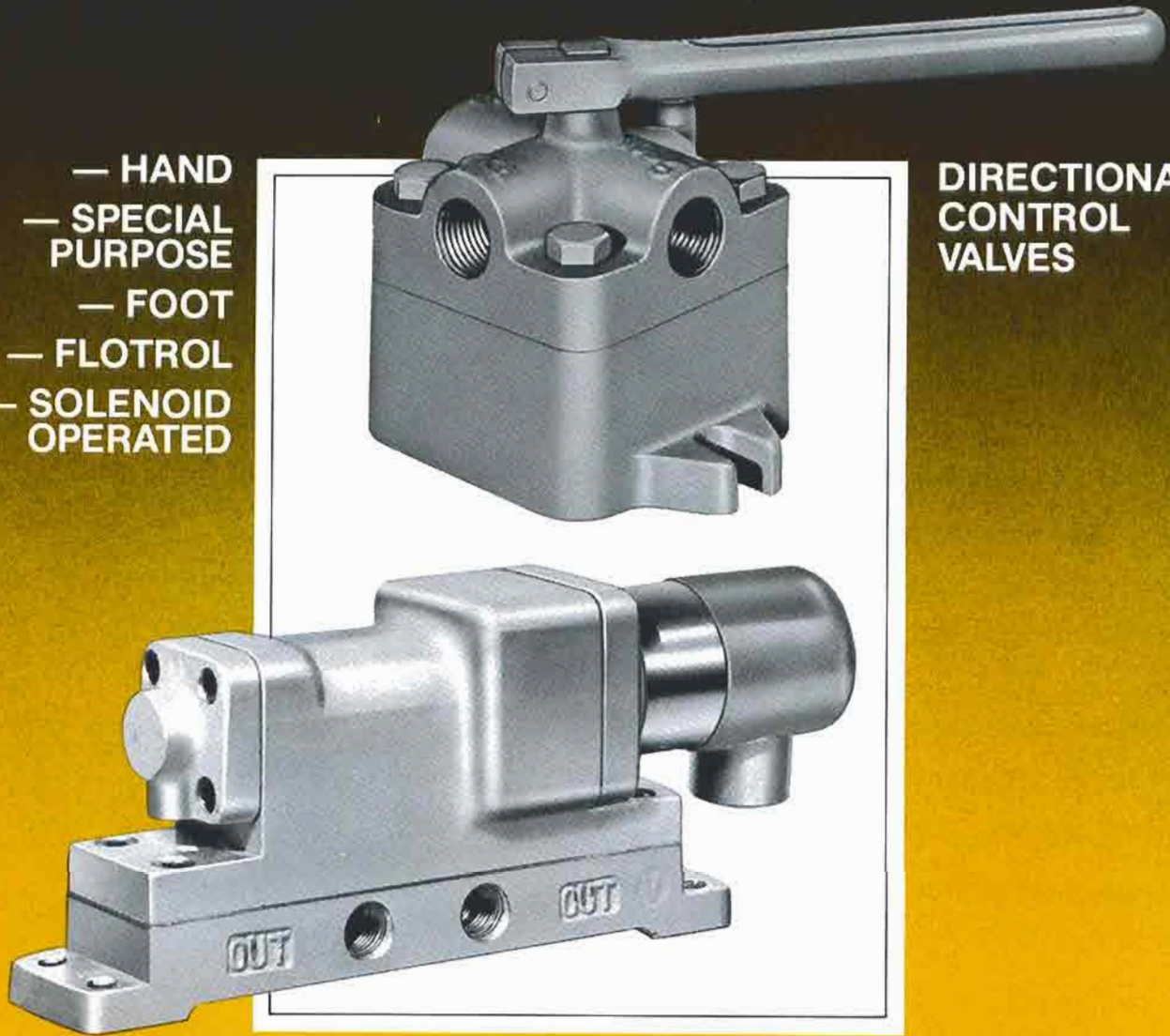


NOPAK[®]

CATALOG 102

- HAND
- SPECIAL PURPOSE
- FOOT
- FLOTROL
- SOLENOID OPERATED

DIRECTIONAL CONTROL VALVES



GALLAND HENNING NOPAK, Inc.

1025 South 40th Street ■ West Milwaukee, Wisconsin 53215

www.HoustonHydraulic.com ■ 34391 ■ West Milwaukee, Wisconsin 53234 Sales@HouHyd.com

PHONE: 414-645-6048 ■ FAX: 414-645-6048

713-692-4421
www.nopak.com ■ email: sales@nopak.com

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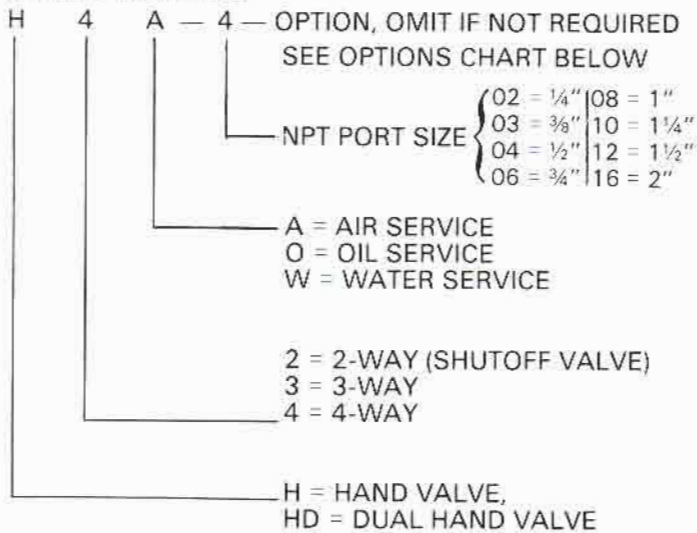
NOPAK VALVES

NOPAK Directional Control Valves are noted throughout industry for their simplicity of design, rugged construction, long-lived, trouble-free service, and low maintenance. The original NOPAK Valve design, with its patented, rotating lapped disc, has been augmented with other designs until today the NOPAK line includes valves for control of fluid power under practically all operating conditions.

In specifying NOPAK Valves, operating requirements are the most important consideration. Such factors as unusual working conditions (heat, cold, moisture), the operating medium to be used (air, oil or water), line pressure and capacity, type of control (hand, foot, solenoid or pilot valve) — all must be considered in choosing the particular NOPAK Valve best suited for the application.

HOW TO ORDER

ORDERING CODE HAND VALVES



HAND VALVES — PANEL MOUNT

ONE SIZE AVAILABLE: 1/4" NPT SEE PAGES 6 & 7, TOP ITEM

250 PM

ORDERING CODE FOR STANDARD DETENTED 3-POSITION 4-WAY CLOSED-CENTER VALVE

OPTIONAL FEATURE

EN = EXHAUST IN NEUTRAL DETENTED.

ST = SHORT THROW WHICH IS TWO POSITION WITH NO NEUTRAL DETENTED.

FOOT VALVES:

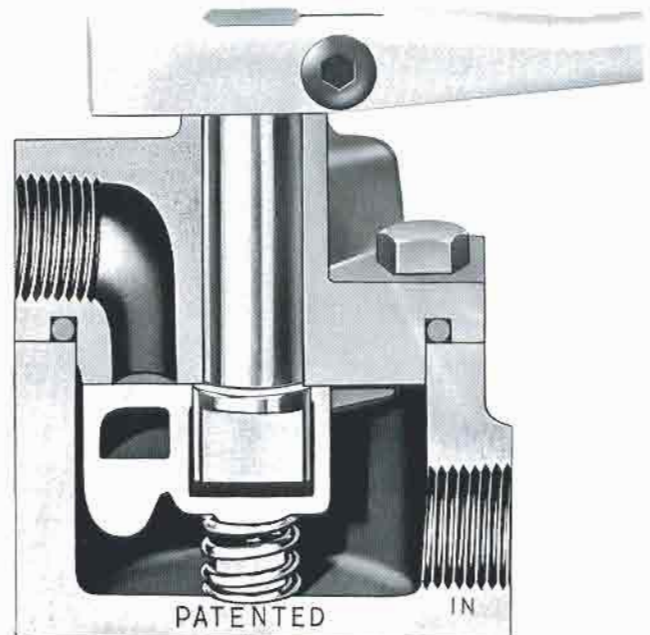
F (Foot-Operated) R, F or RN (Model) A, O, or W (Service) — (use dash number) (Pipe Size)

V-VALVES:

V (V-Valve) — (use dash number) (Pipe Size) — A or AR (Master Valve or Air Return Master Valve)

R = Master Valve
AR = Air Return Master Valve

DISC VALVE FEATURES AND BENEFITS



NOPAK Disc-Type Valves have a well-earned reputation of being "practically indestructible." They have established an enviable record for efficient, trouble-free operation, freedom from leakage and pressure loss, and long-service-life — under extremely rugged operating conditions. These benefits are a direct result of the simplicity and ruggedness of the basic NOPAK Rotating Disc design. The flat, lapped disc, rotating at right angles to the stream flow, results in the following advantages:

Precision Control — Positive precision control through the complete cycle of valve operation, from slow gradual throttling action to instant full opening, without damaging shock, impact, or pressure cutting.

Sealing Surfaces Improve with Use — The precision-lapped sealing surfaces of disc and seat actually improve with use because the "lapping-in" process continues while the valve is operated. The flat disc and seat have no interlocking contours, therefore they cannot stick and always remain free for easy operation.

Protected Against Grit, Abrasion or Wire Drawing — The valve seat is always covered by the rotating disc so that both sealing surfaces are always shielded from direct pressure flow and possible abrasion caused by grit, scale or other foreign matter usually present in air or hydraulic lines. An internal channel in the disc carries off such abrasive materials without damage to the sealing surfaces.

Pressure Sealing — Line pressure is exerted against the valve disc at all times to keep the lapped surfaces of disc and seat positively sealed.

Packless Construction — NOPAK Valves depend entirely upon metal-to-metal, precision lapped sealing surfaces for their leak-proof construction. When used for hydraulic service (oil or water), additional protection against leakage past the valve stem has been provided by the use of an "O" ring in the valve body and around the stem, just below the operating handle.

OPTIONS					
DISC VALVES	DESCRIPTION	V VALVES	DISC VALVES	DESCRIPTION	V VALVES
EN	EXHAUST IN NEUTRAL		ENR	EXHAUST IN NEUTRAL & SPRING RETURN NEUTRAL	X
SRN	SPRING RETURN TO NEUTRAL		B	BLEEDER/BLEED OFF	B
ST	SHORT THROW			PRESSURE APPLIED	P
STR	SHORT THROW & SPRING RETURN		OC	OPEN CENTER	
STNS	SHORT THROW NO SPRING		CC	CLOSED CENTER	C

“FOUNDRY TOUGH” HAND VALVES—DISC TYPE

FOUR-WAY, 3-POSITION, AIR AND HYDRAULIC VALVES

The standard four-way valve has two cycles of operation and is generally used to actuate double acting cylinders. The construction and materials are identical to the three-way valve. Both three and four-way hand operated air valves, 3/4" pipe size and larger, are fitted with grease cups to lubricate lapped surfaces.

FOUR-WAY, 2-POSITION, SHORT THROW

This valve has no neutral & is available with a total lever throw of 45° in the 1/4", 3/8", 1/2", 3/4" and 1" pipe sizes. It is available with a total lever throw of 60° in the 1-1/4", 1-1/2" and 2" pipe sizes. It is dimensionally identical with the standard four-way valve and identified by "2/P" stamped on the spindle end.



FOUR-WAY SPRING RETURN TO NEUTRAL VALVE

Having the same basic construction and cycles of operation as the four-way valves above, this valve is available in 1/4" through 1" pipe size for air, water and oil service at line pressures up to 100 psi. Moving the lever to either extreme position pressurizes either cylinder port. A torsion spring located under the operating lever returns the lever to the neutral position when released. It is also available in the 2-position short throw valve.



THREE-WAY AIR AND HYDRAULIC VALVES

The three-way valve has two lever positions — pressure and exhaust, and is used to actuate single acting cylinders.

The body and cap are made of semi-steel, the disc of hard bronze. This construction provides the best friction coefficient for air service and insures easy operating and long wearing qualities

These same materials are used for oil hydraulic service along with an "O" ring in the body for extra precaution against stem leakage. For Water Service the valve body is constructed of cast bronze, uses a bronze spindle, a Nye-Koted cap, and the stem is equipped with an "O" ring.

A three-way, 3 position valve with a hold position can be had by using a standard four-way valve and plugging one cylinder port.

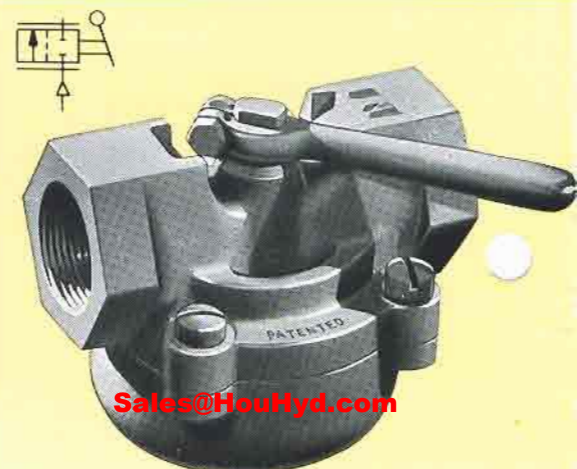


IN-LINE SHUT-OFF VALVES (TWO-WAY)

The In-Line or Shut-Off Type is used in place of a Gate or Globe Valve where a quick acting lever operated valve is wanted. The Shut-Off Valve incorporates a bronze body and disc. The respective bronzes are of different specifications that afford the proper friction coefficient to insure easy operation and long wearing qualities.

A quarter turn of the lever opens or closes the valve with quick or throttling action as desired.

The disc and seat are always protected from direct stream-flow, therefore eliminating abrasion and preventing any injury from dirt or grit. Furthermore, there are no tapers or interlocking contours to stick or wear out. NOPAK shut-off valves can also be furnished with Bleeder arrangement at slightly higher cost; in certain cases, the bleeders relieve the pressure in the line between valve and tool where both are closed.

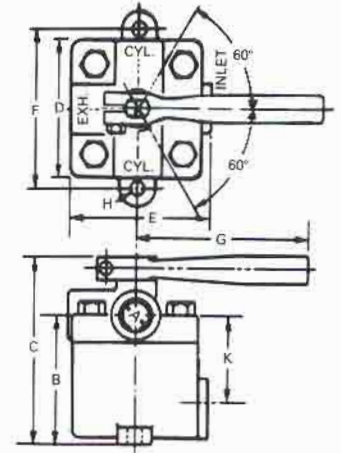


DATA AND DIMENSIONS

FOUR-WAY VALVE, 250 PSI MAX. PRESSURE

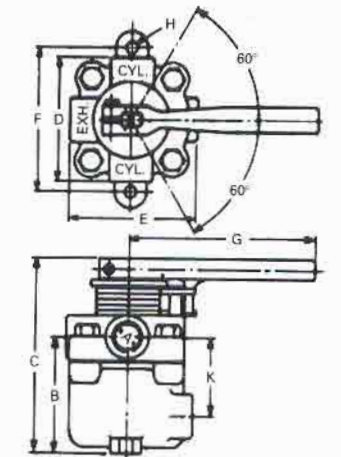
MODEL NUMBER	Pipe Size A	B	C	D	E	F	G	H	K	Weight in Pounds
H4()-2 ()	1/4"	1 7/8"	3"	2 1/2"	2 1/2"	2 3/4"	4 1/4"	5/16"	1-3/16"	2 1/4
H4()-3 ()	3/8"	2 1/4"	3 7/8"	2 7/8"	3-1/16"	3 3/4"	6 1/8"	7/16"	1-9/16"	4 3/4
H4()-4 ()	1/2"	2 1/4"	3 7/8"	2 7/8"	3-1/16"	3 3/4"	6 1/8"	7/16"	1-9/16"	4 3/4
H4()-6 ()	3/4"	2 3/4"	4 7/8"	3 7/8"	4"	4 5/8"	8"	9/16"	1-15/16"	6
H4()-8 ()	1"	3 1/2"	5 5/8"	4 1/4"	4 1/4"	5 3/8"	9"	9/16"	2 1/2"	16 7/8
H4()-10 ()	1 1/4"	5 1/4"	7-13/16"	6"	6-7/16"	6 3/4"	12"	9/16"	3 3/4"	29
H4()-12 ()	1 1/2"	5 1/4"	7-13/16"	6"	6-7/16"	6 3/4"	12"	9/16"	3 3/4"	29
H4()-16 ()	2"	6-7/16"	9 3/4"	7 1/4"	7-7/16"	8 3/8"	15"	13/16"	4 1/2"	49 1/4

*1 1/4" and 1 1/2" valves have 3 mounting lugs on cap.



FOUR-WAY SPRING RETURN TO NEUTRAL VALVE — 100 PSI MAX. PRESSURE

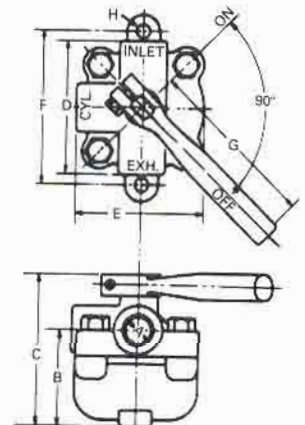
MODEL NUMBER	Pipe Size A	B	C	D	E	F	G	H	K	Weight in Pounds
H4()-2 ()	1/4"	1 7/8"	3 5/8"	2 1/2"	2 1/2"	2 3/4"	5 1/2"	5/16"	1-3/16"	2 3/4
H4()-3 ()	3/8"	2 1/4"	4 5/8"	3 1/8"	3 1/4"	3 3/4"	8"	7/16"	1 3/4"	6 5/8
H4()-4 ()	1/2"	2 1/4"	4 5/8"	3 1/8"	3 1/4"	3 3/4"	8"	7/16"	1 3/4"	6 5/8
H4()-6 ()	3/4"	2 3/4"	4 7/8"	3 7/8"	4"	4 5/8"	8"	9/16"	1-13/16"	7
H4()-8 ()	1"	3 1/2"	6 3/8"	4 1/4"	4-9/16"	5 3/8"	9"	9/16"	2 1/2"	16



THREE-WAY VALVE, 250 PSI MAX. PRESSURE

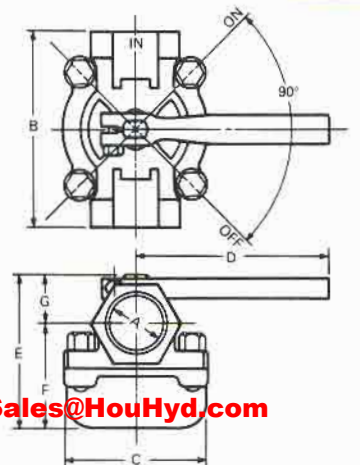
MODEL NUMBER	Pipe Size A	B	C	D	E	F	G	H	Weight in Pounds
H3()-2 ()	1/4"	1 7/8"	3"	2 1/2"	2-5/16"	2 3/4"	4 1/4"	5/16"	2
*H3()-3 ()	3/8"	2-11/16"	4-3/16"	3 1/8"	3-1/16"	3 3/4"	6"	7/16"	5 1/2
*H3()-4 ()	1/2"	2-11/16"	4-3/16"	3 1/8"	3-1/16"	3 3/4"	6"	7/16"	5 1/2
*H3()-6 ()	3/4"	2 3/4"	4 7/8"	3 7/8"	4"	4 5/8"	8"	9/16"	6
*H3()-8 ()	1"	3 1/2"	5 5/8"	4 1/4"	4 1/4"	5 3/8"	9"	9/16"	16 7/8
*H3()-10 ()	1 1/4"	5 1/4"	7-13/16"	6"	6-7/16"	6 3/4"	12"	9/16"	29
*H3()-12 ()	1 1/2"	5 1/4"	7-13/16"	6"	6-7/16"	6 3/4"	12"	9/16"	29
*H3()-16 ()	2"	6-7/16"	9 3/4"	7 1/4"	7-7/16"	8 3/8"	15"	13/16"	49 1/4

*This valve is the 4-way of the same pipe size described in the table at the top of this page, with one cyl. port plugged.



STRAIGHTWAY, SHUT-OFF VALVE, 250 PSI MAX. PRESSURE

MODEL NUMBER	Pipe Size A	B	C	D	E	F	G	Weight in Pounds
H2()-2 ()	1/4"	2 3/4"	1 3/4"	3"	2 1/4"	1 1/2"	19/32"	1 1/4
H2()-3 ()	3/8"	2 3/4"	1 3/4"	3"	2 1/4"	1 1/2"	19/32"	1 1/4
H2()-4 ()	1/2"	3 1/4"	2-1/16"	4 1/4"	2 5/8"	1 7/8"	3/4"	2 1/2
H2()-6 ()	3/4"	3 3/4"	2 1/2"	4 1/4"	3-5/16"	2-3/16"	15/16"	3 1/4
H2()-8 ()	1"	4"	2 3/4"	4"	3 3/8"	2-5/16"	1-1/16"	5
H2()-10 ()	1 1/4"	5 1/8"	3 7/8"	5"	3-13/16"	2-11/16"	1 1/8"	8 1/2
H2()-12 ()	1 1/2"	5 7/8"	4 3/8"	6"	4-9/16"	3 1/8"	1-7/16"	10 1/2
H2()-16 ()	2"	7 1/4"	5 1/2"	7 1/2"	8 1/2"	3 1/2"	1 5/8"	19



“FOUNDRY TOUGH”

HAND VALVES—DISC TYPE

NOPAK PANEL MOUNTED VALVE

The Nopak Panel Mounted Valve, Model 250 PM, incorporates the same basic patented construction and sealing features of the reliable and rugged Nopak Hand and Foot Operated Valves, so well known through industry for many years. The rotating lapped disc feature gives you precision control, sealing surfaces that improve with use, protection against grit, abrasion and wire drawing, pressure sealing, and packless construction.

The Nopak Panel Mounted Valve is suitable for air and oil pressures to 250 psi, and is presently offered in the 1/4" pipe size only. All-position detents are standard. An exhaust in neutral cycle is also available. The valve can also be furnished as two position short throw, which also includes detents as standard.

Panel mounting of the valve itself is easily accomplished by inserting the hand lever and pilot hub section through the panel and securing the valve by three cap screws. An optional detachable foot mounting plate is also available where panel mounting is not required or desired, NOPAK P/N 1097 NP.

Effective January, 1990, NOPAK Panel Mounted Valves are available with the *Hand Lever* field-changeable to any of *four positions* (in 90° increments), at no extra charge. However, if this feature is desired, please specify on order: WITH NEW STYLE BODY.

TYPICAL INSTALLATION
PLATE NOT INCLUDED WITH VALVE

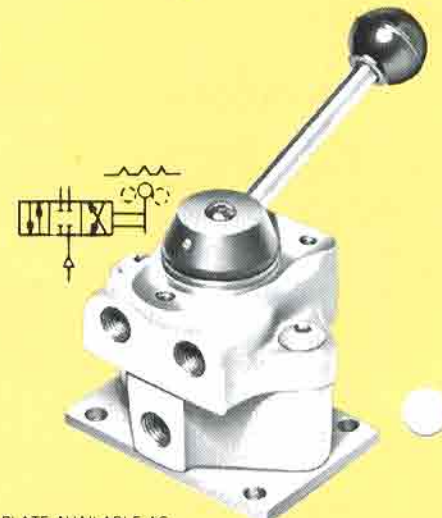
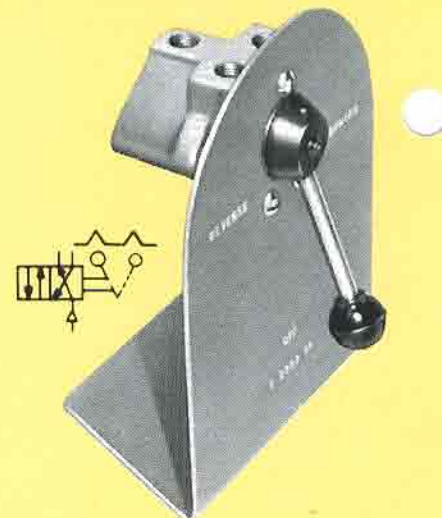


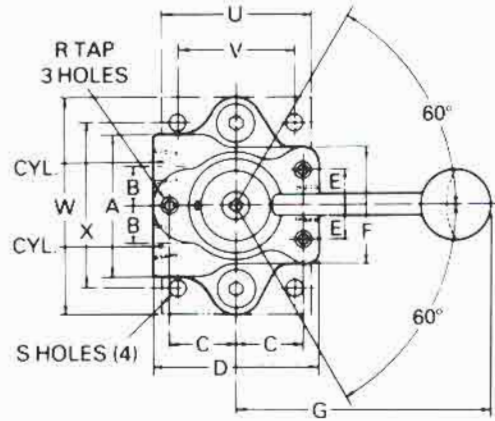
PLATE AVAILABLE AS
OPTION P/N 1097 NP

NOPAK DUAL FOUR-WAY HAND VALVE

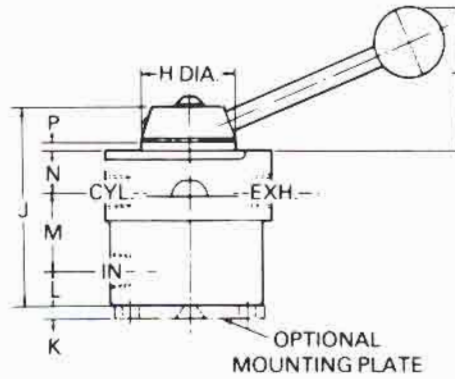
This valve is the equivalent of two four-way valves in one; it makes it possible to control the action of two double acting cylinders with a single operating lever. Available in 1/2" size only.



DATA AND DIMENSIONS



Model Number	PIPE SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X
250 PM - ()	1/4	2 1/8	9/16	1	2 1/2	1/2	1 3/4	3/8	1 3/8	2-15/16	1/4	1/2	1-3/16	5/8	1/8	1/4-20	9/32	2 1/2	2 1/4	1 3/4	3 1/4	2 1/2

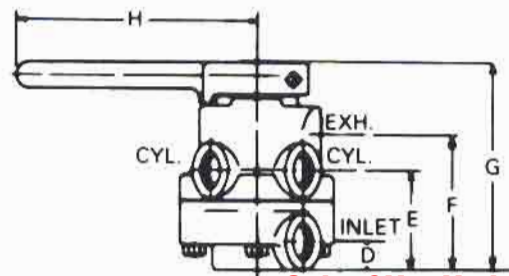
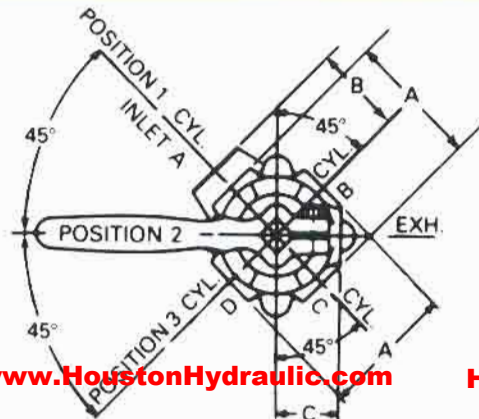


DUAL FOUR-WAY VALVE 250 PSI MAX. PRESSURE

Model Number	Pipe Size	A	B	C	D	E	F	G	H	Weight in Pounds
HD4 ()-4 ()	1/2"	4"	2 1/4"	2"	7/8"	2-9/16"	3-7/16"	5 3/8"	6"	8

VALVE FUNCTION

LEVER POSITION	PRESSURE PORTS	EXHAUST PORTS
1	A-C	B-D
2	A-D	B-C
3	B-D	A-C



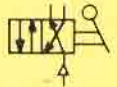
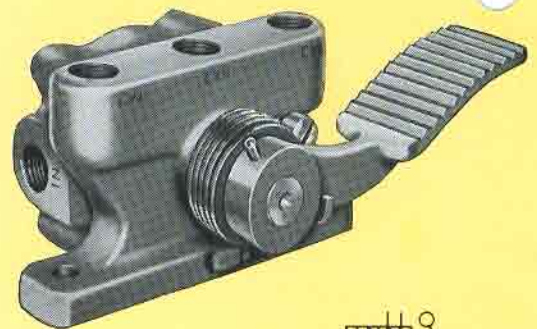
FOOT VALVES — DISC TYPE

NOPAK Foot-Operated Valves incorporate all the features found in the NOPAK Hand-Operated models, including the lapped disc type design with the packless spindle construction.

In addition to the standard valves for air service, NOPAK Foot-Operated Valves are available for oil or water service at slight additional cost.

MODEL R

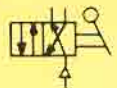
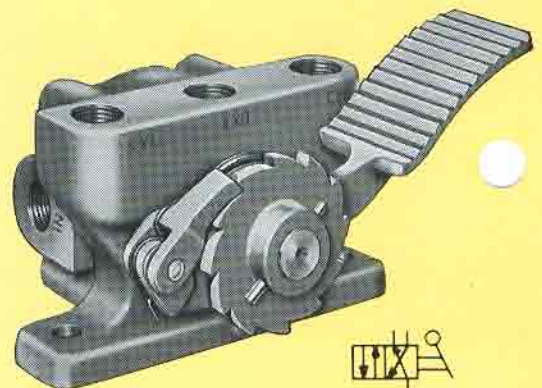
MODEL R VALVE has an oscillating disc with no neutral position. The valve spindle is pinned to the foot pedal. When pedal is up, the line pressure is always on Port No. 1 with Port No. 2 open to exhaust. When pedal is depressed 30°, cycle reverses, that is, line pressure is on Port No. 2 and Port No. 1 is open to exhaust. When pedal is released, the torque spring returns pedal to original position with pressure again on Port No. 1. This valve can be used as a three-way valve, for a single-acting cylinder, by inserting a pipe plug in one cylinder port. It can also be used as a spring-return shut-off valve, as follows: (a) "Normally closed" by plugging Port No. 1 and exhaust. (b) "Normally open" by plugging Port No. 2 and exhaust. (c) Bleeder arrangement for (a) or (b) is obtained by omitting plug in exhaust port.



MODEL F

MODEL F valve utilizes a pawl driven ratchet for rotation of the disc which has no neutral position.

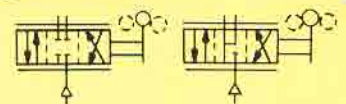
The valve spindle is pinned to the ratchet. Let us assume that line pressure is on Port No. 1. Then, when foot pedal is depressed, the pawl, attached thereto, engages the ratchet and rotates it 30°, thereby reversing the valve cycle. When pedal is released, the torque spring returns pedal, but position of ratchet does not change. A second depression of pedal rotates ratchet a further 30°, again putting line pressure on Port No. 1. This model is particularly suited to applications in which the operator is required to leave the valve after depressing the foot pedal. This valve can also be used as a three-way or shut-off valve, as described under Model R.



MODEL RN

MODEL RN VALVE Double-Pedal, Foot-Operated, has a "neutral" or "Shut-off" position in which both cylinder ports and exhaust ports are closed to pressure. It can be employed as an inching valve, its neutral holding position permitting an air cylinder to be positioned and held at any point along the full length of its stroke. This valve can also be furnished with cylinder ports open to exhaust in neutral position.

MODEL RN can also be furnished without spring-return to neutral, for either or both pedals. When spring-return is eliminated, the respective foot pedal rests in the "ON" position, holding the cylinder under pressure until operator steps on opposite pedal.

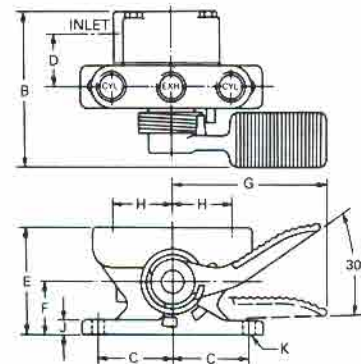


DATA AND DIMENSIONS

MODEL R VALVE 125* PSI MAX. PRESSURE

MODEL NUMBER	Pipe Size	B	C	D	E	F	G	H	J	K	Weight in Pounds
FR()-2	1/4"	5-1/16"	2-9/16"	1-11/16"	3-9/16"	1-13/16"	6 1/2"	2"	1/2"	7/16"	10
FR()-3	3/8"	5-1/16"	2-9/16"	1-11/16"	3-9/16"	1-13/16"	6 1/2"	2"	1/2"	7/16"	10
FR()-4	1/2"	5-1/16"	2-9/16"	1-11/16"	3-9/16"	1-13/16"	6 1/2"	2"	1/2"	7/16"	10
FR()-6	3/4"	5 7/8"	3 1/4"	1-15/16"	4-5/16"	2-5/16"	6 1/2"	2 1/4"	5/8"	9/16"	14 5/8
FR()-8	1"	5 7/8"	3 1/4"	1-15/16"	4-5/16"	2-5/16"	6 1/2"	2 1/4"	5/8"	9/16"	14 5/8

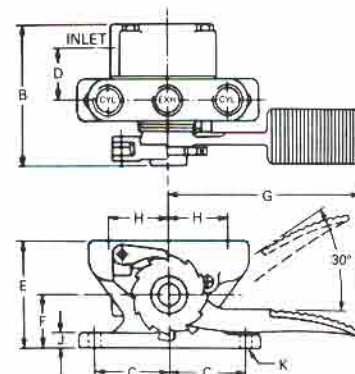
*Model R maximum pressure is limited by the returning power of the foot lever spring.
Available with foot pedal guard. Consult factory for additional information.



MODEL F VALVE 250 PSI MAX. PRESSURE

MODEL NUMBER	Pipe Size	B	C	D	E	F	G	H	J	K	Weight in Pounds
FF()-2	1/4"	4-9/16"	2-9/16"	1-11/16"	3-9/16"	1-13/16"	6 7/8"	2"	1/2"	7/16"	10
FF()-3	3/8"	4-9/16"	2-9/16"	1-11/16"	3-9/16"	1-13/16"	6 7/8"	2"	1/2"	7/16"	10
FF()-4	1/2"	4-9/16"	2-9/16"	1-11/16"	3-9/16"	1-13/16"	6 7/8"	2"	1/2"	7/16"	10
FF()-6	3/4"	5 7/8"	3 1/4"	1-15/16"	4-5/16"	2-5/16"	6 7/8"	2 1/4"	5/8"	9/16"	14 5/8
FF()-8	1"	5 7/8"	3 1/4"	1-15/16"	4-5/16"	2-5/16"	6 7/8"	2 1/4"	5/8"	9/16"	14 5/8

Available with foot pedal guard. Consult factory for additional information.



MODEL RN VALVE 125* PSI MAX. PRESSURE

MODEL NUMBER	Pipe Size	B	C	D	E	F	G	H	J	K	Weight in Pounds
FRN()-2 ()	1/4"	6-9/16"	2-9/16"	1-11/16"	3-9/16"	1-13/16"	5 5/8"	2"	1/2"	7/16"	11 3/4
FRN()-3 ()	3/8"	6-9/16"	2-9/16"	1-11/16"	3-9/16"	1-13/16"	5 5/8"	2"	1/2"	7/16"	11 3/4
FRN()-4 ()	1/2"	6-9/16"	2-9/16"	1-11/16"	3-9/16"	1-13/16"	5 5/8"	2"	1/2"	7/16"	11 3/4
FRN()-6 ()	3/4"	7 1/4"	3 1/4"	1-15/16"	4-5/16"	2-5/16"	5 5/8"	2 1/4"	5/8"	9/16"	16 3/4
FRN()-8 ()	1"	7 1/4"	3 1/4"	1-15/16"	4-5/16"	2-5/16"	5 5/8"	2 1/4"	5/8"	9/16"	16 3/4

*This maximum pressure is limited by the returning power of the foot lever spring.

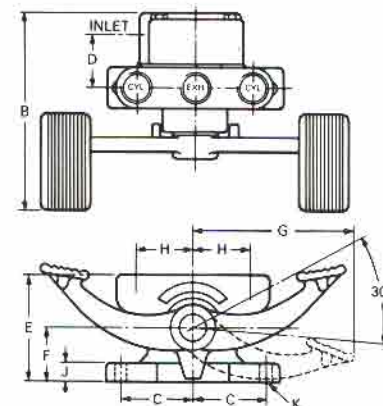
Suitable for 250 PSI if returned by foot, not spring.

Available with foot pedal guard. Consult factory.

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Houston Hydraulic
713-692-4421

Sales@HouHyd.com





SC-2,3,4



SC-6.8

NOPAK FLOTROL VALVES

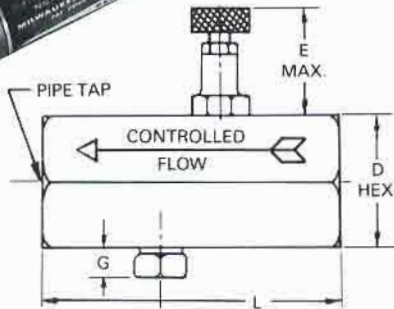
AVAILABLE IN 2 BODY STYLES, 5 PIPE SIZES

Features of the Nopak Flotrol include full pipe area through the valve and a compact design that holds space requirements to a minimum and easy installation in the line. Valves are constructed of rust and corrosion resistant materials throughout and are adaptable to most industrial fluids.

Flotrol valves are available in two body styles that offer a total of five different pipe sizes ranging from 1/4" to 1" NPT. They are designed to handle pressures up to 2000 PSI in the 1/4", 3/8" and 1/2" sizes and to 300 PSI in the 3/4" and 1" size.

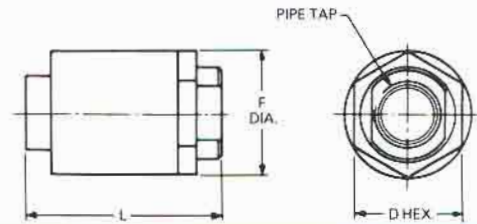
Bodies of the 1/4, 3/8 and 1/2" pipe sizes are machined from solid hexagon bronze bar stock. An aluminum body and bronze interior construction is used for the 3/4 and 1" model.

Control of the amount of flow going thru the 1/4, 3/8 and 1/2" model Flotrols is regulated by a combination stainless steel needle valve and floating piston and spring assemblies. Flow thru the 3/4"-1" valves is adjusted by rotating a center floating sleeve — the sleeve acting as a union in the piping. Only 180° rotation is required from closed to full open.

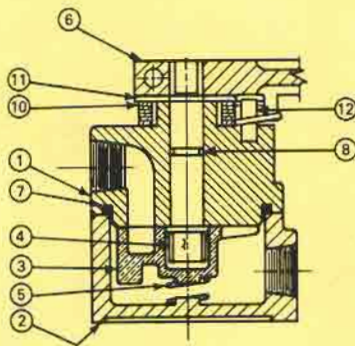


DIMENSIONS

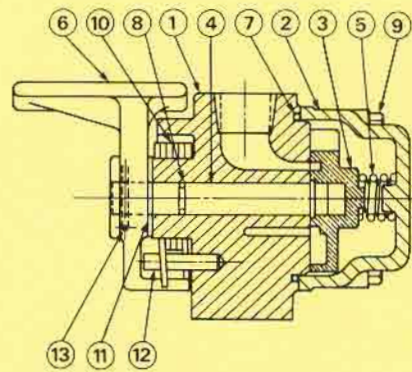
Model No.	Pipe Sizes	D	E	F	G	L
SC-2	1/4	3/8	1 1/4	—	7/32	2 3/4
SC-3	3/8	1-1/16	1 3/8	—	1/4	2 3/4
SC-4	1/2	1-5/16	1 3/8	—	9/32	3-3/16
SC-6	3/4	2-3/16	—	2 1/2	—	4
SC-8	1	2-3/16	—	2 1/2	—	4



PARTS LIST — NOPAK DISC VALVES



HAND VALVE



FOOT VALVE

HAND—FOOT— SPECIAL PURPOSE MODELS

- 1. VALVE BODY
 - 2. VALVE CAP
 - 3. VALVE DISC
 - 4. VALVE SPINDLE
 - 5. DISC SPRING
- (ONE PIECE ON SOME EARLIER MODELS)

- 6. LEVER (HAND, FOOT, OPERATING) COMPLETE
- 7. BODY O-RING (HYDRAULIC USE ONLY)
- 8. SPINDLE O-RING (HYDRAULIC USE ONLY) — 3 SIZE AND UP
- 9. CAP SCREWS (NOT SHOWN)

SPRING RETURN MODELS

- 10. RETURN SPRING
- 11. WASHER
- 12. SPRING STOP
- 13. PIN

REPLACEMENT PARTS — DISC VALVE

When ordering replacement parts, please give the following information: Name of Part, Part Number, Dash No. (Pipe Size of valve), Type of Valve (full description: Manifold Valve, Spring Return Valve), and

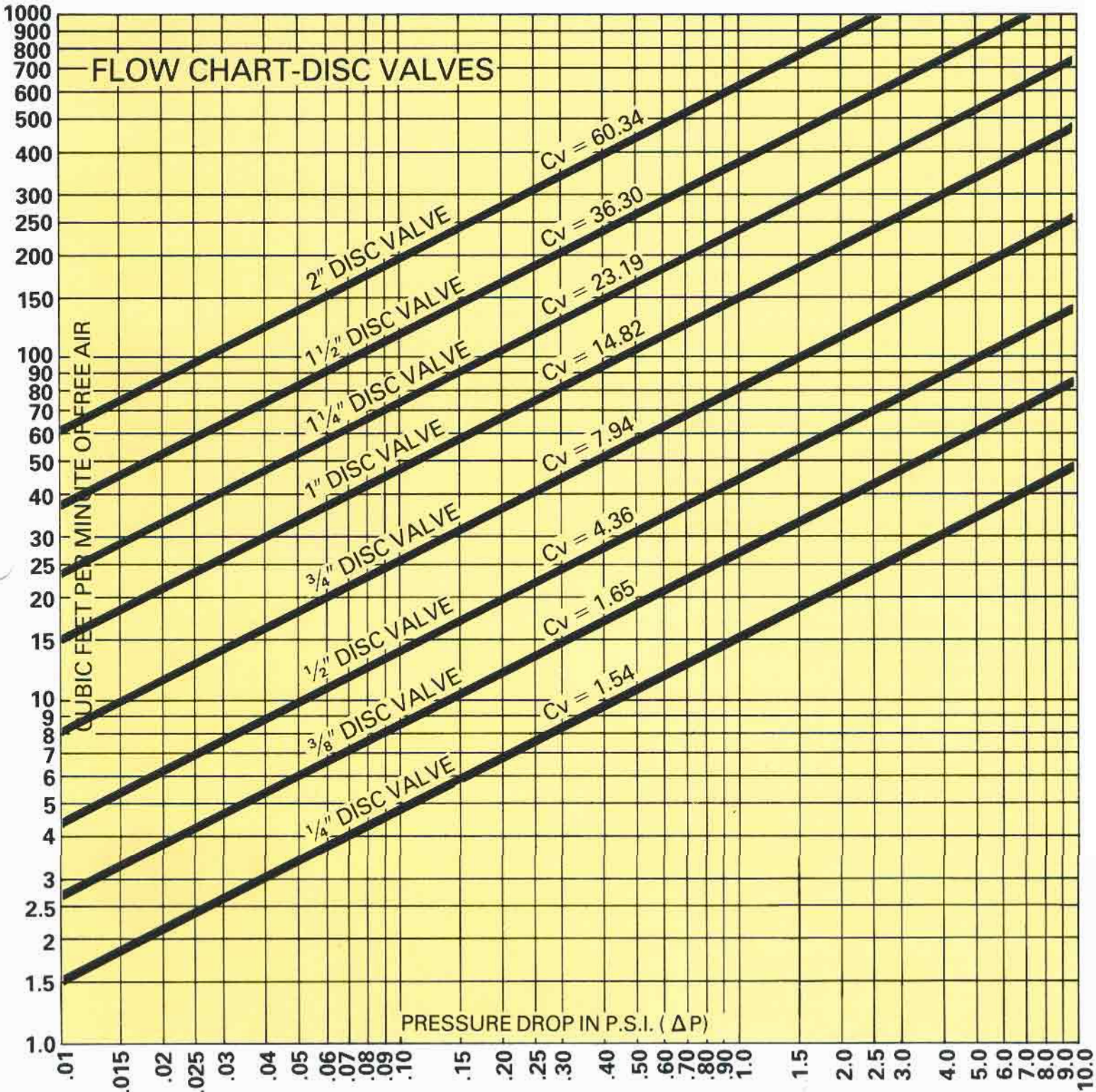
if possible, the Purchase Order Number on which the original valve was purchased. The valve body and valve disc should be replaced as a unit.

The disassembled components of a typical NOPAK Disc-Type Valve. Note especially the simple rugged design, minimum number of parts.



NOPAK

FLOW CHART — DISC VALVES



$P_s = 100 \text{ PSIG}$
 FOR OTHER VALUES OF P_s
 $\frac{100 (\Delta P_{100})}{P_s} = \Delta P_s$

V VALVES — SLIDE TYPE

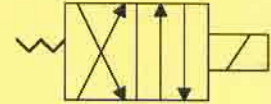
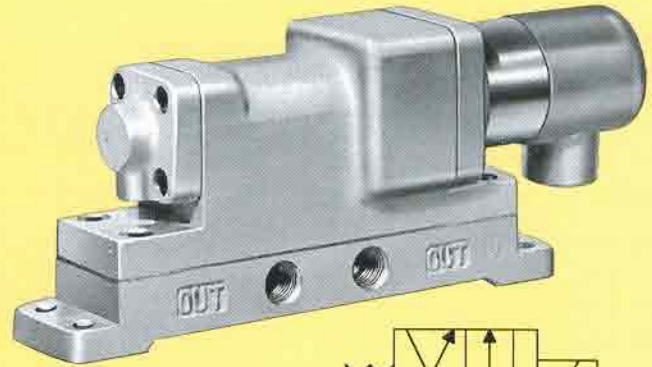
FOR DIRECT OR REMOTE CONTROL,
ELECTRIC OR AIR PILOT

MODEL "AR" Pipe Sizes $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ "

This 2-position, 3 or 4-way master valve incorporates a double-ended **unbalanced** piston, coupled to and reciprocating a composition-faced master slide valve which is sealed by line pressure. When the solenoid of a normally closed 3-way pilot valve (Fig. C, pg. 13) is energized, it applies (pilot) line pressure to outboard face of large piston head, which reverses position of the master valve. De-energizing the solenoid exhausts the pilot valve and the unbalanced piston returns the master valve to the normal position.

This "AR" valve can also be **all-air** piloted: either with a bleed end cover [B] (Fig. A, pg. 13), plus a normally closed 2-way pilot poppet valve; or with a pressure-applied end cover [P] (Fig. B, pg. 13), plus a normally closed 3-way hand valve.

To use the "AR" as a 3-way master valve, normally open or normally closed, simply plug the corresponding cylinder port.



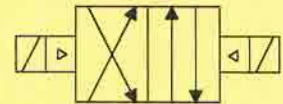
MODEL AR

MODEL "R" Pipe Sizes $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ "

This 2-position, 3 or 4-way master valve incorporates a double-ended **balanced** piston, coupled to and reciprocating a composition-faced master slide valve which is sealed by line pressure. Valve housing is constantly under line pressure, which is also applied to the outboard faces of the pistons through small orifices drilled through each piston. Momentary energization of either 2-way normally closed poppet valves (Fig. A, pg. 13), which are attached to the end covers, creates a momentary unbalance of the piston, shifting it (and the slide valve) towards the end cover being bled. This piston, because of its balanced design, remains in this position after poppet valve is closed and will reverse position only when popped valve in opposite end is actuated.

These "R" valves may also be cycled by two, 2-way normally closed solenoid valves (Fig. C, pg. 13) also requiring only momentary energization.

In some circuits it is more practical to apply pressure to each piston end rather than to bleed pressure. For this, a piston without the drilled orifices is used. Then two, 3 way valves (Fig. B, pg. 13), using external pilot pressure, are required.



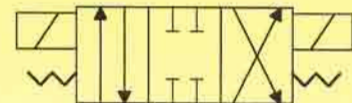
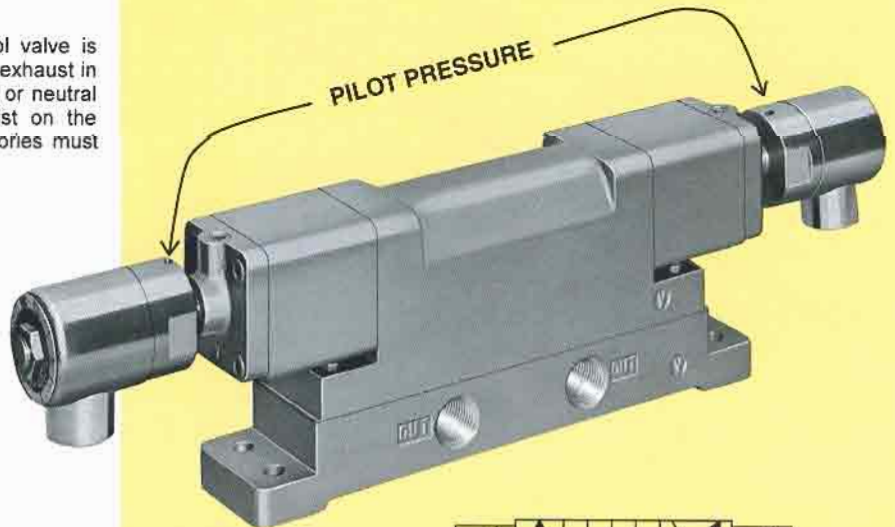
MODEL R
2-POSITION

MODEL "R3" Pipe Sizes $\frac{1}{4}$ ", $\frac{1}{2}$ "

The spring centered, 3-position, four-way directional control valve is available either closed center (C) with all ports blocked, or as exhaust in neutral (X), with cylinder ports open to exhaust. The center or neutral position allows a "hold" (C) or "drift" (X) condition to exist on the downstream side of the valve. The desired control accessories must also be specified when ordering a V valve.

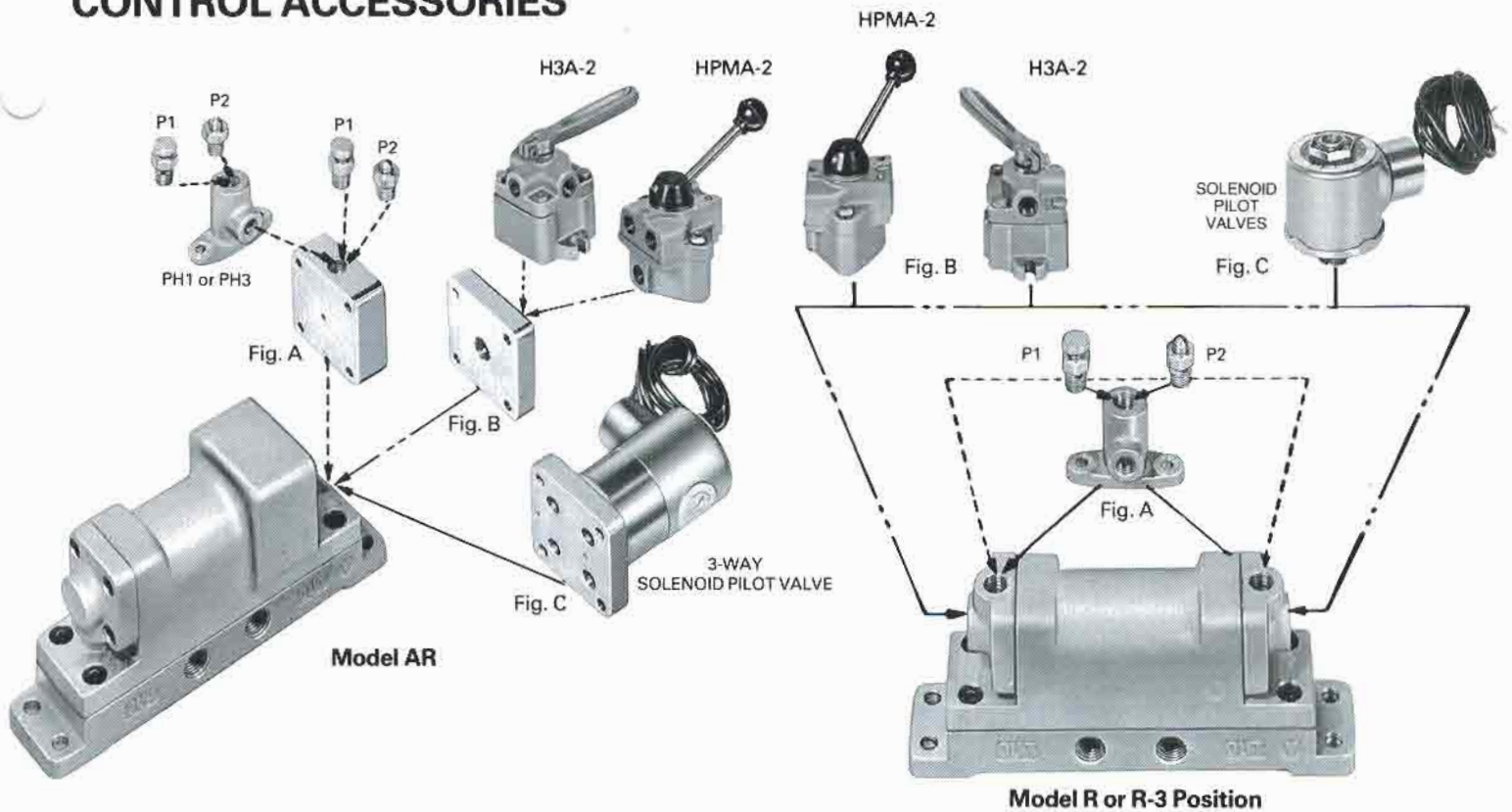
All models can operate as 3-way valves by plugging either one of the cylinder ports.

Note: Model R3 Valves need PILOT PRESSURE available at all times at both $\frac{1}{8}$ " NPT ports IMMEDIATELY ADJACENT TO THE SOLENOID COIL ITSELF. See picture at right. Installation personnel normally tee these pilot lines off the incoming air supply.



Model R3
3-POSITION

CONTROL ACCESSORIES

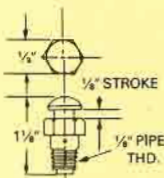


These V valves can operate with either bleed-off (B) or pressure applied (P) construction, with air or electric controls. The bleed-off type with air pilot controls (Fig's. A and B) allows internal pilot pressure to vent out of the valve permitting the piston to shift. The bleed-off type with electrical control (Fig. C.), available on the Model R and Model R-3 position valves only, requires a two-way normally closed solenoid pilot valve (2P) to operate the valve.

The pressure applied type with air pilot control (Fig. B)

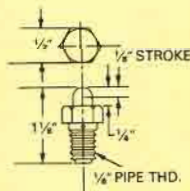
requires an external pilot air supply to operate the valve. The pressure applied type with electrical controls (Fig. C), requires a three-way normally closed solenoid valve (3P) for pilot control operation. The Model AR valve provides an internal pilot air supply but the Models R and R-3 position require an external pilot air supply.

Solenoids, AC or DC are available in standard voltages. Maximum capacity is 10 watts. Maximum current drain at 115V/60 Hz. A.C. is .27 amps. Holding current is .18 amps.



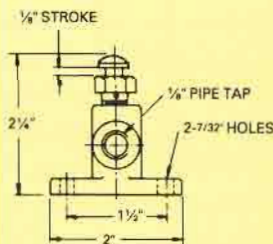
P1

Type P 1 — A hand control 2-way poppet. This is the basic bleeder type control for Master valves where solenoid controls are not used. Attachable directly to master valve or used for remote hook-up as Type PH 1.



P2

Type P 2 — a cam control 2-way poppet. Normally used in cam actuated installation where automatic or semi-automatic valve control is desirable. For remote control, see Type PH 3.

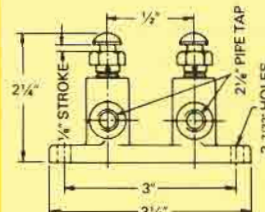


PH 1

Type PH 1 — a remote control hand poppet consisting of a P 1 threaded into a bronze base. It is used to operate master valves from a remote position. 1/8" FPT in base permits piping to master valves.

PH 3

Type PH 3 — same as PH 1 except with cam poppets.

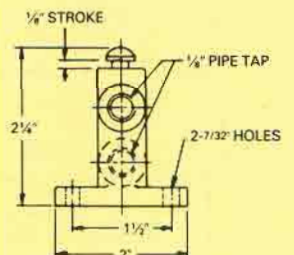


PH 2

Type PH 2 — a remote control, double hand poppet. For control of both ends of Type R master valve from one station.

PH 4

Type PH 4 — same as PH 2 except with cam poppets.



PHT 1

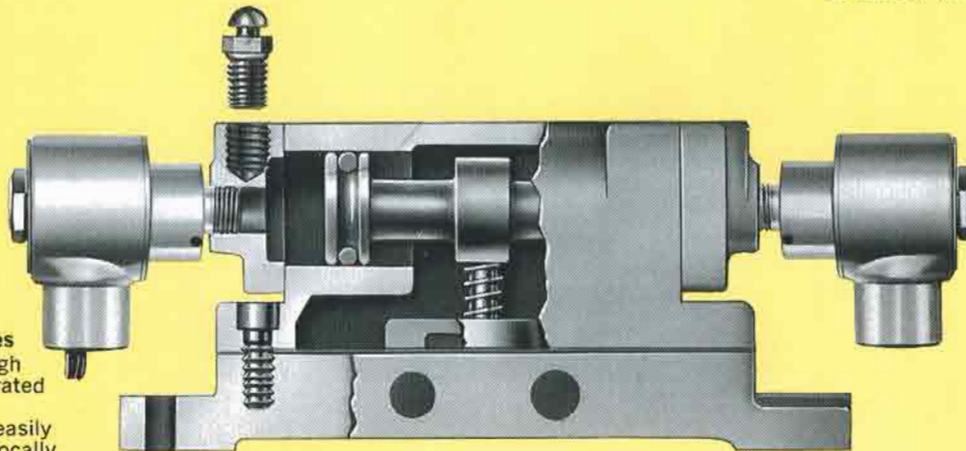
Type PHT 1 — a hand poppet with two 1/8" FPT ports. Lower port is inlet, upper port exhaust. Recommended where pilot exhaust air is to be piped away. Use two PHT 1 poppets for safe operation when worker must use both hands to operate master valve.

Simple Design — results in minimum number of working parts, low maintenance cost.

Wide Pressure Range — 25 to 115 psi, air.

Small, Compact, Lightweight — made of light corrosion resistant aluminum alloys. Smooth exterior easily kept clean.

Durable Construction — Precision machined and wear resistant components assure dependable operation, long service life.



Positive Action — Rapid piston response in any position. Completely air operated. No return spring needed.

Solenoid Pilot Valves
Continuous duty, high speed solenoid operated pilots of standard manufacture. Coils easily replaced; available locally.

Direct or Remote Control — Cam or hand controls are available for flexibility of installation.

Low Current Consumption — 10 watts maximum.

Maximum Capacity — Full pipe area through valve.

Bottom Porting — available for added flexibility.

PARTS NUMBERS — V VALVES

ITEM NO.	PART NAME	NO. REQ'D.			V-250- (AR-R-R3)	V-375- (AR-R)	V-500- (AR-R-R3)
		AR	R	R3			
1	BASE (X)	1	1	1	14601	14637	14610
1	BASE (C)	-	-		14883	14884	14882
2	GASKET	1	1	1	14603	14639	14612
3	END COVER	-	2	2	14609	14645	14618
3	END COVER	1	-	-	14828	14829	14830
4	SCREW	4	4	4	14608	14644	14617
5	O-RING	1	2	2	14775	14776	14777
6	SLIDE VALVE	1	1	1	14606	14642	14615
7	SPRING	1	1	1	14607	14643	14616
8	PISTON (B)	-	1	1	14604	14640	14613
8	PISTON (P)	-			14892	14894	14893
9	PISTON	1	-	-	14819	14820	14821
10	QUAD-RING	1	-	-	14837	14838	14839
11	HOUSING	-	1	1	14602	14638	14611
11	HOUSING	1	-	-	14825	14826	14827
12	END GASKET	1	-	-	14831	14841	14842
13	END GASKET	1	2	4	14781	14782	14783
14	SOLENOID ADAPTER (3-WAY)	1	-	-	14856	14858	14860
14	SOLENOID ADAPTER (3-WAY) MANUAL OVERRIDE		-	-	14926	14927	14928
14	END COVER (B)		-	-	14810	14812	14814
14	END COVER (P+)		-	-	14811	14813	14815
15	SCREW	8	8	-	14787	14788	14789
15	SCREW	-	-	8	14749	14749	14750
18	VALVE HEAD	-	-	2	14871	14885	14868
19	SPRING	-	-	2	SG-173	SG-157	SG-171
20	SPRING GUIDE	-	-	2	14872	14886	14869
21	SOLENOID ADAPTER (2-WAY) (B)	-	2	2	14900	14900	14900
21	SOLENOID ADAPTER (3-WAY) (P+)	-			14865	14865	14865

X = EXHAUST IN NEUTRAL C = CLOSED CENTER P = PRESSURE APPLIED B = BLEED OFF

+ REQUIRES EXTERNAL PILOT AIR
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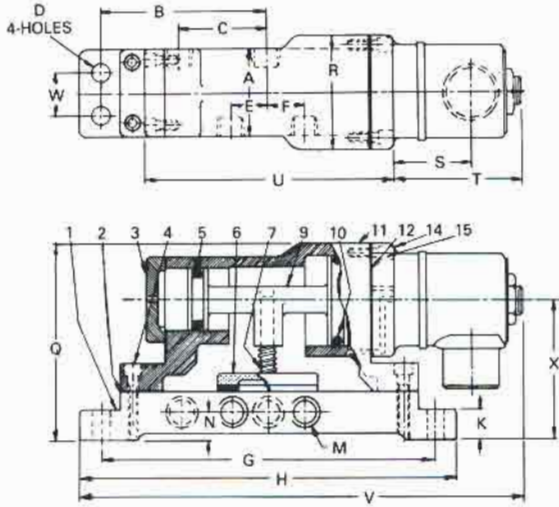
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713-692-4421

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DATA AND DIMENSIONS



MODEL AR



INSTALLATION DIMENSIONS

DIM.	V-250- (AR-R-R3)	V-375- (AR-R)	V-500- (AR-R-R3)
A	1.50	1.75	2.00
B	3.19	3.81	4.25
C	1.50	1.94	2.63
D	0.28	0.28	0.34
E	0.63	0.88	1.25
F	0.63	0.88	1.25
G	6.38	7.63	8.50
H	7.00	8.50	9.50
J	5.13	6.00	6.88
K	0.38	0.50	0.63
L	10.50	11.50	12.50
M	0.25 NPT	0.38 NPT	0.50 NPT
N	0.50	0.75	0.75
O	2.13	2.75	3.13
P	2.88	3.63	4.13
Q	3.38	4.13	4.94
R	2.00	2.25	2.75
S	1.25	1.25	1.25
T	2.13	2.13	2.13
U	4.25	5.25	6.00
V	8.00	9.19	10.13
W	0.88	1.00	1.00
X	2.38	3.00	3.63
Y	7.31	8.44	10.75
Z	12.56	13.69	16.00

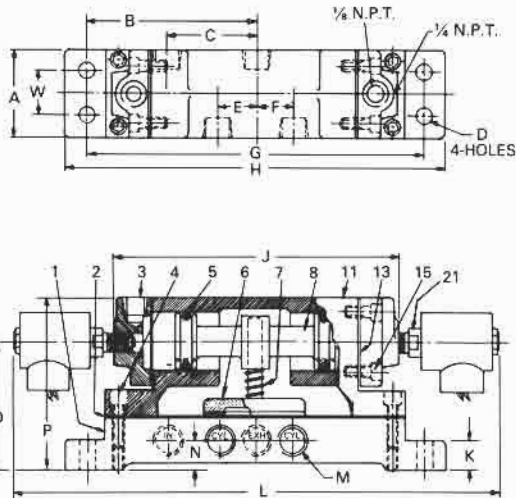
WEIGHT

	AR	R	R3
◆ Includes 3-Way Solenoid.	◆ 4.25 lbs.	◆ 5.25 lbs.	◆ 7.50 lbs.
▲ Master Unit Only - Less Solenoids.	▲ 2.00 lbs.	▲ 3.00 lbs.	▲ 4.25 lbs.
■ Also available with tapped bottom ports on a gasketed bottom drilled subplate.	2.50 lbs.	3.50 lbs.	5.00 lbs.

- ◆ Includes 3-Way Solenoid.
- ▲ Master Unit Only - Less Solenoids.
- Also available with tapped bottom ports on a gasketed bottom drilled subplate.



**MODEL R
2-POSITION**



**MODEL R
3-POSITION**

