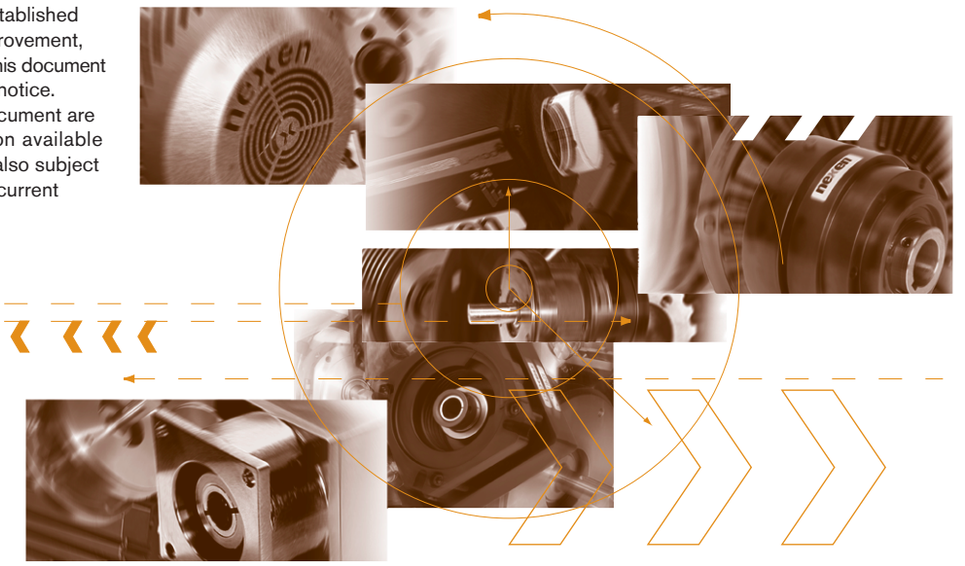
In accordance with Nexen's established policy of constant product improvement, the specifications contained in this document are subject to change without notice. Technical data listed in this document are based on the latest information available at the time of printing and are also subject to change without notice. For current information, please consult:
www.nexengroup.com

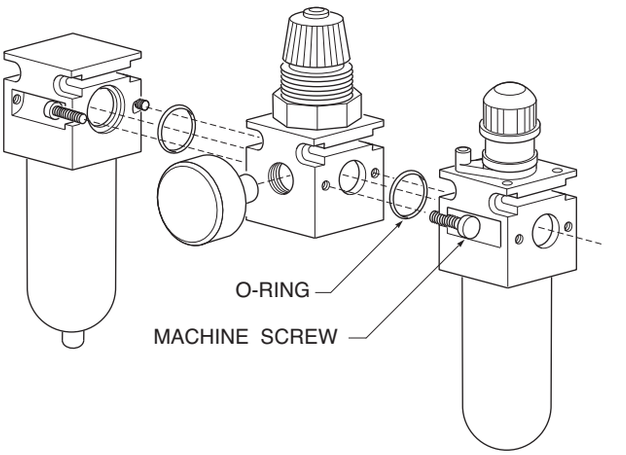


CLUTCH AND BRAKE CONTROLS

This Section Contains: . . . . .Page

The Nexen FRL System

- Modular.
- Simple, compact design.
- Easily serviced — no special tools required.
- Body shape allows regular mounting in any of four positions, at the 90° increments, relative to the filter and lubricator.
- Solid porting, .250" sizes.
- Threaded bowl attachment.
- Simple joining method uses standard machine screws.
- Designed to meet or exceed NFPA standards, and other international specifications.
- Regulator features non-rising, tamper-resistant adjusting knob.
- Metal bowls — standard.



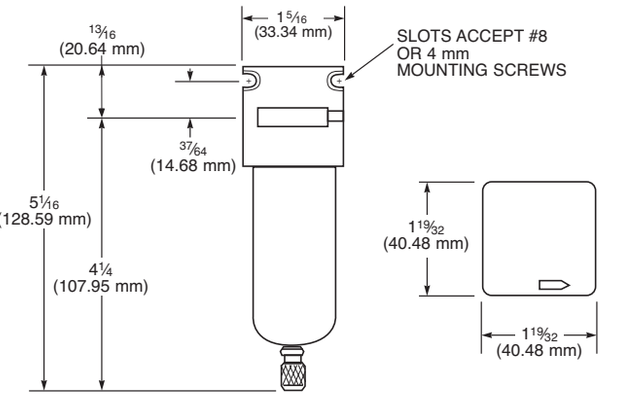
Filter

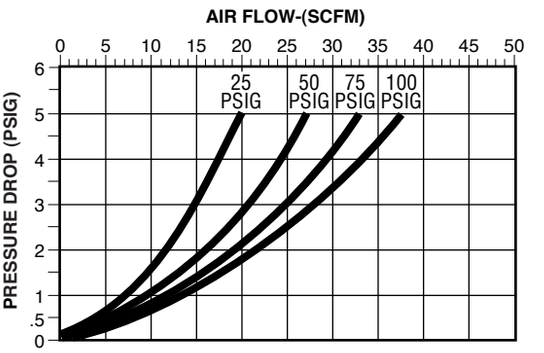
Self-sealing, plastic deflector — no gasket. One-piece molded element-retainer and baffle.

- Flow: 39.5 SCFM
- Port Size: .25" NPTF
- Temperature Range: 40°-180° F (4.4°-82.2°C)
- Pressure Range: 300 Psig Max. (20.4 Bars)
- Bowl Capacity: 1.5 oz. Std.
- Body: Zinc
- Bowl: Metal
- Drain: Manual Drain
- Filter Rating: 5 Micron
- Weight. per Unit: .91 lbs.

Product No. 939101

NOTE — All flows taken at 100 Psig inlet pressure, and 5 Psig pressure drop.





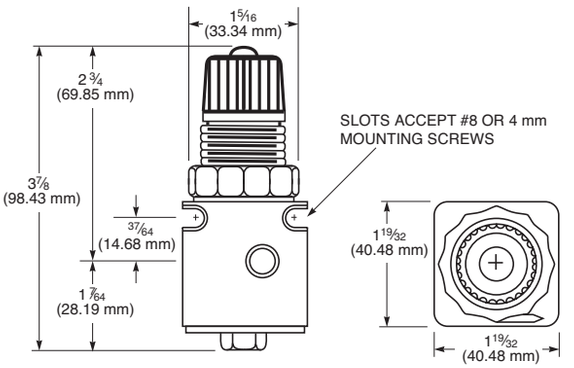
Regulator

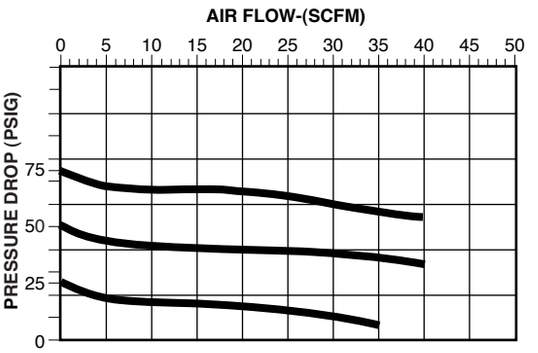
Features non-rising adjustment knob. Aspirator for performance. Dual in-line gauge ports. Alignment system allows four different orientations. at 90° increments, relative to the filter and lubricator.

- Flow: 39.4 SCFM
- Port Size: .25" NPTF
- Supply Pressure: 300 Psig Max. (20.4 Bars)
- Pressure Range: 0-125 Psig (0-8.5 Bars) std.
- Temperature Range: 40°-120° F (4.4°-48.9°C)
- Piston Operated
- Relieving
- Body: Zinc
- Spring Cage: Celcon
- Bottom Plug: Celcon
- Adjustment Mech.: Locking Knob
- Weight per Unit: .824 lbs.

Product No. 940001

NOTE: Flows taken at 100 Psig inlet pressure, and 25, 50 and 75 Psig reduced pressures.





Lubricator

Proven fog-type design. Has anti-vibration, tamper-proof adjustment.

- Flow: 53.4 SCFM
- Port Size: .25" NPTF
- Temperature Range: 40°-180° F (4.4°-82.2°C)
- Pressure Range: 300 Psig Max. (20.4 Bars)
- Bowl Capacity: 1.5 oz. Std.
- Body: Zinc
- Bowl: Metal
- Weight. per Unit: .94 lbs.

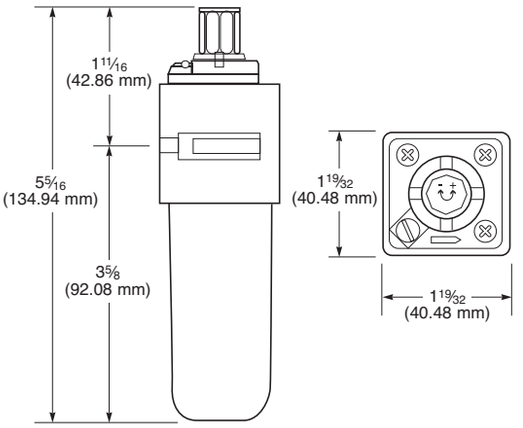
Product No. 939201

NOTE — All flows taken at 100 Psig inlet pressure, and 5 Psig pressure drop.

Lubricator Drip Rate Setting

A. Determine the average internal air volume of the clutch or brake. See clutch and brake air volume/rate data pages 367 and 368.
Example: Nexen Brake Model T-1000 Average Volume = Vn + Vo/2 = 1.739 + 8.656/2 = 6.067 cubic inches.

B. Multiply the result in step A by the maximum cycle rate per minute.
Example: At 20 cycles per minute; Cubic Inches per Minute = 20 x 6.067 = 121.34



C. Determine the CF factor for the air pressure setting from the graph on page 366.
Example: The CF factor for 80 psi = 6.5

D. Multiply the result in Step B by the CF factor to determine the cubic inches of free air;
Example: 6.5 x 121.34 = 788.7 cubic inches per minute of free air.

E. Divide the result in step D by 1728 to convert to cubic feet per minute.
Example: 788.7/1728 = 788.7/1728 = .456 cubic feet per minute.

NOTE: Nexen recommends one drop of oil for every 20 cubic feet of air.

F. To determine the amount of time between drops, divide 20 by the flow rate.
Example: Divide 20 by the result of step E; 20/.456 = 44 minutes between drops of oil.

WARNING

The polycarbonate plastic material used to manufacture the sight dome may be attacked by certain chemicals. Do not use this lubricator on systems with air supplied by a compressor lubricated with synthetic oils or oils containing phosphate esters or chlorinated hydrocarbons. These oils can carry over into the air lines and chemically attack and possibly rupture the sight dome. Also, do not expose the sight dome to materials such as carbon tetrachloride, trichlorethylene, acetone, paint thinner, cleaning fluids, or other harmful materials, for they too will cause the plastic to craze and/or rupture. For use in environments where these, or any, chemicals may be present, consult the factory for approval.

3-Way Clutch or Brake Controls

.125" or .250" NPT, 3-Way Controls feature 6 watt coils. Available in three mounting configurations, normally open and normally closed. For explosion proof or encapsulated coils, consult factory. 0-150 psi operating range standard.

3-Way Controls, In-Line Mount

Valve	Operating Range (PSI)	Effective Orifice	Port Size①	Volts②	Power Consumption	Product Number
Normally Open	0 - 125	.0469	.125 NPT	120 AC	6 Watts	948801
Normally Open	0 - 125	.0469	.25 NPT	120 AC	6 Watts	949001
Normally Closed	0 - 150	.0469	.125 NPT	120 AC	6 Watts	948802
Normally Closed	0 - 150	.0469	.25 NPT	120 AC	6 Watts	949002

3-Way Controls, Air Inlet Mount

Valve	Operating Range (PSI)	Effective Orifice	Port Size①	Volts②	Power Consumption	Product Number
Normally Open	0 - 125	.0469	.125 NPT	120 AC	6 Watts	948803
Normally Open	0 - 125	.0469	.25 NPT	120 AC	6 Watts	949003
Normally Closed	0 - 150	.0469	.125 NPT	120 AC	6 Watts	948804
Normally Closed	0 - 150	.0469	.25 NPT	120 AC	6 Watts	949004

① Top port, .125 NPT, Normally Open; 10-32, Normally Closed. See air flow rate, page 366

② See page 154 for 24 VDC, 90 VDC and 240 VAC 3-way Controls

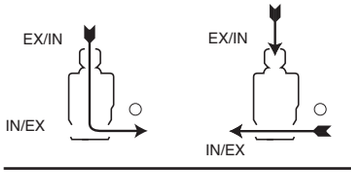
Optional Coils

Style of Coil	Product Number	Voltage	Power Consumption
Standard	1876	12 VDC	7 Watts
Standard	1877	24 VDC	7 Watts
Standard	1878	90 VDC	7 Watts
Standard	1879	120 VAC	6 Watts
Standard	1880	240 VAC	6 Watts
Standard	1881	480 VAC	6 Watts
Explosion Proof	1882	6 VDC	7 Watts
Explosion Proof	1883	12 VAC	7 Watts
Explosion Proof	1885	24 VDC	7 Watts
Explosion Proof	1887	240 VAC	6 Watts

NORMALLY OPEN (N.O.)

DE-ENERGIZED
Allows air supply to flow to a clutch or brake.

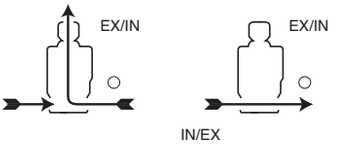
ENERGIZED
Blocks the air supply and allows the air in the clutch or brake to exhaust.



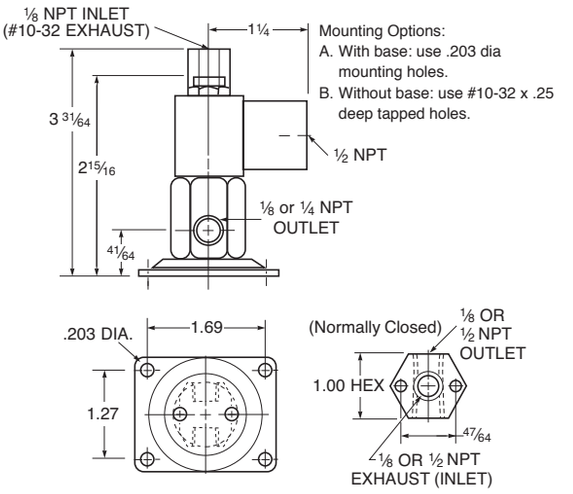
NORMALLY CLOSED (N.C.)

DE-ENERGIZED
Blocks the air supply to a clutch or brake.

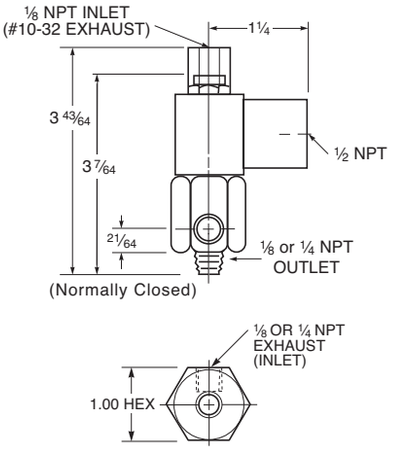
ENERGIZED
Allows air supply to flow to a clutch or brake.



APPROXIMATE DIMENSIONS



APPROXIMATE DIMENSIONS



C_V Flow: Up to 0.055

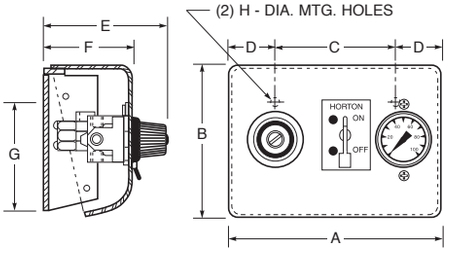
Clutch or Brake Control Panel

Compact Regulator, 3-way toggle switch and gauge fitted into attractive contoured case. Ideal for wall mounting. Simply connect inlet and outlet. Regulator hand wheel lock discourages unwanted adjustment.

- 5-125 psi range
- .09375" internal flow passages, Flow rate: 150 SCFM at 100 psi.
- 300 psi max. inlet pressure.
- 180° F max. operating temp.
- .125" NPT Air line connections

Product No. 854000

APPROXIMATE DIMENSIONS



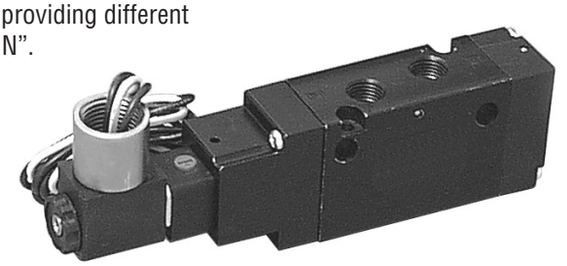
Control Panel

Dim	A	B	C	D	E	F	G	H
Inches	6.125	4.875	3.875	1.125	4.5	2.875	3.5	.25

Spool Controls - 4 and 5 Way Clutch-Brake Controls

A 4 way control directs a common air supply to the clutch or brake providing the same outlet pressure to each cylinder.

A 5 way control directs a separate pressure air supply to the clutch and brake providing different pressures to each cylinder. Each cylinder exhausts through the port marked "IN".



SPOOL CONTROLS

Single Solenoid Models

Style	Product Number	Operating Range(PSI)
4-Way, Internally Piloted	170012	20 - 150
4/5-Way, Externally piloted	170013	0 - 150

Product Number	Effective Orifice	Port Size	Voltage	Power Consumption
170012	.188 in	.25 NPT	120 AC	6.3 VA
170013	.188 in	.25 NPT	120 AC	6.3 VA

Single Solenoid Models are not suitable for non-lubricated air applications

Double Solenoid Models

Style	Product Number	Operating Range(PSI)
4-Way, Internally Piloted	170014	20 - 150
4/5-Way, Externally piloted	170017	0 - 150

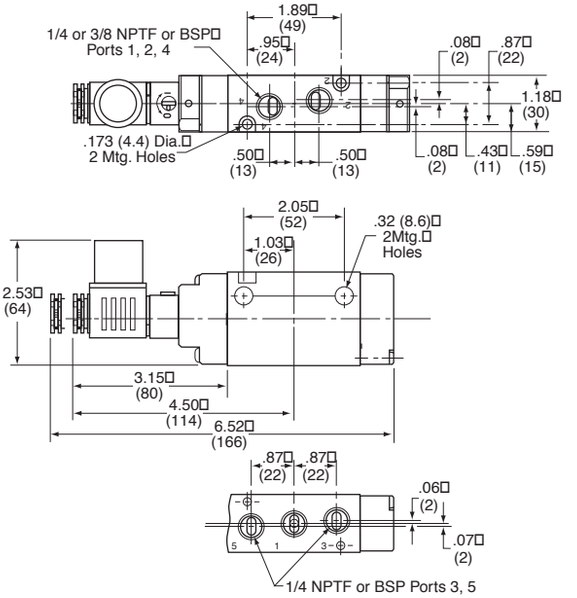
Product Number	Effective Orifice	Port Size	Voltage	Power Consumption
170014	.188 in	.25 NPT	120 AC	6.3 VA
170017	.188 in	.25 NPT	120 AC	6.3 VA

Optional Coils

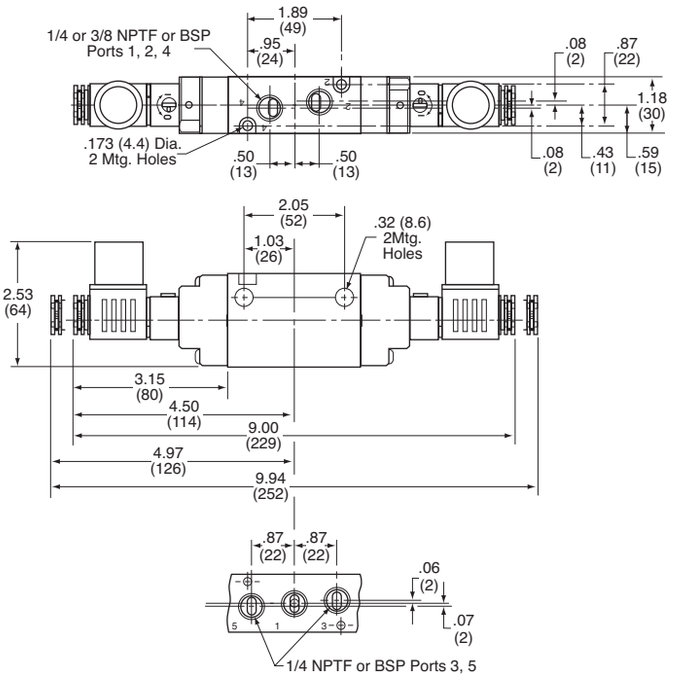
Style of Coil	Product Number	Voltage	Power Consumption
Standard	170020	12 VDC	4.6 Watts
Standard	170021	24 VDC	4.8 Watts
Standard	170023	120 VAC	6.3 VA
Standard	170024	240 VAC	6.4VA

C_V Flow: Up to 1.4

APPROXIMATE DIMENSIONS - SINGLE SOLENOID MODELS



APPROXIMATE DIMENSIONS - DOUBLE SOLENOID MODELS



Adjustable Pressure Clutch or Brake Flow Control

A spring biased ball or optional poppet check provides full flow in one direction. A stainless steel, tapered needle provides a wide range of adjustment of flow in the controlled direction. A locknut prevents unwanted changes in adjustment.

This control allows higher air pressure for maximum torque capacity while achieving a "soft" start or stop through a gradual pressure build-up in the clutch or brake air chamber.

Controlled acceleration or deceleration ("soft" start or stop) can also be incorporated into a clutch/brake circuit similar to the 3 way circuit diagram shown on page 351, by adding a flow control, quick exhaust valve and accumulator between the control valve and the clutch/brake unit.

Pipe Size	C_V Maximum open Needle	C_V Flow Check	Product Number
.125 NPT	.20	.23	940412
.250 NPT	.43	.54	940425

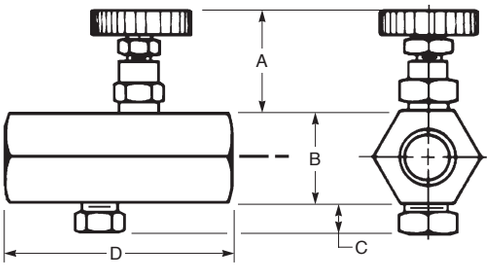
SPECIFICATIONS

scfm = 22.67 (C_V)

Where: P1- P2 = Pressure Drop Across Flow Control
G = Specific Gravity of the Liquid at Flowing Temperature (G = 1 for air)

Operating Temperature Range = -40°F to +212°F

APPROXIMATE DIMENSIONS



Flow Control

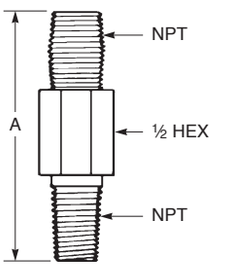
Pipe Size	Dim.	A OPEN	B HEX	C	D
.125 NPT	Inches	.875	.688	.203	1.75
.250 NPT	Inches	1	.875	.359	2.375

Restrictor-Fixed Pressure Clutch or Brake Flow Control

Fixed orifice restrictor slows down flow rate in one direction, yet allows free flow the other way. Used to retard clutch or brake engagement until another function is complete. Ideal when alternately pressurizing two systems with one control switch. Standard pipe threads allow in-line plumbing.

.125 NPT Product No. 932800
.250 NPT Product No. 933800

APPROXIMATE DIMENSIONS



Restrictor

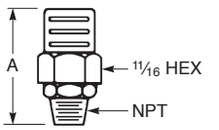
Dim	NPT	A	NPT	A
Inches	.125	1.75	.25	1.75

Exhaust Muffler

Mufflers truly silence noisy air exhaust. Extremely low air resistance in the unit means no interference with system operation difficulties due to back pressure.

.125 NPT Product No. 939300
.250 NPT Product No. 939400

APPROXIMATE DIMENSIONS



Exhaust Muffler

Dim	NPT	A	NPT	A
Inches	.125	1.438	.25	1.625

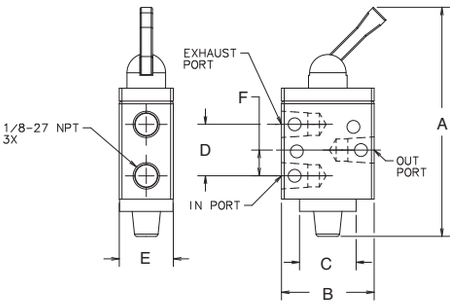
3-Way Manual Clutch or Brake Control

3-way manual control comes complete with escutcheon plate and mounting screws. Use to override automatic controls in emergencies or pilot a 4 or 5 way control. 3/32" internal orifice.

Product No. 944901

C_V Flow: Up to 0.34

APPROXIMATE DIMENSIONS



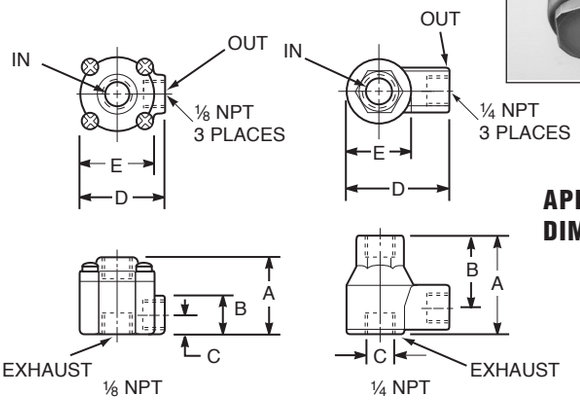
3-WAY MANUAL CONTROL

Dim	A	B	C	D	E	F
Inches	3.50	1.42	0.87	0.79	0.83	0.39

Clutch or Brake - Quick Exhaust/Shuttle Valve

Mounts directly to the clutch or brake air chamber inlet where air and airline impurities are exhausted directly to the atmosphere by a 3-5 psi drop in the supply pressure. Increases clutch and brake response times because air need not travel thru long lines back to the control. Can also eliminate overlap in clutch-brake combinations. Use also as a shuttle valve when alternating supplying cylinder with two pressures.

1/8 NPT Product No. 945100
1/4 NPT Product No. 945125



APPROXIMATE DIMENSIONS

1/8 NPT

Dim	A	B	C	D	E
Inches	1.125	.563	.281	1.188	1.031

1/4 NPT

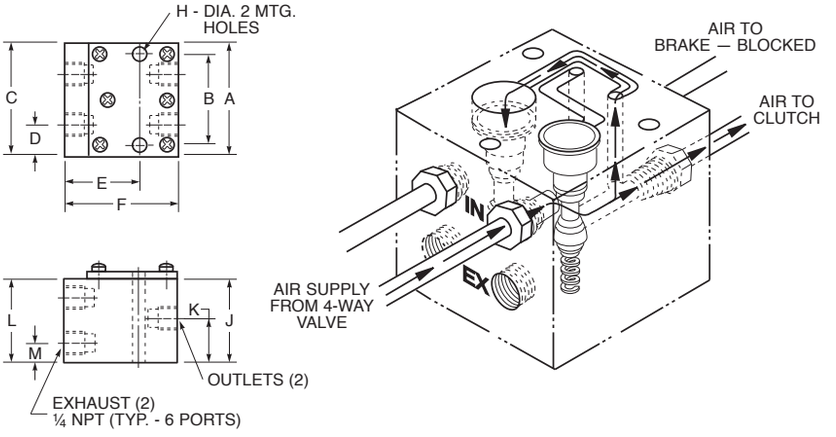
Dim	A	B	C	D	E
Inches	1.672	1.219	.547	1.359	1.094

Clutch/Brake Combination Overlap Eliminator

An Overlap Eliminator between a 4-way control and a clutch-brake system prevents a torque rise in either the clutch or brake until the alternate unit torque has dropped to an ineffective level.

Product No 944400

APPROXIMATE DIMENSIONS



OVERLAP ELIMINATOR

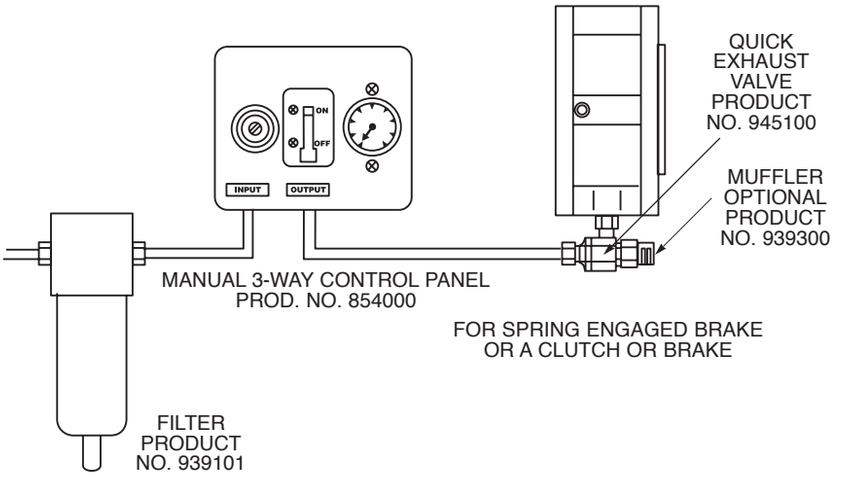
Dim	A	B	C	D	E	F	G	H	J	K	L	M
Inches	2.5	2	1.813	.688	1.656	2.5	.25	.266	2.188	.969	1.406	.406

Typical Circuit Diagrams

MANUAL CONTROL PANEL

Product Number	Description
940021	Control Kit N.O.

This Kit Contains:
1 each, Filter (.250 NPT.)
1 each, Control Panel
1 each, Quick Exhaust Valve (.125 NPT.)
1 each, Muffler (.125 NPT.)
1 each, Adapter (.125 NPT. to .250 NPT.)

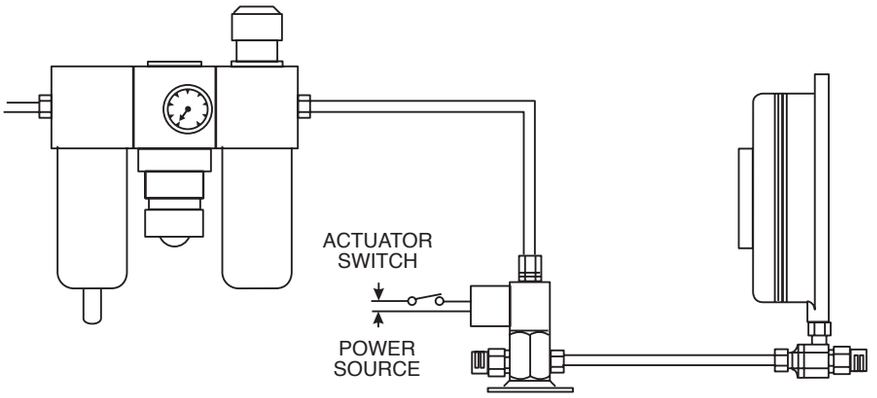


3-WAY CONTROL — N.O. — DISENGAGES CLUTCH OR BRAKE WHEN ACTUATOR SWITCH IS CLOSED

CONTROL KIT - SINGLE UNIT

Product Number	Description
940011	Control Kit N.O.

This Kit Contains:
1 each, 3-Way Valve (.25 NPT.), Inline Mount
1 each, Filter (.250 NPT.)
1 each, Regulator (.250 NPT.)
1 each, Lubricator (.250 NPT.)
1 each, Quick Exhaust Valve (.125 NPT.)
1 each, Muffler (.125 NPT.)
1 each, Adapter (.125 NPT. to .250 NPT.)



Typical Circuit Diagrams

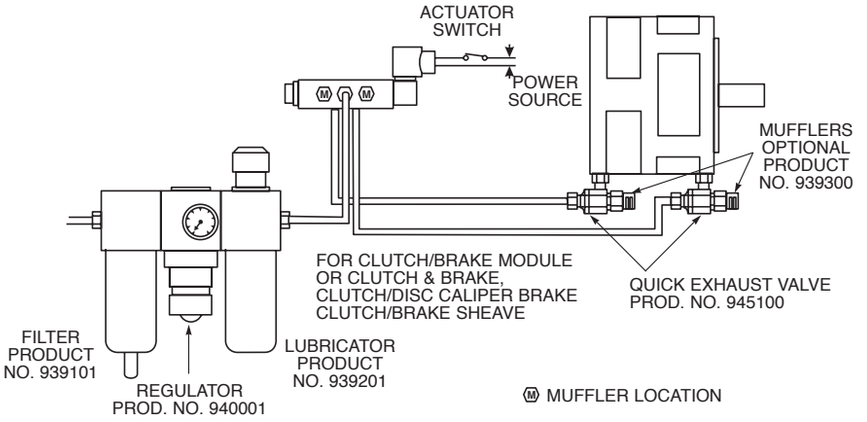
4-WAY SINGLE SOLENOID SPOOL CONTROL — INTERNALLY PILOTED — N.C. FOR OPERATING CLUTCH AND BRAKE AT PRESSURES 20 TO 100 PSI

CONTROL KIT - 4-Way

Product Number	Description
940019	Control Kit, 4-Way

This Kit Contains:

1 each, Filter (.250 NPT.)
1 each, Regulator (.250 NPT.)
1 each, Lubricator (.250 NPT.)
1 each, 4-Way Valve, Single Solonoid
2 each, Quick Exhaust Valve (.125 NPT.)
2 each, Muffler (.125 NPT.)
2 each, Adapter (.125 NPT. to .250 NPT.)



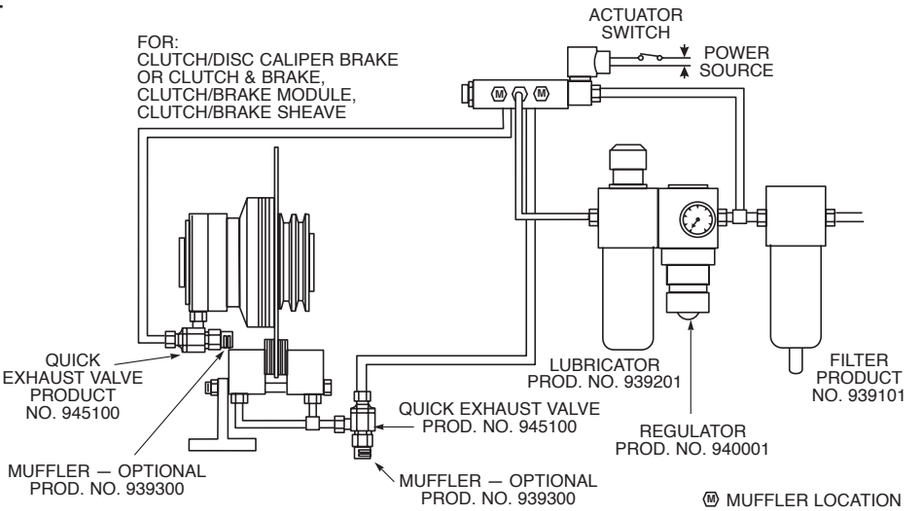
4-WAY SINGLE SOLENOID SPOOL CONTROL — EXTERNALLY PILOTED — N.C. FOR OPERATING CLUTCH AND BRAKE AT PRESSURES 20 TO 100 PSI

CONTROL KIT - 4 or 5-Way

Product Number	Description
940018	Control Kit, 4 or 5-Way

This Kit Contains:

1 each, Filter (.250 NPT.)
1 each, Regulator (.250 NPT.)
1 each, Lubricator (.250 NPT.)
1 each, 4 or 5-Way Valve, Single Solonoid
2 each, Quick Exhaust Valve (.125 NPT.)
2 each, Muffler (.125 NPT.)
2 each, Adapter (.125 NPT. to .250 NPT.)



Typical Circuit Diagrams

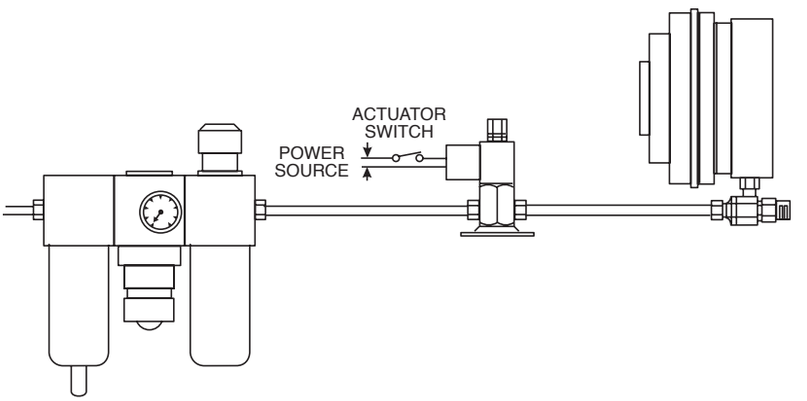
3-WAY CONTROL — N.C. — ENGAGES CLUTCH OR BRAKE WHEN ACTUATOR SWITCH IS CLOSED

CONTROL KIT - SINGLE UNIT

Product Number	Description
940012	Control Kit N.C.

This Kit Contains:

1 each, 3-Way Valve (.250 NPT.), Inline Mount
1 each, Filter (.250 NPT.)
1 each, Regulator (.250 NPT.)
1 each, Lubricator (.250 NPT.)
1 each, Quick Exhaust Valve (.125 NPT.)
1 each, Muffler (.125 NPT.)
1 each, Adapter (.125 NPT. to .250 NPT.)



5-WAY DOUBLE SOLENOID SPOOL CONTROL — EXTERNALLY PILOTED FOR OPERATING CLUTCH AND BRAKE AT DIFFERENT AIR PRESSURES USING ONE CONTROL — FROM 20 TO 100 PSI

CONTROL KIT - TWO UNITS

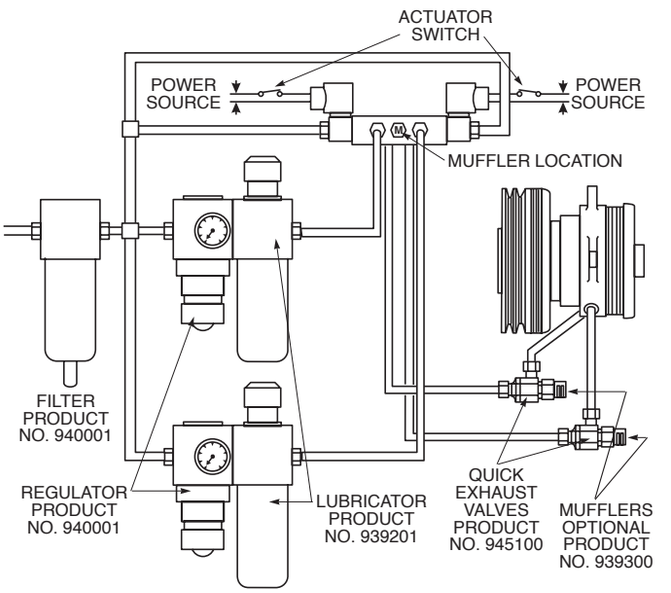
For controlling air to two units or to a combination clutch/brake, select from the following:

Product Number	Description
940013	Control Kit. 4/5 Way (.125" NPT Quick Exhaust Valves & Mufflers)
940014	Control Kit. 4/5 Way (.25" NPT Quick Exhaust Valves & Mufflers)

These kits Contain:

1 each, Double Solenoid 4/5 Way Externally Piloted Spool Valve (.125 NPT.)
1 each, Filter (.250 NPT.)
2 each, Regulator (.250 NPT.)
2 each, Lubricator (.250 NPT.)
2 each, Quick Exhaust Valve (.125 or .250 NPT.)
2 each, Mufflers (.125 or .250 NPT.)

NOTE : Externally piloted, double solenoid spool valves can be connected for 4 or 5-Way operation.



FOR CLUTCH/BRAKE SHEAVE OR CLUTCH & BRAKE. CLUTCH/DISE CALIPER BRAKE, CLUTCH/BRAKE MODULE

Typical Circuit Diagrams

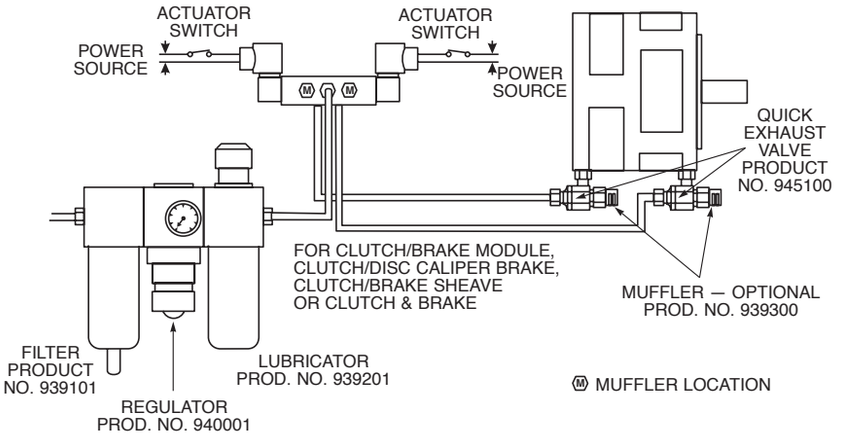
4-WAY DOUBLE SOLENOID CONTROL — INTERNALLY PILOTED FOR CLUTCH AND BRAKE OPERATING ABOVE 30 CPM — FROM 20 TO 100 PSI

CONTROL KIT - 4-Way

Product Number	Description
940020	Control Kit, 4-Way

This Kit Contains:

1 each, Filter (.250 NPT.)
1 each, Regulator (.250 NPT.)
1 each, Lubricator (.250 NPT.)
1 each, 4-Way Valve, Double Solenoid
2 each, Quick Exhaust Valve (.125 NPT.)
2 each, Muffler (.125 NPT.)
2 each, Adapter (.125 NPT. to .250 NPT.)



SOFT START OR STOP CIRCUIT

CONTROL KIT - 3-Way

Product Number	Description
940017	Control Kit, 3-Way

This Kit Contains:

1 each, 3-Way Valve, N.C.
1 each, Flow Control Valve
1 each, Quick Exhaust Valve (.125 NPT.)
1 each, Muffler (.125 NPT.)
2 each, Filter (.250 NPT.)
1 each, Regulator (.250 NPT.)
1 each, Lubricator (.250 NPT.)