



**CD50-2000 Bar
UHP Water-Jetting Unit**

**Diesel Driven
MECHANICAL BOOSTER PUMP**

**User Guide
Maintenance Guide
Spare-parts book**



RTH Renders Technischer Handel
Böttcherweg 27
25355 Barmstedt

Telefon: +49 4122 - 55 444
Mobil: +49 172 - 411 30 90
Fax: +49 4122 - 95 38 64

Thank you for choosing our water blaster. For your safety and correct operation, please carefully read the information and instructions in this manual before use.

NOTE: All of the information stated in this manual is based on data available at the time of printing. DEN-JET reserves the right to modify or change its products and / or specification data at any time without prior notice.

DEN-JET has no responsibility or liability regarding misuse of the product or use of the product with third party products.

DEN-JET warranty's is limited to repair or replacement of faulty items at the time of manufacture.

DEN-JET has the copyright for this material and all kinds of reproduction are prohibited without DEN-JET's permission.

Model:	CD50 UHP
Data:	
Pressure [Bar] [Psi]	2000 29000
Flow [L/min] US Gpm	11 2.9
Power [Hp] [Kw]	50 37
Fuel	Diesel
Engine Speed [Rpm]	1900-2000
Dimensions LxWxH [mm]	1500 x 920 x 1000
Weight [Kg]	650

General information	
Specification data	2
Index	3
Certificate(s) of conformity	4
Safety precautions	5-6
Medical emergency information	7
Set-up & Use	
Set-up & Use	8
Remote control (optional)	9
Remote Junction box (optional)	10
Daily Inspection	11
Maintenance Pump	
Lubrication	12
Cleaning	12
Storage	12
Trouble shooting / Repair Unit	
Problem / Repair / Service	13-20
Maintenance / Service Diesel Engine	
Lubrication	21
Fuel	21
Air	21
Cleaning	21
Storage / Antifreeze	21
Trouble shooting / Repair Diesel Engine	
Problem / Repair / Service	22-23
Spare-part lists	
CD50 Main Spare-part assembly	24-25
Diesel Tank Spare-part assembly	26-27
Water Tank Spare-part assembly	28-29
Motor-Pump Unit Spare-part assembly	30-31
Pump Unit	32-33
Pump Spare-part assembly	34-36
Power end Spare-parts assembly	37-38
Rupture disc	39-40
Linear Actuator	41-42
Wiring diagram	43
Water Gun	44-51

Machine directive Certificate of E.U conformity:

DEN-JET Nordic A/S
Terndrupvej 7, Astrup
DK-9510 Arden
Denmark

According to E.U. Machine Directive 2006/42/EC. Appendix IIA

We hereby declare that the Diesel driven high-pressure water blaster machine:
CD50-2000.

Has been designed, manufactured and tested to fully comply with the health and safety requirements of the E.U. machine regulations.

ANY modification or change of the machine without our prior consent will render this declaration null and void.

Appropriate E.U. regulations: E.U. Machine Directive (2006/42/EC) Current issue.
E.U. Low Voltage Directive (2006/95/EC)
E.U. EMC Directive (2004/108/EC).

Coordinated standards
Used particularly:

EN 809+A1	EN 1829-1
EN 1829-2/AC	EN 2100
EN 60204-1	EN 574+A1
EN 13857	EN 61000-6-4
EN 6100-6-2	

Date: November 2016

Benny S. Jensen

Managing Director.

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.

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 gun and high pressure hoses. 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.

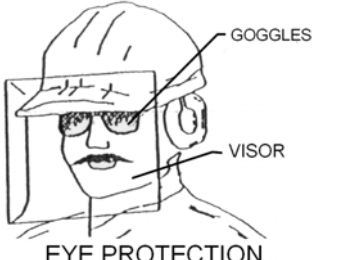
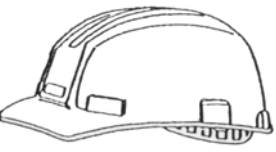

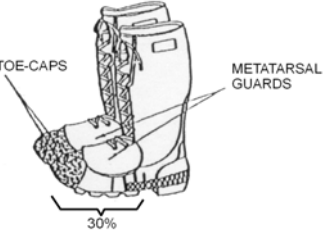

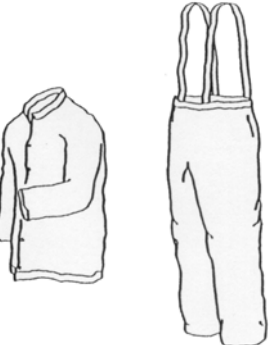
Before service or repair: Make sure the machine is turned off, and pressure is released from the system by pulling the trigger after shutting down the machine. The machine should be disconnected from the main power supply by pulling out the electrical plug.

NEVER attempt to stop a leak or tighten fittings when the system is under pressure.

NEVER block or restrict the movement of the gun trigger, it must be able to move freely in order to release pressure when not triggered.

Safety Precautions:

The below shown protective clothing and devices should be worn both by personnel operating the water blaster system and equipment and by those working nearby:

 <p>EYE PROTECTION</p>	<p>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.</p>
 <p>HEAD PROTECTION</p>	<p>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.</p>
 <p>HAND PROTECTION</p>	<p>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.</p>
 <p>FOOT PROTECTION</p>	<p>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.</p>
 <p>HEARING PROTECTION</p>	<p>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.</p>
 <p>PROTECTIVE CLOTHING</p>	<p>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.</p>

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.

MEDICAL ALERT

This card is to be carried by personnel working with high-pressure water jetting equipment. Obtain medical treatment immediately for ANY high-pressure water-jet injuries.



This person has been working with water jetting at pressures up to 55,000 psi (374Mpa, 3,740bar, 3,867 kg/cm²) with a jet velocity of up to 3,000 fps (914 mps). This should be taken into account during diagnosis. Unusual infections with microaerophilic organisms occurring at lower temperatures have been reported. These may be gram-negative pathogens such as found in sewage. Bacterial swabs and blood cultures may therefore be helpful. A local poison control centre should be contacted for additional treatment information and advise.



DEN-JET Nordic A/S

Terndrupvej 7, Astrup, DK-9510 Arden, Denmark
Tel: +45 98 55 88 68 Fax: +45 98 55 88 18 www.denjet.com

Set-Up & Use:

Mount the 9/16" high-pressure hose on to the Water-blaster by screwing the Gland-nut on the hose end into the high-pressure outlet fitting on the left side of the cylinder-head. Mount the trigger gun with lance to the high-pressure hose. (1800 Bar version may be with 1/4"SW hose) Always use two wrenches when tightening the hoses. FLUSH hose(s) and gun and nozzle carrier WITHOUT Nozzles installed before operating at high pressure. Otherwise the very small orifices in the nozzle may block because of small debris, with risk of over pressure. SWITCH OFF MACHINE WHEN MOUNTING THE NOZZLES!

Prepare the water supply for the Water-blaster, by attaching a 1" hose to the supplied low pressure inlet coupling on the back 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. Never supply water via opened tank-lid .

Fill the diesel tank with clean diesel fuel.

Turn on the unit by turning the key to the preheating stage, wait a few seconds then turn key to start. Throttle up the engine by pulling or turning the throttle cable.

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

IMPORTANT: This machine must NEVER be operated directly with a dry-shut gun or foot valve. Always use a Dump-gun or a gun with a matching relief valve or dump valve.

Notice:

The machine is equipped with the following safety devices:

- a) Key switch for normal shut down (and start up), turn key counter clockwise to stop.
- b) Emergency Stop Button, at front side of unit, stops the machine when pushed in. Twist to reset.
- c) Low engine oil-pressure shut down.
- d) Low booster pump pressure shut down.
- e) High engine temperature shut down.
- f) Redundant Rupture disc assemblies, blows at over-pressure.



REMOTE CONTROL SENDER/RECEIVER (Optional)

JUNCTION BOX	REMOTE CONTROL	FUNCTION
A	-	Left: Manual Control (Junction box) Right: Remote control
Turn Key clockwise	GREEN BUTTON	Start
Turn Key counter clockwise	RED BUTTON	Stop, rotate red button to release/reset it after use
B	1	Increase rpm
C	2	Decrease rpm
D	3	Extract hose
E	4	Rewind hose
-	5	Optional
-	6	Optional

This page: Remote control, before using the remote control; make sure the junction box (next page) is set to remote control, and not manual control.

The green button starts the machine. 1 and 2 respectively increases and decreases the engines rpm.

The engine should be running with high rpm to achieve maximum pressure.

Buttons 3 and 4 is used to roll off the hose before use and for winding it in afterwards.

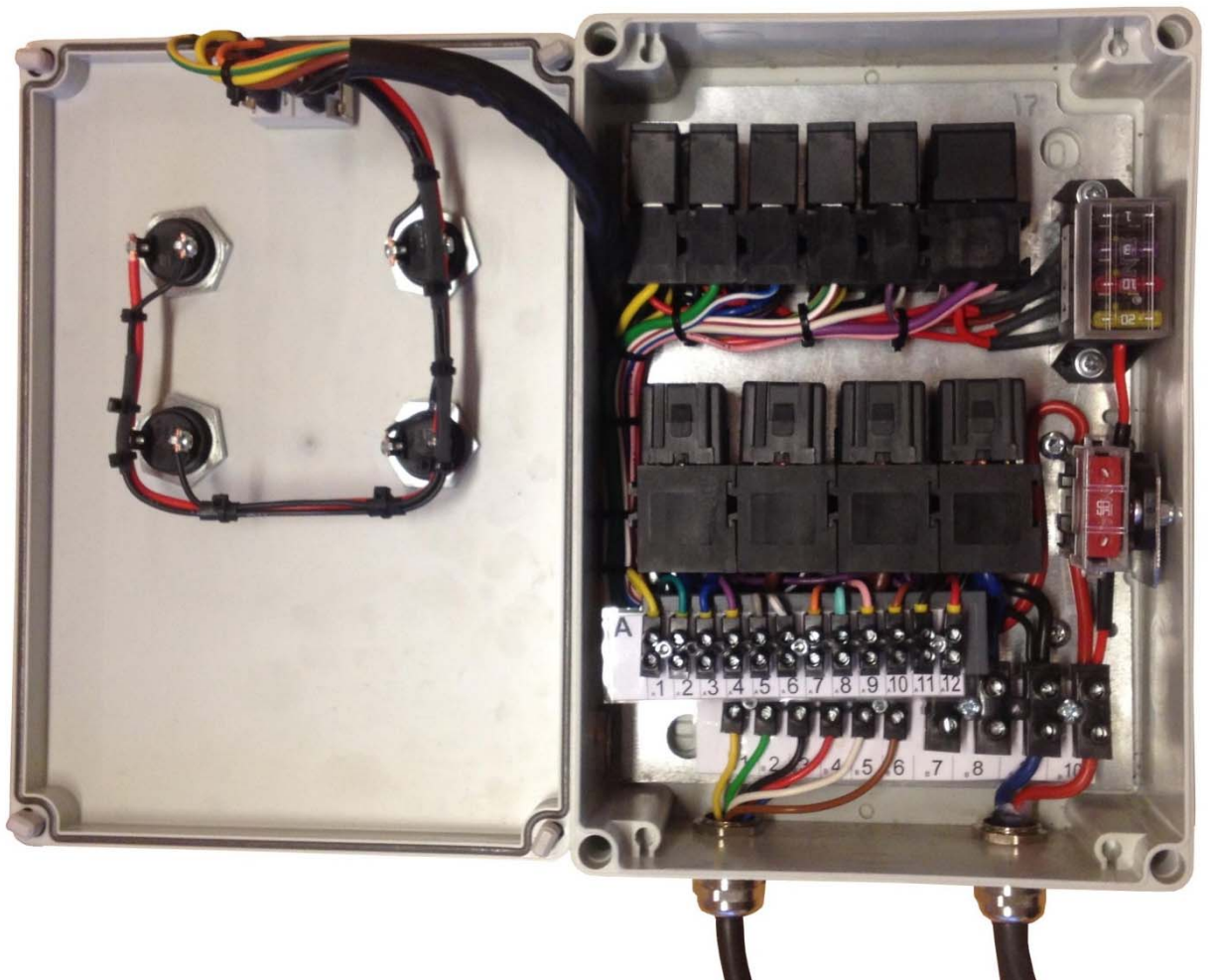
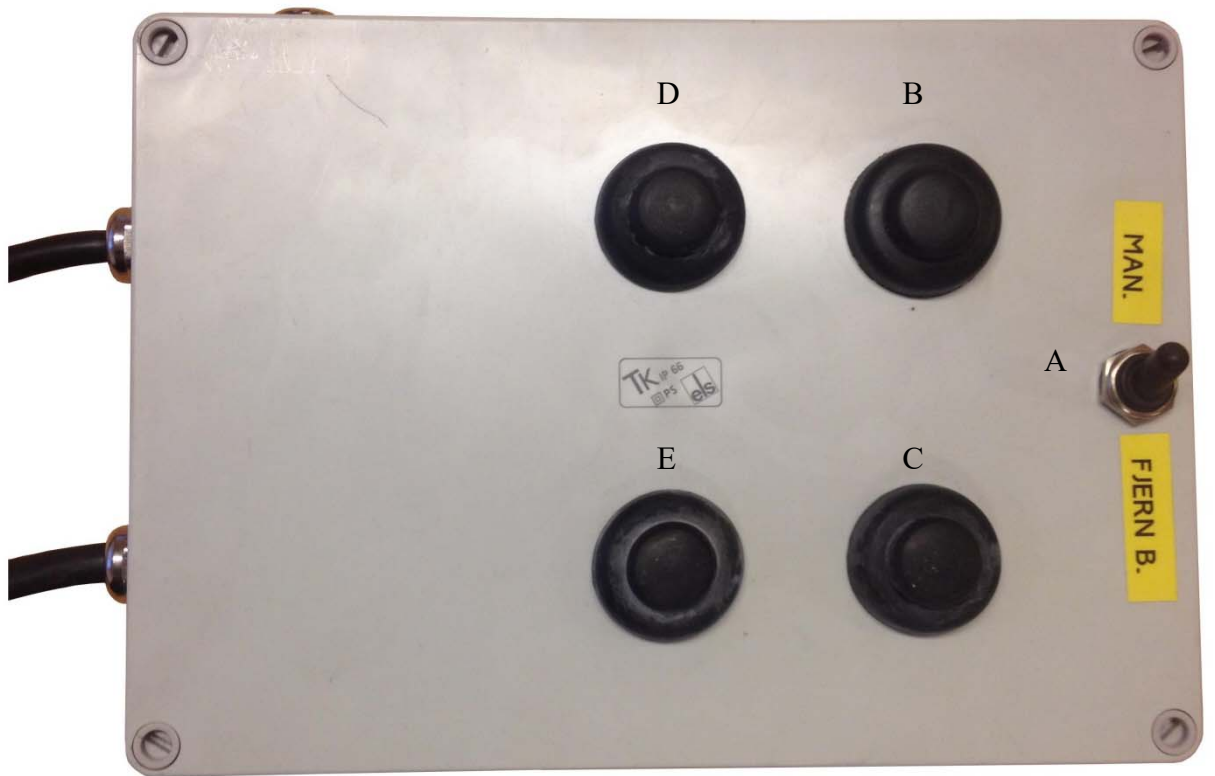
The buttons 5 and 6 is normally inactive but can be assigned to a specific task in some cases.

Next page: Junction box, the A switch should be switched to the left in order to use the junction box. To start the machine turn the key and wait a few seconds before increasing the rpm using the B button. C button is used to decrease the rpm.

Buttons D and E are used to extract and rewind the hose, if you have a model with automatic hose reel.



REMOTE JUNCTION BOX (Optional)

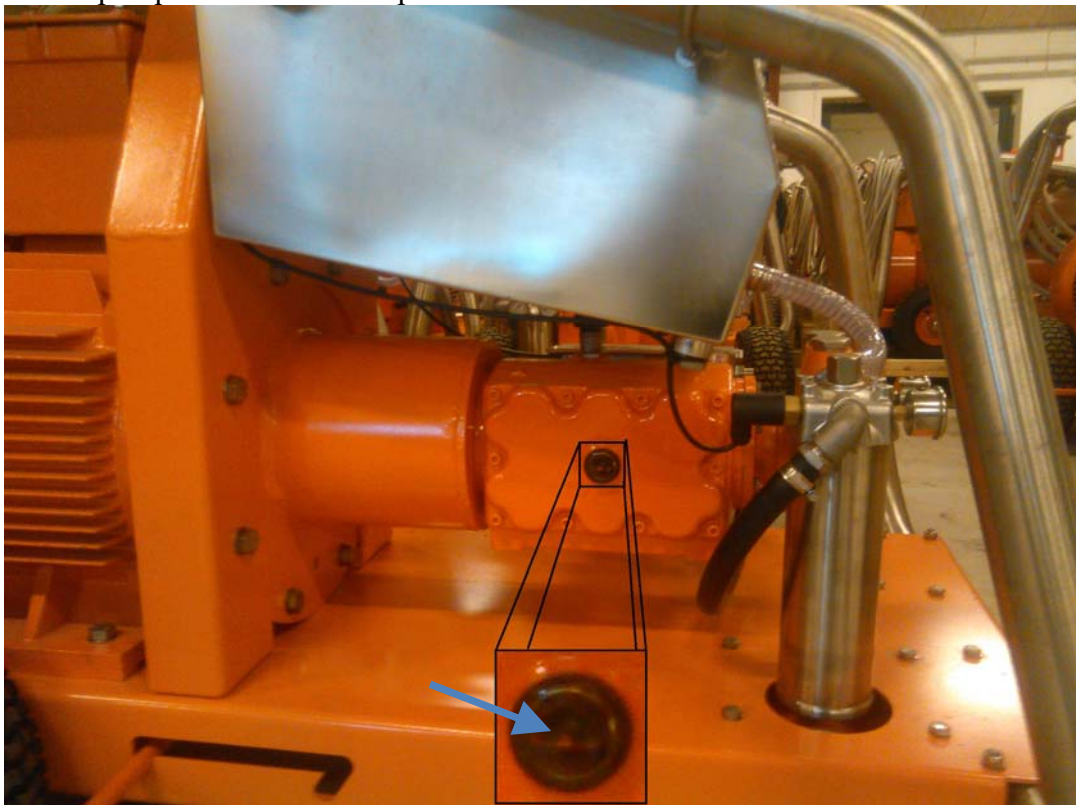


Set-Up & Use / Daily inspection:

Check	Task
Daily Inspection & Preventive Maintenance	<p><i>Check the oil level at the rear of the crankcase of the pump sight glass.</i> Fill up if necessary. <i>Check for air-bubbles in the suction hose between tank and feed pump.</i> If there are bubbles then tighten the hose-clips. <i>Check high pressure connections for leakage.</i> NEVER tighten connections under pressure. <i>Check high pressure hoses for wear and cracks.</i> Replace if necessary. <i>Check the oil level on the crankcase of the engine. Use the dip stick</i> Replenish if low. <i>Check the air intake grill.</i> Clean for dust if necessary. Do NOT Cover. <i>Check fan belts.</i> Tighten / Exchange if loose or damaged. <i>Check fuel and cooling system hoses.</i> Replace if damaged. <i>Check the inlet water strainer in the water tank.</i> Wash if necessary.</p>
	<p>Notice: To prevent damage to hoses, avoid letting the high-pressure hoses rub against sharp edges for example manholes or getting squeezed in door openings etc. Replace if necessary.</p>
	<p>Inlet water temperature must be below 40°C (104°F)</p>

Checking oil level

When the machine is stopped and is horizontal, the oil level must be visual in the middle of the rear sight glass. The oil level should only be verified from the sight glass on the back cover of the pump as seen in below picture.



Maintenance & Preventive Maintenance Instructions:

Maintenance	Task
Lubrication & Oil Renewal	<p><i>Oil renewal on the pump crankcase is to be completed the first time after no more than 50 hours of use. Oil renewal is hereafter to be completed in every 500 hours of use. Or at least one time a year.</i></p> <p><i>Use an Industrial purpose 220 Oil</i> <i>Examples: Shell Tellus 220, Esso Nuto 220, Texaco Regal EP220</i> <i>Statoil: Loadway EP220</i> <i>Quantity: 4 Liter (Do not overfill check rear oil sight glass on pump.</i></p> <p><i>Fill up until the oil level is visible in the middle of the <u>rear</u> sight glass. Switch off the machine. Loosen the oil drain screw on the lower side of the pump crank-case. Let the oil drain out into a waste oil-tray. Remount the oil drain screw and pour in new oil through the oil inlet on top of the pump until visible in the oil sight glass.</i></p> <p>Notice: Always dispose of the used oil in a proper manner.</p>
Cleaning	<p><i>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.</i></p>
Storage	<p><i>Keep the unit frost free, or flush the pump system thoroughly with Glycol based antifreeze fluid/coolant for engine use.</i></p> <p>To flush the unit with anti-freeze fluid: Unscrew the nozzle inserts. Stop the water supply to the tank, run the machine with-out pressure, keeping an eye on the water level in the tank, when the water level falls to just above the filter-strainer in the tank, introduce 1-2 liter of Glycol based anti-freeze fluid into the tank. The water glycol mixture in the tank will now be sucked in through the pump and out through the gun, the pump should stop by itself from the low level water cut-out when the water-tank is just about empty, when the entire pumping system has been flushed with anti-freeze fluid it can be stored.</p>

Trouble shooting and repair, unit:

Problem	<i>Repair</i>
When the key is turned the engine will not crank	<i>Start battery not charged enough to crank engine.</i> Charge battery (12 Volt)
The engine cranks but will not start.	<i>Empty diesel tank, clogged diesel fuel filter.</i> Fill diesel tank Change fuel filter. If fuel supply has been stopped, manually pump fuel through to engine by means of the hand push pump on top of the diesel filter before attempting to start engine
The pressure drops and the Water-blaster works irregularly.	<i>The filter strainer in the water tank is blocked or dirty or the water supply from the tap is insufficient. Air in the Suction hose. The fine filter inserts is dirty. The valves are dirty or faulty. The high pressure seals are worn.</i> Clean the water strainer filter. The machine must always suck from the water-tank. Open fresh water tap fully. Tighten the hose clamps on the suction hose. Replace the fine filter. Flush system with-out nozzle inserts before pressurizing again. Inspect valves for dirt, wear, O-ring wear, broken springs, inlet / outlet valve wear, valve body cracks. Replace packings. Check if the Ø6mm black cooling water hose pos. 46 page 28 returning to tank is pulsing. A pulsing sensation indicates that packings are worn. (Always replace O-ring as-well)
The Water-blaster continues jetting at high pressure when trigger is released.	<i>The Gun valve is stuck by dirt and indicate That the filter or hoses has not been clean before assembly</i> Replace gun rep kit and ensure that system is flushed at low pressure before mounting nozzle.
The Water-blaster does not reach the right working pressure when the trigger handle is activated.	<i>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 packings are worn. Valves are leaking</i> Turn of the water-blaster. Inspect for leakage. Replace the nozzle. Set the safety valve, repair if necessary. Change rupture disc. Change packings. See above.
The Water-blaster works with approximately 2/3 of the maximum pressure, and the high-pressure hose is vibrating.	<i>There is dirt in the valves.</i> 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.

Trouble shooting and repair, unit:

Problem	<i>Repair</i>
Excessive water leakage from under the pump	<i>Packing is worn</i> Replace packings. Check if the black cooling water hose returning to the water tank is pulsing. A pulsing sensation indicates that packings are worn. (Always replace O-ring as-well)
Noisiness	<i>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.</i> Inspect the low-pressure water supply. Tighten hose clips. Replace springs. Clean the valves. Replace the bearings.
Water in the oil	<i>The Oil-seal is worn out. High moisture in the air (condensing inside the crankcase) The high pressure seals are completely worn out.</i> Check or replace the oil-seals. Renewal of the crankcase oil more often. Replace the high pressure seals.

Service:

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 packing tape (if using threaded nozzles). 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, fan-jet and self-rotating types.

The gun is also suitable for using with wet sand-blasting.

Overhauling 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.

Service:

Cleaning the strainer in the water tank:

Drain the water tank by un-screwing the drain plug located on the down left hand corner of the water tank.

Flush out the tank inside with a water hose.

Unscrew and take out the water strainer from inside the water tank. Wash it from inside with a water hose. Scrub it on the outside if stubborn dirt.

Screw back the cleaned strainer, re-pack and screw in the drain plug. Before pressurizing the system it must be flushed through with the nozzle inserts removed.

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 located beneath the water tank.

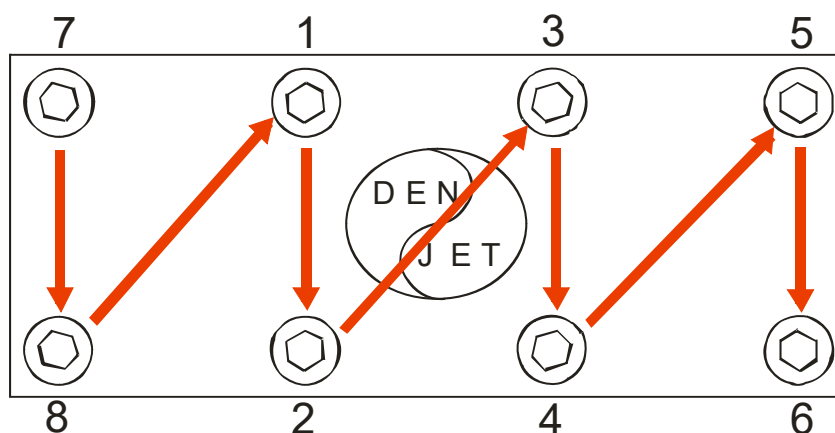
Take out the corrugated filter cartridge (81001142). Discard the cartridge. The filter cartridge absorbs dirt particles, THE CARTRIDGE IS DISPOSABLE AND CANNOT BE CLEANED.

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. Run the machine without nozzle insert to flush the system before pressurizing.

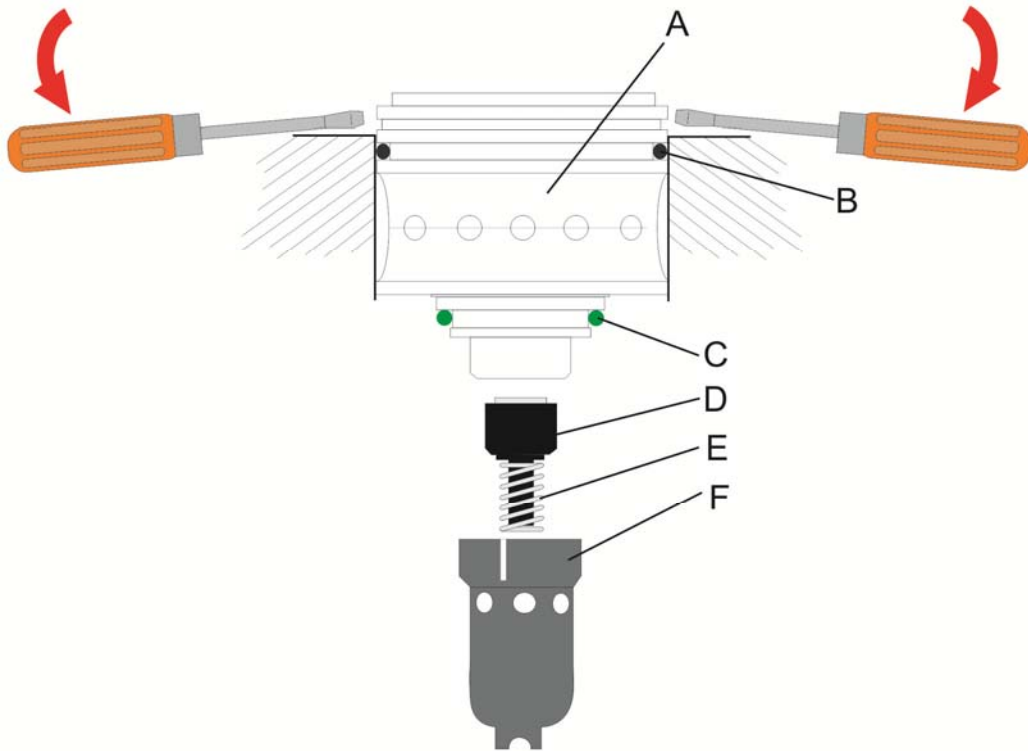
Overhauling pump, valves:

Start dismantling the front of the pump by removing water supply and cooling hoses. Loosen the cylinder head bolts in reverse order as shown:



Do not loosen one bolt entirely, loosen them bit by bit and alternate according to the pattern.

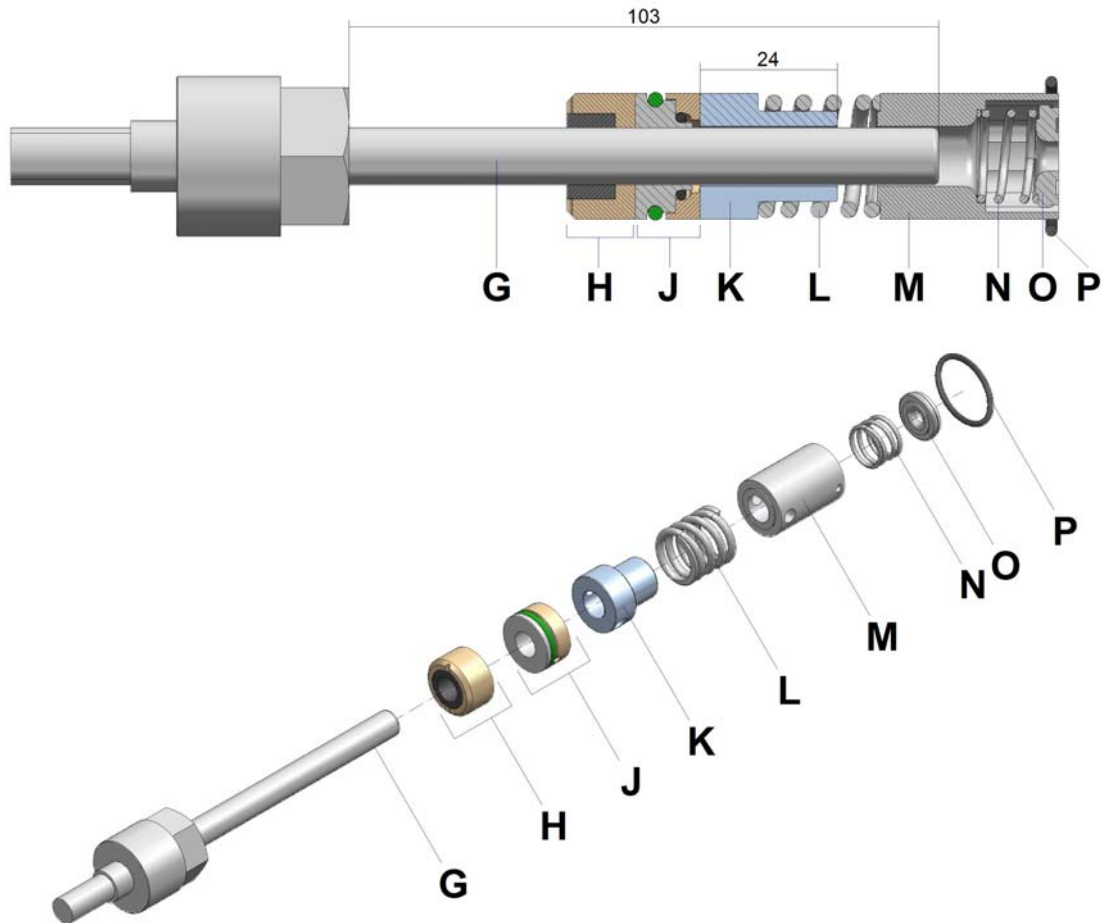
Pull out the valve A by applying pressure in the extraction groove with 2 flat-face screwdrivers as shown below:



Dismantle the valve assembly by Holding on to the valve-body “A” And pull / twist “F” off. Check the mating surfaces of the inlet valve disc “O” and the body “A”, and the outlet valve “D” and the body “A”. The mating surfaces should be free from wear and tear. It is possible to touch up the mating surfaces by lapping the parts on a piece of very fine sand-paper laid out on an absolutely flat surface. If wear and tear is too severe for touch up, replace items. Ensure O-rings “B” and “P” and high pressure seal “J” are in good condition, replace if worn. Re-assemble the valve, make sure F click correct into place. Push the assembled valve back into the cylinder-head.

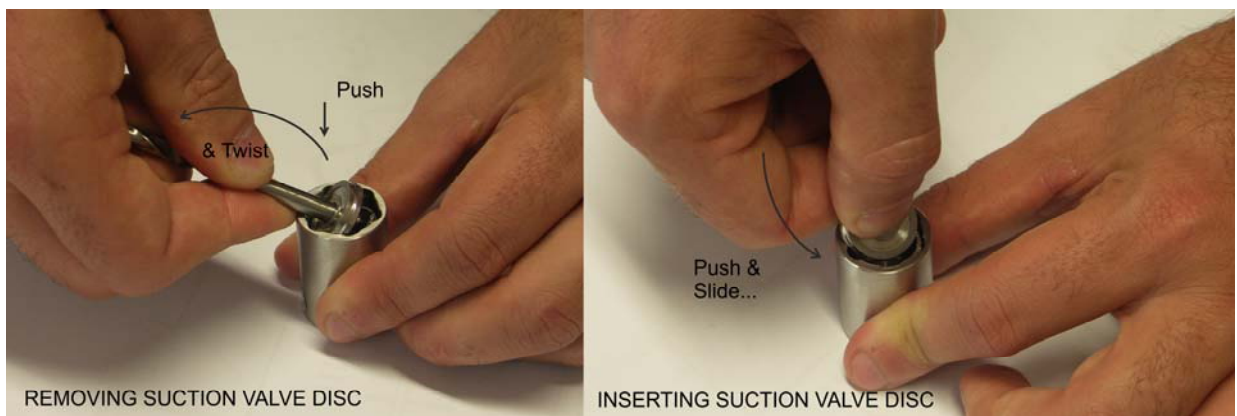
Changing Packing and Plungers:

Take of the cylinder-head as explained earlier. Remove the cooling pipes on top and below on the cylinder Support. Gently, to prevent plunger damage, pull out the cylinders one by one. "H, J, K, L, M, N, O, and P" should remain in the cylinder, but may fall out. The plungers "G" will remain on the crossheads extensions. "M, N & O" is the part of the suction valve assembly standing on the packing spring "L". Pay attention to the orientation of the back-up ring "H" the chamfer on edge and grooves on one side must face towards the crank case of the pump. The high pressure seal "J" must have the green O-ring facing towards the pump head and valve of the pump.

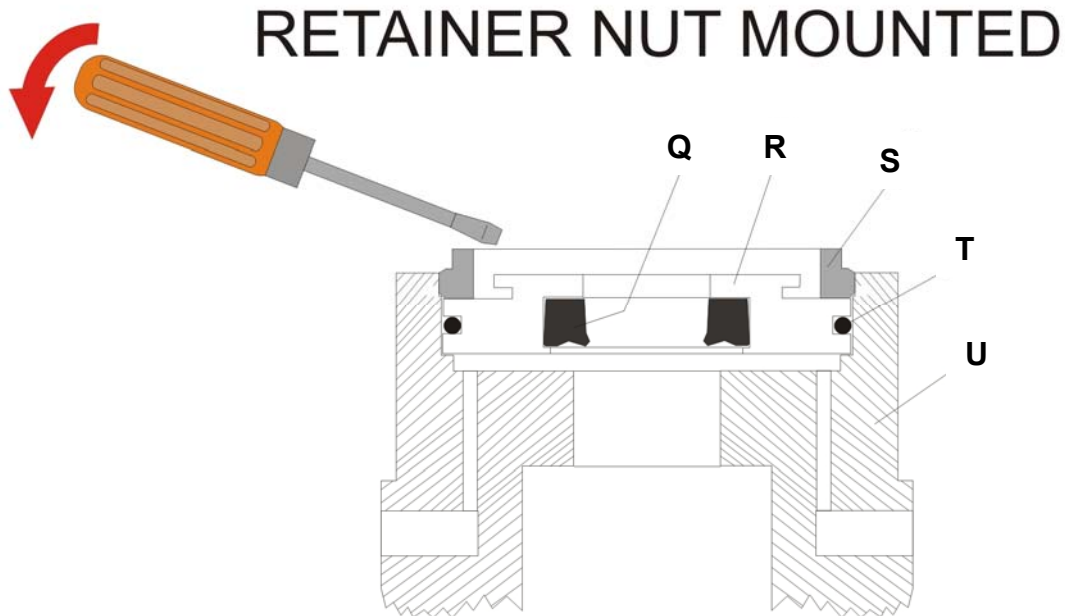


Pay attention to the length of plunger "G" and packing support "K" is according to drawing above

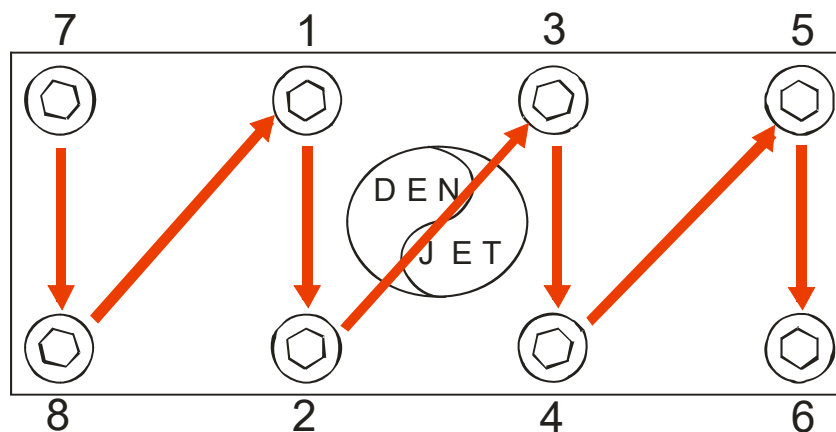
Removing and inserting suction valve discs O in Valve cage M:



Unscrew the big hexagon retainer nut “S” at the back of the cylinder support “U”. Use a screw driver to gently pry out the cooling plate assembly “R”. Seal assembly “J” needs replacement every time when the pump has been disassembled after running. Unscrew the plunger “A” using the supplied orange Z-shaped spanner. Inspect plunger surface and replace if necessary. Ensure the low pressure cooling seal “Q” is in good condition, replace both seal “Q” and o-ring “T” if worn.

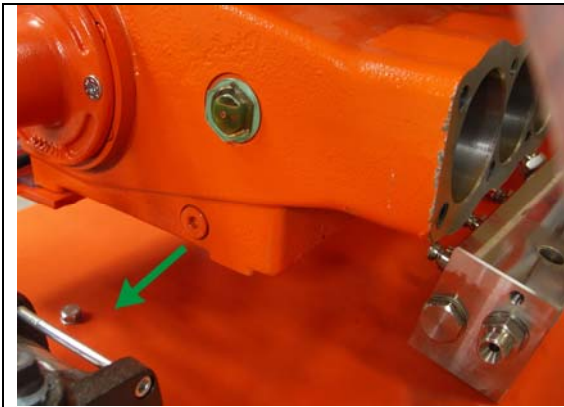


Assemble parts, paying attention to place position and orientation.
Remember to put back cooling pipes and cover plate before tightening the cylinder head



Tighten the bolts in the above shown pattern in steps of torque.
(105Nm - 170Nm – 210Nm – 280Nm and finally 340Nm) alternating between bolts

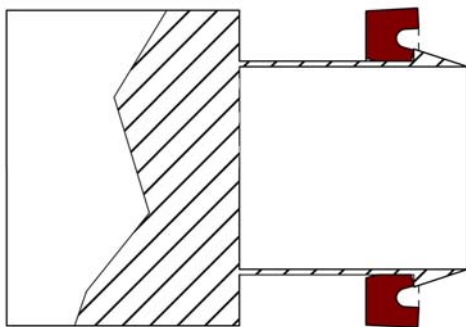
Procedure for Seal Extraction



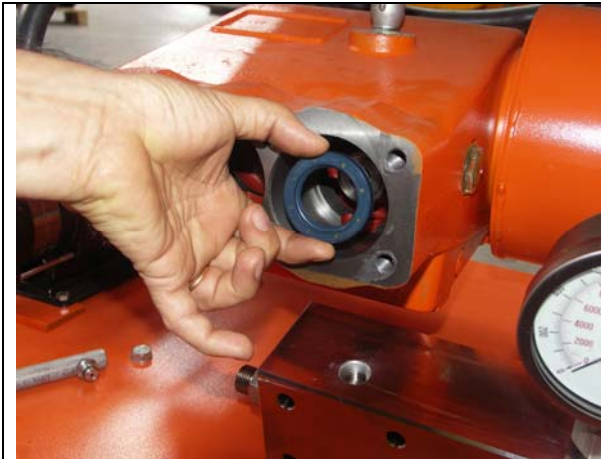
Take the oil out



Turn to get the right position



Take the seal off



Put the new seal in place using just fingers



Hammer it gently and equally

Maintenance / Service, Diesel Engine:

Maintenance	Task
Lubrication	<p><i>Oil renewal on the engine crankcase is to be completed the first time after no more than 50 hours of use. Oil renewal is hereafter to be completed after every 150 hours of use. Or at least one time a year.</i></p> <p><i>Use a CC or CD Grade oil (API classification) Under normal operating temperatures -30°C to 30°C use multigrade SAE10W/30 or SAE 10W/40(part number:83600870) Under cold operating temperature below -30°C use multigrade SAE 5W/20 or SAE 5W/30 Under warm operating temperature over 30°C use multigrade SAE 10W/40</i></p> <p><i>Quantity: fill up with oil until oil level is just below the “full” mark on the dip stick. Approx. 7 Liter</i></p> <p><i>Remember to refit oil drain plug. Fill up until the oil level is visible at the full mark on the oil dip stick.</i></p>
Oil Filter	<p><i>Change the oil filter when changing the oil. (Part number: 81001047)</i></p>
Renewal of oil	<p><i>Switch off the machine. Loosen the oil drain screw on the lower side of the pump crank-case. Let the oil drain out into a waste oil-tray. Remount the oil drain screw and pour in new oil through the oil inlet on top of the pump until visible in the oil sight glass.</i></p> <p>Notice: Always dispose of the used oil in a proper manner.</p>
Diesel Fuel	<p><i>Use fresh clean automotive quality diesel fuel. When operating in cold environments, make sure the diesel fuel are suitable for the temperature.</i></p>
Air intake filter	<p><i>Clean air intake filter every 50-100 hours, Exchange every 200-400 Hours. (Depending on running environment. (Part number: 81001034)</i></p>
Diesel Fuel filter	<p><i>Diesel fuel filter should be changed every 400 Hours (Part number: 81001048)</i></p>
Cleaning	<p><i>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.</i></p>
Storage /Antifreeze	<p><i>Always run the engine with glycol based antifreeze mixture in the cooling system, also in hot weather. Mix accordingly with manufactures specifications to obtain the desired antifreeze temperature. Change every 2 years. The unit is protected to -30°C at delivery. The cooling system contains approximately 10 Liters of fluids.</i></p>

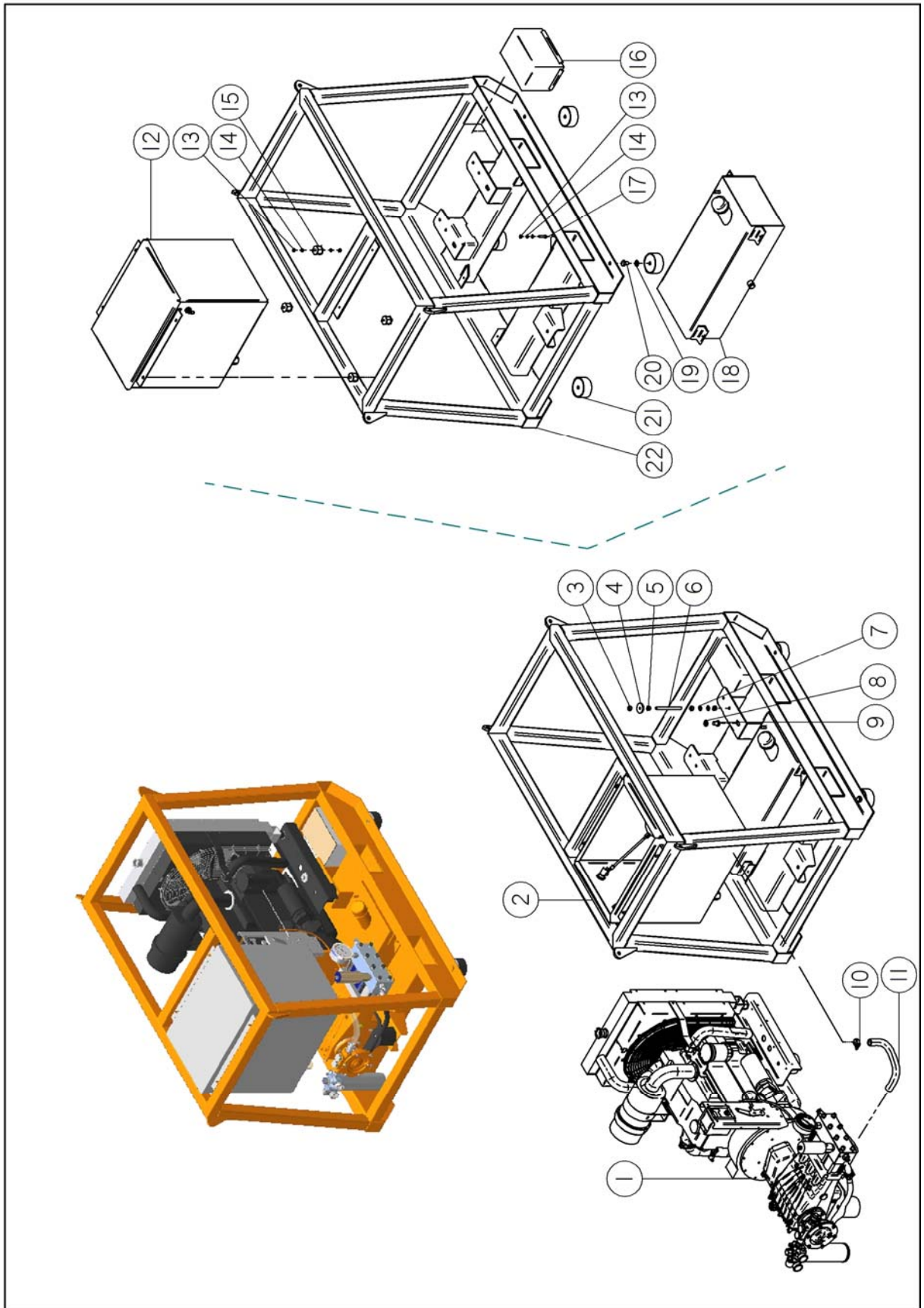
Trouble shooting / Repair, Diesel Engine:

Problem	Cause / Repair
Exhaust smoke is black	<p><i>The load is too heavy for the engine.</i> Reduce load. <i>Air intake filter dirty.</i> Clean or replace air filter. <i>Bad fuel injector nozzle(s)</i> Check nozzles, replace if spray pattern is faulty. <i>Intake/exhaust valves needs adjusting.</i> <i>Motor is worn.</i></p>
Exhaust smoke is white	<p><i>When running in cold weather and before the engine is warm white smoke is normal.</i> <i>Cylinder head gasket leaking.</i> Check cause of cooling water leak into engine. <i>Wrong injection timing.</i> Set timing correctly. <i>Air intake filter dirty.</i> Clean or replace filter. <i>Dirty fuel filter.</i> Change filter. <i>Air in fuel line, leak in fuel pipe.</i> Tighten or replace faulty fuel line. <i>Leakage around injectors.</i> Tighten or replace seal.</p>
Exhaust smoke is blue	<p><i>Oil level in crankcase to high.</i> Drain oil until correct level. <i>Too much oil fog in air breather / crankcase ventilation.</i> Check breather valve/ Valve seal. Replace breather valve and / or tube.</p>
Engine is not running smoothly	<p><i>Air somewhere in fuel line</i> Tighten or replace faulty fuel line. <i>Fault in speed-regulating governor.</i> <i>Faulty injector nozzle(s)</i> <i>Faulty Diesel distributor pump.</i></p>
Engine temperature too High.	<p><i>Low level in radiator / cooling system.</i> CAUTION when opening. Steam boiling water may escape. Fill up radiator. <i>Blocked air intake outlet grille.</i> Remove obstruction. <i>Engine is overloaded.</i> Reduce Load. <i>Fan belt (water pump belt) is broken.</i> Replace fan belt. <i>Electric fan is not running.</i> Fault in electric circuit Faulty thermostat in lower cooling hose. <i>Fuel injection timing wrong (Retarded)</i> Set correct timing. <i>Water cooling system pump faulty.</i> Replace pump.</p>

Trouble shooting / Repair, Diesel Engine:

Problem	Cause / Repair
Engine is not charging the battery	<p><i>Fault in the alternator / Alternator circuit</i> Find fault and rectify. Battery is faulty.</p>
Engine stops suddenly	<p><i>Run out of fuel</i> Fill up with fuel, hand pump to prime. <i>Air in fuel line.</i> Bleed air. Hand pump to prime. <i>Fuel filter clogged.</i> Change fuel filter. <i>Fuel feed pump faulty</i> Check pump, replace if faulty. <i>Engine is stuck.</i></p>
Abnormal noise	<p><i>Fan is touching metal.</i> Make clearance. <i>Valve clearance too big.</i> Adjust valves. <i>Injection timing wrong (too advanced).</i> Adjust timing. <i>Badly worn engine bearings.</i></p>

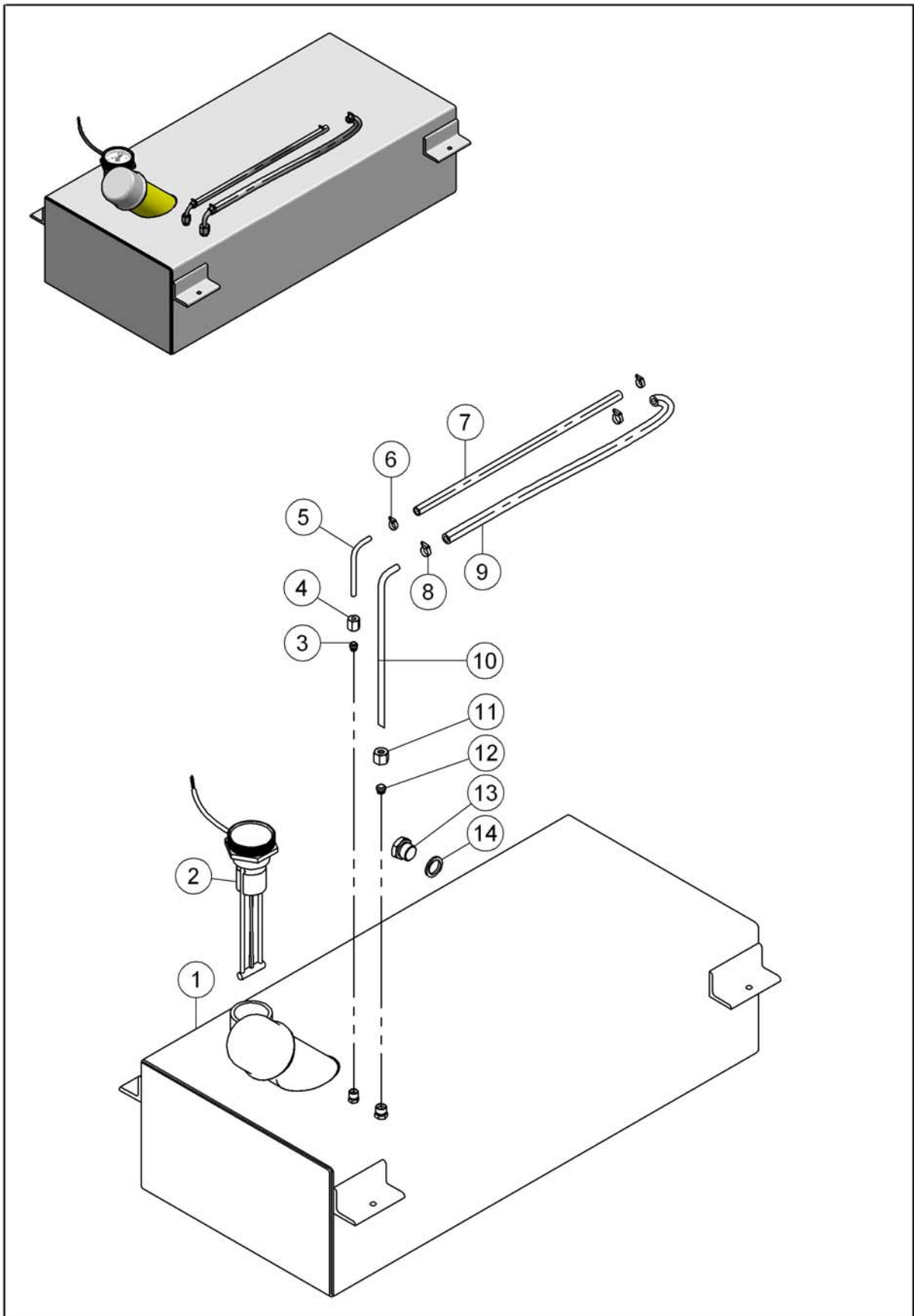
CD50-2000 UHP WATER-BLASTER MAIN SPARE-PARTS ASSEMBLY



**CD50-2000 UHP WATER-BLASTER
MAIN SPARE-PARTS LIST**

Pos.	Item No.	Qty.	Description
1		1	UNIT CD50
2		1	FRAME ASSY.
3	80100381	4	LOCK NUT M12 Zn
4		2	WASHER WIDE
5	80000511	4	NUT
6	80100842	6	THREADED ROD
7	80100799	4	WASHER
8	80100637	2	WASHER
9	80100872	2	SCREW
10	80100527	1	HOSE CLIPS
11	83400524	1	HOSE SUCTION
12		1	WATER TANK CD50
13	80100697	12	LOCK NUT
14	80100606	16	WASHER
15	81000857	4	RUBBER DAMPENER
16	81100990	1	BATTREY
17	80100704	4	SCREW
18	81000965	1	DIESEL TANK CD50
19	80100637	4	WASHER
20	80100872	4	SCREW
21	81000935	4	RUBBER FOOT
22	81000954	1	OPEN FRAME CD50
N/A	81101272	1	EMERGENCY STOP

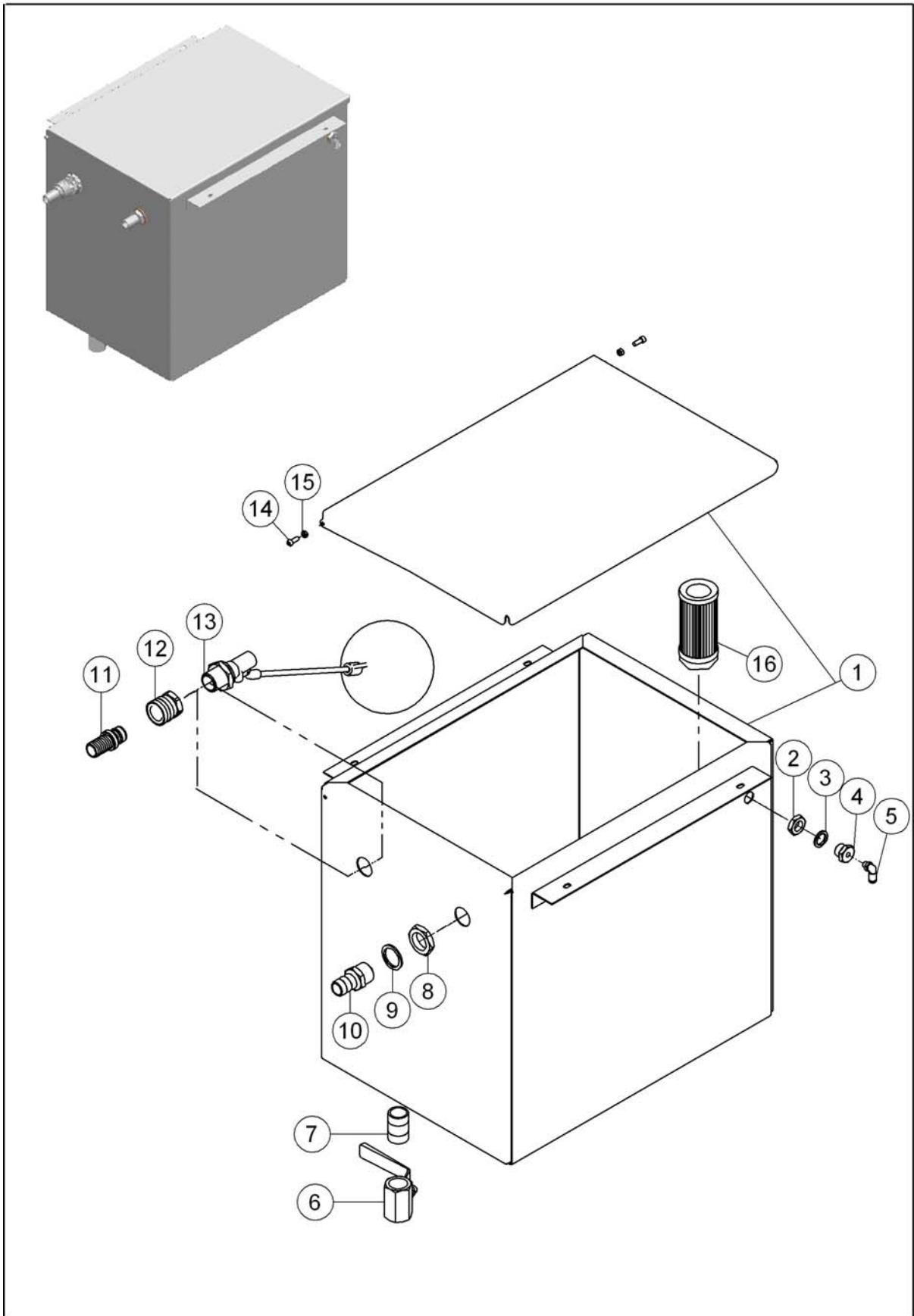
CD50-2000 UHP WATER-BLASTER DIESEL TANK SPARE-PARTS ASSEMBLY



**CD50-2000 UHP WATER-BLASTER
DIESEL TANK SPARE-PARTS LIST**

Pos.	Item No.	Qty.	Description
1	81001403	1	DIESEL TANK CD50 WELDED
2	81101186	1	LEVEL GAUGE W/SWITCH
3	80501074	1	FERRULE Ø6
4	80501075	1	SWIVEL NUT
5	83100647	1	HYDRAULIC PIPE Ø6
6	80100905	2	HOSE CLIP
7	83400625	1	HOSE
8	80100904	2	HOSE CLIP
9	83400624	1	HOSE
10	83100648	1	HYDRAULIC PIPE Ø8
11	80501077	1	SWIVEL NUT
12	80501076	1	FERRULE Ø8
13	80500617	1	PLUG
14	80500429	1	BONDED SEAL

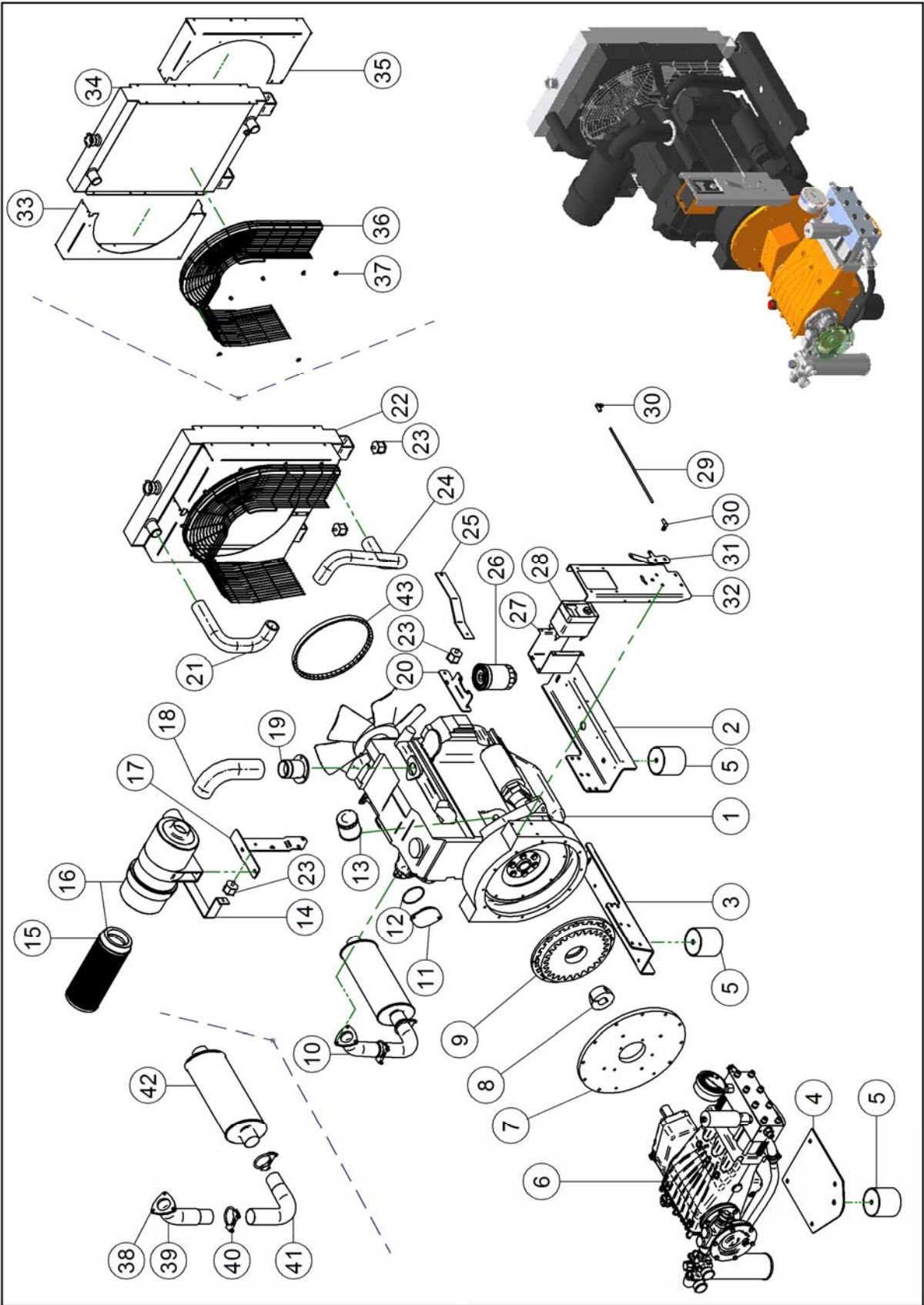
CD50-2000 UHP WATER-BLASTER WATER TANK SPARE-PARTS ASSEMBLY



**CD50-2000 UHP WATER-BLASTER
WATER TANK SPARE-PARTS LIST**

Pos.	Item No.	Qty.	Description
1	81000978	1	WATER TANK CD50
2	80100632	1	CONTRA NUT
3	80500429	1	BONDED SEAL
4	80500606	1	BUSHING
5	80500279	1	ELBOW SWIVEL
6	80500660	1	BALL VALVE
7	80500908	1	NIPPLE
8	80100405	1	CONTRA NUT
9	80500975	1	BONDED SEAL
10	80500227	1	HOSE NIPPLE
11	80501065	1	QUICK COUPLING
12	80501066	1	QUICK COUPLING MALE
13	81000428	1	FLOAT VALVE
14	80100052	2	SCREW ALLEN
15	80100053	2	LOCK NUT
16	81000902	1	FILTER

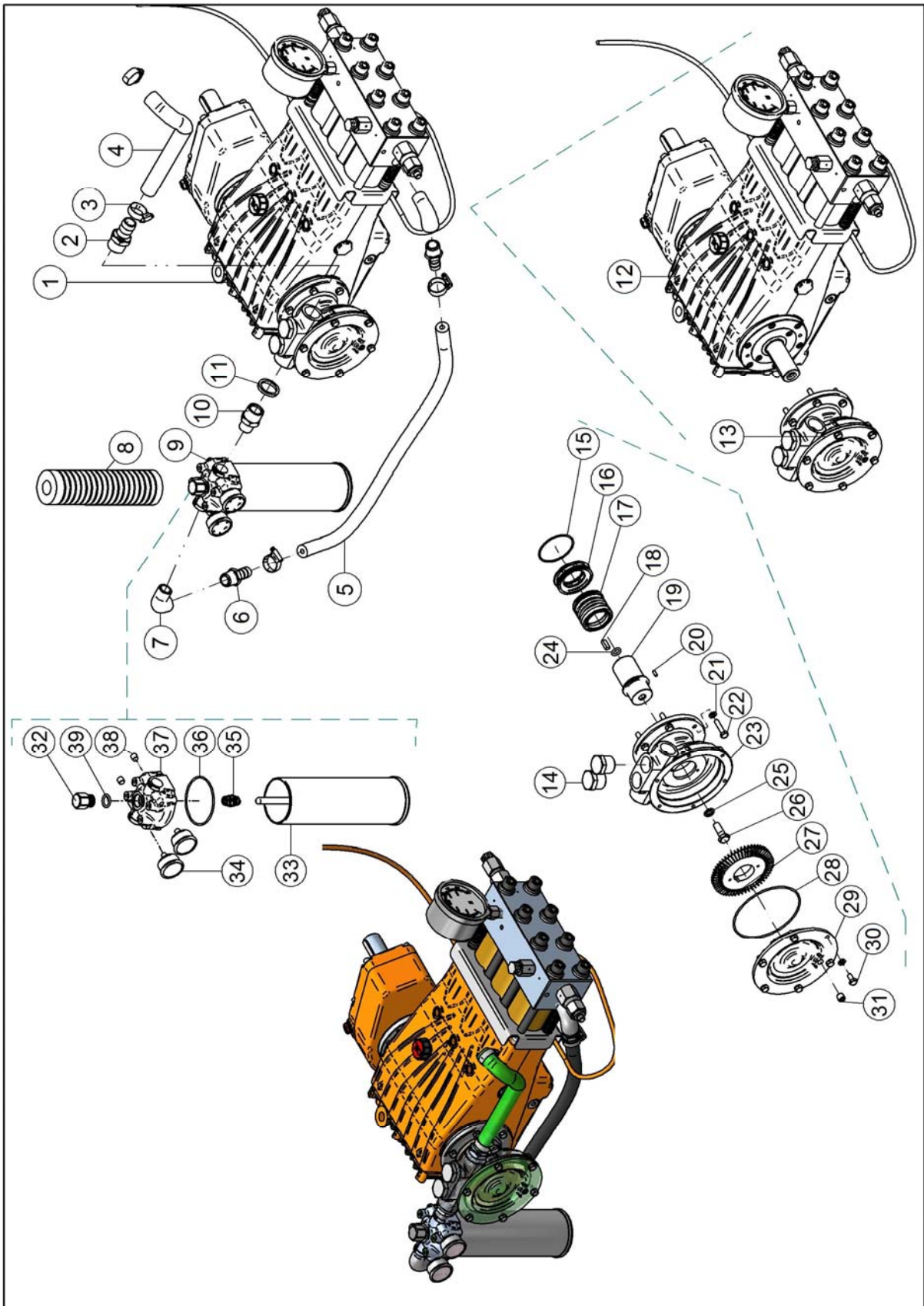
**CD50-2000 UHP WATER-BLASTER
MOTOR-PUMP UNIT SPARE-PARTS ASSEMBLY**



**CD50-2000 UHP WATER-BLASTER
MOTOR-PUMP UNIT SPARE-PARTS LIST**

Pos.	Item No.	Qty.	Description
1	81100954	1	ENGINE TOYOTA
2	81001010	1	HOLDER BRACKET LEFT
3	81001011	1	HOLDER BRACKET RIGHT
4	81001012	1	HOLDER BRACKET PUMP
5	81000934	3	RUBBER FOOT
6		1	PUMP C50 W GEARBOX,BOOSTER PUMP
7	81000842	1	BELL HOUSING
8	81000269	1	TAPER BUSH
9	81001272	1	COUPLING P/N (81001271 & 81001284)
	81001271	1	RUBBER ELEMENT FOR COUPLING
	81001284	1	FLANGE FOR COUPLING
10		1	EXHAUST COMPLETE (pos. 38,39,40.41.42)
11	81001751	1	BLIND COVER PTO ENGINE
12	80200695	1	O-RING
13	81001047	1	OIL FILTER
14	81001074	1	BRACKET RADIATOR SUPPORT (part 1 see pos. 25)
15	81001034	1	FILTER INSERT AIR INTAKE
16	81000861	1	AIR INTAKE FILTER COMPLETE
17	81001058	1	HOLDER BRACKET AIR FILTER
18	81001071	1	RUBBER ELBOW
19	81000966	1	AIR INLET PIPE FLANGE
20	81001059	1	HOLDER BRACKET DIESEL FILTER
21	81001073	1	RUBBER HOSE MOTOR-RADIATOR
22		1	RADIATOR COMPLETE (pos.33.34.35.36.37)
23	81000857	4	RUBBER DAMPENER
24	81001072	1	RUBBER HOSE RADIATOR-MOTOR
25	81001074	1	BRACKET RADIATOR SUPPORT (part 2 see pos. 14)
26	81001048	1	FUEL FILTER
27	81000765	1	BRACKET ENGINE CONTROL
28	81100845	1	ENGINE CONTROLLER
29	80100864	1	THREADED ROD
30	80100870	2	ANGULAR BALL CONNECTION
31	81001404	1	GAS HANDLE
32	81000962	1	BRACKET FOR ENGINE CONTROLLER
33	81000972	1	RADIATOR GUARD RIGHT
34	81000981	1	RADIATOR
35	81000971	1	RADIATOR GUARD LEFT
36	81000982	1	RADIATOR NET
37	81100993	7	WIRE CLAMP RUBBER
38	81001018	1	FLANGE TOYOTA EXHAUST
39	81001015	1	EXHAUST PIPE BEND 45°
40	81000969	2	U-CLAMP
41	81001016	1	EXHAUST PIPE BEND 90°
42	81001017	1	EXHAUST MUFFLER
43	81000862	1	FAN BELT

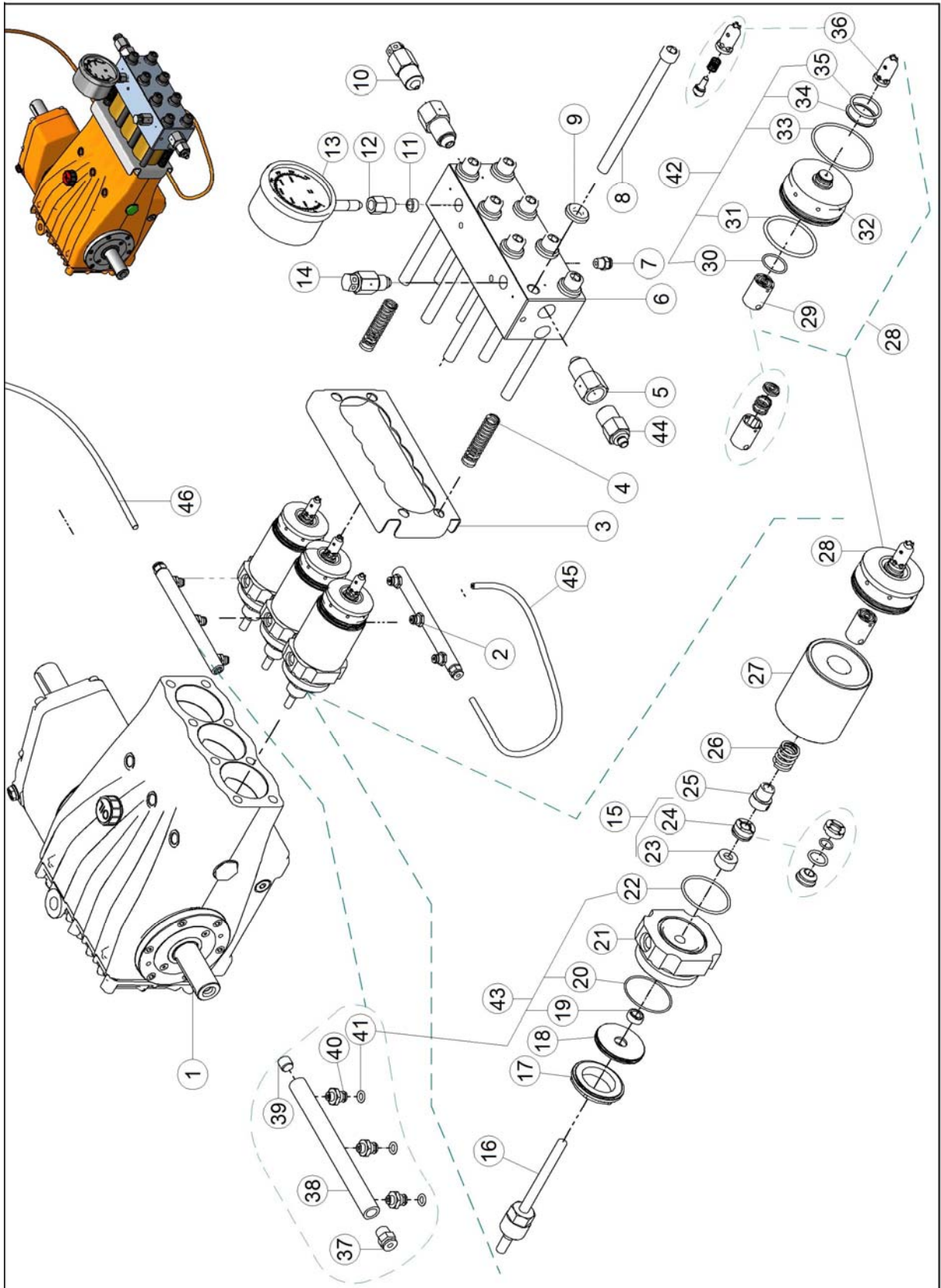
**CD50-2000 UHP WATER-BLASTER
PUMP UNIT SPARE-PARTS ASSEMBLY**



**CD50-2000 UHP WATER-BLASTER
PUMP UNIT SPARE-PARTS LIST**

Pos.	Item No.	Qty.	Description
1		1	PUMP-BOOSTER PUMP UNIT CD50
2	80500227	1	HOSE NIPPLE
3	80100527	4	HOSE CLIPS
4	83400524	1	HOSE SUCTION
5	83400599	1	RUBBER HOSE
6	80500436	2	HOSE NIPPLE
7	80500437	2	ELBOW
8	81001142	1	FILTER INSERT
9	81000647	1	FILTER
10	80500260	1	NIPPLE
11	80501412	1	DISTANCE BUSHING
12		1	PUMP
13	81200158	1	BOOSTER PUMP COMPLETE
14	80500607	2	PLUG
15	80200407	1	O-RING
16	81200163	1	DRAIN BUSHING
17	80200157	1	MECHANICAL SEAL
18	81200164	1	KEY
19	81200173	1	AXLE ADAPTOR
20	81200165	1	KEY
21	80100732	12	WASHER
22	80100704	6	SCREW
23	81200160	1	HOUSING BOOSTER PUMP MACHINED
24	80200634	1	O-RING
25	80500971	1	BONDED SEAL
26	80100168	1	SCREW
27	81200172	1	IMPELLER
28	80200568	1	O-RING
29	81200162	1	END COVER BOSSTER PUMP MACHINED
30	80100703	6	SCREW
31	80500341	1	PLUG
32	81000649	1	TOP SCREW
33	81000572	1	HOUSING FOR FILTER
34	81300631	2	GAUGE
35	80300604	1	DISTANCE SPRING
36	80200637	1	O-RING
37	81000650	1	COVER
38	80500094	2	PLUG
39	80200491	1	O-RING

CD50-2000 UHP WATER-BLASTER PUMP SPARE-PARTS ASSEMBLY



**CD50-2000 UHP WATER-BLASTER
PUMP SPARE-PARTS LIST**

Pos.	Item No.	Qty.	Description	
1	81201487	1	POWER END UHP	
2	81200334	2	COOLING PIPE	
3	81200335	1	COVER F	
4	80300661	2	SPRING	
5	80500681	2	ADAPTOR	
6	81201508	1	CYLINDER HEAD PUMP C40 UHP	
7	80500095	1	QUICK COUPLING	
8	80101031	8	SCREW ALLEN Torque: 105Nm - 170Nm – 210Nm –280Nm and finally 340Nm	
9	81201472	8	WASHER	
10	81300643	1	RUPTURE DISC ASSEMBLY	
11	80500040	1	COLLAR	
12	80500950	1	GLANDNUT	
13	81300767	1	GAUGE	
14	81300778	1	RUPTURE DISC	
15	81201561		SEAL KIT UHP Ø 10 PLUNGER	
16	81201565	3	PLUNGER UHP Ø10	
17	81200966	3	RETAINER NUT FOR COOLING PLATE	
18	81201124	3	COOLING PLATE PLUNGER Ø10	
19	80200766	3	SEAL COOLING	Part of LP seal kit 81201559 (pos.43)
20	80200222	3	O-RING	Part of LP seal kit 81201559 (pos.43)
21	81201405	3	CYLINDER SUPPORT	
22	80200489	3	O-RING	Part of LP seal kit 81201559 (pos.43)
23	81201551	3	BACK UP RING COMBI COMPLETE	Part of plunger seal kit 81201561 (pos.15)
24	81201554	3	SEAL RETAINER ASSY	Part of plunger seal kit 81201561 (pos.15)
25	81201550	3	PACKING SUPPORT	
26	80300649	3	SPRING	
27	81201512	3	CYLINDER UHP 2000 BAR	
28	81201539	3	VALVE UHP COMPLETE	
29	81201540	3	SUCTION VALVE UHP COMPLETE	
30	80200814	3	O-RING	Part of valve seal kit 81201558 (pos.42)
31	80200740	3	O-RING	Part of valve seal kit 81201558 (pos.42)
32	81201507	3	VALVE BODY	
33	80200771	3	O-RING	Part of valve seal kit 81201558 (pos.42)
34	80200900	3	BACK-UP RING	Part of valve seal kit 81201558 (pos.42)
35	80200806	3	O-RING	Part of valve seal kit 81201558 (pos.42)
36	81201541	3	DISCHARGE VALVE ASSY COMPLETE	
37	80500095	2	QUICK COUPLING	
38	81200332	2	COOLING PIPE	
39	80500341	2	PLUG	
40	81200333	6	NIPPLE FOR COOLING PIPE	
41	80200340	6	O-RING	Part of LP seal kit 81201559 (pos.43)
42	81201558	3	SEAL KIT VALVE 2000 BAR	
43	81201559	3	SEAL KIT LOW PRESSURE Ø10 PLUNGER	
44	80501264	1	NIPPLE ADAPTOR (OPTIONAL FOR ¼"SW HOSE)	
45	83400522	0,3m	SUPPLY HOSE (COOLING SYSTEM)	
46	83400522	1m	RETURN HOSE (COOLING SYSTEM)	

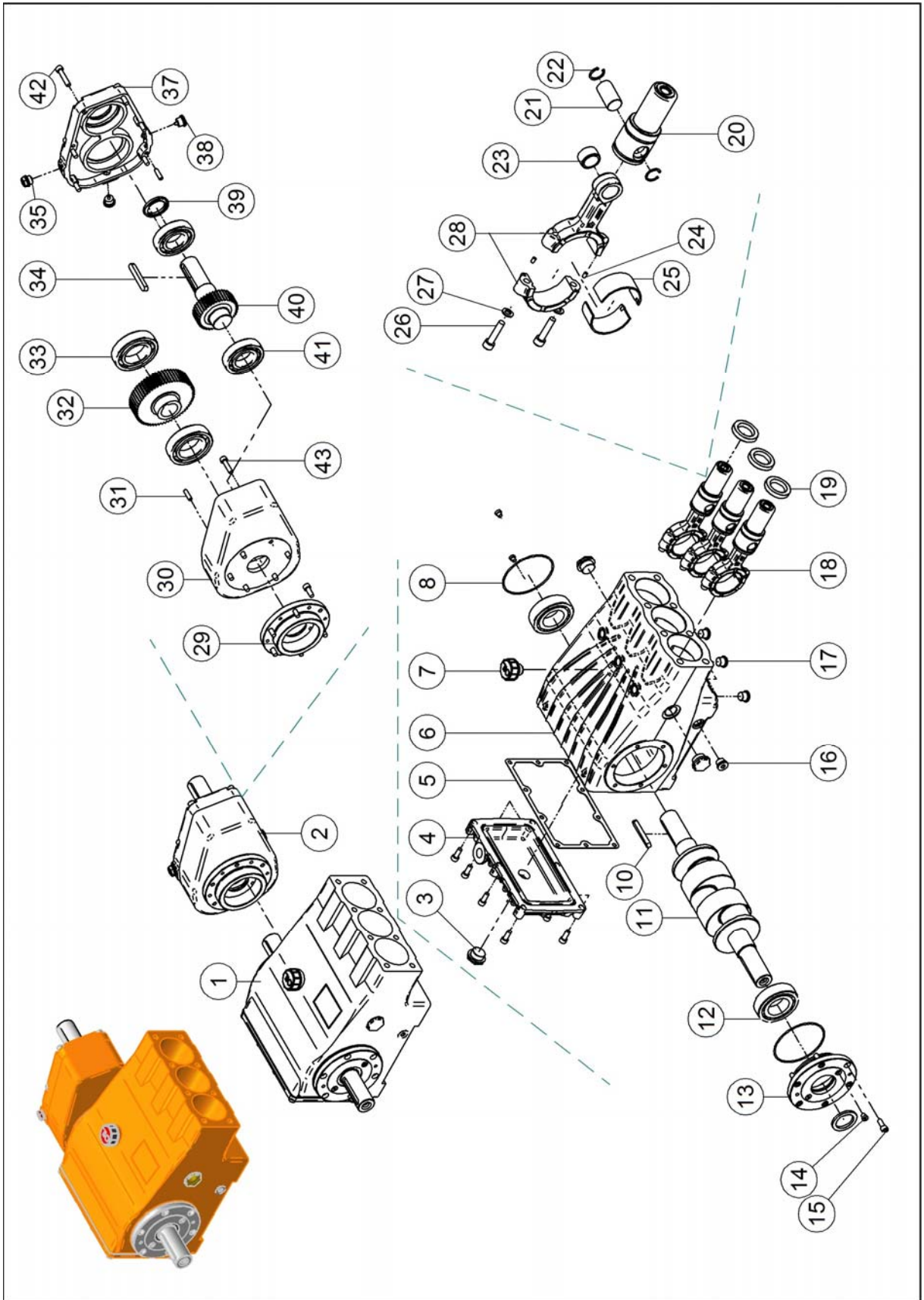
PUMP SPARE-PARTS KIT

Item No./Kit Description	Pos.	Item No.	Qty.	Description
POS. 15 81201561 SEAL KIT PLUNGER Ø10 UHP (3 kit to overhaul)	23	81201551	1	BACK UP RING COMBI COMPLETE
	24	81201554	1	SEAL ASSY

Item No./Kit Description	Pos.	Item No.	Qty.	Description
POS. 42 81201558 SEAL KIT VALVE 2000 BAR (3 kit to overhaul pump)	30	80200814	1	O-RING
	31	80200740	1	O-RING
	33	80200771	1	O-RING
	34	80200900	1	BACK-UP RING
	35	80200806	1	O-RING

Item No./Kit Description	Pos.	Item No.	Qty.	Description
POS. 43 81201559 SEAL KIT LOW PRESSURE PLUNGER Ø 10 (3 Kit to overhaul pump)	19	80200766	1	SEAL COOLING
	20	80200222	1	O-RING
	22	80200489	1	O-RING
	41	80200340	2	O-RING

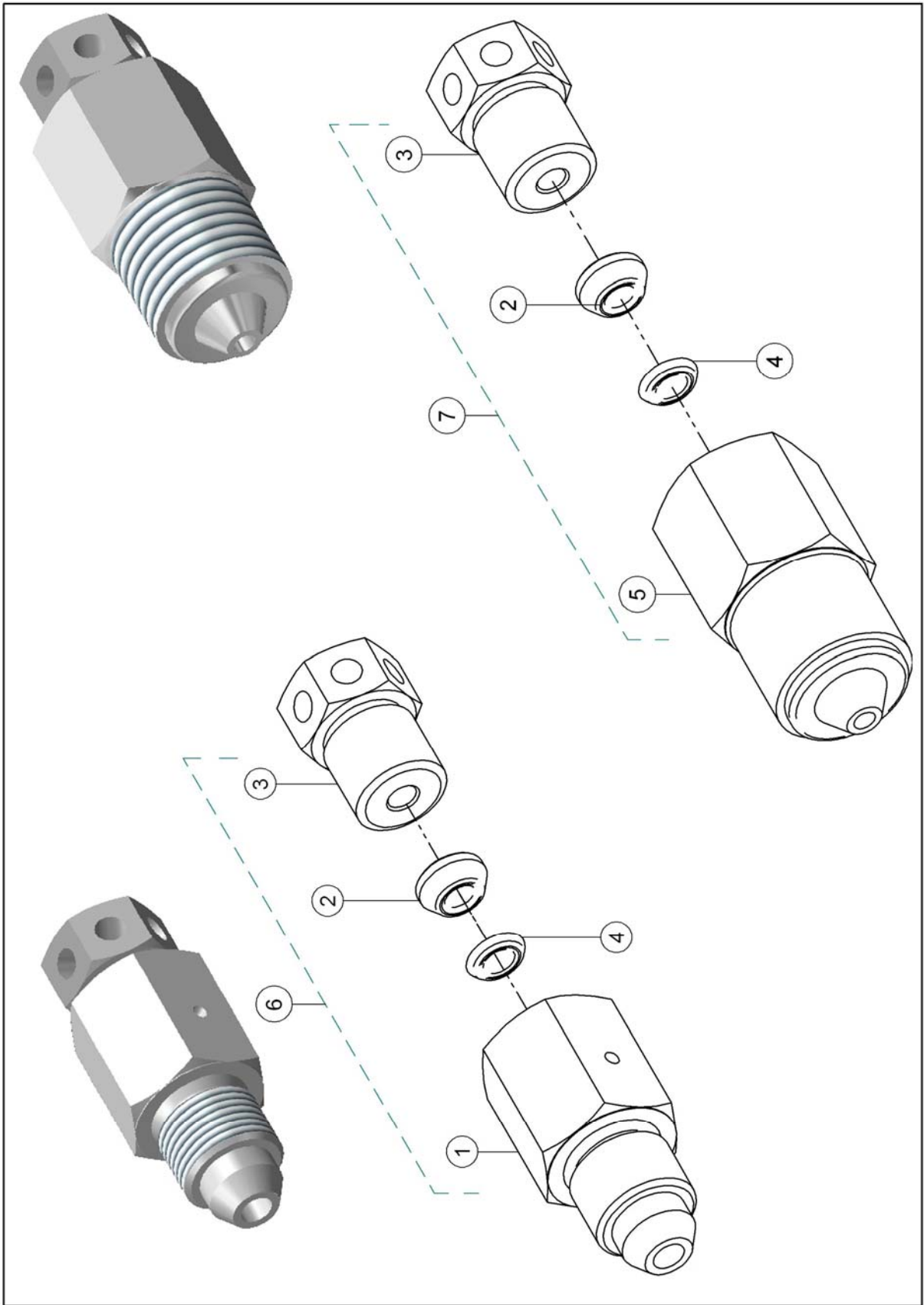
**CD50-2000 UHP WATER-BLASTER
POWER END SPARE-PARTS ASSEMBLY**



**CD50-2000 UHP WATER-BLASTER
POWER END SPARE-PARTS LIST**

Pos.	Item No.	Qty.	Description
1	81201486	1	POWER END
2	81201463	1	GEAR BOX COMPLETE
3	81200365	3	OIL LEVEL GLASS
4	81200369	1	OIL COVER
5	81200371	1	PACKING
6		1	BODY
7	81200349	1	OIL FILL
8	80200354	2	O-RING
10	81200368	1	KEY
11	81200359	1	CRANK SHAFT
12	80400355	2	BEARING
13	81200352	2	COVER
14	81200358	4	PLUG
15	80100194	22	SCREW
16	81200350	2	PLUG OIL DRAIN
17	81200351	3	PLUG
18		3	ARM (see details)
19	80200595	3	SEAL
20	81200360	3	GUIDE PISTON
21	81200361	3	PIN
22	80300363	6	SNAP RING
23	81200362	3	BUSHING
24	81200370	6	PIN
25	81200364	6	BEARING SHELL
26	80100367	6	SCREW
27	80100170	6	WASHER
28	81200366	3	CONNECTING ROD
29	81000850	1	FLANGE FOR GEAR BOX
30	81201458	1	HOUSING FOR GEAR BOX
31	81201459	2	PIN
32	81201460	1	CROWN GEAR WHEEL
33	80400627	2	BEARING
34	81200368	1	KEY PUMP C40
35	81201461	1	PLUG
37	81201464	1	COVER FOR GEAR BOX HOUSING
38	81200350	2	PLUG OIL DRAIN
39	80200353	1	SEAL POWER END
40	81201462	1	PINION
41	80400628	2	BEARING
42	80100746	6	SCREW
43	80100860	6	SCREW

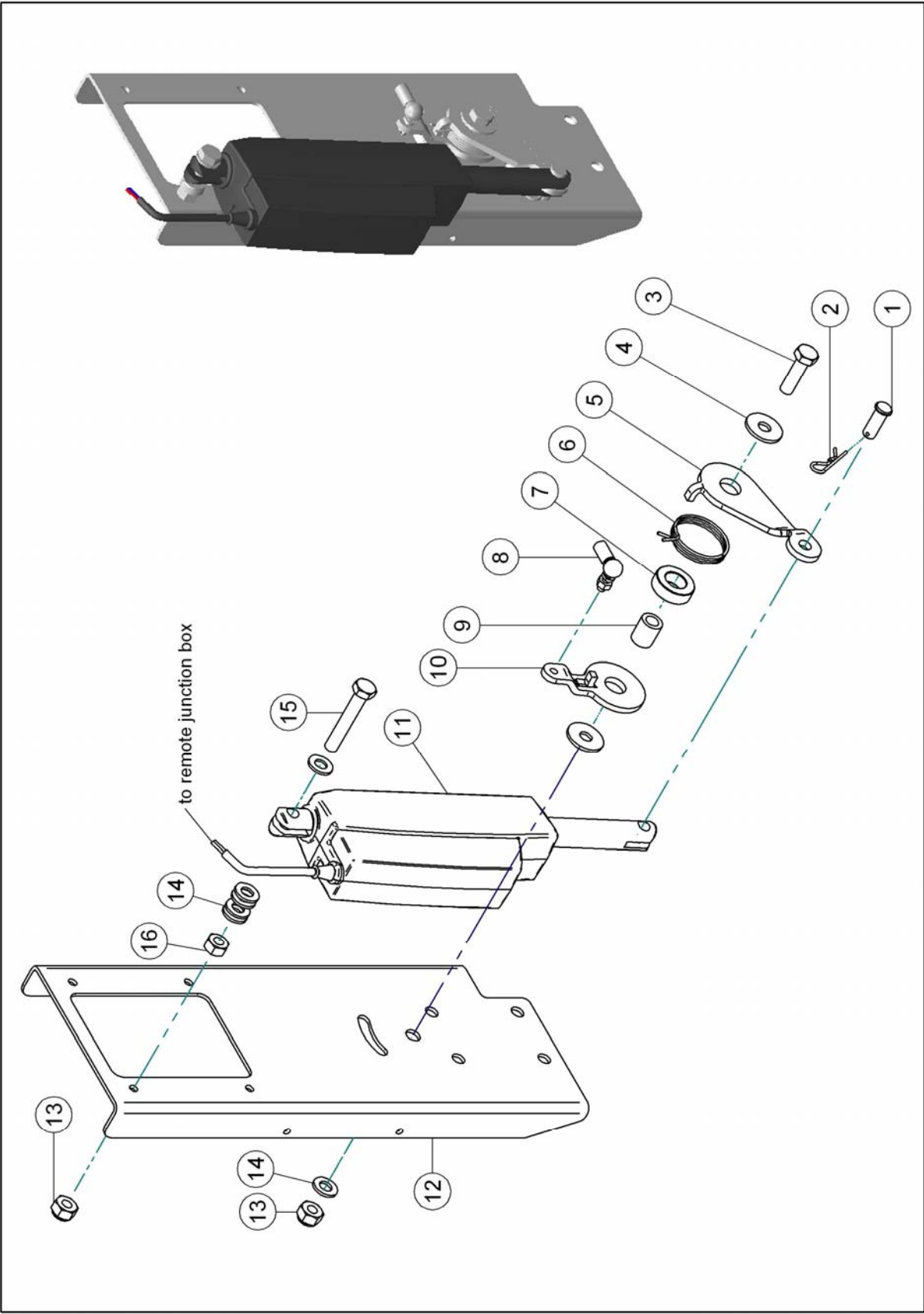
**CD50-2000 UHP WATER-BLASTER
SAFETY VALVE & RUPTURE DISC SPARE-PARTS ASSEMBLY**



**CD50-2000 UHP WATER-BLASTER
SAFETY VALVE SPARE-PARTS LIST**

Pos.	Item No.	Qty.	Description
1	81300777	1	RUPTURE DISC HOLDER UHP ½"BSPP
2	81300642	2	RUPTURE DISC SEAT
3	81300641	2	RUPTURE DISC THRUST SCREW
4	81300648	2	RUPTURE DISC 2000 BAR 37000PSI
5	81300639	1	RUPTURE DISK HOLDER 1.1/8 UNF
6	81300778		RUPTURE DISC HP ASSEMBLY ½ BSPP (pos.15 in pump spare parts)
7	81300643		RUPTURE DISC ASSEMBLY 1.1/8 UNF (pos.11 in pump spare parts)

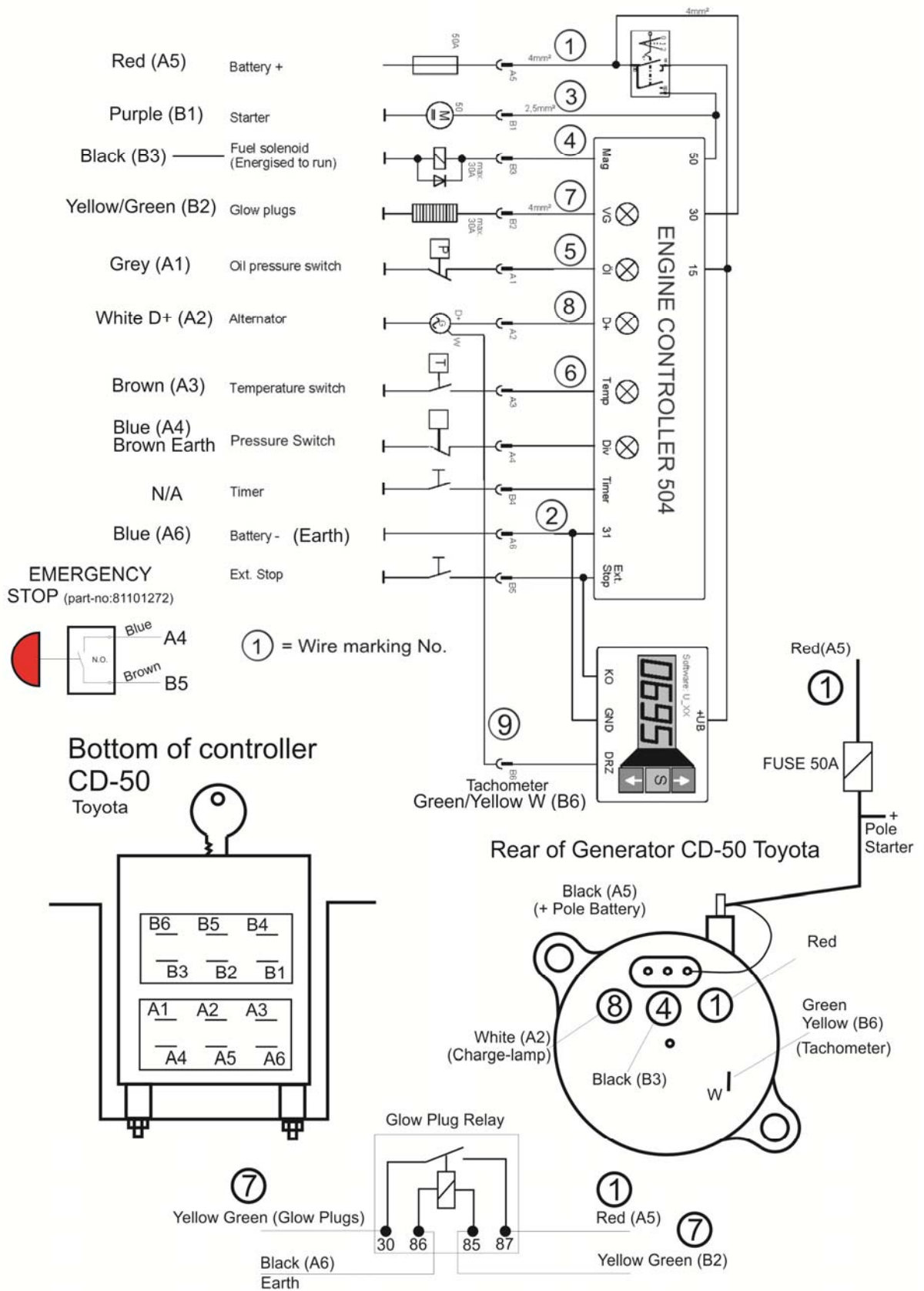
**LINEAR ACTUATOR
SPARE-PARTS ASSEMBLY**



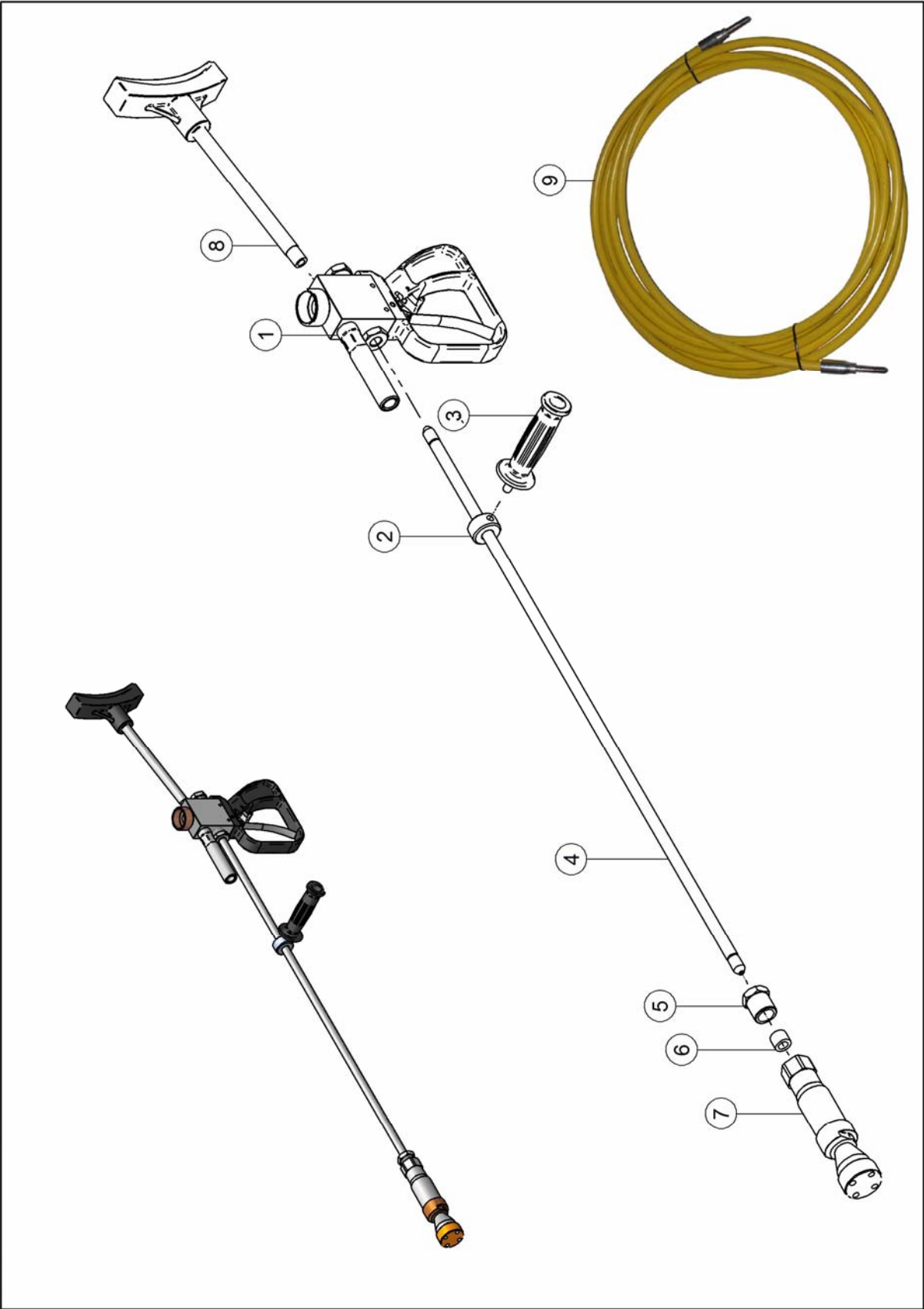
**LINEAR ACTUATOR
SPARE-PARTS LIST**

Pos.	Item No.	Qty.	Description
1	81101013	1	PIN LINEAR ACTUATOR
2	80100881	1	HAIR PIN
3	80100780	1	SCREW
4	80100906	2	WASHER
5	81101008	1	ARM LINEAR ACTUATOR ACTIVE
6	80300639	1	SPRING
7	81101011	1	BUSHING
8	80100870	1	ANGULAR BALL CONNECTION
9	81101010	1	SHAFT LINEAR ACTUATOR
10	81101009	1	ARM LINEAR ACTUATOR PASSIVE
11	81101003	1	LINEAR ACTUATOR
12	81000962	1	BRACKET
13	80100259	2	LOCK NUT
14	80100506	6	WASHER
15	80100786	1	SCREW
16	80100449	1	NUT
	81101025	1	REMOTE JUNCTION BOX
	81100997	1	REMOTE CONTROL SENDER/RECEIVER

WIRING DIAGRAM



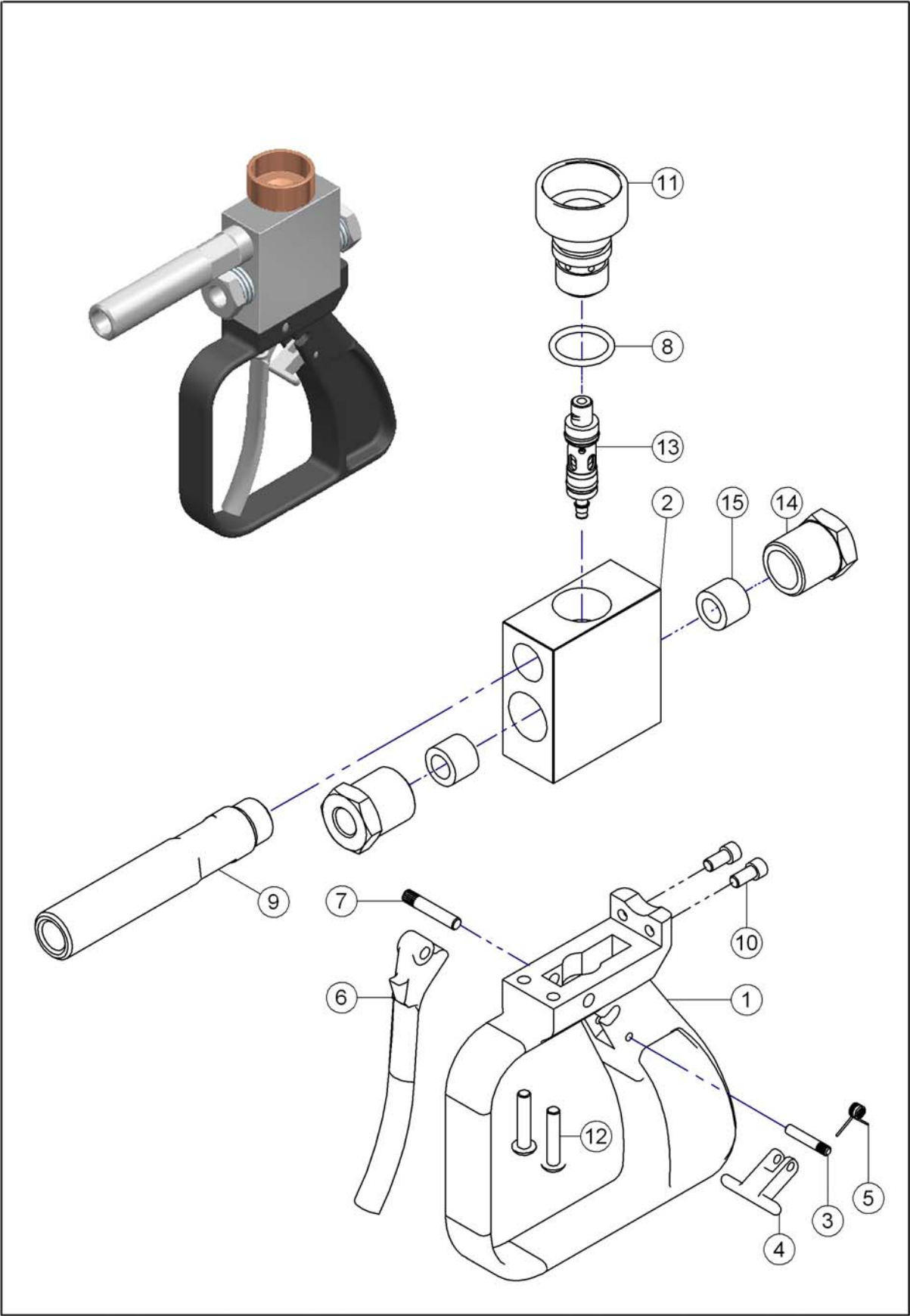
**DUMP GUN 40 KPSI
SPARE-PARTS ASSEMBLY**



**DUMP GUN 40 KPSI
SPARE-PARTS LIST**

Pos.	Item No.	Qty.	Description
	81400991		DUMP GUN 40KPSI COMPLETE W/O NOZZLE
1	81401783	1	HANDLE ASSY. 40KPSI - PLASTIC HANDLE
2	81400076	1	HOLDER FOR SIDE HANDLE
3	81400075	1	SIDE HANDLE
4	81401053	1	LANCE
5	80500631	1	GLAND NUT
6	80500632	1	COLLAR
7	81501029	1	ULTRA IMPACT 2800 SELF-ROTATING NOZZLE LOW FLOW
7	81501030	1	ULTRA IMPACT 2800 SELF-ROTATING NOZZLE STANDARD
7	81501527	1	ULTRA IMPACT 2800 SELF-ROTATING NOZZLE VERY LOW FLOW
8	81400231	1	SHOULDER SUPPORT
9	81400709	1	HOSE UHP

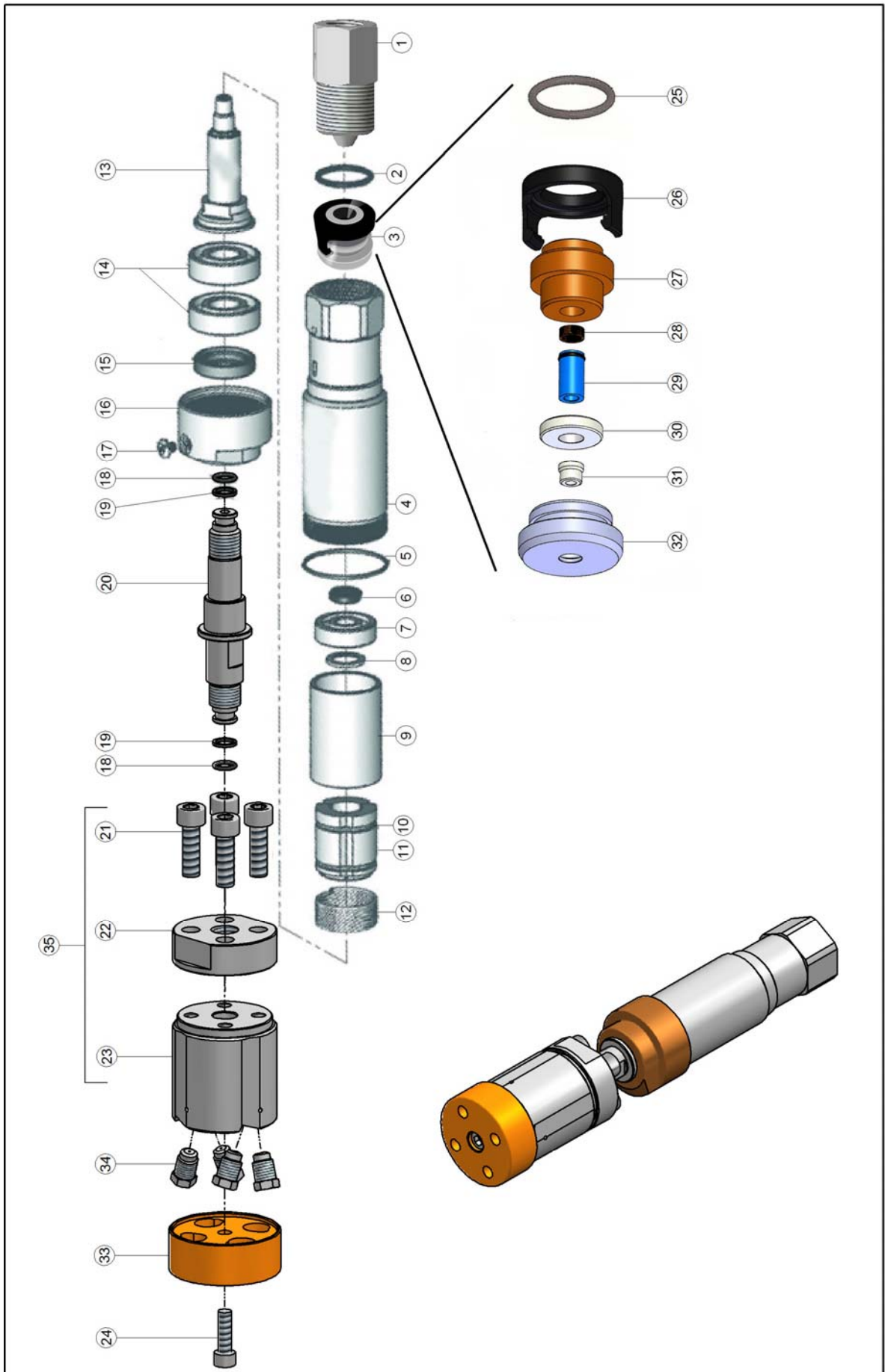
**HANDLE DUMP GUN 40 KPSI
SPARE-PARTS ASSEMBLY**



**HANDLE DUMP GUN 40 KPSI
SPARE-PART LIST**

Pos.	Item No.	Qty.	Description
1	81401777	1	HANDLE PLASTIC
2	81401773	1	VALVE HOUSING
3	81401782	1	PIN FOR SAFETY LATCH
4	81401779	1	SAFETY LATCH
5	80300651	1	SPRING FOR SAFETY LATCH
6	81401778	1	TRIGGER
7	81401143	1	PIN FOR TRIGGER
8	80200879	1	O-RING
9	81401781	1	DUMP TUBE
10	80101020	2	SCREW
11	81401780	1	ADPTOR CAP
12	80101021	2	SCREW
13	81401037	1	REP KIT 40KPSI
14	80500631	2	GLAND NUT
15	80500632	2	COLLAR

**ULTRA IMPACT NOZZLE 2800R
SPARE-PART ASSEMBLY**



**ULTRA IMPACT NOZZLE 2800R
SPARE-PART LIST**

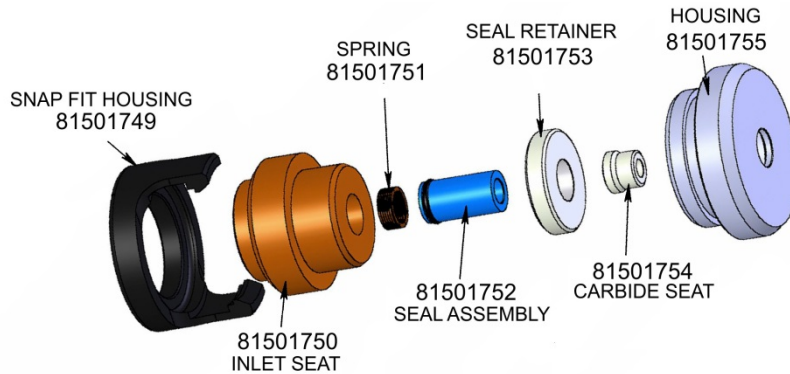
Pos.	Item No.	Qty.	Description
	81501527		ULTRA IMPACT 2800 ROTATING NOZZLE
1	80500891	1	ADAPTOR LANCE 20-40KPSI (optional - ordered separately)
2	80200779	1	O-RING
3	81501748	1	OVERHAUL REP.KIT ULTRA IMPACT NOZ. NEW IMPROVED TYPE
4	81501020	1	BODY
5	80200702	1	O-RING
6	81500982	1	SHAFT SEAL
7	80400610	1	BEARING
8	81500971	1	WASHER
9	81500993	1	SLEEVE
10	81500980	1	GARTER SPRING
11	81500979	1	WEIGHTS
12	80300626	1	SPRING
13	81500992	1	SHAFT
14	80400609	2	BEARING
15	80200749	1	OIL SEAL WITH DUST LIP
16	81501019	1	CAP
17	81501018	1	PORT SCREW
18	80200487	2	O-RING
19	80200754	2	BACK-UP RING5
20	81501512	1	SPINDLE
21	80101008	4	SCREW (cannot ordered separately)
22	81501513	1	ADAPTOR NUT (cannot ordered separately)
23	81501514	1	NOZZLE HOLDER SELF-ROTATING (cannot ordered separately)
24	80100902	1	SCREW
25	80200059	1	O-RING
26	81501749	1	SNAP FIT HOUSING
27	81501750	1	INLET SEAT
28	81501751	1	SPRING
29	81501752	1	SEAL ASSEMBLY
30	81501753	1	SEAL RETAINER
31	81501754	1	CARBIDE SEAT
32	81501755	1	HOUSING
33	81501526	1	WEAR CAP
34	81500594	4	NOZZLE 0.013"(0.33mm)
35	81501555	1	NOZZLE HOLDER COMPLETE (pos.21,22,23)

***Please order pos.34 nozzles according to machine model**

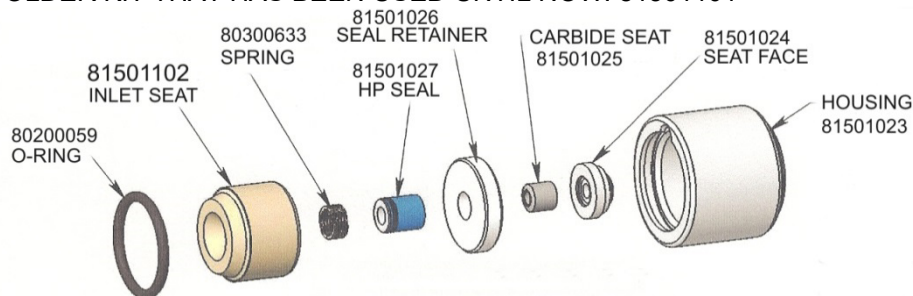
ULTRA IMPACT NOZZLE 2800R OVERHAUL KIT 81501748 ORIENTATION OF PARTS

OVERVIEW OF THE DIFFERENT DESIGNS OF REP. KIT FOR THE ULTRA IMPACT:
THE NEWEST REP. KIT WILL SUBSTITUTE THE OLDER REP. KITS

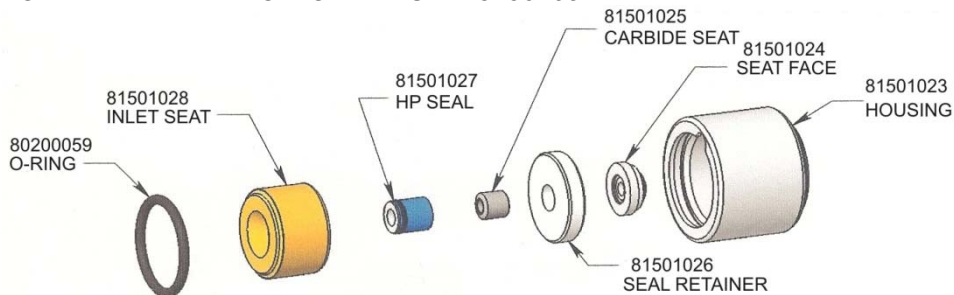
THIS IS THE NEWEST REP. KIT THAT WILL BE PUT IN TO USE AS FROM NOW: 81501748



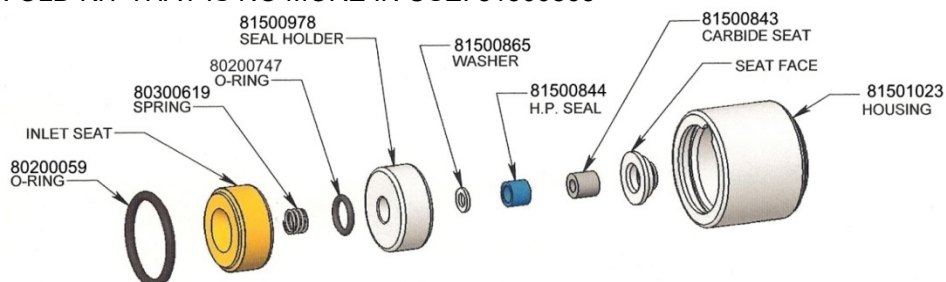
THIS IS AN OLDER KIT THAT HAS BEEN USED UNTIL NOW: 81501101



THIS IS AN OLD KIT THAT IS NO MORE IN USE: 81501057



THIS IS AN OLD KIT THAT IS NO MORE IN USE: 81500865

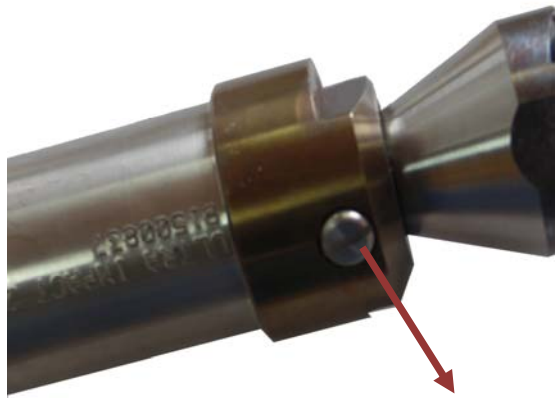


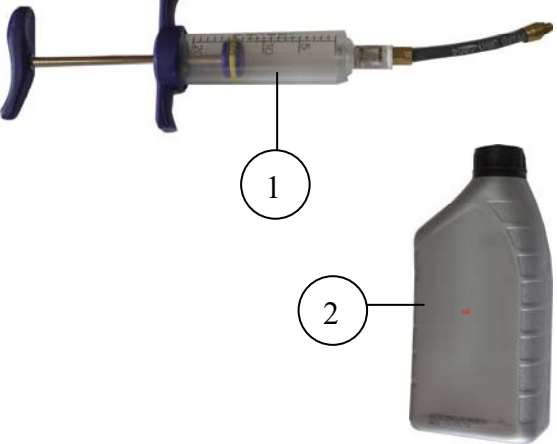
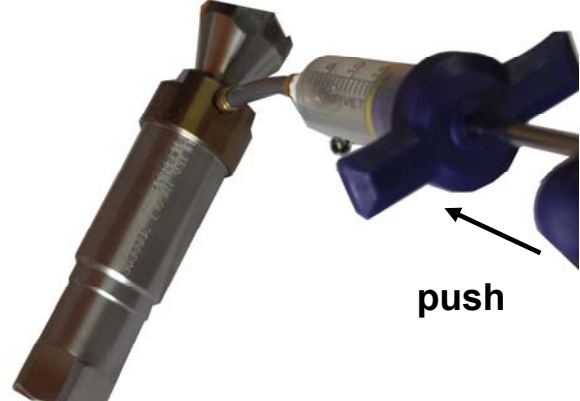
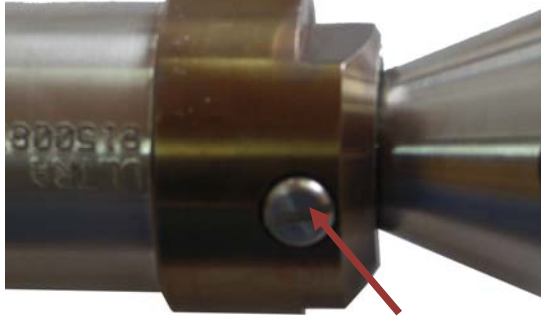


The old overhaul kit 81500896, 81501057 & 81501101 can be completely substituted with the new kit 81501748 and if a complete old rep kit is ordered, the new type kit will be delivered by default.

The internal parts of the old overhaul kit are NOT compatible or interchangeable with the new kit or vice versa. If you wish to buy internal parts to refurbish your old repair kit please refer to the above spare-parts assembly. Not all parts are available

If you are going to order almost all of the internal parts for the old repair kit, we suggest that you consider ordering a complete new repair kit 81501748, it will do a complete overhaul, as well as improve durability.

ULTRA IMPACT MAINTENANCE PROCEDURE & SPARE/PART LIST

 <p>unscrew plug</p>	
 <p>pull</p> <p>drain old oil out</p>	 <p>Discard of old oil in a proper manner fill it with new oil</p>
 <p>push</p> <p>Press new oil in</p>	 <p>Screw the plug on</p>

Pos.	Item No.	Qty.	Description
1	81501042	1	SYRINGE ULTRA IMPACT
2	83600613	1L	OIL

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