



Operation & Maintenance Manual

Original Instructions

DSK 4018 Truck Mounted Jetter

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Operation & Maintenance Manual for:

UNIT: DSK 4018 Truck Mounted Jetter

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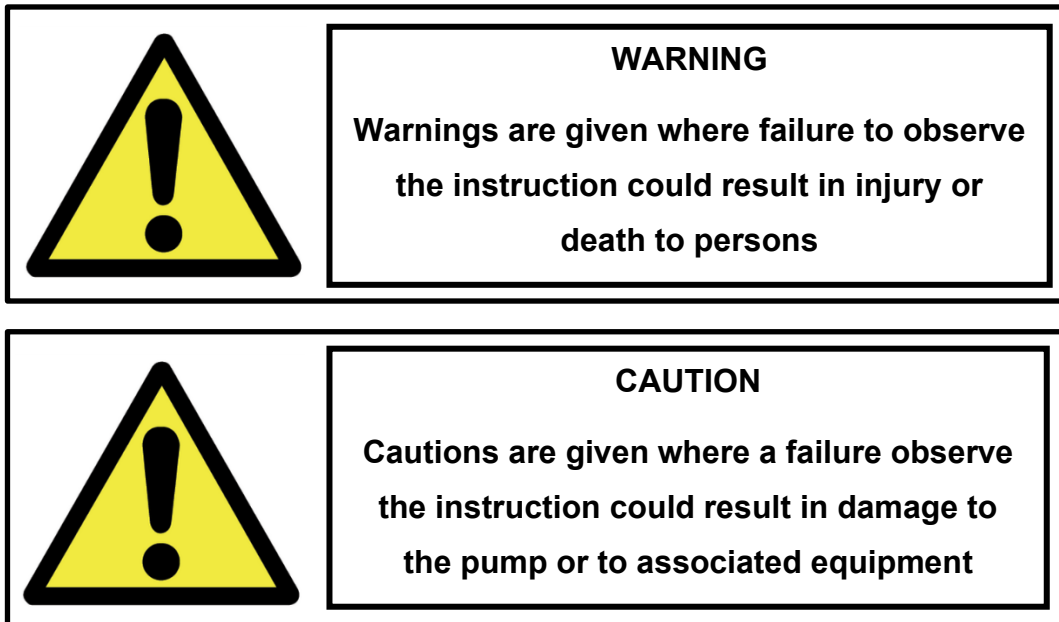
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1.2. Introduction

Read this manual before you operate, or carry out any maintenance on the high pressure jetter. Important safety information is highlighted as **WARNING** and **CAUTION** instructions. You must obey these instructions. The use of warnings and cautions is defined below:



Notices

Carefully read the notices of this manual because they give important information concerning safe installation, use and maintenance; familiarise yourself with the workings of the machine to rapidly switch it off and eliminate pressure.

This manual is an integral and essential part of the product; it will be consigned to the user to ensure the training/information for personnel.

The manufacturer does not assume responsibility for damage caused to persons, things or to the machine, in the case of improper use. Carefully preserve this manual for any further consultation.

Identify the model of your machine by reading the details on the identification plate. Upon delivery, inspect the machine / accessories for any damage, which may occur during transport.

IMPORTANT, Follow the recommended operating procedures at all times; do not misuse the equipment as this could result in injury or mechanical breakdown!

1.3. Scope of this Manual

This manual provides operation, maintenance and safety instructions for the jetter. Where the jetter has been fitted with proprietary components, details of these are also included in this manual.

This manual is compiled to match the Scope of Supply detailed in Section 2. All specifications, descriptions and parts lists refer only to the components in the version of the unit detailed in this scope of supply.

Maintenance instructions included in this manual include:

- Routine maintenance to be carried out at specific times.
- Maintenance of the high pressure pump.

Repairs to the pump crankcase are not considered maintenance operations as these should be undertaken only by HARBEN INC, their approved agents, or at least competent automotive engineers.

1.4. The Truck Mounted Jetter

Harben drain jettors have been designed to the highest standards so that they will work safely and reliably for many years. It is important that you take time to read the information provided in this operation and maintenance manual so that you understand how to make the most of the jetter and how to use it safely. Harben jettors are powerful pieces of industrial equipment and should only be operated by competent users who understand that serious injury or death can occur through misuse.

The jettors described in this operation and maintenance manual are intended to be used for high pressure water jetting in drain and sewer systems from 2" up to 18" diameter.

They will remove soft blockages, tree roots and hard scale, liquefying fats and restoring drain flow by blasting high pressure water through a drain nozzle connected to the end of a high pressure hose. Some models can be fitted with jump jets kits to increase the effective cleaning distance.

Harben Truck Mounted jettors use diesel engines to power a high pressure water pump up to 5,000 psi and 18 gpm.

Additional accessories can be purchased from Harben Inc, such as floor cleaners, jetting guns and jet pumps which extend the range of work that can be carried out with the jetter. Separate details are available on request.

1.5. Composition of this Manual

This manual comprises the following further sections:

Section 2 Scope of Supply

This section defines the scope of supply of the equipment in compliance with the sales order.

Section 3 Technical Data

This section contains technical information about the jetter.

Section 4 Health & Safety

This section details health and safety considerations in general and specific to water jetting equipment.

Section 5 Operation

This section describes the recommended operating procedures for the jetter.

Section 6 Routine Maintenance

This section details recommended routine maintenance requirements for the pump and jetter.

Section 7 Fault Finding

Fault diagnosis tables for the pump, engine and ancillaries.

Section 8 Harben P-Type Pump

Details of the pump and gearbox assembly.

Section 9 Circuit diagrams/Electrical Details

This section includes the Hydraulic and water circuits of the jetter.

Section 10 Diesel Engine

This section provides part details of the diesel engine.

Section 11 Parts list / Spares / Auxiliary Components

How to identify and order spares / auxiliary components.

Section 12 Service Documents

Service logbook and checklist.

Section 13 Warranty & Certification

2. Section 2 – Scope of Supply

2.1. Scope of Supply

Unit:	DSK 4018 Truck Mounted Jetter
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2.2. Pump Assembly

Figure 2.1 defines the components of the jetter assembly as follows:

The pump is driven by an industrial diesel engine.

The engine drives the pump via a 2:1 reduction gearbox which reduces the pump rpm down to the correct shaft speed.

Water is fed from a mains supply into a plastic water storage tank. The tank supplies the pump with a positive head of pressure via an inline hydro strainer that filters the water to approximately 80 microns.

The 'P' Type 8 22 radial piston high pressure diaphragm pump is driven by an industrial diesel engine through a 2:1 reduction gearbox.

The water is directed by a divert valve, to a hydraulically driven hose reel with up to 500 feet of ½" hose, or at low pressure 'dumped' back to tank.

The system is protected from over pressurization by a safety relief bursting disc.

The engine and system pressure can be monitored at the control panel situated at the rear of the jetter.

2.3. Detailed Drawings

Detailed drawings and parts lists for the above components are provided as follows:

The pump is detailed in Section 8.

Details of other parts and assemblies are included at Section 11.

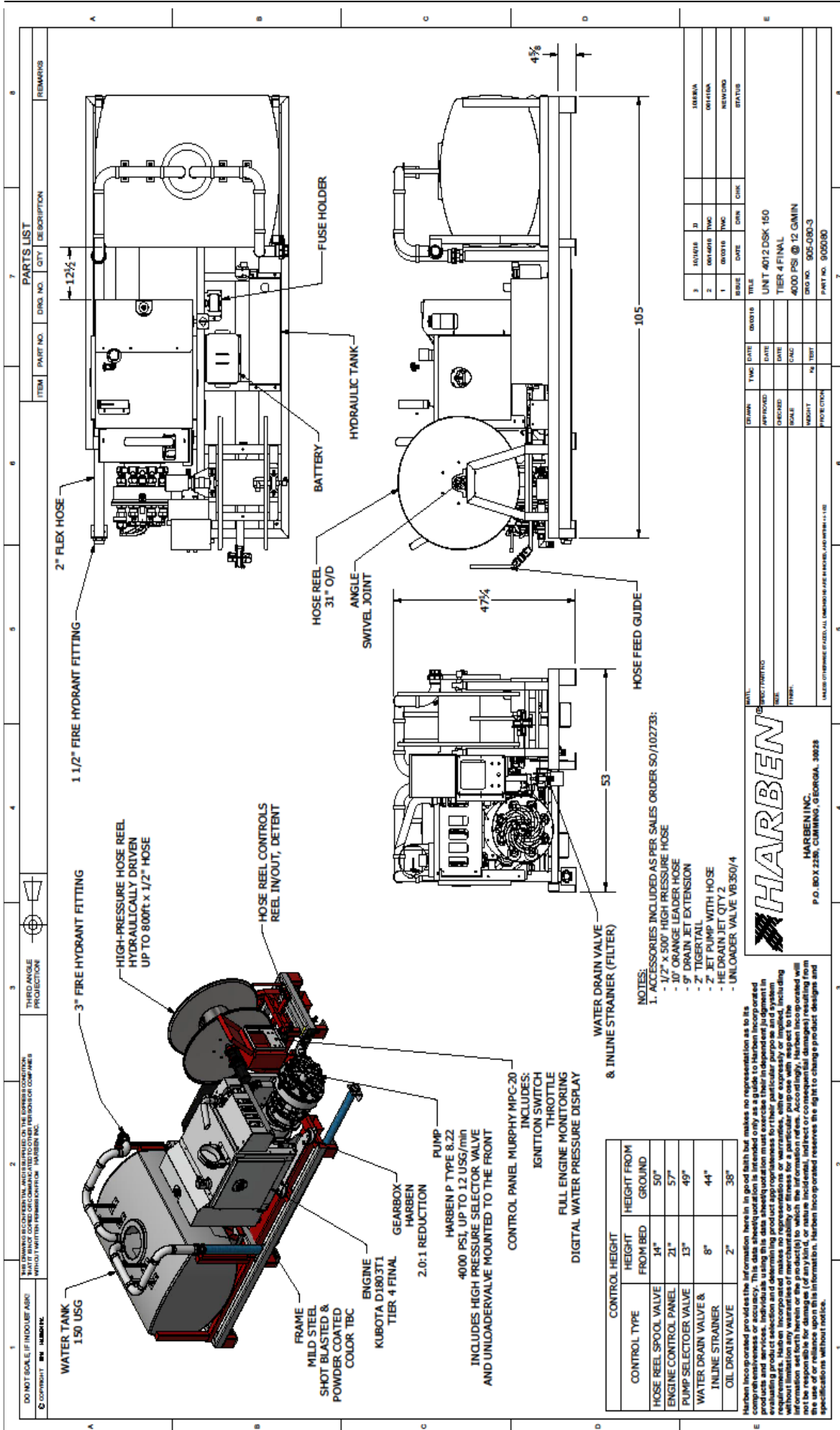


Fig. 2.1 – DSK 4018 Primary Components

3. Section 3 - Technical Data

3.1. Technical Data

3.1.1. Pump Data

Pump Type	Harben 'P' Type 8 22 (See Section 8)
Pump diameter	16" approx.
Pump length	15" approx.
Inlet	1 ¼" dia.
Outlet	G1/2" (1/2" BSP)
Shaft dia	30 mm
Shaft length	65 mm
Cylinder options	8
Power rating (nominal)	45 hp
Plunger diameter	22 mm
Shaft speed	1250 rpm
Maximum pressure	Up to 4000 psi (280 bar)
Max flow rate	Up to 18 USG/min (70 lpm)
Crankcase lubrication	Fully immersed
Oil capacity	1.3 USG
Weight	176 lb
Recommended crankcase oil	Shell Morlina 150 or Tellus 150 (see section 6)
Max inlet temperature	77°F

3.1.2. Main Components

Engine	ENGINE KUBOTA D1803TI TIER 4 FINAL TRUCK MOUNTED
Pump	020041AAB Harben P Type 8 22
Gearbox	012242 Harben P Type 2:1

3.1.3. Ancillaries

Water tank	150 gal capacity
Supply filter	042134 Hypro line strainer / 170 micron mesh
Monitoring & control	Standard engine controller and throttle
Pressure control and safety	011046 Pressure disc white 4000 psi

3.1.4. Services Required

Mains water supply	Positive head capable of delivering greater than 16 USG/min
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Note: Water pH value of 5 to 9 is recommended.

3.2. Technical Description

3.2.1. Primary Components

The primary components of the jetter are illustrated in Figure 2.1 which are as follows:

- A prime mover in the form of an industrial diesel engine which drives a Harben P Type high pressure pump.
- The pump is capable of producing high pressure water up to 4000 psi.
- *Note: See above or section 8 for performance options.*
- A hydraulic driven hose reel with up to 500 feet of single wire braid high pressure hose with either a nozzle or gun attachment to deliver the high pressure water to the work application.
- Plastic water tank, acting as a reservoir, also ensuring the water is settled and non-turbulent, discharging a smooth uninterrupted supply, with a positive head of pressure to the inlet, maximising the full potential of the pump.
- The pressure valve directs high pressure water to the main jetting hose, or diverts it back to the tank.
- The control panel which includes the engine controller, pressure gauge, throttle, high pressure selector, jump jet valve & hydraulic hose reel controls.
- A Hypro 80 micron mesh inline strainer is fitted to the suction line between the tanks and the pump inlet.

Note: This is a critical component which ensures that no contaminants are drawn into the pump inlet. This filter must be inspected and cleaned daily, if it becomes blocked it will cause the pump to cavitate)

3.2.2. Engine Monitoring

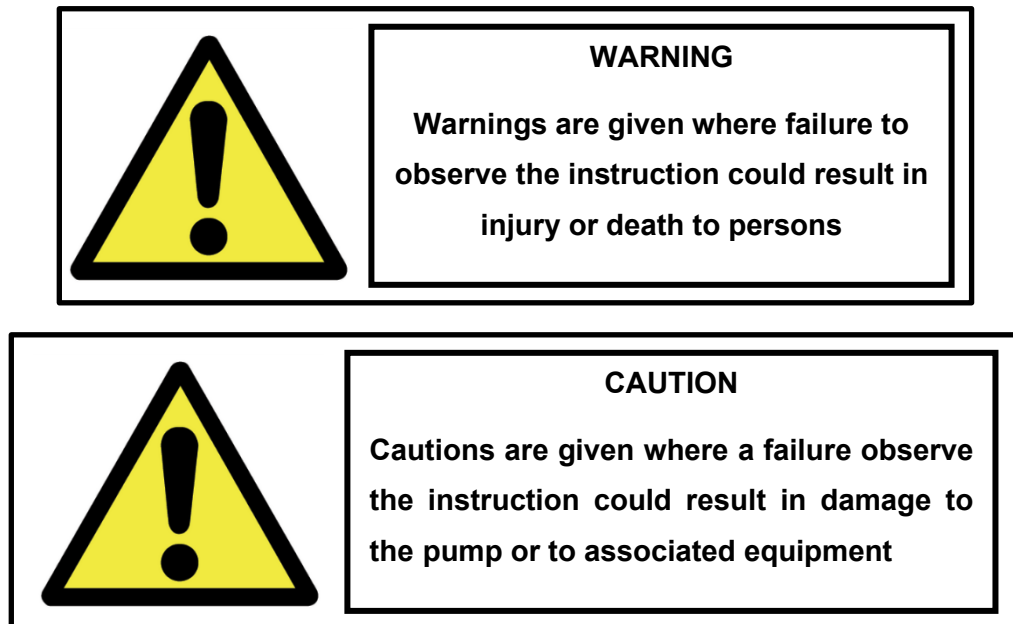
Engine oil pressure and hours run are monitored on the engine control panel.

4. Section 4 – Health & Safety

4.1. Introduction

This section should be read in conjunction with the WARNING and CAUTION notices contained throughout this manual or any safety notices on any items of the equipment supplied.

The use of WARNINGS and CAUTIONS is defined below:



All procedures and recommendations in this manual must be strictly adhered to by operators of the jetter, or by any person passing within close proximity.

All Company Safety Regulations applicable must be adhered to at all times.

The following notes, and safety notices throughout this manual, are intended to guide the operator in the safe use and maintenance of the equipment. Whilst every effort has been made for completeness, these notes and notices must be supplemented by the knowledge, training and experience of persons carrying out their tasks.

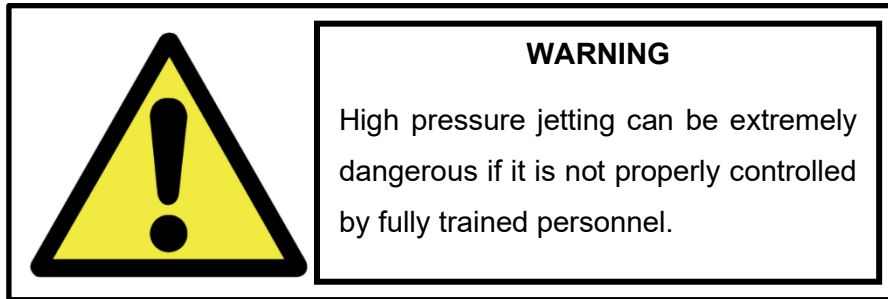
4.2. Safety Notes

Please see a list of safety notes which should be read and understood before operating the machine.

For a comprehensive list of general safety warnings relating to the operation of high pressure water jetting equipment refer to **Section 4.6**.

- Operating procedures throughout this manual must be adhered to. In the case of conflicting or ambiguous instructions, reference must be made to a Site Management or Safety Officer.
- Any person operating, working with, or passing near, the unit must wear the necessary Personal Protective Equipment (PPE).
- The Site Management should make available to operators or persons working with the unit, or part thereof, the appropriate technical documentation and should ensure such persons read and understand the documentation prior to commencing their duties.
- Special tools should be used where recommended in this manual.
- Prior to any maintenance or repair work being carried out, the unit, or part thereof, must be shut down and equipment isolated.
- Any maintenance requirements in this manual should be adhered to as minimum maintenance requirements. Maintenance records should be up to date at all times.
- Guards which are located within the unit must be fitted and secured in accordance with the drawings and must not be loosened or removed whilst the unit or part thereof, is operational. Should it be necessary to remove any guard for access prior to start-up of the unit, it must be re-fitted and secured before start up.
- Oils, lubricants, greases and fluids used within the unit must be in accordance with the recommendations given in this manual.
- Fully competent personnel must carry out coupling and uncoupling of the unit.

4.3. Water Jetting Equipment or High Pressure Equipment



Operators, and the employers of operators, of water jetting equipment should be trained in accordance with and be fully conversant with the;

- **'Recommended Practices for the Use of High Pressure Waterjetting Equipment' (Code of Practice) - Issued by The WaterJet Technology Association (WJTA)**

Copies of the Code of Practice are available from Harben Inc.

Supervisors and operators should always adhere to recommendations and instructions contained within the Code of Practice

The following Water Jetting Safety Instructions are based on the Code of Practice.

4.4. Water Jetting Safety Instructions

4.4.1. Training

All persons using high-pressure jetting equipment should be fully conversant with relevant operating instructions, safety notes and Codes of Practice. If in doubt, contact Harben Inc. for advice on operator training.

4.4.2. Supervision

All high pressure water jetting operations should be under the control of a fully trained supervisor, who will be aware of the potential hazards to operators and passers-by.

4.4.3. Jetting Area

Warning notices, "DANGER - HIGH PRESSURE JETTING" should be displayed at all possible access points to the jetting area. Notices are available from Harben Inc.

4.4.4. Before Starting

Before starting the unit, ensure that you, and anyone else who may be in control at any time, are fully aware of its controls and their function.

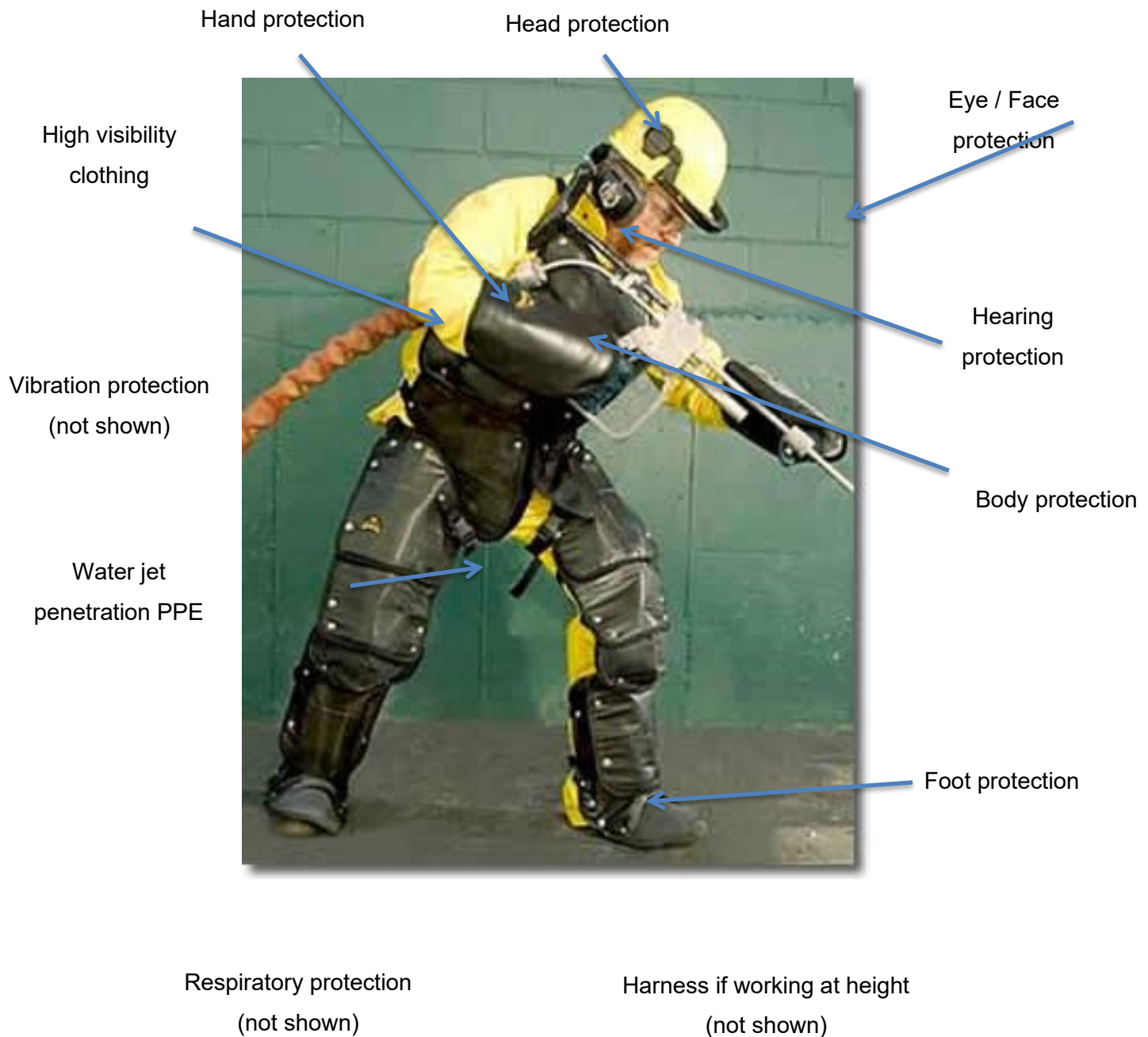
It is especially important that everyone knows how to stop the unit in case of an emergency.

Ensure that all the pre-operational checks have been completed, and that any necessary actions have been taken.

4.5. Personal Protective Equipment (PPE)

All persons using high pressure water jetting equipment should use all necessary PPE suitable for the task being carried out. Please note PPE shown below can be supplied in various formats.

PPE for consideration: -



Please note, a site-specific job hazard analysis must be completed to analyse which PPE must be worn. For more information visit [osha.gov](https://www.osha.gov)

A full range of PPE is available from [Harben Inc.](https://www.harben.com)

4.6. General Safety Warnings

1. Never use high pressure jetting equipment that has not been regularly serviced according to manufacturer's specifications.
2. Always carry out the manufacturers recommended daily checks to your jetting unit before turning it on.
3. When water jetting equipment is used to clean sewer and drains that are contaminated with hazardous substances it is possible these may be entrained in the resulting aerosol and inhaled by the operator. Consider using a respirator.
4. Never start the jetter frozen. Operating jetting equipment while frozen could cause high speed ice bullets to be ejected from the jetter hose upon machine start up.
5. Never start jetting a drain, sewer or pipe unless the jet nozzle is safely inside the drain and pointing in the direction that you intend it to travel.
6. When drain jetting a drain, sewer or pipe with an inside diameter that is not small enough to prevent the hose from turning back on itself, a drain jet extension (a piece of straight rigid tube equivalent to the pipe diameter) should be fitted between the end of the hose and the nozzle.
7. Always consider the use of a safety leader hose at the beginning of the main jetting hose to alert operators when the jet nozzle is nearing the manhole entrance.
8. Always consider the use of a tiger tail hose feed guide to protect the jetting hose from abrasion and prevent premature failure.
9. Be aware that high pressure hoses can generate static electricity which may need to be controlled when working in hazardous areas.
10. When jetting drains or sewers if there is a danger to the general public from hoses laying across sidewalks they must be covered in such a way as to protect against injury from hose failure and tripping hazards.
11. Before starting work check and ensure the drain jets have no blocked holes or nozzles as this may cause the pumping system to over pressurize which could result in burst disc failure or bursting the jetting hose.
12. Never attempt to unblock a fully choked drain or pipe before considering the consequence of releasing the blockage and having a plan to deal with it. e.g. flooding, material ejection, drain nozzle ejection.
13. Never attempt to clean drains or pipes in one pass because this could lead to debris build up behind the jet nozzle causing a pressure build up in the drainage system. Be aware that a pressure build up in the drain or pipe could cause the jet nozzle to be ejected at speed back towards the operator.
14. Never enter the manhole to either place the jet nozzle into or extract it from the drain entrance unless the required confined space regulations have been met.

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15. Never work in a manhole with a radio remote control transmitter that is not classified for use in such areas.
 16. Never use the hydraulic hose reel facility as a winch to retract a jetting hose that has become stuck in the drain or pipe. Damage to the hose could be caused that will make subsequent hose failure more likely.
 17. Never allow jetting hoses to become kinked and always remove from service any jetting hose with an outer cover that has worn through to the reinforcing braid.
 18. Never use the high pressure jetting hose for any purpose other than sewer, drain or pipe cleaning e.g. winching vehicles or other plant.
 19. Never use jetting nozzles and/or accessories that have not been calibrated for the jetting machine pump performance as this could cause rapid over pressurization catching operators unaware.
 20. Never attempt to clean a drain or pipe with a nozzle that has more forward force than rear force. It could be ejected back toward the operator causing injury.
 21. Never attempt to clean a drain or pipe with a chain flail type jet that has unequal chain lengths as this could lead to severe vibration and high pressure hose failure.
 22. When using a venturi jet pump to remove fluid from a flooded manhole never place your fingers into the pump inlet as they could be trapped by the vacuum and injured.
 23. When using a venturi jet pump to remove fluid from a flooded manhole always secure the free end of the pump hose securely and ensure adequate drainage is in place to deal with high volumes of pumped water.
 24. Never use a dry shut type foot control valve on a jetting machine that does not have a pressure unloader valve as this could result in burst disc failure or bursting the jetting hose.
 25. Never use a dry shut type jetting gun valve on a jetting machine that does not have a pressure unloader valve as this could result in burst disc failure or bursting the jetting hose.
 26. When using a dry shut type system be aware that high pressure can be retained in the jetting hose even after the machine has been shut down. Always discharge pressure in a safe manner after machine shut down.
 27. Never point the gun at anyone as injury from high pressure water will occur if the jet stream comes into contact with body parts.
 28. Never work on a slippery surface because the reaction force of the jetting gun could cause you to become unstable and lose your footing.
 29. Never work from a ladder as the reaction force of the jetting gun could cause the ladder to fall backwards from the working area causing possible injury.

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30. Never work from scaffolding unless it is designed, erected and managed by competent persons and it is adequately secured to prevent it being pushed over by gun reaction forces
 31. When using the jetting gun to clean hard surfaces be aware that splash back could contain hard debris travelling at speed.
 32. When using the jetting gun to clean contaminated surfaces be aware that splash back could contain dangerous contaminants.
 33. Never use the jetting gun to clean a surface that could be damaged or penetrated by the water pressure unless that is the desired effect.
 34. Never use a high pressure jetting gun to clean down PPE whilst you or others are still wearing it as serious injury and death could result.
 35. When using a jetting gun or nozzle to clean at floor level wear suitable protective footwear.
 36. Always ensure that an adequate area is cordoned off around the working zone so that flying debris and contamination cannot injure passers-by.
 37. Be aware that the use of water jet guns fitted with oscillating or rotating heads tend to produce higher hand arm vibration levels than simple fixed head jets.
 38. Never use a high pressure jetting gun to wash or cool down livestock as serious injury and death could result.
 39. Never use ANYTHING other than a pressure disc in the holder. A pressure disc is designed to burst for a reason. Use of anything else may over pressurize the pump and cause personal injury.
 40. The number of operators required to carry out the water jetting task must be decided after performing a job hazard analysis but always consider having a nozzle operator to perform the jetting task and a pump operator to control the machine and act as a safety lookout.

HIGH PRESSURE WATER JETTING CAN BE DANGEROUS OR EVEN FATAL IF THE PROPER PRECAUTIONS ARE NOT TAKEN. DON'T BECOME A STATISTIC!

4.8. High Pressure Water Hoses

4.8.1. Hose Checks

The following checks must be made at regular intervals during the unit's life span.

- High pressure jetting hoses must be checked along their entire length at the start of each shift to ensure that they are free from external damage. Hoses with exposed or broken reinforcing braid or damaged couplings and fittings may fail without warning and must be replaced immediately.
- Before use check end fittings and couplings for damage to threads, sealing faces and rounding of connection nuts. Only use the correct size spanner to tighten the hose fitting. Stilsons or adjustable spanner type tools with serrated teeth must not be used.

4.8.2. Hose Use Limitations

The hoses intended use is water jetting, any other uses are strictly prohibited they include:-

- Using the hose for applications above the maximum working pressure.
- Using the hose as a towing aid.
- Using the hose as a lifting or restraining device.

4.9. Reaction Forces or “Back Thrust” (where applicable)

It is a mandatory requirement to carry out a job hazard analysis for each new application before commencing work. This must include calculating the reaction force created by the jet, taking into account; pressure, flow, nozzle coefficient of discharge and pressure drop through the hoses fittings and gun. Harben Inc. can offer assistance with this process if required.

It is not recommended that any one person be required to withstand a back thrust of more than 1/3rd of their bodyweight for an extended period of time. For example an operator weighing 160 lbs should not handle a back thrust of more than 53 lbs for extended periods.

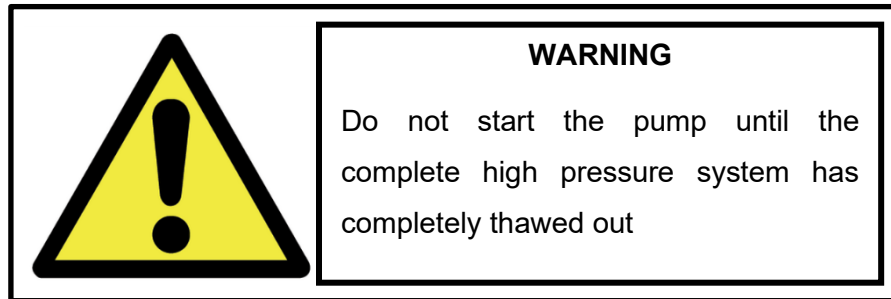


WARNING

Water jetting accessories can generate high back thrusts that can fatigue operators and may lead to them tripping or falling with the potential for serious injury. To avoid physically stressing the operator always rotate tasks to allow adequate rest periods.

4.10. Frosty Conditions (where applicable)

If frost has occurred there may be frozen water in the hose or pump which will cause a dangerous blockage. Ice bullets could be ejected from the end of an open hose at dangerously high speed capable of causing serious injury or death.





4.11. Safety Gun (where applicable)

When operating a high pressure water gun follow these steps and make note of important warnings.

- Never point a gun or lance at anyone, even if switched off.
- When using the gun, the jet should be fitted correctly before starting the unit. All other hose connections must be checked before attempting to start the unit.
- Do not allow children the opportunity to play with the equipment!
- Always consider using a safety shroud to provide the operator with greater protection in the event of a hose burst.



	<p>WARNING</p> <p>High pressure water jet! Grip lance with both hands. Never direct jet of water towards people or animals.</p>
	<p>WARNING</p> <p>High pressure water can be extremely dangerous do not leave plant unattended!</p>

4.12. During Operations

- If water appears from the hose, coupling or connector, often first sighted as a fine mist, then the hose is damaged and could burst or a joint is loose or defective. STOP THE UNIT IMMEDIATELY!
- No attempt should be made to adjust any hose, coupling or connector whilst that part of the system is under pressure.

4.13. During Maintenance

- A unit undergoing maintenance should be isolated from other plant or suitably identified to ensure that it is not used inadvertently.
- Maintenance must only be carried out by skilled personnel, who are conversant with the nature and dangers of high pressure water, of jetting safety regulations and codes of practice.

4.14. Tools

- The correct tools of the right size for the job must always be used to avoid damaging the unit and possibly making it unsafe. Adjustable tools with serrated gripping jaws should not be used.

4.15. Replacement Parts

- Only replacement parts which have been obtained from or approved by Harben Inc. are to be used when undertaking maintenance. Using any other replacement parts will normally invalidate the warranty and could be dangerous.

4.16. Performance

- Never exceed the maximum rated pressure or engine speed.


Note: The maximum engine speed quoted refers to the “High Idle Speed” at no load condition i.e. at the lowest possible pressure.

4.17. Pressure Safety Device

- Pressure discs should be replaced at least every 6 months to ensure continued safe operation and only manufacturer's original replacements should be used.

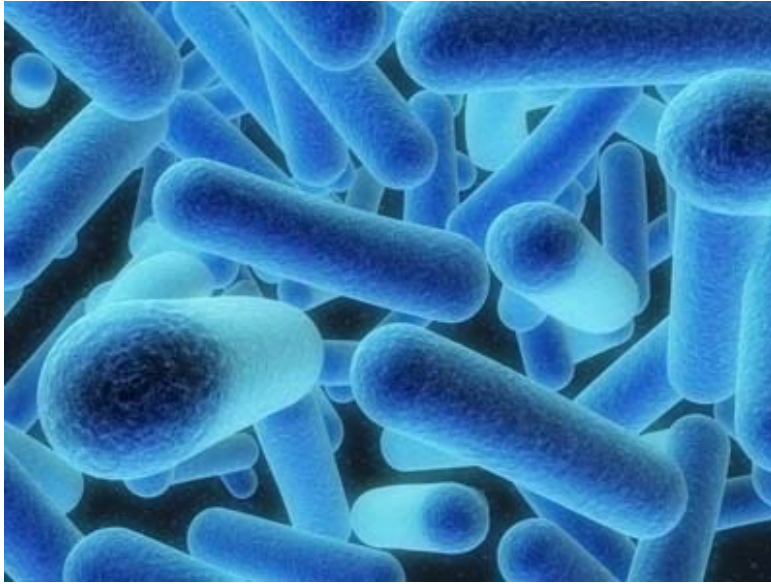
4.18. Exposure to Vibration

- The use of 'Jump or Pulse Jets' in drain cleaning applications may expose the operator to vibration levels in excess of the exposure limits action value if the jetting hose is handled. Water jetting hose should not be handled whilst the 'Jump or Pulse Jet' is in operation.

	<p style="text-align: center;">WARNING</p> <p>Handling the jetting hose with the Jump Jet switched on for 15 minutes per day could subject operators to maximum exposure allowable in an 8 hour working shift. Increased exposure is likely to exceed the exposure action value and a health surveillance programme will be required (see below).</p>
--	--

If exposures are likely to exceed the exposure action value an action plan of controls to limit exposures must be provided and acted on. Operators regularly receiving a hand-arm vibration exposure above the exposure action value must be included in a health surveillance programme to monitor for signs of hand-arm vibration syndrome. Always keep hands warm and dry under all circumstances. It is good practice to maintain a record of employee's exposure to vibration over their working life.

4.19. Legionnaire's Disease



- The bacteria are common and are found naturally in water, usually in low numbers. The bacteria do not seem to multiply below 68°F and will not survive above 140°F; water temperatures between 70°F and 113°F being optimum for growth. The bacteria may remain dormant in water temperatures between 43°F and 68°F, multiplying when water temperatures reach a suitable level.
- The bacteria also require food to multiply such as algae, amoebae and other bacteria. The presence of scale, sediment, sludge and other material within the system may be important in creating favourable conditions for the growth of bacteria as are biofilms (a thin layer of micro-organisms which may form slime on the surfaces in contact with the water).
- As the tanks of the unit are required to be emptied after the completion of jetting operations, so that the daily checks required by the operation & maintenance manual can be carried out, each jetting operation will be commenced with fresh water.
- In the event that the operations manual is ignored and the tanks not emptied, the risk of bacterial growth within the system would increase but the ambient temperature of the water in the tanks is likely to reach 68°F, and be maintained at that level, only in exceptional circumstances.
- To prevent a build-up of scale, sediment, sludge and other materials and reduce and associated hose and pipe work be thoroughly cleaned and flushed through at least every six months (preferably with hot water in excess of 158°F).

5. Section 5 – Operation

5.1. Operating Conditions

Operators of water jetting equipment should be fully conversant with the 'Industry Best Practices for The Use of High Pressure Water Jetting Equipment', hereafter referred to as 'The Code of Practice'. A copy of The Code of Practice is available upon request.

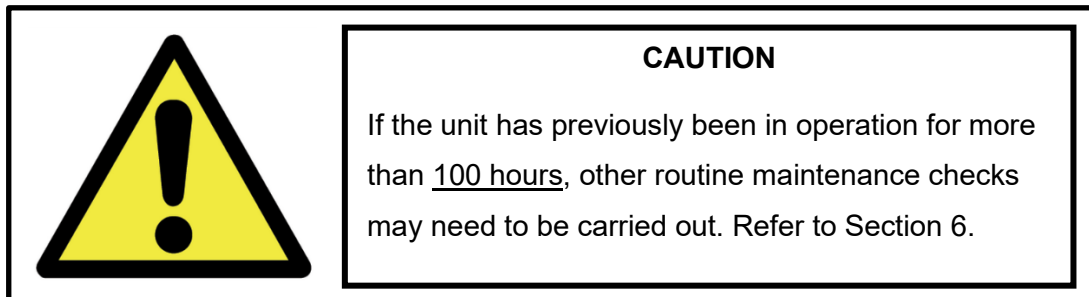
Section 4 - Health & Safety in this manual includes a synopsis of the relevant parts of The Code of Practice, which pertain to this equipment and specifically to single person operation.

5.2. Daily Checks

Carry out all daily checks. Full maintenance checks are detailed in Section 6 - Routine Maintenance.

They are:

- pump oil level
- gearbox oil level
- water filter cleanliness
- engine oil level
- tank water level

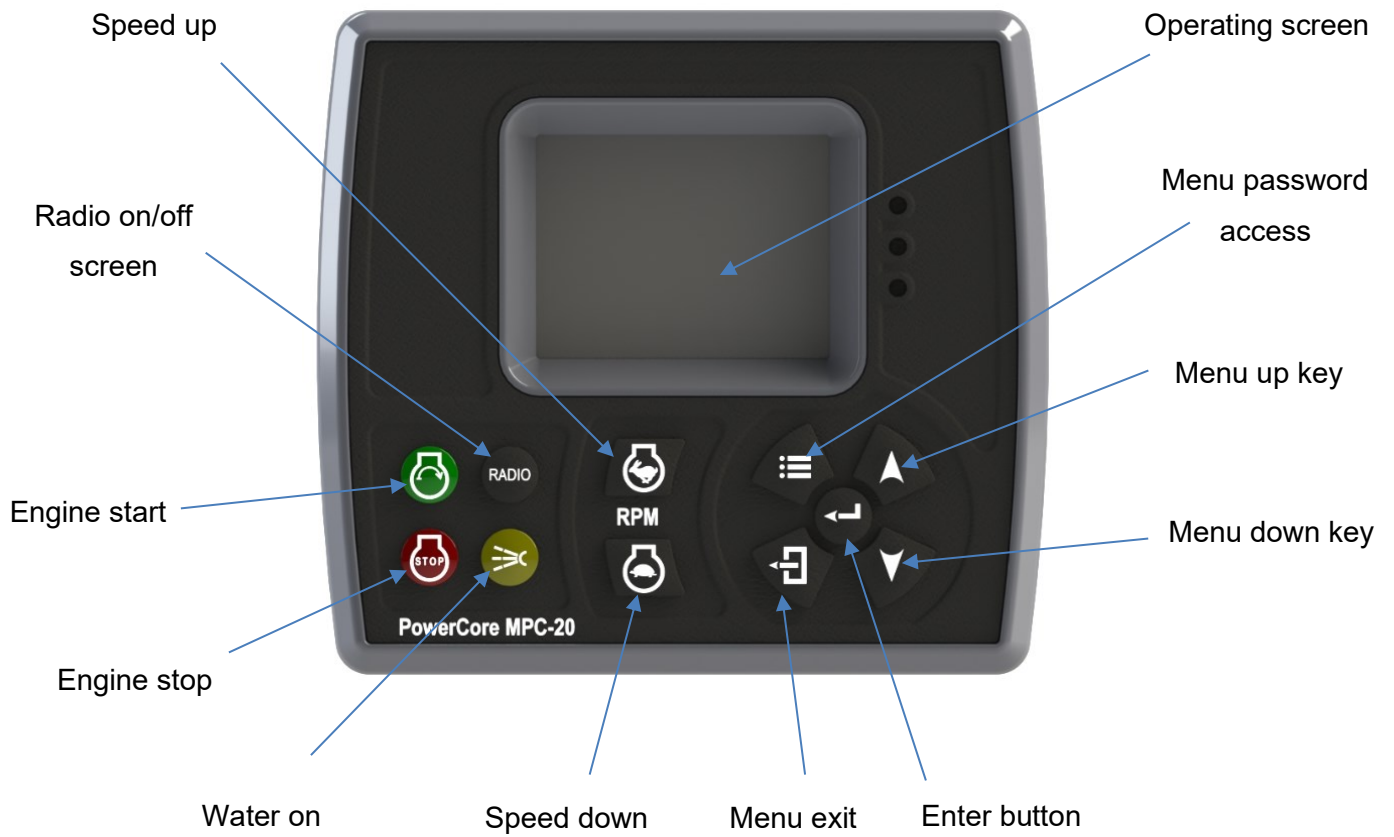


5.3. Pre-start Checks & Procedures

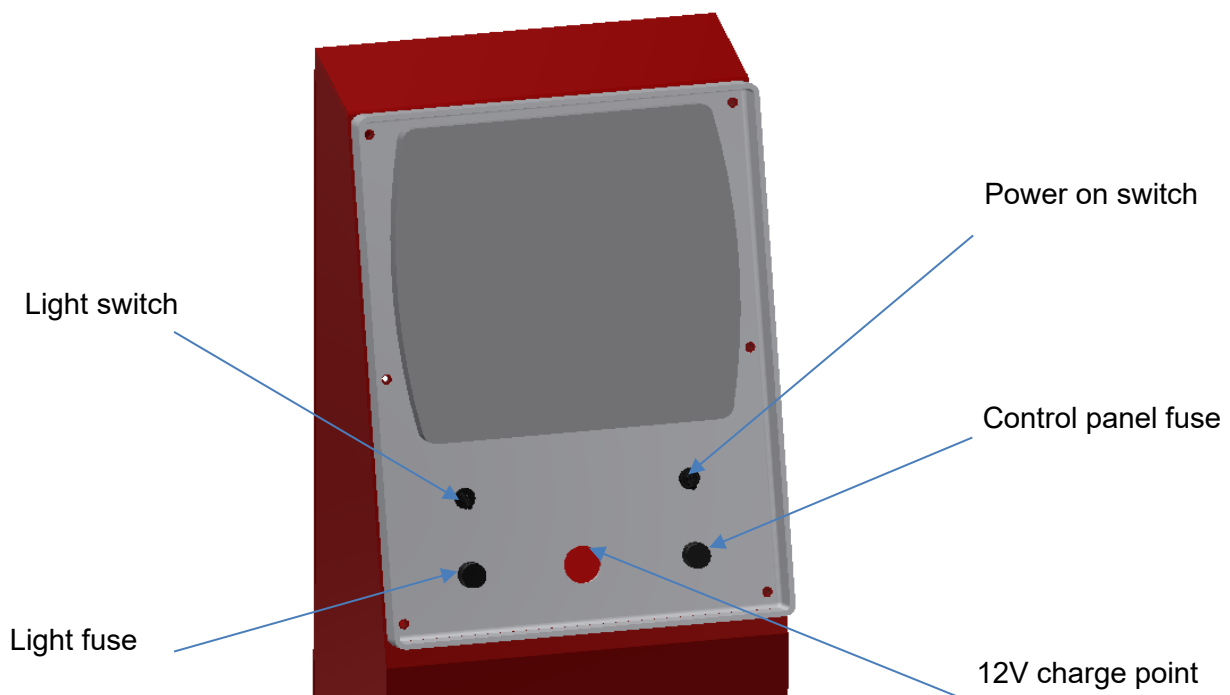
1. Ensure the vehicle is parked on a level surface, and the hand brake is applied.
2. To fill water tank, connect water supply to the hydrant fitting on the street side of the unit.
3. Feed off the hose reel approximately 10 feet of high pressure hose. **Do not fit the nozzle or gun at this point!**

5.4. Control panel layout and function

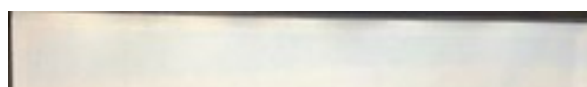
5.4.1. Control keys



5.4.2. Toggle switch operation



5.4.3. Screen layouts



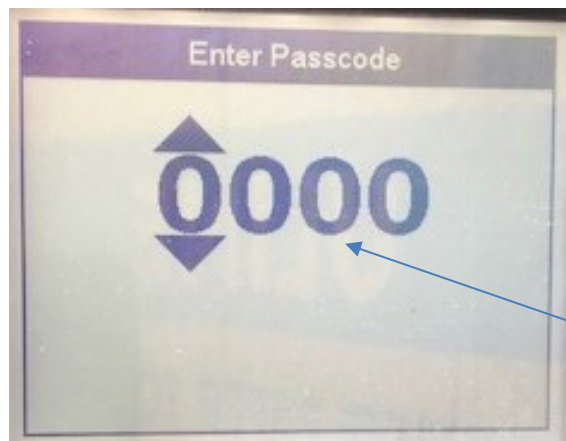
Starting splash screen

← Software version

Password screen

Run screen entry – 2010

Minor programme updates - 1111



→ Password screen – Use enter, up and down buttons to enter password

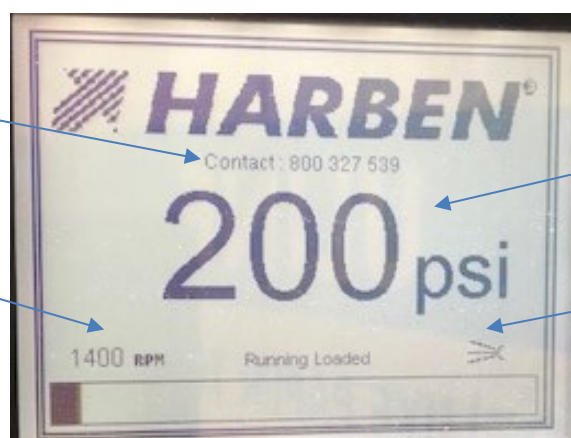
Main run screen (access by pressing menu exit key)

Harben contact number

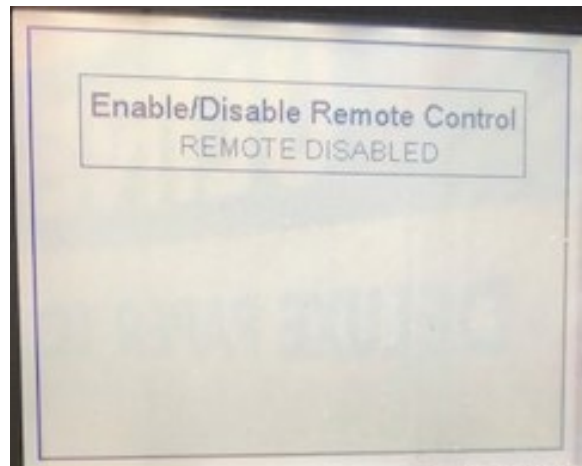
Unit pressure

Engine speed

Water on indication



Remote enable/control screen (Enter button will toggle between function)



Run detail screen (access via the up and down keys)

Actual RPM	Target RPM	Engine Battery	Run Hours
1250	1250	14.0 volts	2.45 Hrs
Engine Status	Status Time	Remote	Water
Running Loaded	00:00:00	REMOTE DISABLED	On
Time	Unit pressure	Engine Temp	Fuel Level
07:35:09 AM Date 20 Jul 18	0 psi	45.0 °F	

Radio control layout



5.5. Running the engine (Manual Mode)

If your machine is fitted with a radio remote control go to section 5.7.

1. Switch on unit using toggle switch
2. Enter password '2010' to enter
3. You will now enter the run screen
4. Press the engine start button
5. The control system will now go through a pre start (glow plugs)
6. The engine will now start and run in idle
7. The user can now increase and decrease the speed of the engine using the engine up and down speed
8. Increase the speed of the engine and when it is safe to turn the water on, press the water on button
9. The engine speed and pressure can now be increased and decreased using speed up and speed down button.
10. Radio mode will not operate when manual mode is selected.

5.6. Running the engine (Radio Mode)

1. Switch on unit using toggle switch
2. Enter password '2010' to enter
3. You will now enter the run screen
4. Press the radio screen button
5. Press the enter button to turn the radio function on
6. Switch on the radio handset by releasing the E-stop button
7. Hold down button 5 and 6 on the radio handset until the buzzer sounds and the top green LED on the handset lights.
8. Press the engine start button
9. The control system will now go through a pre start (glow plugs)
10. The engine will now start and run in idle
11. The user can now increase and decrease the speed of the engine using the engine up and down speed on the handset
12. Increase the speed of the engine and when it is safe to turn the water on, press the water on button on the handset
13. The engine speed and pressure can now be increased and decreased using speed up and speed down button.
14. Manual mode will not operate when radio mode is selected.

5.7. Running the Jetter

1. With the engine running at idle, and the water being diverted back to the tank, fit the required nozzle to the end of the hose and tighten securely.
2. Insert the nozzle approximately 6 feet into the drain before diverting the water through the main jetting hose.
3. Once inserted, press the water on button Water will now be diverted to the main jetting hose.
4. To increase engine speed, use the speed up and speed down buttons
5. Adjust the engine speed until the desired pressure is reached.
DO NOT EXCEED THE MAXIMUM OPERATING PRESSURE OF 4000 PSI. IF YOU DO SO YOU RUN THE RISK OF INJURY, AND DAMAGE TO EQUIPMENT.
6. Once you have completed your jetting work and area ready to retrieve the nozzle decrease the engine speed to idle. The unit will be running at around 700 psi. it is recommended that you rewind your hose while under some sort of pressure. A tightly wound hose that is re-energized could crush the drum of the reel.
7. Rewind hose. Once the orange leader hose becomes visible from the pipe, divert the water back to the tank, and continue to fully rewind the hose. Remove nozzle and secure hose to adapter for "travel mode".

6. Section 6 - Routine Maintenance

Table 1 provides a basic guide to routine maintenance requirements for the various components of the jetter.

Warning: Maintenance should only be carried out with the engine turned off and when cold.

6.1. Maintenance Procedures

Prior to use / Daily / After 8 hours running	<ul style="list-style-type: none"> • Check inlet water filter element (Ref Para 6.3) • Check engine oil level on dip stick (Ref section 10) • Check engine coolant level (Ref section 10) • Visual check for hose damage/water leaks & for any cracks in frame/chassis etc. • Check ignition and warning lamp operation • Check emergency stop button operation (Ref para 5.4)
Weekly / every 24 hours running	<ul style="list-style-type: none"> • Visually inspect jetter for security checking for any loose, damaged or missing parts. • Check air filter cleanliness (Ref section 10) • Check engine fuel water trap for contamination (Ref section 10)
3 months / 50 hours	<ul style="list-style-type: none"> • First service contact Harben Inc.
6 months / 150 hours	<ul style="list-style-type: none"> • Inspect tanks and fittings for leaks, thoroughly clean & flush through (with hot water in excess of 70 degrees C) • Tighten any loose joints • Grease the hydraulic hose reel bearing blocks • Check condition of 12volt start battery • Grease battery terminals for protection • Check alternator belt
Yearly / 300 hours	<ul style="list-style-type: none"> • Intermediate service of engine, gearbox and pump required (Contact Harben Inc.) • Closely inspect the structural integrity of the framework for signs of stress and cracking • Check hydraulic filter gauge. If it reads in the red replace the filter and oil (Shell Tellus 22) • Carry out detailed inspection of pipes, hoses and fittings. • Dismantle, clean & lube the hydraulic diverter valve
2 yearly / 600 hours	<ul style="list-style-type: none"> • Major service of engine, gearbox and pump required (Contact Harben Inc.) • Replace the pump inlet/delivery valves and diaphragms • Check wiring terminals/connections and continuity of electrical earth.

Table 1 Recommended Routine Maintenance

For a detailed guide to pump maintenance and overhaul procedures refer to **Section 8**.

For routing engine maintenance please refer to the engine handbook supplied with the unit.

6.2. Daily Maintenance

The following must be completed daily with the jetter switched **OFF**.


1. Check condition of inlet water filter & element. Clean or replace. (Harben part no. 042-134)



Unscrew the bowl to remove the mesh (Harben part no. 903-245). Take precautions so as not to lose the sealing ring (Harben part no. 903-300).



2. Visually inspect all hoses for signs of chaffing or leaks. Report any damage immediately to supervisor or manager.

	<p>WARNING</p> <p>Water at high pressure jetting from a damaged hose or hose connector can cause serious injury. Do not attempt to repair or secure any hose while the high pressure pump is running.</p>
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With the jetter **running**:

3. Make further inspection for leaks. If a leak is observed, shut down immediately and report the leak to a supervisor or manager.

6.3. Pump Lubricating Chart

Manufacturer	Type
ESSO	Nuto H150
GULF	LP 150
MOBIL	DTE Extra Heavy
ROC	Kiron 150
TEXACO	Rando HD 150
BP	Energol HLP 150
AGIP	OSO 105
SHELL	Tellus/Morlina 150
CENTURY OIL	PWLM
PETROFINA	Hydran 51
CASTROL	Hyspin AWS 150

Oil Capacity (litres)			
Number of Cylinders			
3-cyl	4-cyl	6-cyl	8-cyl
6.5	6.0	5.75	5.0

6.4. Burst Discs

When carrying out any maintenance/overhaul of the pump, always ensure the correct burst disc for its working pressure is fitted. The available burst discs are as follows:

Colour Code	Part Number	For Maximum Working Pressure
Yellow	011019	125 bar (1800 psi)
Blue	011020	140 bar (2000 psi)
Red	011021	175 bar (2500 psi)
Purple	011022	210 bar (3000 psi)
Green	011045	240 bar (3500 psi)
White	011046	275 bar (4000 psi)
Black	011047	345 bar (5000 psi)
Orange	011107	415 bar (6000 psi)



(Burst disc holder showing “White” burst disc)

7. Section 7 – Fault Finding

Most of the problems experienced during jetting operations are likely to be caused by the pump or the associated hoses.

These types of problems are covered in the pump fault finding chart, which is repeated at 7.3 overleaf for convenience.

Also covered at 7.3 overleaf is a diagnosis of selector valve problems

7.1. Fault finding - Electrical

As part of the control system, there is a detailed log of all electrical alarms and shutdowns. These will range from oil pressure to CanBus failure. To access this menu, use the following instructions.

1. Enter 1111 into the low password screen
 - a. Main menu
 - b. Systems settings
 - c. Event history
2. The event history will now give time, date and alarm/event history

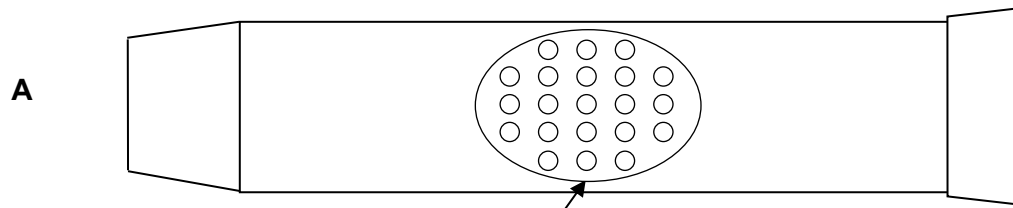
7.2. Fault finding - Hydraulic

Problem	Possible Cause	Recommended Action
Low system pressure	<ul style="list-style-type: none"> • Worn or incorrect size of cutting nozzle • Engine speed slow • Leaks from hose, pipes and connections • Blocked inlet filter • Inlet hose too long • Loss of water through dump line of selector valve or gun when high pressure selected • Loss of water through dump line of remote control kit, if fitted 	<ul style="list-style-type: none"> • Replace the old jetting Nozzle with a new one • Adjust to correct speed • Check the connections for tightness, replace if needed • Clean or replace element • Shorten hose length • Check seats and seals • Check seats and seals
High system pressure	<ul style="list-style-type: none"> • Blocked nozzle, selector valve or gun • Incorrect nozzle size • Incorrect bore size • Engine speed high • Crushed delivery hose • Two-gun choke left in gun when operating as single gun unit 	<ul style="list-style-type: none"> • Clean the items and flush out the delivery line • Replace the nozzle • Replace the hose • Adjust to correct speed • Replace if necessary • Replace with standard choke
Low water level	<ul style="list-style-type: none"> • Blocked or dirty pre-filters • Faulty ball valve assembly • Wrong seat in ball valve assembly • Low inlet pressure 	<ul style="list-style-type: none"> • Clean or replace elements • Replace if necessary • Replace the seat if necessary • Increase pressure
Pump not running evenly (also refer to pump faults)	<ul style="list-style-type: none"> • Air in water • Air in crankcase oil • Worn drive coupling • Faulty inlet or delivery valve • Valve nut over tightened 	<ul style="list-style-type: none"> • Water bleed pump • Oil bleed pump • Replace flexible elements and examine coupling • Check valve condition • Check tightness of inlet & delivery nut
Burst disc failure or safety relief valve operating (also refer to high system pressure problem)	<ul style="list-style-type: none"> • Incorrect burst disc • Incorrect valve setting • Faulty valve • Faulty or fatigued burst disc 	<ul style="list-style-type: none"> • Replace with correct disc • Check certificate/setting • Repair or replace if required • Replace with new disc

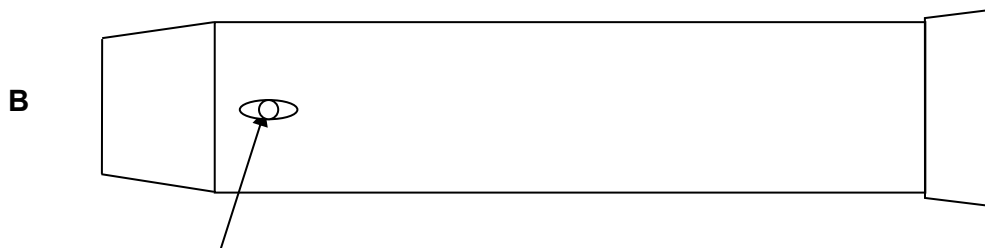
7.3. Pump Fault Finding

Problem	Possible Cause	Recommended Action
<ul style="list-style-type: none"> • Mixing of oil and water in crankcase • Loss of pressure • Pump not running evenly 	<ul style="list-style-type: none"> • Worn or damaged delivery valves. • Damaged filter element allowing debris to jam delivery valve 	<ul style="list-style-type: none"> • Check all delivery valves – replace as necessary • Check all diaphragms – replace as necessary • Replace oil • Check filters – replace as necessary
<ul style="list-style-type: none"> • 1 Loss of crankcase oil through high pressure hose • Loss of pump pressure • Pump not running evenly 	<ul style="list-style-type: none"> • Inlet restriction may have been caused through; <ul style="list-style-type: none"> ○ Blocked filters ○ Kinked inlet hose ○ Worn or damaged inlet valves ○ Excessive inlet hose length • Pump has been frozen 	<ul style="list-style-type: none"> • Clear restriction • Check inlet valves – replace as necessary • Check diaphragms – replace as necessary • Replenish oil
<ul style="list-style-type: none"> • Mixing of oil and water in crankcase 	<ul style="list-style-type: none"> • Diaphragm failure (may have been through fatigue from excessive running hours) 	<ul style="list-style-type: none"> • Check all diaphragms – replace as necessary

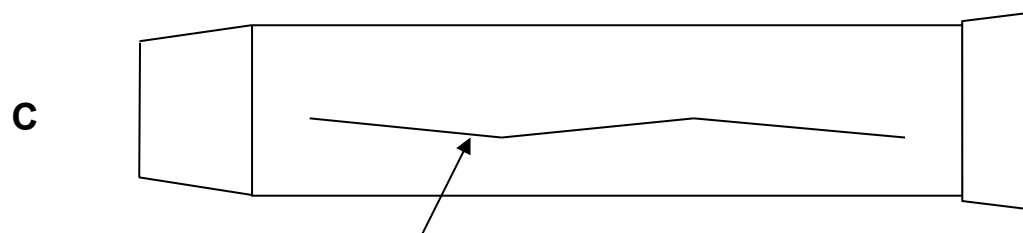
Distinguishing features of failure on diaphragm



Impression of the baffle on diaphragm
Reason: It has been inflated



4 small impressions, cause more damage on the inside, than on the outside. Reason: the diaphragm has pumped through mandrel delivery



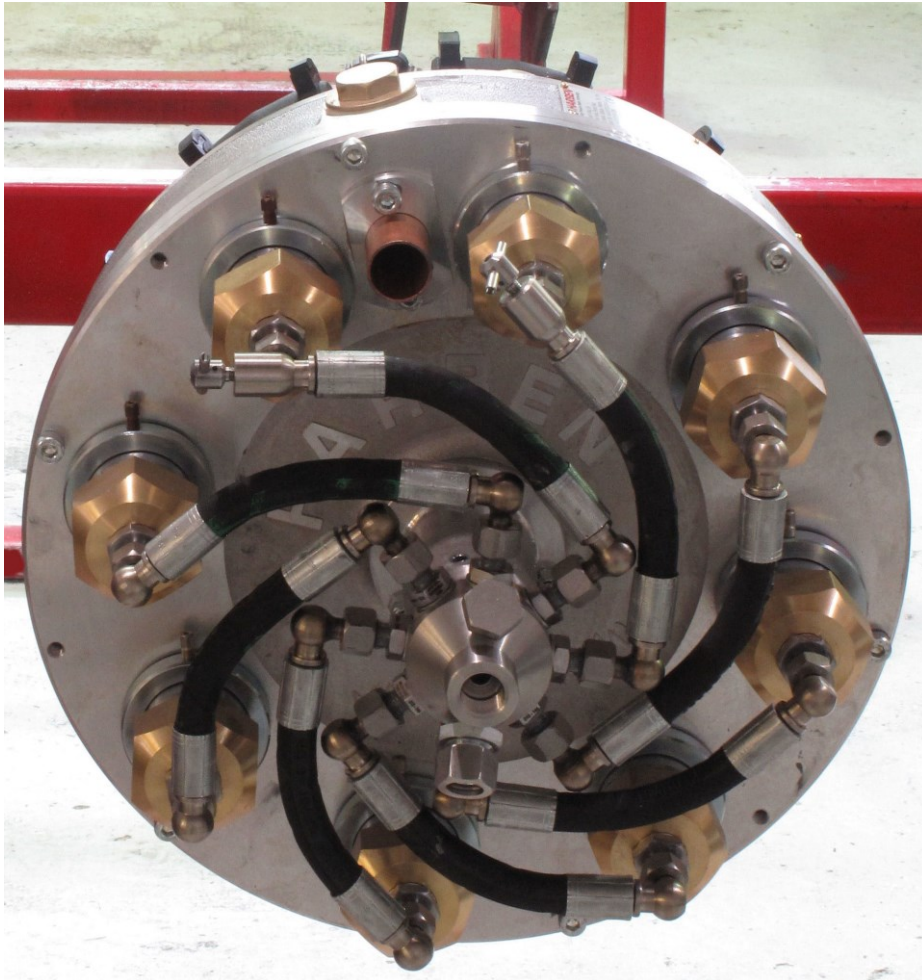
Shear through wall of diaphragm

7.4. Selector Fault Finding

Selector problem	Cause	Action
Loss of pressure and flow is down	Water leaking through the worn seat back to tank	Replace the seats and the plug if also damaged
If water leaks along spindle and past lever	O-ring and back up ring failure along shaft	Replace O-ring and back up ring 013-021 & 023-001.
Water leaking along the gland nut thread	Leaking selector seal	Replace seal 012-095.

8. Section 8 – Pump

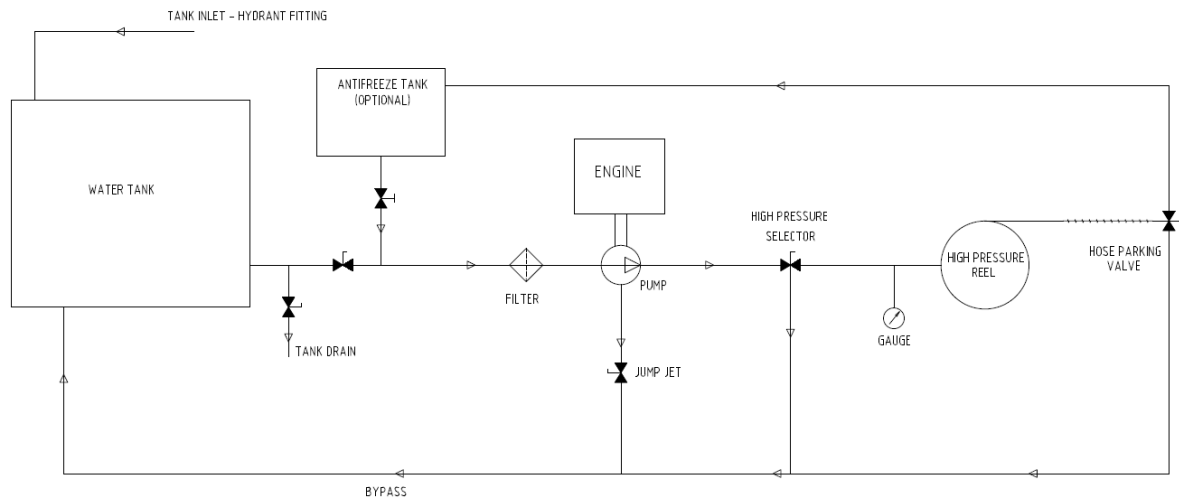
Refer to the **P Type Service Manual** Part No. 061-352 included with your jetter.



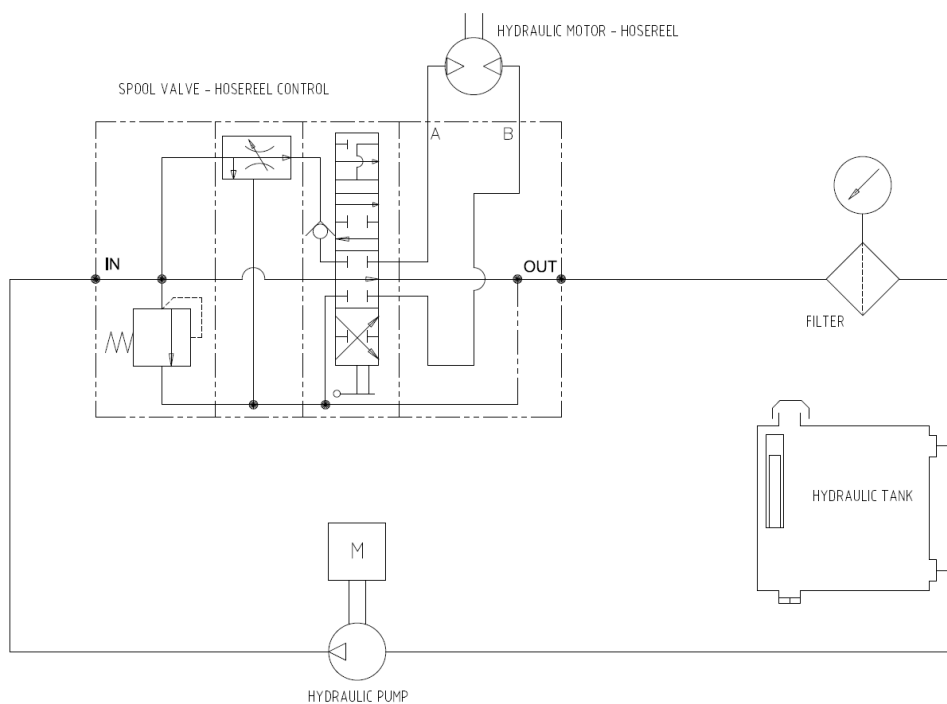
9. Section 9 – Circuit Diagrams

For wiring diagrams relating to the engine, refer to your engine handbook supplied with your jetter.

9.1. Water Circuit for DSK 4018



9.2. Hydraulic Circuit for DSK 4018



10. Section 10 - Engine

A copy of the Engine Manufacturer's Operators Handbook is supplied with this equipment



11. Section 11 – Parts List / Spares

11.1. Introduction

This section includes advice on obtaining spare parts.

To identify consumable items and service kits you require you should use the information in this section. To identify components for the pump or engine etc, refer to the relevant parts in this manual.

11.2. Ordering Spare Parts

Order spare parts from:



Harben Inc.

2010 Ronald Reagan Blvd.

Cumming GA 30041

Tel. (770) 889-9535 - Fax. (770) 887-9411

email: sales@harben.com

www.harben.com

11.3. Routing Maintenance / Consumable Items

See **Section 6**

11.4. Consumable components

See **Section 6**

11.5. Parts List

The parts list below details the common parts for your DSK 4018 jetter. For parts relating to the engine, or for details of optional extras fitted to your unit, contact either your distributor, or Harben Inc.

11.5.1. Manual

Component	Description	Qty
011046	PRESSURE DISC WHITE 4000	11
011086	PUMP P TYPE 8-22 BRASSNUTS/MANIFOLD S/S BARRELS	1
011156	ELBOW RUBBER 1 1/4" INLET	1
011157	TUBE SUPPORT 1 1/4" INLET	1
012096	GAUGE PRESSURE 10000 PSI SCREW IN	1
016398	COUPLING KUBOTA TIER 4 FINAL	1
018005	VALVE SPOOL HYD FLOW CONTROL CV1185 (SEE NOTES)	1
020143	GEARBOX HARBEN 2.0:1 SAE5 FLANGE (TIER 4 FINAL)	1
021020	BELL HOUSING LISTER	1
021113	SELECTOR 8 CYL S/STEEL	1
023011S	PARKER H.P. SWIVEL JOINTWITH 1 X 903 058 ADAPTOR	1
023088	PART 1 NEUPEX B140 PERQUOTE 144.704.068/REV B	1
023093	PART 4 NEUPEX B140SAME AS 480.009.327	2
028038	VINYL DECALS WITH NEWADDITIONS PER FAX	1
033010	SEAL DOWTY 1/2"	3
033013	SEAL DOWTY 3/8"	5
041044	PLUG SQUARE HEAD 1/2"	1
042134	POLYPROPYLENE 1 1/4" FPTSTRAINER	1
043057	DUMP DIFFUSER	3
043109	LABEL OPERATING DIESEL	1
043177	MALE PIPE x HOSE BARB2 x 2 NYLON ONLY	3
043201	MALE PIPExHOSE BARB1 1/4" NYLON ONLY	2
048008	ROLLER HOSE GUIDE	4
048010	SPACER HOSE GUIDE	4
055024	HOSE 1/2" ID NYLOBRAID	20
055063	HOSE 1 1/4" ID NYLOBRAID	6
055085	HOSE 2" ID CLEAR VINYL1/4" WALL	3
061027	LABEL "HARBEN"	3
061093	VINYL CUSTOM DECAL	1
900113	ELBOW 3/4" MALEx1/2" MALE	1
900116	ADAPTOR 1/2" Fx1/2" F SWVL	1
900199	ADAPTOR 3/4" GARDEN HOSE FEMALE x 1/2" NPTF	1
900207	ELBOW 1/2" Mx1/2" FEMALE	1
900226	LOCK RING 2"	1

900247	INSERT FOR HOSE 7/8"-14JIC F SWVL x 1/2"OD 90DEG	4
900281	ADAPTOR 1/2"NPTMx#8JICM	5
900294	TEE 1/2"NPT FEMALE	1
900295	ADAPTOR 1/2"BSPMx#10JICM	1
900304	ADAPTOR 1/2"NPTMx3/4"NPTM	1
900319	BUSHING 1/2"NPT FEMALE x3/4"NPT MALE	1
900327	ADAPTOR 3/8" BSP - #10 JIC M x M	1
900338	ADAPTOR 3/8" BSP - #8 JIC MxM	4
900339	ADAPTOR ELBOW #8 JIC MALE x SWIVEL FEMALE	4
900351	ADAPTOR 1/2 x 3/8 FG-S	1
900437	F471TC-3906-10-10-8-60	1
903058	ADAPTOR 1/2" NPTM x #10 JICM	6
903076	ELBOW 2"M x 2"BARB NYLON	1
9031015	BALL VALVE 1/2" NPT F/F LOW PRESSURE 600 PSI 2-WAY	1
9031039	451TC-3906 -8-8-6 x 26"	2
9031042	LABEL 'WARNING - UNBLOCKING PIPES'	1
9031043	LABEL 'WARNING - NEVER PLACE YOUR HANDS NEAR LEAKS'	1
9031044	LABEL 'WARNING - ALWAYS WINTERIZE'	1
9031045	LABEL 'SAFETY FIRST'	1
9031046	LABEL 'CAUTION - HOT SURFACE'	1
9031047	LABEL 'NEVER ALLOW ANTIFREEZE'	1
9031048	LABEL 'WARNING - DO NOT OPERATE WITH CANOPY OPEN'	1
9031049	LABEL 'DANGER - WATER JETS CAN CAUSE FATAL INJURIES'	1
9031050	LABEL 'WARNING - JETTER HOSES'	1
9031051	LABEL 'WARNING - PPE'	1
9031052	LABEL 'WARNING - DRAIN JET EXTENSION'	1
9031075	3 x 2 REDUCING BUSHING	2
903882	ENGINE KUBOTA D1803TI TIER 4 FINAL ENCLOSED	1
9031088	MPC-20-R2 POWER CORE CONTROLLER	1
9031089	GASKET FOR MPC-20 CONTROLLER	1
9031090	ML2000 INTERNAL HARNESS FOR MPC-20 CONTROLLER	1
9031099	Toggle Switch sealed on-off 15A	1
9031102	PRESSURE TRANSDUCER 0-5000PSI 4-20mA DIN CONNECTOR 1/4" NPT MALE	1
9031104	TANK WATER 150 GAL LOAF TYPE	1
9031105	COUPLING 3" PART D ALUMINIUM	1
9031106	COUPLING 3" PART A ALUMINIUM	1
903124	I.D. PLATE FOR TRAILER	1
903139	U-BOLT 1 1/2" PIPE	2
903160	WASHER GARDEN HOSE	1
903167	U-BOLT 2" PIPE	4
903172	TEE 1 1/4" B1140	1
903175	CLAMP HOSE #20	2


903178	CLAMP HOSE #08	8
903191	HYDRAULIC MOTOR PAINTED GLOSS BLACK	1
903197	BARBED FITTING 1/2" HOSEx 1/2 FEMALE PIPE	2
903208	FILTER HEAD & ELEMENT	1
903224	BULKHEAD 1 1/4" TxT	1
903225	1 1/4 SCH 80PVC NIPPL 2 INCH	2
903238	VALVE BALL 1 1/4"	1
903249	HYDRAULIC MOTOR BRACKET	1
903358	BATTERY 775DT	1
903376	BATTERY CABLE DT300 POS	1
903377	BATTERY CABLE DT300 NEG	1
903389	ELBOW 1 1/4" MALE TO BARB	2
903417	BUSHING 2" X 3/4" NYLON	1
903439	VELVAC VENTED GAS CAP2"F/M PIPE THREAD W/CHAIN (FUEL CAP)	1
903647	BATTERY BOX 11" x 6 3/4"x 8"	1
903770	HOSE ASSY 451TC-3906-10-10-8 x 47"	1
903854	451TC-3906-8-8-6 x 70"	1
903983	HOSE REEL HARBEN SPECBARE STEEL ONLY REVERSE ROTATION AS 903444 BUT RB	1
904048	FRAME DSK150 SERVICE TRUCK	1
Z894	TANK HYDRAULIC ALUMINUM	1
900337	ADAPTOR M16 - #8 JIC MxM	1
903851	451TC-3906-8-8-6 x 38"	1
900335	ELBOW PVC 2" MALE x FEMALE	1
900334	ELBOW PVC 2" FEMALE x FEMALE	6
903805	PIPE PVC 2" WHITE (10FT)	1
900336	ADAPTOR PVC 2" MALE x 2" SLIP	3
055024	HOSE 1/2" ID NYLOBRAID	10
9031136	2" X 3" NYLON REDUCER	1
9031137	1 1/2" X 2" NYLON REDUCER	1

12. Service Documents

12.1. Service Checklist

SERVICE CHECK LIST													
Serial Number -				Sht 1 of 2									
Unit Number -													
Date -				Engineer -									
Hours Run -				ESR -									
I - Intermediate service				Y - Yearly service				R - Customer request					
Engine				Hydraulics				Water tank					
	I	Y	R		I	Y	R		I	Y	R		
1	Check oil level			34	Check oil level			63	Clean water filter				
2	Change oil			35	Change oil			64	Change water filter				
3	Change oil filter			36	Change filter			65	Check hoses & fittings				
4	Clean air filter			37	Inspect hoses			66	Check tank security				
5	Change air filter			38	Inspect reel			67	Check tank integrity				
6	Change fuel filter			39	Grease reel bearings			68	Check A/Freeze				
7	Clean water trap			40	Check reel mountings			69	Check inlet ball valve				
8	Check coolant level & A/F mix			41	Check operation			OMO Foot pedal					
9	Inspect radiator			42	Check for leaks					I	Y	R	
10	Inspect hoses			Electrics/Controls				70	Check cable & plugs				
11	Check fan belt					I	Y	R	71	Test operation			
12	Check engine mounts			43	Check battery				72	Check safety button			
13	Check exhaust			44	Check/grease terminals			Pressure Hose					
14	Check throttle cable			45	Check charge system					I	Y	R	
15	Check for leaks			46	Check wiring connections			73	Check for wear / damage				
Gearbox				47	Test/check operations			74	cuts / tears				
		I	Y	R	48	Test remote control unit			75	Braiding showing			
16	Check oil level			Vanpack frame				76	Any joins in single length				
17	Change oil					I	Y	R	77	Fittings in good order			
18	Check for leaks			49	Check for cracks/damage				78	Leader hose satisfactory			
				50	Check fixing bolts & brackets			Hot Wash					
Pump				51	Check safety straps					I	Y	R	
		I	Y	R	Trailer				79	Check fuel pump pressure			
20	Check valves (Inlet/delivery)					I	Y	R	80	Clean fuel filter			
21	Replace valves (Inlet/delivery)			52	Check for cracks/damage				81	Check swirl plate adjustment			
22	Check diaphragms			53	Check wheels/tyres/pressure				82	Check electrode gap			
23	Replace diaphragms			54	Check brake operation				83	Check air flow			
24	Change oil			55	Check lights/reflectors				84	Check thermostat operation			
25	Check hoses/fittings			56	Check tow hitch/lubricate				85	Check low water level switch			
26	Check working pressure			57	Check safety cable				86	Check unloader valve			
27	Check working temp			58	Check jockey wheel condition				87	Check burner is running clean			
28	Check smooth running			Gun & Lance				Remote Control					
29	Change Burst Disc (Must be changed every 6 months)					I	Y	R			I	Y	R
30	Set Safety Relief Valve (Must be set by manufacturer/authorised agent and reset/certificated every six months)			59	Check for leaks on pressure				88	Check handset operation			
30	Check main pressure gauge			60	Check for damage				89	Check Antenna			
31	Check burst disc fitted			61	Check operation			Other					
32	Check jump jet operational			62	Check jets are correct					I	Y	R	
33	Pressure gauge reading correctly							90	Test emergency stop button				
I	Intermediate Service												
Y	Yearly Service												
R	At Request of Customer												
NA - Not applicable, A - Adjusted, √ - Satisfactory, R - Repair required, O - Observation													
Note - If 'Adjusted' or 'Repair required' please describe issue on sht 2													

12.2. Service Logbook

Harben Unit Log Book		
Serial Number -		
Unit Number -		
Date of Manufacture -		<i>Sht 1 of 2</i>
Date	Official Harben Stamp and Signature	<div style="border: 2px solid red; width: 100px; height: 60px; margin: auto;"></div>
Engineer		
Type of Service	Please state if other Service provider used	
Date	Official Harben Stamp and Signature	<div style="border: 2px solid red; width: 100px; height: 60px; margin: auto;"></div>
Engineer		
Type of Service	Please state if other Service provider used	
Date	Official Harben Stamp and Signature	<div style="border: 2px solid red; width: 100px; height: 60px; margin: auto;"></div>
Engineer		
Type of Service	Please state if other Service provider used	
Date	Official Harben Stamp and Signature	<div style="border: 2px solid red; width: 100px; height: 60px; margin: auto;"></div>
Engineer		
Type of Service	Please state if other Service provider used	
Date	Official Harben Stamp and Signature	<div style="border: 2px solid red; width: 100px; height: 60px; margin: auto;"></div>
Engineer		
Type of Service	Please state if other Service provider used	
Date	Official Harben Stamp and Signature	<div style="border: 2px solid red; width: 100px; height: 60px; margin: auto;"></div>
Engineer		
Type of Service	Please state if other Service provider used	
Date	Official Harben Stamp and Signature	<div style="border: 2px solid red; width: 100px; height: 60px; margin: auto;"></div>
Engineer		
Type of Service	Please state if other Service provider used	
Type of service - Intermediate, Yearly		<i>FLOW 0322 Iss 1</i>

13. Section 12 – Warranty

13.1. Warranty of New Products:

Equipment manufactured and supplied by Harben Inc. is warranted to be free from defects in materials and workmanship.

The warranty includes both parts and labor necessary to correct any such defects.

The warranty period for new products is one year or 2000 hours, whichever occurs soonest, from date of shipping from our factory.

We shall repair or, at our option, replace free of charge any product, part(s) or component(s) manufactured by Harben Inc. which fail due to faulty manufacture or material within the warranty period.

For all products not manufactured by Harben Inc; the warranty period is one year. The following exceptions to the one year warranty period are listed below.

13.2. Warranty of Major Components:

The warranty for the Harben “P” Style pump is five years or 2000 hours, whichever occurs soonest, when used in the sewer and drain cleaning industry. The warranty is two years or 2000 hours, whichever occurs soonest, when used in all other industries. Wearable parts within the “P” Pump are warranted for 90 days. These parts are:

- Inlet and Delivery valves
- Diaphragms

Engines – Please see the engine manual that came with your machine.

Poly Tanks – All poly tanks are warranted for three years for material and workmanship.

Harben DSK Frame – Warranty is for one year covering material and workmanship.

In Order To Make A Claim:

1. You must be the original purchaser of the machine in which these components were originally installed.
2. You must notify Harben Inc. with the pump serial number and any substantiation which may include, but is not limited to, the return of parts that we may reasonably request.
3. All components must have been installed and maintained in accordance with good industry practice and any specific Harben recommendations, including those in Harben’s maintenance schedule that is supplied with your machine.
4. Harben will replace, at the customers cost, any part returned for warranty. Once inspection has been completed and the part deemed to be warranted, Harben Inc. will credit your account for amount of the new part, minus taxes and shipping charges.
5. Harben Inc. warranty DOES NOT cover travel charges or down time.

Provision of this warranty shall not apply to any Harben product which has been:

- Used for a purpose for which it is not designed for; or
- Applied to a use which has not been approved by Harben Inc; or
- Subject to misuse, negligence, lack of maintenance or accident; or
- Repaired or altered in any way so as, in the judgement of Harben Inc, to adversely affect its performance and reliability; or
- Normal wear and tear

13.3. Limitations of Warranty:

The new product and spare parts warranty is limited to defects in material or workmanship of the product. It does not cover loss of time, inconvenience, property damage or any consequential damages. Repair or replacement of the product is your exclusive remedy.

Our liability under this clause shall be in lieu and to this exclusion of any warranty or conditions implied or expressed by law as to the quality or fitness for purpose of any goods supplied hereunder PROVIDED THAT nothing in this clause shall operate so as to exclude liability for death or personal injury arising from the negligence of the company or its employees.

Our obligations as aforesaid shall constitute the full extent of our liability in respect of any loss or damage sustained by the purchaser whether caused by any breach of this contract or by our negligence or otherwise and we shall not be liable to make good or pay for loss of use of the goods, loss of revenue, loss of profit or goodwill or any direct or consequential losses howsoever caused and the purchaser undertakes to indemnify us against any such claims against us by third parties.

All products manufactured, supplied or installed for use at work are tested before they leave our factory and are supplied with adequate instructions for their proper use. Further copies of these instructions are available from us upon request.