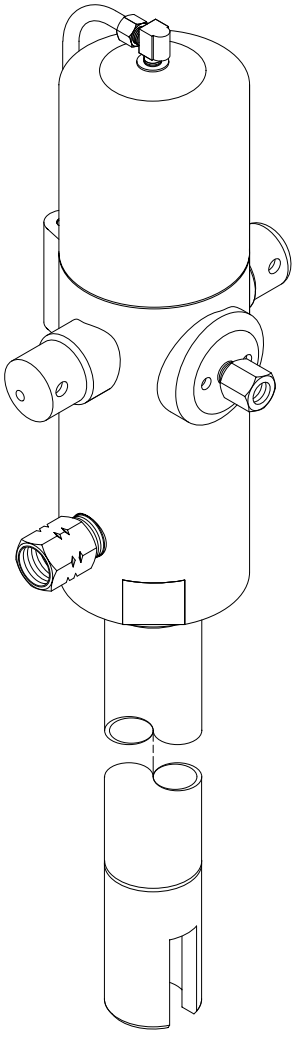
High-pressure pump

Models 331380, series -A5, -B5, -C5, -D5, -E1, -M1, -MA, -MB, and -N1



Date of issue	**August 2020**
Form number	**670629**
Version	**2**

Contents

Safety

- Read and carefully observe these installation instructions before installing, operating or troubleshooting pump. Pump must be installed, maintained and repaired exclusively by persons familiar with instructions.
- Install assembly only after safety instructions and this guide have been read and are completely understood.
- Review parts list and nomenclature prior to disassembly or operation.
- Adequate personal protection must be used to prevent splashing of material on skin or in eyes.
- Always disconnect power source (electricity, air or hydraulic) from pump when it is not being used.
- This equipment generates very high grease pressure. Extreme caution should be used when operating this equipment as material leaks from loose or ruptured components can inject fluid through skin and into body. If any fluid appears to penetrate skin, seek attention from a doctor immediately.
- Do not treat injury as a simple cut. Tell attending doctor exactly what type of fluid was injected.
- Any other use not in accordance with instructions will result in loss of claim for warranty or liability.
- Do not misuse, over-pressurize, modify parts, use incompatible chemicals, fluids, or use worn and/or damaged parts.
- Do not exceed stated maximum working pressure of pump or of lowest rated component in system.
- Always read and follow fluid manufacturer's recommendations regarding fluid compatibility and use of protective clothing and equipment.
- Failure to comply may result in death or serious injury.

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.

⚠ 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.

Description

Model 331380 series pumps consist of a reciprocating air motor and a double-acting pump tube.

These high-pressure (50:1 ratio) pumps are designed to deliver a range of light to heavy lubricants directly from an original container.

Each pump model is designed with a pump tube length to accommodate different size containers (**→ Table 3**, **page 3**).

The difference in length of pump tubes for the two 12.5 kg models is due to cover design.

Model 331380-N1 bolts to a cover with a flat design (obsolete). Model 331380-E1 mounts to a cover with a bung adapter. See section entitled *Pump accessories* (**page 3**) for details.

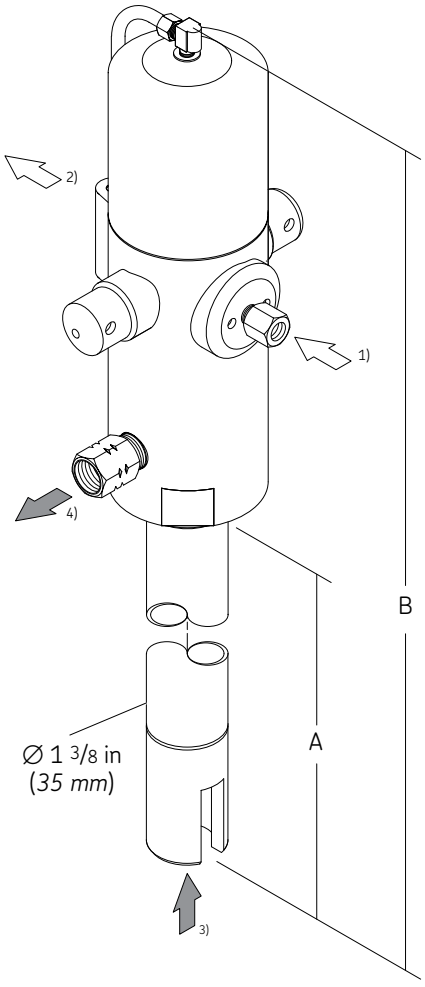
Pump model 331380-MA and -MB are equipped with air motor model 324300-M. This air motor contains BSPP air inlet and BSPT material outlet adapters (**→ Table 2**, **page 3**).

Nameplates

All models except 331380-C5, 331380-D5, and 331380-N1 have nameplates.

Fig. 1

Pump dimensions



1) Air inlet
2) Air outlet
3) Material inlet
4) Material outlet

Table 1

Air motor specifications (324300-5, 324300-M)

Piston diameter	2 7/16 in (*6.2 cm*)
Stroke	1 5/8 in (*4.1 cm*)
Air inlet	1/4 in NPSI
Max air pressure	150 psi (*10.3 bar*)

Table 2

Air motor adapters (324300-M)

Air inlet adapter	1/4 in BSPP(f) × 1/4 in NPSI(m)
Material outlet adapter	3/8 in BSPT(f) × 3/8 in NPTF(m)

Table 3

Dimensions

Pump model	Container	Length	
		Dimension "A"	Dimension "B"
331380-A5, -C5	120 lb	27 3/4 in (*70.5 cm*)	38 1/8 in (*96.8 cm*)
331380-MA 1)	50 kg	27 3/4 in (*70.5 cm*)	38 1/8 in (*96.8 cm*)
331380-B5, -D5	400 lb	37 in (*94 cm*)	47 3/8 in (*120.3 cm*)
331380-MB 1)	180 kg	37 in (*94 cm*)	47 3/8 in (*120.3 cm*)
331380-E1	12.5 kg	15 1/4 in (*38.7 cm*)	26 5/8 in (*67.6 cm*)
331380-N1	12.5 kg	12 in (*30.5 cm*)	22 3/8 in (*56.8 cm*)
331380-M1	20 kg	19 in (*48.3 cm*)	29 3/8 in (*74.6 cm*)

1) With 324300-M air motor (**→ Table 1, page 3**)

Early Model Pumps

Earlier versions of these model pumps did not contain seals in the tube assembly. Piston and primer rod cycled in "select-fit" bores (→ **Fig. 2**, **page 4**).

Any earlier model pump that has not been repaired since 1983 requires a 393516 conversion kit.

NOTE

In addition to the contents within the kit, pump tube must be replaced (→ **Table 4**, **page 4**).

Install Kit

To reassemble pump with conversion kit, follow procedures outlined in section entitled *Assembly* (**page 8**).

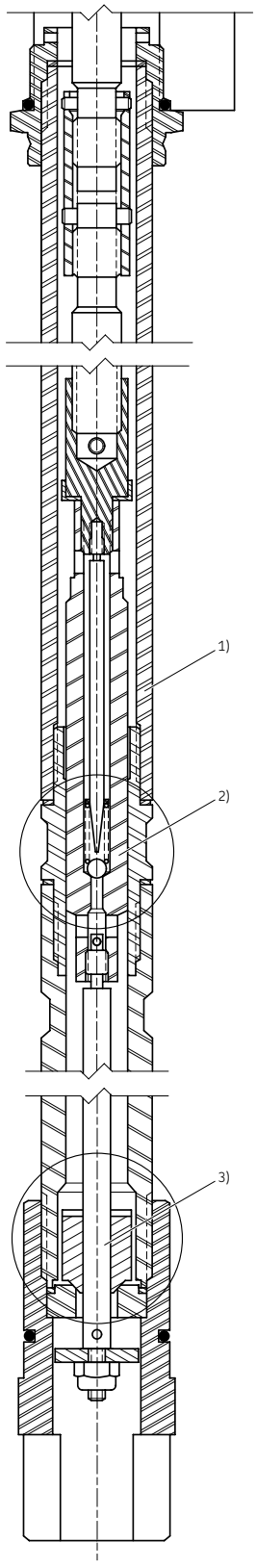
Table 4

Pump tubes

Model	Tube length	Part
331380-A5, -C5, -MA	Tube, 21 1/4 in (*540 mm*)	337392
331380-B5, -D5	Tube, 30 7/16 in (*773 mm*)	337392-2
331380-E1	Tube, 9 in (*228 mm*)	337392-1
331380-M1	Tube, 12 1/2 in (*318 mm*)	337392-4
331380-N1	Tube, 5 1/2 in (*140 mm*)	337392-3

Fig. 2

Early pump tubes



1) Pump tube
2) Piston
3) Primer rod

Pump performance

Pump's ability to deliver material is based on pressure (psi/bars) and quantity (cfm/lpm) of air supplied to motor and amount of material discharge backpressure to be overcome within system.

This chart (→ **Fig. 3**, **page 5**) contains curves based on three different air pressures. Curves relate delivery in ounces (grams) per minute (X axis) to air consumption in cubic feet (liters) per minute (right Y axis) and to material discharge pressure in psi/bars (left Y axis).

Table 5

Pump tube specifications

Material outlet	3/8 in NPTF
Max material pressure	7500 psi (*517 bar*)
Max delivery (approximate)	39 oz/min (*1100 g/min*)
Displacement per cycle	0.28 in³ (*4.54 cm³*)

Table 6

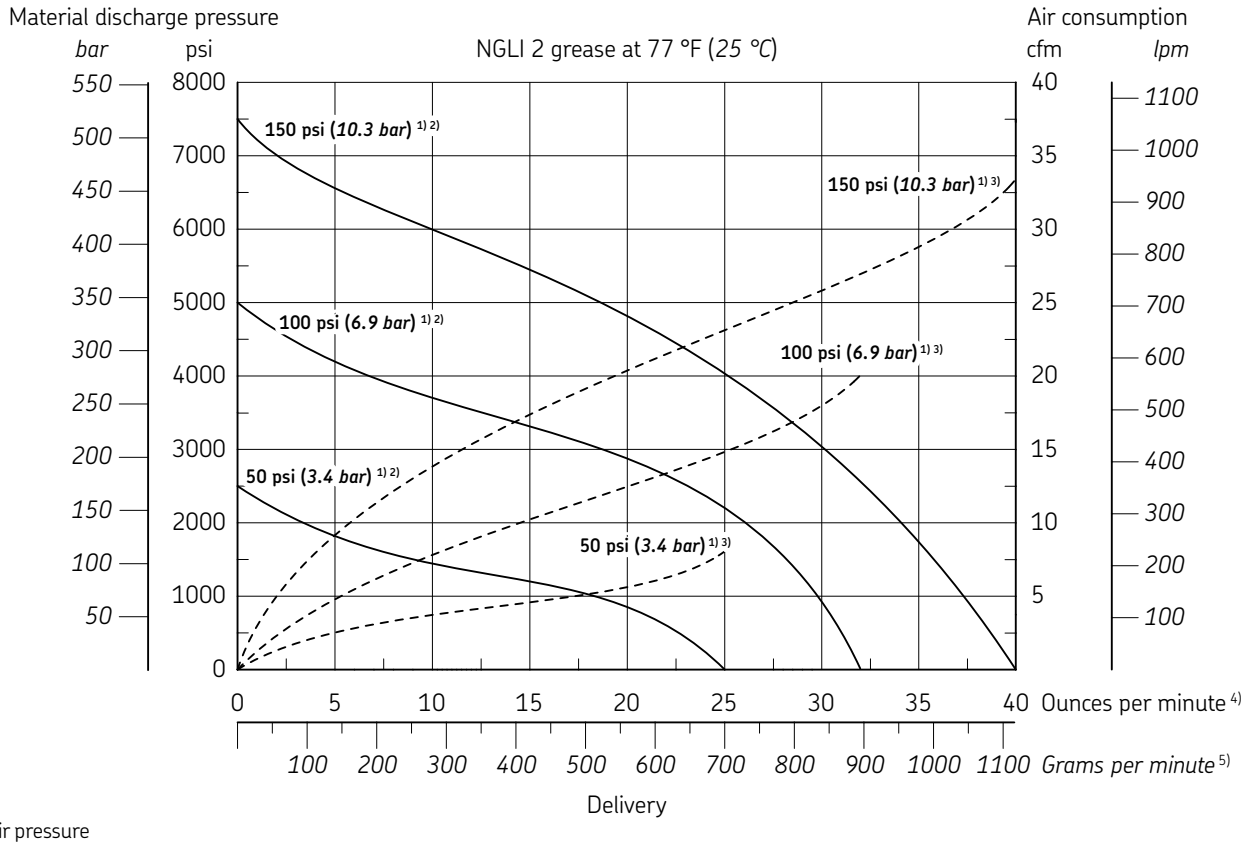
Pump accessories

Model	Container	Follower	Cover	Bung adapter
331380-A5, -C5	120 lbs	338802	338371	326750
331380-MA	50 kg	338993	338983	326750
331380-B5, -D5	400 lbs	338911	318040-4	326750
	180 kg	338984	338984	326750
331380-E1	12.5 kg	338991	338981	326750
331380-M1	20 kg	338992	338982	326750
331380-N1	12.5 kg	338991	Obsolete [1]	–

[1] Design is flat for bolt-on application

Fig. 3

Pump performance
Delivery versus discharge pressure and air consumption.



[1] Air pressure
[2] Material discharge pressure
[3] Air consumption
[4] 123 ounces approximates 1 gallon
[5] 840 grams approximates 1 liter

Maintenance and repair

⚠ WARNING
Prior to performing any maintenance, safety precautions must be observed.
Failure to comply may lead to personal injury.

⚠ WARNING
Do not use halogenated hydrocarbon solvents such as methylene chloride or 1,1,1-trichloroethane in this pump. An explosion can result within an enclosed device capable of containing pressure when aluminum and/or zinc-plated parts in pump come in contact with halogenated hydrocarbon solvents.
Failure to comply may lead to death or serious personal injury.

⚠ WARNING
Release all pressure within system prior to performing any overhaul procedure.
- Disconnect air supply line from pump motor.
- Into an appropriate container, operate control valve to discharge remaining pressure within system.

Failure to comply may lead to personal injury.

⚠ WARNING
Do not point a control valve at any portion of body or another person. Accidental discharge of pressure and/or material can occur.
Failure to comply may lead to death or serious personal injury.

Overhaul

NOTE
Refer to **Fig. IPB 1**, **page 12** for component identification on all overhaul procedures.

Disassembly

1 Secure pump assembly in a soft-jaw vise at adapter (**3**).
2 Extend primer rod (**27**) to end of primer body (**33**). Apply air to motor as necessary.
3 Gently remove nut (**30**) from primer rod using an appropriate size punch in hole of primer rod to prevent rotation (→ **Fig. IPB 1**, **page 12**).
4 Remove primer disc (**29**) from primer rod.
5 Push primer rod into primer body.

Pump tube (outer components)

6 Rotate primer body using a large wrench or other suitable tool.

NOTE
Pump tube will break at one of three places. Unscrew separated portion from inner components of pump tube assembly.

7 Remove follower tube assembly (**31**) from inner tube assembly.
8 Unscrew air motor from adapter (**3**) and rotate air motor assembly.
9 Remove o-ring (**2**) from adapter.

NOTE
If pump was not leaking at top of tube (**16**), do not separate adapter from tube. Components are locked with low strength threadlocker.

10 Unscrew tube (**16**) from adapter as required and remove gasket (**4**).
11 Clamp retainer (**18**) horizontally in a soft-jaw vise.
12 Unscrew primer body from extension (**22**).
13 Remove o-ring (**32**) from primer body.

NOTE

Remove valve seat (**26**) squarely from primer body. Should valve seat cock during removal, realign and start again. Gasket (**4**) may interfere.

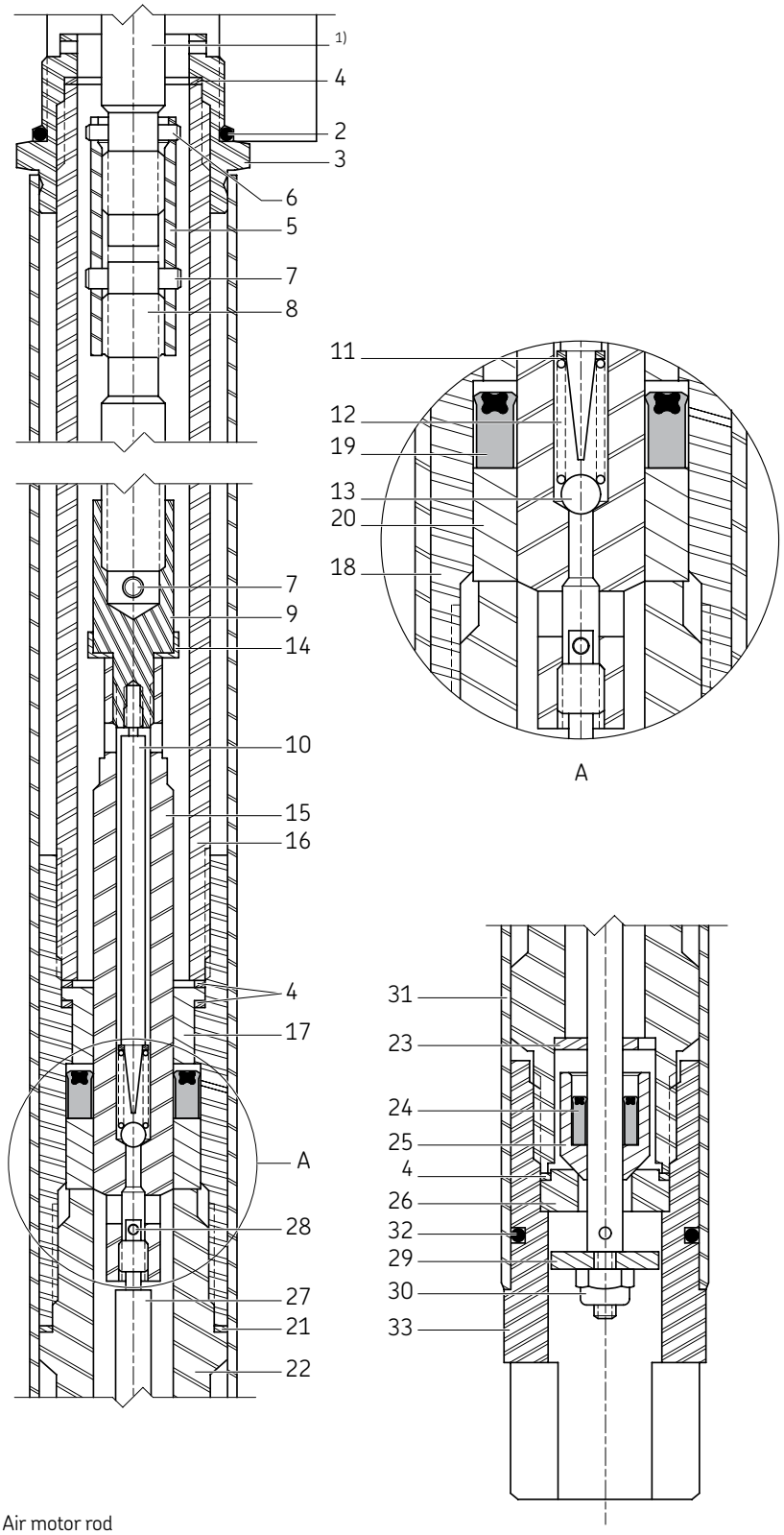
14 Remove valve seat (**26**) from primer body.
15 Remove gasket (**4**) from valve seat.
16 Unscrew extension (**22**) from retainer (**18**).
17 Remove gasket (**21**) from extension.
18 Remove valve body (**25**) from extension.
19 Remove stop washer (**23**).
20 Remove seal (**24**) from valve body.
21 Remove bearing (**20**) and seal (**19**) from retainer.
22 Unscrew tube (**16**) from retainer.
23 Remove gasket (**4**), bearing (**17**), and additional gasket (**4**) from retainer.

Pump tube (inner components)

24 Remove pin (**6**) securing coupling (**5**) to air motor rod. Unscrew coupling assembly from air motor rod.
25 Clamp coupling (**9**) in a soft-jaw vise.
26 Remove upper pin (**7**) that secures coupling (**5**) to rod (**8**). Unscrew rod from coupling.
27 Remove lower pin (**7**) that secures coupling (**9**) to rod. Unscrew rod from coupling.
28 Remove pin (**28**) that secures piston (**15**) to primer rod (**27**). Unscrew coupling from rod.
29 Straighten tabs on locking washer (**14**).
30 Unscrew piston (**15**) from coupling.
31 Remove locking washer from piston.
32 Remove ball (**13**) from piston.
33 Remove spring (**12**) and washer (**11**) from ball stop (**10**). Separate ball stop from coupling only if connection is loose.
34 Unscrew ball stop from coupling as needed.

Fig. 4

Pump tubes section view



1) Air motor rod

Clean and Inspect

NOTE
Use appropriate repair kit for replacement parts. Make sure all components are included in kit and in good condition before discarding used parts.

1 Clean all metal parts in cleaning solvent. Solvent should be environmentally safe.
2 Inspect all parts for wear and/or damage. Replace if necessary.
3 Inspect piston (**15**) closely. Use a magnifying glass to detect any wire draw marks. Replace if necessary.
4 Closely inspect mating surfaces of all components for any imperfections. Ensure a smooth and clean contact is obtained when assembled. (EXAMPLE: Place ball (**13**) into piston (**15**). Fill piston with solvent. Make sure no leakage occurs.)

Assembly

NOTE
Prior to assembly, certain components require lubrication in clean oil (→ **Table 7**, **page 9**).

Pump tube (inner components)

Refer to **Fig. 4**, **page 7** for a section view of pump tube assembly.

1 Place ball (**13**) into piston (**15**).

NOTE
If ball stop was previously locked with medium strength threadlocker, skip step 2.

2 Screw and seat ball stop (**10**) [with medium strength threadlocker] into coupling (**9**).
  2.1 Follow thread sealant manufacturer's recommendations.
  2.2 Tighten securely.
3 Install washer (**11**) and spring (**12**) onto ball stop.
4 Position locking washer (**14**) into groove on top of piston.
5 Screw coupling assembly into piston.
  5.1 Tighten from 19 - 21 ft-lbf (*25.4 - 28.3 Nm*).
  5.2 Continue to tighten and align nearest flat of coupling with tabs on locking washer as necessary.

NOTE
Press on ball to ensure it moves a minimum of 1/8 in (*3.2 mm*) prior to contact with ball stop. Should value be less, check to ensure ball stop is fully seated in coupling.

6 Bend tabs of locking washer upward onto coupling.
7 Screw primer rod (**27**) into piston until pin holes align. Use a spot of grease on all pins to prevent movement.
8 Install pin (**28**).
9 Screw rod (**8**) into coupling (**9**) until pin holes align.
10 Install pin (**7**).
11 Screw coupling (**5**) [end without counter-bore] onto rod until pin holes align.
12 Install additional pin (**7**).
13 Secure air motor assembly in a soft-jaw vise.
14 Screw coupling assembly onto air motor rod until pin holes align.
15 Install pin (**6**).

Pump tube (outer components)

16 Install and seat seal (**19**) [lips first] into bottom of retainer (**18**) (→ **Fig. IPB 1**, **page 12**).
17 Install and seat bearing (**20**) into bottom of retainer.
18 Install gasket (**21**) onto top of extension (**22**).
19 Screw extension [with low strength threadlocker] (gasket end first) into bottom of retainer. Do not tighten at this time.
20 Install gasket (**4**) into top of retainer.

21 Install and seat bearing (**17**) [small diameter first] and additional gasket (**4**) into top of retainer.
22 Screw tube (**16**) [with low strength threadlocker] into top of retainer. Do not tighten at this time.
23 Install and seat gasket (**4**) into adapter (**3**).
24 Screw tube assembly [with low strength threadlocker] into adapter. Do not tighten at this time.
25 Install o-ring (**2**) onto adapter.
26 Apply grease to piston (**15**) to aid installation.

⚠ CAUTION

Install outer component assembly onto inner assembly with care. Damage to seal (**19**) can occur.

27 Install outer component assembly onto inner assembly.
27.1 Use a slight twisting motion to pass seal.
27.2 At same time, thread adapter into base of air motor.

NOTE

Make sure flange portion of adapter seats flush against base of air motor. Should a gap exist, inspect components of air motor packing group.

28 Install stop washer (**23**) into extension.
29 Install and seat seal (**24**) [heel end first] into valve body (**25**).
30 Install valve body assembly (seal first) onto rod (**27**).
30.1 Make sure valve body assembly seats properly in extension.
31 Install follower tube (**31**) over outer tube assembly.
32 Install o-ring (**32**) onto primer body (**33**)
33 Install and seat valve seat (**26**) [large diameter first] into primer body.
34 Install and seat gasket (**4**) into primer body.
35 Screw primer body onto extension.
36 Place a large wrench or other suitable tool into slot of primer body.
36.1 Tighten all components of assembly securely.
36.2 Crush all gaskets.
37 Extend rod (**27**) from primer body. Apply air to motor as necessary.
38 Install primer disc (**29**) onto primer rod.
39 Gently screw nut (**30**) onto primer rod.
39.1 Use an appropriate size punch in hole of primer rod to prevent rotation (→ **Fig. IPB 1**, **page 12**).
39.2 Do not overtighten.

Table 7

Lubricated components

Item	Description	Dimensions (inner diameter)	Dimensions (outer diameter)
2	O-Ring	1 1/8 in (*28.58 mm*)	1 1/4 in (*31.75 mm*)
19	Seal	0.540 in (*13.7 mm*)	0.914 in (*23.22 mm*)
24	Seal	0.282 in (*7.16 mm*)	0.532 in (*13.52 mm*)
32	O-Ring	1 in (*25.4 mm*)	1 1/4 in (*31.75 mm*)

Installation and operation

⚠ WARNING

Maximum allowable output pressure of this pump is 7 500 psi (*517 bar*). Be sure that all system equipment and accessories are rated to withstand maximum working pressure of pump. Do not exceed maximum working pressure of lowest rated component in system.

Failure to comply may lead to death or serious personal injury.

⚠ CAUTION

Do not alter design of pump Never install additional components to outlet of pressurtrol.

Failure to comply may lead to personal injury.

⚠ WARNING

Never point a control valve at any portion of your body or another person. Lubricant discharged at high velocity can penetrate skin and cause severe injury. Should any fluid appear to puncture skin, get medical care immediately.

Failure to comply may lead to death or serious personal injury.

⚠ CAUTION

Ensure all components are in operable condition. Replace any suspect parts prior to operation.

Failure to comply may lead to personal injury.

Operation

1 Make sure air pressure at regulator reads zero.
2 Connect required air line components to air motor assembly (**1**).
3 Slowly supply air pressure [not to exceed 20 psi (*1.4 bars*)] to pump's motor. Pump assembly should cycle. If pump assembly does not cycle, refer to *Troubleshooting* (**page 14**) to determine cause.
4 With air pressure at zero, connect product hose to pressurtrol's material outlet. Direct hose into an appropriate collection container.
5 Place pump in grease.
6 Slowly supply air pressure to pump's motor.

Allow pump to cycle slowly until system and grease is free of air. If pump assembly does not prime, refer to *Troubleshooting* (**page 14**) to determine cause.

⚠ CAUTION

Should leakage occur anywhere within system, disconnect air to motor.

Failure to comply may lead to personal injury.

7 With air pressure at zero, attach a control valve to outlet hose of pump.
8 Set air pressure to 100 psi (*6.9 bar*).
9 Operate control valve into a container.
10 Allow pump to cycle until system and grease is once again free of air.
11 Shut off control valve.
11.1 Visually inspect pump for external leaks.
11.2 Pump should not cycle.
12 If pump does not stall, refer to *Troubleshooting* (**page 14**) to determine cause.
13 Check motor for air leakage. If motor leaks, refer to air motor service guide **670628** for details.

Installation

Refer to *Air line components* (**→ Table 8**, **page 11**) for additional air line components that should be incorporated into air piping system.

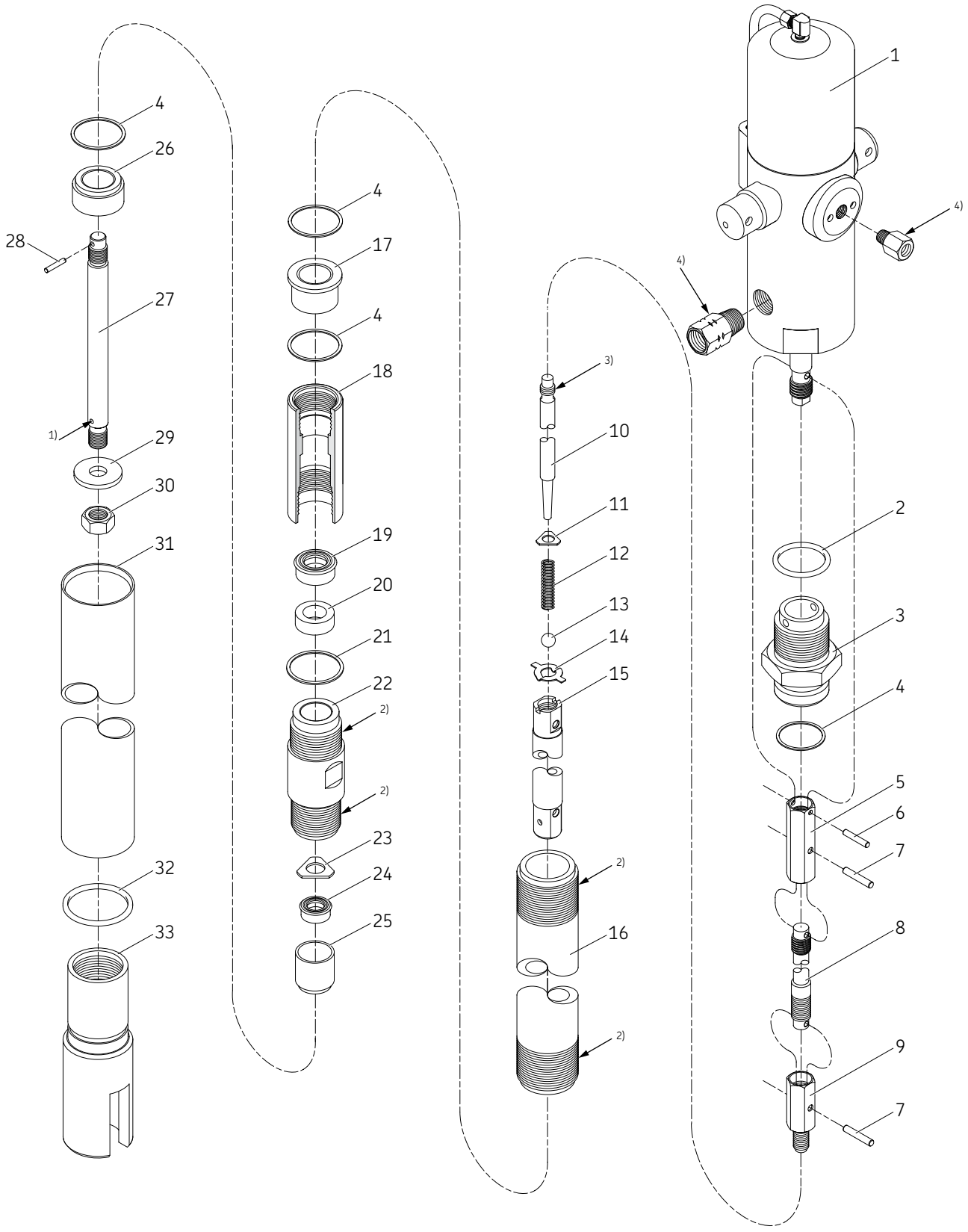
Table 8

Air line components

Part	Description
338860	Moisture separator/regulator and gauge combination
5604-3	Moisture separator
7604-B	Regulator and gauge
5904-3	Lubricator [1)]

[1)] Although air motor is lubricated at factory, life of motor can be extended with use of a lubricator.

Fig. IPB 1



1) Place punch here
2) Apply low strength threadlocker
3) Apply medium strength threadlocker
4) Part of air motor 324300-M

Service parts

Item	Description	Part	Quantity
1	Air motor assembly [1]		1
2 [2] [3]	O-ring, 1 1/8 in ID × 1 1/4 in OD	X171013-12	1 [4]
3	Adapter	324805	1
4 [2] [3]	Gasket (aluminum)	51017	4
5	Coupling	320974	1
6 [2] [3]	Pin, 0.088 in × 41/64 in	320971	1
7 [2] [3]	Pin, 0.120 in × 41/64 in	320975	2
8 [5]	Rod		1
9	Coupling	320705	1
10	Ball stop	320718	1
11	Washer	321605	1
12 [2] [3]	Spring, 0.75 in (*19 mm*)	320719	1
13 [2] [3]	Ball, 3/16 in	171700-12	1
14 [2] [3]	Lockwasher	317536	1
15 [3]	Piston	330332	1
16 [5]	Tube		1
17 [2] [3]	Bearing (brass)		1
18 [3]	Retainer	337391	1
19 [2] [3]	Seal, 0.540 in ID × 0.914 in OD		1
20 [2] [3]	Bearing (brass)		1
21 [2] [3]	Gasket (aluminum) 1.08 in ID		1
22 [3]	Extension	337388	1
23 [2] [3]	Washer, stop	317549	1
24 [2] [3]	Seal, 0.282 in ID × 0.532 in OD		1
25 [2] [3]	Valve body	337995	1
26 [2] [3]	Valve seat	320716	1
27 [3]	Primer rod, 3.91 in (*100 mm*)	330329	1
28 [2] [3]	Pin, 1/16 in × 0.50 in	131168	1
29 [2] [3]	Primer disc	320713	1
30 [2] [3]	Elastic stop nut, 12- 28	320712	1
31 [5]	Follower tube		1
32 [2] [3]	O-ring, 1 1/16 in ID × 1 5/16 in OD	X171000-20	1
33	Primer body	324437	1

Part numbers left blank are not available separately.
[1] See manual **670628** for air motor assembly
[2] Included in repair kit 393514
[3] Included in repair kit 393516
[4] Pack of ten
[5] See *Model specific part numbers* (**page 13**) for rod and tube lengths

Model specific part numbers

Item	Description	Part	Quantity
Models 331380-A5, -C5, -MA			
8	Rod, 17 3/4 in (*450 mm*)	320704-1	1
16	Tube, 21 1/4 in (*540 mm*)	337392	1
31	Follower tube, 25 9/16 in (*650 mm*)	324438-1	1
Models 331380-B5, -D5, -MB			
8	Rod, 27 in (*687 mm*)	320704-3	1
16	Tube, 30 7/16 in (*773 mm*)	337392-2	1
31	Follower tube, 34 11/16 in (*880 mm*)	324438-2	1
Model 331380-E1			
8	Rod, 5 1/2 in (*140 mm*)	320704-2	1
16	Tube, 9 in (*228 mm*)	337392-1	1
31	Follower tube, 13 5/16 in (*338 mm*)	324438-5	1
Model 331380-M1			
8	Rod, 9 in (*228 mm*)	320704-9	1
16	Tube, 12 1/2 in (*318 mm*)	337392-4	1
31	Follower tube, 16 13/16 in (*427 mm*)	324438-8	1
Model 331380-N1			
8	Rod, 2 in (*50 mm*)	320704-8	1
16	Tube, 5 1/2 in (*140 mm*)	337392-3	1
31	Follower tube, 9 13/16 in (*250 mm*)	324438-7	1

Repair kits

Kit number	Description
393514	Major repair kit
393516	Conversion kit [1]
393530-9	Seal kit, item **19** (quantity of 5)
393530-10	Seal kit, item **24** (quantity of 5)

[1] Tube required

Troubleshooting

Condition	Possible cause	Corrective action
Pump does not cycle	Air motor not operating properly	Inspect air motor and rebuild or replace as necessary
	Pump tube jammed and/or contains loose components	Rebuild pump tube
	Insufficient air pressure	Increase air pressure
Pump will not prime	Excessive cycling speed	Reduce air pressure
	Pump leaking internally	See *Internal leaks* (**page 14**)
Pump cycles rapidly	Product source empty	Replenish product
Pump cycles continuously, or slowly (once or twice/hour)	Pump leaking internally	See *Internal leaks* (**page 14**)
	Pump leaking externally	See *External leaks* (**page 14**)
	Distribution system leaking	Correct leak
External leaks		
Product leakage visible at top of adapter (**3**)	Initial tightening of adapter (**3**) to air motor assembly (**1**) not sufficient	Tighten adapter (**3**) into air motor assembly (**1**)
	Damaged o-ring (**2**)	Replace o-ring (**2**)
Product leakage visible at top of follower tube (**31**)	Initial tightening of tube (**16**) to adapter (**3**) not sufficient	Tighten tube (**16**) into adapter (**3**)
	Initial tightening of tube (**16**) to retainer (**18**) not sufficient	Tighten tube (**16**) into retainer (**18**)
	Initial tightening of extension (**22**) to retainer (**18**) not sufficient	Tighten extension (**22**) into retainer (**18**)
	Initial tightening of extension (**22**) to primer body (**33**) not sufficient	Tighten extension (**22**) into primer body (**33**)
	Gasket(s) (**4**) worn or improperly crushed	Replace gasket(s) (**4**)
	Gasket (**21**) worn or improperly crushed	Replace gasket (**21**)
Product leakage visible at bottom of follower tube (**31**)	Damaged o-ring (**32**)	Replace o-ring (**32**)
	Initial tightening of tube (**16**) to retainer (**18**) not sufficient	Tighten tube (**16**) into retainer (**18**)
Internal leaks		
Pump does not prime or cycles continuously, or slowly (once or twice/hour)	Foreign material between ball (**13**) and seat in piston (**15**)	Locate and eliminate source of foreign material.
	Foreign material between valve body (**25**) and valve seat (**26**)	Disassemble pump tube, clean, inspect, and replace worn or damaged components.
	Worn or damaged component(s) • Ball (**13**) • Piston (**15**) • Spring (**12**) • Valve body (**25**) • Valve seat (**26**) • Seal (**19**) • Seal (**24**) • Rod (**27**)	Disassemble pump tube, clean, inspect, and replace worn or damaged components.

This page left intentionally blank.

Warranty

The instructions do not contain any information on the warranty. This can be found in the Terms and Conditions, available at: www.skf.com/alemite.

skf.com | **alemite.com**

August 2020 · Form 670629 Version 2