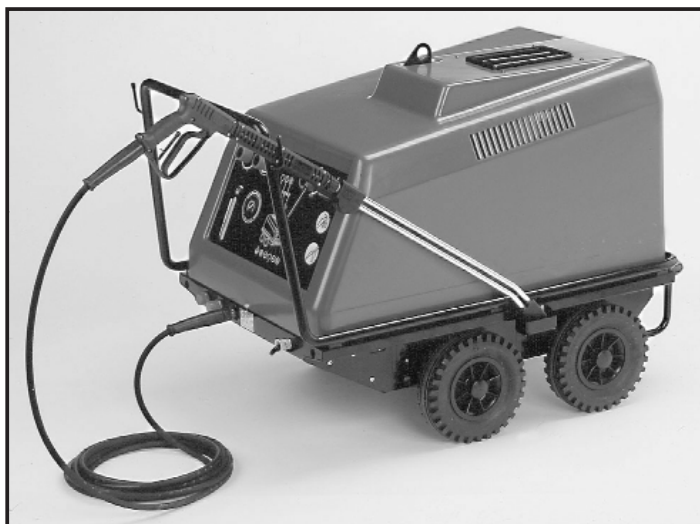


## ***N/G-6400A/6600A***



|           |                                      |                  |
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| <b>DK</b> | <b>Betjeningsvejledning .....</b>    | <b>side 2</b>    |
| <b>N</b>  | <b>Bruksanvisning .....</b>          | <b>side 11</b>   |
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**NILFISK****Gerni****DK**

Type: N/G-6400/6600

Maskinen er fremstillet i overensstemmelse med følgende direktiver:

Maskindirektiv: 89/392/EØF 91/368/EØF 93/44/EØF

EMC-direktiv: 89/336/EØF

Lavspændingsdirektiv: 73/23/EØF 92/31/EØF

**F**

Type: N/G-6400/6600

Cette machine a été fabriquée conformément aux directives suivantes:

Réglementation machine: 89/392/CEE 91/368/CEE 93/44/CEE

Réglementation CEM 89/336/CEE

Règlement basse tension: 73/23/CEE 92/31/CEE

**N**

Type: N/G-6400/6600

Maskinen er fremstilt i overensstemmelse med følgende direktiver:

Maskindirektiv: 89/392/EØS 91/368/EØS 93/44/EØS

EMC-direktiv: 89/336/EØS

Lavspændingsdirektiv: 73/23/EØS 92/31/EØS

**NL**

Type: N/G-6400/6600

Deze machine is vervaardigd overeenkomstig de volgende richtlijnen:

Machine richtlijn: 89/392/EEC 91/368/EEC 93/44/EEC

EMC-richtlijn: 89/336/EEC

Laagspanning richtlijn: 73/23/EEC 92/31/EEC

**S**

Typ: N/G-6400/6600

Maskinen är framställd i överensstämmelse med följande direktiv:

Maskindirektiv: 89/392/EEC 91/368/EEC 93/44/EEC

EMC-direktiv: 89/336/EEC

Lågspänningsdirektiv: 73/23/EEC 92/31/EEC

**E**

Tipo: N/G-6400/6600

Esta máquina ha sido fabricada en conformidad a las siguientes normativas:

Normativa de la máquina: 89/392/CEE 91/368/CEE 93/44/CEE

Normativa EMC: 89/336/CEE

Normativa sobre baja tensión: 73/23/CEE 92/31/CEE

**UK**

Type: N/G-6400/6600

This machine was manufactured in conformity with the following directives:

Machine directive: 89/392/EEC 91/368/EEC 93/44/EEC

EMC-directive: 89/336/EEC

Low voltage directive: 73/23/EEC 92/31/EEC

**P**

Tipo: N/G-6400/6600

Esta máquina foi fabricada em conformidade com as seguintes directrizes:

Directriz de maquinaria: 89/392/CEE 91/368/CEE 93/44/CEE

Directriz EMC: 89/336/CEE

Directriz de baixa voltagem: 73/23/CEE 92/31/CEE

**D**

Typ: N/G-6400/6600

Diese Maschine wurde gemäß den folgenden Richtlinien hergestellt:

Maschinenrichtlinie: 89/392/EWG 91/368/EWG 93/44/EWG

EMV-Richtlinie: 89/336/EWG

Niederspannungsrichtlinie: 73/23/EWG 92/31/EWG

**G**

Τύπος: N/G-6400/6600

Το μηχάνημα έχει κατασκευαστεί σύμφωνα με τις παρακάτω προδιαγραφές:

Προδιαγραφή μηχανήματος: 89/392/CEE 91/368/CEE 93/44/CEE

Προδιαγραφή-EMC: 89/336/CEE

Προδιαγραφή χαμηλής τάσεως: 73/23/CEE 92/31/CEE

Ove Trankjær

July 28th 1998

Nilfisk-Advance A/S, Myntevej 2, DK-8900 Randers  
Int. telephone: +45 86 43 98 00 Int. fax: +45 86 43 14 81



# ENGLISH

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## INTRODUCTION

We congratulate you on your choice of new high pressure cleaner. We are confident that the product will fully meet your expectations. It has been designed and produced by one of Europe's leading manufacturers of high pressure cleaners. Nilfisk-Advance caters for all industries with a complete range of cold and hot water cleaners as well as a wide assortment of accessories.

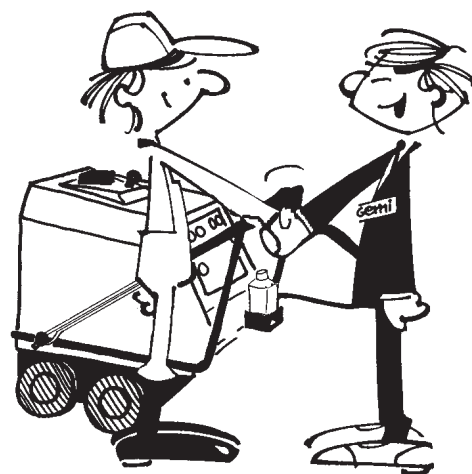
To secure full benefit from your high pressure cleaner we ask you and other possible operators to study the following operating guide. The operating guide should be regarded as an integral part of the high pressure cleaner and should always be available to the operator. The operating guide briefly explains the construction and the operation of the high pressure cleaner.

The high pressure cleaner is built for fast and simple operation. Should problems occur which you cannot solve yourself by means of the operating guide, we ask you to contact our service department whose experience and expertise is at your disposal.

By following this operating guide, you will enhance the economical and safe operation of your high pressure cleaner. In the same way as with a car, the high pressure cleaner's operational life will be prolonged and the performance will be more effective if the cleaner is main-

tained and serviced according to the operating guide.

In the operating guide the picture references are marked as e.g. (2.28) meaning that reference is made to photo No. 2 and object No. 28 (in this instance: the high pressure hose).



Type: .....

No.: .....

Date of purchase: .....



## SAFETY INSTRUCTIONS

Anybody working with the high pressure cleaner should:

- be familiar with the safety functions, equipment and maintenance of the machine,
- be well-informed about the safety and health regulations which apply to the operation of the machine,
- have acquired a safe working technique so that accidents during work are avoided.

It is the duty of the employer to make sure everybody who operates the high pressure cleaner meets these three requirements - if necessary by providing training by persons with experience of working with high pressure cleaners.

During use the high pressure cleaner should be in good condition with regard to safety. This is ensured by necessary replacement of worn or defective parts and by maintenance and service in accordance with this operation guide.

The following safety instructions must be carefully observed:

- The high pressure cleaner must be earthed according to regulations.
- Never exceed the maximum pressures and temperatures indicated on the machine plate.
- In case of operational failures and when carrying out repairs or maintenance - switch off the high pressure cleaner at the mains switch and turn off the water supply.
- After operation - switch off the high pressure cleaner at the mains and turn off the water supply. Always lock the pistol with the safety device on the trigger when you leave the high pressure cleaner.
- After use of the hot water/steam device the high pressure cleaner must be flushed with cold water for about 1 min.
- Never attempt to exchange the pistol or disconnect the hoses before the high pressure cleaner has been switched off and the pressure has been relieved.
- Use only original high pressure hoses. Do not use alternative high pressure hoses as they may not comply with the safety standards required by Nilfisk-Advance A/S. Never attempt to repair defective high pressure hoses yourself.
- Never allow other persons than the user of the high pressure cleaner to stay in the area where they risk being hit by the jet.
- The user should be able to stand firm and steady with sufficient space around him/her so that it is

possible to adopt a proper working posture. It is recommended to use footwear which is flexible, laced and with anti-skid soles.

- Do not add diesel oil during operation or when the machine is hot.
- For reasons of health and safety, operation of oil burning high pressure cleaners is only permitted under observation of certain regulations - e.g. concerning air intake and draught.

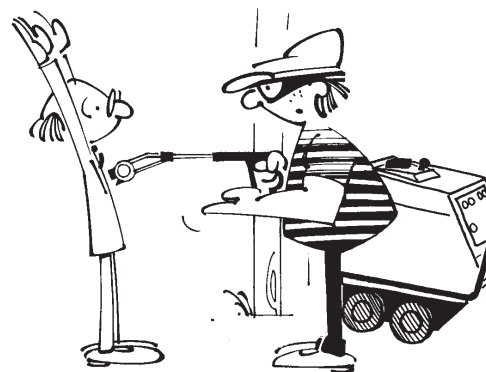
*Hot water cleaners produce about 120-150m<sup>3</sup> of waste gases an hour. Therefore, it is essential that the cleaner is supplied with the same quantity of air - if possible by means of a fresh-air conduit, ventilating plant or the like (ø350 mm or 400x400 mm). Combination of two or more smoke flues - please see page 75 - 76*

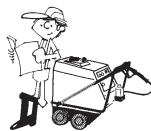
*Mounting of chimney/smoke flue should normally be carried out by a plumber who at the same time guarantees that the chimney/smoke flue meets the local authority regulations. The smoke flue of hot water cleaners should have a diameter of min. 250 mm and be placed 150 - 200 mm above the exhaust of the cleaner.*

*In freezing weather, the chimney should be fitted with a closing device so that frost cannot cause fracturing of the heating coil and boiler.*

*To obtain optimum combustion it is necessary to make combustion tests and adjustments of the burner as required - so the fuel and heating capacity is utilised maximum and sooting up of coil and boiler is avoided.*

- The high pressure cleaner should not be used from a ladder unless the ladder has a working platform or other precautions providing at least the same safety.
- Lance and pistol should always be held with both hands. Do not override the automatic trigger release mechanism.
- Never aim the water jet in the direction of electric installations as the jet may then become live.
- The water jet is delivered from the nozzle at high speed. Therefore, never aim the jet in the direction of people or animals.
- Hearing protection should be used to reduce the noise loading below 85dB(A).
- It is recommended that protective clothing be worn to avoid accidental spraying of unprotected skin.





## DESCRIPTION

### The Construction and Function of the High pressure Cleaner

Your new high pressure cleaner is constructed as shown in the functional diagram and photograph No 2 - 6. The machine consists of a low pressure side and a high pressure side with a built in boiler system and high pressure pump (2.16). From the water inlet (2.24) the water is carried through the float valve (2.26), into the pre-heater (2.7) and into the water box (2.23). At maximum water level the float valve shuts off the water supply. Part of the water from the water inlet (2.24) will be led directly to the control unit (2.20). When the pistol handle (2.29) is activated a flow will be created in the control unit and the high pressure cleaner will start via a signal from the flow switch (2.21). From the water box the water is sucked into the three cylinder pump which is driven by the electric motor (2.14). From the low pressure chamber of the high pressure pump the water is sucked through the suction valves into the cylinders. Here the water is pressurised and pumped through the pressure valves into the high pressure side through the flow switch (2.21) and into the coil (2.6) where it is heated to the required temperature to give hot water or steam. The operating temperature is set and adjusted on the thermostat (2.32). The water is pumped through the pressure outlet (2.35) and into the high pressure hose (2.28), to the pistol (2.29), the lance (2.30) and out through the nozzles (2.1) and (2.2).

The pressure of your high pressure cleaner is adjustable by way of the pressure regulation handle (2.3) and can be read on the pressure gauge (5.2). If the water pressure exceeds the normal working pressure the built-in safety valve will run in by-pass and thereby prevent damage to the high pressure cleaner.

The flow switch shuts off the oil burner via the solenoid valve if the water supply

should fail, so that overheating and boiling dry are prevented.

The oil pump (2.9) which is driven by the electric motor sucks fuel from the oil tank (2.11) through the oil filter (2.13).

The high pressure cleaner can operate with cold water, hot water or steam. For hot water and steam operation the outlet water is pre-heated on the low pressure side in the pre-heater, while on the high pressure side it is heated by means of the burner (2.10) to the operating temperature in the boiler coil.

The high pressure cleaner is equipped with a steam bloc (2.19). For re-circulation the water may be heated to 130°C.

Detergent is added via the detergent valve (2.17) from an external detergent tank (2.15) which may be placed on the holder for detergent tank (2.34). By means of the built-in injector it is possible to dose up to 6% detergent.

The dosing pump doses water softener from the container (3.1) into the water box.

|      |                            |
|------|----------------------------|
| 2.1  | High pressure jet          |
| 2.2  | Low pressure jet           |
| 2.3  | Pressure regulation handle |
| 2.4  | Overheating protector      |
| 2.5  | Thermostat sensor          |
| 2.6  | Heating coil               |
| 2.7  | Pre-heater                 |
| 2.8  | Flame control              |
| 2.9  | Oil pump                   |
| 2.10 | Burner                     |
| 2.11 | Fuel tank                  |
| 2.12 | Fuel level control         |
| 2.13 | Fuel filter                |
| 2.14 | Electric motor             |
| 2.15 | Detergent tank             |
| 2.16 | High pressure pump         |
| 2.17 | Detergent valve            |
| 2.18 | Top section                |
| 2.19 | Steam bloc                 |
| 2.20 | Control unit               |
| 2.21 | Flow switch                |
| 2.22 | Floater                    |

|      |                                     |
|------|-------------------------------------|
| 2.23 | Water box                           |
| 2.24 | Water inlet/low pressure side       |
| 2.25 | Water pressure control/water supply |
| 2.26 | Float valve                         |
| 2.27 | High pressure side                  |
| 2.28 | High pressure hose                  |
| 2.29 | Pistol                              |
| 2.30 | Double lance                        |
| 2.31 | Crane hook                          |
| 2.32 | Operating thermostat                |
| 2.33 | Start/stop knob                     |
| 2.34 | Detergent tank                      |
| 2.35 | Pressure outlet                     |
| 2.36 | Cap for L/C waste box               |
| 3.1  | Water softener tank                 |
| 3.2  | Oil waste box                       |
| 4.1  | Cover switch                        |
| 4.2  | Drain off - Boiler shell            |
| 5.1  | Water softener Gauge                |
| 5.2  | Pressure Gauge                      |
| 6.1  | Lamp for Operation                  |
| 6.2  | Lamp for Re-start                   |
| 6.3  | Lamp for phase sequence control     |
| 6.4  | Lamp for fuel level                 |
| 6.5  | Lamp for flame control              |
| 6.6  | Lamp for water inlet control        |

## SAFETY CIRCUITS

### No Voltage Release

Protects against re-start of the high pressure cleaner following voltage supply failure.

Stop the high pressure cleaner by setting the start/stop knob (2.33) in position "0" and start the machine.

### Flame Control

Your machine may be equipped with flammme control. The flame control (2.8) ensures correct oil burner operation. Any combustion fault conditions will cause the oil burner to be switched off after 20 seconds. When the oil burner is switched off the machine will continue operation as a cold water cleaner.

Stop the high pressure cleaner by setting the start/stop knob (2.33) in position "0". Remedy the fault (see "Faultfinding") and re-start the machine.

### Cover Switch

The cover switch (4.1) switches off the machine if the cover is opened during operation.

Stop the high pressure cleaner by setting the start/stop knob (2.33) in position "0". Close the cover and re-start the machine.

### Overheating Protector

The overheating protector (2.4) will stop the high pressure cleaner if the boiler temperature exceeds 140°C.

Stop the high pressure cleaner by setting the start/stop knob (2.33) in position "0". Let the high pressure cleaner cool for 15 min. and re-start the machine.

### Overload Protector

Thermal switches in the pump motor housing protect the electric motor against overload. The control voltage for all control and safety functions is 24V low-frequency voltage. In case of overload the high pressure cleaner will be switched off.

Stop the high pressure cleaner by setting the start/stop knob (2.33) in position "0". Let the motor cool for 15 min. and re-start the machine.

### Phase Sequence Control

Your high pressure cleaner has a built-in phase sequence control which will prevent the oil burner from starting if the direction of rotation of the machine is incorrect.

### Water Pressure Control

The water pressure control (2.25) switches off the oil burner if the water inlet pressure is too low. Stop the high pressure cleaner by setting the start/stop knob (2.33) in position "0". Remedy as required (see "Fault Finding") and re-start the machine.





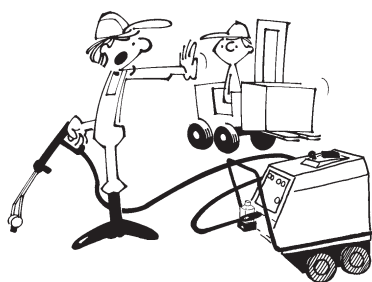
## OPERATING AND STARTING GUIDE

### Transport

When moving the high pressure cleaner a crane hook (2.31) may be used.

### High pressure Hose

Your new high pressure cleaner is provided with a heavy high pressure hose. Do not attempt to pull the high pressure hose when moving the high pressure cleaner. Be careful not to run over or in any other way damage the high pressure hose. The warranty does not cover broken hoses or hoses which have been run over.



### Lances:

Your new high pressure cleaner may be equipped with one or more of the following lances:

#### • Single lance

is supplied with a fixed spray nozzle and a lance with the possibility of constant pressure and application of detergents. It is operated by means of the pistol grip.

#### • Double lance

is supplied with a fixed spray nozzle and two lances with the possibility of pressure regulation and application of detergents. It is operated by means of the pistol grip and the regulation handle.

#### • SPECTRUM lance

is supplied with a high efficiency fixed spray nozzle and two lances with the possibility of pressure regulation and application of detergents. It is operated by means of the pistol grip and the regulation handle.

#### • Turbo Laser lance

is supplied with a patented nozzle system that provides an increased cleaning effect together with two lances with the possibility of pressure regulation and application of detergents. It is operated by means of the pistol grip and the regulation handle.

**NOTE: When using the Turbo LaserLance the temperature must not exceed 90°C.**

### Fine Sand Filter

If you use water containing fine sand you must mount a fine sand filter. The filter element is exchanged as required. If a fine sand filter is not fitted there is a risk that the fine sand will deposit in the unit and hereby damage the machine. This is not covered by the warranty.

### Starting

1. Connect the electric cable. Please note the rated voltage and amperage of the high pressure cleaner:

|        |          |         |
|--------|----------|---------|
| 3x200V | 50/60 Hz | 22/23 A |
| 3x230V | 50/60 Hz | 21 A    |
| 3x400V | 50/60 Hz | 12,5 A  |
| 3x415V | 50 Hz    | 12 A    |

2. Flush the water supply hose through and connect it to the machine. The hose must be min. 3/4". Maximum water inlet pressure during operation: 10 bar. Minimum water inlet pressure during operation: 1 bar (N/G-6600A) - 1.5 bar (N/G-6400A). Check the oil level of the pump. Read the oil level only with the machine stationary. The oil level must be at the "MAX" mark in oil glass. If necessary, oil can be refilled in the oil glass (Oil type: see technical data), and add water softener to the container (3.1). Turn on the water supply. Fill fuel tank (2.11) with diesel oil.

3. Connect the high pressure hose to the machine. Turn on the mains switch and start the high pressure cleaner by turning the start/stop knob (2.33) to pos. "1".

4. Check the indicator lamps on the control panel. Only the green operating lamp (6.1) must be on. If the other lamps light up, the high pressure cleaner is not ready for operation (see "Fault Finding").

5. Flush the high pressure hose and pistol through. Allow the high pressure cleaner to run until the pressure is stable (to bleed the high pressure cleaner and hose). Fit the lance on the pistol. The high pressure cleaner is now ready for operation as an ordinary cold water cleaner.

6. Activate the pistol (2.29) and by means of the pressure regulating handle, the pressure can be adjusted infinitely variable up to the maximum pressure of the high pressure cleaner.

7. Turn the start/stop knob (2.33) to pos. "1" and set the operating thermostat on the required temperature. The high-pressure cleaner will now operate as a hot water cleaner.

8. Check the warning lamp (6.5) for flame control. If the lamp is on - see "Fault Finding".

### Stopping

When the pistol handle (2.29) is released the high pressure cleaner will stop. To re-start simply activate the pistol handle. To stop the high pressure cleaner turn the start/stop knob (2.33) to position "0". Switch off the main switch of the high pressure cleaner and disconnect the water supply.

Always lock the pistol with the safety device on the handle whenever you put down the pistol. This will prevent any unauthorised persons from immediately using the high pressure cleaner.

### Warning Lamps

The 6000 front panel is provided with 6 warning lamps:

- (6.1) Operation - is lit during normal operation
- (6.2) Re-start - set start/stop knob in position "0" remedy and re-start high pressure cleaner.
- (6.3) Lamp for phase sequence control
- (6.4) Lamp for fuel level
- (6.5) Lamp for flame control
- (6.6) Lamp for water inlet control

During normal operation only the green lamp should be lit. If one or more of the other lamps are lit the high pressure cleaner is not ready for use (see "Faultfinding").

### Operating Thermostat

The hot water temperature may be adjusted from 40 - 80°C (N/G-6400A) / 40 - 90°C (N/G-6600A) on the operating thermostat (2.32).

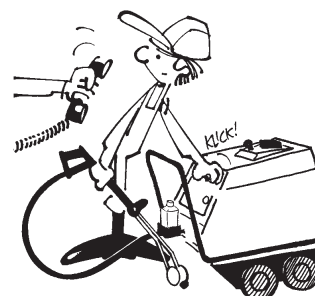
### Steam Bloc

The high pressure cleaner is equipped with a special steam bloc. With a combined setting of the operating thermostat (2.32) and the steam bloc (2.19) it is possible to infinitely vary the temperature from 40°C to 130°C. The high pressure cleaner will produce 130°C only with a fully open operating thermostat and steam bloc. When using the steam bloc approx. 40% of the outlet water is re-circulated to the suction side of the pump whereby the temperature is increased to the maximum level.

The steam bloc may also be used for infinitely variable pressure regulation from 70 to 160 bar. This will result in a reduction of the water capacity by approximately 40% at 70 bar.

### Fuel Level Control

The fuel level control (2.12) switches off the oil burner when the oil level in the fuel tank is too low. When the oil burner is disconnected the machine will continue operation as a cold water cleaner. Stop the high pressure cleaner by setting the start/stop knob (2.33) in position "0". Fill with diesel oil and re-start the oil burner.





### Detergent application

Use only detergent which has been developed specifically for use in high pressure cleaners. It is economical in use and is gentle on the cleaning object and the high pressure cleaner.

1. Place the detergent hose with the detergent filter in the tank containing detergent. Check that the detergent covers the filter completely.

2. The desired amount of detergent (up to 6%) can be set on the detergent regulator (2.29).

After using detergents, clean water should be sucked through the pump. Place the detergent hose in clean water, and let the machine run for a few minutes.

**NOTE!** The detergent regulator must be in pos. "0" when detergent is not being used as the pump will suck in air.

## MAINTENANCE

### Oil Level

Check the oil level of the pump on the oil glass frequently. The oil level should be at the "MAX" indication.

The oil level must only be read with the high pressure cleaner switched off. (Oil type - see technical data).

Used oil/water is collected in an oil waste box (3.2). Empty the waste box as required, by unscrewing the cap (2.36).

### Oil Change

The pump oil should be changed after a maximum of 300 working hours and at least once a year. If there is water in the pump oil (the oil turns white) the contaminated oil should be changed and new oil added (oil type: See technical data).

### Water Filter

Clean the water filter as required. Disconnect the water inlet hose and remove the water filter.

### Fuel Filter

If there is water in the fuel filter (2.13) replace the filter and empty the fuel tank (2.11) by removing the fuel tank drain plug and clean the tank.

### Turbo Laser

Clean the filter in the Turbo Laser lance (2.27) regularly. The filter is mounted in the inlet opening at the throttle control to prevent particles such as calcium and sand from entering the Turbo Laser where they may cause increased wear, leaks or in serious cases operating malfunctions. It may be necessary to change the filter. If so, put a screwdriver or similar tool through the filter and pull it out. Fit the new filter with an O-ring and press it into the opening of the Turbo Laser lance. Make sure that the filter is placed with the largest contact face towards the Turbo Laser head.

When inspecting or replacing parts in the Turbo Laser spray the metal parts with "Pronto Universal", "WD 40", "Servisol", "Caramba" or similar products that are able to:

- a. Counteract moisture
- b. Protect against corrosion
- c. Lubricate and clean

We also recommend the above mentioned treatment if the Turbo lance is not being used for a long period of time.

### Water softener

To prevent deposit of calcium blocking pipes, hoses and nozzles water softener is added to the water which is poured into the container (3.1). On the front panel there is a water softener level gauge (5.1), which indicates when re-filling is necessary.

### Decalcification

Even though the high pressure cleaner is equipped with a water softener device we recommend that the machine be regularly descaled. Descaling is required if you find a pressure increase of 5 bar or more over operating pressure.

1. Place the detergent pipe into the descaling acid.
2. Dismount the lance(2.30) from the pistol(2.29).
3. Start the cleaner at pos. "1" and let it run for 1/2 min.
4. Close the pistol (2.29) a few times so the cleaner is also descaled in the by-pass system.
5. Stop the cleaner and let the descaling acid work for 5 min.
6. Restart the cleaner.

If the pressure is not down to the operating pressure the process is repeated.

After descaling the system must be with clean water to remove acid residues. Close the pistol a couple of times so that the by-pass system of the cleaner is flushed clean. The cleaner is then ready for use again.

**NOTE!** Descaling acid is corrosive; wear facial protection, protective gloves, etc.

### Frost Protection

The best frost protection is to place your high pressure cleaner in a frostfree environment. If this is not possible, the high pressure cleaner must be frost protected as follows:

Empty the boiler shell at (4.2) and the water box via the drain plug. Disconnect the water inlet hose and pour 5 litres of antifreeze into the water box (2.23). Start the high pressure cleaner, activate the pistol and let the machine run with the pressure regulation handle in the open position until antifreeze trickles from the nozzles (2.1) and (2.2). Activate the pistol trigger a couple of times to protect the by-pass and safety valves. If your machine is equipped with steam device, turn the steam device on and repeat the procedure to protect the steam system. The antifreeze can be collected and used again.

### Cleaning

Always keep your high pressure cleaner clean. This increases both the life and the function of the individual machine parts considerably.

### Replacements/disposal

All replaced parts such as water filter, fine sand filter, Turbo Laser filter as well as contaminated oil and antifreeze must be handed in to the local approved authority/institution for deposit/destruction.

When the high pressure cleaner is no longer to be used, the detergent as well as pump and stator oil must be drained off and delivered in accordance with the above mentioned instructions. The high pressure cleaner must likewise be handed in to the local, approved institution for destruction.

Any replaced parts from service visits may be given to the service personnel who will deliver them to the proper authority.





## CHECK LIST

| ACTION   | WHAT/WHO           | WHEN/HOW OFTEN                                   | HOW  |
|----------|--------------------|--|--|
| Instruct | New operator       | Before operator uses high pressure cleaner       | Let operator read instruction guide                |
| Check    | High pressure hose | During daily use                                 | Leaks ? - call service engineer                    |
| Check    | Pressure gauge     | During daily use                                 | Too high/too low ? - call service engineer         |
| Check    | Detergent suction  | Daily - by means of detergent                    | Lack of suction/leaks ? - call service engineer    |
| Clean    | Water filter       | Weekly/as needed                                 | See maintenance                                    |
| Clean    | Fine sandfilter    | As needed  | See maintenance                                    |
| Check    | Machine for leaks  | Every other month                                | Leaks ? - call service engineer                    |
| Check    | Oil level - pump   | During daily use                                 | See maintenance                                    |
| Perform  | Oil change - pump  | After 300 hours operation - at least once a year | See maintenance                                    |
| Adjust   | Oil burner         | Twice a year/as needed                           | Call service engineer                              |
| Clean    | Boiler/coil        | Yearly/as needed                                 | Call service engineer                              |
| Perform  | Descaling          | For pressure increase over 5 bar                 | See maintenance                                    |
| Check    | Thermostat         | Every other month                                | Temperature too high/low ? - call service engineer |

## FAULT FINDING

|  | Indicator lamp     | Cause   | Corrective action  |
|--|--------------------|---|--|
|  | Does not light up. | Cable pulled out of plug.<br>No supply voltage.<br>No supply voltage on the print plate transformer.<br>Cover not correctly closed. | Refit electric cable in the plug.<br>Replace fuses in the electric board.<br>Replace the fuse in the control voltage.<br>Close cover correctly and re-start the high pressure cleaner. |
|  | Lights up          | The supply voltage has been disconnected.<br>The motor is overloaded,<br>The coil too hot.  | Restart the high pressure cleaner.<br><br>Cool the motor and restart the high pressure cleaner.  |
|  | Lights up.         | Lack of fuel.<br>pressure cleaner.  | Add diesel oil and restart the high  |
|  | Lights up.         | The water tap is not open.<br>No water supply.  | Turn on the water and restart the high pressure cleaner.<br>Fit the water inlet hose on the high pressure cleaner and restart.   |
|  | Lights up.         | The phase sequence in the electric plug is incorrect.   | Change phase sequence in plug and restart high pressure cleaner.   |
|  | Lights up.         | No flame.   | Switch off and restart the high pressure cleaner. Replace the fuel filter and restart the high pressure cleaner. If unable to reset machine - contact the service department.          |





## FAULT FINDING

| Symptoms  | Cause  | Remedy  |
|---|--|---|
| The high pressure cleaner does not start.                                       | Start/stop knob not activated.<br>Cleaner is not connected to the electric supply.<br>Fuse blown.<br>Phase is missing in the electric plug.  | Turn knob to position "1".<br>Put the power plug into the socket, switch on the main switch.<br>Change it. If it still blows contact service department.<br>Reconnect plug, as per the electric diagram.  |
| The high pressure cleaner suddenly stops.                                       | Fuse blown.<br>Low voltage.<br>Motor too hot.<br><br>Working pressure too high (nozzle dirty or wrong nozzle).   | Change fuse. If it still blows contact the service department.<br>Extension cable too long contact service department.<br>Turn start/stop knob to position "0" and wait till motor has cooled off. Re-start.<br>Clean/change nozzle (see "Technical Data").   |
| Motor hums when starting.   | Fuse blown.<br><br>Defect in the electric supply mains.  | Change fuse. If fuse still blows or motor still hums, contact service department.<br>Check the phases in electric plug.   |
| The high pressure hose and the pistol are vibrating.                            | Air in the pump.<br>Lack of water.   | Tighten suction hose again.<br>Clean suction filter. Open the water cock completely.  |
| The by-pass valve is "knocking" or the gauge fluctuates with open pistol.       | The nozzle is partially blocked.   | Remove and clean pressure nozzle.   |
| The safety valve begins to function or the pressure of the machine is too high. | Front nozzle partially blocked.<br>Pressure nozzle partially blocked.<br>Wrong nozzle.   | Remove and clean front nozzle.<br>Remove and clean pressure nozzle.<br>Change nozzle (see "Technical Data").  |
| The nozzle does not oscillate.  | Turbo Laser dirty.<br>Turbo Laser worn.<br>Turbo Laser filter blocked.<br>Wrong nozzle.  | Disassemble and clean Turbo Laser.<br>Change pressure nozzle and wheel (Service Kit).<br>Clean/change filter (see Maintenance).<br>Change the nozzle (see "Technical Data").  |
| Turbo Laser leaks.  | Gaskets defective.   | Leak can seal itself with continued use.<br>Replace gaskets nozzle (Service Kit).   |
| No detergent supply.  | Empty detergent tank.<br>Detergent filter dirty.   | Refill.<br>Clean detergent filter.  |
| Boiler smokes.  | Water in the fuel.   | Empty and clean fuel tank (see Maintenance).  |
| The machine suddenly emits steam.   | Cleaning fluid tank empty (takes in air).<br>The pump suction side is leaking (takes in air).  | Re-fill the tank. Close the dosing valve.<br>Bleed hoses.<br>Check for leakages - tighten hose retaining rings.   |
| The burner stops during operation.  | Thermostat set too low.<br>Fuel filter dirty.<br>Water in the fuel.  | Check the thermostat setting and adjust if necessary.<br>Clean the fuel filter (see "Maintenance").<br>Empty and clean fuel tank (see Maintenance).   |
| The burner starts and stops incorrectly with                                    | Fuel filter dirty.<br>Thermostat set too low.  | Clean the fuel filter (see Maintenance).<br>Check the thermostat setting and adjust correct working pressure if necessary.  |
| The burner does not start.  | Thermostat set too low.<br>Fuel filter dirty.<br>Water in the fuel.  | Check the thermostat setting and adjust if necessary.<br>Clean the fuel filter (see Maintenance).<br>Empty and clean fuel tank (see Maintenance).   |
| The high pressure cleaner does not go to max. pressure/pressure fluctuates.     | Detergent tank empty (takes in air).<br>Detergent hose defect.<br><br>The pump suction side leaks (takes in air).<br>High pressure nozzle blocked.<br>Machine needs decalcification<br>High pressure nozzle worn.<br>Air in the system.<br><br>Wrong nozzle. | Refill the tank. Close the detergent valves.<br>Replace the detergent hoses.<br><br>Check for leakages, tighten any hose retaining rings.<br><br>Remove and carefully clean the nozzle.<br>Descale the machine (see Maintenance).<br>Fit new nozzle. Note nozzle type (see "Technical Data").<br>Bleed the cleaner. Open the pressure regulation handle, activate the pistol. Let the machine run until stable pressure has been obtained.<br>Change the nozzle. Note nozzle type (see "Technical Data"). |
| The water does not reach operating temperature.                                 | Operating thermostat set too low.<br>Fuel filter dirty.<br>The machine needs descaling.<br>Boiler and coil clogged up  | Check the thermostat setting and adjust if necessary.<br>Clean the fuel filter (see Maintenance).<br>Descale the machine - see maintenance.<br>Call service engineer.   |



## TECHNICAL DATA

| Model                             |         | 6400A    | 6600A    |
|-----------------------------------|---------|----------|----------|
| Working pressure                  | bar     | 160      | 175      |
| Turbo power                       | ETP-bar | 200      | 215      |
| Working pressure w. steam bloc    | bar     | 70-80    | 70 - 80  |
| Water capacity, min               | l/h     | 1380     | 1170     |
| Water capacity w. steam bloc      | l/h     |          | 600-720  |
| Temperature                       | °C      | 40 - 130 | 40 - 130 |
| Temperature, water *              | °C      | 80       | 80       |
| Temperature, steam *              | °C      | 130      | 130      |
| Thermal effect                    | kW      | 95       | 95       |
| Motor effect input                | kW      | 6,8      | 6,8      |
| Noise level (ISO3746)             | dB(A)   | 83       | 83       |
| Amp. consumption 3x200V, 50/60 Hz | A       | 22/23    | 22/23    |
| Amp. consumption 3x230V, 50/60 Hz | A       | 21       | 21       |
| Amp. consumption 3x400V, 50/60 Hz | A       | 12,5     | 12,5     |
| Amp, consumption 3x415V, 50 Hz    | A       | 12       | 11,5     |
| Fuse 3x200V, 50/60 Hz             | A       | 25       | 25       |
| Fuse 3x230V, 50/60 Hz             | A       | 25       | 25       |
| Fuse 3x400V, 50/60 Hz             | A       | 16       | 16       |
| Fuse 3x415V, 50 Hz                | A       | 16       | 16       |
| Detergent                         | %       | 0 - 6    | 0 - 6    |
| Inlet pressure max./min.          | bar     | 10/1.5   | 10/1     |
| Inlet temperature max.            | °C      | 20       | 20       |
| Fuel consumption **               | l/h     | 7,4      | 7,4      |
| Pump oil HYPOID 80/90             | l       | 0,6      | 0,6      |
| Cylinders                         | pcs.    | 3        | 3        |
| By-pass pressure                  | bar     | 17       | 17       |
| Opening pressure                  | bar     | 185      | 205      |
| Oil nozzle                        | gal./ ° | 1,75/80  | 1,75/80  |
| Oil pressure max.                 | bar     | 13       | 13       |
| Fuel tank                         | l       | 30       | 30       |
| Double Lance high pressure nozzle | Size    | 1509,0   | 1507,0   |
| Double Lance low pressure nozzle  | Size    | 4040     | 4040     |
| Double Lance nozzle angle         | °       | 15/40    | 15/40    |
| Water attachment                  | Size(“) | 3/4      | 3/4      |
| Water tank                        | l       | 16       | 16       |
| Electric cable                    | m       | 10       | 10       |
| High pressure hose                | m       | 10       | 10       |
| Weight                            | kg      | 182      | 182      |
| Depth                             | mm      | 1200     | 1200     |
| Width                             | mm      | 700      | 700      |
| Height                            | mm      | 890      | 890      |

\* At inlet temperature = 10°C

\*\* Δ T = 50°C

**Røgafgang**  
**Smoke flues**  
**Rookkanalen**

• **Røykavganger**  
• **Abgas-Schornsteine**  
• **Conductos de humo**

• **Rökavgångar**  
• **Conduits de fumée**  
• **Chaminés para fumos**

## FAST INSTALLATION HEDTVANDSMASKINER

### **RØGAFGANG:**

Hver maskine skal forsynes med røggasafgang med dimensioner i.h.t. skitsen på side 76. Installationen bør udføres af en lokal VVS-installatør, der samtidig sikrer, at installationen overholder de lokale myndighedskrav.

### **RØGGASBLÆSER:**

Når der monteres 2 eller flere maskiner til et samlet røggasanlæg, skal dette forsynes med røggasblæser.

Røggassen kan nå en temperatur på op til 300°C.

Blæserens ydelse skal dimensioneres i.h.t. den samlede mængde røggas og tillægsluft. Der anbefales en luftmængde  $\geq 2 \times$  luftmængden i tabellen side 76.

### **LUFTINDGANG:**

Maskinrummet skal være forsynet med luftindgang som muliggør tilførelse af nødvendig luftmængde til forbrændingen i maskinerne (se tabellen side 76).

## STATIC INSTALLATION OF HOT WATER CLEANERS

### **EXHAUST OUTLET:**

Every machine should be equipped with an exhaust gas outlet with dimensions according to the table on page 76. The installation should be made by a local plumber who at the same time secures that the installation satisfies the local requirements of the authorities.

### **EXHAUST GAS BLOWER:**

When two or more machines are gathered in an exhaust gas unit, this is to be equipped with an exhaust gas blower.

The exhaust gas can reach as much as 300 degrees.

The performance of the blower should be dimensioned according to the total quantity of exhaust gas and additional air. An air quantity  $\geq 2 \times$  the air quantity of the table on page 76 is recommended.

### **AIR INTAKE:**

The engine room is to be equipped with an air intake, which makes the supply of a necessary air quantity for the combustion of the machines possible (please see table on page 76).

## STATIONÄR INSTALLATION VON HEIßWASSERMASCHINEN

### **RAUCHAUSLAß:**

Jede Maschine soll mit einem korrekt bemessenen Rauchgasauslaß ausgestattet sein (laut der Skizze auf Seite 76). Die Einrichtung soll vom lokalen Gas- und Wasserinstallateur ausgeführt werden, der gleichzeitig sichern wird, daß die Einrichtung die lokalen Forderungen der Behörden einhält.

### **ABGASGEBLÄSE:**

Wenn 2 oder mehr Maschinen zur einen gesammelten Abgasanlage gemacht werden, ist diese mit einem Abgasgebläse ausgestattet zu werden.

Die Abgase können Temperaturen bis an 300°C erreichen.

Die Leistung des Gebläses soll laut der gesammelten Menge von Abgasen und Zusatzluft bemessen werden. Eine Luftmenge  $\geq 2 \times$  die Luftmenge der Tabelle auf Seite 76 wird empfohlen.

### **LUFTEINLAß:**

Der Maschinenraum soll mit einem Lufteinlaß ausgestattet sein, der die Zufuhr einer notwendigen Luftmenge zur Verbrennung in der Maschinen ermöglicht (siehe die Tabelle auf Seite 76).

## INSTALLATION EN POSTE FIXE DES NETTOYEURS EAU CHAUDE

### **PASSAGE DE FUMÉE:**

Chaque machine doit être équipée d'un passage de gaz à fumée dimensionné comme sur le dessin à la page 76. Le montage doit être effectué par le plombier local qui assure en même temps le respect des normes officielles.

### **EXTRACTEUR:**

Le raccordement de 2 ou plusieurs machines sur un seul conduit de fumée doit être réalisé avec un extracteur. La température des gaz peut atteindre 300°C. La puissance d'aspiration doit être déterminée suivant la quantité totale de gaz brûlé et d'air supplémentaire. La quantité d'air supplémentaire (voir tableau page 76) est supérieure ou égale à 2 fois la quantité de gaz brûlé.

### **ENTREE D'AIR:**

Le local technique doit être équipé d'une entrée d'air qui permet l'admission d'une quantité d'air nécessaire à la combustion dans les machines (voir le tableau page 76).

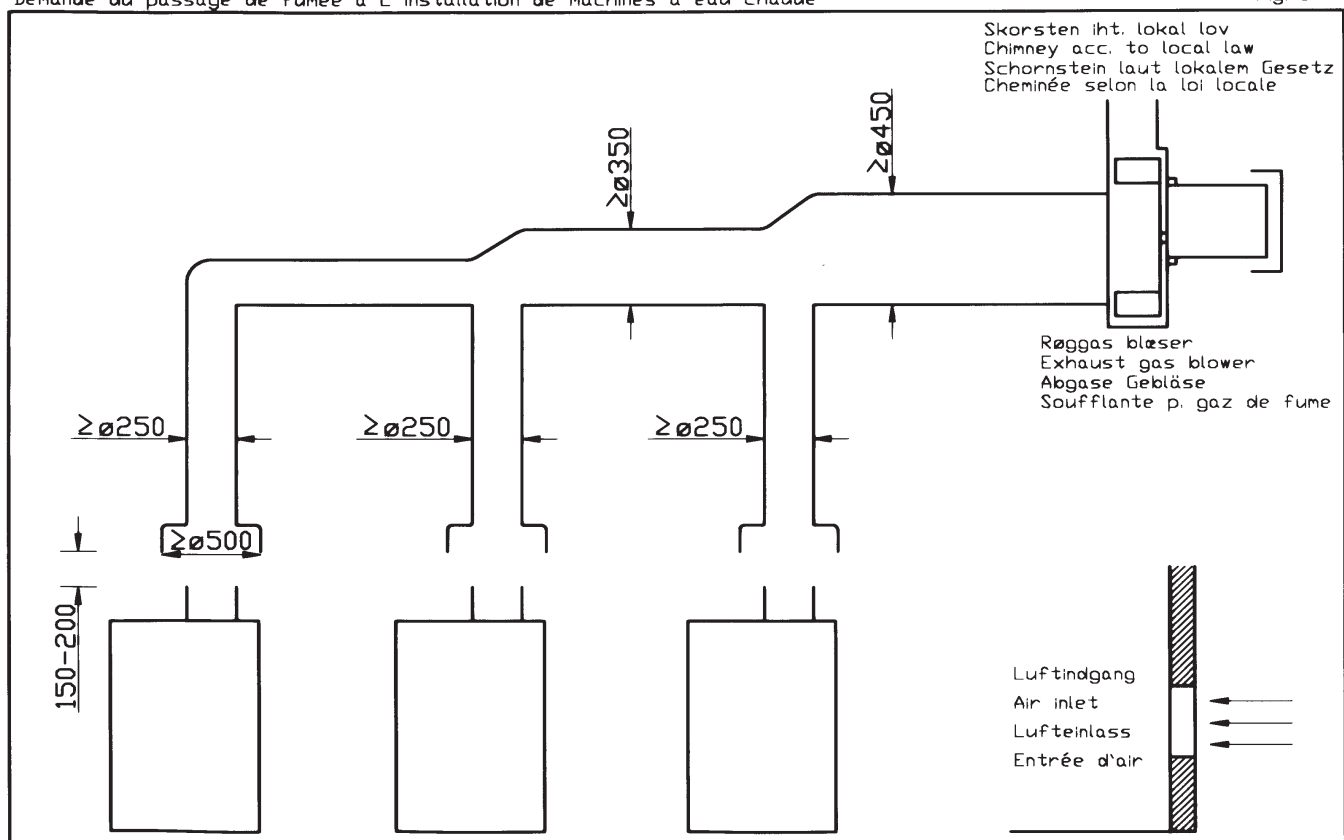
**Røgafgang**  
**Smoke flues**  
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• **Røykavganger**  
• **Abgas-Schornsteine**  
• **Conductos de humo**

• **Rökavgångar**  
• **Conduits de fumée**  
• **Chaminés para fumos**

Krav till røgafgange ved installationer af hedvandsmaskiner  
Demands on smoke outlets on installations of hot water machines  
Forderungen an Rauchauslässe bei Installationen von Heisswassermaschinen  
Démarche du passage de fumée à l'installation de machines à eau chaude

Fig. 1



Oversigt over luftforbrug/min. luftindtag ved installation af hedvandsmaskiner  
Outline of air consumption/min. air intake on installation of hot water cleaners  
Übersicht über Luftverbrauch/min. Lufteinlass bei Installation von Heisswasserreiniger  
Tableau de consommation d'air/entrée d'air min. à l'installation de machines à eau chaude

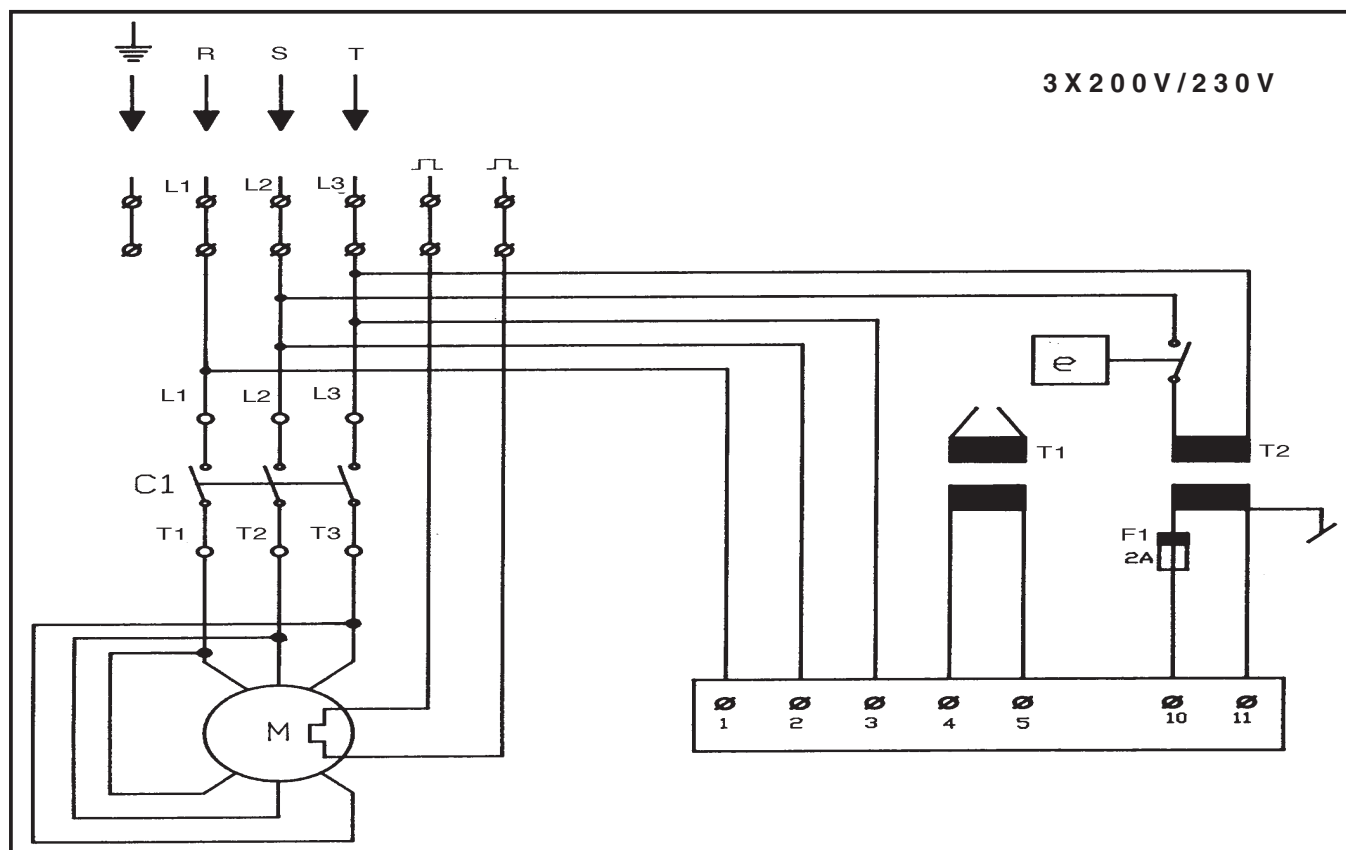
Tabel 2

| Type<br>Type<br>Typ<br>Modèle      | Luftforbrug i m³/t<br>Air consumption m³/h<br>Luftverbrauch m³/std<br>Consommation d'air m³/h |     |     | Min. luftindtag<br>Min. air intake<br>Min. Lufteinlass<br>Entree d'air min. |                 |                 |
|------------------------------------|---|-----|-----|---|-----------------|-----------------|
| Antal<br>Number<br>Stück<br>Nombre |   |     |     | <div> <div>ø mm</div> <div>□ mmxmm</div> </div>                             |                 |                 |
|                                    | 1   | 2   | 3   | 1   | 2               | 3               |
| 3000                               | 60  | 120 | 180 | ø250<br>200x200   | ø300<br>250x250 | ø350<br>300x300 |
| 41/4500                            | 90  | 180 | 270 | ø250<br>200x200   | ø300<br>250x250 | ø350<br>300x300 |
| 46/4800                            | 140   | 280 | 420 | ø300<br>250x250   | ø400<br>350x350 | ø450<br>400x400 |
| 5000                               | 150   | 300 | 450 | ø300<br>250x250   | ø400<br>350x350 | ø450<br>400x400 |
| 6000                               | 200   | 400 | 600 | ø300<br>250x250   | ø400<br>350x350 | ø500<br>450x450 |

**EI-diagram**  
**Wiring diagram**  
**Elektrisch schema**

**EI-diagram**  
**Elektodiagramm**  
**Diagrama eléctrico**

**Elschema**  
**Schéma électrique**  
**Diagrama EI**

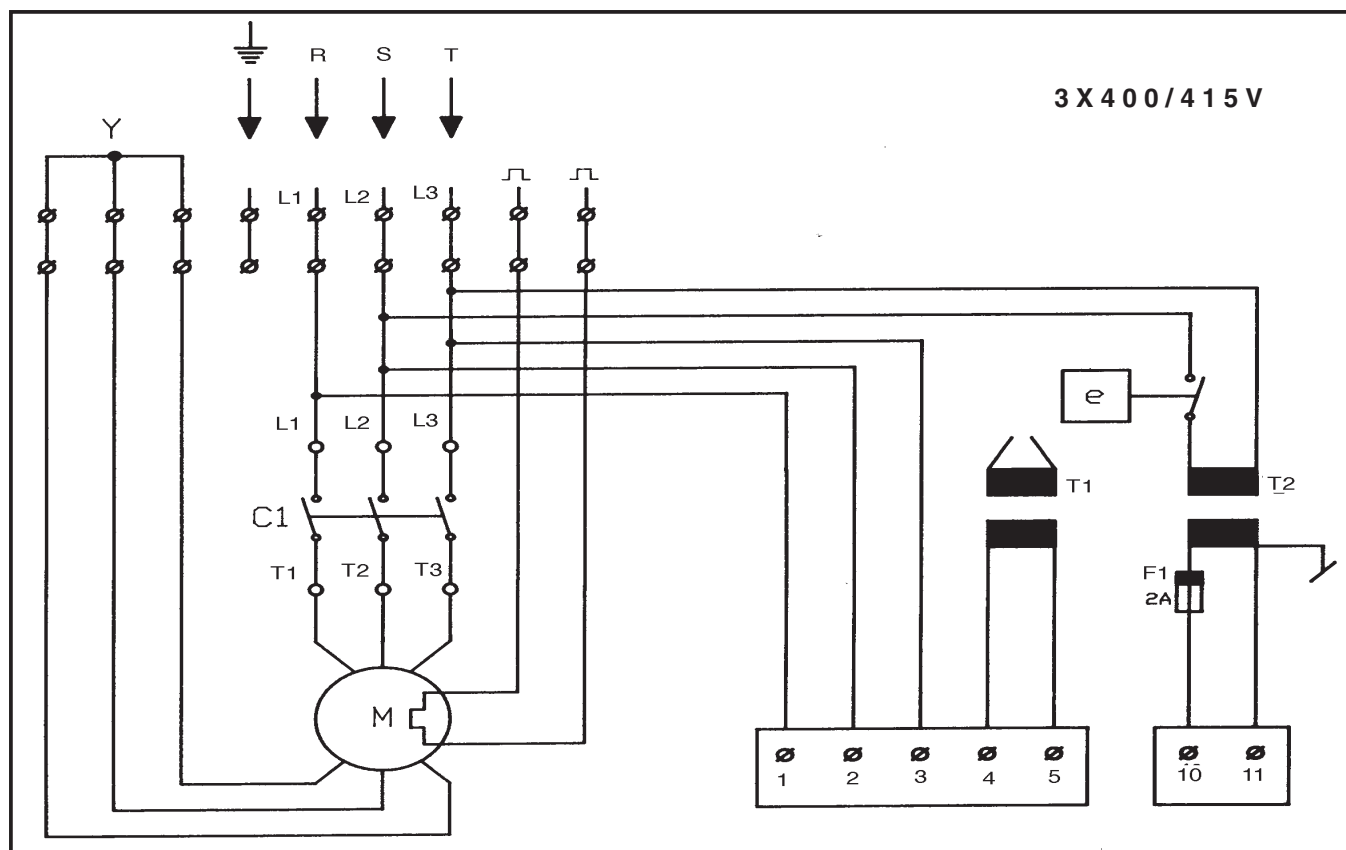


M = Motor  
 C1 = Kontaktor  
 T1 = Styretransformer  
 T2 = Tændtransformer  
 F1 = Sikring

Motor  
 Contactor  
 Control transformer  
 Ignition transformer  
 Fuse

Motor  
 Schutz  
 Steuerungstransformator  
 Zündtrafo  
 Sicherung

Moteur  
 Contacteur  
 Transformateur de contrôle  
 Transformateur  
 Fusible

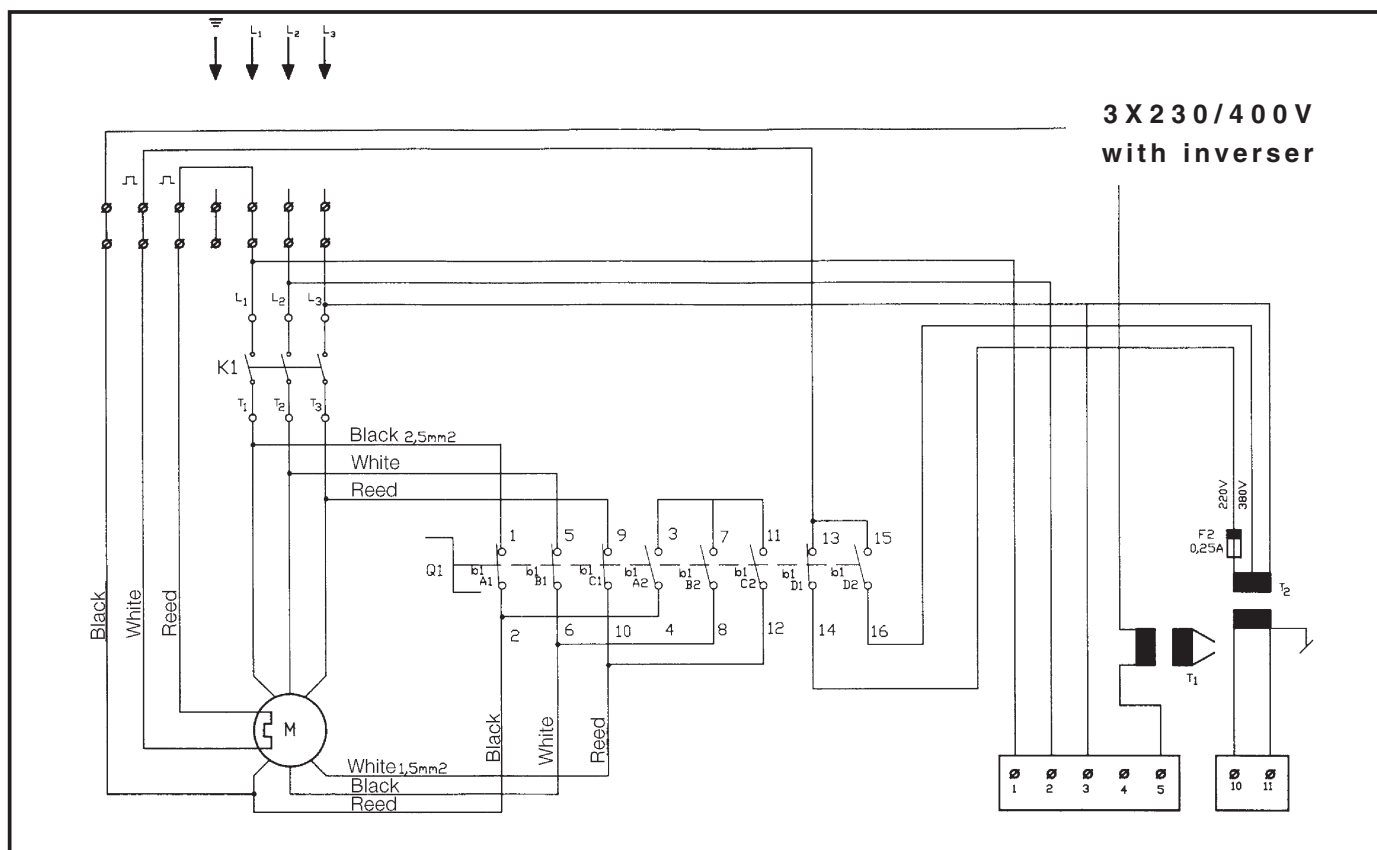




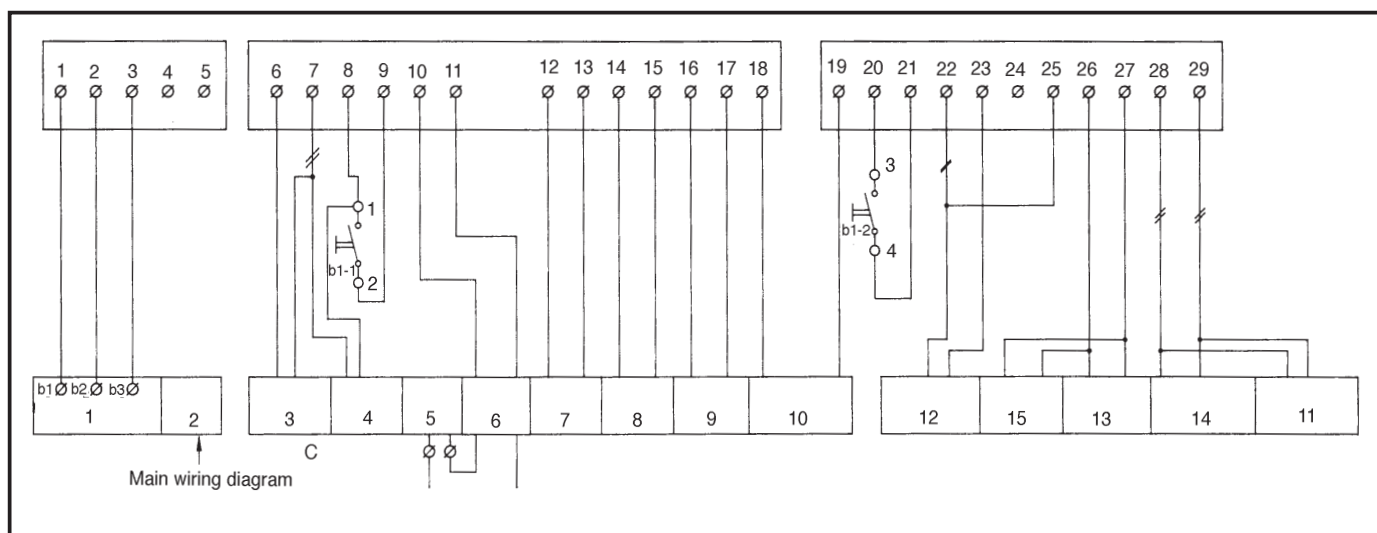
**El-diagram**  
**Wiring diagram**  
**Elektrisch schema**

• **El-diagram**  
• **Elektodiagramm**  
• **Diagrama eléctrico**

• **Elschema**  
• **Schéma électrique**  
• **Diagrama EI**

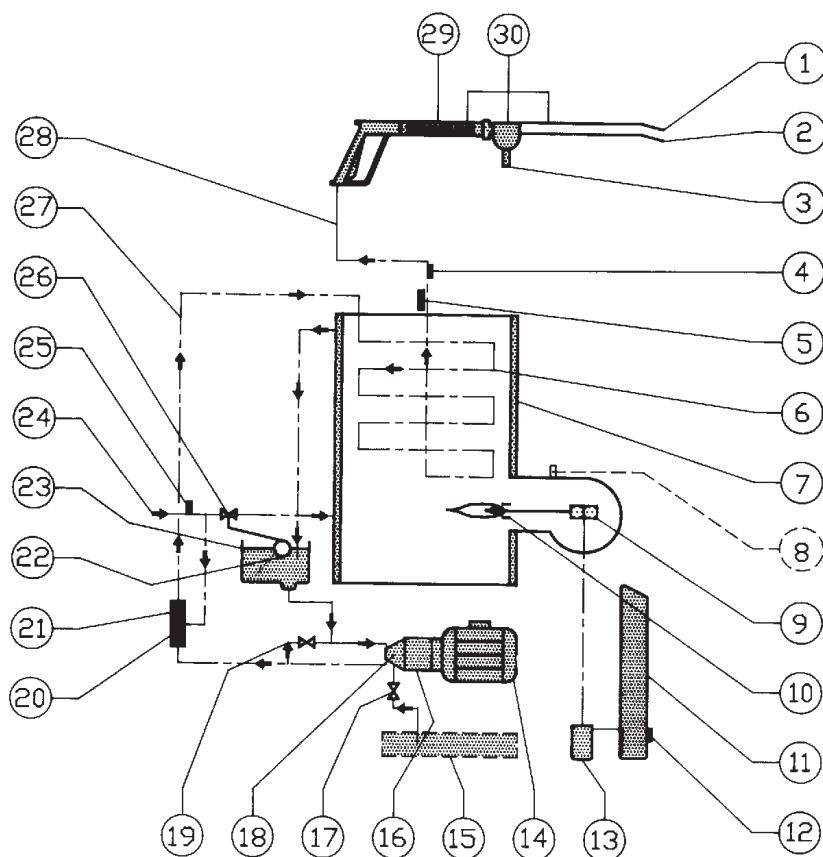


|    |                    |                      |                         |                            |
|----|--------------------|----------------------|-------------------------|----------------------------|
| M  | = Motor            | Motor                | Motor                   | Moteur                     |
| K1 | = Kontaktor        | Contact              | Schutz                  | Contacteur                 |
| Q1 | = Omskifter        | Switch               | Schalter                | Interrupteur               |
| T1 | = Styretransformer | Control transformer  | Steuerungstransformator | Transformateur de contrôle |
| T2 | = Tændtransformer  | Ignition transformer | Zündtrafo               | Transformateur             |
| F2 | = Sikring          | Fuse                 | Sicherung               | Fusible                    |

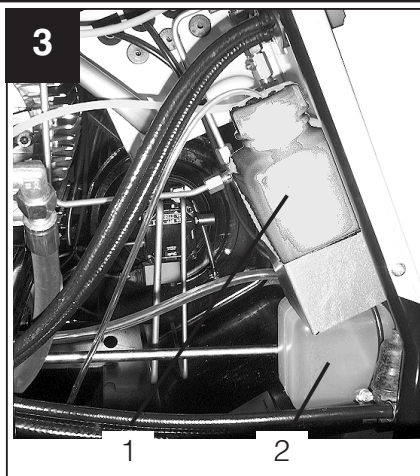


|      |                       |                           |                        |                             |
|------|-----------------------|---------------------------|------------------------|-----------------------------|
| b    | = Afbryder            | Switch                    | Schalter               | Interrupteur                |
| 1/13 | = Hovedkontakt        | Main contactor            | Hauptschutz            | Contacteur                  |
| 2    | = Tændtransformer     | Ignition transformer      | Zündtransformator      | Transformateur d'allumage   |
| 3    | = Overkogningssikring | Priming thermostat        | Überhitzungsthermostat | Thermostat de surchauffe    |
| 4    | = Karosseswitch       | Body switch               | Karosserie Schalter    | Interrupteur de carrosserie |
| 5    | = Termoudløser        | Thermal release           | Thermoauslöser         | Thermo-déclencheur          |
| 6    | = Transformer         | Transformer               | Transformator          | Transformateur              |
| 7    | = Brændstofniveau     | Fuel level                | Brennstoffniveau       | Niveau de combustible       |
| 8    | = Tilgangsvand        | Water inlet pressure      | Wassereinlaßdruck      | Pression, arrivée d'eau     |
| 9    | = Fotocelle           | Photo cell                | Fotozelle              | Cellule photo-électrique    |
| 10   | = Termostat           | Thermostat                | Thermostat             | Thermostat                  |
| 11   | = Blødgøringsanlæg    | Water softening equipment | Enthärtungsanlage      | Adoucisseur                 |
| 12   | = Flowswitch          | Flow switch               | Strömungswächter       | Interrupteur de pression    |
| 14   | = Magnetventil        | Magnet valve              | Magnetventil           | Vanne magnétique            |
| 15   | = Timetæller          | Hour counter              | Stunden Zähler         | Horocompteur                |

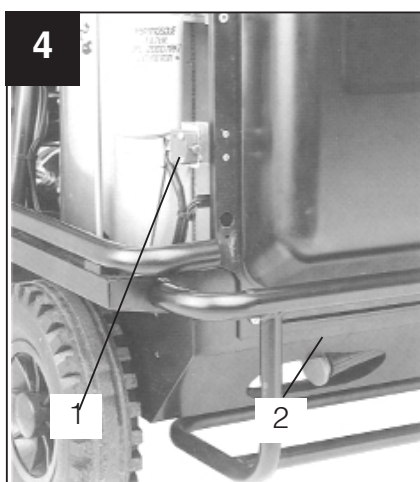
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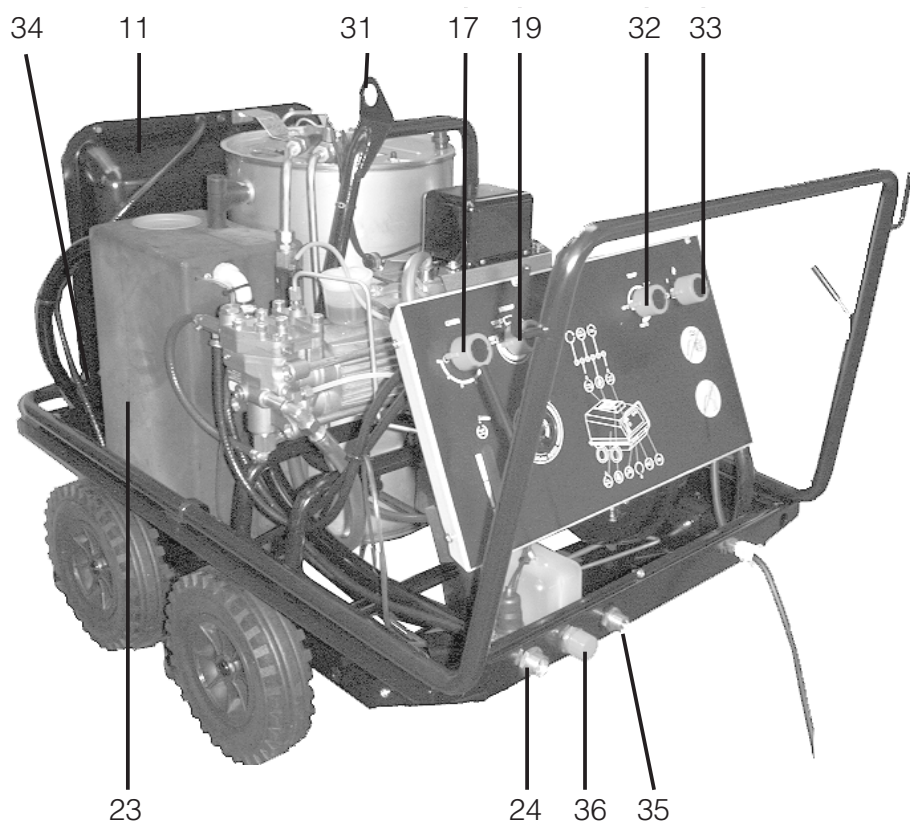
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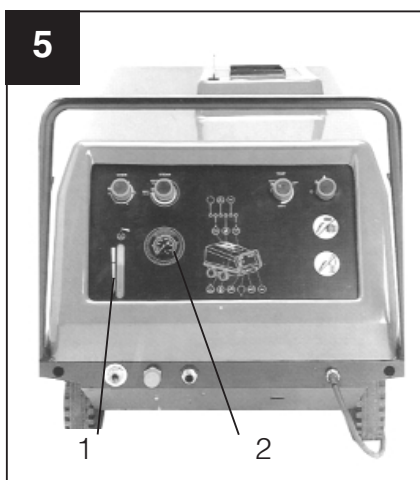
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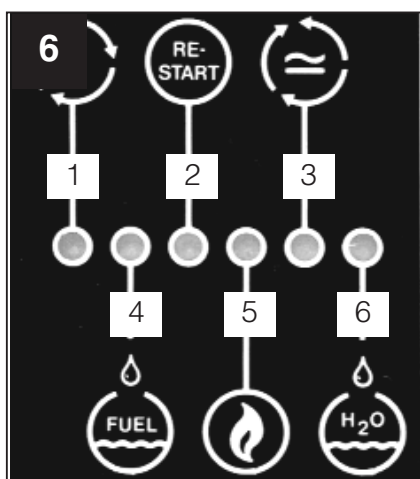
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5



6





**Nilfisk  
Advance**

***setting standards***



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