

03KLU



Nilfisk
ALTO

Why Compromise

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Congratulations

Congratulations on your choice of new cold water cleaner. We are sure that it will live up to your expectations.

To ensure that you obtain the best possible results from your new cleaner we ask you to read this instruction manual carefully before use.

Yours faithfully

Nilfisk-ALTO, Division of Nilfisk-Advance A/S

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"DET NORSKE VERITAS" CERTIFICATE:

Rules for Mobile Offshore Units..... 25-27

1.0 Guarantee

EN

Your new Nilfisk-ALTO cold water high pressure cleaner is guaranteed for 12 months from date of purchase. The guarantee covers defects which can be ascribed to defects in material or workmanship. The guarantee stipulations appear on the enclosed guarantee card, which we kindly ask you to fill in and return to us so that, should the occasion arise, we would be able to help you in the best possible way.

1.1 Owners responsibility

To maintain the efficient operation and ensure a long trouble free life from your new Nilfisk-ALTO high pressure cleaner it rests with each operative to handle and operate the cleaner in the correct way. It is important therefore to ensure that the instruction manual is made available to each operative and that it is always to hand in order that he may read the operating instructions and in particular the safety requirements (section 8.0).

1.2 Use in hazardous areas

This high pressure cleaner model **03KOS** has been approved by "DET NORSKE VERITAS" for use in hazardous areas classified as zone 1 and 2 as the models comply with the requirements of "DET NORSKE VERITAS's Rules for Mobile Offshore Units, Part 5, Chapter 3". (See certificate page 25-27).

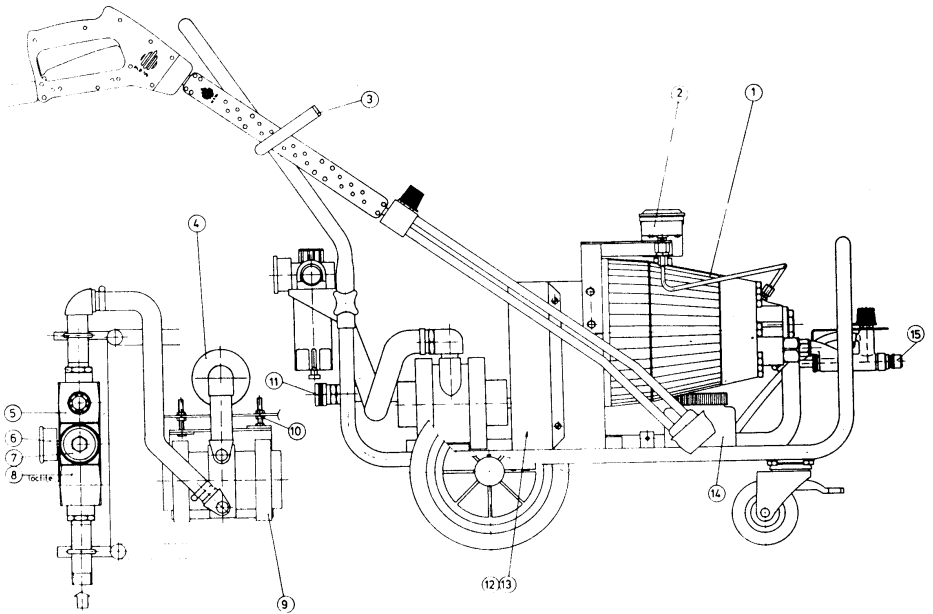
The approval appears from the model tag of the cleaner.

Even though the above-mentioned cleaners have been approved for use in hazardous areas, Nilfisk-ALTO still recommends the users to observe all necessary precautions when using mobile high pressure cleaners in hazardous areas.

Furthermore it should be emphasized that the users are responsible for the examination and observance of other national and international requirements of any kind.

2603KLU

- 1. Pump with bracket
- 2. Manometer
- 3. Chassis
- 4. Exhaust filter
- 5. Lubricating device
- 6. Manometer
- 7. Regulating valve
- 8. Filter
- 9. Air motor
- 10. Belt tightener
- 11. Water inlet
- 12. Belt guard
- 13. V-belt
- 14. Sludge container
- 15. Water outlet



3.0 Connections

EN

3.1 Water connection

The water input is connected at the back of the machine. The machine can be connected directly to the mains water supply, or it can work as a self-priming unit*).

For direct water connection the inlet hose must be at least 6 m long, and the water temperature must not exceed 85°C. Please note that connection to the public water supply may entail mounting of a float chamber.

If there is sand or other impurities in the water, it is advisable to provide an external water filter in addition to the internal filter situated behind the quick coupling.

For connection of air motor, see section 9.0.

*) With cold water (up to 8°C) the cleaner will operate satisfactorily with up to a 5 metre difference of level between cleaner and water supply.

The pump and the inlet hose must be connected to the water supply before starting up. When working with hot water (85°C) the cleaner must be below or on a level with the point of water supply. Working with hot water and connected to high pressure hoses longer than 10 m or inlet hoses shorter than 6 m, the cleaner must be equipped with a float chamber. The same applies if the outlet of the cleaner is connected to a tube system.

4.0 Standard equipment

The cleaner is delivered with a double lance and a spray handle together with high pressure hose as standard equipment. The low pressure tube is equipped with a flat jet nozzle 6530 and the high pressure hose with a flat jet nozzle 1506.

The first two figures of the nozzle reference number indicate the spray angle in degrees and the last two indicate the water flow in l/min. at a pressure of 20 bar and a temperature of 20°C. The equivalent hole diameters for nozzle 1506 is 1.6 mm and for nozzle 6530 is 3.6 mm. Do **not** replace with nozzles of a smaller diameter. The maximum working pressure and temperature are printed on the standard high pressure hose. Only use Nilfisk-ALTO high pressure hoses. In case of damage, arrange for Nilfisk-ALTO service engineers to repair it. Do not attempt to repair it yourself.

The thrust on the nozzle is for:

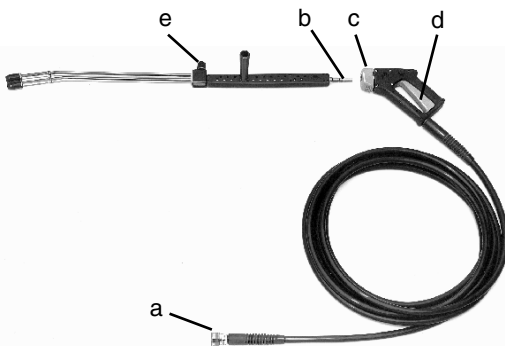
2603KLU 31N (3.2 kp)

As the thrust forms an angle with the spray lance, the spray handle is subject to torque.

As standard equipment the cleaner is delivered with chemical injector for addition of detergents.

5.1 Starting-up procedure

1. Check the oil level in the oil glass. The level should be maintained between the MIN. and MAX. marks. This applies also for the oil level in the oil-mist lubricator (pos. 5).
2. Run water through the inlet hose before connecting, in order to remove possible impurities in the hose. Connect the hose.
3. Connect the quick coupling (a) of the high pressure hose to the outlet socket.
4. Check the input end of the spray lance (b) for possible impurities. Pull forward the grey trigger (c) of the spray handle. Connect the input end of the spray lance to the quick coupling. Release the grey trigger.
5. Press the trigger of the spray handle (d) and allow the water to run, until the system has been completely vented. For self-priming it is recommended to open the regulating valve (e) during the venting.
6. Release the trigger of the spray handle (d) and turn on the air supply. The pump will now be in idle motion.
7. For cleaning at high pressure press home the trigger of the spray handle after having closed the regulating valve.
8. For cleaning at low pressure open the regulating valve. When cleaning at low pressure the chemical injector will allow supply of detergents according to the scale of the injector situated at the water outlet.



5.2 Stopping

1. Turn off the air supply.
2. Turn off the water supply.
3. Press home the trigger of the spray handle to relieve the pressure of the cleaner.
4. Do not disconnect the high pressure hose, until the cleaner has cooled down and stopped.

6.0 Frost proofing EN

Operation and storage in frosty weather (below 0°C).

Never leave the cleaner unless it has been emptied of water, not even for a short period. Empty the cleaner in the following way:

1. Disconnect and empty both the water supply and the high pressure hoses.
2. Start the pump and allow it to run until it is empty.

If the cleaner is not stored in a frost-proof place between operations, it should be protected from frost in the following way:

1. Disconnect the lance.
2. Start the machine and allow it to run without water.
3. Place the suction hose into a container of antifreeze.
4. Draw in the antifreeze from the container by activating the spray handle. Having placed the spray handle above the antifreeze funnel, open and close it a few times, so that the antifreeze can circulate.
5. Remove the inlet hose from the container. Activate the spray handle and allow the rest of the antifreeze to run back into the container.

NB! The antifreeze will be diluted with water and will after some time lose its effect.

IMPORTANT:

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

7.1 Changing of oil

The oil should be changed after each 1000 hours' use.

Remove the cover of the oil glass. Unscrew the drain plug. Allow the oil to run out and clean the drain plug of impurities. Screw in the plug and refill the pump with fresh oil through the oil glass. Holds approx. 1 l.

From Nilfisk-ALTO the pump is filled with zincless hydraulic oil - Nilfisk-ALTO Pump Oil 100. When refilling and changing the oil this or an oil with the following specifications should be used:

ISO no. 100

Viscosity index (VI) min. 130

Pour point below -30°C

Concerning oil for mist lubricating, see section. 9.0.

7.2 Sludge container

The used oil is caught in a sludge container (pos. 14), which should be emptied before it is completely full. The oil must not be reused in the pump. This applies also to the moisture trap for air flow (pos. 8).

7.3 Water filter

To avoid debris entering the high pressure pump a water filter is fitted at the water inlet. This filter must be taken apart and cleaned regularly. The intervals between cleaning depend on the purity of the water. The filter can be removed, when the quick coupling has been unscrewed.

7.4 Couplings

To avoid leakages and damage to the quick couplings on hoses, spray handle and spray lance it is necessary to clean and lubricate the parts regularly with a little oil or grease.

Your Nilfisk-ALTO cold water cleaner is designed and manufactured to comply with the very latest labour regulations.

Nevertheless, the following instructions must be strictly observed.

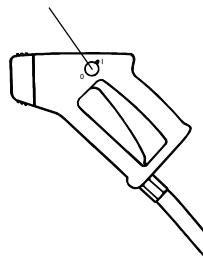
1. Always hold the spray handle and lance firmly in both hands during operation at high pressure.



2. Never direct the high pressure spray towards people or electrical devices.



3. When not in use turn the safety locking lever to position **O**.



4. Only use the hoses and nozzles approved by Nilfisk-ALTO.
5. Do not disconnect the high pressure hose until the cleaner has cooled down and stopped.
6. Don't attempt to touch nozzle nor water jet during operation.
7. Never tie knots in or kink the high pressure hose as it may be damaged and consequently burst.
8. Do not leave your machine exposed to frost. However if cleaner, hose or lance should become frozen do not use until they have thawed.
9. The high pressure pump features a safety valve, the adjustment of which **SHOULD NOT BE CHANGED**.
10. The machine should only be used by people who have been properly instructed.

GAST Air motor Type AM 8

9.1 Construction

Your air motor is a precision built rotary type motor. The vanes take up their own wear and will last 5,000-15,000 hours depending upon speed, method of oiling, operating pressure, and the precautions taken in maintaining the motor. The type of shaft seal used does not lend itself to operating pressures above 100 Psi (6.89 bar metric).

9.2 Installation

Install a moisture trap and filter in the air line ahead of motor. For efficiency of output and control of speed use air lines the same size or in the next pipe size larger than the intake port of the motor.

9.3 Lubrication - use a detergent SAE

10 or detergent with antifreezing additive.

For proper operation and maximum service life an automatic air line lubricator must be installed in the air line just ahead of the air motor. The lubricator should be adjusted to feed one drop of oil for every 50-75 CMF of air going through the motor.

Air consumption figures for various models at various speeds and air line pressures can be obtained from your local GAST representative or the factory. Lubrication is necessary for all internal moving parts and rust prevention.

Excessive moisture in the air line can cause rust formation in motor and might also cause ice to form in the muffler due to expansion of air through the motor. The moisture problem can be corrected by installing a moisture separator in the air line and also by installing an aftercooler between the compressor and air receiver.

9.4 Operation

The starting torque is less than the running torque and could vary depending on the position at which the vanes stop in relation to the air intake port.

The speed and torque can be regulated by using a pressure regulator or a simple shut-off valve to obtain desired power and conserve air. It is very important that the air motor not be allowed to »run free« at high speeds with no load and improper lubrication. Running under these conditions can cause excessive internal heat build up, loss of internal clearances and rapid motor damage.

9.5 Servicing

If the motor is sluggish or inefficient try flushing with solvent*). To flush a unit, disconnect air line and muffler and add several teaspoonful of solvent. Rotate the shaft by hand in both directions for a few minutes, reconnect the air line and slowly apply pressure until there is no trace of solvent in exhaust air.

Flush unit in a well ventilated area. Eye protection is recommended. Keep face away from exhaust port and do not flush with flammable solvent. Relubricate the motor with a squirt of oil in the chamber. If the vanes need replacing or foreign materials are present in motor chamber, an experienced mechanic may remove the end plate opposite the drive shaft end. Do not try with a screwdriver. It will dent the surface of the plate and body causing leaks. A puller tool should be used which will remove the end plate while maintaining the position of the shaft. New vanes should have the edge with the corners cut on angle or the notched edge (if reversible) towards the bottom of the vane slot.

Danger: To prevent explosive hazard do not drive this air motor with combustible gases.

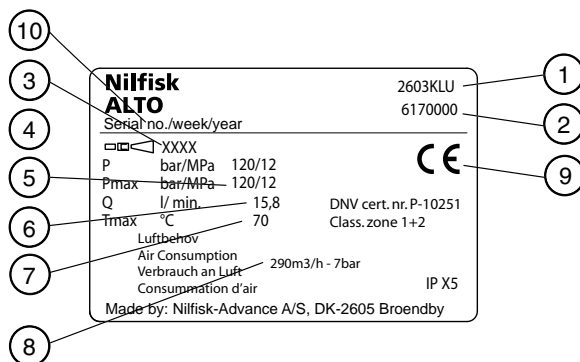
*) Recommended commercial solvent for air motors and lubricated pumps is Gast Flushing Solvent part AH255, or any non toxic, non flammable industrial cleaning solvent.

10.0 Model designation

EN

The Nilfisk-ALTO 03K-series of cold water cleaners is produced in several models. The model designation is printed on the model plate, e.g. Nilfisk-ALTO 2603KLU. This plate provides the following details.

1. Model designation
2. Nilfisk-ALTO order no.
3. Nozzle
4. Pump pressure
5. Max. pressure
6. Water capacity
7. Max. temperature
8. Air flow
9. Approval
10. Serial no./production week and -year



11.0 Technical data

EN

Model		2603KLU	
Cleaning power adjustable max.	kW/hp	2.6/3.5	
Pump pressure max.	bar/psi	120/1740	
Nozzle pressure, adjustable min./max.	bar/psi	4/104-58/1510	
Water capacity	l/min.lmpG/min	15.8/3.5	
	USG/min.	4.2	
Max. pressure of inlet water	bar/psi	15/217	
Self-priming, max. suction height	m/ft	5/16	
Max. temp. of inlet water	°C/°F	70/160	
Oil capacity of oil pump	l/lmpG/USG	1/0.22/0.26	
High pressure hose, length	m/ft	10/32.8	
Nozzle sizes ¹⁾ , high/low pressure		1506/6530	
Dimensions:	length	mm/inch	1000/39.4
	width	mm/inch	545/21.5
	height	mm/inch	825/32.5
Weight complete, incl. of oil	kg/lb	75/165	
Motor	type	GAST-8AM	
Air consumption	m ³ /h-ft ³ /min.	290-170	
Inlet pressure	bar/psi	7/100	

We reserve the right to amend the specifications.

12.0 Diagnosis of faults and repair

EN

Fault	Cause	Repair
The motor fails to start	Oil supply not connected	Connect the oil hose
	Oil supply closed	Open the valve
	No oil pressure	Start the hydraulic pump
	The pump is frozen	Let the pump thaw
Working pressure too high	Nozzle partly blocked	Clean the nozzle
Working pressure too low	Valve for regulation of water capacity is not adjusted to max. pressure	Open fully the valve for regulation of water. Turn in the direction indicated by the arrow
	Regulating valve open	Close the regulating valve
Irregular working pressure	Air in the pump	Repeat the venting procedure
	During self-priming Suction height too high or water too hot	Read the paragraph conc. self-priming p. 6
	During direct water connection Filter blocked	Clean the filter. See p. 11
	Insufficient water supply from the water works	Change to a water supply with greater output. If this is not possible; turn the valve for regulation of the water capacity in the opposite direction of that indicated by the arrow, until the machine works smoothly.
No working pressure	Nozzle blocked	Clean the nozzle
	No water	Check the water connection
	High pressure hose/lance frozen	Allow the high pressure hose/lance to thaw
	By-pass valve frozen	Allow the machine to thaw

Should faults occur other than those mentioned above, please contact the nearest Nilfisk-ALTO service organization.

COPY



DET NORSKE VERITAS TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. P-10251
This Certificate consists of 3 pages

This is to certify that the
High Pressure Cleaner

with type designations
KLU, KO and KOS

Manufactured by
**ALTO Danmark A/S
Hadsund, DENMARK**

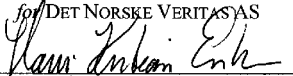
is found to comply with
DET NORSKE VERITAS' RULES FOR CLASSIFICATION OF MOBILE OFFSHORE UNITS, PART 5,
CHAPTER 3.

Application

These high pressure cleaner units may be used in hazardous areas classified as zone 1 and
2. Maximum pressure and temperature limits to be in accordance with the manufacturer's
recommendations.


Design: The pump of type KLU is driven by air motor. The pump of KO and KOS is
driven by hydraulic oil motor.

Place and date
Høvik, 16 July 1998
for DET NORSKE VERITAS AS


Jon Rysst
Head of Section



This Certificate is valid until
30 June 2002


Tom Berg-Nielsen
Surveyor

Notice: This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.

No person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.



Cert. No.: P-10251
File No.: 795.40

COPY

Product description

Design:

The pump of type KLU is driven by air motor.

The pump of KO and KOS is driven by hydraulic oil motor.

The pump and motor of KOS are mounted on a steel frame and designed for stationary operation i.e. walls mounting.

The pump and motor of KLU and KO are mounted on a wagon with rubber wheels and thermo-plastic bearings.

The steel frame of the wagon is isolated with polyester powder paint to a thickness of 250µm (0.25 mm) in order to prevent that the frame forms sparks when subject to blows.

The motor and the pump of KLU and KO are protected by plastic.

All pressure guns are protected from forming sparks.

A high-pressure hose is fitted between the pump and the gun with a quick connecting coupling on the pump side.

Application/Limitation

These high-pressure cleaner units may be used in hazardous areas classified as zone 1 and 2.

Maximum pressure and temperature limits to be in accordance with the manufacturer's recommendations.

The units shall be equipped with high-pressure hoses of approved type.



Cert. No.: P-10251
File No.: 795.40

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Type Approval documentation

Reference documents:

Drawing no.: 6167011a

Spare Part catalogue KEW 03KO/KOS (91.06).

Marking of product

For traceability to this Type Approval each unit shall be marked:

- Manufacturer's name: ALTO
- Type designation

Certificate retention survey

In connection with Product Audits as required by DNV Certification Notes 1.2, the following tests shall be performed on samples taken at random from stock, or from the running production:

- Hydraulic pressure testing to 1.5 times the maximum working pressure.
- Thickness measurements of the polyester powder paint protection of the frame of the wagon.

The Product Audits are to be performed annually under supervision of a Surveyor from Det Norske Veritas.

END OF CERTIFICATE

Nilfisk ALTO

Why Compromise

<http://www.nilfisk-advance.com>

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