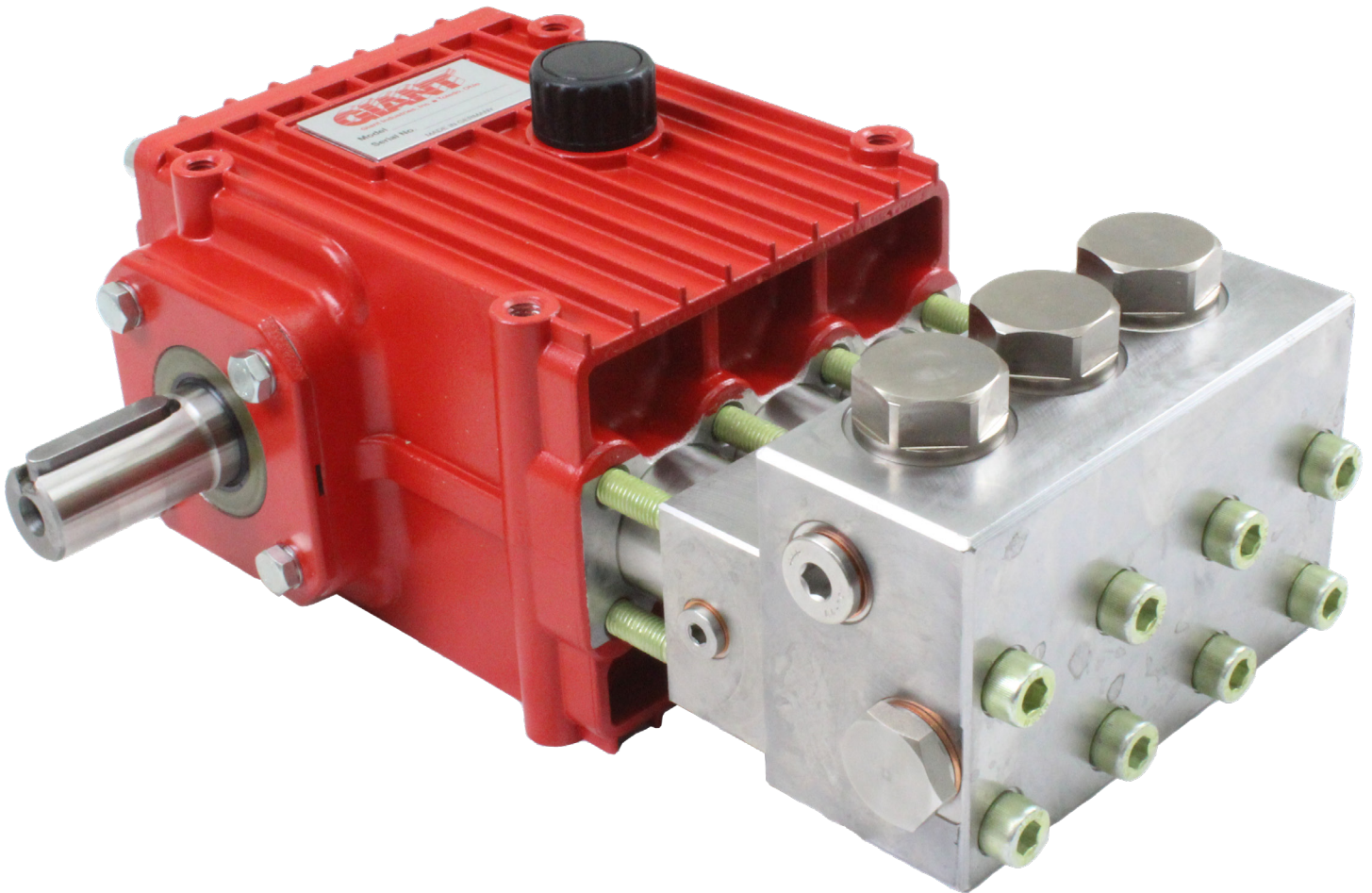


# Models

# P414 /P460A/P480

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Updated 02/22

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# INSTALLATION INSTRUCTIONS

Required NPSH refers to water (specific weight 1kg/dm<sup>3</sup>) at maximum permissible pump revolutions.

## Operation and Maintenance

Check oil level prior to starting to ensure trouble-free water supply.

**Important!** If there is a **danger of frost**, the water in the pump and in the pump fittings (particularly the unloader valve) must be emptied. The second discharge port can also be used and the pump run "dry" for 1-2 minutes for this purpose.

Oil amount: 30.4 ounces (0.9 liters). Only use **ISO VG 220 industrial gear oil** (e.g. Aral Degol BG220) or **automobile gear oil SAE 90 GL4** (Giant p/n 01154).

Initial oil change after 50 operating hours and then every 500 hours, after 1 year if used less. Caution when operating in damp places or with high temperature fluctuations. Oil must be changed immediately should condensate (frothy oil) occur in the gear box.

### NPSH values must be observed.

Maximum input pressure 145 PSI (10 bar), maximum suction head -4.35 PSI (-0.3 bar). Make sure that suction pulsation is sufficiently dampened - water column resonance must be avoided.

**Important!** If the pump is not used for a long period of time, it is possible the seals (18/23) could become hard or brittle thus causing the pump to leak when put into operation.

If this is the case, we recommend these seals be replaced every 4 years.

### Safety Rules

A safety valve is to be installed in accordance with the guidelines for liquid spraying units so that the admissible operating pressure cannot be exceeded by more than 10%. Pump operation without a safety valve as well as any excess in temperature or speed limits automatically voids the warranty.

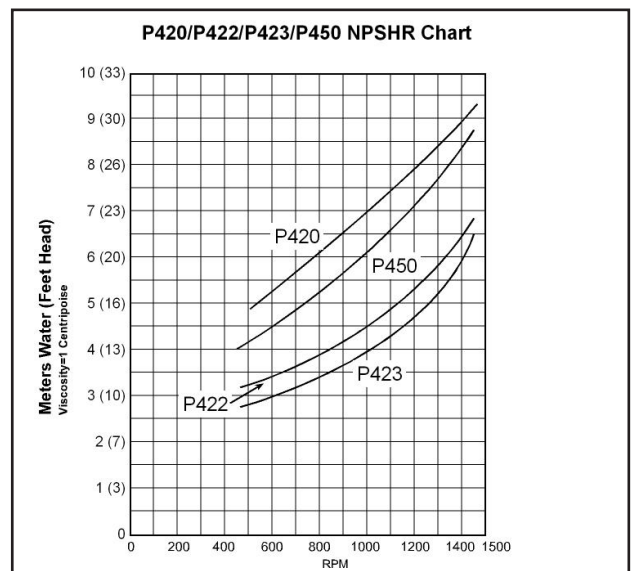
When the pump is in operation, the drive shaft end and the coupling must be enclosed by a protective cover or a coupling bell.

Pressure in the discharge line and pump must be at zero before any maintenance to the pump takes place. Shut off suction line. Disconnect fuses to ensure that the driving motor does not get switched on accidentally. Make sure that all parts on the pressure side of the unit are vented before starting the pump. In order to prevent air, or an air-water mixture being absorbed and to prevent cavitation occurring, the pump NPSHR (=suction head) and water temperature must be respected.

**Cavitation and/or compression of gases lead to uncontrollable pressure kicks which can ruin pump and unit parts and also be dangerous to the operator or anyone standing nearby.**

Giant Plunger Pumps are suitable for pumping clean water and other non-aggressive or non-abrasive media with a specific weight similar to water.

**Before pumping other liquids - especially inflammable, explosive and toxic media - the pump manufacturer must be consulted with regard to the resistance of the pump material. It is the responsibility of the equipment manufacturer and/or operator to ensure that all pertinent safety regulations are adhered to.**



# Pump Specifications

## U.S. Measurements

	Max. Flow	Max. Discharge Pressure	Max. Speed	Power Required	Plunger Diameter	Stroke	Gallons Per Revolution	NPSHR
Model	GPM	PSI	RPM	BHP	in	in		ft.-head
P414	3.1	10,150	1450	21.7	0.55	0.79	0.00214	29.5
P480	3.2	7250	1450	16	0.55	0.79	0.00221	29.5
P460	3.8	7250	1450	19	0.55	0.94	0.00262	29.5

## Metric Measurements

	Max. Flow	Max. Discharge Pressure	Max. Speed	Power Required	Plunger Diameter	Stroke	Liters Per Revolution	NPSHR
Model	l/min	Bar	RPM	kW	mm	mm		mWs
P414	11.8	700	1450	16.2	14	20	0.00814	9.0
P480	12.1	500	1450	11.9	14	20	0.00834	9.0
P460	14.5	500	1450	14.2	14	24	0.01	9.0

Consult the factory for special requirements that must be met if the pump is to operate beyond one or more of the limits specified above.

### Horsepower Ratings:

We recommend a 1.15 service factor be specified when selecting an electric motor as the power source.

To compute electric motor horsepower required, use the following formula:  $HP = (GPM \times PSI) / 1450$ .

The formula to determine the horsepower required for a gas engine is:  $HP = (GPM \times PSI) / 1150$ .

The formula to determine the horsepower required for a diesel engine is:  $HP = (GPM \times PSI) / 1250$ .

### For the Application of a Hydraulic Motor:

To Determine the Torque of a Hydraulic Motor --  $(GPM \times PSI \times 36.77) / RPM = \text{Torque (in-lbs)}$

### Calculating RPM / GPM of Pump:

A pump must be connected to an electric motor or gas or diesel engine with the correct ratio of pulleys and belts to attain the required speed and GPM. The use of a Variable Frequency Drive (VFD) may also be used to control the RPM of a properly sized electric motor when variable flows are required.

$$(\text{Max. Pump RPM} / \text{Rated Pump GPM}) \times \text{Required Pump GPM} = \text{Required Pump RPM}$$

To calculate a pulley diameter one (1) pulley diameter and the required pump RPM must be known:

$$(\text{Pump RPM} \times \text{Pump Pulley Diameter}) / \text{Motor RPM} = \text{Motor Pulley Diameter}$$

$$(\text{Motor RPM} \times \text{Motor Pulley Diameter}) / \text{Pump RPM} = \text{Pump Pulley Diameter}$$

### Common Specifications:

	<u>US</u>	<u>Metric</u>
Inlet Pressure .....	-4.35 to 145 PSI....	-0.3 to 10 Bar
Max. Temp. ....	104 °F .....	40°C
Inlet Ports .....	(2) 1/2" BSP	
Discharge Ports .....	(2) 3/8" BSP	
Shaft Rotation.....	Top of pulley towards fluid end	
Crankshaft Diameter.....	28mm	
Key Width .....	8mm	
Shaft Mounting .....	Either side <sup>1</sup>	
Weight .....	42 lbs. ....	19 kg
Crankcase Capacity .....	30.4 fl.oz. ....	0.9 Liters

### <sup>1</sup>NOTES:

In order to drive the pump from the side opposite the present shaft extension, simply remove the valve casing from the crankcase and rotate the pumps 180 degrees to the desired position. Be certain to rotate the seal case (item #20) as well, so that the weep holes are down at the six o'clock position. Exchange the oil fill and the oil drain plugs, also. Refer to the repair instructions as necessary for the proper assembly sequence.

# P414/P460A/P480 PARTS LIST

<u>ITEM</u>	<u>PART</u>	<u>DESCRIPTION</u>	<u>QTY.</u>	<u>ITEM</u>	<u>PART</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
1	08377	Crankcase	1	26	06488	Valve Casing (P460/P480)	1
2	08378	Oil Fill Plug with Gasket	1	26	05939	Valve Casing (P414)	1
3	06479	Crankcase Cover	1	26A**	04767	Set Screw	2
3A	07186	Oil Sight Glass w/Gasket	1	27A	05543	Valve Assy.	6
4	08380	O-Ring	1			(Includes items 27-31)	
5	07109	Oil Drain Plug	1	27	05541	Valve Seat	6
5A	06015	O-Ring	1	28	05542	Valve Plate	6
5B	08092	Plug with Gasket	1	29	07906	Valve Spring	6
6	01010	Screw	4	30	07907	Valve Spring Retainer	6
6A	01011-0400	Spring Washer	4	31	07770	O-Ring	6
7	04739	Bearing Cover Open	1	32	08406-0100	Plug	3
8	05291	Bearing Cover Closed	1	33	07489	O-Ring	3
8A	05292	Shim	1-3	34	06494	Cap Screw	8
8B	05293	Shim	1	36	04369	Plug, 3/8" BSP	1
9	01016	O-Ring	2	37	08486	Copper Washer	1
10	07114	Screw with Washer	8	38	07109-0400	Plug, 1/2" BSP	1
11	07459	Radial Shaft Seal	1	39	06272	Copper Washer	1
12	05350	Bearing	2		04665	Crankcase Assembly, P414/P480	
13	04741	Crankshaft, P460	1			(1-19, 34)	
13	04740	Crankshaft, P414/P480	1		04666	Crankcase Assembly, P460	
13A	04742	Spacer Ring	1			(1-19, 34)	
14	08091	Fitting Key	1		04667	Manifold Assembly, P460/P480	
15	08390	Connecting Rod Assy.	3			(26-39 w/o 34)	
15A	07311	Screw with Washer	6		04668	Manifold Assembly, P414	
16	06480	Plunger Assembly	3			(26-39 w/o 34)	
17	06790	Crosshead Pin	3		04669	Seal Case Assembly (20-25B)	
19	05444	Oil Seal	3				
20	05938	Seal Adapter	3				
20A	06482 <sup>+</sup>	Seal Casing	1				
20C	06589	Plug	2				
20D	07676	Copper Washer	2				
21	07266	O-Ring	3				
23*	06483	Grooved Seal Packing	6				
23A**	13036	Spacer Ring	2				
24	06484	Pressure Ring	3				
25	06485	Seal Case	3				
25A	06492	Support Ring	6				
25B	06487	O-Ring	6				

\*Important! If the pump is not used for a long period of time, it is possible the seals (23) could become hard or brittle thus causing the pump to leak when put into operation. If this is the case, we recommend the seals be replaced every 4 years.

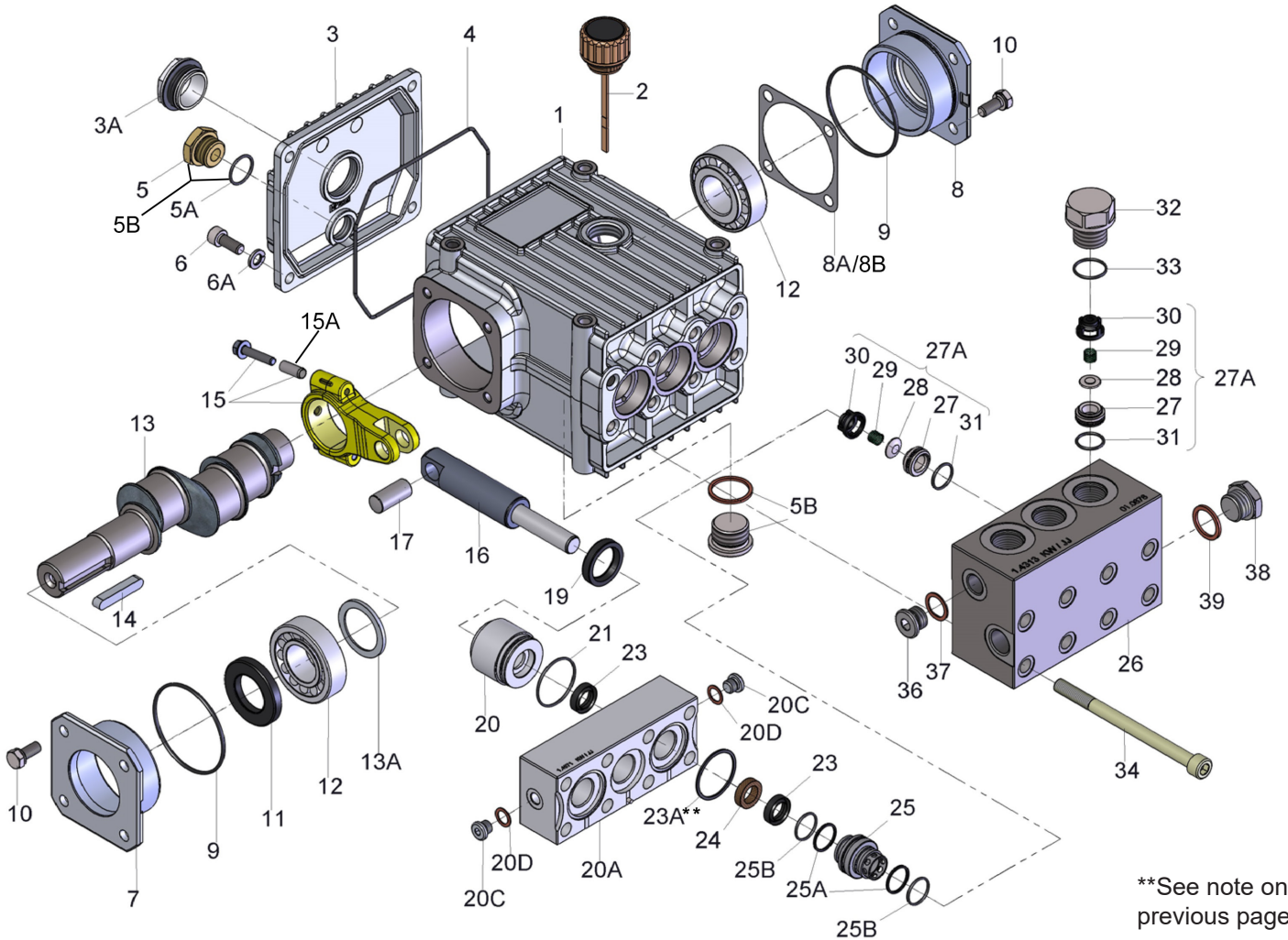
\*\*Only used if weep return bores are closed. In this case item 23A should be removed.

+If pumps are made with closed weep return bores and open cross bore (for rinsing/cooling) the seal case becomes part number 04761.

## P414/P460A/P480 TORQUE SPECIFICATIONS

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Lubrication</u>	<u>Torque Amount</u>
3A	07186	Oil Sight Glass w/Gasket	Loctite 5910	106 in.-lbs. (12 Nm)
5	07109	Oil Drain Plug		59 ft.-lbs. (80 Nm)
5B	08092	Plug with Gasket		59 ft.-lbs. (80 Nm)
6	01010	Screw		110 in.-lbs. (12.5 Nm)
10	07114	Screw with Washer		132 in.-lbs. (15 Nm)
15A	07311	Screw with Washer		98 in.-lbs. (11 Nm)
32	08406-0100	Plug	Pro Pack 550	110 ft.-lbs. (150 Nm)
34	06494	Cap Screw		29.5 ft.-lbs. (40 Nm)

# Exploded View - P414/P460A/P480



## P414/P460A/P480 REPAIR KITS

### Plunger Packing Kits

Part # 09499

Item	Part #	Description	Qty.
21	07266	O-Ring	3
23	06483	Grooved Seal Packing	6
23A	13036	Spacer Ring	3
24	06484	Pressure Ring	3
25A	06492	Support Ring	6
25B	06487	O-Ring	6

### Valve Assembly Kits

Part # 09498

Item	Part #	Description	Qty.
27A	05543	Valve Assembly, Complete	6
33	07489	O-Ring	3

### Oil Seal Kit

Part # 09641

Item	Part #	Description	Qty.
19	05444	Oil Seal	3

# Repair Instructions\* - P414/P460A/P480 PUMPS

## Inlet Valves

Remove inner hexagon screws (34) and pull off valve casing (26) to the front. Take out seal case (25) from valve casing (26). Remove the exposed inlet valve with a pair of flat nose pliers and the valve seat (27) with a valve puller. Disassemble parts and examine valve plate (28), valve seat (27), O-ring (31) and support ring (31A). Replace worn parts. Tighten inner hexagon screws (34) again to 30 ft-lbs. (40 Nm).

**Discharge Valves:** With a socket 32mm wrench, screw out valve plugs (32). Remove the exposed discharge valves with a pair of flat nose pliers and the valve seat (27) with a valve seat puller. Disassemble parts and examine valve plate (28), valve seat (27), and O-rings (31, 33). Replace worn parts. Take care to reassemble in correct sequence. Tighten plugs (32) to 111 ft-lbs. (150 Nm).

## Seals

Remove oil drain plug (5) and drain oil. Remove inner hexagon screws (34) and pull off valve casing (26) frontwise over the plungers (16).

**Important!** if the seal casing (20A) does not separate from the valve casing (26), press both casings apart by placing two flat screwdrivers in the side notches on the seal casing (20A). Be careful not to damage casing surfaces.

Remove seal cases (25) situated either in valve casing (26) or seal casing (20A). Separate seal casing (20A) from seal retainers (20). Remove grooved ring (23) and guide ring (24) from the seal casing (20A). Examine O-rings (25B) and support rings (25A) attached to seal casing (26). Check seal ring (23A) situated between valve casing and seal casing, and replace if necessary. Then remove seal retainers (20) from crankcase (1). Pull grooved ring (23) out of seal retainer (20). Check O-ring (21). Grease new seals and O-rings with silicone grease before reinstallation.

**Important!** Seal casing (20A) has a notched pin to ensure correct fitting. Reassemble parts in the proper sequence.

**Important!** The grooved seal (23) on the high-pressure side is to be fitted carefully into the seal casing (20A) using a 22mm plastic rod. Under no circumstances must the surface in the seal casing or the seal lip of the grooved seal be damaged.

Check surfaces of plunger (16). Damaged surfaces cause hard wear on seals. Deposits of all kinds must be removed from the plungers.

**Important!** The plunger surfaces are not to be damaged. If there are lime deposits in the pump, care must be taken that the drip-return bore in parts (25) and (26) ensure trouble-free drip-return.

If the plunger (16) is worn, the complete plunger must be changed. The ceramic pipe alone cannot be changed due to reasons of precision. When reassembling tighten inner hexagon screw (34) to 30 ft-lbs. (40 Nm).

If the plunger (16) is worn, the complete plunger must be changed (see below). The ceramic pipe alone cannot be changed due to reasons of precision. When reassembling tighten inner hexagon screw (34) to 30 ft-lbs (40 Nm).

## Gear and Plunger

If oil leaks where the plunger (16) protrudes out of the gear, gear seals (19) and plungers have to be examined and replaced as necessary.

## Gear Seal

Remove plug (5) and drain oil. Remove valve casing as described above. Take seal adapter (20) off plunger (16) and replace gear seal (19).

## Plungers

Drain oil and remove crankcase cover (3). Take off screws on con rods (15). Be careful not to mix up the con rod halves. Push con rod shaft as far as possible into the crosshead guide. Loosen screws (10) and remove bearing covers (7&8) with the help of a screw-driver.

Take crankshaft out carefully so as not to bend the con rods. Remove and dismantle con rods and plungers (18). Replace worn parts. **Connecting rods must be installed in the same position and orientation.**

To reinstall, insert con rods and plungers, put crankshaft in carefully and then push the bearing covers (7&8) onto the ends of the crankshaft. Screw on bearing covers with screws (10). Mount con rod halves and tighten screws (15) to 8 in-lbs. (11Nm). Mount crankcase cover (3) together with O-ring (4).

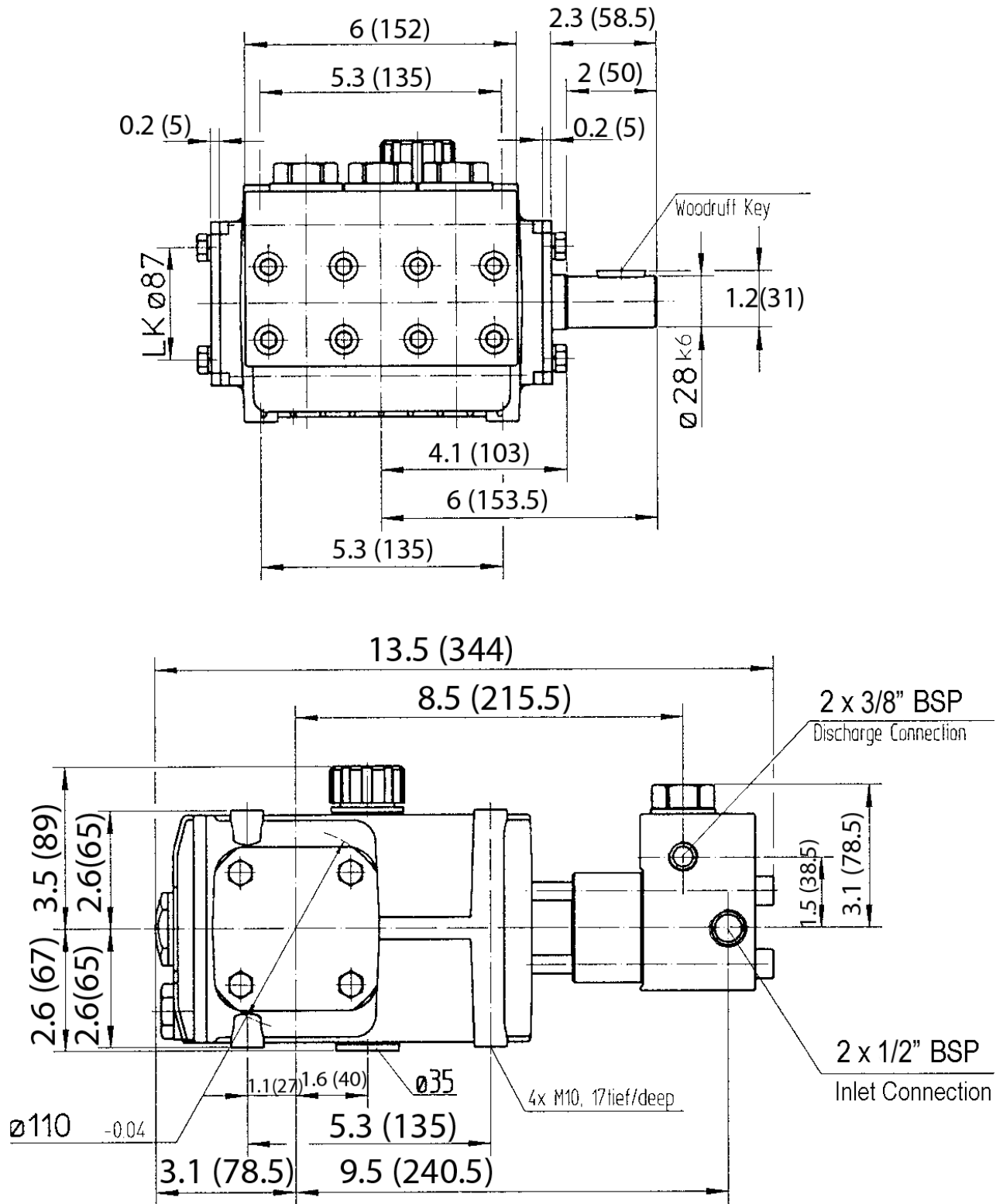
## To rotate crankshaft to the opposite side.

The shaft end is on the left side of the pump looking at it from behind. If it should be on the other side, the valve casing (26) and seal casing (20A) have to be removed, turned by 180° and then put on again. Turn seal adapters (20) 180°, so that the leakage holes are underneath. Oil dipstick (2) and oil drain plug (58) have to be interchanged and crankcase cover turned by 180°.

**Contact Giant Industries for service school information. Phone: (419) 531-4600**

\*Additional instructions with pictures are available on Giant's website

## Model P414/P460A/P480 Dimensions in(mm)



## GIANT INDUSTRIES LIMITED WARRANTY

Giant Industries, Inc. pumps and accessories are warranted by the manufacturer to be free from defects in workmanship and material as follows:

1. Five (5) years from the date of shipment for all pumps used in portable pressure washers with NON-SALINE, clean water applications.
2. Two (2) years from the date of shipment for Giant pumps used in car wash applications.
3. One (1) year from the date of shipment for all other Giant industrial and consumer pumps.
4. Six (6) months from the date of shipment for all rebuilt pumps
5. Ninety (90) days from the date of shipment for all Giant accessories.

This warranty is limited to repair or replacement of pumps and accessories of which the manufacturer's evaluation shows were defective at the time of shipment by the manufacturer. The following items are NOT covered or will void the warranty:

1. Defects caused by negligence or fault of the buyer or third party.
2. Normal wear and tear to standard wear parts.
3. Use of repair parts other than those manufactured or authorized by Giant.
4. Improper use of the product as a component part.
5. Changes or modifications made by the customer or third party.
6. The operation of pumps and or accessories exceeding the specifications set forth in the Operations Manuals provided by Giant Industries, Inc.

Liability under this warranty is on all non-wear parts and limited to the replacement or repair of those products returned freight prepaid to Giant Industries which are deemed to be defective due to workmanship or failure of material. A Returned Goods Authorization (R.G.A.) number and completed warranty evaluation form is required prior to the return to Giant Industries of all products under warranty consideration. Call (419)-531-4600 or fax (419)-531-6836 to obtain an R.G.A. number.

Repair or replacement of defective products as provided is the sole and exclusive remedy provided hereunder and the MANUFACTURER SHALL NOT BE LIABLE FOR FURTHER LOSS, DAMAGES, OR EXPENSES, INCLUDING INCIDENTAL AND CONSEQUENTIAL DAMAGES DIRECTLY OR INDIRECTLY ARISING FROM THE SALE OR USE OF THIS PRODUCT.

THE LIMITED WARRANTY SET FORTH HEREIN IS IN LIEU OF ALL OTHER WARRANTIES OR REPRESENTATION, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND ALL SUCH WARRANTIES ARE HEREBY DISCLAIMED AND EXCLUDED BY THE MANUFACTURER.



**WARNING:** This product might contain a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm.  
For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)