### Technical Specifications

**Process Moisture Analyser**

- **Sensor Technology**: Ceramic Moisture Sensor technology
- **Measurement range**: -100 to +20 °C dew point
- **Accuracy**: ±0.1 °C from -20 to +20 °C dew point; ±0.2 °C from +20 to -60 °C dew point
- **Hygrometric units**: Digital processing linearisation with pressure compensation from measured dew point with pressure compensation to any other hygrometric unit
- **Pressure input**: Fixed value (user programmed) or dynamic measurement (4-20 mA pressure transducer, optional)
- **Resolution**: 0.1 °C (DP) 0.1 °F (DP), 0.01 ppmV, 0.01 mg/m³, 0.01 Lb/mmscf
- **Analogue output**: 4-20 mA isolated (4-20 mA pressure transmitter, optional)
- **Power consumption**: 100 or 200 Watts max. Add 40 Watts for single stage electricity heated pressure regulation where used (80 Watts for two stage)
- **Enclosure temp**: Heated/thermostatic adjustable set point range 3 to control ±2 °C from -60 to -100 °C dew point
- **Heater power supply**: 230/120 or 220/200/253 V ac, 50/60 Hz
- **Dimensions**: 775H x 612W x 555D mm
- **Clearance**: 19" annodised aluminium, 3U high 132 x 200 mm clearance depth

**Sample Conditioning Systems**

- **Enclosure**: Glass fibre reinforced polyester (flame retardant, anti-static). All fixtures stainless steel. Option for complete enclosure in AISI 316 stainless steel
- **Interconnecting Sensor Cable**: Polyethylene insulation (cable temperature resistance 85 °C), 0.5 mm², 0.5 mm² or 0.82 L/min (max load 880 W/kg)
- **Sensor calibration**: Traceable to British (NPL) or American (NIST)
- **Flow rate**: 0.4 l/min for 4-20 mA to 20 mA pressure transmitter, optional
- **Pressure input**: Fixed value (user programmed) or dynamic measurement (4-20 mA pressure transmitter, optional)

**Safe Aspects**

- **Enclosure**: All through base of enclosure. Pre-manufactured M20 entries clearance holes for sensor field cable and heater power supply cable entries. 6 mm bulkhead compression couplings for process gas supply and exhaust
- **Enclosure mounting**: Stainless steel wall mounting brackets
- **Degree of protection**: IP65 / IP66 optional (NEMA 4)
- **Cable piperick**: All through base of enclosure. Pre-manufactured M20 entries clearance holes for sensor field cable and heater power supply cable entries. 6 mm bulkhead compression couplings for process gas supply and exhaust
- **Flow rate**: 5 l/min (add 10 l/min for configuration with continuous drain arrangement)
- **Analysis pressure**: Up to 30 MPa

**Alarm**

- Two user adjustable for set points and operating configurations

**Mounting panel**

- 19" annodised aluminium, 3U high 132 x 200 mm clearance depth

**Interconnecting Sensor Cable**

- Polyethylene insulation (cable temperature resistance 85 °C), 0.5 mm², 0.5 mm² or 0.82 L/min (max load 880 W/kg)

**Pressure input**

- Fixed value (user programmed) or dynamic measurement (4-20 mA pressure transmitter, optional)

**Resolution**

- 0.1 °C (DP) 0.1 °F (DP), 0.01 ppmV, 0.01 mg/m³, 0.01 Lb/mmscf

**Enclosure temp**

- Heated/thermostatic adjustable set point range 3 to control ±2 °C from -60 to -100 °C dew point

**Heater power supply**

- 230/120 or 220/200/253 V ac, 50/60 Hz

**Dimensions**

- 775H x 612W x 555D mm

### Features

- Total analyser system tailored to specific customer requirements
- Fully field interchangeable sensors
- Pressure compensation of conversions to moisture content
- Wide dew point measurement range with display in any hygrometric unit
- Analysis pressure up to 30MPa
- Sensor protected against glycol and other process borne liquid contaminants
- Immune to chemical attack from H₂S, mercaptans and other sulphides
- ATEX certified operation in Zone 1 or 2 EExd option

**Background**

Promet Moisture Analysers are heavy duty, industrial hygrometer systems for the measurement of high pressure process gases and vaporised liquids on natural gas platforms and terminals, petrochemical plants and industrial gas manufacturing facilities. Promet combines best practise sample conditioning system design with highly reliable moisture sensing technology to provide a rugged on-line instrument tailored to customers' specific application and technical requirements.

Measurements can be made across the range -100 to +20 °C dew point with an accuracy of ±1 °C dew point and at pressures up to a maximum of 30 MPa.

**Sensor Technology**

The Promet Moisture Analyser is based on Michell's proven Ceramic Moisture Sensor technology, giving unrivalled performance. The Promet Moisture Analyser provides a complete, turnkey hygrometer system for moisture measurement in critical process gas applications.
**The Dew Point Specialists**

### Performance and Ease of Use

At the heart of the Promet Moisture Analyser is the Transmet IS Dewpoint Transmitter. This self-contained unit consists of a Ceramic Moisture Sensor and microprocessor electronics unit that stores the sensor calibration data and provides a linear 4-20 mA output in terms of °C dew point. The Transmet IS Transmitter is fully calibrated, therefore ensuring the highest level of calibration integrity and easy interchangeability for servicing in order to maintain traceability to national standards, and to achieve minimal downtime. 24 V power for the Transmet IS is derived from the Promet Monitor and its output can be transmitted up to 500 m to the Promet monitor unit located in a safe area (or hazardous area with optional EEExd housing), via the safety barrier system. For further details please refer to our Transmet IS datasheet.

### Sample Conditioning Systems

Process moisture measurement is application critical and, as such, great care and attention must be paid to the design and construction of the analyser sampling system. That's why we employ experienced engineers with real World experience to design each and every Promet Sampling System to suit your specific requirements. Below are detailed four of the most common sampling arrangements, but each one of these can be customised to your needs in any way, giving you complete integration with your process.

- Each sampling system provides pressure reduction, flow control and in-line sample filtration, together with the sensor itself in a weatherproof, temperature-controlled enclosure certified for Zone 1 or 2 hazardous area operation. This enables the complete system to be located as close as possible to the sampling point thus reducing sample line response lags to an absolute minimum. The gas wetted system components are manufactured to the highest standards and materials are selected to suit the specific process gas composition (including compliance with NACE MR0175).
- The design of the Sample Conditioning System is configured to suit the environmental conditions and characteristics of the gas being analysed in each individual application. Examples of sample conditioning system configurations are shown below.

### Comprehensive Measurement

The standard Promet Monitor is provided in a panel-mounting 3U 19” sub-rack system with all the interlocking and interconnection required to allow on-line monitoring of process gas moisture under your preferred conditions. The Promet monitor gives current and voltage outputs as well as a digital RS232 output for connection to external devices.

- Alternatively, if no external pressure transducer is available, a preset pressure value can be input to the monitor via the front panel to enable passive pressure correction. Up to four individually selectable alarms can be provided (two as standard) and the Promet Monitor gives current and voltage outputs as well as a digital RS232 output for connection to external devices.

The Promet Monitor is configured and delivered complete with input/output connections and a 24 V excitation source to drive the Transmet IS transmitter located in the field. We even supply a ready assembled, wired and configured IS barrier assembly on-board the Promet Monitor if required. All you need do is mount the monitor, sampling system and make the interconnections and the system is ready to operate.

### Sample Conditioning Systems

- **Configuration 1: LNG Production**
  - Trace moisture analysis in natural gas prior to cryogenic liquefaction process.
  - Natural gas is dried to less than 1 ppm moisture content by desiccant columns. This is critical in order to avoid freeze up inside the cryogenic process that operates below -161 °C, the boiling point of LNG. Under normal operation, the moisture content for this process is usually 0.1 ppm, with alarm at 0.25 ppm.

- **Configuration 2: Glycol Dehydration of Natural Gas**
  - For this application, effective filtration of the sample flow to remove all traces of glycol mist droplets, carried through for the process, is essential to ensure reliable, accurate operation of a moisture measurement system. To achieve this, Michell Instruments use conventional fibre coalescing filtration with a continuous drain flow to remove all collected liquids away from the sample flow path to avoid any adverse effect on the response of the analyser to process moisture changes. For installations where glycol carry-through is considered to be a particularly severe problem, advanced membrane technologies are utilised to provide the very highest level of protection.

- **Configuration 3: Export Natural Gas**
  - Maintaining a moisture level of 20 to 30 ppm in the re-cycle hydrogen is critical. Less moisture would result in less efficient chemical reactions whilst higher moisture levels would risk poisoning of the precious metal catalyst - both problems having serious cost repercussions.

- **Configuration 4: Hydrogen Re-cycle Gas in Refinery Catalytic Reformers**
  - For this application, where the sample handling requirements are relatively straightforward, the most important aspect is to protect the moisture sensor during catalyst regeneration whereby hydrotrophic acid vapour is periodically introduced as a cleaning agent. For this reason the sampling system incorporates selection valves to isolate the sample flow path from the process gas during the regeneration period. At this time, instrument air is used as a dry, inert gas to maintain the sensor in good condition ready to return into service as soon as the concentrations of HCl have returned to normal.

The Promet Monitor provides data and all monitoring functions in the unit of ppm, moisture content.