10.6 2nd Low Probe

10.6.1 Overview

The 2nd low probe is a conductivity probe, and its purpose is to act as an additional 2nd low water cut-off when the water falls too low in the boiler. The conductive technology with safe electronic control has been granted a worldwide patent for its continuous electrical and mechanical self-checking software.

If the water level in the boiler falls below the end of the probe, then a 2nd low water level alarm will occur. The water level may be low due to insufficient water in the feed water tank, feed water pump failure, feed water line isolated and/or the level controls have failed. If there is not enough water in the boiler, the heated tubes will be left exposed and unable to cool down as there is no longer water to transfer the heat to. If the burner were to continue firing, the temperature of the tubes would be rapidly increase, reducing the metal strength, and could cause a collapse or explosion. On the MM system the 2nd low water level alarm will shut down the burner.

10.6.2 Operation

The water level detection probes use capacitance technology, whereas the 2nd low safety probe uses conductive technology. Following basic electric circuit theory, when the probe is in the water in the boiler and an electrical voltage is applied, the current will flow; when water level drops below the probe, no current will flow. This is the basic principle of the 2nd low safety probe, if the water levels drop below the cut-length of the probe, then a 2nd low water alarm will occur on the MM or for standalone mode, the volt-free connection will open to indicate this alarm. When used with an MM, the 2nd low water alarm requires a manual reset.

10.6.3 Specifications

Specifications	Metric	Imperial
Part number	SLP70001	
Compatible with	Mk8 MM and Mk7 MM	
Standalone usage	Yes	
Internal relay	Self-checking	
Technology	Conductivity	
Material	Stainless Steel	
Coating	PTFE coated	
Integration with external safety devices and circuits	Volt free contacts	
Thread type	NPT	
Standard probe length*	750mm	30”
Supplied flying lead	2m	6ft
Probe connection– quick connect	½” NPT Tapered Tread	
Ingress Protection	IP 68	NEMA 6P
Temperature rating of housing	0 - 70°C	32 - 158°F
Nominal Size of Line	15mm	½”
Maximum Allowable Pressure	16 Bar	232 PSI
Maximum Allowable Temperature	200°C	392°F
Test Pressure	40 Bar	580 PSI

*The 2nd low probe can be cut to length to suit application

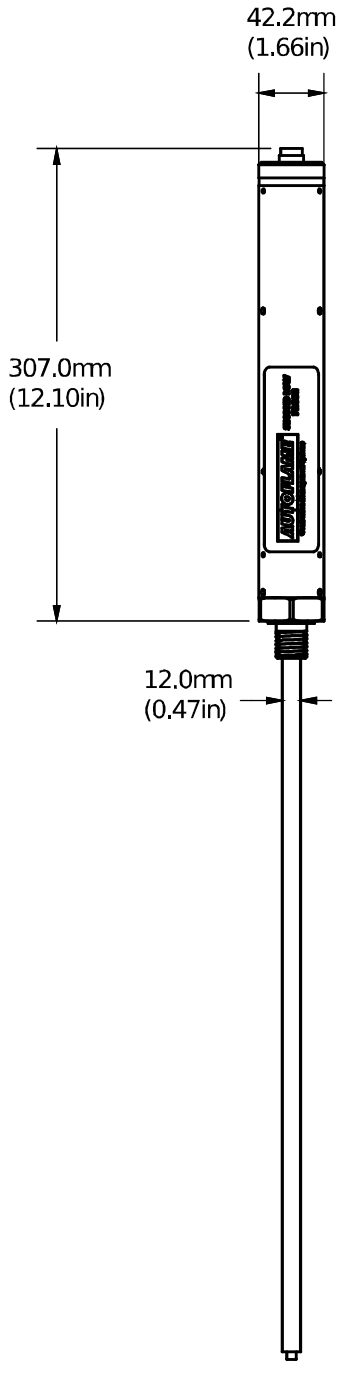
2nd Low Probe Flying Lead

The 2nd low probe is supplied with a 2m (6ft) flying lead, which has quick-connect multi-pin end.
The cable shield is connected to the probe body.

Description	Wire	MM Terminal
Optional ground connection (not used)	Black	
0V Power (DC or AC)	Blue	4P-
12V Power (DC or AC)	Red	4P+
RS485 Comms -	Yellow	5T-
RS485 Comms +	Green	5T+
Volt-free connection 1 (250mA max)	Brown	
Volt-free connection 2 (250mA max)	Purple	

If using the 2nd low probe for standalone operation, then the volt-free connections must be used; the volt-free connection will be closed when water is detected and there is no system fault.

Dimensions



10.6.4 Installation and Safety Guidelines

The 2nd low probe's length must be equivalent to the 2nd low water level in the boiler as recommended by the boiler's manufacturer; this length should match the commissioned 2nd low level of the capacitance probes or external level sensing device.

The 2nd low probe can be cut to the required length using pression cutting equipment. If this is not available, please order the exact probe length from Autoflame.

The 2nd low probe should not be installed in the same pot as the capacitance water level probes. Any blockages in the line will affect the levels; therefore the 2nd low probe should be fitted in a pot with a separate line to the water level probes line. If the water level probes are installed in a pot externally mounted to the boiler as shown in section 3.5.4, the 2nd low probe can either be fitted in a separate pot, or internally mounted pot directly into the boiler. If the water level probes are installed in internally mounted pots as shown in section 3.5.4, the 2nd low probe can also be installed in an internally mounted pot directly into the boiler.

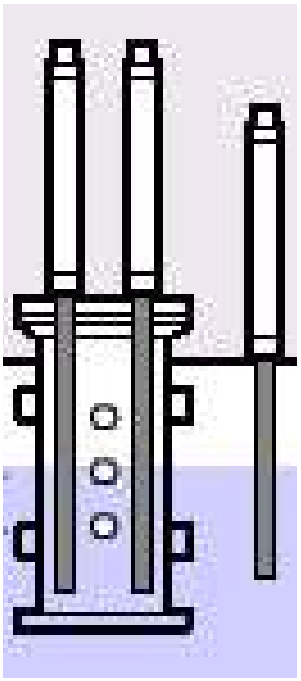


Figure 10.6.4.i Capacitance Probes and 2nd Low Probe displayed on the main Mk8 MM screen

10.6.5 Configuration

The table below shows the Mk8 MM terminals allocated for the 2nd low safety probe.

Terminal	Description
5T+	Digital communication connections from 2nd low resistance probe
5T-	Digital communication connections from 2nd low resistance probe
4P+	+12V supply to 2nd low resistance probe
4P-	0V supply to 2nd low resistance probe

The screen is connected through the casing of the flying lead supplied with the 2nd low safety probe. When connecting the flying lead to the MM, do not wire the screen at the MM.

The table below shows the expansion options to be set when using the 2nd low probe with the MM.

Expansion Option	Description	Setting
1	Water level control function	1
6	Second Low Probe	1

Note: 2nd low probe can only be used in conjunction with an analogue sensing device such as two capacitance probes or one capacitance and an external level sensor at minimum; please see section 3.3 Ways of Level Sensing for more information.

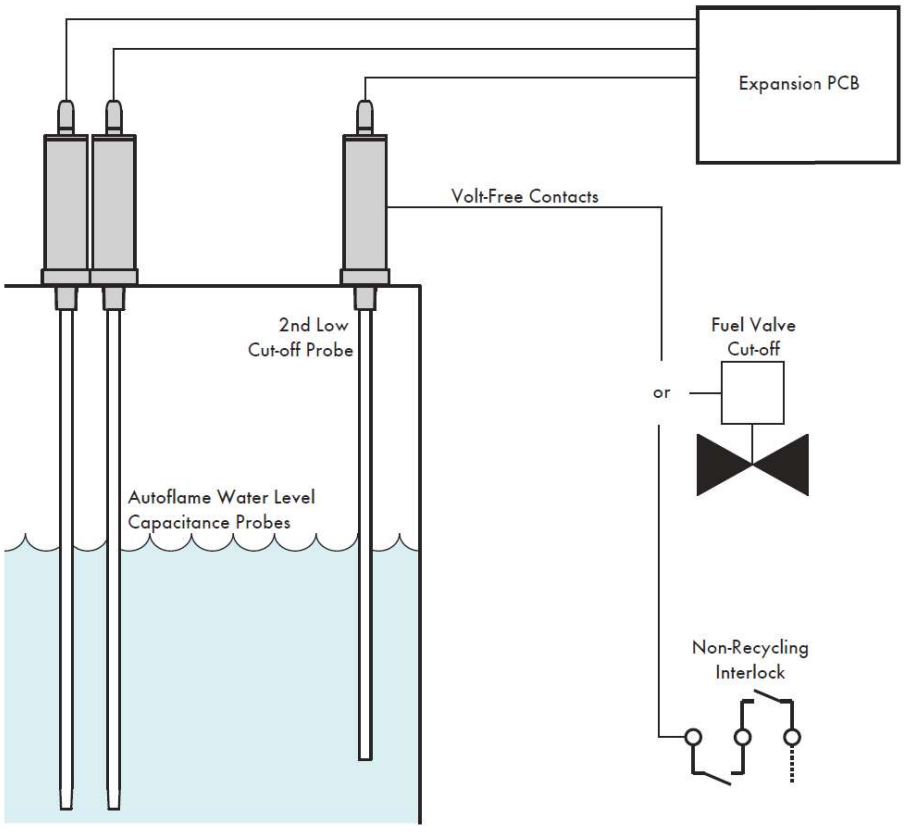


Figure 10.6.5.i 2nd Low Probe Installation Example

To install the 2nd low probe, no commissioning is required; just simply option the probe in expansion option 6. The bottom of the 2nd low probe should be at the capacitance probes/external level sensor commissioned 2nd low level or higher.