

**LSP-4**

**Level Switch Probe**

**(Threaded & Flanged)**

**Installation and Configuration Manual**



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## IN THE NAME OF GOD

### 1. GENERAL DESCRIPTION AND SAFETY CONSIDERATIONS

1. General Description: This product is installed on top of boilers or other types of vessel by means of flanges or a threaded connection. Each of the four tips of this level switch is capable of providing an independent switching signal. CP33 panel receives an electrical signal when the tips touch the surface of a conductive fluid, inside which the electrical current enters through the body of a metal vessel. If the vessel is made of a non-conductive material, a rod or wire that is connected to the body of your probe can be used as reference. Alternatively, one of the tips may be connected to the reference terminal; however, this will only leave three tips to be used for switching. Probe tips are one meter long by default; an extra one meter extension can be added if necessary.

### 2. CONSIDERATIONS FOR USING THIS PRODUCT

#### 2.1 Sound Performance

This equipment is guaranteed to perform soundly as long as it is repaired, configured and commissioned according to relative procedures and by qualified personnel.

#### 2.2 Safety Considerations

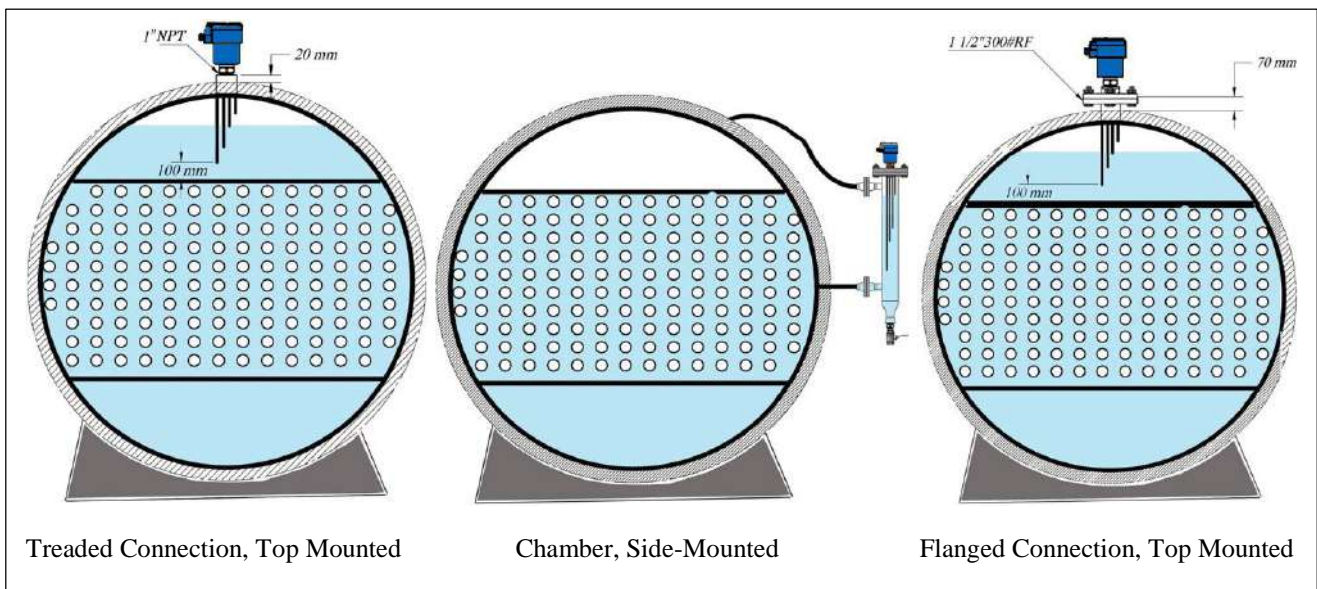
Before repairing, configuring, or commissioning this product, check if you have all necessary tools available in good condition. Make sure the product is suitable for the process fluid, and for the process pressure and temperature (Maximum 40 bars and 235 °C, respectively). If the pressure and temperature of your system may rise to a dangerous level as a result of product malfunction, or in case maximum system parameters may exceed product specifications, a safety mechanism should be installed on the system in order to avoid dangerous circumstances. Probe tips, especially when their lengths exceed one meter, are prone to getting bent or twisted; so handle the product with care. Make sure the product is installed properly.

### 3. COMMISSIONING

Before installing the product, choose a point that can be easily accessed yet not exposed to accidental workshop damage. This controller may be installed on top of a vessel through flanges or a threaded connection. When the product is to be side-mounted, a chamber should be installed on one side of the tank. Connection nuts, which are used to fasten probe tips to the body, are provided in the product package. Make sure all threaded connections on the tips are secured. Turn locking nuts tightly.

Warning: Failing to secure connection nuts properly may result in tips to become loose and ultimately fall inside the tank or boiler.

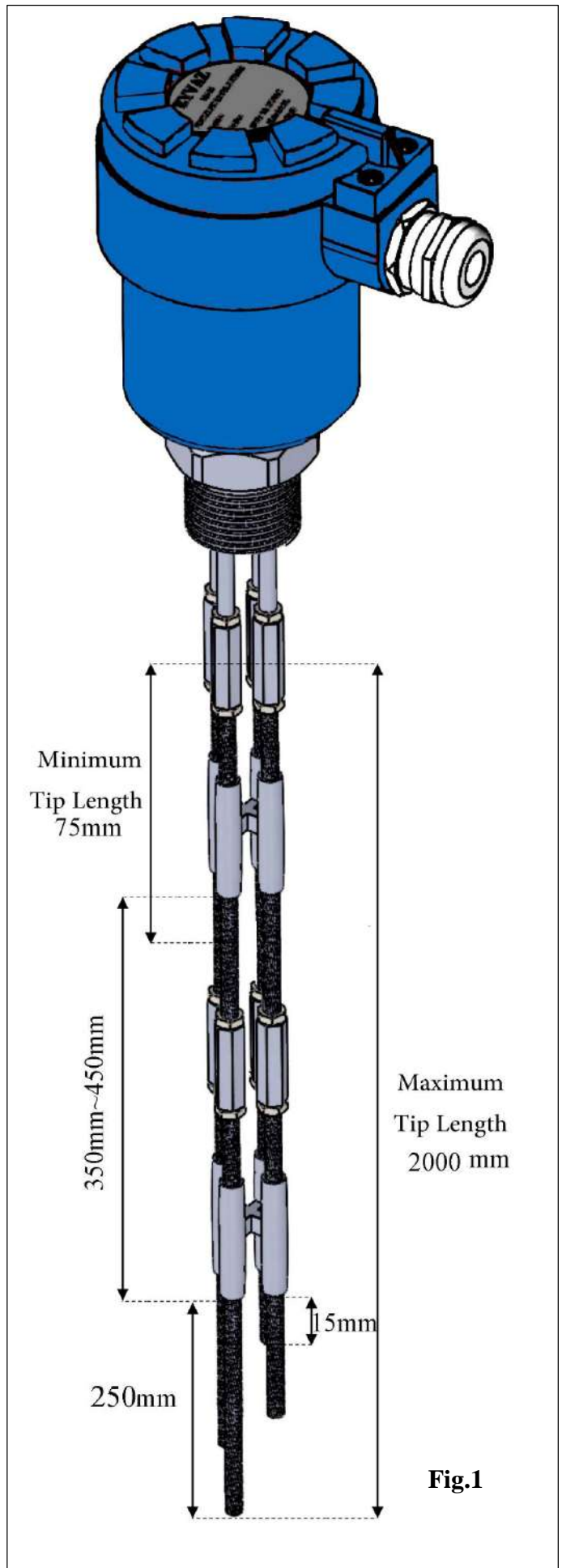
Different methods for installing a probe on a vessel (in this case, a boiler) are illustrated bellow.



Depending on what levels are determined for switching signals, Probe tips must be cut to desired lengths before being connected to the body.

Important Note: When adjusting the length of tips, please be noted that probe tips cannot be used interchangeably: each tips, as well as the wire and terminal that is connected to it, are considered for a particular level. For example, Tips coded LL and HH should be used for the Lowest and Highest level, respectively. In order to provide guidance for length adjustment, four long nuts (about 3 centimeters in length) are used, which are marked uniquely. Each tip is distinguished by one of these marked nuts. The Switch LL (Lowest level), the longest tip, is connected to Terminal 6 and distinguished by the nut that has 4 marks. Switch L (pump start) is connected to terminal 7 and has the nut with 3 marks. Pump Stop (switch H) is connected to terminal 8 and has the nut two marks. The highest alarm (switch HH) is connected to terminal 9 is recognized by the nut with one mark. Finally, the reference connection (or COM) is connected to terminal 5 and to the Flanged or 1" NPT threaded body (see Chart 2). As mentioned before, one should pay attention to the marked nut and the circuit board terminal of each tip before adjusting its length; otherwise, an error will occur in the system.

After cutting the tips to desired lengths, slide a tip steady through the tips. It should be placed as near to the free end of tips as possible. Tip steadies support tips by preventing any contact between them. Tip steadies are essential to be installed; without them, a short circuit may occur between tips and this could bring about a dangerous situation. Maximum and minimum distance between two steadies (if more than one steady is used) is 450mm and 350mm, respectively. Minimum tip length is 75mm and maximum length would be 2000mm. Also, a certain length of tips should extend below a tip steady (15mm as minimum and 250mm as maximum).



This level switch may be manufactured with a 1" threaded connection or a 1 1/2" flange connection. For Flanged level switches, a gasket should be placed between the two connection flanges before bolts and nuts are secured. To provide sealing for a threaded connection, apply a PTFE tape around the connection (three turns max). Place the product in place, start turning it by hand, and continue securing by a special wrench; you need to grip the connection nut of the body with the wrench. Do not over-tighten the connection so that the level switch could be easily removed later: leave a small part of the threaded body visible.

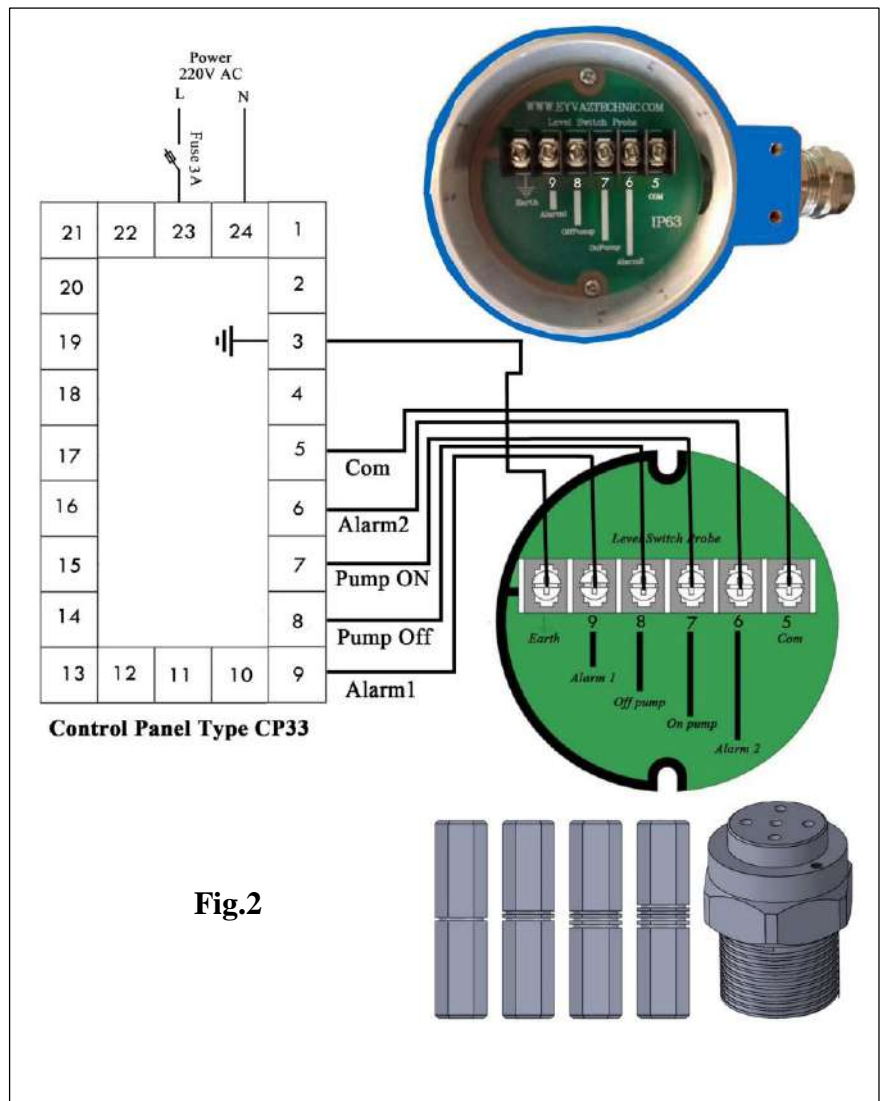


Fig.2

#### 4. WIRING:

The next job after cutting the tips and installing the product in its place is to do the wiring. As the first step, open the cap bolt and the cap itself. Panel terminals number 5 to 9 are meant to receive input signals from the product box, and should be connected to relative terminals in numerical order. If the product is to be used in boilers or other high temperature vessels, temperature-resistant cables should be used for wiring between the level switch and the panel. Connection cables between the level switch box and the panel may be up to 30 meters long. After the wiring between the level switch and the panel is completed, the panel should be connected to other devices for pump start/stop or alarm applications. Panel terminals number 23 and 24 are intended for 220V AC Voltage electrical supplying. Terminals 13 to 21 are used for alarm or start/stop applications. It's worth mentioning that panel output voltage and current must be 12~220V, AC/DC and 5A, respectively. The illustration bellow (Diagram 3) demonstrates how to connect the panel to Alarms and pumps. Depending on the climate of the working region, it may be necessary to put the CP33 panel inside an electrical enclosure. For more information, please contact our sales department.

**Attention:** The catalogue is related to the Type 2. If the wiring have differences with your panel

## 5. REPAIR AND MAINTENANCE:

This type of level switch is designed to function without a float, and therefore needs little maintenance. Repairing should be done according to safety procedures; otherwise, serious injuries are likely to occur. Make sure the vessel is cooled down and depressurized first; after a safe condition is achieved, the product should be dismantled using a special wrench (it is recommended not to use a pipe wrench). Grip the hexagonal nut for opening and closing.

Sometimes connection nuts may become loose, and tips or threaded rods will fall into the boiler or tank. Make sure to check all couplings for possible looseness or detachment. If any of the tips or threaded rods fell inside the vessel, replace the tip with a new one and put it in the designated place inside the probe box.

By removing the green circuit board, you can see all wires that are connected to probe tips (see diagram 4). As illustrated in the diagram, terminal 5 is connected to the body (1 1/2" 300# flange or 1" NPT threaded connection) with a black wire; this is the reference connection, or COM. Lowest level alarm (switch LL) is the longest tip which is connected to terminal 6 with a red wire and has a connection nut with four marks on it. The nut with three marks is connected to terminal 7 with a yellow wire, and it's meant to be used as switch L (pump start). The nut that has two marks is connected to terminal 8 with a green wire and is used as Switch H (pump stop). Finally, the nut with on mark is connected to terminal 9 with a white wire and is intended for Highest Switch (switch HH). Probe body and tips are designed to be scale-resistant; but in case scaling happened, please wash tips and body with a diluted acid or a mixture of water and hydrochloric acid. Also, check the connecting wires between the level switch and the panel for possible cuts. After checking all the foregoing, re-install the level switch in place and configure as explained.

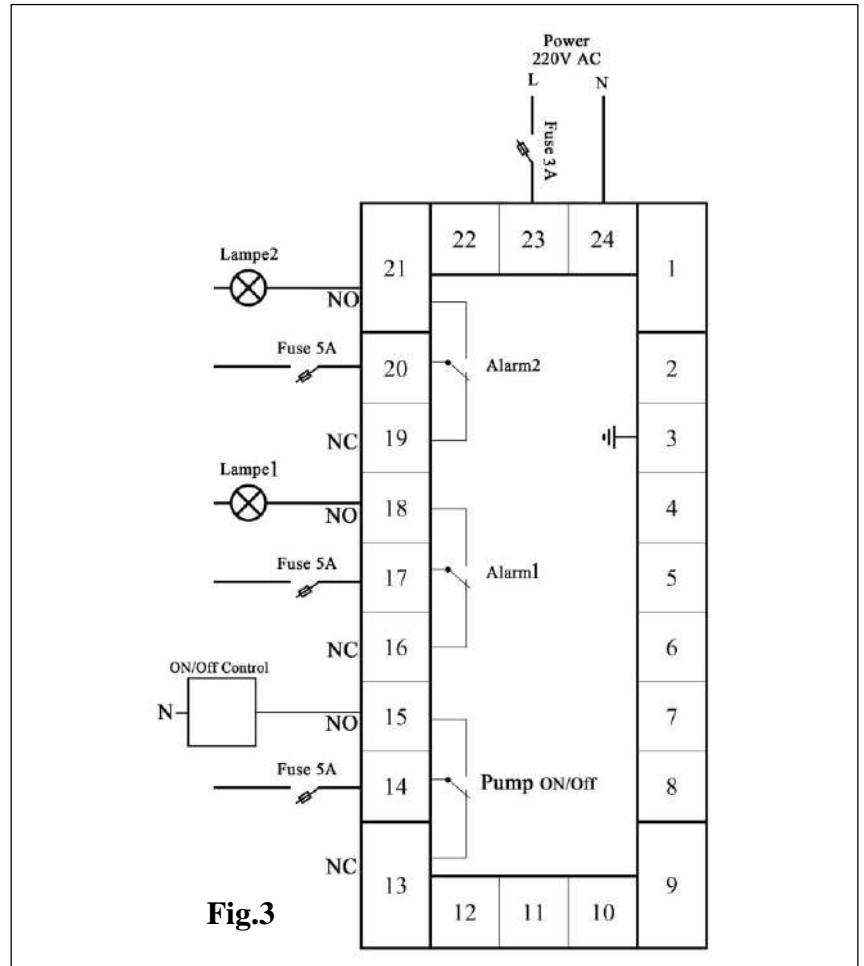


Fig.3

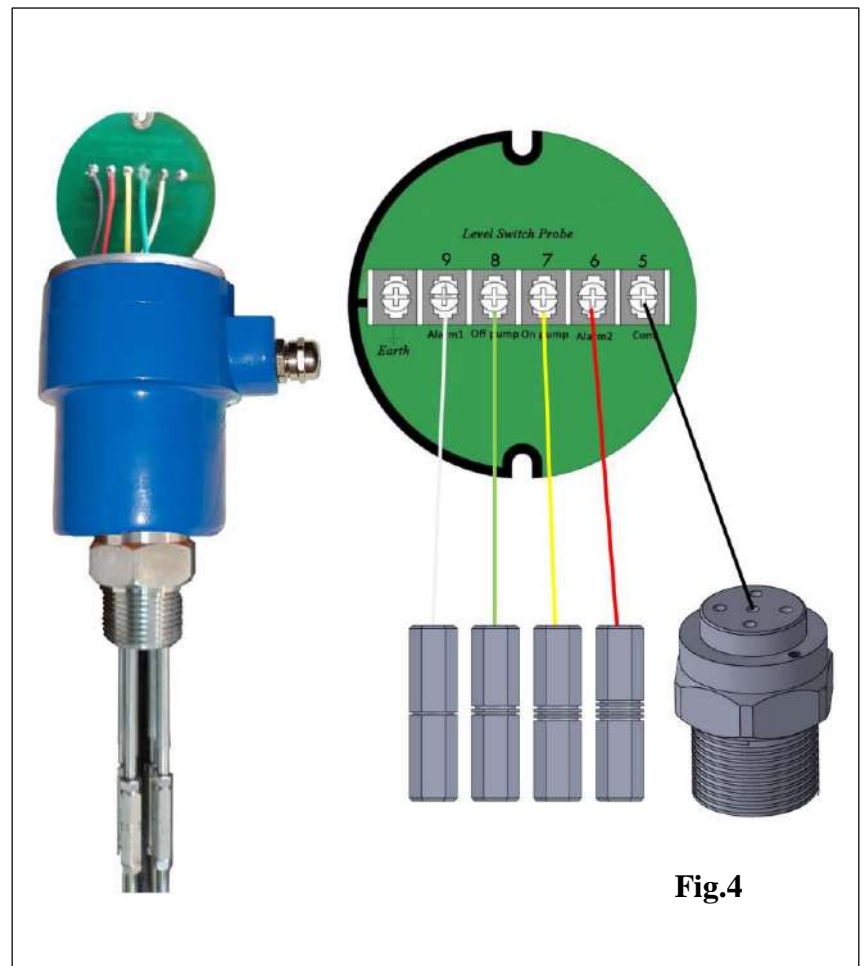


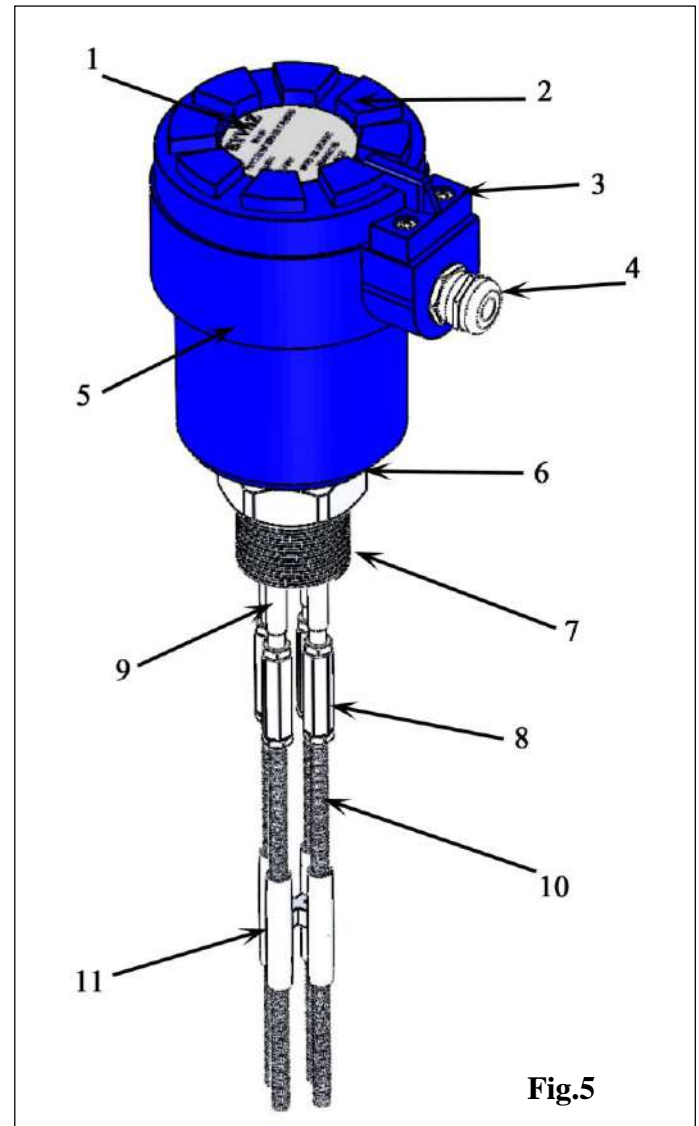
Fig.4

## 6. COMPONENTS

### 6.1 Table OF Components:

No	Part Name
1	Technical Spec. Tag
2	Cap
3	Cap Bolts
4	Cable gland
5	Body
6	Heat Insulation
7	Threaded Connection(1"NPT)
8	Connection Bolts Set
9	Insulation Sleeving
10	Tips
11	Tip Steady

### 6.2 Assembly Drawing:



**Fig.5**

### 6.3 Spare Parts Table:

Part Name	Part Number
Probe Tip with Insulation Sleeving	9205
Tip steady, made of PEEK	9203
M5 Threaded Rod (1 m long)	9208.1
Round Circuit board and Terminal	9212
Connection Bolts Set	9206

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