

Owner's Manual

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



MK9M5B - MK9M8B - MK9M5D - MK9M8D

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1. INTRODUCTION

This manual describes the use and maintenance instructions of the MK9M pump, and should be carefully read and understood before using the pump.

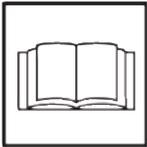
Correct use and adequate maintenance will guarantee the pumps trouble-free operation for a long time. General Pump declines any responsibility for damage caused by misuse or the non-observance of the instructions indicated in this manual.

Upon receiving the pump, check that it is complete and in perfect condition. Should anything be found out of order, please contact us before installing and starting the pump.

2. SYMBOL DESCRIPTIONS



Warning
Potential Danger



Read carefully and understand the manual before operating the pump



Danger
High Voltage



Danger
Wear protective mask



Danger
Wear goggles



Danger
Wear protective gloves



Danger
Wear protective boots

3. SAFETY

3.1 General Safety Indications

The misuse of pumps and high pressure units, and the non-observance of installation and maintenance instructions may cause severe injury to people and/or damage to property. Anyone requested to assemble or use high pressure units must possess the necessary competence to do so, should be aware of the characteristics of the components assembled/used, and must adopt all the necessary precautions in order to guarantee maximum safety in any operating condition. In the interest of safety, no precaution that is reasonably feasible must be neglected, both by the Manufacturer and the Operator.

3.2 High pressure unit safety requirements

1. The pressure line must always be equipped with a safety valve.
2. High pressure unit components, in particular for those units working outside, must be adequately protected against rain, frost and heat.
3. The units electrical parts must be adequately protected from water spray, and must comply with the specific norms in force.
4. High pressure hoses must be correctly sized for the unit's maximum operating pressure, and must only be used within the pressure range indicated by the hose manufacturer. The same conditions apply to all other unit accessories where high pressure is involved.
5. The extremities of high pressure hoses must be sheathed and fastened to a steady structure in order to avoid dangerous whiplashes should they burst or should their connections break.
6. Appropriate safety guards must be provided for the pump transmission systems (joints, pulleys and belts, auxiliary drives).

3.3 Safety During Operation



The working area of a high pressure system must be clearly signalled. Access must be prohibited to non-authorized personnel and, if possible, the area must be fenced in. The personnel authorized to access this area must be previously trained, and informed about the risks that may arise from failures or malfunctions of the high pressure unit.

Before starting the unit, the operator must check:

1. That the high pressure unit is correctly fed (see paragraph 9.5).
2. The pump inlet hose must be free from blockage of any origin. The use of a solid waste storage tank is highly recommended
3. That electrical parts are adequately protected and in perfect condition.
4. That high pressure hoses do not show apparent signs of abrasion, and that fittings are in perfect shape.

Any anomaly or reasonable doubt that may arise before or during operation must be promptly reported and verified by competent personnel. In these cases, pressure must be immediately released and the high pressure unit stopped.

3.4 General Procedures For Using Nozzles



1. The Operator must always place his own and other worker's safety before any other interest; his actions should always be governed by good sense and responsibility.
2. The Operator must always wear a helmet with a protective visor, waterproof clothing, and appropriate boots capable of guaranteeing grip on wet pavement.

Note: appropriate clothing will effectively protect against water spray, but it may not offer adequate protection against the direct impact of water jets or sprays from a close distance. Some circumstances may require further protection.

3. We advise to employ a team of at least two Operators, able to provide mutual and immediate assistance if needed, and to rotate their duties in case of long and heavy work.
4. Access to the work area that is within the water jets' range must be absolutely forbidden; the area must be free of objects that may be unintentionally hit by the pressurized jet, causing damage or dangerous situations.
5. The water jet must only and always be directed towards the work area, even during testing or preliminary inspections.
6. The Operator must always pay attention to the trajectory of the debris removed by the water jet. If necessary, adequate side guards must be provided by the Operator in order to protect anything that may be accidentally exposed.
7. For no reason must the Operator be distracted during operation. The personnel that needs to access the working area must wait for the Operator to suspend his work, and then immediately make his presence known.
8. For safety reasons, it is important that each member of the team is perfectly aware of the intentions and actions of other team members in order to avoid dangerous misunderstandings,
9. The high pressure unit must not be started and brought up to pressure unless each member of the team is in their designated position, and the Operator has already directed the nozzle towards the work area.

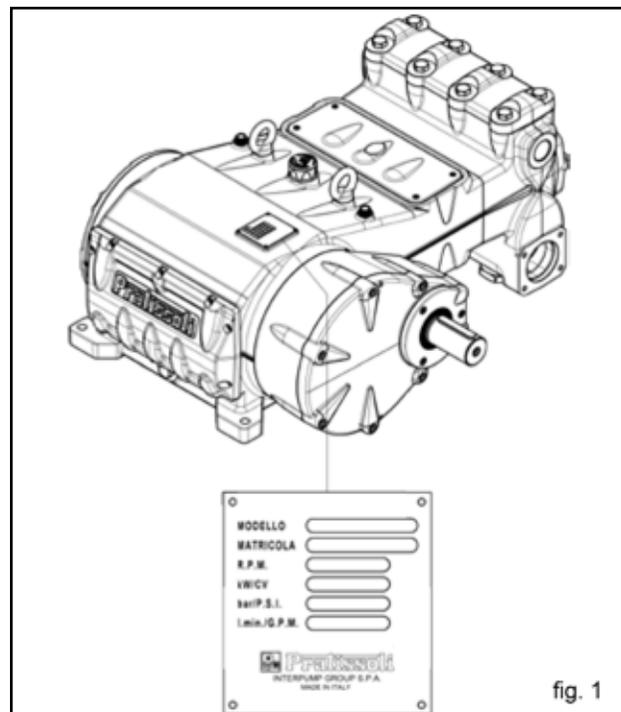
3.5 Safety During Unit Maintenance

1. The maintenance of the high pressure unit must be done within the time intervals indicated by the Manufacturer, who is responsible for the entire unit's compliance with the norms in force.
2. Maintenance must always be carried out by specialized and authorized personnel.
3. Assembly and disassembly of the pump and its various components must be performed exclusively by authorized personnel, using appropriate tools in order to avoid damage to components and connections.
4. To guarantee total reliability and safety, always use original spare parts.

4. PUMP IDENTIFICATION

Each pump (fig. 1) is equipped with a rating plate that indicates:

- Pump model and version
- Serial Number
- Maximum RPM
- Power absorbed Hp-kW
- Flow Rate l/mn - GPM
- Pressure bar/PSI



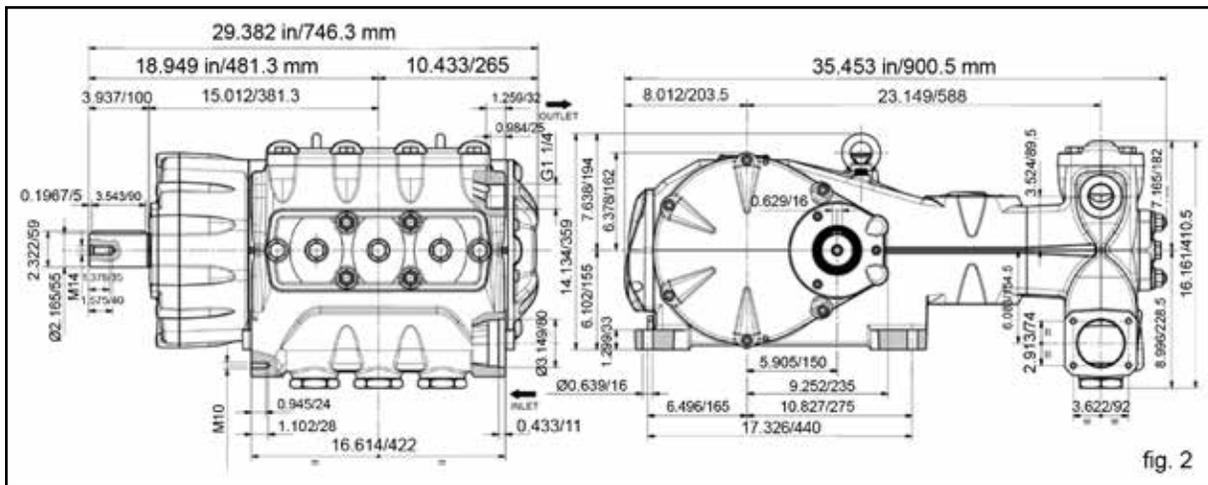
Pump model, version and serial number must always be specified when ordering spare parts.

5. TECHNICAL FEATURES

Input speed	rpm		350	400	500	650	770	950		
Reduction ratio	i		2.22	2.65	3.29	2.22	2.65	3.29		
Shaft speed	rpm		158	151	152	293	291	289		
Model	Valves	Cylinders	Pressure Bar PSI	Flow rate/ Power	Theoretical folw rate with 100% volumetric efficiency					
					flow rate		Power			
MK9M5B	Ball	Ceramic	50 725	GPM HP	57.33 27.8	54.68 26.6	55.21 26.8			
MK9M5D	Plate	Ceramic	50 725	GPM HP	57.33 27.8	54.68 26.6	55.21 26.8	106.20 51.5	105.40 51.1	104.88 50.8
MK9M8B	Ball	Steel	80 1160	GPM HP	57.33 44.5	54.68 42.4	55.21 42.8			
MK9M8D	Plate	Steel	80 1160	GPM HP	57.33 44.5	54.68 42.4	55.21 42.8	106.20 82.3	105.40 81.8	104.88 81.4

6. DIMENSIONS AND WEIGHT

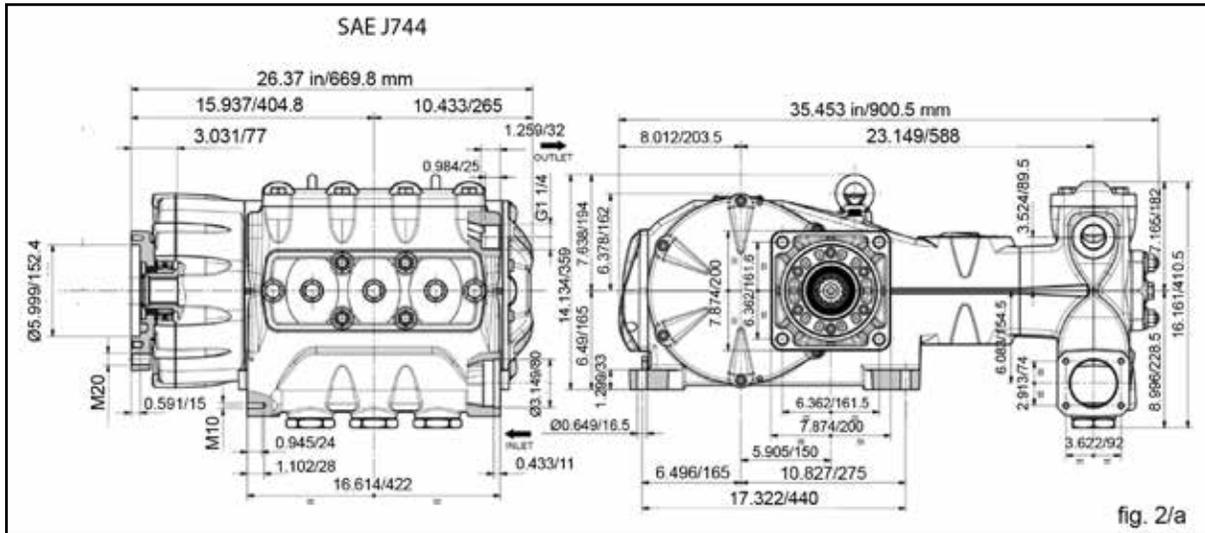
For standard version pump dimension and weight, please refer to fig. 2.



Dry Weight: 917.12 Lbs./416 Kg.

6. DIMENSIONS AND WEIGHT (cont.)

For dimensions and weight of pumps with hydraulic pack setup refer to fig. 2/a



7. INFORMATION ABOUT PUMP USE



The MK9M pump has been designed and developed to operate in environments with atmospheres that are not potentially explosive and with fluids with a high percentage of bentonite, maximum density is equal to ~45 sec. marsh cone and at a maximum temperature of 104°F (40°C).

Other liquids can be used only with approval by **Customer Service Department**.



7.1 Bentonite Temperature

The maximum bentonite temperature is 86°F (30°C). The pump can be used with bentonite up to a temperature of 104°F (40°C), but only for a short period of time. In this case, it is best to consult with the **Customer Service Department**.

7.2 Max Flow Rate and Pressure Values

The performance values indicated in the catalog refer to the maximum performance of the pump. Regardless of the power used, pressure and maximum RPM values indicated on the plate may not be exceeded unless expressly authorized by the **Customer Service Department**.

7.3 Lowest RPM

The minimum speed for these types of pumps is 100 RPM at the crankshaft.

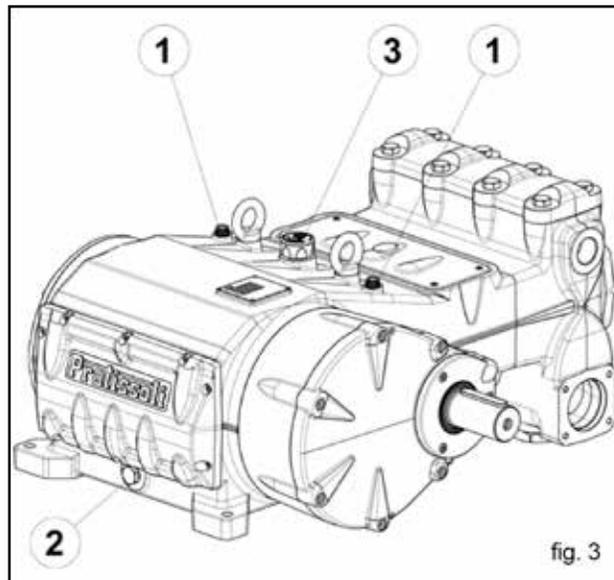
Any RPM value different from what is indicated in the performance table (see chapter 5) must be expressly authorized by the **Customer Service Department**.

7.4 Recommended Lubricant Oil Types & Manufacturers

The pump is delivered with lubricant oil compliant with room temperatures ranging between 32° and 89.6° F (0° and 30°C). Some recommended lubricant types are indicated in the table below; these lubricants are treated with additives in order to increase corrosion protection and resistance to fatigue. As an alternative, Automotive SAE 85W-90 gearing lubricants may also be used.

BRAND	TYPE
GENERAL PUMP	SERIES 220
ARAL	Aral Degol BG220
BP	ENERGOL HLP 220
CASTROL	Hyspin VG 220, Magna 220
ELF	POLYTELIS 220
ESSO	NUTO 220
FINA	Cirkan 220
FUCHS	RENOLIN 220
MOBIL	DTE OIL BB
SHELL	TELLUS C 220
TEXACO	RANDO HD 220
TOTAL	CORTIS 220

Check the oil level by using the oil level dipstick with minimum and maximum value notches (1), fig. 3. Refill if needed from the oil cap (3), fig 3. Correct oil level inspection is done with the pump at room temperature; oil is changed with the pump at working temperature, by removing the rear plug (2), fig 3. Checking and changing oil is to be carried out as indicated in Chapter 11. The amount required is 456.5 oz. (13.5 liters).

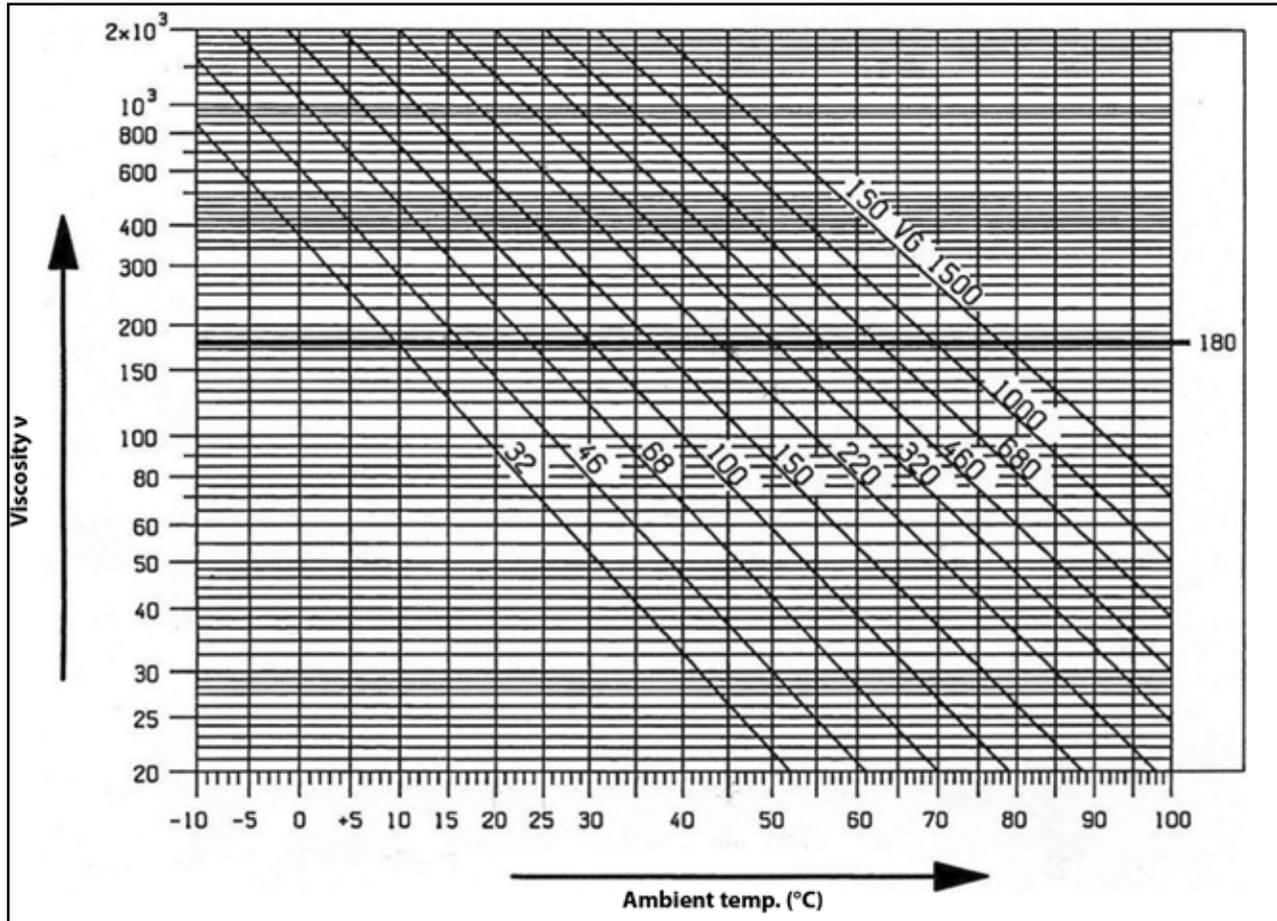


In any case, oil must be changed at least once a year since it may deteriorate by oxidation.

For room temperatures that differ from that mentioned earlier, follow the indications contained in the diagram below, keeping in mind that the oil must have a minimum viscosity of 180 cSt.

VISCOSITY/ROOM TEMPERATURE DIAGRAM

mm²/S = cSt

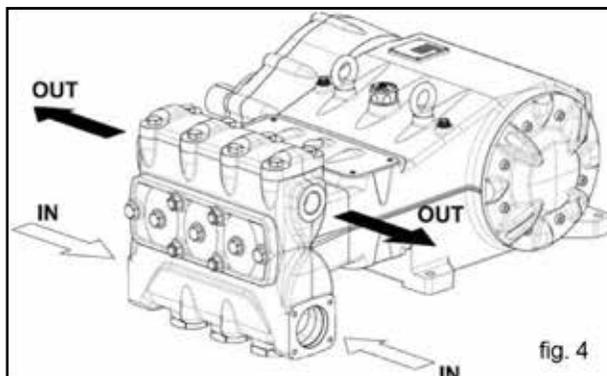


Exhausted oil must be collected in an appropriate recipient and disposed of in appropriate locations. In absolutely no case may it be dispersed into the environment.

8. PORTS AND CONNECTIONS

The MK9M series pumps (see fig. 4) are equipped with:

1. 2 "IN" inlet ports Ø 3.15 in. (80 mm).
Line connection to any of the two ports is indifferent for proper pump functioning. the unused ports must be hermetically sealed.
2. 2 "OUT" outlet ports 1" 1/4 Gas.



9. PUMP INSTALLATION

9.1 Installation

The pump must be installed in a horizontal position using the correct drilled support feet \varnothing .649in (16.5 mm). The base must be perfectly flat and sufficiently rigid in order to avoid bending and misalignments on the pump/transmission coupling axis due to the torque applied during operation.

The pump is equipped with two lifting eyebolts to facilitate installation, as shown in the following figure.



The lifting eyebolts must **not** be removed.



The eyebolts are sized for lifting the pump only. They must never be used for any additional loads.



Replace the oil filler closing plug located on the crankcase with the oil fill cap.
The oil filler cap must always be reachable, even when the unit is assembled.



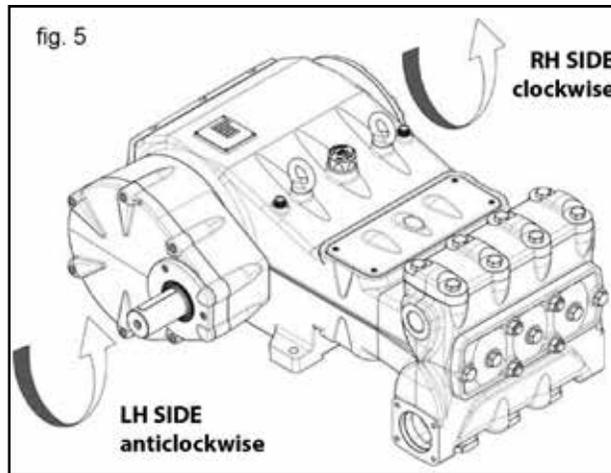
The pump's shaft (PTO) must not be rigidly connected to the motor unit.

The following transmission types are suggested:

- Flexible joint
- Cardan Joint (please respect the maximum working angles indicated by the manufacturer)
- Belts; for correct application, please contact the **Customer Service Department**.

9.2 Direction of rotation

An arrow situated on the crankcase near the shaft indicates the correct direction of rotation. Standing in front of the pump head, the direction of rotation must be as shown in fig. 5.



9.3 Version Change and Reducer Positioning

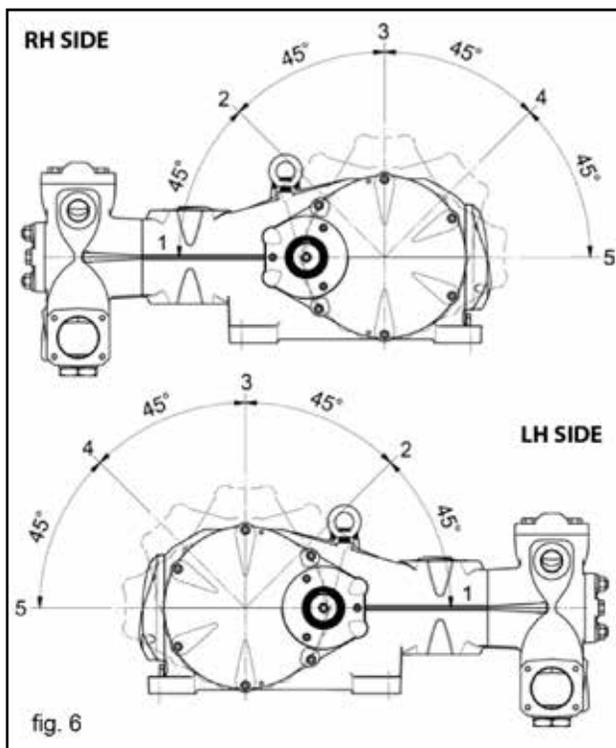
A right version pump is defined when: observing the pump from the head side, the PTO shank of the pump shaft is on the right side.

A left version pump is defined when: observing the pump from the head side, the PTO shank is on the left side. See fig. 5.



The version may be changed only by specialized and authorized personnel by carefully following the instructions in the repair manual.

Furthermore, it is possible to position the reducer in 5 different positions, both on the right and left sides, as shown in fig. 6.



The position of the reducer unit can only be changed by authorized specialized personnel following the instructions in the repair manual.

9.4 Hydraulic Connections

In order to isolate the system from the vibrations produced by the pump, we advise to build the first section of the duct near the pump (both for intake and delivery) with flexible hose. The consistency of the intake section must allow to avoid deformation caused by the depressurization produced by the pump.

9.5 Pump Feeding

A positive head of at least 0.66 ft (0.20 meters) is recommended for the best volumetric efficiency, to be increased with increasing fluid density.



For the priming conditions see the chart in par. 9.8.

9.6 Inlet Line

For the pump's correct operation, the inlet line must have the following characteristics:

1. Minimum internal diameter for hoses of length less than 26.25 ft. (8 meters) is \varnothing 3.54 in. (90 mm).
The hose must be rigid enough to avoid self-constriction caused by the pressure drop.



Along the duct, avoid localized diameter reductions that may cause pressure drops with subsequent cavitation. Absolutely avoid 90° elbows, connections with other hoses, bottlenecks, counter-slopes, upside down "U" shaped curves, "T" connections.

2. The selected lay-out must allow to avoid cavitation.
3. It should be perfectly airtight, and built in a way that guarantees perfect sealing over time.
4. Avoid pump emptying when stopping (even partial emptying).
5. Do not use hydraulic-type fittings, 3 or 4 way fittings, adapters, etc., since they may hinder the pump's performance.
6. Avoid use of base valves or other types of unidirectional valves.
7. Avoid the use of standing valves, check valves, or any other type of one-way valves.
8. Provide proper guards inside the tank to prevent the bentonite flow from the bypass and the tank supply line can create vortexes or turbulence near the pump supply pipe port.
9. Make sure the suction line thoroughly clean inside before connectin it to the pump.

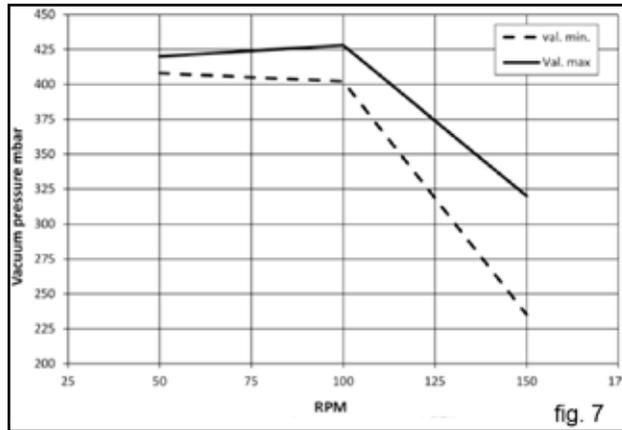
9.7 Outlet Line

For the pump's correct operation, the outlet line must have the following characteristics:

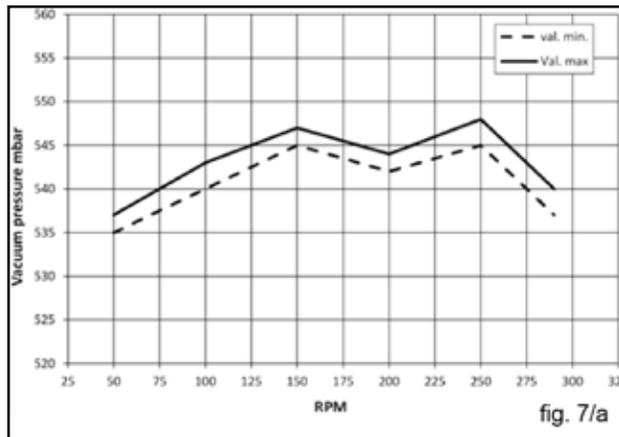
1. The internal diameter of the pipe must be sufficient to ensure correct fluid velocity.
2. The first section of the hose connected to the pump outlet must be a flexible hose, in order to isolate the vibrations produced by the pump of the rest of the system.
3. Use high pressure hoses and fittings to ensure high safety margins in all operatin conditions.
4. Use pressure guages suitable to withstand pulsating loads typical the plunger pumps.
5. During the design stage, keep in mind the line load losses which result in a drop in pressure during use with respect to the pressure measured on the pump.
6. For applications where pulses produced by the pump on the outlet line may prove harmful or unwanted, install a pulsation dampener of sufficient size.

9.8 Typical Diagram

For MK9M5B and MK9M8B pumps refer to fig. 7.



For MK9M5D and MK9M8D pumps refer to fig. 7/a.



9.9 V-belt Transmission

As indicated in paragraph 9.1, only in exceptional cases may the pump be driven by a v-belt system. For correct lay-out sizing, please contact our **Customer Service Department**.

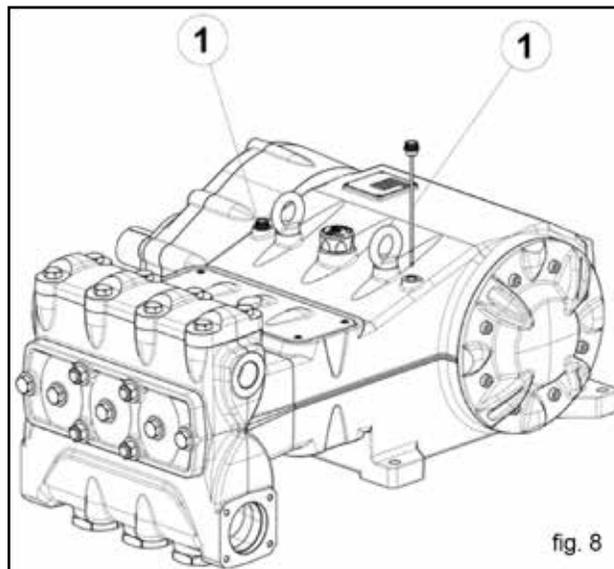
10. START-UP AND OPERATION

10.1 Preliminary Inspections

Before Start-up Be sure that:

The suction line is connected and up to pressure (see Chapter 9) the pump must never run dry.

1. The suction line must be hermetic seal over time
2. All the On-Off valves between the pump and the feeding source are completely open. The delivery line must discharge freely in order to allow the air in the pump to be expelled easily, thus facilitating pump priming.
3. All suction/delivery connections and fittings must be correctly tightened.
4. Coupling tolerances on the pump/transmission axis (half-joint misalignment, Cardan joint tilt, belt tightening, etc.) must remain within the limits indicated by the transmission Manufacturer.
5. The pump's oil level must be verified using the correct dipsticks (position 1, fig 8).



In case of prolonged storage or long-term inactivity, check proper functioning of the suction and outlet valves.

10.2 Start-up

1. When starting the pump for the first time, check for the correct direction of rotation
2. The pump must be started off-load.
3. Verify correct feeding pressure.
4. During operation, check that the rotating speed does not exceed the rated value.
5. Before putting the pump under pressure let it run for at least 3 minutes.
6. Before each pump stop, reset pressure by means of the control valve or with any relieving devices and reduce to a minimum rpm (activation with combustion motors).

11. PREVENTIVE MAINTENANCE

For pump reliability and efficiency, comply with maintenance intervals as shown in the table of fig. 9. Many applications will require changes at the frequency shown in the table due to severe and unusual operating conditions.

PREVENTIVE MAINTENANCE	
EVERY 100 HOURS	EVERY 300 - 500 HOURS
Check oil level	Change oil
	Check / Replace: <ul style="list-style-type: none"> • Balls • Valve seats For MK9M5B and MK9M8B
	Check / Replace: <ul style="list-style-type: none"> • Valves • Valve seats • Valve springs • Valve guides for MK9M5D and MK9M8D
Fig. 9	Check / Replace: <ul style="list-style-type: none"> • H.P. seal • Wiper ring



If the pump is temporarily not going to be used, in order to prevent stiffening or corrosion caused by the fluids being pumped, it is strongly recommended to flush all the components inside the head

To increase the component life of hydraulic parts, wash the parts with fresh water at the end of the working day.

12. PUMP STORAGE



12.1 Long term inactivity

If the pump is started for the first time after a long period from the date of shipment, before operation check the oil level, inspect the valves as specified in chapter 10, then follow described start-up procedures.

12.2 Filling the Pump With An Anti-Corrosion Emulsion or Anit-freeze

- a) Make sure the connecting hose is clean
- b) Fix the suction hose to the diaphragm pump, open the pump suction connection and attach the pipe between it and the diaphragm pump
- c) Fill the container with the solution / emulsion.
- d) Insert the free ends of the suction hose and the high pressure exhaust pipe inside the container.

12.2 Filling the Pump With An Anti-Corrosion Emulsion or Anit-freeze (continued)

- e) Switch on the diaphragm pump.
- f) Pump the emulsion until it comes out of the high pressure hose,
- g) Continue pumping for at least another minute; if needed, the emulsion can be reinforced by adding, for example, Shell Donax.
- h) Stop the pump, remove the hose from the suction connection and close it with a plug.
- i) Remove the hose from the high pressure outlet port. Clean, grease and plug both connections and the hoses.

13. PRECAUTIONS AGAINST FREEZING

In areas and periods of the year where there is risk of freezing, follow the instructions indicated in Chapter 12 (see paragraph 12.2).



In the presence of ice, in no case must the pump be started until the entire circuit has been completely thawed out; not complying with this indication may cause serious damage to the pump.

14. WARRANTY TERMS

The guarantee period and conditions are contained in the purchase agreement.

The warranty is void if:

- a) The pump has been used for purposes that differ from that agreed.
- b) The pump has been fit with an electric or diesel engine with performance greater than that indicated in the table.
- c) The required safety devices were un-adjusted or disconnected.
- d) The pump was used with accessories or spare parts not supplied by General Pump.
- e) Damage was caused by:
 - 1) improper use
 - 2) the non-observance of maintenance instructions
 - 3) use not compliant with operating instructions
 - 4) insufficient flow rate
 - 5) faulty installation
 - 6) incorrect positioning or sizing of the hoses
 - 7) non-authorized design changes
 - 8) cavitation

15. TROUBLESHOOTING**The pump does not produce any noise at start-up:**

- The pump is not primed and is running dry
- There is no water in the inlet line
- The valves are blocked
- The delivery line is closed and does not allow the air in the pump to be discharged

**The pump pulses irregularly (knocking):**

- Air suction
- Insufficient feeding
- Bends, elbows, fittings along the suction line obstruct the fluid's passage
- The inlet filter is dirty or too small
- The booster pump, where provided, supplies insufficient pressure or flow rate
- The pump is not primed due to insufficient head or the delivery line is closed during priming
- The pump is not primed due to valve seizing
- Worn valves
- Worn pressure packings
- Incorrect operation of the pressure adjustment valve
- Transmission problems

**The pump does not deliver the rated flow / is noisy:**

- Insufficient feeding (see the causes listed above)
- RPM are less than the rated value
- Excessive amount of water by-passed by the pressure adjustment valve
- Worn valves



- Leakage from the pressure packings
- Cavitation due to:
 - 1) Wrong sizing of the suction hose/undersized diameters
 - 2) Insufficient flow rate
 - 3) High water temperature

**Insufficient pump pressure:**

- The nozzle (or has become) too large
- Insufficient RPM
- Leakage from the pressure packings
- Incorrect operation of the pressure adjustment valve
- Worn valve

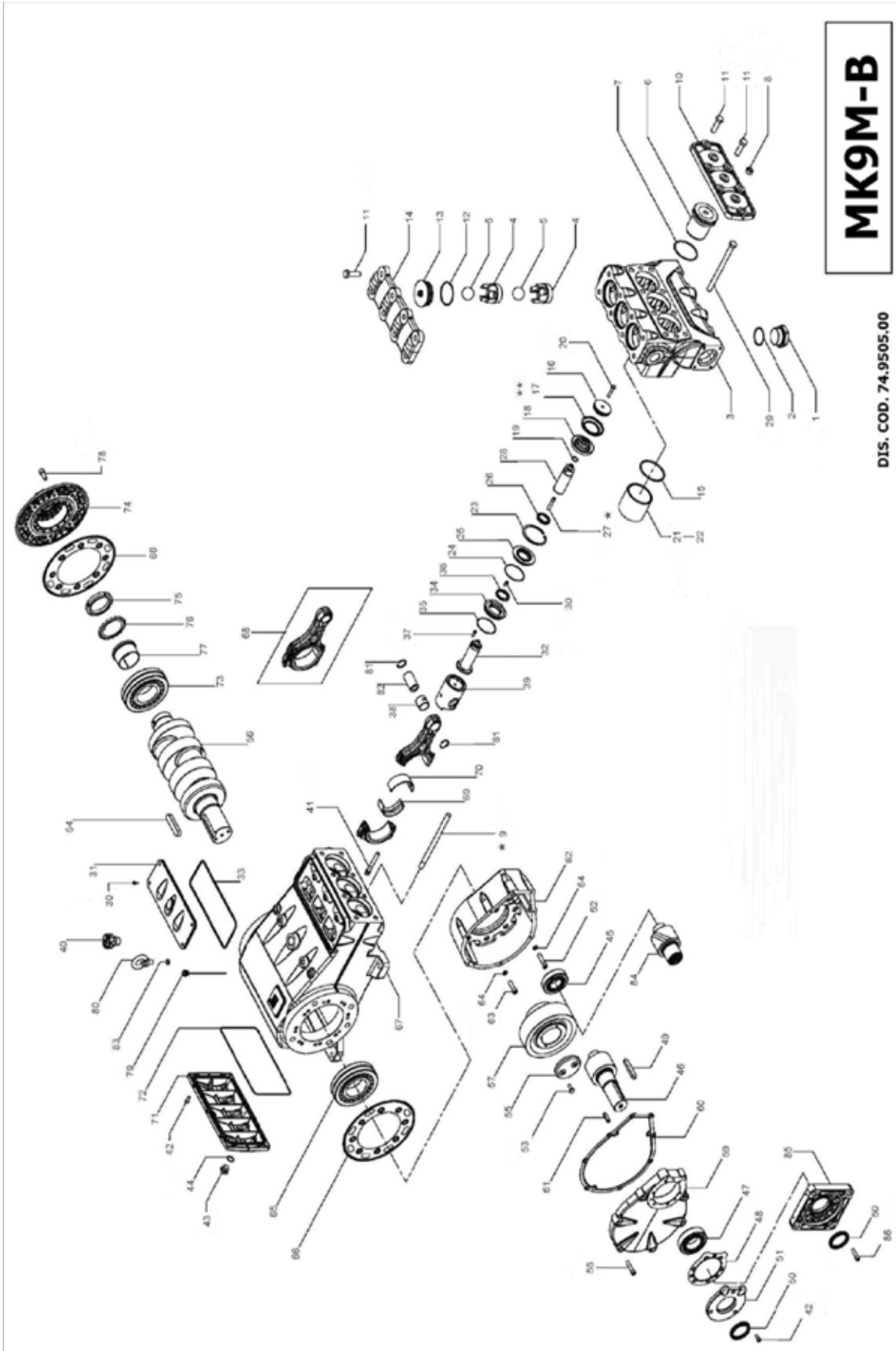
**Overheated pump:**

- The pump is overloaded (pressure or RPM exceed the rated values)
- Oil level is too low, or the oil is not of a suitable type, indicated in Chapter 7 (see para graph 7.4)
- Incorrect alignment of the joint or pulleys
- Excessive inclination of the pump during operation

**Pump vibrations or knocking:**

- Air suction
- Incorrect operation of the pressure adjustment valve
- Valve malfunction
- Irregular drive transmission motion

16. EXPLODED VIEW AND PARTS LIST



MK9M-B

DIS. COD. 74.9505.00

MK9M8-B and MK9M5-B Pumps

Item	Part #	Description	QTY.
1	F98244500	Plug G 2"x25	3
2	F90409700	OR Ø 55.56x3.53	3
3	F74120815	Manifold Ø 90	1
4	F36213556	Valve seat	6
5	F97493000	Ball Ø44.45 (1 3/4")	6
6	F74215962	Front cap	3
7	F90414400	OR Ø 88.5x3.53	3
8	F92255300	Nut M16x13	4
9	F95848000	Captive screw M16x234	4
10	F74215315	Front cover	1
11	F99514800	Screw M16x55	13
12	F90413400	OR Ø75.8x3.53	3
13	F74216062	Valve plug	3
14	F74215415	Valve cover	1
15	F93203000	Seal Ø 93x101.9x1.5	3
16	F74215866	Plunger mounting seal bushing	3
17	F93202500	Plunger seal Ø 90	3
18	F74215770	Plunger support seal	3
19	F90384500	OR Ø 18.72x2.62	3
20	F99312720	Screw M8x45	3
21	F74060091	Sleeve Ø 90x87 MK9M8	3
22	F74060102	Sleeve Ø 90x87 MK9M5	3
23	F90100200	Seeger ring Ø 92	3
24	F90391450	OR Ø 75.87x2.62	3
25	F74215670	Scraper support	3
26	F90283100	Scraper ring Ø 40x53x5.5	3
27	F95828400	Screw M10x40	3
28	F74215556	Plunger spacer	3
29	F99522700	Screw M16x220	4
30	99183700	Screw M6x14	10
31	F74150122	Upper cover	1
32	F74050336	Plunger stem guide	3
33	F90450000	OR Ø 266.04x5.33	1
34	F74213171	Plunger guide seal	3
35	F90391400	OR Ø 72.69x2.62	3
36	F90167900	Ring Ø 40x52x7	3
37	F99188400	Screw M6x20	12
38	F90917300	Connecting rod bushing	3
39	F79050443	Plunger guide	3
40	F98233300	Oil plug G 1"	1
41	F99441000	Connecting rod screw	6
42	F99304500	Screw M8x18	13
43	F98218700	Plug g 1/2"x10	1
44	96751400	Washer Ø 21.5x27x1.5	1
45	F91858000	Roller bearing	1
46	F10070235 F10070335 F10073755	Pinion Z20 R.2.65 Pinion Z17 R.3.29 Pinion Z23 R.2.22	1
47	F91860000	Roller bearing	1
48	F74212984	Gearbox flange gasket	1
49	F91503000	Key 16x10x90	1

Item	Part #	Description	QTY.
50	F90180000	Ring Ø 60x80x8	1
51	F74212722	Gearbox flange	1
52	F99433500	Screw M12x50	2
53	99366700	Screw M10x25	2
54	F91512000	Key 22x14x100	1
55	F74213255	Gear stop	1
56	F74020135	Crankshaft	1
57	F10070535 F10070635 F10073635	Gear Z53 R.2.65 Gear Z56 R.3.29 Gear Z51 R.2.22	1
58	F99373000	Screw M10x50	8
59	F74212613	Gearbox cover	1
60	F74212884	Gearbox gasket	1
61	F97630000	Retainer pin Ø 12x40	3
62	F74212413	Gearbox housing	1
63	F99430500	Screw M12x40	6
64	F96717000	Washer Ø 12.2x18x2.5	8
65	F91885000	Bearing	1
66	F74213084	Side gasket	2
67	F74010213	Pump housing	1
68	F74030201	Connecting rod assembly	3
69	F90930000 F90930100 F90930200	Semi-bushing lower Semi-bushing +0.25 lower Semi-bushing +0.50 lower	3
70	F90931000 F90931100 F90931200	Semi-bushing upper Semi-bushing +0.25 upper Semi-bushing +0.50 upper	3
71	F74160022	Crankcase cover	1
72	F90416000	OR Ø 304.39x3.53	1
73	F91885200	Bearing	1
74	F74150022	Bearing cover	1
75	F93080000	Locking ring	1
76	F96830000	Locking washer	1
77	F91880000	Bearing bushing	1
78	99428000	Screw M12x30	8
79	F98209200	Dipstick G 3/8"	1
80	F93105000	Eye bolt M16	2
81	F90069700	Seeger ring Ø 35	6
82	F97745000	Plunger pin Ø 35x64	3
83	90383300	OR Ø 13.95x2.62	2
84	F10072555	Bushing	1
85	F10072620	Hydraulic motor flange	1
86	F99304500	Screw M8x18	4

REPAIR KITS

KIT NUMBER	F2053 (MK9M8-B and MK9M5-B) Plunger Packing Kit	F2271 (MK9M8-B and MK9M5-B) Valve Kit	F2272 (MK9M8-B) Plunger Rebuild Kit	F2273 (MK9M5-B) Plunger Rebuild Kit	F2274 (MK9M8-B and MK9M5-B) Complete Seals Kit	F2076 Con-rod Kit	F2077 (+0.25) Con-rod Kit	F2078 (+0.50) Con-rod Kit
Positions Included	7, 17, 19	2, 4, 5, 7, 12	7, 15, 17, 19, 21, 22, 26	7, 15, 17, 19, 21, 22, 26	2, 7, 12, 15, 19, 24, 26, 33, 35, 36, 48, 50, 60, 66, 72, 83	69, 70	69, 70	69, 70

MK9M8-D and MK9M5-D Pumps

Item	Part #	Description	QTY.
1	F98244500	Plug G 2"x25	3
2	F90409700	OR Ø 55.56x3.53	3
3	F74120815	Manifold Ø 90	1
4	F36213656	Inlet valve seat	3
5	F36208701	Poppet valve assembly	6
6	F36208951	Internal valve guide	6
8	F94769800	Spring Ø 41.5x37.9	3
9	F36206005	Suction / delivery valve guide	6
10	F36723001	Inlet valve group	3
11	F74215962	Front cap	3
12	F90414400	OR Ø 88.5x3.53	3
13	F92255300	Nut M16x13	4
14	F95848000	Captive screw M16x234	4
15	F74215315	Front cover	1
16	F99514800	Screw M16x55	13
17	F36213756	Outlet valve seat	3
18	F94770000	Spring Ø 41.5x41.1	3
19	F36723701	Outlet valve group	3
20	F90413400	OR Ø 75.8x3.53	3
21	F74210970	Valve plug	3
22	F74215415	Valve cover	1
23	F93203000	Seal Ø 93x101.9x1.5	3
24	F74215866	Plunger mounting seal bushing	3
25	F93202500	Plunger seal Ø 90	3
26	F74215770	Plunger support seal	3
27	F90384500	OR Ø 18.77x2.62	3
28	F99312720	Screw M8x45	3
29	F74060091	Sleeve Ø 90x87 MK9M8	3
30	F74060102	Sleeve Ø 90x87 MK9M5	3
31	F90100200	Seeger ring Ø 92	3
32	F90391450	OR Ø 75.87x2.62	3
33	F74215670	Scraper support	3
34	F90283100	Scraper ring Ø 40x53x5.5	3
35	F95828400	Screw M10x40	3
36	F74215556	Plunger spacer	3
37	F99522700	Screw M16x220	4
38	99183700	Screw M6x14	10
39	F74150122	Upper cover	1
40	F74050336	Plunger stem guide	3
41	F90450000	OR Ø 266.07x5.33	1
42	F74213171	Plunger guide seal	3
43	F90391400	OR Ø 72.69x2.62	3
44	F90167900	Ring Ø 40x52x7	3
45	F99188400	Screw M6x20	12
46	F90917300	Connecting rod bushing	3
47	F79050443	Plunger guide	3
48	F98233300	Oil plug G 1"	1
49	F99441000	Connecting rod screw	6
50	F99304500	Screw M8x18	13

Item	Part #	Description	QTY.
51	F98218700	Plug G 1/2"x10	1
52	96751400	Washer Ø 21.5x27x1.5	1
53	F91858000	Roller bearing	1
54	F10070235 F10070335 F10073755	Pinion Z20 R. 2.65 Pinion Z17 R. 3.29 Pinion Z23 R. 2.22	1
55	F91860000	Roller bearing	1
56	F74212984	Gearbox flange gasket	1
57	F91503000	Key 16x10x90	1
58	F90180000	Ring Ø 60x80x8	1
59	F74212722	Gearbox flange	1
60	F99433500	Screw M12x50	2
61	99366700	Screw M10x25	2
62	F91512000	Key 22x14x100	1
63	F74213255	Gear stop	1
64	F74020135	Crankshaft	1
65	F10070535 F10070635 F10073635	Gear Z53 R. 2.65 Gear Z56 R. 3.29 Gear Z51 R. 2.22	1
66	F99373000	Screw M10x50	8
67	F74212613	Gearbox cover	1
68	F74212884	Gearbox gasket	1
69	F97630000	Plug Ø 12x40	3
70	F74212413	Gearbox housing	1
71	F99430500	Screw M12x40	6
72	F96717000	Washer Ø 12.2x18x2.5	8
73	F91885000	Bearing	1
74	F74213084	Side gasket	2
75	F74010213	Pump housing	1
76	F74030201	Connecting rod assembly	3
77	F90930000 F90930100 F90930200	Semi-bushing lower Semi-bushing +0.25 lower Semi-bushing +0.50 lower	3
78	F90931000 F90931100 F90931200	Semi-bushing upper Semi-bushing +0.25 upper Semi-bushing +0.50 upper	3
79	F74160022	Crankcase cover	1
80	F90416000	OR Ø 304.39x3.53	1
81	F91885200	Bearing	1
82	F74150022	Bearing cover	1
83	F93080000	Locking ring	1
84	F96830000	Locking washer	1
85	F91880000	Bearing bushing	1
86	99428000	Screw M12x30	8
87	F98209200	Dipstick G 3/8"x163	1
88	F93105000	Eye bolt M16	2
89	F90069700	Seeger ring Ø 35	6
90	F97745000	Plunger pin Ø 35x64	3
91	90383300	OR Ø 13.95x2.62	2
92	F10072555	Bushing	1
93	F10072620	Hydraulic motor flang	1
94	F99304500	Screw M8x18	4

REPAIR KITS

KIT NUMBER	F2270 (MK9M8-D and MK9M5-D) Plunger Packing Kit	F2275 (MK9M8-D and MK9M5-D) Valve Kit	F2272 (MK9M8-D) Plunger Rebuild Kit	F2273 (MK9M5-D) Plunger Rebuild Kit	F2274 (MK9M8-D and MK9M5-D) Complete Seals Kit	F2076 Con-rod Kit	F2077 (+0.25) Con-rod Kit	F2078 (+0.50) Con-rod Kit
Positions Included	12, 25, 37	10, 19, 20	12, 23, 25, 27, 29, 30, 34	12, 23, 25, 27, 29, 30, 34	2, 12, 20, 23, 27, 32, 34, 41, 43, 44, 56, 58, 68, 74, 80, 91	77, 78	77, 78	77, 78

MAINTENANCE LOG

HOURS & DATE

OIL CHANGE							
GREASE							
PACKING REPLACEMENT							
PLUNGER REPLACEMENT							
VALVE REPLACEMENT							



GP Companies, Inc.
1174 Northland Drive
Mendota Heights, MN 55120
Phone: 651.686.2199 Fax: 800.535.1745
www.generalpump.com email: sales@gpcompanies.com

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