

Promet I.S.

Process Moisture Analyser

Promet I.S. Process Moisture Analysers are heavy duty, industrial hygrometer systems for measurement of high pressure, process gases and vaporised liquids on natural gas platforms and terminals, petrochemical plants and industrial gas manufacturing facilities. Promet I.S. combines the latest in Michell Ceramic Moisture Sensing technologies with sample conditioning system design engineering capabilities to provide a reliable and rugged on-line instrument for both flammable and non-flammable gases.



Promet I.S. sampling system

Benefits

- Reliable measurement
- Easy to use with complete functionality
- Accurate measurement
- Certified intrinsically safe
- Simple to maintain with a sensor calibration exchange programme
- Flexible configuration

Applications

- Natural Gas Production and Processing
- Pipeline Drying
- Offshore export pipeline natural gas
- Transmission pipeline monitoring
- Fiscal Metering of Gas
- Gas Storage Facilities
- Refinery Recycle Gas – Reformer and Platformer
- LNG Plant

Promet I.S.

Michell Promet I.S. process moisture analyser

Michell Promet I.S. is a rugged on-line instrument tailored to customers' specific application and technical requirements. Measurements can be made across a wide range from -100 to +20 °C dew point with a best accuracy of ± 1 °C dew point and at pressures up to a maximum of 40 MPa.

Continuous monitoring is essential for process moisture control to achieve optimum production efficiency. The rack-mounted Promet I.S. Control Unit provides real-time two-line display of moisture content/dew point and pressure, user settable alarms together with analogue output and digital communications, conveniently located in a safe area. Intrinsically safe sensors, with a sampling system, are installed in the hazardous zone to minimise sample transportation time and ensure fast response to process moisture changes.

The Control Unit in multi-channel MCU format can also include moisture in liquid analysis function by combining with Liquidew IS Moisture in Liquid Analyser.

Benefits

- **Reliable measurement**

Michell's Thick- and Thin-film Ceramics Moisture Sensor is exceedingly durable; chemically inert materials coupled with physical resilience provide long-term reliable service in process measurements.

Analysis pressure of Promet I.S. is up to 40 MPa. Sensor protected against glycol and other process borne liquid contaminants. Immune to chemical attack from H₂S, mercaptans and other sulphides

- **Easy to use with complete functionality**

The 19" sub-rack mounting Promet I.S. Control Unit provides complete operational functionality. The bright alphanumeric LED display with live pressure compensation provides unit conversions from dew point to an exhaustive list of moisture content units, so user has flexibility to select the preferred hygrometric unit. The conversion method is for ideal gases and also specific to natural gas, using either the long established IGT Research Bulletin No. 8 or the more recently published ISO 18453, to customer order preference.

The front panel buttons, enable the user to scroll through the set up menus to easily configure the analyser to their own requirements. There is a 24 V excitation source to drive the Dewpoint transmitter and pressure transmitter located in the field. Four

user-adjustable alarm points and two analogue 4-20mA outputs are provided as well as a digital RS485 RTU for connection to external devices.

- **Accurate measurement.**

Michell's Calibration Laboratories are world recognised through the UKAS accreditation scheme under the auspices of EAL, European co-operation for the Accreditation of Laboratories. Each sensor is calibrated and certified traceable to the humidity standards of leading international metrology institutes, NPL (UK) and NIST (USA), so assuring correct measurement of the moisture in your process.

The Promet I.S. features moisture content calculation with user input analysis pressure but, in applications where pressure varies, the optional pressure sensor provides more accurate, active compensation for moisture content conversion.

To ensure continuous optimum performance, the Promet IS sampling system is internally temperature controlled. This greatly reduces the effect of diurnal temperature variations that would otherwise introduce transitional adsorption and de-sorption effects in the sampling system components and result in erroneous measurements during periods of temperature change. Best practice also dictates that sample line tubing should be maintained at an elevated temperature, so for customer convenience, self limiting heated tube bundle is available as a factory option for Promet I.S. sampling system.

- **Certified intrinsically safe**

Promet I.S. is designed for flammable and non-flammable gas within hazardous areas. ATEX certified by EECS for use in hazardous areas to II 1G EEx ia IIC T4.

- **Simple to maintain with a sensor calibration exchange programme**

For Promet I.S., calibration maintenance is simple. The unique Michell Calibration Exchange Service offers fast, world-wide delivery of replacement ceramic sensors certified traceable to NPL and NIST. As the calibration data for the sensor is factory programmed into onboard non-volatile memory, fitment of a Calibration Exchange Sensor renews the calibration, with minimal down-time. No programming or data input is required by the user to complete the calibration process.

The Calibration Exchange Service facilitates a professional, scheduled user QA programme at a lower cost than a traditional 'return to manufacturer' re-calibration service.

- **Flexible configuration. Total analyser system tailored to specific customer requirements**

The Control Unit is available in multi-channel format (MCU). This MCU Multi-channel Control Unit enables up to four measurement channels within a single 19" sub-rack unit. The sister product for moisture in process liquid analysis, Liquidew I.S., can be combined together with Promet I.S. into a MCU in any configuration of channels to enable both gas and liquid phase samples to be measured with a single analyser system. With the MCU, each measurement channel functions totally independent of the others, so that any maintenance on one channel will not affect the others.

A comprehensive options list for the Promet I.S. Premium Sampling System enables each complete analyser to be configured to suit each individual customers' application and installation requirements.

There are two core configurations. The Natural Gas Processing and Transmission Sampling System uses the most advanced filtration techniques with micro-porous membrane and continuous by-pass flow to remove and dispose of all liquid phase contaminants. A glycol adsorption cartridge removes residual glycol vapour carried over from dehydration process that may otherwise interfere with the moisture signal. The Trace Moisture in Hydrocarbon Gas Sampling System is for trace moisture measurement after molecular sieve dehydration process. Also suitable for many other monitoring applications at trace moisture levels in refinery gases and critical petrochemical processes. A minimalist approach to the sampling system design is essential to ensure best dynamic response to process moisture variations. A particulate filter and isolation valve are the only components prior to the sensor.

A panel mounted version of the sampling system and sensor are offered for internal installations, while various alternative enclosures and heating options are available for field installation next to the sample source. If your need is not accommodated by these options, our systems engineering department will work with you to provide a customised solution.



Promet I.S. control unit

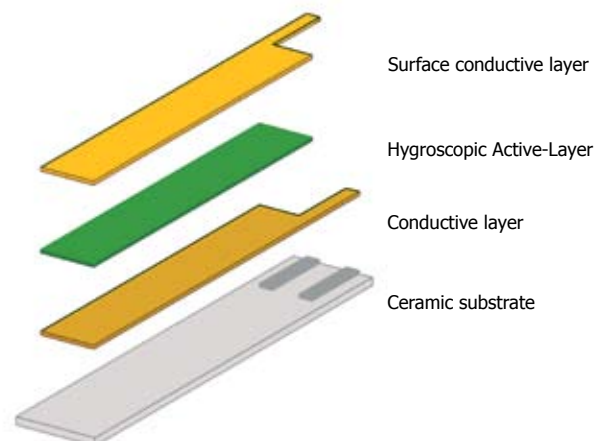
Technology

Promet I.S. utilises Michell Ceramic Moisture Sensor, offering unrivalled reliability and performance with more than 1,000 installations in natural gas and petrochemical installations world-wide.

Thick- and thin-film semiconductor technologies with metallized ceramics produce an exceedingly durable sensor, with measurement sensitivity to 10 ppbv moisture content and high-pressure capability up to 40MPa.

Unlike older aluminium-oxide technologies, the inherent immunity to pressure shock of the Ceramic Sensor completely avoids any risk of sensor failure at commissioning or shut-down, whilst the unique inert nature of the sensor gives unrivalled long-term resistance to chemical attack, even in extremely sour gas with percentage level H₂S concentrations. The microprocessor electronics unit in the sensor stores the sensor calibration data and provides a linear 4-20 mA output in terms of °C dew point.

The Ceramic Sensor responds to the partial pressure of water vapour in the gas being measured, which is directly related to the dew point temperature. Every Promet I.S sensor is calibrated against fundamental dew point measurement systems in Michell's world-class laboratory, which is internationally accredited and directly traceable to both NPL (UK) and NIST (USA) base standards.



Layers of the Michell Ceramic Moisture Sensor

Order codes

Control unit and sensor

Order codes	Product description	
PTI {1}{2}{3}	Intrinsically Safe Process moisture analyser	
Suffix:	Order code	Description
{1} – Power supply	1	110 V AC 50/60HZ
	2	230 V AC 50/60HZ
{2} – Pressure compensation	G	Without active pressure compensation
	P1	With pressure sensor/dynamic pressure compensation (maximum 1000 PSI)
	P2	With pressure sensor/dynamic pressure compensation (maximum 2000 PSI)
{3} – Hazardous Area Certificate Configuration	AT	ATEX certified system
	CS	CSA(US) certified system

Note: for more than one channel measurement, see multi-channel control unit order code

Premium sampling system

Order codes	Product description	
SAM PTI {1}{2}{3}{4}{5}	Premium Sample Handling System for Promet IS	
Suffix:	Order code	Description
{1} – Base model	NS1	Natural Gas process and transmission. For glycol dehydration.
	TS1	Trace moisture in HC gas. For LNG production and critical petrochemical process.
{2} – Installation configuration	A3	304 stainless steel enclosure, IP66/NEMA 4
	B3	316 stainless steel enclosure, IP66/NEMA 4
	C3	Panel mounted, 316 stainless steel (for indoor installations)
{3} – High pressure configuration	D1	Natural Gas Higher Pressure, 2,000 psig/138 barg
	E1	Trace Moisture Higher Pressure, 2,000 psig/138 barg
{4} – Heater configuration	F1	Standard Heater/Fixed Thermostat +20°C
	G1	Thermostatic Heater, adjustable 0 to 50°C
{5} – Further options	H	Enclosure cooling – instrument air supply required
	JXX	Trace Heated Sample Line Assembly – 6mm O.D. where X is length in metres

Multi-channel control unit

Order codes	Product description	
MCU {1}{2}{3}{4}{5}{6}{7}	Multi-channel Control Unit (Maximum 4 channels), can be combined with Liquidew I.S. for liquids	
Suffix:	Order code	Description
{1} – Power supply	1	110 VAC 50/60HZ
	2	230 VAC 50/60HZ
{2} – Hazardous Area Certificate Configuration	AT	ATEX certified system
	CS	CSA(US) certified system
{3} – Number of channels	2	2 Channels
	3	3 Channels
	4	4 Channels
{4} – {7} – Channel configuration	L	Liquid measurement
	G	Gas measurement (combine with the Promet I.S.)
	P1	Gas measurement with active pressure compensation (range 1000psig)*
	P2	Gas measurement with active pressure compensation (range 2000psig)*
	0	Channel not required

*For other ranges, consult Michell

Technical Specifications

Sensors

Sensor Technology	Michell Ceramic Moisture Sensor
Sensor version	EA2-TX-I.S.-APV (ACCURACY plus Version)
Measurement range	-100°C dp to +20°C dp
Calibration range	-100°C dp to +20°C dp
Calibration	Traceable to British (NPL) and American (NIST) National Humidity Standards
Accuracy	Dew point: $\pm 1^\circ\text{C}$ between -59.9 & $+20^\circ\text{C}$ dp Moisture content: $\pm 10\%$ of reading Dew point: $\pm 2^\circ\text{C}$ between -60 & -100°C dp Moisture content: $\pm 20\%$ of reading
Resolution	0.1°C between $+20^\circ\text{C}$ dp and -80°C dp 1°C between -80°C dp and -100°C dp
Analysis pressure	Up to 40 MPa
Operating temperature	-40°C to $+60^\circ\text{C}$
Sample flow rate	0.5 to 5 litres/min
I.S. Certification	ATEX certified by EECs for use in hazardous areas to Ex II 1G EEx ia IIC T4. (CSA certified IS Class I, Division 1, Groups A, B, C & D, T4)
Optional pressure sensor	0–138 barg (other ranges available). Accuracy: $\pm 0.25\%$ FS.

Control Unit

Display	Two line 6-digits LED, displaying moisture content / dew point (user toggle) and analysis pressure.
Analogue output	Two 4-20mA (max load 500 ohms) User configured for parameter, unit and range.
Digital output	RS485 Modbus RTU
Display mode	Moisture content (ppm _v) Moisture content in natural gas (ppm _v , LBMMSCF, mg/m ³) Dew point ($^\circ\text{C}$ or $^\circ\text{F}$) Temperature ($^\circ\text{C}$ or $^\circ\text{F}$) Pressure (MPa, psig, barg)
Pressure compensation	Fixed value (user programmed) or dynamic input from optional pressure sensor
Display resolution	0.1°C dp, 0.1°F dp, 0.1-0.001 ppm _v ideal gas (adjustable), 0.01 ppm _v natural gas, 0.01 mg/m ³ , 0.01 LBMMSCF, 1 psig, 0.1 barg
Alarms	Four alarm relays. Control action and setpoint are user programmable. Two Form C contacts rated 10 A, 240 V AC or 8 A, 24 V DC. Non-inductive load. Two Form A contacts rated 5 A, 240 V AC or 4 A 24 V DC. Non-inductive load.
I.S. Barriers	Galvanic isolation type, integrated to Control Unit
Power supply	110/230 V AC, 50/60 Hz. 10 Watts max. power consumption
Interconnection cable	General instrument type, twisted pair, screened, angle pair (two pairs with pressure sensor)
Enclosure	19" sub rack unit Dimensions 132H x 483W x 370D mm
Operating environment	Indoor, safe area, 0 to $+50^\circ\text{C}$, $<90\%$ RH

Premium Sampling Systems

Enclosure	304 stainless steel enclosure. Option for complete enclosure in AISI 316 stainless steel. All fixtures stainless steel. Galvanised steel internal mounting plate. Open panel version available for indoor installation Dimensions 800H x 600W x 300D mm
Enclosure mounting	Stainless steel wall mounting brackets
Enclosure ingress protection	IP66
Enclosure temperature control	Heater/thermostat options for fixed set-point $+20^\circ\text{C}$ or adjustable set-point range 0 to control 50°C .
Heater power supply	110/120 or 220/240/255 V ac, 50/60 Hz. Power consumption 100 Watts max.
Operating environment	Shaded position, on or off shore, -20 to $+50^\circ\text{C}$ (-40 to $+60^\circ\text{C}$ max transient) Enclosure cooling option recommended for climatic ambient $> +45^\circ\text{C}$

Michell Instruments

Michell Instruments is the international leader in the field of gas analysis, moisture and humidity measurement solutions.

With over 30 years' experience, Michell designs and manufactures a wide range of transmitters, instruments and system solutions capable of measuring trace moisture and relative humidity, as well as traces and percentages of oxygen, in diverse applications and industries including compressed air, power generation, process, oil and gas, HVAC, pharmaceutical and many more.

With a fast-growing international subsidiary and distribution network, the Michell Group provides solutions in moisture, humidity and gas analysis for the most demanding applications world-wide.

Michell Instruments

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**Please note: Michell Instruments adopts a continuous development programme which sometimes necessitates specification changes without notice.
Contact us for latest version. Ref: PRO_IS-0509**