## EAGLE 2
### Dual Channel Critical Speed Switch
## MODEL 11-7000
**PA BOTE APPROVAL: 1084-89**

## DESCRIPTION

The EAGLE 2, Model 11-7000 monitors speed and detects motion in all types of rotating electrical apparatus. Two independent channels allow a variety of control functions to meet virtually any application requirement for under-speed or zero speed detection from 6 RPM up to 800 RPM. Its rugged NEMA enclosure is well-suited to meet the environmental challenges of any industry. Ideal for conveyors, crushers, fans, motors and other rotating apparatus.

## INSTALLATION

DISCONNECT AC Power before proceeding with instructions.

1. Mount the EAGLE 2 control unit in a convenient location.
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 VR SENSOR cables to the sensor connectors on the control unit.
3. Install sensors at rollers. See sensor installation sheet.

## SETUP 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
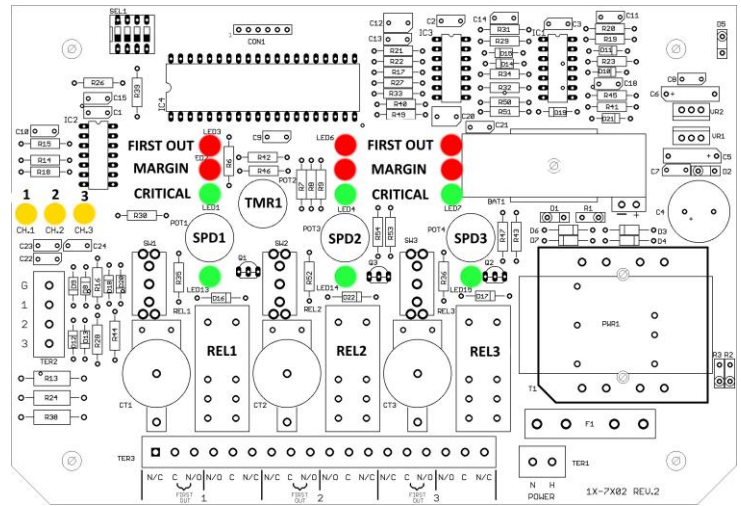


| | |
|---|---|
| SENSOR LEDs (CH1, CH2, CH3) | Sensor LEDs blink when targets are seen by corresponding sensor |
| CRITICAL LEDs | Critical speed LEDs illuminate when target speed is => setpoint. These LEDs must be on continuously for control relay to energize |
| MARGIN LEDs | Indicates percentage 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

## 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
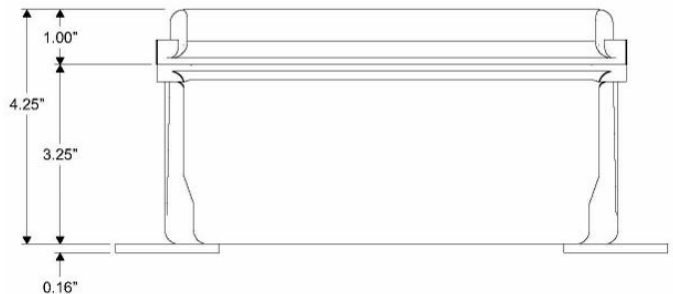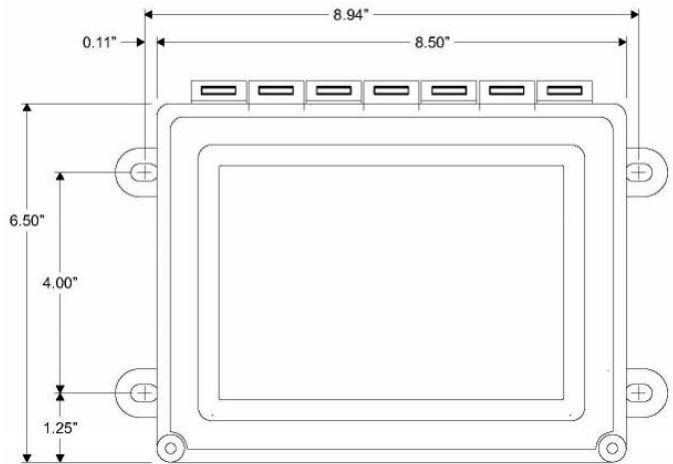


## SPECIFICATIONS

| | |
|---|---|
| AC Input | 120 VAC 15 W |
| Fuse Protected | 1 amp |
| Operating Temperature | -40ºC - +60ºC (-40º - +140ºF) |
| 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 | Hinged fiberglass with window / NEMA 4, IP66 |

## REPLACEMENT AND OPTIONAL PARTS

| | |
|---|---|
| P.C. Board | 11-7002 |
| Variable Reluctance Sensor | 10-7003 |
| Relay | 99-REL-0001 |
| Strain Relief (Power Input) | 99-CON-0011 |
| Strain Relief (Control) | 99-CON-0012 |

**TYPICAL BELT STARTER**