



Micro-set® Meter Prover Sphere Detector

IOM Manual

Doc no.: HES.MSD2.600.IOM.R4 (2027)

Standard model ANSI 600#

Technical Details

Pressure Rating	- ANSI 600
Materials	- 316 stainless steel construction.
Switch Rating	- 250V DC @ 2 amps or 250V AC maximum.
Certification	- ATEX: ExVeritas 19 ATEX 0477X IECEX: EXV 19.0016X UKCA: ExVeritas 21 UKEX 0763X
Ex markings	- II 2 G Ex db IIB T6 Gb Ta -40°C to +75°C
Approved to	- IEC 60079-0:2017, Edition 7.0 IEC 60079-1:2014, Edition 7.0 EN 60079-0:2018 EN 60079-1:2014

Fitting Instructions

If the detector is a replacement then set on site setting jig and go straight to point 4.

1. Drill a 20mm hole in the prover pipe, unless the pipe wall is greater than 9.55mm thick, in which case a 32mm hole is required.
2. Ensure that no burrs protrude into the pipe and remove the sharp edge of the hole on the inside of the pipe. A 3mm radius is recommended.
3. Mount detector boss (without the Micro-set) on the pipe and weld in position (1mm min. to 1.5mm max. weld gap), preferably using a Boss Alignment Tool (BAPTT) to ensure concentric alignment of the boss bore with the drilled hole. The lower surface of the boss has a radius to match the pipe O/D – ensure this radius lays over the pipe in the correct orientation. Ensure minimum of weld protrusion into the bore of the boss to ensure the weld root does not prevent the detector mounting fully into the boss - the Boss Alignment Tool (or detector body) must lower and mate flush with the top surface of the boss.

IMPORTANT

Maintaining the correct weld gap, and concentricity of pipe hole to the boss bore, IS CRITICAL TO OPERATION OF THE MICRO-SET DETECTOR.

The Micro-set detector is an instrument and can be damaged by severe shock.

Refer to part numbers in the Sectional GA Drawing on page 6.

4. Fix Micro-set assembly to the boss using the 4 off M8 x 65mm screws (PL1193.6A). Ensure mating surfaces and internal bore of boss are clean and 'O' ring (PL1193.9) is undamaged.
5. Remove the Ex d JB lid and carefully feed the 2 wires of the sphere detector up through the M25 adapter (in the bottom of the JB) - it is **CRITICAL** that the 2 wires are fully pulled up through the sealing washer (contained within the M25 adapter) without the wires becoming trapped in the sealing washer. If the wires are trapped then they will be cut when the M25 adapter is screwed into position, and the sphere detector will not work.
6. Turn the JB/adaptor assembly carefully until the adapter internal sealing washer is compressed - hand tight only, so the washer is not crushed / damaged.
7. Spin the M25 nylon locknut up the M25 thread to meet the underside of the adapter, and lightly tighten with a wrench.
8. Terminate the 2 wires of the Micro-set into one side of the top 2 terminals (the 3rd terminal is a spare).
9. You are now ready to introduce your site cable & gland to the side entry of the JB and install as per owner / operator approved electrical procedures. The 2 cores of the site cable should be terminated into the opposite side of the 2 terminals containing the 2 Micro-set wires. Test the electrical installation per site procedures.
10. Close and seal enclosure in accordance with the relevant standard and the manufacturer's instructions.

Switch Replacement

The Micro-set is factory set on a standard setting fixture, and so is fully interchangeable with any previously installed standard design Micro-set without re-setting.

New Micro-set detectors do not require setting prior to installation, whether installed onto a new prover loop or if the unit is replacing an existing detector.

Re-setting should therefore only be necessary if the internal reed assembly is being changed out – a long term maintenance precaution.

Switch Resetting

Refer to part numbers in the Sectional GA Drawing on page 6.

When the internal reed assembly is being changed out, it is essential that the reed is set at the correct point within the detector housing. To ensure this is achieved these instructions must be followed implicitly and the setting undertaken under clean conditions.

1. Remove signal power from the detector switch and isolate.
2. Obtain relevant site approvals to open the junction box.
3. Open the junction box, disconnect the external connections and with-draw cable. **Take care not to damage the insulation.**
4. Disconnect detector reed switch wires from the terminal block.
5. Unscrew the JB from the threaded top housing of the detector. **Take care not to damage the insulation on the reed switch wires.**
6. Unscrew the 4 off M8 x 65mm screws (PL1193.6A) retaining the Micro-set to the pipeline boss. This must only be done when prover is de-pressurised and drained.
7. Remove Micro-set assembly to instrument workshop.
8. If a new reed switch is required loosen reed lock nut (PL1193.10) and remove reed switch assembly (PL1193.11.12.18).
9. Place Micro-set onto setting fixture. Ensure that mating surfaces are clean. The plunger depth is automatically set when the metal surfaces mate.
10. Put reed lock nut (PL1193.10) on the new reed switch assembly (PL1193.11.12.18) and screw into Micro-set top housing (PL1193.41).
11. If a special purpose illuminated screwdriver assembly is available mount on the reed switch assembly (PL1193.11.12.18) passing the wires through the centre. Secure the wires to the screwdriver terminals. (The integral lamp illuminates when the reed switch contacts are made).
12. Screw the reed switch assembly (PL1193.11.12.18) down until the lamp illuminates. Mark the point of contact with a pencil against the detector body.
13. Unscrew 2 or 3 turns to check the hysteresis. The lamp will extinguish thus displaying hysteresis.
14. Steadily screw in the reed assembly to the point where the lamp illuminates. The pencil mark acts as a guide to position. **Do not contra-rotate the assembly until the lamp extinguishes and screw down again.**

15. Tighten reed lock nut (PL1193.10) in position to prevent movement of the reed switch assembly (PL1193.11.12.18). Lamp may extinguish.
16. The Micro-set switch assembly may be reset using an ordinary screwdriver and continuity meter if required. In this event items 12 to 15 should be followed.
17. Check 'O' ring (PL1193.9) is undamaged. Replace if necessary.
18. Fit to pipeline by following Fitting Instructions within this manual.

Leaking Detector

If leakage is observed from the base of the Micro-set between the bottom housing (PL1193.8) and the pipeline boss, the Micro-set must be removed from the pipeline in accordance with Switch Replacement Instructions, points 1 to 6 inclusive and the 'O' ring (PL1193.9) should be replaced. Follow fitting instructions points 4 to 10 inclusive.

If leakage is observed between the top housing (PL1193.41) and the bottom housing (PL1193.8) then the Micro-set must be removed from the pipeline in accordance with Switch Replacement Instructions, points 1 to 7 inclusive.

1. Unscrew remaining 2 nos. M8 x 25mm socket head screws (PL1193.5) and with-draw top housing (PL1193.41)
2. Check 'O' ring (PL1193.13) and replace if damaged.
3. Ensure surfaces are clean, lightly grease 'O' ring (PL1193.13) and replace top housing (PL1193.41).
4. Replace and screw up the 2 off 25mm socket head screws (PL1193.5).
5. Replace in pipeline following the Switch Replacement Instructions, points 17 and 18.

Hazardous Area Use

The Micro-set detector has been designed such that it will not give rise to physical injury when handled properly, nor does it produce excessive surface temperature or emit infra-red, electromagnetic or ionising radiation.

Before starting installation work ensure that the power connections are isolated and precautions are taken to prevent power being restored whilst work is taking place. Hazardous area installations forbid the use of tools or equipment that could produce an explosion hazard by causing a spark or imposing excessive mechanical stress. In addition, the Micro-set must not be subjected to thermal or mechanical stresses in service or be placed where there is a risk of attack by aggressive substances.

No repair should be attempted to existing Micro-set components - faulty assemblies should be replaced by an equivalent unit.

Other conditions apply to Micro-sets installed in a hazardous area. The equipment must only be installed in hazardous areas classified appropriate to the method of protection.

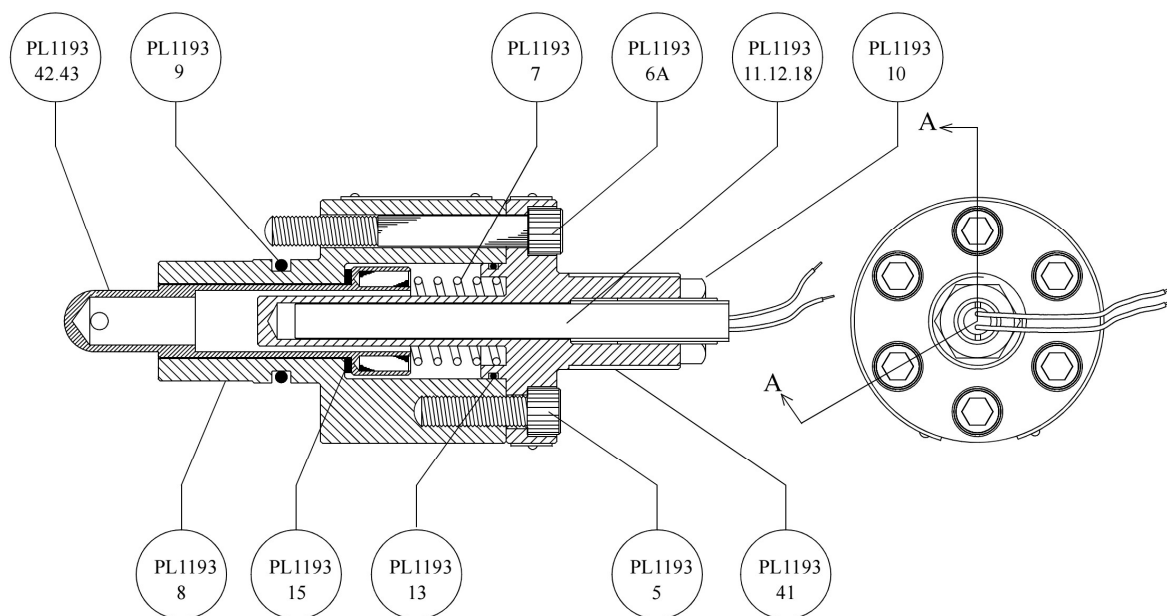
Micro-sets are marked for use in hazardous areas as required by the ATEX Directive & IECEx, the equipment marking includes the following information:

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Specific Conditions of Use:

- The sensor must be fitted with a suitably approved earthed metallic Ex db IIB Gb rated flameproof enclosure to facilitate connection of the sensor flying leads
- Under the scope of the approval the hazardous area approvals the equipment has been subject to overpressure testing at a test pressure of 30 barg.
- No repairs are permitted to the M25 threaded flameproof joint (external thread).

Manufacturer	HALL Engineering Services Limited
Equipment name / model no.	'Skeltonhall' Micro-set® / MSD2



SECTION A-A

Part number	Quantity (device)	Description	Material	Quantity (spares pack)
PL1193.5	2	M8 x 25mm screw	A4 marine SS	2
PL1193.6A	4	M8 x 65mm screw	A4 marine SS	4
PL1193.7	1	Standard spring	SS	2
PL1193.9	1	Boss seal	Viton FKM	4
PL1193.10	1	M12 reed lock nut	Brass	1
PL1193.13	1	Housing seal	Viton FKM	4
PL1193.15	1	Plunger washer	PEEK	2
PL1193.11.12.18	1	Reed assembly	Brass	1
Optional / Special Parts (not on drawing)				
PL1193.21	1	Flushing plug seal	Nitrile	1 (if fitted to original Micro-set)
PL1193.22	1	Flushing plug, 1/8" BSP(P)	SS	1 (if fitted to original Micro-set)
Parts not sold as spares				
PL1193.8	1	Lower housing	316 SS	N/A
PL1193.41	1	Upper housing	316 SS	N/A
PL1193.42.43	1	Plunger c/w 4 x magnets	316 SS	N/A



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