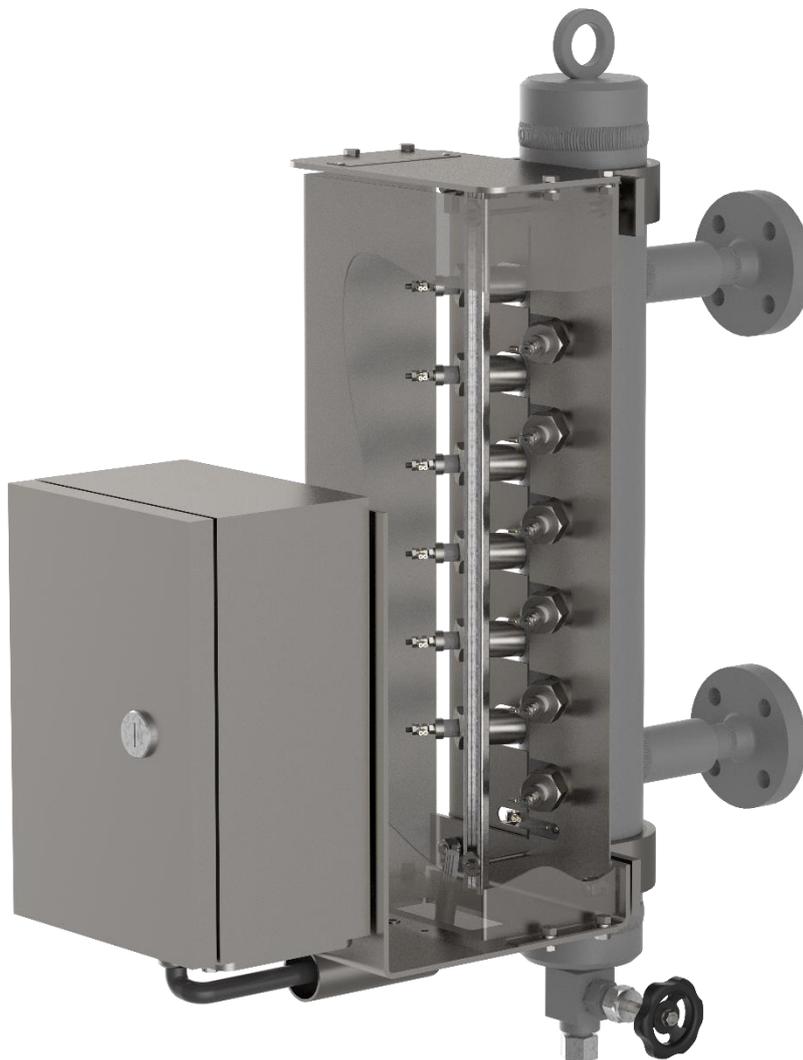




Electronic Remote Water Level Indicator

EWLI-3B

for use with level probes EL65 or EL60



Edition 01/2023

D-05-B-51530-EN-00

INSTALLATION AND OPERATING INSTRUCTION

Product philosophy

Thank you for placing your trust in IGEMA and deciding in favour of one of our high-quality products.

For more than 100 years, measuring and control systems have been developed, produced and sold worldwide under the IGEMA brand name.

“Steam is our passion” and we offer you the entire programme for the safe and economic operation of your plants, especially in the steam and condensate sector.

Please read the installation and operating instructions carefully to ensure a safe and reliable operation.

In addition to the information on installation and operation, you will also find important information on maintenance, care, safety and value retention of your measuring and control system.



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1 Important safety instructions

KEEP THESE INSTALLATION AND OPERATING INSTRUCTIONS IN A SAFE PLACE!

Commissioning as well as maintenance and repair work may only be carried out by qualified persons in compliance with the installation instructions given in this operating manual. The correct installation, commissioning, maintenance and operation of the device presupposes that the person in charge is familiar with measurement and control systems and complies with the general installation and safety instructions. In addition, the correct and intended use of tools and the handling of safety devices must be ensured. Unqualified persons must not be assigned the above tasks!

IGEMA GmbH accepts no liability for damage to property or personal injury caused by unqualified persons or by failure to observe these installation and operating instructions. If no sufficiently qualified person can be found, IGEMA GmbH can be commissioned with the installation/maintenance.

1.1 Symbols used in these instructions

In the following installation and operating instructions, safety instructions are marked with the following symbols:

 <p>Danger</p>	This symbol and signal word refer to a potentially hazardous situation which could result in death or injuries if ignored.
 <p>Caution electrical voltage</p>	This symbol and signal word indicate live parts with an immediate danger of death from electric shock.
 <p>Caution hot</p>	This symbol with a signal word indicates a potentially hazardous situation that can result in severe burns and scalds all over the body.
 <p>Caution</p>	This symbol and signal word refer to a potentially hazardous situation which could result in personal injury, property and environmental damage if ignored.
 <p>Caution</p>	This symbol and signal word refer to a potentially hazardous situation which could result in damage to the equipment if ignored.
 <p>Info</p>	This symbol indicates useful information and recommendations as well as measures that will prolong the value of your measuring and control system.

1.2 Intended use of the device



Use these installation and operating instructions, the identification on the rating plate (see 9.4) and the technical data sheet to check whether the device is suitable for the intended use/application. The device complies with the requirements of the European Pressure Equipment Directive 2014/68/EU.

The device may only be used to indicate fill levels on containers.

The maximum values of the pressure and temperature range of the device must be checked before installation. If the maximum allowable operating values of the device are lower than those of the system on which it is to be installed, protective instruments for the device, such as pressure reducers or similar, must be provided to avoid limit situations. The device may only be used in accordance with the information in these installation and operating instructions or for the parameters and applications agreed in the supply contract (see rating plate, 9.4). The operator of the facility is obliged to familiarise himself on compatibility of the medium and the device. In case of doubt, contact the relevant installation manager or site manager.

The correct installation position, alignment and flow direction of the device must be observed! Before installing the IGEMA product on boilers or containers, it is essential to remove all protective covers.

1.3 Safety at work



Before installation or carrying out maintenance work on the device, safe access must be ensured and a secure working area with sufficient lighting must be defined and marked out. Always use lifting equipment for heavy loads!

Before starting any work, carefully check which liquids or gases are or have been in the pipeline. (flammable substances, irritating substances, substances hazardous to health) When opening or dismantling the device, residues of the medium can escape. Subsequent fumes are also possible in unpressurized and cold systems. Use designated PPE such as safety goggles and respiratory protection!

Special attention must be paid to the condition of the environment around the installation or maintenance site. Be aware of e.g.: potentially explosive atmospheres, lack of oxygen in tanks and pits, dangerous gases/liquids, extreme temperatures, hot surfaces, fire hazard (e.g. during welding) and moving machine and system components. Protect yourself from excessive noise by taking the required protective measures.

For all maintenance work or new installations, on new or existing boilers or vessels, it is imperative to check that the boiler or vessel has been depressurised and that the pressure has been safely reduced to atmospheric pressure. In principle, no system should be regarded as unpressurized even if indicated by pressure measuring devices such as pressure gauges or sensors. When releasing the pressure, make sure that no persons are in the release area. Carefully check whether you and/or other persons in the vicinity need PPE to protect yourself from external influences such as high and low temperatures, radiation, noise, danger to eyes, loose objects that can fall down or chemicals.

There is always a risk of injury when handling large and/or heavy equipment. Observe the load handling regulation as a minimum requirement for working with loads. Avoid handling the device with your own physical force, e.g. by lifting, pulling, carrying, pushing or supporting it, especially to prevent back injuries. Use lifting equipment to move heavy and bulky equipment in accordance with Article 1, Section 2 of the German Load Handling Regulation (LasthandhabV).



Under normal operating conditions the surface of the device can become very hot! Under the maximum operating conditions, the surface temperature can exceed 350°C. After shutting off or, if necessary, shutting down the boiler, wait until the temperature has normalized to room level. To avoid the risk of burns and scalds, always use PPE including safety goggles!

1.4 Safety instructions for this device



These installation and operating instructions are an integral part of the device and must be forwarded to the responsible departments "Goods inward, Transport, Installation, Commissioning and Maintenance". They must be kept in such a way that the technical staff have access to these documents at all times. If the device is passed on to a third party, these installation and operating instructions must also be included in the national language of the third party.

Avoid shocks and hard contact during transport, as this can lead to damage. During intermediate storage, the device must be kept dry and secured against damage.

When servicing the unit, check for damage. There is a risk of cutting hands and arms! Wear work gloves!

For units with a dead weight of 30 kg or more, the customer must provide adequate support (e.g. via a spring suspension device, etc.). This can be attached to the holding strap/eyelet on the device.

When returning goods to IGEMA GmbH, the applicable safety and environmental laws according to GGVSEB [German ordinance on the national and international carriage of dangerous goods by road, rail, and inland waterways] must always be observed. If there are any risks to health or the environment due to residues or the device has a mechanical defect this must be indicated when returning the device and the necessary precautionary measures must be taken. If the returned goods are devices that have come into contact with or contain hazardous substances, a safety data sheet must be enclosed, and the goods must be clearly marked. In addition, the hazardous substance must be reported to the logistics service provider.

1.5 Exclusion of liability

IGEMA GmbH Mess- und Regelsysteme will assume no liability if the above regulations, instructions and safety precautions are not observed and followed. If they are not expressly listed in the installation and operating instructions, changes to an IGEMA device are carried out at the risk of the user.

2 Scope of supply

1 EWLI-3B consisting of:

Water column with number of probes ordered (EL65 ($\leq 32\text{bar}$) or EL60 ($> 32\text{bar}$))

Measuring unit (MU-3); fitted onto the water column and fully wired

Control unit (CU-3)

1 Power supply (top-hat rail) for supplying the control unit (CU-3) with 24VDC

1 set of installation and operating instructions

3 Important information



The direct water level gauge is for measurement and control purposes and must only be used to display fill levels on a tank. Here care must be taken that pressure and temperature do not exceed the maximum limitations of use. These can be found on the identification plate.



The operator of the direct water level gauge is responsible for the intended use of the indicator.



Note!

For displays weighing 30 kilograms or more, the customer must provide sufficient support (e.g. by spring hangers or similar).

3.1 Use in compliance with regulations

The EWLI-3B (electronic water level indicator) is used as a remote water level indicator for steam boilers or (pressure) tanks with electrically conductive liquids. Depending on the regulations applied the EWLI-3B can also be used as a multi-control system (indicator - limiter – controller), by means of the programmable assignment of outputs (change-over contacts) relative to the levels. The EWLI-3B water column is fastened to the process connections provided on the tank.

The EWLI-3B has been developed in compliance with the EU Directives 2014/35/EU, 2014/30/EU, 2014/68/EU and the standards:

EN 61000 -4

EN 61000 -6

EN 61010 -1

EN 13445

DIN EN 12952-7

DIN EN 12953-6

The device is used for measuring the level of a liquid. It is used predominantly on steam boilers. With the aid of probes the EWLI-3B measures the current level in the water column and thus in the boiler. With the ability of having up to 32 Probes (minimum 5 / 2-4 probes EWLS) one achieves a quasi-continuous level display, taking into account a minimum probe spacing of 36mm.

4 System Description

4.1 Components

- Water column with number of probes ordered (EL65 (≤ 32 bar) or EL60 (> 32 bar))
- Measuring unit (MU); fitted onto the water column and fully wired
- Control unit (CU) with separate power supply unit; for top-hat rail fitting within its switch box
- Display unit (DU) – optional – (optional) (4-20 mA)
- various CAN-Bus connecting cables (optional)

4.2 Funktion

The EWLI-3B level indicator works on the basis of the conductive fill level method of measurement whereby the electric conductivity of the medium is used. The conductivity of the medium is measured in $\mu\text{S}/\text{cm}$. For the secure functioning of this method of measurement a minimum conductivity of the substance to be measured is required.

The conductive method of measurement makes two statements: electrode submerged, or electrode emerged.

The measuring unit (MU-3) feeds and evaluates the installed probes (5 to 32 in number). The state of the probes attached in the water column is then sent to the control unit (CU-3).

The control unit (CU-3) determines the reactions necessary from the received data from the measuring unit (MU-3).

Safe operating mode during which the output contacts of the device go into rest position, corresponds at the same time to the de-energised state of the control unit.

The DU-3 (optional) display unit can be used as a remote indicator. The status LEDs show the same as the LEDs of the CU-3. In addition, each probe is linked to an LED. Green shows a submerged probe, red a probe in the steam space and a flashing LED means a probe in an incorrect state. The output current of the 4 mA .. 20 mA output of the DU-3 is calculated like that of the CU-3 (not available at the DU-3-XL).

System status	LCD display	LEDs ^{1*}	4 mA .. 20 mA	Output contact ^{2*}
Correct operation	IGEMA EWLI3-CU		4mA + (16 mA / number of probes fitted) x Number of probes submerged ^{3*}	A: activated F: activated Z: depending on assignment / programming
correct operation with failure of one 24V supply ^{4*}	(40) PIN 1 power too low ^{5*}		4mA + (16 mA / number of probes fitted) x Number of probes submerged ^{3*}	A: activated F: activated Z: depending on assignment / programming
System error	(65) MU CANBUS no Data ^{5*}		2 mA	A: no power / state of rest F: no power / state of rest Z: all without power
Water level alarm (LLW / HHW)	(33) LLW alarm ^{5*}		4 mA + x (LLW) 20 mA - y (HHW) x, y corresponding to programmed Probe	A: no power / state of rest F: activated Z: depending on assignment / programming
Water over steam	("Nr") please check probe: "Nr" ^{5*}		2 mA	A: activated F: no power / state of rest Z: depending on assignment / programming
Probe error ^{7*} (LLW / HHW)	(33) LLW alarm ^{5*}		2 mA	A: no power / state of rest F: no power / state of rest Z: depending on assignment / programming
Probe error ^{6*} (assigned)	("Nr") please check probe: "Nr" ^{5*}		2 mA	A: no power / state of rest F: no power / state of rest Z: assigned without power; Rest: depending on assignment / progr.

S Probe error ^{6*} (not assigned)	("Nr") please check probe: "Nr" ^{5*}		2 mA	A: activated F: no power / state of rest Z: depending on assignment / programming
---	---	---	------	--

^{1*} Fully lit LED: continuous light / half lit LED: flashing

^{2*} Description: "A" Alarm output "F" Error output "Z" Assigned output

^{3*} Example: 12 probes / 4 submerged: ...mA = 9.3 mA (4mA + (16mA / 12) * 4)

16 probes / 7 submerged: ...mA = 11.0 mA (4mA + (16mA / 16) * 7)

15 probes / 13 submerged: ...mA = 17.9 mA (4mA + (16mA / 15) * 13)

^{4*} When using 2 power supply units

^{5*} Example

^{6*} See Chap. 7 Special features of system setup

^{7*} As LLW/HHW-Alarm has priority, this message is shown. However, considering the LED-display (yellow flashes also) the probe fault is recognisable.

4.3 Setup

For ensuring high availability IGEMA recommends the use of 2 power supply units (redundancy). In terms of hardware the CU-3 is designed for operation with 2 power supply units.

Both the measuring unit (MU-3) and the control unit (CU-3) have 2 independent electronic circuits with their own processors. All processors carry out regular self-tests for internal faults in the electronic circuit. This provides self-monitoring of the device and thus a higher safety standard.

Measuring unit:

Both electronic circuits record the state of the probes and send it to the control unit.

Control unit:

Both electronic circuits evaluate the status messages of both electronic circuits of the measuring unit. If both status messages are identical the required reaction (Chap. 4.2) is carried out.

A plausibility check takes place.

Each electronic circuit switches its "own" relay (SPDT) for the corresponding output. Only when both relays of both electronic circuits are driven (activated) equally (e.g. during normal operating status) is the output active.

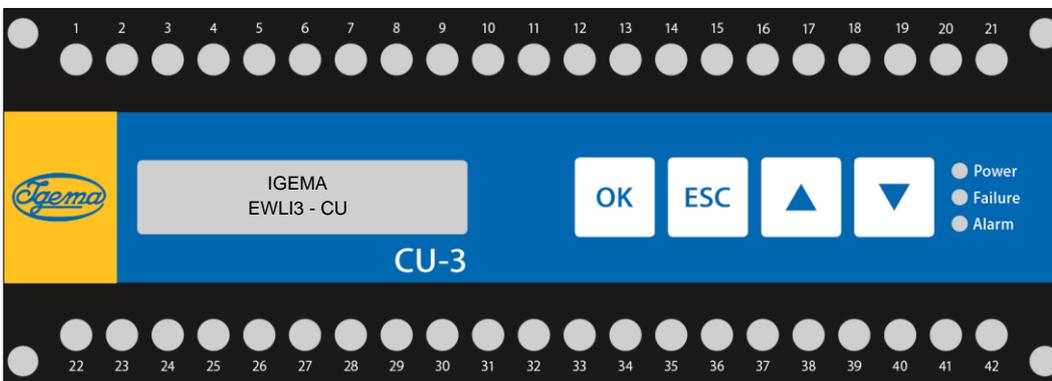


The output contacts do not have any latching. The switching behaviour is exclusively in line with the desired specified (programmed) state. If latching is required, this manual locking (latching) must be carried out on site.

4.4 Components of the control unit (CU-3)

The control unit contains:

- 1 LCD display (2-line each 16 characters) for communication with the operator (programming and information display)
- 4 Buttons for programming
- 3 LEDs as status indication
- 1 SPDT alarm output for fill level signalling (fixed); the corresponding probes (LW and/or HW) can be freely chosen
- 1 SPDT error output (fixed); output is in state of rest, if any system error occurs
- 7 SPDT outputs freely controllable (see assignment plan Chap.: 5.2.2)
- 1 4mA .. 20mA output for loads up to 500Ω, not galv. isolated



4.5 Operation



Operation of the EWLI-3B is carried out by the 4 buttons of the CU-3. This is described in Chap. 6 "Configuration via Menu".

4.6 Error messages

In the LCD display errors from the evaluator and probes are displayed number-coded and in plain text abbreviations.

If there is a DU-3 present (optional), errors by evaluator and probes are displayed in the 7-segment display number-coded and 2-digit.

For analysis and error correction see Chap. 10.

4.7 Overview of the system properties

- Up to 32 probes (minimum 5 probes) for quasi-continuous level measuring
- Can be used up to PS = 200bar // TS = 367°C
- Double power supply for high availability (redundancy) with display of failure of one power supply
- Self-monitoring electronics for high system safety during monitoring functions
- wire breakage monitoring
- Adjustable switching delay on all outputs for avoiding false signals
- 1 alarm output (SPDT) for the reaction in case of low water and/or overfilling
- 1 error output (SPDT) for the display of (electronic) system errors
- 7 user specific and programmable outputs (SPDT) enable:
 - * individual switch points e.g. horn when exceeding or falling below a fill level
 - * double switch points e.g. for a pump controlIn the case of identical programming of two outputs a "DPDT output" is possible.
- 1 4mA .. 20mA output for loads up to 500Ω, not galv. isolated-
- Remote - indicator (DU-3, optional) with 4mA .. 20mA output for loads up to 500Ω, not galv. isolated, as many as desired

4.8 Display unit (DU-3)

There are different versions of the (optional) display unit DU-3 e.g.:

- systems with up to 16 probes have a single-row LED-display
- systems with 17 up to 32 probes have a double-row LED-display

For each probe, a LED indicates the state of the probe:

- green: probe submerged in water
- red: probe in steam
- surplus LEDs (e.g. 13, 14, 15, and 16 if the system has 12 probes) are not activated and remain dark

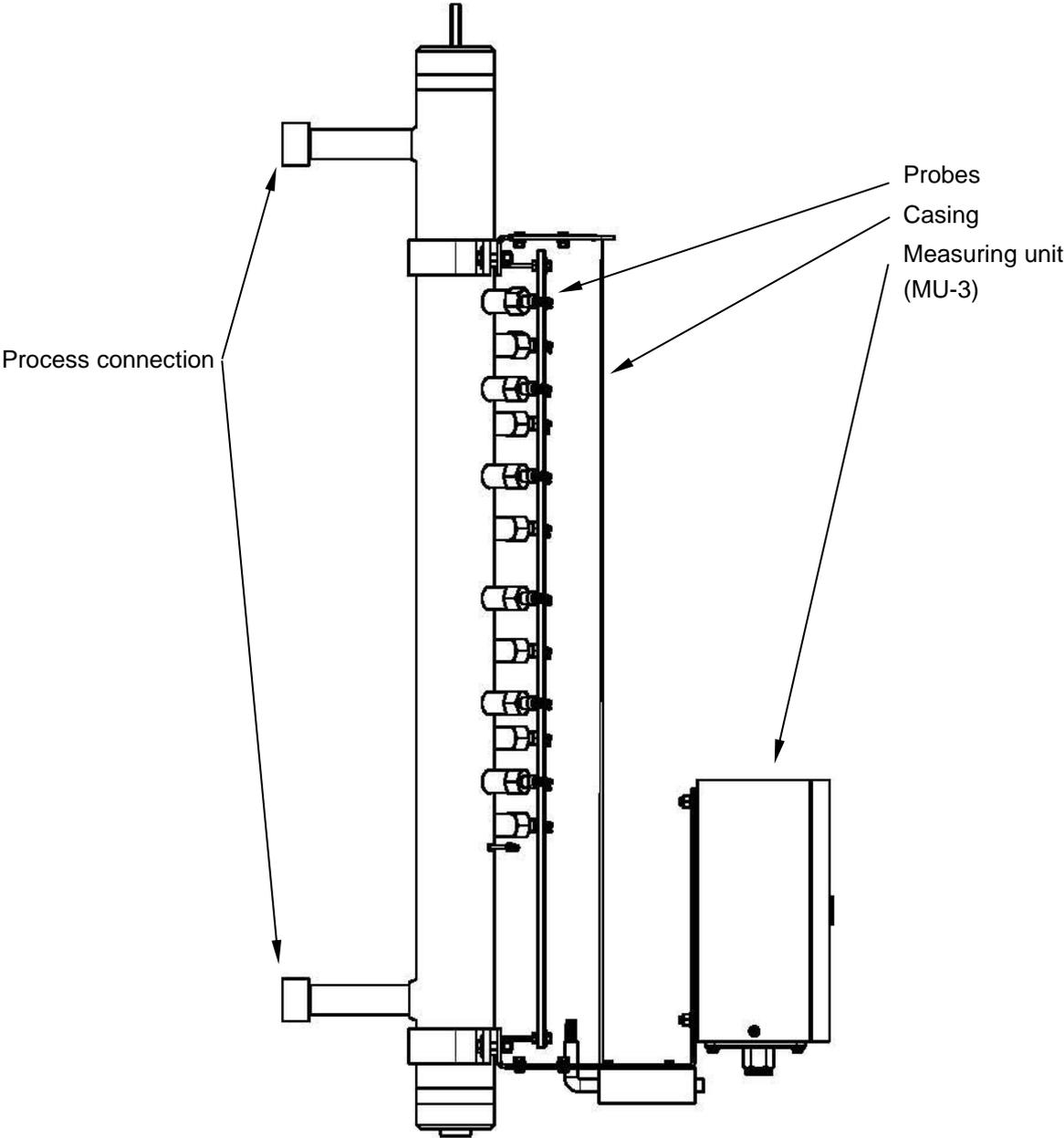
The condition of the system is indicated via 3 status-LEDs (identical to the LEDs of the CU-3 / see Chap. 4.2).

If a discrepancy in the measurement is detected (water above steam), the probe that indicates water flashes green (see Chap. 4.2).

If a probe failure is detected the corresponding LED flashes red (see Chap. 4.2).

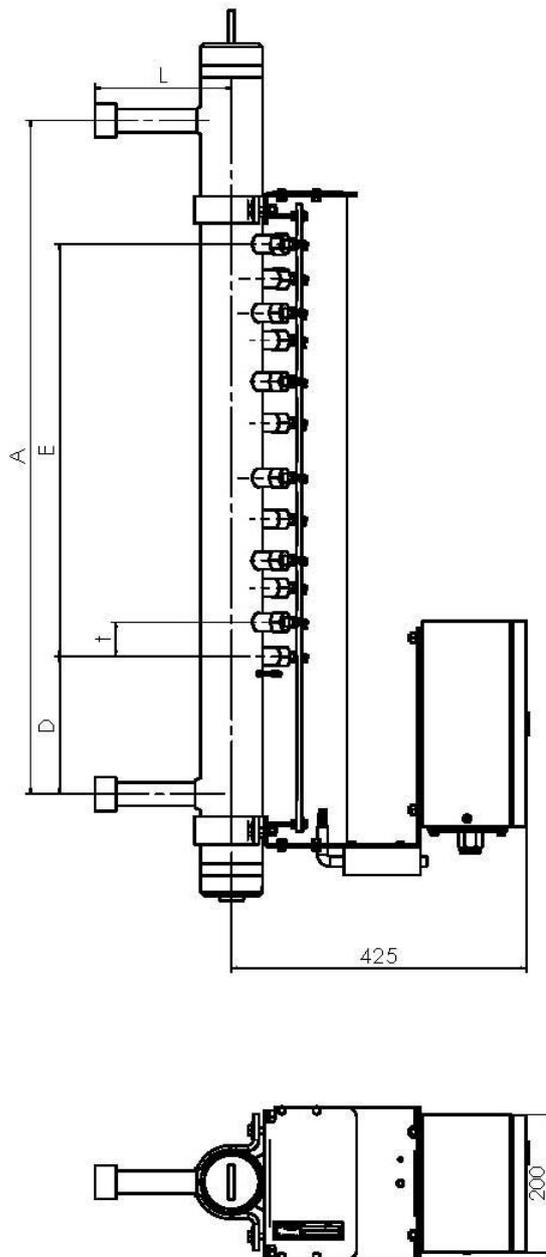
5 Assembly and Installation

5.1 Water column



5.1.1 Installation dimensions and descriptions

- A: Boiler connection dimensions
- E: Display area
- D: Minimum water level
- T: Distance between probes
- L: Lateral dismantling dimensions



5.1.2 Installation

The water column is supplied fully wired.

It is attached via the process connections in accordance with the rules / regulations on the boiler.



Because of the temperature-dependent density of the medium, it must be ensured that a flow through the water column with the medium is ensured, e.g. through a forced circulation (inclination).

5.2 Control unit CU-3

The control unit and also the associated power unit are 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.



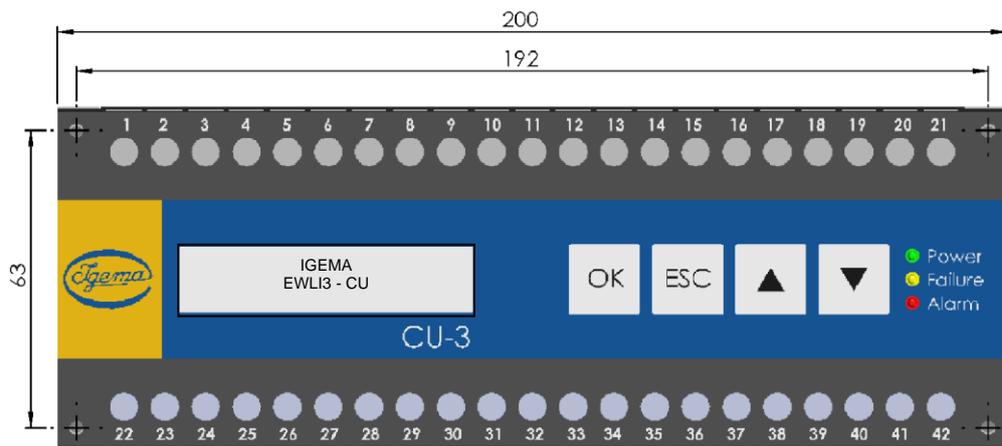
Ensure protection class in accordance with current regulations

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

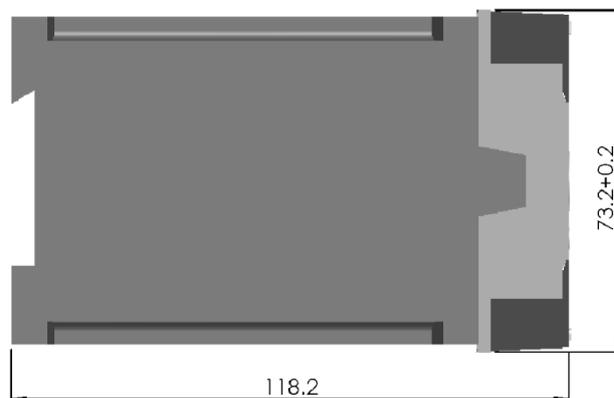
Fix device on standard carrier rail by means of the snap fastening (4).

5.2.1 Installation dimensions and descriptions

Front view:



Side view:





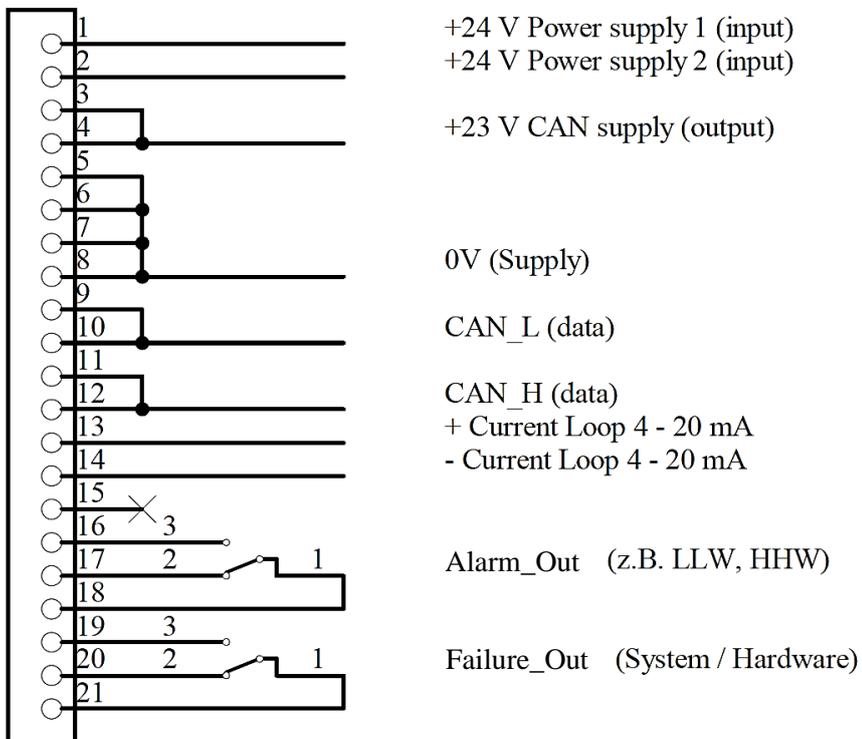
**The terminal strip of the device is live during operation!!
Before working on the device disconnect it from the mains!!**



The output contacts are only switched when both electronic circuits energise the corresponding relays (Chap. 4.3)

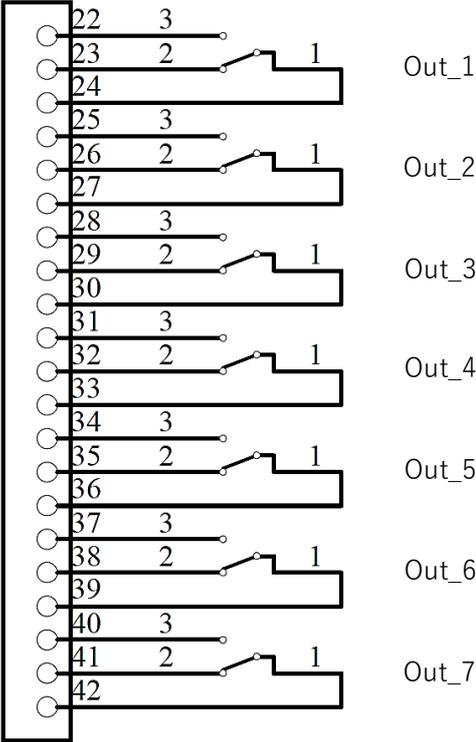
Assignment plan:

Upper bar / contacts 1 – 21 (for the output contacts the rest position is displayed):



When using only one 24V supply, contacts 1 and 2 must be bridged.

Lower bar / contacts 22 – 42: (freely programmable output change contacts)
(rest position displayed)



The CAN-Bus control cable must be a 4-wire, twin stranded, shielded cable (min 2*2*0,34mm²).

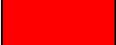


For the current loop interface (4 mA .. 20 mA) a shielded data cable (2 x 0,34mm² or 2 x 0,75mm²) must be used.

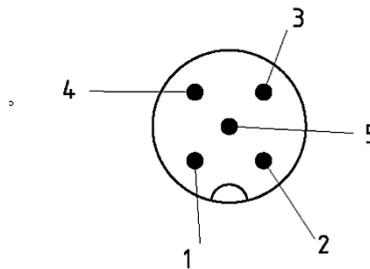
5.3 Measuring unit MU-3

The measuring unit is fixed to the water column and the probes are fully wired. The connection to the control unit takes place via a 5-pin plug at the bottom of the switching cabinet of the measuring unit.

If no assembled cable is ordered, the assembling of the enclosed plug socket is done according to the Device Net™ BUSsystem.

PIN	Lead colour	Signal Device Net™
1		Drain
2	RD 	V+
3	BK 	V-
4	WH 	CANH
5	BU 	CANL
Screen fixed to housing		

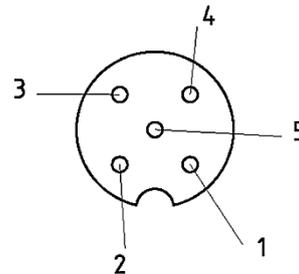
Cable plug M12, 5-pole, A-coded



Assignment of terminals on the MU circuit board:

connecting terminal		Signal Device Net™	
2		—	CAN L
3		—	CAN H
4		—	V -
5		—	V +

Plug socket M12, 5-pin, A-coded

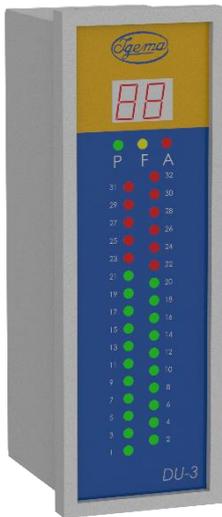


5.4 Display unit DU-3 (optional)

The (optional) display unit is designed as switchboard mountable device.

For fastening, a screw system (switchboard) or a top-hat rail adapter is available (see accessoires).

The DU3 is supplied as standard with 120 Ω bus terminating resistor (contact 3 – contact 4 // CAN L -CAN H).



DU3

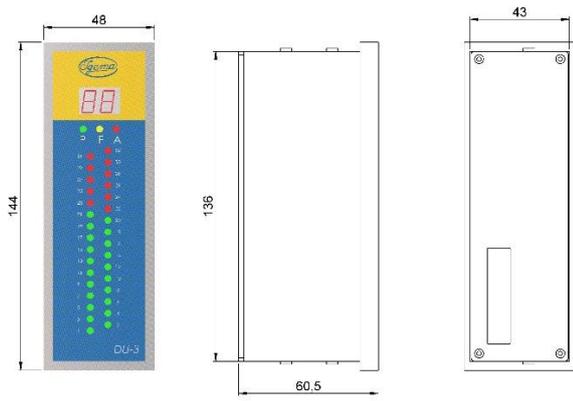


DU3-XL

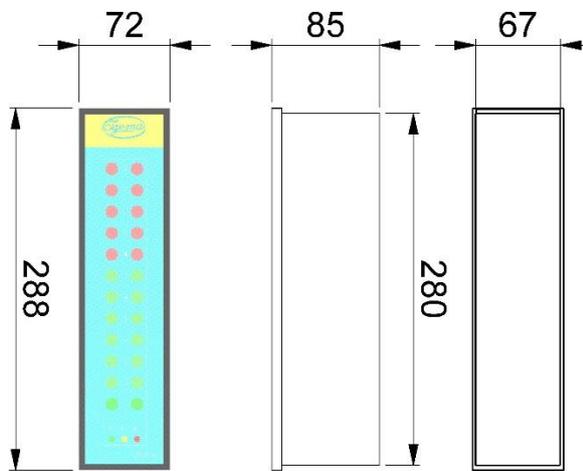


DU3-XXL

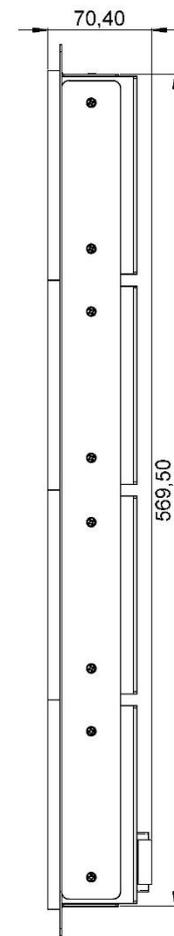
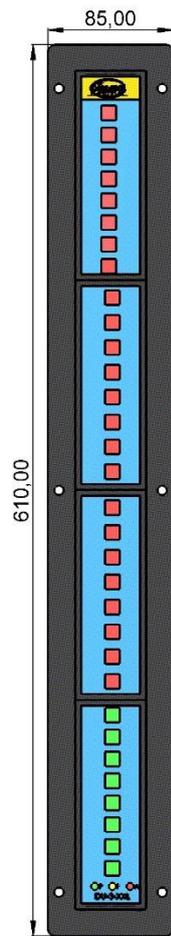
5.4.1 Installation dimensions and descriptions



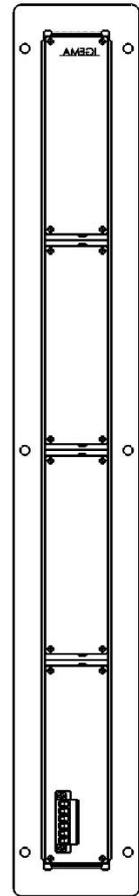
DU3



DU3-XL

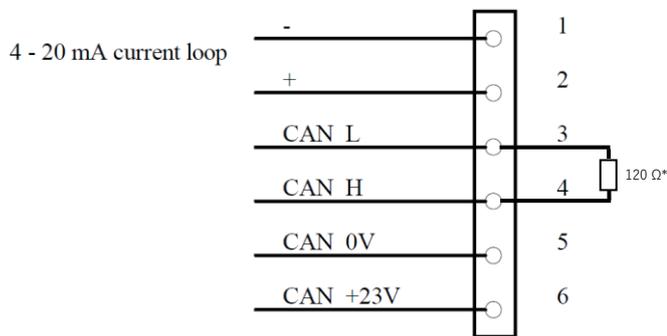


DU3-XXL



5.4.2 Electrical connection

A plug-in connector is led out at the rear. The assignment is:



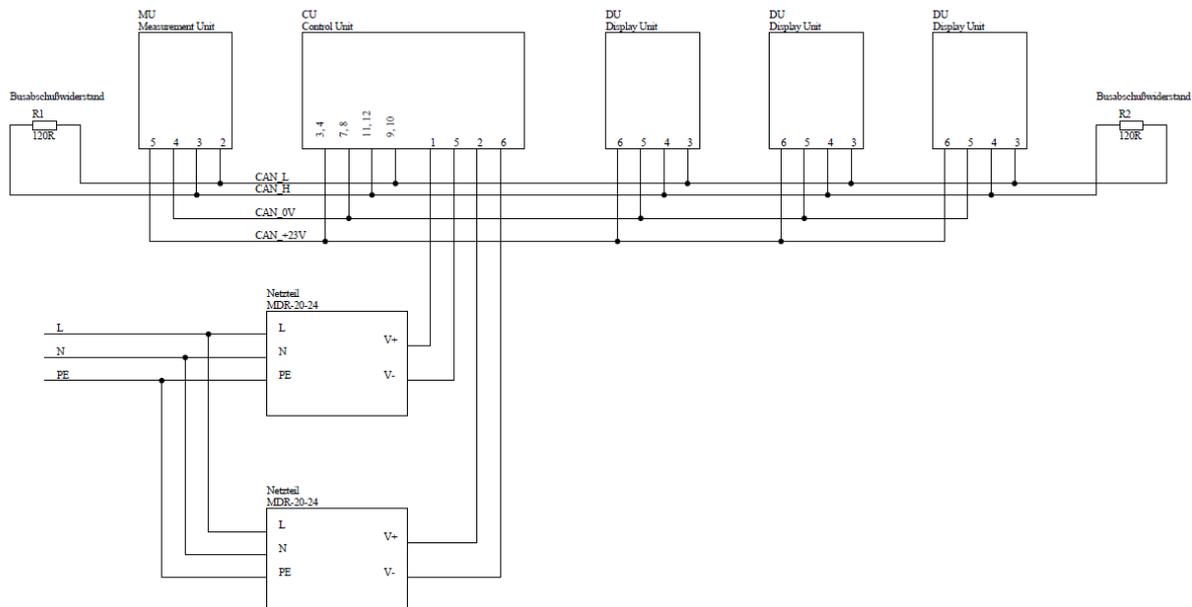
- * The DU-3 is supplied as standard with 120 Ω bus terminating resistor (terminator).

If the DU-3 is not the last device (see Chap 5.5), it must be removed when fitting (the CAN-Bus). If the DU-3 is the last device, the CAN-Bus must simply be added

5.5 System connection

An overview of the electrical configuration of the overall system is given by the following graphics:

(The illustration shows the redundant configuration with 2 power supplies and 3 optional DU-3s.)



The bus terminating resistor is already implemented in the MU-3. Thus one side of the bus (on the left in the diagram) is sealed off. The other side of the bus must be terminated on CAN H and CAN L on the last device via a 120 Ohm resistance.

Only IGEMA components belonging to the EWLI-3B system may be operated on this CAN-Bus control cable (1xMU-3; 1xCU-3, X x DU-3). The short-circuit-proof 24V voltage of the CAN-Bus is designed exclusively for the supply to the system and must not be used for the external supply of further devices.

The maximum length of the bus line can be a total of 750m.



When fitting, bear in mind that the cable must not come into contact with heat-conducting parts.

The CU-3 control unit can supply the measuring unit (MU-3) and up to 3 display units (DU-3). The connection of further DU-3s is possible. However, these must then be provided with their own separate and independent 24V supply (observe Chap. 9.2!).

6 Configuration via Menu

The menu of the EWLI-3B is divided into two levels:

Level 1 | Level 2

The menu is accessed by pressing the "OK" key. A menu item of Level 1 will appear in the LCD display. With the keys "▲" or "▼" you can choose between the menu items of the respective level. The upper row is "active".

By pressing the "OK" key you will get to the next level down or confirm the entry.

By pressing the "ESC" key you can get to the next level up or out of the menu without the current entry being saved. (With "OK" confirmed data are already saved and remain so.)

The menu language is English.

Automatic menu exits after 2 minutes if no key operation is carried out (without saving / see "ESC").

The menu consists of 4 items. Items 1 to 3 are purely for information! Whereas item "1.1 Probe state" and above all item "1.2 Relay state" are very useful for checking the correct programming and the desired switching operations.

(You find examples for programming in the attachment)

Schema:

- | --- 1. System Info ---
 - | - 1.1. Probe state |
 - | - 1.2. Relay state |
 - | - 1.3. MU system A |
 - | - 1.4. MU system B |
- | --- 2. Supply ---
 - | - 2.1. Input Pin 1 |
 - | - 2.2. Input Pin 2 |
 - | - 2.1. Output Pin 3 |
- | --- 3. Version ---
 - | - 3.1. Control |
 - | - 3.2. Measurement |
 - | - 3.3. Display |
- | --- 4. Settings ---
 - | - 4.1. Backlight |
 - | - 4.2. Password |
 - | --- |----- **After entering valid password** -----
 - | - 4.3. Relay setup |
 - | - 4.4. LLW Alarm |
 - | - 4.5. HHW Alarm |



The password is: 123; It activates the menu items 4.3, 4.4 und 4.5 and its only function is the prevention of unintentional programming of system functions.

Menu description:

- | | |
|------------------------|--|
| 1.1 Probe state: | The state of the probes is displayed, “w” for water, “s” for steam; For illogical states, for example water over steam, the submerged probe is displayed in capitals (e.g. “W”). |
| 1.2 Probe state: | The switch state of the 9 outputs is displayed “0” for rest position (NO) and “1” for activated. |
| 1.3/1.4 MU System A/B: | Temperature of the respective electronics of the measuring unit. |
| 2.1 Input Pin 1: | Supply voltage 1 (theoretical 24 V) |
| 2.2 Input Pin 2: | Supply voltage 2 (theoretical 24 V) |
| 2.3 Output Pin 3: | Can-Bus – voltage (theoretical 23.5 V) |
| 3.1 Control: | Version number CU-3 |
| 3.2 Measurement: | Version number MU-3 |
| 3.3 Display: | Version number DU-3 |

- | | |
|------------------|---|
| 4.1 Backlight: | Brightness setting of LCD display |
| 4.2 Password: | Password "123" |
| 4.3 Relay setup: | Programming of the "additional outputs" 1-7 |
| 4.4 LLW Alarm: | Programming of the "low water level" |
| 4.5 HHW Alarm: | Programming of the "high water level" |

The flashing cursor marks the position where an entry is possible. In some menus this can be moved with the arrow keys ("▲" or "▼"), otherwise the arrow keys change the value saved. "OK" confirms the entry and with "ESC" the entry is left (without saving) or you move up a menu level.

Programming logic of the outputs:

Programming is carried out in 3 stages:

1. Selection of the output to be programmed
2. "R x" "on/off" in "00" sec, ("R" stands for output)
if "P00" in "WATER/STEAM" ("P" stands for probe)
(The "output x" is switched after "00" seconds if probe "00" is in water.)
3. "R x" "off/on" in "00" sec,
if "P00" in "STEAM/WATER"
(The "output x" is switched after "00" seconds into the other state if probe "00" is in steam.)

→ On designation of the same probe "P00" in the program steps 2 and 3 an alarm (e.g. horn) can be implemented.

On designation of different probes "P00" and "P01" control (switching a pump on and off) can be implemented.



Programming the outputs is independent of each other. Different outputs can be switched via the same logic and thus via the same probes. Thus, DPDT interconnection is also possible.

Programming logic of LLW and HHW output:

Programming is carried out in 2 stages:

1. "LLW" "on/off"
2. if "P00" in STEAM

Programming is carried out in 2 stages:

1. "HHW" "on/off"
2. if "P00" in WATER



To finish the programming of an output all conditions must be set and confirmed with "o.k.". The new switching function is set, after the complete set of requirements of an output has been specified.

7 Special features of system setup

The setup of all probes is the same. However, due to the system setup there are 3 differently weighted types of use of the probes.

Water level limiter probes:	If desired, probes can be defined as water level limiter probes. These then switch the alarm output. Both low water level monitoring and high-water level monitoring are possible (observe local regulations!).
“Control probes”: (assigned)	These probes are for enabling via an output a switching function (pump control, horn, or such like).
Water level probes: (not assigned)	These probes display via their state (submerged / emerged) only the current fill level.



Note the system reaction to state changes (also errors) of individual probes as described in Chapter 4.2.

8 Commissioning



Commissioning and maintenance must be carried out by qualified personnel! If no sufficiently qualified person can be employed, IGEMA GmbH can be commissioned to carry out the commissioning. In principle IGEMA GmbH recommends commissioning the indicator at the same time as the boiler (item 8.3). If it is not possible to commission the indicator according to item 8.3, the indicator can be commissioned with the boiler under pressure and temperature (item 8.4)

All liquid level gauges are subjected to 100% pressure testing before delivery. In individual cases, material settling may occur during transport, longer storage or during assembly. All screw connections must therefore be checked for tight fit and appropriate torque (see following text).

8.1 System setup

- Regulation-compliant assembly of the water column at the boiler.
- Electrical connection as in Chapter 5, in particular Chapter 5.5.
- System planning
 - e.g. with system / assignment table (in correct operating state)
 - from the attachment to these mounting and operating instructions
- programming as in Chapter 6

8.2 Factory settings

HHW:	on the top probe	correct operation = probe in steam
LLW:	on the bottom probe (= probe no. 1)	correct operation = probe in water
Output contact 1:	on probe 2	correct operation = probe in water
...		
Output contact 7:	on probe 8*	correct operation = probe in water

* or on the top probe if the system consists of less than 8 probes

All delays for switching operations are set to "00"s.



All 7 additional outputs must be assigned to a probe, even if they are not in use. IGEMA recommends assigning unused probes to the top probe. However, there is the possibility to create redundancy.

8.3 Commissioning when starting up the boiler



After commissioning the indicator must be checked for function and leakage.

- Close drain valve
- Fully open the valves to the boiler
- Device is heated up together with the boiler

8.4 Commissioning during boiler operation



Wait for the water level to be adjusted and then check the indicator for leakage.

- Fully open drain valve
- Slightly open upper valve to boiler, carefully heat up device with steam until operating temperature is reached.
- Close drain valve
- Slowly open upper and lower valve to the fully open position.

9 Technical Data

9.1 Device data

Manufacture in accordance with:	EU Directive 2014/35/EU EU Directive 2014/30/EU EU Directive 2014/68/EU
Applied standards:	EN 61000 -4 EN 61000 -6 DIN EN 12952-7 DIN EN 12953-6 EN 61010-1 EN 13445
Data exchange:	CAN-Bus in accordance with DIN ISO 11898, CANopen protocol
Number of probes:	5 to 32
Total length of CAN-Bus:	max. 750m

Allowable pressure	PS [bar]	32	200
Allowable temperature	TS [°C]	239	367
Electrode	Type	EL65 	EL60 
	pH-Wert	-	< 10
	Item no.	15-01877	15-00790
	Insulator	PTFE	Ceramic
Conductivity	0,5 µS/cm ≤ æ ≤ 10.000 µS/cm (25°C)		

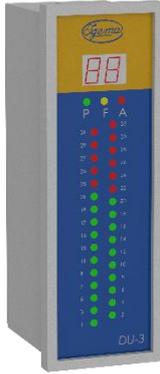
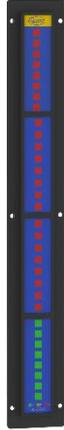
CU-3



Power supply	24VDC / 24 W through separate switched-mode power supply redundant design due to the possible use of 2 power supplies
Interfaces:	
internal	CAN-Bus for supply and internal communication
output	4 mA – 20 mA output (load < 500Ohm) not galv. isolated e.g. for connection to a PLC
	7 SPDT / 3 DPDT output contacts freely programmable (Probe – switch contact)
	1 SPDT output contact permanently assigned to device errors
	1 SPDT output contact permanently assigned to the water level alarm (LW and/or HW); the corresponding probes for LW and/or HW are freely selectable

Housing design	
Material	PC-GF V-0
Protection type	Housing: IP40 Terminals: IP20
Connection	Two 21-terminal strips to 2.5 mm ²
Display	LCD display with 2 16-character lines
Input / Programming	4 keys
Working temperature	0°C bis +55°C (-10°C without condensation)

MU-3	
Probe design	
Connection thread	G 1/2"
Width across flats	AF27
Material screw connection	Stainless steel
Material electrode tip	Stainless steel
Electrode spacing	At least 36 mm with offset arrangement; smaller distances upon request
Housing design	
Material	Stainless steel
Protection type	IP65 (also available for the probes as an option)
Interface	CAN-Bus
Working temperature	0°C to +85°C (-10°C without condensation)

DU-3			
	DU3	DU3-XL	DU3-XXL
			
	up to 16 probes: single column 17 -32 probes: double column	for (up to) 12 probes	Modules for 8 probes; combinable for (up to): 8 / 16 / 24 / 32 probes
Power supply	18V – 36V; 24V DC / 2W electrical short-circuit- proof via lead	18V – 36V; 24V DC / 2W electrical short-circuit- proof via lead	24V DC +10% / -20% / 6W electrical short-circuit- proof via lead
Current consumption	70mA @ 24V	70mA @ 24V	80mA @ 24V

Interfaces DU-3			
internal	CAN-Bus for supply and internal communication		
output	4 mA – 20 mA (load < 500Ohm) not galv. isolated e.g. for connection to a PLC	---	4 mA – 20 mA (load < 500Ohm) not galv. isolated e.g. for connection to a PLC
design housing	As per IEC 61554		
material	Housing: Noryl SE1, GFN2; Pane: Macrolon		
Protection class	Front: IP40 Rear: IP20		
Working temperature	0°C bis +55°C (-10°C without condensation)		
Display	2 x 7-segment display	---	---
	3 Status LEDs: green: Power	yellow: Error	red: Alarm
	Fill level display per probe : green – water // red – steam		

9.2 Mains transformer

The mains transformer supplied is an integral part of the EMC tests. IGEMA only guarantees EMC compliance when the power supply unit supplied is used.

9.3 Maximum ratings of potential free contacts

Limit or additional relay	Switching voltage (max.)	250 VAC	24 VDC
	Switching current (max.)	4 A ohmic	4 A
		inductive / higher loads: use contactor	

9.4 Data plate

IGEMA Type EWLI-3 CU-3 -12
CE

24V DC +10% 24W	Art.No. 20-10011
S/N 14030002	Gehäuse: IP40
0°C < Tamb < 55°C	Klemmen: IP20
Spannungsversorgung CAN-BUS: 23V DC 10W max.	
Comm.No.: 14-207579-10	

IGEMA GmbH
Mess- und Regelsysteme
Antwepener Str. 1
D-48163 Münster
Made in Germany

* Fertigung überwacht

See installation instructions!

IGEMA Type EWLI-3 DU-3 CE

23V DC (CAN) 2W	Art.No. 20-10013
S/N 14030021	Front: IP40
0°C < Tamb < 55°C	Rückwand: IP20

• Fertigung überwacht

IGEMA GmbH
Mess- und Regelsysteme
D-48163 Münster
Made in Germany

See installation instructions!

IGEMA Type EWLI-3 MU-3
CE

23V DC (CAN) 4W	Art.No. 20-10008
S/N 14030020	0,5 - 10.000 µS/cm
0°C < Tamb < 85°C	

IGEMA GmbH
Mess- und Regelsysteme
Antwepener Str. 1
D-48163 Münster
Made in Germany

* Fertigung überwacht

See installation instructions!

IGEMA GmbH
Mess- und Regelsysteme
Antwepener Straße 1
Germany - 48163 Münster

BUILD 2014	TYPE EWLI - 3 - 32	ITEM No.: 10-18684
PS 160 bar	TS 348 °C	cl 1" / 1500 / 1 1/2"
COMMISSION 208 464 - 1		CE 0035
TAG No.: 50 HAD 10 CL 455		MONITORED PRODUCTION

SEE INSTALLATION INSTRUCTIONS!

IGEMA GmbH
Mess- und Regelsysteme
Antwepener Straße 1
Germany - 48163 Münster

BUILD 2014	TYPE EWLI - 3 - 32	ITEM No.: 15-11604
CONTROL BOX FOR EWLI 3	IP65	CE
COMMISSION 208 464 - 2		MONITORED PRODUCTION
TAG No.: 50 HAD 10 CL 455		SEE INSTALLATION INSTRUCTIONS!



In the name of the item EWLI - 3 - 32 or EWLI-3B CU -12 the number of used probes is shown.

Item numbers und serial numbers are examples, that are not valid for orders. If you intend to order, please contact IGEMA-sales department.

10 System Maintenance

It is assumed that the person charged with the maintenance tasks is fully conversant with measurement and control systems. Untrained persons must not carry out maintenance work! If there is no adequately qualified person available, IGEMA GmbH can be brought in to service your measurement and control system.

When replacing components, it must be ensured that only original IGEMA GmbH parts are used.

Any warranty is void if components from other manufacturers are used.

10.1 Preventive Maintenance

The following points should be observed to maximize gauge life:

Proper cleaning and maintenance of level gauges in steam service is vital for enhanced performance and service life. The gaskets shall always be replaced during maintenance, even if they appear to be in perfect condition. Gaskets relax and can harden over time.

The user must determine upon evaluation of his or her own operating experience an appropriate maintenance schedule necessary for the specific application. Note that the frequency and method of blow-down/purging may affect service life and performance of glass level gauges. Realistic maintenance schedules can only be determined with full knowledge of the services and application situation involved.

The probes must be cleaned annually. Depending on the condition of the boiler water, a shorter cleaning cycle may be necessary.



Always depressurise the boiler / water column and allow it to cool down before dismantling the probes! Mind the danger of scalding through steam or hot water.

The water column must be completely emptied.



Probes are wearing parts that must be replaced after prolonged use.

10.2 Depressurising water column

- Close the valves to the boiler
- Slowly open drain valve and drain off water
- Fully open drain valve
- Wait for the device to cool down
- Remove protective housing

10.3 Dismantling and fitting probes

- Loosen the nut at the probe end and remove the cable lugs
- Unscrew the probe with wrench (27mm) and screw out carefully
- Carefully remove probe taking care that the insulation (PTFE or ceramic) is not damaged.
- Clean the probe electrode when it has completely cooled down with a clean, soft cloth.
- If necessary, replace probe.
- Clean and check sealing surfaces
- Insert **new** sealing ring
- Lubricate thread with heat-resistant solid lubricant (e.g. graphite).
- Screw in electrode and tighten, max. tightening torque $M_d=140$ Nm.
- Fit into the water column before establishing the electrical connection.
- Refit protective housing
- Start up the device again (see Chap. 8.4.)



The PTFE or ceramic insulation must not be damaged.



When starting up the boiler check the probe screw connection in the flange for tightness and if necessary, retighten! Observe Chap. 10.1!!



Do not seal thread with PTFE strip or the like (electrical insulating sealing compound)!

11 Fault analysis and rectification



**The device terminal strip is live during operation!!
Before working on the device disconnect it from the mains!!**

Various error states are displayed during operation via the LCD display of the CU-3 (error code and plain text abbreviation) and via the 2x7 segment display (error code) of an (optional) DU-3.

This information can be assigned to possible causes of error with the following table.

Error codes:

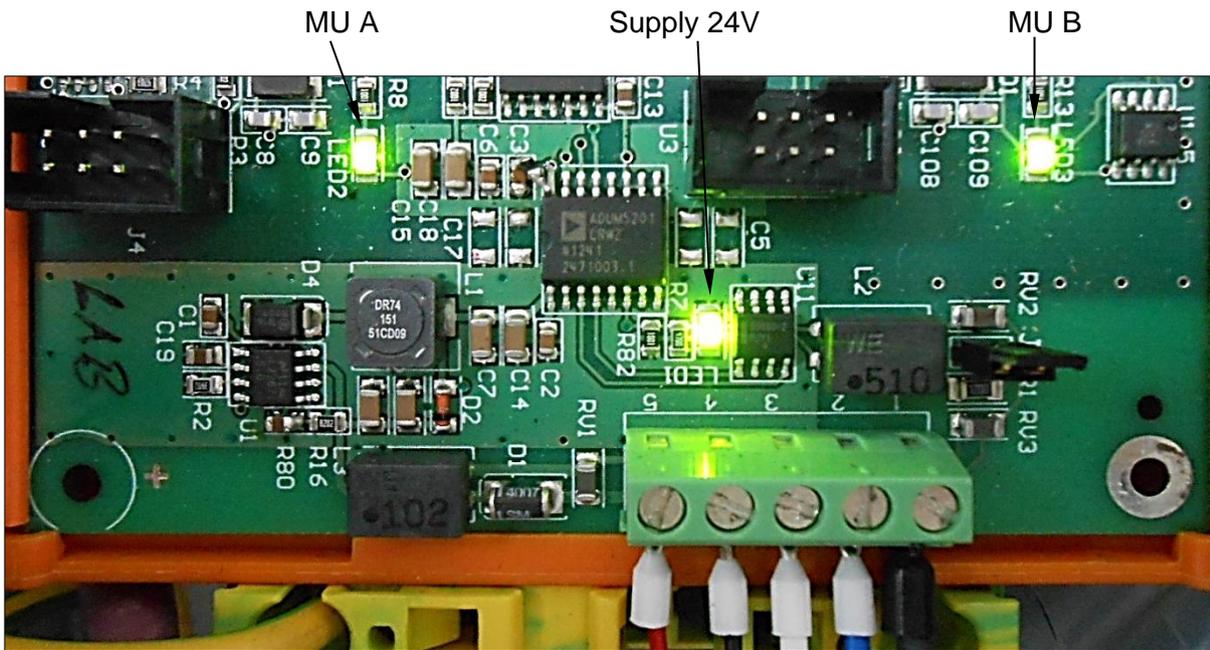
Error code		Cause	Remedial Action
Display CU-3	Display DU-3		
("xx" 1*) please check probe: "xx"	"xx" 1*	Problem with probe "xx" 2*	Check probe "xx"
(33) LLW alarm	33	Below low water level	Provide supply of water
(34) HHW alarm	34	High water level reached	Switch off water supply
(40) PIN 1 power too low	40	24V supply 1 failed	Check power supply unit 1
(41) PIN 2 power too low	41	24V supply 2 failed	Check power supply unit 2
(50) MU A high temperature	50	Temperature in MU distribution cabinet too high	Optimise heat balance in MU distribution cabinet
(51) MU B high temperature	51	Temperature in MU distribution cabinet too high	Optimise heat balance in MU distribution cabinet
(60) MU hardware error	60	MU hardware error	Restart device; Replace MU electronic board
(61) MU A case connection	61	MU A earth cable faulty	Check measuring cable to housing mounting flange
(62) MU B case connection	62	MU B earth cable faulty	Check measuring cable to housing mounting flange
(63) MU A CAN bus no data	63	MU A transmitting no data via CAN-Bus	Restart device; Replace MU electronic board
(64) MU B CAN bus no data	64	MU B transmitting no data via CAN-Bus	Restart device; Replace MU electronic board
(65) MU CAN bus no data	65	CU receiving no data from CAN-Bus	Check CAN-bus lead Check CAN-bus voltage supply Replace MU electronic board
(98) CU hardware error	98	CU hardware error	Restart CU; Replace CU
(99) PIN 3 power too low	99	24V supply not available on CAN-Bus	Check 24V CAN PIN 3 3*

1*: "xx" = Number of probe "01" to "32"

2*: Probe fault such as cable breakage
System error such as water over steam

3*: Remove cable from PIN 3, measure output at terminal:
24V CAN output of the CU-3 shows 24V□ error in the CAN cable
24V CAN output of the CU-3 does not show 24V□ Replace CU-3

MU-3 electronic board:



Continuous light of all 3 LEDs: MU-3 working correctly
LED MU A off: MU A error
LED MU B off: MU B error
all 3 LEDs off: no 24V supply



Dieses hochwertige IGEMA- Produkt wurde unter Anwendung der QM-System-vorgaben gemäß DIN EN ISO 9001:2015 projektiert, gefertigt und geprüft.

Sollte das angelieferte Gerät Transportschäden aufweisen oder trotz unserer Qualitäts-Endkontrolle zu Beanstandungen Anlass geben, so wenden Sie sich bitte umgehend an unsere SERVICE- Bearbeitung unter der Rufnummer

+49 2501 92424-0.

12 Declaration of Conformity



EU-Konformitätserklärung EU-Declaration of Conformity

Konformitätserklärung gemäß EU- Richtlinien 2014/35/EU // 2014/30/EU

Die Firma:
IGEMA GmbH
Antwerpener Str. 1
48163 Münster, Deutschland

erklärt, dass der

Elektronische Füllstand-Fernanzeiger
EWLI3-B

Komponenten

- Anbaugehäuse mit Sonden: EL60,
EL65 und Erfassungseinheit: MU-3
- Auswerteeinheit: CU-3
- Anzeigeeinheit: DU-3-...

mit den Richtlinien übereinstimmt.

Angewandte Normen:

EN 61000-4, EN61000-6,
EN 61010-1, EN 13445

Anbaugehäuse:

2014/68/EU, Modul D (Kat. II)

Weitere berücksichtigte Regelwerke:

AD2000

Als Anlagenkomponente für Großwasser-
raumkessel / Wasserrohrkessel erfüllt das
Produkt ebenfalls die Anforderungen an die
Norm:

DIN EN 12952-7
DIN EN 12953-6

Notifizierte Stelle für die Module:

TÜV Rheinland Industrieservice GmbH
Am Grauen Stein, 51105 Köln
Kenn-Nr. 0035

Münster, 18.03.2020

H. Gartenbroker
(Geschäftsführer; QM-B)
(Managing Director; QM-O)

Declaration of Conformity as per EU- Directives 2014/35/EU // 2014/30/EU

The company:
IGEMA GmbH
Antwerpener Str. 1
48163 Münster, Germany

declares that the

Electronic Remote Water Level Indicator
EWLI3-B

Components

- Water Column with Probes: EL60,
EL65 and Measuringunit: MU-3
- Controlunit: CU-3
- Displayunit: DU-3-...

Complies with the directives.

Applied standards:

EN 61000-4, EN61000-6,
EN 61010-1, EN 13445

Water column:

2014/68/EU, Module D (Kat. II)

Additional considered technical rules:

AD2000

As a system component for shell boilers /
water-tube boilers, the product also meets
the requirements of the standards:

DIN EN 12952-7
DIN EN 12953-6

Notified body for the modules:

TÜV Rheinland Industrieservice GmbH
Am Grauen Stein, 51105 Köln
Identification no. 0035

C. Hummel
(F&E)
(R&D)

13 Attachment

List of accessories:

Power supply unit	Art.no.:	20-10010
DU (up to 16 Probes)	Art.no.:	20-10013
DU (17 - 32 Probes)	Art.no.:	20-10012
CU (with gold plated relay contacts)	Art.no.:	20-10015
Top-hat rail adapter for DU	Art.no.:	40-50055
Switch amplifier for galvanic decoupling of the current output	Art.no.:	20-10016

Assembled BUS connecting cable (including assembled plug and plug socket):

2m	Art.no.:	40-10392
5m	Art.no.:	40-10111
10m	Art.no.:	40-10112
15m	Art.no.:	40-10393
25m	Art.no.:	40-10394

BUS connecting cable not assembled for all devices:

Length as ordered	Art.no.:	35-10058
-------------------	----------	----------

System- / Assignment table (in correct operating state):

Relay	tighten	open (no power, state of rest)
LLW output	Probe ____ submerged	Probe ____ emerged
HHW output	Probe ____ emerged	Probe ____ submerged
Output 1	Probe ____ submerged / emerged *	Probe ____ submerged / emerged *
Output 2	Probe ____ submerged / emerged *	Probe ____ submerged / emerged *
Output 3	Probe ____ submerged / emerged *	Probe ____ submerged / emerged *
Output 4	Probe ____ submerged / emerged *	Probe ____ submerged / emerged *
Output 5	Probe ____ submerged / emerged *	Probe ____ submerged / emerged *
Output 6	Probe ____ submerged / emerged *	Probe ____ submerged / emerged *
Output 7	Probe ____ submerged / emerged *	Probe ____ submerged / emerged *

* delete wrong state

Programming example:

Start:

press "o.k." (to access the menu)
 press ▼ or ▲ until 4.2 Password is displayed in top row
 press "o.k."

Enter Password:

Display: 000 ▲ 100 "o.k." 100 ▲ ▲ 120 "o.k." 120 ▲ ▲ ▲ 123 "o.k."
 → The items 4.3, 4.4, and 4.5 can now be accessed!

Low-water-level-alarm set to probe 2:

enter password, then

press ▼ or ▲ until 4.4 LLW Alarm is shown
 press "o.k."
 press ▼ or ▲ until "on" is shown
 press "o.k."
 press ▼ or ▲ until 00 is shown (0 indicates the first digit of the desired probe's number)
 press "o.k."
 press ▼ or ▲ until 02 is shown (2 indicates the second digit of the desired probe's number)
 press "o.k."
 (again 4.4 LLW Alarm is displayed)

The programming is finished.

fill level control (via 2 contacts) by way of pump control:

Probe 3 emerged: start pump / probe 13 submerged: stop pump / via output 5

The pump contactor is connected to the contacts Out5:34 and Out5:36

enter password, then

press ▼ or ▲ until 4.3 Relay setup is shown

press "o.k."

press ▼ or ▲ until 5 is shown

press "o.k."

press ▼ or ▲ until "on" is shown

press "o.k."

press ▼ or ▲ until 00 is shown (0 indicates the first digit of the desired time's number)

press "o.k."

press ▼ or ▲ until 00 is shown (0 indicates the second digit of the desired time's number)

press "o.k."

(the desired delay time should be displayed)

press ▼ or ▲ until 00 is shown (0 indicates the first digit of the desired probe's number)

press "o.k."

press ▼ or ▲ until 03 is shown (3 indicates the second digit of the desired probe's number)

press "o.k."

(the desired probe (03 in this example) should be displayed)

press "o.k."

press ▼ or ▲ until STEAM is shown

press "o.k."

press ▼ or ▲ until 00 is shown (0 indicates the first digit of the desired time's number)

press "o.k."

press ▼ or ▲ until 00 is shown (0 indicates the second digit of the desired time's number)

press "o.k."

(the desired delay time should be displayed)

press ▼ or ▲ until 10 is shown (1 indicates the first digit of the desired probe's number)

press "o.k."

press ▼ or ▲ until 03 is shown (3 indicates the second digit of the desired probe's number)

press "o.k."

The programming is finished.



Logical correlations are set automatically:

- If in the first part of the programming the output is to be active (ON), then in the second part OFF is set automatically.

- If the output is to be active, if the probe emerges (STEAM) (1st part of the programming), then in the 2nd part WATER is pre-set.

→ Thus, the programming ends with the affirmation of the 1-digit of the probe. The settings are saved, and the display returns to the menu item "4.3 Relay setup".



Link for pdf.-directdownload



Productpage in the internet

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Management
System
ISO 9001:2015

www.tuv.com
ID 0091004092