Air Operated Grease Ratio Pumps 50:1

GP1 **GP2** **GP3** **GP4**

World-class Industrial High Pressure Grease pumps with guaranteed performance & hassle free operation

Pump dispenses grease at pressures upto 50 times the air inlet pressure

Designed to work in tough conditions - these are ideal for use in Industry, Workshop, Farm, Construction or as part of the Mobile Grease System

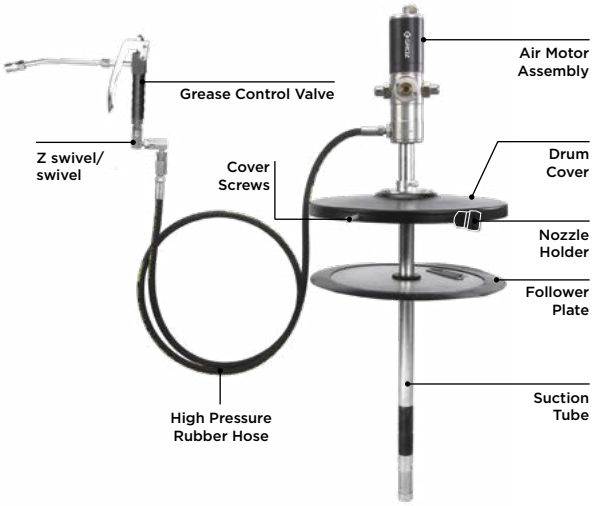
All metal construction, fully CNC machined with hardened wear resistant moving parts

Reciprocating piston operated 2-1/2" (63 mm) dia. air motor

Fitted with strainer at suction tube inlet for clean grease to the bearing

Supplied complete with drum cover, rubber lined follower plate, 7' (84") of high pressure grease hose, Z swivel/swivel* & professional grease control valve

*for GP4 only



SPECIFICATIONS

MODEL	GP1/GP4	GP2	GP3
SUCTION TUBE LENGTH	17.32" (440 mm)	28.74" (730 mm)	37.38" (950 mm)
WORKING PRESSURE	30 to 150 PSI (2–10 BAR)		
MAXIMUM AIR PRESSURE	150 PSI (10 BAR)		
MAXIMUM OUTLET PRESSURE	7,500 PSI (500 BAR)		
AIR INLET/PUMP OUTLET CONNECTION	1/4" BSP (F) / 1/4" NPT (F)		
AIR CONSUMPTION	230 LPM (61 GPM)		
GREASE OUTPUT (NLGI NO. 2 GREASE)	1.10 kg/min. (2.42 lbs/min.)		
NOISE LEVEL	81 db		
WETTED COMPONENTS	Steel, Brass, Aluminium, Polyurethane & Nitrile Rubber		
RECOMMENDED USE	With light and self collapsing grease up to NLGI No. 2		

CAT NR.	CAT NR.	FITS	DRUM COVER DIAMETER		FOLLOWER PLATE DIMENSIONS					
BSP THREADS	NPT THREADS				O.D. STEEL END		O.D. PLATE		I.D. GROMMET	
			(INCH)	(MM)	(INCH)	(MM)	(INCH)	(MM)	(INCH)	(MM)
PUMP ASSEMBLY										
GP0/ST/501/BSP	-	12.5 kg drums	11	284	9-3/64	230	10-1/8	257	1.16	29.5
GP4/ST6/501/BSP	-	25-50 lb / 5 gal. / 20-30 kg pails	13	330	10-1/4	260	12	305	1.16	29.5
GP1/ST/501/BSP	GP1/ST/501/N	25-50 lb / 5 gal. / 20-30 kg pails	12	310	9-1/2	241	11-11/32	288	1.16	29.5
GP2/ST/501/BSP	GP2/ST/501/N	120 lb / 16 gal. / 50-60 kg pails	15	381	12-11/16	322	15	380	1.16	29.5
GP3/ST/501/BSP	GP3/ST/501/N	400lb / 180 kg drums	24-1/2	612	21-5/8	550	23-11/16	602	1.16	29.5

SAFETY INFORMATION

- Follow workshop Health & Safety rules, regulations and conditions when using the grease pump.
- Use genuine parts only. Unauthorised parts may be dangerous and will void the warranty.
- Wear approved safety gloves and eye and ear protection.
- Keep the pump clean and in good working order for best and safest performance.
- When not in use, disconnect from air supply and store in a safe, dry, childproof location.

WARNING!

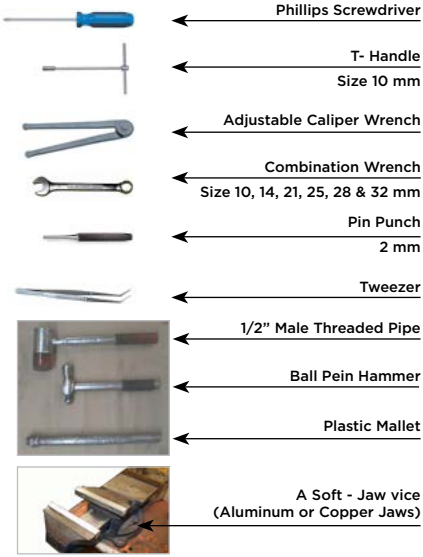
- DO NOT use the pump for a task it is not designed to perform.
- DO NOT carry the pump by hose.
- DO NOT use grease pump if damaged or thought to be faulty. Contact your local service agent.
- Grease is delivered at high pressure. DO NOT point the grease outlet at yourself or others.

PACKAGE CONTENT

DESCRIPTION	QTY.
Grease Pump Assembly	1
Drum Cover with Thumb Screws	1
Follower Plate	1
High pressure Hose	1
Professional Grease Control Valve with Z swivel/swivel*	1

*for GP4 only

TOOLS NEEDED



BEFORE INSTALLATION

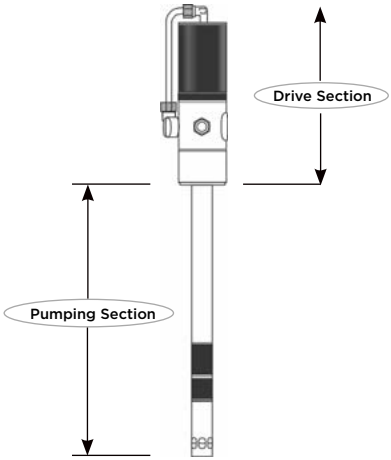
- Dry air is needed to operate this pump. Make sure a FRL (Filter, Regulator, and Lubricator) unit is installed in the airline as moisture in the air will damage the grease pump.
- Set the regulator to 6 BAR (90 PSI) or any required inlet pressure, but never more than 150 PSI (10 BAR) or less than 30 PSI (2 BAR).
- Line pressure should be increased to compensate for unusually long air hoses (over 8 metres).
- This grease pump has a 50:1 pressure ratio; i.e. the grease discharge pressure will be 50 times the inlet air pressure.
- Keep hose away from heat, oil and sharp edges. Check hose for wear and make sure that all connections are secure.

WARNING!

- Defective accessories can lead to personal injury and material damage

Know the Pump

The pump is made up of two sections:

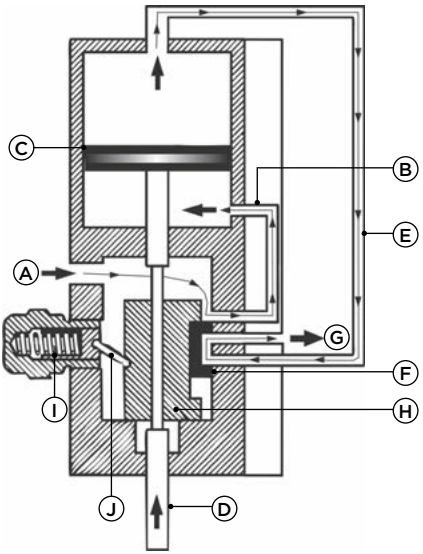


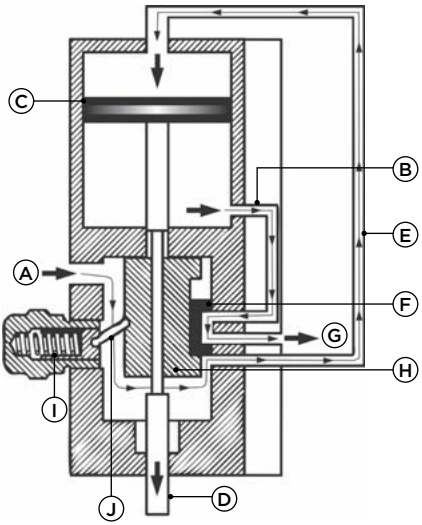
- **Drive Section:** It consists of an air motor assembly driven by compressed air. The piston diameter of the air motor is 2.5"/63mm. The motor consists of an air cylinder with piston and one reciprocal valve with a nylon slider. The valve directs the compressed air alternately to the top or bottom of the piston, thus producing a reciprocating motion of the piston rod.
- **Pumping Section:** It consists of a pump in which a piston lifts the grease through non return valves by reciprocating inside the pump cylinder. The grease is discharged with pressure (from the outlet located at bottom of Air Motor) into the delivery hose.

Note:

- **Air Motor** of these pumps starts automatically when the grease control valve is opened. When the valve is closed, air motor builds up a back-pressure and stops operating the pumping section.
- **Pressure Ratio** of the pump states the ratio of the output grease pressure to the incoming air pressure. When the pressure ratio is 50:1, we achieve an output grease pressure up to 7500 PSI (500 BAR) when the incoming air pressure is 150 PSI (10 BAR).

Pump Working





Upstroke
When grease control valve is opened, compressed air enters at arrow (A) and passes through passage (B) to the underside of the Piston (C), driving the Piston (C) and Piston Rod (D) upwards. The air above the Piston is evacuated through passage (E), past the Slider Valve (F) and out at arrow (G).
The Piston approaches top dead centre and Piston Rod (D) makes contact with the Slider Rod (H). Now the Slider Rod (H) starts moving up with the Piston Rod (D).

Downstroke
The incoming air is now led via passage (E) to the upper side of Piston (C), driving it and the Piston Rod (D) downwards. The air under the Piston (C) is evacuated through passage (B), past the Slider Valve (F) and out at arrow (G).
The Piston approaches bottom dead centre and Piston rod (D) makes contact with the Slider Rod (H). When Slider Rod (H) passes its centre position, the Pusher Spring (I) and Pusher Button (J) snap it over to its lower position.

The air motor repeats upstroke & downstroke in continuous cycle to produce a reciprocating motion, driven by compressed air. This motion is transferred via a connecting rod to the piston in the pumping section. During every upstroke, non return valves (with spring & ball check) get opened & the piston lifts the grease. During every downstroke, non return valves get closed & the piston discharges grease from the outlet valve. Closing the grease control valve shuts off the air motor & pump stops dispensing grease.

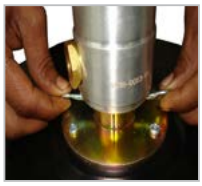
INSTALLATION

1. Fill the drum with Grease leaving empty space of about 2" from the top rim. Shake the drum after it is filled to remove air pockets. Place the follower plate in the grease drum with the lift handle facing upwards. Push the follower plate down, until some grease is forced through the centre hole on the plate.

2. Place the drum cover on the drum. Lift the pump assembly & slide the suction tube through the drum cover & centre hole in the follower plate.

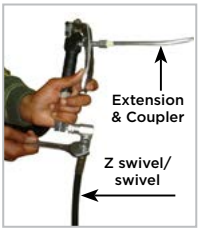
3. Push the pump assembly down till the bottom of the pump touches the base of the drum. Adjust the drum cover and tighten it with the thumb screws provided along with the drum cover.

4. Tighten the drum cover with the pump suction tube with the help of thumb screws.



5. Use a wrench to tighten high pressure hose to the pump outlet.

6. Use a wrench to tighten the other end of the hose to Z swivel/swivel of grease control valve. Tighten the outlet extension & coupler to the control valve outlet. Use thread sealant on all connections to ensure leak-proof working.



7. With the air supply turned off, connect the air line into the air inlet on the pump.

OPERATING INSTRUCTIONS

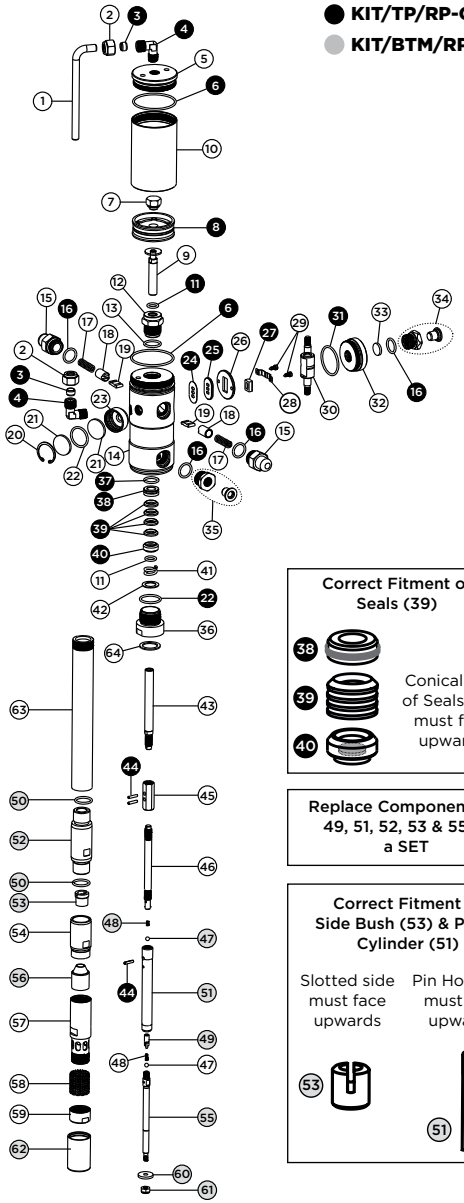
1. Partially open the on/off air valve (It helps in creating initial vacuum when filling a totally dry pump). Pump will start operating automatically until it gets primed. Pump is said to be Primed when grease is available at the pump outlet, making the pump ready to use. Once primed, the air motor will stop. Open the on/off air valve fully.
2. Hold the grease control valve near a container & press the trigger. Pump will start operating with continuous grease discharge as long as the trigger is pressed. Release the trigger & this will stop the pump. Check for any leaks from any of the connections & tighten again if required.

3. Connect coupler fitted onto the control valve extension with the grease fitting & press trigger. Be careful not to over-lubricate as the pump will keep dispensing grease as long as the trigger is pressed. Once the trigger is released, pump will stop dispensing grease & the air motor will stop.
4. When not in use & at the end of each day, air supply to the pump must be switched off.

MAINTENANCE

- Grease pump and hose should be kept clean and checked for damage before each use.
- Use an air supply system that incorporates a filter, regulator and lubricator.

EXPLODED VIEW



Correct Fitment of Seals (39)

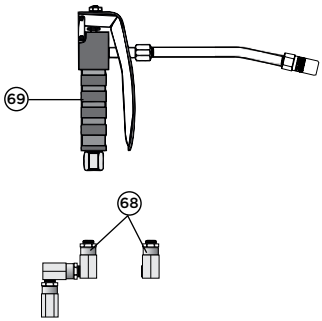
Conical side of Seals (39) must face upwards

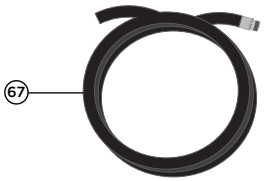
Replace Component No. 49, 51, 52, 53 & 55 as a SET

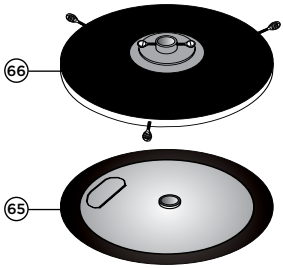
Correct Fitment of Side Bush (53) & Pump Cylinder (51)

Slotted side must face upwards

Pin Hole end must face upwards







PARTS LIST

REF NO.	PARTS DESCRIPTION	QUANTITY
1	Bend Pipe	1
2	Coupling Nut	2
3	Sealing Ring	2
4	Bend	2
5	Cylinder Cover	1
6	O Ring (BS141)	2
7	Plunger Nut	1
8	Rubber Plunger	1
9	Plunger Rod	1
10	Cylinder	1
11	O Ring (BS614)	2
12	Rod Guide	1
13	O Ring (BS116)	1
14	Housing	1
15	Pusher	2
16	O Ring BS617	4
17	Pusher Spring	2
18	Pusher Nut	2
19	Pusher Button	2
20	Circlip	1
21	Filter (B)	2
22	O Ring (BS121)	2
23	Exhaust Valve	1
24	Paper Seal	1
25	Seat	1
26	Slider Guide	1
27	Nylon slider	1
28	Clip	1
29	Self Tapping Screw	2
30	Slider	1
31	O Ring (BS129)	1
32	Inlet Cover	1
33	Filter (S)	1
34	Air Inlet Adapter	1
35	Outlet Adapter	1

REF NO.	PARTS DESCRIPTION	QUANTITY
36	Adapter	1
37	O Ring (BS115)	1
38	Seal Guide	1
39	Seal	4
40	Seal Support	1
41	Spring (Seal)	1
42	Steel Washer	1
43	Connecting Rod	1
44	Slotted Spring Pin	3
45	Connector	1
46	Extension Rod	1
47	Steel Ball (7/32")	2
48	Non Return Spring	2
49	Valve	1
50	O ring (BS812)	2
51	Pump Cylinder	1
52	Top Coupler	1
53	Slide Bush	1
54	Bottom Coupler	1
55	Piston Rod	1
56	Guide Bush	1
57	Filter Tube	1
58	Filter	1
59	End Cap (Filter)	1
60	Piston Washer	1
61	Nyloc Nut	1
62	Filter Cap	1
63	Barrel	1
64	Rubber Washer	1
65	Follower Plate	1
66	Drum Cover	1
67	Hose	1
68	Z swivel/swivel	1
69	Grease Control Valve	1

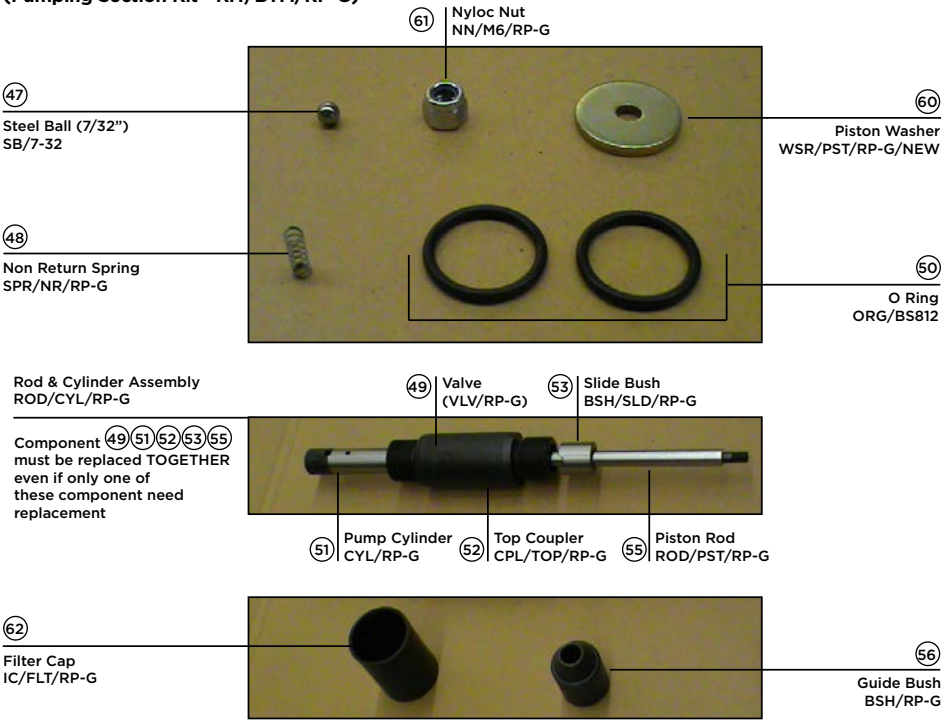
REPAIR & SPARE PART PROGRAMME (Refer "EXPLODED VIEW")

Service Precautions

- Before performing any service operation, always shut off the air supply and release the pressure of the medium, i.e. let the grease out so that the pressure decreases. When storing the pump assembly without the bucket, cover the Filter Tube (57) with Filter Cap (62).
- Be careful not to damage any parts when dismantling. While removing shafts which do not have key flats, use a Pipe wrench or Polygrip wrench. The easiest way to remove such a shaft is to grip it in a vice with aluminium or copper jaws, clamp the shaft in a hand-drill chuck and then turn the chuck by hand.

- Be careful when fitting O-rings and seals. Always lubricate them with grease before fitting. They must never be threaded over sharp edges when being fitted. Lubricate all moving parts with synthetic grease. Apply minor locking fluid on all threaded joints.
- When repairing, be on a lookout for dirt in valves / ball seats, scratches in sealing surfaces & damaged O-rings / seals / gaskets.

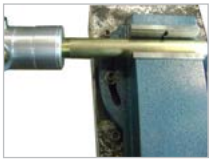
(Pumping Section Kit - KIT/BTM/RP-G)



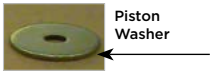
KIT PART NO.	KIT DESCRIPTION	CONSTITUENT PART NO.	PART DESCRIPTION	REFERENCE NO. FROM EXPLODED VIEW	QTY. PER KIT
KIT/BTM/RP-G	PUMPING SECTION KIT	SB/7-32	Steel Ball (7/32")	47	1
		SPR/NR/RP-G	Non Return Spring	48	1
		ORG/BS812	O Ring	50	2
		ROD/CYL/RP-G	Valve (VLV/RP-G)	49	1
			Pump Cylinder (CYL/RP-G)	51	1
			Top Coupler (CPL/TOP/RP-G)	52	1
			Slide Bush (BSH/SLD/RP-G)	53	1
			Piston Rod (ROD/PST/RP-G)	55	1
		BSH/RP-G	Guide Bush	56	1
		WSR/PST/RP-G/NEW	Piston Washer	60	1
		NN/M6/RP-G	Nyloc Nut	61	1
		IC/FLT/RP-G	Filter Cap	62	1

Pumping Section Kit (KIT/BTM/RP-G)

1. Hold Barrel (63) in a soft-jaw vice. Pull out Filter Cap (62) by hand.



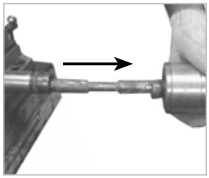
2. Unscrew Nyloc Nut (61) using T-handle (size 10 mm) & also remove Piston Washer (60) from the end of Filter Tube (57).



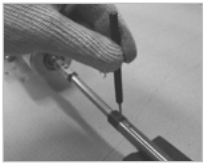
3. Unscrew Top Coupler (52) using wrench (size 28 mm) on the given flats. Remove lower coupler assembly.

4. Remove the outlet adapter (35) using wrench (size 25 mm).

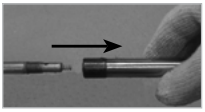
5. Tighten a 1/2" male threaded pipe into the outlet port & unscrew air motor assembly anticlockwise. Carefully remove air motor from Barrel (63)



6. Support Pump Cylinder (51) on a V block & insert a pin punch vertically into the hole of Pump Cylinder (51). Tap lightly with a hammer to drive out lower Slotted Spring Pin (44) taking care not to bend the Extension Rod (46).



7. Unscrew Pump Cylinder (51) & remove upper Steel Ball (47) & Non Return Spring (48).



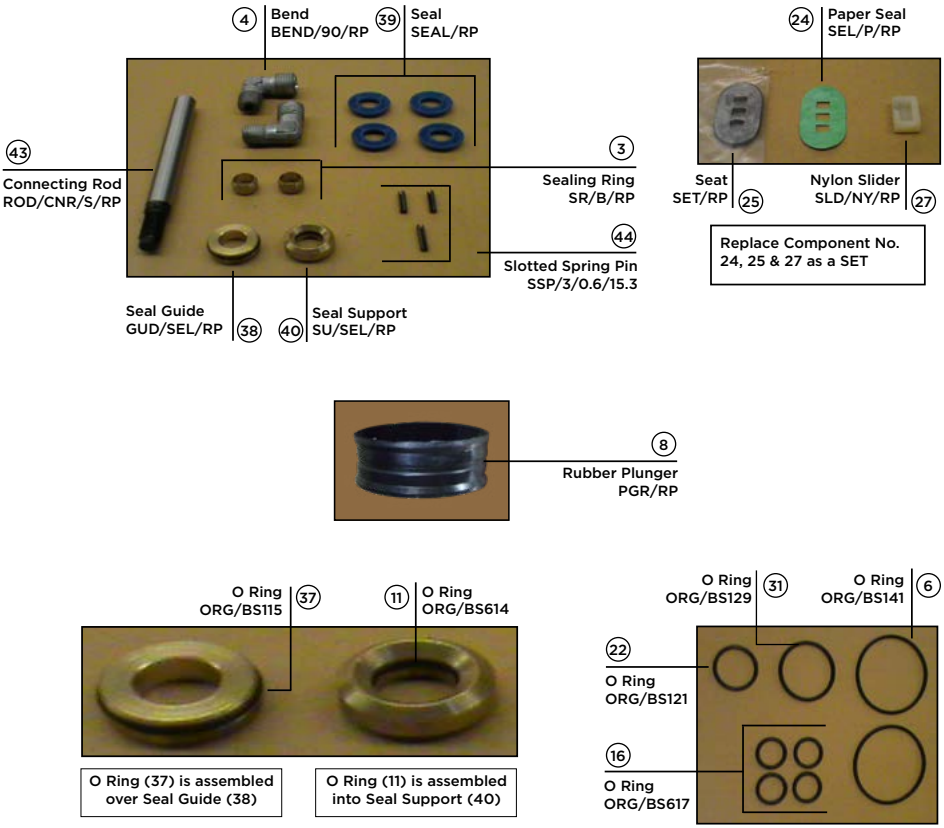
8. Hold Filter Tube (57) in vice. Using two wrenches (size 28 mm), hold Bottom Coupler (54) & unscrew Top Coupler (52). Remove Slide Bush (53).

9. Unscrew Bottom Coupler (54) with wrench (size 28 mm) & remove Guide Bush (56).

10. Replace the Repair Kit (KIT/BTM/RPG) Reassemble the pump by following the steps 1-9 in reverse order taking care of the points below:
    - **Pump Cylinder (51) has a pin-hole end that must face upwards; towards Extension Rod (46).**
    - **Slide Bush (53) has a slotted end that must always face upwards; towards Top Coupler (52).**

- **Replace Part No. 49, 51, 52, 53 & 55 TOGETHER as a set even if there is a need to replace only one of these parts. Apply minor grease on all the moving parts before assembly. Also, ensure movement of part 49, 51, 52 & part 53, 55 is smooth.**

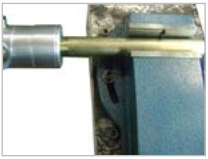
(Drive Section Kit - KIT/TP/RP-G)



KIT PART NO.	KIT DESCRIPTION	CONSTITUENT PART NO.	PART DESCRIPTION	REFERENCE NO. FROM EXPLODED VIEW	QTY. PER KIT
KIT/TP/RP-G	DRIVE SECTION KIT	SR/B/RP	Sealing Ring	3	2
		BEND/90/RP	Bend	4	2
		ORG/BS141	O Ring	6	2
		ORG/BS614	O Ring	11	1
		ORG/BS617	O Ring	16	4
		ORG/BS121	O Ring	22	1
		SEL/P/RP	Paper Seal	24	1
		SET/RP	Seat	25	1
		SLD/NY/RP	Nylon Slider	27	1
		ORG/BS129	O Ring	31	1
		ORG/BS115	O Ring	37	1
		GUD/SEL/RP	Seal Guide	38	1
		SEAL/RP	Seal	39	4
		SU/SEL/RP	Seal Support	40	1
		ROD/CNR/S/RP	Connecting Rod	43	1
		SSP/3/0.6/15.3	Slotted Spring Pin	44	3
		PGR/RP	Rubber Plunger	8	1

Drive Section Kit (KIT/TP/RP-G)

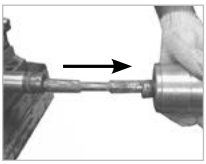
1. Hold Barrel (63) in a soft- jaw vice. Pull out Filter Cap (62) by hand



2. Unscrew Nyloc Nut (61) using T-handle (size 10 mm) & also remove Piston Washer (60) from the end of Filter Tube (57).

3. Remove the outlet adapter (35) using wrench (size 25 mm).

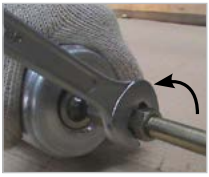
4. Tighten a 1/2" male threaded pipe into the outlet port & unscrew air motor assembly anticlockwise. Carefully remove air motor from Barrel (63).



5. Support Extension Rod (46) on a V block & insert a pin punch vertically into the hole of Connector (45).

Tap lightly with a hammer to drive out upper Slotted Spring Pin (44) taking care not to bend Extension Rod (46).

6. Unscrew Connector (45) with wrench (size 14 mm) & separate air motor assembly from Extension Rod (46).



7. Hold air motor assembly in a soft-jaw vice. Loosen both Coupling Nuts (2) using wrench (size 21 mm).

8. Remove Bend Pipe (1) along with both Coupling Nuts (2) & Sealing Rings (3). Unscrew Exhaust Valve (23) with an adjustable wrench.

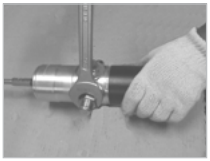
9. Unscrew both Bends (4) using wrench (size 13 mm).

10. Lightly tap Cylinder (10) with a plastic hammer & unscrew it.

11. Unscrew Air Inlet Adapter (34) using wrench (size 25 mm).

12. Connect a calliper wrench into the holes on Inlet Cover (32) & unscrew it.

13. Unscrew both Pushers (15) using wrench (size 25 mm).



14. Remove both Pushers (15), Pusher Spring (17), Pusher Nuts (18) & Pusher Buttons (19).

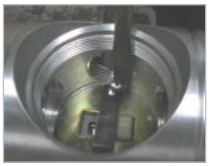
15. Using two wrenches (size 10 mm), hold Plunger Rod (9) & turn Connecting Rod (43) anticlockwise. This will unscrew Connecting Rod (43). Open plunger nut (7) to remove rubber plunger (8).

16. Remove Connecting Rod (43) along with Steel Washer (42), Spring (41), Seal Support (40), Seals (39) & Seal Guide (38).

If Connecting Rod (43) is still attached to the inner rod of Slider (30), hold the inner rod in a vice & unscrew Connecting Rod (43) with wrench (size 10 mm).

17. Remove Slider (30) with a tweezer.

18. Open the two Self Tapping Screw (29) with a Philips screwdriver & remove Clip (28)



19. Remove Nylon Slider (27).

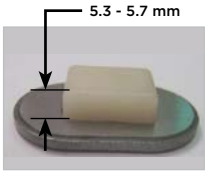
20. Remove Slider Guide (26).

21. Remove Seat (25) & Paper Seal (24). Clean the bottom surface thoroughly.

22. Replace the Repair Kit (KIT/TP/RPG) Reassemble the pump by following the steps 1-21 in reverse order taking care of the points below:

- **Ensure all mating surfaces are clean before reassembly. Apply minor grease on all mating surfaces, O Rings & moving parts before reassembly.**

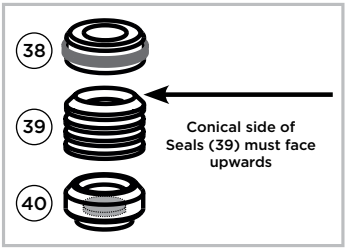
- **Ensure that height of Nylon Slider (27) is approx. 5.3 - 5.7 mm. Also, hollow portion of Nylon Slider (27) should rest evenly on top of Seat (25).**



- **When fitting Pushers (15), see through Inlet Cover (32) & ensure Pusher Buttons (19) are installed in centre position. Also ensure that Clip (28) is tight & Nylon Slider (27) moves smoothly.**

- **When fitting Plunger Rod (9) & Connecting Rod (43), apply locking fluid on the inner rod of Slider (30).**

- **Conical side of Seals (39) must face upwards. Assemble them with Seal Guide (38), Seal Support (40) & mount them as a set on Connecting Rod (43).**



REPLACEMENT PARTS PROGRAM
(Refer "EXPLODED VIEW")

REF. NO. FROM EXPLODED VIEW	PART NO.	DESCRIPTION	QUANTITY
65	FLP/241-288/6	GP1 Follower Plate	1
	FLP/322-380/6	GP2 Follower Plate	1
	FLP/550-602/6/GP3	GP3 Follower Plate	1
	FLP/260-305/6	GP4 Follower Plate	1
66	DC/GP1/BL	GP1 Drum Cover	1
	DC/GP2/BL	GP2 Drum Cover	1
	DC/GP3/BL	GP3 Drum Cover	1
	ZSA/DC/GRP/501/06	GP4 Drum Cover	1
67	HOSE/GRP/84/B	Hose, BSP Threads	1
	HOSE/GRP/84/N	Hose, NPT Threads	1
68	HFC/S/1-4F/1-4M/B	Swivel*, BSPT Threads	1
	HFC/1-4F/1-4M/B	Z swivel, BSPT Threads	1
	HFC/1-4F/1-4M/N	Z swivel, NPT Threads	1
69	APG/04/1-4F/B	Grease Control Valve, BSPT Threads	1
	APG/04/1-4F/N	Grease Control Valve, NPT Threads	1

*for GP4 only

TROUBLESHOOTING
(Refer "EXPLODED VIEW")

PROBLEM	POSSIBLE CAUSE	SOLUTION
Pump operates, but does not dispense any grease	Grease is too thick / too cold	Store grease in a warm place
	Air pockets in grease	Shake the Grease bucket & manually force down the Follower Plate (65) to remove air pockets
	Dent in the Grease Bucket restricting movement of Follower Plate (65) leading to formation of air pockets in the bucket and inefficient working	Get the dent removed to ensure proper movement of Follower Plate (65)
Pump not working / less discharge	Inlet pressure is too less	Increase inlet pressure. It must be at least 30 PSI (2 BAR)
	Nylon Slider (27) is jammed / overtight	Refer "Drive Section Kit (KIT/TP/RP-G)" Check for any build-up edge on Clip (28) & tighten it again. Make sure the movement of Nylon Slider (27) is neither very loose nor very tight If needed, replace Nylon Slider (27). Also replace the Paper Seal (24), Seat (25) & Slider Guide (26) to ensure the best fitting
	Piston / Piston Rod / Plunger jammed. **NOTE** Especially check Extension Rod (46), Pump Cylinder (51), Top Coupler (52), Slide Bush (53) & Piston Rod (55)	Refer "Pumping Section Kit (KIT/BTM/RP-G)" Remove suction tube. Disconnect air motor assembly from pumping section by removing the upper Slotted Spring Pin (44) from Connector (45) Supply input air to air motor. If it works properly without the barrel assembly, then the problem lies with the pumping section. Otherwise check the air motor for smooth movement After locating the faulty section, check the respective Piston / Plunger & the associated washers & seals for any overlap or wear & tear. Replace the defective parts from repair kit Ensure to replace the moving parts having close tolerances (such as Piston & Cylinder alongwith Non Return Springs & balls) as a set to ensure the best fitting

Pump continues to operate even after the trigger of Grease Control Valve (69) has been released	Leakage in the assembly	Check all the connections to ensure they are air tight. Use thread sealant. Check O rings & seals for damage. Replace the defective parts from repair kit
Grease comes through the air Exhaust Valve (23)	Grease leaks into the air motor	Check Seal Guide (38), O Ring (37), lower O Ring (11), Seals (39) & Seal Support (40) for wear & tear. Replace the damaged parts from repair kit
Air passes directly from inlet to the outlet & pump does not work	Nylon Slider (27) is jammed / overtight	Refer "Drive Section Kit (KIT/TP/RP-G)" Check for any build-up edge on Clip (28) & tighten it again. Make sure the movement of Nylon Slider (27) is neither very loose nor very tight If needed, replace Nylon Slider (27). Also replace the Paper Seal (24), Seat (25) & Slider Guide (26) to ensure the best fitting
Discharge suddenly stopped while the pump was running	Seals / O Rings Damage	Check all seals / O Rings & replace the damaged parts from repair kit
	Chip / Other foreign particles get clogged at discharge coupler	Open the coupler, remove all foreign particles / chips & reassemble properly
	Clogging of Filter Tube (57) and Filter (58)	Open Filter Cap (62) & End Cap (59), clean Filter Tube (57), Filter (58) & reassemble it properly

DISPOSAL

The components or the used product must be given to companies that specialize in the disposal and recycling of industrial waste.

GROZ WARRANTY POLICY

Groz makes all efforts to ensure that its products meet the highest standards of quality and durability and warrants to the original purchaser its range of products for a period of 12 months from Groz Invoice date, against defects in materials and workmanship. If the Groz product is part of a set, only the portion that is defective is subject to this warranty.

This warranty does not apply to damage due directly or indirectly, to misuse, abuse, wear and tear, negligence or accident, repairs or alterations outside Groz plants, or to lack of maintenance. Groz shall in no event be liable for death, injuries to persons or property or for incidental, contingent, special or consequential damages arising from the use of its products. It is upto the user to determine suitability and safety of the product for their intended use, and the user assumes all risks and liability herewith.

In no event, shall Groz's liability exceed the invoiced cost of the product In case of identification of defect covered under this warranty, the same must be notified in writing to Groz /Groz designated authorized service location. Proof of purchase date must accompany the complaint. Groz reserves the right to call back the faulty unit, all charges including transportation prepaid. On verification of the defect, the unit will be repaired or replaced with a new or reconditioned product or part of equal utility or a full refund given at Groz's discretion. The repaired /replaced units will be returned to the user freight prepaid, using most economical freight carrier. However if determined that the defect resulted from causes not within the scope of the warranty, then the cost of returning the product would be to buyer's account.

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