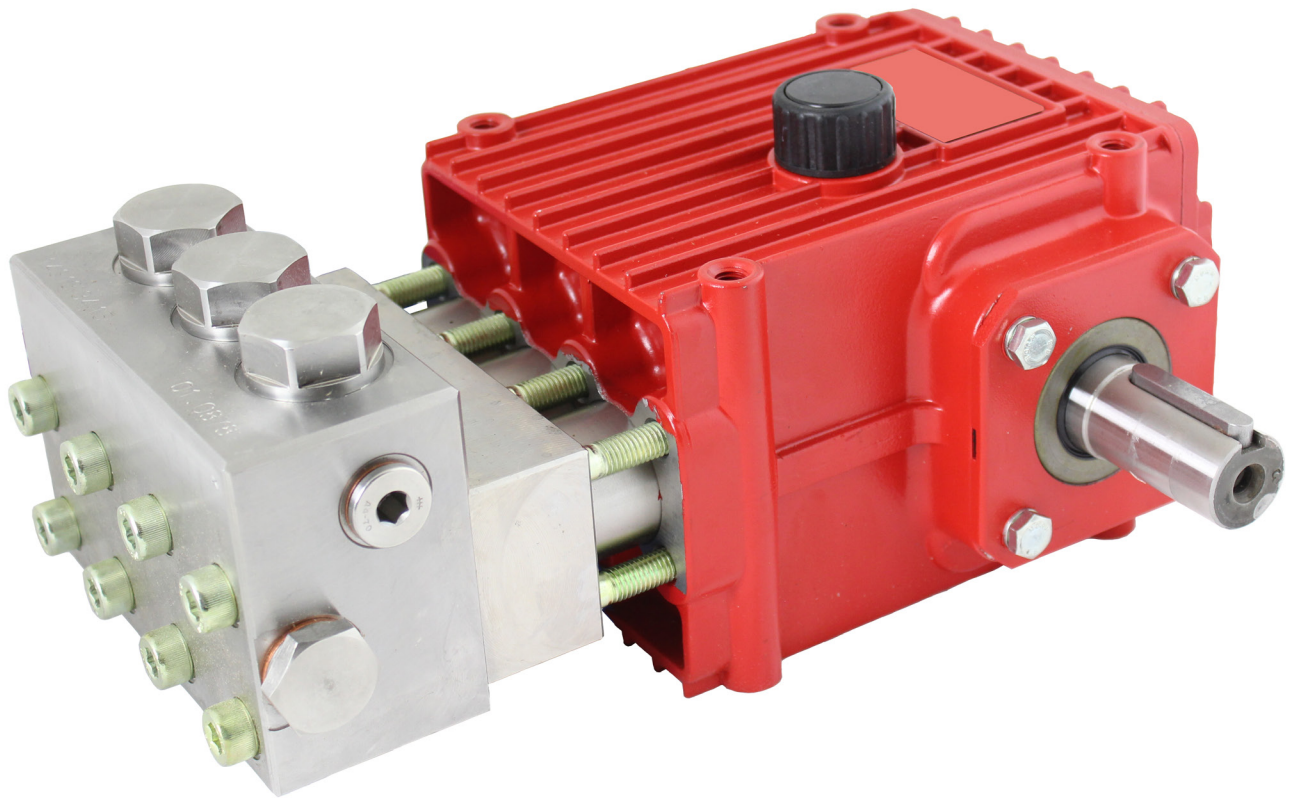


# Model CP460

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Triplex Ceramic  
Plunger Pump  
Operating Instructions/  
Repair and Service Manual



Updated 08/18

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# INSTALLATION INSTRUCTIONS

## Operation

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

**Important!** The crankcase must be filled with synthetic motor oil of class SAE 0W 40 when pumping CO<sub>2</sub> under 0° C.

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 is 1200 PSI (83 bar). The maximum suction head is 14.5 PSI (1 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 (23/23B) 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.**

Eco<sub>2</sub>Blast 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 manufacture and/or operator to ensure that all pertinent safety regulations are adhered to.**

# CP460 Pump Specifications

	<u>U.S.</u>	<u>Metric</u>
Volume.....	2.0 GPM*	7.5 L/min*
Discharge Pressure.....	6000 PSI	580 Bar
Inlet Pressure.....	14-870 PSI	1-60 Bar
Stroke.....	0.98"	24 mm
Speed.....		150 to 750 RPM
Plunger Diameter.....	0.55"	14 mm
Temperature of Pumped Fluids.....	-40 °F to 32 °F	-40 °C to 0 °C
Inlet Ports.....		(2) x 1/2" BSP
Discharge Ports.....		(2) x 3/8" BSP
Shaft Rotation.....		Top of pulley towards fluid end
Crankshaft Diameter.....	1.10"	28 mm
Key Width.....	0.31"	8 mm
Shaft Mounting.....		Either side <sup>1</sup>
Weight.....	42 lbs.	19 KG
Crankcase Capacity.....	27 fl.oz.	0.8 Liter

\*Based on 90% volumetric efficiency. Inlet conditions will dictate actual performance.

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.

**<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.

**HORSEPOWER RATINGS:**

The rating shown are the power requirements for the pump. Gas engine power outputs must be approximately twice the pump power requirements shown above.

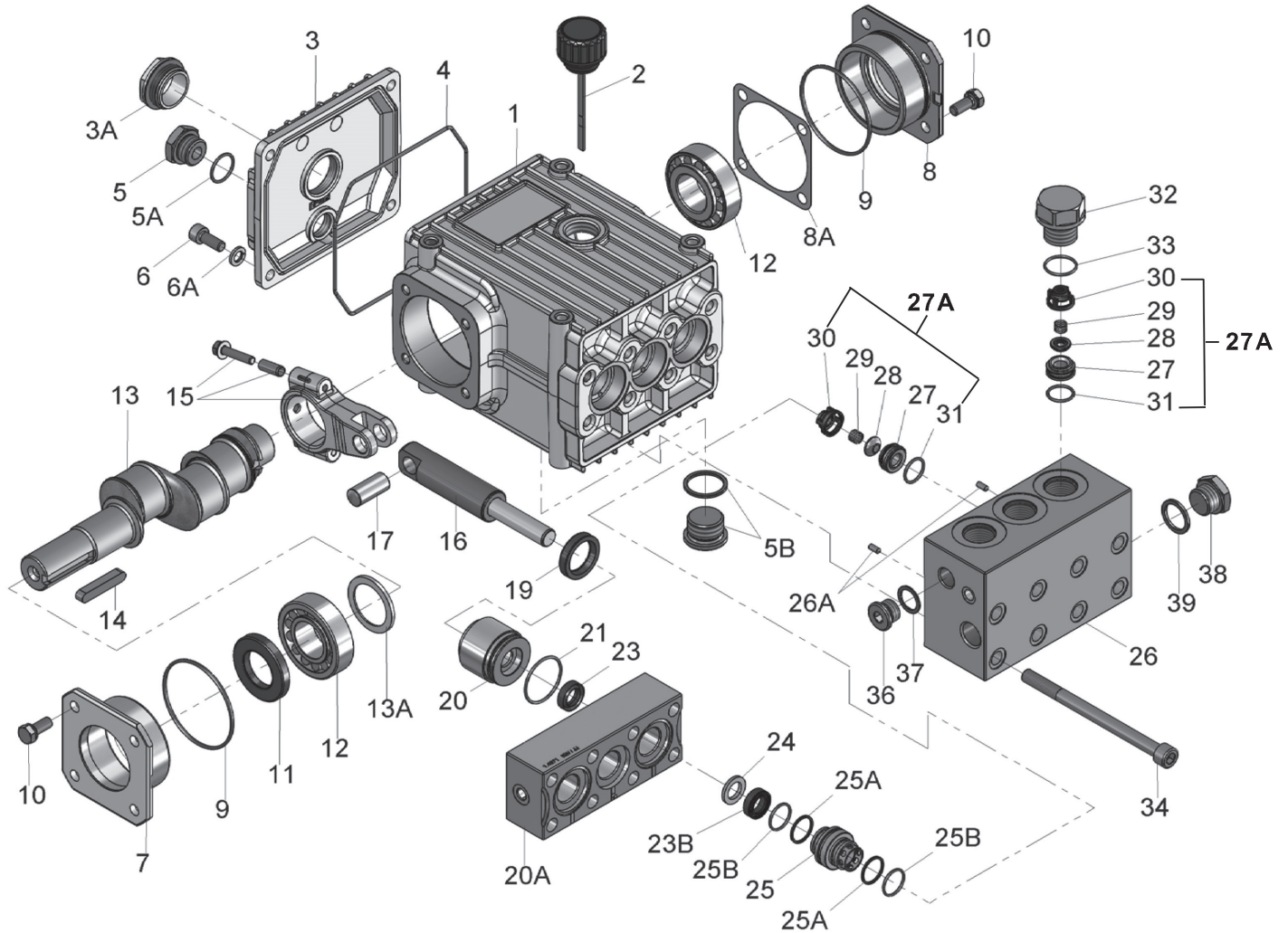
We recommend a 1.15 service factor be specified when selecting an electric motor as the power source. To compute specific pump horse power requirements, use the following formula:

$$HP = (GPM \times PSI) / 1450$$

<b>CP460 Horsepower Requirements</b>					
<b>RPM</b>	<b>GPM</b>	<b>3000 PSI</b>	<b>4000 PSI</b>	<b>5000 PSI</b>	<b>6000 PSI</b>
150	0.40	0.8	1.1	1.4	1.7
250	0.67	1.4	1.9	2.3	2.8
350	0.93	1.9	2.6	3.2	3.9
450	1.2	2.5	3.3	4.1	5.0
550	1.5	3.1	4.1	5.2	6.2
650	1.7	3.5	4.7	5.9	7.0
750	2.0	4.1	5.5	6.9	8.3

# Exploded View - CP460

**Note: Do not use mineral oil on seals and o-rings.  
Use silicone grease only.**



## CP460 REPAIR KITS

### Plunger Packing Kits

Part # CP09499-0023

Item	Part #	Description	Qty.
21	CP07266-0003	O-Ring	3
23	CP04762	Grooved Seal Packing	3
23B	CP06483-0020	Grooved Seal, Teflon	3
24	CP04582	Pressure Ring	3
25A	CP04764	Support Ring	6
25B	CP06818	O-Ring	6

### Valve Assembly Kits

Part # CP09498-0003

Item	Part #	Description	Qty.
27A	CP05543	Valve Assembly	6
33	CP05545-0003	O-Ring	3

### Oil Seal Kit

Part # CP09641

Item	Part #	Description	Qty.
19	CP05444	Oil Seal	3

# CP460 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	CP08377	Crankcase	1	20	CP05938	Seal Adapter	3
2	CP08378	Oil Fill Plug with Gasket	1	20A	CP04761	Seal Case	1
3	CP06479	Crankcase Cover	1	21	CP07266-0003	O-Ring	3
3A	CP07186	Oil Sight Glass w/Gasket	1	23	CP04762	Grooved Seal Packing	3
4	CP08380	O-Ring	1	23B	CP06483-0020	Gooved Seal, Teflon	3
5	CP07109	Oil Drain Plug	1	24	CP04582	Guide Ring	3
5A	CP06015	O-Ring	1	25	CP06485	Seal Case	3
5B	CP08092	Plug with Gasket	1	25A	CP04764	Support Ring	6
6	CP01010	Screw	4	25B	CP06818	O-Ring	6
6A	CP01011-0400	Spring Washer	4	26	CP04874	Valve Casing	1
7	CP04739	Bearing Cover, Open	1	26A	CP04767	Set Screw	2
8	CP05291	Bearing Cover, Closed	1	27A	CP05543-0003	Valve Assy.	6
8A	CP05292	Shim	1-3			(Includes items 27-31)	
8B	CP05293	Shim	1-3	27	CP05541	Valve Seat	6
8C	CP05964	Shim*	1-3	28	CP05542	Valve Plate	6
9	CP01016	O-Ring	2	29	CP07906	Valve Spring	6
10	CP07114	Screw with Washer	8	30	CP07907	Spring Tension Cap	6
11	CP07459	Radial Shaft Seal	1	31	CP07770-0003	O-Ring	6
12	CP05350	Bearing	2	32	CP08406-0100	Plug	3
13	CP04741	Crankshaft	1	33	CP05545-0003	O-Ring	3
13A	CP04742	Spacer Ring	1	34	CP06494	Cap Screw	8
14	CP08091	Fitting Key	1	36	CP04369	Plug, 3/8" BSP	1
15	CP08390	Connecting Rod Assy.	3	37	CP08486	Copper Washer	1
16	CP06480	Plunger Assembly	3	38	CP07109-0400	Plug, 1/2" BSP	1
17	CP06790	Crosshead Pin	3	39	CP06272	Copper Washer	1
19	CP05444	Radial Shaft Seal	3				

\*May not be present

## CP460 TORQUE SPECIFICATIONS

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Lubrication Info</u>	<u>Torque Amount</u>
3A	CP07186	Oil Sight Glass w/Gasket	Loctite 5910	106 in.-lbs. (12 Nm)
5	CP07109	Oil Drain Plug		59 ft.-lbs. (80 Nm)
5B	CP08092	Plug with Gasket		59 ft.-lbs. (80 Nm)
10	CP07114	Screw with Washer		132 in.-lbs. (15 Nm)
15	CP08390	Connecting Rod Assembly		97 in.-lbs. (11 Nm)
21	CP07266-0003	O-Ring	Silicone Grease Only	
31	CP07770-0003	O-Ring	Silicone Grease Only	
32	CP08406-0100	Plug	Pro Pack 550	110 ft.-lbs. (150 Nm)
33	CP05545-00033	O-Ring	Silicone Grease Only	
34	CP06494	Cap Screw		30 ft.-lbs. (40 Nm)

# Repair Instructions - CP460 Pumps

**Note: All o-rings and seals must not come into contact with mineral oil. Use silicone grease only.**

## 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. Make sure the flat side of the pressure ring faces the back of the grooved seal.

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.

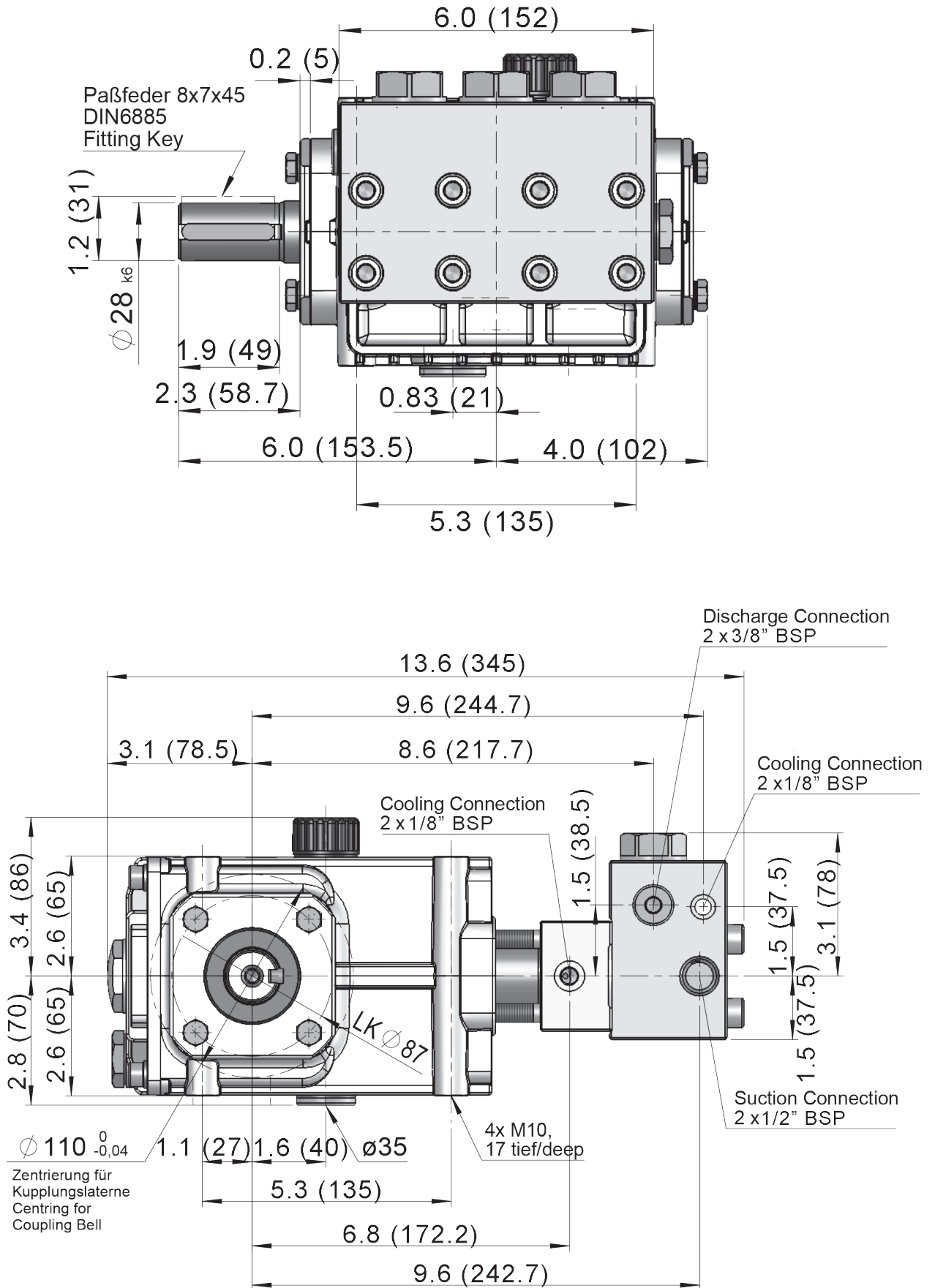
Take crankshaft out carefully so as not to bend the con rods. Remove and dismantle con rods and plungers (18). Replace worn parts. **Connecting rods must be installed in the same position and orientation.**

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°.

# Model CP460 Dimensions in(mm)



## LIMITED WARRANTY

Eco<sub>2</sub>Blast pumps and accessories are warranted by the manufacturer to be free from defects in workmanship and material as follows:

1. For portable pressure washers and car wash applications, the discharge manifolds will never fail, period. If they ever fail, we will replace them free of charge. Our other pump parts, used in portable pressure washers and in car wash applications, are warranted for five years from the date of shipment for all pumps used in NON-SALINE, clean water applications.
2. One (1) year from the date of shipment for all other Eco<sub>2</sub>Blast industrial and consumer pumps.
3. Six (6) months from the date of shipment for all rebuilt pumps.
4. Ninety (90) days from the date of shipment for all Eco<sub>2</sub>Blast 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 Eco<sub>2</sub>Blast.
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 Eco<sub>2</sub>Blast.

Liability under this warranty is on all non-wear parts and limited to the replacement or repair of those products returned freight prepaid to Eco<sub>2</sub>Blast 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 Eco<sub>2</sub>Blast of all products under warranty consideration. Call (260)728-4433 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.  
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