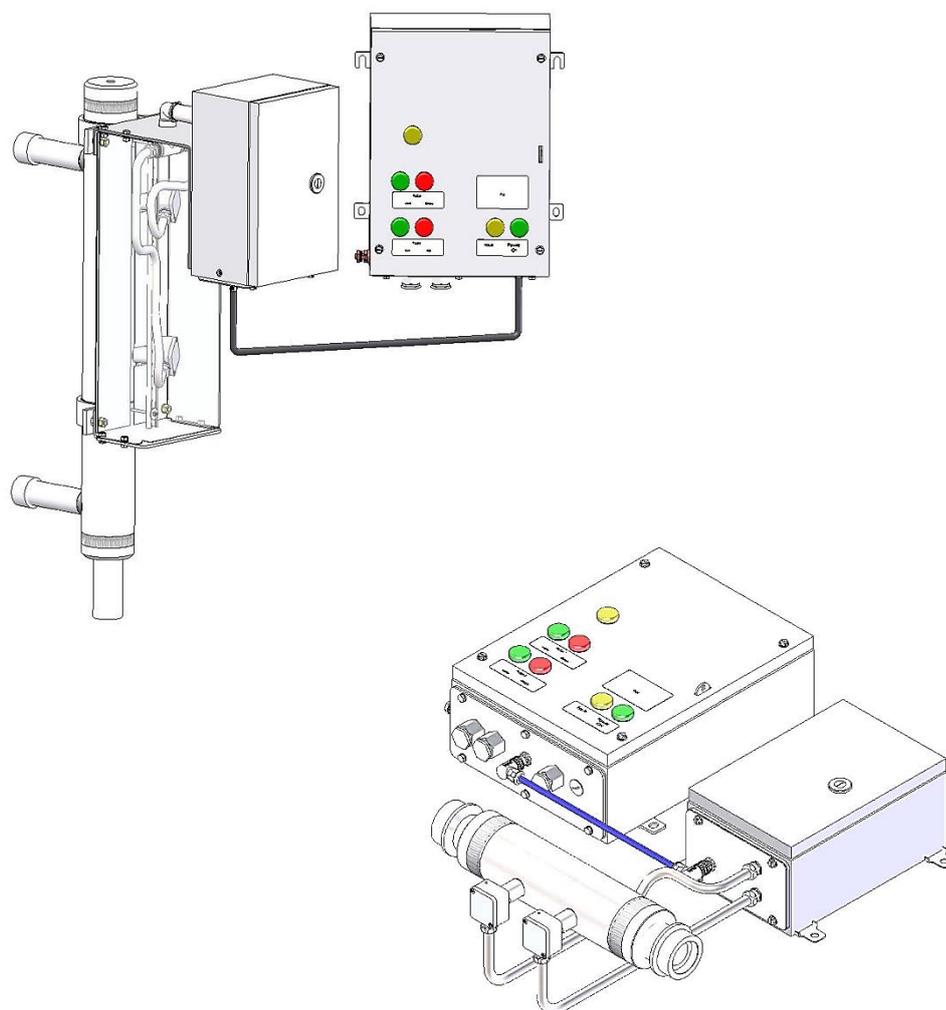


Electronic Water Level Switch

EWLS for use with level probes: EL65 or EL60



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.

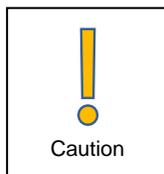
1.1 Symbols used in these instructions

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

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

1.2 Intended use of the device



Use these installation and operating instructions, the identification on the rating plate (see 9.3) 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, 9.3) The operator of the facility is obliged to familiarise himself on the 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 and, if necessary, the protective film from rating plates.

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.

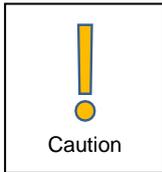
For all maintenance work or new installations, on new or existing boilers or vessels, it is imperative to check that the boiler or vessel has been depressurised and that the pressure has been safely reduced to atmospheric pressure. In principle, no system should be regarded as unpressurized even if indicated 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. Contents of the packaging

1 EWLS consists of:

Water column with number of probes ordered (EL65 (≤ 32 bar) or EL60 (> 32 bar))

Measuring unit (MU-3); completely pre-wired

Control unit (CU-3)

Switch box with green / red signal lamps and yellow warning lamps 24 VDC

1 set of installation and operating instructions

3. Important information

3.1 Use in compliance with regulations

The **Electronic Water Level Switch (EWLS)** is used for level monitoring of electrically conductive liquids.

Typical applications:

- Steam lines (monitoring and discharge of condensate)
- Feedwater tanks (water tank, deaerator, condensate monitoring)
- Flash tanks, feedwater preheaters
- Turbine protection against water ingress (TWIP)
- Steam cooler
- High and low water (alarm and control)

The EWLS 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

4. System description

4.1 Components

- Water column with number of probes ordered (EL65 (≤ 32 bar) or EL60 (> 32 bar))
- Measuring unit (MU-3); completely pre-wired
- Control unit (CU-3) with separate power supply unit; for top-hat rail fitting within its switch box
- Display unit (DU-3) – (optional) (4-20 mA)
- Various CAN-Bus connecting cables (optional)

4.2 Function

The detection is done by a conductive measuring principle, which requires a minimum conductivity of the liquid. The conductivity of the medium is measured in the unit $\mu\text{S}/\text{cm}$. The conductive measuring method makes two statements: electrode immersed, or electrode not immersed.

The measuring unit (MU-3) can be equipped with up to 4 probes. Their spacing can be determined by the customer.

Both the measuring unit and the control unit have 2 independent electronic circuits with their own processors. All processors perform a regular self-check for internal errors of the electronic circuits.

The control unit (CU-3) processes the acquired signals and controls the downstream functions. It is installed in a steel housing (IP65/NEMA4X). In the switch housing there are two lamps per electrode (water=green, steam=red), normal operation (green LED), water alarm (yellow) and system error (yellow):

System Status	LED on	Status of probes	Arrangement of the lights on the switch box door
Normal Operation	H1, H5, H7	All probes in steam	
System error / Physical state not possible	H1, H2, H5, H6	Probe 1 in Steam Probe 2 in Water	
Water alarm Visual Warning	H1, H4, H7, H3 blinkt	Probe 1 in Water Probe 2 in Steam	
Water Alarm	H1, H4, H6, H3	Probe 1 in Water Probe 2 in Water	

One contact (SPDT) is permanently connected as a signal contact for device errors. Signalling (e.g. for PLC) for the 4 probes is done via a separate output contact each. Each processor controls its own relay per contact, whereby the output contacts are only switched when both processors signal the normal operating state in unison. In addition, a 4mA - 20mA interface is available as an output. For each immersed probe, the output is increased by the corresponding proportion (16 mA / number of probes). In the event of an error, the output goes to 2 mA.

Programming is done via 4 buttons and a 2-row LCD display with 16 characters each. The LCD display is also used for local error indication, such as failure of a supply, probe error, display error (water over steam), electronic error as well as cable error (break or short circuit). The local display, which is visible from a distance, informs the user of the system status. If a fault occurs in the system, it is displayed immediately.

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.

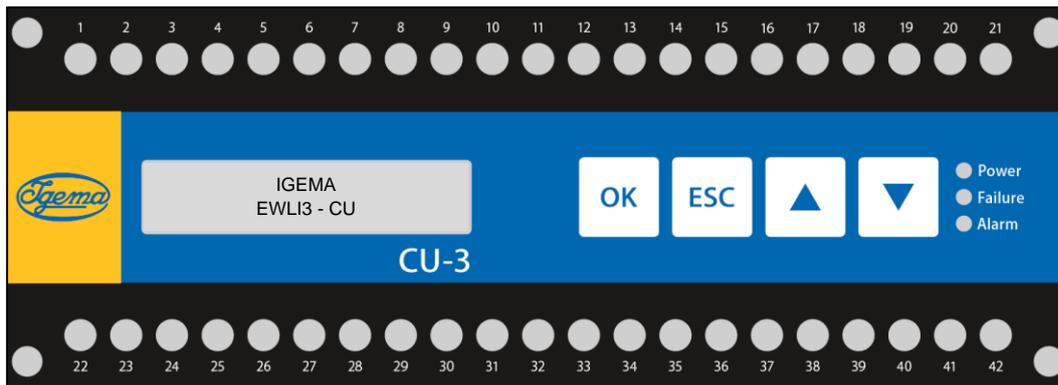


The output contacts do not have any latching. The switching behaviour is exclusively in line with the desired specified (programmed) state. If latching is required, this manual locking (latching) must be carried out on site.

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 additional status indication
- 3 SPDT outputs to be freely assigned by customer (see assignment plan Chap.: 5.2.2) when using two probes
- 1 4mA.. 20mA output for loads up to 500Ω, not galv. insulated (optional)



4.5 Operation



Operation of the EWLS is carried out by the 4 buttons on the front of the Control Unit CU-3. This is described in Chap. 6 "Configuration via Menu".

4.6 Error message

In the LCD display of the CU-3 errors from the evaluator and probes are displayed number-coded and in plain text abbreviations.

For analysis and error correction see Chap. 11.

4.7 Overview of the system properties

- Up to 4 probes (minimum 2 probes) for level measuring / switching
- Can be used up to design pressures $PS = 200 \text{ bar} / 2901 \text{ PSI}$ // Design temp. of TS = $554^\circ\text{C} / 1030^\circ\text{F}$
- Double power supply (optional) for high availability (redundancy)
- Self-monitoring electronics for high system safety during monitoring functions
- Wire breakage monitoring
- Adjustable switching delay on all outputs for avoiding false signals
- 1 potentially free alarm output (SPDT) for the reaction in case of low water and/or overfilling
- 1 potentially free error output (SPDT) for the display of (electronic) system errors
- 3 user specific and freely programmable outputs (SPDT): (when 2 probes are used in the EWLS)

Enabling:

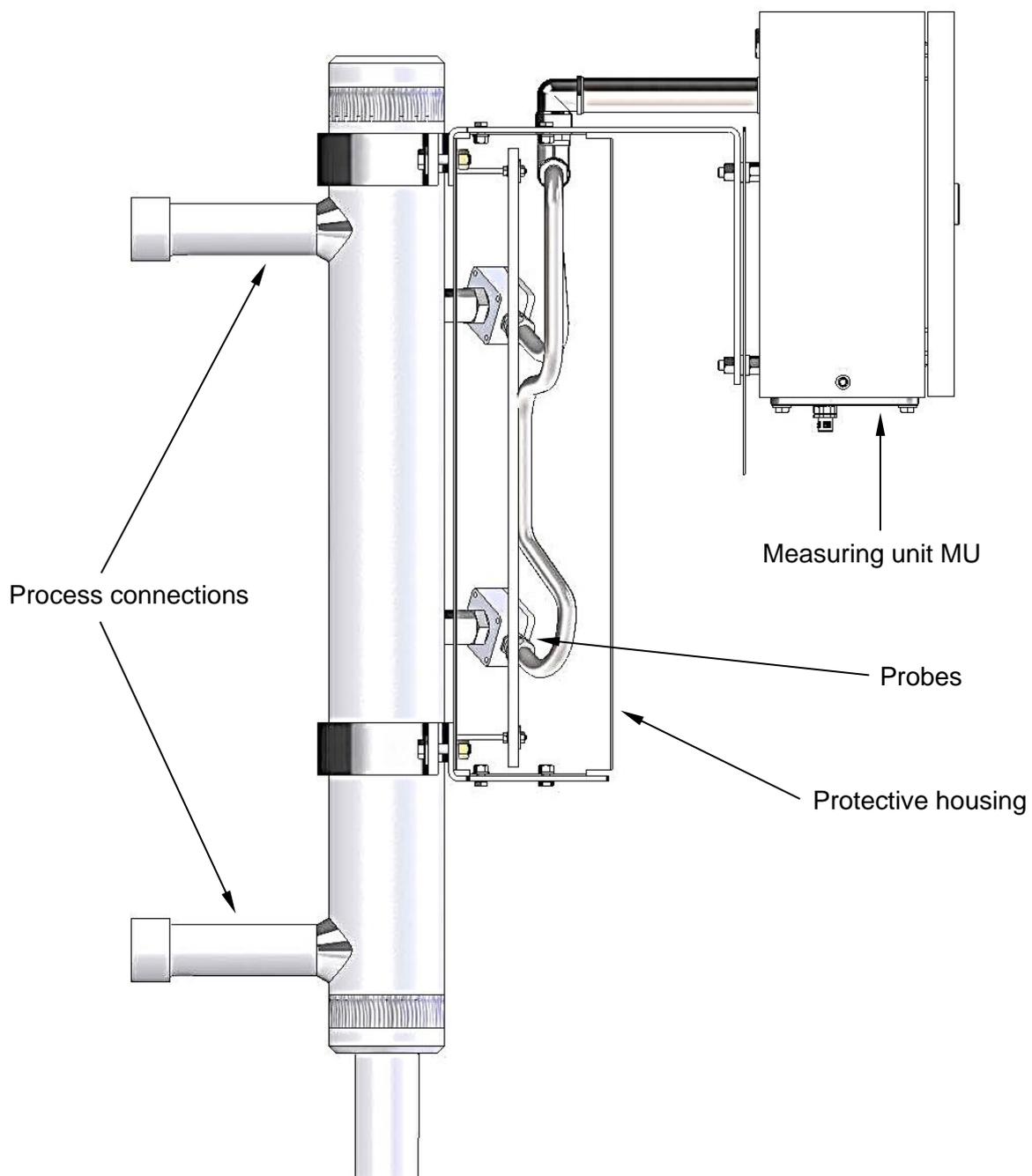
- * Individual switch points e.g. horn when exceeding or falling below a fill level
- * Double switch points e.g. for a pump control

In the case of identical programming of two outputs a “DPDT output” is possible.

- 1 4mA..20mA output for loads up to 500Ω, not galv. insulated (optional)

5. Assembly and Installation

5.1 Water column



5.2 Control unit CU-3

The control unit and also the associated power unit(s) 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.



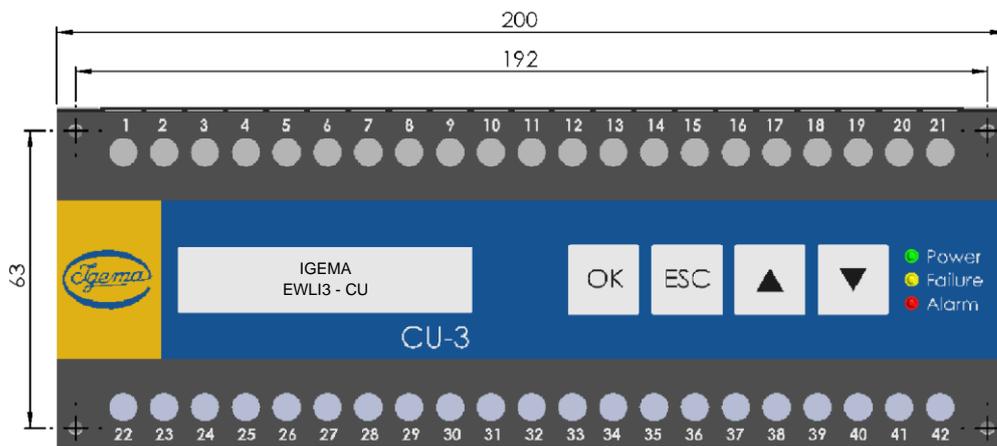
Ensure protection class in accordance with current regulations

With quick fitting with a spring catch for standard DIN EN 50022 35 mm carrier rail

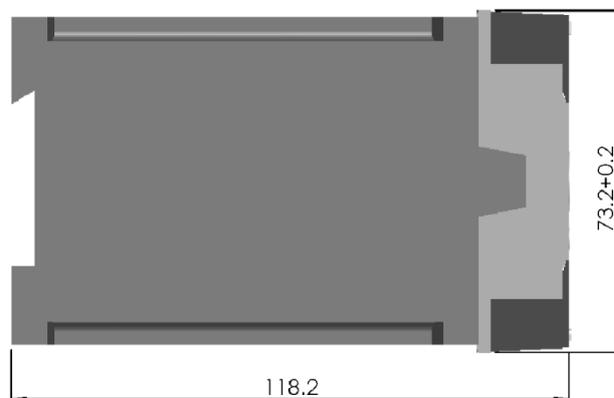
Fix device on standard carrier rail by means of the snap fastening (4).

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!!

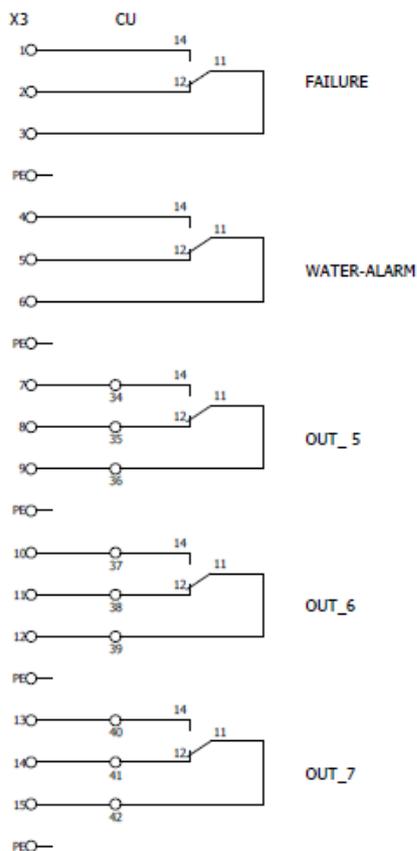


If inductive equipment is connected, voltage peaks occur when switching off. For this reason, connected inductive equipment (e.g. contactor) must be provided additionally with an RC circuit: e.g. $0.1\mu\text{F} / 100\Omega$.



The output contacts are only switched when both electronic circuits energise the corresponding relays (Chap. 4.3)
For free assignment are solely the outputs 5-7 and 2 potentially free outputs. All of these 5 SPDT outputs are located on the terminal strip X3.

Assignment plan:



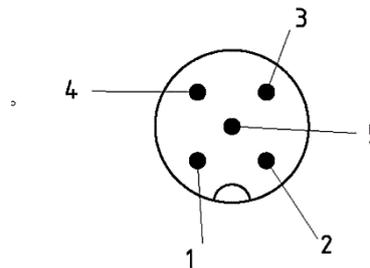
5.3 Measuring unit MU-3

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™ BUS System.

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

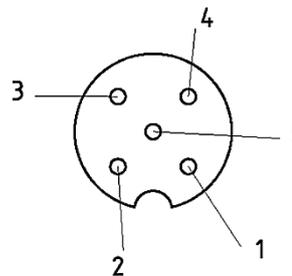
Cable plug M12, 5-pin, A-coded



Pin assignment on the MU circuit board:

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

Cable socket M12, 5-pin, A-coded



6. Configuration via Menu

The menu of the EWLS 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.

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 unlocks programming points 4.3, 4.4 and 4.5 and is only used to prevent unintentional system programming.

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. PLEASE NOTE THAT OUTPUTS 1 – 4 must not be changed. If these are change you will remove the function of the Lamps on the front of the switch box. Only outputs 5-7 can be freely assigned from the customer.



4.4 LLW Alarm:

Must not be changed otherwise the function of the lamps in the front of the switch box door will not function.

4.5 HHW Alarm:

Cannot be changed otherwise the function of the EWLS will be lost.

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.

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 a switching function via a relay output (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



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 (point 8.3). If it is not possible to commission the indicator according to point 8.3, the indicator can be commissioned with the boiler under pressure and temperature (point 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.

8.1 System setup

- Regulation-compliant assembly of the water column at the boiler.
- Electrical connection as in Chap. 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

Output contact 5: on Probe 2*
Output contact 6: on Probe 2*
Output contact 7: on Probe 2*

* this only applies with the 2-probe system, otherwise these output contacts are not freely available

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



All 3 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



First make sure that the drain valve is closed. Then open the shut-off valves to the stop. The boiler can now be commissioned with the indicator. After commissioning the indicator must be checked for function and leakage.

8.4 Commissioning during boiler operation



The shut-off valves must be closed and the drain valve needs to be fully open. Next, slowly and carefully open the upper shut-off valve a little so that the unit and its be carefully heated with steam, until the operating temperature has been reached. This takes about 5-10 minutes. Next, close the drain valve. Now the upper shut-off valve can be opened slowly until it stops.

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:	2 to 4
Total length of CAN-Bus:	max. 500m
Electrical conductivity of the liquid:	$0.5 \mu\text{S/cm} \leq \rho \leq 10,000 \mu\text{S/cm} (25^\circ\text{C})$

Probes / water column:

Allowable pressure	PS [bar]	32	200
Allowable temperature	TS [°C]	239	367
Probe	Type	EL65	EL60
	Item-no.	15-14864	15-13243
	Insulator	PTFE	Ceramic
Connection thread	G ½"		
Width across flats	AF27		
Electrode spacing	At least 36 mm with offset arrangement		
Material screw connection	Niro		
Material electrode tip	Niro		
Material water column	SA106 GrB (Standard); materials according to DIN or ASME		
Process connection	according to DIN or ANSI; Flange or welding end		

MU-3:

Material switch box	Stainless steel (1.4404/316L)
Protection type	Front side IP65, NEMA 4x
Working temperature:	0°C to + 85°C
Humidity	noncondensing
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

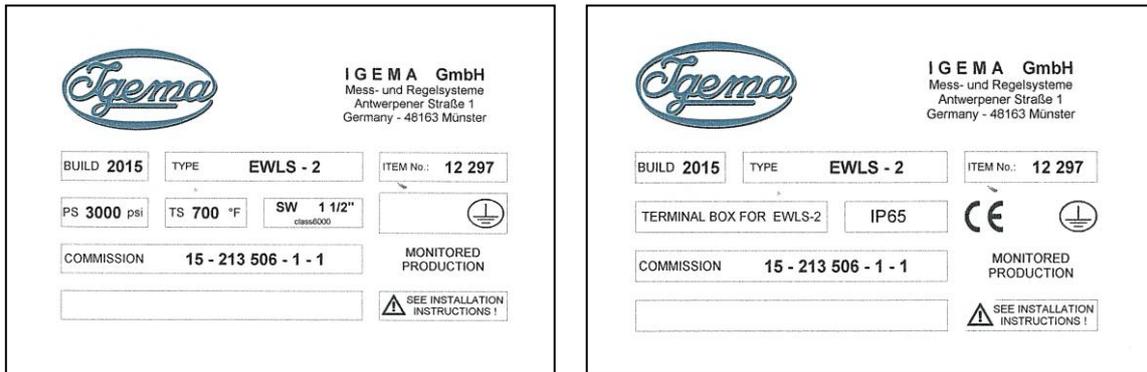
CU-3:

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 (Bürde < 500Ohm) not galv. insulated (optional)
	3 SPDT output contacts freely programmable (Probe – switch contact // 2-probe system)
	1 SPDT potential free output contact system error
	1 SPDT potentially free contact responding to water level alarm
Material	PC-GF V-0
Protection type	Housing: IP40 Terminals: IP20
Connection	2-terminal strips to 2,5 mm ²
Display	LCD display with 2 16-character lines
Input / Programming	4 keys
Working temperature:	0°C to +55°C
Self-Test	every 3 s

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 Rating plate



The description EWLS - 2 refers to the number of probes in the device.



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.

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 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 maintenance may affect service life and performance of 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 quality of the boiler water, a shorter cleaning cycle may be required.



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 the 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

10.2 Dismantling and fitting probes



Attention! Disassembly only in cold condition!

- Remove the protective housing “roof”
- Loosen the nut at the end of the probe and remove the cable eyes
- Loosen the M20 floor fixing nut of the housing
- Remove housing
- Unscrew the probe with wrench (27mm) and screw out carefully
- Remove probe carefully, making sure that the insulation (PTFE or ceramic) is not damaged.
- Clean the electrode of the probe in the fully cooled state with a soft, clean cloth.
- Where appropriate or required, replace the 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.
- Remount the housing
- Tighten the M20 floor fixing nut of the housing
- Fit into the add-on housing before establishing the electrical connection.
- Mount the housing „roof“
- Mount the 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!!**

Over the LCD display of the CU-3 (error code and plain text abbreviation) various errors are displayed during operation. This information can be assigned to possible causes of error with the following table.

System-Error codes:

Error code	Cause	Remedial Action
Display CU-3		
("xx" 1*) please check probe: "xx"	Problem with probe "xx" 2*	Check probe "xx"
(33) LLW alarm	Below low water level	Provide supply of water
(34) HHW alarm	High water level reached	Switch off water supply
(40) PIN 1 power too low	24V supply 1 failed	Check power supply unit 1
(41) PIN 2 power too low	24V supply 2 failed	Check power supply unit 2
(50) MU A high temperature	Temperature in MU-3 distribution cabinet too high	Optimise heat balance in MU distribution cabinet
(51) MU B high temperature	Temperature in MU-3 distribution cabinet too high	Optimise heat balance in MU distribution cabinet
(60) MU hardware error	MU hardware error	Restart device; Replace MU electronic board
(61) MU A case connection	MU A earth cable faulty	Check measuring cable to housing mounting flange
(62) MU B case connection	MU B earth cable faulty	Check measuring cable to housing mounting flange
(63) MU A CAN bus no data	MU A transmitting no data via CAN-Bus	Restart device; Replace MU electronic board
(64) MU B CAN bus no data	MU B transmitting no data via CAN-Bus	Restart device; Replace MU electronic board
(65) MU CAN bus no data	CU receiving no data from CAN-Bus	Check CAN-bus lead Check CAN-bus voltage supply Replace MU electronic board
(98) CU hardware error	CU hardware error	Restart CU-3; Replace CU-3
(99) PIN 3 power too low	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-3

MU-3 Electronic board:



This high-quality IGEMA product was designed, manufactured and tested with the application of the QM System guidelines in accordance with DIN EN ISO 9001:2015. If the device supplied indicates transport damage or gives cause for complaint in spite of our final quality control please contact our SERVICE department on telephone +49 2501 92424-0.by return.

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-Schalter
EWLS

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

Anbaugehäuse:

Art. 4 Abs. 3

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

DIN EN 12952-7
DIN EN 12953-6

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 Level-Switch
EWLS

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

Water column:

Art. 4 para. 3

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

Münster, 18.03.2020


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


C. Hummel
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BOILER MONITORING HEAT & STEAM TECHNOLOGY



13. Attachments

List of accessories:

Power supply unit Art.-no.: 40-53105

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.: 40-55216

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