**Xentaur**

Model HDT

Loop-powered

Hybrid Dewpoint Transmitter

-100°C(dp) to +20°C(dp)

• HTF™ Aluminum Oxide Sensor Technology

• Loop-powered (2-wire)

• Analog (4-20 mA) Output

• Digital (HART Compliant) Output

• Programmable Alarm Signal

• NEMA 4X IP66 Stainless Steel Enclosure

• Compact Design

• Temperature Compensated Calibration

• Certifications applied for: CE, IS(UL,Demko)

HDT Hybrid Dewpont Transmitter

HTF™ High Capacitance Aluminum Oxide Sensor The HDT uses a Xentaur HTF™ high capacitance alumi- num oxide sensor with a measuring range of -100°C(dp) to

+20°C(dp). HTF™ sensors provide a degree of accuracy,

speed of response and stability unavailable from instru- ments using conventional sensors.

Hart-compliant, IP66/NEMA4X Transmitter

The model HDT is a HART compliant IP66/NEMA4X hybrid dewpoint transmitter, providing loop powered analog as well as a digital output. Housed in a 1.25”dia. stainless steel

case it has an overall length of 5.68”, including the standard industrial 9.4mm 4 pin connector. This makes the HDT the world's smallest dewpoint transmitter.

Analog Output Loop

The instrument draws 4-20mA from the power supply. The

4-20mA is linear to °C(dp) with an output resolution of

0.1°C(dp) or 0.25uA, whichever is greater. The output range is programmable.

Digital Output Loop

The instrument can supply a 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

Built-in Alarm

The HDT provides a factory programmable dewpoint alarm signal through a digital output pin. Additionally, relays or external devices can be operated through the analog or digital loops.

Connections

The HDT has two different thread types, which makes the upgrade of existing installations easy. The HDT con- nects through inexpensive two-conductor cables over long

distances.

Measurement Accuracy/Stability

The HDT transmitter uses a multipoint calibration table which provides temperature compensated dewpoint read- ings for temperatures from -10°C(t) to +70°C(t). Thus, the HDT provides accurate dewpoint measurements over its full range even under extreme temperature conditions, such as when installed outdoors or close to heat sources.

Xentaur HTF™ Aluminum Oxide Technology

Due to a hyper-thin film and a unique pore geometry, Xentaur sensors have a capacitance change over their full range, several orders of magnitude larger than that of conventional aluminum oxide sensors. Additionally, this change is quasi linear and its sensitivity to temperature is negligible.

The advantages of the linear high capacitance response of Xentaur HTF™

sensors are shown in the graphs below:

Hyper-Thin-Film vs. Conventional Al2O3 Sensor

Deviation in °C(dp) from the measurement at 6.5 month

Change of Capacitance with Dewpoint

Negligible

Ageing Drift

1.5

1.0

0.5

0.0

-0.5

-1.0

-1.5

**Aging effect on dewpoint measurement of sensor s/n 15730 over a 6.5 month period, exposed to -85°C(dp) at +60°C(t).**

1 2 3 4 5 6

TIME (months after installation)

Measurements

at -80°C(dp) at -60°C(dp) at -40°C(dp) at -20°C(dp)

 at 0°C(dp)

at +20°C(dp)

200

150

20

10

0

-10

Temperature Effect on XTR-100 Dewpoint Reading

Temperature Effect on Conventional and Ceramic Al2O3 Dewpoint Readings

20

10

0

-10

Dewpoint °C

100

nF

50

XTR-100

Conventional

Better Temperature Coefficient

-20

-30

Dewpoint °C

-40

-50

-60

MBW Reference Standard

Xentaur XTR-100 at 50°C

-20

-30

-40

-50

-60

MBW Reference Standard

 Conventional at 50°C Conventional at 20°C

-70 Xentaur XTR-100 at 20°C

-80

-90

-10

10

30

0

-70

-80

-90

 Ceramic at 50°C

Ceramic at 20°C

Dewpoint (∞C)

-90

-70

-50

-30

-90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20

Reference Dewpoint °C (MBW)

-90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20

Reference Dewpoint °C (MBW)

0

10

20 Time required to complete 65% of the step change

**Xentaur** 2 min 30 sec

% of step change

Respnse times of

Al2O3 sensors

Faster

Response

30 **Conv E**

40 **Conv P Ceramic**

50

6 min 15 sec

8 min 20 sec

15 min

to a step change

(DOWN) from

-39.4 to -62.2˚C(dp)

For more detailed technical information, please visit our web site at:

60

70

80

90

100 95% of step change

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

shorter bars are better

65% of step change

[www.xentaur.com](http://www.xentaur.com/)

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

Time (minutes)

Specifications of HDT Transmitter

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; 0.5lbs. Pressure operating range: . . . . Standard: 500 PSI (34 bar).

Optional: 5,000 PSI (340 bar). Operating Temperature: . . . . . . -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), °C(t).

Controls: . . . . . . . . . . . . . . . . . . HART interface, user’s selections are stored in EEPROM. Outputs: . . . . . . . . . . . . . . . . . . Analog and digital outputs are available.

A. 4-20mA drawn by the instrument from 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 grounded to the current loop negative side. Warranty: . . . . . . . . . . . . . . . . . . 1 year

Specifications of HTF™ Dewpoint Sensor Element

Type . . . . . . . . . . . . . . . . . . . . . . Hyper Thin Film high capacitance Al2O3

Dewpoint range:

XTR-100: . . . . . . . . . . . . . . . -148°F to +68°F (-100°C to +20°C) XTR-65 . . . . . . . . . . . . . . . . -85°F to +68°F ( -65°C to +20°C)

Capacitance: . . . . . . . . . . . . . . . 15nF to 200nF Accuracy: . . . . . . . . . . . . . . . . . ±5.5°F (±3°C) Repeatability: . . . . . . . . . . . . . . ±0.9°F(±0.5°C

Temperature Range: . . . . . . . . . -14°F to 158°F (-10°C to +70°C) Sample flow range:

(linear vel. @ 1atm): . . . . . Static to 100 m/s

Storage temperature: . . . . . . . . -40°F to +176°F (-40°C to +80°C)

Calibration method: . . . . . . . . . . Multipoint calibration table with temperature compensation over the full range

Dimensions:

Methods of using and interfacing the HDT Transmitter:

HDT Block Diagram

Factory Default Setup

1

Resetable

Fuse

100mA

28V

47

3.3V

0.01F Regulator

• Burst enabled Command 3

• Pin 3 mirrors HART output

3 P

4/20mA

Bell 202 modem

in digital 0-3V levels.

• No polling address assigned

10K

0.01F

2 Sensor

Housing GND Shield

Standard hookup

Monitor current (4/20mA) across resistor R, and/or HART signal across pins 1&2. Choose V and R such that there is a minimum of 6V across pins 1&2 when the instrument draws 20mA, and no more than 28V when the instrument draws 4mA. For standard HART connections recommended 250<R<500 ohms.

R

+V

Gnd

1

3 HDT

2

G

Economy hookup

Monitor digital RS-232 TTL level.

+5V to 28V

0-3V serial; inverted RS232 format

HART protocol

Gnd

1

3 HDT

2

G

Factory preset alarm hookup

Monitor and/or drive relay from digital level alarm. Special order means that factory default settings must be modified, and alarm level must be chosen.

+5V to 28V

Factory-set dewpoint alarm level

0-3V, 5mA max

Gnd

1

3 HDT

2 (special order)

G

Bell 202 demodulator or

Caller ID chip

+5V to 28V Gnd

50 

1

3 HDT

2

G

Multi-channel hookup

Multiple HDT transmitters are parallel connected through an interface box to the serial port of a PC. In this mode, each transmitter draws 4 mA regard- less of dewpoint.

Serial port interface box

Represented by:

**Dr. Marino Müller AG**

Process Control Instrumentation

**w e l c o m e @ m u e l l e r a g . c h**

**G e w e r b e s t r a s s e 9 C H - 8 1 3 2 E g g S w i t z e r l a n d**

**Te l . + 4 1 4 4 9 8 6 2 9 2 9 F a x + 4 1 4 4 9 8 6 2 9 3 9**

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**Xentaur**

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