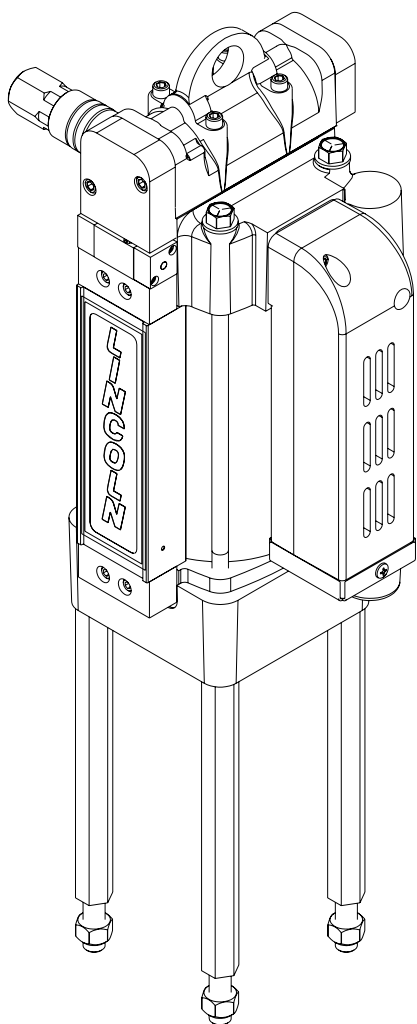


3-, 4¹/₄-, 6-, 8- and 10-in air motors

Models 84803, 84804, 84806, 84808, 86810



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EC Declaration of Incorporation

Manufacturer: SKF
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St. Louis, MO U.S.A.
URL: SKF.com
Phone: 314-6794200

EU contact: SKF
Heinrich-Hertz-Straße 2-8
69190 Walldorf
Phone: 49 (0) 6227-30

Product: Air motors
Description: reciprocating air motor to drive pumps
Model(s): 84803, 84804, 84806, 84808, 86810
Year of construction: see type identification plate

complies with all basic requirements of the following directives
at the time when first being launched in the market.

Report no.'s: NA

The equipment indicated on this declaration complies with the
following directives:

Machinery Directive 2006/42/EC

And was evaluated using the following harmonized EN standards:

EN ISO 12100:2010, EN ISO 4413:2010, EN ISO 809:1998+A1:2009

SKF declares under its sole responsibility that the
Air motor model(s): 84803, 84804, 84806, 84808 and 86810

are in conformity with the Machinery Directive 2006/42/EC.

In the case of modifications or alterations of the above
mentioned machine not authorized by the manufacturer,
validity of this EC declaration of conformity will cease.
The person empowered to assemble the technical
documentation on behalf of the manufacturer is the head
of standardization; see EC-representative's address.



Brad Edler
Manager Product Development
Product Engineering LPD North America
Innovation and Product Management

Safety

It is responsibility of owner and/or operator to properly use and maintain equipment. Carefully read and understand instructions and warnings in manual before operating equipment.

Equipment complies with OSHA Standards where applicable.

Manual contains important warnings and instructions. Read and retain for reference.

Explanation of signal words for safety

NOTE

Emphasizes useful hints and recommendations as well as information to prevent property damage and ensure efficient trouble-free operation.

⚠ WARNING

Do not exceed stated maximum working pressure of air motor or of lowest rated component in system.

Do not alter or modify any part of this equipment.

Do not operate this equipment with combustible gas.*

Do not attempt to repair or disassemble equipment while system is pressurized.

Tighten all fluid connections securely before using equipment.

Always read and follow fluid manufacturer's recommendations regarding fluid compatibility, and use of protective clothing and equipment.

Check all equipment regularly and repair or replace worn or damaged parts immediately.

Failure to comply with warnings including misuse, over pressurizing, modifying parts, using incompatible chemicals and fluids, or using worn or damaged parts, may result in equipment damage and/or serious personal injury, fire, explosion, or property damage.

⚠ CAUTION

Indicates a dangerous situation that can lead to light personal injury if precautionary measures are ignored.

⚠ WARNING

Indicates a dangerous situation that could lead to death or serious injury if precautionary measures are ignored.

⚠ DANGER

Indicates a dangerous situation that will lead to death or serious injury if precautionary measures are ignored.

* Indicates change.

Fig. 1

Dimensions

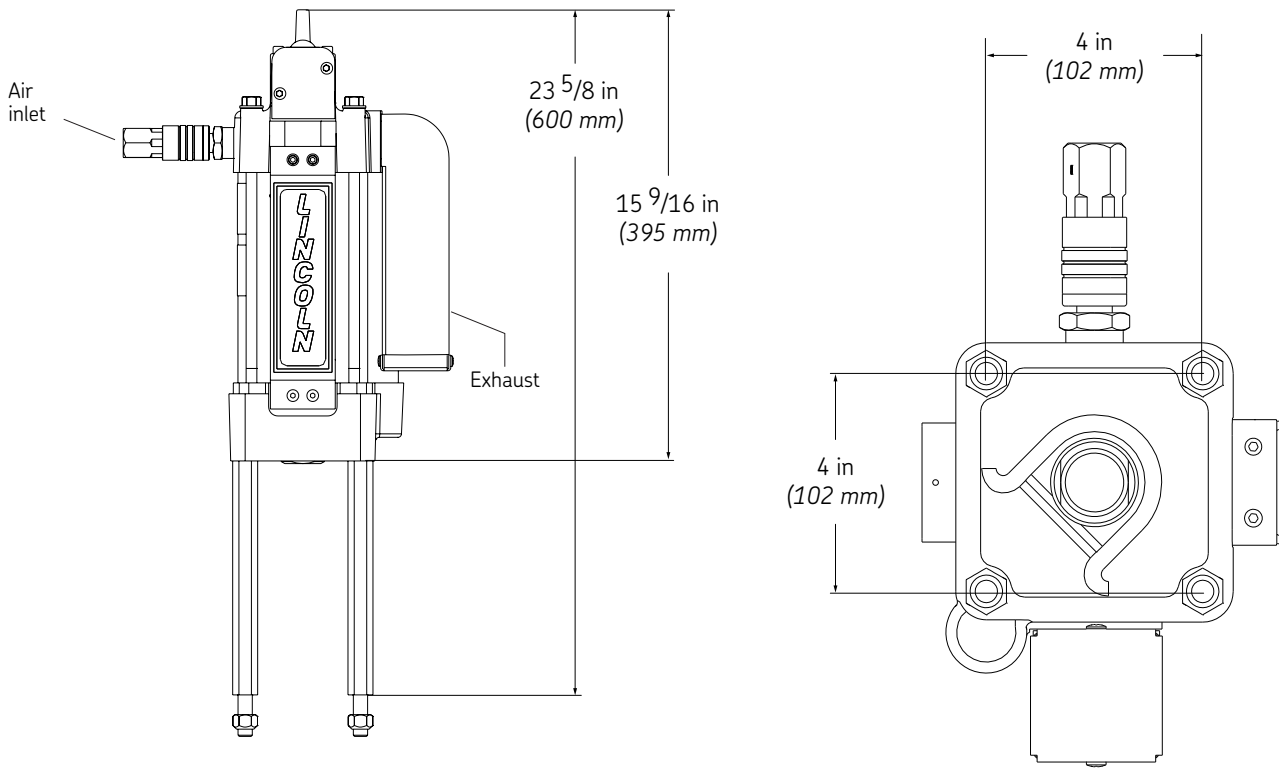


Table 1

Specifications

Model	Cylinder diameter		Effective piston area		Operating pressure range		Operating temperature range		Minimum I.D. of air supply		Air inlet NPTF	Air consumed per cycle at 100 psi (7 bar)	
	in	mm	in ²	cm ²	psi	bar	°F	°C	in	mm	in	SCF	L(N)
86810	10	254	78	503	30 to 100	2 to 7	-30 to +200	-34 to +93	3/4	19	3/4	3.6	103
84808	8	203	50	323	30 to 100	2 to 7	-30 to +200	-34 to +93	3/4	19	3/4	2.6	75
84806	6	152	28	181	30 to 100	2 to 7	-30 to +200	-34 to +93	1/2	13	3/4	1.6	46
84804	4 1/4	108	14	90	30 to 200	2 to 14	-30 to +200	-34 to +93	1/2	13	1/2	1.1	32
84803	3	76	7	45	30 to 200	2 to 14	-30 to +200	-34 to +93	3/8	10	1/2	0.7	20

Table 2

Specifications (continued)

Model	Maximum recommended speed, cycles/min	Stroke length		Weight		Seal material ¹⁾	Dimension					
		in	mm	lb	kg		A		B		C	
							in	mm	in	mm	in	mm
86810	75	6	152	62	28	Nitrile and PTFE	13 1/4	337	11 5/8	295	22 3/4	578
84808	75	6	152	47	21	Nitrile and PTFE	11 1/4	286	9 9/16	243	22 3/4	578
84806	75	6	152	34	15	Nitrile and PTFE	9 1/4	235	7 3/4	197	22 3/4	578
84804	75	6	152	26	12	Nitrile and PTFE	7 1/2	191	6	152	23 5/8	600
84803	75	6	152	25	11	Nitrile and PTFE	7 1/2	191	6	152	23 5/8	600

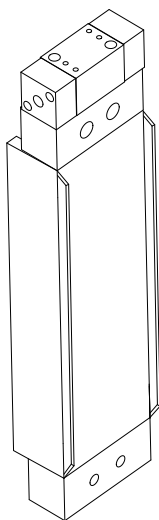
¹⁾ PTFE seals used with power valve spool (14) and relay valve (26).*
* Indicates change.

Service assemblies and kits

To reduce down-time and take advantage of modular design of air motor, the following service assemblies are recommended for repair of air motor. After removal, faulty assembly can be repaired using corresponding soft parts kit.

Fig. 2

Pilot bar subassembly (35)



For assemblies and soft parts kits
(→Series III air motor kits, page 19).

Fig. 3

Relay valve (26)

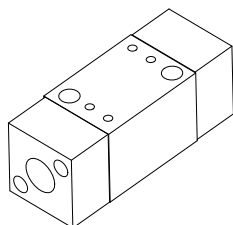


Fig. 4

Air signal valve (32)

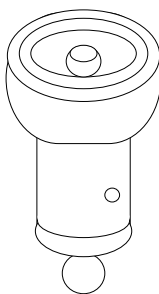
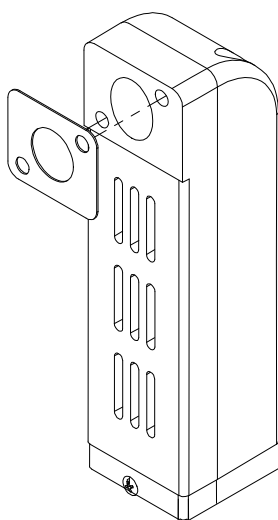


Fig. 5

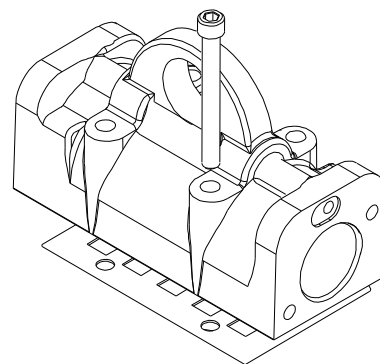
Muffler (22)
Shown with gasket (20)



For assemblies and soft parts kits
(→Series III air motor kits, page 19).

Fig. 6

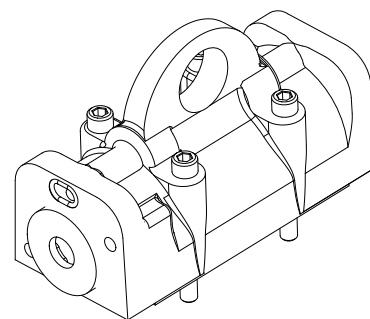
Power valve subassembly



For assemblies and soft parts kits
(→Series III air motor kits, page 19).

Fig. 7

Power valve spool and body (14)



NOTE

Replace all parts included in soft parts kit when replacing soft parts.

⚠ WARNING

Do not alter or modify any part of this equipment.

Check equipment for proper operation before each use.

Do not operate equipment without safety devices installed.

Failure to comply may result in equipment malfunction and/or damage and result in serious personal injury.

⚠ WARNING

Do not pump flammable material or operate this equipment with combustible gas.

Failure to comply may result in death or serious injury.

⚠ WARNING

Do not operate pump without recommended protective equipment.

Failure to comply may result in death or serious injury.

⚠ WARNING

Do not exceed maximum air or fluid working pressure of lowest rated system component.

Failure to comply may result in death or serious injury.

NOTE*

Do not operate with air contaminated with materials not compatible with nitrile seals.

Use only with 6 in (152 mm) stroke pump tubes.

* Indicates change.

Before connecting air motor to air line

Lincoln series III air motors are fully pneumatic and require a minimum specified size of air supply hose for proper operation. Check specification for minimum ID of air supply hose and select corresponding sizes of air controls and accessories for non-restrictive air flow. Lincoln filter and regulator with gauge are available as combination units.

It is recommended to use 40 micron minimum pneumatic filter along with pressure regulator with system. Special lubricant is used in assembly of air motors. It is not recommended to lubricate system after it has been installed as new lubricant will wash away factory lubricant, and could result in air motor failing. Added lubrication could also result in critical small pneumatic paths being blocked resulting in malfunction.

- For 3/8 in air line
 - Model 85388-6
- For 1/2 in air line
 - Model 85388-8
- For 3/4 in air line
 - Model 85388-12

If quick disconnect coupling should be used, install supplied coupler to ensure proper air motor operation.

Operating precautions

Use Lincoln replacement parts to assure compatible pressure rating. Comply with all warnings.

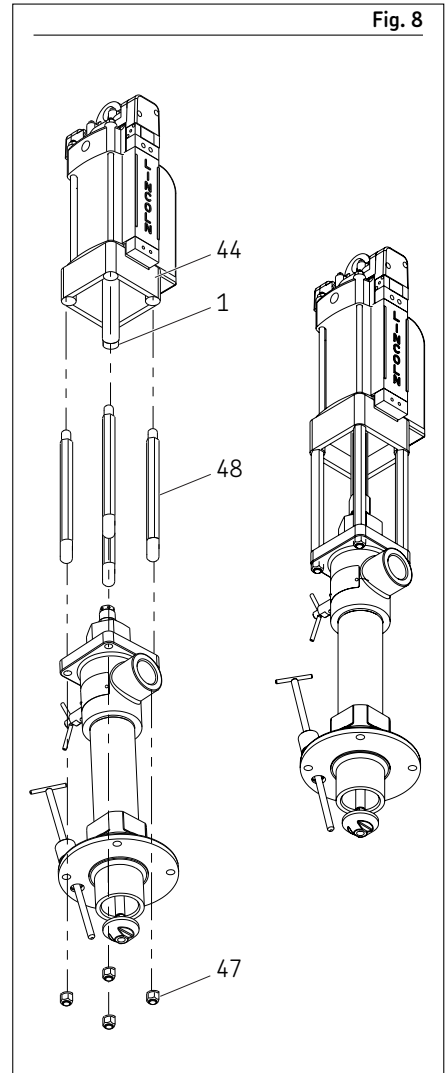
Do not operate air motor in excess of recommended pressure range.

Disconnect air line and relieve (vent) pressure when air motor sits idle for long periods of time and before servicing.

Attach air motor to pump tube

- 1 Tightly attach connecting rods (48) to air motor lower casting (44). Use short threaded end of connecting rods (→ Fig. 8).
- 2 Mount air motor on top of pump tube outlet and tightly connect pump tube coupling nut to air motor piston rod (1).
- 3 Attach connecting rods (48) to pump tube with four nuts (47) supplied with air motor. Leave nuts loose.
- 4 Connect air supply and slowly cycle pump several times using only enough air pressure to operate pump without stalling.
- 5 Stop pump on **up** stroke and tighten four nuts to securely fasten air motor to pump tube.

Fig. 8



Service and disassembly procedure

Disconnect air line and relieve (vent) pressure when air motor sits idle for long periods of time and before servicing. Modular design of air motor and accessibility of vital operation parts make service available without taking air motor out of line or without complete disassembly.

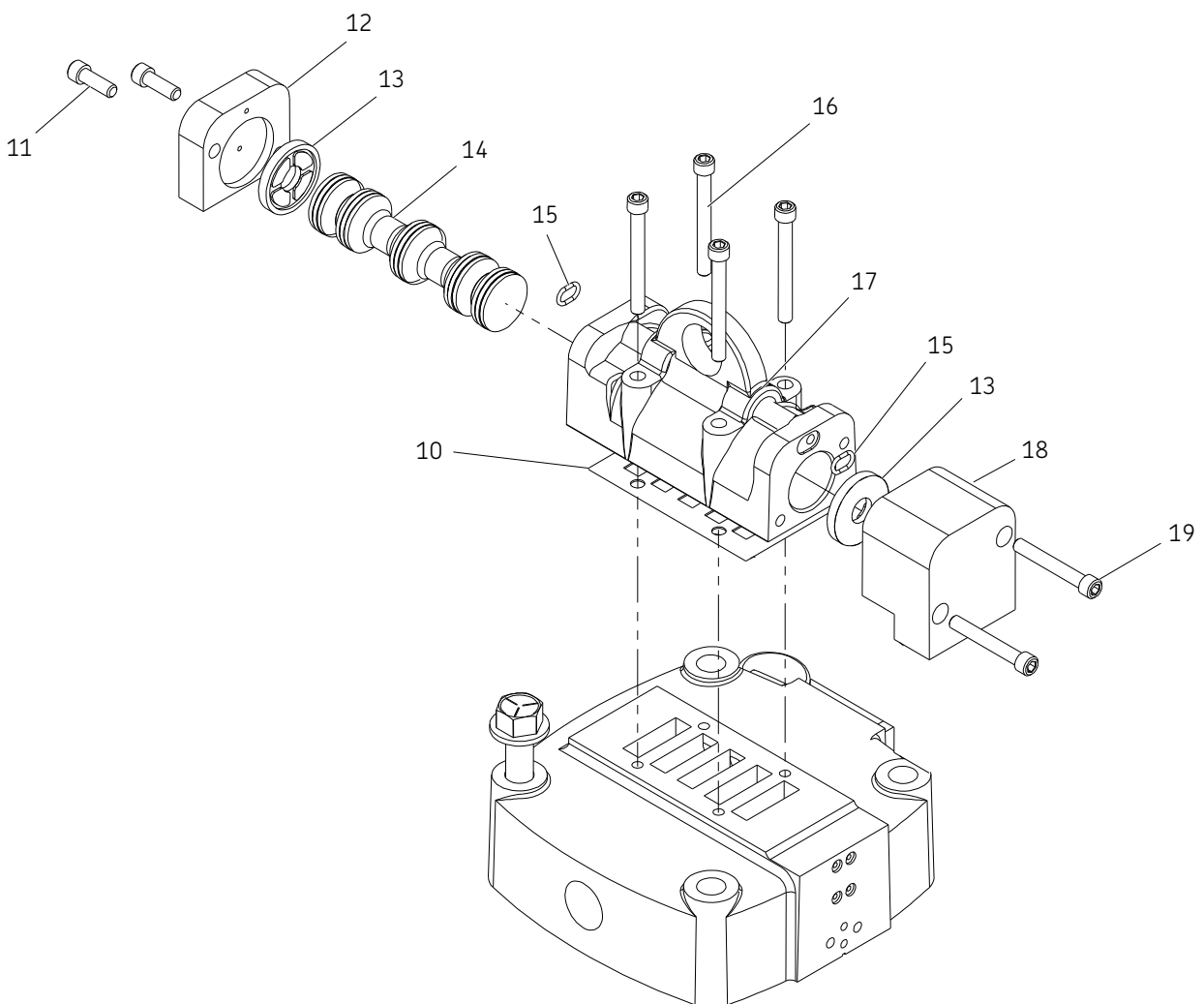
Power valve

- 1 Remove four screws (11 and 19), two on each side (→ Fig. 9).
- 2 Remove end caps (12 and 18).
- 3 Push out valve spool (14).
- 4 Remove spool bumpers (13) (one from each end).
- 5 Remove o-ring (15), one from each end.
- 6 Remove four screws (16) and lift valve body (17).
- 7 Remove gasket (10) to complete valve disassembly.

⚠ WARNING

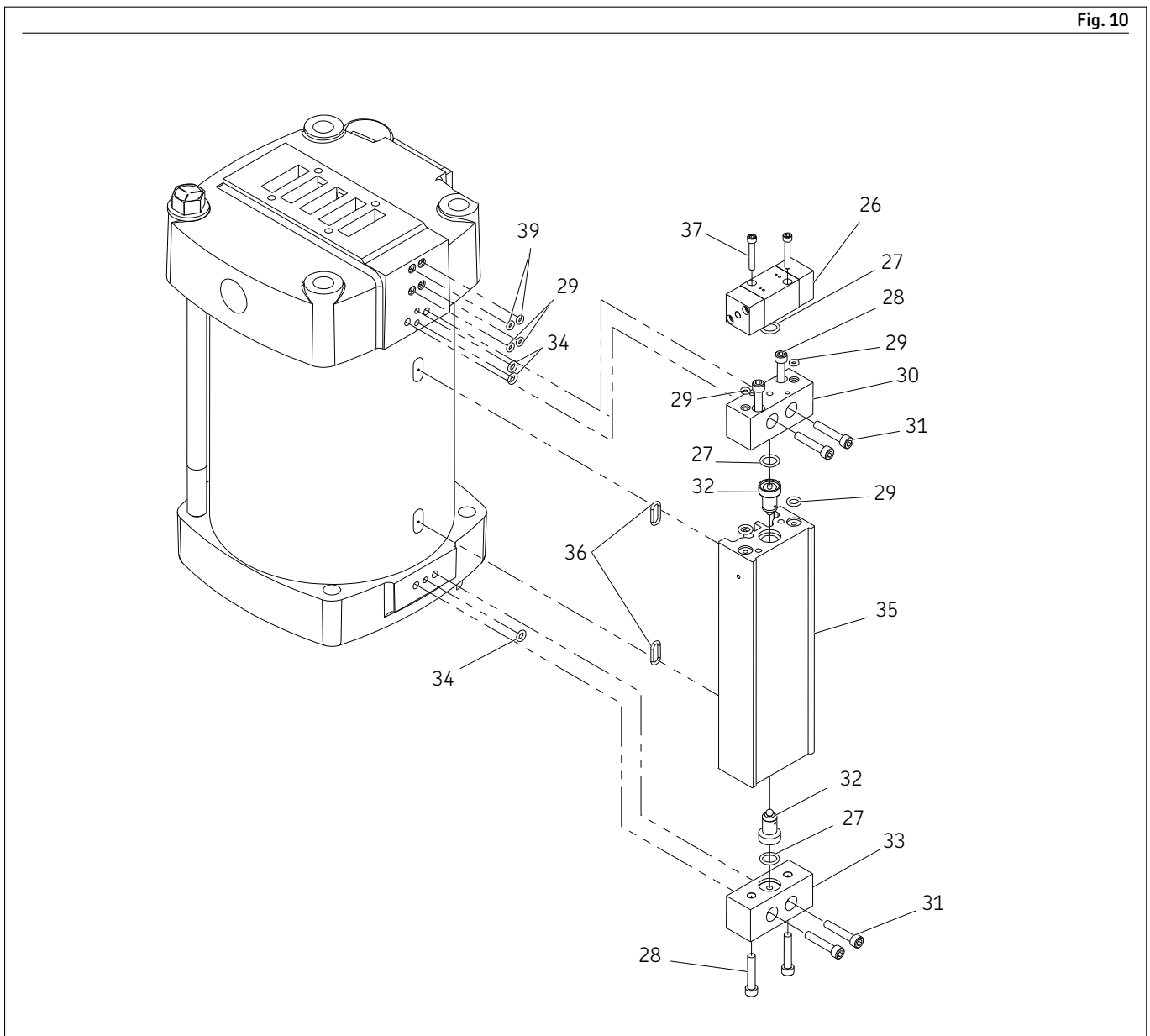
Do not check, service or repair any part of motor with air supply connected or before relieving pressure to motor. Failure to comply may result in serious personal injury and/or damage to equipment.

Fig. 9



Pilot bar subassembly

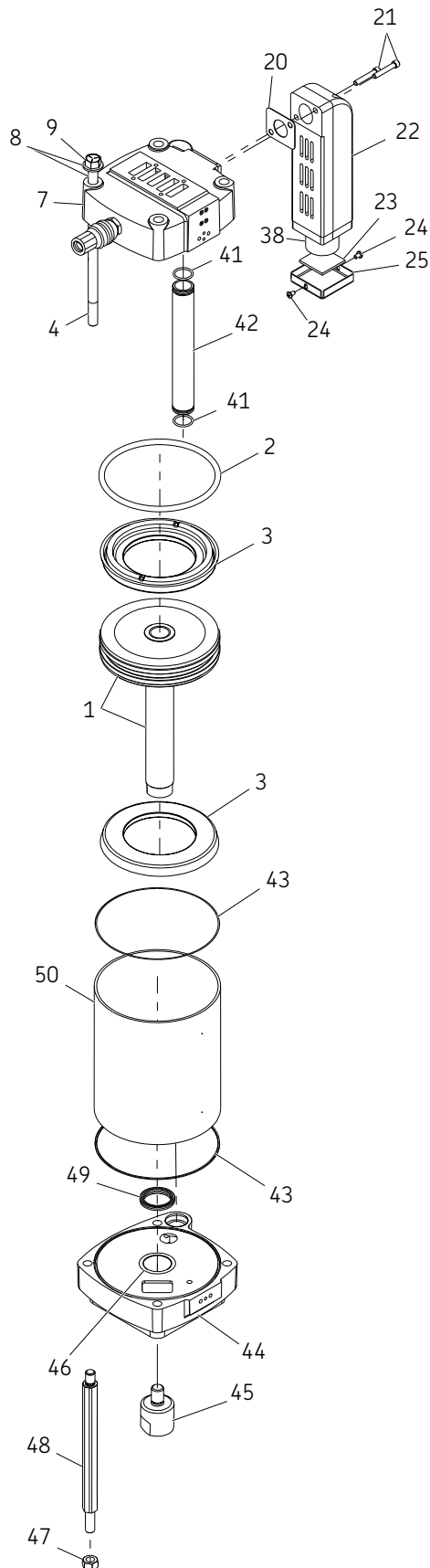
- 1 Remove four screws (31), two on upper bracket (30) and two on lower bracket (33).
- 2 Pull out pilot bar subassembly (35) and remove o-rings (29, 34, 36 and 39).
- 3 Remove two screws (37) and lift off relay valve (26).
- 4 Remove o-rings (27 and 29) from upper bracket (30).
- 5 Remove four screws (28), two on upper bracket (30) and two on lower bracket (33).
- 6 Lift off upper bracket (30) and lower bracket (33).
- 7 Remove o-rings (27 and 29) and two air signal valves (32).



Cylinder tube and muffler

Fig. 11

- 1 Remove two screws (21) and pull off muffler (22) (→ Fig. 11).
- 2 Remove gasket (20).
- 3 Remove two screws (24) to release end element (23) from muffler plate (25).
- 4 Remove muffler element (38).
- 5 Unscrew four nuts (9) with open end wrench and remove tie bolts (8).
- 6 Remove four tie rods (4).
- 7 Unscrew air tube (42) from upper casting (7) and lower casting (44).
- 8 Remove o-rings (41).*
- 9 Lift upward and remove upper casting (7).
- 10 Remove o-ring (2).
- 11 Remove upper piston seal (3).
- 12 Remove piston and piston rod (1) from rod bearing (46).
- 13 Remove lower piston seal (3).
- 14 Remove cylinder seal (43) on top of cylinder tube (50).
- 15 Lift upward and remove cylinder tube (50).
- 16 Remove remaining cylinder seal (43) and rod bearing (46).
- 17 Remove adapter (45) from bottom of lower casting (44).
- 18 Remove U-cup (49) from bottom of lower casting (44).
- 19 Remove four nuts (47) from connecting rods (48) with open end wrench.
- 20 Remove four connecting rods (48) from lower casting (44).



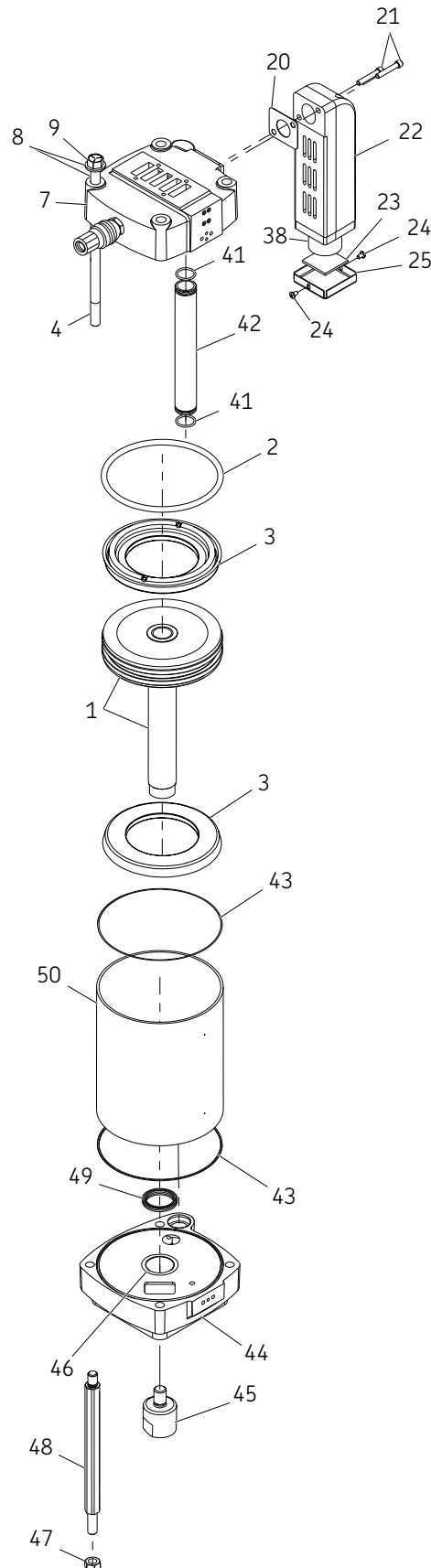
* Indicates change.

Service and assembly procedure

Fig. 12

Cylinder tube and muffler

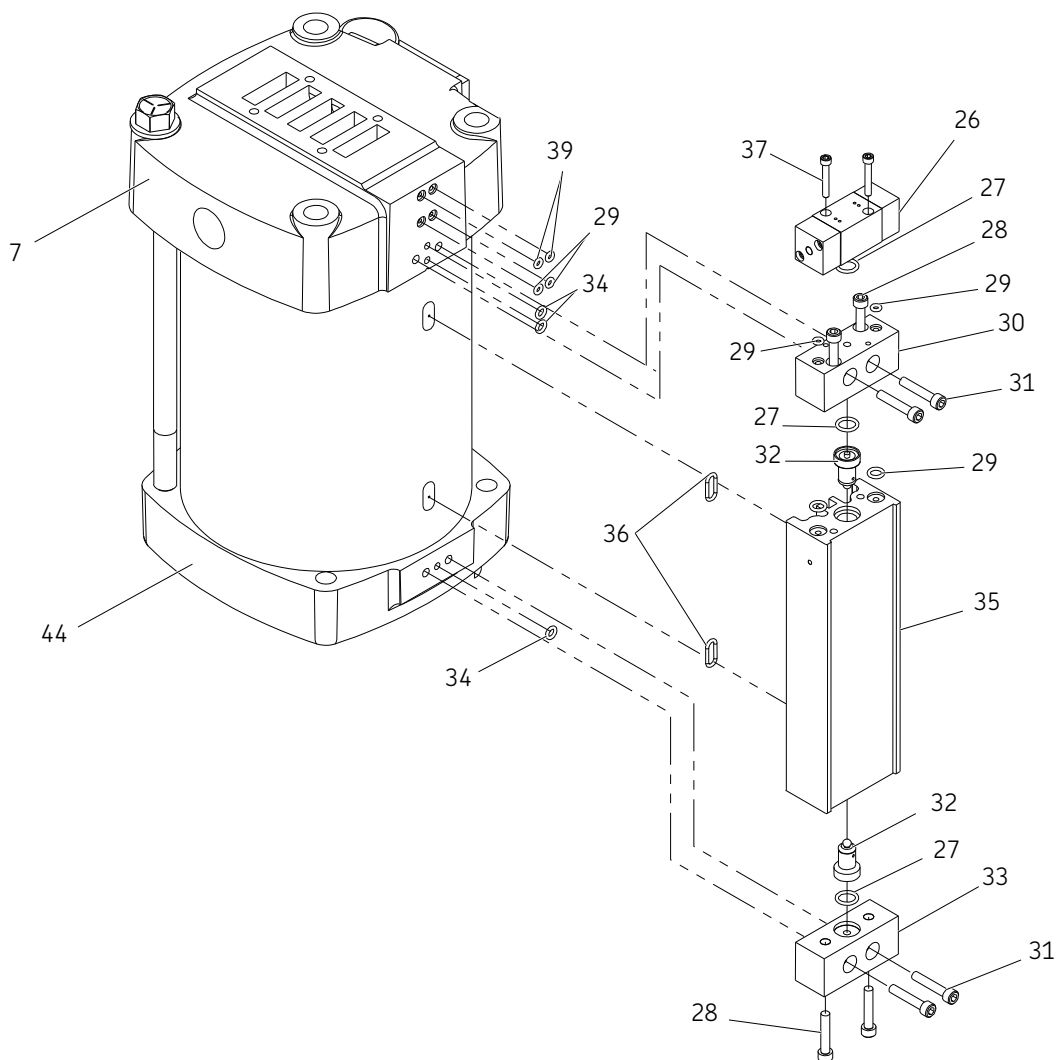
- 1 Insert four connecting rods (48) into lower casting (44) (→ Fig. 12).
- 2 Tighten four nuts (47) on connecting rods (48) with open end wrench.
- 3 Place U-cup (49) on bottom of lower casting (44).
- 4 Insert adapter (45).
- 5 Position cylinder seal (43) and rod bearing (46) on top of lower casting (44).
- 6 Slide lower piston seal (3) onto bottom of piston rod (1).
- 7 Tighten piston and piston rod (1) into rod bearing (46).
- 8 Place upper piston seal (3) on top of piston rod assembly (1).
- 9 Lower cylinder tube (50) into position on lower casting (44).
- 10 Insert cylinder seal (43) on top of cylinder tube (50).
- 11 Place o-ring (2) on top of piston (1).
- 12 Insert o-ring (41) into lower casting (44).
- 13 Screw in air tube (42) to lower casting (44).
- 14 Place remaining o-ring (41) on top of air tube and screw air tube into upper casting (7).
- 15 Insert four tie rods (4).
- 16 Tighten four nuts (9) and tie bolts (8) with open end wrench.
- 17 Insert muffler element (38) to bottom of muffler (22).
- 18 Place muffler plate (23) inside end element (25) and tighten two screws (24) to secure.
- 19 Align gasket (20) with muffler (22) and tighten muffler to upper casting (7) with two screws (21).



Pilot bar subassembly

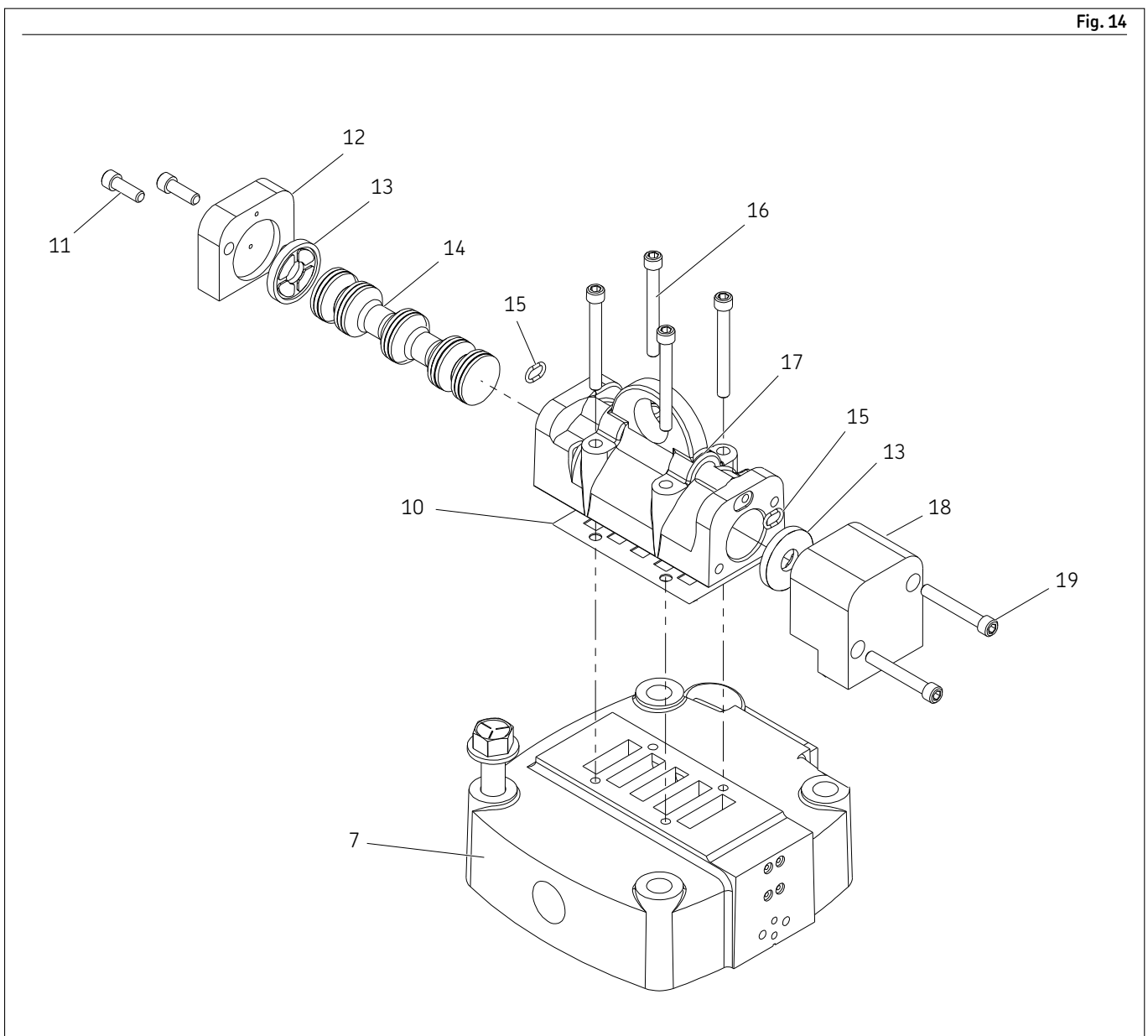
- 1 Insert o-rings (27 and 29) and two air signal valves (32) to top of pilot bar subassembly (35) (→ Fig. 13).
- 2 Place upper bracket on top of pilot bar subassembly (35) and secure by tightening two screws (28).
- 3 Insert air signal valve (32) to bottom of pilot bar subassembly (35).
- 4 Place o-ring (27) in slot of lower bracket (33) and tighten to bottom of pilot bar subassembly (35) with two screws (28).
- 5 Insert o-rings (27 and 29) and tighten relay valve (26) to top of pilot bar subassembly (35) with two screws (37).
- 6 Position o-rings (29, 34, 36 and 39) with appropriate slots and slide two screws (31) through lower bracket (33) and two screws (31) through upper bracket (30).
- 7 Tighten screws (31) to secure pilot bar subassembly (35) to casting (7 and 44).

Fig. 13



Power valve

- 1 Place gasket (10) on top of upper casting (7) (→ Fig. 14).
- 2 Align valve body (17) with gasket (10) and secure to upper casting (7) with four screws (16).
- 3 Insert valve spool (14) to valve body (17).
- 4 Place o-rings (15) into slot on each end of valve body (17).
- 5 Insert spool bumpers (13), one on each end.
- 6 Align end caps (12 and 18) and secure with four screws (11 and 19), two on each end.



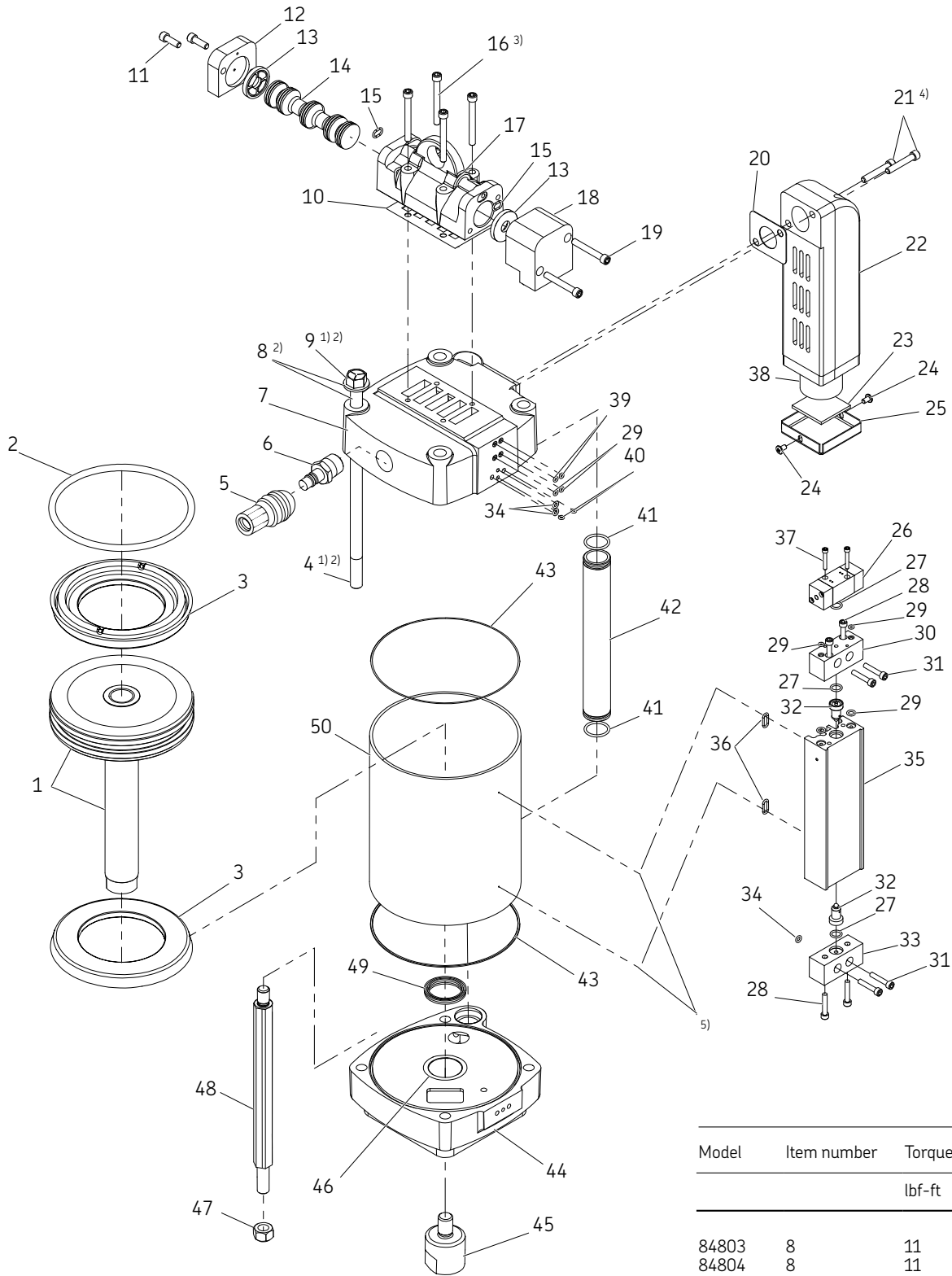
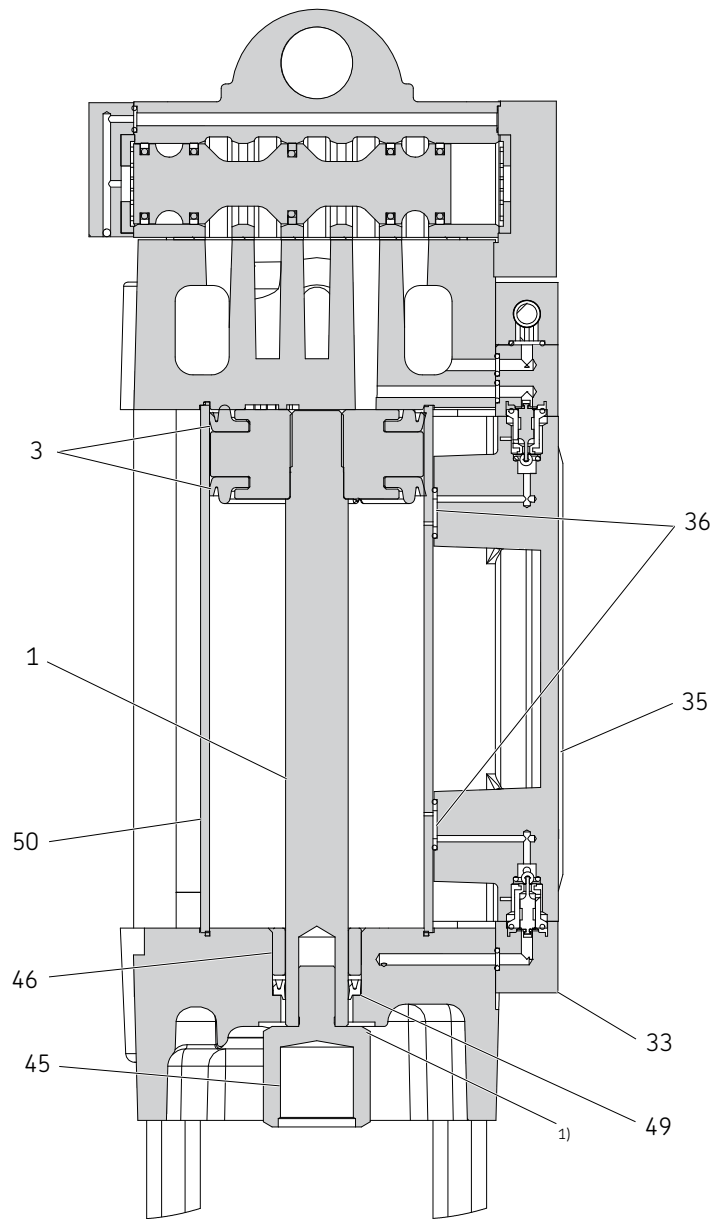


Table 3

Model	Item number	Torque to	
		lbf-ft	Nm
84803	8	11	15
84804	8	11	15
84806	8	26	35
84808	8	53	72
86810	4 and 9	60	81

1) Used on model 86810 only.
 2) Torque (4, 8 and 9) as shown in Table 3.
 3) Torque 10 to 12 lbf-ft (14 to 16 Nm).
 4) Torque to 50 lbf-in (6 Nm). After 24 hours, torque to 50 lbf-in (6 Nm).
 5) Align two holes on cylinder tube (50) with two holes on pilot bar (35) before tightening tie rods (4) so proper seal with o-rings is achieved.

Models 84803 and 84804



¹⁾ Assemble adapter to piston rod using thread locker on threads. Torque 60 to 65 lbf-ft (81 to 88 Nm).

Models 84806, 84808 and 86810

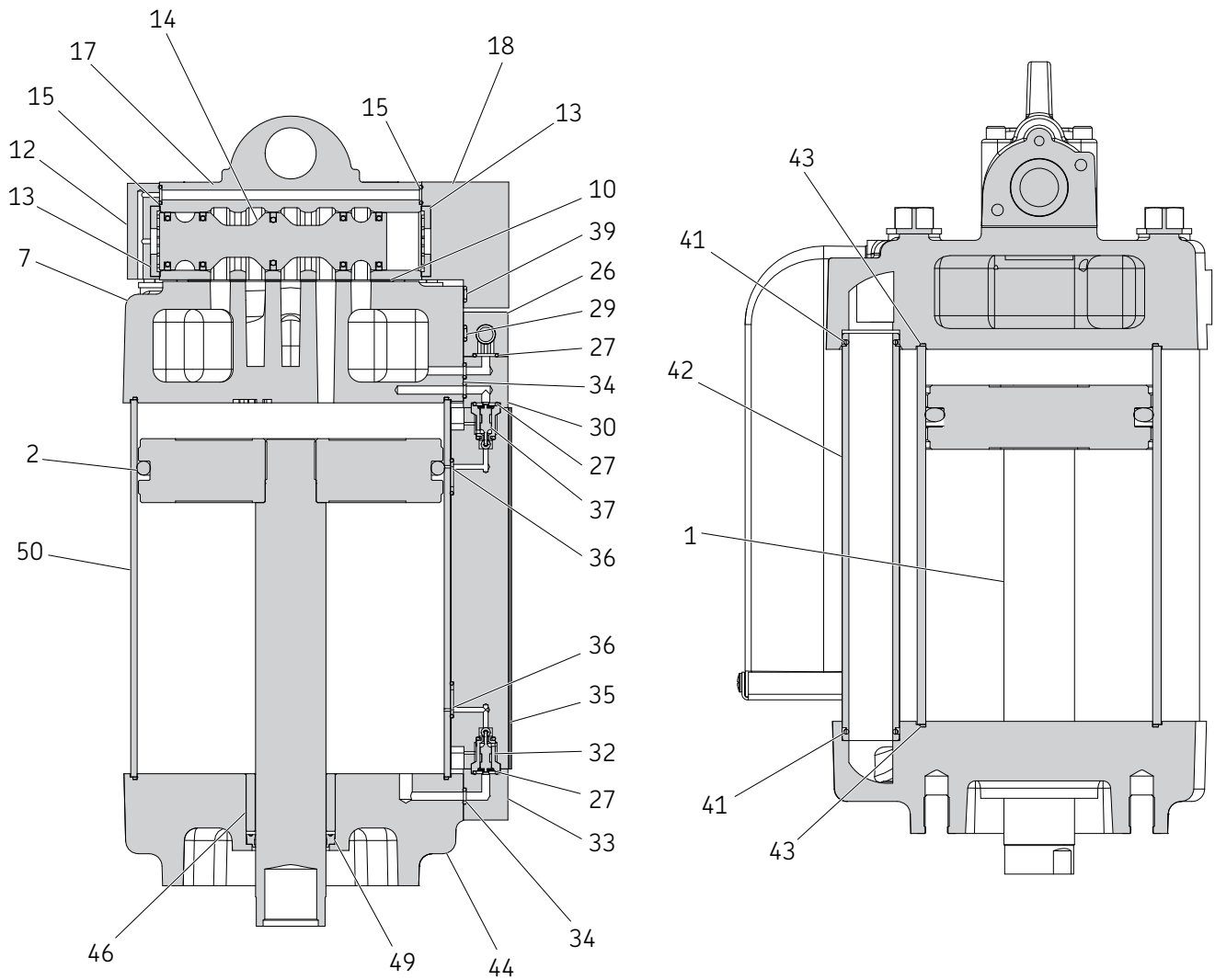
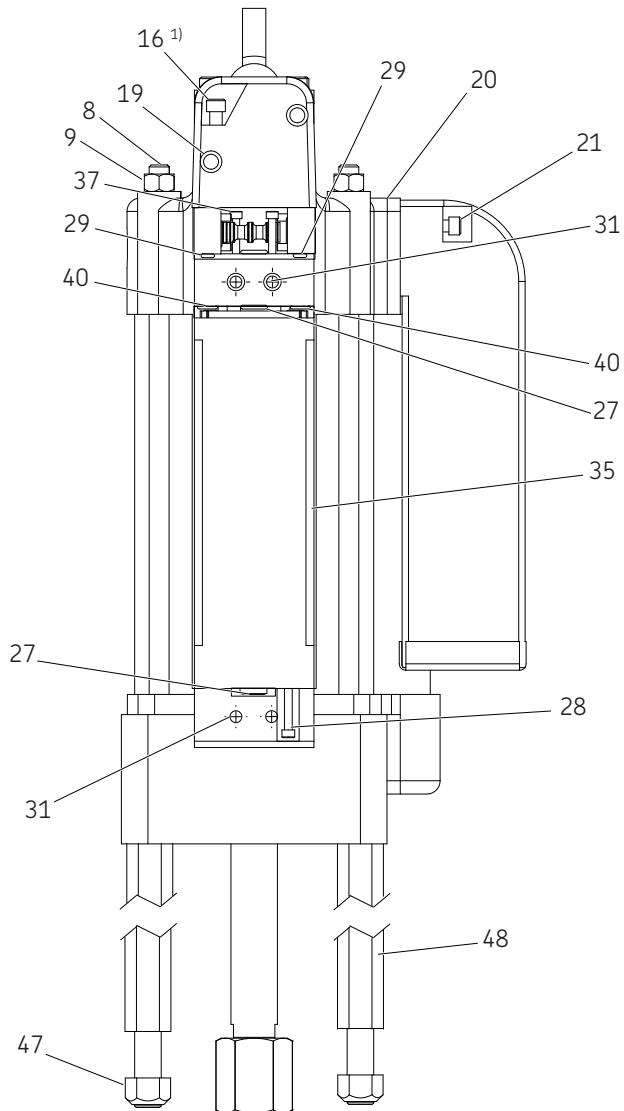


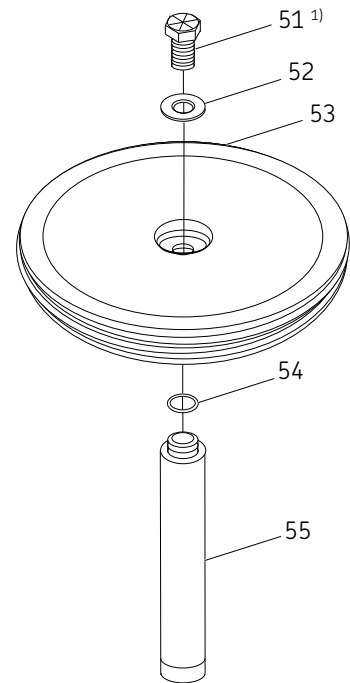
Fig. IPB 4



¹⁾ Torque 10 to 12 lbf-ft (14 to 16 Nm).

Fig. IPB 5

Piston assembly for model 86810



¹⁾ Torque 115 to 125 lbf-ft (156 to 170 Nm).

Parts list

Item	Description	Quantity	Model 86810 10 in (254 mm)	Model 84808 8 in (203 mm)	Model 84806 6 in (152 mm)	Model 84804 4 1/4 in (107 mm)	Model 84803 3 in (76 mm)
1	Piston rod assembly	1	247449	241740	241741	241742	241743
2	O-ring piston (Nitrile)	1	84789 1)	84791 1)	84792 1)	N/A	N/A
3	Seal, piston	2	N/A	N/A	N/A	84793 1)	84794 1)
4	Tie rod	4	247295	N/A	N/A	N/A	N/A
5	Coupler	1	662012	662012	662012	655008	655008
6	Nipple	1	660112	653112	653112	653112	653112
7	Upper casting	1	247304	241750	241751	241752	241753
8	Tie bolts	4	N/A	279386	279385	279384	279384
9	Nut	4	247298	N/A	N/A	N/A	N/A
10	Gasket	1	84968 4)	84968 4)	84968 4)	84968 4)	84968 4)
11	Screw	2	244995	244995	244995	244995	244995
12	Cap, valve	1	241755	241755	241755	241755	241755
13	Bumper, valve	2	84968 4)	84968 4)	84968 4)	84968 4)	84968 4)
14	Spool, valve	1	244802 5)	244802 5)	244802 5)	244802 5)	244802 5)
15	O-ring (Nitrile)	2	84968 4)	84968 4)	84968 4)	84968 4)	84968 4)
16	Screw (3/4-20 x 2 1/4 in)	4	244975	244975	244975	244975	244975
17	Body, valve	1	244802 5)	244802 5)	244802 5)	244802 5)	244802 5)
18	Cap, valve	1	247302	241759	241760	241761	241761
19	Screw	2	247299	244993	241783	244994	244994
20	Gasket	1	84939 2)	84939 2)	84939 2)	84939 2)	84939 2)
21	Screw (3/4-20 x 1 1/2 in)	2	50051	50051	50051	50051	50051
22	Muffler body	1	241021	241021	241021	241021	241021
23	End element	1	84939 2)	84939 2)	84939 2)	84939 2)	84939 2)
24	Screw, self tapping (10-32)	2	66962	66962	66962	66962	66962
25	Muffler plate	1	241027	241027	241027	241027	241027
26	Relay valve	1	242787	242787	242787	242787	242787
27	O-ring (Nitrile)	3	84967 3)	84967 3)	84967 3)	84967 3)	84967 3)
28	Screw (10 - 32 x 1 in)	4	50823	50823	50823	50823	50823
29	O-ring (Nitrile)	4	84967 3)	84967 3)	84967 3)	84967 3)	84967 3)
30	Bracket, upper	1	241784	241784	241784	241784	241784
31	Screw (3/4-20 x 7/8 in)	4	50526	50526	50526	50526	50526
32	Air signal valve	2	241768	241768	241768	241768	241768
33	Bracket, lower	1	241785	241785	241785	241785	241785
34	O-ring (Nitrile)	3	84967 3)	84967 3)	84967 3)	84967 3)	84967 3)
35	Pilot bar	1	242786	242786	242786	242786	242799
36	O-ring (Nitrile)	2	84967 3)	84967 3)	84967 3)	84967 3)	84967 3)
37	Screw (6-32)	2	50816	50816	50816	50816	50816
38	Muffler element	1	84939 2)	84939 2)	84939 2)	84939 2)	84939 2)
39	O-ring (Nitrile)	2	84968 4)	84968 4)	84968 4)	84968 4)	84968 4)
40	O-ring (Nitrile)	2	84967 3)	84967 3)	84967 3)	84967 3)	84967 3)
41	O-ring (Nitrile)	2	84789 1)	84791 1)	84792 1)	84793 1)	84794 1)
42	Air tube	1	247336	241748	241748	241749	241749
43	Seal, cylinder (Nitrile)	2	84789 1)	84791 1)	84792 1)	84793 1)	84794 1)
44	Lower casting	1	247303	241773	241774	241775	241776
45	Adapter	1	N/A	N/A	N/A	241789	241789
46	Rod bearing	1	247296	241732	241732	241733	241733
47	Nut (1/2-20)	4	236203	236203	236203	236203	236203
48	Connecting rod	4	241023	241023	241023	241023	241023
49	U cup (Nitrile)	1	84789 1)	84791 1)	84792 1)	84793 1)	84794 1)
50	Cylinder tube	1	247448	241744	241745	241746	241747
51	Screw	1	272736	N/A	N/A	N/A	N/A
52	Washer	1	272737	N/A	N/A	N/A	N/A
53	Piston	1	272766	N/A	N/A	N/A	N/A
54	O-ring (Nitrile)	1	84789 1)	N/A	N/A	N/A	N/A
55	Piston rod	1	272767	N/A	N/A	N/A	N/A

1) Included in cylinder tube soft parts kit.

2) Included in muffler element kit.

3) Included in soft parts kit for pilot bar subassembly.

4) Included in soft parts kit for power valve subassembly.

5) Included in power valve spool and body kit.

Series III air motor kits*

Used on model	Description	Kit number
84803	Cylinder tube soft parts kit	84794
84804	Cylinder tube soft parts kit	84793
84806	Cylinder tube soft parts kit	84792
84808	Cylinder tube soft parts kit	84791
84610	Cylinder tube soft parts kit	84789
All series III air motors	Power valve soft parts kit	84968
All series III air motors	Pilot bar soft parts kit	84967
All series III air motors	Muffler element kit	84939

NOTE: Complete overhaul requires use of the appropriate cylinder tube soft parts kit, plus all three of the common kits (power valve, pilot bar and muffler element) listed.

Series III air motor assemblies*

Used on model	Description	Kit number
All series III air motors	Air signal valve	241768
84804	Pilot bar subassembly	242786
84806	Pilot bar subassembly	242786
84808	Pilot bar subassembly	242786
84610	Pilot bar subassembly	242786
All series III air motors	Relay valve	242787
All series III air motors	Muffler with gasket	242788
86810	Power valve subassembly	244800
84808	Power valve subassembly	244804
All series III air motors	Power valve spool and body	244802
84806	Power valve subassembly	244806
84803	Power valve subassembly	244808
84804	Power valve subassembly	244808
84803	Pilot bar subassembly	242799

* Indicates change.

Troubleshooting

Problem	Possible cause	Solution
Air motor is not working and air is coming from exhaust.	Restricted or inadequate air supply.	Check air supply and adjust to minimum recommended level. Check air supply hose diameter and change it to minimum recommended size (see specifications). Check size of FRL and Quick disconnect coupling. Replace if small size or restricted.
Erratic or accelerated operation with short stroking.	Dirty or damaged relay valve (26) or air signal valve (32).	Check valves and clean if necessary. Replace any damaged seals or worn parts.

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Warranty

The instructions do not contain any information on the warranty.
This can be found in the General Conditions of Sales, available at:
www.lincolnindustrial.com/technicalservice or www.skf.com/lubrication.

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