

# JT400 Multivariable Transmitter

*Wireless Ultra Low Power Platform with Integrated, Chart Replacement Data Logging and I/O*

The industry's first ultra-low power, multivariable (DP/P/T) transmitter / chart replacement provides best-in-class measurement accuracy, wireless interface, USB, I/O and much more.

**UP TO 60% LOWER TCO:** The JT400 incorporates the latest advances in low power and wireless technologies. It is very easy to install and startup. No barriers, long conduit runs, trenches or wiring are needed.

**BROAD COMPATIBILITY:** A variety of interfaces (USB, RS-232, RS-485) and protocols allow the JT400 to readily drop-in to practically any SCADA or natural gas measurement network.



## ULTRA LOW POWER

- Industry's lowest current draw, 1 mA at 4.0 Vdc
- Integral battery and solar power system options

## High Accuracy for Custody Transfer

- Industry-leading, 0.05% DP measurement accuracy is standard
- Best-in-class static pressure (0.035%) and temperature (0.1°C) measurements
- Best-in-class pressure (0.1%) and temperature (0.125%) effects on DP

## API 21 Compliant Data Logging

- Full digital chart-replacement functionality
- Over 35 day capacity with 15-minute averaging

## WIRELESS INTERFACE

- Integrated radio and antenna optional

## Drop-in Compatibility

- Standard mapping via BSAP, ROC and Enron Modbus protocols
- Automatic protocol detection
- Process I/O
- 2 AI, 1 High-speed counter, 4 DI/DO (selectable per-point), 1 HS switch

## Hazardous Area Classifications

- Class I, Division 1, Groups C, D Explosion-proof UL/CUL

## Simplified User Interface

- Intuitive menu operation, live trending

## PHYSICAL OVERVIEW

The JT400 is designed specifically for remote measurement of Differential Pressure, Static Pressure and Temperature with external RTD.

Diaphragm Material: SS316 or Hastelloy C

Flange Material: SS316 or Hastelloy C

Fill Medium: DC 200 Silicone Oil

Process Connections: ¼" NPT on flanges or manifold mount

Electrical Connections: ½" and ¾" NPT conduit connections

Explosion Proof Housing: Low copper aluminum, polyester paint

Local indication: 6- ½ - Digit LCD display selectable engineering units

Process Temperature – RTD Interface, 100 Ohms  
A three-wire platinum RTD per DIN 43760 is supported. The temperature, T, in degrees Celsius is calculated using the Calendar Van Dusen Equation according to the DIN EN 60751 standard for Class A & B RTDs.

Auto RTD error detection

The user may enter the coefficients from a custom calibrated RTD.

User connections: Pluggable terminal blocks

## POWER SUPPLY INFORMATION

Operating Voltage Range: 4.0 to 30.0 VDC

## AVERAGE CURRENT DRAW:

1 mA (typ.)

## TURN-ON TIME:

Measured input variables will be within specifications less than two seconds after power is applied to the JT400.

## ACCURACY AND PERFORMANCE SPECIFICATIONS

All specifications are for the digital, floating-point signal.

## DIFFERENTIAL PRESSURE AND STATIC PRESSURE

Combined effects of nonlinearity, non-repeatability and hysteresis at reference pressure and over the operating temperature range:

DP linear mode:  $\pm 0.05\%$  of Calibrated Span or  $0.015\%$  of URL, whichever is greater.

Static Pressure  $\pm 0.035\%$  of span or  $0.015\%$  of URL whichever is greater.

Temperature effect on Differential pressure:  
 $\pm 0.21\%$  URL maximum combined shift zero and span with an ambient temperature change of  $60^{\circ}\text{C}$  ( $108^{\circ}\text{F}$ ).  
 $\pm 0.17\%$  URL maximum for Static pressure ranges.

Static pressure effects on Differential pressure:  
Zero error:  $\pm 0.1\%$  URL max, for a change in static pressure of 1000 PSI  
Span error:  $\pm 0.1\%$  reading max, for a change in static pressure of 1000 PSI  
Static effects may be calibrated out.

Long term stability at constant conditions:  
 $\pm 0.05\%$  URL/Year Typical  
Mounting position effect:  $\pm 2$  in H<sub>2</sub>O max, which can be calibrated out  
Ripple and noise: Per ISA 50.1 Section 4.6

## OVER RANGE CAPABILITY

All sensors remain accurate to  $\pm 0.1\%$  while over-pressured up to 133% of URL.

Proof Pressure:  $1\frac{1}{2}$  x URL without recalibration

## MOUNTING EFFECTS

Mounting torque effects: None  
Flow direction change effects: No "oil canning"

## PROCESS TEMPERATURE INPUT SPECIFICATIONS

RTD Conversion Accuracy:  $\pm 0.1^{\circ}\text{C}$ , or  $\pm 0.1\%$  of reading, whichever is greater

Ambient temperature effect on RTD measurement:  
 $\pm 0.01^{\circ}\text{C} / ^{\circ}\text{C}$  max  
Long term stability at constant conditions:  
 $\pm 0.25^{\circ}\text{C} / \text{month}$  max

## ENVIRONMENTAL SPECIFICATIONS

Temperature limits:

Sensor body: -40 to +80°C

Electronics: -40 to +80°C

With Display: -30 to +60°C

Storage: -40 to +100°C

Humidity limits: When covers are properly installed, unit will withstand 0 to 100% RH (Type 4 enclosure)

Vibration:  $\pm 0.1\%$  URL/g max 10-500Hz in any axis per SAMA PMC-33-1C

Electromagnetic compatibility:

Conditions: Twisted pair wires including RTD. Covers installed and wiring run in grounded conduit. 10V/m, 20-500 MHz per SAMA PMC-33-1C

DP and SP:  $\pm 0.25\%$  URL

RTD Temperature:  $\pm 1^\circ\text{C}$

## OPTIONAL LIQUID CRYSTAL DISPLAY (LCD)

The Optional LCD display is configurable for units, variable display sequence and period

## USER INTERFACE

With a laptop computer, the JT400 transmitter can be quickly calibrated and configured. The computer interfaces to the USB port and the network port wiring does not need to be disconnected. A variety of communication interfaces are offered for the JT400:

RS-485

RS-232

USB (The JT400 may be powered over USB)

Radio - optional

## COMMUNICATION PROTOCOLS

BSAP

Enron Modbus

## ACCESSORIES

The following items are ordered separately:

Manifold adapters (“furbols”)

Three-valve or five-valve manifold

Mounting brackets

Explosion-proof USB connector

Wireless Receiver 2.4 GHz (Gateway)

RTD

## FIELD UPGRADEABLE FIRMWARE

Firmware factory updates and added options may be added through the USB port in the field without loss of calibration.

## WIRELESS POWER SYSTEM

The JT400 operates on a rechargeable lead acid battery pack with up to a 10-year life in conjunction with the internal solar panel (100 days autonomy) or on a non-rechargeable Lithium Pack with up to 2 years autonomy.

## USER CONFIGURABLE I/O

Four digital inputs may be configured as open drain digital outputs.

The high-speed counter's 10 KHz bandwidth may be filtered to 100 Hz by user selection and may also serve as a digital input.

The high-speed switch (to detect momentary inputs) provides an interrupt to the main processor for accurate time-stamping.

Two 1-5 V analog inputs have a 10% over range capability.

12 Volt output provides power for external devices such as low-power, voltage pressure transmitters.

## PRESSURE SENSOR RANGES

Multivariable sensor is available in:

Differential Pressure/Static Pressure

150 in H<sub>2</sub>O/1000 PSI

150 in H<sub>2</sub>O/2000 PSI

300 in H<sub>2</sub>O/1000 PSI

300 in H<sub>2</sub>O/2000 PSI

400 in H<sub>2</sub>O/2000 PSI

Single Variable Static pressure sensor is available in:

300 in H<sub>2</sub>O

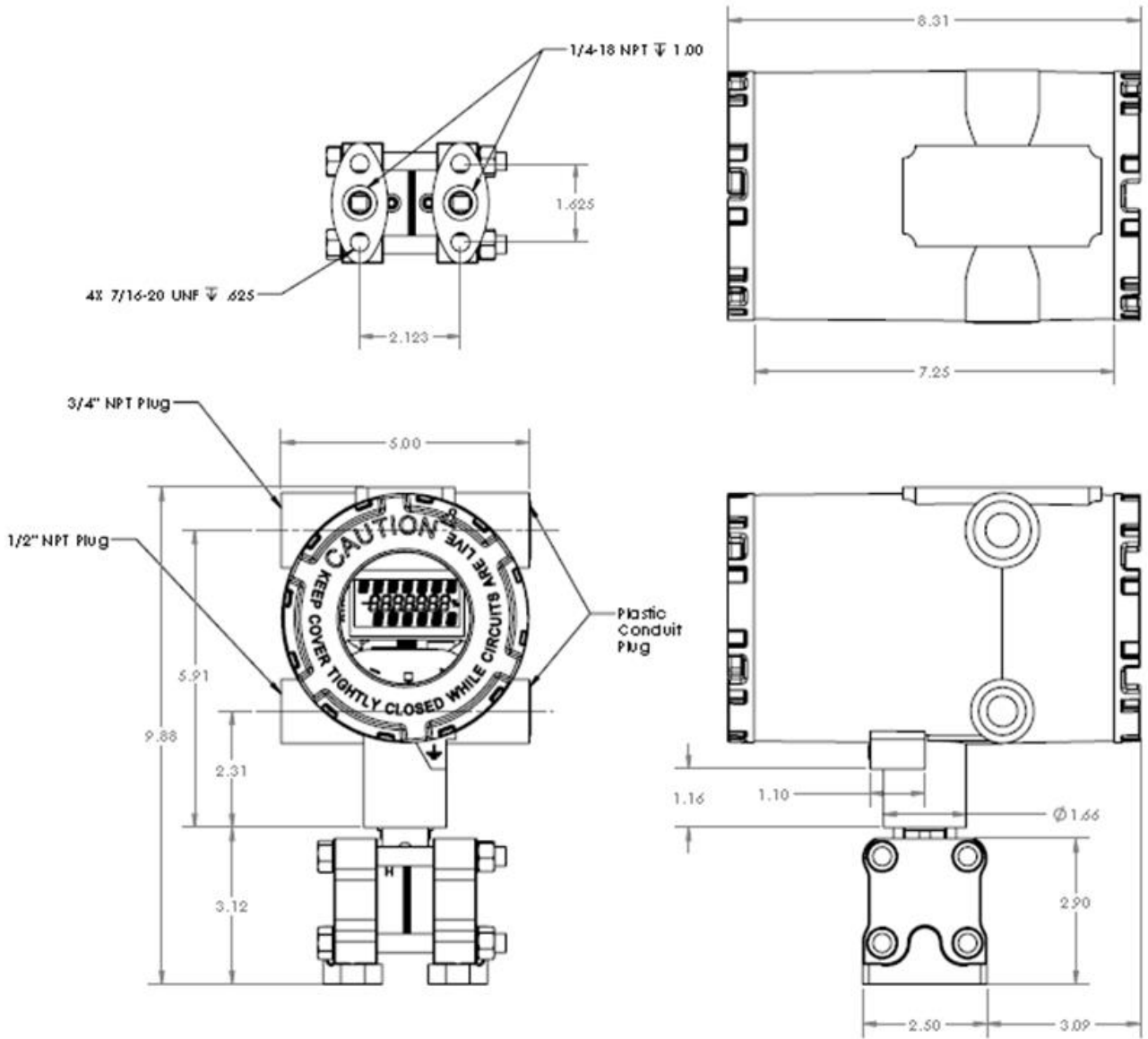
25 PSIG, 100 PSIG and 500 PSIG

1000 PSIS and 2000 PSIS

Optional:

3000 PSIS and 5000 PSIS (with indication up to 10,000 PSI)

## DIMENSIONS



MODEL STRING			
JT400-AB-C-D-E-F-G-H-J-K-L-M-N-P-Q-R-S-T			
CODE - AB			NOTES
GP Gauge Pressure Model - Range	300" H2O	1	
	25 PSIG	2	
	100 PSIG	3	
	500 PSIG	4	
	1000 PSIS	5	
	2000 PSIS	6	
	3000 PSIS	7	
	5000 PSIS	8	
CODE - AB			
DP/P Version - DP/P Range	150" / 1000 PSIS	11	
	150" / 2000 PSIS	12	
	300" / 1000 PSIS	13	
	300" / 2000 PSIS	14	
	400" / 2000 PSIS	15	
	700" / 2000 PSIS	16	
CODE - C			
Diaphragm Material	316 SS	1	
	Hastelloy C	2	
CODE - D			
Flange/ Process Connection Material	316 SS	1	For GP model material must be the same as C
	Hastelloy C	2	
CODE - E			
Fill Medium	DC200 Silicone Oil	1	
	Other	2	Consult factory
CODE - F			
DP Manifold Adapter ("Futbols")	None	0	Must be same material as D
	316 SS	1	
	Hastelloy C	2	
CODE - G			
Mounting Bracket	None	0	
	DP Flange Bracket	1	
	GP Flange Bracket	2	
CODE - H			
Local Indication	None	0	
	6 ½ Digit LCD	1	

<b>CODE - J</b>			
<b>Internal Power System</b>	None	0	Requires external power source
	Lithium Battery Pack	1	Not available with Code-L = 1
	Lead Acid Battery Pack with Solar Panel and 2nd Glass Window	2	Requires external charging source; not available with Code-L = 1
<b>CODE - K</b>			
<b>Data logging (Chart Replacement)</b>	Off	0	
	On	1	
<b>CODE - L</b>			
<b>Communications</b>	USB/RS232/RS485	0	USB, RS232 and RS 485 are standard (supplied with 6 ft. USB Interface cable, terminal block connectors)
		1	Consult factory
<b>CODE - M</b>			
<b>Flange Orientation</b>		0	Consult factory
		1	Vertical (facing down)
<b>CODE - N</b>			
<b>Hazardous Area Approval</b>	UL/CUL CI D1 Explosion-proof	1	
	Other	2	Consult factory
<b>CODE - P</b>			
<b>12 Volt Output</b>	Off	0	
	On	1	Requires battery option.
<b>CODE - Q</b>			
<b>Analog and Digital I/O</b>	Off	0	
	On	1	Supplied with terminal block connector
<b>CODE - R</b>			
<b>Radio Options</b>	None	0	
	900 MHz Transmitter	1	Requires external antenna and battery
	2.45 GHz Transmitter	2	Internal antenna supplied. Requires battery option
<b>CODE - S</b>			
<b>Explosion-Proof Antenna Coupler</b>	None	0	
	Coupler	1	Required if using an external antenna
<b>CODE - T</b>			
<b>External Antenna</b>	None	0	
	Wireless 900 MHz	1	
	Wireless 2.45 GHz	2	



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