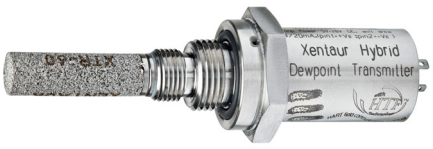
On-line Moisture Measurement in Liquids

cosa+xentaur
INNOVATIVE MEASUREMENT SOLUTIONS

The Complete Moisture Package

BASED ON YEARS OF DEDICATED RESEARCH AND DEVELOPMENT
AND PROPRIETARY SCIENTIFIC BREAKTHROUGHS



Xentaur Dewpoint Transmitter (HDT)
with XTR-LQ HTF™ Sensor
Measures Water Concentrations
from ***<1ppmw to Saturation***

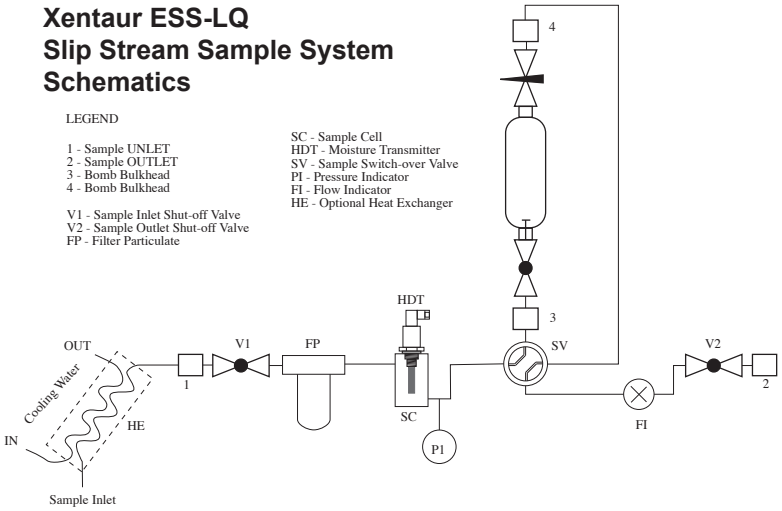
Xentaur ESS-LQ
Slip Stream Sample System
Continuous Preparation of
"Grab" Sample

Portable Karl Fischer Titrator
CA-31
Validation of data and calibration
by Primary Standard in the Field

Applications

- *Liquid Hydrocarbon Streams in the Most Challenging Conditions (Hexane, Hexene, Benzene, Mixtures, Complex Matrices)*
- *Oils and Lubricants*
- *Solvents*
- *Refrigerants*

Xentaur ESS-LQ Slip Stream Sample System Schematics



THEORY OF MEASUREMENT

Al203 oxide sensors measure changes in partial water vapor pressure (PWVP). They follow complicated principles of physical chemistry.

Henry's Law defines the relationship between PWVP and water concentration in PPMW (µg /g).

Henry's Law PPMW(µg /g)=PWVP * K

K is Henry's constant. This constant is effected by sample matrix and temperature. Xentaur has developed a sample system with an integral "Grab" sample to facilitate the determination of K in the "real" process. The sample system can then be used on a routine basis to validate K.

The procedure required to make a small number of empirical measurement is quite easy. By utilizing the "grab" sample and Karl Fischer titration, K is easily calculated. This is done at 2 critical concentrations. This data is then incorporated into a look-up table. The table is completed utilizing Henry's Law theory. By using this approach PPMW (ug/g) measurements are possible directly from the sensor.

HDT SPECIFICATIONS

The HDT is a loop powered HART enabled dewpoint transmitter.

Enclosure	Stainless Steel, IP66 NEMA 4X.
Dimensions & Weight	~1.25”Dia. x ~5.68” long including sensor & connector; 0.5 lbs.
Pressure operating range	Standard: 500 PSI (34 bar). Optional: 5,000 PSI (340 bar).
Operating Temperature	14°F to 158°F (-10°C to +70°C).
Mechanical connection	14mm x 1.25mm threads, and 3/4”-16 threads.
Electrical connections	Industrial Standard 9.4 mm, 4 pin connector. IP66 NEMA 4X
Cable	Two conductor cable. Min. #24AWG; for total cable length >5000ft.min. #20AWG (Cable must be shielded to meet CE requirements.)
Power Requirements	5 to 28 VDC, the instrument draws 4-20mA depending on measured dewpoint.
Input resolution	0.1°C dewpoint.
Indicators	None.
Engineering units	°C(dp), PMVP(mb), PPMW(µg/g)
Controls	HART interface, user’s selections are stored in EEPROM.
Outputs	Analog and digital outputs are available. A. 4-20mA drawn by the instrumentfrom the power supply. The 4-20mA is linear to °C(dp), the range is programmable. Output resolution is 0.1°C(dp) or ~ 0.25uA whichever is greater. B. The instrument can supply digital output by modulating the 4-20mA loop line. The interface is defined by HART. In the digital mode the HDT can be remotely operated and the dewpoint as well as temperature (and pressure if installed) can be read. In the digital mode multiple units can operate on the same loop cable as a multi-channel instrument. In this configuration each HDT draws only 4mA independent of the measured dewpoint
Alarms	The 4-20mA signal may be used by an external device to operate relays. In addition, a digital output pin is provided which can be factory (or specially equipped customer) programmed to provide dewpoint alarm indications.
Isolation	Sensor and case are referenced to the current loop negative side.
Warranty	1 year

SPECIFICATIONS OF HTFTM DEWPOINT SENSOR ELEMENT XTR-LQ

Type	Hyper-Thin-Film (HTFTM) high capacitance Al2O3
Dewpoint range XTR-LQ	-80°C to 25°C
Partial Water Vapor Pressure Range	0.0005mb to 31.65 mb
Capacitance	5nF to 225nF
Accuracy	±2°C(±3.6°F)for -100°C to 0°C Dewpoint
	±3°C(±5.5°F)for 0°C to + +20°C Dewpoint
Repeatability	±0.9°F(±0.5°C)
Temperature Range	+14°F to +158°F (-10°C to +70°C)
Storage temperature	-40°F to +176°F (-40°C to +80°C)
Calibration method	Multipoint calibration table with temperature compensation over the full range

CA-31 SPECIFICATIONS

Method	Coulometric Karl Fischer Titration
Measuring range	10µg-100mgH2O
Repeatability standard deviation	Within ±5µg for 10µg-1mgH2O Within 0.5% of RSD value for 1mgH2O or more
Sensitivity	0.1µg H2O
Temperature	5°C -40°C
Humidity	Under 80%, No moisture condensation
Power supply	AC 100/115/230/240V, 50/50Hz, 30VA
Dimensions	Main Unit (excluding cell & battery unit): Approx.280(W)x180(D)x200(H)mm
Weight	Main Unit : Approx.4.5 kg

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