spirax sarco

APS1 Probe Simulator
Installation and Maintenance Instructions

CP10 connector

DIN 43650 connector

APS 1
+
-
3 Dry ●→ Wet
2 Dry ●→ Wet
1 Dry ●→ Wet
Capacitance Probe
LP31
LP30
LP10 (high sens)
LP10 (low sens)
22Ω
68Ω
220Ω
680Ω
2.2kΩ
22kΩ
6.8kΩ

Test sockets

Toggle switches

Potentiometer

Selector switch
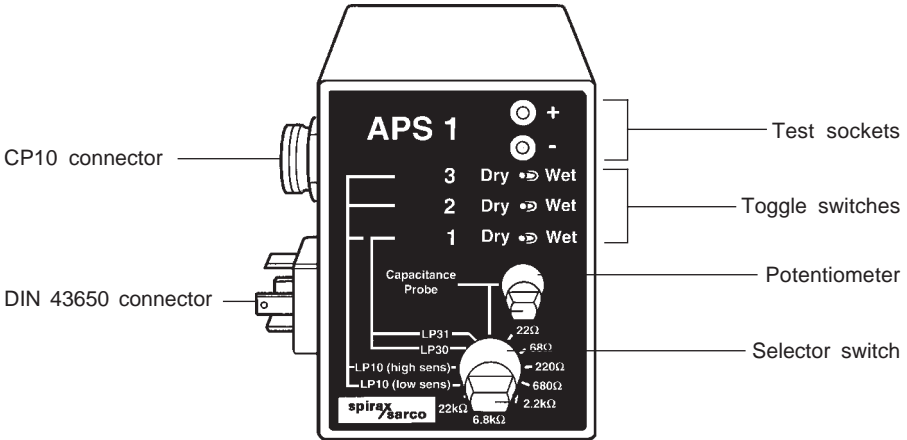
Description

The APS1 probe simulator is used as a substitute for conductivity probes, (TDS or level), and capacitance probes, to verify the correct functioning of Spirax Sarco controllers and wiring. As it is powered by the controller under test, no external power source or batteries are needed. The unit has a range of switch-selectable internal resistors that simulate the probes used with blowdown controllers, and provide test resistances.

Three numbered toggle switches provide 'wet' or 'dry' resistance equivalents for one, two or three-tip conductivity level probes. Switch numbers correspond with the probe tip and connector pin number.

The potentiometer above the selector switch is used to vary the voltage / current when simulating capacitance preamplifiers.

A multimeter is connected to the 4 mm test sockets on the front panel for this test.

Operation - Blowdown controllers

• Unplug / unscrew the connector from the TDS probe and connect it to the appropriate socket on the APS1.
• Select a resistance that gives approximately a mid-range reading on the controller. (See controller IMI)
• Check that the controller functions correctly.
Note: Increasing the resistance simulates a reduction in conductivity.

Operation - Conductivity level controllers / alarms

• Unplug the connector from the probe and plug it into the APS1 socket. (DIN 43650).
• Select probe type switch and controller sensitivity setting on selector switch.
Note: The controller internal sensitivity setting is normally 'low' for boilers, and 'high' for many tanks and other vessels.

To simulate EL9 series probes, select 'LP10 (high sens)', or LP10 (low sens)'.

• Operate switches 1, 2 and 3 as applicable to simulate tips exposed (dry), high resistance, or immersed (wet), low resistance and check controller functions correctly.

Table 1 overleaf is given as an aid to fault finding.

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Table 1

Level probe	Resistance to earth					
	Pin 1		Pin 2		Pin 3	
	Wet	Dry	Wet	Dry	Wet	Dry
LP10 high sens.	68 k	150 k	68 k	150 k	68 k	∞
LP10 low sens.	6.8 k	15 k	6.8 k	15 k	6.8 k	∞
LP30	6.8 k	15 k	Short to 'P3'		Short to 'P2'	
LP31	6.8 k	15 k	Short to 'P1'		4.7 k	
Conductivity monitoring	Resistance as selected		Short to 'P1'		Short to earth	

Note: ∞ = infinity / open circuit. The table shows the approximate resistance to be expected between pins 1, 2 or 3, and the earth pin unless otherwise indicated.

Capacitance level controllers
- Connect a multimeter to the APS1 test sockets.
- Select 0-10 Vdc range on the multimeter.
- Select 'capacitance probe' on the main selector switch.
- Unplug the connector from the probe and plug it into the APS1 input.
- Vary the probe input to the controller using the potentiometer on the APS1 front panel.
- Turn the potentiometer clockwise to simulate an increase in water level.
- Check controller for correct function over the full range. See controller IMI for details.

Note: A delay in controller response of up to one minute is normal, depending on controller type and settings.

If no voltage output is apparent, check controller power is on and that the supply and return wires are connected and undamaged.

For an LP20 capacitance probe fitted with an LP20 preamplifier, it is necessary to disconnect the wires in the preamplifier and to connect them correctly to a DIN 43650 cable socket in order to plug it into the APS1.

For LP20 probes fitted with a PA20 preamplifier, the cable socket can be disconnected and plugged directly into the DIN 43650 connector on the side of the APS1.

Do not plug either type of preamplifier directly into the APS1.

Probe wiring
The APS1 may be used to facilitate a check on the wiring between the controller and the probe, in conjunction with a multimeter:-
- Unplug the probe wiring from controller, or remove controller from its base as applicable.
- Select probe type on APS1 selector switch, (or for conductivity monitoring probes, select a mid-range resistance value).
- Connect the APS1 in place of the probe.
- Use a multimeter to measure the resistance values at the controller end of the wiring, and compare with the values given in the above table.