

Thermocouples

EXTENDED
CAPABILITY

EXACTSENSE®

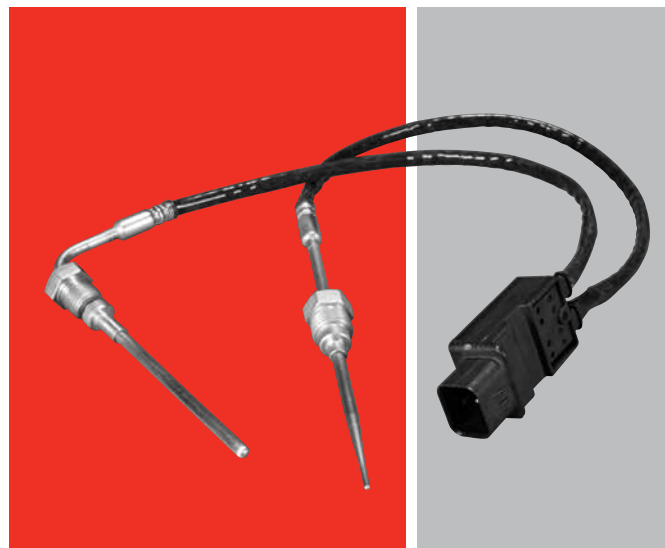
The EXACTSENSE® thermocouple from Watlow provides the accuracy, time response and durability required to help manufacturers improve the control of their diesel engine aftertreatment systems. The resulting benefits include more efficient regeneration, better fuel economy and improved emissions to meet the more stringent global requirements.

The EXACTSENSE thermocouple features integrated electronics within a molded connector housing. The electronics convert the thermocouple signal into either an analog or digital output signal that is compatible with the engine control module (ECM). Having a sensor with integrated electronics helps improve overall system accuracy and enables the use of information about the sensor such as part number, serial number, date of manufacture, time response, calibration, drift and more to enhance system performance or improve diagnostic capabilities.

The EXACTSENSE thermocouple includes WATCOUPLE™ sensing technology. This technology uses materials selected for their stability and longevity at high temperatures making this thermocouple an ideal choice for burner, flame and turbo applications. The durable mineral insulated thermocouple construction is also superior for applications requiring long immersion depths up to 7.9 in. (200 mm). The EXACTSENSE is point sensitive unlike RTDs, which average the temperature over the length of the element. These EXACTSENSE features provide the ability to accurately measure the temperature near the center of larger pipes without complex algorithms.

The mineral insulated construction also enables the tip to be tapered. This durable closed tip construction results in faster response times than competing sensor technologies can achieve with their less durable open tip constructions. EXACTSENSE tapered construction results in improved control and increased sensor life.

The EXACTSENSE thermocouple meets the demanding requirements for over-the-road medium and heavy-duty vehicles as well as on off-road equipment including construction, mining, agriculture, marine and locomotive. The EXACTSENSE thermocouple is available with a variety of standard options to meet specific manufacturer requirements.



Features and Benefits

Integrated electronics

- Provide high system accuracy resulting in improved fuel economy
- Enable the availability of information for system performance monitoring and improved diagnostic capability
- Allow a variety of output signals compatible with ECMs

WATCOUPLE thermocouple technology

- Provides reliability in rugged environments
- Operates at a wide range of temperatures
- Maximizes stability at high temperatures
- Provides longer sensor life

Tapered tip construction

- Provides faster response time
- Increases life of sensors due to closed tip construction

Long immersion depth

- Improves detection of actual process temperatures

Typical Applications

- Diesel particulate filter (DPF)
- Diesel oxidation catalyst (DOC)
- Selective catalytic reduction (SCR)
- Exhaust gas recirculation (EGR)
- Lean NOx trap (LNT)
- Turbocharger
- Burner
- Reformer

EXACTSENSE

Specifications

Sensor Type

- Mineral insulated thermocouple

Output Options

- Analog 0 – 5V ratiometric analog voltage signal (RAVS)
- Analog 0 – 5V non-ratiometric analog voltage signal (AVS)
- LIN 2.1 or 1.3 compatible
- CAN J1939

Analog Supply Voltage (Vs1)

- 5V \pm 0.25VDC

LIN Supply Voltage (Vs2)

- 9 to 17VDC

CAN Supply Voltage

- 6 to 16VDC

LIN Output Communication Speed

- 9600, 19200 baud rate
- LIN 2.1 or 1.3 compatible

CAN Output Communication Speed

- 250,000, 500,000 baud rate

Operating Temperature Range of Sensor

- -40 to 1382°F (-40 to 750°C) (stainless)
- -40 to 1832°F (-40 to 1000°C) (alloy 600)
- -40 to 2012°F (-40 to 1100°C) (Haynes® 230)

Analog Accuracy with Electronics

- \pm 18°F (\pm 10°C) from -40 to 932°F (-40 to 500°C)
- \pm 22.5°F (\pm 12.5°C) from 932 to 1832°F (500 to 1000°C)

LIN Accuracy with Electronics

- \pm 14.4°F (\pm 8°C) from -40 to 2012°F (-40 to 1100°C)

CAN Accuracy with Electronics

- 12.6°F (\pm 7°C) from -40 to 1112°F (-40 to 600°C)

Response Time (T63) 0.08 in. (2.1 mm) Tip

- ~3 seconds in air moving at 70 meters/second

Response Time (T63) 0.16 in. (4.0 mm) Tip

- ~7 seconds in air moving at 70 meters/second

Immersion Depth (A Dimension)

- 0.98 to 7.87 in. (25 to 200 mm)

Operating Temperature Range of Electronics and Connector

- -40 to 248°F (-40 to 120°C)

Operating Temperature Range of Sensor to Wire Interface

- -40 to 392°F (-40 to 200°C)

Electromagnetic Interference (EMI), Radio Control Frequency (RFI)

- 100V/meter 20MHz to 2GHz

Materials and Mounting

Sheath Materials

- 316 SS, alloy 600 or Haynes® 230

Mounting Fittings

- M12x1.5-6g, M14x1.5-6g and M16x1.5-6g, 400 SS

Lead Wire

- 0.96 mm² (18 AWG - 19 strands of 30 AWG) stranded wire with Tefzel® insulation

Protective Sleeve

- 392°F (200°C) silicone coated fiberglass sleeve (optional)

Connector

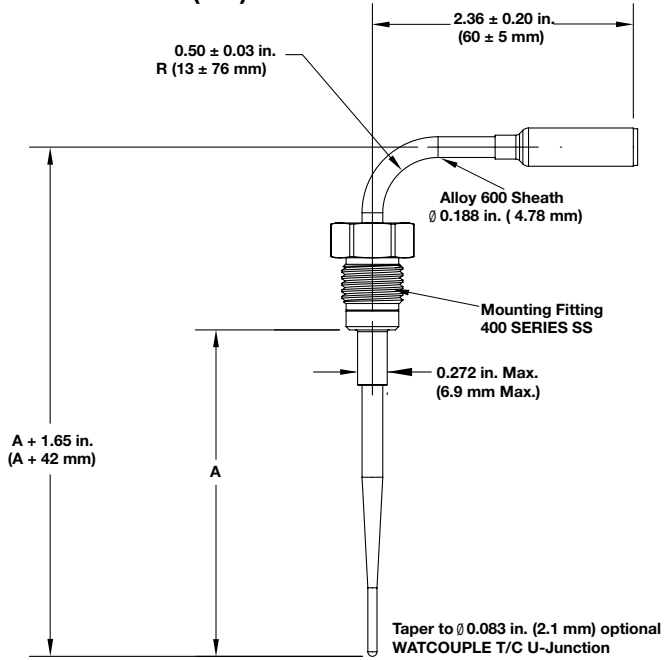
- Tyco Electronics 776488-1 (AMPSEAL 16 SERIES) with 2 rows of 2 gold plated pins
- Mating connector: Tyco plug 776487-1, Tyco S&F gold plated socket 776492-1, Tyco plug seal 776363-1

Thermocouples

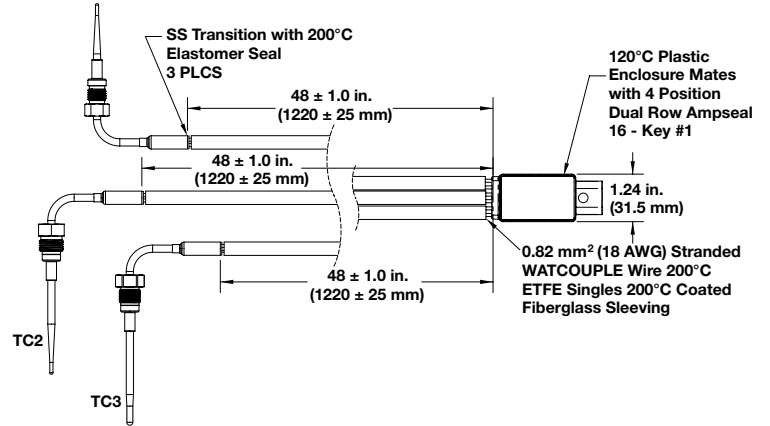
EXACTSENSE

Dimensional Drawings

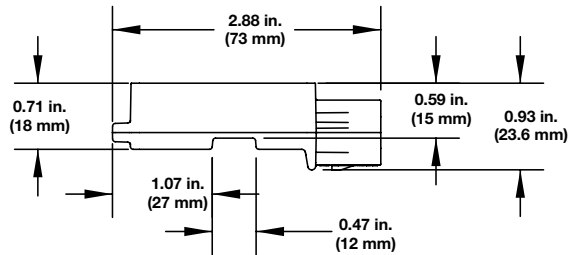
Bent Probe (90°)



Assembly (Shown with Three Inputs)



Electronic Housing



Straight Probe

