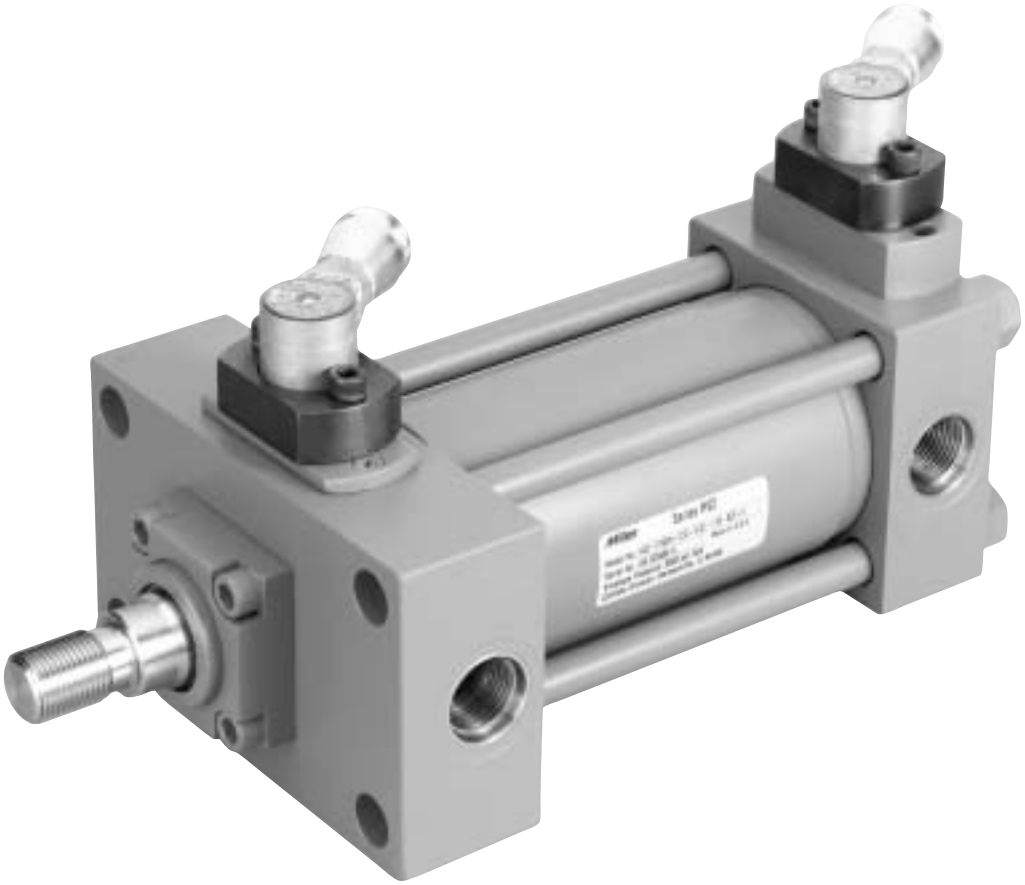
# Cylinder End-of-Stroke Switches

## For Miller Series AV, AVN, JV, HV2, & MHP Cylinders

## INNOVATIONS

### Step Up to the Next Level

*Bulletin M0840-B11*
*Effective: November, 2002*

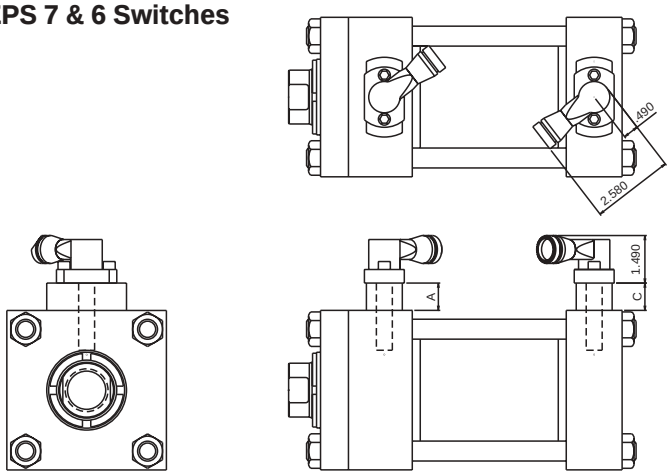


**"EPS" Style Inductive Sensors**
**For General Industrial AC and DC Applications**

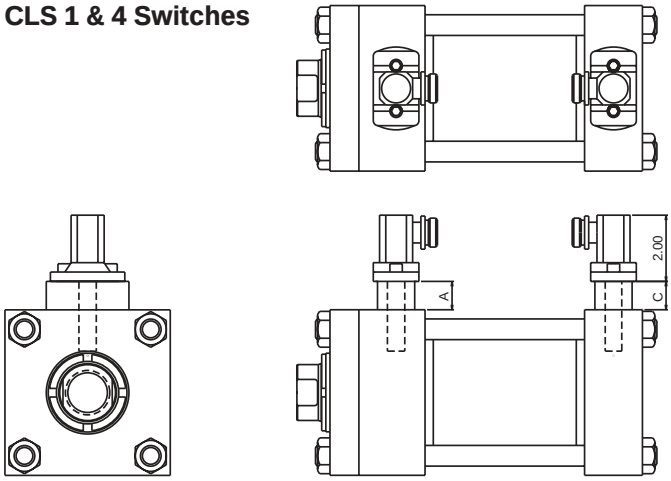
**"CLS" Style Magnetic Sensors**
**For Extreme Temperature Applications**

**All Sensors Are:**
**Non-Contacting**
**Water Resistant**
**Weld-Field Immune**
**Shock and Vibration Resistant**
**Flange-Mounted to Cylinder End Caps**

### EPS 7 & 6 Switches

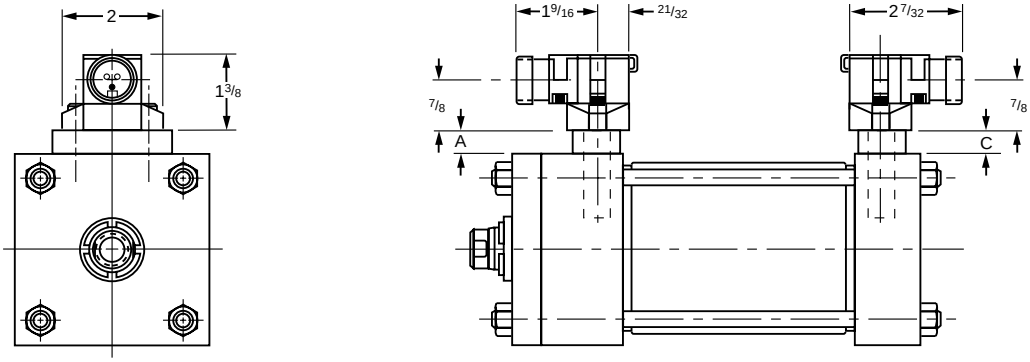



### CLS 1 & 4 Switches




### EPS 5
### Automotive Applications

(Meets some Automotive Manufacturer's Specifications)




## Series and Parallel Wiring

When Miller EPS-5, 6 or 7 proximity switches are used as inputs to programmable controllers the preferred practice is to connect each switch to a separate input channel of the PC. Series or parallel operations may then be accomplished by the internal PC programming.

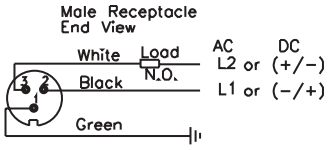
Miller EPS-5, 6 or 7 switches may be hard wired for series operation, but the voltage drop through the switches (see specifications) must not reduce the available voltage below what is needed to actuate the load.

Miller EPS-5, 6 or 7 switches may also be hard wired for parallel operation. However, the leakage current of each switch will pass through the load. The total of all leakage currents must not exceed the current required to actuate the load. In most cases, the use of two or more EPS-5, 6 or 7 switches in parallel will require the use of a bypass (shunt) resistor.

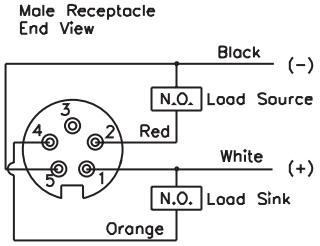
| Series | A max. | C max. |
|---|---|---|
| HV2 | .86" | 1.75" |
| JV | 1.55" | 1.05" |
| AV | 1.55" | 1.30" |
| MHP | 1.19" | 1.05" |
| For exact dimensions, see Bulletin M0840-G-E1 | | |

### Connector Pin Numbering

**3-Pin Mini**




**5-Pin Mini**



| Specifications | | | | | |
|---|---|---|---|---|---|
| **Style:** | **EPS-7** | **EPS-5** | **EPS-6** | **CLS-1** | **CLS-4** |
| **Code Designator:** | H | R | D | F | B |
| **Description:** | Economical, General Purpose, 2 wire device, primarily for AC applications, not suitable for 24 VDC applications. Use EPS-5 only for automotive industry customers who specify them. | | Economical, General Purpose, 3 wire, DC sensor, dual output: sinking and sourcing | For applications where NC contacts, zero leakage, zero voltage drop, higher or lower load current than EPS-style are required. | For High Temperature applications, or where NC contacts, zero leakage, zero voltage drop, higher or lower load current than EPS-style are required. |
| **Supply Voltage:** | 20 to 250 VAC/DC | 20 to 230 VAC/DC | 10 to 30 VDC | 24 to 240 VAC/DC | 24 to 240 VAC/DC |
| **Load Current, min:** | 8 mA | 5 mA | NA | NA | NA |
| **Load Current, max:** | 300 mA | 500 mA | 200 mA | 4 AMPS @ 120 VAC<br>3 AMPS @ 24 VDC | 4 AMPS @ 120 VAC<br>3 AMPS @ 24 VDC |
| **Leakage Current:** | 1.7 mA, max. | 1.7 mA, max. | 10 micro amps max. | - | - |
| **Voltage Drop:** | 7 V, max. | 10 V, max | 2 VDC max. | NA | NA |
| **Operating Temperature:** | -14° to +158° F | -4° to +158° F | -14° to +158° F | -40°F to +221° F | -40° F to +400° F |
| **Sensor Type:** | Inductive proximity | Inductive proximity | Inductive proximity | Non-contacting magnetically actuated | Non-contacting magnetically actuated |
| **Part Number:** | 148897**** | 146617**** | 148896**** | 148275**** | 149109**** |
| **Part Number Suffix **** :** | **** 4-digit suffix indicates probe length: 0125=1.25", 0206=2.06", 0288=2.875", 0456=4.562" | | | | |
| **Connection:** | 3 pin mini | 3 pin mini | 5 pin mini | 3 pin mini | 144" PTFE Coated Flying Leads with 1/2" conduit hub |
| **Enclosure Rating:** | IEC IP67 | NEMA 4, 6, 12, 13 | IEC IP67 | NEMA 1, 2, 3, 4, 4x, 5, 6, 6P, 11, 12, 12K, 13 | NEMA 1, 2, 3, 4, 4x, 5 |
| **LED indication:** | Yes | Yes | Yes | No | No |
| **Short Circuit Protection:** | Yes | Yes | Yes | No | No |
| **Weld Field Immunity:** | Yes | Yes | Yes | Yes | Yes |
| **Output:** | 2 wire, Normally Open with leakage current | 2 wire, Normally Open with leakage current | Dual output: DC Sinking and DC Sourcing, user selectable via wiring | SPDT (Single Pole Double Throw), Normally Open/Normally Closed, Form C | SPDT (Single Pole Double Throw), Normally Open/Normally Closed, Form C |
| **Approvals/ Marks:** | CE, UL, CSA | UL | CE, UL, CSA | UL or CSA | UL or CSA |
| **Make/ Break Location** | 0.125" from end of stroke, typical. Tolerance is 0/-.125" | | | | |
| **Wiring Instructions:** | Pin 1: AC Ground (Green)<br>Pin 2: Output (Black)<br>Pin 3: AC Line (White) | Pin 1: AC Ground (Green)<br>Pin 2: Output (Black)<br>Pin 3: AC Line (White) | Pin 1) +10 to 30 VDC (White)<br>Pin 2) Sourcing Output (Red)<br>Pin 3) Grounded (not connected or required)<br>Pin 4) Sinking Output (Orange)<br>Pin 5) DC Common (Black) | Pin 1: Common (Green)<br>Pin 2: Normally Closed (Black)<br>Pin 3: Normally Open (White) | Common: (Black)<br>Normally Open: (Blue)<br>Normally Closed: (Red) |
| **Cable: 6'** | 085355-0006 | 085355-0006 | 085917-0006 | 085355-0006 | - |
| **Cable: 12'** | 085355-0012 | 085355-0012 | 085917-0012 | 085355-0012 | - |
| **Cable: 6', Right Angle** | 087547-0006 | 087547-0006 | - | 087547-0006 | - |

Miller EPS proximity switches may be ordered on Series AV, AVN, JV, HV2 and MHP cylinders as follows:

1) Complete the basic cylinder model number.

2) Place a “9” in the model number to denote switches and/or special features.

3) Models 65, 66, 67, 73, 81, or 82 should be used with caution because of possible mounting interferences. Consult bulletin M0840-G-E1 for additional information.

4) Special modifications to cylinders other than switches must have a written description.

## Basic Cylinder Model Numbers

**How To Order** Example: AV-74B2B-00400-00800-0138 N11-9

| AV | 74 | B | 2 | B- | 004.00- | 008.00- | 01.38 | N | 1 | 1- | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Series** | **Mounting Style** | **Bushing** | **Rod End Style** | **Cushions** | **Bore Dia.** | **Stroke** | **Rod Dia.** | **Port Type** | **Port Location** | | **Modified** |
| AV<br>AVN<br>(N=Non-Lube)<br>JV<br>HV2<br>MHP | | B=<br>Bolted<br>Bushing<br>R=<br>Retainer<br>Held<br>Bushing | 2<br>(Standard)<br>4<br>5<br>X<br>(Special) | R=<br>Rod End<br>Cushioned<br>C=<br>Cap End<br>Cushioned<br>B=<br>Both Ends<br>Cushioned<br>N=<br>Non-<br>Cushioned | | | | N=<br>NPTF<br>S=<br>S.A.E. | See Figure 1 | | 0=<br>Standard<br>9=<br>Modified |

## How to Specify EPS Switches

5) Specify letter prefix “H” for EPS-7, “D” for EPS-6, and “F” for CLS-1, or “B” for CLS-4, then fill in the four blanks specifying port location, switch orientation and actuation point for both head and cap. If only one switch is used, place “XXXX” in the unused blanks.

Example = H13CGG-XXXX denotes a switch on the head end only, EPS-7

Example = BXXXX-42BGG denotes a switch on the cap end only, CLS-4

**Head End**

| R | 1 | 3 | A | GG |
|---|---|---|---|---|
| Specify:<br>“H” = EPS-7<br>“D” = EPS-6<br>“F”= CLS-1<br>“B”= CLS-4<br>“R” = EPS-5<br>“N” = Prepared for switches only | Port Location See Figure 1. | Switch Location See Figure 1. | Switch Orientation See Figure 2 for EPS-7 and EPS-6 only. | Actuation Point<br>GG = End of Stroke<br>FF = Stroke to Go;<br>See Bulletins M0840-G-E1 for stroke remaining. |

**Cap End**

| 4 | 2 | B | GG |
|---|---|---|---|
| Port Location See Figure 1. | Switch Location See Figure 1. | Switch Orientation* See Figure 2 for EPS-7 and EPS-6 only. | Actuation Point<br>GG = End of Stroke<br>FF = Stroke to Go;<br>See Bulletins M0840-G-E1 for stroke remaining. |

Note: All specified switch and port locations are as seen from rod end of cylinder.
*EPS-5 switches will be oriented so that the connectors face each other.

**Figure 1**

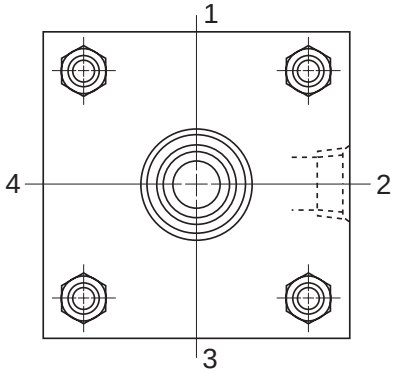



**Figure 2**