

TURCK

Industrial Automation

FOUNDATION™ FIELDBUS

USER MANUAL DIGITAL FIELDBUS DISPLAY FD-49-T317/EX





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Meaning of the symbols used



DANGER

Imminent risk of physical injury.

Please act with extreme caution.

This sign is placed next to a warning indicating a potential hazard.

This can relate to personal injury as well as to system (hardware and software) and equipment damage.

The user should interpret this symbol as follows: exercise extreme caution.



NOTE

Important information and description about a determined procedure.

This sign is located next to general notes providing important information on individual or stepwise work procedures. The relevant instructions can facilitate work and possibly help to avoid additional work resulting from faulty procedures.

1 Notes for explosion-proof equipment

Scope and regulations

The notes and warnings stated in these operating instructions must be observed in order to ensure safe and proper operation. This equipment must only be used for its intended use. It complies with EN 60079 regulations, in particular EN 60079-14 "Electrical Equipment for Explosion Hazardous Areas" and EN 50281-1-2 "Electrical Apparatus for Use in the Presence of Combustible Dust". It is suitable for use in hazardous locations that are endangered by gases and vapours which are assigned to the explosion group stated on the type label. The mounting and operation of explosion-proof controllers and systems must be carried out according to the relevant national regulations and directives.

General notes

Correct and safe operation of this equipment relies on appropriate transport and storage, correct installation as well as careful operation and maintenance. Any work on the equipment must only be carried out by trained and qualified personnel. The electrical characteristic values stated on the type label and the EC type examination certificate TÜV 07 ATEX 553588, and any special requirements related to this must be observed.

If the installation is outdoors, it is recommended that the explosion-proof device is protected against direct influence of the weather, e.g. by means of a protective cover. The maximum permissible ambient temperature is stated in the technical data in the Appendix.

Intrinsically safe circuits

The installation instructions stated in the EC type examination certificates of the intrinsically safe electrical equipment must be observed. The safety-related electrical values stated on the type label must not be exceeded in the intrinsically safe circuit. When intrinsically safe circuits are interconnected, the occurrence of a voltage and/or current addition must be tested. The intrinsic safety of the interconnected circuits must be ensured (EN 60079-14, section 12)

The certification of intrinsic safety is not required if the display device is connected to a FISCO-compliant fieldbus.



DANGER

Explosion hazard! Imminent risk of physical injury in case of non-compliance with Ex-protection

Working on live electrical installations and equipment is expressly forbidden in hazardous locations. This does not apply to work on intrinsically safe circuits. In special cases, work can also be carried out on non-intrinsically safe circuits, in which case it must be ensured that an explosive atmosphere is not present during the work.

Isolation must only be tested with permissible explosion-proof measuring devices.

Earthing and short-circuiting must only be carried out if there is no explosion hazard at the point of earthing and short-circuiting

- Danger of static charging. Only clean with damp cloth!
 - Do not open in an explosive dust-loaded atmosphere!
-

2 FD-49-T317/Ex Digital Display

Brief description

The FD-49-T317/Ex digital display device is used for displaying process information of fieldbus nodes connected to the FOUNDATION™ fieldbus H1 network. The display device operates as a “listener”, i.e. it does not appear on the bus as a node with its own address and also does not increase the traffic on the bus.

The display device listens to the data (**only publisher/subscriber data traffic**) published by a field device.

The process value of the actuator or sensor is displayed as a five-digit number, and the process value status can be scanned via status key. As well as the display for measured values, the device also features a 41 segment bargraph for trend monitoring that can be scaled separately from the displayed value.

The device is also provided with a rugged powder-coated die-cast aluminium housing.

The FD-49-T317/Ex digital display device can be used in Zone 1 and 2 (hazardous area exposed to gas) as well as in Zone 21 and 22 (area exposed to dust hazards).

Overview of features

FD-49-T317/Ex Ex i display device in the fieldbus network

Uses the auxiliary supply from the fieldbus – use in an Ex environment is simple since no power supply cables are required

Provided with an easy to install bus node connection.

Explosion protection for gas and dust-charged environments:

II 2(1) G, EEx ia IIC T6 and T5

II 2 D, IP65 T 70°C

Display:

Five-digit 7-segment display (display range from -9999 to (+)99999)

LCD display with 30 mm digit height

Fast response bargraph for trend monitoring (41 segments, image generated several times per second)

Ergonomics:

Microprocessor technology for extensive parameterization options

Status control key

All parameters retained after power failure

Parameters can be modified during operation

Exchangeable unit of measure symbols

Housing:

Rugged die-cast aluminium housing

Dimensions (H x W x D) 140 x 140 x 72 mm

3 Mounting and connection

Mounting

Choose a solid surface for fastening the display device.

The device has an integrated paper strip for writing the unit of measure symbols.

- To write the required unit of measure symbols on the paper strip, unscrew the four screws of the housing cover and remove the cover.
- The unit of measure symbol slot is located under the display panel.

Inserting the unit of measure symbols:

- Insert the prepared paper strip with the symbols facing the front into the unit of measure symbol slot on the inside of the housing cover.
- Screw on the cover to the housing bottom.

Connection



DANGER

Explosion hazard! Imminent risk of physical injury in case of non-compliance with Ex-protection

The device should only be connected to the FOUNDATION fieldbus™ H1 network.

The maximum values for terminal voltage and short-circuit current specified in the EC type examination certificate TÜV 07 ATEX 553588 must be observed.

The device must be earthed if there is a risk of static charge.

There must be a low-resistance connection between shield of the connection cable and the screw connection.

When used in hazardous locations the housing must be connected to the equipotential bonding via the external earthing connection (EN 60079-14, para. 12.2.2.3).

Any multiple earthing must only be implemented using a capacitive connection (EN 60079-14, para. 12.2.2.3c).

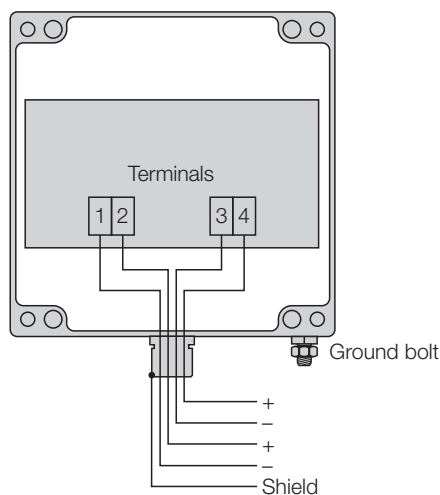
The connection terminals of the display device are located in the housing.

To connect, undo the housing screws and remove the cover.

The figure below shows the terminal arrangement:

- Terminal 1: –
- Terminal 2: +
- Terminal 3: – For other bus nodes
- Terminal 4: + For other bus nodes
- The shield must be connected to the housing of the cable gland

After connection screw on the cover.



Commissioning

1. A display segment test is carried out for one second after the device is connected.
2. The version number of the device is displayed for another second.

The device is factory set with the following parameters when commissioned for the first time after initial connection.

Description	Display	Parameter
Number of displayed channels	Chan	1
Fieldbus address(es)	Addr.1	10
Activate DLCEP automatic The DLCEP is automatically determined	dAut1	Aut.y
Set decimal place	dP.PO1	999.99
Display bargraph	bAr.	b On
Min value for bargraph	bar.L1	000.00
Max value for the bargraph	bar.H1	100.00
Measured value scaling factor	SFAC1	0001.0
Measured value scaling offset	SOFS1	0000.0
Menu code word	CodE	0001
Menu end	END	/

Field devices with several output variables

E Col

If a field device has several output variables, e.g. a pressure measuring device supplies pressure and temperature, then the measured values are transferred via the bus using the same device address. In order to distinguish them, the measured values are assigned a DLCEP (Data Link Connection End Point) number.

Instructions:

1. First, select the corresponding device address from the menu and parameterize it. Then set the DLCEP (Data Link Connection End Point) to automatic mode (dAut1 resp. dAut2 resp. dAut3 = Aut.y). The possible measured values of the bus node are determined and listed in menu item dLCE1 resp. dLCE2 resp. dLCE3.
2. Select the required value from the list.
3. Close the menu. The collision is cleared.

Restoring the factory set parameters (RESET)

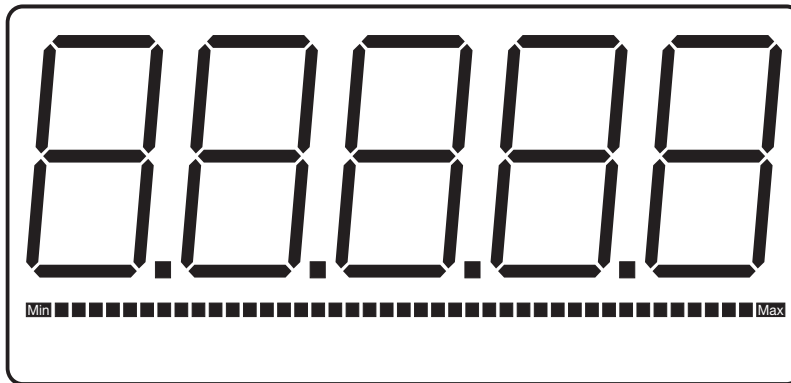


NOTE

Pressing the Enter key  and the Right key  simultaneously during startup will restore the factory set parameters.

4 Operation

LCD front view



Display with decimal points

Bargraph for measured value

Keypad

Three membrane keys with different function symbols are located on the front of the display device. These keys enable the user to select all functions of the device and carry out the individual settings. The keys have the following names:



Enter key

The *Enter* key is used to activate the Entry menu. Pressing the Enter key activates the displayed menu item or confirms entries.



Up key

The *Up* has the following functions:

- Status byte scan (Status key)
- Modification of the selected digit
- Move through menu items



Right key

The *Right* has the following functions:

- Move through channels
- Change the selected digit
- Move to menu end

LED indications

The display device has three LEDs. Each LED shows its respective channel and the associated physical unit of measure by means of unit of measure symbols on a paper strip. Inserting the writable paper strip (see page 6)

The LED states have the following meaning:

Green:	The channel is active, the data is received correctly and displayed.
Green flashing:	The display device cannot detect data traffic on the bus at the set address. See also section 5, Error messages: "Error C".
Off:	The corresponding channel is not displayed.

Parameter entry

Display of operating state



After the display device is connected up it starts up with the initialisation of parameter and scaling data. This is read from the internal EEPROM memory and comes from the previous operation. On delivery this memory is assigned default values (see page 8)

Holding down the *Up* key (Status key) will cause the display of the status byte belonging to the float value. Releasing the key will return the device to the output status (operating state).

Switching to the Entry menu



Starting from the operating state, pressing the *Enter* key switches to Code word protection.



Entering and modifying device settings is to be reserved for authorized persons. The activation of the Entry menu is therefore protected by the code word.



The Code word menu is factory set to [00001]. The code word request for accessing the Entry menu cannot be deactivated.

Confirm with the *Enter* key in order to modify the code word.



A flashing bar will appear underneath the 1st digit on the left (the sign can be entered here in the Entry menu).

Pressing the *Right* key will select the digit to be modified and pressing the *Up* key will increment the value by one.



The Entry menu for setting parameters is started after the correct code word is entered and confirmed via the *Enter* key.

List and explanation of parameters in the Entry menu – see next page.

Parameters in the Entry menu (see also parameter example page 14)

The parameters are shown as simple digits on the 7-segment display.

The following list shows the name and values of the parameters in the order of their appearance and provides an explanation.

The setting of each parameter must be confirmed by pressing the *Enter* key.

This will cause the next parameter to appear.

The *Right* key can be used to jump directly to the end of the menu after the parameter has been displayed.

Chan

The parameter can specify the number (1...3) of measured values (= channels) to be displayed.

Auto

If more than one channel is to be displayed, setting Auto = yes will cause the automatic switching through channels (delay approx.4 sec.) during operation. Otherwise one channel will remain on the display until the operator presses the *Right* key.

Addr1

This is used to set the bus address that is to be "listened to". If several channels were activated "Addr2" and "Addr3" will then appear.

dAut1

The DLCEP (Data Link Connection End Point) indicates which published value of the previously selected address is to be displayed. If the field device only publishes one value, the display device can determine the assigned DLCEP itself. In this case, the DLCEP Automatic (= dAut1) can be activated.

In the event of ambiguous meaning or collision, the display device cannot determine the value automatically, in which case the subsequent menu item will show a selection of possible DLCEPs. If several channels were activated, "dAut2" and "dAut3" will then appear.

dLCE1

The DLCEP described above is entered manually with the "dLCE1" parameter if Automatic was not selected. If several channels were activated, "dLCE2" and "dLCE3" will then appear.

dP.PO1

This menu item defines the position of the decimal point. If several channels were activated, "dP.PO2" and "dP.PO3" will then appear.

bAr.

This menu item defines whether a values bargraph is to be displayed or not.

"bAr = "Yes": displays the bargraph.

"bAr = "No": does not display the bargraph.

bar.L1

If the bargraph was activated in menu item bAr., the minimum value of the bargraph (= Bargraph Low 1) must be defined for all channels in order to scale the bargraph to customer requirements. If several channels were activated, "bar.L2" and "bar.L3". will then appear.

bar.H1

If the bargraph was activated in menu item bAr., the maximum value of the bargraph (= Bargraph High1) must be defined for all channels in order to scale the bargraph to customer requirements. If several channels were activated, "bar.H2" and "bar.H3" will then appear.

SFAC1

The menu item "SFAC1" (measured value scaling: factor) defines the factor by which the currently displayed value is multiplied. SFAC1 = 10.0 will display a ten times larger display value than the value read in the data word.

The factor can be entered up to 3 places behind the point, and the display will scroll automatically to the left during entry.

If several channels were activated, "SFAC2" and "SFAC3" will then appear.

SOFS1

Menu item "SOFS1" (measured value scaling: Offset) defines the offset constant. The display then outputs the *sum* of the read data value and the offset.

SOFS1 = -10.0, means that 10 will be deducted from the read data word before it is displayed.

If several channels were activated, "SOFS2" and "SOFS3" will then appear.

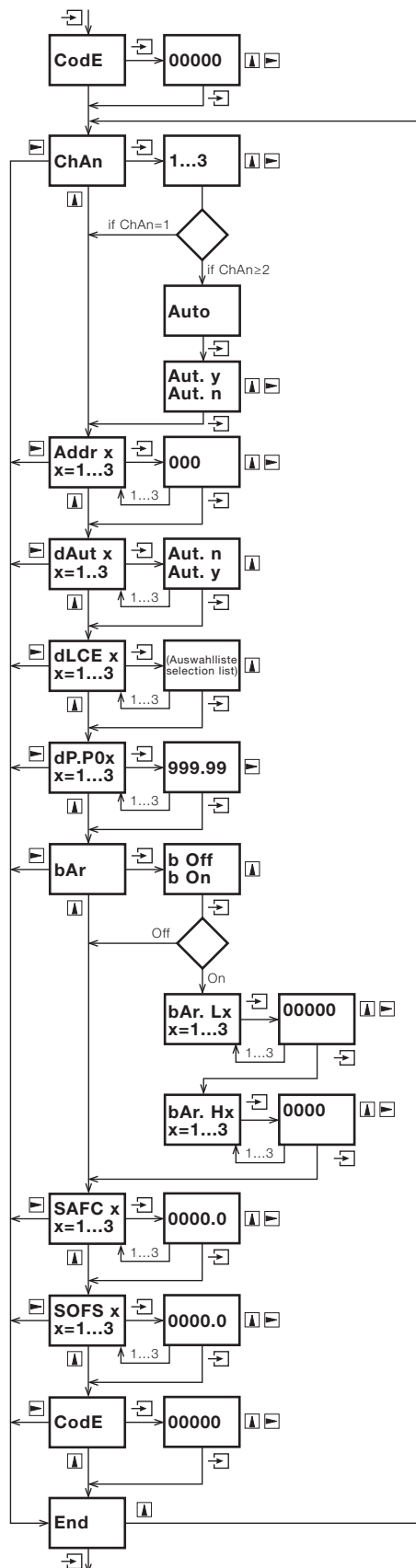
CodE

This menu can be used to reset the factory set code word "00001" in order to prevent access to the Entry menu by unauthorised persons.

End

Exit the menu by pressing the *Entry* key. The display device returns to the operating state. The entries become active immediately and are also stored after the display device is disconnected from the bus. Carry out a RESET in order to use the factory set settings (see page 8).

Overview – parameter menu structure



Parameter

Parameter value / Legend

CodE = Code word protection

Factory set settings [00001]

Chan = Channels 1...3

▶ Right key

Auto = Automatic switching through

▲ Up key

↵ Enter key

Addr = Bus address

dAut = DLCEP automatic

dLCE = DLCEP manually

dP.PO = Decimal point

bAr. = Values bargraph

bAr.L = Minimum value of the bargraph

bAr.H = Maximum value of the bargraph

SAFC = Measured value scaling (factor)

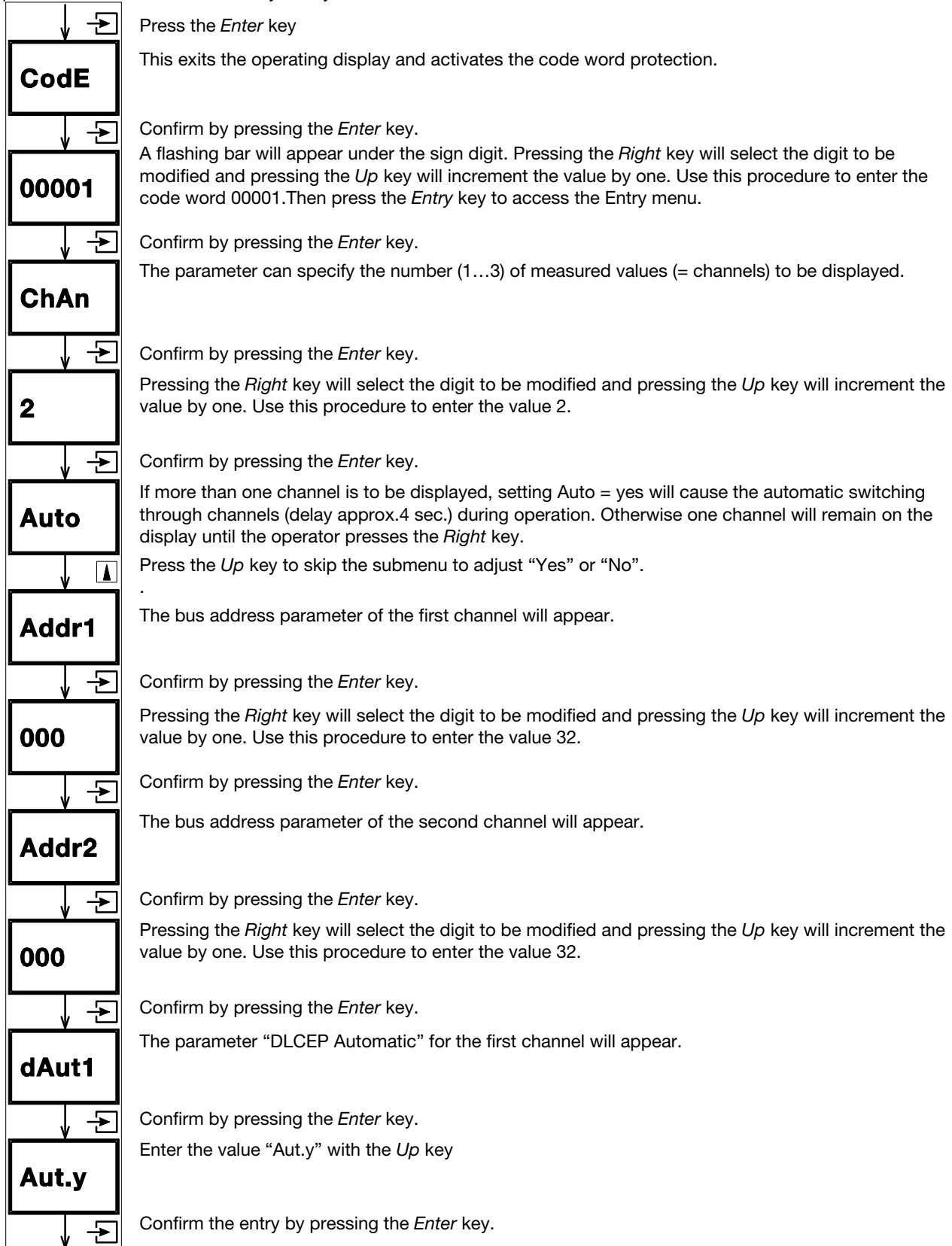
SOFS = Measured value scaling (offset)

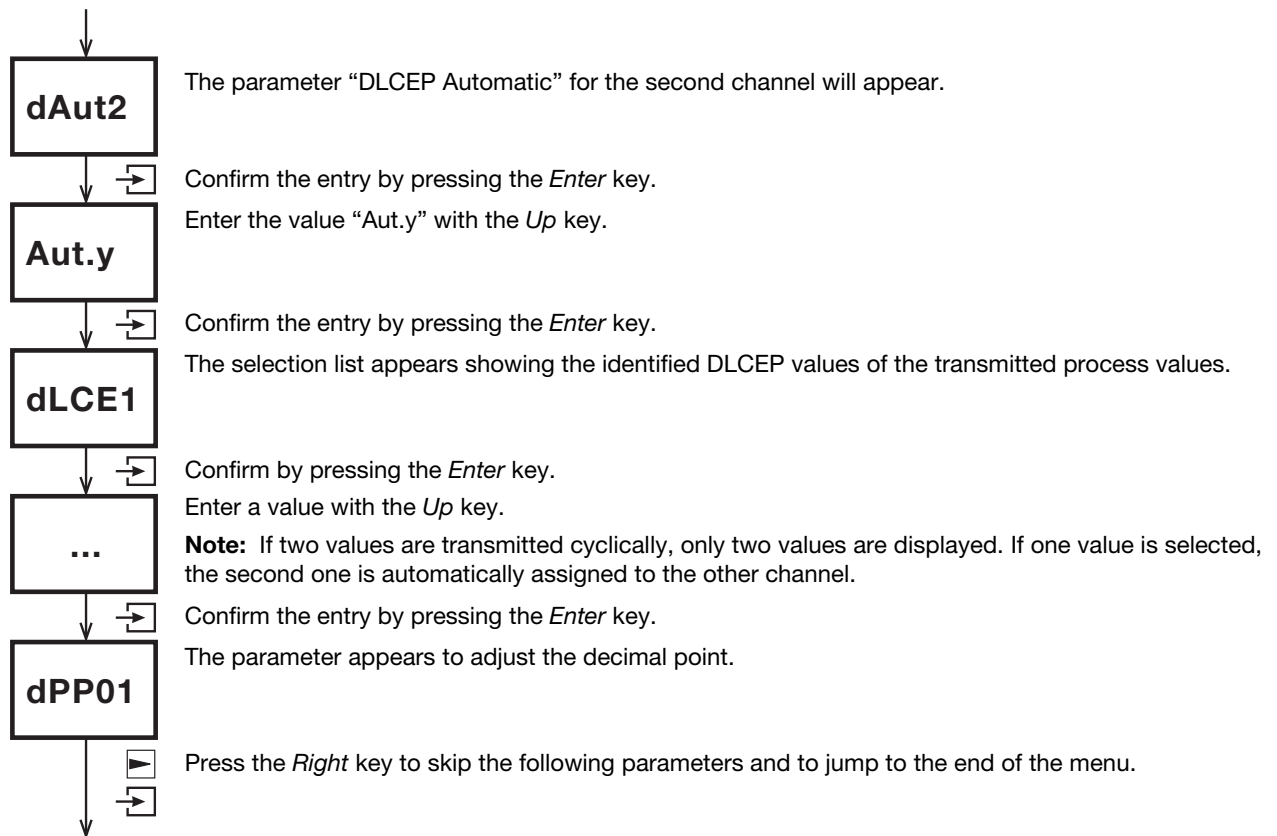
CodE = Code word protection

END = End of parameter entry

Example for parameterization:

How to set parameters at a temperature gauge indicating two temperature values of a fieldbus device is explained in the following example. Precondition: The fieldbus address must be known. In this example it is address 32. The temperature values are transmitted cyclically.





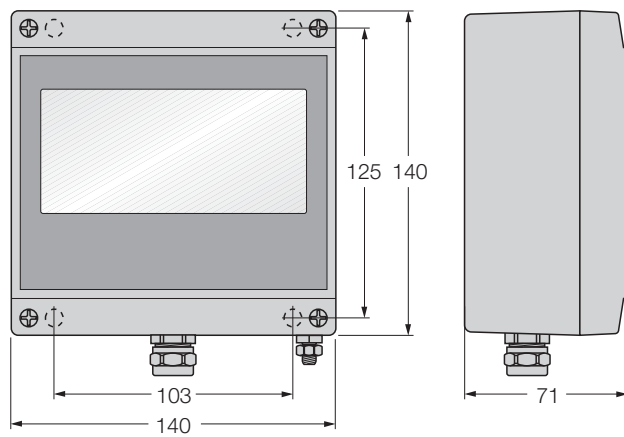
5 Appendix

Technical data

Type Ident no.		FD-49-T317/Ex 6901312
General	Explosion protection	II 2(1) G, EEx ia IIC T6 and T5 II 2 D, IP65 T 70°C
	Explosion limit values FISCO-compliant	$U_i = 30 \text{ V}$ $I_i = 660 \text{ mA}$ $P_i = 1.6 \text{ W}$ $C_i = 0 \text{ F}$, $L_i = 0 \text{ H}$
	EC type examination certificate	TÜV 07 ATEX 553588
	Ambient temperature T_{amb}	-10°C ...+45°C for T 6 and -10°C ...+60°C for T 5 -10°C ...+65°C for II 2 D (devices with range starting temperature of -20 °C on request)
Housing	Type	Field housings
	Protection degree	IP66 according to IEC/EN 60529
	Dimensions W x H x D [mm]	140 x 140 x 71
	Material	Aluminium
	Weight	900 g
Display	LCD	5-digit LCD 7-segment display
	Digit height	30 mm
	Display range	-9999 ... +99999
	Dimension symbols	Can be inscribed with insert symbol strip
	Decimal points	Freely adjustable for scaling
	Bargraph	41 segments
Electrical Specifications	Auxiliary supply	None – fed from bus (9...30 V)
	Current consumption (Bus)	< 10 mA
	Status control key	Display of the current status code

Error messages

Error message	Cause	Solution
E Col	The automatic DLCEP selection has determined several active DLCEPs on the stated address and now displays "ERROR COLLISION".	Set DLCEP manually (see page 8 and "example for parameterization", page 14)
Err_E.	"EEPROM ERROR" The data in the EEPROM is inconsistent and is not accepted.	Switch the device off and on. If the error persists the device must be exchanged.
Err_C.	The display device cannot detect data traffic on the bus at the set address.	Check the set device address

Dimension drawing FD-49-T317/Ex

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