

CONTRACTOR DIESEL



ALTO®
Why
Compromise™

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2003-11-11

**Wap
KEW**

TECHNOLOGIES

Congratulations!

We'd like to say, "Thank You" for choosing the CONTRACTOR DIESEL. This instruction manual is provided with your new High Pressure Washer to ensure that you obtain the best results, in the safest manner, with your new machine.

IMPORTANT

This machine is a High Pressure Washer, capable of producing 2600 psi (180 bar). Read this manual completely, before operating the machine. A complete understanding of the material in this manual will help you avoid possible injury or damage to other objects, as well as damage to the machine, itself. It's also important that you read the Ruggerini engine manual provided, before you begin to use this machine.

Sincerely,
ALTO Danmark A/S

Contents

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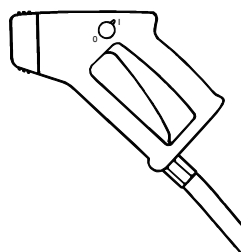
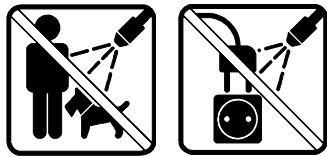
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Your CONTRACTOR DIESEL washer has been developed and manufactured in accordance with the latest working safety regulations.

Caution! However, to prevent possible personal accidents or damage to any other product, we advise you to read carefully through this section on safety precautions before you operate your washer for the first time.

General safety precautions

1. Always use both hands for operating spray equipment to maintain complete control of the lance.
2. Water jets should never be directed towards people, pets, electrical wiring or the ALTO CONTRACTOR DIESEL machine itself.
3. Always switch off engine during work breaks.
4. Connect or disconnect the high pressure hose ONLY when the engine is stopped.
5. Use only those hoses and nozzles specified by ALTO.
6. The machine should only run for a maximum of five minutes once the spray handle has been released (the pump then circulates the water internally and the machine will overheat unless stopped after 5 minutes).
7. The pump is equipped with a high pressure relief safety valve. This adjustment, like any others that require the use of tools, should only be made by a trained service technician.
8. Operating the machine when it, or any attachments are frozen, is dangerous. Be sure everything is thawed before operating the machine.
9. Manufacturer's instructions for the use of any detergents should be carefully observed at all times.
10. During work breaks, or any time lances or accessories are changed, the spray handle must be secured by rotating the safety knob into position O.



11. The machine must not be used in surroundings with risk of fire or explosion.
12. Exhaust from engine and burner contains poisonous carbon monoxide gases. Avoid inhalation of exhaust gases. Never run the machine in a closed garage or confined area.
13. To prevent fire hazards and to provide adequate ventilation, keep the engine at least 1m/3ft away from buildings and other equipment during operation.
14. Do not place flammable objects such as gasoline, matches, etc., close to the machine while it is running.
15. Allow only properly instructed personnel to use the machine.
16. Never let children operate your CONTRACTOR DIESEL at any time.
17. Don't use the machine if important parts of the equipment are damaged - i.e. safety devices, high pressure hoses, spray handle, cabinet.

1.1 Warning

Refilling with diesel:

Always stop the Ruggerini engine and allow it to cool off for at least two minutes before filling with diesel. Avoid spilling diesel. If diesel nevertheless is spilled while refilling, the engine must not be started before the spilled diesel has been removed. If the machine is located in a trailer, any diesel spillage must be removed before restarting the machine. Never use an open flame near the machine. It is forbidden to smoke while refilling with diesel. Read the instruction manual for the Ruggerini engine carefully.

NOTE: Never run the machine in a closed room. The exhaust gases are dangerous

1.2 Asbestos

To avoid release of asbestos fibers into the environment, ALTO strongly recommends that this machine not be used for cleaning of materials or surfaces of materials containing asbestos. If this machine is to be used for asbestos removal do so only in complete compliance with approved government guidelines and/or procedures.

2.0 Motor Protection Device

The diesel engine is equipped with a protection device called "Oil Alert", which stops the engine if the oil level is insufficient. If this occurs, check the engine for leaks, and after making sure the machine is level, refill it to the proper level. The engine can then be restarted.

3.0 Key photo's

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(See drawing on the cover)

1. Water inlet and filter
(quick-coupler for supply hose)
2. Pump oil level inspection and fill cup
3. Oil drain plug for pump
4. Sludge container
5. Engine oil dipstick and filler tube
6. Oil drain plug for diesel engine
7. Diesel filling cap
8. Burner coil
9. Fan for burner
10. High pressure outlet (male quick-connector)
11. Battery
12. Container rack for detergents
13. "Jerry-can" for heating oil
14. Burner fuel filter
15. Frame lift points
16. Thermostat
17. Thermometer
18. Key for electric start
19. Battery charge control
20. »Oil Alert« (see section 2.0)
21. Pressure gauge
22. Knob for adjustment of water volume
23. Fuse (protection of electronic unit)
rating 1.25 AT

Double spray lance with hose

24. High pressure, steam-capable hose
25. Male connector
26. Quick coupler
27. Pressure adjustment
28. Release trigger
29. Standard double spray lance
30. Low pressure nozzle
31. High pressure nozzle
32. Spray handle
33. Trigger safety knob
35. Data plate
36. Inlet hose w. filter

4.0 Application EN

ALTO's diesel powered high pressure washers can be used for all outdoor cleaning jobs for which steam, hot or cold water is used. Detergents can be used (see section 8.5)

4.1 Handling and Transport

When handling the machine with a fork lift truck, be sure the forks extend completely under the machine to prevent tipping. When lifting the machine, a sling may be wrapped around the upper frame tubes for lifting. Ensure that personnel aren't under or near the machine during lifting. When transporting the machine in a truck or trailer, be sure that it is secured against sliding or tipping.

5.0 Standard equipment

The machine is delivered with a double lance and a spray handle with high pressure steam-capable hose. The low pressure tube (pos. 30) is fitted with a flat jet nozzle 6530* and the high pressure tube (pos. 31) with a flat jet nozzle 1506*.

*) The first two digits of the nozzle number refer to the spray angle, in degrees. The last two digits indicate the water flow in l/min. at a pressure of 20 bar and a temperature of 20°C.

The actual nozzle orifice size are 0.63" (1.6 mm) for the nozzle 1506 and 0.142" (3.6 mm) for the nozzle 6530. NEVER replace the nozzles with those of a smaller size.

Maximum working pressure and temperature rating are embossed on the ALTO hose. Use only ALTO high pressure, steam-capable hoses. In case of damage to your hose, DO NOT attempt to repair the hose yourself! The thrust (backwards turned force) on the nozzle is approximately 12.5 ft/lb (55 N).

Since the nozzles are mounted at an angle to the lance, there will be a torque effect at the handle when spraying. Always use two hands when operating the spray equipment.

6.0 Accessories EN

In order that you may make the most of your high pressure washer, ALTO has produced a very comprehensive accessory program, including a pneumatic tire kit especially for the CONTRACTOR DIESEL.

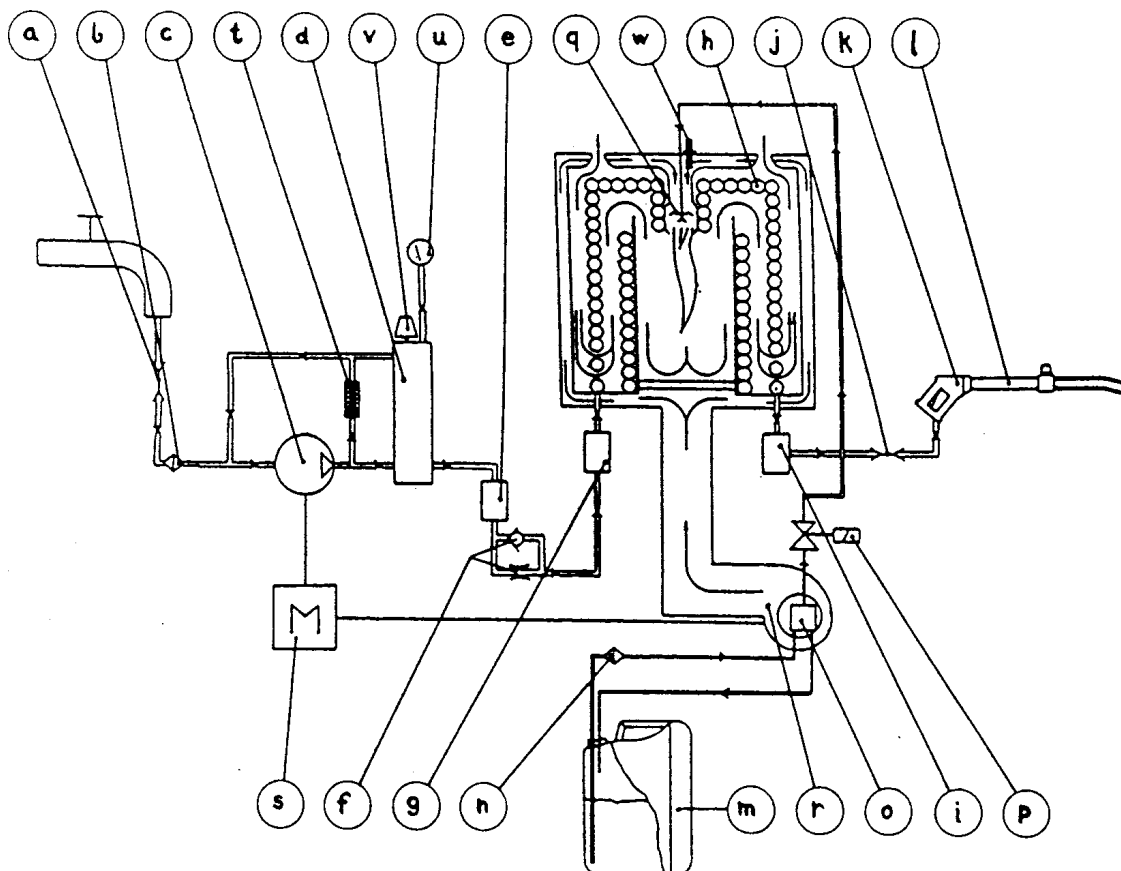
Please feel free to contact your ALTO supplier for further information.

7.0 Functional description

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The water passes from the inlet connector (a) through a water filter (b) and into the high pressure pump (c). The high pressure water is passed through the regulating unloader (recycling valve) (d) and the first flow control (e) to the throttle valve (f) and through the second flow control (g) into the burner-coil (h). Here the water is heated to the required temperature. At the outlet of the burner-coil the hot high pressure water passes the temperature sensor (i) and proceeds through the outlet connector (j) to the spray handle (k) and double spray lance (l). The fuel is drawn from the fuel tank (m) through the fuel filter (n) by the fuel pump (o). The fuel pump passes the fuel through the magnetic solenoid valve (p) to the fuel nozzle (q) where it is ignited. The combustion in the burner is monitored by the flame sensor (w) and is supplied with air from the fan (r), which together with the high pressure pump (c) are driven by the diesel engine (s).

- a Inlet quick-connector
- b Water filter
- c High pressure pump
- d Unloader/regulator (recycling valve)
- e Flow switch
- f Throttle valve
- g Flow switch
- h Burner coil
- i Temperature sensor
- j Outlet quick-connector
- k Spray handle
- l Double spray lance
- m Fuel tank "Jerry-can"
- n Burner fuel filter
- o Fuel pump
- p Magnetic solenoid valve
- q Fuel nozzle
- r Blower for burner
- s Diesel engine
- t Safety valve (internal)
- u Pressure gauge
- v Water volume adjustment
- w Flame sensor



7.1 High pressure pump

An unloader (recycling valve) and a safety valve are located on the pressure side of the high pressure pump. The unloader recirculates the water to the suction side of the pump when the spray handle is closed or if a nozzle is blocked. The safety valve is adjusted to approx. 25 bar (360 psi) above the working pressure. The high pressure pump should not run idle for more than 5 min., since the water inside the pump gets hot while it is recirculating. The unloader ensures there is no pressure in the pump when the engine is stopped. The unloader and safety valve are adjusted and sealed at the factory. DO NOT attempt to change this adjustment.

7.2 Burner system

The burner is controlled by electronic circuits which include a thermostat, flow switches to evaluate water flow and a sensor to monitor the flame. Water temperature is regulated by the thermostat. Flow switches ensure there is water flowing through the machine before allowing the burner to light. These devices are connected to a printed circuit board which activates a magnetic solenoid valve on the fuel pump to supply or stop fuel flow to the burner. There are two flow switches installed, for additional safety and protection of the burner coil. The circuit board ensures that they agree before allowing fuel to flow to the burner. The flame sensor is a separate circuit which stops the machine if there is no flame in the burner in hot water or steam mode.

It is important for the life of the fuel pump, that the machine is not allowed to run in the hot water or cold water mode, with empty fuel tank. If the burner stops working unexpectedly, check the fuel level in the tank and refill it if necessary.

7.3 Diesel engine

A description and operating/maintenance instructions for the Ruggerini engine will be found in the Ruggerini manual provided with the CONTRACTOR DIESEL. Please read this before starting up. The throttle limit of the engine has been adjusted by ALTO, so that the max. number of revolutions corresponds to the max. pressure of the pump. The adjustment is sealed. This adjustment must not be changed.

7.4 Spray lance

The double spray lance is fitted with 2 nozzles, a high pressure nozzle and a low pressure nozzle. When the pressure adjustment valve (pos. 27) is completely closed only the high pressure nozzle is used. Both the high pressure nozzle and the low pressure nozzle are used when the pressure adjustment valve is opened. Nozzles with smaller orifice size (0) than described in section 5.0 must not be mounted on the lance.

8.1 High pressure Hose

Connect the high pressure, steam-capable hose (pos. 24), to the outlet quick-coupling (pos. 10) on the machine front. Use only original ALTO high pressure, steam-capable hoses. The hose should not be exposed to abuse, such as knots, kinks, contact with sharp objects or external heat sources, as this may cause bursting. Only ALTO high pressure, steam-capable hose should be used for extension hoses. The extension hoses should not exceed a total maximum length of 300 ft (100 m).

8.2 Spray handle and lance

Check the male connector (pos. 25) of the spray lance for foreign material. With one hand, grasp the quick coupler fitting (pos. 26) and pull it forward. Insert the male connector of the lance or accessory into the spray handle quick-coupler, and release the fitting. Pull the lance or accessory forward to ensure it is correctly and tightly installed, before operating the machine. NEVER release a lance or accessory while water or steam are coming from the nozzles of the lance or accessory.

8.3 Water connection

The water inlet connection is at the front of the machine, on the pump (pos. 1). Before connecting the water supply hose, it should be flushed to remove any impurities. The machine can be connected directly to a pressurized water supply or a tank. The inlet pressure must not exceed 15 bar (218 psi) and the water temperature must not exceed 35°C (95°F). When the machine is connected to a water supply with back-flow-preventer the water supply hose must be at least 6 m (20 ft) in length. If there are impurities in the water source, it is advisable to provide additional filtration in the inlet line. Ask your ALTO representative about the filters and filters available for your CONTRACTOR.

8.4 Suction Mode

The machine is self priming, when used from a tank or stream, etc. The inlet hose must be filled with water before starting up. The self priming height depends on the water temperature. Max. self priming height of 5 m (17 ft) is reached with cold water (up to 8°C/47°F). Foreign material in the water supply can damage your machine. If there is a risk of foreign material in the water source entering the supply hose, a filter or filter must be mounted.

8.5 Use of Detergents

The machine is supplied as standard without detergent injection equipment. In self priming mode, detergents must not be added to the feed water (pos. 1), and thereby circulated through the pump. If your work requires detergents, they may be added through the optional external (downstream) injector available from your ALTO supplier.

NOTE! Certain organic solvents are aggressive to rubber and plastics used in high pressure hoses and must therefore not be used. Using detergents outside the range from 4.0 - 10.0 pH, will result in a loss of working life for your high pressure hose and seals in the spray handle, lances and other accessory. Follow precisely the directions printed on the packing when using detergents.


8.6 Fuel for burner

Use ONLY "heating oil", kerosene or diesel fuel in the "Jerry-can" fuel tank for the burner. DO NOT put gasoline in the burner fuel can!

8.7 Fuel for engine

Use only clean auto-diesel for the Ruggerini engine.

9.1 Start-up procedure

1. Check that the pump oil level is between the MIN. and MAX. marks (pos. 2). Oil type: ALTO Pump Oil 100.
2. Check the oil level on the Ruggerini engine. Oil type: Choose oil type in accordance with the instructions in the Ruggerini manual.
3. Run water through the inlet hose before connecting in order to remove possible impurities in the hose. Any water supply valve must be fully open in order to provide sufficient water supply.
4. Open the small venting cap on the "Jerry-can" if you intend to operate in hot water or steam mode.
5. Turn the thermostat (pos. 16) to the blue field.
6. Start the Ruggerini engine as described in the enclosed operating instructions. The key for the electric start has the following 3 positions:
 - 1 "0" off
 - 2 "I" run
 - 3  the startkey will return to position 2 when released.
7. Turn the trigger safety knob (pos. 33) to position 0 and squeeze the trigger of the spray handle (pos. 28) allowing water to flow until the stream is steady.
8. When the engine is warmed up, check that max. working pressure does NOT exceed the maximum allowable pump pressure. This can be taken from the pressure gauge and must not exceed 180 bar (2600 psi). Overload will reduce the life of the machine. (See section 14.0).

9.2 Cold water operation

After the starting up procedure the machine is ready for cleaning with cold water.

9.3 Hot water/Steam operation

Hot water:

Adjust the thermostat (pos. 16) to the required temperature, 30-95°C (86-200°F).

Steam:

- a) Adjust to temperatures above 95°C (200°F) ONLY with the trigger on spray handle released.
- b) Turn the water volume adjustment knob (pos. 22) completely in (fully clockwise).
- c) Adjust the thermostat to the required temperature, 95-150°C (200-302°F).

- d) Start the machine, if stopped, and activate the spray handle to start the burner.

IMPORTANT: For safety reasons it is important that instruction (a), above, always be followed!

Note: If the engine stops immediately after having been started up, it should be checked whether the throttle control is set at idle speed. If it is, the throttle control should be adjusted to full speed.

9.4 Adjustment of pressure and water volume

High pressure/volume

In order to achieve maximum working pressure the pressure adjustment knob (pos. 27) on the lance should be turned all the way in (clockwise until completely closed) and the volume adjustment knob (pos. 22) situated on the front of the pump should be turned all the way out (counterclockwise). The water volume is infinitely variable up to the max. capacity of the machine.

Low pressure/volume

To reduce the working pressure, turn the pressure adjustment knob (pos. 27) on the lance, counterclockwise until the desired result is achieved. To reduce the water pressure AND volume, release the trigger (pos. 28) or stop the machine. Turn the volume adjustment knob on the front of the pump, clockwise, reducing water flow and volume. Test the results, and repeat the process until you have achieved the results you wish. By varying the settings of the pressure adjustment knob on the lance, and the volume adjustment knob on the pump, you may obtain pressures from 4 bar (60 psi) to 180 bar (2600 psi), and water flows from 6 l/min. (1.6 US gpm) to 20.5 l/min. (5.4 US gpm).

9.5 Shutdown

WARNING: Danger of burn

Do not disconnect the high pressure hose until you have completed the following steps (risk of injury):

1. Turn the thermostat (pos. 16) to the blue field. Spray cold water until the water temperature is under 50°C (122°F). Disconnect or turn off the water supply.
2. Squeeze the trigger of the spray handle for a short time to empty the system of water.
3. Stop the diesel engine. (See instructions for the Ruggerini engine).
4. Disconnect the high pressure hose.

10.0 Storage/frost proofing

It is advisable to store the machine in a frost proof place between operations. If this is not possible the machine should be protected in the following way:

1. Disconnect the inlet hose. Remove the lance (pos. 29) and empty it of water.
2. Ensure that the thermostat is set in the blue field, and start the machine, allowing it to run with the spray handle opened until it is empty of water.
3. Place a suction hose in a bucket with 6-8 l (1.5-2 gallons) anti-freeze.
4. Place the spray handle (without spray lance) above the bucket, open the spray handle so that the antifreeze can circulate. Open and close the spray handle a few times.
5. Remove the suction hose from the bucket and allow the machine to pump all of the solution back into the anti-freeze container. The anti-freeze can be re-used, but keep in mind that it is slightly diluted with water each time this is done.

Important:

To avoid damage always ensure that the washer, the hoses and the spray lance are unfrozen before restarting. Place the washer and the accessories in a warm environment for some time before starting up.

11.0 Model tag

This machine has the model name, "CONTRACTOR DIESEL". The model designation is printed on a decal positioned on the control panel and on the data plate. The data plate provides the following important information:

1. Model designation
2. Production code (year and week)
3. Serial number
4. Pump pressure
5. Water volume
6. Max pressure
7. Max temperature
8. Manufacturer

12.1 Water inlet filter

The inlet water connection (pos. 1) contains a filter to prevent impurities entering the high-pressure pump. This filter must be inspected at regular intervals, and cleaned as required. The filter can be removed after removing the quick coupling.

NOTE:

To avoid serious damage to the rubber gasket, the quick coupling should be tightened only gently.

12.2 Couplings/connectors

To prevent leakage and damage to connectors/couplings on hoses, spray handle, machine and spray lance, these need to be cleaned occasionally and lightly lubricated with oil or grease.

12.3 Oil Change

The oil level must be checked at regular intervals (see section 9.1). The oil should be changed according to the following guidelines:

1. OIL CHANGE FOR PUMP

Change the oil after 1000 hours of operation, or when the oil appears "milk-white". Take off the cover of the oil glass (pos. 2). Unscrew the oil drain plug on the bottom of the pump (pos. 3). Drain the oil and then clean the dirt off the drain plug. Screw the plug in and top up the pump with fresh oil through the oil glass.

The pump holds approximately 1 quart (1 litre) of zincless hydraulic oil. From ALTO the pump is filled with ALTO Pump Oil 100. When refilling and changing the oil this or a substitute with the following specifications may be used:

Zincless Hydraulic Oil

ISO no. 100

Viscosity Index (VI) min. 130

Pour Point below -30°C

SLUDGE CONTAINER

It is normal for a small amount of oil and water to get past their seals. This oil/ water is collected in a sludge container (pos. 4). Empty the container before it has filled completely. This oil/water mixture must not be re-used in the pump.

2. ENGINE OIL CHANGE

Refer to the Ruggerini engine manual for break-in and normal operating oil change requirements. Carry out first oil change after 10 hours of operation and then every 100 hours. Not less than once every six months, however.

NOTE: Protect the environment by properly disposing of used pump and engine oil.

12.4 Burner fuel filter

To prevent foreign material from entering the fuel pump a filter (14) is fitted between the fuel tank and the fuel pump. This filter must be changed regularly, the frequency depends on the purity of the fuel. Replacement of the filter each year is recommended. See also diagnosis of faults and repair 16.0.

12.5 Descaling

After a period of operation depending on the hardness of the water, scale deposits will begin to accumulate in the heating coil. These deposits will reduce the effect of the water heating system and increase the fuel consumption. The machine should therefore be descaled regularly. If the machine adjusted on maximum water volume will not heat cold water (8°C/47°F) to 70°C (158°F) within three minutes, the burner or coil require servicing or descaling, as follows:

NOTE:

Always carry out the descaling according to the instructions supplied with the descaling product:

1. Disconnect the high pressure hose
2. Place an inlet hose in a container of at least 10 l (3 gallon) capacity, with a solution of recognized descaling product (i.e. ALTO STONEX), and water in the recommended percentage (not normally over 10% of the descaling product ratio 1:10). Ask your ALTO distributor for recommendations.
3. Start the machine.
4. Switch off the machine when the water from the outlet fitting is colored by the scale remover.

WARNING! The solution can be caustic. Note: Air must in no circumstances get into the system; therefore the container with scale remover must never be emptied completely.

Maintenance EN

5. Leave the machine for 20 minutes.
6. Start the machine and pump the used solution into a container for proper disposal.
7. Immediately connect a fresh water supply and turn it on.
8. Start the machine, let it work for 5-10 minutes, until all the scale remover is out of the system.
9. If necessary, repeat the procedure from instructions 2 to 8.

12.6 High pressure nozzle care

An obstructed nozzle causes an increase in pump pressure. Immediate correction is required.

1. Stop the machine and dismount the spray lance.
2. Clear the nozzle obstruction with a ALTO nozzle tool No. 6401654.
WARNING: This operation must be performed ONLY with the lance removed from the machine.
3. Backflush the spray lance with water. Use the spray handle, pressing it towards the nozzle protection cap on the front of the spray lance.
4. If the pressure is still too high, repeat items 1-3, or remove the nozzle from the lance for cleaning.

13.0 Warranty

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ALTO Danmark A/S warrants against defects in the supplied product for a period of 12 months from the purchase date subject to the following conditions:

- that defects are attributable to material or manufacturing flaws. (Items which require replacement due to normal wear and tear, abuse or misuse are not included in this limited warranty).
- Repairs required due to improperly performed service or repairs, are excluded.
- Repairs required due to the use of non-ALTO parts or accessories, are excluded.
- Repairs required by operation of the machine in a manner not prescribed in this Instruction Manual.

The engine warranty is as described by, and in accordance with the practices and policies of Ruggerini Motor Company. See the Ruggerini documents for details.

14.0 Troubleshooting

EN

Fault	Cause	Repair
The engine fails to start	Insufficient diesel supply Battery run down Fuse blown The pump is frozen	Refill diesel tank. Recharge the battery*) Exchange fuse. See section 3.0. Let the pump thaw.
Working pressure too high	Nozzle partly blocked	Clean the nozzle. See section 12.6.
Working pressure too low	Valve for regulation of water volume is not adjusted to max pressure Nozzle worn Motor speed too low	Open fully the valve for regulation of water. Turn counterclockwise. Replace nozzle. Contact ALTO service technician.
Irregular working pressure	Air in the pump Inlet filter/filter blocked Insufficient water supply from the water works	Repeat the venting procedure. Clean the filter. See section 12.1. Change to a water supply with greater output. If this is not possible; turn the valve for regulation of the water volume clockwise, until the machine works smoothly. Read section on suction mode (8.4).
In suction mode:	Excessive suction head or excessively hot water Nozzle partly blocked	Clean nozzle. See section 12.6.
No working pressure	Nozzle blocked No water Unloader (recycling valve) frozen High pressure hose/spray lance frozen	Clean nozzle. See section 12.6. Check the water connection. Allow the machine to thaw. See section 10.0. Allow the high pressure hose/spray lance to thaw.
The burner does not ignite	Insufficient fuel supply Fuel filter blocked	Refuel. Clean the filter. See section 12.4

Should faults occur other than those mentioned above, please contact the nearest ALTO service organization *) IMPORTANT NOTE: To avoid damage to the electronic systems, the battery connecting cables must be removed when recharging the battery.

15.0 Technical data

EN

Model		CONTRACTOR DIESEL
Pump pressure, max.	bar/psi	180/2610
Water volume at min/max pressure	l/min-USgpm	20,5/19 - 5.42/5
Max. temperature of inlet water	°C/°F	35/95
Heating power	kW/Kcal	115/98.200
Nozzle, spray angle	degrees	(05) 15/65
Self-priming, max. lift	m/ft	5/16.5
Engine		Ruggerini MD 151
Rated effect	kW/hp	12/16.3
Start system		Electric start
Battery	V/Ah	12/50
Diesel consumption, max. pressure	l/h-USgph	3.0-0.79
Fuel consumption at 60°C/140°F ¹⁾	l/h-USgph	7.5-1.98
"Jerry-can", capacity	l/Usq	20/5

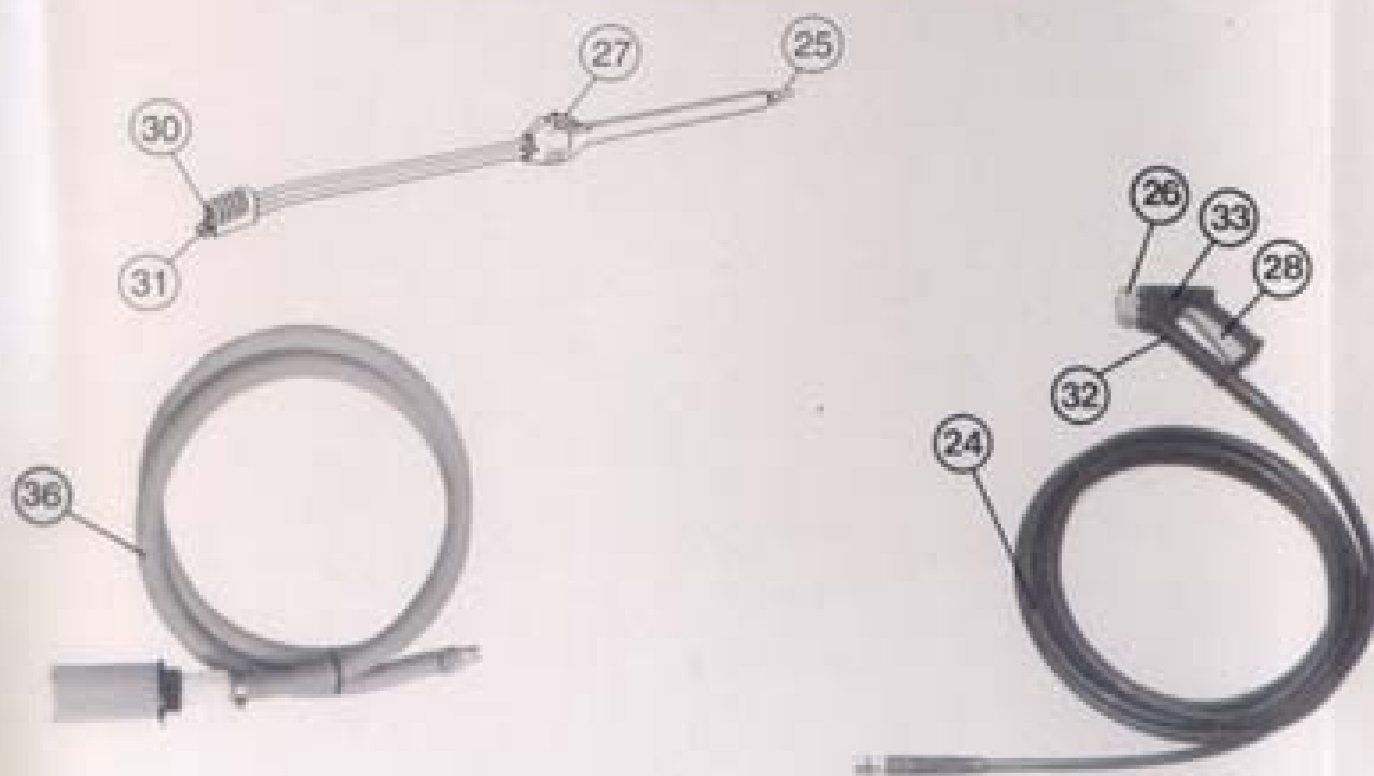
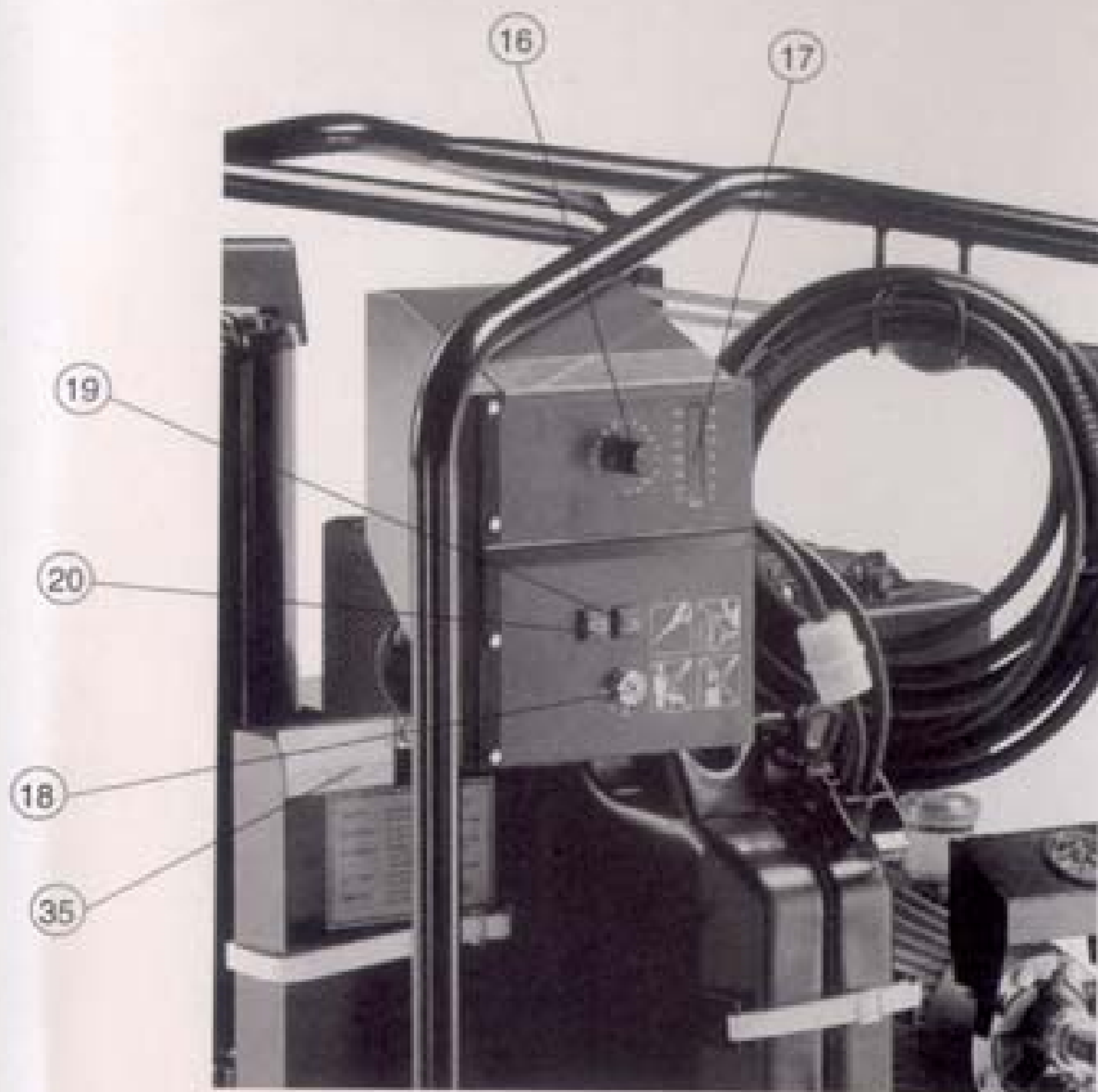
Sound power level (L_{WA}) of the machine measured in accordance with ISO 3746: 112 dB(A).

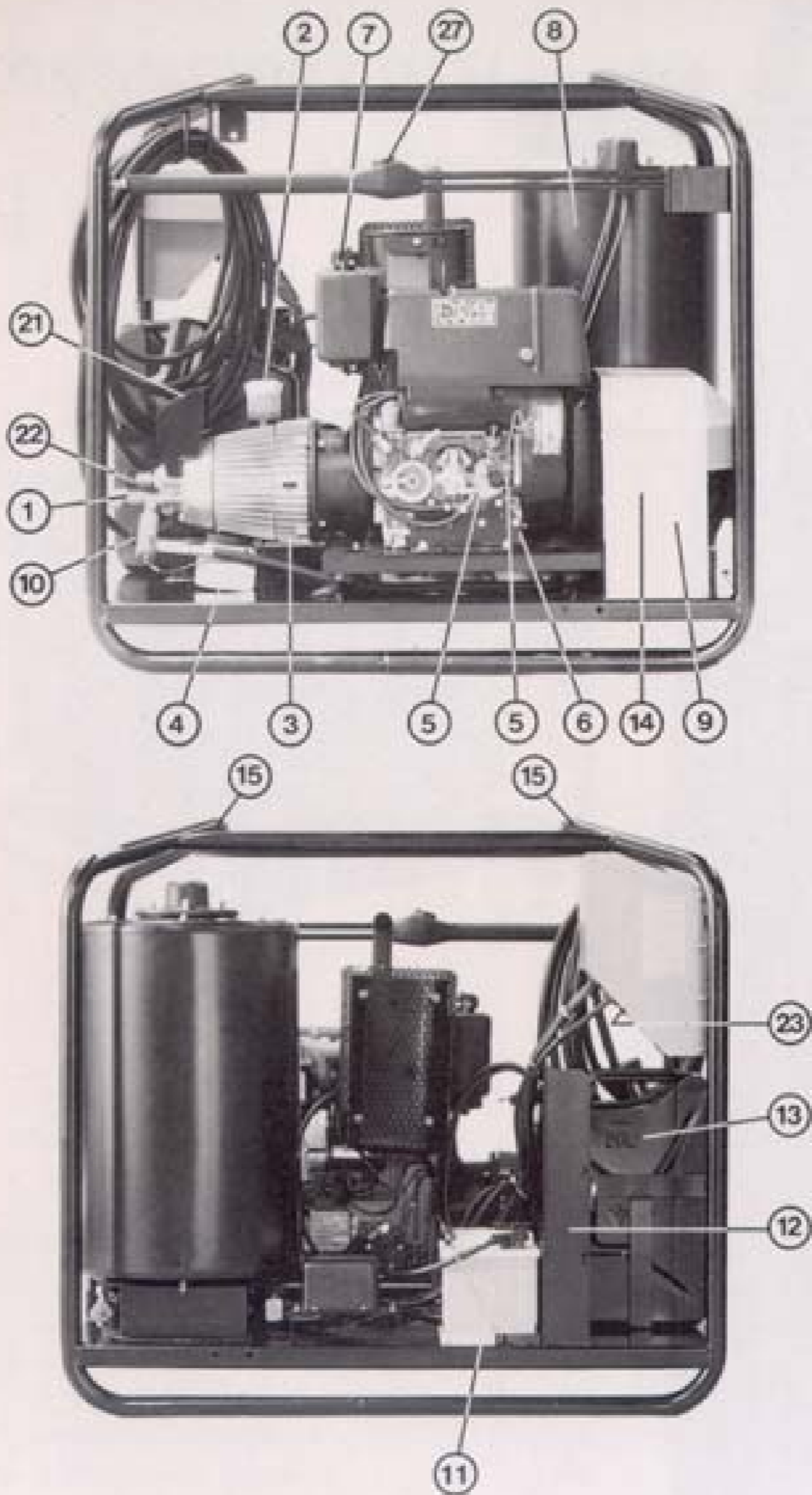
Sound pressure level (L_{PA}) measured in accordance with ISO 11202 [DISTANCE 1m] [FULL LOAD]: 100 dB(A).

¹⁾ Delta t= 52°C/126°F

This machine has been manufactured in accordance with the EMC directive 89/336/EEC inclusive of subsequent amendments.

Specifications are subject to alterations.





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