TR5000

Description:
The TR5000 is a Full Logic Control Process ratemeter that can display up to three separate values of rate and compare them to programmable set points. Rates A & B can be programmed by the user for speed or time in process. Rate C allows the user to display a relationship between Rates A & B. This can be a Ratio (A/B), Sum (A+B), Difference (A-B), or Draw (A-B)/B. A Ratio is typically used in blending and mixing applications. The Sum and Difference are commonly used when the operator needs to display the combined output of two separate but related processes. Draw is commonly used in web handling systems, such as plastic or wire, to indicate the thickness or stretch of the material being processed.

Principle of Operation:
The TR5000 is supplied with a shaft mounted magnetic disc or optional pulser wrap, which generates 8 pulses per revolution with our standard non-contact sensor. The sensor transmits the speed as a digital pulse frequency to the TR5000 via a three conductor shielded cable. The TR5000, then compares this frequency signal to its programming and determines the appropriate set point output state and display value. The TR5000 features three transistor outputs that can be set within any of the three rates A, B, or C. These outputs can be programmed to latch (requiring a manual reset), or stay active only when the set point condition is present. The TR5000 set point delay allows the user to program how long the set point must be exceeded before the set point output activates.

Pulser Disc:
The end of the shaft to be monitored must be center drilled to a depth of 1/2 inch with a No. 21 drill, and tapped for 10-32 UNF. Apply Loctite® a similar adhesive on the screw threads to keep the pulser disc tight. Attach the disc, decal side out, with the 10-32 UNF machine screw and lock washer provided. Pulser Discs can be used with all Electro-Sensors, Inc. sensors.

Pulser Wrap (optional):
Pulser Wraps are custom manufactured to fit the specific diameter of the shaft on which they will be mounted. When the wrap is shipped, four Allen-Head cap screws hold the two halves of the wrap together. These screws must be removed so that the wrap is in two halves. Place the halves around the shaft, re-insert the screws and torque them to 5 foot-pounds. Pulser Wraps can be used with all Electro-Sensors, Inc. sensors.

Sensor Installation:
The standard sensor is supplied with a mounting bracket and two jam nuts. The explosionproof sensor is supplied with a slotted mounting bracket. Sensors should be installed so the center line of the magnets passes 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 figures 1 and 3, 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, can be 1/4 in. +/- 1/8 in.
To achieve the proper gap distance, adjust the jam nuts holding the standard sensor in the mounting bracket, or adjust the position of the explosionproof sensor, using the slots on the mounting bracket.

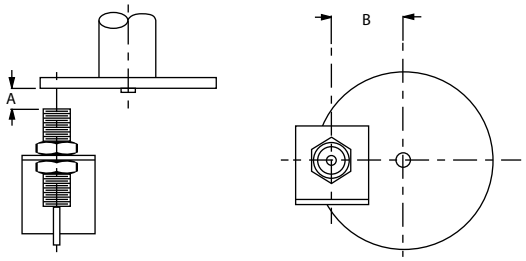

Figure 1: Standard 906 Sensor and Pulser Disc

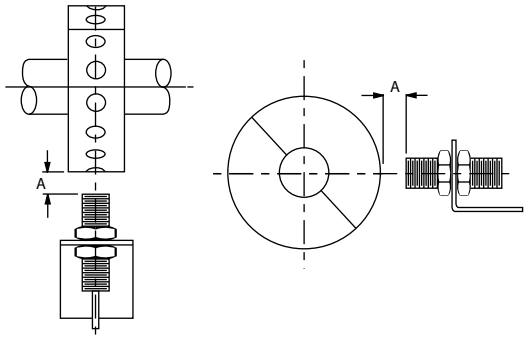

Figure 2: Standard 906 Sensor and Pulser Wrap

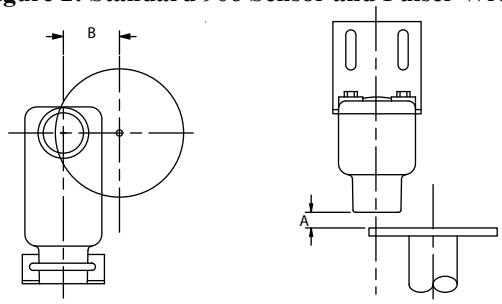

Figure 3: Explosion proof 907 Sensor and Pulser Disc

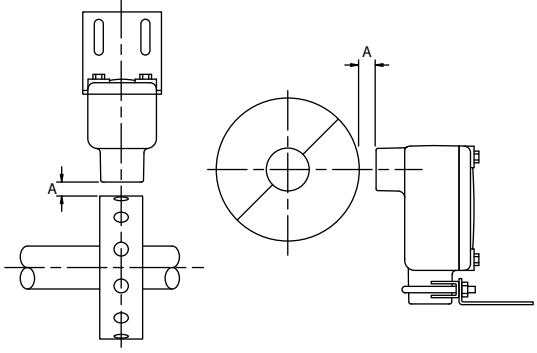

Figure 4: Explosion proof 907 Sensor and Pulser Wrap

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Introduction:
The TR5000 is a multi-purpose tachometer, featuring multiple display options and set point outputs. It can display as a time-based tach, ratio tach, time in process tach, summing tach, or subtracting tach. The three programmable outputs can be programmed to give an indication, or enable other machine functions based on the tachometer's logic.

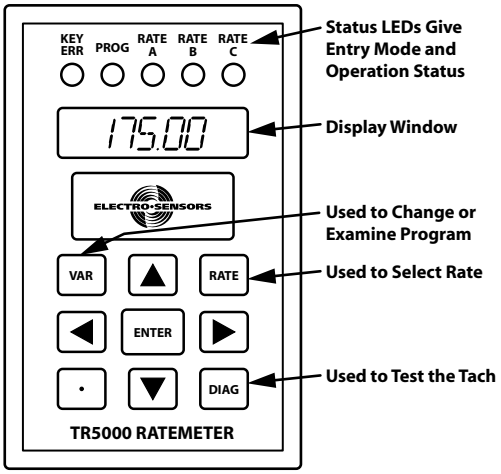


Figure 5: TR5000 Front View

Entering Variables into the TR5000:
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 of the desired number. Press the "ENTER" key and the selected variable's 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 "◀" or "▶" keys to move to the 10s, 100s, 1000s, or 10,000s position (the selected position will flash) and then use the "▲or▼" keys to change the value. If the entry is a negative number, the 10,000s position must be used to enter the minus sign.

The minus is found between the 0 and 9, while scrolling through the numbers. Only variables that allow a negative number will allow this. To add a decimal point, press the "●" key. The decimal point will scroll from right to left one digit each time the "●" key is pressed. Press the "ENTER" key to enter the new value. Pressing the "VAR" key without pressing "ENTER" will keep the old value and return the tach to the readout mode.

Note: The variables are protected by Variable 00 – Security Code. You may view variables, but cannot change them unless the correct security code is entered. See page 6, for the complete variable list.

Wiring the TR5000 Connections:
The Standard TR5000 uses 115Vac, 7 VA at 50/60 Hz with 230Vac available as an option. External fusing must be provided by the customer. The recommended fuse size is 1/16 amp slow-blow.

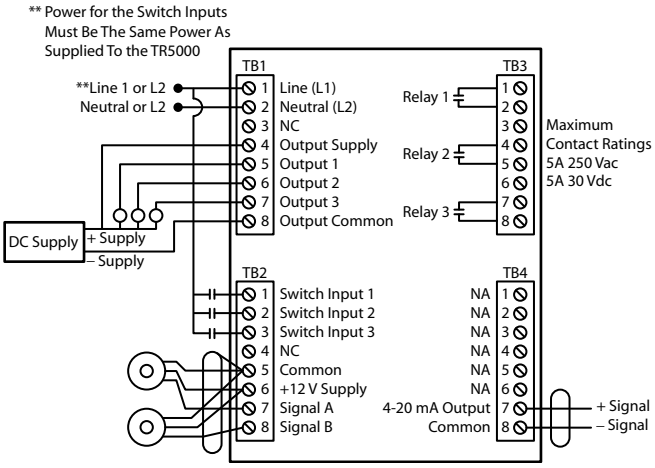


Figure 6: TR5000 Wiring Diagram

Panel Cutout: (See Dimensional Drawings page 6)
Remove mounting brackets. Slide the controller into the cutout. Replace the mounting bracket and replace the screws. Do not over-tighten.

AC Switch Inputs:
lnput **1** - TB2-1, lnput **2** --rB2-2, lnput 3 - TB2-3 are programmable inputs and are programmed by variable 22. They can be used to reset any of the outputs, freeze the display or select the rate, Inputs 1, 2 and 3 require AC voltage equal to the supply voltages. This voltage must be the same voltage as supplied to the Line (LI) Input. The opposite sides (non-terminalled) of these solid state inputs are tied to the Neutral (L2) Input.

A & B Signal Inputs:
TB2-7 - **A** Signal Input, TB2-8 - B 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 (+I2 VDC) and TB2-5 (Common). The maximum power draw available is 100mA at an unregulated 12Vdc. Wiring to these inputs should be done with shielded cable with the shield tied to TB2-5 only.
Note: Never use shielded cable with extra conductors. Extra conductors act as antennas that pick up electrical noise. This is one of the most common reasons for electrical noise on the frequency input signals.

Sensor Input Configuration Switches:
The default switch selection settings comply with Electro-Sensors, NPN type sensors.

Signal	Input Type	Switches ON	Switches OFF
A Signal TB2-7	NPN	7	5, 6, 8
	PNP	8	5, 6, 7
	Mag. Pickup 2 wire	5, 6	7, 8
	Logic Level	None	5, 6, 7, 8
B Signal TB2-8	NPN	3	1, 2, 4
	PNP	4	1, 2, 3
	Mag. Pickup 2-Wire	1, 2	3, 4
	Logic Level	None	1, 2, 3, 4

Sensor Input Configuration Switch Location:

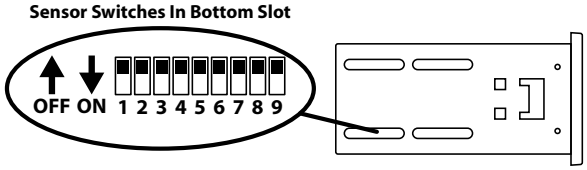


Figure 7: DIP-Switch Location

Primary Sensor (Channel A) Connection Table:

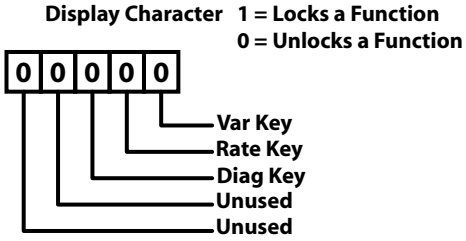
Terminal TB2	ESI 906	ESI 907 ESI Prox	All Other ESI Sensors	ESI 907 Old
5 Common	White & Shield	Blue & Shield	Black & Shield	White & Shield
6 Supply	Red	Brown	Red	Red
7 Signal A	Black	Black	White	Black

Secondary Sensor (Channel B) Connection Table:

Terminal TB2	ESI 906	ESI 907 ESI Prox	All Other ESI Sensors	ESI 907 Old
5 Common	White & Shield	Blue & Shield	Black & Shield	White & Shield
6 Supply	Red	Brown	Red	Red
8 Signal A	Black	Black	White	Black

Programming The TR5000:

Programming Security:



Variable 00 - Security Code: The security code must be entered in this variable before any variables can be changed. The functions which are locked out can be modified using Variable 10. To re-lock functions, change Variable 00 to any number other than the security code. The default value for the Security Code is 5000.

Variable 10 - Keypad Lockout:
This function selects the keys that are enabled or disabled when security is set.

Programming the Display:

Programming Rate A and Rate B:
The TR5000 has the ability to display two separate rate inputs. Rate A displays the A Signal Input, and Rate B displays the B Signal Input. The options for display also include displaying them as a Speed
(motion/time) or as a Time in Process Tach (time/motion) as programmed with variable 09. Variables 01 through 03 program Rate A, and variables 04 through 06 program Rate B.
Note: Electro-Sensors model 906 sensor with a model 255 disc provides 8 PPR.

Rate A:
Variable 01 - A Signal Maximum RPM: Enter the maximum speed in revolutions per minute of the monitored shaft.
Variable 02 - A Signal PPR: Enter the pulses per revolution of the sensor on the monitored shaft. 8 PPR is standard.
Variable 03 - A Signal Display Units: Enter the value to be displayed by the TR5000 when the monitored shaft is turning at the speed programmed in Variable 01. The placement of the decimal location will be fixed in the display mode by its placement in this variable.

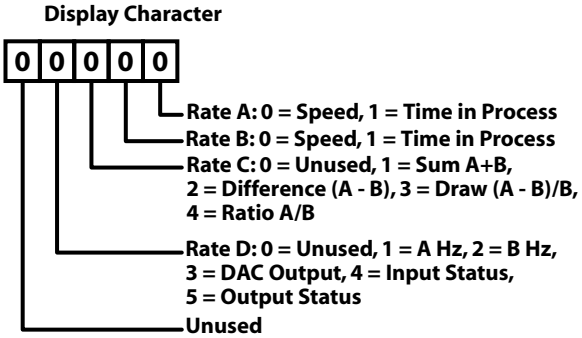
Rate B:
Variable 04 - B Signal Maximum RPM: Enter the maximum speed in revolutions per minute of the monitored shaft.

Variable 05 - B Signal PPR: Enter the pulses per revolution of the sensor on the monitored shaft. 8 PPR is standard.

Variable 06 - B Signal Display Units: Enter the value to be displayed by the TR5000 when the monitored shaft is turning at the speed programmed in Variable 04. The placement of the decimal location will be fixed in the display mode by its placement in this variable.

Types of Displays:

Programming the Display:



Variable 09 - Rate Function: Selects the type of display for rates A, B, C, and D.

Rates A & B Options: Speed: This is the most commonly selected display option. Speed is calculated by the formula (motion/time) = display. The examples of this type of display are RPM and FPM. Time in Process: The Time In Process display is the inverse of the speed display and is found by the formula (time/motion) = display.

Rate C Options:
Sum: A + B: This display option will add the values of the Rate A and Rate B and display the result. The Display Scaling Factor (Variable 08) will multiply this display. The decimal point location will be displayed based on Rate A's decimal place.

Difference: A – B: This display option will subtract Rate B from Rate A. It is possible to have a negative display value. The Display Scaling Factor (Variable 08) will multiply this display and controls the decimal point placement during the display.

Draw: (A - B)/B: This display option will give the percent of difference between the A and B rates. This display can be negative. The Display Scaling Factor (Variable 08) will multiply this display and control the decimal point placement in the display.

Ratio: A/B, This display option gives the ratio between Rates A and Rates B. It is not affected by the display scaling factor (Variable 07) but instead uses the Unity User Ratio. This is the value to be displayed when the ratio between Rates A and B is equal to the ratio between Variables 01 and 04.

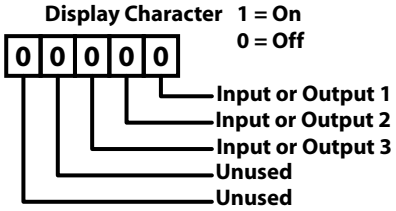
Rate D Options: These are diagnostic displays. The Rate C LED will flash when selected.

A lnput Hertz - Frequency of the A input signal.

B lnput Hertz - Frequency of the B input signal.

DAC Output - Present output value of the optional 4-20mA outputs in bits (0 to 4095).

Input Status - Status of the three digital inputs. 1 is ON, 0 is OFF.



Output Status - Status of the three digital outputs. 1 is energized, 0 is de-energized.

Variable 07 - User Unity Ratio: Rate C Only. This variable specifies the value to be displayed when rates A and B are operating at the speed relationship programmed into variables 01 and 04 (Signal at Maximum RPM). The placement of the decimal point in this variable will control the placement of the decimal point while displaying Rate C with the ratio function selected. This variable can be a negative number.

Variable 08 – Display Scaling Factor: Rate C only. This factor multiplies the result of the Rate C calculations. It will multiply the result of the Sum, Difference, or Draw function calculations, before displaying the new value. With the Difference of Draw functions, it will also specify where to place the decimal point while displaying the new value. This variable can be a negative number.

Display Enhancements:

Variable 27 - Global Frequency Cutoff: This variable sets the minimum frequency that the TR5000 will detect. It affects all sections of the TR5000: Display, Relay Operation, and Analog Output. The maximum is 050.00 and the minimum is 000.01 in Hz. The default is 0.1 Hz.

Variable 28 - Range Selection: The Range Selection can be set to values from 2 to 99999. The default setting is 500, which should be suitable for most applications. If the TR5000 display does not zero out as desired, decrease the range selection value which will decrease the time for the display to read zero (0), but will increase the minimum speed that will appear on the display.

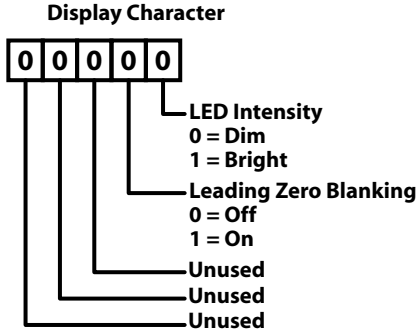
For example, when the TR5000 is programmed to read 1800 RPM maximum, it will read any speed under 3.6 RPM as zero (0); RPM formula (1800/500 = 3.6). This is used to prevent long update times before the display reads zero (0).

Variable 29 - Display Update Interval: The Display Update Interval enables the TR5000 to show speed averages for slow and unstable shafts. The minimum update interval is 0.5 seconds, and the maximum update interval is eight (8) seconds. The factory default is 0.5 seconds.

Variable 30 - Pulses to Average: Enter the desired number of pulses to average. Valid values are 0 to 16 pulses.

Variable 31 - Averaging Window: This is a window, expressed in percent, in which pulse averaging will be used. Deviations that are greater than the window will cause the TR5000 to switch to pulse to pulse output. Ideally setting a window of about 2% greater than the actual measured is desired. Valid values are 00005 to 00050. If during the course of operation the monitored speed exhibits jumping in the display or the analog output, the window may be set too low. The larger the window the slower the response is to a sudden change in speed. This is most noticeable at slower speeds.

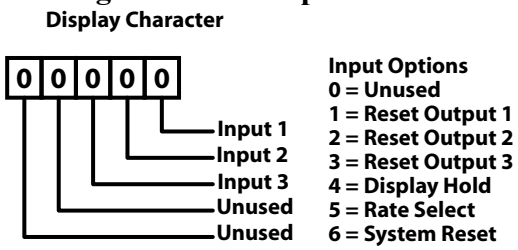
Variable 32 - Segment Intensity and Leading Zero Blanking: This variable configures how the display appears. The display appearance bit assignments are as shown below.



LED Intensity: - Makes the LED seven segments bright or dim to enhance the viewability based on ambient light.

Leading Zero Blanking - Makes the leading zeros visible or invisible.

Programming the Switch Inputs:



Variable 22 - input Switches Function Selection: Configures the function of the switch inputs to the TR5000

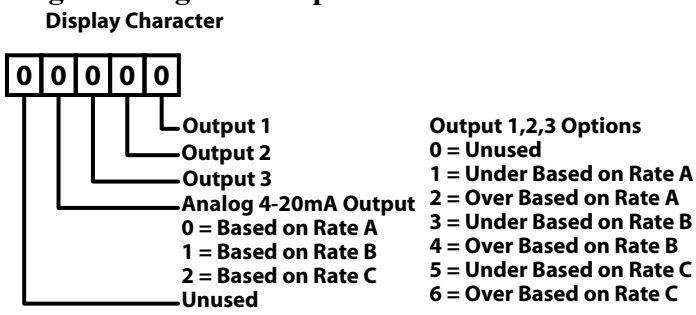
Reset Set Point Outputs 1, 2, and 3: When the input is activated, the set point output is reset. The output will remain energized until the switch is released. If the set point condition exists when the input is released, then your speed must exceed the set point (when detecting underspeed) before an underspeed condition can be detected.

Display Hold: Freezes the display. The analog output and set point outputs are unaffected by this switch.

Rate Select: Selects displayed rate. Each activation of the input changes the rate to be displayed to the next rate. If a rate is programmed as unused, the rate will not be selected. The order for selection is A, B, C then D. The TR5000 will remember which rate was displayed at “power down” and return to that rate on “power up.”

System Reset: Behaves like a fresh “power up” of the controller. All set point outputs are reset and go through a start delay before they will activate again.

Programming The Outputs:



Variable 21 - Output Function Selection: Selects the set point function of the transistor outputs, the factory optional relay and 4 to 20mA output. Underspeed de-energizes the output when the value is below the set point, and Overspeed de-energizes the output when the value is above the set point.

Programming Set Points for the Transistor and Relay Outputs: (the relay outputs are optional) The Set Point Outputs are numbered 1 through 3. Upon "power up," these outputs will energize. If after the programmed start delay, a set point condition is detected, the corresponding output will de-energize.

Variable 11 - Start Delay Time: Upon "power up" or an active system reset input, the alarms are held energized until this time period has expired. Enter the desired delay time in seconds. Valid times are 0.0 - 600.0 seconds.

Programming the Set Points:

	Output 1	Output 2	Output 3
Set Point Value	Variable 12	Variable 15	Variable 18
Delay Time	Variable 13	Variable 16	Variable 19
On Time	Variable 14	Variable 17	Variable 20

Set Point Value: Enter the set point value, based on the selected rate at which the output will de-energize. There is a 1% hysteresis for the value at which the output will reset. This variable can be negative.
Output Delay Time: Programs the amount of time the set point condition must exist, before the output will de-energize.

Output On Time: Programs the minimum time that the output will stay de-energized when a set point condition occurs. Set the On Time to 600.0 seconds for a Latching Output. A Latching Output must be cleared by a Reset lnput (see Programming Inputs) or a "power down."
Latching Set Point Outputs: Program the On Time Variable to 600.0 seconds, to make the output latch. This will hold the setpoint output in the de-energized state until a reset input clears the output.

Analog outputs:

Analog 4 to 20mA Output Programming*: (available as a factory option): The rate to be represented is selected in variable 21. The 4 to 20mA range is then specified with variable 23 and 24. The output is linear between the two specified values.

Variable 23 - Display value at 4mA: Enter the rate display value to be represented at 4mA output.

Variable 24 - Display Value at 20mA: Enter the rate display value to be represented at 20mA output.
Note: Both of the above variables can have negative values.

Variable 25 - The variable sets the response time of the TR5000's analog output from 0 to 100 percent. The TR5000 will limit how much the analog output can change as the input frequency changes, filtering the output. The minimum response time is "0.0," which corresponds to approximately 50 msec from 0 to 100 percent. The maximum response time is 10.0 which corresponds to (10) seconds. The default is "0.0."

Variable 26 - Analog Output Cutoff: This is used to set when the analog output goes to zero. It can be set from 0.0 to 10.0 percent. This is used to speed up the zeroing of the analog output to zero. An example of when you might want to use it is when you want an input calibration that starts around 0 Hz to 10 Hz but you don't want to wait for the analog output to zero out on the low end since it could take a fair amount of time. If you are not concerned with the lowest 5% to zero. In this scenario the unit will be linear from 0 - 10 Hz, the only exception is the notch on the lowest 5%. Midscale on the input will equal midscale on the output. This is used primarily on shafts that are slow so they can change a zeroing time from 10's of seconds to 1 or 2 seconds. It has no effect on the relays. If you want to zero everything faster then Variable 27 Global Frequency Cutoff can be used.

**Note: 0-10VDC also available as a factory option. Variable 23 would represent the value at 0 VDC and variable 24 would represent the value at 10 VDC.*

Diagnostics:

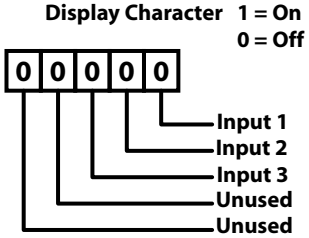
When the “DIAG” key is pressed the TR5000 will display “dlAg” and all the LEDs except the “KEY ERR” LED will light. The LEDs will remain on until the Diagnostic Mode has been exited.

Memory and Variable Reset: Hold the “DIAG” key while “powering up” the TR5000. This will reset the memory and all variables to the factory default settings.

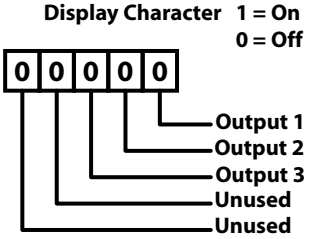
Reset Variables: To set the variables back to the factory default settings, press the “DIAG” key, then the “RATE key and the “ENTER” key twice.

Keypad and Display Test: Press the “DIAG” key, then the “VAR” key to enter. This diagnostic will display 11111 through 88888 as the keys are pressed from left to right, going from top to bottom. Example: “Var” key displays 11111, “▲” key displays 22222. “SETPT” key displays 33333, etc.

Input Switch Test: To enter the input switch test, press the “DIAG” key, then the “▲” key. This diagnostic will display the status of the three AC inputs. When an input is energized, the corresponding display character will be a 1. When an input is off, the corresponding display character will be a 0.



Relay and Transistor Output Test: To enter the output test, press the “DIAG” key, then the “▶” key. The right most characters will display the status of outputs 1, 2, and 3. To change the status of outputs 1, 2, or 3, use the “▶” key to turn on output 1, then the “▲” key to turn on output 2, and the “◀” will turn on output 3. Pressing the “ENTER key will turn off all outputs.



Rate D - Diagnostic Displays: This diagnostic can be used to read the A and B signal frequencies, and the status of all inputs and outputs. See Rate D Options (page 4) for more information.

Security Code Change: This diagnostic will change the value that must be entered into Variable 00 to access the locked out functions. Press the “DIAG” key, then the “◀” key. The TR5000 will display the present security code number. The value can now be changed with the same method used to change variable values.

IMPORTANT: Make sure to record this value, because the control functions cannot be accessed until the new code is entered into variable 00.

4 to 20mA Output Test: Press the “DIAG” key, and then press the “▼” key, this will put the TR5000 in Digital Pot Output Mode. The control will display 000%. Press the “▲” key to increase the output, and the “▼” key to decrease the output.

Troubleshooting:

Clearing the LRC Code: LRC on the display is due to the nonvolatile memory corruption. This is typically caused by a large power disturbance. Normally all that is necessary is that the unit will have to be reset, and the values in the variables re-entered. This can be done by holding the “DIAG” key while the power to the unit is off, and continue holding the “diAg’ key while the power to the unit is restored. The unit will say “RESE”. When the “RESE” is displayed the “DIAG” key should be released. It should now no longer display the LRC and you should be free to reprogram at this time. A second method is you can press the “DIAG” key after powering unit up making the unit display “DIAG” then press the “Count Reset” key, and then the “Enter” key twice.

Listing of TR5000 Variables:

Var	Variable Name	Description	Default	Units	New Value
00	Security Match Code	This is where you enter your security PIN to unlock the selected keys.	5000	Any whole number	
01	A Signal Max RPM	Maximum speed of the “A” channel	1800	RPM	
02	A Signal PPR	“A” channel pulses per revolution.	8	PPR	
03	A Signal Display Units	What the “A” display should read when running at the speed in variable 01.	1800	User Defined	
04	B Signal Max RPM	Maximum speed of the “B” channel.	1800	RPM	
05	B Signal PPR	“B” channel pulses per revolution.	8	PPR	
06	B Signal Display Units	What the “B” display should read when running at the speed in variable 04. For RPMs variable 04 and 06 are the same.	1800	User Defined	
07	User Unity Ratio	Specifies the value to display in rate “C” when at the rates programmed in rate “A” and “B.”	1.000	1= A/B	
08	Display Scaling Factor	Scaling factor for rate “C”	1.00	Multiplier of Rate C	
09	Rate Function	Determines what is displayed for the various rates.	1400	Coded	
10	Keypad Lockout	This is where you specify what keys are to be locked.	0101	Coded	
11	Start Delay Time	Time the relays are to energize unconditionally at start up.	1.0	Seconds	
12	Output 1 Value	Setpoint for relay number 1. Value is entered in user units	1500	Display Units	
13	Output 1 delay time	Amount of time the output condition with relay 1 must exist before responding to it.	1.0	Seconds	
14	Output 1 On Time	Minimum time relay 1 is to remain de-energized once set-point condition occurs.	1.0	Seconds	
15	Output 2 Value	Setpoint for relay number 2. Value is entered in user units	1000	Display Units	
16	Output 2 Delay Time	Amount of time the output condition with relay 2 must exist before responding to it.	1.0	Seconds	
17	Output 2 On Time	Minimum time relay 2 is to remain de-energized once set-point condition occurs.	1.0	Seconds	
18	Output 3 Value	Setpoint for relay number 3. Value is entered in user units	500	Display Units	
19	Output 3 Delay Time	Amount of time the output condition with relay 3 must exist before responding to it.	1.0	Seconds	
20	Output 3 On Time	Minimum time relay 3 is to remain de-energized once set-point condition occurs.	1.0	Seconds	
21	Output Function Selection	This is where you specify what input represent value is used for which relay.	0642	Coded	
22	Input Switch Function Select	This programs how the switch inputs operate.	321	Coded	
23	Display Value at 4mA	4mA setpoint for units with analog output. 0 VDC setpoint for units with DC output.	0	Display Units	
24	Display Value at 20mA	20mA setpoint for units with analog output. 10 VDC setpoint for units with DC output.	1800	Display Units	
25	Analog Output Response Time	The response time of the analog output time in seconds to change from 0% to 100% of output.	00.0		
26	Analog Output Cutoff %	The percent of full scale where the analog cuts off to zero output.	00.0	Percent	
27	Frequency Cutoff	Global minimum frequency that the TR5000 will read. The value is in Hertz.	000.10	Hz	
28	Range Selection	The time it takes the display to zero out.	500	X to 1	

29	Display Unit Interval	The time in seconds for the display to update	0.5	Seconds	
30	Pulses to Average	The number of pulses to average to smooth out the display and analog	0	Pulses	
31	Averaging Window	Sets the window in which the pulses will be averaged. Exceeding it makes it operate pulse to pulse.	10	Percent	
32	Display Features	Leading zero blanking and bright/dim display	00011	Coded	

TR5000 Dimensional Drawings:

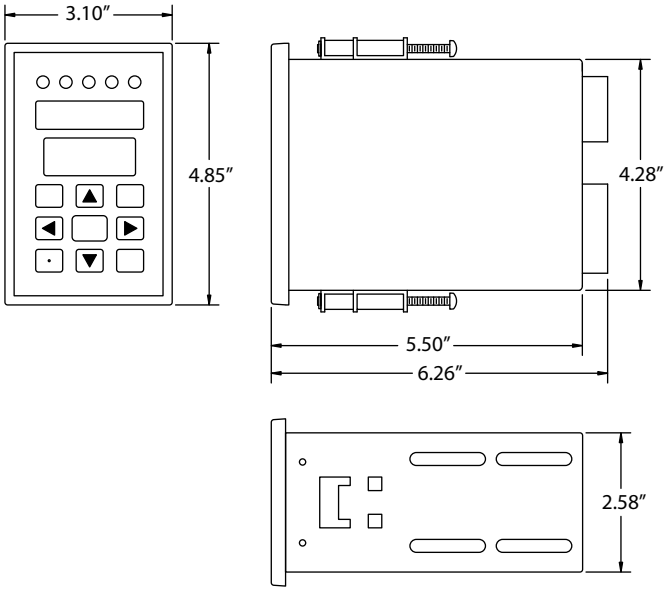


Figure 8: TR5000 Dimensions

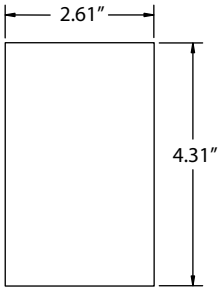


Figure 9: Panel Cutout

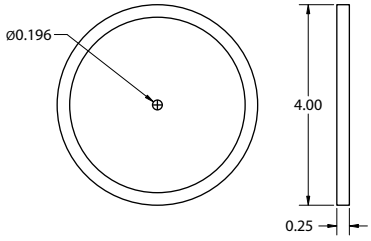


Figure 10: 255 Pulser Disc

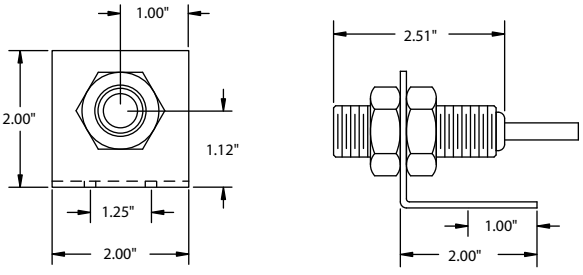


Figure 11: Standard 906 Sensing Head

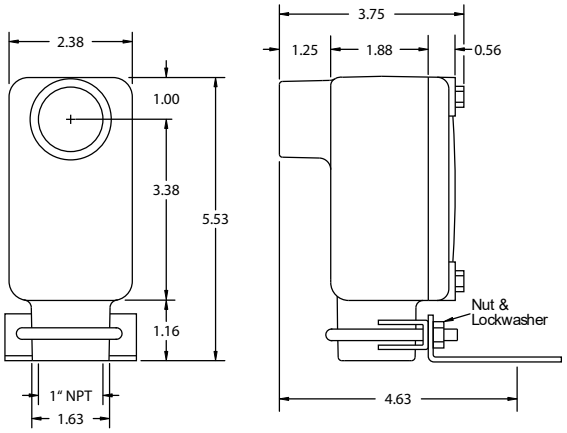


Figure 12: Optional Explosionproof 907 Sensor

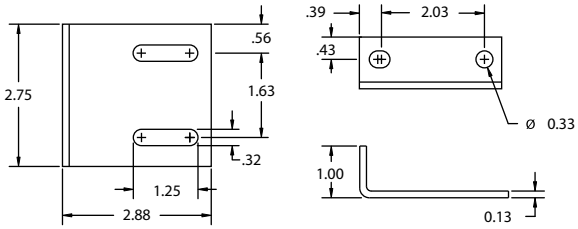


Figure 13: Explosionproof Sensor Bracket

Specifications:

Input Power	Parameters
Standard AC	115Vac, 6 VA @ 50/60 Hz
Recommended Fuse	1/16 Amp Slo-Blo
Optional AC	230Vac, 6 VA @ 50/60 Hz
Recommended Fuse	1/32 Amp Slo-Blo
Optional DC	10-30Vdc
Recommended Fuse	2 Amp Slo-Blo

Input Signal	Parameters
Transducer Input	Switch Selectable
NPN Open Collector	2200 Ohm Pull Up to 12Vdc 2.5 Volt trigger level
PNP Open Collector	2200 Ohm Pull Down 2.5 Volt trigger level
Logic Level	2.5 Volt trigger level
Magnetic Pickup	150mv Peak to Peak Minimum signal, 50mv trigger level
Max. Frequency	20,000 Hz
Min. Frequency	0.10 Hz (Programmable)
Transducer Supply	12Vdc Unregulated, 100mA Max

External Control I/O:

Input/Output	Parameters
Standard Inputs	3 Programmable Switch Inputs
Standard Set Point Outputs	3 Programmable, Open Collector Transistors, 30Vdc 150mA Max.
Optional Set Point Outputs	3 Programmable N.O. Contacts
Rating	250Vac 5A, 30Vdc 5A Resistive Load
Optional Analog Output	1 Programmable 4-20mA Output 12 Bits
Analog Output Accuracy	0.1% of Full Scale Reading

Operational:

Set Point Data	Parameters
Accuracy	0.01%
Response Time	Minimum 0.02 Seconds
Control Range	Default 500 to 1 (Can be programmed as high as 10,000 to 1 or lower)
Modes of Operation	Time In Process, Ratio, Sum, Difference, Draw
Set Point Presets	3 Programmable as Over or Under of Rate A, B, or C
Display Update Time	0.5 Seconds (Programmable)

Mechanical:

Physical/Enviroment	Parameters
Enclosure	ABS Plastic 94V-0
Keypad	Polycarbonite Tactile Switch Pad, Chemical Resistant, Splash Proof
Display	5 Digit, 0.3 Inch Height, Seven Segment Displays, 5 Status LEDs
Operating Temperature	0°C - 50°C (32°F - 122” F)
Humidity	0% - 90% Non-Condensing

906 Sensor	Parameters
Body Material	Aluminium
Bracket Material	Steel
Thread Size	3/4 - 16 UNF
Output Type	Open Collector, Current Sinking 20 Ma Max
Signal Cable	3 - Conductor Shielded 10 ft. supplied std.
Max Cable Length	1500 Ft.
Operating Temperature	-40°C to +60°C
Air Gap	1/4 in. +/- 1/8 in. with standard 255 Pulser disc (1/2” magnets)

907 Explosionproof Sensor (optional)	Parameters **
c UL us LISTED	Class I, Div 1, Group D Class II, Div 1, Groups E, F, G UL File: E249019 CE
Mounting Bracket Material	Plate Steel U-Bolt Assembly
Other Specifications	Similar to 906 standard sensor

Pulser Disc	Parameters
Material	Nylon 12 Std. Aluminum Optional
Operating Temperature	-40°C to +60°C
Maximum Speed	Consult Factory

Pulser Wrap	Parameters
Material	Consult Factory
Operating Temperature	-40°C to +60°C
Maximum Speed	Consult Factory

Specifications Subject to Change Without Notice.