Instruction
and
Maintenance Manual

WEEDMASTER L

Ensure that the operator reads and understands this manual before maintenance or operation.

IMPORTANT NOTICE

This is the industry's "Safety Alert Symbol". This symbol is used to call your attention to items or operations that could be dangerous to you or other persons using this installation. Pleas read these massage carefully. It is essential that you read the instructions and regulations before you attempt to use this installation.

Warnings: Warnings, call attention to instructions which must be followed precisely to avoid injury or death.

Caution: Cautions, call attention to instructions which must be followed precisely to avoid damaging the product, process or its surroundings.

Notes: Notes, are used for supplementary information.

Waarschuwing - Raadpleeg het instructie- en onderhoudsboek.
Warning - Consult the operating and maintenance manual.
Attention - Consulter le manuel d'utillisation et d'entretien.
Warnung - Bedienungsanleitung lesen.

Waarschuwing - Elektrische schok risico
Warning - Electrical shock risk.
Attention! - Risque d` électrocution.
Warnung - Gefährliche elektrische Spannung.

Waarschuwing - Heet oppervlak.
Warning - Hot surface.
Attention - Surface chaude.
Warnung - Heiße Oberfläche.

Waarschuwing - Bijtende vloeistof.
Warning - Corrosion risk.
Attention - Risque de corrosion.
Warnung - Ätzende Stoffe.

Waarschuwing- Lees het instructie- en onderhoudsboek voordat u gaat draaien of onderhoud gaat uitvoeren.
Warning - Read the Operation and Maintenance manual before operation or maintenance of this machine is undertaken.
Attention! - Lire le manuel d'utillisation et de d'maintenance de cette machine avant d'intervenir.
Warnung - Bedienungs- u. Wartungsanleitung vor der Inbetriebnahme bzw. Wartung lesen.

Geen open vuur.
No open fire.
Pas de flammes nues.
Feuer, offenes Licht und Rauchen verboten.

Technical data

Machine type :
Waterkracht number : see type plate.
Production date : see type plate.

Machine:	*Discription*	*Type*
	Engine	Kubota 2 cylinder.
	HP-pump	Aquabar.
	Working pressure	bar (max).
	Max. flow rate	ltr./min.

General: Design working pressure: 90 bar.
Working pressure : adjustable till max. (Limited) 90 bars.
Water flow : adjustable till max. 30 litre per minute.
Waterinlet temp. : Max. 60°C.
Motor rpm : 1800 – 3600 rpm.

Engine: Make / Type : Kubota Z602 E3B.
: Air-cooled engine.
Maximum rpm : 3600 rpm.
Power : Max. 11,6 KW.

Pump: Type : High pressure three-plunger pump.
Make : Aquabar XWL 50.15N.
R.p.m. : max.1450 rpm.
Capacities : 150 bar – 30 lpm.
Working Pressure : 90 bar – 30 Lpm.

Transmission: Gearbox : 1:2,176

Heating: Type : Diesel oil high pressure coil.
Make : Porto. / M40 / 12 V - 500 bar.
Capacities : 86 kW at 13,0 bar oil pressure.

Hose reels: Hose reel : type 14/10E high pressure hose.
Storage tanks: Fuel tank : 40 and 80 litre.
Lime bindingliquid tank: Jerry can 5,0 litre.

RECOMMENDATIONS FOR THE USE OF THE HIGH PRESSURE JETTING EQUIPMENT.

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1 Protective clothing and personal protection shall be provided to all operators of High Pressure Water Jetting Equipment, and must be worn within the working area.

2 Avoid contact with the water jet, while it may cause serious injuries.
Never aim the water jet in the direction of persons, animals, electric equipment or the high pressure water jetting equipment itself.

3 A pressurized liquid is very dangerous if handled by incompetent persons.
Before starting maintenance or repair at high pressure water jetting equipment, be sure the system is depressurized and can not be started by accident.

4 Any persons required to operate or use High Pressure Water Jetting Equipment shall be competent to do so.

5 The Equipment shall not be used as long as any persons are within the reach of the water jet.

6 The electrical wiring shall be installed and connected by an authorized person, according to the local regulations.

7 Eventual cable extension pieces shall be provided with watertight connectors.
Never pull the machine or the electrical cable to disconnect the electrical power.

8 In case of hot water equipment only suitable fuels shall be used. Other than the recommended fuels may be very dangerous and may cause serious damage to the equipment.

9 When using oil or gas heated equipment, the air supply and flue shall meet the regulations and must be installed by authorized persons.

10 Oil heated equipment without flame failure protection may only be used when the equipment is visible for the operator.

11 For descaling of the heating element only a by the manufacturer recommended liquid may be used. While descaling, always wear protective clothing.

12 Beware of the reaction force and twisting moment of the lance or high pressure spray gun.

The operator should be safely positioned on a rough sub soil.

Gun and lance should be held by two hands.

13 Always be sure that the equipment is working at the nominal pressure and inform any person required to operate or use the high pressure water jetting equipment of this pressure.

14 The equipment shall not be used in case of damage of important parts, such as electrical cable, high pressure hose, safety devices and spray gun.

15 Only by the manufacturer recommended and approved cleaning and maintenance chemicals and/or devices shall be used.
Always meet the recommendations for use.

16 All pressurized parts, in particular hoses and couplings shall be inspected regularly, be free of faults and replaced when necessary.

17 When not in use or during service or maintenance the main switch shall be turned off, and the system shall be depressurized by pulling the trigger of the spray gun.

18 Maintenance and repairs shall only be carried out by authorized persons.

19 All connected accessories and auxiliaries shall be suited for the nominal working pressure of the equipment.

20 In case more than one high pressure water jetting equipment is connected to a joint pressure line, reliable and suitable pressure regulating devices should be installed, and working procedures shall avoid starting the equipment by accident or unintended.

21 Never use pressurized liquids for direct injection in drinking water equipment.

22 When working in a small and closed room, be sure that there is sufficient ventilation.

23 The safety device shall be regularly checked for a proper functioning.

24 Periodical, and at least once a year the safety system of the equipment shall be checked by an authorized and skilled person.

25 When selecting the working position of the machine ensure that there is sufficient clearance for ventilation and exhaust requirements, observing any specified minimum dimensions (to walls, floors etc.)

26 Adequate clearance needs to be allowed around and above the machine to permit safe access for specified maintenance tasks.

27 Ensure that the machine is positioned securely and on a stable foundation. Any risk of movement should be removed by suitable means, especially to avoid strain on any rigged hoses/piping.

FOREWORD.

The contents of this manual are considered to be proprietary and confidential to Waterkracht B.V. and should not be reproduced without the prior written permission of Waterkracht B.V.

Nothing contained in this document is intended to extend any promise, warranty or representation, expressed or implied, regarding the Waterkracht products described herein. Any such warranties or other terms and conditions of sale of products, which are available upon request.

This manual contains instructions and technical data to cover all routine operation and scheduled maintenance tasks by operation and maintenance staff. Major overhauls are should be referred to an authorized Waterkracht service department.

The design specification of this machine has been certified as complying with E.C. directives. Any modification to any part is absolutely prohibited and would result in the CE certification and marking being rendered invalid.

All components, accessories, pipes and connectors added to the high pressure system should be:

- of good quality, procured from a reputable manufacturer and wherever possible, be of a type approved by Waterkracht B.V.
- clearly rated for a pressure at least equal to the machine maximum allowable working pressure.

The use of repair parts other than those included within the Waterkracht approved parts list may create hazardous conditions over which Waterkracht has no control. Therefore Waterkracht B.V. cannot be non-approved repair parts are installed.

Waterkracht B.V. reserves the right to make changes and improvements to products without notice and without incurring any obligation to make such changes or add such improvements to products sold previously.

SAFETY.

Warnings: Warnings call attention to instructions which must be followed precisely to avoid injury or death.

Cautions: Cautions call attention to instructions which must be followed precisely to avoid damaging the product, process or it surroundings.

Notes: Notes are used for supplementary information.

SAFETY PRECAUTIONS.

General information:
Ensure that the operator reads and understands the decals and consults the manuals before maintenance or operation.

Ensure that the Operation and Maintenance manual not be removed permanently from the machine.

Ensure that maintenance personnel are adequately trained, competent and have read the Maintenance Manual.

Make sure that all protective covers are in place and that the doors/panels are closed during operation.

The specification of this machine is such that the machine is not suitable for use in flammable gas risk areas. If such an application is required then all local regulations, codes of practice and site rules must be observed. To ensure that the machine can operate in a safe and reliable manner, additional equipment such as gas detection, exhaust spark arrestors, and may be required, depending on local regulations or the degree of risk involved.

High pressure water can be dangerous if incorrectly handled. Before doing any work on the machine, ensure that all pressure is vented from the system and that the machine cannot be started accidentally.

Ensure that the machine is operating at the rated pressure and that the rated pressure is known to all relevant personal.

All water pressure equipment installed in or connected to the machine must have safe working pressure ratings of at least the machine rated pressure.

High pressure water must not be used for a direct feed to any form of drinking water apparatus.

If high pressure water is to be ultimately released into a confined space, adequate ventilation must be provided.

When using high pressure water always use appropriate personal protective equipment.

All pressure containing parts, especially flexible hoses and their couplings, must be regularly inspected.

Avoid bodily contact with the water jet, while it may cause serious injuries.

The safety valve must be checked periodically for correct operation.

AVOID INHALATION.

Ensure that adequate ventilation of the cooling system and exhaust gases is maintained at all times.

The following substances are used in the manufacture of this machine and may be hazardous to health if used incorrectly:
- engine lubricant
- preservative grease
- rust preventative

AVOID INGESTION, SKIN CONTACT AND INHALATION OF FUMES.

Transport:
When loading or transporting machines ensure that the lifting and tie down points are used.

When loading or transporting machines ensure that the towing vehicle, its size, weight, towing hitch and electrical supply are all suitable to provide safe and stable towing at speeds either, up to the legal maximum for the country in witch it is being towed or, as specified for the machine model if lower than the legal maximum.

Before towing the machine, ensure that:
- the tires and towing hitch are in serviceable condition,
- all doors are closed,
- all ancillary equipment is stored in a safe and secure manner,
- the brakes and lights are functioning correctly and meet necessary road traffic requirements,
- break-away cables/safety chains are connected to the towing vehicle.

The machine must be towed in a level attitude in order to maintain correct handling, braking and lighting functions.

When parking always use the handbrake, if necessary, suitable wheel chocks.

ROUTINE MAINTENANCE.

This section refers to the various components which require periodic maintenance and replacement.
Water under high pressure can be dangerous if incorrectly handled. Before doing any work on the unit, ensure that all pressure is vented from the system and that the machine cannot be started accidentally.
Ensure that maintenance personnel are adequately trained, competent and have read the Maintenance Manual.

Prior to attempting any maintenance work, ensure that:
- all pressure is fully discharged and isolated from the system.
- the machine cannot be started accidentally or otherwise, by posting warning signs and/or fitting appropriate anti-start devices.
- all residua electrical power sources (mains and battery) are isolated.

Prior to opening or removing panels or covers to work inside a machine, ensure that:
- anyone entering the machine is aware of the reduced level of protection and the additional hazards, including hot surfaces and intermittently moving parts.
- the machine cannot be started accidentally or otherwise, by posting warning signs and/or fitting appropriate anti-start devices.

Prior to attempting any maintenance work on a running machine, ensure that:
- the work carried out is limited to only those tasks which require the machine to run.
- the work carried out with safety protection devices disabled or removed is limited to only those tasks which require the machine to be running with safety protection devices disabled or removed.
- appropriate personal protective equipment is worn.
- loose clothing, jewelry, long hair etc. is made safe.
- warning signs indicating that Maintenance Work is in Progress are posted in a position that can be clearly seen.

Upon completion of maintenance tasks and prior to returning the machine into service, ensure that:
- the machine is suitable tested.
- all guards and safety protection devices are refitted.
- all panels are replaced and doors closed.
- hazardous materials are effectively contained and disposed of.

DECOMMISSIONING.

When the machine is to be permanently decommissioned or dismantled, it is important to ensure that all hazard risks are either eliminated or notified to the recipient of the machine.
In particular:
- do not destroy batteries or components containing asbestos without containing the materials safely.
- do not dispose of any pressure vessel that is not clearly marked with its relevant data plate information or rendered unusable no drilling, cutting etc.
- do not allow lubricants or coolants to be released into land surfaces or drains.
- do not dispose of a complete machine without documentation relating to instructions for it use.

1. GENERAL.

The “WEEDMASTER L unit”, this machine is equipped with hot water technology that kills weeds,alge,moss and possible residual parts of these in an environmentally friendly way, delaying re-growth for a relatively long time. The machine is provided with a fuel engine to drive the pump, a burner in order to heat the water and a control to regulate the temperature accurately. The hot water unit is suitable to work with tap water or filtered surface water. If you use surface water, you must follow the instructions of the manufacturer concerning filling the storage tank as described.

The standard version is equipped with an automatic pressure regulating system which controls the system pressure when shutting spray gun.

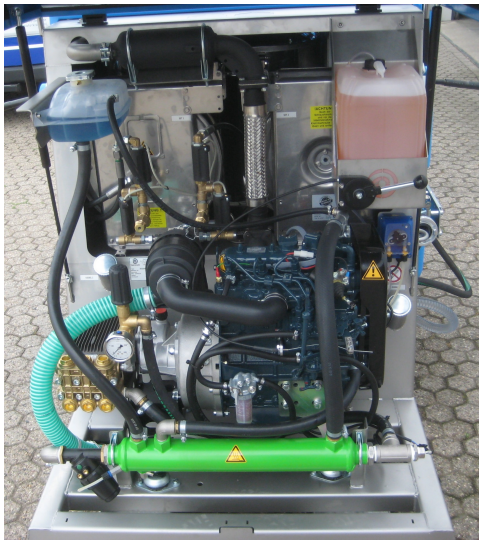
Do not use the machine when persons or animals are in its of action field. Protect yourself against the ejection of solid materials or corrosive substances by means of adequate protective clothing.

Use only original accessories that can allow safe working of the appliance of the machine.

1.2. After sales.

Quick service is supported by fully equipped service cars from several places in Holland.

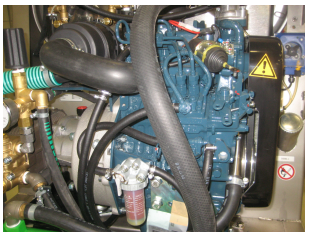
Waterkracht customers can concluse service contracts for their high pressure cleaning units to be assured of regular maintenance. This will increase the reliability of the unit.



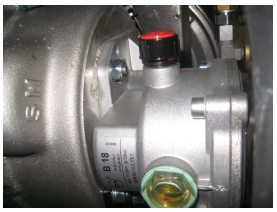
2. TECHNICAL DESCRIPTION.

2.1. General.

The **"Weedmaster L"** is build up with the following components:



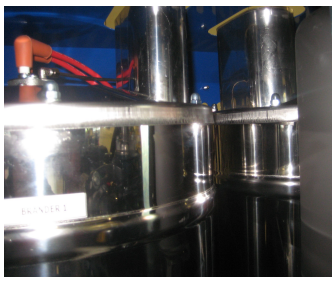
* 2 Cylinder engine, Kubota Z602.
* High pressure pump, Aquabar.
* Diesel oil burner, Porto M40.
* Pressure regulator, type VB85
* High pressure hoses, high pressure lance.
* Control- and safety-switches.



2.1.1. Construction.

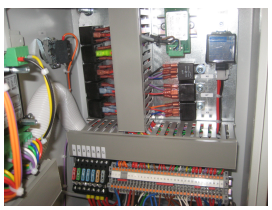
The motor is directly connected to the high pressure pump through a gearbox transmission.

For heating the high pressure water, we use a heating coil with stainless steel cover, complete with 12 Volt blower and diesel oil pump.



The powerunit is completed built on a frame, together with the fuel tank, installed in a completely covered foolding hood with gas springs, which can be opened/closed.

On side of this construction is the central switchboard mounted.
With: Compact Control panel.
Electrical components.

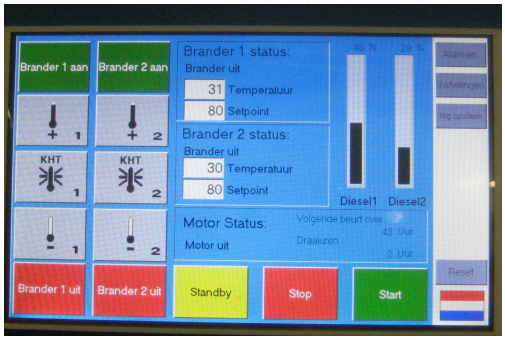


2.1.2. How it works.

When opening the high pressure gun, the high pressure pump will bring the system under pressure and water comes out of the nozzle. This will be detected by two flow switch, these components will switch on the heating-unit.

When closing the high pressure gun the pressure in the system will drop and there is no flow, the heating-unit will be switched off.

Cleaning with Hot water:
Is cleaning with Hot water required, switch on the heating unit by tuch on "Burner" on the central switchboard.



The machine is equipped with a temperature sensor to regulate and control the adjusted temperature.

To stop working with Hot water, press the burner off, and the heating-unit will stop.

2.1.4. Water storage tank. (Option)
The water storage tank is equipped with an automatic float control, water level protection and an overflow.

2.1.5. High pressure pump.
In the suction side of the high pressure pump is a suction filter and a heat exchanger mounted. The pressure side is equipped with an automatic pressure regulating, safety valve, pressure gauge, and flow switch.
system which controls the system pressure to zero when shutting spray gun and increases to the adjusted pressure smoothly when opening the spray gun. No pressure peaks; safe and comfortable.

2.1.6. Drive.
The motor is directly connected to the high pressure pump through a gearbox transmission. The pump is driven by a gearbox; therefore the oil in the gearbox must be checked regularly and top up if necessary.

WARNING !.

Never let the machine run whitout the protecting covers.
Never attempt to top up the oil while the engine is running.
Be sure that the machine is switched of, before any maitenance is carried out.

2.1.7. Pressure switch / Flow switch.

After closing the high pressure gun the flow switch will switch of the heating-unit.

2.1.8. Heating-unit.

The machine is equipped with an heating-unit, to heat up 8 litre water from 10°C up to 98°C, water will be heated after the high pressure pump.

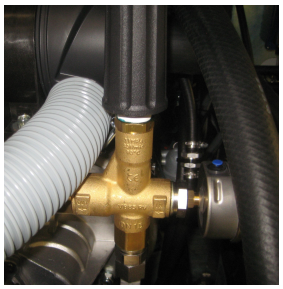
Dosing pump.

Dosage of anti-limescale means the anti-limescale fluid is to the high pressure pump from an external anti-calc holder sucked. The dosing quantity is with the dosing setting on th dosing pump set.

2.1.9. Pressure regulator.

The automatic unloader valve is an important part of the high pressure pumpunit. It regulates the working pressure of the unit. When no water is drawn from the unit, the valve will be set on "by-pass" so that the water of the pump flows back to the storage tank without any pressure.
When shutting spray gun and increases to the adjusted pressure smoothly when opening the spray gun. No pressure peaks; safe and comfortable.

2.1.10. Adjust the working pressure.



With the pressure regulator the working pressure can be set by hand wheel.

Turn to the right - Working pressure up.

Turn to the left - Working pressure down.

WARNING! The maximum working pressure is 90 bar.

2.2. Protections.

2.2.1. General.

The high pressure cleaning installation is equiped with the following protections:

* Waterlevel in the water storage tank to low.
* To high cooling water temperature in the engine.
* Max.water temperature protection.
* Oil pressure of the engine to low.

When the machine is shutdown by a safetyswitch, besure that the reson of shuting down the machine is known and corrections been made, before starting the machine again.

During maintenance the machine must be shut off by the contact key.

2.3. Connections to be made.

2.3.1. Water supply connection.

Connect the water supply hose to a water tapping point. Check that de water quantity is sufficient.
The installation is equipped with a water inlet pressure protection switch, wich the installation
turns off when there is no water supply.

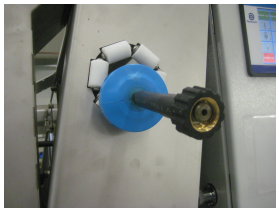
Water supply connection; *Geka quick coupling.*

Important! To eliminate any impurities from the water supply circuit we advise before connecting the water supply hose to let water run freely for a few seconds.

Any high pressure pumping system has to be fed with clean water of a good quality. Lime-, or iron containing water as well as other defilements may cause severe damage to the installation.

2.3.2. High pressure connection.

Connect the high pressure hose (whitch is mounted on the high pressure hose reel) to the high pressue gun.



High pressure connection*; M24 coupling.*

2.4. Spare Parts List.

The installation is build up with the following components:

	Frame.	
	Handle	Wk.nr: 260360
	Connect cliff 28 mm	Wk.nr: 260362
	Connect cliff 38 mm	Wk.nr: 260361
	Gas spring 600 N	Wk.nr: 273888
	Hinge	Wk.nr: 260350
	Door magnet	Wk.nr: 260363
	Water supply.	
1a	Water filter 1”	Wk.nr: 217713
1b	Heat exchanger R75 – 20”	Wk.nr: 202078
1c	Temperature protection 1/2"	Wk.nr: 272552
1d	Water level sensor, LS 103	Wk.nr: 272558
2	**High pressure pump,** type Aquabar XWL 50.15N.	Wk.nr: 204771
3	**Water-cooled 2-cylinder engine,** Type: Kubota Z 602.	Wk.nr: 202586
3a	Dosing pump lime binder, 12 V	Wk.nr: 276416
	- lime binder liquid (per 10 litre)	Wk.nr: 301578
4	**Drive with gearbox,** type 1:2.176	Wk.nr: 202998
	- V-belt of dynamo, type AVX 10 x 950	Wk.nr: 275461
5	**Pressure regulator,** type VB 85R	Wk.nr: 204444
5a	Safety valve, type VS 160	Wk.nr: 203432
5b	Flow switch, type ST5	Wk.nr: 272556
5c	Pressure gauge 150 bar	Wk.nr: 300749
6	**High pressure heating unit,** type: Porto M40-500 bar, 86 kW, ketelrendement 88%	Wk.nr: 371434
7	**High pressure hose reel,** type 14/10E.	Wk.nr: 218179
	HP-hose, NST6 250 bar 2xM22W L = 15 meter.	Wk.nr: 290298
8	**Spraying equipment. (Option)**	
9	**Control paneel 12 Volt**	Wk.nr: 262109
	- Socket 2 pole.	Wk.nr: 272005
	- Emergency Stop	Wk.nr: 262324
	- Compact control V7c	Wk.nr: 262334
	- PT 100 Invertor	Wk.nr: 262326
	- Voltage regulator	Wk.nr: 262338
	- Stop timer	Wk.nr: 202103
	- Plug for stop timer	Wk.nr: 202107

	- Relais 12V-30A	Wk.nr: 272316
	- Relais 12V-500A	Wk.nr: 272338
	- Temperature sensor	Wk.nr: 262209
	- Fuse 2 Amp.	Wk.nr: 262173
	- Fuse 5 Amp.	Wk.nr: 272057
	- Fuse 10 Amp.	Wk.nr: 272074
	- Fuse 15 Amp.	Wk.nr: 272075
	- Fuse 30 Amp.	Wk.nr: 272064
	- Fuse 40 Amp.	Wk.nr: 272028
10	**Battery 12V – 45 Ah.**	Wk.nr: 273365
11	**Dieseloil storage tanks,** content 40 and 80 litre	
	- With level sensor	Wk.nr: 306002

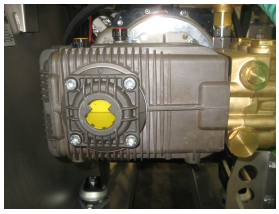
3. OPERATING INSTRUCTIONS.

IMPORTANT.

Prevention of accidents.

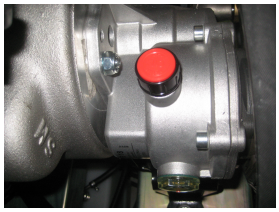
The unit is designed to minimize the risks of accidents under normal operation circumstances. Special attention should be payed to the use of the spraying guns. The water jet is as sharp as a knife. Therefore <u>never</u> spray in the direction of living creatures.

3.1. Control before use.



Before starting the machine you have to check the following points:

* **Place the unit in a position that is as level as possible.**
  The design of the unit permits a 15 degree lengthways and sideways limit on out of level operation.
* **Oil level engine.**
  Check the oil level of the engine. Level must be in the middle of the oil dipstick.
  Top up if necessary with the recommended sort of oil. (see maintenance procedure, Maintenance engine)



* **Oil level high pressure pump.**
  Check the oil level of the pump. Level must be in the middle of the sight glass.
  Top up if necessary with the recommended sort of oil. (see maintenance procedure, Maintenace high pressure pump)
* **Oil level gearbox.**
  Check the oil level of the gearbox. Level must be in the middle of the sight glass.
  Top up if necessary with the recommended sort of oil. (see maintenance procedure, Maintenace gearbox transmission)
* **Cooland level engine.** Top up if necessary with the recommended sort of cooland.
* **Check the fuel level.** A good rule is to topup at the end of each working day. This prevents condensation from occurring in the tank.

  CAUTION:
  When refeulling:
  - switch off the engine.
  - do not smoke.
  - extinguish all naked lights.
  - do not allow the fuel to come into contact with hot surfaces.
  - wear personal protective equipment.
* **Check the filters in watersupply.** Depending of the water quality a regular check up of the waterfilters will be required, if nessesary clean filters or replace the element.
* **Correct connections** of hoses, spraying guns en nozzles.

3.2. Starting procedure WEEDMASTER L.

WARNING!

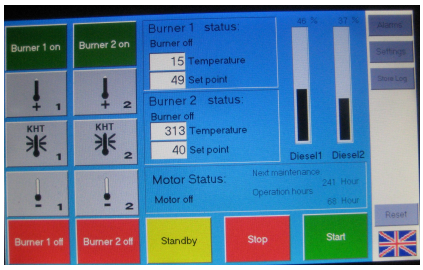
Before starting this machine besure there are no persons in a hazardous position of the machine. Any warnings necessary have been suitable displayed (where applicable).
Under no circumstances should volatile liquids such as Ether be used for starting this machine.

Under normal conditions the starting procedure has to made with the switchboard.

1. Connect the water inlet hose to the water tapping point.

2. Take the high pressure hose of the hose reel and keep the end of the hose in your hand.

3. *Start the engine on the control screen.*
Wait a few seconds till the water flow out of the high pressure hose is without air bubbles, it must be a continuously flow.
Stop the engine on the control screen or press the emergency stop.

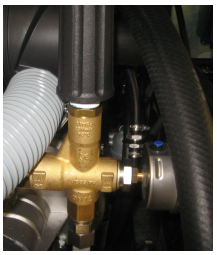


4. Connect the high pressure gun and spray lance with nozzle to the high pressure hose.

5. Start the engine again; see the above mentioned point 3.
Wait a few minutes, till the engine is warmed up. Good for the life time of the engine.

6. Take the high pressure gun in you hand and clean the object you want to clean.

When you start up the machine, the motor starts automatically on stationary speed. On the nozzle we have 90 bar.



For more pressure;
Turn the regulator to the right “Pressure Up”, working pressure maximum 90 bar / 30 liters per minute.

For less pressure;
- Turn the regulator to the left “Pressure Down”, working pressureminimal 90 bar / 30 liters per minute

7. When cleaning with hot water, press the burner swiths on the central switchboard.
The temperature of the water at the spraying nozzle will be shown on the display of the central switchboard.

8. For cold water, press burner swiths off.

It is always necessary to work with cold water during a few minutes, after using warm or boiling water.

WARNING:

The unit is designed to minimize the risks of accidents under normal operation circumstances. Special attention should be payed to the use of the spraying guns. The water jet is as sharp as a knife. Therefore never spray in the direction of living creatures.

When cleaning with " Hot water " certain measurements has to be taken;

WARNING!

After operating with " Hot water " always switch off the burner and let water run for a few minutes until water and there couplings are cooled down.

First make sure that the machine is stopped and the system has been completely relieved of al the pressure, before maintenance take place.

WARNING:

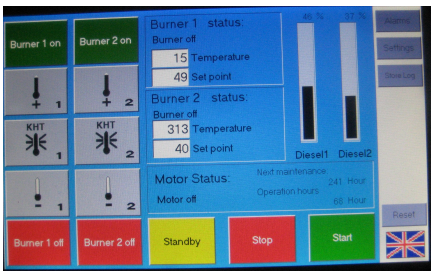
- The unit is designed to minimize the risks of accidents under normal operation circumstances. Special attention should be payed to the use of the spraying guns. The water jet is as sharp as a knife. Therefore never spray in the direction of living creatures.

3.3. Control during operation.

- During operation of the machine, a second person has to check the pressure gauge of the working pressure, the pressure has to be constant and the working pressure may not exceed above 90 bar.
  The second person also has to look after the person with the spraying gun, both persons needs to work in each other sights.

3.4. Stop procedure WEEDMASTER L.

1. After using warm water, turn the swiths burner off; keep on working till the water flow is cooled down, it takes some minutes.



2. Close high pressure gun.

3. Stop the machine on the control screen or press the emergency stop.

4. Open high pressure gun (to make sure there is no pressure on the hose), uncouple the high pressure gun.
   After cleaning and controlling the high pressure hose, put it away.

5. Close the water inlet tap and put the hose away.

6. If necessary, drain the water out of the water tank.

   Clean the machine and store it.

N.B.
After shutting down the machine, remove the key and keep the key out of range of other people.

4. MAINTENANCE.

4.1. General.

CAUTION.

Be sure the unit is switched off, when maintenance or repairs are taking place.
Once maintenance or repairs are completed, and all the protecting panels have been correctly placed, the installation can be started again.

Punctual and accurate execution of maintenance will increase the reliability and service life of the installation.

* Before maintenance on the machine is taking place, be sure that the machine is switched off and cooled down, high pressure system is released from all the pressure, and the machine can not be started accidentally..
* To remove oil, oil filters and cleaning liquids always respect the regulations of the product.
* Keep starter-key away from persons who have no knowles of the machine
* Always disconnect the battery cables before performing any maintenance or service.
* Check after maintenance if all the tools are removed, and all the protecting covers are mounted.
* Before starting the machine, be sure that there are no persons in the hazards aria of the machine.
* Punctual and accurate execution of maintenance will increase the reliability and service life of the machine.
* Suction filter must be cleaned regularly.
  Stopped up filters, leakages in the suction side of the pump or defective pump valves may cause heavy pump vibrations, which will effectuate in serious pump damage.
* The machine should be protected against sub-zero temperatures during storage or operation, to prevent damage caused by freezing.

4.2. Maintenance on the Kubota Z 602 engine.

Check oil: Check oil level at least every day, before using the machine.
Top up if necessary.

Change oil: first time after : 50 hours,
and again every : 250 hours.
Use: API classification CD (series 3) SAE 15/W40
The engine consist 2,5 litres oil.

Note.

The temperature of the engine oil can be about 100°C, so watch out for burn wounds.
Be sure that the old oil will be diposed following the regulations.

Oilfilter : Change oilfilter every 250 running hours and clean also the filterhousing.

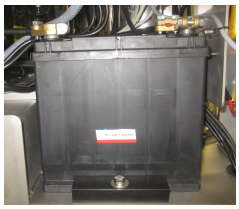
Airfilter : Change the filter every 250 running hours.

Dynamo - pump belt: Check the stress of the belt every 100 hours. The maximum allowed margin is 9 mm at an tractive power of 100 N.

Fuel: : Check every 50 running hours the connections of the fuel hoses. Change the fuel filter every 250 hours.

Warning.

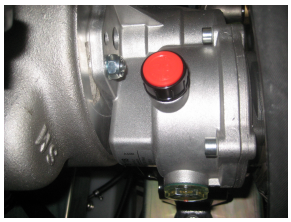
By working on the fuel system:
NO FIRE AND DON'T SMOKE !!



Battery: Always respect the safety regulations for handling battery's. **Do not place any tools on the battery.**
Check the acidity of liquid in the battery every 150 hours, or every month. Keep the battery terminals and cable clamps clean and lightly coated with petroleum jelly to prevent corrosion.

For maintenance instructions of the engine: Kubota Z 602 manual.

4.2.1. Gearbox transmission.



The high pressure pump is driven by an gearbox.
Tap off oil when the oil is still hot. Fill up with the recommended sort of oil. Check oil level; oil level must be in the middle of the sight glass.
Too much oil may raise the temperature of the gearbox which may cause serius damage.
Check if there has been any leakage of oil and check if all the screws are still fastened.

Check oil: Check oil level at least every day, before using the machine.
Top up if necessary.

Change oil: first time after : 50 hours,
and again every : 250 hours.
Use: API classification CD (series 3) SAE 80W/90

IMPORTANT. These intervals are for normal operating conditions.

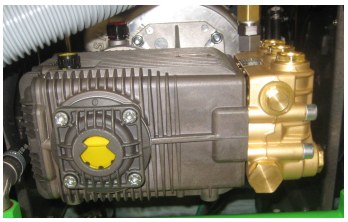
Note.

The temperature of the oil can be about 100°C, so watch out for burn wounds.
Be sure that the old oil will be diposed following the regulations.

CAUTION.
Be sure that the machine is switched of, before any maitenance is carried out.

4.3. Maintenance on the high pressure pump.

Check oil level:
Before use of the machine, check oil level of the high pressure pump. Top up if necessary.



Use: SAE 80W/90
The pump and gearbox about 1,5 litres oil.

Punctual and accurate execution of maintenance will increase the reliability and service life of the unit.

Change oil:
- first oil change after a period of 50 working hours.
- second oil change after a period of 250 working hours.
- next oil change every 250 / 500 working hours or once a year.

IMPORTANT.
These intervals are for normal operating conditions.

* Tap off oil when the pump is still hot. Fill up with the recommended sort of oil. Check oil level; oil level must be in the middle of the sight glass.
* Too much oil may raise the temperature of the pump which may cause pump damage.
* Check if there has been any leakage of oil or if some water has entered the driving parts of the pump. Also check if the pump screws are still fastened.

Torque pump bolts Aquabar.

The torque for the bolts in the pump are:

		Nm.	Kgm.
- Bolts in pumphead	Part.no. 1	50	5,0
- Ceramic plunger/plunjerbolt	Part.no. 17	12	1,2
- Valve bolts	Part no. 3	68	6,8

Suction filter:
In the suction side of the high pressure pump, there is an water inlet filter.
Check this filter during the maintenance procedure of the powerset.

Open cap of suction filter.
Take out filter element, and clean filter element.
Incase the filter element is damaged replace by a new one.
Waterkracht order number: 217713
Place element in filter housing.
Turn the cap back up on the filter housing.

4.4. Precautions against frost.

The machine must not be exposed to frost in winter. If the machine is left in premises where it is exposed to frost, when work is over or for storage, we recommend using antifreeze to prevent serious damage to the water circuit:

IMPORTANT! To prevent freezing of important parts of the machine, do not use the machine when the outside temperature is below sub-zero.

* Tap off all the circuits in the machine where water is running (suction line, by-pass, high pressure hose, water supply circuit and water storage tank.

You can also protect the machine against frost, as follow:

* Fill the water storage tank with a mixture of antifreeze and water.
* Be sure that there is enough antifreeze mixture in the water storage tank, to prevent the pump from running without water.
* Unroll the high pressure hose from the hose reel and connect the hose to the high pressure gun. Don't forget to put the clamp on the hose reel.
* Start the machine. The high pressure pump will pump water without any pressure.
* Let the machine run for a few minutes, to make sure that the antifreeze is in all of the water circuit.
* Open high pressure gun and let the machine run until antifreeze comes out of the nozzle.
* When a mixture of water and antifreeze comes out of the nozzle close high pressure gun so that the water will be set on by-pass and the by-pass system will be protected, stop engine.
* Connect the high pressure hose to the water supply hose (use a special coupling), and start the engine. Let the engine run until the water supply system is protected with a mixture of antifreeze, stop the engine and roll up the high pressure and the water supply hose reels.
* Antifreeze may cause environmental pollution. Always follow the instructions given on the pack (dispose of carefully).

NEVER LET THE HIGH PRESSURE PUMP DRY !

<u>WARNING !</u>

Never let the machine run when a high pressure pump or a part of the machine is frozen.

4.5. Conserving when not in use for a longer period.

If the machine is not active for a long period, certain enragements has to be taken to prevent problems by a restart.

* Remove dirt from the machine.
* Let the pump suck a mixture of water and antifreeze (see par. 4.4.:" Precautions against frost").
  Disconnect al the connections on the pump head, and tap off al the water.
  Also tap off all the water from suction-side of the high pressure pump.
* Tap off oil while the pump is still warm.
* Disconnect pump head, plungers, and seals grease them. Do not grease the ceramic plungers and store them.
* When engine oil is filthy, tap off oil, fill carter of the engine with new oil, let motor run for 5 minutes.
* Tap off coolant from the diesel engine.
* Disconnect battery, take out battery and reload (store on a dry and dark place)

4.6. Spare Parts order.

Original (or replacing parts of equal or better quality) can be delivered up to 15 years after production of the unit.
When ordering spare parts, please do not fail to indicate Part no. and Code no.

4.7. Nozzles.

The spraying nozzles will wear out during operation and have to be replaced regularly.
The total water capacity of the nozzles at the working pressure has to be lower than the water capacity of the high pressure pump.

CAUTION.

Before replacing the spraying nozzle, stop te machine and discharge the pressure of the lance by operating the gun trigger.

5. TROUBLE SHOOTING.

The **"WEEDMASTER L"** is equipped with several safety devices, who shut of the machine. Normal you can trace the malfunction, water supply, engine oil ect, and start de machine.
Further malfunctions can be an defect fuse or electrical problem. Defective or of control components can also be a reason/cause of malfunction.

For trouble shooting and maintenance instructions of the diesel engine: See **Kubota** manual.

Water- and oil leaks must be immediately repaired to prevent serious damage to the high pressure pump.
During operation a small amount of water (a few drops a minute) is released from the pump fluid end, with can cause pressure drops.

Pressure drops can also acoure by leaks in the water supply line or in the high-pressure line, not sufficient water supply, wrong type, or worn nozzles in the spraying lance or defective pump valves.
A worn out nozzle, defective valves or a leak in the suction-line can cause sirius pump vibrations what can leads to pump damage.

Incase repairs are necessary we advice to let this don by an expert.
Specialty for the high pressure pump and high pressure system. Contact your manufactures by malfunctions **Waterkracht B.V.** Varsseveld HOLLAND.

5.1. Fault / Cause / Remedy.

If the machine has been switched off for reasons of safety, then ensure that the machine can be operated safely before re-starting.

A. *Engine don't start:*

1. **Battery empty,** not or wrong connected,
- re-load battery.
- connect the battery in a proper way.

2. **Emercengy stop out,**
- turn the key on.

2. **Fuse** defect,
- Replace fuse.

Be sure the cause of the failure is corrected before restarting the engine.

B. *Engine goes around but wil not start:*

1. **Fuel level** in tank to low,
- refill fueltank.

2. **Oil pressure safety** is activated,
- check diesel engine for oil leaks.
- top up engine with the recommended oil. Be sure that the reason (leaks) are repeared.

3. **Water supply to the water storage tank** is not sufficient
- connect the water supply hose and fill water storage tank.
- check water supply filter for dirt.

C. *Machine starts, but after a period the machine stops:*

1. **Water supply to the water storage tank** is not sufficient,
- connect the water supply hose and fill water storage tank.
- check water supply filter for dirt.

CONTACT YOUR DEALER.

D. *Working pressure is to low:*

1. **Leak in high pressure system,**
- close high pressure valve, check if the working pressure is reached.
- if so; check high pressure hose for leaks.

2. **Suction valve** closed, (If available)
- open the suction valve.

3. **Suction filter** blocked,
- check suction filter for dirt.

4. **Suction hose, connections and/or filter are** leaky,
- repair or replace leaky parts.

Warning: never let the high pressure pump run without water.

5. **Pressure regulator** filthy or wrong adjusted,
- clean or adjust if nesecerry.

6. **Nozzle incorrectly sized,**
- worn or wrong type of nozzles,
- check type of nozzle. Replace if nesecerry. The total waterflow of the nozzle in the spray lance, must be lower then the total waterflow of the high pressure pump.

7. **Pump valves** vervuild or worn,
- clean or replace valves.

8. **Plungers and/or plunger packings** worn,
- replace if nesecerry.

9. **Drive pump** defect,
- Remove pumphead and check plunger povement.

10. **Safety valve** is leaky,
- replace safety valve.

E. *Heavy pump vibrations:*

1. **Pump suchs air,**
   - check suction hose and connections and/or suction filter.
2. **Broken or weak suction or delivery valve spring**,
   - check and replace if necessery.
3. **Plunger packing** worn,
   - check and if necessary replace plunjer packing.
4. **Accumulator** pressure to low, (if availeble)
   - check and replace if necessary.
5. **Drive (transmission) pump** worn,
   - check and if nesesarry repair or replace pump.

Warning: heavy pump vibrations can cause serious pump damage.

F. *When opening high pressure gun, heating-unit do not switch on:*

1. **Faulty electric current**,
   - check fuses.

   First make sure that the reason is eliminated, before starting the machine.
2. **Heating-unit is not switch on**.
   - turn the switch on the heating-unit.
3. **Pressure switch faulty**,
   - replace pressure switch.
4. **Flow switch** worn or adjustment incorrect,
   - adjust flow switch or replace flow switch.
5. **Fuel tank empty**,
   - refill the fuel tank, make sure that there is no air in the fuel system.
6. **Temperature adjustment** defect or incorrect,
   - adjust or replace.

G. *White exhaust fumes from the heating-unit:*

1. **Fuel filter of the burner is blocked** or fuel tank empty.
   - clean/replace fuel filter, refill fuel tank.

H. *Black exhaust fumes from the heating-unit:*

1. **Burner blocked up.**
   - contact your dealer.

6. TECHNICAL INFO.

The following technical data:

* High pressure pump Aquabar : Exploded view and spare parts list.
* Pressure regulator : Exploded view and spare parts list.
* Safety valve : Exploded view and spare parts list.
* Gearbox : Exploded view and spare parts list.
* Flow switch : Exploded view and spare parts list.
* High pressure heating-unit M-40 : Exploded view and spare parts list.
* Electrical shedule
* Flow diagram