



Specialised Air Motors and Transmission

TONSON®

New South Wales

HEAD OFFICE

Unit 19/5 Lyn Parade

Prestons NSW 2170

Ph: (02) 9607 4100

Fax: (02) 9600 8882

Web: www.tonson-motor.com.au

Email: sales@samt.com.au



Piston Air Motors Parts List



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Specialised Air Motors & Transmission (SAMT) - incorporating TONSON - was founded in 1966 and provides efficient solutions and equipment to all major industries including mining, chemical, food, paper, plastic, power transmission, manufacturing and pharmaceutical.

Our commitment to you is best service, quick lead times and very competitive prices.

Innovation & Quality

Specialised Air Motors & Transmission is committed to providing clever solutions for all hazardous environments and continues to develop smart ways to meet requirements from all different industries; our products meet CE standards ISO9002, ISO9001 and patents are registered globally including USA, Taiwan and China.

Unlike other conventional methods our products mainly use air instead of electricity as the source of power. This eliminates the chance of electricity shock and fire, which are the most crucial factors for industries involved in chemical, flammable or volatile contents.

Specialised Air Motors & Transmission products include air/electric motors, air/electric mixers and air fans which are engineered to meet the highest standards featuring 100% explosion-proof, low air consumption, light weight, high torque, reversible step less speed control, easy maintenance and various mounting methods. And can be used in very harsh conditions such as humidity, high temperature and flammable environments.

Products & Services

SAMT's other popular products include Pressure Tanks up to 200L (with and without integrated mixer), spray guns, pneumatic double diaphragm pumps, vertical pumps, magic drum carriers, non-spark drum openers, propellers, plus many more exciting and innovative products.

We also have the technical capability and expertise to provide complete power transmission solutions to meet your specific requirements, including full engineering assistance with design, selection and site installation. We also specialise in the supply of all types of Industrial gearboxes including Helical, Worm, Bevel-Helical, Bevel, screw jacks and planetary. All are interchangeable with other internationally recognised brands.

SAMT can also customise any product to suit your specific requirements and will investigate the possibilities of developing new products to satisfy your special specifications.



Features and applications

Piston Air Motor features include:

- 100% Explosion-proof
- Stalling Safety
- Step less Speed Control
- Never Burn Out
- Self-Sealing & Cool Running
- Positive Start
- Mounting Flexibility (Flange, Foot, Hub, IEC, Nema, Custom Mounting Available)
- All Plane Operation
- Toleration of Environment
- High Start Torque
- Instantly Reversible
- Rugged Design
- Intrinsically safe in hazardous environment (ex. Mines, Petrochemical, Volatile atmosphere)
- Modular Design: All motors may be equipped with Gear Reducer, Brake, Hand, Remote, Pendant control as options

Piston Air Motor applications are unlimited including:

- Hoist / Winches
- Pump Drives
- Automation Devices
- Hose Reels
- Conveyor Drives
- Choppers / Grinders
- Turntables
- Mixing Equipment
- Food / Pharmacy Packaging
- Lifting Device
- Mining Equipment



Chromium-plated
Also available
Full Stainless Steel Construction

Air Motors have many Patterns and Mounting to meet different application, such as Dual-Shaft (DS), Air Mixer-reserved. Mounting methods including Flange, Foot, Butterfly, IEC, NEMA, and many special flange plates can be customized.

Also other materials:
Stainless Steel & Chromium-plated.

M1



M2



M3



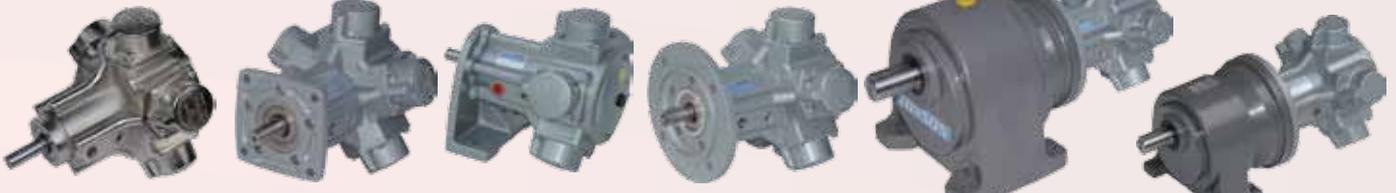
M4



M5



M6



M6-ET
Chromium
Plated

M6-F
Flange

M6-L
Foot

M6-I
Metric

M6-LG200
w/ Reducer

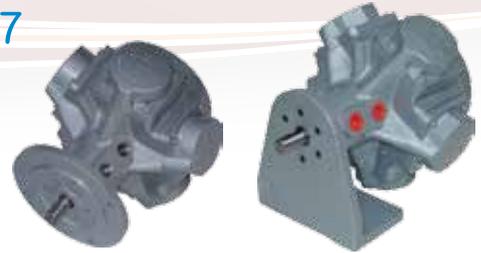
M6-LG5
w/ Reducer

Series	Gear Ratio	Performance at Maximum Speed (at 6 bar)						Max. Torque			
		Power		Torque		Speed	Air Comp.		Speed	Torque	
		HP	kW	N-m	lb-in	RPM	l/min	CFM	RPM	N-m	lb-in
M1 (010)	1:1	0.10	0.07	0.637	5.64	1100	200	7	220	1.12	9.9
	5:1			2.84	25.1	220			44	4.99	44.2
	10:1			5.69	50.4	110			22	10	88.5
	15:1			8.53	75.5	73.3			14.7	15	133
	20:1			11.5	102	55			11	20.2	179
	30:1			16.4	145	36.7			7.3	28.9	256
M2	1:1	0.16	0.12	0.84	7.43	1000	211	7	200	1.5	13.3
	5:1	0.12	0.09	3.61	32.0	200			40	6.4	56.6
	10:1			7.22	63.9	100			20	12.7	112
	15:1			10.8	95.9	66.7			13.3	19.1	169
	20:1			14.4	128	50			10	25.4	225
	30:1			21.7	192	33.3			6.7	38.1	337
M3 (015)	1:1			0.25	0.19	1.37	12.1	900	260	9	180
	5:1	5.88	52.0			180	36	10.8			95.6
	10:1	11.8	104			90	18	21.6			191
	15:1	17.7	157			60	12	32.4			287
	20:1	23.5	208			45	9	42.8			379
	30:1	35.3	312			30	6	64.2			568
	40:1	47.1	417			22.5	4.5	85.7			759
	50:1	58.8	520			18	3.6	107			947
	60:1	70.6	625			15	3	129			1137
	80:1	93.2	825			11.2	2.2	170			1501
	100:1	118	1044			9	1.8	214			1891
	120:1	137	1213			7.5	1.5	248			2195
	160:1	176	1558			5.6	1.1	319			2820
	200:1	233	2062			4.5	0.9	422			3732
M4	1:1	0.33	0.25	2.16	19.1	850	267	9	170	3.95	35.0
	5:1	0.22	0.17	9.29	82.2	170			34	17.0	150
	10:1			18.6	164	85			17	34.0	301
	15:1			27.9	247	56.7			11.3	51.0	451
	20:1			37.2	329	42.5			8.5	67.9	601
	30:1			55.7	493	28.3			5.7	102	902
M5 (030)	1:1			0.5	0.37	2.94	26.0	750	400	14	150
	5:1	12.7	112			150	30	23.5			208
	10:1	26.5	235			75	15	49.0			434
	15:1	39.2	347			50	10	72.1			638
	20:1	53	469			37.5	7.5	97.5			863
	30:1	78.5	695			25	5	144			1278
	40:1	106	938			18.7	3.7	195			1726
	50:1	132	1168			15	3	243			2150
	60:1	157	1390			12.5	2.5	289			2557
	80:1	203	1797			9.3	1.9	374			3306
	100:1	250	2213			7.5	1.5	463			4093
	120:1	300	2655			6.2	1.2	555			4912
	160:1	396	3505			4.6	0.92	733			6484
	200:1	500	4425			3.7	0.74	925			8187
M6	1:1	0.75	0.56	4.40	38.9	700	507	18	140	8.1	71.7
	5:1	0.43	0.32	18.9	167	140			28	34.8	308
	10:1			37.8	335	70			14	69.6	616
	15:1			56.8	502	46.7			9.3	104	919
	20:1			75.7	670	35			7	138	1226
	30:1			114	1005	23.3			4.7	208	1839
M7 (507)	1:1			1	0.75	28	248	320	985	35	60
	3:1	0.89	0.66	65	575	100	20	116			1030
	5:1			110	974	64	12.8	197			1743
	10:1			212	1876	30	6	379			3359
	20:1			423	3744	16	3.2	757			6702
	20:1			850	7523	8	1.6	1522			13466
M9 (403)	1:1			0.35	0.26	1.67	14.8	1500	450	16	300
	5:1	0.31	0.23	6.86	60.7	300	60	12.2			108
	10:1			13.7	121	150	30	24.4			216
	15:1			20.6	182	100	20	36.7			325
	20:1			27.5	243	75	15	49.0			433
	30:1			41.2	365	50	10	73.3			649



M6-LBG20
w/ Reducer & Brake

M7



M7-I
Metric

M7-L
Foot



M7-FG30
Flange w/ Reducer



M7-LBG
Foot w/ Reducer & Brake

M9



M9-I
Metric

M10



M10-L
Foot

M11



M11-F
Flange



M11-L
Foot



M11-LBG30
w/ Reducer
& Brake



M11-FB
w/ Brake

M12



M12-F Flange



M12-I Metric



M12-FG10
Flange w/ Reducer



M12-LG5
Foot w/ Reducer

M13



M13-F
Flange

M13S



M13S-F Flange

Series	Gear Ratio	Performance at Maximum Speed (at 6 bar)						Max. Torque			
		Power		Torque		Speed	Air Comp.		Speed	Torque	
		HP	kW	N·m	lb·in	RPM	l/min	CFM	RPM	N·m	lb·in
M10 (404)	1:1	0.77	0.57	3.63	32.1	1500	950	34	300	6.5	57.5
	5:1	0.69	0.51	15.7	139	300			60	28.1	249
	10:1			31.4	278	150			30	56.2	497
	15:1			47.1	417	96			19.2	84.3	746
	20:1			62.8	556	72			14.4	112	995
30:1	94.1	833	48	9.6	168	1491					
M11 (405)	1:1	1.36	1.00	6.57	58.1	1450	1750	62	290	11.5	102
	5:1	1.22	0.91	29.4	260	290			58	51.5	455
	10:1			58.8	520	145			29	103	911
	15:1			88.3	782	96			19.2	155	1368
	20:1			118	1044	72			14.4	207	1828
30:1	177	1567	48	9.6	310	2742					
M12 (406)	1:1	3.31	2.47	17.5	155	1350	3700	131	270	31	274
	5:1	3	2.24	78.5	695	270			54	139	1231
	10:1			157	1390	135			27	278	2462
	15:1			235	2080	90			18	416	3684
	20:1			314	2779	67.5			13.5	556	4923
	30:1			471	4169	45			9	834	7385
	40:1			602	5328	33.8			6.8	1066	9438
	60:1			903	7992	22.5			4.5	1600	14158
	100:1			1505	13320	13.5			2.7	2666	23596
	120:1			1806	15984	11.3			2.3	3199	28315
160:1	2408	21313	8.44	1.7	4266	37754					
200:1	3010	26641	6.75	1.4	5332	47192					
M13 (506)	1:1	4.2	3.09	21.6	191	1350	4200	148	270	39	345
	5:1	3.8	2.83	98.1	868	270			54	177	1563
	10:1			196	1735	135			27	353	3123
	15:1			294	2602	90			18	529	4684
	20:1			392	3469	67.5			13.5	706	6245
	30:1			583	5160	45			9	1049	9288
	40:1			745	6594	33.8			6.8	1341	11869
	60:1			1115	9865	22.5			4.5	2006	17756
	100:1			1858	16441	13.5			2.7	3344	29594
	120:1			2229	19729	11.3			2.3	4012	35513
160:1	2972	26306	8.4	1.7	5350	47350					
200:1	3715	32882	6.8	1.4	6687	59188					
M13S (110)	1:1	2.28	1.7	8.10	71.7	2000	1920	68	400	12	106
	3:1	2.05	1.53	21.9	194	666			133	32.4	287
	5:1			36.5	323	400			80	54	478
	10:1			72.9	645	200			40	108	956
	15:1			109	968	133			26.6	162	1434
	20:1			146	1290	100			20	216	1912
	30:1			219	1936	66			13.2	324	2868
	40:1			292	2581	50			10	432	3824
60:1	413	3656	33	6.6	612	5417					
80:1	551	4875	25	5	816	7222					



M13S-L Foot



M13S-I IEC

M14



M13S-FBHCV



M14-F Flange



M14-I IEC



M14-L Foot



M14-FBG40
w/ Reducer & Brake

M15



M15-F
Flange



M15-IBRCV
w/ Brake



M15-I
Metric



M15-L
Foot



M15-LHCV
w/ Hand Control Valve

M16



M16-I IEC



M16-F
Flange



M16-L Foot



M16-N Imperial



M16-FBHCV
w/ HCV & Brake



M16-FG
w/ Reducer



M17-FHCV
w/ Hand Control Valve



M17-FBRCV
w/ Remote Control
Valve & Brake



M18-IRCV
IEC w/ Remote
Control Valve



M18 FBHCV
w/ Hand Control
Valve & Brake

Series	Gear Ratio	Performance at Maximum Speed (at 6 bar)							Max. Torque		
		Power		Torque		Speed	Air Comp.		Speed	Torque	
		HP	kW	N·m	lb·in	RPM	l/min	CFM	RPM	N·m	lb·in
M14 (210)	1:1	5.36	4	20	177	1900	5880	208	380	34	301
	3:1	4.80	3.58	54	478	633			126.7	94.5	836
	5:1			90	797	380			76	158	1394
	10:1			180	1593	190			38	315	2788
	15:1			270	2390	127			25.3	473	4182
	20:1			360	3186	95			19	630	5576
	30:1			540	4779	63.3			12.7	945	8364
	40:1			720	6373	47.5			9.5	1260	11152
	60:1			1080	9559	31.7			6.3	1890	16728
80:1	1440			12745	23.8	4.75	2520	22304			
M15 (310)	1:1	10.1	7.5	42	372	1800	9840	347	360	70	620
	3:1	9.55	7.12	113	1004	647			129	189	1673
	5:1			189	1673	358			71.6	315	2788
	10:1			378	3346	203			40.6	630	5576
	15:1			567	5018	136			27.2	945	8364
	20:1			756	6691	86			17.2	1260	11152
	30:1			1134	10037	57			11.4	1890	16728
	40:1			1512	13382	45			9	2520	22304
	50:1			1890	16728	36			7.2	3150	27880
60:1	2142			18958	32	6.4	3570	31597			
80:1	2856	25278	21	4.2	4760	42130					
M16 (410)	1:1	18.8	14	85	752	1600	15600	551	320	140	1239
	3:1	13	9.70	227	2009	533			106.7	374	3308
	5:1			378	3348	320			64	623	5514
	10:1			757	6696	160			32	1246	11028
	15:1			1135	10043	107			21.3	1869	16542
	20:1			1513	13391	80			16	2492	22056
	30:1			2270	20087	53.3			10.7	3738	33084
	40:1			3026	26782	40			8	4984	44112
	60:1			4539	40174	26.7			5.3	7476	66168
M17 (510)	1:1			21.7	16.2	140	1239	1100	19810	700	220
	3:1	19	14.2	374	3308	367	73.3	627			5553
	5:1			623	5514	220	44	1046			9256
	10:1			1246	11028	110	22	2092			18511
	20:1			2464	21808	55	11	4136			36607
	30:1			3696	32712	36.7	7.3	6204			54910
40:1	4928			43616	27.5	5.5	8272	73213			
M18 (610)	1:1	31.2	23.3	155	1372	1500	22500	795	300	235	2080
	3:1	28.7	21.4	414	3663	500			100	627	1722
	5:1			690	6105	300			60	1046	1935
	10:1			1380	12210	150			30	2092	3617
	20:1			2728	24145	75			15	4136	8367
	30:1			4092	36217	50			10	6204	9612
40:1	5456			48290	37.5	7.5	8272	10543			

Control Vales



HV1 Mini Reverse Control

HV2 Reverse Control

HV3 Reverse Control

HV4 Reverse Control

HCV Hand Control Valve

RCV Remote Control Valve

Pressure Gauge

Air Regulator

APPLICATION

Model	Piston Air Motor																	
	M1	M2	M3	M4	M5	M6	M7	M9	M10	M11	M12	M13	M13S	M14	M15	M16	M17	M18
HV1 Mini (1/4")	●	●	●	●	●	●		●										
HV2(1/4")								●										
HV3(1/2")							●		●	●								
HV4(1")											●	●						
HCV1(RCV1)1/2"													●					
HCV2(RCV2)3/4"														●				
HCV3(RCV3)1"															●			
HCV4(RCV4)1-1/4"																●		
HCV5(RCV5)1-1/2"																	●	
HCV6(RCV6)2"																		●

● Standard
★ Better Performance

Silencer



Model	SC2	TC1	TC2S	TC3	TC4	MF1	MF3	MF5	MF7	MF9	MF11	NM1	NM2	NM3	SM1	SM2	SP1	SP2	SP2L	SP3	SP4	PL1	PL2	PL3	PL4	PL5	PL6
Caliber(PT)	2"	1"	1-1/2"	1-1/2"	2"	3/8"	1/2"	3/4"	1"	1-1/2"	2"	1/8"	1/4"	1/2"	1/4"	1/2"	1/8"	1/4"	1/4"	3/8"	1/2"	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Dia. O	86	100	70	100	100	80	90	100	112	132	150	48	76	78	40.5	65	16	16	20	26	28	12	19	20	24	40	49
Height mm	256	202	164	217	211	129	147	171	195	259	312	48	58	107	50	80	34	37	62	67	70	30	42	57	55	113	112
Material	Carbon Steel	Filter:Fiber Shell:Steel				Filter:A5052P.SPCC Shell:PC.A2011						Adsorb Active Carbon		Industrial Cotton		Forming Resin (5µm)				Filter: Plastic Particle Shell: Engineering Plastic							

FRL (Filter, Regulator, and Lubricator)



Model	Piston Air Motor																		Caliber	Mass (kg)							
	M1	M2	M3	M4	M5	M6	M7	M9	M10	M11	M12	M13	M13S	M14	M15	M16	M17	M18									
FRL1/4 Mini	FOR TONSON AIR FAN ONLY																		1/4"	0.2							
FRL1/4	●	●	●	●	●	●		●																			
FRL1/2								●		●	●			●													
FRL1												●	●		★	●											
FRL1-1/4																★	●										
FRL2																	★	●	●	●							

Temperature Range: -5~60°C
Maxx Pressure: 9.5 (kgf/cm²)

Pressure Range: 0.5~8.5 (kgf/cm²)
Lubrication Recommended: ISO VG or Equivalent

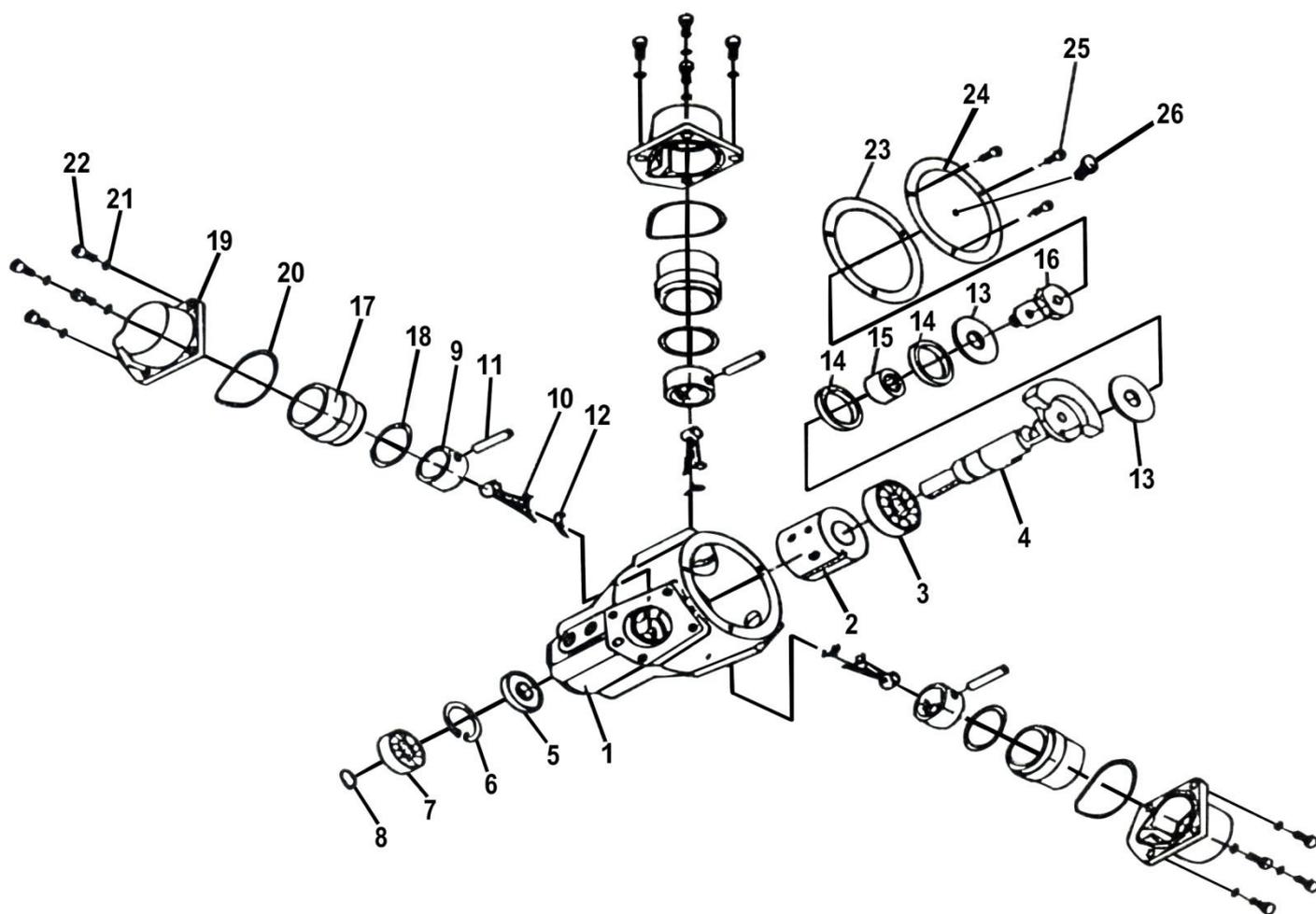
● Standard
★ Better Performance

Model	FRL1/4Mini	FRL1/4 & FRL1/2	SS1/4	FRL1	FRL2
Dimension(cm)	9x4.5x17.5	16x7x23.5	11.5x7x24.5	17.8x7x28	65x16x72

FRL (Filter, Regulator, and Lubricator) are recommendd to improve air motor performance and provide longer life.

Working Fluid: Compressed Air Operating Pressure: 6kg/cm² Max. Operating Pressure: 7kg/cm² Ambient Temperature: -10 ~+120°C
Air Motors are designed to operate by compressed air and to be used with filter, regulator and lubricator to improve performance and provide longer life. Users should be responsible for determining suitable of the product for intended use and assuming all risk and liability whatsoever in connection therewith.

Parts List - M1 Series



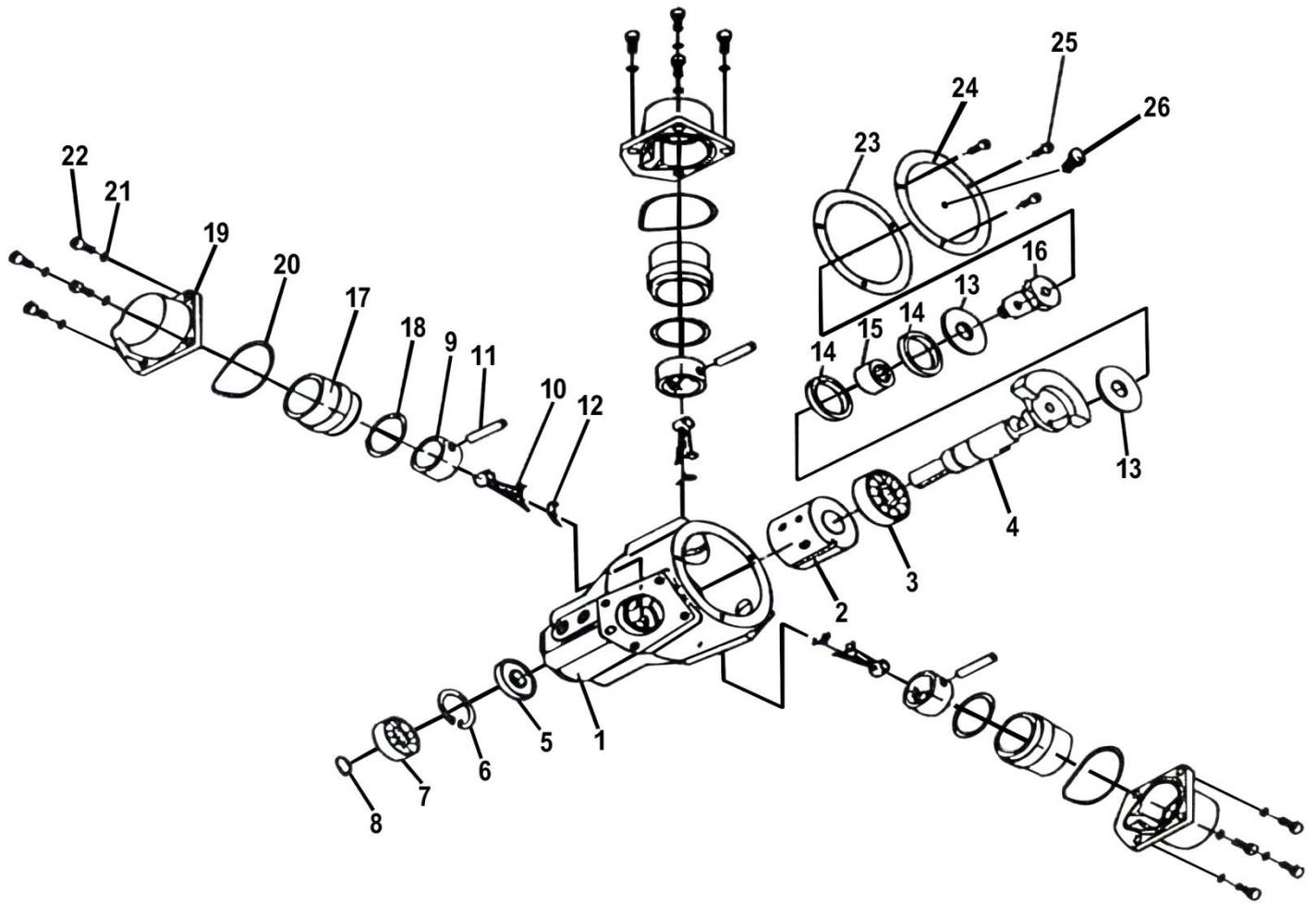
NO.	Description	Qty	NO.	Description	Qty	NO.	Description	Qty
1	Casing	1	11	Piston Pin	3	21	Spring washer	12
2	Valve bushing	1	12	Gasket	3	22	Screw	12
3	Bearing	1	13	Thrust washer	2	23	Gasket	1
4	Shaft	1	14	Ring	2	24	Casing cover	1
5	Oil seal	1	15	Needle bearing	1	25	Screw	3
6	Snap ring	1	16	Crank pin	1	26	Air through screw	1
7	Bearing	1	17	Sleeve	3	27	Flange type	1
8	Snap ring	1	18	O-Ring	3	28	Foot type	1
9	Piston	3	19	Cylinder cover	3	29	Silencer	1
10	Connecting rod	3	20	O-Ring	3			

All Items in RED are included in the Seal Kit

All Items in RED & PURPLE are included in the Repair Kit

All Items in BLUE are included in the Piston Kit

Parts List - M2 Series



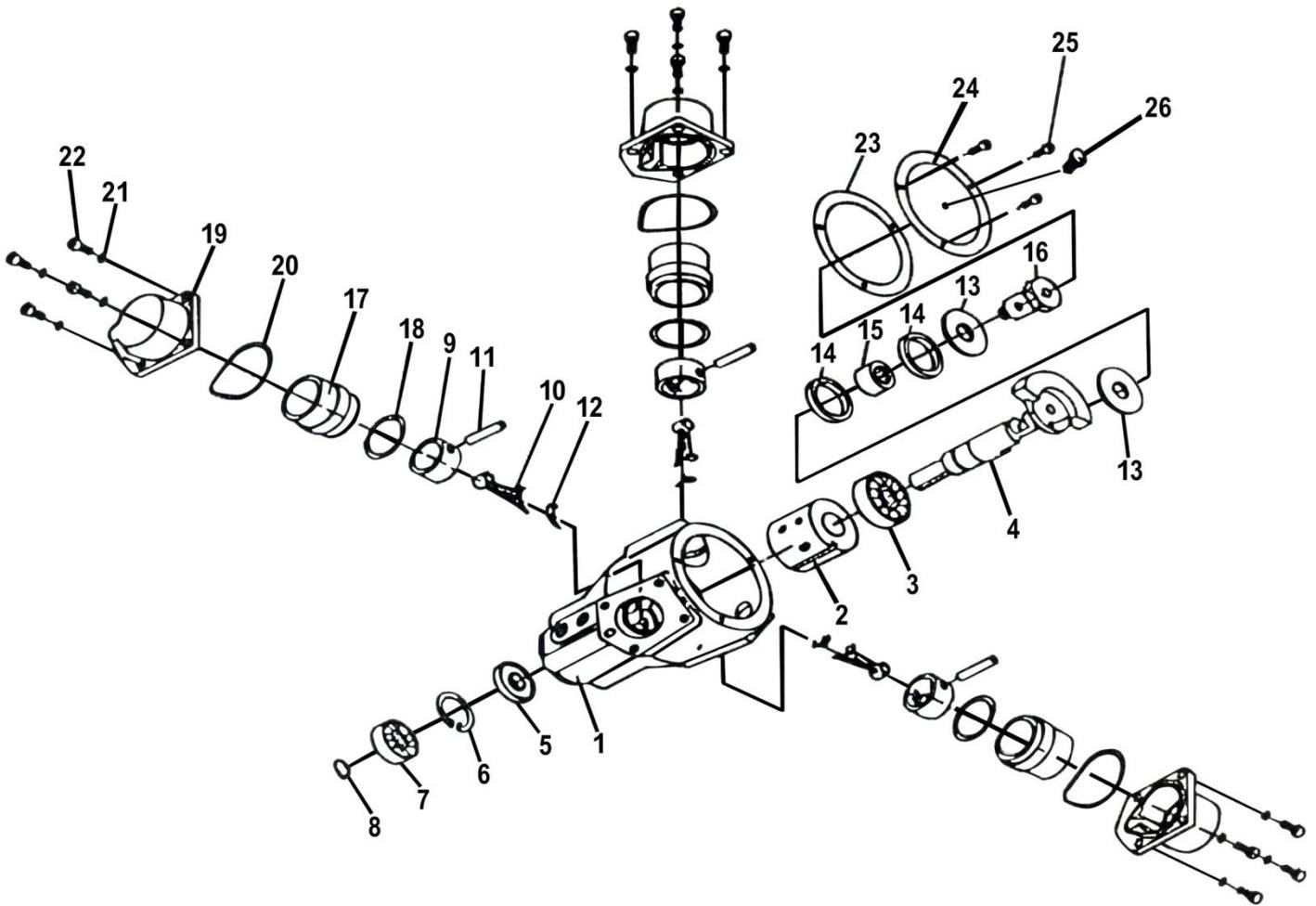
NO.	Description	Qty	NO.	Description	Qty	NO.	Description	Qty
1	Casing	1	11	Piston Pin	3	21	Spring washer	12
2	Valve bushing	1	12	Gasket	3	22	Screw	12
3	Bearing	1	13	Thrust washer	2	23	Gasket	1
4	Shaft	1	14	Ring	2	24	Casing cover	1
5	Oil seal	1	15	Needle bearing	1	25	Screw	3
6	Snap ring	1	16	Crank pin	1	26	Air through screw	1
7	Bearing	1	17	Sleeve	3			
8	Snap ring	1	18	O-Ring	3			
9	Piston	3	19	Cylinder cover	3			
10	Connecting rod	3	20	O-Ring	3			

All Items in RED are included in the Seal Kit

All Items in RED & PURPLE are included in the Repair Kit

All Items in BLUE are included in the Piston Kit

Part List - M3 Series



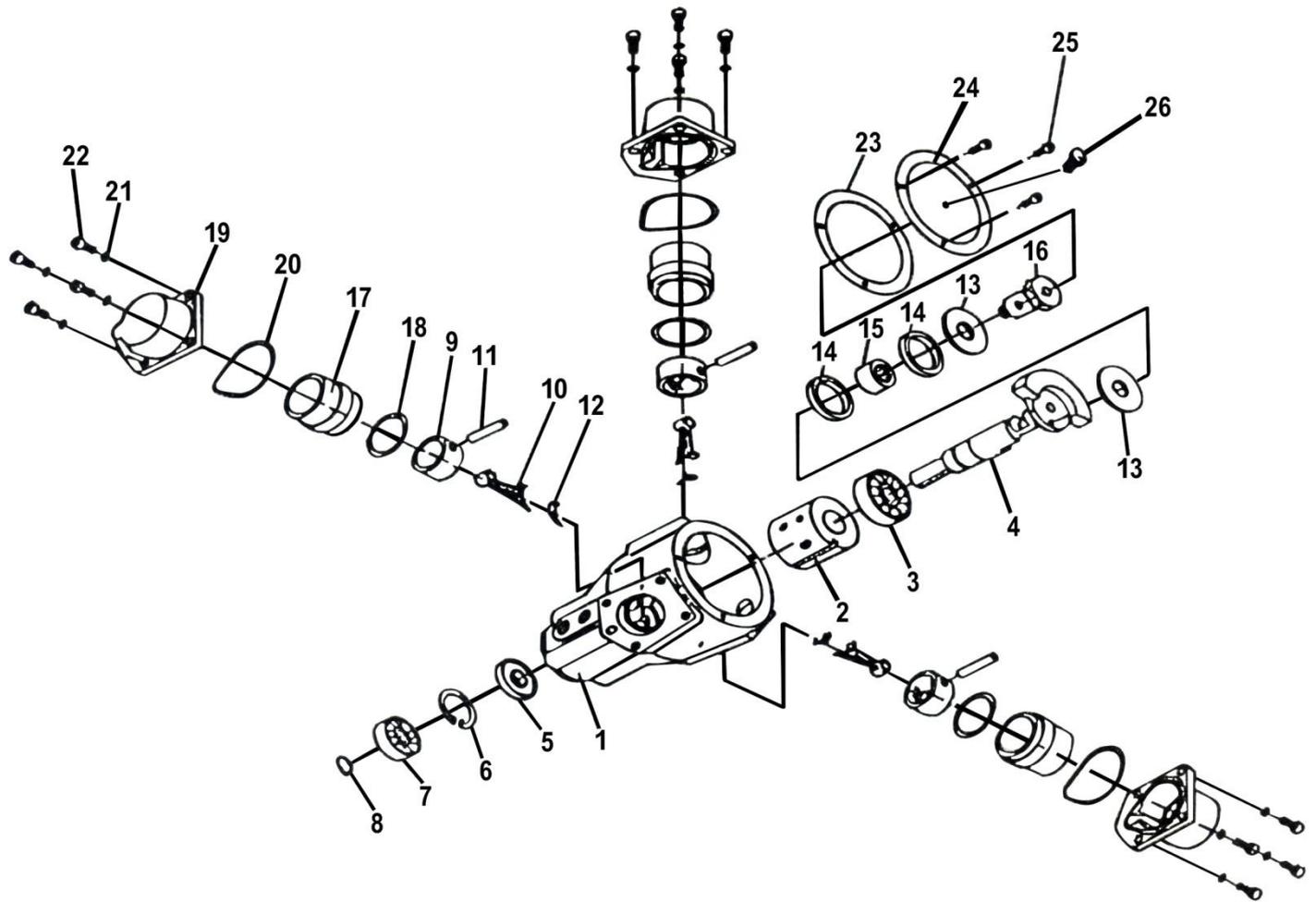
NO.	Description	Qty	NO.	Description	Qty	NO.	Description	Qty
1	Casing	1	11	Piston Pin	3	21	Spring washer	12
2	Valve bushing	1	12	Gasket	3	22	Screw	12
3	Bearing	1	13	Thrust washer	2	23	Gasket	1
4	Shaft	1	14	Ring	2	24	Casing cover	1
5	Oil seal	1	15	Needle bearing	1	25	Screw	3
6	Snap ring	1	16	Crank pin	1	26	Air through screw	1
7	Bearing	1	17	Sleeve	3			
8	Snap ring	1	18	O-Ring	3			
9	Piston	3	19	Cylinder cover	3			
10	Connecting rod	3	20	O-Ring	3			

All Items in RED are included in the Seal Kit

All Items in RED & PURPLE are included in the Repair Kit

All Items in BLUE are included in the Piston Kit

Parts List - M4 Series



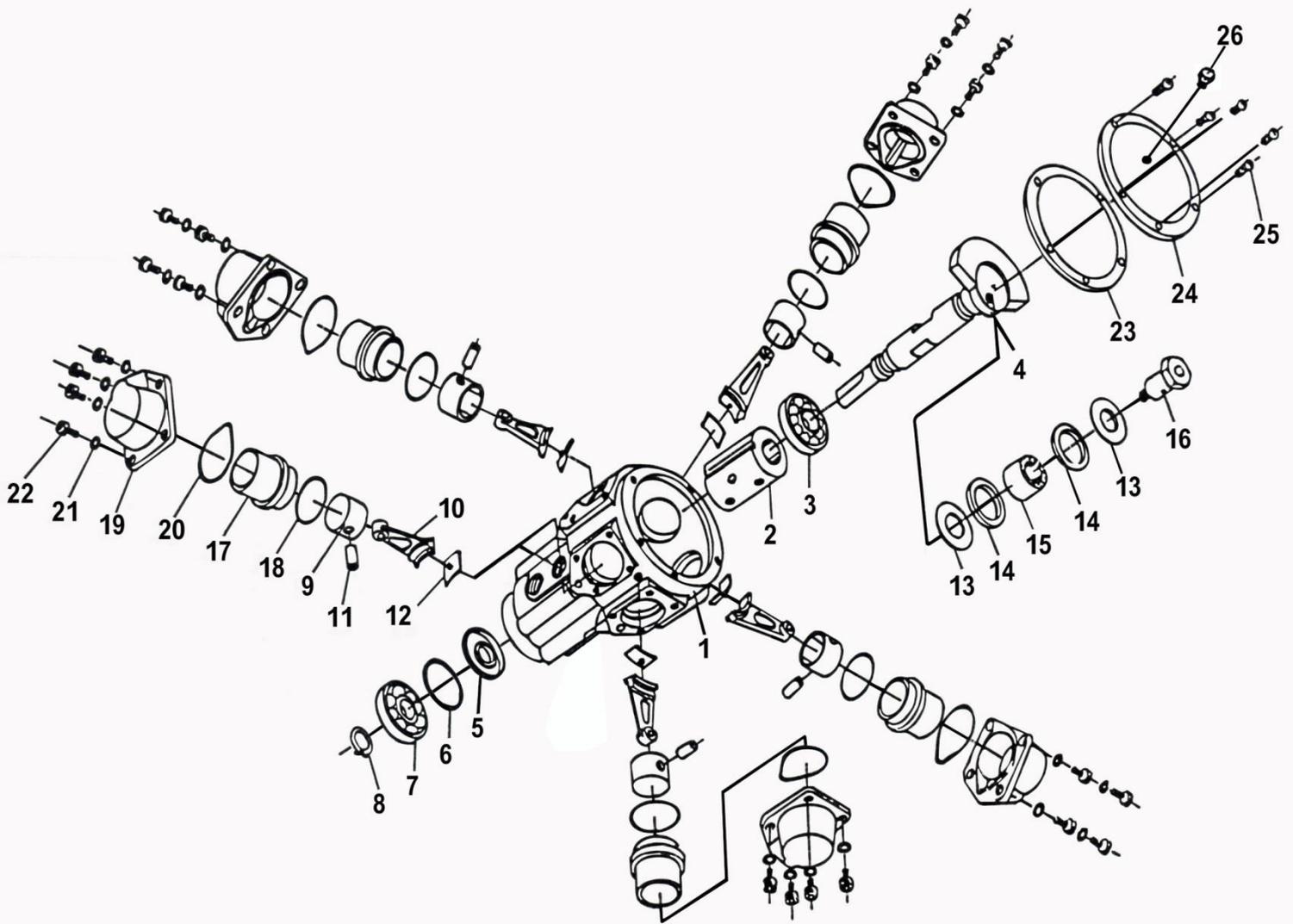
NO.	Description	Qty	NO.	Description	Qty	NO.	Description	Qty
1	Casing	1	11	Piston Pin	3	21	Spring washer	12
2	Valve bushing	1	12	Gasket	3	22	Screw	12
3	Bearing	1	13	Thrust washer	2	23	Gasket	1
4	Shaft	1	14	Ring	2	24	Casing cover	1
5	Oil seal	1	15	Needle bearing	1	25	Screw	3
6	Snap ring	1	16	Crank pin	1	26	Air through screw	1
7	Bearing	1	17	Sleeve	3			
8	Snap ring	1	18	O-Ring	3			
9	Piston	3	19	Cylinder cover	3			
10	Connecting rod	3	20	O-Ring	3			

All Items in RED are included in the Seal Kit

All Items in RED & PURPLE are included in the Repair Kit

All Items in BLUE are included in the Piston Kit

Parts List - M5 Series



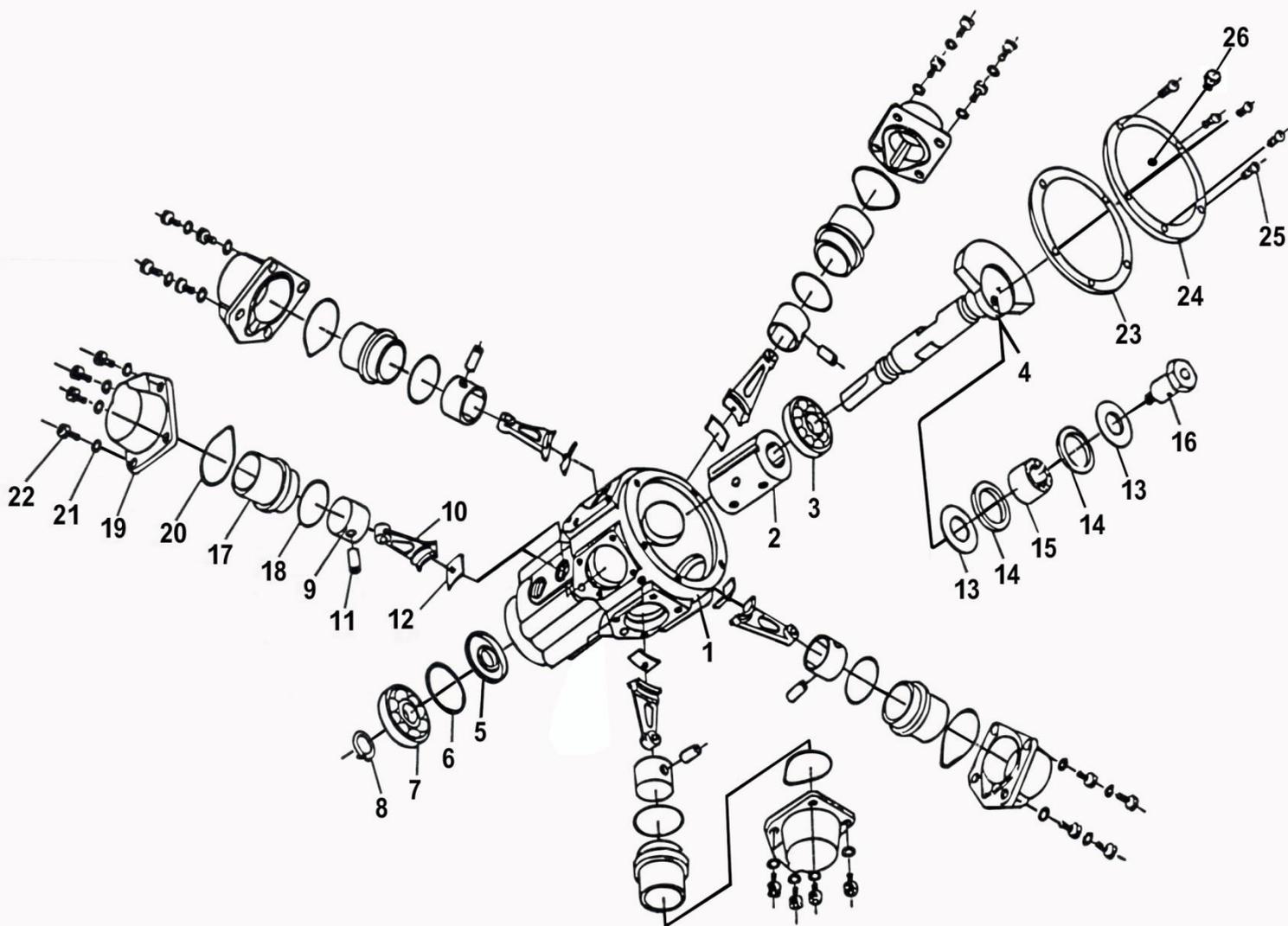
NO.	Description	Qty	NO.	Description	Qty	NO.	Description	Qty
1	Casing	1	11	Piston Pin	3	21	Spring washer	12
2	Valve bushing	1	12	Gasket	3	22	Screw	12
3	Bearing	1	13	Thrust washer	2	23	Gasket	1
4	Shaft	1	14	Ring	2	24	Casing cover	1
5	Oil seal	1	15	Needle bearing	1	25	Screw	3
6	Snap ring	1	16	Crank pin	1	26	Air through screw	1
5	Bearing	1	17	Sleeve	3	27	Foot type	1
8	Snap ring	1	18	O-Ring	3	28	Flange type	1
9	Piston	3	19	Cylinder cover	3	29	Silencer	1
10	Connecting rod	3	20	O-Ring	3			

All Items in RED are included in the Seal Kit

All Items in RED & PURPLE are included in the Repair Kit

All Items in BLUE are included in the Piston Kit

Parts List - M6 Series



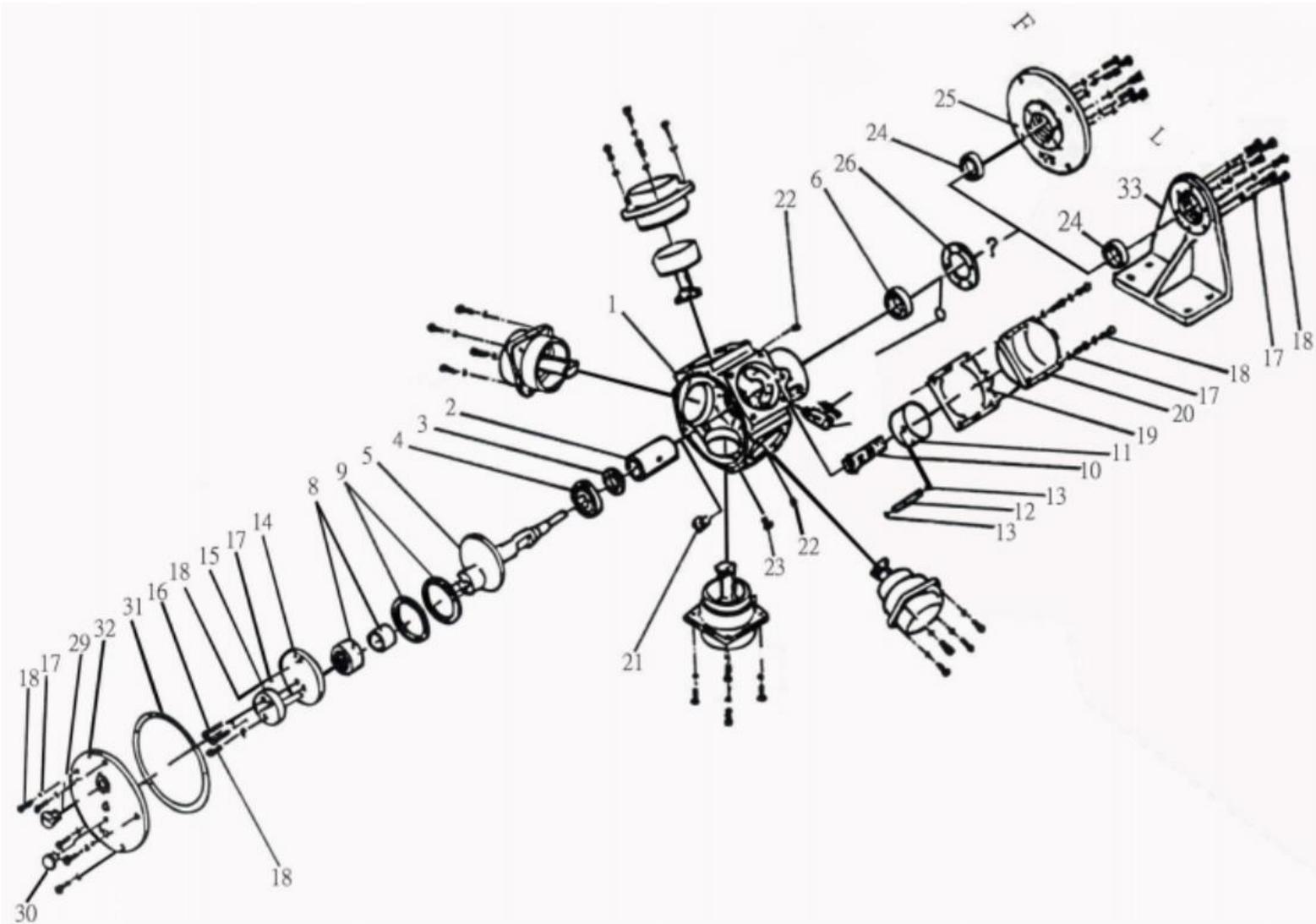
NO.	Description	Qty	NO.	Description	Qty	NO.	Description	Qty
1	Casing	1	11	Piston Pin	3	21	Spring washer	12
2	Valve bushing	1	12	Gasket	3	22	Screw	12
3	Bearing	1	13	Thrust washer	2	23	Gasket	1
4	Shaft	1	14	Ring	2	24	Casing cover	1
5	Oil seal	1	15	Needle bearing	1	25	Screw	3
6	Snap ring	1	16	Crank pin	1	26	Air through screw	1
5	Bearing	1	17	Sleeve	3	27	Foot type	1
8	Snap ring	1	18	O-Ring	3	28	Flange type	1
9	Piston	3	19	Cylinder cover	3	29	Silencer	1
10	Connecting rod	3	20	O-Ring	3			

All Items in RED are included in the Seal Kit

All Items in RED & PURPLE are included in the Repair Kit

All Items in BLUE are included in the Piston Kit

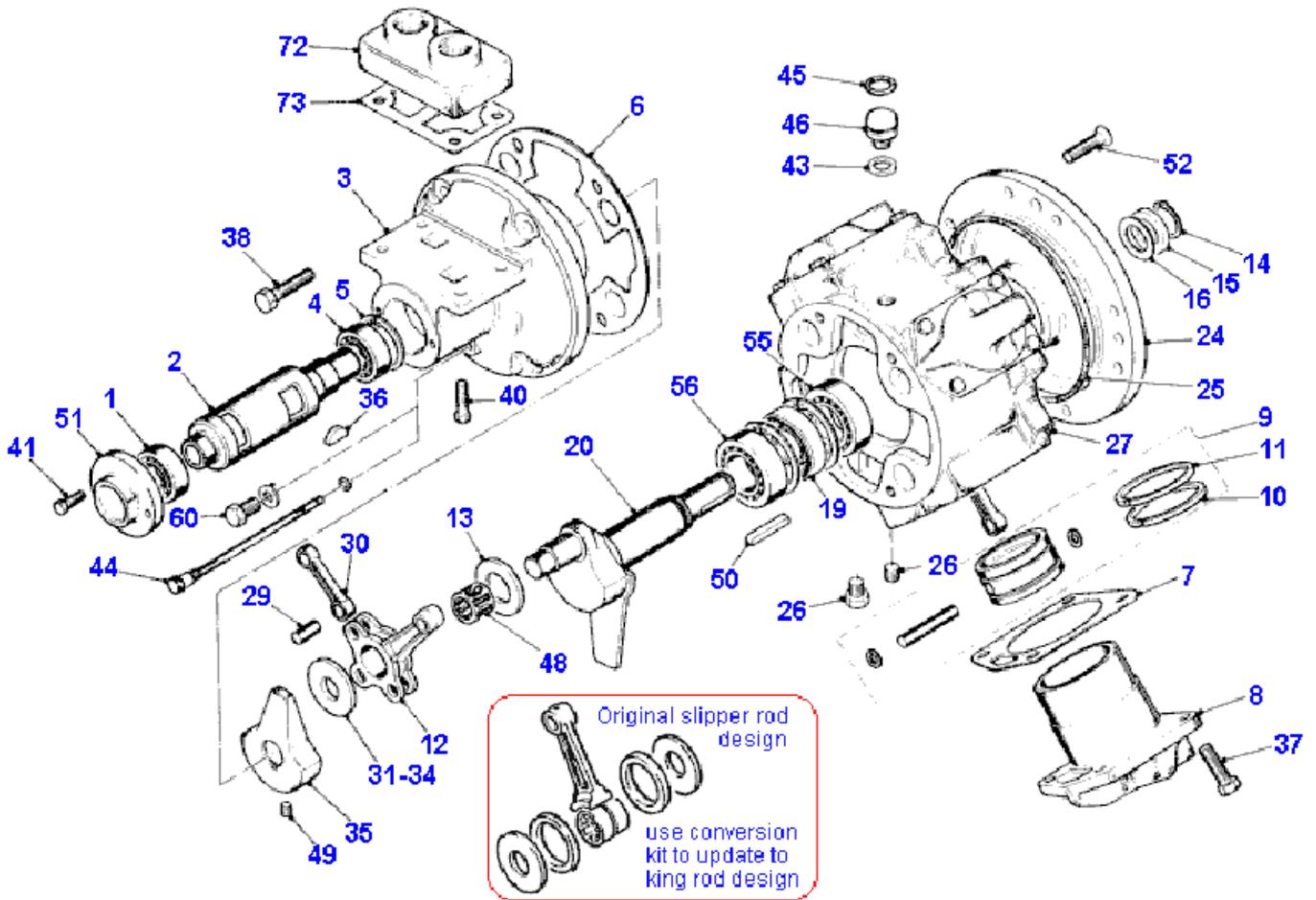
Parts List - M7 Series



NO.	Name	Qty	NO.	Name	Qty	NO.	Name	Qty
1	Casing	1	12	Piston Pin	5	23	Air Through Screw	1
2	Valve Bushing	1	13	O-Ring	10	24	Oil Seal	1
3	Oil Seal	1	14	Balance Block A	1	25	Flange	1
4	Bearing	1	15	Balance Block B	1	26	Gasket	1
5	Shaft	1	16	Hexagon Socket Head Screw	2	27	3/8" Adapter	1
6	Bearing	1	17	Spring Washer	33	28	Muffler	1
7	Snap Ring	1	18	Hexagon Socket Head Screw	33	29	Transparency Oil Cover	1
8	Needle Bearing	1	19	Gasket	5	30	Oil Cover	1
9	Ring	2	20	Cylinder Cover	5	31	Gasket	1
10	Connecting Rod	5	21	Oil Measuring Gauge	1	32	Casing Cover	1
11	Piston	5	22	Screw	1	33	Foot Mounting	1

All Items in RED are included in the Seal Kit
 All Items in RED & PURPLE are included in the Repair Kit
 All Items in BLUE are included in the Piston Kit

Parts List - M13S Series

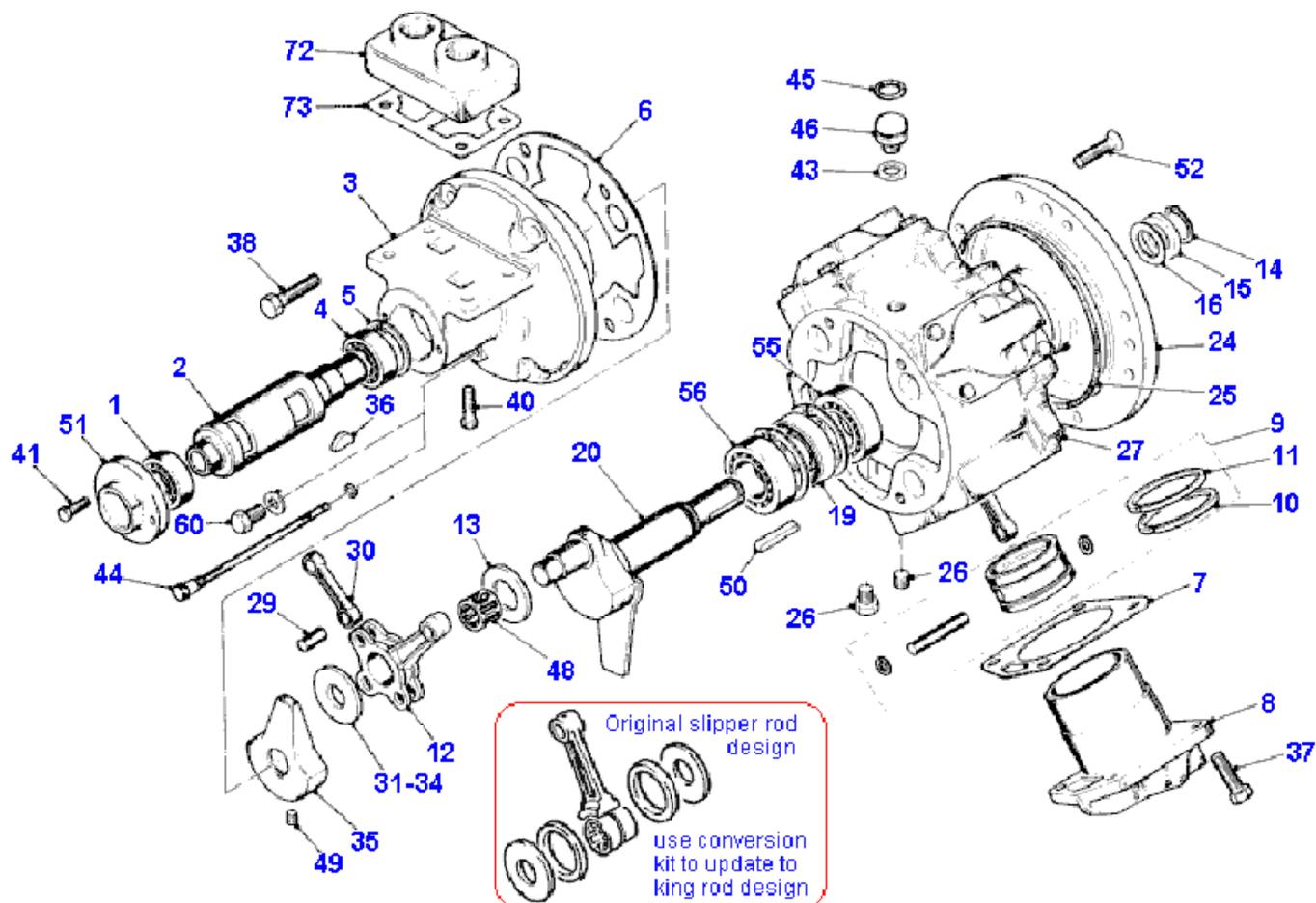


Part No	Description	QTY	Part No	Description	QTY
1	Rotary Valve Bearing (Outer)	1	34	Crank Spacer	1
2	Rotary Valve	1	35	Balance Weight	1
3	Rotary Valve Housing	1	36	Woodruff Key	1
4	Rotary Valve Bearing (Inner)	1	37	Cylinder Bolts	16
5	Rotary Valve Bearing Circlip	1	38	Valve Housing Bolts	4
6	Rotary Valve Housing Gasket	1	40	Adapter Plate Bolts	4
7	Cylinder Gasket	4	41	Exhaust Cover Bolts	2
8	Cylinder	4	43	Breather Plug Seals	1
9*	Piston Assembly	4	44	Dipstick (Vertical Mounting)	1
10*	Compression Ring	4	45	Seal (Transit Only)	1
11*	Oil Control Ring	4	46	Breather Plug	1
13	Crankshaft Spacer	1	48	Needle Bearing	1
14	Crankshaft Circlip	1	49	Grub Screw	1
15	Crankshaft Spacer	1	50	Key	1
16	Crankshaft Spacer Shim	5	51	Rotary Valve Exhaust Cover	1
19	Crankshaft Oilseal	1	52	Countersunk Flange Bolts	4
20	Crankshaft Assembly	1	53	Connecting Rod (Slipper Type)	4
24	Flange Plate	1	55	Output Shaft Bearing (Outer)	1
25	Flange Plate Seal	1	56	Output Shaft Bearing (Inner)	1
26	Plug	1	60	Oil Level Plug	1
27	Engine Case	1	72	Inlet Adapter Plate	1
31	Crank Spacer	1	73	Inlet Adapter Plate Gasket	1
32	Crank Spacer	1	74	Retaining Ring	2
33	Crank Spacer	1	75	Dipstick Seal	1

All Items in BLUE are included in the Piston Kit

All Items in RED are included in the Seal Kit

Parts List - M14 Series

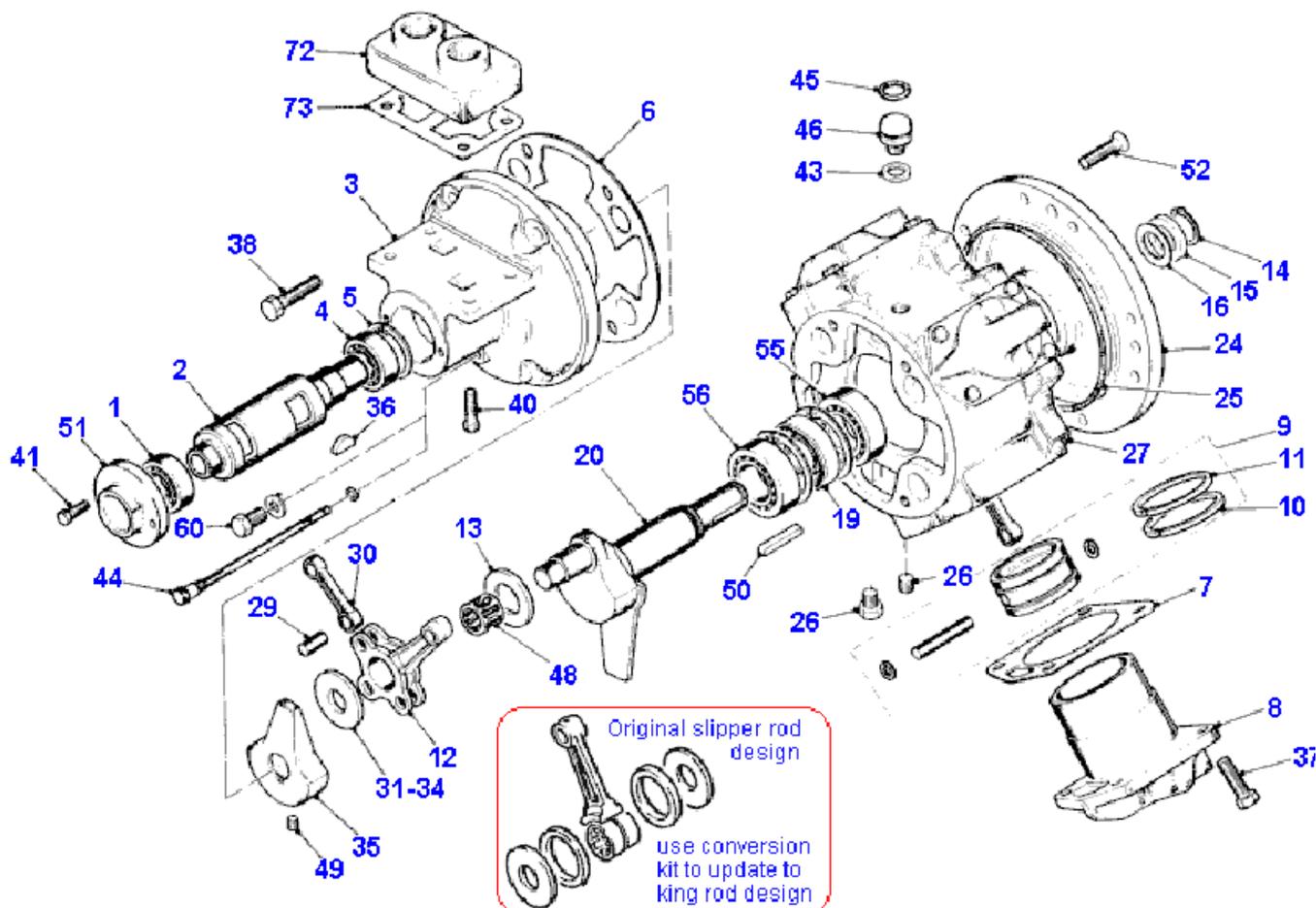


Part No	Description	QTY	Part No	Description	QTY
1	Rotary Valve Bearing (Outer)	1	31	Crank Spacer	1
2	Rotary Valve	1	33	Crank Spacer	1
3	Rotary Valve Housing	1	34	Crank Spacer	1
4	Rotary Valve Bearing (Inner)	1	35	Balance Weight	1
5	Rotary Valve Bearing Circlip	1	36	Woodruff Key	1
6	Rotary Valve Housing Gasket	1	37	Cylinder Bolts	16
7	Cylinder Gasket	4	38	Valve Housing Bolts	4
8	Cylinder	4	39	Washer for Item 38	4
9*	Piston Assembly	4	40	Adapter Plate Bolts	4
10*	Compression Ring	4	41	Exhaust Cover Bolts	2
11*	Oil Control Ring	4	43	Breather Plug Seals	1
12	King Rod	1	44	Dipstick (Vertical Mounting)	1
13	Crankshaft Spacer	1	45	Seal (Transit Only)	1
14	Crankshaft Circlip	1	46	Breather Plug	1
15	Crankshaft Spacer	1	48	Needle Bearing	1
16	Crankshaft Spacer Shim	5	49	Grub Screw	1
18	Crankshaft Bearing Circlip	2	50	Key	1
19	Crankshaft Oilseal	1	51	Rotary Valve Exhaust Cover	1
20	Crankshaft Assembly	1	52	Countersunk Flange Bolts	4
24	Flange Plate	1	55	Output Shaft Bearing (Outer)	1
25	Flange Plate Seal	1	56	Output Shaft Bearing (Inner)	1
26	Plug	1	60	Oil Level Plug	1
27	Engine Case	1	72	Inlet Adapter Plate	1
29	Queen Rod Pivot	3	73	Inlet Adapter Plate Gasket	1
30	Queen Rod	3	75	Dipstick Seal	1

All Items in BLUE are included in the Piston Kit

All Items in RED are included in the Seal Kit

Part List - M15 Series

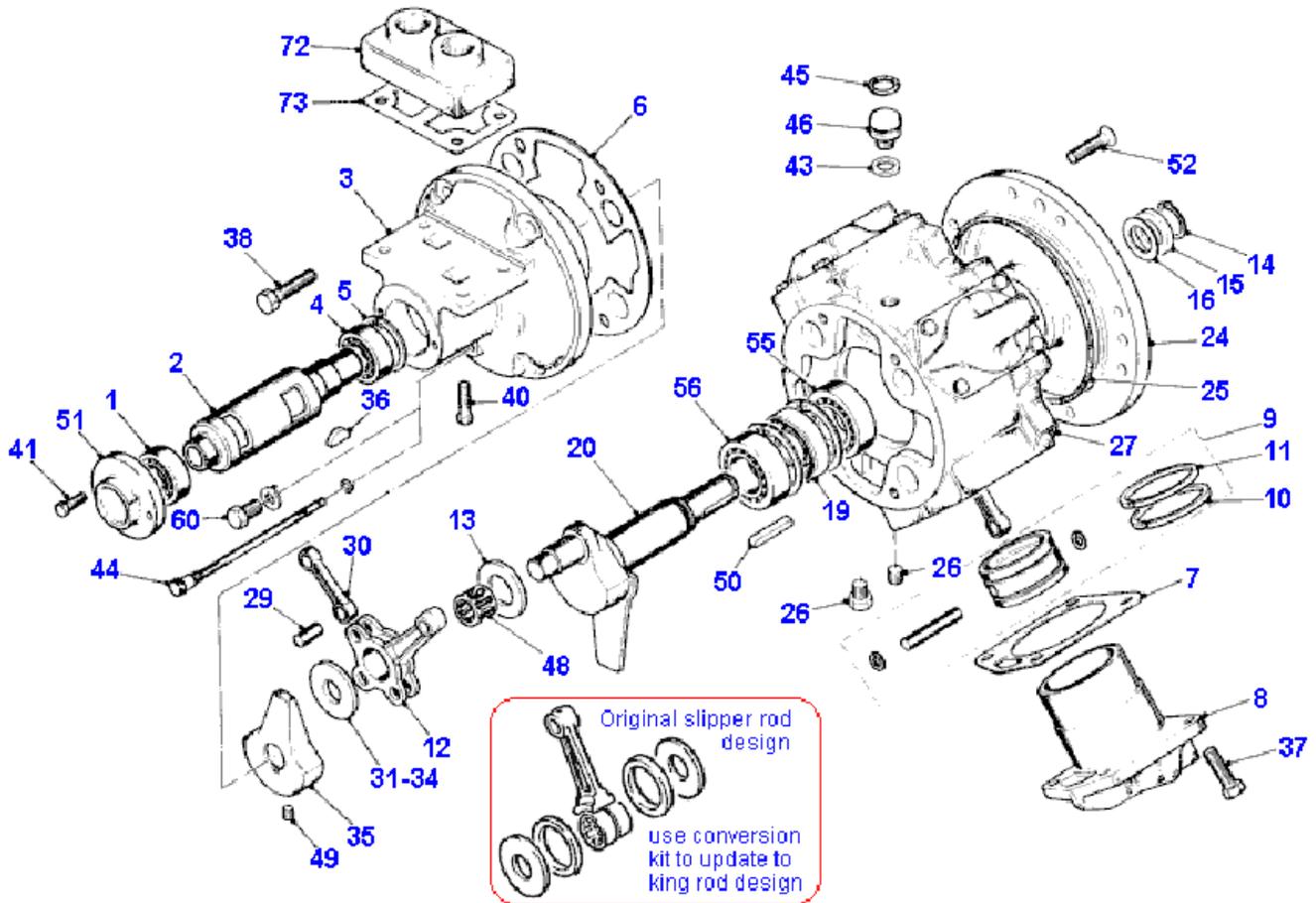


Part No	Description	QTY	Part No	Description	QTY
1	Rotary Valve Bearing (Outer)	1	30	Queen Rod	3
2	Rotary Valve	1	31	Crank Spacer	1
3	Rotary Valve Housing	1	32	Crank Spacer	1
4	Rotary Valve Bearing (Inner)	1	33	Crank Spacer	1
5	Rotary Valve Bearing Circlip	1	35	Balance Weight	1
6	Rotary Valve Housing Gasket	1	36	Woodruff Key	1
7	Cylinder Gasket	4	37	Cylinder Bolts	16
8	Cylinder	4	40	Adapter Plate Bolts	4
9*	Piston Assembly	4	41	Exhaust Cover Bolts	2
10*	Compression Ring	4	43	Breather Plug Seals	1
11*	Oil Control Ring	4	44	Dipstick (Vertical Mounting)	1
12	King Rod	1	45	Seal (Transit Only)	1
13	Crankshaft Spacer	1	46	Breather Plug	1
14	Crankshaft Circlip	1	48	Needle Bearing	1
15	Crankshaft Spacer	1	49	Grub Screw	1
16	Crankshaft Spacer Shim	5	50	Key	1
18	Crankshaft Bearing Circlip	2	51	Rotary Valve Exhaust Cover	1
19	Crankshaft Oilseal	1	52	Countersunk Flange Bolts	4
20	Crankshaft Assembly	1	55	Output Shaft Bearing (Outer)	1
24	Flange Plate	1	56	Output Shaft Bearing (Inner)	1
25	Flange Plate Seal	1	60	Oil Level Plug	1
26	Plug	1	72	Inlet Adapter Plate	1
27	Engine Case	1	73	Inlet Adapter Plate Gasket	1
29	Queen Rod Pivot	3	75	Dipstick Seal	1

All Items in BLUE are included in the Piston Kit

All Items in RED are included in the Seal Kit

Parts List - M16 Series

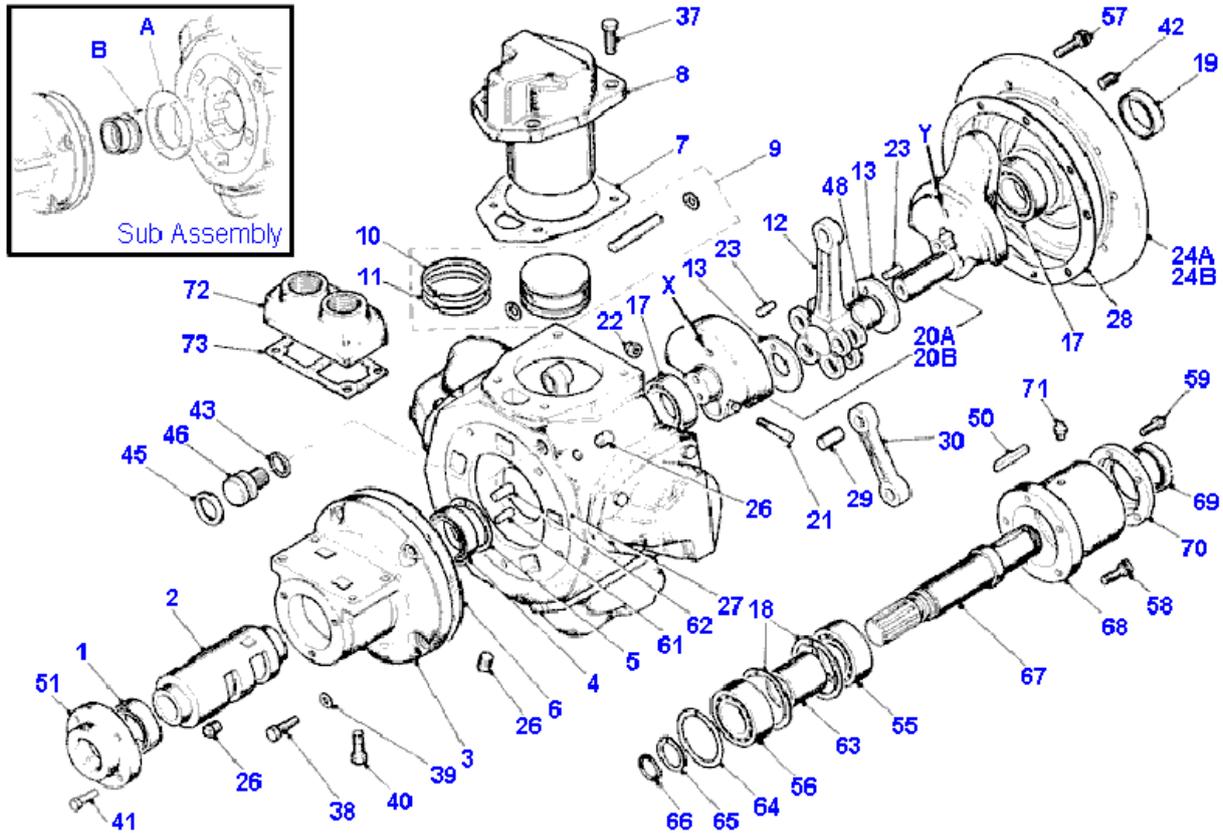


Part No	Description	QTY	Part No	Description	QTY
1	Rotary Valve Bearing (Outer)	1	31	Crank Spacer	1
2	Rotary Valve	1	32	Crank Spacer	1
3	Rotary Valve Housing	1	33	Crank Spacer	1
4	Rotary Valve Bearing (Inner)	1	35	Balance Weight	1
5	Rotary Valve Bearing Circlip	1	36	Woodruff Key	1
6	Rotary Valve Housing Gasket	1	37	Cylinder Bolts	16
7	Cylinder Gasket	4	38	Valve Housing Bolts	4
8	Cylinder	4	40	Adapter Plate Bolts	4
9*	Piston Assembly	4	41	Exhaust Cover Bolts	2
10*	Compression Ring	4	43	Breather Plug Seals	1
11*	Oil Control Ring	4	45	Seal (Transit Only)	1
12	King Rod	1	46	Breather Plug	1
13	Crankshaft Spacer	1	47	Oil Seal Carrier	1
14	Crankshaft Circlip	1	48	Needle Bearing	1
15	Crankshaft Spacer	1	49	Grub Screw	1
16	Crankshaft Spacer Shim	5	50	Key	1
18	Crankshaft Bearing Circlip	2	51	Rotary Valve Exhaust Cover	1
19	Crankshaft Oilseal	1	52	Countersunk Flange Bolts	4
20	Crankshaft Assembly	1	54	Nylon Washer	1
24	Flange Plate	1	55	Output Shaft Bearing (Outer)	1
25	Flange Plate Seal	1	56	Output Shaft Bearing (Inner)	1
26	Plug	1	60	Oil Level Plug	1
27	Engine Case	1	72	Inlet Adapter Plate	1
29	Queen Rod Pivot	3	73	Inlet Adapter Plate Gasket	1
30	Queen Rod	3			

All Items in BLUE are included in the Piston Kit

All Items in RED are included in the Seal Kit

Parts List - M17 Series

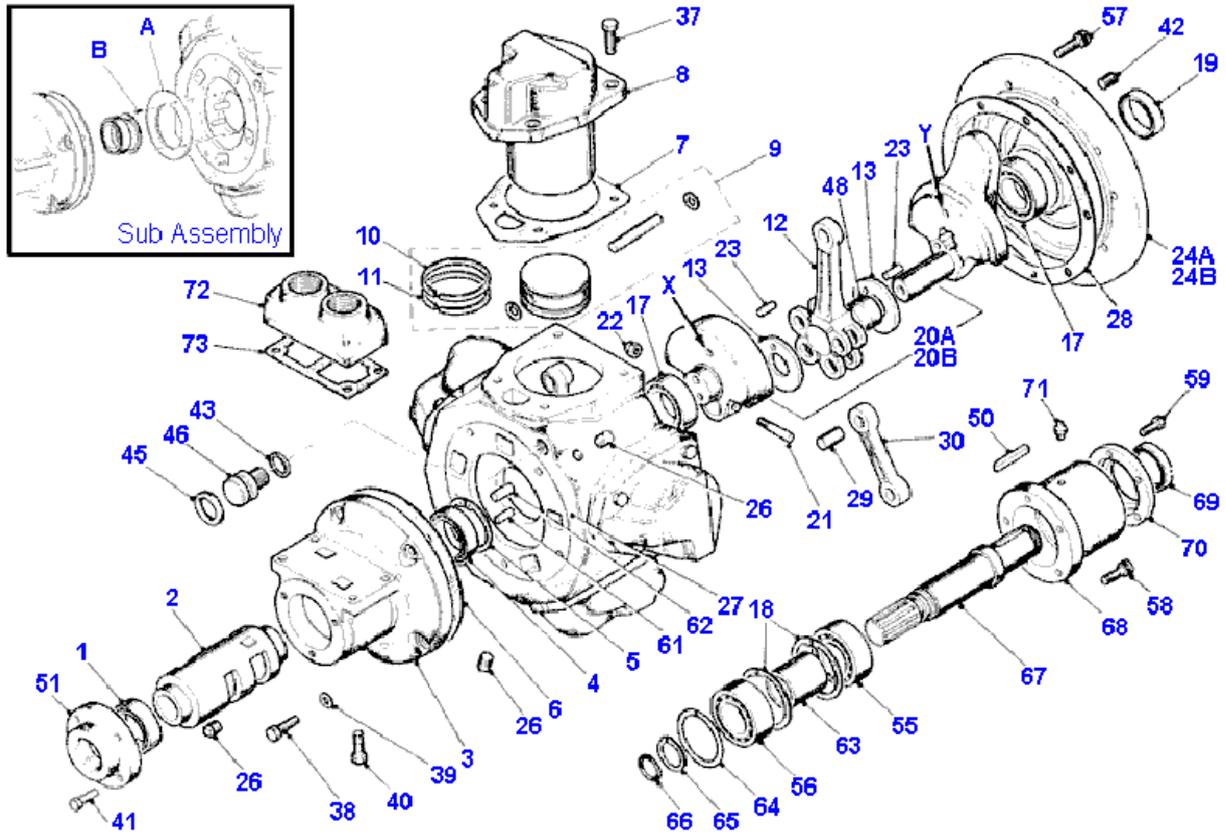


Part No	Description	QTY	Part No	Description	QTY
1	Rotary Valve Bearing (Outer)	1	38	Valve Housing Bolts	10
2	Rotary Valve	1	39	Washer for Item 38	10
3	Rotary Valve Housing	1	40	Adapter Plate Bolts	4
4	Rotary Valve Bearing (Inner)	1	41	Exhaust Cover Bolts	4
5	Rotary Valve Bearing Circlip	1	42	Flange Plate Plugs	5
6	Rotary Valve Housing Gasket	1	43	Breather Plug Seals	1
7	Cylinder Gasket	5	45	Seal (Transit Only)	1
8	Cylinder	5	46	Breather Plug	1
9	Piston Assembly	5	48	Needle Bearing	1
10*	Compression Ring	5	50	Key	1
11*	Oil Control Ring	5	51	Rotary Valve Exhaust Cover	1
12	King Rod	1	55	Output Shaft Bearing (Outer)	1
13	Crankshaft Spacer	1	59	Output Housing Cover Bolts	5
17	Crankshaft Bearing	2	61	Drive Pin (Dia. 10mm)	1
18	Crankshaft Bearing Circlip	2	62	Drive Pin (Dia. 12mm)	1
19	Crankshaft Oilseal	1	63	Output Shaft Bearing Spacer	1
20	Crankshaft Assembly	1	64	Output Shaft Spring Ring	1
21	Crank Bolt	1	65	Output Shaft Circlip	1
22	Crank Nut	1	66	Output Shaft Seal	1
23	Spring Dowel	2	67	Output Shaft	1
24	Flange Plate	1	68	Output Shaft Housing	1
26	Plug	3	69	Output Shaft Oil Seal	1
27	Engine Case	1	70	Output Shaft Housing Cover	1
28	Engine Case Gasket	1	71	Output Shaft Grease Nipple	1
29	Queen Rod Pivot	4	72	Inlet Adapter Plate	1
30	Queen Rod	4	73	Inlet Adapter Plate Gasket	1
37	Cylinder Bolts	16			

All Items in **BLUE** are included in the Piston Kit

All Items in **RED** are included in the Seal Kit

Parts List - M18 Series



Part No	Description	QTY	Part No	Description	QTY
1	Rotary Valve Bearing (Outer)	1	38	Valve Housing Bolts	10
2	Rotary Valve	1	39	Washer for Item 38	10
3	Rotary Valve Housing	1	40	Adapter Plate Bolts	4
4	Rotary Valve Bearing (Inner)	1	41	Exhaust Cover Bolts	4
5	Rotary Valve Bearing Circlip	1	42	Flange Plate Plugs	5
6	Rotary Valve Housing Gasket	1	43	Breather Plug Seals	1
7	Cylinder Gasket	5	45	Seal (Transit Only)	1
8	Cylinder	5	46	Breather Plug	1
9	Piston Assembly	5	48	Needle Bearing	2
10*	Compression Ring	5	50	Key	1
11*	Oil Control Ring	5	51	Rotary Valve Exhaust Cover	1
12	King Rod	1	55	Output Shaft Bearing (Outer)	1
13	Crankshaft Spacer	1	59	Output Housing Cover Bolts	5
17	Crankshaft Bearing	2	61	Drive Pin (Dia. 10mm)	1
18	Crankshaft Bearing Circlip	2	62	Drive Pin (Dia. 12mm)	1
19	Crankshaft Oilseal	1	63	Output Shaft Bearing Spacer	1
20	Crankshaft Assembly	1	64	Output Shaft Spring Ring	1
21	Crank Bolt	1	65	Output Shaft Circlip	1
22	Crank Nut	1	66	Output Shaft Seal	1
23	Spring Dowel	2	67	Output Shaft	1
24	Flange Plate	1	68	Output Shaft Housing	1
26	Plug	3	69	Output Shaft Oil Seal	1
27	Engine Case	1	70	Output Shaft Housing Cover	1
28	Engine Case Gasket	1	71	Output Shaft Grease Nipple	1
29	Queen Rod Pivot	4	72	Inlet Adapter Plate	1
30	Queen Rod	4	73	Inlet Adapter Plate Gasket	1
37	Cylinder Bolts	16			

All Items in BLUE are included in the Piston Kit

All Items in RED are included in the Seal Kit

SAMT[®]



Specialised Air Motors and Transmission

TONSON[®]

New South Wales

HEAD OFFICE

Unit 19/5 Lyn Parade

Prestons NSW 2170

Ph: (02) 9607 4100

Fax: (02) 9600 8882

Web: www.tonson-motor.com.au

Email: sales@samt.com.au