OPERATING MANUEL

Model : ISS

LEVEL SWITCH

Information in this manual is reviewed and completely reliable. Responsibility is not assumed due to any typing error.
Products in this manual are available only for information purpose and they may be changed without notice.



Models :

ISS 04

CE

Important Notes:

Used Symbols :

: Caution : Note : Disposal

- Please read this manual carefully before installation of the **level switch**. User is responsible for accidents and losses arising from failure to comply with the warnings in this manual.
- In the event that **level switch** is broken, take measures in order to prevent accidents and losses which can occur in its system.
- There is not any fuse and circuit breaker on the instrument; they should have been added to the system by the user.
- This manual should be stored in an easily accessible place for subsequent use.
- The manufacturer's liability cannot exceed the purchase price of the device according to the law.
- Do not make any modification on the instrument and do not try to repair it. Reparation should be made by authorized service staff.
- Do not operate the system before making assembly in compliance with the assembly chart related to the instrument.
- Products which do not contain label and serial number are considered to be excluded from the warranty scope.
- The instrument's useful life, determined and announced by the ministry, is 10 years.

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1. General Information

1.1. Material Acceptance

Check that there is no damage on the packages during the transportation immediately after the material acceptance. If packages are damaged, open the packages immediately and check whether products are affected or not, if there is any damage, send your complaint report to the transporter company and its photocopy to the address of our company.

1.2. Information about Areas of Use

ISS Seviye sensörleri buhar kazanları su seviye kontrolü ve muhtelif iletken sıvı tankları için ekonomik ve güvenli bir çözümdür.

Aplications Areas: Steam boilers , Degasifier , Condansate tanks , Conductive liquid tanks.
It should be used in allowed using medium and application areas!
It is not used in the corrosive mediums, ambient with explosive and flammable material.
Conformity with medium to be measured should be also taken into consideration.
Responsibility is not assumed in case of inappropriate use, modification and injure, and such cases are not covered by warranty.

Ambient Conditions: Relative Humidity: 5-95 %RH **Ambient temperature:** 70 °C (It is not used under -5 °C)

1.3. Working Principle

ISS 04 Level Sensor is designed for controlling of conductive measurement principle. It has four different measurement probe and an electronic unit and so without any other control unit it allows to control by itself.

The sensor has two different conductive level measurement and four different control function, which are selectable by user.

It can be used in min.1 µS/cm and over conductive liquids.

1.4. Features and Material Information

Technicial Specifications :

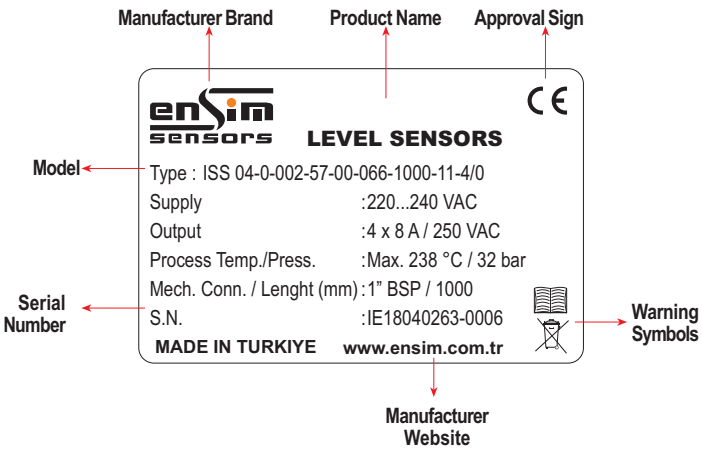
Mounting Position	Vertical (into boiler or with by-pass tube)
Process Connections	G 1”
Working Pressure	32 Max. barg , Max. 238 °C
Case	Aluminum Casting (Electrostatic Painted)
Connection Material	1.4571 Stainless Steel
Electrode Isolation	PTFE
Electrode Material	1.4571 Stainless Steel
Pipe Part	PTFE
Pipe Material	Stainless Steel
Electrode Lenght	500 mm , 1000 mm , 1500 mm
Electrode Diameter	4 mm
Cable	5 x 0.75 mm² With Silicon İsolated
Cable Entry	3 pcs. PG 11 Chromed Brass
Supply	220-240 VAC (Std) or optional 24 VDC,2 VA
Electrode Voltage	Max 6 V
Sensitivity	1 uS/cm min. or 30 uS/cm min. selectable
Output	Contact
Contact Current	4 x 8 A / 250 VAC
Relay Delay	3 sec.
Ambient Temperature	70 °C
Protection Class	IP 65
Weight	2,9 kg (For L: 1000mm)

Avantages :

* Compact structure.
* Multi-function can be controlled.
* Wetted parts is 316 stainless steel.
* Low conductivity liquids can be worked.

1.5. Label Information

Product Label :



1.6. Target Group

This operating manual has been prepared for qualified technical personel.

1.7. Security Notes

Following notes should be taken into consideration in order to avoid dangers which can occur on the operator and around the ambient.

Installation, operation and maintenance of this instrument should be made only by people who have read the operating manual and who are knowledgeable about work safety!
It should be complied with work safety, accident prevention regulations and national installation standards.
Escaping steam or hot water when working on boilers.Wait for the pressure gets down to zero to intervene the device
Electrical shock while working with terminal strip which has 220-240 VAC on all terminals possibly.always cut off the power before interventions.
Product should be used only within the scope of stated specifications!
You can assemble the instrument only when pressure is not available!

1.8. Content of Package

Please check whether you have taken delivery of below listed content completely or not and check its conformity with criterions in your order:
·Level Switch
·This operating manual

2. Installation

2.1. General Notes

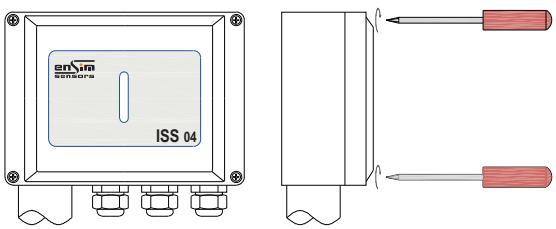
Installation of the instrument should be made only by authorized personnel.
Do not apply force to the instrument during the installation!
Do not use the level switch with a greater pressure than recommended pressure.
Do not forget that instrument is precise, carry it carefully and prevent to be damaged.
It should be guaranteed that there are not any magnetic particles.

2.2. General Installation Stages

·Remove level indicator from the box carefully
·Check whether gasket is appropriate for fluid or not. If is not appropriate, contact with the producer.
·Then, apply below mentioned explanations according to structure of the design.
·Level switch should be placed in completely vertical position on the line.
·If instrument is mounted outside and if there is any danger of lightning or excessive pressure, take preventive measures by taking necessary measures.
·In the operating conditions, level switch may be hot according to situation of fluid, in this case, do not touch the indicator, otherwise your skin is damaged.

2.3. Installation For Mechanical Connections

·Use appropriate O-Ring or gasket for tightness.
·Ensure that its surface is clean and smooth.
·Assemble the instrument manually.
(For G1" max. 20 Nm , For G2" max. 30 Nm)



Components

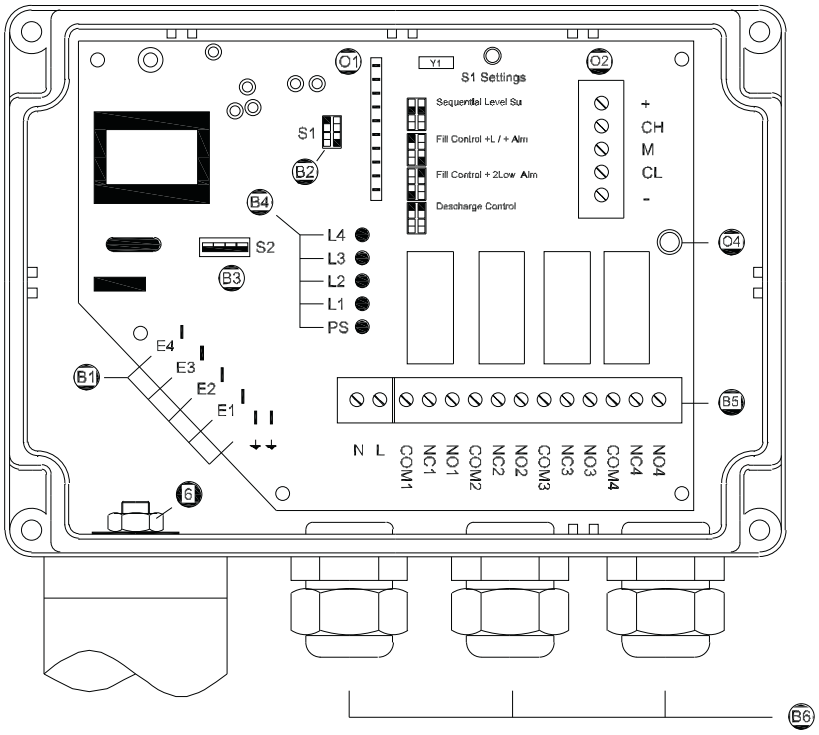


Figure 1

1. Terminal Box (E.Card Case)
2. Heat insulating Lag
3. Connection Screw
4. Joint Ring (Copper or Aluminium)
5. Electrode Rods
6. Fixing Nut

B1. Electrode Tips Connection Headers

B2. S1- Configuration Switch

B3. S2- Sensitivity Switch

B4. Indicator LEDs

B5. Terminal Strip

B6. Cable Glands (3xPg11)

01. Fieldbus Add-On Card Connection Header (Option!.)

02. CanOpen Terminal (Option!.)

03. Fieldbus Line Cable Gland (Option!.)

04. Hole for Add-On Card Fixing screw.

2.4. Fonksiyonlar ve Uygulama Çeşitlilikleri

Kontrol Fonksiyonları Dip switch ile muhafaza içinden kullanıcı tarafından yapılabilir.

Procedure varies according to process type which can be a b oiler or a storage vessel.

F1.Level Switch

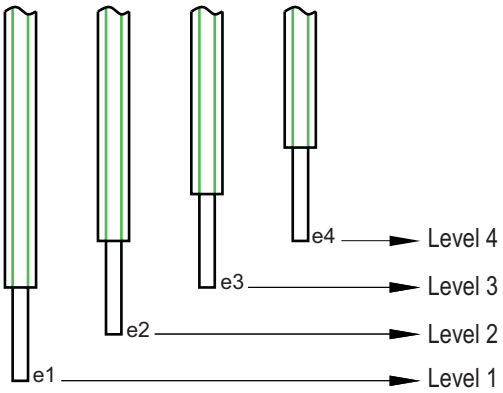


Figure 2

F2.Fill Control + Low Level Alarm + High Level Alarm

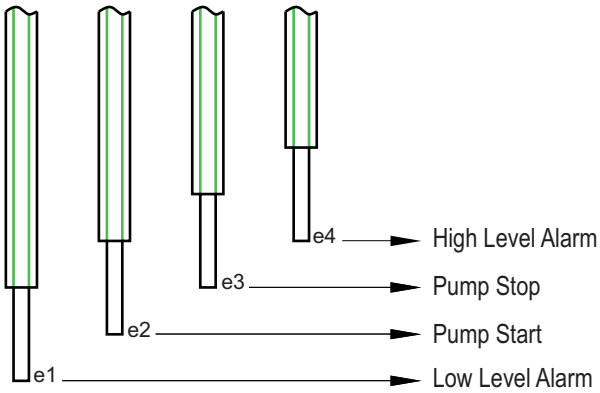


Figure 3

F3.Fill Control + 2 pcs Low Level Alarm

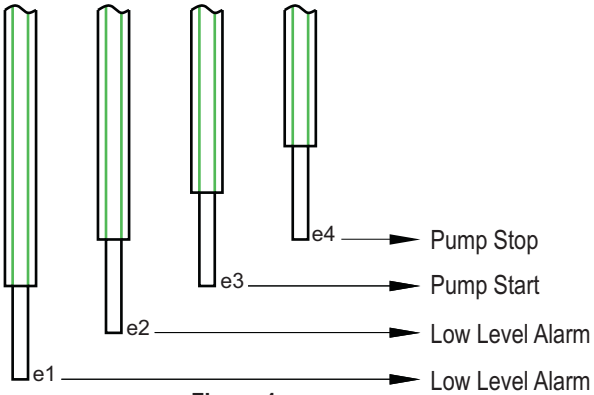


Figure 4

F4.Descharge Control

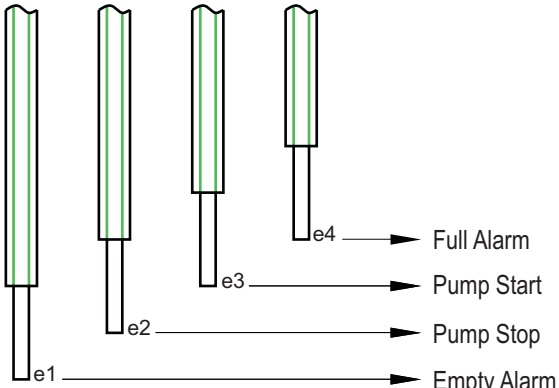


Figure 5

ISS 04 can work on boilers with configuration F1 , F2 , F3 and on water strage vessels with configuration F1 and F4 .

Working with Boilers

1- If your need is to get signals at some levels of water and you don't concern boiler security etc then Configuration-I suits your need. No matter 1st rod is shorter than 3rd or 4th rod is taller than 2nd or vice versa. Cut the electrode tips at lengths which levels you need signal at. This working mode is very rarely used with boilers though. (When electrode is mounted as a spare signaler for instance).

2- If your need is to establish a Fill-Control then Configuration-II or Configuration-III must be used.

? At Conf-II Control mode, the electrode tip-1 is always Low level alarm and the 1st relay contacts must be in the Burner Security Chain. The 2nd and 3rd electrode tips work for pump control, and the 4th tip works as High level alarm. Relation between rod lengths will be like "Le1>Le2>Le3>Le4".

? At Conf-III control mode, the electrode tip-1 and tip-2 work as Low level alarm together and the 1st and 2nd relay contacts must be in the Burner Security Chain. The 3rd and 4th electrode tips work as pump control. Relation between rod lengths will be like "Le1=Le2>Le3>Le4".

Working with Vessels

1- Use the Configuration-I to have a level signaler. Just cut the rods as you plan. There are no prediction about the length of rods.

2- Use the Configuration-IV to establisn a Descharge-Control. Relation between rod lengths will be like "Le1>Le2>Le3>Le4".

2.5. Dimensions :

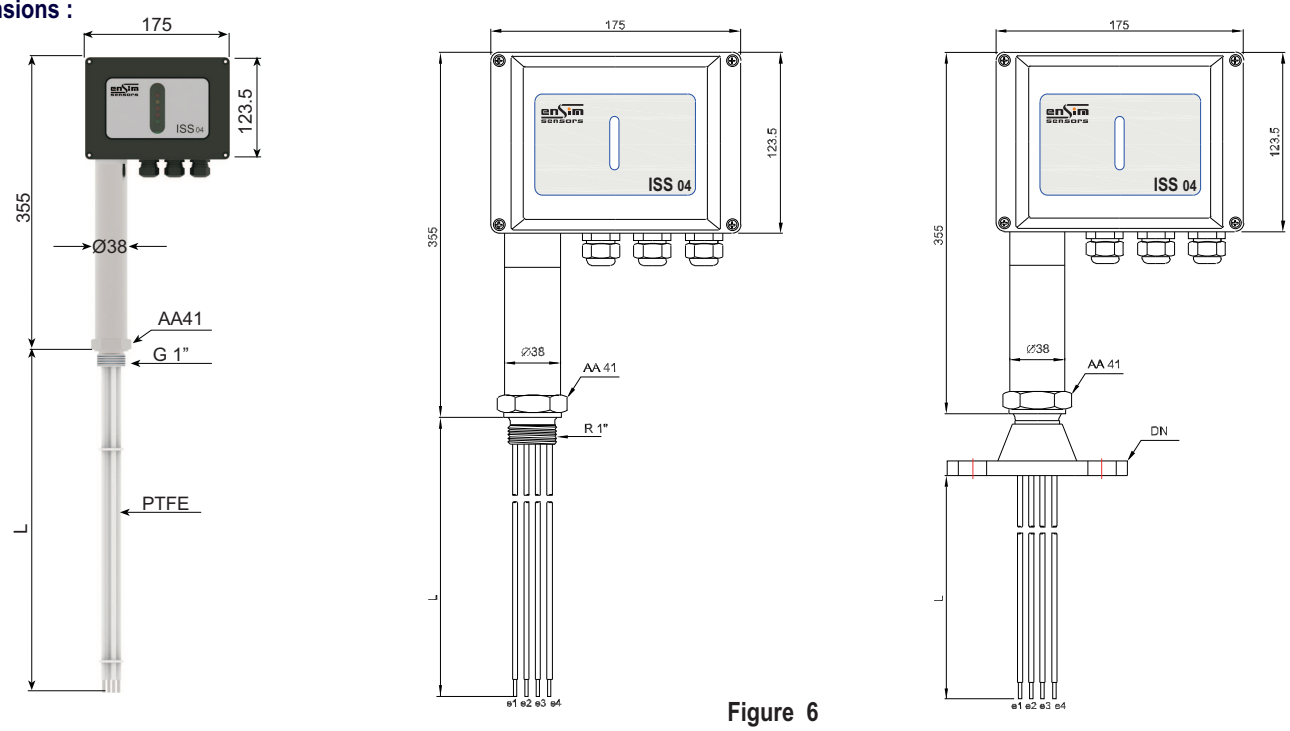
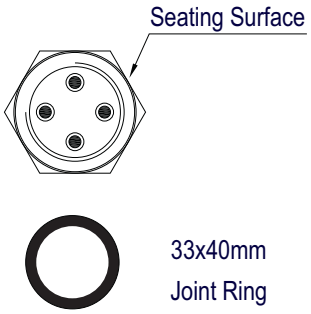


Figure 6

Note: Kontrol kutusu bakış açısına uygun olacak şekilde 360 derece döndürülebilir.



Mechanical Installation

The mounting part of the ISS-04 is the G1” screw. While mounting:

*Be careful about the seating surface is clean and flat.

*Don’t use any PTFE sealing strip,

use joint ring of Cu/Al instead.

*Don’t bend or press the rods.

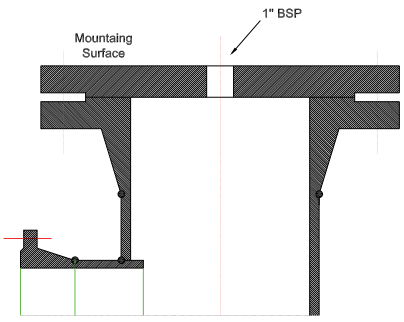
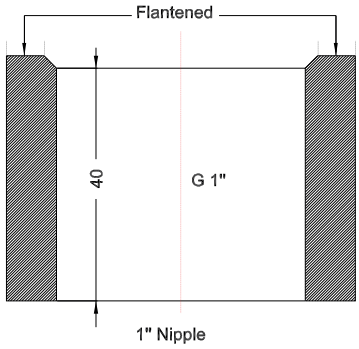


Figure 7

After mountings finished , loose the fixing nut (B6) of head ,

adjust the direction of terminal box and refix it.



2.7. Calculating Electrode Rod Lenghts

Once you ve decided the Control mode , calculate the rod lenghts and cut them as mentioned following pages.

F1.Level Signaler

ISS-04 probe works as a simple “water level signaler” at this mode.
You must cut the electrode rods simply “ which level you want a signal at.”
Don’t forget :
I-To include the mounting bush or flange height (F) to the desired rod length.
II- The inner diameter of Measuring pot is 60mm at least.(100mm.suggested)

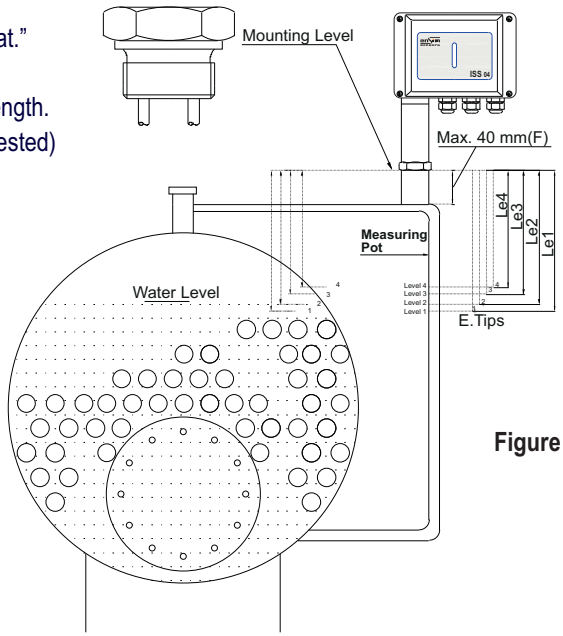


Figure 8

F2.Fill Control + 1 pcs Low Level Alarm + 1 pcs High Level Alarm

The electrod tips 1..4 work as LOW Level Alarm, PUMP-ON, PUMP-OFF and HIGH Level Alarm respectively. Again, don’t forget to get into account flange heights(F)!.
Generally, the Nominal Water Level (NW, Desired Level) and Low Water level given by the Boiler Manufacturer. The height of the Measuring Pot may be at any length between 600..900 mm. Once the NW level is known, this length can be used as center point between Pump-ON and Pump-OFF. (Say, NW level is 300mm from top of measuring pot-Thickness of flanges excluded- , then:
Le2 = (300 – 40) + F mm (Pump-ON) and
Le3= (300 + 40) + F mm (Pump-OFF).
This means that the fill control dead band is 80mm.
If you want less frequent Pump action, then make bigger the dead band, means use, say, 50mm instead of 40mm

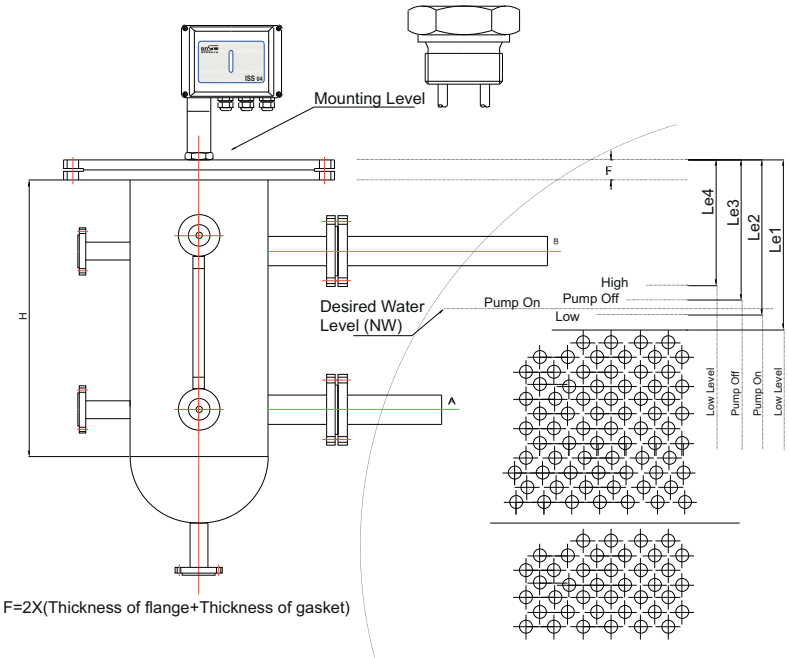
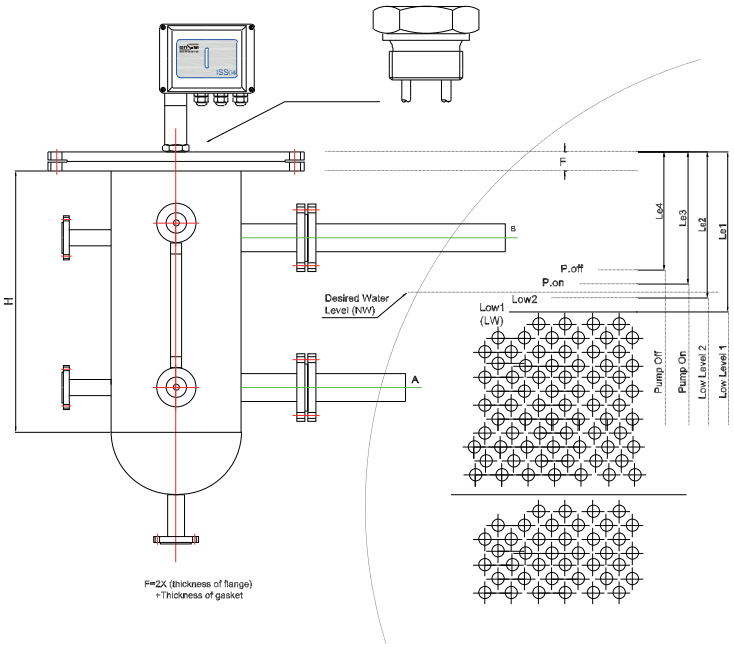


Figure 9

F3.Fill Control + 2 pcs Low Level Alarm

The electrod tips 1..4 act as Low Level1, Low Level2, Pump-ON, Pump-OFF respectively.
The lengths of two low level electrodes are equal or very near as a convention. This is not an obligation on the other hand.
Recommended minimal distance between Pump-ON..Pump-OFF electrodes is 50-80mm(Dead band)
related to the tonnage of the boiler (bigger the boiler – shorter the distance). Make it bigger if you
want less frequent pump action.



There is no High Level Alarm at this configuration,
you can use pump-OFF relay to catch the levels over this level though.
(Relay-4 remains activated at levels higher than P.off).

Figure 10

F4.Descharge Control + 1 pcs Empty Alarm + 1 pcs Full Alarm

This configuration is likely “inverse of ConfigurationII”.
Electrodes 4..1 act as FULL(H-level), Pump-ON, Pump-OFF and EMPTY(Low Level) respectively.
The comments are valid about the dead band of pump-control at the preceding page.

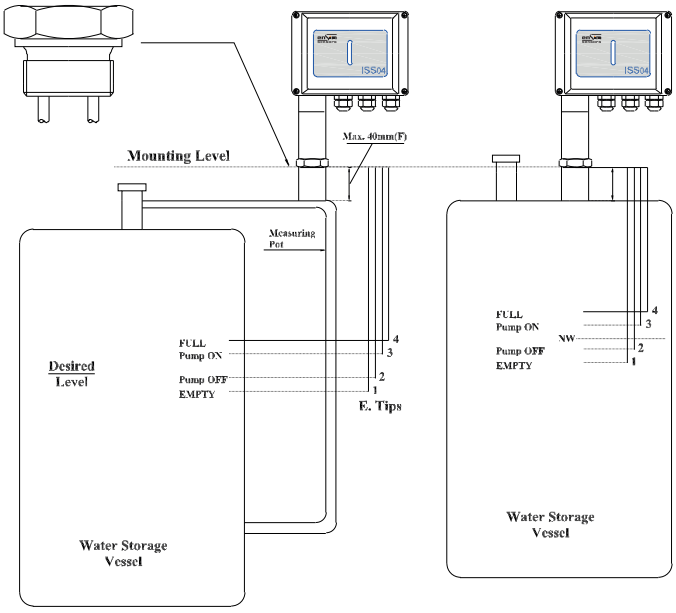
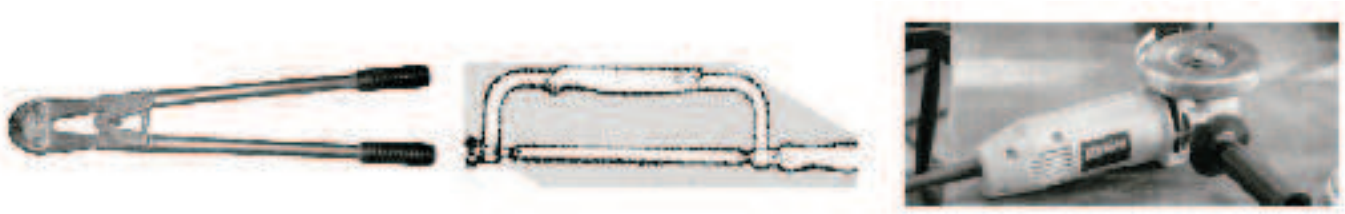


Figure 11

2.8. Cutting the Electrode Rods

After Le1, Le2, Le3 and Le4 values have been defined, cut the rods by any available cutting tool.



Crimp the PTFE insulator approx 50mm from the bottom of the rod using a pipecutter or a plier.

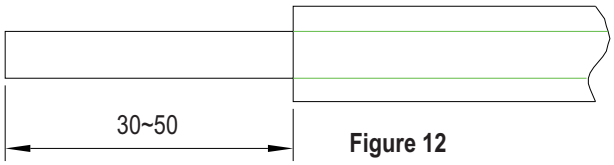


Figure 12



Blanked length of the tip must not be shorter then 30mm!
The length of the blanked portion affects the sensitivity directly. If the conductivity of the water is near a few thousand mikroS/cm then it can be said that blanked tip of 30mm is enough.

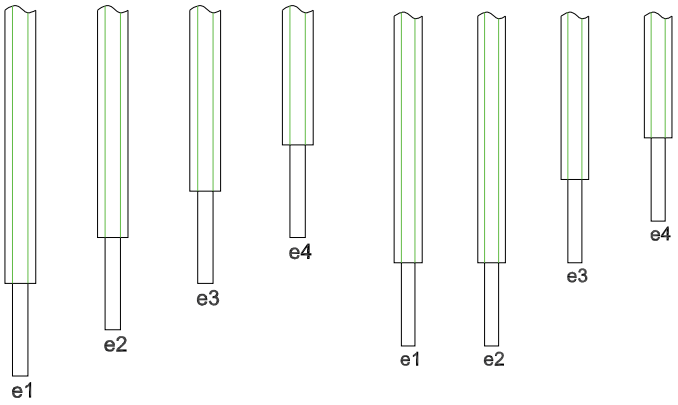


Figure 13

Figure 14

Two cutting examples are shown on the left.
Figure13: For Configurations F2 and F4.
Figure14: For Configurations F3.
Try to deburr the tips using any grinding tool or sandpaper if available.

2.9. Electrical Instulation

Make the electrical connection of the instrument according to details on its label , table and cable figures in this manuel.
Contact positions with no power applied:

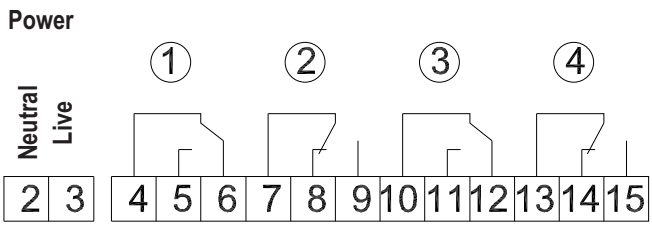


Figure 15

The terminal number “1” is assigned to earth fictively and therefore not shown.
In fact the ground terminal of electrod is connected to the body of the boiler and “earted” anyway

Terminal 2 is the “neutral” and the terminal 3 is the “Live” of the power connection (mains). A 2A thermic – or thermic + magnetic – breaker suits the protection needs.
The position of contacts do not change if power applied at Configuration-I while all tips are exposed but relay-1, 2 or 3 is activated on all other configurations.
The diagrams are given for general usage according to configurations at the following pages.

F1.Level Switch

The relay activated if the respective tip “immersed”.

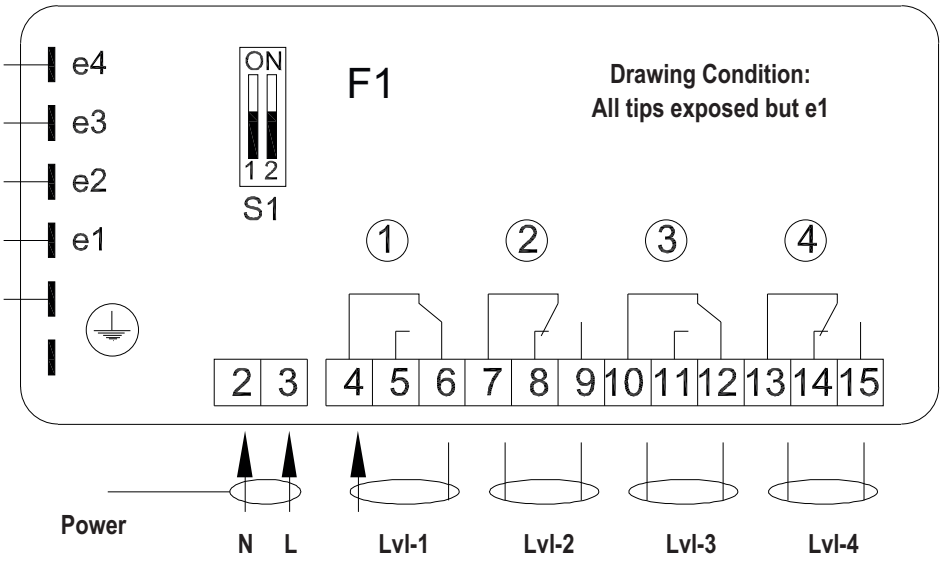


Figure 16

F2.Fill Control + Low Alarm + High Alarm

The relay activated if the respective tip “immersed” except relay-3
(It is activated if the tip-e2 is exposed).

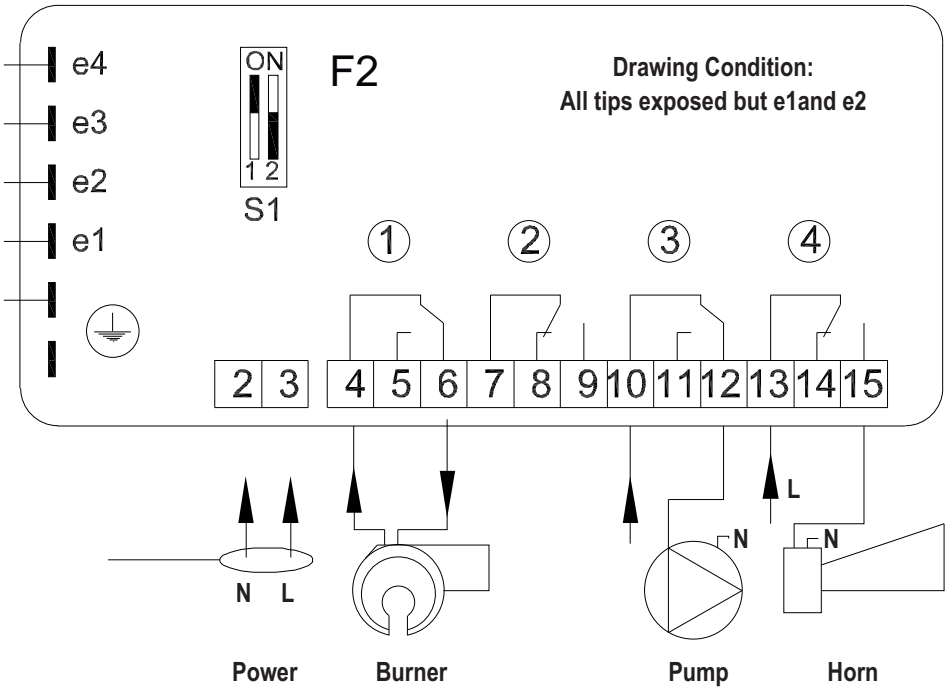


Figure 17

F3.Fill Control + 2 pcs Low Level Alarm

If also e1 is exposed, Relay1 release and burner stops at figure18.

The relay activated if the respective tip « immersed» except relay-3 (It s activated if the tip e3 exposed)

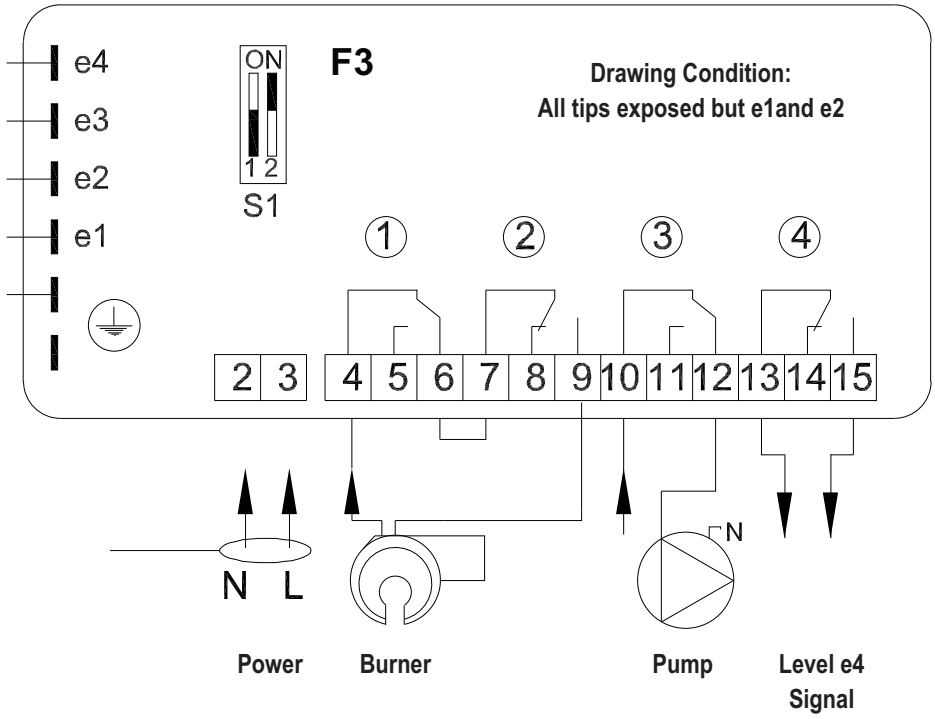


Figure 18

F4.Descharge Control + 1 pcs Empty Alarm+ 1 pcs Full Alarm

If e1 or e2 exposed then burner stops at the scenario of figure 19.
F4: The relay activated if the respective tip "exposed" except relay-3 &4(R-3 or 4 is activated if the tip-e3 or 4 is immersed respectively).

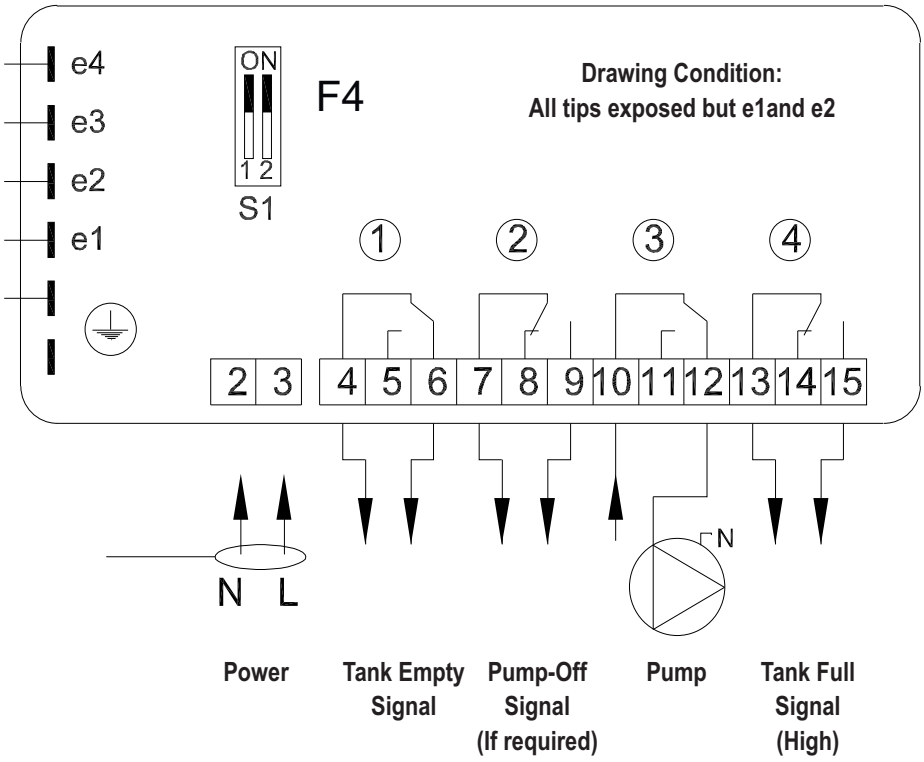


Figure 19

2.10. Commissioning

Before power on:
*Let the Vessel reaches up to the service pressure.
*Check for any leakage from the joint area.
*Check the electrical connections.
If not any problem with above precautions, apply the power.

Meaning of LED

Check the led indicators which are extinguish and/or distinguish according to the Configuration and present water level at the vessel. Use the tables given below for this purpose.

Meanings of LEDS according to configuration

Functions				
LED	F1	F2	F3	F4
L4 (Red)	Level 4	HL Alarm	PUMP-OFF	FULL
L3 (Orange)	Level 3	PUMP-OFF	PUMP-ON	PUMP-ON
L2 (Red)	Level 2	PUMP-ON	LOW-2 Alarm	PUMP-OFF
L1 (Red)	Level 1	LL Alarm	LOW-1 Alarm	EMPTY
P3 (Green)	Power	Power	Power	Power

Configuration settings (S1 switch positions)

	Functions			
MOD (S1)	I	II	III	IV
S1-1	OFF	ON	OFF	ON
S1-2	OFF	OFF	ON	ON

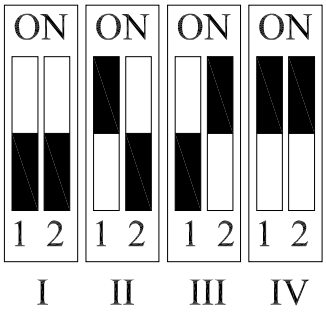


Figure 20

Relay&LED behaviour for F1

e1- e4 Any electrode	R1-R4 Any Relay	L1-L4 Any LED
Immersed	Activated	Extinguish
Emerged (Exposed)	NOT Activated	Distinguish

About indicator LEDS:

The LEDs do NOT follow the respective Relay-action with the F2, **F3** and **F4** as you can see at the following pages.

The leds follow the respective relay with F1 only.

2.11.

Relay&LED behaviour for F2

Water Level	Relay-1	Led-1	Relay-2	Led-2	Relay-3	Led-3	Relay-4	Led-4
e4 - Immersed	Activated	●	NOT Activated	●	Released	●	Activated	○
e3 - Immersed								
e2 - Immersed								
e1 - Immersed								
e4 - Emerged								
e3 - Immersed	Activated	●	NOT Activated	●	Released	●	NOT Activated	●
e2 - Immersed								
e1 - Immersed								
e4 - Emerged								
e3 - Emerged								
e2 - Immersed	Activated	●	NOT Activated	●	Activated	○	NOT Activated	●
e1 - Immersed								
e4 - Emerged								
e3 - Emerged								
e2 - Emerged	Activated							
e1 - Immersed		●	Released	○	Activated	○	NOT Activated	●
e4 - Emerged								
e3 - Emerged								
e2 - Emerged								
e1 - Emerged	Released	○	Activated	○	Activated	○	NOT Activated	●

Relay&LED behaviour for F3

Water Level	Relay-1	Led-1	Relay-2	Led-2	Relay-3	Led-3	Relay-4	Led-4
e4 - Immersed	Activated	●	Activated	●	Released	●	Activated	○
e3 - Immersed								
e2 - Immersed								
e1 - Immersed								
e4 - Emerged								
e3 - Immersed	Activated	●	Activated	●	Activated	○	NOT Activated	●
e2 - Immersed								
e1 - Immersed								
e4 - Emerged								
e3 - Emerged								
e2 - Immersed	Activated	●	Activated	●	Activated	○	NOT Activated	●
e1 - Immersed								
e4 - Emerged								
e3 - Emerged								
e2 - Emerged								
e1 - Immersed	Activated	●	Released	○	Activated	○	NOT Activated	●
e4 - Emerged								
e3 - Emerged								
e2 - Emerged								
e1 - Emerged	Released	○	Released	○	Activated	○	NOT Activated	●

Relay&LED behaviour for F4

Water Level	Relay-1	Led-1	Relay-2	Led-2	Relay-3	Led-3	Relay-4	Led-4
e4 - Immersed	NOT Activated	●	NOT Activated	●	Activated	○	Activated	○
e3 - Immersed								
e2 - Immersed								
e1 - Immersed								
e4 - Emerged	NOT Activated	●	NOT Activated	●	Activated	○	NOT Activated	●
e3 - Immersed								
e2 - Immersed								
e1 - Immersed								
e4 - Emerged								
e3 - Emerged	NOT Activated	●	NOT Activated	●	Activated	○	NOT Activated	●
e2 - Immersed								
e1 - Immersed								
e4 - Emerged								
e3 - Emerged								
e2 - Emerged	NOT Activated	●	NOT Activated	○	Released	●	NOT Activated	●
e1 - Immersed								
e4 - Emerged								
e3 - Emerged								
e2 - Emerged								
e1 - Emerged	Activated	○	Activated	○	Released	●	NOT Activated	●

Order Form : Please consider sample models when coding

1 MODEL ISS

Std. 04

2 CERTIFICATE

None.....0

(EN10204-3-1) Material Certification.....1

3 BODY AND ELECTRODE MATERIAL

316 Stainless steel 002

Special.....x

4 HOUSING

Aluminium B175x.....855

PC Gri PC170(Std.).....255

5 ELECTRICAL CONNECTION

Clamp.....00

Special.....x

6 INSULATION MATERIAL

PTFE (Std.).....066

Special.....x

7 STEM LENGTH (mm) L

500 mm (Std.)..... 500

1000 mm (Std.).....1000

1500 mm (Std.).....1500

Special.....x

8 OUTPUT

4 x 5 A / 250 VAC.....11

Special.....x

9 ELECTRODE NUMBER

4 (Std.).....4

Special.....x

10 OPTIONAL

None...../ 0

Special.....x

EXAMPLE

ISS 04-0-002-255-00-066-1000-11-4/0

ISS 04 Level Sensor , 4 Electrode , Stem Length : 1000mm , PC Gray boxed

2.13.

WARNINGS!!!

Please pay attention to following matters in order to operate your level switch properly.



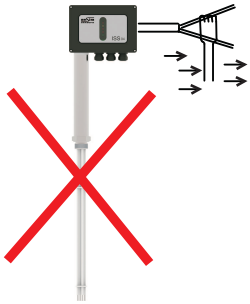
Do not remove the float from connection part. Because its pin might be damaged.



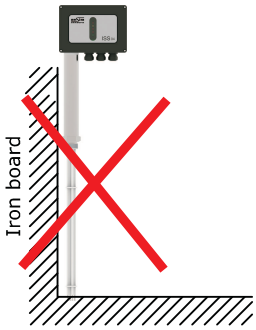
Please do not dip cables potting into liquids,otherwise instulation problem may cause.



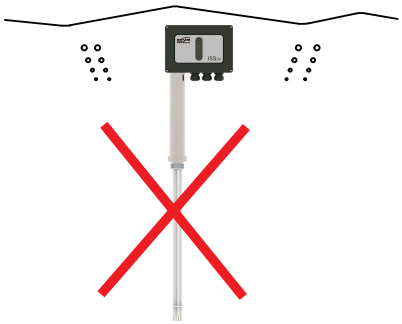
Do not remove the plastic parts of the bottom of the switch body , do not loosen.



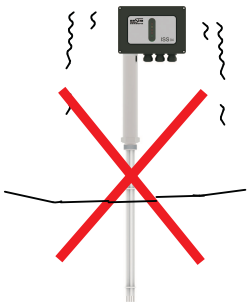
Do not pull the cable strongly, otherwise the characteristics might be changed.



Please keep away from magnetic materials like iron board ; otherwise the characteristics might be affected



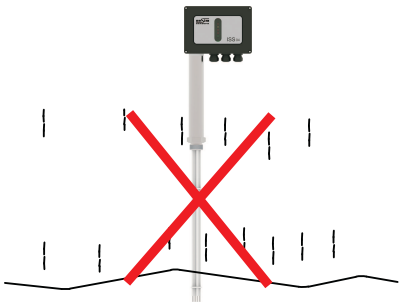
In case vapour splash cable potting points,insulation problem may cause.



Please do not dip cables potting into liquids,otherwise instulation problem may cause.



Do not fasten switch reversely , otherwise its characteristics might be changed.



Please avoid using with liquids which damage materials of parts ,otherwise quality can not be maintained accurately.

3. Failure Detection

Breakdown	Probable	Failure detection/correction
Low Level Alarm does not switch	Power Supply absent. Earth connection is weak or absent. Conductivity is too low. Electronics card is defect. Length of LL tip is too short.	Apply power. Remount electrode using copper ring. Switch S1 (1-4) "OFF". Consult factory if conductivity is <1uS/cm). Change electronics pcb. Electrode tip has been cut not suitably. Change Electrode.
High Level Alarm does not switch	Length of HL tip is too long. Contact of HL relay is defect. HL tip of electrode short-circuited to earth. Electronics card is defect.	Re-cut the HL tip suiyably. Consult factory. Use additional relay for High Level connection. Consult factory. Change electronics pcb.
Pump does not activate	Electrode is mounted without cutting tips. S1 is not assigned for true configuration. The "pump start tip of electrode" has earth connection. Electronics card is defect.	Cut the tips suitably. Re-check the purpose of electrode and re-configure S1. Clean electrode tips. Consult factory if the fault continues. Change electronics pcb.
Pump activates very frequently	Length of pump start-stop tips are very near.	Cut the tips with a difference of 4cm(reasonably big boilers) or 10cm (small boilers<1t/h) at least.
Pump does not stop	İlConductivity is too low. Earth connection to vessel is too weak. Pump – stop tip connection is defect.	Switch S1 (1-4) "OFF". Consult factory if conductivity is <1uS/cm). Clean the mounting surface and remount electrode using copper ring Check the cable from p-stop tip of electrode, repair if defect. IT IS NOT possible to repair the connection at the plant, if the cable-tip is breaked off inside the body. Consult factory if this is the situation. **Don't pull by force the cables coming out from the body!**

If you find an error, try to eliminate it by using this table or send the instrument to our service address for repair.



The instrument should be repaired only by authorized service!

4. Disassembly of Instrument

Instrument should be disassembled while feeding and pressure is not available!

5. Service

The instrument does not require maintenance. If it is desired, residue accumulated inside should be blown according to kind of fluid and instrument can be cleaned with soft cleaning solutions. Measures should be taken during the disassembly.

6. Recalibration

Calibration is not required during long period useful life of a level switch.

7. Repair – Manufacturer Address

If irreparable breakdowns occur, the instrument should be sent to us for repair purpose. Before this, the instrument should be cleaned carefully and packaged so as not to be broken. Furthermore, you should also add a detailed explanation which describes the breakdown while instrument is sent. If your instrument contacts with harmful substances, decontamination report should be also sent additionally. In the event that instrument does not have any decontamination report or our service department has doubts about instrument, repair process will not start until an acceptable report is sent.



If the instrument contacts with hazardous substances, necessary measures should be taken for decontamination!
Service -Manufacturer Company Name and Address:

Ferhatpaşa Mah. 37 Sok. No:78/A 34888 Ataşehir - İSTANBUL / TÜRKİYE

Phone : +90 216 50 50 555 / E-Mail: lonca@ensim.com.tr Web : www.ensim.com.tr

8. Disposal

The instrument should be disposed according to 2002/96/EC and 2003/108/EC European Directives (waste electrical and electronic instruments). Waste electrical and electronic equipment should not be mixed with domestic wastes!





If the instrument has contacted with harmful substances, special attention should be paid for its disposal!

9. Terms of Warranty

The instrument has warranty legally for 24 months after delivery date. Warranty demands are not accepted in case of inappropriate operation, damage on the instrument or any modification on the instrument.

10. Terms of Return

In the return of materials, user should send an open list related to damage or problem, malfunction of the material to be returned or its operation in the different modification, with the instrument. If it is required to return the material, used in the dangerous, corrosive or toxic fluid, in this case, used part should be cleaned very carefully. Security of personnel should be ensured. All products to be returned should be sent to our company address, which we have stated.