



105 Bonnie Drive
Butler, PA 16002
724-283-4681
724-283-5939 (fax)
www.bwieagle.com

PRODUCT INFORMATION BULLETIN

I.S. OPTIMA 2 Intrinsically Safe, Dual Channel Critical Speed Switch System MODEL 11-8102

DESCRIPTION

The model 11-8102 is one in a series of intrinsically safe critical speed switch systems that monitor speed and detect motion in all types of machinery and apparatus. The 11-8102 monitors speed ranges of 60 - 800 RPMs. Consisting of a panel mounted PC Board and Zener Barriers, the I.S. OPTIMA 2 is shipped complete with two non-contacting I.S. proximity sensors that may be remotely located up to one mile from the control unit. Ideal for conveyors, crushers, fans, motors and other rotating apparatus.

INSTALLATION

DISCONNECT AC Power before proceeding with instructions.

1. Mount the OPTIMA 2 control unit in a certified enclosure or fresh air.
2. Make the following connections:
 - A. Connect power cable to 120 VAC.
 - B. Connect control cables to proper terminals in the motor control circuit.
 - C. Connect EAGLE I.S. PROX SENSORS to the proper terminals on the Zener Barriers.
3. Install sensors at rollers. See sensor installation sheet.

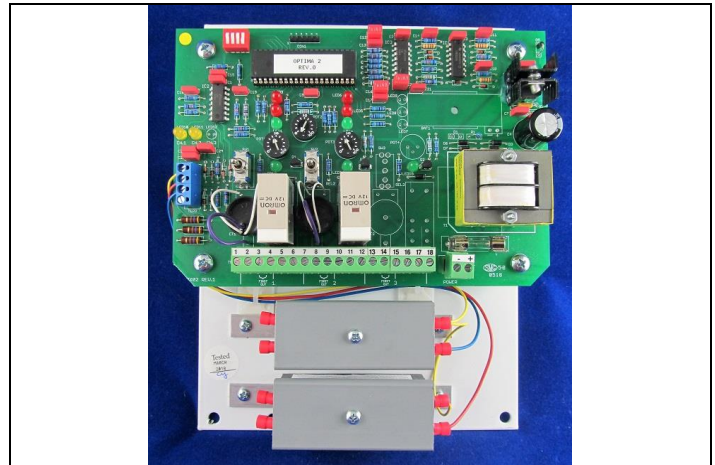
SET-UP AND TESTING

Final calibration should be performed with the belt loaded and running at normal speed.

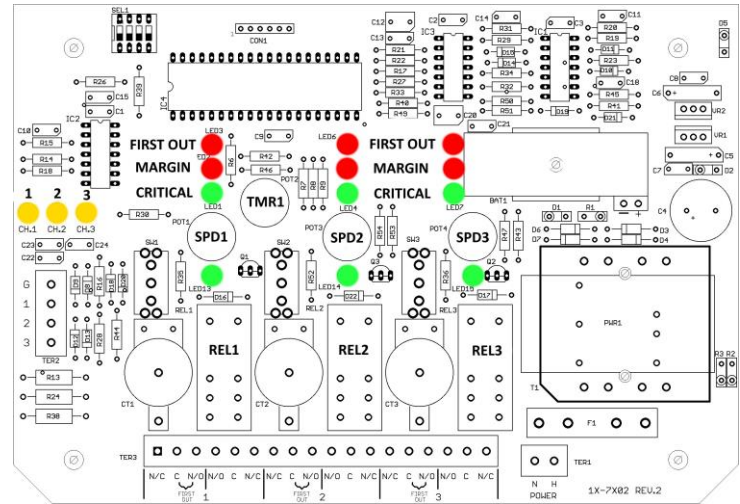
1. Turn SPEED ADJUST potentiometer (SPD1) CCW until it stops (approximately 7 o'clock).
2. Hold SW1 switch in SET* position to energize relay.
3. Turn SPEED ADJUST pot CW SLOWLY until CRITICAL SPEED LED stays on continuously.
4. Continue turning SPEED ADJUST pot CW until MARGIN LED begins to blink. **
5. After RELAY LED is illuminated, return switch to RUN position.
6. There is a "safety delay" built into all EAGLE units. This delay leaves the control relay un-energized for 2.5 seconds after critical speed has been achieved to prevent false machinery actuation during maintenance or assembly. For the Eagle 3, channel 1 is adjustable from 0 - 10 seconds using TMR1.
7. Return switch to RUN position.
8. A momentary TEST* position is provided to simulate the loss of sensor signal which releases the control relay.
9. Repeat steps 1 through 8 using the appropriate channel potentiometer (SPD) and test/set switch (SW) for remaining sensor adjustments.

* TEST position is up and SET position is down

** Using the above calibration, the control relay will drop out at a machinery slowdown of approximately 15%. For a 20% MARGIN, adjust the SPEED ADJUST control so that the MARGIN LED just comes on steady. For a 10% MARGIN, adjust the SPEED ADJUST control CCW so that the MARGIN LED has just gone out.



CONTROLS AND INDICATORS



SENSOR LEDs (CH1, CH2, CH3)	Sensor LEDs blink when targets are seen by corresponding sensor
CRITICAL LEDs	Critical speed LEDs illuminate when target speed is => setpoint. These LEDs must be on continuously for control relay to energize
MARGIN LEDs	Indicates percentage of slip (slow down) the channel is calibrated for (Off = 10%; Blinking = 15%; Solid = 20%)
FIRST OUT LEDs	Indicates that the channel shut down due to speed going below set point. If the LED is off then something external caused the belt to shut off (OPTIMA mode ONLY)
RELAY LEDs (LED13, LED14, LED15)	Illuminates when corresponding control relay is energized
SPD1, SPD2, SPD3	Speed adjust potentiometer for channels 1, 2 & 3 respectively
TMR1	Channel 1 relay on-delay potentiometer Adjustable from 0 - 10 seconds (Eagle 3 only)

Note - Not all models will have the controls & indicators shown above

I.S. OPTIMA 2

Intrinsically Safe, Dual Channel Critical Speed Switch System

MODEL 11-8102

FIRST OUT OPERATION

The EAGLE OPTIMA "First Out" capability enables the user to visually see (by an LED indicator) if the slip switch relay contacts were the first to open. Once the belt is running and the control relay in the OPTIMA unit has energized, the First-Out indication (if activated) will extinguish. If the belt begins to slip and the OPTIMA unit shuts the drive down, the First-Out LED will illuminate. This LED will stay lit until the belt is restarted and the control relay in the Optima has energized. If R1, R2, or R3 (See TYPICAL BELT STARTER) would open, this would shut the drive down and also the slip switch contacts would open. But, the First-Out LED would not be illuminated. This would allow the user to see that the slip switch relay contacts were not the first to open and cause the shutdown.

DIP SWITCH SETTINGS

Speed Setting	SW1	SW2	SW3
60-800 RPM (default)	OPEN	OPEN	Reserved for future use
6-60 RPM (ALS6) *	CLOSED	OPEN	
15-100 RPM (ALS15) *	OPEN	CLOSED	
25-200 RPM (ALS25) *	CLOSED	CLOSED	
* Proximity Sensor Required for Proper Operation			

Eagle/Optima Settings		
	OPEN	CLOSED
SW4	Eagle Unit	Optima Unit

EAGLE/OPTIMA SETTINGS

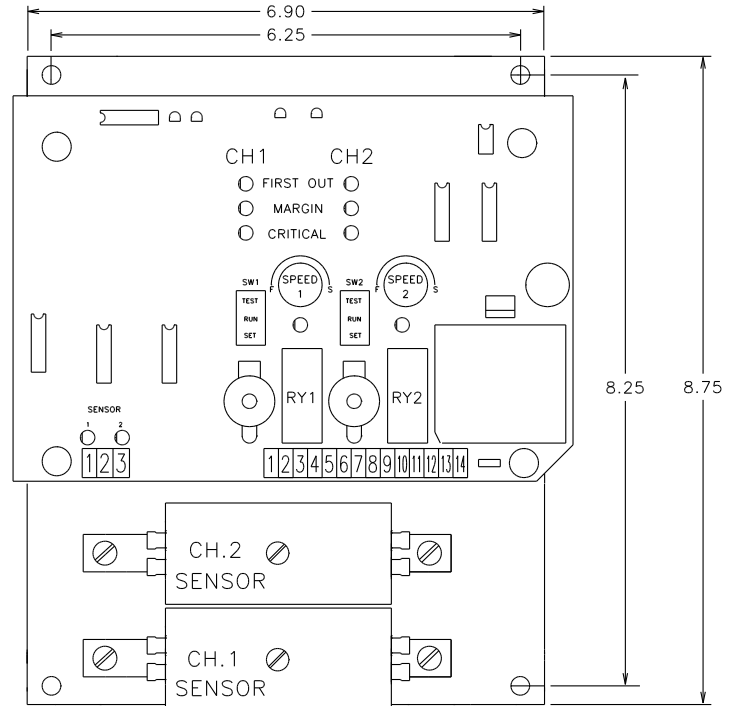
If switch 4 is open, then the unit is set to operate as a standard Eagle unit. The First Out LED will not operate in this mode. If switch 4 is closed, then the unit is set to operate as an Optima unit. In this mode the external control circuit should be wired through the set of contacts labelled "First Out" on the wiring chart. If the speed drops below the set point that was calibrated during setup, then the relay will turn off and the First Out LED will illuminate. If an external action caused the belt to shut down (i.e. pull cord, loose wire, external shutoff) then the First Out LED will be off when the relay opens.

TERMINAL STRIP WIRING

TER3					
CHANNEL 1		CHANNEL 2		CHANNEL 3	
1	N/C	7	N/C	13	Not Used
2	C (FIRST OUT)	8	C (FIRST OUT)	14	Not Used
3	N/O (FIRST OUT)	9	N/O (FIRST OUT)	15	Not Used
4	N/O	10	N/O	16	Not Used
5	C	11	C	17	Not Used
6	N/C	12	N/C	18	Not Used

TER1	
120VAC	
1	120VAC Neutral
2	120VAC Hot

DIMENSIONS



SPECIFICATIONS

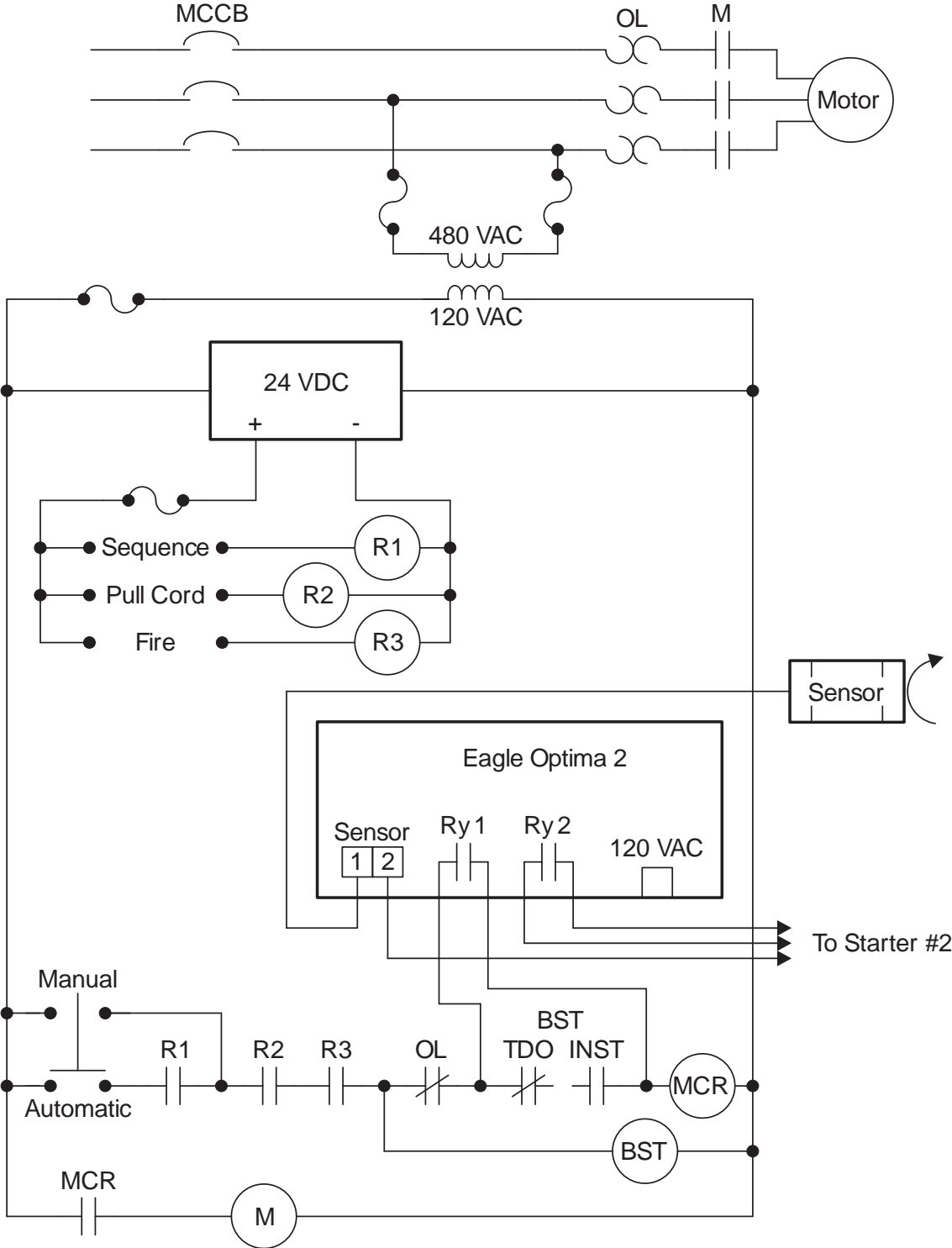
AC Input	120 VAC 15 W
Fuse Protected	1 amp
Operating Temperature	-40°C - +60°C (-40° - +140°F)
Speed Range	60 - 800 RPM
Relay Contacts	DP/DT 5 amp @ 120 VAC
First-Out AC Current Range	17mA – 5 amps
Safety Delay – Ch.1 & 2	2.5 Seconds
Response Time	1 Second or Less
Enclosure	Panel Mounted

REPLACEMENT AND OPTIONAL PARTS

P.C. Board	11-7102P
I.S. Threaded PVC Proximity Sensor	10-7039-50
I.S. Zener Barrier	10-7072

I.S. OPTIMA 2
I.S. Dual Channel Critical Speed Switch
MODEL 11-8102

TYPICAL BELT STARTER





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PRODUCT INFORMATION BULLETIN

I.S. PROX SENSOR Intrinsically Safe Inductive Proximity Type MODEL 10-7039

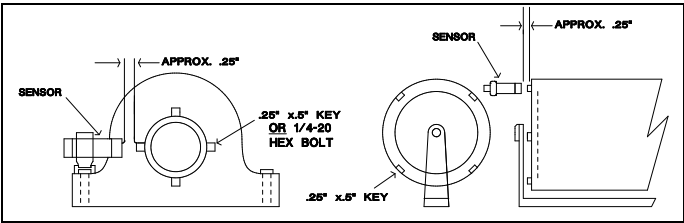
APPROVALS

MSHA - IA444-1
PA - BISC 121-94

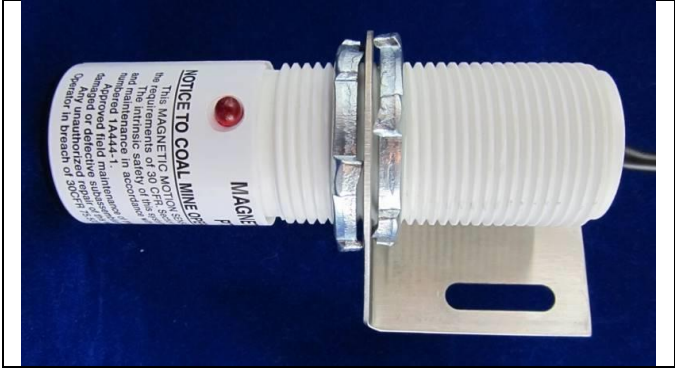
INSTALLATION

- Select the roller or shaft to be monitored. If a roller is to be monitored, be sure it is always contacting the belt.
- Affix a target on the roller or shaft. The target should be a piece of key-stock, 1/4-20 Hex Nut, etc. (Figure 1) **NOTE:** The use of a notch or a dent is not an acceptable target for the prox sensor. This sensor must see the presence of a target, not an absence of a target as there would be with a notch or dent.
- Mount sensor firmly with hose clamps or U-bolts to prevent it from moving or working loose. Tape is NOT recommended as a fastener.
- Before tightening, check that the target passes through the center area of the sensor face. This will produce the greatest sensitivity and sensing distance. With the roller or shaft spinning, move the sensor toward the target. The LED on the sensor should blink in direct proportion to the speed of the shaft or roller. Effective distance between the sensor and target is approximately .1 inch to .5 inch depending on the size of the target.

FIGURE 1



Note: When mounting sensor on small idler rollers (less than 6 inches in diameter), install a maximum of 2 targets

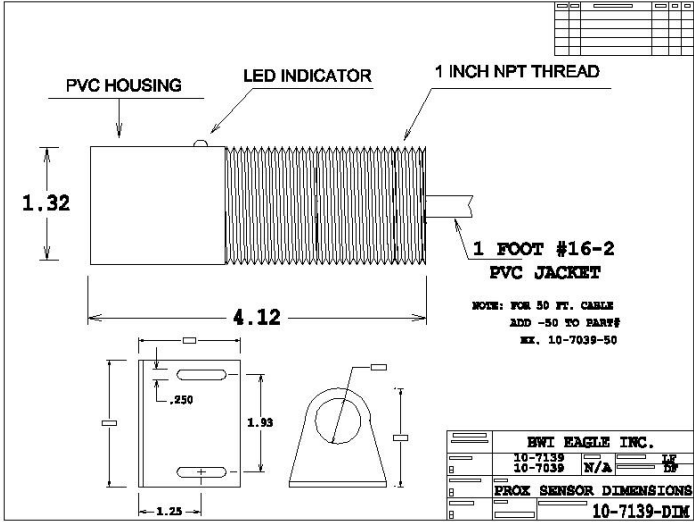


SPECIFICATIONS

Dimensions	4.12 in. x 1.32 in. O.D.
Sensor Type	Inductive Proximity (Metal)
Housing / Mounting	Threaded PVC / Conduit or Bracket Mounting
Sensor Power Requirement	Current Limited 12VDC from Zener Barrier
Unit Sensor Cable	Unshielded** Twisted Pair 16/2 - 3 Ft. Pigtail
Distance	Sensor to Control Unit - 1 Mile
Sensing Speed Range	Less than 1 RPM to 6000 RPM

**NOTE - Shielded cable is recommended for all above ground applications. The shield of the cable should be attached to earth ground within 2 feet of the sensor head. In severe noise environments, grounding the shield at the control module also, will eliminate any E.M.I. interference.

DIMENSIONS



BWI EAGLE INC.	
10-7139	16
10-7039	N/A
PROX SENSOR DIMENSIONS	
10-7139-DIM	

I.S. ZENER BARRIER

Intrinsically Safe Zener Barrier

MODEL 10-7072

APPROVAL

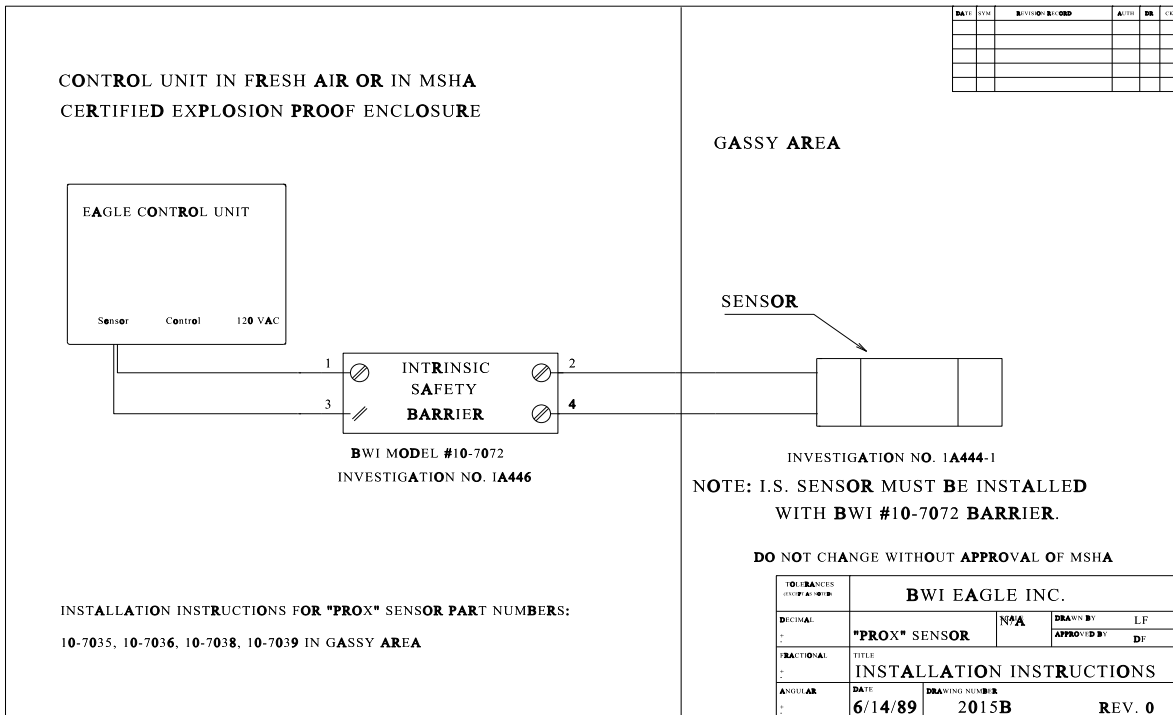
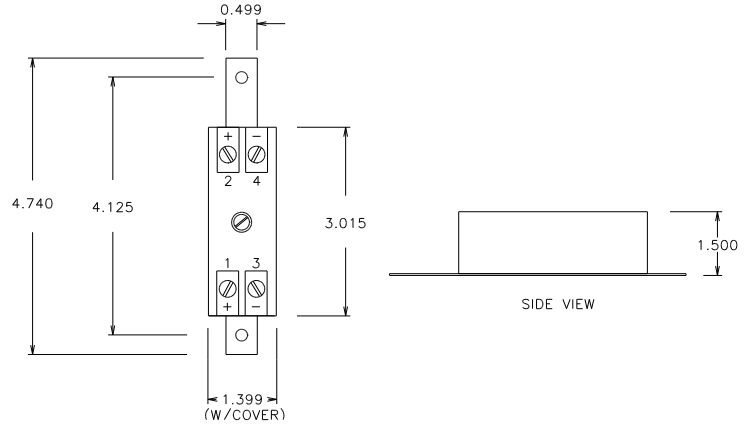
MSHA - IA446-0

INSTALLATION

When installing a Zener Barrier to the control unit, the polarity of the wiring from the control unit to the barrier input **MUST BE OBSERVED.**

Terminal	Description
1	Input from control unit (+) positive
3	Input from control unit (-) common
2	Output to I.S. Sensor (no polarity)
4	Output to I.S. Sensor (no polarity)

DIMENSIONS



DOCUMENT DATE: 8/21/19 / PRODUCT REV. 0



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