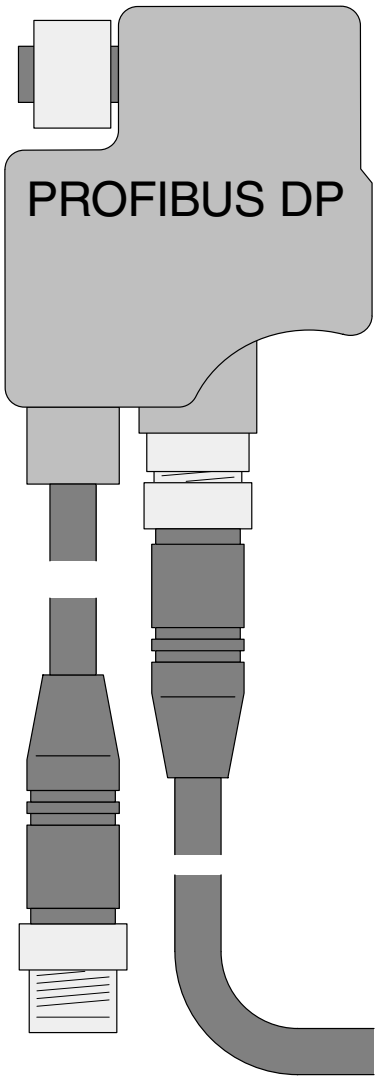
Technical Description **FBP FieldBusPlug**

V6

PROFIBUS DP FieldBusPlug
PDP21-FBP



PDP21-FBP PROFIBUS DP FieldBusPlug

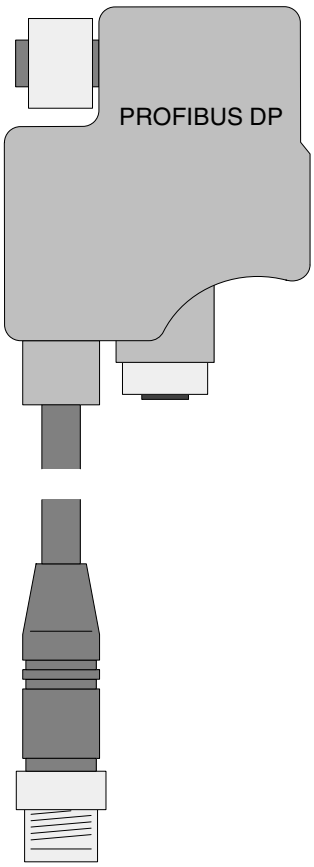


Fig. 1: PDP21-FBP

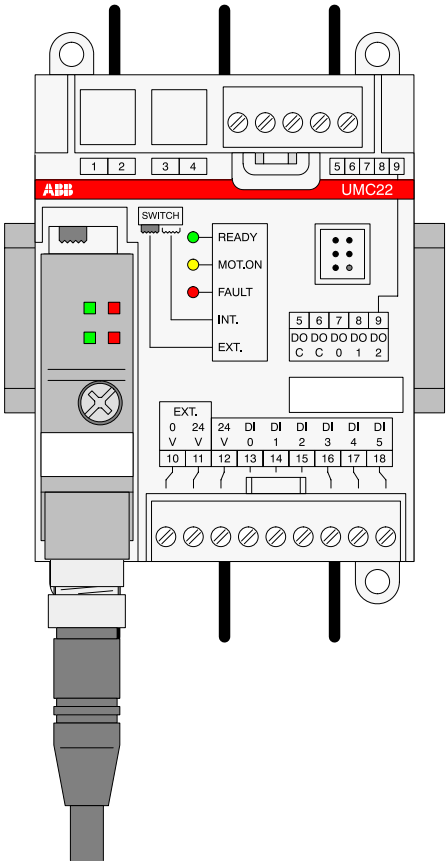


Fig. 2: PDP21-FBP, plugged to the Universal Motor Controller UMC22-FBP

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Purpose and short description

The PROFIBUS DP FieldBusPlug PDP21-FBP establishes the field bus connection between the PROFIBUS DP and the terminal devices connected to this bus. The PROFIBUS DP FieldBusPlugs are slaves (nodes) on the PROFIBUS DP.

The terminal devices must have the field bus-neutral interface (e.g. as provided by the ABB FBP modules MSD11-FBP, MSR22-FBP, MFI21-FBP and UMC22-FBP).

The **data exchange between the PROFIBUS DP FieldBusPlug and the terminal device** can be performed in two ways:

• Parallel communication

The signals are exchanged **directly** via the connections of the field bus-neutral interface.
Scope of data: max. 1 digital output (1 control signal to terminal device) plus 2 digital inputs (2 feedback signals from terminal device). If the FieldBusPlug does not receive any telegram from the terminal device during power-on, this mode of data exchange will be set.

• Serial communication

The signals are exchanged with the help of a serial data protocol via the field bus-neutral interface. Binary, analog, parameter and diagnostic data is sent and received. As soon as the FieldBusPlug receives a valid telegram from the terminal device, this mode of data exchange will be set non-volatile.

The **PROFIBUS DP FieldBusPlug PDP21 behaves as an input/output module on the PROFIBUS.** During the initialization phase, the plug receives the device-specific data from the terminal device. This data is equal to the corresponding data in the bus master, provided that the correct terminal device was selected there.

The GSD file ABB_078F.GSD, belonging to it, contains the list of terminal devices which can be connected, including the parameters with their selection possibilities. When opening the GSD file, the parameters appear. During start-up, their setting is transferred from the bus master to the plug. The plug forwards this data to the terminal device without checking.

To make sure, that the bus master can access the slaves connected to the bus line, a setting of the slave addresses is always necessary. Generally and over the full address range, the CAS21-FBP addressing set can be used. But it is easier, if the terminal device has address setting switches or similar means for the address setting. In this case, the FieldBusPlug adopts the address from the terminal device during power-on.

Once the address is set, it is stored in the FieldBusPlug, even in case of supply voltage breakdown.

According to the PROFIBUS DP standard, the addresses 1 to 126 can be set (recommended 3 to 125). The addresses 0...2 and 127...128 are reserved and should not be used for slaves. 126 is the default address, some bus masters can change this address during operation, provided that it is used only with one slave at the bus.

For diagnosis purposes, the PROFIBUS DP FieldBusPlugs are equipped with four LEDs (see Fig. 4).

In addition to the two signal cores, the PROFIBUS cable contains two cores for 24 V. This voltage is always necessary for supplying the FieldBusPlugs. The voltage can be fed-in at the bus master, for example.

Caution: False polarity or reversal between bus lines and power supply lines can cause a destruction of the FieldBusPlug.

Supplying the terminal devices can be selected as follows:

Internal supply (switch position "INT"):

The terminal device is powered from the bus cable, too.

External supply (switch position "EXT"):

The terminal device is powered by a remote power supply. This is necessary, if the current consumption is high or if there are components installed to the terminal device, which are not nearby, e.g. proximity switches. There is an electrical isolation between the PROFIBUS DP signals and the field bus-neutral interface.

In order to build up a PROFIBUS DP bus line using PROFIBUS DP FieldBusPlugs, the FieldBusPlugs must be simply connected in series, i.e. the cable of the first FieldBusPlug is plugged to the PROFIBUS DP distributor (in the direction of the bus master), the cable of the second FieldBusPlug is plugged to the socket of the first plug, etc. To make work easier, the PROFIBUS-DP FieldBusPlugs are available with different cable lengths. On the field bus side, the plugs work like T connectors.

For very long distances, several cable extensions are available as well as cable coils and male and female plug connectors for self-mounting.

The PROFIBUS DP must be terminated with active bus-line terminators of **150 Ω** at each end of the bus. In general, the bus master is put to the beginning of the bus line. In many cases, the bus master incorporates a bus-line terminator, which can be activated by a switch. There are also PROFIBUS DP plugs which include switchable bus-line terminators. At the end of the bus line, the bus-line terminator PDR11-FBP can be used. It is then mounted to the M12 socket of the FieldBusPlug.

When determining the total bus length, all cables belonging to the PROFIBUS DP FieldBusPlugs must also be taken into account. They are part of the PROFIBUS.

Due to their compound construction, the PROFIBUS DP FieldBusPlugs comply with the requirements of **IP 65** and consequently can also be mounted outside the control cabinet. Usually, the last free connector of a FieldBusPlug chain is connected to a bus-line terminator and thus also meets IP 65.

Connector pin assignment

Fig. 3 shows the connector pin assignment of the FieldBusPlug for

- the PROFIBUS DP interface (plug at the cable end and bus interface to the next FieldBusPlug)
- the field bus-neutral interface to the terminal device

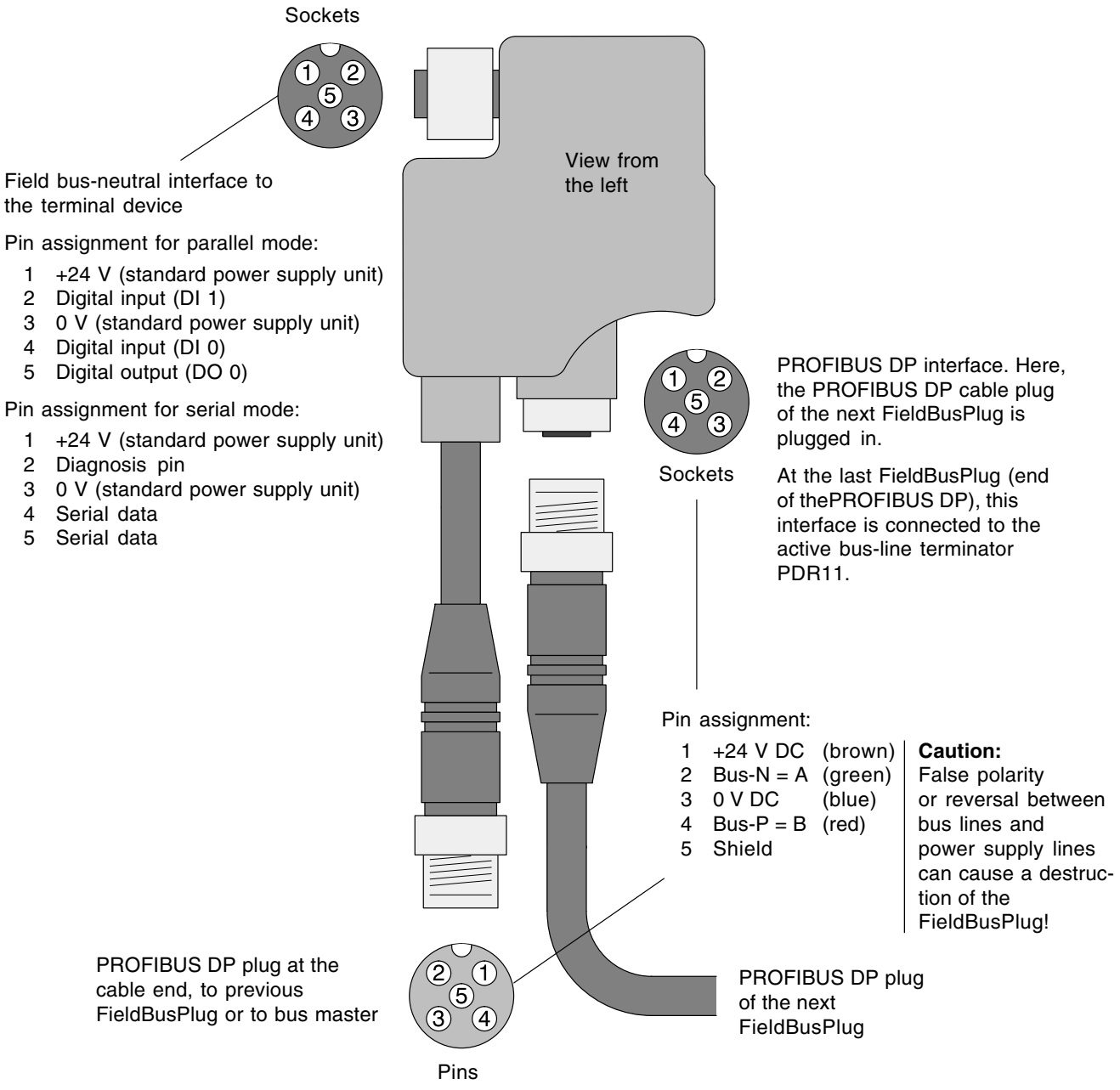
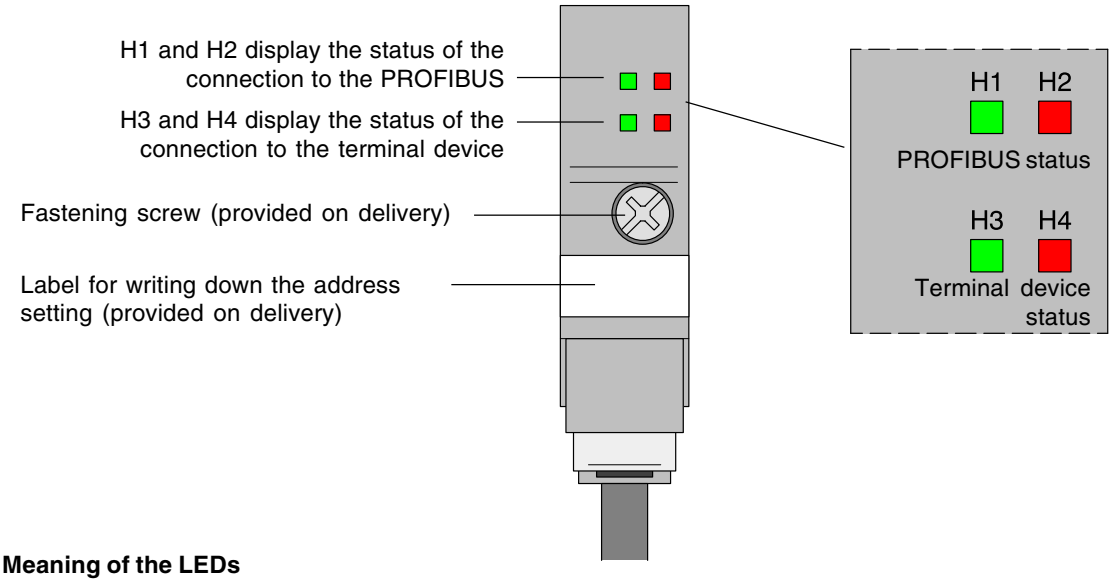


Fig. 3: PDP21-FBP, connector pin assignment

Indicators and operating elements on the front plate

The following figure shows the indicators and operating elements on the front plate.



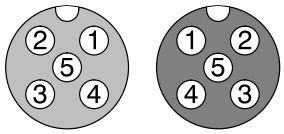
Meaning of the LEDs

Connection to the bus		Connection to the term. device		Status / Cause
green LED H1	red LED H2	green LED H3	red LED H4	
off	off	off	off	Power supply is missing.
		flashes	flashes	Plug is under self-test.
		flashes	off	Plug is waiting for configuration data, to be sent from the terminal device (number of input/output bytes, number of parameter bytes, data rate etc.). Note: If no data has been sent by the terminal device within 2 seconds, the plug switches to the parallel mode.
		on	off	The connection to the terminal device works properly.
		off	flashes	Error: can be remedied, e.g. connection to the terminal device is broken.
		off	on	Error: cannot be remedied, e.g. incorrect checksum in the flash, exchange plug.
on	off			Normal data exchange
on	flashes			Error: Plug is ready for operation, but it is not accessed by the bus master or the configuration, sent by the bus master, is not equal to the configuration of the terminal device. The terminal device is blocked, if an other type of a terminal device is connected instead of that, which is configured in the bus master.
flashes	on			Error: The terminal device parameters, received from the bus master, are formal incorrect, e.g. of other length or inconsistent contents. No forwarding. Note: The plug forwards formal correct terminal device parameters to the terminal device, without checking them for a correct content. Terminal devices, which can be parameterized, do not start without valid parameters and indicate this error via the diagnosis pin 2 and the red LED on the terminal device.
off	flashes			Error: The plug did not receive any data from the bus within the monitoring time, e.g. because the data line was broken. The monitoring time is set by the bus master.

Fig. 4: PDP21-FBP, indicators and operating elements on the front plate

Technical data

Supply voltage	24 V DC +30 % / –20 %
Current consumption (without terminal device)	
at 19.2 V	44 mA
at 24.0 V	37 mA
at 31.2 V	30 mA
Mounting	on the terminal device, fixed with a screw (provided on delivery) or by M12 box nut fixing
Building of a PROFIBUS DP bus line	by connecting the FieldBusPlugs in series (first bus plug to coupler/master, second bus plug to socket of the first FieldBusPlug, etc.)
Bus termination	active bus-line terminator 150 Ω at both ends of the bus, the bus master units (or repeaters) often offer a bus-line terminator at the start of the bus line.
Modes of data communication between FieldBusPlug and terminal device	parallel and serial
Scope of data	according to PROFIBUS-DP specifications
Electrical isolation / test voltage between PROFIBUS DP and terminal device	yes, 500 V DC
Construction of the FieldBusPlug cable	round cable, violet, 2 x 0.5 mm² for the supply voltage 2 x 0.22 mm² for the data lines 2 shields
PROFIBUS pin assignment	1 +24 V DC (brown) 2 Bus-N = A (green) 3 0 V DC (blue) 4 Bus-P = B (red) 5 Shield
Load capacity of plugs and cables	max. 4 A
	Caution: False polarity or reversal between bus lines and power supply lines can cause a destruction of the FieldBusPlug!
Pin assignment of the interfaces	see Fig. 3
Degree of protection (see also Fig. 3)	IP 65, if M 12 box nut fixing is used at the terminal device (e.g. sensor) IP 20, if mounting is performed using the supplied fastening screw (e.g. for UMC22-FBP)
Ambient temperature	
storage	-20...+75 °C
operation	0...+55 °C
Dimensions	see Fig. 5
Total power dissipation of the unit PDP21-FBP	max. 0.89 W
Weight plug with cable 0.25 m	0.09 kg
plug with cable 0.5 m	0.10 kg
plug with cable 1 m	0.13 kg
plug with cable 5 m	0.35 kg
Bus address setting	- with address switches on the terminal device (if existing) - with addressing set (interface device + PC + SW)
Possible addresses	1 to 126 (recommended 3 to 125), the addresses 0...2 and 127...128 are reserved and should not be used for slaves.
Diagnosis (see Fig. 4)	4 LEDs on the front plate
LED green, LED red	status of the connection to the PROFIBUS
LED green, LED red	status of the connection to the terminal device



Ordering data

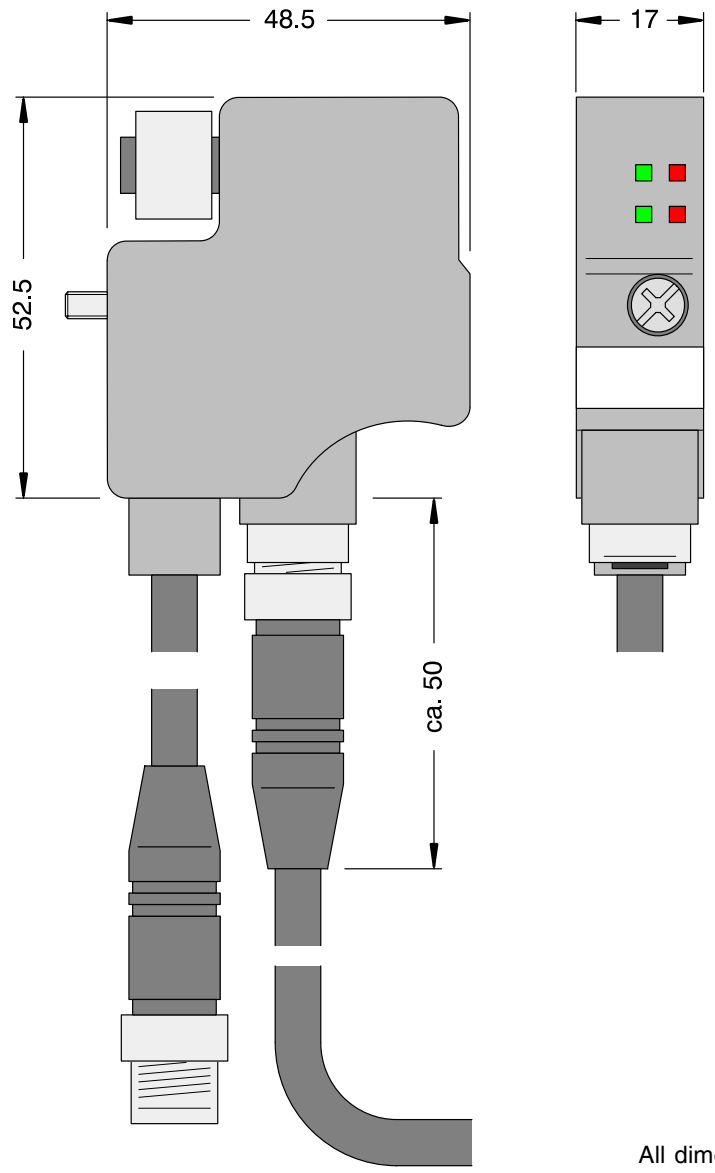
A fastening screw, an address label and a terminal cap for the bus are supplied along with the FieldBusPlug.

Type	Description	Order number
PDP21-FBP.025	PROFIBUS DP FieldBusPlug, cable length 0.25 m	1SAJ 240 000 R0003
PDP21-FBP.050	PROFIBUS DP FieldBusPlug, cable length 0.5 m	1SAJ 240 000 R0005
PDP21-FBP.100	PROFIBUS DP FieldBusPlug, cable length 1 m	1SAJ 240 000 R0010
PDP21-FBP.500	PROFIBUS DP FieldBusPlug, cable length 5 m	1SAJ 240 000 R0050

Accessories

Type	Description	Order number
PDX11-FBP.100	PROFIBUS DP extension cable, length 1 m	1SAJ 924 001 R0010
PDX11-FBP.300	PROFIBUS DP extension cable, length 3 m	1SAJ 924 001 R0030
PDX11-FBP.500	PROFIBUS DP extension cable, length 5 m	1SAJ 924 001 R0050
PDF11-FBP.050	PROFIBUS DP round cable, female plug attached at one end, 0.5 m, sheath partially removed, wire-end ferrules attached	1SAJ 924 002 R0005
PDM11-FBP.050	PROFIBUS DP round cable, male plug attached at one end, 0.5 m, sheath partially removed, wire-end ferrules attached	1SAJ 924 003 R0005
PDC11-FBP.999	PROFIBUS DP round cable on 100 m coil	1SAJ 924 004 R1000
PDM11-FBP.0	PROFIBUS DP male connector for round cable	1SAJ 924 005 R0001
PDF11-FBP.0	PROFIBUS DP female connector for round cable	1SAJ 924 006 R0001
PDR11-FBP.150	PROFIBUS DP active bus-line terminator	1SAJ 924 007 R0001
CAS21-FDP.0	Addressing set for DeviceNet, PROFIBUS etc.	1SAJ 929 003 R0001
CAL11-FBP.0	Address label for FielBusPlug (400 pieces)	1SAJ 929 005 R0001

Mechanical dimensions



All dimensions in mm

Fig. 5: PDP21-FBP, mechanical dimensions

Manual No. 2CDC 192 001 D0202

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