ELKHART BRASS MFG. CO., INC.
1302 WEST BEARDSLEY AVENUE • P.O. BOX 1127 • ELKHART IN 46515 • (574) 295-8330 • FAX (574) 293-9914

8394053 Industrial Electric "Spitfire" Monitor

81417001 & 81572001 Gear Case Field Retrofit with 81612001

Gear Case Replacement Instructions -
Part No. 81612001 Monitor 90° Gear Case Sub-Assembly in place of
Part No. 81417001 & 81572001 90° Gear Case Sub-Assembly

1. Remove the nozzle and stream shaper from the discharge of the nozzle.
2. Move the discharge elbow of the monitor to the maximum angle below horizontal.
3. Remove the manual over-ride hand wheel off of the monitor motor shaft. Use a round punch to knock out roll pin holding the hand wheel on the shaft.
4. Remove motor cable connection and each of the socket head cap screws from the vertical 90° gear case sub-assembly (for 90° gear case assembly part number 81417001 [See Figure 3], use 5/32 inch hex bit; for 90° gear case assembly part number 81572001 [See Figure 4] use 3/16 inch hex bit). See Figure 1 for the location of these screws. **Warning: Be sure to secure the gear case sub-assembly before removing the last of the four screws. Personal injury may result from the gear case sub-assembly being dropped.**
5. Pull old gear case assembly out, leaving worm shaft and bevel gear in place in monitor. See Figure 2 for a drawing showing the correct disassembly. **Do not move the discharge elbow up and down while the gear case is detached from the monitor.**
6. Pull out worm shaft assembly from the monitor. The bevel gear will be replaced in a future step.
7. If the 90° vertical gear case motor that you have is square in shape, please skip to **Appendix A** on page 3 for further instructions.
8. If the 90° vertical gear case motor that you have is round in shape, but has the Motor Flange Adapter (Det. 21; Figure 3) please skip to **Appendix B** on page 3 for further instructions.
9. If the 90° vertical gear case motor that you have is round in shape and you have no adaptor plates (Figure 4) please continue on to instruction 10 below.
10. Remove items on the obsolete drawing in (part number 81572001) Figure 4. All items except Det. 13, 17 and 23 will be re-used. Take care not to move the monitor elbow to avoid loosing pieces into the monitor elbow.
11. If significant shaft wear exists it will be necessary to replace the Shaft-Worm (Det. 31 on Figure 3; Det. 26 on Figure 4; Det. 27 on Figure 5) (Shaft – Worm). This assembly drives the monitor elbow up and down. Care must be taken not to loose other pieces from the shaft assembly into the monitor elbow. Ensure that all

pieces are accounted for. The worm gear should be pre-lubricated prior to re-assembly.

12. Replace 90° Gear Case (Obsolete Gear Case Det. 20, Figure 3, Part Number 23591000: or Det. 17; Figure 4; Part Number 23598001) with Det. 17; Figure 5; Part Number 24471001)
13. Re-assemble all parts as shown in Figure 5 (part number 81612001), Det. 11, 16, 21-28 using the new Bearing Spacer Det. 24, Figure 5, Part Number 65590001) and Bevel Gear supplied (Det. 21, Figure 5, Part Number 33981000). Grease may be used to help hold components in place during assembly. Fill the gear case with specified grease after assembly.
14. Install new worm gear sub-assembly shaft from Step 13 above into the inlet body sub-assembly (See Figure 2). The assembly may need to be turned to have proper engagement of the worm and worm gears.
15. Re-assemble all parts (Det. 4 through Det. 20) as shown on assembly 81612001 (Figure 5) using the new Pinion Gear supplied (Det. 13, Figure 5, Part Number 33982000). Apply adequate grease to all components to minimize wear and for O-ring sealing during assembly. Fill the case with specified grease prior to assembly onto monitor. This will become the gear case sub-assembly.
16. Install the gear case sub-assembly from Step 15 onto the inlet body sub-assembly. Once inserted correctly with gears engaged, install ¼-20 x 0.750 cap screws using Loctite adhesive part number 242 or equivalent to secure the threads.
17. To install monitor motor (Det. 1, Figure 5; part number 46090000), line up motor shaft key way with the key (Det. 10, Figure 5; part number 42003000), then slide motor output shaft into the other shaft (Det. 12, Figure 5; part number 65337001)
18. When motor shaft is pushed all the way into the gear case, rotate motor so cable connector is in the down position.
19. Tighten monitor motor (Det. 1, Figure 5; part number 46090000) using four ¼-20 x 1.00 socket head cap screws (Det. 2, Figure 5; part number 61047000).
20. Install the manual over-ride hand wheel and roll pin.
21. Reinstall nozzle and reconnect cables.
22. Verify proper operation of the monitor.

Appendix A:

1. Remove the four socket head cap screws from the 90° vertical gear case sub-assembly and the motor (Det. 4; Figure 3) using a 3/16 inch hex bit.
2. Carefully remove the gearcase sub-assembly from the motor. Keep Det. 12; Figure 3 (AS568-142 O-Ring). An additional AS568-142 O-Ring (along with the O-Ring kept from Det. 12, Figure 3 [this step]) will be needed in a future step.
3. Remove adapter plates, O-Rings and hardware using a 5-32 inch hex bit. Det. 1, 5-6, 9, 13, 15 and 17-21 (Figure 3) will be removed and not used again.
4. Drill the four 10-24 threaded holes of the inlet body sub-assembly of the monitor (shown in Figure 1) 0.500 inch deep with a #7 drill bit. **Use extreme caution to avoid penetration into the waterway by not exceeding the 0.500 inch hole depth.** Use measures to prevent drill chips from entering monitor worm gear housing.
5. Tap the four holes in the inlet body sub-assembly to ¼-20 X 0.500 depth. Use of a bottom tap is recommended to provide sufficient threads.
6. Remove items on Shaft–Worm of obsolete drawing in Figure 3, Det. 31 (part number 81417001). All items except Det. 15 and 28 will be re-used. Take care not to move the monitor elbow to avoid loosing pieces into the monitor elbow.
7. Replace old square 90° vertical gear case motor with new round 90° vertical gear case motor Part Number 46090000 (Det. 1, Figure 5).
8. Return to regular instructions on Page 1, Step 11 for the remainder of the 90° vertical gear case retrofit.

Appendix B:

1. Remove the four socket head cap screws from the 90° vertical gear case sub-assembly and the motor (Det. 4; Figure 3) using a 3/16 inch hex bit.
2. Carefully remove the gearcase sub-assembly from the motor. Keep Det. 12; Figure 3 (AS568-142 O-Ring). An additional AS568-142 O-Ring (along with the O-Ring kept from Det. 12, Figure 3) will be needed in a future step.
3. Remove adapter plates, O-Rings and hardware using a 5/32 inch hex bit. Det. 1, 5-6, 9, 13, 15, and 17-21; Figure 3) will be removed and not used again.
4. Drill the four 10-24 threaded holes of the inlet body sub-assembly of the monitor (shown in Figure 1) 0.500 inch deep with a #7 drill bit. **Use extreme caution to avoid penetration into the waterway by not exceeding the 0.500 inch hole depth.** Use measures to prevent drill chips from entering monitor worm gear housing.
5. Tap the four holes in the inlet body sub-assembly to ¼-20 X 0.500 depth. Use of a bottom tap is recommended to provide sufficient threads.
6. Remove items on Shaft–Worm of obsolete drawing in Figure 3, Det. 31 (part number 81417001). All items except Det. 15 and 28 will be re-used. Take care not to move the monitor elbow to avoid loosing pieces into the monitor elbow.
7. Return to regular instructions on Page 1, Step 11 for the remainder of the 90° vertical gear case retrofit.

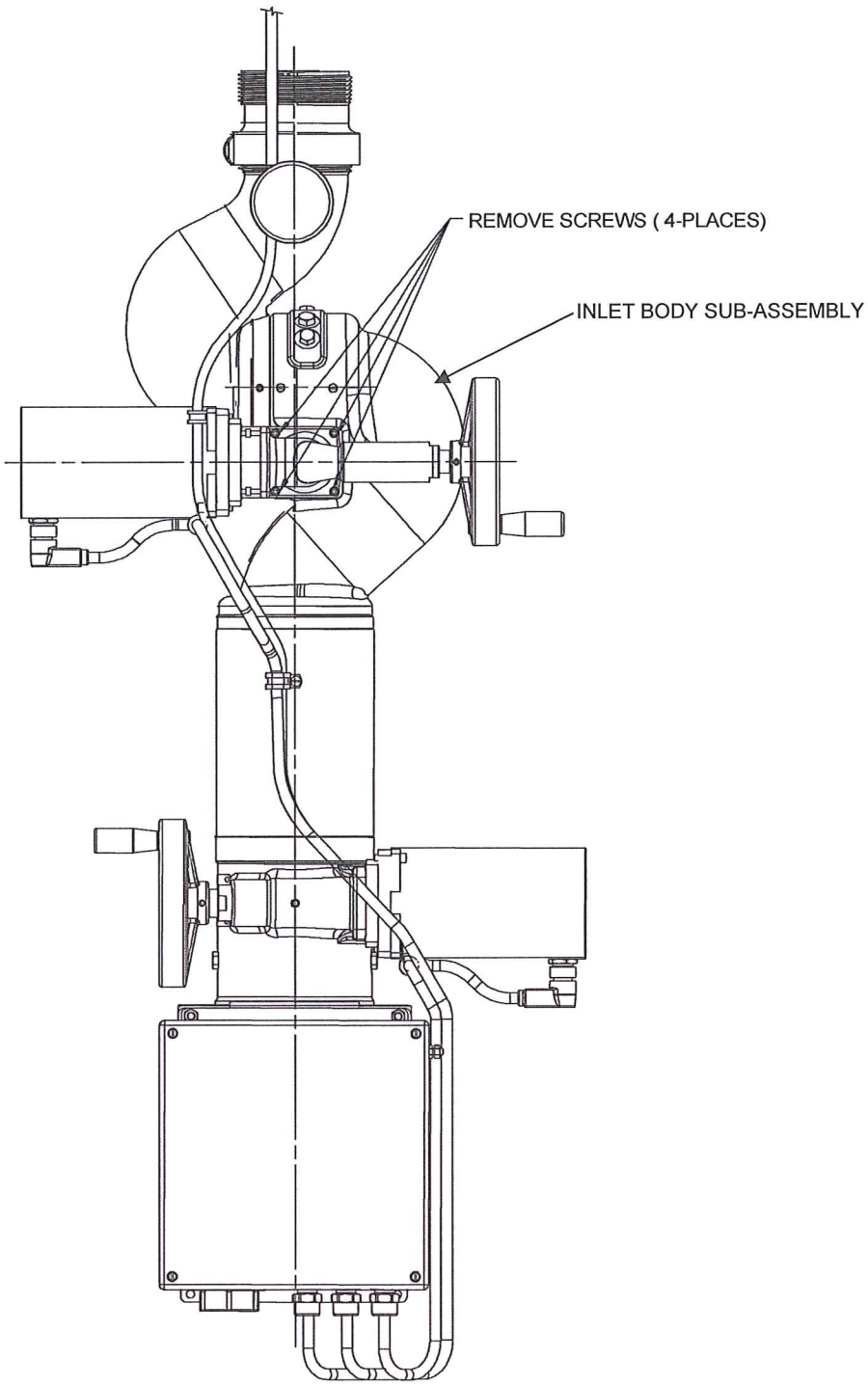


Figure 1: Location of the gear case sub-assembly mounting screws.

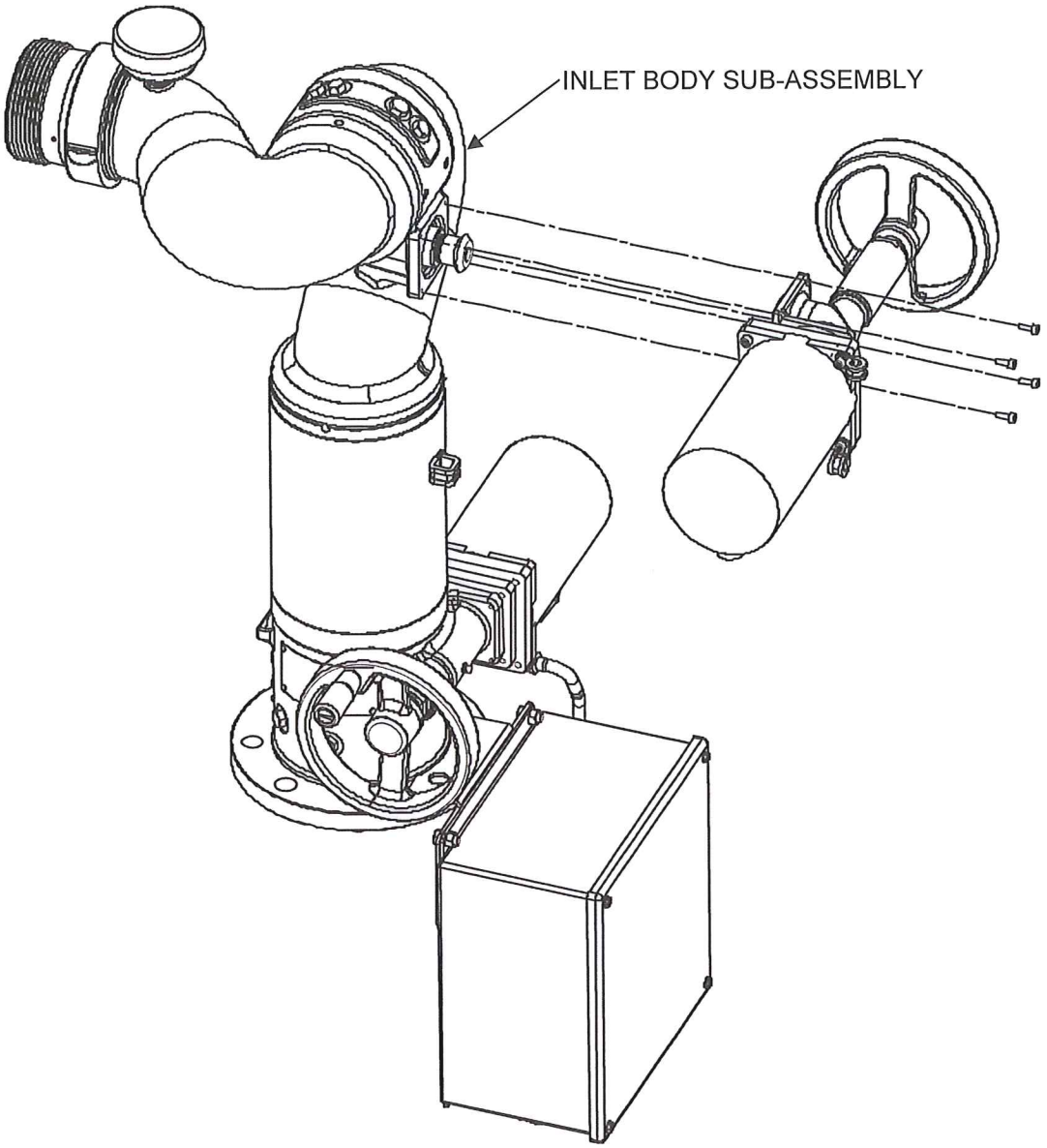
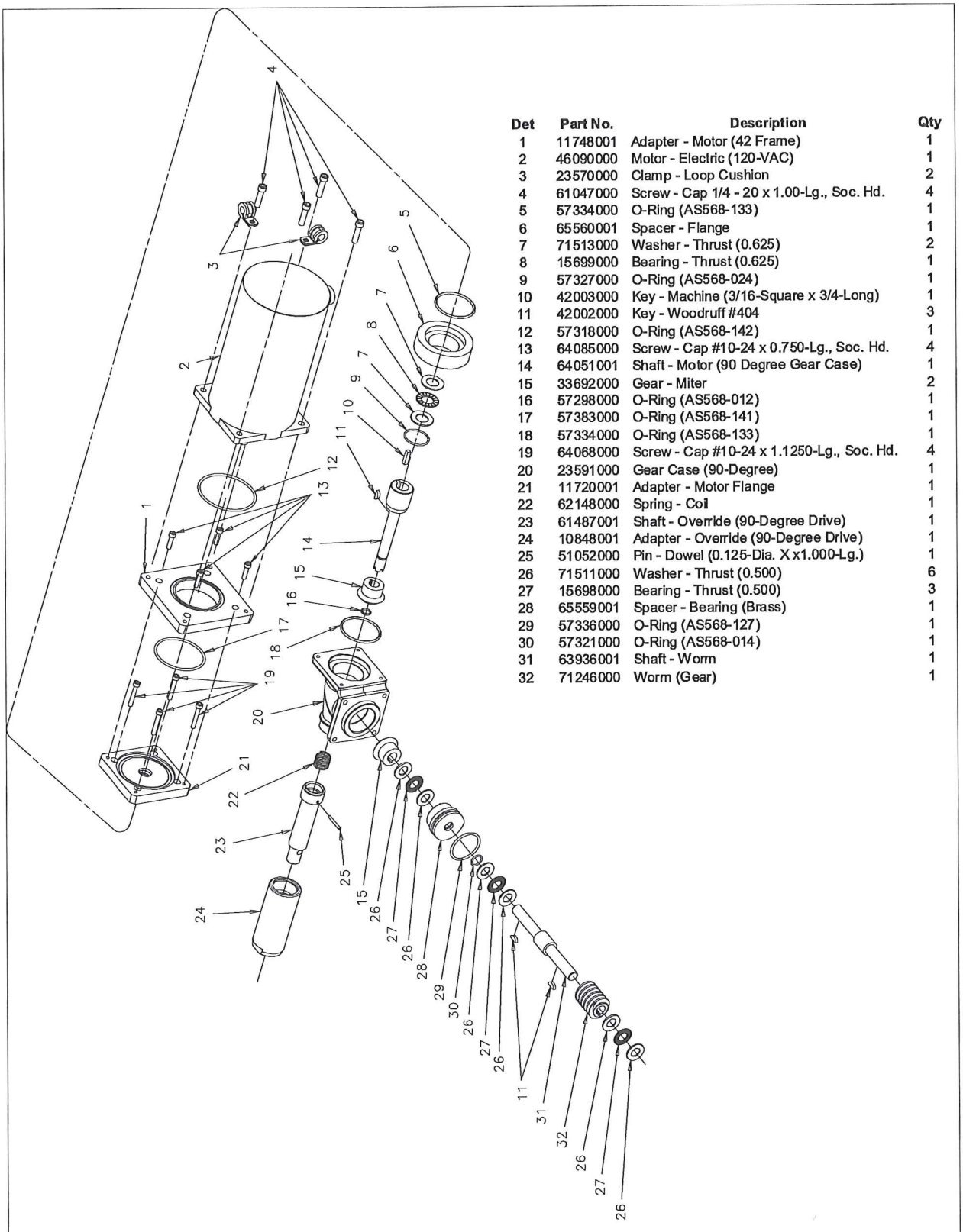


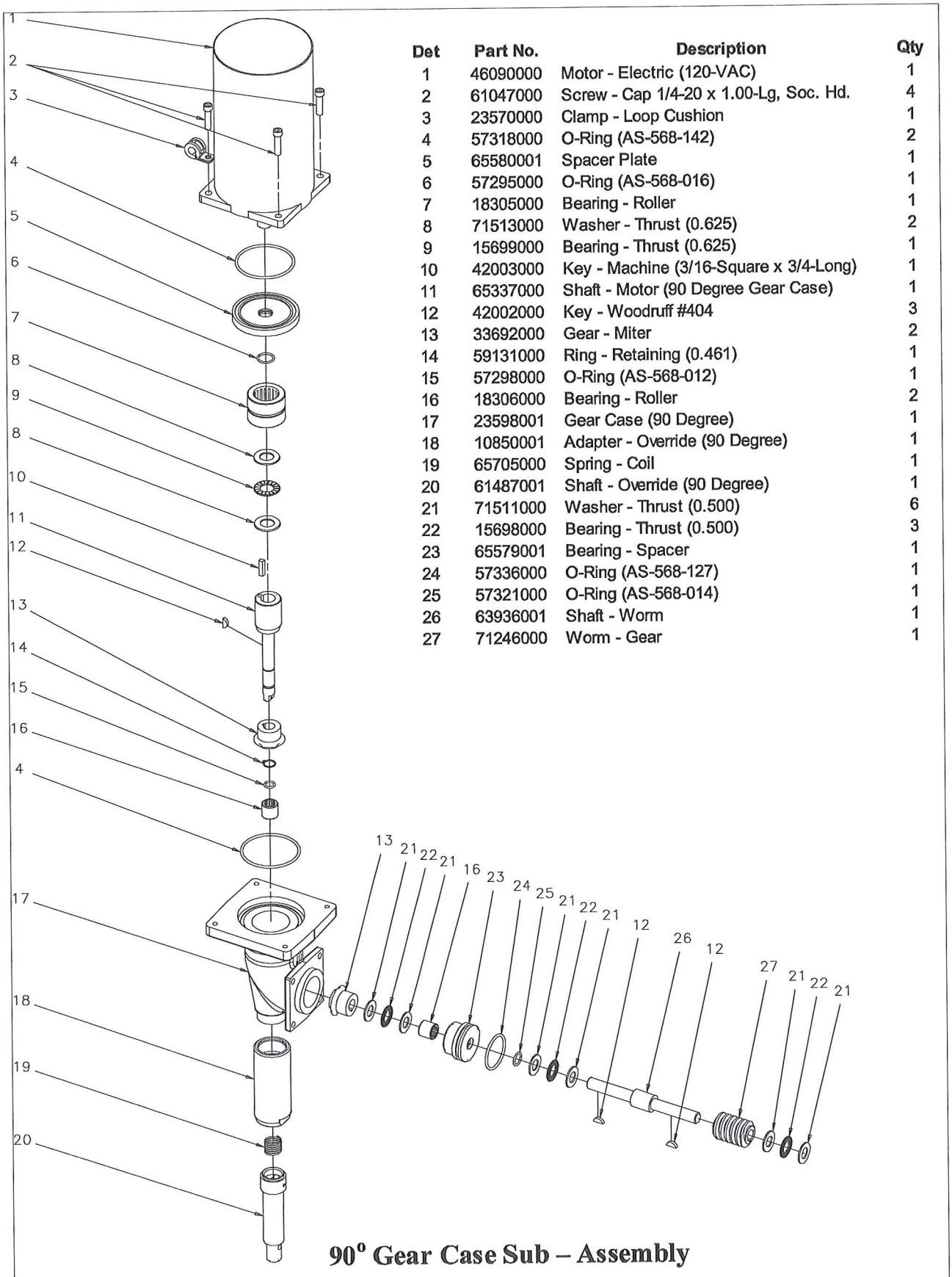
Figure 2: Disassembly of the gear case sub-assembly. Note the worm shaft and bevel gear are still secured on the monitor.



Det	Part No.	Description	Qty
1	11748001	Adapter - Motor (42 Frame)	1
2	46090000	Motor - Electric (120-VAC)	1
3	23570000	Clamp - Loop Cushion	2
4	61047000	Screw - Cap 1/4 - 20 x 1.00-Lg., Soc. Hd.	4
5	57334000	O-Ring (AS568-133)	1
6	65560001	Spacer - Flange	1
7	71513000	Washer - Thrust (0.625)	2
8	15699000	Bearing - Thrust (0.625)	1
9	57327000	O-Ring (AS568-024)	1
10	42003000	Key - Machine (3/16-Square x 3/4-Long)	1
11	42002000	Key - Woodruff #404	3
12	57318000	O-Ring (AS568-142)	1
13	64085000	Screw - Cap #10-24 x 0.750-Lg., Soc. Hd.	4
14	64051001	Shaft - Motor (90 Degree Gear Case)	1
15	33692000	Gear - Miter	2
16	57298000	O-Ring (AS568-012)	1
17	57383000	O-Ring (AS568-141)	1
18	57334000	O-Ring (AS568-133)	1
19	64068000	Screw - Cap #10-24 x 1.1250-Lg., Soc. Hd.	4
20	23591000	Gear Case (90-Degree)	1
21	11720001	Adapter - Motor Flange	1
22	62148000	Spring - Coil	1
23	61487001	Shaft - Override (90-Degree Drive)	1
24	10848001	Adapter - Override (90-Degree Drive)	1
25	51052000	Pin - Dowel (0.125-Dia. X x1.000-Lg.)	1
26	71511000	Washer - Thrust (0.500)	6
27	15698000	Bearing - Thrust (0.500)	3
28	65559001	Spacer - Bearing (Brass)	1
29	57336000	O-Ring (AS568-127)	1
30	57321000	O-Ring (AS568-014)	1
31	63936001	Shaft - Worm	1
32	71246000	Worm (Gear)	1

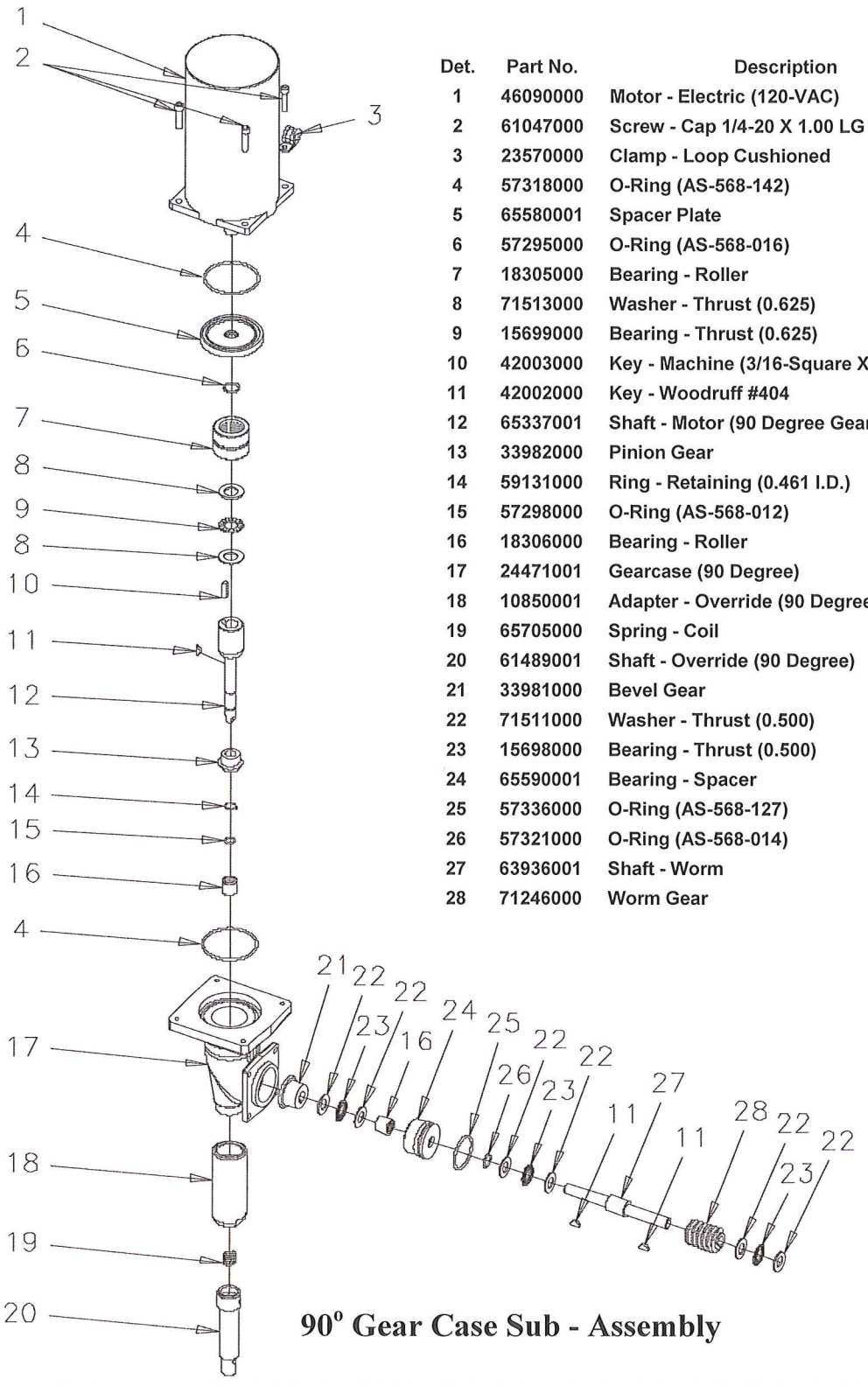
90° Gear Case Sub-Assembly

Figure 3: Obsolete Design – Part Number 81417001 - 90° Gear Case Sub – Assembly



Det	Part No.	Description	Qty
1	46090000	Motor - Electric (120-VAC)	1
2	61047000	Screw - Cap 1/4-20 x 1.00-Lg, Soc. Hd.	4
3	23570000	Clamp - Loop Cushion	1
4	57318000	O-Ring (AS-568-142)	2
5	65580001	Spacer Plate	1
6	57295000	O-Ring (AS-568-016)	1
7	18305000	Bearing - Roller	1
8	71513000	Washer - Thrust (0.625)	2
9	15699000	Bearing - Thrust (0.625)	1
10	42003000	Key - Machine (3/16-Square x 3/4-Long)	1
11	65337000	Shaft - Motor (90 Degree Gear Case)	1
12	42002000	Key - Woodruff #404	3
13	33692000	Gear - Miter	2
14	59131000	Ring - Retaining (0.461)	1
15	57298000	O-Ring (AS-568-012)	1
16	18306000	Bearing - Roller	2
17	23598001	Gear Case (90 Degree)	1
18	10850001	Adapter - Override (90 Degree)	1
19	65705000	Spring - Coil	1
20	61487001	Shaft - Override (90 Degree)	1
21	71511000	Washer - Thrust (0.500)	6
22	15698000	Bearing - Thrust (0.500)	3
23	65579001	Bearing - Spacer	1
24	57336000	O-Ring (AS-568-127)	1
25	57321000	O-Ring (AS-568-014)	1
26	63936001	Shaft - Worm	1
27	71246000	Worm - Gear	1

Figure 4: Obsolete Design - Part Number 81572001 - 90° Gear Case Sub – Assembly



Det.	Part No.	Description	Qty.
1	46090000	Motor - Electric (120-VAC)	1
2	61047000	Screw - Cap 1/4-20 X 1.00 LG Soc. Hd.	4
3	23570000	Clamp - Loop Cushioned	1
4	57318000	O-Ring (AS-568-142)	2
5	65580001	Spacer Plate	1
6	57295000	O-Ring (AS-568-016)	1
7	18305000	Bearing - Roller	1
8	71513000	Washer - Thrust (0.625)	2
9	15699000	Bearing - Thrust (0.625)	1
10	42003000	Key - Machine (3/16-Square X 3/4-Long)	1
11	42002000	Key - Woodruff #404	3
12	65337001	Shaft - Motor (90 Degree Gearcase)	1
13	33982000	Pinion Gear	1
14	59131000	Ring - Retaining (0.461 I.D.)	1
15	57298000	O-Ring (AS-568-012)	1
16	18306000	Bearing - Roller	2
17	24471001	Gearcase (90 Degree)	1
18	10850001	Adapter - Override (90 Degree)	1
19	65705000	Spring - Coil	1
20	61489001	Shaft - Override (90 Degree)	1
21	33981000	Bevel Gear	1
22	71511000	Washer - Thrust (0.500)	6
23	15698000	Bearing - Thrust (0.500)	3
24	65590001	Bearing - Spacer	1
25	57336000	O-Ring (AS-568-127)	1
26	57321000	O-Ring (AS-568-014)	1
27	63936001	Shaft - Worm	1
28	71246000	Worm Gear	1

90° Gear Case Sub - Assembly

Figure 5: New Design - Part Number 81612001 90° - Gear Case Sub – Assembly