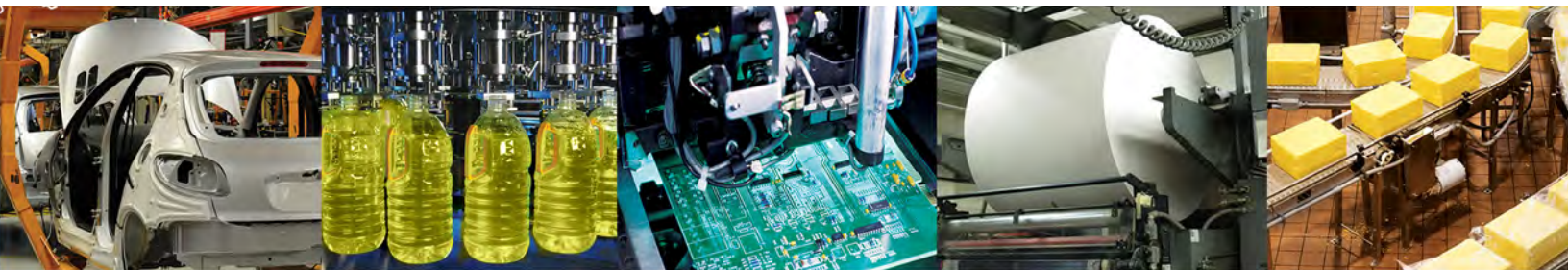
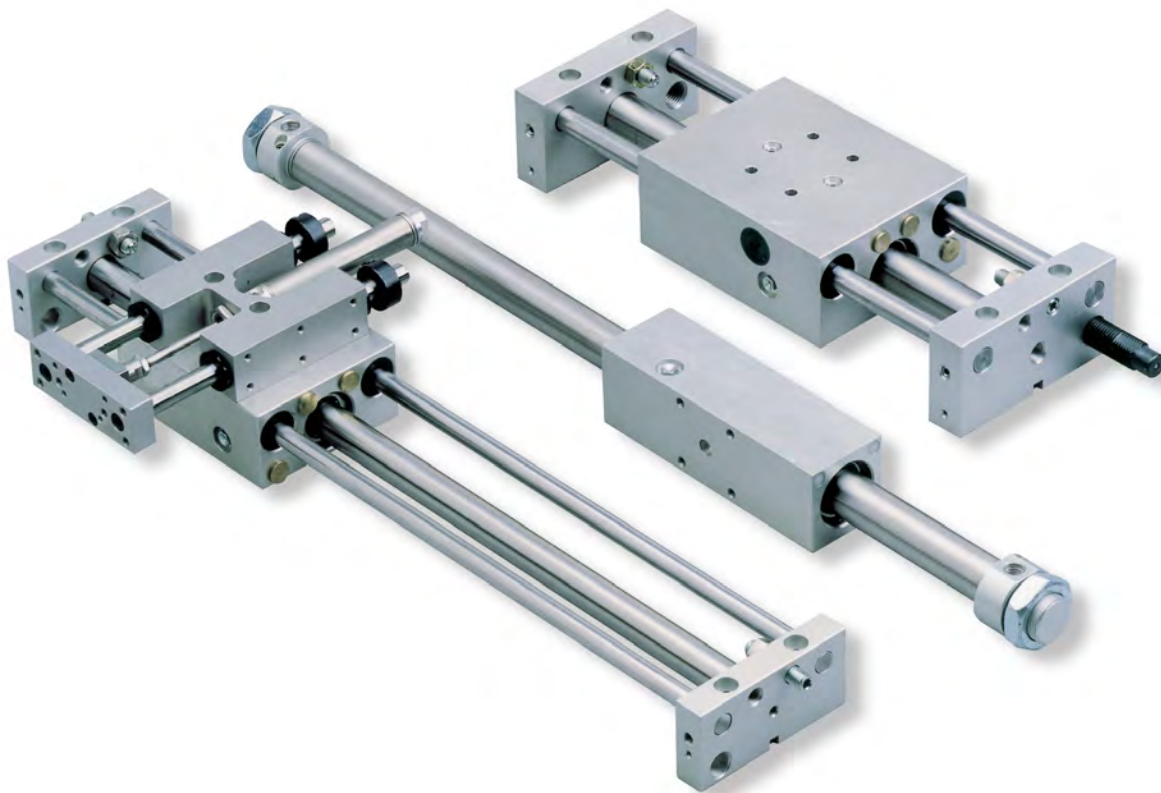


# MCR Series

Magnetically Coupled Rodless Cylinders



## MCR Series

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Magnetically Coupled Rodless Cylinders

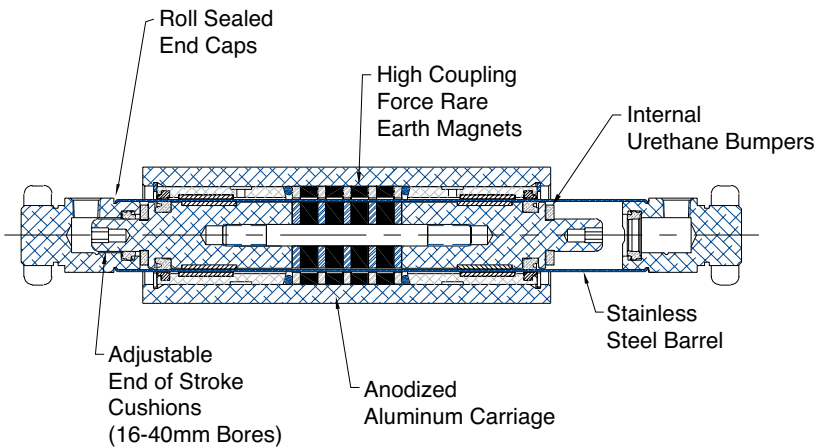
MC1 & MC2 Standard Carriage Series

- 50% Space Savings Over Conventional Cylinders
- Two Magnet Coupling Strength Options
- 6 Bore Sizes
- 304 Stainless Steel Barrel
- Compressed Air or Low Pressure Hydraulic Service
- Rare Earth Magnets for Greater Coupling Forces



MC3, MC4 & MC5 Externally Guided Series

- Higher Load Capacity
- Non-Rotating Linear Travel
- NuMate™ Interface Capabilities for Multi Axis Motions
- Stroke Adjustment Kits
- Precision Linear Ball Bearings
- Position Sensing Switches



Magnetically Coupled Rodless Cylinders

| Specifications             |                                                                                       |
|----------------------------|---------------------------------------------------------------------------------------|
| Bore                       | 12 16 20 25 32 40                                                                     |
| Series                     | Standard and Guided Carriages                                                         |
| Working Pressure:          | Up to 7 Bar / 100 PSIG                                                                |
| Ambient Temperature Range: | -20° to +60° C (-4° to +140° F)                                                       |
| Medium:                    | Filtered Compressed Air<br>With or Without Lubrication and<br>Low Pressure Hydraulic* |
| Standard Stroke Lengths:   | Non-Guided up to 2540 mm (100 inches)<br>Guided up to 1524 mm (60 inches)             |
| Velocity:                  | Up to 1 Meter / Second (3.28 Feet / Second)                                           |

\* Consult Factory for Cylinder Rating

## How To Order

**MC1 12 0024 A 6 D A 2**

### Series Identifier

- MC1 = Magnetically Coupled Rodless Cylinder  
Standard Coupling Strength
  - MC2 = Magnetically Coupled Rodless Cylinder  
Lower Coupling Strength
  - MC3 = Magnetically Coupled Rodless Cylinder  
Hardened Steel Shafts
  - MC4 = Magnetically Coupled Rodless Cylinder  
Stainless Steel Shafts\*\*
  - MC5 = Magnetically Coupled Rodless Cylinder\*\*\*  
Single End Supply Hollow Steel Shafts
- \*\*Stainless steel shafts,  
includes all stainless hardware
- \*\*\*Not available in 12mm bore

### Bore Size

- 12 = 12 millimeters c/w 10-32 UNF ports
- 16 = 16 millimeters c/w 10-32 UNF ports
- 20 = 20 millimeters c/w 1/8" NPT ports
- 25 = 25 millimeters c/w 1/8" NPT ports
- 32 = 32 millimeters c/w 1/8" NPT ports
- 40 = 40 millimeters c/w 1/4" NPT ports

### Full Inches or Millimeters of Stroke

Note: This section requires four digits  
For Example: 24 inches would be entered as 0024  
and 1000 millimeters would be entered as 1000

### Fractional Inches of Stroke

(if ordering cylinder stroke in millimeters,  
place the letter 'M' in this box)

- |          |                 |
|----------|-----------------|
| A = 0"   | F = 5/8"        |
| B = 1/8" | G = 3/4"        |
| C = 1/4" | H = 7/8"        |
| D = 3/8" | M = millimeters |
| E = 1/2" |                 |

### Shock Absorbers & Stroke ADJ. Kit\*\*\*

- 1 = Shock Only
- 2 = No Shocks
- 3 = Right Side Adj. Stroke Kit with Shocks\*\*
- 4 = Left Side Adj. Stroke Kit with Shocks\*\*
- 5 = Right & Left Side Adj. Stroke Kits with Shocks
- 6 = Right Side Adj. Stroke Kit, no Shocks
- 7 = Left Side Adj. Stroke Kit, no Shocks
- 8 = Right & Left Side Adj. Stroke Kits, no Shocks

\*\*Stroke adder required

\*\*\*Kit includes two shocks

### Adapters and Options

- A = No Adapter
- B = NPT Male/BSP Female Port Adapter
- C = NuMate™ Adapter Plate
- D = Fittings (B) and NuMate™ Adapter Plate
- E = No Cushions (MC1 & MC2)
- G = Male Grease Nipple
- H = Hydraulic
- 5 = Ports in Pos. #5

### Sensing Position

- A = Single Position Right
- B = Single Position Left
- C = Both Right & Left
- D = No Sensing
- E = Switch Rail

### Sensing Type

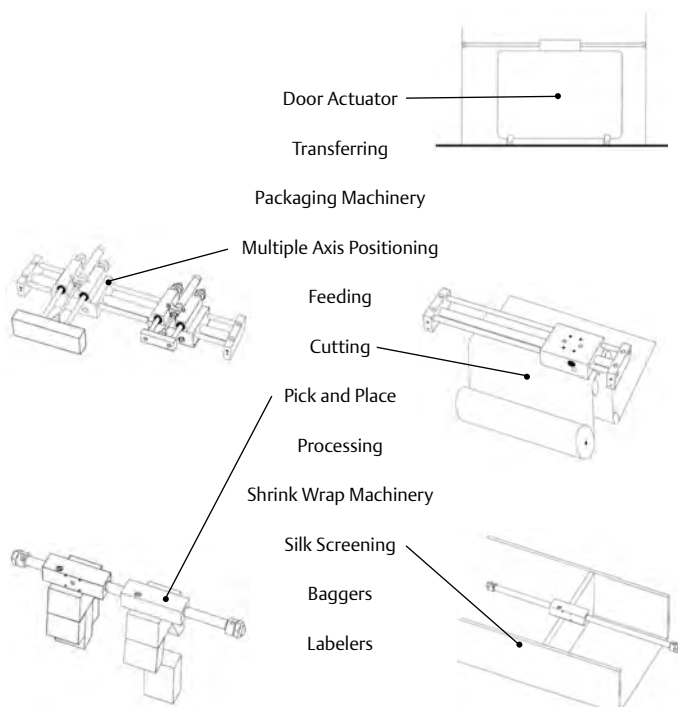
- Standard Cord
- 1 = Hall Effect PNP (Sourcing) - magnet sensing
  - 2 = Hall Effect NPN (Sinking) - magnet sensing
  - 3 = Reed Switch - magnet sensing
  - 4 = Prox Switch on Cylinder - PNP (Sourcing)\*\*\*
  - 5 = Prox Switch on Cylinder - NPN (Sinking)\*\*\*
  - 6 = No Sensing

### Quick Disconnect Switch

- Z = Hall Effect PNP (Sourcing) - magnet sensing
- Y = Hall Effect NPN (Sinking) - magnet sensing
- X = Reed Switch - magnet sensing
- W = Prox Switch - PNP (Sourcing)\*\*\*
- V = Prox Switch - NPN (Sinking)\*\*\*

\*\*\*Only available on the linear guided units (MC3-MC5).

## Typical Applications

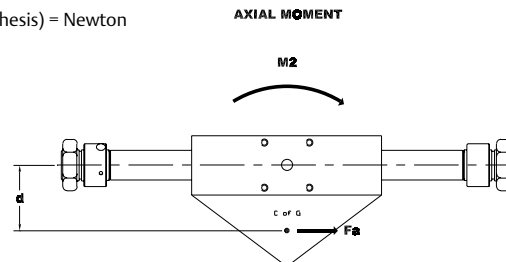
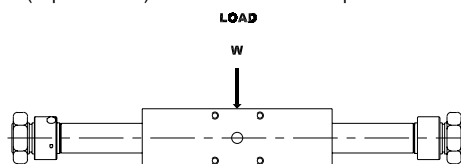


## MC1 and MC2 Series

### MC1 & MC2 Series

| MC1 & MC2 Series     |            |            |                                                                                                                                                                                              |                                         |                                      |             |                                      |         |                                 |         |
|----------------------|------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------|-------------|--------------------------------------|---------|---------------------------------|---------|
| Medium               |            |            | Compressed air (filtered, lubricated or unlubricated) and hydraulics                                                                                                                         |                                         |                                      |             |                                      |         |                                 |         |
| Design               |            |            | Magnetically coupled non-guided cylinder line                                                                                                                                                |                                         |                                      |             |                                      |         |                                 |         |
| Max. operating range |            |            | 7 bar / 100 psi                                                                                                                                                                              |                                         |                                      |             |                                      |         |                                 |         |
| Temperature range    |            |            | -20° to 60° C / -4° to 140° F                                                                                                                                                                |                                         |                                      |             |                                      |         |                                 |         |
| Material             |            |            | Carriage, End cap: Anodized Aluminum, Bearings: Thermoplastic, Tube: Stainless Steel, Seals & O-rings: Polyurethane & Buna, Magnets: Rare Earth, Fasteners: Zinc Plated, Needle Valve: Brass |                                         |                                      |             |                                      |         |                                 |         |
| Diameter             | Stroke     |            | Port Size *                                                                                                                                                                                  | Effective force at 100 psi/7bar ibf (N) | Breakaway force of magnetic coupling |             | Basic weight of zero stroke cylinder |         | Weight Adder per Unit of Stroke |         |
|                      | in         | mm         |                                                                                                                                                                                              |                                         | MC1 ibf (N)                          | MC2 ibf (N) | lbs                                  | (kgs)   | lbs                             | (kgs)   |
| 12 mm                | .39 to 48  | 10 to 1220 | 10-32                                                                                                                                                                                        | 18 (77.8)                               | 25 (111.2)                           | 18 (80.1)   | 0.600                                | (0.272) | 0.010                           | (0.004) |
| 16 mm                | .39 to 100 | 10 to 2500 | 10-32                                                                                                                                                                                        | 31 (138.8)                              | 40 (177.9)                           | 27 (120.1)  | 1.220                                | (0.553) | 0.014                           | (0.006) |
| 20 mm                | .39 to 100 | 10 to 2500 | 1/8 NPT                                                                                                                                                                                      | 49 (216.7)                              | 75 (333.6)                           | 44 (195.7)  | 1.850                                | (0.839) | 0.018                           | (0.008) |
| 25 mm                | .39 to 100 | 10 to 2500 | 1/8 NPT                                                                                                                                                                                      | 76 (338.6)                              | 110 (485.0)                          | 80 (355.9)  | 2.790                                | (1.266) | 0.029                           | (0.013) |
| 32 mm                | .39 to 100 | 10 to 2500 | 1/8 NPT                                                                                                                                                                                      | 125 (554.9)                             | 175 (778.4)                          | 105 (467.1) | 4.670                                | (2.118) | 0.034                           | (0.015) |
| 40 mm                | .39 to 100 | 10 to 2500 | 1/4 NPT                                                                                                                                                                                      | 195 (866.8)                             | 236 (1049.8)                         | 150 (667.2) | 8.050                                | (3.651) | 0.045                           | (0.020) |

Dimensions = inches & (in parenthesis) = millimeters • Force = pound force & (in parenthesis) = Newton



### Load vs. Stroke - Non guided (MC1 & MC2) Maximum Static Load

| Diameter | Stroke Inches (mm)  |            |            |            |            |            |             |             |             |             |
|----------|---------------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
|          | 6 (152.4)           | 12 (304.8) | 18 (457.2) | 20 (508.0) | 32 (812.8) | 36 (914.4) | 42 (1066.8) | 48 (1219.2) | 54 (1371.6) | 60 (1524.0) |
|          | Static Load lbs (N) |            |            |            |            |            |             |             |             |             |
| 12 mm    | 8 (35.6)            | 8 (35.6)   | 8 (35.6)   | 8 (35.6)   | 8 (35.6)   | 7 (29.8)   | 5 (22.2)    | 4 (17.8)    | -           | -           |
| 16 mm    | 12 (53.4)           | 12 (53.4)  | 12 (53.4)  | 12 (53.4)  | 12 (53.4)  | 12 (53.4)  | 11 (48.9)   | 9 (38.7)    | 7 (31.0)    | 6 (25.8)    |
| 20 mm    | 19 (84.5)           | 19 (84.5)  | 19 (84.5)  | 19 (84.5)  | 19 (84.5)  | 19 (84.5)  | 19 (84.5)   | 16 (71.6)   | 13 (57.8)   | 11 (47.6)   |
| 25 mm    | 27 (120.1)          | 27 (120.1) | 27 (120.1) | 27 (120.1) | 27 (120.1) | 27 (120.1) | 27 (120.1)  | 27 (120.1)  | 27 (120.1)  | 21 (94.7)   |
| 32 mm    | 37 (164.6)          | 37 (164.6) | 37 (164.6) | 37 (164.6) | 37 (164.6) | 37 (164.6) | 37 (164.6)  | 37 (164.6)  | 37 (164.6)  | 37 (164.6)  |
| 40 mm    | 47 (209.1)          | 47 (209.1) | 47 (209.1) | 47 (209.1) | 47 (209.1) | 47 (209.1) | 47 (209.1)  | 47 (209.1)  | 47 (209.1)  | 47 (209.1)  |

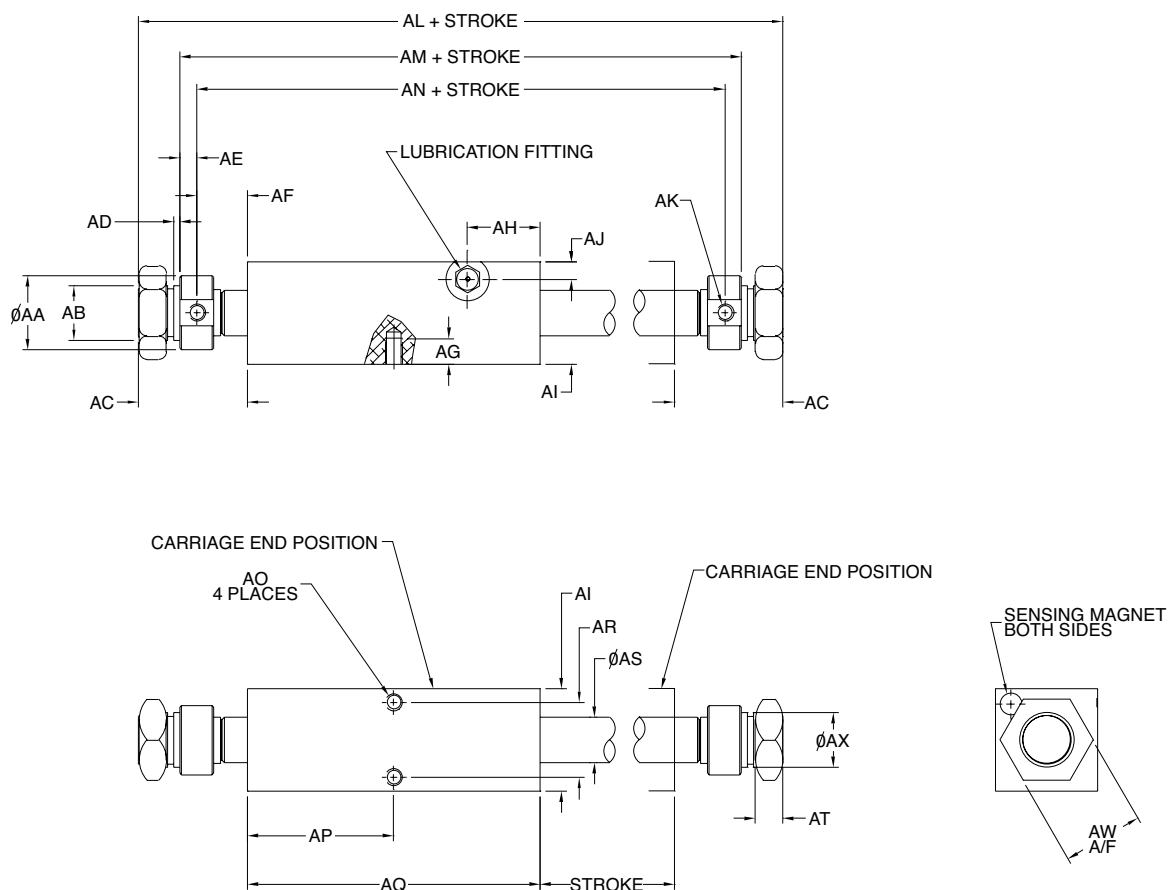
### Maximum Dynamic Moment

| Diameter | Stroke Inches (mm)  |                |                |                |                |                |                 | Diameter                                                                                                   | Maximum Axial Moment<br>M2 In-Lbs (Nm) |
|----------|---------------------|----------------|----------------|----------------|----------------|----------------|-----------------|------------------------------------------------------------------------------------------------------------|----------------------------------------|
|          | 66<br>(1676.4)      | 72<br>(1828.8) | 78<br>(1981.2) | 84<br>(2133.6) | 90<br>(2286.0) | 96<br>(2438.4) | 100<br>(2540.0) |                                                                                                            |                                        |
|          | Static Load lbs (N) |                |                |                |                |                |                 | 12 mm                                                                                                      | 9 (1.0)                                |
| 12 mm    | -                   | -              | -              | -              | -              | -              | -               | 16 mm                                                                                                      | 21 (2.3)                               |
| 16 mm    | 5 (21.4)            | 4 (18.2)       | 3.5 (15.6)     | 3 (13.3)       | 3 (12.0)       | 2 (10.7)       | 2 (9.8)         | 20 mm                                                                                                      | 34 (3.9)                               |
| 20 mm    | 9 (40.0)            | 8 (34.2)       | 6 (27.1)       | 6 (25.4)       | 5 (22.2)       | 5 (20.0)       | 4 (18.2)        | 25 mm                                                                                                      | 55 (6.2)                               |
| 25 mm    | 18 (80.1)           | 16 (68.9)      | 14 (60.0)      | 12 (52.5)      | 10 (46.3)      | 9 (41.4)       | 9 (38.3)        | 32 mm                                                                                                      | 84 (9.5)                               |
| 32 mm    | 37 (164.6)          | 37 (164.6)     | 32 (143.7)     | 28 (124.5)     | 25 (110.3)     | 22 (97.9)      | 20 (90.7)       | 40 mm                                                                                                      | 128 (14.4)                             |
| 40 mm    | 47 (209.1)          | 47 (209.1)     | 47 (209.1)     | 47 (209.1)     | 46 (206.0)     | 41 (183.3)     | 38 (169.9)      | Axial Moment = M2 = Fa x d<br>Fa = Applied Force<br>d = Distance from Center of the Bore, of the cylinder, |                                        |

Axial Moment =  $M2 = Fa \times d$   
 $Fa$  = Applied Force  
 $d$  = Distance from Center of the Bore, of the cylinder, to the Center of Gravity of the Load

Dimensions: Inches (mm)

MC1 and MC2 Series Non-Guided Unit 12mm Bore



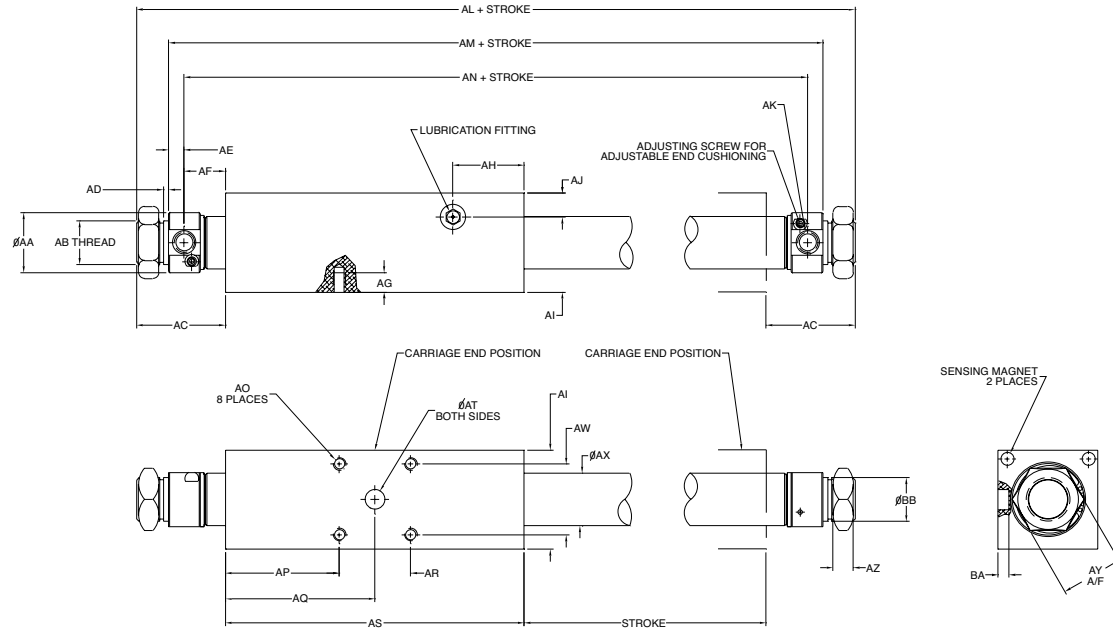
| Bore<br>in. (mm) | AA<br>in. (mm) | AB<br>mm  | AC<br>in. (mm) | AD<br>in. (mm) | AE<br>in. (mm) | AF<br>in. (mm) | AG<br>in. (mm) | AH<br>in. (mm) |
|------------------|----------------|-----------|----------------|----------------|----------------|----------------|----------------|----------------|
| 12 mm            | 0.86 (21.7)    | M16 x 1.5 | 1.26 (31.9)    | 0.07 (1.8)     | 0.20 (5.1)     | 0.58 (14.8)    | 0.38 (9.5)     | 0.84 (21.4)    |

| Bore<br>in. (mm) | AI<br>in. (mm) | AJ<br>in. (mm) | AK<br>in.  | AL<br>in. (mm) | AM<br>in. (mm) | AN<br>in. (mm) | AO<br>mm | AP<br>in. (mm) |
|------------------|----------------|----------------|------------|----------------|----------------|----------------|----------|----------------|
| 12 mm            | 1.18 (30.0)    | 0.21 (5.2)     | #10-32 UNF | 5.90 (150.0)   | 4.95 (125.7)   | 4.55 (115.6)   | M5 x .8  | 1.69 (43.0)    |

| Bore<br>in. (mm) | AQ<br>in. (mm) | AR<br>in. (mm) | AS<br>in. (mm) | AT<br>in. (mm) | AW<br>in. (mm) | AX<br>in. (mm) |
|------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 12 mm            | 3.39 (86.0)    | 0.87 (22.1)    | 0.52 (13.3)    | 0.32 (8.0)     | 0.95 (24.0)    | 0.63 (16.0)    |

Dimensions: Inches (mm)

MC1 and MC2 Series Non-Guided Unit 16mm – 40mm Bore



| Diameter | AA          | AB        | AC          | AD         | AE          | AF          | AG          | AH          | AI          |
|----------|-------------|-----------|-------------|------------|-------------|-------------|-------------|-------------|-------------|
| 16 mm    | 0.90 (22.7) | M16 x 1.5 | 1.49 (37.7) | 0.07 (1.8) | 0.63 (16.1) | 0.38 (9.6)  | 0.32 (8.0)  | 1.26 (32.0) | 1.41 (36.0) |
| 20 mm    | 1.30 (33.0) | M22 x 1.5 | 1.66 (42.0) | 0.07 (1.8) | 0.31 (7.7)  | 0.72 (18.2) | 0.32 (8.0)  | 1.34 (34.0) | 1.66 (42.0) |
| 25 mm    | 1.19 (30.2) | M22 x 1.5 | 1.76 (44.7) | 0.10 (2.5) | 0.31 (7.7)  | 0.82 (20.9) | 0.39 (10.0) | 1.41 (35.8) | 1.97 (50.0) |
| 32 mm    | 1.56 (39.5) | M30 x 1.5 | 1.97 (50.0) | 0.10 (2.5) | 0.36 (9.1)  | 0.96 (24.4) | 0.50 (12.7) | 1.68 (42.5) | 2.34 (59.5) |
| 40 mm    | 1.80 (45.7) | M38 x 1.5 | 2.49 (63.2) | 0.10 (2.5) | 0.48 (12.2) | 1.38 (35.0) | 0.63 (16.0) | 1.97 (50.0) | 2.91 (74.0) |

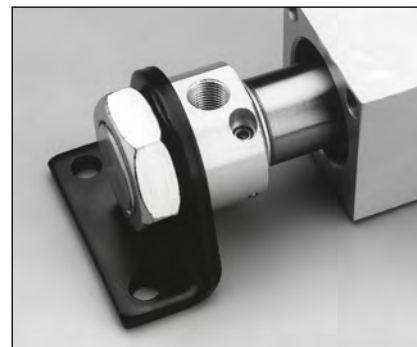
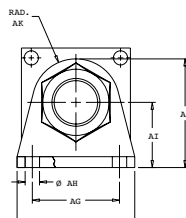
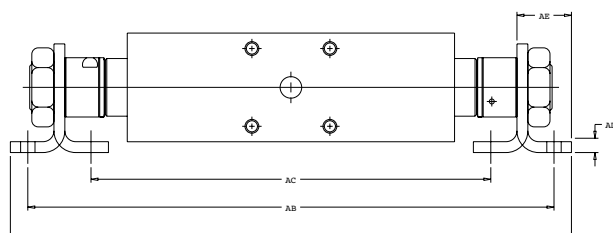
| Diameter | AJ          | AK          | AL            | AM            | AN            | AO        | AP          | AQ           | AR          |
|----------|-------------|-------------|---------------|---------------|---------------|-----------|-------------|--------------|-------------|
| 16 mm    | 0.29 (7.4)  | #10-32 UNF  | 7.89 (200.5)  | 6.94 (176.4)  | 5.68 (144.2)  | M5 x .8   | 1.95 (49.5) | 2.47 (62.5)  | 1.02 (26.0) |
| 20 mm    | 0.40 (10.1) | 1/8-27 NPTF | 8.63 (219.2)  | 7.36 (187.0)  | 6.75 (171.4)  | M5 x .8   | 2.03 (51.5) | 2.66 (67.5)  | 1.26 (32.0) |
| 25 mm    | 0.48 (12.2) | 1/8-27 NPTF | 9.44 (239.7)  | 8.17 (207.5)  | 7.56 (192.0)  | M6 x 1.0  | 2.25 (57.0) | 2.96 (75.0)  | 1.41 (35.8) |
| 32 mm    | 0.56 (14.2) | 1/8-27 NPTF | 10.63 (270.0) | 9.36 (237.6)  | 8.61 (218.6)  | M6 x 1.0  | 2.40 (61.0) | 3.34 (84.9)  | 1.89 (47.9) |
| 40 mm    | 0.97 (24.7) | 1/4-18 NPTF | 12.85 (326.4) | 11.59 (294.4) | 10.63 (270.0) | M8 x 1.25 | 2.95 (75.0) | 3.94 (100.0) | 1.97 (50.0) |

| Diameter | AS           | AT          | AW          | AX          | AY          | AZ          | BA         | BB          |
|----------|--------------|-------------|-------------|-------------|-------------|-------------|------------|-------------|
| 16 mm    | 4.92 (125.0) | 0.32 (8.0)  | 1.02 (26.0) | 0.68 (17.3) | 0.95 (24.0) | 0.32 (8.0)  | 0.16 (4.0) | 0.63 (16.0) |
| 20 mm    | 5.32 (135.0) | 0.32 (8.0)  | 1.26 (32.0) | 0.84 (21.3) | 1.24 (31.5) | 0.40 (10.2) | 0.12 (3.0) | 0.87 (22.0) |
| 25 mm    | 5.91 (150.0) | 0.39 (10.0) | 1.41 (35.8) | 1.04 (26.5) | 1.24 (31.5) | 0.40 (10.2) | 0.22 (5.5) | 0.87 (22.0) |
| 32 mm    | 6.69 (169.8) | 0.39 (10.0) | 1.89 (47.9) | 1.32 (33.6) | 1.65 (42.0) | 0.32 (8.0)  | 0.18 (4.4) | 1.18 (30.0) |
| 40 mm    | 7.87 (200.0) | 0.47 (12.0) | 2.21 (56.0) | 1.64 (41.6) | 1.97 (50.0) | 0.32 (8.0)  | 0.18 (4.5) | 1.50 (38.0) |

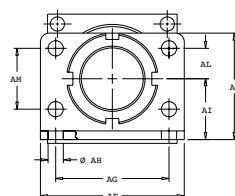
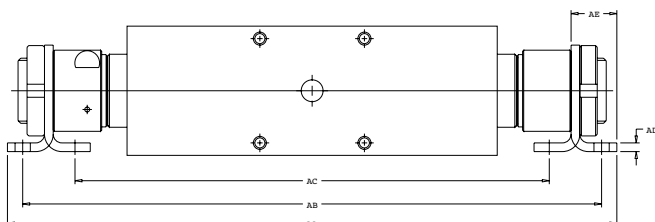
**Dimensions: Inches (mm)**

**MC1 and MC2 Series Mounting Accessories – Foot Mount**  
**16 mm through 40 mm Bore Sizes**

**MC1 & MC2 - 12 MM THROUGH TO 25 MM BORE FOOT MOUNT**



**MC1 & MC2 - 32 MM AND 40 MM BORE FOOT MOUNT**



| Diameter | AA            | AB            | AC            | AD         | AE          | AF          | AG          | AH         | AI          |
|----------|---------------|---------------|---------------|------------|-------------|-------------|-------------|------------|-------------|
| 12 mm    | 6.52 (165.7)  | 6.05 (153.7)  | 4.16 (105.7)  | 0.16 (3.9) | 0.79 (19.9) | 1.65 (42.0) | 1.26 (32.0) | 0.22 (5.5) | 0.79 (19.9) |
| 16 mm    | 8.62 (216.4)  | 8.05 (204.4)  | 6.16 (156.4)  | 0.16 (3.9) | 0.79 (19.9) | 1.65 (42.0) | 1.26 (32.0) | .022 (5.5) | 0.79 (19.9) |
| 20 mm    | 9.33 (236.9)  | 8.70 (220.9)  | 6.41 (162.9)  | 0.20 (5.0) | 0.98 (24.9) | 2.13 (54.0) | 1.58 (40.0) | 0.26 (6.6) | 0.98 (24.9) |
| 25 mm    | 10.14 (257.5) | 9.51 (241.5)  | 7.22 (183.5)  | 0.20 (5.0) | 0.98 (24.9) | 2.13 (54.0) | 1.58 (40.0) | 0.26 (6.6) | 0.98 (24.9) |
| 32 mm    | 11.01 (279.6) | 10.46 (265.6) | 8.57 (217.6)  | 0.16 (3.9) | 0.83 (21.0) | 2.60 (65.9) | 2.05 (51.9) | 0.28 (7.0) | 1.10 (27.9) |
| 40 mm    | 13.95 (354.4) | 13.16 (334.4) | 10.41 (264.4) | 0.20 (5.0) | 1.18 (29.9) | 3.46 (87.9) | 2.36 (59.9) | 0.35 (8.9) | 13.0 (32.9) |

| Diameter | AJ          | AK          | AL          | AM          |
|----------|-------------|-------------|-------------|-------------|
| 12 mm    | 13.2 (33.4) | 0.53 (13.4) | –           | –           |
| 16 mm    | 1.32 (33.4) | 0.53 (13.4) | –           | –           |
| 20 mm    | 1.69 (43.0) | 0.71 (18.0) | –           | –           |
| 25 mm    | 1.69 (43.0) | 0.71 (18.0) | –           | –           |
| 32 mm    | 1.93 (48.9) | –           | 0.55 (13.9) | 1.10 (27.9) |
| 40 mm    | 2.28 (58.0) | –           | 0.59 (15.0) | 1.18 (39.9) |

**Foot Mounting for MC1 and MC2 Cylinders**

| Diameter | 12 & 16 | 20 & 25 | 32       | 40       |
|----------|---------|---------|----------|----------|
|          | 155-115 | 155-116 | 155-138* | 155-139* |

\*The 32 and 40mm Brackets are a combination Foot and Flange Mount

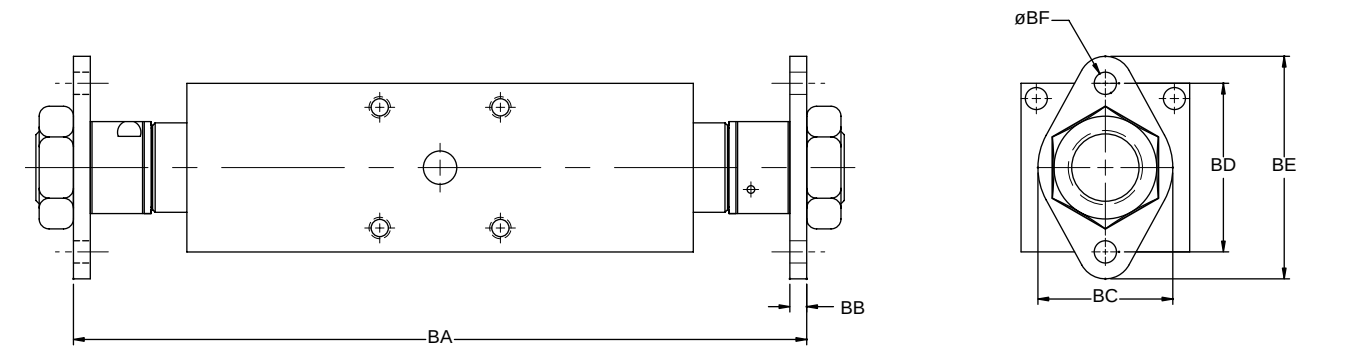
**Nuts for Mounting Accessories\*\***

| Bore | 12 & 16 | 20 & 25  | 32      | 40      |
|------|---------|----------|---------|---------|
|      | 128-343 | N90-1213 | 128-228 | 128-229 |

\*\*End cap nuts are included with the MC1 and MC2 Series

Dimensions: Inches (mm)

MC1 and MC2 Series Mounting Accessories – Flange Mount



| Diameter | BA           | BB         | BC          | BD          | BE          | BF         |
|----------|--------------|------------|-------------|-------------|-------------|------------|
| 12 mm    | 5.26 (133.7) | 0.16 (3.9) | 1.18 (29.9) | 1.58 (40.0) | 2.05 (51.9) | 0.22 (5.5) |
| 16 mm    | 7.26 (184.4) | 0.16 (3.9) | 1.18 (29.9) | 1.58 (40.0) | 2.05 (51.9) | 0.22 (5.5) |
| 20 mm    | 7.75 (196.9) | 0.20 (5.0) | 1.58 (40.0) | 1.97 (50.0) | 2.60 (65.9) | 0.26 (6.6) |
| 25 mm    | 8.56 (217.5) | 0.20 (5.0) | 1.58 (40.0) | 1.97 (50.0) | 2.60 (65.9) | 0.26 (6.6) |
| 32 mm    | –            | –          | –           | –           | –           | –          |
| 40 mm    | –            | –          | –           | –           | –           | –          |



Flange Mounting for MC1 and MC2 Cylinders

| Diameter | 12 & 16 | 20 & 25 | 32       | 40       |
|----------|---------|---------|----------|----------|
|          | 155-112 | 155-113 | 155-138* | 155-139* |

\*Foot and Flange Mounting

Nuts for Mounting Accessories\*\*\*

| Diameter | 12 & 16 | 20 & 25  | 32      | 40      |
|----------|---------|----------|---------|---------|
|          | 128-343 | N90-1213 | 128-228 | 128-229 |

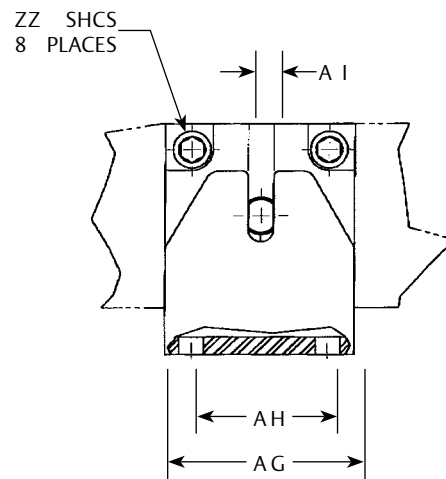
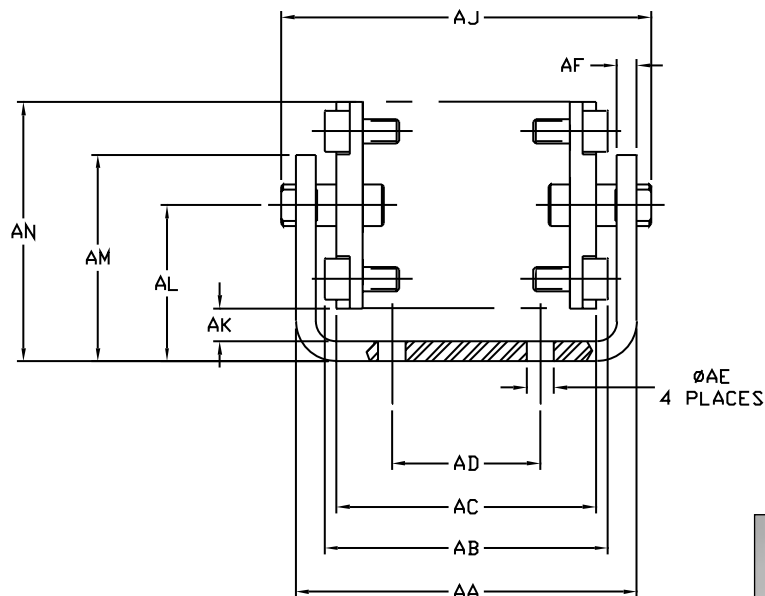
\*\*\*Nuts are included with the MC1 & MC2 Series

**Dimensions: Inches (mm)**

**MC1 and MC2 Series Floating Mounting Bracket 16mm – 40mm Bore**

**Floating Mounting Bracket Kit Part Numbers**

| Bore | 12  | 16       | 20       | 25       | 32       | 40       |
|------|-----|----------|----------|----------|----------|----------|
|      | N/A | 239-1429 | 239-1430 | 239-1431 | 239-1432 | 239-1433 |



When incorporating the MC1 or MC2 Series with external guides it is necessary to include the floating mounting bracket. This will compensate for any non-parallel alignment between the cylinder and the external guiding mechanism.

| Part Number | Diameter | AA           | AB          | AC          | AD          | AE         | AF         | AG          | AH          |
|-------------|----------|--------------|-------------|-------------|-------------|------------|------------|-------------|-------------|
| 239-1429    | 16 mm    | 2.48 (63.0)  | 1.96 (49.7) | 1.92 (48.7) | 1.02 (26.0) | 0.22 (5.6) | 0.13 (3.2) | 1.58 (40.0) | 1.02 (26.0) |
| 239-1430    | 20 mm    | 2.80 (71.1)  | 2.20 (55.7) | 2.15 (54.7) | 1.26 (32.0) | 0.22 (5.6) | 0.13 (3.2) | 1.65 (42.0) | 1.26 (32.0) |
| 239-1431    | 25 mm    | 3.24 (82.3)  | 2.69 (68.4) | 2.47 (62.7) | 1.41 (35.8) | 0.26 (6.6) | 0.19 (4.8) | 1.97 (50.0) | 1.41 (35.8) |
| 239-1432    | 32 mm    | 3.61 (91.7)  | 3.06 (77.8) | 2.84 (72.2) | 1.89 (48.0) | 0.26 (6.6) | 0.19 (4.8) | 2.36 (59.9) | 1.89 (48.0) |
| 239-1433    | 40 mm    | 4.46 (113.3) | 3.79 (96.3) | 3.54 (89.9) | 2.21 (56.0) | 0.35 (8.8) | 0.25 (6.4) | 2.76 (70.0) | 1.97 (50.0) |

| Part Number | Diameter | AI         | AJ           | AK          | AL          | AM          | AN          | ZZ      |
|-------------|----------|------------|--------------|-------------|-------------|-------------|-------------|---------|
| 239-1429    | 16 mm    | 0.21 (5.3) | 2.80 (71.1)  | 0.33 (8.3)  | 1.14 (29.0) | 1.58 (40.0) | 1.85 (47.0) | M5x.8   |
| 239-1430    | 20 mm    | 0.22 (5.6) | 3.12 (79.3)  | 0.28 (7.0)  | 1.23 (31.2) | 1.69 (43.0) | 2.06 (52.2) | M5x.8   |
| 239-1431    | 25 mm    | 0.26 (6.6) | 3.52 (89.3)  | 0.32 (8.0)  | 1.49 (37.8) | 1.97 (50.0) | 2.47 (62.8) | M6x1.0  |
| 239-1432    | 32 mm    | 0.26 (6.6) | 3.89 (98.8)  | 0.32 (8.0)  | 1.68 (42.8) | 2.17 (55.0) | 2.85 (72.5) | M6x1.0  |
| 239-1433    | 40 mm    | 0.38 (9.5) | 4.70 (119.3) | 0.39 (10.0) | 1.85 (47.0) | 2.76 (70.0) | 3.56 (90.3) | M8x1.25 |

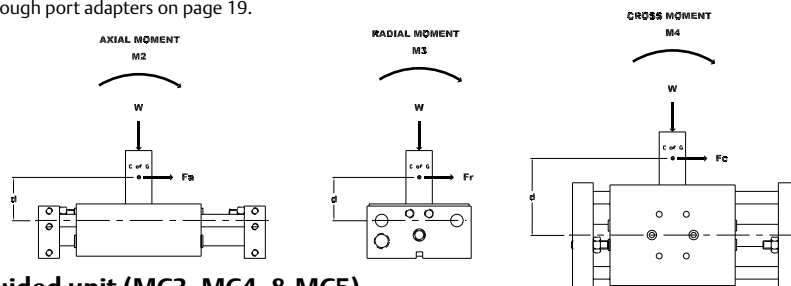


## MC3, MC4 and MC5 Series

| Specifications       |                                                                                                                                                                                                                                                                           |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Medium               | Compressed air (filtered, lubricated or unlubricated) and hydraulics                                                                                                                                                                                                      |
| Design               | Magnetically coupled guided cylinder line                                                                                                                                                                                                                                 |
| Max. operating range | 100 psi / 7 bar                                                                                                                                                                                                                                                           |
| Temperature Range    | -4° to 140° F / -20° to 60° C                                                                                                                                                                                                                                             |
| Material             | <b>Carriage, End Plate and Stop Plate:</b> Anodized Aluminum, <b>Bearings:</b> Thermoplastic & Topball slide bush, <b>Guide rods:</b> Steel & Stainless Steel, <b>Seals &amp; O-rings:</b> Polyurethane & Buna, <b>Magnets:</b> Rare Earth, <b>Fasteners:</b> Zinc Plated |

| Diameter | Standard Stroke |              | Port Size* | Effective force at 100 psi/7 Bar lbf (N) | Breakaway force of magnetic coupling lbf (N) | Basic Weight of Zero Stroke Cylinder |         | Slide Weight |         | Weight Adder per Unit of Stroke |         |
|----------|-----------------|--------------|------------|------------------------------------------|----------------------------------------------|--------------------------------------|---------|--------------|---------|---------------------------------|---------|
|          | in              | (mm)         |            |                                          |                                              | lbs.                                 | (kgs)   | lbs.         | (kgs)   | lbs.                            | (kgs)   |
| 12 mm    | .39 to 20       | (10 to 500)  | 10-32      | 18 (77.8)                                | 25 (110.0)                                   | 2.140                                | (0.971) | 1.390        | (0.630) | 0.055                           | (0.020) |
| 16 mm    | .39 to 32       | (10 to 800)  | 10-32      | 31 (138.8)                               | 40 (178.0)                                   | 2.960                                | (1.343) | 1.460        | (0.662) | 0.084                           | (0.040) |
| 20 mm    | .39 to 32       | (10 to 800)  | 1/8 NPT    | 49 (216.7)                               | 75 (333.6)                                   | 5.140                                | (2.331) | 3.340        | (1.515) | 0.118                           | (0.050) |
| 25 mm    | .39 to 60       | (10 to 1524) | 1/8 NPT    | 76 (338.6)                               | 110 (485.0)                                  | 7.650                                | (3.470) | 3.880        | (1.760) | 0.206                           | (0.090) |
| 32 mm    | .39 to 60       | (10 to 1524) | 1/8 NPT    | 125 (554.9)                              | 175 (778.4)                                  | 14.020                               | (6.369) | 7.500        | (3.402) | 0.311                           | (0.140) |
| 40 mm    | .39 to 60       | (10 to 1524) | 1/4 NPT    | 195 (866.8)                              | 236 (1049.8)                                 | 20.860                               | (9.462) | 10.70        | (4.853) | 0.476                           | (0.220) |

\*Metric porting available through port adapters on page 19.



### Load vs. Stroke - Guided unit (MC3, MC4, & MC5)

Maximum Static Load

| Diameter | Stroke Inches (mm) |             |             |             |             |             |             |             |             |             |
|----------|--------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|          | 6 (152)            | 12 (305)    | 18 (457)    | 20 (508)    | 32 (813)    | 36 (914)    | 42 (1067)   | 48 (1219)   | 54 (1372)   | 60 (1524)   |
| 12 mm    | 11 (48.9)          | 11 (48.9)   | 11 (48.9)   | 11 (48.9)   | -           | -           | -           | -           | -           | -           |
| 16 mm    | 15 (68.5)          | 15 (68.5)   | 15 (68.5)   | 15 (68.5)   | 14 (60.9)   | -           | -           | -           | -           | -           |
| 20 mm    | 45 (201.6)         | 45 (201.6)  | 45 (201.6)  | 45 (201.6)  | 26 (116.2)  | -           | -           | -           | -           | -           |
| 25 mm    | 54 (240.7)         | 54 (240.7)  | 54 (240.7)  | 54 (240.7)  | 54 (240.7)  | 54 (240.7)  | 54 (240.7)  | 40 (175.7)  | 140 (31.4)  | 25 (113.0)  |
| 32 mm    | 89 (397.0)         | 89 (397.0)  | 89 (397.0)  | 89 (397.0)  | 89 (397.0)  | 89 (397.0)  | 89 (397.0)  | 89 (397.0)  | 76 (336.3)  | 62 (274.0)  |
| 40 mm    | 126 (560.7)        | 126 (560.7) | 126 (560.7) | 126 (560.7) | 126 (560.7) | 126 (560.7) | 126 (560.7) | 126 (560.7) | 126 (560.7) | 126 (560.7) |

### Maximum Dynamic Moments

| Diameter | Axial Moment - M2 in-lbs (Nm) | Radial Moment - M3 in-lbs (Nm) | Cross Moment - M4 in-lbs (Nm) |
|----------|-------------------------------|--------------------------------|-------------------------------|
| 12 mm    | 8 (0.9)                       | 1 (0.2)                        | 8 (0.9)                       |
| 16 mm    | 18 (2.0)                      | 3 (0.3)                        | 18 (2.0)                      |
| 20 mm    | 54 (6.0)                      | 9 (1.0)                        | 54 (6.0)                      |
| 25 mm    | 113 (12.7)                    | 19 (2.1)                       | 113 (12.7)                    |
| 32 mm    | 188 (21.2)                    | 31 (3.5)                       | 188 (21.2)                    |
| 40 mm    | 271 (30.6)                    | 45 (5.1)                       | 271 (30.6)                    |

Axial moment =  $M2 = Fa \times d$

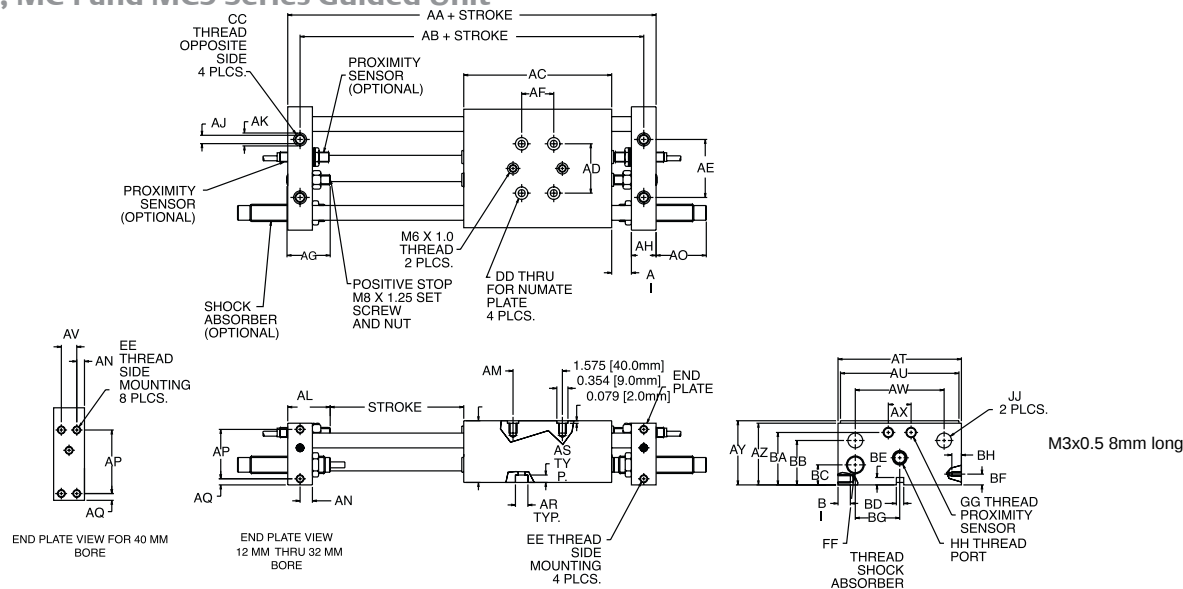
Radial moment =  $M3 = Fr \times d$

Cross moment =  $M4 = Fc \times d$

$$\text{Compound moment \%} = 100 \times \left( \frac{M2}{M2_{MAX}} + \frac{M3}{M3_{MAX}} + \frac{M4}{M4_{MAX}} \right) \leq 100\%$$

**Dimensions: Inches (mm)**

**MC3, MC4 and MC5 Series Guided Unit**

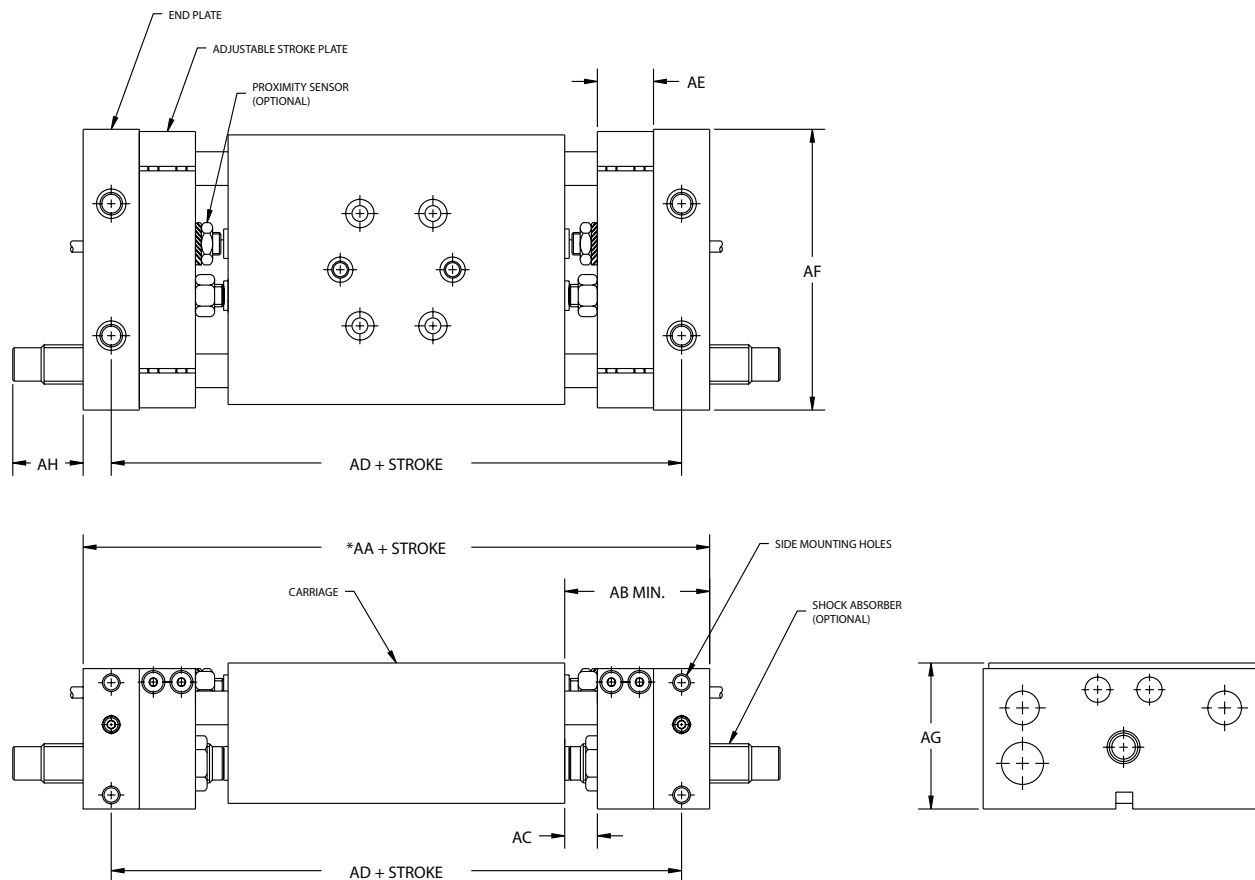


| Diameter | AA            | AB           | AC           | AD          | AE           | AF          | AG           | AH          | AI          |
|----------|---------------|--------------|--------------|-------------|--------------|-------------|--------------|-------------|-------------|
| 12 mm    | 5.48 (139.1)  | 4.89 (124.1) | 3.35 (84.9)  | 1.02 (25.9) | 1.38 (35.1)  | 0.75 (18.9) | 1.378 (35.0) | 0.59 (15.0) | 0.47 (11.9) |
| 16 mm    | 6.07 (154.1)  | 5.48 (139.1) | 3.94 (99.9)  | 1.26 (32.0) | 1.58 (40.0)  | 1.26 (32.0) | 1.378 (35.0) | 0.59 (15.0) | 0.47 (11.9) |
| 20 mm    | 7.56 (192.0)  | 6.77 (171.9) | 4.72 (119.9) | 1.58 (40.0) | 1.85 (46.9)  | 1.02 (26.0) | 1.378 (35.0) | 0.79 (19.9) | 0.63 (16.0) |
| 25 mm    | 8.35 (211.9)  | 7.56 (191.9) | 5.51 (139.9) | 1.77 (44.9) | 1.89 (48.0)  | 1.02 (26.0) | 1.378 (35.0) | 0.79 (19.9) | 0.63 (16.0) |
| 32 mm    | 9.84 (249.9)  | 8.86 (224.9) | 6.30 (159.9) | 2.56 (64.9) | 2.28 (58.0)  | 1.58 (40.0) | 1.378 (35.0) | 0.98 (24.9) | 0.79 (19.9) |
| 40 mm    | 10.86 (275.8) | 9.87 (250.8) | 7.32 (185.8) | 2.95 (75.0) | 3.07 (78.0)  | 1.97 (49.9) | 1.378 (35.0) | 0.98 (24.9) | 0.79 (19.9) |
| Diameter | AJ            | AK           | AL           | AM          | AN           | AO          | AP           | AQ          | AR          |
| 12 mm    | 0.21 (5.3)    | 0.40 (10.1)  | 1.00 (25.4)  | 1.50 (37.9) | 0.30 (7.5)   | 1.22 (30.9) | 1.22 (31.0)  | 0.14 (3.5)  | 0.36 (9.1)  |
| 16 mm    | 0.21 (5.3)    | 0.40 (10.1)  | 1.00 (25.4)  | 1.58 (40.0) | 0.30 (7.5)   | 1.22 (30.9) | 1.22 (31.0)  | 0.18 (4.5)  | 0.39 (10.0) |
| 20 mm    | 0.27 (6.8)    | 0.41 (10.5)  | 1.36 (34.4)  | 1.97 (49.9) | 0.39 (10.0)  | 1.60 (40.7) | 1.58 (40.0)  | 0.20 (5.0)  | 0.39 (10.0) |
| 25 mm    | 0.27 (6.8)    | 0.41 (10.5)  | 1.36 (34.4)  | 2.17 (54.9) | 0.39 (10.0)  | 1.60 (40.7) | 1.66 (42.0)  | 0.20 (5.0)  | 0.39 (10.0) |
| 32 mm    | 0.34 (8.6)    | 0.59 (15.0)  | 1.71 (43.4)  | 2.76 (69.9) | 0.49 (12.5)  | 2.85 (72.5) | 2.26 (57.3)  | 0.24 (5.9)  | 0.44 (11.1) |
| 40 mm    | 0.34 (8.6)    | 0.59 (15.0)  | 1.71 (43.4)  | 2.95 (75.0) | 0.25 (6.2)   | 2.85 (72.5) | 2.03 (51.5)  | 0.22 (5.5)  | 0.44 (11.1) |
| Diameter | AS            | AT           | AU           | AV          | AW           | AX          | AY           | AZ          | BA          |
| 12 mm    | 0.30 (7.6)    | 2.91 (73.9)  | 2.8 (70.9)   | -           | 2.05 (51.9)  | 0.65 (16.4) | 1.58 (40.0)  | 1.50 (37.9) | 1.18 (29.9) |
| 16 mm    | 0.22 (5.6)    | 3.31 (83.9)  | 3.15 (80.0)  | -           | 2.28 (58.0)  | 0.84 (21.3) | 1.66 (42.0)  | 1.58 (40.0) | 1.27 (32.4) |
| 20 mm    | 0.24 (5.9)    | 3.94 (99.9)  | 3.78 (96.0)  | -           | 2.84 (72.0)  | 0.73 (18.5) | 2.05 (51.9)  | 1.97 (50.0) | 1.67 (42.5) |
| 25 mm    | 0.23 (5.7)    | 4.49 (113.9) | 4.33 (109.9) | -           | 3.15 (80.0)  | 0.95 (24.1) | 2.24 (56.9)  | 2.17 (55.1) | 1.86 (47.3) |
| 32 mm    | 0.30 (7.6)    | 5.51 (139.9) | 5.32 (135.0) | -           | 3.94 (99.9)  | 1.02 (25.9) | 2.87 (72.9)  | 2.76 (70.0) | 2.34 (59.5) |
| 40 mm    | 0.55 (13.9)   | 6.54 (165.9) | 6.30 (159.9) | 0.49 (12.5) | 4.65 (118.0) | 1.86 (47.2) | 3.07 (78.0)  | 2.95 (75.0) | 2.53 (64.4) |
| Diameter | BB            | BC           | BD           | BE          | BF           | BG          | BH           | BI          | CC          |
| 12 mm    | 1.06 (27.0)   | 0.37 (9.5)   | 0.20 (5.0)   | 0.20 (5.0)  | 0.64 (16.2)  | 1.09 (27.6) | 0.31 (7.8)   | 0.32 (8.0)  | M6          |
| 16 mm    | 1.12 (28.5)   | 0.37 (9.5)   | 0.20 (5.0)   | 0.20 (5.0)  | 0.69 (17.1)  | 1.22 (30.9) | 0.31 (7.8)   | 0.32 (8.0)  | M6          |
| 20 mm    | 1.42 (35.9)   | 0.64 (16.3)  | 0.24 (5.9)   | 0.24 (5.9)  | 0.34 (8.7)   | 1.42 (35.9) | 0.31 (7.8)   | 0.39 (10.0) | M8          |
| 25 mm    | 1.44 (36.5)   | 0.54 (13.8)  | 0.24 (5.9)   | 0.24 (5.9)  | 0.34 (8.7)   | 1.58 (40.0) | 0.31 (7.8)   | 0.39 (10.0) | M8          |
| 32 mm    | 1.95 (49.5)   | 0.74 (18.9)  | 0.24 (5.9)   | 0.24 (5.9)  | 0.34 (8.7)   | 1.97 (50.0) | 0.31 (7.8)   | 0.55 (13.9) | M10         |
| 40 mm    | 2.01 (51.0)   | 0.60 (15.2)  | 0.24 (5.9)   | 0.24 (5.9)  | 0.34 (8.7)   | 2.32 (59.0) | 0.31 (7.8)   | 0.39 (10.0) | M10         |
| Diameter | DD            | EE           | FF           | GG          | HH           | JJ          |              |             |             |
| 12 mm    | 0.21 (5.4)    | M5           | M12 x 1.0    | M8 x 1.0    | 10-32 UNF    | 0.32 (8.0)  |              |             |             |
| 16 mm    | 0.22 (5.6)    | M5           | M12 x 1.0    | M8 x 1.0    | 10-32 UNF    | 0.39 (10.0) |              |             |             |
| 20 mm    | 0.22 (5.6)    | M6           | M14 x 1.5    | M8 x 1.0    | 1/8 NPT      | 0.47 (11.9) |              |             |             |
| 25 mm    | 0.22 (5.6)    | M6           | M14 x 1.5    | M8 x 1.0    | 1/8 NPT      | 0.63 (16.0) |              |             |             |
| 32 mm    | 0.26 (6.6)    | M8           | M20 x 1.5    | M8 x 1.0    | 1/8 NPT      | 0.79 (19.9) |              |             |             |
| 40 mm    | 0.26 (6.6)    | M8           | M20 x 1.5    | M8 x 1.0    | 1/4 NPT      | 0.98 (24.9) |              |             |             |



## Dimensions: Inches (mm)

### MC3, MC4 and MC5 Series Stroke Adjustment Plate



### Mid-Plate Dimensions for all Bore Sizes

| Kit Part Number | Diameter | AA *          | AB          | AC          | AD            | AE          | AF           | AG          | AH **       |
|-----------------|----------|---------------|-------------|-------------|---------------|-------------|--------------|-------------|-------------|
| SA-010012       | 12 mm    | 6.55 (166.3)  | 1.60 (40.6) | 0.42 (10.6) | 5.96 (151.2)  | 0.59 (15.0) | 2.91 (73.9)  | 1.58 (40.1) | 0.68 (17.3) |
| SA-010016       | 16 mm    | 7.14 (181.2)  | 1.60 (40.6) | 0.42 (10.6) | 6.55 (166.2)  | 0.59 (15.0) | 3.31 (83.9)  | 1.65 (42.0) | 0.68 (17.3) |
| SA-010020       | 20 mm    | 8.79 (223.1)  | 2.03 (51.6) | 0.46 (11.6) | 8.00 (203.1)  | 0.79 (19.9) | 3.94 (99.9)  | 2.05 (51.9) | 0.99 (25.1) |
| SA-010025       | 25 mm    | 9.58 (243.2)  | 2.03 (51.6) | 0.46 (11.6) | 8.79 (223.2)  | 0.79 (19.9) | 4.49 (113.9) | 2.25 (57.1) | 0.99 (25.1) |
| SA-010032       | 32 mm    | 11.34 (288.1) | 2.52 (64.1) | 0.55 (14.0) | 10.36 (263.1) | 0.98 (25.0) | 5.51 (139.9) | 2.87 (75.5) | 2.10 (53.4) |
| SA-010040       | 40 mm    | 12.36 (313.9) | 2.52 (64.1) | 0.55 (14.0) | 11.37 (288.9) | 0.98 (25.0) | 6.54 (165.9) | 3.07 (78.0) | 2.10 (53.4) |

\*If using only one Mid Plate subtract "AE" from this dimension

\*\* Add this dimension to "AA" for each shock absorber for total length

## Magnetically Coupled Rodless Cylinders

### MCR Series Switch Options

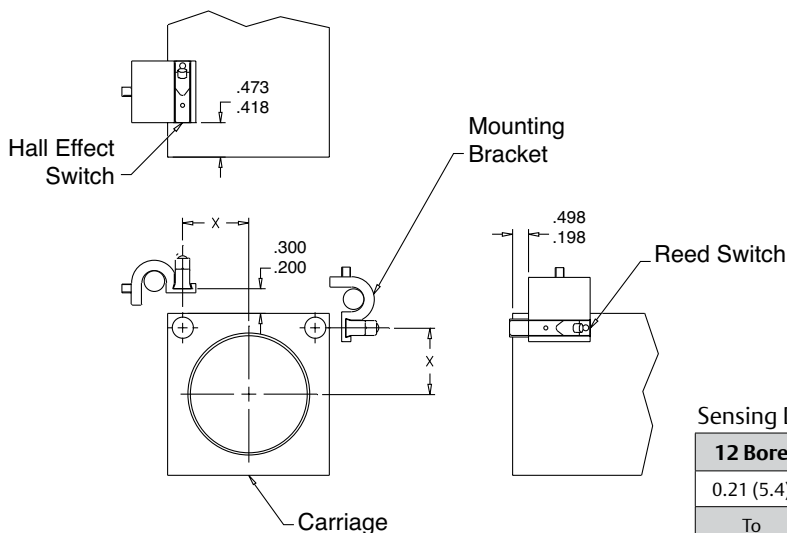
Switch Magnets are Standard on all MCR Series Carriages

Switch mounting for the MC1 and MC2 Series is achieved by an adjacent rod running the entire length of the cylinder. Refer to the switch rail/rod chart below.

MC3, MC4, and MC5 Series include a switch rail that is mounted to the end plates running the entire length of the cylinder. It is included when the switch option is ordered.



### MC1 and MC2 Series Switch Mounting Rods



Sensing Dimension "X" in. (mm)

| 12 Bore           | 16 Bore           | 20 Bore           | 25 Bore           | 32 Bore           | 40 Bore           |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 0.21 (5.4)        | 0.33 (8.4)        | 0.45 (11.4)       | 0.61 (15.4)       | 0.79 (20.1)       | 1.08 (27.5)       |
| To<br>0.61 (15.5) | To<br>0.73 (18.5) | To<br>0.85 (21.6) | To<br>1.01 (25.6) | To<br>1.19 (30.3) | To<br>1.28 (31.9) |

### Magnetic Switches

| Switch Description         | Standard Part No. | Quick Disconnect Part No. |
|----------------------------|-------------------|---------------------------|
| Hall Effect-PNP (Sourcing) | PNP-FL2-00-U      | PNP-QDS-M8-U              |
| Hall Effect-NPN (Sinking)  | NPN-FL2-00-U      | NPN-QDS-M8-U              |
| Reed Switch                | REED-FL2-00       | REED-QDS-M8U              |

### Switch Rail/Rod and Brackets

| Rail for Linear Slide | Hardware       |
|-----------------------|----------------|
| RM001*                | PNP-FL2-00-U   |
| Rod for Non-Guided    | Switch Bracket |
| 1/4-304-SSR*          | 900-F00-000    |

\*Specify Length



MCR (Magnetically Coupled Non-Guided)

| Bore | Bracket P/N     |
|------|-----------------|
| 12mm | P4995051680N001 |
| 16mm | P4995051680N001 |
| 20mm | P4995051680N001 |
| 25mm | P4995051680N001 |
| 32mm | P4995051680N001 |
| 40mm | P4995051680N001 |



| Sensor Description | Standard Cord Set | Quick Disconnect |
|--------------------|-------------------|------------------|
| Reed Switch        | P494A0021300A00   | P494A0021600A00  |
| Hall PNP           | P494A0022300A00   | P494A0022600A00  |
| Hall NPN           | P494A0022400A00   | P494A0022700A00  |

See page 16, 17, & 18 for sensor specifications

MCR (Magnetically Coupled Guided)

| Bore | Bracket P/N     |
|------|-----------------|
| 12mm | P4994406190N001 |
| 16mm | P4994406190N001 |
| 20mm | P4994406190N001 |
| 25mm | P4994406190N001 |
| 32mm | P4994406190N001 |
| 40mm | P4994406190N001 |

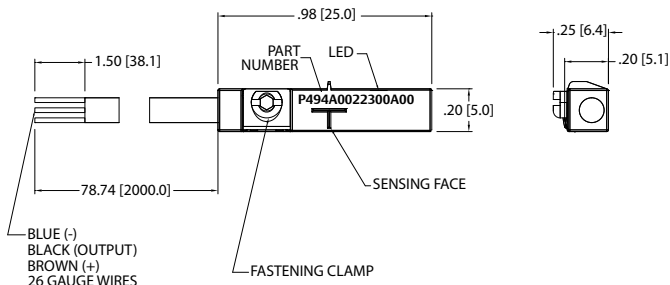


| Sensor Description | Standard Cord Set | Quick Disconnect |
|--------------------|-------------------|------------------|
| Reed Switch        | P494A0021300A00   | P494A0021600A00  |
| Hall PNP           | P494A0022300A00   | P494A0022600A00  |
| Hall NPN           | P494A0022400A00   | P494A0022700A00  |

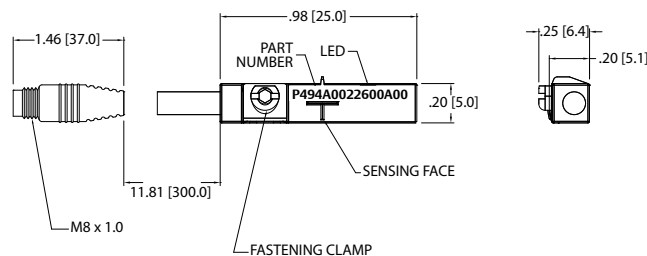
See page 16, 17, & 18 for sensor specifications  
Also available with 8mm Prox sensor see page 21

## Sensing Part Numbers

### P494A0022300A00



### P494A0022600A00



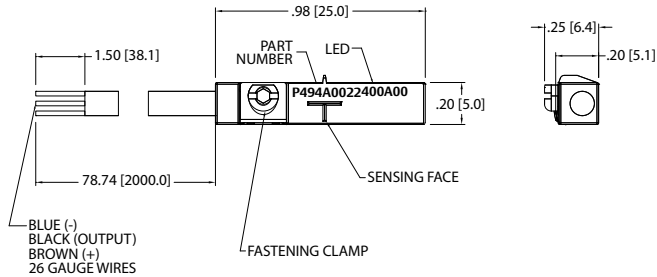
| ELECTRICAL DESIGN                 | DC PNP                                                                                          |
|-----------------------------------|-------------------------------------------------------------------------------------------------|
| OUTPUT                            | Normally Open                                                                                   |
| OPERATING VOLTAGE                 | 10-30 VDC                                                                                       |
| CURRENT RATING                    | 100 mA                                                                                          |
| SHORT-CIRCUIT PROTECTION          | Yes                                                                                             |
| OVERLOAD PROTECTION               | Yes                                                                                             |
| REVERSE POLARITY PROTECTION       | Yes                                                                                             |
| VOLTAGE DROP                      | < 2.5 V                                                                                         |
| CURRENT CONSUMPTION               | < 12 mA                                                                                         |
| REPEATABILITY                     | < .2mm                                                                                          |
| POWER-ON DELAY TIME               | < 30 ms                                                                                         |
| SWITCH FREQUENCY                  | > 3000 Hz                                                                                       |
| AMBIENT TEMPERATURE               | -25°C to 85°C                                                                                   |
| PROTECTION                        | IP 67, III                                                                                      |
| HYSTERESIS                        | 1.0mm                                                                                           |
| MAGNETIC SENSITIVITY              | 2.0 mT                                                                                          |
| TRAVEL SPEED                      | > 10 m/s                                                                                        |
| HOUSING MATERIAL                  | PA (Polyamide) Black; Fastening Clamp: Stainless Steel                                          |
| FUNCTION DISPLAY SWITCHING STATUS | Yellow LED                                                                                      |
| CONNECTION                        | Flying Leads, Pur Cable (2m Long, 3 x26 Gauge Wire)                                             |
| REMARKS                           | Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5<br>cULus - Class 2 Source Required |
| ACCESSORIES                       | Rubber Placeholder, Cable Clip, and Cut Sheet To Be Provided with Every Switch                  |
| AGENCY APPROVALS                  | CE cUL US RoHS                                                                                  |

| ELECTRICAL DESIGN                 | DC PNP                                                                                          |
|-----------------------------------|-------------------------------------------------------------------------------------------------|
| OUTPUT                            | Normally Open                                                                                   |
| OPERATING VOLTAGE                 | 10-30 VDC                                                                                       |
| CURRENT RATING                    | 100 mA                                                                                          |
| SHORT-CIRCUIT PROTECTION          | Yes                                                                                             |
| OVERLOAD PROTECTION               | Yes                                                                                             |
| REVERSE POLARITY PROTECTION       | Yes                                                                                             |
| VOLTAGE DROP                      | < 2.5 V                                                                                         |
| CURRENT CONSUMPTION               | < 12 mA                                                                                         |
| REPEATABILITY                     | < .2mm                                                                                          |
| POWER-ON DELAY TIME               | < 30 ms                                                                                         |
| SWITCH FREQUENCY                  | > 3000 Hz                                                                                       |
| AMBIENT TEMPERATURE               | -25°C to 85°C                                                                                   |
| PROTECTION                        | IP 67, III                                                                                      |
| HYSTERESIS                        | 1.0mm                                                                                           |
| MAGNETIC SENSITIVITY              | 2.0 mT                                                                                          |
| TRAVEL SPEED                      | > 10 m/s                                                                                        |
| HOUSING MATERIAL                  | PA (Polyamide) Black; Fastening Clamp: Stainless Steel                                          |
| FUNCTION DISPLAY SWITCHING STATUS | Yellow LED                                                                                      |
| CONNECTION                        | M8 Connector (Snap Fit) , Pur Cable (.3 m)                                                      |
| REMARKS                           | Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5<br>cULus - Class 2 Source Required |
| ACCESSORIES                       | Rubber Placeholder, Cable Clip, and Cut Sheet To Be Provided with Every Switch                  |
| AGENCY APPROVALS                  | CE cUL US RoHS                                                                                  |

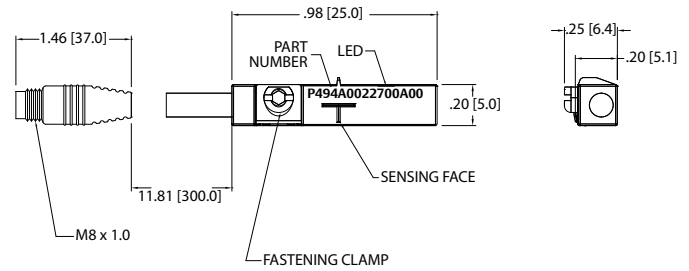
\*Switches are not designed for wet environments. Please see your distributor for additional information.

## Sensing Part Numbers

### P494A0022400A00



### P494A0022700A00



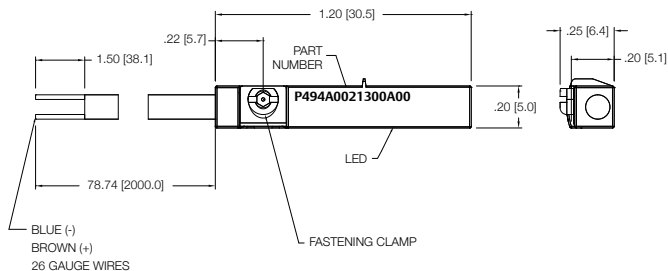
| ELECTRICAL DESIGN                 | DC NPN                                                                                          |
|-----------------------------------|-------------------------------------------------------------------------------------------------|
| OUTPUT                            | Normally Open                                                                                   |
| OPERATING VOLTAGE                 | 10-30 VDC                                                                                       |
| CURRENT RATING                    | 100 mA                                                                                          |
| SHORT-CIRCUIT PROTECTION          | Yes                                                                                             |
| OVERLOAD PROTECTION               | Yes                                                                                             |
| REVERSE POLARITY PROTECTION       | Yes                                                                                             |
| VOLTAGE DROP                      | < 2.5 V                                                                                         |
| CURRENT CONSUMPTION               | < 12 mA                                                                                         |
| REPEATABILITY                     | < .2mm                                                                                          |
| POWER-ON DELAY TIME               | < 30 ms                                                                                         |
| SWITCH FREQUENCY                  | > 3000 Hz                                                                                       |
| AMBIENT TEMPERATURE               | -25°C to 85°C                                                                                   |
| PROTECTION                        | IP 67, III                                                                                      |
| HYSTERESIS                        | 1.0mm                                                                                           |
| MAGNETIC SENSITIVITY              | 2.0 mT                                                                                          |
| TRAVEL SPEED                      | > 10 m/s                                                                                        |
| HOUSING MATERIAL                  | PA (Polyamide) Black; Fastening Clamp: Stainless Steel                                          |
| FUNCTION DISPLAY SWITCHING STATUS | Yellow LED                                                                                      |
| CONNECTION                        | Flying Leads, Pur Cable (2m Long, 3 x26 Gauge Wire)                                             |
| REMARKS                           | Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5<br>cULus - Class 2 Source Required |
| ACCESSORIES                       | Rubber Placeholder, Cable Clip, and Cut Sheet To Be Provided with Every Switch                  |
| AGENCY APPROVALS                  | CE cULus RoHS                                                                                   |

| ELECTRICAL DESIGN                 | DC NPN                                                                                          |
|-----------------------------------|-------------------------------------------------------------------------------------------------|
| OUTPUT                            | Normally Open                                                                                   |
| OPERATING VOLTAGE                 | 10-30 VDC                                                                                       |
| CURRENT RATING                    | 100 mA                                                                                          |
| SHORT-CIRCUIT PROTECTION          | Yes                                                                                             |
| OVERLOAD PROTECTION               | Yes                                                                                             |
| REVERSE POLARITY PROTECTION       | Yes                                                                                             |
| VOLTAGE DROP                      | < 2.5 V                                                                                         |
| CURRENT CONSUMPTION               | < 12 mA                                                                                         |
| REPEATABILITY                     | < .2mm                                                                                          |
| POWER-ON DELAY TIME               | < 30 ms                                                                                         |
| SWITCH FREQUENCY                  | > 3000 Hz                                                                                       |
| AMBIENT TEMPERATURE               | -25°C to 85°C                                                                                   |
| PROTECTION                        | IP 67, III                                                                                      |
| HYSTERESIS                        | 1.0mm                                                                                           |
| MAGNETIC SENSITIVITY              | 2.0 mT                                                                                          |
| TRAVEL SPEED                      | > 10 m/s                                                                                        |
| HOUSING MATERIAL                  | PA (Polyamide) Black; Fastening Clamp: Stainless Steel                                          |
| FUNCTION DISPLAY SWITCHING STATUS | Yellow LED                                                                                      |
| CONNECTION                        | M8 Connector (Snap Fit) , Pur Cable (.3 m)                                                      |
| REMARKS                           | Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5<br>cULus - Class 2 Source Required |
| ACCESSORIES                       | Rubber Placeholder, Cable Clip, and Cut Sheet To Be Provided with Every Switch                  |
| AGENCY APPROVALS                  | CE cULus RoHS                                                                                   |

\*Switches are not designed for wet environments. Please see your distributor for additional information.

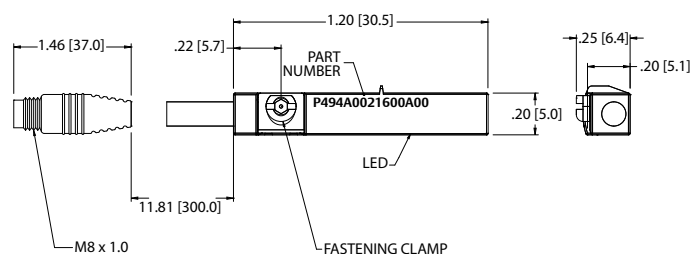
## Sensing Part Numbers

### P494A0021300A00



| ELECTRICAL DESIGN                 | AC/DC REED                                                                                                                                                                                                                                                                      |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OUTPUT                            | Normally Open                                                                                                                                                                                                                                                                   |
| OPERATING VOLTAGE                 | 5-120 VAC/DC                                                                                                                                                                                                                                                                    |
| CURRENT RATING                    | 100 mA*                                                                                                                                                                                                                                                                         |
| SHORT-CIRCUIT PROTECTION          | No                                                                                                                                                                                                                                                                              |
| OVERLOAD PROTECTION               | No                                                                                                                                                                                                                                                                              |
| REVERSE POLARITY PROTECTION       | Yes                                                                                                                                                                                                                                                                             |
| VOLTAGE DROP                      | < 5 V                                                                                                                                                                                                                                                                           |
| REPEATABILITY                     | ± .2mm                                                                                                                                                                                                                                                                          |
| MAKETIME INCLUDING BOUNCE         | < .6 ms                                                                                                                                                                                                                                                                         |
| BREAKTIME                         | < .1 ms                                                                                                                                                                                                                                                                         |
| SWITCHING POWER (MAX)             | 5 W                                                                                                                                                                                                                                                                             |
| SWITCH FREQUENCY                  | 1000 Hz                                                                                                                                                                                                                                                                         |
| AMBIENT TEMPERATURE               | -25°C to 70°C                                                                                                                                                                                                                                                                   |
| PROTECTION                        | IP 67, II                                                                                                                                                                                                                                                                       |
| HYSTERESIS                        | .9mm                                                                                                                                                                                                                                                                            |
| HOUSING MATERIAL                  | PA (Polyamide) Black; Fastening Clamp: Stainless Steel                                                                                                                                                                                                                          |
| FUNCTION DISPLAY SWITCHING STATUS | Yellow LED                                                                                                                                                                                                                                                                      |
| CONNECTION                        | Flying Leads, Pur Cable (2m Long, 2 x26 Gauge Wire)                                                                                                                                                                                                                             |
| REMARKS                           | <p>*External Protective Circuit for Inductive Load (Valve, Contactor, Etc..) Necessary. Conforms to 2008 NEC Section 725 III, Class 2 Circuits</p> <p>Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5.<br/>No LED Function in case of Polarity in DC Operation</p> |
| ACCESSORIES                       | Rubber Placeholder, Cable Clip, and Cut Sheet To Be Provided with Every Switch                                                                                                                                                                                                  |
| AGENCY APPROVALS                  | <b>CE RoHS</b>                                                                                                                                                                                                                                                                  |

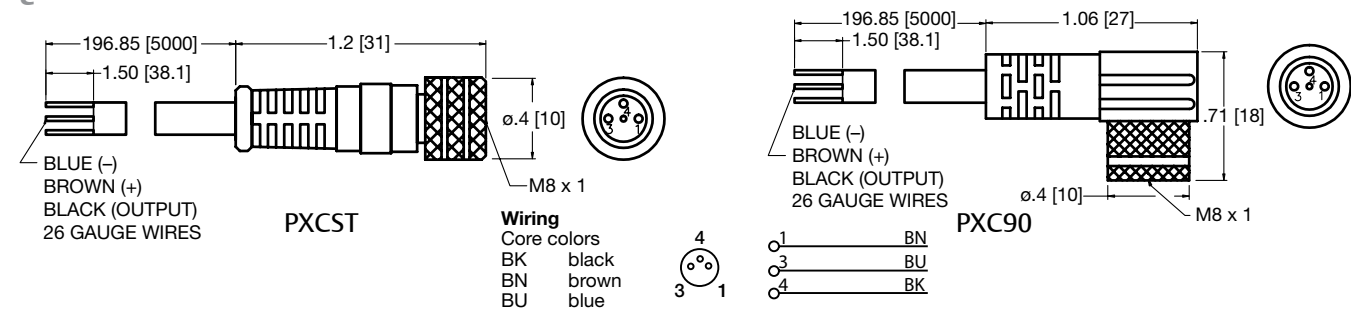
### P494A0021600A00



| ELECTRICAL DESIGN                 | AC/DC REED                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OUTPUT                            | Normally Open                                                                                                                                                                                                                                                                                                                                                                   |
| OPERATING VOLTAGE                 | * 5-60 VDC / 5-50 VAC                                                                                                                                                                                                                                                                                                                                                           |
| CURRENT RATING                    | 100 mA                                                                                                                                                                                                                                                                                                                                                                          |
| SHORT-CIRCUIT PROTECTION          | No                                                                                                                                                                                                                                                                                                                                                                              |
| OVERLOAD PROTECTION               | No                                                                                                                                                                                                                                                                                                                                                                              |
| REVERSE POLARITY PROTECTION       | Yes                                                                                                                                                                                                                                                                                                                                                                             |
| VOLTAGE DROP                      | < 5 V                                                                                                                                                                                                                                                                                                                                                                           |
| REPEATABILITY                     | ± .2mm                                                                                                                                                                                                                                                                                                                                                                          |
| MAKETIME INCLUDING BOUNCE         | < .6 ms                                                                                                                                                                                                                                                                                                                                                                         |
| BREAKTIME                         | < .1 ms                                                                                                                                                                                                                                                                                                                                                                         |
| SWITCHING POWER (MAX)             | 5 W                                                                                                                                                                                                                                                                                                                                                                             |
| SWITCH FREQUENCY                  | 1000 Hz                                                                                                                                                                                                                                                                                                                                                                         |
| AMBIENT TEMPERATURE               | -25°C to 70°C                                                                                                                                                                                                                                                                                                                                                                   |
| PROTECTION                        | IP 67, II                                                                                                                                                                                                                                                                                                                                                                       |
| HYSTERESIS                        | .9mm                                                                                                                                                                                                                                                                                                                                                                            |
| HOUSING MATERIAL                  | PA (Polyamide) Black; Fastening Clamp: Stainless Steel                                                                                                                                                                                                                                                                                                                          |
| FUNCTION DISPLAY SWITCHING STATUS | Yellow LED                                                                                                                                                                                                                                                                                                                                                                      |
| CONNECTION                        | M8 Connector (Snap Fit), Pur Cable (.3m)                                                                                                                                                                                                                                                                                                                                        |
| REMARKS                           | <p>*External Protective Circuit for Inductive Load (Valve, Contactor, Etc..) Necessary. Conforms to 2008 NEC Section 725 III, Class 2 Circuits</p> <p>M8 Connector voltage limited to 5-60 vdc / 5-50 vac to conform with 2008 IEC 61076-2-104</p> <p>Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5.<br/>No LED Function in case of Polarity in DC Operation</p> |
| ACCESSORIES                       | Rubber Placeholder, Cable Clip, and Cut Sheet To Be Provided with Every Switch                                                                                                                                                                                                                                                                                                  |
| AGENCY APPROVALS                  | <b>CE RoHS</b>                                                                                                                                                                                                                                                                                                                                                                  |

\*Switches are not designed for wet environments. Please see your distributor for additional information.

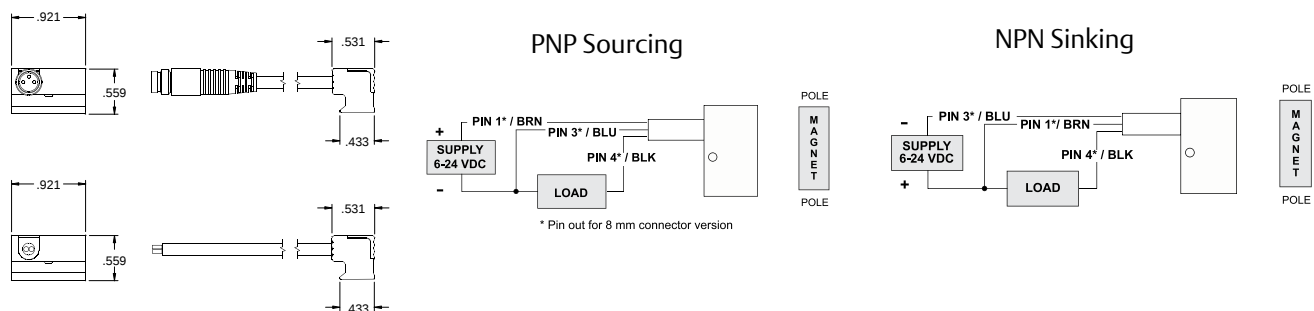
## Quick Disconnect Cables



| Order Code | Type                                   | Operating Voltage | Current Rating | Cable Material | Protection | Connector |
|------------|----------------------------------------|-------------------|----------------|----------------|------------|-----------|
| PXCST      | Straight 5 m Cable (3 x 26 Gauge wire) | 60 AC/75 DC       | 3 A            | PUR            | IP 68, III | M8        |
| PXC90      | 90° 5 m Cable (3 x 26 Gauge wire)      | 60 AC/75 DC       | 3 A            | PUR            | IP 68, III | M8        |

## World Switch Hall Effect Part Numbers

### MCR Series World Switch Hall Effect Part Numbers



| P/N     | Switch Style | Electrical Design | Output        | Operating Voltage | Current Rating | Switching Power | Voltage Drop | NEMA IP Rating | Temperature Rating |
|---------|--------------|-------------------|---------------|-------------------|----------------|-----------------|--------------|----------------|--------------------|
| SH6-031 | Flying Lead  | DC PNP            | Normally Open | 6-24 VDC          | 0.3 Amps Max.  | 7.2 Watts Max.  | .5 Volts     | NEMA 6         | -25° to +75° C     |
| SH6-032 | Flying Lead  | DC PNP            | Normally Open | 6-24 VDC          | 0.3 Amps Max.  | 7.2 Watts Max.  | .5 Volts     | NEMA 6         | -25° to +75° C     |
| SH6-021 | M8 Connector | DC NPN            | Normally Open | 6-24 VDC          | 0.3 Amps Max.  | 7.2 Watts Max.  | .5 Volts     | NEMA 6         | -25° to +75° C     |
| SH6-022 | M8 Connector | DC NPN            | Normally Open | 6-24 VDC          | 0.3 Amps Max.  | 7.2 Watts Max.  | .5 Volts     | NEMA 6         | -25° to +75° C     |

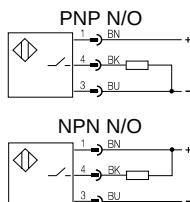
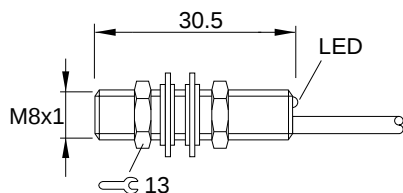
## Magnetically Coupled Rodless Cylinders

### End of Stroke Proximity Switch



Proximity Sensor

#### Prox Switch (NPN NO) Flying Leads - PX08NS (PNP NO) Flying Leads - PX08PS



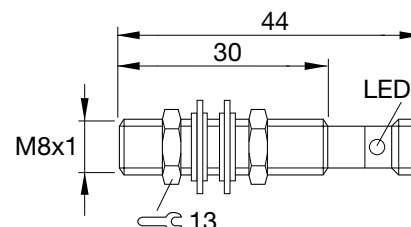
#### Sensing Data

|                                       |      |             |
|---------------------------------------|------|-------------|
| Repeat accuracy R                     |      | ≤5%         |
| Ambient temperature range $\vartheta$ | (°C) | -25...+70°C |
| Operating frequency f                 | (Hz) | 1000        |
| Utilization categories                | (DC) | 13          |
| Function indication                   |      | YES         |

#### Electrical Data

|                                        |      |            |
|----------------------------------------|------|------------|
| Rated operational voltage $U_e$        | (V)  | 24 DC      |
| Supply voltage $U_B$                   | (V)  | 10...30 DC |
| Voltage drop $U_d$ at $I_e$ Stat./dyn. | (V)  | ≤2.5       |
| Rated insulation voltage $U_i$         | (V)  | 75 VDC     |
| Load current capacity                  | (mA) | 200        |
| Current consumption                    | (mA) | ≤25 / ≤12  |
| Off-State Current $I_r$                | (uA) | ≤80        |
| Protected against polarity reversal    |      | YES        |
| Short circuit protected                |      | YES        |
| Load Capacitance                       | (uF) | ≤1.00      |

#### Prox Switch (NPN NO) 8 mm connector - PX08NQ (PNP NO) 8 mm connector - PROX-8QDS-PN



|                                   |                                                                                                                           |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Electrical Design                 | 3-wire DC PNP; 2-wire DC PNP/NPN                                                                                          |
| Output                            | Normally Open                                                                                                             |
| Operating Voltage                 | 10-30 VDC                                                                                                                 |
| Current Rating                    | 100 mA                                                                                                                    |
| Minimum Load Current              | 2 mA*                                                                                                                     |
| Leakage Current                   | < .5 mA                                                                                                                   |
| Short-Circuit Protection          | Yes (Non latching)                                                                                                        |
| Overload Protection               | Yes                                                                                                                       |
| Reverse Polarity Protection       | Yes                                                                                                                       |
| Voltage Drop                      | < 2.8 V                                                                                                                   |
| Current Consumption               | < 10 mA**                                                                                                                 |
| Switching Frequency               | > 1000 Hz                                                                                                                 |
| Ambient Temperature               | 0 °C to 60°C                                                                                                              |
| Protection                        | IP 67, III                                                                                                                |
| Hysteresis                        | 1 -15% of Sr                                                                                                              |
| Operating Distance                | 0 - 2.4mm                                                                                                                 |
| Correction Factor                 | Mild Steel = 1, Stainless Steel = .7,<br>Brass = .5, Alum = .4, Copper = .3<br>Brass with bronze coated; Active face; LCP |
| Housing Material                  |                                                                                                                           |
| Function Display Switching Status | Yellow LED (4 x 90°)                                                                                                      |
| Connection                        | M8 Connector                                                                                                              |
| Remarks                           | 2 M8 lock nuts included                                                                                                   |
| Accessories                       | 2 M8 lock nuts included                                                                                                   |
| Agency Approvals                  |                                                                                                                           |



## MC1 and MC2 Series Cushion Capacity Chart

Adjustable cushions are standard on the MC1 & MC2 Series (16mm - 40mm Bores). They reduce the end of stroke piston energy. If the application exceeds the capacities listed an external shock or deceleration circuit must be incorporated.

Cushioning Capacity (Maximum Kinetic Energy)

|          | 12 Bore | 16 Bore | 20 Bore | 25 Bore | 32 Bore | 40 Bore |
|----------|---------|---------|---------|---------|---------|---------|
| in./lbs. | 3.79    | 10.68   | 20.33   | 33.12   | 64.71   | 101.26  |
| Nm       | (0.43)  | (1.21)  | (2.30)  | (3.75)  | (7.32)  | (11.45) |



## Cushion Capacity – Weight versus Speed

| Piston Speed |         | 12mm Bore<br>Maximum Mass<br>To Be Cushioned |         | 16mm Bore<br>Maximum Mass<br>To Be Cushioned |        | 20mm Bore<br>Maximum Mass<br>To Be Cushioned |        | 25mm Bore<br>Maximum Mass<br>To Be Cushioned |        | 32mm Bore<br>Maximum Mass<br>To Be Cushioned |        | 40mm Bore<br>Maximum Mass<br>To Be Cushioned |        |
|--------------|---------|----------------------------------------------|---------|----------------------------------------------|--------|----------------------------------------------|--------|----------------------------------------------|--------|----------------------------------------------|--------|----------------------------------------------|--------|
| in/sec       | (m/sec) | lb                                           | (kg)    | lb                                           | (kg)   | lb                                           | (kg)   | lb                                           | (kg)   | lb                                           | (kg)   | lb                                           | (kg)   |
| 3.94         | (0.1)   | 220.46                                       | (100.0) | N/A                                          | N/A    | N/A                                          | N/A    | N/A                                          | N/A    | N/A                                          | N/A    | N/A                                          | N/A    |
| 7.87         | (0.2)   | 55.12                                        | (25.0)  | 154.32                                       | (70.0) | N/A                                          | N/A    | N/A                                          | N/A    | N/A                                          | N/A    | N/A                                          | N/A    |
| 11.81        | (0.3)   | 21.61                                        | (9.8)   | 66.14                                        | (30.0) | 121.25                                       | (55.0) | 198.42                                       | (90.0) | N/A                                          | N/A    | N/A                                          | N/A    |
| 15.75        | (0.4)   | 11.02                                        | (5.0)   | 37.48                                        | (17.0) | 66.14                                        | (30.0) | 110.23                                       | (50.0) | 198.42                                       | (90.0) | N/A                                          | N/A    |
| 19.69        | (0.5)   | 7.17                                         | (3.3)   | 22.05                                        | (10.0) | 39.68                                        | (18.0) | 66.14                                        | (30.0) | 127.87                                       | (58.0) | 209.44                                       | (95.0) |
| 23.62        | (0.6)   | 4.96                                         | (2.3)   | 14.77                                        | (6.7)  | 28.66                                        | (13.0) | 44.09                                        | (20.0) | 88.18                                        | (40.0) | 141.10                                       | (64.0) |
| 27.55        | (0.7)   | 3.75                                         | (1.7)   | 10.14                                        | (4.6)  | 19.84                                        | (9.0)  | 33.07                                        | (15.0) | 66.14                                        | (30.0) | 103.62                                       | (47.0) |
| 31.50        | (0.8)   | 2.87                                         | (1.3)   | 7.72                                         | (3.5)  | 15.43                                        | (7.0)  | 26.46                                        | (12.0) | 52.91                                        | (24.0) | 77.16                                        | (35.0) |
| 35.43        | (0.9)   | 2.20                                         | (1.0)   | 5.73                                         | (2.6)  | 12.13                                        | (5.5)  | 19.84                                        | (9.0)  | 39.68                                        | (18.0) | 61.73                                        | (28.0) |
| 39.37        | (1.0)   | 1.76                                         | (0.8)   | 4.41                                         | (2.0)  | 9.92                                         | (4.5)  | 14.99                                        | (6.8)  | 31.97                                        | (14.5) | 49.60                                        | (22.5) |

Cushion adjustment: To increase cushioning turn adjustment screw clockwise. All MCR Series cushion adjustment screws are mechanically retained for safety and to prevent loss.

## MC3, MC4 and MC5 Series Shock Absorbers

$$E_3 = \text{Kinetic Energy} + (\text{propelling force} \times \text{shock stroke})$$

$$\text{Effective weight} = \frac{E_3}{0.2 \times \text{Velocity}^2}$$



## Shocks

| Diameter | Part Number   | Shock Stroke |      | Effective Weight |          | Max. Energy Capacity Inch/Lbs.<br>Per Cycle E3 Per Hour E4 |      |         |        | Accessories |           |
|----------|---------------|--------------|------|------------------|----------|------------------------------------------------------------|------|---------|--------|-------------|-----------|
|          |               | in           | (mm) | in               | (kg)     | IN-LBS                                                     | (Nm) | IN-LBS  | (Nm)   | JAM NUTS    | SOFT PADS |
| 12 mm    | NC-S0.2-1A    | 0.472        | 12   | 4.4 - 24         | 2 -- 11  | 194                                                        | 22   | 309,760 | 35,200 | NU-17012    | NU-17011  |
| 16 mm    | NC-S0.2-1A    | 0.472        | 12   | 4.4 - 24         | 2 -- 11  | 194                                                        | 22   | 309,760 | 35,200 | NU-17012    | NU-17011  |
| 20 mm    | NC-S0.25-3L   | 0.551        | 14   | 136 - 554        | 62 - 252 | 264                                                        | 30   | 440,000 | 50,000 | NU-21052    | NU-21011  |
| 25 mm    | NC-S0.25-3L   | 0.551        | 14   | 136 - 554        | 62 - 252 | 264                                                        | 30   | 440,000 | 50,000 | NU-21052    | NU-21011  |
| 32 mm    | NC-S0.5x19-2L | 0.748        | 19   | 88 - 460         | 40 - 209 | 880                                                        | 100  | 673,200 | 76,500 | NU-21152    | NU-21111  |
| 40 mm    | NC-S0.5x19-2L | 0.748        | 19   | 88 - 460         | 40 - 209 | 880                                                        | 100  | 673,200 | 76,500 | NU-21152    | NU-21111  |

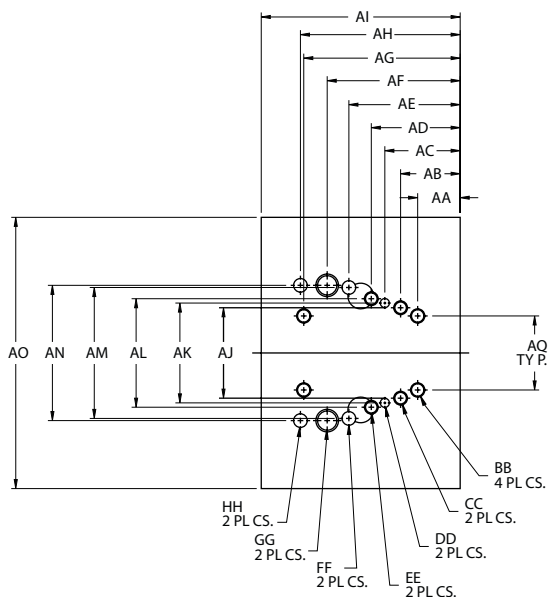
More shocks are available, consult factory

## NuMate Interface Plates for MC3, MC4 and MC5 Series Guided Units

Enables the mounting of slides, grippers and rotary actuators incorporating the NuMate Mounting Pattern.

### NuMate Transition Plate for Linear Guided Cylinders Model Number Chart

| 12 Bore   | 16 Bore   | 20 Bore   | 25 Bore   | 32 Bore   | 40 Bore   |
|-----------|-----------|-----------|-----------|-----------|-----------|
| AP-010012 | AP-010016 | AP-010020 | AP-010025 | AP-010032 | AP-010040 |



### NuMate Plate Kit Weight For MC3, MC4 and MC5

| Diameter | Plate Weight lbs (kg) | Bolt Weight lbs (kg) | Total Weight lbs (kg) |
|----------|-----------------------|----------------------|-----------------------|
| 12mm     | 0.38 (0.172)          | 0.015 (0.007)        | 0.44 (0.200)          |
| 16mm     | 0.46 (0.209)          | 0.018 (0.008)        | 0.53 (0.240)          |
| 20mm     | 0.65 (0.295)          | 0.02 (0.009)         | 0.73 (0.331)          |
| 25mm     | 0.93 (0.422)          | 0.023 (0.010)        | 1.02 (0.463)          |
| 32mm     | 1.76 (0.798)          | 0.038 (0.017)        | 1.91 (0.866)          |
| 40mm     | 2.43 (1.102)          | 0.038 (0.017)        | 2.56 (1.161)          |

### Transition Plate For MC3, MC4 and MC5

| Transition Plate | Bolt P.N. | Bolt Size |
|------------------|-----------|-----------|
| AP-010012 SPEC   | 127-413   | M5 x 40   |
| AP-010016 SPEC   | 127-353   | M5 x 45   |
| AP-010020 SPEC   | 127-416   | M5 x 55   |
| AP-010025 SPEC   | 127-620   | M5 x 60   |
| AP-010032 SPEC   | 127-432   | M6 x 70   |
| AP-010040 SPEC   | 127-432   | M6 x 70   |

| Diameter | Magnetically Coupled Compatibility with Motion Control Slides |       |       |       |     |     |     |
|----------|---------------------------------------------------------------|-------|-------|-------|-----|-----|-----|
| 12mm     | SH031                                                         | LC056 | LC075 | B04   | —   | —   | —   |
| 16mm     | SH031                                                         | LC056 | LC075 | B04   | B06 | —   | —   |
| 20mm     | SH056                                                         | LC056 | LC075 | LC106 | B04 | B06 | B08 |
| 25mm     | SH056                                                         | LC056 | LC075 | LC106 | B04 | B06 | B08 |
| 32mm     | SH075                                                         | LC075 | LC106 | LC150 | —   | —   | —   |
| 40mm     | SH075                                                         | LC075 | LC106 | LC150 | —   | —   | —   |

| Part Number    | Diameter | AA          | AB          | AC          | AD          | AE          | AF          | AG           | AH          |
|----------------|----------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|
| AP-010012 SPEC | 12 mm    | 0.74 (18.8) | 0.90 (22.7) | 1.12 (28.3) | 1.25 (31.8) | 1.56 (39.6) | 1.80 (45.6) | 1.76 (44.7)  | 2.17 (55.0) |
| AP-010016 SPEC | 16 mm    | 0.75 (18.9) | 0.91 (23.0) | 1.12 (28.3) | 1.25 (31.8) | 1.56 (39.6) | 1.76 (44.7) | 2.01 (50.9)  | 2.13 (54.1) |
| AP-010020 SPEC | 20 mm    | 0.84 (21.3) | 1.07 (27.3) | 1.38 (35.1) | 1.57 (39.9) | 1.95 (49.4) | 2.25 (57.0) | 2.41 (61.3)  | 2.62 (66.4) |
| AP-010025 SPEC | 25 mm    | 1.11 (28.3) | 1.36 (34.5) | 1.67 (42.4) | 1.86 (47.2) | 2.23 (56.7) | 2.53 (64.3) | 2.89 (73.3)  | 2.90 (73.7) |
| AP-010032 SPEC | 32 mm    | 1.22 (31.0) | 1.50 (38.1) | 1.88 (47.6) | 2.18 (55.4) | 2.56 (64.9) | 2.95 (74.9) | 3.78 (96.0)  | 3.38 (85.8) |
| AP-010040 SPEC | 40 mm    | 1.34 (33.9) | 1.50 (38.1) | 1.88 (47.6) | 2.25 (57.2) | 2.63 (66.7) | 2.95 (74.9) | 4.29 (108.9) | 3.38 (85.8) |

| Part Number    | Diameter | AI           | AJ          | AK          | AL          | AM          | AN          | AO           | AP          |
|----------------|----------|--------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|
| AP-010012 SPEC | 12 mm    | 2.50 (63.5)  | 1.00 (25.4) | 1.25 (31.8) | 1.37 (34.9) | 1.50 (38.1) | 1.81 (46.0) | 3.25 (82.5)  | 0.50 (12.7) |
| AP-010016 SPEC | 16 mm    | 2.75 (69.9)  | 1.00 (25.4) | 1.25 (31.8) | 1.37 (34.9) | 1.50 (38.1) | 1.81 (46.0) | 3.50 (88.9)  | 0.50 (12.7) |
| AP-010020 SPEC | 20 mm    | 3.25 (82.5)  | 1.25 (31.8) | 1.37 (34.9) | 1.50 (38.1) | 1.81 (46.0) | 1.87 (47.6) | 4.25 (108.0) | 0.50 (12.7) |
| AP-010025 SPEC | 25 mm    | 4.00 (101.6) | 1.25 (31.8) | 1.37 (34.9) | 1.50 (38.1) | 1.81 (46.0) | 1.87 (47.6) | 5.00 (127.0) | 0.50 (12.7) |
| AP-010032 SPEC | 32 mm    | 5.00 (127.0) | 1.50 (38.1) | 1.81 (46.0) | 1.87 (47.6) | 2.25 (57.2) | 2.50 (63.5) | 6.00 (152.4) | 0.63 (16.0) |
| AP-010040 SPEC | 40 mm    | 5.63 (143.0) | 1.50 (38.1) | 1.81 (46.0) | 1.87 (47.6) | 2.25 (57.2) | 2.50 (63.5) | 7.00 (177.8) | 0.63 (16.0) |

| Part Number    | Diameter | AQ          | BB     | CC         | DD                  | EE          | FF                  | GG          | HH                  |
|----------------|----------|-------------|--------|------------|---------------------|-------------|---------------------|-------------|---------------------|
| AP-010012 SPEC | 12 mm    | 0.75 (19.0) | M5x.8  | 6-32 UNC   | .094/.095 (2.3/2.4) | 10-32 UNC   | .125/.126 (3.1/3.2) | 1/4-20 UNC  | .187/.188 (4.7/4.8) |
| AP-010016 SPEC | 16 mm    | 1.26 (32.0) | M5x.8  | 6-32 UNC   | .094/.095 (2.3/2.4) | 10-32 UNC   | .125/.126 (3.1/3.2) | 1/4-20 UNC  | .187/.188 (4.7/4.8) |
| AP-010020 SPEC | 20 mm    | 1.02 (26.0) | M5x.8  | 10-32 UNC  | .125/.126 (3.1/3.2) | 1/4-20 UNC  | .187/.188 (4.7/4.8) | 5/16-18 UNC | .187/.188 (4.7/4.8) |
| AP-010025 SPEC | 25 mm    | 1.02 (26.0) | M5x.8  | 10-32 UNC  | .125/.126 (3.1/3.2) | 1/4-20 UNC  | .187/.188 (4.7/4.8) | 5/16-18 UNC | .187/.188 (4.7/4.8) |
| AP-010032 SPEC | 32 mm    | 1.58 (40.0) | M6x1.0 | 1/4-20 UNC | .187/.188 (4.7/4.8) | 5/16-18 UNC | .187/.188 (4.7/4.8) | 5/16-18 UNC | .187/.188 (4.7/4.8) |
| AP-010040 SPEC | 40 mm    | 1.97 (50.0) | M6x1.0 | 1/4-20 UNC | .187/.188 (4.7/4.8) | 5/16-18 UNC | .187/.188 (4.7/4.8) | 5/16-18 UNC | .187/.188 (4.7/4.8) |

Dimensions = inches & (in parenthesis) = millimeters



## Theoretical Force

The forces listed below are theoretical. Due to Internal & external friction it is recommended that 75% of the available cylinder force be utilized. If the system requirement exceeds that value select the next larger bore size.

## Maximum Thrust Force

dimensions = inches (dimensions in parenthesis = millimeters)

| Diameter                         | Pressure PSI (bar) |              |              |               |               |               |               |               |
|----------------------------------|--------------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|
|                                  | 25 (1.7)           | 40 (2.8)     | 50 (3.4)     | 60 (4.1)      | 70 (4.8)      | 80 (5.5)      | 90 (6.2)      | 100 (6.9)     |
| Theoretical Thrust Force lbf (N) |                    |              |              |               |               |               |               |               |
| 12 mm                            | 4.4 (19.5)         | 7.0 (31.2)   | 8.8 (39.0)   | 10.5 (46.8)   | 12.3 (54.6)   | 14.0 (62.4)   | 15.8 (70.2)   | 17.5 (78.0)   |
| 16 mm                            | 7.8 (34.7)         | 12.5 (55.5)  | 15.6 (69.3)  | 18.7 (83.2)   | 21.8 (97.1)   | 24.9 (110.9)  | 28.0 (124.8)  | 31.2 (138.7)  |
| 20 mm                            | 12.2 (54.2)        | 19.5 (86.7)  | 24.3 (108.3) | 29.3 (130.0)  | 34.1 (151.7)  | 39.0 (173.3)  | 43.8 (195.0)  | 48.7 (216.7)  |
| 25 mm                            | 19.0 (84.6)        | 30.4 (135.4) | 38.0 (169.3) | 45.7 (203.1)  | 53.3 (237.0)  | 60.9 (270.8)  | 68.5 (304.7)  | 76.1 (338.6)  |
| 32 mm                            | 31.2 (138.7)       | 49.9 (221.9) | 62.3 (277.3) | 74.8 (332.8)  | 87.3 (388.3)  | 99.7 (443.8)  | 112.2 (499.2) | 124.7 (554.7) |
| 40 mm                            | 48.7 (216.7)       | 77.9 (346.7) | 97.4 (433.4) | 116.9 (520.0) | 136.3 (606.7) | 155.8 (693.4) | 175.3 (780.0) | 194.8 (866.7) |

## Port Adapters

To Convert the standard NPT port to BSP select the appropriate adapter.

### Port Adapters – NPTF Male/BSP Female

| NPT   | G Thread | Part Number   |
|-------|----------|---------------|
| 10-32 | M5       | IN438-036-005 |
| 1/8   | 1/8      | IN438-020-000 |
| 1/4   | 1/4      | IN438-021-001 |



## Hydraulic Operation

The MCR Series Magnetically Coupled Rodless Cylinders are rated for up to 100 PSI non-shock hydraulic operation.

## When To Consider

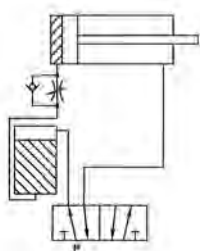
Due to the non-compressible quality of hydraulic fluids they may be utilized when slow speed, constant velocity or constant force are critical. Since the MCR Series incorporates a totally sealed barrel configuration it is well suited for low pressure hydraulic operation.

## Service

The hydraulic supply must be regulated to no more than 100 PSI. If a hydraulic supply is not available an air over oil tank can be utilized. A sample circuit is shown.

For more information concerning this type of circuitry contact Emerson or your local Emerson Distributor.

NOTE: The MC1 and MC2 Series will not include an adjustable cushion when used in conjunction with hydraulic fluid.



## Vertical Applications

When applying into a vertical orientation only 60% of the magnetic coupling force should be considered. If the application requires greater than 60% of the rated coupling force the next size larger should be selected.

## Lubrication

The internal piston seals and bearings are lubricated during assembly. All Emerson MCR Series can be operated with a non-lubricated air supply. If airline lubrication is supplied it must be maintained for the life of the cylinder.

All carriages include a grease fitting. The mating grease coupler is a Type D, DIN 3405 (Cup type) nipple, Part number 113-073. Carriages have been lubricated at assembly. Additional grease is required after every 120 miles of travel. Do not over fill the carriage or barrel wiper effectiveness may be reduced. Utilize Grease EP-2.

## Recoupling

Magnet decoupling can occur if the external force or weight exceeds the rated coupling force of any given unit. To recouple the carriage to the internal piston it is necessary to manually push the carriage fully to the end of stroke where the piston is located. If this continues the application should be reviewed.

## Service or Repair

Emerson recommends that repair of any MCR Series be performed by the factory or your local Emerson Distributor.

## Ambient Conditions

The MCR Series Cylinders should not be used in areas where they will be exposed to acids, chlorine or sulfur gas, organic solvents, or ester type machine oils.

Do not install on equipment where metal particulate or dust is present.

## General Cylinder Care

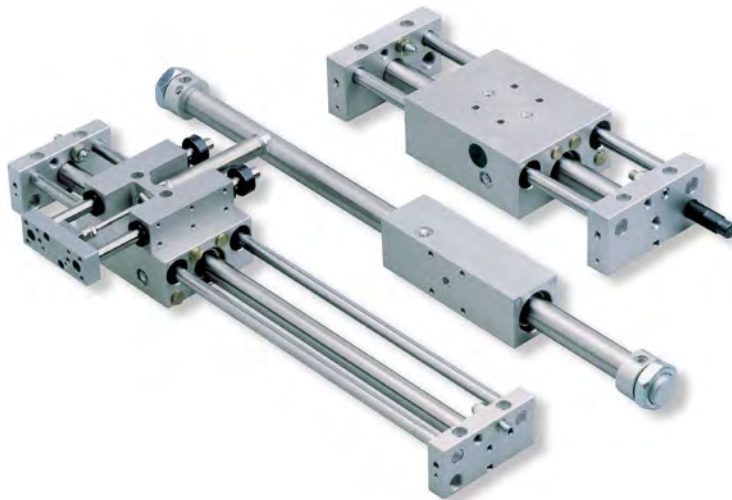
- Do not scratch or damage the barrel or guide shafts. They are bearing surfaces.
- Periodically clean cylinder barrel and external guide shafts.
- If shocks are used for the deceleration of the load they should be inspected on a regular basis to determine their effectiveness and general condition.
- Do not scratch or damage the barrel or guide shafts. They are bearing surfaces.
- Periodically clean cylinder barrel and external guide shafts.
- If shocks are used for the deceleration of the load they should be inspected on a regular basis to determine their effectiveness and general condition.



## Application Considerations

- If the load is externally guided and the MC1 or MC2 Series is utilized a floating mounting bracket must be installed between the cylinder carriage and the externally guided carriage. It will compensate for any nonparallel alignment between them.
- To inch, jog, or stop a cylinder in a mid-position use a 3-position 5-function four-way valve. The middle position enables pressurization of both sides of the piston. This will allow positive hold on cylinder position.
- For proper cylinder selection the following must be known. The orientation of the cylinder, stroke length, operating pressure, velocity, and center of gravity of the load in respect to the carriage. This information is required to calculate dynamic moments and cushion capacity.
- In harsh environments consider a boot or bellows for added cylinder protection.
- Consider a slow start valve. Once the air is exhausted from the machine system vertically mounted cylinders may drift down. Returning air to the system may cause damage to the cylinder or tooling due to the fact there is no pressure in the cylinder for the flow control to meter. This condition may exceed the internal cushion, shock capacity, or magnet coupling force of the cylinder.
- Position sensing can be achieved by incorporating the Emerson end of stroke inductive proximity switch or the rail mounted magnetic switch. Rail mounting enables sensing along the entire stroke length.
- Guided units, MC3, MC4, and MC5 Series should always incorporate a shock at both ends. If you are using the adjustable stroke kit a shock must be mounted into the hole provided.

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