

- Low-cost compact control system using the latest technology
- Network connection optional
- Good communication capability thanks to 2 serial interfaces
- User-oriented software – programming the way you think or according to standard

Controllers FEC, Compact

Key features



The networkable compact control system

The FEC Compact is more than just a small, low cost control system. The FEC Compact proves that low cost can be combined with the latest technology and an extensive range of functions.

The basic equipment of the FEC Compact is typical of that used in any small, basic control system:

- 20 digital inputs/outputs for 24 V DC.
- 2 serial interfaces in every FEC Compact variant ensure good communication ability.
- The fast counter means it can be used for simple positioning tasks.
- The 110/230 V AC versions offer the flexibility for working without 24 V power supply. The inputs can be used with positive or negative switching, while the outputs can, of course, operate with AC or DC.

A mini control system does not just need to be small; it has to be able to function as part of an integrated system. This is effected in the FEC Compact with a network connection. This solution gives you all of the advantages of distributed automation technology at low cost. This is what we mean by flexibility in a low cost control system.

Controllers FEC, Compact

Key features

Hardware

The FEC Compact has a clip for a top-hat rail and corner holes for bolt-mounting using a mounting plate.



Power supply

The FEC Compact is flexible; you can choose from 24 V DC versions or 110/230 V AC versions. The input signals always use 24 V DC. In the AC versions, the power supply for the sensors is integrated in the controller.

Inputs

The inputs of the FEC Compact can be used as PNP and NPN inputs. The input selection is made by setting the connection to 0 V (positive switching signal) or +24 V DC (negative switching signal).

Outputs

Every FEC Compact has relay outputs, which can operate up to 230 V AC. The FEC-FC2X modules have 8 relay outputs, which can also be used as a solid state relay. The FEC-FC3X modules have 2 relay outputs and 6 transistor outputs. The FEC Compact therefore offers excellent flexibility for output selection.

Serial interfaces

Every FEC Compact is equipped with two serial interfaces – COM and EXT. The COM interface is generally used for programming, while the EXT interface can be used for an MMI device, an extension, a modem or other devices with a serial interface.

Ethernet interface

The FEC Compact versions with an Ethernet interface incorporate an Ethernet 10 BaseT interface with an RJ45 connection and a data transmission rate of 10 Mbits/s. A combined “Link/Active” LED indicates the connection status. The FEC Compact supports data communication and programming/troubleshooting via the Ethernet interface.



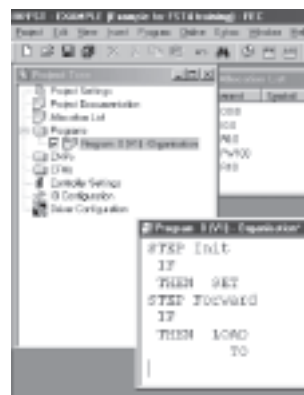
Programming

The FEC Compact is programmed using either FST or MULTIPROG.

FST is a unique programming language which is rich in tradition and very easy to use, allowing “programming the way you think”:

IF ... THEN ... OTHERWISE

FST also supports STEP operation for sequence programming. FST can be used for programming via Ethernet; a web server is also available.



MULTIPROG is a programming system in accordance with IEC 6 1131-3 for all 5 standard programming languages. MWT facilitates standardised programming with its integrated facilities for operations, modules and variables management. MWT provides ideal support for the programming of complete networks within a project.

Controllers FEC, Compact

Key features



Programming with FST



Programming the way you think

How do we describe a machine?

“When a workpiece reaches here, this cylinder should advance.”

How does the software interpret this?

```
Program: 0 (F1) - "Organisation"  
IF I0.0  
THEN SET O0.0
```

Or does your machine work through a sequence step by step?

“First, this cylinder must advance and stop the workpiece, and then the workpiece must be clamped, and then finally...”

```
Program: 0 (F1) - "Organisation"  
STEP Aplus  
IF I0.0  
THEN SET O0.0  
  
STEP Close  
IF I0.2  
THEN RESET O0.2  
SET O0.3  
STEP More
```

Programming just couldn't be easier.

How, for example, can we sub-divide a task?

- Program 0: Organisation
- Program 1: Set-up program
- Program 2: Automation program
- Program 3: Fault monitoring
- Program 4: Manual operation
- .
- .
- .
- Program 63: Troubleshooting program

Timers and counters?

Each CPU has 256 timers and 256 counters.

How does one controller communicate with another?

Every controller with Ethernet can send and receive data from every other controller within a network – no matter whether this data relates to inputs, outputs, flags or registers.

Central programming of distributed controllers

Every controller within a network can be programmed from any desired network interface.

A controller on the World Wide Web

FST incorporates a web server – the Internet and the world of automation meet.



Controllers FEC, Compact

Key features

FESTO

Programming with MWT



Programming based on the international standard

DIN IEC 6 1131-3 is the international standard for PLC programming. MULTIPROG supports all the 5 programming languages defined by this standard:

- Text-based languages:
statement list and structured text
- The graphical languages:
ladder diagram and function block diagram
- The language for organisation:
sequential function chart

MWT makes everything easy

MULTIPROG offers assistance and dialogues to ensure that programming in accordance with IEC 6 1131-3 is easy even with mini controllers. Ready-made templates support direct access to controller equipment.

Network

With MWT, you can link up any desired number of controllers. This allows all the controllers in a network to be dealt with as a single project. Similarly, it means that programs and modules can be written just once and used in a large number of stations – software re-usability is a central feature of IEC 6 1131-3.

Central programming of distributed controllers

Every controller within a network can be programmed from any desired network interface.

Counters, timers, flags?

With MWT, you can program timers and counters any way you like (the way which is the best for your application) – and go on programming for as long as controller memory space is available. And you can define up to 32,000 byte flags – more than enough for any mini controller.

MULTIPROG MWT

MWT is based on MULTIPROG from KW-Software. For more information about our software partner KW-Software

→ www.kw-software.com

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Product range overview

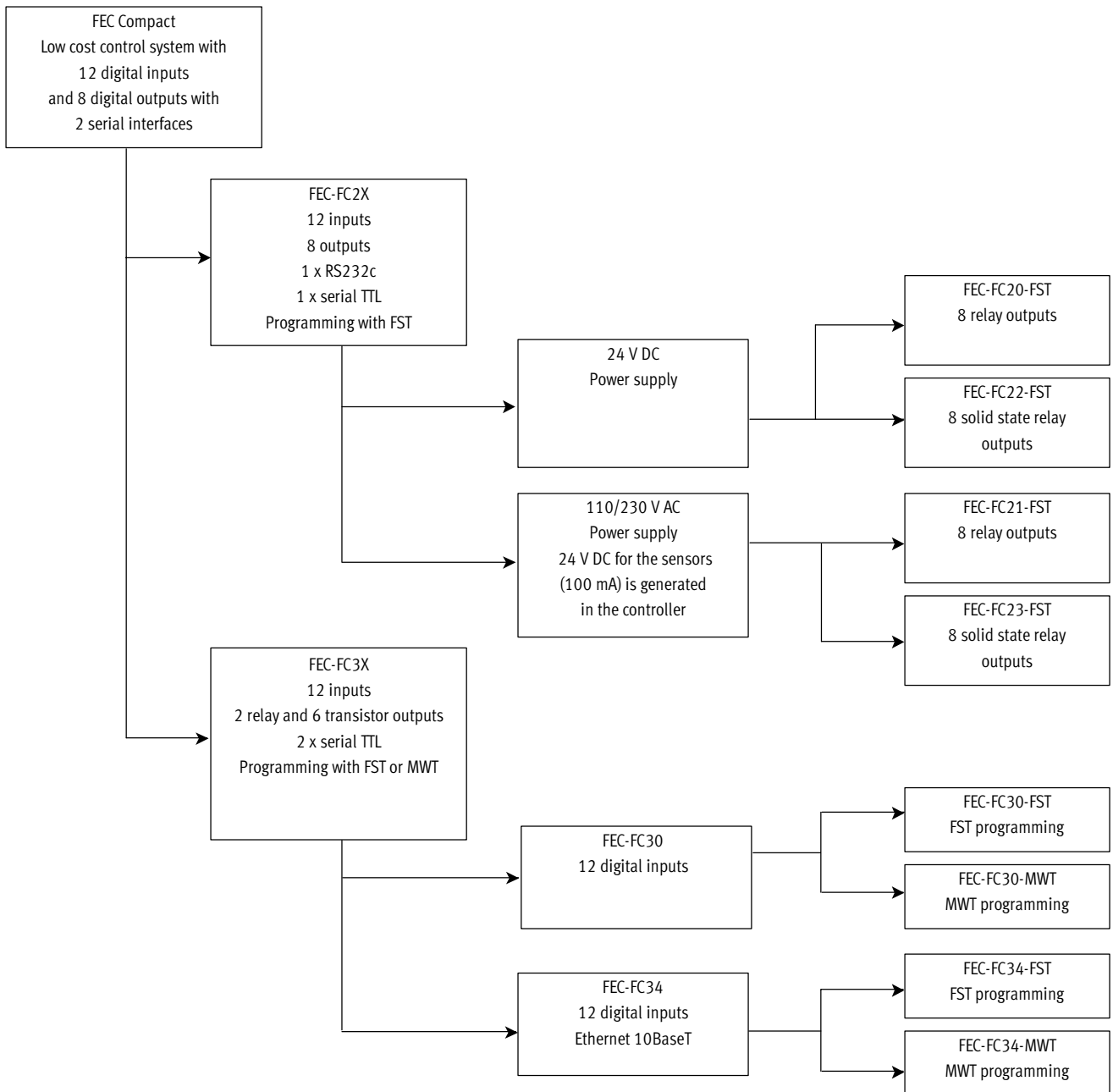


The FEC Compact



Electronic control systems
Front End Controllers

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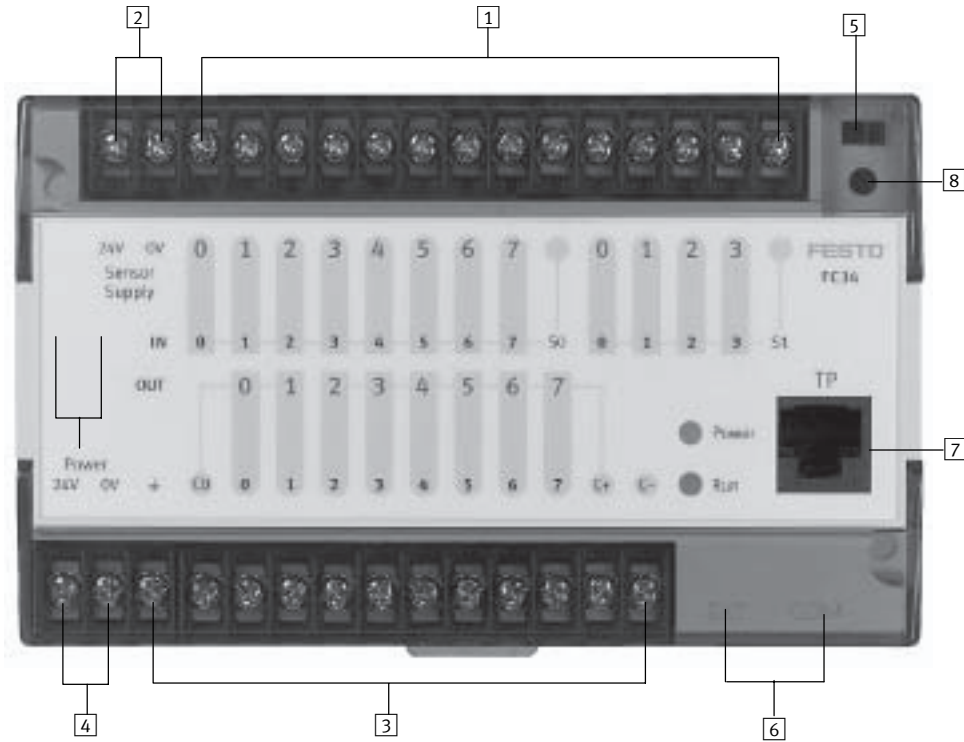


Controllers FEC, Compact

Product range overview

FESTO

The principle of the FEC Compact



- | | | |
|------------------------------------|---------------------|--------------------------------|
| 1 12 digital inputs | 3 8 digital outputs | 6 2 serial interfaces |
| 2 Separate power supply to sensors | 4 Power supply | 7 Optional Ethernet |
| | 5 RUN/STOP switch | 8 Trimmer, resolution 0 ... 63 |

Controllers FEC, Compact

Technical data



General						
	FEC-FC20-FST	FEC-FC21-FST	FEC-FC22-FST	FEC-FC23-FST	FEC-FC30-...	FEC-FC34-...
Weight approx.	230 g	330 g	230 g	330 g	230 g	230 g
Max. operating temperature (IEC 68-2-1/2)	0 ... 55°C					
Max. transport and storage temperature (IEC 68-2-1/2)	-25 ... +75°C					
Rel. humidity (IEC 68-2-1/2)	0 ... 95% (non condensing)					
Protection class (IEC 60529)	IP20					
Degree of protection	Degree of protection III. Power pack in accordance with IEC 742 / EN60742 / VDE0551 / PELV with at least 4 kV insulation resistance or switched-mode power supplies with safety isolation as defined by EN 60950/VDE 0805 are required.					
Supply voltage	24 V DC	110/230 V AC	24 V DC	110/230 V AC	24 V DC	24 V DC

Digital inputs						
	FEC-FC20-FST	FEC-FC21-FST	FEC-FC22-FST	FEC-FC23-FST	FEC-FC30-...	FEC-FC34-...
Number	12					
Number of above usable as high-speed inputs (max. 2 kHz)	2					
Number of above usable as incremental encoders	2					
Input voltage/current	24 V DC, typical 7 mA					
Connection type	Positive or negative switching (PNP or NPN)					
Nominal value for TRUE	15 V DC min. (for positive switching)					
Nominal value for FALSE	5 V DC max. (for positive switching)					
Input signal delay	Typical 5 ms					
Electrical isolation	Yes, via optocoupler					
Perm. length of connecting cable	Max. 30 m					
Status display via LED	Yes, green (via electrical isolation)					

Digital outputs						
	FEC-FC20-FST	FEC-FC21-FST	FEC-FC22-FST	FEC-FC23-FST	FEC-FC30-...	FEC-FC34-...
Number	8					
Contacts	Relay, 3 groups with 4/2/2 relays		Solid state relay		2 x relay 6 x transistor	
Relay features						
Maximum voltage	250 V AC, 30 V DC					
Maximum peak current	5 A for 100,000 switching cycles					
Maximum switching frequency	25 Hz					
Solid state relay features						
Maximum voltage	250 V AC, 125 V DC					
Maximum peak current	600 mA					
Service life	100,000 hours					
Maximum switching frequency	10 Hz					
Transistor features						
Voltage	24 V DC					
Current	600 mA					
Short circuit proof	Yes					
Overload-proof	Yes					
Proof against lamp resistances	Yes					
Service life	100,000 hours					
Maximum switching frequency	1 kHz					

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Control options						
	FEC-FC20-FST	FEC-FC21-FST	FEC-FC22-FST	FEC-FC23-FST	FEC-FC30-...	FEC-FC34-...
RUN/STOP switch	1					
Trimmer	1, resolution 0 ... 63					
RUN LED	Three colours: green, orange, red					
Power LED	Green					

Serial interfaces						
	FEC-FC20-FST	FEC-FC21-FST	FEC-FC22-FST	FEC-FC23-FST	FEC-FC30-...	FEC-FC34-...
Number	2					
Connection	COM: RJ11/EXT: RJ12				RJ12	
Designation	EXT and COM					
EXT interface						
Features	Serial, asynchronous, TTL level, no electrical isolation, RJ12 connector					
Use as RS232c	SM14 or SM15 required					
Terminal assignment SM14/15	Transmit, receive, RTS, CTS					
Use as RS485	SM35 required					
Use as universal interface: EXT	300 ... 115,000 bits/s, 7N1, 7E1, 7O1, 8N1, 8E1, 8O1					
COM interface						
Features	Serial, asynchronous, RS232c, passive, electrical isolation, RJ11 connector			Serial, asynchronous, TTL level, no electrical isolation, RJ12 connector		
Use as RS232c	Can be used directly FEC-KSD2 with SUB-D9 connector socket for programmer (neutral modem), FEC-KSD1 with SUB-D9 connector pins for any RS232 devices			SM14 or SM15 required		
Terminal assignment	Transmit, receive, RTS, CTS			Transmit, receive, RTS, CTS		
Use as RS485				SM35 required		
Use as programming interface	9600 bits/s, 8/N/1					
Use as universal interface: COM	300 ... 9600 bits/s, 7N1, 7E1, 7O1, 8N1, 8E1, 8O1					

Ethernet						
	FEC-FC20-FST	FEC-FC21-FST	FEC-FC22-FST	FEC-FC23-FST	FEC-FC30-...	FEC-FC34-...
Number	0	0	0	0	0	1
Bus interface						IEEE802.3 (10BaseT)
Data transmission speed						10 Mbits/s
Connector						RJ45
Supported protocols						TCP/IP, EasyIP, http and ftp (FST only)
OPC server						On request
DDE server						Yes for EasyIP, also for RS232 with FST

 Note The programming cable must always be ordered separately. For all FEC-FC2X-FSTs, please order FEC-KSD2. For all FEC-FC3X-FSTs, please order PS1-SM14.

Controllers FEC, Compact

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Programming		
	FST	MWT
Programming languages	Version 4.02: Statement list (with version 3.2 statement list and ladder diagram)	Statement list, structured text, ladder diagram, function block diagram and sequential function chart
Working language	English and German	German, English, French
Number of programs and tasks per project	64 (0 ... 63)	Unlimited number of programs (limited only by memory size), max. 15 tasks
Permissible input addresses	0 ... 255 (addressable as bits or words)	Permanently defined for FEC Compact
Permissible output addresses	0 ... 255 (addressable as bits or words)	Permanently defined for FEC Compact
Number of flags	10,000 words (0 ... 9999) (addressable as bits or words)	32,000 bytes, addressable as bits or words
Number of timers and counters	256 (0 ... 255) in each case, with 1 status bit, 1 setpoint and 1 actual value	Unlimited (limited only by memory size)
Number of registers (words)	0 ... 255 (addressable as words)	0
Programming interface	RS232c or Ethernet	
Number of different operations	> 28	> 50
Subroutine	Up to 200 different subroutines per project	Unlimited (limited only by memory size)
C/C++	Yes, for modules and drivers	Yes
File handling	Yes	No
RS232c	Yes	Yes
ABG	Yes	Partial
FED	Yes	Partial
Web server	Yes	No
Remanence	Flag words 0 ... 255 Register 0 ... 126 Timer and counter preselects and counter words 0 ... 127 Password	2 kB
Performance	1.6 ms/1k instructions approx.	Smallest task pulse: 4.3 ms

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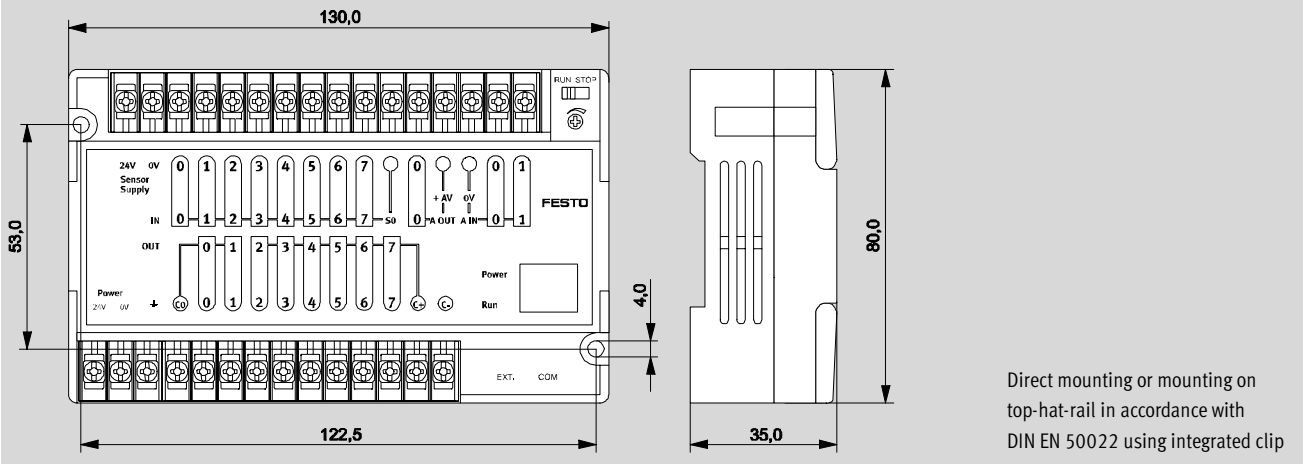
Technical data



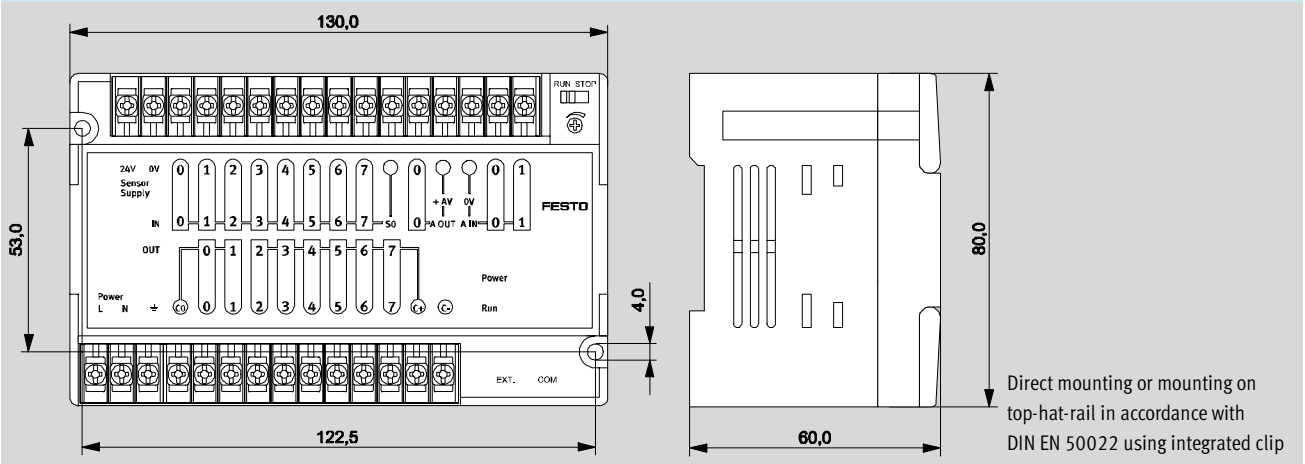
Dimensions

Download CAD data → www.festo.com/en/engineering

Power supply 24 V DC



Power supply 110/230 V AC



Controllers FEC, Compact

Technical data



Ordering data – The FEC Compact with FST programming			
Type	Part No.	Designation	Features
FEC-FC20-FST	177 428	IPC controller	12 in/8 relay out, 24 V DC, COM as RS232c, 256 KB RAM, 256 KB Flash
FEC-FC21-FST	177 429		12 in/8 relay out, 110/230 V AC, COM as RS232c, 256 KB RAM, 256 KB Flash
FEC-FC22-FST	184 332		12 in/8 SSR out, 24 V DC, COM as RS232c, 256 KB RAM, 256 KB Flash
FEC-FC23-FST	184 333		12 in/8 SSR out, 110/230 V AC, COM as RS232c, 256 KB RAM, 256 KB Flash
FEC-FC30-FST	183 861		12 in/2 relay out/6 transistor out, 24 V DC, COM as TTL, 512 KB RAM, 256 KB Flash
FEC-FC34-FST	190 587		12 in/2 relay out/6 transistor out, 24 V DC, COM as TTL, 512 KB RAM, 512 KB Flash, Ethernet

Ordering data – The FEC Compact with MWT programming			
Type	Part No.	Designation	Features
FEC-FC30-MWT	190 574	IPC controller	12 in/2 relay out/6 transistor out, 24 V DC, COM as TTL, 512 KB RAM, 256 KB Flash
FEC-FC34-MWT	191 448		12 in/2 relay out/6 transistor out, 24 V DC, COM as TTL, 512 KB RAM, 512 KB Flash, Ethernet

Ordering data – Cables for the FEC Compact			
Type	Part No.	Designation	Features
FEC-KSD2-RJ11	177 431	Programming cable	Programming cable for FEC-FC2X-FST, 150 cm
FEC-KSD1-RS232-RJ11	177 432	Cable	RS232 cable for FEC-FC2X-FST, 15 cm, for connection of devices with serial interface to FEC FC2X-FST
PS1-SM14-RS232	188 935	Programming cable	RS232c adapter for programming FEC-FC3X-FST from the PC, complete with neutral modem cable
PS1-SM15-RS232	192 681	Converter	RS232c adapter for connection of any desired devices with a serial interface to FEC-FC3X-FST, with top-hat-rail clip, no neutral modem or RS232 cable
PS1-SM35-RS485	193 390	Converter	RS485 adapter for FEC-FC3X-FST, including top-hat rail bracket
FEC-KSD4	183 635	Cable	Networking cable for connecting a second FEC Compact as an I/O module, 30 cm long, assigned EXT interface

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Ordering data – Display and operating units			
Type	Part No.	Designation	Features
FED-50	533 531	Operator unit	Display and operating unit, LCD with 4 lines, 20 characters each, illuminated background, 4 function keys, real-time clock and expansion interface, e.g. Ethernet
FED-90	533 532	Operator unit	Display and operating unit, LCD with 4 lines, 20 characters each, illuminated background, 12 function keys, numeric keypad, real-time clock and expansion interface, e.g. Ethernet
FEDZ-IET	533 533	Fieldbus interface	Ethernet interface module for FED
FEDZ-PC	533 534	Programming cable	Programming cable for FED
FEC-KBG3	189 429	Cable	Connecting cable FEC (RJ11, COM) to FED
FEC-KBG6	189 432	Cable	Connecting cable FEC (RJ12, COM and EXT) to FED

Ordering data – Software and manuals for the FEC Compact			
Type	Part No.	Designation	Features
PS1-FST2-CD-WIN	191 440	Programming software	FST software version 4.X on CD, manuals on CD
FEC-CD-MWT	189 530		MWT software version 2.01 for FEC on CD, manuals on CD
FST 4.1 DE	537 927		FST software version 4.1 on CD with manual DIN A5 in German
FST 4.1 EN	537 928		FST software version 4.1 on CD with manual DIN A5 in English
P.BE-FEC-C-SYS-DE	527 482	Manual	System manual FEC Compact German
P.BE-FEC-C-SYS-EN	527 483		System manual FEC Compact English