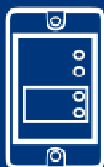




IGEMA GmbH
Mess- und Regelsysteme



Installation and operating instructions

High water level limiter SMHC1

- With level electrode EL 040 / EL 21-2



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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 fitting 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.



Attention

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 high water level limiter SMHC1 in combination with the level electrodes EL 040 or EL 21-2 is a multi-dynamic limiter in accordance with DIN EN 50156-1 and water level 100.

The self-monitoring control system (SMC) enables first failure identification at the time of occurrence and immediately switches off the downstream relays.

3. Function

The general function of the limiter is displayed by lighting of the green LED "**UB**". The input stage of the SMHC1 compares the values of the limiter electrode in a Wheatstone bridge using a mains synchronised reference voltage. The dimensioning of this stage allows the identification of short circuits and interruptions in the electrode power line. The core element of this limiter is a timer and control unit monitoring the output of the input stage at intervals of 40 ms for its in-phase dynamic behaviour.

If the behaviour is correct the timer and control unit activates the driver of the final stage with its own momentum. The final stage has its own specified time response which only activates the output relay when phasing and time of the activation are carried out within a fixed framework. The power flowing via the contacts of the safety chain is limited in the SMHC1 by 4 amp fuse protection by which sticking of the contacts is prevented. With static activation or failure of the activation the final stage will switch off after a delay time.

Faults and high water level are displayed by the lighting of the red LED "**FAULT**". In the event of high water level, after a time delay of one second the contacts of the additional fault reporting are closed and the display "**FAULT**" is shown. After the delay time which can be set at 4, 8, 12, 16 seconds, switch-off of the relays of the safety chain takes place.

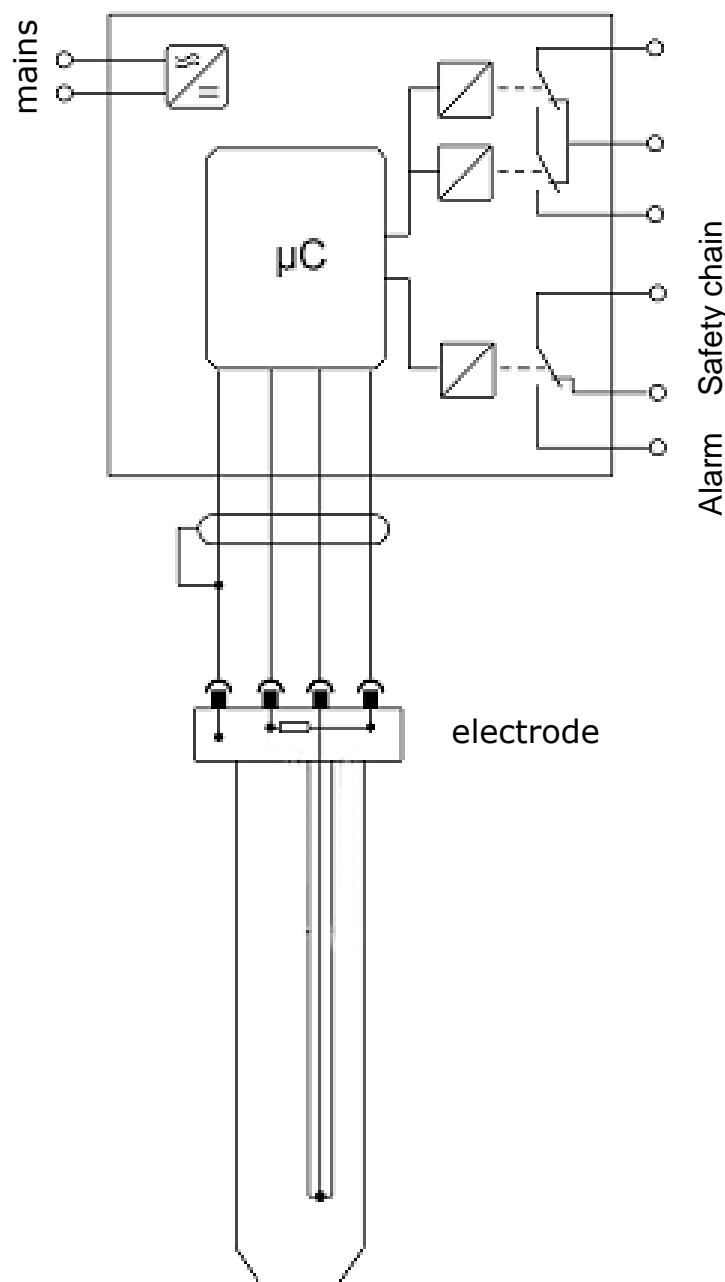
The delay time is preset at 4 seconds.

3.1 Operating principle SMHC1

The SMC system is capable of identifying any possible first failure the moment it occurs and switching off the downstream relays. Failure to detect a fault is therefore impossible.

As further dynamic monitoring, the periodic overall test of the device takes place every 2 minutes for one second as a fully automatic process. The yellow LED "TEST" shows that the test is being carried out followed by confirmation by the red LED "FAULT" lighting up briefly.

Because of this first failure safe concept, manual tests are not necessary - so there are no test switches on the SMHC1.



4. Design

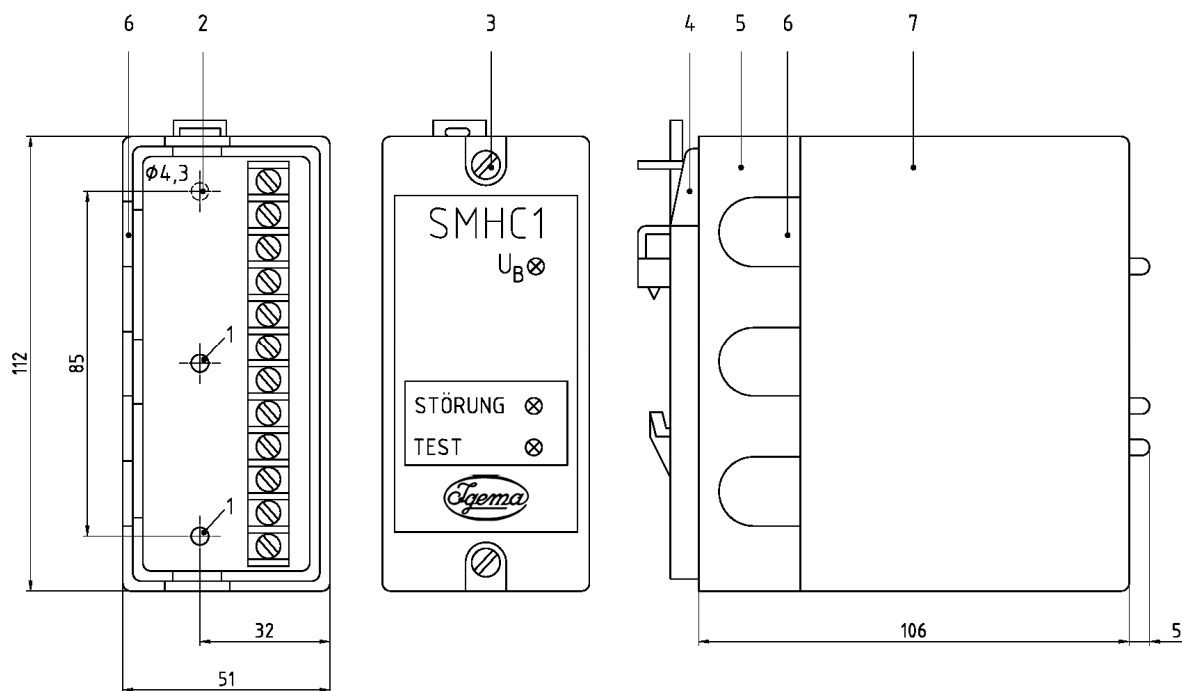
The SMHC1 is supplied in a plastic plug-in housing for fitting into switch cabinets. The housing is designed for quick fitting with a spring catch for the DIN EN 50022 standard 35 mm carrier rail and for screw fixing on a mounting plate.

4.1 Installation dimensions and descriptions SMHC1

Base
with connecting terminals

Front view

Side view



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

5. Installation



Unsure 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 \varnothing 4.3 mm drill.
- Fit base (5) on base plate with two M4 screws.

6. Configuration

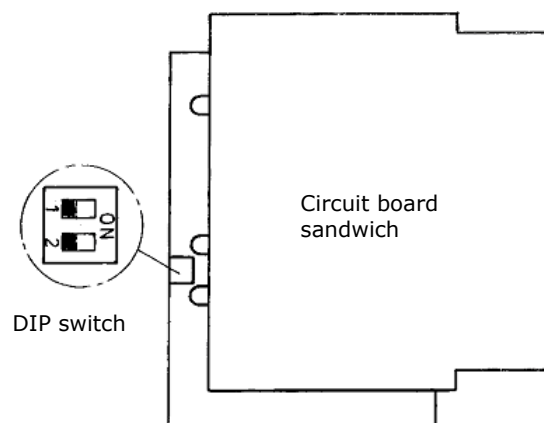


The preset switch-off time of 4 seconds can be changed. It is to be agreed with the local expert.

Setting the switch-off time:

- Open SMHC1. To do this release the fixing screws (3) and pull the hood (7) off the holder (5) – with the device disconnected from the power supply.
- After unlatching the back plate pull the circuit board sandwich out of the hood (7). On the smaller circuit board at the front edge there is a two-pole DIP switch (see diagram) via which the switch-off time can now be changed as follows:

DIP switch		Switch-off time
1	2	
off	off	4 s
on	off	8 s
off	on	12 s
on	on	16 s



7. Fitting the electrode

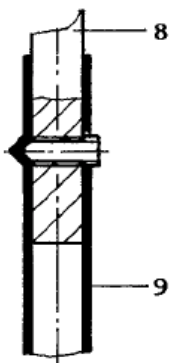


It is essential to remove the protective tube for transport before installation!



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

Fixing the electrode extension (9)



Push the electrode extension (9) approx. 30 mm over the electrode shank (8) until the \varnothing 4.3 mm hole matches the threaded hole in the electrode shank.

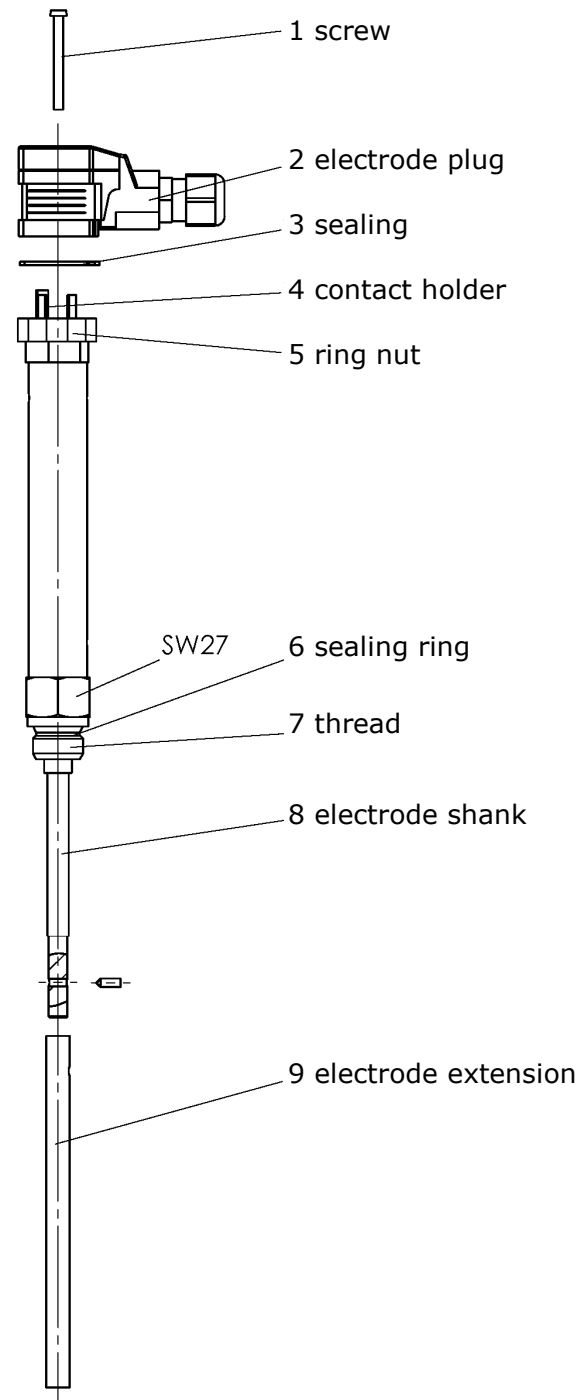
Screw up both parts by means of the enclosed M4 set screw with AF2 hexagon socket.

Screwing in the electrode

- Release screw (1) and pull off electrode plug (2).
- Clean sealing surfaces and check
- Insert sealing ring (6)
- Lubricate thread (7) with heat-resistant solid lubricant (e.g. graphite).
- Screw in electrode and tighten, max. tightening torque $M_d=140$ Nm.



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



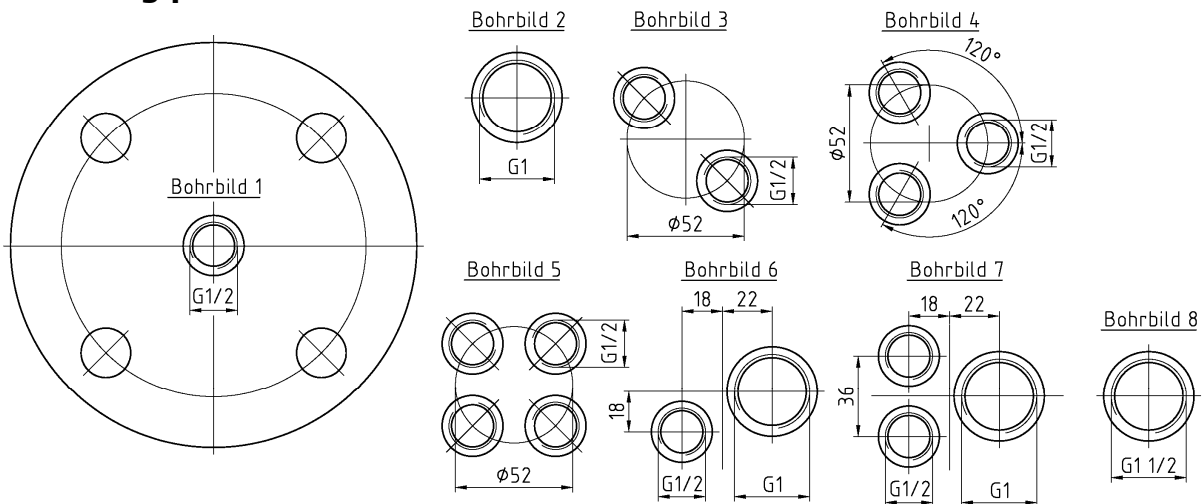
7.1 Fixing elements for receiving the electrodes

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 Technischer Überwachungsverein (TÜV) [Technical Inspection Agency].

DIN flanges

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

Drilling patterns 1-8



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	Quantity	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		2510		M24 x 110	Ck 35
100/160			LM27 x 145		

DIN nuts

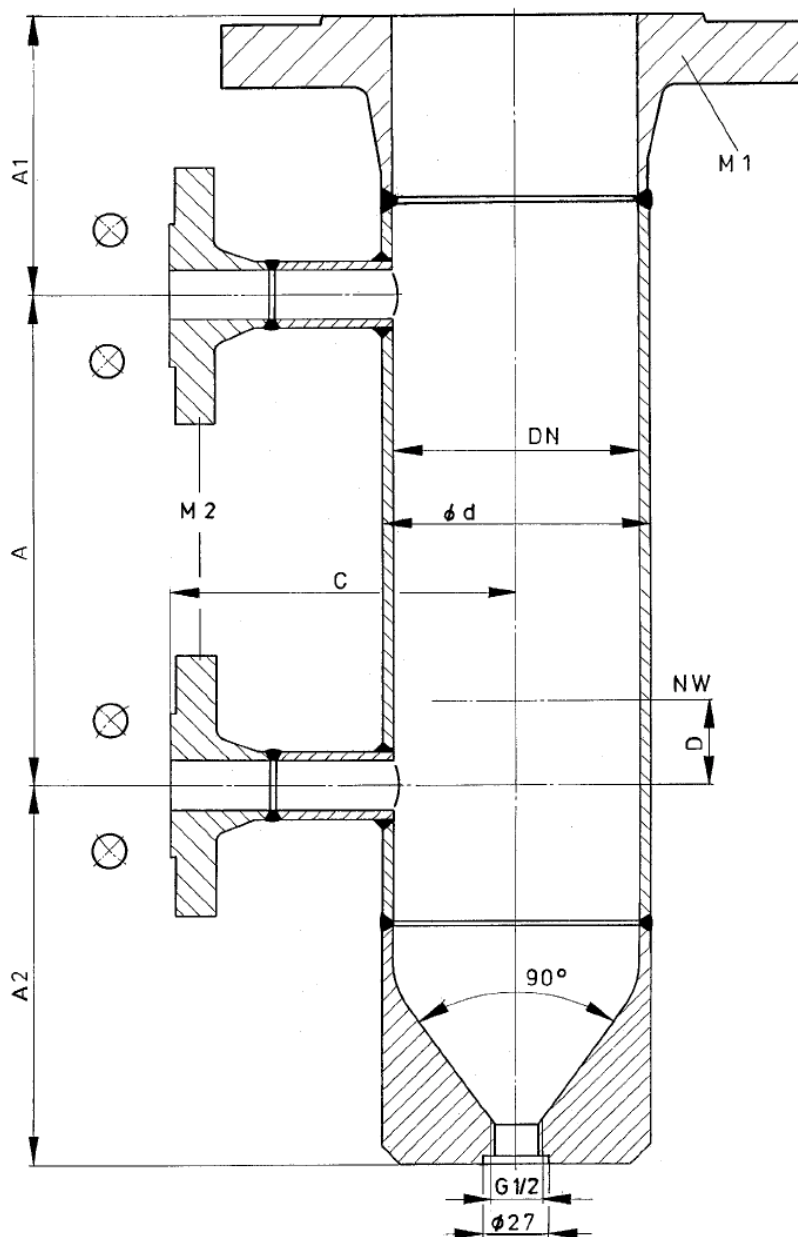
PN	DN	DIN	Quantity	Dimension	Material
40	50	EN 24032	8	M16	1.7258
63				M20	
100/160				M24	
40	100	EN 24032	16	M20	1.7258
63		2510		M24	C 35
100/160			NFM27		

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			

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			

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

7.3 Adjusting the electrode plugs (see sketch page 9)

If insertion of the electrode plugs (2) is not possible because of the position of the contact holder (4) take the following steps:

- Keep releasing the threaded ring (5) until the contact holder (4) can be lifted.
- Turn the contact holder (4) into the required position and snap in; retighten the electrode plug (5).

7.4 Shortening the electrode extension (see sketch page 9)



Never dismantle the electrode when the boiler / mounting housing is pressurised!

- Release screw (1) and pull off electrode plug (2).
- Screw out electrode.
- Dismount electrode extension (9) by screwing out the set screw.
- Clamp electrode extension (9) directly at the point to be shortened and shorten. Do not distort the electrode extension!



Lengthening is not permissible!



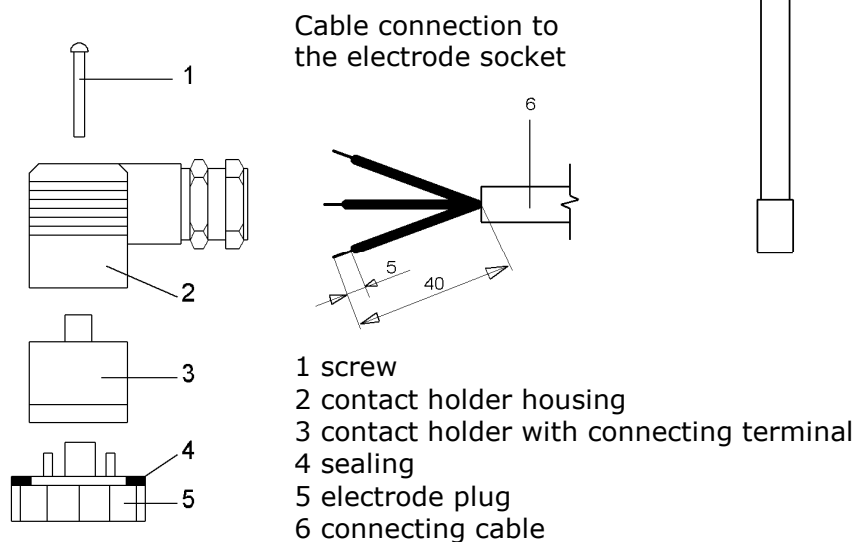
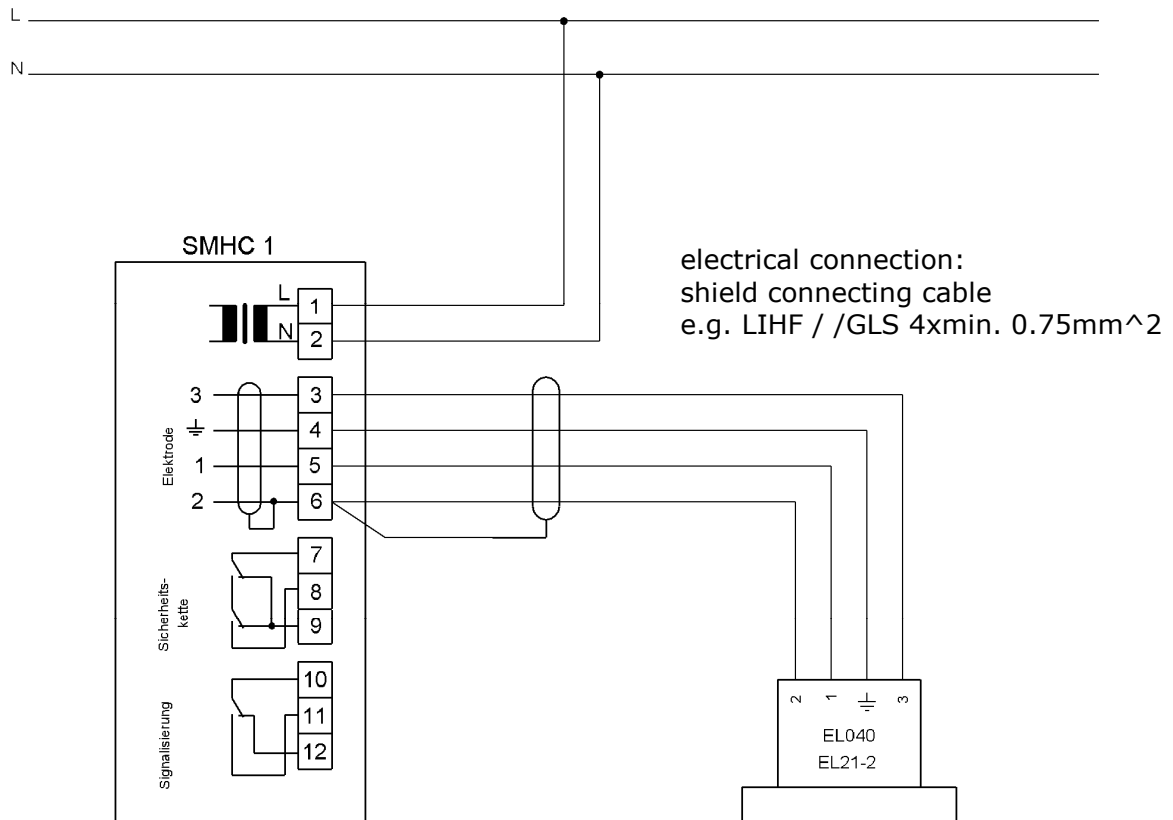
Do not heat insulate electrode head - all parts above the thread (7)!!

8. Power connection



Carry out connection according to the SMHC1 wiring diagram on the back plate of the hood (see page 7 item 7) or according to the wiring diagram illustrated!

8.1 Wiring diagram (EL 040, EL 21-2)



8.2 Procedure

- Pierce or pull out cable feedthrough (6) and feed connection cable through. Check supply voltage. See name plate for allowable voltage. Use shielded connection cable to the electrode 2 x 2 STP, e.g. LIHF/GLS, 4 x 0.75 mm². Length of connecting line max. 100 m at 5 – 10,000 µS/cm or max. 30 m at 0.5 – 2,000 µS/cm.
- Only connect shielding on the SMHC1 control unit (terminal 6). After electrical connection - with device disconnected from the mains - put hood (7) on holder (5) and tighten fastening screws (3).

8.3 Testing

Switch on supply voltage, the green LED "U_B" lights up.

- When the electrode is submerged the red LED "FAULT" lights up.
- When the electrode is uncovered the LED "FAULT" must not light up.
- The LED "TEST" must light up for one second every two minutes.

A successful test is confirmed by the red LED flashing briefly.

9. Technical data

9.1 Device data

Component identification mark	TÜV ID: 000006512
CE ID no: 0035	
Manufacture in accordance with EC Directive 97/23/EC, Module D1, Category II Applied standards: Control device: DIN EN 50081-1, DIN EN 50082-1 Electrode: TRD, AD2000, ASME boiler	
Mains connection	230 V ± 15% 50/60 Hz
Power consumption	approx. 4.5 VA
Device fuse	80 mA/T
Protection class in accordance with DIN VDE 0470	IP 40*
Allowable ambient temperature	0 - 60°C

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

Electrode		EL 040		EL 21-2				
Nominal pressure	PN	25	40	63	100	160	250	320
Max. allowable pressure	PS [bar]	20	32	50	80	100	160	250
Max. allowable temperature	TS [°C]	214	239	265	296	312	346	367
Construction dimensions Y [mm]		> 125		> 130				
Mechanical connection		Thread G ½						
Power connection		Plug connection with screw terminals, strain relief						
Screw cable connection		M16X1.5						
Protection class in accordance with DIN VDE 0470		IP 65						
Max. allowable ambient temperature at the plug [°C]		100°C						

Construction dimension Y [mm]	EL 040 / EL 21-2	
1.700	with protective tube > DN 80,	vertical installation position
800	with protective tube DN 50,	vertical installation position
800	with protective tube DN 50 / 100,	installation position inclined up to 45°

Electrode	EL 040	EL 21-2
Insulator	PTFE	Ceramic
Plug	Polyamide (glass fibre reinforced)	
Sealing ring	Soft iron	
Electrode housing	Stainless steel	
Electrode rod	Stainless steel	
Electrode extension	Stainless steel	

9.2 Maximum ratings of potential free contacts

Safety chain	Switching voltage	max. 250 V AC
	Switching current	max. 4 A resistive max. 0.75 A inductive cos φ0.5
Additional fault reporting	Switching voltage	max. 250 V AC
	Switching current	max. 8 A resistive max. 1.5 A inductive cos φ0.5
Electrical conductivity of the fluid	5 μS/cm ≤ æ ≤ 10,000 μS/cm	
	0.5 μS/cm ≤ æ ≤ 2,000 μS/cm	
Length of the connecting cables	max. 100 m at 5 - 10,000 μS/cm	
	max. 30m at 0.5 - 2,000 μS/cm	

10. Appendix

Warranty

We accord a warranty period of 24 months on our products. A condition for that is the appropriate treatment according to these mounting and operating instructions. The warranty for wear and spare parts is restricted to material defects and construction faults. Level electrodes are wearing parts and do **not** form part of the warranty.

11. Declaration of Conformity

EC conformity declaration in accordance with
EC Directive 97/23/EC, Annex VII,
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 "SMHC1" with
Electrode "EL040" or "EL21-2"

complies with the directives and has 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
(Managing director)



A.Scholl
(QM Officer)



J.Riechelmann
(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*.
