### Air Cylinder

**Series NCM**

Stainless Steel Body Cylinders


#### Now available in 7/16" and 9/16" bore

- Double Rod/Double End Mounting
- Non-rotating Rod Option
- Auto Switch Capable

#### Specifications

<table>
<thead>
<tr>
<th>Standard type</th>
<th>Actuation</th>
<th>Style</th>
<th>Auto Switch</th>
<th>Standard stroke (inch)</th>
</tr>
</thead>
</table>
|               | Double acting | Single rod |             | [Bore size 044/056] 0050 (1/2"), 0100 (1"), 0150 (1-1/2"), 0200 (2"), 0250 (2-1/2"), 0300 (3"), 0400 (4"
|               | Double acting | Double rod |             | [Bore size 075 and above] 0050 (1/2"), 0100 (1"), 0150 (1-1/2"), 0200 (2"), 0250 (2-1/2"), 0300 (3"), 0400 (4"), 0600 (6"
|               | Single acting | Single rod |             | [Bore size 075 and above] 0050 (1/2"), 0100 (1"), 0150 (1-1/2"), 0200 (2"), 0250 (2-1/2"), 0300 (3"), 0400 (4"), 0600 (6"

<table>
<thead>
<tr>
<th>Bore size</th>
<th>Single rod</th>
<th>Double rod</th>
<th>Non-rotating Rod</th>
<th>Auto Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>044 (7/16&quot;)</td>
<td>056 (9/16&quot;)</td>
<td>075 (3/4&quot;)</td>
<td>088 (7/8&quot;)</td>
<td></td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>125 (1-1/4&quot;)</td>
<td>150 (1-1/2&quot;)</td>
<td>200 (2&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standard stroke (inch)</th>
<th>Bore size</th>
</tr>
</thead>
<tbody>
<tr>
<td>0050 (1/2&quot;)</td>
<td>0100 (1&quot;)</td>
</tr>
<tr>
<td>0150 (1-1/2&quot;)</td>
<td>0200 (2&quot;)</td>
</tr>
<tr>
<td>0250 (2-1/2&quot;)</td>
<td>0300 (3&quot;)</td>
</tr>
<tr>
<td>0400 (4&quot;)</td>
<td>0600 (6&quot;)</td>
</tr>
</tbody>
</table>

Now available in 7/16" and 9/16" bore
Now available in 8 different bore sizes, 7/16" to 2".

5 Actuation options available:
- Double Acting, Single Rod
- Double Acting, Double Rod
- Non-rotating Rod
- Single Acting, Spring Return
- Single Acting, Spring Extend

A wide variety of mounting configurations:
- Front Nose Mount
- Rear Pivot Mount
- Double End Mount
- Block Mount
- Foot Mount (optional brackets)

Chrome plated carbon steel piston rod improves corrosion resistance. Stainless steel 304 is available for further protection.

Available bumper for increased kinetic energy absorption, increased life cycles, and decreased noise.

Piston is crimped to rod to achieve tighter clearances and reduce piston rod deflection.

Chromated aluminum piston improves corrosion resistance.

Magnetic actuated limit switches are available as a standard option.

Seal, wear ring, and polished stainless steel tube work together to absorb side load and decrease overall friction, ensuring long lasting service life. (Wear ring used on 3/4" bore and larger.)

Pre-lubricated at the factory means that the NCM does not require a lubricated air system.
Step 1
Obtain the bore of the cylinder tube. → Refer to Graph (1) and (2).

1. Determine the load factor in accordance with the purpose.

<table>
<thead>
<tr>
<th>Purpose of operation</th>
<th>Load factor $\eta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static operation (Clamping, Low-speed vise crimping, etc.)</td>
<td>0.7 or less (70% or less)</td>
</tr>
<tr>
<td>Dynamic operation</td>
<td></td>
</tr>
<tr>
<td>Horizontal movement of load on guide</td>
<td>1 or less (100% or less)</td>
</tr>
<tr>
<td>Vertical and horizontal movement of the load</td>
<td>0.5 or less (50% or less)</td>
</tr>
</tbody>
</table>

Note) If it is particularly necessary to operate at high speeds, the load rate must be reduced further. (In the graph, it is possible to select a load rate of 0.4, 0.3, 0.2 or less.)

2. Determine the operating pressure.
Generally, set the regulator to 85% of the source air pressure. (In the graph, a selection between 0.2 MPa and 0.8 MPa is possible.)

3. Determine the direction in which the cylinder force will be used.
   - Extending side → Refer to Graph (1).
   - Retracting side → Refer to Graph (2).

Note) If the same load is applied both for pushing and pulling in a horizontal operation, set the direction to the pulling side.

Step 2
Take the impact at the stroke end into consideration.

1. When an external stopper (shock absorber, etc.) is provided to absorb the impact, select a stopper with sufficient absorption capacity.
2. Stopping the piston with the cylinder without a stopper:
   Verify in Graph (3) to (4) the absorption capacity of the cushion that is enclosed in the cylinder.
   Bumper ··················· Urethane rubber is used for preventing metal-to-metal contact between the piston and the cover.

Step 3
The aspects indicated below may need to be taken into consideration, depending on how the cylinder is operated.

1. If a lateral load is applied to the piston rod:
   Verify in Graph (5) whether the lateral load is within an allowable range.
2. When using a cylinder with a relatively long stroke, if a buckling force acts on the piston rod or the cylinder tube, verify in the table whether the stroke or the operating pressure is within a safe range.

Step 4
Obtain the cylinder’s air consumption and its required air volume.

Obtain the air consumption selecting a compressor and for calculating the running cost and the required air volume (Graph (6) to (7)) that is necessary for selecting a compressor and for calculating the running cost and the required air volume (Graph (8)) that is necessary for selecting equipment such as an air filter or a regulator, or the size of the piping upstream.
Model Selection

Step 1

Obtain the bore of the cylinder tube. → Refer to Graph (1) and (2).

Graph (1)
Extending Side Cylinder Force (Double acting cylinder)

Graph (2)
Retracting Side Cylinder Force (Double acting cylinder)

Example 1: If the minimum force of 85 lbf is necessary to keep the workpiece pressed as shown in Fig. (1), because this is the extending side, use Graph (1) to determine the load factor of 0.7 and the operating pressure of 75 PSI. Then, seek the point at which the cylinder force of 85 lbf intersects, and this will result in a bore size of 1.5 inches.

Example 2: To move a load with a 90 lbf weight horizontally on a guide as shown in Fig. (2), because the load is the same for both the pushing and retracting sides, use Graph (2), which is the retracting side with a smaller force. Determine the load factor of 1, and the operating pressure of 75 PSI. Then, seek the point at which it intersects with the load weight of 90 lbs, and this will result in a bore size of 1.5 inches.

Example 3: To pull a load with a 100 lbs weight vertically upward as shown in Fig. (3), use Graph (2) to determine the load factor of 0.5 and the operating pressure of 75 PSI. Then, seek the point at which it intersects with the load weight of 100 lbs, and this will result in a bore size of 2.0 inches.
Step 2

Take the impact at the stroke end into consideration.

**With Bumper**

**Without Bumper**

---

**Graph (3) Allowable Kinetic Energy with Bumper**

**Graph (4) Allowable Kinetic Energy without Bumper**
Model Selection

Step 3

The aspects indicated below may need to be taken into consideration, depending on how the cylinder is operated.

1. The maximum stroke at which the cylinder can be operated under a lateral load.

   The region that does not exceed the bold solid line represents the allowable lateral load in relation to the cylinder of a given stroke length. In the graph, the range of the broken line shows that the long stroke limit has been exceeded. In this region, as a rule, operate the cylinder by providing a guide along the direction of movement.

Graph (5)
Max. Allowable Lateral Load

<table>
<thead>
<tr>
<th>Cylinder stroke (in)</th>
<th>Lateral load applied to the rod end fR (lbf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>0.10</td>
<td>1.00</td>
</tr>
<tr>
<td>1.00</td>
<td>10.00</td>
</tr>
<tr>
<td>10.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stroke (in)</th>
<th>Max. Allowable Lateral Load (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.44 (7/16&quot;)</td>
<td>0.56 (9/16&quot;)</td>
</tr>
</tbody>
</table>

NCME/L50132
NCMC/L50132
NCMB/L50132
NCM/L50132
NCMB/L50132
NCMB/L50132
NCMB/L50132
NCMB/L50132
NCMB/L50132
NCMB/L50132
The aspects indicated below may need to be taken into consideration, depending on how the cylinder is operated.

<table>
<thead>
<tr>
<th>Mounting Type</th>
<th>Type 1</th>
<th>Type 2</th>
<th>Type 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
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<tr>
<td>Type 2</td>
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<tr>
<td>Type 3</td>
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<tr>
<td>Type 4</td>
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</tbody>
</table>

The relationship between the cylinder size and the maximum stroke depending on the mounting style.

Assuming that the force that is generated by the cylinder itself acts as a buckling force on the piston rod or on the piston rod and the cylinder tube, the table below indicates in inches the maximum stroke that can be used, which was obtained through calculation. Therefore, it is possible to find the maximum stroke that can be used with each cylinder size according to the relationship between the level of the operating pressure and the type of cylinder mounting, regardless of the load factor.

Reference: Even under a light load, if the piston rod has been stopped by an external stopper at the extending side of the cylinder, the maximum force generated by the cylinder will act upon the cylinder itself.

<table>
<thead>
<tr>
<th>Operating pressure (PSI)</th>
<th>NCM</th>
</tr>
</thead>
<tbody>
<tr>
<td>044</td>
<td>056</td>
</tr>
<tr>
<td>075</td>
<td>088</td>
</tr>
<tr>
<td>106</td>
<td>125</td>
</tr>
<tr>
<td>150</td>
<td>200</td>
</tr>
</tbody>
</table>

| Maximum stroke that can be used according to buckling strength (inch) |
|-------------------------|-----|-----|-----|-----|-----|-----|
| 25 (12)°                | 11  | 13.5| 11.5| 14.5| 25  | 20.5|
| 50 (12)°                | 10  | 7.5 | 9   | 7.5 | 10  | 17  |
| 75 (1°)                 | 8   | 6   | 7   | 6   | 8   | 13.5|
| 100 (1°)                | 6.5 | 5   | 6   | 5   | 6.5 | 11.5|
| 125 (1°)                | 6   | 4.5 | 5.5 | 4.5 | 6   | 10  |
| 150 (1°)                | 5   | 4   | 4.5 | 4   | 5   | 9   |
| 25 (12)°                | 6   | 4.5 | 5   | 4.5 | 6   | 10.5|
| 50 (12)°                | 3.5 | 2.5 | 3   | 2.5 | 3.5 | 7   |
| 75 (1°)                 | 2.5 | 2   | 2   | 1.5 | 2.5 | 5   |
| 100 (1°)                | 2   | 1.5 | 1   | 1   | 2   | 4   |
| 125 (1°)                | 1.5 | 1   | 1   | 1.5 | 3.5 | 2.5 |
| 150 (1°)                | 1.5 | 1   | 1.5 | 0.5 | 1   | 3   |

Note 1) This data is in 0.5 inch increments (round off).
Note 2) For those that exceed maximum stroke that can be manufactured, (40) indicates the maximum stroke that can be manufactured.

* The data in ( ) are limited by max. stroke length.
Model Selection

**Step 4**

Obtain the cylinder’s air consumption and its required air volume.

**Cylinder’s air consumption and its required air volume.**

In equipment that used a cylinder, air consumption is the volume of air that is consumed in the cylinder, or in the piping between the cylinder and the switching valve, every time the switching valve operates.

This is necessary for selecting a compressor and for calculating the running cost. The required air volume is the volume of air that is necessary for operating a specified load at a specified speed, and it is necessary for selecting the F.R.L equipment or the size of the upstream piping.

**How to Obtain the Air Consumption/How to Read Graphs (6), (7)**

**Step 1** By using Graph (6), obtain the air consumption of the air cylinder.

1. Seek the point at which the operating pressure (diagonal line) intersects with the cylinder stroke, and from that point, perpendicularly extend a vertical line upward.
2. From the point at which it intersects with the bore size (diagonal line) of the cylinder to be used, look sideways (Either to the right or left) to obtain the air consumption that is required by one cycle of the air cylinder.

**Step 2** By using Graph (7), obtain the air consumption of the tube or steel pipe in the same way as in Step 1.

**Step 3** Obtain the total air consumption per minute as described below.

\[
\text{Air consumption of air cylinder + Air consumption of tube or steel pipe} \times \text{Number of cycles per minute} \times \text{Number of cylinders being used} = \text{Total air consumption [Unit: l/min (ANR)]}
\]

*Note:* In selecting a compressor, the temperature drop, leakage, and consumption by the intermediary equipment must be taken into consideration. Thus, select one with a generous capacity, with a discharge that exceeds the total air consumption indicated above. (Reference: At a minimum, select one with 1.4 times the volume; select one with a higher volume as needed.)

Example: When 10 air cylinders with a 1.25 inch bore size and a 3 inch stroke are used at a pressure of 50 PSI, what is the air consumption of their 5 cycles per minute? (A 20 inch tube with a 0.179 inch bore is used for piping between the cylinders and the switching valve.)

1. Operating pressure 50 PSI → Cylinder stroke 30 inch → Bore size 1.25 inch → Air consumption ≈ 0.5 l/ANR
2. Operating pressure 50 PSI → Piping length 20 inch → Bore 0.179 inch → Air consumption ≈ 0.1 l/ANR
3. Total air consumption = (0.5 + 0.1) x 10 x 5 = 30 l/ANR

**How to Obtain the Required Air Volume/How to Read Graph (8)**

**Step 3** By using Graph (8), obtain the air cylinder’s required air volume.

1. Seek the point at which the operating pressure (diagonal line) intersects with the cylinder stroke, and from that point, perpendicularly extend a vertical line upward.
2. From the point at which it intersects with the bore size (diagonal line) of the cylinder to be used, look sideways (Either to the right or left) to obtain the air consumption that is required by one cycle of the air cylinder.

Example: What is the required air volume for operating a cylinder with a bore size of 1.25 inch, at pressure of 50 PSI, and at a speed of 10 inch/s?

How to read: Operating pressure 50 PSI → Maximum piston speed 500 mm/s → Bore size 1.25 inch → Then, a required air volume 30 l/ANR can be obtained.
Step 4

Obtain the cylinder’s air consumption and its required air volume.

Cylinder’s air consumption and its required air volume.
In equipment that used a cylinder, air consumption is the volume of air that is consumed in the cylinder, or in the piping between the cylinder and the switching valve, every time the switching valve operates. This is necessary for selecting a compressor and for calculating the running cost. The required air volume is the volume of air that is necessary for operating a specified load at a specified speed, and it is necessary for selecting the F.R.L equipment or the size of the upstream piping.

Graph (7)
Air Consumption of Tube or Steel Pipe (For one cycle)

Graph (8)
Required Air Volume of Cylinder and Piping

* The piping length is the length of the steel pipe or tube that connects the cylinder with the switching valve (solenoid valve, etc.)
* For the dimensions (bore size and O.D.) of the steel tubing, refer to SMC “Best Pneumatics 2004” Vol. 6 catalog.
Air Cylinder: Standard Double Acting, Single/Double Rod

Series NCM

How to Order

Built-in magnet
- Nil
- D Built-in magnet with auto switch

Mounting
- B Front nose mount
- C Rear pivot mount
- E Double end mount
- R Block mount (Note 2, 10, 11)
- W Double rod (Note 3, 10)

Bore size
- 044 7/16”
- 056 9/16”
- 075 3/4”
- 088 7/8”
- 106 1-1/16”
- 125 1-1/4”
- 150 1-1/2”
- 200 2” (Note 3, 4)

Standard stroke
Inches (Note 5)

Stroke
Hundreds of an inch
(i.e. 06 = 0.06”)

Bumper
- Nil
- C (Note 6) Without bumper

Rod boot (Note 10, 11)
- Nil
- J Nylon tarpaulin
- K Heat resistant tarpaulin

Number of auto switches
- Nil 2 pcs.
- S 1 pc.
- n “n” pcs.

Auto switch
- Nil Without auto switch

Option (Note 10)
When ordering multiple options, refer to options compatibility page to ensure options availability.

<table>
<thead>
<tr>
<th>Option</th>
<th>Note 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td>None</td>
</tr>
<tr>
<td>XB6</td>
<td>High temperature (Note 10, 11)</td>
</tr>
<tr>
<td>XB7</td>
<td>Low temperature (Note 10, 11)</td>
</tr>
<tr>
<td>XB9</td>
<td>Low speed (Note 10, 11)</td>
</tr>
<tr>
<td>XC4</td>
<td>Heavy duty wiper (Note 9)</td>
</tr>
<tr>
<td>XC6</td>
<td>Stainless steel rod (Note 9)</td>
</tr>
<tr>
<td>X103US</td>
<td>Rotated ports (Note 7, 10)</td>
</tr>
<tr>
<td>X114US</td>
<td>Rear clevis mount without pin and with rear clevis bronze bushing (Note 10, 11)</td>
</tr>
<tr>
<td>X142US</td>
<td>Long stroke (Note 10, 11)</td>
</tr>
<tr>
<td>X155US</td>
<td>Rear pivot mount (C) without clevis pin (Note 10, 11)</td>
</tr>
<tr>
<td>X163US</td>
<td>Heavy duty spring (Note 10)</td>
</tr>
<tr>
<td>X169US</td>
<td>Dimensional interchange to other manufacturer’s magnetic reed switch cylinders (Note 1, 8, 10)</td>
</tr>
<tr>
<td>X6002</td>
<td>Air tank (Note 10)</td>
</tr>
<tr>
<td>X6005</td>
<td>Spring assist (Note 12)</td>
</tr>
</tbody>
</table>

Note 1) ø3/4", ø1-1/16", ø1-1/2" and ø2" only.
Note 2) Not offered in ø7/8", ø1-1/4", or with rod boot.
Note 3) Double acting only.
Note 4) Not available as standard with C, R mount, with rod boot.
Note 5) See specifications for standard and maximum stroke lengths.
Note 6) Bumper is offered at no additional cost on ø7/8” and ø1-1/4”.
They are options on the other bore sizes. The “C” after the bore size must be included in either case. Bumper affects cylinder overall length of some models. Refer to the dimensional data.
Note 7) Available only with B or C mounting. Not available on 2” bore.
Note 8) Not available with ø7/8” bore, or with C, R mount, or non-rotating rod (K).
Note 9) Stainless steel rod standard on ø7/16”, ø9/16”, ø3/4” and ø7/8”.
Note 10) Exclude ø7/16” and ø9/16”.
Note 11) Exclude ø2”.
Note 12) ø3/4”, ø1-1/16” and ø1-1/2” only.
## Auto Switch Specifications

### Applicable Auto Switches

<table>
<thead>
<tr>
<th>Type</th>
<th>Special function</th>
<th>Electrical entry</th>
<th>Wiring (Output)</th>
<th>Load voltage</th>
<th>Auto switch model</th>
<th>Lead wire length (m)</th>
<th>Pre-wired connector</th>
<th>Applicable load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid state switch</td>
<td></td>
<td>Grommet</td>
<td></td>
<td>DC</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>3-wire (NPN)</td>
<td>5 V, 12 V</td>
<td>M9N</td>
<td>0.5 (Nil)</td>
<td>IC circuit</td>
<td>Relay, PLC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>12 V</td>
<td>M9P</td>
<td>1 (M)</td>
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<tr>
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<td></td>
<td></td>
<td>2-wire</td>
<td></td>
<td>M9B</td>
<td>3 (L)</td>
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<td>H7C</td>
<td>5 (Z)</td>
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<td>None</td>
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<tr>
<td>Reed switch</td>
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<td>Grommet</td>
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<td>DC</td>
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<td></td>
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<td></td>
<td>2-wire</td>
<td>5 V</td>
<td>A96</td>
<td>100 V</td>
<td></td>
<td>IC circuit</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>100 V or less</td>
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<td></td>
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<td>100 V, 200 V</td>
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<td>200 V or less</td>
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<td>24 V or less</td>
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</tbody>
</table>

| * Lead wire length symbols: 0.5 m ·········· Nil (Example) M9NW | + Solid state switches marked with “□” are produced upon receipt of order. |
| 1 m ··········· M (Example) M9NWM | + D-B54, B64, and B59W cannot be mounted for bore size 044 and 056. |
| 3 m ··········· L (Example) M9NL | + D-A93, M9L, M9LW are shipped together. (Only switch mounting bracket is assembled at the time of shipment.) |
| 5 m ··········· Z (Example) M9NZW | + D-M9LN and M9LN which lead wire length is 1 m are available from July, 2008. |

* For details about auto switches with pre-wired connector, refer to Best Pneumatics catalog.
## Option Compatibility

### Option Compatibility (1)

<table>
<thead>
<tr>
<th>Description</th>
<th>Note</th>
<th>NCM-Standard</th>
<th>NCDM</th>
<th>NCMW</th>
<th>NCM-‘J’</th>
<th>NCM-‘K’</th>
<th>C</th>
<th>XB6</th>
<th>XB7</th>
<th>XB9</th>
<th>XC6</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCM Standard</td>
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<tr>
<td>NCDM Auto switch capable</td>
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<td>O</td>
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<tr>
<td>NCMW Double rod</td>
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<td>O</td>
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<td></td>
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</tr>
<tr>
<td>NCM-‘J’ Nylon rod boot</td>
<td>1, 5</td>
<td>O</td>
<td>O</td>
<td>S</td>
<td>N</td>
<td>–</td>
<td></td>
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<tr>
<td>NCM-‘K’ Neoprene rod boot</td>
<td>1, 5</td>
<td>O</td>
<td>O</td>
<td>S</td>
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<td>–</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>C Bumper</td>
<td>2</td>
<td>O</td>
<td>S</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>–</td>
<td></td>
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<tr>
<td>XB6 Heat resistant</td>
<td>1, 5</td>
<td>O</td>
<td>S</td>
<td>O</td>
<td>S</td>
<td>S</td>
<td>N</td>
<td>–</td>
<td></td>
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<tr>
<td>XB7 Cold resistant</td>
<td>1, 5</td>
<td>O</td>
<td>S</td>
<td>O</td>
<td>S</td>
<td>S</td>
<td>N</td>
<td>N</td>
<td>–</td>
<td></td>
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</tr>
<tr>
<td>XB9 Low speed</td>
<td>1, 5</td>
<td>O</td>
<td>O</td>
<td>S</td>
<td>S</td>
<td>O</td>
<td>N</td>
<td>N</td>
<td>–</td>
<td></td>
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<tr>
<td>XC6 Stainless steel rod</td>
<td>3</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>–</td>
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<tr>
<td>B Front nose mount</td>
<td></td>
<td>O</td>
<td>N</td>
<td>O</td>
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<td>O</td>
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<td>C Rear pivot mount</td>
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<td>O</td>
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<td>N</td>
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<td>O</td>
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<td>E Double end mount</td>
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<td>O</td>
<td>N</td>
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<tr>
<td>R Block mount</td>
<td>1, 5</td>
<td>O</td>
<td>O</td>
<td>S</td>
<td>N</td>
<td>N</td>
<td>O</td>
<td>S</td>
<td>S</td>
<td>O</td>
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O ----- Combination available to order
S ----- Available with special request
N ----- Not available

Note 1) Exclude ø2".
Note 2) Bumper no additional charge on ø7/8" and ø1-1/4".
Note 3) Stainless steel rod standard on ø7/16", ø9/16", ø3/4" and ø7/8". Use XC6 option to get stainless steel rod nut.
Note 4) Block mount not available in ø7/8" and ø1-1/4".
Note 5) Exclude ø7/16" and ø9/16".

### Option Compatibility (2)

<table>
<thead>
<tr>
<th>Description</th>
<th>044</th>
<th>056</th>
<th>075</th>
<th>088</th>
<th>106</th>
<th>125</th>
<th>150</th>
<th>200</th>
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<tbody>
<tr>
<td>Double acting, Single rod, No bumper</td>
<td>O</td>
<td>O</td>
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<td>O</td>
<td>O</td>
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<tr>
<td>Double acting, Single rod, With bumper</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td>Double acting, Double rod, No bumper</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td>Double acting, Double rod, With bumper</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td>With rod boot</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<td>O</td>
<td>O</td>
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<tr>
<td>Direct double acting, Single rod, No bumper</td>
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<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td>Direct double acting, Single rod, With bumper</td>
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<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td>Direct single acting, Spring return (S), No bumper</td>
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<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td>Direct single acting, Spring extend (T), No bumper</td>
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<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td>Double acting, Single rod, No bumper XB6</td>
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<td>O</td>
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<td>O</td>
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<tr>
<td>Double acting, Single rod, No bumper XB7</td>
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<td>O</td>
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<td>O</td>
<td>O</td>
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<tr>
<td>Double acting, Single rod, No bumper XB9</td>
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<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Double acting, Single rod, With bumper XB9</td>
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<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td>Double acting, Single rod, No bumper XC6 Standard</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Double acting, Single rod, With bumper XC6 Standard</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Double acting, Single rod, No bumper, With air cushion</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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</table>
### Specifications: Double Acting, Single/Double Rod

#### Specifications

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>044 (7/16&quot;)</th>
<th>056 (9/16&quot;)</th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
<th>200 (2&quot;)</th>
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</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Maximum operating pressure</td>
<td>250 PSI / 1.7 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Minimum operating pressure</td>
<td>8 PSI / 0.06 MPa</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Ambient and fluid temperature</td>
<td>40 to 140°F / 5 to 60 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston speed</td>
<td>No bumper: 2 to 20 in/sec (50 to 500 mm/sec)</td>
<td>Bumper: 2 to 30 in/sec (50 to 750 mm/sec)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Bumper</td>
<td>Optional (No additional charge on 7/8&quot; and 1-1/4&quot; bore)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubrication</td>
<td>Not required (Pre-lubricated at factory)</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Mounting</td>
<td>B, C, E, R (see Note)</td>
<td></td>
<td></td>
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<td></td>
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</table>

Note) R mount available on ø3/4", ø1-1/16", and ø1-1/2" only.

#### Standard Stroke

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Standard stroke</th>
<th>Max. stroke as standard</th>
<th>Long stroke</th>
<th>X142US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front nose mount (B)</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
<td>12</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Rear pivot mount (C)</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
<td>32</td>
<td>40</td>
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</tr>
<tr>
<td>Double end mount (E)</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
<td>32</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Block mount (R)</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
<td>12</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Double rod (W)</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
<td>12</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

Note) 1) Minimum stroke for mounting auto switches: 0.6 inch for 2 switches, 0.4 inch for one switch.
Note) 2) The production maximum stroke of ø7/16" and ø9/16" are up to 12 inches.
Note) 3) Exclude ø7/8" and ø9/16".

#### Weight (Except Non-rotating Rod)

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>044 (7/16&quot;)</th>
<th>056 (9/16&quot;)</th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
<th>200 (2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bore size</td>
<td>0.059</td>
<td>0.080</td>
<td>0.200</td>
<td>0.218</td>
<td>0.330</td>
<td>0.531</td>
<td>0.680</td>
<td>1.345</td>
</tr>
<tr>
<td>Base weight by mounting style</td>
<td>0.076</td>
<td>0.091</td>
<td>0.200</td>
<td>0.198</td>
<td>0.320</td>
<td>0.581</td>
<td>0.710</td>
<td>1.493</td>
</tr>
<tr>
<td>Add'l weight per inch stroke</td>
<td>0.026</td>
<td>0.034</td>
<td>0.030</td>
<td>0.037</td>
<td>0.430</td>
<td>0.781</td>
<td>0.930</td>
<td>1.812</td>
</tr>
<tr>
<td>Add'l weight for magnet</td>
<td>0.019</td>
<td>0.034</td>
<td>0.030</td>
<td>0.037</td>
<td>0.430</td>
<td>0.781</td>
<td>0.930</td>
<td>1.812</td>
</tr>
<tr>
<td>Add'l weight for bumper</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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</table>

#### Theoretical Output: Double Acting Cylinder (Extend)

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>044 (7/16&quot;)</th>
<th>056 (9/16&quot;)</th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
<th>200 (2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rod size (in)</td>
<td>0.197</td>
<td>0.197</td>
<td>0.250</td>
<td>0.250</td>
<td>0.312</td>
<td>0.437</td>
<td>0.437</td>
<td>0.625</td>
</tr>
<tr>
<td>Operating direction</td>
<td>OUT</td>
<td>OUT</td>
<td>OUT</td>
<td>OUT</td>
<td>OUT</td>
<td>OUT</td>
<td>OUT</td>
<td>OUT</td>
</tr>
<tr>
<td>Operating pressure (PSI)</td>
<td>25</td>
<td>50</td>
<td>75</td>
<td>100</td>
<td>125</td>
<td>150</td>
<td>125</td>
<td>150</td>
</tr>
<tr>
<td>Piston area (in²)</td>
<td>0.152</td>
<td>0.246</td>
<td>0.442</td>
<td>0.601</td>
<td>0.887</td>
<td>1.227</td>
<td>1.767</td>
<td>3.14</td>
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<tr>
<td>Operating pressure (PSI)</td>
<td>7.6</td>
<td>12.3</td>
<td>22.1</td>
<td>30.1</td>
<td>44.4</td>
<td>42.2</td>
<td>44.2</td>
<td>78.5</td>
</tr>
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</table>

Note) R mount available on ø3/4", ø1-1/16", and ø1-1/2" only.
**Series NCM**

**Construction: Double Acting, Single Rod**

**NCM044/056**

- **Component Parts**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rod cover</td>
<td>Aluminum alloy</td>
<td>Anodized</td>
</tr>
<tr>
<td>2</td>
<td>Head cover</td>
<td>Aluminum alloy</td>
<td>Anodized</td>
</tr>
<tr>
<td>3</td>
<td>Cylinder tube</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Piston A</td>
<td>Aluminum alloy</td>
<td>Chromated</td>
</tr>
<tr>
<td>5</td>
<td>Piston B</td>
<td>Aluminum alloy</td>
<td>Chromated</td>
</tr>
<tr>
<td>6</td>
<td>Piston rod</td>
<td>7/16&quot;, 9/16&quot;</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>7</td>
<td>Bumper</td>
<td>Urethane</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Rod seal</td>
<td>NBR</td>
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<tr>
<td>9</td>
<td>Piston seal</td>
<td>NBR</td>
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<tr>
<td>10</td>
<td>Tube gasket</td>
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</table>

**NCM075 and above**

- **Component Parts**

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<th>Description</th>
<th>Material</th>
<th>Note</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Rod cover</td>
<td>Aluminum alloy</td>
<td>Anodized</td>
</tr>
<tr>
<td>2</td>
<td>Head cover</td>
<td>Aluminum alloy</td>
<td>Anodized</td>
</tr>
<tr>
<td>3</td>
<td>Cylinder tube</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Piston</td>
<td>Aluminum alloy</td>
<td>Chromated</td>
</tr>
<tr>
<td>5</td>
<td>Piston rod</td>
<td>3/4&quot;, 7/8&quot;</td>
<td>Stainless steel</td>
</tr>
<tr>
<td></td>
<td>1-1/16&quot;, 1-1/4&quot;, 1-1/2&quot;, 2&quot;</td>
<td>Carbon steel</td>
<td>Hard chrome plated</td>
</tr>
<tr>
<td>6</td>
<td>Bushing</td>
<td>Sintered bronze</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Wear ring</td>
<td>Phenolic resin</td>
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</tr>
<tr>
<td>8</td>
<td>Retaining ring</td>
<td>Spring steel</td>
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<tr>
<td>9</td>
<td>Bumper</td>
<td>Urethane</td>
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<tr>
<td>10</td>
<td>Retaining ring</td>
<td>Spring steel</td>
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</tr>
<tr>
<td>11</td>
<td>Rod seal</td>
<td>NBR</td>
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<tr>
<td>12</td>
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<tr>
<td>13</td>
<td>Piston gasket</td>
<td>NBR</td>
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</table>
Construction: Double Acting, Double Rod

Component Parts

<table>
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<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
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<tbody>
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<td>1</td>
<td>Rod cover</td>
<td>Aluminum alloy</td>
<td>Clear anodized</td>
</tr>
<tr>
<td>2</td>
<td>Cylinder tube</td>
<td>Stainless steel</td>
<td>Stainless steel 304</td>
</tr>
<tr>
<td>3</td>
<td>Piston</td>
<td>Aluminum alloy</td>
<td>Chromated</td>
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<td>4</td>
<td>Piston rod</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3/4&quot;, 7/8&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1-1/16&quot;, 1-1/4&quot;, 1-1/2&quot;, 2&quot;</td>
<td>Carbon steel</td>
<td>Hard chrome plated</td>
</tr>
<tr>
<td>5</td>
<td>Bushing</td>
<td>Sintered bronze</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Retaining ring</td>
<td>Spring steel</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Bumper</td>
<td>Urethane</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Piston seal</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Piston gasket</td>
<td>NBR</td>
<td></td>
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<tr>
<td>10</td>
<td>Rod seal</td>
<td>NBR</td>
<td></td>
</tr>
</tbody>
</table>
Series NCM

Dimensions: Double Acting, Single Rod

Front nose mount: NC(D)MB

### 044 (7/16")

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>A</th>
<th>B</th>
<th>EA</th>
<th>EB</th>
<th>KK</th>
<th>MM</th>
<th>NA</th>
<th>NB</th>
<th>NE</th>
<th>NN</th>
<th>W</th>
<th>Y</th>
<th>ZC</th>
<th>ZD</th>
</tr>
</thead>
<tbody>
<tr>
<td>044 (7/16&quot;)</td>
<td>0.50</td>
<td>0.437</td>
<td>0.669</td>
<td>0.520</td>
<td>No.10-32</td>
<td>0.197</td>
<td>0.59</td>
<td>0.38</td>
<td>0.19</td>
<td>7/16-20</td>
<td>0.38</td>
<td>0.72</td>
<td>0.05</td>
<td>No.10-32</td>
</tr>
<tr>
<td>ZB</td>
<td>2.11</td>
<td>2.30</td>
<td>2.36</td>
<td>2.55</td>
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</table>

### 056 (9/16")

<table>
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<tr>
<th>Bore size (inch)</th>
<th>A</th>
<th>B</th>
<th>EA</th>
<th>EB</th>
<th>KK</th>
<th>MM</th>
<th>NA</th>
<th>NB</th>
<th>NE</th>
<th>NN</th>
<th>W</th>
<th>Y</th>
<th>ZC</th>
<th>ZD</th>
</tr>
</thead>
<tbody>
<tr>
<td>056 (9/16&quot;)</td>
<td>0.50</td>
<td>0.437</td>
<td>0.669</td>
<td>0.520</td>
<td>No.10-32</td>
<td>0.197</td>
<td>0.50</td>
<td>0.19</td>
<td>7/16-20</td>
<td>0.38</td>
<td>0.75</td>
<td>0.06</td>
<td>No.10-32</td>
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<tr>
<td>ZB</td>
<td>2.19</td>
<td>2.32</td>
<td>2.19</td>
<td>2.32</td>
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### 075 (3/4"), 088 (7/8"), 106 (1-1/16"), 125 (1-1/4"), 150 (1-1/2"), 200 (2")

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>MM</th>
<th>KK</th>
<th>A</th>
<th>B</th>
<th>D</th>
<th>E</th>
<th>K</th>
<th>N</th>
<th>NC</th>
<th>NE</th>
<th>NN</th>
<th>W</th>
<th>Y</th>
<th>ZC</th>
<th>ZD</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.250</td>
<td>1/4-28</td>
<td>0.50</td>
<td>0.624</td>
<td>0.003</td>
<td>–</td>
<td>0.86</td>
<td>–</td>
<td>0.75</td>
<td>0.62</td>
<td>0.12</td>
<td>5/8-18</td>
<td>0.50</td>
<td>0.95</td>
<td>0.09</td>
</tr>
<tr>
<td>ZB no bumper</td>
<td>2.97</td>
<td>2.97</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZB with bumper</td>
<td>2.97</td>
<td>2.97</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>0.250</td>
<td>1/4-28</td>
<td>0.50</td>
<td>0.624</td>
<td>0.003</td>
<td>–</td>
<td>0.93</td>
<td>–</td>
<td>0.75</td>
<td>0.75</td>
<td>0.18</td>
<td>5/8-18</td>
<td>0.50</td>
<td>0.95</td>
<td>0.09</td>
</tr>
<tr>
<td>ZB no bumper</td>
<td>2.97</td>
<td>2.97</td>
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</tr>
<tr>
<td>ZB with bumper</td>
<td>2.97</td>
<td>2.97</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.312</td>
<td>5/16-24</td>
<td>0.50</td>
<td>0.624</td>
<td>0.003</td>
<td>0.25</td>
<td>1.12</td>
<td>0.12</td>
<td>0.88</td>
<td>0.88</td>
<td>0.24</td>
<td>5/8-18</td>
<td>0.62</td>
<td>1.17</td>
<td>0.09</td>
</tr>
<tr>
<td>ZB no bumper</td>
<td>3.25</td>
<td>3.25</td>
<td></td>
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<tr>
<td>ZB with bumper</td>
<td>3.25</td>
<td>3.25</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>0.437</td>
<td>7/16-20</td>
<td>0.75</td>
<td>0.749</td>
<td>0.003</td>
<td>0.38</td>
<td>1.32</td>
<td>0.25</td>
<td>1.06</td>
<td>1.06</td>
<td>0.25</td>
<td>3/4-16</td>
<td>0.88</td>
<td>1.62</td>
<td>0.09</td>
</tr>
<tr>
<td>ZB no bumper</td>
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<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.437</td>
<td>7/16-20</td>
<td>0.75</td>
<td>0.749</td>
<td>0.003</td>
<td>0.38</td>
<td>1.56</td>
<td>0.25</td>
<td>1.25</td>
<td>1.25</td>
<td>0.25</td>
<td>3/4-16</td>
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<td>0.09</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>ZB with bumper</td>
<td>3.69</td>
<td>3.69</td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 (2&quot;)</td>
<td>0.625</td>
<td>1/2-20</td>
<td>0.88</td>
<td>1.375</td>
<td>0.003</td>
<td>0.50</td>
<td>2.06</td>
<td>0.38</td>
<td>1.75</td>
<td>1.75</td>
<td>0.31</td>
<td>1-1/4-12</td>
<td>1.19</td>
<td>1.91</td>
<td>0.12</td>
</tr>
<tr>
<td>ZB no bumper</td>
<td>4.69</td>
<td>4.95</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZB with bumper</td>
<td>4.69</td>
<td>4.95</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Series NCM

Dimensions: Double Acting, Single Rod

Rear pivot mount: NC(D)MC

044 (7/16")

056 (9/16")

| Bore size (inch) | A       | B     | EA    | F     | G     | GB    | KK    | L     | MM    | NA    | NN    | W     | Y     | ZC    | ZD    | LB    | LB    | LB    | LB    | ZB    | ZB    | ZB    | ZB    |
|------------------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 044 (7/16")     | 0.50    | 0.437 | 0.47  | 0.31  | 0.156 | 0.50  | 0.10  | 0.197 | 0.59  | 0.38  | 0.72  | 0.05  | 0.44  | 0.05  | 11/32 | 25/64 | 7/32  | 23/64 | 3/32  | 29/64 | 3/32  | 29/64 | 3/32  | 29/64 |
| 056 (9/16")     | 0.50    | 0.437 | 0.654 | 0.31  | 0.157 | 0.50  | 0.10  | 0.197 | 0.59  | 0.38  | 0.75  | 0.06  | 0.38  | 0.06  | 11/32 | 25/64 | 7/32  | 23/64 | 3/32  | 29/64 | 3/32  | 29/64 | 3/32  | 29/64 |

075 (3/4"), 088 (7/8"), 106 (1-1/16"), 125 (1-1/4"), 150 (1-1/2")

Note) There are no threads on the NCMC 150 rear tang (FF dim).
Series NCM

Dimensions: Double Acting, Single Rod

Double end mount: NC(D)ME

044 (7/16")

056 (9/16")

Bore size (inch) A B EA F G K L MM NA NN W Y YC ZC ZD LB With bumper LB With bumper LB With bumper LB With bumper LB With bumper ZB With bumper ZB With bumper ZB With bumper ZB With bumper LB With bumper With magnet LB With bumper With magnet LB With bumper With magnet LB With bumper With magnet LB With bumper With magnet ZB With bumper With magnet ZB With bumper With magnet ZB With bumper With magnet

044 (7/16") 0.50 0.437 0.669 0.31 0.156 0.25 0.197 0.59 0.38 0.72 0.44 0.05 0.10-32 2.56 2.75 2.81 3.00 3.06 3.24

056 (9/16") 0.50 0.437 0.654 0.31 0.157 0.25 0.197 0.50 0.38 0.75 0.38 0.06 0.10-32 2.56 2.69 2.56 2.69 2.75 2.88 2.75 2.88

075 (3/4"), 088 (7/8"), 106 (1-1/16"), 125 (1-1/4"), 150 (1-1/2"), 200 (2")

Bore size (inch) MM KK A B G K L N NN W Y YC ZC ZD

075 (3/4") 0.250 1/4-28 0.50 0.624 0.38 0.251 0.34 0.34 0.75 5/8-18 0.50 0.95 0.62 0.09 1/8 NPT

088 (7/8") 0.250 1/4-28 0.50 0.624 0.38 0.251 0.34 0.34 0.75 5/8-18 0.50 0.95 0.62 0.09 1/8 NPT

106 (1-1/16") 0.312 5/16-24 0.50 0.624 0.25 1.12 0.38 0.251 0.12 0.34 0.88 5/8-18 0.62 1.17 0.62 0.09 1/8 NPT

125 (1-1/4") 0.437 7/16-20 0.75 0.749 0.38 1.32 0.50 0.251 0.25 0.41 1.06 3/4-16 0.88 1.62 0.78 0.09 1/8 NPT

150 (1-1/2") 0.437 7/16-20 0.75 0.749 0.38 1.56 - - 0.25 0.63 1.25 3/4-16 0.88 1.50 0.91 0.09 1/8 NPT

200 (2") 0.625 1/2-20 0.88 1.375 0.50 2.06 0.75 0.375 0.38 0.56 1.75 1-1/4-12 1.19 1.91 1.03 0.12 1/4 NPT
Dimensions: Double Acting, Single Rod

Block mount: NC(D)MR

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>MM</th>
<th>KK</th>
<th>A</th>
<th>AA</th>
<th>B</th>
<th>CA</th>
<th>D</th>
<th>DD</th>
<th>E</th>
<th>EA</th>
<th>EE</th>
<th>NA</th>
<th>NE</th>
<th>NH</th>
<th>NT</th>
<th>TN</th>
<th>WF</th>
<th>YE</th>
<th>XA</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.250</td>
<td>1/4-28</td>
<td>0.75</td>
<td>1.00</td>
<td>0.625</td>
<td>0.093</td>
<td>0.22</td>
<td>10-32 UNF</td>
<td>0.81</td>
<td>1.00</td>
<td>1/8</td>
<td>1.12</td>
<td>0.12</td>
<td>10-32 UNF</td>
<td>0.62</td>
<td>0.34</td>
<td>0.88</td>
<td>0.36</td>
<td></td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.312</td>
<td>7/16-20</td>
<td>0.75</td>
<td>1.25</td>
<td>0.750</td>
<td>0.093</td>
<td>0.25</td>
<td>10-32 UNF</td>
<td>1.12</td>
<td>1.25</td>
<td>1/8</td>
<td>1.47</td>
<td>0.24</td>
<td>10-32 UNF</td>
<td>0.81</td>
<td>0.47</td>
<td>1.22</td>
<td>0.62</td>
<td></td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.437</td>
<td>5/16-24</td>
<td>1.25</td>
<td>1.75</td>
<td>1.000</td>
<td>0.125</td>
<td>0.38</td>
<td>1/4-20 UNC</td>
<td>1.56</td>
<td>1.75</td>
<td>1/4</td>
<td>1.93</td>
<td>0.25</td>
<td>1/4-20 UNC</td>
<td>1.12</td>
<td>0.38</td>
<td>1.57</td>
<td>0.88</td>
<td></td>
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</tbody>
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**Block Mount**

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>3.22 No bumper</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>3.75</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>4.19</td>
</tr>
</tbody>
</table>

Note) Length not affected by addition of magnet.
Series NCM

Dimensions: Double Acting, Double Rod

**Double Acting, Double Rod**

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No bumper</td>
<td>With bumper</td>
</tr>
<tr>
<td>075 (3/4&quot;)</td>
<td>3.00</td>
<td>3.00</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>2.66</td>
<td>2.91</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>2.75</td>
<td>2.88</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>3.56</td>
<td>3.81</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>3.38</td>
<td>3.51</td>
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<tr>
<td>200 (2&quot;)</td>
<td>4.18</td>
<td>4.44</td>
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</tbody>
</table>

Note) Length not affected by addition of magnet except 106 bore.

**Double Acting, Double Rod with Magnet** (106 Bore)

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No bumper</td>
<td>With bumper</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>3.13</td>
<td>3.25</td>
</tr>
</tbody>
</table>
Air Cylinder: Non-rotating Rod
Double Acting, Single Rod

Series NCM

How to Order

Built-in magnet
- Nil: None
- D: Built-in magnet with auto switch

Non-rotating rod

Mounting
- B: Front nose mount
- C: Rear pivot mount
- E: Double end mount

Bore size

<table>
<thead>
<tr>
<th>Code</th>
<th>Bore Size</th>
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<tbody>
<tr>
<td>075</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>088</td>
<td>7/8&quot;</td>
</tr>
<tr>
<td>106</td>
<td>1-1/16&quot;</td>
</tr>
<tr>
<td>125</td>
<td>1-1/4&quot;</td>
</tr>
<tr>
<td>150</td>
<td>1-1/2&quot;</td>
</tr>
</tbody>
</table>

Standard stroke

Hundredths of an inch
(i.e. 0.06 = 0.06"

Stroke

Option

- Nil: None
- X142US: Long stroke

Number of auto switches

<table>
<thead>
<tr>
<th>Code</th>
<th>Number of Switches</th>
</tr>
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<tr>
<td>Nil</td>
<td>2 pcs.</td>
</tr>
<tr>
<td>S</td>
<td>1 pc.</td>
</tr>
<tr>
<td>n</td>
<td>&quot;n&quot; pcs.</td>
</tr>
</tbody>
</table>

Auto switch

- Nil: Without auto switch
- For applicable auto switch models, refer to the table on page 13.

Bumper

- Nil: Without bumper
- C: Bumper

Note 1) See specifications for standard and maximum stroke lengths.
## Auto Switch Specifications

### Applicable Auto Switches

<table>
<thead>
<tr>
<th>Type</th>
<th>Special function</th>
<th>Electrical entry</th>
<th>Wiring (Output)</th>
<th>Load voltage</th>
<th>Auto switch model</th>
<th>Lead wire length (m)</th>
<th>Pre-wired connector</th>
<th>Applicable load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid state switch</td>
<td>—</td>
<td>Grommet</td>
<td>3-wire (NPN)</td>
<td>5, 12 V</td>
<td>M9N</td>
<td>N</td>
<td>—</td>
<td>IC circuit</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>12 V</td>
<td>M9P</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>12 V</td>
<td>M9B</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>5 V, 12 V</td>
<td>H7C</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>5 V, 12 V</td>
<td>M9NW</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>12 V</td>
<td>M9PW</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>5 V, 12 V</td>
<td>M9BW</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>12 V</td>
<td>H7BA</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4-wire (NPN)</td>
<td>5 V, 12 V</td>
<td>H7NF</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Reed switch</td>
<td>—</td>
<td>Grommet</td>
<td>2-wire (NPN)</td>
<td>12 V</td>
<td>A96</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>5 V</td>
<td>A93</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>100 V</td>
<td>A90</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>100 V, 200 V</td>
<td>B54</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>200 V, 200 V</td>
<td>B64</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>24 V</td>
<td>C73C</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>24 V</td>
<td>—</td>
<td>C80C</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>24 V</td>
<td>—</td>
<td>B59W</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

* Lead wire length symbols: 0.5 m ········ Nil (Example) M9NW
  1 m ········ M (Example) M9NWL
  3 m ········ L (Example) M9NWM
  5 m ········ Z (Example) M9NWZ
  None ········ N (Example) H7CN

* Solid state switches marked with “*” are produced upon receipt of order.
* D-B54, B64, and B59W cannot be mounted for bore size 044 and 056.
* D-A96, M9C, M9C:W are shipped together.
  (Only switch mounting bracket is assembled at the time of shipment.)
* D-M9C:M and M9C:VM which lead wire length is 1 m are available from July, 2008.

### Option Compatibility

#### Option Compatibility (1)

<table>
<thead>
<tr>
<th>Description</th>
<th>Note</th>
<th>NCDMK</th>
<th>NCMK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto switch capable</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-rotating</td>
<td>1, 7</td>
<td>O</td>
<td>S</td>
</tr>
<tr>
<td>Nylon rod boot</td>
<td>1, 7</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Neoprene rod boot</td>
<td>1, 7</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Bumper</td>
<td>2</td>
<td>O</td>
<td>S</td>
</tr>
<tr>
<td>Heat resistant</td>
<td>1, 7</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Cold resistant</td>
<td>1, 7</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Low speed</td>
<td>1, 7</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Stainless steel rod</td>
<td>3, 4</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Front nose mount</td>
<td>1</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Rear pivot mount</td>
<td>1</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Double end mount</td>
<td>1</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>Block mount</td>
<td>1, 5, 6, 7</td>
<td>S</td>
<td>S</td>
</tr>
</tbody>
</table>

O …… Combination available to order
S …… Available with special request
N …… Not available

Note 1) Exclude ø2”.
Note 2) Bumper no additional charge on ø7/8” and ø1-1/4”.
Note 3) Stainless steel rod standard on ø7/16”, ø9/16”, ø3/4” and ø7/8”. Use XC6 option to get stainless steel rod nut.
Note 4) Non-rotating rod is stainless steel. Use XC6 option to get stainless steel rod nut.
Note 5) Block mount not available in ø7/8” and ø1-1/4”.
Note 6) Block, Auto switch capable, S and T only available as special.
Note 7) Exclude ø7/16” and ø9/16”.

#### Option Compatibility (2)

<table>
<thead>
<tr>
<th></th>
<th>044</th>
<th>056</th>
<th>075</th>
<th>088</th>
<th>106</th>
<th>125</th>
<th>150</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double acting, Single rod, No bumper, Non-rotating rod</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Double acting, Single rod, With bumper, Non-rotating rod</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

---

**Series NCM**
### Specifications: Double Acting, Single Rod Non-rotating Rod

#### Specifications

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum operating pressure</td>
<td>250 PSI / 1.7 MPa</td>
<td>8 PSI / 0.06 MPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum operating pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temperature</td>
<td>40 to 140°F / 5 to 60 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston speed</td>
<td>2 to 20 in/sec / 50 to 500 mm/sec</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rod material</td>
<td>Stainless steel 303</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bumper</td>
<td>Optional (No additional charge on 7/8&quot; and 1-1/4&quot; bore)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-rotating accuracy</td>
<td>± 2.0°</td>
<td>± 1.4°</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum allowable torque</td>
<td>0.04 ft-lbf (0.08 N·m)</td>
<td>0.09 ft-lbf (0.13 N·m)</td>
<td>0.12 ft-lbf (0.16 N·m)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Standard Stroke

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Standard stroke</th>
<th>Max. stroke as standard</th>
<th>Long stroke -X142US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front nose mount (B)</td>
<td>1/2, 1, 2, 3, 4, 5, 6,</td>
<td>12</td>
<td>40</td>
</tr>
<tr>
<td>Double end mount (E)</td>
<td>1/2, 1, 2, 3, 4, 5, 6, 7, 8, 10, 12</td>
<td>32</td>
<td>40</td>
</tr>
</tbody>
</table>

Note 1) Minimum stroke for mounting auto switches: 0.6 inch for 2 switches, 0.4 inch for one switch.
Note 2) Spring return up to 18" available as special request.

#### Theoretical Output: Non-rotating Rod

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rod diameter (inch)</td>
<td>0.250</td>
<td>0.250</td>
<td>0.375</td>
<td>0.437</td>
<td>0.437</td>
</tr>
<tr>
<td>Operating direction</td>
<td>OUT</td>
<td>IN</td>
<td>OUT</td>
<td>IN</td>
<td>OUT</td>
</tr>
<tr>
<td>Effective area (sq.inch)</td>
<td>0.442</td>
<td>0.399</td>
<td>0.608</td>
<td>0.566</td>
<td>0.682</td>
</tr>
<tr>
<td>Operating pressure (PSI)</td>
<td>25</td>
<td>50</td>
<td>75</td>
<td>100</td>
<td>125</td>
</tr>
<tr>
<td>25</td>
<td>11.0</td>
<td>22.1</td>
<td>33.1</td>
<td>44.2</td>
<td>55.2</td>
</tr>
<tr>
<td>50</td>
<td>20.0</td>
<td>30.4</td>
<td>45.6</td>
<td>60.8</td>
<td>76.0</td>
</tr>
<tr>
<td>75</td>
<td>30.0</td>
<td>44.1</td>
<td>66.2</td>
<td>88.2</td>
<td>110.3</td>
</tr>
<tr>
<td>100</td>
<td>39.9</td>
<td>59.0</td>
<td>82.3</td>
<td>109.8</td>
<td>137.2</td>
</tr>
<tr>
<td>125</td>
<td>49.9</td>
<td>78.7</td>
<td>118.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>59.9</td>
<td>84.9</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

#### Weight

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base weight by mounting style</td>
<td>0.200</td>
<td>0.200</td>
<td>0.280</td>
<td>0.035</td>
<td>0.008</td>
</tr>
<tr>
<td>Add'l weight per inch stroke</td>
<td>0.038</td>
<td>0.038</td>
<td>0.063</td>
<td>0.083</td>
<td>0.020</td>
</tr>
<tr>
<td>Add'l weight for magnet</td>
<td>0.001</td>
<td>0.012</td>
<td>0.001</td>
<td>0.024</td>
<td>0.020</td>
</tr>
<tr>
<td>Add'l weight for bumper</td>
<td>0.011</td>
<td>0.011</td>
<td>0.011</td>
<td>0.029</td>
<td>0.020</td>
</tr>
</tbody>
</table>
**Series NCM**

**Dimensions: Double Acting, Single Rod Non-rotating Rod**

**Front nose mount**

**Rear pivot mount**

**Double end mount**

**Non-rotating Rod (B/C/E) Mount**

| Bore size (inch) | BB | A | B | BC | DA | E | F | FF | G | GA | GB | K | L | N | NC | NE | NN | W | Y | YC |
|------------------|----|---|---|----|----|---|---|----|---|----|----|---|---|---|----|----|----|----|---|---|---|
| 075 (3/4")      | 0.250 | 0.50 | 0.624 | 0.624 | 0.25 | 0.86 | 0.38 | 5/8-18 | 0.251 | 0.250 | 0.75 | 0.25 | 0.34 | 0.75 | 0.62 | 0.12 | 5/8-18 | 0.75 | 1.20 | 0.62 |
| 088 (7/8")      | 0.250 | 0.50 | 0.624 | 0.624 | 0.25 | 0.93 | 0.38 | 5/8-18 | 0.251 | 0.250 | 0.75 | 0.25 | 0.34 | 0.75 | 0.75 | 0.18 | 5/8-18 | 0.75 | 1.20 | 0.62 |
| 106 (1-1/16")   | 0.312 | 0.50 | 0.624 | 0.624 | 0.38 | 1.25 | 0.38 | 5/8-18 | 0.251 | 0.250 | 0.75 | 0.25 | 0.34 | 0.88 | 0.24 | 5/8-18 | 0.75 | 1.30 | 0.62 |
| 125 (1-1/4")    | 0.375 | 0.88 | 0.749 | 0.749 | 0.44 | 1.32 | 0.50 | 3/4-16 | 0.251 | 0.250 | 0.98 | 0.25 | 0.41 | 1.06 | 1.06 | 0.25 | 3/4-16 | 0.88 | 1.62 | 0.78 |
| 150 (1-1/2")    | 0.375 | 0.88 | 0.874 | 0.749 | 0.44 | 1.56 | 0.62 | 3/4-16 | 0.375 | 1.00 | 0.38 | 0.50 | 1.25 | 1.25 | 0.25 | 7/8-14 | 1.12 | 1.81 | 0.78 |

*(Note) Length not affected by addition of magnet.*
Air Cylinder: Standard Single Acting, Spring Return/Extend

Series NCM

How to Order

- NC
- M
- B
- 075
- 01
- 00
- M9BW
- Option
  - Built-in magnet
    - Nil: None
    - D: Built-in magnet with auto switch
  - Mounting
    - B: Front nose mount
    - C: Rear pivot mount
    - E: Double end mount
  - Bore size
    - 075: 3/4"
    - 088: 7/8"
    - 106: 1-1/16"
    - 125: 1-1/4"
    - 150: 1-1/2"
  - Standard stroke
    - Inches (Note 1)
  - Stroke
    - Hundredths of an inch (i.e. .06 = 0.06"
  - Bumper
    - Nil: Without bumper
    - C: Bumper
  - Auto switch
    - Nil: Without auto switch
    - For applicable auto switch models, refer to the table on page 18.
  - Action
    - S: Spring return
    - T: Spring extend
  - Number of auto switches
    - Nil: 2 pcs.
    - S: 1 pc.
    - n: n pcs.
  - Spring assist
    - Note 4)
  - Heavy duty spring
    - Note 4)

Nil

Note 1) See specifications for standard and maximum stroke lengths.
Note 2) Bumper is offered at no additional cost on ø7/8" and ø1-1/4". They are options on the other bore sizes. The "C" after the bore size must be included in either case. Bumper affects cylinder overall length of some models. Refer to the dimensional data.
Note 3) Stainless steel rod standard on ø3/4" and ø7/8".
Note 4) ø3/4", ø1-1/16" and ø1-1/2" only.
### Auto Switch Specifications

#### Applicable Auto Switches

<table>
<thead>
<tr>
<th>Type</th>
<th>Special function</th>
<th>Electrical entry</th>
<th>Wiring (Output)</th>
<th>Load voltage</th>
<th>Auto switch model</th>
<th>Lead wire length (m)</th>
<th>Pre-wired connector</th>
<th>Applicable load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid state switch</td>
<td></td>
<td></td>
<td>3-wire (NP)</td>
<td>5V, 12V</td>
<td>M9N</td>
<td>0.5 (Nil)</td>
<td></td>
<td>Relay, PLC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3-wire (PN)</td>
<td>12 V</td>
<td>M9P</td>
<td>0.5 (M)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>5V, 12V</td>
<td>H7C</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>5V, 12V</td>
<td>M9NW</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>12 V</td>
<td>M9PW</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>5V, 12V</td>
<td>M9BW</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>12 V</td>
<td>H7BA</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>5V</td>
<td>H7NF</td>
<td>–</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Lead wire length symbols: 0.5 m = Nil (Example) M9NW
  1 m = M (Example) M9NW
  3 m = L (Example) M9NWL
  5 m = Z (Example) M9NZW
  None = N (Example) H7CN

* Solid state switches marked with “O” are produced upon receipt of order.

#### Option Compatibility (1)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Note</th>
<th>NCDM</th>
<th>S</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC1D</td>
<td>Auto switch capable</td>
<td>1, 6</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>S</td>
<td>Spring return</td>
<td>1, 6</td>
<td>O</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>T</td>
<td>Spring extend</td>
<td>1, 6</td>
<td>O</td>
<td>N</td>
<td>–</td>
</tr>
<tr>
<td>C</td>
<td>Bumper</td>
<td>1, 2, 6</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>XB6</td>
<td>Heat resistant</td>
<td>1, 6</td>
<td>S</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>XB7</td>
<td>Cold resistant</td>
<td>1, 6</td>
<td>S</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>XB9</td>
<td>Low speed</td>
<td>1, 6</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>XC6</td>
<td>Stainless steel rod</td>
<td>1, 3, 6</td>
<td>S</td>
<td>S</td>
<td>O</td>
</tr>
<tr>
<td>B</td>
<td>Front nose mount</td>
<td>1, 6</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>C</td>
<td>Rear pivot mount</td>
<td>1, 6</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>E</td>
<td>Double end mount</td>
<td>1, 6</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>R</td>
<td>Block mount</td>
<td>1, 5, 6</td>
<td>S</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

O ...... Combination available to order
S ...... Available with special request
N ...... Not available

Note 1: Exclude ø2".
Note 2: Bumper no additional charge on ø7/8" and ø1-1/4".
Note 3: Stainless steel rod standard on ø7/16", ø9/16", ø3/4" and ø7/8". Use XC6 option to get stainless steel rod nut.
Note 4: Block mount not available in ø7/8" and ø1-1/4".
Note 5: Block, Auto switch capable, S and T only available as special.
Note 6: Exclude ø7/16" and ø9/16".

#### Option Compatibility (2)

<table>
<thead>
<tr>
<th>Option</th>
<th>044</th>
<th>056</th>
<th>075</th>
<th>088</th>
<th>106</th>
<th>125</th>
<th>150</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single acting, Spring return (S), No bumper</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>Single acting, Spring return (S), With bumper</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Single acting, Spring extend (T), No bumper</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>Single acting, Spring extend (T), With bumper</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Direct single acting, Spring return (S), No bumper</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>Direct single acting, Spring extend (T), No bumper</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>Single acting, Spring extend (T), No bumper XC6</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>Single acting, Spring extend (T), With bumper XC6</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>O</td>
</tr>
</tbody>
</table>

Note: O = Optional feature; X = Included feature; S = Special request; N = Not available.
## Specifications: Single Acting, Spring Return / Spring Extend

### Specifications

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum operating pressure</td>
<td>250 PSI / 1.7 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum operating pressure</td>
<td>25 PSI / 0.18 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temperature</td>
<td>40 to 140°F / 5 to 60 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston speed</td>
<td>2 to 20 in/sec / 50 to 500 mm/s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bumper</td>
<td>Optional (No additional charge on 7/8&quot; and 1-1/4&quot; bore)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubrication</td>
<td>Not required (Pre-lubricated at factory)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting</td>
<td>B, C, E, R</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note) R mount available on 3/4", 1-1/16", and 1-1/2" bore only.

### Standard Stroke (inch)

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Standard stroke</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front nose mount (B)</td>
<td>1/2, 1, 1-1/2, 2, 3, 4</td>
<td>6</td>
</tr>
<tr>
<td>Rear pivot mount (C)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Double end mount (E)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Block mount (R)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note) Up to 18" available as special request.

### Theoretical Output: Spring Return (S) with Standard Rod (lbf)

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>Rod diameter (inch)</th>
<th>Operating direction</th>
<th>Effective area (sq.inch)</th>
<th>Operating pressure (PSI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.250</td>
<td>OUT</td>
<td>0.442</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IN</td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>0.250</td>
<td>OUT</td>
<td>0.608</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IN</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.312</td>
<td>OUT</td>
<td>0.882</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IN</td>
<td></td>
<td>150</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>0.437</td>
<td>OUT</td>
<td>1.227</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>IN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.437</td>
<td>OUT</td>
<td>1.767</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>IN</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note 1) Force on extension (OUT) is shown as the theoretical force of a double acting cylinder on extension less the compressed force of the extend spring.

Note 2) Force on retraction (IN) is the resting force of spring when fully retracted.

### Theoretical Output: Spring Extend (T) with Standard Rod (lbf)

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>Rod diameter (inch)</th>
<th>Operating direction</th>
<th>Effective area (sq.inch)</th>
<th>Operating pressure (PSI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.250</td>
<td>OUT</td>
<td>-</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IN</td>
<td>0.393</td>
<td>50</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>0.250</td>
<td>OUT</td>
<td>-</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IN</td>
<td>0.559</td>
<td>100</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.312</td>
<td>OUT</td>
<td>-</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IN</td>
<td>0.806</td>
<td>150</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>0.437</td>
<td>OUT</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>IN</td>
<td>1.077</td>
<td></td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.437</td>
<td>OUT</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>IN</td>
<td>1.617</td>
<td></td>
</tr>
</tbody>
</table>

Note 1) Force on retraction (IN) is shown as the theoretical force of a double acting cylinder on retraction less the compressed force of the extend spring.

Note 2) Force on extension (OUT) is the resting force of spring when fully extended.
### Specifications: Single Acting, Spring Return / Spring Extend

**Spring Force: Spring Return (S) and Spring Extend (T) Type Cylinders**

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>Resting lbf (N)</th>
<th>Compressed lbf (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>3 (13.3)</td>
<td>6 (26.8)</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>3 (13.3)</td>
<td>5.45 (24.4)</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>3 (13.3)</td>
<td>6 (26.8)</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>7 (31.2)</td>
<td>12.4 (55.6)</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>7 (31.2)</td>
<td>12.4 (55.6)</td>
</tr>
</tbody>
</table>

### Weight: Single Acting, Spring Return except Non-rotating Rod

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>Base weight by mounting style</th>
<th>1st inch of stroke</th>
<th>Add'l weight per inch stroke</th>
<th>Add'l weight for magnet</th>
<th>Add'l weight for bumper</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>C</td>
<td>E</td>
<td>R</td>
<td>B, C, E</td>
</tr>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.148</td>
<td>0.164</td>
<td>0.224</td>
<td>0.224</td>
<td>0.044</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>0.194</td>
<td>0.182</td>
<td>0.264</td>
<td>N/A</td>
<td>0.047</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.293</td>
<td>0.287</td>
<td>0.369</td>
<td>0.430</td>
<td>0.063</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>0.514</td>
<td>0.518</td>
<td>0.644</td>
<td>N/A</td>
<td>0.108</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.587</td>
<td>0.619</td>
<td>0.707</td>
<td>1.020</td>
<td>0.113</td>
</tr>
</tbody>
</table>

### Weight: Single Acting, Spring Extend except Non-rotating Rod

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>Base weight by mounting style</th>
<th>1st inch of stroke</th>
<th>Add'l weight per inch stroke</th>
<th>Add'l weight for magnet</th>
<th>Add'l weight for bumper</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>C</td>
<td>E</td>
<td>R</td>
<td>B, C, E</td>
</tr>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.197</td>
<td>0.171</td>
<td>0.253</td>
<td>0.210</td>
<td>0.044</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>0.214</td>
<td>0.188</td>
<td>0.270</td>
<td>N/A</td>
<td>0.047</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.337</td>
<td>0.311</td>
<td>0.393</td>
<td>0.430</td>
<td>0.063</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>0.598</td>
<td>0.564</td>
<td>0.690</td>
<td>N/A</td>
<td>0.108</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.749</td>
<td>0.781</td>
<td>0.869</td>
<td>1.020</td>
<td>0.113</td>
</tr>
</tbody>
</table>
Series NCM

Construction: Single Acting, Spring Return

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rod cover</td>
<td>Aluminum alloy</td>
<td>Clear anodized</td>
</tr>
<tr>
<td>2</td>
<td>Head cover</td>
<td>Aluminum alloy</td>
<td>Clear anodized</td>
</tr>
<tr>
<td>3</td>
<td>Cylinder tube</td>
<td>Stainless steel</td>
<td>Stainless steel 304</td>
</tr>
<tr>
<td>4</td>
<td>Piston</td>
<td>Aluminum alloy</td>
<td>Chromated</td>
</tr>
<tr>
<td>5</td>
<td>Piston rod</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3/4&quot;, 7/8&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1-1/16&quot;, 1-1/4&quot;, 1-1/2&quot;</td>
<td>Carbon steel</td>
<td>Hard chrome plated</td>
</tr>
<tr>
<td>6</td>
<td>Bushing</td>
<td>Sintered Bronze</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Bumper</td>
<td>Urethane</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Piston seal</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Piston gasket</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Spring</td>
<td>Music wire</td>
<td>Chromated</td>
</tr>
<tr>
<td>11</td>
<td>Spring guide</td>
<td>Aluminum alloy</td>
<td>Chromated</td>
</tr>
</tbody>
</table>
Construction: Single Acting, Spring Extend

Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rod cover</td>
<td>Aluminum alloy</td>
<td>Clear anodized</td>
</tr>
<tr>
<td>2</td>
<td>Head cover</td>
<td>Aluminum alloy</td>
<td>Clear anodized</td>
</tr>
<tr>
<td>3</td>
<td>Cylinder tube</td>
<td>Stainless steel</td>
<td>Stainless steel 304</td>
</tr>
<tr>
<td>4</td>
<td>Piston</td>
<td>Aluminum alloy</td>
<td>Chromated</td>
</tr>
<tr>
<td>5</td>
<td>Piston rod</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3/4&quot;, 7/8&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1-1/16&quot;, 1-1/4&quot;, 1-1/2&quot;</td>
<td></td>
<td>Carbon steel</td>
</tr>
<tr>
<td>6</td>
<td>Bushing</td>
<td>Sintered Bronze</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Retaining ring</td>
<td>Spring steel</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Bumper</td>
<td>Urethane</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Retaining ring</td>
<td>Spring steel</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Piston seal</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Piston gasket</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Rod seal</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Spring</td>
<td>Music wire</td>
<td>Chromated</td>
</tr>
<tr>
<td>14</td>
<td>Spring guide</td>
<td>Aluminum alloy</td>
<td>Chromated</td>
</tr>
</tbody>
</table>
### Dimensions: Single Acting, Spring Return

**Front nose mount / Spring return NCMB__S**

- BB: 075 (3/4")
- K6: 0.250
- EGF: 0.50
- F: 0.38
- FF: 0.38
- G: 0.251
- GA: 0.75
- GB: 0.75
- K: 0.34
- L: 0.12
- NC: 0.62
- NE: 0.62
- NN: 1/2-20
- W: 0.44
- YC: 0.62
- ZC: 1.69

**Double end mount / Spring return NCME__S**

- BB: 075 (3/4")
- K6: 0.250
- EGF: 0.50
- F: 0.38
- FF: 0.38
- G: 0.251
- GA: 0.75
- GB: 0.75
- K: 0.34
- L: 0.12
- NC: 0.62
- NE: 0.62
- NN: 1/2-20
- W: 0.44
- YC: 0.62
- ZC: 1.69

**Rear pivot mount / Spring return NCMC__S**

- BB: 075 (3/4")
- K6: 0.250
- EGF: 0.50
- F: 0.38
- FF: 0.38
- G: 0.251
- GA: 0.75
- GB: 0.75
- K: 0.34
- L: 0.12
- NC: 0.62
- NE: 0.62
- NN: 1/2-20
- W: 0.44
- YC: 0.62
- ZC: 1.69

**Note**

1) F dimension for NCME150 not applicable. There are no flats on the E type 150 bore rear tang.

2) FF dimension for NCMC 150 is not applicable. There are no threads on the C type 150 bore rear tang.

---

**Single Acting, Spring Return (B/C/E) Mount without Magnet**

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB1</th>
<th>ZB2</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>2.28</td>
<td>2.41</td>
<td>2.41</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>2.35</td>
<td>2.47</td>
<td>2.47</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>2.66</td>
<td>2.79</td>
<td>2.79</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>3.25</td>
<td>3.38</td>
<td>3.38</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>3.12</td>
<td>3.25</td>
<td>3.25</td>
</tr>
</tbody>
</table>

**X155US (without clevis pin)**

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>øG</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.251</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>0.251</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.251</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>0.251</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.378</td>
</tr>
</tbody>
</table>

**Note**

- LB dimension for NCME150 not applicable.

---

**Single Acting, Spring Return (B/C) Mount with Magnet**

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB1</th>
<th>ZB2</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>2.41</td>
<td>2.53</td>
<td>2.69</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>2.47</td>
<td>2.59</td>
<td>2.75</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>2.79</td>
<td>2.91</td>
<td>3.06</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>3.38</td>
<td>3.50</td>
<td>3.79</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>3.25</td>
<td>3.38</td>
<td>3.63</td>
</tr>
</tbody>
</table>

**Single Acting, Spring Return (E) Mount with Magnet**

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB1</th>
<th>ZB2</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>2.41</td>
<td>2.53</td>
<td>2.69</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>2.47</td>
<td>2.59</td>
<td>2.75</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>2.79</td>
<td>2.91</td>
<td>3.06</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>3.38</td>
<td>3.50</td>
<td>3.79</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>–</td>
<td>–</td>
<td>3.38</td>
</tr>
</tbody>
</table>
Dimensions: Single Acting, Spring Extend

Front nose mount / Spring extend NCMB - _ T

Double end mount / Spring extend NCME - _ T

Rear pivot mount / Spring extend NCMC - _ T

Note) LB dimension for NCME150 not applicable.
Note) LB dimension for NCMB150 not applicable.
Note 2) FF dimension for NCMC 150 is not applicable. There are no threads on the C type 150 bore rear tang.

Single Acting, Spring Extend (B/C/E) Mount without Magnet

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>MM</th>
<th>KK</th>
<th>A</th>
<th>B</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>F</th>
<th>G</th>
<th>GA</th>
<th>GB</th>
<th>K</th>
<th>L</th>
<th>LB</th>
<th>N</th>
<th>NN</th>
<th>W</th>
<th>WB</th>
<th>YD</th>
<th>ZC</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.250</td>
<td>1/4-28</td>
<td>0.50</td>
<td>0.624</td>
<td>0.624</td>
<td>0.38</td>
<td>0.86</td>
<td>0.38</td>
<td>5/8-18</td>
<td>0.251</td>
<td>0.250</td>
<td>0.75</td>
<td>0.34</td>
<td>2.44</td>
<td>0.75</td>
<td>5/8-18</td>
<td>0.50</td>
<td>0.50</td>
<td>0.45</td>
<td>2.69</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>0.250</td>
<td>1/4-28</td>
<td>0.50</td>
<td>0.624</td>
<td>0.624</td>
<td>0.38</td>
<td>0.93</td>
<td>0.38</td>
<td>5/8-18</td>
<td>0.251</td>
<td>0.250</td>
<td>0.75</td>
<td>0.34</td>
<td>2.62</td>
<td>0.75</td>
<td>5/8-18</td>
<td>0.50</td>
<td>0.50</td>
<td>0.45</td>
<td>2.56</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.312</td>
<td>5/16-24</td>
<td>0.50</td>
<td>0.624</td>
<td>0.624</td>
<td>0.25</td>
<td>1.12</td>
<td>0.38</td>
<td>5/8-18</td>
<td>0.251</td>
<td>0.250</td>
<td>0.75</td>
<td>0.12</td>
<td>0.34</td>
<td>2.78</td>
<td>0.88</td>
<td>5/8-18</td>
<td>0.62</td>
<td>0.50</td>
<td>0.55</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>0.437</td>
<td>7/16-20</td>
<td>0.75</td>
<td>0.749</td>
<td>0.749</td>
<td>0.38</td>
<td>1.32</td>
<td>0.50</td>
<td>3/4-16</td>
<td>0.251</td>
<td>0.250</td>
<td>0.75</td>
<td>0.25</td>
<td>0.41</td>
<td>3.76</td>
<td>1.06</td>
<td>3/4-16</td>
<td>0.88</td>
<td>0.62</td>
<td>0.75</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.437</td>
<td>7/16-20</td>
<td>0.75</td>
<td>0.749</td>
<td>0.749</td>
<td>0.38</td>
<td>1.56</td>
<td>0.62</td>
<td>0.375</td>
<td>0.75</td>
<td>0.25</td>
<td>0.63</td>
<td>3.88</td>
<td>1.25</td>
<td>3/4-16</td>
<td>0.88</td>
<td>0.62</td>
<td>0.63</td>
<td>3.00</td>
<td></td>
</tr>
</tbody>
</table>

Note) F dimension for NCME150 not applicable. There are no flats on the E type 150 bore rear tang.

Single Acting, Spring Extend (B/C) Mount with Magnet

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB1</th>
<th>ZB2</th>
</tr>
</thead>
<tbody>
<tr>
<td>No bumper</td>
<td>With bumper</td>
<td>No bumper</td>
<td>With bumper</td>
</tr>
<tr>
<td>075 (3/4&quot;)</td>
<td>2.44</td>
<td>2.56</td>
<td>2.10</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>2.50</td>
<td>2.62</td>
<td>2.15</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>2.78</td>
<td>2.91</td>
<td>2.42</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>3.64</td>
<td>3.76</td>
<td>3.22</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>3.88</td>
<td>4.00</td>
<td>3.16</td>
</tr>
</tbody>
</table>

Single Acting, Spring Extend (E) Mount with Magnet

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB2</th>
</tr>
</thead>
<tbody>
<tr>
<td>No bumper</td>
<td>With bumper</td>
<td>No bumper</td>
</tr>
<tr>
<td>075 (3/4&quot;)</td>
<td>2.56</td>
<td>2.69</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>2.62</td>
<td>2.75</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>2.91</td>
<td>3.03</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>3.76</td>
<td>3.88</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>––</td>
<td>4.12</td>
</tr>
</tbody>
</table>

X155US (without clevis pin)

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>eG</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.251</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>0.251</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.251</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>0.251</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.378</td>
</tr>
</tbody>
</table>

Note) LB dimension for NCME150 not applicable.
Air Cylinder: Non-rotating Rod
Single Acting, Spring Return

Series NCM

How to Order

- **Built-in magnet**
  - Nil: None
  - D: Built-in magnet with auto switch

- **Non-rotating rod**

- **Mounting**
  - B: Front nose mount
  - C: Rear pivot mount
  - E: Double end mount

- **Bore size**
  - 075: 3/4"
  - 085: 7/8"
  - 106: 1-1/16"
  - 125: 1-1/4"
  - 150: 1-1/2"

- **Standard stroke** (inches, Note 2)

- **Stroke** (hundredths of an inch, i.e., 0.06"

- **Bumper**
  - Nil: Without bumper
  - C: Bumper

- **Auto switch**
  - Nil: Without auto switch

- **Number of auto switches**
  - Nil: 2 pcs.
  - S: 1 pc.
  - n: "n" pcs.

- **Option**
  - When ordering multiple options, refer to options compatibility page to ensure options availability.
  - Nil: None
  - X163US: Heavy duty spring

- **Action**
  - S: Spring return

**Note 1:** Not available with double rod (W), block mount (R), rod boot.

**Note 2:** See specifications for standard and maximum stroke lengths.

**Note 3:** Bumper is offered at no additional cost on ø7/8" and ø1-1/4". They are options on the other bore sizes. The "C" after the bore size must be included in either case. Bumper affects cylinder overall length of some models. Refer to the dimensional data.

For applicable auto switch models, refer to the table on page 28.
Auto Switch Specifications

### Applicable Auto Switches

<table>
<thead>
<tr>
<th>Type</th>
<th>Special function</th>
<th>Electrical entry</th>
<th>Wiring (Output)</th>
<th>Load voltage</th>
<th>Auto switch model</th>
<th>Lead wire length (m)</th>
<th>Pre-wired connector</th>
<th>Applicable load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid state switch</td>
<td></td>
<td>Grommet</td>
<td>3-wire (NPN)</td>
<td>5 V, 12 V</td>
<td>M9N</td>
<td>0.5 (M)</td>
<td>–</td>
<td>PLC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>12 V</td>
<td>M9P</td>
<td>1 (M)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>–</td>
<td>M9B</td>
<td>3 (L)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Connector</td>
<td>3-wire (NPN)</td>
<td>5 V, 12 V</td>
<td>H7C</td>
<td>5 (L)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>12 V</td>
<td>M9 NW</td>
<td>(Z)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Diagnostic</td>
<td></td>
<td>3-wire (NPN)</td>
<td>5 V, 12 V</td>
<td>M9 PW</td>
<td>(Z)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>indication</td>
<td></td>
<td>2-wire</td>
<td>12 V</td>
<td>M9 BW</td>
<td>(Z)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>(2-color indication)</td>
<td></td>
<td>4-wire (NPN)</td>
<td>5 V, 12 V</td>
<td>H7BA</td>
<td>(Z)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Water resistant</td>
<td></td>
<td></td>
<td>–</td>
<td>H7 NF</td>
<td>(Z)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>(2-color indication)</td>
<td></td>
<td></td>
<td>–</td>
<td></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>With diagnostic</td>
<td></td>
<td></td>
<td>–</td>
<td></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>output (2-color indication)</td>
<td></td>
<td></td>
<td>–</td>
<td></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Read switch</td>
<td></td>
<td>Grommet</td>
<td>3-wire (NPN)</td>
<td>5 V</td>
<td>A96</td>
<td>0.5 (M)</td>
<td>–</td>
<td>PLC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(NPN equivalent)</td>
<td>–</td>
<td></td>
<td>1 (M)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Diagnostic</td>
<td></td>
<td>2-wire</td>
<td>5 V</td>
<td>A93</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>indication</td>
<td></td>
<td></td>
<td>–</td>
<td>100 V</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>(2-color indication)</td>
<td></td>
<td></td>
<td>–</td>
<td>100 V or less</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
<td>100 V, 200 V</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
<td>200 V or less</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
<td>B64</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
<td>C73</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
<td>C80</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
<td></td>
<td>24 V or less</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>–</td>
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<td></td>
<td></td>
<td>–</td>
<td></td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

* Lead wire length symbols: 0.5 m -------- Nil (Example) M9NW
  1 m -------- M (Example) M9NWWM
  3 m -------- L (Example) M9NWLL
  5 m -------- Z (Example) M9NWWZ
  None -------- N (Example) H7CN

* Solid state switches marked with “○” are produced upon receipt of order.
* D-A94, M93, M95, M9W are shipped together.
* Only switch mounting bracket is assembled at the time of shipment.
* D-M93M and M95VM which lead wire length is 1 m are available from July, 2008.

### Option Compatibility

#### Option Compatibility (1)

| Description       | Note | NCMK-S | NCMK-T | C       | | | | | |
|-------------------|------|--------|--------|---------| | | | | |
| NCMK-S            | Spring return | 1, 3 | –      |         | | | | | |
| NCMK-T            | Spring extend | 1, 3 | N      | –       | | | | | |
| C                 | Bumper   | 1, 2, 3 | O      | O       | – | | | | |
| B                 | Front nose mount | 1, 3 | O      | O       | | | | | |
| C                 | Rear pivot mount | 1, 3 | O      | O       | | | | | |
| E                 | Double end mount | 1, 3 | O      | O       | | | | | |

O …… Combination available to order
S …… Available with special request
N …… Not available

Note 1) Exclude ø2".
Note 2) Bumper no additional charge on ø7/8" and ø1-1/4".
Note 3) Exclude ø7/16" and ø9/16".

#### Option Compatibility (2)

| Single acting, Spring return (S), Non-rotating rod, No bumper | 044 | 056 | 075 | 088 | 106 | 125 | 150 | 200 |
| Single acting, Spring return (S), Non-rotating rod, With bumper | O   | O   | O   | O   | O   | O   | O   | O   |
## Specifications: Single Acting, Spring Return Non-rotating Rod

### Specifications

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum operating pressure</td>
<td>250 PSI / 1.7 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum operating pressure</td>
<td>25 PSI / 0.18 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temperature</td>
<td>40 to 140°F / 5 to 60 °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston speed</td>
<td>2 to 20 in/sec / 50 to 500 mm/s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rod material</td>
<td>Stainless steel 303</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bumper</td>
<td>Optional (No additional charge on 7/8&quot; and 1-1/4&quot; bore)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-rotating accuracy</td>
<td>± 2.0°</td>
<td>± 1.4°</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum allowable torque</td>
<td>0.04 ft-Lbf (0.06 N·m)</td>
<td>0.09 ft-Lbf (0.13 N·m)</td>
<td>0.12 ft-Lbf (0.16 N·m)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Standard Stroke (inch)

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Standard stroke</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front nose mount (B)</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
<td>6</td>
</tr>
<tr>
<td>Double end mount (E)</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
<td>6</td>
</tr>
<tr>
<td>Rear pivot mount (C)</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
<td>6</td>
</tr>
</tbody>
</table>

Note 1) Minimum stroke for mounting auto switches: 0.6 inch for 2 switches, 0.4 inch for one switch.
Note 2) Spring return up to 18" available as special request.

### Theoretical Output (lb)

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>Rod diameter (inch)</th>
<th>Operating direction</th>
<th>Effective area (sq.inch)</th>
<th>Operating pressure (PSI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.25</td>
<td>OUT</td>
<td>0.442</td>
<td>8.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IN</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>0.25</td>
<td>OUT</td>
<td>0.608</td>
<td>12.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IN</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.375</td>
<td>OUT</td>
<td>0.882</td>
<td>19.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IN</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>0.437</td>
<td>OUT</td>
<td>1.227</td>
<td>23.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IN</td>
<td></td>
<td>7.0</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.437</td>
<td>OUT</td>
<td>1.767</td>
<td>37.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IN</td>
<td></td>
<td>7.0</td>
</tr>
</tbody>
</table>

Note 1) Force on extension (OUT) is shown as the theoretical force of a double acting non-rotating rod cylinder on extension less the compressed force of the return spring.
Note 2) Force on retraction (IN) is the resting force of spring when fully retracted.

### Weight (lbs)

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>Base weight by mounting style</th>
<th>1st Inch of stroke</th>
<th>Add'L weight for 1 inch stroke</th>
<th>Add'L weight for magnet</th>
<th>Add'L weight for bumper</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.143</td>
<td>0.159</td>
<td>0.219</td>
<td>0.045</td>
<td>0.080</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>0.216</td>
<td>0.204</td>
<td>0.286</td>
<td>0.047</td>
<td>0.086</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.287</td>
<td>0.281</td>
<td>0.363</td>
<td>0.075</td>
<td>0.138</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>0.490</td>
<td>0.494</td>
<td>0.620</td>
<td>0.112</td>
<td>0.224</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.582</td>
<td>0.574</td>
<td>0.742</td>
<td>0.118</td>
<td>0.248</td>
</tr>
</tbody>
</table>
Dimensions: Single Acting, Spring Return Non-rotating Rod

Front nose mount / Spring return NCMB_-_S

![Diagram of Front Nose Mount]

Double end mount / Spring return NCME_-_S

![Diagram of Double End Mount]

Rear pivot mount / Spring return NCMC_-_S

![Diagram of Rear Pivot Mount]

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>KK</th>
<th>A</th>
<th>B</th>
<th>BC</th>
<th>DA</th>
<th>E</th>
<th>F</th>
<th>FF</th>
<th>G</th>
<th>GA</th>
<th>GB</th>
<th>K</th>
<th>L</th>
<th>NC</th>
<th>NE</th>
<th>NN</th>
<th>W</th>
<th>YC</th>
<th>ZC</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>1/4-28</td>
<td>0.50</td>
<td>0.496</td>
<td>0.624</td>
<td>0.000</td>
<td>0.25</td>
<td>0.38</td>
<td>5/8-18</td>
<td>0.251</td>
<td>0.250</td>
<td>0.75</td>
<td>0.25</td>
<td>0.34</td>
<td>0.62</td>
<td>0.12</td>
<td>1/2-20</td>
<td>0.69</td>
<td>0.62</td>
<td>1.69</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>1/4-28</td>
<td>0.50</td>
<td>0.624</td>
<td>0.624</td>
<td>0.000</td>
<td>0.25</td>
<td>0.38</td>
<td>5/8-18</td>
<td>0.251</td>
<td>0.250</td>
<td>0.75</td>
<td>0.25</td>
<td>0.34</td>
<td>0.75</td>
<td>0.18</td>
<td>5/8-18</td>
<td>0.75</td>
<td>0.62</td>
<td>1.56</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>7/16-20</td>
<td>0.88</td>
<td>0.749</td>
<td>0.749</td>
<td>0.000</td>
<td>0.44</td>
<td>0.50</td>
<td>3/4-16</td>
<td>0.251</td>
<td>0.250</td>
<td>0.75</td>
<td>0.25</td>
<td>0.41</td>
<td>1.06</td>
<td>0.25</td>
<td>3/4-16</td>
<td>0.88</td>
<td>0.76</td>
<td>1.81</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>7/16-20</td>
<td>0.88</td>
<td>0.749</td>
<td>0.749</td>
<td>0.000</td>
<td>0.44</td>
<td>0.56</td>
<td>3/4-16</td>
<td>0.375</td>
<td>1.00</td>
<td>0.38</td>
<td>0.50</td>
<td>1.25</td>
<td>0.25</td>
<td>3/4-16</td>
<td>1.00</td>
<td>0.91</td>
<td>1.69</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB1</th>
<th>ZB2</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>2.53</td>
<td>1.75</td>
<td>2.80</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>2.72</td>
<td>2.09</td>
<td>3.00</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>2.78</td>
<td>2.19</td>
<td>3.06</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>3.38</td>
<td>2.66</td>
<td>3.77</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>3.25</td>
<td>2.56</td>
<td>3.25</td>
</tr>
</tbody>
</table>

Note 1) F dimension for NCME150 not applicable. There are no flats on the E type 150 bore rear tang.
Note 2) FF dimension for NCMC 150 is not applicable. There are no threads on the C type 150 bore rear tang.

Single Acting, Spring Return (B/C/E) Mount without Magnet

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB1</th>
<th>ZB2</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>2.66</td>
<td>1.88</td>
<td>2.92</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>2.85</td>
<td>2.22</td>
<td>3.13</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>2.92</td>
<td>2.31</td>
<td>3.19</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>3.50</td>
<td>2.78</td>
<td>3.91</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>3.38</td>
<td>2.69</td>
<td>3.38</td>
</tr>
</tbody>
</table>

Single Acting, Spring Return (B/C) Mount with Magnet

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB1</th>
<th>ZB2</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>2.66</td>
<td>2.93</td>
<td>2.93</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>2.85</td>
<td>3.19</td>
<td>3.19</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>2.92</td>
<td>3.19</td>
<td>3.19</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>3.50</td>
<td>3.91</td>
<td>3.91</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>3.38</td>
<td>3.38</td>
<td>3.38</td>
</tr>
</tbody>
</table>

Single Acting, Spring Return (E) Mount with Magnet

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB1</th>
<th>ZB2</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>2.66</td>
<td>2.93</td>
<td>2.93</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>2.85</td>
<td>3.19</td>
<td>3.19</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>2.92</td>
<td>3.19</td>
<td>3.19</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>3.50</td>
<td>3.91</td>
<td>3.91</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>3.38</td>
<td>3.38</td>
<td>3.38</td>
</tr>
</tbody>
</table>

X155US (without clevis pin)

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>øG</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.251</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>0.251</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.251</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>0.251</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.378</td>
</tr>
</tbody>
</table>

Note) LB dimension for NCME150 not applicable.
### High Temperature -XB6 Option

**Series NCM**

- High temperature up to 300°F
- Double acting only

#### Specifications

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>250 PSI / 1.7 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. operating pressure</td>
<td>8 PSI / 0.06 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temp.</td>
<td>–4 to 300°F / –20 to 150°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston speed</td>
<td>2 to 20 in/sec / 50 to 500 mm/s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bumper</td>
<td>Not available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>Double acting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto switch capable</td>
<td>Special order only</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Standard Stroke (inch)

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Standard stroke</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front nose (B)</td>
<td>1/2, 1, 1-1/2, 2, 3, 4, 5, 6, 8, 10, 12</td>
<td>12</td>
</tr>
<tr>
<td>Rear pivot, Double end (C, E)</td>
<td>1/2, 1, 1-1/2, 2, 3, 4, 5, 6, 8, 10, 12, 32</td>
<td>32</td>
</tr>
</tbody>
</table>

#### How to Order

NCM Mounting Bore Stroke Option XB6

Ex.) NCMB 075-0400-XB6

High temperature

### Low Temperature -XB7 Option

- Low temperature down to –22°F
- Double acting only

#### Specifications

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>250 PSI / 1.7 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. operating pressure</td>
<td>8 PSI / 0.06 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temp.</td>
<td>–22 to 158°F / –30 to 70°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston speed</td>
<td>2 to 20 in/sec / 50 to 500 mm/s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bumper</td>
<td>Not available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>Double acting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto switch capable</td>
<td>Special order only</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Standard Stroke (inch)

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Standard stroke</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front nose (B)</td>
<td>1/2, 1, 1-1/2, 2, 3, 4, 5, 6, 8, 10, 12</td>
<td>12</td>
</tr>
<tr>
<td>Rear pivot, Double end (C, E)</td>
<td>1/2, 1, 1-1/2, 2, 3, 4, 5, 6, 8, 10, 12, 32</td>
<td>32</td>
</tr>
</tbody>
</table>

#### How to Order

NCM Mounting Bore Stroke Option XB7

Ex.) NCMB 075-0400-XB7

Low temperature
Heavy Duty Wiper -XC4 Option

Specifications

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
<th>200 (2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>250 PSI / 1.7 MPa</td>
<td>8 PSI / 0.06 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. operating pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temp.</td>
<td>40 to 140°F / 5 to 60°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston speed</td>
<td>No bumper: 2 to 20 in/sec (50 to 500 mm/sec)</td>
<td>Bumper: 2 to 30 in/sec (50 to 750 mm/sec)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bumper</td>
<td>Optional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubrication</td>
<td>Not required (Pre-lubricated at factory)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto switch capable</td>
<td>Optional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting</td>
<td>B, C, E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Standard Stroke (inch)

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Standard stroke</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front nose (B)</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
<td>12</td>
</tr>
<tr>
<td>Rear pivot (C)</td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>Double end mount (E)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How to Order

NC(D)M Mounting Bore Stroke Option - XC4

Ex.) NCDME075-0400-M9B-XC4

• Rod wiper option
Series NCM

Stainless Steel Rod -XC6 Option

- Stainless steel piston rod is used to protect in harsh or wet environments.
- Auto switch capable
- Stainless steel rod is a standard on bores 3/4 and 7/8 and non-rotating rod. Add -XC6 to obtain stainless steel rod nut.

Specifications

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
<th>200 (2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>250 PSI / 1.7 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. operating pressure</td>
<td>8 PSI / 0.06 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temp.</td>
<td>40 to 140°F / 5 to 60°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston speed</td>
<td></td>
<td></td>
<td>2 to 20 in/sec / 50 to 500 mm/s</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bumper</td>
<td></td>
<td></td>
<td>Optional (No additional charge on 1-1/4&quot; bore)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td></td>
<td></td>
<td>Double acting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto switch capable</td>
<td></td>
<td></td>
<td>Optional</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Standard Stroke

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Standard stroke</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front nose (B)</td>
<td>1/2, 1, 1-1/2, 2, 3, 4, 5, 6, 8, 10, 12</td>
<td>12</td>
</tr>
<tr>
<td>Rear pivot, Double end (C, E)</td>
<td>1/2, 1, 1-1/2, 2, 3, 4, 5, 6, 8, 10, 12, 32</td>
<td>32</td>
</tr>
</tbody>
</table>

Note) See standard specifications for minimum and maximum strokes.

How to Order

NC(D)M Mounting Bore Stroke Option XC6

Ex.) NCDMB 150-0400-XC6

Stainless steel rod

Low Speed -XB9 Option

- Smooth movements even at 0.4 to 2.0 inch/sec.
- Double acting
- Auto switch capable

Specifications

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>250 PSI / 1.7 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. operating pressure</td>
<td>8 PSI / 0.06 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temp.</td>
<td>40 to 140°F / 5 to 60°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston speed</td>
<td></td>
<td></td>
<td>0.4 to 20 in/sec / 10 to 500 mm/s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bumper</td>
<td></td>
<td></td>
<td>Optional (No additional charge on 7/8&quot; and 1-1/4&quot; bore)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td></td>
<td></td>
<td>Double acting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto switch capable</td>
<td></td>
<td></td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
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Standard Stroke

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Standard stroke</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front nose (B)</td>
<td>1/2, 1, 1-1/2, 2, 3, 4, 5, 6, 8, 10, 12</td>
<td>12</td>
</tr>
<tr>
<td>Rear pivot, Double end (C, E)</td>
<td>1/2, 1, 1-1/2, 2, 3, 4, 5, 6, 8, 10, 12, 32</td>
<td>32</td>
</tr>
</tbody>
</table>

Note) See standard specifications for minimum and maximum strokes.

How to Order

NCM Mounting Bore Stroke Option XB9

Ex.) NCDMB 075-0400-XB9

Low speed
Rod Boot Option

- Boots are supplied to protect the surface of piston rod and rod seals in harsh or wet environments.
- Bore size 3/4", 7/8", 1-1/16", 1-1/4", 1-1/2"
- Double acting only

Rod Boot Material

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Material</th>
<th>Max. temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>Tarpaulin</td>
<td>140°F (60°C)</td>
</tr>
<tr>
<td>K</td>
<td>Heat resistant tarpaulin</td>
<td>230°F (110°C)</td>
</tr>
</tbody>
</table>

* Max. temperature is for boot only.

Maximum Stroke

<table>
<thead>
<tr>
<th>Bore size</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4, 7/8, 1-1/16</td>
<td>12 Standard - 16 Maximum</td>
</tr>
<tr>
<td>1-1/4, 1-1/2, 2</td>
<td>12 Standard - 26 Maximum</td>
</tr>
</tbody>
</table>

How to Order

NCDMB 075-0400 J

Ex.) NCDMB 075-0400 J
Rod boot
J - Tarpaulin
K - Heat resistant tarpaulin

| Bore size (inch) | A  | E  | F  | 0 to 2 | 2.1 to 4 | 4.1 to 6 | 6.1 to 8 | 8.1 to 10 | 10.1 to 12 | 12.1 to 14 | 14.1 to 16 | 16.1 to 20 | 20.1 to 24 | 24.1 to 28 |
|------------------|----|----|----|--------|----------|----------|----------|-----------|------------|------------|------------|------------|------------|------------|------------|
| 075 (3/4")      | 0.50 | 1.18 | 0.51 | 1.81   | 2.31     | 2.81     | 3.31     | 3.81      | 4.31       | 4.81       | 5.31       | -          | -          | -          |
| 088 (7/8")      | 0.50 | 1.18 | 0.51 | 1.81   | 2.31     | 2.81     | 3.31     | 3.81      | 4.31       | 4.81       | 5.31       | -          | -          | -          |
| 106 (1-1/16")   | 0.50 | 1.18 | 0.51 | 1.81   | 2.31     | 2.81     | 3.31     | 3.81      | 4.31       | 4.81       | 5.31       | -          | -          | -          |
| 125 (1-1/4")    | 0.75 | 1.38 | 0.55 | 1.94   | 2.44     | 2.94     | 3.44     | 3.94      | 4.44       | 4.94       | 5.44       | 6.44       | 7.44       | 8.44       |
| 150 (1-1/2")    | 0.75 | 1.38 | 0.55 | 1.94   | 2.44     | 2.94     | 3.44     | 3.94      | 4.44       | 4.94       | 5.44       | 6.44       | 7.44       | 8.44       |

| Bore size (inch) | L  | 0 to 2 | 2.1 to 4 | 4.1 to 6 | 6.1 to 8 | 8.1 to 10 | 10.1 to 12 | 12.1 to 14 | 14.1 to 16 | 16.1 to 20 | 20.1 to 24 | 24.1 to 28 |
|------------------|---|--------|----------|----------|----------|----------|------------|------------|------------|------------|------------|------------|------------|
| 075 (3/4")      | 0.50 | 1.00   | 1.50     | 2.00     | 2.50     | 3.00     | 3.50       | 4.00       | -          | -          | -          | -          |
| 088 (7/8")      | 0.50 | 1.00   | 1.50     | 2.00     | 2.50     | 3.00     | 3.50       | 4.00       | -          | -          | -          | -          |
| 106 (1-1/16")   | 0.50 | 1.00   | 1.50     | 2.00     | 2.50     | 3.00     | 3.50       | 4.00       | -          | -          | -          | -          |
| 125 (1-1/4")    | 0.50 | 1.00   | 1.50     | 2.00     | 2.50     | 3.00     | 3.50       | 4.00       | 5.00       | 6.00       | 7.00       | -          |
| 150 (1-1/2")    | 0.50 | 1.00   | 1.50     | 2.00     | 2.50     | 3.00     | 3.50       | 4.00       | 5.00       | 6.00       | 7.00       | -          |
### Specifications

<table>
<thead>
<tr>
<th></th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>250 PSI / 1.7 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. operating pressure</td>
<td>8 PSI / 0.06 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temp.</td>
<td>40 to 140°F / 5 to 60°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston speed</td>
<td>No bumper: 2 to 20 in/sec (50 to 500 mm/sec)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bumper: 2 to 30 in/sec (50 to 750 mm/sec)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bumper</td>
<td>Optional</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubrication</td>
<td>Not required (Pre-lubricated at factory)</td>
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<td></td>
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</tr>
<tr>
<td>Auto switch capable</td>
<td>Optional</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting</td>
<td>B, C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Standard Stroke (inch)

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Standard stroke</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front nose (B)</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
<td>12</td>
</tr>
<tr>
<td>Rear pivot (C)</td>
<td></td>
<td>32</td>
</tr>
</tbody>
</table>

### How to Order

**NC(D)M Mounting Bore Stroke Option X103US**

Ex.) NCDMB075-0400-M9B-X103US
Rotated Rear Port -X103US Option

NC(D)MB | Bore | Stroke -X103US

Without Bumper

| Bore size (inch) | MM | KK | A | B | BA | D | E | F | BA | K | L | N | NN | W | Y | YC | ZB |
|------------------|----|----|---|---|----|---|---|---|----|----|---|---|----|----|----|----|----|----|
| 075 (3/4")      | 0.250 | 1/4-28 | 0.50 | 0.622 | – | 0.86 | 0.37 | 0.622 | – | 0.13 | 0.75 | 5/8-18 | 0.50 | 0.96 | 0.41 | 3.54 |
| 088 (7/8")     | 0.250 | 1/4-28 | 0.50 | 0.622 | – | 0.93 | 0.37 | 0.622 | – | 0.15 | 0.75 | 5/8-18 | 0.50 | 0.96 | 0.41 | 3.12 |
| 106 (1-1/16")  | 0.312 | 5/16-24 | 0.50 | 0.622 | 0.25 | 1.12 | 0.37 | 0.622 | 0.13 | 0.14 | 0.87 | 5/8-18 | 0.63 | 1.18 | 0.41 | 3.62 |
| 125 (1-1/4")   | 0.437 | 7/16-20 | 0.75 | 0.748 | 0.37 | 1.31 | 0.49 | 0.748 | 0.26 | 0.09 | 1.06 | 3/4-16 | 0.89 | 1.64 | 0.46 | 4.15 |
| 150 (1-1/2")   | 0.437 | 7/16-20 | 0.75 | 0.748 | 0.37 | 1.56 | – | 0.748 | 0.26 | 0.14 | 1.25 | 3/4-16 | 0.89 | 1.52 | 0.41 | 4.00 |

With Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>3.79</td>
<td>4.07</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>3.58</td>
<td>3.86</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>4.29</td>
<td>4.57</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>4.74</td>
<td>5.13</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>4.51</td>
<td>4.89</td>
</tr>
</tbody>
</table>

NC(D)MC | Bore | Stroke -X103US

Without Bumper

| Bore size (inch) | MM | KK | A | B | BA | D | E | F | FF | GA | GB | K | L | LB | N | NN | W | Y | YC | ZB |
|------------------|----|----|---|---|----|---|---|---|----|----|----|---|---|----|----|----|----|----|----|
| 075 (3/4")      | 0.250 | 1/4-28 | 0.50 | 0.622 | – | 0.86 | 0.37 | 0.622 | 5/8-18 | 0.250 | 0.75 | – | 0.35 | 3.75 | 0.75 | 5/8-18 | 0.50 | 0.96 | 0.62 | 4.03 |
| 088 (7/8")     | 0.250 | 1/4-28 | 0.50 | 0.622 | – | 0.93 | 0.37 | 0.622 | 5/8-18 | 0.250 | 0.75 | – | 0.35 | 3.32 | 0.75 | 5/8-18 | 0.50 | 0.96 | 0.62 | 3.60 |
| 106 (1-1/16")  | 0.312 | 5/16-24 | 0.50 | 0.622 | 0.25 | 1.12 | 0.37 | 0.622 | 5/8-18 | 0.250 | 0.75 | 0.13 | 0.35 | 3.84 | 0.87 | 5/8-18 | 0.63 | 1.18 | 0.62 | 4.11 |
| 125 (1-1/4")   | 0.437 | 7/16-20 | 0.75 | 0.748 | 0.37 | 1.31 | 0.49 | 0.748 | 3/4-16 | 0.250 | 0.75 | 0.26 | 0.42 | 4.48 | 1.06 | 3/4-16 | 0.89 | 1.64 | 0.78 | 4.87 |
| 150 (1-1/2")   | 0.437 | 7/16-20 | 0.75 | 0.748 | 0.866 | 0.37 | 1.56 | 0.62 | – | 0.375 | 1.00 | 0.26 | 0.63 | 4.37 | 1.25 | 3/4-16 | 0.89 | 1.52 | 0.78 | 4.75 |

With Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>3.79</td>
<td>4.07</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>3.58</td>
<td>3.86</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>4.29</td>
<td>4.57</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>4.74</td>
<td>5.13</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>4.51</td>
<td>4.89</td>
</tr>
</tbody>
</table>

SMC
Series NCM

Rotated Rear Port -X103US Option

NC(D)MKB | Bore + Stroke - X103US

Without Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>MM</th>
<th>KK</th>
<th>A</th>
<th>B</th>
<th>BA</th>
<th>DA</th>
<th>E</th>
<th>F</th>
<th>K</th>
<th>L</th>
<th>N</th>
<th>NN</th>
<th>W</th>
<th>Y</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.250</td>
<td>1/4-28</td>
<td>0.50</td>
<td>0.622</td>
<td>0.622</td>
<td>0.25</td>
<td>0.86</td>
<td>0.37</td>
<td>0.26</td>
<td>0.13</td>
<td>0.75</td>
<td>5/8-18</td>
<td>0.76</td>
<td>1.21</td>
<td>0.41</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>0.250</td>
<td>1/4-28</td>
<td>0.50</td>
<td>0.622</td>
<td>0.622</td>
<td>0.25</td>
<td>0.93</td>
<td>0.37</td>
<td>0.26</td>
<td>0.15</td>
<td>0.75</td>
<td>5/8-18</td>
<td>0.76</td>
<td>1.21</td>
<td>0.41</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.312</td>
<td>5/16-24</td>
<td>0.50</td>
<td>0.622</td>
<td>0.622</td>
<td>0.38</td>
<td>1.12</td>
<td>0.37</td>
<td>0.26</td>
<td>0.14</td>
<td>0.88</td>
<td>5/8-18</td>
<td>0.76</td>
<td>1.31</td>
<td>0.41</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>0.375</td>
<td>3/8-24</td>
<td>0.88</td>
<td>0.748</td>
<td>0.748</td>
<td>0.44</td>
<td>1.31</td>
<td>0.49</td>
<td>0.26</td>
<td>0.09</td>
<td>1.06</td>
<td>3/4-16</td>
<td>0.89</td>
<td>1.64</td>
<td>0.46</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.375</td>
<td>3/8-24</td>
<td>0.88</td>
<td>0.874</td>
<td>0.748</td>
<td>0.44</td>
<td>1.56</td>
<td>0.62</td>
<td>0.38</td>
<td>0.14</td>
<td>1.25</td>
<td>7/8-14</td>
<td>1.12</td>
<td>1.82</td>
<td>0.41</td>
</tr>
</tbody>
</table>

With Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>4.02</td>
<td>4.30</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>3.83</td>
<td>4.11</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>4.11</td>
<td>4.29</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>4.75</td>
<td>5.13</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>4.82</td>
<td>5.20</td>
</tr>
</tbody>
</table>

NC(D)MKC | Bore + Stroke - X103US

Without Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>MM</th>
<th>KK</th>
<th>A</th>
<th>B</th>
<th>BA</th>
<th>DA</th>
<th>E</th>
<th>F</th>
<th>K</th>
<th>L</th>
<th>N</th>
<th>NN</th>
<th>W</th>
<th>Y</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.250</td>
<td>1/4-28</td>
<td>0.50</td>
<td>0.622</td>
<td>0.622</td>
<td>0.25</td>
<td>0.86</td>
<td>0.37</td>
<td>0.26</td>
<td>0.13</td>
<td>0.75</td>
<td>5/8-18</td>
<td>0.76</td>
<td>1.21</td>
<td>0.41</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>0.250</td>
<td>1/4-28</td>
<td>0.50</td>
<td>0.622</td>
<td>0.622</td>
<td>0.25</td>
<td>0.93</td>
<td>0.37</td>
<td>0.26</td>
<td>0.15</td>
<td>0.75</td>
<td>5/8-18</td>
<td>0.76</td>
<td>1.21</td>
<td>0.41</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.312</td>
<td>5/16-24</td>
<td>0.50</td>
<td>0.622</td>
<td>0.622</td>
<td>0.38</td>
<td>1.12</td>
<td>0.37</td>
<td>0.26</td>
<td>0.14</td>
<td>0.88</td>
<td>5/8-18</td>
<td>0.76</td>
<td>1.31</td>
<td>0.41</td>
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<tr>
<td>125 (1-1/4&quot;)</td>
<td>0.375</td>
<td>3/8-24</td>
<td>0.88</td>
<td>0.748</td>
<td>0.748</td>
<td>0.44</td>
<td>1.31</td>
<td>0.49</td>
<td>0.26</td>
<td>0.09</td>
<td>1.06</td>
<td>3/4-16</td>
<td>0.89</td>
<td>1.64</td>
<td>0.46</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.375</td>
<td>3/8-24</td>
<td>0.88</td>
<td>0.874</td>
<td>0.748</td>
<td>0.44</td>
<td>1.56</td>
<td>0.62</td>
<td>0.38</td>
<td>0.14</td>
<td>1.25</td>
<td>7/8-14</td>
<td>1.12</td>
<td>1.82</td>
<td>0.41</td>
</tr>
</tbody>
</table>

With Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>4.02</td>
<td>4.30</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>3.83</td>
<td>4.11</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>4.11</td>
<td>4.29</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>4.75</td>
<td>5.13</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>4.82</td>
<td>5.20</td>
</tr>
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</table>
Rear Clevis Mount without Pin and with Rear Clevis Bronze Bushing -X114US Option

Specifications

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>250 PSI / 1.7 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. operating pressure</td>
<td>8 PSI / 0.06 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temp.</td>
<td>40 to 140°F / 5 to 60°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston speed</td>
<td>No bumper: 2 to 20 in/sec (50 to 500 mm/sec)</td>
<td>Bumper: 2 to 30 in/sec (50 to 750 mm/sec)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bumper</td>
<td>Optional</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubrication</td>
<td>Not required (Pre-lubricated at factory)</td>
<td>Optional</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto switch capable</td>
<td>Optional</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting</td>
<td>E</td>
<td></td>
<td></td>
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</tbody>
</table>

Standard Stroke

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Standard stroke</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double end mount (E)</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
<td>32</td>
</tr>
</tbody>
</table>

How to Order

NC(D)M  Mounting  Bore—Stroke  Option—X114US

Ex.) NCDME075-0400-M9B-X114US

NC(D)ME(075 to 50)—Stroke(C)—X114US

With Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.37</td>
<td>0.250</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>0.37</td>
<td>0.250</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.37</td>
<td>0.250</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>0.49</td>
<td>0.250</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.62</td>
<td>0.375</td>
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</table>

• Bronze bushing in place of clevis pin
Series NCM

Rear Pivot Mount without Clevis Pin -X155US Option

Specifications

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>250 PSI / 1.7 MPa</td>
<td>8 PSI / 0.06 MPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. operating pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temp.</td>
<td>40 to 140°F / 5 to 60°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston speed</td>
<td>No bumper: 2 to 20 in/sec (50 to 500 mm/sec)</td>
<td>Bumper: 2 to 30 in/sec (50 to 750 mm/sec)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bumper</td>
<td></td>
<td></td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubrication</td>
<td></td>
<td></td>
<td>Not required (Pre-lubricated at factory)</td>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td>Auto switch capable</td>
<td></td>
<td></td>
<td></td>
<td>Not Available</td>
<td></td>
</tr>
<tr>
<td>Mounting</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Standard Stroke

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Standard stroke</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rear pivot (C)</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
<td>38</td>
</tr>
</tbody>
</table>

How to Order

NC(D)M Mounting Bore—Stroke Option—X155US

Ex.) NCDMC075-0400-M9B-X155US

Single Acting with Heavy Spring Force -X163US Option

Specifications

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>075 (3/4&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>150 (1-1/2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>250 PSI / 1.7 MPa</td>
<td>8 PSI / 0.06 MPa</td>
<td></td>
</tr>
<tr>
<td>Min. operating pressure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temp.</td>
<td>40 to 140°F / 5 to 60°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston speed</td>
<td>No bumper: 2 to 20 in/sec (50 to 500 mm/sec)</td>
<td>Bumper: 2 to 30 in/sec (50 to 750 mm/sec)</td>
<td></td>
</tr>
<tr>
<td>Bumper</td>
<td></td>
<td></td>
<td>Optional</td>
</tr>
<tr>
<td>Lubrication</td>
<td></td>
<td></td>
<td>Not required (Pre-lubricated at factory)</td>
</tr>
<tr>
<td>Auto switch capable</td>
<td></td>
<td></td>
<td>Not Available</td>
</tr>
<tr>
<td>Mounting</td>
<td>B, C, E</td>
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</table>

Spring Force: Spring Return (S) and Spring Extend (T) Type Cylinders

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>Resting lbs (N)</th>
<th>Compressed lbs (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>2 (8.9)</td>
<td>9 (40)</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>5.5 (24.5)</td>
<td>11.5 (51.1)</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>7.5 (33.4)</td>
<td>16 (71.1)</td>
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Standard Stroke

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Standard stroke</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front nose (B)</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
<td>6</td>
</tr>
<tr>
<td>Rear pivot (C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Double end mount (E)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How to Order

NCM Mounting Bore—Stroke Option—X163US

Ex.) NCMB075-0400-X163US

• Rear clevis mount without rear clevis pin

• Single acting with heavy spring force
Specifications

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>075 (3/4&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
<th>200 (2&quot;)</th>
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</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>250 PSI / 1.7 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. operating pressure</td>
<td>8 PSI / 0.06 MPa</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Ambient and fluid temp.</td>
<td>40 to 140°F / 5 to 60°C</td>
<td></td>
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</tr>
<tr>
<td>Piston speed</td>
<td>No bumper: 2 to 20 in/sec (50 to 500 mm/sec)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bumper</td>
<td>Optional</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubrication</td>
<td>Not required (Pre-lubricated at factory)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto switch capable</td>
<td>Standard</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting</td>
<td>B, E, W</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Stroke</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Mounting</td>
<td>Front nose (B)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Double end mount (E)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Double rod (W)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. stroke</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
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<td></td>
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</tbody>
</table>

How to Order

NCDM Mounting Bore Stroke Option X169US

Ex.) NCDMB075-0400-M9B-X169US

NCDMb(075 to 200)- Stroke(C)-X169US

Without Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>A</th>
<th>øB</th>
<th>D</th>
<th>øE</th>
<th>EE</th>
<th>K</th>
<th>KK</th>
<th>øMM</th>
<th>N</th>
<th>NC</th>
<th>NE</th>
<th>NN</th>
<th>W</th>
<th>Y</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.59</td>
<td>0.624</td>
<td>0.22</td>
<td>0.86</td>
<td>1/8</td>
<td>0.25</td>
<td>1/4-28</td>
<td>0.250</td>
<td>0.75</td>
<td>0.62</td>
<td>0.12</td>
<td>5/8-18</td>
<td>0.75</td>
<td>1.21</td>
<td>3.42</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.62</td>
<td>0.749</td>
<td>0.25</td>
<td>1.12</td>
<td>1/8</td>
<td>0.25</td>
<td>5/16-24</td>
<td>0.312</td>
<td>0.88</td>
<td>0.88</td>
<td>0.24</td>
<td>3/4-16</td>
<td>0.88</td>
<td>1.43</td>
<td>3.66</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>0.75</td>
<td>0.874</td>
<td>0.38</td>
<td>1.32</td>
<td>1/8</td>
<td>0.25</td>
<td>3/8-24</td>
<td>0.437</td>
<td>1.06</td>
<td>1.06</td>
<td>0.25</td>
<td>7/8-14</td>
<td>1.00</td>
<td>1.75</td>
<td>3.84</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.88</td>
<td>0.999</td>
<td>0.38</td>
<td>1.56</td>
<td>1/4</td>
<td>0.25</td>
<td>7/16-20</td>
<td>0.437</td>
<td>1.25</td>
<td>1.25</td>
<td>0.25</td>
<td>1-14</td>
<td>1.06</td>
<td>1.69</td>
<td>3.98</td>
</tr>
<tr>
<td>200 (2&quot;)</td>
<td>1.00</td>
<td>1.249</td>
<td>0.50</td>
<td>2.07</td>
<td>1/4</td>
<td>0.31</td>
<td>1/2-20</td>
<td>0.625</td>
<td>1.75</td>
<td>1.75</td>
<td>0.31</td>
<td>1 1/4-12</td>
<td>1.31</td>
<td>2.04</td>
<td>4.97</td>
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With Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>3.68</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>3.86</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>4.10</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>4.18</td>
</tr>
<tr>
<td>200 (2&quot;)</td>
<td>5.23</td>
</tr>
</tbody>
</table>
## Series NCM

### Dimensional Interchange to Other Manufacturers Magnetic Reed Switch Cylinders -X169US Option

**NCDME(075 to 200)-(Stroke C)-X169US**

#### Without Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>A</th>
<th>øB</th>
<th>D</th>
<th>øE</th>
<th>EE</th>
<th>K</th>
<th>KK</th>
<th>L</th>
<th>LB</th>
<th>øMM</th>
<th>N</th>
<th>NN</th>
<th>W</th>
<th>Y</th>
<th>YC</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.59</td>
<td>0.624</td>
<td>0.22</td>
<td>0.86</td>
<td>1/8</td>
<td>0.44</td>
<td>0.220</td>
<td>0.25</td>
<td>1/4-28</td>
<td>0.34</td>
<td>4.31</td>
<td>0.250</td>
<td>0.75</td>
<td>5/8-18</td>
<td>0.75</td>
<td>1.21</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.62</td>
<td>0.749</td>
<td>0.25</td>
<td>1.12</td>
<td>1/8</td>
<td>0.50</td>
<td>0.253</td>
<td>0.25</td>
<td>5/16-24</td>
<td>0.38</td>
<td>4.47</td>
<td>0.312</td>
<td>0.88</td>
<td>3/4-16</td>
<td>0.88</td>
<td>1.43</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>0.75</td>
<td>0.874</td>
<td>0.38</td>
<td>1.32</td>
<td>1/8</td>
<td>0.62</td>
<td>0.315</td>
<td>0.25</td>
<td>3/8-24</td>
<td>0.47</td>
<td>4.62</td>
<td>0.437</td>
<td>1.06</td>
<td>7/8-14</td>
<td>1.00</td>
<td>1.75</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.88</td>
<td>0.999</td>
<td>0.38</td>
<td>1.56</td>
<td>1/4</td>
<td>0.69</td>
<td>0.377</td>
<td>0.25</td>
<td>7/16-20</td>
<td>0.56</td>
<td>5.06</td>
<td>0.437</td>
<td>1.25</td>
<td>1-14</td>
<td>1.06</td>
<td>1.69</td>
</tr>
<tr>
<td>200 (2&quot;)</td>
<td>1.00</td>
<td>1.249</td>
<td>0.50</td>
<td>2.07</td>
<td>1/4</td>
<td>0.86</td>
<td>0.439</td>
<td>0.31</td>
<td>1/2-20</td>
<td>0.56</td>
<td>6.12</td>
<td>0.625</td>
<td>1.75</td>
<td>1 1/4-12</td>
<td>1.31</td>
<td>2.04</td>
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</table>

#### With Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>4.57</td>
<td>4.85</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>4.73</td>
<td>5.04</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>4.88</td>
<td>5.26</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>5.32</td>
<td>5.79</td>
</tr>
<tr>
<td>200 (2&quot;)</td>
<td>6.38</td>
<td>6.82</td>
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**NCDMW(075 to 200)-(Stroke C)-X169US**

#### Without Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>A</th>
<th>øB</th>
<th>D</th>
<th>øE</th>
<th>EE</th>
<th>K</th>
<th>KK</th>
<th>L</th>
<th>LB</th>
<th>øMM</th>
<th>N</th>
<th>NN</th>
<th>W</th>
<th>Y</th>
<th>YE</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.59</td>
<td>0.624</td>
<td>0.22</td>
<td>0.86</td>
<td>1/8</td>
<td>0.44</td>
<td>0.220</td>
<td>0.25</td>
<td>1/4-28</td>
<td>0.34</td>
<td>4.31</td>
<td>0.250</td>
<td>0.75</td>
<td>5/8-18</td>
<td>0.75</td>
<td>1.21</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.62</td>
<td>0.749</td>
<td>0.25</td>
<td>1.12</td>
<td>1/8</td>
<td>0.50</td>
<td>0.253</td>
<td>0.25</td>
<td>5/16-24</td>
<td>0.38</td>
<td>4.47</td>
<td>0.312</td>
<td>0.88</td>
<td>3/4-16</td>
<td>0.88</td>
<td>1.43</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>0.75</td>
<td>0.874</td>
<td>0.38</td>
<td>1.32</td>
<td>1/8</td>
<td>0.62</td>
<td>0.315</td>
<td>0.25</td>
<td>3/8-24</td>
<td>0.47</td>
<td>4.62</td>
<td>0.437</td>
<td>1.06</td>
<td>7/8-14</td>
<td>1.00</td>
<td>1.75</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>0.88</td>
<td>0.999</td>
<td>0.38</td>
<td>1.56</td>
<td>1/4</td>
<td>0.69</td>
<td>0.377</td>
<td>0.25</td>
<td>7/16-20</td>
<td>0.56</td>
<td>5.06</td>
<td>0.437</td>
<td>1.25</td>
<td>1-14</td>
<td>1.06</td>
<td>1.69</td>
</tr>
<tr>
<td>200 (2&quot;)</td>
<td>1.00</td>
<td>1.249</td>
<td>0.50</td>
<td>2.07</td>
<td>1/4</td>
<td>0.86</td>
<td>0.439</td>
<td>0.31</td>
<td>1/2-20</td>
<td>0.56</td>
<td>6.12</td>
<td>0.625</td>
<td>1.75</td>
<td>1 1/4-12</td>
<td>1.31</td>
<td>2.04</td>
</tr>
</tbody>
</table>

#### With Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>3.67</td>
<td>5.17</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>3.69</td>
<td>5.45</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>3.64</td>
<td>5.64</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>3.89</td>
<td>6.01</td>
</tr>
<tr>
<td>200 (2&quot;)</td>
<td>4.76</td>
<td>7.38</td>
</tr>
</tbody>
</table>
Air Tank -X6002 Option

Specifications

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
<th>200 (2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>250 PSI / 1.7 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting</td>
<td>B, E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Standard Length

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Standard length</th>
<th>Max. length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front nose (B)</td>
<td>1, 2, 3, 4, 5, 6</td>
<td>38</td>
</tr>
<tr>
<td>Double end mount (E)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Volume

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Bore</th>
<th>Standard length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front nose (B)</td>
<td>075</td>
<td>0.51 + 0.44 per inch of length</td>
</tr>
<tr>
<td></td>
<td>088</td>
<td>0.45 + 0.60 per inch of length</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>0.95 + 0.88 per inch of length</td>
</tr>
<tr>
<td></td>
<td>125</td>
<td>1.19 + 1.22 per inch of length</td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>1.83 + 1.77 per inch of length</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>3.48 + 3.14 per inch of length</td>
</tr>
<tr>
<td>Double end mount (E)</td>
<td>075</td>
<td>0.68 + 0.44 per inch of length</td>
</tr>
<tr>
<td></td>
<td>088</td>
<td>0.61 + 0.60 per inch of length</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>1.08 + 0.88 per inch of length</td>
</tr>
<tr>
<td></td>
<td>125</td>
<td>1.25 + 1.22 per inch of length</td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>1.91 + 1.77 per inch of length</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>4.81 + 3.14 per inch of length</td>
</tr>
</tbody>
</table>

How to Order

NCM Mounting Bore Stroke X6002

Ex.) NCMB075-0400-X6002

NCMB(075 to 200)-Stroke-X6002

Without Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>øE</th>
<th>NC</th>
<th>NE</th>
<th>ZB</th>
<th>ZD</th>
<th>Volume (Cubic inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.86</td>
<td>0.62</td>
<td>0.12</td>
<td>1.95</td>
<td>1/8</td>
<td>0.51 + 0.44 per inch of length</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>0.93</td>
<td>0.75</td>
<td>0.18</td>
<td>1.73</td>
<td>1/8</td>
<td>0.45 + 0.60 per inch of length</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>1.12</td>
<td>0.88</td>
<td>0.25</td>
<td>2.15</td>
<td>1/8</td>
<td>0.95 + 0.88 per inch of length</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>1.32</td>
<td>1.06</td>
<td>0.25</td>
<td>2.17</td>
<td>1/8</td>
<td>1.19 + 1.22 per inch of length</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>1.56</td>
<td>1.25</td>
<td>0.25</td>
<td>2.23</td>
<td>1/8</td>
<td>1.83 + 1.77 per inch of length</td>
</tr>
<tr>
<td>200 (2&quot;)</td>
<td>2.06</td>
<td>1.75</td>
<td>0.31</td>
<td>2.81</td>
<td>1/4</td>
<td>3.48 + 3.14 per inch of length</td>
</tr>
</tbody>
</table>
**Series NCM**

**Air Tank -X6002 Option**

**NCME(075 to 200)-[Stroke]-X6002**

---

### Without Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>øE</th>
<th>F</th>
<th>øG</th>
<th>L</th>
<th>LB</th>
<th>NN</th>
<th>ZB</th>
<th>ZC</th>
<th>ZD</th>
<th>Volume (Cubic inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.86</td>
<td>0.38</td>
<td>0.251</td>
<td>0.34</td>
<td>3.50</td>
<td>5/8-18</td>
<td>4.06</td>
<td>0.09</td>
<td>1/8</td>
<td>0.68 + 0.44 per inch of length</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>0.93</td>
<td>0.38</td>
<td>0.251</td>
<td>0.34</td>
<td>2.97</td>
<td>5/8-18</td>
<td>3.53</td>
<td>0.09</td>
<td>1/8</td>
<td>0.61 + 0.60 per inch of length</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>1.12</td>
<td>0.38</td>
<td>0.251</td>
<td>0.34</td>
<td>3.33</td>
<td>5/8-18</td>
<td>3.89</td>
<td>0.09</td>
<td>1/8</td>
<td>1.08 + 0.88 per inch of length</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>1.32</td>
<td>0.50</td>
<td>0.251</td>
<td>0.41</td>
<td>3.64</td>
<td>3/4-16</td>
<td>4.43</td>
<td>0.09</td>
<td>1/8</td>
<td>1.25 + 1.22 per inch of length</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>1.56</td>
<td>0.62</td>
<td>0.375</td>
<td>0.63</td>
<td>--</td>
<td>3/4-16</td>
<td>3.88</td>
<td>0.09</td>
<td>1/8</td>
<td>1.91 + 1.77 per inch of length</td>
</tr>
<tr>
<td>200 (2&quot;)</td>
<td>2.06</td>
<td>0.75</td>
<td>0.375</td>
<td>0.56</td>
<td>4.67</td>
<td>1 1/4-12</td>
<td>5.54</td>
<td>0.12</td>
<td>1/4</td>
<td>4.81 + 3.14 per inch of length</td>
</tr>
</tbody>
</table>
Double Acting/Spring Assist -X6005 Option

Specifications

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>075 (3/4&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>150 (1-1/2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>250 PSI / 1.7 MPa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. operating pressure</td>
<td>8 PSI / 0.06 MPa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temp.</td>
<td>40 to 140°F / 5 to 60°C</td>
<td>40 to 140°F / 5 to 60°C</td>
<td>40 to 140°F / 5 to 60°C</td>
</tr>
<tr>
<td>Piston speed</td>
<td>No bumper: 2 to 20 in/sec (50 to 500 mm/sec)</td>
<td>Bumper: 2 to 30 in/sec (50 to 750 mm/sec)</td>
<td>Bumper: 2 to 30 in/sec (50 to 750 mm/sec)</td>
</tr>
<tr>
<td>Bumper</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubrication</td>
<td>Not required (Pre-lubricated at factory)</td>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td>Auto switch capable</td>
<td>Optional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting</td>
<td>B, C, E</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Standard Stroke

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Standard stroke</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front nose (B)</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
<td>6</td>
</tr>
<tr>
<td>Rear pivot (C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Double end mount (E)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How to Order

NC(D)M Mounting Bore Stroke Option X6005

Ex.) NCDMB075-0400-X6005

NCMB(075 to 150)-[Stroke](C)-S-X6005

Without Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>øMM</th>
<th>KK</th>
<th>A</th>
<th>øB</th>
<th>D</th>
<th>øE</th>
<th>K</th>
<th>N</th>
<th>NC</th>
<th>NE</th>
<th>NN</th>
<th>W</th>
<th>YD</th>
<th>ZB</th>
<th>ZC</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>ø0.250</td>
<td>1/4-28</td>
<td>0.50</td>
<td>ø0.624</td>
<td>–</td>
<td>ø0.86</td>
<td>–</td>
<td>0.75</td>
<td>0.62</td>
<td>0.12</td>
<td>5/8-18</td>
<td>0.50</td>
<td>0.45</td>
<td>3.02</td>
<td>1.69</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>ø0.312</td>
<td>5/16-24</td>
<td>0.50</td>
<td>ø0.624</td>
<td>0.25</td>
<td>ø1.12</td>
<td>0.12</td>
<td>0.88</td>
<td>0.88</td>
<td>0.24</td>
<td>5/8-18</td>
<td>0.62</td>
<td>0.55</td>
<td>3.86</td>
<td>1.56</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>ø0.437</td>
<td>7/16-20</td>
<td>0.75</td>
<td>ø0.749</td>
<td>0.38</td>
<td>ø1.56</td>
<td>0.25</td>
<td>1.25</td>
<td>1.25</td>
<td>0.25</td>
<td>3/4-16</td>
<td>0.88</td>
<td>0.63</td>
<td>4.42</td>
<td>1.69</td>
</tr>
</tbody>
</table>

Note: For fractions 1/2" go to next highest whole stroke and subtract 1/2".

With Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>3.04</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>4.08</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>4.62</td>
</tr>
</tbody>
</table>
Series NCM

Double Acting/Spring Assist -X6005 Option

NCMB(075 to 150)-[Stroke](C)T-X6005

Without Bumper

| Bore size (inch) | øMM | KK | A    | øB  | D   | øE  | F   | FF | GA  | GB  | K   | L   | LB  | N   | NN  | W   | YD  | ZB  | ZC  |
|------------------|-----|----|------|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 075 (3/4")      | 0.250 |    | 0.50 | 0.624 |    | 0.86 | 0.75 | 0.62 | 0.12 | 5/8-18 | 0.50 | 0.45 | 3.02 | 2.69 |
| 106 (1-1/16")   | 0.312 | 1/4-28 | 0.50 | 0.624 | 0.25 | 1.12 | 1.25 | 0.25 | 3/4-16 | 0.88 | 0.63 | 4.42 | 2.69 |
| 150 (1-1/2")    | 0.437 | 7/16-20 | 0.75 | 0.749 | 0.38 | 1.56 | 1.56 | 0.75 | 3/4-16 | 0.88 | 0.63 | 4.42 | 2.69 |

Note: For fractions 1/2" go to next highest whole stroke and subtract 1/2".

With Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>3.04</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>4.08</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>4.62</td>
</tr>
</tbody>
</table>

NCMC(075 to 150)-[Stroke](C)S-X6005

Without Bumper

| Bore size (inch) | øMM | KK | A    | øB  | D   | øE  | F   | FF | GA  | GB  | K   | L   | LB  | N   | NN  | W   | YD  | ZB  | ZC  |
|------------------|-----|----|------|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 075 (3/4")      | 0.250 |    | 0.50 | 0.624 |    | 0.86 | 0.38 | 0.38 | 5/8-18 | 0.88 | 0.63 | 4.81 | 1.69 |
| 106 (1-1/16")   | 0.312 | 1/4-28 | 0.50 | 0.624 | 0.25 | 1.12 | 1.00 | 0.25 | 5/8-18 | 0.88 | 0.63 | 4.81 | 1.69 |
| 150 (1-1/2")    | 0.437 | 7/16-20 | 0.75 | 0.749 | 0.38 | 1.56 | 1.56 | 0.75 | 5/8-18 | 0.88 | 0.63 | 4.81 | 1.69 |

Note: For fractions 1/2" go to next highest whole stroke and subtract 1/2".

With Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>3.82</td>
<td>4.10</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>4.10</td>
<td>4.38</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>4.63</td>
<td>5.01</td>
</tr>
</tbody>
</table>
**Series NCM**

**Double Acting/Spring Assist -X6005 Option**

**NCM(075 to 150)-(Stroke)(C)T-X6005**

**Without Bumper**

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>øMM</th>
<th>KK</th>
<th>A</th>
<th>øB</th>
<th>D</th>
<th>øE</th>
<th>F</th>
<th>FF</th>
<th>GA</th>
<th>GB</th>
<th>K</th>
<th>L</th>
<th>LB</th>
<th>N</th>
<th>NN</th>
<th>W</th>
<th>WB</th>
<th>YD</th>
<th>YC</th>
<th>ZB</th>
<th>ZC</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>ø0.250</td>
<td>1/4-28</td>
<td>0.50</td>
<td>ø0.624</td>
<td>–</td>
<td>ø0.86</td>
<td>0.38</td>
<td>5/8-18</td>
<td>0.250</td>
<td>0.75</td>
<td>–</td>
<td>0.34</td>
<td>3.81</td>
<td>0.75</td>
<td>5/8-18</td>
<td>0.50</td>
<td>0.50</td>
<td>0.45</td>
<td>0.62</td>
<td>4.09</td>
<td>2.69</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>ø0.312</td>
<td>5/16-24</td>
<td>0.50</td>
<td>ø0.624</td>
<td>0.25</td>
<td>ø1.12</td>
<td>0.38</td>
<td>5/8-18</td>
<td>0.250</td>
<td>0.75</td>
<td>0.12</td>
<td>0.34</td>
<td>3.89</td>
<td>0.88</td>
<td>5/8-18</td>
<td>0.62</td>
<td>0.50</td>
<td>0.55</td>
<td>0.62</td>
<td>4.17</td>
<td>2.56</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>ø0.437</td>
<td>7/16-20</td>
<td>0.75</td>
<td>ø0.749</td>
<td>0.38</td>
<td>ø1.56</td>
<td>0.62</td>
<td>–</td>
<td>0.375</td>
<td>1.00</td>
<td>0.25</td>
<td>0.50</td>
<td>4.43</td>
<td>1.25</td>
<td>3/4-16</td>
<td>0.88</td>
<td>0.62</td>
<td>0.63</td>
<td>0.78</td>
<td>4.81</td>
<td>2.69</td>
</tr>
</tbody>
</table>

**Note:** For fractions 1/2" go to next highest whole stroke and subtract 1/2”.

**With Bumper**

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>3.82</td>
<td>4.10</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>4.10</td>
<td>4.38</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>4.63</td>
<td>5.01</td>
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**NCM(075 to 150)-(Stroke)(C)S-X6005**

**Without Bumper**

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>øMM</th>
<th>KK</th>
<th>A</th>
<th>øB</th>
<th>D</th>
<th>øE</th>
<th>F</th>
<th>G</th>
<th>K</th>
<th>L</th>
<th>LB</th>
<th>N</th>
<th>NN</th>
<th>W</th>
<th>WB</th>
<th>YD</th>
<th>YC</th>
<th>ZB</th>
<th>ZC</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>ø0.250</td>
<td>1/4-28</td>
<td>0.50</td>
<td>ø0.624</td>
<td>–</td>
<td>ø0.86</td>
<td>0.38</td>
<td>0.251</td>
<td>–</td>
<td>0.34</td>
<td>3.81</td>
<td>0.75</td>
<td>5/8-18</td>
<td>0.50</td>
<td>0.62</td>
<td>4.09</td>
<td>1.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>ø0.312</td>
<td>5/16-24</td>
<td>0.50</td>
<td>ø0.624</td>
<td>0.25</td>
<td>ø1.12</td>
<td>0.38</td>
<td>0.251</td>
<td>0.12</td>
<td>0.34</td>
<td>3.89</td>
<td>0.88</td>
<td>5/8-18</td>
<td>0.62</td>
<td>0.62</td>
<td>4.17</td>
<td>1.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>ø0.437</td>
<td>7/16-20</td>
<td>0.75</td>
<td>ø0.749</td>
<td>0.38</td>
<td>ø1.56</td>
<td>0.62</td>
<td>–</td>
<td>0.25</td>
<td>0.50</td>
<td>1.25</td>
<td>3/4-16</td>
<td>0.88</td>
<td>0.91</td>
<td>0.63</td>
<td>4.56</td>
<td>1.69</td>
<td></td>
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</tr>
</tbody>
</table>

**Note:** For fractions 1/2" go to next highest whole stroke and subtract 1/2”.

**With Bumper**

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>3.82</td>
<td>4.10</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>4.10</td>
<td>4.38</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>–</td>
<td>4.76</td>
</tr>
</tbody>
</table>
Series *NCM*

**Double Acting/Spring Assist -X6005 Option**

**NCME(075 to 150)-(Stroke)(C)T-X6005**

### Without Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>øMM</th>
<th>KK</th>
<th>A</th>
<th>øE</th>
<th>F</th>
<th>G</th>
<th>K</th>
<th>L</th>
<th>LB</th>
<th>N</th>
<th>NN</th>
<th>W</th>
<th>YD</th>
<th>YC</th>
<th>ZB</th>
<th>ZC</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>ø0.250</td>
<td>1/4-28</td>
<td>0.50</td>
<td>ø0.624</td>
<td>–</td>
<td>ø0.86</td>
<td>0.38</td>
<td>0.251</td>
<td>–</td>
<td>0.34</td>
<td>3.81</td>
<td>0.75</td>
<td>5/8-18</td>
<td>0.50</td>
<td>0.45</td>
<td>0.62</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>ø0.312</td>
<td>5/16-24</td>
<td>0.50</td>
<td>ø0.624</td>
<td>0.25</td>
<td>ø1.12</td>
<td>0.38</td>
<td>0.251</td>
<td>0.12</td>
<td>0.34</td>
<td>3.89</td>
<td>0.88</td>
<td>5/8-18</td>
<td>0.62</td>
<td>0.55</td>
<td>0.62</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>ø0.437</td>
<td>7/16-20</td>
<td>0.75</td>
<td>ø0.749</td>
<td>0.38</td>
<td>ø1.56</td>
<td>–</td>
<td>–</td>
<td>0.25</td>
<td>0.63</td>
<td>–</td>
<td>1.25</td>
<td>3/4-16</td>
<td>0.88</td>
<td>0.63</td>
<td>0.91</td>
</tr>
</tbody>
</table>

Note: For fractions 1/2" go to next highest whole stroke and subtract 1/2".

### With Bumper

<table>
<thead>
<tr>
<th>Bore size (inch)</th>
<th>LB</th>
<th>ZB</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>3.02</td>
<td>4.10</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>4.10</td>
<td>4.38</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>–</td>
<td>4.76</td>
</tr>
</tbody>
</table>
## Accessories

### Foot bracket

![Foot bracket diagram]

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Applicable bore size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCM-L044</td>
<td>7/16&quot;, 9/16&quot;</td>
<td>1.38</td>
<td>0.56</td>
<td>0.83</td>
<td>0.09</td>
<td>0.44</td>
<td>0.50</td>
<td>0.19</td>
<td>0.69</td>
<td>0.38</td>
</tr>
<tr>
<td>NCM-L075</td>
<td>3/4&quot;, 7/8&quot;, 1-1/16&quot;</td>
<td>1.89</td>
<td>0.81</td>
<td>1.36</td>
<td>0.12</td>
<td>0.63</td>
<td>0.75</td>
<td>0.27</td>
<td>0.98</td>
<td>0.56</td>
</tr>
<tr>
<td>NCM-L150</td>
<td>1-1/4&quot;, 1-1/2&quot;</td>
<td>2.52</td>
<td>1.00</td>
<td>1.75</td>
<td>0.12</td>
<td>0.75</td>
<td>0.94</td>
<td>0.27</td>
<td>1.50</td>
<td>0.75</td>
</tr>
<tr>
<td>NCMK-L150</td>
<td>1-1/2&quot; (Non-rotating)</td>
<td>2.52</td>
<td>1.00</td>
<td>1.75</td>
<td>0.12</td>
<td>0.88</td>
<td>0.94</td>
<td>0.27</td>
<td>1.50</td>
<td>0.75</td>
</tr>
<tr>
<td>NCM-L200</td>
<td>2&quot;</td>
<td>3.126</td>
<td>1.50</td>
<td>2.5</td>
<td>0.25</td>
<td>1.38</td>
<td>1.13</td>
<td>0.34</td>
<td>1.63</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Note) NCM-L075 will not fit NCM°075°S (Single acting). For this option use: NCM075-19-51046. (F dimension=0.51")

### Rod clevis

![Rod clevis diagram]

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Applicable bore size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>NY-044</td>
<td>7/16&quot;, 9/16&quot;</td>
<td>0.38</td>
<td>No.10-32</td>
<td>0.75</td>
<td>0.94</td>
<td>0.56</td>
<td>0.19</td>
<td>0.38</td>
<td>0.56</td>
<td>0.19</td>
<td>0.12</td>
<td>No.10-32</td>
</tr>
<tr>
<td>NY-075</td>
<td>3/4&quot;, 7/8&quot;</td>
<td>0.51</td>
<td>1/4-28</td>
<td>0.94</td>
<td>1.18</td>
<td>0.69</td>
<td>0.25</td>
<td>0.51</td>
<td>0.71</td>
<td>0.25</td>
<td>0.18</td>
<td>1/4-28</td>
</tr>
<tr>
<td>NY-106</td>
<td>1-1/16&quot;</td>
<td>0.51</td>
<td>5/16-24</td>
<td>0.94</td>
<td>1.18</td>
<td>0.69</td>
<td>0.25</td>
<td>0.51</td>
<td>0.71</td>
<td>0.25</td>
<td>0.19</td>
<td>5/16-24</td>
</tr>
<tr>
<td>NY-125</td>
<td>1-1/4&quot;, 1-1/2&quot;</td>
<td>0.75</td>
<td>7/16-20</td>
<td>1.31</td>
<td>1.69</td>
<td>0.94</td>
<td>0.38</td>
<td>0.75</td>
<td>1.02</td>
<td>0.38</td>
<td>0.25</td>
<td>7/16-20</td>
</tr>
<tr>
<td>NY-G050</td>
<td>2&quot;</td>
<td>0.75</td>
<td>1/2-20</td>
<td>1.32</td>
<td>1.69</td>
<td>0.94</td>
<td>0.38</td>
<td>0.75</td>
<td>1.02</td>
<td>0.38</td>
<td>0.31</td>
<td>1/2-20</td>
</tr>
</tbody>
</table>

### Jam nut (Rod thread)

![Jam nut diagram]

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Applicable bore size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>JM-02</td>
<td>7/16&quot;, 9/16&quot;</td>
<td>0.38</td>
<td>0.43</td>
<td>0.13</td>
<td>No.10-32 UNF</td>
</tr>
<tr>
<td>JM-025</td>
<td>3/4&quot;, 7/8&quot;</td>
<td>0.44</td>
<td>0.51</td>
<td>0.16</td>
<td>1/4-28 UNF</td>
</tr>
<tr>
<td>JM-03</td>
<td>1-1/16&quot;</td>
<td>0.50</td>
<td>0.50</td>
<td>0.19</td>
<td>5/16-24 UNF</td>
</tr>
<tr>
<td>JM-045</td>
<td>1-1/4&quot;, 1-1/2&quot;</td>
<td>0.69</td>
<td>0.79</td>
<td>0.26</td>
<td>7/16-20 UNF</td>
</tr>
<tr>
<td>JM-04</td>
<td>1-1/4&quot;, 1-1/2&quot; (Non-rotating)</td>
<td>0.56</td>
<td>0.65</td>
<td>0.23</td>
<td>3/8-24 UNF</td>
</tr>
<tr>
<td>JM-05</td>
<td>2&quot;</td>
<td>0.75</td>
<td>0.87</td>
<td>0.32</td>
<td>1/2-20 UNF</td>
</tr>
</tbody>
</table>

Note 1) Please order separately. (044, 056, 200 only)
**Series NCM**

**Accessories**

**Pivot bracket (Rear pivot): NCMC**

| Part no. | Applicable bore size | A   | B   | C   | D   | E   | F   | G   | H   | J   | K   | L   | M   | N   | øP  |
|----------|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| NCM-PC044 | 7/16", 9/16"          | 0.50| 0.12| 0.19| 0.19| 0.28| 0.50| 0.28| 0.50| 0.75| 0.06| 0.56| 0.77| 0.20| 0.16|
| NCM-PC075 | 3/4", 7/8", 1-1/16", 1-1/4" | 0.75| 0.18| 0.27| 0.27| 0.44| 0.79| 0.44| 0.79| 1.101| 0.12| 0.88| 1.18| 0.31| 0.26|
| NCM-PC150 | 1-1/2"                | 1.00| 0.25| 0.27| 0.27| 0.62| 0.98| 0.98| 1.50| 0.12| 1.38| 1.75| 0.38| 0.38|

**Pivot bracket (End mount): NCME**

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Applicable bore size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>øE</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>øE Slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCM-PE056</td>
<td>9/16&quot;</td>
<td>0.91</td>
<td>1.35</td>
<td>0.22</td>
<td>0.35</td>
<td>0.19</td>
<td>0.19</td>
<td>0.16</td>
<td>0.06</td>
<td>0.77</td>
<td>0.56</td>
<td>0.50</td>
<td>0.75</td>
<td>0.12</td>
<td>0.20</td>
</tr>
<tr>
<td>NCM-PE075</td>
<td>3/4&quot;, 7/8&quot;, 1-1/16&quot;</td>
<td>1.25</td>
<td>1.95</td>
<td>0.35</td>
<td>0.38</td>
<td>0.27</td>
<td>0.25</td>
<td>0.25</td>
<td>0.12</td>
<td>1.16</td>
<td>0.88</td>
<td>0.75</td>
<td>1.10</td>
<td>0.18</td>
<td>0.31</td>
</tr>
<tr>
<td>NCM-PE125</td>
<td>1-1/4&quot;</td>
<td>1.38</td>
<td>2.08</td>
<td>0.35</td>
<td>0.50</td>
<td>0.27</td>
<td>0.25</td>
<td>0.25</td>
<td>0.12</td>
<td>1.18</td>
<td>0.88</td>
<td>0.75</td>
<td>1.10</td>
<td>0.18</td>
<td>0.31</td>
</tr>
<tr>
<td>NCM-PE55</td>
<td>2&quot;</td>
<td>2.12</td>
<td>3.00</td>
<td>0.44</td>
<td>0.75</td>
<td>0.26</td>
<td>0.38</td>
<td>0.24</td>
<td>1.75</td>
<td>1.38</td>
<td>1.00</td>
<td>1.50</td>
<td>0.25</td>
<td>0.37</td>
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**Mounting nut (Nose mount thread)**

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Applicable bore size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>JM-045</td>
<td>7/16&quot;, 9/16&quot;</td>
<td>0.69</td>
<td>0.79</td>
<td>0.26</td>
<td>7/16-20 UNF</td>
</tr>
<tr>
<td>JM-08</td>
<td>3/4&quot;, 7/8&quot;, 1-1/16&quot;</td>
<td>0.94</td>
<td>1.08</td>
<td>0.38</td>
<td>5/8-18 UNF</td>
</tr>
<tr>
<td>JM-10</td>
<td>1-1/4&quot;, 1-1/2&quot;</td>
<td>1.12</td>
<td>1.30</td>
<td>0.42</td>
<td>3/4-16 UNF</td>
</tr>
<tr>
<td>JM-14</td>
<td>2&quot;</td>
<td>1.61</td>
<td>1.86</td>
<td>0.43</td>
<td>1-1/4-12 UNF</td>
</tr>
</tbody>
</table>
Auto Switch Proper Mounting Position and Its Mounting Height (Single rod)

D-A9□(V)

D-C7/C8

D-B5/B6/B59W

D-C73C/C80C

In case of NCDMC, NCDME

D-M9□(V)/M9□W(V)

D-H7□/H7□W/H7NF/H7BAL□

D-G5NTL

D-H7C
### Auto Switch Mounting Position (NCMB, NCDME) (in)

<table>
<thead>
<tr>
<th>Bore size</th>
<th>Auto switch model</th>
<th>Auto switch model</th>
<th>Auto switch model</th>
<th>Auto switch model</th>
<th>G5NTL</th>
<th>B5</th>
<th>B95W</th>
</tr>
</thead>
<tbody>
<tr>
<td>044 (7/16&quot;)</td>
<td>1.4</td>
<td>1.24</td>
<td>1.05</td>
<td>1.22</td>
<td>1.03</td>
<td>1.26</td>
<td>1.07</td>
</tr>
<tr>
<td>056 (9/16&quot;)</td>
<td>1.21</td>
<td>1.1</td>
<td>1.05</td>
<td>1.13</td>
<td>0.97</td>
<td>1.07</td>
<td>0.96</td>
</tr>
<tr>
<td>075 (3/4&quot;)</td>
<td>1.25</td>
<td>1.17</td>
<td>1.1</td>
<td>1.02</td>
<td>1.08</td>
<td>1.00</td>
<td>1.12</td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>1.09</td>
<td>0.9</td>
<td>0.94</td>
<td>0.75</td>
<td>0.92</td>
<td>0.72</td>
<td>0.96</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>1.31</td>
<td>1.07</td>
<td>1.16</td>
<td>0.92</td>
<td>1.14</td>
<td>0.90</td>
<td>1.18</td>
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<tr>
<td>125 (1-1/4&quot;)</td>
<td>1.54</td>
<td>1.16</td>
<td>1.39</td>
<td>1.01</td>
<td>1.37</td>
<td>0.98</td>
<td>1.41</td>
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<tr>
<td>150 (1-1/2&quot;)</td>
<td>1.44</td>
<td>1.07</td>
<td>1.29</td>
<td>0.92</td>
<td>1.27</td>
<td>0.89</td>
<td>1.31</td>
</tr>
<tr>
<td>200 (2&quot;)</td>
<td>1.89</td>
<td>1.51</td>
<td>1.74</td>
<td>1.36</td>
<td>1.72</td>
<td>1.34</td>
<td>1.75</td>
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</table>

### Mounting Height (NCMD)

<table>
<thead>
<tr>
<th>Bore size</th>
<th>Auto switch model</th>
<th>Auto switch model</th>
<th>Auto switch model</th>
<th>Auto switch model</th>
<th>G5NTL</th>
<th>B5</th>
<th>B95W</th>
</tr>
</thead>
<tbody>
<tr>
<td>044 (7/16&quot;)</td>
<td>0.7</td>
<td>0.72</td>
<td>0.63</td>
<td>-</td>
<td>0.61</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>056 (9/16&quot;)</td>
<td>0.77</td>
<td>0.79</td>
<td>0.9</td>
<td>-</td>
<td>0.88</td>
<td>-</td>
<td>-</td>
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<tr>
<td>075 (3/4&quot;)</td>
<td>0.85</td>
<td>0.67</td>
<td>0.98</td>
<td>-</td>
<td>0.98</td>
<td>-</td>
<td>-</td>
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<tr>
<td>088 (7/8&quot;)</td>
<td>0.91</td>
<td>0.93</td>
<td>1.04</td>
<td>1.02</td>
<td>1.04</td>
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<td>-</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.96</td>
<td>0.98</td>
<td>1.14</td>
<td>-</td>
<td>1.12</td>
<td>1.14</td>
<td>-</td>
</tr>
<tr>
<td>125 (1-1/4&quot;)</td>
<td>1.06</td>
<td>1.08</td>
<td>1.24</td>
<td>-</td>
<td>1.22</td>
<td>1.24</td>
<td>-</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>1.18</td>
<td>1.20</td>
<td>1.36</td>
<td>1.34</td>
<td>1.36</td>
<td>-</td>
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<tr>
<td>200 (2&quot;)</td>
<td>1.44</td>
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<td>1.61</td>
<td>1.59</td>
<td>1.61</td>
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</table>

Note 1) D-G5NTL, B5, B64, B95W cannot be mounted on models with bore size 044 and 056.
Note 2) When setting an auto switch, confirm the operation and adjust its mounting position.
Auto Switch Proper Mounting Position and Its Mounting Height (Double rod)

**Note 1)** D-G5NTL, B5

**Note 2)** When setting an auto switch, confirm the operation and adjust its mounting position.

---

**Auto Switch Mounting Position (NCDMW)**

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<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>D-M9□/M9□/W(V)</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
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</tr>
<tr>
<td>D-G5NTL</td>
<td>-</td>
<td>-</td>
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<tr>
<td>D-B5-B64</td>
<td>-</td>
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<tr>
<td>D-B5-B59W</td>
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**Auto Switch Mounting Position (NCDMW--C)**

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>D-M9□/M9□/W(V)</td>
<td>-</td>
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<tr>
<td>D-G5NTL</td>
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<tr>
<td>D-B5-B64</td>
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<tr>
<td>D-B5-B59W</td>
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**Mounting Height (NCDMW)**

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</tr>
</thead>
<tbody>
<tr>
<td>D-M9□/M9□/W(V)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>D-G5NTL</td>
<td>-</td>
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</tr>
<tr>
<td>D-B5-B64</td>
<td>-</td>
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<tr>
<td>D-B5-B59W</td>
<td>-</td>
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</tbody>
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Note 1) D-G5NTL, B5 cannot be mounted on models with bore size 044 and 056.

Note 2) When setting an auto switch, confirm the operation and adjust its mounting position.
**Series NCM**

Auto Switch Proper Mounting Position and Its Mounting Height (Block mount)

### Auto Switch Mounting Position (NCDMR)

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<thead>
<tr>
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<th></th>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bore size</strong></td>
<td><strong>A</strong></td>
<td><strong>B</strong></td>
<td><strong>A</strong></td>
<td><strong>B</strong></td>
<td><strong>A</strong></td>
<td><strong>B</strong></td>
<td><strong>A</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>075 (3/4&quot;)</td>
<td>1.67</td>
<td>0.74</td>
<td>1.50</td>
<td>0.56</td>
<td>1.54</td>
<td>0.60</td>
<td>1.36</td>
<td>0.42</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>1.98</td>
<td>0.83</td>
<td>1.66</td>
<td>0.70</td>
<td>1.67</td>
<td>0.52</td>
<td>1.61</td>
<td>0.46</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>2.47</td>
<td>0.97</td>
<td>1.95</td>
<td>0.74</td>
<td>2.16</td>
<td>0.56</td>
<td>2.10</td>
<td>0.50</td>
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</table>

**Auto Switch Mounting Position (NCDMR-C)**

<table>
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<tr>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Bore size</strong></td>
<td><strong>A</strong></td>
<td><strong>A</strong></td>
<td><strong>B</strong></td>
<td><strong>A</strong></td>
<td><strong>B</strong></td>
<td><strong>A</strong></td>
<td><strong>A</strong></td>
<td><strong>B</strong></td>
</tr>
<tr>
<td>075 (3/4&quot;)</td>
<td>1.67</td>
<td>0.74</td>
<td>1.66</td>
<td>0.70</td>
<td>1.67</td>
<td>0.52</td>
<td>1.61</td>
<td>0.46</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>1.98</td>
<td>0.83</td>
<td>1.95</td>
<td>0.74</td>
<td>2.16</td>
<td>0.56</td>
<td>2.10</td>
<td>0.50</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>2.47</td>
<td>0.97</td>
<td>2.24</td>
<td>0.84</td>
<td>2.47</td>
<td>0.61</td>
<td>2.42</td>
<td>0.61</td>
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### Mounting Height (NCDMR and NCDMR-C)

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</tr>
</thead>
<tbody>
<tr>
<td><strong>Bore size</strong></td>
<td><strong>A</strong></td>
<td><strong>A</strong></td>
<td><strong>A</strong></td>
<td><strong>A</strong></td>
<td><strong>A</strong></td>
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<td><strong>A</strong></td>
<td><strong>A</strong></td>
<td><strong>A</strong></td>
</tr>
<tr>
<td>088 (7/8&quot;)</td>
<td>0.91</td>
<td>0.93</td>
<td>1.02</td>
<td>1.04</td>
<td>1.12</td>
<td>1.14</td>
<td>1.22</td>
<td>1.24</td>
<td>1.50</td>
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<td>1.50</td>
<td>1.50</td>
<td>1.50</td>
<td>1.50</td>
</tr>
<tr>
<td>106 (1-1/16&quot;)</td>
<td>0.98</td>
<td>0.98</td>
<td>1.12</td>
<td>1.14</td>
<td>1.22</td>
<td>1.24</td>
<td>1.46</td>
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<td>1.67</td>
<td>1.67</td>
<td>1.67</td>
<td>1.67</td>
</tr>
<tr>
<td>150 (1-1/2&quot;)</td>
<td>1.06</td>
<td>1.08</td>
<td>1.22</td>
<td>1.24</td>
<td>1.46</td>
<td>1.46</td>
<td>1.67</td>
<td>1.67</td>
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<td>1.95</td>
<td>1.95</td>
<td>1.95</td>
<td>1.95</td>
<td>1.95</td>
</tr>
</tbody>
</table>

**Note 1:** D-G5NTL, B5, B64, B59W cannot be mounted on models with bore size 044 and 056.

**Note 2:** When setting an auto switch, confirm the operation and adjust its mounting position.
Minimum Stroke for Auto Switch Mounting

<table>
<thead>
<tr>
<th>Auto switch model</th>
<th>Number of switches</th>
<th>With 2 auto switches</th>
<th>On the same surface</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>On different surfaces</td>
<td>On the same surface</td>
<td>On different surfaces</td>
</tr>
<tr>
<td>D-M9(^\text{W})</td>
<td>0.6 + 1.8 (\frac{(n-2)}{2})</td>
<td>0.6 + 1.8 (\frac{(n-2)}{2})</td>
<td>1.8 + 1.8 (\frac{(n-2)}{2})</td>
</tr>
<tr>
<td>D-M9(^\text{W})</td>
<td>1.4 (\frac{(n-2)}{2})</td>
<td>1.4 (\frac{(n-2)}{2})</td>
<td>(\frac{(n-2)}{2})</td>
</tr>
<tr>
<td>D-M9(^\text{W})</td>
<td>2.3 (\frac{(n-2)}{2})</td>
<td>2.3 (\frac{(n-2)}{2})</td>
<td>2.3 (\frac{(n-2)}{2})</td>
</tr>
<tr>
<td>D-H7(^\text{C})</td>
<td>0.6 + 1.8 (\frac{(n-2)}{2})</td>
<td>0.6 + 1.8 (\frac{(n-2)}{2})</td>
<td>0.6 + 1.8 (\frac{(n-2)}{2})</td>
</tr>
<tr>
<td>D-H7(^\text{C})</td>
<td>0.6 + 1.2 (\frac{(n-2)}{2})</td>
<td>0.6 + 1.2 (\frac{(n-2)}{2})</td>
<td>0.6 + 1.2 (\frac{(n-2)}{2})</td>
</tr>
<tr>
<td>D-G5(^\text{NTL})</td>
<td>0.6 + 2 (\frac{(n-2)}{2})</td>
<td>0.6 + 2 (\frac{(n-2)}{2})</td>
<td>0.6 + 2 (\frac{(n-2)}{2})</td>
</tr>
<tr>
<td>D-G5(^\text{NTL})</td>
<td>2.8 (\frac{(n-2)}{2})</td>
<td>2.8 (\frac{(n-2)}{2})</td>
<td>2.8 (\frac{(n-2)}{2})</td>
</tr>
<tr>
<td>D-B5(^\text{W})</td>
<td>0.6 + 2 (\frac{(n-2)}{2})</td>
<td>0.6 + 2 (\frac{(n-2)}{2})</td>
<td>0.6 + 2 (\frac{(n-2)}{2})</td>
</tr>
<tr>
<td>D-B5(^\text{W})</td>
<td>2.7 (\frac{(n-2)}{2})</td>
<td>2.7 (\frac{(n-2)}{2})</td>
<td>2.7 (\frac{(n-2)}{2})</td>
</tr>
<tr>
<td>D-B5(^9\text{W})</td>
<td>0.8 + 2 (\frac{(n-2)}{2})</td>
<td>0.8 + 2 (\frac{(n-2)}{2})</td>
<td>0.8 + 2 (\frac{(n-2)}{2})</td>
</tr>
</tbody>
</table>

Note 1) D-G5\(^\text{NTL}\), B5\(^\text{C}\), B64, B5\(^9\text{W}\) cannot be mounted on models with bore size 044 and 056.

Note 2) When two D-M9\(^\text{W}\), M9\(^\text{W}\), or A9\(^3\) type auto switches are mounted on models with bore size 044.

The proper mounting position is 0.24" inward from the end face of the switch holder.

The switches are mounted in staggered positions in a direction (toward the outer circumference of the cylinder tube) in which the switches and lead wires will not interfere with one another.

<table>
<thead>
<tr>
<th>Auto switch model</th>
<th>On different surfaces</th>
<th>On the same surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-M9(^\text{W})</td>
<td>Less than 0.8&quot; stroke</td>
<td>Less than 2&quot; stroke</td>
</tr>
<tr>
<td>D-M9(^\text{W})</td>
<td></td>
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</tr>
<tr>
<td>D-A9(^3)</td>
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Auto Switch Mounting

### Auto Switch Mounting Bracket Part No.

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<tr>
<th>Auto switch model</th>
<th>044</th>
<th>056</th>
<th>075</th>
<th>088</th>
<th>106</th>
<th>125</th>
<th>150</th>
<th>200</th>
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<tbody>
<tr>
<td>D-M9(V)</td>
<td>BJ2-012</td>
<td>BJ2-015</td>
<td>BJ3-1</td>
<td>BJ3-1</td>
<td>BJ3-1</td>
<td>BJ3-1</td>
<td>BJ3-1</td>
<td>BJ3-1</td>
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<tr>
<td>D-M9(W(V))</td>
<td>BBA3</td>
<td>BBA4</td>
<td>BBA3</td>
<td>BBA4</td>
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<td></td>
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<tr>
<td>D-A9(V)</td>
<td>BJ2-012</td>
<td>BJ2-015</td>
<td>BJ3-1</td>
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<td>BJ3-1</td>
<td>BJ3-1</td>
<td>BJ3-1</td>
<td>BJ3-1</td>
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<tr>
<td>D-H7(W)</td>
<td>BJ2-012</td>
<td>BJ2-015</td>
<td>NBM2-075</td>
<td>NBM2-088</td>
<td>NBM2-088</td>
<td>NBM2-125</td>
<td>NBM2-150</td>
<td>NCMB-200</td>
</tr>
<tr>
<td>D-H7BAL</td>
<td>BJ2-012</td>
<td>BJ2-015</td>
<td>NBM2-075</td>
<td>NBM2-088</td>
<td>NBM2-088</td>
<td>NBM2-125</td>
<td>NBM2-150</td>
<td>NCMB-200</td>
</tr>
<tr>
<td>D-C73C/80</td>
<td>BJ2-012</td>
<td>BJ2-015</td>
<td>NBM2-075</td>
<td>NBM2-088</td>
<td>NBM2-088</td>
<td>NBM2-125</td>
<td>NBM2-150</td>
<td>NCMB-200</td>
</tr>
<tr>
<td>D-C73C/80C</td>
<td>BJ2-012</td>
<td>BJ2-015</td>
<td>NBM2-075</td>
<td>NBM2-088</td>
<td>NBM2-088</td>
<td>NBM2-125</td>
<td>NBM2-150</td>
<td>NCMB-200</td>
</tr>
<tr>
<td>D-GSNTL</td>
<td>BJ2-012</td>
<td>BJ2-015</td>
<td>NBA-075</td>
<td>NBA-088</td>
<td>NBA-106</td>
<td>NBA-125</td>
<td>NBA-150</td>
<td>NCMA-200</td>
</tr>
</tbody>
</table>

Note 1) Two types of auto switch mounting brackets are used as a set.

Note 2) D-GSNTL, B5, B6, B59W cannot be mounted on models with bore size 044 and 056.

### Detailed Contents of Stainless Steel Mounting Screw Sets

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Description</th>
<th>Size</th>
<th>Qty.</th>
<th>Applicable auto switch mounting bracket part no.</th>
<th>Applicable auto switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBA3</td>
<td>Auto switch mounting screw</td>
<td>M4X0.7X22L</td>
<td>1</td>
<td>NBA-075/088/106/125/150 NCMA-200</td>
<td>D-GSNTL D-B5 D-B64</td>
</tr>
<tr>
<td>BBA4</td>
<td>Auto switch mounting screw</td>
<td>M3X0.5X14L</td>
<td>1</td>
<td>BJ2-012/015 NBM2-075/088/106/125/150 NCMB-200</td>
<td>D-H7 D-C7 D-C80</td>
</tr>
</tbody>
</table>

D-H7BAL switch is set on the cylinder with the stainless steel screws (BBA4) above when shipped.
When only a switch is shipped independently, BBA4 screws are attached.

Stainless steel screw set

The set of stainless steel mounting screws described below is available and can be used depending on the operating environment. As auto switch bracket is not included, order separately.
### Operating Range

<table>
<thead>
<tr>
<th>Auto switch model</th>
<th>Bore size (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>044</td>
</tr>
<tr>
<td>M9□/W(V)</td>
<td>0.12</td>
</tr>
<tr>
<td>D-A9□/V</td>
<td>0.22</td>
</tr>
<tr>
<td>D-H7□/W/H7NF/H7BAL</td>
<td>0.16</td>
</tr>
<tr>
<td>D-H7C</td>
<td>0.16</td>
</tr>
<tr>
<td>D-C□/C80/C73C/C80C</td>
<td>0.3</td>
</tr>
<tr>
<td>D-G5NTL</td>
<td>–</td>
</tr>
<tr>
<td>D-B5□/B64</td>
<td>–</td>
</tr>
<tr>
<td>D-B9□/W</td>
<td>–</td>
</tr>
</tbody>
</table>

Notes:
1) Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion)
2) There may be the case it will vary substantially depending on an ambient environment.

Other than the models listed “How to Order,” the following auto switches are applicable.

<table>
<thead>
<tr>
<th>Auto switch type</th>
<th>Model</th>
<th>Electrical entry (Entry direction)</th>
<th>Special function</th>
<th>Applicable bore size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid state</td>
<td>D-M9NV, M9PV, M9BV</td>
<td>Grommet (In-line)</td>
<td></td>
<td>044 to 200</td>
</tr>
<tr>
<td>Reed</td>
<td>D-H7A1, H7A2, H7B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>D-M9NWV, M9PWV, M9BWV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>D-H7NW, H7PW, H7BW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>D-G5NTL</td>
<td></td>
<td>With timer</td>
<td>075 to 200</td>
</tr>
<tr>
<td></td>
<td>D-B53</td>
<td></td>
<td>–</td>
<td>044 to 200</td>
</tr>
<tr>
<td></td>
<td>D-A9□/V, A96V</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>D-C7□/C80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>D-A90V</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Solid state switches with pre-wired connector are also available. For details, refer to Best Pneumatics catalog.
Series NCM
Auto Switch Specifications

Auto Switch Common Specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Reed switch</th>
<th>Solid state switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leakage current</td>
<td>None</td>
<td>3-wire: 100 μA or less  2-wire: 0.8 mA or less</td>
</tr>
<tr>
<td>Operating time</td>
<td>1.2 ms</td>
<td>1 ms or less</td>
</tr>
<tr>
<td>Impact resistance</td>
<td>300 m/s²</td>
<td>1000 m/s²</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Withstand voltage</td>
<td>1500 VAC for 1 minute (between lead wire and case)</td>
<td>1000 VAC for 1 minute (between lead wire and case)</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>–10 to 60°C</td>
<td></td>
</tr>
<tr>
<td>Enclosure</td>
<td>Conforming to CE</td>
<td>IEC60529 standard IP67</td>
</tr>
<tr>
<td>Standard</td>
<td>Standard</td>
<td></td>
</tr>
</tbody>
</table>

Note) D-C73C/C80C type: 1000 VAC/min. (Between lead wire and case)

Lead Wire

Lead wire length indication
(Example) D-M9BW

Note 1) Applicable auto switch with 5 m lead wire “Z”
Solid state switch: Manufactured upon receipt of order as standard.
Note 2) 1 m (M): D-M9BW only.
Note 3) Lead wire tolerance

<table>
<thead>
<tr>
<th>Lead wire length</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 m</td>
<td>±15 mm</td>
</tr>
<tr>
<td>1 m</td>
<td>±30 mm</td>
</tr>
<tr>
<td>3 m</td>
<td>±90 mm</td>
</tr>
<tr>
<td>5 m</td>
<td>±150 mm</td>
</tr>
</tbody>
</table>

Contact Protection Boxes: CD-P11, CD-P12

<Applicable switch model>
D-A9/A9/C7/C80/C73C/C80C type
The auto switches below do not have a built-in contact protection circuit.
A contact protection box is not required for solid state switches due to their construction.
Therefore, please use a contact protection box with the switch for any of the following cases:

1. Where the operation load is an inductive load.
2. Where the wiring length to the load is greater than 5 m.
3. Where the load voltage is 100 VAC.

Where the load voltage is 110 VAC.
Where the load voltage is increased by 10% of the rated voltage for the above applicable auto switch model (except for D-C73C, C80C), you can use the auto switches at a load voltage of 110 VAC by using a contact protection box (CD-P11) and setting the load current within the current range in which the maximum load current is decreased by 10%.

Specifications

<table>
<thead>
<tr>
<th>Part no.</th>
<th>CD-P11</th>
<th>CD-P12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load voltage</td>
<td>100 VAC</td>
<td>200 VAC</td>
</tr>
<tr>
<td>Max. load current</td>
<td>25 mA</td>
<td>12.5 mA</td>
</tr>
</tbody>
</table>

* Lead wire length — Switch connection side 0.5 m
Load connection side 0.5 m

Solid state switch with oilproof flexible heavy-duty vinyl cord indication
To designate solid state switches with flexible specifications, add “-61” after the lead wire length. Flexible cable is used for D-M9BW, D-M9BW as standard.
There is no need to place the suffix “-61” at the end of the part number.

(Example) D-H7BAL-61

Flexible specification

Lead wires with connector indication
Part No. of Lead Wires with Connectors

<table>
<thead>
<tr>
<th>Model</th>
<th>Lead wire length</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-LC05</td>
<td>0.5 m</td>
</tr>
<tr>
<td>D-LC30</td>
<td>3 m</td>
</tr>
<tr>
<td>D-LC50</td>
<td>5 m</td>
</tr>
</tbody>
</table>

(Applicable for connector type only)

Internal Circuit

CD-P11
Surge absorber
Choke coil
OUT Brown
OUT Blue

CD-P12
Choke coil
Zener diode
OUT (+) Brown
OUT (-) Blue

Dimensions

To connect a switch unit to a contact protection box, connect the lead wire from the side of the contact protection box marked SWITCH to the lead wire coming out of the switch unit. Keep the switch as close as possible to the contact protection box, with a lead wire length of no more than 1 meter.
Auto Switch Connections and Examples

Basic Wiring

Solid state 3-wire, NPN

Solid state 3-wire, PNP

2-wire (Solid state)

2-wire (Reed)

(Power supplies for switch and load are separate.)

Example of Connection to PLC (Programmable Logic Controller)

• Sink input specification 3-wire, NPN

• Source input specification 3-wire, PNP

Connect according to the applicable PLC input specifications, since the connection method will vary depending on the PLC input specifications.

Example of AND (Serial) and OR (Parallel) Connection

• 3-wire

AND connection for NPN output (using relays)

OR connection for NPN output

2-wire with 2-switch AND connection

2-wire with 2-switch OR connection

When two switches are connected in series, a load may malfunction because the load voltage will decrease when in the ON state. The indicator lights will illuminate if both of the switches are in the ON state.

When two switches are connected in parallel, a malfunction may occur because the load voltage will increase when in the OFF state. Because there is no current leakage, the load voltage will not increase when turned OFF. However, depending on the number of switches in the ON state, the indicator lights may sometimes dim or not light because of the dispersion and reduction of the current flowing to the switches.

Load voltage at ON = Power supply - Residual voltage x 2 pcs.
= 24 V - 4 V x 2 pcs.
= 16 V

Example: Power supply is 24 VDC. Internal voltage drop in switch is 4 V.

Load voltage at OFF = Leakage current x 2 pcs. x Load impedance
= 1 mA x 2 pcs. x 3 kΩ
= 6 V

Example: Load impedance is 3 kΩ. Leakage current from switch is 1 mA.
Solid State Switch: Direct Mounting Style
D-M9N(V)/D-M9P(V)/D-M9B(V)

Grommet

- 2-wire load current is reduced (2.5 to 40 mA).
- Flexibility is 1.5 times greater than the conventional model (SMC comparison).
- Using flexible cable as standard spec.

Caution

Fix the switch with appropriate screw installed on the switch body. If using other screws, the switch may be damaged.

Auto Switch Internal Circuit
D-M9N(V)

D-M9P(V)

D-M9B(V)

Auto Switch Specifications

<table>
<thead>
<tr>
<th></th>
<th>D-M9N(V)</th>
<th>D-M9P(V)</th>
<th>D-M9B(V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto switch model</td>
<td>D-M9N</td>
<td>D-M9P</td>
<td>D-M9B</td>
</tr>
<tr>
<td>Electrical entry direction</td>
<td>In-line</td>
<td>Perpendicular</td>
<td>In-line</td>
</tr>
<tr>
<td>Wiring type</td>
<td>3-wire</td>
<td>NPN</td>
<td>PNP</td>
</tr>
<tr>
<td>Output type</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Applicable load</td>
<td>IC circuit, Relay, PLC</td>
<td>24 VDC relay, PLC</td>
<td>—</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>5, 12, 24 VDC (4.5 to 28 V)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Current consumption</td>
<td>10 mA or less</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Load voltage</td>
<td>28 VDC or less</td>
<td>—</td>
<td>24 VDC (10 to 28 VDC)</td>
</tr>
<tr>
<td>Load current</td>
<td>40 mA or less</td>
<td>2.5 to 40 mA</td>
<td>—</td>
</tr>
<tr>
<td>Internal voltage drop</td>
<td>0.8 V or less at 10 mA (2 V or less at 40 mA)</td>
<td>4 V or less</td>
<td>—</td>
</tr>
<tr>
<td>Leakage current</td>
<td>100 μA or less at 24 VDC</td>
<td>0.8 mA or less</td>
<td>—</td>
</tr>
<tr>
<td>Indicator light</td>
<td>Red LED illuminates when turned ON.</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Standards</td>
<td>CE marking</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Note 1) Refer to page 58 for solid state switch common specifications.
Note 2) Refer to page 58 for lead wire lengths.

Weight

<table>
<thead>
<tr>
<th>Auto switch model</th>
<th>D-M9N(V)</th>
<th>D-M9P(V)</th>
<th>D-M9B(V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead wire length (m)</td>
<td>0.5</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>68</td>
<td>68</td>
</tr>
</tbody>
</table>

Dimensions

<table>
<thead>
<tr>
<th>D-M9□V</th>
<th>Unit: mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator light</td>
<td>—</td>
</tr>
<tr>
<td>M2.5 X 4 long Slotted set screw</td>
<td>20</td>
</tr>
<tr>
<td>Most sensitive position</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D-M9V</th>
<th>Unit: mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator light</td>
<td>—</td>
</tr>
<tr>
<td>M2.5 X 4 long Slotted set screw</td>
<td>20</td>
</tr>
<tr>
<td>Most sensitive position</td>
<td>8</td>
</tr>
</tbody>
</table>
Solid State Switch: Band Mounting Style
D-H7C

Auto Switch Specifications

<table>
<thead>
<tr>
<th>Auto switch part no.</th>
<th>D-H7C (With indicator light)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiring type</td>
<td>2-wire</td>
</tr>
<tr>
<td>Output type</td>
<td>—</td>
</tr>
<tr>
<td>Applicable load</td>
<td>24 VDC Relay, PLC</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>—</td>
</tr>
<tr>
<td>Current consumption</td>
<td>—</td>
</tr>
<tr>
<td>Load voltage</td>
<td>24 VDC (10 to 28 VDC)</td>
</tr>
<tr>
<td>Load current</td>
<td>5 to 40 mA</td>
</tr>
<tr>
<td>Internal voltage drop</td>
<td>4 V or less</td>
</tr>
<tr>
<td>Leakage current</td>
<td>0.8 mA or less at 24 VDC</td>
</tr>
<tr>
<td>Indicator light</td>
<td>Red LED illuminates when ON.</td>
</tr>
<tr>
<td>Standard</td>
<td>Conforming to CE</td>
</tr>
</tbody>
</table>

Note 1) Refer to page 58 for solid state switch common specifications.
Note 2) Refer to page 58 for lead wire lengths and lead wire with connector.

Weight

<table>
<thead>
<tr>
<th>Auto switch part no.</th>
<th>D-H7C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead wire length (m)</td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>5</td>
<td>85</td>
</tr>
</tbody>
</table>

Dimensions

<table>
<thead>
<tr>
<th>Indicator light</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø3.4 Mounting Hole</td>
</tr>
<tr>
<td>Ø3.4</td>
</tr>
<tr>
<td>Ø10</td>
</tr>
</tbody>
</table>

Operating Precautions

Caution

1. Confirm that the connector is appropriately tightened. If tightened insufficiently, the waterproof performance will deteriorate.

2. For how to handle a connector, refer to Best Pneumatics catalog.

Auto Switch Internal Circuit

Connector

Caution

Operating Precautions

1. Confirm that the connector is appropriately tightened. If tightened insufficiently, the waterproof performance will deteriorate.

2. For how to handle a connector, refer to Best Pneumatics catalog.
2-Color Indication Solid State Switch: Direct Mounting Style
D-M9NW(V)/D-M9PW(V)/D-M9BW(V)

Grommet

- 2-wire load current is reduced (2.5 to 40 mA).
- RoHS compliant
- Flexibility is 1.5 times greater than the conventional model (SMC comparison).
- Using flexible cable as standard spec.
- The optimum operating position can be determined by the color of the light. (Red → Green ← Red)

Auto Switch Specifications

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Electrical entry direction</th>
<th>Wiring type</th>
<th>Output type</th>
<th>Applicable load</th>
<th>Power supply voltage</th>
<th>Current consumption</th>
<th>Load voltage</th>
<th>Load current</th>
<th>Internal voltage drop</th>
<th>Leakage current</th>
<th>Indicator light</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-M9NW(V)</td>
<td>In-line Perpendicular</td>
<td>3-wire</td>
<td>NPN</td>
<td>IC circuit, Relay, PLC</td>
<td>5, 12, 24 VDC (4.5 to 28 V)</td>
<td>10 mA or less</td>
<td>28 V or less</td>
<td>40 mA or less</td>
<td>0.8 V or less at 10 mA (2 V or less at 40 mA)</td>
<td>100 μA or less at 24 VDC</td>
<td>Operating position ........ Red LED illuminates. Optimum operating position ........ Green LED illuminates.</td>
<td>Conforming to CE</td>
</tr>
<tr>
<td>D-M9PW(V)</td>
<td>In-line Perpendicular</td>
<td>2-wire</td>
<td>NPN</td>
<td>IC circuit, Relay, PLC</td>
<td>5, 12, 24 VDC (4.5 to 28 V)</td>
<td>—</td>
<td>28 V or less</td>
<td>40 mA or less</td>
<td>0.8 V or less at 10 mA (2 V or less at 40 mA)</td>
<td>100 μA or less at 24 VDC</td>
<td>Operating position ........ Red LED illuminates. Optimum operating position ........ Green LED illuminates.</td>
<td>Conforming to CE</td>
</tr>
<tr>
<td>D-M9BW(V)</td>
<td>Perpendicular</td>
<td>—</td>
<td>PNP</td>
<td>24 VDC relay, PLC</td>
<td>10 to 28 VDC</td>
<td>—</td>
<td>24 VDC (10 to 28 VDC)</td>
<td>0.8 mA or less</td>
<td>—</td>
<td>4 V or less</td>
<td>Operating position ........ Red LED illuminates. Optimum operating position ........ Green LED illuminates.</td>
<td>Conforming to CE</td>
</tr>
</tbody>
</table>

Auto Switch Internal Circuit

D-M9NW(V)

D-M9PW(V)

D-M9BW(V)

Indicator light / Display method

<table>
<thead>
<tr>
<th>Operating range</th>
<th>Display method</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>Red</td>
</tr>
<tr>
<td>OFF</td>
<td>Green</td>
</tr>
</tbody>
</table>

Auto Switch part no.

<table>
<thead>
<tr>
<th>Lead wire length (m)</th>
<th>D-M9NW(V)</th>
<th>D-M9PW(V)</th>
<th>D-M9BW(V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>8</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>1</td>
<td>14</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>41</td>
<td>41</td>
<td>38</td>
</tr>
<tr>
<td>5</td>
<td>68</td>
<td>68</td>
<td>63</td>
</tr>
</tbody>
</table>

Weight

<table>
<thead>
<tr>
<th>Auto switch part no.</th>
<th>D-M9NW(V)</th>
<th>D-M9PW(V)</th>
<th>D-M9BW(V)</th>
</tr>
</thead>
</table>

Dimensions

D-M9NW

D-M9PW

D-M9BW

Note 1) Refer to page 58 for solid state switch common specifications.
Note 2) Refer to page 58 for lead wire lengths.
Grommet
Water (coolant) resistant type

The optimum operating position can be determined by the color of the light.
(Red → Green ← Red)

Note
Consult SMC if using coolant liquid other than water based solution.

Auto Switch Internal Circuit

Indicator light / Display method

Auto Switch Specifications

<table>
<thead>
<tr>
<th>D-H7BAL (With indicator light)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto switch part no.</td>
<td>D-H7BAL</td>
</tr>
<tr>
<td>Wiring type</td>
<td>2-wire</td>
</tr>
<tr>
<td>Output type</td>
<td>—</td>
</tr>
<tr>
<td>Applicable load</td>
<td>24 VDC Relay, PLC</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>—</td>
</tr>
<tr>
<td>Current consumption</td>
<td>—</td>
</tr>
<tr>
<td>Load voltage</td>
<td>24 VDC (10 to 28 VDC)</td>
</tr>
<tr>
<td>Load current</td>
<td>5 to 40 mA</td>
</tr>
<tr>
<td>Internal voltage drop</td>
<td>4 V or less</td>
</tr>
<tr>
<td>Leakage current</td>
<td>0.8 mA or less at 24 VDC</td>
</tr>
<tr>
<td>Indicator light</td>
<td>Operating position — Red LED illuminates. Optimum operating position — Green LED illuminates.</td>
</tr>
<tr>
<td>Standard</td>
<td>Conforming to CE</td>
</tr>
</tbody>
</table>

Auto Switch Specifications

![Image](image_url)

Weight

<table>
<thead>
<tr>
<th>Auto switch part no.</th>
<th>D-H7BA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead wire length</td>
<td></td>
</tr>
<tr>
<td>(m)</td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td>—</td>
</tr>
<tr>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>5</td>
<td>81</td>
</tr>
</tbody>
</table>

Dimensions

![Image](image_url)

---

**Operating Precautions**

Consult SMC if using coolant liquid other than water based solution.

**Note**

- Lead wires — Oilproof heavy-duty vinyl cable: ø3, ø4, 0.2 mm² x 2 cores (Brown, Blue), 3 m (Standard)
- Refer to page 58 for solid state switch common specifications.
- Refer to page 58 for lead wire lengths.

**Standard**

Conforming to CE

**Operating range**

ON

Display: Red, Green, Red

OFF

Optimum operating position

---

**Dimensions**

![Image](image_url)
2-Color Indication with Diagnostic Output Solid State Switch: Band Mounting Style D-H7NF

Auto Switch Specifications

<table>
<thead>
<tr>
<th>D-H7NF (With indicator light)</th>
<th>Auto switch part no.</th>
<th>D-H7NF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiring type</td>
<td>4-wire</td>
<td></td>
</tr>
<tr>
<td>Output type</td>
<td>NPN</td>
<td></td>
</tr>
<tr>
<td>Diagnostic output type</td>
<td>Normal operation</td>
<td></td>
</tr>
<tr>
<td>Applicable load</td>
<td>IC circuit, Relay, PLC</td>
<td></td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>5, 12, 24 VDC (4.5 to 28 VDC)</td>
<td></td>
</tr>
<tr>
<td>Current consumption</td>
<td>10 mA or less</td>
<td></td>
</tr>
<tr>
<td>Load voltage</td>
<td>28 VDC or less</td>
<td></td>
</tr>
<tr>
<td>Load current</td>
<td>50 mA or less at the total amount of normal output and diagnostic output</td>
<td></td>
</tr>
<tr>
<td>Internal voltage drop</td>
<td>1.5 V or less (0.8 V or less at 5 mA)</td>
<td></td>
</tr>
<tr>
<td>Leakage current</td>
<td>100 μA or less at 24 VDC</td>
<td></td>
</tr>
<tr>
<td>Indicator light</td>
<td>Operating position .......... Red LED illuminates.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Optimum operating position .......... Green LED illuminates.</td>
<td></td>
</tr>
<tr>
<td>Standard</td>
<td>Conforming to CE</td>
<td></td>
</tr>
</tbody>
</table>

* Lead wires — Oilproof heavy-duty vinyl cable: ø3.4, 0.2 mm² x 4 cores (Brown, Black, Orange, Blue), 0.5 m
  Note 1) Refer to page 58 for solid state switch common specifications.
  Note 2) Refer to page 58 for lead wire lengths.

Weight

<table>
<thead>
<tr>
<th>Auto switch part no.</th>
<th>D-H7NF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead wire length (m)</td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>56</td>
</tr>
<tr>
<td>5</td>
<td>90</td>
</tr>
</tbody>
</table>

Diagnostic Output Operation

The diagnostic signal is output within unsteady detecting area (where indicator light is Red), and the diagnostic output becomes OFF when the detecting position remains within the optimum operating position (where indicator is Green). When the detecting position is not adjusted, the diagnostic output becomes ON.

Dimensions

![Dimensions Diagram]
In a case where the operation load is an inductive load.

In a case where the wiring load is greater than 5 m.

In a case where the load voltage is 100 VAC.

Use the auto switch with a contact protection box in any of the above mentioned cases.

(For details about the contact protection box, refer to page 58.)

Fix the auto switch with the existing screw installed on the switch body. The auto switch may be damaged if a screw other than the one supplied is used.

Auto Switch Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>D-A90</th>
<th>D-A90V</th>
<th>D-A93</th>
<th>D-A93V</th>
<th>D-A96</th>
<th>D-A96V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable load</td>
<td>IC circuit, Relay, PLC</td>
<td>IC circuit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load voltage</td>
<td>24 VAC/DC or less</td>
<td>24 VDC</td>
<td>48 VAC/DC or less</td>
<td>100 VAC/DC or less</td>
<td>4 to 8 VDC</td>
<td></td>
</tr>
<tr>
<td>Maximum load current</td>
<td>50 mA</td>
<td>5 to 40 mA</td>
<td>40 mA</td>
<td>5 to 20 mA</td>
<td>20 mA</td>
<td></td>
</tr>
<tr>
<td>Contact protection circuit</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal resistance</td>
<td>1 Ω or less (including lead wire length of 3 m)</td>
<td>2.4 V or less (to 20 mA)/3 V or less (to 40 mA)</td>
<td>2.7 V or less</td>
<td>2.4 V or less (to 20 mA)/3 V or less (to 40 mA)</td>
<td>0.8 V or less</td>
<td></td>
</tr>
<tr>
<td>Standards</td>
<td>CE marking</td>
<td>CE marking</td>
<td>CE marking</td>
<td>CE marking</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note 1) Refer to page 58 for reed switch common specifications.
Note 2) Refer to page 58 for lead wire lengths.
Note 3) Under 5 mA, the visuality of an indicator light is worsened. Furthermore, although it could be impossible to recognize it under 2.5 mA, but there would be no problem only with 1 mA or more in terms of the contact output.

Weight

<table>
<thead>
<tr>
<th>Model</th>
<th>D-A90</th>
<th>D-A90V</th>
<th>D-A93</th>
<th>D-A93V</th>
<th>D-A96</th>
<th>D-A96V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead wire length (m)</td>
<td>0.5</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Weight (g)</td>
<td>3</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>41</td>
</tr>
</tbody>
</table>

Dimensions

Unit: mm

<table>
<thead>
<tr>
<th>Model</th>
<th>D-A90</th>
<th>D-A90V</th>
<th>D-A93</th>
<th>D-A93V</th>
<th>D-A96</th>
<th>D-A96V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>Width</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Depth</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Most sensitive position</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Note 1) In a case where the operation load is an inductive load.
Note 2) In a case where the wiring load is greater than 5 m.
Note 3) In a case where the load voltage is 100 VAC.

Use the auto switch with a contact protection box in any of the above mentioned cases.

(For details about the contact protection box, refer to page 58.)
Reed Switch: Band Mounting Style
D-B54/D-B64

Auto Switch Specifications

<table>
<thead>
<tr>
<th>D-B5 (With indicator light)</th>
<th>D-B6 (Without indicator light)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto switch part no.</td>
<td>D-B54</td>
</tr>
<tr>
<td>Applicable load</td>
<td>Relay, PLC</td>
</tr>
<tr>
<td>Load voltage</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Load current range Note 3</td>
<td>5 to 50 mA</td>
</tr>
<tr>
<td>Contact protection circuit</td>
<td>Built-in</td>
</tr>
<tr>
<td>Internal voltage drop</td>
<td>2.4 V or less (to 20 mA)</td>
</tr>
<tr>
<td>Indicator light</td>
<td>Red LED illuminates when turned ON.</td>
</tr>
<tr>
<td>Standard</td>
<td>Conforming to CE</td>
</tr>
<tr>
<td>D-B64</td>
<td></td>
</tr>
<tr>
<td>Auto switch part no.</td>
<td>D-B64</td>
</tr>
<tr>
<td>Applicable load</td>
<td>Relay, PLC</td>
</tr>
<tr>
<td>Load voltage</td>
<td>24 VAC or less</td>
</tr>
<tr>
<td>Maximum load current</td>
<td>Max. 50 mA</td>
</tr>
<tr>
<td>Contact protection circuit</td>
<td>Built-in</td>
</tr>
<tr>
<td>Internal resistance</td>
<td>25 Ω or less</td>
</tr>
<tr>
<td>Standard</td>
<td>Conforming to CE</td>
</tr>
</tbody>
</table>

- Lead wires — Oilproof heavy-duty vinyl cable: ø4, 0.3 mm² x 2 cores (Brown, Blue), 0.5 m
- Note 1) Refer to page 58 for reed switch common specifications.
- Note 2) Refer to page 58 for lead wire lengths.
- Note 3) Under 5 mA, the strength of the indicator light is poor. In some cases, visibility of the indicator light will not be possible where the output signal is less than 2.5 mA. However, there is no problem in terms of contact output, when an output signal exceeds 1 mA or more.

Weight

<table>
<thead>
<tr>
<th>Auto switch part no.</th>
<th>D-B54</th>
<th>D-B64</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead wire length (m)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>3</td>
<td>78</td>
<td>78</td>
</tr>
<tr>
<td>5</td>
<td>126</td>
<td>—</td>
</tr>
</tbody>
</table>

Dimensions

<table>
<thead>
<tr>
<th>Indicator light</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-B64 type comes</td>
</tr>
<tr>
<td>without indicator light.</td>
</tr>
</tbody>
</table>

Dimensions Unit: mm

Dimensions Unit: mm
Reed Switch: Band Mounting Style
D-C73C/D-C80C

Auto Switch Specifications

<table>
<thead>
<tr>
<th>Auto switch part no.</th>
<th>D-C73C</th>
<th>D-C80C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable load</td>
<td>Relay, PLC</td>
<td>Relay, PLC</td>
</tr>
<tr>
<td>Load voltage</td>
<td>24 VDC</td>
<td>24 VAC/DC or less</td>
</tr>
<tr>
<td>Load current range</td>
<td>Note 4</td>
<td>5 to 40 mA</td>
</tr>
<tr>
<td>Contact protection circuit</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Indicator light</td>
<td>Red LED illuminates when turned ON.</td>
<td>Conforming to CE</td>
</tr>
<tr>
<td>Standard</td>
<td>Conforming to CE</td>
<td>Conforming to CE</td>
</tr>
</tbody>
</table>

D-C73C (With indicator light)

- Auto switch part no.: D-C73C
- Applicable load: Relay, PLC
- Load voltage: 24 VDC
- Load current range: 5 to 40 mA
- Contact protection circuit: None
- Internal voltage drop: 2.4 V or less
- Indicator light: Red LED illuminates when turned ON.
- Standard: Conforming to CE

D-C80C (Without indicator light)

- Auto switch part no.: D-C80C
- Applicable load: Relay, PLC
- Load voltage: 24 VAC/DC or less
- Maximum load current: 50 mA
- Contact protection circuit: None
- Internal resistance: 1 Ω or less (including lead wire length of 3 m)
- Standard: Conforming to CE

Weight

<table>
<thead>
<tr>
<th>Auto switch part no.</th>
<th>D-C73C</th>
<th>D-C80C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead wire length</td>
<td>0.5</td>
<td>14</td>
</tr>
<tr>
<td>(m)</td>
<td>3</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>83</td>
</tr>
</tbody>
</table>

Dimensions

Unit: mm

Auto Switch Internal Circuit

D-C73C

- Resistor
- LED diode
- Contact protection box CD-P12
- Zener diode
- OUT (+) Brown
- Brown
- OUT (–) Blue
- Blue

D-C80C

- Contact protection box CD-P11
- CD-P12
- OUT (+) Brown
- Brown
- OUT (–) Blue
- Blue

Note:
1. In a case where the operation load is an inductive load.
2. In a case where the wiring load is greater than 5 m.
3. Use the contact protection box in any of the above listed situations. The contact point life may decrease. (Refer to page 58 for contact protection box.)

Note 1) Refer to page 58 for reed switch common specifications.
Note 2) Refer to page 58 for lead wire lengths.
Note 3) Lead wire with connector may be shipped with switch.
Note 4) Under 5 mA, the strength of the indicator light is poor. In some cases, visibility of the indicator light will not be possible where the output signal is less than 2.5 mA. However, there is no problem in terms of contact output, when an output signal exceeds 1 mA or more.

Operating Precautions

1. Confirm that the connector is appropriately tightened. If tightened insufficiently, the waterproof performance will deteriorate.
2. For how to handle a connector, refer to “Best Pneumatics 2004” Vol. 6 catalog.
2-Color Indication Reed Switch: Band Mounting Style
D-B59W

Grommet

The optimum operating position can be determined by the color of the light. (Red → Green ← Red)

Auto Switch Internal Circuit

**Auto Switch Specifications**

<table>
<thead>
<tr>
<th>D-B59W (With indicator light)</th>
<th>D-B59W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable load</td>
<td>Relay, PLC</td>
</tr>
<tr>
<td>Load voltage</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Load current range</td>
<td>5 to 40 mA</td>
</tr>
<tr>
<td>Contact protection circuit</td>
<td>Built-in</td>
</tr>
<tr>
<td>Internal voltage drop</td>
<td>4 V or less</td>
</tr>
<tr>
<td>Standard</td>
<td>Conforming to CE</td>
</tr>
</tbody>
</table>

- Lead wires — Oilproof heavy-duty vinyl cable: ø4, 0.3 mm² x 2 cores (Brown, Blue), 0.5 m
- Note 1) Refer to page 58 for reed switch common specifications.
- Note 2) Refer to page 58 for lead wire lengths.
- Note 3) Under 5 mA, the strength of the indicator light is poor. In some cases, visibility of the indicator light will not be possible where the output signal is less than 2.5 mA. However, there is no problem in terms of contact output, when an output signal exceeds 1 mA or more.

**Weight**

<table>
<thead>
<tr>
<th>Auto switch part no.</th>
<th>D-B59W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead wire length (m)</td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>76</td>
</tr>
<tr>
<td>5</td>
<td>—</td>
</tr>
</tbody>
</table>

**Dimensions**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit: mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicator light</td>
<td>ø4.5</td>
</tr>
<tr>
<td>Most sensitive position</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>12.6</td>
</tr>
</tbody>
</table>

**Indicator light / Display method**

- Operating range: ON
- Display: Green
- Optimum operating position: Red

**Weight**

<table>
<thead>
<tr>
<th>Weight</th>
<th>Unit: g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto switch part no.</td>
<td>D-B59W</td>
</tr>
<tr>
<td>0.5</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>76</td>
</tr>
<tr>
<td>5</td>
<td>—</td>
</tr>
</tbody>
</table>

- Lead wires — Oilproof heavy-duty vinyl cable: ø4, 0.3 mm² x 2 cores (Brown, Blue), 0.5 m
- Note 1) Refer to page 58 for reed switch common specifications.
- Note 2) Refer to page 58 for lead wire lengths.
- Note 3) Under 5 mA, the strength of the indicator light is poor. In some cases, visibility of the indicator light will not be possible where the output signal is less than 2.5 mA. However, there is no problem in terms of contact output, when an output signal exceeds 1 mA or more.
These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC), Japan Industrial Standards (JIS)*1 and other safety regulations*2.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.  
ISO 4413: Hydraulic fluid power – General rules relating to systems.  
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)  
JIS B 8370: General rules for pneumatic equipment.  
JIS B 8361: General rules for hydraulic equipment.  
JIS B 9960-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)  
etc.

*2) Labor Safety and Sanitation Laws, etc.

**Caution:** Operator error could result in injury or equipment damage.  
**Warning:** Operator error could result in serious injury or loss of life.  
**Danger:** In extreme conditions, there is a possibility of serious injury or loss of life.

**Warning**

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.  
   Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results.  
   The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.  
   The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.  
   1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.  
   2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.  
   3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.  
   1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.  
   2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.  
   3. An application which could have negative effects on people, property, or animals requiring special safety analysis.  
   4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.
Safety Instructions

⚠️ Caution

The product is provided for use in manufacturing industries.
The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary. If anything is unclear, contact your nearest sales branch. (1-800-SMC-SMC1)

Limited Warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited Warranty and Disclaimer” and “Compliance Requirements”. Read and accept them before using the product.

Limited Warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered. 
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.
   3) Vacuum pads are excluded from this 1 year warranty.
   A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
   Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

When the product is exported, strictly follow the laws required by the Department of Commerce, International Trade Administration (Foreign Exchange and Foreign Trade Control Law).
### Design and Selection

#### Warning

1. **There is a danger of sudden action by air cylinders if sliding parts of machinery are twisted, etc., and changes in forces occur.**
   
   In such cases, human injury may occur; e.g., by catching hands or feet in the machinery, or damage to the machinery itself may occur. Therefore, the machine should be designed to avoid such dangers.

2. **Install a protective cover when there is a risk of human injury.**

   If a driven object and moving parts of a cylinder pose a danger of human injury, design the structure to avoid contact with the human body.

3. **Securely tighten all stationary parts and connected parts so that they will not become loose.**

   Especially when a cylinder operates with high frequency or is installed where there is a lot of vibration, ensure that all parts remain secure.

4. **A deceleration circuit may be required.**

   When a driven object is operated at high speed or the load is heavy, a cylinder’s cushion will not be sufficient to absorb the impact. Install a deceleration circuit to reduce the speed before cushioning to relieve the impact. In this case, the rigidity of the machinery should also be examined.

5. **Consider a possible drop in operating pressure due to a power outage, etc.**

   When a cylinder is used in a clamping mechanism, there is a danger of work pieces dropping if there is a decrease in clamping force due to a drop in circuit pressure caused by a power outage, etc. Therefore, safety equipment should be installed to prevent damage to machinery and/or human injury. Suspension mechanisms and lifting devices also require consideration for drop prevention.

6. **Consider a possible loss of power source.**

   Measures should be taken to protect against human injury and equipment damage in the event that there is a loss of power to equipment controlled by air pressure, electricity or hydraulics, etc.

7. **Design circuitry to prevent sudden lurching of driven objects.**

   When a cylinder is driven by an exhaust center type directional control valve or when starting up after residual pressure is exhausted from the circuit, etc., the piston and its driven object will lurch at high speed if pressure is applied to one side of the cylinder because of the absence of air pressure inside the cylinder. Therefore, select equipment and design circuits to prevent sudden lurching, because there is a danger of human injury and/or damage to equipment when this occurs.

8. **Consider emergency stops.**

   Design so that human injury and/or damage to machinery and equipment will not be caused when machinery is stopped by a safety device under abnormal conditions, such as a power outage or a manual emergency stop.

9. **Consider the action when operation is restarted after an emergency stop or abnormal stop.**

   Design the machinery so that human injury or equipment damage will not occur upon restart of operation. When the cylinder has to be reset at the starting position, install safe manual control equipment.

#### Warning

1. **Confirm the specifications.**

   The products advertised in this catalog are designed according to use in industrial compressed air systems. If the products are used in conditions where pressure, temperature, etc., are out of specification, damage and/or malfunction may be caused. Do not use in these conditions. (Refer to the specifications.) Consult SMC if you use a fluid other than compressed air.

2. **Intermediate stops**

   When intermediate stopping of a cylinder piston is performed with a 3 position closed center type directional control valve, it is difficult to achieve stopping positions as accurate and precise as with hydraulic pressure due to the compressibility of air. Furthermore, since valves and cylinders, etc., are not guaranteed for zero air leakage, it may not be possible to hold a stopped position for an extended period of time. Contact SMC in case it is necessary to hold a stopped position for an extended period.

#### Caution

1. **Operate within the limits of the maximum usable stroke.**

   The piston rod will be damaged if operated beyond the maximum stroke. Refer to the air cylinder model selection procedure for the maximum usable stroke.

2. **Operate the piston within a range such that collision damage will not occur at the stroke end.**

   Operate within a range such that damage will not occur when the piston having inertial force stops by striking the cover at the stroke end. Refer to the cylinder model selection procedure for the range within which damage will not occur.

3. **Use a speed controller to adjust the cylinder drive speed, gradually increasing from a low speed to the desired speed setting.**

4. **Provide intermediate supports for long stroke cylinders.**

   Provide intermediate supports for cylinders with long strokes to prevent rod damage due to sagging of the rod, deflection of the tube, vibration and external loads, etc. It is assumed the persons determining the stroke requirements have technical training and expertise in the design limitations of pneumatic equipment and are aware that death, personal injury, and property damage may result from the improper use of these products. Proper use is the users responsibility.
**Mounting**

**Caution**

1. Be certain to align the rod axis with the load and direction of movement when connecting.
   When not properly aligned, the rod and tube may be twisted, and damage may be caused due to wear on areas such as the inner tube surface, bushings, rod surface and seals.

2. When an external guide is used, connect the rod end and the load in such a way that there is no interference at any point within the stroke.

3. Do not scratch or gouge the sliding parts of the cylinder tube or piston rod, etc., by striking or grasping them with other objects.
   Cylinder bores are manufactured to precise tolerances, so that even a slight deformation may cause malfunction. Also, scratches or gouges, etc., in the piston rod may lead to damaged seals and cause air leakage.

4. Prevent the seizure of rotating parts.
   Prevent the seizure of rotating parts (pins, etc.) by applying grease.

5. Do not use until you can verify that equipment can operate properly.
   Verify correct mounting by appropriate function and leakage inspections after compressed air and power are connected following mounting, maintenance or conversions.

6. Instruction manual
   The product should be mounted and operated after thoroughly reading the manual and understanding its contents.
   Keep the instruction manual where it can be referred to as needed.

7. Preparation before piping
   Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

8. Wrapping of pipe tape
   When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealing material do not get inside the piping.
   Also, when pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.

9. Mount an auto switch at the center of the operating range.
   Adjust the mounting position of an auto switch so that the piston stops at the center of the operating range (the range in which a switch is ON). (The mounting position shown in the catalog indicates the optimum position at stroke end.) If mounted at the end of the operating range (around the borderline of ON and OFF), operation will be unstable.

**Cushion**

**Caution**

1. Readjust using the cushion needle.
   Cushion is adjusted at the factory, however, the cushion needle on the cover should be readjusted when the product is put into service, based upon factors such as the size of the load and the operating speed. When the cushion needle is turned clockwise, the restriction becomes smaller and the cushion's effectiveness is increased. Tighten the lock nut securely after adjustment is performed.

2. Do not operate with the cushion needle in a fully closed condition.
   This will cause damage to the seals.

**Warning**

1. Use clean air.
   Do not use compressed air which includes chemicals, synthetic oils containing organic solvents, salt or corrosive gases, etc., as it can cause damage or malfunction.

**Caution**

1. Install air filters.
   Install air filters at the upstream side of valves. The filtration degree should be 5 μm or finer.

2. Install an after-cooler, air dryer or water separator, etc.
   Air that includes excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this, install an after-cooler, air dryer or water separator, etc.

3. Use the product within the specified range of fluid and ambient temperature.
   Take measures to prevent freezing, since moisture in circuits can be frozen below 5°C, and this may cause damage to seals and lead to malfunction.
   Refer to “Best Pneumatics 2004” Vol.14 catalog for further details on compressed air quality.

**Maintenance**

**Warning**

1. Removal of equipment, and supply/exhaust of compressed air.
   When equipment is removed, first check measures to prevent dropping of driven objects and run-away of equipment, etc. Then cut off the supply pressure and electric power, and exhaust all compressed air from the system.
   When machinery is restarted, proceed with caution after confirming measures to prevent cylinder from lurching.

**Caution**

1. Drain flushing
   Remove drainage from air filters regularly. (Refer to the specifications.)
**Warning**

1. **Confirm the specifications.**
   
   Read the specifications carefully and use this product appropriately. The product may be damaged or malfunction if it is used outside the range of specifications for current load, voltage, temperature or impact.

2. **Cautions for use in an interlock circuit**
   
   When an auto switch is used for an interlock signal requiring high reliability, devise a double interlock system to avoid trouble by providing a mechanical protection function, or by also using another switch (sensor) together with the auto switch. Also, perform periodic maintenance and confirm proper operation.

3. **Do not make any modifications (including exchanging the printed circuit boards) to the product.**
   
   It may cause human injuries and accidents.

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**Caution**

1. **Pay attention to the length of time that a switch is ON at an intermediate stroke position.**

   When an auto switch is placed at an intermediate position of the stroke and a load is driven at the time the piston passes, the auto switch will operate, but if the speed is too great the operating time will be shortened and the load may not operate properly. The maximum detectable piston speed is:

   \[
   V \text{ (mm/s)} = \frac{\text{Auto switch operating range (mm)}}{\text{Time load applied (ms)}} \times 1000
   \]

   In cases of high piston speed, the use of an auto switch (G5NTL) with a built-in OFF delay timer (= 200 ms) makes it possible to extend the load operating time.

2. **Keep wiring as short as possible.**

   **<Reed switches>**
   
   As the length of the wiring to a load gets longer, the rush current at switching ON becomes greater, and this may shorten the product’s life. (The switch will stay ON all the time.)

   1) Use a contact protection box when the wire length is 5 m or longer.

   2) Even if an auto switch has a built-in contact protection circuit, when the wiring is more than 30 m long, it is not able to adequately absorb the rush current and its life may be reduced. It is again necessary to connect a contact protection box in order to extend its life. Please contact SMC in this case.

   **<Solid state switches>**
   
   3) Although wire length should not affect switch function, use a wire 100 m or shorter.

   If the wiring is longer it will likely increase noise although the length is less than 100 m.

   When the wire length is long, we recommend attaching the ferrite core to the both ends of the cable to prevent excess noise.

   A contact protection box is not required for solid state switches due to their construction.

3. **Do not use a load that generates surge voltage. If a surge voltage is generated, the discharge occurs at the contact, possibly resulting in the shortening of product life.**

   **<Reed switches>**
   
   If driving a load such as a relay that generates a surge voltage, use an auto switch with built-in contact protection circuit or use a contact protection box.

   **<Solid state switches>**
   
   Although a zener diode for surge protection is connected at the output side of a solid state auto switch, damage may still occur if the surge is applied repeatedly. When a load, such as a relay or solenoid which generates surge is directly driven, use a type of switch with a built-in surge absorbing element.

4. **Take precautions when multiple cylinders (actuators) are used close together.**

   When multiple auto switch cylinders (actuators) are used in close proximity, magnetic field interference may cause the auto switches to malfunction. Maintain a minimum cylinder separation of 40 mm.

   (When the allowable interval is specified for each cylinder series, use the indicated value.) The auto switches may malfunction due to the interference from the magnetic fields.
Series NCM
Auto Switches
Precautions 2
Be sure to read this before handling.

⚠️ Caution

5. Pay attention to the internal voltage drop of the auto switch.

 Redistribution
1) Auto switches with an indicator light (Except D-A96, C76)
   - If auto switches are connected in series as shown below, take note that there will be a large voltage drop because of internal resistance in the light emitting diodes. (Refer to the internal voltage drop in the auto switch specifications.)
   - Even though an auto switch operates normally, the load may not operate.
   - Even though an auto switch operates normally, the load may not operate. Therefore, the formula below should be satisfied after confirming the minimum operating voltage of the load.
     \[
     \text{Supply} - \text{Internal voltage drop of auto switch} > \text{minimum operating voltage of load}
     \]
   
   2) If the internal resistance of a light emitting diode causes a problem, select an auto switch without an indicator light (Model D-A90, C80).

 Redistribution
2) If the internal resistance of a light emitting diode causes a problem, select an auto switch without an indicator light (Model D-A90, C80).

 Redistribution
3) Generally, the internal voltage drop will be greater with a 2-wire solid state auto switch than with a reed switch. Take the same precautions as in 1).
   - Also, note that a 12 VDC relay is not applicable.

 Redistribution
6. Pay attention to leakage current.

 Redistribution
With a 2-wire solid state auto switch, current (leakage current) flows to the load to operate the internal circuit even when in the OFF state.

 Redistribution
Operating current of load (OFF condition) > Leakage current

 Redistribution
If the criteria given in the above formula are not met, it will not reset correctly (stays ON). Use a 3-wire switch if this specification will not be satisfied.

 Redistribution
Moreover, leakage current flow to the load will be \( n \) times larger when \( n \) auto switches are connected in parallel.

 Redistribution
7. Ensure sufficient clearance for maintenance activities.

 Redistribution
When designing an application, be sure to allow sufficient clearance for maintenance and inspections.

⚠️ Warning

8. When multiple auto switches are required

 Redistribution
“\( n \)” indicates the number of auto switch which can be physically mounted. Detection intervals depends on the auto switch mounting structure and set position therefore some required interval and set positions may not be available.

 Redistribution
9. Limitations of detectable positioning

 Redistribution
When using certain mounting brackets, the surface and position where an auto switch can be mounted maybe restricted due to physical interference. For example, when using some bracket types the auto switch cannot be surface mounted at the bottom side of foot bracket, etc.

 Redistribution
Please select the set position of the auto switch so that it does not interfere with the rear plate of the cylinder.

 Redistribution
10. Use the cylinder and auto switch in proper combination.

 Redistribution
The auto switch is pre-adjusted to activate properly for an auto-switch-capable SMC cylinder.

 Redistribution
If the auto switch is mounted improperly, used for another brand of cylinder or used after the alternation of the machine installation, the auto switch may not activate properly.

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10. Use the cylinder and auto switch in proper combination.

 Redistribution
The auto switch is pre-adjusted to activate properly for an auto-switch-capable SMC cylinder.

 Redistribution
If the auto switch is mounted improperly, used for another brand of cylinder or used after the alternation of the machine installation, the auto switch may not activate properly.

 Redistribution
1. Do not drop or bump.

 Redistribution
Do not drop, bump or apply excessive impacts (300 m/s² or more for reed switches and 1000 m/s² or more for solid state switches) while handling. Although the body of the auto switch may not be damaged, the inside of the auto switch could be damaged and cause a malfunction.

 Redistribution
2. Mount auto switches using the proper tightening torque.

 Redistribution
If an auto switch is tightened beyond the range of tightening torque, the auto switch mounting screws, auto switch mounting brackets or auto switch may be damaged.

 Redistribution
On the other hand, tightening below the range of tightening torque may allow the auto switch to slip out of position. (Refer to the auto switch mounting instructions for each series for auto switch mounting, moving, and tightening torque, etc.)

 Redistribution
3. Do not carry a cylinder by the auto switch lead wires.

 Redistribution
Never carry a cylinder by its lead wires. This may not only cause broken lead wires, but it may cause internal elements of the auto switch to be damaged by the stress.

 Redistribution
4. Fix the auto switch with appropriate screw installed on the switch body. If using other screws, auto switch may be damaged.
Series NCM
Auto Switches
Precautions 3
Be sure to read this before handling.

---

**Wiring**

1. **Confirm proper insulation of wiring.**
   Be certain that there is no faulty wiring insulation (contact with other circuits, ground fault, improper insulation between terminals, etc.). Damage may occur due to excess current flow into a switch.

2. **Do not wire with power lines or high voltage lines.**
   Wire separately from power lines or high voltage lines, avoiding parallel wiring or wiring in the same conduit with these lines. Control circuits containing auto switches may malfunction due to noise from these other lines.

3. **Avoid repeatedly bending or stretching lead wires.**
   Broken lead wires will result from repeatedly applying bending stress or stretching force to the lead wires. Stress and tensile force applied to the connection between the cable and auto switch increases the possibility of disconnection. Fix the cable in the middle so that it is not movable in the area where it connects with the auto switch.

4. **Be sure to connect the load before power is applied.**
   **<2-wire type>**
   If the power is turned ON when an auto switch is not connected to a load, the auto switch will be instantly damaged because of excess current.
   It is the same as when the 2-wire brown cord (+, output) is directly connected to the (+) power supply terminal.

5. **Do not allow short circuit of loads.**
   **<Reed switches>**
   If the power is turned ON with a load in a short circuited condition, the auto switch will be instantly damaged because of excess current flow into the switch.
   **<Solid state switches>**
   All models of D-M9□(V) except D-M9□W(V) and G5NB and PNP output type auto switches do not have built-in short circuit protection circuits.
   Note that if a load is short circuited, the auto switch will be instantly damaged as in the case of reed switches.
   Take special care to avoid reverse wiring with the brown power supply line and the black output line on 3-wire type auto switches.

6. **Avoid incorrect wiring.**
   **<Reed switches>**
   A 24 VDC auto switch with indicator light has polarity. The brown lead wire or terminal No. 1 is (+), and the blue lead wire or terminal No. 2 is (–).
   1) If connections are reversed, an auto switch will operate, however, the light emitting diode will not light up.
   Also note that a current greater than that specified will damage a light emitting diode and it will no longer operate.
   Applicable model: D-A93, A93V, C73, C73C, B53, B54
   2) When using a 2-color indication type auto switch (D-B59W), the auto switch will constantly remain ON if the connections are reversed.

   **<Solid state switches>**
   1) If connections are reversed on a 2-wire type auto switch, the auto switch will be protected by a protection circuit. However, it is still necessary to avoid reversed connections, since the auto switch could be damaged by a load short circuit in this condition.
   2) If connections are reversed (power supply line + and power supply line –) on a 3-wire type auto switch, the auto switch will be protected by a protection circuit. However, if the power supply line (+) is connected to the blue wire and the power supply line (–) is connected to the black wire, the auto switch will be damaged.

   **<D-M9□> Applicable to D-M9□(V) prior to July, 2008.**
   D-M9□ does not have built-in short circuit protection circuit. Be aware that if the power supply connection is reversed (e.g. (+) power supply wire and (–) power supply wire connection is reversed), the auto switch will be damaged.

   **7. When the cable sheath is stripped, confirm the stripping direction.** The insulator may be split or damaged depending on the direction. (D-M9□ only)

   **Recommended Tool**
<table>
<thead>
<tr>
<th>Model name</th>
<th>Model no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire stripper</td>
<td>D-M9N-SWy</td>
</tr>
</tbody>
</table>

   * Stripper for a round cable (ø2.0) can be used for a 2-wire type cable.
Operating Environment

⚠️ Warning

1. Never use in an atmosphere of explosive gases.
   The structure of auto switches is not intended to prevent explosion. Never use in an atmosphere with an explosive gas since this may cause a serious explosion.

Caution

1. Do not use in an area where a magnetic field is generated.
   Auto switches will malfunction or magnets inside cylinders will become demagnetized. (Consult SMC regarding the availability of a magnetic field resistant auto switch.)

2. Do not use in an environment where the auto switch will be continually exposed to water.
   Although auto switches satisfy IEC standard IP67 construction, do not use auto switches in applications where continually exposed to water splash or spray. Poor insulation or swelling of the potting resin inside auto switches may cause malfunction.

3. Do not use in an environment with oil or chemicals.
   Consult SMC if auto switches will be used in an environment with coolant, cleaning solvent, various oils or chemicals. If auto switches are used under these conditions for even a short time, they may be adversely affected by improper insulation, malfunction due to swelling of the potting resin, or hardening of the lead wires.

4. Do not use in an environment with temperature cycles.
   Consult SMC if auto switches are used where there are temperature cycles other than normal temperature changes, as there may be adverse effects inside the auto switches.

5. Do not use in an environment where there is excessive impact shock.
   <Reed switches>
   When excessive impact (300 m/s² or more) is applied to a reed switch during operation, the contact point will malfunction and generate or cut off a signal momentarily (1 ms or less). Consult SMC regarding the need to use a solid state switch depending upon the environment.

6. Do not use in an area where surges are generated.
   <Solid state switches>
   When there are units (solenoid type lifter, high frequency induction furnace, motor, radio equipment etc.) which generate a large amount of surge in the area around cylinders with solid state auto switches, this may cause deterioration or damage to the auto switch. Avoid sources of surge generation and disorganized lines.

7. Avoid accumulation of iron waste or close contact with magnetic substances.
   When a large amount of iron waste such as machining chips or spatter is accumulated, or a magnetic substance (something attracted by a magnet) is brought into close proximity with an auto switch cylinder, it may cause the auto switch to malfunction due to a loss of the magnetic force inside the cylinder.

⚠️ Caution

8. Please consult SMC concerning water resistance, elasticity of lead wires, usage at welding sites, etc.

9. Do not use in direct sunlight.

10. Do not mount the product in locations where it is exposed to radiant heat.

Maintenance

⚠️ Warning

1. Removal of equipment, and supply/exhaust of compressed air
   Before any machinery or equipment is removed, first ensure that the appropriate measures are in place to prevent the fall or erratic movement of driven objects and equipment, then cut off the electric power and reduce the pressure in the system to zero. Only then should you proceed with the removal of any machinery and equipment.

When machinery is restarted, proceed with caution after confirming that appropriate measures are in place to prevent actuators from sudden movement.

⚠️ Caution

1. Perform the following maintenance periodically in order to prevent possible danger due to unexpected auto switch malfunction.
   1) Secure and tighten auto switch mounting screws.
      If screws become loose or the mounting position is dislocated, retighten them after readjusting the mounting position.
   2) Confirm that there is no damage to lead wires.
      To prevent faulty insulation, replace auto switches or repair lead wires, etc., if damage is discovered.
   3) Confirm the lighting of the green light on the 2-color indicator type auto switch.
      Confirm that the green LED is on when stopped at the established position. If the red LED is on, the mounting position is not appropriate. Readjust the mounting position until the green LED lights up.
**Key Features**

- Multiple methods of Product Selection.
- Part Number Validation.
- Preview and download 2D & 3D CAD Models online with real-time updating.
- Save Parts into a custom Parts List.
- E-Mail Parts Lists to internal groups (purchasing, maintenance) or external (partner companies, SMC sales representative).

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**Product Selection**

**Browse Catalog**
- Allows user to select products based on visual representation.
- For use when “I know what I’m looking for, I just don’t know the part number”.

**Direct Entry**
- Fastest method to select product.
- Partial part numbers or full part numbers can be entered.
- Automatically sets drop down options on configuration page.

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**Part Number Validation**

- Use Pull-Downs to make selections and “build” the part number.
- The part number is validated:
  - **Partial** indicates that additional entries are needed.
  - **Invalid** indicates that there is a conflict between two or more values. Conflicting values are shown in red. 4 Valid part numbers can be ordered and downloaded as CAD files.

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**Parts List**

- Select “Save Part” to add the part to your personal Parts List.
- When you return to the site, your Parts List will contain all saved parts.

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**CAD Functions**

- Preview and download online 2D & 3D CAD. Preview parts online using a free ActiveX browser applet which auto-installs the first time this function is used.
- The preview model matches the specified part you have configured and validated.
# Global Manufacturing, Distribution and Service Network

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  - SMC Industrial Automation Bulgaria EOOD
- **CROATIA**
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  - **HONG KONG**
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    - SMC Pneumatics (Philippines), Inc.
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www.smcus.com
For International inquiries: www.smcworld.com

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Series **NCM-A**

Stainless Steel Body Cylinder with Adjustable Air Cushion

Available in 4 bore sizes with adjustable air cushion

**Same quality features as the standard NCM**

- Floating cushion seal for smooth movements
- Piston wear ring to extend seal life
- Cushion adjustment is recessed so it does not protrude
- Dimensionally interchangeable with the standard NCM
Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>075 (3/4&quot;)</th>
<th>106 (1 1/16&quot;)</th>
<th>150 (1 1/2&quot;)</th>
<th>200 (2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum operating pressure</td>
<td>250 PSI/1.7 MPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum operating pressure</td>
<td>8 PSI/0.06 MPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temperature</td>
<td>40 to 140°F / 5 to 60 °C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston speed</td>
<td>2 to 30 in/sec (50 to 750 mm/sec)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubrication</td>
<td>Not required (Pre-lubricated at Factory)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting</td>
<td>B, C, E</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Standard Stroke (inch)

<table>
<thead>
<tr>
<th>Mounting</th>
<th>Standard stroke</th>
<th>Max. stroke as standard</th>
<th>Long stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front nose mount (B)</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
<td>12</td>
<td>40</td>
</tr>
<tr>
<td>Rear pivot mount (C)</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>Double end mount (E)</td>
<td>1/2, 1, 2, 3, 4, 5, 6</td>
<td>32</td>
<td>40</td>
</tr>
</tbody>
</table>

Note) Minimum stroke for mounting auto switches: 0.6 inch for 2 switches, 0.4 inch for one switch.
Dimensions

<table>
<thead>
<tr>
<th>Bore</th>
<th>MM</th>
<th>KK</th>
<th>A</th>
<th>B</th>
<th>D</th>
<th>E</th>
<th>K</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4”)</td>
<td>0.250</td>
<td>1/4-28</td>
<td>0.50</td>
<td>0.624</td>
<td>-</td>
<td>0.86</td>
<td>-</td>
<td>0.75</td>
</tr>
<tr>
<td>106 (1 1/16”)</td>
<td>0.312</td>
<td>5/16-24</td>
<td>0.50</td>
<td>0.624</td>
<td>0.25</td>
<td>1.12</td>
<td>0.12</td>
<td>0.88</td>
</tr>
<tr>
<td>150 (1 1/2”)</td>
<td>0.437</td>
<td>7/16-20</td>
<td>0.75</td>
<td>0.749</td>
<td>0.38</td>
<td>1.56</td>
<td>0.25</td>
<td>1.25</td>
</tr>
<tr>
<td>200 (2”)</td>
<td>0.625</td>
<td>1/2-20</td>
<td>0.88</td>
<td>1.374</td>
<td>0.50</td>
<td>2.06</td>
<td>0.38</td>
<td>1.75</td>
</tr>
</tbody>
</table>

CUSHION NEEDLE (HEX 1.5MM)

<table>
<thead>
<tr>
<th>NE</th>
<th>NN</th>
<th>W</th>
<th>WA</th>
<th>WB</th>
<th>WC</th>
<th>Y</th>
<th>YC</th>
<th>ZB</th>
<th>ZC</th>
<th>ZD</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.12</td>
<td>5/18-18</td>
<td>0.50</td>
<td>0.60</td>
<td>0.51</td>
<td>90°</td>
<td>0.95</td>
<td>0.28</td>
<td>3.39</td>
<td>0.09</td>
<td>1/8 NPT</td>
</tr>
<tr>
<td>0.25</td>
<td>5/18-18</td>
<td>0.62</td>
<td>0.72</td>
<td>0.47</td>
<td>90°</td>
<td>1.17</td>
<td>0.28</td>
<td>3.47</td>
<td>0.09</td>
<td>1/8 NPT</td>
</tr>
<tr>
<td>0.41</td>
<td>3/4-16</td>
<td>0.88</td>
<td>0.85</td>
<td>0.51</td>
<td>45°</td>
<td>1.50</td>
<td>0.31</td>
<td>3.91</td>
<td>0.09</td>
<td>1/8 NPT</td>
</tr>
<tr>
<td>0.50</td>
<td>1 1/4-12</td>
<td>1.19</td>
<td>1.20</td>
<td>0.81</td>
<td>45°</td>
<td>1.91</td>
<td>0.59</td>
<td>5.11</td>
<td>0.12</td>
<td>1/4 NPT</td>
</tr>
</tbody>
</table>
**Series NCM-A**

**Dimensions**

<table>
<thead>
<tr>
<th>Bore</th>
<th>MM</th>
<th>KK</th>
<th>A</th>
<th>B</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>GA</th>
<th>GB</th>
<th>K</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>075 (3/4&quot;)</td>
<td>0.250</td>
<td>1/4-28</td>
<td>0.50</td>
<td>0.624</td>
<td>-</td>
<td>0.86</td>
<td>0.38</td>
<td>0.250</td>
<td>0.75</td>
<td>-</td>
<td>0.34</td>
</tr>
<tr>
<td>106 (1 1/16&quot;)</td>
<td>0.312</td>
<td>5/16-24</td>
<td>0.50</td>
<td>0.624</td>
<td>0.25</td>
<td>1.12</td>
<td>0.38</td>
<td>0.250</td>
<td>0.75</td>
<td>0.12</td>
<td>0.34</td>
</tr>
<tr>
<td>150 (1 1/2&quot;)</td>
<td>0.437</td>
<td>7/16-20</td>
<td>0.75</td>
<td>0.749</td>
<td>0.38</td>
<td>1.56</td>
<td>0.62</td>
<td>0.375</td>
<td>1.00</td>
<td>0.25</td>
<td>0.50</td>
</tr>
<tr>
<td>200 (2&quot;)</td>
<td>0.625</td>
<td>1/2-20</td>
<td>0.88</td>
<td>1.374</td>
<td>0.50</td>
<td>2.06</td>
<td>0.75</td>
<td>-</td>
<td>-</td>
<td>0.38</td>
<td>0.56</td>
</tr>
</tbody>
</table>

Note: The clevis pin for NCMC200 is not included.

**Table for Additional Dimensions**

<table>
<thead>
<tr>
<th>LB</th>
<th>N</th>
<th>NN</th>
<th>W</th>
<th>WA</th>
<th>WB</th>
<th>WC</th>
<th>Y</th>
<th>YC</th>
<th>ZB</th>
<th>ZC</th>
<th>ZD</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.74</td>
<td>0.75</td>
<td>5/8-18</td>
<td>0.50</td>
<td>0.60</td>
<td>0.86</td>
<td>90*</td>
<td>0.95</td>
<td>0.63</td>
<td>4.02</td>
<td>0.09</td>
<td>1/8 NPT</td>
</tr>
<tr>
<td>3.82</td>
<td>0.88</td>
<td>5/8-18</td>
<td>0.62</td>
<td>0.72</td>
<td>0.82</td>
<td>90*</td>
<td>1.17</td>
<td>0.63</td>
<td>4.10</td>
<td>0.09</td>
<td>1/8 NPT</td>
</tr>
<tr>
<td>4.37</td>
<td>1.25</td>
<td>3/4-16</td>
<td>0.88</td>
<td>0.85</td>
<td>0.98</td>
<td>45*</td>
<td>1.50</td>
<td>0.78</td>
<td>4.75</td>
<td>0.09</td>
<td>1/8 NPT</td>
</tr>
<tr>
<td>5.62</td>
<td>1.75</td>
<td>1 1/4-12</td>
<td>1.19</td>
<td>1.20</td>
<td>1.45</td>
<td>45*</td>
<td>1.91</td>
<td>1.03</td>
<td>6.06</td>
<td>0.12</td>
<td>1/4 NPT</td>
</tr>
</tbody>
</table>
Stainless Steel Body Cylinder  
**Series NCM-A**

### Dimensions

#### Stainless Steel Body Cylinder

![Diagram of Stainless Steel Body Cylinder with dimensions labeled]

#### Bore Dimensions

<table>
<thead>
<tr>
<th>Bore</th>
<th>MM</th>
<th>KK</th>
<th>A</th>
<th>B</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>K</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>075</td>
<td>0.250</td>
<td>1/4-28</td>
<td>0.50</td>
<td>0.624</td>
<td>-</td>
<td>0.86</td>
<td>0.38</td>
<td>0.251</td>
<td>-</td>
<td>0.34</td>
</tr>
<tr>
<td>106</td>
<td>0.312</td>
<td>5/16-24</td>
<td>0.50</td>
<td>0.624</td>
<td>0.25</td>
<td>1.12</td>
<td>0.38</td>
<td>0.251</td>
<td>0.12</td>
<td>0.34</td>
</tr>
<tr>
<td>150</td>
<td>0.437</td>
<td>7/16-20</td>
<td>0.75</td>
<td>0.749</td>
<td>0.38</td>
<td>1.56</td>
<td>-</td>
<td>-</td>
<td>0.25</td>
<td>0.63</td>
</tr>
<tr>
<td>200</td>
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<td>1/2-20</td>
<td>0.88</td>
<td>1.374</td>
<td>0.50</td>
<td>2.06</td>
<td>0.75</td>
<td>0.375</td>
<td>0.38</td>
<td>0.56</td>
</tr>
</tbody>
</table>

#### Cushion Needle Dimensions

![Diagram of Cushion Needle with dimensions labeled]

<table>
<thead>
<tr>
<th>LB</th>
<th>N</th>
<th>NN</th>
<th>W</th>
<th>WA</th>
<th>WB</th>
<th>WC</th>
<th>Y</th>
<th>YC</th>
<th>ZB</th>
<th>ZC</th>
<th>ZD</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.74</td>
<td>0.75</td>
<td>5/8-18</td>
<td>0.50</td>
<td>0.60</td>
<td>0.86</td>
<td>90°</td>
<td>0.95</td>
<td>0.63</td>
<td>4.02</td>
<td>0.09</td>
<td>1/8 NPT</td>
</tr>
<tr>
<td>3.82</td>
<td>0.88</td>
<td>5/8-18</td>
<td>0.62</td>
<td>0.72</td>
<td>0.82</td>
<td>90°</td>
<td>1.17</td>
<td>0.63</td>
<td>4.10</td>
<td>0.09</td>
<td>1/8 NPT</td>
</tr>
<tr>
<td>-</td>
<td>1.25</td>
<td>3/4-16</td>
<td>0.88</td>
<td>0.85</td>
<td>1.10</td>
<td>45°</td>
<td>1.50</td>
<td>0.91</td>
<td>4.50</td>
<td>0.09</td>
<td>1/8 NPT</td>
</tr>
<tr>
<td>5.62</td>
<td>1.75</td>
<td>1 1/4-12</td>
<td>1.19</td>
<td>1.20</td>
<td>1.45</td>
<td>45°</td>
<td>1.91</td>
<td>1.03</td>
<td>6.06</td>
<td>0.12</td>
<td>1/4 NPT</td>
</tr>
</tbody>
</table>
Series **NCM-X6009**

**All Stainless Steel Cylinder**

- All exterior components made from corrosion resistant 304 stainless steel
- Built in rod wiper to protect interior from contaminants
- Same built-in quality features as standard NCM Series
- Available in 6 bore sizes
- Rod cover wrench flats for safer cylinder tightening
- Dimensionally interchangeable with standard NCM Series
### Specifications

<table>
<thead>
<tr>
<th>Bore Size (Inch)</th>
<th>075 (3/4&quot;)</th>
<th>088 (7/8&quot;)</th>
<th>106 (1-1/16&quot;)</th>
<th>125 (1-1/4&quot;)</th>
<th>150 (1-1/2&quot;)</th>
<th>200 (2&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Operating Pressure</td>
<td>250 PSI (1.7MPa)</td>
<td>150 PSI (1.0 MPa)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Operating Pressure</td>
<td>8 PSI (0.06MPa)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and Fluid Temperature</td>
<td>40° to 140° F</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston Speed</td>
<td>No bumper: 2 to 20 inch/sec (50 to 500 mm/sec)</td>
<td>Bumber: 2 to 30 inch/sec (50 to 750 mm/sec)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bumper</td>
<td>Optional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubrication</td>
<td>Not required (Food grade pre-lubricated at factory)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting</td>
<td>B, E</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### How to Order

**Construction Features**

- **Water Resistant 2-Color Indication**
- **Solid State Switch: Direct Mounting Style**

**NCD-M9**

**Options**
- All stainless steel
- Food grade grease
- Food grade grease & viton wiper/rod seal
- Food grade grease & all viton seals
- XB6-X6009* High temp. and stainless
- XB7-X6009* Low temp. and stainless

*XB6-X6009 contains XB6 seals and grease. XB7-X6009 contains standard XB7 seals and grease.

**Wiring/Output type**
- N 3-wire NPN
- P 3-wire PNP
- B 2-wire

**Lead wire length**
- Nil: 0.5 m
- M: 1 m
- L: 3 m
- Z: 5 m

*Note: 0.5m, 1m are produced upon receipt of order

**Electrical entry direction**
- Nil: In-line
- V: Perpendicular

*With pre-wired connector is also available.

**Water (coolant) resistant type**
- **2-wire load current is 2.5 to 40 mA**
- **RoHS compliant**
- **UL certified (style 2844) lead cable is used**

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**SMC Corporation of America**

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