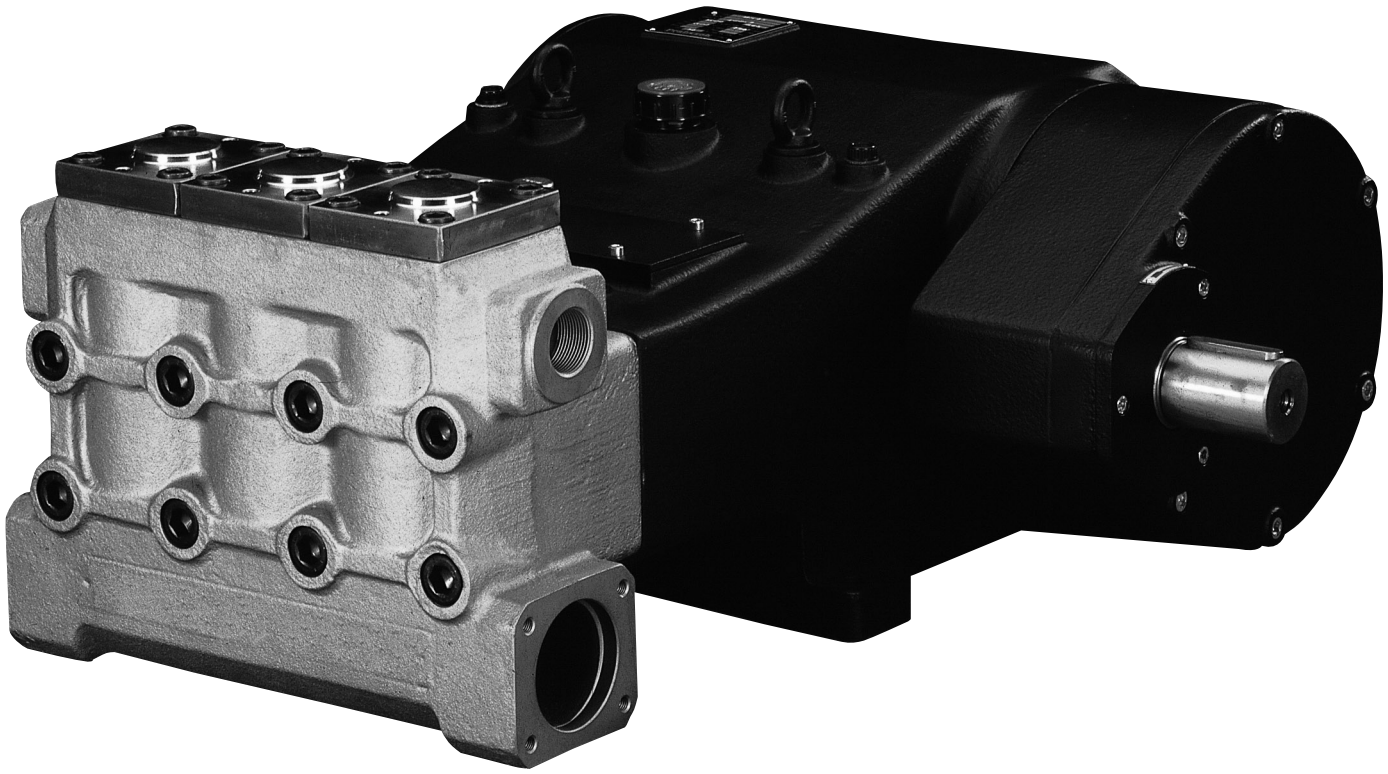
GENERAL PUMP

MH

Owner's Manual

- ***Installation***
- ***Use***
- ***Maintenance***



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1. INTRODUCTION

The General Pump MH series of high pressure plunger pumps have been designed for long life. They will provide a long period of trouble free operation, if they are correctly installed and maintained.

Read this manual carefully before using your pump. It contains necessary information for correct installation, use and maintenance, and practical trouble shooting suggestions.

2. GENERAL WARNINGS FOR SAFE OPERATION

WARNING: The misuse of a high pressure water unit and improper pump installation and maintenance increases the risk of personal injury and serious damage to the equipment.

WARNING: High pressure spray can cause serious injury. For professional use only. Observe all warnings.

WARNING: Read and understand all instruction manuals before operating equipment.

2a. Fluid injection hazard

General safety

This pump generates very high fluid pressure. Spray from a gun, leaks or ruptured components can inject fluid through your skin and into your body and cause extremely serious bodily injury including the need for amputation. Also, fluid injected or splashed into the eyes or on the skin can cause serious damage.

- **Never** point the spray gun or wand at anyone or at any part of the body. **Never** put hand or fingers over the spray tip.
- **Always** relieve system pressure before cleaning or servicing any part of the system.
- **Never** try to stop or deflect leaks with your hand or body.
- Be sure all equipment safety devices are operating properly before each use.
- **Always** install a pressure relief valve sized to discharge (bypass) 110% of the maximum pump flow rate.
- Protect all components from environmental damage and high pressure water spray.
- **Always** restrict access to the area to properly trained and required personnel.
- Keep the area clear of debris and loose items.
- **Always** use only genuine General Pump replacement parts when servicing the pump.

Medical treatment

If any fluid appears to penetrate your skin, get **EMERGENCY MEDICAL TREATMENT AT ONCE. DO NOT TREAT AS A SIMPLE CUT.** Tell the doctor exactly what fluid was injected.

NOTE **NOTE TO PHYSICIAN:** *Injection in the skin is a traumatic injury.* **It is important to treat the injury surgically as soon as possible.** *Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected directly into the bloodstream. Consultation with a plastic surgeon or reconstructive hand surgeon may be advisable.*

Pressure relief procedure
To reduce the risk of serious bodily injury, including fluid injection and splashing in the eyes or on the skin, always follow this procedure whenever you stop spraying for more than 10 minutes, when shutting down, and before checking or repairing any part of the system.

1. Engage the trigger safety latch.
2. Turn the system off.
3. Disconnect the power supply.
4. Shut off the water supply.
5. Disengage the trigger safety latch and trigger the gun to relieve pressure, and then engage the trigger safety latch again.
6. Before long-term (overnight) storage, disconnect the water supply and disconnect the power supply.

Spray gun safety devices
Be sure all gun safety devices are operating properly before each use. Do not remove or modify any part of the gun; this can cause a malfunction and result in serious bodily injury.

Safety latch: Whenever you stop spraying for a moment, always set the gun safety latch in the engaged or "safe" position, making the gun inoperative. Failure to properly set the safety latch can result in accidental triggering of the gun.

Spray tip safety: Use extreme caution when cleaning or changing spray tips. If a spray tip clogs while spraying, engage the gun safety latch immediately. **Always relieve system pressure before removing the spray tip to clean it.**

2b. Fuel and emission hazards: engine driven products

Never fill the fuel tank while the unit is running or hot. The fuel used in this unit is combustible and when spill on a hot surface can ignite and cause a fire. **Always** fill tank slowly to avoid spilling.

Never operate the unit in a closed building. The exhaust contains carbon monoxide, a poisonous, odorless, invisible gas which can cause serious injury or death if inhaled.

Never alter the maximum throttle setting, which is factory set. Tampering with this adjustment can damage the pressure washer and will void the warranty.

2c. Grounding instructions: motor driven products

This product must be grounded. If it should malfunction or break down, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. If the equipment is equipped with a cord having an equipment-grounding conductor and a grounding plug, the plug must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances.

DANGER: Improper connection of the equipment-grounding conductor can result in the risk of electrocution. Check with a qualified electrician or service person if you are in doubt as to whether an outlet is properly grounded. Do not modify any plug provided with the product – if it will not fit the outlet, have a proper outlet installed by a qualified electrician.

2d. Extension cords: motor driven products

Use only 4-wire extension cords that have 4-prong grounding-type plugs and 4-pole cord connectors that accept the plug from the product. Use only extension cords that are intended for outdoor use. These extension cords are identified by a marking, “Acceptable for use with outdoor appliances; store indoors while not in use.” Use only extension cords having an electrical rating not less than the rating of the product. Do not use damaged extension cords. Examine extension cord before using and replace if damaged. Do not abuse extension cord and do not yank or pull on any cord to disconnect. Keep cord away from heat and sharp edges. Always disconnect the extension cord from the receptacle before disconnecting the product from the extension cord.

WARNING: To reduce the risk of electrocution, keep all connections dry and off the ground. Do not touch plug with wet hands.

2e. Equipment misuse hazard

General safety

Any misuse of the pump or accessories, such as overpressurizing, modifying parts, using incompatible chemicals and fluids, or using worn or damaged parts, can cause them to rupture and result in fluid injection, splashing in the eyes or on the skin, or other serious bodily injury, fire, explosion or property damage.

Never alter or modify any part of this equipment; doing so could cause it to malfunction.

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

Always wear protective eyewear, hearing protection and appropriate clothing. If using a chemical, read and follow the chemical manufacturer’s literature for recommendations on additional protective equipment, such as a respirator.

System pressure

This pump can develop high operating pressure. Be sure that all equipment and accessories are rated to withstand the maximum working pressure of this system. **Do not** exceed the maximum working pressure of any component or accessory used in the system.

Chemical compatibility

Be sure that all chemicals used are compatible with the wetted parts as given in the Technical Data. Always read the chemical manufacturer’s literature before using any chemical.

2f. Hose safety

High pressure fluid in the hoses can be very dangerous. If the hose develops a leak, split or rupture due to any kind of wear, damage or misuse, the high pressure spray emitted from it can cause a fluid injection injury or other serious bodily injury or property damage.

ALL FLUID HOSES MUST HAVE STRAIN RELIEFS ON BOTH ENDS. The strain reliefs help protect the hose from kinks or bends at or close to the coupling, which can result in hose rupture.

Tighten all fluid connections securely before each use. High pressure fluid can dislodge a loose coupling or allow high pressure spray to be emitted from the coupling.

Never use a damaged hose. Before each use, check entire hose for cuts, leaks, abrasion, bulging cover, or damage or movement of the hose couplings. If any of these conditions exist, replace the hose immediately. **Do not** try to recouple high pressure hose or mend it with tape or any other device. A repaired hose cannot contain the high pressure fluid.

HANDLE AND ROUTE HOSES CAREFULLY. Do not pull on hoses. Do not use chemicals which are not compatible with the inner tube and cover of the hose. **Do not** expose hose to temperatures above 200° F (93° C) or below –40° F (–40° C).

2g. Moving parts hazard

Moving parts can pinch or amputate fingers or other body parts. **Keep clear** of moving parts when starting or operating the system.

Never operate the system without all guards and interlocks installed and functioning. **Always** relieve system pressure before cleaning or servicing any part of the system to prevent discharging high pressure fluid from the gun.

2h. Terms

WARNING or **DANGER:** Alerts user to avoid or correct conditions that could cause bodily injury.

CAUTION: Alerts user to avoid or correct conditions that could cause damage to the equipment.

NOTE **NOTE:** Identifies helpful procedures and information.

IMPORTANT: United States Government safety standards have been adopted under the Occupational Safety and Health Act. These standards – particularly the General Standards, Part 1910, and the Construction Standards, Part 1926 – should be consulted.

3. PUMP IDENTIFICATION

Each pump is fitted with a rating plate. The specifications stamped on it are as follows:

- pump model and version
- maximum rpm
- maximum pressure and volume
- crankcase oil capacity and specification
- serial number

The pump model, pump version and serial number data must be specified when ordering spare parts. If the pump is modified, any change should be mentioned on the rating plate for future reference.

4. TECHNICAL FEATURES

The pump features:

- three horizontal plungers and five different bore sizes
- vertically-arranged valves
- double V-shaped pressure packings lubricated by a water drip feed system and routine greasing
- splash lubricated crank mechanism
- pulley, flexible joint or PTO shaft drive capabilities
- 2.65:1 or 3.29:1 gear reduction. Gear boxes can be fitted on the left or right side of the pump in different positions according to customer requirements

PUMP MODELS

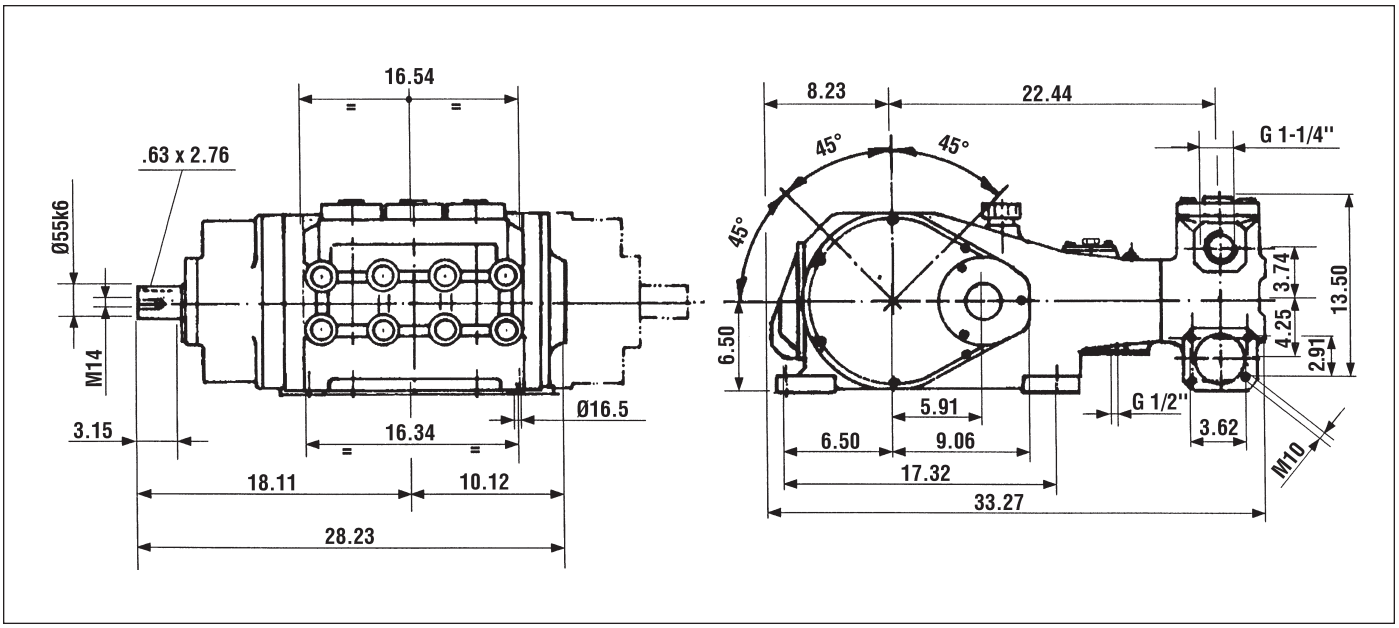
MODEL	RPM*	Volume		Pressure		Power	
		L /min	GPM	Bar	PSI	KW	HP
MH 45	1500	194	51.2	300	4350	112	152
	1800	187	49.4	300	4350	108	147
MH 50	1500	240	63.4	240	3500	111	151
	1800	231	61.0	250	3600	111	151
MH 55	1500	290	76.6	200	2900	112	152
	1800	280	74.0	205	2950	110	149
MH 60	1500	345	91.1	165	2400	110	149
	1800	333	88.0	175	2550	112	152
MH 65	1500	405	107	140	2050	109	148
	1800	391	103	145	2100	109	148

Performances refer to theoretical delivery with 100% volumetric efficiency. Under normal operating conditions, pump volumetric efficiency is over 95%. Please contact our technical staff in case of continuous, heavy-duty or special applications.

FEATURES		
• Stroke	72 mm	2.83 in
• Max. Inlet Pressure	3 bar	45 psi
• Max. Inlet Water Temperature	60° C	150° F
• Oil Capacity	14 liters	14.8 qts.
• Weight	400 kg	882 lbs.

★ **1500 RPM Crankshaft Speed**
2.65 gear reduction
Rated crankshaft speed 566 RPM

1800 RPM Crankshaft Speed
3.29 gear reduction
Rated Crankshaft speed 546 RPM



5. CONSTRUCTION FEATURES

The main components of the pump consist of:

A. crank mechanism
B. plunger and packing system
C. manifold

A. CRANK MECHANISM Includes the cast iron crankcase containing the drive system components:

- gas-nitrided, hardened and tempered alloy steel crankshaft mounted on self-adjusting double roller shaft bearings.
- forged split connecting rods with special anti-friction bearings.
- surface-treated steel piston guides.
- splash lubricated by the pump crankcase oil.

B. PLUNGER AND PACKING SYSTEM Primarily composed of ceramic-coated stainless steel plungers and pressure packings with packing supports and cylinders. The pumping system is also greased to further improve the life of pressure packings and plungers.

C. MANIFOLD Contains the inlet and discharge valves, made of stainless steel. Valve components come out as a single unit.

6. GENERAL INFORMATION ON PUMP USE

The MH pump has been designed to pump, at room temperature, fresh, filtered water or other liquids of similar viscosity that are compatible with the wetted materials (for questionable liquids contact our Technical Department).

6a. Water temperature.

The maximum inlet water temperature is 150° F. Water temperature can can be a significant factor in pump life. The higher the water temperature, the more likely it is to create cavitation, resulting in premature seal and valve failures.

For water above 100° F, follow these procedures:

- Feed the plunger pump with a centrifugal pump, supplying at least twice the plunger pump volume at 30 to 45 psi.
- Make the pump run more slowly, de-rating rpm by 30% at least (lowest allowable speed: 350 rpm)
- Make sure the crankshaft turns in the direction indicated by the arrows located near the drive shaft projection (see paragraph 8.b)

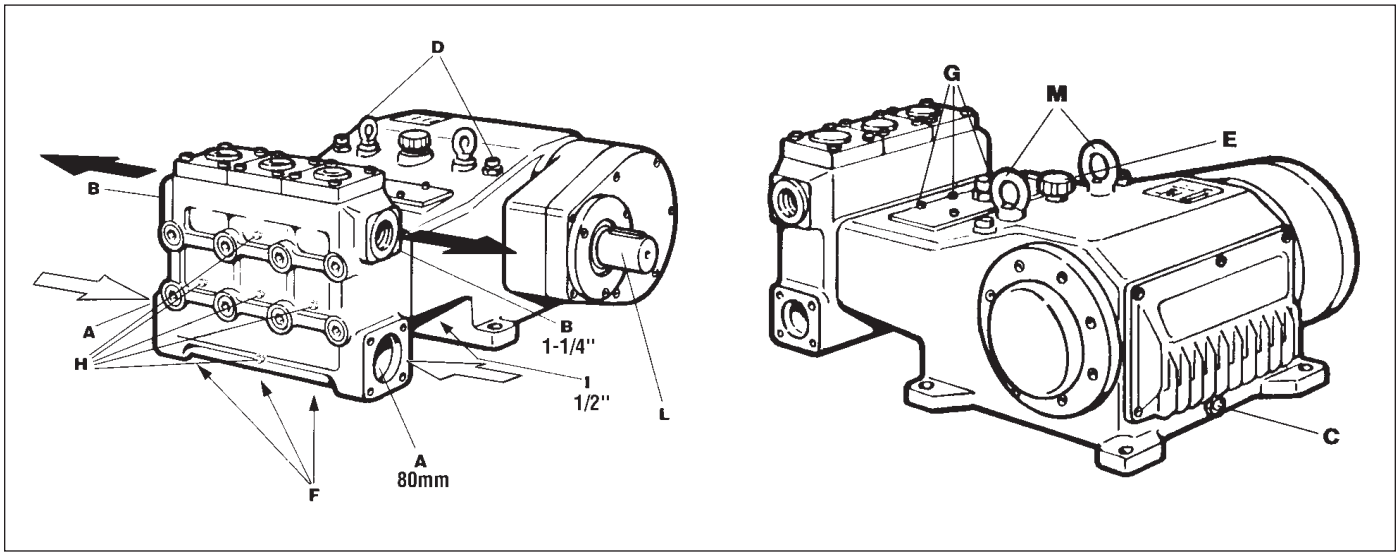
6b. Pump performance

Never exceed the maximum pump flow rate or pressure.

7. CONNECTIONS AND PLUGS

The MH series pumps have:

A. **80 MM Dia Inlet Ports (2)** Water supply connection to either or both ports is acceptable. The port not being used must be sealed with the correct plugs.
B. **1-1/4"-NPT Outlet Ports (2)** Both ports can be connected to the delivery line, depending on the accessories to be installed and inlet line characteristics.
C. **Oil Drain Plug (1)** (position 30)* Used to empty the crankcase during oil changes. It includes a magnet to collect metal impurities inside the crankcase.
D. **Oil Dipstick (2)** (position 34) Used to monitor oil level.



E. **Oil Fill Plug (1)** (position 38) Used to change or add oil.
F . **Plug (3)** (position 83) Used to remove the valve assembly from its seat if it is stuck due to excessive scaling. Remove plugs and insert a pin to dislodge the valve assembly and push it out.
F. **Grease Fittings (3)** (position 51) Used to apply grease to the pressure packings.
H. **Plugs (5)** (position 80) Used to drain the fluid end.
I. **1/2"-NPT Drain Hole** Used to drain water from the pressure packing chamber. Always leave this hole open.
L. **Shaft Extension (1)** 55 MM Dia.
M. **Eyebolts (2).**

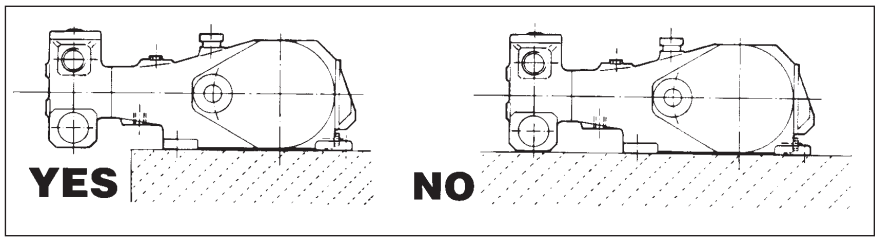
**All positions are referenced as shown on the parts breakdown on page 14.*

8. PUMP INSTALLATION

8a. Positioning

The pump must be mounted to a rigid and flat base using the four threaded feet in the crankcase.

Be sure maximum pump inclination during operation does not exceed 5° from level in order to guarantee the correct splash lubrication.

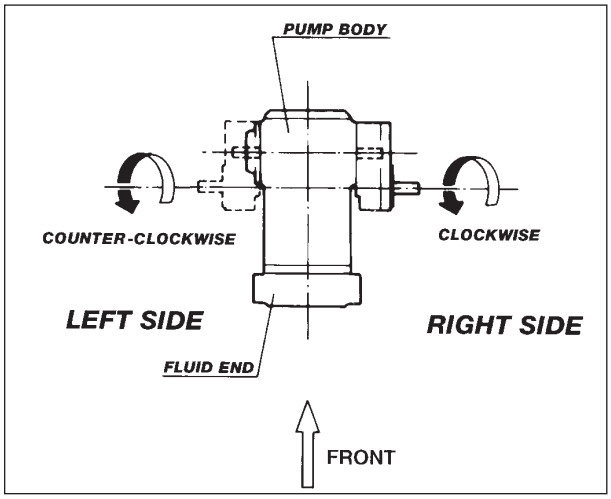


The base must not permit any misalignment or flexing of the pump/transmission coupling.

Never install the pump such that the fluid end rests on the base on which the pump is mounted. The fluid end must be left free and not subject to any force.

8b. Direction of rotation

The diagram at right shows the correct direction of rotation looking at the pump from the **fluid end side:**



8c. Water line connections

In order to isolate any pump vibration, use flexible hoses for both the inlet and discharge lines. The flexible hose must be rigid enough not to collapse during the suction stroke, when a partial vacuum may occur.

8d. Pump feeding

MH pumps require an inlet pressure at the inlet port between 15 psi and 45 psi.

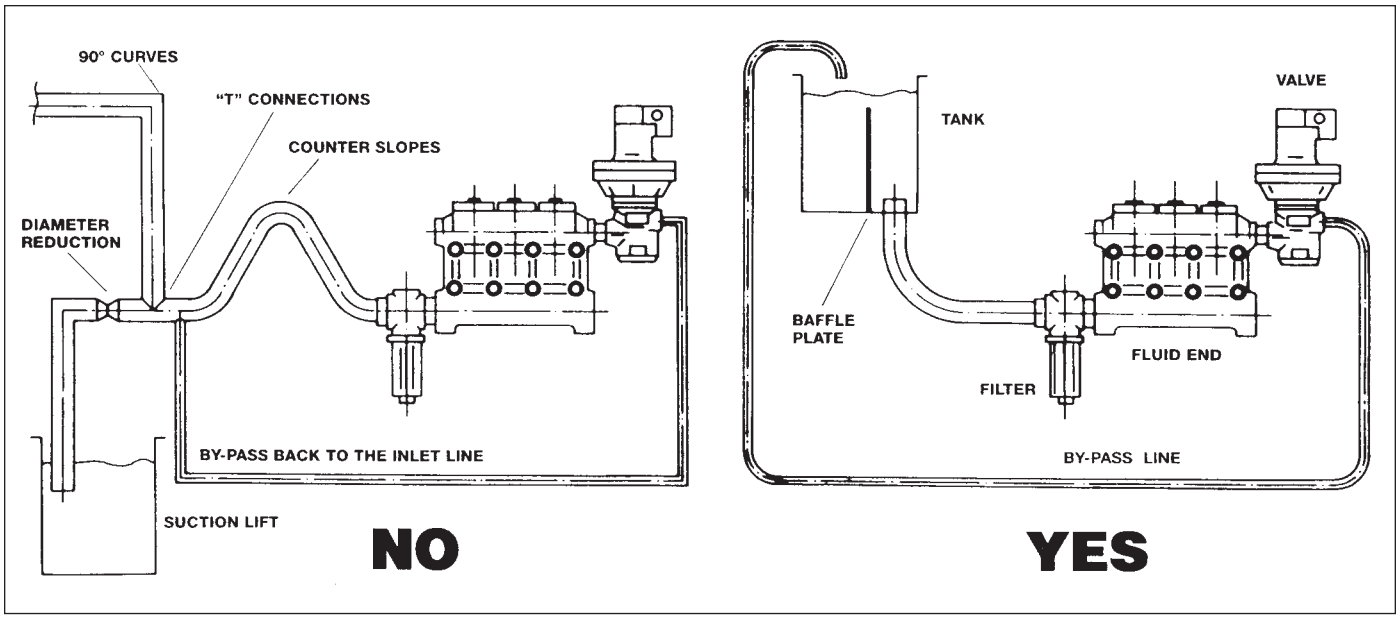
The feed pump (centrifugal type) must: (1) supply at least twice the plunger pump volume at the required pressure, (2) operate independently and (3) supply its full rated performance even if the plunger pump is run below its rated performances.

We recommend a pressure switch in the inlet line (after the filters) to prevent the MH pump from starting until the inlet pressure has reached 15 psi. This pressure switch will also stop the pump in case of filter clogging.

8e. Inlet line

THE INLET LINE **MUST** HAVE THE FOLLOWING CHARACTERISTICS:

- Minimum internal diameter of 80 mm (3.15 in.).
- No bends or changes in diameter within 12 inches of the suction port.
- Be airtight.
- Minimize all 90° elbows, diameter reductions, counter slopes and T-connections, and must not be connected with other pipelines within 10 diameters of inlet port.
- Be positioned so that it remains filled after the pump stops.



RECOMMENDATIONS:

- Do not connect the bypass line directly to the inlet line.
- Do not use high pressure flexible hose for the inlet line.
- Install the inlet pressure gauge after the filters and as close as possible to the pump inlet port.
- Be sure that the feed pump tank dimensions and the minimum water level do not create turbulence at the pump inlet port. Recommended minimum tank volume is five times discharge flow rate.
- Connect the by-pass directly to the feed tank and be sure that both the by-pass and feed tank flows do not create turbulence at the pump inlet port. Baffle plates should be inside the tank.
- Before connecting the suction line to the pump inlet port be sure the line is clean inside.
- Do not install a chemical injector on the inlet line.

8f. Filtration

MH pumps require 200 to 360 micron filtration.

The filters should be installed as close as possible to the pump, allow easy inspection and have the following characteristics:

- The capacity of each filter must be at least 3 times the rated pump volume.
- Filter port diameters should not be smaller than the pump inlet ports.

IMPORTANT NOTE: Clean the filters daily, more often in poor water conditions, to prevent premature pump wear and damage.

8g. Discharge line

To ensure the discharge line is correctly installed:

- Install a suitable safety valve on the discharge line.
- Use only high pressure hoses and fittings that exceed the working pressure of the system.
- Use glycerine filled pressure gauges.

9. START-UP AND RUNNING PROCEDURES

9a. Start-up checks

Before starting the pump, be sure that the following conditions have been met:

- Inlet line must be connected, and tight: **the pump must never run dry.**
- All ON-OFF valves in between the pump and water supply must be open. Be sure water flows into the pump.
- Be sure all connections are tight.
- Set the discharge line into the dump mode, to prime the pump.
- Be sure joint alignment, belt tension or U-joint angle is within Manufacturer's specification.
- Check oil level.

NOTE: If pump has not been operated for a long period of time, check the inlet and dishcarge lines for scaling.

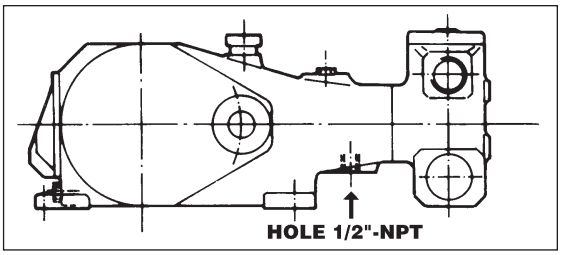
9b. Start-up and operation

- Make sure the correct inlet pressure is provided.
- Do not start pump and motor (or engine) under load. Set the regulating valve to zero or set the discharge line into the dump mode.
- Be sure that the correct inlet pressure is provided.
- Check for proper direction of pump rotation.
- Be sure the rotating speed does not exceed the rated speed.
- Before putting the pump under pressure, let the pump run for some time until the oil flows freely.
- After stopping the pump, relieve the pressure from the system.

NOTE: In case of feeding by a centrifugal pump, make sure that the plunger pump starts only when the correct inlet pressure is provided.

9c. Cooling system

During operation a small amount of water (a few drops a minute) is released from the pump fluid end. This leakage is designed to provide lubrication for the pressure packings. The leakage is drained out of the pump through a hole in the cover (position 24). **Always leave this hole open.**



10. MAINTENANCE INSTRUCTIONS

10a. Crank mechanism maintenance

Check the oil level (position 34)* frequently. It should be checked on a weekly basis. Oil level should remain between the notches on the dipstick. Stop the pump and provide immediate service if water gets into the oil. Before filling the pump with new oil, wash the crankcase and crank mechanism with a solvent and allow to dry completely. To ease the replacement of the oil seals (position 93) we recommend the use of maintenance tool (p/n F2000.0014.0). Oil seals (position 93) should be replaced every three years.

Change oil after 50 working hours and every 500 working hours thereafter.

The oil must be changed at least once a year.

We recommend you use General Pump Industrial oil or its equivalent. (If working at normal room temperature – from 32° to 113° F – use General Pump Series 220 Oil (P/N 100217).)

Pump oil pump capacity is 14.8 quarts

During oil changes, the pump oil should be at working temperature; be sure to clean the magnetic plug (position 30) and check the cover (position 24) for grease sediment.

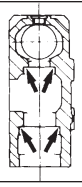
**All positions are referenced as shown on the parts breakdown on page 14.*

10b. Fluid end maintenance

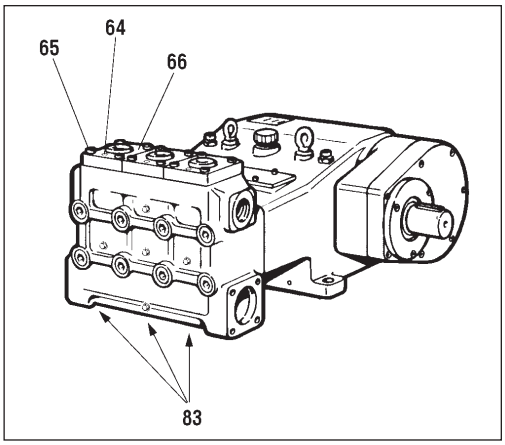
The fluid end **does not** require periodic maintenance.

Service operations are limited to valve inspection and/or replacement, when necessary:

Step 1. Loosen the four valve cover screws (position 65)* and gradually tighten the set screws (position 64) to lift the valve unit and allow extraction by hand.



IMPORTANT NOTE: BEFORE REPOSITIONING THE VALVE UNITS, CLEAN AND DRY ALL VALVE HOUSINGS INSIDE THE MANIFOLD.

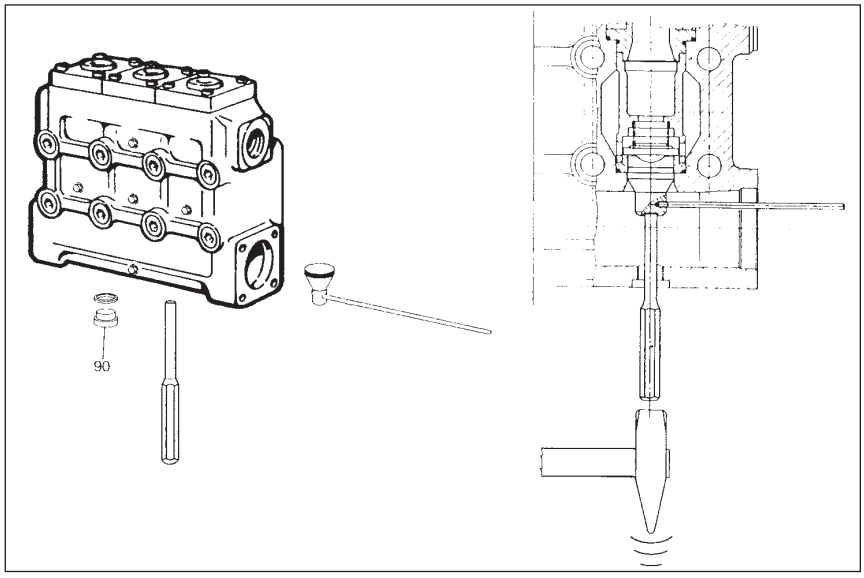


Step 2. Replace each valve assembly. Before repositioning the valve assemblies in the fluid end, unscrew the set screws (position 64) until they reach their initial position.

Step 3. Replace all valve and valve cover O-rings at every inspection.

Step 4. Replace valve cover screws (position 65) and tighten the screws to 90 ft.-lbs. in an alternating sequence.

If excessive scaling inside the fluid end prevents valve extraction, open one of the two inlet ports, loosen the three plugs (position 83), insert valve extraction tool (p/n F2000.0005.0) and push the valve unit out as shown.



10c. Pressure packings and plungers maintenance

The only maintenance operation required for the pumping system is the pressure packing greasing through the proper greasers (position 51) located on the pump crankcase.

Greasing must be carried out at even intervals at least every 100 working hours by means of a hand pump. Stop greasing when the pump trigger becomes harder to operate: that means the grease chamber is full.

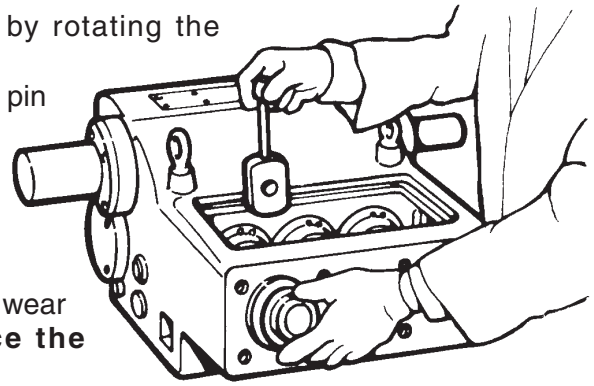
Use General Pump Packing Lubricant (p/n 100278).

Periodically check the amount of water drained out by the pump through the hole provided in the cover (position 24). It clearly shows the pressure packing state of wear; replace packings if water dripping becomes continuous.

**All positions are referenced as shown on the parts breakdown on page 14.*

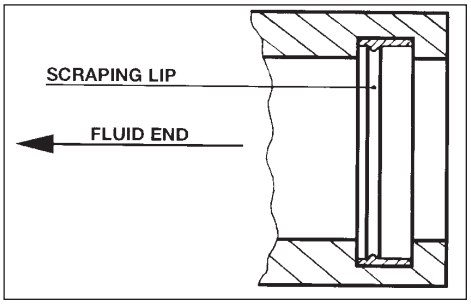
Inspection/replacement of the pumping unit components:

Step 1. Remove the manifold (position 82) by loosening the eight mounting screws (position 20).
Step 2. Remove the plunger bolt (position 62) and washer (position 61) and push the plunger forward.
Step 3. Remove the cover (position 41).
Step 4. Move piston guide (position 53) backwards by rotating the crankshaft to bottom dead center.
Step 5. Insert maintenance tool (p/n F2000.3005.0) or a pin of adequate dimensions in between the guide piston and packing support (position 91). By rotating the crankshaft, move the piston guide forward. In turn, the pin will move forward to eject the complete pumping unit.

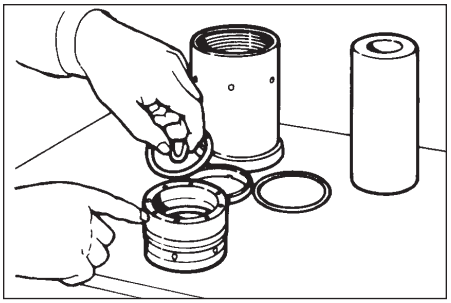


Step 6. Split the pumping unit, check the components for wear and replace as necessary. **Always replace the pressure packings.**

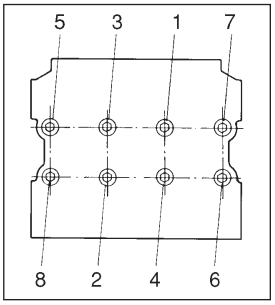
NOTE: The scraper (position 93) features a particular shape on its internal diameter which performs the correct scraping effect only if fitted in the correct position, as shown.



Step 7. To fit the scraper in place, shape it with your fingers as shown. Once in place, seat the scraper with your fingers.
Step 8. When replacing the pressure packings, apply a very small quantity of silicone grease on their lips to ease assembly.
Step 9. Replace all O-rings of the pumping unit.
Step 10. Set up the complete pumping unit and install it in the pump in one single block. The wiper (position 93) must be in the correct position.
Step 11. Tighten the plunger screws (position 62) to 72 ft.-lbs. The washer (position 61) **should always be replaced.**
Step 12. Install the manifold and tighten the screws (position 20) to 259 ft.-lbs. in an alternating sequence as shown.
Step 13. Grease the pumping units through the grease fittings (position 51).



10d. Fastener torque values



Always use a torque wrench:

POSITION*	DESCRIPTION	Kgm	Nm	Ft-lbs
65	Valve cover screws	12.5	123	90
81	Manifold screws	36	353	259
62	Plunger screws	10	98	72
52	Connecting rod screws	7.5	74	55
10	Gear box outer cover & rear cover screws	2	20	14.7
9	Gear box main cover screws	4	40	29.4
3	Gear box housing screws	7	70	51.5
25	Bottom cover screws	1	10	7.3
49	Side cover screws	7	70	51.5

**All positions are referenced as shown on the parts breakdown on page 14.*

11. PUMP STOPPED FOR LONG PERIOD

Before starting the pump after a long period of inactivity: (1) check for correct oil level, (2) check the valves as indicated in section 10b and (3) use the starting procedures indicated in section 9.

When a long period of inactivity is scheduled, drain the entire suction and delivery line and run the pump for a few seconds to drain out all water.

12. FROST PRECAUTIONS

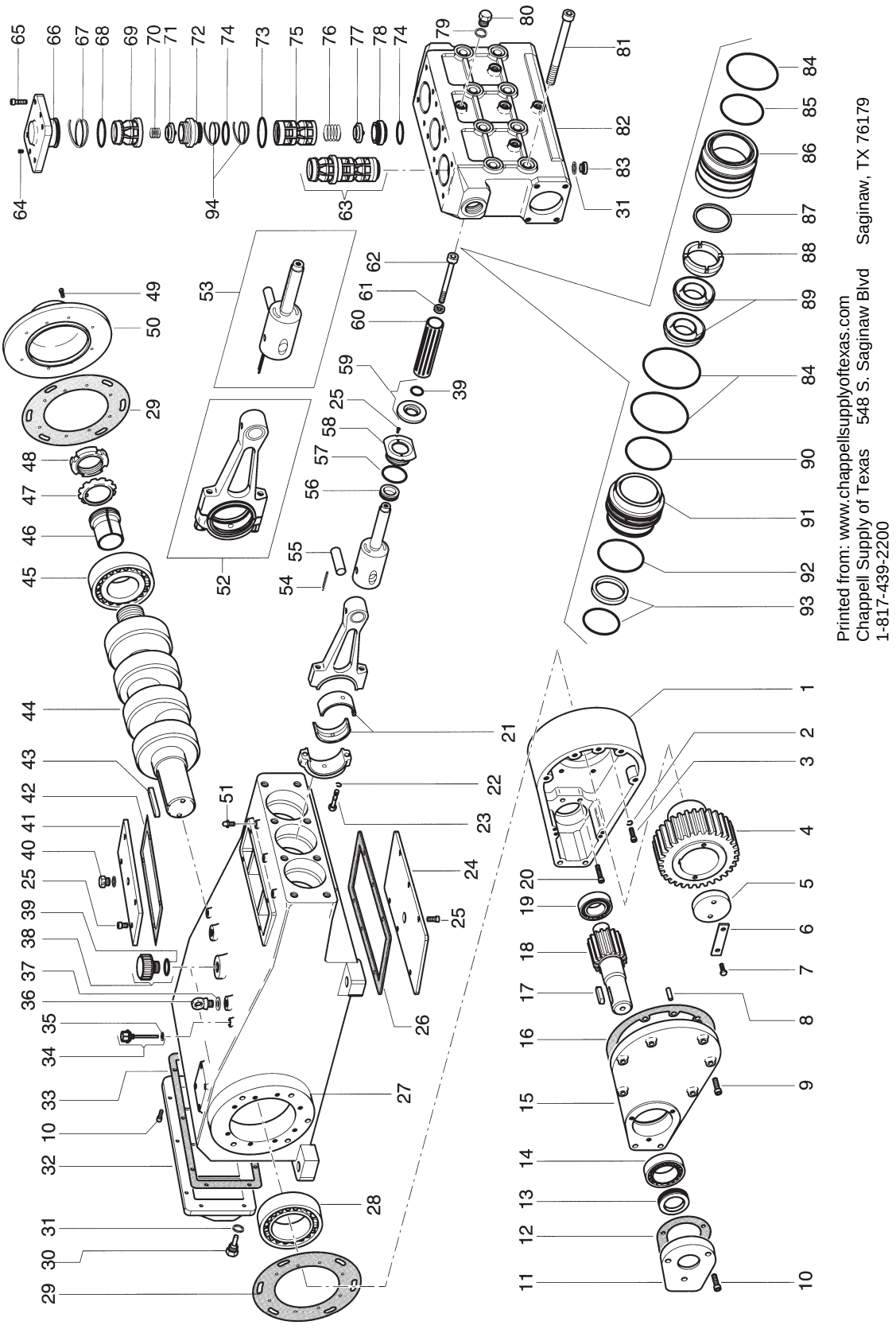
When there is risk of freezing:

- Drain all suction and delivery lines (filter included).
- Run the pump for a few seconds to drain the water collected inside the manifold. Flush the system with a 50-percent solution of anti-freeze until the anti-freeze works throughout the system.

WARNING: If a pump is frozen or appears frozen **DO NOT OPERATE THE PUMP** until the entire system has been thawed.

**All positions are referenced as shown on the parts breakdown on page 14.*

10e. Parts breakdown



MH SERIES PARTS

Item	Part number	Description	Qty
1.	F060100200	Gearbox body	1
2.	F872047006	Lock washer Ø12	8
3.	F871131105	SHCS M 12x40	6
4.	F052000060	Driven gear 1500 RPM (Z 53)	1
	F052000080	Driven gear 1800 RPM (Z 56)	1
5.	F030000080	Gear retainer block	1
6.	F042000000	Keeper	1
7.	F871024107	SHCS 10x25	2
8.	F872126004	Roll pin Ø12x40	3
9.	F871125109	SHCS M 10x45	8
10.	F871121151	SHCS M 8x16	13
11	F063100070	Pinion cover	1
12	F080600090	Gasket, pinion cover	1
13	F881080028	Seal Ø 60x80x10	1
14	F811110012	Bearing	1
15	F063100050	Cover, gearbox	t
16	F080600080	Gasket, gearbox	1
17	F872098009	Key, Pinion gear	t
	F872097013	Key, Pinion gear Ø 48	1
18	F052000070	Pinion gear 1500 RPM (Z 20) MH	1
	F052000090	Pinion gear 1800 RPM (Z 17) MH	1
	F052000190	Pinion gear 1500 RPM (Z 20) Ø 48	1
	F052000200	Pinion gear 1800 RPM (Z 17) Ø 48	1
19	F811110006	Bearing	1
20	F871131107	SHCS M 12x50	2
21	F812000000	Bearing, conn rod	3
22	F872046006	Lock washer Ø12	6
23	F035000070	Connecting rod bolt	6
24	F040000030	Lower cover	1
25	F871115152	SHCS M 6x14	16
26	F080600070	Gasket, lower cover	1
27	F060100180	Crankcase	1
28	F811110021	Bearing	1
29	F080600050	Gasket, side	2
30	F801057002	Magnetic plug G 1/2"	1
31	F872043002	Aluminum washer Ø1/2"	4
32	F063400500	Rear cover	1
33	F080600040	Gasket, rear cover	1
34	F001000000	Oil level dipstick	2
35	F872041501	Washer Ø 3/8"	2
36	F872026003	Eye bolt M 16	2
37	F030000030	Washer, eyebolt	2-4
38	F801054027	Vented plug G 1"	1
39	F881010116	OR Ø 29,82x2,62	4
40	F801056002	Plug G 1/2"	1
41	F040000010	Top cover	1
42	F080600060	Gasket, top cover	1
43	F872101009	Key	1
44	F050000080	Crankshaft	1
45	F811111014	Bearing	1
46	F811920014	Bearing retainer bushing	1
47	F872069016	Keepr MB 16	1
48	F872020016	Nut KM 16	1
49	F871131153	SHCS M 12x30	8
50	F063400460	Side cover	1
51	F801077003	Grease fitting M 10x1	3
52	F250000040	Complete connecting rod	3
53	F250001080	Complete piston guide	3
54	F872142015	Roll pin Ø 5x36	3
55	F071000050	Wrist pin Ø 35	3
56	F881081001	Seal Ø 35x47x8,5 - Spec.	3
57	F881010128	OR Ø 72,69x2,62	3
58	F063400480	Retainer, seal, piston	3
59	F205000010	Flinger washer	3
60	F024200260	Plunger MH 45	3
	F024200270	Plunger MH 50	3
	F024200280	Plunger MH 55	3
	F024200290	Plunger MH 60	3
	F024200330	Plunger MH 65	3
61	F872040004	Washer 014 - Spec.	3
62	F871135518	SHCS M 14140 SS MH 45	3
	F871135510	SHCS M 1480 SS MH 50-55-60-65	3
63	F208005230	Valve assembly	3
64	F871245356	Set screw M 10x20	6
65	F871135102	SHCS M 14x40	12
66	F063200030	Valve cover	3
67	F881112003	Anti-extrusion ring	3
68	F881011252	OR Ø 70x4 - Spec.	3
69	F021200090	Discharge valve guide	3
70	F090200050	Discharge valve spring	3
71	F082200060	Discharge valve poppet	3
72	F081200710	Discharge valve seat	3
73	F881011168	OR Ø 72x3 - Spec.	3
74	F881011161	OR Ø 56x3 - Spec.	6
75	F021200070	Inlet valve guide	3
76	F090200040	Inlet valve spring	3
77	F082200050	Inlet valve poppet	3
78	F081200060	Inlet valve seat	3
79	F872041300	Gasket washer Ø1/4"	5
80	F821201051	Plug G 1/4"	5
81	F871151120	SHCS M 20x200	8
82	F064100220	Manifold	1
83	F084000010	Plug G 1/2"	3
84	F881011054	OR Ø 96x2	9
85	F881011253	OR Ø 72x4 - Spec.	3
86	F062200170	Cylinder MH 45	3
	F062200180	Cylinder MH 50	3
	F062200190	Cylinder MH 55	3
	F062200200	Cylinder MH 60	3
	F062200210	Cylinder MH 65	3
87	F031300120	Spacer MH 45	3
	F031300050	Spacer MH 50	3
	F031300060	Spacer MH 55	3
	F031300070	Spacer MH 60	3
	F031300080	Spacer MH 65	3
88	F031200110	Head ring MH 45	3
	F031200210	Head ring MH 50	3
	F031200220	Head ring MH 55	3
	F031200230	Head ring MH 60	3
	F031200250	Head ring MH 65	3
89	F881020012	Packing MH 45	6
	F881020014	Packing MH 50	6
	F881020015	Packing MH 55	6
	F881020016	Packing MH 60	6
	F881020017	Packing MH 65	6
90	F881011163	OR Ø 59,5x3 MH 45	3
	F881011165	OR Ø 65x3 MH 50	3
	F881011167	OR Ø 69,5x3 MH 55	3
	F881011169	OR Ø 76x3 MH 60	3
	F881011170	OR Ø 80x3 MH 65	3
91	F022300290	Packing support MH 45	3
	F022300300	Packing support MH 50	3
	F022300310	Packing support MH 55	3
	F022300320	Packing support MH 60	3
	F022300330	Packing support MH 65	3
92	F881011053	OR Ø 80x2	3
93	F881061017	Scraper MH 45	3
	F881061018	Scraper MH 50	3
	F881061019	Scraper MH 55	3
	F881061021	Scraper MH 60	3
	F881061023	Scraper MH 65	3
94	F881112011	Anti-extrusion ring	6

REPAIR KITS

ITEM	MH45	MH50	MH55	MH60	MH65
61-84-85-89-90-92-93	KIT 1190	KIT 1191	KIT 1192	KIT 1193	KIT 1194
31-67-68-73-74-94	KIT 1195				
2-6-12-13-16-22-26-29-31-33-35 39-42-47-51-54-56-57-61-67-68 73-74-79-84-85-89-90-92-93-94	KIT 1196	KIT 1197	KIT 1198	KIT 1199	KIT 1200

MAINTENANCE LOG

	HOURS & DATE						
Oil Change							
Grease							
Packing Replacement							
Plunger Replacement							
Valve Replacement							

GENERAL PUMP

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