAT®.

The module has basic diagnostic functions.
It has 6 integrated status LEDs for on-site display.
A maximum of 16 byte inputs and 16 byte outputs are transmitted in the cyclic process image.



Application

Fieldbus interface

The bus connection is established via two M12 sockets, D-coded to IEC61076-2-101 with degree of protection IP65/IP67.
Both connections are equivalent 100BaseTX Ethernet ports with integrated auto MDI functionality (crossover and patch cables can be used) that are brought together via an internal switch.

The module has a system and load supply, a fieldbus connection and a connection to the valve terminal with serial I-Port interface.

Please observe the applicable specifications such as the cable specifications for Ethernet networks ISO/IEC11801 and ANSI/TIA/EIA-568-B.

- Maximum cable length (between network stations): 100 m
- Transmission rate: 100 Mbps
- EtherCAT communication chip: ASIC ET1100

EtherCAT bus node

The EtherCAT bus node supports the EtherCAT protocol based on the Ethernet standard and TCP/IP technology to IEEE802.3.
This guarantees a data exchange with a high data transmission rate, for example I/O data from sensors, actuators or robot controllers, PLCs or process equipment. Furthermore, information that is not critical in real-time, such as diagnostic information, configuration information, etc. can be transferred.
The data bandwidth is sufficient to transmit both data types (real-time and non-real-time) in parallel.

The bus node has a system and load supply, EtherCAT input and output port, LEDs for status and diagnostic messages and DIL switch elements.
Diagnostics is possible directly at the bus node and/or via fieldbus.
The bus node has separate operating and load voltage supplies.
The bus node is mounted on an I-Port compatible device (e.g. valve terminal or electrical sub-base) from Festo.

The bus node supplies voltage to downstream devices connected via the I-Port interface.

The following can be set via DIL switch:
- Station addresses
- Diagnostics on/off
- Fail state behaviour

General technical data		
Fieldbus interface		
Protocol		EtherCAT
Function		Bus connection incoming/outgoing
Transmission rate	[Mbps]	100
Type		Ethernet
Connection type		2x socket
Connection technology		M12x1, D-coded to EN 61076-2-101
Number of pins/wires		4
Galvanic isolation		Yes
Internal cycle time		1 ms per 1 byte of user data
Inputs/outputs		
Max. address volume for inputs	[byte]	16
Max. address volume for outputs	[byte]	16

General data		
Device-specific diagnostics		System diagnostics
		Undervoltage
		Communication error
Parameterisation		Activating diagnostics
		Fail-safe and idle response
Additional functions		Diagnostics object
		Acyclic data access via SDO
		Emergency message
		Modular device profile (MDP)
Configuration support		XML file
Control elements		DIL switch
LED display	Product-specific	PS: Operating voltage for electronics and load supply
		X1: System status of module at I-Port 1
		X2: System status of module at I-Port 2
	Fieldbus-specific	Run: Operating status (communication status)
		L/A2:Network active (connection status) port 2 (Out)
		L/A1:Network active (connection status) port 1 (In)

Technical data – Electrical components		
Nominal operating voltage	[V DC]	24
Operating voltage range	[V DC]	18 ... 30
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 60
Max. power supply	[A]	4
Power supply		
Function		Electronics and load
Connection type		Plug
Connection technology		M12x1, A-coded to EN 61076-2-101
Number of pins/wires		5

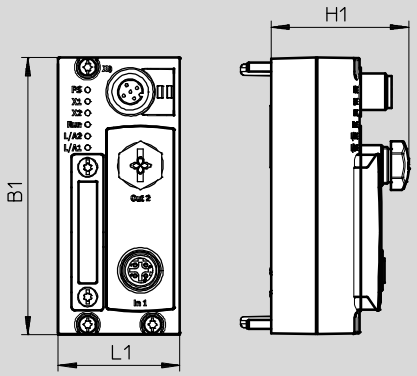
Technical data – Mechanical components		
Type of mounting		On electrical sub-base
		On electrical interface
Product weight	[g]	90 (without fieldbus connector and without interlinking module)
Grid dimension	[mm]	40
Dimensions W x L x H	[mm]	40 x 91 x 50

Materials	
Housing	PA
Note on materials	RoHS-compliant
	Contains paint-wetting impairment substances

Operating and environmental conditions		
Ambient temperature	[°C]	–5 ... +50
Storage temperature	[°C]	–20 ... +70
Corrosion resistance class CRC[1)]		2
CE mark (see declaration of conformity)[3)]		To EU EMC Directive[2)]
KC mark		KC EMC
Certification		c UL us - Listed (OL)
		RCM mark
Degree of protection		IP65/IP67
Note on degree of protection		In assembled state
		Unused connections sealed

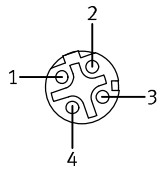
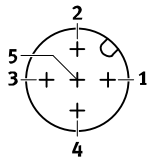
1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.
3) Additional information www.festo.com/sp ➔ Certificates.

Dimensions Download CAD data ➔ **www.festo.com**

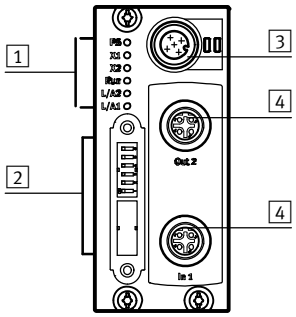


Type	B1	H1	L1
CTEU-EC	91	45.3	40

Pin allocation

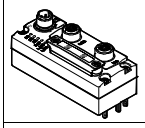
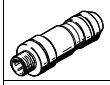
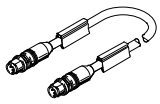
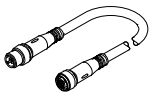
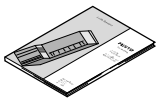
	Pin	Allocation	Description
EtherCAT interface, M12, D-coded			
	1	TX+	Transmitted data+
	2	RX+	Received data+
	3	TX-	Transmitted data-
	4	RX-	Received data-
	Housing		Cable shielding, connection to functional earth FE
Power supply, M12, A-coded			
	1	24 $V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
	2	24 $V_{VAL/OUT}$	Load voltage supply (valves/outputs)
	3	0 $V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
	4	0 $V_{VAL/OUT}$	Load voltage supply (valves/outputs)
	5	FE	Functional earth

Connection and display components



1 Status LED (operating status/diagnostics)
2 DIL switch
3 Power supply for bus node and connected devices (valve terminal)
4 Fieldbus connection (M12 socket, D-coded)

Ordering data

				Part No.	Type
Bus node					
	EtherCAT bus node			**572556**	**CTEU-EC**
Plug for bus connection					
	Plug M12x1, 4-pin, D-coded			**543109**	**NECU-M-S-D12G4-C2-ET**
Connecting cable for bus connection					
	Straight plug, M12x1, 4-pin, D-coded	Straight plug, M12x1, 4-pin, D-coded	0.5 m	**8040446**	**NEBC-D12G4-ES-0.5-S-D12G4-ET**
			1 m	**8040447**	**NEBC-D12G4-ES-1-S-D12G4-ET**
			3 m	**8040448**	**NEBC-D12G4-ES-3-S-D12G4-ET**
			5 m	**8040449**	**NEBC-D12G4-ES-5-S-D12G4-ET**
			10 m	**8040450**	**NEBC-D12G4-ES-10-S-D12G4-ET**
		Straight plug, RJ45, 8-pin	1 m	**8040451**	**NEBC-D12G4-ES-1-S-R3G4-ET**
			3 m	**8040452**	**NEBC-D12G4-ES-3-S-R3G4-ET**
			5 m	**8040453**	**NEBC-D12G4-ES-5-S-R3G4-ET**
			10 m	**8040454**	**NEBC-D12G4-ES-10-S-R3G4-ET**
		Open end, 4-wire	5 m	**8040456**	**NEBC-LE4-ES-5-D12G4-ET**
Plug socket for power supply					
	Socket M12x1, 5-pin			**18324**	**FBSD-GD-9-5POL**
Connecting cable for power supply					
	• M12x1 socket, 5-pin • Plug M12x1, 5-pin	Suitable for energy chains	5 m	**574321**	**NEBU-M12G5-E-5-Q8N-M12G5**
			7.5 m	**574322**	**NEBU-M12G5-E-7.5-Q8N-M12G5**
			10 m	**574323**	**NEBU-M12G5-E-10-Q8N-M12G5**
		Standard	0.5 m	**570733**	**NEBU-M12W5-K-0.5-M12W5**
				8003617	**NEBU-M12G5-K-0.5-M12W5**
			2 m	**570734**	**NEBU-M12W5-K-2-M12W5**
				8003618	**NEBU-M12G5-K-2-M12W5**
User documentation					
	User documentation – bus node CTEU-EC		German	**575400**	**P.BE-CTEU-EC-OP+MAINT-DE**
			English	**575401**	**P.BE-CTEU-EC-OP+MAINT-EN**
			Spanish	**575402**	**P.BE-CTEU-EC-OP+MAINT-ES**
			French	**575403**	**P.BE-CTEU-EC-OP+MAINT-FR**
			Italian	**575404**	**P.BE-CTEU-EC-OP+MAINT-IT**
			Chinese	**575405**	**P.BE-CTEU-EC-OP+MAINT-ZH**

The bus node handles communication between the valve terminal and a higher-order AS-Interface® master.

- Activation of up to 16 solenoid coils per valve terminal
- Automatic addressing
- Automatic detection of the number of connected valves

Characteristics

The module has a system and load supply, a bus connection and a connection to the valve terminal with serial I-Port interface.

The module has basic diagnostic functions. It has 3 integrated LEDs for on-site display.

A maximum of 2 byte inputs and 2 byte outputs are transmitted in the cyclic process image.

General technical data		
Fieldbus interface 1		
Protocol		AS-Interface
Function		Bus connection incoming
		Power supply
Type		AS-Interface
Connection type		Plug
Connection technology		M12x1, A-coded to EN 61076-2-101
Number of pins/wires		4
Internal cycle time	[ms]	10
Fieldbus interface 2		
Function		Bus connection outgoing
		Power supply
Connection type		Socket
Connection technology		M12x1, A-coded to EN 61076-2-101
Number of pins/wires		4
Inputs/outputs		
Max. address volume for inputs	[byte]	2
Max. address volume for outputs	[byte]	2

General data		
Device-specific diagnostics		System diagnostics
		Undervoltage
		Communication error
Parameterisation		Watchdog enable
		Watchdog disable
Additional functions		Emergency message
		Acyclic data access via SDO
Configuration support		None
Control components		DIL switch
LED display	Product-specific	PS: Operating voltage for electronics and load supply
		X1: System status of module at I-Port 1
	Fieldbus-specific	AS-i: AS-Interface mode

Technical data – Electrical components		
Nominal operating voltage	[V DC]	30
Operating voltage range	[V DC]	20 ... 31.6
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 50
Max. power supply	[A]	4

Technical data – Mechanical components		
Type of mounting		On electrical sub-base
		On electrical interface
Product weight	[g]	90 (without AS-i plug and without interlinking module)
Grid dimension	[mm]	40
Dimensions W x L x H	[mm]	40 x 91 x 50

Materials	
Housing	PA
Note on materials	RoHS-compliant
	Contains paint-wetting impairment substances

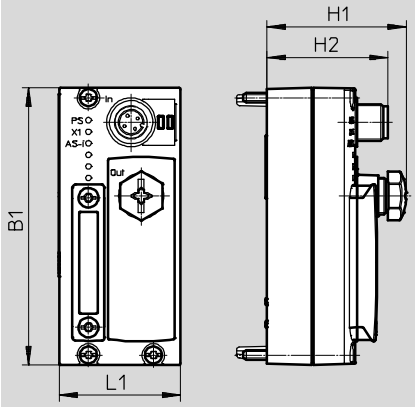
Operating and environmental conditions		
Ambient temperature	[°C]	–5 ... +50
Storage temperature	[°C]	–20 ... +70
Corrosion resistance class CRC[1)]		2
CE marking (see declaration of conformity)[3)]		To EU EMC Directive[2)]
Certification		c UL us - Listed (OL)
Degree of protection		IP65/IP67
Note on degree of protection		In assembled state
		Unused connections sealed

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

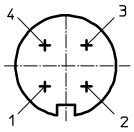
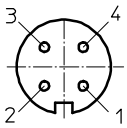
3) Additional information www.festo.com/sp ➔ Certificates.

Dimensions

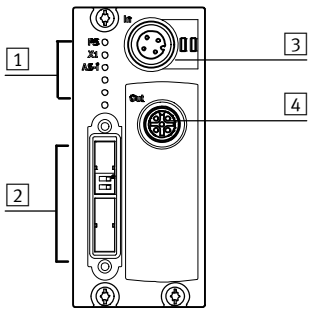


Type	B1	H1	H2	L1
CTEU-AS	91	45.3	39.7	40

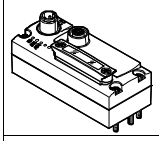
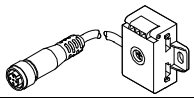
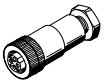
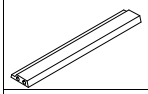
Pin allocation

	Pin	Allocation
M12 plug, AS-Interface In		
	1	AS-Interface +
	2	24 V load voltage supply
	3	AS-Interface –
	4	0 V load voltage supply
M12 socket, AS-Interface Out		
	1	AS-Interface +
	2	24 V load voltage supply
	3	AS-Interface –
	4	0 V load voltage supply

Connection and display components

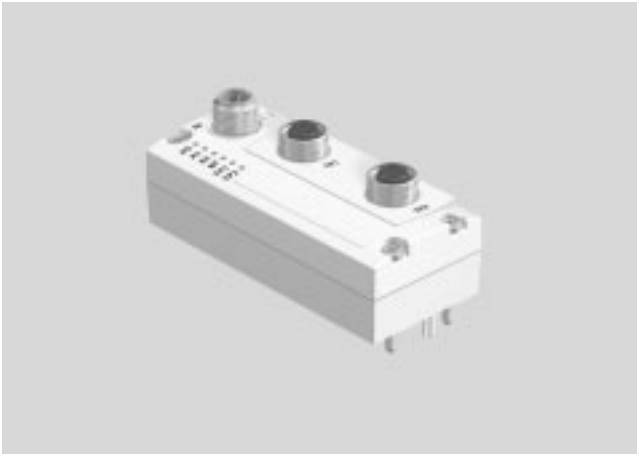


1 Status LED (operating status/diagnostics)
2 DIL switch
3 M12 plug, AS-Interface bus and auxiliary power supply (AS-i In)
4 M12 socket, AS-Interface bus and auxiliary power supply (AS-i Out)

Ordering data					
				Part No.	Type
Bus node					
	AS-Interface bus node			**572555**	**CTEU-AS**
Cable socket with load voltage supply					
	Flat cables	4-pin socket, M12x1, A-coded	–	**572226**	**NEFU-X24F-M12G4**
	Flat cables	4-pin socket, M12x1, A-coded	1 m	**572227**	**NEFU-X24F-1-M12G4**
Cable socket without load voltage supply					
	Flat cables	4-pin socket, M12x1, A-coded		**572225**	**NEFU-X22F-M12G4**
	Flat cable, screw terminal	4-pin straight socket, M12x1, A-coded		**18789**	**ASI-SD-PG-M12**
Flat cable					
	AS-Interface flat cable		Yellow	**18940**	**KASI-1,5-Y-100**
			Black	**18941**	**KASI-1,5-Z-100**
	Cable sleeve for insulating and sealing the flat cable			**165593**	**ASI-KT-FK**
	Cable cap for insulating and sealing the flat cable			**18787**	**ASI-KK-FK**

The bus node handles communication between the valve terminal and a higher-order PROFINET® master.

The module has basic diagnostic functions. It has 6 integrated LEDs for on-site display. A maximum of 64 byte inputs and 64 byte outputs are transmitted in the cyclic process image.



Application

Fieldbus interface

The bus connection is established via two M12 sockets, D-coded to IEC61076-2-101 with degree of protection IP65, IP67.

Both connections are equivalent 100BaseTX Ethernet ports (as per IEEE 802.3).

There is also an integrated switch function that enables free selection of the ports TP1/TP2 for PROFINET communication.

The voltage for the CTEU-PN bus node is supplied via an M12 plug, 5-pin, A-coded.

I-Port interface

The bus node supports two interfaces for connecting I-Port devices.

When mounting the bus node on a valve terminal (direct integration) only one interface is used.

When using the CTEU-PN bus node on the electrical sub-base CAPC (installation system CTEL),

both interfaces are available via the electrical sub-base.

General technical data		
Fieldbus interface		
Protocol		PROFINET RT
Function		Bus connection incoming/outgoing
Transmission rate	[Mbps]	100
Type		Ethernet
Connection type		2x socket
Connection technology		M12x1, D-coded to EN 61076-2-101
Number of pins/wires		4
Galvanic isolation		Yes
Internal cycle time		1 ms per 1 byte of user data
Inputs/outputs		
Max. address volume for inputs	[byte]	64
Max. address volume for outputs	[byte]	64

General data		
Device-specific diagnostics		System diagnostics
		Undervoltage
		Communication error
Additional functions		Conformance class C
		Fast start-up (FSU)
		LLDP
		MRP
		PROFINET IRT
		PROFIenergy
		SNMP
		Shared device
		Web servers
Configuration support		GSDML file
LED display	Product-specific	PS: Operating voltage for electronics and load supply
		X1: System status of module at I-Port 1
		X2: System status of module at I-Port 2
	Fieldbus-specific	NF: Network fault
		TP1: Network active port 1
		TP2: Network active port 2

Technical data – Electrical components		
Nominal operating voltage	[V DC]	24
Operating voltage range	[V DC]	18 ... 30
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 80
Max. power supply	[A]	4
Power supply		
Function		Electronics and load
Connection type		Plug
Connection technology		M12x1, A-coded to EN 61076-2-101
Number of pins/wires		5

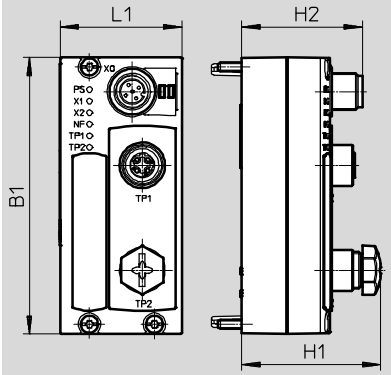
Technical data – Mechanical components		
Type of mounting		On electrical sub-base
		On electrical interface
Product weight	[g]	93
Grid dimension	[mm]	40
Dimensions W x L x H	[mm]	40 x 91 x 50

Materials	
Housing	PA
Note on materials	RoHS-compliant
	Contains paint-wetting impairment substances

Operating and environmental conditions		
Ambient temperature	[°C]	–5 … +50
Storage temperature	[°C]	–20 … +70
Corrosion resistance class CRC[1)]		2
CE mark (see declaration of conformity)[3)]		To EU EMC Directive[2)]
KC mark		KC EMC
Certification		c UL us - Listed (OL)
		RCM mark
Degree of protection		IP65/IP67
Note on degree of protection		In assembled state
		Unused connections sealed

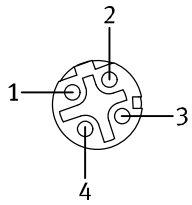
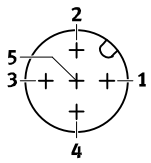
1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.
3) Additional information www.festo.com/sp ➔ Certificates.

Dimensions Download CAD data ➔ **www.festo.com**

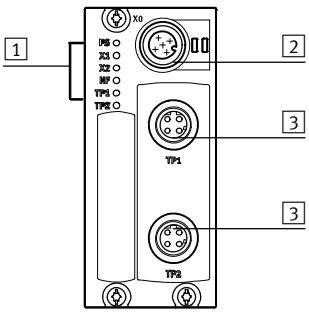


Type	B1	H1	H2	L1
CTEU-PN	91	45.7	39.7	40

Pin allocation

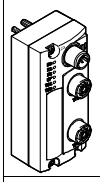
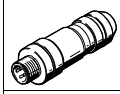
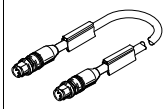
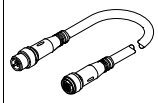
	Pin	Allocation	Description
PROFINET interface, M12 socket, 4-pin, D-coded			
	1	TX+	Differential transmitter cable, positive signal
	2	RX+	Differential receiver cable, positive signal
	3	TX-	Differential transmitter cable, negative signal
	4	RX-	Differential receiver cable, negative signal
	Housing		Functional earth
Power supply, M12 plug, 5-pin, A-coded			
	1	24 $V_{EL/SEN}$	Operating voltage supply (internal electronics, I-Port devices)
	2	24 $V_{VAL/OUT}$	Load voltage supply (I-Port devices)
	3	0 $V_{EL/SEN}$	Operating voltage supply (internal electronics, I-Port devices)
	4	0 $V_{VAL/OUT}$	Load voltage supply (I-Port devices)
	5	FE	Functional earth

Connection and display components



1 Status LED (operating status/diagnostics)
2 Power supply for bus node and connected devices (valve terminal)
3 Fieldbus interface

Ordering data

				Part No.	Type
Bus node					
	PROFINET bus node			**2201471**	**CTEU-PN**
Plug for bus connection					
	Plug M12x1, 4-pin, D-coded			**543109**	**NECU-M-S-D12G4-C2-ET**
Connecting cable for bus connection					
	Straight plug, M12x1, 4-pin, D-coded	Straight plug, M12x1, 4-pin, D-coded	0.5 m	**8040446**	**NEBC-D12G4-ES-0.5-S-D12G4-ET**
			1 m	**8040447**	**NEBC-D12G4-ES-1-S-D12G4-ET**
			3 m	**8040448**	**NEBC-D12G4-ES-3-S-D12G4-ET**
			5 m	**8040449**	**NEBC-D12G4-ES-5-S-D12G4-ET**
			10 m	**8040450**	**NEBC-D12G4-ES-10-S-D12G4-ET**
		Straight plug, RJ45, 8-pin	1 m	**8040451**	**NEBC-D12G4-ES-1-S-R3G4-ET**
			3 m	**8040452**	**NEBC-D12G4-ES-3-S-R3G4-ET**
			5 m	**8040453**	**NEBC-D12G4-ES-5-S-R3G4-ET**
			10 m	**8040454**	**NEBC-D12G4-ES-10-S-R3G4-ET**
		Open end, 4-wire	5 m	**8040456**	**NEBC-LE4-ES-5-D12G4-ET**
Plug socket for power supply					
	Socket M12x1, 5-pin			**18324**	**FBSD-GD-9-5POL**
Connecting cable for power supply					
	• M12x1 socket, 5-pin • Plug M12x1, 5-pin	Suitable for energy chains	5 m	**574321**	**NEBU-M12G5-E-5-Q8N-M12G5**
			7.5 m	**574322**	**NEBU-M12G5-E-7.5-Q8N-M12G5**
			10 m	**574323**	**NEBU-M12G5-E-10-Q8N-M12G5**
		Standard	0.5 m	**570733**	**NEBU-M12W5-K-0.5-M12W5**
				8003617	**NEBU-M12G5-K-0.5-M12W5**
			2 m	**570734**	**NEBU-M12W5-K-2-M12W5**
				8003618	**NEBU-M12G5-K-2-M12W5**

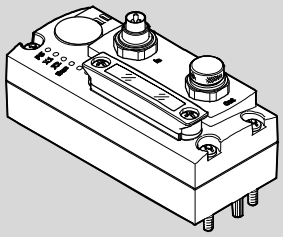
- 1 - **Type discontinued**
Available up until 2021

Fieldbus modules CTEU/Installation system CTEL

Technical data – CTEU-CP

CPI interface for integrating components with I-Port interface into the installation system CPI from Festo.

The module has basic diagnostic functions. It has 4 integrated LEDs for on-site display. A maximum of 4 byte inputs and 4 byte outputs are transmitted in the cyclic process image.



Application

Fieldbus interface/power supply

In the CPI system, the power supply and the communication signal are routed via a common port.

The bus node additionally has an M9 plug for connection to the signal coming from the CPI master and an M9 socket for transmitting the signal to other CPI modules.

The series connection of CPI modules (string) can contain a maximum of 4 modules with CPI functionality. The number of outputs/inputs per string is limited to 32 of each.

The maximum length of a string is 10 m.

I-Port interface

The bus node supports two interfaces for connecting I-Port devices.

When mounting the bus node on a valve terminal (direct integration) only one interface is used.

When using the bus node CTEU-CP on the electrical sub-base CAPC (installation system CTEL), both interfaces are available via the electrical sub-base.

The total number of inputs/outputs that can be connected is limited by the overall configuration of the CP string.

General technical data		
Fieldbus interface 1		
Protocol		CPI-B
Function		Bus connection incoming
		Power supply
Transmission rate	[kbps]	1000
Type		CP installation system
Connection type		Plug
Connection technology		M9x0.5
Number of pins/wires		5
Internal cycle time		2 ms per 2 byte of user data
Fieldbus interface 2		
Function		Bus connection outgoing
		Power supply
Connection type		Socket
Connection technology		M9x0.5
Number of pins/wires		5
Inputs/outputs		
Max. address volume for inputs	[byte]	4
Max. address volume for outputs	[byte]	4

Fieldbus modules CTEU/Installation system CTEL

FESTO

Technical data – CTEU-CP

General data		
Device-specific diagnostics		System diagnostics
		Undervoltage
		Communication error
Parameterisation		Diagnostic behaviour
		Fail-safe reaction
Configuration support		None
Control components		DIL switch
LED display	Product-specific	PS: Operating voltage for electronics and load supply
		X1: System status of module at I-Port 1
		X2: System status of module at I-Port 2
	Fieldbus-specific	RUN: Communication OK

Technical data – Electrical components		
Nominal operating voltage	[V DC]	24
Operating voltage range	[V DC]	18 ... 30
Power failure buffering	[ms]	10
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 50
Max. power supply	[A]	3.5

Technical data – Mechanical components		
Type of mounting		On electrical sub-base
		On electrical interface
Product weight	[g]	105
Grid dimension	[mm]	40
Dimensions W x L x H	[mm]	40 x 91 x 50

Materials	
Housing	PA
Note on materials	RoHS-compliant
	Contains paint-wetting impairment substances

Operating and environmental conditions		
Ambient temperature	[°C]	–5 ... +50
Storage temperature	[°C]	–20 ... +70
Corrosion resistance class CRC[1)]		2
CE mark (see declaration of conformity)[3)]		To EU EMC Directive[2)]
KC mark		KC EMC
Certification		c UL us - Listed (OL)
		RCM mark
Degree of protection		IP65/IP67
Note on degree of protection		In assembled state
		Unused connections sealed

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.
3) Additional information www.festo.com/sp ➔ Certificates.

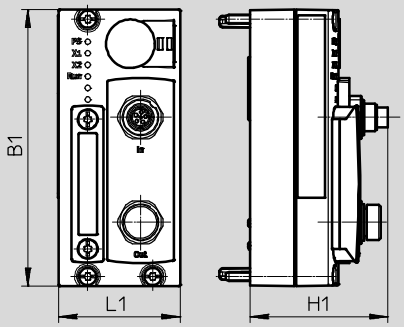
- 1 - **Type discontinued**
Available up until 2021

Fieldbus modules CTEU/Installation system CTEL

Technical data – CTEU-CP

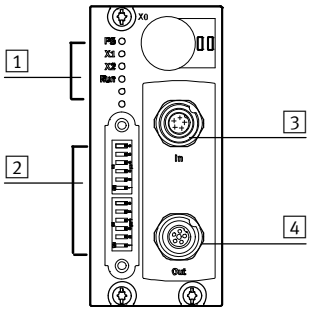
Dimensions

Download CAD data ➔ **www.festo.com**



Type	B1	H1	L1
CTEU-CP	91	45.4	40

Connection and display components



1 Status LED (operating status/diagnostics)
2 DIL switch
3 CP connection, incoming
4 CP connection, outgoing

Fieldbus modules CTEU/Installation system CTEL

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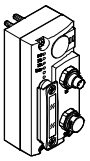
Accessories – CTEU-CP

Ordering data				
			Part No.	Type
Bus node				
	Bus node CP		**2149714**	**CTEU-CP**
Connecting cable for fieldbus interface/power supply				
	Angled plug - angled socket	0.25 m	**540327**	**KVI-CP-3-WS-WD-0,25**
		0.5 m	**540328**	**KVI-CP-3-WS-WD-0,5**
		2 m	**540329**	**KVI-CP-3-WS-WD-2**
		5 m	**540330**	**KVI-CP-3-WS-WD-5**
		8 m	**540331**	**KVI-CP-3-WS-WD-8**
	Straight plug - straight socket	2 m	**540332**	**KVI-CP-3-GS-GD-2**
		5 m	**540333**	**KVI-CP-3-GS-GD-5**
		8 m	**540334**	**KVI-CP-3-GS-GD-8**
Connecting component for fieldbus interface				
	Straight plug, 5-pin, M9 Straight socket, 5-pin, M9		**543252**	**KVI-CP-3-SSD**

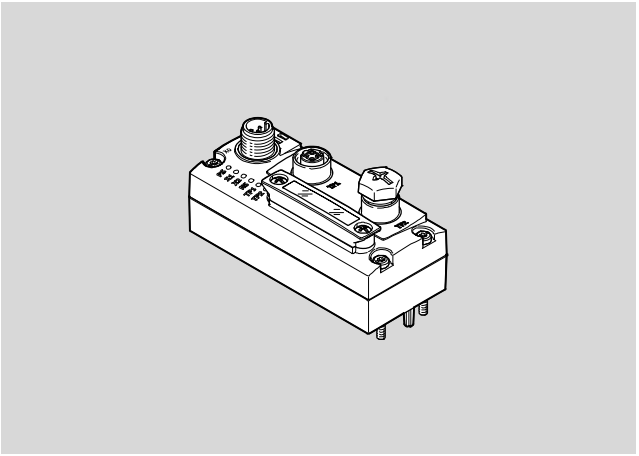
New

Fieldbus modules CTEU/Installation system CTEL

Technical data – CTEU-EP

The bus node handles communication between the valve terminal and a higher-order master via Ethernet.

The module has basic diagnostic functions. It has 6 integrated LEDs for on-site display. A maximum of 64 byte inputs and 64 byte outputs are transmitted in the cyclic process image.



Application

The bus node CTEU-EP is a module within the CTEU series which can be used to connect I-Port devices with specification V1.0 to an EtherNet/IP or Modbus/TCP bus.
Depending on the installation, the bus node provides two I-Port interfaces for the connection of I-Port devices.

Installation

Direct integration

- Mounting the bus node on an I-Port device, e.g. valve terminal
- One I-Port interface available (for internal communication)

CAPC adapter

- Mounting the bus node on the adapter
- Two I-Port interfaces available on the adapter

Power supply

Power is supplied to the bus node and the connected I-Port devices by means of an M12 plug, 5-pin, A-coded, on the top side of the housing.

Ethernet connection

The bus node CTEU-EP provides two 100BASE-TX Ethernet interfaces (to IEEE802.3) galvanically isolated from the rest of the internal electronics. The integrated switch function differentiates automatically between the incoming and outgoing Ethernet connection, regardless of the network connection used.

General technical data		
Fieldbus interface		
Protocol		EtherNet/IP
		Modbus® TCP
Transmission rate	[Mbps]	110/100
Fieldbus interface		2x socket, M12x1, 4-pin, D-coded
Internal cycle time		1 ms per 1 byte of user data
Inputs/outputs		
Max. address volume for inputs	[byte]	64
Max. address volume for outputs	[byte]	64

Technical data – Electrical components		
Nominal operating voltage	[V DC]	24
Operating voltage range	[V DC]	18 ... 30
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 65
Max. power supply	[A]	4

Fieldbus modules CTEU/Installation system CTEL

Technical data – CTEU-EP

General data		
Device-specific diagnostics		System diagnostics
		Undervoltage
		Communication error
Parameterisation		Diagnostic behaviour
		Fail-safe and idle response
Additional functions		AddressConflictDetection (ACD)
		Acyclic data access via "Explicit Message"
		EtherNet/IP Quickconnect
		IP addressing via DHCP, DIL switch, fieldbus or FFT
		Integrated switch
		Ring topology (DLR)
		SNMP
		Start-up parameterisation in plain text via fieldbus
		System status can be displayed using process data
		Web servers
Configuration support		EDS files
Control elements		DIL switch
LED display	Product-specific	PS: Operating voltage for electronics and load supply
		X1: System status of module at I-Port 1
		X2: System status of module at I-Port 2
	Fieldbus-specific	TP1: Network active port 1
		TP2: Network active port 2
		NS: Network status

Technical data – Mechanical components		
Product weight	[g]	98
Dimensions W x L x H	[mm]	40 x 91 x 50

Materials	
Housing	PA
Note on materials	RoHS-compliant
	Contains paint-wetting impairment substances

Operating and environmental conditions		
Ambient temperature	[°C]	–5 ... +50
Storage temperature	[°C]	–20 ... +70
Corrosion resistance class CRC[1)]		2
CE mark (see declaration of conformity)[3)]		To EU EMC Directive[2)]
KC mark		KC EMC
Certification		c UL us - Listed (OL)
		RCM mark
Degree of protection		IP65/IP67

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.
3) Additional information www.festo.com/sp ➔ Certificates.

Fieldbus modules CTEU/Installation system CTEL

Technical data – CTEU-EP

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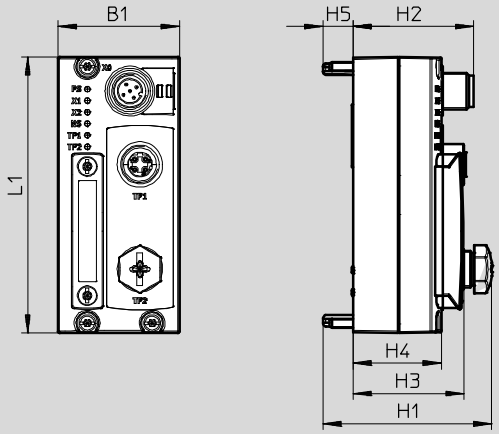
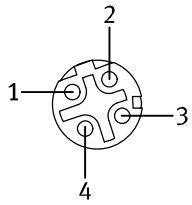
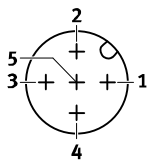
Dimensions

Download CAD data ➔ **www.festo.com**

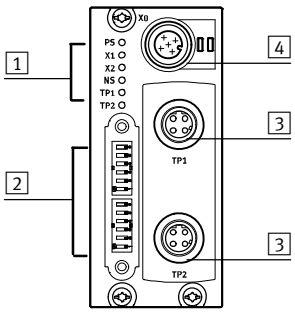


Type	L1	H1	H2	H3	H4	H5	B1
CTEU-EP	91	55.6	39.7	36.6	29.1	10	40

Pin allocation

	Pin	Allocation	Description
Ethernet interface, socket M12, 4-pin, D-coded			
	1	TX+	Differential transmitter cable, positive signal
	2	RX+	Differential receiver cable, positive signal
	3	TX-	Differential transmitter cable, negative signal
	4	RX-	Differential receiver cable, negative signal
	Housing		Functional earth
Power supply, M12, A-coded			
	1	24 $V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
	2	24 $V_{VAL/OUT}$	Load voltage supply (valves/outputs)
	3	0 $V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
	4	0 $V_{VAL/OUT}$	Load voltage supply (valves/outputs)
	5	FE	Functional earth

Connection and display components



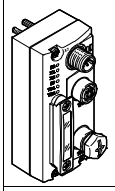
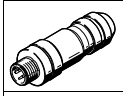
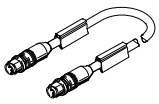
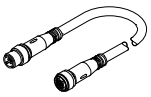
1 Status LED (operating status/diagnostics)
2 DIL switch
3 Network connections (network ports TP1/TP2, fieldbus interface)
4 Power supply connection

Fieldbus modules CTEU/Installation system CTEL

FESTO

Accessories – CTEU-EP

Ordering data

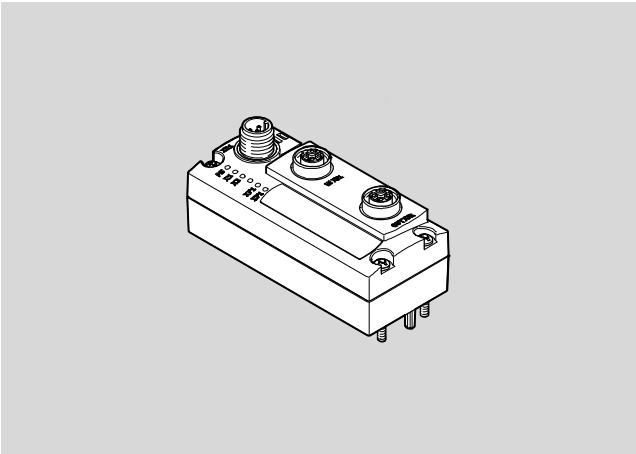
				Part No.	Type
Bus node					
	EP bus node			**2798071**	**CTEU-EP**
Plug for bus connection					
	Plug M12x1, 4-pin, D-coded			**543109**	**NECU-M-S-D12G4-C2-ET**
Connecting cable for bus connection					
	Straight plug, M12x1, 4-pin, D-coded	Straight plug, M12x1, 4-pin, D-coded	0.5 m	**8040446**	**NEBC-D12G4-ES-0.5-S-D12G4-ET**
			1 m	**8040447**	**NEBC-D12G4-ES-1-S-D12G4-ET**
			3 m	**8040448**	**NEBC-D12G4-ES-3-S-D12G4-ET**
			5 m	**8040449**	**NEBC-D12G4-ES-5-S-D12G4-ET**
			10 m	**8040450**	**NEBC-D12G4-ES-10-S-D12G4-ET**
		Straight plug, RJ45, 8-pin	1 m	**8040451**	**NEBC-D12G4-ES-1-S-R3G4-ET**
			3 m	**8040452**	**NEBC-D12G4-ES-3-S-R3G4-ET**
			5 m	**8040453**	**NEBC-D12G4-ES-5-S-R3G4-ET**
			10 m	**8040454**	**NEBC-D12G4-ES-10-S-R3G4-ET**
		Open end, 4-wire	5 m	**8040456**	**NEBC-LE4-ES-5-D12G4-ET**
Plug socket for power supply					
	Socket M12x1, 5-pin			**18324**	**FBSD-GD-9-5POL**
Connecting cable for power supply					
	• M12x1 socket, 5-pin • Plug M12x1, 5-pin	Suitable for energy chains	5 m	**574321**	**NEBU-M12G5-E-5-Q8N-M12G5**
			7.5 m	**574322**	**NEBU-M12G5-E-7.5-Q8N-M12G5**
			10 m	**574323**	**NEBU-M12G5-E-10-Q8N-M12G5**
		Standard	0.5 m	**570733**	**NEBU-M12W5-K-0.5-M12W5**
				8003617	**NEBU-M12G5-K-0.5-M12W5**
			2 m	**570734**	**NEBU-M12W5-K-2-M12W5**
				8003618	**NEBU-M12G5-K-2-M12W5**

Fieldbus modules CTEU/installation system CTEL

Technical data – CTEU-VN

The bus node handles communication between the valve terminal and a higher-order master for VARAN.

The module has basic diagnostic functions. It has 5 integrated LEDs for on-site display. Up to 32 byte inputs and 32 byte outputs are typically transmitted in the cyclic process image.



Application

Bus connection

The bus node provides two VARAN interfaces in line with IEEE802.3 that are galvanically isolated from the rest of the internal electronics.

The Ethernet cables are connected via a 4-pin, D-coded M12 socket.

The metal M12 push-in connectors of the ports on the bus node are connected directly to FE.

The connections are marked as IN XF1 and OUT XF2.

Type of installation

Direct integration:
In the case of direct mounting on an I-Port device, only one I-Port can be used. The connection with the device is established via a 5-pin, A-coded M12 socket.

Decentralised installation of CTEL system with adapter CAPC:
If the bus node is used on a CAPC adapter, the electrical connection of both I-Ports is established via an 8-pin socket strip.

General technical data		
Fieldbus interface		
Protocol		VARAN
Transmission rate	[Mbit/s]	100
Type		Ethernet
Connection type		2x socket
Connection technology		M12x1, D-coded to EN 61076-2-101
Number of pins/wires		4
Galvanic isolation		Yes
Internal cycle time		1 ms per 1 byte of user data
Function		Bus connection incoming/outgoing
Inputs/outputs		
Maximum address volume for inputs	[bytes]	32
Maximum address volume for outputs	[bytes]	32

Fieldbus modules CTEU/installation system CTEL

Technical data – CTEU-VN

General data	
Diagnostics	System diagnostics
	Undervoltage
	Communication error
Parameterisation	IO-Link® mode
	Fail-safe reaction
Additional functions	FFT
	VARAN splitter
Configuration support	LASAL module
LED indicator	PS: operating voltage for electronics and load supply
	X1: system status of module at I-Port 1
	X2: system status of module at I-Port 2
	XF1 AC: network data exchange, port 1
	XF1 LI: network active, port 1

Technical data – Electrical components		
Nominal operating voltage	[V DC]	24
Operating voltage range	[V DC]	18 ... 30
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 65
Max. power supply	[A]	4
Power supply		
Function		Electronics and load
Connection type		Plug
Connection technology		M12x1, A-coded to EN 61076-2-101
Number of pins/wires		5

Technical data – Mechanical components		
Type of mounting		On electrical connection block
		On electrical interface
Product weight	[g]	98
Grid dimension	[mm]	40
Dimensions W x L x H	[mm]	40 x 91 x 50

Materials	
Housing	PA
Note on materials	RoHS-compliant
	Contains PWIS (paint-wetting impairment substances)

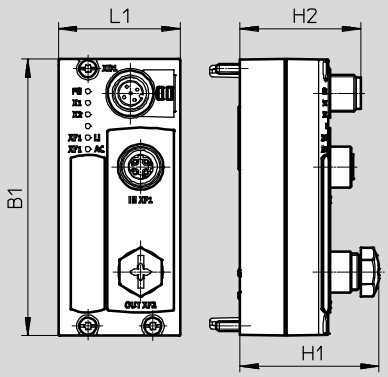
Fieldbus modules CTEU/installation system CTEL

Technical data – CTEU-VN

Operating and environmental conditions		
Ambient temperature	[°C]	–5 … +50
Storage temperature	[°C]	–20 … +70
Corrosion resistance class CRC[1)]		2
CE marking (see declaration of conformity)[3)]		To EU EMC Directive[2)]
KC mark		KC EMC
Certification		RCM compliance mark
Degree of protection		IP65/IP67
Note on degree of protection		In assembled state
		Unused connections sealed

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.
3) Additional information www.festo.com/sp ➔ Certificates.

Dimensions Download CAD data ➔ **www.festo.com**



Type	B1	H1	H2	L1
CTEU-VN	91	45.7	39.7	40

Fieldbus modules CTEU/installation system CTEL

Technical data – CTEU-VN

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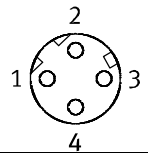
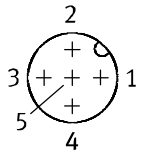
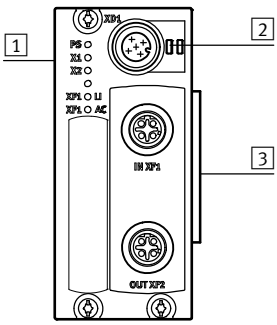
Pin allocation

	Pin		Allocation	Description
	IN XF1	OUT XF2		
Ethernet interface, socket, M12, 4-pin				
	1	2	TX+	Differential transmitter cable, positive signal
	2	1	RX+	Differential receiver cable, positive signal
	3	4	TX-	Differential transmitter cable, negative signal
	4	3	RX-	Differential receiver cable, negative signal
Power supply, M12 plug, A-coded				
	1	–	$24V_{EL/SEN}$	Operating voltage supply PS I-Port devices
	2	–	$24V_{VAL/OUT}$	Load voltage supply PL I-Port devices
	3	–	$0V_{EL/SEN}$	Operating voltage supply PS I-Port devices
	4	–	$0V_{VAL/OUT}$	Load voltage supply PL I-Port devices
	5	–	FE	Functional earth

Connection and display components

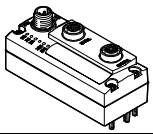
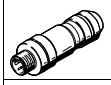
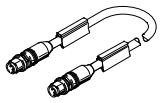
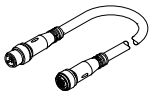
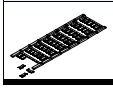


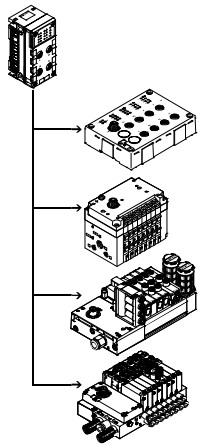
1 Status LED (operating status/diagnostics)
2 Power supply
3 Bus interface incoming IN XF1/outgoing OUT XF2

Fieldbus modules CTEU/installation system CTEL

Accessories – CTEU-VN

FESTO

Ordering data					
				Part No.	Type
Bus node					
	VARAN bus node			8087559	CTEU-VN
Plug for bus connection					
	Plug M12x1, 4-pin, D-coded			543109	NECU-M-S-D12G4-C2-ET
Connecting cable for bus connection					
	Straight plug, M12x1, 4-pin, D-coded	Straight plug, M12x1, 4-pin, D-coded	0.5 m	8040446	NEBC-D12G4-ES-0.5-S-D12G4-ET
			1 m	8040447	NEBC-D12G4-ES-1-S-D12G4-ET
			3 m	8040448	NEBC-D12G4-ES-3-S-D12G4-ET
			5 m	8040449	NEBC-D12G4-ES-5-S-D12G4-ET
			10 m	8040450	NEBC-D12G4-ES-10-S-D12G4-ET
		Straight plug, RJ45, 8-pin	1 m	8040451	NEBC-D12G4-ES-1-S-R3G4-ET
			3 m	8040452	NEBC-D12G4-ES-3-S-R3G4-ET
			5 m	8040453	NEBC-D12G4-ES-5-S-R3G4-ET
			10 m	8040454	NEBC-D12G4-ES-10-S-R3G4-ET
		Open end, 4-wire	5 m	8040456	NEBC-LE4-ES-5-D12G4-ET
Plug for power supply					
	Socket M12x1, 5-pin			18324	FBSD-GD-9-5POL
Connecting cable for power supply					
	• Socket M12x1, 5-pin • Plug M12x1, 5-pin	Suitable for energy chains, straight socket	5 m	574321	NEBU-M12G5-E-5-Q8N-M12G5
			7.5 m	574322	NEBU-M12G5-E-7.5-Q8N-M12G5
			10 m	574323	NEBU-M12G5-E-10-Q8N-M12G5
		Standard, angled socket	0.5 m	570733	NEBU-M12W5-K-0.5-M12W5
				8003617	NEBU-M12G5-K-0.5-M12W5
			2 m	570734	NEBU-M12W5-K-2-M12W5
				8003618	NEBU-M12G5-K-2-M12W5
Cover cap					
	For sealing female threads M12x1			165592	ISK-M12
Identification label holder					
	5 frames with 40 pieces each			565306	ASLR-C-E4



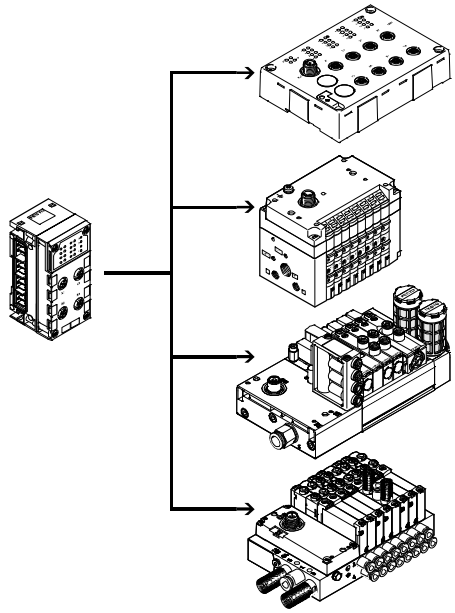
The electrical interface CPX-CTEL master establishes the connection to modules of the CTEL/CTEU series that have an I-Port interface (device). The I/O data from the connected devices are transmitted to the connected CPX bus node and thus to the higher-order controller via fieldbus.
A maximum of 4 devices can be connected to a CPX CTEL Master via corresponding M12 interfaces.

Application

I-Port interface

As well as transmitting the communication data, the I-Port interfaces of a CPX-CTEL master also transmit the power supply to the connected sensors and the load supply to the valves (or outputs). Both circuits are supplied separately with 24 V, using a separate reference potential.
The connecting cables used must meet the enhanced requirements resulting from the dual function of signal cable and supply cable.

Configuration example – CPX-CTEL master with CTEL modules



The CPX-CTEL master provides 4 external I-Port interfaces, each of which can be connected with a device. I-Port is an interface for exchanging serial data for connecting decentralised modules or valve terminals from Festo. The I-Port interface is based on IO-Link and is compatible with it in certain areas. The connection type corresponds to a star topology. In other words, only one module or valve terminal can be connected to each I-Port.

The restrictions compared to IO-Link include:

- Permanently set baud rate of 230.4 kbps
- SIO mode is not supported
- Max. 32 bytes of input data and 32 bytes of output data
- Only one dump of the master commands is used
- Festo plug & work principle, configuration via IODD is not supported.

Implementation

The CPX-CTEL master from Festo enables modules with an I-Port interface to be connected to a CPX system:

- A maximum of 4 devices with individual electronic fuse protection
- A maximum of 64 inputs/ 64 outputs per I-Port interface
- The maximum length of a string is 20 m

The following device variants are available:

- Input modules with 16 digital inputs (connection technology M8 3-pin and M12 5-pin)
- Valve terminals with I-Port interface (up to 48 solenoid coils, different valve functions)

The decentralised arrangement of the modules and valve terminals with I-Port enables them to be mounted close to the cylinders and actuators or sensors to be controlled. This means that the compressed air supply lines and sensor cables used can be shortened, and it may be possible to use smaller valves, thereby saving costs.

Several CPX-CTEL masters can be combined in one CPX terminal, depending on the address capacity of the bus node.
Example:

- CPX-FB13 (512 I/O)
- A maximum of 2 CPX-CTEL masters is possible (each with 256 E/A)

Configuration

Settings

The precise number of the I/O bytes made available depends on the requirements of the connected devices or of the suitable selected operating mode.
The operating mode or preset configuration of the CPX-CTEL master can be specified by the user.
DIL switches are used for selecting the operating mode and setting the manual configuration. These DIL switches are not required during continuous operation and are only accessible in the disassembled state.

Manual configuration

In the case of manual configuration (tool change mode), the volume of inputs and outputs in the process image of the CPX system or of the higher-level fieldbus can be defined manually using the DIL switches.

The process image then always has the same scope, regardless of the connected devices.
The I/O length specified always applies to all four I-Ports (max. 8 bytes per I-Port).

Automatic configuration

In the case of automatic configuration, the I/O length for each I-Port is determined individually and this value is used to select the appropriate or next highest configuration preset.

Power supply for I-Port devices

The CPX-CTEL master provides two separate power supplies for the connected devices:

- For operating the device and the inputs connected to it
- For the outputs and valves that are connected to the device

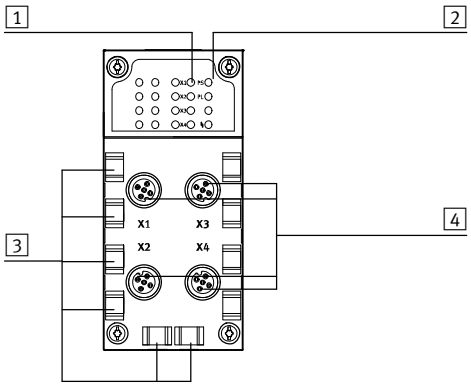
The power supply for the devices and the inputs is provided by the power supply for the electronics and sensors of the CPX terminal.
The power supply for the outputs and valves is provided by the power supply for the valves of the CPX terminal.
The interlinking block with additional power supply ensures a separate voltage supply for the valves and outputs. This allows the supply voltage to be disconnected separately.
The valves and outputs of the connected I-Port devices can therefore be disconnected separately without disconnecting the devices.

General technical data			
Type			CPX-CTEL-4-M12-5POL
Protocol			I-Port
Maximum address capacity	Outputs	[bit]	256
	Inputs	[bit]	256
I-Port connection			4x socket M12, 5-pin, A-coded
Number of I-Port interfaces			4
Max. cable length		[m]	20
Internal cycle time		[ms]	1 per 8 bits of user data
Electrical isolation	Channel – channel		No
	Channel – internal bus		Yes, using an intermediate supply
LED displays			X1 … 4 = status of the I-Port interface 1 … 4 PS = Electronic supply PL = Load supply ↳ = Module error
Diagnostics			• Communication error • Short circuit module • Module-oriented diagnostics • Undervoltage
Parameterisation			• Diagnostic behaviour • Fail-safe mode per channel • Forcing per channel • Idle mode per channel • Module parameters • Tool change mode
Additional functions			Tool change mode
Control elements			DIL switches
Operating voltage	Nominal value	[V DC]	24 (polarity-safe)
	Permissible range	[V DC]	18 … 30
	Power failure buffering	[ms]	10
Intrinsic current consumption at nominal operating voltage		[mA]	Typically 65
Max. power supply per channel		[A]	4x 1.6
Max. residual current of outputs per channel		[A]	4x 1.6
Degree of protection to EN 60529			IP65/IP67
Temperature range	Operation	[°C]	–5 … +50
	Storage/transport	[°C]	–20 … +70
Materials			PA reinforced, PC
Note on materials			RoHS compliant
Grid dimension		[mm]	50
Dimensions (incl. interlinking block) W x L x H		[mm]	50 x 107 x 55
Product weight		[g]	110

Note

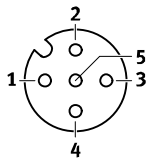
Please observe the general limits and guidelines for the system when configuring the electrical modules.

Connection and display components



1 Status LEDs for I-Port interfaces
2 CPX-specific status LEDs
3 Holders for inscription labels (IBS 6x10)
4 I-Port interfaces for up to 4 devices

Pin allocation I-Port interface/IO-Link



Pin	Allocation	Description
1	$24V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
2	$24V_{VAL/OUT}$	Load voltage supply (valves/outputs)
3	$0V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
4	C/Q	Data communication
5	$0V_{VAL/OUT}$	Load voltage supply (valves/outputs)

Dimensions

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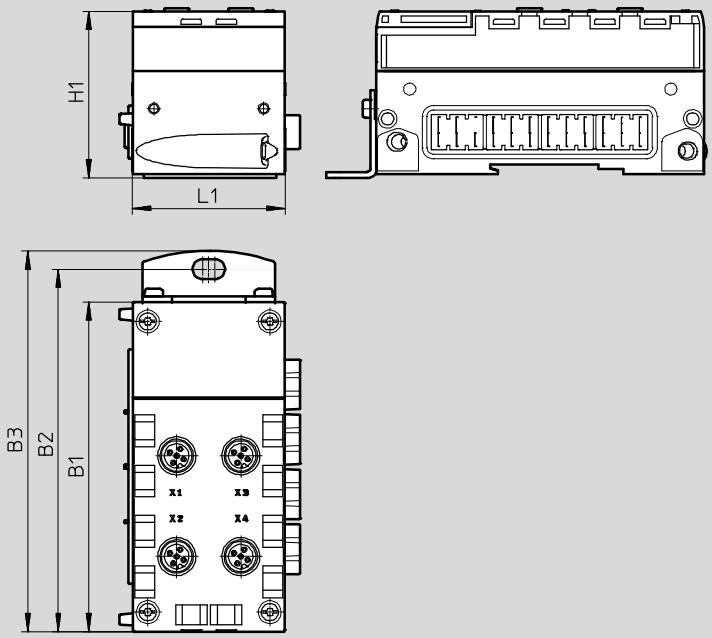
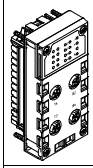
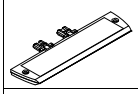
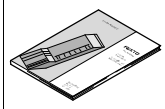
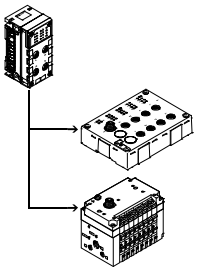


Type	B1	B2	B3	H1	L1
CPX-CTEL-4-M12-5POL	108.1	118.9	124.9	55.1	50

Ordering data					
Description				Part No.	Type
CPX-CTEL master					
	Interface for a maximum of 4 I/O modules and valve terminals with I-Port interface (devices)			**1577012**	**CPX-CTEL-4-M12-5POL**
Bus connection					
	Cover cap M12			**165592**	**ISK-M12**
	Inscription label holder for connection plate			**536593**	**CPX-ST-1**
Connecting cable					
	Straight - angled	Suitable for use with energy chains	5 m	**574321**	**NEBU-M12G5-E-5-Q8N-M12G5**
			7.5 m	**574322**	**NEBU-M12G5-E-7.5-Q8N-M12G5**
			10 m	**574323**	**NEBU-M12G5-E-10-Q8N-M12G5**
	Angled - angled	Standard	0.5 m	**570733**	**NEBU-M12W5-K-0.5-M12W5**
	Straight - angled			**8003617**	**NEBU-M12G5-K-0.5-M12W5**
	Angled - angled		2 m	**570734**	**NEBU-M12W5-K-2-M12W5**
	Straight - angled			**8003618**	**NEBU-M12G5-K-2-M12W5**
User documentation					
	User documentation for CPX-CTEL master	German		**574600**	**P.BE-CPX-CTEL-DE**
		English		**574601**	**P.BE-CPX-CTEL-EN**
		Spanish		**574602**	**P.BE-CPX-CTEL-ES**
		French		**574603**	**P.BE-CPX-CTEL-FR**
		Italian		**574604**	**P.BE-CPX-CTEL-IT**



The electrical interface CPX-CTEL master establishes the connection to modules of the CTEL/CTEU series that have an I-Port interface (device). The I/O data from the connected devices are transmitted to the connected CPX bus node and thus to the higher-order controller via fieldbus.
A maximum of two IO-Link devices can be connected to an electrical interface CPX-CTEL-2-... via corresponding M12 interfaces.

Application

IO-Link interface

The communication system IO-Link is used to exchange serial data from decentralised function modules (devices) at the field level.
The electrical interface CPX-CTEL-2-... provides two IO-Link interfaces, each of which can be connected with a device.
The connection type corresponds to a star topology, which means that only one device can be connected to each port.
The address space that the module makes available and assigns accordingly in the CPX system can be configured according to various presettings.
Selection of the operating mode and the setting for manual configuration takes place via the DIL switches. These DIL switches are not required during continuous operation and are only accessible in the disassembled state.

Restrictions

The interfaces (ports) of electrical interface CPX-CTEL-2-... support the connection of IO-Link devices with few limitations.

- The process data length of the inputs and outputs is limited to 16 bytes per port for inputs and outputs
- The driver strength on the C/Q line is limited to 250 mA
- SIO mode is not supported

Power supply for devices

The electrical interface CPX-CTEL-2-... provides two separate power supplies for the connected devices:

- For the operation of the device and the inputs connected to it
- For the outputs and valves that are connected to the device

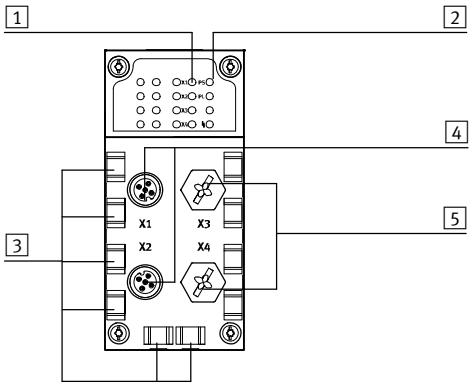
The power supply for the devices and the inputs is provided by the power supply for the electronics and sensors of the CPX terminal.
The power supply for the outputs and valves is provided by the power supply for the valves of the CPX terminal.
The interlinking block with additional power supply ensures a separate voltage supply for the valves and outputs. This allows the supply voltage to be disconnected separately.
The valves and outputs of the connected I-Port devices can therefore be disconnected separately without disconnecting the devices.

General technical data			
Type			CPX-CTEL-2-M12-5POL-LK
Protocol			IO-Link, master version V 1.0
Max. address capacity	Outputs	[bit]	256
	Inputs	[bit]	256
I-Port connection			2x socket M12, 5-pin, A-coded
Number of IO-Link interfaces			2
Max. cable length		[m]	20
Internal cycle time		[ms]	1 per 8 bits of user data
Electrical isolation	Channel – channel		No
	Channel – internal bus		Yes, using an intermediate supply
LED displays			X1 … 2 = status of the IO-Link interface 1 … 2 PS = Electronic supply PL = Load supply ↳ = Module error
Diagnostics			• Communication error • Short circuit module • Module-oriented diagnostics • Undervoltage
Parameterisation			• Diagnostic behaviour • Fail-safe mode per channel • Forcing per channel • Idle mode per channel • Module parameters
Additional functions			–
Control elements			DIL switches
Operating voltage	Nominal value	[V DC]	24 (polarity-safe)
	Permissible range	[V DC]	18 … 30
	Power failure buffering	[ms]	10
Intrinsic current consumption at nominal operating voltage		[mA]	Typically 65
Max. power supply per channel		[A]	2x 1.6
Max. residual current of outputs per channel		[A]	2x 1.6
Degree of protection to EN 60529			IP65, IP67
Temperature range	Operation	[°C]	–5 … +50
	Storage/transport	[°C]	–20 … +70
Materials			PA reinforced, PC
Note on materials			RoHS compliant
Grid dimension		[mm]	50
Dimensions (incl. interlinking block) W x L x H		[mm]	50 x 107 x 55
Product weight		[g]	110

Note

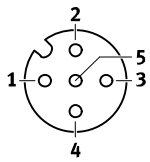
Please observe the general limits and guidelines for the system when configuring the electrical modules.

Connection and display components



1 Status LEDs for I-Port interfaces
2 CPX-specific status LEDs
3 Holders for inscription labels (IBS 6x10)
4 IO-Link interfaces for up to 2 devices
5 Unoccupied connections

Pin allocation – IO-Link interface

Pin allocation	Pin	Signal	Designation
	1	24 V_{SEN}	24 V DC supply voltage for electronics and inputs
	2	24 V_{VAL}	24 V DC load voltage supply for valves and outputs
	3	0 V_{SEN}	0 V DC supply voltage for electronics and sensors
	4	C/Q $_{I\text{-}PORT}$	Communication signal C/Q, data transmission line
	5	0 V_{VALVES}	0 V DC load voltage supply for valves and outputs

Dimensions

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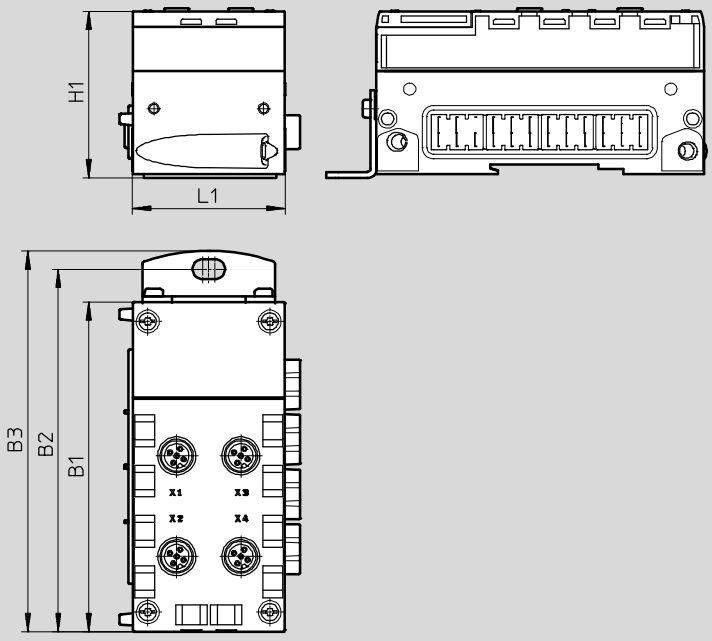
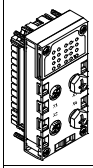
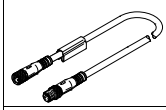
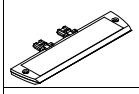
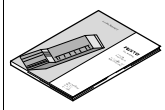


Type	B1	B2	B3	H1	L1
CPX-CTEL-2-M12-5POL-LK	108.1	118.9	124.9	55.1	50

Ordering data				
Description			Part No.	Type
CPX CTEL master, IO-Link				
	Interface for max. 2 I/O modules and valve terminals with IO-Link interface (devices)		**2900543**	**CPX-CTEL-2-M12-5POL-LK**
Bus connection				
	Cover cap	M12	**165592**	**ISK-M12**
	Connecting cable M12-M12, 5-pin, straight plug connector-straight socket	5 m	**574321**	**NEBU-M12G5-E-5-Q8N-M12G5**
		7.5 m	**574322**	**NEBU-M12G5-E-7.5-Q8N-M12G5**
		10 m	**574323**	**NEBU-M12G5-E-10-Q8N-M12G5**
	Inscription label holder for connection plate		**536593**	**CPX-ST-1**
User documentation				
	User documentation for CPX CTEL master	German	**8034115**	**P.BE-CPX-CTEL-LK-DE**
		English	**8034116**	**P.BE-CPX-CTEL-LK-EN**
		Spanish	**8034117**	**P.BE-CPX-CTEL-LK-ES**
		French	**8034118**	**P.BE-CPX-CTEL-LK-FR**
		Italian	**8034119**	**P.BE-CPX-CTEL-LK-IT**
		Swedish	**8034120**	**P.BE-CPX-CTEL-LK-ZH**

- Flow rate
  CPV10: up to 400 l/min
  CPV14: up to 800 l/min

- Valve width
  CPV10: 10 mm
  CPV14: 14 mm

- Voltage
  24 V DC

I-Port interface for communication between a valve terminal CPV and an I-Port master. It activates a valve terminal CPV with up to 16 solenoid coils on max. 8 valve positions.
The connection to a higher-order controller can be achieved by:

- Connection to an I-Port master from Festo (CPX-CTEL)
- Direct mounting of a bus node CTEU
- Connection to an IO-Link master (in IO-Link mode)

General technical data			
Protocol			IO-Link/I-Port
IO-Link	Connection technology		5-pin
	Protocol		V 1.0
	Communication mode		COM2 (38.4 kBaud), COM3 (230 kBaud)
	Port type		B
	Number of ports		1
	Process data width OUT	[bit]	16
	Minimum cycle time	[ms]	3.2
Baud rate		[kbps]	38.4/230.4
Maximum number of valve positions			8
Nominal operating voltage		[V DC]	24
Nominal load voltage		[V DC]	24
Operating voltage range	Electronics/sensors	[V DC]	18 ... 30
	Load voltage	[V DC]	21.6 ... 26.4
Intrinsic current consumption	Operating voltage	[mA]	35
	Load voltage	[mA]	700
Reverse polarity protection			For operating voltage
Diagnostics			Undervoltage in load voltage supply
LED display	Bus-specific		1 communication status
	Product-specific		16 valve status

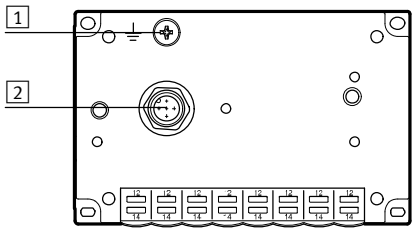
Materials	
Cover	PA
Note on materials	RoHS compliant

Operating and environmental conditions		
Mounting position		Any
Degree of protection to EN 60529		IP65 (when fully plugged in or fitted with protective cover)
Ambient temperature	[°C]	–5 ... +50
Storage temperature	[°C]	–20 ... +70
Relative air humidity	[%]	93 (non-condensing)
CE marking (see declaration of conformity)		To EU EMC Directive[1)]

1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Connection and display components

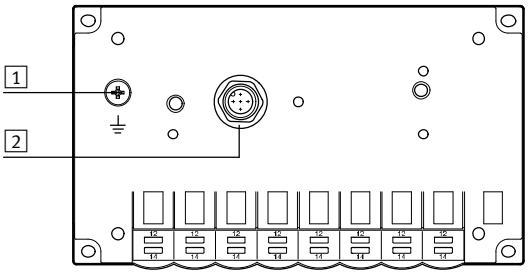
CPV10



1 Earthing screw

2 I-Port interface/IO-Link

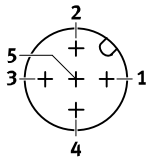
CPV14



1 Earthing screw

2 I-Port interface/IO-Link

Pin allocation – I-Port interface/IO-Link



Pin	Allocation	Description
1	$24V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
2	$24V_{VAL/OUT}$	Load voltage supply (valves/outputs)
3	$0V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
4	C/Q	Data communication
5	$0V_{VAL/OUT}$	Load voltage supply (valves/outputs)

Dimensions

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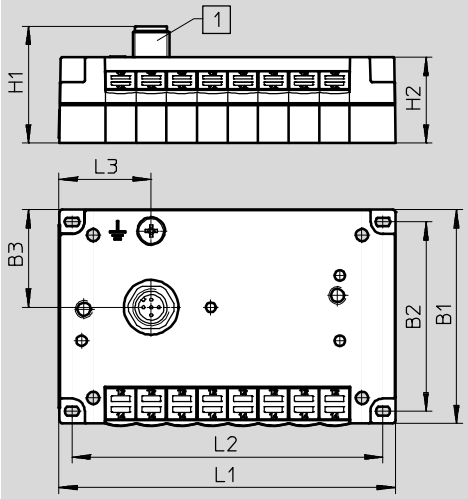
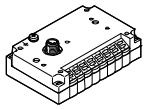


1 I-Port interface/IO-Link

Type	B1	B2	B3	H1	H2	L1	L2	L3
CPV10-GE-PT-8	71	62	32	38.3	26.2	110	101.8	30.2
CPV14-GE-PT-8	89	78	32.4	38.3	26.2	152	142	56.5

Ordering data

					Part No.	Type
I-Port bus node						
	Bus node with I-Port interface/IO-Link and 8 valve positions (maximum 8 double solenoid valves)	CPV10	Device ID: 0x 000410	108.5 g	**1565761**	**CPV10-GE-PT-8**
		CPV14	Device ID: 0x 000510	200 g	**1564984**	**CPV14-GE-PT-8**
Connection technology for IO-Link						
	T-adapter M12, 5-pin for IO-Link and load voltage supply				**171175**	**FB-TA-M12-5POL**
	Straight plug connector M12, 5-pin (for T-adapter)				**175487**	**SEA-M12-5GS-PG7**
Connecting cable						
	Straight - angled	Suitable for use with energy chains		5	**574321**	**NEBU-M12G5-E-5-Q8N-M12G5**
				7.5	**574322**	**NEBU-M12G5-E-7.5-Q8N-M12G5**
				10	**574323**	**NEBU-M12G5-E-10-Q8N-M12G5**
	Angled - angled	Standard		0.5 m	**570733**	**NEBU-M12W5-K-0.5-M12W5**
	Straight - angled				**8003617**	**NEBU-M12G5-K-0.5-M12W5**
	Angled - angled			2 m	**570734**	**NEBU-M12W5-K-2-M12W5**
	Straight - angled				**8003618**	**NEBU-M12G5-K-2-M12W5**

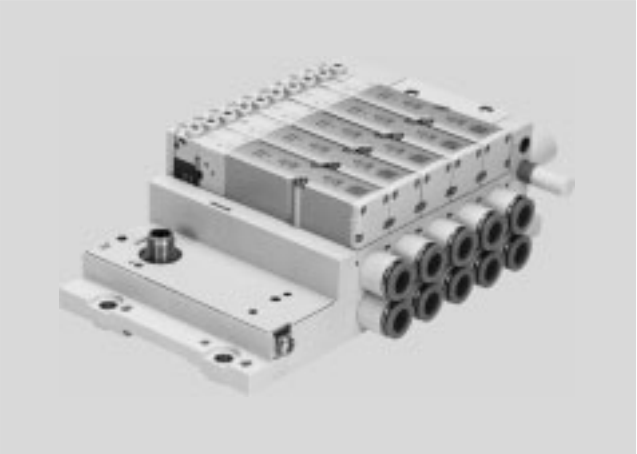
Flow rate
VMPA1: up to 360 l/min
VMPA14: up to 670 l/min
VMPA2: up to 700 l/min

Valve width
VMPA1: 10 mm
VMPA14: 14 mm
VMPA2: 20 mm

Voltage
24 V DC

I-Port interface for communication between a valve terminal MPA-L and an I-Port master. It activates a valve terminal MPA-L with up to 32 solenoid coils on max. 32 valve positions.
The connection to a higher-order controller can be achieved by:

- Connection to an I-Port master from Festo (CPX-CTEL)
- Direct mounting of a bus node CTEU
- Connection to an IO-Link master (in IO-Link mode)



General technical data			
Protocol			IO-Link/I-Port
IO-Link	Connection technology		5-pin
	Protocol		V 1.0
	Communication mode		COM2 (38.4 kBaud), COM3 (230 kBaud)
	Port type		B
	Number of ports		1
	Process data width OUT	[bit]	8 … 32
	Minimum cycle time	[ms]	3.2
Baud rate		[kbps]	38.4/230.4
Operating pressure		[bar]	–0.9 … 10
Pilot pressure		[bar]	3 … 8
Nominal operating voltage		[V DC]	24
Intrinsic current consumption	Operating voltage	[mA]	30
	Load voltage	[mA]	30
Reverse polarity protection			For operating voltage
Diagnostics			Undervoltage in load voltage supply
LED display			1 communication status

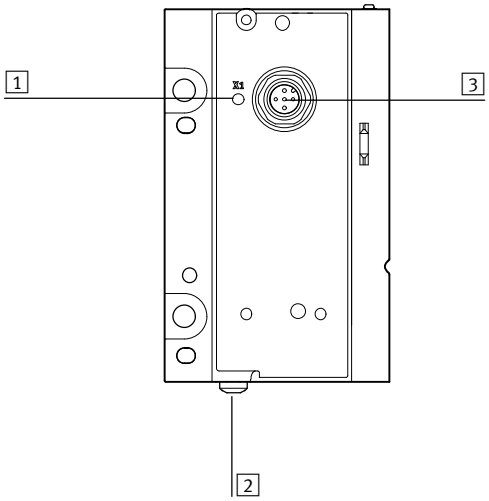
Materials	
End plate	PPA reinforced
Note on materials	RoHS compliant

Operating and environmental conditions		
Mounting position		Any
Ambient temperature	[°C]	–5 … +50
Storage temperature	[°C]	–20 … +40
Corrosion resistance class CRC[1)]		3

1) Corrosion resistance class 3 according to Festo standard 940 070
Components subject to high corrosion stress. Externally visible parts with primarily functional surface requirements which are in direct contact with the surrounding industrial environment or media such as solvents and cleaning agents.

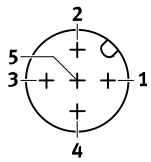
Connection and display components

VMPAL-EPL-IPO32



1 Status LED
2 Earthing screw
3 I-Port interface/IO-Link

Pin allocation I-Port interface/IO-Link



Pin	Allocation	Description
1	$24V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
2	$24V_{VAL/OUT}$	Load voltage supply (valves/outputs)
3	$0V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
4	C/Q	Data communication
5	$0V_{VAL/OUT}$	Load voltage supply (valves/outputs)

Dimensions

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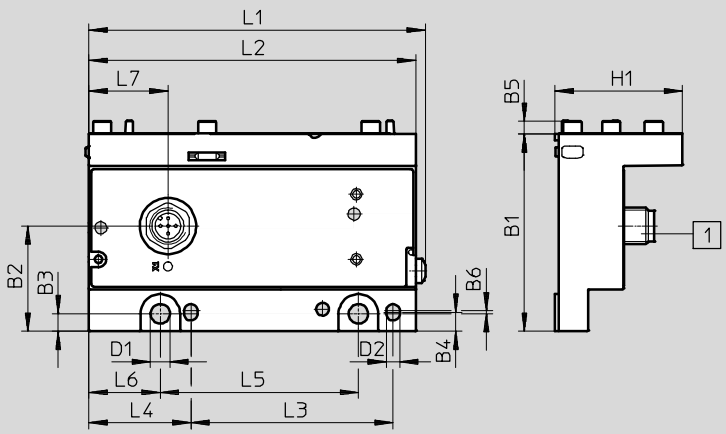
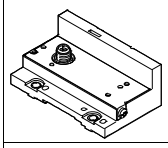


1 I-Port interface/IO-Link

Type	B1	B2	B3	B4	B5	B6	D1	D2	H1	L1	L2	L3	L4	L5	L6	L7
VMPAL-EPL-IPO32	64.8	34.5	5.7	6.2	4	1	6.4	4.5	41.8	110	107	66.3	33.5	65	23.5	26

Ordering data					
				Part No.	Type
I-Port bus node					
	Bus node with I-Port interface/IO-Link and up to 32 valve positions (maximum 16 double solenoid valves)	Device ID: 0x 000620	170 g	**575667**	**VMPAL-EPL-IPO32**
Connection technology for IO-Link					
	T-adapter M12, 5-pin for IO-Link and load voltage supply			**171175**	**FB-TA-M12-5POL**
	Straight plug connector M12, 5-pin (for T-adapter)			**175487**	**SEA-M12-5GS-PG7**
Connecting cable					
	Straight - angled	Suitable for use with energy chains	5 m	**574321**	**NEBU-M12G5-E-5-Q8N-M12G5**
			7.5 m	**574322**	**NEBU-M12G5-E-7.5-Q8N-M12G5**
			10 m	**574323**	**NEBU-M12G5-E-10-Q8N-M12G5**
	Angled - angled	Standard	0.5 m	**570733**	**NEBU-M12W5-K-0.5-M12W5**
	Straight - angled			**8003617**	**NEBU-M12G5-K-0.5-M12W5**
	Angled - angled		2 m	**570734**	**NEBU-M12W5-K-2-M12W5**
	Straight - angled			**8003618**	**NEBU-M12G5-K-2-M12W5**

Fieldbus modules CTEU/Installation system CTEL

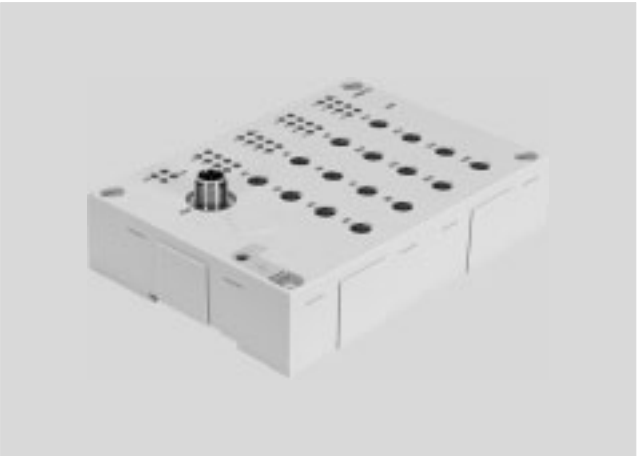
Technical data – Input modules CTSL

Function

Digital input modules facilitate the connection of proximity sensors or other 24 V DC sensors (inductive, capacitive, etc.).
Plug connectors with double allocation are separated using a DUO plug connector or DUO cable.

Application

- Input modules for 24 V DC sensor signals
- M12 connection technology
- Display of the input statuses for each input signal via an assigned LED
- Operating voltage supply 24 V DC for all connected sensors
- Diagnostic LED for short circuit/ overload of sensor supply
- Labelling options on all sides with large, hinged inscription label
- Earthing plate and H-rail mounting already integrated



General technical data				
Type			**CTSL-D-16E-M8-3**	**CTSL-D-16E-M12-5**
Electrical connection			16x socket M8, 3-pin	8x socket M12, 5-pin
Protocol			IO-Link/I-Port	
IO-Link	Connection technology		5-pin	
	Protocol		V 1.0	
	Communication mode		COM2 (38.4 kBaud), COM3 (230 kBaud)	
	Port type		B	
	Number of ports		1	
	Process data width OUT	[bit]	16	
	Minimum cycle time	[ms]	3.2	
	Device ID	[ms]	0x 700410	
Baud rate		[kbps]	38.4/230.4	
Max. no. of inputs			16	
Nominal operating voltage		[V DC]	24	
Operating voltage range		[V DC]	18 ... 30	
Current consumption at nominal operating voltage of logic circuit		[mA]	Max. 35	
Max. residual current per module		[mA]	1.2	
Reverse polarity protection			For operating voltage	
Fuse protection (short circuit)			Internal electronic fuse protection for each group	
Electrical isolation between channels			No	
Switching level	Signal 0	[V]	≤5	
	Signal 1	[V]	≥11	
Input debounce time		[ms]	0.5 (3 ms, 10 ms, 20 ms parameterisable)	
Input characteristic			IEC1131-T2	
Switching logic at inputs			PNP (positive switching)	
LED display	Bus-specific		X20: I-Port/IO-Link	
	Product-specific		1 operating voltage	
			16 channel status	
			2 group diagnostics	

Materials			
Housing			PA reinforced
Cover			PA reinforced
Note on materials			RoHS compliant
Product weight		[g]	250
Dimensions	(W x L x H)	[mm]	143 x 103 x 32

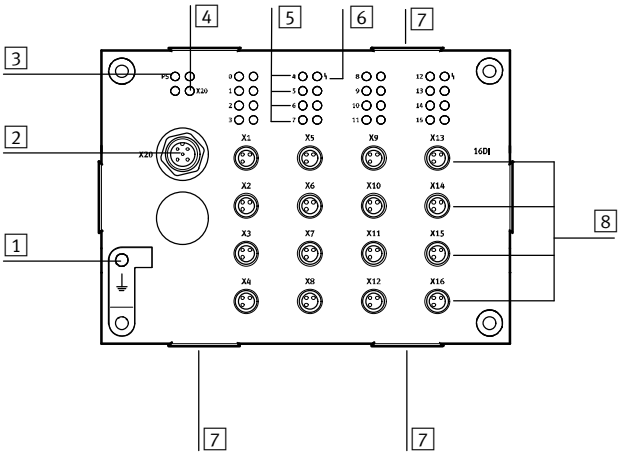
Operating and environmental conditions		
Type of mounting		Either via H-rail or via through-hole
Degree of protection to EN 60529		IP65/IP67 (when fully plugged in or fitted with protective cap)
Ambient temperature	[°C]	–5 ... +50
Storage temperature	[°C]	–20 ... +70
Corrosion resistance class CRC[1)]		2
CE mark (see declaration of conformity)[2)]		To EU EMC Directive
KC mark		KC EMC
Approval certificate		RCM trademark

1) Corrosion resistance class 2 according to Festo standard 940 070
Components subject to moderate corrosion stress. External visible parts with primarily decorative surface requirements which are in direct contact with the surrounding industrial environment or media such as coolants or lubricating agents.

2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

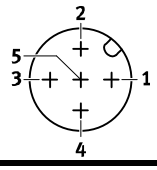
Connection and display components

CTSL-D-16E-M8-3



1 Earth terminal
2 I-Port interface/IO-Link
3 Status LED for power supply (PS)
4 Status LED for I-Port (X20)
5 Status-LEDs for inputs (status display, green)
6 Status LED (group) for short circuit/overload of sensor supply (red)
7 Fixture for inscription label holder ASCF-H-E2
8 Sensor connections (1 input per socket)

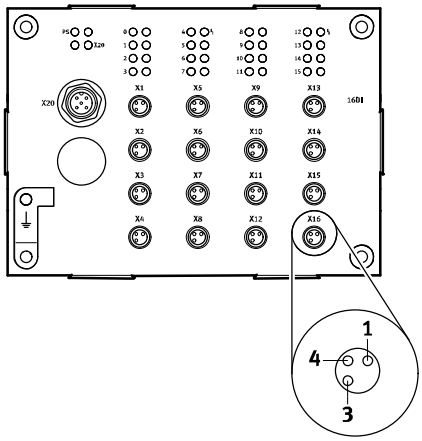
Pin allocation – I-Port interface/IO-Link



Pin	Allocation	Description
1	$24V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
2	–	–
3	$0V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
4	C/Q	Data communication
5	–	–

Pin allocation – Sensor connections CTSL-D-16E-M8-3

Pin allocation

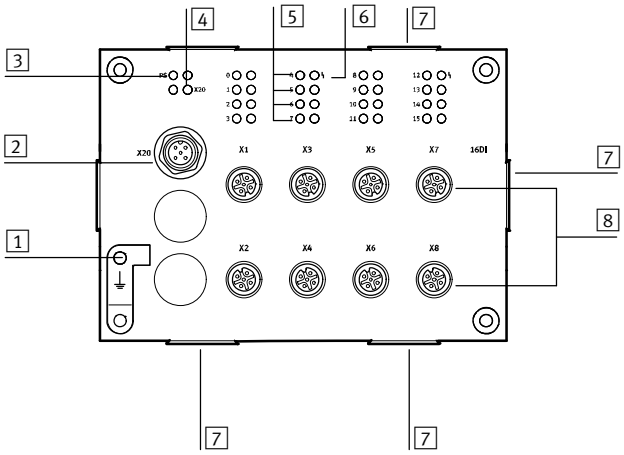


Pin	Allocation	Description
1	24V	Operating voltage 24 V
3	0V	Operating voltage 0 V
4	Ix*	Sensor signal

* Ix = Input x

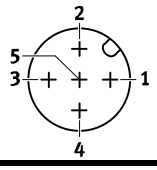
Connection and display components

CTSL-D-16E-M12-5



1 Earth terminal
2 I-Port interface/IO-Link
3 Status LED for power supply (PS)
4 Status LED for I-Port (X20)
5 Status-LEDs for inputs (status display, green)
6 Status LED (group) for short circuit/overload of sensor supply (red)
7 Fixture for inscription label holder ASCF-H-E2
8 Sensor connections (2 inputs per socket)

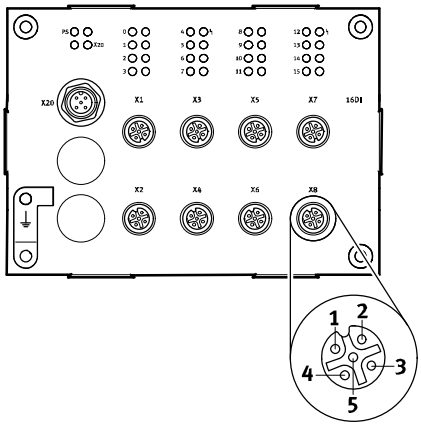
Pin allocation – I-Port interface/IO-Link



Pin	Allocation	Description
1	$24V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
2	–	–
3	$0V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
4	C/Q	Data communication
5	–	–

Pin allocation – Sensor connections CTSL-D-16E-M12-5

Pin allocation

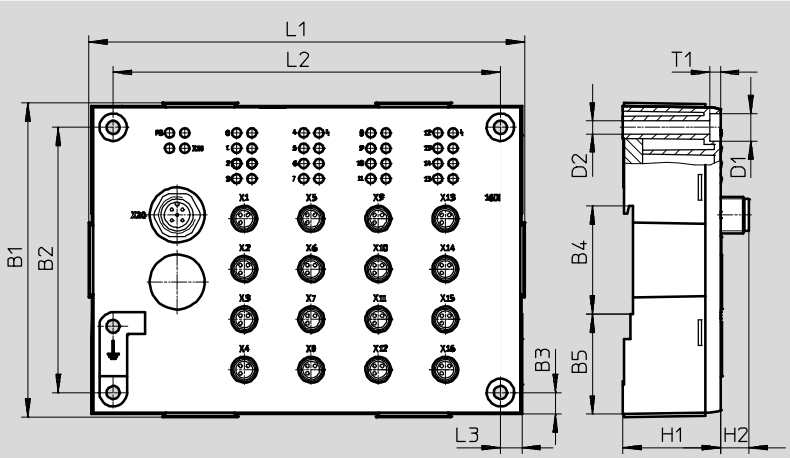


Pin	Allocation	Description
1	24V	Operating voltage 24 V
2	Ix+1*	Sensor signal
3	0V	Operating voltage 0 V
4	Ix*	Sensor signal
5	FE	Functional earth

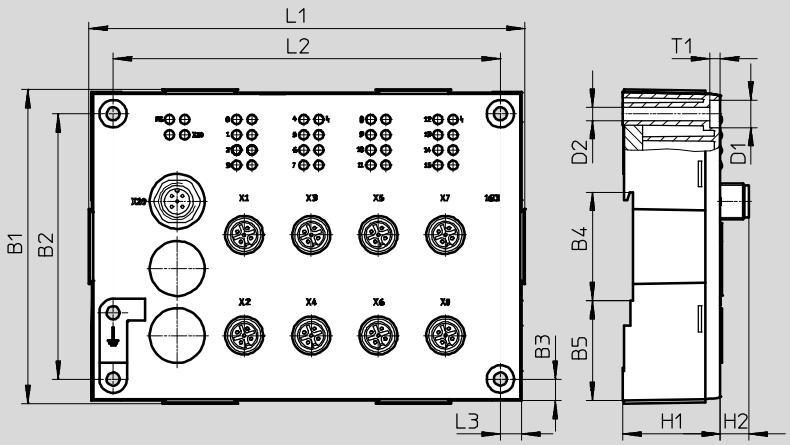
* Ix = Input x

Dimensions Download CAD data ➔ **www.festo.com**

CTSL-D-16E-M8-3

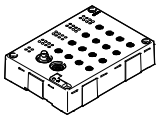
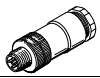
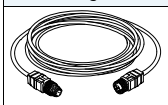
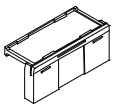


CTSL-D-16E-M12-5



Type	B1	B2	B3	B4	B5	D1	D2	H1	H2	L1	L2	L3	T1
CTSL-D-16E	103	87	7	35.5	32.8	9	4.3	32	9.4	143	127	7	3.5

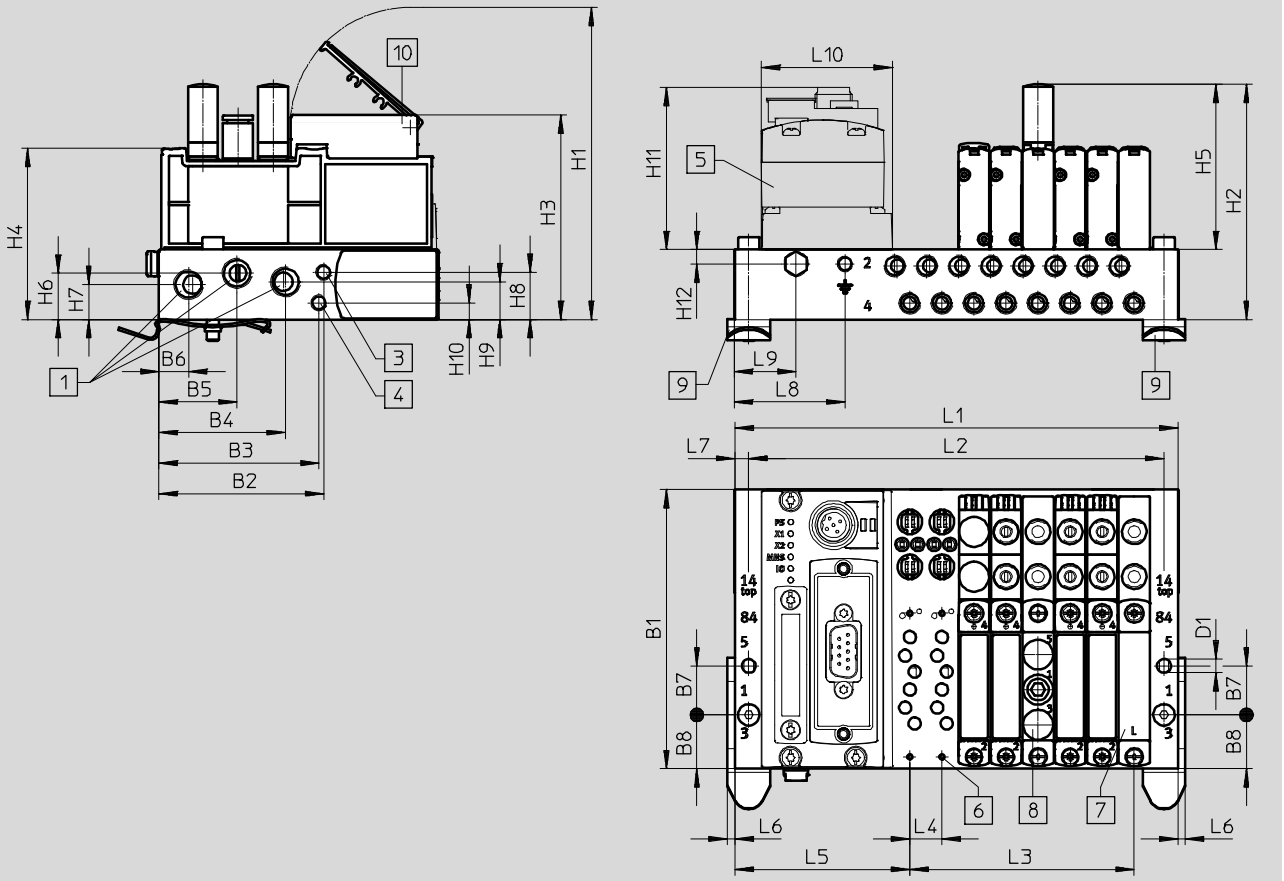
Ordering data

Description			Part No.	Type
Input modules				
	16 sensor connections M8, 3-pin, single allocation		**1387363**	**CTSL-D-16E-M8-3**
	8 sensor connections M12, 5-pin, double allocation		**1387359**	**CTSL-D-16E-M12-5**
Plug connector				
	Straight plug connector, M12	5-pin, PG7	**175487**	**SEA-M12-5GS-PG7**
		4-pin, PG7	**18666**	**SEA-GS-7**
		4-pin, for cable diameter 2.5 mm^2	**192008**	**SEA-4GS-7-2,5**
	Straight plug connector, M8	3-pin, solderable	**18696**	**SEA-GS-M8**
		3-pin, screw-in	**192009**	**SEA-3GS-M8-S**
	Plug connector for 2 cables, M12, PG11	4-pin	**18779**	**SEA-GS-11-DUO**
		5-pin	**192010**	**SEA-5GS-11-DUO**
Connecting cables				
	Connecting cable, M12, 4-pin, straight plug connector - straight socket	2.5 m	**539052**	**NEBU-M12G4-K-2.5-M12G4**[1]
		5.0 m	**539052**	**NEBU-M12G4-K-5-M12G4**[1]
	Connecting cable, M8, 3-pin, straight plug connector - straight socket	0.5 m	**539052**	**NEBU-M8G3-K-0.5-M8G3**[1]
		1 m	**539052**	**NEBU-M8G3-K-1-M8G3**[1]
		2.5 m	**539052**	**NEBU-M8G3-K-2.5-M8G3**[1]
		5 m	**539052**	**NEBU-M8G3-K-5-M8G3**[1]
	Straight - angled	5 m	**574321**	**NEBU-M12G5-E-5-Q8N-M12G5**
		7 m	**574322**	**NEBU-M12G5-E-7.5-Q8N-M12G5**
		10 m	**574323**	**NEBU-M12G5-E-10-Q8N-M12G5**
	Angled - angled	0.5 m	**570733**	**NEBU-M12W5-K-0.5-M12W5**
	Straight - angled		**8003617**	**NEBU-M12G5-K-0.5-M12W5**
	Angled - angled	2 m	**570734**	**NEBU-M12W5-K-2-M12W5**
	Straight - angled		**8003618**	**NEBU-M12G5-K-2-M12W5**
Inscription label holder				
	Inscription label holders for EL modules, bag of 10		**547473**	**ASCF-H-E2**

1) Modular product, more information ➔ Internet: nebu

Dimensions – Example of a valve terminal with I-Port interface, size 10

Download CAD data ➔ **www.festo.com**



1 Ports 1, 3 and 5: G⅛ (at both ends)
3 Ports 12/14: M5 (at both ends)
4 Ports 82/84: M5 (at both ends)
5 CTEU CANopen
6 For mounting valves/blanking plates/supply plates on manifold block: M2
7 Blanking plate
8 Supply plate, ports 1, 3 and 5: M7
9 H-rail mounting
10 Inscription label holder

Example of a valve terminal VTUG with I-Port interface

Type	No. of valve positions	Size 10																
		B1	B2	B3	B4	B5	B6	B7	B8	D1 ∅	H1	H2	H3	H4	H5	H6	H7	H8
VABM	4-24	91.5	54	52.4	41.5	25.6	9.8	16	17.7	4.5	102.3	77.1	67	56.1	54.1	15.2	11.5	15.5

Type	No. of valve positions	Size 10										
		H9	H10	H11	H12	L4	L5	L6	L7	L8	L9	L10
VABM	4-24	12.4	5.5	54.8	4.8	10.5	57.3	2.5	4.5	36	20	42.5

Type	No. of valve positions	Size 10		
		L1	L2	L3
VABM	4	103	94	31.5
	5	113.5	104.5	42
	6	124	115	52.5
	7	134.5	125.5	63
	8	145	136	73.5
	9	155.5	146.5	84
	10	166	157	94.5
	12	187	178	115.5
	16	229	220	157.5
	20	271	262	199.5
	24	313	304	241.5