- Operator's manual
- Parts manual

Cold water pressure washer Hot water pressure washer Environmental Weed killer

Model







MS Gregson

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SPECIFICATIONS

General Features

Use	Commercial
Engine	Subaru, EX400
Rotation speed	3450 rpm
Shaft	Solid shaft, 1"
Fuel tank	1.85 US gal (7.0 l)
Starting	Electric starter
Pump	Comet, CO-ZWD3540G
Rotation speed	3450 rpm
Туре	Ceramic plunger pump
Drive	Direct drive, hollow shaft pump
Pump protection	Metal screen filter
	140°F thermal protector
Pressure hose	3/8" x 50' x 6000 psi
Spraying gun	5000 psi x 10.4 gpm
Wand	Single, 44"
Burner	1/6 HP, 12 Vdc, 12 A
Controls	12 Vdc
Safety valve	4000 psi (276 bar)
Oil nozzle	DELAVAN 2.25 – 80°A
Oil pressure	130 psi (9.0 bar)
Air shutter	2
Air band	6
Maximum oil consumption	2.5 gph (8.7 l/h)
Btu/h, input	350 000
Btu/h, net	250 000
Tank capacity	9.7 US gal (37 l)
Flue collar diameter	8"
Overall dimensions	54" x 31" x 45"
	(137 cm x 79 cm x 114 cm)
Weight (empty tanks and plumbing)	574 lb (261 kg)
Weight (full tanks and plumbing)	669 lb (304 kg)
Gun and wand weight	7 lb (3.2 kg)

Pressure washer mode specifications

Maximum flow rate	3.5 US gpm (13.2 l/min)	
Maximum pressure	3500 psi (241 bar)	
Engine maximum fuel consumption	0.80 US gph (3.03 l/h)	
Soap injection	Low pressure type	
	Adjustable rate	
	Activation by soap nozzle	
Pressure nozzles	15035, 25035, 40035	
Soap nozzle	6540	
Burner exhaust temperature	720°F (382°C)	
Burner carbon monoxide emission	10 ppm	
Water temperature rise at full flow	160°F (89°C)	
Maximum noise level at 3 feet (1 m)	94.5 dB(A)	
Maximum noise level at 10 feet (3 m)	92.6 dB(A)	
Nozzle weight	0.6 oz (17 g)	

Weed killer mode specifications

Maximum flow rate	3.0 US gpm (11.4 l/min)
Typical pressure at pump head	500 to 600 psi (35 to 41 bar)
Typical pressure at control regulator	300 to 400 psi (20 to 28 bar)
Pressure at weed killing tool	40 psi (2.8 bar)
Engine maximum fuel consumption	0.15 US gph (0.58 l/h)
Weed killing tool nozzle	0015
Burner exhaust temperature	749°F (398°C)
Burner carbon monoxide emission	19 ppm
Typical outlet water temperature	250°F (121°C)
Maximum noise level at 3 feet (1 m)	92.3 dB(A)
Maximum noise level at 10 feet (3 m)	88.0 dB(A)
Weed killing tool weight	12.6 oz (357 g)

TO THE PURCHASER

All products are designed to give safe, dependable service if they are operated and maintained according to instructions. **Read and understand this manual before operation.**

This manual has been prepared to assist the owner and operators in the safe operation and suitable maintenance of the hot water pressure washer / thermal weed killer. The information is applicable to products at the time of manufacture and does not include modifications made afterwards.

Read and understand this operator's manual before attempting to put equipment into service. Familiarize yourself with the operating instructions and all the safety recommendations contained in this manual and those labeled on the equipment. Follow the safety recommendations and make sure that those with whom you work follow them.

Illustrations

The illustrations may not necessarily reproduce the full detail and the exact shape of the parts or depict the actual models, but are intended for reference only.

To assist your dealer in handling your needs, please record hereafter the model number and serial number of your machine. It is also advisable to supply them to your insurance company. It will be helpful in the event that the machine is lost or stolen.

Model:
Serial number :
Date of purchase :
Dealer name :
Dealer phone number :

LIMITED WARRANTY

Pressure washers/weed killers manufactured by **MS Gregson DIV. OF RAD TECHNOLOGIES INC.** are warranted, to the original purchaser, to be free from defects in materials and workmanship for the periods specified below. Normal use conditions, according to the instructions in this manual, apply. This limited warranty is subject to the exclusions listed below, is calculated from the date of delivery to the original purchaser, and applies to the original components only. Parts replaced under this warranty will assume the remainder of the corresponding part's warranty period.

5 YEAR PARTS, 1 YEAR LABOUR WARRANTY

Metallic components manufactured by **MS Gregson DIV. OF RAD TECHNOLOGIES INC.**, such as frames, handles, guards, protective gratings and plates, covers, and also pumps* and heating coils**, have a 5 year warranty.

*Pumps are warranted for 5 years by the pumps manufacturer. Manufacturer's warranty does not apply to freight damage, to freezing damage, to damage caused by replacement parts others than the manufacturer's ones, to normal wear of moving parts or components affected by moving parts.

**The heating coils are protected by a 5 year pro rated warranty to the original purchaser upon the following decreasing scale:

- Full replacement or repair during the first 2 years.
- Replacement or repair with customer bearing 40% of cost during the third year.
- Replacement or repair with customer bearing 60% of cost during the fourth year.
- Replacement or repair with customer bearing 80% of cost during the fifth year.

1 YEAR PARTS, 1 YEAR LABOUR WARRANTY

The other components, excluding accessories listed below and normal wear items listed below are warranted for 1 year on parts and labour.

30 DAY ACCESSORIES WARRANTY

Accessories such as discharge hoses, quick couplers, swivels, guns, lances, nozzles, pressure gauges, thermal protectors, and options are warranted for 30 days on parts.

WARRANTY PROVIDED BY OTHER MANUFACTURERS

Engines, batteries or other items, which are warranted by their respective manufacturers, are serviced through these manufacturer's local authorized service centres.

MS Gregson DIV. OF RAD TECHNOLOGIES INC. cannot provide warranty on these items.

EXCLUSIONS OF THIS WARRANTY

This warranty does not cover the following items:

- Routine adjustments and normal wear items such as lubricants, spark plugs, filters, O-rings, fuses, pump valves and seals.
- Damage or malfunctions resulting from accidents, bumping, abuse, modifications made to the equipment without authorization, incorrect installation, improper servicing, failure to follow manufacturer's maintenance instructions, or use of the equipment beyond its stated usage specifications as contained in this manual or the common sense.
- Damage due to freezing, chemical deterioration, rust, corrosion, scale build up, or thermal expansion.
- Damage caused by replacement components others than those obtained from or approved by MS Gregson DIV. OF RAD TECHNOLOGIES INC.
- Damage caused by insufficient water supply or poor quality water.
- Damage due to improper fuel use, impurities or water in fuel, or lack of fuel.
- Transportation to dealer, travelling fees, or freight damage.

EXECUTION OF REPAIRS WITHIN THE WARRANTY PERIOD

In order to obtain warranty service on items warranted by **MS Gregson DIV. OF RAD TECHNOLOGIES INC.**, you must return the product to your authorized **MS Gregson** dealer, freight prepaid, with proof of purchase, within the applicable warranty period. For warranty service on components warranted by other manufacturers, your authorized **MS Gregson** dealer can help you obtain warranty service through these manufacturers' local authorized service centres.

LIMITATION OF LIABILITY

MS Gregson DIV. OF RAD TECHNOLOGIES INC.'s liability for special, incidental, or consequential damages is expressly disclaimed. In no event shall MS Gregson DIV. OF RAD TECHNOLOGIES INC.'s liability exceed the purchase price of the product in question. THE WARRANTY CONTAINED HEREIN IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. MS Gregson DIV. OF RAD TECHNOLOGIES INC. does not authorize any other party, including authorized MS Gregson dealers, to make any representation or promise on behalf of MS Gregson DIV. OF RAD TECHNOLOGIES INC. or to modify the terms, conditions, or limitations in any way. It is the buyer's responsibility to ensure that the installation and use of MS Gregson products conform to local codes. While MS Gregson DIV. OF RAD TECHNOLOGIES INC. attempts to assure that its products meet national codes, it cannot be responsible for how the customer chooses to use or install the product.

SAFETY PRECAUTIONS



This symbol, the industry's «Safety Alert Symbol», is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully. It is essential that you read the instructions and safety regulations before you attempt to assemble or use this machine.



DANGER:

Indicates an immediate hazardous situation which, if not avoided, will result in death or serious injury.



WADNING.

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION:

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

IMPORTANT:

Indicates that machine or property damage could result if instructions are not followed.

NOTE: Gives helpful information.

All products are designed to give safe, dependable service if they are operated and maintained according to instructions. Read and understand this manual before operation. It is the owner's responsibility to be certain anyone operating this product reads this manual, and all other applicable manuals, to become familiar with this machine and all safety precautions. Failure to do so could result in personal injury or machine damage. If you have any questions, consult your dealer.

Notice

A safe operator is the best insurance against accidents. All operators, no matter how experienced they may be, should read this operator's manual and all other related manuals before attempting to operate the machine. Please read the following section and pay particular attention to all safety recommendations contained in this manual and those labeled on the machine.

Before operation

- 1. Read and understand both the engine's and the pressure washer/weed killer's manuals before using it. Know how to operate all controls and how to stop the unit. Lack of knowledge can lead to accidents.
- 2. Do not modify or alter this product or any of its components without first consulting MS Gregson.
- 3. Check parts for excessive wear regularly. Replace worn parts with genuine parts.
- 4. Always make sure all components are properly installed and securely fastened before operation.
- 5. Always follow chemical manufacturer's instructions before injecting soap or chemical products.
- 6. Always wear long-sleeve shirt, pants, closed-toed shoes and appropriate personal protective equipment (gloves, goggles, apron) when handling chemicals.

Pressure washer/weed killer operation

- 1. When the machine is not used, after stopping the machine, or before performing any repairs, adjustments or inspections, make sure the machine is parked on a flat level surface, with wheel brake on and remove the engine key from switch.
- 2. Make sure the burner switch is in OFF position before starting the engine.
- 3. Never allow children to operate the machine.
- 4. Never allow anyone near the working area.
- 5. Never allow anyone to operate the machine until they have read the manual completely and are thoroughly familiar with the unit operation.
- 6. Never operate the machine if it is tilted more than 10° from the horizontal.
- 7. Never attempt to make any electrical adjustments while the engine is running. It may result in deadly electrical shocks.
- 8. Never spray people or animals with the spray wand. It may result in serious injuries.
- 9. Always wear long clothes, gloves and safety glasses when operating this machine.
- 10. Never direct the jet toward the machine or toward any electrical appliance.

SAFETY PRECAUTIONS

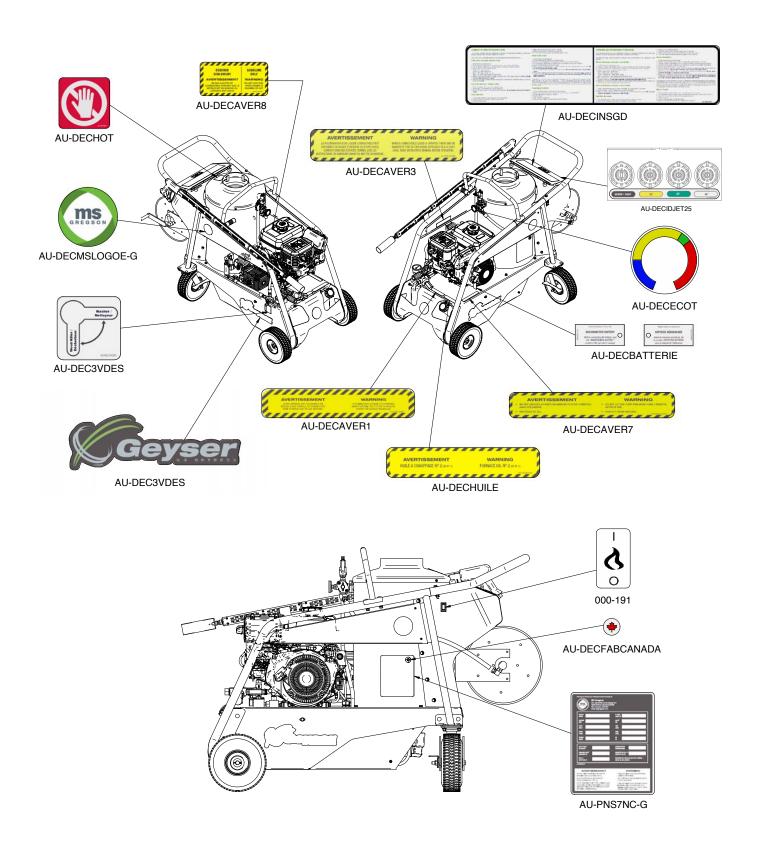
- 11. Never operate the pump without water supply.
- 12. Never let the burner run when the oil tank is empty.
- 13. Children and pets must be kept away from the area of operation due to a possibility of burns from hot machine components or injury from any equipment.
- 14. Refuel in a well-ventilated area with the equipment stopped. If any fuel is spilled, clean it up completely and allow vapors to dissipate before starting the machine again.
- 15. Do not fill the fuel tanks when the engine is running or hot.
- 16. Do not use the machine in a non-ventilated area.
- 17. Exhaust gas contains poisonous carbon monoxide. Avoid inhalation of exhaust gases.
- 18. The battery gives off explosive gases. Keep sparks, flames and cigarettes away.
- 19. The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Always wear protective clothing and a face shield. If electrolyte gets on your skin, flush with water. If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- 20. Electrolyte is poisonous. If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician immediately.
- 21. Never use in the rain or during thunderstorms.
- 22. Never use in a ladder or other unstable places.
- 23. Do not let the pump run more than 3 minutes without using the gun.
- 24. Make sure the fuel tanks are always clean and avoid water or dirt entering while filling the tanks. If you have any doubt, empty and clean the tanks.
- 25. Install the machine in a place:
 - protected against frost
 - sheltered against rain
 - well ventilated
 - as far away as possible from the working area.
- 26. Always depressurize the system after stopping the machine.
- 27. Always make a pre-operation inspection before starting the machine. You may prevent an accident or equipment damage.

Maintenance

ALWAYS USE GENUINE PARTS WHEN REPLACEMENT PARTS ARE REQUIRED.

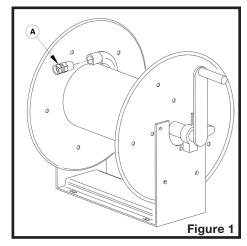
- 1. Keep the machine and its accessories properly maintained.
- 2. Before performing any repairs, adjustments or inspections, make sure the machine is parked on a flat level surface, with wheel brake on, with all switches OFF, and remove the engine key from switch.
- 3. Make sure there is no soap or chemical remaining in the pipes and hose before making any repairs.
- 4. Always wear personal protective equipment when cleaning, servicing and using the washer/weed killer.
- 5. Do not service the machine while the engine is running or hot.
- 6. Do not modify or alter this equipment or any of its components or operating functions.
- 7. Do not operate a machine that is defective or has missing parts. Make sure that all recommended maintenance procedures are completed before operating the machine.
- 8. Periodically check all bolts and nuts for tightness.
- 9. Dispose of used oil or crankcase draining according to environmental laws. Keep in a closed container, and then bring to the nearest deposit. Do not throw to garbage or pour in the soil or in a sewer.

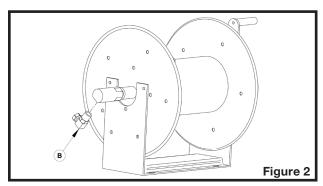
LABELS

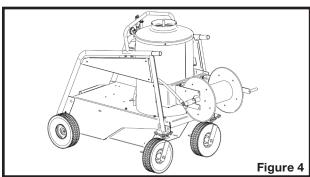


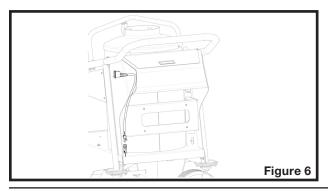
INSTALLATION INSTRUCTIONS

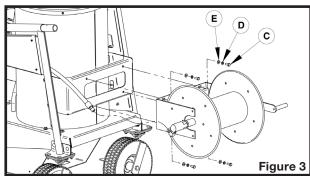
- 1. Install the hydraulic straight fitting (A on figure 1) to the reel exit.
- 2. Install the hydraulic elbow fitting (B on figure 2) to the reel entry.
- 3. Install the reel to the reel support with 5/16" NC x 3/4" bolts, 5/16" lockwashers and 5/16" flat washers (C, D and E on figure 3).
- 4. Connect the hose coming from the coil to the hydraulic elbow fitting at the reel entry.
- 5. Install the storage compartment (F on figure 5) with 5/16" NC x 1" bolts, 5/16" lockwashers and 5/16" flat washers (G, H and I on figure 5).
- 6. Connect the electric connector located at the end of the burner switch harness.
- 7. Install the handlle (J on figure 7) with 5/16" NC x 2 1/4" bolts, 5/16" washers and 5/16" nylon locknuts (K, L and M on figure 7).
- 8. Connect the spray gun hose to the hydraulic straight fitting located at the reel exit. Roll the hose on the reel.
- 9. Connect the connector from the battery harness to the engine starter, see battery section. (page 15).

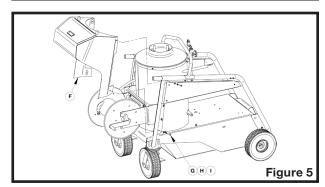


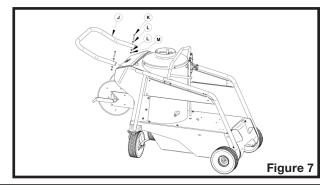






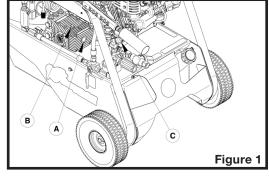


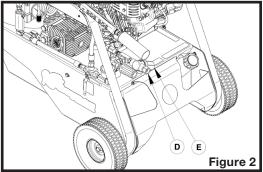


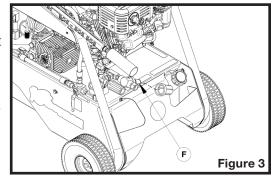


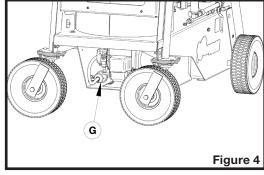
Preparation

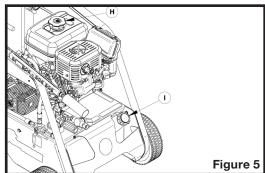
- 1. Make sure that all hoses are in good state, not cracked or crushed.
- 2. Check the oil level of the pump. Pump must be in a level position. Oil level must be halfway on the sight glass (A on figure 1) or visible on the dipstick (B on figure 1).
- Check the oil level of the engine. Engine must be in a level position. Remove the oil filler cap/ dipstick (C on figure 1). Oil level should be at bottom edge of the oil fill hole.
- 4. Check the presence and state of the water inlet gasket (D on figure 2).
- 5. Check the water inlet filter. Unscrew the bowl (E on figure 2) and rinse if needed. Remove and clean the filter screen (F on figure 3). Put back in place the screen and bowl.
- Check the state of the fuel oil filter (G on figure 4). Replace the filter if it is damaged or dirty.













WARNING: to avoid injuries :

- Before inspecting, cleaning, or repairing, make sure the machine is parked on a flat level surface, with wheel brake on and remove the engine key from switch.
- Risk of injection; always put the safety-catch on the gun as soon as the gun is not used, and especially for replacement of nozzles.
- Always wear long clothes, gloves and safety glasses when inspecting, cleaning, repairing and operating this machine.

Filling the fuel tanks

- 1. Remove the cap (H on figure 5) from the engine gas tank.
- 2. Fill with unleaded gasoline with a pump octane rating of 86 or higher. Do not overfill. Do not fill above the top of the fuel filter screen. Avoid water or dirt entering while filling the tank.
- 3. Screw back the gas tank cap.
- 4. Remove the cap (I on figure 5) from the oil tank.
- 5. Fill with #2 furnace oil (or lighter) or diesel. Do not overfill. Do not fill the collar of the tank. Do not use gasoline, crankcase draining or oil containing gasoline or solvents.
- 6. Screw back the oil tank cap.



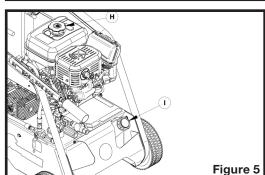
DANGER:

Do not remove fuel caps nor add fuel when the engine is running or hot.



WARNING:

- Refuel outdoors only and in a well-ventilated area with the equipment stopped.
- If any fuel is spilled, clean it up completely and allow vapors to dissipate before starting the engine.
- Do not refuel while smoking, near an open flame, sparks, or other heat source.



Starting the engine

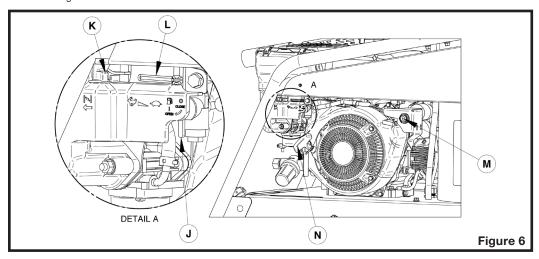
DO NOT START THE ENGINE WITHOUT SUPPLYING WATER TO THE PUMP

These instructions will be useful for the following sections and will be referred to as "start the engine".

Starting the engine with the electric starter:

- 1. Turn down the fuel valve (J on figure 6) to open.
- 2. Close the choke by moving the lever (K on figure 6) completely to the left.
- 3. Move the throttle lever (L on figure 6) from the right to 1/3 of the way to the left.
- 4. Turn the engine switch (M on figure 6) to ON position.
- 5. Turn the engine switch (M on figure 6) to START position until the engine starts.
- 6. When the engine starts, let the switch go back to ON position.
- 7. As engine warms, gradually open the choke by moving the lever (K on figure 6) to the right.
- 8. Let the engine idle for a couple of seconds.
- 9. Move the throttle lever (L on figure 6) completely to the left, to full throttle.

NOTE: do not use the electric starter for more than 5 seconds at a time. If the engine fails to start, release the switch and wait 10 seconds before operating the starter again.



Starting the engine with the starter grip:

- 1. Turn down the fuel valve (J on figure 6) to open.
- 2. Close the choke by moving the lever (K on figure 6) completely to the left.
- 3. Move the throttle lever (L on figure 6) from the right to 1/3 of the way to the left.
- 4. Turn the engine switch (M on figure 6) to ON position.
- 5. Pull the start grip (N on figure 6) lightly until resistance is felt, and then pull briskly. Do not allow the starter grip to snap back against the engine. Return it gently to prevent damage to the starter.
- 6. As engine warms, gradually open the choke by moving the lever (K on figure 6) to the right.
- 7. Let the engine idle for a couple of seconds.
- 8. Move the throttle lever (L on figure 6) completely to the left, to full throttle.

A DANGER:

• Never run the engine indoors or in a poorly ventilated area such as tunnel or cave.

Cold water pressure washing

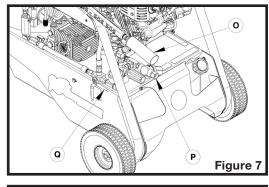
- 1. Fill the fuel tanks (see "Filling the fuel tanks" previous section).
- 2. Remove the washing nozzle or weed killing tool at the wand outlet (0 on figure 7).
- 3. Connect a water supply hose at the machine inlet (P on figure 7) and open the hose valve. The supply hose flow rate must be at least 4 gpm (15 l/min).
- 4. Turn the mode selection valve (Q on figure 7) on the side of the machine, to "Washer" position.
- 5. Depress the gun trigger (R on figure 8) until water flows out limpid and regularly. Release the gun trigger.
- 6. Install a high pressure nozzle (S on figure 8) at the wand outlet (T on figure 9):

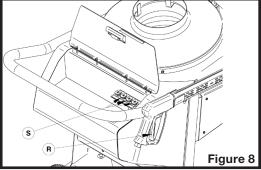
Yellow = 15° angle, heavy dirt

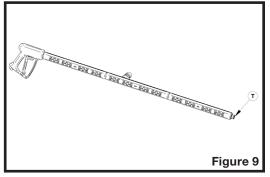
Green = 25° angle, medium dirt

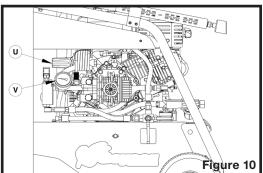
White = 40° angle, light dirt or rinse.

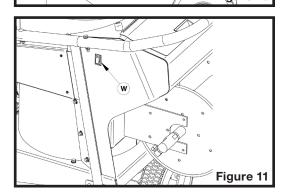
- Start the engine according to "Starting the engine" previous section and set the speed to full throttle.
- 8. Press the gun trigger and wash. Operate the gun continuously. Do not press and release the trigger in cycles of less than 5 seconds.
- 9. Pressure can be adjusted by means of the high pressure regulator (U on figure 10) up to 3500 psi. Pressure is read on the pressure gauge (V on figure 10).
- 10. To stop, see section "Stopping procedure" further in this manual.











Λ

WARNING:

The muffler and other engine parts become very hot. Do not touch with bare hand.

Hot water pressure washing

- 1. Follow steps 1 to 9 from "Cold water pressure washing" previous section.
- 2. Turn on the burner switch (W on figure 11).
- 3. Do not let the burner run when the oil tank is empty. Oil pump would be damaged.
- 4. To stop, see section "Stopping procedure" further in this manual.

WARNING:

- The muffler and other engine parts, the heating coil, outlet plumbing, hose reel, hose, gun, wand and nozzles and tool become very hot. Do not touch with bare hand.
- If any fuel is spilled, clean it up completely and allow vapors to dissipate before starting the
 engine.
- Do not refuel while smoking, near an open flame, sparks, or other heat source.

Injecting soap

- 1. If the machine is running in hot water pressure washing mode, turn off the burner switch (W on figure 11) and keep water flowing until its temperature is less than 100°F (40°C).
- 2. Remove the high pressure nozzle at the wand outlet and replace it by the black soap nozzle (X on figure 12).
- 3. Insert the soap filter and hose (Y on figure 13) in a liquid soap container.
- 4. Rate of injected soap can be adjusted using the soap valve (Z on figure 13).
- 5. Depress the gun trigger. Water and soap mix will take 30 seconds to reach the nozzle and flow out.
- 6. Once soap application is finished, remove the soap nozzle and install a high pressure nozzle to rinse (yellow, green or white). Soap will flow out for 30 seconds and then stop.

IMPORTANT:

• If corrosive products have been injected, rinse injector by injecting water for a couple of minutes.

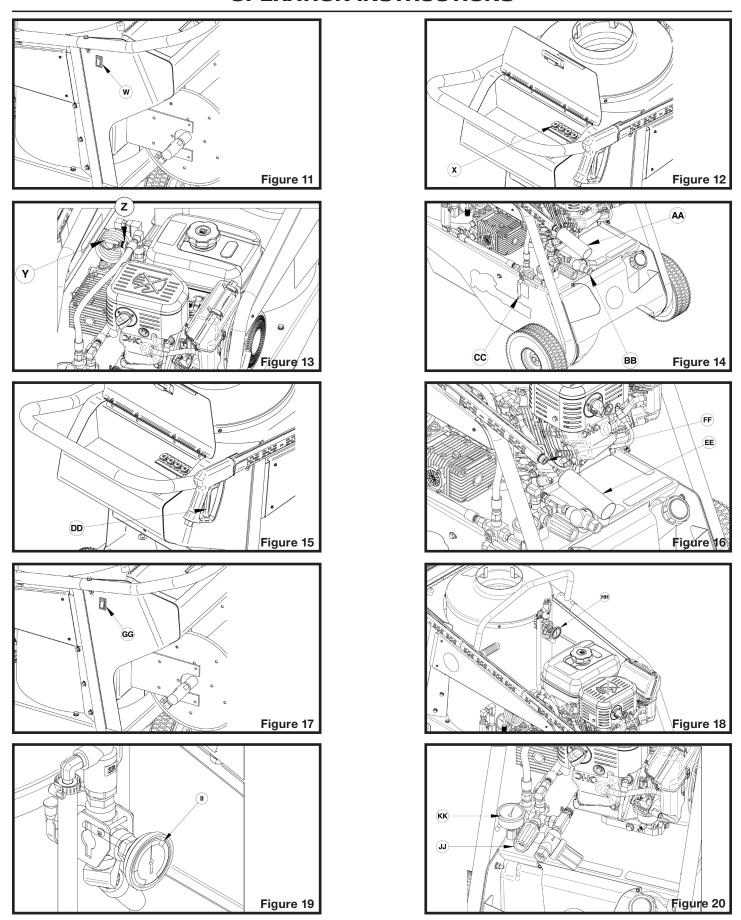
Weed killing

- 1. Fill the fuel tanks (see "Filling the fuel tanks" previous section).
- 2. Remove the washing nozzle or weed killing tool at the wand outlet (AA on figure 14).
- 3. Connect a water supply hose at the machine inlet (BB on figure 14) and open the hose valve. The supply hose flow rate must be at least 4 gpm (15 l/min).
- 4. Turn the mode selection valve (CC on figure 14) on the side of the machine, to "Weed killer" position.
- 5. Depress the gun trigger (DD on figure 15) until water flows out limpid and regularly. Release the gun trigger.
- 6. Install the weed killing tool (EE on figure 16) at the wand outlet (FF on figure 16).
- 7. Start the engine according to "Starting the engine" previous section and set the speed to full throttle.
- 8. Turn on the burner switch (GG on figure 17).
- 9. Do not let the burner run when the oil tank is empty. Oil pump would be damaged.
- 10. Press the gun trigger. Operate the gun continuously. Do not press and release the trigger in cycles of less than 5 seconds.
- 11. Temperature will start to increase. Temperature is read on the thermometer (HH on figure 18).
- 12. Temperature will increase fast in the beginning, then slowly, and will finally stabilize (about 3 minutes from beginning to stabilization).
- 13. To be sure that all vegetation will be killed, temperature should be in the green zone on the thermometer (II on figure 19).
- 14. If temperature is not in the green zone, readjust weed killing pressure. If temperature is too high, increase pressure using the weed killing pressure regulator (JJ on figure 20). Pressure is read on the pressure gauge (KK on figure 20). If temperature is too low, decrease pressure with the weed killing pressure regulator. A 5 psi (0.3 bar) variation will cause a 1°F (0.6°C) variation. Normal pressure should be around 350 psi (24 bar).
- 15. For best results, keep the weed killing tool at 6 to 12 inches (15 to 30 cm) from vegetation to kill. Do not move the weed killing tool too fast; temperature of the plant would not increase enough to kill it.
- 16. To stop, see section "Stopping procedure" further in this manual.

IMPORTANT:

Do not touch grass you want to keep with water exceeding 175°F (80°C), hot water would kill it.

See pictures on the next page (12)

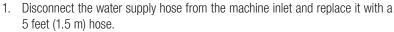


Stopping procedure

- 1. If the machine has been used for hot water pressure washing or for weed killing, turn off the burner switch (LL on figure 21).
- 2. If the machine has been used for soap injecting, install a high pressure yellow, green or white nozzle (MM on figure 22) at wand outlet (NN on figure 22).
- 3. Depress the gun trigger until water flows out limpid and regularly, and at a temperature of less than 100°F (40°C).
- 4. Release the gun trigger.
- 5. Move the throttle lever (00 on figure 23) completely to the right.
- 6. Let the engine idle for a couple of seconds.
- 7. Turn off the engine switch (PP on figure 23).
- 8. Turn right the fuel valve (QQ on figure 23) to close.
- 9. Close the water supply valve.
- 10. Depress the gun trigger to release pressure from the system.
- 11. Disconnect the water supply hose.
- 12. Make sure that all nozzles, tool, gun and wand are stored in their proper place.
- 13. Make sure that all safety equipment is stored in its proper place.



During winter and cold periods, if there is a freezing risk for the machine, it is recommended to take the following precautions immediately after stopping the machine:



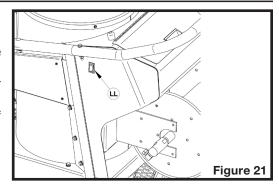
- 2. Place the free end of the hose into a container filled with a 50% antifreeze and 50% water solution. Use automotive antifreeze. NEVER use plumbing antifreeze, alcohol or windshield washer fluid.
- 3. Remove the nozzle or tool from the wand outlet.
- 4. Turn the mode selection valve to "Washer" position.
- 5. Start the engine and let it idle.
- 6. Do not turn on the burner switch.
- 7. Depress the gun trigger.
- 8. When the pump is primed and pumping antifreeze, release the gun trigger to fill the pressure washing by-pass line with antifreeze.
- 9. Turn the mode selection valve to "Weed killer" position.
- 10. Depress the gun trigger for a couple of seconds.
- 11. Release the gun trigger to fill the weed killing by-pass line with antifreeze.
- 12. Depress the gun trigger again until antifreeze begins to flow out from the wand outlet, and then release the trigger.
- 13. Stop the engine.
- 14. Depress the gun trigger to release pressure from the system.

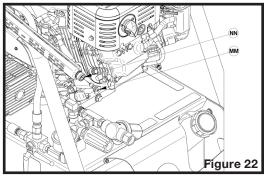
Antifreeze can be recovered at the next use and be used again on condition that you measure the concentration and add antifreeze to the solution if needed. To recover antifreeze, connect a water supply hose to the machine inlet and open the supply hose valve. Do not start the engine. The water supply pressure will be sufficient to slowly push solution to the outlet.

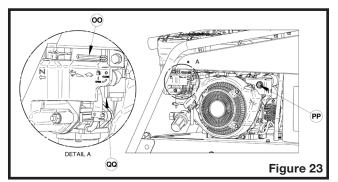
Dispose of used antifreeze according to environmental laws. Keep it in a closed container, then bring to the nearest deposit. Do not throw to garbage or pour in the soil or in a sewer.

IMPORTANT:

• Do not forget that at 32°F (0°C), the machine can freeze.







Engine oil change

The first engine oil change must be done after 10 hours of use. The next oil changes must be done after every 50 hours of use.

- 1. Place a container under the machine to recover used oil.
- 2. Unscrew the oil drain plug (A on figure 1).
- 3. Let oil flow slowly to avoid splash.
- 4. When engine crankcase is empty, screw back the drain plug.
- 5. Unscrew the oil filler cap/dipstick (B on figure 2).
- 6. Fill with SAE 10W-30 oil to bottom edge of the oil fill hole. Engine crankcase capacity is 40 ounces (1.2 l).
- 7. Screw the oil filler cap/dipstick back in place.

IMPORTANT:

Dispose of used oil according to environmental laws. Keep it in a closed container, and then bring to the nearest deposit. Do not throw to garbage or pour in the soil or in a sewer.

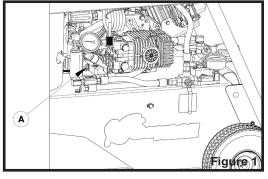
Pump oil change

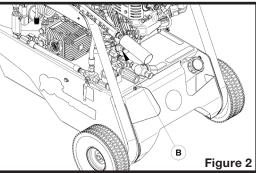
The first pump oil change must be done after 10 hours of use. The next oil changes must be done after every 200 hours of use.

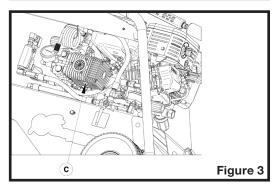
- 1. Place a container under the pump to recover used oil.
- 2. Unscrew the oil drain plug (C on figure 3).
- 3. Let oil flow slowly to avoid splash.
- 4. When pump crankcase is empty, screw back the drain plug.
- 5. Unscrew the oil filler cap/dipstick (D on figure 4).
- 6. Fill with NON DETERGENT SAE 30 oil to halfway on the sight glass (E on figure 4). Pump crankcase capacity is 14 ounces (0.4 l).
- 7. Screw the oil filler cap/dipstick back in place.

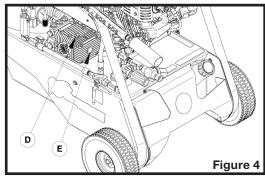
IMPORTANT:

Dispose of used oil according to environmental laws. Keep it in a closed container, and then bring to the nearest deposit. Do not throw to garbage or pour in the soil or in a sewer.









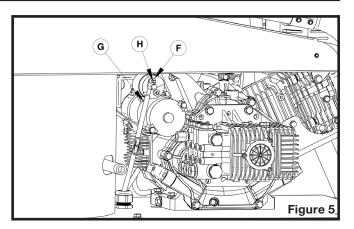
Battery

DISCONNECTED BATTERY:

When you receive your high pressure washer/weed killer, the battery has been disconnected to avoid long term discharging.

INITIAL START-UP:

Recharge the battery to full capacity before connecting it to the machine. Look for the positive wire (G on figure 5) between the engine and the heating coil. Take off the plastic insulator and keep it in the storage compartment for further use. Make sure that the now non-protected connector does not touch grounded metallic parts. Refer to "Recharging the battery", further in this section.



CONNECTING THE BATTERY:

Before connecting the battery, make sure that all switches are turned off. Unscrew the starter connection nut (F on figure 5). Connect the positive wire (G on figure 5) to the starter bolt (H on figure 5). Screw back the starter connection nut. When proceeding to this connection, make sure that the wire connector and metallic tools do not cause a short circuit between the positive wire and nut and all surrounding grounded metallic parts.

DISCONNECTING THE BATTERY:

Before disconnecting the battery, make sure that all switches are turned off. Disconnect the positive wire (G on figure 5) from the starter bolt (H on figure 5) and place an insulator on the wire connector; you may use the original insulator that was installed on the machine when you received it. When disconnecting, make sure that the wire connector and metallic tools do not cause a short circuit between the positive wire and nut and all surrounding grounded metallic parts.

STORAGE:

If the machine is not to be used for more than a month, disconnect the battery according to above instructions and recharge it to full capacity. Before the next use, recharge again the battery to full capacity before connecting it. If the machine is stored in a cold place, it is not necessary to remove the battery from the machine. The battery loses its charge slower in cold conditions than in a heated place. If storage has to be extended, recharge the battery to its full capacity every 3 months.

ELECTROLYTE:

Every 100 hours of work or every 6 months, check the battery electrolyte (acid) level. Each cell must be individually checked. Level must be between minimum level and maximum level indicated on the battery casing or it must slightly cover the top of the plates. Electrolyte level must be checked when the battery is fully charged. If it is necessary to add liquid to electrolyte, use distilled water. Do not add acid or tap water.

The top of the battery must be kept clean and dry. Keep vent caps in place during use and recharging. Remove them only to check electrolyte level or to add distilled water.

RECHARGING THE BATTERY:

Use a charger that regulates voltage to a fixed level. This regulated voltage must be between 14 and 14.5 volts. The charger must also have an ammeter. The ammeter will be used to determine at which moment the battery is fully charged. For more security, use a charger with a protection system against reversed polarities or, at least, with a polarity indicator.

Make sure the charger is turned off before connecting it to the battery to be charged. First, connect the red alligator clip (positive) to the battery positive wire. Wrap the connection, if needed, to avoid short circuit with surrounding grounded parts. Only after that, connect the black alligator clip to a grounded part of the machine, like an engine bolt. Anchor securely the clips claws to metal. After that, turn on the charger.

While recharging, avoid any source of heat, sparks, or open flame near the battery; gasses produced are explosive.

Because voltage is regulated by the charger, the battery accepts only current that it can take according to its condition and state of charge. Current is higher in the beginning and slowly decreases. When current is less than 0.6 ampere, the battery is fully charged. At this moment, turn off the charger and disconnect the alligator clips, beginning with the negative clip. In the case of a dead battery, recharging may take up to 8 hours.

The charger must be attended while recharging. If the charger is not stopped when the battery is fully charged, additional charging will cause sulphatization of the battery plates, reducing power and also reducing the battery expected life.



WARNING:

- The battery contains sulphuric acid. Avoid contact with skin, eyes or cloths. Wear rubber gloves and eyeglasses or visor when handling, filling or recharging the battery. If electrolyte splashes in the eyes or on the skin, rinse with a large quantity of pure water and call a physician immediately.
- The battery produces gaseous hydrogen and oxygen while recharging. Keep away all sources of lighting. When checking electrolyte level, use a flashlight or permanent light for lighting. Do not turn on or turn off the lighting source near the battery. Do not smoke or produce sparks.



CAUTION:

- Always disconnect the battery before recharging.
- Recharge only in a well vented area.
- Never let metal tools, like wrenches or screwdrivers, rest onto the battery.
- Never disconnect a running battery. Turn off all the switches first.

Descaling the heating coil

Periodically check for possible lime formation into the water circuit. If necessary, proceed as follow:

- 1. Use a container that can contain at least 4 gallons (20 liters) and pour in water and a special scaling acid solution like the MS-DETAR6K, following the manufacturer recommended mixing.
- Install a 5 ft x ½» of inside diameter (1.5 m x 13 mm) hose at pump inlet; put the free end of the 5 ft hose into the container. Remove the nozzle or tool at the wand outlet and put the wand in that same container.
- 3. Close the metering valve on the soap injector.
- 4. Start the engine. Set the engine to mid-speed. DO NOT TURN THE BURNER ON. Depress the gun trigger. Let the solution circulate into the system for approximately one hour or until the layer of lime has dissolved. As hard water neutralizes acid, in extreme cases you may have to change the solution during the treatment.
- 5. When the operation is completed:
 - Clean the pump inlet filter
 - Connect a water supply hose to the machine inlet
 - Start the engine and depress the gun trigger
 - Run the machine until water flows out limpid and regularly.
 - Release the gun trigger and stop the engine.

IMPORTANT:

To prevent possible damages, avoid splashing or spilling solution on the machine or its components during the scaling operation.



WARNING: to avoid injuries:

Always wear long clothes, gloves and safety glasses when descaling a heating coil.

Storage

If the machine is to be stored for a long time, take the following precautions:

- 1. Winterize the machine. Follow instructions specified at the end of previous section.
- 2. Using a siphon, empty the engine gas tank.
- 3. Recirculate antifreeze. Suck antifreeze from the container and return it into the same container. To empty the carburetor, start the engine and let it run until engine stops by itself.
- 4. Using a siphon, empty the oil tank.
- 5. Change the engine oil. Follow instructions specified earlier in this section.
- 6. Change the pump oil. Follow instructions specified earlier in this section.
- 7. Disconnect and charge the battery. Follow instructions specified earlier in this section.
- 8. Store the machine in a cool dry place, sheltered against rain and well ventilated.

When the time comes to restart the machine, take the following precautions:

- 1. Make sure that all hoses are in good state, not cracked or crushed.
- 2. Check the state of the fuel oil filter. Replace the filter if it is damaged or dirty.
- 3. Check the presence and condition of the water inlet gasket.
- 4. Change the engine oil. Follow instructions specified earlier in this section.
- 5. Change the pump oil. Follow instructions specified earlier in this section.
- 6. Recover antifreeze from the machine. Follow instructions specified at the end of previous section.
- 7. Charge and connect the battery. Follow instructions specified earlier in this section.
- 8. Check the general condition of the machine. Perform a complete visual inspection.
- 9. When everything seems to be perfect, fill the tanks and start the machine.

WARNING:

- Refuel outdoors only and in a well-ventilated area with the equipment stopped.
- If any fuel is spilled, clean it up completely and allow vapors to dissipate before starting the engine.
- Do not refuel while smoking, near an open flame, sparks, or other heat source.
- Always wear long clothes, gloves and safety glasses when inspecting, cleaning, repairing and operating this machine.
- The battery contains sulphuric acid. Avoid contact with skin, eyes or cloths. Wear rubber gloves and eyeglasses or visor when handling, filling or recharging the battery. If electrolyte splashes in the eyes or on the skin, rinse with a large quantity of pure water and call a physician immediately.
- The battery produces gaseous hydrogen and oxygen while recharging. Keep away all sources of lighting. When checking electrolyte level, use a flashlight or permanent light for lighting. Do not turn on or turn off the lighting source near the battery. Do not smoke or produce sparks.



CAUTION:

- Always disconnect the battery before recharging.
- Recharge only in a well vented area.
- Never let metal tools, like wrenches or screwdrivers, rest onto the battery.
- Never disconnect a running battery. Turn off all the switches first.

PERIODIC MAINTENANCE SCHEDULE TABLE

Maintenance items	Daily	Every 50 hours	Every 100 hours	Every 200 hours	Every 500 hours	Every 1000 hours
Check general condition of the machine	•					
Check engine oil level	•					
Check pump oil level	•					
Check hoses condition	•					
Check water inlet gasket and filter	•					
Check fuel oil filter condition	•					
Change engine oil		•	Initia	al 10 ho	urs	
Check bolts and nuts tightening		•				
Clean engine air cleaner		•				
Clean engine spark plug			•			
Check battery electrolyte			•			
Change pump oil	Ini	tial 10 h	ours	> •		
Replace fuel oil filter				•		
Replace engine air cleaner element				•		
Clean engine fuel cup				•		
Clean and adjust engine spark plug				•		
Replace engine spark plug					•	
Clean and adjust engine carburetor					•	
Replace burner nozzle					•	
Replace fuel lines						•

FAULT	CAUSE	REMEDY
ENGINE		
The engine starter does not work.	Discharged battery.	Charge battery. Check engine charging system.
	Defective battery.	Replace battery.
The engine stops and does not restart.	The oil level is too low. The engine oil alert system cuts the ignition.	Add oil in the engine crankcase. Adjust oil level.
The engine does not start.	No fuel in tank.	Check fuel level.
	Fuel valve close.	Open fuel valve.
	Choke open.	Close choke to start.
	Bad fuel; wrong fuel; contaminated fuel.	Drain fuel tank and carburetor. Refuel with fresh gasoline.
	Spark plug wet with fuel (flooded engine).	Dry and reinstall spark plug. Start engine with throttle lever in maximum speed position.
	Spark plug faulty, fouled or improperly gapped.	Adjust or replace spark plug.
	Carburetor, ignition, valves, etc.	Take engine to an authorized Subaru service center.

FAULT	CAUSE	REMEDY
PUMP The motor runs but the pump does not work.	The pump valves are jammed by dirt.	Clean the valves. Check or add a filter at the pump inlet.
	The O' rings of the valves are damaged.	Replace.
	The pump key is broken.	Replace.
The pump runs, but does not give maximum pressure.	The nozzle is worn or has not the proper size.	Check for the recommended size or replace.
	The reading of the gauge is wrong.	Replace the gauge.
	The soap nozzle or weed killing tool is installed.	Replace with a high pressure nozzle.
	Leaks in the high pressure line.	Stop the leaks.
	The seat or the valve of the washing regulator are dirty or worn.	Check, clean or replace the defective parts.
	The pump valves are worn or dirty.	Clean or replace.
	Pump water seals are worn.	Replace.
	Pump is sucking air.	Check the supply piping.
	Water supply is insufficient.	Check if supply flow provides the pump's needs.
Fluctuating pressure.	Valves are worn or dirty.	Clean or replace.
	Water seals are worn.	Replace.
	Pump is sucking air.	Check the supply piping.
	Water supply is insufficient.	Check if supply flow provides the pump's needs.
Excessive vibration in delivery hose	Pump valves are dirty or worn.	Clean or replace.
and gun.	Pump water seals are worn.	Replace.
	A connecting rod is broken.	Replace.

FAULT	CAUSE	REMEDY
PUMP	Design as a superior	Bankas
Noisy pump.	Bearings are worn.	Replace.
	Pump is sucking air.	Check the supply piping.
	Water supply is insufficient.	Check the supply flow.
	Inlet water temperature is too high.	Lower the inlet water temperature.
	The pump key is worn.	Replace.
Presence of water in oil (white oil).	Pump water seals are worn.	Replace.
	High humidity in the air.	Increase the oil change frequency.
	Cleaning of the pump with the nozzle.	Never direct the jet toward the machine.
Oil dripping under the pump.	Crankshaft oil seal broken or worn.	Replace.
	Piston guide scratched or worn.	Replace.
	Piston guide oil seal broken or worn.	Replace.
	Air vent jammed.	Clean.
	Air vent replaced by a non-ventilated cap.	Put the origin parts back.
Water dripping between pump head and crankcase.	Pump water seals are worn.	Replace.

FAULT	CAUSE	REMEDY				
PRESSURE WASHING PRESSU	PRESSURE WASHING PRESSURE REGULATOR					
The regulator engages and releases when the gun trigger is released.	The gun does not properly close.	Adjust, repair or replace the gun.				
when the guir trigger is released.	Leaks on the high pressure line.	Stop the leaks.				
	The regulator check valve does not properly close.	Replace the defective parts.				
	The regulator piston seal kit is worn.	Replace the defective parts.				
	The regulator guide seal kit is worn.	Replace the defective parts.				

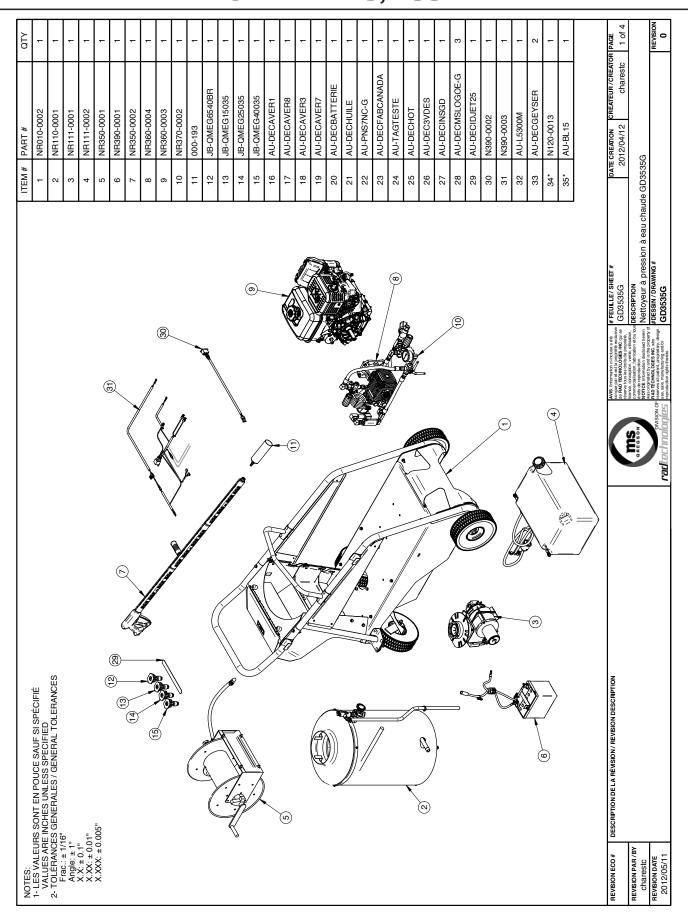
FAULT	CAUSE	REMEDY				
PRESSURE WASHING PRESSU	PRESSURE WASHING PRESSURE REGULATOR					
	Water coming into the soap jar.	Clean or repair the soap injector check valve.				
The regulator engages and releases when the gun trigger is engaged.	There is not enough flow to maintain the regulator engaged (jammed nozzle).	Clean the nozzle (problem encountered with interchangeable nozzles).				
Pump staying under pressure when the gun is released.	The gun does not properly close.	Repair the gun.				
guir is released.	The regulator check valve does not close.	Repair the check valve.				
Water dripping from the regulator guide.	The regulator guide seal kit is worn.	Replace the defective parts.				

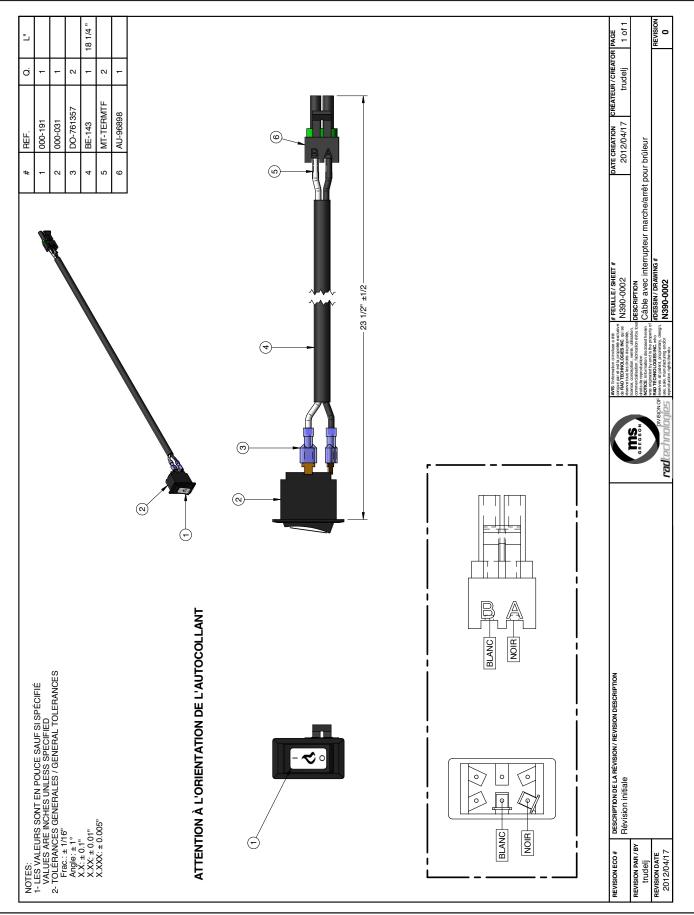
FAULT	CAUSE	REMEDY
WEED KILLING PRESSURE RE	GULATOR	
The regulator engages and releases when the gun trigger is released.	The gun does not properly close.	Adjust, repair or replace the gun.
Then are gan angger to released.	Leaks on the high pressure line.	Stop the leaks.
	The regulator check valve does not properly close.	Replace the defective parts.
	The regulator piston seal kit is worn.	Replace the defective parts.
	The regulator guide seal kit is worn.	Replace the defective parts.
The regulator engages and releases when the gun trigger is engaged.	There is not enough flow to maintain the regulator engaged (jammed nozzle in weed killing tool).	Clean the nozzle (problem encountered with interchangeable nozzles/tools).
Pump staying under pressure when the	The gun does not properly close.	Repair the gun.
gun is released.	The regulator check valve does not close.	Repair the check valve.
Water dripping from the regulator guide.	The regulator guide seal kit is worn.	Replace the defective parts.

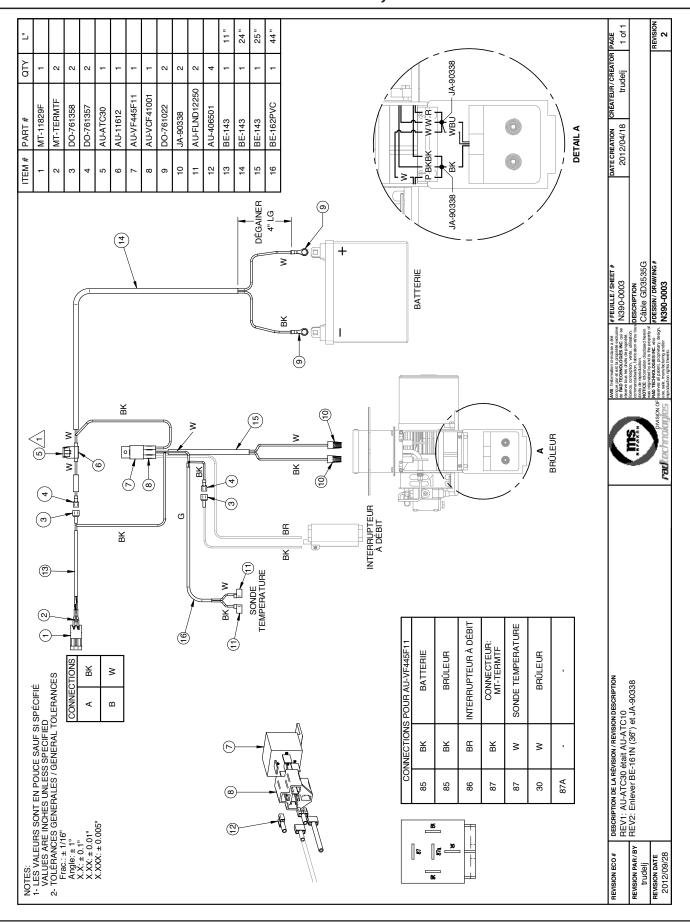
FAULT	CAUSE	REMEDY
SOAP INJECTOR		
Soap does not inject.	The soap hose or the soap filter is dirty.	Check and clean.
	The soap nozzle is not installed.	Install the soap nozzle.
	The injector is dirty or jammed.	Check and clean.
	The injector restrictor is worn.	Replace.
	The pressure hose is damaged or has a too small inside diameter.	Replace with a new hose of the right size.
	The pressure hose is too long.	Try with the original hose.
	The gun does not open enough.	Adjust the gun piston.
	The soap nozzle is dirty or damaged.	Clean or replace.
Water goes into the soap jar when in high pressure mode.	The injector check valve is dirty or worn.	Clean or replace.

FAULT	CAUSE	REMEDY
OIL BURNER		
The burner produces white smoke.	Presence of water into the oil tank.	Empty and clean the tank. Fill with clean oil.
	The tank is almost empty.	Fill the tank.
	The electrovalve is defective.	Repair or replace.
The burner produces black smoke.	Oil pressure is incorrect.	Adjust according to manufacturer recommendations.
	Air regulation is incorrect.	Adjust according to manufacturer recommendations.
	The oil nozzle is dirty or worn.	Replace.
	The oil pump is dirty.	Dismantle and clean.
	The oil filter is dirty.	Replace.
	The electrovalve is defective.	Repair or replace.

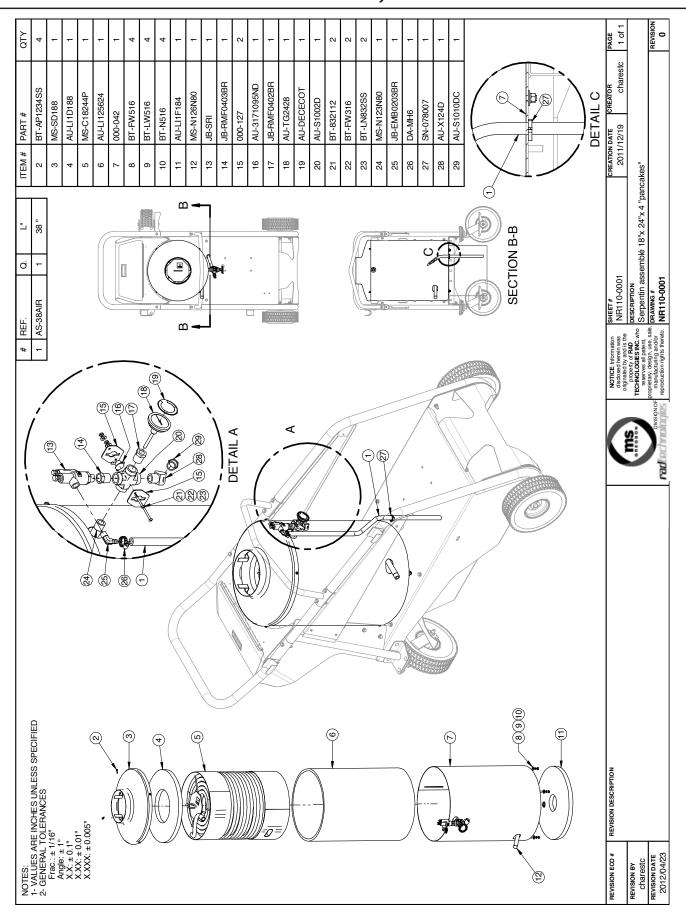
FAULT	CAUSE	REMEDY
OIL BURNER		
The water temperature is not sufficient.	Check the weed killing temperature and pressure.	Adjust the weed killing pressure.
	The high limit temperature switch is defective.	Replace.
	Lime has built up inside the heating coil.	Scale the coil (see maintenance section).
Several times, the burner runs for a few	The oil filter is dirty.	Replace.
minutes, then stops.	The coupling between the motor and the oil pump is damaged.	Replace.
The burner continues to heat when the	The flow switch is defective.	Repair or replace.
gun trigger is released.	The electrovalve is defective.	Replace.
The burner extinguishes or refuses to	The oil tank is empty.	Fill the tank.
light.	The oil filter is blocked.	Replace.
	The oil nozzle is blocked.	Replace.
	The oil pump is defective.	Repair or replace.
	The electrovalve is defective.	Replace.
	The coupling between the motor and the oil pump is broken.	Replace.
	The flow switch is defective.	Repair or replace.
	The high limit temperature switch is defective.	Replace.
	The fuse has blown.	Replace.
	The ignition transformer is defective.	Replace.
	The electrodes are defective or have moved.	Adjust the electrodes according to manufacturer recommendations or replace.
	The burner motor is defective.	Repair or replace.

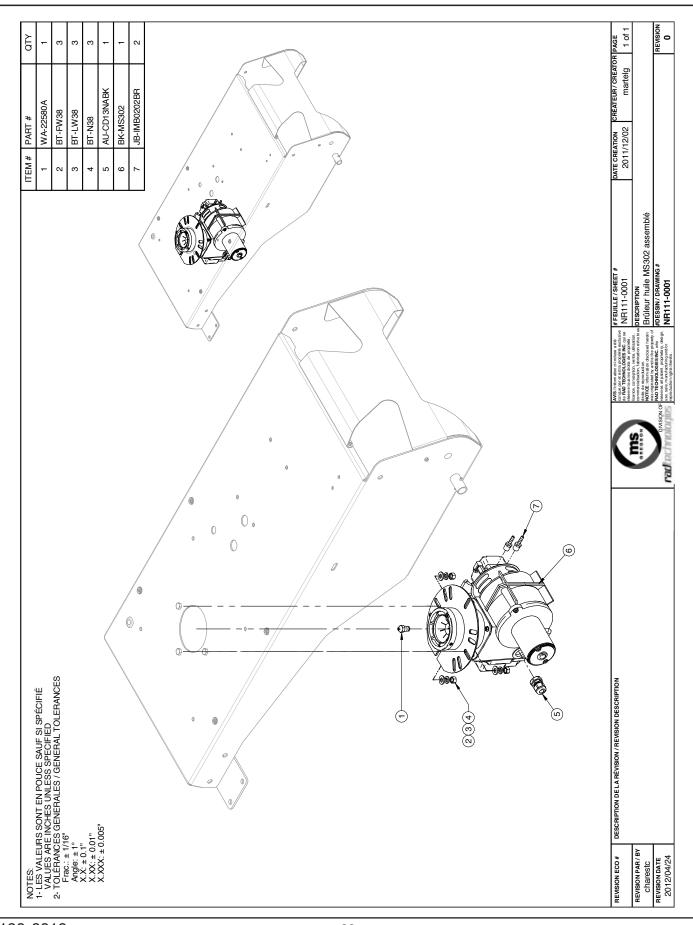


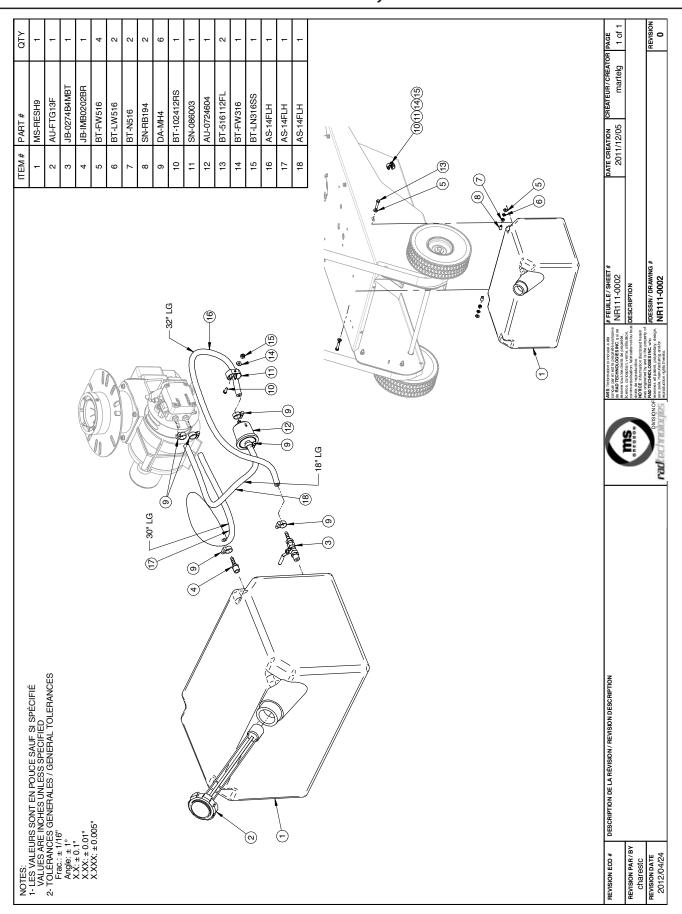


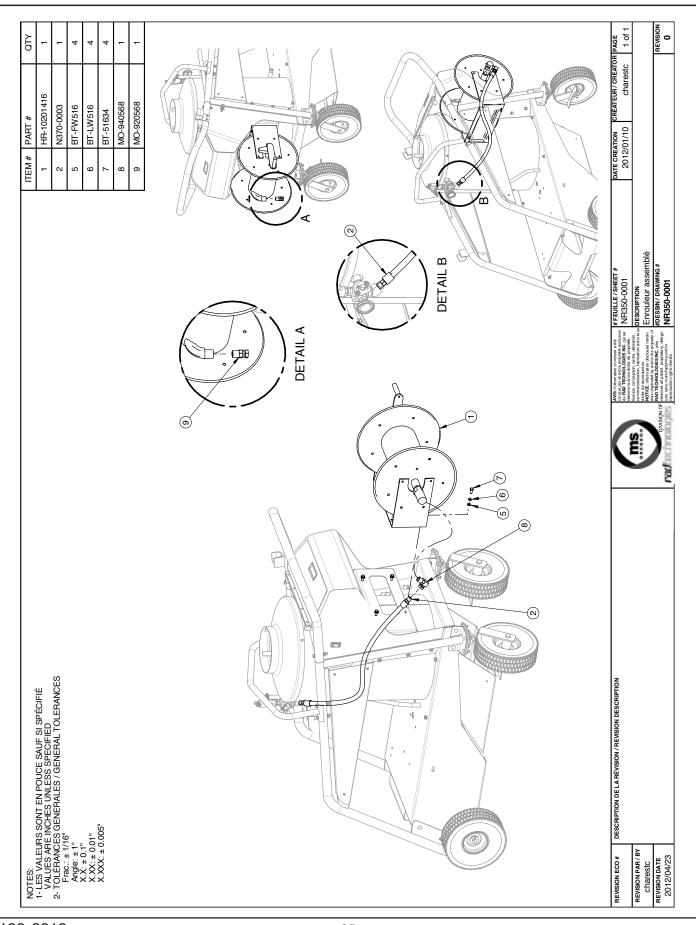


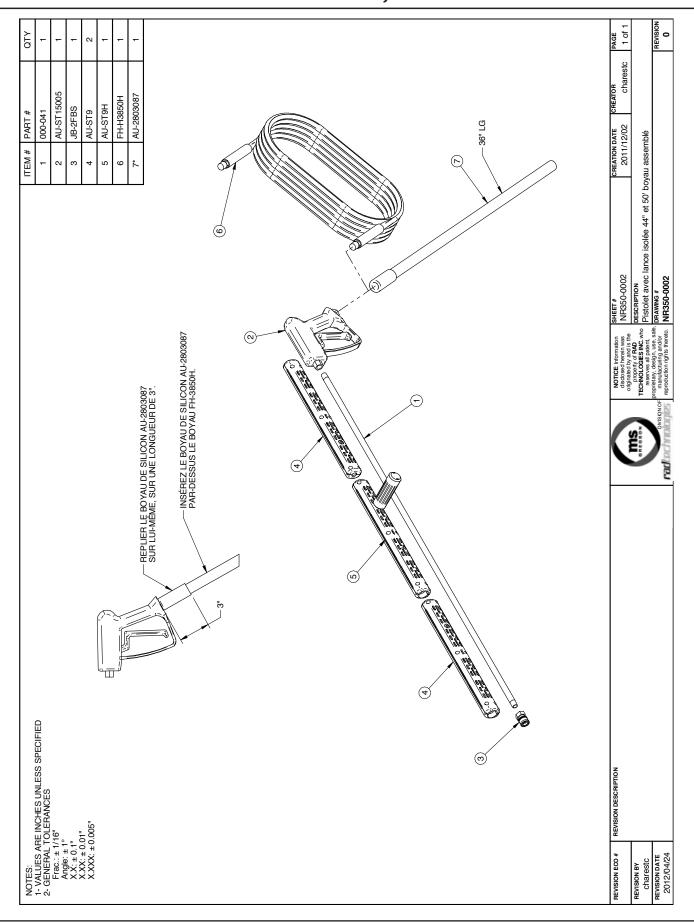
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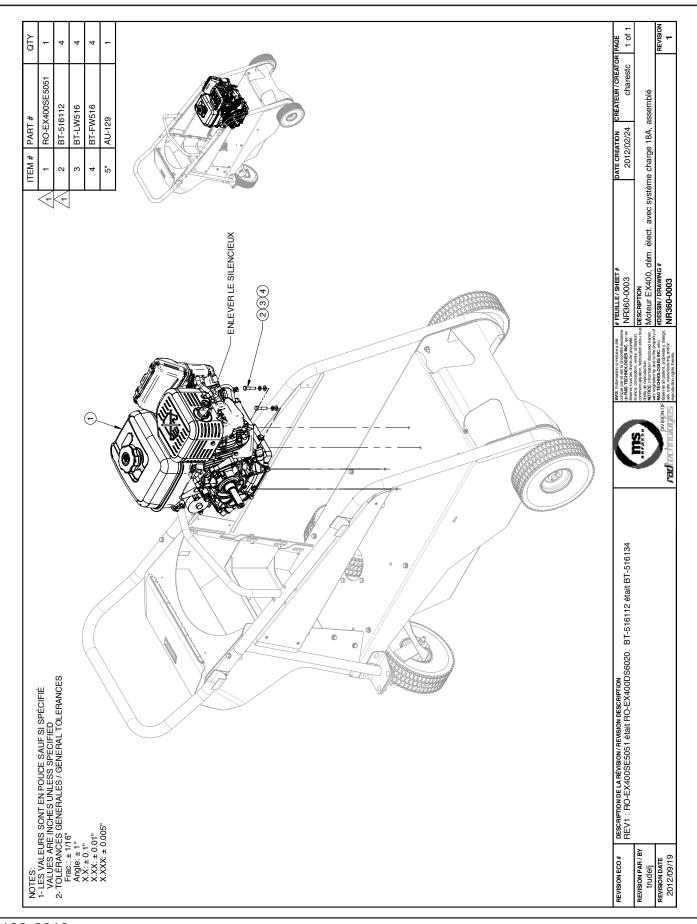


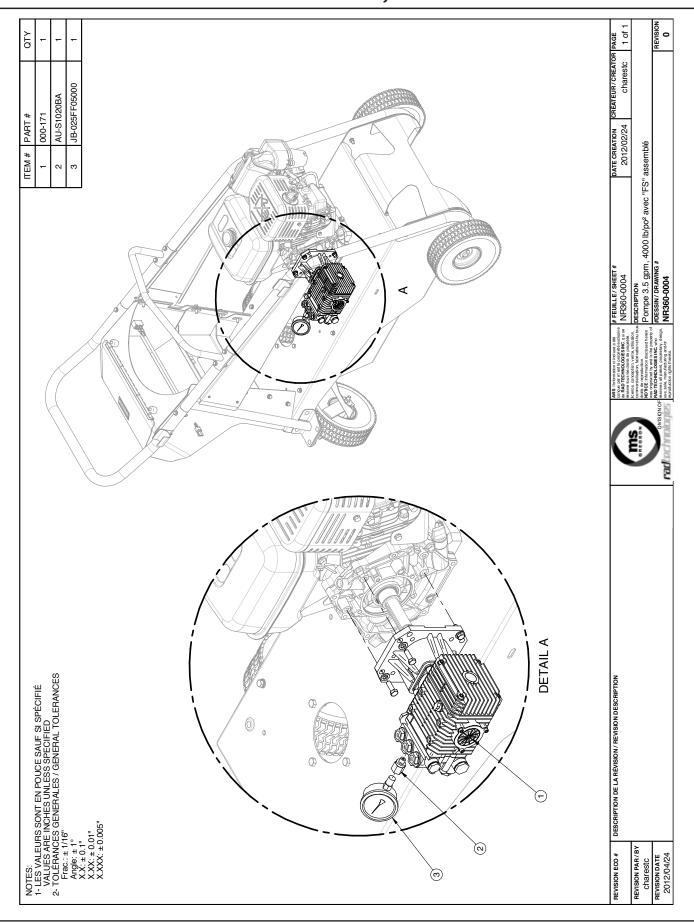


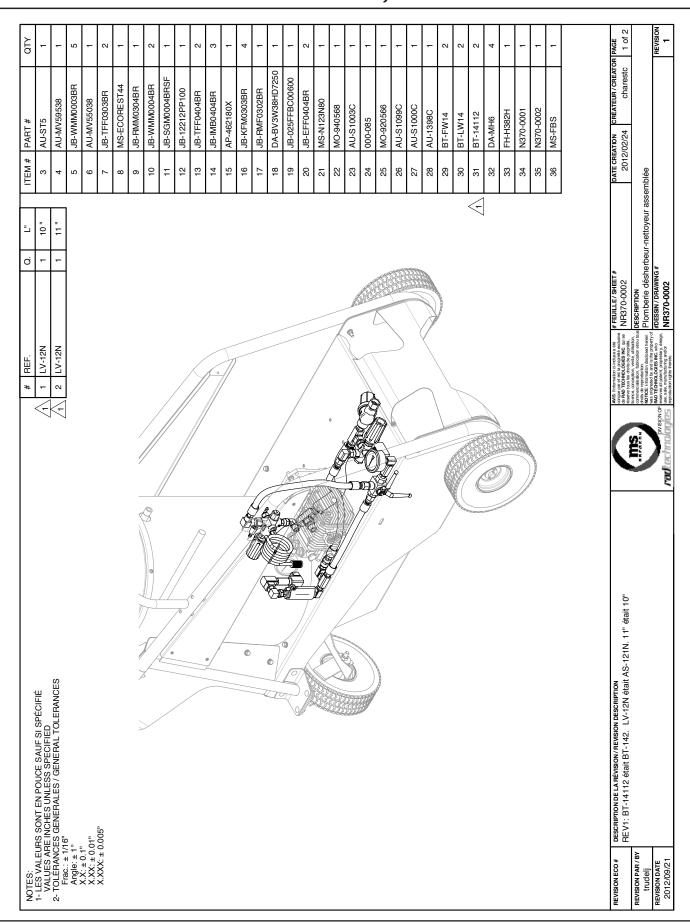


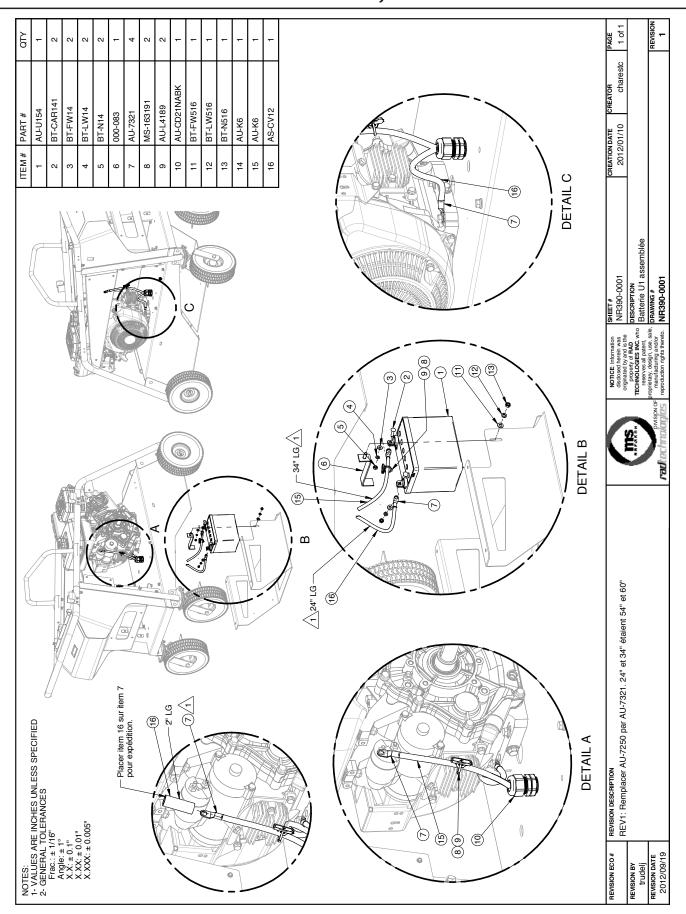


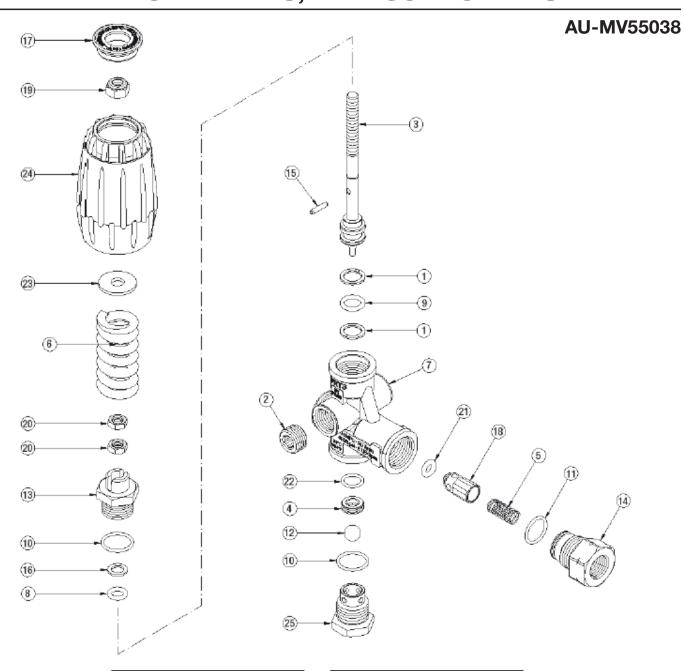






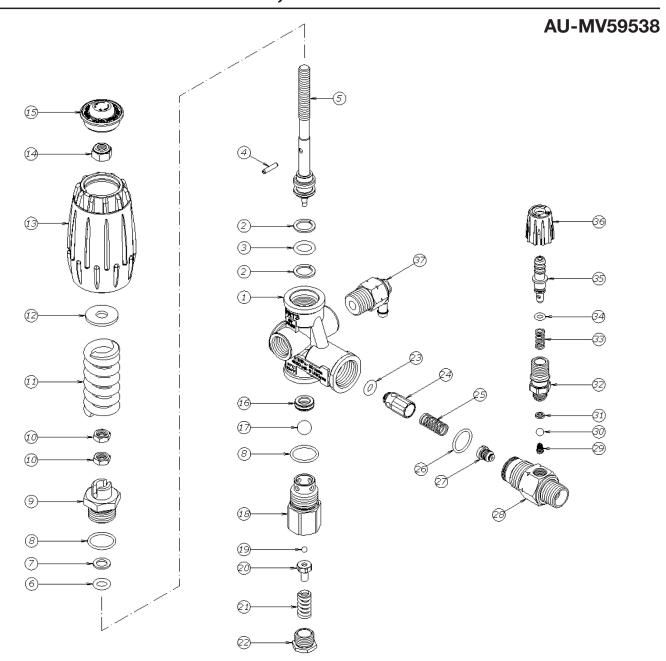






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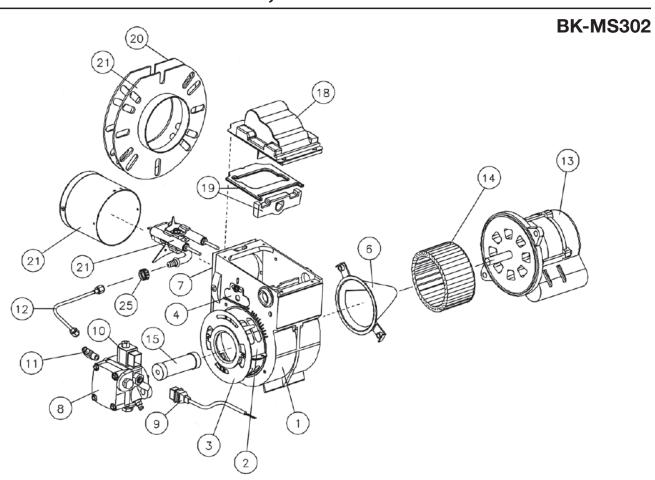


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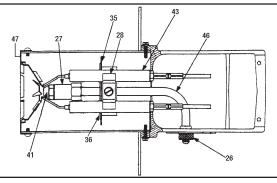
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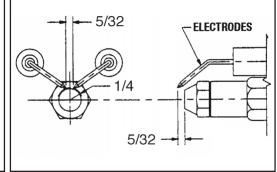


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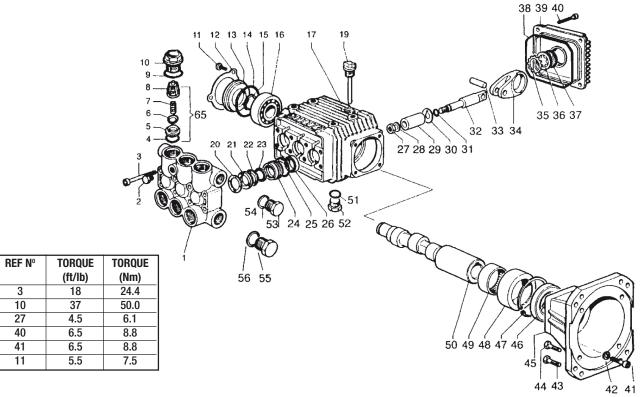
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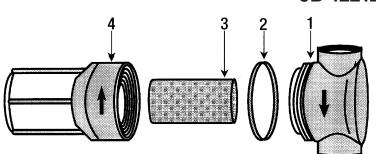
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10	CO-3202/269		6
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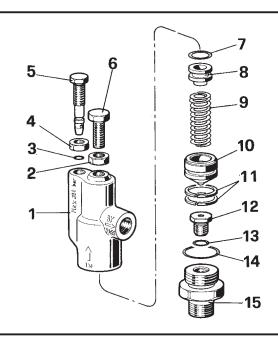
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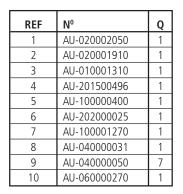
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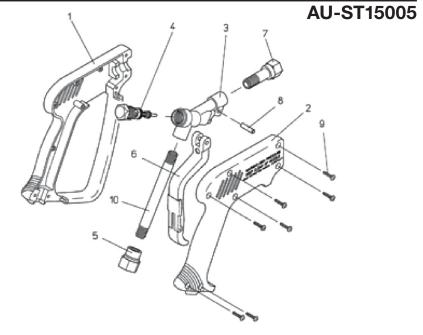


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N120-0013 45

NOTES

NOTES



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