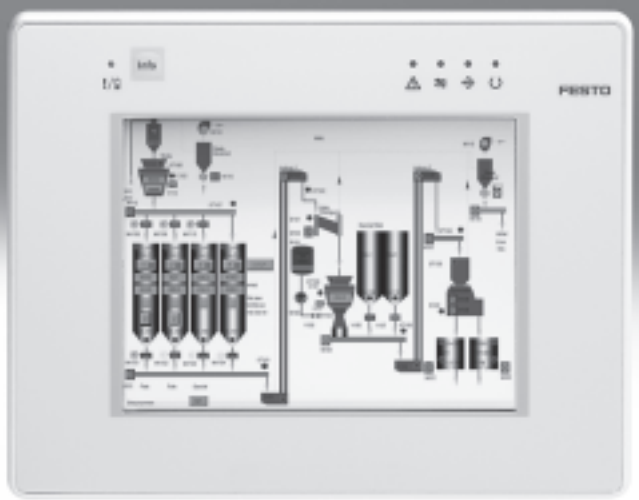
Operator units FED

FESTO



Operator units FED

Key features

Multifunctional in use

FED human-machine interfaces simplify the control of automation tasks at field level and set new standards in functionality and integration.

Whether for single or multi-axis control systems in handling technology or process automation, the Front End Display FED is the optimum solution.

FED-40 ... FED-90:
The semi-graphical display of process values makes them easier to read. Straightforward designing of human-machine dialogues using the FED Designer programming tool supplied.

FED-301 ... FED-5000:
Graphics-capable for maximum flexibility when displaying processes and data. Straightforward designing of human-machine dialogues using the FED Designer programming tool supplied. With integrated web features that support the use of standards.

Text-based Front End Displays FED-40 ... FED-90

The FED-40 and FED-60 versions complement the proven FED-50 and FED-90 for simple dialogues using 4-line text display and operating buttons whether via a serial, fieldbus or Ethernet connection – the text panels of the FED series are 100% compatible with Festo controllers.

The following functionalities are available depending on the version:

- Serial interface (FED-40 to FED-90), optional Ethernet for use in a network (not with FED-40)
- Battery backup of the alarm and event data (not with FED-40)
- FED Designer graphical design tool included
- No parameterisation required; the software contains the controller data and detects the display
- Simple graphics possible, enabling scalable font size and simple representation of pictograms and bar charts
- Software for uploading projects
- Recipe handling
- Simple data acquisition
- Generous program memory
- Real-time clock (not with FED-40)
- Printer port (FED-90)
- Password protection
- Alarm handling
- Keypad can be easily programmed using macros
- Multilingual projects possible
- Import and export of texts for translation

FED-40: the entry-level model

A serial connection is established with the controller. Operation is by means of four freely programmable function keys and seven system keys.

FED-50: fieldbus-capable

The FED-50 offers the functions of the FED-40 and can additionally be extended with an Ethernet or fieldbus interface. A real-time clock is standard on the FED-50 and higher.

FED-60: 10-key pad included

In addition to the function and system keys, the FED-60 also features a 10-key pad. The real-time clock is also standard and a fieldbus interface can be optionally retrofitted.

FED-90: all-inclusive

Because of its larger size in comparison with the FED-60, the FED-90 can offer 12 function keys and 23 system keys. A printer interface permits direct output of the alarm and/or event list.

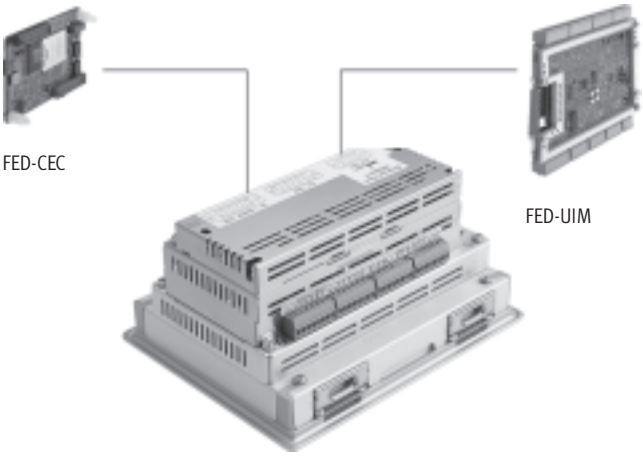
Front End Displays with touchscreen FED-301 to FED-5000

The touchscreen displays FED-301 to FED-5000 with graphical user interface extend the proven text-based and key pad-equipped Front End Displays FED-40 to FED-9 to include touch-sensitive displays in sizes from 3.8" to 15". As alternatives to CPX handhelds and integrated displays, these Front End Displays provide a freely definable user interface.
As a client/server system, the terminal receives data from web servers connected to it and displays this data using the integrated browser functionality.

Operator units FED

Key features

FED-CEC with CoDeSys software platform



CoDeSys makes your life easier with simple commissioning, fast programming and parameterisation – standardised programming of embedded devices to IEC 61131-3.

- Hardware-neutral software platform for quick and easy configuration, programming and commissioning of pneumatic and electric automation solutions.
- Extensive module libraries for single or multi-axis positioning motions.
- The IEC 61131-3 standard means that CoDeSys is flexible and open for all types of control tasks.
- Extremely flexible and modular: offline and online functions, as well as components for hardware configuration and visualisation. User-friendly IEC functional module extension.
- Re-use of existing application parts.

Functions

- Can be connected to all FEC® and CoDeSys controllers from Festo, serially or via Ethernet
- Trend display
- Recipe handling
- Multilingual projects and language changeover during runtime
- Software enables uploading of projects
- Import and export of texts for translation

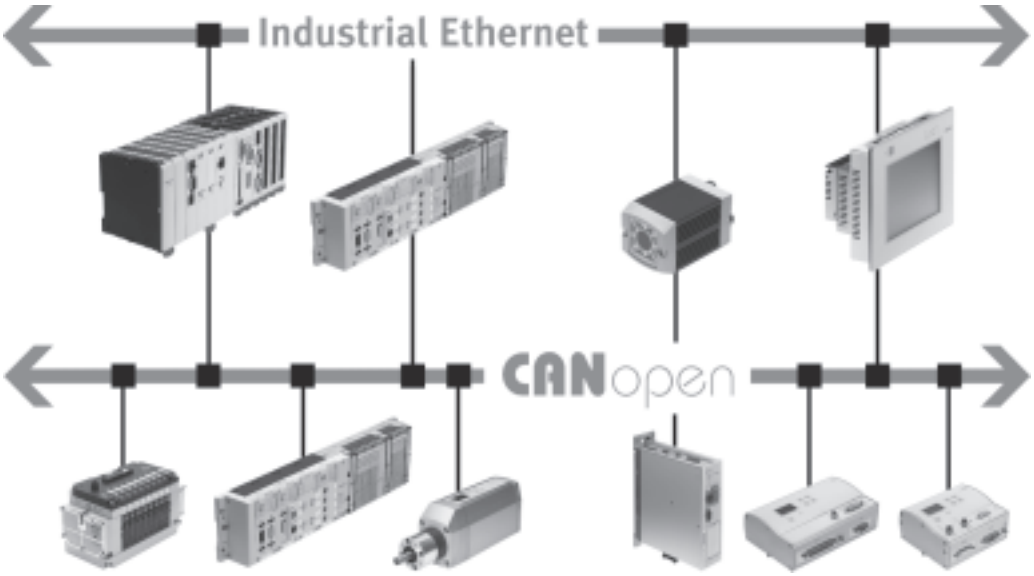
Designing

Straightforward designing and programming with the programming tool CoDeSys provided by Festo and FED Designer.

Key features at a glance

- Convenient FED Designer WYSIWYG design tool.
- No duplicate work thanks to import of variable declarations (allocation list) from the control software.
- Can also be used with Festo FEC® and CoDeSys controllers from Festo in a network by means of Ethernet.
- Graphics capability offers maximum flexibility when displaying processes and data.
- Shorter design times thanks to reusability of objects (libraries containing graphical elements).
- Generous memory means almost unlimited numbers of graphics and texts can be displayed.
- Display of complex processes is possible thanks to an unlimited number of variables per page.
- Extremely sturdy thanks to a metal housing to facilitate use in tough environments.

The Front End Displays in the Festo controller landscape



Operator units FED

Product range overview, type codes

Type	Display resolution	Number of colours	Display size	Interfaces	➔ Page/Internet
Text-based					
FED-40	120x32 pixels	B/W	4x20 characters	PLC, PC	5
FED-50				PLC, PC, Ethernet[1)]	
FED-60				PLC, PC, Ethernet[1)]	
FED-90				PLC, PC, printer, Ethernet[1)]	
Touch screen					
FED-301	1/4 VGA, 320x240 pixels	B/W	3.8”	PLC, PC, Ethernet[1)]	8
FED-400	480x272 pixels	256	4.3”	PLC, PC, Ethernet[2)]	
FED-501	1/4 VGA, 320x240 pixels	8 grey scales	5.6”	PLC, PC, printer, Ethernet[1)]	
FED-550		64 k	5.7”	PLC, PC, printer, Ethernet[3)]	
FED-700	VGA, 640x480 pixels	64 k	7.5”	PLC, PC, printer, Ethernet[4)]	
FED-1000			10.4”		
FED-2000	SVGA, 800x600 pixels	64 k	12.1”	PLC, PC, printer, Ethernet[4)]	
FED-5000	XGA, 1024x768 pixels	64 k	15”		

1) 10 MBd optional
2) 100 MBd
3) 10/100 MBd standard
4) 10/100 MBd standard, 2nd 10 MBd interface optional

Type codes

FED – 2000

Function	
FED	Teach pendant

Display size, equipment	
Text-based	
40	4 x 20 characters
50	Equipment details ➔ Product range overview and Technical data
60	
90	
Touch screen	
301	3.8”, B/W
400	4.3”, 256 colours
501	5.6”, 8 grey scales
550	5.7”, 64 k colours
700	7.5”, 64 k colours
1000	10.4”, 64 k colours
2000	12.1”, 64 k colours
5000	15”, 64 k colours

Operator units FED, text-based

Technical data

FESTO

- Voltage
  18 ... 30 V DC
- Temperature range
  0 ... +50 °C

General technical data					
		FED-40	FED-50	FED-60	FED-90
Display		Monochrome LCD with backlighting			
Display size		4x20 characters			
Display resolution		120x32 pixels			
Number of colours		–			
Number of function keys		4	4	9	12
Number of system keys		7	7	10	23
Number of user LEDs		5	5	10	13
Number of system LEDs		4	4	4	4
User memory		512 KB			
Recipe memory		–	16 KB	16 KB	16 KB
Event lists		–	256	256	256
Alerts		1,024			
Type of mounting		Front panel mounting			
Installation depth	[mm]	53	53	53	71
Max. front panel thickness	[mm]	5			

Electrical data					
		FED-40	FED-50	FED-60	FED-90
Nominal operating voltage DC	[V]	24			
Operating voltage range DC	[V]	18 ... 30			
Current consumption at nominal operating voltage	[A]	0.25			0.3
AUX interface		–	Sub-D socket, 9-pin		
Printer interface		–	–	–	Sub-D socket, 15-pin, RS232
Ethernet interface		–	Optional, 10 MBd		
PC interface		Sub-D plug, 15-pin, RS232			Sub-D socket, 15-pin, RS232
Programming interface		9.6 kBd	9.6 ... 38.4 kBd		
Programming software		FED Designer 6.06 or higher			
PLC interface		Sub-D plug, 15-pin, RS232			
Backup battery		–	3 V/270 mA lithium		
Real-time clock		–	Yes		
Real-time clock deviation		–	130 s/month		
Protection class		IP65 at the front following installation into control panel, IP20 at the back			

Operator units FED, text-based

Technical data

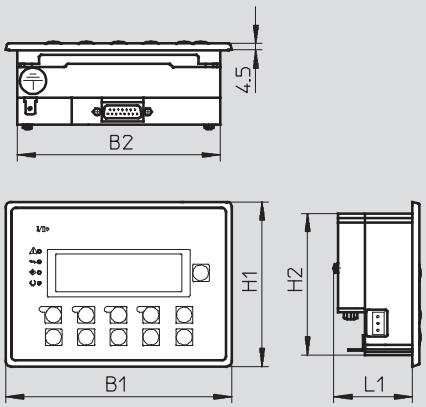
Operating and environmental conditions		
Ambient temperature	[°C]	0 ... +50
Storage temperature	[°C]	–20 ... +70
Relative air humidity	[%]	5 ... 85, non-condensing
CE mark (see declaration of conformity)		To EU EMC Directive[1)]
Certification		RCM trademark
		c UL us - Listed (OL)
Explosion protection certification outside the EU		NEC 500 Class I, Div. 2

1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com ➔ Support ➔ User documentation.
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.

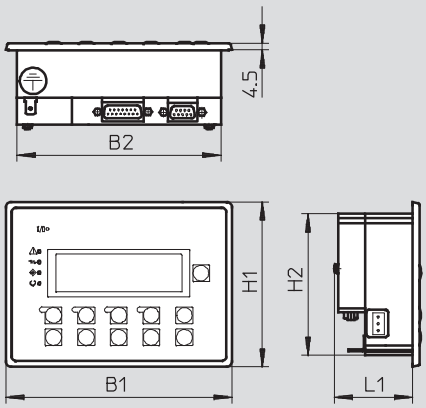
Weight [g]					
		FED-40	FED-50	FED-60	FED-90
Product weight	[g]	1,000	1,000	1,000	1,100

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

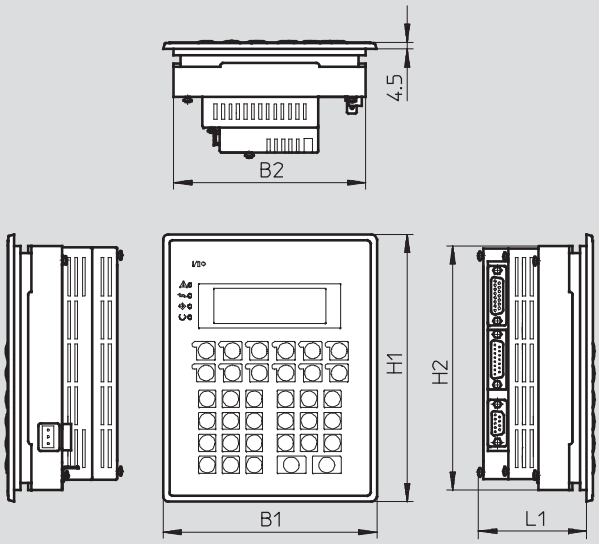
FED-40



FED-50/60



FED-90



Type	B1	B2	H1	H2	L1
FED-40	149	134	108.5	93.5	52.5
FED-50					
FED-60					
FED-90	140.6	126.6	176	161	71

Operator units FED, text-based

Technical data

Ordering data						
Display resolution	Number of colours	Display size	Interfaces	Number of function/ system keys	Part No.	Type
120x32 pixels	B/W	4x20 characters	PLC, PC	4/7	**541998**	**FED-40**
			PLC, PC, Ethernet[1)]	4/7	**533531**	**FED-50**
			PLC, PC, Ethernet[1)]	9/10	**541999**	**FED-60**
			PLC, PC, printer, Ethernet[1)]	12/23	**533532**	**FED-90**

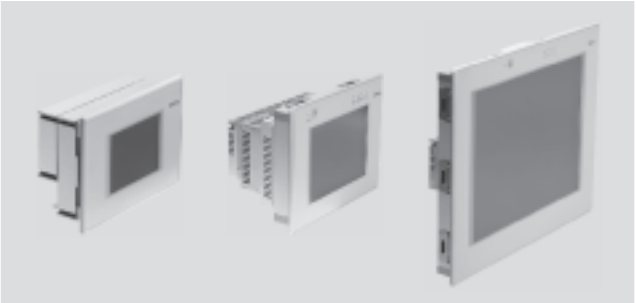
1) 10 MBd optional

Operator units FED, touch screen

Technical data

FESTO

- Voltage
  18 ... 30 V DC
- Temperature range
  0 ... +50 °C



General technical data						
		FED-301	FED-400	FED-501	FED-550	FED-700
Display properties		Touch screen				
Display		Monochrome LCD	Colour TFT	Monochrome LCD	Colour TFT	Colour TFT
Display size		3.8”	4.3”	5.6”	5.7”	7.5”
Display resolution		1/4 VGA, 320x240 pixels	480x272 pixels	1/4 VGA, 320x240 pixels	1/4 VGA, 320x240 pixels	VGA, 640x480 pixels
Number of colours		B/W	256	8 grey scales	64 k	64 k
Number of function keys		–		1		
Number of user LEDs		–		1		
Number of system LEDs		4	–	4		
User memory		512 KB	2 MB	32 MB	64 MB	32 MB
Recipe memory		32 KB				
Event lists		256		1,024		
Alerts		1,024				
Type of mounting		Front panel mounting				
Installation depth	[mm]	61	56	66	91	71
Max. front panel thickness	[mm]	5				
Materials						
Note on materials		RoHS-compliant				

		FED-770	FED-1000	FED-2000	FED-3000	FED-5000
Display properties		Touch screen				
Display		Colour TFT				
Display size		7”	10.4”	12.1”	13.3”	15”
Display resolution		WVGA, 800x480 pixels	VGA, 640x480 pixels	SVGA, 800x600 pixels	WXGA, 1280x800 pixels	XGA, 1024x768 pixels
Number of colours		64 k				
Number of function keys		1				
Number of user LEDs		1				
Number of system LEDs		4				
User memory		64 MB	32 MB	32 MB	64 MB	32 MB
Recipe memory		32 KB				
Event lists		1,024				
Alerts		1,024				
Type of mounting		Front panel mounting				
Installation depth	[mm]	45	91	91	42	101
Max. front panel thickness	[mm]	4	5	5	4	5
Materials						
Note on materials		RoHS-compliant				

Operator units FED, touch screen

Technical data

Electrical data						
		FED-301	FED-400	FED-501	FED-550	FED-700
Nominal operating voltage DC	[V]	24				
Operating voltage range DC	[V]	18 ... 30				
Current consumption at nominal operating voltage	[A]	0.4		0.6	1	1.1
AUX interface		Sub-D socket, 9-pin				
Printer interface		–		Sub-D socket, 15-pin, RS232		
Ethernet interface		Optional, 10 MBd	100 MBd	Optional, 10 MBd	RJ45 10/100 MBd	
PC interface		Sub-D plug, 15-pin, RS232		Sub-D socket, 15-pin, RS232		
Programming interface		9.6 ... 38.4 kBd				
Programming software		FED Designer 6.06 or higher	FED Designer 6.09 or higher	FED Designer 6.06 or higher	FED Designer 6.09 or higher	FED Designer 6.06 or higher
PLC interface		Sub-D plug, 15-pin, RS232				
Backup battery		3 V/270 mA lithium				
Real-time clock		Yes				
Real-time clock deviation		130 s/month				
Protection class		IP65 at the front following installation into control panel, IP20 at the back				

		FED-770	FED-1000	FED-2000	FED-3000	FED-5000
Nominal operating voltage DC	[V]	24				
Operating voltage range DC	[V]	18 ... 30				
Current consumption at nominal operating voltage	[A]	0.6	1.2	1.3	1.4	1.5
AUX interface		Sub-D socket, 9-pin				
Printer interface		Sub-D socket, 15-pin, RS232				
Ethernet interface		RJ45 10/100 MBd				
		2nd Ethernet interface optional, 10 MBd				
PC interface		Sub-D socket, 15-pin, RS232				
USB interface		Yes	–	–	Yes	–
Programming interface		9.6 ... 38.4 kBd				
Programming software		FED Designer 6.06 or higher				
PLC interface		Sub-D plug, 9-pin, RS232, RS485	Sub-D plug, 15-pin, RS232		Sub-D plug, 9-pin, RS232, RS485	Sub-D plug, 15-pin, RS232
Backup battery		Lithium, rechargeable	3 V/270 mA lithium		Lithium, rechargeable	3 V/270 mA lithium
Real-time clock		Yes				
Real-time clock deviation		130 s/month				
Protection class		IP65 at the front following installation into control panel, IP20 at the back				

Operator units FED, touch screen

Technical data

Operating and environmental conditions						
		FED-301	FED-400	FED-501	FED-550	FED-700
Ambient temperature	[°C]	0 ... +50		0 ... +50	0 ... +45	0 ... +45
Storage temperature	[°C]	–20 ... +70				
Relative air humidity	[%]	5 ... 85, non-condensing				
CE mark (see declaration of conformity)		To EU EMC Directive[1)]				
Certification		c UL us - Listed (OL)				
		RCM trademark				
Explosion protection certification outside the EU		–		NEC 500 Class I, Div. 2	–	–

		FED-770	FED-1000	FED-2000	FED-3000	FED-5000
Ambient temperature	[°C]	0 ... +50	0 ... +45	0 ... +45	0 ... +50	0 ... +45
Storage temperature	[°C]	–20 ... +70				
Relative air humidity	[%]	5 ... 85, non-condensing				
CE mark (see declaration of conformity)		To EU EMC Directive[1)]				
Certification		cULus listed (OL)	–	–	cULus listed (OL)	cULus listed (OL)
		C-Tick	C-Tick	C-Tick	C-Tick	C-Tick
Ex certification to NEC 500		–	Class I, Division 2, Groups A, B, C and D		–	–

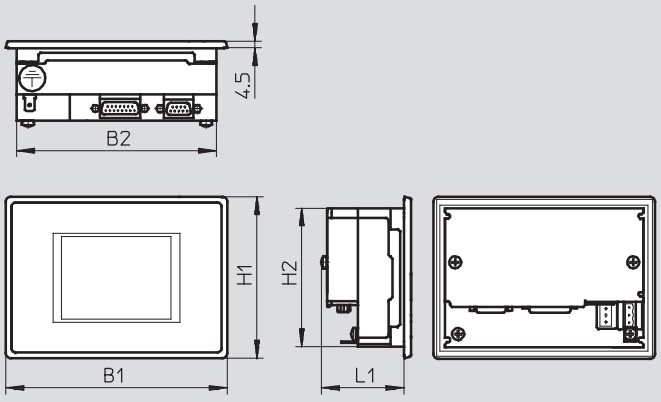
1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com → Support → User documentation.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures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

Weight [g]						
		FED-301	FED-400	FED-501	FED-550	FED-700
Product weight	[g]	1,000	1,000	1,400	1,400	1,600

		FED-770	FED-1000	FED-2000	FED-3000	FED-5000
Product weight	[g]	1,000	2,300	2,800	2,500	3,800

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

FED-301/400



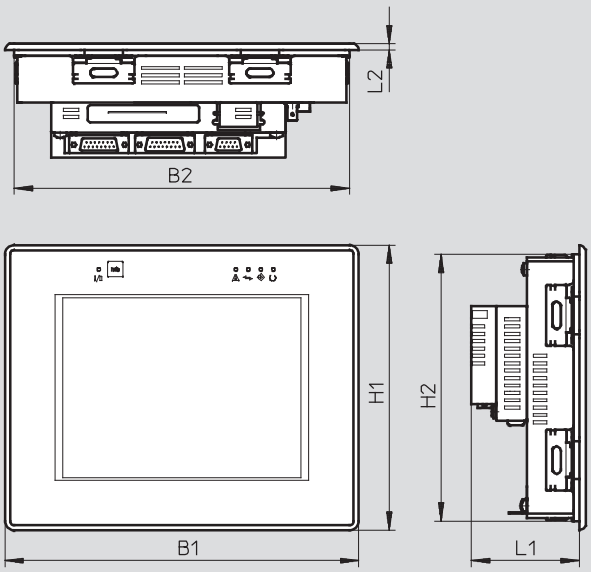
Type	B1	B2	H1	H2	L1
FED-301	149	134	108.5	93.5	60.5
FED-400	149	136	109	96	56

Operator units FED, touch screen

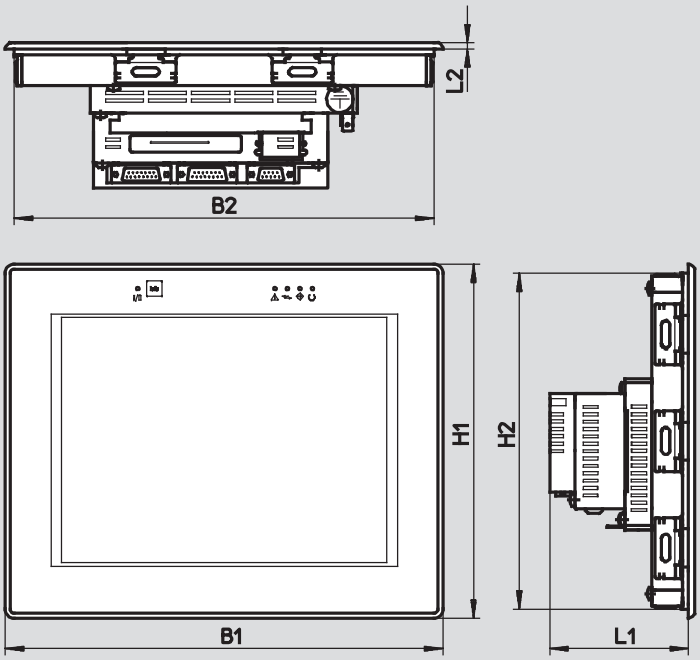
Technical data

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

FED-700/770/3000



FED-501/550/1000/2000/5000



Type	B1	B2	H1	H2	L1	L2
FED-501	187	175	147	135	66	4
FED-550	187	176	147	136	91	4
FED-700	232	220	187	175	71	4
FED-770	187	175	147	135	45	4
FED-1000	287	275	232	220	91	4
FED-2000	337	325	267	255	91	4
FED-3000	337	325	267	255	41.5	4
FED-5000	392	380	307	295	101	4

Operator units FED, touch screen

Technical data

Ordering data						
Display resolution	Number of colours	Display size	Interfaces	Number of function/ system keys	Part No.	Type
1/4 VGA, 320x240 pixels	B/W	3.8”	PLC, PC, Ethernet[1)]	–/–	**543438**	**FED-301**
480x272 pixels	256	4.3”	PLC, PC, Ethernet[2)]	–/–	**570864**	**FED-400**
1/4 VGA, 320x240 pixels	8 grey scales	5.6”	PLC, PC, printer, Ethernet[1)]	1/–	**543440**	**FED-501**
	64 k	5.7”	PLC, PC, printer, Ethernet[3)]	1/–	**570398**	**FED-550**
VGA, 640x480 pixels	64 k	7.5”	PLC, PC, printer, Ethernet[4)]	1/–	**543442**	**FED-700**
WVGA, 800x480 pixels	64 k	7”	PLC, PC, printer, Ethernet[3)]	–/–	**573905**	**FED-770**
VGA, 640x480 pixels	64 k	10.4”	PLC, PC, printer, Ethernet[4)]	1/–	**543515**	**FED-1000**
SVGA, 800x600 pixels	64 k	12.1”	PLC, PC, printer, Ethernet[4)]	1/–	**543444**	**FED-2000**
WXGA, 1280x800 pixels	64 k	13.3”	PLC, PC, printer, Ethernet[3)]	–/–	**573906**	**FED-3000**
XGA, 1024x768 pixels	64 k	15”	PLC, PC, printer, Ethernet[4)]	1/–	**543447**	**FED-5000**

1) 10 MBd optional
2) 100 MBd
3) 10/100 MBd standard
4) 10/100 MBd standard, 2nd 10 MBd interface optional

Operator units FED, embedded control

Accessories

Controller
Plug-in card with processor module for installation in the operator units FED-50 to FED-5000.

Controller FED-CECCAN
Plug-in card with processor module for installation in the operator units FED-400, FED-550, FED-700, FED-1000, FED-2000 and FED-5000.

Fieldbus interfaces

CANopen

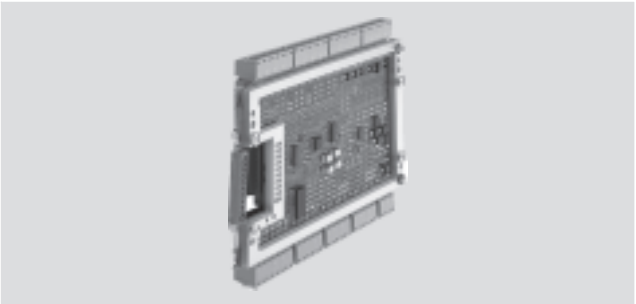
General technical data			
		FED-CEC	FED-CECCAN
CPU data		32-bit RISC processor, 24 MHz	
		Watchdog	
Programming software		CoDeSys provided by Festo	
Programming language		SFC, IL, FCH, LD and ST to IEC 61131-3	
		Additionally CFC	
Ethernet			
Connector plug		RJ45	
Number		1	
Transmission speed	[Mbps]	10	10/100
Supported protocols		TCP/IP	
		EasyIP	
Fieldbus interface			
Type		CAN	
Connection technology		Sub-D plug, 9-pin	
Transmission rate		Max. 1 Mbps, adjustable	
Materials			
Note on materials		Contains PWIS (paint-wetting impairment substances)	
		–	RoHS-compliant

Operating and environmental conditions		
Ambient temperature	[°C]	0 ... +50
Storage temperature	[°C]	–20 ... +70
Relative air humidity	[%]	5 ... 85 (non-condensing)
CE mark (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 ➔ Support ➔ User documentation.
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.

Ordering data			
		Part No.	Type
Controller		**559869**	**FED-CEC**
		570400	**FED-CECCAN**

I/O module FED-UIM
Plug-in card for installation in the operator units FED-550, FED-1000, FED-2000 and FED-5000.



General technical data		
Analogue inputs		
Number		8
Resolution	[bit]	12
Signal range	[V]	0 ... 10
	[V]	±10
	[V]	0 ... 5
	[V]	±5
	[V]	0 ... 1
	[V]	±1
	[mA]	0 ... 20
	[mA]	4 ... 20
		PT 100 (–100 ... +850 °C)
		Thermoelement E, J, K, R, S, T
Absolute accuracy at 25 °C	[%]	0.1
Linearity error at 25 °C	[%]	0.1
Input resistance	[Ω]	47
Analogue outputs		
Number		4
Resolution	[bit]	12
Max. load resistance	[Ω]	470
Signal range	[V]	±10
Linearity error at 25 °C	[%]	±0.15 voltage output
	[%]	±0.2 current output
Digital inputs		
Number		20
Fast clock pulse inputs		4
Incremental encoder connection		4
Input signal delay	[ns]	200
Input voltage	[V DC]	24
Input current	[mA]	3
Input signal delay	[ms]	50
Nominal value for TRUE	[V DC]	12 ... 30
Nominal value for FALSE	[V DC]	≤ 6
Electrical isolation		Yes, via optocoupler

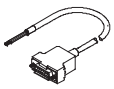
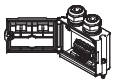
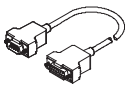
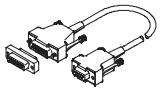
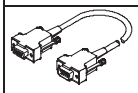
General technical data		
Digital outputs		
Number		12
Contact		Transistor
Output voltage	[V DC]	12 ... 30
Output current	[mA]	500
Electrical isolation		Yes, via optocoupler
Short circuit proof		Yes
Overload proof		Yes
Materials		
Note on materials		Contains PWIS (paint-wetting impairment substances)

Operating and environmental conditions		
Ambient temperature	[°C]	0 ... +50
Storage temperature	[°C]	–20 ... +70
Relative air humidity	[%]	5 ... 85 (non-condensing)
CE mark (see declaration of conformity)		To EU EMC Directive[1)]

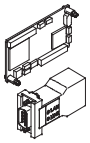
1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com ➔ Support ➔ User documentation.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures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

Ordering data		
	Part No.	Type
I/O module	**559870**	**FED-UIM**

Ordering data – Cables and plugs

	Description	Electrical connection	Cable length [m]	Part No.	Type
	For connecting to control block CPX-FEC Prepared for combining with plug FBS-SUB-9-GS-1X9POL-B	Open end Sub-D socket, 15-pin	5	**539642**	**FEC-KBG7**
	Suitable for control block CPX-FEC For combining with cable FEC-KBG7	Sub-D plug, 9-pin	–	**534497**	**FBS-SUB-9-GS-1X9POL-B**
	For connecting to control block CPX-FEC	Sub-D plug, 15-pin Sub-D socket, 15-pin	2.5	**539643**	**FEC-KBG8**
	Programming cable	Sub-D plug, 15-pin Sub-D socket, 15-pin	3	**533534**	**FEDZ-PC**
	Connecting cable, serial	Sub-D plug, 9-pin Sub-D socket, 9-pin	3	**575299**	**FEDZ-PC-9PIN**

Ordering data

	Description	Electrical connection	Part No.	Type
Fieldbus interface				
	Ethernet interface module (FST controller software)	Sub-D adapter, 9-pin to RJ45	**533533**	**FEDZ-IET**
	Ethernet TCP interface module (CoDeSys controller software)	Sub-D adapter, 9-pin to RJ45	**543450**	**FEDZ-IET TCP**
Memory card				
	User memory 32 MB		**543514**	**FEDZ-MEM32**