

SH SOLAR G, GH, GW

Instructions for use



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Symbols used to mark instructions



Before using the high-pressure washer, be sure to also read the enclosed operating instructions and keep them within reach at all times.



This symbol is used to mark safety instructions that must be observed to prevent damage to the machine and its performance.



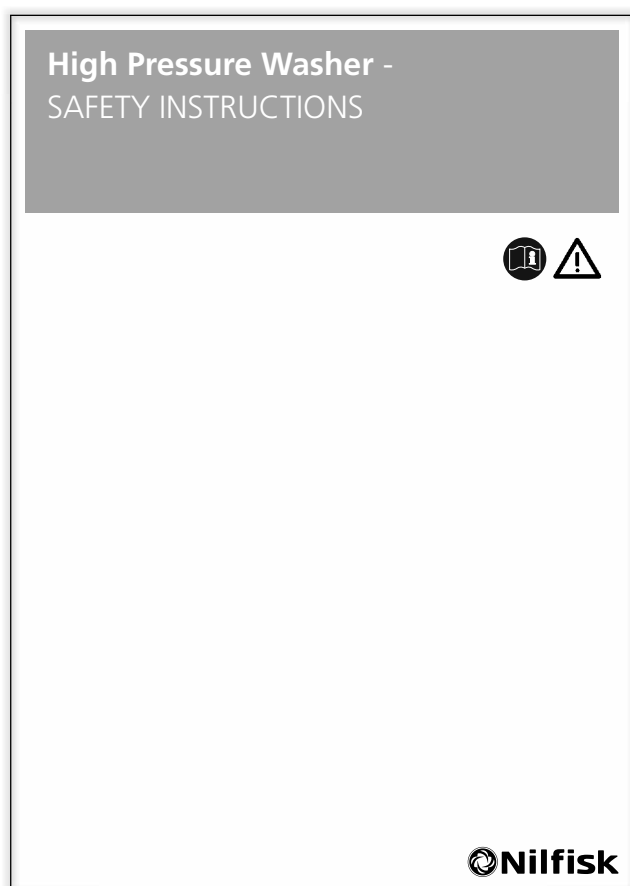
Safety instructions in these operating instructions which must be observed to prevent risks to persons are marked with this danger symbol.



This indicates tips and instructions to simplify work and to ensure safe operation.



1 Safety Precautions and Warnings



2 Description



2.1 Application

This high pressure hot water washer has been developed for stationary installation and professional use within:

- agriculture
- light industry
- transport
- building and construction
- service

Section 4 describes how to use the high pressure hot water washer.

Only use the high pressure hot water washer for purposes described in this manual.

The safety precautions must be observed to prevent damage to the machine, the surface to be cleaned or severe personal injuries.

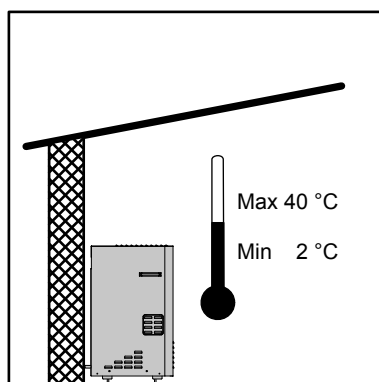
2.2 Operation elements

See illustration at the end of the manual

- 1 High pressure outlet (quick coupling, male)
- 2 Main switch
- 3 Start push button (illuminated, green)
- 4 Stop push button (illuminated, red)
- 5 Heating ON/OFF push button (illuminated, yellow)
- 6 Pressure gauge
- 7 Water inlet (quick coupling, female)
- 8 Thermostat (temperature adjustment)
- 9 Electric cable
- 10 Inspection window (hour counters, error messages)
- 11 Chimney
- 12 Data plate
- 13 Measuring point, exhaust gases
- 14 Overheat fuse - resettable

3 Installation

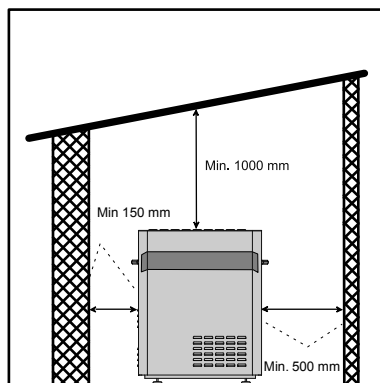
3.1 Installation conditions



The machine should be installed in a frost-free room. This applies to pump as well as pipelines incl. of outlet points. If connected to outdoor outlet points it should be possible to close and empty that part of the line which is exposed to frost. The maximum ambient temperature for the machine is 40°C. Air humidity: max. 80% relative humidity.



3.2 Condition of distance



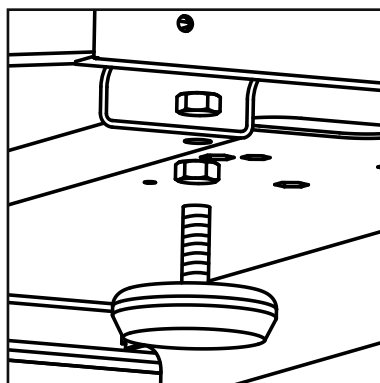
In consideration of the cooling system of the machine and the accessibility of service, there must be free wall space on both sides of the machine. To the right 500 mm at a minimum and to the left 150 mm at a minimum. To the ceiling there must be at least 1000 mm and from the rear point of the machine to the back wall there must be at least 100 mm. There must not be any other objects in this area either, such as pipes etc.

3.3 Mounting of feet and levelling of machine

The machine is delivered without feet mounted. Loosen the machine from the pallet and mount the 4 feet by fastening them to the flange underneath the machine by means of a 19 mm open-end wrench.

Place the machine on a plane floor.

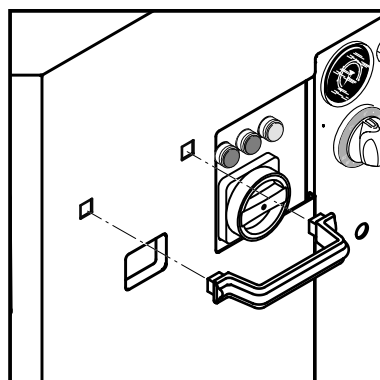
IMPORTANT: Of safety reasons it is important that the machine is level because of the functionality of the boiler drain.



To level the machine, loosen the lock nut on the appropriate feet and adjust the height by screwing the foot up or down.

Next cross-tighten the lock nuts around the flange. It is important that all 4 feet are in contact with the floor.

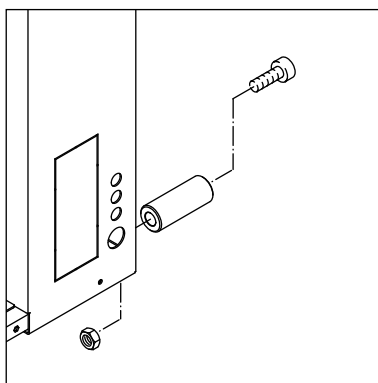
3.4 Mounting of handle



Mount the enclosed handles on the machine by pressing them into the suitable openings in the cabinet.

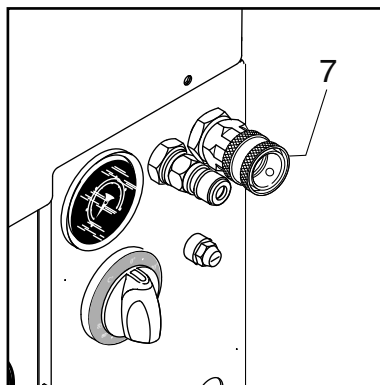


3.5 Mounting of spacers



Mount the enclosed spacers at the back of the machine.

3.6 Water connection



the following specifications and that the water does not contain particles such as floating sand. Min. water inlet pressure: 1 bar (at the required flow rate of the machine - see data plate.)

Max. water pressure: 10 bar

Max. water inlet temp.:
GH model: 85°C.
G model: 35°C.

The water connection is made through a flexible hose connected to the quick coupling on the water inlet (7) of the machine.

Make sure that the supply hose is suited for the purpose (temperature and flow rate). If in doubt, contact your Nilfisk representative.

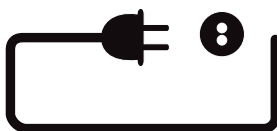
The connection can be made to a public drinking water supply network or a private water supply. A shut-off cock should be mounted on the water supply network in the immediate vicinity of the machine. Make sure that the water supply is within

All machine feature a water tank, and no further protection against back-flowing water into the supply network is required. The machine complies with EN 1717.

If there is a risk of floating sand or other impurities in the inlet water, a sand filter (50 micron) should be mounted between the supply outlet and the internal filter of the machine.

Clean the water inlet filter (7) once a month or in case of poor throughput (inlet pressure below 1 bar at the flow rate required by the machine).

3.7 Mains power connection



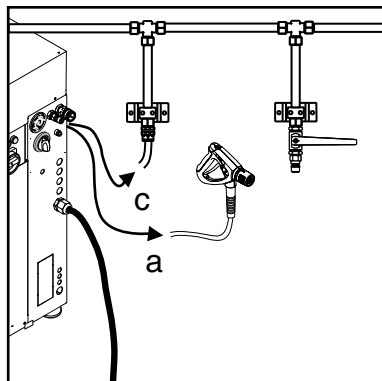
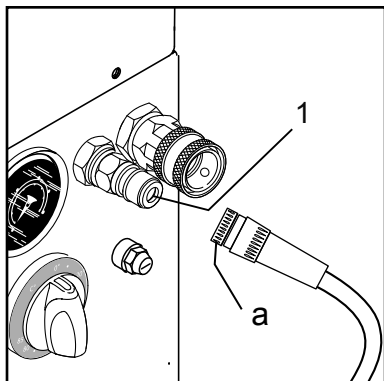
CAUTION! An authorized electrician must perform the electrical connection of the machine to the main power supply. Refer to section "1 Safety precautions and warnings".



3.8 High pressure connection

The outlet of the machine (1) can be connected directly to a standard high pressure hose (a) or to a pipeline with fixed outlet points (c).

IMPORTANT: When connecting to a pipeline always use a flexible hose connection from the outlet of the machine (1). Contact your Nilfisk distributor for further information.

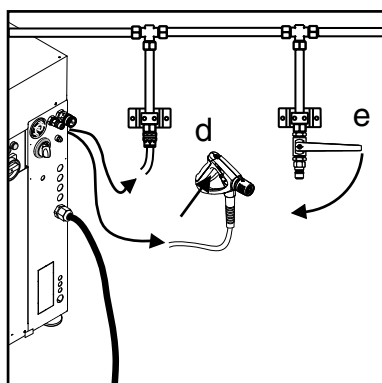
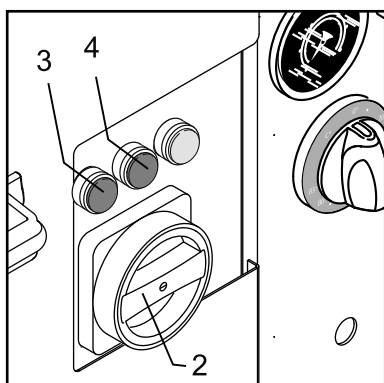
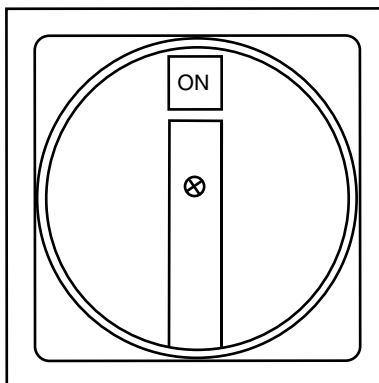


It is recommended to let a service technician authorized by Nilfisk prepare the pipeline.

3.9 Venting G models

When the machine is properly connected to supply water, electrical installation and a high pressure hose (or pipeline) the high pressure pump must be vented before it is operational.

1. Turn the main switch, (2) to position "ON".
2. Push the "START" button (3), and the machine will start.
3. Open the outlet point (spray handle on high pressure hose, (d) or outlet on piping system (e) without having a spray lance connected.
4. Let the water run until all air has escaped from the pump (even water flow).
5. In the case of a recently installed piping system, or if the pipeline and the pump have been emptied in any other way, the system should be vented by starting the pump and then letting the water run at each outlet point of the pipeline at turns. It is recommended to begin with the most distant outlet (height and/or length).
6. When connecting the high pressure hose directly to the machine, starting the pump and activating the trigger of the spray handle without having attached the spray lance, should vent the system.
7. Stop the machine by pressing the "STOP" push button (4).

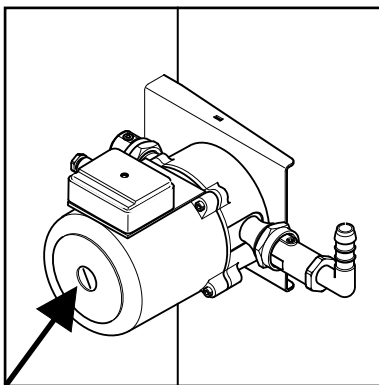
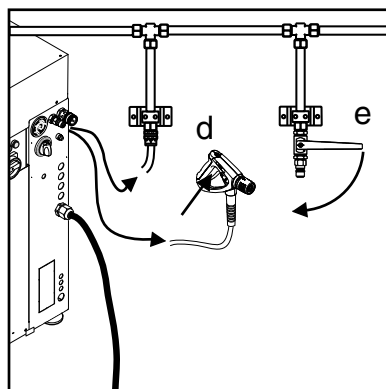
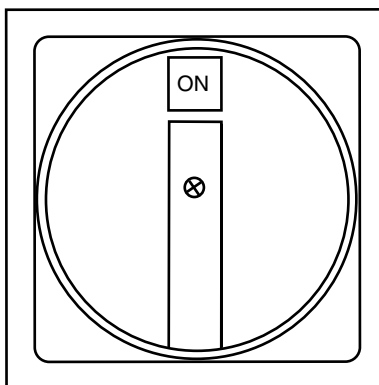
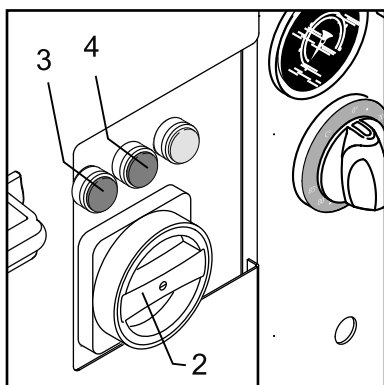


The machine is now vented.

3.10 Venting GH model

When the machine is properly connected to supply water, electrical installation and a high pressure hose (or pipeline) the high pressure pump must be vented before it is operational.

1. Turn the main switch, (2), to position "ON".
2. It is important that the heating tank is filled with water before the venting can take place. Pushing the "START" push button (3) and keeping it depressed will do this. The inlet solenoid valve then opens



and allows water to enter the heating tank. When the tank is full, the solenoid valve will automatically shut off, and the machine will start. This procedure will be necessary whenever the tank is emptied – i.e. during service.

3. Otherwise push the "START" button (3), and the machine will start.
4. Open the outlet point - spray handle on high pressure hose, (d) or outlet on piping system (e) without having a spray lance connected.
5. Let the water run until all air has escaped from the pump (even water flow). If little or no water flows from the system, it may be necessary to vent the internal feed pump separately. The Nilfisk service technician should perform this by loosening the center screw on the feed pump, see arrow.
6. In the case of a recently installed piping system, or if the pipeline and the pump have been emptied in any other way, the system should be vented by starting the pump and then letting the water run at each outlet point of the pipeline at turns. It is recommended to begin with most distant outlet (height and/or length).
7. When connecting the high pressure hose directly to the machine, starting the pump and activating the trigger of the spray handle without having attached the spray lance should vent the system.
8. Stop the machine by pressing the "STOP" push button (4).

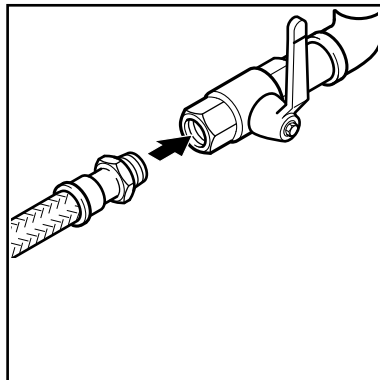
The machine is now vented.



3.11 Connecting to gas supply

All models are equipped with a gas burner.

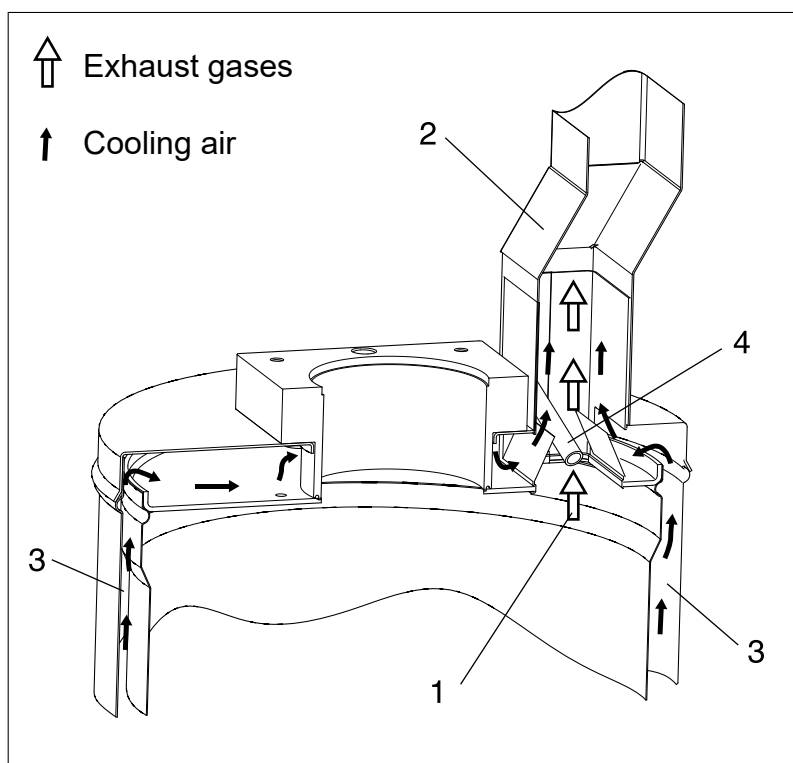
An authorized gas technician must perform connection of the gas burner to the public gas supply and adjust it.



Make sure that the machine is connected to the gas supply with a flexible, approved hose - at least 1 m long. This will eliminate vibrations of the machine to the gas supply line and hereby prevent long-term damage to the gas line.

The flexible hose also makes it convenient and faster for the Nilfisk service representative to perform service on the heating coil / heat exchanger of the machine - not having to interrupt the gas supply.

3.12 Functional description, GW models with Weishaupt burner



The gas burner burns off the gas in a boiler. Exhaust gases (1) are led through the funnel (2).

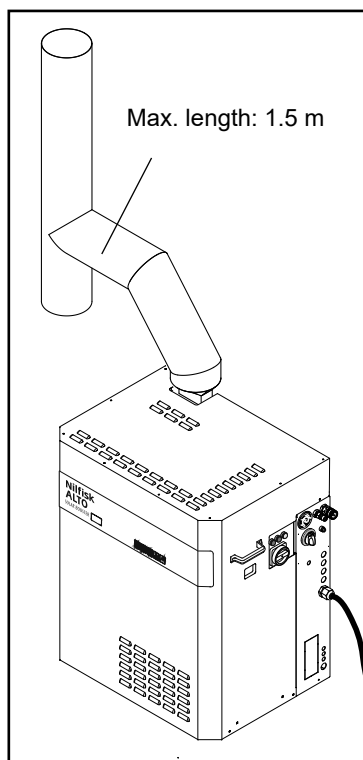
The cooling fan (3) blows air in between the outer and the inner jacket and further on through the funnel. The cooling air does not enter the combustion chamber.

NOTE: All exhaust gas measurements must be made in the measuring pipe (4).

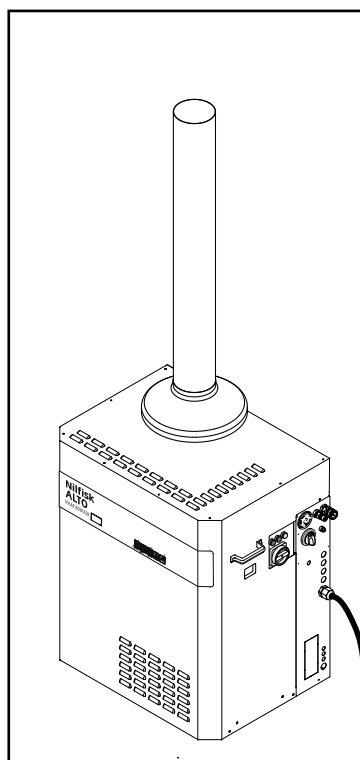
Detach plug prior to measurement.

If the measurements are made above the funnel, the cooling air will be mixed with flue gases.

3.13 Connection of funnel



Fixed funnel
Natural draught



Cowl with draught

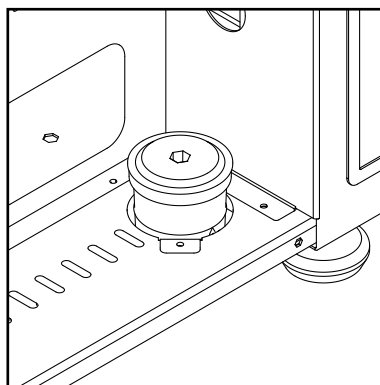
Standards and requirements to funnel installations may vary from country to country. Before installing the funnel, you should contact the local authorities. The following funnel connections are not legal in all countries and are therefore only intended as a guide. However, all installations must comply with the following requirement:

3.14 Drain, G models

Your machine features a drain. The drain runs through a water cup placed underneath the electric box of the machine.

Therefore the water cup must be filled with distilled water before the machine is started.

Filling: Dismount the cabinet



and remove the cover of the water cup. Then fill with distilled water until the water runs through the drain hose and out of the water cup.

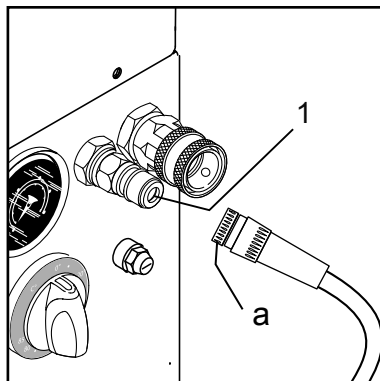
The drain hose must be guided to a sewer system. In case of local requirements to the disposal of drain water, contact the local authorities.

NOTE: In order that the drain will work properly it is important that the machine is level and that the drain hose is not placed above the level of the boiler bottom.

EN 4 Operation

4.1 Connections

4.1.1 High pressure hose - directly on the machine



The Nilfisk high pressure hose with imprinted max. working pressure and temperature should be attached to the outlet connection of the machine (1) by the quick coupling (a).

Max. extension hose: 50 m.

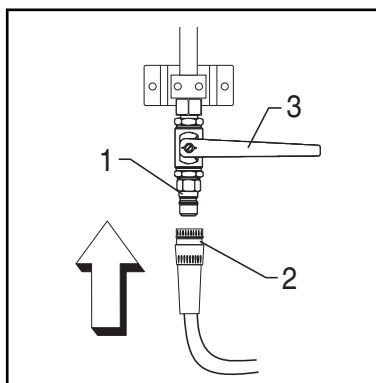
Danger of scalding!

Never dismount high pressure hoses at water temperatures above 50°C.



IMPORTANT: Prior to dismounting of the high pressure hose, the machine should be cooled down. After cooling down, stop the machine and close the shut-off cock. Then activate the trigger of the spray handle to relieve the high pressure hose of pressure.

4.1.2 High pressure hose - to outlet point



In the case of a pipeline with fixed outlet points the high pressure hose with imprinted working pressure and temperature should be attached to the nipple of the high pressure cock (1) by the quick coupling (2). Upon attachment turn the handle of the high pressure cock (3) to open position.

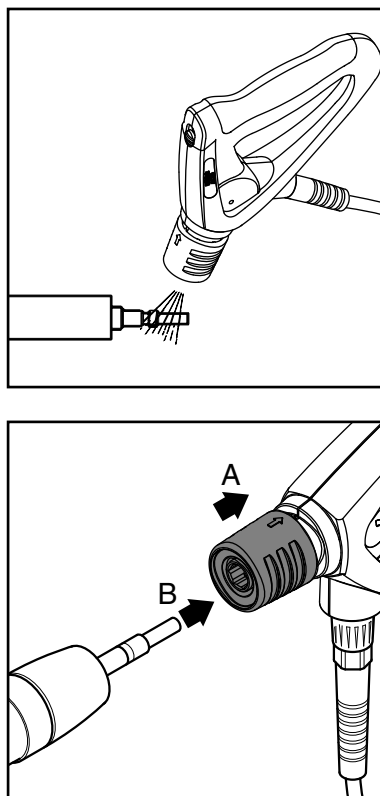
Danger of scalding!

Never dismount high pressure hoses at water temperatures above 50°C.



IMPORTANT: Prior to dismounting of the high pressure hose or when changing to another outlet point, the machine should be cooled down. After cooling down, stop the machine and close the high pressure cock carefully. Then activate the trigger of the spray handle to relieve the high pressure hose of pressure.

4.1.3 Spray handle - accessories



NOTE!

Clean nipple of any impurities each time the spray lance has been dismantled, see illustration.

1. Pull backward the quick coupling trigger (A) of the spray handle.
2. Insert the nipple of the spray lance (B) in the quick coupling and release the trigger.
3. Pull forward the spray lance or any other accessory to ensure correct mounting before starting the machine.

4.1.4 Selection of spray lance

You may use a double spray lance as well as a single spray lance with the machine. The recommended nozzle size of the lance is printed on the data plate of the machine – i.e. 0680.

The working pressure of the machine can be reduced by using nozzles with a wider diameter.

Never use lances with smaller nozzles (nominal value / diameter) than stated on the data plate.

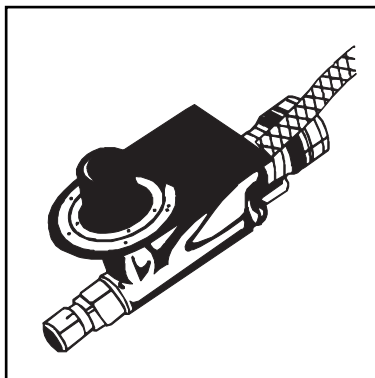


4.1.5 Application of detergents (external)

If you want to apply detergents or disinfectants these can be dosed to the water through an external injector. In conjunction with the injector it may be advantageous to use a wall rack on which spray lances, 2 pcs. of 25 l containers as well as 10 m high pressure hose can be placed.

Refer to your Nilfisk sales representative for your optimal solution.

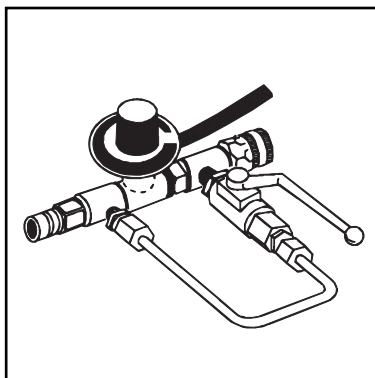
Below you will find various types of outlet points with injectors.



Outlet point with detachable injector

To be attached to the quick coupling of the high pressure cock. To be used for dosing of low-foaming detergents or disinfectants.

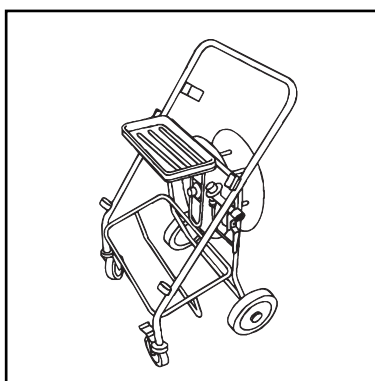
Dosage 1-8%.



Outlet point with detachable foam injector

To be attached to the quick coupling of the high pressure cock. To be used in conjunction with foam lance for application of high-foaming detergents or disinfectants.

Dosage 1-5%.



Outlet point with cleaning trolley and foam injector

To be attached to the quick coupling of the high pressure cock.

To be used in the same way as "Outlet point with detachable foam injector".

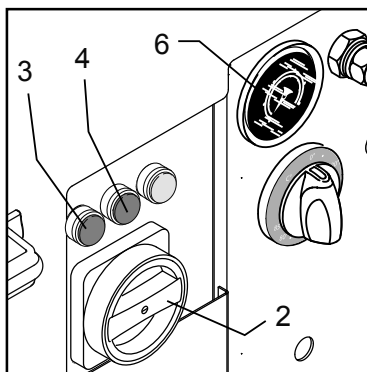
Makes it possible to place 4 spray lances, 2 pcs. of 25 l containers as well as 20 m high pressure hose.

4.1.6 Application of detergents (internal)

If your machine is equipped with an **optional**, internally mounted chemical system – dosing the chemical to the inlet of the high pressure pump, please refer to the separate “Operating instructions, Chemical dosing” on this option.

4.2 Operation

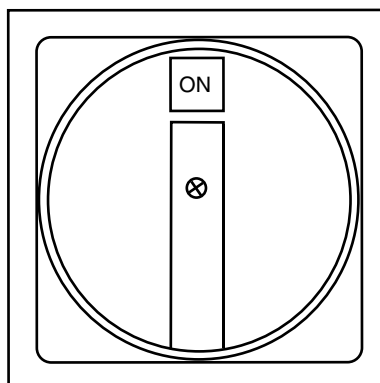
4.2.1 Starting up



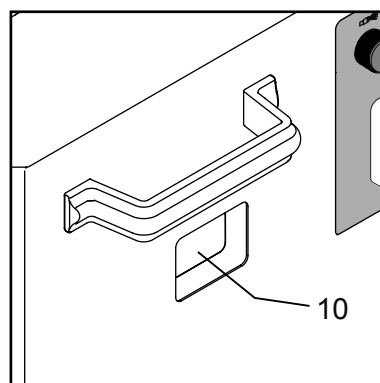
The shut-off cock on the water inlet should be open, and the spray handle on the high pressure hose should be closed.

1. Turn the main switch (2) to position - **ON** -.
2. Push the green "**START**" push button (3).

Check on the pressure gauge (6) that a pressure is being built up in the system and that the motor of the machine stops within appr. 20 seconds with the green “START” push button (3) lit. The machine is now in “Stand-by” mode waiting for the operator to activate the spray handle.



If a pressure is not being built up, vent the machine as described in sections **3.9 - 3.10 Venting**.

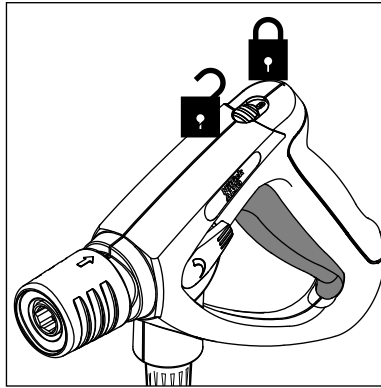


If the motor of the machine does not start or stops unintendedly with the red “STOP” push button (4) flashing, an error is present. Read the error message through the “Inspection window” and refer to section **7 Troubleshooting**.



4.2.2 Automatic start/stop

Always hold the spray lance with both hands!



The machine is automatically started when the trigger (1) of the spray handle is activated and will automatically stop and enter standby mode when the trigger is released. If the handle has not been activated within 20 seconds, the machine will enter stand-by mode.

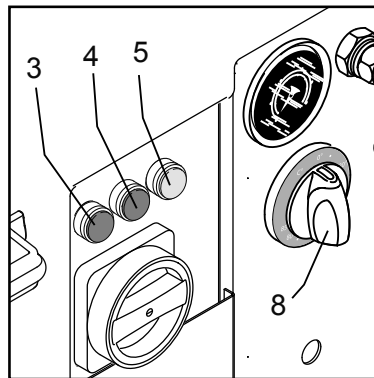
When the machine is not in use, the trigger should be locked with locking device.

4.2.3 Running with hot water

The machine is equipped with a gas burner and a boiler to heat the water.

The heating source can be switched on or off at convenience by pushing the yellow "Heating" push button (5). Pushing the button once will turn on the lamp in the button and switch ON the heating source.

Pushing the button again will turn out the lamp in the button and switch OFF the heating source.



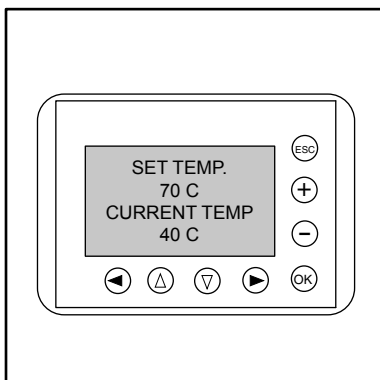
preset temperature.

On GH-models, with heating tanks on the suction side of the high pressure pump, heating will be performed independently of the spraying operation - "Working mode" as well as "Standby mode". The temperature is controlled by a temperature sensor in the water tank. Thus the water will always be preheated to the desired value - ready for use when the spray handle is activated.

On G-models heating is performed by a burner in a pressurized boiler. Heating is controlled by a thermostat on the outlet of the boiler when water is flowing out of the machine - "Working mode". As the hot water does not have to pass through the high pressure pump the maximum temperature can be as high as 99°C.

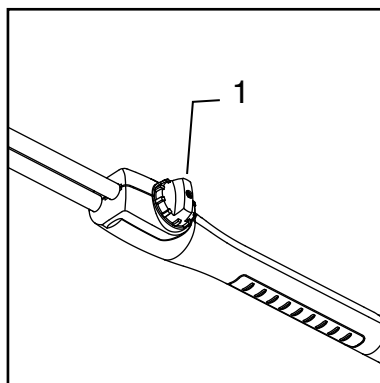
If an error occurs to the heating system of all models, the machine stops and the red "STOP" push button (4) will start flashing and the heating source will be shut off. Press the red button to re-set the machine. The machine will continue to be functional with non heated water by pushing the green "START" push button (3).

In this case please refer to section "7 Troubleshooting".



On the G-model the temperature can be adjusted within the limits stated on the "Thermostat" (8), by turning the knob to the desired value. When the heating source is ON (push button (5) alight), the preset and the actual outlet temperature of the water can be read on the display. The control unit of the machine will monitor the water temperature and regulate the heating source to provide the

4.2.4 Double spray lance, pressure regulation



The spray lance features 2 nozzles, a high pressure nozzle and a low pressure nozzle.

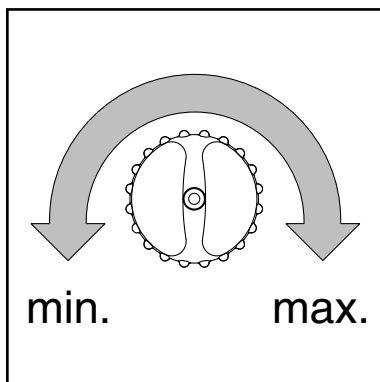
High pressure mode

When the pressure reducing valve (1) is completely closed (turned clockwise - **B**), only the high pressure nozzle is used - **high pressure mode**.

Low pressure mode

When the reducing valve (1) is completely opened (turned counterclockwise, both spray lances are used - **low pressure mode** / possibility of dosing detergents.

The pressure may be regulated between these positions.



4.2.5 Stop

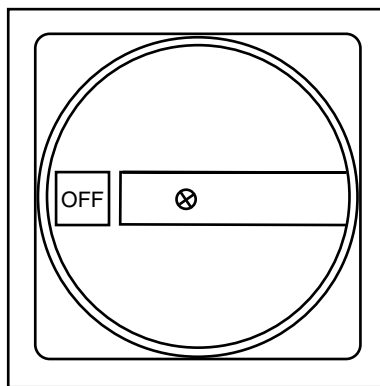
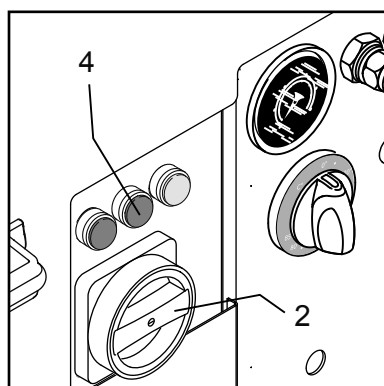


Danger of scalding!

Never detach high pressure hoses at a water temperature above 50°C.

Prior to dismantling of the high pressure hose, the machine should be cooled down. After cooling down, stop the machine and close the shut-off cock.

Never detach the high pressure hose while the machine is in operation.



1. To stop the machine push the red "STOP" button (4). The red light will come on. To disconnect the machine completely from mains, turn the main switch (2) to position - **OFF** -.
2. Close the shut-off cock of the water inlet and activate the spray lance or open the high pressure cock to relieve the pipeline / high pressure hose of pressure.



4.2.6 Automatic "system shut-down"

Your machine features a function called "system shut-down".

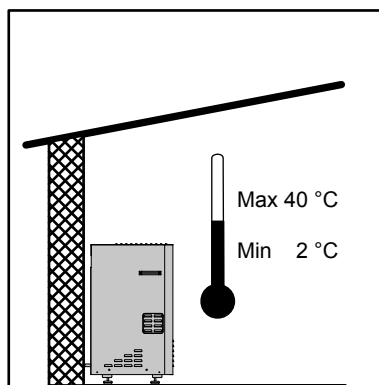
If this function is activated the machine will automatically shut down if it has not been used in a period preset by the user (1 sec. - 9 hours).

On the machine GH-model it will be possible to automatically stop the heating of the water in the water tank if the machine has not been used in a period

preset by the user (1 sec. - 9 hours).

The functions system shut-down and switching off the heating work together but may have different switch-off delays. The functions are disabled on delivery - please contact your Nilfisk service representative if you would like the function(s) to be enabled.

4.2.7 Frost protection



The machine should be installed in a frost-free room. This applies to pump as well as pipelines incl. of outlet points. Concerning outdoor outlet points it should be possible to empty that part of the line which is exposed to frost.

IMPORTANT: For safety reasons, hoses, spray lances and other accessories should always be thawed prior to use.

5 Fields of Application and Working Methods

5.1 Fields of application

The most important fields of application for this product are:

Agriculture	Cleaning of machinery, agricultural implements, stalls, equipment and buildings.
Transport	Cleaning of trucks, buses, cars etc.
Building & Construction	Cleaning of vehicles, equipment, buildings etc.
Light industry	Degreasing and cleaning of machines, workpieces, and vehicles.
Service	Cleaning of vehicles, public baths, institutions etc.

5.2 Working pressure

The high pressure system may be used with high or low pressure at your own option:

Low pressure	Is first and foremost used for the application of detergents and for flushing.
High pressure	Is used during the actual cleaning.
Intermediate pressure	As an example it may be used for the cleaning of surfaces which cannot stand a too powerful jet, i.e. soft surfaces.



5.3 Temperature

Hot water significantly increases the efficiency of the cleaning process – especially grease, oils and fats can be broken down more easily at higher temperatures.

Temperatures up to 60°C should clean off proteins, such as blood substances.

Oil and traffic film should be exposed to app. 70°C, whereas grease and fat is easiest to remove with temperatures of 80 to 85°C.

Several detergents become more efficient when acting with hot water – please refer to manufacturers recommendations.

5.4 Mechanical impact

In order to break down tough layers of dirt, additional mechanical impact may be required. Special lances with special nozzles (pulsating jet / concentrated "0" jet) are avail-

able for such purposes as are rotating brushes plus soft & sand blasting equipment.

Please ask your Nilfisk representative.

5.5 Detergents

As standard the system is delivered without a detergent injector and the optional, factory mounted, internal chemical system.

If you want to use detergents or disinfectants these should be dosed through an external injector (see section 4.1.5) or through the pump (see section 4.1.6).

The most efficient cleaning is reached with detergents in conjunction with the high pressure cleaning. For that purpose Nilfisk can offer you a series of products specially developed for high pressure cleaning, among other fields within:

- Cleaning of vehicles, machines, stalls etc.
- Disinfection
- Degreasing of workpieces
- Descaling

The products are water-based, without phosphates, and the applied tensides (surface active substances) comply with the present requirements for easy biodegradability.

Contact your Nilfisk distributor for directions as to which product(s) will fulfill your requirements.

The method of application and the dosage of the individual products appear from the product labels or the data sheet.

Low-foaming detergents are applied through an injector and under low pressure. A change to cleaning under high pressure is effected by regulating from »low pressure mode« to »high pressure mode« on the double spray lance or by attaching a high pressure spray lance.

For foam cleaning you will have to attach a special foam equipment. Insert the suction hose of the injector into the foam detergent.

Attach the foam lance on the spray handle and now you are ready for foam application. Upon the application open the by-pass cock of the foam injector and replace the foam lance by a spray lance, and you are ready for cleaning.



General rules for addition of detergents

Nilfisk cleaning equipment can be used for all detergents and disinfectants, which are suitable for high pressure cleaning according to the prescriptions of the supplier. (If using external injector, section 4.1.5, the pH-value should be between 4 and 14. If using addition of chemicals through the high-pressure pump, section 4.1.6, the pH-value MUST be between 5.5 and 8.5). Acid and lye should not be applied in a concentrated form.

Carefully observe the prescriptions and guidelines of the supplier, also the rules concerning safety clothing and drainage facilities.

Detergents, which are not exactly prescribed for use in conjunction with high pressure cleaning, **must only** be used upon a previous approbation from Nilfisk and the supplier.

The use of Nilfisk detergents ensures that machines, accessories and detergents match, which is the condition of an optimal solution of a cleaning task.

Nilfisk can offer you a wide range of efficient agents for cleaning and disinfection. The products are composed of substances which combine efficiency and environmental considerations at one and the same time.

5.6 Working methods

Your high pressure hot water washer has been developed for cleaning according to the so-called »2-step method«.

However, your high pressure hot water washer must be equipped with an external detergent injector.

STEP 1

Application of detergent - soaking.

STEP 2

High pressure cleaning.

In practice the working process is laid down in accordance with the actual job, but as a starting point the following working method can be described for a job:

1. Apply detergent under low pressure. The dosage is chosen according to the job which is to be carried through, and the adjustment is made on the dosing unit.
2. Await acting time. Let the detergent act on the dirt/surface for a short time prior to pressure cleaning - usually a few minutes.
3. High pressure cleaning. Clean all surfaces under high pressure.
4. Rinse afterwards, if necessary. To make sure that resi-

dual impurities are removed from the surface.

In connection with the working process the optimum cleaning will be reached by following these 3 pieces of advice:

Advice no. 1

When using a detergent, usually always apply it on a dry surface. If the surface is rinsed with water at first, it may be difficult for it to absorb the detergent, and the result is a reduced effect of the detergent.

Advice no. 2

When applying a detergent on large vertical surfaces (i.e. the sides of a truck) work from below and upwards. Thus you will avoid the detergent running off the surface through grooves and dark streaks appearing on the surface whilst cleaning.

Advice no. 3

During the high pressure cleaning you should work so that the high pressure water does not run over the surface which has not been cleaned yet. This is to ensure that there is sufficient detergent on the surface when the high pressure water hits the surface.

5.7 Typical cleaning tasks

5.7.1 Agriculture

Task	Accessories	Method
Stables Pig pens, sties Cleaning of walls, floors and equip- ment Disinfectant	Chemical foam injectors Foam lance Powerspeed lance Floor cleaner Detergents Universal Alkafoam Disinfectant DES 3000	<ol style="list-style-type: none"> 1. Soaking - apply foam to all surfaces (bottom to top) and wait for approx. 30 minutes. 2. Remove the dirt from surface with the high pressure lance or chosen accessory. Again, clean from bottom to top on vertical surfaces. 3. To flush away large quantities of dirt, change to low pressure mode and use the higher flow to push away the dirt. 4. Use recommended disinfectant products and methods to ensure hygiene. Apply DES 3000 disinfectant once the surfaces are perfectly clean.
Machinery Tractors Ploughs etc.	Detergent injection Powerspeed lances Curved lances and un- derchassis washers Brushes	<ol style="list-style-type: none"> 1. Apply detergent to vehicle or equipment surfaces in order to soften up dirt and grime. Apply from bottom to top. 2. Proceed with cleaning using the high pressure lance. Clean again from bottom to top. Use accessories to clean in difficult to reach places. 3. Clean fragile areas such as motors, rubber at lower pressure levels to avoid damage.

5.7.2 Vehicle

Task	Accessories	Method
Vehicle body- work	Standard lance Detergent injection Curved lances and un- derchassis washers Brushes Detergents Active Shampoo Active Foam Sapphire Super Plus Aktive Wax Allosil RimTop	<ol style="list-style-type: none"> 1. Apply detergent to vehicle or equipment surfaces in order to soften up dirt and grime. Apply from bottom to top. In cases of particularly dirty vehicles, pre-spray with a product such as Allosil in order to remove traces of insects etc, then rinse at low pressure and apply normal car cleaning detergent. Let detergents settle for 5 minutes before cleaning off. Metallic surfaces can be cleaned using RimTop. 2. Proceed with cleaning using the high pressure lance. Clean again from bottom to top. Use accessories to clean in difficult to reach places. Use brushes in order to add a mechanical cleaning effect. Short lances can help for cleaning of motors and wheel arches. Curved lances or undercarriage washers can be valuable for the cleaning of car under-chassis and wheel arches. 3. Clean fragile areas such as motors, rubber at lower pressure levels to avoid damage. 4. Apply a liquid wax using the pressure washer in order to protect the bodywork from pollution.



5.7.3 Building and equipment

Task	Accessories	Method
General surfaces Metallic equipment	Foam injectors Standard lance Curved lances Tank cleaning head Detergents Intensive J25 Multi Combi Aktive Alkafoam Disinfectant DES 3000	<ol style="list-style-type: none"> 1. Apply thick foam over the surfaces to be cleaned. Apply on dry surfaces. Apply from top to bottom on vertical surfaces. Let the foam act for up to 30 minutes for the optimal effect. 2. Proceed with cleaning using the high pressure lance. Use applicable accessories. Use high pressure to dislodge large amounts of incrustated dirt or grime. Use lower pressure and high water volume in order to rapidly flush away loose dirt and rinse surfaces. 3. Apply DES 3000 disinfectant once the surfaces are perfectly clean. <p>Areas covered by amounts of loose dirt, such as animal remains in slaughterhouses, can be removed by using high water flow to flush away the dirt to evacuation pits or drains.</p> <p>Tank cleaning heads can be used to clean barrels, vats, mixing tanks etc. Cleaning heads may be hydraulically or electrically powered and give the possibility for automatic cleaning without a constant user.</p>
Rusted or damaged surfaces prior to treatment	Wet sand blasting equipment	<ol style="list-style-type: none"> 1. Connect the sand blasting lance to the pressure washer and place the suction tube in the sand. 2. Always wear protective equipment during sand blasting. 3. Spray the surfaces to be treated with the mix of water and sand. Rust, paint etc will be stripped off.

These are merely several examples of cleaning tasks that can be solved by a pressure washer in association with accessories and detergents. Each cleaning task is different. Please consult your local dealer or Nilfisk representative in order to discuss the best solution for your own cleaning tasks.

6 Maintenance

To ensure the most optimal maintenance of your machine, you should consider making a "Service Contract" with Nilfisk. In this way your machine will always be ahead of potential problems.

Though paying attention to a few things will ensure a prolonged and reliable operation of your machine. Therefore it will be a good idea to make a habit of the following:

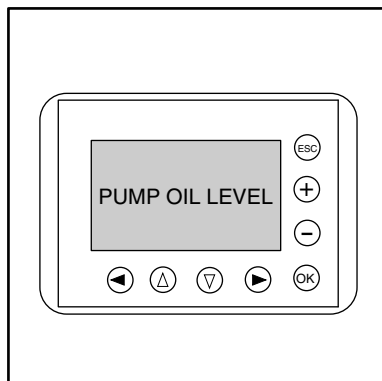
Prior to attaching the water hose and the high pressure hose, the quick couplings should be cleaned of dust and sand. Flush if necessary. This will prevent premature clogging of filters.

Prior to attaching the spray lance or other accessories to the spray handle, the machine should be started and the quick coupling cleaned of dust and sand.

Maintenance Schedule

	Weekly	After the first 50 operating hours	Every six months or 500 operating hours	As required
6.1 Checking pump oil level	●			
- Changing pump oil		●	●	
6.2 Cleaning water filter	●			●

6.1 Oil



Your machine is equipped with an electronic “oil sensor”, which monitors the level of lubricant oil in the high pressure pump. If the oil level (by malfunction or excessive wear) should drop to a low level, your machine will stop (or not be able to start) with an error indication “PUMP OIL LEVEL LOW” in the inspection window.

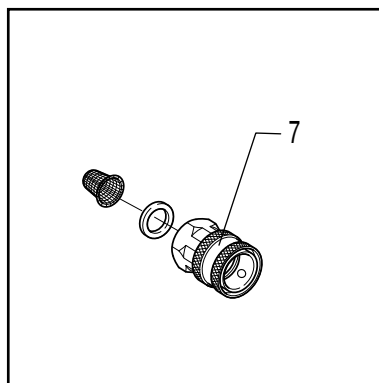
tion window.

Topping up the oil cup will be possible with the cabinet removed, but you should send for an Nilfisk service technician as soon as possible to disclose the cause of the oil loss.

PROTECT THE ENVIRONMENT

Waste oil and oil sludge must be removed as laid down in the instructions.

6.2 Water filter



To avoid debris entering the high pressure pump, a water filter (fine) is fitted at the water inlet. Dependent on the purity of the water, this filter will have to be cleaned at regular intervals. The filter can be removed when the quick coupling (7) has been unscrewed.

6.3 Cleaning of high pressure nozzle

A clogging up in the nozzle will cause the pump pressure to increase above normal operating pressure, and cleaning of the nozzle is required immediately.

1. Stop the cleaner and detach the spray lance.
2. Clean the nozzle with the cleaning tool.

IMPORTANT: ONLY use the cleaning tool when the spray lance is detached.

3. Flush the spray lance backwards with water.
4. If the pressure is still too high, repeat items 1-3.



6.4 Disposable waste

This high pressure hot water washer consists of parts which can affect the environment when thrown away. Parts that can pollute are as follows:

Oil, painted/zinc-coated parts, plastics/plastic-coated parts. Therefore, it is important to follow the laws concerning the

removal of polluting and dangerous materials when replacing spare parts or disposing of high pressure hot water washer. It is recommended that you bring the rejected parts to waste disposal areas or recycling plants that are approved for the destruction of these types of materials.

7 Trouble Shooting



You have chosen the best quality and therefore deserve the best service. All models feature an "Error detection system" that will stop the machine in case of a severe error that needs immediate attention. The red light of the STOP button will flash, and the display in the inspection window will indicate the nature of the error. Please refer to the specific section (7.2 to 7.3) that represents your machine.

Though the user can correct some of these errors, you should note the error and contact the nearest Nilfisk service organisation. To avoid unnecessary disappointments, you should check section "7.1 General trouble shooting" before contacting the nearest Nilfisk service organisation.

Should other malfunctions occur than those mentioned in sections 7.1 to 7.3, please contact your nearest Nilfisk service organisation.

7.1 General trouble shooting - all models

Symptom	Reason	Action
Machine will not start (NO ERROR indication)	<ul style="list-style-type: none"> > A fuse has blown > Power disconnected 	<ul style="list-style-type: none"> • Change the fuse. • Connect power.
Fuses blow	<ul style="list-style-type: none"> > Installation does not correspond to the ampere consumption of the machine 	<ul style="list-style-type: none"> • Change to an installation corresponding to the ampere consumption of the machine at a minimum. • Change the fuse.
Working pressure too low	<ul style="list-style-type: none"> > Nozzle worn > Wrong spray lance > Reduction valve of spray lance not adjusted to max. pressure. > Nozzle partly clogged up 	<ul style="list-style-type: none"> • Replace the nozzle. • Replace the spray lance (see section 4.1.4). • Turn reduction valve completely counter-clockwise (see section 4.1.4). • Clean the nozzle (see section 6.3).
Working pressure fluctuating	<ul style="list-style-type: none"> > Insufficient water supply > High pressure hoses too long 	<ul style="list-style-type: none"> • Dismount the cabinet and check that the water tank is not drained of water during operation of the machine. If it is, clean the water inlet filter of the machine. If that does not solve the problem, the water supply for the machine is insufficient. NB! Avoid long, thin hoses (min. 3/4"). • Dismount high pressure extension hoses and retry.



Symptom	Reason	Action
		Extension hose max. 50 m. NB! Avoid long extension hoses with many couplings.
	> Air in the system	• Vent the system (see sections 3.9-3.10).
	> Detergent container empty	• Refill or close dosing valve.
	> Water inlet filter clogged up	• Clean filter (see sect. 6.2).
No working pressure	> Nozzle clogged up	• Clean nozzle (see sect. 6.3).
	> No inlet water	• Check that the shut off cock of the water inlet is open. Check that the water supply meets the requirements (see section 1.2).
	> High pressure cock of outlet point open	• Close all high pressure cocks not in use.
Machine starts and stops	> Leaky hose/ pipeline/spray handle	• Repair leak.

7.2 Error messages, G models

If your G model does not heat the water although the yellow “Heating” push button (5) has been activated, the “overheat melting fuse” has blown. This fuse is located within the machine and **MUST ONLY** be exchanged by an Nilfisk service technician.

Error Message (red STOP light flashing)	Reason	Action
<p>„Pump oil level low“</p> <p>E3</p>	<p>> Level of lubricant oil of HP pump is at a low level</p>	<ul style="list-style-type: none"> • Remove cabinet and top up oil if no leakage is present. • Call Nilfisk service if oil is leaking or if water is mixed in the oil (creamy white or transparent)
<p>„Overload cut out“ or „Low inlet pressure“</p> <p>E2</p>	<p>> Overload or short circuit of the machine.</p> <p>> If Option “Low water security” mounted – lack of inlet pressure can be the reason</p>	<ul style="list-style-type: none"> • Call Nilfisk service. • Check your water supply – open?, sufficient pressure?
<p>„Water Shortage“ „No flow detected“</p> <p>E1</p>	<p>> Lack of water</p> <p>or</p> <p>> Defective or mal-adjusted flow sensor / pressure switch</p>	<ul style="list-style-type: none"> • Check your water supply – open?, sufficient pressure? • Check and clean inlet filter, section 6.2. • Call Nilfisk service.
<p>„Flow failure“ E4</p>	<p>> Defective or mal-adjusted flow sensor</p>	<ul style="list-style-type: none"> • Call Nilfisk service.
<p>„Overheat protection cut out or external control cut out“</p> <p>E7</p>	<p>> Overheat sensor on boiler enclosure has tripped. Gas burner stops.</p> <p>> External safety device (optional) has tripped. Gas burner stops.</p>	<ul style="list-style-type: none"> • Remove cabinet and check air supply to cooling fan. Clean if necessary. • Otherwise call Nilfisk service. • Check external safety switch (i.e. that external exhaust fan is on = pressure guard ON). • Otherwise call Nilfisk service.
<p>„Burner failure – press warm on and hold for two sec.“</p> <p>E9</p>	<p>> The gas burner has detected an error in the burner system:</p> <ul style="list-style-type: none"> • Lack of gas. • No ignition. • Other errors. <p>> Condensation drain clogged up</p> <p>> Condensate in boiler</p>	<ul style="list-style-type: none"> • Call Nilfisk service. • Dismount drain cup and clean the pipe at the bottom of the boiler.

EN	"Air Control Failure" E11	<ul style="list-style-type: none"> > The air pressure gauge on the booster blower is not activated properly. > The booster blower is not generating sufficient pressure 	<ul style="list-style-type: none"> • Adjust the air pressure gauge • Make sure that the booster blower is functioning, and that inlet is not blocked.
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7.3 Error messages, GH models (gas heated)

If heating cannot be switched on or is switched off without any error messages, it is likely that the over-heat protection (pos. 14 on illustration at the end of the manual) has tripped. Unscrew the dust cap, and push the rod to reset the overheat protection switch. If this error re-occurs call Nilfisk service.

Error Message (red STOP light flashing)	Reason	Action
Pump oil level low E3	<ul style="list-style-type: none"> > Level of lubricant oil of HP pump is at a low level 	<ul style="list-style-type: none"> • Remove cabinet and top up oil if no leakage is present. • Call Nilfisk service if oil is leaking or if water is mixed in the oil (creamy white or transparent)
Overload cut out E2	<ul style="list-style-type: none"> > Overload or short circuit of the machine. 	<ul style="list-style-type: none"> • Call Nilfisk service.
Water shortage E1	<ul style="list-style-type: none"> > Lack of water in heating tank 	<ul style="list-style-type: none"> • See section "3.10 Venting" • Check your water supply – open?, sufficient pressure? • Check and clean inlet filter, section 6.2.
Risk of leakage E8	<ul style="list-style-type: none"> > Water inlet magnet valve has been open more than 10 minutes 	<ul style="list-style-type: none"> • Check the flow rate from your water supply. • Inlet magnet valve defective – call Nilfisk service. • Leakage in tank or internal feed system – call Nilfisk-service.
Motor cut out E10	<ul style="list-style-type: none"> > Motor is not running 	<ul style="list-style-type: none"> • Motor overheated – let the machine cool down and retry. Check pressure and clean nozzle if too high. • Cooling of motor damaged – call Nilfisk service. • Other motor problems – call Nilfisk service.
Burner failure – press heat ON/OFF button and hold for 2 sec. E9	<ul style="list-style-type: none"> > The gas burner has detected an error in the burner system: <ul style="list-style-type: none"> • Lack of gas. • No ignition. • Other errors. 	<ul style="list-style-type: none"> • Call Nilfisk service.

8 Technical Data



PROGRAM	SH SOLAR 5M-150/1020 G	SH SOLAR 7P-150/1100 GH	SH SOLAR 7P-170/1200 G	SH SOLAR 7P-170/1200 GW
Item Nr.	107370450	107370495	107370470	107370480
Performance data :				
Pump pressure [bar]	150	150	170	170
Q _{iec} [l/h]	900	1030	1110	1110
Cleaning Impact [kg-force]	4.5	5.1	5.8	5.8
Δ temp - (Full flow) [°C]	78	58	78	78
Heating power [kW]	93	70	100	100
Efficiency [%]	95.5	NA	94.1	94.1
Weight (empty) [kg]	186	213	214	214
Max. sound power level [LWA]	92	93	93	93
Motor / Pump :				
Nozzle type	550	640	680	680
Q _{max} [l/h]	1020	1100	1200	1200
Pump type	NA5	C3	C3	C3
Pump oil. type	Castrol Alphasyn T 150	Castrol Alphasyn T 150	Castrol Alphasyn T 150	Castrol Alphasyn T 150
Motor output power [kW]	5.5	5.5	6.5	6.5
Motor / pump [rpm]	1450	1450	1450	1450
Pump drive	Direct	Direct	Direct	Direct
Connection requirements :				
Voltage [V]	400	400	400	400
Current - Max. consumption [amp]	14/~3	14/~3	15/~3	15/~3
Power consump. (heating+motor) [kW]	1.4 + 6.1	- + 7	1.4 + 6.9	1.4 + 6.9
Frequency [Hz]	50	50	50	50
Min. inlet water pressure (full flow) [bar]	1.0	1.0	1.0	1.0
Heating :				
Boiler type	EcoPower 7	Heating tank	EcoPower 7	EcoPower 7
Max. inlet temperature [°C]	30	30	30	30
Max. outlet temperature [°C]	99	85	99	99
Burner fuel type	Natural gas LPG	Natural gas LPG	Natural gas / LPG	Natural gas / LPG
Fuel consumption @ΔT=45°C _{CHHV} = 11 kW/m ³ [m ³ /h]	4.5	NA	5.6	5.6
Available options :				
Stainless steel cabinet	•	•	•	•
Manual detergent	•	•	•	•
Remote control	•	•	•	•
1 x detergent	•	•	•	•
2 x detergent	•	•	•	•
Mechanical coin box	•	•	•	•
Mechanical coin box with detergent	•	•	•	•
Low water security	•	•	•	•
No-Scale	•	•	•	•
Cold/warm selector switch	•	•	•	•
Pressure relief	•	•	•	•
Multiple machine connection box	•	•	•	•



9 Warranty

Your Nilfisk product is guaranteed for 12 months from date of purchase (purchase receipt must be presented) on the following conditions:

- that defects are attributable to flaws or defects in materials or workmanship. (Usual wear and tear as well as misuse are not covered by the guarantee).
- that repairs have not been carried out or attempted by other than Nilfisk-trained service staff.

- that only original accessories have been applied.
- that the product has not been exposed to abuse such as knocks, bumps or frost.
- that the instructions in the manual have been carefully observed.

A warranty repair comprises the replacement of defective parts, but it does not cover freight and packaging charges. Besides we refer to national Sale of Goods Act.

Any **illegitimate** guarantee repair will be invoiced. (I.e. malfunctions due to **causes** mentioned in section “**7.0 Trouble shooting**” of the instruction manual).



EU / UE / EL / EC / EE / ES / EÚ / AB

Declaration of Conformity

Prohlášení o shodě
Konformitätserklärung
Overensstemmelseserklæring
Declaración de conformidad
Vastavusdeklaratsioon
Déclaration de conformité
Vaatumustenmukaisuusvakuutus

Декларация за съответствие
Δήλωση συμμόρφωσης
Megfelelősségi nyilatkozat
Izjava o skladnosti
Dichiarazione di conformità
Atitikties deklaracija
Atbilstības deklarācija
Samsvarserklæring
Conformiteitsverklaring

Declaração de conformidade
Deklaracija zgodności
Declaratie de conformitate
Декларация о соответствии
Försäkran om överensstämmelse
Vyhlášení o zhode
Izjava o skladnosti
Uygunluk beyanı

Manufacturer / Výrobce / Hersteller / Fabrikant /
Fabricante / Κατασκευαστής / Gyártó / Proizvođač /
Fabbricante / Gamintojas / Ražotājs / Producers /
Fabrikant / Fabricante / Producent / Producător /
производитель / Tillverkaren / Výrobca / Proizvajalec /
Üretici firma:

**Nilfisk A/S, Kornmarksvej 1
DK-2605 Broendby, DENMARK**

Product / Produkt / Producto, Toode, Produit, Tuote /
Продукт / Προϊόν / Termék / Proizvod / Prodotto /
Produkta / Produkts / Artikel / Produtos / Prods /
Izdelek / Ürün

SH Solar 5M, -7P, G, GH, GW

Description / Popis / Beschreibung / Beskrivelse /
Descripción / Kirjeldus / La description / Kuvaus /
Описание / Περιγραφή / Leirás / Opis / Descrizione /
Aprašymas / Apraksts / Beschrijving / Descrição /
Descriere / Beskrivning / Popis / Açıklama

**HPW - Professional - Stationary - EI
400V 3~ 50Hz, IPX5**

EN

We, Nilfisk hereby declare under our sole responsibility, that the above-mentioned product(s) is/are in conformity with the following directives and standards.

LT

Mes, "Nilfisk pareiškiu vienašališkos atsakomybės, kad pirmiau minėtas produktas atitinka šias direktyvas ir standartu

CS

My, Nilfisk prohlašujeme na svou výlučnou odpovědnost, že výše uvedený výrobek je ve shodě s následujícími směrnici a normami.

LV

Mēs, Nilfisk šo apliecinu ar pilnu atbildību, ka iepriekš minētais produkts atbilst šādām direktīvām un standartie

DE

Wir, Nilfisk erklären in alleiniger Verantwortung, dass das oben genannte Produkt den folgenden Richtlinien und Normen entspricht.

NO

Vi, Nilfisk erklærer herved under eget ansvar, at det ovennevnte produktet er i samsvar med følgende direktiver og standarder

DA

Vi, Nilfisk erklærer hermed under eget ansvar at ovennævnte produkt(er) er i overensstemmelse med følgende direktiver og standarder.

NL

We verklaren Nilfisk hierbij op eigen verantwoordelijkheid, dat het bovengenoemde product voldoet aan de volgende richtlijnen en normen

ES

Nosotros, Nilfisk declaramos bajo nuestra única responsabilidad que el producto antes mencionado está en conformidad con las siguientes directivas y normas

PT

Nós, a Nilfisk declaramos, sob nossa exclusiva responsabilidade, que o produto acima mencionado está em conformidade com as diretrizes e normas a seguir

ET

Meie, Nilfisk Käesolevaga kinnitame ja kanname ainuisikulist vastutust, et eespool nimetatud toode on kooskõlas järgmiste direktiivide ja

PL

My, Nilfisk Niniejszym oświadczamy z pełną odpowiedzialnością, że wyżej wymieniony produkt jest zgodny z następującymi dyrektywami i normami..

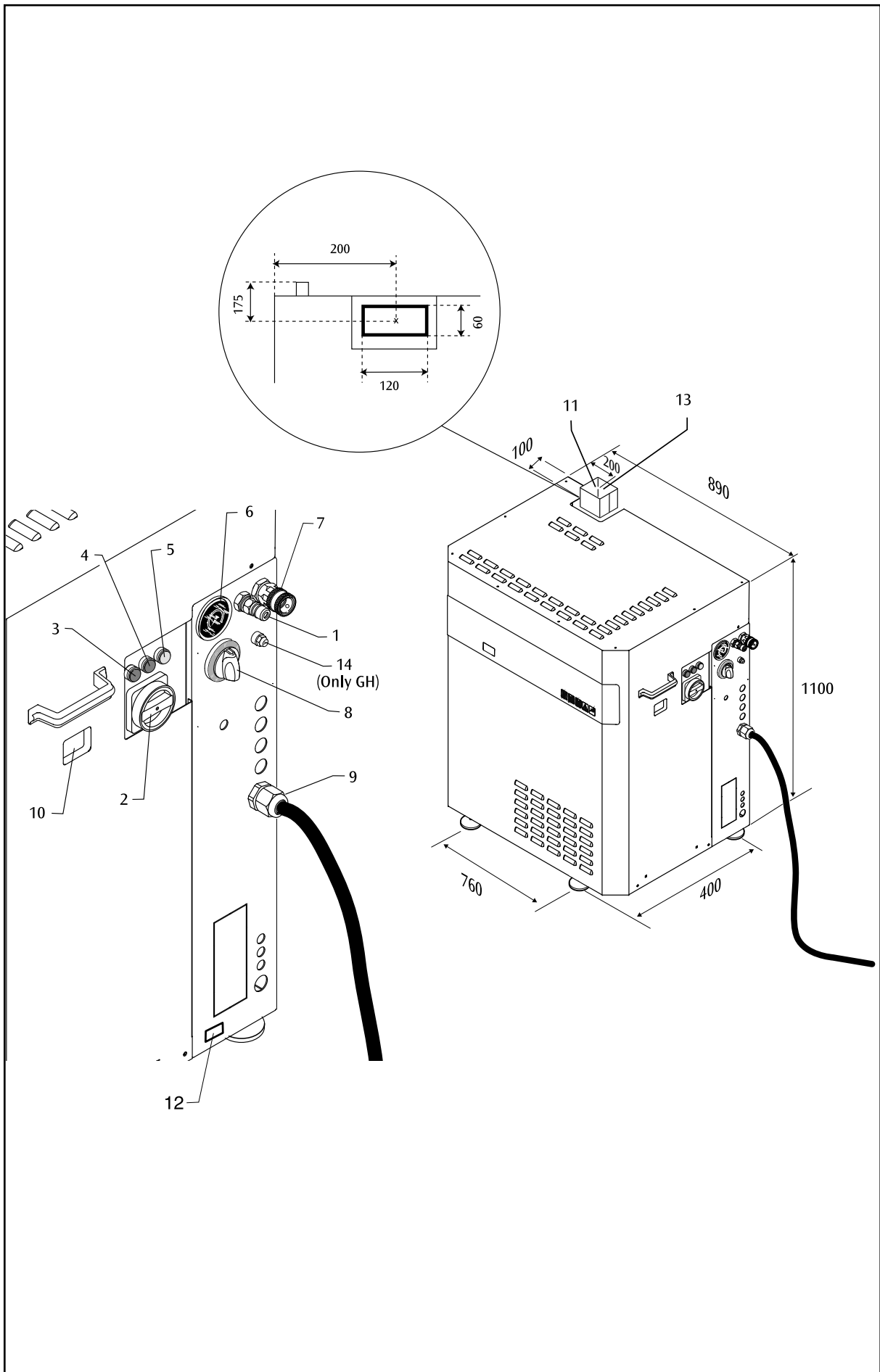
<p>FR Nilfisk déclare sous notre seule responsabilité que le produit mentionné ci-dessus est conforme aux directives et normes suivantes.</p>	<p>RO Noi, Nilfisk Prin prezenta declarăm pe propria răspundere, că produsul mai sus menționat este în conformitate cu următoarele standarde și directive</p>
<p>FI Me, Nilfisk täten vakuutamme omalla vastuulla, että edellä mainittu tuote on yhdenmukainen seuraavien direktiivien ja standardien mukaisesti</p>	<p>RU Мы, Nilfisk настоящим заявляем под нашу полную ответственность, что вышеперечисленные продукция соответствует следующими директивам и стандартам.</p>
<p>BG Ние, Nilfisk С настоящото декларираме на своя лична отговорност, че посочените по-горе продуктът е в съответствие със следните директиви и стандарти.</p>	<p>SV Vi Nilfisk förklarar härmed under eget ansvar att ovan nämnda produkt överensstämmer med följande direktiv och normer.</p>
<p>EL Εμείς, Nilfisk δηλώνουμε με αποκλειστική μας ευθύνη, ότι το προαναφερόμενο προϊόν συμμορφώνεται με τις ακόλουθες οδηγίες και πρότυπα.</p>	<p>SK My, Nilfisk prehlasujeme na svoju výlučnú zodpovednosť, že vyššie uvedený výrobok je v zhode s nasledujúcimi smernicami a normami.</p>
<p>HU Mi, Nilfisk Kijelentjük, egyedüli felelősséggel, hogy a fent említett termék megfelel az alábbi irányelveknek és szabványoknak</p>	<p>SL Mi, Nilfisk izjavljamo s polno odgovornostjo, da je zgoraj omenjeni izdelek v skladu z naslednjimi smernicami in standardi.</p>
<p>HR Mi, Nilfisk Izjavljujemo pod punom odgovornošću, da gore navedeni proizvod u skladu sa sljedećim direktivama i standardima.</p>	<p>TR Nilfisk, burada yer alan tüm sorumluluklarımıza göre, yukarıda belirtilen ürünün aşağıdaki direktifler ve standartlara uygun olduğunu beyan ederiz.</p>
<p>IT Noi, Nilfisk dichiara sotto la propria responsabilità, che il prodotto di cui sopra è conforme alle seguenti direttive e norme.</p>	

2006/42/EC	EN 60335-1:2012+A11:2014+A13:2017 EN 60335-2-79:2012 EN 60204-1:2006+A1:2009
2014/30/EU	EN 55014-1:2006+A1:2009+A2:2011 EN 55014-2:2015 EN 61000-3-2:2014 EN 61000-3-11:2000
2011/65/EU	EN 63000:2018
2000/14/EC – Conformity assessment procedure according to Annex V.	- Measured sound power level: 89-90 dB(A); Guaranteed sound power level: 92-93 dB(A)

Authorized signatory: Pierre Mikaelsson, Executive Vice President, Global Products & Services, Nilfisk NLT

June 4, 2020







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