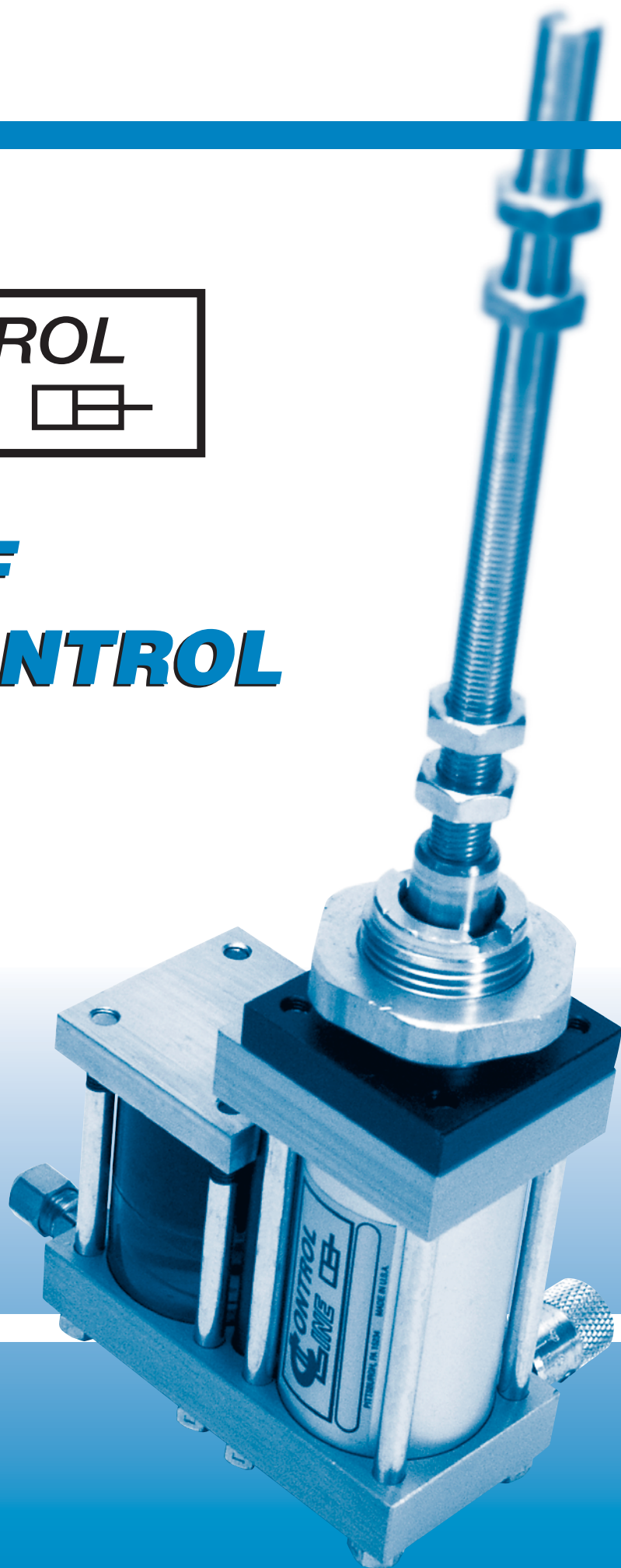




SERIES F FEED CONTROL



**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

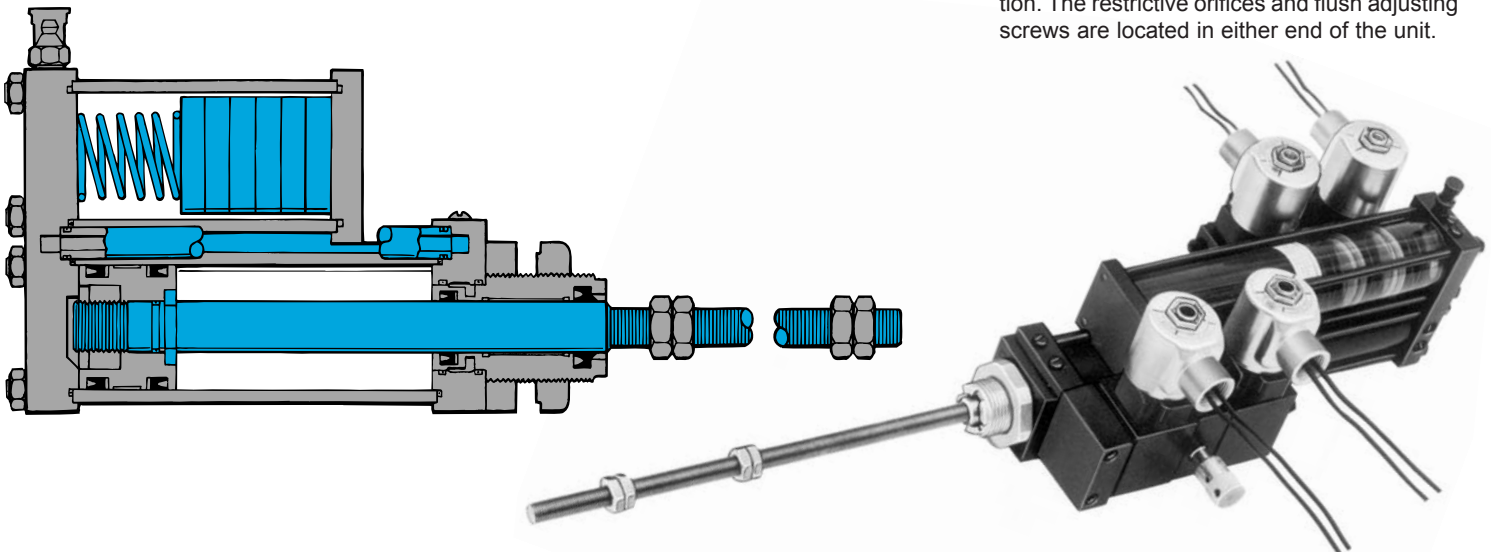
The piston for the forward feed unit has a flapper style check valve which is held closed when the piston moves forward. This closes the passageways in the piston and forces the oil through a restrictive orifice which controls the feed rate. When the piston is retracted, fluid pressure opens the check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

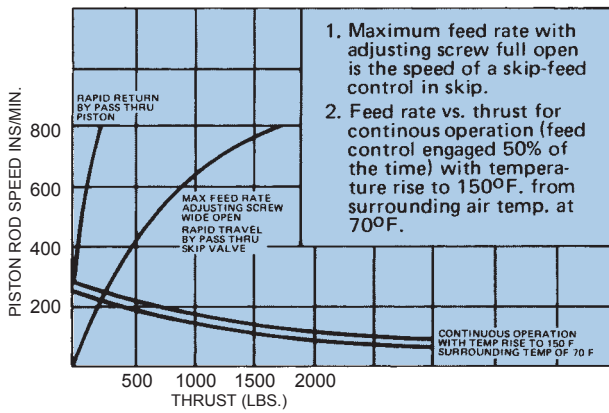
Maximum Feed Rate	150-400" / minute*
Minimum Feed Rate	4" / minute
Maximum Thrust	2,000 lbs.†
Maximum Operating Temperature	175° F
Maximum Creep, Stop Valve Activated**	.004" first minute .010" after five minutes

* 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

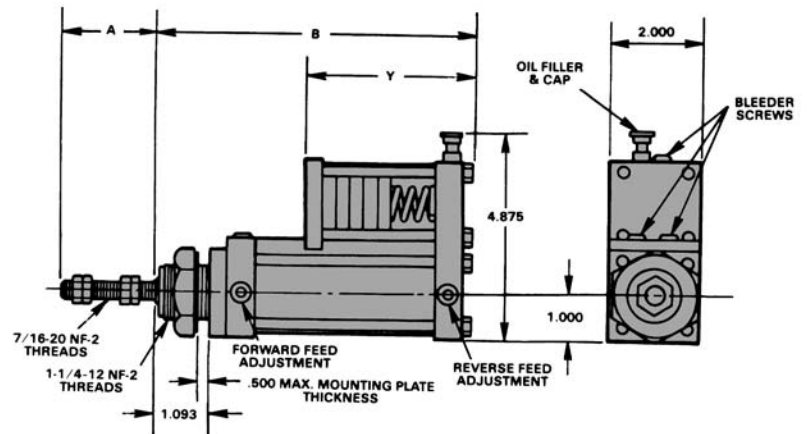
With tandem coupling, the Feed Control is connected to the back of the cylinder and the two piston rods are joined together. While this mounting method eliminates the bending movement, it also necessitates the use of a skip valve for rapid traverse. This mounting method is also available with Control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

How to Order

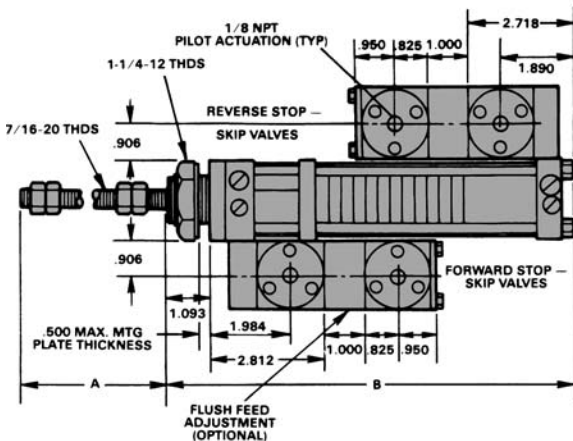
Specify:

- Quantity
- Model Number
 - F8323** Forward Feed
 - R8323** Reverse Feed
 - D8323** Double Feed
- Stroke Length **-2", -4", etc.**
- 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.)
- Valve Operator **-E** Solenoid operated (specify voltage)
- Mounting Kits
 - Specify if factory assembly is required
 - 8321** Parallel Coupling (specify cylinder model)
 - 8938** Tandem Coupling (specify cylinder model)
- Accessories
 - CB** Factory assembled clevis mount
 - 1579** Oil Filling Kit
 - 1626** Feed Control Oil
 - CK** Calibrated Knob

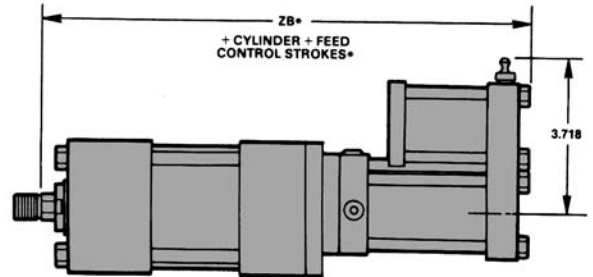
Standard Feed Stroke	A	B	Y	Net. Weight
1-1/2	6	5-5/8	3-5/16	6.1#
2	6	6-1/8	3-5/16	6.3
3	6	7-1/8	4-7/32	7.0
4	10	8-1/8	5-1/8	7.8
6	10	10-1/8	7-3/16	9.5
9	10	13-1/8	10-9/64	10.8
12	12	16-1/8	15-51/64	14.2
15	15	19-1/8	15-51/64	14.2
18	18	22-1/8	18-25/32	15.8



AIR PILOT VALVE OPTION

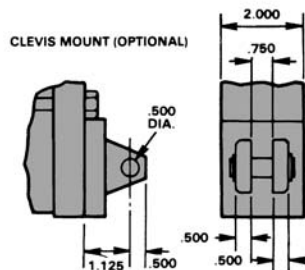


Bore Size	ZB
1-1/2	8-17/32
2	8-17/32
2-1/2	8-21/32
3-1/4	9-25/32
4	9-25/32
5	10-1/32
6	10-29/32

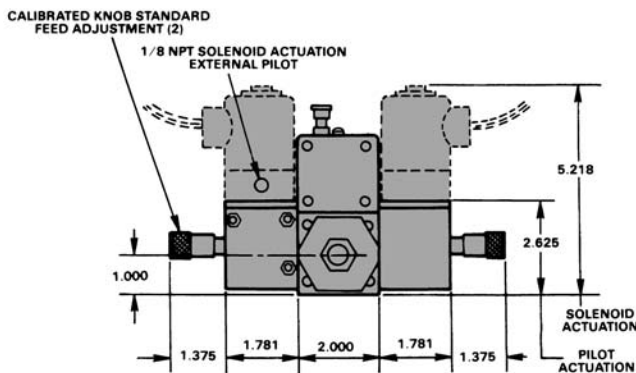


SERIES B CYLINDER TANDEM-COUPLED TO F8323 CONTROL

* 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



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