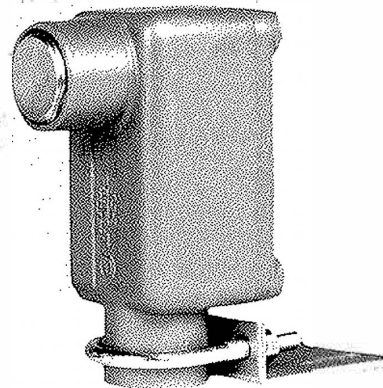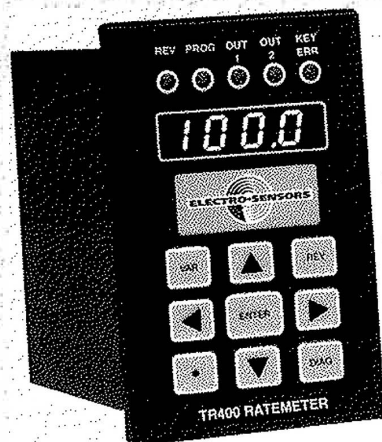# Speed Indicator

**ELECTRO·SENSORS** ## Model TR400-C

**Electro-Sensors, Inc. Ratemeter/Tachometer • TR400-C**

Sensor Installation:

The explosionproof sensor is supplied with a slotted mounting bracket. Sensors should be installed so the center line of the magnets pass in front of the center line of the sensor as the disc or wrap rotates. When using the pulser disc, the center line of the magnetized area of the disc, shown as Dimension B, in figure 1, is 1-3/4 inches from the center hole of the disc.

The gap distance between the sensor and the disc or wrap, Dimension A in the diagrams, is 3/8 inch ±1/8 inch. To achieve the proper gap distance, adjust the position of the explosionproof sensor, using the slots on the mounting bracket.
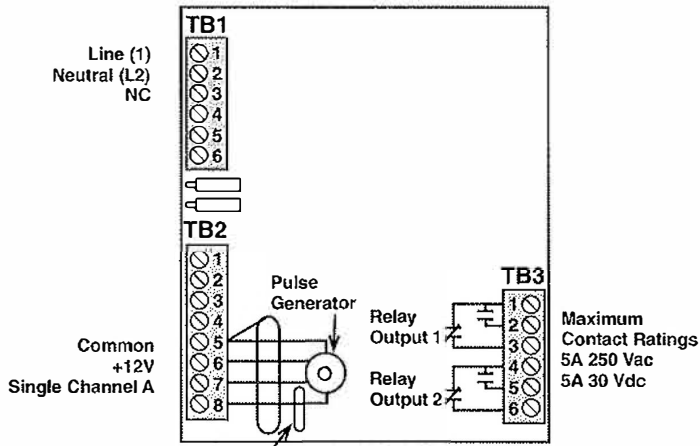
Explosionproof Sensor and Disc (Figure 1)
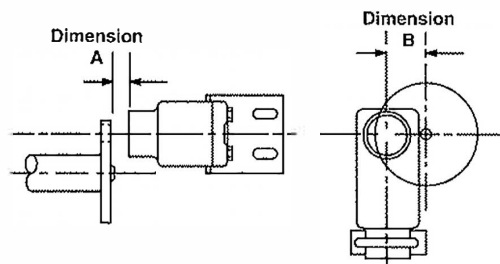
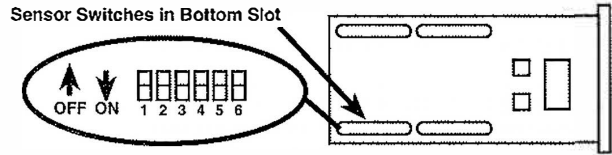**Explosionproof Sensor and Wrap (Figure 2)**

ELECTRO·SENSORS
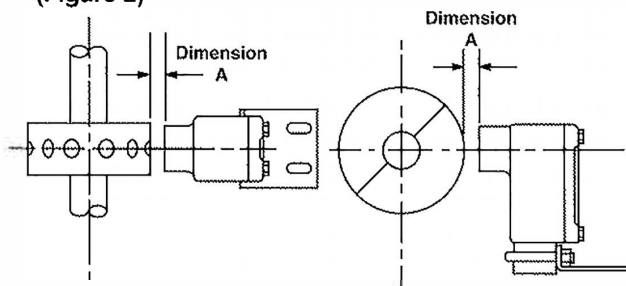
Wiring:

AC Power Supply: Line TB1-1, Neutral TB1-2

The TR400-C Standard uses 115 Vac 6 VA at 60/50 Hz with 230 Vac available as an option. External fusing must be provided by the customer. The recommended fuse is 1/16 amp slow-blow.

Relay Outputs:

Output 1-TB3 and Output 2–TB3 the TR400-C offers 2 Form C Relays. These relays are rated 250 Vac 5 A, and 30 Vdc 5 A resistive load.

Programming the Relay Outputs:

Relay Output Functions:

Each relay output has a set point value (Variables 07 and 10). This value is compared to the displayed value on the front panel and any action required is performed on the outputs.

Underspeed: De-energizes the output when the displayed value is below the set point value.

Relay Programming Variables:

	Output 1	Output 2
Set Point Value	Variable 07	Variable 10

Output Value: Enter the value at which the set point will de-energize. There is a 1% hysteresis for the value at which the output will re-energize (i.e. Underspeed Set Point at 100 rpm output will reset at 101 rpm, if On Time has expired).

Variable 02-PPR: Enter the pulses per revolution of the sensor on the monitored shaft. *Note: Electro-Sensors Model 907 Sensor with a Model 255 Disc will provide 8 PPR.*
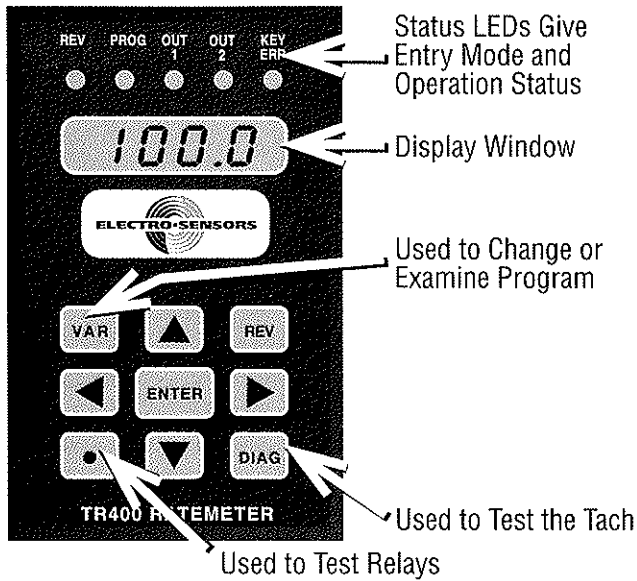
Sensor Connections:

Sensor Switches in Bottom Slot

Sensor Input Configuration Switches:

Input	Channel A TB2-7
Input Type	NPN
Switches On	5
Switches Off	4, 6

Terminal	Description	ESI 907	ESI 907 Old
TB2-6	Supply	Brown	Red
TB2-7	Signal A	Black	Black
TB2-5	Common	Blue & Shield	White & Shield

A Signal Input:
TB2-7 A Signal Input:

These inputs require a frequency input relative to speed. Devices such as Hall-Effect Sensors, encoders or magnetic pickups can all be used. Power for sensors is provided across TB2-6 (+12 Vdc) and TB2-5 (common). The maximum power draw available is 100 mA at an unregulated 12 Vdc. Wiring to these inputs should be shielded cable with the shield tied to TB2-5 only. Never use shielded cable with extra conductors. Extra conductors act as antennas picking up electrical noise. This is one of the most common reasons for electrical noise on the frequency input signals. The default switch selection settings comply with Electro-Sensors Inc. sensors.

Diagnostics:

The relays may be tested by pressing the "." decimal place button and holding it for 4 seconds. The relays will turn off as long as the button is held. Releasing the button will reinitialize the relays and include the start delay (Variable 6).

Status LEDs Give
Entry Mode and
Operation Status

Display Window

Used to Change or
Examine Program

Used to Test the Tach

Used to Test Relays

Entering Variables into the TR400-C:

To change a variable press the "VAR" key. The "PROG" LED will light, and the display will read "Pr" followed by the presently selected variable number. Press the "▲ or ▼" keys to change the value of the 1s location to the desired variable number. Then use the "◀" key to move to the 10s position and change the value to the desired variable number. Press the "ENTER" key and the selected variables value will be displayed, and the 1s location will flash in the display window. Press the "▲ or ▼" keys to change the value of the 1s location. Use the "◀▶" keys to move to the 10s, 100s, or 1000s position (the selected position will flash) and then use the "▲ or ▼" keys to change the value. Press the "ENTER" key to enter the new value. Pressing the "VAR" key without pressing "ENTER" will keep the old value and return the tachometer to the display mode.

Specifications:

Input Power	115 Vac, 6 VA, 1/16 amp External Fuse Recommended, 230 Vac Input Power Optional
Sensor Input	Switch Selectable
NPN Open Collector	2200 Ohm Pull Up to 12 Vdc, 2.5 Volt Trigger Level
Maximum Frequency	4000 Hz 4K Hz – 10 KHz Available Upon Request
Minimum Frequency	.01 Hz
Sensor Supply	12 Vdc Unregulated, 100 mA Max.

Operational:

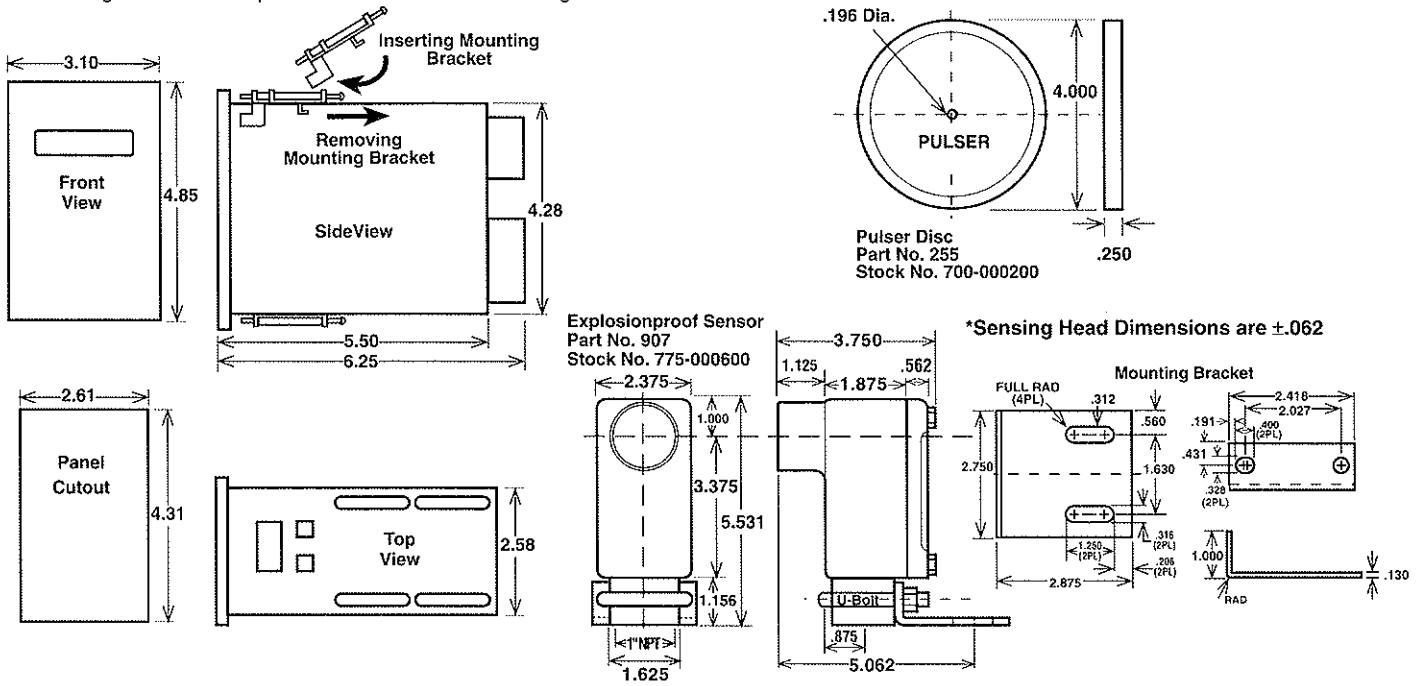|	
Accuracy	.01%
Response Time	Minimum .02 Seconds
Set Point Presets	2 Programmable as underspeed
Display Update Time	0.5 Second Update Time

Mechanical:

Enclosure	ABS Plastic 94V-0
Keypad	Polycarbonate Tactile Switch Pad, Chemical Resistant, Splash Proof
Display	4 digit .3 Inch Height, Seven Segment Displays, 5 Status LEDs
Operating Temperature	0°C to +50° C (+32° to +122° F)
Humidity	0% to 90% Non-Condensing

Specifications Subject to Change Without Notice.

TR400-C Dimensional Drawings:
Dimensions in Inches

Panel Cutout:
Remove mounting brackets. Slide the controller into the cutout. Replace the mounting bracket and replace the screws. Do not over-tighten.

Pulser Disc
Part No. 255
Stock No. 700-000200

Explosionproof Sensor
Part No. 907
Stock No. 775-000600

*Sensing Head Dimensions are ±.062

TR400-C Variable List:

	Variable Number	Variable Name	Default	Units	Factory Set Values
General Purpose	00	SECURITY MATCH CODE	400	any whole number	0400
	01	MAX RPM	0200	RPM	0200
	02	PPR	8	PPR	A/R
	03	DISPLAY UNITS	0200	User Defined	0200
	04	Rate Function	0000	Coded	0000
	05	Keypad Lockout	0011	Coded	0011
Optional Outputs	06	Start Delay Time	002.0	Seconds	002.0
	07	Output 1 Value	0150	Display Units	A/R
	08	Output 1 Delay Time	000.0	Seconds	000.0
	09	Output 1 On Time	002.0	Seconds	002.0
	10	Output 2 Value	0100	Display Units	A/R
	11	Output 2 Delay Time	000.0	Seconds	000.0
	12	Output 2 On Time	002.0	Seconds	002.0
	13	Output Function Selection	0011	Coded	0011
Opt Inputs	14	Input Function Selection	0000	Coded	0000
Opt Analog Out	15	Display Value at 4 mA	0	Display Units	0000
	16	Display Value at 20 mA	0200	Display Units	0200
	17	Range Selection	0200	X to 1	0200
	18	Display Update Interval	0.5	0.5 to 10.00 Seconds	000.5
	19	Analog Ramp Time	0.0	0.0 to 10.00 Seconds	000.0