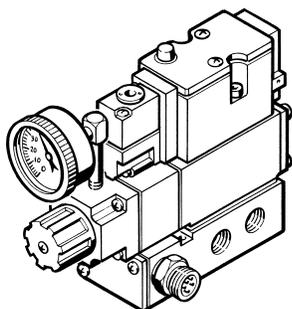


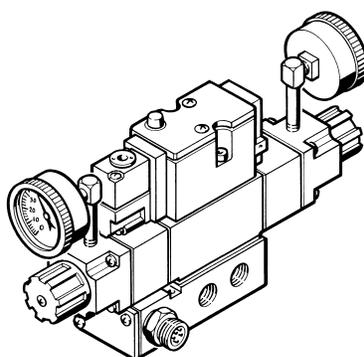


502-CV-001-00

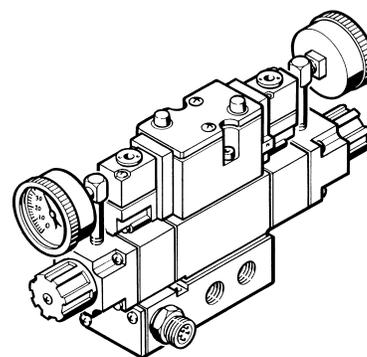
# SERVICE MANUAL AND REPAIR PARTS FOR *Pneumatic Control Valves & Accessories*



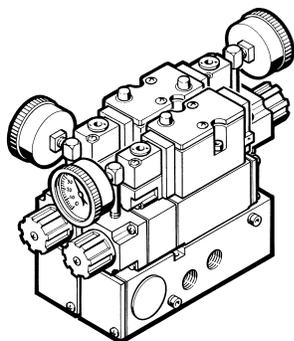
**1PC-3/8**  
SINGLE PRESSURE  
CONTROL VALVE



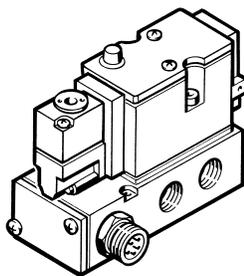
**2PC-3/8**  
DUAL PRESSURE  
CONTROL VALVE



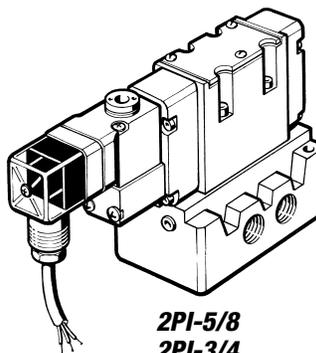
**2PC-SC-3/8**  
**2PC-DC-3/8**  
DUAL PRESSURE  
CONTROL VALVE



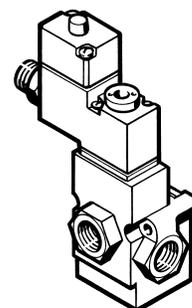
**3PC-DC-3/8**  
TWO STATION MANIFOLD  
THREE PRESSURE  
DUAL CONTROL VALVES



**2PI-3/8**  
DUAL PRESSURE INLET  
CONTROL VALVE



**2PI-5/8**  
**2PI-3/4**  
DUAL PRESSURE INLET  
CONTROL VALVE



**2PI-Br-3/8**  
SINGLE PRESSURE  
CONTROL VALVE  
(Motor Brakes)



**FORCE CONTROL INDUSTRIES, INC.**

**WARNING - Read this manual before any  
installation, maintenance or operation.**

**MANUFACTURERS OF MECHANICAL AND  
ELECTRICAL POWER TRANSMISSION EQUIPMENT**

## Limited Warranty

Force Control Industries, Inc. ("Force Control") warrants its products to be free from defects in material and workmanship under normal and proper use for a period of one year from the date of shipment. Any products purchased from Force Control that upon inspection at Force Control's factory prove to be defective as a result of normal use during the one year period will be repaired or replaced (at Force Controls' option) without any charge for parts or labor. This limited warranty shall be void in regard to (1) any product or part thereof which has been altered or repaired by a buyer without Force Control's previous written consent or (2) any product or part thereof that has been subjected to unusual electrical, physical or mechanical stress, or upon which the original identification marks have been removed or altered. Transportation charges for shipping any product or part thereof that the buyer claims is covered by this limited warranty shall be paid by the buyer. If Force Control determines that any product or part thereof should be repaired or replaced under the terms of this limited warranty it will pay for shipping the repaired or replaced product or part thereof back to the buyer. EXCEPT FOR THE EXPRESS WARRANTY SET OUT ABOVE, FORCE CONTROL DOES NOT GRANT ANY WARRANTIES EITHER EXPRESSED OR IMPLIED, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR USE. The warranty obligation set forth above is in lieu of all obligations or liabilities of Force Control for any damages. Force Control specifically shall not be liable for any costs incurred by the buyer in disconnecting or re-installing any product or part thereof repaired or replace under the limited warranty set out above. FORCE CONTROL EXPRESSLY EXCLUDES ALL LIABILITY FOR ANY INDIRECT OR CONSEQUENTIAL DAMAGES THE BUYER MAY SUSTAIN IN CONNECTION WITH THE DELIVERY, USE, OR PERFORMANCE OF FORCE CONTROL PRODUCTS. Under no circumstances shall any liability for which Force Control is held responsible exceed the selling price to the buyer of the Force Control products that are proven to be defective. This limited warranty may be modified only in writing signed by a duly authorized officer of the company. This limited warranty applies exclusively to Force Control products; warranties for motors and gear reducers and other component parts may be provided by their respective manufactures. Any legal action for breach of any Force Control warranty must be commenced within one year of the date on which the breach is or should have been discovered.

A Return Goods Authorization (RGA) number must be obtained from the factory and clearly marked on the outside of the package before any equipment will be accepted for warranty work. Force Control will pay the shipping costs of returning the owner parts that are covered by warranty.

Force Control believes that the information in this document is accurate. The document has been carefully reviewed for technical accuracy. In the event that technical or typographical errors exist, Force Control reserves the right to make changes to subsequent editions of this document without prior notice to holders of this edition. The reader should consult Force Control if errors are suspected. In no event shall Force Control be liable for any damages arising out of or related to this document or the information contained in it.

---

# PNEUMATIC CONTROLS

---

*This manual lists and describes all standard Pneumatic Mac Brand Control Valves and Accessories used on Posidyne Clutch/Brakes, Posistop Motor Brakes and Posidyne Dual Clutch Units.*

## TABLE OF CONTENTS

Pneumatic Actuation System .....	1
A. How a <i>Posidyne</i> Clutch/Brake, <i>Posistop</i> Brake and <i>Positorq</i> Brake Works .....	1
B. How to Set the Air Pressure .....	1
C. Types of Applications and Air System Requirements .....	2
Pneumatic Valve Selection Chart .....	3
Installation and Design Recommendations .....	4
Mac Control Valve Electrical Specifications .....	4
1PC-3/8 Single Pressure, Single Solenoid Control Valve .....	5
2PC-3/8 Dual Pressure, Single Solenoid Control Valve .....	6
2PC-SC-3/8 and 2PC-DC-3/8 Dual Pressure, Dual Solenoid Control Valve .....	7
3PC-DC-3/8 Two Station Manifold with Dual Control Valves .....	8
2PI-3/8 Two Pressure Inlet Control Valve .....	9
2PI-5/8 and 2PI-3/4 Two Pressure Inlet Control Valves .....	10
1PI-Br-3/8 Control Valve for Motor Brake Applications .....	11
Control Valve Electrical Wiring .....	12
Accumulators, Optional Manifold Mounted Control Valve and Quick Exhaust Valves .....	13
Trouble Shooting Procedure .....	14
Checking Solenoid Coils .....	15
General Repair, Servicing and Ordering Repair Parts .....	16
Control Valve Repair Parts Information Form .....	16
<i>Posidyne</i> Pressure vs. Static Torque Charts	
(01-1.5 Single Clutch and 1.5 Dual Clutch) .....	17
(02-03 Single and Dual Clutch) .....	17
(05-20 Single and Dual Clutch) .....	18
(02 and 2.5 Multi-Speed Drive) .....	19
<i>Posistop</i> Motor Brake Pressure vs. Static Torque Chart .....	19
Torque vs. Motor Frame Size Chart .....	19
How to Order Your Pneumatic Control Valve .....	20

**PNEUMATIC ACTUATION SYSTEM**

**A. HOW A Posidyne CLUTCH/BRAKE, Posistop BRAKE AND Positorq BRAKE WORKS**

1. The **Posidyne Clutch/Brake** always has an air set clutch. Therefore the clutch torque is related to the actuation pressure.

The Brake can be air set, spring set or spring set with air assist. Spring set with air assist means the brake is partially set with springs, then air pressure on the piston can be used to increase the brake torque up to the maximum. The “P” logic is an air set brake, the “S” and “SA” are spring set with air assist and the “A” and “B” logics are just spring set.

2. The **Posistop Brake** comes in several varieties. It can be spring set with air release or air set with spring release.

The **Posistop Motor Brake** is normally spring set with air release. The **Foot Mounted Posistop** with “A” and “B” Logic is also normally spring set with air release. The air pressure is used to release the brake. The springs determine the torque the brake will transmit.

The **Foot Mounted Posistop** with “S” Logic is air set and spring release. The torque is directly related to the air pressure on the actuating piston.

3. The **Positorq Brake** is an air set brake with spring release. The air pressure on the actuating piston is directly related to the torque transmitted to the load. The springs release the brake when the air pressure on the actuating piston is exhausted.

Unit	Logic	Clutch	Brake
Posidyne Clutch	C	Air Set	-----
Posidyne Clutch/Brake	S or SA	Air Set	Spring Set/Air Assist
	A or B	Air Set	Spring Set
	P	Air Set	Air Set
Posistop Motor Brake	-----	-----	Spring Set
Posistop Foot Mounted Brake	S	-----	Air Set
	A or B	-----	Spring Set
Positorq Brake	-----	-----	Air Set

Only one air pressure is required in the *Posistop* and *Positorq* Brake products and *Posidyne* “C” Logic (Clutch Only) , “A” or “B” Logic products. If the pressure is used to set the torque it must have an adjustable regulator. It is best to also have a regulator for the air release products, but it is not required.

Two air pressures are required for the other *Posidyne* Clutch/Brakes (“S”, “SA” and “P” Logics). One for the clutch and one for the brake. **This is critical for proper operation.**

**B. HOW TO SET THE AIR PRESSURE**

**WARNING - Air pressure settings on the clutch or brake that are too high will cause severe jerky motion and can cause damage to the drive train components and/or other machine components. If the air pressure settings are too low, over-heating can occur (clutch slipping), errors in positioning and severe wear.**

■ **Air Set Clutch**

If the unit is Air Set the pressure is directly related to the torque transmitted by the clutch. **The pressure must not exceed the maximum shown in the Specification Charts on pages 17, 18 and 19 or severe damage will result to the unit.** It is also important to reduce the pressure to that required by the load so as not to severely jerk the load causing damage to other components in the drive train.

**Determining Clutch Torque**

*There are several ways to determine the required air pressure. (The Clutch Torque is based on required torque.)*

1. The clutch torque can best be determined by knowing the load, inertia and time in seconds for acceleration. Further explanation can be found in the APC Catalog.
2. The motor horsepower can be used as a guide to set the Clutch Torque using the following formula. The Clutch Air Pressure can be set to this torque by using the **Pressure Vs Static Torque Charts** on pages 17, 18 and 19.

RPM	Lb. In./HP	Lb.Ft./HP
1800	36	3
1200	54	4.5
900	72	6

*Motor HP X Lb. Ins./HP X Ratio of Drive Between Motor and Clutch/Brake X 175% = Approx. Clutch Torque Initial Setting in Lb. Ins. (TR)*

**EXAMPLE: 3 HP, 1800 RPM Motor, 2:1 Belt Drive to Posidyne (3 X 36 X 2 X 1.75 = 378)**

3. Calculate Actuation Pressure for **Torque Required (TR)**.

Now use the following Formula for determining the **Actuation Pressure for a Required Torque**.

$$\text{Clutch PSI} = (T_R / C_T) + C_E$$

**Example: Size 2.5 Posidyne Clutch/Brake with "S" Logic**  
(See Chart on Page 17)

$$\text{Clutch PSI} = (378 / 21) + 6.84$$

**Clutch PSI = 24.8 PSI** (Initial Clutch Pressure Setting)

4. Several operations will determine if the pressure needs to be increased or decreased based on jerking, slipping and overheating. **(The Clutch must not be allowed to slip more than 1 to 2 Seconds.)**

■ **Air Set or Air Assist Brake**

Brake Torque on a Clutch/Brake is even more critical as the torque that the brake is set to will be transmitted to the load through the drive train. The clutch is often limited by how much torque the motor can develop. Also in many applications the required brake torque is much less than what is required by the clutch. This is common in high friction loads (conveyors) and worm gear drives, especially with high ratios. Other factors come in to play on vertical loads.

Also in the **Posidyne Clutch/Brakes** the "S" and "SA" logic units have spring set pistons with air assist. This means the brake will be set with no air pressure. The air assist will increase brake torque above the spring set torque. **It is critical that the stopping torque be determined and set according to the charts on pages 17, 18 and 19. Excessive torque settings on the brake can damage drive train components if not set properly.**

**Determining Brake Torque**

1. The **Brake Torque** can be determined using the load, inertia and time in seconds for deceleration. Further explanation can be found in our APC Catalog. The brake air pressure can be set to this torque by using the charts on pages 17, 18 and 19.
2. The Motor Horsepower can be used as a guide to set the **Brake Torque** using the following formula.

**Posidyne or Posistop Brake Formula (For Brake Torque)**

**Motor HP X Lb. Ft./HP X Ratio of Drive Between Motor and Clutch/Brake X 150% = Approx. Brake Torque Initial Setting in Lb. Ft. (T<sub>R</sub>)**

$$\text{Brake PSI} = (T_R / B_T) + B_S$$

High friction loads, especially with the "SA" logic, the brake pressure should be set to a minimum of 0 to 5 PSI.

Several operations will determine if the air pressure needs to be increased or decreased, based on jerking or slipping.

**CAUTION - Never set the brake on a Posidyne Clutch/Brake with "SA" Logic higher than 40 PSI.**

■ **Air Release Units**

1. If the unit is spring set, the torque is determined by the springs. The air pressure is used to release the unit. The air pressure must exceed the minimum to release the stack. The maximum is not critical, however higher than required pressures may cause a delay in engaging due to the extra volume of air in the piston chamber.

A quick exhaust valve can be helpful in this situation. (See charts on pages 17, 18 and 19 for air pressure ranges.)

**C. TYPES OF APPLICATIONS AND AIR SYSTEM REQUIREMENTS**

Air system components will vary by the type of application.

The air actuation system is critical to the operation of the Force Control Clutch and Brake Systems. The air system may be set up differently depending on the product, but is determined by the following factors:

1. Is the Clutch or Brake air set, air assist or spring set?
2. Is positioning accuracy critical?
3. Is this a high cycle application? (Greater than 60 CPS.)

**Low Cycle Applications**

For low cycle applications or if positioning accuracy is not critical the sandwich regulator built into the control valve is a convenient and simple assembly. The control Valve can be manifold mounted (directly mounted on the unit housing eliminating hoses and fittings), or pre-plumbed and mounted (mounted on a plate or bracket on the housing with hoses pre-plumbed from the valve to the actuating ports).

**Accurate Positioning Applications**

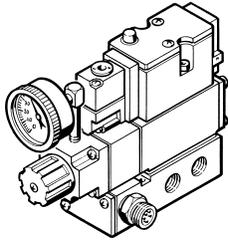
If Positioning Accuracy is required, the manifold mounted control valve is ideal. It should also use a DC solenoid (24 VDC is common). It is also critical that the actuating air pressure be consistent. If this cannot be assured, a set of accumulators should be used. For even better Positioning Accuracy and Consistency consider the **CLPC Closed Loop Positioning Control**. Ask for Catalog **CLPC-908**.

**High Cycle Applications**

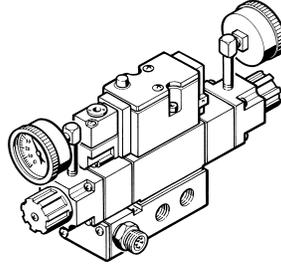
For High Cycle Applications the manifold mounted control valve is highly recommended. If not available a pre-plumbed and mounted control valve assembly should be used. A DC solenoid is also required, as well as a 2-Pressure Inlet (PI) Control Valve. Accumulators are also required for best results and should have the pressure regulators installed so the air is drawn directly from the accumulator and not through the regulator. If tight positioning accuracy is also required, the **CLPC Closed Loop Positioning Control** is highly recommended.

## PNEUMATIC CONTROLS

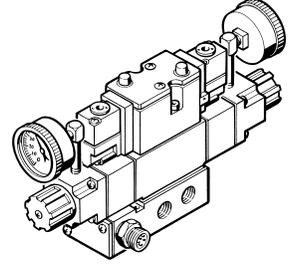
The following pages describes and illustrates the Pneumatic Control Valves used for Force Control's Drive Systems: 1. *Posidyne* Clutch/Brakes, 2. *Posistop* Motor Brakes and 3. *Positorq* Brakes.



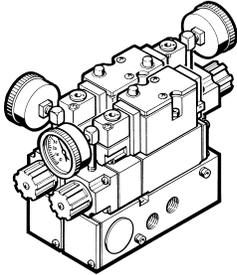
**1PC-3/8 Single Pressure Control Valve**  
Two position, four way, five ported, single solenoid, spring return, with single pressure regulator and gauge, sub-base mounted, 3/8" NPT.  
*(Located on Page 5)*



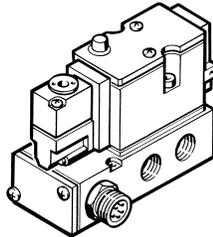
**2PC-3/8 Dual Pressure Control Valve**  
Two position, four way, five ported, single solenoid, spring return, with dual pressure sandwich regulator and gauges, sub-base mounted, 3/8" NPT.  
*(Located on Page 6)*



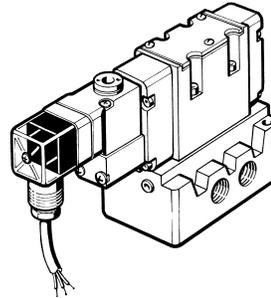
**2PC-SC-3/8 2PC-DC-3/8 Dual Pressure Control Valve** Three position, four way, five ported, center position to exhaust, dual solenoid, spring centered, with dual pressure sandwich regulator and gauges, sub-base mounted, 3/8" NPT.  
*(Located on Page 7)*



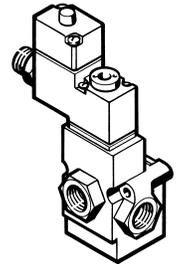
**3PC-DC-3/8 Two Station Manifold Three Pressure Control Valve** Station 1-Two position, four way, five ported, single solenoid, spring return, with single pressure sandwich regulator and gauge, 3/8" NPT; Station 2-Three position, four way, center position to exhaust, dual solenoid, spring return, with dual pressure sandwich regulator and gauge, 3/8" NPT.  
*(Located on Page 8)*



**2PI-3/8 Dual Pressure Inlet Control Valve** Two position, four way, five ported, single solenoid, spring return, 3/8" NPT.  
*(Located on Page 9)*



**2PI-5/8 2PI-3/4 Dual Pressure Inlet Control Valve** Two position, four way, five ported, single solenoid, spring return, 5/8" NPT and 3/4" NPT.  
*(Located on Page 10)*



**2PI-Br-3/8 Single Pressure Control Valve** Two position, two way, three ported, single sol., spring return, internal pilot operated, normally closed, 3/8" NPT.  
*(Located on Page 11)*

### Pneumatic Valve Selection Charts

*Force Control's* family of **Oil Shear Clutch and Brake Products** are most often actuated by pneumatic control valves. Torque control of the units is accomplished by adjusting the actuation pressure. To aid the designer in the selection specification of the correct control circuit the charts below have been provided. During the selection process of the *Posidyne* or *Posistop* a particular logic type was decided upon. Based on the logic type of your unit find the correct control valve model number indicated in the appropriate chart.

#### Posidyne Clutch/Brake

Logic	Valve Model No.			
	Single Clutch			Dual Clutch
	Sizes 01 to 10	Sizes 11	Size 20	
S	2PC-3/8 or 2PI-3/8	2PI-5/8	2PI-3/4	N/A
SA	2PC-3/8 or 2PI-3/8	2PI-5/8	2PI-3/4	3PC-DC-3/8
A	1PC-3/8 or 2PI-3/8*	2PI-5/8*	2PI-3/4*	2PC-DC-3/8
B	1PC-3/8 or 2PI-3/8*	2PI-5/8*	2PI-3/4*	2PC-DC-3/8
C	1PC-3/8 or 2PI-3/8*	2PI-5/8*	2PI-3/4*	2PC-DC-3/8
SCP	2PC-SC-3/8 or 2PI-3/8	2PI-5/8	2PI-3/4	3PC-DC-3/8
P	2PC-3/8 or 2PI-3/8	2PI-5/8	2PI-3/4	N/A

#### Posistop Motor Brake

Logic	Valve Model No.	
	Foot Mtd.	Motor Mtd.
S	2PI-Br-3/8 or 1PC-3/8	
A		
B		

\* - When using a **Model 2 PI Control Valve** for A, B or C Logic Single Clutch Unit, the brake port is not used and must be plugged.

**Installation and Design Recommendations**

**A. Air Supply**

The Air Supply should be dry and free of all contamination. The cleaner the air is the longer the control valves and drive unit will last.

Lubricated air will make the pneumatic control valves last longer but. . .

. . . too much oil will fill up the piston chamber with oil and cause sluggish actuation of the piston. **No oil is better than too much oil. Lubricated air is not necessary for our drive units.**

**B. Air Line Sizes and Fittings**

The optimum air line size is 3/8" for sizes 01 through 11 *Posidyne* Clutch/Brakes and 056 through 280 *Posistop* Brakes. The size 20 *Posidyne* Clutch/Brake and size 320 *Posistop* Brake should have 1/2" air lines. The fewest number of fittings should be used and all fittings should be maximum flow type. A tee and pressure gauge located near the actuation port is often helpful for troubleshooting.

**C. Manifold Mounting**

The internal piston volumes of Force Control Clutch/Brake and Brake Products is quite low. The control valves should be located as close as possible to the unit, as this directly affects the response time and consistency. Most of the Pneumatic Control Valves shown in this manual have Manifold Mounting available which is the best arrangement because it eliminates the external plumbing between the Control Valve and the Force Control Unit.

Each Sub-Base for Manifold Mounting is shown and listed for each Control Valve.

**D. Accumulators**

In High Cycle Applications, for the best response and consistency, one accumulator should be used for the clutch and one for the

brake on *Posidyne* clutch/brakes. This will maintain a constant pressure to the unit. Regulators should be located on the inlet to the accumulators. See Page 13 for available Accumulator Assemblies.

**E. Air Line Connections**

Both top and bottom porting is supplied in many of the models. Whenever possible, bottom porting is recommended to purge any contamination from the piston chamber.

**F. High Speed - High Accuracy Applications**

For High Speed and High Accuracy Applications the system should be equipped with a consistent air supply, accumulators of the proper size (*Consult Force Control for assistance*), with regulators on the input, large hoses to the valve and manifold mounted valve, if possible. If not manifold mounted, the valve should be located as close as possible and quick exhaust valves should be used at the actuation port.

**G. Electronic Controls**

Many of the positioning problems associated with the clutch/brake can be traced to the control system. PLC controls often include scan time delays depending on the speed of the control and number of lines of code used. High-speed cards may be required. The type of limit switches can also cause position error.

**Force Control** has developed the **CLPC** Closed Loop Positioning Control which eliminates scan time problems. The **CLPC** is closed loop to correct positioning errors and will compensate for cold start to hot run phase shift, as well as adjustment for changing speeds, loads and other variables in the drive system. (*See Section 11 in our All Products Catalog for further information on the CLPC series controls.*)

**NOTES:** All valves Cv = 1.0 Min.; All solenoids are standard 24 VDC or 110 VAC continuous duty rated for 50/60 Hz operation.

Hazardous location solenoids are available. Consult factory.

See chart below for Electrical Specifications on all Control Valves

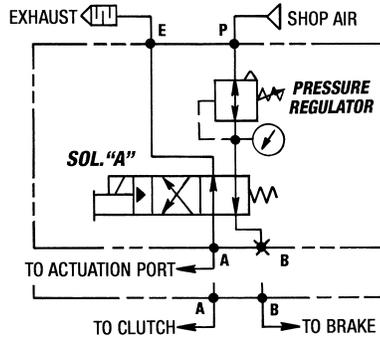
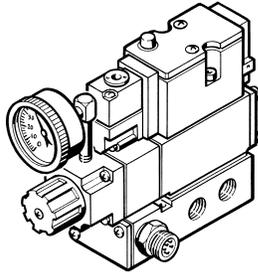
**Mac Control Valve Electrical Specifications**

Mac VALVE Series	VOLTAGE (AC/DC)	AC CYCLES (CPS)	POWER RATING (WATTS)	IN-RUSH CURRENT (AMPS)	HOLDING CURRENT (AMPS)	TIME TO ENERGIZE (SEC.)	TIME TO DE-ENERGIZE (SEC.)	COIL RESISTANCE (OHMS)
<b>55 Series</b>	24 VDC	-----	6	-----	.35	.009	.005	64.2 - 71.5
	110 VAC	50/60	6.8	.12	.09	.011	.011	481 - 563
<b>82 Series</b>	24VDC	-----	12.7	-----	.53	.006	.007	42.8 - 47.8
	110 VAC	50/60	6.8	.09	.06	.011	.016	640 - 756
<b>ISO II Series</b>	24 VDC	-----	17.1	-----	.71	.007	.011	32.0 - 35.2
	110 VAC	50/60	6.8	.12	.09	.006 - .012	.010 - .017	481 - 563
<b>ISO III Series</b>	24 VDC	-----	17.1	-----	.71	.007	.011	32.0 - 35.2
	110 VAC	50/60	6.8	.12	.09	.006	.010 - .017	481 - 563

# PNEUMATIC CONTROLS

(Mac 82 Series)

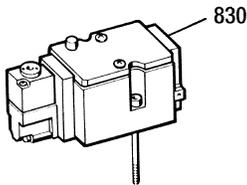
## 1PC-3/8 Single Pressure Control Valve



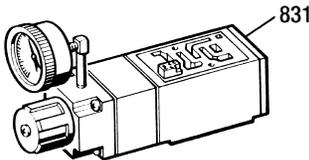
**DESCRIPTION:**

Two position, four way, four ported, single solenoid, spring return, with single pressure sandwich regulator and gauge, sub-base mounted, 3/8" NPT.

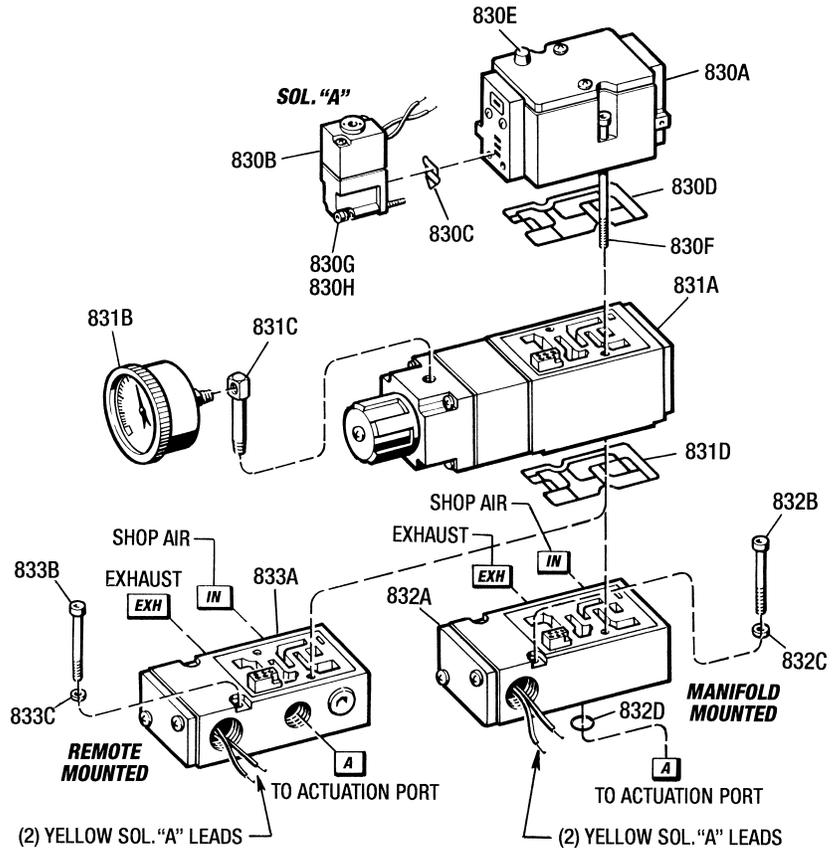
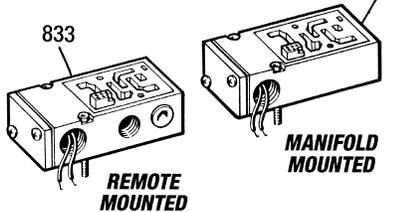
**SOLENOID, PILOT VALVE AND SPOOL ASSEMBLY**



**SINGLE PRESSURE SANDWICH REGULATOR ASSEMBLY**



**SUB-BASE ASSEMBLY**

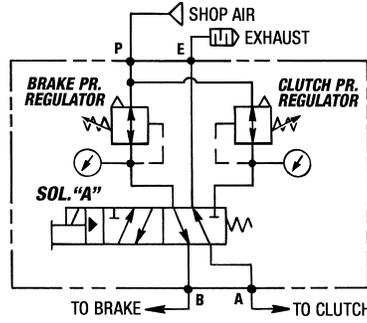
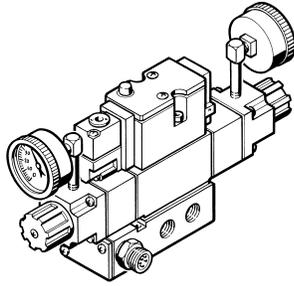


Ref. No.	Part Name	Qty.	Ref. No.	Part Name	Qty.
830	Solenoid, Pilot Valve and Spool Assembly . . .	1	831C	Gauge Stem . . . . .	1
830A	Spool Sub-Ass'y. . . . .	1	831D	Bottom Seal . . . . .	1
830B	Solenoid and Pilot Valve Sub-Ass'y. . . . .	1	<b>832</b>	<b>Manifold Mounted Sub-Base Assembly . . . . .</b>	<b>1</b>
830C	Pilot Valve Seal . . . . .	1	832A	Manifold Mounted Sub-Base Sub-Ass'y. . . . .	1
830D	Bottom Seal . . . . .	1	832B	#10-24 x 1-3/8" Lg. Soc. Hd. Cap Screw . . . . .	2
830E	Power "On" Light . . . . .	1	832C	#10 Lock Washer . . . . .	2
830F	M4 x 0.7 x 73 mm Soc. Hd. Screw . . . . .	2	832D	Bottom Seal . . . . .	1
830G	M3 x 0.5 x 35 mm Soc. Hd. Screw . . . . .	2	<b>833</b>	<b>Remote Mounted Sub-Base Assembly . . . . .</b>	<b>1</b>
830H	M3 Lock Washer . . . . .	2	833A	Remote Mounted Sub-Base Sub-Ass'y. . . . .	1
<b>831</b>	<b>Single Pressure Sandwich Regulator Assembly .</b>	<b>1</b>	833B	#10-24 x 1-3/8" Lg. Soc. Hd. Cap Screw . . . . .	2
831A	Single Pressure Sandwich Regulator Sub-Ass'y.	1	833C	#10 Lock Washer . . . . .	2
831B	Pressure Gauge . . . . .	1			

# PNEUMATIC CONTROLS

(Mac 82 Series)

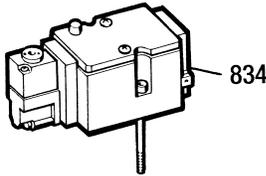
## 2PC-3/8 Dual Pressure Control Valve



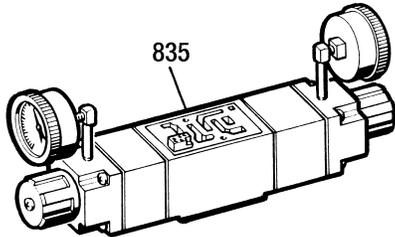
**DESCRIPTION:**

Two position, four way, four ported, single solenoid, spring return, with dual pressure sandwich regulator and gauges, sub-base mounted, 3/8" NPT.

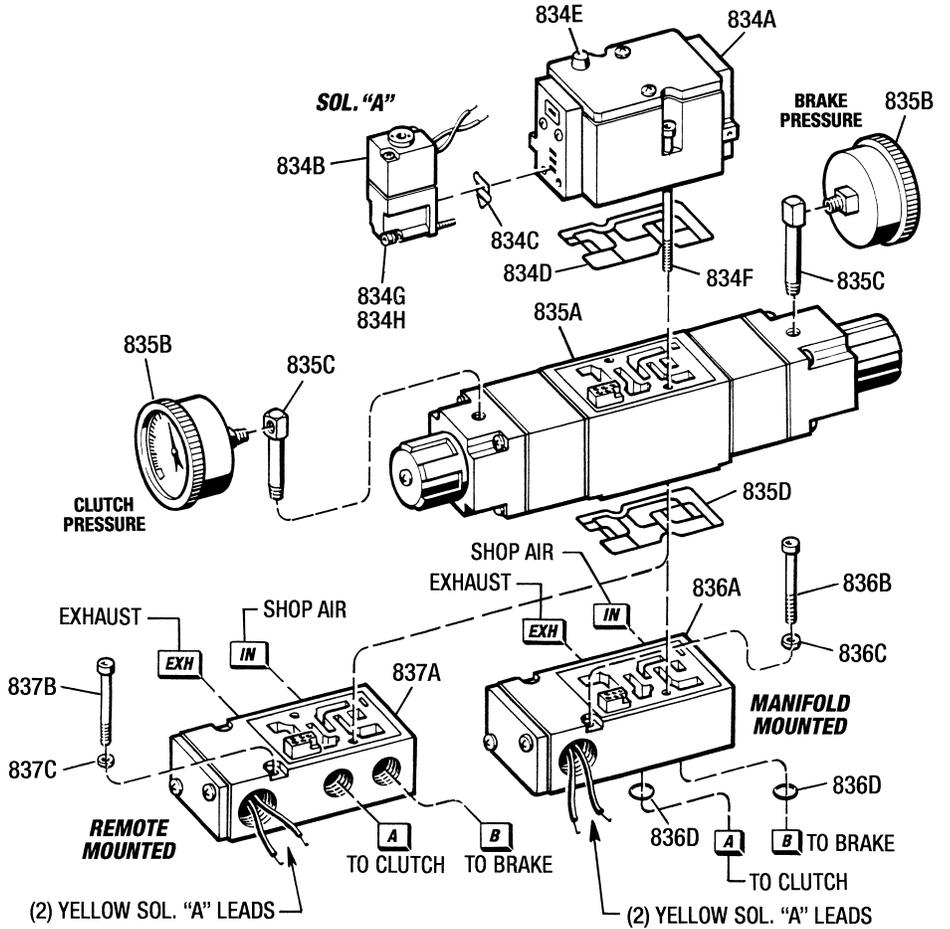
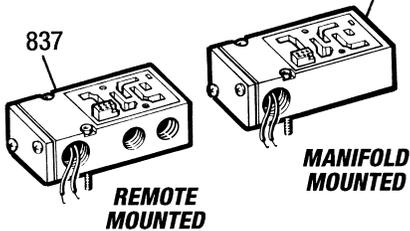
**SOLENOID, PILOT VALVE AND SPOOL ASSEMBLY**



**DUAL PRESSURE SANDWICH REGULATOR ASSEMBLY**



**SUB-BASE ASSEMBLY**

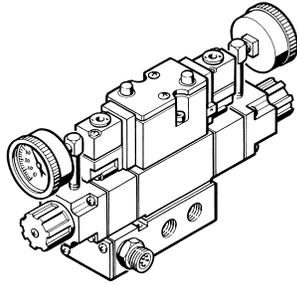


Ref. No.	Part Name	Qty.	Ref. No.	Part Name	Qty.
834	Solenoid, Pilot Valve and Spool Assembly . . .	1	835C	Gauge Stem . . . . .	2
834A	Spool Sub-Ass'y. . . . .	1	835D	Bottom Seal . . . . .	1
834B	Solenoid and Pilot Valve Sub-Ass'y. . . . .	1	<b>836</b>	<b>Manifold Mounted Sub-Base Assembly . . . . .</b>	<b>1</b>
834C	Pilot Valve Seal . . . . .	1	836A	Manifold Mounted Sub-Base Sub-Ass'y. . . . .	1
834D	Bottom Seal . . . . .	1	836B	#10-24 x 1-3/8" Lg. Soc. Hd. Cap Screw . . . . .	2
834E	Power "On" Light . . . . .	1	836C	#10 Lock Washer . . . . .	2
834F	M4 x 0.7 x 73 mm Soc. Hd. Screw . . . . .	2	836D	O-Ring . . . . .	2
834G	M3 x 0.5 x 35 mm Soc. Hd. Screw . . . . .	2	<b>837</b>	<b>Remote Mounted Sub-Base Assembly . . . . .</b>	<b>1</b>
834H	M3 Lock Washer . . . . .	2	837A	Remote Mounted Sub-Base Sub-Ass'y. . . . .	1
<b>835</b>	<b>Dual Pressure Sandwich Regulator Assembly.</b>	<b>1</b>	837B	#10-24 x 1-3/8" Lg. Soc. Hd. Cap Screw . . . . .	2
835A	Dual Pressure Sandwich Regulator Sub-Ass'y. . . . .	1	837C	#10 Lock Washer . . . . .	2
835B	Pressure Gauge . . . . .	2			

# PNEUMATIC CONTROLS

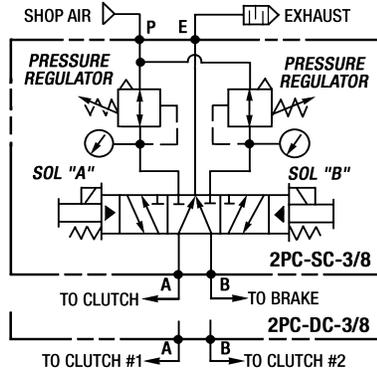
(Mac 82 Series)

## 2PC-SC-3/8 Dual Pressure Control Valve (Single Clutch)



(Mac 82 Series)

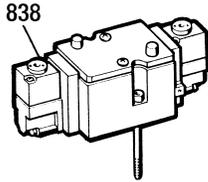
## 2PC-DC-3/8 Dual Pressure Control Valve (Dual Clutch)



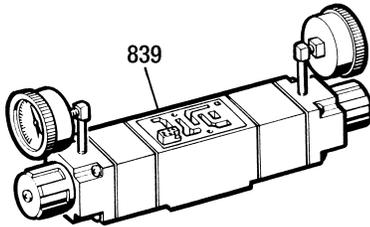
### DESCRIPTION:

Three position, four way, four ported, center position to exhaust, dual solenoid, spring centered, with dual pressure sandwich regulator and gauges, sub-base mounted, 3/8" NPT.

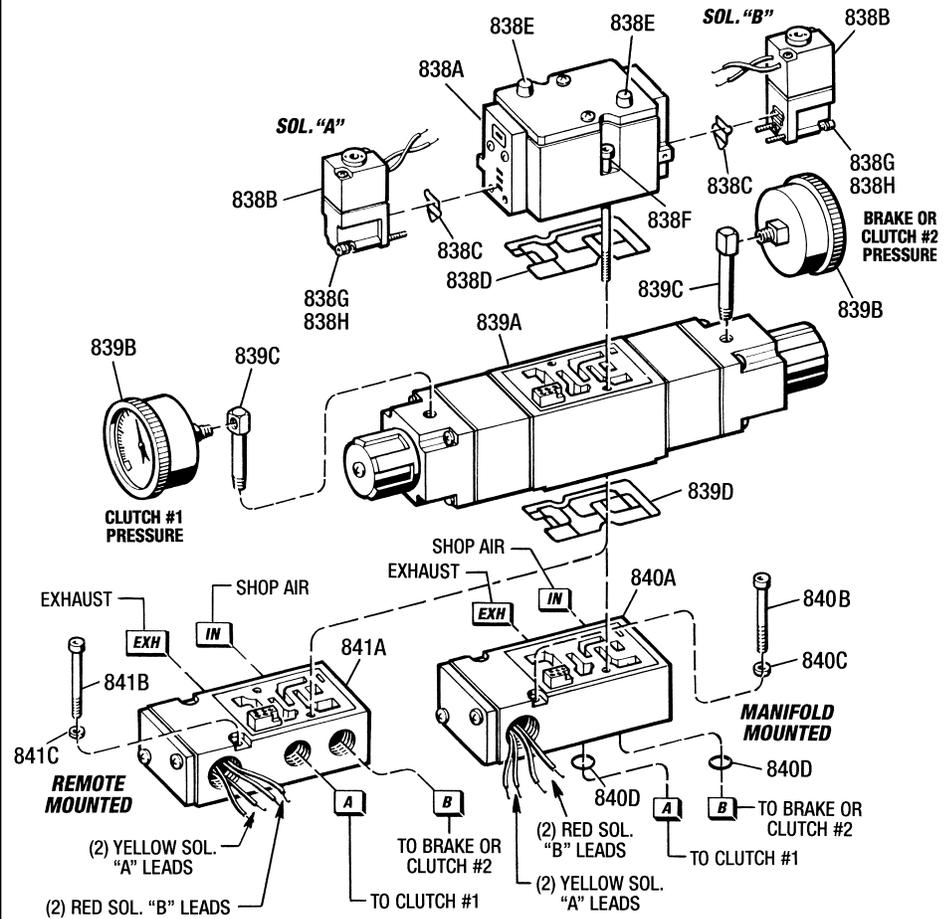
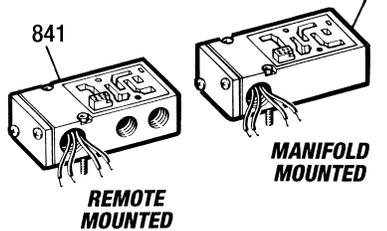
### DUAL SOLENOID, PILOT VALVE AND SPOOL ASSEMBLY



### DUAL PRESSURE SANDWICH REGULATOR ASSEMBLY



### SUB-BASE ASSEMBLY

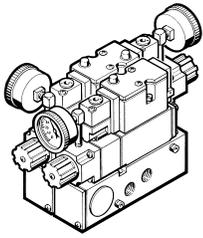


Ref. No.	Part Name	Qty.	Ref. No.	Part Name	Qty.
838	Dual Solenoid, Pilot Valve and Spool Ass'y. . . . .	1	839C	Gauge Stem. . . . .	2
838A	Spool Sub-Ass'y. . . . .	1	839D	Bottom Seal . . . . .	1
838B	Dual Solenoid and Pilot Valve Sub-Ass'y. . . . .	2	<b>840</b>	<b>Manifold Mounted Sub-Base Assembly . . . . .</b>	<b>1</b>
838C	Pilot Valve Seal . . . . .	2	840A	Manifold Mounted Sub-Base Sub-Ass'y. . . . .	1
838D	Bottom Seal . . . . .	1	840B	#10-24 x 1-3/8" Lg. Soc. Hd. Cap Screw. . . . .	2
838E	Power "On" Light . . . . .	2	840C	#10 Lock Washer . . . . .	2
838F	M4 x 0.7 x 73 mm Soc. Hd. Screw . . . . .	2	840D	O-Ring . . . . .	2
838G	M3 x 0.5 x 35 mm Soc. Hd. Screw . . . . .	4	<b>841</b>	<b>Remote Mounted Sub-Base Assembly . . . . .</b>	<b>1</b>
838H	M3 Lock Washer . . . . .	4	841A	Remote Mounted Sub-Base Sub-Ass'y. . . . .	1
<b>835</b>	<b>Dual Pressure Sandwich Regulator Assembly. . . . .</b>	<b>1</b>	841B	#10-24 x 1-3/8" Lg. Soc. Hd. Cap Screw. . . . .	2
839A	Dual Pressure Sandwich Regulator Sub-Ass'y. . . . .	1	841C	#10 Lock Washer . . . . .	2
839B	Pressure Gauge . . . . .	2			

# PNEUMATIC CONTROLS

## (Mac 82 Series) 3PC-DC-3/8

(Dual Clutch -SA Logic)  
(Dual Clutch -SCP Logic)

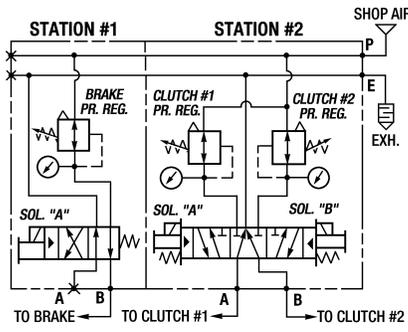


### DESCRIPTION: Two Station Manifold

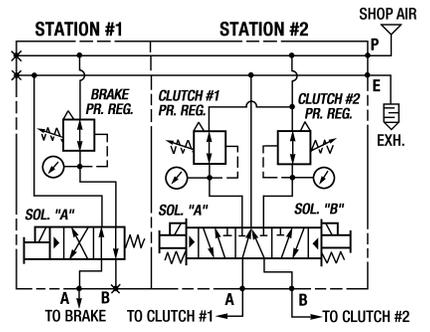
**Station 1** - Two position, four ported, four way, single solenoid, spring return, with single pressure sandwich pressure regulator and gauge, 3/8" NPT.

**Station 2** - Three position, four ported, four way, center position to exhaust, dual solenoid, spring return, with dual pressure sandwich pressure regulator and gauges, 3/8" NPT.

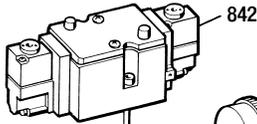
### SA Logic



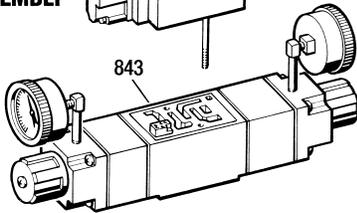
### SCP Logic



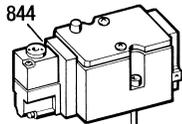
#### DUAL SOLENOID, PILOT VALVE AND SPOOL ASSEMBLY



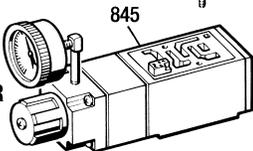
#### DUAL PRESSURE SANDWICH REGULATOR ASSEMBLY



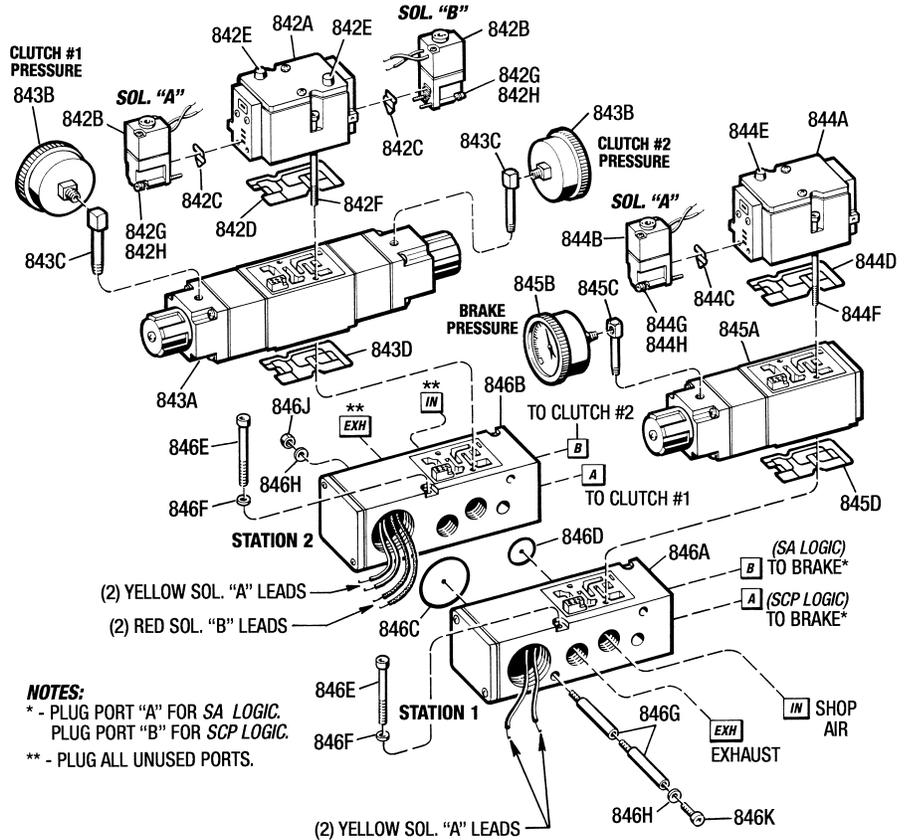
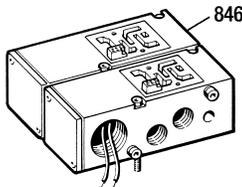
#### SINGLE SOLENOID, PILOT VALVE AND SPOOL ASSEMBLY



#### SINGLE PRESSURE SANDWICH REGULATOR ASSEMBLY



#### TWO STATION MANIFOLD ASSEMBLY



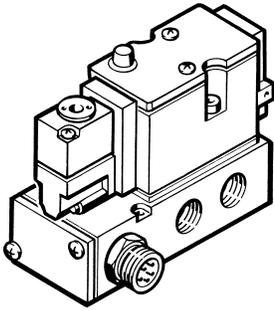
**NOTES:**  
\* - PLUG PORT "A" FOR SA LOGIC.  
PLUG PORT "B" FOR SCP LOGIC.  
\*\* - PLUG ALL UNUSED PORTS.

Ref. No.	Part Name	Qty.	Ref. No.	Part Name	Qty.
842	Dual Solenoid, Pilot Valve and Spool Ass'y.	1	844F	M4 x 0.7 x 73 mm Soc. Hd. Screw	2
842A	Spool Sub-Ass'y.	1	844G	M3 x 0.5 x 35 mm Soc. Hd. Screw	2
842B	Dual Solenoid and Pilot Valve Sub-Ass'y.	2	844H	M3 Lock Washer	2
842C	Pilot Valve Seal	2	<b>845</b>	<b>Single Pressure Sandwich Regulator Assembly</b>	1
842D	Bottom Seal	1	845A	Single Pressure Sandwich Regulator Sub-Ass'y.	1
842E	Power "On" Light	2	845B	Pressure Gauge	1
842F	M4 x 0.7 x 73 mm Soc. Hd. Screw	2	845C	Gauge Stem	1
842G	M3 x 0.5 x 35 mm Soc. Hd. Screw	4	845D	Bottom Seal	1
842H	M3 Lock Washer	4	<b>846</b>	<b>Two Station Manifold Assembly</b>	1
<b>835</b>	<b>Dual Pressure Sandwich Regulator Assembly</b>	1	846A	Station 1 Manifold	1
843A	Dual Pressure Sandwich Regulator Sub-Ass'y.	1	846B	Station 2 Manifold	1
843B	Pressure Gauge	2	846C	O-Ring	1
843C	Gauge Stem	2	846D	O-Ring	3
843D	Bottom Seal	1	846E	1/4"-20 x 2-1/4" Lg. Soc. Hd. Cap Screw	4
<b>844</b>	<b>Solenoid, Pilot Valve and Spool Assembly</b>	1	846F	1/4" Lock Washer	4
844A	Spool Sub-Ass'y.	1	846G	Threaded Extension, M5 x 0.8 mm Thread	4
844B	Solenoid and Pilot Valve Sub-Ass'y.	1	846H	M5 Flat Washer	4
844C	Pilot Valve Seal	1	846J	Hex Nut, M5 x 0.8 mm	2
844D	Bottom Seal	1	846K	M5 x 0.8 x 14 mm Soc. Hd. Screw	2
844E	Power "On" Light	1			

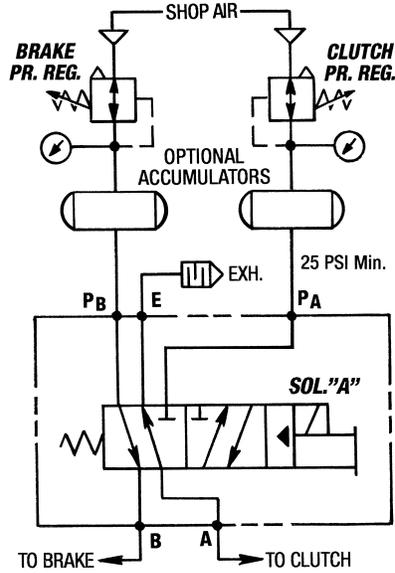
# PNEUMATIC CONTROLS

(Mac 82 Series)

## 2PI-3/8 (2 Pressure Inlet-3/8)



The 2PI-3/8 Control Valve is used on Sizes 01 to 10 Posidyne Clutch/Brake Units.



**DESCRIPTION:**

Two position, four way, five ported, single solenoid, spring return, 3/8" NPT.

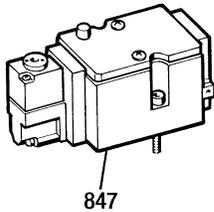
This pneumatic valve set-up requires the use of external pressure regulators. *(The Pressure Regulators must be sized to furnish the required torque.)*

For high cycle applications when a **CLPC** (Closed Loop Position Control) is used an accumulator is recommended to be installed in the inlet pressure line. *(The accumulator must be sized to be 10 x the air required per engagement.)*

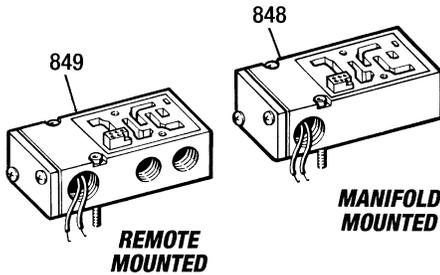
(See appropriate Specification Charts for the required torque and required air per engagement.)

**NOTE:** This 2PI-3/8 with external pilot is available. Specify this when ordering because it requires a different Sub-Base.

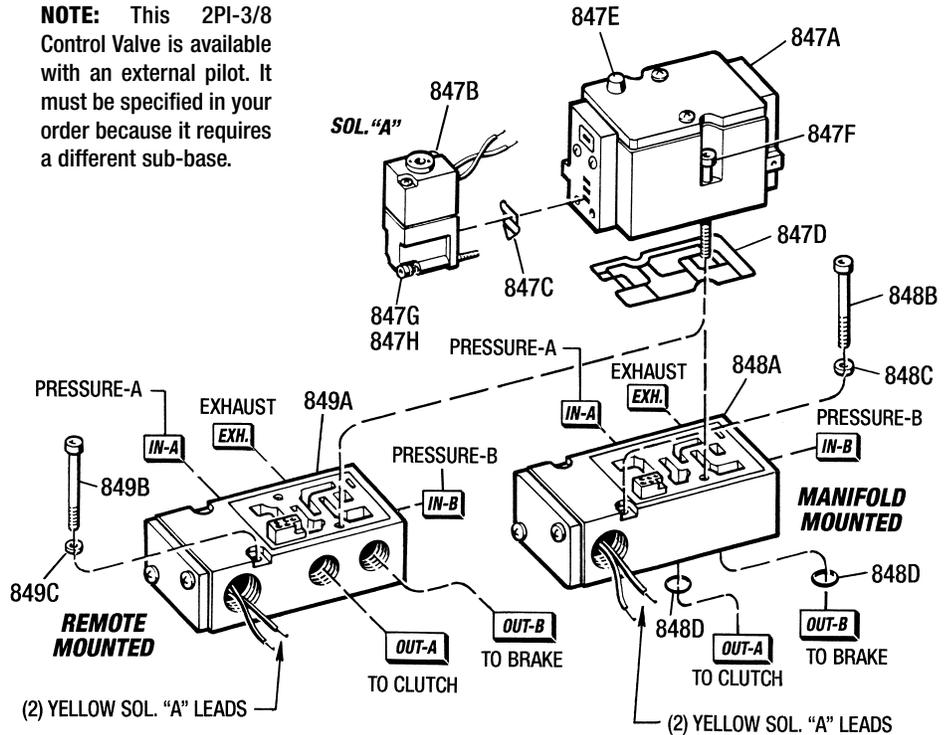
**SOLENOID, PILOT VALVE AND SPOOL ASSEMBLY**



**SUB-BASE ASSEMBLY**



**NOTE:** This 2PI-3/8 Control Valve is available with an external pilot. It must be specified in your order because it requires a different sub-base.

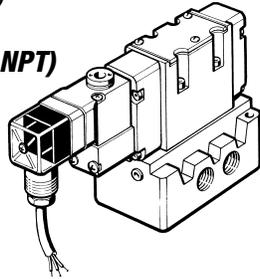


Ref. No.	Part Name	Qty.	Ref. No.	Part Name	Qty.
847	Solenoid, Pilot Valve and Spool Assembly . . . . .	1	848	Manifold Mounted Sub-Base Assembly . . . . .	1
847A	Spool Sub-Ass'y. . . . .	1	848A	Manifold Mounted Sub-Base Sub-Ass'y. . . . .	1
847B	Solenoid and Pilot Valve Sub-Ass'y. . . . .	1	848B	#10-24 x 1-3/8" Lg. Soc. Hd. Cap Screw. . . . .	2
847C	Pilot Valve Seal . . . . .	1	848C	#10 Lock Washer . . . . .	2
847D	Bottom Seal . . . . .	1	848D	Bottom Seal . . . . .	1
847E	Power "On" Light . . . . .	1	849	Remote Mounted Sub-Base Assembly . . . . .	1
847F	M4 x 0.7 x 73 mm Soc. Hd. Screw . . . . .	2	849A	Remote Mounted Sub-Base Sub-Ass'y. . . . .	1
847G	M3 x 0.5 x 35 mm Soc. Hd. Screw . . . . .	2	849B	#10-24 x 1-3/8" Lg. Soc. Hd. Cap Screw. . . . .	2
847H	M3 Lock Washer . . . . .	2	849C	#10 Lock Washer . . . . .	2

# PNEUMATIC CONTROLS

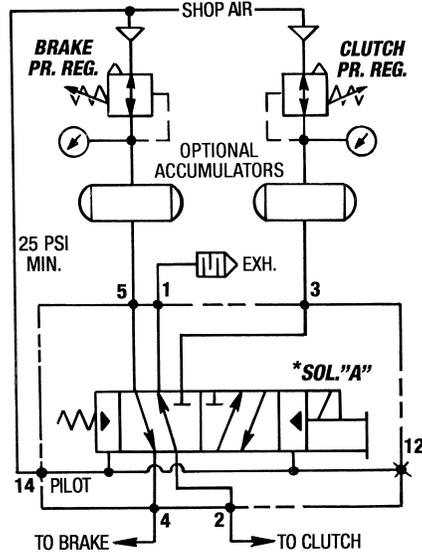
(Mac ISO II Series)  
**2PI-5/8**  
 (2 Pressure Inlet-5/8" NPT)

(Mac ISO III Series)  
**2PI-3/4**  
 (2 Pressure Inlet-3/4" NPT)



The **2PI-5/8 Control Valve** is used on Size 11 Posidyne Clutch/Brake Unit and the **2PI-3/4 Control Valve** is used on the Size 20 Posidyne Clutch/Brake Unit.

**NOTE:** Both the **2PI-5/8** and **2PI-3/4 Control Valves** are furnished with a DIN Connector and 6 Ft. long electrical cable.



**DESCRIPTION:**

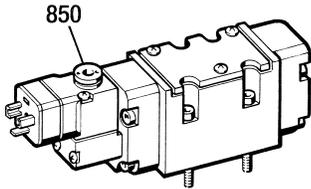
Two position, four way, five ported, single solenoid, spring return, 3/8" NPT.

This pneumatic valve set-up requires the use of external pressure regulators. *(The Pressure Regulators must be sized to furnish the required torque.)*

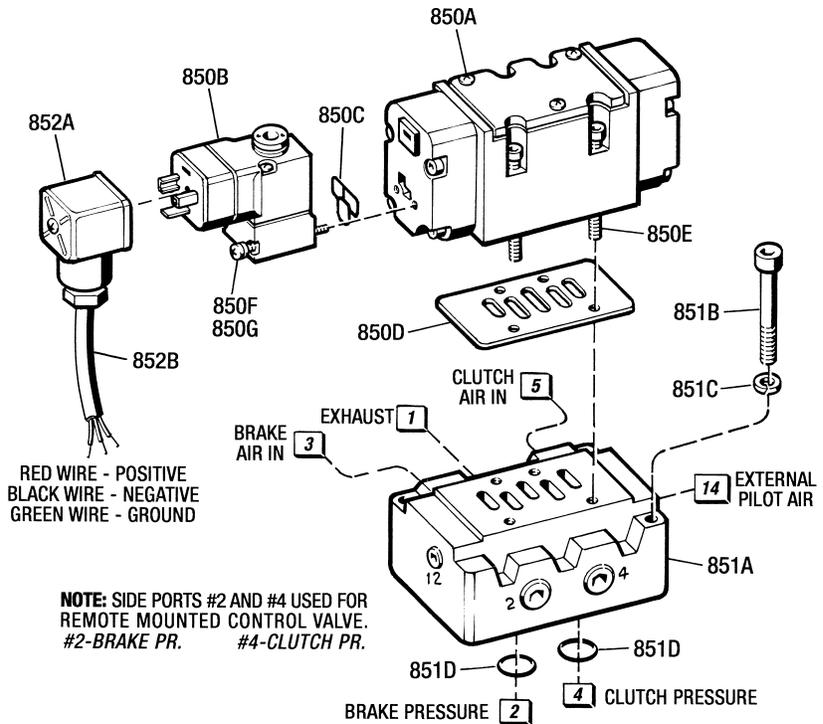
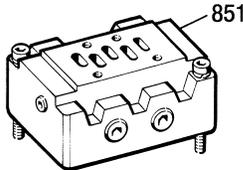
For high cycle applications when a **CLPC** (Closed Loop Position Control) is used an accumulator is recommended to be installed in the inlet pressure line. *(The accumulator must be sized to be at least 10 x the air required per engagement.)*

(See appropriate Specification Charts for the required torque and required air per engagement.)

**SOLENOID, PILOT VALVE AND SPOOL ASSEMBLY**



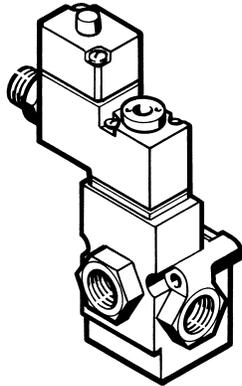
**DIN CONNECTOR AND 3-WIRE ELECTRICAL CABLE**



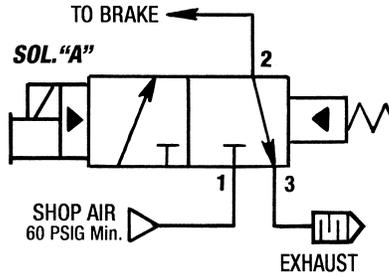
Ref. No.	Part Name	Qty.	Ref. No.	Part Name	Qty.
850	Solenoid, Pilot Valve and Spool Assembly . . .	1	851	Sub-Base Assembly . . . . .	1
850A	Spool Sub-Ass'y. . . . .	1	851A	Sub-Base Sub-Ass'y. . . . .	1
850B	Solenoid and Pilot Valve Sub-Ass'y. . . . .	1	851B	1/4"-20 x 2-1/4" Lg. Soc. Hd. Cap Screw . . . . .	2
850C	Pilot Valve Seal . . . . .	1	851C	1/4" Lock Washer . . . . .	2
850D	Gasket. . . . .	1	851D	O-Ring . . . . .	2
850E	M6 x 1 x 49 mm Soc. Hd. Screw . . . . .	4	852	Electrical Cable and DIN Connector . . . . .	1
850F	M4 x 0.7 x 38 mm Rd. Hd. Screw . . . . .	2	852A	DIN Connector . . . . .	1
850G	M4 Lock Washer . . . . .	2	852B	3 Wire Electrical Cable, 6 Ft. Lg. . . . .	1

# PNEUMATIC CONTROLS

(Mac 55 Series)  
**1PI-Br-3/8**  
**Control Valve**



This Control Valve is used on Motor Brake Applications.



### Motor Brake Application

Two position, Two Way, Three Ported, Single Solenoid, Spring Return, Internal Pilot Operated, Normally Closed, 3/8" NPT Pneumatic Control Valve.

### Valve Specifications:

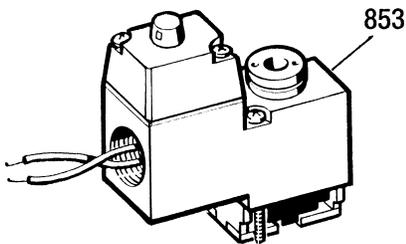
Ambient Temp. 0° F. to 120° F.

- Electrical .....120 VAC
- 60 Hz
- Inrush - 14.7 Volt/Amp (.12 Amps)
- Seal - 10.4 Volt/Amps (.09 Amps)
- Coil .....General Purpose Class A Continuous Duty.
- Pr. Range .....150 PSI Max.

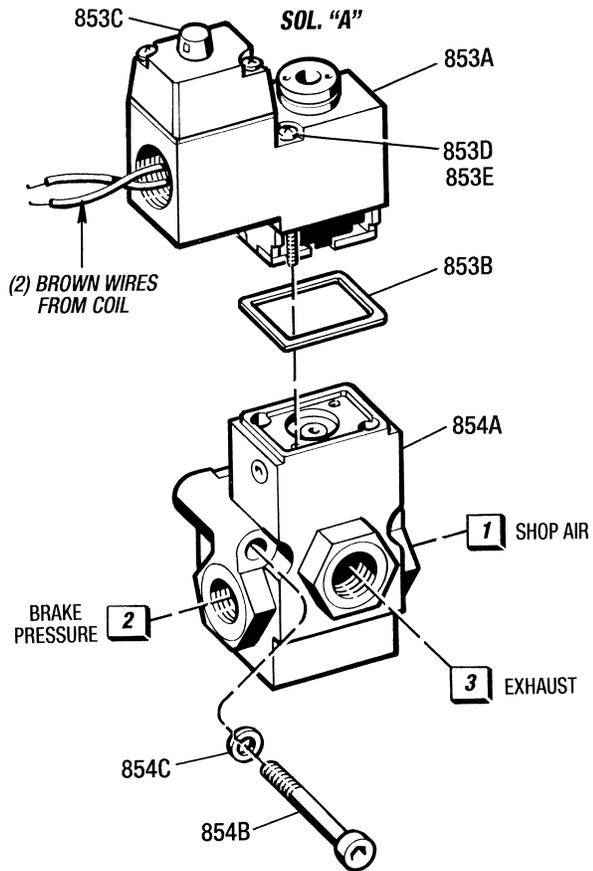
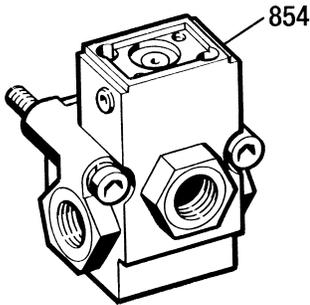
### Control Valve Logic

	RUN	STOP
Solenoid Function	ON Energized	OFF De-Energized

### SOLENOID AND POWER LIGHT ASSEMBLY



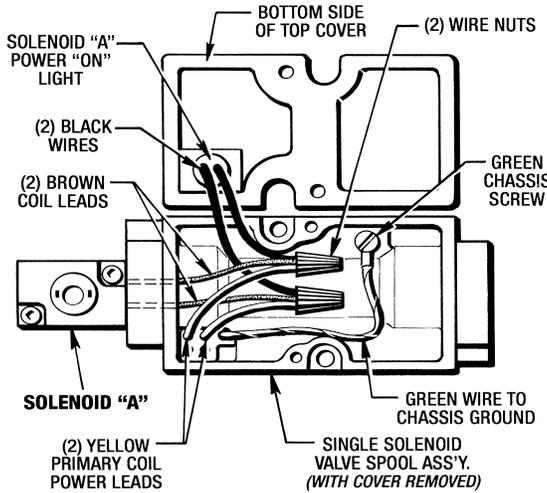
### CONTROL VALVE SPOOL ASSEMBLY



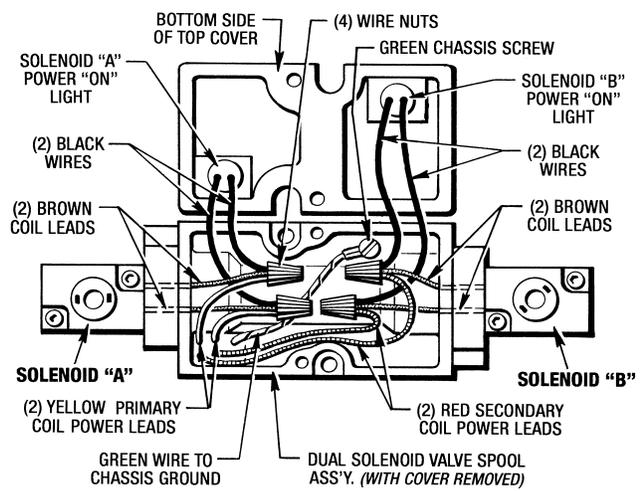
Ref. No.	Part Name	Qty.	Ref. No.	Part Name	Qty.
853	Solenoid and Power Light Assembly	1	854	Control Valve Spool Assembly	1
853A	Solenoid Sub-assembly	1	854A	Spool Sub-Assembly	1
853B	Gasket	1	854B	1/4"-20 x 1-3/4" Lg. Soc. Hd. Screw	2
853C	Power Light	1	854C	1/4" Lock Washer	2
853D	M4 x 0.7 x 37 mm But. Hd. Screw	2			
853E	M4 Lock Washer	2			

Control Valve Electrical Wiring

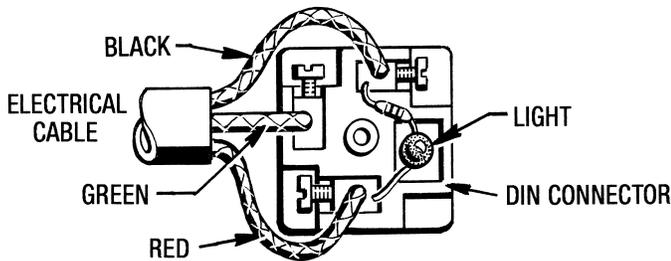
Mac 82 Series Control Valve (Single Solenoid Wiring)



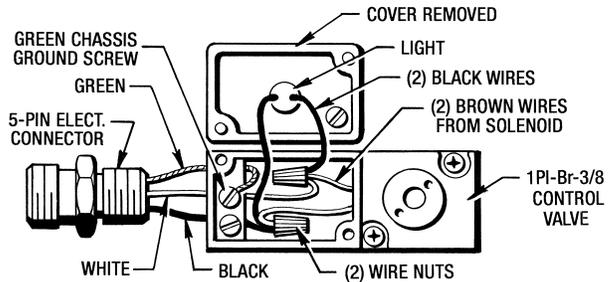
Mac 82 Series Control Valve (Dual Solenoid Wiring)



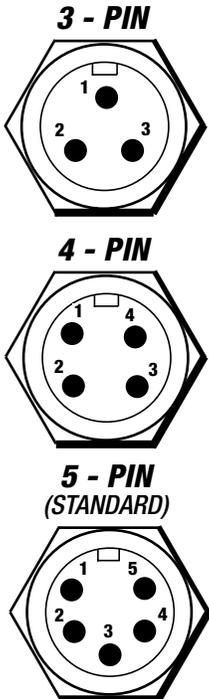
Mac ISO II & ISO III Series Control Valves (DIN Connector)



Mac 55 Series Control Valve



Brad-Harrison Connector Wiring



BRAD/HARRISON CONNECTOR		CONNECT TO SOLENOID WIRE (Color)					
		SINGLE SOLENOID	DUAL SOLENOIDS		THREE SOLENOIDS		
			SOL. "A"	SOL. "A"	SOL. "B"	STATION #1 SOL. "A"	STATION #2 SOL. "A" SOL. "B"
PIN/COLOR	FUNCTION	SOL. "A"	SOL. "A"	SOL. "B"	SOL. "A"	SOL. "A"	SOL. "B"
1 - GREEN	EARTH GROUND	*CHASSIS	-----	-----	-----	-----	-----
2 - BLACK	POWER - 1	YELLOW	-----	-----	-----	-----	-----
3 - WHITE	NEUTRAL/COMMON	YELLOW	-----	-----	-----	-----	-----
1 - BLACK	POWER - 1	YELLOW	YELLOW	-----	-----	-----	-----
2 - WHITE	NEUTRAL/COMMON	YELLOW	YELLOW	RED	-----	-----	-----
3 - RED	POWER - 2	NOT USED	-----	RED	-----	-----	-----
4 - GREEN	EARTH GROUND	*CHASSIS	*CHASSIS		-----	-----	-----
1 - WHITE	NEUTRAL/COMMON	YELLOW	YELLOW	RED	YELLOW	YELLOW	RED
2 - RED	POWER - 2	NOT USED	-----	RED	-----	YELLOW	-----
3 - GREEN	EARTH GROUND	*CHASSIS	*CHASSIS		*CHASSIS		
4 - ORANGE	POWER - 3	NOT USED	NOT USED		-----	-----	RED
5 - BLACK	POWER - 1	YELLOW	YELLOW	-----	YELLOW	-----	-----

\*Green earth ground wires always connects to the green colored chassis screw located in the valve body junction box.

## Accumulators

Pneumatic Accumulators are recommended for high cyclic applications and when the air supply fluctuates. Fluctuating air supply will cause erratic operation. There are two basic types:

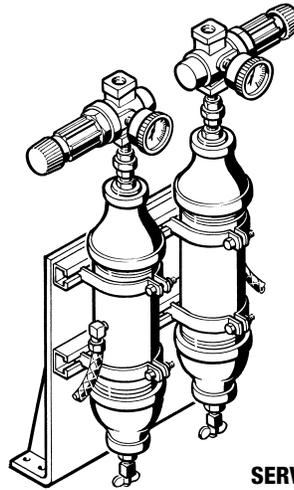
**1. Cast Iron-Pipe Nipple Type** complete with air regulators, pressure gauges and mounting bracket. This type comes in two std. sizes and can be ordered with the following part numbers:

- 25 cu. in. . . . .Part Number 07-92-202-00
- 200 cu. in. . . . .Part Number 07-92-203-00

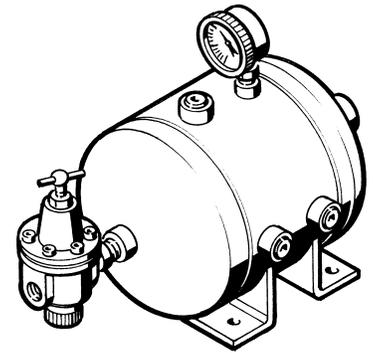
**2. Welded Steel Tank Type** which also includes an air regulator, pressure gauge and mounting feet. This type comes in one std. size and can be ordered with the following part number:

- 460 cu. in. . . . .Part Number 01-S/N-47045

**1. Cast Iron-Pipe Nipple Type**



**2. Welded Steel Tank Type**



Contact Force Control for Special Accumulator Requirements to meet your specific needs and application parameters.

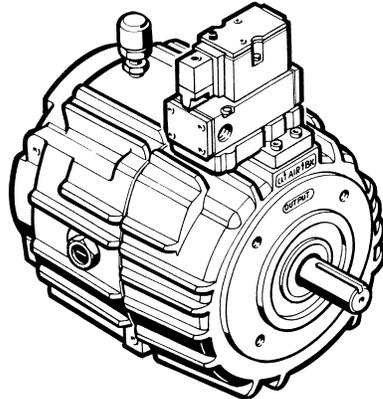
**SERVICING NOTE:** Each accumulator tank has a drain cock located at the bottom. Drain the moisture from the tanks weekly or until experience dictates otherwise.

## Optional Manifold Mounted Control Valve

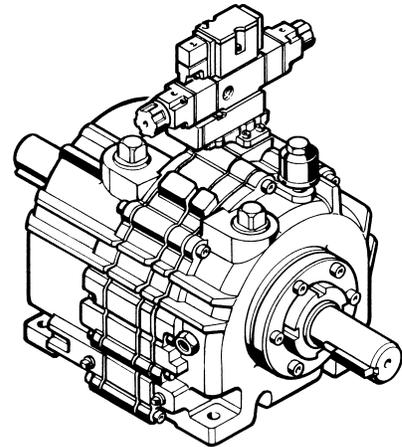
### 1PC-3/8, 2PC-3/8, 2PI-3/8, 2PI-5/8, 2PI-3/4 and 2PC-SC-3/8 Control Valves

These pneumatic control valves can also be furnished with bottom porting for Manifold Mounting. This allows the control valve to be directly mounted to the drive unit which gives you a **compact and efficient drive unit with improved response time.**

When ordering a **Manifold Mounted Control Valve**, just use the **Ordering System Chart** and specify **"Manifold Mounted"** in the appropriate block.



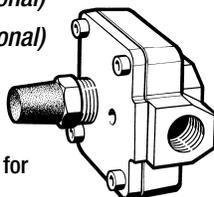
The example shown is a 1.5 Posidyne Clutch/Brake Unit with a 2 Pr. Inlet-3/8 Manifold Mounted Control Valve



The example shown is a 03 Posidyne Clutch/Brake Unit with a 2-PC-3/8 Manifold Mounted Control Valve.

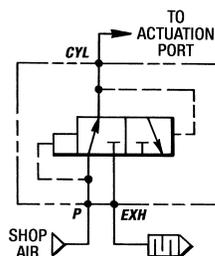
## Quick Exhaust Valve

- (QE-3/8)** 3/8" NPT (Standard)
- (QE-1/4)** 1/4" NPT (Optional)
- (QE-1/8)** 1/8" NPT (Optional)

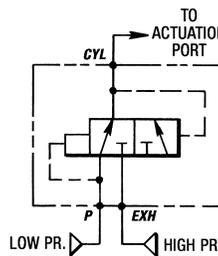


**NOTE:** The Muffler is not used for the Shuttle Valve Application.

### Standard Use As Exhaust Valve



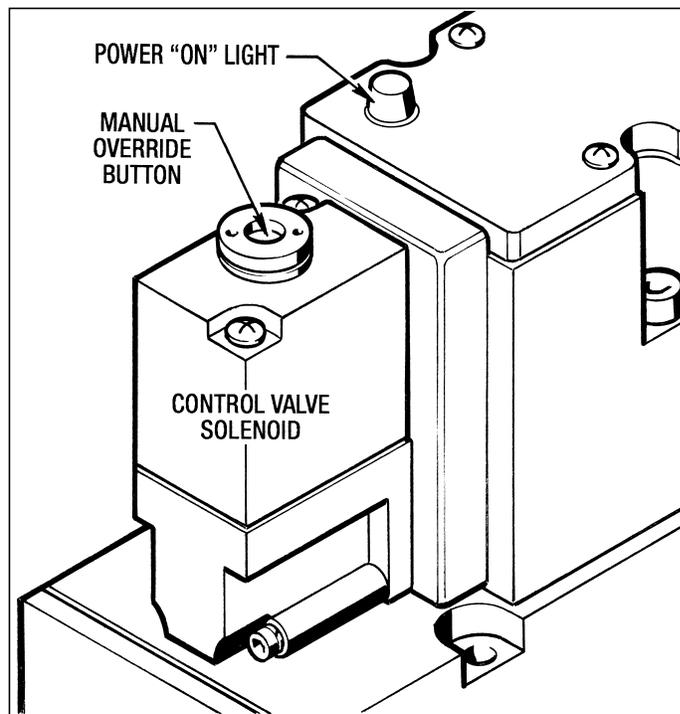
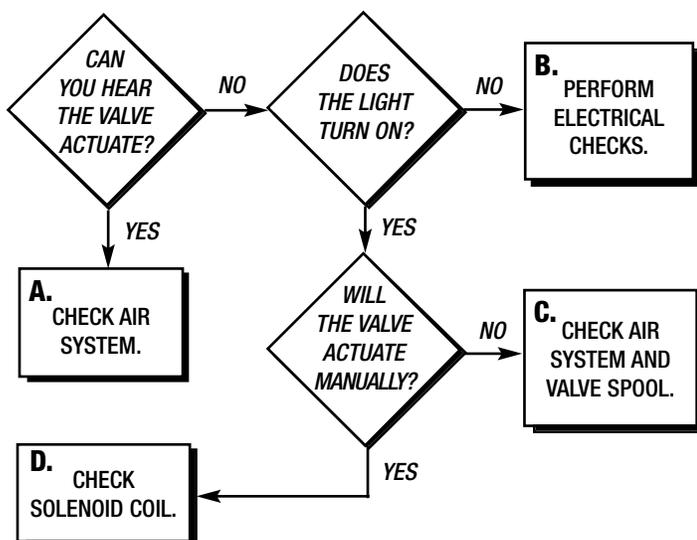
### When Used As Shuttle Valve



The use of **Quick Exhaust Valves** installed directly at the actuation port of the clutch or brake improves response time, repeatability and final positioning accuracy for most applications. It is recommended that when the control valve is located 10 Ft. or more away from the drive unit this Quick Exhaust Valve is used in each pressure line. This valve is available as part number **QE-3/8, QE-1/4 or QE-1/8.**

**TROUBLE SHOOTING PROCEDURE**

If the *Posidyne Clutch/Brake* or *Posistop Motor Brake* operation is erratic, sluggish or not engaging properly, make the following **Checks to Troubleshoot the Pneumatic System**.



Control Valve "Manual Override" Button and Power "On" Light

**A. Checking the Air System**

1. Check the air supply pressure and volume to see if there is adequate and constant compressed air to properly actuate the piston. See **Pressure vs. Static Torque Charts** for minimum and maximum air pressure requirements.

*(Adjust as necessary.)*

Also check the air supply for cleanliness to make sure that there are no contaminants in the air to affect the operation of the unit.

2. Check the Filters to see if the filter elements are dirty and need cleaned or replaced.

*(Clean or replace as necessary.)*

3. Check the Muffler or Silencer installed in the Valve Exhaust Port to see if it is dirty and needs cleaning.

*(Remove and clean in a suitable solvent.)*

4. Check any Pressure Regulators to see if they are set for the proper air pressure as specified in the **Pressure vs. Static Torque Charts**.

*(Adjust as necessary.)*

5. Check any Accumulators for any accumulated moisture in them.

*(Drain out any water.)*

**B. Electrical Checks**

1. Check the Voltage and all Electrical Connections.

*(Adjust the Voltage and tighten any loose connections as necessary.)*

**C. Checking the Valve Spool Operation**

If the Valve Spool did not actuate properly when you pressed the "Manual Override" Button the Spool could be sticking or there is some other mechanical failure in the valve.

We recommend that you replace the whole Spool, Pilot Valve and Solenoid Assembly. They can be ordered from each exploded view drawing for your individual control valve.

**D. Checking Solenoid Coils**

Check the Coil Resistance and for Current Leakage as shown on the next page.

*(Replace the Solenoid and Pilot Valve Assembly if the coil is bad.)*

**E. Check the Unit Piston Chamber** for water or oil contamination.

*(Disassemble the drive unit to the extent necessary to drain the water or oil out of the chamber.)*

Refer to each particular Service Manual for each Clutch and/or Brake for Disassembly Procedure and any other problems with the drive unit not covered in this manual.

**CHECKING SOLENOID COILS**

**A. Coil Resistance Test**

Remove the end cover from the Sub-Base Assembly and remove the (2) wire nuts from the (2) coil leads. Disconnect the (2) power leads.

Hook-Up a Meg-Ohmmeter to both coil leads as shown below. Set the Meg-Ohmmeter to "Ohm" range and test Resistance at 500 VDC.

The Resistance should read as follows:

**MAC 55 Series Control Valves**

- 24 VDC (6 Watts) . . . . .64.2 - 71.5 Ohms
- 110 VAC (6.8 Watts) . . . . .481 - 563 Ohms

**MAC 82 Series Control Valves**

- 24 VDC (12.7 Watts) . . . . .42.8 - 47.8 Ohms
- 110 VAC (6.8 Watts) . . . . .640 - 756 Ohms

**MAC ISO Series Control Valves**

- 24 VDC (17.1 Watts) . . . . .32.0 - 35.2 Ohms
- 110 VAC (6.8 Watts) . . . . .481 - 563 Ohms

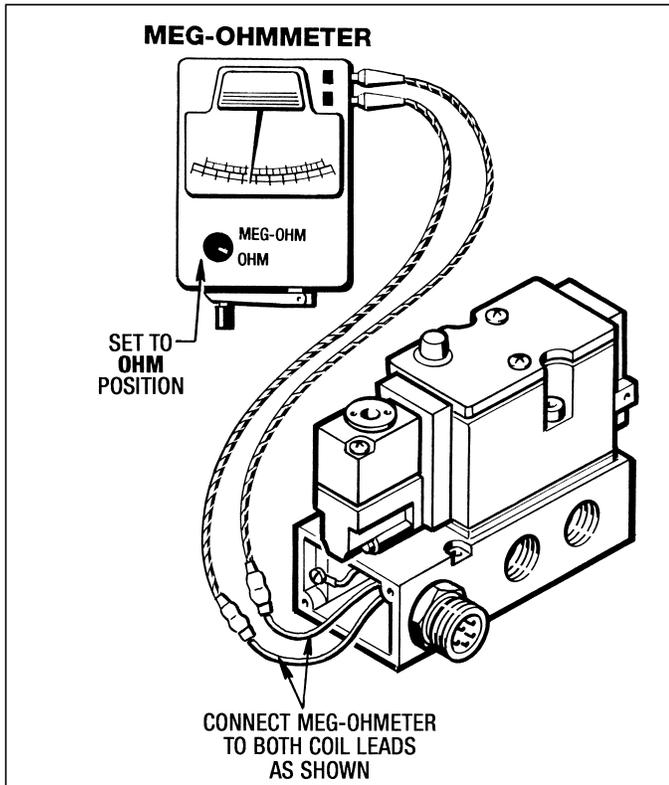
A reading outside of this range would indicate that the Coil is bad and needs to be replaced.

**B. Coil Current Leakage Test**

Remove the end cover from the Sub-Base Assembly and remove the (2) wire nuts from the (2) coil leads. Disconnect the (2) power leads.

Connect (1) alligator clip to both Coil Leads and the other one to Chassis Ground. (See Figure below.)

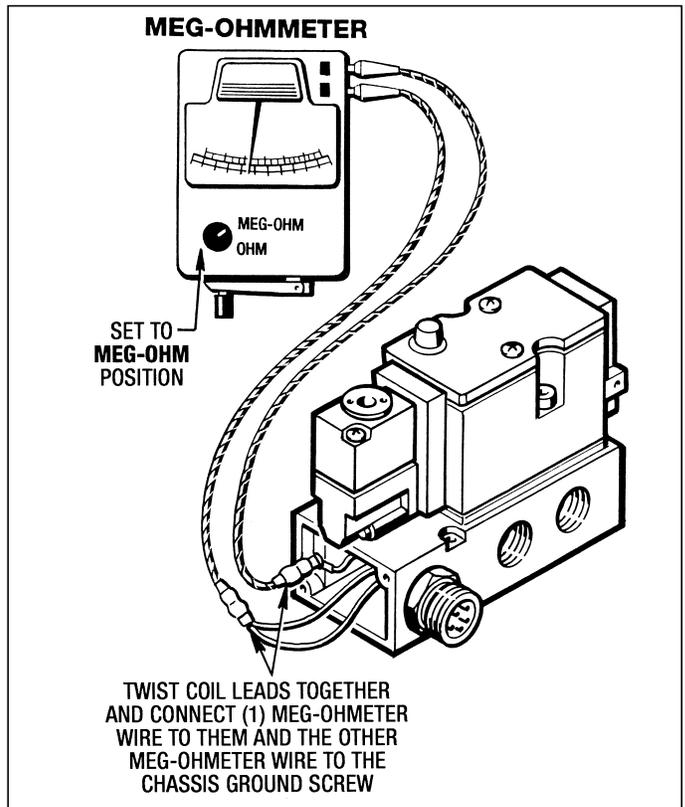
A reading of **10 Meg-Ohms or greater** indicates that the Coil is fine and does not need to be replaced. Anything much less would indicate that there is a short to ground and the Coil would need to be replaced.



*Coil Resistance Testing*

**NOTE:**

A Hi-Pot Tester can be used for this test but do not exceed 1250 VDC.



*Coil Current Leakage Testing*

**NOTE:**

A Hi-Pot Tester can be used for this test but do not exceed 1250 VDC.

**GENERAL REPAIR, SERVICING AND ORDERING REPAIR PARTS**

**GENERAL REPAIR AND SERVICING**

1. Each Control Valve is broken up into logical Sub-assemblies that can be ordered and replaced. Certain Sub-Assemblies are broken down even further so that individual parts can be ordered and replaced if you choose.
2. Some screws are Metric and some are English. The sizes and description is given on the Control Valve Parts List.
3. Always make sure that the Rubber Seals between valve components are completely seated in their prospective groove before reassembly. **Be very careful not to pinch them at reassembly. If they get damaged always replace them with new ones.**
4. If at any time you change voltages for the solenoid, you must also change the Power "ON" Light to match the voltage.

**ORDERING REPAIR PARTS**

When ordering repair parts, please copy, fill out and fax the Control Valve Information Form below with your order to our Parts Ordering Department.

**Complete Shipping Information.**

Failure to include all information will only delay your parts order. Unless another method is specified all parts will be shipped United Parcel Service. Air freight and other transportation services are available but only if specified on your order.

**Force Control Industries, Inc.**  
 3660 Dixie Highway  
 Fairfield, Ohio 45014  
 Phone: (513) 868-0900  
 Fax: (513) 868-2105  
 E-Mail: info@forcecontrol.com

CUT ALONG DOTTED LINE



**CONTROL VALVE REPAIR PARTS INFORMATION FORM**

**DRIVE UNIT USED ON**

Posidyne - <input type="checkbox"/> Posistop - <input type="checkbox"/> Positorq - <input type="checkbox"/>	Manifold Mounted Control Valve Yes <input type="checkbox"/> No <input type="checkbox"/>	Model No. <input style="width: 90%;" type="text"/> Serial No. <input style="width: 90%;" type="text"/>
(FROM NAME PLATE ON DRIVE UNIT)		

**CONTROL VALVE INFORMATION**

Valve Type	<input style="width: 95%;" type="text"/>	Example: 2PC-3/8 or 2PC-SC-3/8
Part Ref. No.	Part Name	Quantity
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
(FROM PARTS LISTS ON PAGES 5 - 11)		

**NAME PLATE INFORMATION ON VALVE SUB-ASSEMBLIES**

<p><b>SOLENOID</b></p> Model No. <input style="width: 95%;" type="text"/> Modif. No. <input style="width: 15%;" type="text"/> Voltage <input style="width: 15%;" type="text"/> Watts <input style="width: 15%;" type="text"/> <p><b>REGULATOR</b></p> Model No. <input style="width: 95%;" type="text"/>	<p><b>VALVE SPOOL ASSEMBLY</b></p> Model No. <input style="width: 95%;" type="text"/> Modif. No. <input style="width: 15%;" type="text"/>
--	--

**PNEUMATIC CONTROLS**

**Posidyne Pressure vs. Static Torque Chart**

**(01-1.5 Single Clutch and 1.5 Dual Clutch)**

Size	Logic	Clutch				Brake					
		C <sub>M</sub>		C <sub>E</sub>	C <sub>T</sub>	B <sub>O</sub>	B <sub>M</sub>		B <sub>S</sub>	B <sub>T</sub>	
		Clutch Static Torque (Lb.In.)	Maximum @ Actuation Pressure (PSIG)	Clutch Engmt. Air Pr. Req'd. (PSIG)	Clutch Net Torque (Lb. In./ PSIG)	Spring Set Only-Torque w/o Air Assist (Lb.In.)	Brake Static Torque (Lb.In.)	Maximum @ Actuation Pressure (PSIG)	Brake Spring Bias (PSIG)	Brake Net Torque (Lb. In./ PSIG)	
01	S	108	@ 70	6.4	1.75	10	132 @ 70	5.5	1.75		
	SA	97	@ 70	14.8		23	102 @ 45	12.9	1.75		
	A	100	@ 80	22.1		33	-----	19	1.75		
	B	62	@ 80	44.1		67	-----	38	1.75		
	C	108	@ 70	6.4		-----	-----	-----	-----		
	P	105	@ 60	-----		0	105 @ 60	-----	1.75		
1.5	S*	427	@ 60	4.2	7.6	32	484 @ 60	3.3	7.6		
	SA	387	@ 70	18.8		110	492 @ 70	15.0	5.5		
	A	387	@ 70	18.8		110	-----	15.0	-----		
	B	240	@ 70	37.6		220	-----	30.0	-----		
	C	427	@ 60	4.2		-----	-----	-----	-----		
	P*	427	@ 55	3.0		0	484 @ 63	0	7.6		

**(02-03 Single and Dual Clutch)**

02**	S*	445	@ 60	7.01	8.3	40	472 @ 60	5.6	7.2
	SA	368	@ 80	24.50		105	332 @ 40	18.4	5.7
	A	387	@ 80	21.60	6.6	110	-----	19.4	---
	B	240	@ 80	43.40		220	-----	38.6	---
	C	254	@ 60	21.60		---	-----	---	---
	P*	445	@ 53	3.0		0	472 @ 66	0	7.2
2.5**	S*	1116	@ 60	6.84	21.0	103	1183 @ 60	5.7	18.0
	SA	1245	@ 80	20.70		418	1378 @ 40	17.4	24.0
	A	1237	@ 80	21.10		418	-----	17.4	---
	B	794	@ 80	42.20		835	-----	34.8	---
	C	1063	@ 60	9.37		---	-----	---	---
	SCP	1234	@ 60	1.26		0	1051 @ 60	-1.5	18.0
03	P*	1116	@ 53	3.0	0	1183 @ 66	0	18	
	S*	2158	@ 60	6.00	40.0	121	1719 @ 60	4.5	26.6
	SA	2306	@ 60	22.30		514	1848 @ 40	15.4	33.4
	A	2368	@ 80	21.00		522	-----	15.6	---
	B	1530	@ 80	41.70		1041	-----	31.2	---
	C	2064	@ 60	8.36		---	-----	---	---
	SCP	2233	@ 60	4.12		0	1518 @ 60	-3.0	26.6
P*	2158	@ 54	3.0	0		1719 @ 65	0	26.6	

**NOTE:** For Dynamic torque ratings multiply static torque ratings above by .86 for sizes 01 to 03.

\* S and P Logic not available on 01, 02 and 03 Dual Clutch *Posidyne*s. \*\* For 02 and 2.5 MSDr see page 19.

**Posidyne Pressure vs. Static Torque Chart**

**(05-20 Single and Dual Clutch)**

Size	Logic	Clutch				Brake					
		C <sub>M</sub>		C <sub>E</sub>	C <sub>T</sub>	B <sub>0</sub>	B <sub>M</sub>		B <sub>S</sub>	B <sub>T</sub>	
		Clutch Static Torque (Lb.In.)	Maximum Actuation Pressure (PSIG)	Clutch Engmt. Air Pr. Req'd. (PSIG)	Clutch Net Torque (Lb. In./ PSIG)	Spring Set Only-Torque w/o Air Assist (Lb.In.)	Brake Static Torque (Lb.In.)	Maximum Actuation Pressure (PSIG)	Brake Spring Bias (PSIG)	Brake Net Torque (Lb. In./ PSIG)	
05	S*	3633	@ 60	5.55	66.7	176	3380 @ 60	3.3	53.4		
	SA	3792	@ 80	23.16		936	3336 @ 40	15.6	60.0		
	A	3792	@ 80	23.16		936	-----	15.6	---		
	B	2251	@ 80	46.26		1866	-----	31.1	---		
	C	3386	@ 60	9.25		0	-----	---	---		
	SCP	3661	@ 60	5.13		0	2942 @ 60	-4.9	53.4		
	P*	3633	@ 54	3.0		0	3380 @ 63	0	53.4		
10	S*	8336	@ 60	6.85	156.8	619	8848 @ 60	4.5	137.4		
	SA	8253	@ 80	27.38		2481	7968 @ 40	18.1	137.2		
	A	8791	@ 80	23.95		2368	-----	17.3	---		
	B	5030	@ 80	47.93		4733	-----	34.5	---		
	C	7905	@ 60	9.60		0	-----	---	---		
	SCP	8501	@ 60	5.80		0	7660 @ 60	-4.2	137.2		
	P*	8336	@ 53	3.0		0	8848 @ 65	0	137.4		
11	S*	14220	@ 80	6.85	194.4	613	11500 @ 80	4.5	136.1		
	SA	10314	@ 80	27.04		2335	7778 @ 40	17.2	136.1		
	A	10896	@ 80	23.95		2354	-----	17.3	---		
	B	6234	@ 80	47.93		4695	-----	34.5	---		
	C	13686	@ 80	9.6		0	-----	---	---		
	SCP	14424	@ 80	5.80		0	10319 @ 80	-4.2	136.1		
	P*	14220	@ 73	3.0		0	11500 @ 86	0	136.1		
20	S*	23229	@ 80	9.61	330.0	1827	24915 @ 80	6.3	288.6		
	SA	18348	@ 80	24.40		4644	16188 @ 40	16.1	288.6		
	A	20272	@ 80	18.57		3538	-----	12.3	---		
	B	11910	@ 80	43.91		5645	-----	19.6	---		
	C	22770	@ 80	11.00		0	-----	---	---		
	SCP	24377	@ 80	6.13		0	21674 @ 80	-4.9	288.6		
	P*	23229	@ 70	3.0		0	24915 @ 86	0	288.6		

**NOTE:** For Dynamic torque ratings multiply static torque ratings above by .86 for all units.

\* S and P Logic not available on Dual Clutch **Posidyne**s.

To find Torque Developed at a given Actuation Pressure.

To find Actuation Pressure needed for Req'd. Torque.

$$\text{Clutch Torque} = (\text{PSI} - C_E) \times C_T$$

$$\text{Brake Torque} = (\text{PSI} + B_S) \times B_T$$

$$\text{Clutch PSI} = (T_R / C_T) + C_E$$

$$\text{Brake PSI} = (T_R / B_T) - B_S$$

## PNEUMATIC CONTROLS

### Posidyne Pressure vs. Static Torque Chart

**(02 and 2.5 Multi-Speed Drive Only)**

Size	Logic	Primary Clutch				Secondary Clutch and Brake					
		C <sub>M</sub>		C <sub>E</sub>	C <sub>T</sub>	B <sub>O</sub>	B <sub>M</sub>		B <sub>S</sub>	B <sub>T</sub>	
		Clutch Static Torque (Lb.In.)	Maximum Actuation Pressure (PSIG) @	Clutch Engmt. Air Pr. Req'd. (PSIG)	Clutch Net Torque (Lb. In./ PSIG)	Spring Set Only-Torque w/o Air Assist (Lb.In.)	Brake Static Torque (Lb.In.)	Maximum Actuation Pressure (PSIG) @	Brake Spring Bias (PSIG)	Brake Net Torque (Lb. In./ PSIG)	
02	SA	314	@ 70	29	7.6	165	426 @ 30	19	8.7		
	A	424	@ 70	14		85	-----	10	---		
	B	290	@ 70	32		190	-----	22	---		
	C	317	@ 45	7		---	-----	---	---		
2.5	S	1118	@ 60	7.57	21.3	120	1400 @ 60	5.6	21.3		
	SA	1189	@ 80	24.25		457	1554 @ 40	16.7	27.4		
	A	1227	@ 80	22.46		432	-----	15.7	---		
	B	749	@ 80	44.85		862	-----	31.4	---		
	C	1057	@ 60	10.43		---	-----	---	---		

### Posistop Motor Brake Pressure vs. Static Torque

Motor Brake Size	Static Torque (Ft. Lbs.)	Qty. of Springs	No. of Friction Discs	No. of Drive Plates	Air Pressure to Release (PSI)	
					Min.	Max.
MB-056	6	2	3	4	20	120
	9	3			30	
	12	4			40	
	18	6			60	
MB-180 MB-210 MB-210L	20	2	2	6	20	120
	30	2	3	4	20	
	45	3			28	
	60	4			35	
	90	6			51	
MB-250 MB-280	75	2			5	5
	150	4	32			
	225	6	46			
	300	8	60			
MB-320	120	3	4	7	23	120
	150	3	5	6	23	
	200	4			30	
	300	6			42	
	450	9			62	

### Motor Full Load

#### Torque vs. Motor Frame Size

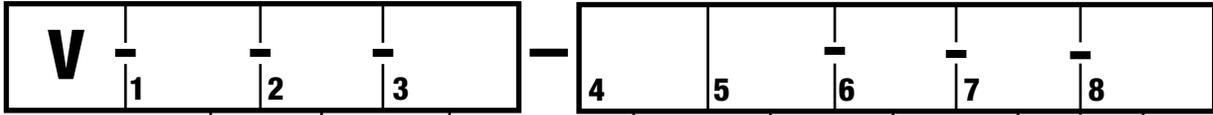
U Frame Motors		T Frame Motors	
Frame Size	Torque (Lb. Ft.)	Frame Size	Torque (Lb. Ft.)
56	3	-----	-----
-----	-----	143	3.4
-----	-----	145	6
182	3.4	182	9
184	6.7	184	15
213	9	213	22.5
215	15	215	30
254	22.5	254	45
256	33.5	256	60
284	45	284	75
286	60	286	90
324	75	324	120
326	90	326	150.1
364	120	364	180.1
365	150.1	365	240.1
404	180.1	404	300.1
405	240.1	405	375.1
444	300.1	444	450.2
445	360.1	445	600.2

Ratings are for Direct Coupled Drive Units. Multiply Drive Ratio X Frame Torque for Belt Driven Drive Units.

## How to order your Pneumatic Control Valve...

### Ordering System Chart

**Example: V-2-PC-3/8--1A-M-4BH-G**



#### Number of Pressures (1)

- 1** = 1 Pressure  
*(Single Clutch or Brake)*
- 2** = 2 Pressure  
*(Single Clutch & Brake)*
- 3** = 3 Pressure  
*(Dual Clutch & Brake)*

#### Port Size (3)

- 3/8** = 3/8" NPT
- 5/8** = 5/8" NPT
- 3/4** = 3/4" NPT

#### Valve Type (2)

- PC** = Sandwich Regulators *(Single Clutch)*
- PC-SC** = Sandwich Regulators  
*(Single Clutch SCP Logic Only)*
- PC-DC** = Sandwich Regulators *(Dual Clutch)*
- PI** = No Regulators, Dual Pressure Inlet
- PI-Br** = No Regulators *(Motor Brake Only)*

#### Voltage (4,5)

- 1 A** = 115VAC
- 2 A** = 220 VAC
- 4 A** = 460 VAC
- 1 D** = 12 VDC
- 2 D** = 24 VDC

#### Mounting (6)

- L** = Shipped Loose. *(Mounted and Plumbed by Customer)*
- M** = Manifold Mounted on *Posidyne.*
- PR** = Pre-Plumbed and Brkt. Mntd.  
*(Right Side Viewing Output Shaft)*
- PL** = Pre-Plumbed and Brkt. Mntd.  
*(Left Side Viewing Output Shaft)*

#### Wire Connector (7)

- 3BH** = 3 Pin BH Mini-Change Connector.
- 4BH** = 4 Pin BH Mini-Change Connector.
- 5BH** = 5 Pin BH Mini-Change Connector.
- DIN** = DIN Connector *(#11 & #20 Posidyne)*
- N** = None

#### Gauges (8)

- G** = Glycerin Type (Optional)
- D** = Dry Type (Standard)
- N** = None

***FORCE CONTROL INDUSTRIES, INC.***  
***Worldwide Leader in Oil Shear Technology.***

*Providing today's industries  
with Oil Shear Clutch and  
Brake Drives that delivers:  
Flexibility • Efficiency  
Endurance • Performance  
Dependability*

---

---

**“Built to Last - Guaranteed to Perform”**

---

---



***FORCE CONTROL INDUSTRIES, INC.***

**MAIN OFFICE**  
P.O. Box 18366  
Fairfield, Ohio 45018

3660 Dixie Highway  
Fairfield, Ohio 45014

Tel: (513) 868-0900  
Fax: (513) 868-2105

**DETROIT OFFICE**  
24419 Sorrentino Court  
Clinton Twp., Mich. 48035

Tel: (586) 792-7100  
Fax: (586) 792-7329

E-Mail: [info@forcecontrol.com](mailto:info@forcecontrol.com) Web: [www.forcecontrol.com](http://www.forcecontrol.com)