

**Instruction
and
Maintenance Manual
WEEDMASTER TM 221**





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. Please read these messages 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.



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Waarschuwing
Warning
Attention
Warnung

- Raadpleeg het instructie- en onderhoudsboek.
- Consult the operating and maintenance manual.
- Consulter le manuel d'utilisation et d'entretien.
- Bedienungsanleitung lesen.



Waarschuwing
Warning
Attention!
Warnung

- Elektrische schok risico
- Electrical shock risk.
- Risque d'électrocution.
- Gefährliche elektrische Spannung.



Waarschuwing
Warning
Attention
Warnung

- Heet oppervlak.
- Hot surface.
- Surface chaude.
- Heiße Oberfläche.



Waarschuwing
Warning
Attention
Warnung

- Bijtende vloeistof.
- Corrosion risk.
- Risque de corrosion.
- 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'utilisation et de d'maintenance de cette machine avant d'intervenir.

Warnung - Bedienungs- u. Wartungsanleitung vor der Inbetriebnahme bzw. Wartung lesen.



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

Technical data WEEDMASTER TM 221.

Machine type : WEEDMASTER TM 221.
Waterkracht number : see type plate.
Production date : see type plate.

<i>Code</i>	<i>Discription</i>	<i>Type</i>
K	Diesengine	Kubota.
A	HP-pump	Aquabar.
200	Working pressure	bar (max).
21	Max. flow rate	ltr./min.
KHT	Kokend Heetwater Techniek. Boiling Hot water Technique.	

	Markenweg 1 Varsseveld +31 (0)315 25 81 81 www.waterkracht.nl		
	Waterkracht		
Type	<input type="text"/>		
Machine Nr.	<input type="text"/>		
Bouwjaar	<input type="text"/>		
Max. werkdruk	<input type="text"/>	Bar	
Debiet	<input type="text"/>	L/min	
Vermogen	<input type="text"/>	kW	

General: Design working pressure: 200 bar.
Working pressure : adjustable till max. (Limited) 200 bars.
Water flow : adjustable till max. 21 litre per minute.
Water temperature : A, thermostatic adjustable till 98°C.
: B, by pressure button, adjustable till boiling hot water on spray nozzle !
Motor rpm : adjustable from stationary till maximum rpm.

Engine: Make / Type : Kubota / Z 602.
: Water cooled 2 cylinder diesel engine.
Maximum rpm : 1800 - 3200 rpm.
Maximum power : 10,3 kW / 14,0 PK

Pump: Type : High pressure three-plunger pump.
Make : Aquabar 200/21.
R.p.m. : max.1500 rpm.
Capacities : 200 bar – 21 lpm.
Required power : 8.5 kW = 11,5 PK at 1500 rpm.

Transmission: Gearbox : 1:2.176

Heating: Type : Diesel oil high pressure coil.
Make : Porto. / M40 / 12 V - 500 bar.
Working pressure : 200 bar.
Bore : 3/8"
Capacities : 80 kW at 12 bar oil pressure, 88 kW at 13 bar oil pressure.

Hose reels: Hose reel : type T52, 300 bar 3/8" for high pressure hose.
Hose reel : type T52, 200 bar 1/2" for water supply hose.

Storage tanks: Water tank : Water storage tank, content 750 litre.

Fuel tank : Diesel oil storage tank, content ca.80 litre

Filters: Water supply filter : ¾" Polyprop filter (clear), filter element 75 Mu.
Suction filter : ¾" Y-filter.

RECOMMENDATIONS FOR THE USE OF THE HIGH PRESSURE JETTING EQUIPMENT.

IMPORTANT NOTICE

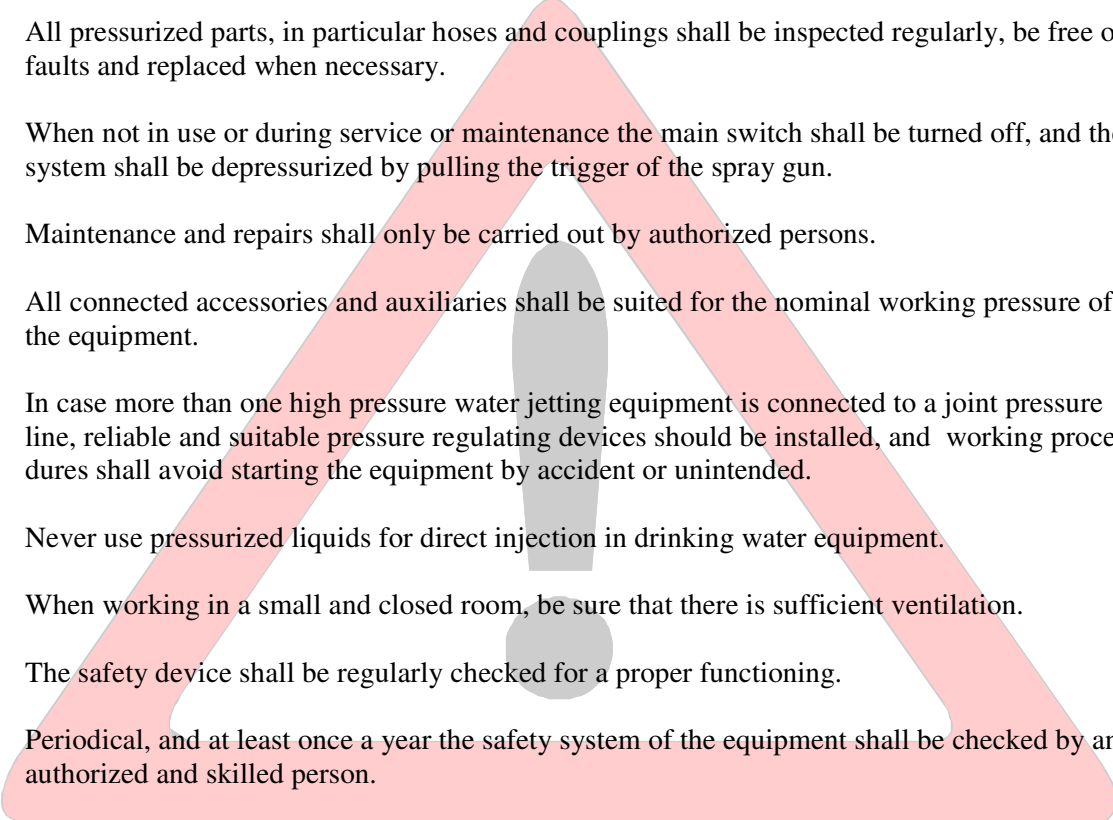


This is the industry's "Safety Alert Symbol". This symbol is used to call your attention to items or operations that could be dangerous to you or other persons using this installation. Please read these messages carefully. It is essential that you read the instructions and regulations before you attempt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

- 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.

-

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- 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.

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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 which 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 residual 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 suitably 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 by 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 its use.

1. GENERAL.

The WEEDMASTER TM, with the patented “Boiling Hotwater System” is developed for environmental friendly removing from, graffiti, paint, stickers, chewing gum spots, grease, pollutions en even weed.

For removing graffiti from buildings, statues, etc, we work with the adjustable “power of water drops” combined with the “temperature of steam”, (9-15 litres/min at 120-200 bar and a water temperature at the nozzle of 100/102°C).

For general cleaning jobs / industrial cleaning we have the possibility to work with maximum 200 bar and 15 litres/min, also in this case we have (almost) boiling water at the nozzle.

By remote control it is possible to start and stop the machine and also we can adjust the pressure up to 200 bar and the needed water temperature.

The standard version is equipped with an automatic pressure regulating 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.



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 "WEEDMASTER TM 221".

1.2. After sales.

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

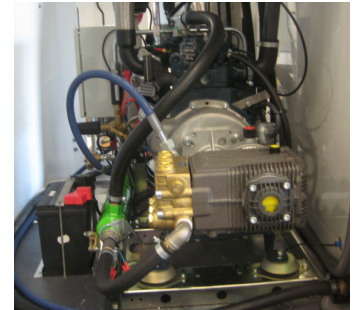
Waterkracht customers can conclude service contracts for their high pressure cleaning units to be assured of regular maintenance. This will increase the reliability of the unit.

2. TECHNICAL DESCRIPTION.

2.1. General.

The high pressure "WEEDMASTER TM 221" is build up with the following components:

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



2.1.1. Construction.

The WEEDMASTER TM 221® is provided with an Kubota industrial liquid- cooled diesel engine, type Z 602, with heat exchanger between the water tank and the high pressure pump. The motor is directly connected to the high pressure pump through a gearbox transmission.

For heating the high pressure water, we use a 200 bar heating coil with stainless steel cover, complete with 12 Volt DC blower and diesel oil pump.

The powerunit is completed with an 750 litres water tank and is, together with the 80 litres fuel tank, installed in a completely covered trailer with two side panels and 2 backdoors, which can be opened/closed.



In the back side of the trailer are the high pressure and the water supply hose reels mounted, these are assembled on a stainless steel construction. On top of this construction is the central switchboard mounted.

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 a pressure switch and an 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.

2.1.3. Switchboard.

The functions of the press buttons on the switchboard in the WEEDMASTER TM correspondence with the press buttons on the wireless remote control. Nearby, on the display of the switchboard you can read the running hours, level in the diesel oil tank and the water temperature at the nozzle.

Central switchboard.



Wireless remote control (Option).




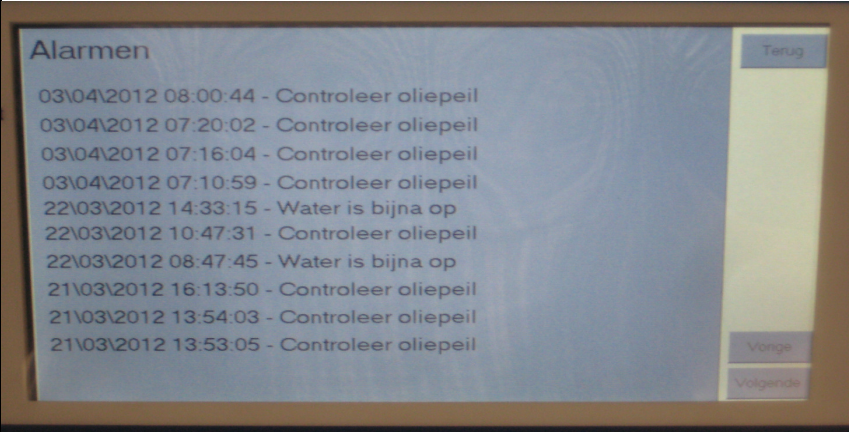

The functions of the press buttons on the wireless remote control correspondence with the press buttons on the switchboard in the WEEDMASTER TM.

The buttons for the hose reels are option and don't work in standard version.



Switchboard;

The central switchboard is provided with several functions:

SYMBOL:	DESCRIPTION:
Standby	- Standby, push till the message glowing will be shown.
Start	- Start machine / diesel engine, after about 10 sec. glowing.
Stop	- Stop machine
	- Cold water
	- Hot water
	- Boiling Hot Water
P +	- Pressure up
P -	- Pressure down
	- Running hours diesel engine
	- Fuel level in the diesel tank
	- Display signals, machine will stop
	
	- Emergency stop (Big red button, with key inside; this is the main switch)

Cleaning with Hot water:



Is cleaning with Hot water required, switch on the heating unit by pushing the button “Hot water” on the central switchboard.

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

Cleaning with Boiling water:



Switch on the heating-unit by pushing the button “Boiling water” on the central switchboard.



To stop working with Boiling water, push the button “Cold Water: and the heating-unit will switch off.



2.1.4. Water storage tank.

The water storage tank is equipped with an automatic float control, water level protection and an overflow.

2.1.5. High pressure pump.

The suction side of the high pressure pump is equipped with a heat exchanger.

The pressure side is equipped with an automatic pressure regulating, safety valve, pressure gauge, pressure- 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 without the protecting covers.

Never attempt to top up the oil while the engine is running.

Be sure that the machine is switched off, before any maintenance is carried out.

2.1.7. Pressure switch / Flow switch.

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

2.1.8. Heating-unit.

The machine is equipped with an heating-unit, to heat up 15 litre water from 10°C up to 98°C, water will be heated after the high pressure pump.



Descaling.

If the the pressure gauge reads an increase of over 10 bar, without the high pressure hose, in the presence of the maximum quantity of water, this indicates the presence of internal deposits/calcification. The heating coil must be descaled

This operation should be entrusted to your authorized technical service center as in this case the flow of the water softening liquid should be controlled.

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.



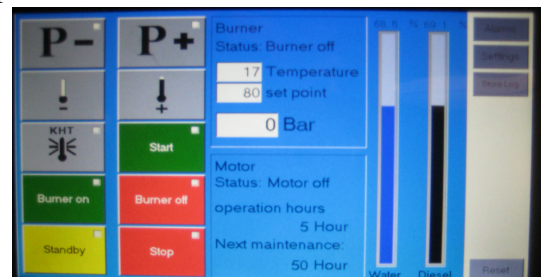
2.1.10. Adjust the working pressure.

By means of the buttons P+ and P-, mounted on the front of the switchboard, you can adjust the rpm of the diesengine, flow rate and the working pressure:

Button **P+** (rpm high) - Working pressure up.

Buttun **P-** (rpm low) - Working pressure down.

WARNING! The maximum working pressure is 200 bar.



2.1.11. Remote control (Option).

Important!



Starting of the diesel engine by remote control is only then allowed when all the doors (except for the back doors) of the trailer are closed, the person who starts the dieselenigne must have the machine insight, and under a safe circumstances.







INSTRUCTIONS FOR THE REMOTE CONTROL.

How to activate the remote control.



- Unlock the emergency stop on switchboard by turning the key right-hand side.
- Remove the key, and keep it with you.
- Press at least 2 seconds on the “standby” button from the remote control.
- When the green led lights up, the remote control is ready for use.



Description and function.		
Button	Function	Remarks
P-	Working pressure Down.	Minimal 100 bar.
P+	Working pressure Up.	Maximal 200 bar.
	Burner Off.	Cold water
	Burner On.	Hot water.
	Boiling Hot water Technique.	Boiling Hot water.
Start	Start.	Start dieselenigne
	Hose reel down (optionel).	HP-hosereel wind.
	Hose reel up (optionel).	HP-hosereel rewind.
I	Stand-By.	Remote control Stand-By
	Off.	Stop dieselenigne.

After 5 minutes not using the remote control, it automatically goes in “sleep-mode”, the red led on the standby button lights up. If you want to work again with the remote control, you have to activate it again.

2.2. Protections.

2.2.1. General.

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

- * Waterlevel in the water storage tank to low.
- * To high water temperature in the water storage tank.
- * High temperature of cooling liquid dieselengine.
- * Oil level dieselengine.
- * Load of the battery.
- * Manual controled emergency stop.

When one of the above mentions protections will activate, a central light on the switchboard will light starts to flash (except when the emergency is activated) and the machine will be shut down.



When the machine is shutdown by a safetyswitch, besure that the reson of shutting 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 (witch is mounted on the water supply hose reel) to a water tapping point. Check that de water quantity is sufficient.

Water supply connection; *3/4" 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 Male coupling.*

2.4. Spare Parts List.

The high pressure cleaning installation "WEEDMASTER TM 221" is build up with the following components:

1	-waterstorage tank, contents 750 litre	
1a	Water supply filter, ¾"	Wk.nr: 217769
	- filterelement 70 micron (for water supply filter)	Wk.nr: 217764
1b	Float control valve, bore diameter ¾"	Wk.nr: 217657
1c	Water tap valve, 1"	Wk.nr: 217484
1d	Suction Y-filter, ¾"- 10 Bar - 40°C	Wk.nr: 217786
	- filterelement, 1 mm.	Wk.nr: 217697
	- O-ring 2 x 35,5 mm.	Wk.nr: 217788
1e	Water level sensor, LS 103	Wk.nr: 272558
2	High pressure pump,	Wk.nr: 204757
	type Aquabar 200/21 max. 21 litre - 200 bar.	
2a	High pressure hose from pump to regular	Wk.nr: 277241
3	Water cooled 2-cylinder dieselengine,	Wk.nr: 202589
	type Kubota Z 602.	
3a	- heat exchanger Kubota R75-16"	Wk.nr: 202126
3b	- temperature safety, klikson	Wk.nr: 272552
3c	- dosing pump kalkbinder, 12VDC (optional)	Wk.nr: 276416
	- jerrycan 10 litre + cap	Wk.nr: 306003
	- 4 mm chemical hose	Wk.nr: 301020
	- kalkbinder vloeibaar (per litre)	Wk.nr: 301687
4	Drive with gearbox, type 1:2.	Wk.nr: 202998
5	Pressure regulator, type Pulsar Zero 3/8"	Wk.nr: 277768
5a	Pressure regulator UL250H	Wk.nr: 203755
5b	Safety valve, type VS 350	Wk.nr: 203480
5c	Pressure switch, stainless steel 600 bar	Wk.nr: 203721
5d	Flow switch, type FL7 / HD 500 bar	Wk.nr: 262155
5e	High pressure valve ½" 500 bar	Wk.nr: 217556
6	High pressure heating unit,	Wk.nr: 371434
	type: Porto M40-500 bar, 88 kW, ketelrendement 88%	
6a	Max. temperature safety 90°C 250V/16	Wk.nr: 272656

7	Watersupply hose reel, (Option) - Watersupply hose, Tricoflex 3/4".	Wk.nr: 301798 Wk.nr: 217101
8	High pressure hose reel, type T52.	Wk.nr: 301784
8a	Rotating coupling, type 600 bar. - HP-hose, NST6.	Wk.nr: 218150 Wk.nr: 277401
9	Spraying equipment. - High pressure gun, RL56 - Spray Lance 0,8 m - Spray Lance 1,2 m - Hot water Lance 200 mm * with restriction 1,5 mm - m6 - High pressure nozzle 15045	Wk.nr: 306865 Wk.nr: 275941 Wk.nr: 275942 Wk.nr: 290374 Wk.nr: 250335 Wk.nr: 114016
10	Control paneel 12 Volt Colorado - emergency stop with key - Swiths box AE 1030 - Compact Control V7c - Voltage regulator - Adapter - Contact element - Fuse 2 Amp	Wk.nr: 290281 Wk.nr: 262324 Wk.nr: 272234 Wk.nr: 262334 Wk.nr: 272338 Wk.nr: 262313 Wk.nr: 262314 Wk.nr: 272706
	Burner Box - Fuse 5 Amp. - Fuse 10 Amp. - Fuse 15 Amp. - Fuse Maxi 40 Amp. - Fuse 2 Amp - Relais 12V 20/30A - Relais 12V 75A - Relais 12V - 500A - Temperatur sensor - Lamp holder - Lens red - Lamp 12V-4W	Wk.nr: 272057 Wk.nr: 272074 Wk.nr: 272075 Wk.nr: 272028 Wk.nr: 262173 Wk.nr: 272316 Wk.nr: 272333 Wk.nr: 272338 Wk.nr: 262206 Wk.nr: 272167 Wk.nr: 272216 Wk.nr: 262305
11	Battery 12V – 45 Ah.	Wk.nr: 273365
12	Dieseloil storage tank, content 80 litre. Equipped with: - Fuel level meter. - Tankcap (no key).	Wk.nr: 306016 Wk.nr: 273645

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 paid 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.

3.1. 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 diesel engine.**
Check the oil level of the diesel engine. Level must be in the middle of the oil dipstick.
Top up if necessary with the recommended sort of oil. (see maintenance procedure, par. 4.2. Maintenance diesel Z 602 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, par. 4.3. Maintenance 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, par. 4.2.1.. Maintenance gearbox transmission)
- * **Cooland level dieselmotor.** Top up if necessary with the recommended sort of cooland.
- * **Check the diesel 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.
- * **Before starting the machine, besure that all the side penals are closed.**

3.2. Starting procedure WEEDMASTER TM.

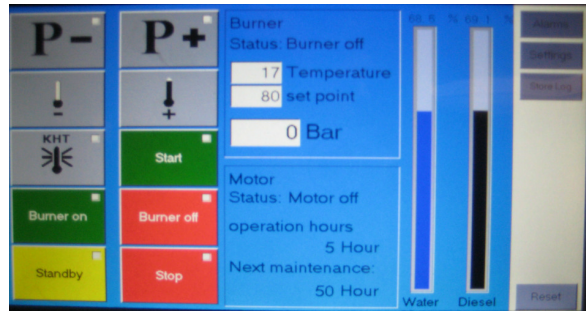
WARNING!



Before starting this machine be sure 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 be made with the buttons on the switchboard. But,...if you want to do it with the remote control, first you have to activate it.



1. Connect the yellow 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. Unlock the emergency stop on switchboard by turning the key right-hand side.
4. Press at least 2 seconds on the “standby” button, then the message glowing.
5. Control the sign in the display; wait till the “glowing time” of the diesel motor is finished.
6. Start with the “Start” button the diesel motor.
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 diesel engine with button “Stop”.
7. Connect the high pressure gun and spray lance with nozzle to the high pressure hose.
8. Start the diesel motor again; see the above mentioned points 5, 6 and 7.
Wait a few minutes, till the motor is warmed up. Good for the life time of the engine.
On the display you can read the following:
 - running hours diesel engine.
 - diesel oil level in the tank.
 - water temperature at the nozzle.
9. Take the high pressure gun in your hand and clean the object you want to clean.
When you start up the machine, the diesel motor starts automatically on stationary speed. On the nozzle we have more/less 120 bar.



For more pressure;

- Press button **P+** “Pressure Up”, working pressure maximum 200 bar / 21 liters per minute.

For less pressure;

- Press button **P-** “Pressure Down”, working pressure minimal 100 bar / 10 liters per minute

10. When cleaning with hot water, press the button “Hot water” on the central switchboard.
Set temperature by pushing the button “Hot Water” and then in the same time pushing several times the button **P+** or **P-**.



Button **P+** temperature up. (set: maximal 80°C)

Button **P-** temperature down. (set: minimal 20°C)

The temperature of the water at the spraying nozzle will be shown on the display of the central switchboard.

11. If you want to work with Boiling Hot Water, press button “Boiling water”.

For cold water, press button “Cold water”.

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

When you start up the machine, the diesel motor starts automatically on stationary speed. On the nozzle we have more/less 120 bar.

For more pressure, press button **P+** “Pressure Up”, maximum 200 bar.

For less pressure, press button **P-** “Pressure Down”.

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 “Boiling Hot water Technique” certain measurements has to be taken;

WARNING!



Before operating with “Boiling Hot water Technique” always switch off the burner and let water run for a few minutes until water (TMP on the display = 0°C), 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.

Note. Depending on delivery:

When cleaning with “Boiling Hot water Technique” disconnect the high pressure hose witch is mounted on the high pressure hose reel by disconnecting the hose reel at the quick coupling, use the special high pressure hose with a length of 15 meters.

Next: Starting machine. (See 3.2. Starting procedure WEEDMASTER TM.)

As following:



Open high pressure spray-gun and set rpm low till the pressure required, push the button Boiling Water button.

Note;



After closing the high pressure spraying gun and open the spraying gun again, the function Boiling water will be still active. To switch over to another function first switch off Boiling water by push the button Cold water.

Weed control.

Ball valve open, working with one person pressure on 80 bar, with two people set the working pressure through speed on 65 bar.



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 starting of the machine with the remote control, is only the allowed under a safe circumstances.
- Be sure that there are no persons in the direct aria of the machine.

3.3. Control during operation.

- During operation of the machine, a second person has to check the working pressure, the pressure has to be constant and the working pressure may not exceed above 200 bar.
The second person also has to look after the person with the spraying gun, both persons needs to work in each other sights.

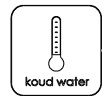


By a dangerous situation or a malfunction of the machine, the machine must be immediately stopped by the emergency stop knob

3.4. Stop procedure WEEDMASTER TM.

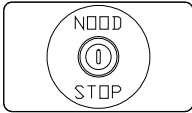
1. - After using warm or boiling water, press the button “Cold water”; keep on working till the water flow is cooled down, it takes some minutes.
2. - Close high pressure gun.
3. - Stop the WEEDMASTER TM with button “Stop”.
4. - Puss the red button “Emergency Stop”.
5. - Open high pressure gun (to make sure there is no pressure on the hose), uncouple the high pressure gun.
After cleaning and controlling the high pressure hose, put it away.
6. - Close the water inlet tap and put the hose away.
7. - If necessary, drain the water out of the water tank.

- Clean the WEEDMASTER TM and store it. -



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

3.5. Emergency stop.



Incase of an emergency the machine can be stopped means pushing the emergency knob on de central switchboard. (Only use incase of an emergency)



If the machine has been switched off because of a machine malfunction, then identify and correct the fault before attempting to re-start.

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

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 Z 602 diesel 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 : 200 hours.
Use: API classification CD (series 3) SAE 15W/50
The diesel motor 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 disposed following the regulations.

Oilfilter : Change the filter every 200 running hours.
Clean outside of the filterhousing, turn filter loss and remove filter, clean contact ring of filter en mount a new filter.

Airfilter : Clean / change the filter every 200 running hours.
After 6 cleanings, change filter.

Alternator (dynamo) belt: Check the stress of the belt every 200 hours. The maximum allowed margin is 9 mm at an tractive power of 10 kgf.

Fuel: : Check every 50 running hours the connections of the fuel hoses.
Change the fuel filter every 200 hours.

Warning.



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

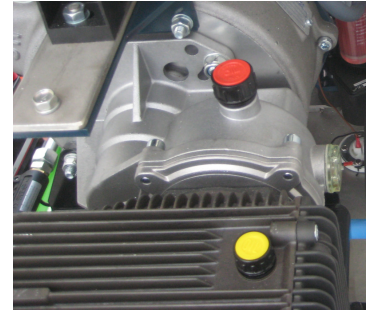
Battery: Always respect the safety regulations for handling battery's. **Do not place any tools on the battery.**

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 diesel engine: See **KUBOTA** 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 serious 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 : 200 hours.
Use: API classification CD (series 3) SAE 80W/90
The gearbox consist 0,37 litres oil.

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 disposed following the regulations.



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

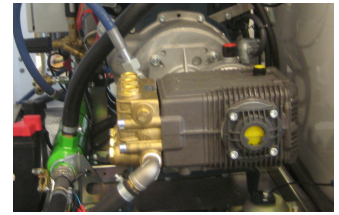
4.3. Maintenance on the high pressure pump.

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 consist 1,2 liters 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 200 working hours.
- next oil change every 200 / 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 200/15.

The torque for the bolts in the pump are:

		Nm.	Kgm.
- Bolts in pumhead	Part.no. 1	50	5,0
- Ceramic plunger/plunjerbolt	Part.no. 48	7	0,7
- Valve bolts	Part no. 9	54	5,4

Suction filter:

In the suction line, between the water tank and the heat exchangers, there is an small water inlet filter.

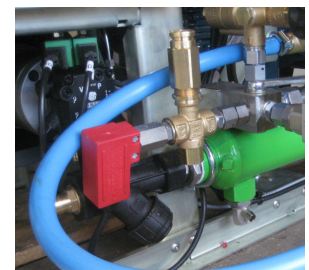
Check this filter during the maintenance procedure of the powerset.

- Tap off waterstoragetank.
- Open cap of suction filter (watch out for the O-ring).
- Take out filter element, and clean filter element.
Incase the filter element is damaged replace by a new one.
Waterkracht order number: 217787

- Place element in filter housing.
- Turn the cap back up on the filter housing.

NOTE !

- Be sure that the O-ring is in place.
- Fill the waterstoragetank, and check water suction filter for leaks.



4.4. Precautions against frost.

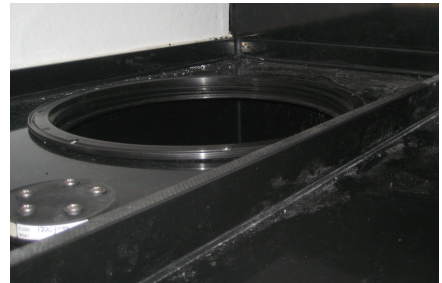
The machine must not be exposed to frost in winter. If the machine is left in premises where it is exposed to frost, when work is over or for storage, we recommend using antifreeze to prevent serious damage to the water circuit:

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 diesel engine.
- * Connect the high pressure hose to the water supply hose (use a special coupling), and start the diesel engine. Let the diesel engine run until the water supply system is protected with a mixture of antifreeze, stop the diesel 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 !



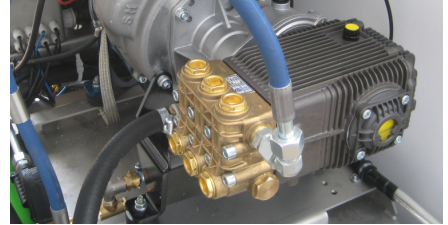
WARNING !

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 TM 221" 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.

For trouble shooting and maintenance instructions of the remote controle: **See the instructions manual of the remote controle.**

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.

When the installation has stopped for malfunction reason, a red warning light starts to flash and the cause of malfunction will be shown on the display of the switchboard.

Causes of malfunctions can be:

ERROR

- waterlevel.
- max. temperature in waterstorage tank.
- coolant.
- oil pressure.
- battery.



If the machine has been switched off because of a machine malfunction, then identify and correct the fault before attempting to re-start.

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

A. *Diesengine don't start:*

1. **Battery empty**, not or wrong connected,
 - re-load battery.
 - connect the battery in a proper way.
2. **Emergency stop** is pressed,
 - reset the emergency stop knob by turning the emergency key to the right.
3. **Fuse defect**,
 - Replace fuse.



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

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

1. **Fuel level** in tank to low,
 - refill fuel tank.
2. **Oil pressure safety** is activated, (red light on the central switchboard goes on and off).
 - check diesel engine for oil leaks.
 - top up diesel engine with the recommended oil. Be sure that the reason (leaks) are repaired.
3. **Water supply to the water storage tank** is not sufficient, (red light on the central switchboard goes on and off).
 - connect the water supply hose and fill water storage tank.
 - check water supply filter for dirt.
4. **Maximum temperature safety** of the diesel engine is activated, (red light on the central switchboard goes on and off).
 - check cooling system of the diesel engine for leaks.
 - top up cooling system from the diesel engine with coolant. Be sure that the reason (leaks) are repaired.

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

1. **Water supply to the water storage tank** is not sufficient, (red light on the central switchboard goes on and off).
 - connect the water supply hose and fill water storage tank.
 - check water supply filter for dirt.
2. **Maximum temperature safety** of the diesel engine is activated, (red light on the central switchboard goes on and off).
 - check cooling system of the diesel engine for leaks.
 - top up cooling system from the diesel engine with coolant. Be sure that the reason (leaks) are repaired.

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 necessary.
9. **Drive pump** defect,
 - Remove pumphead and check plunger movement.
10. **Safety valve** is leaky,
 - replace safety valve.

E. *Heavy pump vibrations:*

1. **Pump sucks air,**
 - check suction hose and connections and/or suction filter.
2. **Broken or weak suction or delivery valve spring,**
 - check and replace if necessary.
3. **Plunger packing** worn,
 - check and if necessary replace plunger packing.
4. **Accumulator** pressure too low, (if available)
 - check and replace if necessary.
5. **Drive (transmission) pump** worn,
 - check and if necessary 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.**
 - press button "hot water" to 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.
7. **Exhaust temperature safety (optional),**
 - (LED-signal light in box near the heating-unit will light up),
 - *to reset the exhaust temperature safety, by turn the key in the emergency stop off and then in position on.*
 - check/replace ignition module,
 - check/adjust/replace electrodes.

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 200/21 : Exploded view and spare parts list.
- * Pressure regulator Pulsar Zero : Exploded view and spare parts list.
- * Pressure regulator UL250H : Exploded view and spare parts list.
- * Gearbox : Exploded view and spare parts list.
- * Safety valve VS350 : Exploded view and spare parts list.
- * Pressure switch : Exploded view and spare parts list.
- * Flow FL7 : Exploded view and spare parts list.
- * High pressure heating-unit M-40 : Exploded view and spare parts list.
- * Hose reel T52 : Exploded view and spare parts list.
- * Electrical shedule
- * Flow diagram