ALEMITE®

Service Guide

3685-1
3685-D1

Mechanical-Metered Control Valve

Description

Each of these control valve models are equipped to dispense and meter motor oil.

CAUTION

Do not dispense antifreeze or a mixture of antifreeze and water from these valves. Component damage can occur.

All models contain a 30-mesh strainer within the swivel assembly and an automatic non-drip nozzle.

3685-1and 3685-D1

The difference between these models is the unit of measure. See **Figure 1**.

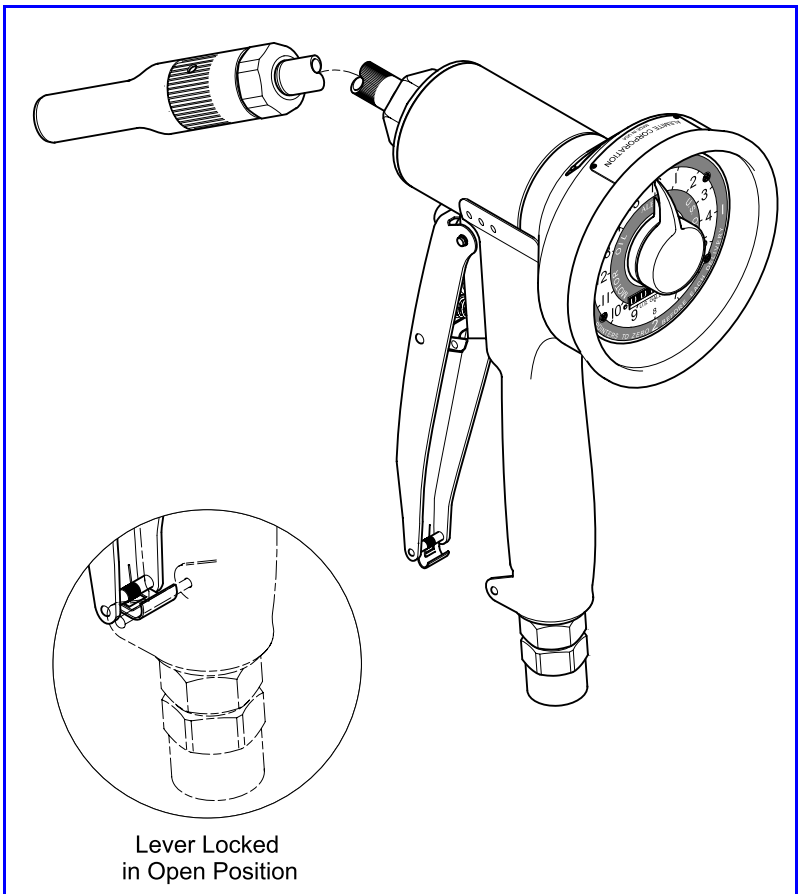
Operation

To begin, press the button in the center of the Lever. This releases the safety. With the button held, squeeze the Lever to open the valve.

To latch the valve in the full open position, flip the Lever's hook to engage the pin on the handle. See **Figure 1**.

To shut the valve off, squeeze the Lever (this automatically unlatches the hook) and release.

After each delivery, turn the Pointers counterclockwise to reset to zero.



Model	Dial		Totalizer
	Outer Scale	Inner Scale	
3685-1	4 Quarts	16 Quarts	Gallons
3685-D1	4 Liters	16 Liters	Liters

Figure 1 *Mechanical-Metered Control Valve Models 3685-1 and 3685-D1*

Specifications

Inlet Connection	Maximum Operating Pressure		Maximum Flow Rate		Accuracy
	psi	Bars	Gallons / Minute	Liters / Minute	
1/2 " NPTF (f)	1000	69	4	15.1	+ / - 0.65 %

Table 1 *Mechanical-Metered Control Valve Models 3685-1 and 3685-D1 Specifications*

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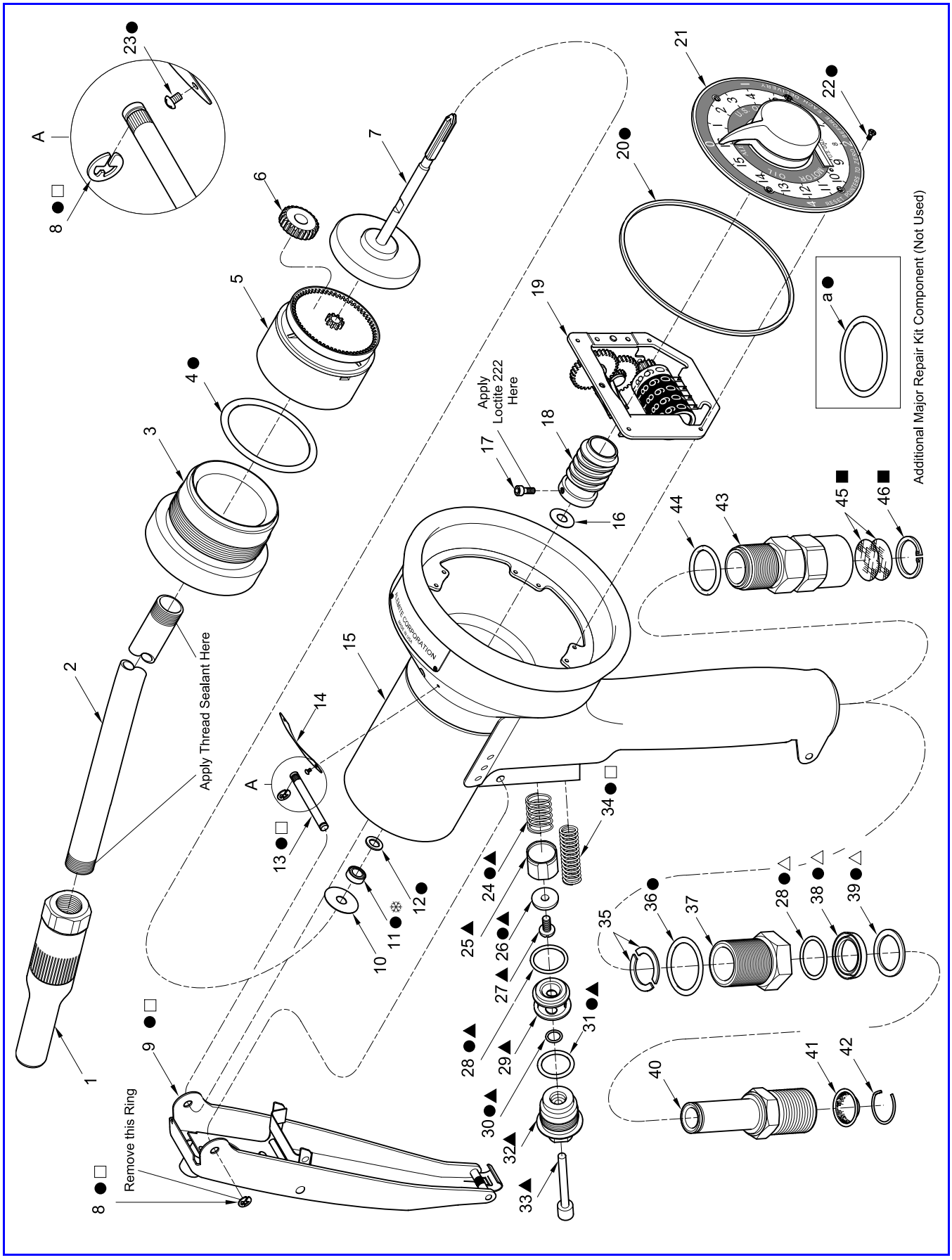


Figure 2-A *Mechanical-Metered Control Valve Models 3685-1 and 3685-D1 - Exploded View*

Item No.	Part No.	Description and Model		Qty	Notes		Numeric Order Part # (Item #)
1	B339800	Nozzle Assembly, Automatic		1			*50333* (23)
2	337976	Extension	All	1			*77230* (16)
3	331836	Body		1			79557 (22)
4	319469	O-Ring, 1.546 ID x 1.824 OD		1	●		X171000-1 (30)
5	398672	Mechanism Assembly, Metering	3685-1	1			X171000-10 (31)
	398674	Mechanism Assembly, Metering	3685-D1	1			X171000-15 (a)
6		Gear, Planetary (Brass)	3685-1	1			X171001-13 (36&44)
		Gear, Planetary (Brass)	3685-D1	1			*171006-10* (46)
7	319484	Gear and Shaft Assembly, Internal	3685-1	1			X171009-3 (28)
	321473	Gear and Shaft Assembly, Internal	3685-D1	1			*171060* (27)
8		Ring, Retaining		2	● □		*171868* (8)
9	320440	Lever Assembly		1	● □		*314670* (38)
10		Washer, 0.204 " ID x 3/4 " OD		1			314671 (39)
11		Ring, Quad, 3/16 " ID x 7/16 " OD		1	● ❄	Qty of 10 in ❄ kit	314714 (12)
12	314714	Washer (Leather), 0.187 " ID		1	●		*315198* (35)
13		Pin	All	1	● □		319469 (4)
14		Plate, Cover		1			319484 (7)
15		Housing		1			*319509* (6)
16		Washer, 0.194 " ID x 0.500 " OD		1			*319589* (18)
17		Screw, 6-32 x 1/4 "		1			320405 (21)
18		Gear, Worm		1			320405-B1 (21)
19	320410	Totalizer Assembly	3685-1	1			320410 (19)
	321493	Totalizer Assembly	3685-D1	1			320433 (34)
20		Gasket (Buna-N)	All	1	●		*320438* (10)
21	320405	Dial Assembly	3685-1	1		See **Figure 2-B**	320440 (9)
	320405-B1	Dial Assembly	3685-D1	1			*320449* (32)
22	79557	Screw, 4-40 x 1/4 "		4	●		*320457-0* (14)
23		Screw, 2-32 x 3/16 "		2	●		*321466* (6)
24		Spring		1	● ▲		321473 (7)
		Valve Assembly		1	▲		321493 (19)
25		Plunger		1	▲		321636 (26)
26	321636	Seat (Buna-N)		1	● ▲		*321651* (33)
27		Screw, 5-40 x 1/4 "		1	▲		*321653* (29)
28	X171009-3	O-Ring, 9/16 " ID x 11/16 " OD	All	2	● △ ▲	Qty of 10 in △ kit	*321654* (25)
29		Seat, Valve		1	▲		*321655* (24)
30	X171000-1	O-Ring, 1/8 " ID x 1/4 " OD		1	● ▲		*321656*
31	X171000-10	O-Ring, 1/2 " ID x 11/16 " OD		1	● ▲		*331835* (15)
32		Plug		1	▲		331836 (3)
33		Cap and Pin Assembly		1	▲		*333149* (13)
34	320433	Spring		1	● □		*335661* (20)
Early Model Swivel							*337019* (37)
35		Ring, Split		2			*337736* (40)
36	X171001-13	O-Ring, 11/16 " ID x 7/8 " OD		1	●		*337737* (42)
37		Adapter, Swivel		1			*337738* (41)
38		Packing, Block-V	All	1	● △	Qty of 10 in △ kit	337976 (2)
39	314671	Washer (Leather), 1/2 " ID		1	● △		*338385* (11)
40		Stem, Swivel		1			*338408* (17)
41		Strainer (Stainless Steel)		1			339657 (43)
42		Ring		1			*339659* (45)
Current Model Swivel							B339800 (1)
43	339657	Swivel Assembly		1		Includes No. 44-46	398672 (5)
44	X171001-13	O-Ring, 11/16 " ID x 7/8 " OD	All	1			398674 (5)
45		Screen		2	■	Qty of 10 in Kit	
46		Ring, Retaining		1	■	Qty of 5 in Kit	
Kit Component for Gear Oil Valve Models 3682-A, 3683-A, and 3683-D1							
a	X171000-15	O-Ring, 3/4 " ID x 1 " OD		1	●	Not Used	

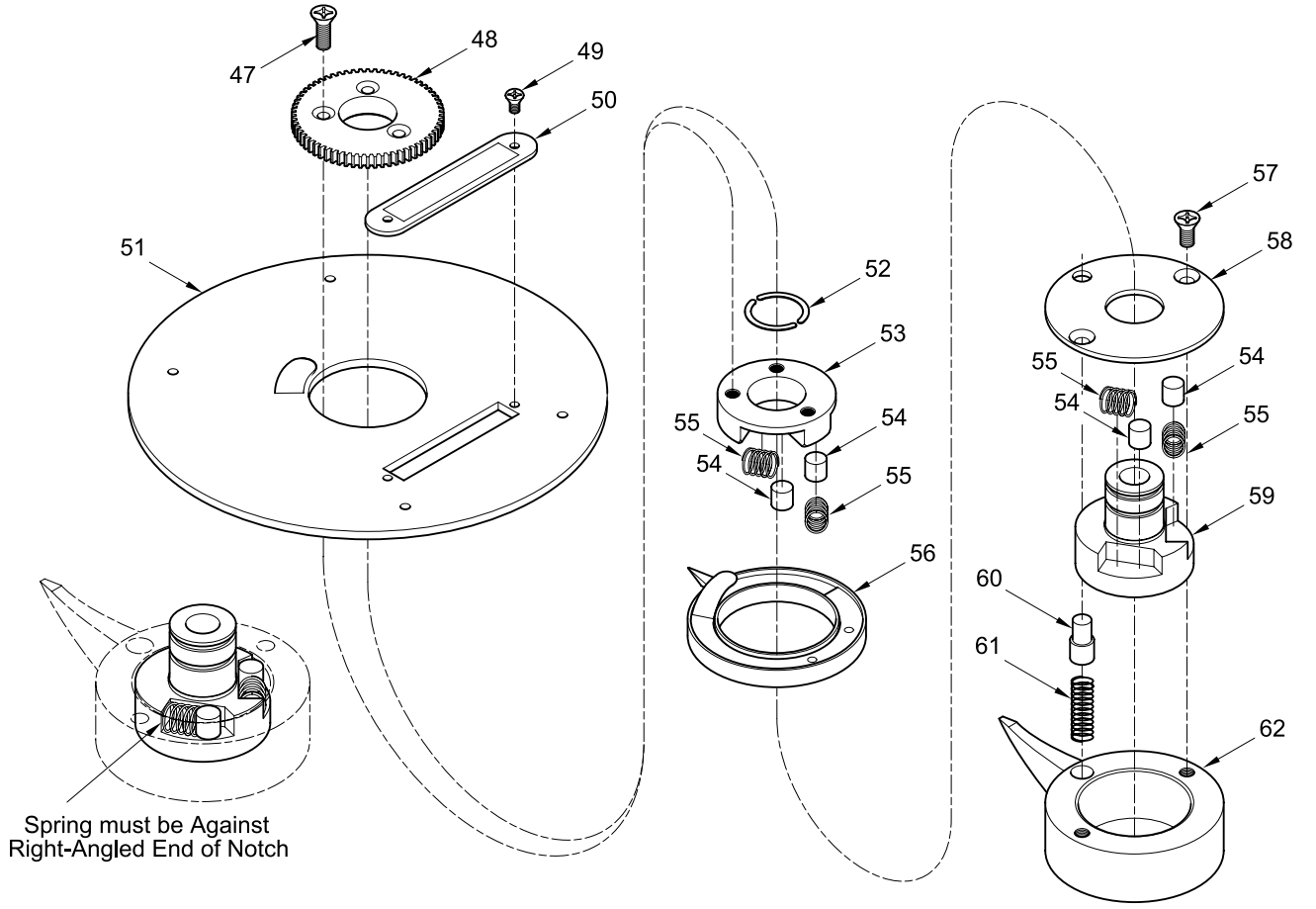
Legend:

Part numbers left blank (or in *italics*) are not serviced separately Part numbers with an X prefix indicate a quantity of ten (10)

●△▲□■ ❖❄ designates a repair kit item

Repair Kits

Part No.	Kit Symbol	Description	Part No.	Kit Symbol	Description
393030	●	Kit, Major Repair	**393520**	□	Kit, Lever Repair
393519	△	Kit, Swivel Repair			
393522	▲	Kit, Valve Repair	**393599**	❄	Kit, Seal
			393741	■	Kit, Strainer



Item No.	Part No.	Description and Model		Qty	Numeric Order Part #	(Item #)
47		Screw, 2-56 x 5/16 "	All	3	*75430*	(47)
48		Gear, Planetary		1	*170203*	(49)
49		Screw, 2-56 x 1/8 "		2	*172383*	(57)
50	319508	Window		1	319474	(54)
51	319586	Dial	3685-1	1	*319475*	(60)
	335591	Dial	3685-D1	1	319476	(55)
52	320412	Retainer		2	319508	(50)
53	320411	Cam	All	1	*319585*	(48)
54	319474	Roller		4	319586	(51)
55	319476	Spring		4	319587	(62)
56	319592	Pointer and Spring Assembly, Inner		1	319592	(56)
57		Screw, 2-56 x 3/16 "		2	*320403*	(61)
58		Plate		1	320411	(53)
59	337982	Clutch		1	320412	(52)
60		Pin		1	335591	(51)
61		Spring		1	337982	(59)
62	319587	Pointer, Outer		1	*337983*	(58)

Legend:
Part numbers left blank (or in *italics*) are not serviced separately

Figure 2-B *Dial Assembly Models 320405 (Quarts) and 320405-B1 (Liters) - Exploded View*

Overhaul

WARNING

Do not use halogenated hydrocarbon solvents such as methylene chloride or 1,1,1 trichloroethane in this valve assembly. An explosion can result within an enclosed device capable of containing pressure when aluminum and/or zinc-plated parts come in contact with halogenated hydrocarbon solvents.

Release all pressure within the system prior to performing any overhaul procedure.

- **Disconnect the air supply line from the pump motor.**
- **Into an appropriate container, operate the control valve to discharge remaining pressure within the system.**

Never point a control valve at any portion of your body or another person. Accidental discharge of pressure and/or material can result in personal injury.

Read each step of the instructions carefully. Make sure a proper understanding is achieved before proceeding.

Disassembly

NOTE: Refer to **Figures 2-A** and **2-B** for component identification on all overhaul procedures.

Inlet Swivel Assembly (Early Model)

1. Remove Ring (**42**) that secures Strainer (**41**) to Swivel Stem (**40**).
   - Remove the Strainer from the Swivel Stem.
2. Unscrew Swivel Adapter (**37**) from Housing (**15**).
3. Remove Split Rings (**35**) that secure the Swivel Stem to the Swivel Adapter.
   - Remove the Swivel Stem from the Swivel Adapter.
4. Remove O-Ring (**36**) from the Swivel Adapter.
5. Remove Washer (**39**) and from the Swivel Stem.
6. Remove Block-V Packing (**38**) and O-Ring (**28**) from the Swivel Adapter.

Inlet Swivel Assembly (Current Model)

7. Unscrew Swivel Assembly (**43**) from Housing (**15**).
   - Remove O-Ring (**44**) from the Swivel Assembly.
8. Remove Retaining Ring (**46**) and both Screens (**45**) from the Swivel Assembly.

Dial and Totalizer Assemblies

9. Remove Screws (**22**) that secure Dial Assembly (**21**) to the Housing.
   - Remove the Dial Assembly from the Housing.
10. Remove Gasket (**20**) and Totalizer Assembly (**19**) from the Housing.
11. Refer to the section entitled **Dial Assembl**y for details on the disassembly of this component.

    NOTE: The Totalizer is serviced only as an assembly

Metering Mechanism Assembly

12. Remove Screws (**23**) that secure Cover Plate (**14**) to the Housing.
    - Remove the Cover Plate.
13. Through the access hole in the Housing, loosen Screw (**17**) that secures Worm Gear (**18**) to Internal Gear and Shaft Assembly (**7**).
    - Use a 7/64-inch allen wrench.
    - Remove the Worm Gear and Washer (**16**) from the Internal Gear and Shaft Assembly.
14. Unscrew Body (**3**) [with attached components] from the Housing.
15. Remove O-Ring (**4**) from the Body.
16. Remove Metering Mechanism (**5**), Planetary Gear (**6**), and the Internal Gear and Shaft Assembly from the Housing.
17. Remove Washer (**10**), Quad Ring (**11**), and Washer (**12**) from the Housing.
18. Unscrew Nozzle (**1**) from Extension (**2**) as required.
19. Unscrew the Extension from Body (**3**) as required.

Lever and Valve Assembly

CAUTION

Pin (13) is knurled on one end only. Remove the Pin from the right side of the Valve Assembly (facing the Dial). Damage to components can occur.

20. Remove left-hand Retaining Ring (**8**) from Pin (**13**).
    - See **Figure 2-A**.
21. Remove the Pin and remaining Retaining Ring from the Housing and Lever Assembly (**9**).
    - See **Figure 3**.
    - Remove the Lever Assembly from the Housing
22. Remove Spring (**34**) from the Housing.
23. Unscrew Plug (**32**) from the Housing.
    - Remove Cap and Pin Assembly (**33**) and O-Ring (**30**) from the Plug.
24. Remove O-Ring (**31**), Valve Seat (**29**), O-Ring (**28**), the Valve Assembly [consists of items **25**, **26**, and **27**], and Spring (**24**) from the Housing.

Valve Assembly

25. Remove Screw (**27**) that secures Seat (**26**) to Plunger (**25**).
    - Remove the Seat from the Plunger.

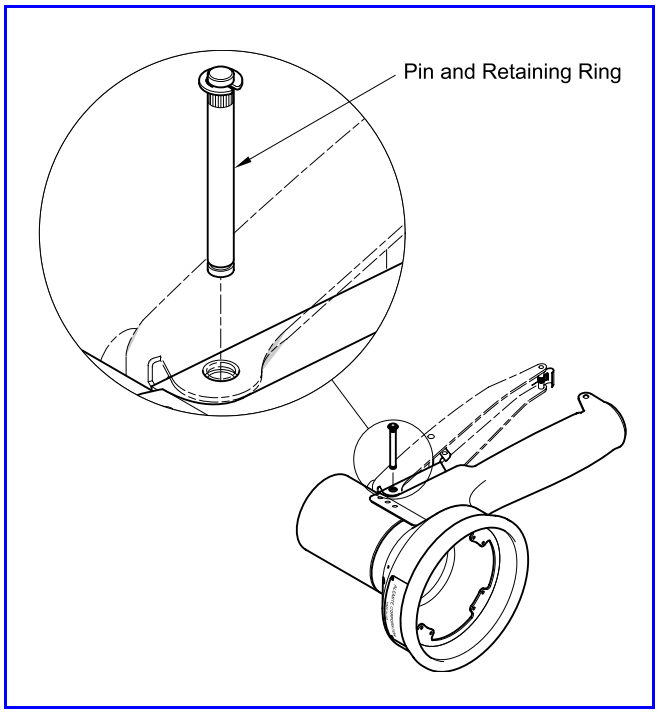


Figure 3 *Pin Removal and Installation*

Dial Assembly

26. Remove Screws (**49**) that secure Window (**50**) to Dial (**51**) as required.
    - Remove the Window from the Dial.
27. Remove Screws (**47**) that secure Planetary Gear (**48**) to Cam (**53**).
    - Remove the Planetary Gear and the Dial from the Cam.
28. Remove Retainers (**52**) that secure Clutch (**59**) to the Cam.
29. Remove Inner Pointer and Spring Assembly (**56**) [with attached components] from the Clutch.
30. Carefully separate the Cam, Rollers (**54**), and Springs (**55**) from the Inner Pointer and Spring Assembly.
31. Remove Screws (**57**) that secure Plate (**58**) to Outer Pointer (**62**).
    - Remove the Plate from the Outer Pointer.
32. Remove Pin (**60**) and Spring (**61**) from the Outer Pointer.
33. Carefully remove Springs (**55**), Rollers (**54**), and the Clutch from the Outer Pointer.

Clean and Inspect

1. Clean all metal parts in cleaning solvent. The solvent should be environmentally safe.
2. Inspect all parts for wear and/or damage.
    - Replace as necessary.

Assembly

NOTE: Prior to assembly, certain components require lubrication in clean oil. See **Table 2**.

Dial

1. Install Clutch (**59**) into Outer Pointer (**62**).
2. Install a Roller (**54**) into each notch in the Clutch.

   IMPORTANT: Make sure Springs (55) are against right-angled end of notches.
   • *See **Figure 2-B**.*
3. Install a Spring (**55**) into each notch in the Clutch.

   HINT: Place one end of the Spring against the Roller. Compress the Spring with a small flat-head screwdriver and at the same time push the Spring down into the notch.
4. Install Spring (**61**) and Pin (**60**) [large diameter first] into the Outer Pointer.
5. Position Plate (**58**) [hole chamfers upward] onto the Outer Pointer.
   • Make sure the Pin protrudes from the hole in the Plate.
6. Install Screws (**57**) that secure the Plate to the Outer Pointer.
   • Tighten the Screws securely.
7. Position Cam (**53**) with the notches upward.
8. Install Inner Pointer and Spring Assembly (**56**) [Spring side first] onto the Cam.
9. Repeat procedural steps **2** and **3** for the Cam.

Item No.	Description
4	O-Ring, 1.546 ID x 1.824 OD
11	Quad Ring, 3/16 " ID x 7/16 " OD
28	O-Ring, 9/16 " ID x 11/16 " OD
30	O-Ring, 1/8 " ID x 1/4 " OD
31	O-Ring, 1/2 " ID x 11/16 " OD
36	O-Ring, 11/16 " ID x 7/8 " OD
38	Packing, Block-V
44	O-Ring, 11/16 " ID x 7/8 " OD

Table 2 *Components Lubricated in Clean Oil*

   IMPORTANT: Make sure the top surface of the Cam is flush with the surface of the Inner Pointer and Spring Assembly.
10. Install the Cam and Pointer subassembly [Rollers downward] onto the Clutch.
11. Install Retainers (**52**) that secure the Clutch to the Cam.
12. Position Dial (**51**) [face downward] onto the Inner Pointer and Spring Assembly.
13. Install Planetary Gear (**48**) [small diameter first] onto the Cam.
14. Install Screws (**47**) that secure the Planetary Gear to the Cam.
    • Tighten the Screws securely.
15. Fit Window (**50**) into the back of the Dial.
16. Secure the Window with Screws (**49**).
    • Tighten the Screws securely.

Valve and Lever

Valve

17. Install Seat (**26**) [flat side first] into the threaded end of Plunger (**25**).

    IMPORTANT: Thread Screw (27) an additional 1/2-turn once it contacts the Seat.
18. Install Screw (**27**) that secures the Seat to the Plunger.
19. Install Spring (**24**) and Valve Assembly [Seat upward into the Housing.
    • Press on the Valve Assembly to ensure it's centered.
20. Install and seat O-Ring (**28**) and Valve Seat (**29**) [large bore first] into the Housing.

Plug

21. Install O-Ring (**30**) into Plug (**32**).
22. Install Cap and Pin Assembly (**33**) into the opposite end of the Plug.
23. Install O-Ring (**31**) onto the Plug.
24. Install the Plug assembly into the Housing.
    • Tighten the Plug securely.

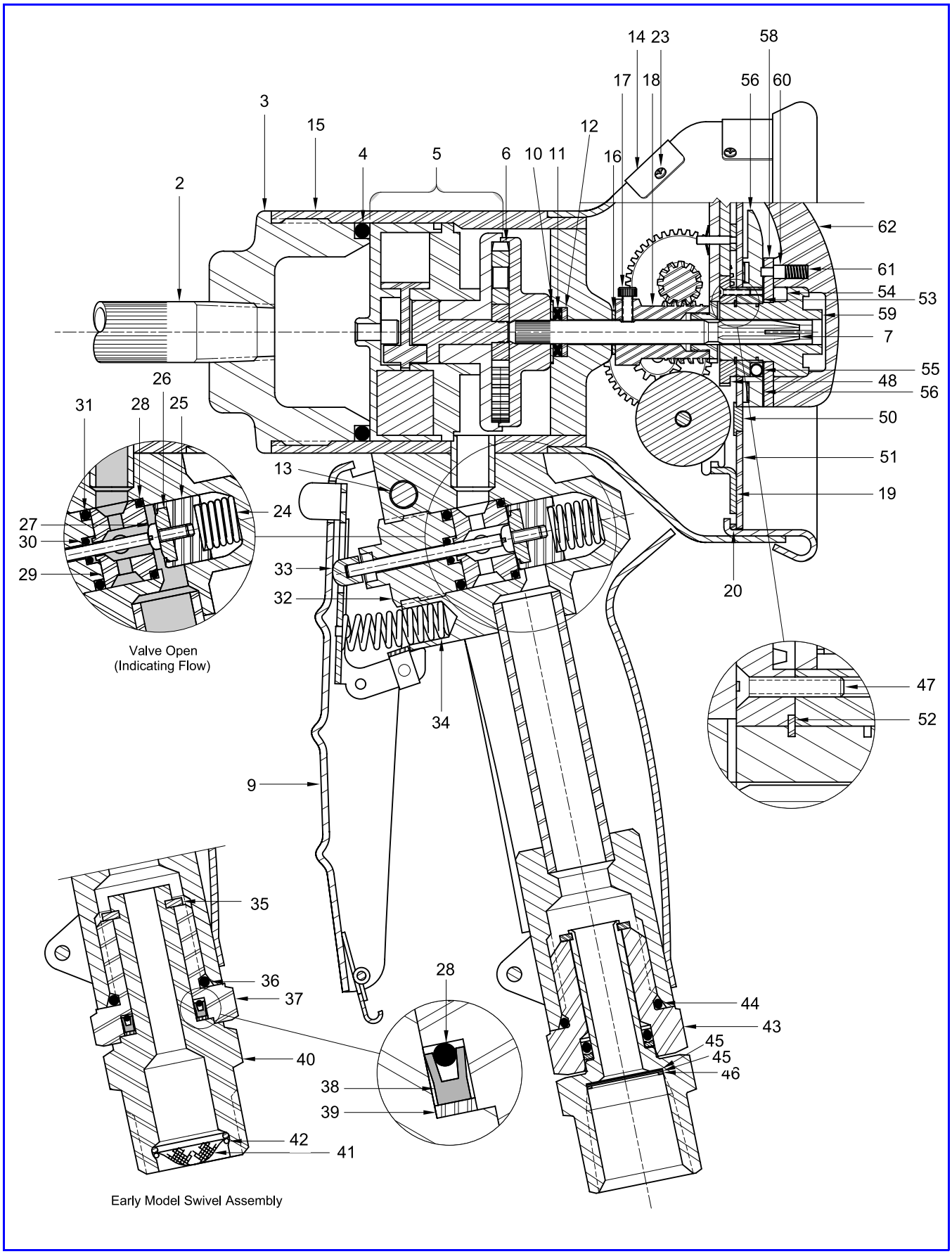


Figure 4 *Mechanical-Metered Control Valve Models 3685-1 and 3685-D1 - Section View*

Lever Assembly

25. Install Retaining Ring (**8**) onto the knurled end of Pin (**13**) as required.

26. Install Spring (**34**) into the Housing.

27. Position Lever Assembly (**9**) onto the Housing.

IMPORTANT: Make sure the button on the safety latch engages the end of the Spring.

CAUTION

Install the Pin assembly into the right side of the Valve Assembly (facing the Dial). Damage to components can occur.

28. Install the Pin and Retaining Ring assembly into the Housing and Lever Assembly.
    - See **Figure 3**.

29. Gently tap on the end of the Pin until the Retaining Ring is flush with the Lever Assembly.

30. Install the remaining Retaining Ring (**8**) onto the Pin.

Metering Mechanism

31. Install and seat Washer (**12**) and Quad Ring (**11**) into the rear of the Housing.

32. Install Washer (**10**) onto Internal Gear and Shaft Assembly (**7**).

33. Position Metering Mechanism (**5**) gear end upward.

34. Install Planetary Gear (**6**) into the Metering Mechanism.

35. Position the Internal Gear and Shaft Assembly onto the Metering Mechanism assembly.

36. With the Internal Gear and Shaft Assembly pointed upward, install the entire subassembly into the Housing.
    - Use care passing the Quad Ring and Washer.

IMPORTANT: Make sure the flat on the shaft points toward the hole on the Housing.

CAUTION

Make sure the subassembly does not shift during installation or once installed. Damage to the Planetary Gear can occur.

37. Install O-Ring (**4**) onto Body (**3**).

38. Screw the Body assembly into the Housing.
    - Tighten the Body securely

39. Install Washer (**16**) onto the Internal Gear and Shaft Assembly.

40. Install Screw (**17**) [with Loctite 222] into Worm Gear (**18**) as required.
    - Make sure only a few threads are engaged.

41. Install the Worm Gear onto the Internal Gear and Shaft Assembly.
    - Make sure to position the Screw upward.

42. Through the access hole in the Housing, tighten the Screw that secures the Worm Gear to the flat on the Internal Gear and Shaft Assembly.
    - Use a 7/64-inch allen wrench.

43. Position Cover Plate (**14**) onto the Housing.

44. Install Screws (**23**) that secure the Cover Plate to the Housing.
    - Tighten the Screws securely.

Extension and Nozzle

45. Screw the knurled end of Extension (**2**) [with thread sealant] into Body (**3**).
    - Tighten the Extension securely while maintaining the proper orientation with the Control Valve.

46. Screw Nozzle (**1**) onto the Extension [with thread sealant].
    - Tighten the Nozzle securely.

Dial and Totalizer

47. Install Totalizer Assembly (**19**) and Gasket (**20**) into the Housing.
    - Make sure to orient the Meter Totalizer properly.

48. Install Dial Assembly (**21**) into the Housing and onto the spline of the Internal Gear and Shaft Assembly.

49. Install Screws (**22**) that secure the Dial Assembly and Totalizer Assembly to the Housing.
    - Tighten the Screws securely.

Inlet Swivel Assembly (Early Model)

50. Install Strainer (**41**) [concave surface first] into the Swivel Stem.
51. Install Ring (**42**) that secures the Strainer to the Swivel Stem.
52. Install O-Ring (**28**), Block-V Packing (**38**) [lips first], and Washer (**39**) into Swivel Adapter (**37**).
53. Install Swivel Stem (**40**) into the Swivel Adapter.
    - A slight snap occurs that indicates the O-Ring engaged the Block-V Packing
54. Install Split Rings (**35**) that secure the Swivel Stem to the Swivel Adapter.
55. Install O-Ring (**36**) onto the Swivel Adapter.
56. Install the Swivel assembly into the Housing.
    - Tighten securely.

Inlet Swivel Assembly (Current Model)

57. Install both Screens (**45**) into Swivel Assembly (**43**).
58. Install Retaining Ring (**46**).
59. Install O-Ring (**44**) onto the Swivel Assembly.
60. Screw the Swivel Assembly into the Housing.
    - Tighten securely.

Troubleshooting Chart

Indications	Possible Problems	Solution
Reduced or zero flow	1. Strainer (**41**) or Screens (**45**) clogged 2. Clogged system	1. Remove Strainer (**41**) or Screens (**45**) and clean or replace with Kit **393741** 2. Clean or replace system filter
Continuous product flow	1. Foreign material on Seat (**26**) 2. Seat (**26**) worn or damaged 3. Spring (**24**) worn or damaged 4. Screw (**27**) loose 5. O-Ring (**28**) worn or damaged	1. Disassemble, clean, and inspect seat area. Check mating surfaces and replace Seat (**26**) as necessary. Locate and eliminate source of foreign material. 2. Replace Seat (**26**) 3. Use Kit **393030** or **393522** 4. Tighten Screw (**27**) into Plunger (**25**) 5. Replace O-Ring (**28**)
Leakage at top of Swivel Adapter (**37**) or Swivel Assembly (**43**)	1. Initial tightening of Swivel Adapter (**37**) or Swivel Assembly (**43**) not sufficient 2. O-Ring (**36** or **44**) worn or damaged	1. Tighten Swivel Adapter (**37**) or Swivel Assembly (**43**) 2. Replace O-Ring (**36** or **44**)
Leakage at Swivel Stem (**40**)	O-Ring (**28**) and/or Block V-Packing (**38**) worn or damaged	Use Kit **393030** or **393519**
Leakage at Swivel Assembly (**43**)	Seal worn or damaged	Replace Swivel Assembly (**43**)
Leakage at perimeter of Plug (**32**)	1. Initial tightening of Plug (**32**) not sufficient 2. O-Ring (**31**) worn or damaged	1. Tighten Plug (**32**) 2. Replace O-Ring (**31**)
Leakage at Cap and Pin Assembly (**33**)	O-Ring (**30**) worn or damaged.	Replace O-Ring (**30**)
Leakage at Body (**3**)	1. Initial tightening of Body (**3**) not sufficient 2. O-Ring (**4**) worn or damaged	1. Tighten Body (**3**) 2. Replace O-Ring (**4**)
Fluid within Dial Assembly (**21**) cavity	Quad Ring (**11**) worn or damaged	Replace Quad Ring (**11**) with Kit **393599** and Washer (**12**)
Leakage at front end of Nozzle (**1**)	Nozzle (**1**) worn or damaged	Replace Nozzle (**1**)
Leakage at either end of Extension (**2**)	1. Initial tightening of components not sufficient 2. Thread sealant missing or inadequate on Extension (**2**)	1. Tighten leaking connection 2. Apply thread sealant* to Extension (**2**)
Hook on Lever Assembly (**9**) does not disengage	Broken spring in Lever Assembly (**9**)	Replace Lever Assembly (**9**)
* Do not apply thread sealant to the first two (2) threads. Contamination can occur.		

Changes Since Last Printing

Removed 393534 Strainer Repair Kit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