Combijet®

JE80-1500

ULTRA HIGH PRESSURE WATER-BLASTER

USER, SERVICE & PARTS MANUAL

V2.4

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Contents

WARNING & SAFETY PRECAUTIONS

To safeguard the operator who uses the machine and its accessories and as accident prevention and protection of bystanders and property, the following safety precautions must be observed. Always treat the water blaster in the same way as any other power driven high speed cutting tool!

Never let children or people who have not been properly instructed operate the machine.
Use the electric plug in a proper socket with ground to earth wiring. The entire electrical installation must be with earth wiring! The motor should be connected to an appropriate earth point.
All electrical installations must be made only by an electrician. A GFCI (Residual current device) is recommended.

Always keep the high-pressure cleaner and the belonging accessories in good working condition. Check that the machine and its accessories are free from defects, and in good working condition, with special attention to the insulation on the electric cable. In case of defect: Do NOT OPERATE THE MACHINE! Get the machine serviced.

Eye protection must be worn at all times when operating the machine to protect against repelling or ricocheting materials hitting the eyes and causing damage.

Ear protection must be worn at all times when operating the machine to protect against hear loss during operation.

Proper footwear and protective clothing must be worn at all times when using the equipment to avoid and prevent damage to the operator.

NEVER direct the jet at yourself. Do not attempt to clean your clothes or footwear with the machine. Be especially alert when pulling or releasing the trigger as sudden reaction forces will occur.

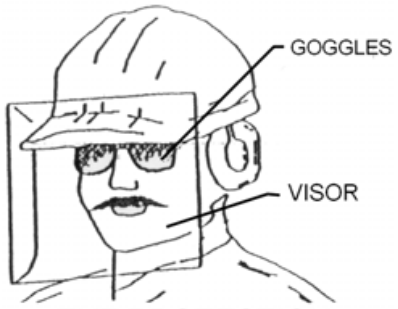
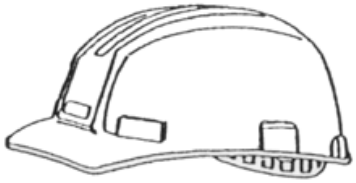
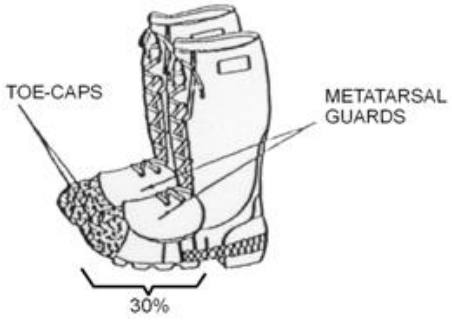
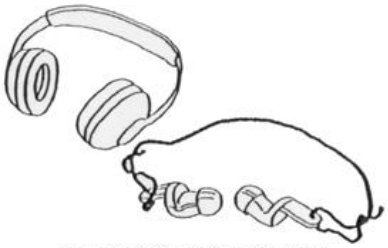
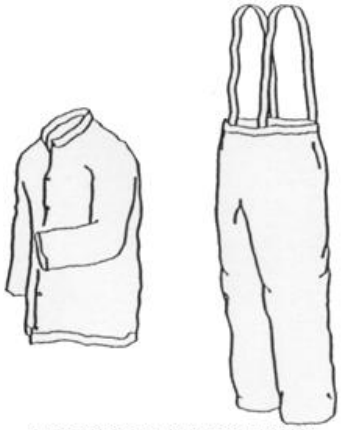
Precautions must be made to keep bystanders away from the working range. Especially when pulling the trigger as sudden reaction forces can make changes in the direction of the jet.

NEVER spray-jet on humans or live animals, the high pressure jet can cause severe injury and/or death.

NEVER spray at electrical equipment, or at the machine itself.

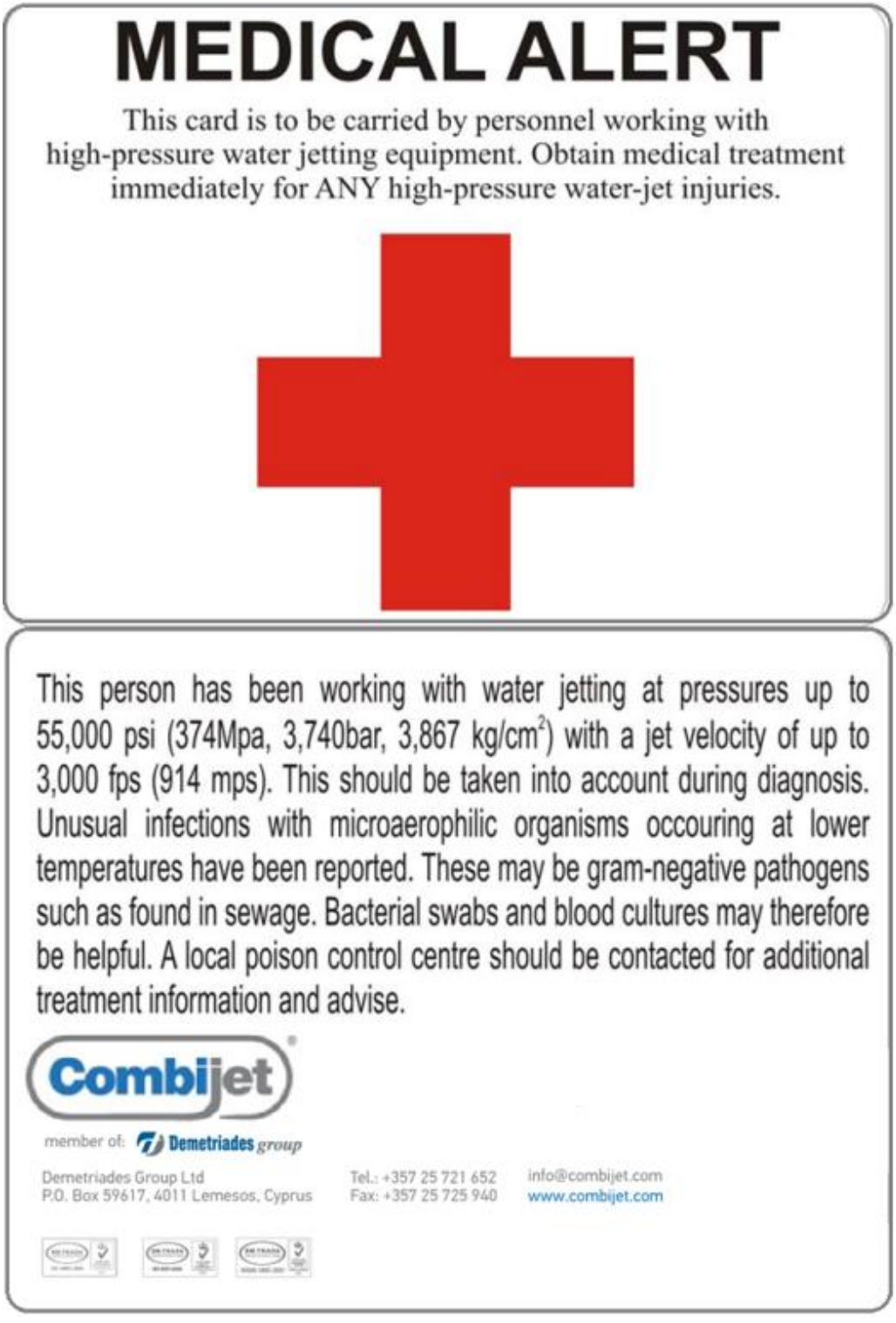
Before service or repair: Make sure the machine is turned off, and pressure is released from the system by pulling the trigger after shutting down the machine. The machine should be disconnected from the main power supply by pulling out the electrical plug.

PROTECTION GEAR

 EYE PROTECTION	Operators must wear visors or goggles to guard against spray and flying debris. A combination of both goggles and visor is recommended. It will protect the eyes and the face during both water-blasting as well as abrasive water-blasting.
 HEAD PROTECTION	Safety helmets must be worn at all time by personnel within the work area. Helmet material must be able to withstand mechanical shock exceeding 10G in 8ms without fracturing.
 HAND PROTECTION	Shear proof gloves must be worn by the operator at all times. A glove combination of a cloth inner lining and a water tight outer layer is preferable.
 FOOT PROTECTION	Safety boots with steel toecaps minimum 0.5mm (0.02”) thick must be worn. The toecap must cover at least 30% of the footwear length. Basic safety footwear must also be equipped with metatarsal guards to protect the instep. Safety boots are available in numerous designs.
 HEARING PROTECTION	Operators and other personnel exposed to noise levels of more than 90-dBa for more than 1 hour must wear suitable ear protection. Ear plugs or ear muffs are usually sufficient.
 PROTECTIVE CLOTHING	Waterproof clothes protect the operator only from spray and flying debris. They do NOT deflect direct jet impact. Therefore, an operator must take care never to point a water jet either at themselves or other personnel.

MEDICAL EMERGENCY INFORMATION

Immediate medical attention should be given to personnel who sustain equipment related injuries while operating the system. In such cases, it is vital that medical personnel be apprised of all facts relevant to such injuries. Therefore, all operating personnel should be provided with waterproof emergency medical alert tags or cards, describing the nature of their work and the possibility of injury inherent in the use of water jetting equipment. The below example of a standard card can be printed out or photo copied, bend, laminated and used as medical alert tag.



MACHINE NAMEPLATE

PUMP INFORMATION

PUMP NAMEPLATE

Each pump (fig. 1) has: its own serial number XX.XXX.XXX (see point **[1]**) and a rating plate (see point **[2]**) that indicates:

Pump model and version
Maximum (rpm)
Power absorbed (Hp – kW)
Flow rate (l/min - G.P.M)
Pressure (bar - P.S.I.)

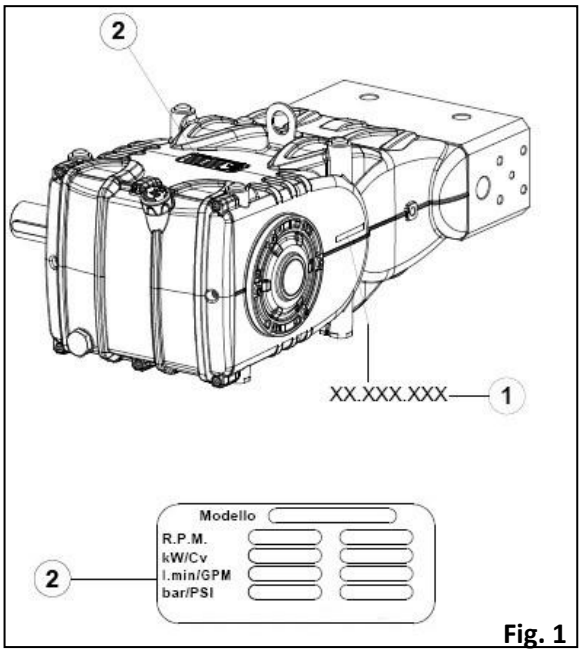


Fig. 1

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

INFORMATION REGARDING PUMP USE

The pump has been designed to operate with filtered water and at room temperature.

The maximum water temperature allowed is 30°C.

PORTS AND CONNECTIONS

The pump (see figure 2) is provided with:
[1] N° 2 inlet ports "IN", 3/4" Gas.
The line can be connected to either of the two inlet ports; the ones not being used must be hermetically sealed.
[2] N° 2 outlet ports "OUT", Ø 8 mm
[3] N° 2 auxiliary ports, 1/2" Gas; they can be used for the pressure gauge and the safety valve
[4] N° 1 drain port "DRAIN " supplied with an adjustable 90° rapid fitting for Ø 10 mm polyamide pipes; It is needed to recover the fluid drained from the packing cooling circuit, and must be connected to the outlet port being careful to avoid counter-pressure.

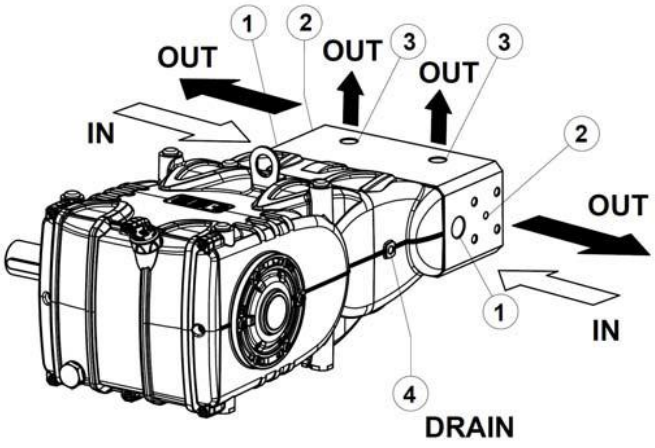


Fig. 4

SENSE OF ROTATION

An arrow situated on the crankcase near the shaft indicates the correct sense of rotation.
Standing in front of the pump head, the sense of rotation must be as shown in Fig. 3.

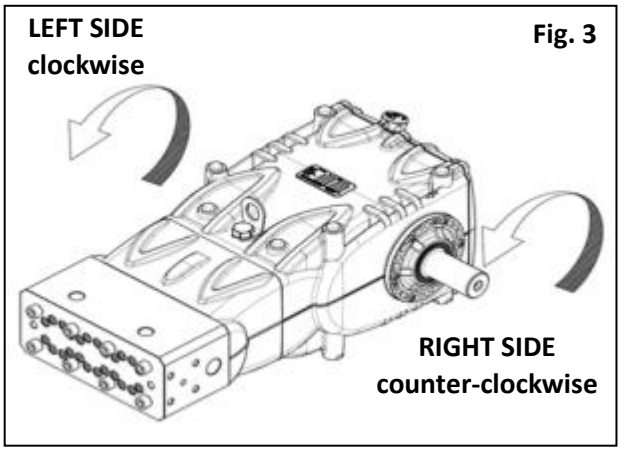


Fig. 3

SETUP & USE

Mount the high-pressure hose on to the water-blaster by screwing the swivel on to the high-pressure fitting on the side of the cylinder-head (OR right-side of the pressure regulating valve, when that is available).
Mount the dump gun with lance to the ½" high-pressure hose. Always use two wrenches when tightening the hoses.

Prepare the water supply for the water-blaster, by attaching a ¾" or 1" hose to the supplied low pressure inlet coupling on the side of the water tank. Connect the other end of the water supply hose to a fresh water tap. Open the tap. To prevent water spill always use the float valve inlet.

Connect the main power cords to an earthed 3 phase main power supply. Connect a grounding cable from the motor grounding point to an appropriate earth point. Turn on the power and push the start button on the electric panel. Allow the machine a few seconds for the star delta connection to switch over automatically before using the dump gun.

For the initial start and at the beginning of every job shift, remove any nozzles on the gun, in order to flush the system from any dirt or particles that might block the nozzles. Press the trigger and let the water flow to flush the system.

Replace the nozzles onto the gun, get a firm grip with both hands on the gun handle and the lance handle. Press the trigger on the dump gun and start blasting. Pay special attention to the fact that energizing the gun causes reaction forces that can cause the jet to change direction.

After the shutdown of the water-blaster, it is always recommended to pull the trigger on the dump gun to make sure that there is no pressure in the high pressure hose. Trapped high-pressure can cause severe injury.

Notice
Make sure your local power supply specifications are suitable for the motor need. Refer to the ID-plate located at the base of the chassis plate.

Onboard vessels

Position the Water-blaster machine behind the super structure or on the poop Deck, securely fastened. Engage the built in brake when running the machine.

The machine is equipped with the following safety devices

1) **Stop Button**: The stop button (POS. 22 - Electrical Spare-parts Assembly page 24) stops the machine when pushed in.
2) **Emergency Stop Button**: The emergency stop button (POS. 23 – Electrical Spare-parts Assembly page 24) immediately stops the power supply to the machine when pushed in
3) **Main switch**: The main switch (POS. 28 - Electrical Spare-parts Assembly page 24) disconnects the main supply.
4) **Over load relay**: The overload relay protects the motor against overloading (POS. 11 - Electrical Spare-parts Assembly page 24)
5) **Inlet pressure sensor**: The sensor prevents the pumps from running dry, by shutting off the machine when inlet pressure in the main pump falls below 3.5 bar.

UN-PLUG MACHINE WHEN REPAIRING!

DAILY INSPECTION

CHECK
Check the strainer in the water-tank. Clean if necessary. Check the oil level on the crankcase of the pump. Fill up if necessary. Check for air-bubbles in the suction hose between tank and pump. If there are bubbles then tighten the hose-clips. Check high pressure connections for leakage. NEVER tighten connections under pressure. Check high pressure hoses for wear and cracks. Replace if necessary. Check the power cord for wear and cracks. Replace if necessary. Check the air intake grill of the electric motor. Clean for dust if necessary.
Notice: To prevent damage to hoses and electrical cord, avoid letting the high-pressure hoses rub against sharp edges for example manholes or getting squeezed in door openings etc. Replace if necessary.
Inlet water temperature must be below 60°C (140°F)

MAINTENANCE

PUMP MAINTENANCE

The pump is delivered with lubricant oil, compliant with room temperatures ranging between 0°C 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 (according to DIN 51517 part 2).
As an alternative, Automotive SAE 85W-90 gearing lubricants may also be used.

Hersteller Manufacturer Producteur	Schmieröl Lubricant Lubrifiant
Agip	AGIP ACER 220
ARAL	Aral Degol BG 220
BP	BP Energol HLP 220
Castrol	CASTROL HYSPIN VG 220, CASTROL MAGNA 220
DEA	Falcon CL 220

Hersteller Manufacturer Producteur	Schmieröl Lubricant Lubrifiant
elf	ELF POLYTELIS 220, REDUCTELF SP 220
Esso	NUTO 220, TERESSO 220
FINA	FINA CIRKAN 220
FUCHS	RENOLIN 212, RENOLIN DTA 220
Mobil	Mobil DTE Oil BB

Hersteller Manufacturer Producteur	Schmieröl Lubricant Lubrifiant
Shell	Shell Tellus Öl C 220
SRS	Wintershall Ersolan 220, Wintershall Wiolan CN 220
TEXACO	RANDO HD 220
TOTAL	TOTAL Cortis 220

Check the oil level by using the opposite oil level dipstick with minimum and maximum value notches **[1],** fig.3. Refill if needed.
Correct oil level inspection is done with the pump at room temperature; oil is changed with the pump at working temperature, by removing the rear plug **[2]**, Fig.3.
Oil is to be changed every 1000 hours of operation.
The amount required is ~3.8 litres.

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

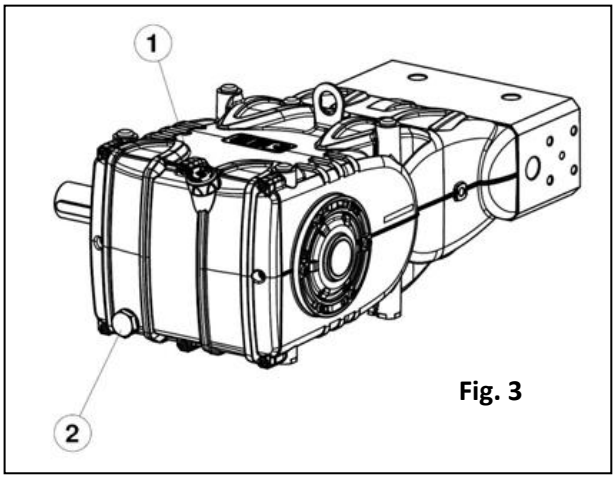


Fig. 3

CLEANING

A part of keeping the machine and its accessories in good working condition is keeping it clean.
But NEVER clean the machine itself with high-pressure. Do not use solvents.

STORAGE

Inactivity for long periods
If the machine is to be inactive for long periods, keep the unit frost free, and flush the pump thoroughly with non alcoholic antifreeze fluid.

Filling the pump with an anti-corrosion emulsion or anti-freeze solution by using an external diaphragm pump

a) Close the filter draining, if open.
b) Be sure that the connecting pipe 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 pipe and the high pressure outlet pipe inside the container
f) Start up the diaphragm pump
g) Pump the emulsion until it comes out of the high pressure outlet pipe
h) Continue pumping for at least another minute; if needed, the emulsion can be re-enforced, by adding for example Shell Donax
i) Stop the pump, remove the pipe from the suction connection and close it with a plug
j) Remove the pipe from the high pressure outlet port. Clean, grease and plug both connections and the pipes.

Pipes

a) Before greasing and protecting the pipes according 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 folding

Starting after long period of inactivity
If the machine is started up for the first time after a long period of time, before starting operation check the oil level and the valves, and follow the start-up procedure described

PRECAUTIONS AGAINST FREEZING

In areas and periods of the year where there is risk of freezing, follow the instructions indicated above in STORAGE section.

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

MACHINE TROUBLESHOOTING & REPAIR

PROBLEM	REPAIR
When the main switch is turned on and the green start button is pushed in, the water-blaster will not start.	Fault somewhere in the power supply. Is the Power light on? Make sure the main supply cable is connected correctly. Inspect cord for cracks and wears.
The motor is humming but the pump does not run.	Too low voltage, one phase is missing. High-pressure pump is blocked. Check the mains voltage. Check the main connection voltage with a meter. With the machine turned off, hand turn the motor, at the fan, if it remains blocked, check the pump.
The machine shuts off, and the two red pilot lights are ON	Inlet pressure to the main pump is low (below 3.5 bar) Check water level in tank. If low, fill up or increase water flow into tank. Check feed pump Check filter Check inlet pressure sensor
The pressure drops and the Water-blaster works irregularly.	The strain filter in the water tank is blocked or dirty or the water supply from the tap is insufficient Air in the Suction hose. Clean the strain water filter. The machine should always suck from the water-tank. Open fresh water tap fully. Tighten the hose clamps on the suction hose.
The Water-blaster continues jetting at high pressure when trigger is released.	The Gun valve is stuck by dirt and indicate That the filter or hoses has not been clean before assembly Replace gun rep kit and ensure that system is flushed at low pressure before mounting nozzle
The Water-blaster is running at high pressure when trigger is released and no jetting.	The check valve in the un-loader out-let fitting is stuck or leaking. The hose may still contain pressure so loosen hose and bleed pressure slowly before opening fully. Clean the check-valve in the un-loader out-let fitting. Replace the O-ring.
The Water-blaster does not reach the right working pressure when the trigger handle is activated.	Leakage from: Safety valve, hose connections, trigger-gun. The pump sucks air. The high-pressure nozzle is worn or too big in size or safety valve is not correctly adjusted, or is worn. Rupture disc is burst. Plunger seals are worn. Turn of the water-blaster. Inspect for leakage. Replace the nozzle. Set the safety valve, repair if necessary. Change rupture disc. Change seals.
The Water-blaster works with approximately 2/3 of the maximum pressure, and the high-pressure hose is vibrating.	There is dirt in the valves. Turn off the Water-blaster. Dismantle the pump head and the valves, remove the dirt and check to ensure the valve discs are moving freely and fits tight and smooth to their seats.

Excessive water leakage from under the pump	Seal is worn Replace seals. (Always replace O-ring as-well)
Noisiness	The pump sucks air. One or more valve springs are broken or stuck. Dirt in the valves. No or too little oil in the crankcase or motor bearings worn out. Inspect the low-pressure water supply. Tighten hose clips. Replace springs. Clean the valves Replace the bearings.
Water in the oil	The Oil-seal is worn out. High moisture in the air (condensing inside the crankcase) The high pressure seals are completely worn out. Check or replace the oil-seals. Renewal of the crankcase oil more often. Replace the high pressure seals.

Nozzle change

Change the nozzle when it is worn, (spray pattern becomes irregular and/or a drop in pressure occurs. Use 2 wrenches when changing nozzle. Only change to a correctly sized new nozzle.
Repack nozzle thread with PTFE seal tape. Please notice that the size rating for one particular nozzle may differ from another, for example: The same sizes fan and straight jet may differ in pressure.

Using optional Nozzle types

The gun can be used with different types of nozzles: Straight-jet and Ultra Impact rotating types.

Overhauling the dump gun

If the gun starts to leak or parts become damaged, it can be repaired. Please refer to the main spare-parts assembly for correct position of parts during repair.

Cleaning the water tank

Check the water tank for any dirt or debris. If any, empty water tank, and wipe out any dirt completely. Dirt might cause malfunction of the machine, especially to the pump.

Changing the micro filter cartridge

Drain the water from the tank as described above. Unscrew the hexagon nut on top of the round filter cartridge.
Take out the corrugated filter cartridge. Discard the cartridge. The filter cartridge absorbs dirt particles, THE CARTRIDGE IS DISPOSABLE AND CANNOT BE CLEANED. Flush the filter housing with water. Refit a new filter cartridge into the filter housing, ensure the length of the filter is correct, measured against the discarded cartridge. Clean and put O-rings back in place. Mount the filter housing and tighten the hexagon top nut.
Remember to tighten the drain screw at the bottom of the filter housing.

Pump Repair Instructions

If pump is removed for repairs, when re-installing the pump, care must be taken to secure it on firm base and align it perfectly with transmission components.

Crank Mechanism Repair

Crank mechanism repair operations must be carried out after draining the oil from the crankcase.
To drain the oil, remove the oil dipstick pos. [1] and then the draining plug. [2], Fig. 1.

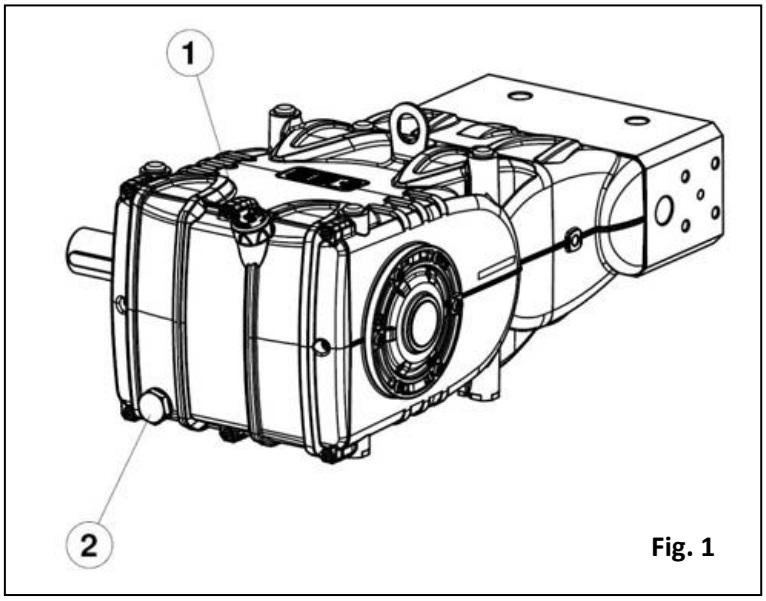


Fig. 1

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

Crank Mechanism Disassembly

The correct sequence is the following:

A) Drain oil, and then remove:
- Pump shaft key
- Rear cover
- Connecting rod cap
- Side covers, using n° 3 wholly threaded M6x 50 screws, inserting them in the opposite holes as shown in Fig. 2

Fig. 2

B) Push the piston guides and connecting rods forward in order to facilitate the lateral extraction of the pump shaft.

Two marks are visible on the crankshaft, as shown in fig. 3; they must be turned towards the operator in order to facilitate extraction.
NB: to extract the piston guide it is necessary to remove the ceramic piston and wiper first.

Fig. 3

C) Disassemble the crankshaft oil seals and the piston guides using standard tools

Crank mechanism assembly

After cleaning the crankcase, reassemble the crankcase mechanism as follows:

a) Thoroughly fit the piston guide seals into their seat on the crankcase as shown in fig. 5/a, using the opposite tool CJL10PT007.

b) Introduce the pre-assembled piston guide / connecting rod units into their seat; to facilitate tightening of the connecting rod cap, we advise to position the connecting rod so you can easily read the number. To easily introduce the crankshaft, without the key, fully push the piston guide / connecting rod unit, shown in fig. 4.

Fig. 4

c) Before reassembly of the side covers, check the seal lips for wear. If replacement is necessary, position the new ring using the opposite tool CJL10PT003 as shown in fig. 5.

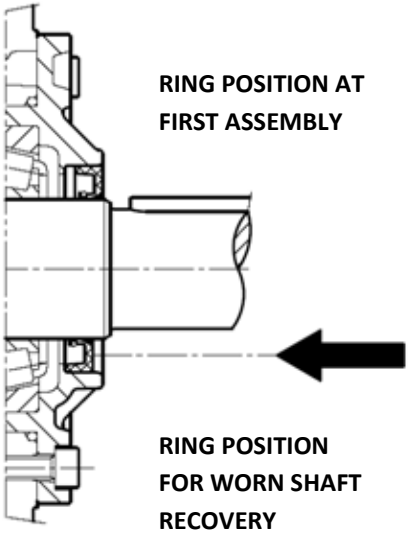


Fig. 5

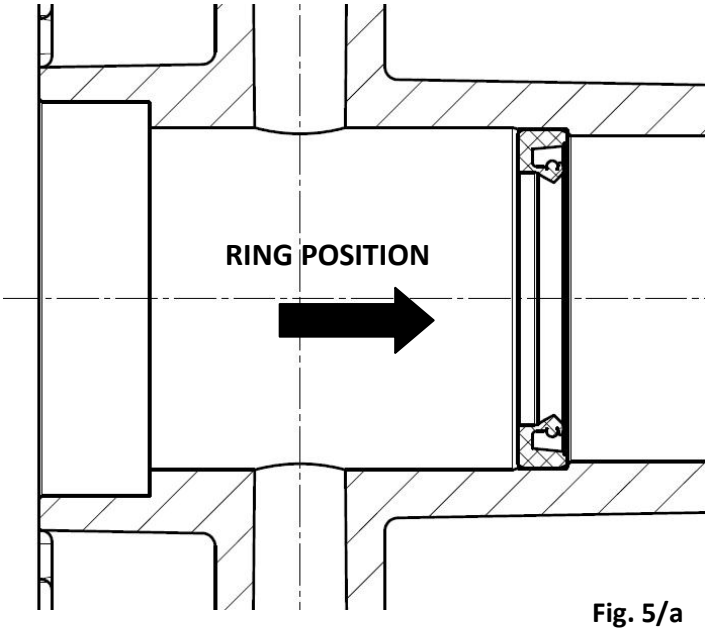


Fig. 5/a

If the shaft presents diameter wear corresponding to the sealing lip, to avoid the need for grinding it is possible to position the ring as indicated in fig. 5.

Before assembling the cover (sight glass side), be sure that the shim rings have been inserted. To help the covers fit onto the crankcase, we advise to use N° 3 screws M6x40, and then finish the operation with the screws supplied (M6x18) as shown in fig. 6.

Fig. 6

D) Install the connecting rod cap according to the numbering, and fasten the relevant bolts (lubricating both the head and the threaded stem with the same oil used for the crankcase) proceeding in three different steps, see fig. 7:

1. Approaching torque 6 - 8 Nm
2. Pre-fasting torque 25 - 28 Nm
3. Fastening torque 38 Nm

Fig. 7

E) Install the rear cover, positioning the oil dipstick hole upward.
F) Fill the crankcase with oil as indicated in the MAINTENANCE part of the manual

Disassembly / Assembly of bearings and shims

The type of bearings used (tapered roller bearings), ensures the absence of axial play on the crankshaft; the shims are to be determined to reach this purpose.

To disassemble / assemble, or to replace them if needed, carefully follow the indications below:

A) Disassembly / Assembly of the crankshaft without replacing the bearings

After removing the side covers, as indicated above, check the rollers and their races for ware; if all parts are in good condition, accurately clean the components with a suitable degreaser and grease them again evenly using the same oil used in the crankcase. The same shims can be used again, being careful to fit them under the cover on the sight glass side.
After installing the complete unit (sight glass side flange + shaft + engine side flange), check that the shaft's rolling torque - with the connecting rods free – is at least 4 Nm, Max 7 Nm.
To position the two side covers on the crankcase, initially use N°3 screws M6x40 as shown in fig. 6, and then the fastening screws. The shaft's rolling torque (with connecting rods coupled) must not exceed 8 Nm.

B) Disassembly / Assembly of the crankshaft with bearings replacement

After disassembling the side covers as indicated above, remove the outer ring nut of the bearings from their covers and the inner ring nut, with the remaining part of the bearing, from the two shaft extremities using a standard pin extractor or similar tool as indicated in figures 8 - 9.

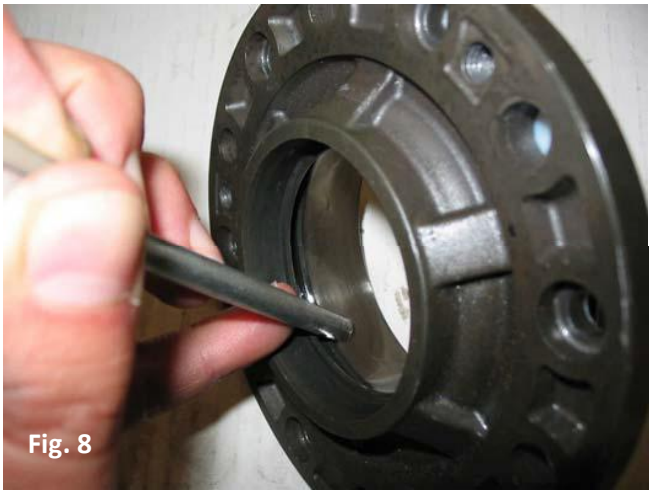


Fig. 8


Fig. 9

The new roller bearing can be mounted at room temperature with a press; it is necessary to lay them on the lateral side of the relevant ring nuts with apposite rings. The driving operation can be facilitated by heating the relevant parts at a temperature ranging between 120° - 150° C (250° - 300° F), making sure that the ring nuts are correctly fitted in their seats.

Never invert the parts of the two bearings.

The shim pack must be redefined as follows:
A) Insert the crankshaft in the crankcase, being sure that the P.T.O. shank comes out of the correct side.
B) Fit the P.T.O. side flange to the crankcase paying great attention to the seal lip
C) Position the flange on the sight glass side
D) Use a thickness gauge (see fig. 10)


Fig. 10

to determine the shim pack as indicated in the table below:

Measurement	Shim type	N° pieces
From: 0.05 to 0.10	/	/
From: 0.11 to 0.20	0.1	1
From: 0.21 to 0.30	0.1	2
From: 0.31 to 0.35	0.25	1
From: 0.36 to 0.45	0.35	1
From: 0.46 to 0.55	0.35 0.10	1 1
From: 0.56 to 0.60	0.25	2
From: 0.61 to 0.70	0.35 0.25	1 1


Fig. 11

E) Insert the shims under the cover on the sight glass side (see fig. 11), fixing it to the crankcase using the appropriate screws, and verifying that the stall torque is between 4 Nm and 7Nm.

F) If the torque value is correct, connect the rods to the crankshaft; otherwise, redefine the shims again repeating the operations from point “C”.

Fluid End Repair

Disassembly of the head – liners – valves

The pump head does not require periodical maintenance.
Service operations are limited to valve inspection or replacement if needed.
To extract the valve units proceed as follows:

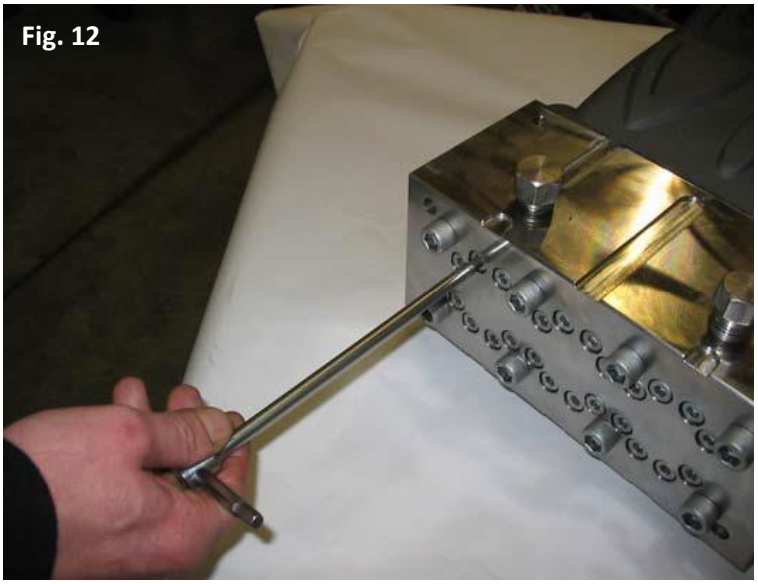


Fig. 12

A) Loosen the screws M8x100 that fix the liners to the head as shown in fig.12.

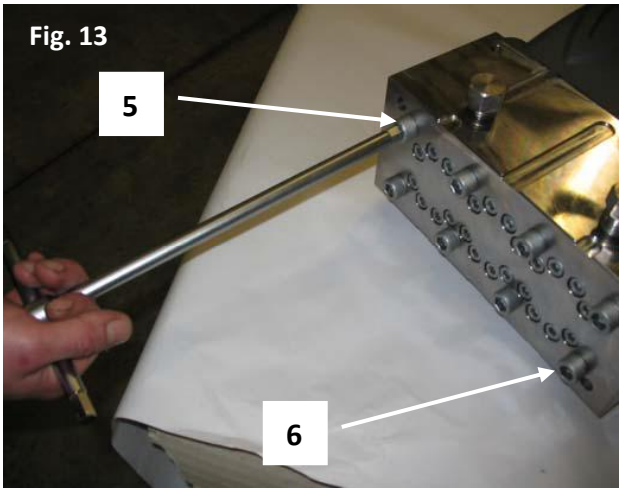


Fig. 13

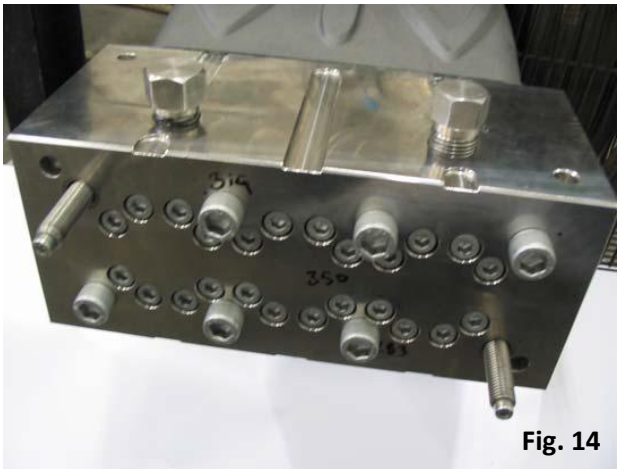


Fig. 14

B) Unfasten the head screws M12x260 N° 5 and N° 6 as shown in fig. 13, replacing them with two auxiliary screws (tool CJL10PT001) as shown in fig. 14; therefore remove the remaining screws.

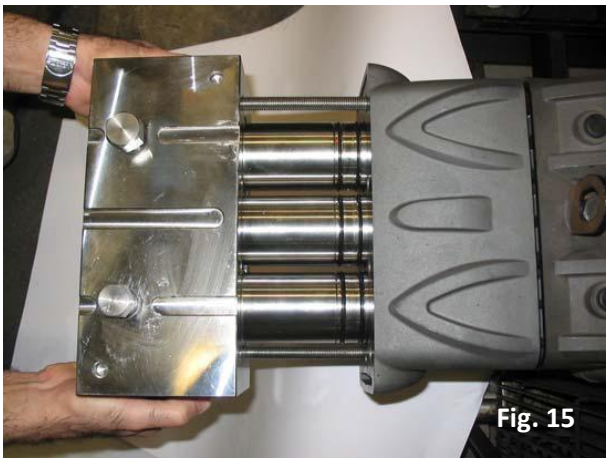


Fig. 15

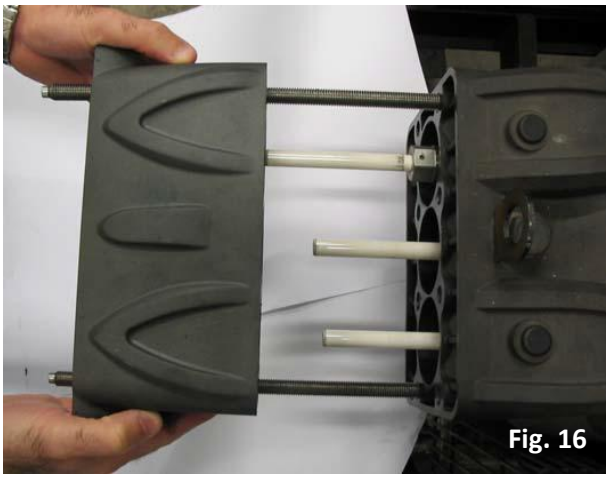


Fig. 16

C) Separate the head and the liner manifold from the pump crankcase as shown in fig. 15-16.

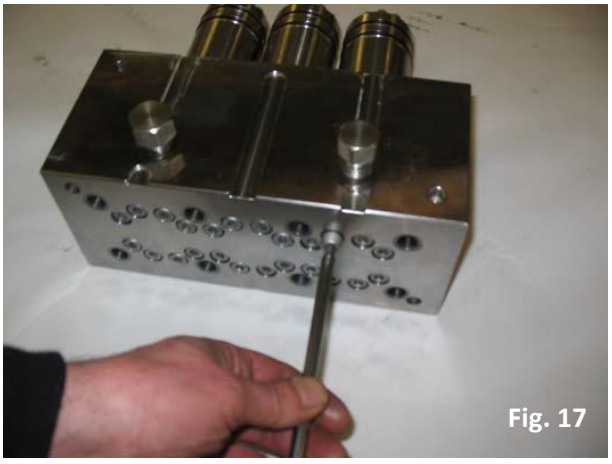


Fig. 17

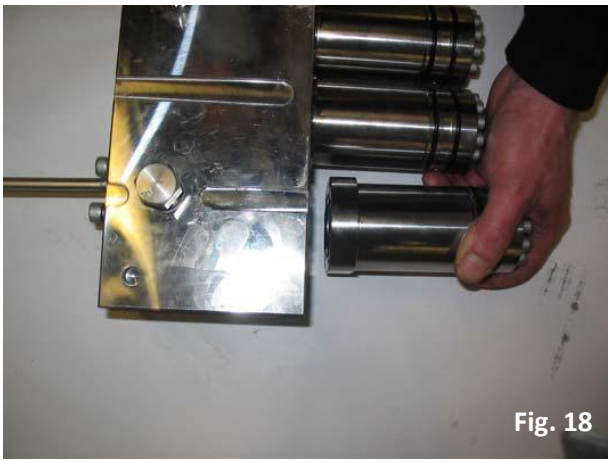


Fig. 18

D) Remove the screws M 8x100 that fasten the liners to the head as shown in fig. 17 and proceed as indicated in fig. 18.

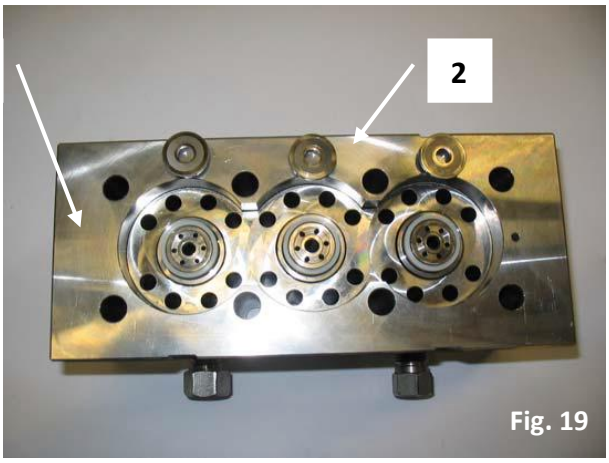


Fig. 19

When disassembling the liners, be careful not to lose the valve seats **[1]** and the flat valves **[2]** as shown in fig. 19; in fact, they may fall since they are only laid down.

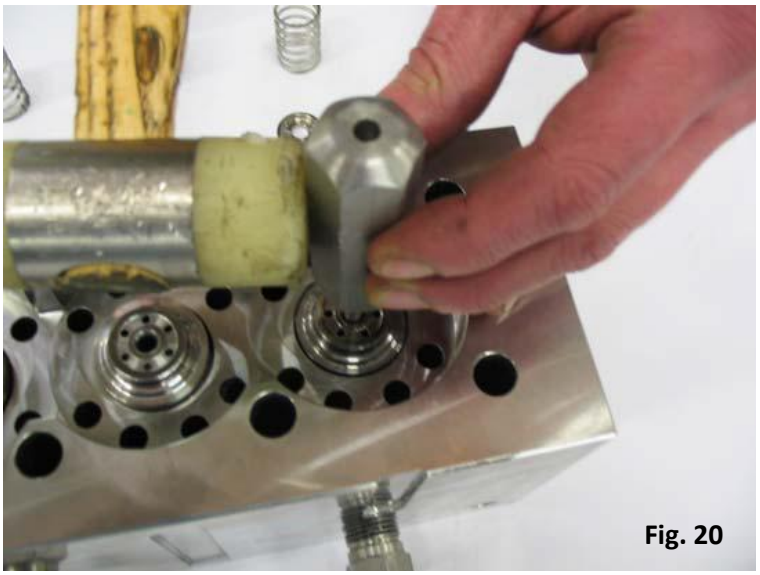


Fig. 20

If the valve seats are blocked on the head due to the formation of limestone or oxide, they must be freed by inserting the opposite tool CJL10PT005 in the suction hole and operating as in fig. 20.

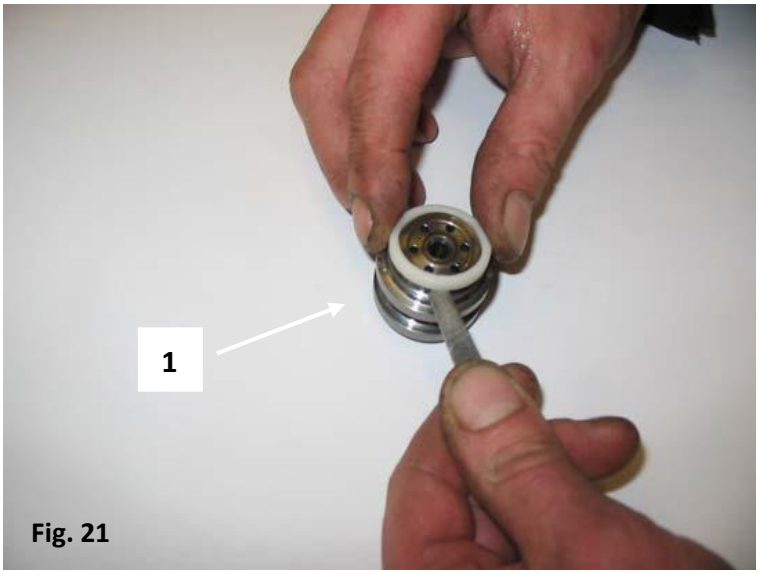


Fig. 21

E) Extract the valve seat **[1]** as shown in fig. 21; check components for wear and replace them if necessary.

At every valve inspection, always replace all the seal rings and the O-rings between the liner and the head, between the head and the liner manifold in the area of the recirculation hole.
Before reassembly, clean and dry off the components and all their seats inside the head.

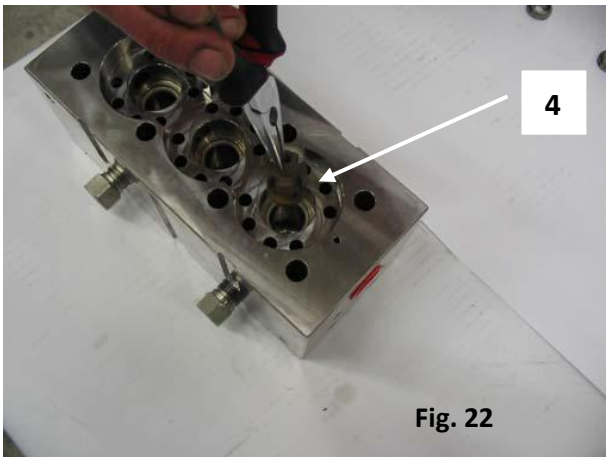


Fig. 22

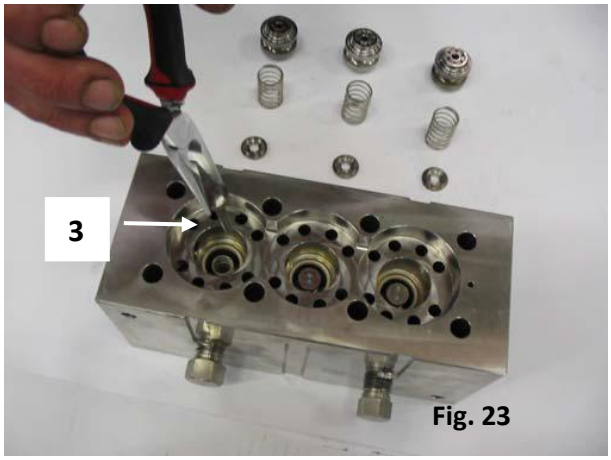


Fig. 23

F) Extract the delivery pads **[3]** and the related guides **[4]** and springs, as shown in fig. 22 - 23; check for wear and replace components if necessary.

Assembly of the head – liners – valves

To reassemble the components, invert the previously listed operations, paying attention to the correct assembly of the liner manifold: when the component is mounted, the two rough casting exhausts present on one of the sides must be oriented towards the lower part of the crankcase (pump bracket side).
Heads - liners: proceed with assembly and head screw calibration, and then continue with the calibration of the liner fastening screws.
For fastening torque values, please follow the indications in Screw Calibrations section.

Disassembly of the piston unit – supports – seals

The piston unit does not require periodical maintenance.
Service operations are limited to the visual inspection of the cooling circuit's draining. In case of anomalies / oscillations on the delivery pressure gauge, or pulsating of the cooling circuit's draining pipe (if flexible), seal packings must be inspected and replaced if necessary.
To extract the piston unit operate as follows:

A) Separate the head and the liner manifold from the pump crankcase as indicated earlier.

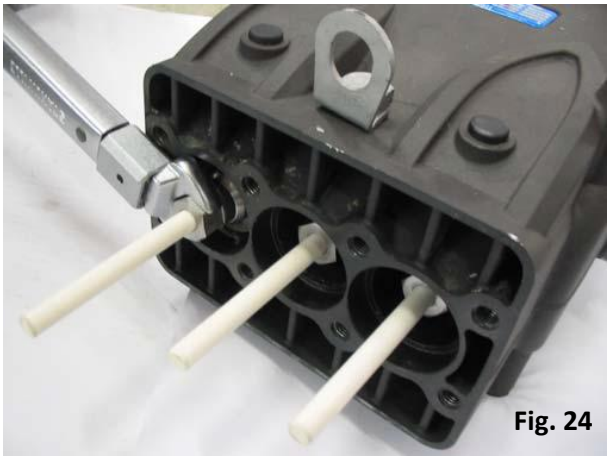


Fig. 24

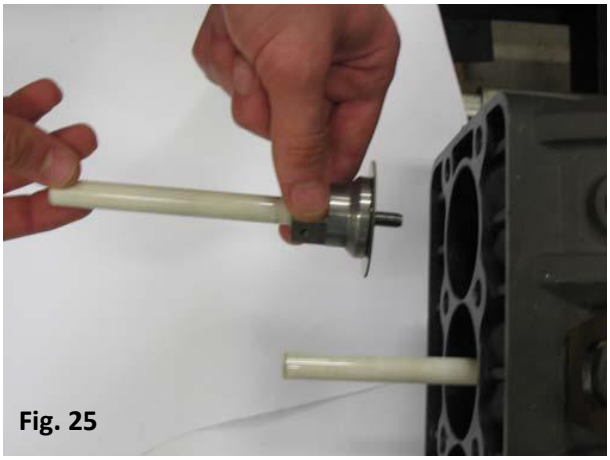


Fig. 25

B) Remove the pumping assembly with a fork wrench and check for wear as indicated in fig. 24- 25; replace if necessary.

Fig. 26

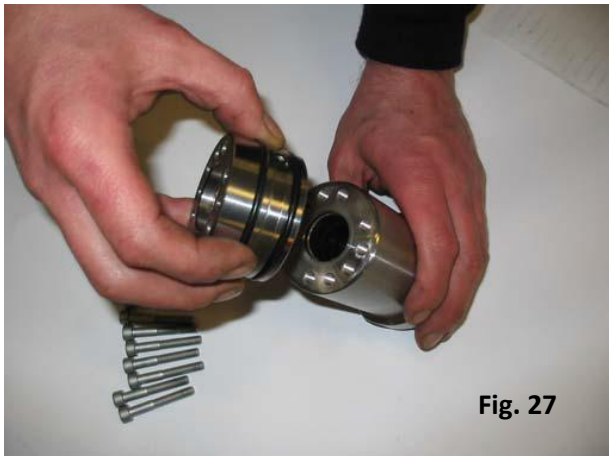


Fig. 27

C) Remove the M 6x40 screws of the liner support as indicated in fig. 26, and separate the support as shown in fig. 27.

Fig. 28

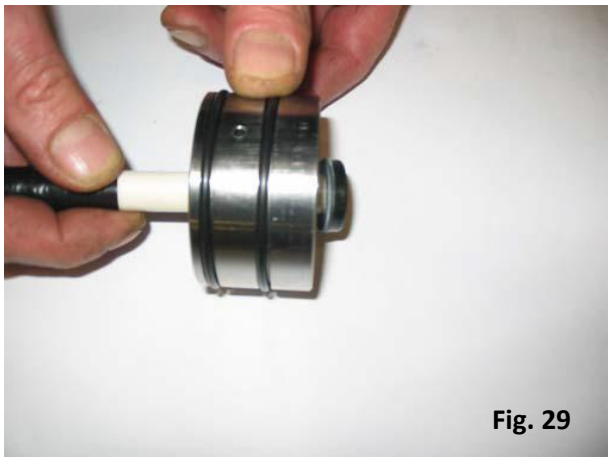


Fig. 29

D) Remove the snap ring and the seal retainer ring as shown in fig. 28, and with an opposite plastic pin extract the L.P. (low pressure) gasket **[1]** as shown in fig. 29.

At each disassembly, the low pressure seals and all O-rings must be replaced.

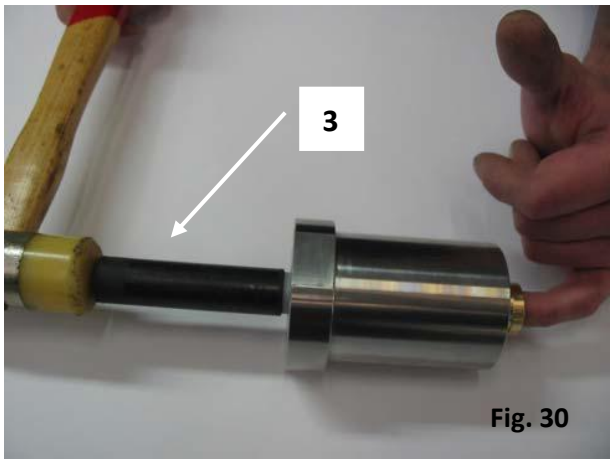


Fig. 30

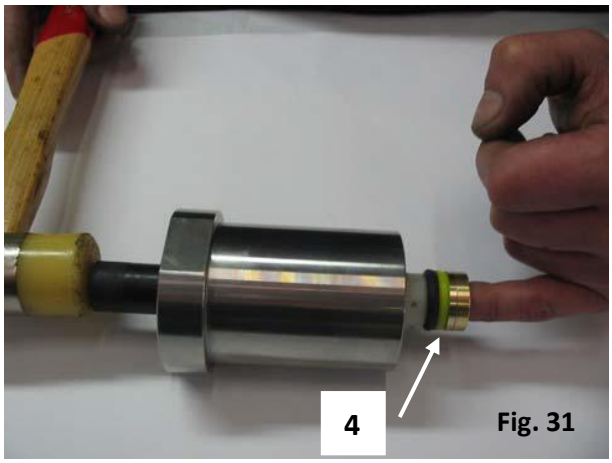


Fig. 31

E) With the liner separated from the support, and with an opposite plastic pin **[3]** as shown in fig. 30, push out the H.P. (high pressure) packing **[4]** by operating as in fig. 31.

At each disassembly, the HP packing **[4]** fig. 31 must be replaced.

Assembly of the piston unit – supports – seals

To reassemble the components, invert the operations paying attention to the sequences listed below; for fastening torque values and phases, please respect the indications in Screw Calibrations.

A) Insert the upper bush into the liner.

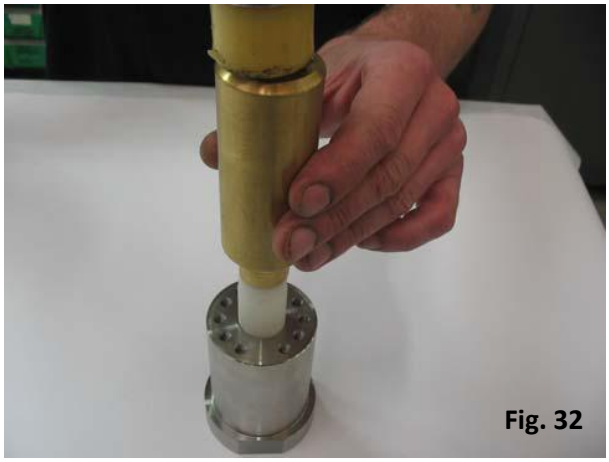


Fig. 32

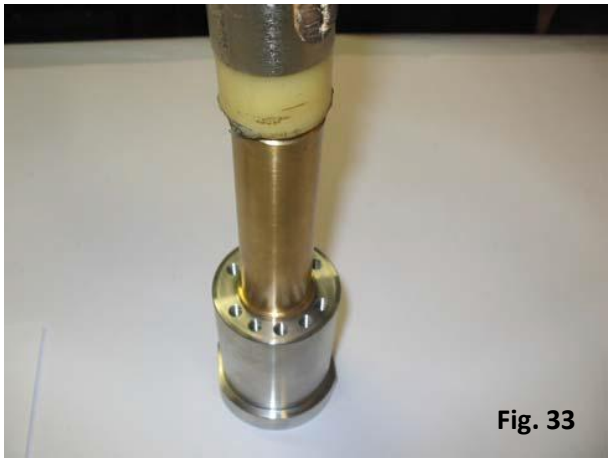


Fig. 33

For the correct axial positioning of the bush, use the opposite tool CJL10PT002 as shown in fig. 32 and 33.

Fig. 34

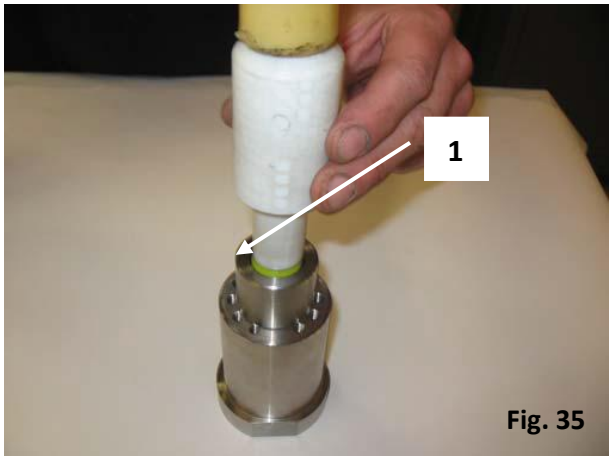


Fig. 35

B) Insert the H.P. packing; considered the slight interference between the seal and the liner, to avoid damage we advise to use the opposite tool **[1]** CJL10PT004 and CJL10PT008 as shown in fig. 34 and 35.

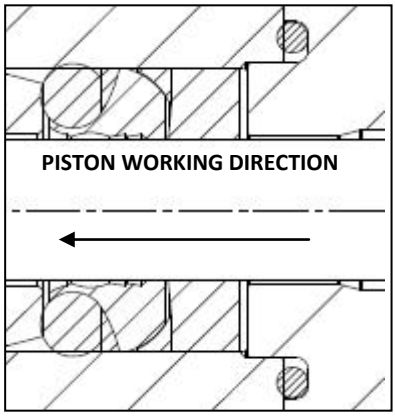


Fig. 36

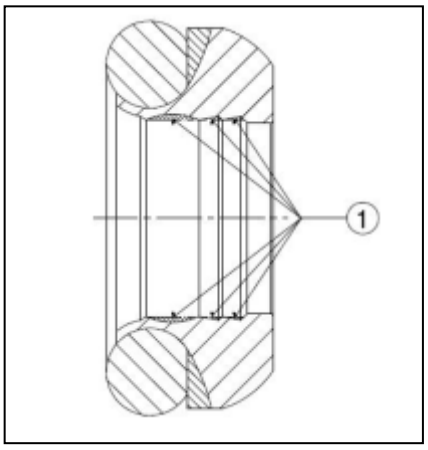


Fig. 37

Fill pockets with grease

The H.P. seal must be inserted into the liner with the OR ring in the piston working direction as shown in fig. 34 and 36.

Before inserting them into their seats, the H.P. seals must be lubricated with silicone grease Type OKS1110, following the operations listed below:

A) The external diameter must only be slightly greased;
B) On the internal diameter, grease must be applied paying great attention to filling all the pockets between the sealing lips as shown fig. 36/a.

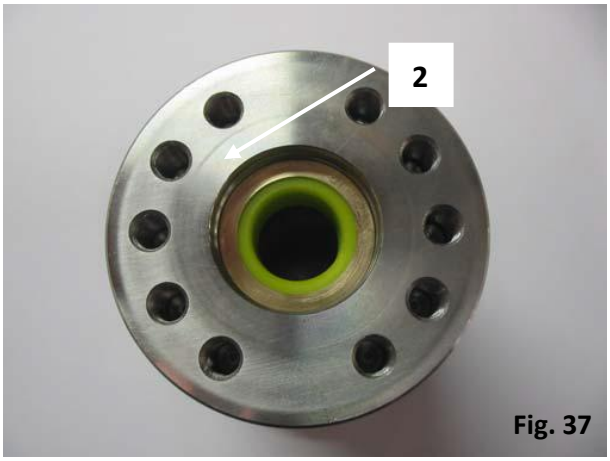


Fig. 37

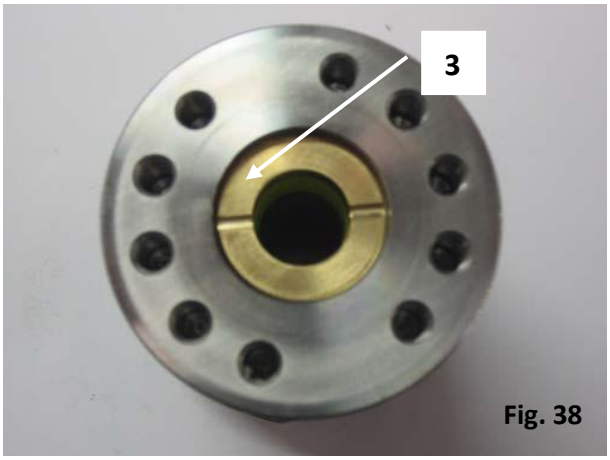


Fig. 38

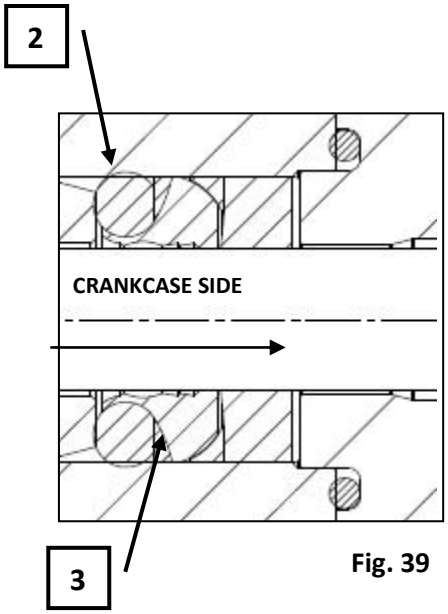


Fig. 39

C) Insert the anti-extrusion ring **[2]** and the gasket bush **[3],** arranged as shown in fig. 37 – 38 – 39

The gasket bush **[3]** must be introduced into the liner with the outlets facing outwards (crankcase side) as shown in fig. 38 and in fig. 39.

The L.P. seal must be inserted into the liner with the sealing lip in the piston working direction as shown in fig. 40 and fig. 41, slightly lubricating the external diameter with silicone grease type OKS 1110.

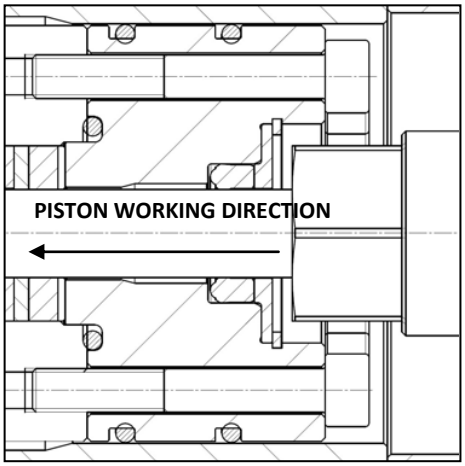


Fig. 40

Fig. 41

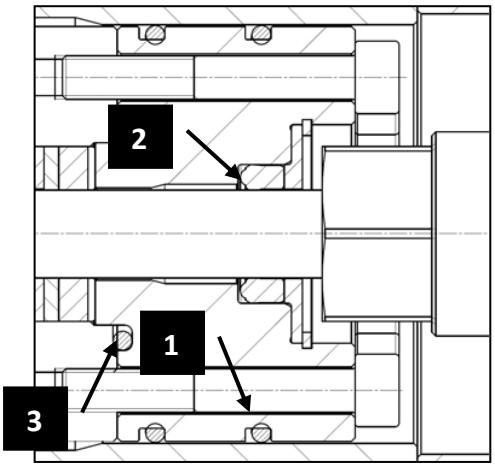


Fig. 42

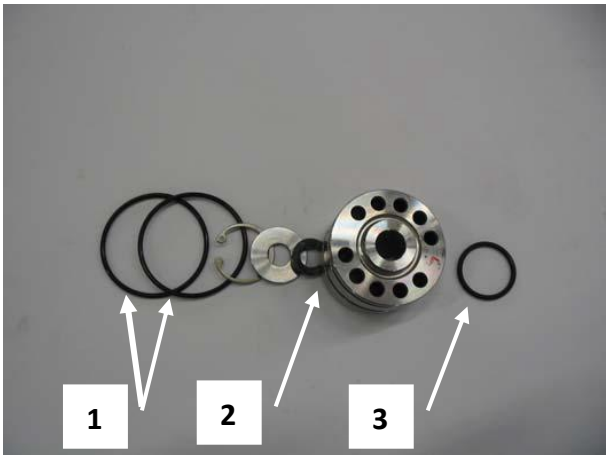


Fig. 43

D) Reassemble the seals support unit as shown in fig. 42 – 43, replacing components **[1] [2] [3]**.

Fig. 44

E) Assemble the support - liner unit by manually screwing the M 6x40 screws as shown in fig .44, and then proceed with calibration using a torque wrench as indicated in 3.

SCREW CALIBRATION

Screw calibration by means of a torque wrench only.

Description	Exploded view position	Fastening Torque Nm
Cover fastening screws	9	10
Oil discharge plug	11	40
Lifting bracket fastening screw	17	100
Conrod caps fastening screw	18	38*
Piston fastening	28	20
Choke	31	10
Support fastening screw	44	15****
Head fastening screw	56	80**
Liner fastening screw	57	35***
Hydraulic motor flange screw	59	40

* The conrod caps fastening screws must be tightened respecting the phases indicated in “Point D” of page 6.

** The head fastening screws must be tightened respecting the phases and the order indicated in fig.45.

*** The liner fastening screws must be tightened respecting the phases and the order indicated in fig.45.

****The support fastening screws must be tightened in a single step, respecting the order indicated in fig.44.

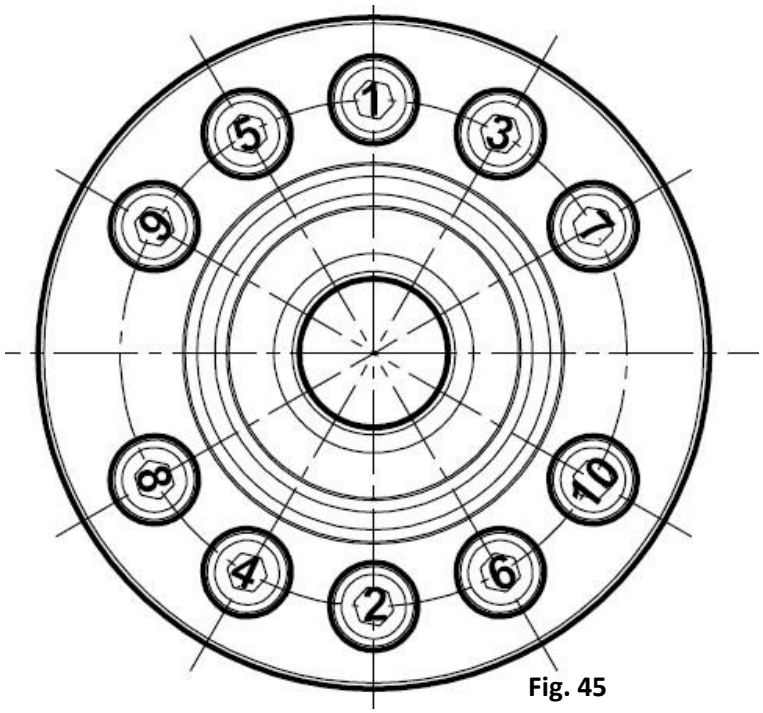
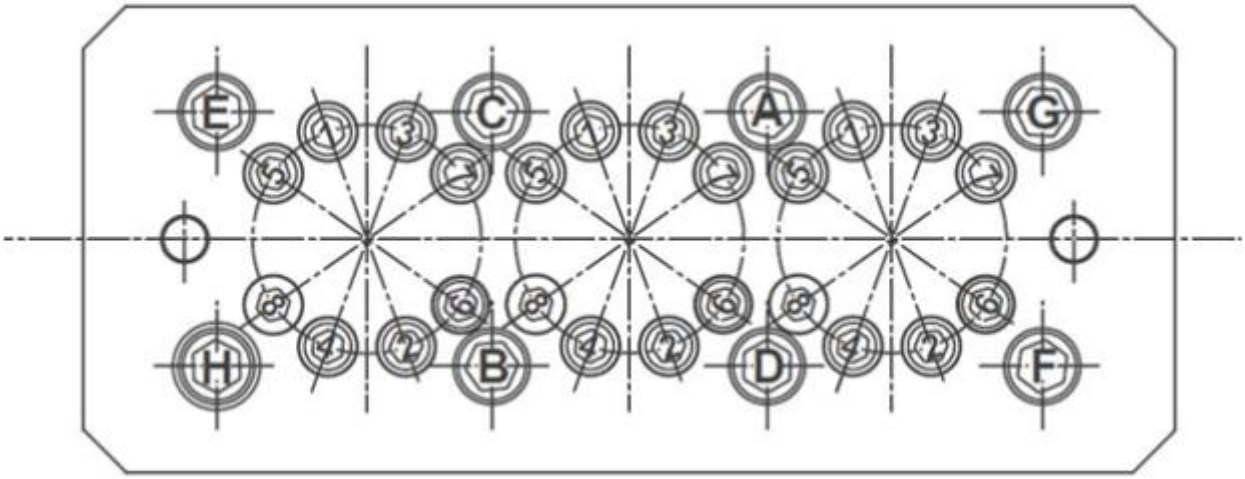


Fig. 45

Screw 44 and 57 of the exploded view, should be greased before being tightened by means of a torque wrench.

Tightening the head and liner screws



Operation 1: Tighten the M12x260 screws (pos. 57) in two steps:
[According to the sequence in the figure (A-B-C-D-E-F-G-H)]
1 – 40 Nm
2 – 80 Nm

Operation 2: Tighten the M8x100 screws (pos. 56) in four steps:
[According to the sequence in the figure (1-2-3-4-5-6-7-8)]
1 – 20 Nm
2 – 30 Nm
3 – 35 Nm
4 – 35 Nm

REPAIR TOOLS

Pump maintenance may be carried out using simple tools for assembling and disassembling components.

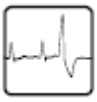
The following tools are available:

For assembly:
- Gasket bush - CJL10PT002
- HP seal packing - CJL10PT004 and CJL10PT008
- Piston guide oil seal - CJL10PT007
- Pump shaft oil seal - CJL10PT003
- Heads / liner manifold - CJL10PT001

For disassembly:
- Valve seats - CJL10PT005
- Heads / liner manifold - CJL10PT001
- Piston guide oil seal - CJL10PT006

PUMP TROUBLESHOOTING

The pump does not produce any noise at start-up:
- The pump is not primed and is running dry
- There is no water in the inlet line
- The valves are blocked
- The delivery line is closed and does not allow the air in the pump to be discharged



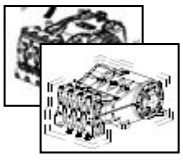
The pump pulses irregularly (knocking):
- Air suction
- Insufficient feeding
- Bends, elbows, fittings along the suction line obstruct the fluid's passage
- The inlet filter is dirty or too small
- The booster pump, where provided, supplies insufficient pressure or flow rate
- The pump is not primed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

The pump does not deliver the rated flow / is noisy:
- Insufficient feeding (see the causes listed above)
- RPM are less than the rated value
- Excessive amount of water by-passed by the pressure adjustment valve

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

Insufficient pump pressure:
- The nozzle is (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.
- Excessive belt tension or incorrect alignment of the joint or the pulleys
- Excessive inclination of the pump during operation



Pipe Vibrations or Knocking:
- Air suction
- Incorrect operation of the pressure adjustment valve
- Valve malfunction
- Irregular drive transmission motion

WARRANTY CONDITIONS

All our machines are subjected to strict tests and are covered against manufacturing defects in accordance with applicable regulations.
The warranty is effective from the date of purchase.
The warranty is only applicable if the machine is used in accordance with the instructions in this manual.

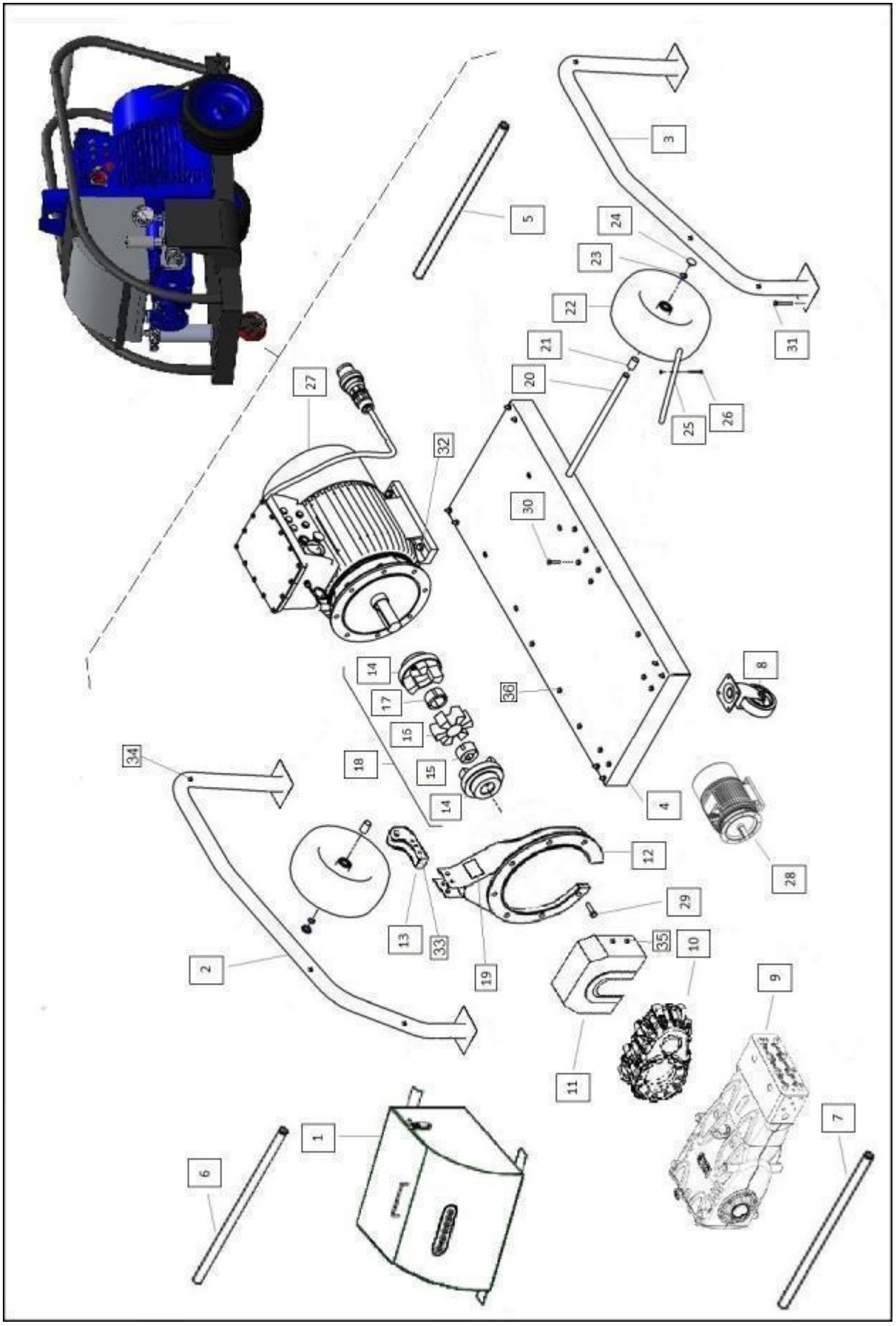
The following are not included in the warranty:
- Parts subject to normal wear. – Rubber parts, nozzles, hoses, filters and other consumable parts and accessories.
- Accidental damage, caused by transport, neglect or inadequate treatment, incorrect or improper use and installation failing
- The warranty shall not cover any cleaning operations to which the operative components may be subjected, such as clogged nozzles and filter blocked due to limestone.

DISPOSAL

As the owner of electrical or electronic equipment, the law (in accordance with the EU Directive 2002/96/EC of 27 January 2003 on waste from electrical and electronic equipment and the national laws of the EU Member States that have implemented this Directive) prohibits you from disposing of this product or its electrical / electronic accessories as municipal solid waste and obliges you to make use of the appropriate waste collection facilities.
The product can be disposed of by returning it to the distributor when a new product is purchased. The new product must be equivalent to that being disposed of.
Disposing of the product in the environment can cause great harm to the environment itself and human health.
The symbol in the figure indicates the urban waste containers and it is strictly prohibited to dispose of the equipment in these containers. Non-compliance with the regulations stipulated in the Directive 2002/96/EC and the decrees implemented in the various EU Member States is administratively punishable.

JE80-1500 WATER-BLASTER

Main Spare-parts Assembly



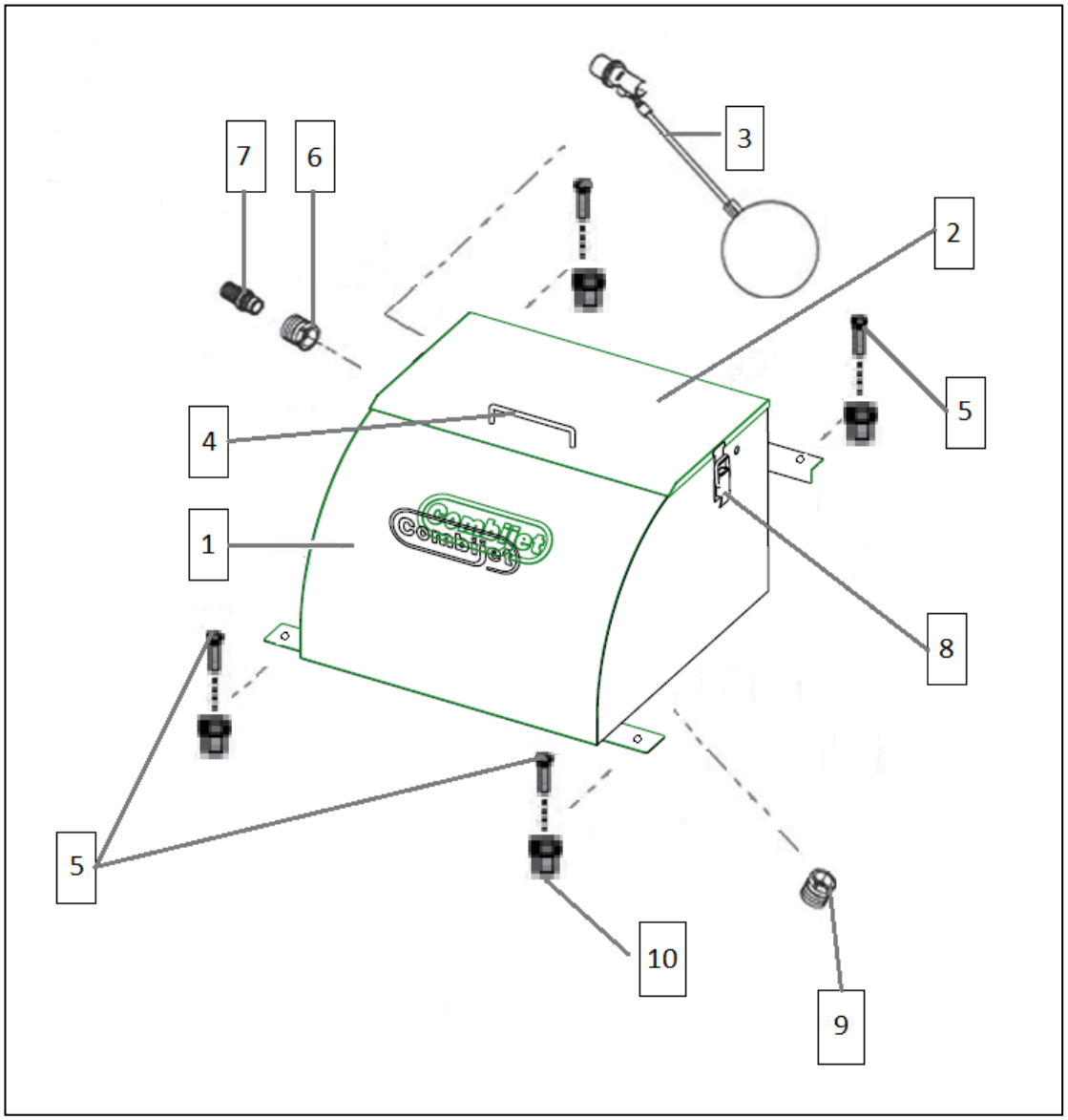
JE80-1500 WATER-BLASTER

Main Spare-parts List

POS.	ITEM NO.	QTY.	DESCRIPTION
1	CJL10T01	1	WATER TANK
2	CJL10M0003	1	FRAME RIGHT
3	CJL10M0004	1	FRAME LEFT
4	CJL10M0002	1	BASE PLATE
5	CJL10M0011	1	REINFORCEMENT ROD - BACK
6	CJL10M0010	1	REINFORCEMENT ROD - MIDDLE
7	CJL10M0012	1	REINFORCEMENT ROD - FRONT
8	CJ20120606	1	CASTOR WHEEL
9	CJL10P19	1	MAIN PUMP
10	CJL10P14	1	GEARBOX (OPTIONAL)
11	CJL10M0017	1	HOUSING
12	CJL10M0006	1	LIFTING FRAME
13	CJL10M0007	1	LIFTING EYE
14	CJL10C01	2	COUPLING HALF
15	CJL10C07	1	TABER BUSH
16	CJL10C02	1	RUBBER ELEMENT
17	CJL10C08	1	TABER BUSH
18	CJL10C05	1	COUPLING COMPLETE
19	CJL10M0022	1	NAMEPLATE
20	CJ20120663	1	AXLE
21	CJL10M0023	2	BUSHING
22	CJ20120466	2	WHEEL PNEUMATIC
23	CJL10M0013	2	CIRCLIP
24	CJL10M0015	2	HUB-CAP
25	CJL10M0005	1	MECHANICAL BRAKE
26	CJL10M0009	1	SCREW AND NUT
27	CJL10M1050	1	ELECTRIC MOTOR 50Hz
27	CJL10M1051	1	ELECTRIC MOTOR 60Hz
28	CJL10M03	1	FEED PUMP
29	CJL10M0014	8	SCREW [M14] (FOR LIFTING FRAME)
30	CJL10M0008	4	SCREW [M8] (FOR FEED PUMP)
31	CJL10M0014	8	SCREW [M14] (FOR FRAME LEGS)
32	CJL10M0016	4	SCREW [M16] (FOR ELECTRIC MOTOR)
33	CJL10M0014	3	SCREW [M14] (FOR LIFTING EYE)
34	CJL10M0010	6	SCREW [M10] (FOR THE RODS)
35	CJL10M0008	4	SCREW [M8] (FOR HOUSING)
36	CJL10M0008	9	SCREW [M8] (FOR BASE PLATE)

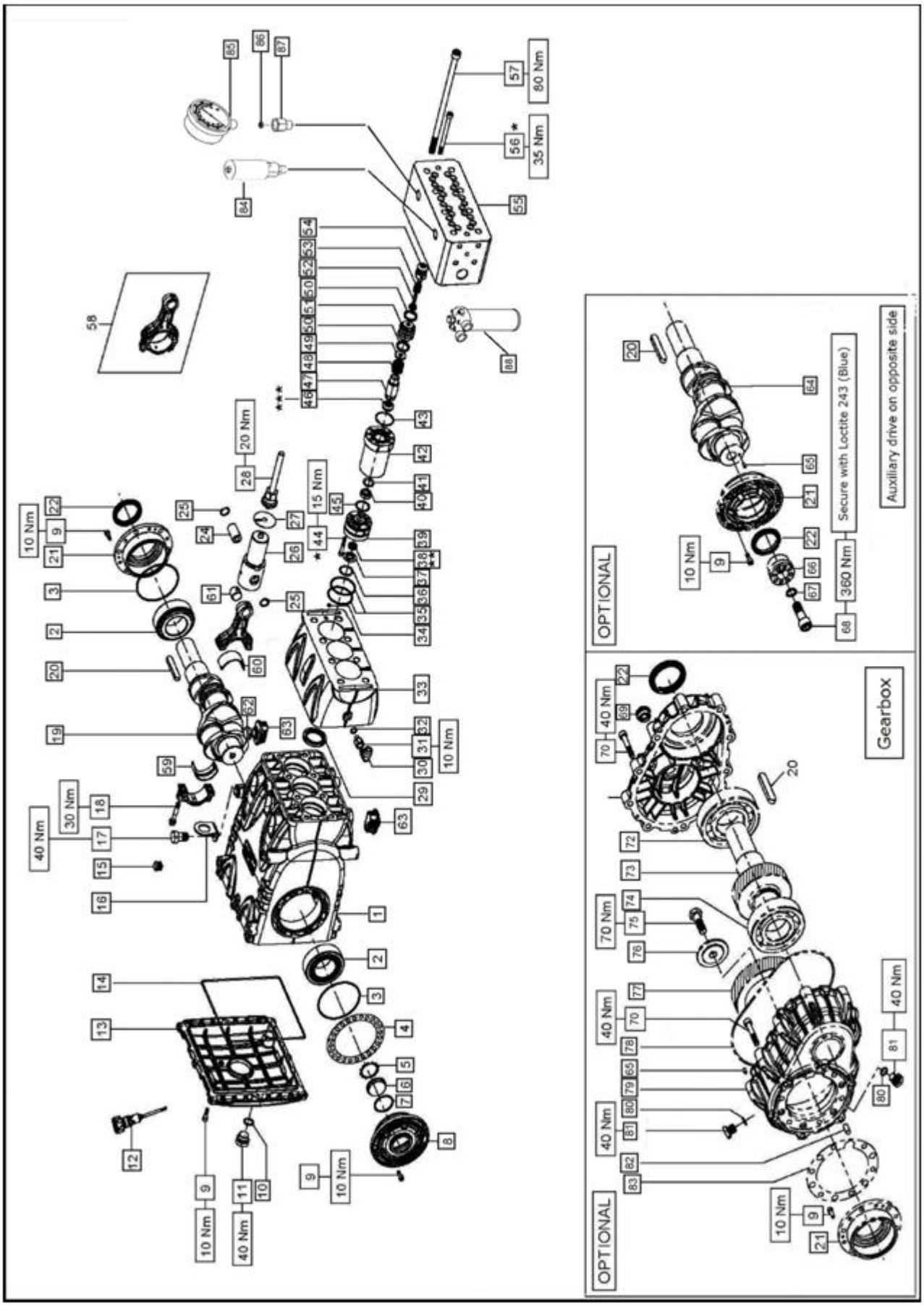
Water Tank Spare-parts Assembly and List

WATER TANK (COMPLETE) – CJL10T01



POS.	ITEM NO.	QTY.	DESCRIPTION
1	CJL10T0001	1	WATER TANK BODY
2	CJL10T0010	1	WATER TANK COVER
3	CJL10T0008	1	FLOAT VALVE
4	CJL10T0003	1	WATER TANK HANDLE
5	CJL10M0008	4	SCREW [M8]
6	CJL10T0007	1	QUICK COUPLING
7	CJL10T0006	1	QUICK COUPLING HOSE NIPPLE
8	CJL10T0002	2	LATCH
9	CJL10T0004	1	PLUG
10	CJL10T0009	4	ANTI-VIBRATION MOUNTS

Pump Spare-parts Assembly



JE80-1500 WATER-BLASTER

Pump Spare-parts List

PUMP (COMPLETE) – CJL10P19

POS.	ITEM NO.	QTY.	DESCRIPTION
1	CJL10P0032	1	OIL PAN
2	CJL10P0019	2	BEARING
3	CJL10P0014	2	O-RING
4	CJL10P0016	1	SHIM / ADJUSTING WASHER
5	CJL10P0040	1	SNAP RING
6	CJL10P0012	1	OIL LEVEL INDICATOR
7	CJL10P0022	1	O-RING
8	CJL10P0026	1	SIDE COVER / FLANGE
9	CJL10P0005	20	SCREW [M06X18]
10	CJL10P0011	1	O-RING
11	CJL10P0035	1	OIL DRAIN PLUG
12	CJL10P0038	1	OIL DIPSTICK
13	CJL10P0033	1	OIL PAN COVER
14	CJL10P0037	1	OIL PAN COVER SEAL
15	CJL10P0032	4	HOLE PLUG
16	CJL10P0006	1	LIFTING EYE/ LIFTING BRACKET
17	CJL10P0003	1	SCREW [M12X25]
18	CJL10P0008	6	SCREW – CONNECTING ROD
19	CJL10P0001	1	CRANKSHAFT
20	CJL10P0004	1	CRANKSHAFT KEY / TAB
21	CJL10P0002	1	SIDE COVER / FLANGE
22	CJL10P0013	1	SEAL
24	CJL10P0043	3	PIN
25	CJL10P0025	6	SNAP RING
26	CJL10P0036	3	GUIDE PISTON
27	CJL10P0028	3	WASHER
28	CJL10P0007	3	PISTON – COMPLETE
29	CJL10P0021	3	SEAL
30	CJL10P0015	1	90^0 ELBOW FITTING
31	CJL10P0017	1	CHOKE
32	CJL10P0020	1	WASHER
33	CJL10P0029	1	CYLINDER LINER BLOCK
34	CJL10P0023	1	O-RING
35	CJL10P0024	6	O-RING
36	CJL10P0042	3	SEAL
37	CJL10P0034	3	SEAL
38	CJL10P0039	3	SEAL
39	CJL10P0031	3	SUPPORT SEAL
40	CJL10P0027	3	BUSHING SEAL
41	CJL10P0041	3	SEAL
42	CJL10P0030	3	CYLINDER
43	CJL10P0018	3	O-RING
44	CJL10P0009	30	SCREW

Pump Spare-parts List

POS.	ITEM NO.	QTY.	DESCRIPTION
45	CJL10P0048	3	O-RING
46	CJL10P0060	3	SEAL
47	CJL10P0057	3	BUSHING
48	CJL10P0046	3	SPRING
49	CJL10P0044	3	FLAT VALVE
50	CJL10P0050	6	SEAL
51	CJL10P0059	3	PISTON VALVE SEAT
52	CJL10P0063	3	VALVE
53	CJL10P0051	3	SPRING
54	CJL10P0064	3	VALVE GUIDE
55	CJL10P0068	1	PUMP HEAD
56	CJL10P0076	24	SCREW [M8X100]
57	CJL10P0072	8	SCREW [M12X260]
58	CJL10P0066	3	CONNECTING ROD – COMPLETE
59	CJL10P0054	3	HALF BUSHING
60	CJL10P0055	3	HALF BUSHING
61	CJL10P0070	3	BUSHING
62	CJL10P0061	3	OIL PLUG CAP
63	CJL10P0062	6	OIL PLUG
84	CJL10P0074	1	PRESSURE RELIEF VALVE
85	CJL10P0100	1	GAUGE
86	CJL10P0053	1	COPPER SEAL
87	CJL10P0069	1	NIPPLE ADAPTER
88	CJL10P0093	1	STAINLESS STEEL FILTER

Pump Spare-parts List

OPTIONAL: AUXILIARY DRIVE ON OPPOSITE SIDE – CJL10P1030

POS.	ITEM NO.	QTY.	DESCRIPTION
9	CJL10P0005	6	SCREW [M06X18]
20	CJL10P0004	1	CRANKSHAFT KEY / TAB
21	CJL10P0002	1	SIDE COVER / FLANGE
22	CJL10P0013	1	SEAL
64	CJL10P0080	1	CRANKSHAFT
65	CJL10P0083	1	PIN
66	CJL10P0082	1	
67	CJL10P0084	1	WASHER
68	CJL10P0081	1	SCREW [M16X45]

OPTIONAL: GEARBOX - CJL10P14

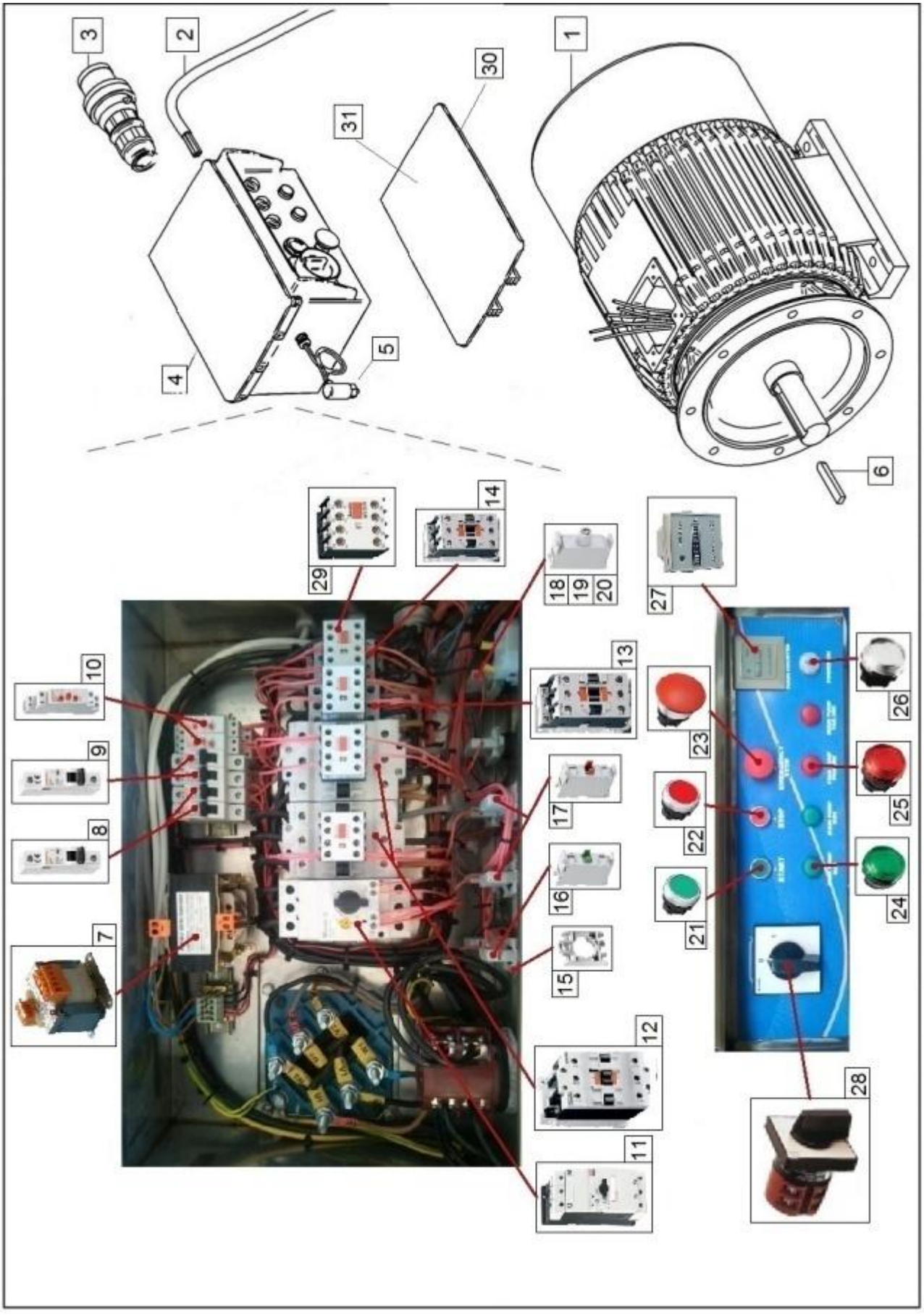
POS.	ITEM NO.	QTY.	DESCRIPTION
9	CJL10P0005	6	SCREW [M06X18]
20	CJL10P0004	1	CRANKSHAFT KEY / TAB
21	CJL10P0002	1	SIDE COVER / FLANGE
22	CJL10P0013	1	SEAL
69	CJL10P0090	1	OIL LEVEL INDICATOR
70	CJL10P0077	16	SCREW [M08X50]
71	CJL10P0045	1	GEARBOX COVER
72	CJL10P0052	1	BALL BEARING
73	CJL10P0049	1	PINION
74	CJL10P0058	1	BALL BEARING
75	CJL10P0067	1	SCREW [M12X40]
76	CJL10P0071	1	WASHER – FOR FASTENING CORONA
77	CJL10P0065	1	CORONA / RING GEAR
78	CJL10P0079	1	SEAL
79	CJL10P0056	1	GEARBOX BODY
80	CJL10P0047	2	O-RING
81	CJL10P0073	2	PLUG
82	CJL10P0076	1	PIN
83	CJL10P0078	1	GASKET (GEARBOX)

Pump Spare-parts Kits

ITEM NO./KIT DESCRIPTION	COMPONENTS (POS.)
CJL10K2037	34, 35, 38, 40, 41, 43, 45, 46
PLUNGER SEAL KIT	
CJL10K2038	50
VALVE SEAL KIT	
CJL10K2036	3, 7, 10, 14, 22, 29, 34, 35, 40, 41, 43, 45, 46, 50
COMPLETE SEALS KIT	

JE80-1500 WATER-BLASTER

Electrical System Spare-parts Assembly

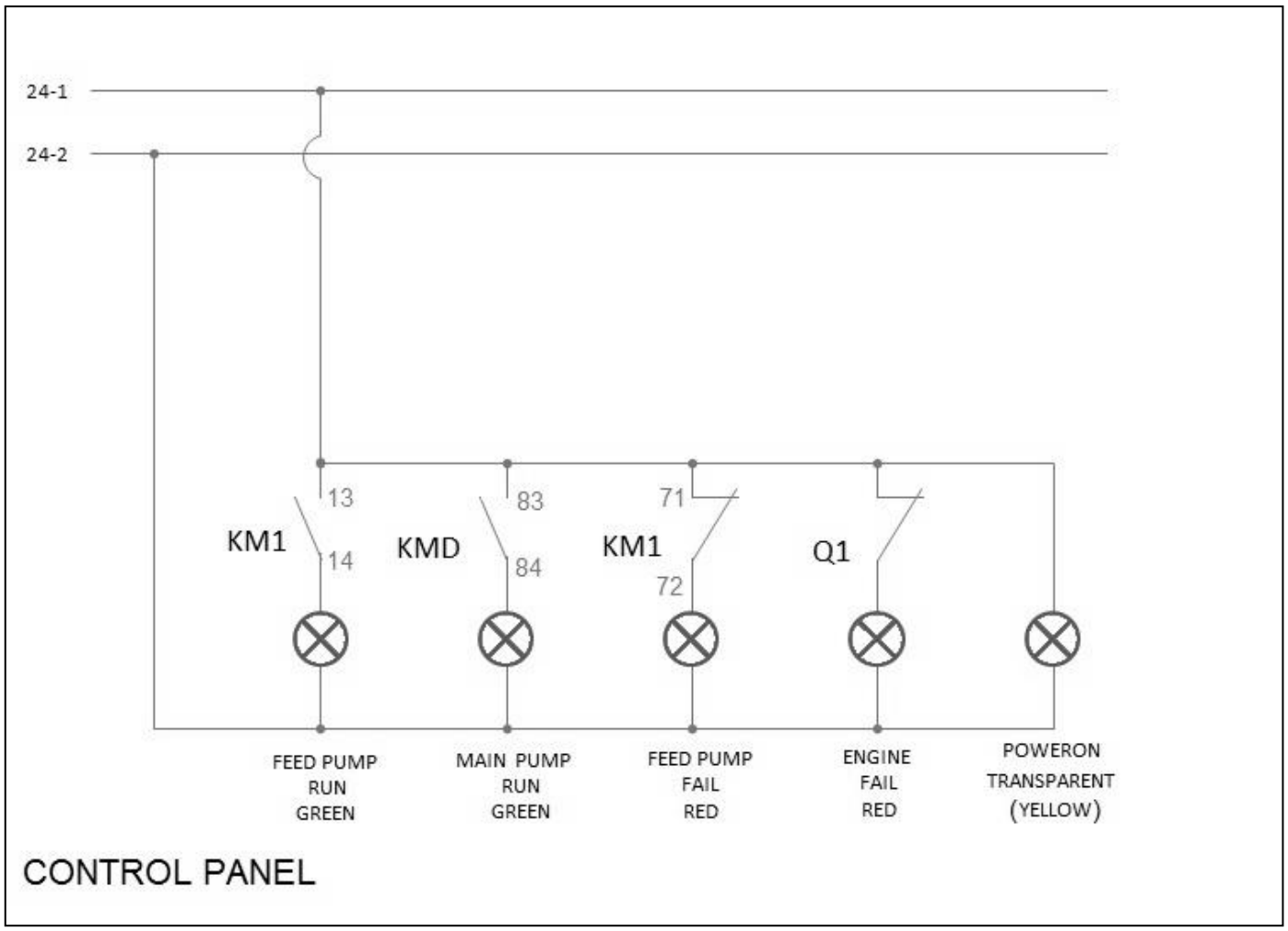


JE80-1500 WATER-BLASTER

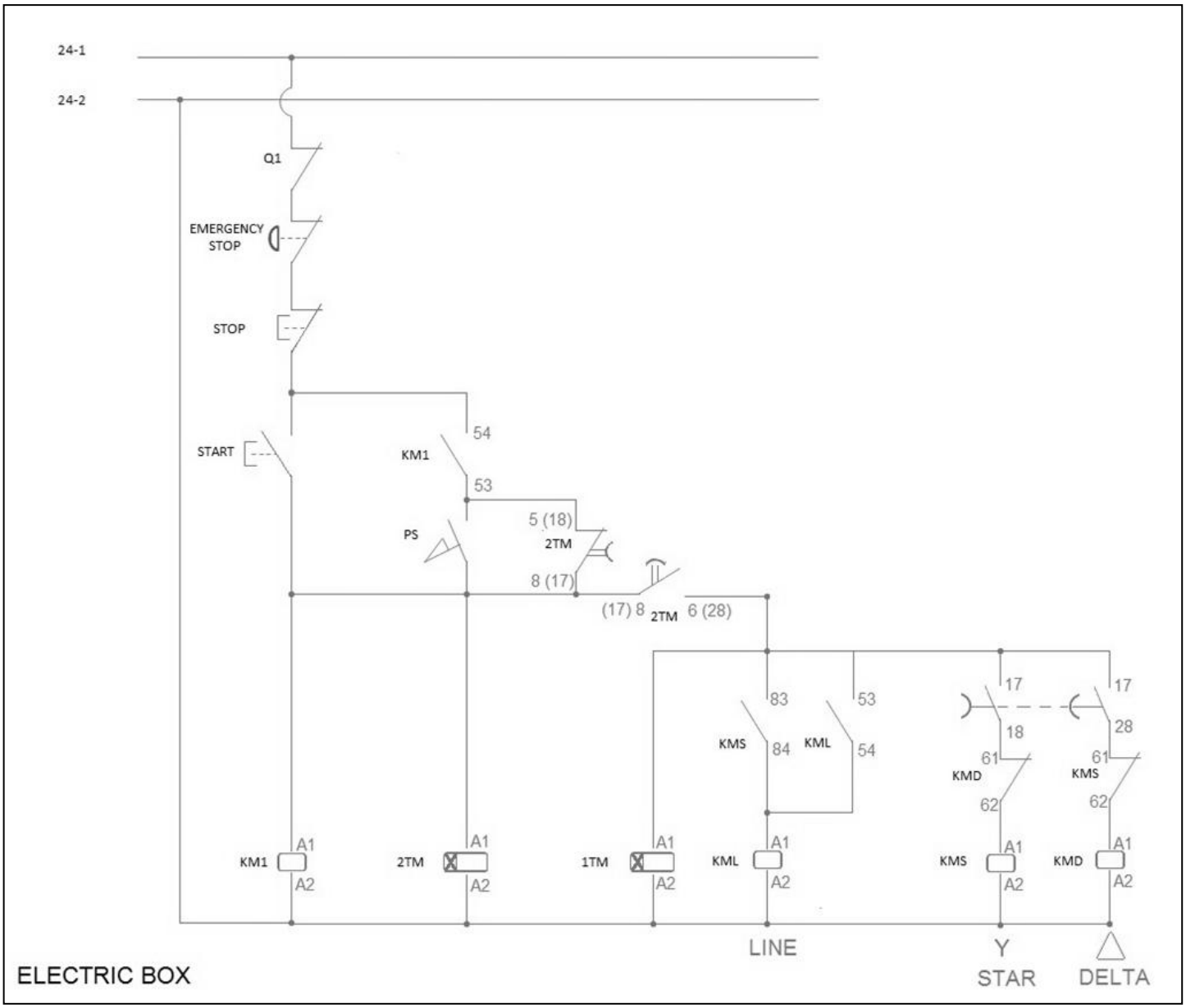
Electrical System Spare-parts List

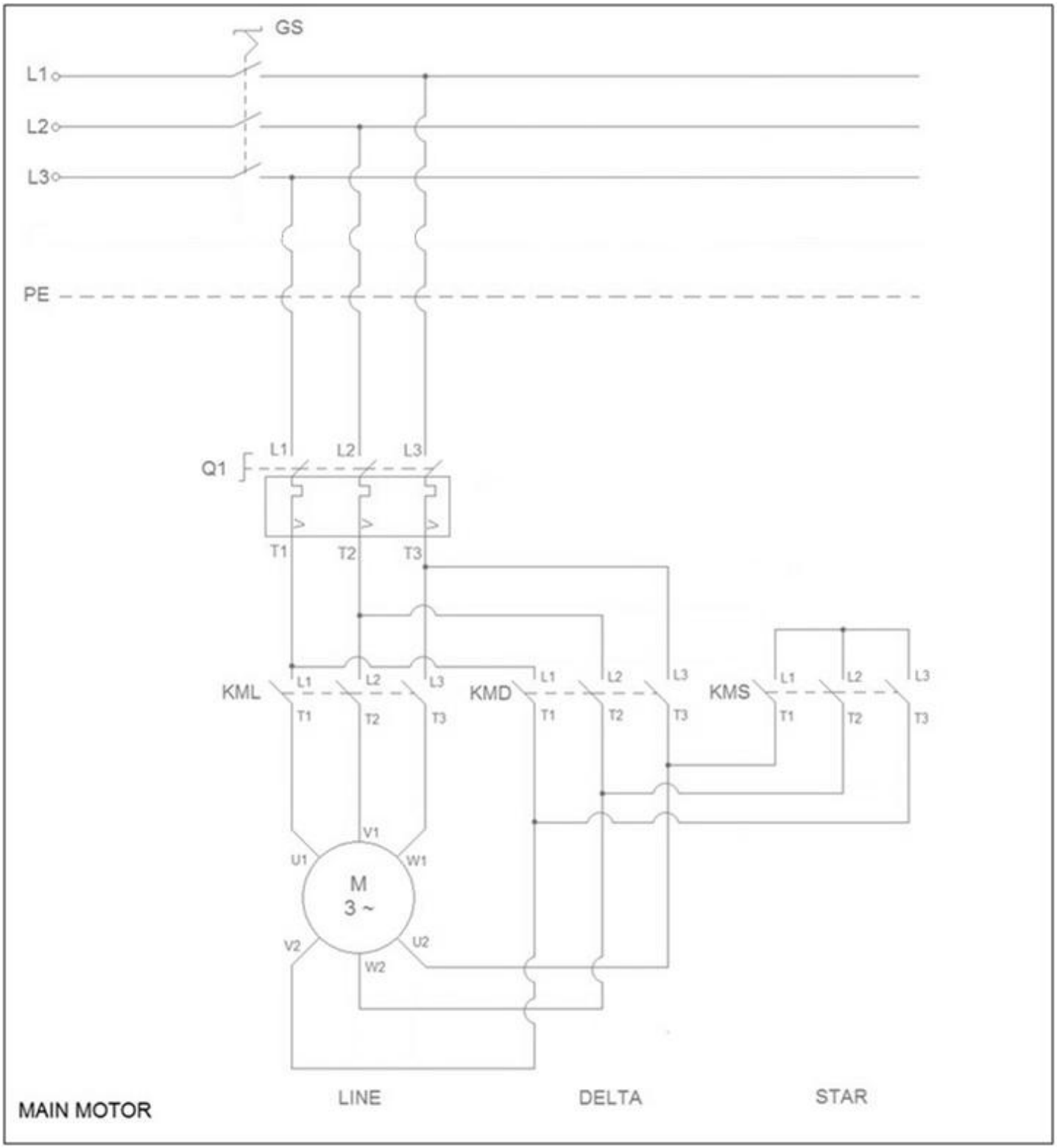
POS.	ITEM NO.	QTY.	DESCRIPTION
1	CJL10M1050	1	ELECTRIC MOTOR 50Hz
	CJL10M1051	1	ELECTRIC MOTOR 60Hz
2	CJL10E0027	1	ELECTRIC CABLE
3	CJL10E0026	1	PLUG CEE 5
4	CJL10B01	1	ELECTRIC BOX (BOX ONLY)
4	CJL10E1010	1	ELECTRIC BOX (COMPLETE WITH COMPONENTS)
5	CJL33950	1	PRESSURE SWITCH
6	CJL10E0033	1	KEY
7	CJL10E24	1	TRANSFORMER
8	CJL10E18	2	MINI CIRCUIT BREAKER
9	CJL10E19	2	MINI CIRCUIT BREAKER
10	CJL10E11	2	TIMER RELAY
11	CJL10E01	1	MOTOR PROTECTION CIRCUIT BREAKER
12	CJL10E03	2	3 POLE CONTACTOR
13	CJL10E04	1	3 POLE CONTACTOR
14	CJL10E02	1	3 POLE CONTACTOR
15	CJL10E17	10	MOUNTING ADAPTER
16	CJL10E06	1	AUXILIARY CONTACT – NO
17	CJL10E08	2	AUXILIARY CONTACT – NC
18	CJL10E13	2	LED LAMP HOLDER – GREEN
19	CJL10E16	2	LED LAMP HOLDER – RED
20	CJL10E15	1	LED LAMP HOLDER – WHITE
21	CJL10E21	1	PUSH BUTTON – GREEN
22	CJL10E22	1	PUSH BUTTON – RED
23	CJL10E20	1	MUSHROOM HEAD PUSH BUTTON – RED
24	CJL10E10	2	PILOT LIGHT HEAD – GREEN
25	CJL10E09	2	PILOT LIGHT HEAD – RED
26	CJL10E14	1	PILOT LIGHT HEAD – TRANSPARENT
27	CJL10E25	1	HOURMETER
28	CJL10E07	1	ROTARY ON/OFF SWITCH
29	CJL10E05	4	AUXILIARY CONTACT – CENTER MOUNTING
30	CJL10E0030	1	MOUNTING PLATE
31	CJL10E0031	1	ANTIVIBRATION RUBBER SHEET

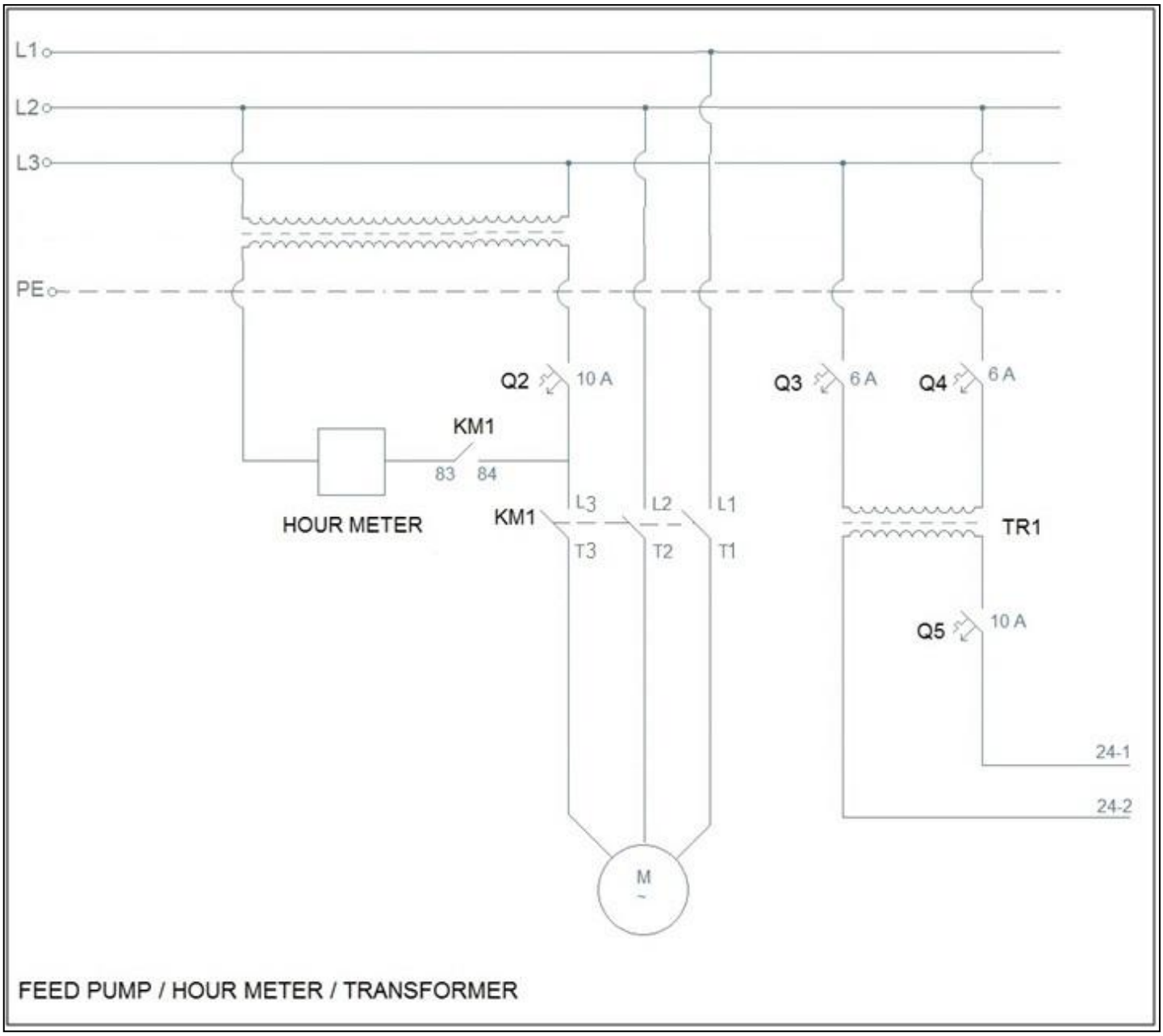
Wiring Diagrams



CONTROL PANEL

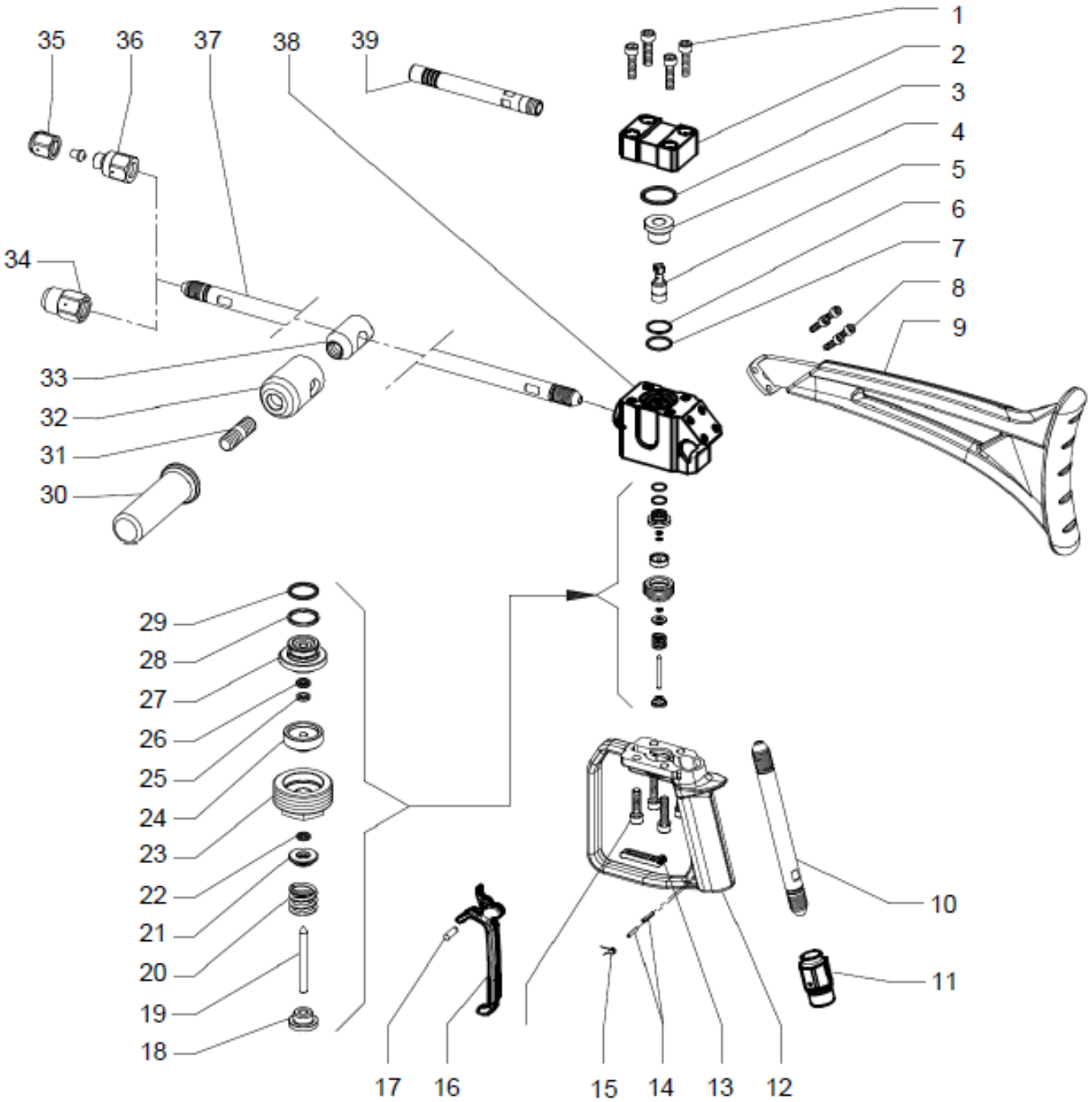

24-1
24-2
Q1
EMERGENCY STOP
STOP
START
KM1
54
53
PS
5 (18)
2TM
8 (17)
(17) 8
2TM
6 (28)
83
53
KMS
84
KML
54
17
17
18
28
61
KMD
61
KMS
62
62
KM1
A1
A2
2TM
A1
A2
1TM
A1
A2
KML
A1
A2
KMS
A1
A2
KMD
A1
A2
LINE
Y
STAR
DELTA
ELECTRIC BOX


GS
L1
L2
L3
PE
Q1
L1
L2
L3
T1
T2
T3
KML
KMD
KMS
V1
U1
W1
M
3 ~
V2
U2
W2
MAIN MOTOR
LINE
DELTA
STAR



FEED PUMP / HOUR METER / TRANSFORMER

Dump Gun Spare-parts Assembly



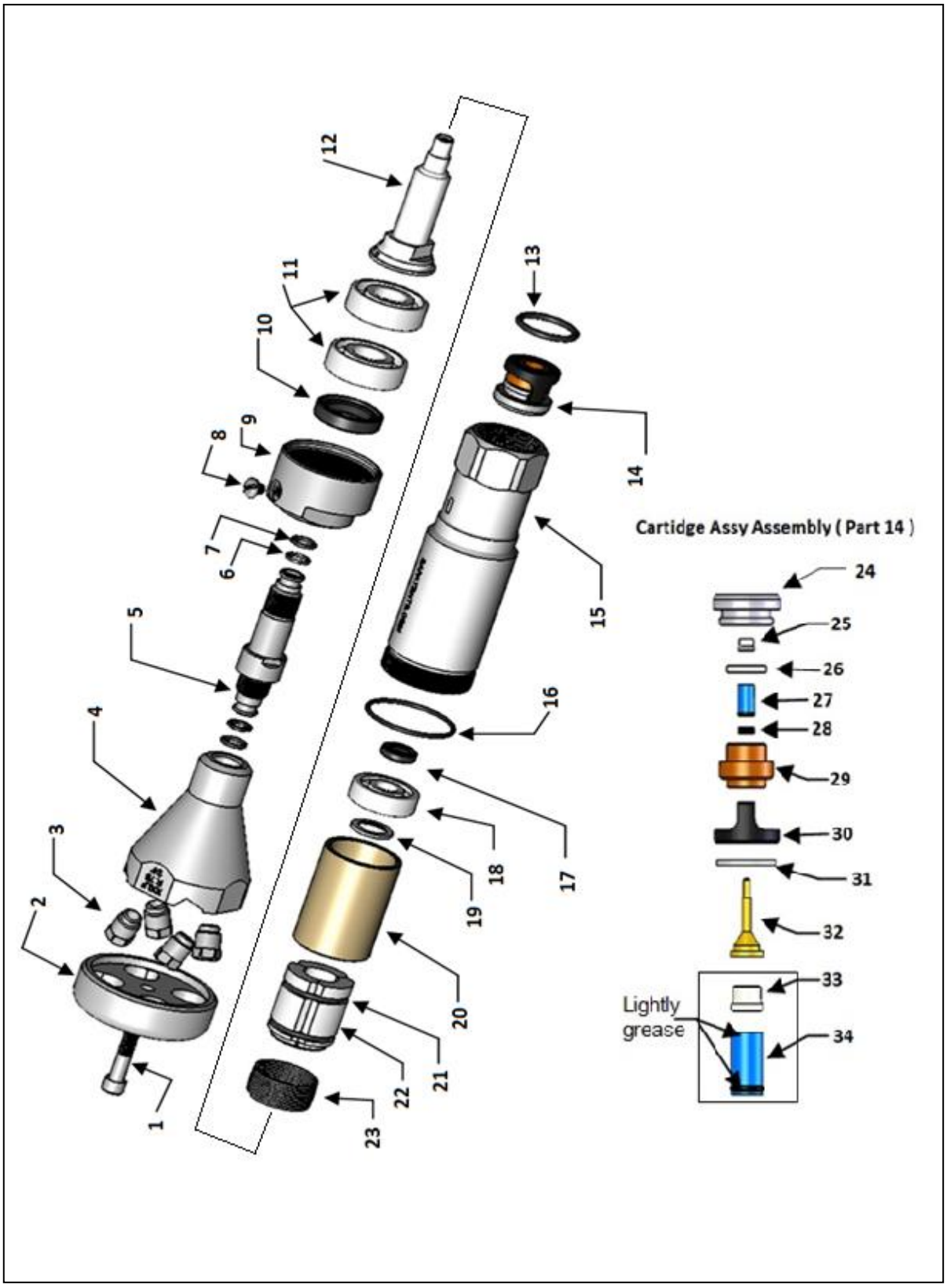
Dump Gun Spare-parts List

POS.	ITEM NO.	QTY.	DESCRIPTION
	CJL90G0002		GUN COMPLETE
1	CJL90G0006	8	SCREWS FOR COVER BODY
2	CJL90G0011	1	COVER BODY
3	CJL90G0068	2	O-RING Ø29.75X3.53
4	CJL90G0071	1	SEAT VALVE
5	CJL90G0086	1	PISTON
6	CJL90G0093	1	O-RING
7	CJL90G0096	1	O-RING Ø21.89X2.62
8	CJL90G0051	4	SCREW M6X16
9	CJL90G0078	1	SHOULDER STOCK
10	CJL90G0080	1	HOSE CONNECTION
11	CJL90G0087	1	NIPPLE F-M M18X1.5 – M24X1.5
12	CJL90G0057	1	HANDLE
13	CJL90G0059	1	SAFETY LEVER
14	CJL90G0089	2	SPIN PLUG Ø3X18
15	CJL90G0014	1	TORSION SPRING
16	CJL90G0016	1	CONTROL LEVER
17	CJL90G0017	1	LEVER PLUG Ø6X20
18	CJL90G0021	1	BUSH FOR NEEDLE
19	CJL90G0022	1	PIN FOR NEEDLE
20	CJL90G0015	1	SPRING Ø12.4X14
21	CJL90G0070	1	SPRING WASHER
22	CJL90G0072	1	O-RING Ø4X1.5
23	CJL90G0090	1	RING M30X1.5
24	CJL90G0048	1	GUIDING NEEDLE
25	CJL90G0050	1	O-RING
26	CJL90G0009	1	O-RING Ø3.69X1.78
27	CJL90G0010	1	BUSH GUIDING NEEDLE
28	CJL90G0037	1	O-RING
29	CJL90G0034	1	O-RING Ø12.42X1.78
30	CJL90G0035	1	HANDLE
31	CJL90G0026	1	STUD
32	CJL90G0027	1	HANDLE-SUPPORT
33	CJL90G0052	1	BUSH-LOCKING HANDLE
34	CJL90G0053	1	NIPPLE F-F M18X1.5-G1/4
35	CJL90G0055	1	RING FOR NOZZLE
36	CJL90G0056	1	NIPPLE FOR NOZZLE
37	CJL90G0074	1	TUBE M18X1.5
38	CJL90G0047	1	VALVE
39	CJL90G0041	1	DRAIN TUBE
	ITEM NO.	**QTY**	**DESCRIPTION / COMPONENTS (POS)**
	CJL90G0098	1	DUMP GUN REPAIR KIT / 3,6,19,22,25,26,28,29

NOZZLE LIST

ITEM NO.	QTY.	DESCRIPTION
CJ20120231	1	NOZZLE STRAIGHT JET SAPPHIRE 0.8 mm
	1	ULTRA IMPACT NOZZLE (SEE PAGE 53)

Ultra Impact Nozzle Spare-parts Assembly (Optional)



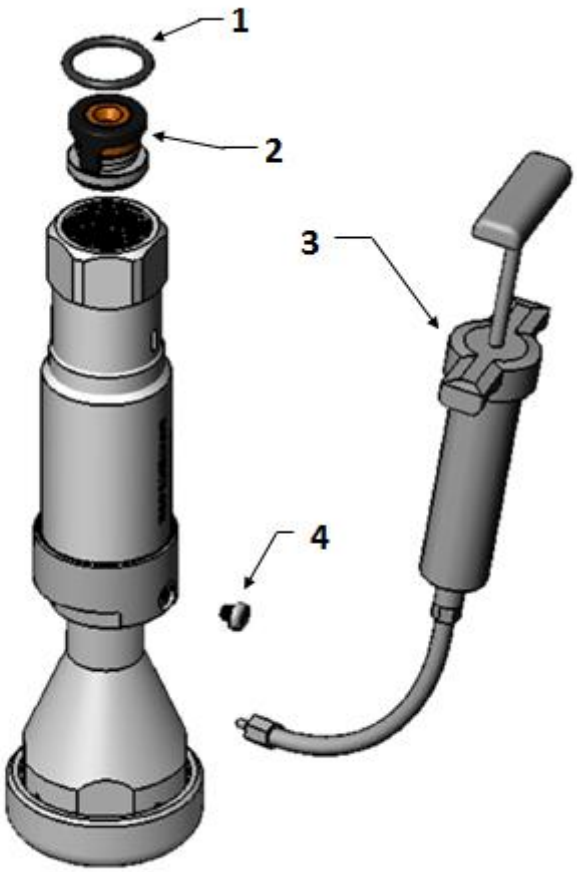
Ultra Impact Nozzle Spare-parts List (Optional)

POS.	ITEM NO.	QTY.	DESCRIPTION
	CJL90N0300		Ultra Impact Rotating Nozzle Extra Extra Low Flow 2,800bar (Excluding POS. 3 nozzles)
1	CJL90N0248	1	BOLT
2	CJL90N0299	1	SHIELD
3	*	4	NOZZLE
4	CJL90N0290	1	HEAD (EXTRA EXTRA LOW FLOW)
5	CJL90N0291	1	STUB SHAFT
6	CJL90N0103	1	BACKUP RING
7	CJL90N0192	1	O-RING
8	CJL90N0188	1	PORT SCREW
9	CJL90N0159	1	CAP
10	CJL90N0165	1	SHAFT SEAL
11	CJL90N0134	2	BEARING
12	CJL90N0123	1	SHAFT
13	CJL90N0155	1	O-RING
14	CJL30831	1	CARTRIDGE ASSY
15	CJL90N0147	1	BODY
16	CJL90N0119	1	O-RING
17	CJL90N0106	1	SHAFT SEAL
18	CJL90N0126	1	BEARING
19	CJL90N0181	1	WASHER
20	CJL90N0144	1	SLEEVE
21	CJL90N0186	2	GARTER SPRING
22	CJL90N0198	1	WEIGHTS
23	CJL90N0171	1	SPRING
24	CJL90N0124	1	RETAINING HOUSING
25	CJL90N0137	1	CARBIDE SEAT
26	CJL90N0196	1	SEAL RETAINER
27	CJL90N0141	1	HP SEAL ASSY
28	CJL90N0131	1	COMPRESSION SPRING
29	CJL90N0143	1	INLET SEAT HOUSING
30	CJL90N0139	1	SNAP FIT HOUSING
31	CJL90N0249	1	FLAT WASHER
32	CJL90N0197	1	MANDREL
33	CJL90N0137	1	CARBIDE SEAT
34	CJL90N0141	1	HP SEAL ASSY

Ultra Impact Nozzle Spare-parts List (Optional)

*	ITEM NO.	DESCRIPTION
*	CJL90N0112	JET NOZZLE SIZE 0.012” (0.30mm)
*	CJL90N0114	JET NOZZLE SIZE 0.014” (0.35mm)
*	CJL90N0116	JET NOZZLE SIZE 0.016” (0.40mm)
*	CJL90N0118	JET NOZZLE SIZE 0.018” (0.45mm)
*	CJL90N0120	JET NOZZLE SIZE 0.020” (0.50mm)
*	CJL90N0122	JET NOZZLE SIZE 0.022” (0.55mm)
		KITS (4 JET NOZZLES)
*	CJL90N0150	FOR 1500 BAR
*	CJL90N0130	FOR 1300 BAR
*	CJL90N0111	FOR 1000 BAR
*	CJL90N0180	FOR 800 BAR

Ultra Impact Nozzle Maintenance



POS.	ITEM NO.	QTY.	DESCRIPTION
1	CJL90N0155	1	O-RING
2	CJL30831	1	CARTRIDGE ASSY
3	CJ20120295	1	SYRINGE
4	CJL90N0188	1	PORT SCREW

Replacing the cartridge assy:

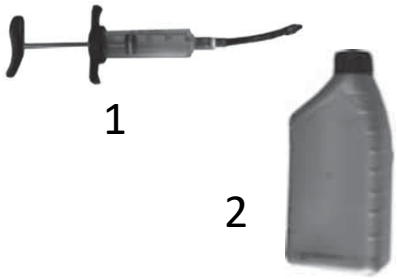
1. Remove the o-ring (CJL90N0155) from the inlet port. It is easiest to push it upward from the round weep hole.
2. If necessary, use two picks inserted through the slots to pry the cartridge assy up and out of the body.
3. Turn the swivel inlet end up; insert a fresh cartridge assy into the inlet port and re-insert the o-ring behind the cartridge assy to secure it in place.

JE80-1500 WATER-BLASTER

Ultra Impact Nozzle Maintenance

Unscrew plug

D



Discard of old oil in a proper manner fill it with new oil

Press new oil in

Screw the plug on

Ultra Impact Nozzle Maintenance Procedure & Spare Parts List

POS.	ITEM NO.	QTY.	DESCRIPTION
1	CJ20120295	1	SYRINGE FOR ULTRA IMPACT NOZZLE
2	CJ20120445	1 LTR	OIL

Recommended oil change / refill every 20 to 40 hours of operation.
Do NOT operate the Ultra Impact Nozzle without oil.

Ultra Impact Nozzle Troubleshooting

Troubleshooting

High pressure seal leak: If water is coming out of the single round hole in the body, it is the inlet connection that is leaking. If water is coming out of the slots in the body, it is the high pressure seal that is leaking. Remove the tool from the gun and remove the o-ring (CJL90N0155) that holds in the cartridge. Replace the cartridge. A slight drip to small stream leakage may be present from the cartridge while the tool reaches pressure, this leak may gradually become present over time. This leakage is considered normal and should be eliminated when the tool reaches the full operating pressure as the dump or pressure shut-off mechanism is engaged.

Seals wear out quickly: Remove and inspect the cartridge parts. The carbide seat should be checked for chips or erosion parts on it. When the life of the high pressure seal becomes noticeably less, the seal retainer needs to be replaced. Also replace the carbide seat if it has not been replaced with each seal change. Very rarely, the spring that controls the speed of the tool will break, allowing the tool to spin too fast and quickly wear out the seal.

Will not rotate: Check the nozzles to see if they are plugged or partially plugged. To clean them, they must be removed from the head; it does not do any good to poke the material plugging the nozzle back into the head. Check that the nozzles are the correct size based on the table given in previous page. If all of these things appear to be correct, the tool may need to be disassembled and repaired. If the tool has just been rebuilt, and the tool starts to spin but stops as pressure is increased, the bearings (CJL90N0134) are installed backwards and the tool must be disassembled and fixed.

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