IGEMA GmbH
Mess- und Regelsysteme

Installation and operating instructions

Digital level Transmitter DLT1

- with capacitive measuring probe EC 6

IGEMA GmbH

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Safety instructions

General safety instructions

1. Avoidance of risks to persons and property

- Only use the device supplied in accordance with the intended planning.
- Extensions and modifications to the device must only be carried out with our approval.
- Observe accident prevention regulations and system-specific safety instructions.
- Read and observe assembly and operating instructions.

2. Limitations of use

The device must only be used in accordance with the details in these operating instructions or for the parameters agreed in the supply contract (see name plate) and the application.

3. Avoidance of risks and damage

- Disseminate the assembly and operating instructions to the departments responsible for "goods in, transport, assembly, commissioning and maintenance".
- If this device is passed on to third parties these assembly and operating instructions in the relevant language of the country must accompany it.
- Work on the device should only be carried out by trained staff specially commissioned and exclusively with the current disconnected.
- Read and observe the assembly and operating instructions carefully and keep them in a safe place.
- **Take note of and follow the safety instructions printed in bold and highlighted in the individual sections!**
- When transporting, avoid e.g. knocks and putting down heavily, this can lead to damage.
- For intermediate storage ensure that the storage location is suitable for the device. The storage location must be dry and the device secured against damage.

4. Symbols

In these assembly and operating instructions safety instructions are specially marked with the following symbols:

Danger

means that if they are not observed there is risk to life and / or significant damage to property may occur.

Take note

means that attention is particularly drawn to technical requirements.

Exclusion of liability

IGEMA GmbH Mess- und Regelsysteme will assume no liability if the above-mentioned regulations, instructions and safety precautions are not noted and followed.

2. Use in compliance with regulations

The DLT1 is intended for use in combination with the IGEMA measuring probe type EC6 as level transmitter for the output of an output current proportional to the fill level 4-20 mA. The measuring range "E" can be individually set over almost the whole measuring probe length.
The DLT1 has been specially developed for use in tanks with liquids with dielectric constant ≥ 5 such as e.g. steam boilers or condensate tanks.

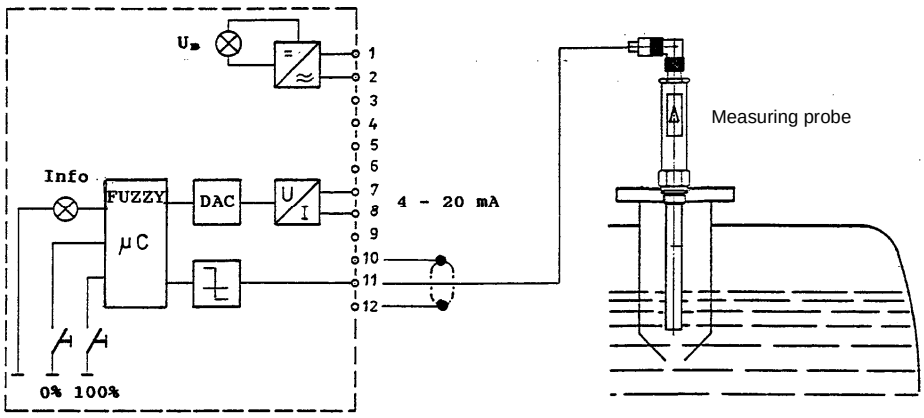
3. Function

The general function of the transmitter is displayed by lighting of the green LED "**UB**".
The limit values 0% and 100% which can be determined by the user determine the value range for the following scaling.
The second LED "**INFO**" gives information about the state of the device:

Signal diode "**INFO**"	**lights up**	Programming mode
Signal diode "**INFO**"	**flashes**	Fault
Signal diode "**INFO**"	**does not light up**	Operation

3.1 Operating principle DLT1

The capacity of the condenser from measuring probe rod, measuring probe protective tube and the stratified dielectric fluid formed from fluid and steam changes with each change of the fluid level in the tank. The IGEMA EC6 measuring probe carries out the measurement of this capacity continuously by means of a high-frequency measurement signal and transfers the result to the DLT1.
This evaluates the measurement signal and outputs the analogue current signal 4 – 20 mA corresponding to the level.
The DLT1 carries out a periodic overall test of the system as a fully automatic process. As soon as the transmitter diagnoses a fault (e.g. a fault in the wiring to the measuring probe or a malfunction of the EC6 probe) this is displayed by the "Test" LED flashing. In normal operation this LED does not light up.



4. Design

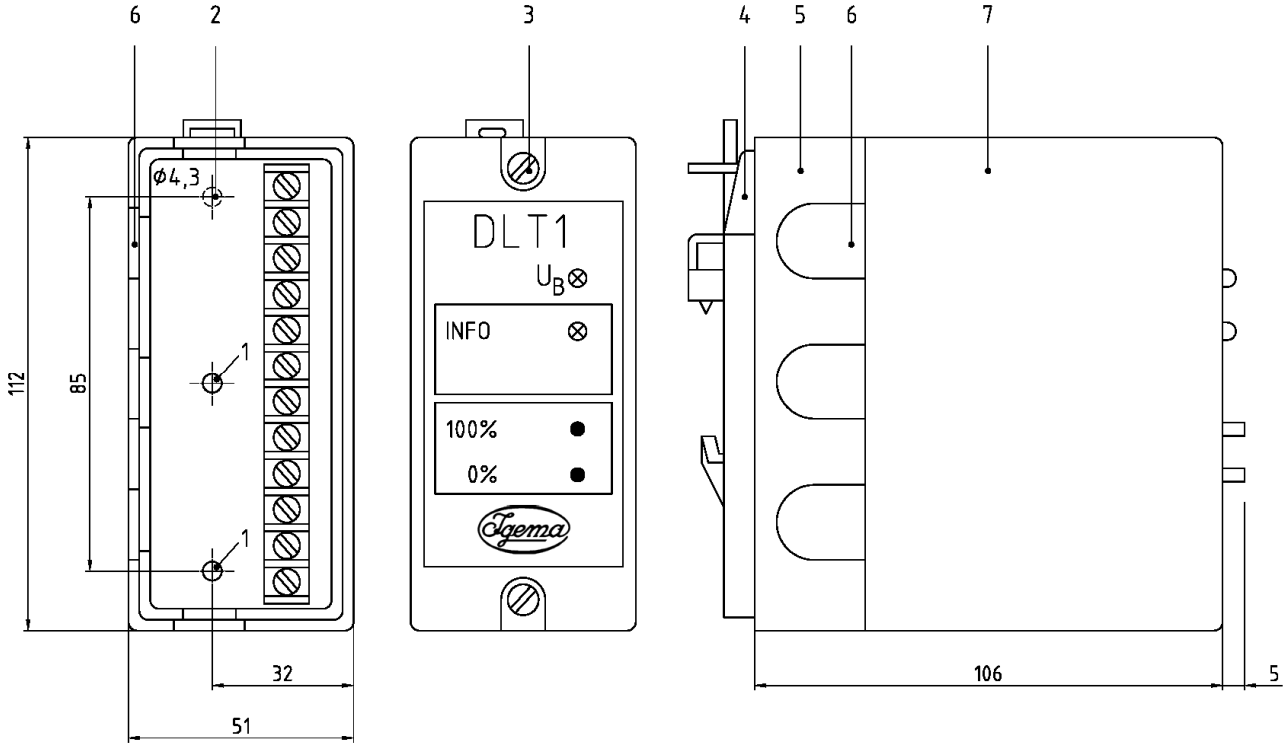
The DLT1 is supplied in a plastic plug-in housing for fitting into switch cabinets. The housing is designed for quick fitting with a spring catch for the DIN EN 50022 standard 35 mm carrier rail and for screw fixing on a mounting plate.

4.1 Installation dimensions and descriptions DLT1

Base with connecting terminals

Front view

Side view



1 Screws for snap fastening
2 Holes, ø 4.3 mm
3 Fixing screws
4 Snap fastening
5 Holder
6 Cable feedthrough
7 Hood

5. Installation

Secure with protection class in accordance with current regulations!

With snap fastening for standard 35 mm carrier rail according to DIN EN 50022

- Fix device on standard carrier rail by means of the snap fastening (4).
- Release fixing screws (3) and pull hood (7) from holder (5).

Without snap fastening

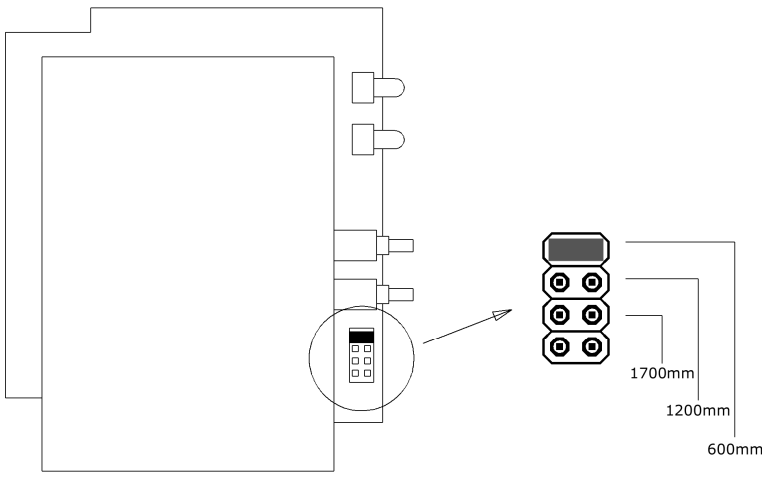
- Release fixing screws (3) and pull hood (7) from holder (5).
- Release screws (1) and remove snap fastening (4). Drill through the marked point (2) in the holder (5) with ø 4.3 mm drill.
- Fit base (5) on base plate with two M4 screws.

6. Configuration

The preset measuring range of 600 mm can be changed.
The physical upper limit for the measuring range for this is the length of the probe.

Setting the measuring range:

- Disconnect the plug base (5) from the mains.
- Open DLT1. (After releasing the fixing screws (3) the hood (7) can be pulled off the holder (5).
- After unlatching the back plate pull both circuit boards out of the hood (7) without damaging them.
- On the larger circuit board at the front edge there is a jumper via which the measuring range can be changed (see illustration). The jumper is to be set at probe length Y

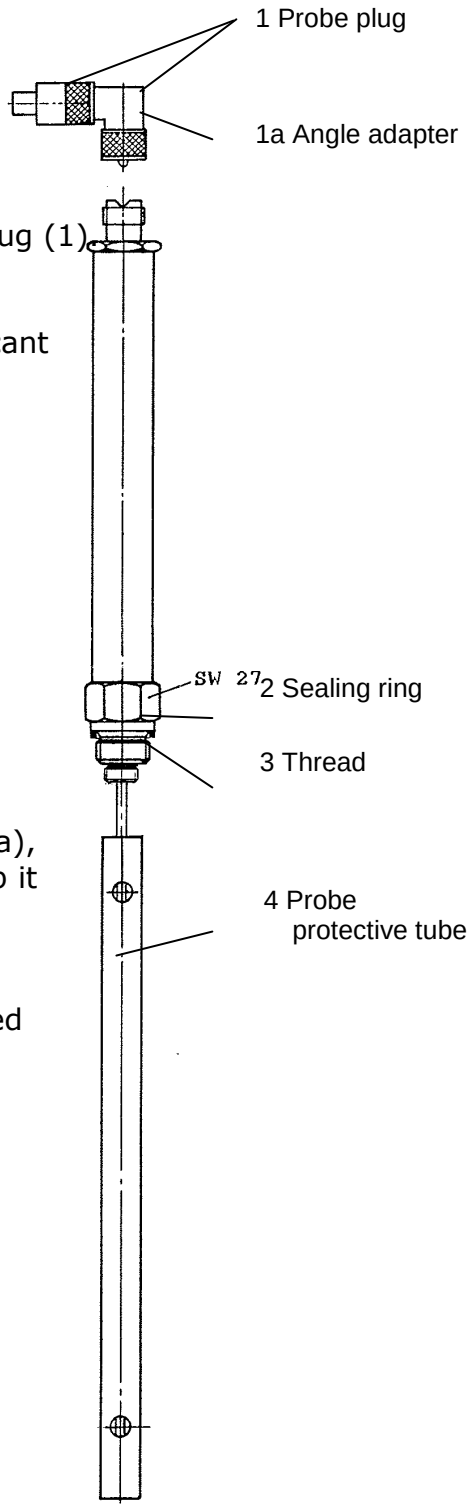


DLT1 circuit boards

7. Fitting the measuring probe

It is essential to remove the protective tube for transport before installation!

If several electrodes are screwed into a flange the electrode plug (2) and the associated electrodes should be labelled to prevent confusion!



Screwing in the electrode

- To do this angle adapter (1a) and pull out probe plug (1)
- Clean sealing surfaces and check
- Insert sealing ring (2)
- Lubricate thread (3) with heat-resistant solid lubricant (e.g. graphite).
  Screw in measuring probe and tighten,
  max. tightening torque Md=140 Nm.

On commissioning the boiler check the electrode screw connection in the flange for tightness and if necessary retighten!

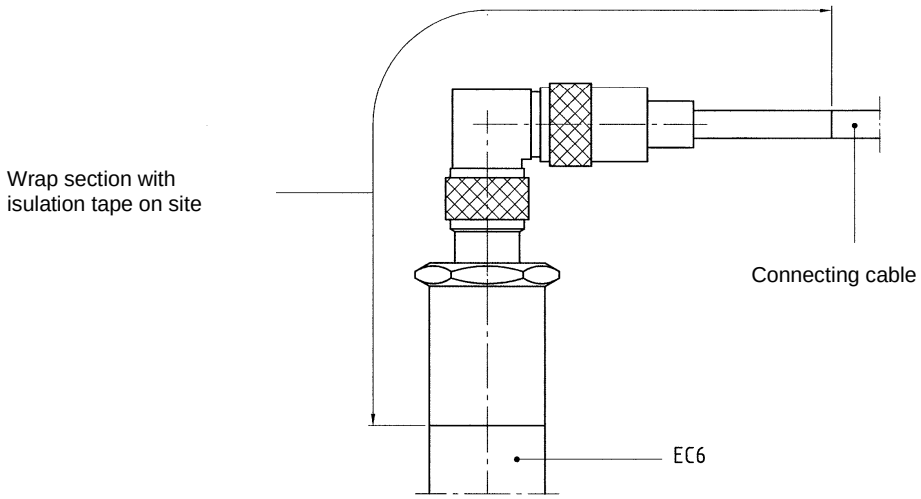
Adjusting the probe plug

Change of position 4 x 90°

- Release the knurled screw on the angle adapter (1a), lift it out of the ratchet mechanism turn it and snap it back into the desired position.
- Tighten knurled screw
- To ensure protection class IP65 for probe plugs it must be wrapped with the insulation tape supplied (self-welding).

Instructions for applying the self-welding insulation tape:

a) Ensure the base is dirt- and grease-free
b) Stretch the insulation tape and wrap half overlapping, avoiding trapping air between the layers.



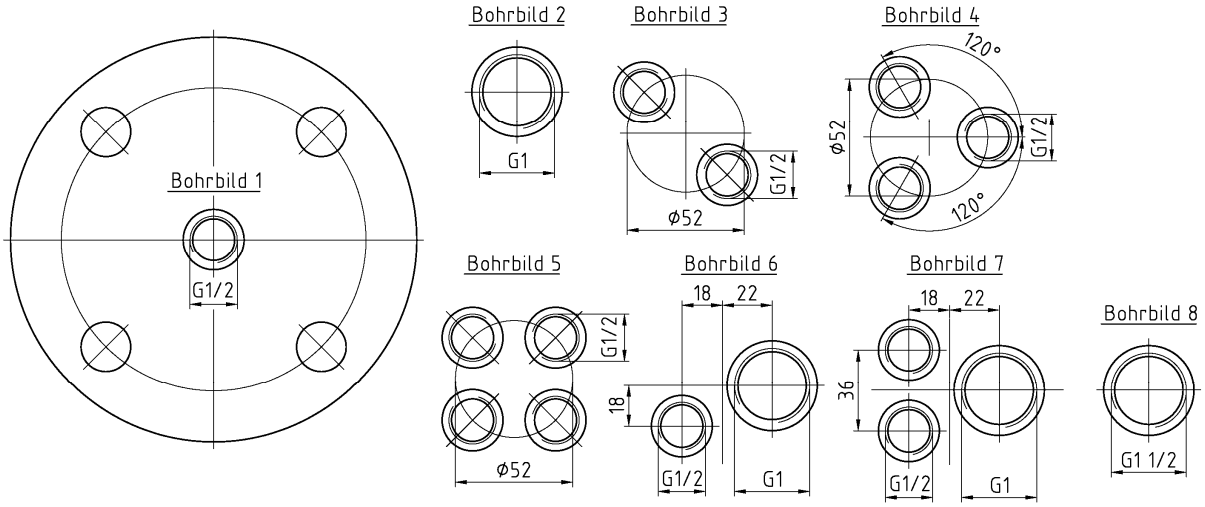
7.1 Fixing elements for receiving the electrodes

The flanges, seals, screws and nuts listed in the table below are laid out in accordance with the Technical Rules for Steam Boilers (TRD) and tested by the Technischen Überwachungsverein (TÜV) [Technical Inspection Agency].

Flange according to DIN

PN	DN	DIN	Sealing surface	Form	Threaded hole	Material
40	50	2635	DIN 2526	B	according to drilling plan 1,2	1.0460
63		2636		E		
100 / 160		2638				
40	100	2635	DIN 2526	B	according to drilling plan 1,2,3,4,5,6,7,8	1.0460
63		2636		E		
100 / 160		2638				

Drilling plans 1-8



"Bohrbild" means: drilling plan

Seals according to DIN

PN	DN	DIN	Material
40	50	EN 1514-1 IBC	asbestos-free
63		2697	RSt 37-2/ 0.5 graphite
100 / 160			
40	100	EN 1514-1 IBC	asbestos-free
63		2697	RSt 37-2/ 0.5 graphite
100/160			

DIN screws

PN	DN	DIN	Number	Dimension	Material
40	50	976	4	M16 x 75	1.7709
63				M20 x 100	
100/160				M24 x 110	
40	100	976	8	M20 x 90	1.7709
63				M24 x 110	
100/160		2510		LM27 x 145	Ck 35

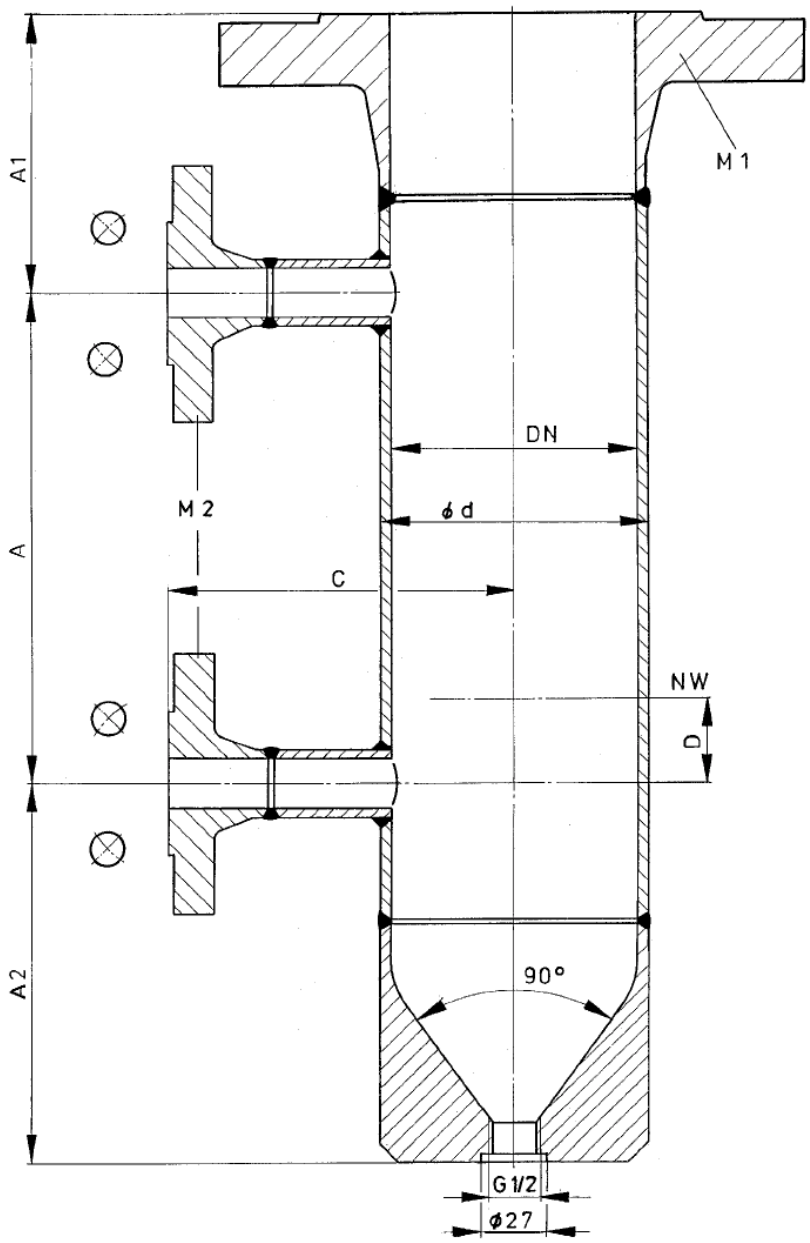
DIN nuts

PN	DN	DIN	Number	Dimension	Material
40	50	EN 24032	8	M16	1.7258
63				M20	
100/160				M24	
40	100	EN 24032	16	M20	1.7258
63				M24	
100/160		2510		NFM27	C 35

7.2 Mounting in mounting housing

The approval is only valid if shut off valves are mounted between the process connections of the mounting housing and the boiler supports and a relief valve is fitted on the mounting housing!

Illustration Mounting Housing



Construction dimensions

PN	DN	Construction dimensions min. [mm]]				
		Ød	C	D	A1	A2
16	50	60.3	115	15	85	100
25						
40						
63			135		100	
100					105	
160					115	
16	100	114.3	140	15	100	150
25						
40						
63			160		140	160
100					155	
160					165	

Materials

Flanges	1.0460
Pipes	St35.8 / 16 Mo 3 (according to pressure range)

Process connection M1

PN	DN	DIN	Sealing form DIN
16	50	2635	2526 Form C
25			
40			
63	100	2637	2526 Form E
100			
160		2638	

Process connection M2

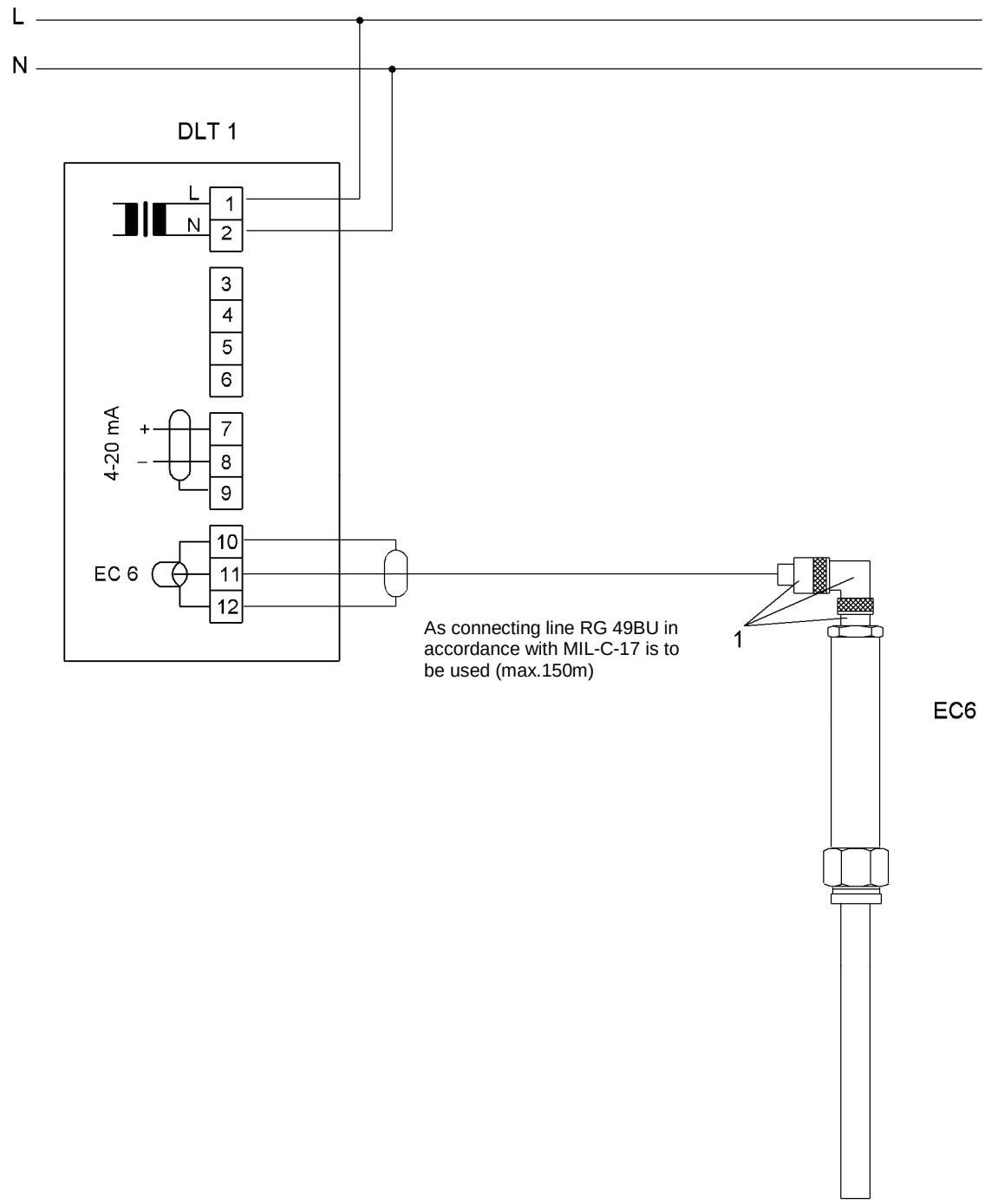
PN	DN	DIN	Sealing form DIN
16	20	2635	2526 Form C
25			
40			
63	25	2637	2526 Form E
100			
160		2638	

On request ASME-compliant flanges, weld-on ends or
DIN or ASME-compliant socket welding on the process connection M2 are also an option.

8. Power connection

Carry out connection according to the DLT1 wiring diagram on the back plate of the hood (see page 8 item 7) or according to the wiring diagram illustrated!

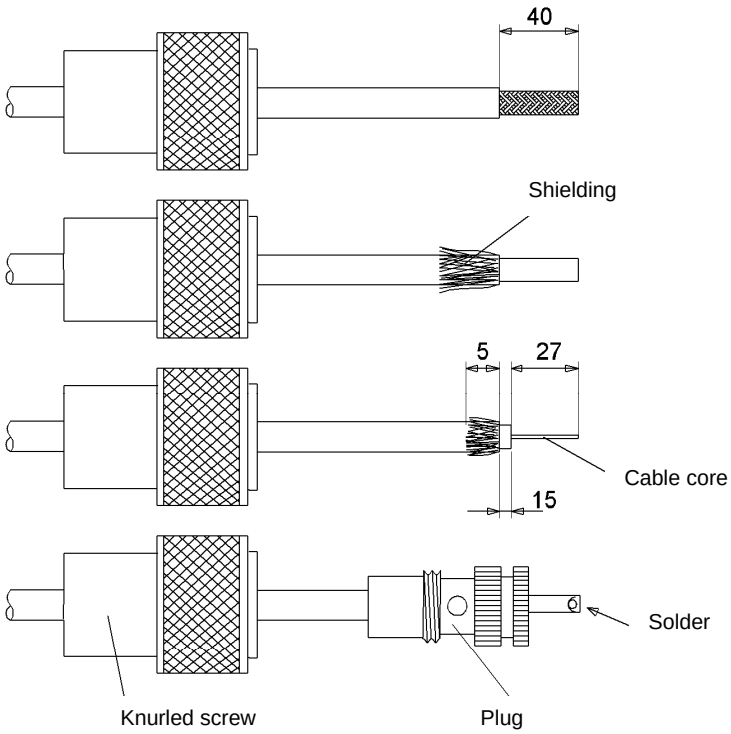
8.1 Wiring diagram

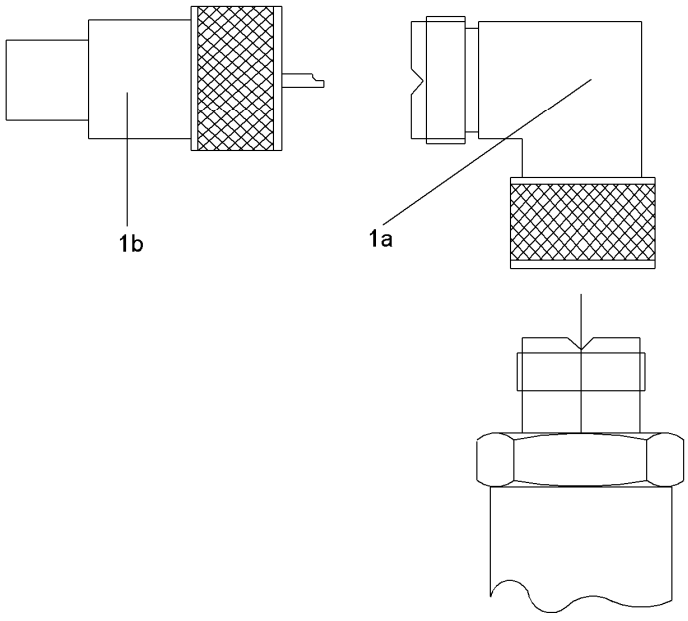


8.2 Procedure

Cable connection at the plug (1b) of the screw plug-in connection (1)

- Pull off plug (1b) after releasing the knurled screw
- Screw off the knurled screw (1b) of the plug
- Remove insulation from connecting cable
- Push the knurled screw over the cable and screw plug on to the reversed shielding
- Solder cable core with plug, cut off overlapping core and screw on knurled screw
- Insert plug (1b) into angle adapter (1a) and tighten knurled screw





Electrical connection of the DLT1

- Pierce or pull out cable feedthrough (6) and feed connection cable through. Check supply voltage. See name plate for allowable voltage.
- Connecting cable to the EC6 –**MIL-C-17F-RG 059BU**- max. 150 m connecting cable for the power interface 4-20 mA –**LICY 0.5 mm²** -unlimited
- When the wiring of the DLT1 transmitter is correct the green LED **"U_B"** lights up.

9. Servicing

At each boiler inspection check by comparison whether the limit values set have not changed.
If changes are determined, the cause may be deposits in the measuring cell.

Remedy: Cleaning the measuring rod:

- Clamp the tube (4) carefully and screw off with a screwdriver on the hexagon head. Carefully remove the tube
  Please note: Thread in the tube may damage PTFE insulation!!
- Clean the measuring rod in the measuring probe when it has completely cooled down with a clean, soft cloth.
- Insert the measuring rod in the tube (4) without damaging and screw tight.

10. Calibration / Programming

Changing the preset measuring range “E” of 600 mm is possible.

Setting the measuring range “E”

Press both buttons “0%” and “100%” and hold them down until the yellow LED “**TEST**” lights up. The device is now in programming mode.

MIN calibration

- Bring the fill level in the tank to the minimum.
- Press the "0%" button and hold it down.
- In addition press the "100%" button and hold it down until the yellow LED “**INFO**” goes out.

The "0%" fill level is programmed. The DLT1 will record the values corresponding to the "0%" fill level. After the recording is completed the yellow LED “**INFO**” lights up again. This may take a few seconds.

MAX calibration

- Bring the fill level in the tank to the maximum.
- Press the "100%" button and hold it down.
- In addition press the "0%" button and hold it down until the yellow LED “**INFO**” goes out.

The "100%" fill level is programmed. The DLT1 will record the values corresponding to the "100%" fill level. After the recording is completed the yellow LED “**INFO**” lights up again.
This may take a few seconds.

To leave programming mode you must press the “100%” and then the “0%” buttons and hold both of them down until the yellow LED “**INFO**” goes out briefly and then lights up again.
After releasing both buttons the yellow LED "**INFO**” goes out.

11. Error reports

11.1 Programming errors

Fault	Cause / remedy
After the programming procedure of the upper and lower measuring range limit values the yellow "Test" LED does **not** go out. It flashes approx. 10 times and then remains permanently lit.	Transmitter does not accept limit value. a) Possibly the limit values "0%" and "100%" have been interchanged. b) Too small a measuring range has been selected (E_{min}=50mm). c) The DLT has been incorrectly configured. Repeat the programming of the limit values "0%" and "100%" in the correct order and observe the minimum distance E_{min}. If necessary correct the configuration of the DLT1 (see chap. 7).

11.2 System / wiring errors

Fault	Cause:
The yellow LED "Test" flashes at intervals of a second.	The transmitter has diagnosed a fault. a) Wiring incorrect or defective. b) Measuring probe defective. Check the wiring for faults or damage and if necessary replace the wiring. Then reset the device by pressing simultaneously both buttons "0%" and "100%" for approx. 1 second. If the fault persists, please contact your local dealer.

Do not remove the hood (7) until the plug base has been disconnected from the mains.

12. Technical data

12.1 Device data DLT1

Component identification mark	TÜV●WRS●04●371
CE ID no.: 0035	
Manufacture in accordance with EC Directive 97/23/EC, Module D1, Category II Standards TRD, AD2000	
Mains connection	230 V ± 10% 50/60 Hz
Power consumption	Approx. 4.5 VA
Device fuse	80 mA/T
Protection class in accordance with DIN VDE 0470	40.
Allowable ambient temperature	0 - 65°C
Power interface	4-20 mA, load max. 300 Ω

* IP 54 protection class is to be ensured in the boiler area to comply with the German regulation VdTÜV-Wasserstand 100, 4.90.

- for connecting cable to EC6: MIL-C-17F-RG 059BU, max. 150 m
- For the power interface: 4-20 mA, LIYCY 0.5 mm², unlimited.

12.2 Device data EC6

Electrode		**EC6**
Nominal pressure	PN	40
Max. allowable pressure	PS [bar]	32
Max. allowable temperature	TS [°C]	239
Construction dimensions "Y_{max}"	[mm]	1700
Measuring range "E_{min}"	[mm]	50
Measuring range "E_{max}"	[mm]	Y-100
Mechanical connection		Thread G ½
Power connection		PL259/LF
Protection class in accordance with DIN VDE 0470		IP65 (with self-welding insulation tape round the probe plug)
Max. allowable ambient temperature at the plug [°C]		70
Insulator		PTFE
Plug		Brass (nickel-plated)
Sealing ring		Soft iron
Electrode housing		Niro
Electrode rod		Niro

13. Attachment

Warranty

We give a guarantee period on our product of 24 months. The condition for this is proper handling in accordance with the assembly and operating instructions. For worn and replacement parts the warranty is limited to defects of material and manufacture.
Level electrodes are wearing parts and do **not** form part of the warranty.

14. Declaration of Conformity

EC conformity declaration in accordance with

EC Directive 2006/95/EC,
EC Directive EMC 2004/108/EC and DIN EN 60730-1+2

We:

IGEMA GmbH
LECOS GmbH
J.G. Merckens Mess- und
Regelsysteme GmbH & Co. KG
Zieglerstraße 10-16
D-52078 Aachen

declare as the IGEMA Group that the
product "NW water level limiter" as pressure accessory

Product type:
Control device "DLT1" with
Electrode "EC 6"

comply with the directives and have been subjected to the following conformity-assessment procedure:

Category II, Module D1

Applied standards:
Control device: DIN EN 50081-1, DIN EN 50082-1
Electrode/float switch: TRD, AD2000

Notified body for the modules:

TÜV Rheinland Industrieservice GmbH
Am Grauen Stein
D-51105 Köln (Cologne)

Identification no. 0035

Aachen, 20.07.2011

E.H. Kilchert	A.Scholl	J.Riechelmann
(Managing director)	(QM Officer)	(Development)

This high-quality IGEMA product was designed, manufactured and tested with the application of the QM System guidelines in accordance with DIN EN ISO 9001:2000.

If the device supplied shows transport damage or gives cause for complaint in spite of our final quality control please contact our SERVICE department by return.
Telephone *0241- 5687-0.*

Prepared by: V.Hugemann	Approved:	Date: 16.09.2011