COMET
INDUSTRIAL PUMPS DIVISION

HIGH PRESSURE PUMPS

Hurco Shorelock Pump Model:

LWD 3020 6303.0508.00

ENGLISH **EN**

ASSEMBLY, OPERATION AND MAINTENANCE INSTRUCTIONS

WARNING.

Read the instructions before using and assembling.

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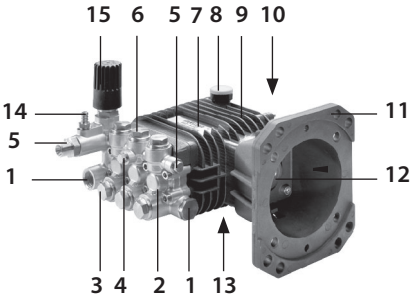
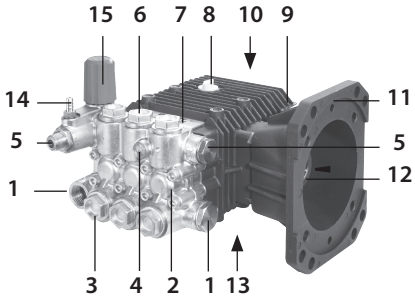


BW - AW



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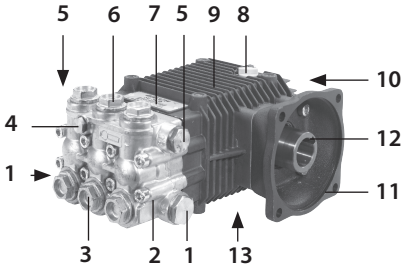

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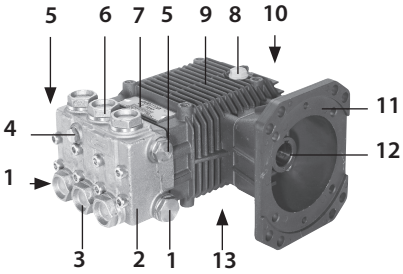

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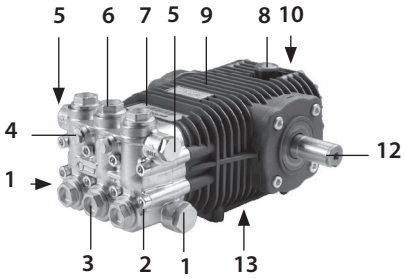

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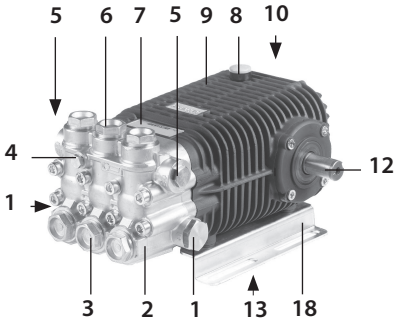
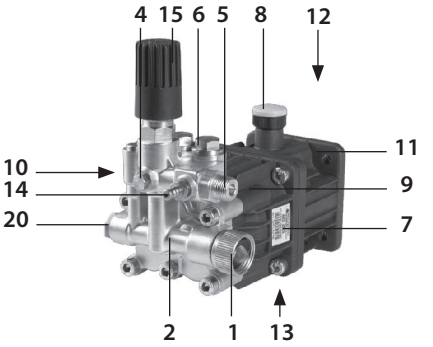


TW - SW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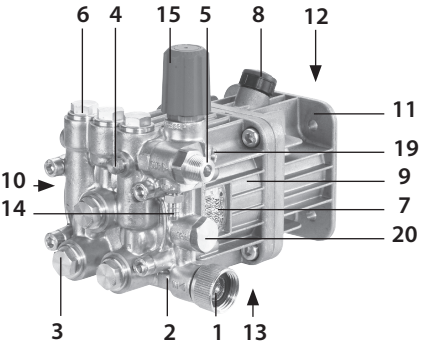
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AX

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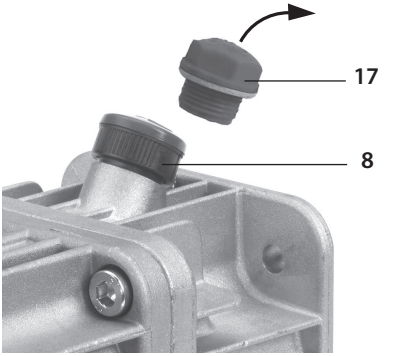
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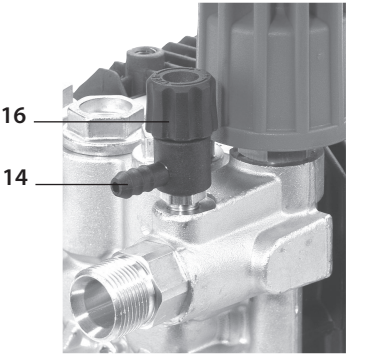
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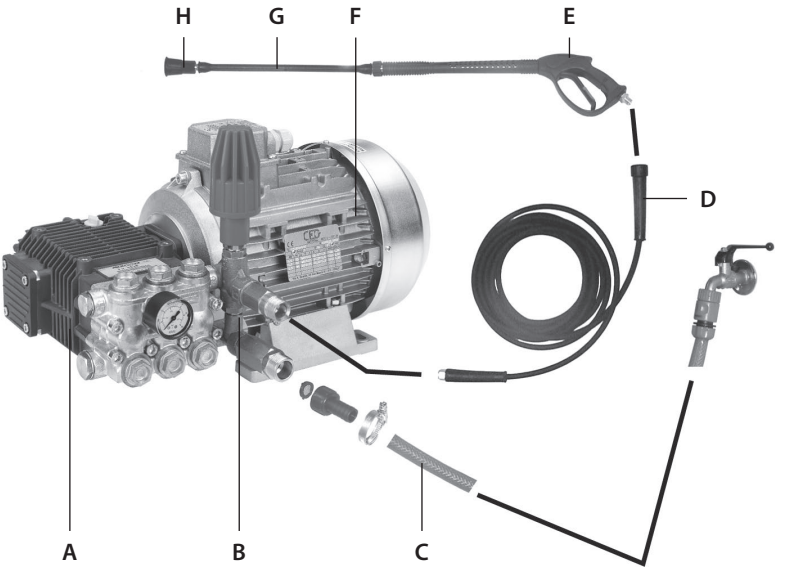
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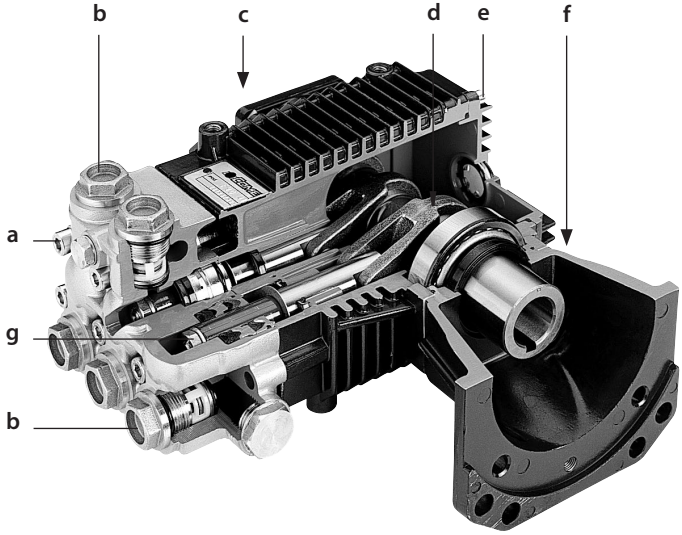
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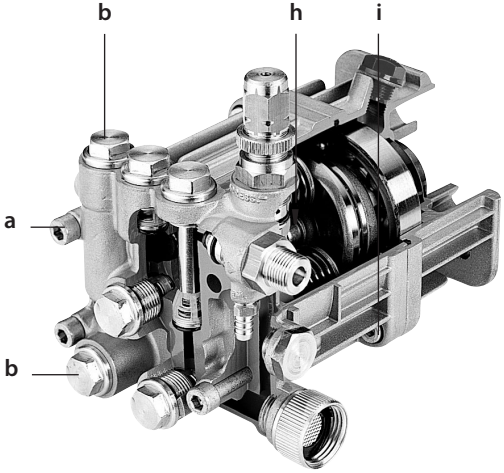
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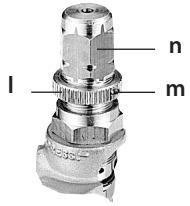
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FOREWORD

This manual consists of two distinct parts.
The first is intended for both the end user and the **Skilled Technician** and contains the pump operation and maintenance instructions; the second is dedicated to the **Skilled Technician** only and provides instructions for the correct integration of the pump in the end machine and for special maintenance.
By **Skilled Technician** is meant:

- the Manufacturer of the machine (e.g., high pressure cleaner) in which the pump is integrated (from now on, when reference is made to "machine in which the pump is integrated", this may also refer to "system in which the pump is integrated", such as, for example, in the case of a pumping station);
- a person, normally belonging to the after-sales centre, specifically trained and authorised to perform special maintenance jobs and repairs on the pump and on the machine in which this is integrated. It should be remembered that jobs on the electrical parts must be performed by a **Skilled Technician** who is also a **Professional Electrician**, meaning a person professionally qualified and trained to check, install and repair electrical apparatus in a "workmanlike" manner and in accordance with the laws applicable in the country where the machine integrating the pump is installed.

PART ONE

GENERAL INFORMATION

Carefully read this manual and the manual of the machine in which the pump is integrated: **always carefully comply with the instructions contained in them.**
Special care must be given to reading the parts of the text marked by the symbol:

⚠ **WARNING**

inasmuch as these contain important safety instructions concerning pump operation.
The Manufacturer disclaims all liability relating to damage caused by:

- failure to abide by the contents of this manual and the manual of the machine in which the pump is integrated;
- the pump being used in ways other than those indicated in the **"INTENDED USE"** paragraph;
- the pump being used in ways contrary to applicable laws on safety and prevention of work accidents;
- tampering with the safety devices and with max operating pressure limitation;
- incorrect assembly and installation;
- incorrect maintenance;
- changes made or jobs done on the pump without the permission of the Manufacturer;
- use of non-original spare parts or which are not suitable for the pump model;
- repairs not performed by a **Skilled Technician**.

USING AND LOOKING AFTER THE MANUAL

⚠ **WARNING**

- *This manual completes that of the machine in which the pump is integrated:* ***read all the manuals carefully.***

The manual must be deemed an integral part of the pump and must be looked after for future reference and kept in a protected place where it can easily be referred to in case of need.

The manual contains safety precautions for the operator and those surrounding him/her and for the protection of the environment.
In case of deterioration or loss, a new copy must be requested from the Manufacturer or from a **Skilled Technician**.
In the event of the machine in which the pump is integrated being transferred to another user, please also include this manual.
The Manufacturer reserves the right to make all the amendments required to update and correct this publication without prior notice.

SYMBOLS

The symbol:

⚠ WARNING

marking certain parts of the text indicates a likely chance of injury to persons unless the relative prescriptions and indications are followed.
The symbol:

CAUTION

marking certain parts of the text indicates the possibility of damaging the pump unless the relative instructions are followed.

SPECIFICATIONS AND TECHNICAL DATA

The first two letters of the pump model code (LW, FW, ZW, etc.) allow identifying the specific model (an exception is represented by the second series of FW pumps, which is indicated by FW2).

		AX	BX	BW	AW	LW	ZW
MECHANICAL CONNECTION							
Max power input (1)	*kW* *CV*	0,3÷6,3 0,4÷8,6	0,54÷4,2 0,7÷5,7	2,0÷4,3 2,7÷5,8	4,7÷7,5 6,4÷10,2	0,2÷4,0 0,3÷5,4	3,7÷8,2 5,0÷11,1
Max rotation speed		See following table					
PUMP OIL		AGIP ROTRA MULTI THT (2)					
Quantity in weight	*kg - lb*	0,16 - 0,35	0,10 - 0,22	0,25 - 0,55	0,25 - 0,55	0,28 - 0,62	0,36 - 0,79
Quantity in volume	*l - USgal*	0,18 - 0,05	0,11 - 0,03	0,28 - 0,07	0,28 - 0,07	0,32 - 0,08	0,41 - 0,11
HYDRAULIC CONNECTION							
Max water temperature (3)	*°C - °F*	60 - 140					
Min water temperature	*°C - °F*	5 - 41					
Max water pressure	*bar - psi*	8 - 116					
Max priming depth	*m - ft*	1 - 3,3 (1000, 1450 and 1750 RPM) 0,5 - 1,7 (2800 and 3400 RPM)					
Min water flow rate		1,3 x max flow rate					
PERFORMANCE - WEIGHT							
Max flow rate		See following table					
Max pressure		See following table					
Max level of sound pressure - uncertainty		79 dB(A) 1 dB(A)					
Max weight	*kg - lb*	6,0 - 13,2	4,7 - 10,3	6,0 - 13,2	6,5 - 14,3	7,2 - 15,9	7,9 - 17,5

		FW	FW2	HW	RW	SW	TW
MECHANICAL CONNECTION							
Max power input [1]	*kW* *CV*	3,7÷7,7 5,0÷10,5	4,0÷10,5 5,4÷14,2	7,1÷11,5 9,7÷15,6	4,4÷11,6 6,0÷15,8	5,5÷7,5 10,8÷14,5	7,5÷20,5 10,2÷27,9
Max rotation speed		See following table					
PUMP OIL		AGIP ROTRA MULTI THT [2]					
Quantity in weight	*kg - lb*	0,50 - 1,1	0,50 - 1,1	0,50 - 1,1	0,70 - 1,5	0,97 - 2,1	0,97 - 2,1
Quantity in volume	*l - USgal*	0,56 - 0,15	0,56 - 0,15	0,56 - 0,15	0,79 - 0,21	1,1 - 0,28	1,1 - 0,28
HYDRAULIC CONNECTION							
Max water temperature [3]	*°C - °F*	60 - 140					
Min water temperature	*°C - °F*	5 - 41					
Max water pressure	*bar - psi*	8 - 116					
Max priming depth	*m - ft*	1 - 3,3 (1000, 1450 and 1750 RPM) 0,5 - 1,7 (2800 and 3400 RPM)					
Min water flow rate		1,3 x max flow rate					
PERFORMANCE - WEIGHT							
Max flow rate		See following table					
Max pressure		See following table					
Max level of sound pressure - uncertainty		79 dB(A) 1 dB(A)					
Max weight	*kg - lb*	9,2 - 20,2	9,2 - 20,2	10,0 - 22,0	11,2 - 24,7	18,0 - 40,0	20,0 - 44,0

Specifications and details are approximate. The Manufacturer reserves the right to make all changes to the appliance deemed necessary.

[1] Depending on specific model.

[2] Corresponding oils:

U.T.T.O. (Universal Tractor Trasmission Oil)	API GL-4	John Deere J20A
Massey-Ferguson M-1135	Ford M2C - 86 B	Esso Torque Fluid 62
Mobil Mobilfluid 422	Ford M2C - 134 B/C	Shell Donax TD

[3] On request, models are available able to operate with water at a temperature of 85 °C/185 °F..

The third letter allows determining the top rotation speed, according to the following table:

Third letter	RPM
N	1000
Absent	1450
S	1750
R	2800
D	3400

For example: TWN 5636 (1000 RPM), LW 2020 (1450 RPM), HWD 4040 (3400 RPM).
A K, preceded by a dash (LW-K, ZW-K), means the pump features a built-in pressure unloader/regulation valve (e.g.: LWR-K 2020, ZW-K 4022). This rule does not apply to the AX and BX models because these already feature built-in pressure unloader/regulation valves.
The model code numbers allow determining max flow rate and pressure.
By means of the first two figures (if the number consists of four figures) or by means of the first three figures (if the number consists of five figures) the max flow rate can be determined according to the following table:

Max flow rate in l/min = first two (or three) figures x 0.378
Max flow rate in USgpm = first two (or three) figures : 10

E.g.: TW 10522 (105 x 0.378 = 39.7 l/min), LW 2015 (20 : 10 = 2 USgpm).
By means of the last two figures, the maximum pressure can be determined according to the following table:

Max pressure in bar = last two figures x 6.9
Max pressure in psi = last two figures x 100

E.g.: TW 10522 (22 x 6.9 = 151.8 bar), LW 2015 (15 x 100 = 1500 psi).
NOTE: in the case of FW2, the "2" must be excluded from what is before which identifies the second series of FW pumps.

IDENTIFICATION OF COMPONENTS

Refer to Figures from 1 to 3 at the beginning of the manual.

1. **Suction fitting**
2. **Pump head**
3. **Suction valve cap**
4. **Pressure gauge fitting**
5. **Delivery fitting**
6. **Delivery valve cap**
7. **Identification plate**
8. **Oil cap with vent**
9. **Pump crankcase**
10. **Oil level indicator**
11. **Motor flange support**
12. **Pump shaft**
13. **Oil drain cap**
14. **Detergent suction fitting**
15. **Pressure adjustment knob**
16. **Detergent adjustment knob**
17. **Oil cap without vent**
18. **Pump foot**
19. **Safety valve connector**
20. **Thermal valve connector**

PUMP IDENTIFICATION PLATE

WARNING

- *Should the identification plate deteriorate during use, contact the Manufacturer or a **Skilled Technician** to have it restored.*

The identification plate (7) shows the serial number and the pump model by means of a specific code which permits identifying the main technical specifications (see **"SPECIFICATIONS AND TECHNICAL DATA"** paragraph). It is located on the pump crankcase.

SAFETY DEVICES

WARNING

- *The machine in which the pump is integrated must always feature a pressure unloader/regulation valve.*
- *If the machine in which the pump is integrated also features a safety valve, i.e., a max. pressure valve, suitably calibrated, which discharges excess pressure in case of a fault in the high-pressure circuit, in the event of the safety valve tripping frequently, immediately stop using the machine in which the pump is integrated and have it checked by a **Skilled Technician**.*

Pressure unloader/regulation valve.
Standard on pumps marked with the letter K preceded by a dash and on the AX and BX series pumps. Available as an optional accessory for the other models.
This valve is suitably set by the Manufacturer, allows regulating the operating pressure and permits the pumped fluid to flow back towards the bypass duct, thus preventing the accumulation of dangerous pressures when the delivery line is closed or when attempts are made to set pressure values above the maximum ones allowed.

⚠ WARNING

- *The pressure unloader/regulation valve is set either by the pump Manufacturer or by that of the machine in which the pump is integrated.* ***Never try and adjust the pressure unloader/regulation valve to alter its setting: only adjust this by means of the knob (15).***

INTENDED USE

⚠ WARNING

- ***The pump must not be run by itself. It is only meant to be integrated in a machine.***
- *The pump must only be integrated in machines used for the following purposes:*
  - *pumping of water at high pressure in washing machines (high pressure cleaners);*
  - *pumping water for non-edible use.*
- *The pump must not be integrated in machines for pumping:*
  - *unfiltered water or with impurities;*
  - *detergents, paints and chemical substances, both pure and in aqueous solution;*
  - *seawater or water with high salt concentration;*
  - *fuels and lubricants of all kinds and types;*
  - *inflammable liquids or liquefied gases;*
  - *edible liquids;*
  - *solvents and thinners of all kinds and types;*
  - *water with temperatures above 60 °C/140 °F or below 5 °C/41 °F;*
  - *liquids containing granules or solid parts in suspension.*
- *The pump must not be integrated in machines designed to wash: people, animals, energized electrical apparatus, delicate objects, the pump itself or the machine in which it is integrated.*
- *The pump is not suitable for being integrated in machines designed to operate in environments with special conditions such as, for example, corrosive or explosive atmospheres.*
- *For integration in machines designed to operate on board vehicles, ships or planes, contact the Manufacturer's Technical After-Sales Service, inasmuch as additional requirements may be necessary.*

  All other uses are to be deemed incorrect.

  The Manufacturer disclaims all liability for any damage deriving from incorrect or erroneous uses.

PRELIMINARY ACTIVITIES

⚠ WARNING

- ***The pump cannot be operated unless the machine in which it is integrated conforms to the safety requirements laid down by European directives. Such conformity is indicated by CE markings and by the declaration of conformity of the Manufacturer of the machine in which the pump is integrated.***
- *Before starting the pump, carefully read the instructions in this manual and in the manual of the machine in which the pump is integrated. In particular, make sure you have correctly understood how the pump and the machine in which it is integrated work as regards liquid on/off operations.*
- *Perform the preliminary operations indicated by the Manufacturer of the machine in which the pump is integrated.*
- *Make sure all deliveries are off or connected to accessories that have been turned off (e.g., closed spray gun).*
- *Make sure that the moving parts of the pump are suitably protected and that they are not accessible to unauthorised persons.*
- *Do not use the pump (and therefore the machine in which it is integrated) in the event of:*
  - *the safety devices being damaged;*
  - *its having suffered heavy knocks;*
  - *evident oil leaks;*
  - *evident leaks of pumped liquid.*

  In such cases, have the pump and the machine in which it is integrated checked by a ***Skilled Technician****.*
- *Have a* ***Skilled Technician*** *perform the inspections required by special maintenance.*

- *Wear clothing and personal protective equipment able to provide adequate protection from any high-pressure jets and chemical products used.*

CAUTION

- In case of operation at very low temperatures, make sure there is no ice inside the pump and pipes.
- Perform the checks required by routine maintenance, with special reference to those relating to the oil.

Carry out the preliminary activities indicated in the manual of the machine in which the pump is integrated; unless otherwise indicated, with respect to the pump, always remember the following.

a) Replace the oil cap without vent (17) with the oil cap with vent (8) (see Fig. 3). This operation could already have been performed by the Manufacturer of the machine in which the pump is integrated.

b) With the pump off and completely cooled down, make sure the oil level is at mid-point of the oil level indicator (10). The oil level can also be checked (except for AX and BX models) by unscrewing the cap with vent (8): the correct level is between the two notches shown on the dipstick.
For any touch ups, refer to the types of lubricants indicated in the paragraph **"SPECIFICATIONS AND TECHNICAL DATA"**.

c) Refer to the operation and maintenance manual of the machine in which the pump is integrated and make sure the suction filter is clean.

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CHECKING AND CONNECTING UP TO WATER MAINS

⚠ WARNING

- ***Also follow the instructions contained in the manual of the machine in which the pump is integrated.***
- *Follow the water mains connection instructions applicable in the country where the machine in which the pump is integrated is installed.*

CAUTION

- Follow the water mains connection instructions shown in the **"SPECIFICATIONS AND TECHNICAL DATA"** paragraph, with special reference to the priming depth and supply pressure and temperature: in case of any doubts, contact a **Skilled Technician**.
- The suction of pump must always be equipped with a suitably-sized filter: frequently make sure this is clean.
- Never operate the pump:
  - without water supply;
  - with salt water or water containing impurities: if this occurs, have it operate for a few minutes with clean water.

STANDARD OPERATION (HIGH PRESSURE)

⚠ WARNING

- ***Also follow the instructions contained in the manual of the machine in which the pump is integrated with special reference to the parts relating to the safety precautions, any use of personal protective equipment (protective eyewear, ear muffs, etc.) and handling.***
- *Before starting up the machine in which the pump is integrated, carefully read the machine's manual and this manual. In particular, make sure you have fully understood how the pump and the machine in which it is integrated work as regards liquid on/off operations.*
- *The pump and the machine in which it is integrated are not intended to be used by people (including children) with reduced physical, sensorial or mental capacities, or who lack the experience and expertise, unless they are able to benefit, through the intermediation of a person responsible for their safety, from supervision or instructions concerning the use of the pump and of the machine in which it is integrated.*
- *Children must be supervised to make sure they do not play with the pump and with the machine in which it is integrated.*
- *Special care must be taken when using the pump in environments where there are moving vehicles which could crush or damage any: delivery pipe, spray gun and nozzle.*

- *Before using the pump, put on individual protective gear and devices to ensure adequate protection from wrong manoeuvres with the jet of fluid under pressure.*
- ***WARNING**. Do not use the pump or the machine in which it is integrated near people if these are not wearing personal protective equipment.*
- ***WARNING**. Do not direct high-pressure jets against yourself or other people to clean clothes or footwear.*
- ***WARNING**. High-pressure jets can be hazardous if incorrectly used. High-pressure jets must not be directed against people, energized electrical appliances or the pump itself or the machine in which it is integrated.*
- *Never run the machine in which the pump is integrated in closed premises, if this is driven by an internal combustion engine.*
- ***WARNING**. Explosion risk - Do not spray inflammable liquids.*
- *Read the **"OPERATION WITH DETERGENT"** paragraph carefully.*
- *Keep clear of moving parts of the pump and of the machine in which it is integrated, even if these are adequately protected.*
- *Do not remove the guards of the moving parts.*
- *Do not touch pipes containing liquids under pressure.*
- *Do not perform maintenance operations on the pump and on the machine in which it is integrated if this is operating.*
- *Read the **"INTENDED USE"** paragraph carefully.*
- *Do not modify in any way the installation conditions of the pump. In particular, do not modify the fastening, the hydraulic connections and the guards.*
- *Do not open any taps on the pump unless these are connected to an accessory that prevents the accidental escape of the pumped liquid.*
- *Do not deactivate or tamper with the controls and the safety devices and the pressure unloader/regulation valve.*
- *The connection of the machine in which the pump is integrated to the power mains must be made by a Professional Electrician in accordance with the regulations applicable in the country of use.*
  During operation:
  - *always keep an eye on the pump and the machine in which it is integrated and out of the reach of children; in particular, be very careful when using near nurseries, clinics and old-people's homes, in case of children, elderly people or disabled people without supervision;*
  - *do not direct high-pressure jets against materials containing asbestos or other substances harmful for the health;*
  - *do not cover the pump and the machine in which it is integrated and do not place them where ventilation is prevented (remember this above all when using the machine in closed environments);*
  - *grip any spray gun tightly because when the lever is operated a reaction force of the high-pressure jet is produced;*
  - *when not in operation and before doing any jobs, perform the operations described in the **"STOP"** paragraph;*
  - *operating pressure must never exceed the maximum value set for the pump (see also **"SPECIFICATIONS AND TECHNICAL DATA"** paragraph);*
  - *use adequate personal protective equipment to safeguard against noise emissions (e.g., ear muffs).*

Perform the steps relating to the high-pressure operation indicated in the manual relating to the machine in which the pump is integrated; unless otherwise indicated, in relation to the pump, the following should be remembered.

a) To allow pump priming, reset the delivery pressure, and open one of the accessories. In the case of a high-pressure cleaner, for example, simply keep the spray gun lever pressed.

b) Start the pump.

c) If the possibility exists of adjusting the delivery pressure, set the required pressure. In the case of models with built-in regulation valve (pumps marked by K preceded by a dash and series AX and BX), pressure adjustment can be achieved by means of the knob (15): when this is turned clockwise, pressure increases, when turned anticlockwise, pressure is reduced.

⚠ WARNING

- ***Never touch the pressure unloader/regulation valve so as not to alter its setting: only adjust this valve by means of the knob (15).***

CAUTION

- To permit fast pump priming, proceed as indicated at point a) every time the pump has to be primed again.
- During the first hours of operation, it is best to check the oil level and, if necessary, top up the level, following the instructions in the **"PRELIMINARY ACTIVITIES"** paragraph.
- In the case of models with built-in regulation valve (pumps marked by K preceded by a dash and series AX and BX) and of all those applications where the pressure unloader/regulation valve bypass is connected to pump suction, do not keep the delivery line closed for more than five minutes (e.g., with spray gun closed), so as to prevent the water recirculating in the head from overheating with consequent seal damage.
- Do not operate the pump if it is too noisy and/or water or oil is dripping from it: in this case have it checked by a **Skilled Technician**.

OPERATION WITH DETERGENT

EN

⚠ WARNING

- ***Follow the instructions contained in the manual of the machine in which the pump is integrated.***
- *The pump has been designed to be used with the detergents recommended by the Manufacturer. The use of different detergents or chemical products could cause safety problems. In particular, never suck up liquids containing solvents, petrol, thinners, acetone and fuel oils, because the nebulized product is highly inflammable, explosive and toxic.*
- *Carefully read the instructions and safety precautions on the detergent packs, so as to be able to implement the necessary measures in case of hazards threatening individuals and the environment. In particular, never exceed the maximum recommended concentrations and only prepare the quantity of product needed to prevent it spreading on the ground and in waters.*
- *Store the detergents in a safe place out of reach of children.*
- *In case of contact with the eyes, wash immediately with water. In case of ingestion, do not provoke vomiting: immediately contact a doctor and show him/her the detergent pack. Avoid inhaling any produced gases.*

The detergent suction option is standard only for a number of models of the LW, ZW, AX and BX series.
To learn how to use the detergent, refer to the detergent pack label, with special attention to doses.
Perform the steps relating to operation with detergent shown in the manual of the machine integrating the pump; unless otherwise indicated, in relation to the pump, the following should be remembered.

a) Reduce the pressure of the pump to below 30 bar/435 psi (e.g., in the case of a high pressure cleaner, by moving the nozzle head to low-pressure position).
b) If the detergent suction adjustment option is provided, adjust the knob (16): turn it clockwise to reduce the flow of detergent suctioned and anticlockwise to increase such flow.

CAUTION

- To prevent scale and/or deposits, after using with detergent, it is best to wash the flow ducts by sucking up some water.

STOPPING OPERATION

By closing the delivery line, the pump switches to bypass operation and remains in this condition until the delivery line is opened again.

CAUTION

- Never leave the pump in bypass for more than five minutes, and avoid the water re-circulating in the pump head from overheating, with consequent damage to seals.

STOPPING, CLEANING AND DECOMMISSIONING

⚠ WARNING

- ***Follow the instructions regarding stopping, cleaning and decommissioning contained in the manual of the machine in which the pump is integrated.***

STOPPING

⚠ WARNING

- *Always make sure that, once stop operations have been performed, no part of the pump and of the machine in which it is integrated is moving and no pipes contain liquid under pressure.*
  Always remember in particular, if present:
  - *to disconnect the power supply;*
  - *to disconnect the sparking plug contact (petrol motors), or remove the ignition key (diesel engines).*

Perform the stop operations contained in the manual of the machine in which the pump is integrated; unless otherwise indicated, in relation to the pump, remember the following.

a) Close the water supply.
b) Stop the machine in which the pump is integrated.
c) Reset the delivery pressure as described at a) of the **"STANDARD OPERATION (HIGH PRESSURE)"** paragraph.
d) Wait for the pump and the machine in which it is integrated to cool down.

⚠ WARNING

- *Once the pump and the machine in which it is integrated have cooled down, be careful:*
  - *not to leave them unattended in the presence of children, elderly people or disabled persons without supervision;*
  - *to arrange them in a stable position without any risk of falling;*
  - *not to put them in contact or in the immediate vicinity of inflammable materials.*

CLEANING AND DECOMMISSIONING

⚠ WARNING

- ***WARNING.*** *All cleaning jobs must only be performed after carrying out the operations described in the* ***"STOP"*** *paragraph, meaning* ***without any moving parts, no pipe full of liquid under pressure and only after complete cooling.***
  In particular, always remember to disconnect the power supply.
- *Any cleaning jobs must be performed in conditions of total stability.*
- *To clean, do not use thinners or solvents.*

CAUTION

- Refer to the manual of the machine in which the pump is integrated and after use, always empty out all the pumped liquid.
- **The pump must be protected against freezing.**
  In very cold environments, to prevent the ice from forming inside, before decommissioning, it is best to suction a car anti-freeze product (after contacting a Skilled Technician inasmuch as the liquid could damage the high-pressure pump seals) and then proceed to fully expel it. If it is not possible to protect the pump this way, before starting it, take it to a warm environment for long enough to melt any ice inside. Failure to do so could cause serious damage to the pump.

⚠ WARNING

- *The antifreeze liquid must be suitably disposed of and not discarded in the environment.*

NOTE: After a prolonged stop, slight water dripping could occur underneath the pump. Such dripping normally disappears after a few hours of operation. Should it persist, contact a **Skilled Technician**.

MAINTENANCE

⚠ WARNING

- ***Follow the maintenance instructions contained in the manual of the machine in which the pump is integrated.***
- *All maintenance jobs must only be performed after carrying out the operations described in the* ***"STOP"*** *paragraph, meaning* ***without any moving parts, no pipe full of liquid under pressure and only after complete cooling.***
  In particular, always remember to disconnect the power supply.
- *Any maintenance jobs must be performed in conditions of total stability.*
- ***WARNING.*** *To ensure the safety of the pump, only use original spare parts supplied by the Manufacturer or approved by it.*

EN

ROUTINE MAINTENANCE

Perform the routine maintenance jobs shown in the manual of the machine in which the pump is integrated; unless otherwise indicated, in relation to the pump, remember the following.

MAINTENANCE SCHEDULE	JOB
After every use	• Check oil level and conditions according to instructions in **"PRELIMINARY ACTIVITIES"** paragraph.
Every 50 hours	• Check the integrity of the suction circuit. • Check and if necessary clean the suction filter. • Check the fastening of the pump to the motor to which it is coupled and/or to the structure of the machine in which it is integrated. In the event of such fastening being precarious, do not use the machine and contact a **Skilled Technician** (1).

(1) Checks must be made more frequently if the pump operates where there are strong vibrations.

SPECIAL MAINTENANCE

⚠ WARNING

- *Special maintenance jobs must only be performed by a* ***Skilled Technician****.*
- *Used oil must be adequately disposed of and not discarded in the environment.*

Perform the routine maintenance jobs shown in the manual of the machine in which the pump is integrated; unless otherwise indicated, in relation to the pump, remember the following.

MAINTENANCE SCHEDULE	JOB
Every 500 hours (200 hours for series AX and BX).	• Check the suction/delivery valves. • Check the tightness of the pump screws (*). • Oil change (**). • Check the pressure unloader/regulation valve.

(*) Checks should be made more frequently if the pump operates where there are strong vibrations.
(**) The first oil change is best made after 50 hours.

CAUTION

- The data shown on the chart are approximate. More frequent jobs may be necessary in case of particularly heavy-duty use.

DISMANTLING AND DISPOSAL

Only qualified persons must be allowed to dismantle the pump and this operation must be performed in compliance with the laws applicable in the country where the machine in which it is integrated has been installed.

TROUBLESHOOTING

⚠ WARNING

- ***Also follow the instructions contained in the manual of the machine in which the pump is integrated.***
- *Before doing any jobs, perform the operations described in the* ***"STOP"*** *paragraph.*
  In the event of not being able to restore the correct operation of the pump with the aid of the information contained on the following table, contact a ***Skilled Technician****.*

PROBLEMS	CAUSES	REMEDIES
The pump does not prime.	Suction of air.	Check the integrity of the suction circuit.
	Delivery line closed (e.g., spray gun closed).	Reset the delivery pressure (e.g., press the spray gun lever).
	Suction circuit with choke points.	Check the suction circuit (especially make sure the suction filter is clean).
The pump fails to reach max pressure.	Pressure adjustment knob (15) not tightened enough.	Turn the knob clockwise until required pressure is achieved.
	Not enough water supply or priming too deep.	Make sure the water supply flow rate or priming depth is in compliance with the indications in the **"SPECIFICATIONS AND TECHNICAL DATA"** paragraph.
	Suction circuit with choke points.	Check the suction circuit (especially make sure the suction filter is clean).
	Unsuitable conditions of use (e.g., nozzle worn, lance in low-pressure position, etc.)	Restore the correct conditions of use.
Irregular pressure and flow rate (pulsating).	Air suction.	Check the integrity of the suction circuit.
	Suction filter dirty.	Clean the filter.
	Not enough water supply or priming too deep.	Make sure the water supply flow rate or priming depth is in compliance with the indications in the **"SPECIFICATIONS AND TECHNICAL DATA"** paragraph.
	The pump has not completed priming.	Prime the pump according to the indications of the **"STANDARD OPERATION (HIGH PRESSURE)"** paragraph.
	Accessory clogged (e.g. clogged nozzle).	Restore the correct use of the accessory.
Too much noise.	Suction circuit with choke points.	Check the suction circuit (especially make sure the suction filter is clean).
	Water supply temperature too high.	Keep to the temperatures indicated in the **"SPECIFICATIONS AND TECHNICAL DATA"** paragraph.
Low detergent suction.	Use of the accessory not in low-pressure mode (e.g., lance not in low-pressure position).	Restore the correct use of the accessory.
	Detergent metering device closed or set for low suction.	Turn the detergent adjustment knob (16) anticlockwise.
	Use of detergent which is too viscous.	Keep to uses and dilutions shown on detergent plate.

PART TWO

(for **Skilled Technicians only**)

WARNING

- *This part of the manual is dedicated to **Skilled Technicians** and is not intended for users of the machine in which the pump is integrated.*

UNPACKING

WARNING

- *During unpacking, always wear gloves and protective eyewear, to prevent injuring hands and eyes.*
- *Some pumps are heavy components (also refer to the **"SPECIFICATIONS AND TECHNICAL DATA"** paragraph) and these are therefore best unpacked by cutting away the bottom of the cardboard box.*
- *The packaging elements (plastic bags, staples, etc.) must not be left within reach of children as they represent potential hazard sources.*
- *Packaging components must be disposed of according to the regulations in force in the country where the machine in which the pump is integrated has been manufactured.*
  Plastic packaging must not be discarded in the environment.
- *After unpacking the pump, make sure no parts are missing and that all parts are in perfect condition, and that the identification plate is in place and legible.*
  *In case of any doubt, do not install the pump, but contact the Manufacturer or a **Skilled Technician**.*
- *This manual and the warranty certificate must always accompany the machine in which the pump is integrated and made available to the end user.*

EN

STANDARD FITTINGS

Make sure the purchased product consists of the following elements:

- pump;
- oil cap with vent (8);
- pump manual;
- declaration of incorporation;
- warranty certificate.

In case of problems, contact the Manufacturer or a **Skilled Technician**.

INSTALLATION

WARNING

- *The **Skilled Technician** must abide by the installation instructions contained in this manual, in particular, the specifications of the motor (electric or internal combustion), to be coupled to the pump must be in conformity with the constructive performance and specifications of the pump (power, rotation speed, flanging, etc.), as shown on the Manufacturer's technical documentation.*
- ***The machine in which the pump is integrated must be made in such a way as to ensure conformity with the safety requirements indicated in the European Directives. This fact is guaranteed by CE markings and by the Declaration of Conformity of the Manufacturer of the machine in which the pump is integrated.***
- *The pump must be installed and allowed to operate horizontally (for any exceptions in merit, contact the Manufacturer).*
- *The pump must be stably fastened.*
- *Being of the positive-displacement type, the pump must always be equipped with a pressure unloader/regulation valve (such valve is already built in the pump marked by the letter K preceded by a dash and in the AX and BX series pumps).*

OPTIONAL ACCESSORIES

⚠ WARNING

- *Inadequate optional accessories could negatively affect pump operation and make this hazardous. Only ever use original optional accessories recommended by the Manufacturer.*
- *As regards general information, safety precautions,installation and maintenance of optional accessories, refer to the accompanying documents.*

The standard pump equipment can be integrated with the following range of accessories:

- pressure unloader/regulation valve;
- safety valve;
- thermal valve;
- suction filter;
- suction fitting of various shapes and sizes;
- pressure gauge;
- etc.

For further details contact your dealer.

APPLICATIONS

⚠ WARNING

- *Adequately protect the moving parts with suitable guards. Special attention must be given to pulley applications.*
- *The pump must operate without exceeding the pressure limits and rotation speed as shown on the plate (7) (also refer to the "**SPECIFICATIONS AND TECHNICAL DATA**" paragraph). In particular, always make sure the pressure unloader/regulation valve is correctly set and that this setting is guaranteed, e.g., by paint coating.*
- *The pump must always be firmly fastened either to the motor flange or on a stable base by means of the feet (optional).*

The pumps described in this manual, depending on the model, are available in versions for numerous applications:

- female shaft Ø 3/4" for internal combustion engine with flange SAE J 609 A;
- female shaft Ø 1" for internal combustion engine with flange SAE J 609 A;
- female shaft Ø 5/8" for electric motor NEMA 56 C;
- female shaft Ø 24 mm for electric motor MEC size 90 B3 - B14;
- male shaft Ø 24 mm for special electric motor with female shaft or for pulley;
- female shaft Ø 20 mm for internal combustion engine with gear reduction unit;
- female shaft Ø 28 mm for electric motor MEC size 100-112 B3 - B14;
- female shaft Ø 1"1/8 for electric motor NEMA 182-184 TC;
- female shaft Ø 25 mm for internal combustion engine with gear reduction unit;
- male shaft Ø 30 mm for special electric motor with female shaft or for pulley or for gear reduction unit or for flexible coupling.

The Manufacturer's After-Sales Service is at the disposal of the **Skilled Technician** to provide all necessary information to identify the most adequate application and its correct execution. Pump applications must in any case be executed according to proper rules of mechanical engineering.
The pump is able to turn both clockwise and anticlockwise.

HYDRAULIC CONNECTION

For the hydraulic suction, delivery and bypass connections, refer to the following table and to Fig. 4, which represents a generic diagram of a possible machine integrating the pump.

A Pump
B Pressure unloader /regulation valve
C Suction circuit
D Delivery circuit
E Spray gun (example of accessory)
F Motor
G Lance
H Nozzle head

EN

CAUTION

- Follow the connection instructions already indicated in the **"CHECKING AND CONNECTING UP TO THE WATER SUPPLY"** and **"SPECIFICATIONS AND TECHNICAL DATA"** paragraphs.
  In particular, the suction circuit must be sized so as not to determine on the pump suction fitting:
  - a pressure higher than 8 bar/116 psi;
  - a vacuum higher than: 0,15 bar/2,18 psi (series AX, BX and pumps at 1000, 1450 and 1750 RPM); 0,1 bar/1,45 psi (MTP LWR-K, MTP ZWR-K); 0,1 bar/1,45 psi (pumps at 2800 and 3400 RPM).
- At pump suction, a filter of adequate dimensions must be fitted. In case of doubts, contact the Manufacturer.
- The suction pipes must have a suitable internal diameter and a nominal pressure of 10 bar/145 psi.
- The delivery pipes must have a nominal pressure not below the pump max. pressure.

On the models LW, ZW, FW, RW, HW, AW, BW, SW and TW, suction and delivery fittings are available both on the right side and on the left side of the head.

PRESSURE UNLOADER/REGULATION VALVE

In the models in which it is already built-in (pumps marked with the letter K preceded by a dash and pumps of the AX and BX series), this is factory set so maximum pump pressure is achieved, using a nozzle which also allows having a small flow rate in bypass (at least 0.3-0.6 l/min/0.08-0.16 USgpm).
The Manufacturer's Technical Assistance Service is at the disposal of the **Skilled Technician** to provide all the information needed, taking into account the fact that such adjustment may have to be corrected according to the plant engineering configuration in which the pump is installed.

RESETTING THE PRESSURE UNLOADER/REGULATION VALVE

⚠ WARNING

- *Operating pressure must never exceed the maximum value indicated for the pump (see also the* ***"SPECIFICATIONS AND TECHNICAL DATA"*** *paragraph).*

To reset the valve, proceed as follows (refer to Fig. 5):
- remove the plastic knob by pulling it upwards;
- loosen the Allen screw (m);
- turn the retention ring nut (l) anticlockwise, so as to partially unscrew it;
- set the required pressure by means of the hexagonal knob (n) (turn clockwise to increase the pressure, anticlockwise to reduce the pressure);
- turn the retention ring nut (l) clockwise, to tighten it;
- fully tighten the Allen screw (m).

COMET PLUNGER PUMP SERVICE MANUAL INDEX

1. SAFETY INSTRUCTIONS, OPERATING PROCEDURES AND LIMITS

1.1 Start-up Information

a. *LUBRICATION:* Make sure crankcase is filled with Comet Pump oil. Running this pump without oil will cause damage and void any warranties. Change the pump oil after the initial 50 hours of operation. Change oil every 500 hours after the initial oil change. The oil level of the pump can be checked by removing the oil cap and inspecting the dip stick. The correct level should fall between the min and max lines on the dip stick.

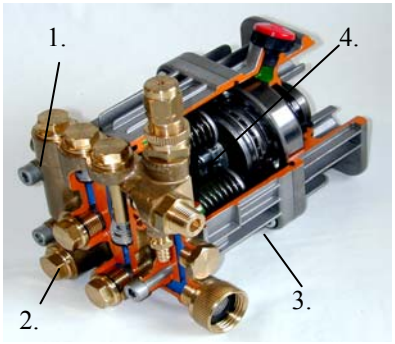
b. *WET END:* The Comet Pump should never be run dry. Running the pump dry will cause premature wear on the seals, packing and plungers. Running the pump dry for a prolonged period of time may cause damage that cannot be repaired. Do not start a pump with frozen water in the manifold.

c. *STORAGE:* If there is a risk of freezing, run antifreeze through the pump. Empty any extra liquid inside the pump by running the pump without water for no more than 20 seconds.

2. TORQUE SETTING CHARTS

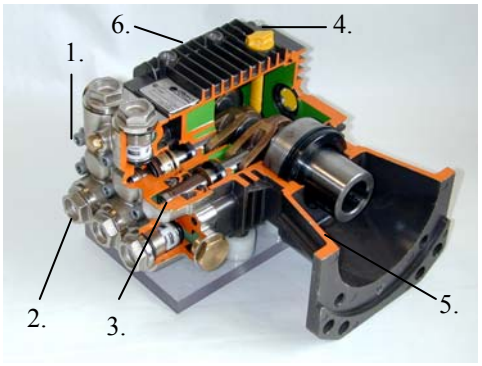
2.1 AXD Series Pump

POSITION#	TORQUE SETTING	FLUID TO BE USED
1	18 FT/LB	
2	33 FT/LB	LOCTITE 243
3	18 FT/LB	
4	18 FT/LB	LOCTITE 243



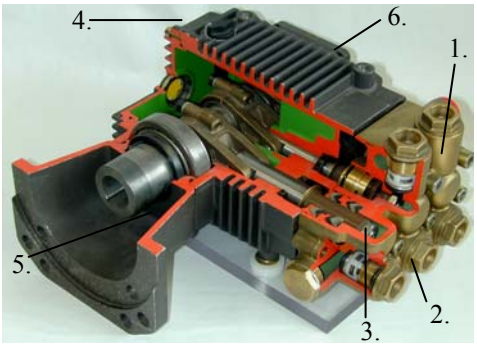
2.2 LW/ZW Series Pump

POSITION#	TORQUE SETTING	FLUID TO BE USED
1	7.5 FT/LB	
2	37 FT/LB	LOCTITE 542
3	4.5 FT/LB	LOCTITE 542
4	6.5 FT/LB	
5	6.5 FT/LB	
6	5.5 FT/LB	



2.3 FW/HW Series Pump

POSITION#	TORQUE SETTING	FLUID TO BE USED
1	18 FT/LB	
2	37 FT/LB	LOCTITE 542
3	7 FT/LB	LOCTITE 542
4	3 FT/LB	
5	18 FT/LB	
6	6 FT/LB	



3. TROUBLE SHOOTING GUIDE

SYMPTOMS	CAUSES	REMEDIES
The pump does not start	Air suction	Control inlet device
	Closed lance	Open the lance
Irregular pressure vibration	Pump sucking air	Check that there is no water leaking as it enters the pump
	Nozzle inadequate or worn	Clean and/or replace nozzle
	Worn, dirty/blocked valves	Replace check valves
Irregular pump pressure	Pump sucking air	Check that there is no water leaking as it enters the pump
	Blocked nozzle	Clean and/or replace nozzle
	Air in pump	Pull the trigger to release air in system
	Water inlet filter blocked	Clean filter
	Inadequate water supply	Make sure tap is completely open and/or connect to a tap that has adequate flow rate
	Worn, dirty/blocked valves	Replace check valve
	Worn packing	Install new seal kit
Drop in pressure	Worn nozzle	Replace the nozzle
	Dirty or blocked valves	Replace check valves
	Worn packing	Install new seal kit
Excessive noise	Pump sucking air	Check that there is no water leaking as it enters the pump
	Blocked suction	Inspect filter and inlet supply
	Water temperature is too hot	Max water temp must not exceed 145° F
	Worn, dirty/blocked valves	Replace check valves
	Worn bearings	Replace bearing
Water leak from head	Worn packing	Install new seal kit
Oil leak	Oil seals worn	Install new oil seals

4. MAINTENANCE SCHEDULE

OPERATION	Every 8 hours	Every 50 hours	Every 500 hours
Check oil level	X		
Check tubes-fittings		X	
Check & clean inlet filter		X	
Control pump connection to the engine		X	
Change oil		X –FIRST CHANGE	X
Check suction/delivery valves			X
Check pump bolt and nut setting			X
Check regulation valve			X

5. PUMP SPECIFICATION AND TECHNICAL DATA

5.1 Pump Identification Model#

	Positions:	1.	2.	3.	4.	5.
a.	Model#: eg.	AX	D	30	20	G

POSITIONS:

1. Model:
   - AX: radial axial
   - LW: small frame
   - ZW: medium duty
   - FW: heavy duty
   - HW super duty
2. RPM
   - D: 3400 RPM
   - S: 1750 RPM
   - -: 1450 RPM
3. GPM eg.55: 5.5 GPM
4. PSI eg. 30: 3000 PSI
5. Flange:
   - G: Gasoline engine mounting flange ¾" or 1"
   - E: Electric Motor Mounting Flange 5/8" or 1 1/8"
   - S: Solid Shaft 24mm

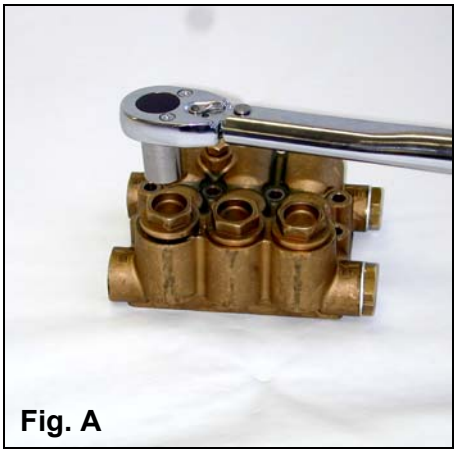


Fig. A

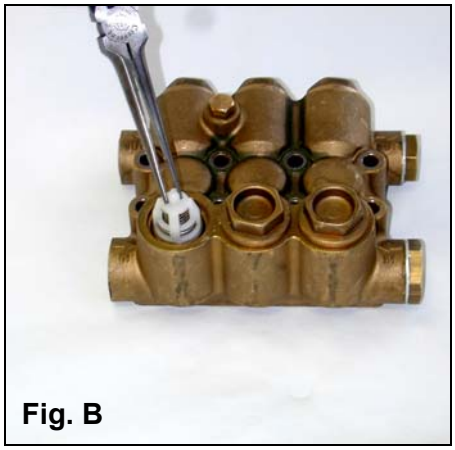


Fig. B

Fig. C

6.2 LW/ZW SERIES PUMP

A. Valve Maintenance

1. Using a 22mm wrench or socket, remove the six valve caps on manifold of pump. **(Fig. A)**
2. Examine the valve cap o'ring for cuts or distortions and replace if worn.
3. Using a needle nose pliers, remove the suction and delivery check valve. The valve assembly usually stays together when removing. If the valve comes apart, use a needle nose pliers or a reverse pliers to remove the remaining parts. **(Fig. B)**
4. Inspect the suction and delivery check valve assembly for general wear and replace if necessary. The valve assembly consists of the plastic cage, spring, valve seat, poppet and o'ring. **(Fig C)** One Comet valve kit is needed for complete valve change of one pump.
5. Replace old valves with new valves by placing assembly in the valve chamber. Press down firmly on the top of the valve assembly. **(Fig. D)**
6. Replace valve caps by applying LOCTITE 243 to valve cap and torque to 33 ft. lbs.

B. Removing & Replacing Pump Manifold

1. Remove the manifold of the pump by taking a 5mm allen head wrench and removing the eight head bolts.
2. With the pump firmly secured, take a medium sized flat head screwdriver and apply pressure to the manifold by prying between the crankcase and manifold. Work around from all sides of the manifold evenly until it comes off of the pistons. Keep manifold properly aligned with the pistons to prevent damage to the seals and pistons. **(Fig. E)**
3. When replacing the manifold, turn crankshaft of pump until the top of pistons are closely aligned. Lubricate the pistons and cylinders with grease and evenly press the manifold toward crankcase until flush. **(Fig. F)**

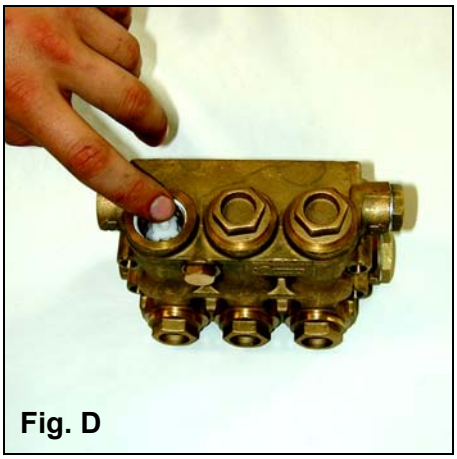


Fig. D

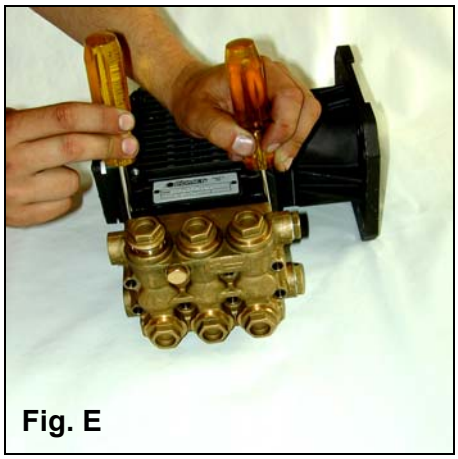


Fig. E

Fig. F

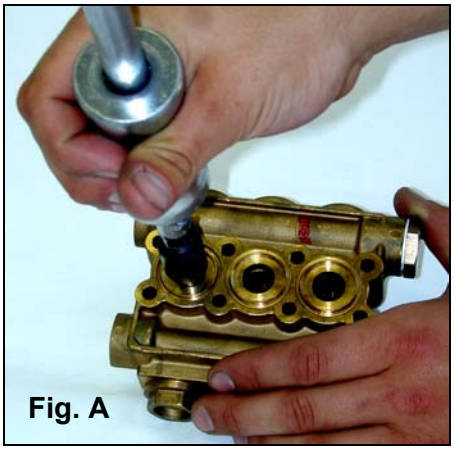


Fig. A

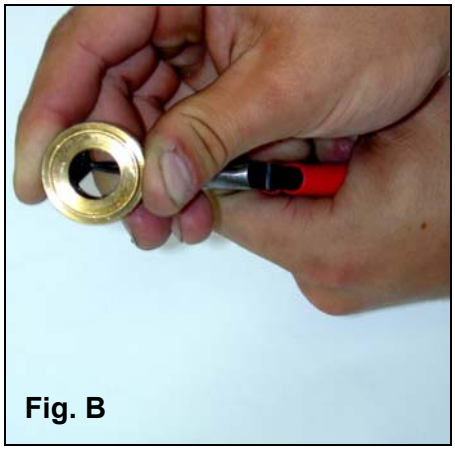


Fig. B

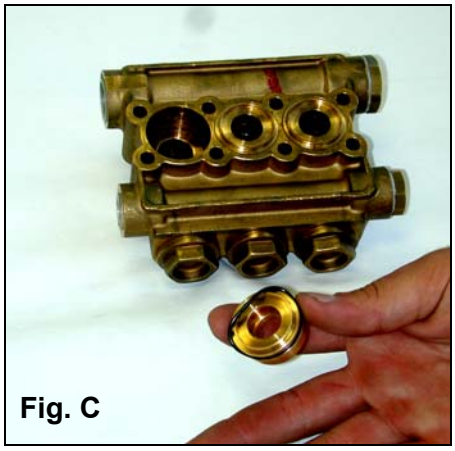


Fig. C

C. Seals and V-Packing Maintenance

1. Remove the manifold as described in section 6.2-B. It is possible that the seal and brass retainer ring assembly stays on the piston or remains in the manifold when removing.
2. Using the packing extraction tool, remove the brass retainer ring/seal stack. **(Fig. A)** Remove the low-pressure seal using a needle nose pliers. **(Fig. B)** Once this seal is removed, replace with a new seal.
3. Remove the outer o'ring by taking a small flat head screwdriver and working it under the o-ring. Simply roll off the o'ring. **(Fig. C)**
4. The V-packing stack can be taken apart by hand.

D. Seals and V-Packing Reassembly

1. Generously lubricate parts with grease when reassembling. Examine brass components for any damage or water residue build-up.
2. Insert low-pressure sealing working it in by hand.
3. Replace the outer o'ring by simply starting on one side and working it into the groove. **(Fig. C)**
4. Stack the V-packing in the correct order and firmly press the assembly into the manifold. **(Fig. D)**
5. Install a new oil seal by laying the seal into the opening and evenly pressing it into place. **(Fig. E)**
6. Reinstall the manifold onto the pump as described in section 6.2-B.

E. Plunger Maintenance

1. Remove the manifold as described in section 6.2-B. Remove the packing retainers if they remain on the pistons after removing the manifold.
2. Remove the nut and washer on the end of the piston using a 13mm wrench or socket.
3. Slide the ceramic plunger and the remaining washer from the piston guide. Inspect ceramic piston, o'ring and washers for wear. Replace if necessary. **(Fig. F)**

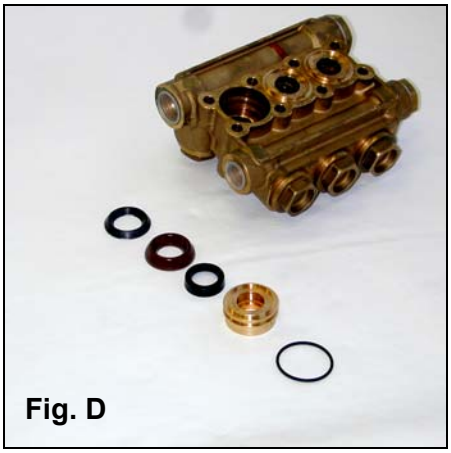


Fig. D


Fig. E

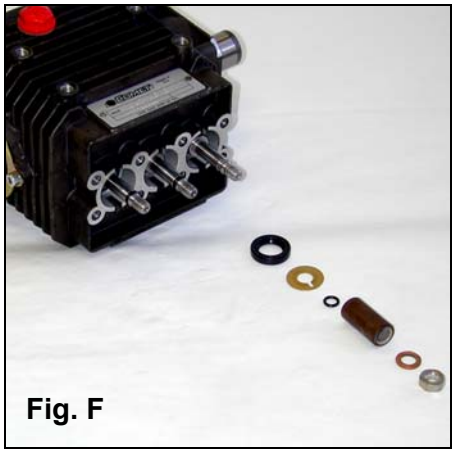


Fig. F

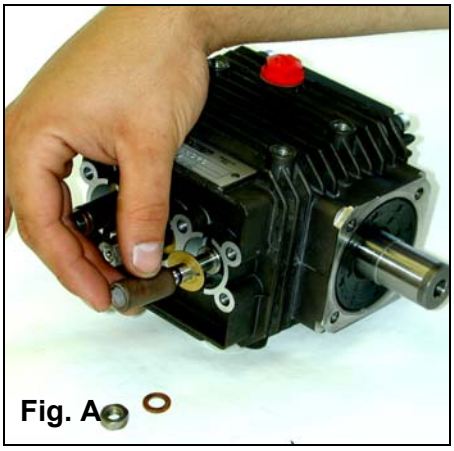


Fig. A

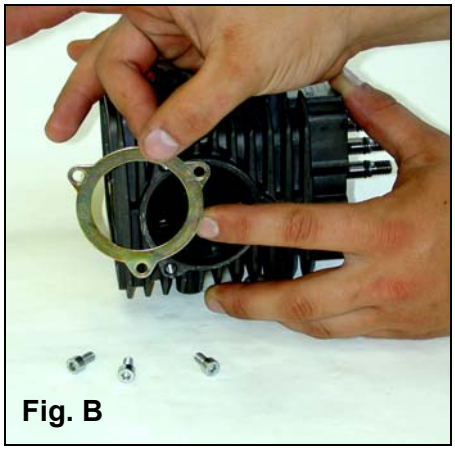


Fig. B


Fig. C

F. Plunger Reassembly

1. Generously grease the piston guide. Replace the o'ring making sure it does not twist or roll.
2. Slide the lower washer and ceramic bushing onto the piston guide. **(Fig. A)**
3. Place a small amount of LOCTITE 243 on the piston guide threads. Replace the outer washer and thread the nut onto the piston guide. Torque to 4.5 ft. lbs.

G. Crankcase Maintenance

1. Remove manifold & pistons as described in sections 6.2-B, 6.2-E.
2. Remove the plastic bearing cover ring using 4mm allen wrench to unscrew the three bolts. **(Fig. B)**
3. Remove plastic spacer and o'ring by hand.
4. Remove the snap ring from end of crankshaft allowing the shaft to slide out of the bearing. **(Fig. D)**
5. On the flange side of the pump, remove the oil seal by piercing a hole in the surface of the oil seal with a flat head screwdriver. Pry it out of the crankcase and over the shaft. **(Fig. E)**
6. Remove the large snap ring securing the flange side bearing into the crankcase.
7. Remove the small snap ring securing the shaft to the bearing.
8. Using an industrial press, or something equivalent, press out the shaft from the side where the plastic cover was removed. Secure the smaller bearing to the crankcase using a vise grips, or something equivalent, to make sure the smaller bearing does not get pushed into the crankcase with the shaft. **(Fig. F)** The larger bearing on the flange side of the pump will likely come out with the shaft.
9. Work the shaft out of connecting rods as needed.
10. Remove the piston guides by pulling out by hand.
11. Press the small bearing out of the crankcase going through the larger bearing opening and pressing out.

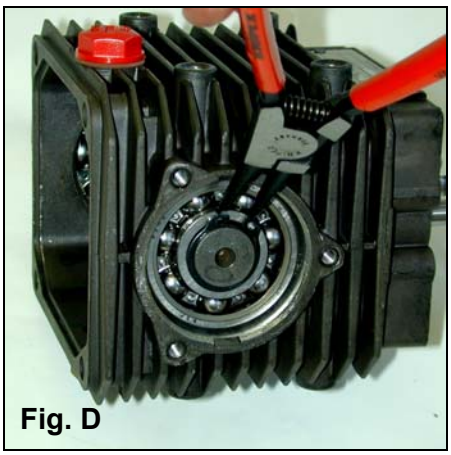


Fig. D

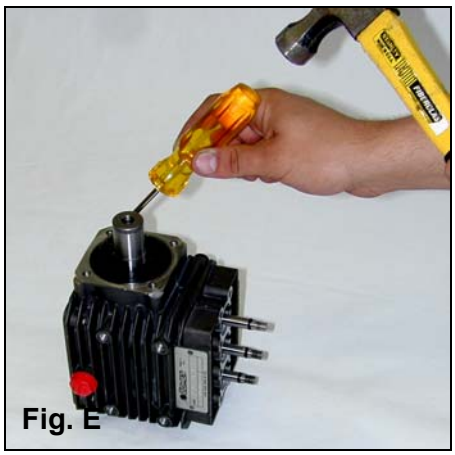


Fig. E


Fig. F

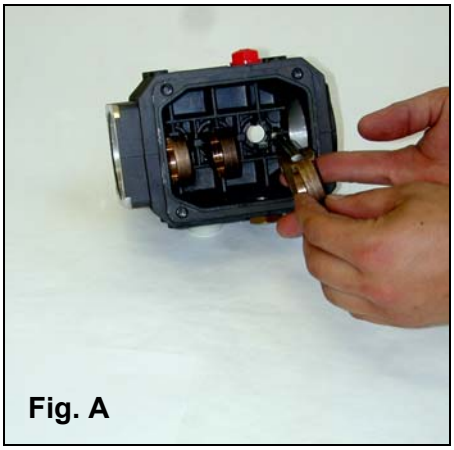


Fig. A

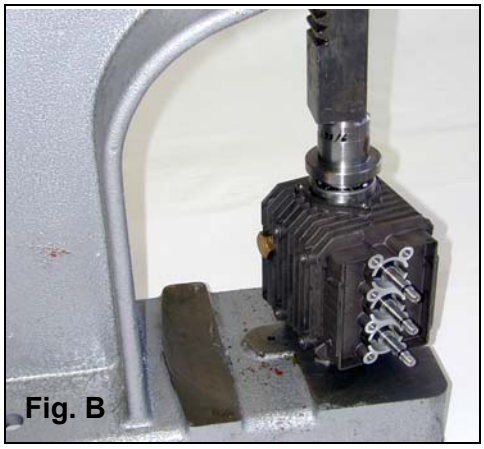


Fig. B

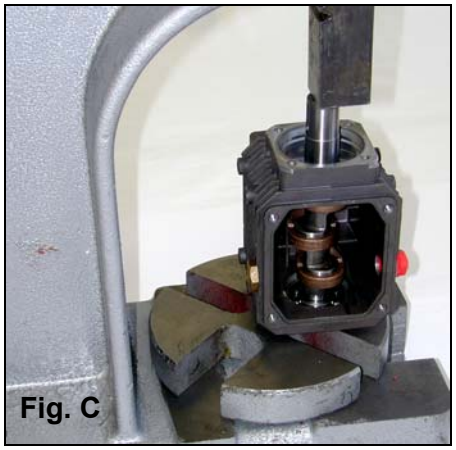


Fig. C

H. Crankcase Reassembly

1. Insert the piston guides by sliding them into the crankcase by hand. **(Fig A)**
2. Press the small bearing into the crankcase. **(Fig B)**
3. Insert the crankshaft through the large bearing opening, eyeing it through the connecting rod openings. Press the end of the shaft down into small bearing. **(Fig C)**
4. Secure the snap ring around the shaft outside of the small bearing. **(Fig D)**
5. Slide the large bearing over the crankshaft and press it into the crankcase.
6. Secure the snap rings into place by securing the bearing into the crankcase, and the shaft into the bearing.
7. Install the large oil seal on the flange side of the crankcase to cover the large bearing. **(Fig E)**
8. Install the plastic spacer, o'ring and metal cover. Secure the three bolts with a 4mm allen wrench. Torque to 3 ft. lbs. **(Fig F)**
9. Install the large crankcase back cover by placing the o'ring outside of the inner lip. Secure with the four 5mm bolts and torque to 7 ft. lbs.

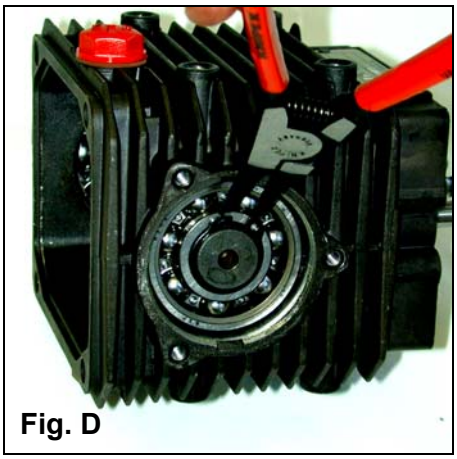


Fig. D

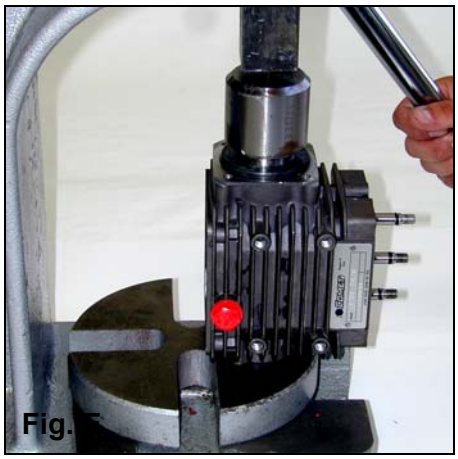


Fig. E

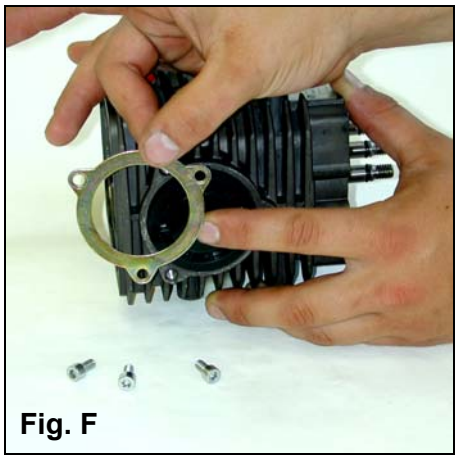


Fig. F

7. PUMP LIMITED WARRANTY

7.1 Comet Pump Limited Warranty

The Comet pump is warranted by the manufacturer to the original purchaser to be free from defects in material and workmanship under normal use and service. "Normal use and service" means not in excess of the recommended maximum speeds, pressures and temperatures or handling fluids not compatible with component materials. This warranty shall not apply to any pump that has been repaired or altered to affect the performance or reliability of the pump.

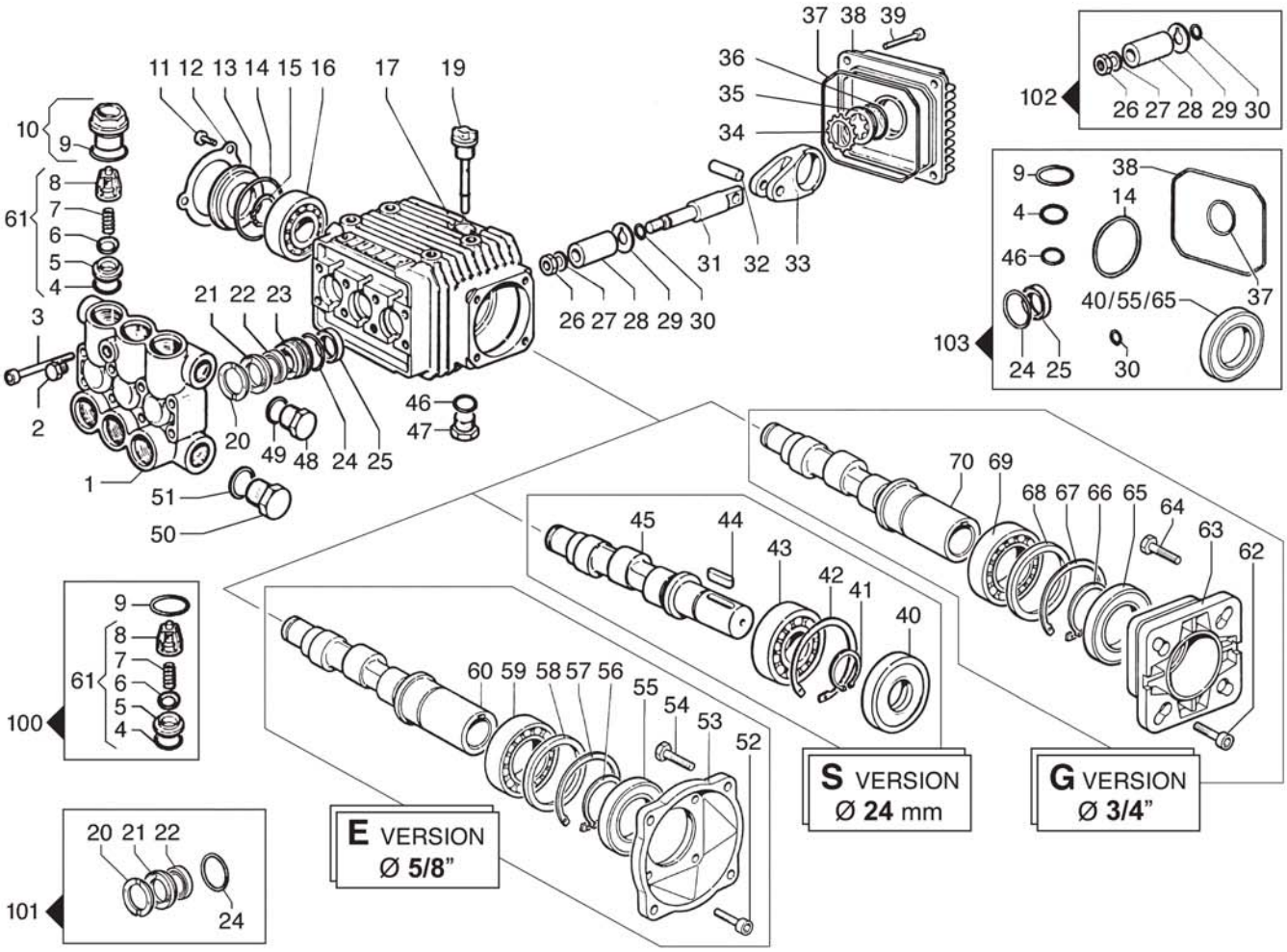
The period of Limited Warranty on AXD models shall be one year from the date of sale to the end user. Liability of manufacturer under the foregoing warranty is limited to repair or replacement at the option of the manufacturer of that product, which according to the manufacturer's investigation was deemed defective at the time of shipment. This warranty is in lieu of all other warranties, expressed or implied, including any warranty of merchantability and/or any and all other obligations or liabilities on the part of the manufacturers.

The period of Limited Warranty on the LW, ZW,FW & HW models shall be five years from the date of sale to the end user. Liability of manufacturer under the foregoing warranty is limited to repair or replacement at the option of the manufacturer of that product, which according to the manufacturer's investigation was deemed defective at the time of shipment. This warranty is in lieu of all other warranties, expressed or implied, including any warranty of merchantability and/or any and all other obligations or liabilities on the part of the manufacturers.

7.2 Limited Warranty Conditions

a. Pump operation must be within the maximum RPM, discharge pressure and inlet pressure specifications. A pressure relief valve must be properly installed in the system.
b. The pump must be operated with sufficient fluid to the manifold. Do not pump aggressive fluid that may cause premature wear to the internal components.
c. The oil level in the crankcase must be maintained at the correct level according to Comet specifications for proper lubrication.
d. The pump must be protected from freezing. Flush the system with propylene glycol antifreeze before storing in freezing conditions. Use the following concentration: 14° F-25% 5°F-33% minus 25°F-50%

3400 RPM



N°	Cod.	Descrizione	*Description*	Note	Q.ty	Model
1	3218 0317	Testata Pompa Ottone	*Brass Pump Manifold*	Ø15	1	
2	3202 0018	Tappo	*Cap*	G1/8	1	
3	3609 0108	Vite	*Screw*	M6x55	8	
4	1210 0046	Guarnizione OR	*O-Ring*	2,62x17,13	6	
5	3009 0087	Sede Valv. Aspir./Mand.	*Suct./Del. Valve Seat*		6	
6	3604 0017	Valvola Aspir./Mand.	*Suct./Del. Valve*		6	
7	1802 0177	Molla Valv. Asp./Mand.	*Suct./Del. Valve Spring*		6	
8	1205 0025	Gabbia Valv. Asp./Mand.	*Suct./Del. Valve Cage*		6	
9	1210 0048	Guarnizione OR	*O-Ring*	2,62X20,24	6	
10	3202 0312	Tappo + OR	*Cap + O-Ring*		6	
11	3609 0088	Vite	*Screw*	M5x10	3	
12	1004 0012	Flangia Tenuta	*Crankcase Flange*		1	
13	0402 0172	Coperchio	*Cover*		1	
14	1210 0386	Guarnizione OR	*O-Ring*	3,53x44,04	1	
15	3019 0011	Seeger Esterno	*Outer Seeger*		1	
16	0438 0066	Cuscinetto a Sfere	*Ball Bearing*	20x52x15	1	
17	0403 0128	Carter Pompa	*Pump Crankcase*		1	
19	3200 0051	Asta Livello Olio	*Oil Dipstick*		1	
20	0009 0196	Anello Pressione	*Packing Head Ring*	Ø15	3	
21	1241 0065	Guarnizione Tenuta	*Packing*	Ø15	3	
22	1241 0030	Guarnizione Tenuta	*Packing*	Ø15	3	
23	0009 0198	Anello Portaguarniz.	*Packing Retainer*	Ø15	3	
24	1210 0223	Guarnizione OR	*O-Ring*	1,78x26,7	3	
25	0019 0095	Anello Tenuta	*Oil Seal*	15x24x5	3	
26	0600 0048	Dado Speciale	*Special Bolt*		3	
27	2811 0080	Rondella	*Washer*	8,2x14x1,5	3	

N°	Cod.	Descrizione	*Description*	Note	Q.ty	Model
28	0202 0020	Bussola Ceramica	*Ceramic Bushing*	Ø15	3	
29	2812 0038	Rondella	*Washer*		3	
30	1210 0055	Guarnizione OR	*O-Ring*	1,78x6,07	3	
31	2409 0044	Pistone Guida	*Piston Guides*		3	
32	3011 0014	Spinotto	*Gudgeon Pin*		3	
33	0205 0048	Kit Biella	*Con. Rod Assembly*		3	
34	3019 0033	Seeger Esterno	*Outer Seeger*	Ø28	1	
35	3201 0026	Spia Livello Olio	*Oil Indicator*		1	
36	1210 0333	Guarnizione OR	*O-Ring*	1,78x23,52	1	
37	1210 0621	Guarnizione OR	*O-Ring*	3,0x94	1	
38	0402 0142	Coperchio Carter	*Crankcase Cover*		1	
39	3609 0041	Vite	*Screw*	M6x25	4	
40	0019 0094	Anello Tenuta	*Oil Seal*	25x62x10/7	1	
41	3019 0006	Seeger Esterno	*Outer Seeger*		1	
42	3020 0012	Seeger Interno	*Inner Seeger*		1	
43	0438 0075	Cuscinetto a Sfere	*Ball Bearing*	25x62x17	1	
44	1602 0045	Linguetta	*Key*	8x7x25	1	
45	0001 0286	Albero Passante	*Throughshaft*	Ø24	1	2015 S
	0001 0332	Albero Passante	*Throughshaft*	Ø24	1	3020 S
46	1210 0441	Guarnizione OR	*O-Ring*	2x14	1	
47	3200 0007	Tappo	*Plug*	3/8 GAS	1	
48	3200 0007	Tappo	*Plug*	3/8 GAS	1	
49	2811 0084	Rondella	*Washer*	16,7x22x1,5	1	
50	3202 0015	Tappo	*Plug*	G1/2	1	
51	2811 0086	Rondella	*Washer*	21,2x27x1,5	1	
52	3609 0032	Vite	*Screw*	M6x20	4	

3400 RPM

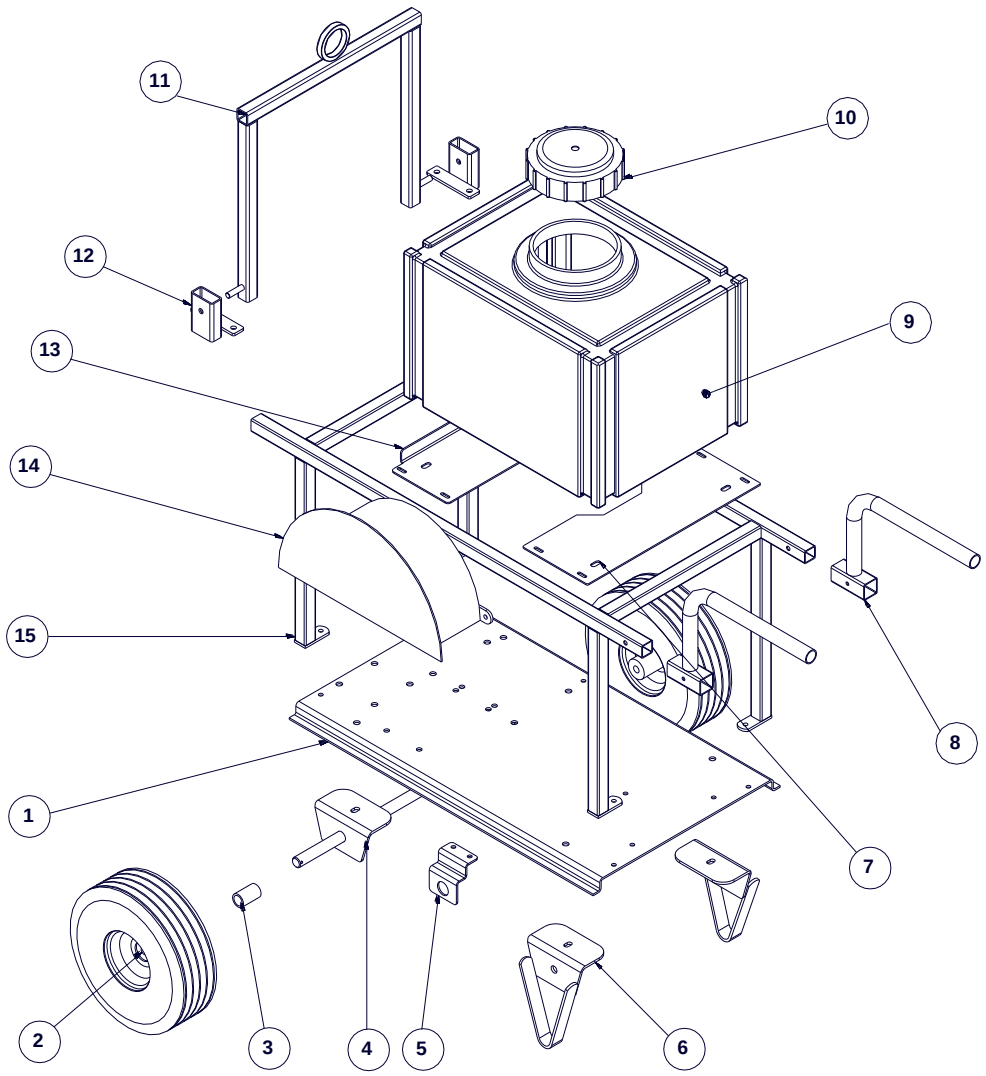
N°	Cod.	Descrizione	*Description*	Note	Q.ty	Model
53	3016 0016	Flangia	*Flange*	NEMA 56 C	1	
54	3607 0200	Vite Testa Esagonale	*Hexagonal Screw*	3/8"16 UNCx3/4"	4	
55	0019 0075	Anello Tenuta Olio	*Oil Seal*	35x62x7	1	
56	3019 0004	Seeger Esterno	*Outer Seeger*	Ø35	1	
57	3020 0012	Seeger Interno	*Inner Seeger*	Ø62	1	
58	2812 0064	Rondella Distanziale	*Spacer*		1	
59	0438 0015	Cuscinetto a Sfere	*Ball Bearing*	35x62x14	1	
60	0001 0336	Albero Femmina	*Hollow Shaft*	Ø 5/8"	1	2D15 E - 2D2D E
	0001 0337	Albero Femmina	*Hollow Shaft*	Ø 5/8"	1	3D2D E
	0001 0532	Albero Femmina	*Hollow Shaft*	Ø 5/8"	1	3522 E
61	1220 0030	Gruppo Valv. Asp./Mand.	*Suct/Del. Valve Assy kit*		6	
62	3609 0032	Vite	*Screw*	M6x20	4	
63	3016 0012	Flangia	*Flange*	SAE J 609 A	1	
64	3607 0199	Vite Testa Esagonale	*Hexagonal Screw*	5/16"24 UNFx3/4"	4	
65	0019 0075	Anello Tenuta Olio	*Oil Seal*	35x62x7	1	
66	3019 0004	Seeger Esterno	*Outer Seeger*	Ø35	1	
67	3020 0012	Seeger Interno	*Inner Seeger*	Ø62	1	
68	2812 0064	Rondella Distanziale	*Spacer*		1	

N°	Cod.	Descrizione	*Description*	Note	Q.ty	Model
69	0438 0015	Cuscinetto a Sfere	*Ball Bearing*	35x62x14	1	
70	0001 0334	Albero Femmina	*Hollow Shaft*	Ø 3/4"	1	2D2D G
	0001 0406	Albero Femmina	*Hollow Shaft*	Ø 3/4"	1	252D G - 2525 G
	0001 0451	Albero Femmina	*Hollow Shaft*	Ø 3/4"	1	3D2D G - 3D25 G
	0001 0383	Albero Femmina	*Hollow Shaft*	Ø 3/4"	1	3515 G - 3522 G

Kit Ricambi

Spare Parts Kit

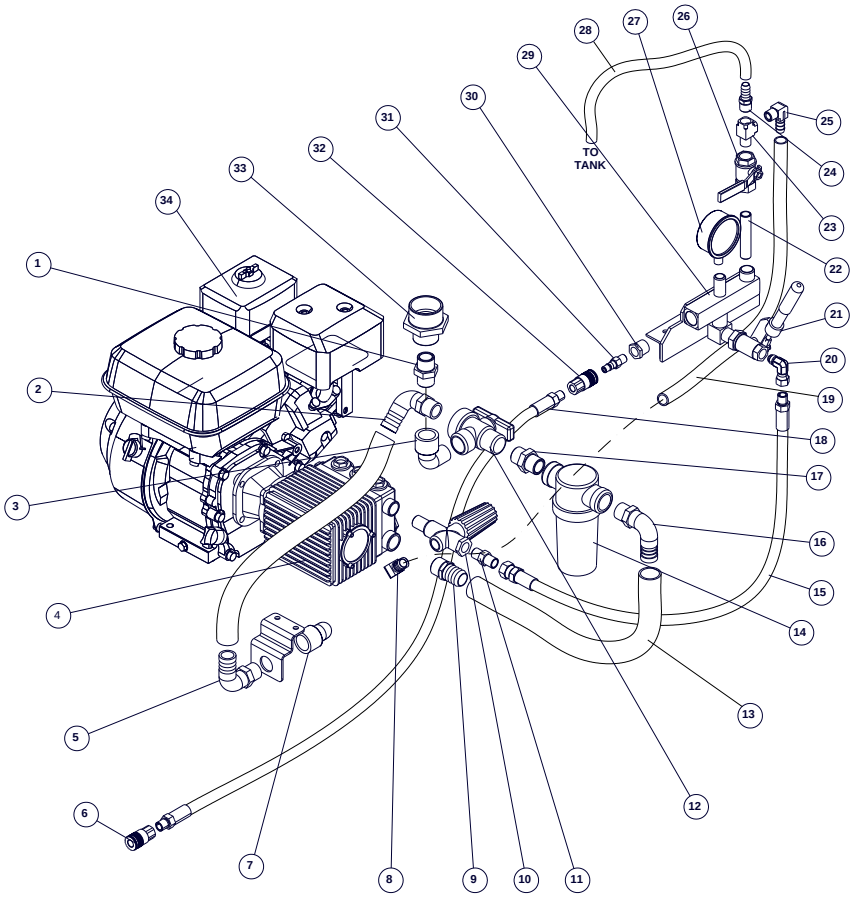
100	5025 0011	Kit Valvole	*Valve Kit*		1	
101	5019 0035	Kit Guarnizioni Acqua	*Water Seal Kit*	Ø15	1	
102	2409 0071	Kit Pistone	*Piston kit*	Ø15	1	
103	5019 0040	Kit Guarnizioni Olio	*Oil Seal Kit*	Male/Solid	1	2D15 S - 3D2D S
	5019 0041	Kit Guarnizioni Olio	*Oil Seal Kit*	Femmina/ Hollow	1	2D15 E - 2D2D E 2D2D G - 252D G 2525 G - 3D2D G 3D2D E - 3D25 G 3515 G - 3522 G 3522 E



ITEM	QTY	DESCRIPTION	PART NO.		ITEM	QTY	DESCRIPTION	PART NO.
1	1	BASE	4200-101-05		9	1	TANK	4200-911
2	2	WHEEL	4200-912		10	1	TANK CAP	4200-519
3	2	AXLE SPACER	4200-304		11	1	LIFT HANDLE	4200-920
4	1	AXLE	4200-302		12	2	LIFT HANDLE BRACKET	4200-921
5	1	DRAIN BRACKET	4200-922		13	1	TANK MOUNTING PLATE	4200-913
6	2	WHEEL KIT STAND	4200-303		14	1	HOSE BRACKET	4200-914
7	1	MOUNTING PLATE	4200-915		15	1	PUMP PROTECTION FRAME	4200-102
8	2	WHEEL KIT HANDLE	4200-309		16	1	HANDLE WHEEL KIT*	HWK

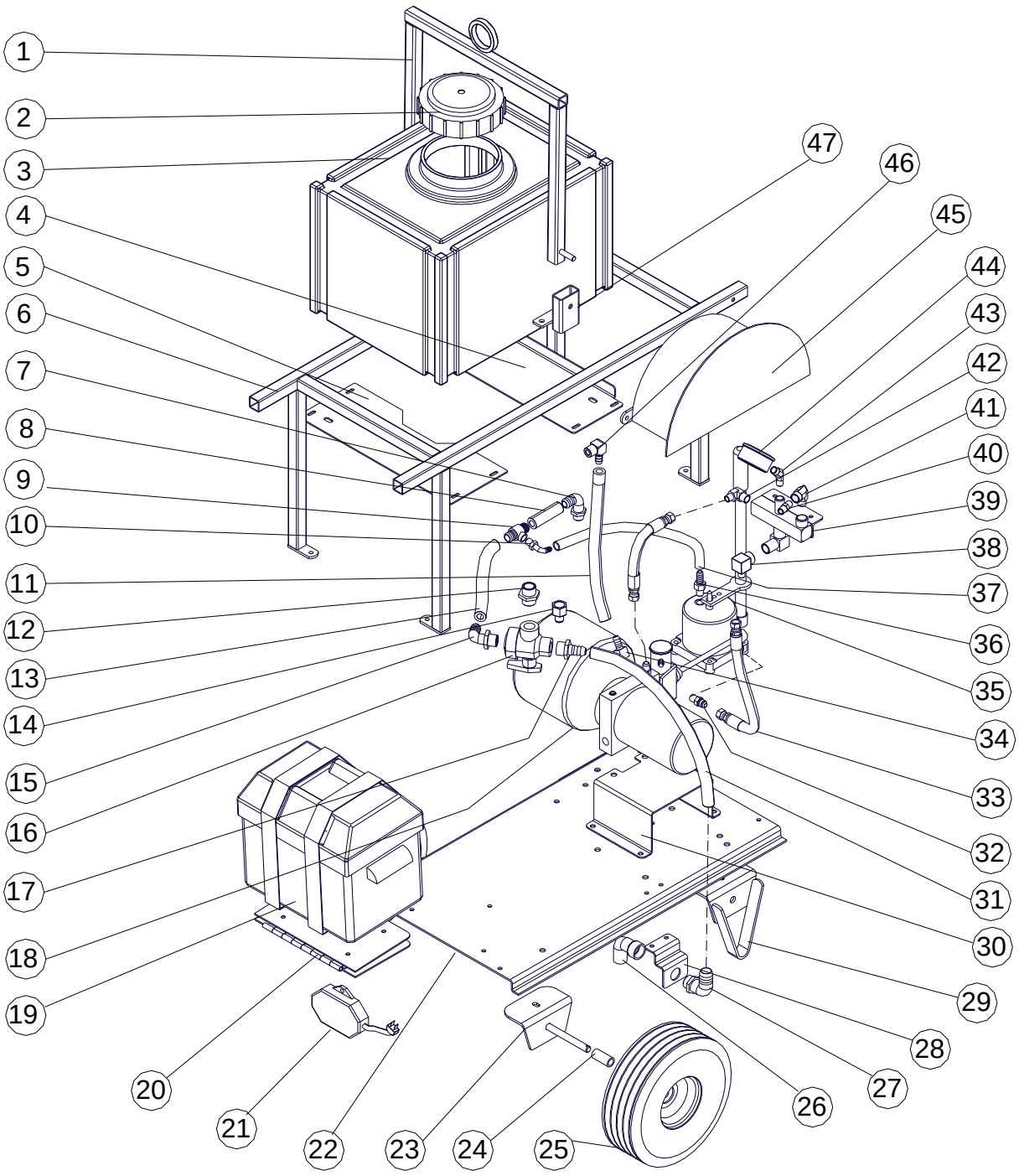
* Wheel kit includes #s 2, 3, 4, 6, & 8 plus hardware

SHORELOCK PUMP, GAS
PARTS BREAKDOWN



ITEM	QTY	DESCRIPTION	PART NO.		ITEM	QTY	DESCRIPTION	PART NO.
1	1	NIPPLE 12MP-12MP	961-M34		18	1	50’ PRESSUE HOSE	962-138
2	1	ELBOW 12MP-16HB	961-EL34100		19	1	SUCTION HOSE	PVC38X21
3	2	ELBOW 12FP-12MP	961-SE34		20	1	FITTING 8MP-8FJ-90	961-6501-8-8
4	1	GEAR PUMP	4200-900		21	1	APOLLO VALVE	4200-903
5	1	ELBOW 12MP-16HB	961-EL100		22	1	PIPE NIPPLE X 4’’	961-QUE-6-N3
6	1	QUICK COUPLER	961-BH2-60		23	1	TEE	961-2225P-6
7	1	FP HEX NUT	961-B35		24	1	HOSE BARB 6MP-6HB	961-125HBL-6-6
8	1	ELBOW 6MP-6HB	961-129HB-6-6		25		SEE IETM 8	
9	1	HOSE BARB 8MP-16HB	961-A12100		26	1	BALL VALVE	961-V502SS-6
10	1	UNLOADER VALVE	4200-922		27	1	PRESSURE GAUGE	4200-905
11	1	BUSHING 6FP-8MP	961-5406-8-6		28	1	HOSE	PVC38X12
12	1	3 WAY VALVE	2104-002-22		29	1	MANIFOLD	4200-916
13	1	SUCTION HOSE	PVC1X14		30	1	NIPPLE 4MP-8MP	961-5404-6-4
14	1	FILTER ASSEMBLY COMPLT	4200-111		31	1	QUICK COUPLER, MALE	961-BH2-61
15	1	UNLOADER HOSE	962-139		32		SEE ITEM 6	
16		SEE ITEM 2			33		N/A	
17		SEE ITEM 1			34	1	ENGINE	4200-104

SHORELOCK PUMP, GAS
PARTS LISTING



SHORELOCK PUMP, ELECTRIC
PARTS BREAKDOWN

SHORELOCK PUMP, ELECTRIC
PARTS LISTING

ITEM	QTY	DESCRIPTION	PART NO.		ITEM	QTY	DESCRIPTION	PART NO.
1	1	LIFT HANDLE	4200-920		26	1	POLY STREET ELBOW	963-SE100
2	1	WATER TANK LID	4200-519		27	1	POLY HOSE ELBOW	963-E100100
3	1	WATER TANK	4200-911		28	1	DRAIN MOUNT	4200-922
4	1	FRONT TANK MOUNTING PLATE	4200-915		29	2	HWK FOOT	4200-303
5	1	REAR TANK MOUNTING PLATE	4200-913		30	1	MOTOR MOUNT	4200-936
6	1	PROTECTION FRAME	4200-910		31	1	DRAIN HOSE	
7	1	POLY HOSE ELBOW	963-E100100		32	1	FITTING	961-6801-6-6
8	1	FEED HOSE 1			33	1	HAND PUMP PRESSURE HOSE	
9	1	POLY HOSE TEE	963-T100		34	1	POLY HOSE ELBOW	963-E038038
10	1	POLY HOSE ELBOW	963-E100100		35	1	HAND PUMP	4200-931
11	1	RECIRCULATION HOSE			36	1	POLY HOSE FITTING	963-A038025
12	1	POLY NIPPLE	963-N100		37	1	FEED HOSE 3	
13	1	FEED HOSE 2			38	1	FITTING	961-2502-6-8
14	1	REDUCER BUSHING	961-5405-6-8		39	1	SLE PRESSURE MANIFOLD	4200-916
15	1	POLY HOSE ELBOW	963-E100100		40	1	MALE COUPLER	961-BH2-61
16	1	POLY 3-WAY VALVE	963-454234N		41	1	FITTING	961-5500-6-4
17	1	POLY HOSE FITTING	963-A100100		42	1	FITTING	961-5500-8-6
18	1	ELECTRIC MOTOR PUMP	4200-935		43	1	FITTING	961-5503-4-4
19	1	12V BATTERY	2250-316-11		44	1	PRESSURE GAUGE	4200-905
20	1	BATTERY MOUNT PLATE	4200-926		45	1	HOSE RACK	4200-914
21	1	1.5 AMP TRICKLE CHARGER	4200-950		46	1	POLY HOSE ELBOW	963-E038050
22	1	BASE PLATE	4200-909		47	2	LIFT HANDLE MOUNT	4200-921
23	2	AXLE	4200-924		48	1	FEMAL COUPLER (NOT SHOWN)	961-BH2-60
24	2	ALE WHEEL SPACER	4200-925		49	1	PRESSURE HOSE (NOT SHOWN)	962-138
25	2	TIRE/RIM	4200-912					

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