

# Model 851

## Pressure Transmitter



### Description

The Model 851 is designed for years of stable performance in even the toughest environmental and media conditions, such as refineries, petrochemical facilities, paper & pulp plants, and waste water treatment facilities. Approvals include FM and CSA for both intrinsic safety and explosion-proof ratings. The Model 851 also meets NACE standards for offshore applications. A one year warranty is standard with every unit.

The small size and light weight of the Model 851 transmitter eliminates the need for complicated mounting hardware and mechanical supports, thereby reducing installation time substantially. The in-line connection permits simple field wiring without the need for additional hardware, adding to the speed and ease of installation. Its slim profile allows for mounting in places too tight for most other transmitters.

A 4-20 mA output is standard with a 12-40 VDC power supply. The Model 851 is bench adjustable, allowing for calibration of zero and span. With the cover sealed double O-ring assembly, this transmitter is weather proof and capable of direct spray, clean-in-place applications.

### Features

- A miniature, low-priced full-featured transmitter—just 1 lb. (450 grams)
- All welded 316 stainless steel construction and wetted parts (no aluminum)
- Ranges from 0-3 (0.2 bar) to 0-5000 psig (345 bar)
- $\pm 0.25\%$  accuracy
- Zero and span adjustability
- Full 5:1 range turndown
- FM & CSA Explosion-proof and intrinsically safe
- 4-20 mA output at 12-40 VDC
- Watertight cable or conduit connection optional
- 1/2 in. NPT Female process connection or flush mount version
- Straight in-line construction for a slim profile
- 24 inch (61 cm) cable standard

### Operation

The heart of the Model 851 pressure transmitter is a silicon piezoresistive sensing chip. This miniature micro-etched semiconductor gives an output proportional to the applied pressure. This chip is isolated from the process media by a stainless steel diaphragm. Silicone oil or other specified fill fluid is used to transmit the process pressure to the sensor.

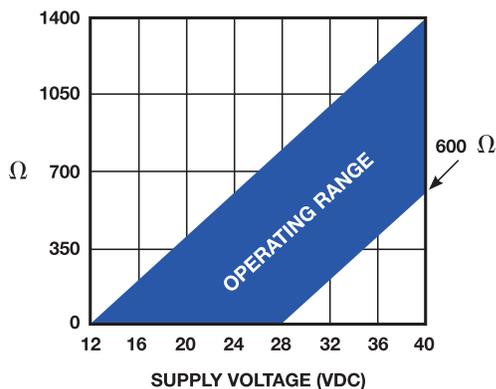
A surface mount amplifier board, enclosed in a sealed chamber, is used to convert the millivolt signal from the sensor to a calibrated 4-20 mA transmitter output. Transmitter electronics are surge and EMI protected.

Each transmitter is tested over both pressure and temperature ranges, and a thick film compensator circuit is used to bring the output of the sensor into specification. After compensation, every transmitter is tested a second time for pressure and temperature effects to ensure that it meets performance specifications.

# Model 851 Pressure Transmitter

## Specifications

- **Service:** Liquid, gas or vapor
- **Range Limits:**
  - 0-3 to 0-6 psi (0-0.2 to 0-0.4 bar)
  - 3-15 psi (0.2-1.0 bar)
  - 0-6 to 0-15 psi (0-0.4 to 0-1.0 bar)
  - 0-15 to 0-30 psi (0-1.0 to 0-2.1 bar)
  - 0-20 to 0-100 psi (0-1.4 to 0-6.9 bar)
  - 0-60 to 0-300 psi (0-4.0 to 0-20.7 bar)
  - 0-200 to 0-1000 psi (0-14.0 to 0-69.0 bar)
  - 0-600 to 0-3000 psi (0-40.0 to 0-206.9 bar)
  - 0-1000 to 0-5000 psi (0-70.0 to 0-344.8 bar)
- **Output:** 4 to 20 mA DC, limited to 30 mA DC
- **Power Supply:** 12 to 40 VDC with reverse polarity protection
- **Loop Resistance:** 1400 ohms maximum at 40 volts



- **Turndown:** 5:1
- **Zero Adjust:**  $\pm 10\%$
- **Span Adjust:**  $\pm 10\%$
- **Temperature Range**
- **Ambient Operating:**
  - FM Intrinsically Safe:  $-40^{\circ}$  to  $140^{\circ}\text{F}$  ( $-40^{\circ}$  to  $60^{\circ}\text{C}$ )
  - FM Explosion-proof:  $-40^{\circ}$  to  $180^{\circ}\text{F}$  ( $-40^{\circ}$  to  $82^{\circ}\text{C}$ )
  - CSA Intrinsically Safe T3C:  $-40^{\circ}$  to  $140^{\circ}\text{F}$  ( $-40^{\circ}$  to  $60^{\circ}\text{C}$ )
  - CSA Explosion-proof:  $-40^{\circ}$  to  $180^{\circ}\text{F}$  ( $-40^{\circ}$  to  $82^{\circ}\text{C}$ )
- **Process Interface:**  $-40^{\circ}$  to  $212^{\circ}\text{F}$  ( $-40^{\circ}$  to  $100^{\circ}\text{C}$ )
- **Storage:**  $-40^{\circ}$  to  $212^{\circ}\text{F}$  ( $-40^{\circ}$  to  $100^{\circ}\text{C}$ )
- **Overrange:** 300% upper range limit
- **Humidity Limits:** 0 to 100% RH

## Performance Specifications

- **Accuracy:**  $\pm 0.25\%$  of calibrated span including linearity, hysteresis and repeatability (BFSL)
- **Response Time:** Time constant of 20 milliseconds
- **Stability:**  $\pm 0.5\%$  of upper range limit for six months
- **Temperature Effect:** (includes zero and span)
  - Compensated:  $-20^{\circ}$  to  $180^{\circ}\text{F}$  ( $-29^{\circ}$  to  $82^{\circ}\text{C}$ )
  - Between  $30^{\circ}$  and  $130^{\circ}\text{F}$  ( $-1^{\circ}$  and  $54^{\circ}\text{C}$ ):  $\pm 1\%$  of URL per  $50^{\circ}\text{F}$  ( $28^{\circ}\text{C}$ )
  - Between  $-20^{\circ}$  and  $180^{\circ}\text{F}$  ( $-29^{\circ}$  and  $82^{\circ}\text{C}$ ):  $\pm 1.6\%$  of URL per  $50^{\circ}\text{F}$  ( $28^{\circ}\text{C}$ )
- **Power Supply Effect:**  $\pm 0.005\%$  full scale per volt
- **Surge Protection:** Standard
- **Vibration Effect:**  $\pm 0.1\%$  of upper range limit for 3 g to 200 Hz
- **Position Effect:** Zero shifts up to 0.01 psi
- **Overrange Effects:**  $\pm 0.15\%$  full scale per 200% of maximum range

## Physical Specifications

### Materials of Construction

- **Process Wetted Parts:** 316 stainless steel
- **Diaphragm (Models 851F):** Hastelloy C
- **Non-Wetted Parts:** 316 stainless steel; Viton® O-ring
- **Fill Fluid:** DC 200 silicone (standard)
- **Process Connection:** Reference model code
- **Electrical Connection:** Reference model code
- **Weight:** 1 lb. (450 grams)
- **Cable Length:** 24 in. (61 cm), 22 AWG

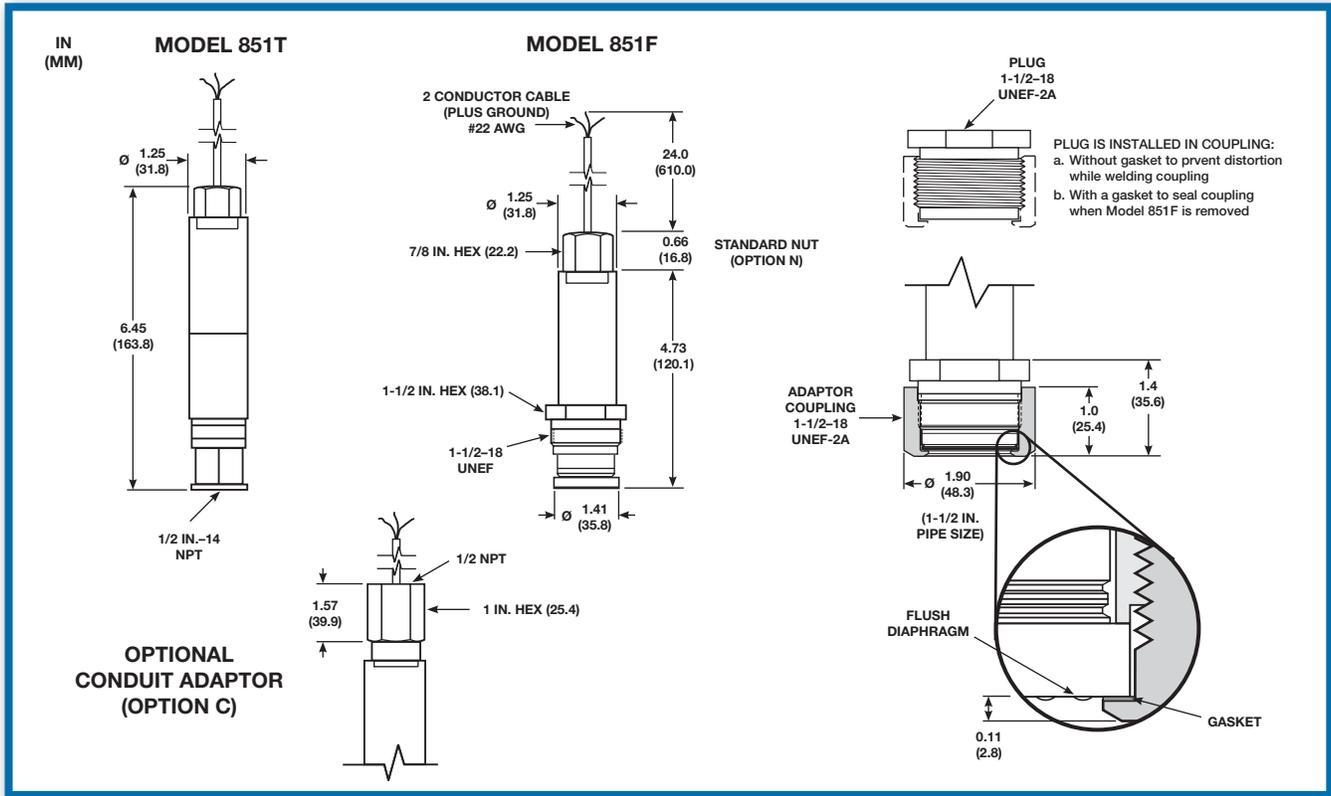
## Classifications

- **Factory Mutual:**
  - Intrinsically safe for Class I, II, III Division I, Groups A, B, C, D, E, F, G for hazardous locations per AMETEK Dwg. BK750407. Maximum ambient temperature  $60^{\circ}\text{C}$ .
  - Entity Requirement:  $I_{max} = 225 \text{ mA}$ ,  $V_{max} = 36\text{V}$ ,  $C_i = 0.126 \mu\text{f.}$ ,  $L_i = 0 \text{ mH}$
  - Explosion-proof for Class I, II, III Division I, Groups C, D, E, G, for hazardous locations. NEMA 4 Enclosure. Conduit seal must be within 18 inches of transmitter.
- **Canadian Standards Association:**
  - Exia-Intrinsically safe for Class I, Division I & 2, Groups A, B, C, D; Class II, Groups E, F, G when connected per AMETEK Dwg. BK750483. Temperature code T3C.
  - Explosion-proof for Class I, Division 1, Groups B, C, D; Class II, Groups E, F, G; Class III for hazardous locations. Enclosure 4.

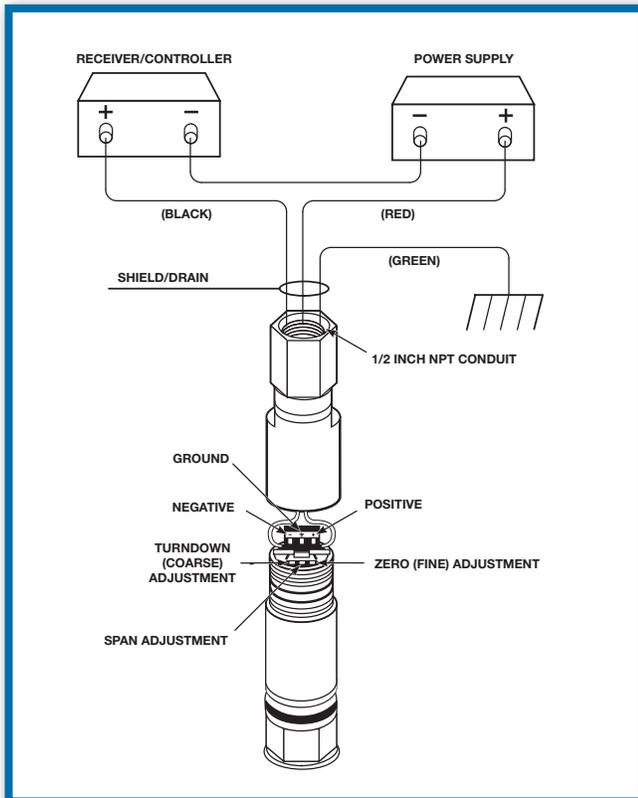
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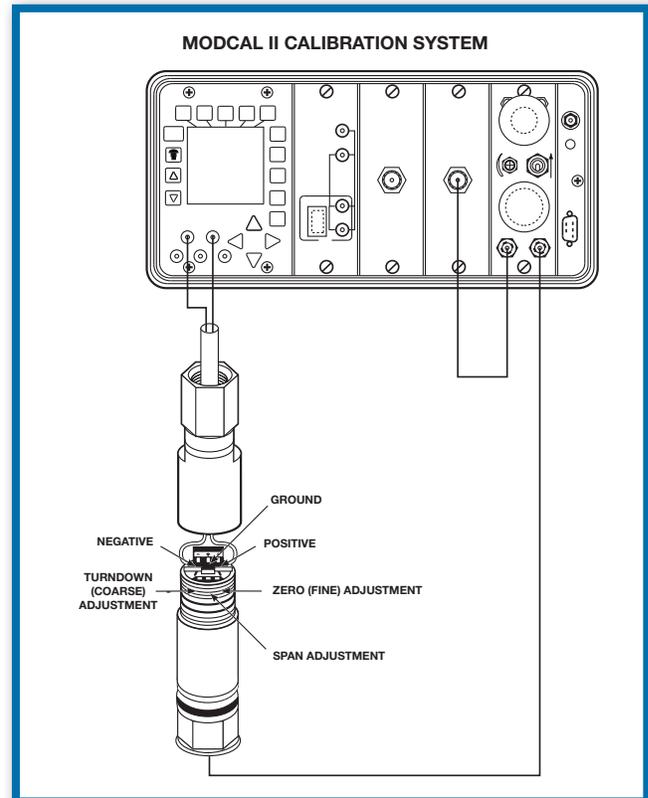
# Dimensions



# Typical Wiring Diagram

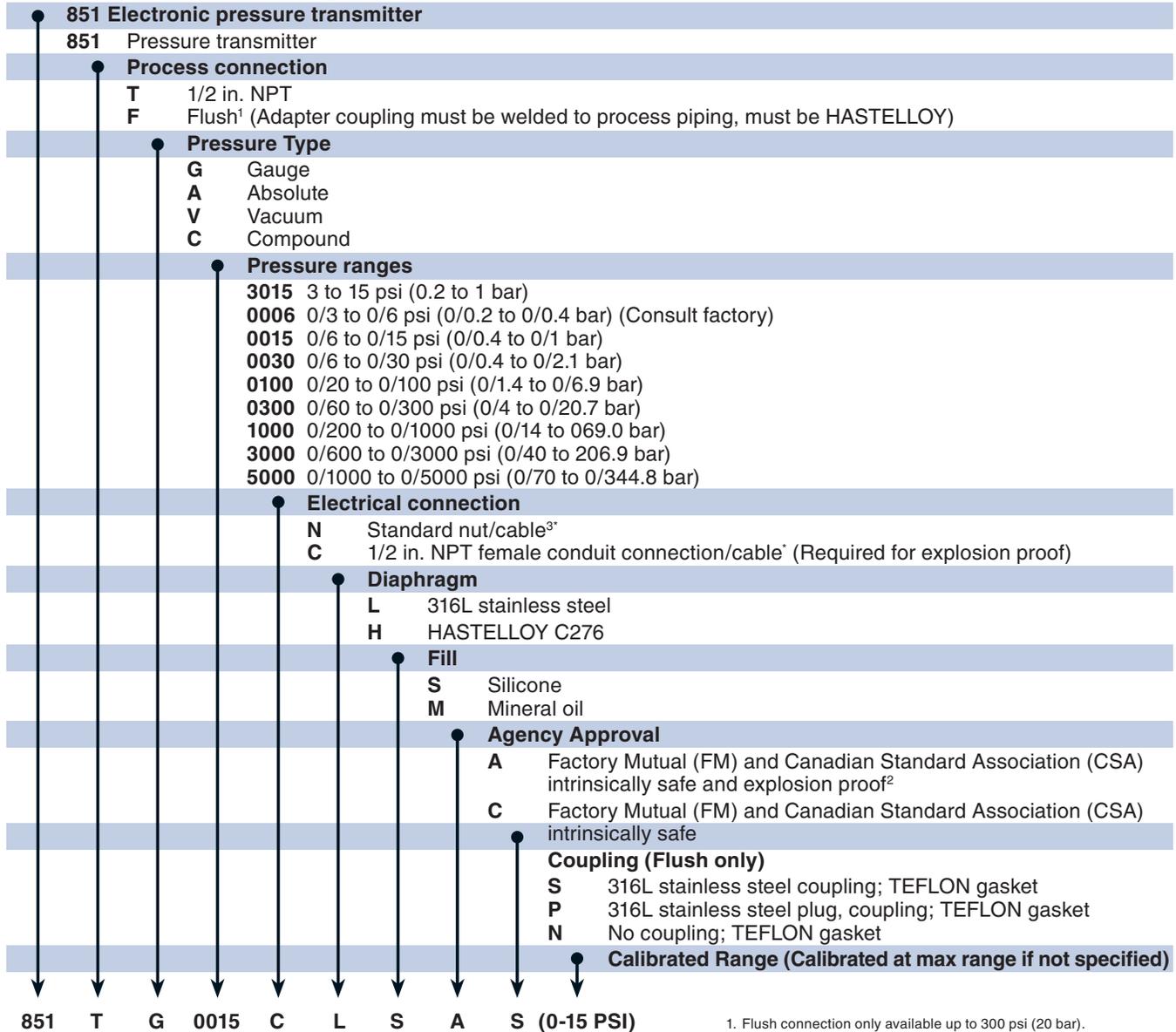


# Calibration



# Model 851 Pressure Transmitter

## Model Numbering:



1. Flush connection only available up to 300 psi (20 bar).  
 2. Explosion-proof approval requires "C" electrical connection option.  
 3. Not available with agency approval "A", FM/CSA explosion-proof.  
 \* Cable length is 24 in. (22 AWG) standard.



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