

Model P35

Portable SF₆ Dewpoint Meter



Instruction Manual

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General Description

The Model P35 Dewpoint Analyser is a self contained, portable instrument specifically designed to measure the Dewpoint of SF₆.

The instrument can be operated either with its own internal batteries or mains power of 100/120V AC or 200/240V AC.

The dewpoint readout is a 3digit LCD that is backlit when the instrument is operated by mains power.

The unique measuring head assembly is designed to keep the measuring sensor dry, when the instrument is not in use, making spot checks of SF₆ gas a simple and speedy process, therefore keeping gas usage to a minimum.

The calibration facility, offered by this instrument, allows verification of the calibration of the whole system simply, in the field, without the need for additional equipment.

Details of the calibration and operation of this instrument are to be found within this manual.

Normal Operation

In order to take a dewpoint reading of the gas, use the following procedure:-

- 1) Remove the back cover from the instrument by unscrewing the two serrated knobs at the back of the instrument.
- 2) Remove the braided sample hose from the back panel loops and the connector from its housing.
- 3) If the instrument is to be operated from a mains power supply, remove the power lead from the back panel loops, switch the toggle switch marked Battery/Mains position and ensure that the voltage selector switch is set to the correct input voltage. Failure to do this will cause the instrument to malfunction and could cause serious damage.

Or. If the instrument is to be operated from its own internal batteries switch the toggle switch marked Battery/Mains to the battery position. In this case the mains power lead will not be required. (See instruction marked BATTERIES on page 5).

- 4) Position the instrument in a convenient position, as close as practical to the sample point, making sure that clear access is available for the mains power lead, if applicable, that the front cover can be hinged open and that clear operation of the telescopic measuring head is available.

NOTE: The position of the instrument handle is adjustable, in 30⁰ steps, by pressing in the black buttons at the handles pivot points and manually positioning the handle. Releasing the buttons allows the handle to lock in the required position. It is recommended that the handle should not be moved more than 2 steps (60⁰) in order not to position the cabinet too far from the horizontal, as this would impair the normal operation of the flow indicator.

- 5) Open the hinged front cover by pulling the black handle at the left hand side of the cover and allow the cover to rest on the handle.
- 6) Ensure that the flow control valve is fully closed and connect the sample hose to the sample point and the sample inlet. The sample inlet on the instrument is at the bottom left hand side of the front panel. Open the isolation valve at the sample point.
- 7) Switch the instrument ON. When the instrument is first switched ON the display will move to full range reading before reverting to displaying the actual sensor dewpoint. This is the initialisation of the microprocessor and is normal. At this time, if the measuring head assembly has been closed for some time, the dewpoint reading should be dry.
- 8) Open the flow control valve, slowly, until the sample flow indicator is reading 0.9 L/min SF₆ (full scale) and allow the system to purge thoroughly before proceeding.
- 9) Restrict the sample flow by placing a finger over the sample outlet. This will cause a slight pressure to build up in the measuring head and it will extend. When it has extended fully, remove the restriction from the sample outlet and adjust the sample flow down to 0.4/0.5 L/min.

Safety Note: The desiccant head is constructed for use at atmospheric pressure. Ensure that there is no restriction to flow from the outlet of the instrument that would cause the desiccant head to become pressurised.

NOTE: If there is insufficient pressure in the sample, it will be necessary to assist the extension of the measuring head by gently pulling the knurled end section out from the panel front. Ensure that it is fully extended.

- 10) Allow the sample to flow through the instrument and observe the dewpoint display. When there is no further increase in displayed value, this is the gas dewpoint.
- 11) When the measurement is complete:
 - a) Close the isolation valve at the tapping point.
 - b) Close the measuring head, manually, by pushing the extended section back towards the panel front.

NOTE: Ensure that the measuring head is fully closed, as failure to do so will cause the internal desiccant to become wet and impair the efficiency of operation of the instrument.

- c) Allow the system to exhaust all residual gas, disconnect the sample hose and close the flow control valve fully.
 - d) Disconnect the sample hose from the sample point, switch the instrument OFF and close the front cover.
- 12) This completes the dewpoint measurement of the gas. The instrument can now be removed to the next test point or stored until required again.

Calibration

The major advantage of the instrument is the Automatic Calibration Feature.

The system relies on the fact that each sensor is designed to give no further increase in reading when it reaches its maximum moisture level. This means that, for instance, the Grey Spot sensor will read 0°C Dewpoint when it is exposed to gas at 0°C Dewpoint, but will continue to read 0°C Dewpoint when it is exposed to wetter gas. The system can therefore be calibrated very simply by exposing the sensor to anything wetter than 0°C Dewpoint and adjusting the reading to that point on the dial.

In practice, the instrument's calibration is checked as follows:-

Automatic Calibration

- 1) Switch the instrument ON.
- 2) Ensure that no gas sample is connected to the instrument head connections.
- 3) Extend the head of the instrument by hand and pump it in and out a few times, ending in the extended position.
- 4) After about 1 minute (not critical, but not more than a few minutes) check the instrument reading. It should display the maximum level of dewpoint for the instrument (i.e. 00C DP)
- 5) If the reading requires adjustment locate the Autocal control, which is to be found on the front panel of the instrument, and using the small screwdriver provided, turn the control clockwise to increase the reading (wetter) or anticlockwise to decrease it.
- 6) Close the instrument head.

NOTE: We suggest that this procedure should be carried out at a time when the head assembly can be allowed to dry thoroughly before any further test samples are measured. We also suggest that the overall calibration of the instrument should be verified on a yearly basis.

Batteries

The internal batteries are 6 x C size disposable cells and are housed in the 2 battery holders in the back panel of the instrument.

The instrument LCD display has a built in 'Low Battery' warning sign which is visible in the top left hand corner of the display when the batteries are below the required operating voltage. If the 'Low Battery' warning is showing then the batteries should be exchanged.

Access to the batteries is obtained by unscrewing the circular cover on each battery holder.

The batteries should be installed (3 in each holder) with the negative terminal of each battery innermost. That is with the positive terminal of each battery facing the back of the instrument. The instrument will not operate, in battery mode, if the batteries are incorrectly installed or if the battery holder covers are not replaced correctly.

Gases to Avoid

Corrosive Gases: The Sensor should not be exposed to corrosive gases (or corrosive contaminants in the gas sample) as these can chemically attack the sensor, impairing calibration accuracy and/or damaging it beyond economic repair. Examples of such gases are mercury (Hg), ammonia (NH₃), chlorine (Cl₂) etc. Strong oxidising agents such as ozone (O₃) should also be prevented from coming into contact with the sensor.