

# Owner's Manual

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



**INDEX**

<b>1.</b>	<b>INTRODUCTION</b> .....	Page 4
<b>2.</b>	<b>DESCRIPTION OF SYMBOLS</b> .....	Page 4
<b>3.</b>	<b>SAFETY</b> .....	Page 5
	3.1 General safety instructions .....	Page 5
	3.2 High pressure unit safety requirements .....	Page 5
	3.3 Safety during operation .....	Page 5
	3.4 General procedures for using nozzles .....	Page 5
	3.5 Safety during unit maintenance .....	Page 6
<b>4.</b>	<b>PUMP IDENTIFICATION</b> .....	Page 6
<b>5.</b>	<b>TECHNICAL CHARACTERISTICS</b> .....	Page 7
<b>6.</b>	<b>DIMENSIONS AND WEIGHT</b> .....	Page 8
<b>7.</b>	<b>OPERATING INSTRUCTIONS</b> .....	Page 10
	7.1 Water temperature .....	Page 10
	7.2 Maximum flow and pressure rates .....	Page 10
	7.3 Minimum RPM .....	Page 10
	7.4 Recommended lubricant types and Manufacturers .....	Page 10
<b>8.</b>	<b>PORTS AND CONNECTIONS</b> .....	Page 12
<b>9.</b>	<b>PUMP INSTALLATION</b> .....	Page 13
	9.1 Installation .....	Page 13
	9.2 Direction of rotation .....	Page 14
	9.3 Version change and reducer positioning .....	Page 14
	9.4 Hydraulic connections .....	Page 15
	9.5 Pump power supply .....	Page 15
	9.6 Suction line .....	Page 16
	9.7 Filtration .....	Page 16
	9.8 Outlet line .....	Page 17
	9.9 Internal diameter of hose .....	Page 18
	9.10 V-belt transmission .....	Page 18
	9.11 Transmission of power from the second PTO .....	Page 18
<b>10.</b>	<b>START UP AND OPERATION</b> .....	Page 19
	10.1 Preliminary inspections .....	Page 19
	10.2 Starting up .....	Page 20
<b>11.</b>	<b>PREVENTATIVE MAINTENANCE</b> .....	Page 20
<b>12.</b>	<b>PUMP STORAGE</b> .....	Page 21
	12.1 Filling the pump with anti-corrosion emulsion or anti-freeze .....	Page 21
	12.2 Hoses .....	Page 21
<b>13.</b>	<b>PRECAUTIONS AGAINST FREEZING</b> .....	Page 21
<b>14.</b>	<b>WARRANTY TERMS</b> .....	Page 21
<b>15.</b>	<b>TROUBLESHOOTING</b> .....	Page 22
<b>16.</b>	<b>EXPLODED VIEWS AND PARTS</b> .....	Page 23

**INDEX**

**17. SPECIAL VERSIONS** ..... Page 27

**17.1 MWN Pump** ..... Page 27

    17.1.1 Operating instructions ..... Page 27

    17.1.2 Water temperature ..... Page 27

    17.1.3 Maximum pressure and flow rate ..... Page 27

    17.1.4 Minimum RPM ..... Page 27

    17.1.5 Technical characteristics ..... Page 27

    17.1.6 Dimensions and weight ..... Page 28

    17.1.7 Exploded view ..... Page 29

**17.2 MWR Pump** ..... Page 33

    17.2.1 Operating instructions ..... Page 33

    17.2.2 Water temperature ..... Page 33

    17.2.3 Maximum pressure and flow rate ..... Page 33

    17.2.4 Minimum RPM ..... Page 33

    17.2.5 Technical characteristics ..... Page 33

    17.2.6 Dimensions and weight ..... Page 34

    17.2.7 Exploded view ..... Page 35

**17.3 MWNR Pump** ..... Page 39

    17.3.1 Operating instructions ..... Page 39

    17.3.2 Water temperature ..... Page 39

    17.3.3 Maximum pressure and flow rate ..... Page 39

    17.3.4 Minimum RPM ..... Page 39

    17.3.5 Technical characteristics ..... Page 39

    17.3.6 Dimensions and weight ..... Page 40

    17.3.7 Exploded view ..... Page 41

**17.4 MWF Pump** ..... Page 45

    17.4.1 Operating instructions ..... Page 45

    17.4.2 Water temperature ..... Page 45

    17.4.3 Maximum pressure and flow rate ..... Page 45

    17.4.4 Minimum RPM ..... Page 45

    17.4.5 Technical characteristics ..... Page 45

    17.4.6 Dimensions and weight ..... Page 45

    17.4.7 Minimum Rotating Speed ..... Page 45

    17.4.8 Flushing circuit diagram of use ..... Page 46

**18. REPAIR TOOLS** ..... Page 47

**19. MAINTENANCE LOG** ..... Page 48

## 1. INTRODUCTION

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

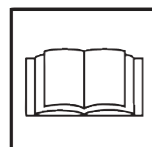
Correct use and adequate maintenance will guarantee the pumps trouble-free operation for a long time. General Pump declines any responsibility for damage caused by misuse or the non-observance of the instructions indicated in this manual.

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



### Protection against explosion.

This defines special safety requirements for the use of the pumps in areas identified in accordance with the ATEX Directive.

**When pumps are ordered in the ATEX configuration** because they are going to work in areas with a potentially explosive environment, you must **STRICTLY comply with the notes given under the headings marked with this symbol and the instructions in the supplementary instructions manual "ATEX EXPLOSION PROTECTION"**.

Versions available in compliance with **ATEX: MW - MWN**

### 3. SAFETY

#### 3.1 General Safety Indications

Improper use of pumps and high pressure systems, and the non-compliance with installation and maintenance instructions may cause severe injury to people and/or damage to property. Anyone assembling or using high pressure systems must possess the necessary competence to do so, should be aware of the characteristics of the components assembled/used, and must take all precautions necessary to ensure maximum safety in any operating condition. In the interest of safety, both for the Installer and the Operator, no reasonably applicable should be omitted.

#### 3.2 High pressure unit safety requirements

1. The pressure line must always be equipped with a safety valve.
2. High pressure system components, in particular for those units working outside, must be adequately protected against rain, frost and heat.
3. The electrical control system must be adequately protected from water spray, and must comply with the specific regulations in force.
4. High pressure hoses must be properly sized for maximum operating pressure of the system and always and only used within the operating pressure range specified by the hose manufacturer. The same rules should be observed for all other auxiliary systems affected by high pressure.
5. The ends of high pressure hoses must be sheathed and secured to a solid structure to prevent dangerous whiplash in case of bursting or broken connections.
6. Appropriate safety guards must be provided for the pump transmission systems (couplings, pulleys and belts, auxiliary drives).



#### 3.3 Safety During Operation

The working area of a high pressure system must be clearly marked. Access must be prohibited to unauthorized personnel and, wherever possible, the area should be restricted or fenced. The personnel authorized to access this area should first be 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 system is properly powered (see paragraph 9.5).
2. That pump intake filters are perfectly clean; we advise the use of a device that indicates the filters clogging level.
3. Electrical parts are adequately protected and in perfect condition.
4. The high pressure hoses do not show apparent signs of abrasion, and that fittings are in perfect shape.

Any fault or reasonable doubt that may arise before or during operation should be promptly reported and verified by competent personnel. In these cases, pressure should immediately be released and the high pressure system 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 and 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. It is generally best to organize personnel into teams of at least two people capable of giving mutual and immediate assistance in case of necessity and of taking turns during long and demanding operation.
4. Access to the work area that is within the water jets' range must be absolutely prohibited to and free from objects that, inadvertently under a pressure jet, can be damaged and or create dangerous situations.
5. The water jet must only and always be directed in the direction of the work area, including during testing or preliminary tests or checks..
6. The Operator must always pay attention to the trajectory of the debris removed by the water jet. If necessary, suitable guards must be provided by the Operator to protect anything that may be accidentally exposed.
7. The Operator should not be distracted for any reason during operation. Workers needing to access the operating area must wait for the Operator to stop work, and then immediately make their presence known.
8. For safety reasons, it is important that each member of the team is fully aware of the intentions and actions of other team members in order to avoid dangerous misunderstandings.
9. The high pressure system must not be started up and run under pressure without all team members in position and without the Operator having already directed his/her lance toward the work area.

### 3.5 Safety During System Maintenance

1. The pressure system maintenance must be carried out in the time intervals set by the manufacturer who is responsible for the whole group according to law.
2. Maintenance should always be carried out by trained and authorized personnel.
3. Assembly and disassembly of the pump and its various components must be performed exclusively by authorized personnel, using appropriate equipment in order to avoid damage to components and connections.
4. Always use original spare parts to ensure total reliability and safety.

## 4. PUMP IDENTIFICATION

Each pump has a specific label which contains (Fig.1, Pos.1):

Pump model and version  
 Serial Number  
 Flow Rate - GPM  
 Pressure - PSI  
 Power - Hp-kW  
 Maximum RPM

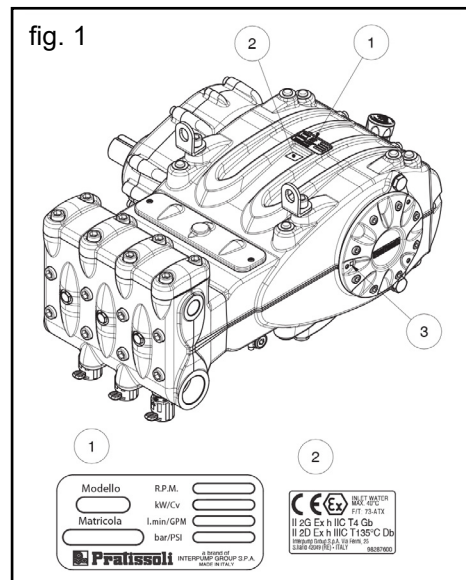


**Pump model, version and serial number must always be specified when ordering spare parts.**



**For pumps ordered with the ATEX configuration.  
 Fig. 1, Pos. 2 plate with specific ATEX marking for explosion protection.**

**Fig.1 Pos. 3 plate for locating the grounding screw.**



**5. TECHNICAL FEATURES**

MODEL	RPM	FLOW RATE		PRESSURE		POWER	
		GPM	l/min	PSI	Bar	Hp	kW
<b>MW32A</b>	800	35.7	135	4350	300	100	73.5
	1500	35.7	135	4350	300	100	73.5
	1800	35.9	136	4350	300	100	73.5
	2200	36.1	136.5	4350	300	100	73.5
	2600	36.1	136.5	4350	300	100	73.5
<b>MWS36A</b>	800	45.2	171	3480	240	100	73.5
	1500	45.2	171	3480	240	100	73.5
	1800	45.4	172	3480	240	100	73.5
	2200	45.7	173	3480	240	100	73.5
	2600	45.7	173	3480	240	100	73.5
<b>MWS40A</b>	800	55.7	211	3045	210	84.6	115
	1500	55.7	211	3045	210	84.6	115
	1800	56.0	212	3045	210	85.3	116
	2200	56.3	213	3045	210	85.3	116
	2600	56.3	213	3045	210	85.3	116
<b>MWS45A</b>	800	70.6	267	2247	155	100	73.5
	1500	70.6	267	2247	155	100	73.5
	1800	71	269	2247	155	100	73.5
	2200	71.3	270	2247	155	100	73.5
	2600	71.3	270	2247	155	100	73.5
<b>MWS50A</b>	800	87.2	330	1812	125	100	73.5
	1500	87.2	330	1812	125	100	73.5
	1800	87.6	332	1812	125	100	73.5
	2200	88	333	1812	125	100	73.5
	2600	88	333	1812	125	100	73.5
<b>MWS55A</b>	800	105.4	399	1450	100	100	73.5
	1500	105.4	399	1450	100	100	73.5
	1800	160	401	1450	100	100	73.5
	2200	106.5	403	1450	100	100	73.5
	2600	106.5	403	1450	100	100	73.5

**6. DIMENSIONS AND WEIGHT**

For dimensions and weight of MW32A, MWS36A and MWS40A pumps, please refer to fig. 2.

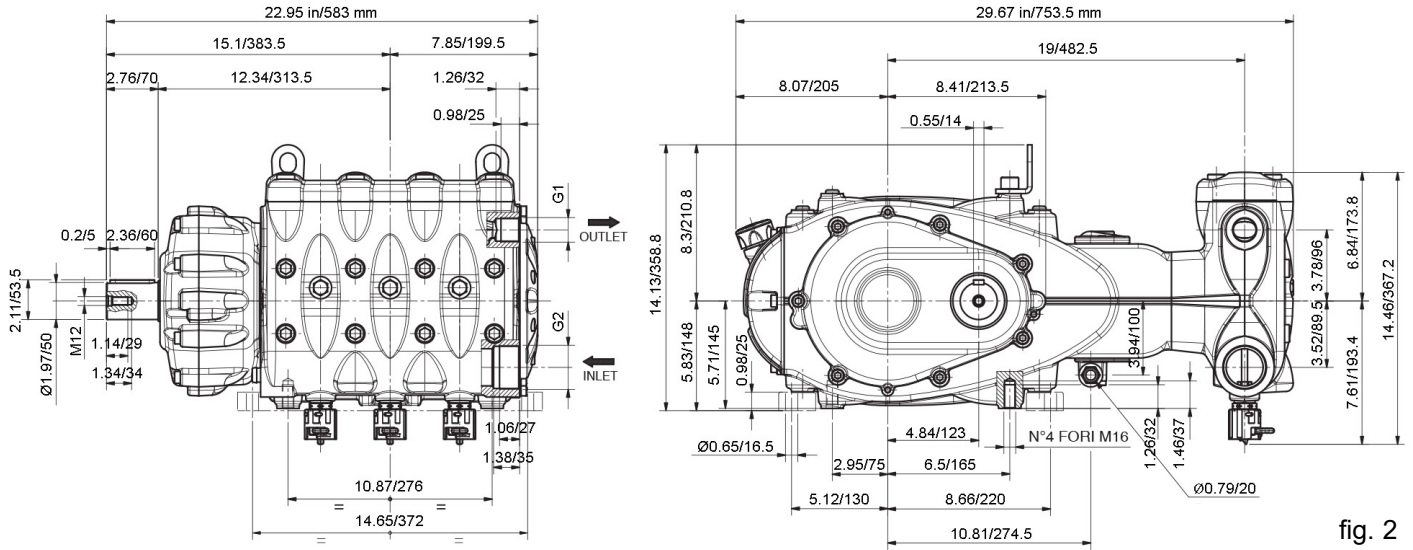


fig. 2

**Weight: 540 Lbs./244 Kg.**

For dimensions and weight of MWS45A, MWS50A and MWS55A pumps, please refer to fig. 2a.

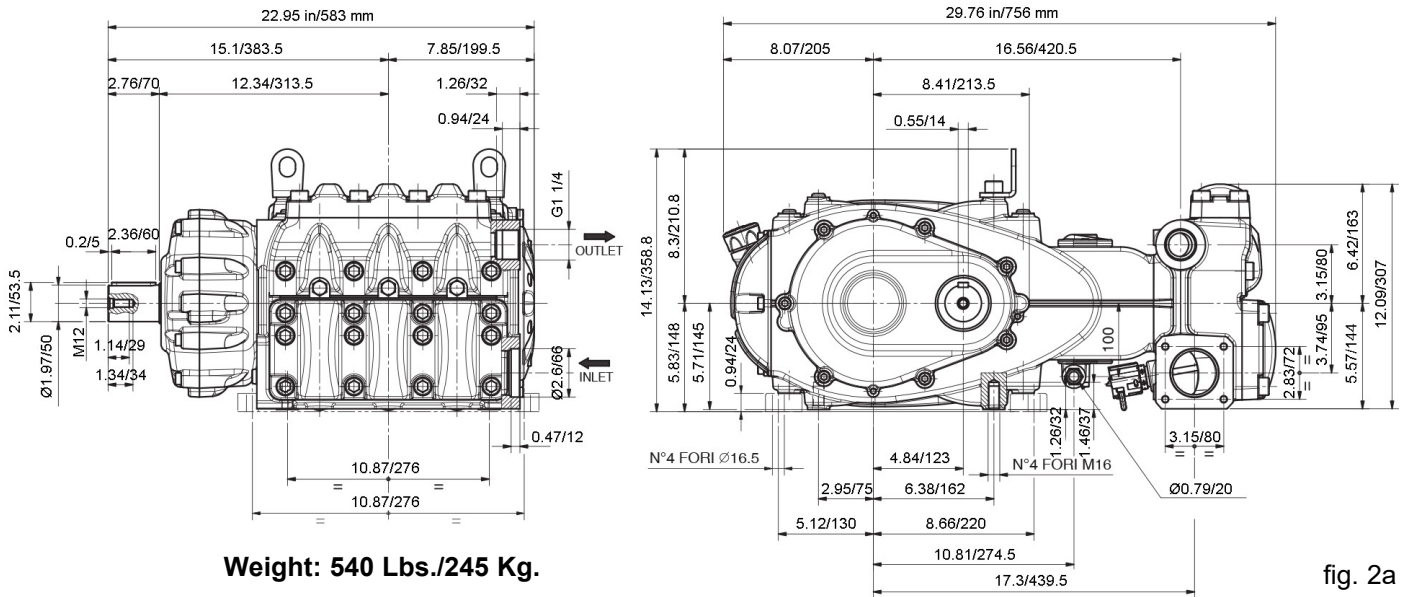
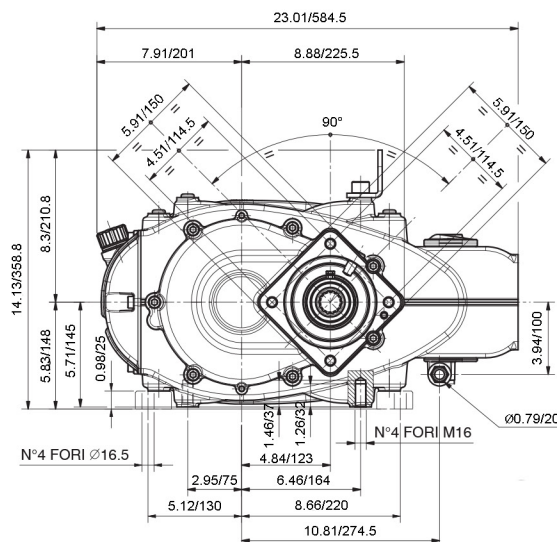
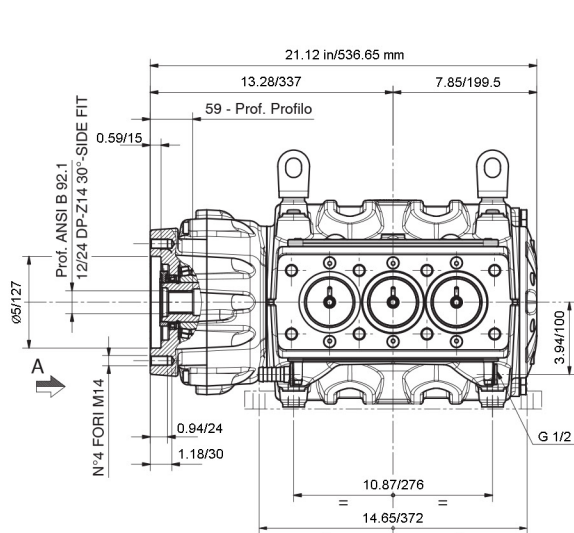


fig. 2a

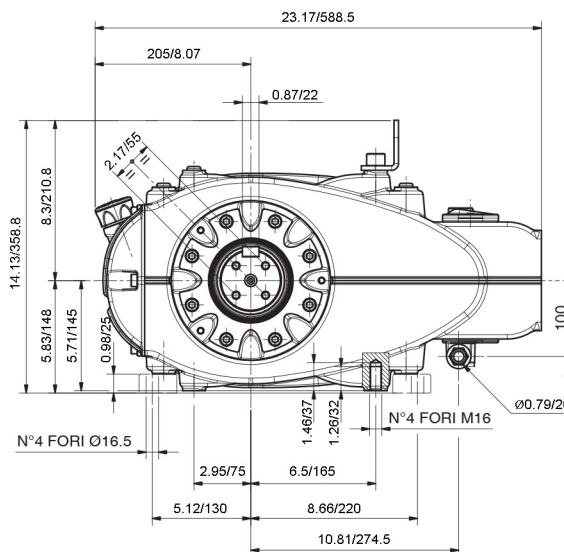
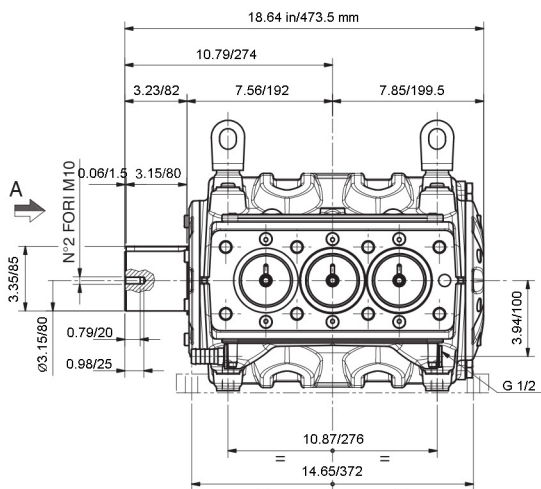
**Weight: 540 Lbs./245 Kg.**



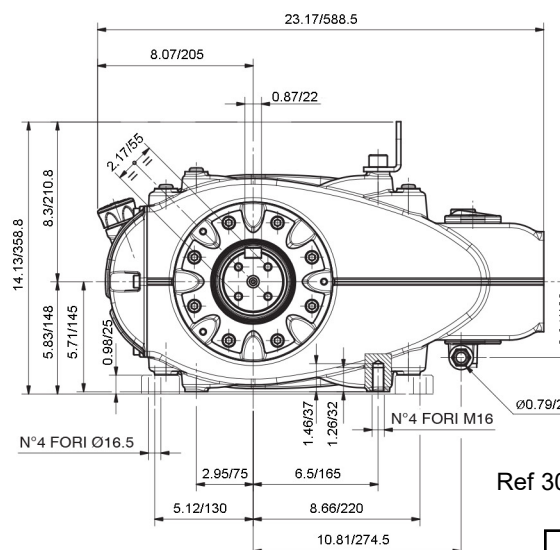
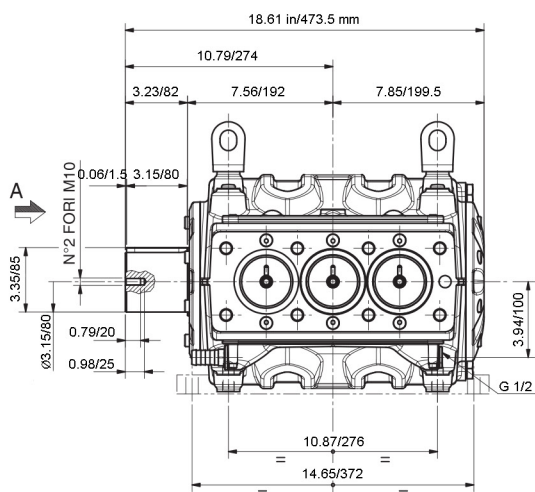
## SAE J744-C Splined Shaft 14T 12/24 DP



## Direct Drive without Gearbox - 800 RPM



## Auxiliary PTO

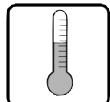


**7. OPERATING INSTRUCTIONS**



The MW/S pump was designed to operate with filtered water (see paragraph 9.7) and at maximum temperature of 104° F (40° C).

**Other fluids may be used only upon the approval of The Customer Service Department .**



**7.1 Water Temperature**

The max water temperature is 104° F (40° C). However, it is possible to use the pump at temperatures of up to 140° F (60°C) for short periods of time. In this case we advise consulting 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**

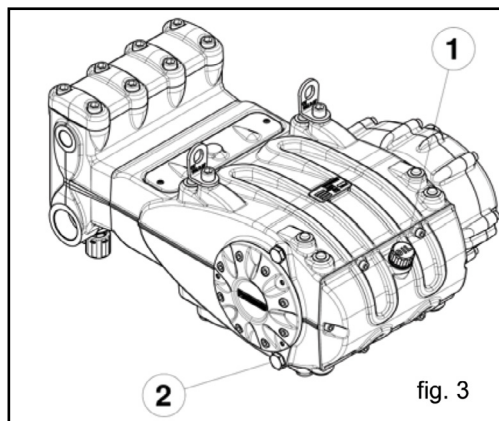
Any RPM value different from what is indicated in the performance table (see chapter 5) must be expressly authorized by the **Customer Service Department.**

**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
<b>GENERAL PUMP</b>	<b>SERIES 220</b>
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 Fig. 3, Pos. 1. Refill if necessary to top off level. 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 Fig. 3 Pos. 2. Checking and changing oil is to be carried out as indicated in Chapter 11. The amount required is 304 oz. (9 liters).



Set up the pump so that the oil temperature never exceeds **212° F (100 °C)** during pump operation under any circumstances.

Use a temperature probe to be inserted into the oil drain plug Fig. 3, Pos.2. See "ATEX EXPLOSION PROTECTION" manual.

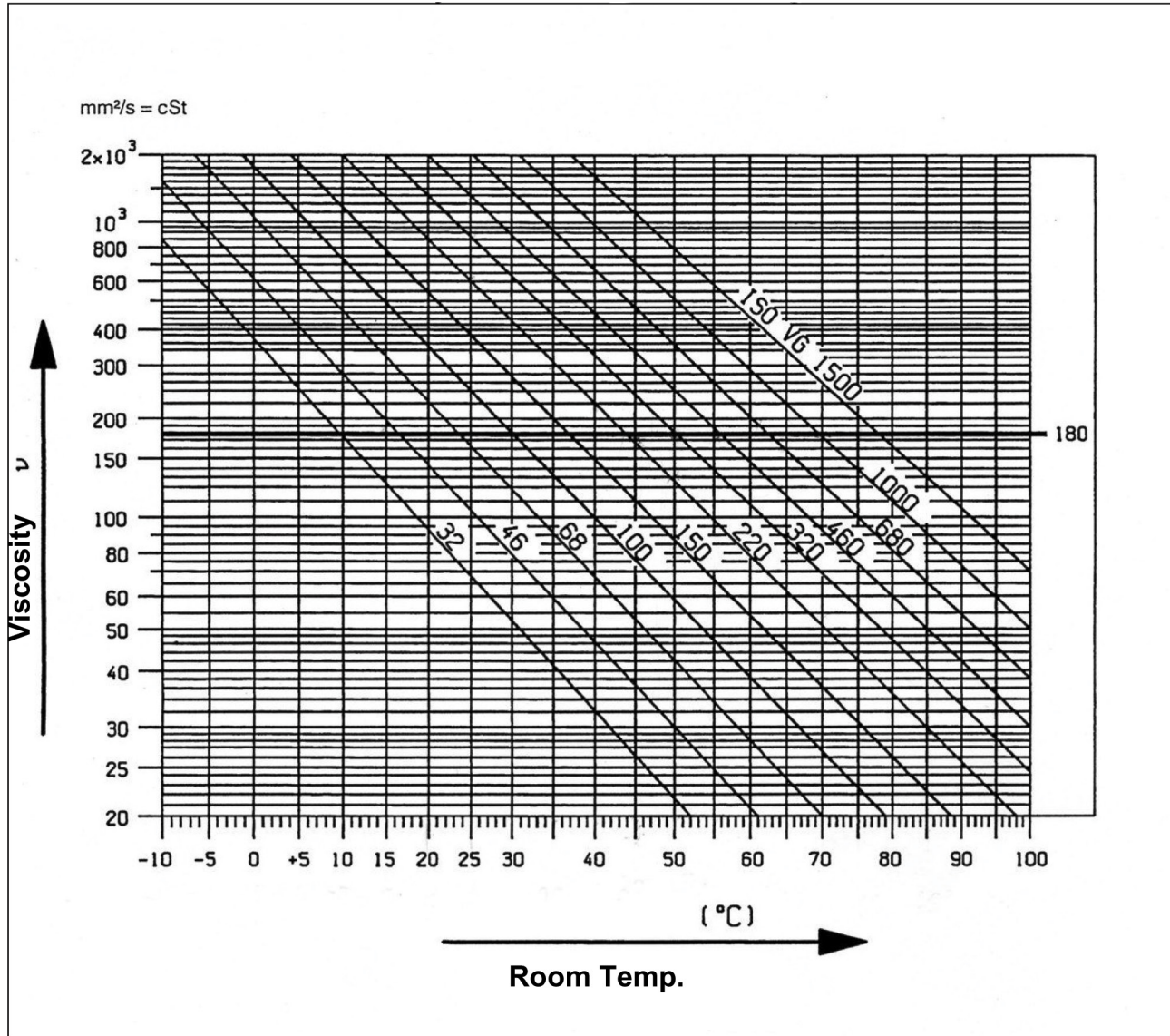
**ATTENTION:** Use only oil with a flash point higher than 392° F (200 °C).



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**



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.

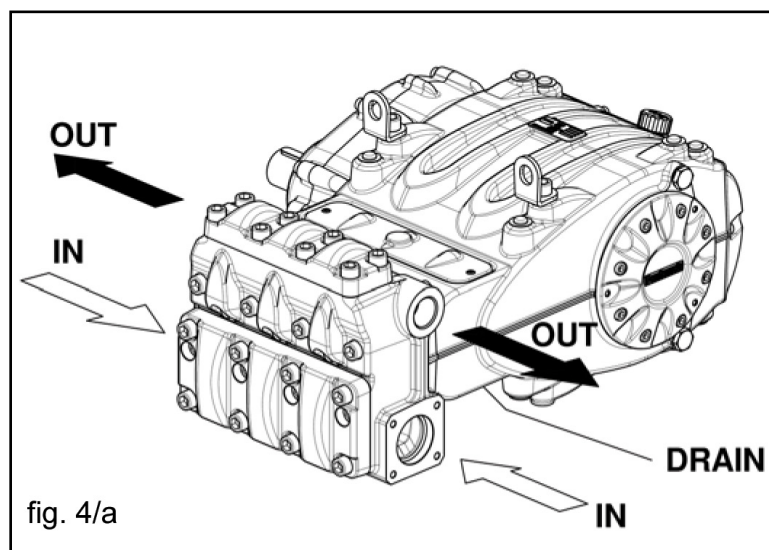
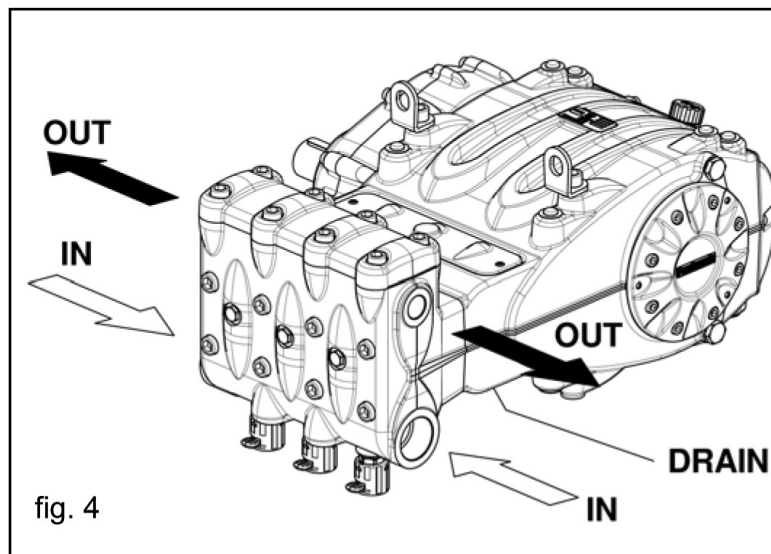
## 8. PORTS AND CONNECTIONS

MW/S Series pumps are equipped with (see fig. 4 and 4a):

1. 2 inlet ports "IN", 2" NPT (MW32A, MWS36A, MWS40A).  
2 inlet ports "IN", 2-1/2" NPT (MWS45A, MWS50A, MWS55A).

The line can be connected to either of the two inlet ports; the ones not being used must be hermetically sealed.

2. 2 outlet ports "OUT", Ø 1" NPT-F (MW32A, MWS36A, MWS40A).  
2 outlet ports "OUT", Ø 1-1/4" NPT-F (MWS45A, MWS50A, MWS55A).
3. 1 drain port "DRAIN" with G1/2" hole in the lower cover to monitor any water leakage due to wear of the pressure packings. In case of leaks, please consult the repair manual.  
**This hole must always be kept open.**



## 9. PUMP INSTALLATION

### 9.1 Installation

The pump must be installed in a horizontal position using the M16 threaded support feet. Tighten the screws with a torque of 200 Nm (147.5 Ft-Lb)

The base must be perfectly flat and rigid enough as not to allow bending or misalignment on the pump coupling and axis/transmission due to torque transmitted during operation.

Two lifting brackets are mounted on the pump for easy installation, as per the figure below.



**The brackets are sized solely for pump lifting and therefore are absolutely not permitted for use of additional loads.**



**Replace the oil filling hole closing service plug positioned on the rear casing cover with the plug with oil dipstick. Check the correct quantity.**

The dipstick must always be reachable, even when the unit is assembled.



**Grounding:** It is necessary to fix a grounding cable to the pump by means of the M8 stainless steel screw and the stainless steel toothed washer properly marked by the YELLOW label. See "ATEX EXPLOSION PROTECTION" manual.



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

The following transmission types are suggested:

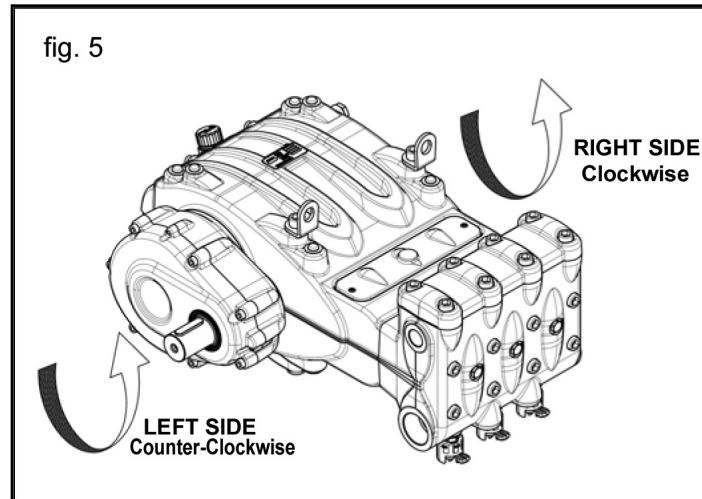
- Flexible joint
- Cardan Joint (please respect the maximum working angles indicated by the manufacturer)
- Belts; for correct application, please contact the Customer Service Department.



The transmission must be assembled correctly to avoid incorrect or rough operation of the connection parts and to prevent excessive wear, temperature rise and/or hazardous breakages that may create potential sources of ignition and explosion. See "ATEX EXPLOSION PROTECTION" manual.

### 9.2 Direction of rotation

The PTO rotation is indicated by an arrow located on the reduction gear cover. From a position facing the pump head, the rotation direction will be as 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 trained and authorized personnel by carefully following the instructions in the repair manual.**

1. Separate the pump head from the power end (crankcase) as indicated in Chapter 2 in points 2.2.1 and 2.2.3 of the Repair Manual.
2. Turn the power end (crankcase) 180° and reposition the rear casing cover in such a way that the oil dipstick is turned upward. Reposition the lifting bracket and relative hole closing plugs in the upper part of the casing. Invert the two inspection covers, ensuring that the open one is positioned lower. Finally, properly reposition the specification label in its housing on the casing.



**Make sure that the lower inspection cover draining holes are open.**

3. Reassemble the pump head with the power end (crankcase) as indicated in Chapter 2 in points 2.2.2 and 2.2.4 of the Repair Manual.

It is also possible to place the reduction gear in 5 different positions as per fig. 6.

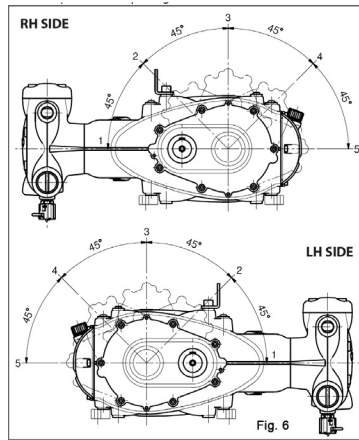


fig. 6



The reducer's position may be changed only by trained and authorized personnel by carefully 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 Power Supply**

MW/S pumps must always be installed under positive head, i.e. they must receive water by gravity or by forced feeding, and never suctioned from a lower level. The pumps can tolerate minimum NPSH even as low as 1 m. (3.28 ft.), however, to obtain a better volumetric efficiency and above all to avoid cavitation, the minimum NPSH available, measured at the pump inlet flange, will have to be at least equal or higher than the values shown in the chart below.

	MW32A	MWS36A	MWS450A	MWS45A	MWS50A	MWS55A
NPSH <sub>r</sub> (ft)	4.5	5.5	6.5	7.5	8	9

For higher cylinder capacity pumps (MWS45A-S50A-S55A), it is strongly recommended to use a booster pump to avoid cavitation, in view of the geometry on the hydraulic section and of the remarkably high flow rates.

The booster pump must have the following specifications: flow rate at least double the rated flow rate of the pump, and pressure between 30 to 40 PSI (2 to 3 Bar). These feeding conditions must be respected at any operating RPM.



Booster start-up must always precede plunger pump start-up. In order to protect the pump, we advise to install a pressure switch on the feeding line after the filters.

**9.6 Suction Line**

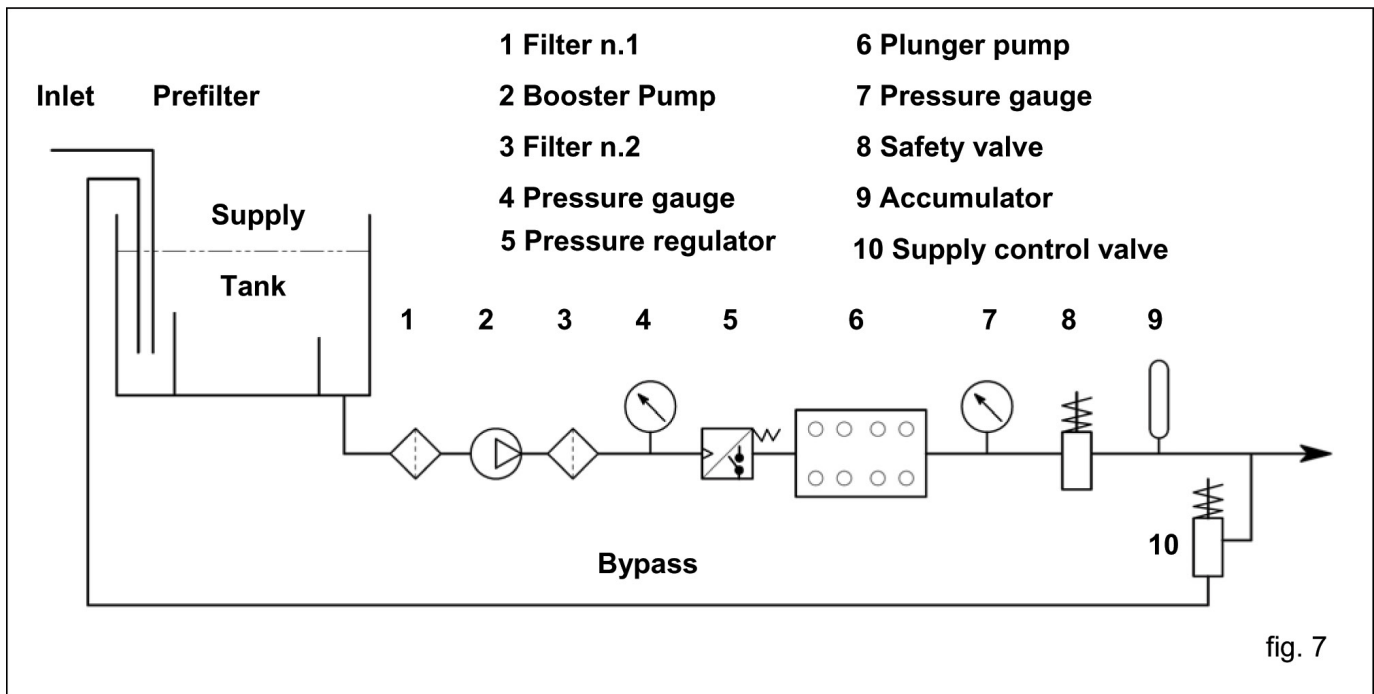
For the pump's correct operation, the suction line must have the following characteristics:

1. Minimum internal diameter as indicated in the diagram in paragraph 9.9, and in any case equal or greater than the pump head's value. 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. With a layout that is set in such a way to prevent 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 fittings, 3 or 4 way fittings, adapters, etc., since they may hinder the pump's performance.
6. Do not install Venturi tubes or injectors for detergent intake.
7. Avoid the use of standing valves, check valves, or any other type of one-way valves.
8. Do not connect the by-pass line from the valve directly to the pump suction line.
9. Provide appropriate baffle plates inside the tank in order to avoid water flows coming from both the by-pass and feeding which lines may create turbulence near the tank's outlet port.
10. Make sure that the suction line is perfectly clean inside before connecting it to the pump.
11. The pressure gauge for checking booster pressure must be installed near the plunger pump's inlet port, and always downstream from the filters.

**9.7 Filtering**

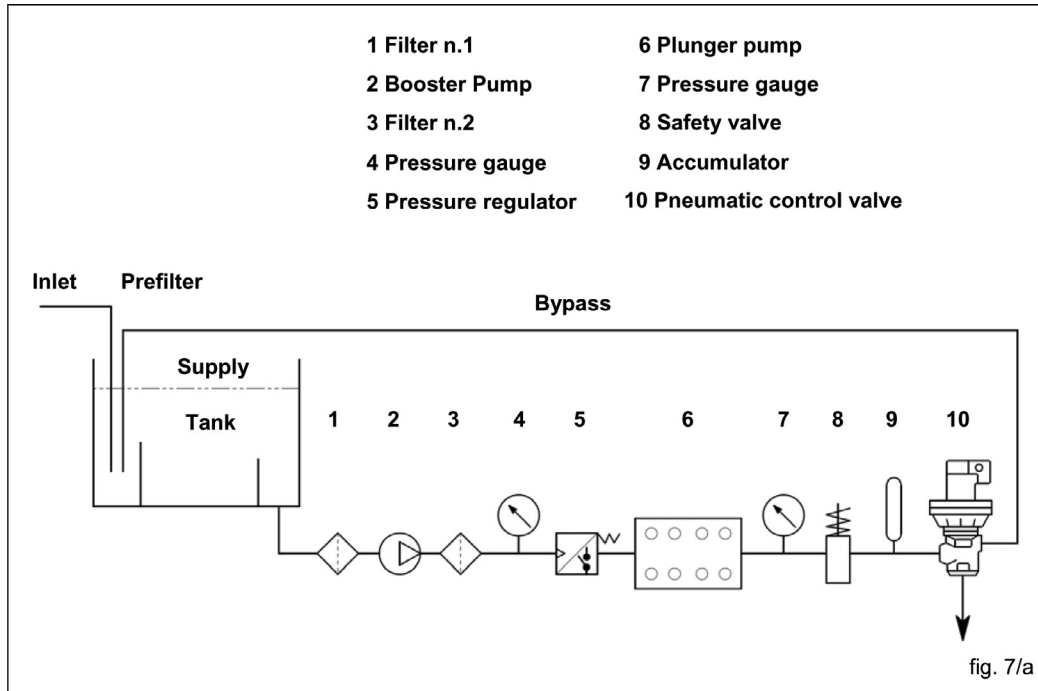
On the suction line, install two filters as indicated in fig. 7 and fig. 7/a.

**With the manual adjustment valve:**





With the pneumatic adjustment valve:



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

1. Minimum capacity 3 times greater than the pump's rated flow value.
2. Filter port diameters must not be smaller than the pump inlet ports.
3. Filtration degree ranging between 200 and 360  $\mu\text{m}$ .



**In order to guarantee correct pump operation, it is important to plan periodical cleaning of the filter depending on actual pump usage, water quality and actual clogging conditions.**

### 9.8 Outlet Line

To obtain a correct delivery line, please comply with the following installation instructions:

1. The internal diameter of the hose must allow to guarantee correct fluid speed; see diagram in paragraph 9.9
2. The first section of the hose connected to the pump must be flexible in order to isolate pump vibrations from the rest of the system.
3. Use high pressure hoses and fittings that guarantee wide safety margins in any working condition.
4. Install a safety valve on the delivery line.
5. Use pressure switches suitable for the pulsating loads typical of plunger pumps.
6. In the design phase, take into proper account the pressure drop along the line, since this causes a reduction in usage pressure with respect to the value measured at the pump.
7. If the pump pulsations are harmful for particular applications, install an appropriately sized pulsation dampener on the outlet line.

**9.9 Internal Diameter of the Hose Line**

To determine the internal diameter of the hose, please refer to the following diagram.

**Suction Hose**

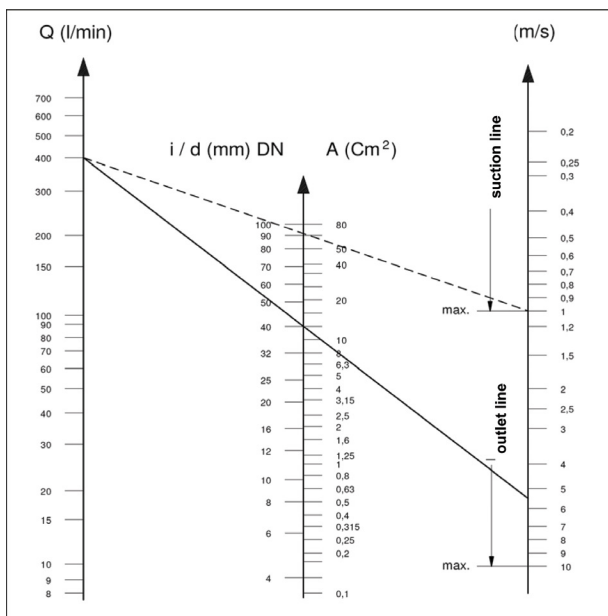
With a flow rate of ~105 GPM (400 l/mn) and water speed of 1 m/sec. the diagram line that connects the two scales intersects the central scale, indicating the diameters, at a value of ~ 3.5 inch (90 mm).

**Delivery Hose**

With a flow rate of ~105 GPM (400 l/mn) and water speed of 5.5 m/sec. The diagram line that connects the two scales intersects the central scale, indicating the diameters at a value of ~ 1.6 inch (40 mm).

**Optimal speed to be obtained with the booster pump:**

- Suction: ≤ 1 m/sec.
- Delivery: ≤ 5.5 m/sec.



The diagram does not take into account the hose and valve resistance, the pressure drop due to the pipe length, the viscosity and the temperature of the pumped fluid. If necessary, contact our Customer Service Department.

**9.10 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.

**9.11 Transmission of power from the second PTO**

Upon request, MW series pumps can be supplied with an auxiliary PTO on the opposite side to the drive. Transmission can be carried out:

- V-belt
- Joint

By means of the V-Belts, with drawable Max Torque is: 150 Nm corresponding to 12.5 kW (17HP) at 800 rpm.  
 By means of the joint, with drawable Max Torque is: 220 Nm corresponding to 18.4 kW (25HP) at 800 rpm.



**With a use of the joint, pay particular attention to perfect alignment so that no transverse forces are generated on the pump shaft.** For applications differing from those specified above, contact our Customer Service Department.

**10. START-UP AND OPERATION**

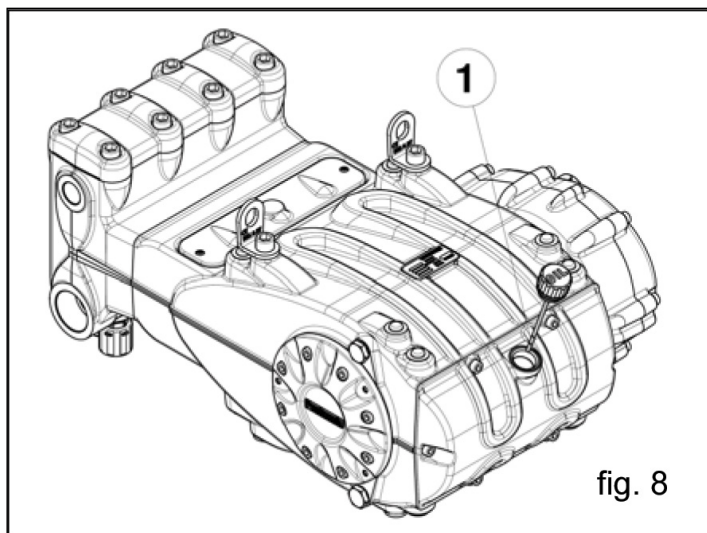
**10.1 Preliminary Inspections**

Before Start-up Be sure that:

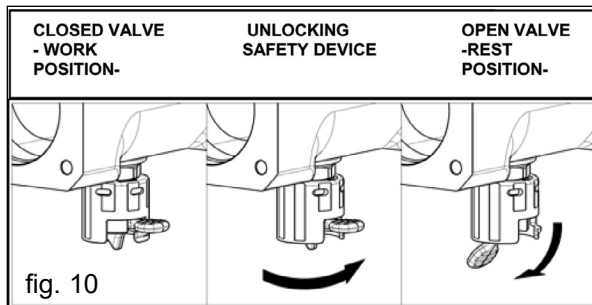
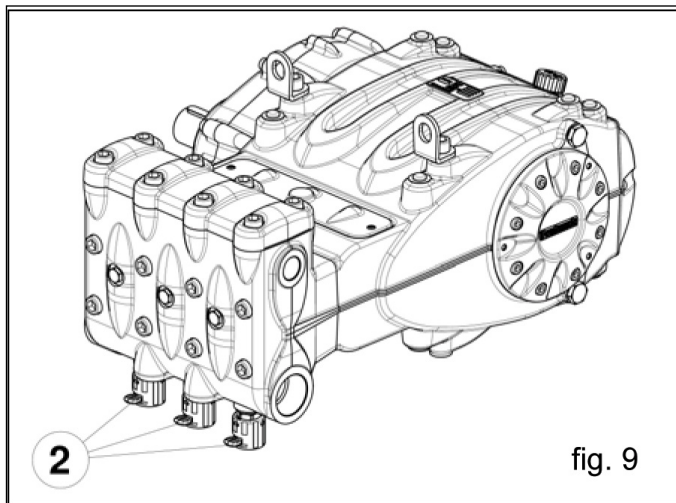


**The suction line is connected and up to pressure (see Chapter 9) the pump must never run dry.**

1. The suction line must be perfectly airtight.
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 ex-pulsed 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 inclination, 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 the pump has not run for a long period of time, recover the correct operation of the suction valves by opening the three valve-lifting devices (see position 2, fig. 9). Be sure to re-close the valves before the pump start-up. See fig. 10 for “work” and “rest” positions.**

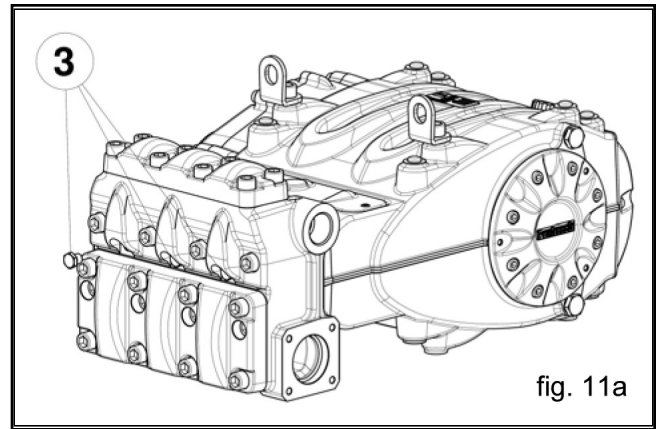
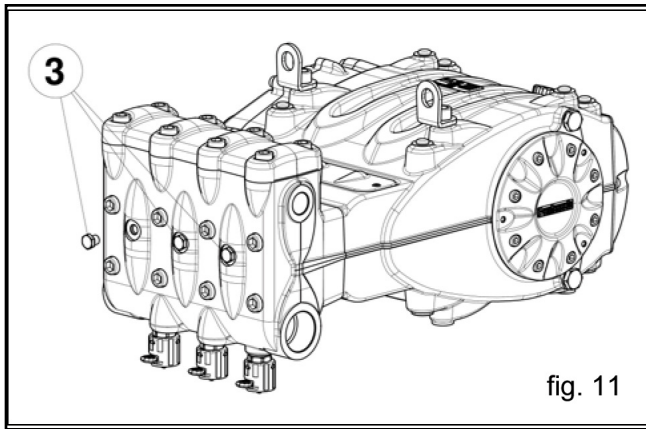


**10.2 Start-up**

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 stopping the pump, release the pressure by acting on the adjustment valve or on any discharging device.



**Whenever priming problems arise due to insufficient feeding, intervene by removing the three front plugs on the head (see position 3, fig. 11 and 11a).**



**11. PREVENTIVE MAINTENANCE**

To guarantee pump reliability and efficiency, comply with the maintenance intervals as indicated in the table below.

PREVENTIVE MAINTENANCE	
EVERY 500 HOURS	EVERY 1000 HOURS
Check oil level	Change oil
	Check / Replace:* <ul style="list-style-type: none"> <li>• Valves</li> <li>• Valve seats</li> <li>• Valve springs</li> <li>• Valve guides</li> </ul>
	Check / Replace: <ul style="list-style-type: none"> <li>• H.P. packings</li> <li>• L.P. packings</li> </ul>

\* For replacement follow instructions contained in the repair manual.

## 12. PUMP STORAGE

### 12.1 Filling the Pump With An Anti-Corrosion Emulsion or Anit-freeze By Using An External Diaphragm Pump As In The Layout Shown in Paragraph 9.7.

- a) Close the filter draining, if open.
- b) Be sure that the connecting hose is clean, spread with grease and connect it to the high pressure outlet port.
- c) Fit a suction hose to the membrane pump. Open the pump suction connection and fit hose between it and the membrane pump.
- d) Fill the container with the solution/emulsion.
- e) Put the free extremities of the suction line and the high pressure outlet hose inside the container.
- f) Start up the diaphragm pump.
- g) Pump the emulsion until it comes out of the high pressure hose.
- h) Continue pumping for at least another minute; if needed, the emulsion can be reinforced by adding, for example, Shell Donax
- i) Stop the pump, remove the hose from the suction connection and close it with a plug.
- j) Remove the hose from the high pressure outlet port. Clean, grease and plug both connections and the hoses.

### 12.2 Hoses

- a) Before greasing and protecting the hoses according to the previously described procedure, dry the connections using compressed air.
- b) Cover with polyethylene.
- c) Do not wrap them too tightly; be sure there is no bending.

## 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 12.1).



**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 pump is guaranteed for a period of 5 years from the delivery date, with the exception of parts subject to wear. In any case, please refer to the contract terms for other warranty conditions. 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 unadjusted 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 flow
- 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 valves

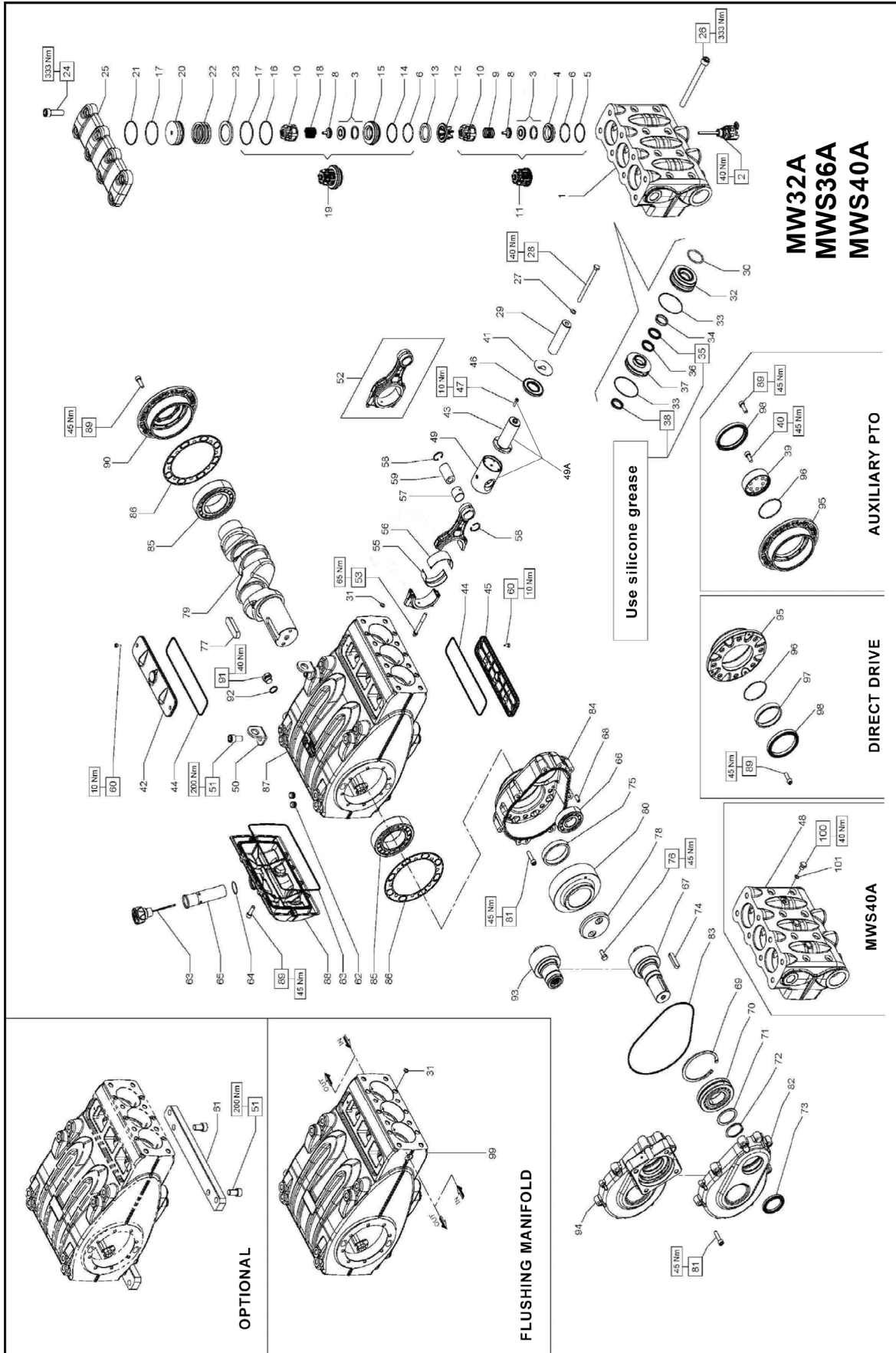
**Overheated pump:**

- 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 paragraph 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**



Item	Part #	Description	QTY.
1	F73120215	MANIFOLD-NPT	1
2	F10744401	DRAIN VALVE	3
3	F36208801	BALL VALVE ASSEMBLY	6
4	F36206766	INLET VALVE HOUSING	3
5	F90526000	ANTIEXTRUSION RING Ø51.5x56x1.5	3
6	F90389000	OR, Ø50.47X2.62	6
8	F36209051	INTERNAL VALVE GUIDE	6
9	F94760000	SPRING Ø 28.3X30.7	3
10	F36206105	INLET/OUTLET VALVE GUIDE	6
11	F36715101	INLET VALVE UNIT	3
12	F74210651	HP VALVE GUIDE SPACER	3
13	F73212270	OR, Ø 10.82X1.78	3
14	F90526500	ANTIEXTRUSION RING Ø 51.7X56.2X1.5	3
15	F36206966	OUTLET VALVE HOUSING	3
16	F90527600	ANTIEXTRUSION RING Ø 67.7X72.2X1.5	3
17	F90391100	OR, Ø 66.35X2.62	6
18	F94760500	SPRING Ø 28.5X32	3
19	F36715301	OUTLET VALVE UNIT	3
20	F74211070	HP OUTLET VALVE PLUG	3
21	F90528000	ANTIEXTRUSION RING Ø 67.7X72.2X1.5	3
22	F94775000	SPRING Ø 58X45.4	3
23	F74210866	OUTLET VALVE HOUSING RING	3
24	F99514700	SCREW, M16x180	8
25	F73210715	VALVE COVER	1
26	F99522200	SCREW, M16x180	8
27	F96710500	WASHER Ø 10X18X0.9, SS, PTFE	3
28	F99383000	SCREW, M10X140	3
29	F73040009	PLUNGER Ø 32	3
	F73040109	PLUNGER Ø 36	3
	F73040209	PLUNGER Ø 49	3
30	F90408500	O-RING, 49.21X3.53	3
31	901111	O-RING, 10.78X2.62	6
32	F73211656	PLUNGER LINER Ø 32	3
	F73211756	PLUNGER LINER Ø 36	3
	F73211856	PLUNGER LINER Ø 40	3
33	F90371000	OR, Ø 81X2	6
34	F73100092	PLUNGER HEAD RING Ø 32	3
	F78100192	PLUNGER HEAD RING Ø 36	3
	F74100092	PLUNGER HEAD RING Ø 40	3
35	F90278800	ALT. SEAL RING, Ø 32, HP	3
	90282060	ALT. SEAL RING, Ø 36, HP	3
	F90283200	ALT. SEAL RING, Ø 40, HP	3
36	F90278400	RESTOP RING Ø 32	3
	90281800	RESTOP RING Ø 36	3
	F90283800	RESTOP RING Ø 40	3
37	F73211068	SEAL SUPPORT, Ø 32	3
	F73211168	SEAL SUPPORT, Ø 36	3
	F73211268	SEAL SUPPORT, Ø 40	3
38	F90278000	ALT. SEAL RING, LP, Ø 32	3
	F90279800	ALT. SEAL RING, LP, Ø 36	3
	F90282800	ALT. SEAL RING, LP, Ø 40	3
41	F96735500	WASHER, Ø16X65X1	3
42	F73150022	CLOSED INSPECTION COVER	1
43	F73050336	PISTON GUIDE ROD	3
44	F90414800	OR, Ø 202.8X3.53	2
45	F73150122	OPEN INSPECTION COVER	1
46	F90168500	RAD. RING, Ø 40X72X7/8.5	3
47	99188400	SCREW, M6X20	3
48	F73120815	MANIFOLD FOR PISTON	1
49	F73050443	PISTON GUIDE	3
	F73050543	PISTON GUIDE, +0.10	3
49A	F73606201	PISTON GUIDE ASSEMBLY	3
50	F73210674	LIFTING BRACKET	2
51	F99513000	SCREW, M16x30, UNI 5931	4
52	F73030101	CONNECTING ROD ASSY.	3
53	F99378800	CONNECTING ROD SCREW	6
55	F90928300	BABBITT BEARING, LOWER	3
	F90928400	BABBITT BEARING, LOWER, +0.25	3
	F90928500	BABBITT BEARING, LOWER, +0.50	3

Item	Part #	Description	QTY.
56	F90928000	BABBITT BEARING, UPPER	3
	F90928100	BABBITT BEARING, UPPER, +0.25	3
	F90928200	BABBITT BEARING, UPPER, +0.50	3
57	F90915800	CONROD FOOT BUSHING	3
58	F90069000	STOP RING, Ø 32, UNI 7437	6
59	F97744000	SPINDLE	3
60	99183700	SCREW, M6x14, UNI 5931	4
61	F73200064	FOOT	2
62	98206000	HOLE PLUG, Ø 15, TTN18	6
63	F98233500	OIL FILLING PLUG, G1" WITH ROD	1
64	90361600	OR, Ø 34.65X1.78	1
65	F73210295	TUBE FOR OIL FILLING PLUG, G1"	1
66	F91854000	CYL. ROLLER BEARING	1
67	F10076735	PINION, Z24 R1.875, HELICOL	1
	F10076835	PINION, Z21 R2.238, HELICOL	1
	F10076935	PINION, Z18 R2.722, HELICOL	1
	F10082255	PINION, Z19 R3.211, HELICOL	1
68	F97623000	TMP. CYL. PIN. Ø 10X24, UNI 6364	2
69	F90101000	STOP RING, Ø 120, UNI 7437	1
70	F91859900	ADJUST ROLLER BEARING	11
71	F73210455	BEARING SUPPORT RING	1
72	F90081000	STOP RING, Ø 55, UNI 7435	1
73	F90172400	RAD. RING, Ø 55X75X8, VITON	1
74	F91500500	TAB, 14X9X60, UNI 6604	1
75	F73210589	RING GEAR SUPPORT RING	1
76	99366700	SCREW, M10X25, UNI 5739	2
77	F91511000	TAB, 22X14X80, UNI 6604	1
78	F74213255	RING GEAR STOP	1
79	F73020035	CRANKSHAFT C. 70	1
80	F10077035	RING GEAR, Z45 R1.875, HELICAL	1
	F10077135	RING GEAR, Z47 R2.238, HELICAL	1
	F10077235	RING GEAR, Z49 R2.722, HELICAL	1
	F10082355	RING GEAR, Z61 R3.211, HELICAL	1
81	F99371000	SCREW, M10X40, UNI 5931	15
82	F73210113	REDUCTION GEAR COVER	1
83	F90415000	OR, Ø 253.6.X3.53	2
84	F73210013	REDUCTION GEAR BOX	1
85	F91881000	CYL ROLLER BEARING	2
86	F73210384	SIDE SEAL	2
87	F73010013	PUMP CASING	1
88	F73160022	CASING COVER	1
89	F99368600	SCREW, M10X30, UNI 5931	14
90	F73150222	BEARING COVER	1
91	F98218700	PLUG, G1/2"X13, SS	2
92	91751400	WASHER, Ø 21.5x27x1.5	2
100	98204600	PLUG, 1/4"X13	3
101	90358400	O-RING, Ø10.82X1.78	3
<b>FLUSHING MANIFOLD</b>			
99	F73010113	PUMP CASING, FLUSHING	1
<b>WITH HYDRAULIC MOTOR</b>			
93	F10079455	PINION, Z18 R. 2.722	1
	F10077355	PINION, Z24 R. 1.875	1
	F10077455	PINION, Z21 R. 2.238	1
94	F73215513	HYDRAULIC GEAR COVER	1
<b>DIRECT DRIVE</b>			
89	F99368600	SCREW, M10X30, UNI 5931	8
95	F73150322	BEARING COVER, OPEN	1
96	F90391450	O-RING, Ø75.87X2.62	1
97	F73215654	RING	1
98	F90195000	RING, RAD., Ø90X110X12	1
<b>AUXILIARY PTO</b>			
39	F73215754	DRAIN	1
40	99367100	SCREW, M8X25	6
89	F99368600	SCREW, M10X30, UNI 5931	8
95	F73150322	BEARING COVER, OPEN	1
96	F90391450	O-RING, Ø75.87X2.62	1
98	F90195000	RING, RAD., Ø90X110X12	1
100	F73215754	PTO OUTLET	1
101	99367100	SCREW, M10X25	6

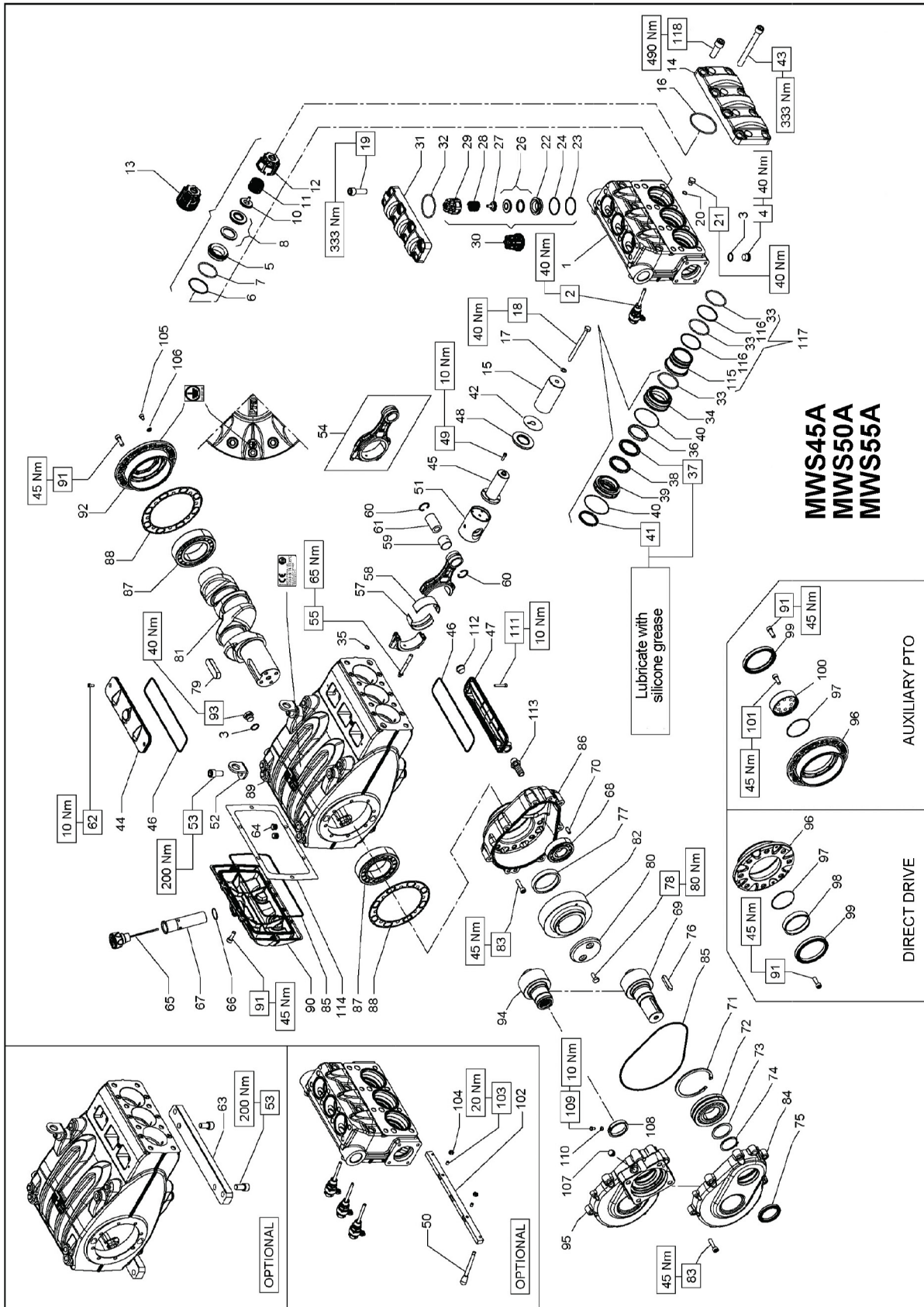
**REPAIR KITS**

KIT NUMBER	F2136 (MW32A) Plunger Packing Kit	F2137 (MWS36A) Plunger Packing Kit	F2138 (MWS40A) Plunger Packing Kit	F2055 Valve Kit	F2144 (MW32A) Complete Seals Kit	F2145 (MWS36A) Complete Seals Kit	F2146 (MWS40A) Complete Seals Kit	F2150 Conn,Rod Kit	F2151 Conn. Rod Kit +0.25	F2153 Conn. Rod Kit +0.50
Positions Included	30, 31, 33, 35, 36, 38,	30, 31, 33, 35, 36, 38,	30, 31, 33, 35, 36, 38,	11, 12, 19, 21	5, 6, 14, 16, 17, 21, 30, 31, 33, 35, 36, 38, 44, 46, 64, 73, 83, 86, 101	5, 6, 14, 16, 17, 21, 30, 31, 33, 35, 36, 38, 44, 46, 64, 73, 83, 86, 101	5, 6, 14, 16, 17, 21, 30, 31, 33, 35, 36, 38, 44, 46, 64, 73, 83, 86, 101	55, 56	55, 56	55, 56



**16. EXPLODED VIEW AND PARTS LIST**

Serial # 19177008 and later



Item	Part #	Description	QTY.
1	F73121615	MANIFOLD, NPT, HR	1
2	F10744501	VALVE OPENING DEVICE	3
3	F96751400	WASHER, Ø 21.5X27X1.5	5
4	F98218500	STEEL PLUG, 1/2"	3
5	F36206666	INLET VALVE HOUSING	3
6	F90527000	ANTI-EXTRUSION RING, Ø 61.2X67X2	3
7	F90410500	OR, Ø 59.62X3.53	3
9	F36208701	BALL VALVE ASSY.	3
10	F36208951	INTERNAL VALVE GUIDE	3
11	F94769800	SPRING, Ø41.5X37.9	3
12	F36206001	INLET VALVE GUIDE	3
13	F36715001	INLET VALVE UNIT	3
14	F73225615	INLET VALVE COVER	1
15	F73040309	PLUNGER, Ø 45X117	3
	F73040409	PLUNGER Ø 50X117	3
	F73040509	PLUNGER Ø 55X117	3
16	F90414200	OR, Ø 85.32X3.53	3
17	F96710500	WASHER, Ø 10X18X0.9,SS, PTFE	3
18	F99383000	SCREW, M10X140	3
19	F99514200	SCREW, M16X45	8
20	F90358400	OR, Ø 10.82X1.78	3
21	F98204600	PLUG, G 1/2"X13, SS	3
22	F36206766	OUTLET VALVE HOUSING	3
23	F90526000	ANTI-EXTRUSION RING, Ø 51.5X56X1.5	3
24	F90389000	OR, Ø 50.47X2.62	3
26	F36208801	BALL VALVE ASSY.	3
27	F36209051	INTERNAL VALVE GUIDE	3
28	F94760500	SPRING, Ø 28.5X32	3
29	F36206101	OUTLET VALVE GUIDE	3
30	F36207701	OUTLET VALVE UNIT	3
31	F73210915	OUTLET VALVE COVER	1
32	F90412000	OR, Ø 68.26X3.53	3
33	F90411500	OR, Ø 63.5X3.53	3
	F73211956	LINER, Ø 45	3
	F73212056	LINER, Ø 50	3
	F73212156	LINER, Ø 55	3
34	F90382500	OR, Ø 10.78X2.62	6
	F74100192	PISTON HEAD RING, Ø 45	3
	F74100292	PISTON HEAD RING, Ø 50	3
	F74100392	PISTON HEAD RING, Ø 55	3
36	F90285000	ALT. SEAL RING, HP, Ø 45	3
	F90286300	ALT. SEAL RING, HP, Ø50	3
	F90287300	ALT. SEAL RING, HP, Ø 55	3
	F90284800	RESTOP RING, Ø 45	3
37	F90286500	RESTOP RING, Ø 50	3
	F90287500	RESTOP RING, Ø 55	3
	F73211368	SEAL SUPPORT, Ø 45	3
	F73211468	SEAL SUPPORT, Ø 50	3
	F73211568	SEAL SUPPORT, Ø 55	3
38	F90371000	OR, Ø 81X2	6
	F90284600	ALT. SEAL RING, LP, Ø 45	3
	F90286000	ALT. SEAL RING, LP, Ø 50	3
	F90287000	ALT. SEAL RING, LP, Ø 55	3
39	F96735500	WASHER, Ø 16X65X1	3
	F99521200	SCREW, M16X150	8
40	F73150022	CLOSED INSPECTION COVER	1
	F73050336	PLUNGER GUIDE ROD	3
	F90414800	OR, Ø202.8X3.53	2
	F73150422	OPEN INSPECTION COVER	1
	F90168500	RAD. RING, Ø40X72X7/8.5	3
	F99188400	SCREW, M6XX20	3
	F94540000	SCREW, M8X107	1
	F73050443	PLUNGER GUIDE	3
	F73050543	PLUNGER GUIDE, +0.10	3
	F73210674	LIFTING BRACKET	2
	F99513000	SCREW, M16x30, UNI 5931	4
	F73030101	CONNECTING ROD ASSY.	3
	F99378800	CONNECTING ROD SCREW, M10X1.5X80	6
	F90928000	BABBITT BEARING, LOWER	3
41	F90928400	BABBITT BEARING, LOWER, +0.25	3
	F90928500	BABBITT BEARING, LOWER, +0.50	3
	F90928300	BABBITT BEARING, UPPER	3
	F90928100	BABBITT BEARING, UPPER, +0.25	3
	F90928200	BABBITT BEARING, UPPER, +0.50	3
	F90915800	CON-ROD HEAD FOOT BUSHING	3
	F90069000	STOP RING, Ø 32 UNI 7437	6

Item	Part #	Description	QTY.
61	F94744000	SPINDLE	3
62	F99183700	SCREW, M6X14, UNI 5931	4
63	F73200064	FOOT	2
64	F98206000	HOLE PLUG, Ø 15	6
	F98233500	OIL FILLING PLUG, G1", WITH ROD	1
	F98233600	OIL FILLING PLUG, G1", WITH ROD, ATEX	1
65	F90361600	OR, 34.65X1.78	1
66	F73210295	TUBE FOR OIL FILLING PLUG, G1 "	1
67	F91854000	CY. ROLLER BEARING	1
68	F10076735	PINION, Z24 R1.875, HELICOL	1
	F10076835	PINION, Z21 R2.238, HELICOL	1
	F10076935	PINION, Z18 R2.722, HELICOL	1
	F10082255	PINION, Z19 R3.211, HELICOL	1
69	F97623000	TMP. CYL. PIN, Ø 10X24	2
	F90101000	STOP RING, Ø 120	1
	F91859900	ADJUST. ROLLER BEARING	1
	F73210455	BEARING SUPPORT RING	1
	F90081000	STOP RING, Ø 55	1
	F90172400	RAD. RING, Ø 55X75X8, VITON	1
	F91500500	TAB, 14X9X60, UNI 6604	1
	F73210589	RING GEAR SUPPORT RING	1
	F99366700	SCREW, M10X25, UNI 5739	2
	F91511000	TAB, 22X14X80 UNI 6604	1
	F74213255	RING GEAR STOP	1
	F73020035	CRANKSHAFT C. 70	1
	F10077035	RING GEAR, Z45 R1.875, HELICAL	1
	F10077135	RING GEAR, Z47 R2.238, HELICAL	1
	F10077235	RING GEAR, Z49 R2.722, HELICAL	1
	F10082355	RING GEAR, Z61 R3.211, HELICAL	1
70	F99371000	SCREW, M10X40, UNI 5931	15
71	F73210113	REDUCTION GEAR COVER	1
72	F90415000	OR, Ø 253.6X3.53	2
73	F73210013	REDUCTION GEAR BOX	1
74	F91881000	CY. ROLLER BEARING	2
75	F73210384	SIDE SEAL	2
76	F73010013	PUMP CASING	1
77	F73160022	CASING COVER	1
78	F99368600	SCREW, M10X30, UNI 5931	14
79	F73150222	BEARING COVER	1
80	F98218700	PLUG, G1/2"X13, ZINC	1
81	F98218150	PLUG, G1/2"X13, SS, ATEX	1
82	F73215864	VALVE UNION BRACKET	1
	F99301800	SCREW, M8X10	2
	F92221800	NUT, M8X1.125X13	2
	F99301900	SCREW, M8X10, ATEX	1
	F96701750	WASHER, Ø 8.4X15.0X0.8, ATEX	1
	F99194300	SCREW, M6X40	2
	F98217300	PLUG, G1/2"	1
	F96338000	FITTING, G1/2"	1
	F73224184	REAR COVER GASKET	1
	F73216056	HEAD BUSHING	3
	F90527400	ANTI-EXTRUSION RING, Ø 64.0X70.0X1.5	6
	F73121501	HEAD BUSHING COMPLETE	1
	F99525000	SCREW, M18X50	8
<b>WITH HYDRAULIC MOTOR</b>			
	F10079455	PINION, Z18 R.2.722	1
94	F10077355	PINION, Z24 R.1.875	1
	F10077455	PINION, Z21 R.2.238	1
95	F73215513	HYDRAULIC GEAR COVER	1
96	F90206500	PLUG, Ø 17	1
97	F73224271	RING, Ø 54	1
98	F70227034	SCREW, M6X12	1
99	F92202500	NUT, M6X5	
<b>DIRECT DRIVE</b>			
91	F99368600	SCREW, M10X30, UNI 5931	8
92	F73150322	BEARING COVER, OPEN	1
93	F90391450	O-RING, Ø 75.87X2.62	1
94	F73215654	RING	1
95	F90195000	RING, RAD. Ø 90X110X12	1
<b>AUXILIARY PTO</b>			
91	F99368600	SCREW, M10X30, UNI 5931	8
92	F73150322	BEARING COVER, OPEN	1
93	F90391450	O-RING, Ø 75.87X2.62	1
94	F90195000	RING, RAD. Ø 90X110X12	1
95	F73215754	PTO OUTLET	1
96	F99367100	SCREW, M10x25	6

**REPAIR KITS**

KIT No.	F2139 (MW45A) Plunger Packing Kit	F2140 (MW50A) Plunger Packing Kit	F2141 (MW55A) Plunger Packing Kit	F2142 Inlet Valve Kit	F2062 Outlet Valve Kit	F2147 (MW45A) Complete Seals Kit	F2148 (MW50A) Complete Seals Kit	F2149 (MW55A) Complete Seals Kit	F2150 Con-Rod Kit	F2151 Con-Rod Kit	F2153 Con-Rod Kit	F2152 Rail Kit	K2189 Valve Lifter kit
Positions Included	33, 35, 37, 38, 40, 41	33, 35, 37, 38, 40, 41	33, 35, 37, 38, 40, 41	6, 7, 13	23, 24, 30	6, 7, 16, 17, 20, 23, 24, 32, 33, 35, 37, 38, 40, 41, 46, 48, 66, 75, 85, 88, 114	6, 7, 16, 17, 20, 23, 24, 32, 33, 35, 37, 38, 40, 41, 46, 48, 66, 75, 85, 88, 114	6, 7, 16, 17, 20, 23, 24, 32, 33, 35, 37, 38, 40, 41, 46, 48, 66, 75, 85, 88, 114	57, 58	57, 58	57, 58	53, 63	50, 102, 103,104

**17. SPECIAL VERSIONS**

The MW pump is also available in the following special versions:

MWN, MWR, MWNR, MWF, MWNF

The following information is helpful in deciding how to choose and use these versions. Unless specified otherwise, observe the previous instruction for the standard MW/S pump.

**17.1 MWN PUMP****17.1.1 Operating instructions**

The MWN pump is ideal for pumping salt water and particularly aggressive fluids. It has been designed to operate in environments with atmospheres that are not potentially explosive, and with filtered water (see 9.7).

**17.1.2 Water temperature**

The maximum permissible water temperature is 104° F (40° C). However the pump can be used with water up to a temperature of 140° F (60° C), but only for short periods.

**17.1.3 Maximum pressure and flow rate**

The rated specifications stated in our catalog are the maximum that can be obtained by the pump. Independently of the power used, the maximum pressure and RPM indicated on the specification label can never be exceeded unless upon prior formal authorization by our Customer Service Department.

**17.1.4 Maximum RPM**

Any rotating speed other than that indicated in the performance table (see 17.1.5) must be expressly authorized by our Customer Service Department.

**17.1.6 Technical characteristics**

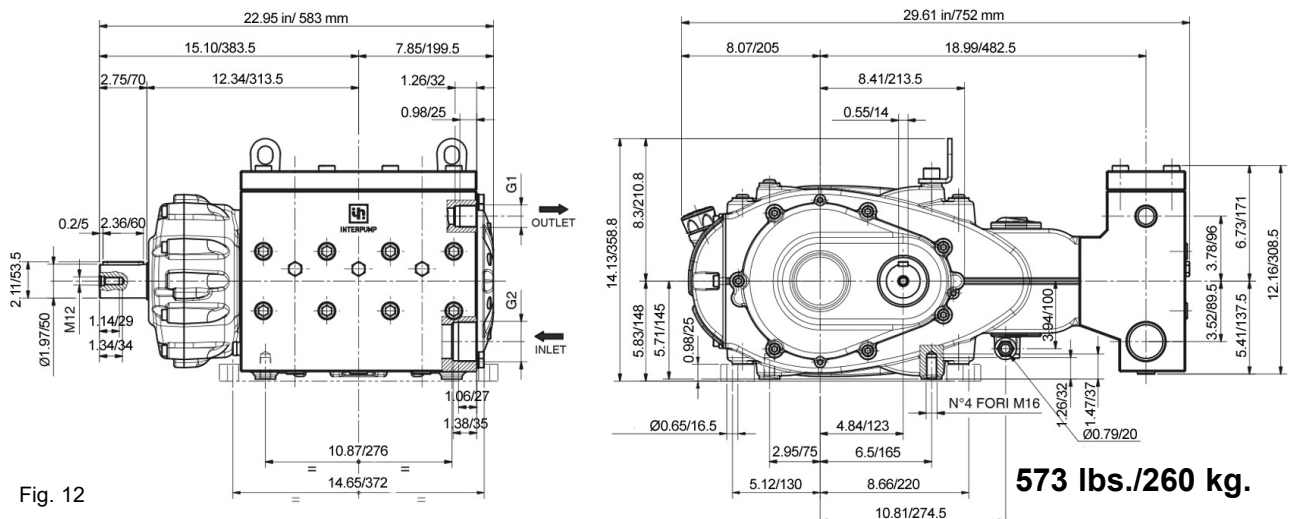
MODEL	RPM	FLOW RATE		PRESSURE		POWER	
		GPM	l/min	PSI	Bar	Hp	kW
MWN32	800	35.7	135	4350	300	100	73.5
	1500	35.7	135	4350	300	100	73.5
	1800	35.9	136	4350	300	100	73.5
	2200	36.1	136.5	4350	300	100	73.5
	2600	36.1	136.5	4350	300	100	73.5
MWN36	800	45.2	171	3480	240	100	73.5
	1500	45.2	171	3480	240	100	73.5
	1800	45.4	172	3480	240	100	73.5
	2200	45.7	173	3480	240	100	73.5
	2600	45.7	173	3480	240	100	73.5
MWN40	800	55.7	211	3045	210	84.6	115
	1500	55.7	211	3045	210	84.6	115
	1800	56.0	212	3045	210	85.3	116
	2200	56.3	213	3045	210	85.3	116
	2600	56.3	213	3045	210	85.3	116
MWN45	800	70.6	267	2247	155	100	73.5
	1500	70.6	267	2247	155	100	73.5
	1800	71	269	2247	155	100	73.5
	2200	71.3	270	2247	155	100	73.5
	2600	71.3	270	2247	155	100	73.5

17.1.5 Maximum RPM Continued

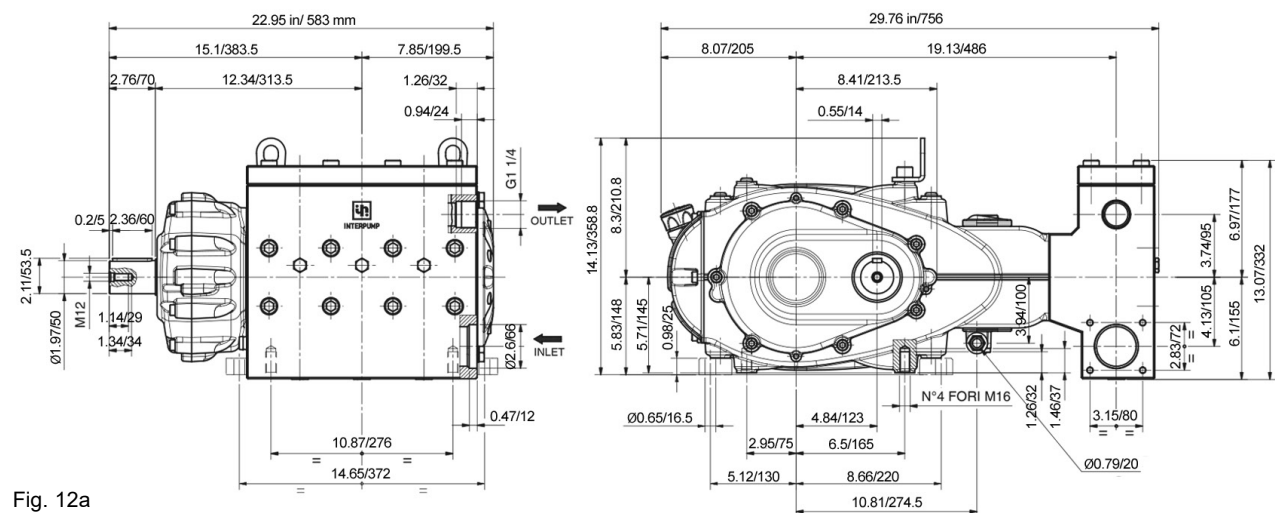
MODEL	RPM	FLOW RATE		PRESSURE		POWER	
		GPM	l/min	PSI	Bar	Hp	kW
MWN50	800	87.2	330	1812	125	100	73.5
	1500	87.2	330	1812	125	100	73.5
	1800	87.6	332	1812	125	100	73.5
	2200	88	333	1812	125	100	73.5
	2600	88	333	1812	125	100 <td 73.5	
MWN55	800	105.4	399	1450	100	100	73.5
	1500	105.4	399	1450	100	100	73.5
	1800	160	401	1450	100	100	73.5
	2200	106.5	403	1450	100	100	73.5
	2600	106.5	403	1450	100	100	73.5

17.1.6 Dimensions and weight

For dimensions and weight of MWN32, MWN36 and MWN40 pumps, please refer to fig. 12.



For dimensions and weight of MWN45, MWN50 and MWN55 pumps, please refer to fig. 12a.



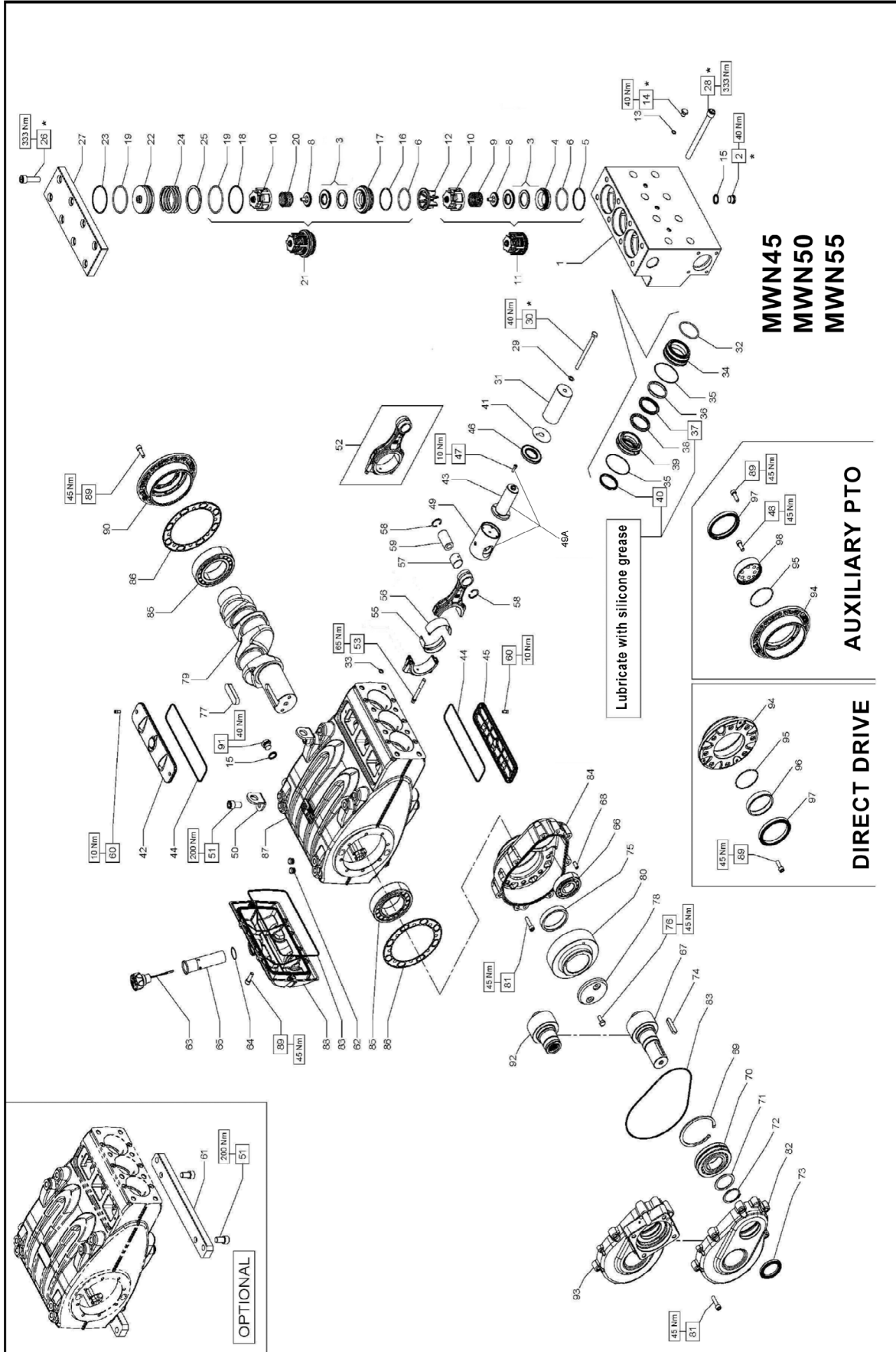


Item	Part #	Description	QTY.
1	F73120456	MANIFOLD	1
2	F98218600	PLUG, G 1/4"X14, SS	3
3	F36208801	BALL VALVE ASSY.	6
4	F36206766	INLET VALVE HOUSING	3
5	F90526000	ANTI-EXTRUSION RING, Ø51.5X56X1.5	3
6	F90389000	OR, Ø50.47x2.62	6
8	F36209051	INTERNAL VALVE GUIDE	6
9	F94760000	SPRING, Ø 28.3X30.7	3
10	F36206101	INLET/OUTLET VALVE GUIDE	6
11	F36715101	INLET VALVE UNIT	3
12	F74210651	HP VALVE GUIDE SPACER	3
15	F73213756	VALVE HOUSING SPACER RING	3
16	F90526500	ANTI-EXTRUSION RING, Ø 51.7X56.2X1.5	3
17	F36206966	OUTLET VALVE HOUSING	3
18	F90527600	ANTI-EXTRUSION RING, Ø 67.7X72.2X1.5	3
19	F90391100	OR, Ø 66.35X2.62	6
20	F94760500	SPRING, Ø 28.5X32	3
21	F36715301	OUTLET VALVE UNIT	3
22	F78215856	HP OUTLET VALVE PLUG	3
23	F90528000	ANTI-EXTRUSION RING, Ø 67.7X72.2X1.5	3
24	F94774900	SPRING, Ø 58X45.4, SS	3
25	F78215991	OUTLET VALVE HOUSING RING	3
26	F99514700	SCREW, M16X55, UNI 5931	8
27	F73212356	VALVE COVER, SS	1
28	F99522200	SCREW, M16x180	8
29	F96710500	WASHER, Ø 10x18x0.9, SS, PTFE	3
30	F99383000	SCREW, M10x140, UNI 5737	3
31	F73040009	PLUNGER, Ø 32	3
	F73040109	PLUNGER, Ø 36	3
	F73040209	PLUNGER, Ø 40	3
32	F90408500	OR, Ø49.21X3.53	3
33	F90382500	OR, Ø10.78X2.62	6
34	F73213056	PLUNGER LINER, Ø 32	3
	F73213156	PLUNGER LINER, Ø 36	3
	F73213256	PLUNGER LINER, Ø 40	3
35	F90371000	OR, Ø 81x2	6
36	F73100191	PISTON HEAD RING, Ø 32	3
	F78100291	PISTON HEAD RING, Ø 36	3
	F78100091	PISTON HEAD RING, Ø 40	3
37	F90278800	ALT. SEAL RING, Ø 32,HP	3
	F90282000	ALT. SEAL RING, Ø 36,HP	3
	F90283200	ALT. SEAL RING, Ø 40,HP	3
38	F90278400	RESTOP RING, Ø 32	3
	F90281800	RESTOP RING, Ø 36	3
	F90283800	RESTOP RING, Ø 40	3
39	F73212492	SEAL SUPPORT, Ø 32	3
	F73212592	SEAL SUPPORT, Ø 36	3
	F73212692	SEAL SUPPORT, Ø 40	3
40	F90278000	ALT. SEAL RING, Ø 32, LP	3
	F90279800	ALT. SEAL RING, Ø 36, LP	3
	F90282800	ALT. SEAL RING, Ø 40, LP	3
41	F96735500	WASHER, Ø 16X65X1	3
42	F73150022	CLOSED INSPECTION COVER	1
43	F73050336	PISTON GUIDE ROD	3
44	F90414800	OR, Ø 202.8X3.53	2
45	F73150422	OPEN INSPECTION COVER	1
46	F90168500	RAD. RING, Ø 40X72X7/8.5	3
47	F99188400	SCREWN M6X20	3
49	F73050443	PISTON GUIDE	3
	F73050543	PISTON GUIDE, +0.10	3
50	F73210674	LIFTING BRACKET	2
51	F99513100	SCREW, M16X30, UNI 5931	4
52	F73030101	CONNECTING ROD ASSY.	3
53	F99378800	CONROD SCREW, M10X1.5X80	6
55	F90928300	BABBITT BEARING, LOWER	3
	F90928400	BABBITT BEARING, LOWER, +0.25	3
	F90928500	BABBITT BEARING, LOWER, +0.55	3
56	F90928000	BABBITT BEARING, UPPER	3
	F90928100	BABBITT BEARING, UPPER, +0.25	3
	F90928200	BABBITT BEARING, UPPER, +0.55	3
57	F90915800	CONROD FOOT BUSHING	3
58	F90069000	STOP RING, Ø 32, UNI 7437	6

**REPAIR KITS**

KIT NUMBER	F2136 (MWN32) Plunger Packing Kit	F2137 (MWN36) Plunger Packing Kit	F2138 (MWN40) Plunger Packing Kit	F2055 Valve Kit	F2144 (MWN32) Complete Seals Kit	F2145 (MWN36) Complete Seals Kit	F2146 (MWN40) Complete Seals Kit	F2150 Conn. Rod Kit	F2151 Conn. Rod Kit	F2153 Conn. Rod Kit	K2152 Rail Kit
Positions Included	32, 33, 35, 37, 38, 40	32, 33, 35, 37, 38, 40	32, 33, 35, 37, 38, 40	5, 6, 11, 12, 19, 21, 23	5, 6, 16, 18, 19, 23, 29, 32, 33, 35, 37, 38, 40, 44, 46, 64, 73, 83, 86, 109	5, 6, 16, 18, 19, 23, 29, 32, 33, 35, 37, 38, 40, 44, 46, 64, 73, 83, 86, 109	5, 6, 16, 18, 19, 23, 29, 32, 33, 35, 37, 38, 40, 44, 46, 64, 73, 83, 86, 109	55, 56	55, 56	55, 56	51, 61

Item	Part #	Description	QTY.
59	F97744000	SPINDLE	6
60	F99183800	SCREW, M6X14, UNI 5931	6
61	F73200064	FOOT	2
62	F98206000	HOLE PLUG, Ø 15, TTN18	6
63	F98233500	OIL FILLING PLUG, G1" WITH ROD	1
	F98233600	OIL FILLING PLUG, G1" WITH ROD, ATEX	1
64	F90361600	OR, 34.65X1.78	1
65	F73210295	TUBE FOR OIL FILLING PLUG, G1"	1
66	F91854000	CYL. ROLLER BEARING	1
67	F10076735	PINION, Z24 R1.875, HELICOL	1
	F10076835	PINION, Z21 R2.238, HELICOL	1
	F10076935	PINION, Z18 R2.7225, HELICOL	1
	F10082255	PINION, Z19 R3.211, HELICOL	1
68	F97623000	TMP. CY. PIN, Ø 10X24, UNI 6364	2
69	F90101000	STOP RING, Ø 120, UNI 7437	1
70	F91859900	ADJUST. ROLLER BEARINGS	1
71	F73210455	BEARING SUPPORT RING	1
72	F90081000	STOP RING, Ø 55, UNI 7435	1
73	F90172400	RAD. RING, Ø 55Xx75X8, VITON	1
74	F91500500	TAB, 14X9X60, UNI 6604	1
75	F73210589	RING GEAR SUPPORT RING	1
76	F99366700	SCREW, M10X25, UNI 5739	2
77	F91511000	TAB, 22X14X80, UNI 6604	1
78	F74213255	RING GEAR STOP	1
79	F73020035	CRANKSHAFT C. 70	1
80	F10077035	RING GEAR, Z45 R1.875, HELICAL	1
	F10077135	RING GEAR, Z45 R1.875, HELICAL	1
	F10077235	RING GEAR, Z49 R2.722, HELICAL	1
	F10082355	RING GEAR, Z61 R3.211, HELICAL	1
81	F99371100	SCREW, M10X40, UNI 5931	15
82	F73210113	REDUCTION GEAR COVER	1
83	F90415000	OR, 253.6X3.53	2
84	F73210013	REDUCTION GEAR BOX	1
85	F91881000	CYL. ROLLER BEARING	2
86	F73210384	SIDE SEAL	2
87	F73010013	PUMP CASING	1
88	F73160022	CASING COVER	1
89	F99368500	SCREW, M10X30, UNI 5931	14
90	F73150222	BEARING COVER	1
91	F98218100	PLUG, G1/2"X13, NICKEL	1
	F98218150	PLUG, G1/2"X13, SS, ATEX	1
92	F93197100	SEAL WASHER, G 1/2", SS	5
100	F99301900	SCREW, M8X10, ATEX	1
101	F96701750	WASHER, Ø8.4X15.0X0.8, ATEX	1
106	F99194300	SCREW, M6X10	2
107	F98217300	NUT, G1/2"	1
108	F96338000	FITTING, G1/2"	1
109	F73224184	REAR GASKET	1
<b>WITH FLUSHING PUMP CASING</b>			
110	F73010113	FLUSHING PUMP CASING	1
<b>WITH HYDRAULIC MOTOR</b>			
93	F10079455	PINION, Z18 R.2.722	1
	F10077355	PINION, Z24 R.1.875	1
	F10077455	PINION, Z21 R.2.238	1
94	F73215513	HYDRAULIC GEAR COVER	1
102	F90206500	PLUG, Ø17	1
103	F73224271	RING, Ø54	1
104	F70227034	SCREW, M6X12	1
105	F92202500	NUT, M6X5	1
<b>DIRECT DRIVE</b>			
89	F99368500	SCREW, M10X30, UNI 5931	14
95	F73150322	BEARING COVER, OPEN	1
96	F90391450	O-RING, Ø 75.87X2.62	1
97	F73215654	RING	1
98	F90195000	RING, RAD. Ø 90X110X12	1
<b>AUXILIARY PTO</b>			
48	F99367100	SCREW, M10X25	6
89	F99368500	SCREW, M10X30, UNI 5931	8
95	F73150322	BEARING COVER, OPEN	1
96	F90391450	O-RING, Ø 75.87X2.62	1
98	F90195000	RING, RAD. Ø 90X110X12	1
99	F73215754	PTO OUTLET	1



**MWN45  
MWN50  
MWN55**

**AUXILIARY PTO**

**DIRECT DRIVE**

Lubricate with silicone grease

**OPTIONAL**

Item	Part #	Description	QTY.
1	F73120556	MANIFOLD	1
2	F98218600	PLUG, G 1/4"X14	3
3	F36208701	BALL VALVE ASSY.	6
4	F36206666	INLET VALVE HOUSING	3
5	F90527000	ANTI-EXTRUSION RING, Ø 61.2X67X2	3
6	F90410500	OR Ø 59.62 X 3.53 (4237)	6
8	F36208951	INTERNAL VALVE GUIDE	6
9	F94769800	SPRING, Ø 41.5X37.9	3
10	F36206001	INLET/OUTLET VALVE GUIDE	6
11	F36715001	INLET VALVE UNIT	3
12	F74210551	HP VALVE GUIDE SPACER	3
13	F90358400	OR, Ø 10.82X1.78	3
14	F90204600	PLUG, G 1/4"X13, SS	3
15	F93197100	SEAL WASHER, G 1/2", SS	5
16	F90527300	ANTI-EXTRUSION RING, Ø 61.4X67.2X1.5	3
17	F36206866	OUTLET VALVE HOUSING	3
18	F90529000	ANTI-EXTRUSION RING, Ø 61.4X67.2X1.5	3
19	F90413400	OR, Ø 75.8X3.53	6
20	F94770000	SPRING, Ø 41.5X41.1	3
21	F36715201	OUTLET VALVE UNIT	3
22	F73213656	OUTLET VALVE PLUG, LP	3
23	F90529300	ANTI-EXTRUSION RING, Ø 77.4X83.2X1.5	3
24	F94800100	SPRING, Ø 75X49.6, SS	3
25	F73213891	OUTLET VALVE HOUSING RING	3
26	F99514700	SCREW, M16X55M UNI 5931	8
27	F73212356	VALVE COVER, SS	1
28	F99522200	SCREW, M16X180, UNI 5931	8
29	F96710500	WASHER, Ø 10X18X0.9, SS, PTFE	3
30	F99383000	SCREW, M10X140, UNI 5737	3
31	F73040309	PLUNGER, Ø 45	3
	F73040409	PLUNGER, Ø 50	3
	F73040509	PLUNGER, Ø 55	3
32	F90411500	O-RING, Ø 63.5X3.53	3
33	F90382500	O-RING, Ø 10.785X2.62	6
34	F73213356	PLUNGER LINER, Ø 45	3
	F73213456	PLUNGER LINER, Ø 50	3
	F73213556	PLUNGER LINER, Ø 55	3
35	F90371000	OR, Ø 81X2	6
36	F78100391	PISTON HEAD RING, Ø 45	3
	F73100291	PISTON HEAD RING, Ø 50	3
	F73100391	PISTON HEAD RING, Ø 55	3
37	F90285000	ALT. SEAL RING, HP, Ø 45	3
	F90286300	ALT. SEAL RING, HP, Ø 50	3
	F90287300	ALT. SEAL RING, HP, Ø 55	3
	F90284800	RESTOP RING, Ø 45	3
38	F90286500	RESTOP RING, Ø 50	3
	F90287500	RESTOP RING, Ø 55	3
	F73212792	SEAL SUPPORT, Ø 45	3
39	F73712892	SEAL SUPPORT, Ø 50	3
	F73212992	SEAL SUPPORT, Ø 55	3
	F90284600	ALT. SEAL RING, LP, Ø 45	3
40	F90286000	ALT. SEAL RING, LP, Ø 50	3
	F90287000	ALT. SEAL RING, LP, Ø 55	3
	F96735500	WASHER, Ø16X65X1	3
42	F73150022	CLOSED INSPECTION COVER	1
43	F73050336	PISTON GUIDE ROD	3
44	F90414800	OR, Ø 202.8X3.53	2
45	F73150422	OPEN INSPECTION COVER	1
46	F90168500	RAD. RING, Ø 40X72X7/8.5	3
47	F99188400	SCREW, M6X20	3
49	F73050443	PISTON GUIDE	3
	F73050543	PISTON GUIDE, +0.10	3
50	F73210674	LIFTING BRACKET	2
51	F99513100	SCREW, M16x30, UNI 5931	4
52	F73030101	CONNECTING ROD ASSY.	3
53	F99378800	CONROD SCREW, M10X1.5X80	6
55	F90928000	BABBITT BEARING, LOWER	3
	F90928400	BABBITT BEARING, LOWER, +0.25	3
	F90928500	BABBITT BEARING, LOWER, +0.50	3
	F90928300	BABBITT BEARING, UPPER	3
56	F90928100	BABBITT BEARING, UPPER, +0.25	3
	F90928200	BABBITT BEARING, UPPER, +0.50	3

Item	Part #	Description	QTY.
57	F90915800	CONROD FOOT BUSHING	3
58	F90069000	STOP RING, Ø 32, UNI 7437	6
59	F97744000	SPINDLE	6
60	F99183800	SCREW, M6x14, UNI 5931	6
61	F73200064	FOOT	2
62	F98206000	HOLE PLUG, Ø 15, TTN18	6
63	F98233500	OIL FILLING PLUG, G1" WITH ROD	1
	F98233600	OIL FILLING PLUG, G1" WITH ROD, ATEX	1
64	F90361600	OR, Ø 34.65X1.78	1
65	F73210295	TUBE FOR OIL FILLING PLUG, G1"	1
66	F91854000	CYL. ROLLER BEARING	1
	F10076735	PINION, Z24 R1.875, HELICOL	1
	F10076835	PINION, Z21 R2.238, HELICOL	1
	F10076935	PINION, Z18 R2.722, HELICOL	1
	F10082255	PINION, Z19 R3.211, HELICOL	1
68	F97623000	TMP. CYL. PIN. Ø 10X24, UNI 6364	2
69	F90101000	STOP RING, Ø 120, UNI 7437	1
70	F91859900	ADJUST ROLLER BEARING	1
71	F73210455	BEARING SUPPORT RING	1
72	F90081000	STOP RING, Ø 55, UNI 7435	1
73	F90172400	RAD. RING, Ø 55X75X8, VITON	1
74	F91500500	TAB, 14X9X60, UNI 6604	1
75	F73210589	RING GEAR SUPPORT RING	1
76	F99366700	SCREW, M10X25, UNI 5739	2
77	F91511000	TAB, 22X14X80, UNI 6604	1
78	F74213255	RING GEAR STOP	1
79	F73020035	CRANKSHAFT C. 70	1
80	F10077035	RING GEAR, Z45 R1.875, HELICAL	1
	F10077135	RING GEAR, Z47 R2.238, HELICAL	1
	F10077235	RING GEAR, Z49 R2.722, HELICAL	1
	F10082355	RING GEAR, Z61 R3.211, HELICAL	1
81	F99371100	SCREW, M10X40, UNI 5931	15
82	F73210113	REDUCTION GEAR COVER	1
83	F90415000	OR, Ø 253.6.X3.53	2
84	F73210013	REDUCTION GEAR BOX	1
85	F91881000	CYL ROLLER BEARING	2
86	F73210384	SIDE SEAL	2
87	F73010013	PUMP CASING	1
88	F73160022	CASING COVER	1
89	F99368500	SCREW, M10X30, UNI 5931	14
90	F73150222	BEARING COVER	1
91	F98218100	PLUG, G1/2"X13	2
	F98218150	PLUG, G1/2"X13, SS, ATEX	1
99	F99301900	SCREW, M8X10, ATEX	1
100	F96701750	WASHER, Ø 8.4X15.0X0.8, ATEX	1
105	F99194300	SCREW, M6X40	2
106	F98217300	PLUG, G 1/2"	1
107	F96338000	FITTING, G 1/2"	1
108	F73224184	REAR GASKET	1
<b>WITH HYDRAULIC MOTOR</b>			
92	F10079455	PINION, Z18 R.2.722	1
	F10077355	PINION, Z24 R.1.875	1
	F10077455	PINION, Z21 R.2.238	1
93	F73215513	HYDRAULIC GEAR COVER	1
101	F90206500	PLUG, Ø 17	1
102	F73224271	RING, Ø 54	1
103	F70227034	SCREW, N6X12	1
104	F92202500	NUT, M6X5	1
94	F73215513	HYDRAULIC GEAR COVER	1
<b>DIRECT DRIVE</b>			
89	F99368500	SCREW, M10X30, UNI 5931	14
94	F73150322	BEARING COVER, OPEN	1
95	F90391450	O-RING, Ø 75.87X2.62	1
96	F73215654	RING	1
97	F90195000	RING, RAD. Ø 90X110X12	1
<b>AUXILIARY DRIVE</b>			
49	F99367100	SCREW, M10X25	6
89	F99368500	SCREW, M10X30, UNI 5931	8
94	F73150322	BEARING COVER, OPEN	1
95	F90391450	O-RING, Ø 75.87X2.62	1
97	F90195000	RING, RAD. Ø 90X110X12	1
98	F73215754	PTO OUTLET	1

**REPAIR KITS**

KIT NUMBER	F2139 (MWN45) Plunger Packing Kit	F2140 (MWN50) Plunger Packing Kit	F2141 (MWN55) Plunger Packing Kit	F2048 Valve Kit	F2159 (MWN45) Complete Seals Kit	F2160 (MWN50) Complete Seals Kit	F2161 (MWN55) Complete Seals Kit	F2150 Con. Rod Kit	F2151 Con. Rod Kit	F2153 Con. Rod Kit	K2152 Rail kit
Positions Included	32, 33, 35, 37, 38, 40	32, 33, 35, 37, 38, 40,	32, 33, 35, 37, 38, 40	5, 6, 11, 12, 21, 23	5, 6, 13, 16, 18, 19, 23, 29, 32, 33, 35, 37, 38, 40, 44, 46, 64, 73, 83, 86, 118	5, 6, 13, 16, 18, 19, 23, 29, 32, 33, 35, 37, 38, 40, 44, 46, 64, 73, 83, 86, 118	5, 6, 13, 16, 18, 19, 23, 29, 32, 33, 35, 37, 38, 40, 44, 46, 64, 73, 83, 86, 118	55, 56	55, 56	55, 56	51, 61



**17.2 MWR PUMP**

**17.2.1 Operating instructions**



The MWR pump has been designed to operate in environments with atmospheres that are not potentially explosive and for using water rich in particulate, therefore it is considered ideal for systems with fluid recirculation.

The durability of the plunger seals is directly in relation to the percentage of the presence of solids in the fluid as regards both their size and their density. For a long seal life we recommend a particulate grain size of no more than 200 micron and 20% max. in volume. For more information and a general system layout see paragraph 9.7.

**17.2.2 Water temperature**

The maximum permissible water temperature is 104° F (40° C). However the pump can be used with water up to a temperature of 140° F (60° C), but only for short periods.

**17.2.3 Maximum pressure and flow rate**

The rated specifications stated in our catalog are the maximum that can be obtained by the pump. Independently of the power used, the maximum pressure and RPM indicated on the specification label can never be exceeded unless upon prior formal authorization by our Customer Service Department.

**17.2.4 Maximum RPM**

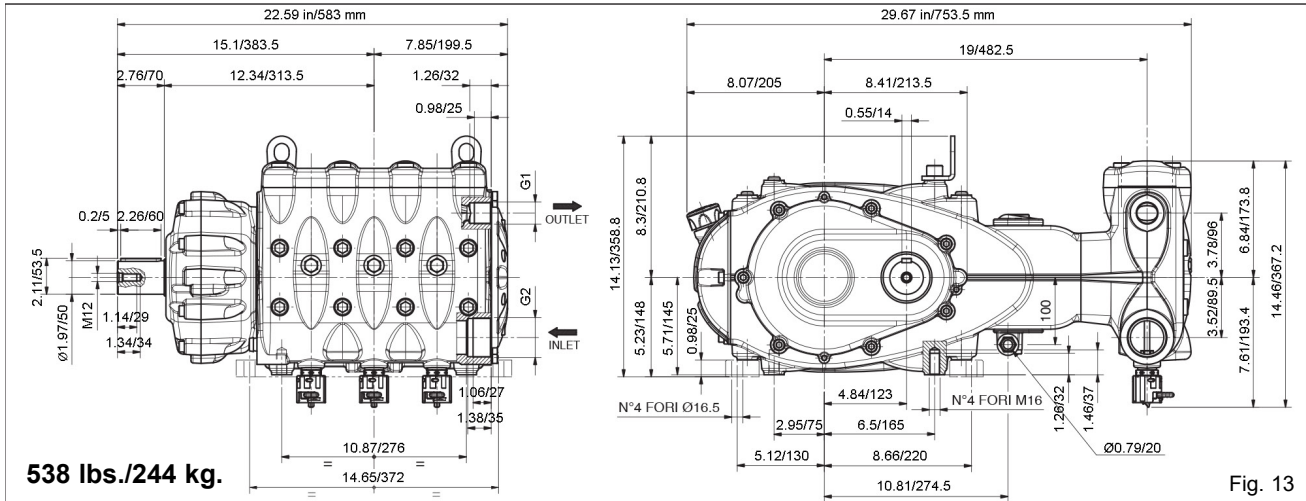
Any rotating speed other than that indicated in the performance table (see 17.2.5) must be expressly authorized by our Customer Service Department.

**17.2.5 Technical Characteristics**

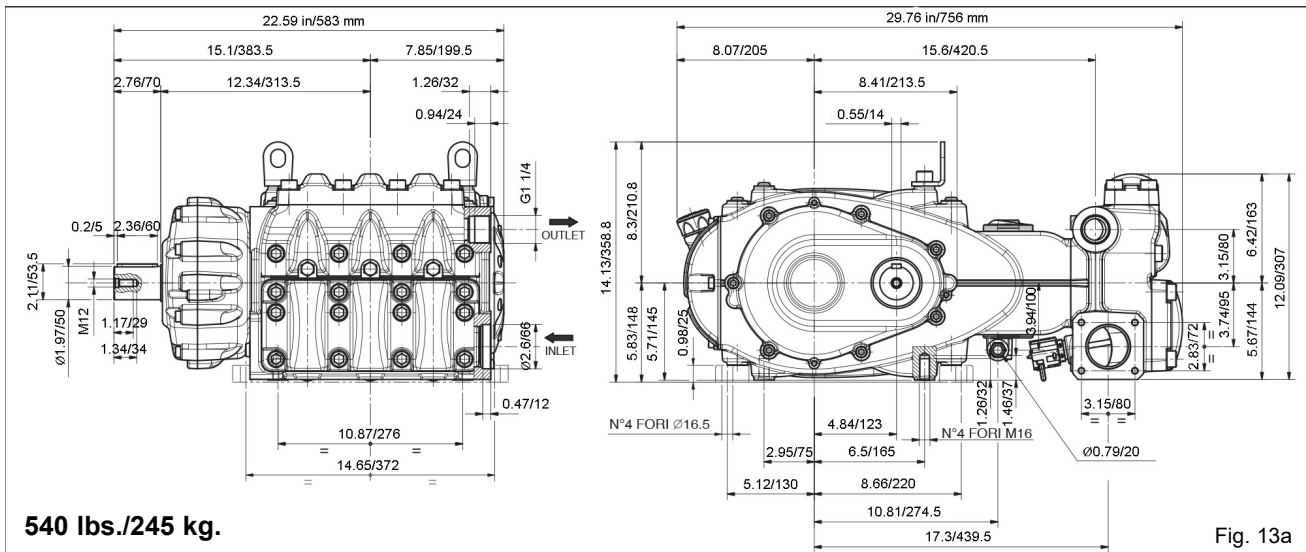
MODEL	RPM	FLOW RATE		PRESSURE		POWER	
		GPM	l/min	PSI	Bar	Hp	kW
MWR32	800	35.7	135	4350	300	100	73.5
	1500	35.7	135	4350	300	100	73.5
	1800	35.9	136	4350	300	100	73.5
	2200	36.1	136.5	4350	300	100	73.5
	2600	36.1	136.5	4350	300	100	73.5
MWR36	800	45.2	171	3480	240	100	73.5
	1500	45.2	171	3480	240	100	73.5
	1800	45.4	172	3480	240	100	73.5
	2200	45.7	173	3480	240	100	73.5
	2600	45.7	173	3480	240	100	73.5
MWR40	800	55.7	211	3045	210	84.6	115
	1500	55.7	211	3045	210	84.6	115
	1800	56.0	212	3045	210	85.3	116
	2200	56.3	213	3045	210	85.3	116
	2600	56.3	213	3045	210	85.3	116
MWR45	800	70.6	267	2247	155	100	73.5
	1500	70.6	267	2247	155	100	73.5
	1800	71	269	2247	155	100	73.5
	2200	71.3	270	2247	155	100	73.5
	2600	71.3	270	2247	155	100	73.5
MWR50	800	87.2	330	1812	125	100	73.5
	1500	87.2	330	1812	125	100	73.5
	1800	87.6	332	1812	125	100	73.5
	2200	88	333	1812	125	100	73.5
	2600	88	333	1812	125	100	73.5
MWR55	800	105.4	399	1450	100	100	73.5
	1500	105.4	399	1450	100	100	73.5
	1800	160	401	1450	100	100	73.5
	2200	106.5	403	1450	100	100	73.5
	2600	106.5	403	1450	100	100	73.5

**17.2.6 Dimensions and weight**

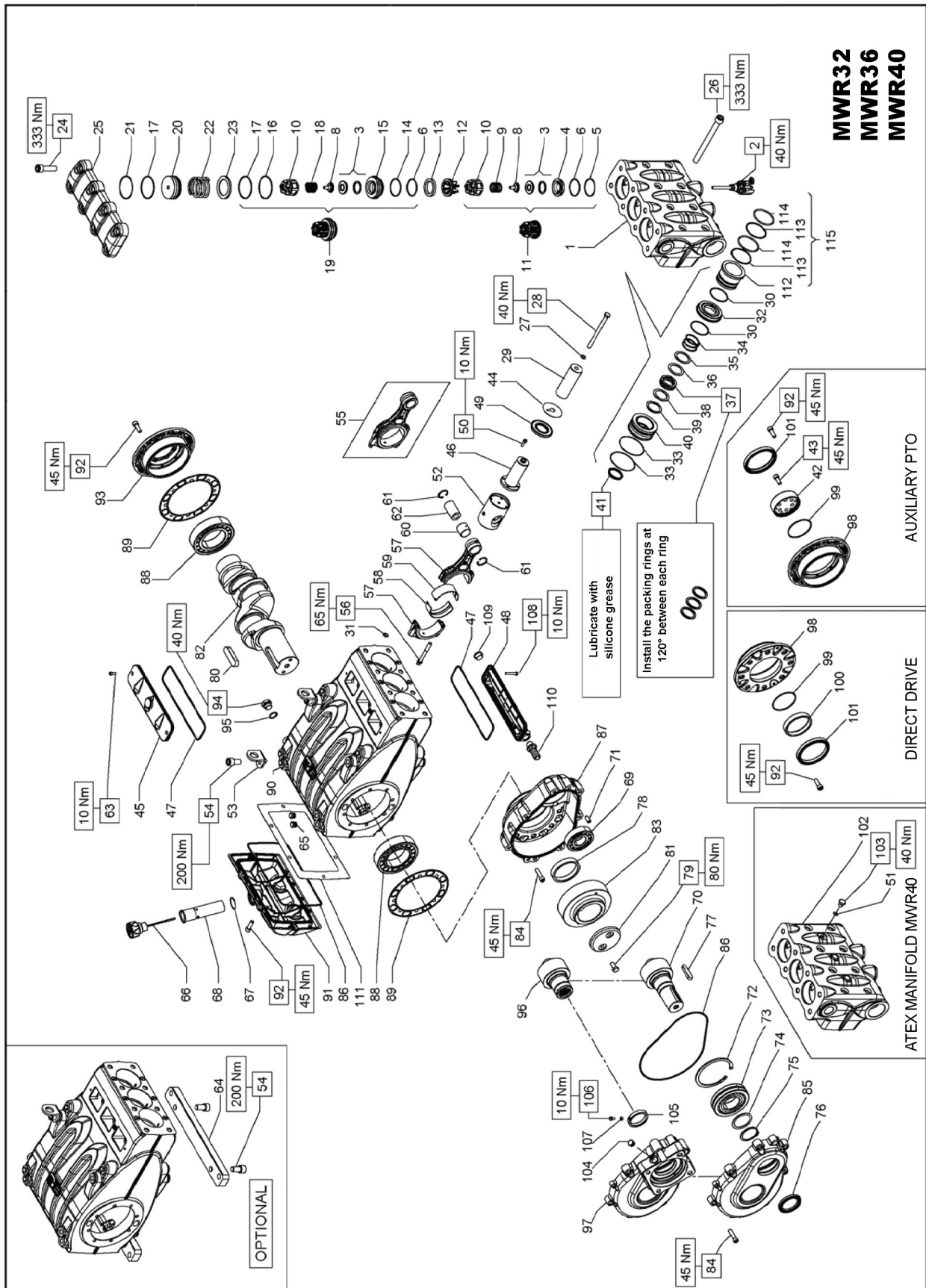
For dimensions and weight of MWR32, MWR36 MWR40, please refer to fig. 13.



For dimensions and weight of MWR45, MWR50 and MWR55 pumps, please refer to fig. 13a.



**17.2.7 EXPLODED VIEW AND PARTS LIST**



Item	Part #	Description	QTY.
1	F73120215	MANIFOLD-NPT	1
2	F10744401	VALVE OPENING DEVICE	3
3	F36208801	BALL VALVE ASSEMBLY	6
4	F36206766	INLET VALVE HOUSING	3
5	F90526000	ANTIEXTRUSION RING Ø51.5x56x1.5	3
6	F90389000	OR, Ø50.47X2.62	3
8	F36209051	INTERNAL VALVE GUIDE	3
9	F94760000	SPRING Ø 28.3X30.7	3
10	F36206101	INLET/OUTLET VALVE GUIDE	3
11	F36715101	INLET VALVE UNIT	3
12	F74210651	HP VALVE GUIDE SPACER	3
13	F73212270	VALVE HOUSING SPACER RING	3
14	F90526500	ANTIEXTRUSION RING Ø 51.7X56.2X1.5	3
15	F36206966	OUTLET VALVE HOUSING	3
16	F90527600	ANTIEXTRUSION RING Ø 67.7X72.2X1.5	3
17	F90391100	OR, Ø 66.35X2.62	6
18	F94760500	SPRING Ø 28.5X32	3
19	F36715301	OUTLET VALVE UNIT	3
20	F74211070	HP OUTLET VALVE PLUG	3
21	F90528000	ANTIEXTRUSION RING Ø 67.7X72.2X1.5	3
22	F94775000	SPRING Ø 58X45.4	3
23	F74210866	OUTLET VALVE HOUSING RING	3
24	F99514700	SCREW, M16x180	8
25	F73210715	VALVE COVER	1
26	F99522200	SCREW, M16x180	8
27	F96710500	WASHER Ø 10X18X0.9, SS, PTFE	3
28	F99383000	SCREW, M10X140	3
	F73040009	PLUNGER, Ø 32X117	3
29	F73040109	PLUNGER, Ø 36X117	3
	F73040209	PLUNGER, Ø 40X117	3
30	F90389800	OR, Ø 56.82x2.62	6
31	F90382500	OR, Ø 10.78x2.62	6
	F73101256	HEAD PACKING RING, Ø 32	3
32	F73101356	HEAD PACKING RING, Ø 36	3
	F73100456	HEAD PACKING RING, Ø 40	3
33	F90371000	OR, Ø 81x2	6
	F94769200	SPRING Ø 41X32, (MWR32, MWR35)	3
34	F94772000	SPRING Ø 47X30 (MWR40)	3
	F73222756	SPRING RING, Ø 32	3
35	F73223156	SPRING RING, Ø 36	3
	F73213956	SPRING RING, Ø 40	3
	F73222682	SCRAPER, Ø 32	3
36	F73223082	SCRAPER, Ø 36	3
	F73214382	SCRAPER, Ø 40	3
	F90560000	PACKING, Ø 32X45X15	3
37	F90562500	PACKING, Ø 36X45X15	3
	F90565000	PACKING, Ø 40X53X15	3
	F90517990	ANTI-EXT. RING, Ø 32X45X2	3
38	F90520200	ANTI-EXT. RING, Ø 36X49X2	3
	F90521000	ANTI-EXT. RING, Ø 40X53X2	3
	F73222560	SUPPORT RING, Ø 32	3
39	F73222960	SUPPORT RING, Ø 36	3
	F73214760	SUPPORT RING, Ø 40	3
	F73222456	PACKING SUPPORT, Ø 32	3
40	F73222956	PACKING SUPPORT, Ø 36	3
	F73215156	PACKING SUPPORT, Ø 40	3
	F90278000	ALT. SEAL RING, LP, Ø 32X40X5.5	3
41	F90279800	ALT. SEAL RING, LP, Ø 36X44X5.4	3
	F90282800	ALT. SEAL RING, LP, Ø 40X48X5.2	3
44	F96735500	WASHER, Ø 16X65X1	3
45	F73150022	CLOSED INSPECTION COVER	1
46	F73050336	PISTON GUIDE ROD	3
47	F90414800	OR, Ø 202.8X3.53	2
48	F73150422	OPEN INSPECTION COVER	1
49	F90168500	RAD. RING, Ø 40X72X7/8.5	3
50	F99188400	SCREW, M6X20	3
51	F90358400	O-RING, Ø10.82X1.78	3
	F73050443	PLUNGER GUIDE	3
52	F73050543	PLUNGER GUIDE, +0.10	3
52A	F73606201	PISTON GUIDE ASSEMBLY	3
53	F73210674	LIFTING BRACKET	2
54	F99513000	SCREW, M16x30, UNI 5931	4
55	F73030101	CONNECTING ROD ASSY.	3
56	F99378800	CONROD SCREW, M10X1.5X80	6
	F90928300	BABBITT BUSHING, LOWER	3
58	F90928400	BABBITT BUSHING, LOWER, +0.25	3
	F90928500	BABBITT BUSHING, LOWER, +0.50	3

**REPAIR KITS**

KIT NUMBER	F2384 Plunger Packing Kit	F2385 Plunger Packing Kit	F2162 Plunger Packing Kit	F2055 Valve Kit	F2386 Complete Seals Kit	F2387 Complete Seals Kit	F2166 Complete Seals Kit	F2150 Con Rod Kit	F2151 Con Rod Kit	F2153 Con Rod Kit	F2152 Rail Kit	
Positions Included	30, 31, 33, 36, 37, 38, 41	30, 31, 33, 36, 37, 38, 41	30, 31, 33, 36, 37, 38, 41	5, 6, 10, 11, 17, 19, 21,	5, 6, 14, 16, 17, 21, 27, 30, 31, 33, 36, 37, 38, 41, 47, 49, 51, 67, 76, 86, 89, 111	5, 6, 14, 16, 17, 21, 27, 30, 31, 33, 36, 37, 38, 41, 47, 49, 51, 67, 76, 86, 89, 111	5, 6, 14, 16, 17, 21, 27, 30, 31, 33, 36, 37, 38, 41, 47, 49, 51, 67, 76, 86, 89, 111		58, 59	58, 59	58, 59	54, 64

Item	Part #	Description	QTY.
59	F90928000	BABBITT BUSHING, UPPER	3
	F90928100	BABBITT BUSHING, UPPER, +0.25	3
	F90928200	BABBITT BUSHING, UPPER, +0.50	3
60	F90915800	BUSHING	3
61	F90069000	STOP RING, Ø 32, UNI 7437	6
62	F97744000	SPINDLE	3
63	F99183700	SCREW, M6x14 UNI 5931	2
64	F73200064	PUMP FEET	2
65	F98206000	HOLE PLUG, Ø 15, TTN18	6
66	F98233500	OIL FILLING PLUG, G1" WITH ROD	1
67	F90361600	OR, Ø 34.65X1.78	1
68	F73210295	TUBE FOR OIL FILLING PLUG, G1"	1
69	F91854000	CYL. ROLLER BEARING	1
	F10076735	PINION, HELICAL, Z24 R1.875	1
70	F10076835	PINION, HELICAL, Z21 R2.238	1
	F10076935	PINION, HELICAL, Z18 R2.722	1
	F10082255	PINION, Z19 R3.211, HELICOL	1
71	F97623000	TMP. CYL. PIN, Ø 10X24, UNI 6364	2
72	F90101000	STOP RING, Ø 120, UNI 7437	1
73	F91859900	ADJUST ROLLER BEARING	1
74	F73210455	BEARING SUPPORT RING	1
75	F90081000	STOP RING, Ø 55, UNI 7435	1
76	F90172400	RAD. RING, Ø 55X75X8, VITON	1
77	F91500500	TAB, 14X9X60, UNI 6604	1
78	F73210589	RING GEAR SUPPORT RING	1
79	F99366700	SCREW, M10X25, UNI 5739	2
80	F91511000	TAB, 22X14X80, UNI 6604	1
81	F74213255	RING GEAR STOP	1
82	F73020035	CRANKSHAFT C. 70	1
	F10077035	RING GEAR, Z45 R1.875, HELICOL	1
83	F10077135	RING GEAR, Z47 R2.238, HELICOL	1
	F10077235	RING GEAR, Z49 R2.722, HELICOL	1
	F10082355	RING GEAR, Z61 R3.211, HELICOL	1
84	F99371000	SCREW, M10X40, UNI 5931	15
85	F73210113	REDUCTION GEAR COVER	1
86	F90415000	OR, Ø 253.6.X3.53	2
87	F73210013	REDUCTION GEAR BOX	1
88	F91881000	CYL ROLLER BEARING	2
89	F73210384	SIDE SEAL	2
90	F73010013	PUMP CASING	1
91	F73160022	CASING COVER	1
92	F99368600	SCREW, M10X30, UNI 5931	14
93	F73150222	BEARING COVER	1
94	F98218700	PLUG, G 1/2" x 13, NICKEL	2
95	F96751400	ALUMINUM WASHER, Ø 21.5X27X1.5	2
102	F73120915	MANIFOLD, ATEX (MWR40)	1
103	F98204600	PLUG, G 1/4"X13	3
108	F99194300	SCREW M6X40	2
109	F98217300	PLUG G 1/2"	1
110	F96338000	FITTING, G 1/2"	1
111	F73224184	REAR GASKET	1
112	F73215956	HEAD BUSHING	3
113	F90523800	ANTI-EXT. RING, Ø 49X55X1.5	6
114	F90408000	OR, Ø 47.63X3.53	6
115	F73120001	HEAD BUSHING COMPLETE (MWR32, MWR36)	1
	F73120801	HEAD BUSHING COMPLETE (MWR40)	1
<b>WITH HYDRAULIC MOTOR</b>			
	F10079455	PINION, HELICAL, Z18 R 2.722	1
96	F10077355	PINION, HELICAL, Z24 R1.875	1
	F10077455	PINION, HELICAL, Z21 R2.238	1
97	F73215513	GEAR BOX COVER	1
104	F90206500	PLUG, Ø 17	1
105	F73224271	RING Ø 54	1
106	F70227034	SCREW, M6X12	1
107	F92202500	NUT, M6X5	
<b>DIRECT DRIVE</b>			
92	F99368600	SCREW, M10X30, UNI 5931	8
98	F73150322	OPEN BEARING COVER	1
99	F90391450	OR, Ø75.87X2.62	1
100	F73215654	RING FOR DIRECT DRIVE	1
101	F90195000	RING, RAD, Ø 90X110X12, VITON	1
<b>WITH AUXILIARY P.T.O.</b>			
42	F73215754	P.T.O. OUTLET	1
43	F99367100	SCREW, M10X25, UNI 5931	6
92	F99368600	SCREW, M10X30, UNI 5931	8
98	F73150322	OPEN BEARING COVER	1
99	F90391450	OR, Ø75.87X2.62	1
101	F90195000	RING, RAD, Ø 90X110X12	1





**17.3 MWNR PUMP**

**17.3.1 Operating instructions**



The MWNR pump has been designed to operate in environments with atmospheres that are not potentially explosive and for using salt water rich in particulate, therefore it is considered ideal for systems with fluid recirculation.

The durability of the plunger seals is directly in relation to the percentage of the presence of solids in the fluid as regards both their size and their density. For a long seal life we recommend a particulate grain size of no more than 200 micron and 20% max. in volume. For more information and a general system layout see paragraph 9.7.

**17.3.2 Water temperature**

The maximum permissible water temperature is 104° F (40° C). However the pump can be used with water up to a temperature of 140° F (60° C), but only for short periods.

**17.3.3 Maximum pressure and flow rate**

The rated specifications stated in our catalog are the maximum that can be obtained by the pump. Independently of the power used, the maximum pressure and RPM indicated on the specification label can never be exceeded unless upon prior formal authorization by our Customer Service Department.

**17.3.4 Maximum RPM**

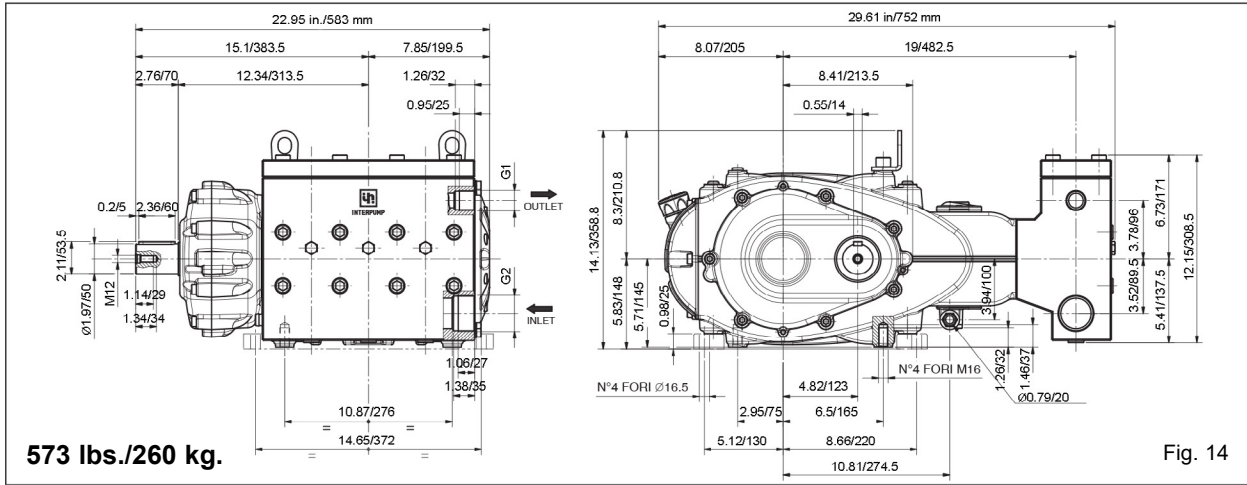
Any rotating speed other than that indicated in the performance table (see 17.3.5) must be expressly authorized by our Customer Service Department.

**17.3.5 Specifications**

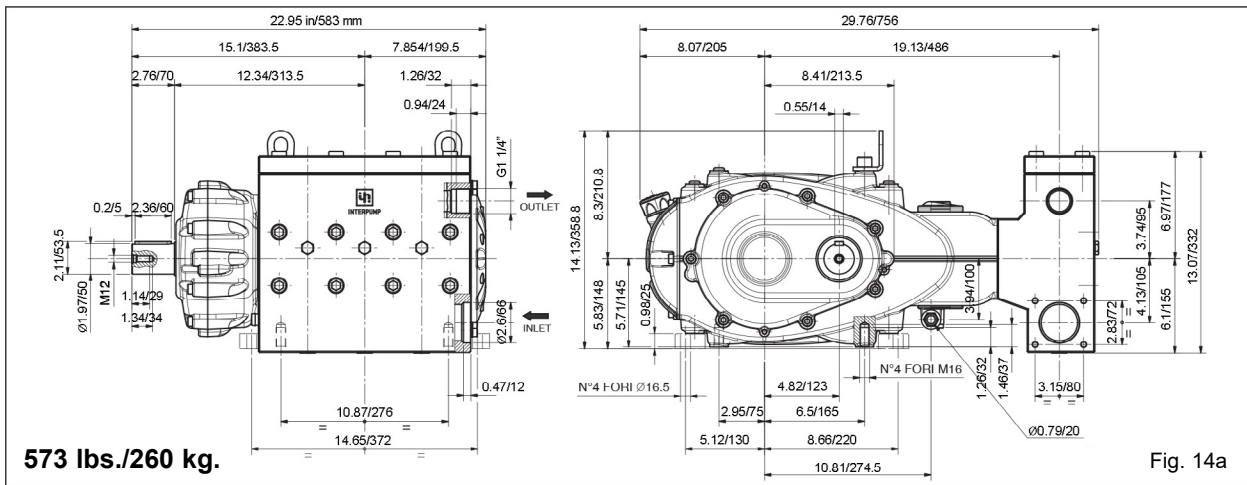
MODEL	RPM	FLOW RATE		PRESSURE		POWER	
		GPM	l/min	PSI	Bar	Hp	kW
MWNR36	800	45.2	171	3,480	240	100	73.5
	1500	45.2	171	3,480	240	100	73.5
	1800	45.4	172	3,480	240	100	73.5
	2200	45.7	173	3,480	240	100	73.5
	2600	45.7	173	3,480	240	100	73.5
MWNR40	800	55.7	211	3,045	210	115	84.6
	1500	55.7	211	3,045	210	115	84.6
	1800	56	212	3,045	210	116	85.3
	2200	56.3	213	3,045	210	116	85.3
	2600	56.3	213	3,045	210	116	85.3
MWNR45	800	70.6	267	2,247	155	100	73.5
	1500	70.6	267	2,247	155	100	73.5
	1800	71	269	2,247	155	100	73.5
	2200	71.3	270	2,247	155	100	73.5
	2600	71.3	270	2,247	155	100	73.5
MWNR50	800	87.2	330	1,812	125	100	73.5
	1500	87.2	330	1,812	125	100	73.5
	1800	87.6	332	1,812	125	100	73.5
	2200	88	333	1,812	125	100	73.5
	2600	88	333	1,812	125	100	73.5
MWNR55	800	105.4	399	1,450	100	100	73.5
	1500	105.4	399	1,450	100	100	73.5
	1800	106	401	1,450	100	100	73.5
	2200	106.5	403	1,450	100	100	73.5
	2600	106.5	403	1,450	100	100	73.5

**17.3.6 Dimensions and weight**

For dimensions and weight of MWNR36, MWNR40 please refer to fig. 14.

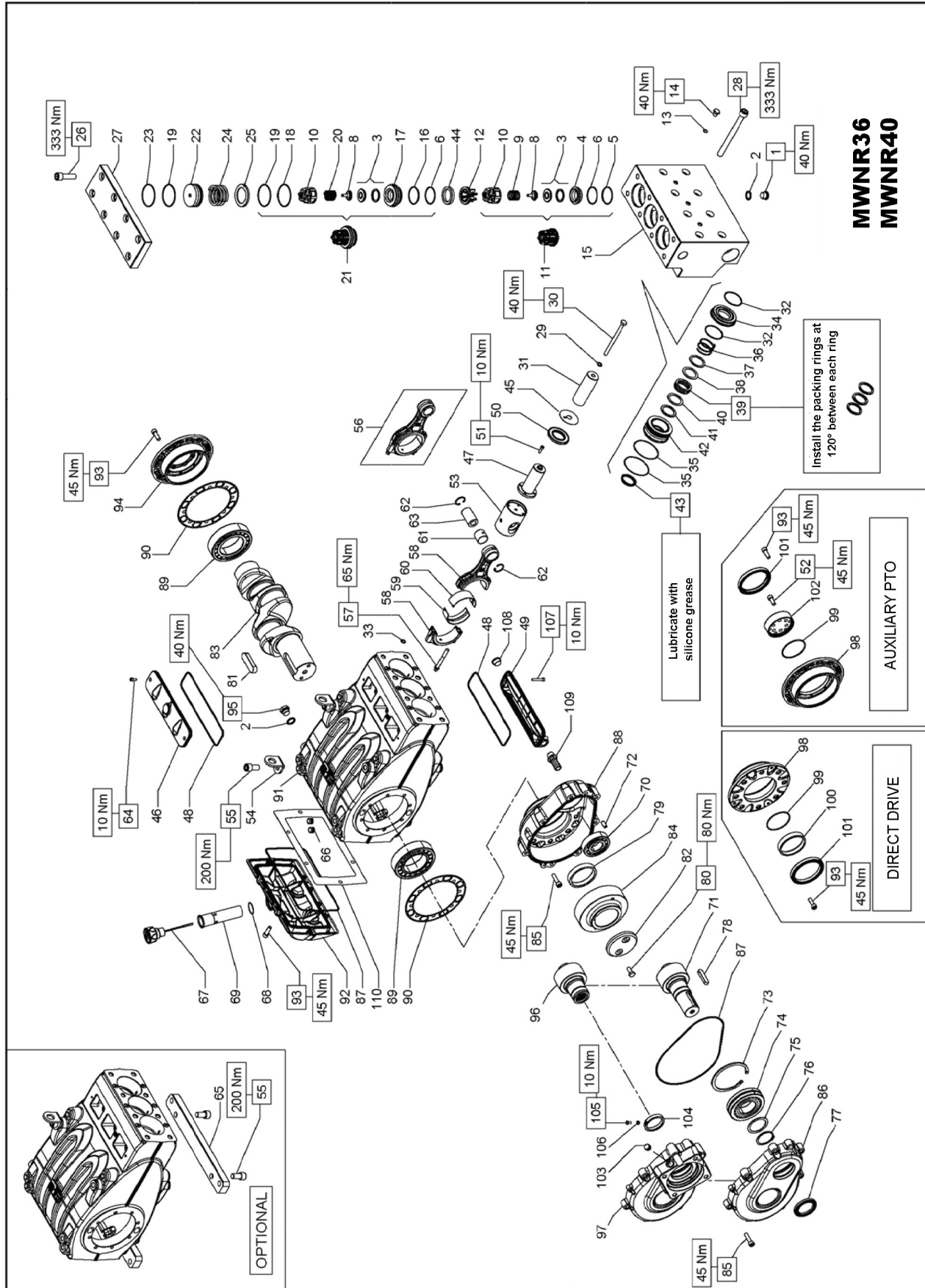


For dimensions and weight of MWNR45, MWNR50 and MWNR55 pumps, please refer to fig. 14a.





**17.3.7. EXPLODED VIEW AND PARTS LIST**

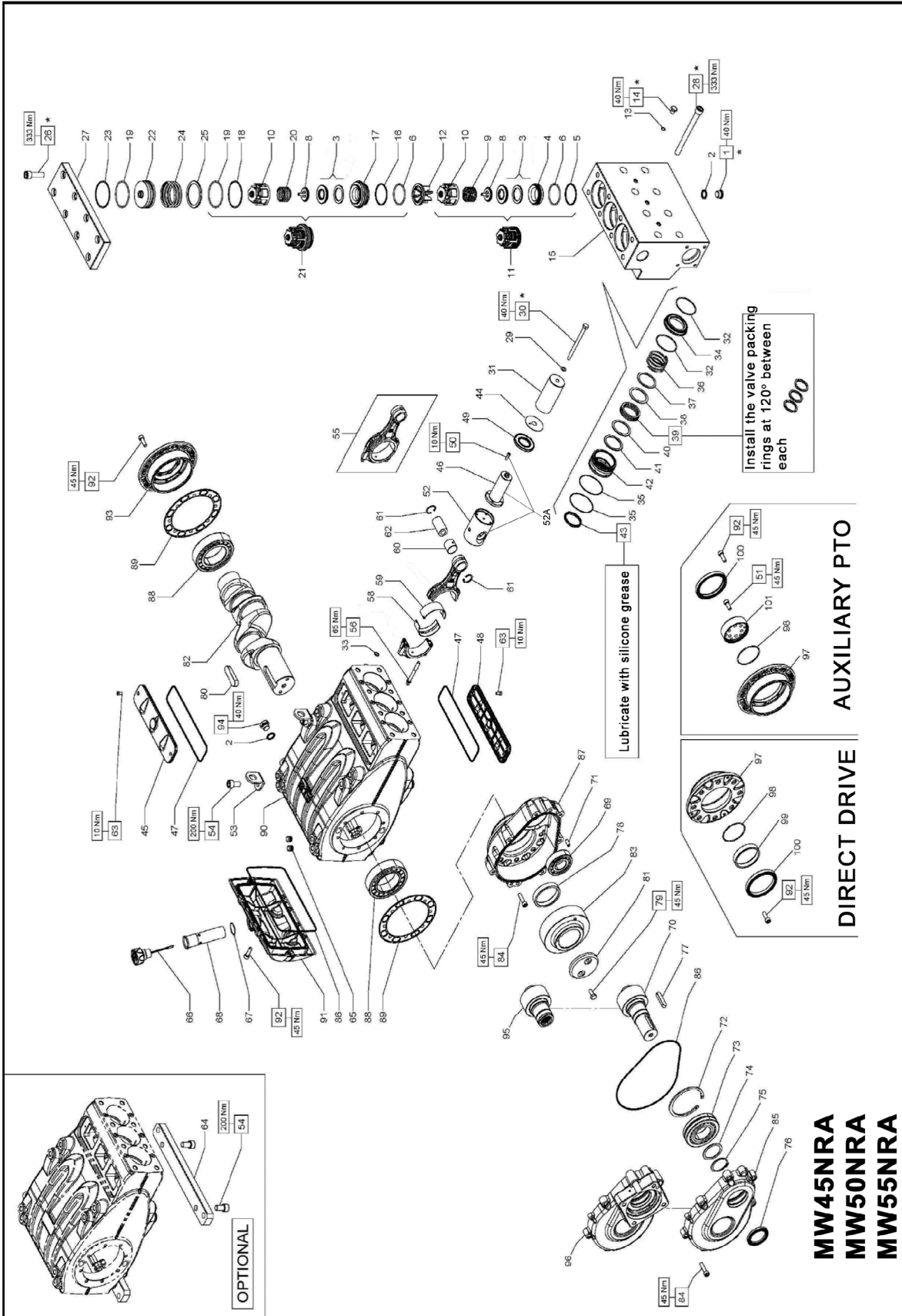


Item	Part #	Description	QTY.
1	F98218600	Plug, 1/2"x14	3
2	F93197100	WASHER WITH SEAL	5
3	F36208801	BALL VALVE ASSY.	6
4	F36206766	INLET VALVE SEAT	3
5	F90526000	ANTI-EXTRUSION RING, Ø 51.5X56X1.5	3
6	F90389000	O-RING, Ø 50.47X2.62	6
8	F36209051	INTERNAL VALVE GUIDE	3
9	F94760000	SPRING, Ø 28.3X30.7	3
10	F36206101	VALVE GUIDE	6
11	F36715101	INLET VALVE UNIT	3
12	F74210651	VALVE GUIDE SPACER	3
13	90358400	O-RING, Ø10.82X1.78	3
14	F98204600	PLUG, G 1/4"X13, SS	3
15	F73120456	MANIFOLD	1
16	F90526500	ANTI-EXTRUSION RING, Ø 51.7X56.2X1.5	3
17	F36206966	VALVE SEAT HOUSING	3
18	F90527600	ANTI-EXTRUSION RING, Ø 67.7X72X1.5	3
19	F90391100	OR, Ø 66.35X2.62	6
20	F90760500	SPRING, Ø 28.5X32	3
21	F36715301	OUTLET VALVE UNIT	3
22	F78215856	PLUG, OUTLET VALVE	3
23	F90528000	ANTI-EXTRUSION RING, Ø 67.7X72.2X1.5	3
24	F94774900	SPRING, Ø 58X45.4	3
25	F78215991	OUTLET NALVE SEAT RING	3
26	F99514700	SCREW, M16X55	8
27	F73212356	VALVE COVER	1
28	F99522200	SCREW, M6X180	8
29	F96710500	WASHER, Ø 10X18X0.9,SS, PTFE	3
30	F99383000	SCREW, M10X140	3
31	F73040109	PLUNGER, Ø 36X117	3
	F73040209	PLUNGER, Ø 40X117	3
32	F90389800	OR, Ø 56.82X2.62	6
33	F90382500	OR, Ø 10.78X2.62	6
34	F73101656	HEAD PACKING RING, Ø 36	3
	F73100856	HEAD PACKING RING, Ø 40	3
35	F90371000	OR, Ø 81X2	6
	F94769200	SPRING, Ø 41X32	3
36	F94772000	SPRING, Ø 47X30	3
37	F73223156	SPRING RING, Ø 36	3
	F73216156	SPRING RING, Ø 40	3
38	F73223082	SCRAPER, Ø 36	3
	F73214382	SCRAPER, Ø 40	3
39	F90562500	PACKING, Ø 36	3
	F90565000	PACKING, Ø 40	3
40	F90520200	ANTI-EXT. RING, Ø 36X49X2	3
	F90521000	ANTI-EXT. RING, Ø 40X53X2	3
41	F73222960	SUPPORT RING, Ø 36	3
	F73216556	SUPPORT RING, Ø 40	3
42	F73224556	PACKING SUPPORT, Ø 36	3
	F73216956	PACKING SUPPORT, Ø 40	3
43	F90279800	WASHER, Ø 36X44X5.5 L.P.	3
	F90282800	WASHER, Ø 40X48X5.5 L.P.	3
44	F73213756	VALVE SEAT SPACER RING	3
45	F96735500	WASHER, Ø 16X65X1	3
46	F73150022	CLOSED INSPECTION COVER	1
47	F73050336	PLUNGER GUIDE ROD	3
48	F90414800	OR, Ø 202.8X3.53	2
49	F73150122	OPEN INSPECTION COVER	1
50	F90168500	RAD. RING, Ø40X72X7/8.5	3
51	F99188400	SCREW, M6X20	12
53	F73050443	PLUNGER GUIDE	3
	F73050543	PLUNGER GUIDE +0.10	3
54	F73210674	LIFTING BRACKET	2
55	F99513100	SCREW, M16x30, UNI 5931	4
56	F73030101	CONNECTING ROD ASSY.	3
57	F99378800	CONNECTING ROD SCREW, M10X1.5X80	6
59	F90928300	BABBITT BUSHING, LOWER	3
	F90928400	BABBITT BUSHING, LOWER, +0.25	3
	F90928500	BABBITT BUSHING, LOWER, +0.50	3

Item	Part #	Description	QTY.
60	F90928000	BABBITT BUSHING, UPPER	3
	F90928100	BABBITT BUSHING, UPPER, +0.25	3
	F90928200	BABBITT BUSHING, UPPER, +0.50	3
61	F90915800	CONROD HEAD FOOT	3
62	F90069000	STOP RING, Ø 32 UNI 7437	6
63	F97744000	SPINDLE	3
64	F99183800	SCREW, M6X14, UNI 5931	4
65	F73200064	FOOT	2
66	F98206000	HOLE PLUG, Ø 15	6
67	F98233500	OIL FILLING PLUG, G1", WITH ROD	1
68	F90361600	OR, 34.65X1.78	1
69	F73210295	TUBE FOR OIL FILLING PLUG, G1 "	1
70	F91854000	CY. ROLLER BEARING	1
	F10076735	PINION, Z24 R1.875, HELICOL	1
	F10076835	PINION, Z21 R2.238, HELICOL	1
	F10076935	PINION, Z18 R2.722, HELICOL	1
	F10082255	PINION, Z19 R3.211, HELICOL	1
72	F97623000	TMP. CYL. PIN, Ø 10X24	2
73	F90101000	STOP RING, Ø 120	1
74	F91859900	ADJUST. ROLLER BEARING	1
75	F73210455	BEARING SUPPORT RING	1
76	F90081000	STOP RING, Ø 55	1
77	F90172400	RAD. RING, Ø 55X75X8, VITON	1
78	F91500500	TAB, 14X9X60, UNI 6604	1
79	F73210589	RING GEAR SUPPORT RING	1
80	F99366700	SCREW, M10X25, UNI 5739	2
81	F91511000	KEY, 22X14X80 UNI 6604	1
82	F74213255	RING GEAR STOP	1
83	F73020035	CRANKSHAFT C. 70	1
84	F10077035	RING GEAR, Z45 R1.875, HELICOL	1
	F10077135	RING GEAR, Z47 R2.238, HELICOL	1
	F10077235	RING GEAR, Z49 R2.722, HELICOL	1
	F10082355	RING GEAR, Z61 R3.211, HELICOL	1
85	F99371100	SCREW, M10X40, UNI 5931	15
86	F73210113	REDUCTION GEAR COVER	1
87	F90415000	OR, Ø 253.6X3.53	2
88	F73210013	REDUCTION GEAR BOX	1
89	F91881000	CY. ROLLER BEARING	2
90	F73210384	SIDE SEAL	2
91	F73010013	PUMP CASING	1
92	F73160022	CASING COVER	1
93	F99368500	SCREW, M10X30, UNI 5931	14
94	F73150222	BEARING COVER	1
95	F98218100	PLUG, G1/2"x10, NICKEL	2
107	F99194300	SCREW, M6X40	2
108	F98217300	PLUG, G 1/2"	1
109	F96338000	FITTING, G 1/2"	1
110	F73224184	REAR GASKET	1
<b>WITH HYDRAULIC MOTOR</b>			
96	F10079455	PINION, Z18, R 2.722, HELICOL	1
	F10077355	PINION, Z24, R1.875, HELICOL	1
	F10077455	PINION, Z21, R2.238, HELICOL	1
97	F73215513	GEAR BOX COVER	1
103	F90206500	SCREW, Ø 17	1
104	F73224271	RING, Ø 54	1
105	F70227034	SCREW M6X12	1
106	F92202500	NUT, M6X5	1
<b>DIRECT DRIVE</b>			
93	F99368600	SCREW, M1-X30	8
98	F73150322	OPEN BEARING COVER	1
99	F90391450	OR, Ø 78.87X2.62	1
100	F73215654	RING FOR DIRECT DRIVE	1
101	F90195000	RING, RAD, Ø 90X110X12, VITON	1
<b>WITH AUXILIARY P.T.O.</b>			
52	F99367100	SCREW, M10X25, UNI 5931	6
93	F99368500	SCREW, M10X30	8
98	F73150322	OPEN BEARING COVER	1
99	F90391450	OR, Ø 78.87X2.62	1
101	F90195000	RING, RAD, Ø 90X110X12, VITON	1
102	F73215754	P.T.O. OUTLET	1

**REPAIR KITS**

KIT NUMBER	F2385 (MWNR36) Plunger Pack	F2162 (MENR40) Plunger Pack.	F2055 Valves kit	F2384 (MWNR36) Complete Seals Kit	F2166 (MNER40) Complete Seals Kit	F2150 Conn. Rod	F2151 Conn. Rod +0.25	F2153 Conn. Rod +0.50	F2152 Mounting Feet
Positions Included	32, 33, 35, 38, 39, 40, 43	32, 33, 35, 38, 39, 40, 43	5, 6, 11, 12, 19, 21, 23,	5, 6, 13, 16, 18, 19, 24, 29, 32, 33, 35, 38, 39, 40, 43, 48, 50, 68, 77, 87, 90, 110	5, 6, 13, 16, 18, 19, 24, 29, 32, 33, 35, 38, 39, 40, 43, 48, 50, 68, 77, 87, 90, 110	59, 60	59, 60	59, 60	55, 65



Item	Part #	Description	QTY.
1	F98218600	Plug, 1/2"x14	3
2	F93197100	WASHER WITH SEAL	5
3	F36208701	BALL VALVE ASSY.	6
4	F36206666	INLET VALVE SEAT	3
5	F90527000	ANTI-EXTRUSION RING, Ø 51.5X56X1.5	3
6	F90410500	O-RING, Ø 50.47X2.62	6
8	F36208951	INTERNAL VALVE GUIDE	3
9	F94768900	SPRING, Ø 28.3X30.7	3
10	F36206005	VALVE GUIDE	6
11	F36715001	INLET VALVE UNIT	3
12	F74210551	VALVE GUIDE SPACER	3
13	F90358400	O-RING, Ø10.82X1.78	3
14	F98204600	PLUG, G 1/4"x13, SS	3
15	F73120556	MANIFOLD	1
16	F90527300	ANTI-EXTRUSION RING, Ø 61.4X67.2X1.5	3
17	F36206866	VALVE SEAT HOUSING	3
18	F90529000	ANTI-EXTRUSION RING, Ø 77.2X83X1.5	3
19	F90413400	OR, Ø 75.8X3.53	6
20	F90770000	SPRING, Ø 41.5X41.1	3
21	F36715201	OUTLET VALVE UNIT	3
22	F73215656	PLUG, OUTLET VALVE	3
23	F90529300	ANTI-EXTRUSION RING, Ø 77.5X83.2X1.5	3
24	F94800100	SPRING, Ø 75X49.6	3
25	F78213891	OUTLET VALVE SEAT RING	3
26	F99514700	SCREW, M16X55	8
27	F73212356	VALVE COVER	1
28	F99522200	SCREW, M6X180	8
29	F96710500	WASHER, Ø 10X18X0.9,SS, PTFE	3
30	F99383000	SCREW, M10X140	3
	F73040309	PLUNGER, Ø 45X117	3
31	F73040409	PLUNGER, Ø 50X117	3
	F73040509	PLUNGER, Ø 55X117	3
	F90390300	OR, Ø 60X2.62, MW45NRA	6
32	F90391300	OR, Ø 69.52X2.62	6
33	F90382500	OR, Ø 10.78X2.62	6
	F73100956	HEAD PACKING RING, Ø 45	3
34	F73101056	HEAD PACKING RING, Ø 50	3
	F73101156	HEAD PACKING RING, Ø 55	3
35	F90371000	OR, Ø 81X2	6
36	F94777000	SPRING, Ø 61X35, MW45NRA	3
	F94773500	SPRING, Ø 54X38.5	3
	F73216256	SPRING RING, Ø 45	3
37	F73216356	SPRING RING, Ø 50	3
	F73216456	SPRING RING, Ø 55	3
	F73214482	SCRAPER, Ø 40	3
38	F73214582	SCRAPER, Ø 50	3
	F73214682	SCRAPER, Ø 55	3
	F90567500	PACKING, Ø 45	3
39	F90569500	PACKING, Ø 50	3
	F72065000	PACKING, Ø 55	3
	F90523500	ANTI-EXT. RING, Ø 45X58X2	3
40	F90524300	ANTI-EXT. RING, Ø 50X63X2	3
	F90526600	ANTI-EXT. RING, Ø 55X68X2	3
	F73216656	SUPPORT RING, Ø 45	3
41	F73216756	SUPPORT RING, Ø 50	3
	F73216856	SUPPORT RING, Ø 55	3
	F73217056	PACKING SUPPORT, Ø 45	3
42	F73217156	PACKING SUPPORT, Ø 50	3
	F73717256	PACKING SUPPORT, Ø 55	3
	F90284600	WASHER, Ø 45X56X5.5 L.P.	3
43	F90286000	WASHER, Ø 50X58X5.5 L.P.	3
	F90287000	WASHER, Ø 55X63X5.5 L.P.	3
44	F96735500	WASHER, Ø 16X65X1	3
45	F73150022	CLOSED INSPECTION COVER	1
46	F73050336	PLUNGER GUIDE ROD	3
47	F90414800	OR, Ø 202.8X3.53	2
48	F73150422	INSPECTION COVER	1
49	F73150122	OPEN INSPECTION COVER	1
50	F90168500	RAD. RING, Ø40X72X7/8.5	3
52	F73050443	PLUNGER GUIDE	3
	F73050543	PLUNGER GUIDE +0.10	3

Item	Part #	Description	QTY.
53	F73210674	LIFTING BRACKET	2
54	F99513100	SCREW, M16x30, UNI 5931	4
55	F73030101	CONNECTING ROD ASSY.	3
56	F99378800	CONNECTING ROD SCREW, M10X1.5X80	6
	F90928000	BABBITT BUSHING, LOWER	3
58	F90928400	BABBITT BUSHING, LOWER, +0.25	3
	F90928500	BABBITT BUSHING, LOWER, +0.50	3
	F90928300	BABBITT BUSHING, UPPER	3
59	F90928100	BABBITT BUSHING, UPPER, +0.25	3
	F90928200	BABBITT BUSHING, UPPER, +0.50	3
60	F90915800	CONROD HEAD FOOT	3
61	F90069000	STOP RING, Ø 32 UNI 7437	6
62	F97744000	SPINDLE	3
63	F99183800	SCREW, M6X14, UNI 5931	4
64	F73200064	FOOT	2
65	F98206000	HOLE PLUG, Ø 15	6
66	F98233500	OIL FILLING PLUG, G1", WITH ROD	1
67	F90361600	OR, 34.65X1.78	1
68	F73210295	TUBE FOR OIL FILLING PLUG, G 1"	1
69	F91854000	CY. ROLLER BEARING	1
	F10076735	PINION, Z24 R1.875, HELICOL	1
	F10076835	PINION, Z21 R2.238, HELICOL	1
	F10076935	PINION, Z18 R2.722, HELICOL	1
	F10082255	PINION, Z19 R3.211, HELICOL	1
71	F97623000	TMP. CYL. PIN, Ø 10X24	2
72	F90101000	STOP RING, Ø 120	1
73	F91859900	ADJUST. ROLLER BEARING	1
74	F73210455	BEARING SUPPORT RING	1
75	F90081000	STOP RING, Ø 55	1
76	F90172400	RAD. RING, Ø 55X75X8, VITON	1
77	F91500500	TAB, 14X9X60, UNI 6604	1
78	F73210589	RING GEAR SUPPORT RING	1
79	F99366700	SCREW, M10X25, UNI 5739	2
80	F91511000	KEY, 22X14X80 UNI 6604	1
81	F74213255	RING GEAR STOP	1
82	F73020035	CRANKSHAFT C. 70	1
	F10077035	RING GEAR, Z45 R1.875, HELICAL	1
	F10077135	RING GEAR, Z47 R2.238, HELICAL	1
	F10077235	RING GEAR, Z49 R2.722, HELICAL	1
	F10082355	RING GEAR, Z61 R3.211, HELICAL	1
84	F99371100	SCREW, M10X40, UNI 5931	15
85	F73210113	REDUCTION GEAR COVER	1
86	F90415000	OR, Ø 253.6X3.53	2
87	F73210013	REDUCTION GEAR BOX	1
88	F91881000	CY. ROLLER BEARING	2
89	F73210384	SIDE SEAL	2
90	F73010013	PUMP CASING	1
91	F73160022	CASING COVER	1
92	F99368500	SCREW, M10X30, UNI 5931	14
93	F73150222	BEARING COVER	1
94	F98218100	PLUG, G1/2"x10, NICKEL	2
106	F99194300	SCREW, N6X40	2
107	F98217300	PLUG, G 1/2"	1
108	F96338000	FITTING, G 1/2"	1
109	F73224184	REAR GASKET	1
<b>WITH HYDRAULIC MOTOR</b>			
	F10079455	PINION, Z18, R 2.722, HELICOL	1
95	F10077355	PINION, Z24, R1.875, HELICOL	1
	F10077455	PINION, Z21, R2.238, HELICOL	1
96	F73215513	GEAR BOX COVER	1
102	F90206500	PLUG, Ø 17	1
103	F73224271	RING, Ø 54	1
104	F70227034	SCREW, M6X12	1
105	F92202500	NUT, M6X5	1
<b>DIRECT DRIVE</b>			
92	F99368500	SCREW, M10X30	8
97	F73150322	OPEN BEARING COVER	1
98	F90391450	OR, Ø 78.87X2.62	1
99	F73215654	RING FOR DIRECT DRIVE	1
100	F90195000	RING, RAD, Ø 90X110X12, VITON	1
<b>WITH AUXILIARY P.T.O.</b>			
51	F99367100	SCREW, M10X25, UNI 5931	6
92	F99368500	SCREW, M10X30	8
97	F73150322	OPEN BEARING COVER	1
98	F90391450	OR, Ø 78.87X2.62	1
100	F90195000	RING, RAD, Ø 90X110X12, VITON	1
101	F73215754	P.T.O. OUTLET	1

**REPAIR KITS**

KIT NUMBER	F2163 (MWNR45) Plunger Pack.	F2164 (MWNR50) Plunger Pack.	F2165 (MWNR55) Plunger Pack.	F2048 Valves	F2167 (MWNR45) Complete Seals Kit	F2168 (MWNR50) Complete Seals	F2169 (MWNR55) Complete Seals	F2150 Con Rod	F2151 Con Rod +0.25	F2153 Con Rod +0.50	F2152 Mounting Feet
Positions Included	32, 33, 35, 38, 39, 40 43	32, 33, 35, 38, 39, 40 43	32, 33, 35, 38, 39, 40 43	5, 6, 11, 12, 21, 23	5, 6, 13, 16, 18, 19, 23, 29, 32, 33, 35, 38, 39, 40, 43, 47, 49, 67, 76, 86, 89, 109	5, 6, 13, 16, 18, 19, 23, 29, 32, 33, 35, 38, 39, 40, 43, 47, 49, 67, 76, 86, 89, 109	5, 6, 13, 16, 18, 19, 23, 29, 32, 33, 35, 38, 39, 40, 43, 47, 49, 67, 76, 86, 89, 109	58, 59	58, 59	58, 59	54, 64

**17.4 MWF PUMP****17.4.1 Operating instructions**

The MWF pump has been designed to operate in environments with atmospheres that are not potentially explosive it is ideal for pumping aggressive, poorly lubricating or abrasive fluids. Other fluids can be used only upon formal approval by the Customer Service Department.

**17.4.2 Water temperature**

The maximum permissible water temperature is 140° F (60° C).

**17.4.3 Maximum pressure and flow rate**

The rated specifications stated in our catalog are the maximum that can be obtained by the pump. Independently of the power used, the maximum pressure and RPM indicated on the specification label can never be exceeded unless upon prior formal authorization by our Customer Service Department.

**17.4.4 Maximum RPM**

Any rotating speed other than that indicated in the performance table (see 17.3.5) must be expressly authorized by our Customer Service Department.

**17.4.5 Technical characteristics**

For the technical characteristics of MWF36A and MWF40A, refer to table 5 for MW pumps (page 7).

**17.4.6 Dimensions and weight**

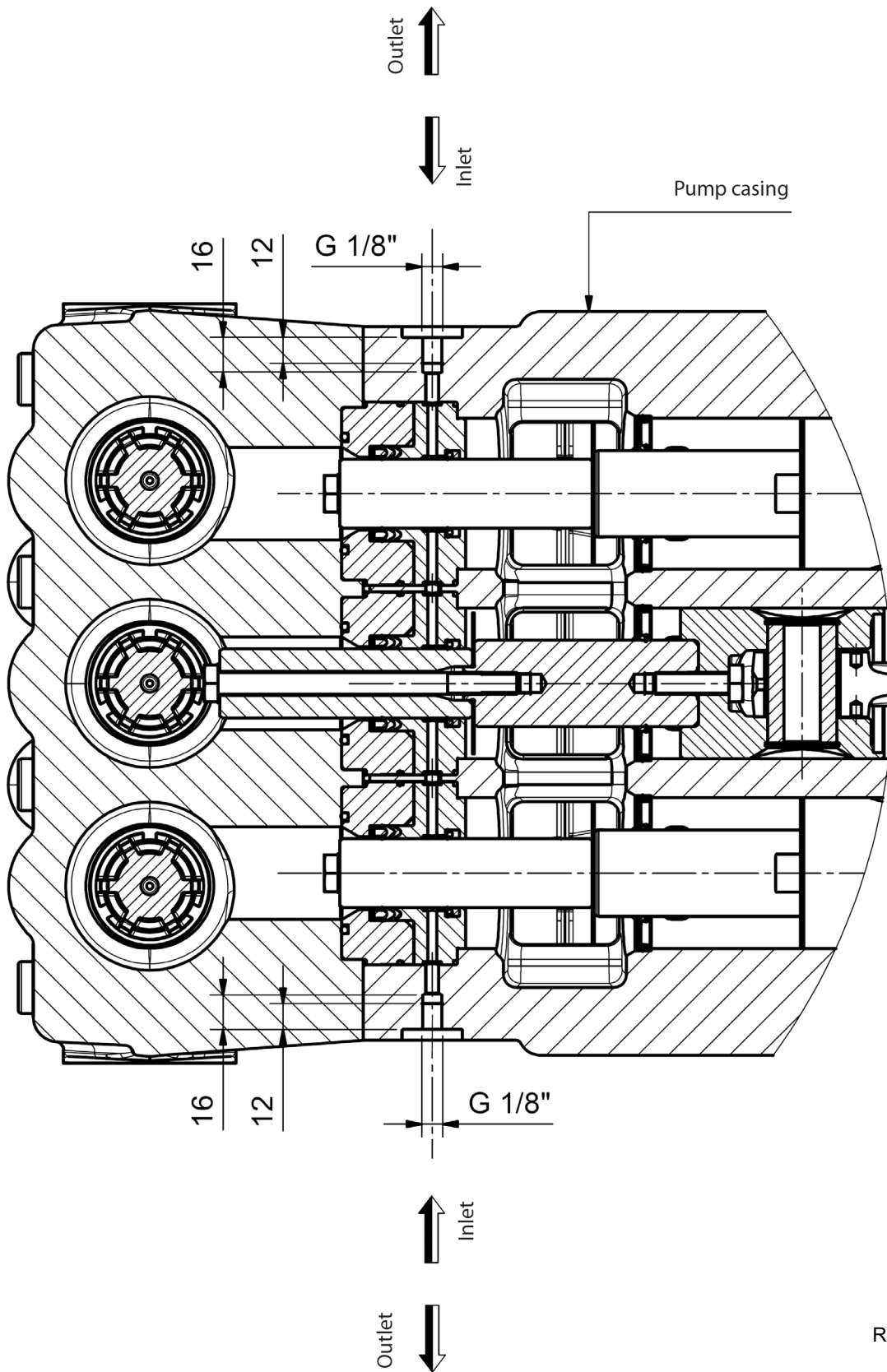
For the dimensions and weight of the MWF36A and MWF40A pumps, refer to the diagram of the MW pump, fig. 2 (page 8).

**17.4.7 Minimum rotating speed**

For the exploded drawing and list of spare parts for the MWF36A and MWF40A pumps, refer to the exploded view of the MW pumps on pages 22 and 23.

**17.4.8. FLUSHING DIAGRAM**

Adhere to the following values for proper system operation: minimum circuit flow rate is 2 GPM (8 l/m), maximum fluid pressure is 87 PSI (6 bar).



**18. REPAIR TOOLS**

Pump maintenance may be carried out using simple tools for assembling and disassembling components. The following tools are available:

<b>KIT</b>	<b>For Assembly:</b>	
	• Shaft (con-rod interlocking) . . . . .	F27566200
	• Bearing on crankshaft . . . . .	F27604700
	• Pinion bearing on reduction gear box . . . . .	F27604900
	• Crankshaft bearing on the reduction gear box. . . . .	F27605000
	• Crankshaft bearing on the bearing cover. . . . .	F27605000
B	• Oil seal insertion tool, MW/S . . . . .	F27605300
B	• Oil seal insertion cone, MW/S . . . . .	F27634400
	• Bearing on pinion . . . . .	F27604800
	• Pinion seal ring. . . . .	F27634900 plus F27635000
D	• Outlet valve housing O-ring MW32A, MWS36A, MWS40A. . . . .	F27516000
<b>KIT</b>	<b>For Disassembly:</b>	
B	• Oil seal extraction tool . . . . .	F27644300
B	• Bolt for oil seal extraction tool . . . . .	99366900
	• Shaft (con-rod interlocking) . . . . .	F27566200
D	• Outlet and suction valve units . . . . .	F27516400
D	• Suction valve housing MW32A, MWS36A, MWS40A . . . . .	F27516200
C	• Cylinder removal tool w/handle, MW/S series . . . . .	F27632500
A	• Slide hammer, MW/S valve tool. . . . .	F26019400
A	• 8mm x 10mm adapter, MW/S slide hammer . . . . .	F27513600
A	• 32mm collett for MW/S discharge seat . . . . .	520339
A	• 42mm collett for MW/S inlet valve seat . . . . .	520340

**RECOMMENDED REPAIR KITS**

**FKITMWV - MWS45A, MWS50A, MWS55A Valve removal / Installation Tool Kit A**

Includes:	F26019400	Slide Hammer	Qty. 1
	F27513600	10mm Adapter	Qty. 1
	520339	32mm Collet	Qty. 1
	520340	42mm Collet	Qty. 1
	520426	Valve Cage Adapter	Qty. 1

**FKITMWP - Piston Oil Seal Removal / Installation Tool Kit B**

Includes:	F27605300	Insertion Tool	Qty. 1
	F27634400	Insertion Cone	Qty. 1
	F27644300	Extraction Tool	Qty. 1
	99366900	Extraction Tool Bolt	Qty. 1
	F27540200	Alignment Pins	Qty. 2

**F27632500 - Cylinder Removal Tool with Handle - MW - Tool Kit C**

Includes:	F27632500	Spacer with Handle	Qty. 1
-----------	-----------	--------------------	--------

**530078 - Splined Dummy Shaft Tool, 14 TPI** Qty. 1

**FKITMKVHP - MW32A, MWS36A, MWS40A Valve removal / Installation Tool Kit D**

Includes:	F27516000	Outlet valve housing O-ring	Qty. 1
	F27516400	Outlet and suction valve units	Qty. 1
	27516200	Suction valve housing	Qty. 1
	520426	Valve Cage Adapter	Qty. 1

**19. MAINTENANCE LOG**

**HOURS & DATE**

<b>OIL CHANGE</b>							
<b>GREASE</b>							
<b>PACKING REPLACEMENT</b>							
<b>PLUNGER REPLACEMENT</b>							
<b>VALVE REPLACEMENT</b>							



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

Ref 300790 Rev. P  
04-24