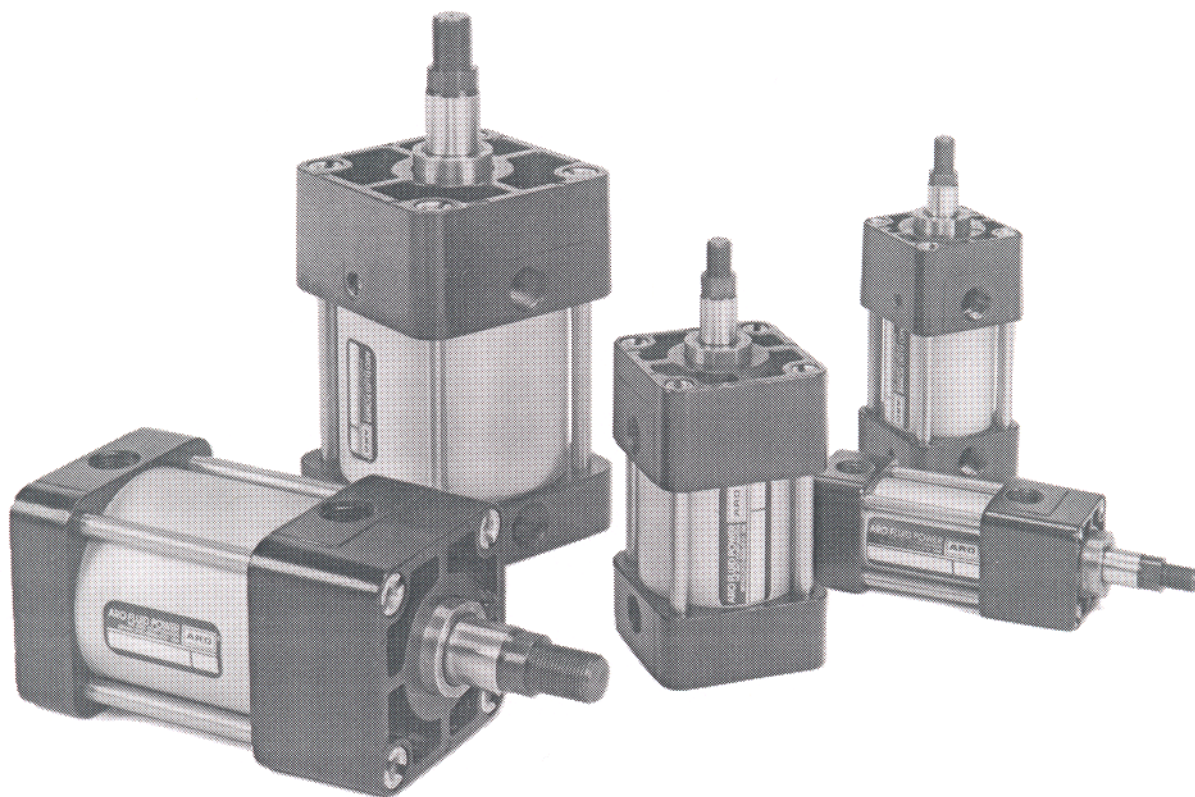


ARO FLUID POWER

SQUARE HEAD TIE ROD PNEUMATIC CYLINDERS 39 Series Parts List



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WARNINGS AND SERVICE INFORMATION

WARNING

Improper application, installation, service or maintenance of ARO® cylinders may create a hazardous condition, which may in turn cause bodily injury as well as shortened product life. Contact The Aro Corporation for special applications.

PROVENAIR II CYLINDER (APPLICATION)

The Provenair II Cylinder is a low cost NFPA style pneumatic cylinder which may be used to replace machine tool grade cylinders in medium duty applications to 200 PSIG air pressure. This cylinder offers the advantage of three (3) basic mounting styles integral to the cylinder and nine (9) mounting kits which adapt to the basic cylinder to provide interchangeable mounts conforming to NFPA dimensions. Complete dimensional information for cylinders and mounting kits can be found in the Aro Pneumatic Cylinder Catalog 8282-M.

CUSHIONS

Series 39 Cylinders are cushioned cylinders. Cushions are protective devices designed to increase cylinder life and should not be used exclusively to decelerate heavy loads.

The cushioned cylinder is equipped with an adjustable screw in each head for easy, precise adjustment of the cushion effect. Clockwise screw rotation increases cushioning, and counterclockwise screw rotation decreases cushioning.

The cushion seal is a "floating" seal which seals on a cushion boss, a part of the piston rod assembly. As the cushion boss enters the cushion seal located in the head or cap, the main air exhaust flow is blocked and forced through a bypass passage containing the needle valve. The cushion effect is created by the resulting back pressure. The cushion needle is used to vary the restriction (back pressure) and control the degree of cushioning. Upon application of air in the opposite direction, the incoming air forces the cushion seal towards the inside of the cylinder and acts as a check valve in the free flow direction. Incoming air flows around the O.D. of the seal providing full flow to the piston face with little or no pressure drop for quick stroke reversal.

OPERATION AND MAINTENANCE

Pneumatic cylinders should be lubricated to provide maximum cycle life. Provenair II cylinders are lubricated with Shell Darina, EP Grade, No. 2 Grease during assembly at our factory in Angola, Indiana. Factory lubrication will provide a satisfactory amount of cycle life if no additional lubrication is provided. However, we recommend lubrication for any pneumatic system and suggest that you follow the guidelines for types of lubricants which are outlined in all of our catalogs (reference Catalog 8282-M).

Periodic maintenance must be performed to insure maximum product life. Disassembly for cleaning, inspection, and relubrication can be performed any time equipment is idle for a short period of time. All metal parts should be cleaned with a non-flammable solvent. All rubber parts should be thoroughly washed with soap and water. Cleaned parts should be rinsed and dried with low pressure air. Any parts which are worn or damaged should be replaced. Selected parts and seals are available in repair kit form.

DISASSEMBLY

If either the rod seal or the rod bearing needs to be replaced, disassembly of the cylinder is not necessary. The threaded rod bearing can be removed by unscrewing counterclockwise until it is completely free of the head. Simply remove it by sliding over the piston rod. Since the bearing cartridge contains the u-cup rod seal, rod wiper, and static o-ring seal, these parts can be easily removed for inspection and

cleaning or replacement. Any damaged or worn parts should be replaced and properly lubricated prior to assembly. Check the rod wiper and rod u-cup seal to be sure they are correctly positioned in their respective grooves. The rod bearing cartridge can be assembled into the head and tightened in a clockwise direction according to the torque values shown in the table on page 2. Use a good fitting wrench and do not overtighten. Care should be exercised to avoid any damage to the lips of the seals.

ASSEMBLY

Verify that all seals are in correct position and that rod and piston seals have been properly lubricated, with Shell Darina, EP Grade, No. 2 Grease or equal.

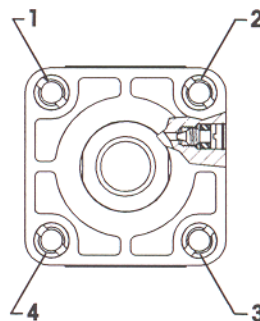
When assembling the piston rod end through the u-cup rod seal, placing u-cups on the piston, or assembling the piston with seals into the barrel, care should be exercised to avoid any damage to the lips of the seals.

After the cylinder has been assembled, the head and cap must be properly aligned prior to final tightening of the tie rod nuts. The following procedure is a satisfactory method.

- 1.) Tighten tie rod nuts to approximately one-half (1/2) the recommended torque shown in the table below.
- 2.) Using a suitable hard, flat surface; with some force, thrust the cylinder down on its mounting pads for proper alignment.
- 3.) Tighten tie rod nuts to the recommended torque values shown in the tables. Tighten evenly, progressing across the four (4) corners (corner 1 to corner 3, to corner 2, to corner 4).

The assembled cylinder can now be tested for leaks and proper operation.

1. Alternately apply 90 PSIG air pressure to each of the cylinder ports and test for internal leaks across the piston and external leaks at the barrel seals and the rod seal.
2. Test for proper cycling at 20 PSIG supply.



TIE ROD TORQUE		ROD CARTRIDGE TORQUE			
BORE	FT-LBS	BORE	PISTON ROD	CARTRIDGE HEX SIZE	TORQUE (FT-LBS)
1-1/2"	5.5-6	1-1/2", 2", 2-1/2"	(Std) 5/8" Dia.	1"	28-32
2", 2-1/2"	8-9		(O.S.) 1" Dia.	1-3/8"	28-32
3-1/4", 4"	20-23	3-1/4", 4"	(Std.) 1" Dia.	1-3/8"	28-32
			(O.S.) 1-3/8" Dia.	1-13/16"	28-32

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PARTS LIST

PROVENAIR II CUSHIONED CYLINDERS
39XX-(1,8)0XX-(1 THRU 4)-XXX
(STANDARD ROD, 1-1/2" THRU 4" BORE)

SERIES:

39

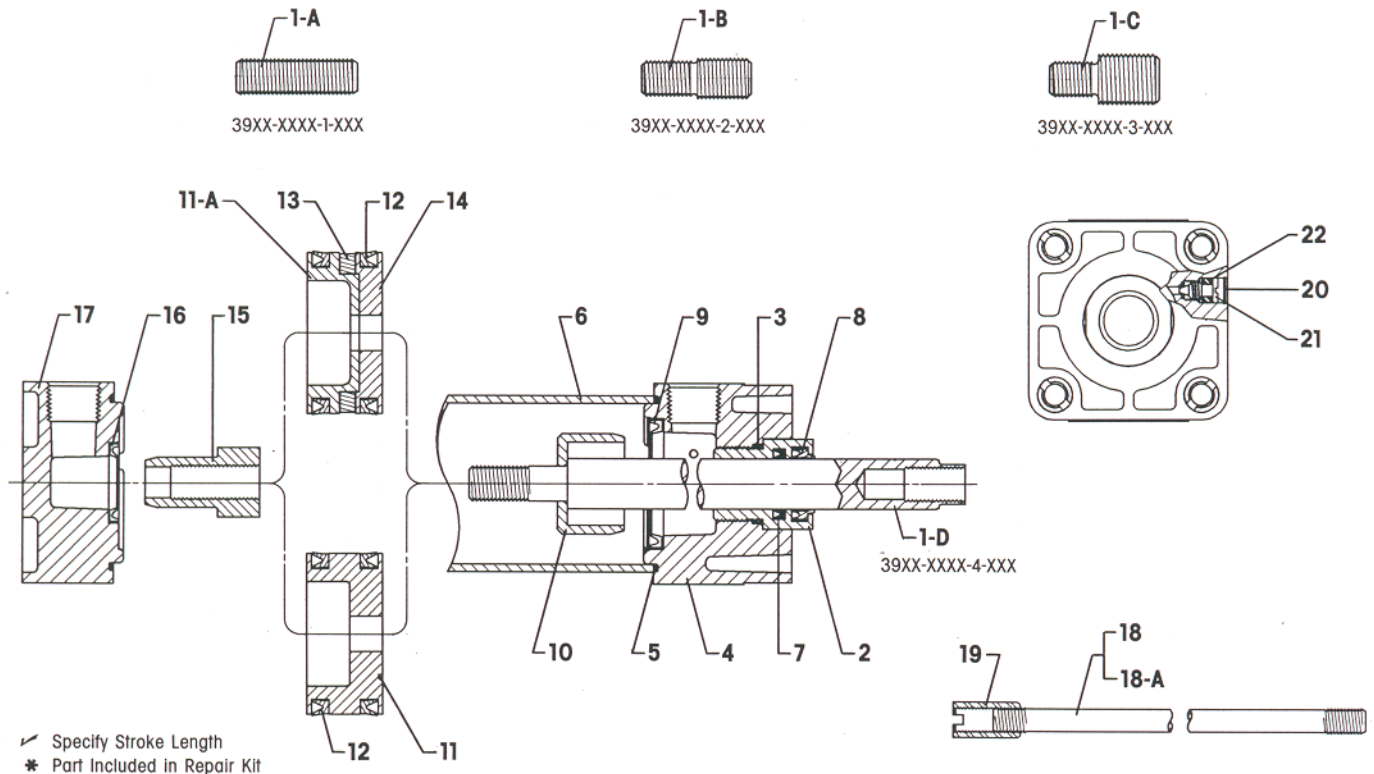
PAGE

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DATE:

10-29-90

TYPE DOUBLE ACTING, SINGLE ROD END
REPAIR KIT SEE CHART BELOW
MOUNTS SEE MOUNTING HARDWARE PARTS LIST



SYMBOL NO.	DESCRIPTION	PISTON ROD TYPE				QTY	3915-	3920-	3925-	3932-	3940-
		1	2	3	4						
1-A	Piston Rod End	X				1	117826	117826	117826	117829	117829
1-B	Piston Rod End		X			1	116694	116694	116694	116686	116686
1-C	Piston Rod End			X		1	116692	116692	116692	116688	116688
✓ 1-D	Piston Rod				X	1	116680-XXX-X	116680-XXX-X	116680-XXX-X	116679-XXX-X	116679-XXX-X
* 2	Rod Bushing	X	X	X	X	1	116672	116672	116672	116673	116673
* 3	"O" Ring	X	X	X	X	1	Y325-020	Y325-020	Y325-020	Y325-026	Y325-026
4	Head	X	X	X	X	1	116659	116661-1	116663-1	116665-1	116667-1
* 5	Barrel Seal	X	X	X	X	2	116718-1	116718-2	116718-3	116718-4	116718-5
✓ 6	Barrel	X	X	X	X	1	115161-XXX-X	115162-XXX-X	115163-XXX-X	115164-XXX-X	115165-XXX-X
* 7	U-Cup	X	X	X	X	1	Y240-9	Y240-9	Y240-9	Y240-15	Y240-15
* 8	Wiper	X	X	X	X	1	116699-04	116699-04	116699-04	116699-05	116699-05
* 9	Cushion Seal	X	X	X	X	1	116698-02	116698-03	116698-03	116698-04	116698-04
10	Cushion Boss	X	X	X	X	1	115172	116015	116015	116719	116719
11	Piston	X	X	X	X	1	116676-150	116676-200	116676-250	116676-325	116676-400
11-A	Piston Body	X	X	X	X	1	116675-150	116675-200	116675-250	116675-325	116675-400
* 12	U-Cup	X	X	X	X	2	Y240-19	Y240-23	Y240-26	Y240-32	Y240-37
13	Magnetic Ring	X	X	X	X	1	116769-150	116769-200	116769-250	116769-325	116769-400
14	Front Piston	X	X	X	X	1	116674-150	116674-200	116674-250	116674-325	116674-400
15	Spear Nut	X	X	X	X	1	116695	116695	116695	116695	116695
* 16	Cushion Seal	X	X	X	X	1	116698-01	116698-01	116698-01	116698-01	116698-01
17	Cap	X	X	X	X	1	116660	116662	116664	116666	116668
✓ 18	Tie Rod	X	X	X	X	4	115184-XXX-X	115186-XXX-X	115186-XXX-X	115187-XXX-X	115187-XXX-X
✓ 18-A	Tie Rod	X	X	X	X	4	115188-XXX-X	115189-XXX-X	115189-XXX-X	115190-XXX-X	115190-XXX-X
19	Nut	X	X	X	X	4	115209	115210	115210	115211	115211
20	Retaining Ring	X	X	X	X	2	Y147-031-C	Y147-031-C	Y147-031-C	Y147-043-C	Y147-043-C
21	Screw	X	X	X	X	2	116705	116705	116705	116706	116706
* 22	"O" Ring	X	X	X	X	2	Y325-105	Y325-105	Y325-105	Y325-108	Y325-108
	Repair Kit	X	X	X	X		117877-150	117877-200	117877-250	117877-325	117877-400
	Hi-Temp Kit	X	X	X	X		117878-150	117878-200	117878-250	117878-325	117878-400

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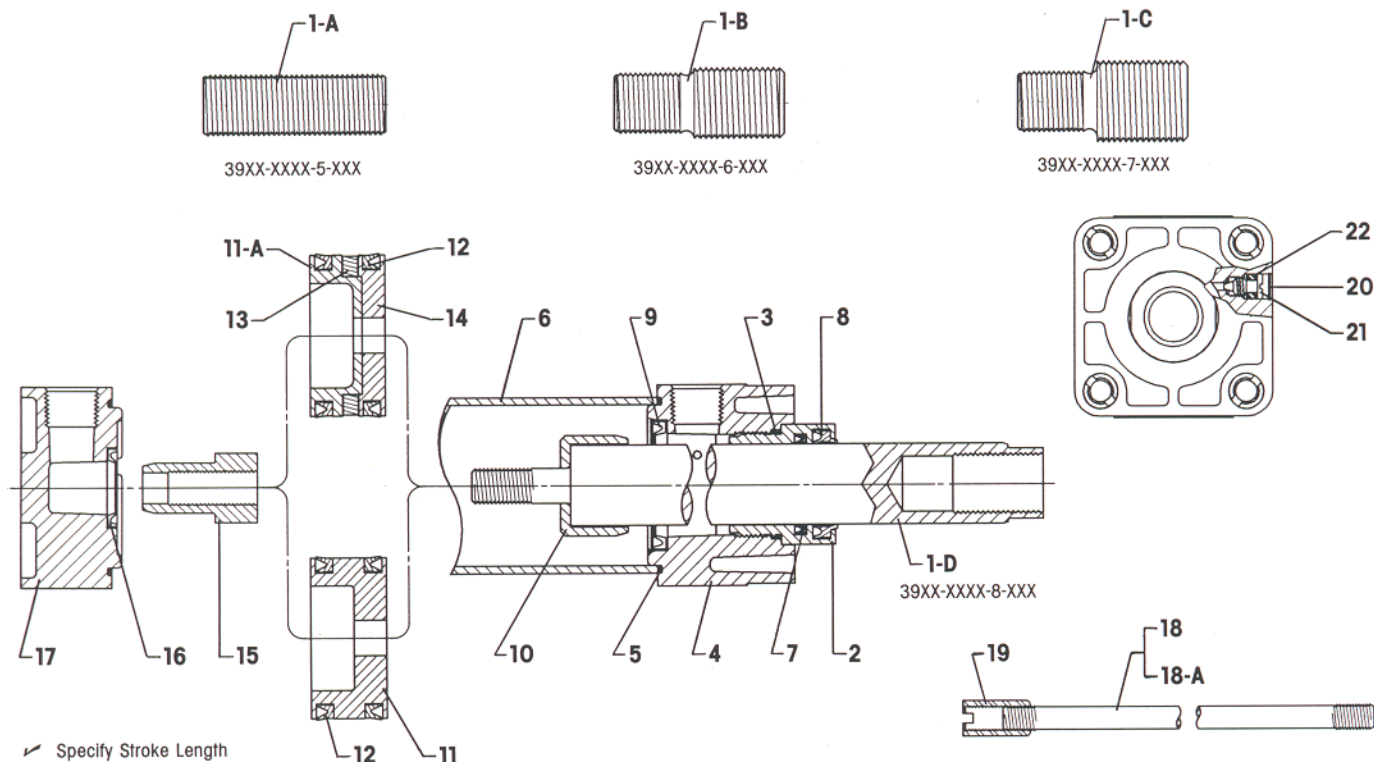
PARTS LIST

PROVENAIR II CUSHIONED CYLINDERS
39XX-(1,8)0XX-(5 THRU 8)-XXX
(OVERSIZE ROD, 2" THRU 4" BORE)

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PAGE
DATE: 6-16-89

TYPE DOUBLE ACTING, SINGLE ROD END
REPAIR KIT SEE CHART BELOW
MOUNTS SEE MOUNTING HARDWARE PARTS LIST



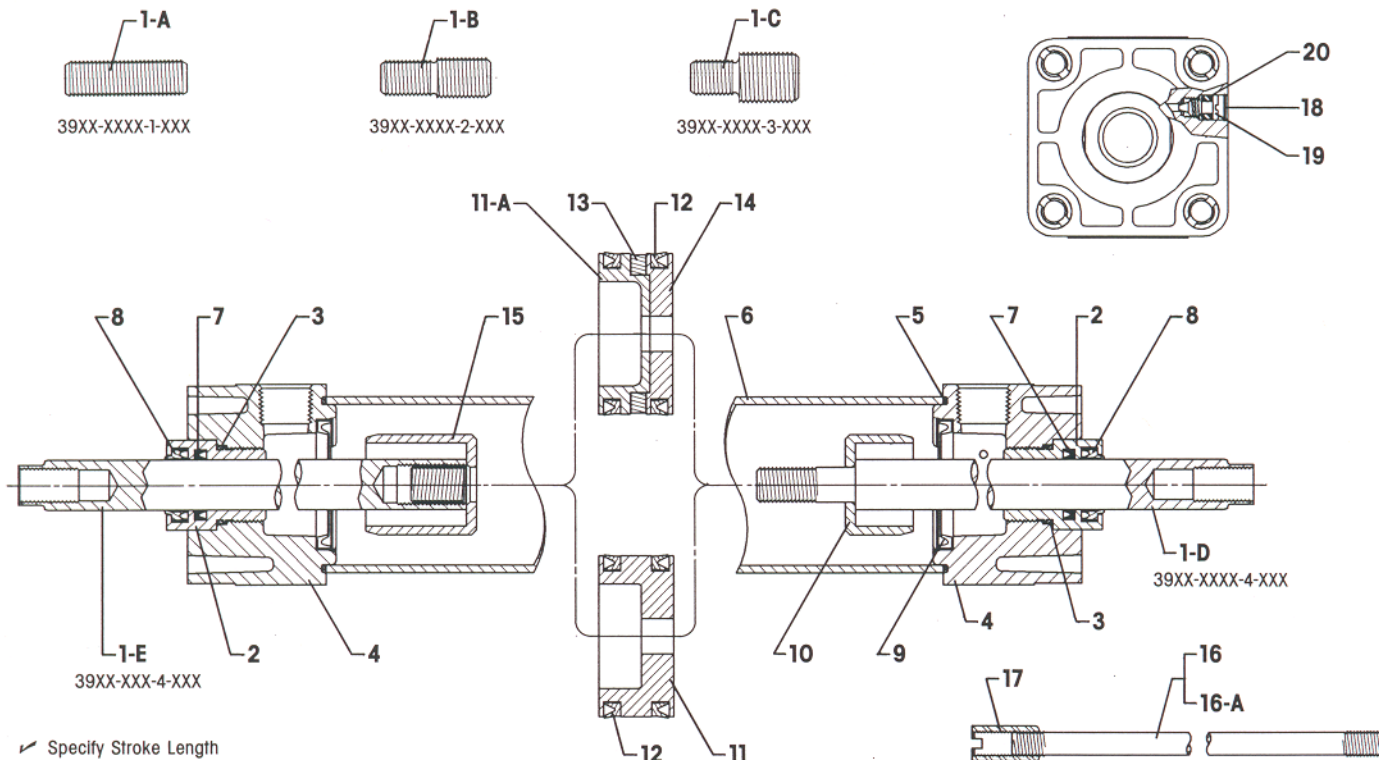
✓ Specify Stroke Length
* Part Included in Repair Kit

SYMBOL NO.	DESCRIPTION	PISTON ROD TYPE				QTY	3915-	3920-	3925-	3932-	3940-
		5	6	7	8						
1-A	Piston Rod End	X				1		117829	117829	117832	117832
1-B	Piston Rod End		X			1		116686	116686	116690	116690
1-C	Piston Rod End			X		1		116688	116688	116691	116691
✓ 1-D	Piston Rod				X	1		116677-XXX-X	116677-XXX-X	116678-XXX-X	116678-XXX-X
* 2	Rod Bushing	X	X	X	X	1		116673	116673	116671	116671
* 3	"O" Ring	X	X	X	X	1		Y325-026	Y325-026	Y325-030	Y325-030
4	Head	X	X	X	X	1		116661-2	116663-2	116665-2	116667-2
* 5	Barrel Seal	X	X	X	X	2		116718-2	116718-3	116718-4	116718-5
✓ 6	Barrel	X	X	X	X	1		115162-XXX-X	115163-XXX-X	115164-XXX-X	115165-XXX-X
* 7	U-Cup	X	X	X	X	1		Y240-15	Y240-15	Y240-21	Y240-21
* 8	Wiper	X	X	X	X	1		116699-05	116699-05	116699-06	116699-06
* 9	Cushion Seal	X	X	X	X	1		116698-03	116698-03	116698-04	116698-04
10	Cushion Boss	X	X	X	X	1		116015	116015	116719	116719
11	Piston	X	X	X	X	1		116676-200	116676-250	116676-325	116676-400
11-A	Piston Body	X	X	X	X	1		116675-200	116675-250	116675-325	116675-400
* 12	U-Cup	X	X	X	X	2		Y240-23	Y240-26	Y240-32	Y240-37
13	Magnetic Ring	X	X	X	X	1		116769-200	116769-250	116769-325	116769-400
14	Front Piston	X	X	X	X	1		116674-200	116674-250	116674-325	116674-400
15	Spear Nut	X	X	X	X	1		116695	116695	116695	116695
* 16	Cushion Seal	X	X	X	X	1		116698-01	116698-01	116698-01	116698-01
17	Cap	X	X	X	X	1		116662	116664	116666	116668
✓ 18	Tie Rod	X	X	X	X	4		115186-XXX-X	115186-XXX-X	115187-XXX-X	115187-XXX-X
✓ 18-A	Tie Rod	X	X	X	X	4		115189-XXX-X	115189-XXX-X	115190-XXX-X	115190-XXX-X
19	Nut	X	X	X	X	4		115210	115210	115211	115211
20	Retaining Ring	X	X	X	X	2		Y147-031-C	Y147-031-C	Y147-043-C	Y147-043-C
21	Screw	X	X	X	X	2		116705	116705	116706	116706
* 22	"O" Ring	X	X	X	X	2		Y325-105	Y325-105	Y325-108	Y325-108
	Repair Kit	X	X	X	X			117877-201	117877-251	117877-326	117877-401
	Hi-Temp Kit	X	X	X	X			117878-201	117878-251	117878-326	117878-401

PARTS LIST

PROVENAIR II CUSHIONED CYLINDERS
39XX-(2,9)OXX-(1 THRU 4)-XXX
(STANDARD ROD, 1-1/2" THRU 4" BORE)

TYPE.....DOUBLE ACTING, DOUBLE ROD END
REPAIR KIT.....SEE CHART BELOW
MOUNTS.....SEE MOUNTING HARDWARE PARTS LIST



✓ Specify Stroke Length
* Part Included in Repair Kit

SYMBOL NO.	DESCRIPTION	PISTON ROD TYPE				QTY	3915-	3920-	3925-	3932-	3940-
		1	2	3	4						
1-A	Piston Rod End	X				2	117826	117826	117826	117829	117829
1-B	Piston Rod End		X			2	116694	116694	116694	116686	116686
1-C	Piston Rod End			X		2	116692	116692	116692	116688	116688
✓ 1-D	Piston Rod				X	1	116680-XXX-X	116680-XXX-X	116680-XXX-X	116679-XXX-X	116679-XXX-X
✓ 1-E	Piston Rod				X	1	116684-XXX-X	116684-XXX-X	116684-XXX-X	116683-XXX-X	116683-XXX-X
* 2	Rod Bushing	X	X	X	X	2	116672	116672	116672	116673	116673
* 3	"O" Ring	X	X	X	X	2	Y325-020	Y325-020	Y325-020	Y325-026	Y325-026
4	Head	X	X	X	X	2	116659	116661-1	116663-1	116665-1	116667-1
* 5	Barrel Seal	X	X	X	X	2	116718-1	116718-2	116718-3	116718-4	116718-5
✓ 6	Barrel	X	X	X	X	1	115161-XXX-X	115162-XXX-X	115163-XXX-X	115164-XXX-X	115165-XXX-X
* 7	U-Cup	X	X	X	X	2	Y240-9	Y240-9	Y240-9	Y240-15	Y240-15
* 8	Wiper	X	X	X	X	2	116699-04	116699-04	116699-04	116699-05	116699-05
* 9	Cushion Seal	X	X	X	X	2	116698-02	116698-03	116698-03	116698-04	116698-04
10	Cushion Boss	X	X	X	X	1	115172	116015	116015	116719	116719
11	Piston	X	X	X	X	1	116676-150	116676-200	116676-250	116676-325	116676-400
11-A	Piston Body	X	X	X	X	1	116675-150	116675-200	116675-250	116675-325	116675-400
* 12	U-Cup	X	X	X	X	2	Y240-19	Y240-23	Y240-26	Y240-32	Y240-37
13	Magnetic Ring	X	X	X	X	1	116769-150	116769-200	116769-250	116769-325	116769-400
14	Front Piston	X	X	X	X	1	116674-150	116674-200	116674-250	116674-325	116674-400
15	Cushion Boss	X	X	X	X	1	115173	116017	116017	116720	116720
✓ 16	Tie Rod	X	X	X	X	4	115184-XXX-X	115186-XXX-X	115186-XXX-X	115187-XXX-X	115187-XXX-X
✓ 16-A	Tie Rod	X	X	X	X	4	115188-XXX-X	115189-XXX-X	115189-XXX-X	115190-XXX-X	115190-XXX-X
17	Nut	X	X	X	X	4	115209	115210	115210	115211	115211
18	Retaining Ring	X	X	X	X	2	Y147-031-C	Y147-031-C	Y147-031-C	Y147-043-C	Y147-043-C
19	Screw	X	X	X	X	2	116705	116705	116705	116706	116706
* 20	"O" Ring	X	X	X	X	2	Y325-105	Y325-105	Y325-105	Y325-108	Y325-108
	Repair Kit	X	X	X	X		117879-150	117879-200	117879-250	117879-325	117879-400
	Hi-Temp Kit	X	X	X	X		117880-150	117880-200	117880-250	117880-325	117880-400

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PARTS LIST

PROVENAIR II CUSHIONED CYLINDERS
39XX-(2,9)0XX-(5 THRU 8)-XXX
(OVERSIZE ROD, 2" THRU 4" BORE)

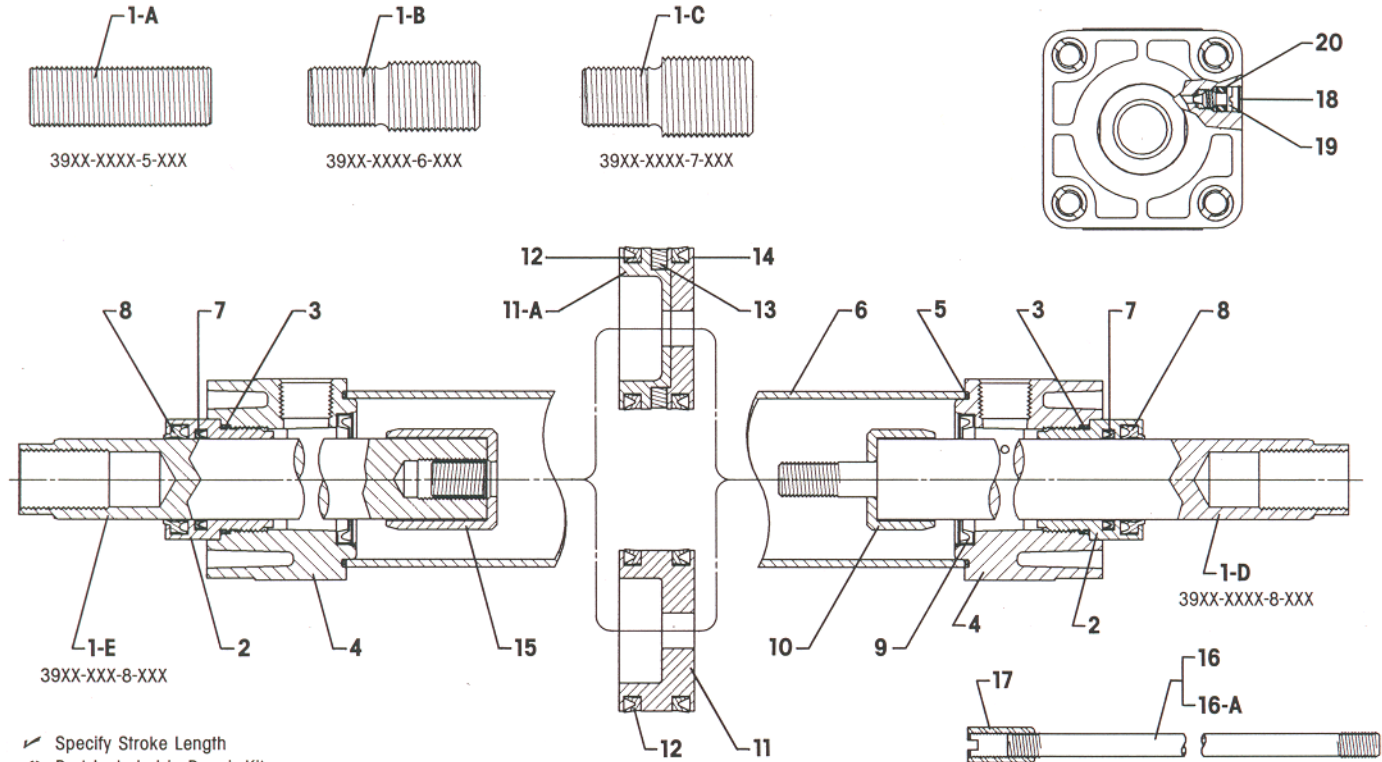
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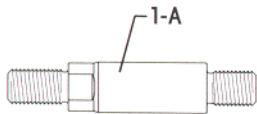
DATE: 6-16-89

TYPE.....DOUBLE ACTING, DOUBLE ROD END
REPAIR KIT.....SEE CHART BELOW
MOUNTS.....SEE MOUNTING HARDWARE PARTS LIST

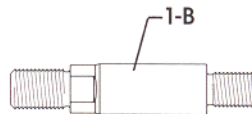


- ✓ Specify Stroke Length
- * Part Included in Repair Kit

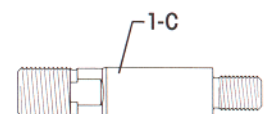
SYMBOL NO.	DESCRIPTION	PISTON ROD TYPE					QTY	3915-	3920-	3925-	3932-	3940-
		5	6	7	8							
1-A	Piston Rod End	X					2		117829	117829	117832	117832
1-B	Piston Rod End		X				2		116686	116686	116690	116690
1-C	Piston Rod End			X			2		116688	116688	116691	116691
✓ 1-D	Piston Rod				X		1		116677-XXX-X	116677-XXX-X	116678-XXX-X	116678-XXX-X
✓ 1-E	Piston Rod				X		1		116681-XXX-X	116681-XXX-X	116682-XXX-X	116682-XXX-X
* 2	Rod Bushing	X	X	X	X		2		116673	116673	116671	116671
* 3	"O" Ring	X	X	X	X		2		Y325-026	Y325-026	Y325-030	Y325-030
4	Head	X	X	X	X		2		116661-2	116663-2	116665-2	116667-2
* 5	Barrel Seal	X	X	X	X		2		116718-2	116718-3	116718-4	116718-5
✓ 6	Barrel	X	X	X	X		1		115162-XXX-X	115163-XXX-X	115164-XXX-X	115165-XXX-X
* 7	U-Cup	X	X	X	X		2		Y240-15	Y240-15	Y240-21	Y240-21
* 8	Wiper	X	X	X	X		2		116699-05	116699-05	116699-06	116699-06
* 9	Cushion Seal	X	X	X	X		2		116698-03	116698-03	116698-04	116698-04
10	Cushion Boss	X	X	X	X		1		116015	116015	116719	116719
11	Piston	X	X	X	X		1		116676-200	116676-250	116676-325	116676-400
11-A	Piston Body	X	X	X	X		1		116675-200	116675-250	116675-325	116675-400
* 12	U-Cup	X	X	X	X		2		Y240-23	Y240-26	Y240-32	Y240-37
13	Magnetic Ring	X	X	X	X		1		116769-200	116769-250	116769-325	116769-400
14	Front Piston	X	X	X	X		1		116674-200	116674-250	116674-325	116674-400
15	Cushion Boss	X	X	X	X		1		116017	116017	116720	116720
✓ 16	Tie Rod	X	X	X	X		4		115186-XXX-X	115187-XXX-X	115187-XXX-X	115187-XXX-X
✓ 16-A	Tie Rod	X	X	X	X		4		115189-XXX-X	115189-XXX-X	115190-XXX-X	115190-XXX-X
17	Nut	X	X	X	X		4		115210	115210	115211	115211
18	Retaining Ring	X	X	X	X		2		Y147-031-C	Y147-031-C	Y147-043-C	Y147-043-C
19	Screw	X	X	X	X		2		116705	116705	116706	116706
* 20	"O" Ring	X	X	X	X		2		Y325-105	Y325-105	Y325-108	Y325-108
	Repair Kit	X	X	X	X				117879-201	117879-251	117879-326	117879-401
	Hi-Temp Kit	X	X	X	X				117880-201	117880-251	117880-326	117880-401

PARTS LIST**PROVENAIR II CYLINDERS
HEAD AND CAP TRUNNION MOUNTS
(STANDARD AND OVERSIZE ROD)**

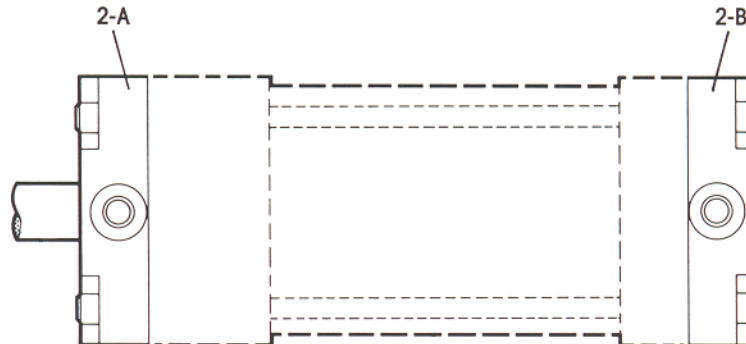
39XX-XXXX-1-XXX
39XX-XXXX-5-XXX



39XX-XXXX-2-XXX
39XX-XXXX-6-XXX



39XX-XXXX-3-XXX
39XX-XXXX-7-XXX



SYMBOL NO.	DESCRIPTION	PISTON ROD TYPE				QTY	3915-	3920-	3925-	3932-	3940-
		1	2	3	4						
1-A	Rod End Ext.	X				1	116776	116776	116776	116782	116782
1-B	Rod End Ext.		X			1	116777	116777	116777	116783	116783
1-C	Rod End Ext.			X		1	116778	116778	116778	116784	116784
2-A	Head Trunnion	X	X	X		1	116357	116358	116359	116360	116361
2-B	Cap Trunnion	X	X	X		1	116357	116358	116359	116360	116361

SYMBOL NO.	DESCRIPTION	PISTON ROD TYPE				QTY	3915-	3920-	3925-	3932-	3940-
		5	6	7	8						
1-A	Rod End Ext.	X				1		116779	116779	116785	116785
1-B	Rod End Ext.		X			1		116780	116780	116786	116786
1-C	Rod End Ext.			X		1		116781	116781	116787	116787
2-A	Head Trunnion	X	X	X		1		116358	116359	116360	116361
2-B	Cap Trunnion	X	X	X		1		116358	116359	116360	116361

117813-() INSTALLATION KIT

DESCRIPTION	QTY	3915-	3920-	3925-	3932-	3940-
Spear Nut	1	116695	116695	116695	116695	116695
U-Cup	2	Y240-19	Y240-23	Y240-26	Y240-32	Y240-37
Kit No.		117813-150	117813-200	117813-250	117813-325	117813-400

116802-() MAGNET KIT

DESCRIPTION	3915-	3920-	3925-	3932-	3940-
Front Piston	116674-150	116674-200	116674-250	116674-325	116674-400
Piston Body	116675-150	116675-200	116675-250	116675-325	116675-400
Magnetic Ring	116769-150	116769-200	116769-250	116769-325	116769-400
Kit No.	116802-150	116802-200	116802-250	116802-325	116802-400

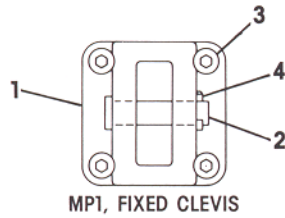
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PARTS LIST

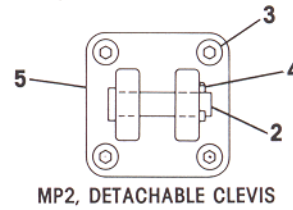
PROVENAIR II CYLINDERS MOUNTING HARDWARE

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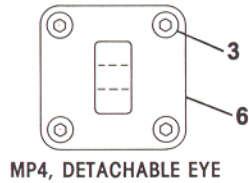
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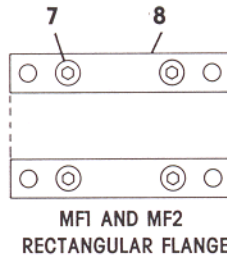
MP1, FIXED CLEVIS



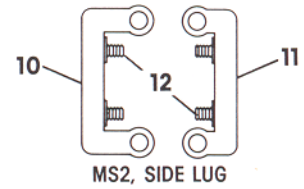
MP2, DETACHABLE CLEVIS



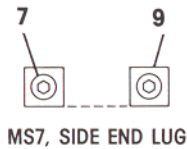
MP4, DETACHABLE EYE



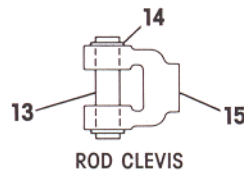
MF1 AND MF2
RECTANGULAR FLANGE



MS2, SIDE LUG



MS7, SIDE END LUG



ROD CLEVIS



ROD EYE

SYMBOL NO.	DESCRIPTION	PART NO.				
		1-1/2" BORE	2" BORE	2-1/2" BORE	3-1/4" BORE	4" BORE
1	Fixed Clevis Bkt.	115490	115491	115492	115493	115494
2	Pivot Pin	115271	115271	115271	115272	115272
3	Screw	Y157-458	Y157-558	Y157-558	Y157-61	Y157-61
4	Cotter Pin	Y15-43	Y15-43	Y15-43	Y15-43	Y15-43
5	Detach. Clevis Bkt.	115238	115240	115242	115244	115246
6	Detach. Eye Bkt.	115248	115250	115268	115269	115270
7	Screw	Y157-40	Y157-50	Y157-50	Y157-658	Y157-658
8	Flange Bar	115228	115230	115232	115234	115236
9	Lug	115218	115220	115222	115224	115226
10	Front Side Lug	116408	116409	116410	116411	116412
11	Rear Side Lug	116413	116414	116415	116416	116417
12	Screw	Y157-458	Y157-51	Y157-51	Y157-62	Y157-62

SYMBOL NO.	DESCRIPTION	ROD THREAD			
		7/16-20	3/4-16	1-14	1-1/4-12
13	Pivot Pin	116187	116175	116178	116181
14	Retaining Ring	Y145-18	Y145-23	Y145-25	Y145-34
15	Rod Clevis	116185	116173	116176	116179
16	Rod Eye	116186	116174	116177	116180