

**Now Available
5", 6", or 8" Bore**

V5 Series Pneumatic Cylinders

*Light-Duty NFPA
Interchangeable*



HYDRO-LINE, INC.

An IMC Company



V5 Design Features

- A Solid Aluminum Head and Cap**
Machined from high grade solid aluminum bar stock and anodized for corrosion resistance. Solid bar stock provides strength and alignment at mounting locations.
- B Extra Long Bronze Bearing**
Distributes bearing load over greater surface area. Reduced unit stress reduces piston rod, rod seal and bearing wear. 660 machined bronze, piloted and threaded 1" diameter rod. Bronze pressed-fit bearing on 5/8" diameter rod.
 - For 5", 6", and 8" bore offer a bronze filled Teflon wearband. The wearband offers good bearing support and long life. Teflon offers lower friction characteristics, improving breakaway and slip stick problems.
- C Unitized Rod Seal/Wiper**
Single, Carboxylated nitrile rod seal and wiper. Pressure activated rod seal maximizes sealability at all pressures. Tough Carboxylated nitrile resists wear for maximum seal life.
- D Hard Coated Anodized Aluminum Alloy Tubing (60 Rc on I.D.)**
Provides superior wear resistance for maximum seal life.
- E Adjustable and Captive Cushion**
Can be safely adjusted under pressure. Fine threads and special tapered tip allow precise adjustment over a broad range of operation.
- F Self-Centering Cushions**
Floating, self-checking elastomeric cushions eliminate the need for ball-check, ensures quick stroke reversal and optimizes performance. See Fig. 2-1.
- G Hard Chrome Plated Piston Rod**
Plated and polished for maximum seal performance.
- H O-Ring Tube End Seals**
Nitrile O-ring design is pressure compensating and reusable. See Fig. 2-2.
- I NPTF Ports**
One NPTF port size under NFPA specification is standard. No need to use reducer bushings to match the standard valve port.
- J Tie Rods**
High strength tie rods are roll threaded for increased fatigue life.
- K Piston**
Machined from solid aluminum alloy.
- L Piston Seals**
Two unidirectional nitrile piston seals for enhanced sealing performance.
 - For 5", 6", and 8" bore offers one O-ring piston seal for reduced friction.

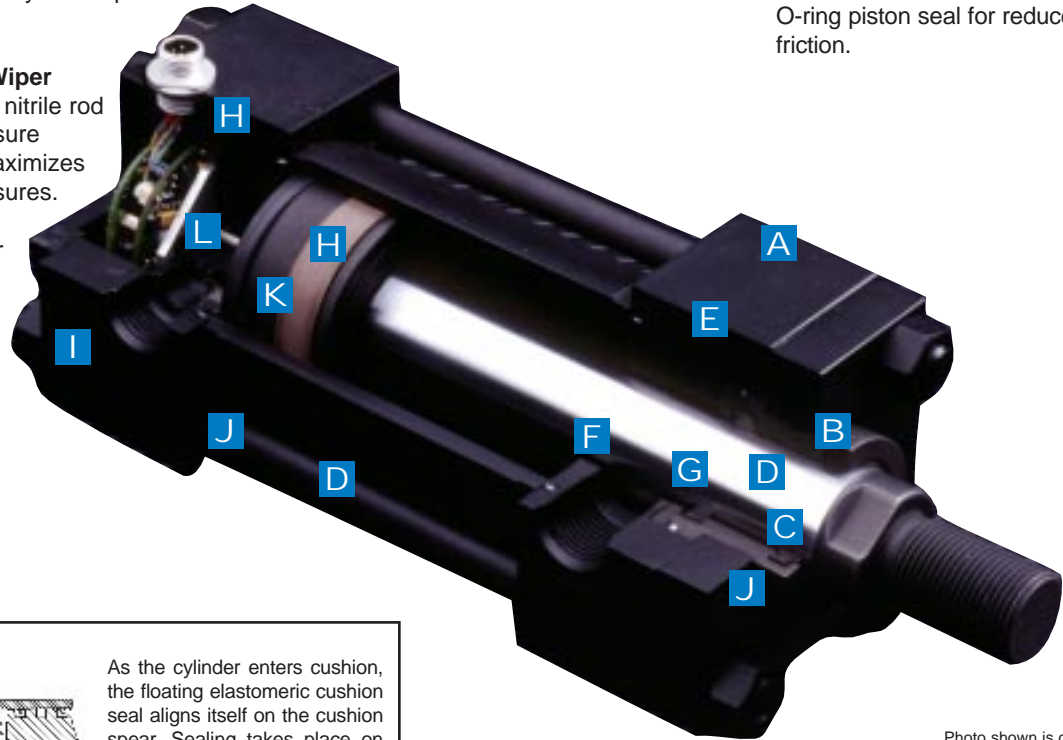
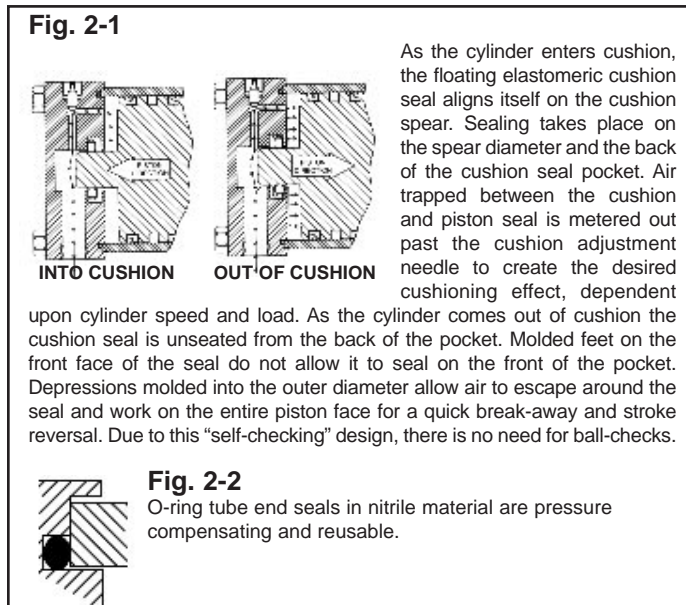


Photo shown is of V5 Small Bore Design



Specifications

- Bore sizes:** 1½" through 8"
- Stroke lengths:** Up to 60". See Chart 5-1 for maximum stroke length.
- Pressure rating:** 200 PSI air
- Temperature:** -40°F to 200°F standard
- NFPA interchangeable mountings**

Cylinders are permanently lubricated at assembly by filling the rod seal and piston seal groove with molybdenum disulfide grease.

How to Order a V5 Cylinder


Hydro-Line standard cylinders can be completely and accurately identified with a model number that encodes construction specifications. To develop the model number for ordering a cylinder, see the following example.

| Feature | Description | Symbol |
|-----------------------|--|------------------------------|
| Rod Diameter | Specify in inches (2 position decimal) | — |
| Cushion | Noncushioned | N |
| | Cushioned both ends | B |
| | Cushioned head end | H |
| | Cushioned cap end | C |
| Stroke | Specify in inches (2 position decimal) | — |
| Bore | Specify in inches (2 position decimal) | — |
| Mounting Style | Side tapped, MS4 (see Port note below) | B |
| | Cap fixed clevis, MP1 | C |
| | Cap detachable clevis, MP2 | DC |
| | Cap Mono detachable clevis, MP4 | DCM |
| | Head rectangular flange, MF1 | F |
| | No mount | K |
| | All tie rods extended, MX1 | L |
| | Head end tie rods extended, MX3 | M |
| | Cap end tie rods extended, MX2 | N |
| | Cap rectangular flange, MF2 | R |
| | Side end angles, MS1 | Y |
| | Model/Series | Air prelubricated to 200 PSI |
| Rod End Style | Male, large | 1 |
| | Male, small (standard) | 2 |
| | Female | 4 |
| Ports | NPTF | N |
| Rod Seal/Wiper | Carboxylated Nitrile | N |
| | Viton | V |
| Piston Seals | Nitrile lip-type (1½" - 4") | N |
| | Nitrile o-ring (5" - 8") | N |
| | Viton lip-type (1½" - 4") | V |
| | Viton o-ring (5" - 8") | V |
| Port Locations | Head End | 1 thru 4 |
| | Cap End | 1 thru 4 |
| Switches | (Leave blank if no magnetic piston option is desired.) | |
| | Magnetic piston (2 switches) Hall Effect | F |
| | Magnetic piston (1 switch) Hall Effect | G |
| | Magnetic piston (no switches) Hall Effect | H |
| | Magnetic piston (2 switches) Reed | M |
| | Magnetic piston (1 switch) Reed | O |
| | Magnetic piston (no switches) Reed | S |

HOW TO ORDER

- Quantity
- Model Number
- Special modifications if required
- Operating temperature if below -40°F or above 200°F
- Required ship date

V5K - 3.25 X 8.00 - N - 1.00
- 2 - N - N - N - 1 - 1 -

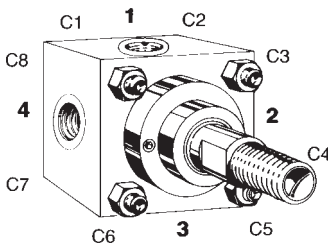


HYDRO-LINE, INC.
Rockford, IL

V5K - 3.25 X 8.00 - N - 1.00
- 2 - N - N - N - 1 - 1
195011234-1
A1579-375

Customer Number (if desired)
Hydro-Line Serial Number

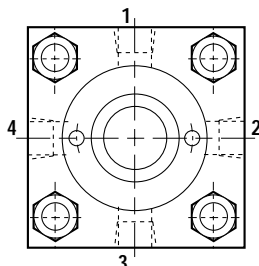
Port and Cushion Adjustment Locations



Standard port locations are at **No. 1**, with optional locations at No. 2, 3 or 4. Port No. 3 is not available on the MS4. Standard cushion adjustment location is above port location No. 2 in location **C3**. Optional cushion location not available. Cushion location will be rotated in relation to the port.

PORT SIZES

| Bore | Standard |
|-----------|----------|
| 1½, 2, 2½ | 1/4 NPTF |
| 3¼, 4 | 3/8 NPTF |
| 5 | 3/8 NPTF |
| 6,8 | 1/2 NPTF |



PORT LOCATIONS

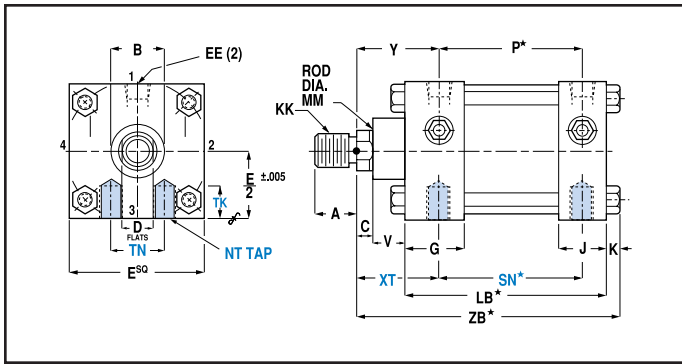
V5 Options

- Cushions
- High temperature seals
- Magnetic piston
- Hall effect or reed switches
- Mounting accessories

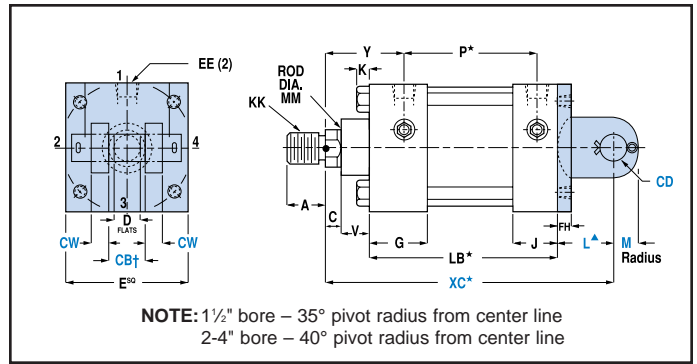


National
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Association
MEMBER

V5 Mounting Dimensions

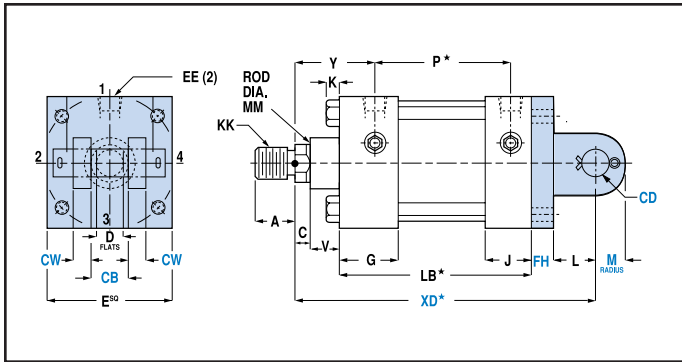


B – Side Tapped Mount (NFFA Style MS4) (1½"-6" Bore)

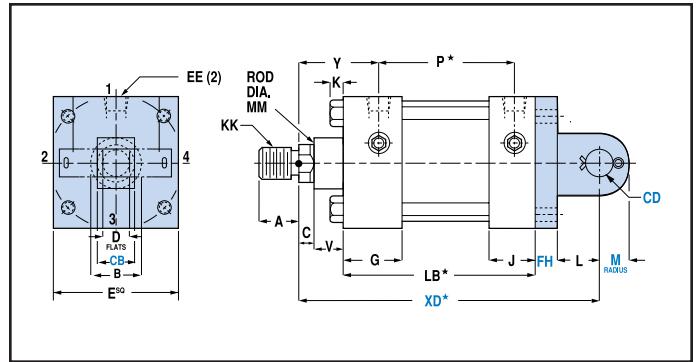


NOTE: 1½" bore – 35° pivot radius from center line
2-4" bore – 40° pivot radius from center line

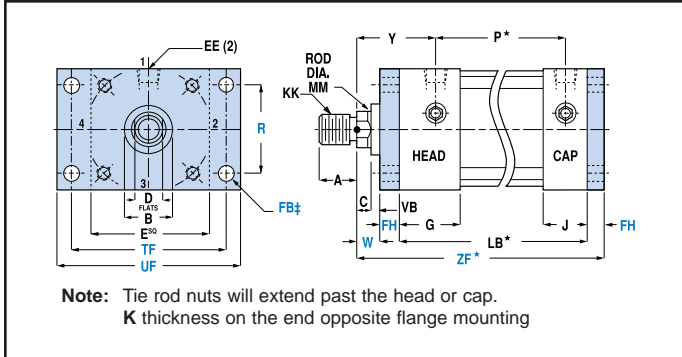
C – Cap Clevis Mount (NFFA Style MP1) (1½"-6" Bore)



DC – Cap Detachable Clevis Mount (NFFA Style MP2)

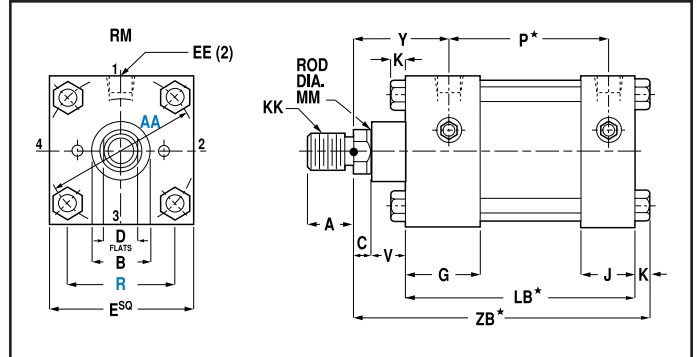


DCM – Cap Detachable Mono Clevis Mount (1½"-6" Bore) (NFFA Style MP4)

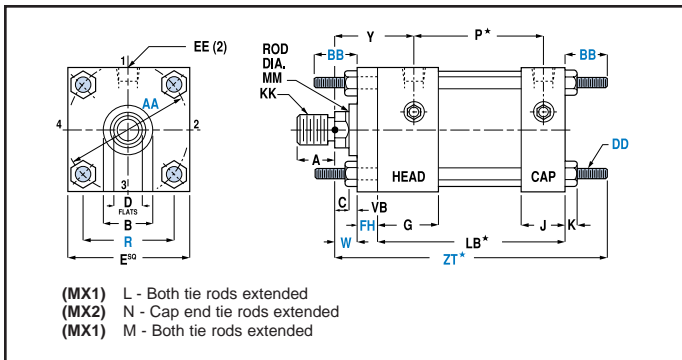


Note: Tie rod nuts will extend past the head or cap.
K thickness on the end opposite flange mounting

**F – Head Rectangular Flange Mount (NFFA Style MF1)
R – Cap Rectangular Flange Mount (NFFA Style MF2)(1½"-6" Bore)**

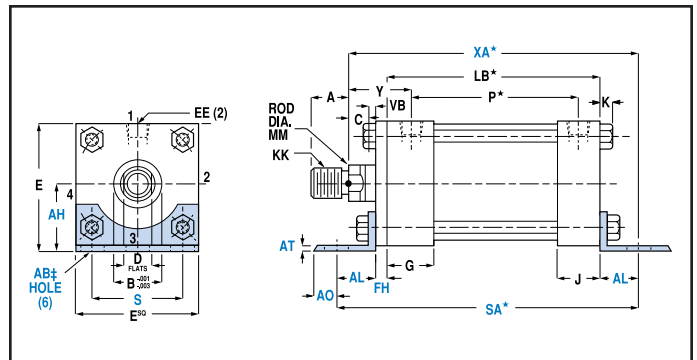


K – No Mount



(MX1) L - Both tie rods extended
(MX2) N - Cap end tie rods extended
(MX1) M - Both tie rods extended

L, M, N – Tie Rods Extended Mount (NFFA Style MX1, MX2, MX3)



Y – Side End Angles (NFFA Style MS1)

Cylinder Dimensions

| BORE | 1½ | 2 | 2½ | 3¼ | 4 | 5 | 6 | 8 |
|-------------------------------|------|------|------|------|------|------|-------|-------|
| A | ¾ | ¾ | ¾ | 1⅛ | 1⅛ | 1⅛ | 1⅝ | 1⅝ |
| AA | 2.02 | 2.6 | 3.1 | 3.9 | 4.7 | 5.8 | 6.9 | 9.1 |
| AB‡ | ⅞ | ⅞ | ⅞ | ⅞ | ⅞ | 1⅛ | 1⅜ | 1⅜ |
| AH | 1⅜ | 1⅜ | 1⅝ | 1⅝ | 2¼ | 2¼ | 3¼ | 4¼ |
| AL | 1 | 1 | 1 | 1¼ | 1¼ | 1⅝ | 1⅝ | 1⅜ |
| AO | ⅝ | ⅝ | ⅝ | ⅝ | ½ | ⅝ | ⅝ | 1⅛ |
| AT | ⅞ | ⅞ | ⅞ | ⅞ | ⅞ | ⅞ | ⅞ | ⅞ |
| B [▲] -.001 -.003 | 1⅝ | 1⅝ | 1⅝ | 1½ | 1½ | 1½ | 2 | 2 |
| BB | 1 | 1⅞ | 1⅞ | 1⅜ | 1⅜ | 1⅜ | 1⅜ | 2⅝ |
| C | ⅝ | ⅝ | ⅝ | ½ | ½ | ½ | ⅝ | ⅝ |
| CB | ¾ | ¾ | ¾ | 1¼ | 1¼ | 1¼ | 1½ | 1½ |
| CC | ½-20 | ½-20 | ½-20 | ⅞-14 | ⅞-14 | ⅞-14 | 1¼-12 | 1¼-12 |
| CD | ½ | ½ | ½ | ¾ | ¾ | ¾ | 1 | — |
| CW | ½ | ½ | ½ | ⅝ | ⅝ | ⅝ | ¾ | — |
| D | 1⅜ | 1⅜ | 1⅜ | ⅞ | ⅞ | ⅞ | 1⅞ | 1⅞ |
| DD | ¼-28 | ⅝-24 | ⅝-24 | ⅞-24 | ⅞-24 | ½-20 | ½-20 | ⅝-18 |
| E | 2 | 2½ | 3 | 3¾ | 4½ | 5½ | 6½ | 8½ |
| EE (NPTF) | ¼ | ¼ | ¼ | ⅜ | ⅜ | ⅜ | ½ | ½ |
| FB‡ | ⅝ | ⅝ | ⅝ | ⅞ | ⅞ | ⅞ | ⅞ | — |
| FH [*] | ⅝ | ⅝ | ⅝ | ⅝ | ⅝ | ⅝ | ¾ | — |
| G | 1½ | 1½ | 1½ | 1¾ | 1¾ | 1¾ | 2 | 2 |
| J | 1 | 1 | 1 | 1¼ | 1¼ | 1¼ | 1½ | 1½ |
| K | ¼ | ⅝ | ⅝ | ⅞ | ⅞ | ⅞ | ⅞ | ⅞ |
| KK | ⅞-20 | ⅞-20 | ⅞-20 | ¾-16 | ¾-16 | ¾-16 | 1-14 | 1-14 |
| L | ¾ | ¾ | ¾ | 1¼ | 1¼ | 1¼ | 1½ | — |
| LB [*] | 3⅝ | 3⅝ | 3⅝ | 4¼ | 4¼ | 4½ | 5 | 5⅝ |
| M | ⅝ | ⅝ | ⅝ | ⅞ | ⅞ | ⅞ | 1¼ | — |
| MM | ⅝ | ⅝ | ⅝ | 1 | 1 | 1 | 1⅜ | 1⅜ |
| NT | ¼-20 | ⅝-18 | ⅞-16 | ½-13 | ½-13 | ⅝-11 | ¾-10 | ¾-10 |
| P [*] | 2⅜ | 2⅜ | 2⅜ | 2⅜ | 2⅜ | 2⅜ | 3⅜ | 3⅜ |
| R | 1.43 | 1.84 | 2.19 | 2.76 | 3.32 | 4.10 | 4.88 | — |
| S | 1.43 | 1.84 | 2.19 | 2.76 | 3.32 | 4.10 | 4.88 | 6.44 |
| SA [*] | 6 | 6 | 6⅝ | 7⅝ | 7⅝ | 7⅝ | 8½ | 8¾ |
| SN [*] | 2¼ | 2¼ | 2⅜ | 2⅝ | 2⅝ | 2⅝ | 3⅝ | 3¼ |
| TF | 2¾ | 3⅜ | 3⅜ | 4⅜ | 5⅜ | 6⅝ | 7⅝ | — |
| TK | ⅝ | ½ | ⅝ | ¾ | ¾ | 1 | 1⅞ | 1⅞ |
| TN | ⅝ | ⅞ | 1¼ | 1½ | 2⅞ | 2⅞ | 3¼ | 4½ |
| UF | 3⅝ | 4⅞ | 4⅝ | 5½ | 6¼ | 7⅝ | 8⅝ | — |
| V | ⅝ | ⅝ | ⅝ | ⅞ | ⅞ | — | — | — |
| VB [*] | ¼ | ¼ | ¼ | ¼ | ¼ | ¼ | ¼ | — |
| W | ⅝ | ⅝ | ⅝ | ¾ | ¾ | ¾ | ⅞ | — |
| XA [*] | 5⅝ | 5⅝ | 5⅜ | 6⅞ | 6⅞ | 7¼ | 8 | 8⅞ |
| XC [*] | 5⅝ | 5⅝ | 5½ | 6⅞ | 6⅞ | 7⅞ | 8⅞ | — |
| XD [*] | 5¼ | 5¼ | 5⅞ | 7½ | 7½ | 7¼ | 8⅞ | — |
| XT | 1⅝ | 1⅝ | 1⅝ | 2⅞ | 2⅞ | 2⅞ | 2⅞ | 2⅞ |
| Y | 1⅜ | 1⅝ | 1⅝ | 2⅝ | 2⅝ | 2⅝ | 2⅝ | 2⅝ |
| ZB [*] | 4⅞ | 4⅞ | 5⅞ | 6 | 6 | 6⅞ | 7⅞ | 7⅞ |
| ZF [*] | 5 | 5 | 5⅞ | 6¼ | 6¼ | 6½ | 7⅞ | — |
| ZT [*] | 5⅝ | 5⅝ | 5⅞ | 7 | 7 | 7⅞ | 8⅞ | 9⅞ |
| PISTON THICKNESS | 1⅞ | 1⅞ | 1¼ | 1¼ | 1¼ | 1½ | 1½ | 1⅞ |

‡ Use screws ⅛" smaller than mounting holes

* Add stroke to all dimensions with an asterisk.

▲ 5-8" bore, F mount only

NOTE: NPTF ports standard on V5.

Dimensions shown in blue are mounting dimensions.

Rod End Styles

Choose from three

| Rod End Style No. | Dimensions |
|---------------------|------------|
| 2 ^{STD} ★ | |
| 1 | |
| 4 ^{STD} ★★ | |

★ Male Rod End Style No. 2 is standard and will be furnished unless otherwise specified.

★★ Rod End Style No. 4 will be furnished when female thread is required unless otherwise specified.

NOTE: All Hydro-Line mounting accessories are designed to fit Nos. 2 and 2X Rod End Styles only.

NOTE: Rods larger than 5/8" diameter are turned down below MM diameter to ease seal replacement. A 1/8" long taper begins 1/16" from pilot face and leads to the turned down diameter.

Chart 5-1 Guidelines for Maximum (Standard) Stroke Length

| Mounting Style | Bore Size | | | | | | | |
|------------------------|-----------|----|----|----|----|----|----|----|
| | 1½ | 2 | 2½ | 3¼ | 4 | 5 | 6 | 8 |
| Clevis (MP1, MP2, MP4) | 17 | 17 | 17 | 16 | 16 | 16 | 16 | 16 |
| Unsupported Rod End | 10 | 10 | 10 | 10 | 10 | 10 | 25 | 18 |
| Supported Rod End | 25 | 25 | 25 | 40 | 40 | 40 | 60 | 60 |
| Firmly Guided Rod End | 25 | 25 | 25 | 40 | 40 | 40 | 60 | 60 |

NOTE: The above chart is based on calculations and empirical data. Some assumptions have been made. If your requirements do not fall within the chart guidelines, consult the factory for longer strokes.

ONE YEAR LIMITED WARRANTY

One Year Normal Use

Hydro-Line Products are warranted for a period of one year from date of shipment from our plant to be free from defects in workmanship and material under correct use, normal operating conditions and proper applications. This warranty does not extend to goods damaged, or subjected to accident, abuse, or misuse after shipment from our factory, nor to goods altered or repaired by anyone other than authorized Hydro-Line representatives.

Disclaimers

This one year limited warranty is the only warranty extended by Hydro-Line Inc. in connection with any sale by Hydro-Line. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, notwithstanding disclosure to Hydro-Line of the product's intended use. An affirmation of fact or promise made on behalf of Hydro-Line shall not be deemed to create an expressed warranty that the goods shall conform to the affirmation of promise; any description of the goods is for the sole purpose of identifying them and shall not be deemed to create an expressed warranty that the goods shall conform to such description; any sample or model is for illustrative purposes only and shall not be deemed to create an expressed warranty that the goods shall conform to the sample or model; and no affirmation or promise, or description, or sample or model, shall be deemed part of the basis of the bargain.

Exclusive Remedy

Hydro-Line's obligation upon breach of warranty shall be limited to replacing or repairing at our option, free of charge, but not including installation, dismantling, reassembling or any other charge, the particular product or part which inspection discloses to have been defective at time of shipment. Inspection may be at the place of installation and use, or at our plant if returned to us at our expense including lowest transportation cost, is requested. Written notice of such defect shall be given by customer to Hydro-Line within 30 days after such defect(s) appear. Written permission for any warranty claim return must be first obtained from authorized Hydro-Line representatives. All returns must be accompanied with a complete written explanation of claimed defects and the circumstances of operational failure. Replacement of cylinders or parts thereof repaired under this warranty shall be warranted under the terms of this warranty for the remainder of the term of the original warranty or for a period of six months after such repair or replacement, whichever is longer. Upon expiration of the warranty, all of Hydro-Line's obligations hereunder shall terminate.

IN NO EVENT SHALL HYDRO-LINE INC. HAVE ANY LIABILITY FOR PAYMENT OF ANY CONSEQUENTIAL, INCIDENTAL, INDIRECT, SPECIAL OR TORT DAMAGES OF ANY KIND INCLUDING, BUT NOT LIMITED TO, ANY LOSS OF PROFITS, TO THE EXTENT EXCLUSION IS PERMITTED BY LAW.

This warranty states our entire and exclusive liability and buyer's exclusive remedy for any claim of damages in connection with the sale or furnishing of Hydro-Line's products or parts, their design, suitability for use, installations or operation, or for any claimed defects therein. Goods not manufactured by Hydro-Line are furnished subject only to the Manufacturer's warranties, if any, and without warranties, expressed or implied, by Hydro-Line.

HYDRO-LINE Actuation Products



N5 SERIES CYLINDERS

- NFPA interchangeable
- **N5** – 3000 psi nominal hydraulic
- **AN5** – to 250 psi very heavy-duty pneumatic
- **LAN5** – to 250 psi very heavy-duty pneumatic – permanently lubricated
- All steel construction



R5 SERIES CYLINDERS

- NFPA interchangeable
- **A5/R5** – to 250 psi pneumatic
- **LA5/LR5** – to 250 psi pneumatic – permanently lubricated
- **HA5** – to 400 psi hydraulic
- **HR5** – 1500 psi nominal hydraulic



Q5 SERIES CYLINDERS

- NFPA interchangeable
- **Q5** – to 250 psi pneumatic
- **LQ5** – to 250 psi pneumatic – permanently lubricated
- **HQ5** – to 400 psi hydraulic
- Aluminum construction



HM SERIES CYLINDERS

- Conform to international metric specifications ISO 6020/2 and DIN 24 554
- 25 mm to 200 mm bore sizes
- 210 BAR nominal hydraulic
- All steel construction



ROCKFORD SERIES CYLINDERS

- ASAE interchangeable agricultural cylinders
- **Rockford 2500**–2500 psi hydraulic
- **Rockford 3000**–3000 psi hydraulic



ELECTRONIC FEEDBACK CYLINDERS

Hydraulic or pneumatic cylinders which incorporate cylinder position sensing and feedback throughout the stroke. Available in N5, R5, A5, Q5, HM, HW, SM or special cylinders.



SERIES 20/30 BOOSTERS

- Standard series to 5000 psi output
- Custom designs to 20,000 psi

T SERIES AIR/OIL TANKS

- All steel construction

QT SERIES AIR/OIL TANKS

- Aluminum end caps and translucent tubing



V5 SERIES CYLINDERS

- NFPA Interchangeable
- To 200 psi pneumatic
- Aluminum construction
- Now available in 5", 6" and 8" bore



HW SERIES CYLINDERS

- Welded construction
- 3000 psi nominal hydraulic



TSAYER CYLINDERS

- Threaded body construction
- To 200 psi pneumatic
- To 1000 psi nominal hydraulic



SM SERIES CYLINDERS

- Steel mill type construction
- **MSM**–2000 psi nominal hydraulic
- **HSM**–3000 psi nominal hydraulic
- **ASM**–Pneumatic



CUSTOM CYLINDERS

- Custom cylinders to meet special requirements
- Bores to 48"
 - Strokes to 300"
 - Pressures to 10,000 psi or higher



VISIT OUR WEB SITE:
www.hydro-line.com



830 MEREDITH WAY
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702-355-7071 • FAX 702-355-7170

HIGHWAY 20 WEST • P.O. BOX 2068
DECATUR, ALABAMA 35602 U.S.A.
205-350-2603 • FAX 205-351-1264

HYDRO-LINE s.r.l.
VIA CAPRETTI 12/14
1-25136 STOCCHETTA BS, ITALY
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HEADQUARTERS

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4908 HOVIS ROAD
CHARLOTTE, NORTH CAROLINA 28208 U.S.A.
704-394-0043 • FAX 704-394-0073

PATRICK GREGORY ROAD
WOLVERHAMPTON WEST MIDLANDS, WV11 3DZ U.K.
(0) 1902 304000 • FAX (0) 1902 305676



HYDRO-LINE, INC.

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in Actuation Worldwide

An IMC Company

REV. 7/98

10,000 CG