



ULTIMATE WATER JETTING SOLUTION

C – 2500 / 25 D

Diesel Powered
Heavy Duty High Pressure
UHP Machine

USER GUIDE & SPARE PARTS MANUAL

ORIGINAL INSTRUCTION



www.densin.com

Introductions

Congratulations on your purchase of the **DEN-SIN C-2500/25D**.

DEN-SIN makes no warranty of any kind with regards to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

DEN-SIN expressly disclaims all responsibility and liability for the installation, use, purpose, maintenance, and support of third party products.

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Warning

Read this user manual before you start up your UHP the first time.

This machine is a UHP producing water jet under Ultra high-pressure, which is why severe injuries can occur if the safety precautions are not observed.

Therefore a full understanding of the contents of this instruction manual is required, in order to prevent injuries to you, objects and persons near- by.

Safety

The following symbols are used in this manual to indicate procedures that if not followed, may results in personal injuries or damage to equipment.



WARNING is used to alert the reader of procedures or practice which if not followed correctly could result in personal injuries.



CAUTION is used to alert the reader of procedures or practice which if not followed correctly could result in damage to machine or other equipment.



NOTE is used to highlight important information that may assist the reader carrying out the procedure or understanding the text.



EAR PROTECTION is used to caution of high noise machine level. User must wear ear plug or ear muffler. High noise level will damage user hearing.



HOT SURFACE is used to caution user of hot surface that may cause injuries. Any maintenance work to be done after the surfaces had cool down.

Operational Information

High Pressure Machine has **IP55** rating. Parking the machine outdoor will not pose any damage to the machine. Ensure that the ventilation to the motor must not be blocked. During operation, the machine must not park at an incline angle of 10deg. The machine will become unstable and may endanger user. When hose is pull up to a high, pressure will drop due to gravity.

This machine is designed to work with **clean fresh water only**. *Sea water is not advisable.*
Life-span of the pump will be shortened. No chemical should be suck into the pump.

Prior to beginning work, all equipment must be inspected to ensure that it is in safe working condition. Inspection shall include verifying the integrity of hoses and connections, tips, lances. Personal protective equipment must be worn.

Prior to commencing any water blasting work, the area must be barricaded to restrict unauthorized access.

We recommend to practice to employ 2 operators blasting method. The role of the 2nd operator is to attend the pump unit keep close watch on the 1st operator for tiredness. Therefore, the operators can take turns to operate the machine.

- ✓ Operators must be trained on how to operate the machine (DENSIN) and the basic blasting protocol before allow to use the machine.
- ✓ How to prepare machine for usage
- ✓ Correct way of holding the trigger gun for blasting due to the recoil force from the trigger gun.
- ✓ Understand how to operate the machine correctly.
- ✓ Basic Maintenance and Troubleshooting.

*******For Den-sin's Training program availability, please make enquiry*******



IMPORTANT that user read the manual guide to understand the operation of the machine before usage.

Revision History

Revision	Rev. No.
Manual updating (913C engine)	9
Manual updating (914C engine)	10
Manual updating (Pneumatic lance service instructions)	11

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The information contained in this user guide is subject to change without notice.

1. Getting acquainted with your UHP

Fast and efficient cleaning

The **DEN-SIN UHP II C-2500/25D** enables you to get more cleaning done in less time.

This **DEN-SIN** cold water UHP offers you high performance and a design optimized for heavy duty use. The design of the surrounding frame safeguard the vital parts during transport and use, and the high performance gives you the opportunity to solve an array of blasting tasks. The UHP is designed for industrial and for offshore use. All pump parts fittings and pipes in contact with water are made of non-corrosive materials. Together with the carbide coated plungers, long life seals and stainless steel valves, it ensures long life and high durability.

Applications

These Heavy Duty Pressure Washers are capable of removing any kind of dirt:

- Algae off concrete constructions
- Paint and graffiti off walls
- Dust, dirt, soil & mud off floors
- Oil & grease off engines and other mechanical parts
- Rust, dirt, salt, scale and paint off ship decks

The Heavy Duty Pressure Washer can also be used for tasks such as:

- Surface preparation
- Concrete removal

And with the option of using different accessories, many more jobs can be dealt with:

- Sandblasting
- Drain-cleaning
- Extra-long / short lances for hard to reach places
- Rotating nozzle



This machine is only to be used for the purposes it is designed for. Any other use shall be considered improper and therefore potentially dangerous. The manufacturer is NOT to be held responsible for any damages caused by improper use.

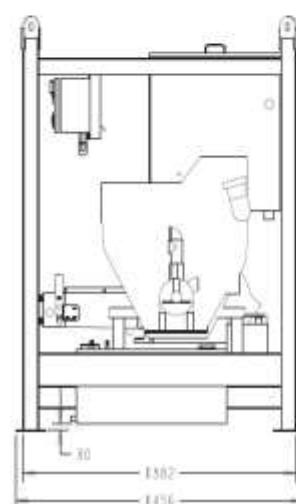
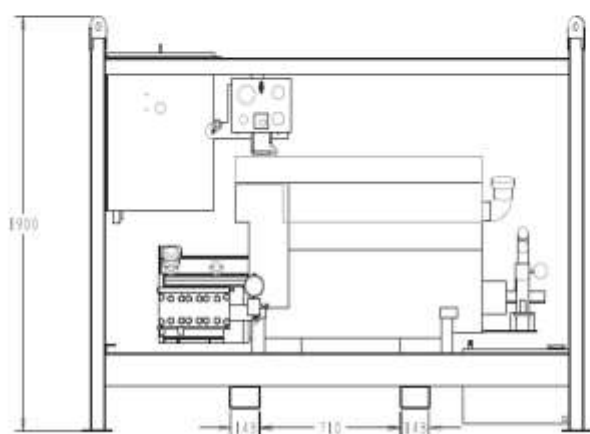
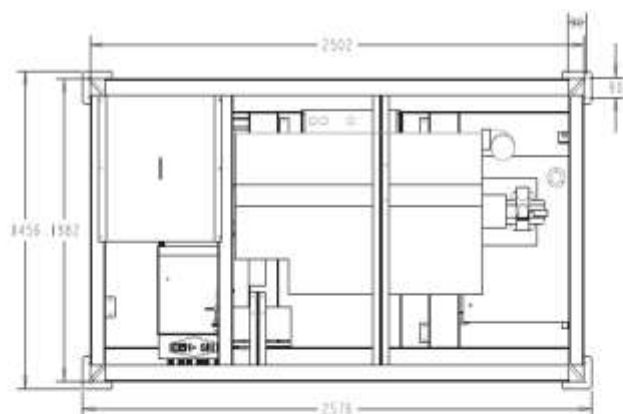
Unpacking

Remove the UHP II Water Blaster and its accessories from the packing material, if any. For transport and packing reasons some accessories may be supplied disassembled.

Make sure all components are present:

- Water Blaster machine itself
- High pressure hose (s) (optional)
- Trigger gun(s) with lance(s) (optional)
- Remote Pneumatic un-loader(s) (optional)
- Water inlet hose coupling for 1 1/2" hose
- Operation manual/Spare-parts book
- Any ordered optional accessories and spare-part

Machine Dimension



Machine Specification

Model	Water Blaster C-800/20D
M/C item no.	700995751
Power Specification	
Engine	Deutz BF 6L914C Series Air-Cooled/136kW
Electrical system	12VDC
Power	110Kw/150Hp
Engine Speed	1800 r.p.m
Pump Specification	
Working Pressure	2500Bar/ 36600psi
Flow-Rate	25 l/min / 5.6Gpm
Machine Footprint	
Machine Mass	1700 kg
Dimension	L2600 x W1450 x H1800 mm

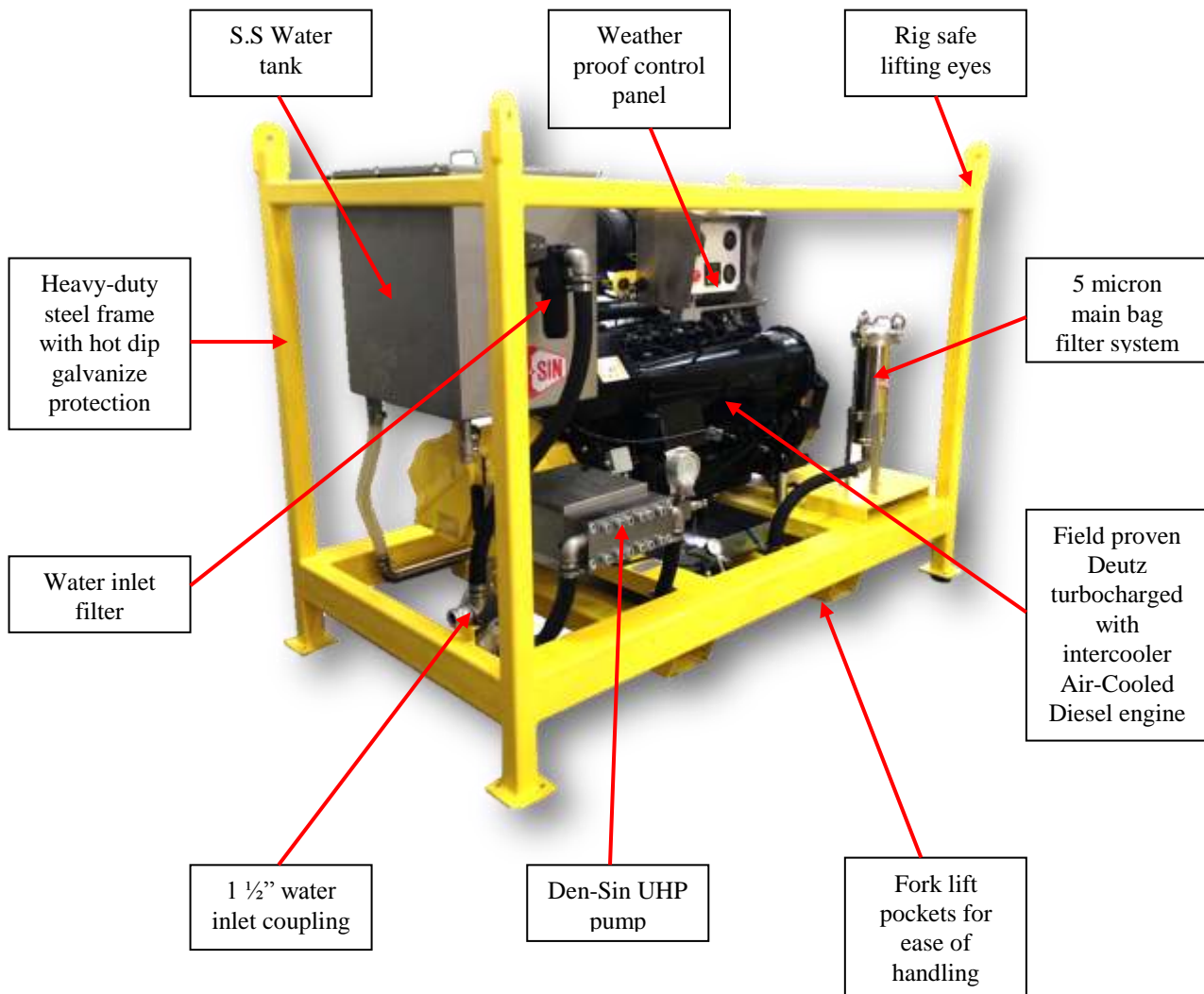
* Water inlet should not more than 40DegC

Machine ID Plate

5 Tusa Ave 2 S(639445) Tel No. : 65-6268 1006 Fax No. : 65-6268 4916			
Model		IS / CL	Hz
Serial No.		Phase	IP
HP/KW		Amp	Volt
RPM		Max. Inlet Temp	°C
BAR/PSI		Noise(Db)	
L/Min		Weight	
A DANISH DESIGNED PRODUCT		Year of Manu.	

Identity Plate will be located on the coupling shield or main frame

Machine Highlights



**some specifications may change without prior notice*

Electrical Control Panel

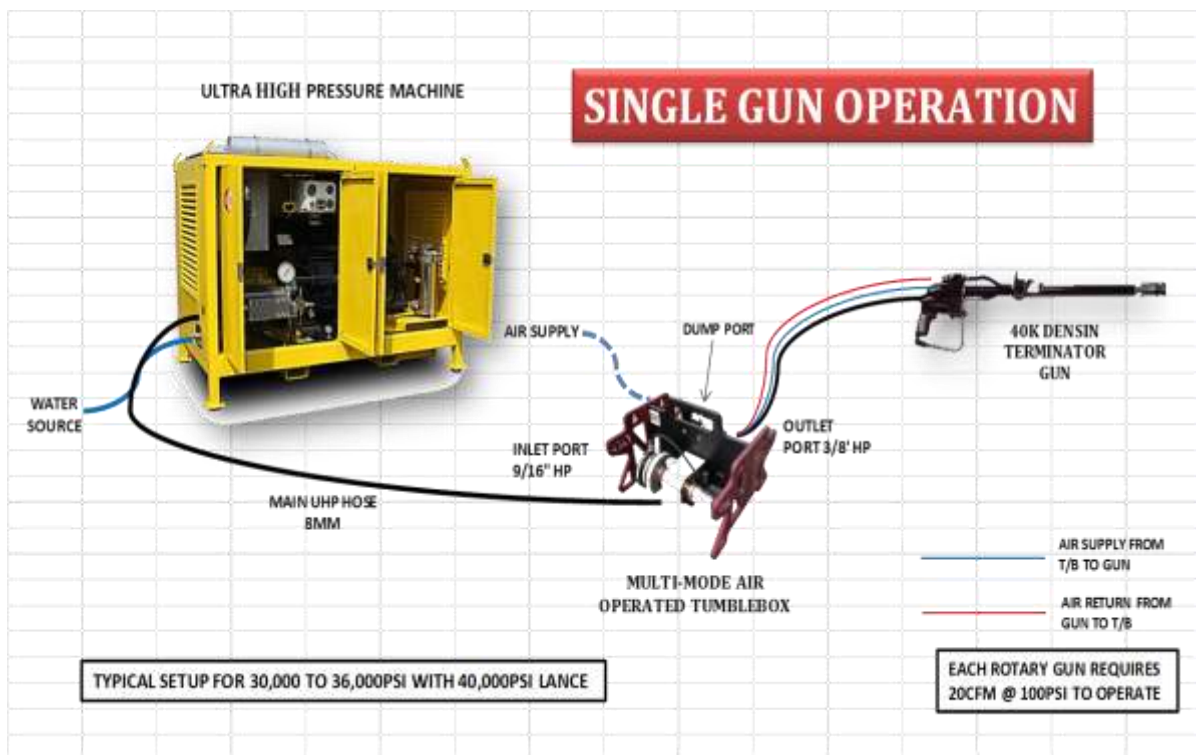
The Control panel consists of the followings:

1. Starting Console
2. Safety Alarms
3. Analog Tachometer with Hour meter
4. Engine Temperature sensor
5. Engine Oil Pressure gauge
6. Engine Kill Switch
7. Engine Manual Throttle control knob

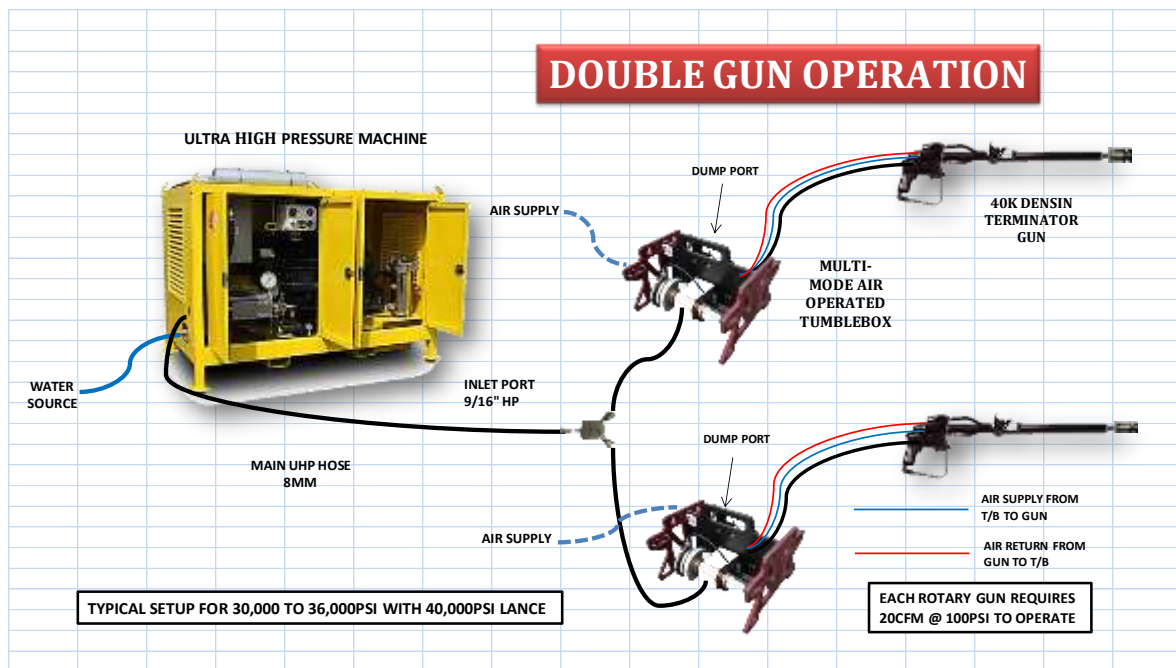


Hose and tumble box connection

Hoses Connection diagram (Single Mode)



Hoses Connection diagram (Dual Mode)



Machine Installation / setup

Make sure that the machine is operating on flat floor or inclined not more than 10Deg.
The machine must be parked or securely tighten to structure.

Step 1. Connect 9/16" high-pressure hose(s) (700550852) to adaptor located on the left hand side of cylinder head.

9/16" High-Pressure Hose

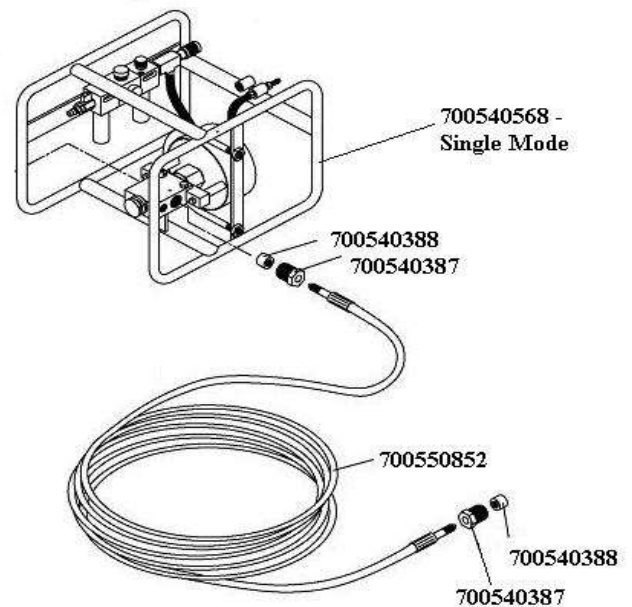


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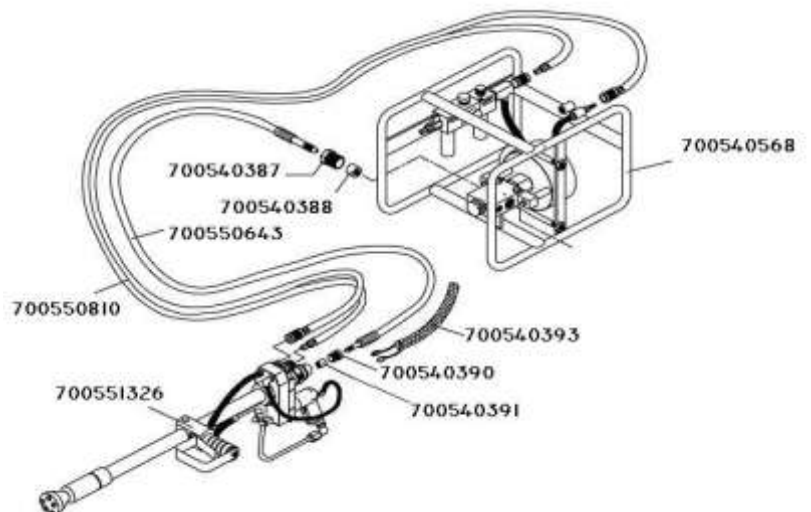
If required, the second hose could be joined up by means of a straight connector (700540378).



Step 2. Connect the other end of the hose to the inlet on the Den-Sin style remote pneumatic un-loader (Single mode) as shown in the picture.



Step 3. Connect the trigger gun hoses with the attached air-hoses. Always use two wrenches when tightening the hoses to the rotating gun. Remove the nozzle from the nozzle carrier.



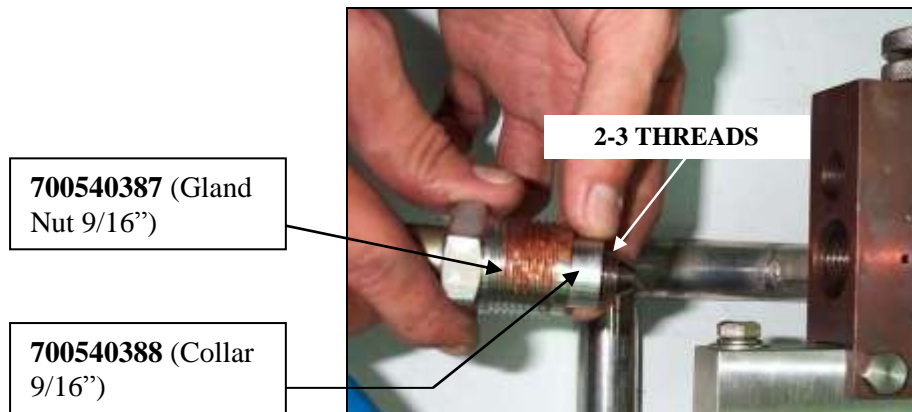
IMPORTANT:

ALWAYS FLUSH THE SYSTEM TO REMOVE ANY PARTICLE THAT MAY CHOKE THE NOZZLE, THUS CAUSING OVER-PRESSURE.

ONLY FIX THE NOZZLES AFTER THE SYSTEM HAD BEEN THOROUGHLY FLUSHED.

Step 4. Connect up air supply to the pneumatic un-loader/s. The system requires a min 90psi and flow rate of 20CFM (single mode) in order to function properly. For 2 guns operation, you will need 90psi air pressure and flow rate of 40CFM.

Note: When tightening the hoses ensure that there are **2 to 3** threads protruding from the collar.



Notes on setting up with Dual Mode pneumatic unloader:

The dual mode tumble box (see pg. 10) is provided with 9/16" HP connections on one side of the body. The high pressure water supply from the pump is connected to the inlet side, and the hose to the gun is connected to the 3/8" HP outlet.

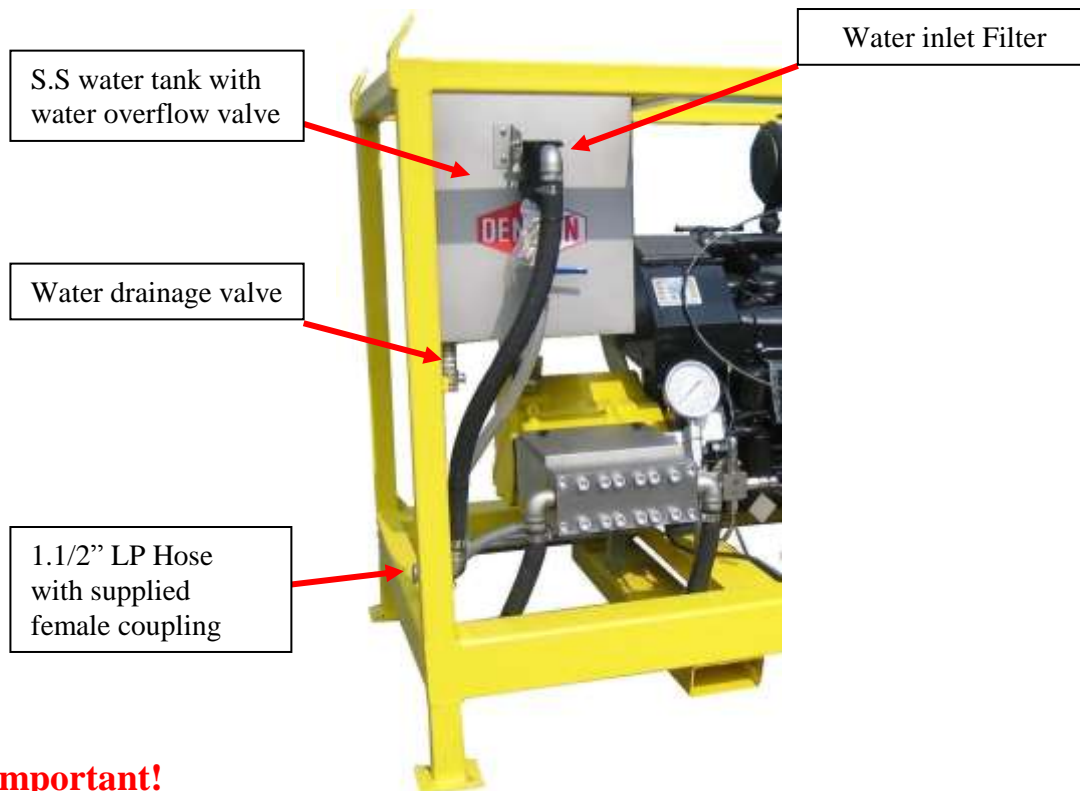
- 1) Close the Air Shut-Off/Exhaust Valve on Part No. 77408674 (Item No. 16).
- 2) Connect air to upstream side of Air Dryer/Regulator on Part No. 77408674 (Item No. 16)
- 3) Connect High Pressure Water Supply line from pump to 9/16" HP connection on the Valve Block: Part No. 77408808 (Item No. 20)
- 4) Connect a high pressure water line from the 3/8" connection on the opposite side of the valve block to the swivel on the back of the gun.
- 5) Connect an air line from the gun, not exceeding 7.5m long, to the Female QD Connector downstream of Air Shut-Off / Exhaust Valve on Part No. 77408674 (Item No. 16), to air inlet on gun.
- 6) Connect Pilot air line, not exceeding 7.5m long, from the gun to the Male Push-Lock Connector: Part No. 77408661 (Item No. 14), on Quick Exhaust Valve.
- 7) Open Air Shut-Off / Exhaust Valve and adjust Air Regulator on Part No. 77408674. (Item No. 16), to give a minimum pressure of 90 psi, and a maximum pressure of 100 psi.
- 8) Operate gun by pressing both triggers simultaneously,
- 9) Adjust the lubricator to 10 drops per minute while the gun is being operated. (To recharge oil reservoir use 10W machine oil).
- 10) Item No. 46, Part No. 700540328, this elbow must be installed and is required for the diffuser to function properly. A discharge hose can be installed should there be a need to return the discharged fluid back to the tank.



After installation of the new cartridge, in some cases there may be some initial leakage from the dump diffuser and hose assembly. This is due to the metal-to-metal seat in the cartridge. Cycling the gun on and off a few times should solve this

Step 5. Water supply connection:

- Attaching a 1.1/2" hose to the supplied low-pressure inlet coupling on the frame.
- Connect the other end of the water supply hose to a **fresh water** tap.
- Turn on the tap.
- To prevent overflowing, always use the float valve inlet.



Important!



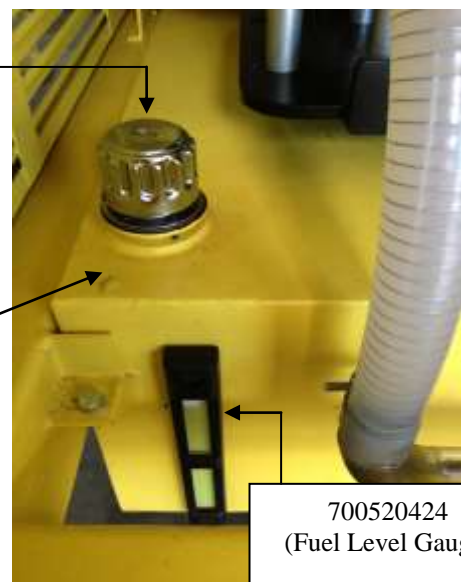
It is NOT allowed to connect this Heavy Duty Pressure washer directly to a portable water supply! If portable water is used, it is strictly necessary to include a water break tank in accordance to EU standards EN 1717

Step 6. Fill the built in fuel tank (700520535) with automotive quality diesel through the strain filler cap (700520137).

Note : Level gauge is just an indicative amount of fuel inside the tank.

700520137
(Fuel Cap w/strainer)

700520535 (140L Fuel Tank)



700520424
(Fuel Level Gauge)

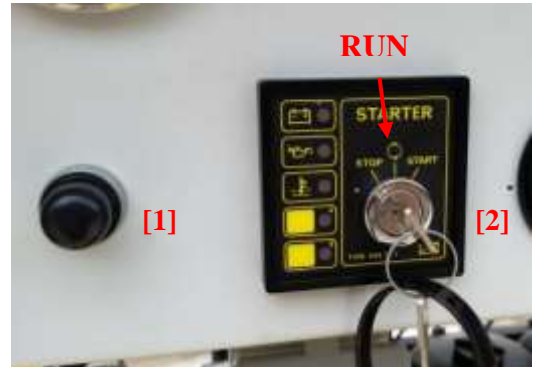
Step 7. Locate the 12V battery and connect up the battery terminals to the cables provided.

Machine startup operation



Always leave the key in running position when operating the machine. Failure to do so will by-pass the safety system designed to protect the users and pump.

Step 1. Locate the starter console on the Control Panel, turn the Key [2] on the ignition switch clockwise to start position in order to crank start the engine. Once engine started, release the key to the Run position at center.



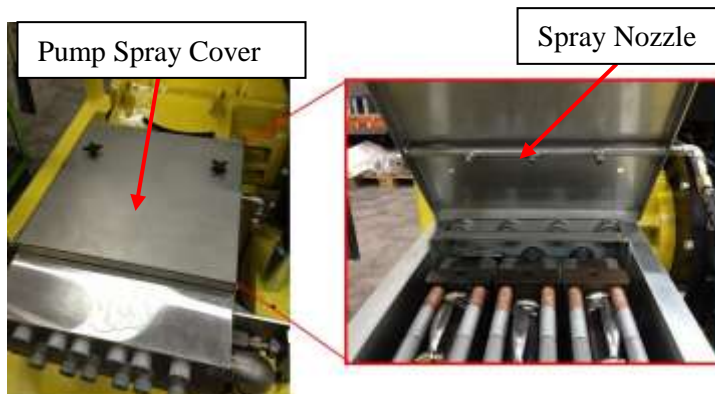
Step 2. Turn the Throttle Control in clockwise direction to take the engine to an idling speed of approximately between 1400-1500rpm. At this time as since the machine is equipped with a pneumatic lance and unloader system, the excess water pumping out from the pump will exit from the dump port of the pneumatic unloader. This is normal and do not panic.



Caution! During Dual mode operation, the water exiting out of the dump ports of the pneumatic unloaders were extremely hot due to they are dumping at high pressure! Do not attempt to touch the hot water with bare hands.

Step 3. Check the Inlet Booster Pressure on the low water pressure gauge is approximately 4 Bar and above. If it is 1 bar or below, undo the Bleed Screw of the main filter housing to bleed out left over air inside the system.

Step 4. Open the pump cover and check that the spray nozzle is spraying out water. Then put back the spray cover and tighten with screws.



Step 5.

- For Single Gun Operation, press both triggers and slowly to bring up the pressure. Next throttle the engine RPM to reach the desired pressure. The nozzle configuration on the gun should be matched so that desired pressure is reached at approximately 1800 RPM. Reconfigure nozzles to obtain desired pressure.

- For Dual Gun Operation, press both gun triggers slowly to bring up pressure. Next throttle the engine RPM to reach the desired pressure. The nozzle configuration on the guns should be matched so that desired pressure is reached at approximately 1800 RPM. Both pressure readings should be equal with either Dual guns running, Single gun running and both guns unloading. Reconfigure nozzles to obtain desired pressure.
- You should get approximately 2500 Bar for both operation types, and no water should exit from the dump port on the pneumatic unloader dump port/s. If found water exiting at the dump port/s and pressure is below 2500Bar, please check the air supply is at required pressure of 90Psi, or the pneumatic unloader may need be leaking, or some service for the initial run in period (see pg. 11 and maintenance section).

Prolong unwanted dumping will result pre-mature failure of the valve system of the pneumatic unloader!

Machine Shut-Down Procedure

Step 1. Turn the Throttle Control Knob in a counter-clockwise direction slowly to ease down the engine speed to approx. 1400 – 1500 rpm. Allow the engine to warm down in few minutes before shutting off by pressing and hold the Engine Kill Switch **[1]** till the engine has come to a complete stop.

Step 2. Turn the key to “off” position only after the engine has come to a complete stopped.

Step 3. Dis-connect the battery cables on the battery terminals.

Step 3. Dis-connect the pneumatic lance, unloader and hose/s, and carefully store them in a safe place.

Shut down: (Emergency)

The system has an **EMERGENCY STOP** button located on the control panel. Once depress, the engine will shut down immediately.



IMPORTANT:

Notice Un-loading cycle:

Do not let the machine unload the water for prolonged periods of time. This is especially when running two-gun operation as the pump and engine is working at full load all the time. In order to reduce wear and tear on the consumables, eg. pump seals, diesel fuel, etc. its recommended to shut down the machine.

Salt-water:

When running the UHP on salt/sea-water supply, the machine **MUST** always be flushed with flash water at the end of each use. More frequent filter change is recommended. Running the machine on salt-water supply may shorten the life of the pump and pump parts.

2. Safety and protection information

General safety & application guidelines



To prevent accidents from happening, ensure the safety of the person(s) who uses the equipment and to protect bystanders and nearby placed inventory or machinery, a few safety precautions needs attention.

- 1) Treat the machine as a high-speed cutting tool.
- 2) Anyone under the age of 18 is NOT allowed to use the machine.
- 3) Always keep the UHP and its accessories in good working condition. Check the machine for defects. Do NOT start up the machine if there is any defect. Have the machine serviced.
- 4) When using the UHP and its accessories, eye protection must be worn to protect against repelling or ricocheting matters causing eye damage.
- 5) Suitable clothing and footwear must be worn while using the equipment to protect the operator. Do not try to clean clothes or footwear with the machine.
- 6) Precautions must be made to keep bystanders away from the working range.



- 7) Do NOT spray-clean on yourself, others or live animals.




- 8) The high-pressure beams are capable of making severe injuries.
- 9) Do NOT spray at electrical equipment OR the machine itself.
- 10) While repairing or servicing the equipment and its accessories always make sure the machine is turned off and disconnected from the main power supply.
- 11) Only allow instructed personnel to operate the machine.
- 12) Activating the trigger/gun can cause backward force therefore always hold spray lance with both hands.
- 13) When pausing during operation turned off the main switch of the machine and ensures that the trigger/gun is locked.
- 14) Only use high-pressure hoses, connections and nozzles specified by DEN-SIN.
- 15) **IMPORTANT** – Do not use the machine in a possible explosive environment in accordance with EN-50014.

Important medical information

Immediate hospital attention should be given 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 photo copied, laminated and used as medical alert tag.

 <small>ULTIMATE WATER JETTING SOLUTION</small>	IMPORTANT MEDICAL INFORMATION
WARNING Obtain medical treatment immediately for ANY high-pressure water-jet injuries. Inform the doctor of the cause of the injury. Show this card to the doctor.	<p>This card is to be carried by personnel working with high-pressure water jetting equipment.</p> 
DEN-SIN a division of Nilfisk-Advance Pte Ltd., 5 Tuas Ave 2, Singapore 639445 Tel: +65 6268 1006 Fax: +65 62684916	

 <small>ULTIMATE WATER JETTING SOLUTION</small>	MEDICAL ALERT NOTE TO PHYSICIAN
<p>This patient may be suffering from a water jet injury. Evaluation and management should parallel that of a gunshot injury. The external manifestations of the injury cannot be used to predict the extent of internal damage. Initial management should include stabilization and a thorough neurovascular examination.</p> <p>X-rays can be used to access subcutaneous air and foreign bodies distant from the site of injury. Injuries to the extremities can involve extensive nerve, muscle, vessel damage, as well as cause a distal compartment syndrome. Injuries to the torso can involve internal organ damage. Surgical consultation should be obtained. Aggressive irrigation and debridement is recommended.</p>	<p>Surgical decompression and exploration may also be necessary. Angiographic irrigation studies are recommended pre-operatively if arterial injury is suspected. Bandages with a hygroscopic solution ($MgSO_4$) and hyperbaric oxygen treatment have been used as adjunctive therapy to decrease pain, edema and subcutaneous emphysema.</p> <p>Unusual infections with uncommon organisms in immunocompetent patients have been seen; the source of the water is important in deciding on initial, empiric antibiotic treatment, and broad spectrum intravenous antibiotics should be administered.</p> <p>Cultures should be obtained</p>
DEN-SIN a division of Nilfisk-Advance Pte Ltd., 5 Tuas Ave 2, Singapore 639445 Tel: +65 6268 1006 Fax: +65 62684916	

Safety devices

The machine is equipped with the following safety devices:

1) Engine kill switch

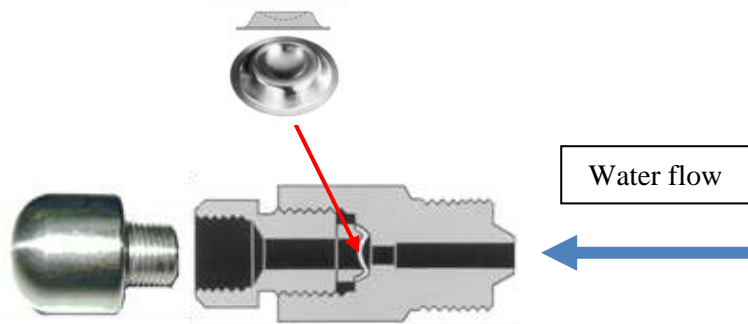


This machine is equipped with an Engine Kill Switch on the control panel. It is not considered primary safeguarding devices because they do not prevent access to a hazard nor do they detect access to a hazard. It is initiated by a single user's action. When executed, it will override all other functions and machine operating modes. The objective is to stop the high pressure machine as quickly as possible without creating additional hazards.

- To use the emergency stop function, user need to Press and Hold on the Stop button .When activated, the engine will immediately come to a total stop, as well as the high pressure pump unit.
- To reset the machine, turn the key on the ignition starter counter-clockwise to reset. To start up the machine again, user needs turn the key on the ignition starter clockwise, and release to key to run mode at center position.

2) Safety rupture disc

It is used to protect against over-pressure. During the event of sudden over-pressure, the safety rupture disc will burst within the holder and water will exit out from the end fitting. The pressure rating of the safety valve system is being factory set to approximately 5-10%. Incorrect pressure rating or tempered with may void warranty for the machine. Please contact DEN-SIN if required any assistance.



3) Machine Safety Shut Down System

[A] Alternator/ Battery Sensor -----

[B] Engine Oil pressure Sensor -----

[C] Engine Temperature sensor -----

[D] Low Water Inlet pressure/ level Sensor -----









[E] Engine Turbine Fan Sensor -----



Personal Protective Equipment (PPE)



The following protective clothing and devices should be worn both by personnel operating the UHP system and equipment and by those working nearby:

<p>Eye protection- Operators must wear visors and goggles to guard against spray and flying debris. A combination of both goggles and visor is advisable. And will protect the eyes and the face during both water-blasting as well as abrasive water-blasting</p> <p>Head protection- Helmets must be worn at all time by personnel within the work area. Helmet material must be able to withstand mechanical shock without fracturing.</p> <p>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.</p>	  
<p>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 preferred.</p>	
<p>Foot protection- Safety footwear with steel toecaps must be worn. Basic safety footwear must also be equipped with metatarsal guards to protect the instep. Safety boots are available in other designs than the illustration.</p> <p>Gaiters- This is an additional layer of protection to the user foot that are not protected by the steel top cap. It is intended to be worn outside of the user's regular protective boots. Five clips ensure that gaiters securely stay in place. The entire area is protected. Very comfortable and light to wear.</p>	 
<p>Body protection- Waterproof garments 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 them selves or other personnel.</p> <p>Hose protection (700799097)- Protect user from high pressure water injuries incase hose connection is loose.</p>	 

3. Maintenance and troubleshooting

Maintenance Schedule

Regular Service Period as indicated	Each use	1 st 50hrs	Every month / Every 500hrs	When needed	Procedure / Remarks
Check pump oil level	◇			◇	<ul style="list-style-type: none"> • Top up if necessary.
Change pump oil Recommended Oil : VG 220 or SAE 90 Usage : Approx. 14.5 Liters Change Engine Oil Recommended oil: SAE 15W 40 Usage: Approx. 16.5 liters		◇	◇		Renewal of oil: <ul style="list-style-type: none"> • Turn off High Pressure Cleaner. • Loosen bolt(Hex) at bottom of pump housing. • Drain oil into a waste oil-tray. • Tighten bolt(Hex) • Add oil through pump inlet on top of the pump until the red point of the oil control glass has been reached. Note: Do not dispose used oil into drain. Always pour the used oil into recycle container or plastic bag with “Waste oil” labeled. Contact recycles company to collect the waste oil for proper dispose. Always let the pump cool before service
Check water-filter inside the water-tank	◇			◇	<ul style="list-style-type: none"> • Check or replaced where necessary
Check water inlet filter	◇			◇	<ul style="list-style-type: none"> • Check or replaced where necessary
Cleaning of engine fan (to ensure sufficient airflow)			◇	◇	<ul style="list-style-type: none"> • Clean the turbine fan blade Do NOT operate the machine while removing fan cover!
Check booster pump filter	◇			◇	<ul style="list-style-type: none"> • Clean or replaced filter if pressure drops below 4 bar
Check for air-bubbles inside hose, pump	◇			◇	<ul style="list-style-type: none"> • If bubbles found inside hose, tighten the hose clamps • Loosen screw of booster pump filter to let out air trapped inside booster pump filter • Run the machine without depress trigger for a few minutes to purge out air bubbles



For any further inconveniences, not mentioned in this user guide or any damages of the machine, we strongly suggest you to make contact with your dealer for the repair or possible replacement of any original spare-parts

3. Maintenance and troubleshooting

Machine Do's and Don'ts

Do	Don't	Action	Cause
	◇	<i>Spray directly onto the machine with high pressure water</i>	<i>Electrical shock may occurs</i>
	◇	<i>Operate the machine with damaged or removed fan cover</i>	<i>Motor will be overheated and malfunction</i>
	◇	<i>Operate/keep machine with frost built up</i>	<i>Flush pump with antifreeze fluids before use.</i>
◇		<i>Check hose and cord are not vehicle run over by heavy or squeezed in door opening</i>	<i>May cause machine not function properly.</i>
◇		<i>Check electrical cord and high pressure hose for wear and cracks</i>	<i>To prevent electrical shock and safety to the user</i>
◇		<i>Ensure coupling parts free of dirt to ensure long life of O-ring seals preventing water leaks.</i>	<i>Extend life span of the pump seals and maintaining correct pressure.</i>
◇		<ul style="list-style-type: none">• <i>Release any residual pressure from the gun when the machine is shut down</i>	<i>To prevent injuries others if the trigger is accidentally pressed.</i>



Used oil must be properly disposed. Do not dispose used oil into the environment that will cause pollution to the environment.

Filter maintenance and filter change

Type 1 (Standard)

Filter bag type of filter is washable and can reuse for a few times before need to be changed.



Stainless
Steel Bag
Filter



Filter Bag
& Holder

Type 2 (Optional)



Stainless Steel Filter



Filter Fiber Cartridges

The filter fiber cartridges inside Stainless Steel filters are not flushable and should be replaced with new cartridges when clogged.

Booster-pump pressure gauges, one before and one after the filters should indicate approximately the same pressure when running the machine. When the gauge after the filters, the one closest to the inlet at the pump-head shows significantly lower pressure than the gauge at the booster pump, before the filters, it indicates a pressure drop through the filters and their cartridges should be replaced. Always replace both filter cartridges. Clogged filters may inflict cavitation in the high-pressure pump leading to severe damage of the pump.

Den-Sin pneumatic gun service & repair instruction

The pneumatic lance consists of a high pressure swivel assembly which rotates at high rpm during operation. In the swivel consist of a high pressure seal assembly, which normally has a working life span of approximately 100hrs. It has to be replaced when found leaks at the swivel body itself.



Besides replacing worn seal assemblies, it is also important to service the swivel body by cleaning the inside of the swivel body due to time to time the material of the seal assembly will work itself into the brass backup ring during operation. If this is not done, prolong accumulation of the debris will create friction between the swivel spindle shaft and the brass backup ring where the small portion of shaft goes through the brass piece.

This friction will turn into heat, and will break the small shaft.



Do not use the lance with bad bearings! If the bearings are worn, it must be replaced immediately. Failure to do so will shortened the life span of the seal assembly and the spindle shaft due to heavy vibrations of the lance tube during rotation.

Replacing seal assembly:

The high pressure seal assembly of the pneumatic lance has a working life of approximately 100hrs, and when it is worn, it is needed to be replaced by simply removed the worn piece out from the inlet adaptor of the swivel assembly.



Servicing and dis-assembly of swivel assembly:

Step 1. After dis-assembled the lance, removed the inlet adaptor but retaining the end cap, and also re-fit the coupling onto the shaft. Placed the assembly as shown in the picture onto a hydraulic press and carefully press the shaft down



Step 2. Make sure you see the complete brass piece is out from the swivel body



Step 3. Remove the brass piece and clean away any debris. It may be necessary to replace the dust seal on the brass piece when required.



Note: To replace spindle shaft, performed the above steps 1 & 2 and continue to press the shaft until it is completely removed.

Re-assembly of swivel assembly:

Carefully aligned the shaft, brass backup and inlet adaptor and then pressed the assembly into the swivel housing.



Pump Service & repair instructions

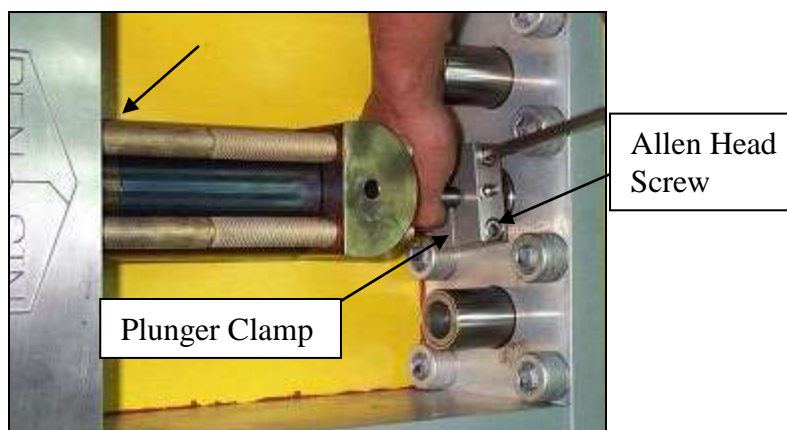
Inspection and replacement of valves and high-pressure plunger packing:

Dis-assembling: (pos. refers to page: 31 if not stated otherwise)

Disconnect the - cable from the battery and drained all water from the water tank.

Remove the spray cover (700680066).

Loosen the Allen head screw (700510181) located at the top of the plunger clamp (700680114).



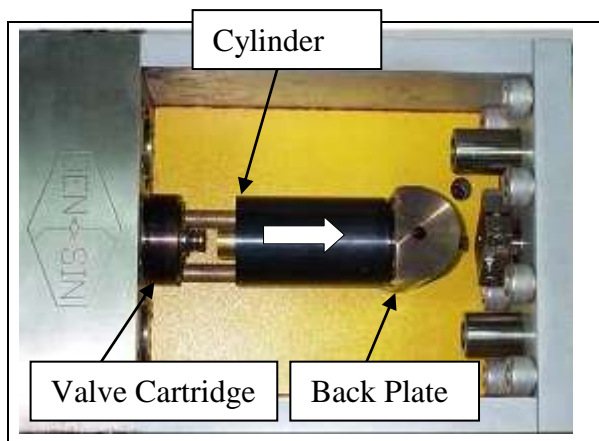
IMPORTANT: AVOID KNOCKING THE PLUNGER AGAINST ANYTHING.

Gently free the plunger (700680111) from the clamp (700680114) and push the plunger (700680111) slightly into the cylinder (700680061).

While pushing, take care not to knock the tip of the plunger (700680111) against the valve pin (700680056).

Loosen the tie bolts (700680054/700680053) in an even and alternating manner. Remove the top 2 screws (700680053) completely and push back the lower 2 (700680054).

Slide the back plate (700680084) and cylinder (700680061) backwards to remove the valve cartridge assembly (700680068).



Slide the cylinder (700680061) forward; ensure that the plunger (700680111) is clear of the back plate (700680084) before lifting and removing the cylinder (700680061).

Once outside, pull out the plunger (700680111) from the back of the cylinder (700680061). Inspect the plungers for scratches, grooves and pitting replace if necessary.

Remove the Throat bushing (700680007) and packing spring (700680059) from the front but leave the packing adaptor (700680008) inside the cylinder (700680061).

3. Maintenance and troubleshooting

Knock out the remaining packing assembly (7006800053 7006800113 700680032 700680008) with the packing removing tool (Order part no: 700953510) or with a piece of plastic rod or suitable piece of round wood from the front of the cylinder.



Inspect the throat bushing(700680007) packing adaptor (700680008), back-up ring (700680005) and support ring(700680110) for wear, replace if necessary. Packing (700680110; 700680032) should be replaced with every dismantling

Inspect the 3 O-rings (700680049, 700680013 & 700680060) on the valve cartridge (700680068) for wear and tear, replace if necessary.

Inspect that the valve spring (700680058) is not broken, replace if necessary.

If valve spring is broken or valve wear is suspected place the valve cartridge on a vice. Clamp on the flat part of the discharge valve-pin (700680056) and carefully unscrew the valve stop nut (700680021) with a suitable spanner or pipe wrench.



Inspect the suction valve disc (700680057) for wear and pitting. Replace if necessary. Temporary field repair of the suction valve-disc can be carried out by sanding it with fine emery-paper on a flat surface.

Re-assembling:

If possible keep the parts as clean as possible and apply some silicone grease (Silicon grease can be ordered as part no.: 700953008) to the parts before assembly for easy assembly.

To assemble the valve cartridge

Clamp the valve and valve cartridge on a vice. Position the valve disc(700680057) and spring (700680058) before applying a drop of “Lock-tite” onto the thread of the discharge valve-pin

3. Maintenance and troubleshooting

(700680056). Do not apply excessive force when tightening the valve stop nut (700680021), but make sure the nut is screwed on completely.

Apply some silicone grease to the O-rings (700680049, 700680013& 700680060) to prevent them from falling off during assembly.

To assemble the cylinder

Silicone grease can be applied to parts for easy assembly.

From the rear of the cylinder insert the back-up ring (700680005) with its chamfered side facing the rear.

Position and align the support ring (700680110) before pushing it into the cylinder, **do not** forcefully knock the support ring into position.



From the front of the cylinder, insert the white packing (700680011). Using the packing adaptor (pos: 26) as adaptor, gently knock the packing into the cylinder with a mallet. Use the special tool (Order part no: 700953510) or a clean plastic rod, gently knock the packing into the cylinder until the packing is touching the backup ring.

Repeat the procedure for black/gold packing (700680032).

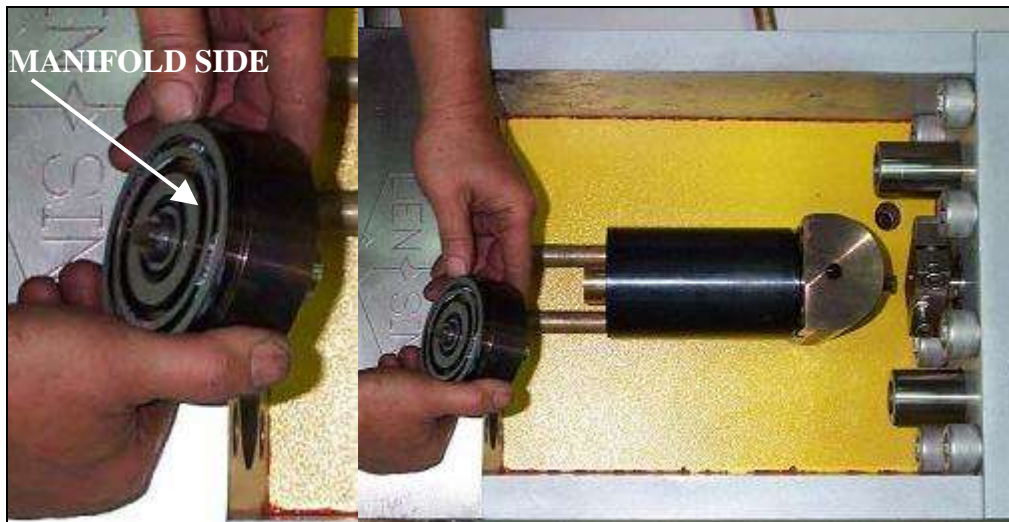
With the packing adaptor still inside the cylinder, slide the packing spring (700680059) into the cylinder.

With its thin walled side facing the front of the cylinder, slide the throat bushing (700680007)

Turn the cylinder over and push in the plunger (700680111) from the rear. .

DO NOT KNOCK THE PLUNGER INTO THE CYLINDER.

To prevent against corrosion and ceasing of the tie bolts (700680054/700680053), copper-slip (order part no.: 700953015) should be applied to the threaded region of the tie bolt.



Assemble the bottom/ longer tie bolt (700680054) and the back plate (700680084). Ensure that the hole is facing upward.

Slide the cylinder with the plunger into the back plate. A portion (at least 2cm) of the plunger should be protruding out of the pack plate. Ensure that the cylinder is properly sited in the step of the back plate before proceeding.

Push in the throat bushing (700680007) and insert the valve cartridge assembly (700680068). Ensure that the valve cartridge assembly is properly sited in the step of the manifold. Ensure that the 3 O-ring did not fall out during installation.

Install the top/ shorter tie bolt (700680053).

Lightly hand torque the tie bolts in an alternating manner until the whole cylinder assembly is correctly seated in its place.

SERIOUS DAMAGE MAY OCCUR IF THE CYLINDER AND VALVE CARTRIDGE ASSEMBLY IS NOT SEATED PROPERLY.

Tighten and torque the tie bolts in a star configuration, the bolts should be torque to the correct value in 3 increasing steps.

Pull the plunger (700680111) toward the floating clamp and tighten the Allen head screw (700510181) located at the top of the plunger clamp. Grease the floating clamp (700550977) through the greasing nipple located at 700540695 with silicone grease.

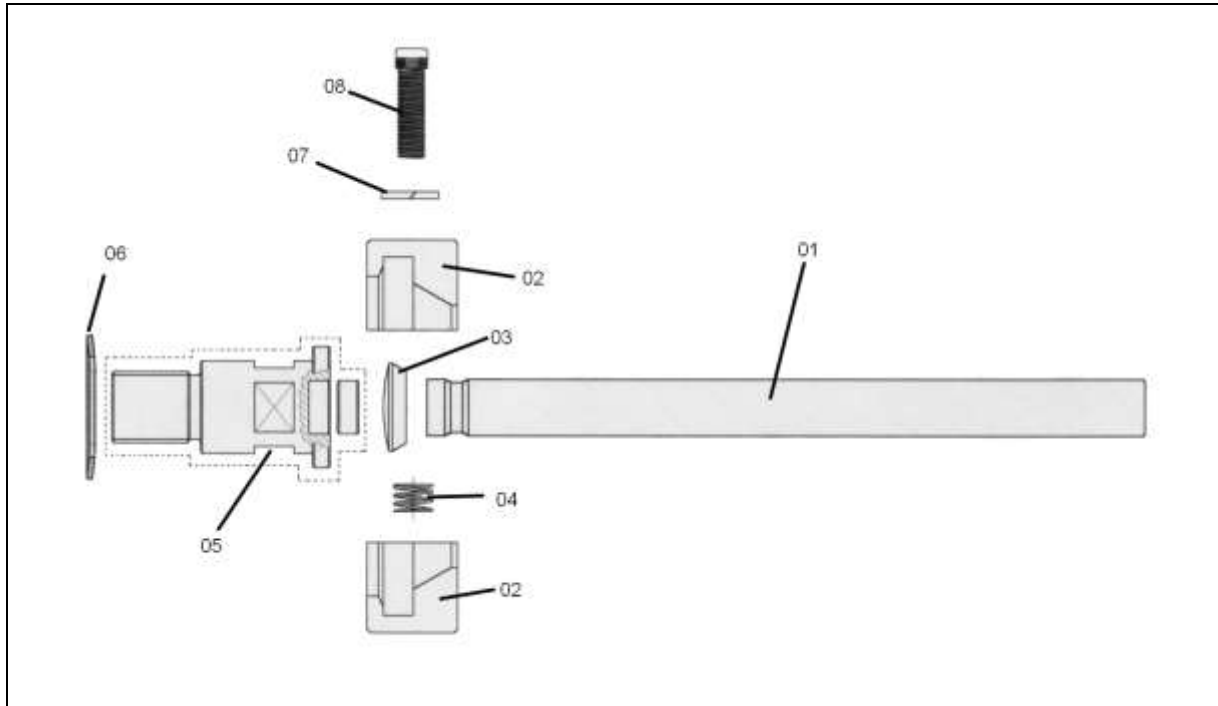
DO NOT CRANK THE ENGINE TO MOVE THE CLAMP FORWARD.

If required, the plunger adaptor (700680112) can be loosen to move it forward. It is important that the plunger adaptor be fully tighten; any excess length may cause the plunger to knock against the valve pin.

Crank the engine while depressing the stop button. This is to ensure that the plunger clamp & the plunger is coupled tightly, the seals are properly seated and is not binding the plunger.

Finish the procedure by mounting back the spray cover.

Inspection and replacement of floating plungers clamps:



Floating plungers clamps parts list

Pos	Part/No:	Qty:	Description:
01	700680111	1	Carbide Plunger Ø5/8"
02	700680114	1	Plunger Clamp
03	700680113	1	Thrust Disc
04	700540447	2	Opening Spring
05	700680112	1	Plunger Adaptor
06	700680115	1	Belville Disc Spring
07	700510185	2	Spring Washer Ø10
08	700510181	2	Screw M10x40

Inspection / Service:

Always stop the pump entirely before inspection and service are carried out.

The self-aligning plunger assembly is designed to work with a light tension from the Belville Disc Spring.

Inspect daily to ensure that the assembly has enough tension to maintain the self-alignment.

By hand: Try to turn the Plunger Clamp around the axis, resistance should be felt. If the Plunger Clamp turns very freely without any resistance at all, or even have slack, dismantling and inspection of the Belville Disc Spring and the Thrust Disc must be carried out. If there is evidence of wear replace the worn parts.

In order to ensure correct self-aligning to take place during operation, the assembly must be kept lubricated with grease at regular intervals. Do not use copper grease.

THE CARBIDE PLUNGER MUST BE HANDLED WITH CARE AT ALL TIMES.

Carbide Plunger is very long lasting, it is a very hard and strong material, it is in danger of chipping if exposed to sharp blows.

3. Maintenance and troubleshooting

Disassembling:

Loosen the two Screws, M10x40 (pos: 08), until the Plunger Clamp is loose enough for the Plunger can be pushed out freely. It is not necessary to dismantle the plunger clamp entirely.

To remove Beville spring, unscrew the Plunger Adaptor (Pos: 05) from the Pony rod.

Reassembling: (pos. refers to page27 if not stated otherwise)

Mount the Belville Disc spring (pos: 06) over the Plunger Adaptor (pos: 05)

TAKE NOTE OF DIRECTION OF THE BELVILLE SPRING.

When the Belville Disc Spring is mounted in the correct way it will give a calculated tension to the plunger assembly allowing for self-alignment.

The inner diameter must face the recess on the Plunger adaptor; the flared outer diameter must face towards the threaded end of the Plunger Adaptor.

Place the Thrust Disc (pos: 03) in the Plunger Clamp (pos: 02) the curved side facing towards the Plunger Adaptor, the tapered sides aligned with the inside taper of the Plunger Clamp.

Lubricate the parts well with grease. (Do NOT use copper grease).

Screw the plunger adaptor (pos: 5) back into the pony rod.

Assemble the plunger clamps, reseal the plunger and tighten the M10 screw (Pos: 08)

Tighten the M10 screw (Pos: 08) to the specified torque.

Repeat the above steps for the remaining two plungers.

Torque specifications

Cylinder head securing screws	450 Nm (45 kgm) (300 lbs.ft)
Plunger clamping screws	20 Nm (2 kgm) (15 lbs.ft)
Connecting rod securing screws	68 Nm (6.8 kgm) (50 lbs.ft)
Main bearing cap screws	570 Nm (57 kgm) (420 lbs.ft)

Recommended pump maintenance chart

Item Description/ Qty	Daily	Every 40hrs	1st 50hrs	Every 500hrs	Every 2000hrs
Plunger clamps		Grease			
Booster pump 2pos		Grease			
Beeville washers	Check			✓	
Engine oil 15W-40 x 14.5L			✓	✓	
Pump Oil ISO 220 x 14L			✓	✓	
Packing seal x 3pcs				✓	
Back up seal x 3pcs				✓	
Back up ring x 3pcs				✓	
Valve springs x 3pcs				✓	
Valve discs x 3pcs				✓	
Valve nut x 3pcs				✓	
Valve O rings x 3sets				✓	
Valve body x 3pcs					✓
Cylinder x 3pcs					✓
Plunger x 3pcs					✓

Tumble Box Service & repair instructions

Replacement of cartridge

The replacement of the cartridge (Part No.: 700540484) is necessary when;

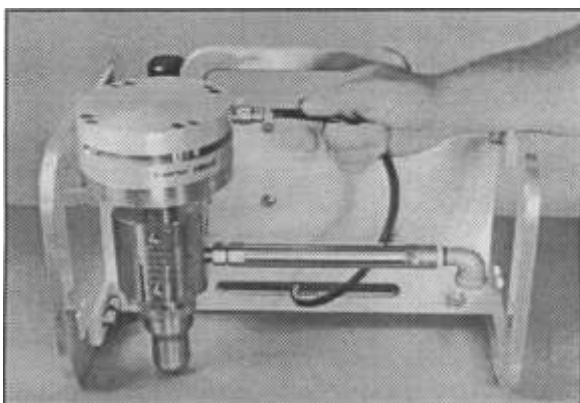
- 1) There is a significant decrease in working pressure and water is leaking out from the diffuser tube while the unit is in the “working” mode.
- 2) Water is leaking out from the gun side while the unit is in the “idling” mode, excessive leaking will constitute to a safety hazard.

There will be no decrease to the working pressure if water leaks from the gun side while the unit is in the “idling” mode.

Removal procedure of the cartridge

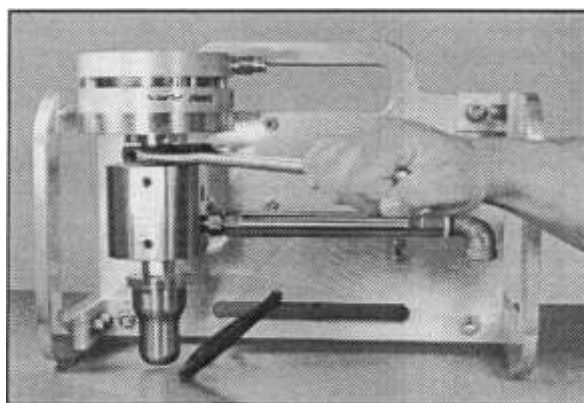
Step 1

Disconnect the QD from the Air Actuator.



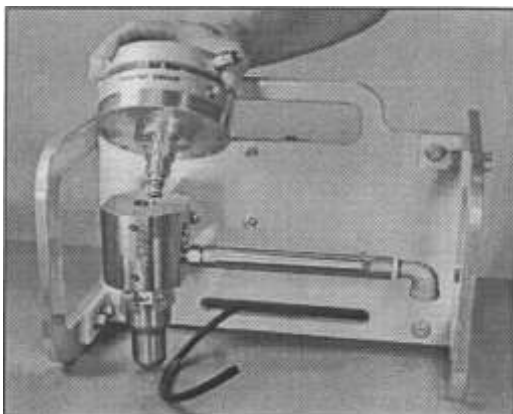
Step 2

Use a crescent wrench turning in a counter clockwise rotation to loosen the valve.



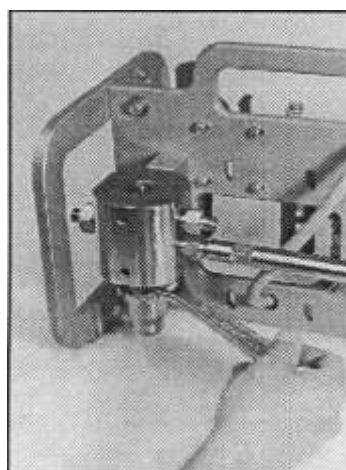
Step 3

Turn by hand to release the cartridge from the block. The seat end of the cartridge will come out of the block. The valve will remain in the block until the lower end cartridge seat is removed.



Step 4

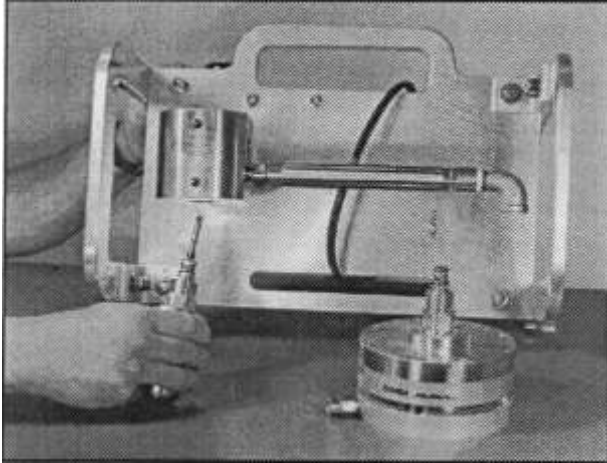
Use a crescent wrench turning in a clockwise rotation to loosen the spring housing, then turn by hand until the lower end of the valve comes out of the block.



3. Maintenance and troubleshooting

Step 5

Tilt the Tumble Box and continue turning by hand to release the valve and seat from the bottom of the block. This exposes the lower end of the cartridge assembly.



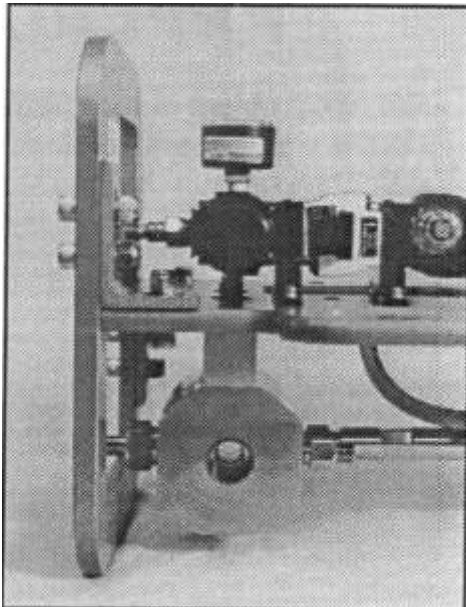
Step 6

Turn the seat to remove it from the Actuator Adapter. This is also done on the Spring Adapter.



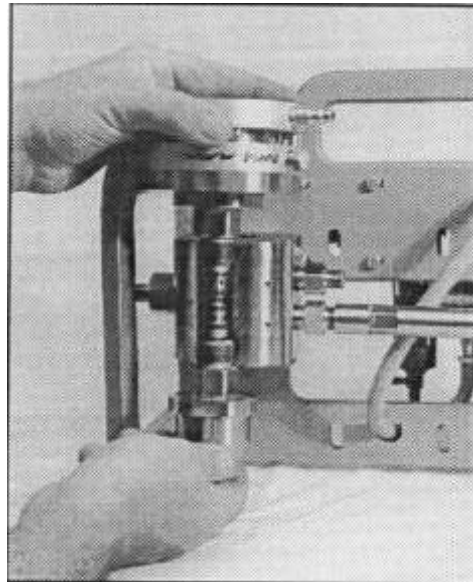
Step 7

Inspect and clean the valve block bore with a clean rag. Do the same to the Actuator Adapter and Spring Adapter copper coated threads.



Step 8

Showing the assembly as it would appear inside the block.



3. Maintenance and troubleshooting

Major service kit for tumble box dual Mode)

(For Pressures to 40,000psi)

Pos:	Part no.:	Qty.:	Description:
36	700540484	1	Cartridge (Rep kit valve tumble box dual mode)



700540484

Maintenance scheduling-must acknowledge that equipment and components wear out during jetting operations. Nozzles, valves, hoses and fittings must be regularly examined to assess their fitness for service. Nozzles, holders and connectors must be examined for damaged threads*, cracks and general wear, and replaced as needed. Valves must be disassembled and inspected for wear and corrosion, and repaired or replaced when necessary. This is particularly important for Control Valves (hand guns & foot guns) which must be kept clean and in good condition to minimize the risk of malfunction. Hoses and their connections and fittings must be thoroughly inspected after **EVERY** job, and/or at the end of each shift. Inspect the hoses periodically during operation of the equipment to make sure there is no damage.

***NOTE:** Many components used in water jetting systems are made of stainless steel and can be easily gall and seize during the makeup of joints. Threads must be protected by use of Teflon™ tape and the use of a high quality anti-seize compound.

Major Service kit installation

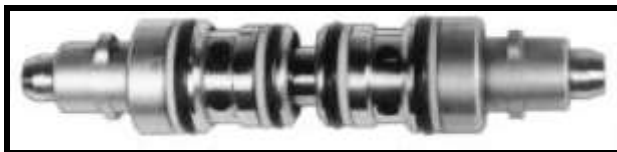
The periodic replacement of the Cartridge, Guide Tube, Jet Impact Slug and Nozzle will be necessary when water begins leaking from the dump side of the Tumble Box while blasting which will cause loss of flow through the gun. These parts receive the heaviest wear. While every precaution has been taken in designing and manufacturing the Tumble Box for ease of operation and maintenance, certain procedures are required:

It is recommended that frequent checking of Guide Tube, Jet Impact Slug and Nozzle in the end of the Dump Tube for signs of wear, and anti-seize lubricant must be applied to all threaded connections during reassembly to prevent undue wear. Any NPT threads must have Teflon™ tape as well as anti-seize lubricant. This affects performance, longevity and the warranty.

Step 1

Shows the components of Tumble Box Major Service Kit

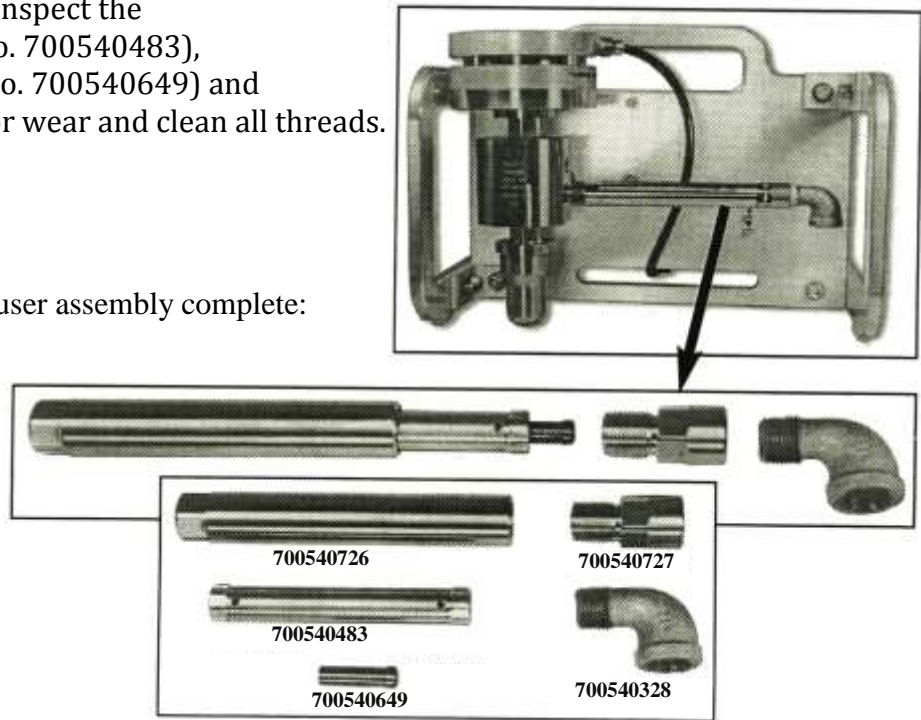
700540484



Step 2

After disassembly, inspect the Guide Tube (Part no. 700540483), Impact Slug (Part No. 700540649) and Discharge Orifice for wear and clean all threads.

Diffuser assembly complete:



4. Available accessories

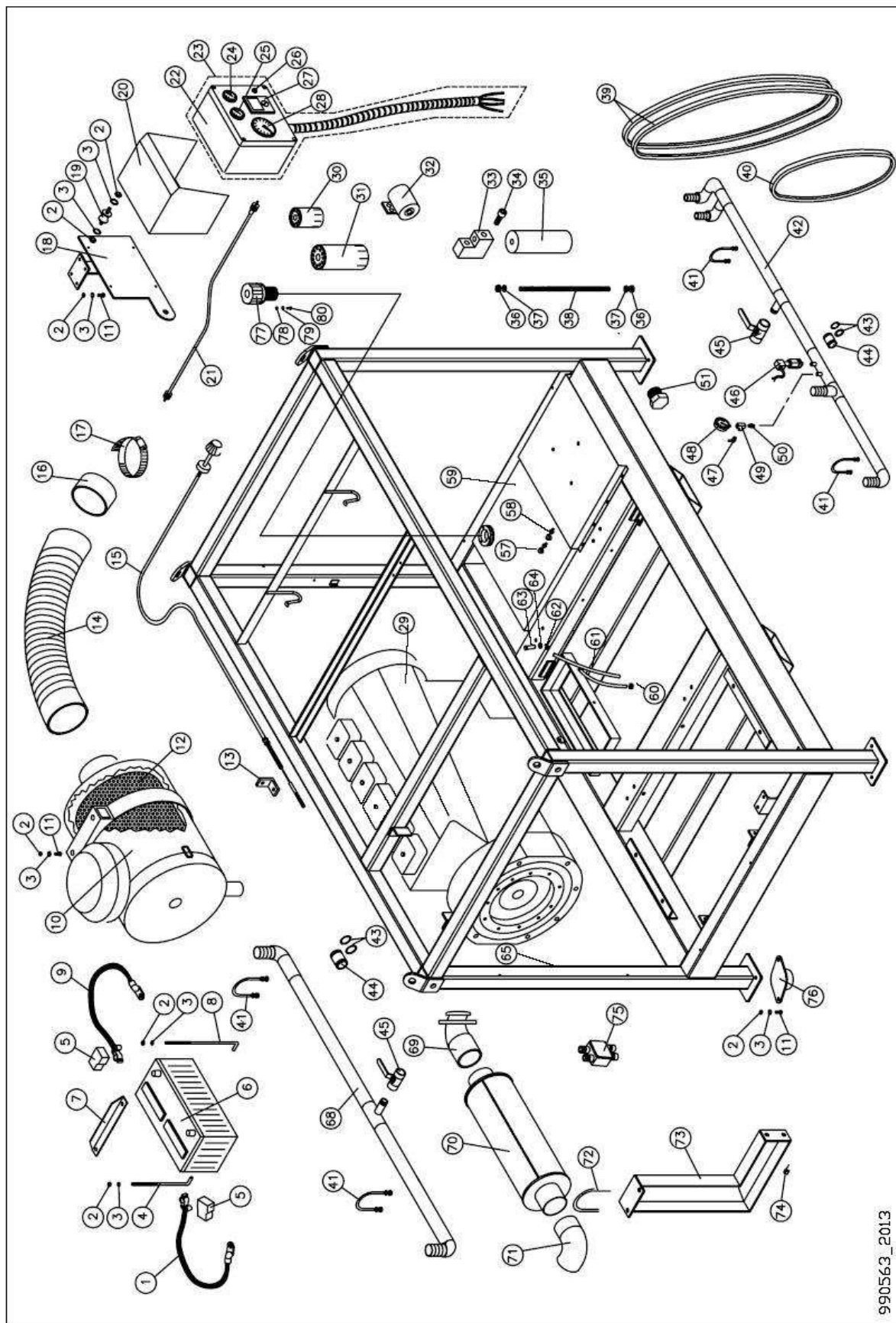
Accessories

Accessories
Special nozzles
Deck Cleaner
Pneumatic Un-loader for 2 gun operations
Various valves & connector
Extension hoses in various lengths
Safety gear

Notice: Always state type of Water Blaster along with the part no.: when ordering accessories or spare-parts.

5. Spare parts list

Main assembly



990563_2013

5. spare parts list

Main assembly spare-parts list

Pos:	Part no.:	Qty.:	Description:
1	700530340	1	Cable for battery “+”
2	700510004	14	Lock nut M8
3	700510005	14	Washer M8
4	700520284	1	Hook “short” for battery
5	700530220	2	Rubber Cover for battery pole
6	700530147	1	Battery
7	700520282	1	Retainer bracket for battery
8	700520283	1	Hook “long” for battery
9	700530339	1	Cable for battery “-”
10	-	1	Air intake filter box complete
11	700510030	14	Bolt M8
12	700520727	1	Air filter cartridge primary BF6L914C
12	700520728	1	Air filter cartridge secondary BF6L914C
13	700530298	1	Bracket for throttle cable
14	700520312	1	Air inlet hose 4”
15	700530297	1	Throttle Cable
16	700530703	1	Connection pipe 4” air inlet
17	700540581	4	Hose clip 4.1/2”
18	700520209	1	Bracket for El-box
19	700510017	4	Rubber element M8
20	700520246	1	Cover for El-box
21	700530344	1	Cable for Tacho-meter (Std)
	700530698	1	Cable for Tacho-meter 6Ft (For Canopy Design)
22	700530351	1	Plastic-box w/ lid
23	700530435	1	El-box shut-down system complete with gauges & key starter
24	700530327	1	Gauge for oil temperature
25	700530326	1	Gauge for oil pressure
26	700530486	1	Emergency / stop button
27	700530234	1	Key starter
28	700530343	1	Tacho-meter, mechanical
29	700530483	1	Engine 6 cylinder Deutz BF6L 914C
30	700520168	1	Fuel filter
31	700520329	1	Oil-filter
32	700540354	1	Solenoid coil 12V Deutz
33	700530338	2	Engine feet
34a	700510112	2	Bolt M12 X 50 Allen
34b	700510113	2	Bolt M12 X 60 Allen
35	700520171	4	Engine support
36	700510068	8	Lock nut M12
37	700510067	8	Washer M12
38	700510163	4	Stud-bolt M12
39	700520193	2	Fan belt
40	700520194	1	Alternator belt
41	700510130	4	U-Bolt 1.1/2”
42	700520675	1	Discharge pipe set
43	700600203	4	O-Ring
44	700520224	2	Connection Suction/Discharge pipe sets
45	700540266	2	Ball Valve 1”
46	700540711	1	Pressure Switch Connector
46	700530460	1	Pressure Switch Socket

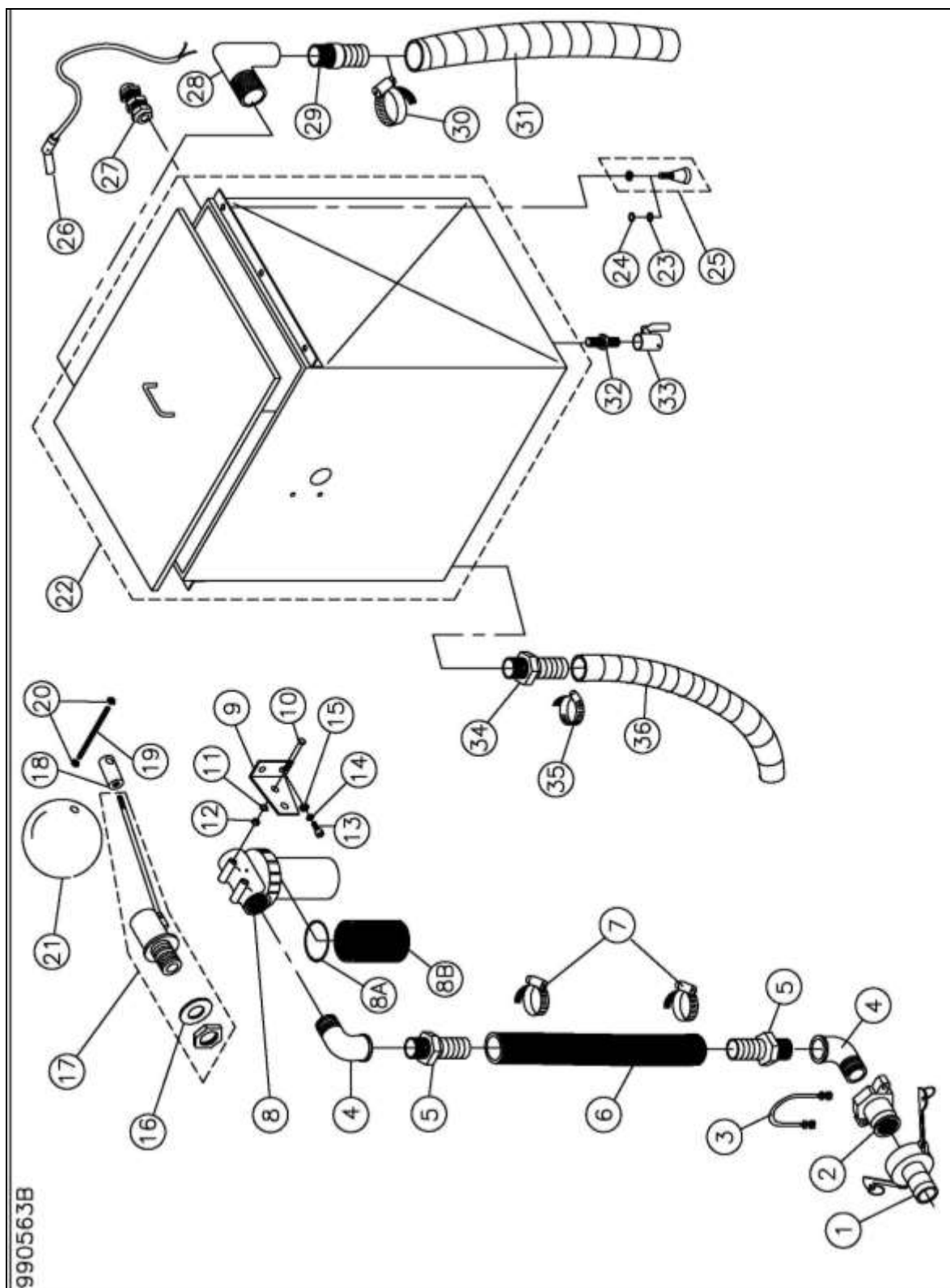
5. spare parts list

47	700540292	1	Hose nipple Elbow ¼"
48	700540306	1	Low-Pressure gauge
49	700540140	1	T-joint ¼"
50	700540307	1	Nipple ¼" NPT M – ¼" BSPP
51	700540611	1	Plug 1" for fuel tank
52	-	-	-
53	-	-	-
54	-	-	-
55	-	-	-
*	700520424	1	Fuel Level Gauge
57	700540282	2	Elbow 1/4"
58	700540291	2	Hose Nipple 3/8"-1/4"
59	700520535	1	Diesel tank
60	700540199	4	Hose clip
61	700530341	2	Hose Fuel Suction & Return 3/8"
62	700540294	1	Hose nipple Banjo 3/8"
63	700540295	1	Banjo Bolt M14
64	700540297	2	Copper Washer Ø14
65	700520529	1	Frame
66	--	-	--
67	--	-	--
68	700520240	1	Suction pipe set
69	700520278	1	Exhaust pipe Engine end
70	-	1	Exhaust muffler
71	700520279	1	Exhaust pipe Out-let end
72	700510207	1	U-bolt 8"
73	700520518	1	Bracket for muffler
74	700510111	2	Bolt M12 X 40 Allen
75	700530431	1	Terminal box
76	700510117	4	Rubber foot
77	700520137	1	Fuel Cap w/ Strainer
78	700510061	3	Bolt M5 allen
79	700510106	3	Washer M5
80	700510032	3	Locknut M5
*	700520643	1	Canopy Complete

***Optional Canopy Complete**



Water tank assembly

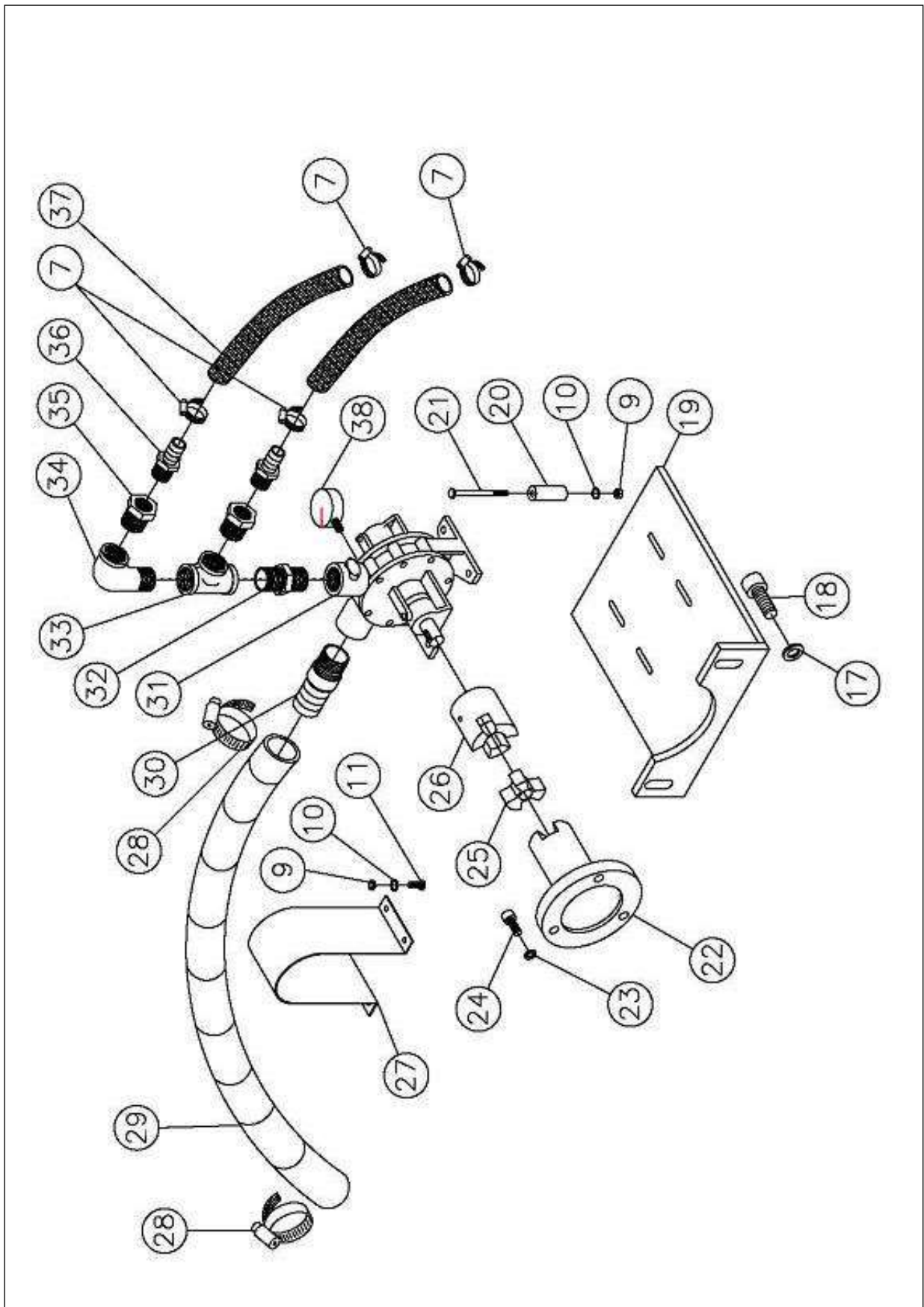


5. spare parts list

Water tank assembly spare-parts list

Pos :	Part no.:	Qty.:	Description:
1	700540303	1	COUPLING EVERTIGHT 1½" (HOSE)
2	700540302	1	COUPLING EVERTIGHT 1½" (ADAPTOR)
3	700510130	1	U BOLT M10 1 1/2" ZN
4	700540564	2	ELBOW 1 1/2" MF SS
5	700540565	2	HOSE NIPPLE 1 1/2" SS
6	700520244	1	SUPPLY HOSE 1 1/2" L=1.5M
7	700540262	2	HOSE CLIP DIA 1 1/2" (SUPEREX)
8	700520122	1	FILTER 1 1/2" BSPPF-F COMP+INS
8A	700520123	1	FILTER INSERT "BLUE" 50 MESH
8B	700520201	1	O-RING
9	700520138	1	BRACKET FOR 1 1/2" WATER FILTE
10	700510208	2	BOLT M8 X 120 HEX ZN
11	700510005	4	WASHER FLAT M8 8.5/18MM X 1/16
12	700510004	2	LOCKNUT M8 ZINC COATED
13	700510107	2	BOLT M8 X 20 HEX ZN
14	700510005	2	WASHER FLAT M8 8.5/18MM X 1/16
15	700510004	2	LOCKNUT M8 ZINC COATED
16	700540273	1	DOWTY SEAL 1 1/2"
17	700520135	1	FLOAT VALVE 1 1/2" W/O BALL
18	700520052	1	BALL HOLDER DOUBLE FOR FLOAT V
19	700510166	1	STUDBOLT M8 X 80 SS
20	700510057	2	NUT M8 ZN
21	700520136	2	BALL 6" FOR FLOAT VALVE
22	700520534	1	WATER TANK UHP 2
23	700510005	6	WASHER FLAT M8 8.5/18MM X 1/16
24	700510034	6	WASHER SPRING M8 ZN
25	700520340	6	RUBBER DAMPENER Ø32x24 M8x20
26	3817582	1	LEVEL SENSOR
27	-	-	-
28	700540564	1	ELBOW 1 1/2" MF SS
29	700540565	1	HOSE NIPPLE 1 1/2" SS
30	700540262	1	HOSE CLIP DIA 1 1/2" (SUPEREX)
31	700950016	1	SUCTION HOSE 1 1/2" L=1.5M
32	700540479	1	NIPPLE 1" BSPT S.S.
33	700540266	1	BALL VALVE 1" BSP F-F BRASS
34	700540565	1	HOSE NIPPLE 1 1/2" BSPT SS
35	700540262	1	HOSE CLIP DIA 1 1/2" (NORMA) 47-51 SS
36	700520467	1	SUCTION HOSE 1.1/2" X 1M CLEAR

Booster Pump Assembly



5. spare parts list

Booster pump assembly spare-parts list

Pos:	Part no.:	Qty.:	Description:
7	700540264	4	Hose clip 1"
9	700510004	8	Lock nut M8
10	700510005	16	Washer flat M8
11	700510030	4	Bolt M8x25
19	700520200	1	Bracket for Booster pump
20	700520238	4	Feet for Booster pump
21	700510127	4	Bolt M8x110
22	700520184	1	Flange for coupling Booster pump
23	700510034	4	Spring washer M8
24	700510027	4	Bolt M8x30
25	700520203	1	Rubber element
26	700520292	1	Coupling booster pump
27	700520487	1	Coupling cover Booster pump
28	700540262	2	Hose clip 1.1/2"
29	700520244	1	Suction Hose 1.1/2" x 1000mm
30	700540480	1	Hose nipple 1.1/2" -1.1/4"
31	700520181	1	Booster pump
32	700540563	1	Nipple 1.1/4"
33	700540562	1	T-joint 1.1/4"
34	700540561	1	Elbow 1.1/4"
35	700540367	2	Bushing 1.1/4" - 1"
36	700540299	2	Hose nipple 1"
37	700520290	2	Hose 1" x 400 mm
38	700540306	1	Low pressure gauge

5. Spare parts list

Booster pump filter assembly (optional)

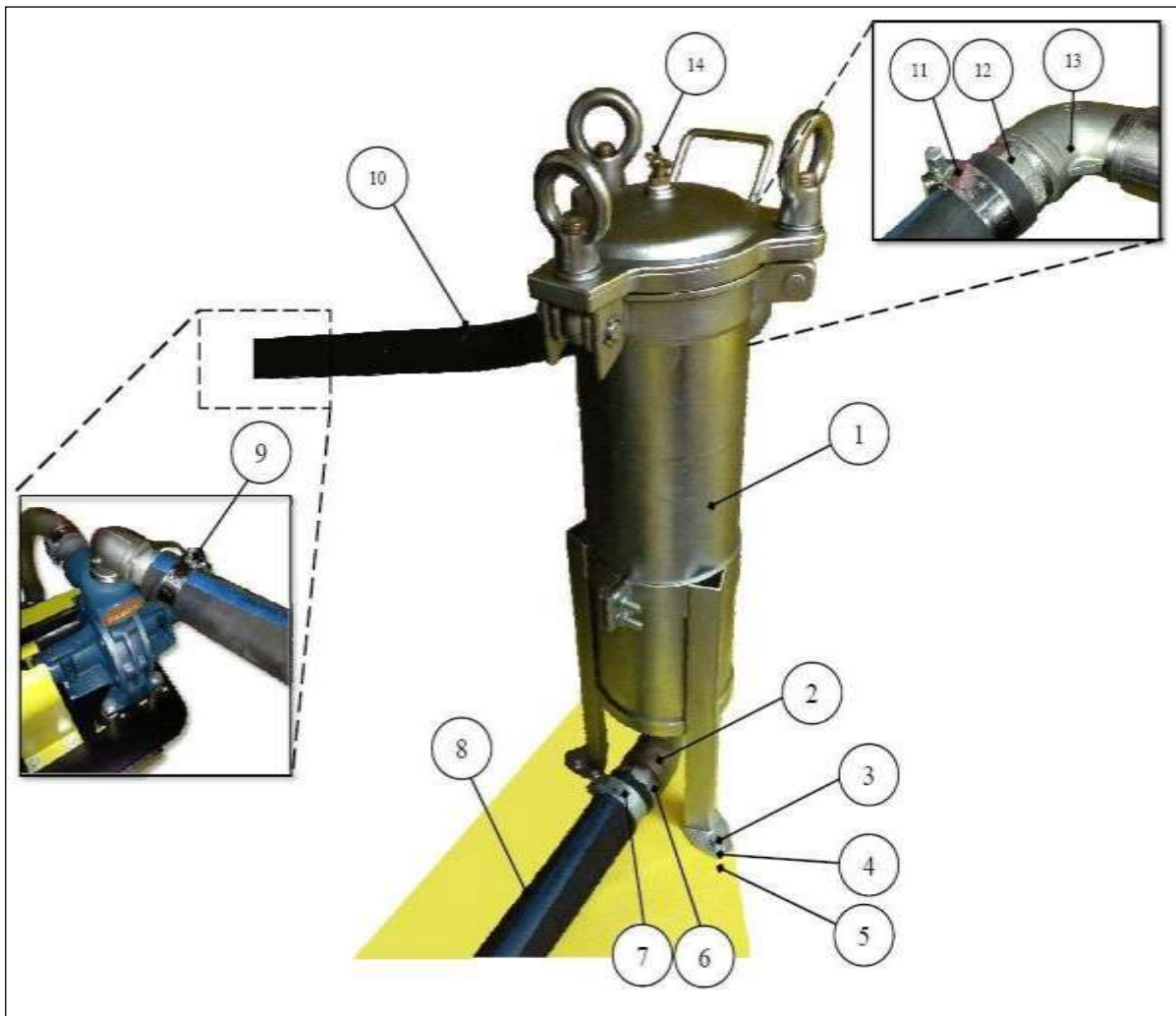


Booster Pump Filter Assembly Part list(optional)

Pos:	Part no.:	Qty:	Description:
1	700520606	1	Filter Housing S.S c/w filter
2	700540625	2	Bushing 1 1/2" - 2"
3	700540565	2	Hose Nipple 1.1/2"
4	700540262	2	Hose Clip
5	700540564	1	Elbow 1 1/2" M-F
6	700540480	1	Hose Nipple 1 1/2"-1 1/4"
7	700510063	6	Bolt M10 x 30mm
8	700510006	6	Washer Flat M10
9	700510035	6	Washer Spring M10
10	700510030	4	Bolt M8 x 25mm
11	700510005	8	Washer Flat M8
12	700510004	4	Locknut M8
13	700540878	1	Ball Valve 3/4" F-F
14	700520653	1	Bracket High Flow Filter
15	700520697	1	Drain cock 1/4"
16	700520244	2	Supply Hose
17	700520666	1	FILTER CARTRIDGE 9 3/4" 5uM
18	700540262	1	HOSE CLIP DIA 1 1/2" (NORMA)
19	700540561	1	ELBOW 1 1/4" MF SS
20	700520467	1	SUCTION HOSE 1.1/2" X 1M
21	700520240	1	SUCTION PIPE SET WELDED 1 1/2"
22	700520675	1	DISCHARGE PIPE SET - HIGH FLOW
1-17	700520674	1	FILTER HOUSING HIGH FLOW SS COMPLETE

5. Spare parts list

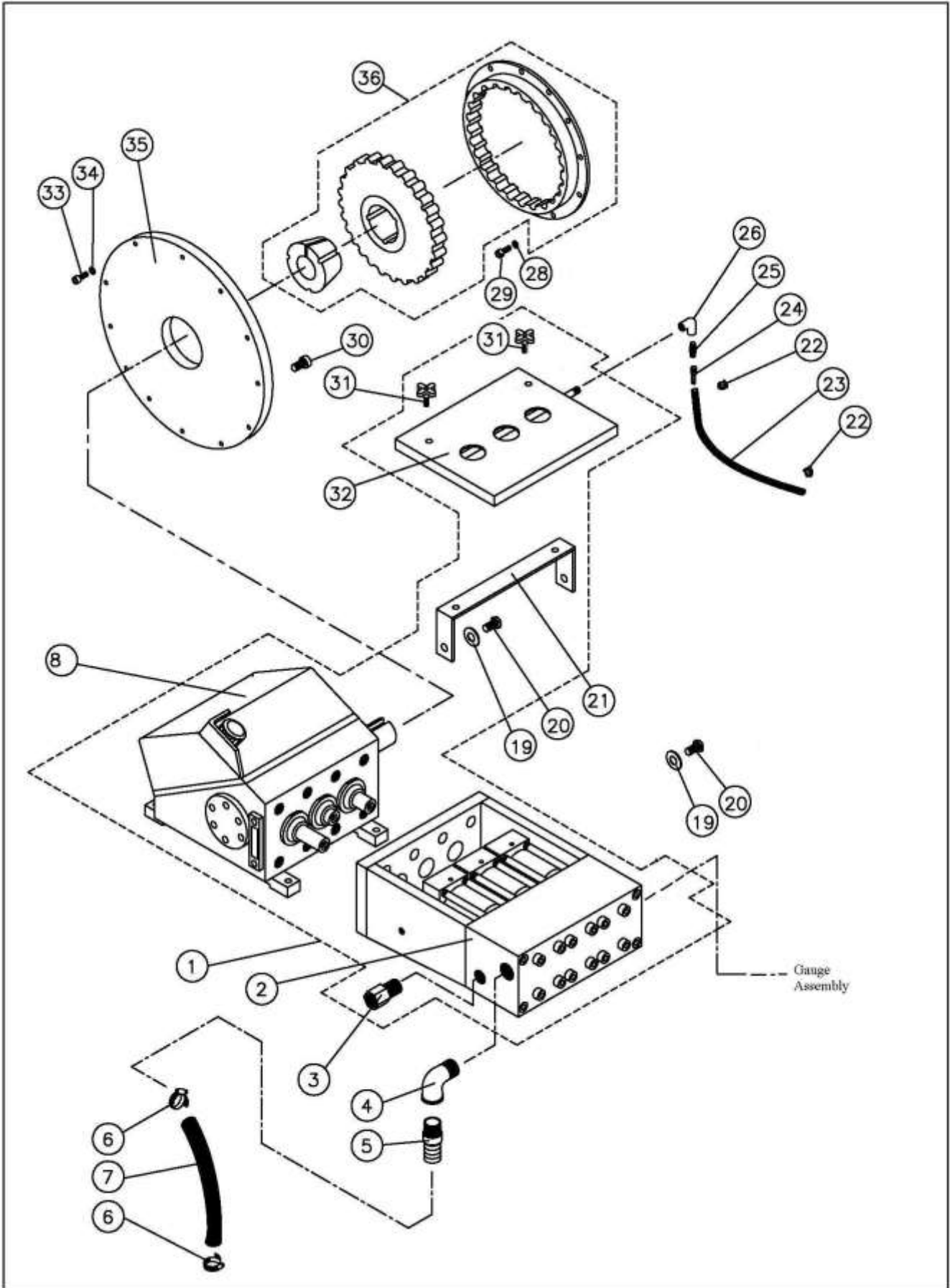
Booster pump filter assembly (standard)



Booster Pump Filter Assembly Part list (standard)

Pos:	Part no.:	Qty.:	Description:
1	700520713	1	FILTER HOUSING S.S, H.F, BAG w/o bag
1a	700520714	1	FILTER BAG, WATER 5MICRON
1b	700520715	1	FILTER BAG, WATER 25MICRON
2	700540564	1	ELBOW 1 1/2" MF
3	700510027	3	BOLT M8 X 30 HEX
4	700510005	6	WASHER FLAT M8
5	700510004	3	LOCKNUT M8
6	700540565	1	HOSE NIPPLE 1.1/2" BSPT
7	700540262	1	HOSE CLIP DIA 1 1/2"
8	700950025	0.78m	HOSE Ø1½" RUBBER (BLACK)
9	700540262	1	HOSE CLIP DIA 1 1/2"
10	700950025	0.42m	HOSE Ø1½" RUBBER (BLACK)
11	700540262	1	HOSE CLIP DIA 1 1/2"
12	700540565	1	HOSE NIPPLE 1.1/2" BSPT
13	700540564	1	ELBOW 1 1/2" MF
14	700520697	1	Drain cock ¼"

Pump Assembly



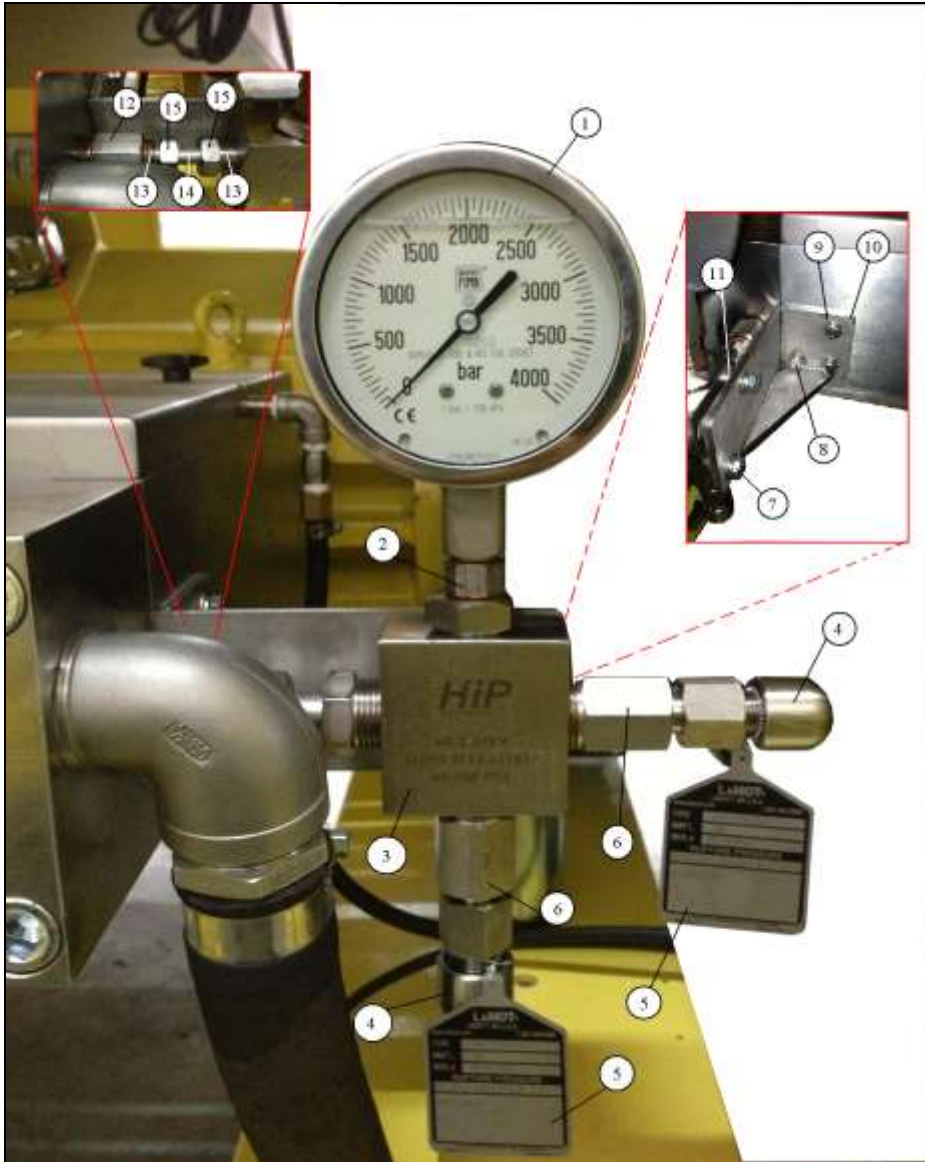
5. Spare parts list

Pump Assembly spare-parts list

Pos:	Part no.:	Qty.:	Description:
1	700680104	1	Pump complete
2	700680065	1	Fluid end complete 36K Psi w. Outlet fittings 700540572
4	700540564	2	Elbow 1.1/2"
5	700540565	2	Hose nipple 1.1/2"
6	700540262	4	Hose clip 1.1/2"
7	700520243	2	Inlet Hose 1.1/2" x 0.45m
8	700650281	1	Pump Power-end
19	700510067	2	Washer Flat M12
20	700510129	3	Bolt Hex M12x25
21	700680067	1	Bracket for Spray-cover
22	700540199	2	Hose clip 1/4"
23	700540582	1	Hose 1/4" x 1000mm
24	700540768	1	Hose Nipple 1/4" F NPT
25	700540754	1	Non return valve
26	700540238	1	Elbow 1/4" NPT F-F
28	700510035	8	Spring washer
29	700510110	8	Bolt M10 x 35
30	700510188	6	Screw M16 x 30
31	700510010	2	Knob Screw M8
32	700680066	1	Spray-cover
33	700510062	12	Bolt M10x50
34	700510035	12	Spring washer
35	700520416	1	Bell housing flange
36	700520173	1	Coupling for flywheel

5. Spare parts list

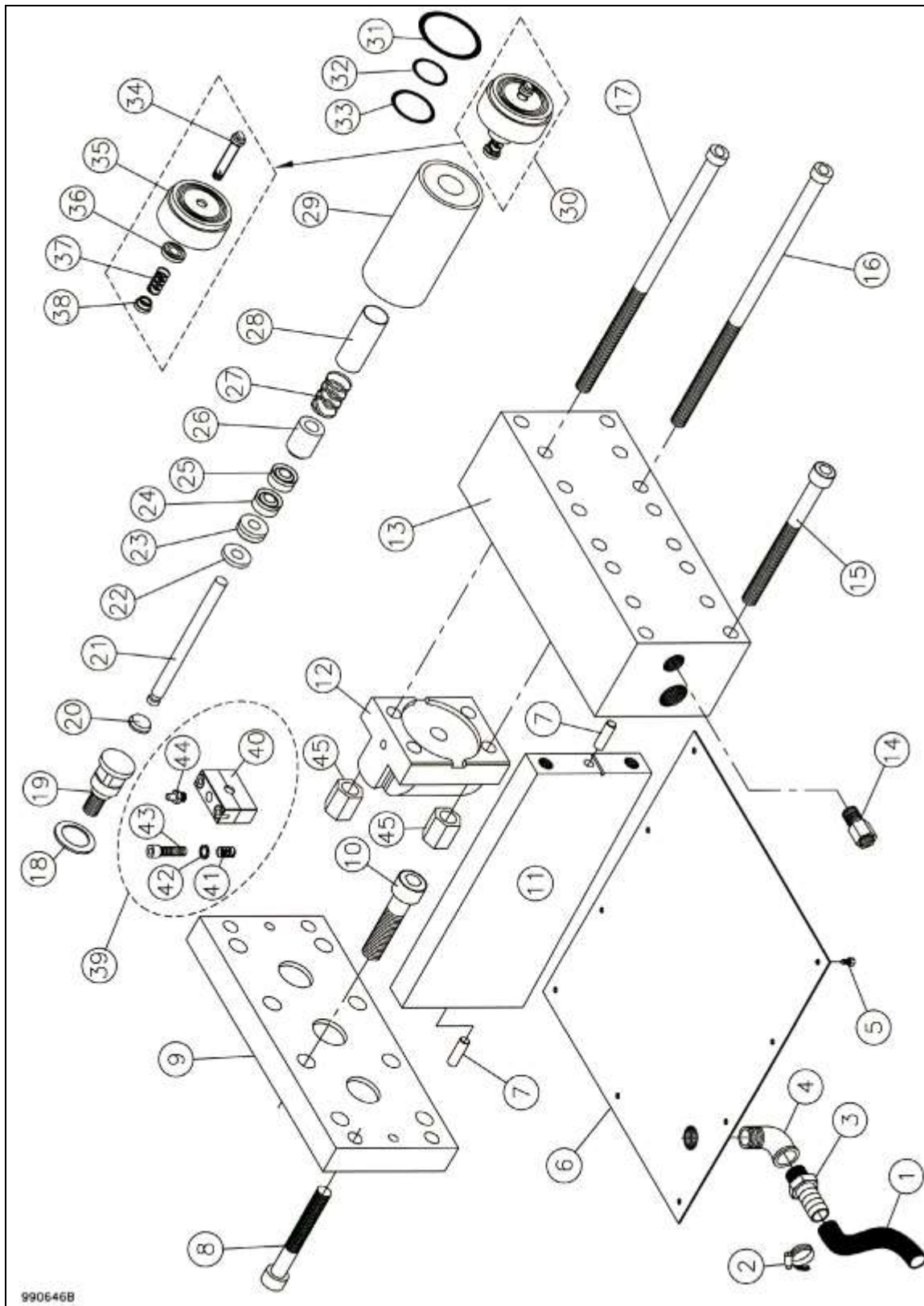
Gauge assembly



Gauge assembly spare-parts list

Pos:	Part no.:	Qty.:	Description:
1	700540881	1	PRESSURE GAUGE 4000BAR 4" DIAL
2	700540879	1	SNUBBER
3	700540354	1	CROSS 9/16" 60K PSI W/O C&G
4	700550771	2	MUSHROOM HEAD 3/8" FOR RUPTURE DISC
5	700540477	2	RUPTURE DISC 43000 PSI
6	700540386	2	"SAFETY HEAD 9/16"" 60K S.S." COMPLETE w/o RUP.DISC
7	700510027	2	BOLT M8 X 30 HEX
8	700510030	3	BOLT M8 X 25HEX
9	700510005	5	WASHER FLAT M8
10	700520486	1	SUPPORT F. RUPT. DISC ASS UHP
11	700510044	2	WASHER 8.2/19X7MM
12	700540572	1	ADAPTOR 1.1/8"M- 1.1/8"F 40KP
13	700540388	2	COLLAR 9/16 60K S.S.
14	700540355	1	NIPPLE 9/16" X 4" 40K

Pump fluid-end assembly

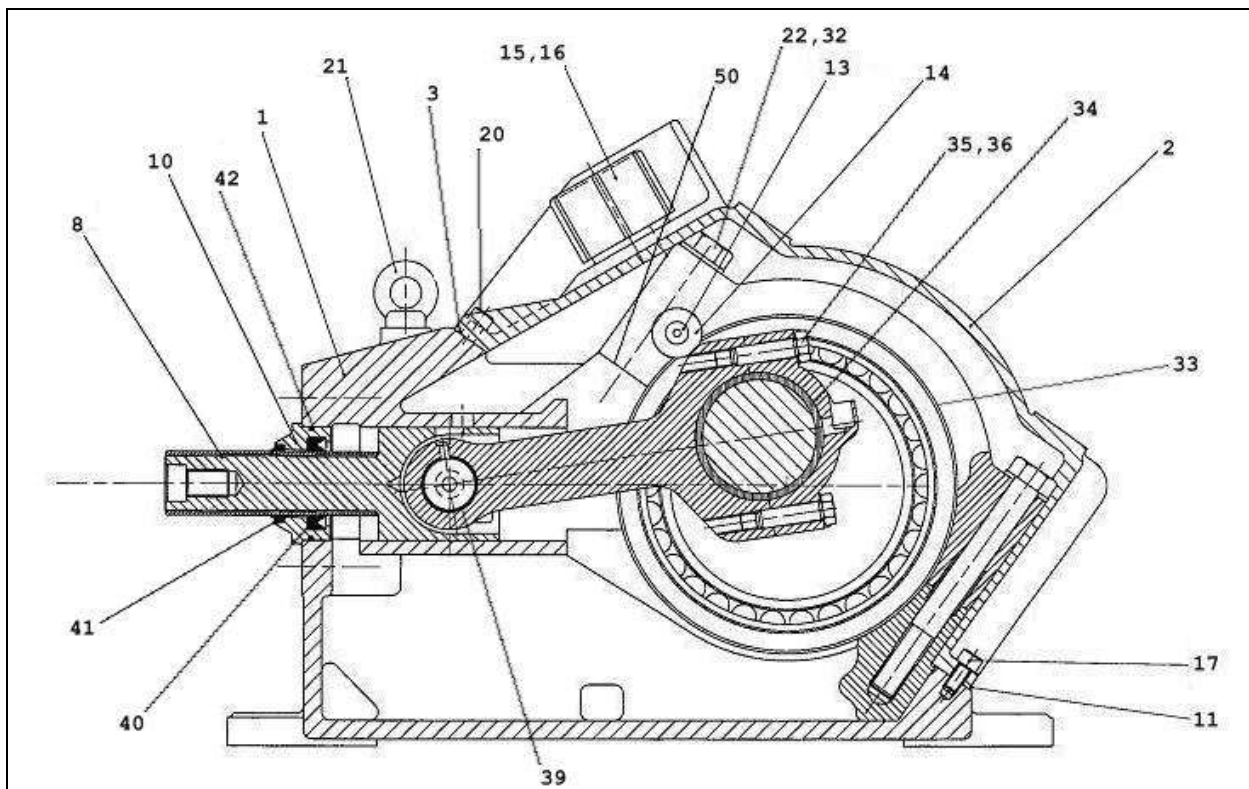
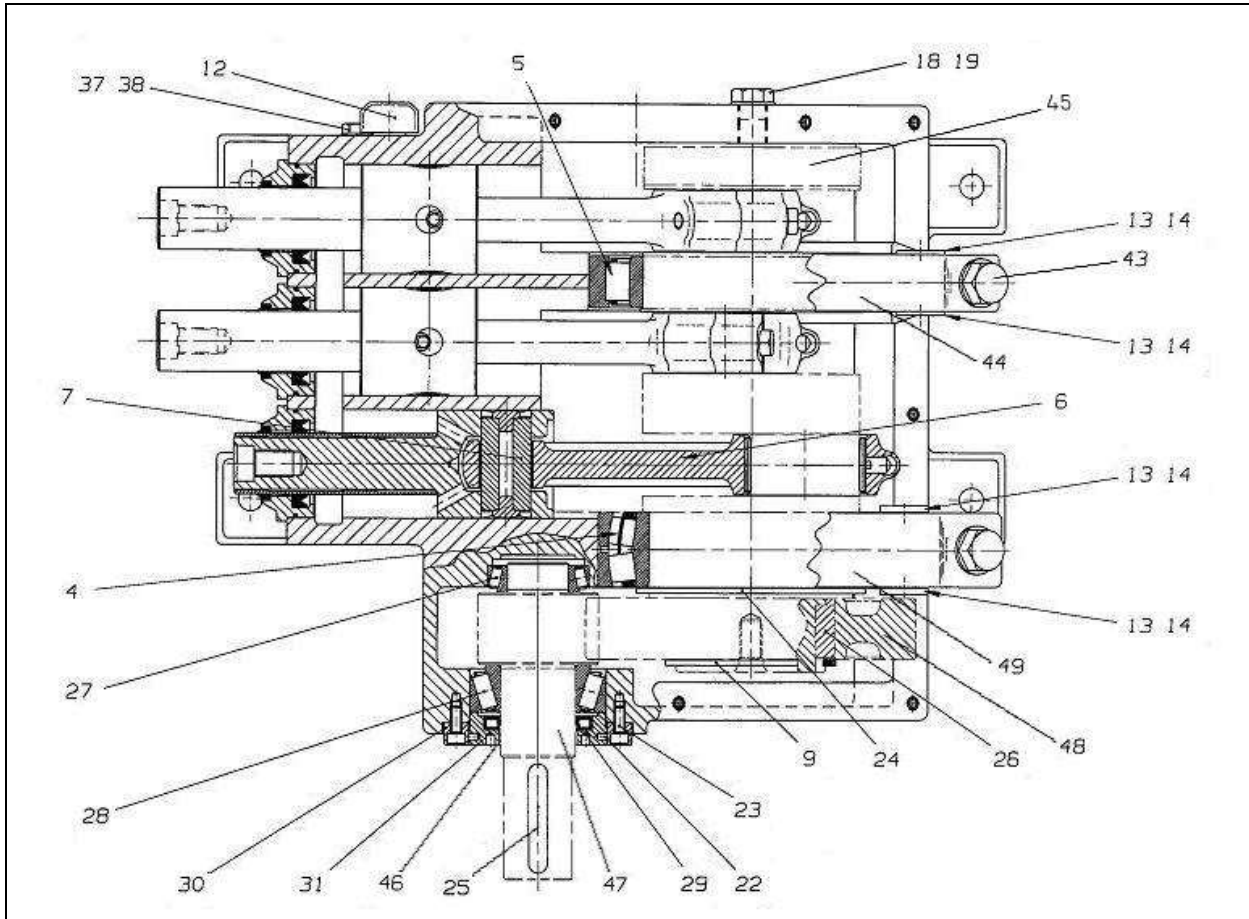


5. Spare parts list

Pump fluid-end assembly spare-parts list

Pos:	Part no.:	Qty:	Description:
1	700520293	1	Hose 1"
2	700540264	1	Hose clip 1"
3	700540245	1	Hose Nipple ¾"-1"
4	700540323	1	Elbow ¾"
5	700510167	9	Bolt M6 x 10 HEX
6	700680096	1	Plate bottom for box for UHP fluid end
7	700510161	4	Dowel pin ø1/2" x1"
8	700510160	4	Bolt ¾" UNC x 3" Allen
9	700680095	1	Plate rear for UHP fluid end
10	700510140	8	Bolt M24 x 80 Allen
11	700680094	2	Plate side for UHP fluid end
12	700680084	3	Back plate
13	700680085	1	Manifold 36 K
14	700540572	2	Outlet fitting UHP
15	700510159	4	Bolt ¾" UNC x 5" Allen
16	700680054	6	Tie bolt 15"
17	700680053	6	Tie bolt 14"
18	700680115	3	Bellville Spring Washer
19	700680112	3	Plunger Adaptor for Floating Plunger AJ
20	700680113	3	Thrust Disc for Floating Plunger
21	700680111	3	5/8" Floating Plunger AJ
22	700680110	3	Ø 5/8" Support Ring
23	700680005	3	Back-up ring for 5/8" - 1.3/8" UHP
24	700680011	3	Packing white 5/8" - 1.3/8"
25	700680032	3	Packing gold 5/8" - 1.3/8"
26	700680008	3	Packing adaptor 5/8" - 1.3/8" AJ
27	700680059	3	Spring for packing, UHP
28	700680007	3	Throat bushing 5/8" - 1.3/8" AJ
29	700680061	3	Cylinder UHP 1.3/8" bore
30	700680068	3	Valve cartridge assembly
31	700680049	3	O-ring manifold end outer
32	700680013	3	O-ring manifold end inner
33	700680060	3	O-ring cylinder end
34	700680056	3	Discharge valve pin
35	700680086	3	Valve cartridge
36	700680057	3	Valve disc suction
37	700680058	3	Spring for valve, UHP
38	700680021	3	Valve stop nut
39	700550977	3	Clamp for plunger UHP complete
40	700680114	3	Clamp for Floating Plunger
41	700540447	6	Spring
42	700510185	6	Spring Washer M10
43	700510181	6	M10x40
44	700540695	3	Grease Nipple
45	700680117	12	Back Plate nut
1-45	700680065	1	Fluid End Complete 36KPsi

Pump power-end assembly part



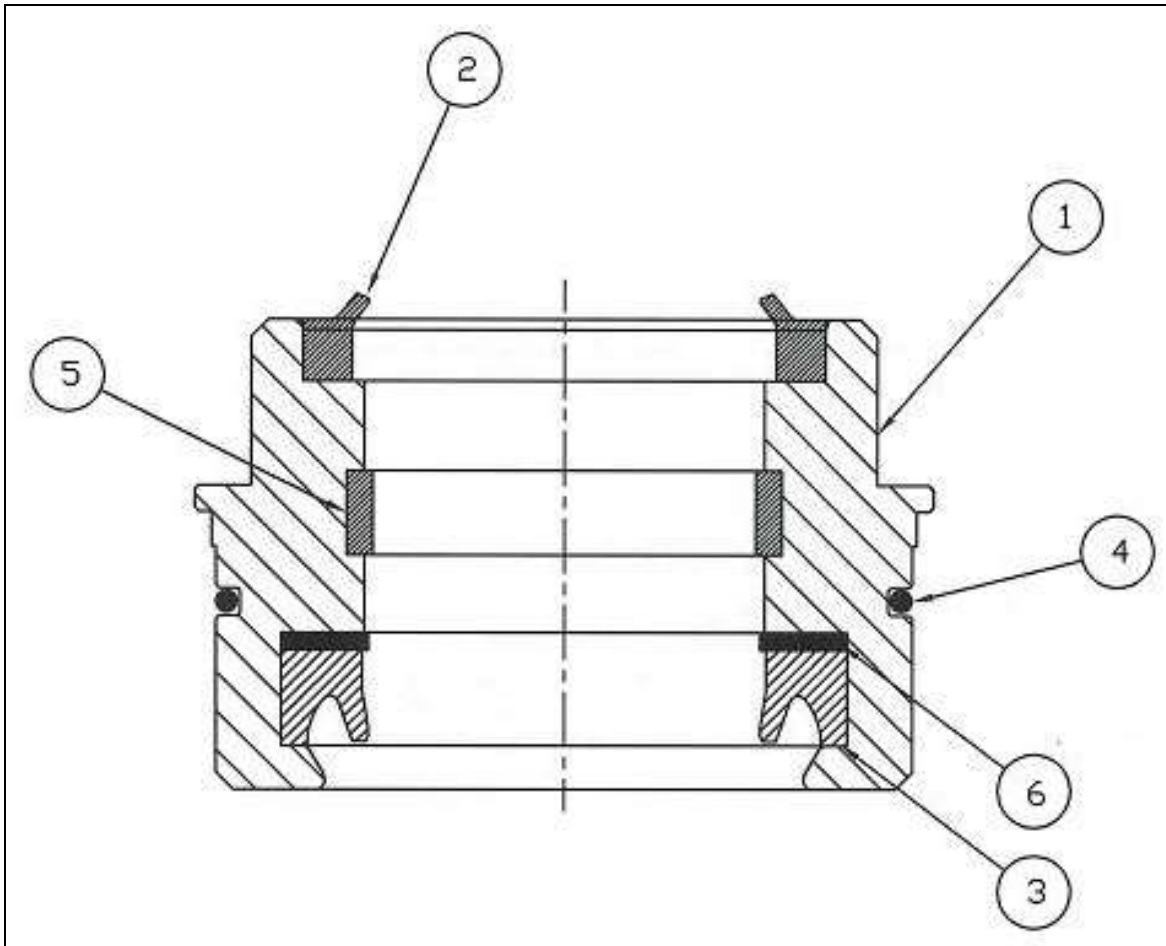
*New Design

5. Spare parts list

Pump power-end assembly spare-parts list

Pos.:	Part. No.:	Qty:	Description.
1	700650268	1	Crankcase
2	700650222	1	Crankcase Cover
3	700650034	1	Gasket for crankcase cover
4	700650234	1	Spherical Roller Bearing
5	700650232	1	Cylindrical Roller Bearing
6	700650223	3	Connecting rod and cap Assembly
7	700650088	3	Gudgeon pin Assembly
8	700650290	3	Ceramic Crosshead & Sleeve Assembly
9	700650237	1	Circlip S150M
10	700650292	3	Oil Seal housing
11	700650034	1	Gasket for crankcase cover
12	700650059	1	Oil level glass
13	700510009	8	Screw
14	700650273	8	Washer retainer for cap bearing
15	700510003	6	Screw filler cap
16	700520137	1	Filler cap
17	700510218	8	Cap Screw
18	700650113	1	Magnetic drain plug
19	700540056	1	Bonded seal
20	700510157	8	Socket head screw for crankcase cover
21	700650105	2	Lifting eye
22	700650228	4	Tab washer
23	700650106	4	Socket head cap screw
24	700650286	1	Circlip External S110M
25	700650277	1	Key
26	700650278	1	Key
27	700650274	1	Taper roller bearing
28	700650275	1	Taper roller bearing
29	700650240	1	Oil seal
30	700650241	1	Pinion bearing retaining plate
31	700650242	1	Adjustable ring
32	700650229	4	Hexagon head bolt
33	700650245	1	Bearing location strip
34	700650230	3	Big end connecting rod bearing
35	700650113	6	Magnetic drain plug
36	700650112	6	Connecting rod bolt
37	700540097	1	Plug
38	700540314	1	Bonded seal
39	700650087	3	Gudgeon pin bearing
40	-	3	Seal Rod U Ring
41	-	3	Oilseal scraper
42	-	3	O-ring
43	700650249	1	Hexagon head bolt
44	700650233	1	Cap
45	700650231	1	Crankshaft
46	700650121	4	Nylon locking slug
47	700650269	1	Pinion gear 3.48:1
48	700650270	1	Gear wheel 3.48:1
49	700650235	1	Cap
50	700650250	4	Dowel
1-50	700650281	1	Power End

Oil Seal Assembly

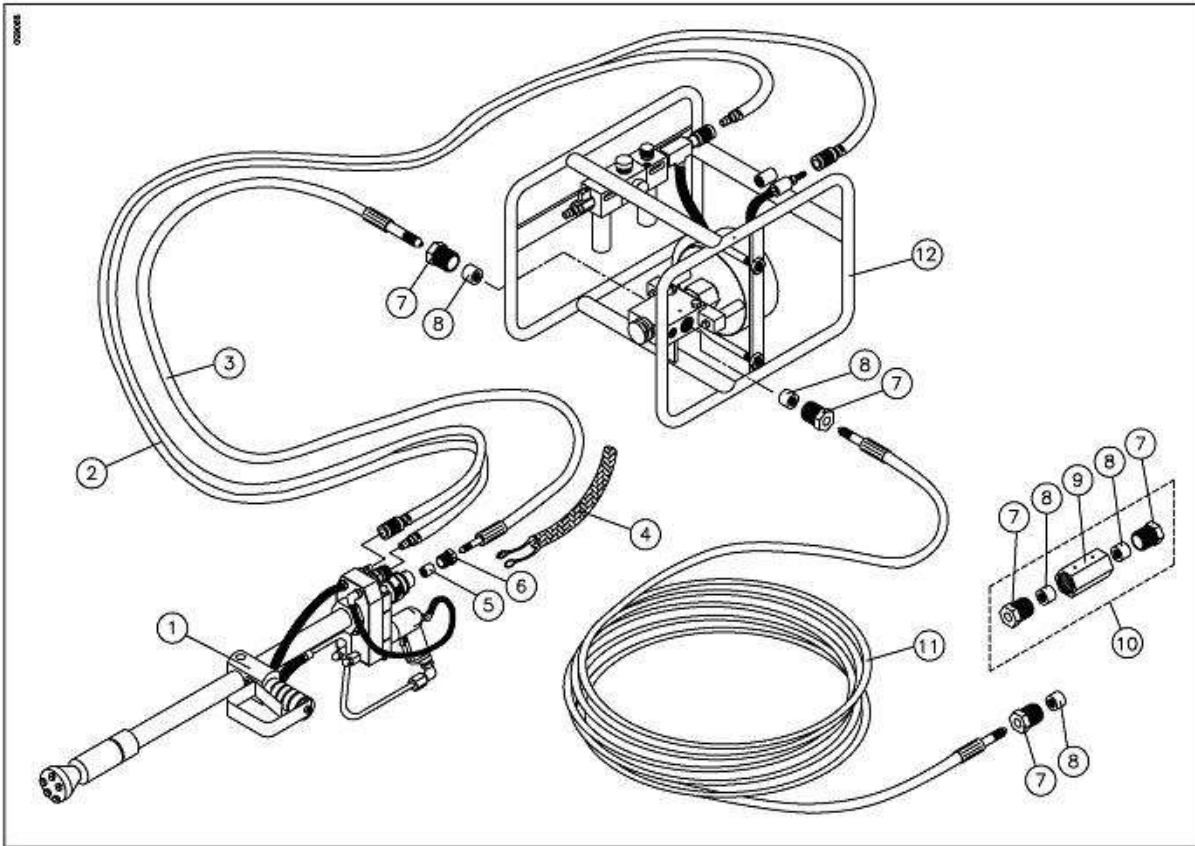


Oil Seal Assembly spare-parts list

Pos:	Part no.:	Qty.:	Description:
1	700650292	3	Oil Seal Housing
2	700650293	3	Oil Seal scraper
3	700650264	3	Seal crosshead oil
4	700650265	3	O-ring
5	700650296	3	Guide Band 45X50X9.7S
6	700650304	3	Spacer Ring Rod Seal
1-6	700650302	3	Oil Seal Assy. 2011

5. Spare parts list

Air Operated Rotating Gun Assembly (Single Mode)



Rotating gun / hoses / un-loader assembly spare-parts list

Pos:	Part no.:	Qty.:	Description:
1	700551326	1	Terminator 1 Rotating Gun
2	700550810	1	Air-hose double x 7m Standard
3	700550643	1	High pressure hose 9/16" - 3/8" Ø5mm for gun x 7m Standard
4	700540393	1	Hose containment safety grip
5	700540391	1	Collar 3/8"
6	700540390	1	Gland nut 3/8"
7	700540387	3	Gland nut 9/16"
8	700540388	3	Collar 9/16"
9	700540353	N/A	Straight Connection 9/16" Optional
10	700540378	N/A	Connection straight 9/16" w/ collars & gland nuts Optional
11	700550852	1	High pressure hose 9/16" Ø8mm x 20m 36kpsi
12	700540568	1	Pneumatic un-loader dump 36kpsi complete (Standard)

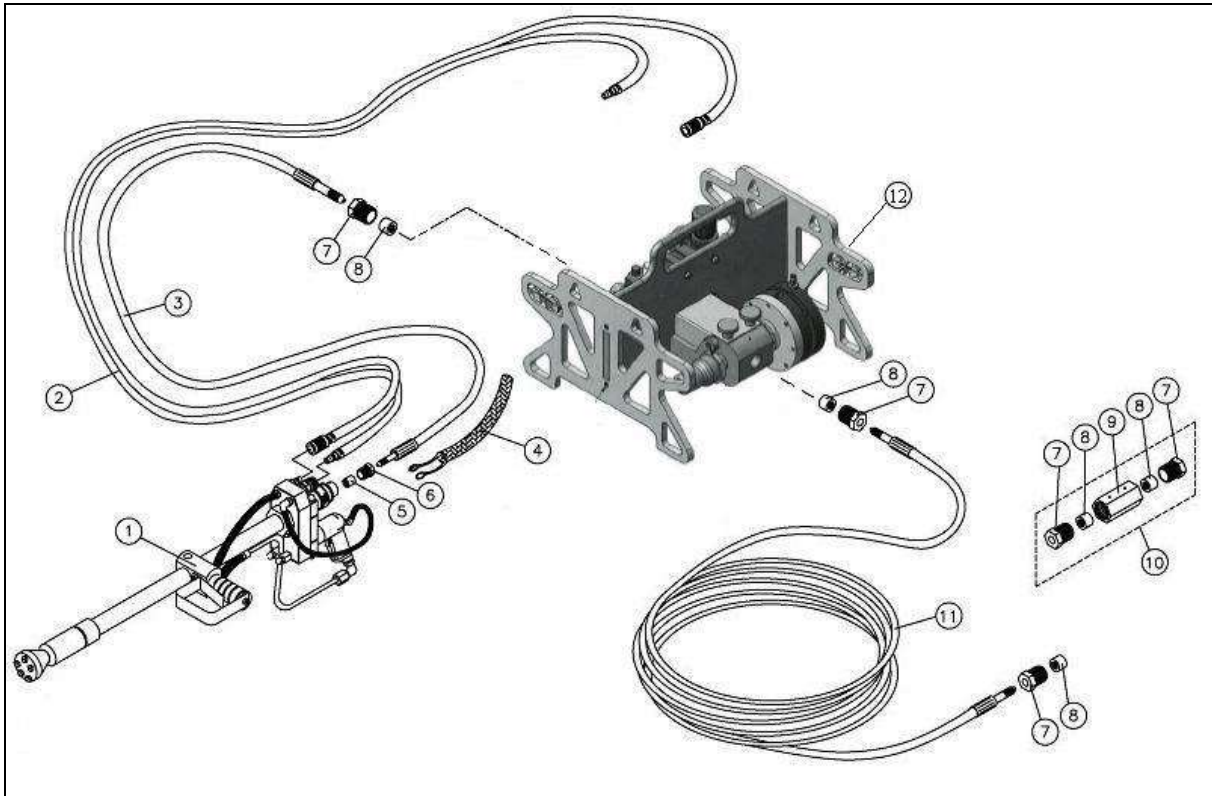
Nozzle Configuration

Part no.:	Qty.:	Description:
700551486	2	UHP Nozzle 0.017
700550680	2	UHP Nozzle 0.018

Note: Above nozzle size may varies according to machine.

5. Spare parts list

Air Operated Rotating Gun Assembly (Dual Mode)



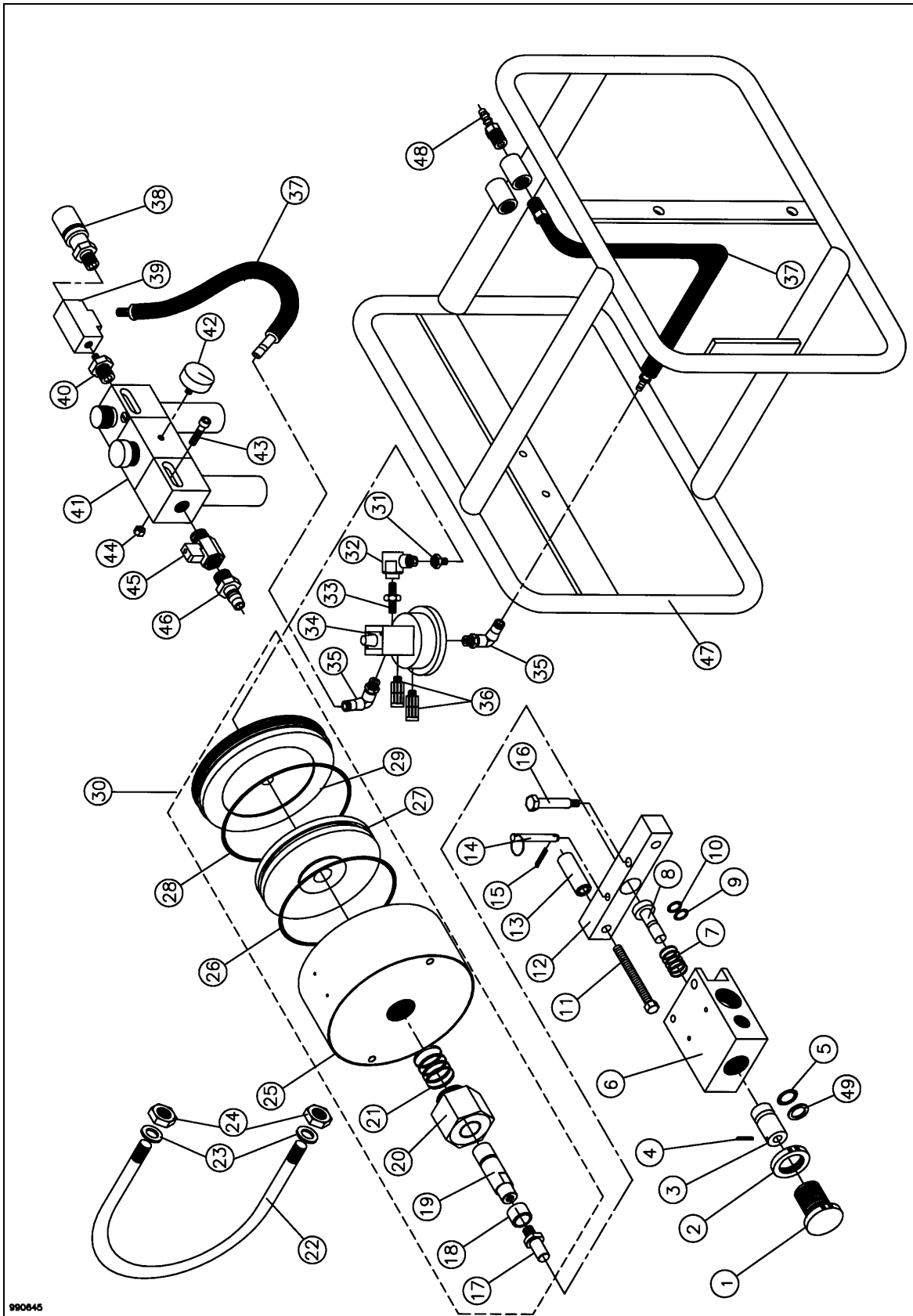
Rotating gun/hoses/un-loader assembly spare-parts list

Pos:	Part no.:	Qty.:	Description:
1	700551326	2	Terminator 1 Rotating Gun
2	700550810	2	Air-hose double x 7m
3	700550939	1	High pressure hose 3/8" – 3/8" Ø5mm for gun x 7m
4	700540393	1	Hose containment safety grip
5	700540391	2	Collar 3/8"
6	700540390	2	Gland nut 3/8"
7	700540387	2	Gland nut 9/16"
8	700540388	2	Collar 9/16"
9	700540353	N/A	Straight Connection 9/16" (Optional)
10	700540378	N/A	Connection straight 9/16" w/ collars & gland nuts (Optional)
11	700550852	1	High pressure hose 9/16" Ø8mm x 20m 36kpsi
12	700540919	1	Dual mode tumble box

Nozzle Configuration

Part no.:	Qty.:	Description:
700550603	2	NOZZLE UHP 0.013
700551171	2	NOZZLE UHP 0.012

Pneumatic un-loader / dump type assembly (Single Mode)



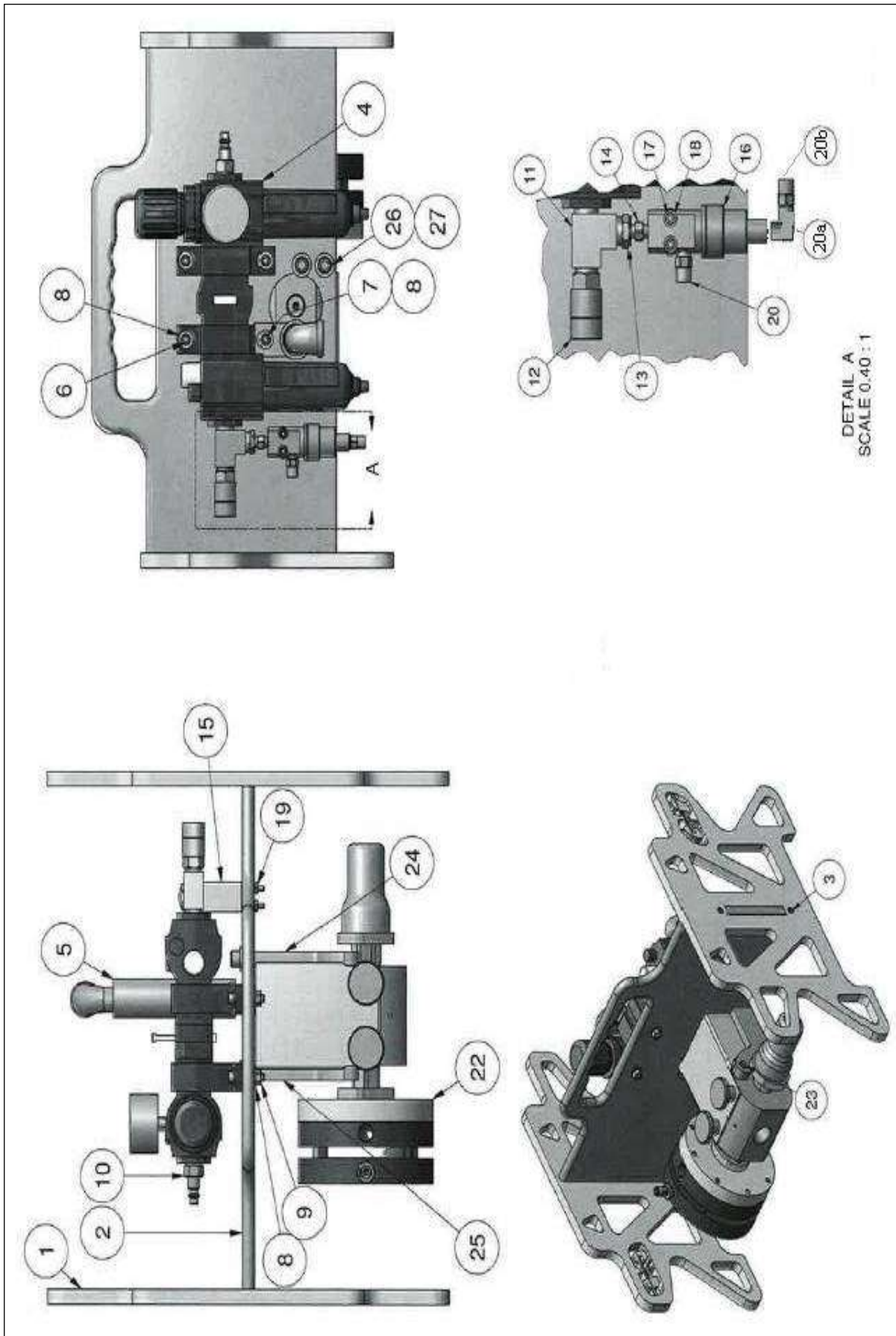
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5. Spare parts list

Pneumatic un-loader / dump type assembly spare-parts list (Single Mode)

Pos:	Part no.:	Qty.:	Description:
1	700540521	1	Valve adjust stem
2	700540522	1	Lock nut knurled
3	700540448	1	Valve seat
4	700540523	1	Roll pin
5	700540446	1	O-ring
6	700540520	1	Valve body for tumble box
7	700540447	1	Spring
8	700540518	1	Valve pin
9	700540445	1	O-ring
10	700550128	1	Back-up ring, for valve pin, UHP tumble box
11	700510059	2	Bolt M8 x 70 Hex
12	700540510	1	Cross bar, valve block mounting
13	700540513	2	Distance bushing
14	700540530	1	Retainer pin w/ ring
16	700510155	1	Retainer screw
17	700540514	1	Push rod, air actuator
18	700540511	1	Bearing linear, air actuator
19	700540515	1	Piston rod, air actuator
20	700540512	1	Connector, valve body actuator, special
21	700540539	1	Spring
22	700520281	1	U-bolt
23	700510067	2	Washer flat M12
24	700510068	2	Lock nut
25	700540507	1	Cylinder for actuator, pneumatic un-loader
26	700540524	1	O-ring
27	700540508	1	Piston for air actuator
28	700540525	1	O-ring
29	700540509	1	Back plate for air actuator
30	700540517	1	Actuator complete
31	700540133	1	Bushing 1/4" - 1/8"
32	700540535	1	Quick exhaust valve 1/8"
33	700540580	1	Nipple 1/8"
34	700540541	1	Valve block pilot 1/8" - 3/2
35	700550766	2	Air elbow P.L. 1/8"
36	700540542	2	Air exhaust silencer 1/8"
37	700550813	2	Hose connection
38	700540481	1	Air coupling female 1/4"
39	700540140	1	T-joint 1/4"
40	700540144	1	Nipple 3/8" - 1/4"
41	700540532	1	FRL valve (filter / regulator / lubricator)
42	700540475	1	Pressure gauge air 1/8"
43	700510168	2	Bolt M5x55 Allen
44	700510032	2	Lock nut M5
45	700540533	1	Ball valve 3/8"
46	700540583	1	Air coupling 3/8"
47	700540534	1	Frame tubular
48	700540363	1	Air coupling 1/4" male
49	700540168	1	Back-up Ring
1-49	700540568	1	Pneumatic un-loader complete (dump)

Pneumatic un-loader / dump type assembly (Dual Mode)



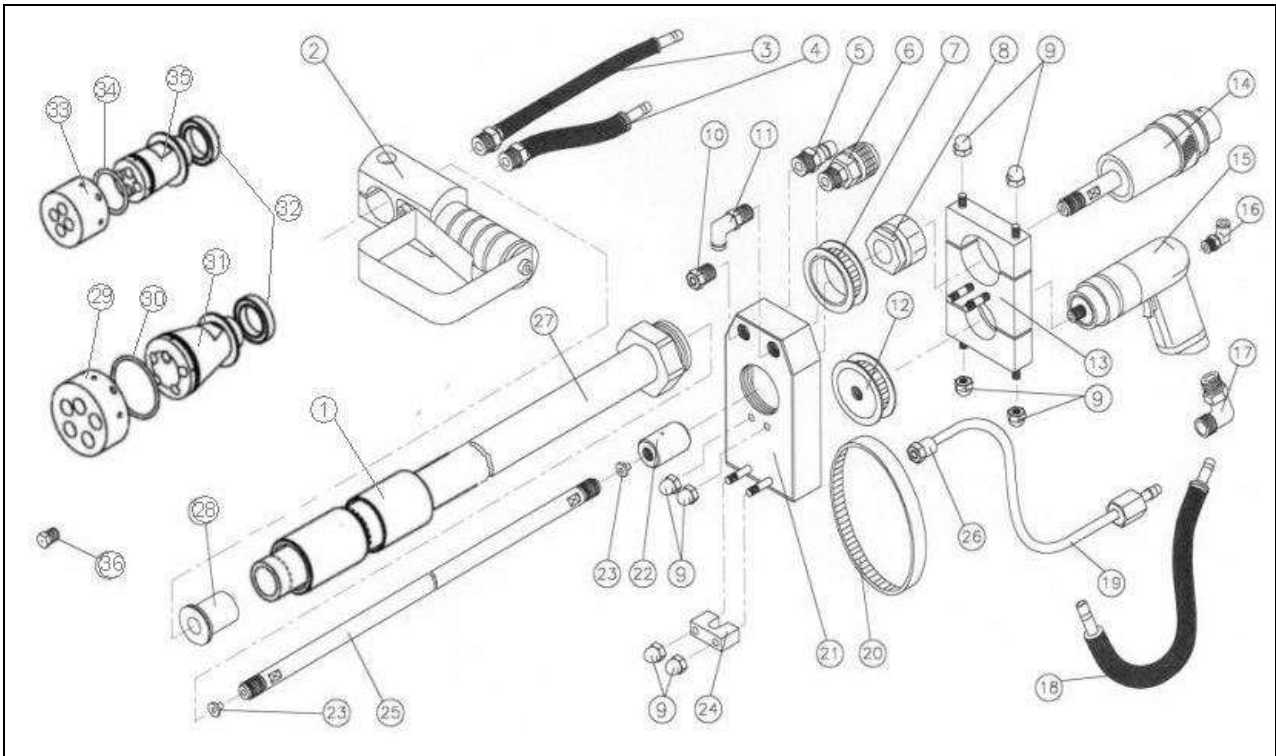
5. Spare parts list

Pneumatic un-loader / dump type assembly spare-parts list (Dual Mode)

Pos:	Part no.:	Qty.:	Description:
1	77408713	2	Side plate, tumble box frame
2	77408714003	1	Base plate, 40K tumble box
3	-	4	Screw, SHCS, 1/4"-20 x 3/4",SS
4	700540823	1	Flow regulator/lubricator valve
5	77408857	1	Diffuser cover
6	-	3	Screw, SHCS, 1/4"-20 x 1-1/4",SS
7	-	1	Screw, SHCS, 1/4"-20 x 1-1/2",SS
8	-	8	Flat washer, 1/4",SS
9	-	4	Hex nut, 1/4"-20",SS
10	700540583	1	Air coupling, malet
11	700540830	1	T-jOINT 3/8" (FFFXMB) brass
12	700540637	1	Coupling air 3/8" BSPP M
13	1900335	1	Busing 3/8" x 1/8" NPTF,Brass
14	1900322001	1	Hex nipple, 1/8"NPT brass
15	700540829	1	Adaptor versa air block
16	700540818	1	Valve versa air pilot
17	77408844	2	Hose, 1/4"Push-Lock on Reel
18	77408845	2	Tee, 1/2"NPT
19	77408846	2	Street Elbow, 1/2" NPT
20	700540826	1	Fitting 1/8 NPTM X 1/4 tube
20a	700540917	1	Elbow 1/8" BSPT MF brass
20b	700540807	1	Nipple air 1-8" BSPT M
22	77408856	1	Dump Valve, 25K Hi Flow, Pilot Op
23	77408716	4	Tubing, 1/4" MP, Air Act.Dump Valve
24	3177231	1	Air Pilot Valve, for Dump Valve
25	3177232	1	Clamp, actuator air
26	-	4	Hex Bolt, 1/4"-20 x 5-1/2"
27	-	4	Hex Nut, 1/4"-20
1-27	700540919	1	Tumble box 40KPSI Dual assy

5. Spare parts list

Rotating gun spare-parts assembly



Rotating gun spare-parts assembly spare-parts list

Pos:	Part no.:	Qty.:	Description:
1	700551304	1	Nozzle carrier sleeve
2	700550758	1	Front trigger, complete
3	700550759	1	Air-hose, in-coming
4	700550760	1	Air-hose, connecting
5	700540363	1	Quick coupling, male
6	700540481	1	Quick coupling, female
7	700550683	1	Timing pulley, driven
8	700550762	1	Taper lock bush
9	700510150	8	Dome nut, M6
10	700550763	1	Air push quick coupling, straight swivel 1/4"-m thread
11	700550764	1	Elbow 1/4"
12	700550682	1	Timing pulley, driving
13	700551293	1	Gearbox cover, gun UHP
14	700550740	1	Swivel assembly, complete
*15	700551294	1	Air drive motor
16	700550766	1	Air push quick coupling, elbow swivel 1/8" M thread
17	700550767	1	Elbow, compression fitting 1/4" male thread
18	700550761	1	Air hose, outgoing
19	700550768	1	Air pipe, trigger guard
20	700550681	1	Timing belt
21	700550735	1	Gearbox housing, gun UHP
22	700550721	1	Coupling, UHP barrel 9/16" thread
23	700550676	2	Button, brass
24	700550736	1	Bracket for gearbox, UHP gun

5. Spare parts list

Pos:	Part no.:	Qty.:	Description:
25	700550652	1	Barrel-tube, standard
	700550651	1	Barrel-tube, short (Optional)
	700550779	1	Barrel-tube, extra long (Optional)
26	700550765	1	Air push quick coupling, straight 1/8" F thread
27	700550769	1	Barrel shroud tube, standard
	700550770	1	Barrel shroud tube, short (Optional)
	700550780	1	Barrel shroud tube, extra long (Optional)
28	700550956	1	Dust Bushing
29	700551301	1	5Way nozzle guard
30	700551324	1	O Ring ID 46 Thk 2.6
31	700551302	1	5Way nozzle carrier w/o bearing
32	700551303	1	Bearing
33	700551318	1	4Way nozzle guard
34	700551325	1	O Ring ID 28 Thk 2.6
35	700551319	1	4Way nozzle carrier w/o bearing
36	700550603	-	Nozzle 013 (Optional)
	700550602	-	Nozzle 014 (Optional)
	700550680	-	Nozzle 018 (Optional)
	700550601	-	Nozzle 020 (Optional)
	700550774	-	Nozzle 026 (Optional)
	700550773	-	Nozzle 036 (Optional)
	700550604	-	Nozzle plug(Optional)

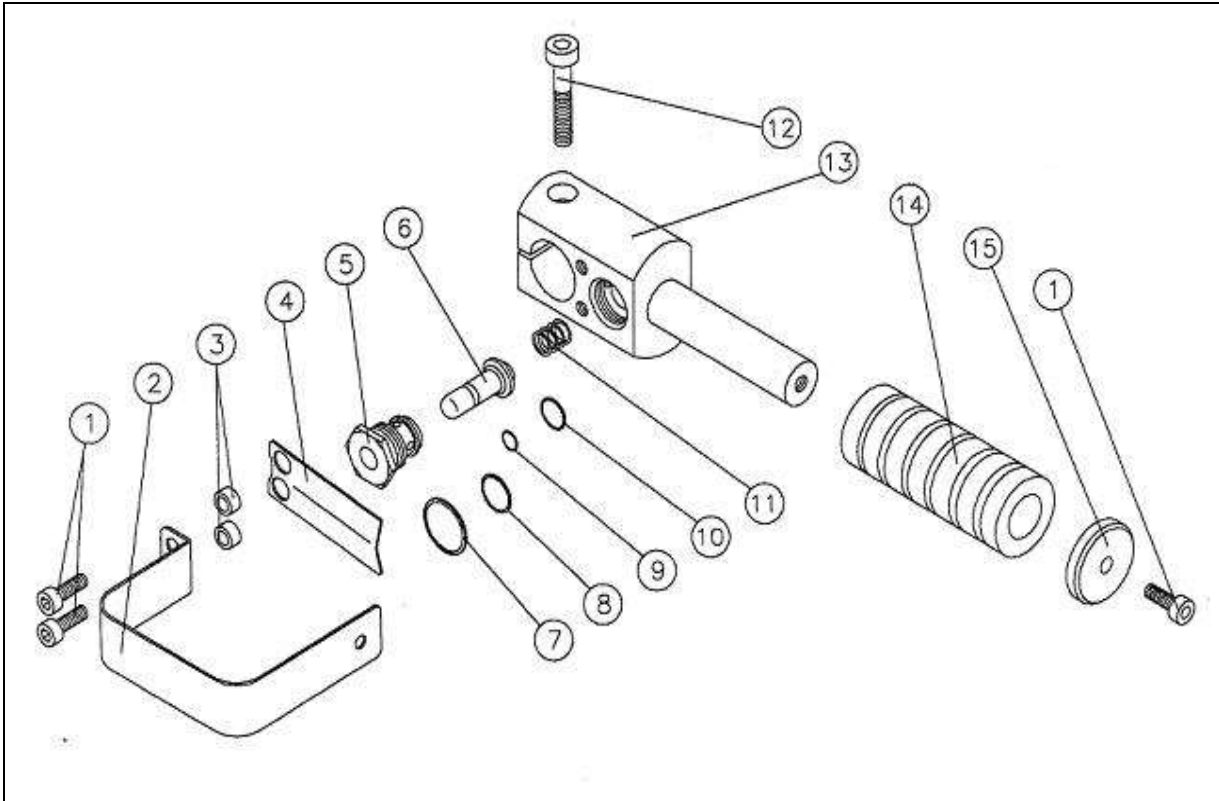
Options Available

Pos:	Part no.:	Qty.:	Description:
23+25+27	700550930	1	Barrel tube set complete standard (Optional)
23+25+27	700550931	1	Barrel tube set complete short (Optional)
23+25+27	700550932	1	Barrel tube set complete extra long (Optional)
29-32	700551300	1	5Way nozzle carrier assy complete
32-35	700551317	1	4Way nozzle carrier assy complete
2-28	700551326	1	Terminator 1, complete UHP 40 kpsi

* When purchasing item 15 (700551294), It is recommended to include item 12 (700550682).

5. Spare parts list

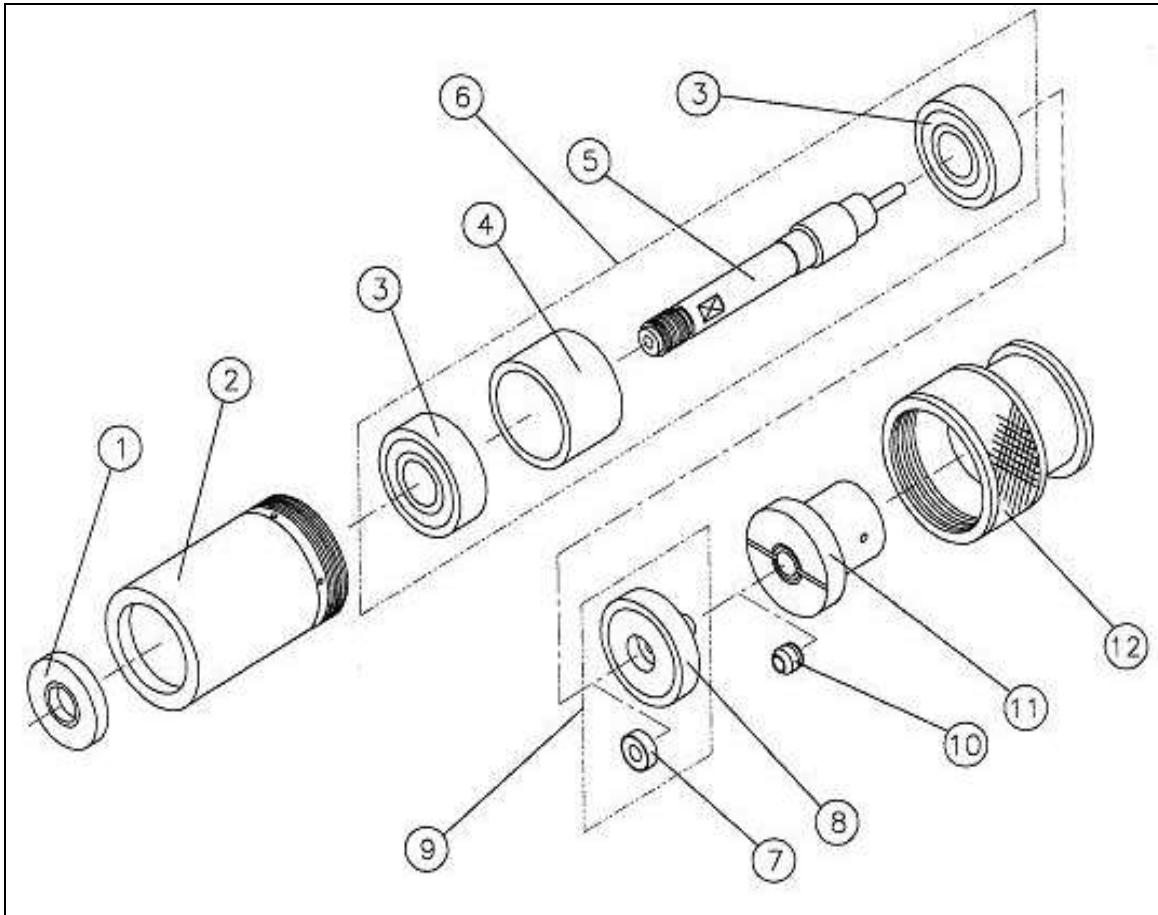
Front trigger for rotating gun assembly



Front trigger for rotating gun assembly spare-parts list

Pos:	Part no.:	Qty.:	Description:
1	700510152	3	Screw M6 SS
2	700550731	1	Guard
3	700550730	2	Bushing
4	700550729	1	Trigger
5	700550727	1	Valve seat
6	700550728	1	Valve pin
7	700540120	1	O-ring
8	700550756	1	O-ring
9	700650055	1	O-ring
10	700550755	1	O-ring
11	700550757	1	Spring
12	700510153	1	Screw M8 SS
13	700550724	1	Valve-body
14	700550725	1	Handle
15	700550726	1	Washer
1-15	700550758	1	Front trigger, complete

Swivel for rotating gun assembly

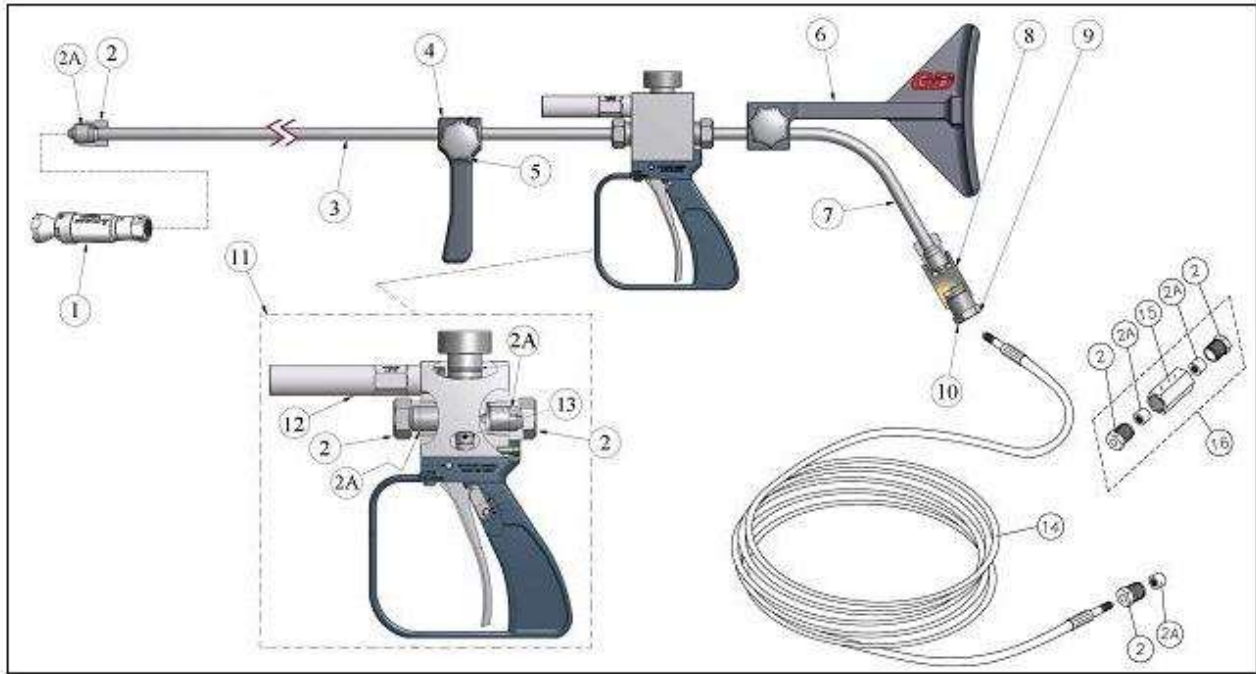


Swivel for rotating gun assembly spare-parts list

Pos:	Part no.:	Qty.:	Description:
1	700550718	1	Swivel oil seal, front
2	700550741	1	Swivel housing
3	700550744	2	Bearing
4	700550751	1	Spacer
5	700550742	1	Spindle
6	700550743	1	Spindle assembly
7	700550746	1	Seal, back-up ring
8	700550745	1	Back-up ring
9	700550747	1	Back-up ring with seal
10	700550748	1	Seal assembly
11	700550749	1	Inlet adaptor
12	700550750	1	Retaining cap
1-12	700550740	1	Swivel complete

5. Spare parts list

Trigger dump-gun & hose assembly



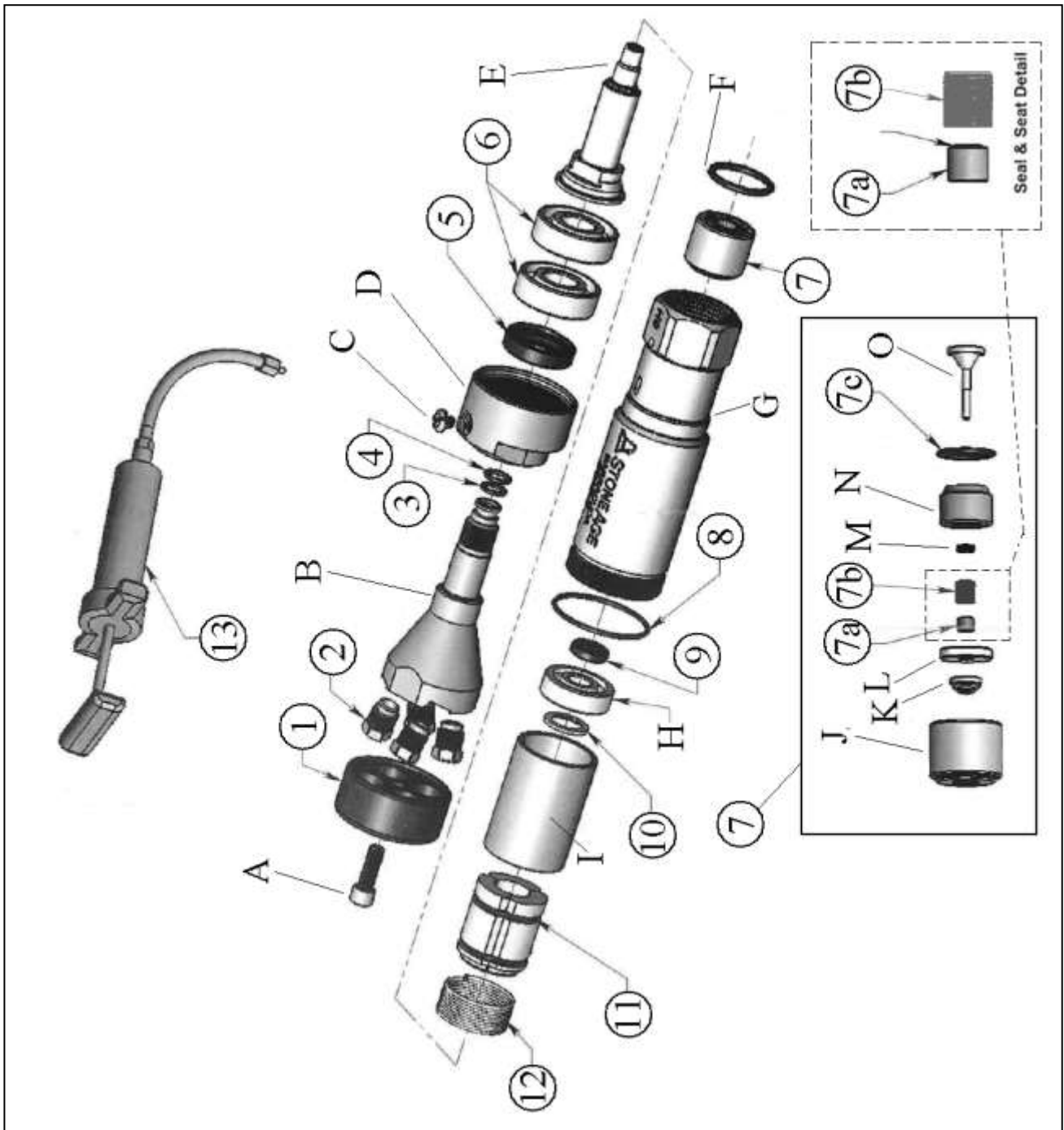
Trigger dump-gun & hose assembly spare-parts list

Pos:	Part no.:	Qty.:	Description:
1	700551279	1	Rotating nozzle barracuda 40K/HF
2	700540387	4	Gland nut 9/16 S.S.
2A	700540388	4	Collar 9/16 S.S.
3	700551487	1	Lance pipe 9/16" HP L48" SS
4	700551488	1	Front grip polymer
5	700551489	1	Grip knob
6	700551490	1	Shoulder suppoer
7	700551491	1	Lance pipe 60 degree bent-40K
8	700540353	1	Coupling straight 9/16"
9	700540387	1	Gland nut 9/16 S.S.
10	700540388	1	Collar 9/16 S.S.
11	700551492	1	Dump gun/handle assembly 40K
12	700540822	1	Dump discharged tube
13	700551159	1	Repair kit 40K HG dump
2-13	700550906	1	Dump gun complete 40K
14	700550852	1	High pressure hose 9/16" Ø8mm x 20m 36kpsi
15	700540353	N/A	Straight Connection 9/16" (Optional)
16	700540378	N/A	Connection straight 9/16" w/ collars & gland nuts (Optional)
2	700540387	2	Gland nut 9/16 S.S. (Optional)
2A	700540388	2	Collar 9/16 S.S. (Optional)

Nozzle Configuration

Part no.:	Qty.:	Description:
700551104	2	Nozzle barracuda 40K 0.018
700551337	2	Nozzle barracuda 40K 0.017

Rotating nozzle assembly

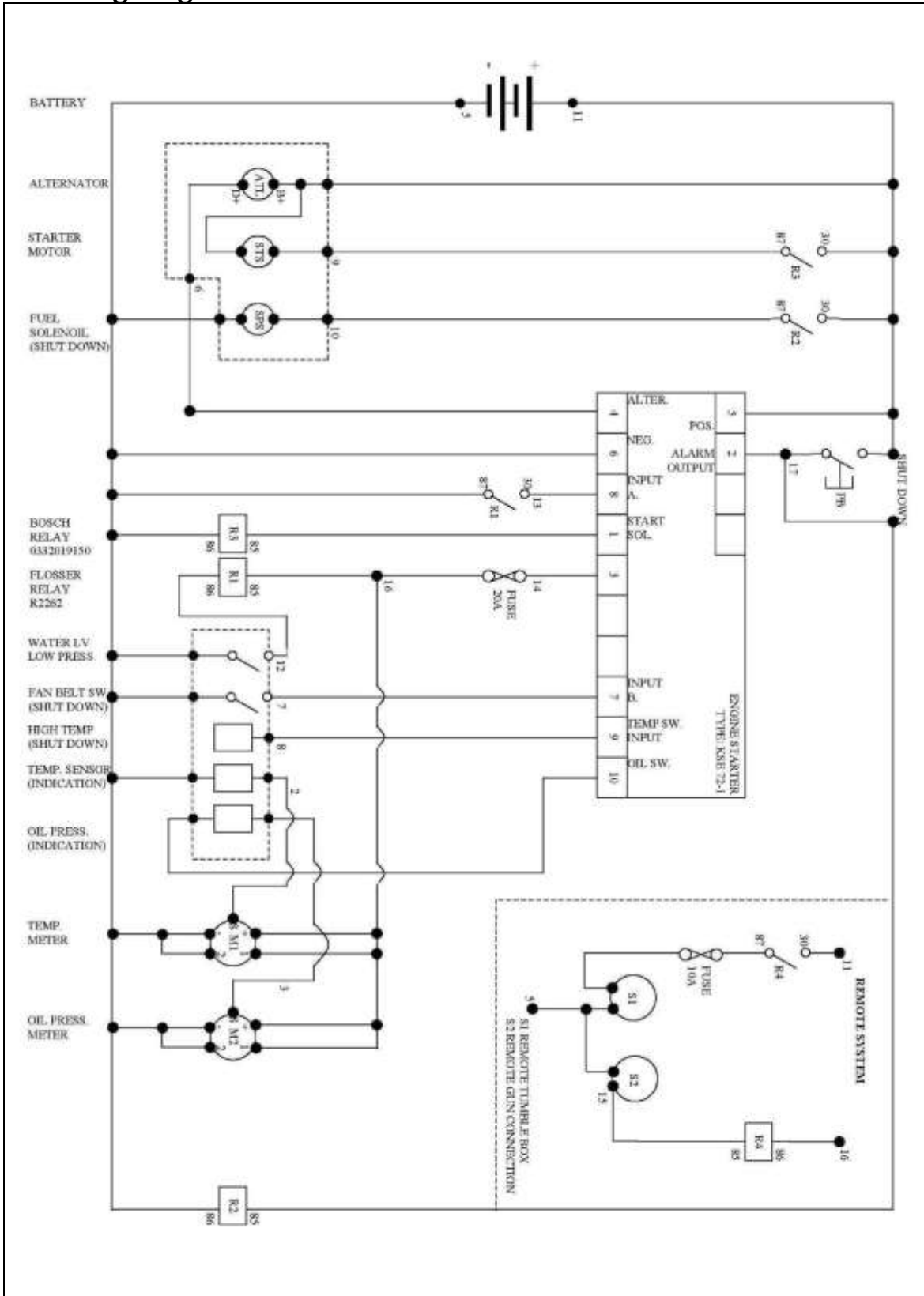


5. Spare parts list

Rotating Nozzle Assembly spare-parts list

Pos:	Part no.:	Qty.:	Description:
1	70051410	1	Shield nozzle. 40K H/F
2	700551104	2	Nozzle barracuda 40K 0.018
	700551337	2	Nozzle barracuda 40K 0.017
3	700551143	1	Multi jet back up ring
4	700551144	1	Multi jet O ring
5	700551145	1	Multi jet seal large
6	700551146	2	Multi jet bearing, thrust
7	700551332	1	Cartridge assembly BC 505-S
7a	-	1	Carbide Seat
7b	-	1	H.P Seal
7c	-	1	O-ring
8	700551153	1	Multi jet O ring
9	700551154	1	Multi jet seal, shaft small
10	700551156	1	Multi jet washer
11	700551184	1	Multi jet garter spring
12	700551142	1	Multi jet spring
13	700551165	1	Multi jet syringe
A	-	1	Bolt
B	-	1	Head
C	-	1	Port Screw
D	-	1	Cab
E	-	1	Shaft
F	-	1	O-ring
G	-	1	Body
H	-	1	Bearing
I	-	1	Sleeve
J	-	1	Cartridge
K	-	1	Seat Face
L	-	1	Seal
M	-	1	Compression Spring
N	-	1	Inlet seat
O	-	1	Mandrel
1-12	700551279	1	Rotating nozzle complete 40K/HF

6. Wiring diagram



7. Declaration and Warranty

EU declaration of conformity

	<u>EU Declaration of Conformity</u>
Product:	Diesel powered Ultra high-pressure water cleaner
Type:	C-2500/25D UHP II
Description:	150Hp, IP 54 – 2500[bar]
The design of the unit corresponds to the following pertinent regulations:	
Applied harmonized standards:	EN Machine Directive 98/37/EC EN Gas Appliances 90/396/EEC EN Pressure Equipment 97/23/EEC EN Simple pressure vessel 87/404/ECC
Applied national standards and technical specifications:	prEN 1829-1 (2001), EN ISO 12100-1, EN ISO 12100-2
Note: This equipment is not subordinated enhanced manufacturing or authority control according to directive 97/23/EEC §2, subsection 10, a+b, §4, subsection 1,3) b) 2) + subsection 3 and §7, subsection 2.	
	DEN-SIN – a division Nilfisk-Advance Pte Ltd. No 5 Tuas Ave 2 Singapore 639445 Tel: +65 62681006 Fax: +65 62684916
Ampornsittikul Preecha General Manager	Singapore, Dec 2013

Warranty

DEN-SIN warrants all equipment's of its manufacture furnished under this agreement to be free from defect in workmanship and material for a period of one year from the date of invoice of the equipment. This warranty does not cover normal wear and tear, consumable items, or part failures caused by (i) accident, (ii) abuse, or (iii) failure to maintain the DEN-SIN system containing the affected parts in accordance with DEN-SIN technical specification. All labour is the responsibility, and the expense of the Buyer. The liability of Seller under this warranty is limited, at Seller's option, solely to repair or replacement with equivalent articles. This warranty is condition upon (a) Seller being notified in writing by Buyer within one week after discovery of defects;

(b) the return of defective articles to Seller, transportation charges prepaid by Buyer; and (c) Seller's examination of such article disclosing to its satisfaction that such defects were not caused by negligence, misuse, improper maintenance, improper installation, accident, or unauthorized repair or alteration.

Accessories or equipment furnished by DEN-SIN but manufactured by others, shall carry the warranty that its manufacturer has conveyed to DEN-SIN, and which may be passed on to the purchaser. The original warranty period of any article, which has been repaired or replaced by DEN-SIN, shall not thereby be extended.

Notes