

Installation Instructions for the Transportation Variable Reluctance Speed Sensors, Thrumold Series

32312331
Issue A

The Thrumold Series VRS (Variable Reluctance Speed) sensors are designed to detect engine timing and transmission speed by determining the speed and position of rotating shafts in heavy-duty, off-road, and construction vehicles, providing information to help improve engine combustion process efficiency.

These passive VRS sensors are simple, rugged devices that do not require an external voltage source for operation. A permanent magnet in the sensor establishes a fixed magnetic field. The approach and passing of a ferrous metal target near the sensor's pole piece (sensing area) changes the flux of the magnetic field, dynamically changing its strength. This change in magnetic field

strength induces a current into a coil winding which is attached to the output terminals.

The output signal of a VRS sensor is an ac voltage that varies in amplitude and frequency as the speed of the monitored device changes, and is usually expressed in peak to peak voltage (Vp-p). One complete cycle occurs as each tooth passes the sensor's pole piece. If a standard gear were used as a target, this output signal would resemble a sine wave if viewed on an oscilloscope.

Table 1. Electrical Specifications

Characteristic	High Voltage Output Versions						Low Voltage Output Versions			
	TM-HAADA	TM-HBA-DA	TM-HBA-DA-001	TM-HBCDA	TM-HCBDF	TM-HCDDF	TM-LAADA	TM-LBADA	TM-LCBDA	TM-LDADA
Input										
Coil resistance: at 25 °C [77 °F] over temp.	1450 Ohm ±180 Ohm 1450 Ohm ±70 Ohm						140 Ohm to 230 Ohm 105 Ohm to 260 Ohm			
Inductance (at 1 kHz, ±2%)	706 mH ±41 mH					580 mH ±35 mH	84 mH ±9 mH			
Operating frequency, max.	15 kHz typ.						40 kHz typ.	15 kHz typ.		40 kHz typ.
Output										
Output voltage, min.	39 Vp-p ±9 Vp-p					34.5 Vp-p ±6.9 Vp-p	28 Vp-p ±7 Vp-p			
Optimum actuator	8 DP									
Gear pitch range	8 mm									
Surface speed, min.	5.9 IPS (0.15 m/s) typ.									

Table 2. Mechanical Specifications

Characteristic	High Voltage Output Versions						Low Voltage Output Versions			
	TM-HAADA	TM-HBA-DA	TM-HBA-DA-001	TM-HBCDA	TM-HCBDF	TM-HCDDF	TM-LAADA	TM-LBADA	TM-LCBDA	TM-LDADA
Housing material	stainless steel				aluminum	anodized aluminum	stainless steel			stainless steel
Mounting thread	M18x1.5 6G	5/8-18 UNF-2A			3/4-16 UNF-2A		M18x1.5 6G	5/8-18 UNF-2A		M16x1.5 6G
Termination	Deutsch DT04 connector									
Chemical compatibility	Engine oil, diesel fuel, water, engine coolant, salt spray, and trisodium phosphate cleaning solution. (Note: do not use oils containing extreme pressure additives (high sulfur content).)									
Weight	72 g [2.54 oz] approx.									

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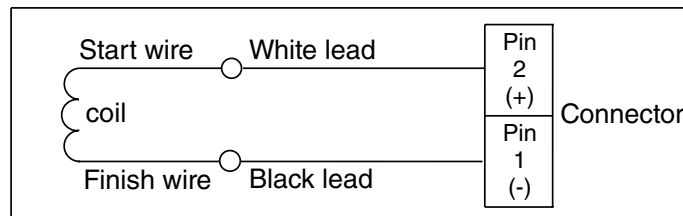
Table 3. Environmental Specifications

Characteristic	High Voltage Output Versions						Low Voltage Output Versions			
	TM-HAADA	TM-HBA-DA	TM-HBA-DA-001	TM-HBCDA	TM-HCBDF	TM-HCDDF	TM-LAADA	TM-LBADA	TM-LCBDA	TM-LDADA
Operating temp.	-40 °C to 120 °C [-40 °F to 248 °F]									
Storage temp.	-55 °C to 150 °C [-67 °F to 302 °F]									
Vibration	20 G RMS from 24 Hz to 2000 Hz >50 MOhm									

Table 4. High Output Versions Only: Test Condition Specifications

Characteristic	TM-HAADA	TM-HBADA	TM-HBADA-001	TM-HBCDA	TM-HCBDF	TM-HCDDF
Surface speed	5.9 IPS typ.					
Gear	8 DP					
Air gap	0,889 mm ±0,381 mm [0.035 in ±0.015 in]					
Load resistance	4.8 kOhm					
Free air condition	no ferrous metals within 38,1 mm [1.5 in] of sensor face					

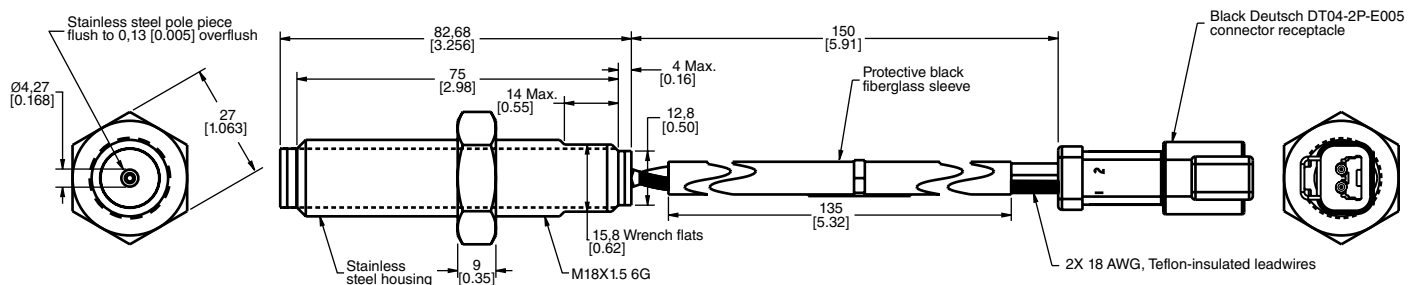
Figure 1. Electrical Schematic



As ferrous material approaches the pole piece, the white lead goes positive with respect to the black lead.

Figure 2 High Output Versions Dimensional Drawings (For reference only: mm [in].)

TM-HAADA

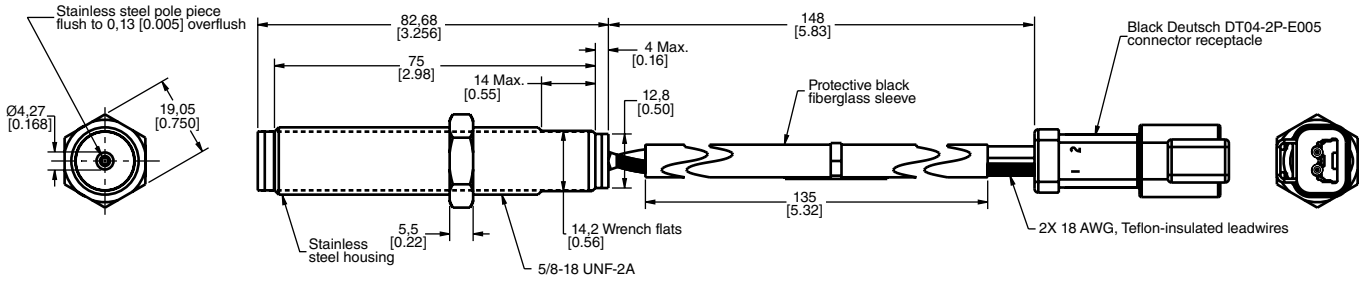


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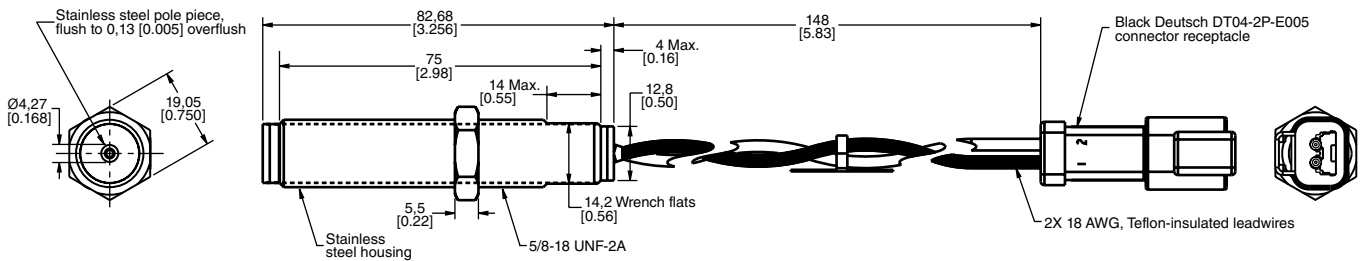
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Figure 2 High Output Versions Dimensional Drawings (continued)

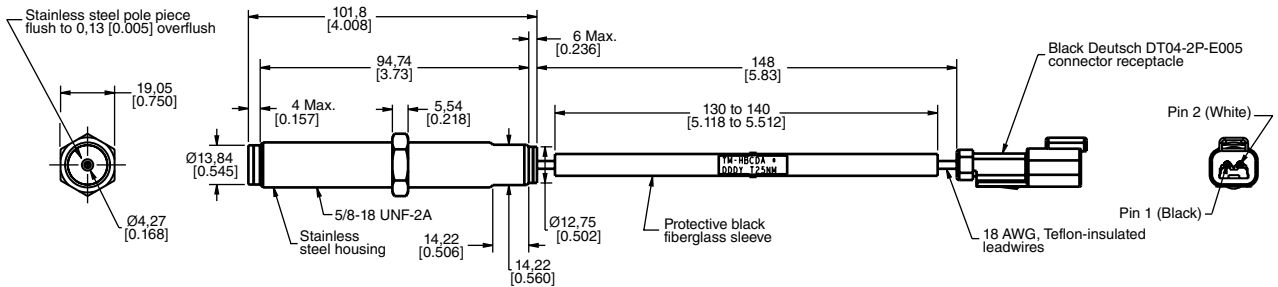
TM-HBADA



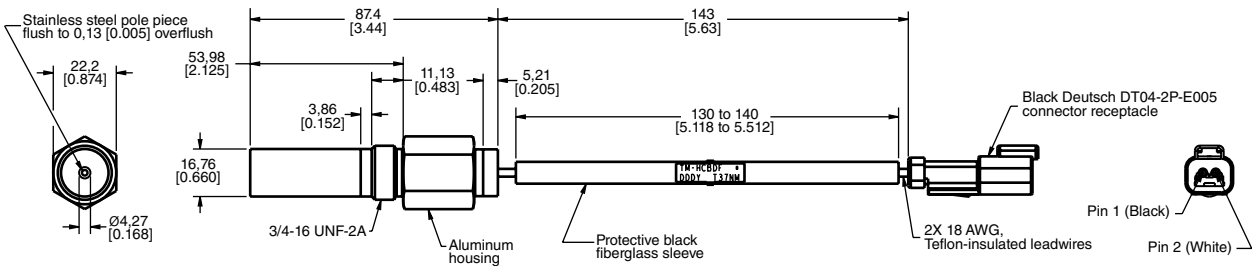
TM-HBADA-001



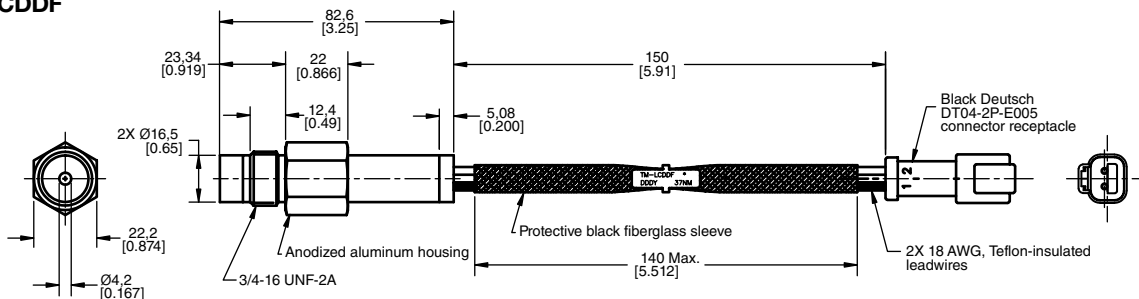
TM-HBCDA



TM-HBCDF



TM-HCDDF

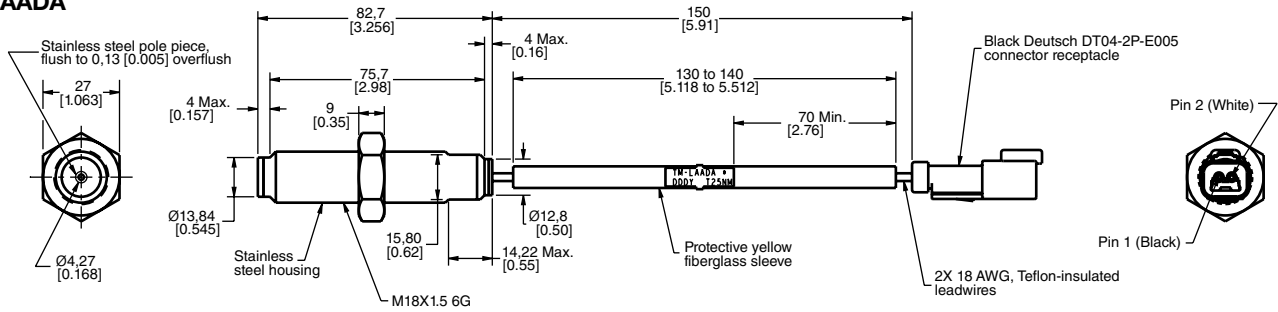


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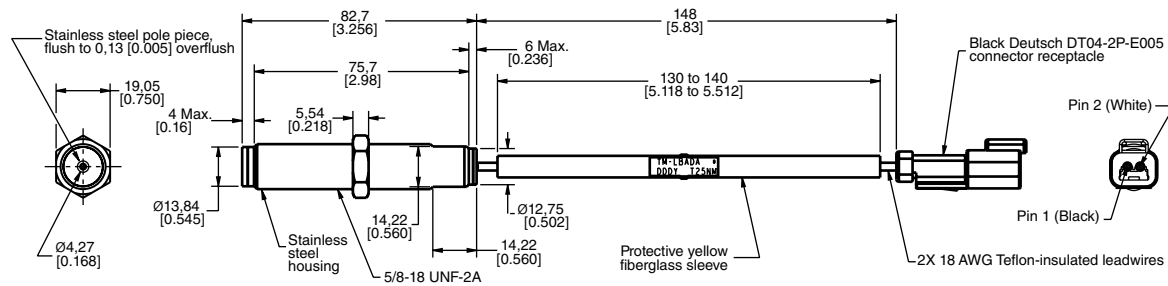
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Figure 3. Low Output Versions Dimensional Drawings (For reference only: mm [in.])

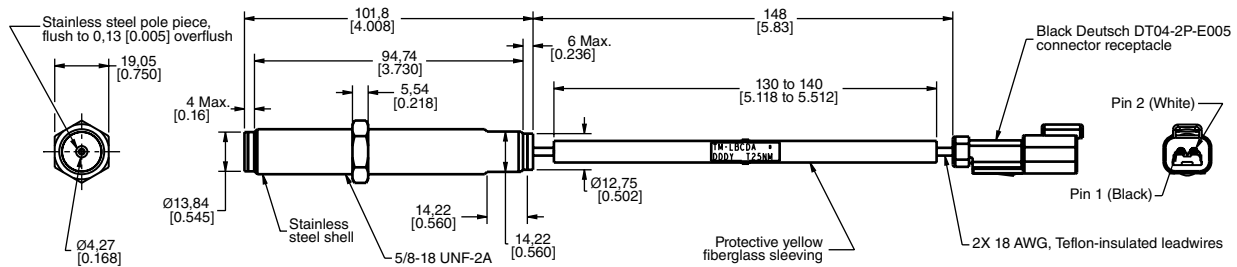
TM-LAADA



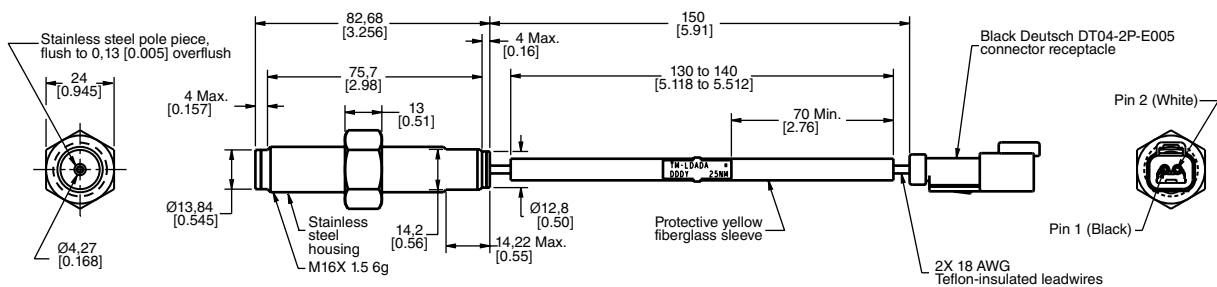
TM-LBADA



TM-LCBDA



TM-LDADA



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▲ WARNING **PERSONAL INJURY**

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

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International +1-815-235-6847; +1-815-235-6545 Fax

Sensing and Productivity Solutions
Honeywell
1985 Douglas Drive North
Golden Valley, MN 55422
honeywell.com

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