



INSTRUCTIONS FOR USE OF INSIGHT ANALYTICAL MOISTURE GENERATOR BLOCK

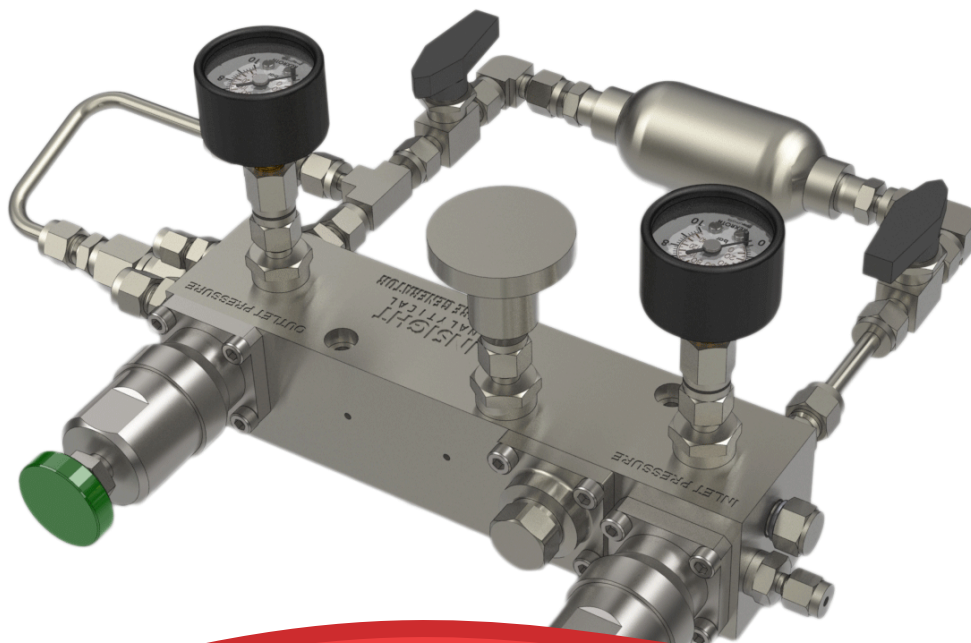
WARNING: This device should only be used by personnel who are qualified to work with high pressure gas. This equipment is only compatible with inlet pressures up to 1500 psig (10342 kPag) – do not hook it up directly to gas cylinders with pressure that exceeds this limit because the sample cylinder containing the mole sieve is only rated for a maximum pressure of 1800 psig.

Principle of Operation:

This device generates a known water vapor content for validating moisture or water dew point analyzers. An inlet pressure regulator is used to adjust the outlet water vapor content with the resulting water vapor concentration being roughly inversely proportional to this pressure setting (so high-pressure setting give low water vapor concentrations and low-pressure results in higher water content). After this pressure adjustment, the gas flow is split into two streams with one flowing into a saturation chamber where the gas becomes water saturated at the supply pressure and block temperature and the other flowing through a dryer containing mole sieve to remove most of the water vapor.

There are two flow restrictors (one at the outlet of the saturation chamber and the other at the inlet to the mole sieve dryer) that control the flow of the dry and wet gas streams so that the mixing ratio is always constant regardless of the inlet pressure regulator setting. The dry gas and wet gas streams are mixed in a T-fitting before exiting the block through an outlet fitting.

The water vapor concentration in the outlet gas is calculated using a spreadsheet which uses the inlet pressure regulator outlet pressure reading and the block temperature to calculate water content. A back pressure regulator (BPR) at the block outlet is used to adjust the outlet pressure to match the inlet pressure requirements of the analyzer being validated and it also vents any excess gas flow that exceeds the analyzer flow requirements.



Instructions:

1. Locate the moisture generator block in a suitable location close to the analyzer being validated. The block can be used on the floor and other stable flat surfaces where it can't fall or alternatively it can be mounted on a backpan or strut using the two mounting holes. The ambient temperature at the block location should be between 10 and 40°C with temperatures close to 20°C being ideal. If the block has been stored at a higher or lower temperature, it will take time for it to stabilize at the temperature of the new location.
2. Use suitable clean tubing to connect high pressure supply gas (400 psig to 1500 psig) to the inlet fitting, the outlet fitting to the inlet of the analyzer, and the vent to a safe low-pressure vent. Eighth inch 316 SS tubing is recommended for the high-pressure gas supply and outlet tubing. The vent tubing can be ¼" 316SS tubing or braided stainless steel hose. Make sure that any tubing used has a sufficient pressure rating.
3. Make sure that the inlet pressure regulator and outlet back pressure regulator settings are reduced to minimum by turning all the way counter-clockwise.
4. Isolate the input of the analyzer being validated.
5. Turn on the high-pressure gas supply to the inlet of the block and leak check connections if required.
6. Open the mole sieve inlet and outlet valves.
7. Note the temperature of the block. Most blocks have a mechanical temperature gauge displaying the block temperature but if this is an older block without this gauge then estimate the temperature using other methods.
8. Gradually increase the setting of the inlet pressure regulator until the desired pressure is reached on the saturation pressure gauge. The target pressure can be estimated by inputting the block temperature into the spreadsheet and adjusting the pressure to get the desired target water content range.
9. Adjust the setting of the outlet BPR pressure to match the inlet pressure requirements of the analyzer being validated. If a moisture analyzer is being tested this pressure will typically be about 15 psig to 20 psig (100 to 130 kPag). Water dew point analyzers will typically require at least 200 psig (1380 kPag) minimum supply pressure in order to have a reading within range.
10. Open the inlet valve to the analyzer being validated to allow validation gas from the block to flow through the analyzer.
11. Recheck block temperature and saturation pressure values and use them to confirm predicted water vapor concentration in the spreadsheet and compare this calculated value with the analyzer reading once it has stabilized.
12. Increase or decrease pressure setting of the inlet pressure regulator as required to obtain different water vapor concentrations. Increasing the pressure should reduce the water content and reducing the pressure will increase it. The practical limits for this pressure adjustment for moisture analyzers are about 100 psig (690 kPag) on the low end and just below the supply pressure on the high end.
13. Note that the outlet pressure setting should always be no more than half of the saturation pressure setting for the flow orifices to work properly. This means that for water dew point analyzers with the outlet pressure set at 200 psig or higher the minimum setting on the inlet pressure regulator should be at least twice the outlet pressure.
14. After the testing is completed, shut off the high pressure inlet gas supply and allow the system pressure to bleed down to zero.
15. Back off the setting of the inlet pressure regulator and outlet BPR to zero and close the mole sieve inlet and outlet valves.

Moisture Block Generator Drawing

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NOTES:

SERVICE FLUID: NORMAL FLUID SERVICE - HYDROCARBON OR OTHER VARIOUS GASES MUST BE COMPATIBLE WITH THE MATERIALS OF CONSTRUCTION INCLUDING ELECTROLESS NICKEL PLATED 6061 T6 ALUMINUM, 316/316L STAINLESS STEEL, AND FKM/BUNA-N O-RING MATERIAL.

TEMPERATURE RATING: -6°C (LIMITED BY O-RING MATERIAL IN SWAGELOK COMPONENTS) TO 65°C.

MAWP 1500 psig (10342 kPag).

