



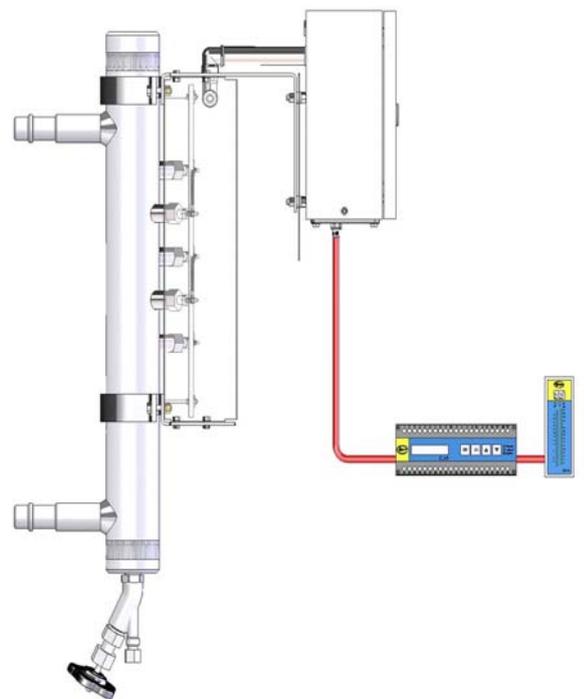
# Installation and operating instructions



## Electronic Remote Water Level Indicator Type EWLI-3B

for use with level probes: EL65 or EL60

D-05-B-30869-EN-0  
Issue date 11/2015



# Table of Contents

1. Risks and Safety Precautions.....	3
1.1 General safety instructions .....	3
1.2 Exclusion of liability.....	4
2. Contents of the packaging .....	5
3 Use in compliance with regulations .....	5
4. System Description .....	5
4.1 Components .....	5
4.2 Function.....	6
4.3 Setup .....	7
4.4 Components of the control unit (CU).....	8
4.5 Operation.....	8
4.6 Error messages .....	9
4.7 Overview of the system properties .....	9
4.8 Display unit (DU) .....	10
5. Assembly and Installation .....	11
5.1 Add-on housing.....	11
5.1.1 Installation dimensions and descriptions.....	12
5.1.2 Installation .....	13
5.2. Control unit CU.....	13
5.2.1 Installation dimensions and descriptions.....	13
5.2.2 Power connection .....	14
5.3. Measuring unit MU .....	16
5.4 Display unit DU (optional).....	17
5.4.1 Installation dimensions and descriptions.....	17
5.4.2 Power connection .....	18
5.5 System connection .....	18
6. Configuration via Menu .....	19
7. Special features of system setup.....	22
8. Commissioning.....	22
8.1 System setup.....	22
8.2 Factory settings .....	22
8.3 Commissioning when starting up the boiler.....	23
8.4 Commissioning during boiler operation.....	23
9. Technical Data.....	23
9.1 Device data.....	23
9.2 Mains transformer .....	25
9.3 Maximum ratings of potential free contacts .....	25
9.4 Data plate .....	26
10. System Maintenance .....	26
10.1 Depressurising add-on housing.....	26
10.2 Dismantling and fitting probes.....	27
11. Fault analysis and rectification .....	27
12. Warranty .....	29
13. Declaration of Conformity.....	30
14 Attachment .....	32



# Safety instructions



## 1. Risks and Safety Precautions

### 1.1 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.
- The device must only be fitted and put into operation by appropriate trained persons.

#### 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.
- Approval for this device loses its validity if changes not authorised by us have been made.
- The safety of the whole boiler system into which this device is fitted lies in the responsibility of the installer of the system.
- If this device is inserted incorrectly the function/protection expected from this device may be impaired.

#### 3 Avoidance of risks and damage

- Disseminate the Installation 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 Installation and operating instructions in the relevant language of the country must accompany it.
- Assembly work on the device should only be carried out by trained staff specially commissioned and only if the device is disconnected.
- Read and observe the Installation 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.
- This device must **not** be used in areas at risk of explosion.

## 4. Symbols

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



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

**Danger**



means that attention is particularly drawn to technical requirements.

**Attention**

## 1.2 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. Contents of the packaging

1 EWLI-3B consisting of:

**Add-on housing** with number of probes ordered (EL65 ( $\leq 32\text{bar}$ ) or EL60 ( $> 32\text{bar}$ ))

**Measuring unit (MU)**; fitted onto the add-on housing and fully wired

**Control unit (CU)**

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

1 set of installation and operating instructions

## 3 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 add-on housing is fastened to the process connections provided on the tank.

The EWLI-3B has been developed in accordance with the requirements of **EC Directive 97/23/EC (2003)** and the standards:

DIN EN 12952 1-7,

DIN EN 12953 1-6,

DIN EN 61000 6-2

DIN EN 61000 6-4

DIN EN 61000 3-2

DIN EN 61000 3-3

DIN EN 61010 1

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 add-on housing and thus in the boiler. With the ability of having up to 32 Probes (minimum 2) one achieves a quasi-continuous level display, taking into account a minimum probe spacing of 36mm.

## 4. System Description

### 4.1 Components

- Add-on housing with number of probes ordered (EL65 ( $\leq 32\text{bar}$ ) or EL60 ( $> 32\text{bar}$ ))
- Measuring unit (MU); fitted onto the add-on housing and fully wired
- Control unit (CU) with separate power supply unit; for top-hat rail fitting in the distribution cabinet
- Display unit (DU) – optional
- various CAN-Bus connecting cables

## 4.2 Function

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) feeds and evaluates the installed probes (2 to 32 in number). The state of the probes attached in the add-on housing is then sent to the control unit (CU).

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

System status	LCD display	LEDs <sup>1*</sup>	4 mA .. 20 mA	Output contact <sup>2*</sup>
<b>Correct operation</b>	IGEMA EWLI3-CU		4mA + (16 mA / number of probes fitted) x Number of probes submerged <sup>3*</sup>	A: activated F: activated Z: depending on assignment / programming
<b>correct operation with failure of one 24V supply <sup>4*</sup></b>	(40) PIN 1 power too low <sup>5*</sup>		4mA + (16 mA / number of probes fitted) x Number of probes submerged <sup>3*</sup>	A: activated F: activated Z: depending on assignment / programming
<b>System error</b>	(65) MU CANBUS no data <sup>5*</sup>		2 mA	A: no power / state of rest F: no power / state of rest Z: all without power
<b>Water level alarm (LLW / HHW)</b>	(33) LLW alarm <sup>5*</sup>		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
<b>Water over steam</b>	("No") please check probe: "No" <sup>5*</sup>		2 mA	A: activated F: no power / state of rest Z: depending on assignment / programming
<b>Probe error <sup>7*</sup> (LLW / HHW)</b>	(33) LLW alarm <sup>5*</sup>		2 mA	A: no power / state of rest F: no power / state of rest Z: depending on assignment / programming

<b>Probe error</b> <sup>6*</sup> (assigned)	("No") please check probe: "No" <sup>5*</sup>		2 mA	A: no power / state of rest F: no power / state of rest Z: assigned without power; Rest: depending on assignment / progr.
<b>Probe error</b> <sup>6*</sup> (not assigned)	("No") please check probe: "No" <sup>5*</sup>		2 mA	A: activated F: no power / state of rest Z: depending on assignment / programming

<sup>1\*</sup> Fully lit LED: continuous light / half lit LED: flashing

<sup>2\*</sup> Description: "A" Alarm output "F" Error output "Z" Assigned output

<sup>3\*</sup> 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)

<sup>4\*</sup> When using 2 power supply units

<sup>5\*</sup> Example

<sup>6\*</sup> See Chap. 7 Special features of system setup

<sup>7\*</sup> As LLW/HHW-Alarm has priority, this message is shown. However, considering the LED-display (yellow flashes also) the probefault is recognisable.

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 (optional) display unit can be used as a remote indicator. The status LEDs show the same as the LEDs of the CU. 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 is calculated like that of the CU.

### 4.3 Setup

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

Both the measuring unit (MU) and the control unit (CU) 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.

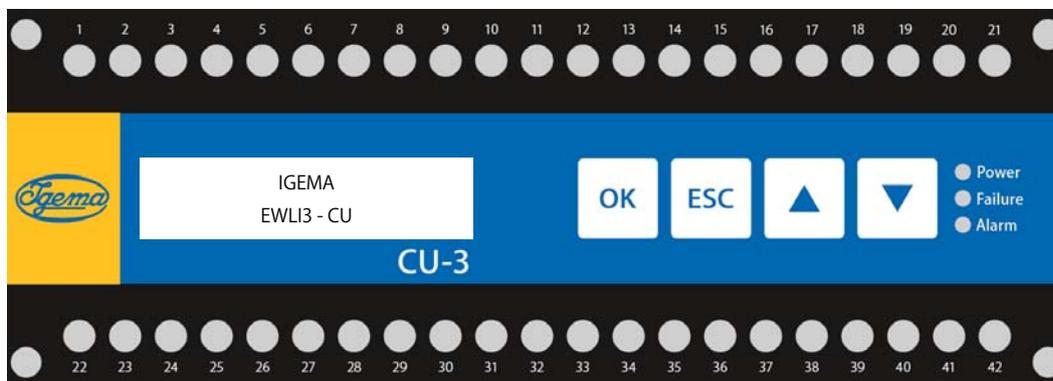


The **output contacts do not have any latching**. The switching behaviour is exclusively in line with the desired specified (programmed) state. If latching is required, this manual locking (latching) must be carried out on site.

#### 4.4 Components of the control unit (CU)

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. 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 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 2 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, optional) with 4mA .. 20mA output for loads up to 500Ω, not galv. isolated, as many as desired

## 4.8 Display unit (DU)

There are two versions of the (optional) display unit DU:

- 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

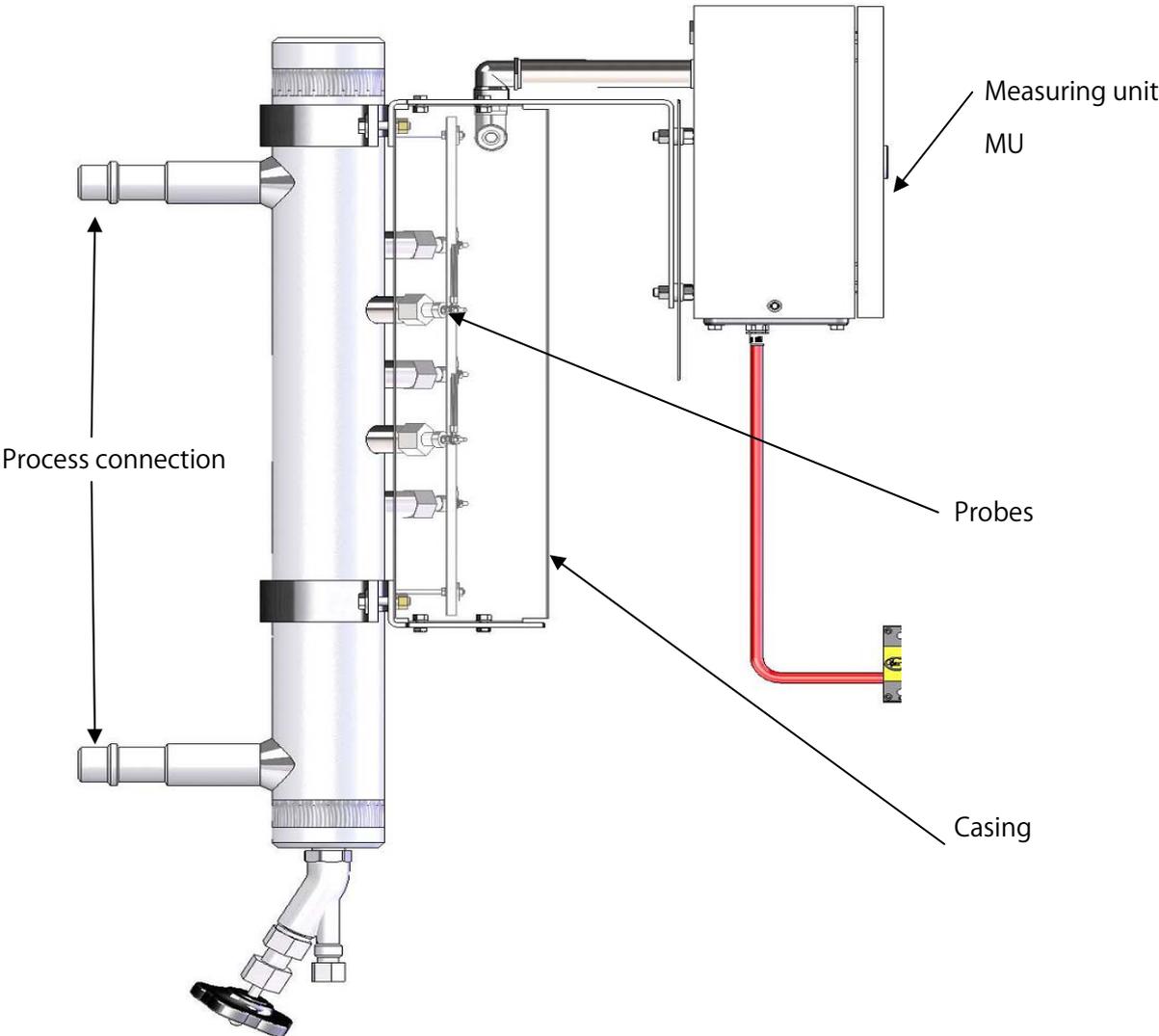
The condition of the system is indicated via 3 status-LEDs (identical to the LEDs of the CU / see Chap. 4.2).

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).

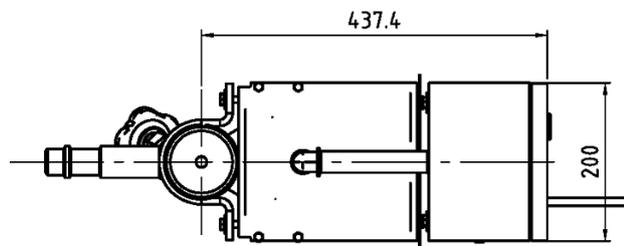
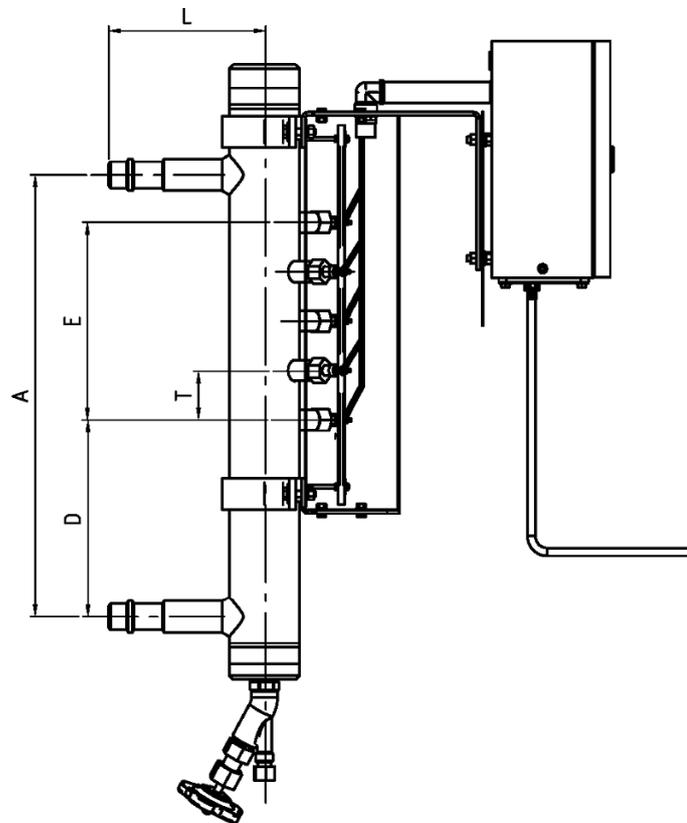
5. Assembly and Installation

5.1 Add-on housing



## 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 add-on housing 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 add-on housing with the medium is ensured, e.g. through a forced circulation (inclination).

## 5.2. Control unit CU

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.



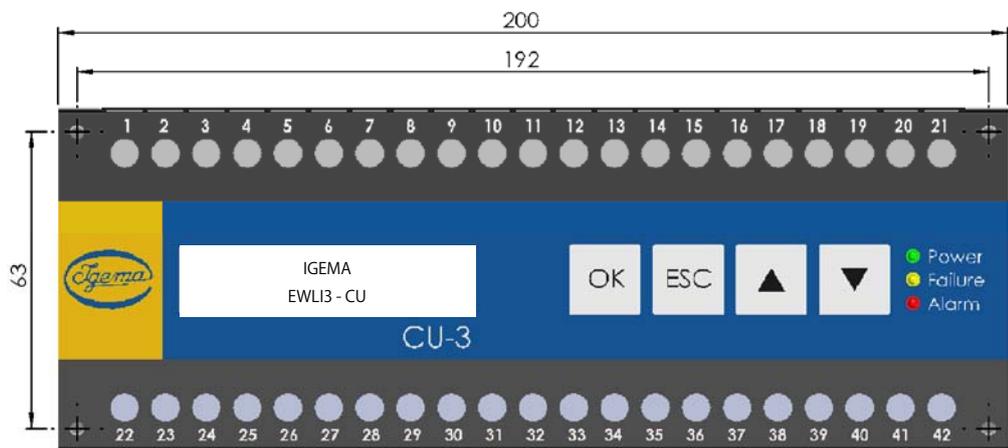
Ensure protection class in accordance with current regulations

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

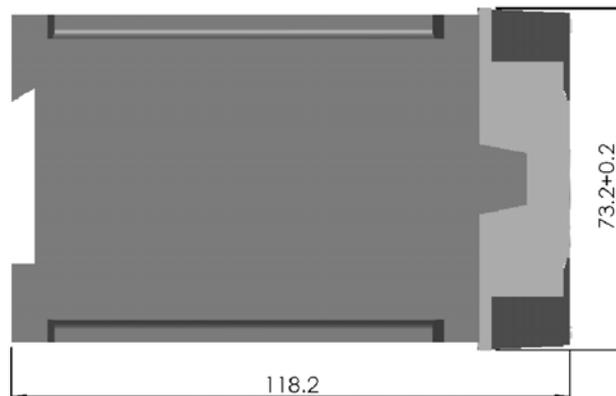
Fix device on standard carrier rail by means of the snap fastening (4).

### 5.2.1 Installation dimensions and descriptions

Front view:



Side view:



## 5.2.2 Power connection



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



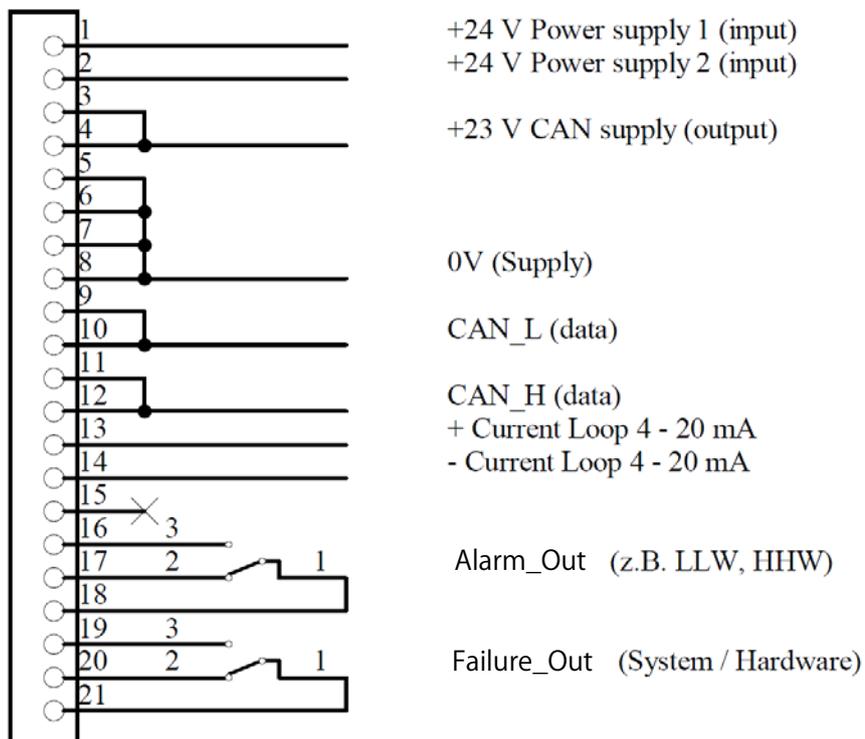
If inductive equipment is connected, voltage peaks occur when switching off.  
For this reason connected inductive equipment (e.g. contactor) must be provided additionally with an RC circuit: e.g.  $0.1\mu\text{F} / 100\Omega$ .



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

### Assignment plan:

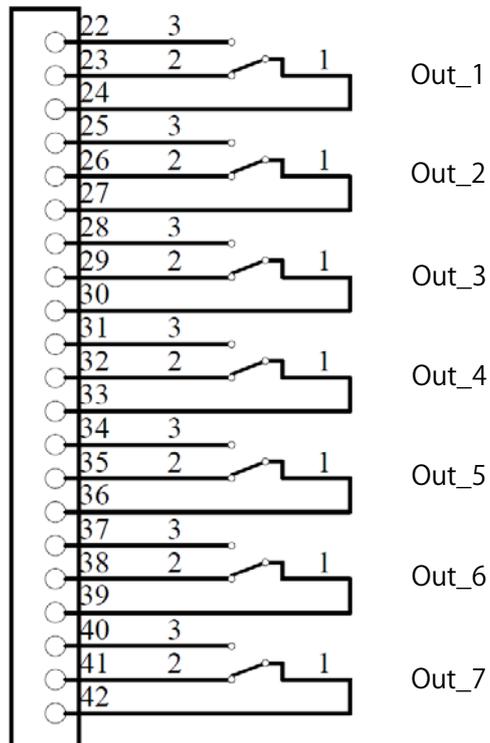
Upper bar / contacts 1 – 21 (for the output contacts the rest position is displayed):



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 has to be a 4-wire, twin stranded, shielded cable (e.g. . UNITRONIC® FD P DeviceNet™ THICK (PUR) // option: IGEMA Art. no. 35-10058).



For the current loop interface (4 mA .. 20 mA) a shielded data cable (2 x 0,34mm<sup>2</sup> or 2 x 0,75mm<sup>2</sup>) (e.g. UNITRONIC® PUR CP) has to be used.

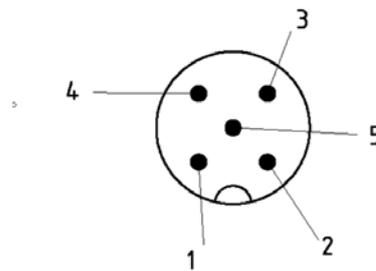
### 5.3. Measuring unit MU

The measuring unit is fixed to the add-on housing 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 color	signal Device Net™
1		Drain
2	RD	V+
3	BK	V-
4	WH	CANH
5	BU	CANL
Screen fixed to housing		

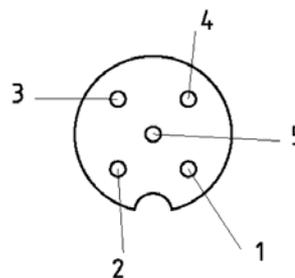
plug M12, 5-pin, A-coded



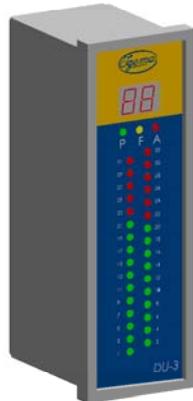
assignment of terminals on the MU circuit board:

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 (optional)

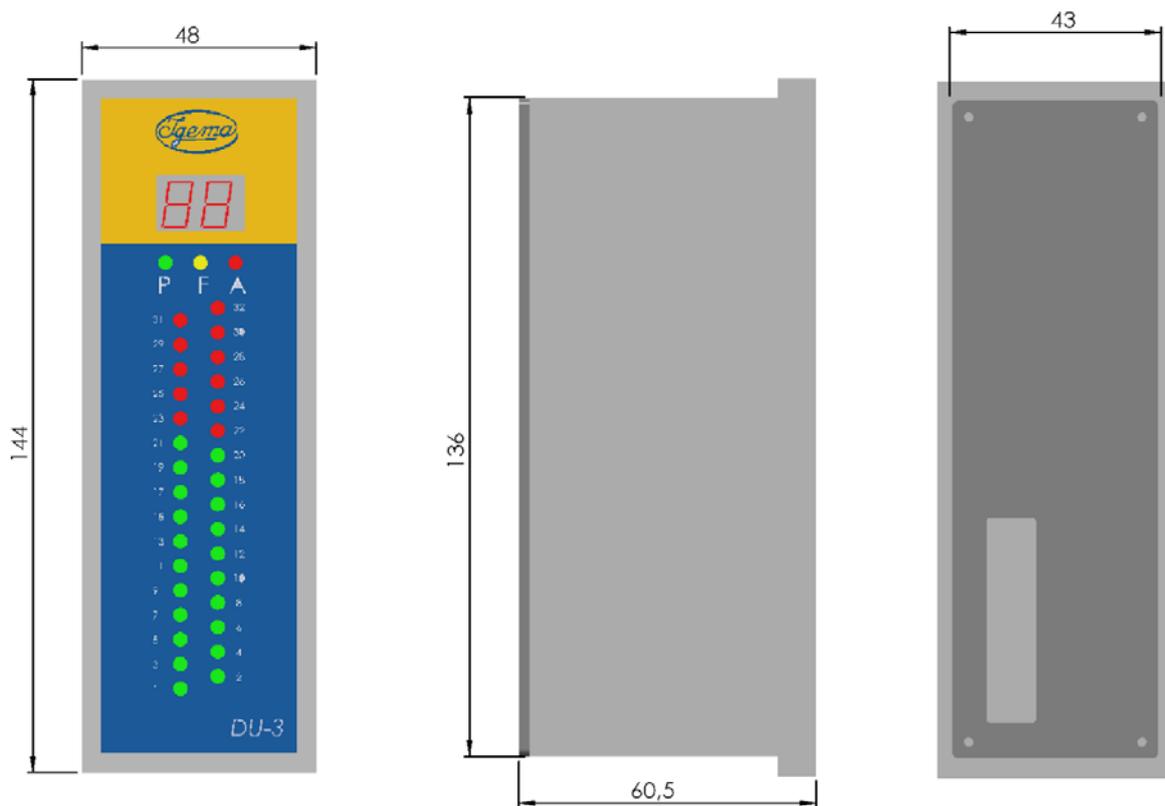


The (optional) display unit is designed as switchboard mountable device.

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

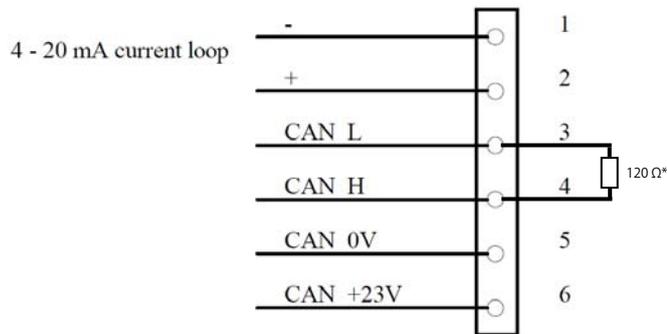
The DU is supplied as standard with 120  $\Omega$  bus terminating resistor (contact 3 – contact 4 // CAN L - CAN H)

### 5.4.1 Installation dimensions and descriptions



## 5.4.2 Power connection

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



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

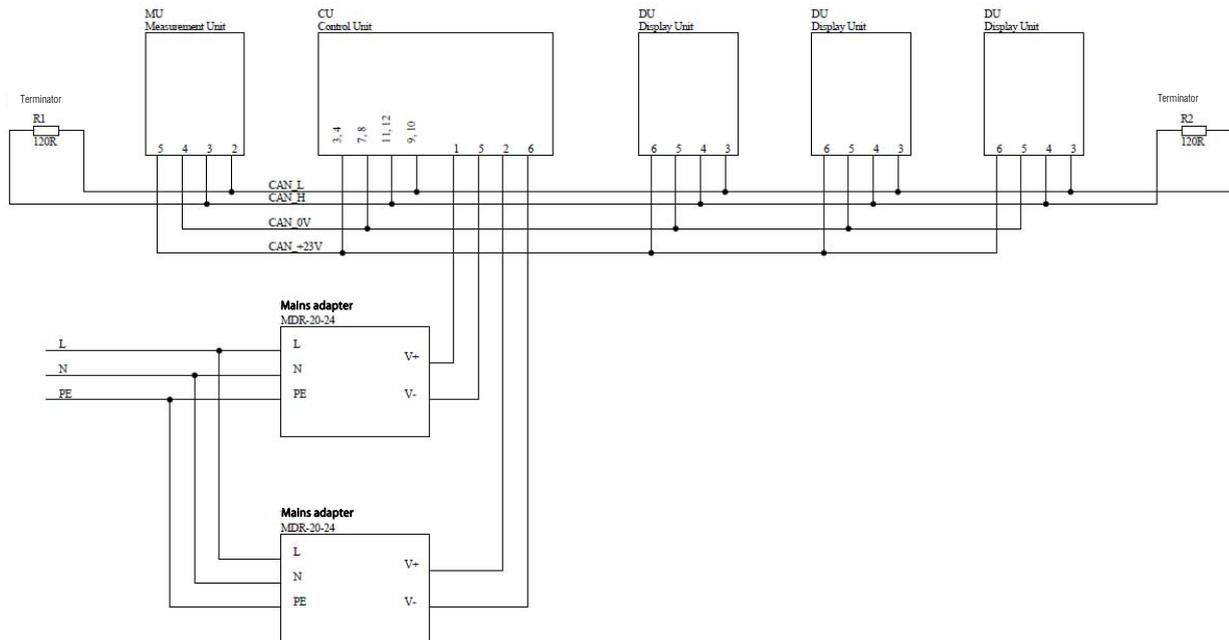
If the DU is not the last device (see Chap 5.5), it must be removed when fitting (the CAN-Bus).

If the DU 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 DUs.)



The bus terminating resistor is already implemented in the MU. 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; 1xCU, X x DU). 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 500m.



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

The CU control unit can supply the measuring unit (MU) and up to 3 display units (DU). The connection of further DUs 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 exit 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)

Diagram:

```
|--- 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  |
| 3.1 Measurement:       | Version number MU  |
| 3.1 Display:           | Version number DU  |

- 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 have to 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 ( <b>observe local regulations!</b> ).
“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 Chap. 4.2.

## 8. Commissioning

### 8.1 System setup

- Regulation-compliant assembly of the add-on housing on the boiler.
- Electrical connection as in Chap. 5, in particular Chap. 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 Chap. 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 have to be assigned to a probe, even if they are not in use. IGEMA recommends to assign unused probes to the top probe. However there is the possibility to create redundancy.

### 8.3 Commissioning when starting up the boiler

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

### 8.4 Commissioning during boiler operation

- 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:	EC Directive 2006/95/EC EC directive 2004/108/EC EC Directive 97/23/EC (2003), Annex III; Module D1, (Category II)
Applied standards:	DIN EN 61000 -6-2: 2011-06      DIN EN 61000 -6-4: 2011-09 DIN EN 61000 -3-2: 2010-03      DIN EN 61000 -3-3: 2009-06 DIN EN 61010-1: 2010
Other Technical Regulations:	Wasserstand 100 (Water level 100) dated February 2010
Data exchange:	CAN-Bus in accordance with DIN ISO 11898, CANopen protocol
Number of probes:	2 to 32
Total length of CAN-Bus:	max. 500m
Electrical conductivity of the liquid:	$0.5 \mu\text{S}/\text{cm} \leq \rho \leq 10,000 \mu\text{S}/\text{cm}$ (25° C)

#### Probes / add-on housing:

Allowable pressure	PS [bar]	32	50	80	100	160	200
Allowable temperature	TS [° C]	239	265	296	312	348	367
Probe	Type	EL65	EL60				
	Item no.	15-01877	15-00790				
	Insulator	PTFE	Ceramic				
Connection thread	G ½"						
Width across flats	WF27						
Electrode spacing	At least 36 mm with offset arrangement						
Material screw connection	Stainless steel						
Material electrode tip	Stainless steel						
Material add-on housing	SA106 GrB (Standard); materials according to DIN or ASME						
Process connection	according to DIN or ANSI; Flange or welding end						

**MU:**

Material switch box	Stainless steel (1.4404/316L)
Protection type	Front side IP65
Working temperature:	0° C to + 85° C
Humidity	non-condensing
Voltage supply	18V – 36V; 24V DC / 2W short-circuit-proof via lead
Current consumption	50mA @ 24V
Electrode voltage	3 Vss
Interface	CAN-Bus according to DIN ISO 11898, CANopen protocol
Self-Test	every 3 s

**CU:**

2x21 pole Screw terminal strip:	
Voltage supply	24V DC $\pm$ 10% / 24 W through 1 or 2 separate power supply unit(s)
Current consumption	200mA
Interfaces	CAN-Bus according to DIN ISO 11898, CANopen protocol
	4 mA – 20 mA (load < 500Ohm) not galv. decoupled
	7 SPDT output contacts freely programmable (Probe – switch contact)
	1 SPDT output contact responding to device errors
	1 SPDT output contact responding to water level alarm (HW and/or LW); the probes for LW and/or HW can be freely chosen
Material	PC-GF V-0
Protection type	Housing: IP40 Terminals: IP20
Connection	Two 21-terminal strips to 2.5 mm <sup>2</sup>
Display	LCD display with 2 16-character lines
Input / Programming	4 keys
Working temperature:	0° C to +55° C
Self-Test	every 3 s

DU:

Voltage supply	18V – 36V; 24V DC / 2W short-circuit-proof via lead
Current consumption	70mA @ 24V
Interfaces	CAN-Bus according to DIN ISO 11898, CANopen protocol
	4 mA – 20 mA (load < 500Ohm) not galv. decoupled
Housing design	As per DIN 61554
Material	Housing: Noryl SE1, GFN2; Pane: Makrolon
Protection type	Front: IP40 Rear: IP20
Display	2 x 7 segment display
	3 Status LEDs green: power yellow: error red: alarm
	Fill level display per probe: green –water // red –steam up to 16 probes: single column otherwise: double column
Working temperature:	0° C to + 55° C

## 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

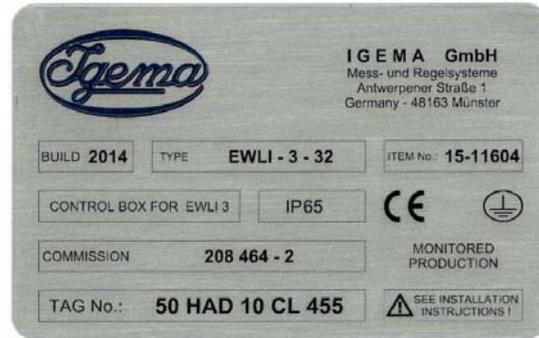
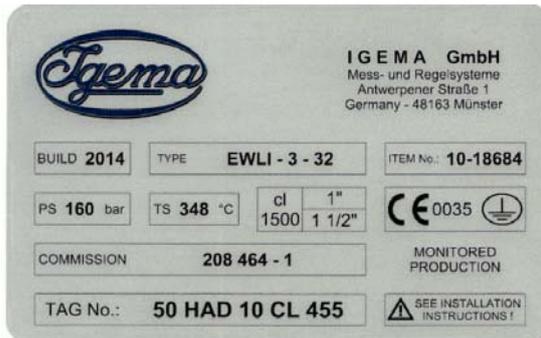
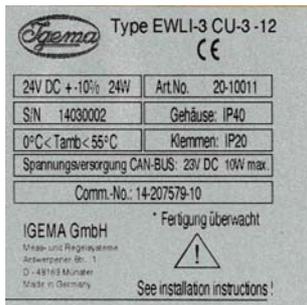
Alarm and error output	Switching voltage	max. 250 V AC
	Switching current	max. 6 A resistive inductive: see load profile
Switch outputs	Switching voltage	max. 250 V AC
	Switching current	max. 6 A resistive inductive: see load profile

During switching operations the load profile of the relay is to be observed! Use contactor!

Relay used: Schrack V23092-A1024-A301

If inductive consumers are connected, voltage peaks occur when switching off. For this reason connected inductive consumers (e.g. contactors) must be provided additionally with an RC circuit: e.g. 0.1µF / 100Ω.

## 9.4 Data plate



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

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 / add-on housing and allow it to cool down before dismantling the probes! Mind the danger of scalding through steam or hot water. The add-on housing must be completely emptied.



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

### 10.1 Depressurising add-on housing

- 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

## 10.2 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 add-on housing 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 (error code and plain text abbreviation) and via the 2x7 segment display (error code) of an (optional) DU.

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

## Error codes:

Error code		Cause	Remedial Action
Display CU	Display DU		
("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

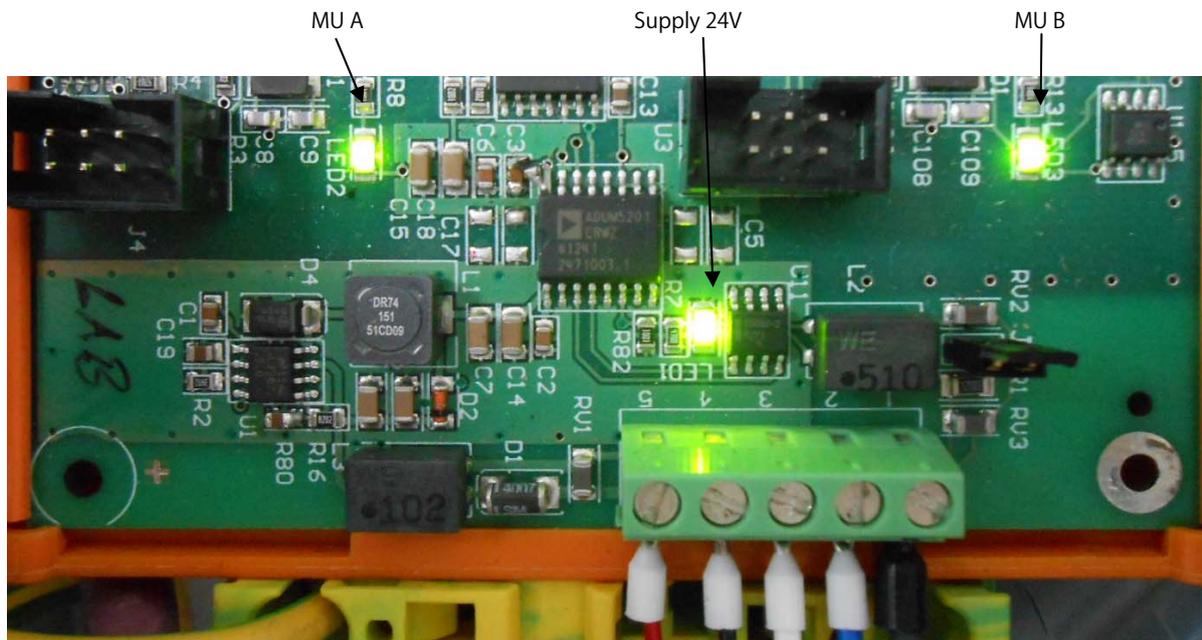
System error such as water over steam

3\*: Remove cable from PIN 3, measure output at terminal:

24V CAN output of the CU3 shows 24V → error in the CAN cable

24V CAN output of the CU3 does not show 24V → Replace CU

## MU electronic board:



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

## 12. Warranty

### Warranty

We grant a 24 month warranty period 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 are *not* part of the warranty.

## 13. Declaration of Conformity

### EC conformity declaration in accordance with

**EC Directive 2006/95/EC,  
EC Directive 2004/108/EC**

The company:

IGEMA GmbH  
Mess- und Regelsysteme  
Antwerpener Str. 1  
D-48163 Münster

declares that the product:

**EWLI-3 "Electronic Remote Water Level Indicator"**  
with the components

"Add-on housing" with the probes "EL60" or "EL65" and the Measuring unit "MU-3"  
Control unit "CU-3"  
Display unit "DU-3"

complies with the directives.

Applied standards:

DIN EN 61000 -6-2: 2011-06    DIN EN 61000 -6-4: 2011-09  
DIN EN 61000 -3-2: 2010-03    DIN EN 61000 -3-3: 2009-06  
DIN EN 61010 -1: 2010

For the add-on housing applies as well:    EC-Directive 97/23/EC (2003), Annex III; Module D1 (Category II)

other applicable technical regulations:

VdTÜV information sheet Wasserstand 100 (Water level 100): 02.2010

Notified body for the module:  
TÜV Rheinland Industrieservice GmbH  
Am Grauen Stein  
D-51105 Cologne

CE 0035

Münster, 04 March 2014

(This declaration loses its validity if changes not authorised by us have been made.)

  
E.H. Kilchert  
(Managing Director)

  
Dr C. Hummel  
(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.

---

## 14 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):

Tighten	relay	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: stopp 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 delaytime 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 delaytime 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 2<sup>nd</sup> part WATER is preset.

→ 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".