FISCHER
MESS- UND REGELTECHNIK

Modbus

CE

RoHS II
COMPLIANT

Operating manual

DE43

Digital 2-channel transmitter

for direct connection to
bus-capable automation devices
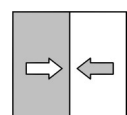
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Version history

Rev. ST4-A 11/18	Version 1 (first edition)

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1 Safety instructions

1.1 General

This operating manual is an integral part of the product and therefore needs to be kept close to the instrument in a place that is accessible at all times to the responsible personnel.

The following sections, in particular instructions about the assembly, commissioning and maintenance, contain important information, non-observance of which could pose a threat to humans, animals, the environment and property.

The instrument described in these operating instructions is designed and manufactured in line with the state of the art and good engineering practice.

1.2 Personnel Qualification

The instrument may only be installed and commissioned by specialized personnel familiar with the installation, commissioning and operation of this product.

Specialized personnel are persons who can assess the work they have been assigned and recognize potential dangers by virtue of their specialized training, their skills and experience and their knowledge of the pertinent standards.

1.3 Risks due to Non-Observance of Safety Instructions

Non-observance of these safety instructions, the intended use of the device or the limit values given in the technical specifications can be hazardous or cause harm to persons, the environment or the plant itself.

The supplier of the equipment will not be liable for damage claims if this should happen.

1.4 Safety Instructions for the Operating Company and the Operator

The safety instructions governing correct operation of the instrument must be observed. The operating company must make them available to the installation, maintenance, inspection and operating personnel.

Dangers arising from electrical components, energy discharged by the medium, escaping medium and incorrect installation of the device must be eliminated. See the information in the applicable national and international regulations.

Please observe the information about certification and approvals in the Technical Data section.

1.5 Unauthorised Modification

Modifications of or other technical alterations to the instrument by the customer are not permitted. This also applies to replacement parts. Only the manufacturer is authorised to make any modifications or changes.

1.6 Inadmissible Modes of Operation

The operational safety of this instrument can only be guaranteed if it is used as intended. The instrument model must be suitable for the medium used in the system. The limit values given in the technical data may not be exceeded.

The manufacturer is not liable for damage resulting from improper or incorrect use.

1.7 Safe working practices for maintenance and installation work

The safety instructions given in this operating manual, any nationally applicable regulations on accident prevention and any of the operating company's internal work, operating and safety guidelines must be observed.

The operating company is responsible for ensuring that all required maintenance, inspection and installation work is carried out by qualified specialized personnel.

1.8 Pictogram explanation

⚠ DANGER

Type and source of danger

This indicates a **direct** dangerous situation that could lead to death or **serious injury** (highest danger level).

   a) Avoid danger by observing the valid safety regulations.

⚠ WARNING

Type and source of danger

This indicates a **potentially** dangerous situation that could lead to death or **serious injury** (medium danger level).

   a) Avoid danger by observing the valid safety regulations.

⚠ CAUTION

Type and source of danger

This indicates a **potentially** dangerous situation that could lead to slight or serious injury, damage or **environmental pollution** (low danger level).

   a) Avoid danger by observing the valid safety regulations.

NOTICE

Note / advice

This indicates useful information of advice for efficient and smooth operation.

2 Product and functional description

2.1 Delivery scope

- DE43 digital 2-channel transmitter
- Operating Manual

2.2 Equipment versions

Assembly
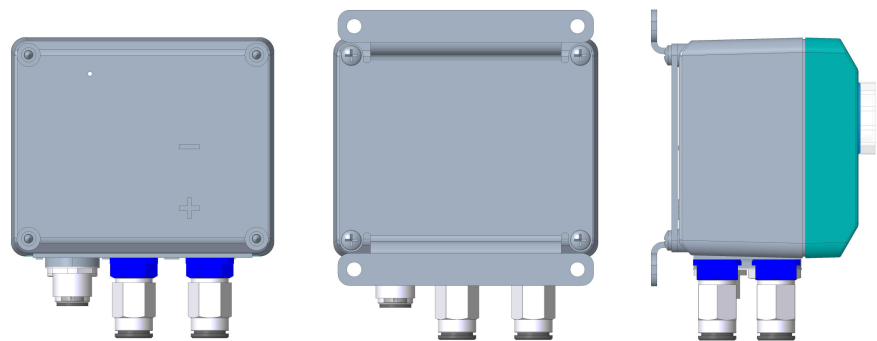
Attachment boreholes for tapping screws   Wall mounting plate

Fig. 1: Wall mounting
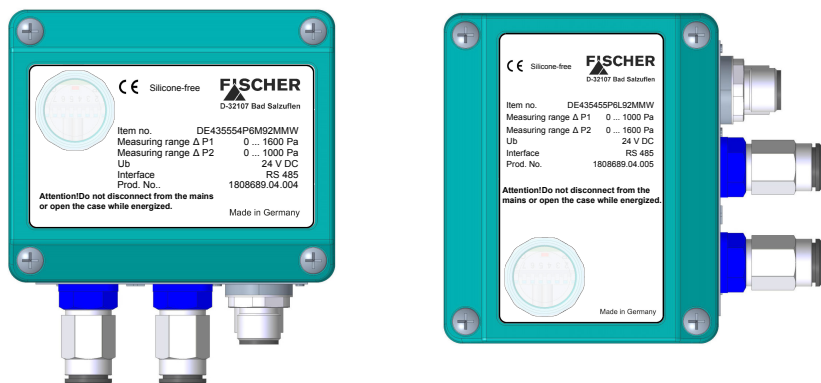
Standard version   90° rotated

Fig. 2: Type plate

Process connection
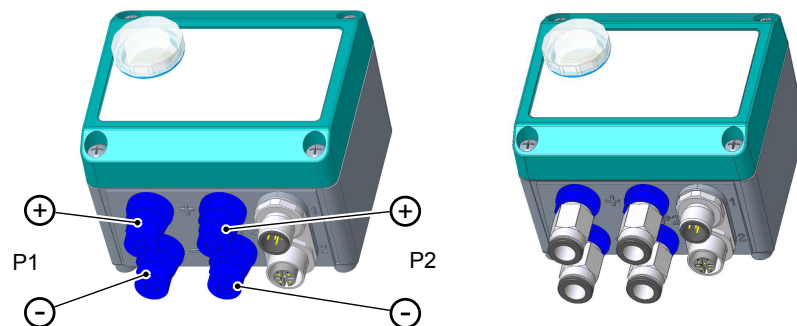
Aluminium CK screw connection   Pneumatic plug connection
for 6/4 or 8/6 mm hose   for 6/4 or 8/6 mm hose

Fig. 3: Process connection

Electrical connections
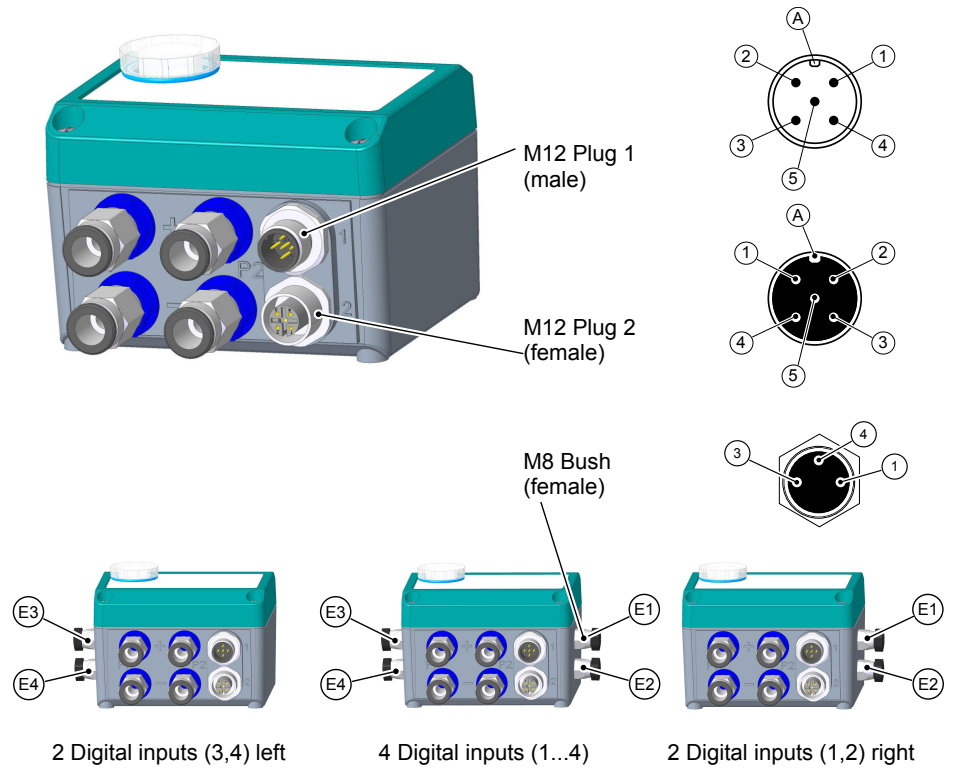
Fig. 4: Electrical connections

2.2.1 Type plate

The presented type plates serve to show an example of the information shown. The data shown is purely fictive, but does correspond to the actual conditions. For more information, please see the order code at the end of these instructions.
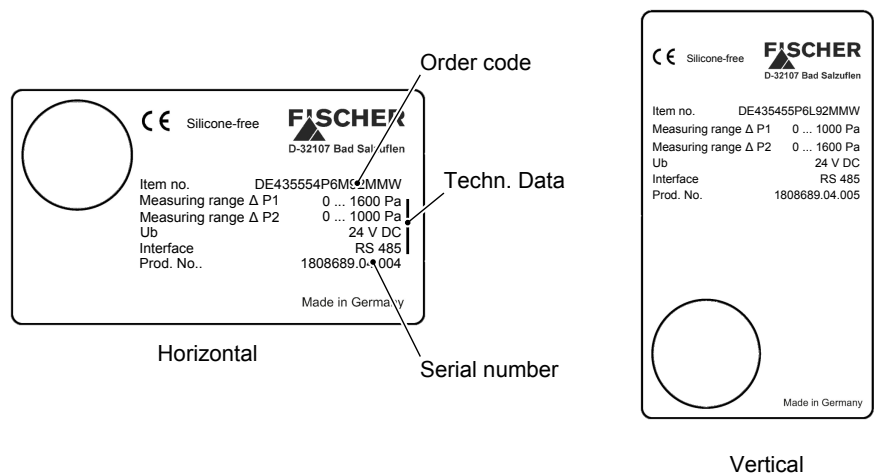
Fig. 5: Type plate

2.3 Function diagram
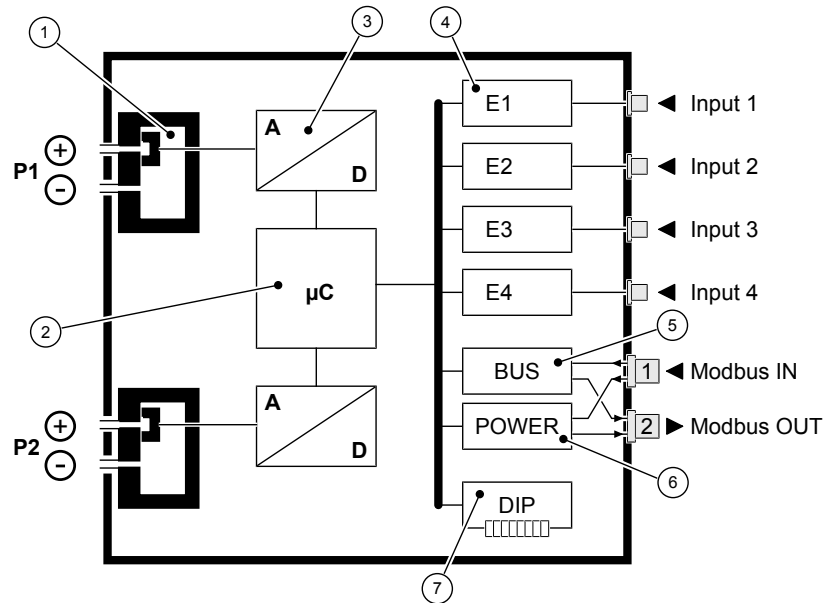
Fig. 6: Function diagram

1	Sensor element	2	Micro-controller
3	AD converter	4	Digital inputs
5	Modbus interface	6	Power Supply
7	Modbus configuration		

2.4 Design and mode of operation

The basis of the DE43 transmitter comprises two piezoresistive sensor elements.

The pressure that is to be measured acts upon a silicone membrane that is equipped with a resistor bridge. The acting pressure causes the membrane to move and therefore a change in resistance. The bridge signal is analysed by the integrated electronics and converted to a pressure value.

The DE43 transmitter communicates with an overriding control system via an RS 485 interface and a Modbus RTU protocol. The currently measured value is forwarded by the overriding control system on request.

The device also has a connecting slot for two or four proximity switches whose signals can also be queried through the Modbus by the overriding control system.

2.5 Intended use

The digital 2-channel transmitter DE43 is suitable for measuring pressure, under-pressure, and differential pressure in neutral gaseous media. The measured value is transferred to an overriding control system via an RS 485 interface with a Modbus RTU protocol.

Optionally, the device can monitor up to four external potential-free contacts, and send their switching status to the overriding control system.

3 Assembly

3.1 General

The device is designed for installation onto flat assembly plates. For screw connection to the assembly plate, the device features four assembly bores on its back, which can be used for Ø 3.5 mm tapping screws.

Optionally, the device can be delivered with a wall-mounting plate. This is also available as accessory.

At the factory, the device is calibrated for vertical installation, but the installation position is arbitrary.

The enclosure protection type IP 65 is only guaranteed, if a suitable power supply cable is used (see accessories).

If the device is intended for outdoor use, we recommend permanent protection against against constant rain or snow, however at the least a sufficiently dimensioned canopy.

3.2 Process connection

- By authorized and qualified specialized personnel only.
- The pipes need to be depressurized when the instrument is being connected.
- Appropriate steps must be taken to protect the device from pressure surges.
- Check that the device is suitable for the medium being measured.
- Maximum pressures must be observed (cf. Tech. data)

The pressure lines must be installed on a gradient so that no water pockets for gas measurements can be created. If the required gradient is not reached, water filters need to be installed at suitable points.

The pressure lines must be kept as short as possible and installed without any tight bends to avoid delays.

The process connections are marked with (+) and (-) symbols on the device. The pressure lines must be mounted according to these symbols.
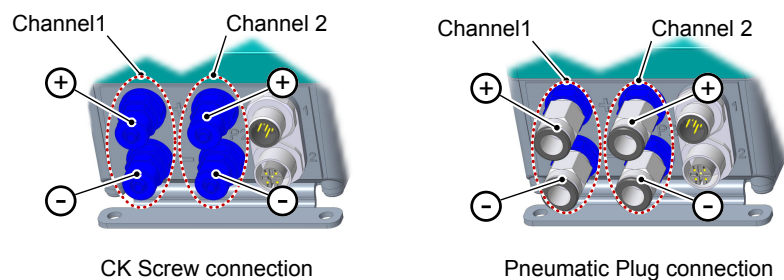
Differential pressure	Pressure	Under-pressure
(+) higher pressure	(+) Pressure	(+) open
(-) lower pressure	(-) open	(-) Under-pressure

Fig. 7: Process connection

The process connections are suitable for hoses made of various materials (PA, PU, Teflon, etc.) with the following dimensions:

Process connection for	Hose 8/6	Hose 6/4
Outer diameter	8 mm	6 mm
Inner diameter	6 mm	4 mm

3.3 Electrical connections

- By authorized and qualified specialized personnel only.
- When connecting the unit, the national and international electro-technical regulations must be observed.
- Disconnect the system from the mains, before electrically connecting the device.
- Do not connect the connector if strained.
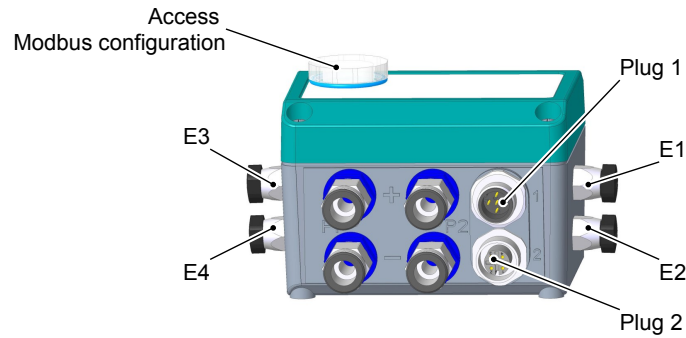
Fig. 8: Electrical connections

WARNING! Please note for the power supply to the devices that the M12 plugs are only suitable for max. 2A.

Plug 1 (Input)

Supply and bus connection
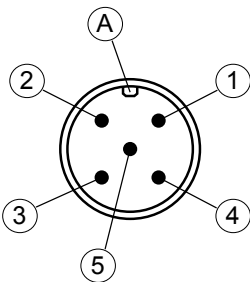
Fig. 9: M12 connector 5-pin

PIN	Signal name		Cable colour
A	Coding		
1	"Supply" dialogue	$+U_b$	brown
2	BUS-D1		white
3	"Supply" dialogue	$-U_b$	blue
4	BUS-D0		black
5	BUS-R		grey

Plug 2 (Output)

Supply and bus connection
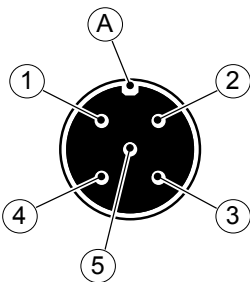
Fig. 10: M12 bush 5-pin

PIN	Signal name		Cable colour
A	Coding		
1	"Supply" dialogue	$+U_b$	brown
2	BUS-D1		white
3	"Supply" dialogue	$-U_b$	blue
4	BUS-D0		black
5	BUS-R		grey

Digital inputs (E1 … E4)

Input for external potential-free contacts.
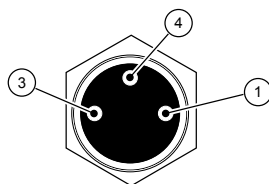
Fig. 11: M8 bush

PIN	Signal name		Cable colour
1	Supply contact 1 (+)	$+U_{E1}$	brown
3	Supply contact 1 (-)	$-U_{E1}$	blue
4	Input	E1	black

The assignment of the M8 bushes is the same for all contacts, which is why only the assignment of digital input E1 is shown here as a example.

3.3.1 Modbus RTU network

The DE43 is usually connected in a line network structure as a so-called slave to the Modbus RTU network. Up to 123 bus participants can be operated without an amplifier on one strand

NOTICE! Star-shaped networks are not allowed.
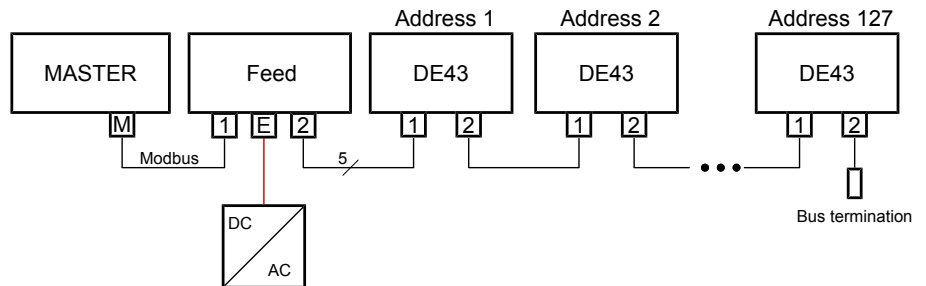
Fig. 12: Modbus RTU network

Communication is effected solely via a Modbus master that is also connected to the bus system. The connected slaves only react to direct commands from the master, which is why communication between the slaves is not possible.

To guarantee fault-free data transmission, we recommend terminating the end point of the Modbus RTU network with a 120Ω resistor. These bus terminating resistors are available as accessories.

It can be connected to an existing Modbus network via a conventional T-piece (passive TAP).
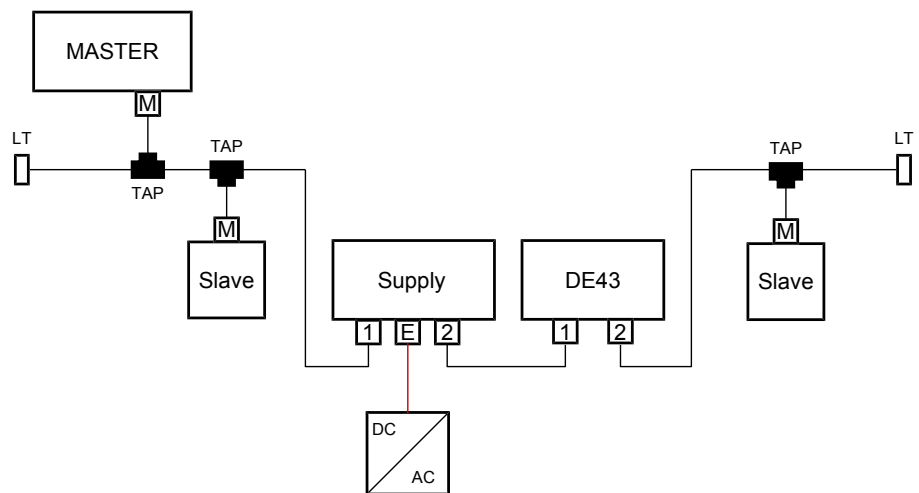
Fig. 13: Modbus connection

Supply circuit
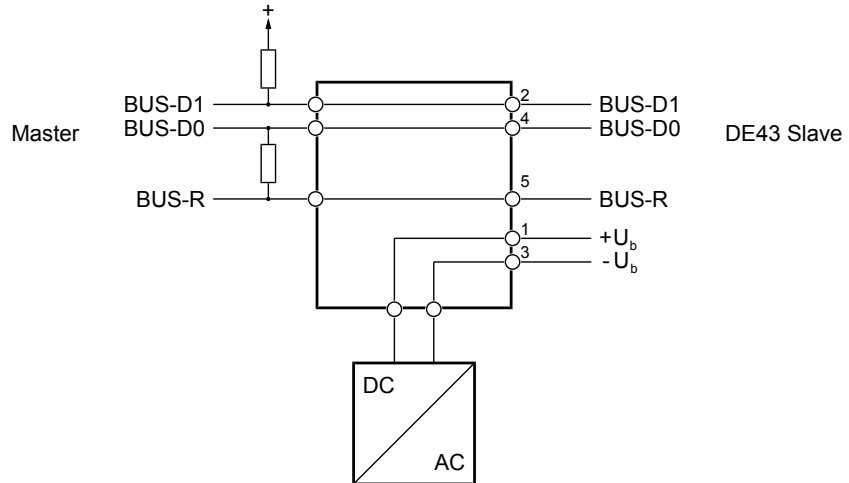
Fig. 14: Supply

Please note that the M12 plugs are suitable for max. 2A. This value may already be exceeded if there are more than 23 bus participants (without digital inputs). For this reason, an intermediate feed should be provided at a suitable place.
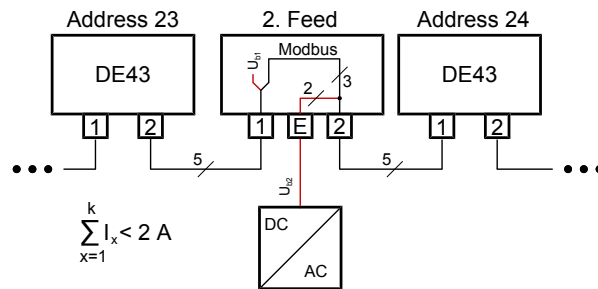
Fig. 15: Intermediate supply

Please note that a DE43 with digital inputs has a higher power draw. If the bus participants are equipped with digital inputs, the number of possible bus participants of a supply circuit are reduced.

The power draw of a device x with n digital inputs is calculated as follows: $I_x = 55$ mA + (n*4.5 mA)

This is calculated for the first bus participant and each of its successors. The results are accumulated in sequence until the result exceeds the limit value 2 A. The interim feed is then set after the bus participant k at which the total current of the supply circuit last lay below 2 A.

4 Start-up

4.1 Generalities

A prerequisite for commissioning is correct installation of all electrical supply lines and the pressure lines. All connections are arranged so that there are no mechanical forces acting on the device.

Also, know-how of the Modbus RTU protocol and the bus architecture are required to commission the bus system.

4.2 Config select

The DE43 Transmitter can be configured using an 8-digit DIP switch. To this end, the sealing plug in the front plate needs to be removed. Below this is an 8-pin DIP switch which can be used to configure both the Modbus address and also the interface.
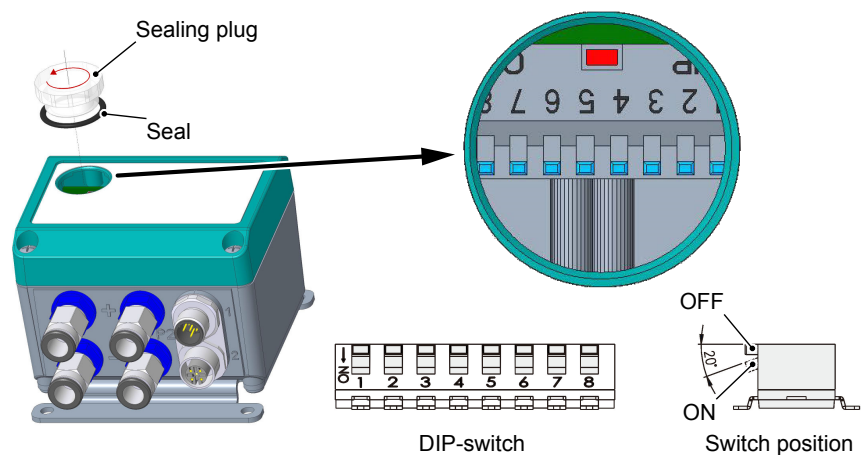
Fig. 16: Access to the DIP switch

After all settings have been made, close the front plate with the plug. Always use the original seal in this case. The sealing plug is screwed in tightly by hand.

4.2.1 Interfaces configuration

NOTICE! An X marks a random switch setting

S1	S2	S3	S4	S5	S6	S7	S8
Baudrate			Parität		Stoppbit	X	**ON**

Fig. 17: DIP switches

The switch S8 is used to select between the interface configuration and Modbus address setting. For the interface configuration, ensure that the switch S8 is always in the setting **ON**.

Baud rate	S1	S2	S3	S4	S5	S6	S7	S8
1200	OFF	OFF	OFF				X	**ON**
2400	ON	OFF	OFF				X	**ON**
4800	ON	ON	OFF				X	**ON**
9600	OFF	ON	OFF				X	**ON**
19200	ON	OFF	ON				X	**ON**
38400	OFF	OFF	ON				X	**ON**
57600	ON	ON	ON				X	**ON**

Parity	S1	S2	S3	S4	S5	S6	S7	S8
None				OFF	OFF	X	X	**ON**
Identical parity				ON	OFF	**OFF**	X	**ON**
Not identical parity				OFF	ON	**OFF**	X	**ON**

It is not possible to combine identical or non-identical parity with 2 stopbits.

Stopbits	S1	S2	S3	S4	S5	S6	S7	S8
1 stopbit						OFF	X	**ON**
2 stopbits						ON	X	**ON**

The device needs to be restarted to confirm the settings. To do this, disconnect the device briefly from the power supply (plug 1).

4.2.2 Modbus address

To set the Modbus address, the switch S8 must be in the position OFF.

S1	S2	S3	S4	S5	S6	S7	S8
Modbus Address							**OFF**

Fig. 18: DIP switches

The address is entered in the dual system. The switches S1 to S7 represent the respective setting value as follows:.

	S1	S2	S3	S4	S5	S6	S7
Binary	2^0	2^1	2^2	2^3	2^4	2^5	2^6
Decimal	1	2	4	8	16	32	64

For example:

The Modbus address 24 should be set.

	S1	S2	S3	S4	S5	S6	S7	S8
Switch setting	OFF	OFF	OFF	ON	ON	OFF	OFF	**OFF**
Priority	$0*2^0$	$0*2^1$	$0*2^2$	$1*2^3$	$1*2^4$	$0*2^5$	$0*2^6$	
Total	0	+0	+0	+8	+16	+0	+0	=24

The device needs to be restarted to confirm the settings. To do this, disconnect the device briefly from the power supply (plug 1).

4.3   Modbus functional description

The following describes the Modbus functions that support the DE43 Transmitter. The descriptions are initially kept general as explained in the [Modbus Protocol Specification](#) and are then supplemented with the unique features of the DE43.

4.3.1   Modbus Transaction

A Modbus transaction comprises two parts. A request from the Master and a response from the Slave.
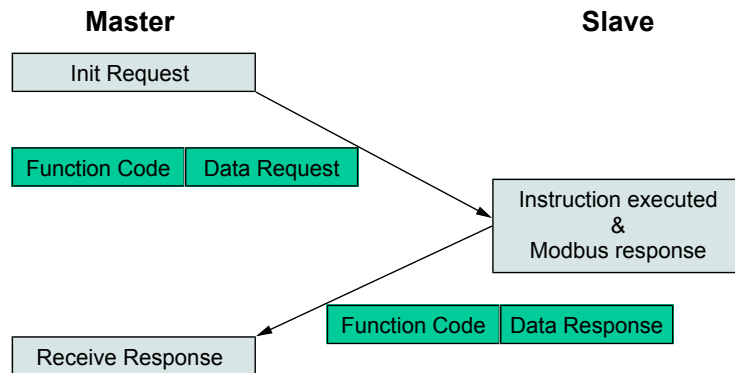
Fig. 19: Error-free request/response cycle

If an error occurs during a Modbus transaction, the Function Code is replaced with a special Function Code with an error indicator in the Modbus Response message and a more detailed description of the error in the data field is sent.
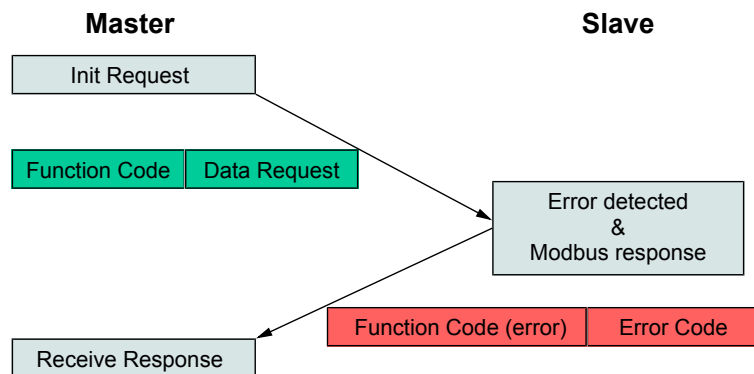
Fig. 20: Faulty request/response cycle

4.3.2   Modbus telegram

The maximum size of a Modbus telegram is 256Byte. The telegram comprises a 1 byte slave address, a 1 byte function code, the data and a 2 byte CRC-checksum.
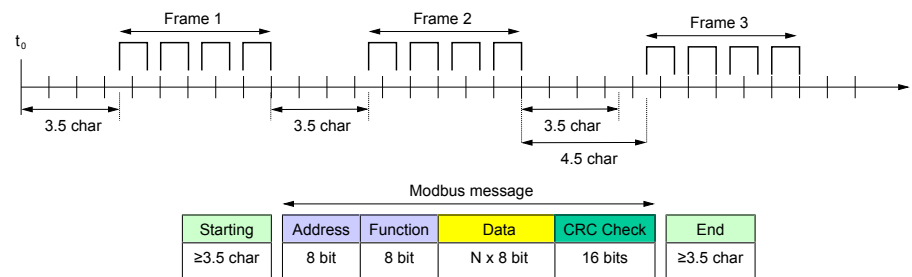
Fig. 21: Modbus Message Frame

4.3.3 Function code 0x02: Read Discrete Inputs

This function code is used to read digital inputs.

Request

The query contains the address of the first bits that are to be read and their number.

Byte   *1*   *2*   *3*   *4*   *5*

| 0x02 | MSB | LSB | MSB | LSB |
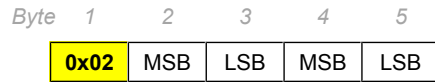
Byte	Field name	Size	Value range
1	Function Code	1 byte	0x02
2.3	Start Address	2 bytes	0x0000 to 0xFFFF
4.5	Number of inputs	2 bytes	1 to 2000 (0x7D0)

The DE43 can be equipped with up to four digital inputs.

Bit	Data type	Description	State
0	Boolean	Digital input 1	0 or 1
1	Boolean	Digital input 2	0 or 1
2	Boolean	Digital input 3	0 or 1
3	Boolean	Digital input 4	0 or 1

Response

The states of the digital inputs are summarised as bytes in the response. The number of bytes (N) is the result of the number of inputs divided by 8. If there is a rest, the number of bytes increases (N=N+1).

However, as the DE43 only has a maximum of 4 inputs, only 1 byte is transferred as a response.

The states of the digital inputs from the bit with the lowest value are saved within a byte. A bit value of 0 corresponds to the status OFF; a bit value of 1 corresponds to the status ON.

Byte   *1*   *2*   *3*

| 0x02 | N | Byte1 | … | Byte N |
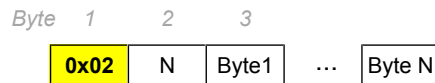
Byte	Field name	Size	Value range
1	Function Code	1 byte	0x02
2	Number of bytes	1 byte	N
3…	Number of inputs	N Bytes	8 Bit value

Error

Byte   *1*   *2*

| 0x82 | Code |
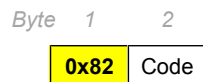
Byte	Field name	Size	Value range
1	Function Code (error)	1 byte	0x82
2	Error code	1 byte	Code s. table Error codes [▷ 21]

4.3.4 Function code 0x03: Read Holding Registers

This Function Code is used to read the Holding Register. The maximum possible number of registers that can be addressed in one message is 125.

Request

The request contains the address of the first register that is to be read and the number of registers that need to be read. The addressing of the register starts with 0; the numbering of the registers starts with 1.

Byte   1   2   3   4   5

| 0x03 | MSB | LSB | MSB | LSB |
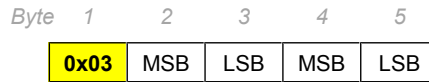
Byte	Field name	Size	Value range
1	Function Code	1 byte	0x03
2.3	Start Address	2 bytes	0x0000 to 0xFFFF
4.5	Number of registers	2 bytes	0x0001 to 0x007D (1…125)

The DE43 Transmitter has precisely 1 Holding Register with the address 0x0000.

Bit	Data type	Description		State
0	Unsigned Integer	Pressure sensor 1	Sensor error	0 or 1
1	Unsigned Integer	Pressure sensor 1	Pressure too low	0 or 1
2	Unsigned Integer	Pressure sensor 1	Pressure too high	0 or 1
3	Unsigned Integer	RESERVED		0 or 1
4	Unsigned Integer	Pressure sensor 2	Sensor error	0 or 1
5	Unsigned Integer	Pressure sensor 2	Pressure too low	0 or 1
6	Unsigned Integer	Pressure sensor 2	Pressure too high	0 or 1
7	Unsigned Integer	RESERVED		0 or 1
8	Unsigned Integer	Temp. sensor	Sensor error	0 or 1
9	Unsigned Integer	Temp. sensor	Temperature too low	0 or 1
10	Unsigned Integer	Temp. sensor	Temperature too high	0 or 1
11	Unsigned Integer	RESERVED		0 or 1
12	Unsigned Integer	General	System error	0 or 1
13	Unsigned Integer	RESERVED		0 or 1
14	Unsigned Integer	RESERVED		0 or 1
15	Unsigned Integer	RESERVED		0 or 1

Response

The response contains two bytes for each read register; therefore the number of bytes is twice of the number of registers (N).

Byte   1   2   3   4

| 0x03 | 2N | MSB | LSB | … | MSB | LSB |

            Register 1   Register N
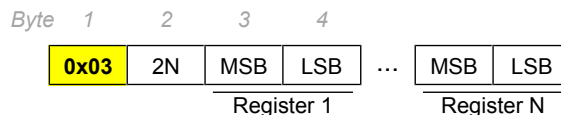
Byte	Field name	Size	Value range
1	Function Code	1 byte	0x03
2	Number of bytes	2 bytes	2N
3.4	Holding Register	N x 2 Byte	16 Bit value

Error

Byte   1   2

| 0x83 | Code |
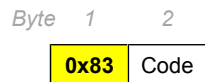
Byte	Field name	Size	Value range
1	Function Code (error)	1 byte	0x83
2	Error code	1 byte	Code s. table Error codes [▸ 21]

4.3.5 Function code 0x04: Read Input Register

This Function Code is used to read the input register. The maximum possible number of registers that can be addressed in one message is 125.

Request

The request contains the address of the first register that is to be read and the number of registers that need to be read. The addressing of the register starts with 0; the numbering of the registers starts with 1.

Byte   1   2   3   4   5

| 0x04 | MSB | LSB | MSB | LSB |
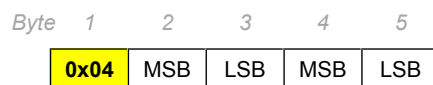
Byte	Field name	Size	Value range
1	Function Code	1 byte	0x04
2.3	Start Address	2 bytes	0x0000 to 0xFFFF
4.5	Number of registers	2 bytes	0x0001 to 0x007D (1…125)

The DE43 Transmitter has 3 Input Registers.

Reg.No.	Address	Data type	Description	Unit	Contents
1	0x0000	Integer	Measured value channel 1	PA	Measured value
2	0x0001	Integer	Measured value channel 2	PA	Measured value
3	0x0002	Integer	Temperature measured value	°C	Measured value

Response

The response contains two bytes for each read register; therefore the number of bytes is twice of the number of registers.

Byte   1   2   3   4

| 0x04 | 2N | MSB | LSB | … | MSB | LSB |

Register 1   Register N
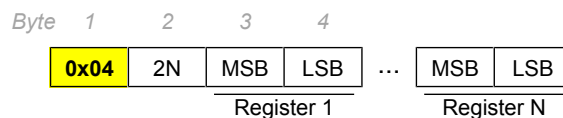
Byte	Field name	Size	Value range
1	Function Code	1 byte	0x04
2	Number of bytes	2 bytes	2N
3.4	Content Register	N x 2 Byte	16 Bit value

Error

Byte   1   2

| 0x84 | Code |
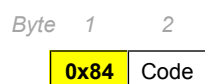
Byte		Size	Value range
1	Function Code (error)	1 byte	0x84
2	Error code	1 byte	Code s. table Error codes [▸ 21]

4.3.6 Function code 0x2B/0x0E: Device Identification

This Function Code is used to read certain information about identification of the unit. The following object types are used in the FISCHER units:

Object ID	Object Name	Type	Category
0x00	VendorName	ASCII String	Basic
0x01	ProductCode	ASCII String	Basic
0x02	MajorMinorRevision	ASCII String	Basic
0x03	VendorUrl	ASCII String	Regular
0x04	ProductName	ASCII String	Regular
0x05	ModelName	ASCII String	Regular
0x06	UserApplicationName	ASCII String	Regular

NOTICE! There are no objects of the Extended category.

Request
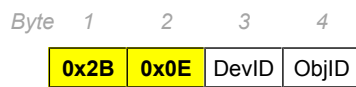
Byte	1	2	3	4
	0x2B	0x0E	DevID	ObjID

Byte	Field name	Size	Value range
1	Function Code	1 byte	0x2B
2	MEI Type[+)]	1 byte	0x0E
3	Read Device ID Code	1 byte	01 / 02 / 04
4	Object ID	1 byte	0x00 to 0xFF

[+)] MEI = Modbus Encapsulated Interface

Read Device ID

The Read Device ID Code (DevID) serves to specify the access. If the code is not correct, an error message with the code 0x03 is sent.

01	Access to objects of the Basic category	stream access
02	Access to objects of the Regular category	stream access
04	Access to a single object	individual access

If the length of the requested information exceeds the maximum possible length of the PDU, several transactions (Request/Response) must be carried out.

Object ID

The Object ID Code states on which object of the 'stream access' should start. If the Object ID does not match the existing objects, the 'stream access' starts with the first object of the category. In the event of an 'individual access', an error message is generated with the error code 0x02.

Response

The response comprises several bytes with status information followed by a list with the requested object information.

Byte	1	2	3	4	5	6	7	1	...	k_0		1	...	k_N
	0x2B	0x0E	DevID	Conf	Follow	Next	Num	ObjID	Len	Val ... Val	...	ObjID	Len	Val ... Val

List — Object 0 ... Object N

Byte	Field name	Size	Value range
1	Function Code	1 byte	0x2B
2	MEI Type	1 byte	0x0E
3	Read Device ID Code	1 byte	01 / 02 / 03 / 04
4	Conformity Level	1 byte	0x83
5	More Follows	1 byte	0x00 / 0xFF
6	Next Object ID	1 byte	Object ID Number
7	Number of Objects	1 byte	
List of object data			
	Object(N).ID	1 byte	
	Object(N).Length	1 byte	
	Object(N).Value	k Byte	

Conformity Level

The Conformity Level specifies the information category and the access type that is supported.

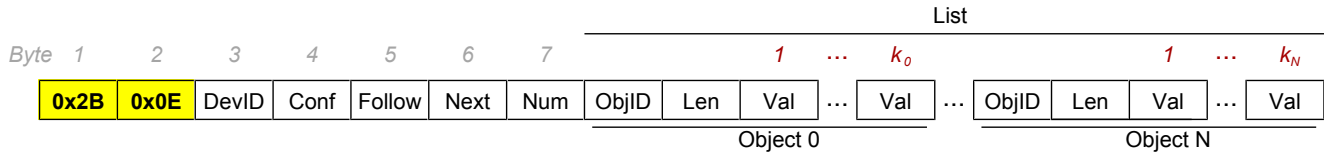| 0x83	Extended Identification	stream and individual access

More Follows

If the length of the requested information exceeds the maximum possible length of the PDU, several transactions (Request/Response) must be carried out. The 'More Follows' byte signalises whether or not further requests are required to transfer all information.

0x00	no further objects	
0xFF	other objects available	other transaction necessary

Next Object ID

If a further transaction is required (More Follows = FF), the Object ID for the following Request is stated at this point.

Otherwise (More Follows = 00) this value is useless and is set to 00.

Number of Objects

This byte states the number N of the objects that are transferred in the response. In the case of 'individual access' the number of objects is = 01.

List of object data

Object(0).ID	Object ID of the first object in the response
Object(0).Length	Length of the object
Object(0).Value	Value of the object
...	
Object(N).ID	Object ID of the last object in the response
Object(N).Length	Length of the object
Object(N).Value	Value of the object

Error

Byte   1   2

| 0xAB | Code |

Byte	Field name	Size	Value range
1	Function Code (error)	1 byte	0xAB (0x2B + 0x80)
2	Error code	1 byte	Code s. table Error codes [▸ 21]

4.3.7 Error codes

0x01	The function is not supported
0x02	An invalid address is referenced
0x03	The request does not correspond to the expected format
0x04	Am error that could not be remedied occurred

4.4 LED flash codes

The operational status of the device is continuously signalised via two LEDs.
The green LED signalises correct operation and will go off in the event of an error. The error type is communicated via flash codes of the red LED.

ON	The LED shines permanently
Flash	The LED flashes regularly for 0.2 s
short	The LED shines for approx. 0.5 s
long	The LED shines for approx. 1 s
OFF	The LED does not shine

green LED	Red LED	Description
ON	OFF	The DE43 is ready for operation
ON	Flash	The DE43 sends an answer to the master via the Modbus
OFF	1 x long 1 x short	Pressure sensor 1: Error reading the sensor signal
OFF	1 x long 2 x short	Pressure sensor 2: Error reading the sensor signal
OFF	1 x long 3 x short	Temperature sensor: Error reading the sensor signal
OFF	1 x long 10 x short	Error reading the configuration parameter
OFF	1 x long 11 x short	Error writing the configuration parameter
OFF	1 x long 12 x short	Wrong configuration of the MODBUS parameter (Baud rate, parity, stopbits)

5 Servicing

5.1 Maintenance

The instrument is maintenance-free. We recommend the following regular inspection to guarantee reliable operation and a long service life:

- Check the function in combination with downstream components.
- Check the leak-tightness of the pressure connection lines.
- Check the electrical connections.

The exact test cycles need to be adapted to the operating and environmental conditions. In combination with other devices, the operating instructions for the other devices also need to be observed.

5.2 Transport

The measuring device must be protected against impacts. It should be transported in the original packaging or a suitable transport container.

5.3 Service

All defective or faulty devices should be sent directly to our repair department. Please coordinate all shipments with our sales department.

⚠ WARNING

Process media residues

Process media residues in and on dismantled devices can be a hazard to people, animals and the environment. Take adequate preventive measures. If required, the devices must be cleaned thoroughly.

Return the device in the original packaging or a suitable transport container.

5.4 Disposal

Please help to protect the environment by always disposing of the work pieces and packaging materials in compliance with the valid national waste and recycling guidelines or reuse them.

6 Technical data

6.1 General

General information	
Type designation	DE43
Pressure type	Differential pressure, relative pressure
Measurement principle	Piezo-resistive

Reference conditions (acc. to IEC 61298-1)		
Temperature	+15 … +25 °C	
Relative humidity	45 … 75 %	
Air pressure	86 … 106 kPa	860 … 1060 mbar
Installation position	User-defined	

6.2 Input variables

Measuring variable	Pressure, under-pressure and differential pressure for neutral gaseous media
Damping (P=10…90%)	1 sec

		Unit	+ ranges (0 … +p)					+ ranges (-p … +p)				
Measuring range (p)		PA	400	600	1000	1600	2500	±250	±400	±600	±1000	±1600
		kPa	0.4	0.6	1	1.6	2.5	±0.25	±0.4	±0.6	±1	±1.6
		mbar	4	6	10	16	25	±2.5	±4	±6	±10	±16
Max. stat. operating pressure		mbar	50	50	100	100	100	50	50	50	100	100
Bursting pressure		mbar	150	150	300	300	300	150	150	150	300	300
Characteristic curve deviation[*]	Max.	%FS					1.0					
	Type	%FS					0.5					
TK Span [**]	Max.	%FS/10K	1.0	1.0	0.3	0.3	0.3	1.0	0.5	0.3	0.3	0.3
	Type	%FS/10K					0.3					
TK zero-point [**]	Max.	%FS/10K	1.0	1.0	0.4	0.4	0.4	1.0	0.5	0.4	0.4	0.4
	Type	%FS/10K					0.2					

[*] Characteristic curve deviation (non-linearity and hysteresis) at 25°C
[**] Compensation range 0…60 °C

6.3 Communication parameter

interface	RS 485
Report	Modbus RTU
Modbus specification	Application Protocol Specification V1.1b3 (April 26, 2012)
Address	1 … 127
Baud rate	1200 … 57600 Baud
Parity	Even, uneven, parity
Stopbits	1…2

Pre-set data format

Baud rate	9600 Baud
Parity	None
Stopbit	1

Supported Modbus functions

0x02	Read Discrete Inputs
0x03	Read Holding Registers
0x04	Read Input Registers
0x2B / 0x0E	Read Device Identification

For more information about this, please refer to the operating instructions and online http://www.modbus.org/docs/Modbus_Application_Protocol_V1_1b3.pdf.

6.4 Auxiliary energy

nominal voltage	24 V DC
Admissible operating voltage	18 … 30 V DC
Absorbed power	Max. 2 W

6.5 Operating conditions

Ambient temperature range	-10 … +70 °C
Storage temperature range	-20 … +70 °C
Medium temperature range	-10 … +70 °C
Protection	IP65
EMC	EN 61326-1:2013 EN 61326-2-3:2013
RoHS	EN 50581:2012

6.6 Construction design

|	
Installation position	User-defined
Max. dimensions (WxHxT)	116 x 103 x 76 mm
Weight	375 g

6.6.1 Connections

Modbus connector 1	M12 round plug connector (5-pin, male, max. 2A) Plug 1 for supply and bus signals
Modbus connector 2	M12 round plug connector (5-pin, female, max. 2A) Plug 2 for forwarding the signals to the next BUS participant or to connect a BUS termination plug
Digital inputs E1 … E4	M8 round plug connector (3-pin, female) Depending on the model, 0, 2 or 4 proximity switches can be connected
Process connection option 1	Aluminium CK screw connection for 6/4 or 8/6 mm hose
Process connection option 2	Pneumatic plug connector for 6/4 or 8/6 mm hose

6.6.2 Materials

Housing	Polyamide PA 6.6
Media-contacting material	Silicon, PVC, aluminium, brass

6.6.3 Dimensional drawings
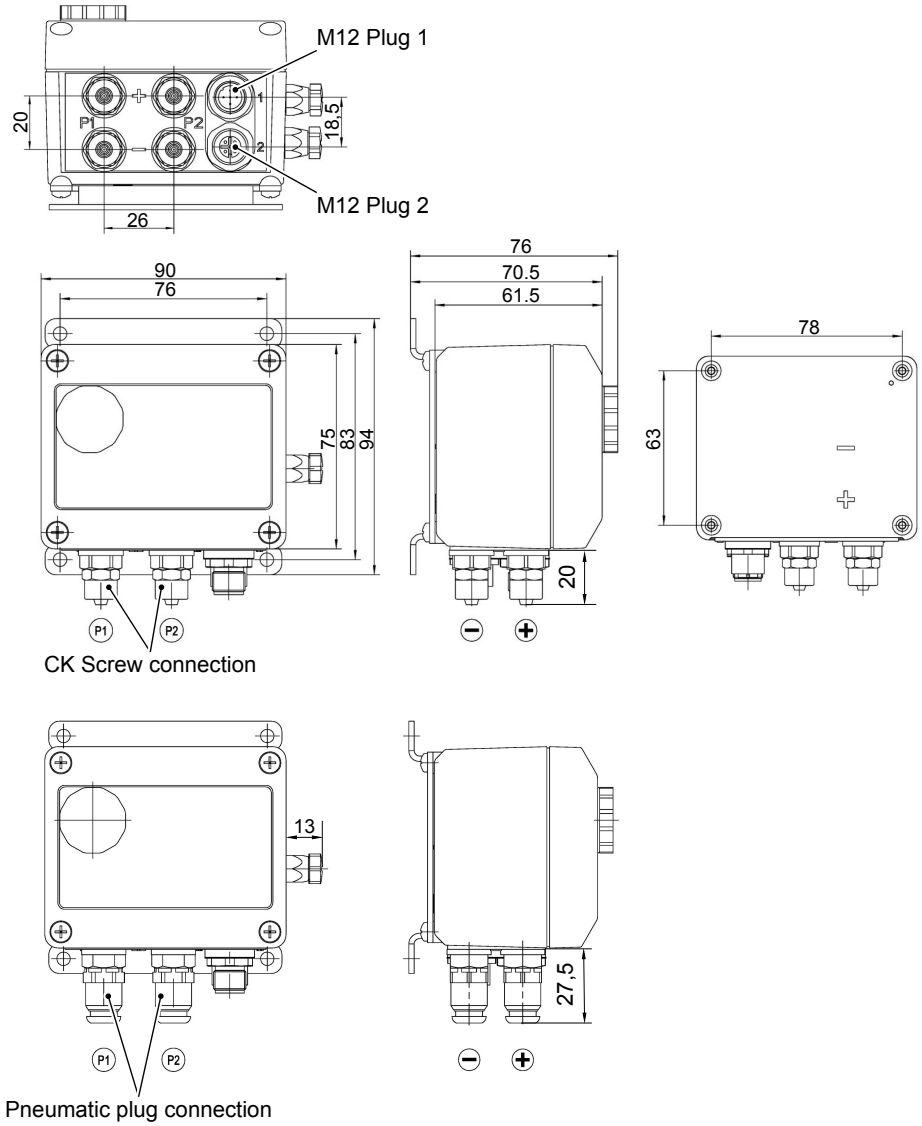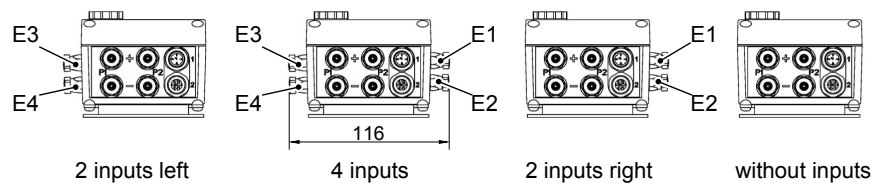
Fig. 22: Dimensional picture

7 Order codes
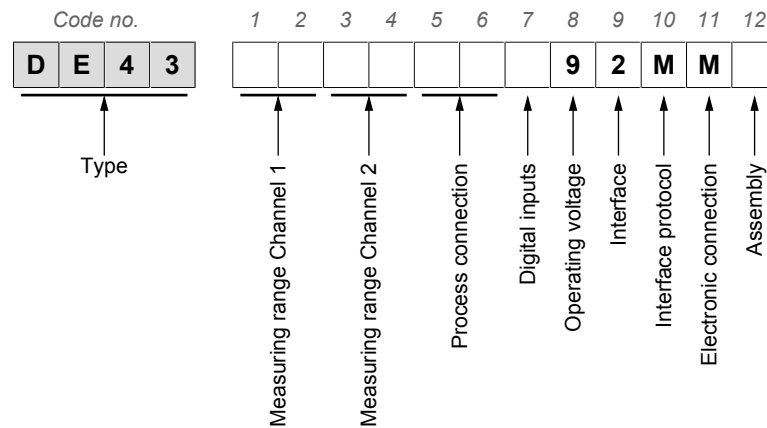
Measuring range channel 1:

[1.2]	[Pa]
D7	0 … 400
D8	0 … 600
D9	0 … 1000
E1	0 … 1600
E2	0 … 2500 Pa
S6	-250 … +250
R1	-400 … +400
R2	-600 … +600
R3	-1000 … +1000
R4	-1600 … +1600

Measuring range channel 2:

[1.2]	[Pa]
D7	0 … 400
D8	0 … 600
D9	0 … 1000
E1	0 … 1600
E2	0 … 2500 Pa
S6	-250 … +250
R1	-400 … +400
R2	-600 … +600
R3	-1000 … +1000
R4	-1600 … +1600

Process connection:

[5.6]	
40	CK aluminium screw connection for 6/4 mm hose
41	CK aluminium screw connection for 8/6 mm hose
P6	Pneumatic plug connector MS nickel-plated for 6/4 mm hose
P8	Pneumatic plug connector MS nickel-plated for 8/4 mm hose

Digital inputs:

[7]	M8 round plug connector 3-pin, female
0	Without digital inputs
L	Two digital inputs (E3, E4) left
K	Two digital inputs (E1, E2) right
C	Four digital inputs (E1, E2) right and (E3, E4) left

Operating voltage:

[8]	
9	24 V DC

Interface:

[9]	
2	RS 485

Interface protocol:

[10]	*(Code no.)*
C	Modbus RTU Protocol

Electrical connection:

[11]	
C	M12 round plug connector (Modbus, power supply)
	M8 round plug connector (Digital inputs, optional→[7])

Assembly:

[12]	
0	Standard (attachment boreholes on rear side)
W	Horizontal wall mounting
V	Vertical wall mounting

8 Attachments

FISCHER
MESS- UND REGELTECHNIK ——————————————————————————— *(Translation)* CE

EU Declaration of Conformity

For the product described as follows

Product designation	**2-channel differential pressure transmitter**
Type designation	**DE43**

it is hereby declared that it corresponds with the basic requirements
specified in the following designated directives:

2014/30/EU	*EMC Directive*
2011/65/EU	*RoHS Directive*

The products were tested in compliance with the following standards.

Electromagnetic compatibility (EMC)

DIN EN 61326-1:2013-07 EN 61326-1:2013	*Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements*
DIN EN 61326-2-3:2013-07 EN 61326-2-3:2013	*Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-3: Particular requirements - Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning*

RoHS Directive (RoHS 2)

DIN EN 50581:2013-02 EN 50581:2012	*Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances*

Also they were subjected to the conformity assessment procedure „**Internal production control**".

The object of the declaration described above is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Sole responsibility for the issue of this declaration of conformity in relation to fulfilment of the fundamental requirements and the production of the technical documents is with the manufacturer.

Manufacturer	**FISCHER Mess- und Regeltechnik GmbH** Bielefelder Str. 37a 32107 Bad Salzuflen, Germany Tel. +49 (0)5222 974 0
Documentation representative	Mr. Torsten Malischewski B.Sc. Development department
The devices bear the following marking:	CE

Bad Salzuflen
05 Dec 2018

G. Gödde
Managing director

Fig. 23: CE_DE_DE43