

Manual

This manual has been translated from the original Finnish manual For models PRO10 and PRO20 DUAL

v 1.2

EWK Finland Oy Venakontie 4, 74130 Iisalmi Business ID: FI31531998

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Declaration of Conformity

Manufacturer

EWK Finland Oy Venakontie 4 74130 Iisalmi Finland

Hereby declares,

That the product: Hot water weed controlling machine ECO WEEDKILLER

Model: PRO10 and PRO20 DUAL

Serial number: 12000 →

Is in accordance with the following Directive(s):

The Machinery Directive 2006/42/EC SFS-EN ISO 12100

The Person Responsible of the Technical File:
Janne Hakkarainen
Mechanical Designer
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Place and date: Iisalmi, Finland, 2.1.2020

Signature:

Marko Laakkonen CEO



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INTRODUCTION

This manual contains information for the user of the hot water weed controlling machine ECO WEEDKILLER, for models PRO10 and PRO20 DUAL. In the following pages we intend to give clear instructions on how to operate and maintain the product correctly and safely.











Picture 1. Warning labels shown in machine

1. Safety instructions

These safety instructions are a summary of the rules which are to be followed whenever working with or maintaining the ECO WEEDKILLER. In addition to the instructions of this manual, all applicable and effective laws and regulations must be followed!

Please read and apply the following instructions:

- Use the ECO WEEDKILLER only for its designed purpose.
- Follow the instructions given in this manual while working.
- Make sure every user has familiarized themselves with this manual before using the product.
- Always shut down the device when servicing or refilling it. Do not leave the device without surveillance when it is running.
- Never aim the water jet towards people, animals, electrical equipment, or other delicate surfaces.
- > Do not insert an arm or any other body part or foreign objects into the machine or in front of the water jet or exhaust guides.
- > Do not operate with faulty device.
- > Do not operate the machine unless guards in place.
- When working with the machine, wear proper protective gear, e.g. gloves to protect yourself from spilling hot water or warm surfaces.
- ➤ The use of hearing protectors is recommended.
- > Do not loosen any hose connections when the machine is running, excluding the quick connector in the washer gun.

In addition, the user must notify the following aspects concerning transportation and lifting of the machine:

- When lifting, water tank must be empty.
- ➤ Use only the lifting points seen in picture 2, number 8. Make sure the lifting machine is suitable for lifting.
- > During the transportation the device must be properly fastened from the fixing points seen in picture 2, number 7.

Do not modify the product without consulting the manufacturer first! Any unapproved changes may lead to unsafe situations and to expiration of warranty.

2. Product information and safety devices

2.1. Product information

Eco Weedkiller is designed to be used as hot water weed controlling machine and cold/hot pressure washer/disinfection machine.

PRO20 DUAL version allows two users to work simultaneously when controlling weeds. Pressure washing is limited to only one user. PRO10 version is for one user only.

The weed controlling is accomplished with the hot water generated by the machine. Usual applications are parks, playgrounds, gardens, and other places where weed controlling is required.

The disinfection feature allows disinfection to be carried out using HOT WASH operation.

The device is designed for outdoor use only. It is transportable with a van, a pickup truck, a trailer, or a truck.

Before transportation of the device, make sure the vehicle is suitable for transporting this machine. The device must be fastened properly during transportation and when working. Before lifting the device, see chapter 1. Safety.

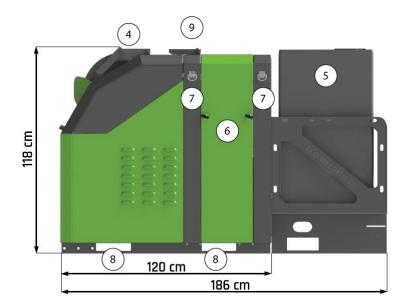
2.2. Safety devices

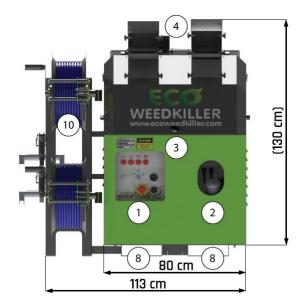
Eco Weedkiller has been equipped with different safety devices, which improve safety. Do not adjust, alter or remove any of them without consulting the manufacturer first or if it's not instructed in this manual.

- > Bypass/overflow valve: prevents the pressure from increasing over the adjusted limit
- > Safety valve: prevents the pressure from increasing over the adjusted limit
- Pressure switch: prevents the burner from working when the pressure is too low

- > Flow switch: prevents the burner from working when there is no water flow in the system
- > Water level switch: shuts down the engine when the water is running low
- > Guards/cover: prevents direct contact with moving parts of the machine, acts as a noise and heat guard

In addition, treatment and washing lances are equipped with insulation layers, which prevent direct contact with hot surfaces.

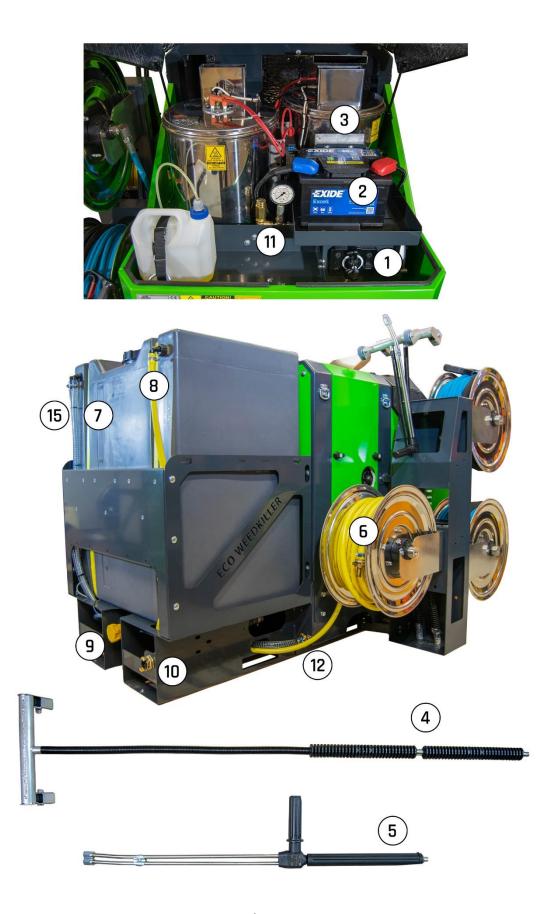




Picture 2

Picture 2:

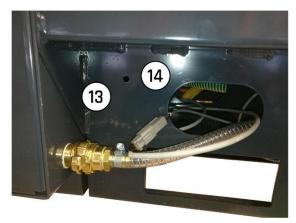
- 1: Control panel
- 2: Fuel refilling
- 3: Opening knob for front hatch
- 4: Adjustable exhaust guides
- 5: Water tank
- 6: Side cover with locks
- 7: Fastening points
- 8: Lifting points
- 9: Cooling air duct for motor
- 10: Hose reels



Picture 3.1









Picture 3.2

Pictures 3.1-3.2:

- 1.Main switch
- 2.Battery
- 3. Boiler (PRO10 1 pc., PRO20 DUAL 2 pcs.)
- 4. Treatment lance for weeds
- 5. Pressure washer lance
- 6. Hose reel for filling the water tank
- 7. Return hose for pump
- 8. Filling hose and a float valve inside the tank
- 9. Water filter
- 10. Emptying valve / linking valve for additional water tank
- 11. Pressure adjusting and pressure gauge for ECO-mode
- 12. Water inlet connection point
- 13. Water bypass connection point
- 14. Plug for water level sensor
- 15. Overflow hose

Note! The location of water filter, emptying valve and hose reels may vary between different models.

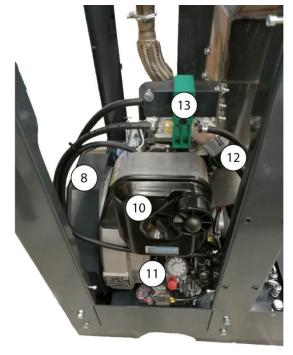


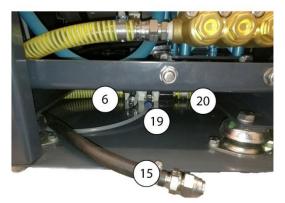
Picture 4.Control box

Picture 4:

- 1. OIL PRESSURE = Light indicating the oil pressure of the motor
- 2. OVERHEAT = Light indicating overheating of the motor
- 3. CHARGE = Light indicating the charge. When lit, the battery will not charge.
- 4. WATER EMPTY = When lit, water level is too low, and the engine is shut down and prevented from starting.
- 5. Start:
 - 0 = power off, shut down.
 - 1 = device running, power on.
 - START = starts the device.
- 6. Operation switch:
 - ECO = Weed control mode.
 - HOT WASH (red flame and water drops) = Hot pressure washer /disinfection mode.
 - COLD WASH (snow flake and water drops) = Cold pressure washer and cooling mode.
- 7. Fuel gauge. When lit, shut down the device and refuel.
- 8. Operating hour gauge = Indicates the working hours of the device.
- 9. EMERGENCY STOP = Shuts down the device and cuts the power from the control box.







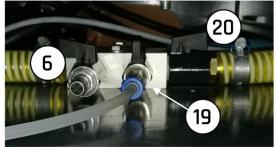
Pictures 5.1-5.2:

Picture 5.1

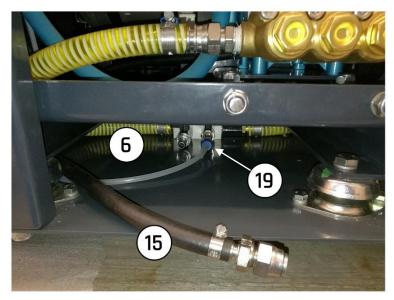
- 1: Diesel motor
- 2: High pressure pump
- 3: Bypass valve / overflow valve
- 4: Pressure gauge
- 5: Magnetic valve
- 6: Connector for compressed air and a valve
- 7: Thermostat (PRO 10 1 pc., PRO 20 DUAL 2 pcs.)
- 8: Belt protector
- 9: Tightening bolts for belt
- 10: Air filter for motor
- 11: Filter and measuring stick for motor oil
- 12: Fuel filter for motor
- 13: Fuel filter for boiler (PRO 10 1 pc., PRO 20 DUAL 2 pcs.)
- 14: Oil level indicator at the back of the pump
- 15: Oil draining hose for high pressure pump

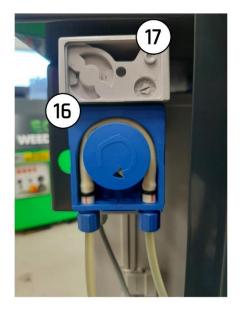
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Picture 5.2

- 16: Peristaltic pump for descaling liquid (optional)
- 17: Adjusting knob for rate of delivery for descaling liquid (from 2,5 ml/min to 75 ml/min)
- 18: Container for descaling liquid (optional)
- 19: Inlet hose for descaling liquid and a ball valve to close the line if needed
- 20: Ball valve for water inlet line

3. Preparation for use and operation

Do not adjust any components without the approval of the manufacturer or against the instructions given in this manual. This may lead to failed results on weed controlling.

3.1. Preparation for use

Before using the device, check the following:

- > The condition of hoses and connections.
- The oil levels in high pressure pump and in motor.
- > The tightness of belts in alternator and the pump.
- > The battery is properly attached.
- > There is water in the water tank.
- The pump gets water.
 - Check that water inlet and water bypass connections are properly secured (pictures 3.1 and 3.2, numbers 12 and 13.)
- ➤ Check that water level sensors plug is properly attached (picture 3.2, number 14)
- > There is fuel in the fuel tank.
 - use only diesel oil or fuel oil; (classifications: EN 590 or BS 2869 A1 / A2 or ASTM D 975 -1D / 2D)
- The device has been set on a solid surface and attached properly.
- Cover plates are in place.

3.2. Operation

BEFORE STARTING THE MACHINE MAKE SURE THE PUMP GETS WATER. DO NOT START THE MACHINE UNLESS THERE IS WATER IN THE WATER TANK AND THE YELLOW CAP IN WATER FILTER IS IN PLACE.

- 1. Turn the main switch ON. The switch can be found under the front hatch. Close the hatch.
- 2. Turn the key into the RUN position (picture 4, number 5). Check the fuel gauge and that the light indicating the lack of water is not on.
 - If the fuel level is low, turn the key into 0 position and add fuel.
 - If the water empty light is lit, add water into the water tank. The indicator light turns off when the water level surpasses the low limit.
- 3. Start the engine.
 - **NOTE!** Check that the exhaust guides (picture 2, no. 4) are open and properly aligned before starting the device.

The device does not endure running dry. Therefore, the water tank is equipped with a low-level sensor, which turns the engine off when lacking water. A float valve is installed for protecting against overfilling the tank when using the filling hose. It is advised to keep the filling hose always attached and water running to ensure a sufficient water level.

WHEN USING ANOTHER WATER TANK THAN THE ONE PROVIDED WITH THE DEVICE, CONTACT THE MANUFACTURER FOR INSTRUCTIONS ON HOW TO PROPERLY INSTALL THE NEW TANK.

3.3. Weed controlling

Weed controlling is done using hot water. Preferred working pace is 3-5 green square meters per minute, depending on the growth.

NOTE! THE DEVICE DOES NOT SEPARATE THE WEEDS FROM OTHER PLANTS. USER MUST SELECT WHICH PLATS ARE TREATED. THE PLANTS THAT ARE SPRAYED WITH HOT WATER WILL BE DAMAGED.

Also, the hot hose can cause some damage to plants if the hose is still for long periods of time.

For weed controlling, do as follows:

- 1. Make sure the weed controlling lance is attached to the washer gun (models with quick coupler).
- 2. Start the device (see chapter 3.2. Operation).
- 3. Choose ECO mode from the operation switch (picture 4, number 6).
- 4. Press the trigger gun, which initiates the water flow out of the lance.

When the required pressure and flow of water is reached, the boiler starts automatically. The boiler heats the water to the required temperature, which takes some time. Therefore, the trigger gun must be pressed, and the water kept flowing until some steam is formed. After that the weed controlling can be started.

NOTE! When the device is cold, the time required to reach the optimal temperature may be longer than when the device is hot.

NOTE! When the trigger gun is released, the boiler shuts down immediately. Therefore, after longer breaks water must be flowed through the system until steam is visible. After that the weed controlling can proceed.

NOTE! Depending of the outside temperature, the hot water coming out of the nozzle may form a lot of steam and the nozzle may make a buzzing sound. This is due to the high water temperature and is perfectly normal.

Sometimes the temperature of outcoming water when controlling weeds may be too cold (no visible steam and no sizzling sound) or too hot (too much steam, very high sizzling sound, high pressure at nozzle). In that case, the temperature can be adjusted by following the next steps:

- NOTE! Adjusting can only be done when the machine is running, ECO-mode selected, and the water must flow out of the system (trigger gun pressed down).
- ➤ Water too cold (no visible steam or sizzling sound):
 - o **Lower the pressure** from the safety valve located under the front hatch (picture 6) by turning it **counterclockwise**. Pay attention to the pressure gauge.
 - Adjust only slightly at a time (1-2 bar) and wait until the temperature has stabilized. This may take 1-2 min.
 - The pressure should not be lowered under 25 bar.

- > Water too hot (too much steam, very high sizzling sound, high pressure at nozzle):
 - o **Increase the pressure** from the safety valve located under the front hatch (picture 6) by turning it **clockwise**. Pay attention to the pressure gauge.
 - Adjust only slightly at a time (1-2 bar) and wait until the temperature has stabilized. This may take 1-2 min.

NOTE! The adjusting of the safety valve may require a size 27 wrench. Make sure the locking ring is loosened before adjusting.



Picture 6. Safety valve and pressure gauge for ECO-mode

3.4. Treating the roots of weeds

To successfully control some species of weeds, it is important to gain access to the roots. To do so, switch the lance with spike (optional) to the trigger gun. Then follow the steps in chapter 3.3 (numbers 2-4).

When the high temperature of water is reached, hold the trigger and push the spike towards the roots of the weed through the soil. Apply hot water to the roots and extract the spike.

NOTE! Be careful not to spray hot water towards yourself or any other people when extracting the spike from soil.

Note! The spike is sharp. Be careful when working with it.

3.5. Hot pressure washing / disinfection

Hot pressure washing /disinfection can be carried out only by one user (PRO 20 DUAL) with the pressure washing lance (picture 3.1, number 5).

To carry out hot pressure washing / disinfection, do as follows:

- 1. Change/select the pressure washer lance.
- 2. Start the device (see chapter 3.2. Operation)
- 3. Choose HOT WASH mode from operation switch (picture 4, number 6).
- 4. Press the trigger gun, and water will flow out of the lance.

When the required pressure and flow of water is reached, the boiler starts automatically. The boiler heats the water to required temperature, which takes some time.

3.6. Cold pressure washing

Cold pressure washing is carried out with same lance than hot pressure washing/ disinfection. To carry out cold pressure washing, do as follows:

- 1. Change/select the pressure washer lance.
- 2. Start the device (see chapter 3.2. Operation)
- 3. Choose COLD WASH mode from operation switch (picture 4, number 6).
- 4. Press the trigger gun, and the water will flow out of the lance.

Carry out cold pressure washing.

3.7. Shutting down the machine

After long periods of working with hot water, it is advised to cool down the system before shutting it down. Cooling is done with COLD WASH mode:

- 1. Choose COLD WASH mode from the operation switch (picture 4, number 6).
- 2. Press the trigger gun, and water will flow out of the pressure washing or weed controlling lance.
- 3. Keep the trigger gun pressed for at least 1 minute. During this time, the systems pipes and hoses will be cooled down.

When working with PRO20 DUAL model, cool down both lances/hoses if work has been done by two users

After this, the device can be shut down and the hoses rolled in. The device is shut down by turning the key into "0" position. Turn the main switch into OFF position.

3.8. Descaling

The device can be equipped with a peristaltic pump (optional) to apply descaling liquid to system. Descaling liquid prevents scale buildups from occurring. Descaling liquid should be applied to the system whenever working with hard water.

The peristaltic pump (picture 5.2, number 16) works automatically whenever water is running through the system. It doesn't not run when the engine is idling. Pump applies the descaling liquid from the container (picture 5.2, number 18) to the system. The ball valve shown in picture 5.2 number 19, must be open (as shown in pictures).

The rate of delivery can be adjusting by turning the adjusting knob found under the cover of the peristaltic pump (picture 5.2, number 17). The rate of delivery varies from 1,5 dl/hour (left position) to 45 dl/hour (right position). It is advised to keep the rate of delivery low, between left and center position, in order to not overdosing the descaling liquid in vain. The optimal amount varies from \approx 0,1 to 3,5 dl / hour, depending on the water hardness (1 to 25 °dH).

4. Service and maintenance

Before servicing the device must be lowered into a solid, flat ground and the main power switched OFF. DO NOT SERVICE OR MAINTAIN THE DEVICE WHEN IT IS RUNNING!

The service must be done by a qualified service person. Regarding the service of the motor, see more detailed instructions from HATZ manual, chapter 8. Maintenance.

Daily maintenance:

- > Check the high-pressure hoses for any damage. Change damaged parts immediately.
- Check the device visually for any leakages when the device is running. If any leakages are visible, shut down the device and fix the problem or contact the manufacturer or the seller

Weekly maintenace:

- ➤ Check the oil levels of the high-pressure pump and the motor.
- Check the fuel filters.
- Check the tension and condition of the belt of high-pressure pump and the alternator.
- Clean the water filter (picture 3.2, number 9):
 - Unscrew the yellow cap by pressing it slightly towards the body of the filter and twisting it counterclockwise.
 - o Pull the yellow cap out and let the water drain out of the filter
 - Unscrew the black locking ring and remove it and the filter cover; the remaining water will now drain out of the filter.
 - Clean the filter element.

- Refit the filter element, cover and locking ring. Tighten the locking ring.
- o Press the yellow cap briefly into the hole; water will flow into the filter forcing out any air.
- Screw the yellow cap in place, clockwise. Make sure the filter doesn't leak any water and the high pressure pump gets water.

After the first 50 hours:

- Change the oil from high pressure pump.
- > Check and adjust tappet clearance from motor if needed. See more details from Hatz manual, chapter 8.

Every 250th hour:

- > Change motor oil and oil filter.
- ➤ Check and adjust tappet clearance from motor.
- Clean cooling air system from motor.

Every 500th hour:

- > Replace fuel filters.
- > Replace / clean air filter from motor.
- Change the oil from high pressure pump.

5. Long time storage

The machine must be stored in a dry and warm place. If that is not possible, the system must be completely emptied from water (hoses, water tank, water filter, hose reels etc.) or antifreeze to be added. It is recommended to empty the system from water for long time storage periods.

Do these steps before storing the device for longer periods of time:

- Clean the machine properly.
- Discharge battery cables.
- Check the condition of high-pressure hoses and adaptors and replace if necessary.
- > Empty the system from water (a) or add antifreeze (b).

a) Emptying the device from water. **NOTE! THE MACHINE MUST BE SHUT DOWN BEFORE CARRYING OUT THIS PROCEDURE:**

- o Close the ball valve from water inlet line (picture 5.2, number 20).
- o Press and secure the trigger gun/s into open position.
- o Insert compressed air hose using suitable adapter (picture 5.1 and 5.2, number 6).
- Open the ball valve (picture 5.1 and 5.2, number 6). Now the pressurized air goes through the system.

- Keep the trigger guns pressed until the water stops from flowing out of them. Close the ball valve and detach the compressed air hose.
- o Remove any water from water tank and water filter.

b) Adding antifreeze:

- Add about 50 l of water and antifreeze to water tank to create required antifreeze mixture.
- o Turn the machine on.
- Select "COLD WASH" and press the trigger gun/s until antifreeze starts to come out the lance/s.
- o Release the trigger gun/s and shut down the machine.

Now the antifreeze is added to the system. After this the trigger gun/s should not be pressed so that the antifreeze doesn't flow out of the system.

6. Spare parts and technical support

For spare parts, contact the manufacturer or your local Eco Weedkiller dealer.

Manufacturer:

EWK Finland Oy Venakontie 4, 74130 Iisalmi, Finland Sales: +358 50 4900085

Spare parts, technical support: +358 50 5710889 / janne@ecoweedkiller.com

+358 50 3313999

7. Troubleshooting

Fault	Possible cause	Solution
The engine won't start	No water	Add water to water tank
	Emergency Stop pressed down	Retract Emergency Stop
		button
	No fuel	Add fuel to fuel tank
	Air in fuel system	Remove any air from fuel system
	Battery voltage too low	Recharge or replace the battery
	Engine oil pressure	Check the engine oil level.
		Contact manufacturer.
	Fuse blown out	Replace the fuse. If the problem
		is frequent, contact
		manufacturer.
Water is not coming out or the	No water in water tank	Shut down the machine, add
pump makes blowing noise		water to water tank and check
		that the water level switch
		works
	Suction filter clogged	Clean the suction filter
	Suction valve closed	Open the suction valve and
		check that the pump gets water
W . 1 2:11	By-pass or safety valve damaged	Replace damaged valves
Water doesn't heat, or the	Wrong position on operation	Change the position of
burner doesn't start	switch	operation switch to either ECO-
	Muses	or HOT WASH
	Wrong pressure	Check the pressure level from
	Thermostat switched off.	pressure gauge Check that the thermostat is
	Thermostat switched on.	
	Low water flow	turned fully to clockwise. Clean the suction filter, check
	Low water now	that the pump gets water
	Flame sensor misaligned	Fix the alignment of flame
	rtaine sensor misaligned	sensor (white wire/sensor in top
		of the burner)
No power in control box	Emergency Stop pressed down	Retract Emergency Stop button
	Main switch OFF	Turn main switch ON
	Fule blown out	Replace the fuse. If the problem
		is frequent, contact
		manufacturer.

The machine is equipped with automatically adjusting RPM control, which reacts to the flow of water. During operation, the RPM level may change from time to time. This doesn't cause any actions.

8. Combining the water flow

8.1. Decription

With Pro20 Dual version, water flow from both weed controlling lances can be combined into one lance to improve the working speed. Thus, one user may work with wider weed controlling lance or with faster speed. With combined water flow, the amount of outcoming hot water (+100°C) is about 20 l /min. The maximum length of hose is 40 m and 3/8" hose must be used.



Picture 8.1. Color-coding

Pressure washing option is also enhanced. Hot water pressure washing mode generates about 20 l/min of +100°C pressurized water.

In some version, trigger gun and a controlling lance can be color-coded (picture 8.1). In that case, use only color-coded pairs (trigger gun and a lance) to make sure proper working of the machine.

8.2. Operating with combined water flow

The use of combined water flow is controlled with 3-way valve (pictures 8.2 and 8.3). By changing the position of the valve, combined water flow can be switched on and off. When the valve is turned to right (picture 8.2) water flow is combined. In that case, all water comes through the thicker (3/8") hose. Before changing the position of the valve, release the trigger gun to lower the engines RPMs.

NOTE! Do not change the position of the 3-way valve when water is running through the system (trigger gun is pressed). That may damage the valve.

NOTE! When working with combined water flow (picture 8.2), the use of smaller controlling hose is not possible. Turn the valve to left (picture 8.3) to regain the using possibility of smaller controlling hose.



Picture 8.2. Water is combined into one hose reel (3/8" hose)



Picture 8.3. Water goes to both hose reels

9. Technical data

Operating voltage: 12 V

Motor: Hatz 1D81- diesel engine

> Power: 9,3 kW @ 2600 rpm

Oil quantity 1,0 - 1,9 l (min. – max.)

Preffered oil quality:
ACEA - B2 / E2 or higher

API - CD / CE / CF / CF-4 / CG-or higher.

High pressure pump*	CAT 5CP5120	Mazzoni MMD 21250R
Water output	23 l/min @1650 rpm	25 l/min @ 1740 rpm
Adjusted max. pressure	150 bar	150 bar
Adjusted working pressure for weed controlling	40-100 bar	40-100 bar
Adjusted working pressure for pressure washing	max. 150 bar	max. 150 bar
Oil quantity	0,55 l	0,75 l
Preferred oil quality	ISO 68 Hydraulic	SAE 15 W 40

^{*}The model of the high-pressure pump may vary depending on the device. Check the pump model on your device:

Blue = CAT 5CP5120

Black = Mazzoni MMD 21250R

Burner: 93 kW, 12V (1 pcs. PRO 10, 2 pcs. PRO 20 DUAL)

Fuel tank capacity: 90 l

Fuel: Diesel

combined fuel consumption: 11 l/h (PRO 10)

20 l/h (PRO 20 DUAL)

Water capacity of water tank: 310 l

Measurements: 1860 x 1130 x 1230

Weight:

PRO10 540: kg dry weight / 930 kg with full fuel and water tanks

PRO20 DUAL: 640 kg dry weight / 1030 kg with full fuel and water tanks

Measured noise level 1 m from the machine, at height of 1,6 m from the ground: 88 dB

Guaranteed sound power level LwA: 89 dB

10.Maintenance

1st.	. maintenance after 50 hours of operating:
	Change the oil from high pressure pump
	Change engine oil
	Check and adjust tappet clearance from motor if needed
Оре	erating hours:
Dat	e:
Sigi	nature:
Eve	ery 250 th hour:
1.	Change motor oil and oil filter.
2.	Check and adjust tappet clearance from motor.

- 3. Clean cooling air system from motor.
- 4. Check high pressure hoses and valves for leakages replace if needed.

Every 500th hour:

- 5. Replace fuel filters.
- 6. Replace / clean air filter from motor.
- 7. Change the oil from high pressure pump.
- 8. Change high pressure hoses and safety valve.

Operating hours	8.	•	6.	•	4.	3.	2.	1.	Hours
									250 h
									500 h
									750 h
									1000 h
									1250 h
									1500 h
									1750 h
									2000 h
									2250 h
									2500h
									2750h
									3000 h
									3250 h
									3500 h
									3750 h
									4000 h