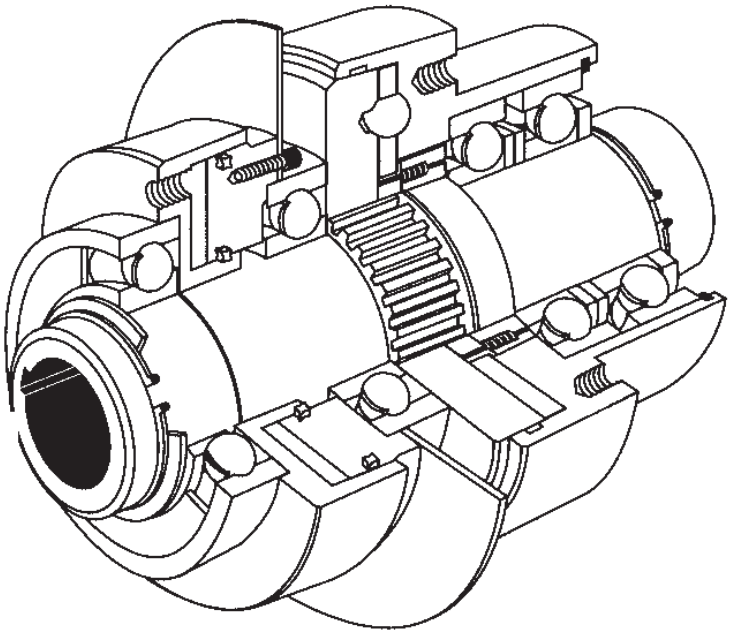


DESCRIPTION OF RESET TYPES

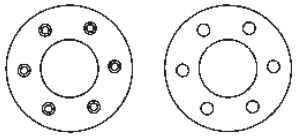
Type AC-Automatic Random Reset

The ball seats in the drive plate (20) and the slide plate (12) as well as retaining holes in the cage plate (14) are equally spaced on the same pitch diameter (See Fig. 1). Upon disengagement, the balls roll out of their detents and drop into the subsequent seats as they are encountered. Re-engagement is audible as the balls contact the seats.

Type ACT-Single Position Reset

Automatically resets each time in the same angular position for drives requiring synchronization. The balls are arranged on different diameters (See Fig. 2). After an overload occurs, the balls will re-seat in their original positions.

TYPE AC
Automatic Random Reset

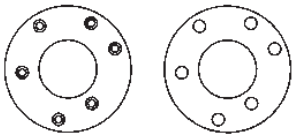


(20) Drive Plate (14) Cage Plate

Figure 1

Either TYPE AC or TYPE ACT may be used with any of the Autogard Models described herein.

TYPE ACT
Automatic Single Position Reset



(20) Drive Plate (14) Cage Plate

Figure 2

CAUTION: On overload, it is necessary to exaust operating air pressure. A limit switch, proximity sensor or Autogard Electronic Shutdown Control should be used with the limit switch plate (9). Switching off the main drive and/or operating an alarm also can be done.

Fig. 3: 602 AP

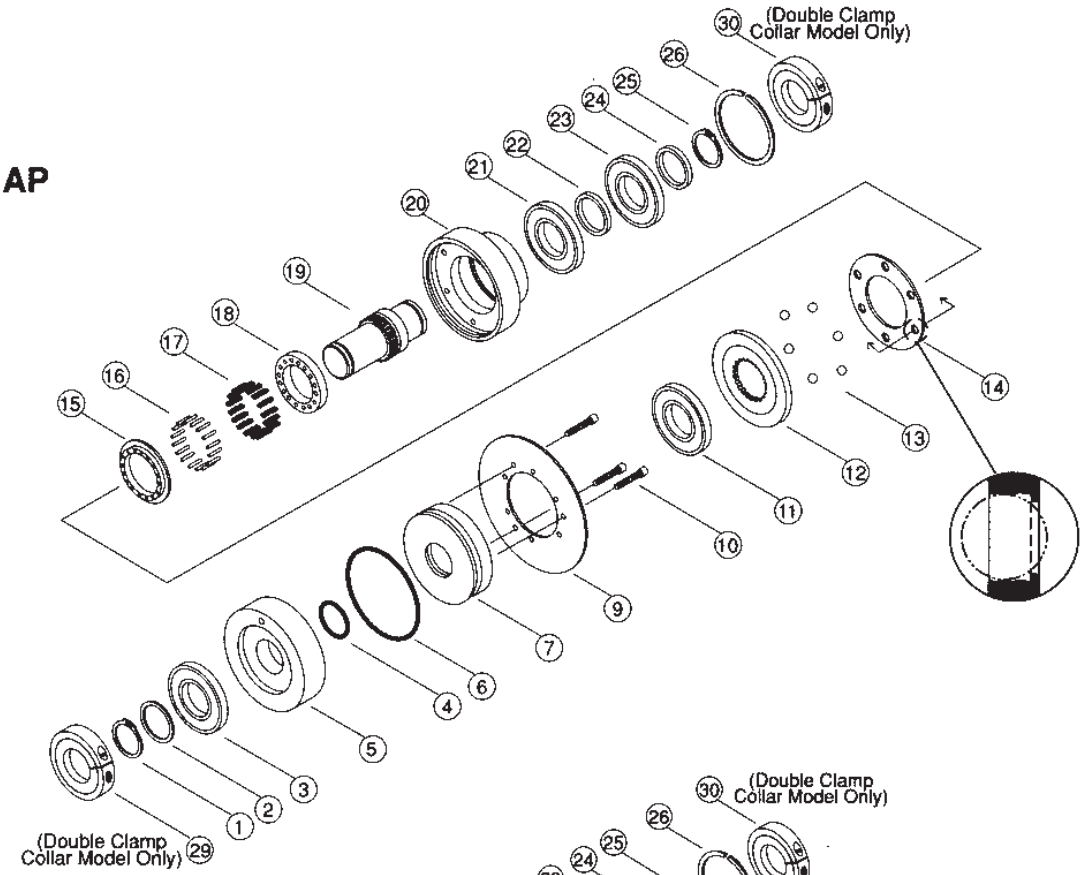


Fig. 4: 602 MP

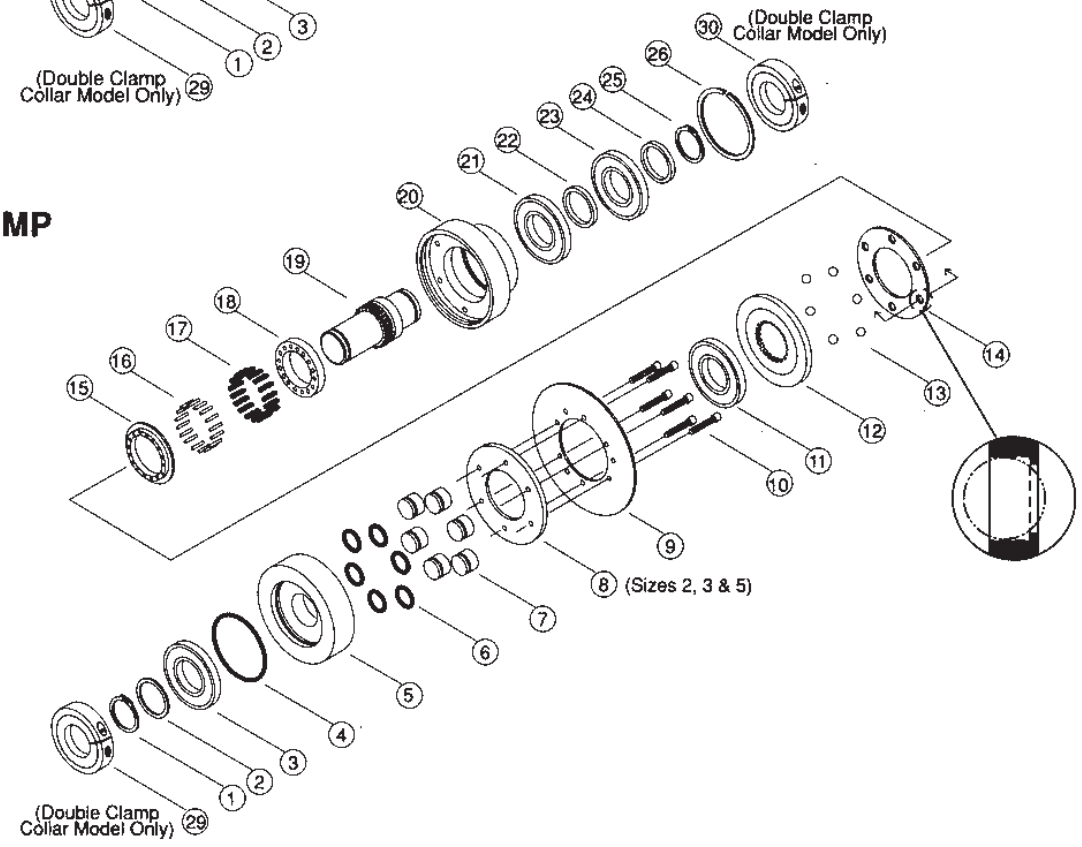


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Fig 5: 602

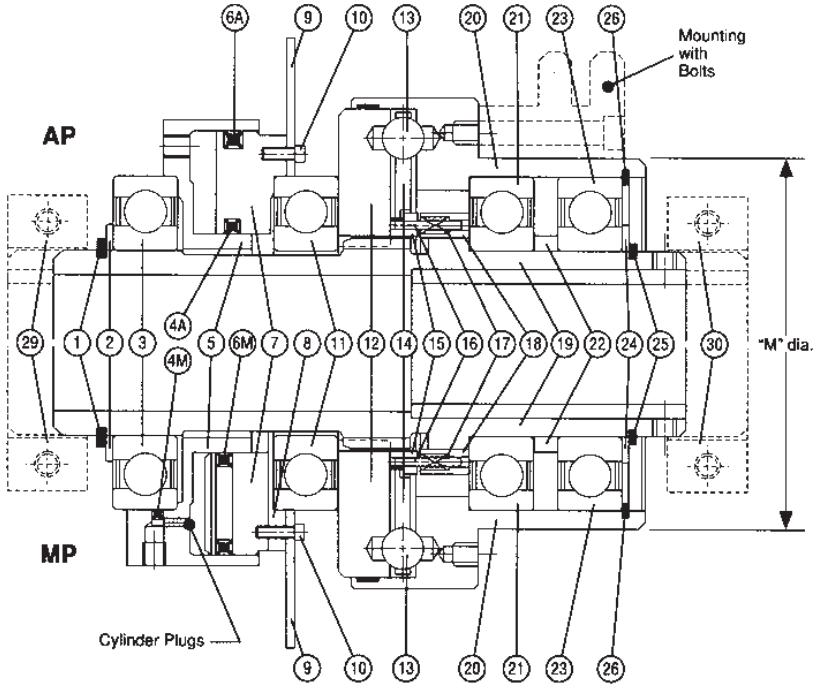


Fig 6: 605

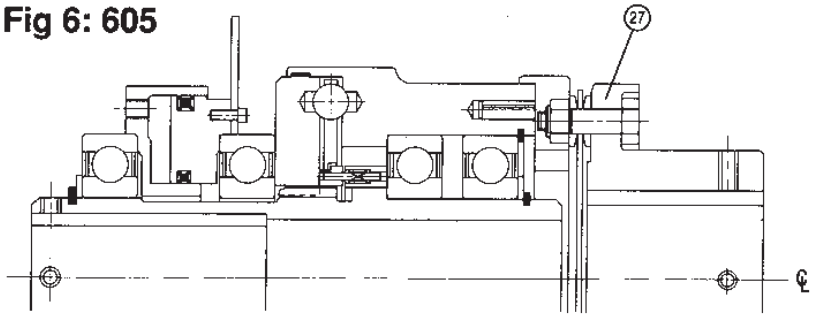
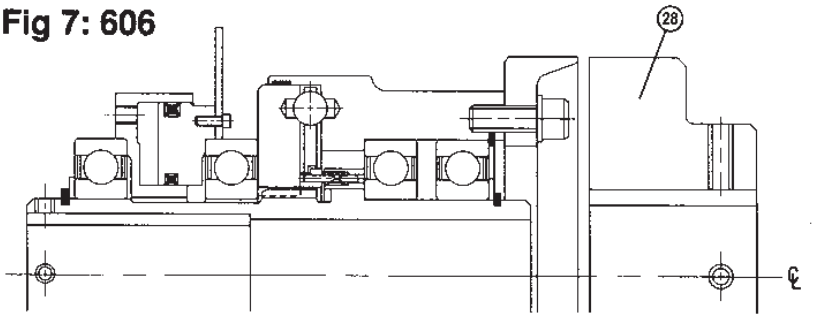


Fig 7: 606



"M" diameter

Size	M dia.*
0	2.062
1	2.750
2	3.375
3 MP	4.375
3 AP	4.375
4 MP	5.500
4 AP	5.500
5 MP	7.125
5 AP	8.250

* Tolerance for M dia. is h7

Parts List

1	Ring, Retaining, External
2	Washer, Shim
3	Bearing, Ball
4M	Air Intake Seal (MP Only)
4A	Seal, Piston ID (AP Only)
5	Cylinder, Air
6M	Seal, Piston OD (MP Only)
6A	Seal Piston OD (AP Only)
7	Piston
8	Piston Locator (MP Only, Sizes 2, 3 & 5)
9	Plate, Limit Switch
10	Screw, Switch Plate
11	Bearing, Ball
12	Plate, Slide
13	Ball, Drive
14	Plate, Cage
15	Ring, Pin
16	Pin
17	Spring, Compression
18	Ring, Spring
19	Hub
20	Plate, Drive
21	Bearing, Ball
22	Washer, Shim
23	Bearing, Ball
24	Washer, Shim
25	Ring, Retaining, External
26	Ring, Retaining, Internal
27	Disc Coupling
28	Rubber Element Coupling
29	Clamp Collar
30	Clamp Collar

PRIOR TO INSTALLATION

1. Mounting sprocket or sheave on Model 602
(See Fig. 5)

A. Mounting with bolts

A sprocket, sheave, etc. may be mounted on Model 602 by bolting as shown in Fig. 5. The drive media dimensions are shown in Table 1.

Table 1: Standard Mounting Hole Patterns

Size	No. of Bolts	B.C.D.	Bolt Size	Drive Media Bore
0	6	2.375	8 - 32	2.063/2.065
1	6	3.125	10 - 24	2.751/2.753
2	6	3.875	1/4 - 20	3.376/3.378
3	6	5.000	5/16 - 18	4.376/4.378
4	8	6.125	5/16 - 18	5.501/5.503
5 MP	8	7.875	3/8 - 16	7.126/7.128
5 AP	8	9.000	3/8 - 16	8.251/8.253

2. Lubrication (All Models)

The needle bearing, spline surfaces, plate faces, pistons, seals, and balls have the proper type and amount of lubricant applied during assembly at the factory. No further lubrication is required at initial installation.

INSTALLATION

Model 602

See Fig. 5

With the torque limiter completely assembled, carefully slide hub (19) on shaft. The standard clearance-fit bore in the hub should permit the hub to be pushed or lightly tapped in place on the shaft. DO NOT STRIKE HEAVY HAMMER BLOWS ON THE HUB AS THIS CAN DAMAGE THE TORQUE LIMITER.

The torque limiter may be moved axially on the shaft to obtain proper alignment of the sprocket or sheave. Minimum recommended shaft engagement is 1.5 times the shaft diameter. Tighten the setscrews fully to recomended torque values shown in Table 2. For models with split hub end and clamp collar(s) (29 & 30), tighten clamp collar screws to recommended torque values shown in Table 2a.

Table 2

Setscrew Size	#10	1/4"	5/16"	3/8"	7/16"	1/2"
Seating Torque in. lbs.	33	87	165	290	430	620

Table 2a

Torque Limiter Size	0	1	2	3	4	5
Screw Torque Setting (in. lb.)	190	190	435	435	750	1700

Models 605 & 606

See Figs. 6 & 7

Mount the torque limiter hub on one shaft and the coupling hub (27) or (28) on the other shaft. Bring the shafts together and align the coupling carefully, checking with a dial indicator. Maintain alignment within the limits shown below.

Fig. 8: Angular Misalignment

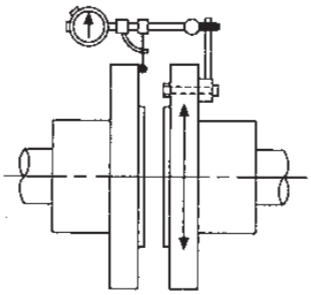
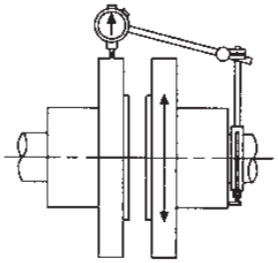


Fig. 9: Parallel Misalignment



Model 605: Maximum Allowable Misalignment

Size	Gap Nom	*Gap Var.
0	0.29	± .013
1	0.37	± .019
2	0.37	± .023
3	0.35	± .029
4	0.35	± .029
5	0.52	± .044

* Gap Var. is the maximum allowable variation from the Gap (Nominal) value between the hub & adaptor flanges measured at all positions around the periphery. This corresponds to .5° of pure angular misalignment or any combination of operational angular and axial misalignment.

Model 606: Maximum Allowable Misalignment

Size	Allowable Misalignment		Gap between hub & adaptor flanges inches	
	Δ Angular inches	Parallel inches	Min.	Max.
0	.005	.005	.08	.16
1	.007	.007	.08	.16
2	.008	.008	.08	.16
3	.011	.011	.08	.24
4	.013	.013	.08	.24
5	.017	.017	.12	.31

Δ This value represents the Max. allowable variation in the gap measured in all positions around the periphery and corresponds to .10° of allowable angular misalignment.

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INITIAL STARTUP

Obtain a torque setting as follows:

1. Setting by trial adjustments:

   Start up the drive with an air pressure setting greater than 20 psi. If the torque limiter disengages before normal operating load level is reached, progressively increase air pressure until the drive will start and operate under normal load without tripping. Starting torque is usually the highest torque that the torque limiter must transmit. A dual pressure air system shown on Pg. 11 is available from Autogard. This package allows the user to drop from high to low pressure or to change from low to high pressure depending on the application.

   After desired torque setting is obtained, note the pressure required.

   For both single and dual air systems, it is necessary to pressurize the Airjustor before starting the motor, by using a pressure switch (described and shown schematically on pages 9, 10 & 11).

2. Setting to an established specified torque:

   An approximate setting can be made from the torque adjustment charts on page 6 Fig. 11. A more precise setting can be obtained before the unit is mounted, by means of a bench test (See Fig. 10 for a typical arrangement).

   The torque setting may also be checked by using a torque wrench, platform scale, etc. These methods will require modifications to the arrangement shown in Fig. 10.

   After the desired torque setting is obtained, note the pressure required.

3. If adding or subtracting pistons in MP versions is necessary to maintain a required torque, please see page 8 for a step by step procedure.

Table 3

Size	Max Bore (inches)	Number of Pistons	Torque Range (in. lbs.)
0	0.625	4	31 - 125
		8	62 - 250
1	1.000	4	125 - 500
		8	250 - 1,200
2	1.375	4	375 - 1500
		8	750 - 3,000
3	1.625	3	375 - 1,500
		6	750 - 3,000
		One Annular	1,500 - 6,000
4	2.125	4	625 - 2,500
		8	1,500 - 5,000
		One Annular	2,500 - 10,000
5	3.375	4	1,406 - 5,622
		8	2,812 - 11,250
		One Annular	5,625 - 22,500

Maximum torque is based on 80 psi air pressure.

Fig. 10: Bench Test for Torque Setting

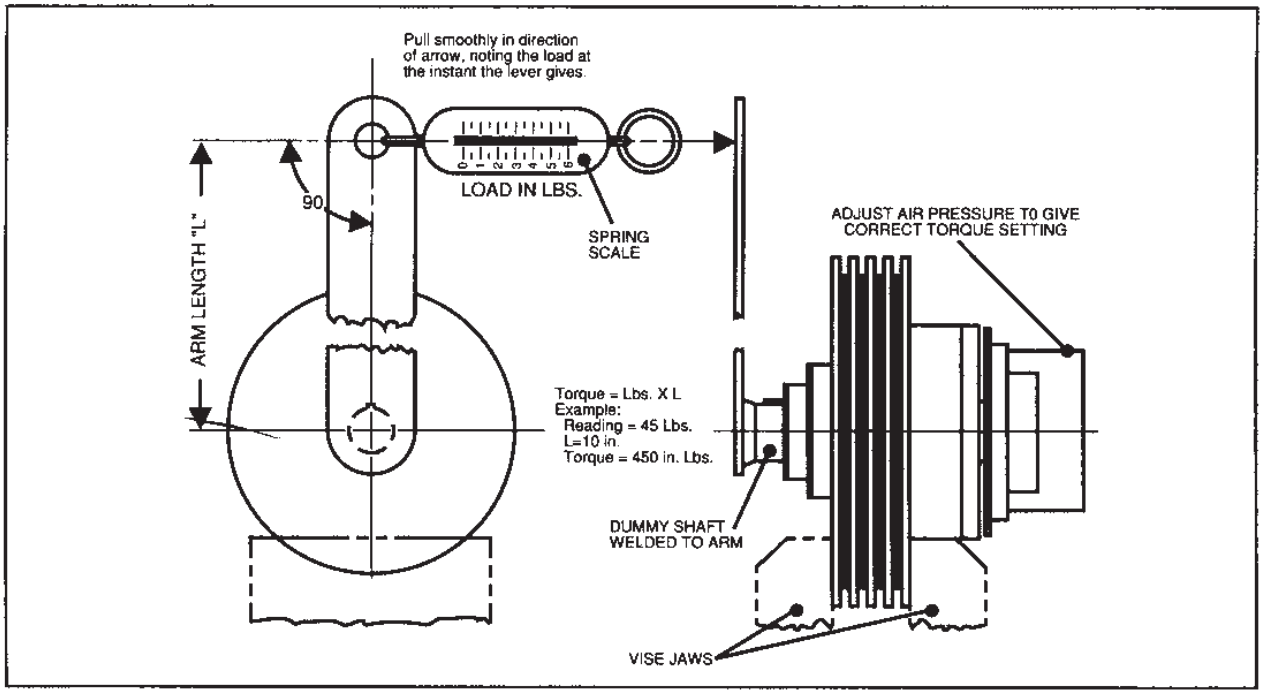
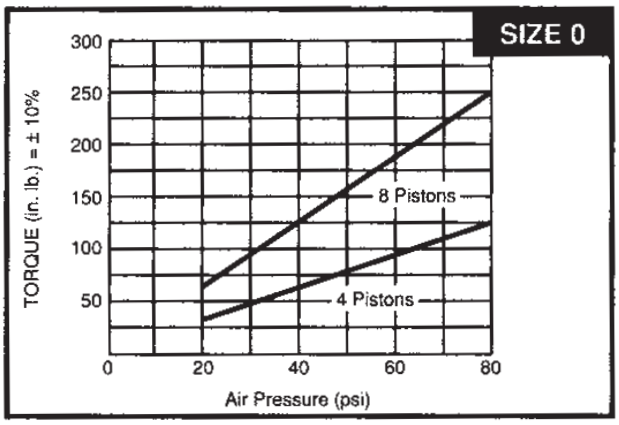
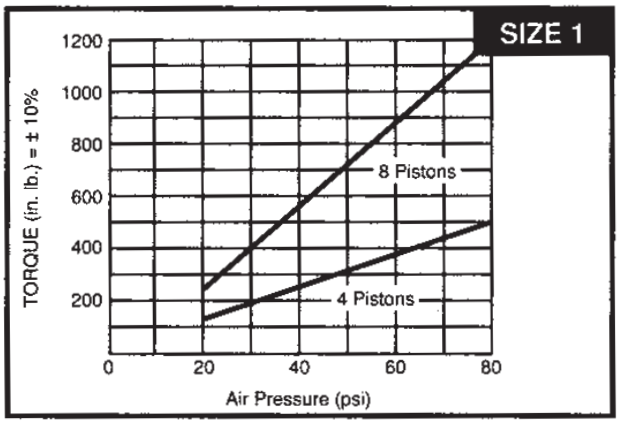
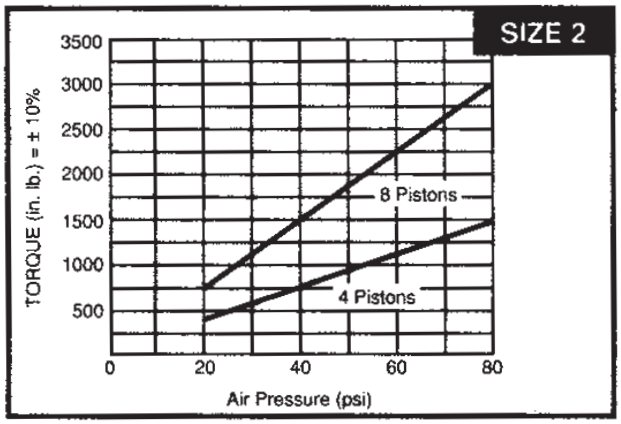
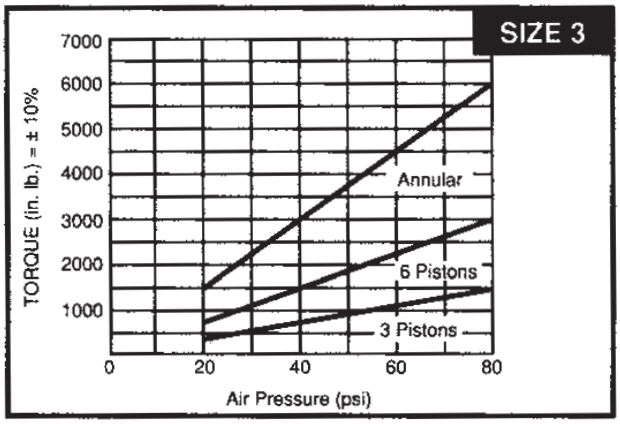


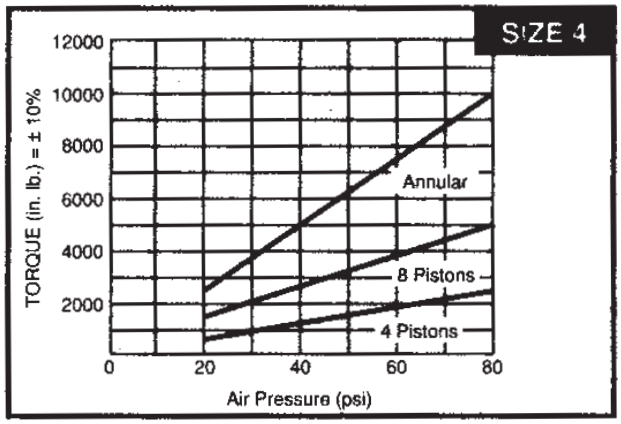
Fig 11: Airjustor Air Pressure vs Torque Charts

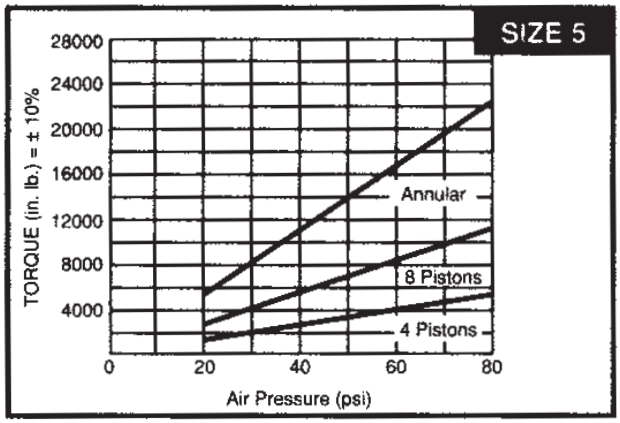












CAUTION

DO NOT INCREASE THE AIR PRESSURE TO GREATER THAN 80 PSI FOR AN EXTENDED PERIOD OF TIME. Plate stresses and bearing life will be affected and damage to the Autogard may result.

It is important that our product is used in the correct manner and that adjustments and settings follow recommended procedures.

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RESETTING PROCEDURE

1. On overload, exhaust the air and shut down the drive.
2. Investigate and remove cause of overload.
3. Resetting is possible in either direction by jogging motor or by manually rotating either side of the Airjustor with the air on.
   A. "AC" type
      Rotation of the drive for a maximum of 120 degrees will re-engage the unit.
   B. "ACT" Type
      Rotation of either side of the drive for a maximum of 720 degrees (2 revolutions) will re-engage the unit.

NOTE: The maximum speeds at which the clutch can be engaged are dependent on the masses to be accelerated and any load moment present.

MAINTENANCE

Under normal operating conditions, an annual inspection and re-greasing should be adequate. This can best be accomplished by DISASSEMBLY PROCEDURE.

Inspect for sprocket wear, tightness of torque limiter on the shaft, tightness of sprocket, etc., at this time.

For unusual conditions such as very high RPM, high ambient temperatures, high vibration or dirty environment; more frequent or special maintenance may be required. Consult factory for recommendations.

DISASSEMBLY PROCEDURE

1. Note pressure setting before proceeding with disassembly.
2. Disconnect air and remove from shaft.
3. Remove retaining ring (1) in outside diameter of hub (19).
4. Remove washer (2) next to inside race of bearing (3).
5. Remove piston/cylinder assembly (3, 4, 5, 6, 7, 8, 9, 10 & 11) from hub. CAUTION: Never hit cylinder with hammer or other object, this will cause irreparable damage to the cylinder. If assembly is tight, place entire Airjustor on a soft surface (wood or rubber) and lift repeatedly from limit switch plate (9) occasionally tapping Airjustor on the soft surface. The mass of the Airjustor should be sufficient to aid removal of the piston/cylinder assembly.
6. AP Only, Remove piston assembly (6, 7, 9 & 10) from cylinder assembly (3, 4 & 5), (applying air to the cylinder may be required on larger units). Remove bearing (3) and seal (4) from cylinder and seal (6) from piston.
   MP Only, for multi-piston units see steps 4 & 5 in PISTON REMOVAL procedure on page 8. Remove bearing (3) and seal (4) from cylinder and seals (6) from pistons. Remove bearing (11) from locator ring (8) if applicable.
7. Remove slide plate, drive balls, and cage plate (12, 13 & 14).(Note: The drive balls (13) are held between the slide plate (12) and the cage plate (14). The configuration of the slide plate (14) can not be reversed.
8. Remove pin ring (15) with pins (16) pressed in.
9. Remove spring ring (18) and springs(17).
10. Remove retaining rings, spacer and bearings (25, 26, 24, 21 & 23). Note: support the drive plate (20) on larger diameter end and press the hub (19) through. Press out the bearings and spacer (21, 22 & 23) from drive plate (20).
11. Inspect drive plate (20) and slide plate (12) for excessive wear. A visible ball path between ball seats is normal. Excessive wear of the ball seats and ball paths may require replacement of the drive plate and slide plate.

REASSEMBLY PROCEDURE

12. Clean all parts thoroughly.
13. Press new bearing (21) in drive plate (20) through outer race.
14. Install washer(s) (22) next to inside race of bearing (21), aligning the inside diameters.
15. Press new bearing (23) in drive plate (20) through outer race.
16. Install new retaining ring (26) in groove on inside diameter of drive plate (20).
17. Press bearings (21 & 23) onto hub (19), while supporting bearing in inner races.
18. Install washer (24) next to bearing (23).
19. Install new retaining ring (25) in groove on the outside diameter of hub (19).
20. Set torque limiter on end such that drive plate (20) ball detents face up.
21. Lubricate the spline on the hub (19) with black Molykote G-N assembly paste or equivalent.
22. Install spring ring (18) with countersinks facing up on torque limiter by sliding it down between the hub (19) and drive plate. (20).
23. Place new springs (17) in counterbores of the spring ring (18).
24. Lubricate outside diameter and shoulder of pin ring (15) with black Molykote G-N assembly paste or equivalent.
25. Install the pin ring assembly (15 & 16) with the spring ring assembly (18 & 17) assuring that each pin mates with each spring.
26. Grease ball detents, ball path, and the annular groove of drive plate (20) with Mobilux EP2 grease or equivalent.
27. Install cage plate (14) onto drive plate (20) with counterbores facing up as shown in the exploded view cutaway of the cage plate (14) (See front page).
28. Place new drive balls (13) into cage plate (14) holes.
29. Grease ball detents and ball path of slide plate (12) with Mobilux EP2 grease or equivalent.
30. Install slide plate (12) over hub (19) with ball detents facing down and mate splines.
31. Replace bearings (3 & 11). Note: bearing (3) must be pressed into the inside diameter of the cylinder (5) thru the bearing outer race.

32. Replace seals (4A, 4M & 6) on piston(s) (7) as described by note in step 7 of the PISTON ADDITION section. Lubricate seals and cylinder walls (5) with Molykote 55m grease, o-ring lubricant or equivalent.
33. Reassemble piston/cylinder assembly (3, 4, 5, 6, 7, 8, 9 & 10). Note: for multi piston units having fewer pistons than cylinder chambers, install pistons in cylinder chambers that do not have cylinder plugs installed, as shown in figure 12, page 9. Do not remove these cylinder plugs.
34. Install piston/cylinder assembly and bearing (3, 4, 5, 6, 7, 8, 9, 10 & 11) onto hub (19).
35. Install washer (2) next to inside race of bearing (3).
36. Install new retaining ring (1) in groove on outside diameter of hub (19).

PISTON REMOVAL

1. Remove retaining ring (1).
2. Remove washer (2).
3. Remove piston/cylinder assembly (3, 4, 5, 6, 7, 8, 9 & 10). CAUTION: Never hit cylinder with hammer or other object, this will cause irreparable damage to the cylinder. If assembly is tight, place entire Airjustor on a soft surface (wood or rubber) and lift repeatedly from limit switch plate (9) occasionally tapping Airjustor on the soft surface. The mass of the Airjustor should be sufficient to aid removal of the piston/cylinder assembly.
4. Lay piston/cylinder assembly on a flat surface with limit switch (9) facing up. Remove limit switch screws (10), set limit switch (9) and piston locator ((8) found on sizes 2, 3, & 5 only) aside.
5. Remove all pistons by putting a limit switch screw (10) in each extra piston, then pull piston out slowly. Leave limit switch screws in the unused pistons, they will not be required for reassembly. NOTE: To maintain equal load around the cylinder (5), use cylinder configurations as shown in Fig 12 for the number of pistons to be used.
6. As a good maintenance practice, replace all piston seals as describedby note in step 7 of the PISTON ADDITION section.
7. Set screws must be added to the air outlets of all unused cylinder chambers to prevent air from escaping. See Table 3 for set screw sizes. Install with Blue Loctite®.
8. To reassemble, place piston locator ((8) found on sizes 2, 3, & 5 only) then limit switch (9) on cylinder (5) being careful to align screw holes. Install limit switch screws (10) with Blue Loctite® in holes with pistons.
9. Carefully slide piston/cylinder assembly on hub (19).
10. Install washer (2).
11. Install new retaining ring (1).
12. Apply and remove air to the Airjustor and check to ensure the cylinder moves freely.
13. Check for air leakage around bearing (3) by applying a light oil, applying air and check for air bubbles. If bubbles appear replacement of air intake seal (4) will be required.

PISTON ADDITION

1. Remove retaining ring (1).
2. Remove washer (2).
3. Remove piston/cylinder assembly (3, 4, 5, 6, 7, 8, 9 & 10). CAUTION: Never hit cylinder with hammer or other object, this will cause irreparable damage to the cylinder. If assembly is tight, place entire Airjustor on a soft surface (wood or rubber) and lift repeatedly from limit switch plate (9) occasionally tapping Airjustor on the soft surface. The mass of the Airjustor should be sufficient to aid removal of the piston/cylinder assembly.
4. Lay piston/cylinder assembly on a flat surface with limit switch (9) facing up. Remove limit switch screws (10), set limit switch (9) and piston locator ((8) found on sizes 2, 3, & 5 only) aside.
5. As a good maintenance practice, remove all pistons by putting a limit switch screw (10) in each piston, pull piston out slowly and replace seal (6) as described in step 6 below.
6. Inspect cylinder walls for contamination and clean out with a soft cloth if necessary being careful not to damage surface.
7. The new pistons should include a piston (7) a seal (6) and a limit switch screw (10). The seal (6) is 4 sided and must not be twisted after installation. Note: To prevent this, apply Molykote® 55m grease o-ring lubricant to seal (6). Gently pull while sliding seal (6) between index finger and thumb around entire circumference. This should provide enough extra diameter to slide seal onto piston without twisting. The seal will slowly return to its original size. With seal (6) in place, run finger around piston making sure that seal (6) is seated in groove.
8. Set screws must be removed from the air outlets of all newly used cylinder chambers to allow air to enter the piston chamber. NOTE: To maintain equal load around the cylinder (5), use cylinder configurations as shown in Fig 12 for the number of pistons to be used.
9. Grease all pistons (7) and seals (6) with Molykote® 55m grease o-ring lubricant.
10. Add extra pistons by putting a limit switch screw (10) in each new piston, then insert piston slowly. Remove limit switch screws.
11. To reassemble, place piston locator ((8) found on sizes 2, 3, & 5 only) then limit switch (9) on cylinder (5) being careful to align screw holes. Install limit switch screws (10) with Blue Loctite® in holes with pistons.
12. Carefully slide piston/cylinder assembly on hub (19).
13. Install washer (2).
14. Install retaining ring (1).
15. Apply and remove air to the Airjustor and check to ensure the cylinder moves freely.
16. Check for air leakage around bearing (3) by applying a light oil, applying air and check for air bubbles. If bubbles appear replacement of air intake seal (4) will be required.

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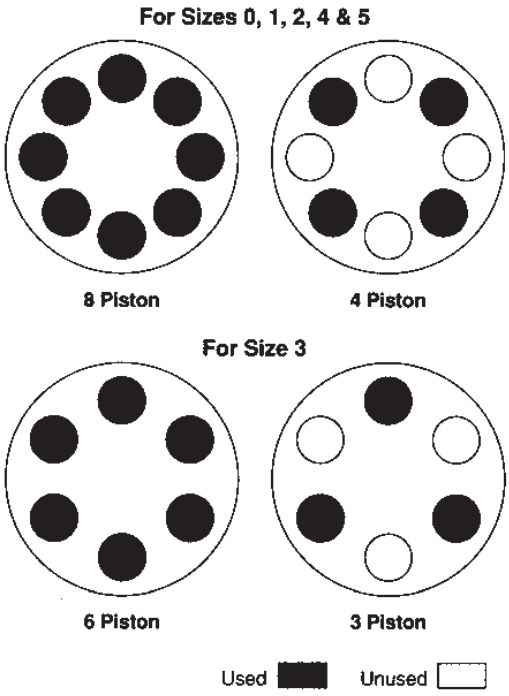
Table 4: Cylinder Plug Set Screw Sizes

Torque Limiter Size	0	1	2	3	4	5
Set Screw Size	M3	M4	M4	M5	M4	M6

Fig 12: Airjustor Piston Configurations



TROUBLE SHOOTING

NOTE: If the torque limiter disengages for no apparent reason during operation, check the following.

1. Operating air supply and piping.
2. Air leakage in Airjustor.
3. Drive train or machine for wear, misalignment, bearing wear, etc.
4. As a last resort, disassemble Airjustor and inspect drive and slide plates. A visible ball path between ball seats is normal. Excessive wear of the ball seats and ball paths may require replacement of the drive plate and slide plate. Reassemble and follow INITIAL STARTUP procedure on page 5.

PNEUMATIC PACKAGES

Single Pressure System

Permits simple adjustment of Airjustor within the 20-80 psi range, while the drive is stationary or 'In-Motion'.

Dual Pressure System

This system also permits simple adjustment of Airjustor within the 20-80 psi range, while the drive is stationary or 'In-Motion'.

This system allows the user to adjust for a higher starting torque and switch to lower running torque after a set period of time. The dual pressure system offers many other possibilties depending on the application.

The pneumatic packages offered by AAC are shown on page 10 (Single Pressure System) and page 11 (Dual Pressure System).

Electrical Operation

The electrical schematics shown require a motor starter (MS1); Start & Stop buttons (PB1 & PB2), a 2 position selector switch (SS1) to turn air ON and OFF, and a pressure switch (PS1).

For normal operation (clutch engaged), the pressure switch ensures that the air is ON before starting the motor Airjustor is not to be used as an engaging slip clutch, as the drive balls may not engage while motor is running.

If the air is turned ON while motor is running and torque limiter disengaged, the motor starter will automatically drop out.

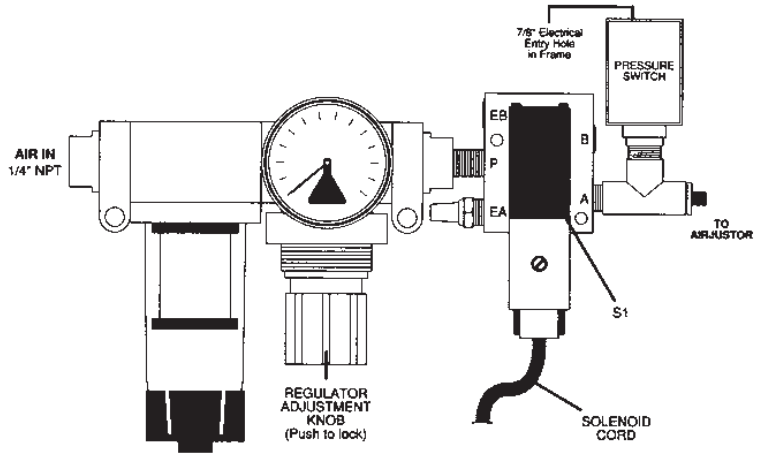
The air may be turned OFF at any time; torque limiter will disengage.

If the sensor detects an overload, torque limiter air will exhaust and motor will shut OFF.

Single Pressure Air Assembly (AAC P/N 158000022A)

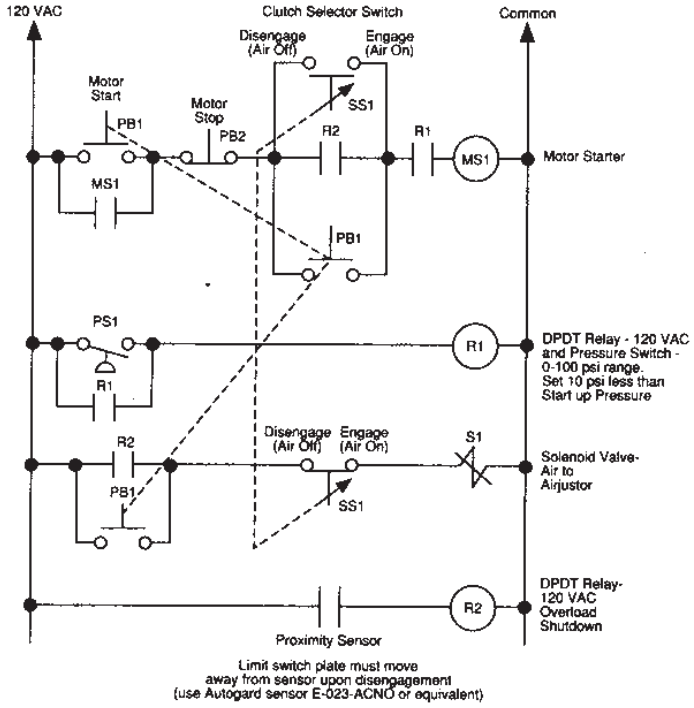
1. Connect the incoming air to the filter and the outgoing air to the Airjustor.
2. Connect the solenoid cord per electrical schematic shown below.
3. Turn regulator adjustment knob for pressure setting clockwise to increase pressure or counter-clockwise to decrease pressure.
4. Set pressure switch 10 psi less than step 3*.

* Note: Pressure switch allows Airjustor to be pressurized before electrical contact is made to start motor.

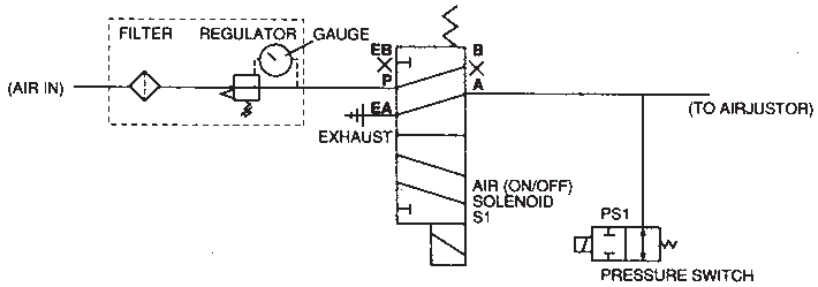


Dimensions: W=9.0", H=4.5", D=3.5"

Electrical Schematic



Pneumatic Schematic
(Solenoid De-energized)



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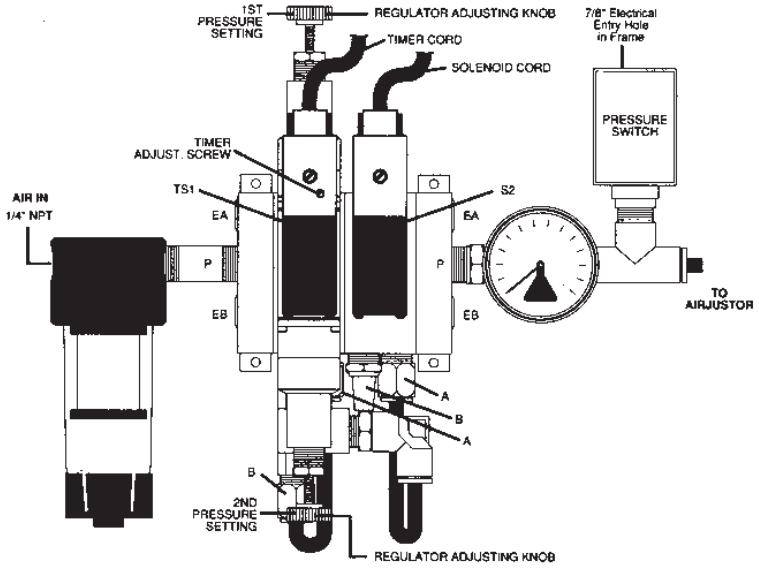
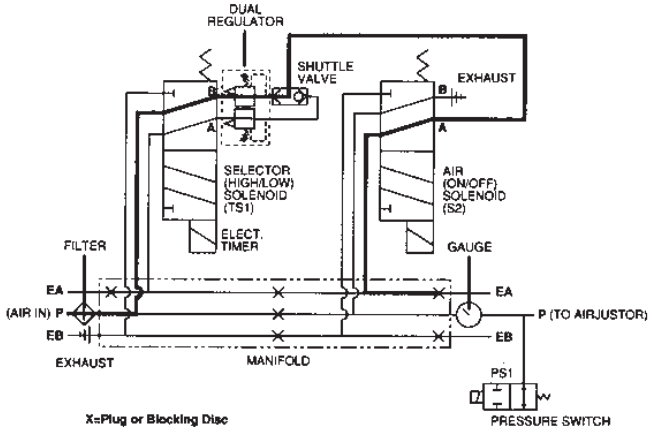
Dual Pressure Air Assembly (AAC P/N 158000022)

1. Connect the incoming air to the filter and the outgoing air to the Airjustor.
2. Connect both the timer cord and the solenoid cord per electrical schematic shown below.
3. Turn adjustment screw on the timer clockwise to increase time or counter-clockwise to decrease time to activate 2nd air pressure setting.
4. Turn regulator adjustment knob for 1st pressure setting clockwise to increase pressure or counter-clockwise to decrease pressure.
5. Set pressure switch 10 psi less than step 4*.
6. Turn regulator adjustment knob for 2nd pressure setting as done for 1st pressure.

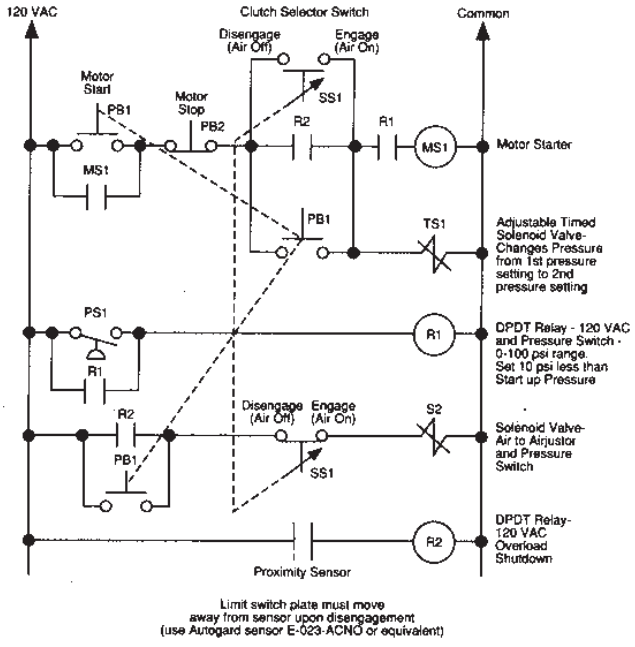
* Note: Pressure switch allows Airjustor to be pressurized before electrical contact is made to start motor.



Dimensions: W=10.0", H=7.5", D=5.25"



Pneumatic Schematic
(Solenoids De-energized)



Electrical Schematic

NOTES

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