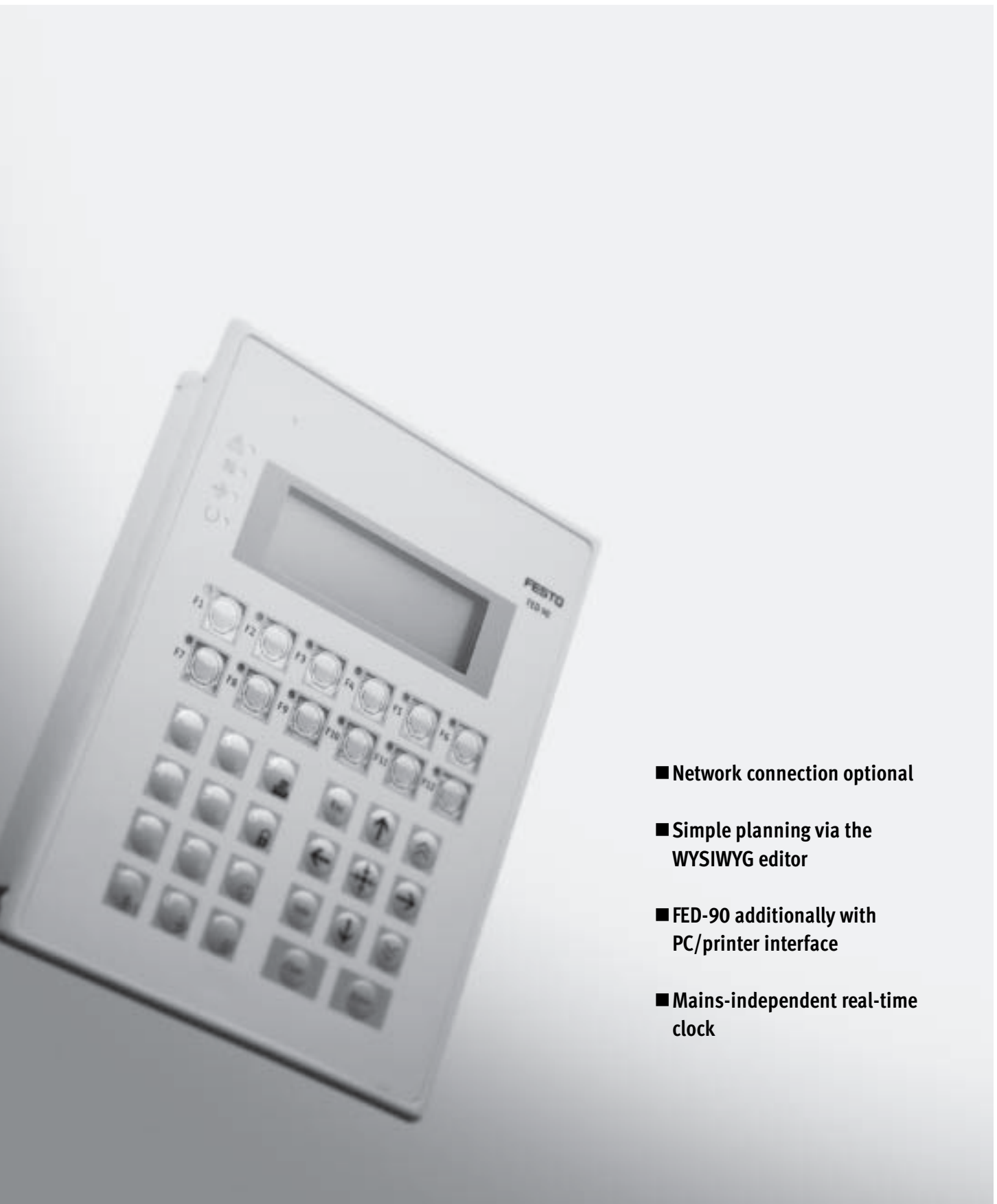


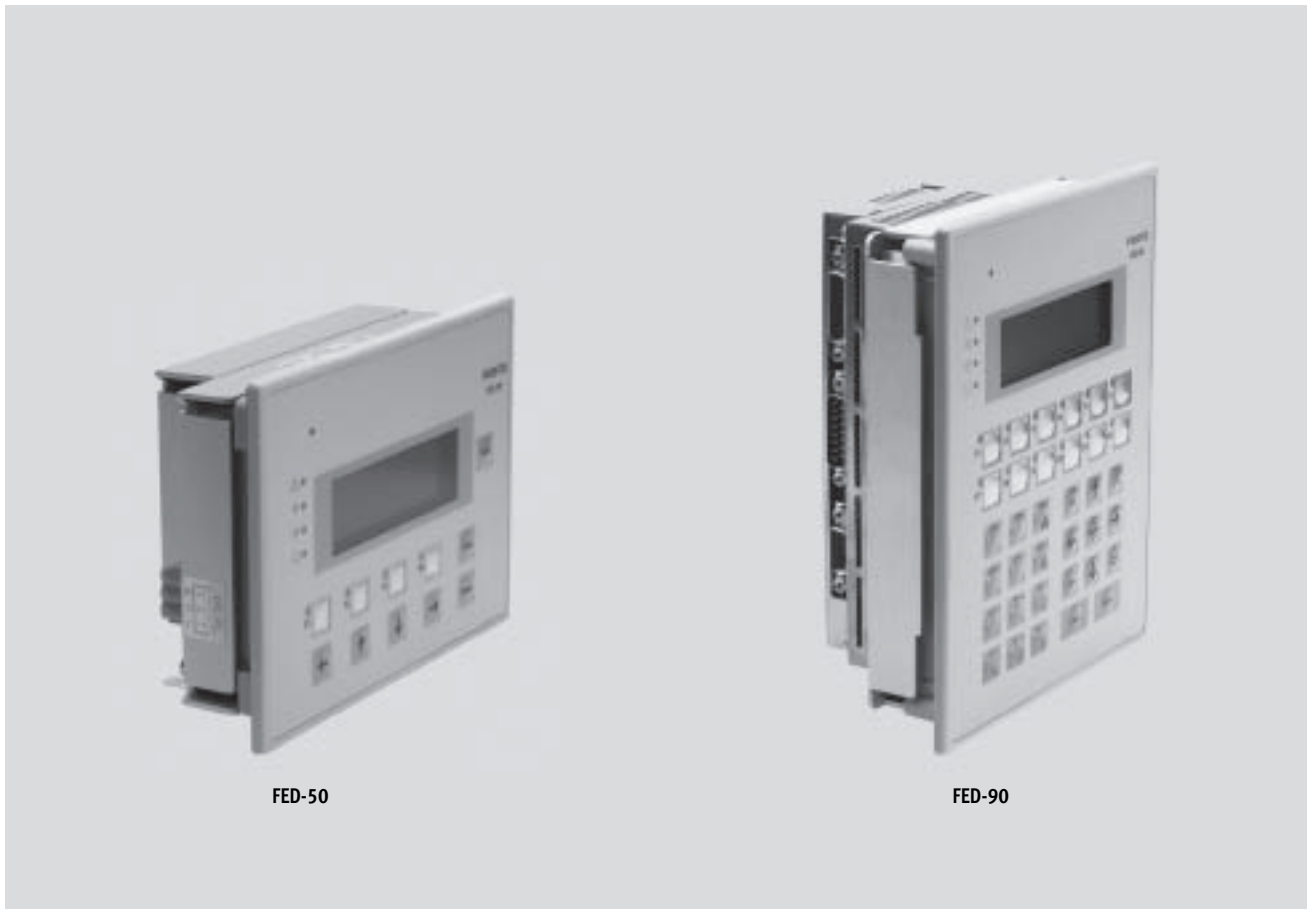
## Operator units FED, Front End Display



- Network connection optional
- Simple planning via the WYSIWYG editor
- FED-90 additionally with PC/printer interface
- Mains-independent real-time clock

## Operator units FED, Front End Display

Key features



FED-50

FED-90

### Front End Displays FED-50 and FED-90

**Sturdy and multi-functional:**

The Front End Display FED-50/90 acts as the interface between man and machine. It displays program sequences and provides the machine operator with a convenient way of entering data and commands.

The FED offers a sturdy hardware basis to facilitate long-term integration of its features into automation solutions. It also features a sturdy metal housing and high-quality touch-sensitive keyboard.

The keys are designed to provide the user with instant feedback when a key is pressed. Additional acknowledgement is provided via LEDs. The keys can be assigned a wealth of functions.

**Simple programming:**

The user-friendly Windows software FED Designer is provided for simple programming. This software permits graphical WYSIWYG planning, with the user immediately shown the output by the FED.

**The perfect companion to FEC:**

FED Designer is one of the Festo software tools (FST4, Part No. 191 440) and is also extremely compatible with the programming software for the FECs. This means that the FST allocation list can be directly read in, permitting planning using symbolic operands. The FED is therefore the perfect companion to FEC® controllers.

- Compatible with FEC®, IPC and SF3 controllers and other Festo products based on FEC®.
- Easy to operate terminal for controlling automation tasks at field level.
- Simple graphical display means the terminal can be used for applications which previously required more costly terminals.
- Easy to plan thanks to object-oriented programming with intuitive software.

# Operator units FED, Front End Display

Key features

FED hardware			
Housing/mechanical construction	Power supply	Interfaces	Real-time clock
<p>The housing of the FED is of a very sturdy mechanical design. The mylar film on the front protects the keyboard and display, while the metal housing protects the electronics. Once installed in a control panel or control cabinet, the FEDs are protected to IP65.</p> <p>The display is backlit to ensure accurate readings even when visibility is poor.</p>	<p>The FEDs are supplied with 24 V DC, as usual in automation applications. However they will also work reliably in the range from 18 to 30 V DC.</p> <p>The devices are equipped with electronic polarity reversal and overload protection.</p>	<p>A serial interface is available for programming and connecting the FED to a controller. The FED can alternatively be equipped with an Ethernet interface, with a fieldbus interface planned for the future.</p> <p>The FED-90 also has an interface for a serial printer.</p>	<p>The battery-buffered real-time clock ensures that the FED always has the right time. This means that printouts, for example, can be scheduled. Alarms and events are stored using the system time.</p> <p>The battery can be replaced by the user if necessary.</p>

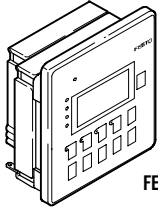
## The functions of the FED

<p><b>Communication</b></p> <p>The FED can communicate serially with a controller, as well as via Ethernet and the EasyIP protocol. It then becomes part of a system with distributed and networked intelligence.</p> <p>Both drivers can also be loaded (dual protocol) if the application requires this. The FED then becomes the gateway between a controller with a serial connection and an EasyIP network.</p> <p>The FED-90 also masters complex disciplines such as communication via a modem and looping of PC signals to the connected controller.</p>	<p><b>Memory</b></p> <p>The FED is equipped with a generous memory to ensure that you do not have to scrimp on words. However the FED's brain provides more than memory.</p> <p>Its recipe function allows it to save data which can either be loaded onto or read from the controller. It can therefore serve as a failsafe memory extension for the FEC.</p> <p>Alarms are stored in a list with timestamps, again failsafe. This ensures that the time at which errors or events occurred on the machine can always be established. The FED also stores the entire project in its 'head' so that it can be loaded from the memory if service is required. This means that the most recent version is always available.</p>	<p><b>Security</b></p> <p>All functions can be password protected to prevent unauthorised access. Since the service personnel usually have different authorisations to the machine operators, up to 8 password levels are available. The project upload function can also be password protected to safeguard know-how.</p> <p><b>Multi-lingual</b></p> <p>Multi-lingual projects are easily handled in the FED, as is switching between languages while the unit is running.</p> <p>In order to make things as user-friendly as possible, all texts can be exported and edited in a table editing program. This means that projects can be easily translated, even without the FED Designer.</p>	<p><b>Display</b></p> <p>The FED represents process data not only as plain text, but also with simple graphics. Bar charts are a quick way of providing information on filling levels and pressure or temperature ranges. Simple monochrome graphics and symbols can be imported. Dynamic displays can be created by linking these graphics and symbols with operands.</p> <p>Completely new character sets can, if necessary, be used in the FED. These character sets can be created or changed by the user.</p>
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# Operator units FED, Front End Display

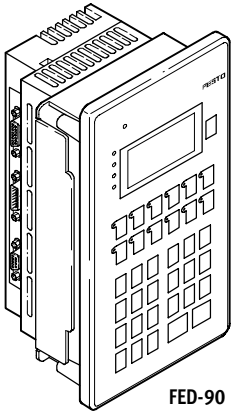
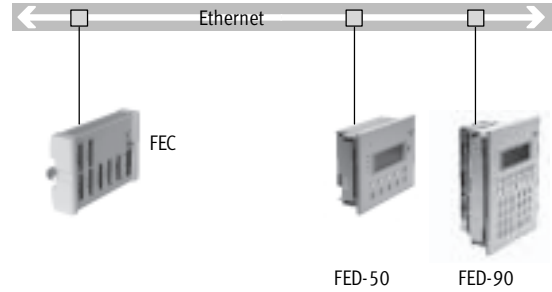
Peripherals overview

## Key features



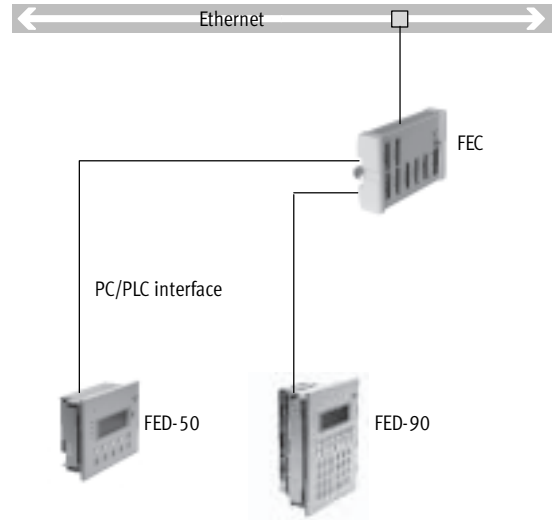
FED-50

- Illuminated monochrome LCD display
- 4 lines of 20 characters each
- Graphics capability (120x32 pixels)
- 4 function keys
- 7 system keys
- 5 user LEDs
- 4 system LEDs
- Hardware RTC
- Ethernet interface (optional)
- PC/PLC interface RS-232, RS-422, RS-485, CL 20 mA
- 512 kB memory
- Mains-independent real-time clock



FED-90

- Illuminated monochrome LCD display
- 4 lines of 20 characters each
- Graphics capability (120x32 pixels)
- 12 function keys
- 23 system keys
- 13 user LEDs
- 4 system LEDs
- Hardware RTC
- Ethernet interface (optional)
- PC/PLC interface RS-232, RS-422, RS-485, CL 20 mA
- 512 kB memory
- Printer interface
- Mains-independent real-time clock



## Welding environment

Control and display units FED have a high-quality metal/plastic design.

Suitable covers should be used to prevent the terminal being damaged as a result of welding spatter.

## Operator units FED, Front End Display

Technical data – FED-50

FESTO

Festo offers different machine operation solutions depending on the task at hand. The connection between the controller and MMI (man-machine interface) is established by means of a serial interface or alternatively via Ethernet.

The graphics-capable Front End Displays (FED) are designed for easy and cost-effective operation of machines. They can be used to perform a range of activities:

- Changing values such as times and counter values, for example
- Making changes to the machine process
- Displaying system states via numerical data fields, bar charts or text messages
- Assigning machine functions to function keys
- Displaying and storing alarms

The Front End Displays are equipped with password protection to prevent unauthorised use.



# Operator units FED, Front End Display

Technical data – FED-50

General technical data		
Type	FED-50	
Part No.	533 531	
PC/PLC interface	RS-232, RS-422, RS-485, CL 20 mA (active) 15-pin Sub-D plug	
AUX interface	9-pin Sub-D coupling	
Protection class to EN 60 529	IP65 (in assembled state)	
Certification	CE	
Dimensions (HxWxD)	[mm]	109x149x65
Weight	[g]	485
	PWIS-free (free of paint-wetting impairment substances)	

Electromagnetic compatibility (EMC)			
Emitted interference	To EN 55 011		Class A
Radio compatibility for electromagnetic fields	0.08 ... 1 GHz, to ENV 50 140	[V/m]	10
	900 MHz, to ENV 50 204	[V/m]	10
Compatibility with interference caused by radio frequency fields	0.15 ... 80 MHz, to ENV 50 141	[V]	10
Quick charge eliminator to EN 61 000	Power supply	[kV]	2
	Signal lines	[kV]	1
Electrostatic discharge to EN 61 000	Into the air	[kV]	8

Electrical data			
Operating voltage		[V DC]	18 ... 30
Current consumption	max.	[mA]	250
Fuses	Electronic overload protection		

Display			
Type	LCD		
Dimensions	HxW	[mm]	21X70
	Diagonal	[inch]	2.8
Lines	4		
Characters per line	20		
Illumination	LED		
Graphical display		[pixels]	120x32

Control panel	
Function keys	4
System keys	7
User LEDs	5
System LEDs	4
Keyboard reliability	>3 million operations

Performance data		
Programming rate	[baud]	9600 ... 38400
User memory	[kB]	512
Recipe memory	[kB]	16
Hardware clock	Yes	
Alarms	1024	
Loadable characters	256	
Event list, buffered via battery	256	
Programming software	Designer Version 6.0 (or higher)	
Password protection	[levels]	8

# Operator units FED, Front End Display

Technical data – FED-50

<b>Battery<sup>1)</sup></b>	
Designation <sup>2)</sup>	CR 2430
Type	Lithium
Voltage [V]	3
Current [mA]	270
Service life [year]	1

- 1) The batteries used must correspond to the abovementioned data at least.
- 2) The designation is specific to the manufacturer. If you wish to use a battery from another manufacturer, please request the corresponding type designation specifying the designation given here. Note the specifications relating to the operating temperature of the FED. The battery must comply with these specifications at least.

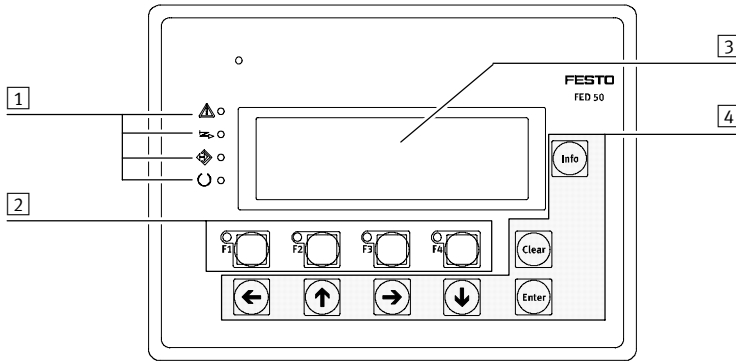
<b>Ambient conditions</b>	
Operating temperature [°C]	0 ... +50
Storage temperature [°C]	-20 ... +70
Relative air humidity [% RH]	85, non-condensing
Corrosion resistance class CRC <sup>1)</sup>	2
Vibration resistance	To DIN/IEC 68/EN 60 068, Parts 2-6 <ul style="list-style-type: none"> <li>■ 10 ... 57 Hz, 0.075 mm peak</li> <li>■ 57 ... 150 Hz, 1G</li> </ul>
Shock resistance	To DIN/IEC 68/EN 60 068, Parts 2-27 <ul style="list-style-type: none"> <li>■ 50 g, 11 ms, 3 pulses per axis</li> </ul>

- 1) CRC2: Corrosion resistance class 2 according to Festo standard 940 070  
 Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a surrounding industrial atmosphere or media such as cooling or lubricating agents.

# Operator units FED, Front End Display

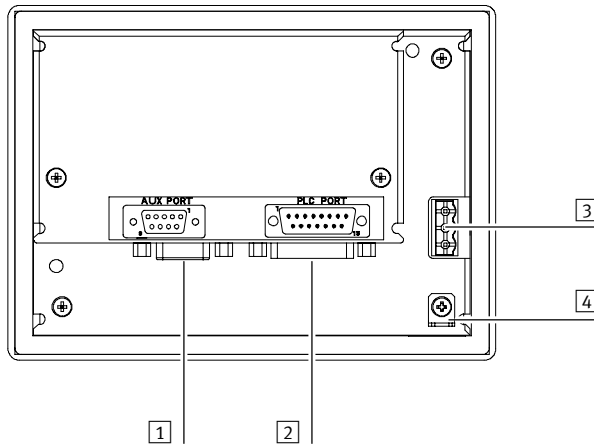
Technical data – FED-50

## Display and control elements



- 1 System LEDs
- 2 Function keys
- 3 LCD display
- 4 System / navigation keys

## Interfaces

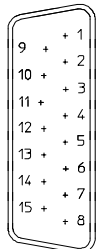


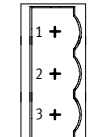
- 1 AUX interface  
(the pin allocation depends on the communication module installed)
- 2 PC/PLC interface
- 3 Power supply
- 4 Earthing terminal



# Operator units FED, Front End Display

Technical data – FED-50

Pin allocation for PC/PLC interface (plug view)		
View	Pin	PLC port
	1	Housing earth
	2	RXD
	3	TXD
	4	+5 V output (max. 100 mA)
	5	GND
	6	CHA-
	7	CHB-
	8	TX +20 mA
	9	TX - 20 mA
	10	RTS
	11	CTS
	12	RX +20 mA
	13	RX - 20 mA
	14	CHA+
	15	CHB+

Pin allocation for power supply (plug view)		
View	Pin	Allocation
	1	Protective earth
	2	0 V
	3	+ 24 V DC

## Operator units FED, Front End Display

Technical data – FED-90

Festo offers different machine operation solutions depending on the task at hand. The connection between the controller and MMI (man-machine interface) is established by means of a serial interface or alternatively via Ethernet.

The graphics-capable Front End Displays (FED) are designed for easy and cost-effective operation of machines. They can be used to perform a range of activities:

- Changing values such as times and counter values, for example
- Making changes to the machine process
- Displaying system states via numerical data fields, bar charts or text messages
- Assigning machine functions to function keys
- Displaying and storing alarms

The Front End Displays are equipped with password protection to prevent unauthorised use.



## Operator units FED, Front End Display

Technical data – FED-90

General technical data	
Type	<b>FED-90</b>
Part No.	<b>533 532</b>
PC/printer interface	RS-232, 15-pin Sub-D socket
PLC interface	RS-232, RS-422, RS-485, CL 20 mA (active) 15-pin Sub-D plug
AUX interface	9-pin Sub-D coupling
Protection class to EN 60 529	IP65 (in assembled state)
Certification	CE
Dimensions (HxWxD)	[mm] 176x141x65
Weight	[g] 895
	PWIS-free (free of paint-wetting impairment substances)

Electromagnetic compatibility (EMC)		
Emitted interference	To EN 55 011	Class A
Radio compatibility for electromagnetic fields	0.08 ... 1 GHz, to ENV 50 140	[V/m] 10
	900 MHz, to ENV 50 204	[V/m] 10
Compatibility with interference caused by radio frequency fields	0.15 ... 80 MHz, to ENV 50 141	[V] 10
Quick charge eliminator to EN 61 000	Power supply	[kV] 2
	Signal lines	[kV] 1
Electrostatic discharge to EN 61 000	Into the air	[kV] 8

Electrical data		
Operating voltage	[V DC]	18 ... 30
Current consumption	max. [mA]	300
Fuses		Electronic overload protection

Display		
Type		LCD
Dimensions	HxW	[mm] 21X70
	Diagonal	[inch] 2.8
Lines		4
Characters per line		20
Illumination		LED
Graphical display	[pixels]	120x32

Control panel	
Function keys	12
System keys	23
User LEDs	13
System LEDs	4
Keyboard reliability	>3 million operations

# Operator units FED, Front End Display

Technical data – FED-90

Performance data		
Programming rate	[baud]	9600 ...38400
User memory	[kB]	512
Recipe memory	[kB]	32
Hardware clock		Yes
Alarms		1024
Loadable characters		256
Event list, buffered via battery		256
Programming software		Designer Version 6.0 (or higher)
Password protection	[levels]	8

Battery <sup>1)</sup>		
Designation <sup>2)</sup>		CR 2430
Type		Lithium
Voltage	[V]	3
Current	[mA]	270
Service life	[year]	1

- 1) The batteries used must correspond to the abovementioned data at least.
- 2) The designation is specific to the manufacturer. If you wish to use a battery from another manufacturer, please request the corresponding type designation specifying the designation given here. Note the specifications relating to the operating temperature of the FED. The battery must comply with these specifications at least.

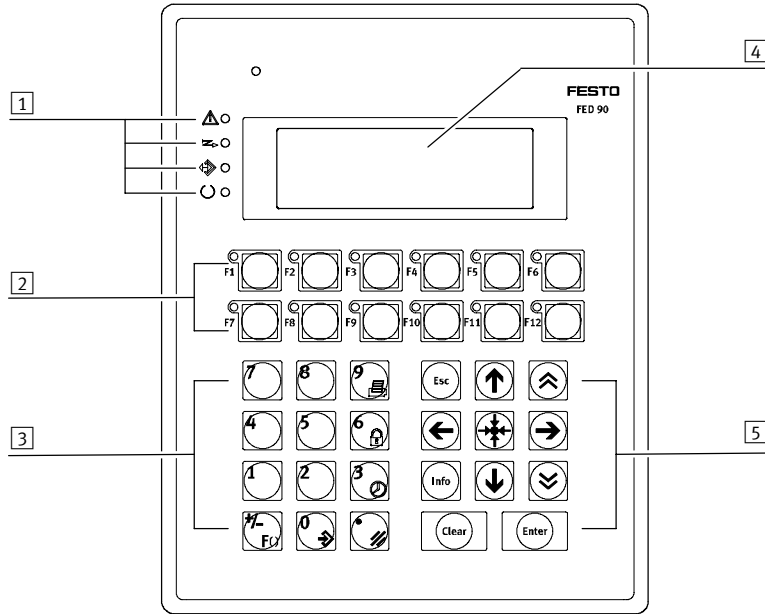
Ambient conditions		
Operating temperature	[°C]	0 ... +50
Storage temperature	[°C]	-20 ... +70
Relative air humidity	[% RH]	85, non-condensing
Corrosion resistance class CRC <sup>1)</sup>		2
Vibration resistance		To DIN/IEC 68/EN 60 068, Parts 2-6 <ul style="list-style-type: none"> <li>■ 10 ... 57 Hz, 0.075 mm peak</li> <li>■ 57 ... 150 Hz, 1G</li> </ul>
Shock resistance		To DIN/IEC 68/EN 60 068, Parts 2-27 <ul style="list-style-type: none"> <li>■ 50 g, 11 ms, 3 pulses per axis</li> </ul>

- 1) CRC2: Corrosion resistance class 2 according to Festo standard 940 070  
 Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a surrounding industrial atmosphere or media such as cooling or lubricating agents.

# Operator units FED, Front End Display

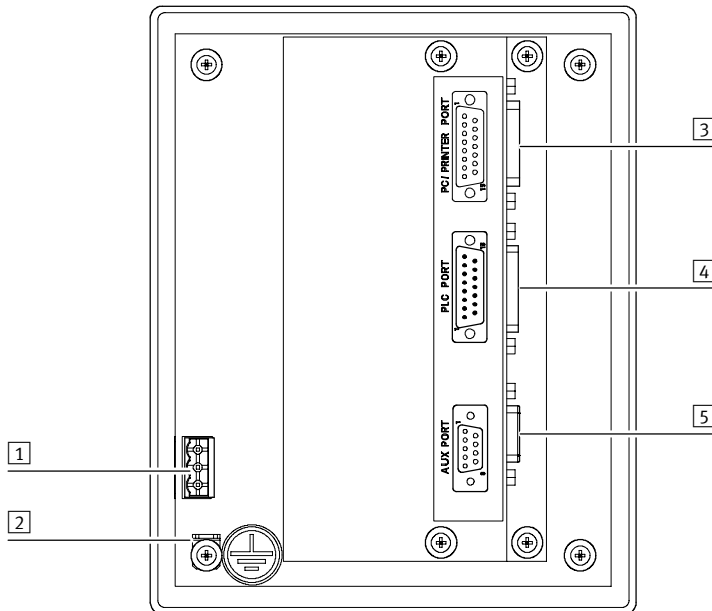
Technical data – FED-90

## Display and control elements



- 1 System LEDs
- 2 Function keys
- 3 System / numerical keys
- 4 LCD display
- 5 System / navigation keys

## Interfaces

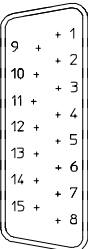


- 1 Power supply
- 2 Earthing terminal
- 3 PC/printer interface
- 4 PLC interface
- 5 AUX interface  
(the pin allocation depends on the communication module installed)

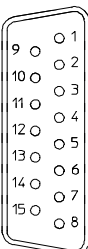
# Operator units FED, Front End Display

Technical data – FED-90

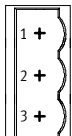
### Pin allocation for PLC interface (plug view)

View	Pin	Allocation
	1	Housing earth
	2	RXD
	3	TXD
	4	+5 V output (max. 100 mA)
	5	GND
	6	CHA-
	7	CHB-
	8	TX + 20 mA
	9	TX - 20 mA
	10	RTS
	11	CTS
	12	RX + 20 mA
	13	RX - 20 mA
	14	CHA+
	15	CHB+

### Pin allocation for PC/printer interface (socket view)


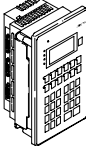
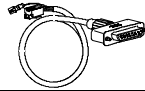
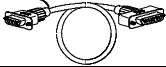
View	Pin	Allocation
	1	Housing earth
	2	RXD
	3	TXD
	4	+5 V output (max. 100 mA)
	5	GND
	6	Reserved
	7	Reserved
	8	Reserved
	9	Reserved
	10	RTS
	11	CTS
	12	Reserved
	13	Reserved
	14	Reserved
	15	Reserved

### Pin allocation for power supply (plug view)

View	Pin	Allocation
	1	Protective earth
	2	0 V
	3	+ 24 V DC

## Operator units FED, Front End Display

Accessories

Ordering data			
	Description	Type	Part No.
	Operator unit, Front End Display	FED-50	533 531
	Operator unit, Front End Display	FED-90	533 532
	Bus connection, Ethernet interface module for FED	FEDZ-IET	533 533
	Programming cable	FEDZ-PC	533 534
	Connecting cable, FEC (RJ11, COM) to FED	FEC-KBG3	189 429
	Connecting cable, FEC (RJ12, COM and EXT) to FED	FEC-KBG6	189 432