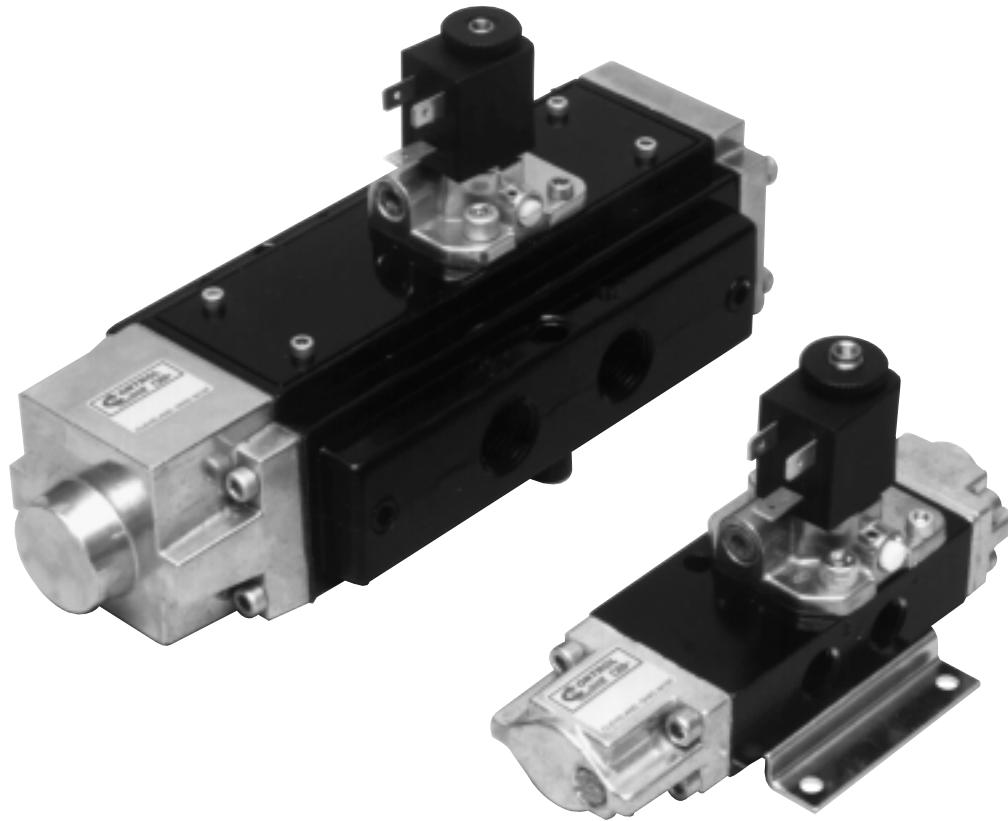


“G” & “J” SERIES HIGH FLOW SPOOL VALVES



- $\frac{1}{4}$ ", $\frac{3}{8}$ " or $\frac{1}{2}$ " NPT PORTS
- 3-WAY OR 4-WAY OPERATION
- PILOT AND SOLENOID OPERATED
- 2 AND 3 POSITION CONFIGURATIONS
- C_v RANGE 1.7 TO 6.6



CONTROL LINE EQUIPMENT, INC.

14750 Industrial Parkway • Cleveland, Ohio 44135
(216) 433-7766 • FAX: (216) 433-7664

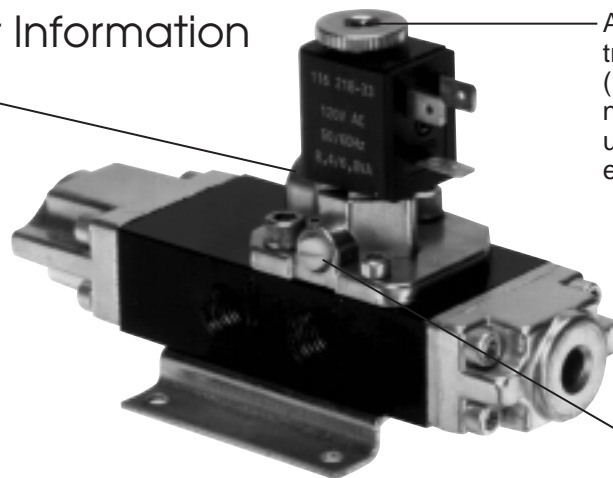
"G" Series 3-Way & 4-Way Valves

Application Information

- Available in pilot and solenoid models only.
- These 1/4" NPTF port valves have self-aligning stacked spacers and O-rings, which assure O-ring seal while allowing increased air flow.
- These valves are ideal for high cycle applications and for operation of larger bore cylinders and air tools.
- The hard anodized, ground and polished spool increases valve life by resisting wear and corrosion while assuring start-ups without hang-ups.
- The ground and polished spool permits operation with no additional lubrication for a cleaner environment and reduced product contamination.
- The low profile aluminum body is lightweight and corrosion resistant.
- These valves are rated at 200 PSIG to 28" of mercury and will operate in high or low pressure or vacuum applications.
- All 4-way valves may be ordered with bottom ports for subplate or manifold mounting.
- Repair kits available.
- Class F coil is rated for 100% duty cycle.
- Standard features include a manual locking override and a pilot override. Override must be depressed and turned to operate.

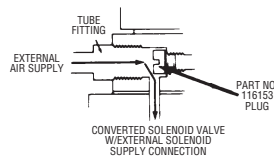
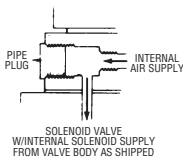
Feature / Benefit Information

Standard external solenoid supply enables valve operation for vacuum service for low pressure operations. Remove and discard the pipe plug. Assemble the 10-32 threaded plug. (part no. 116153 plug kit, order separately), with o-ring assembled into the threaded port to block the internal supply connection. Connect the external air supply to the 1/8 NPTF port.



Air pressure (50 PSI minimum) introduced at the solenoid exhaust port (10-32 thread) will override the solenoid. This is a convenient way to set-up and troubleshoot circuits without electrical power to the solenoids.

Manual locking override is standard. Simply depress and turn the override button to shift the valve.



Specifications

Lubrication: Valves are pre-lubed and can be operated without air line lubrication. If air cylinders or other air line devices require lubrication, ensure that lubrication oils are compatible with valve seals and of sufficient viscosity to assure adequate lubrication.

Flow: 61.6 SCFM

C_v Factor: 1.72

Weights: Pilot — .7 to 1.3 lbs.
Solenoid — 1.8 to 3.4 lbs.

Minimum Pilot Pressure:

Spring return — 40 PSI
Pilot return — 20 PSI

Standard Operating Pressure:

Pilot — Vacuum to 200 PSI
Solenoid — Vacuum to 150 PSI

Temperature Range: -10° to 180°F

Valve Model

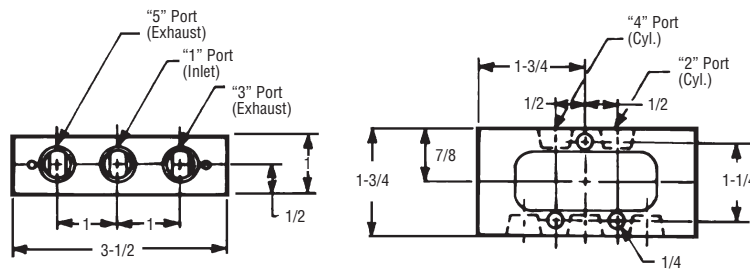
Connector Accessories: CONSULT FACTORY FOR ADDITIONAL CONNECTOR OPTIONS

CSN = Strain Relief

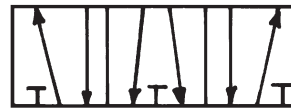
[illegible]

"G" Series 4-Way Dimensions

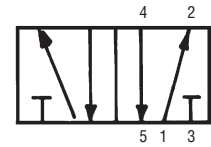
4-Way Basic Valve



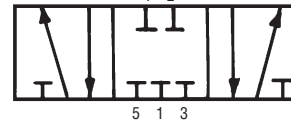
3 Position, Cylinder Ports Open, Inlet Blocked



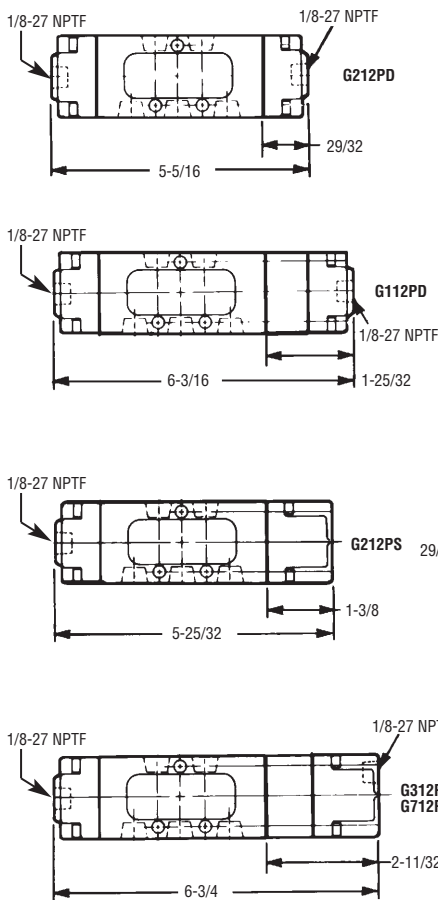
2 Position



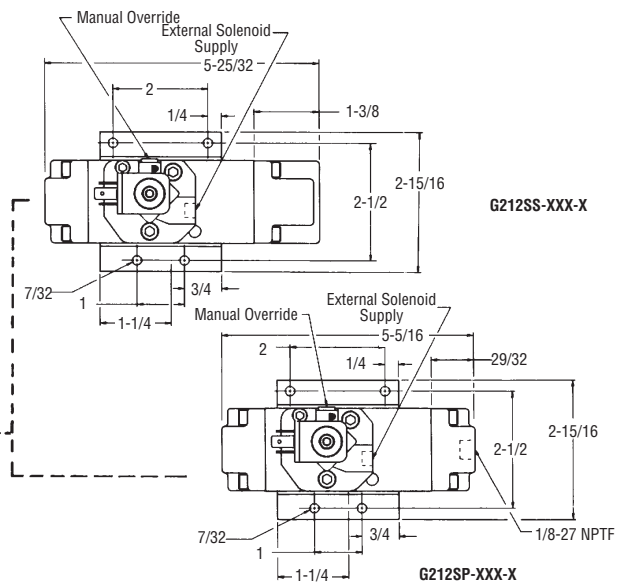
3 Position All Ports Blocked



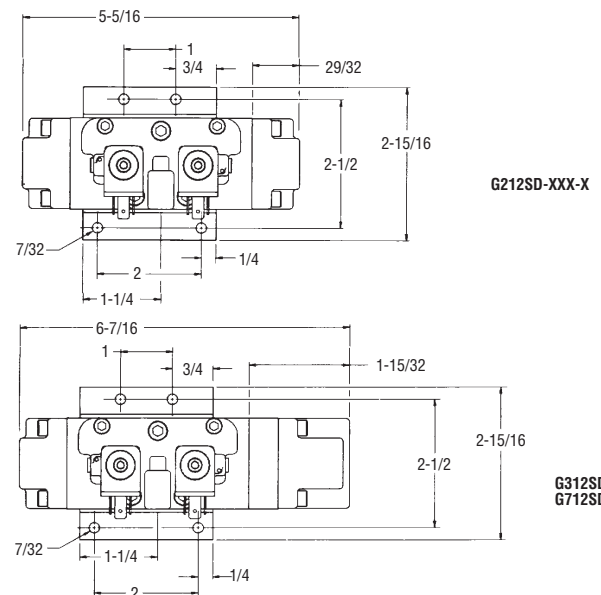
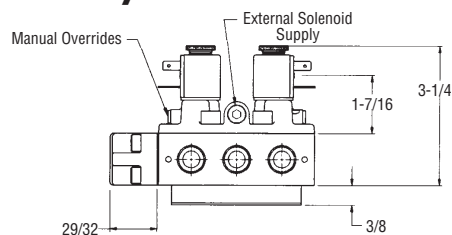
4-Way Pilot



4-Way Single Solenoid

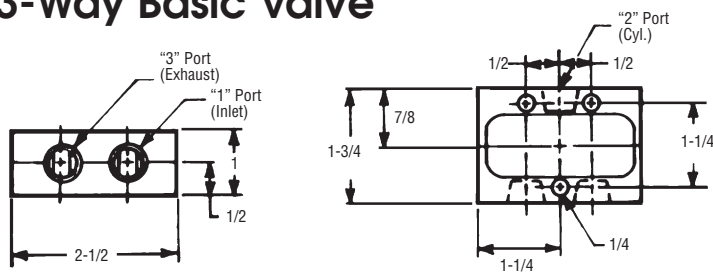


4-Way Double Solenoid



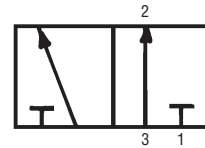
"G" Series 3-Way Dimensions

3-Way Basic Valve

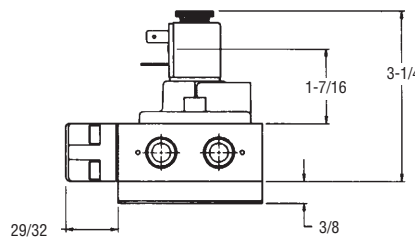
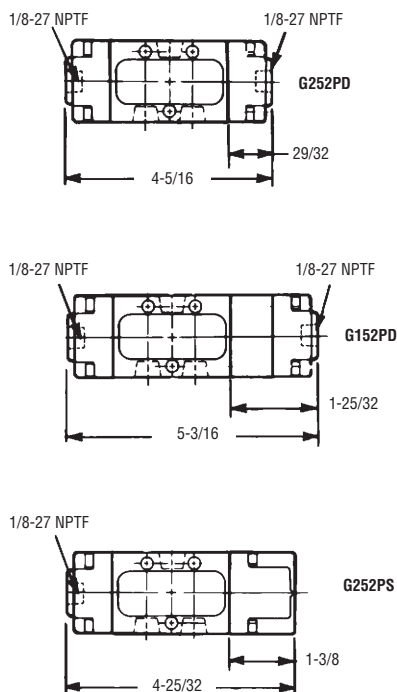


Valve Porting

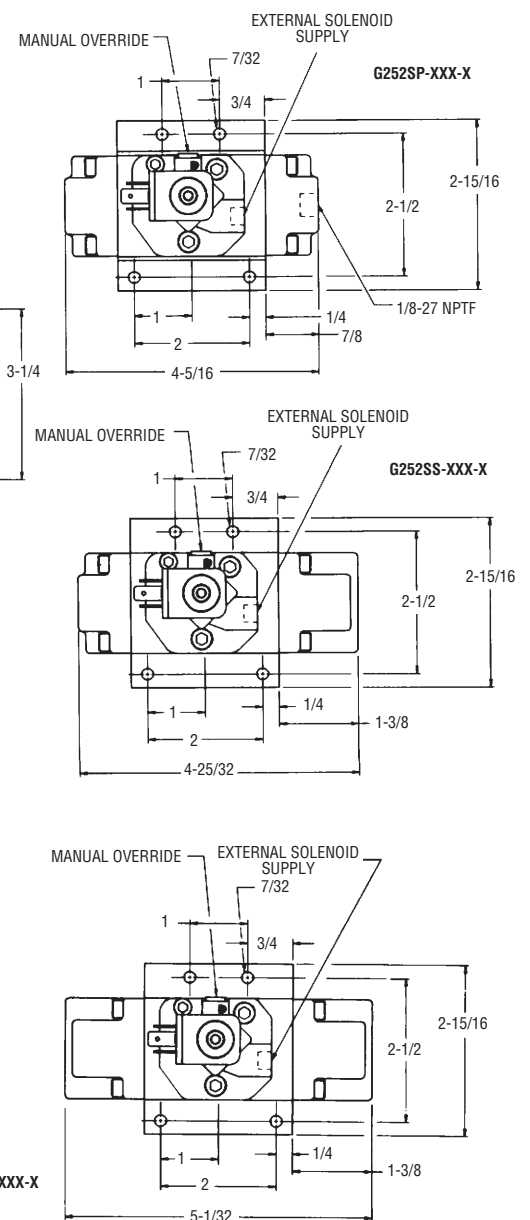
All Models.



3-Way Pilot



3-Way Single Solenoid



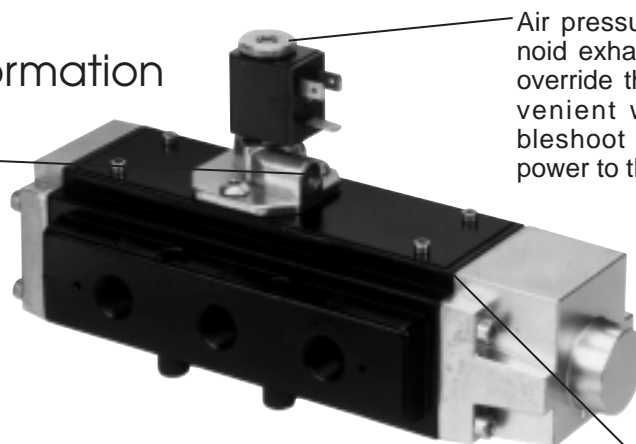
“J” Series 4-Way Valves

Application Information

- Available in pilot and solenoid models only.
- The “J” Series valve has a self-aligned stacked O-ring spacer configuration which allow it to have one of the highest air flow capacities on the market.
- A ground and polished spool permits operation with no additional lubrication for a cleaner environment and reduced product contamination.
- These valves are rated at 150 PSI to 28" of mercury for operation in high and low pressure as well as vacuum applications.
- The anodized polished spool increases valve life by resisting wear and corrosion while assuring start-ups without hang-ups.
- All solenoid actuated models are furnished with Class F coils and external solenoid supply option.
- Coils can easily be interchanged or replaced by removing nut, sliding existing coil off, a new coil on.
- Position the coil connectors where you need them. Simply loosen nut and rotate coil to desired position.
- Molded connectors protect the electrical connections against high humidity and wet environments to meet NEMA 4 classification.

Feature / Benefit Information

Standard external solenoid supply enables valve operation for vacuum service for low pressure operations. Remove and discard the pipe plug. Assemble the 10-32 threaded plug, (Part no. 116153 plug kit, order separately), with o-ring assembled into the threaded port to block the internal supply connection. Connect the external air supply to the 1/8 NPTF port.



Air pressure introduced at the solenoid exhaust port (10-32 thread) will override the solenoid. This is a convenient way to set-up and troubleshoot circuits without electrical power to the solenoids.

Low profile die cast aluminum body is light-weight and corrosion resistant.

General Specifications

Lubrication: Valves are pre-lubed and can be operated without air line lubrication. If air cylinders or other air line devices require lubrication, ensure that lubrication oils are compatible with valve seals and of sufficient viscosity to assure adequate lubrication.

- **Temperature Range:** -10° to 180°F

PORT SIZE	TYPE ACTUATOR	TYPE RETURN	PRESSURE RANGE PSI	MINIMUM PILOT PRES. PSI	FLOW* SCFM	C _v FACTOR
3/8"	All	Pilot or Solenoid	Vacuum To 150	10 15 for detent	200	5.6
3/8"	All	Spring**	Vacuum To 150	20**	200	5.6
1/2"	All	Pilot or Solenoid	Vacuum To 150	10 15 for detent	236	6.6
1/2"	All	Spring**	Vacuum To 150	20**	236	6.6

*Flow capacity approximate. [90 PSIG supply, 75 PSIG outlet.]

**Including 3-position spring centered. These valves require 50 minimum pressure.

"J" Series Valves

Ordering Information

Valve Model

Series		Body Style		Current Type*	
Letter		#	Style	Letter	Type
J		1	4-way side ported	A	AC
				D	DC
				N	No Coil

*Only required when ordering solenoid operated valves. Leave blank when ordering pilot valves.

J

2

1

3

S

S

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1

2

0

—

A

Valve Type		Port Size		Actuator/Return		Coil Voltage*	
#	Type	#	Size	Letter Type		#	Voltage
1	Two Position Detent	3	3/8 NPT	PD	Pilot/Pilot	005	5 Volt DC
2	Two Position	4	1/2 NPT	PS	Pilot/Spring	012	12 Volt (AC or DC)
3*	Three Position Spring Centered			SD	Solenoid/Solenoid	024	24 Volt (AC or DC)
7**	Three Position Spring Centered			SS	Solenoid/Spring	120	120 Volt (AC or DC)
				SP	Solenoid/Pilot	240	240 Volt AC
						380	380 Volt AC
						000	No Coil

*All ports blocked in neutral
**Inlet port blocked, cylinder ports open in neutral.

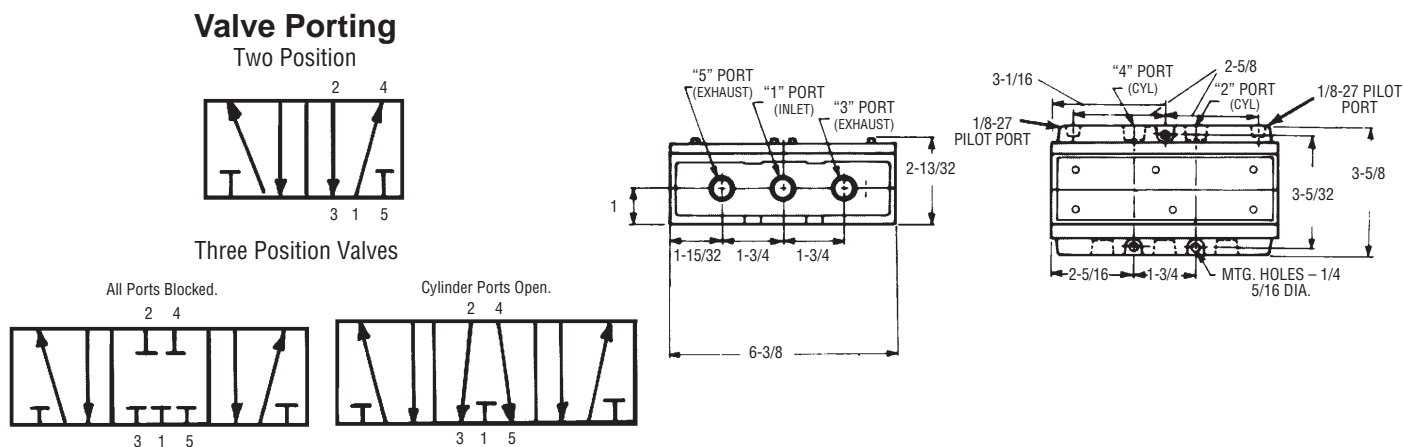
*Only required when ordering solenoid operated valves. Leave blank when ordering pilot valves.

Connector Accessories: CONSULT FACTORY FOR ADDITIONAL CONNECTOR OPTIONS

Connectors — without indicator lights or lead wire: **CDN** = 1/2" Conduit

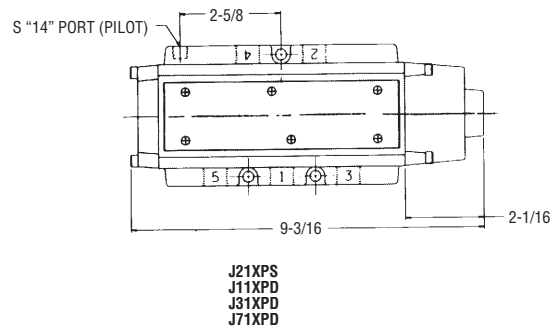
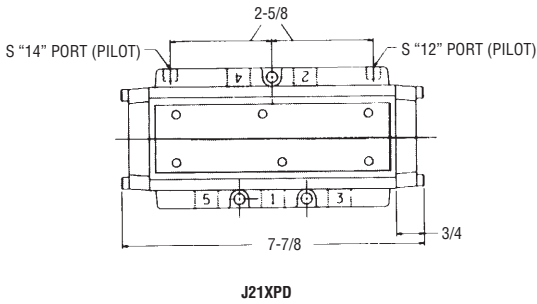
CSN = Strain Relief

4-Way Basic Valve Dimensional Data

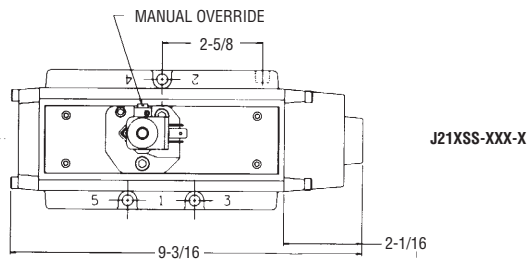
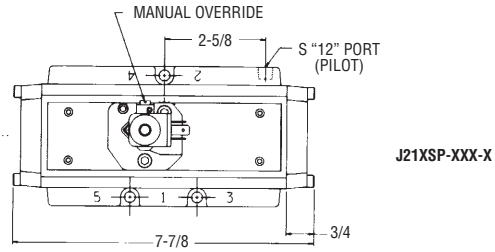
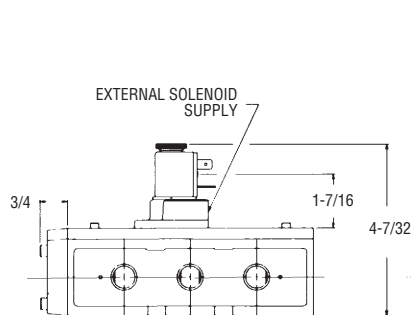


"J" Series 4-Way Dimensions

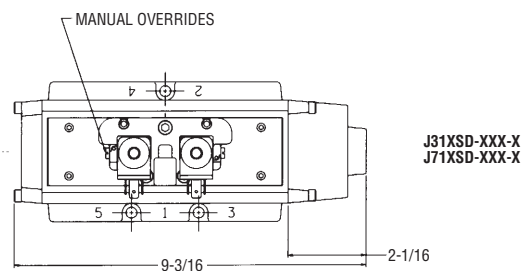
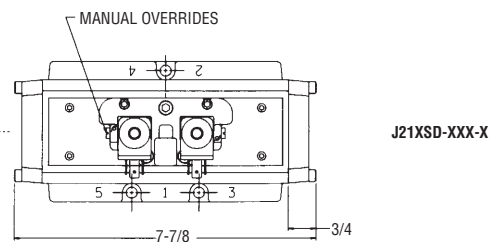
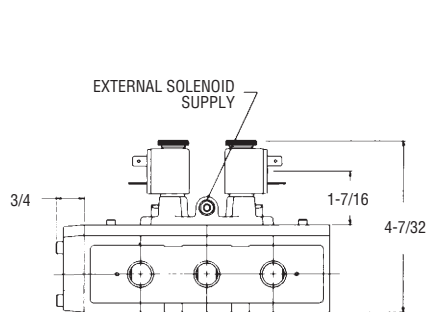
4-Way Pilot



4-Way Single Solenoid



4-Way Double Solenoid





CONTROL LINE EQUIPMENT, INC.



14750 Industrial Parkway • Cleveland, Ohio 44135

Phone: (216) 433-7766 • Fax: (216) 433-7664 • Web Site: www.control-line.com

MIDGET CYLINDERS

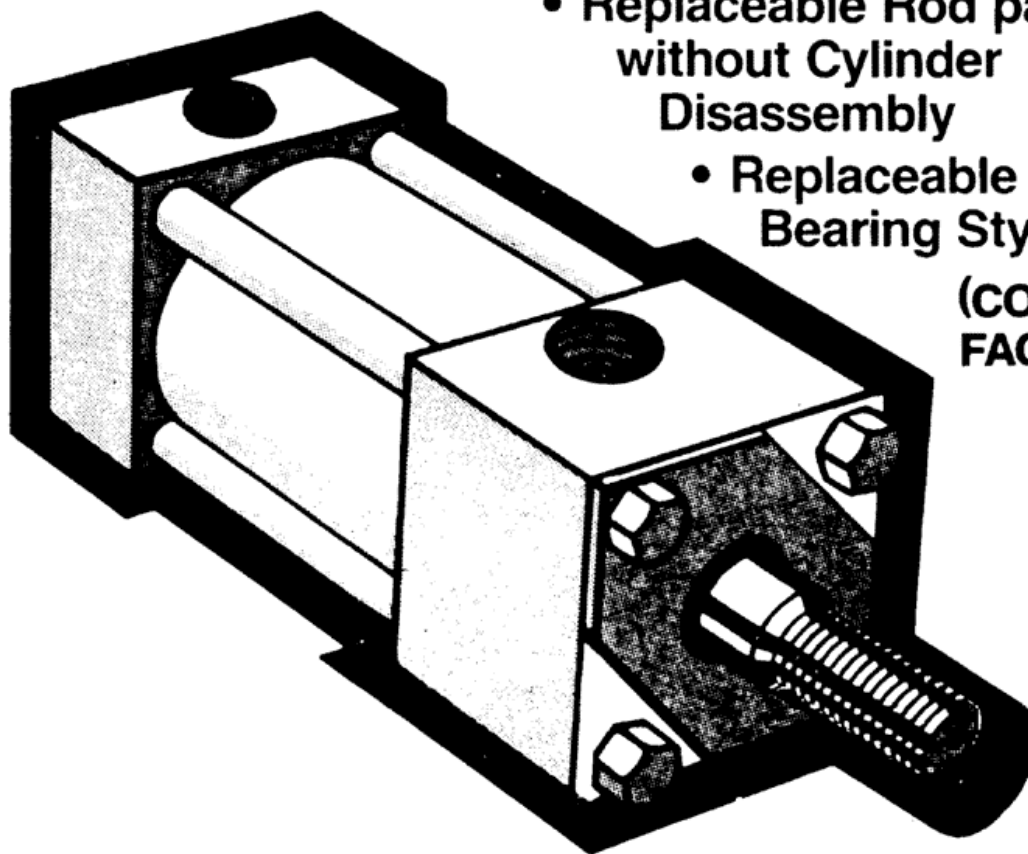
2 BORE SIZES
3/4" & 1 - 1/8"

HEAVY DUTY — 1500 P.S.I. OIL
MEDIUM DUTY — 750 P.S.I. OIL
200 P.S.I. AIR

NEW FEATURES—

- Replaceable Rod packing without Cylinder Disassembly
- Replaceable Rod Bearing Styles

**(CONSULT
FACTORY)**



MOUNTINGS

EXTENDED TIE RODS
HEAD END FLANGE
CAP END FLANGE
FOOT
PIVOT
CLEVIS

SINGLE END AND THRU-ROD CYLINDERS

2:1 ROD DIAMETERS

COMBINATION AIR/OIL CYLINDERS

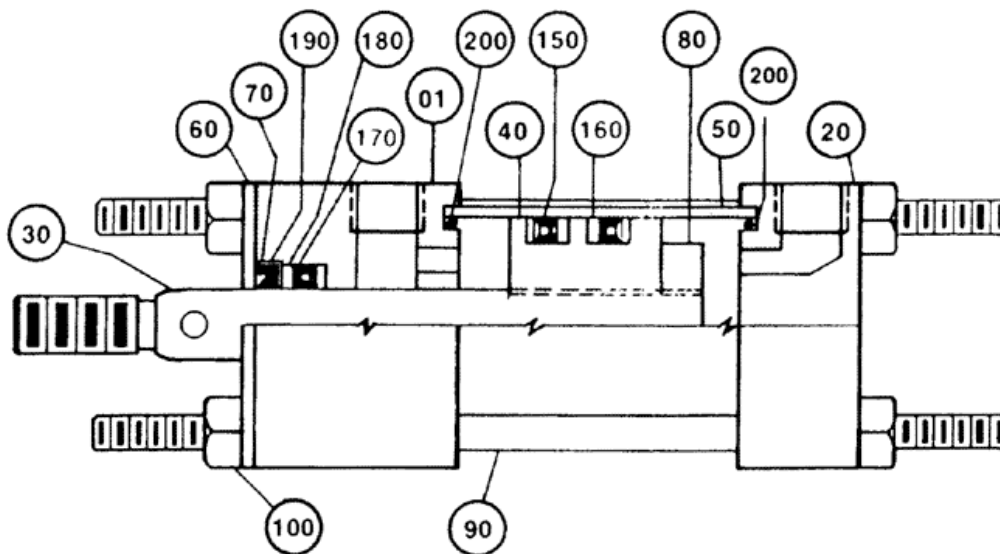
3-POSITION CYLINDERS

FORM ALH8412

MIDGET CYLINDERS

3/4 & 1 - 1/8 BORE

MEDIUM & HEAVY
DUTY CYLINDERS

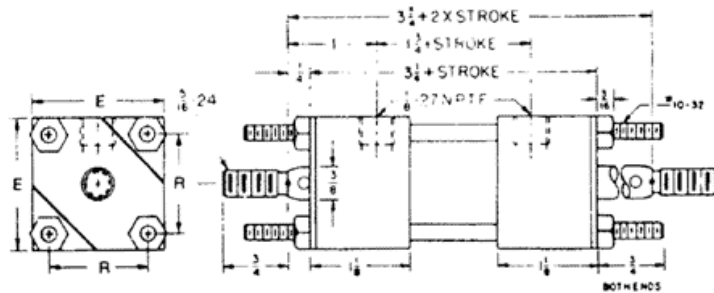
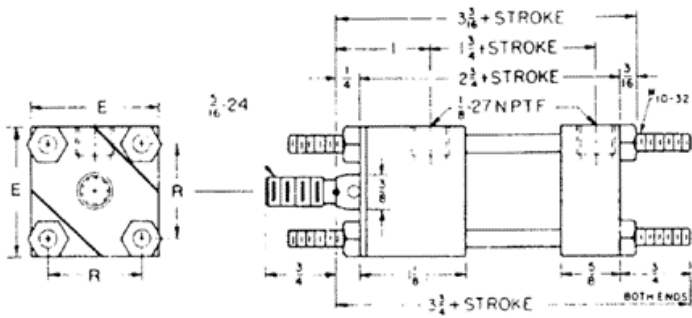


- 01 HEAD END COVER** — High strength die cast ZAMAC zinc heads assure perfect alignment of piston rod and cylinder bore. Long bearing lengths on piston and in rod gland contribute to longer life.
- 20 CAP END COVER** — High strength die cast ZAMAC zinc.
- 30 PISTON ROD** — Stainless steel ground and polished on standard rod (3/8" dia.) cylinders. NOTE - Thread is a reduced diameter to prevent packing damage during the infrequent repacking. 2:1 rods are 60,000 p.s.i. minimum yield, medium carbon steel, hard chrome plated.
- 40 PISTON** — One piece aluminum alloy, threaded onto piston rod, and locked in place with a prevailing-torque lock nut.
- 50 CYLINDER WALL** — Drawn-over-mandrel (D.O.M.) steel tube for hydraulic service. Hard coated aluminum tube for air service.
- 60 ROD GLAND RETAINER** — Permits easy replacement of wiper and rod gland packer from outside without dismantling the cylinder.
- 70 ROD WIPER RETAINER** — Heat treated steel cup prevents the force exerted by the rod gland Block Vee Packer from distorting the wiper.
- 80 LOCK NUT** — All metal prevailing-torque lock nut locks piston in place on threaded piston rod.
- 90 TIE RODS** — Made from carbon steel, pre-stressed at assembly to minimize the possibility of rod elongation.
- 100 TIE ROD LOCKNUTS** — Prevailing torque lock nuts (all metal) assure that tie rod pre-stressing will be maintained.
- 150 BUNA N BLOCK VEE PACKERS** — Self compensating, provide self sealing, low friction and minimum break-away. Optional packers are available for high temperature and phosphate ester service.
- 160 PACKING BACK-UP WASHER** — Prevents packer extrusion on high pressure on Heavy Duty Cylinders.
- 170 ROD GLAND PACKING** — Buna N Block Vee is self-adjusting and wear compensating, has low coefficient of friction and minimum static breakaway. Optional packers are available for high temperature and phosphate ester service.
- 180 ROD PACKING BACK-UP WASHER** — Prevents packer extrusion on high pressure on Heavy Duty Cylinders.
- 190 ROD WIPER** — Buna N lip type wiper keeps external contaminants from entering rod gland. For severe service, Disogrin Wipers are available.
- 200 O-RING TUBE SEALS** — Buna N, positive sealing, confined in groove to prevent extrusion.

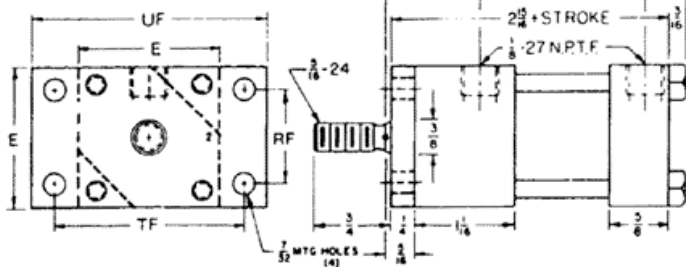
MIDGET CYLINDERS

3/4 & 1 - 1/8 BORE

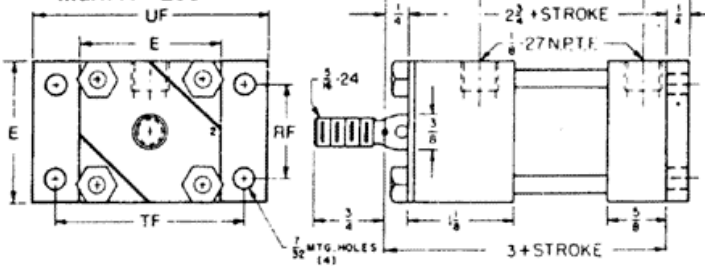
STANDARD DIAMETER PISTON ROD



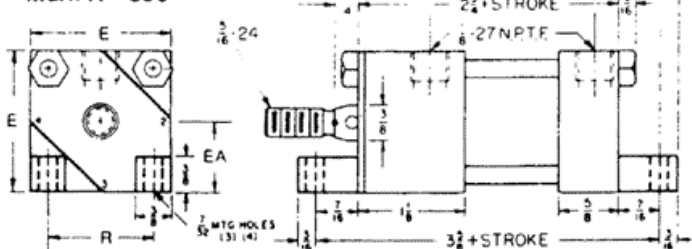
Mark A - 130
Mark L - 130
Mark H - 130



Mark A - 230
Mark L - 230
Mark H - 230



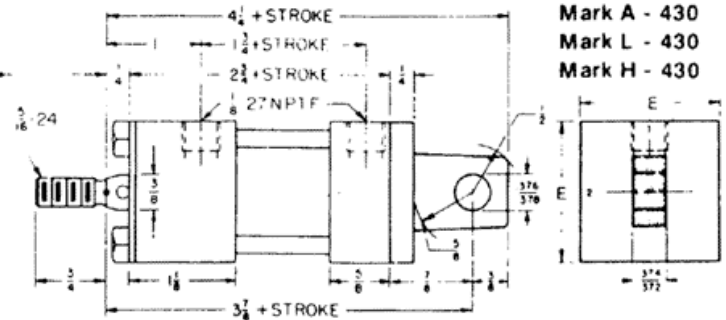
Mark A - 330
Mark L - 330
Mark H - 330



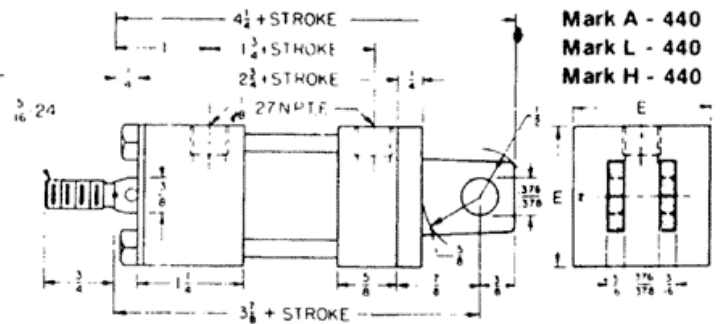
Medium Duty (Series A) - 200 p.s.i. Air
Medium Duty (Series L) - 750 p.s.i. Hydraulic
Heavy Duty (Series H) - 1500 p.s.i. Hydraulic

Mark A - 110 Mark L - 110 Mark H - 110	Tie Rods Extended Both Ends
Mark A - 111 Mark L - 111 Mark H - 111	Tie Rods Extended Cap (Blind) End
Mark A - 112 Mark L - 112 Mark H - 112	Tie Rods Extended Head (Rod) End

TRA/TRL — 110 Mark TRH - 110	Tie Rods Extended Both Ends
TRA/TRL - 112 Mark TRH - 112	Tie Rods Extended Head End



Mark A - 430
Mark L - 430
Mark H - 430



Mark A - 440
Mark L - 440
Mark H - 440

DIMENSIONS

BORE SIZE	E	EA	R	RF	TF	UF
3/4	1 - 1/8	$\frac{.568}{.588}$	25/32	5/8	1 - 5/8	2 - 1/8
1 - 1/8	1 - 1/2	$\frac{.740}{.760}$	1 - 1/8	1	2	2 - 1/2

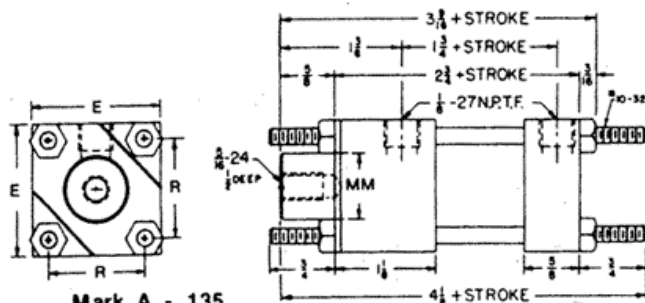
MIDGET CYLINDERS

3/4 & 1 - 1/8 BORE

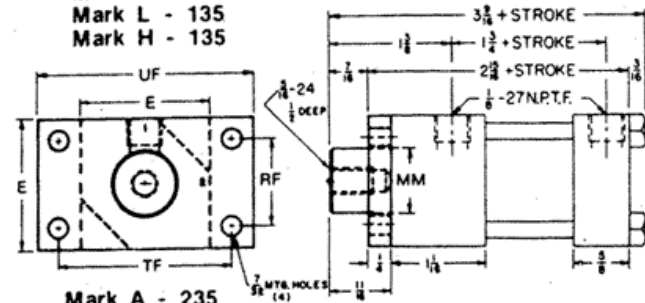
**2:1 DIAMETER
PISTON ROD**

Medium Duty (Series A) - 200 p.s.i. Air
Medium Duty (Series L) - 750 p.s.i. Hydraulic
Heavy Duty (Series H) - 1500 p.s.i. Hydraulic

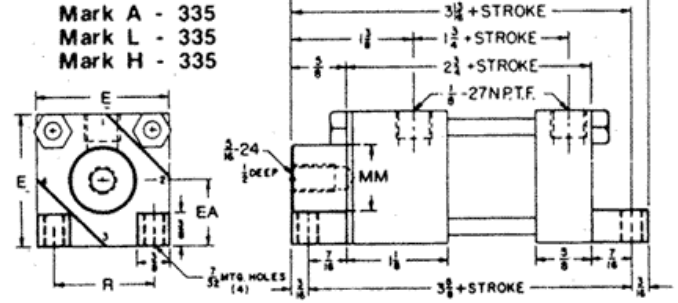
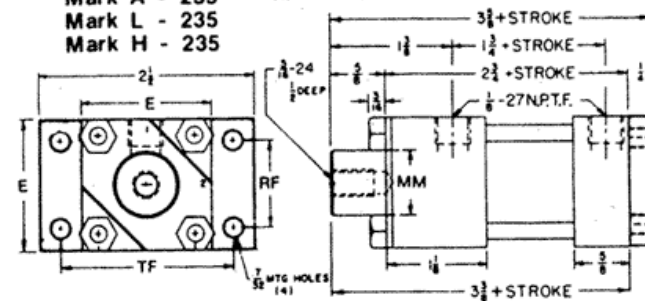
Mark A - 115 Mark L - 115 Mark H - 115	Tie Rods Extended Both Ends
Mark A - 116 Mark L - 116 Mark H - 116	Tie Rods Extended Cap (Blind) End
Mark A - 117 Mark L - 117 Mark H - 117	Tie Rods Extended Head (Rod) End



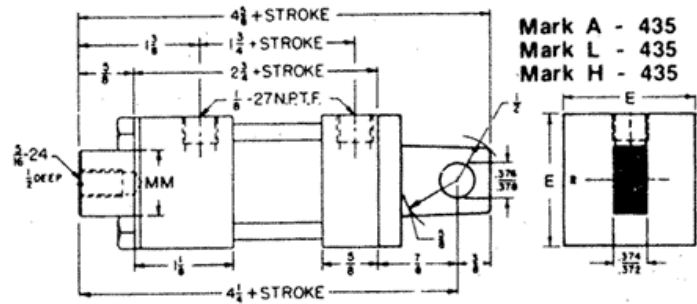
Mark A - 135
Mark L - 135
Mark H - 135



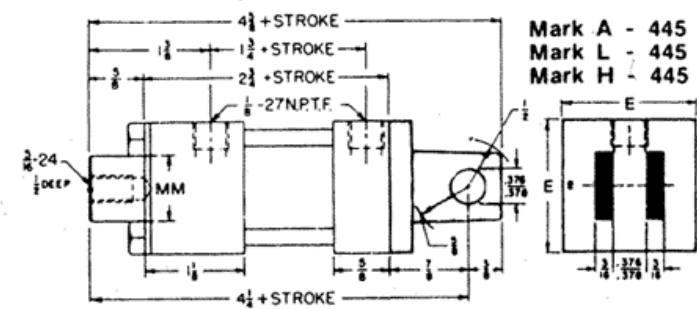
Mark A - 235
Mark L - 235
Mark H - 235



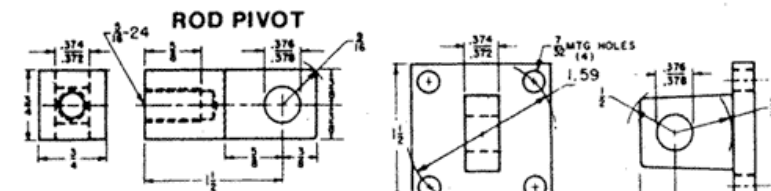
Mark A - 335
Mark L - 335
Mark H - 335



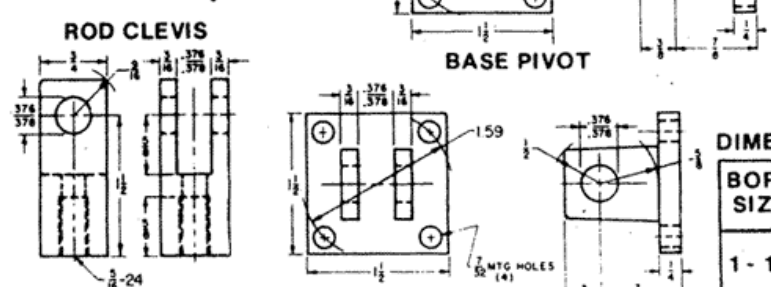
Mark A - 435
Mark L - 435
Mark H - 435



Mark A - 445
Mark L - 445
Mark H - 445



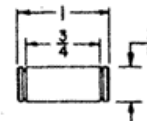
ROD PIVOT



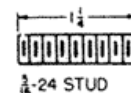
ROD CLEVIS

BASE PIVOT

BASE CLEVIS



**CLEVIS PIN WITH
SNAP RINGS
(2) NOT SHOWN**



**CONVERTS FEMALE
TO MALE THREAD
ON 2:1 RODS**

DIMENSIONS

BORE SIZE	E	EA	MM	R	RF	TF	UF
1 - 1/8	1 - 1/2	$\frac{.740}{.760}$	3/4	1 - 1/8	1	2	2 - 1/2

MIDGET CYLINDERS

3/4 & 1 - 1/8 BORE

GENERAL INFORMATION

A word about Rod Gland seepage

When the rod end of a cylinder is open to exhaust or tank, there is usually little or no back pressure to keep the rod gland packer lip tight against the piston rod. A microscopic film of oil can therefore go out on the advancing piston rod. However, on the retract stroke, the rod end is pressurized, and the packing lip is forced against the piston rod to seal it.

Most of the seepage problems come from the sealed rod gland packer scraping the rod clean. The microscopic oil film from the previous advance stroke collects to form a drop of oil.

GUARANTEE

Our products are 100% inspected and tested before shipment. They are guaranteed for 90 days from date of shipment against defects in material or workmanship, when not mis-applied or mis-used. This guarantee is restricted to the replacement of parts or completed product and no allowance will be made for labor or other expense required to repair or replace such defective material, nor shall we be liable for any damages beyond the price of the defective material.

PRICES

Subject to change without notice, but any such price changes shall not apply to orders previously accepted.

DESIGN

We reserve the right to alter specifications and/or dimensions without notice. Any change in current models does not imply that products already in service will be modified to current design.

RETURNED GOODS

No purchases are to be returned after shipment for any reason without prior consent. All returns are subject to a handling charge which is to cover the cost of handling, disassembly, inspection, rework where applicable, restocking and record work.

Complete cylinders are not stocked as units, but are assembled from stocked components. Return shipping charges shall be prepaid.

OPERATING TEMPERATURES

Control Line cylinders will operate satisfactorily at ambient temperature from 40° F to 180° F, and intermittent temperatures (1 minute out of 5 minutes) up to 200° F. For operating temperatures above or below this range, please consult our factory.

OPERATING PRESSURES

Control Line cylinders will give good service with ample safety factor in the pressure ranges specified. On hydraulic service, our guarantee is void if there is evidence of surge pressures which would exceed the safety factor at the pressure for which the cylinder was intended.

OPERATING MEDIUM

Unless otherwise specified; Buna N packings will be furnished for mineral oil base hydraulic fluids and for air. If you use phosphate ester base hydraulic fluid or any medium which is not compatible with Buna N Compound, please specify.

TO OBTAIN ALL THE BENEFITS FROM YOUR CYLINDERS

- (1) When a cylinder is stored for future use, be sure it is amply lubricated, particularly inside the tube and on the piston rod, as packings will tend to adhere to dry metal surfaces over extended storage.
- (2) A cylinder is NOT a structural unit nor a machine member. It is designed for one purpose only — to push and pull. It is not designed to be a guide or a machine way.
- (3) Please be sure your alignment between the work and the piston rod at both ends of its stroke is faultless. Misalignment will cause mechanical interference and shorten the life of the cylinder.
- (4) Wherever possible, please try to have a maximum of two points of alignment. It is difficult, particularly after servicing, to obtain an identical mounting to the original installation, due to tolerances and allowances on clearance holes, concentricity of threads, etc. When more than two points of alignment are encountered, your problems multiply. If you use a rigidly mounted cylinder (Foot, Flange) plan to allow some "float" to the piston rod end attachment. On Pivot Mounted cylinders (Pivot or Clevis) plan to allow some "float" in the plane at right angles to the piston rod plane.

NOTE: Unless otherwise specified, cylinders will be furnished standard as follows:

- (1) Port locations as shown
- (2) Rod extension and threading as shown
- (3) For temperature service to 180° F

Cylinder components are stocked in stroke length increments of 1". Complete assemblies are not stocked but are made to order promptly from interchangeable parts.

Cylinders will be furnished in fractional stroke lengths, but with the same overall length as the next longer unit inch at no additional charge. A spacer bushing in the rod end of the cylinder will restrict the stroke to your specification. For example, a 1-1/8" stroke cylinder will have the same overall length as a 2" stroke cylinder, but the piston rod travel will be limited to 1-1/8" from its retracted position. If you require this spacer bushing on the blind end of the cylinder to limit the "IN" stroke please specify, as this is not standard, but is available at no extra charge. If you require that the cylinder overall length be reduced to match a fractional stroke, an extra charge is added.

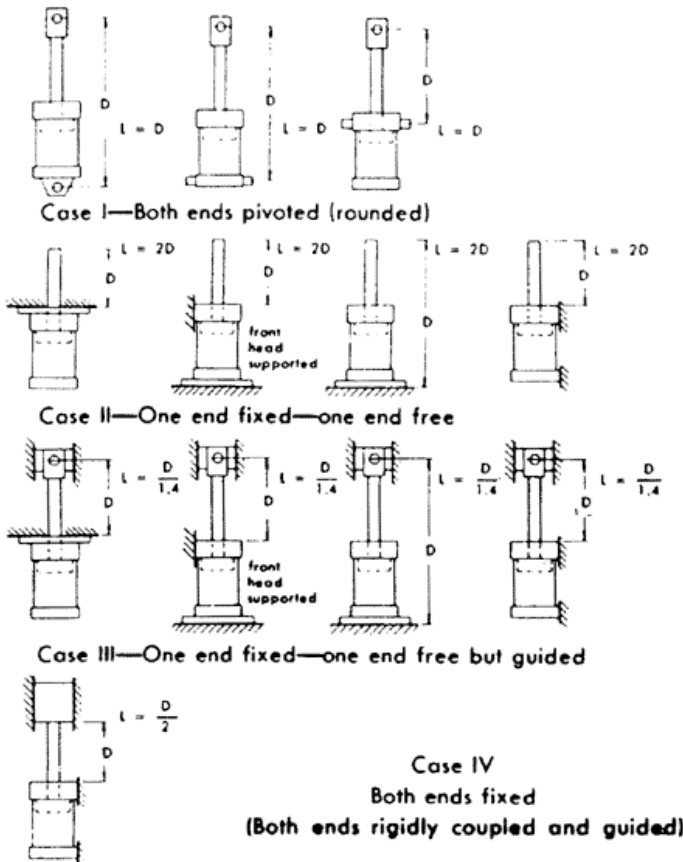
CAPACITY CHART

Force at Following Pressures — Neglecting Friction		250	500	750	1000	1500	2000
BORE							
3/4	Push	110	220	331	441	662	883
	Pull	82	165	247	330	495	660
1-1/8	Push	248	497	745	994	1491	1988
	Pull - 3/8 rod	220	441	662	883	1325	1767
	Pull - 3/4 rod	138	276	414	552	888	1104

MIDGET CYLINDERS

3/4 & 1 - 1/8 BORE

PISTON ROD SELECTOR CHART



THE PISTON ROD in a cylinder acts as a column and, as such, is subjected not only to compressive stresses, but also buckling stresses which are a function of the moment of inertia for a constant modulus of elasticity. The "column strength" of a piston rod cannot be increased by using higher tensile strength or heat treated materials. For this reason, it is sometimes necessary to use an oversize piston rod strictly for the purpose of achieving the necessary "column strength."

The data shown in chart form is based on Euler's equation for a vertical column with both ends rounded (see Case I illustration). The values of "L" shown in the chart are approximately one-half of the theoretical limit of "L" as determined by this equation.

Factors such as vertical or horizontal mounting, shock or non-shock loading, frequency of operation, etc. should be taken into consideration in selecting a permissible value of "L." The values shown indicate our recommended maximum "column lengths" for the various piston rods under specified compressive loads and may be considered safe for most normal cylinder applications, both horizontal and vertical. Deviations from these recommendations are, of course, a matter of engineering judgment based on a knowledge of the application. In some vertical applications, it may be possible to use values of "L" one-third greater than those on the chart shown. On the other hand, for a long stroke, horizontally mounted cylinder subjected to shock-loading, it may be desirable to decrease the value of "L" by one-third.

To determine the proper piston rod diameter for your application, proceed as follows:

1. Determine the maximum thrust required in your application.
2. Identify your installation with one of those illustrated as Case I, II, III or IV.
3. Determine the recommended stop tube length, if one is required. (See "stop tubes" below.)
4. Determine the value of "L" for your installation with the piston rod in the fully extended position.
5. Now, referring to the chart, select the thrust figure that equals or exceeds your requirements.
6. Scan to the right on the chart until the value of "L" equals or exceeds the "L" dimension on your cylinder installation.

STOP TUBES—The function of a stop tube is to act as a spacer to increase the distance between the piston and piston rod bearing when the piston rod is in its fully extended position. This increase in spacing serves to reduce bearing loads and, at the same time, increases the structural rigidity of the assembly to prevent buckling and jack-knifing.

A stop tube is recommended for cylinders mounted as shown in Cases I and II whenever "L" exceeds 40". Use 1" of stop tube for every 10" over the basic 40" value of "L." In case of fractions, always go to the next full inch. For example, if "L" = 83", the stop tube length would become 5". Cylinders mounted as those shown in Cases III and IV do not normally require stop tubes, but the decision should be based on the factors involved in the particular application under consideration.

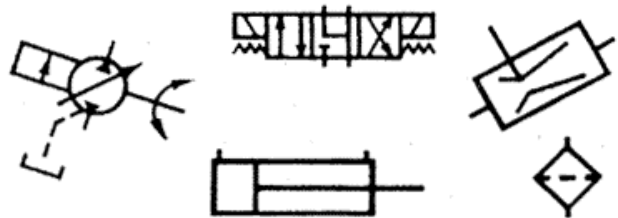
VALUE OF "L" IN INCHES

PISTON ROD DIA.	THRUST IN POUNDS																		
	100	150	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400	1600	1800	2000
3/8	26	22	19	17	15	14	13	13	12	11	10	9	9	8	8	7	7	6	6
3/4	107	88	76	68	62	58	54	51	48	44	41	38	36	34	31	29	27	25	24

CYLINDER & MOUNTING BRACKET WEIGHTS (Base-Zero Stroke)

BORE SIZE	MARK A,L&H—110 A,L&H—111 A,L&H—112	MARK A,L&H—130 A,L&H—230	MARK A,L&H—330 A,L&H—430 A,L&H—440	MARK TRA,TRL,TRH—110 CA—110 A3P,L3P,&H3P—110	MARK A,L&H—115 A,L&H—116 A,L&H—117	Add per Inch Stroke
3/4	10 oz.	13 oz.	11 oz.	15 oz.	22 oz.	2 oz.
1-1/8	15 oz.	20 oz.	16 oz.	21 oz.	22 oz.	2 oz.

Base Pivot 1 oz.
Base Clevis 1 oz.
Rod Eye 3 oz.
Rod Clevis 3 oz.



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WWW.CONTROL-LINE.COM

DISTRIBUTED BY:

PNEUMATIC COUNTERS



PRE-DETERMINING OR TOTALIZING
TYPE COUNTERS



CONTROL LINE EQUIPMENT, INC.

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Select-A-Count® Pneumatic Programmer

WHAT IT DOES

1. COUNTS air signals delivered to the SAC-24.
2. STORES and accumulates the count information indefinitely. Upon receipt of the last "count" signal, a built in valve opens the separate air supply to the outlet port and...
3. DELIVERS this air to perform work function(s).
4. RESETS automatically for another cycle only when the last "count" signal is released (exhausted).



HOW IT WORKS

Each "count" signal operates a ratchet piston which advances a 24 tooth circular gear by one tooth. When the last "count" signal is received, a pin in the circular gear operates an internal 1/8" 3-way N/C valve supplying air to the OUT port. This 3-way valve also operates a second piston which allows the circular gear to return to the start position for another cycle when the last "count" signal is released (exhausted).

REPEATABILITY AND RELIABILITY

Proper lubrication, correct pressures and CRISP COUNT SIGNALS are the keys to trouble free service and multi-million cycle life. Weak or erratic count signals may prevent a proper count. Slow exhaust of a count signal can be corrected by installing a quick exhaust valve with a close nipple, to the count port.

PORTS (ALL): 1/8 NPT

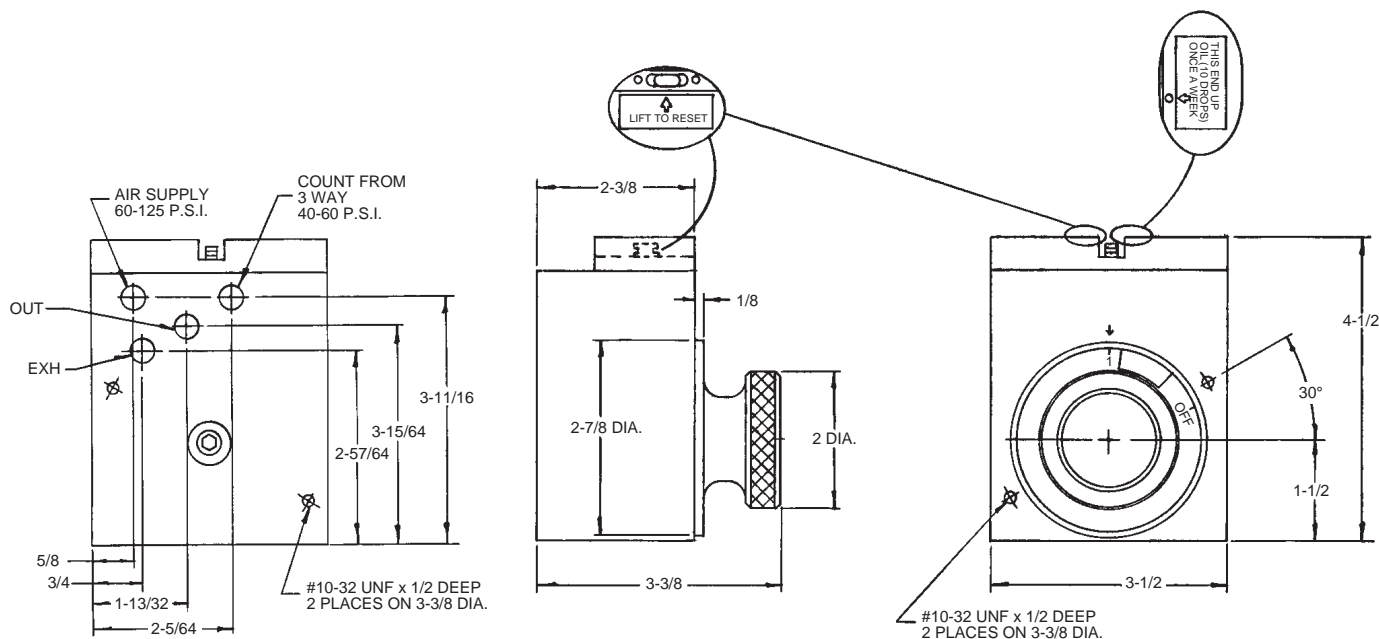
COUNTS PER SECOND: up to 2-1/2 (including reset time)

OUT SIGNAL (CFM): multiply PSI by .22 (27.5 cfm @ 125 PSI)

WEIGHT: 4 pounds

FINISH: black anodized aluminum

MOUNTING: It is recommended that the SAC-24 be mounted with the oil hole up.



IMPULSE COUNTERS

DESCRIPTION

Model AC-6 is a six digit totalizing counter. A pneumatic* signal or impulse, exhausted to atmosphere between inputs, advances the counter one digit each time signal is present. The counter is useful for event recording, piece or part counting or cycle counting. This counter can be used in general counting applications where mechanical or electrical drives are impractical or inconvenient. It is ideal where the surrounding atmosphere prohibits the use of the other types of counting devices. The count is maintained until manually reset.



SPECIFICATIONS

SIGNAL PRESSURE RANGE: 25 to 125 PSI

MAXIMUM COUNT SPEED: 300 counts per minute

TYPE: six digit "count-up" totalizer

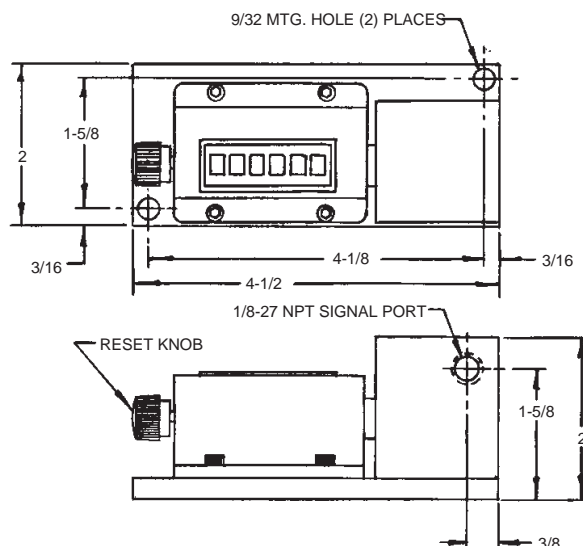
MOUNTING: thru hole base mounting - orientation is not critical

RESET: manual reset knob returns display to zero

WEIGHT: 14 ounces

CONSTRUCTION MATERIALS: anodized aluminum, case hardened steel and acetal plastic

* Consult factory for hydraulic service.



HOW TO ORDER:

ORDER AIR COUNTERS BY MODEL NUMBER:

SAC-24 for a Select-A-Count

AC-6 for a Totalizer

CONTROL LINE EQUIPMENT, INC.

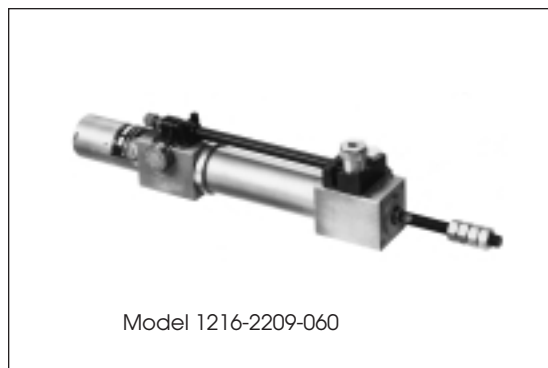
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DISTRIBUTED BY:



Series 12 Veritrol Hydraulic Checking Cylinder



Model 1216-2209-060

Application Information

- Provides uniformly controlled stroke speed essential to tool or work piece feeding on drilling, milling, cut-off and grinding. Smooths out stroke variations caused by compression of air under irregular loads.
- Can be connected to feed table or other driven machine part, or any arrangement where checking stroke opposes air-cylinder work stroke.
- Available in single or double acting models, providing up to 2,000 lbs. checking capacity in either or both directions.
- Dial set speed control permits cylinder travel from 3" to 300" per minute.
- Oil reservoir indicating stem gives visual refill cue.

Specifications

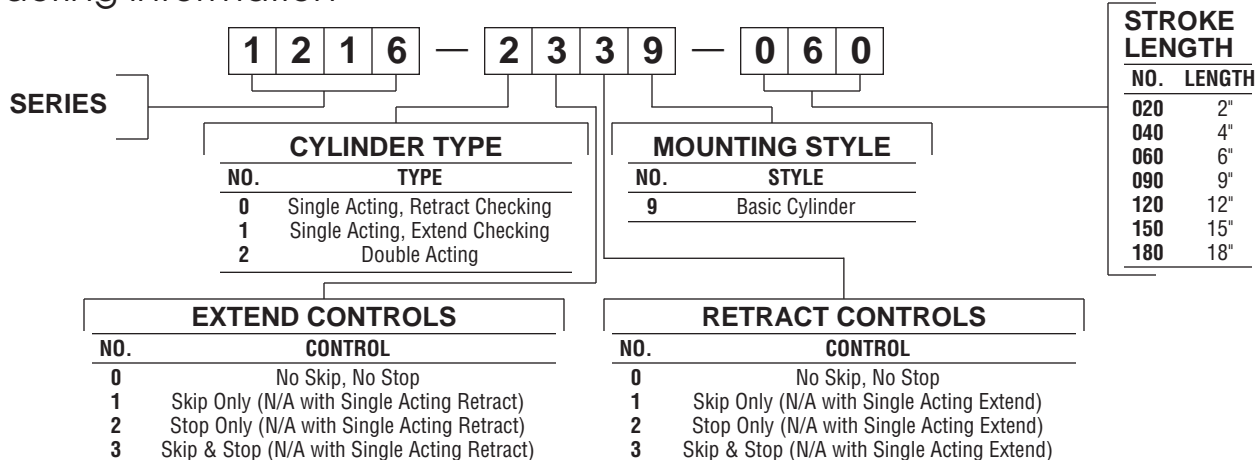
Operating Air Pressure: 60 p.s.i. minimum, 150 p.s.i. maximum.

Skip Control: Valve is normally open. To obtain speed control, skip valve must be actuated by applying a 60 p.s.i. minimum air pilot signal to the 1/8-27 NPTF port.

Stop Control: Valve is normally open. To stop piston rod movement, stop valve must be actuated by applying a 60 p.s.i. minimum air pilot signal to the 1/8-27 NPTF port.

NOTE: On cylinders equipped with skip & stop control valves, both skip & stop valves must be actuated to stop piston rod travel.

Ordering Information



ROD PROJECTION OPTION For additional Rod Projection specify total length of Rod Thread desired as an "E = _____" dimension after the Model No.

EXAMPLE: Where 6" additional Rod Thread is desired: 1216-1009-020, E = 9-3/8" (std. E of 3-3/8" + 6" = 9-3/8").

Model 1579 Hydraulic Oil Fill Kit



Recommended for use in filling oil reservoir in Series 12 cylinders.



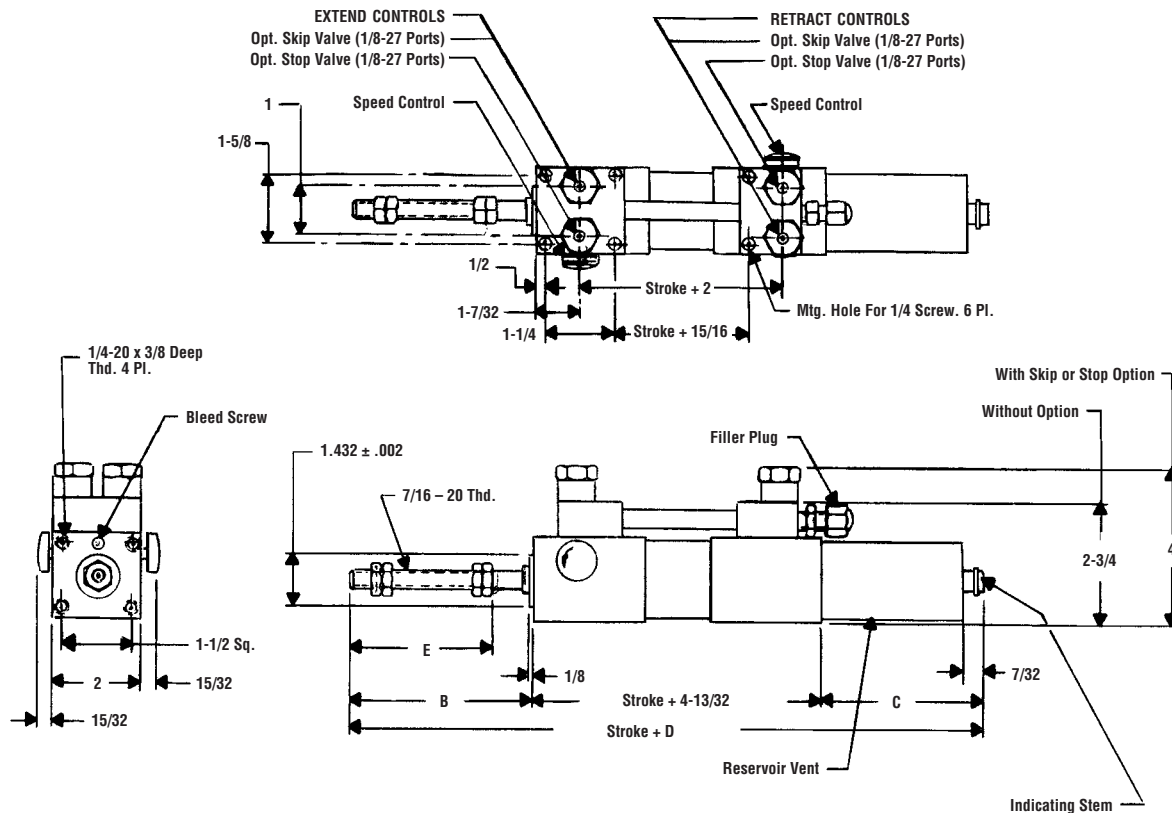
CONTROL LINE Hydraulic Oil

Recommended especially for use in Control Line Series 12 Veritrol hydraulic checking cylinders.

QUANTITY	PART NO.
1 Gallon	1626



Series 12 Veritrol Dimensional Information



Model 1216-2XX9-XXX (shown)
 Model 1216-1X09-XXX (same dimensions less retract controls)
 Model 1216-00X9-XXX (same dimensions less extended controls)

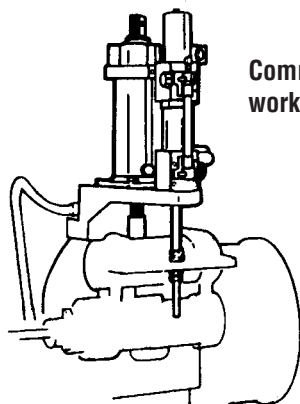
Repair Kit

SERIES 12	NO.
All Models	115808

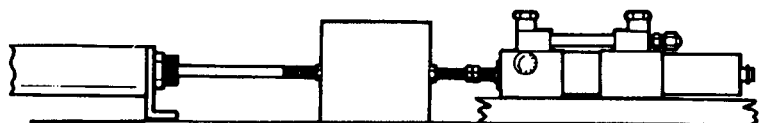
Dimensions

REF.	Stroke Length - Inches								
	2	4	6	9		12	15	18	
B		4					4		
C		3-15/32					5-27/32		
D		Stroke + 11-7/8					Stroke + 14-1/4		
E		3-3/8					3-3/8		

Mounting Capabilities



Common front flange mount with checking cylinder working in tandem with air cylinder.



Flush mounted with checking cylinder opposing air cylinder.

CONTROL LINE EQUIPMENT, INC.

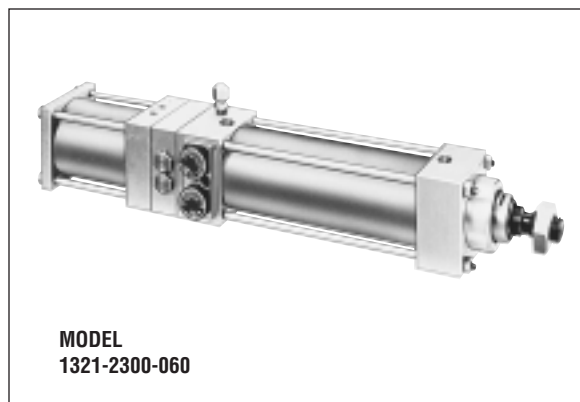
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CONTROL LINE EQUIPMENT, INC.

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Series 13 Coaxial Air / Hydraulic Cylinder



Application Information

- Unique combination cylinder provides smooth, precise hydraulic control, but requires only a shop air supply. Oil cylinder concentric with air cylinder, results in unit about one-half the length of an in-line unit, and easier to install than side-by-side cylinder combination.
- These cylinders recommended for machine tool applications or work-piece feeding, and where precise speed control and smoothness are required.
- The compactness of the Series 13 is beneficial where long stroke length, with controlled and uniform speed throughout the stroke, is desirable.
- Dial-set, stepless, load-compensated, speed control in both directions assures smooth, uniform piston travel regardless of load fluctuations.
- Oil reservoir automatically compensates for volume changes with visual low-oil signal.
- Optional built-in skip-stop control for selection of rapid traverse or stop in either direction.

Specifications

Operating Air Pressure	30 p.s.i. minimum, 150 p.s.i. maximum.
Controlled Speed Either Direction	3 inches per minute minimum, 300 inches plus 60 inches or minus 40 inches maximum.
Effective Piston Area	4.6 square inches extending 3.14 square inches retracting.
Skip & Stop Valve Operation	A 60 p.s.i. minimum air pressure is required on coaxial cylinder operating at from 30 to 70 p.s.i. Cylinder pressures above 70 p.s.i. require a skip or stop valve pressure equal to 85% of operating pressure.
Skip Operation	Pressurizing Skip Port opens Skip Valve allowing speed control to be bypassed, either direction.
Stop Operation	Pressurizing Stop Port closes Stop Valve causing cylinder to immediately stop, in either controlled or skip feed modes.

HOW TO ORDER:

Refer to the table below and specify Series-And-Bore Number. Select suffix number indicating Cylinder Type, Control Option and Mounting Option. Add Stroke Length. This will produce a 4-digit prefix, 4-digit suffix and a dimension in inches. See typical model number beneath illustration above.

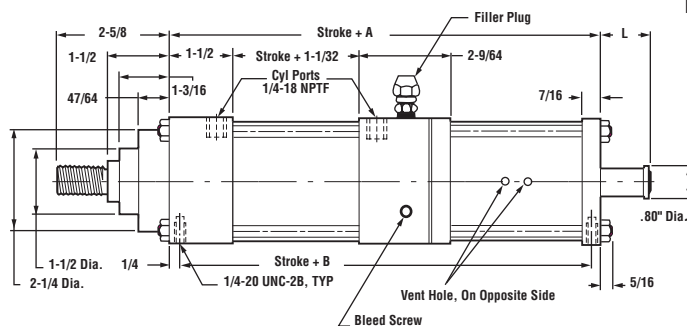
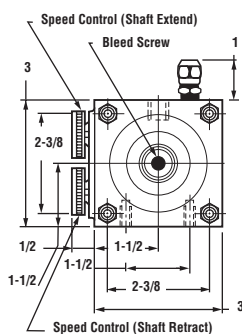
Ordering Information				1321 - 23 0 0 - 060				Available Stroke Lengths	
Series & Bore No.		Control Option		Rod Thread		Mounting Styles		No.	Stroke
No.	Bore	No.	Type	No.	Type	No.	Style		
1321	2-1/2"	20	No Skip or Stop	0	3/4-10 UNC	0	Flush Mount	030	3"
		21	Skip Only	2	3/4-16 UNF	1	Low L	060	6"
		22	Stop Only	3	No Thread	3	Front Flange	090	9"
		23	Skip & Stop			4	Rear Flange	120	12"
								150	15"
								180	18"
								210	21"
								240	24"
								270	27"

FORM COAX 398

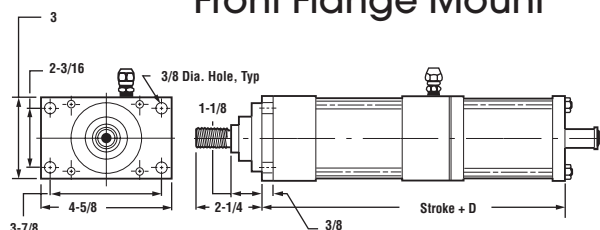


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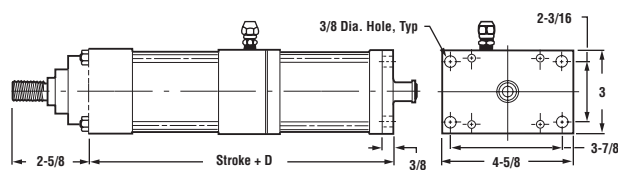
Flush Mount



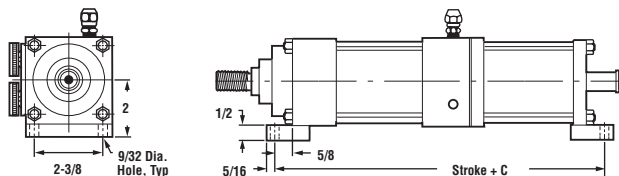
Front Flange Mount



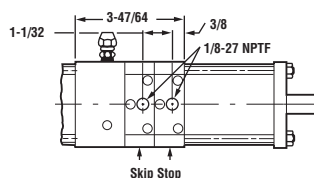
Rear Flange Mount



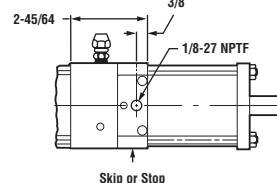
L Mounts



Skip And Stop



Skip Or Stop



Dimensions

Model	Stroke Range	A	B	C	D	L
No Skip Or Stop	Up to 9"	8-1/4	7-25/32	9-17/32	8-5/8	1-9/32
	Over 9" to 18"	9-3/4	9-9/32	11-1/32	10-1/8	2-1/32
	Over 18" to 27"	11-1/4	10-25/32	12-17/32	11-5/8	2-25/32
With Skip Or Stop	Up to 9"	8-13/16	8-11/32	10-3/32	9-3/16	1-9/32
	Over 9" to 18"	10-5/16	9-27/32	11-19/32	10-11/16	2-1/32
	Over 18" to 27"	11-13/16	11-11/32	13-3/32	12-3/16	2-25/32
With Skip And Stop	Up to 9"	9-27/32	9-3/8	11-1/8	10-7/32	1-9/32
	Over 9" to 18"	11-11/32	10-7/8	12-5/8	11-23/32	2-1/32
	Over 18" to 27"	12-27/32	12-3/8	14-1/8	13-7/32	2-25/32

Stroke Force Information

Air Line Pressure PSI (bar)	Extending Force Lbs.	Retracting Force Lbs.
60	250	155
80	345	215
100	435	280
120	525	340
140	620	405
150	665	435

Repair Kit

SERIES 13	NO.
All Units	7153

Model 1579 Hydraulic Oil Fill Kit



Recommended for use in filling oil reservoir in Series 12 and Series 13 cylinders.



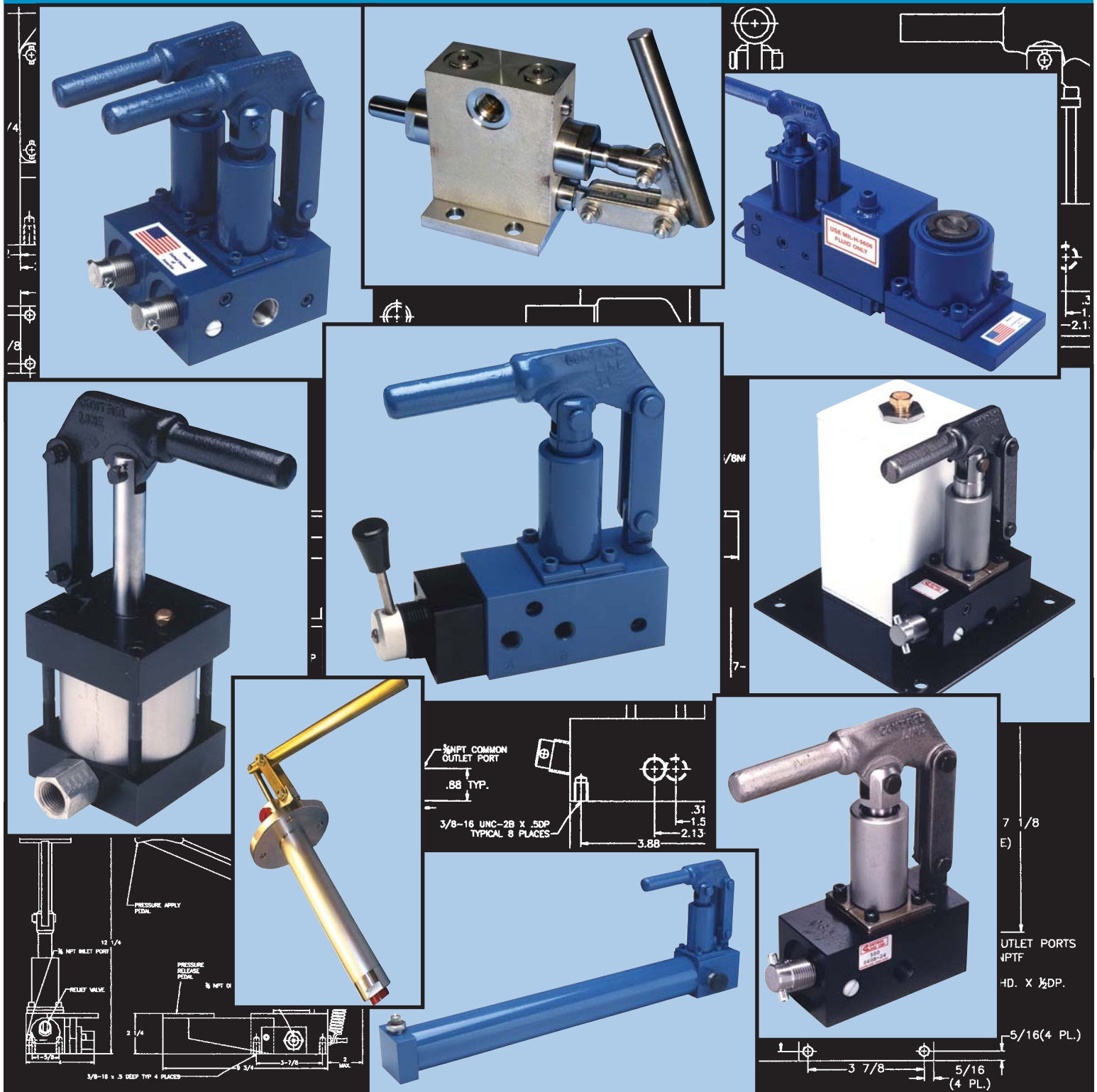
Hydraulic Oil

Recommended especially for use in Control Line Series 12 Veritrol hydraulic checking cylinders and Series 13 Coaxial air-hydraulic cylinders.

QUANTITY	PART NO.
1 Gallon	1626

CONTROL LINE EQUIPMENT, INC.

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SINGLE STAGE PUMPS

The series 500/50R modular hydraulic hand pumps are designed for use with an external hydraulic reservoir in a wide variety of demanding applications.

The 500 series pumps are designed for use in systems, which utilize an external relief valve.

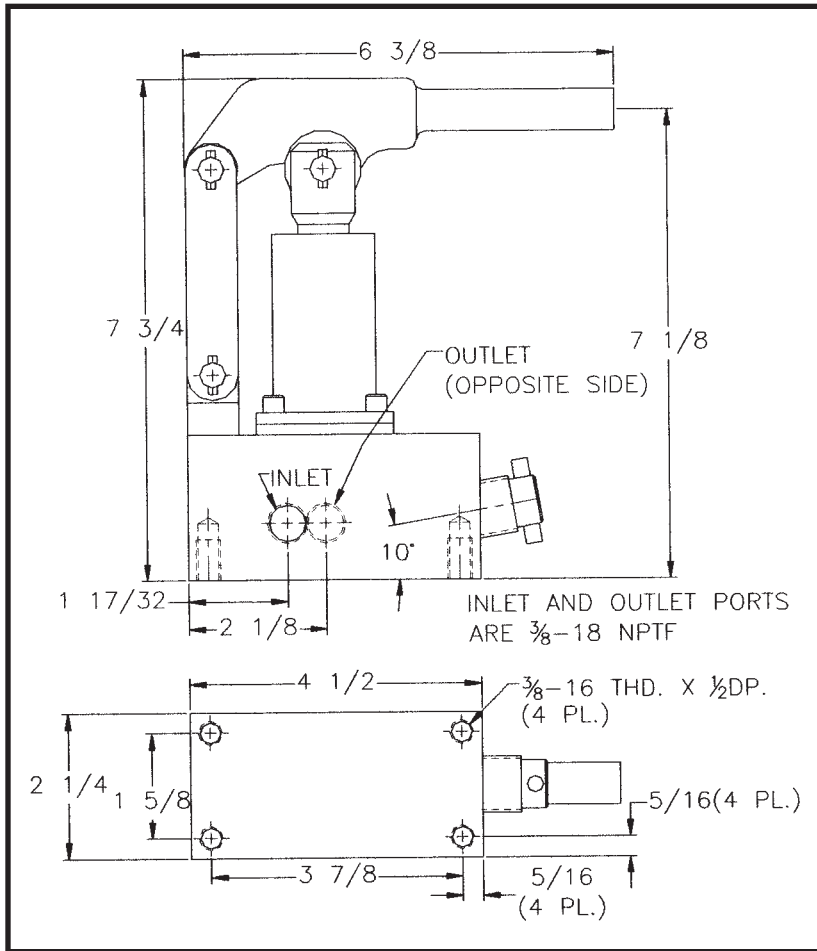
The 50R pumps incorporate an integral, factory set, tamper resistant relief valve for those applications where external relief is impractical or undesirable.

STANDARD FEATURES INCLUDE:

- * All steel construction for rugged use.
- * Rod wiper (except 1-1/2" bore) to exclude dirt.
- * All o-ring seals – no fiber or metal seals to leak.
- * Self-retained release screw, which cannot be accidentally removed.
- * Capable of operating in any mounting orientation.
- * Heat treated pins and linkages for extended life.
- * Ground pistons to prevent seal extrusion.
- * Nitrotec treated pistons for corrosion resistance.

OPTIONAL FEATURES INCLUDE:

- * Optional seals for pumping alternate fluids.
- * Manifold mounting for inlet and/or outlet.
- * Operating handle length – 18 or 36 inches for various handle forces.
- * Custom designs for your particular application requirements.



Single Stage Example:

Series: 500=Without Relief

50R=With Relief

Bore: Inches in Eights

500 - 080 E - 24 - XXXX

Relief Setting PSI omit for 500 Series

Handle Length: 24" is standard

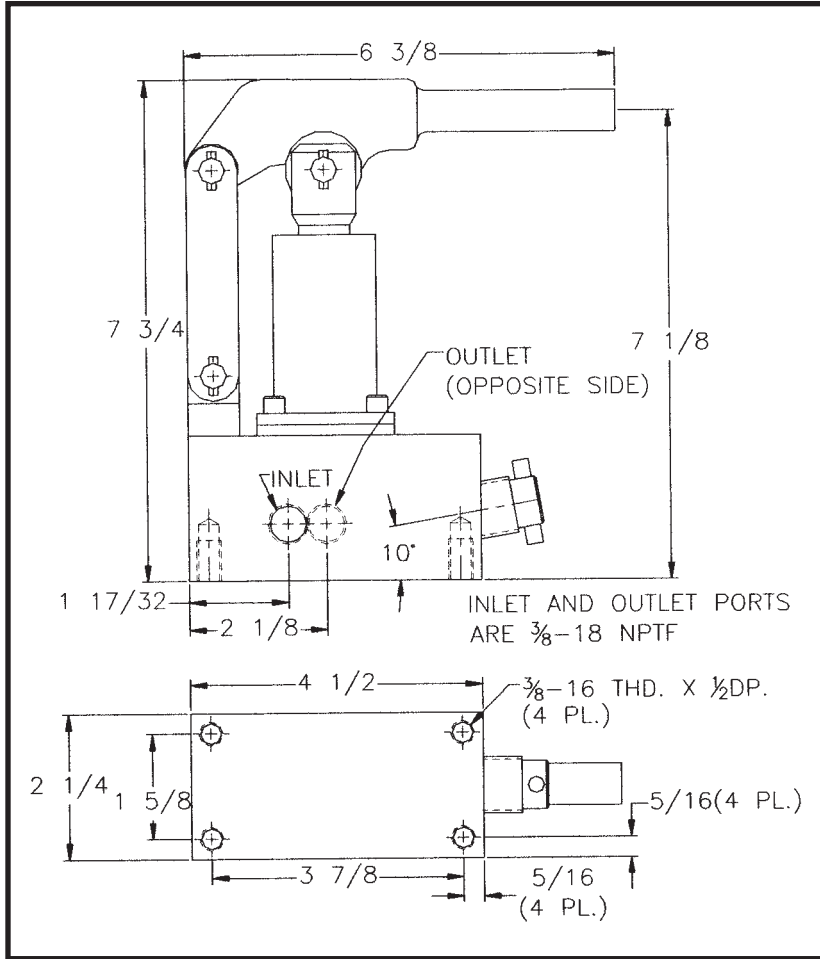
Seals: B=Buna, V=Viton, E=EPR

Model Number	Maximum Rated Pressure	Piston Diameter	Cubic Inches/Stroke	18" Handle Force per 100 PSI	24" Handle Force per 100 PSI	36" Handle Force per 100 PSI	Weight
500-030	10,000	3/8	.14	1.1	.8	.5	11
500-040	10,000	1/2	.26	1.9	1.4	.9	11
500-050	5,000	5/8	.40	2.9	2.2	1.5	11
500-060	3,500	3/4	.58	4.3	3.2	2.1	11
500-080	2,000	1	1.03	7.6	5.7	3.8	11
500-120	1,000	1-1/2	2.10	17.1	12.8	8.5	12

- WARNING -

NO internal relief valve is supplied with these pumps unless ordered as an OPTION. Therefore, for safety purposes, it is necessary to plumb a relief valve, on the outlet of these pumps, which is appropriately set below the lowest maximum rating of any system component.

TWO STAGE PUMPS



The series 550/55R two-stage modular hydraulic hand pumps are designed for use with an external hydraulic reservoir. The two-stage, or "HI-LOW", feature allows the operator to displace a larger amount of fluid at lower pressures. It automatically shifts over to a smaller displacement for higher pressures. This feature dramatically reduces cycle times, and number of strokes required, for many applications.

The 550 series pumps are designed for use in systems that utilize an external relief valve.

The 55R series pumps incorporate a factory set, tamper resistant relief valve for those applications where an external relief is impractical or undesirable.

STANDARD FEATURES INCLUDE:

- * All Steel construction for rugged use. (The low-pressure tube is hard coat anodized aluminum)
- * All o-rings – no fiber or metal gaskets to leak.
- * Self-retained release screw that cannot be accidentally removed.
- * Heat-treated pins and linkages for extended life.
- * Ground pistons to prevent seal extrusion.
- * Nitrotec treated pistons for corrosion resistance.
- * 500 psig standard cross-over between large and small bores.

OPTIONAL FEATURES INCLUDE:

- * Optional seals for pumping alternate fluids.
- * Manifold mounting for inlet and/or outlet.
- * Operating handle length – 18 or 36 inches for various handle forces.
- * Custom designs for your particular application requirements.

Two Stage Example:

Series: 550=Without Relief 55R=With Relief

Low Pressure Bore in Eighths

High Pressure Bore in Eighths

550 - 12 5 B - 24 - XXXX

Relief Setting PSI Omit for 550 Series

Handle Length: 24" is standard

Seals: B=Buna, V=Viton, E=EPR

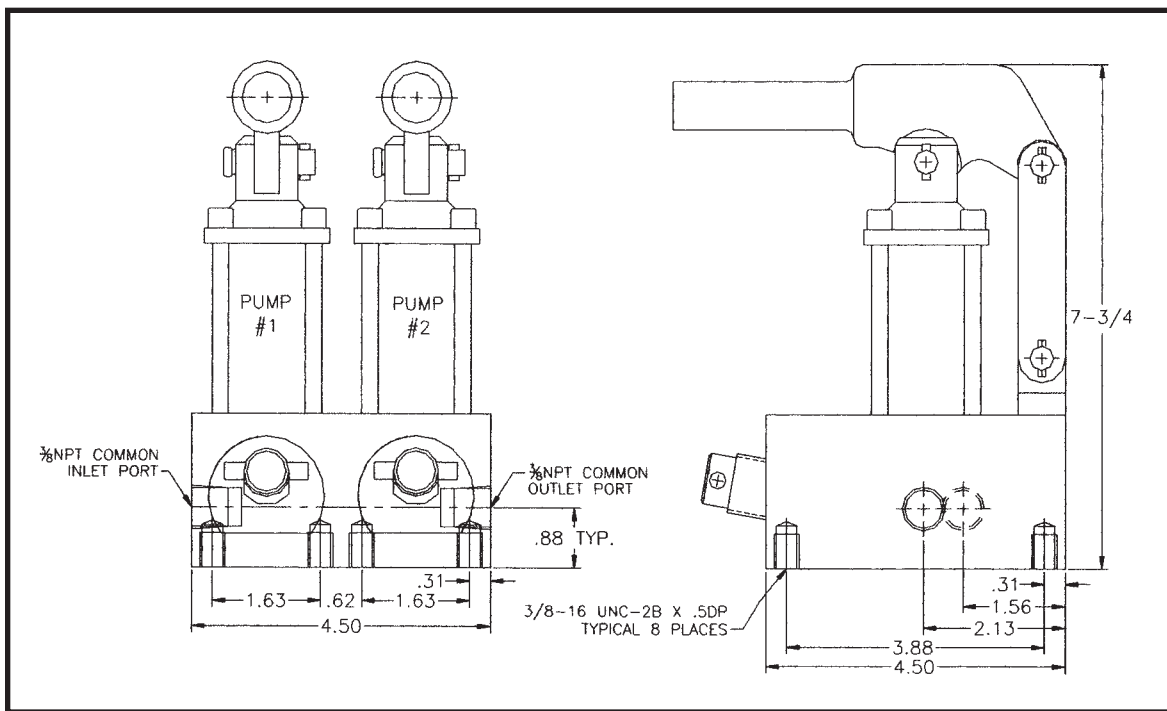
Model Number	Maximum Rated Pressure	Low Pressure Piston Diameter	High Pressure Piston Diameter	Cubic Inches/Stroke		Weight
				Low Pressure	High Pressure	
550-124	5000	1-1/2	1/2	2.1	.26	12
550-125	5000	1-1/2	5/8	2.1	.40	12
550-126	3500	1-1/2	3/4	2.1	.58	12

- WARNING -

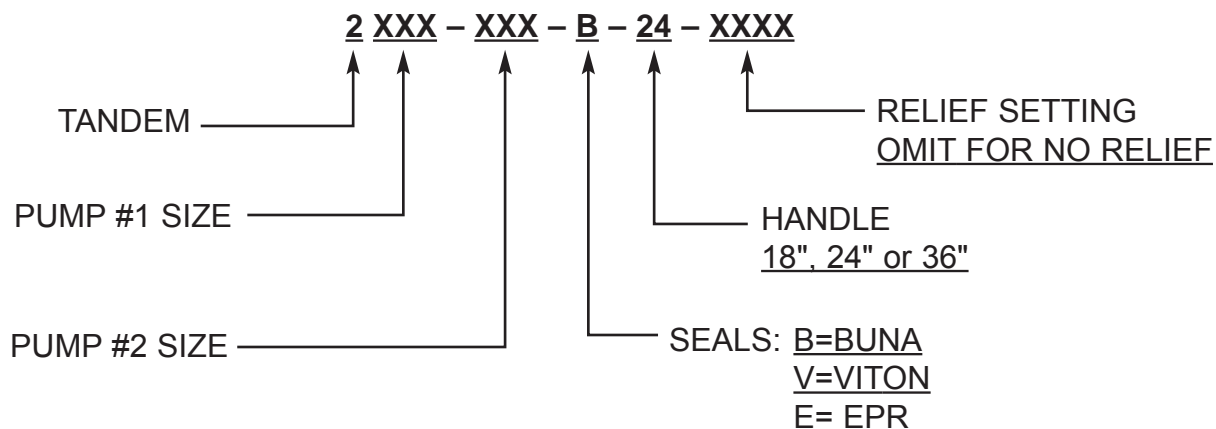
NO internal relief valve is supplied with these pumps unless ordered as an OPTION. Therefore, for safety purposes, it is necessary to plumb a relief valve, on the outlet of these pumps, which is appropriately set below the lowest maximum rating of any system component.

TANDEM PUMPS

Tandem configuration pumps combine any two modular pumps into a single unit. This configuration can yield up to three different displacements and is available with common or separate inlets and outlets. Reservoirs and mounting plates can be added to complete the package. All of the same standard and optional features from the 500/550 series are included in the tandem pumps. A special handle assembly is provided as standard to operate both pumps or just one. Triple and quadruple units are also available consult the factory for details.



ORDERING INFORMATION

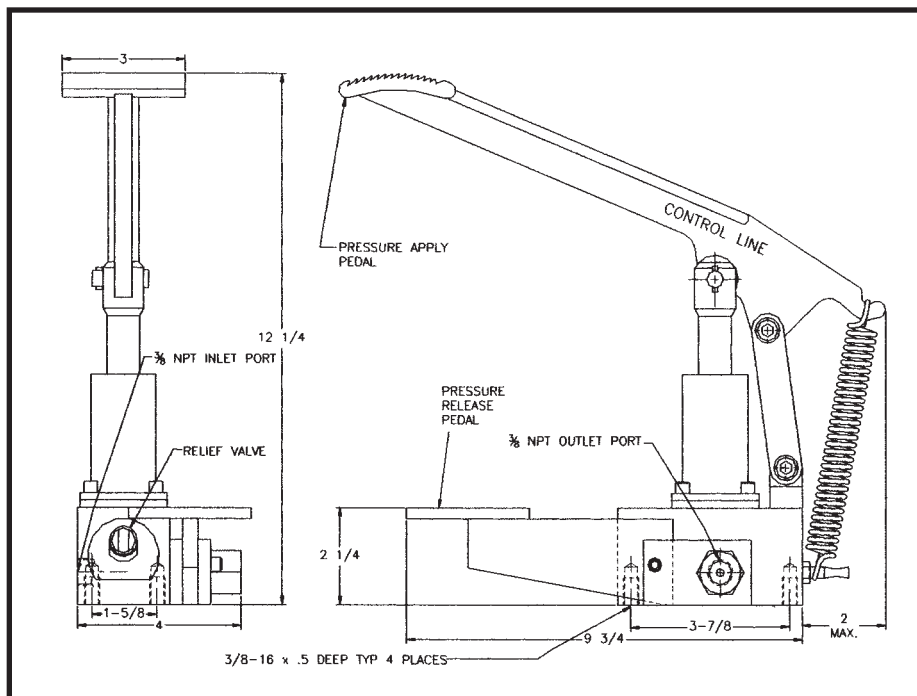


Standard sizes are 030 for 3/8, 040 for 1/2", 050 for 5/8", 060 for 3/4", 080 for 1", 120 for 1-1/2", 124 -125-126 are for two stage configurations. Any two size pumps can be combined, maximum pressure rating is a function of the final configuration, consult engineering for rating. When operated together the displacements and handle forces are cumulative, add for total displacement and force.

Standard configuration is for a common inlet and common outlet, if required a common inlet with separate outlets is available – consult factory.

FOOT OPERATED PUMPS

The 60R/65R Series foot operated hydraulic pumps extend the range of operation for those applications where a hand pump is not ergonomic or practical. Any of the single stage pump 1/2" bore and greater or two-stage pump configurations can be incorporated into the foot pump and where necessary a reservoir can be included to complete the package. As standard the foot-operated pump utilizes one pedal to pump and a separate pedal to release pressure. A relief valve is also standard for foot-operated pumps. Displacements are the same as hand operated pumps, pedal forces and maximum rated pressures are shown below.



ORDERING INFORMATION

6 XX - XXXB - FF - XXXX

FOOT PUMP ————
PUMP TYPE ————
0R = SINGLE STAGE
5R = TWO-STAGE

RELIEF SETTING
FOOT OPERATED BOTH PEDALS

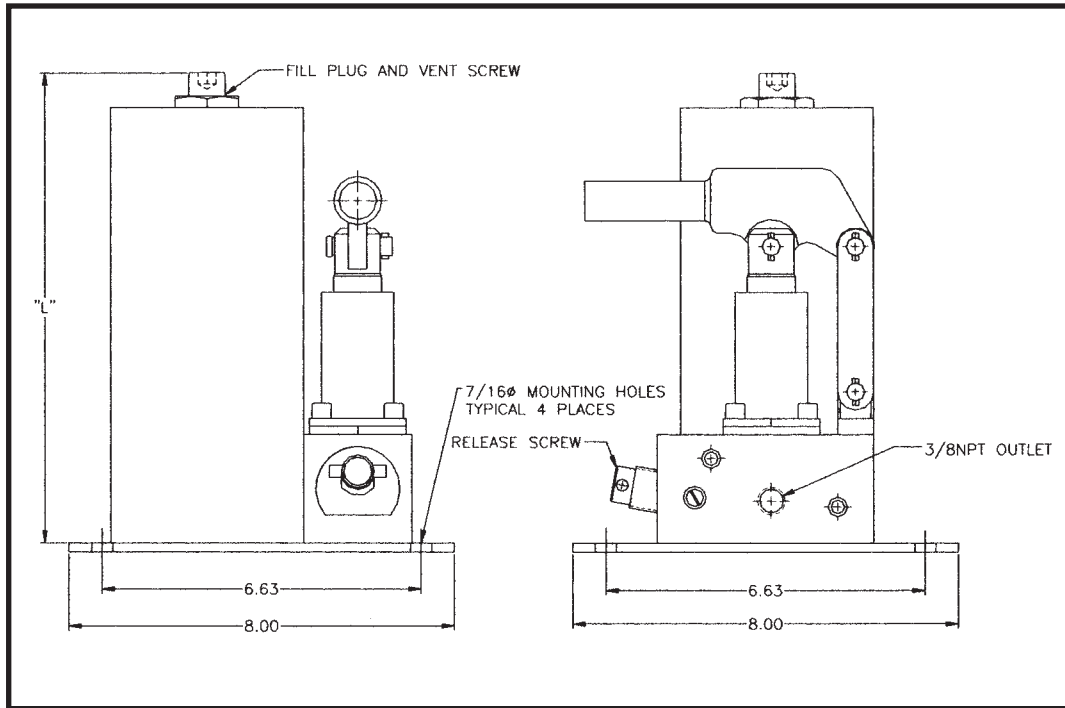
PUMP SIZE:
040 = 1/2" 124 = 1-1/2 X 1/2
050 = 5/8" 125 = 1-1/2 X 5/8
060 = 3/4" 126 = 1-1/2 X 3/4
080 = 1"
120 = 1-1/2"

SEALS:
B=BUNA
V=VITON
E=EPR

MODEL NUMBER	MAXIMUM RATED PRESSURE	PISTON DIAMETER	PEDAL FORCE PER 100PSI	WEIGHT
60R-040	5000	1/2	2.8	16
60R-050	2500	5/8	4.4	16
60R-060	1750	3/4	6.4	16
60R-080	1000	1	11.4	16
60R-120	500	1-1/2	11.4	16
65R-124	5000	1-1/2 x 1/2	2.8	17
65R-125	2500	1-1/2 x 5/8	4.4	17
65R-126	1750	1-1/2 x 3/4	6.4	17

PUMP & RESERVOIR ASSEMBLIES

The unique all bolt together construction of Control Line pump and reservoir assemblies offer the design engineer the most flexible package to meet most all application needs. Any of the single stage or two-stage pumps can be incorporated, as standard, tandem pumps with reservoirs are available as special order products. The all steel modular construction extends the heavy duty, rugged construction of the pumps into the complete hydraulic power source. Since the units bolt together we can modify any one of the components to meet your application requirements while utilizing standard parts for overall cost savings.



"L" = 7-3/4" for the 80 cubic inch reservoir and 13-1/2" for the 160 cubic inch size, consult the factory for custom size reservoir requirements.

ORDERING INFORMATION

1 XXX - XXX X B - 24 - XXXX

PUMP & RESERVOIR

PUMP TYPE

500, 50R, 550, 55R, 60R, 65R

PUMP SIZE

030,040,050,060,080,120,124,125,126

RELIEF SETTING
OMIT FOR NO RELIEF

HANDLE

18", 24", 36" OR "FF" FOR FOOT PUMP

SEAL TYPE

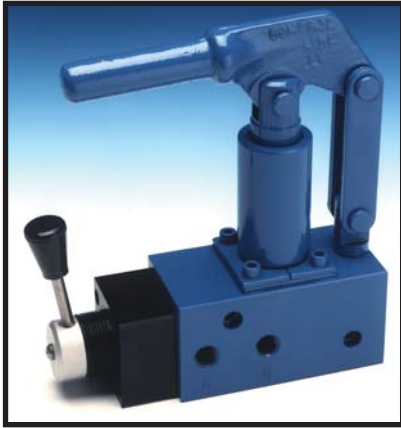
B= BUNA, V=VITON, E=EPR

RESERVOIR CAPACITY

A= 80 Cubic inch, B= 160 Cubic inch, X= Special

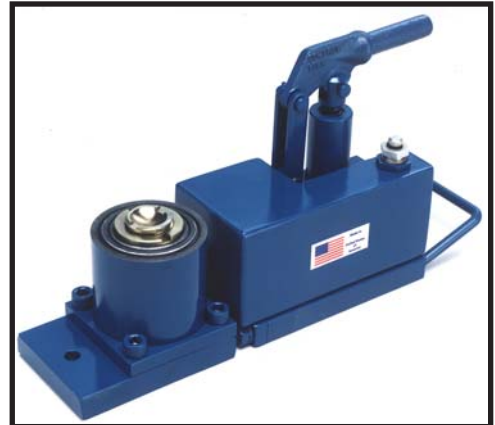
Standard units are shipped without oil and unpainted. Units should be mounted with the fill plug up as shown, the vent screw must be open during operation to prevent malfunction.

MODIFIED PRODUCTS

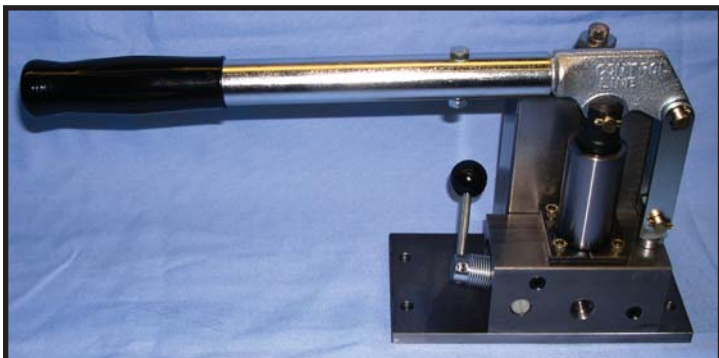


The hand pump with integral 4-way directional control valve incorporates a near zero leak shear seal manual type valve. The 4-way valve can control double acting cylinders or two separate cylinders from one pump. This style of pump can also include a reservoir and base plate to complete the hydraulic power package. There are several configurations for the 4-way including open center, closed center and tandem center. Contact our engineering department with your application specifics.

The integrated package shown at the right is an example of a standard pump manifold mounted to a custom base plate and special reservoir. Completing the package is a two-stage telescopic cylinder assembly. Since the assembly bolts together any one of the components could be changed to a different unit to create a new configuration for similar applications. The modular building style also makes service easier for the field personnel.



The modified pump shown on the left was designed to meet challenging specifications for a customer that required a custom adjustable operating handle interface, non-standard port sizes and a special design for the release screw. We are able to incorporate all of the customer requirements into the final unit so that no field modifications are needed. This saves OEM and user customers both time and money.



The package shown at the left is a modified pump and reservoir assembly. The customer needed a mount for mount interchange for an existing unit, so we provided a custom base plate, reservoir and also provided them with special plating on the linkage assembly. Our package reduced the number of strokes required for their application by 75%, improving overall efficiency.

CUSTOM PRODUCTION



The pump shown on the left is a custom built all Stainless Steel, double acting unit built for use on offshore equipment in a marine environment as the emergency power source used to open or close watertight passage doors. This pump features a displacement of over 4 cubic inches per complete stroke and is rated for 1000PSI service. Oversize internal passages and ports allow for maximum fluid displacement in an application where output flow is critical.

The pump on the right is a special fluid transfer style unit made from aluminum and zinc plated steel. Designed for use in transferring fluid from a portable fluid service cart to the reservoirs onboard mobile equipment. The handle force, displacement and seal compatibility are key to this type of application.



CONSULT THE FACTORY AT THE NUMBERS BELOW FOR OTHER CUSTOM UNITS



DISTRIBUTED BY:

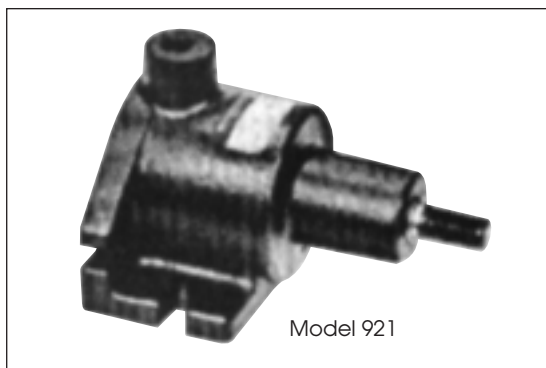
CONTROL LINE EQUIPMENT, INC.

14750 INDUSTRIAL PARKWAY
(216) 433-7766
www.control-line.com

CLEVELAND, OHIO 44135
FAX: (216) 433-7664
sales@control-line.com



Series 900 Clamping Cylinders



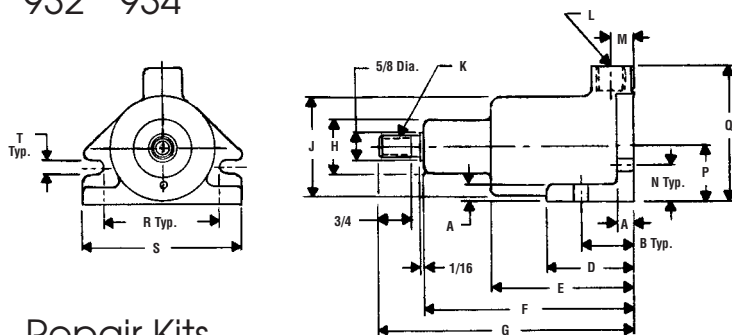
Application Information

- Single acting, spring return cylinder available in 2", 3" or 4" bore sizes in 1" and 2" stroke lengths.
- Cast aluminum body is corrosion resistant.
- Body is designed for horizontal or vertical mounting. Slotted mounting holes permit fast and easy installation or relocation.
- For air service up to 150 PSI.
- Stress proofed steel chrome plated piston rod.
- Available with threaded and non-threaded piston rods.

Ordering Information: Select three digit model number which pertains to bore and stroke from chart below.

Models

921 923
922 924
931 933
932 934

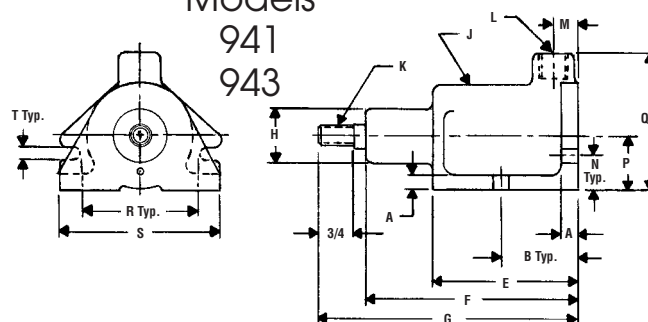


Repair Kits

MODELS	NO.
921, 922, 923, 924	7021
931, 932, 933, 934	7023
941, 942, 943, 944	7025

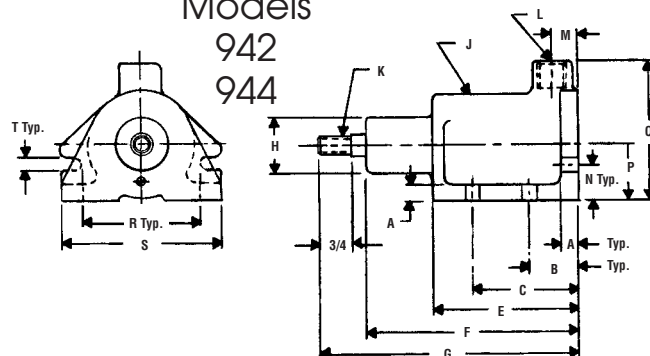
Models

941
943



Models

942
944



Dimensions

Model No.	Th'd. Rod No.	Non-Th'd. Rod No.	Bore Dia. In.	Stroke In.	Spring Force Lbs.	A	B	C	D	E	F	G	H Dia.	J Dia.	K Th'd.	L NPTF	M	N	P	Q	R	S	T
921	923		2	1	9-18	3/8	1-3/16	-	2	2-1/8	3-3/4	4-3/4	1-1/4	2-3/8	1/2-13	1/8-27	35/64	27/32	1-9/32	3-7/32	2-5/8	3-5/8	9/32
922	924		2	2	7-23	3/8	1-3/16	-	2	3-1/8	4-3/4	5-3/4	1-1/4	2-3/8	1/2-13	1/8-27	35/64	27/32	1-9/32	3-7/32	2-5/8	3-5/8	9/32
931	933		3	1	20-38	1/2	1-1/4	-	2-1/16	2-3/8	4-3/16	5-3/16	1-3/8	3-3/8	1/2-13	1/4-18	19/32	1-7/32	1-27/32	4-11/32	3-5/8	4-7/8	13/32
932	934		3	2	20-55	1/2	1-1/4	-	2-1/16	3-3/8	5-3/16	6-3/16	1-3/8	3-3/8	1/2-13	1/4-18	19/32	1-7/32	1-27/32	4-11/32	3-5/8	4-7/8	13/32
941	943		4	1	25-30	1/2	1-11/16	-	-	2-23/32	5-13/32	6-13/32	2	4-1/2	3/4-10	1/4-18	3/4	1-3/8	2-3/8	5-5/16	4-11/16	6	7/16
942	944		4	2	20-30	1/2	1-3/16	2-5/8	-	3-23/32	6-13/32	7-13/32	2	4-1/2	3/4-10	1/4-18	3/4	1-3/8	2-3/8	5-5/16	4-11/16	6	7/16

CONTROL LINE EQUIPMENT, INC.

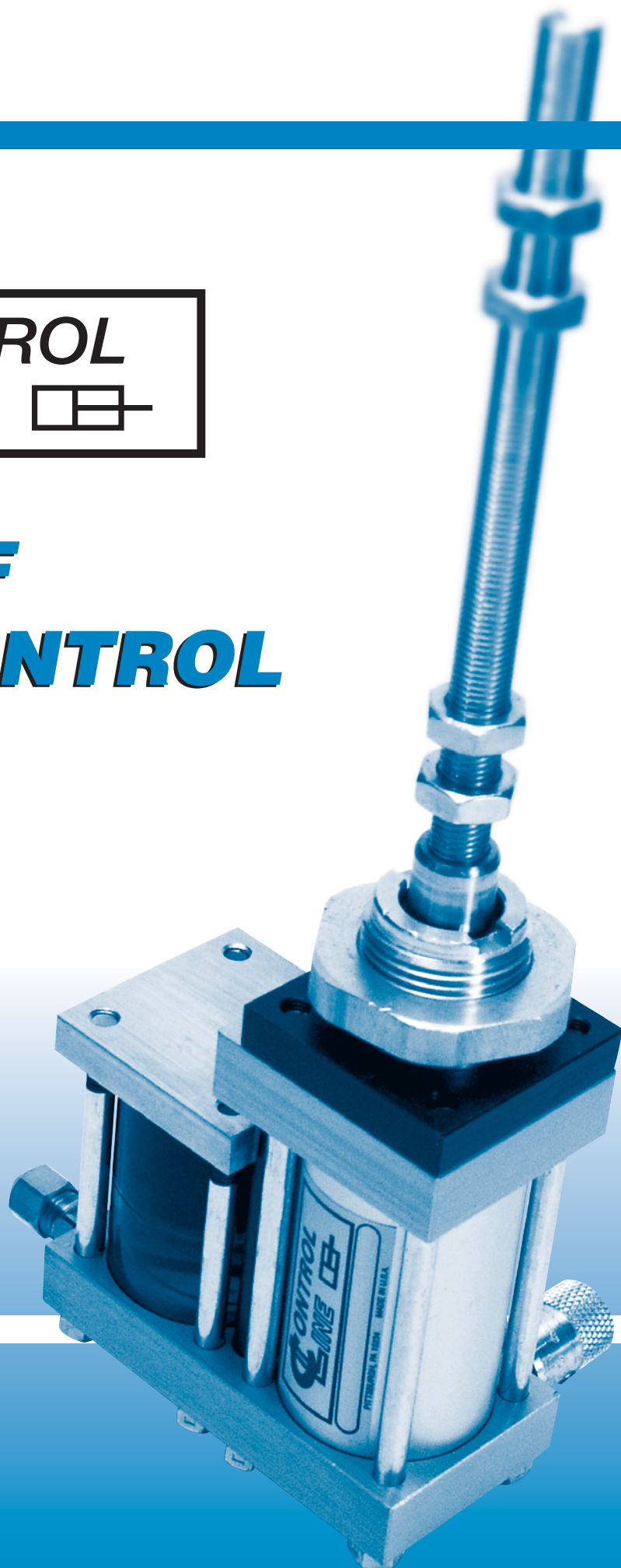
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(216) 433-7766 • FAX: (216) 433-7664



National
FLUID POWER
Association
MEMBER



SERIES F FEED CONTROL



**Smooth control of
air cylinders and
other linear
motions**

SERIES F FEED CONTROL

General Information

The Series F Feed Control is a closed-circuit, self-contained hydraulic metering device. When mechanically coupled to some other linear motion, it provides an accurate, determinable, and smooth feed rate for the device being controlled. The feed rate can be varied as required by adjusting the metering device in the closed system.

It especially provides an economic solution to the long-standing problem of controlling air cylinders. Because of air's compressibility, precise control of air cylinders, by themselves, is not possible in many applications. Therefore, expensive alternate hydraulic or mechanical systems had to be used, despite the basic advantages of air circuitry: low cost, easy maintenance, and almost universal availability of air supply.

The Feed Control has followed the established Control Line tradition of superior design for the maximum in reliability and lowest level of maintenance.

Some of the design specifications and features that assure operating reliability are:

- **Block-Vee dynamic seals to help achieve leak free service.**
- **2 piece construction and rod assembly consists of a 5/8" piston rod and a 7/16" threaded stud, offering greater resistance to rod shearing than is available in single unit constructions.**
- **The piston rod is hard chrome plated to prevent shaft nicks and scratches which could damage seals and result in leakage.**
- **Hard coated aluminum tubing resists scoring and potential seal damage and resultant leakage.**
- **Extra long nonmetallic reinforced PTFE rod and piston bearings provide exceptionally long life to all moving parts.**
- **The sealed compensator assembly consists of compressible rubber discs which expand and contract with the flow of oil, obsoleting the need for a compensator piston and rod assembly.**

Valve Options

Skip Feed and Stop Feed valves provide additional speed control features to the basic Feed Control and consist of either an air pilot operated or solenoid operated valve. A minimum operating air pilot pressure of 35 PSI is required by both valves, although up to 80 PSI may be needed for high speed, high cycle applications. The valves are mounted on the side of the unit with the feed rate adjustment incorporated into the valve stack. A calibrated adjustment knob is standard on all Feed Control models with optional valving. See the illustrations on the back cover.

Stop Feed

A Stop Feed valve allows a Feed Control to be halted at any point of its controlled feed, dwell and then restart. Mounted in front of, and in series with the adjustable orifice, the stop valve blocks the internal flow of fluid when activated. Deactivating the valve opens the flow path and the unit continues its slow controlled feed. The stop valve does not affect flow through the piston and cannot stop the unit during rapid return.

Skip Feed

The Skip Feed uses the same valves as the Stop Feed, but changes their position and the internal flow path. Mounted behind the adjustable orifice and parallel to it, the Skip Feed valve bypasses the restriction and allows free flow when deactivated. When activated, the free flow path is blocked and the fluid is forced through the adjustable orifice, putting the unit back into controlled feed.

Skip-Stop Feed

Both Skip Feed and Stop Feed valves can be combined on a single Feed Control. Multiple feed rates can be obtained by adding skip valves and adjustable orifices to the valve stack. The stop function can be added by placing a valve in front of the adjustable orifice. Double feed units require a separate valve stack to control the feed in each direction.

Forward Feed Model

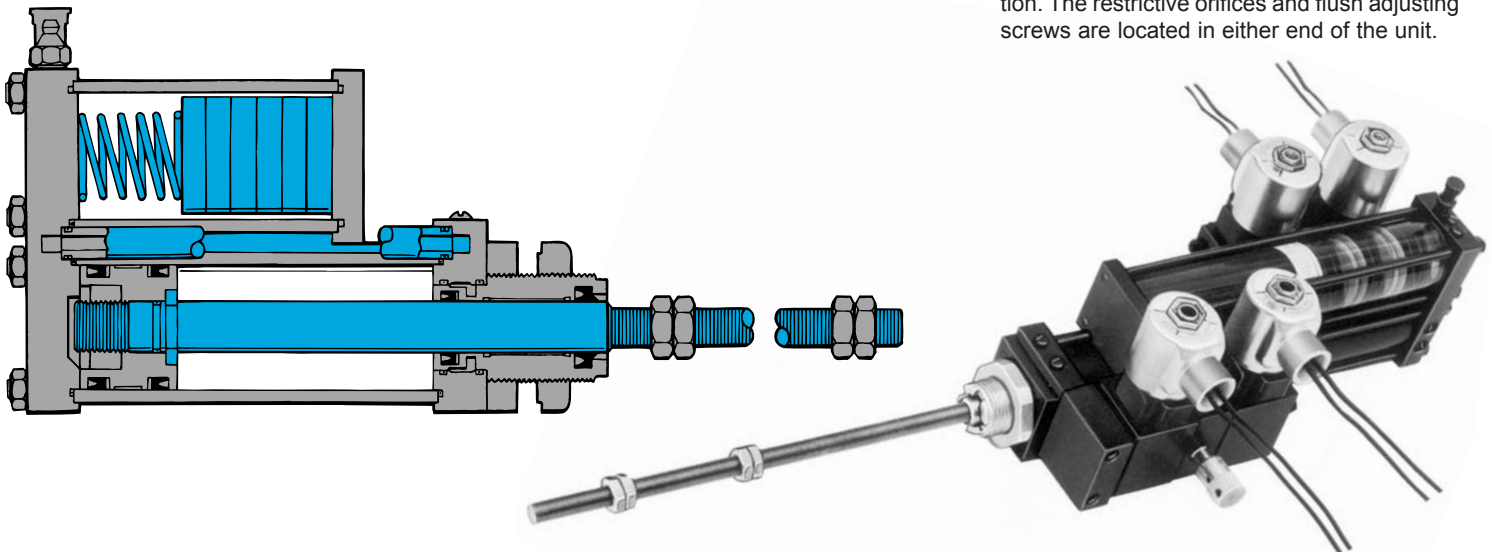
The piston for the forward feed unit has a flapper style check valve which is held closed when the piston moves forward. This closes the passageways in the piston and forces the oil through a restrictive orifice which controls the feed rate. When the piston is retracted, fluid pressure opens the check valve and oil flows freely through the piston.

Reverse Feed Model

The reverse feed model is the exact opposite of the forward feed. When the piston is moved forward, the check valve opens and the piston moves without restriction. In the opposite direction, however, the valve closes and oil is again forced through a restrictive orifice to control the feed rate. The restrictive orifice is located in the rear block of the reverse feed unit.

Double Feed Model

A double feed unit is used whenever the feed rate must be controlled in both directions. The piston on this type of Feed Control does not have any passageways and always forces the oil to flow through a restrictive orifice. However, since different feed rates may be required in each direction, a double feed unit utilizes two restrictive orifices with separate adjustments and internal check valves to ensure independent operation in each direction. The restrictive orifices and flush adjusting screws are located in either end of the unit.



Design Features

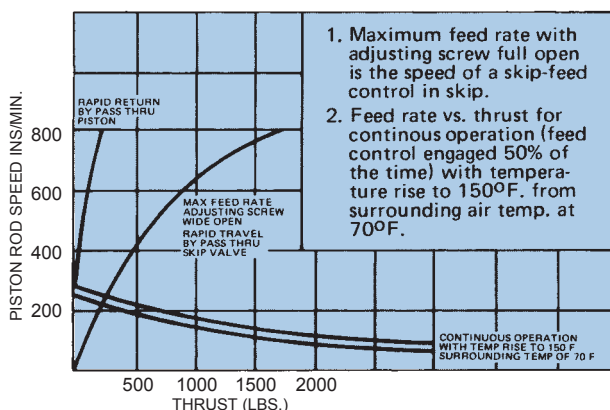
Maximum Feed Rate	150-400" / minute*
Minimum Feed Rate	4" / minute
Maximum Thrust	2,000 lbs.†
Maximum Operating Temperature	175° F
Maximum Creep, Stop Valve Activated**004" first minute .010" after five minutes

* Maximum speed is a function of thrust, and is limited by temperature rise, and valving configuration.

** Powered by 2.5 inch bore cylinder at 80 psi.

† 3000 lb. thrust version available. Consult factory.

Temperature Limitation Curve Thrust vs. Feed Rate



Construction

End Plates	Aluminum
Piston Rod	Chrome Plated Steel
Cylinder Tube	Hard Coated Aluminum
Reservoir Tube	Thermoplastic
Rapid Traverse Nuts	Steel
Rod and Piston Bearing	PTFE
Seals	Block Vee, Buna-N
Valve Blocks	Aluminum

Speed Control for Linear Motion

Control Functions

A Feed Control includes many standard features which allow easy adaptation to almost any given set of control requirements. Three different models are available to satisfy the need for forward, reverse or double feed operation. Each model uses a different piston and valving arrangement to regulate the flow of oil. If only a portion of the cycle needs to be controlled, rapid traverse nuts permit rapid advance. By turning the flush adjusting screw, the unit may be calibrated to provide the exact feed rate required and, for applications which require the unit to stop, skip, or a combination of both, optional valving is also available.

Feed Rate Adjustment

The restrictive orifice which controls the feed rate consists of a small needle valve. Turning the flush adjusting screw raises or lowers the needle to either open or close the orifice. And since flow passes through an orifice at fixed rate at a given pressure, the feed rate can be precisely controlled. The adjusting screw is located in the head on forward feeds, the cap on reverse feeds, and in both locations on double feeds. An Allen screw is utilized to adjust the feed rate, however if adjustment must be made frequently, an optional calibrated knob is available for accurate resetting.

Rapid Traverse Adjustment

Rapid traverse is the ability to engage a Feed Control at any point in the cycle without using external valving. This is accomplished through the use of an extended, threaded piston rod and rapid traverse nuts, both of which are standard on all Feed Control units. Optional lengths are shown on the back cover. A tie bar which moves freely along the extended piston rod is securely fastened to the machine member being controlled. This allows the machine and the tie bar to move freely without engaging the Feed Control. The rapid traverse nuts are then positioned so that the tie bar strikes them at the point where the feed rate needs to be controlled. The machine's feed rate would then be regulated by the Feed Control.

Independent Mounting

Control Line's Feed Control can be mounted directly to a machine by means of the front nose mount or with the optional clevis. As with any cylinder application, care should be taken to ensure proper alignment between the unit and the machine to prevent excessive wear.

Parallel Coupling

A Feed Control can also be mounted on top of a cylinder and connected by a mounting plate and tie bar. Because of the opposing offset forces, a bending movement is created when using parallel coupling. A special effort should be made so that the machine absorbs most of the bending movement.

To accommodate the mounting plate and tie bar, all *Control Line* cylinders require a special rod extension when parallel coupled to a Feed Control. The required dimensions tabulated below are automatically supplied when a parallel coupled Feed Control/cylinder unit is ordered.

SERIES B

Bore Size	A	C
1-1/2	1.968"	1.081"
2, 2-1/2"	2.125"	1.081"
3-1/4", 4, 5	2.937"	.893"
6	4.125"	.612"

SERIES D

Model	A	C
12, 30	1.937"	1.488"
24, 49, 70	3.00"	1.268"
96, 160	3.50"	1.143"

SERIES K

Bore Size	A	C
1-1/2	1.968"	.706"
2, 2-1/2"	2.125"	.706"
3-1/4", 4, 5	2.937"	.500"
6	4.125"	.562"

Tandem Coupling

With tandem coupling, the Feed Control is connected to the back of the cylinder and the two piston rods are joined together. While this mounting method eliminates the bending movement, it also necessitates the use of a skip valve for rapid traverse. This mounting method is also available with *Control Line's* Series B or Series K cylinders. Feed Control stroke must be at least equal to cylinder stroke.

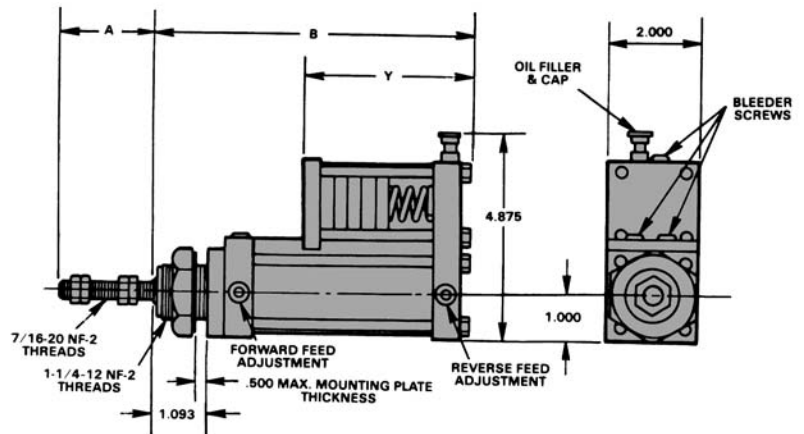
How to Order

Specify:

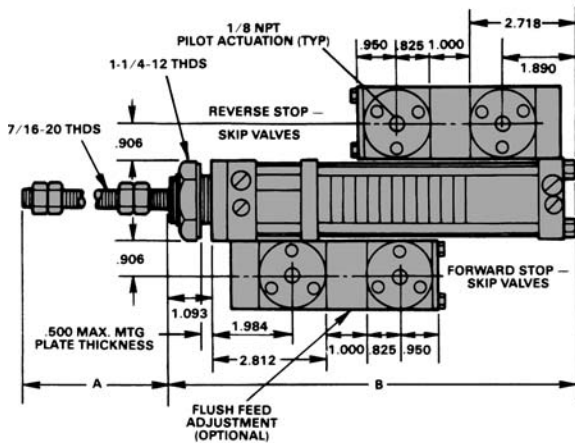
1. Quantity
2. Model Number
 - F8323** Forward Feed
 - R8323** Reverse Feed
 - D8323** Double Feed
3. Stroke Length
 - 2", -4", etc.**
4. Valve Options
 - sk** Skip Feed
 - st** Stop Feed
 - sk/-st** Skip/Stop Feed

(On double feed units, specify what control is needed in which direction.)
5. Valve Operator
 - E** Solenoid operated (specify voltage)
6. Mounting Kits
 - Specify if factory assembly is required
 - 8321** Parallel Coupling (specify cylinder model)
 - 8938** Tandem Coupling (specify cylinder model)
7. Accessories
 - CB** Factory assembled clevis mount
 - 1579** Oil Filling Kit
 - 1626** Feed Control Oil
 - CK** Calibrated Knob

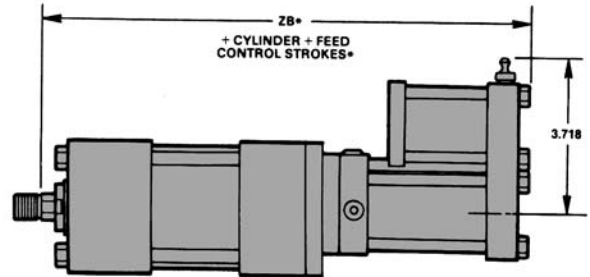
Standard Feed Stroke	A	B	Y	Net. Weight
1-1/2	6	5-5/8	3-5/16	6.1#
2	6	6-1/8	3-5/16	6.3
3	6	7-1/8	4-7/32	7.0
4	10	8-1/8	5-1/8	7.8
6	10	10-1/8	7-3/16	9.5
9	10	13-1/8	10-9/64	10.8
12	12	16-1/8	15-51/64	14.2
15	15	19-1/8	15-51/64	14.2
18	18	22-1/8	18-25/32	15.8



AIR PILOT VALVE OPTION

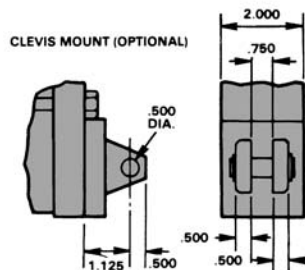


Bore Size	ZB
1-1/2	8-17/32
2	8-17/32
2-1/2	8-21/32
3-1/4	9-25/32
4	9-25/32
5	10-1/32
6	10-29/32

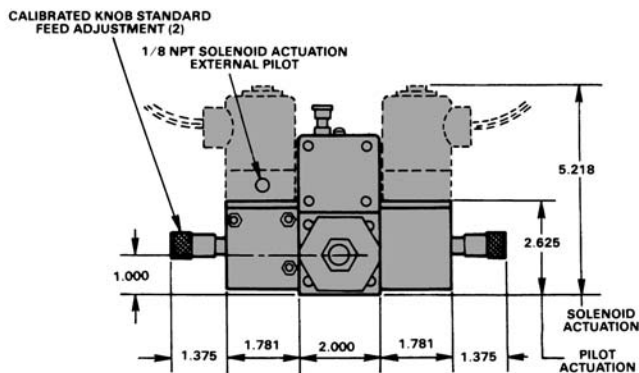


SERIES B CYLINDER TANDEM-COUPLED TO F8323 CONTROL

* Add cylinder stroke and feed stroke to "ZB" dimension to obtain overall length to shoulder of piston rod. Standard "ZB" dimension applies only to Series B cylinders with standard rod diameter and standard "C" rod extension.



SOLENOID OPERATED VALVE OPTION



CONTROL LINE EQUIPMENT, INC.

14750 Industrial Pkwy.

Cleveland, Ohio 44135

(216) 433-7766

Fax (216) 433-7664

Website: www.control-line.com

E-mail: sales@control-line.com

BRASSLINE CYLINDERS



— 3/8" TO 2" BORES —

— 6 MOUNTING STYLES —

— MOUNTING ACCESSORIES —

— 250 PSI AIR, 500 PSI HYDRAULIC —

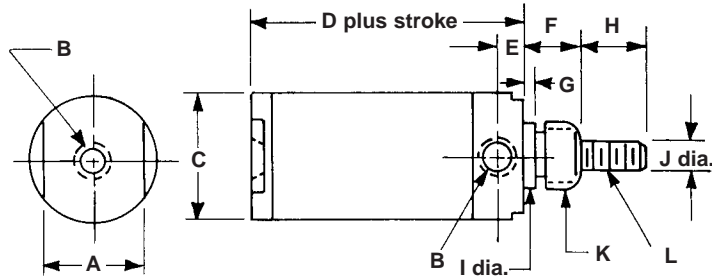
— SPECIAL CONFIGURATIONS AVAILABLE —



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CONTROL LINE EQUIPMENT, INC.

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Bore	A	Two Places B	C	D	E	F	G	H	I	J	K	L	Model Numbers	
													Single Acting	Double Acting
3/8"	3/8	10-32NF	9/16	1-11/16*	7/32	9/16	7/64	5/8	.529	3/16	1/2-20NF	10-32NF	1110101	1120101
1/2"	9/16	10-32NF	3/4	1-11/16*	7/32	9/16	7/64	5/8	.529	3/16	1/2-20NF	10-32NF	1110201	1120201
3/4"	11/16	1/8-27NPT	1	1-31/32*	19/64	19/32	7/64	1	.684	1/4	5/8-18NF	1/4-28NF	1110301	1120301
1"	1	1/8-27NPT	1-1/4	1-31/32†	19/64	19/32	7/64	1	.684	5/16	5/8-18NF	5/16-24NF	1110401	1120401
1-1/8"	1-1/8	1/8-27NPT	1-3/8	1-31/32†	19/64	19/32	7/64	1	.684	5/16	5/8-18NF	5/16-24NF	1110501	1120501
1-1/2"	1-1/2	1/8-27NPT	1-3/4	2-5/8★	3/8	13/16	3/16	1	1.122	1/2	1-14NF	1/2-20NF	1110601	1120601
2"	1-3/4	1/4-18NPT	2-1/4	2-5/8★	3/8	1	3/16	1-7/8	1.373	5/8	1-1/4-12NF	5/8-18NF	1110701	1120701

Note: For Single Acting Spring Return Cylinders — Add To Base Length

*1" For Strokes 0" to 1-1/4"

*1-1/2" For Strokes 1-5/16" to 4-1/4"

*2" For Strokes 4-5/16" to 5-1/4" (3/4" Bore only)

★1-1/2" For Strokes 0" to 2"

★2" For Strokes 2-1/8" to 4"

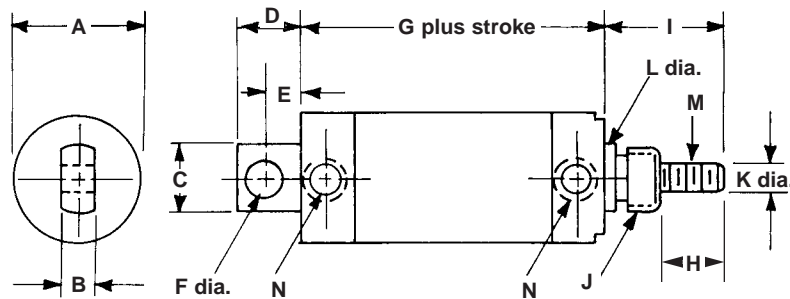
★3" For Strokes 4-1/8" to 8"

†0" For Strokes 0" to 1-1/8" (1" for spring extended single acting)

†1" For Strokes 1-1/4" to 4-1/2"

†1-1/2" For Strokes 4-5/8" to 6-1/2"

†2" For Strokes 6-5/8" to 8-1/2"



Bore	A	B	C	D	E	F	G	H	I	J	K	L	M	Two Places N	Model Numbers	
															Single Acting	Double Acting
3/8"	9/16	.248	1/2	5/8	5/16	.261	1-7/8*	5/8	1-3/16	1/2-20NF	3/16	.529	10-32NF	10-32NF	1110102	1120102
1/2"	3/4	.248	1/2	5/8	5/16	.261	1-7/8*	5/8	1-3/16	1/2-20NF	3/16	.529	10-32NF	10-32NF	1110202	1120202
3/4"	1	.248	5/8	5/8	5/16	.261	2-5/16*	1	1-19/32	5/8-18NF	1/4	.684	1/4-28NF	1/8-27NPT	1110302	1120302
1"	1-1/4	.375	3/4	23/32	13/32	.313	2-5/16†	1	1-19/32	5/8-18NF	5/16	.684	5/16-24NF	1/8-27NPT	1110402	1120402
1-1/8"	1-3/8	.375	3/4	23/32	13/32	.313	2-5/16†	1	1-19/32	5/8-18NF	5/16	.684	5/16-24NF	1/8-27NPT	1110502	1120502
1-1/2"	1-3/4	.615	1-3/8	1-3/8	11/16	.375	3-1/8★	1	1-13/16	1-14NF	1/2	1.122	1/2-20NF	1/8-27NPT	1110602	1120602
2"	2-1/4	.740	1-1/2	1-3/8	3/4	.500	3-1/8★	1-7/8	2-7/8	1-1/4-12NF	5/8	1.373	5/8-18NF	1/4-18NPT	1110702	1120702

Note: For Single Acting Spring Return Cylinders — Add To Base Length

*1" For Strokes 0" to 1-1/4"

*1-1/2" For Strokes 1-5/16" to 4-1/4"

*2" For Strokes 4-5/16" to 5-1/4" (3/4" Bore only)

★1-1/2" For Strokes 0" to 2"

★2" For Strokes 2-1/8" to 4"

★3" For Strokes 4-1/8" to 8"

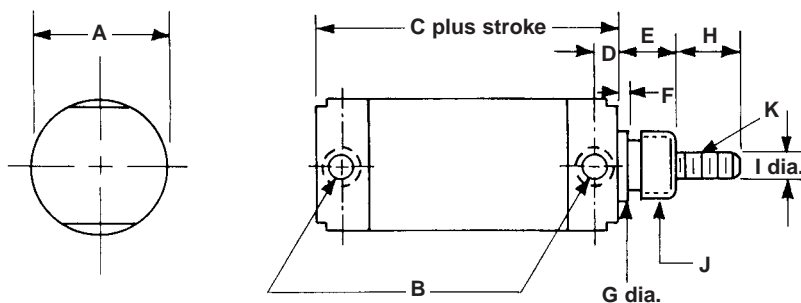
†0" For Strokes 0" to 1-1/8" (1" for spring extended single acting)

†1" For Strokes 1-1/4" to 4-1/2"

†1-1/2" For Strokes 4-5/8" to 6-1/2"

†2" For Strokes 6-5/8" to 8-1/2"

HOW TO ORDER: WHEN ORDERING PLEASE SPECIFY MODEL NO. – STROKE – PLAIN ROD END IF DESIRED – MOUNTING BRACKETS (IF REQUIRED). FOR SPRING EXTENDED SINGLE ACTING MODEL NO. SPECIFY 113XXXX. SEE PAGES 6 & 7 FOR OPTION CODES AND ADDITIONAL ORDERING INFORMATION.



Bore	A	Two Places B	C	D	E	F	G	H	I	J	K	Model Numbers	
												Single Acting	Double Acting
3/8"	9/16	10-32NF	1-7/8*	7/32	9/16	7/64	.529	5/8	3/16	1/2-20NF	10-32NF	1110105	1120105
1/2"	3/4	10-32NF	1-7/8*	7/32	9/16	7/64	.529	5/8	3/16	1/2-20NF	10-32NF	1110205	1120205
3/4"	1	1/8-27NPT	2-5/16*	19/64	19/32	7/64	.684	1	1/4	5/8-18NF	1/4-28NF	1110305	1120305
1"	1-1/4	1/8-27NPT	2-5/16†	19/64	19/32	7/64	.684	1	5/16	5/8-18NF	5/16-24NF	1110405	1120405
1-1/8"	1-3/8	1/8-27NPT	2-5/16†	19/64	19/32	7/64	.684	1	5/16	5/8-18NF	5/16-24NF	1110505	1120505
1-1/2"	1-3/4	1/8-27NPT	3-1/8★	3/8	13/16	3/16	1.122	1	1/2	1-14NF	1/2-20NF	1110605	1120605
2"	2-1/4	1/4-18NPT	3-1/8★	3/8	1	3/16	1.373	1-7/8	5/8	1-1/4-12NF	5/8-18NF	1110705	1120705

Note: For Single Acting Spring Return Cylinders — Add To Base Length

*1" For Strokes 0" to 1-1/4"

*1-1/2" For Strokes 1-5/16" to 4-1/4"

*2" For Strokes 4-5/16" to 5-1/4" (3/4" Bore only)

†0" For Strokes 0" to 1-1/8" (1" for spring extended single acting)

†1" For Strokes 1-1/4" to 4-1/2"

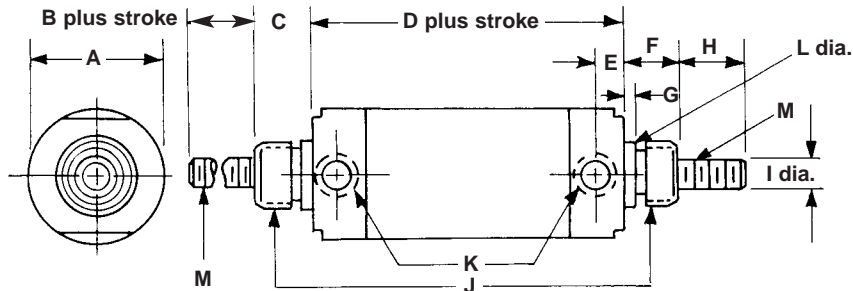
†1-1/2" For Strokes 4-5/8" to 6-1/2"

†2" For Strokes 6-5/8" to 8-1/2"

★1-1/2" For Strokes 0" to 2"

★2" For Strokes 2-1/8" to 4"

★3" For Strokes 4-1/8" to 8"



Bore	A	B	C	D	E	F	G	H	I	Two Places J	Two Places K	Two Places L	Two Places M	Model Numbers	
														Single Acting	Double Acting
3/4"	1	1	19/32	2-5/16*	19/64	19/32	7/64	1	1/4	5/8-18NF	1/8-27NPT	.684	1/4-28NF	1150304	1180304
1"	1-1/4	1	19/32	2-5/16†	19/64	19/32	7/64	1	5/16	5/8-18NF	1/8-27NPT	.684	5/16-24NF	1150404	1180404
1-1/8"	1-3/8	1	19/32	2-5/16†	19/64	19/32	7/64	1	5/16	5/8-18NF	1/8-27NPT	.684	5/16-24NF	1150504	1180504
1-1/2"	1-3/4	1	13/16	3-1/8★	3/8	13/16	3/16	1	1/2	1-14NF	1/8-27NPT	1.122	1/2-20NF	1150604	1180604
2"	2-1/4	1-7/8	1	3-1/8★	3/8	1	3/16	1-7/8	5/8	1-1/4-12NF	1/4-18NPT	1.373	5/8-18NF	1150704	1180704

Note: For Single Acting Spring Return Cylinders — Add To Base Length

*1" For Strokes 0" to 1-1/4"

*1-1/2" For Strokes 1-5/16" to 4-1/4"

*2" For Strokes 4-5/16" to 5-1/4"

†0" For Strokes 0" to 1-1/8"

†1" For Strokes 1-1/4" to 4-1/2"

†1-1/2" For Strokes 4-5/8" to 6-1/2"

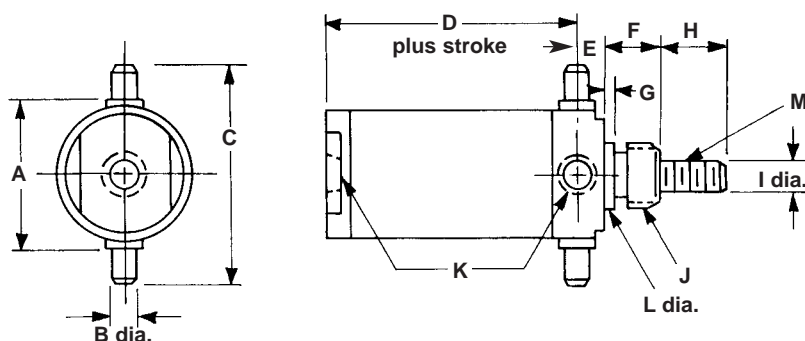
†2" For Strokes 6-5/8" to 8-1/2"

★1-1/2" For Strokes 0" to 2"

★2" For Strokes 2-1/8" to 4"

★3" For Strokes 4-1/8" to 8"

HOW TO ORDER: WHEN ORDERING PLEASE SPECIFY MODEL NO. – STROKE – PLAIN ROD END IF DESIRED – MOUNTING BRACKETS (IF REQUIRED). FOR SPRING EXTENDED SINGLE ACTING (SINGLE ROD END ONLY) MODEL NO. SPECIFY 113XXXX. SEE PAGES 6 & 7 FOR OPTION CODES AND ADDITIONAL ORDERING INFORMATION.



Bore	A	B	C	D	E	F	G	H	I	J	Two Places K	L	M	Model Numbers	
														Single Acting	Double Acting
3/8"	13/16	.251	1-5/16	1-15/32*	7/32	9/16	7/64	5/8	3/16	1/2-20NF	10-32NF	.529	10-32NF	1110106	1120106
1/2"	1	.251	1-1/2	1-15/32*	7/32	9/16	7/64	5/8	3/16	1/2-20NF	10-32NF	.529	10-32NF	1110206	1120206
3/4"	1-1/8	.251	1-5/8	1-43/64*	19/64	19/32	7/64	1	1/4	5/8-18NF	1/8-27NPT	.684	1/4-28NF	1110306	1120306
1"	1-1/2	.313	2-1/4	1-43/64†	19/64	19/32	7/64	1	5/16	5/8-18NF	1/8-27NPT	.684	5/16-24NF	1110406	1120406
1-1/8"	1-1/2	.313	2-1/4	1-43/64†	19/64	19/32	7/64	1	5/16	5/8-18NF	1/8-27NPT	.684	5/16-24NF	1110506	1120506
1-1/2"	2-1/4	.376	3	2-1/4★	3/8	13/16	3/16	1	1/2	1-14NF	1/8-27NPT	1.122	1/2-20NF	1110606	1120606
2"	2-7/8	.501	3-7/8	2-1/4★	3/8	1	3/16	1-7/8	5/8	1-1/4-12NF	1/4-18NPT	1.373	5/8-18NF	1110706	1120706

Note: For Single Acting Spring Return Or Extended Cylinders — Add To Base Length

*1" For Strokes 0" to 1-1/4"

*1-1/2" For Strokes 1-5/16" to 4-1/4"

*2" For Strokes 4-5/16" to 5-1/4" (3/4" Bore only)

★1-1/2" For Strokes 0" to 2"

★2" For Strokes 2-1/8" to 4"

★3" For Strokes 4-1/8" to 8"

†0" For Strokes 0" to 1-1/8" (1" for spring extended single acting)

†1" For Strokes 1-1/4" to 4-1/2"

†1-1/2" For Strokes 4-5/8" to 6-1/2"

†2" For Strokes 6-5/8" to 8-1/2"

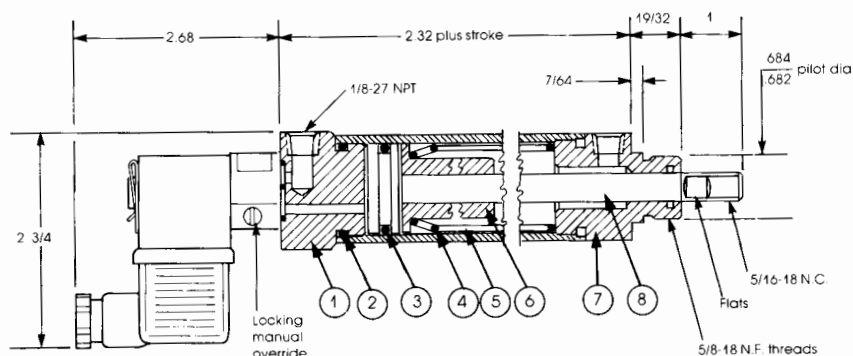
HOW TO ORDER: WHEN ORDERING PLEASE SPECIFY MODEL NO. – STROKE – PLAIN ROD END IF DESIRED – MOUNTING BRACKETS (IF REQUIRED). FOR SPRING EXTENDED SINGLE ACTING MODEL NO. SPECIFY 113XXXX. SEE PAGES 6 & 7 FOR OPTION CODES AND ADDITIONAL ORDERING INFORMATION.

STANDARD FEATURES

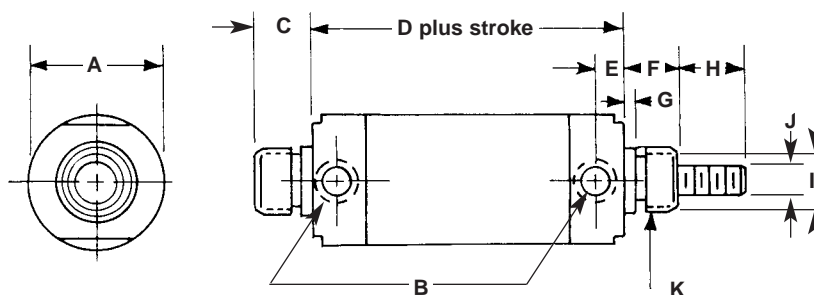
- Normally retracted or normally extended
- Wrench flats
- Operating pressure 15 to 145 PSIG

OPTIONAL FEATURES

- Rod extensions
- Rod wipers
- Plain rods (Plain rods must be specified)
- Optional rod end configurations available — Consult factory



HOW TO ORDER: WHEN ORDERING PLEASE SPECIFY MODEL NO. – STROKE – PLAIN ROD END IF DESIRED – MOUNTING BRACKETS (IF REQUIRED) – VOLTAGE BORE SIZE 1-1/8" – MODEL NUMBER 6110501*. SEE PAGES 6 & 7 FOR OPTION CODES AND ADDITIONAL ORDERING INFORMATION. *SPECIFY STROKE LENGTH AND VOLTAGE. EXAMPLE 6110501-02.00 – 120VAC. FOR OPTIONAL TRUNNION MOUNT VERSION, CONSULT FACTORY.



Bore	A	Two Places B	C	D	E	F	G	H	I	J	Two Places K	Model Numbers	
												Single Acting	Double Acting
3/8"	9/16	10-32NF	9/16	1-7/8*	7/32	9/16	7/64	5/8	.529	3/16	1/2-20NF	1110104	1120104
1/2"	3/4	10-32NF	9/16	1-7/8*	7/32	9/16	7/64	5/8	.529	3/16	1/2-20NF	1110204	1120204
3/4"	7/8	1/8-27NPT	19/32	2-5/16*	19/64	19/32	7/64	1	.684	1/4	5/8-18NF	1110304	1120304
1"	1-1/4	1/8-27NPT	19/32	2-5/16†	19/64	19/32	7/64	1	.684	5/16	5/8-18NF	1110404	1120404
1-1/8"	1-1/4	1/8-27NPT	19/32	2-5/16†	19/64	19/32	7/64	1	.684	5/16	5/8-18NF	1110504	1120504
1-1/2"	1-3/4	1/8-27NPT	13/16	3-1/8★	3/8	13/16	3/16	1	1.122	1/2	1-14NF	1110604	1120604
2"	2-1/4	1/4-18NPT	1	3-1/8★	3/8	1	3/16	1-7/8	1.373	5/8	1-1/4-12NF	1110704	1120704

Note: For Single Acting Spring Return Or Extended Cylinders — Add To Base Length

*1" For Strokes 0" to 1-1/4"

*1-1/2" For Strokes 1-5/16" to 4-1/4"

*2" For Strokes 4-5/16" to 5-1/4" (3/4" Bore only)

†0" For Strokes 0" to 1-1/8" (1" for spring extended single acting)

†1" For Strokes 1-1/4" to 4-1/2"

†1-1/2" For Strokes 4-5/8" to 6-1/2"

†2" For Strokes 6-5/8" to 8-1/2"

★1-1/2" For Strokes 0" to 2"

★2" For Strokes 2-1/8" to 4"

★3" For Strokes 4-1/8" to 8"

HOW TO ORDER: WHEN ORDERING PLEASE SPECIFY MODEL NO. – STROKE – PLAIN ROD END IF DESIRED – MOUNTING BRACKETS (IF REQUIRED). FOR SPRING EXTENDED SINGLE ACTING MODEL NO. SPECIFY 113XXXX. SEE PAGES 6 & 7 FOR OPTION CODES AND ADDITIONAL ORDERING INFORMATION.

RESERVED FOR
FUTURE PRODUCTS

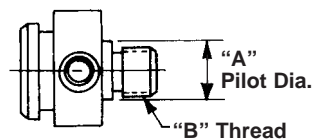
OPTION CODES

OPTION	NO.	DESCRIPTION	BORE SIZE (INCHES)			
			3/8"	1/2"	3/4"	1"
Rod	11	Plain Rod (No Threads)	X	X	X	X
	12	Option Thread (Specific Size Shown at Right)	10-24 x .50	10-24 x .50	1/4-20 x .69	5/16-18 x .69
		Standard O.D. Size (Inches) Optional O.D. Oversize (Inches) Standard Oversize Rod Thread				
	13	3/16 1/4 1/4-28NF		X		
	13	1/4 5/16 5/16-24NF			X	
	13	5/16 3/8 3/8-24NF				X
	14	5/16 1/2 1/2-20NF				X
	13	1/2 5/8 5/8-18NF				
	14	1/2 3/4 3/4-16NF				
	13	5/8 3/4 3/4-16NF				
	54	Rod Wiper*			X	X
	36	Special Extension Plain Rod (Total Rod Extension in the Retracted Position Must be Specified)	X	X	X	X
	37		X	X	X	X
Seals	26	Viton	X	X	X	X
Bumper	57	Bumper — rod end only		X	X	X
	58	Bumper — blind end only		X	X	X
	59	Bumper — both ends		X	X	X
	60	303 Stainless steel rod	standard	standard	X	X
	97	Plain Rod Extension To Interchange With Original Duramite® Units	H=1/2	H=1/2	H=3/4	H=3/4
	98	Coarse Threaded Rod Without Flats To Interchange With Original Duramite® Units	H=1/2	H=1/2	H=3/4	H=3/4
	99	Fine Threaded Rod Without Flats To Interchange With Original Duramite® Units	H=1/2	H=1/2	H=3/4	H=3/4

•When rod wiper is specified, internal wipers are supplied, requiring a larger nosepiece. Nosepiece thread sizes are given in the chart below.

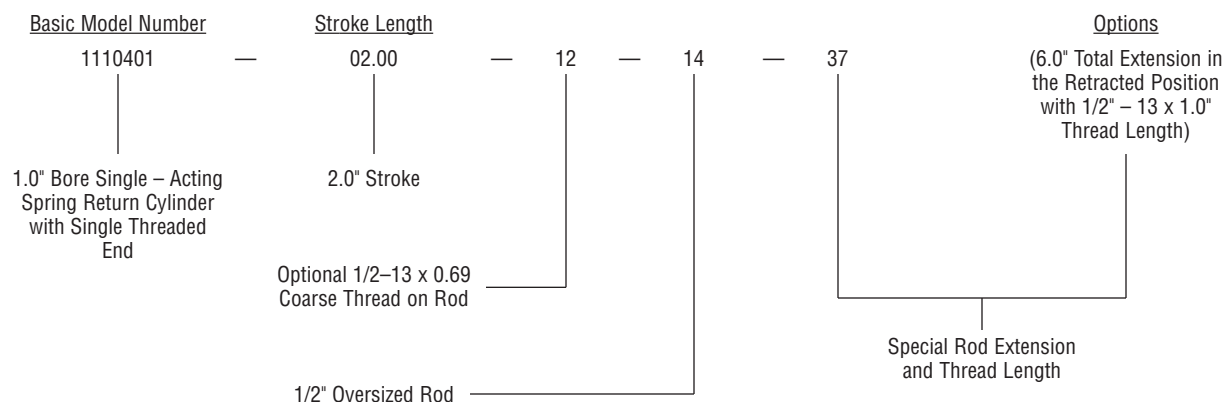
DIMENSIONS FOR OVERSIZED ROD ENDS

Oversized rod dia.	Bore	"B" thread	"A" pilot dia.
5/16" Dia.	3/4"	5/8-18NF	.686/.684
3/8" Dia.	1"	7/8-14NF	.934/.932
3/8" Dia.	1"	3/4-16NF	.750/.748
1/2" Dia.	1"	7/8-14NF	.934/.932
3/8" Dia.	1-1/8"	7/8-14NF	.934/.932
3/8" Dia.	1-1/8"	3/4-16NF	.750/.748
1/2" Dia.	1-1/8"	7/8-14NF	.934/.932
3/4" Dia.	1-1/2"	1-1/4-12NF	1.373/1.371
3/4" Dia.	2"	1-1/4-12NF	1.373/1.371



OPTION	NO.	DESCRIPTION	BORE SIZE (INCHES)		
			1-1/8"	1-1/2"	2"
Rod	11	Plain Rod (No Threads)	X	X	X
	12	Option Thread (Specific Size Shown at Right)	5/16-18 x .69	1/2-13 x .75	5/8-11 x 1.44
		Standard O.D. Size (Inches) Optional O.D. Oversize (Inches) Standard Oversize Rod Thread			
	13	3/16 1/4 1/4-28NF			
	13	1/4 5/16 5/16-24NF			
	13	5/16 3/8 3/8-24NF	X		
	14	5/16 1/2 1/2-20NF	X		
	13	1/2 5/8 5/8-18NF		X	
	14	1/2 3/4 3/4-16NF		X	
	13	5/8 3/4 3/4-16NF			X
	54	Rod Wiper*	X	X	X
	36	Special Extension Plain Rod (Total Rod Extension in the Retracted Position Must be Specified)	X	X	X
	37		X	X	X
Seals	26	Viton	X	X	X
Bumper	57	Bumper — rod end only	X	X	X
	58	Bumper — blind end only	X	X	X
	59	Bumper — both ends	X	X	X
	60	303 Stainless steel rod	X	X	X
	97	Plain Rod Extension To Interchange With Original Duramite® Units	H=3/4	H=1	H=1-1/2
	98	Coarse Threaded Rod Without Flats To Interchange With Original Duramite® Units	H=3/4	H=1	H=1-1/2
	99	Fine Threaded Rod Without Flats To Interchange With Original Duramite® Units	H=3/4	H=1	H=1-1/2

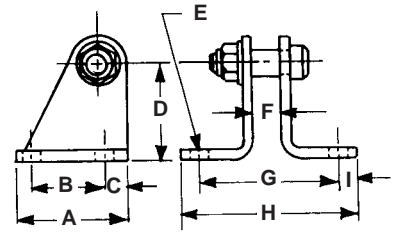
EXAMPLE:



MOUNTING ACCESSORIES

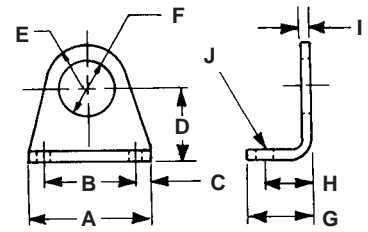
CLEVIS BRACKET FOR 3/8" TO 2" BORE

For Bore Size	A	B	C	D	E	F	G	H	I	Model Numbers
3/8"-3/4"	1-5/32	5/8	17/64	3/4	.191	17/64	1-3/8	1-29/32	17/64	22-0445
1"-1-1/8"	1-5/8	1	5/16	1-1/4	9/32	3/8	1-7/8	2-1/2	5/16	22-0454
1-1/2"	1-3/4	1	3/8	1-3/8	9/32	5/8	2-1/4	3	3/8	22-0462
2"	2-1/4	1-1/4	1/2	1-5/8	11/32	3/4	2-1/2	3-1/2	1/2	22-0470



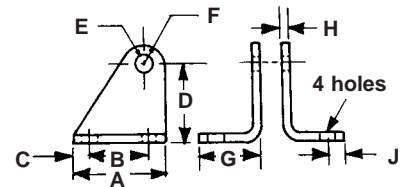
FOOT BRACKET FOR 3/8" TO 2" BORE

For Bore Size	A	B	C	D	E	F	G	H	I	J	Model Numbers
3/8"-1/2"	1-5/8	1-1/4	3/16	7/8	7/16	.534	7/8	5/8	1/8	.191	22-0440
3/4"-1-1/8"	1-5/8	1-1/4	3/16	1	9/16	.691	7/8	5/8	1/8	.191	22-0448
1-1/2"	2-1/2	1-7/8	5/16	1-5/8	7/8	1.126	1-1/2	15/16	.194	9/32	22-0457
2"	3-1/8	2-1/8	1/2	1-1/2	1-1/8	1.380	1-3/4	1-1/4	.194	11/32	22-0466



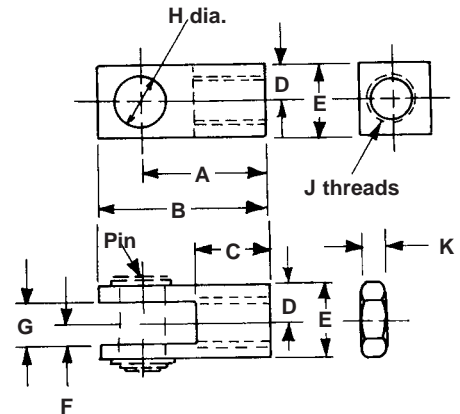
TRUNNION MOUNTING BRACKET FOR 3/8" TO 2" BORE

For Bore Size	A	B	C	D	E	F	G	H	I	J	Model Numbers
3/8"-3/4"	1-5/32	5/8	17/64	3/4	.253	17/64	53/64	.120	.191	17/64	22-0442
1"-1-1/8"	1-5/8	1	5/16	1-1/4	.315	5/16	1-1/16	.120	9/32	5/16	22-0450
1-1/2"	1-3/4	1	3/8	1-3/8	.376	3/8	1-3/16	.134	9/32	3/8	22-0458
2"	2-1/4	1-1/4	1/2	1-5/8	.504	1/2	1-3/8	.194	11/32	1/2	22-0465



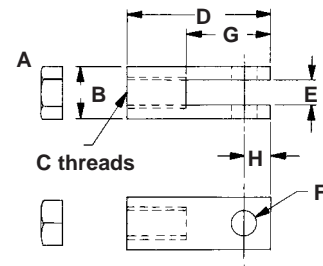
PISTON ROD CLEVIS FOR 3/8" TO 2" BORE (WITH PIN AND NUT)

For Bore Size	A	B	C	D	E	F	G	H	J	K	Model Numbers
3/8"-1/2"	.75	.93	.37	.18	.37	.09	.18	.18	10-32	.12	23-1500
3/4"	.93	1.18	.50	.25	.50	.12	.25	.25	1/4-28	.15	23-1501
1"-1-1/8"	.93	1.18	.50	.25	.50	.12	.25	.25	5/16-24	.18	23-1502
1-1/2"	1.31	1.68	.75	.37	.75	.18	.37	.37	1/2-20	.31	23-1504
2"	1.50	2.00	.75	.50	1.00	.25	.50	.50	5/8-18	.37	22-0471



PISTON ROD CLEVIS FOR 3/8" TO 1-1/2" BORE (WITH NUT ONLY)

For Bore Size	A	B	C	D	E	F	G	H	Model Numbers
3/8"-1/2"	10-24	3/8	10-24NC	1-1/8	3/16	3/16	13/16	1/4	22-0446
3/4"	1/4-20	1/2	1/4-20NC	1-3/8	1/4	1/4	13/16	1/4	22-0449
1"-1-1/8"	5/16-18	1/2	5/16-18NC	1-3/8	1/4	1/4	13/16	1/4	22-0455
1-1/2"	1/2-20	7/8	1/2-20NF	1-1/2	3/8	3/8	15/16	3/8	22-0463



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CONTROL LINE EQUIPMENT, INC.

14750 Industrial Parkway • Cleveland, Ohio 44135
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SOLENOID VALVES

The C345 Solenoid Valves are a rugged yet compact valve which feature Delrin Sleeve construction to reduce friction for smooth performance and long life. They are available as single or double solenoid, internal or external piloted, and can be mounted in-line, on CMX Series Manifolds or with mounting brackets. All solenoid valves have non-locking manual overrides. The valve cover serves as a junction box for easy wiring and can be removed without disconnecting wiring.

SPECIFICATIONS

Flow to atmosphere at 125 PSIG140 SCFM
Pressure range

E1/E230-125 PSIG

AE1/AE20-125 PSIG

A/A20-125 PSIG

External pilot pressure AE1/AE2Equal to
valved pressure, 30 PSIG minimum

Pilot pressure A/A2		Valved Pressure		
		30	60	100
Minimum pilot	C(M)345-4A	30	40	55
pressure	C(M)345-4A2	15	15	15

Temperature range:

Solenoid-20 to 150 F

Piloted-20 to 180 F

Operating speeds:

E1/E2 & AE1/AE2to 600 CPM

A/A2to 900 CPM

MaterialsAluminum, Diecast zinc, Delrin
Stainless steel, Buna-N or Viton

MediumAir

LubricationRecommended for all models

Weight:

Valves- C(M)345-4E1/4AE11 lb. 13 oz.

C(M)345-4E2/4AE22 lb. 3 oz.

C(M)345-4A/4A213 oz.

Manifolds- CMX22 lb. 8 oz.
add 1 lb. 4 oz. per additional station.

ELECTRICAL SPECIFICATIONS

VOLTAGE	WATTS	OHMS	DC RANGE
240 VAC*	6.1	1350	65-140
120 VAC*	8.2	255	35-60
24 VAC[]	6.0	86	21-31
24 VDC	6.6	86	—
12 VDC	7.4	19	—

AC Voltages are dual frequency 50 and 60 hertz.

Voltage fluctuations: Coils are designed for service at plus 10%, minus 15% of rated voltage.

Rectifiers: Ohms resistance readings are without rectifiers.

*Silicon, halfwave 600 P.I.V. avalanche-type rectifier installed in black lead.

[] Two silicon halfwave 600 P.I.V. avalanche-type rectifiers in "fly-wheel" configuration. One installed in black lead, the other bridges the black and yellow leads.

Note: Control circuits must accommodate rectifiers used in AC voltage valves.

Lead wires: 24 inches from coil standard.

Other voltages: Consult factory.

RESPONSE TIME @ 100 PSIG

MODEL	AC		DC	
	OPEN	CLOSE	OPEN	CLOSE
C(M)345-4E1/4AE1	.018	.043	.028	.043
C(M)345-4E2/4AE2	.010	.010	.024	.024

FLOW CO-EFFICIENT

All in-line valvesCV = 1.5

All manifold mount valvesCV = 1.1

ORDERING EXAMPLES

Valves.....C345-4A

C345-4E1 120/60

CM345-4E2-LL-39 24VDC

ManifoldsCMX2 (two station manifold)

CMX7 (seven station manifold)

8-39A (CMX manifold block-off plate)



Model Symbol

Description

C345-4E1 	4-way, 2 position, single solenoid, spring return, internal pilot, in-line mount
C345-4E2 	4-way, 2 position, double solenoid, internal pilot, in-line mount
C345-4AE1 	4-way, 2 position, single solenoid, spring return, external pilot, in-line mount
C345-4AE2 	4-way, 2 position, double solenoid, external pilot, in-line mount
CM345-4E1 	4-way, 2 position, single solenoid, spring return, internal pilot, manifold mount
CM345-4E2 	4-way, 2 position, double solenoid, internal pilot, manifold mount
CM345-4AE1 	4-way, 2 position, single solenoid, spring return, external pilot, manifold mount
CM345-4AE2 	4-way, 2 position, double solenoid, external pilot, manifold mount

See page 4 for dimensional information

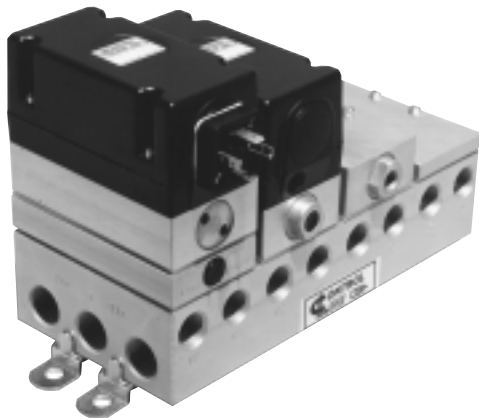
AIR PILOTED VALVES



The C345 Air Piloted Valves are a rugged yet compact valve which feature Delrin Sleeve construction to reduce friction for smooth performance and long life. They are available as single or double air piloted, and can be mounted in-line, on CMX Series Manifolds or with Mounting Brackets.

Model	Description	Symbol
C345-4A	4-way, 2 position, air piloted, spring return, in-line mount	
C345-4A2	4-way, 2 position, double air piloted, in-line mount	
CM345-4A	4-way, 2 position, air piloted, spring return, manifold mount	
CM345-4A2	4-way, 2 position, double air piloted, manifold mount	

See page 4 for dimensional information



CMX SERIES MANIFOLDS

Manifolds permit centralized location of control valves, simplify plumbing and reduce installation costs. Valves and manifolds can be sub-assembled and placed in the end product as a complete, unitized control unit, thereby saving the time and labor involved with installing valves individually.

CMX series manifolds are of rugged, one-piece extruded aluminum construction and are available in models for two to seven stations. A CMX manifold has a common inlet and two common (captured) exhausts. Captured exhaust is desirable when exhausting medium must be piped away to avoid contamination of the ambient area, as in clean rooms.

Valves mount in either of two positions. The position of the electrical connections can be changed by reversing the valve on the manifold.

A CMX series manifold will accept any combination of single or double solenoid and single or double air piloted CM345 valves.

The manifold is furnished with four mounting brackets and screws.

MANIFOLDS, OPTIONS AND ACCESSORIES



PLUG-IN ELECTRICAL CONNECTOR, CODE 39

This optional plug-in electrical connector simplifies wiring and speeds installation. The HS-4 socket for single or double solenoid valves is not supplied with Code 39. Order separately. Cord not included.



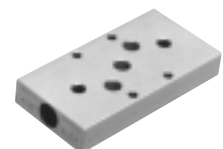
BLOCK-OFF PLATE, 8-39A

This block-off plate may be used either to suspend use of a station or to reserve a station for future use.



MOUNTING BRACKET, 8-45A

The 8-45A mounting bracket comprises of two "Z" type shouldered mounting brackets and two $\frac{5}{16}$ -18 x $\frac{3}{8}$ long screws. Bracket and screws are plated steel.



SPEED CONTROL, CODE 74

This unit, for use with CM345 series manifold valves, provides controlled exhaust flow in both modes of valve operation. The exhaust is ported to the manifold and may be captured.

DIMENSIONS

