

**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.

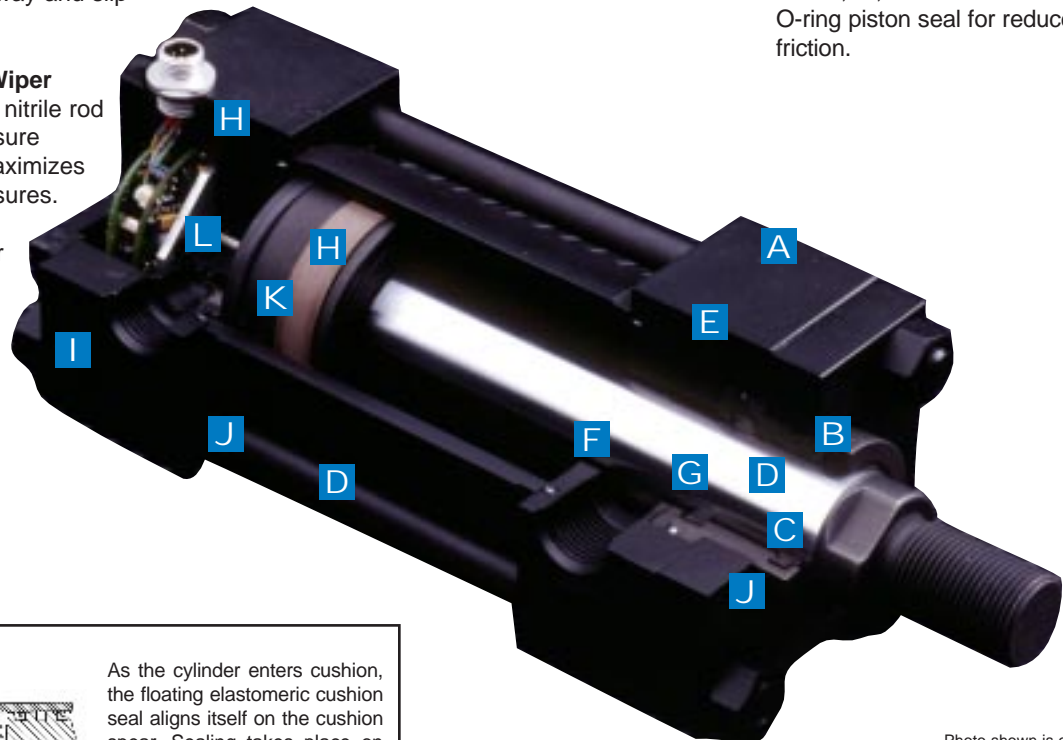
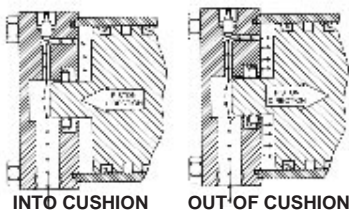


Photo shown is of V5 Small Bore Design

Fig. 2-1



As the cylinder enters cushion, the floating elastomeric cushion seal aligns itself on the cushion spear. Sealing takes place on the spear diameter and the back of the cushion seal pocket. Air trapped between the cushion and piston seal is metered out past the cushion adjustment needle to create the desired cushioning effect, dependent upon cylinder speed and load. As the cylinder comes out of cushion the cushion seal is unseated from the back of the pocket. Molded feet on the front face of the seal do not allow it to seal on the front of the pocket. Depressions molded into the outer diameter allow air to escape around the seal and work on the entire piston face for a quick break-away and stroke reversal. Due to this "self-checking" design, there is no need for ball-checks.



Fig. 2-2

O-ring tube end seals in nitrile material are pressure compensating and reusable.

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	V5
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

1. Quantity
2. Model Number
3. Special modifications if required
4. Operating temperature if below -40°F or above 200°F
5. Required ship date

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



HYDRO-LINE, INC.
Rockford, IL

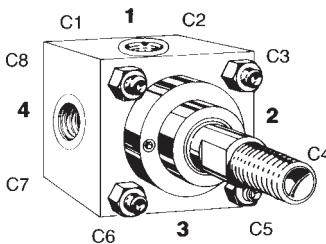
V5K - 3.25 X 8.00 - N - 1.00
- 2 - N - N - N - 1 - 1

195011234-1

A1579-375

Customer Number (if desired)
Hydro-Line Serial Number

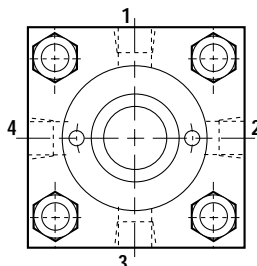
Port and Cushion Adjustment Locations



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

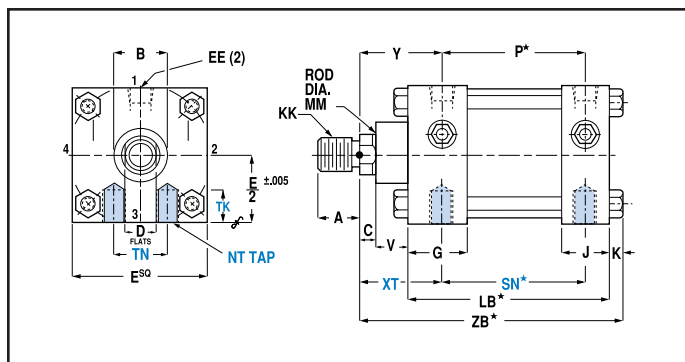
V5 Options

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

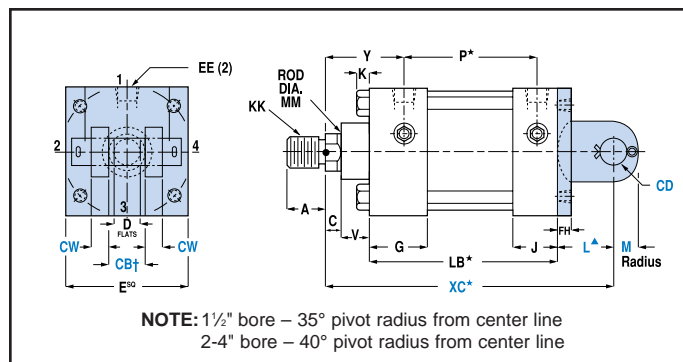


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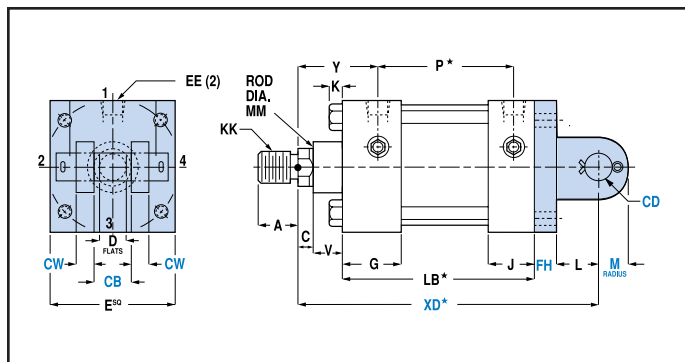
V5 Mounting Dimensions



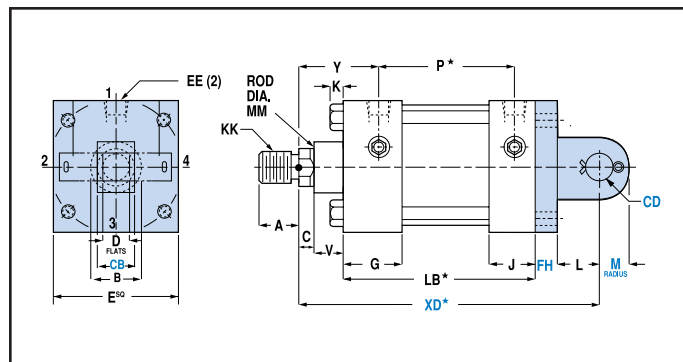
B – Side Tapped Mount (NFFA Style MS4) (1½"-6" Bore)



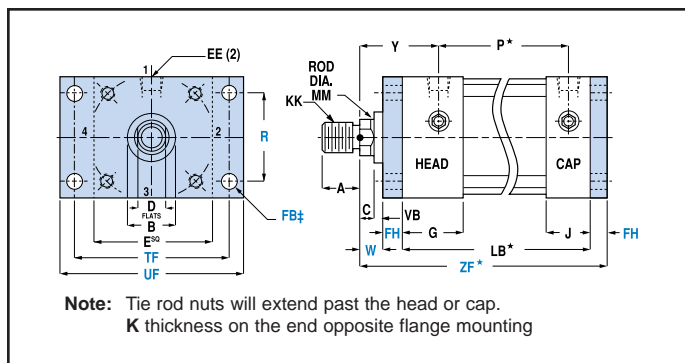
C – Cap Clevis Mount (NFFA Style MP1) (1½"-6" Bore)



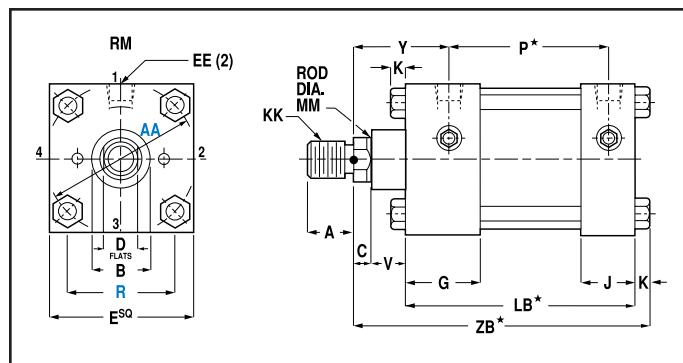
DC – Cap Detachable Clevis Mount (NFFA Style MP2)



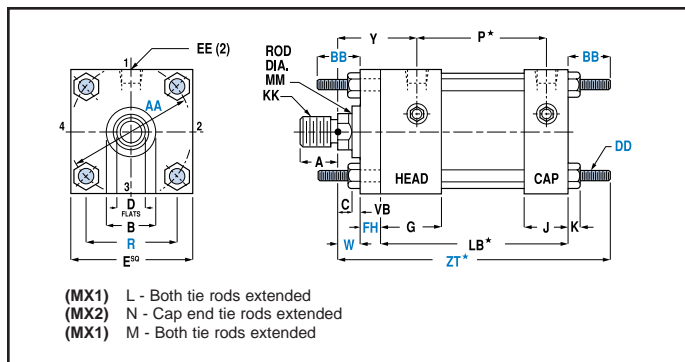
**DCM – Cap Detachable Mono Clevis Mount (1½"-6" Bore)
(NFFA Style MP4)**



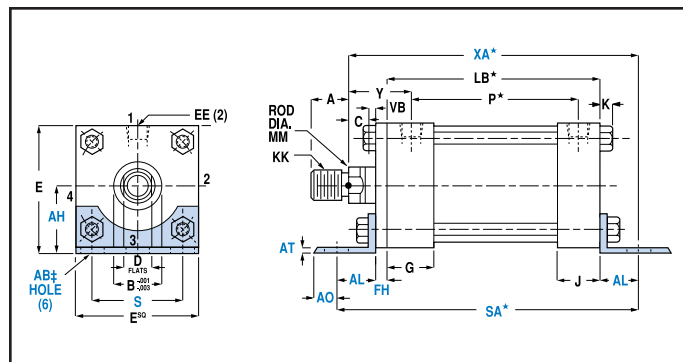
**F – Head Rectangular Flange Mount (NFFA Style MF1)
R – Cap Rectangular Flange Mount (NFFA Style MF2)(1½"-6" Bore)**



K – No Mount



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‡	7/16	7/16	7/16	9/16	9/16	1¼	1¾	1¾
AH	1¾	1¾	1⅝	1⅝	2¼	2¼	3¼	4¼
AL	1	1	1	1¼	1¼	1⅝	1⅝	1¾
AO	¾	¾	¾	¾	½	¾	¾	1⅛
AT	½	½	½	½	½	¾	¾	¾
B [▲] -.001 -.003	1⅝	1⅝	1⅝	1½	1½	1½	2	2
BB	1	1⅝	1⅝	1¾	1¾	1¾	1¾	2⅝
C	¾	¾	¾	½	½	½	¾	¾
CB	¾	¾	¾	1¼	1¼	1¼	1½	1½
CC	½-20	½-20	½-20	¾-14	¾-14	¾-14	1¼-12	1¼-12
CD	½	½	½	¾	¾	¾	1	—
CW	½	½	½	¾	¾	¾	¾	—
D	17/32	17/32	17/32	7/8	7/8	7/8	1⅛	1⅛
DD	¼-28	5/16-24	5/16-24	¾-24	¾-24	¾-24	1¼-20	5/8-18
E	2	2½	3	3¾	4½	5½	6½	8½
EE (NPTF)	¼	¼	¼	¾	¾	¾	1½	1½
FB‡	5/16	¾	¾	7/16	7/16	9/16	9/16	—
FH [▲]	¾	¾	¾	¾	¾	¾	¾	—
G	1½	1½	1½	1¾	1¾	1¾	2	2
J	1	1	1	1¼	1¼	1¼	1½	1½
K	¼	5/16	5/16	¾	¾	7/16	7/16	9/16
KK	7/16-20	7/16-20	7/16-20	¾-16	¾-16	¾-16	1-14	1-14
L	¾	¾	¾	1¼	1¼	1¼	1½	—
LB*	3⅝	3⅝	3¾	4¼	4¼	4½	5	5⅝
M	5/8	5/8	5/8	7/8	7/8	7/8	1¼	—
MM	5/8	5/8	5/8	1	1	1	1¾	1¾
NT	¼-20	5/16-18	¾-16	½-13	½-13	5/8-11	¾-10	¾-10
P*	29/32	213/32	227/64	243/64	243/64	259/64	35/32	35/32
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	7¾	7¾	7¾	8½	8¾
SN*	2¼	2¼	2¾	2⅝	2⅝	2⅝	3⅝	3¼
TF	2¾	3¾	3¾	411/16	57/16	6¾	7¾	—
TK	¾	½	5/8	¾	¾	1	1⅛	1⅛
TN	5/8	7/8	1¼	1½	21/16	211/16	3¼	4½
UF	3¾	4¼	4⅝	5½	6¼	7¾	8¾	—
V	5/8	5/8	5/8	7/8	7/8	—	—	—
VB [▲]	¼	¼	¼	¼	¼	¼	¼	—
W	5/8	5/8	5/8	¾	¾	¾	7/8	—
XA*	5⅝	5⅝	5¾	6¾	6¾	7¼	8	8⅝
XC*	5¾	5¾	5½	6¾	6¾	7¾	8¾	—
XD*	5¾	5¾	5¾	7½	7½	7¾	8¾	—
XT	115/16	115/16	115/16	27/16	27/16	27/16	213/16	213/16
Y	131/32	155/64	155/64	225/64	225/64	225/64	225/32	225/32
ZB*	47/8	415/16	51/8	6	6	6⅝	71/8	71/8
ZF*	5	5	5⅝	6¼	6¼	6½	7¾	—
ZT*	5⅝	5¾	5¾	7	7	711/16	8¾	9¾
PISTON THICKNESS	1⅝	1⅝	1¼	1¼	1¼	1½	1½	1⅝

‡ Use screws 1/16" 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



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HEADQUARTERS

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

PATRICK GREGORY ROAD
WOLVERHAMPTON WEST MIDLANDS, WV11 3DZ U.K.
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HYDRO-LINE, INC.

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in Actuation Worldwide*

An IMC Company

REV. 7/98

10,000 CG