



Unitor™ HPCE DYNAMIS 500+

OPERATIONS MANUAL



Model: HPCE DYNAMIS 500+ WSS Part Number: 720131 Last Revision: October 2023 (Rev. 1.4)



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380V/440V 3ph
50Hz/60Hz
16 KW – 32,6A @380V/50Hz
19,2 KW – 32,6 A @440V/60Hz
CLASS F / IP 55
50 A, class D or K
W5018 HR
SAE 15W40 ISO VG100 DIN 51524
5 litres (pump requires 1lt per fill)
18 lt/min @380V
21 lt/min @440V
500 bar
030 @ 380V/50 HZ
035 @ 440V/60 HZ
550 bar
40 °C
186 kg
108x57x92 cm

Abbreviations

HP - High Pressure

LP - Low Pressure

HPCE – High Pressure Cleaner Extreme PPE – Personal Protective Equipment

Safety symbols

The below symbols used in this manual indicate actions that should not be ignored, as they may result in human injuries or damages to the machine.



Electric shock Risk



Risk for persons



Helpful tips and hints



Risk for the machine

Read carefully $\ensuremath{\textbf{BEFORE}}$ operating the machine



Important Safety Precautions



Before using the machine ensure this operations manual is fully read and understood. Always keep this manual in a safe place near to the machine.

Never let persons, who are not trained work with the machine

This machine should be operated by qualified personnel only

The operator must always wear appropriate and certified personnel protective equipment (PPE) for 500 bar.

Persons that are in the immediate proximity of the cleaning area, have to protect themselves against spurting particles by wearing appropriate personnel protective equipment (PPE) for 500 bar.

There must be two operators on the machine. One at the machine and the other at the spray handle, both having eye contact on each other.

The machine should be used according to relevant national safety rules.



Never direct the spray jet at yourself, other people or at the machine itself.

Never attempt to clean your clothes or footwear that you or other persons are wearing with the machine.

Keep bystanders away from the working area.

Increased hazard caused by short spray equipment (less than 750 mm from the handle to the nozzle)! Never direct the jet against parts of the body! Protect yourself from any particles splashing back against you!



Ensure you connect the machine to the correct main supply voltage, as specified by the manufacturer. The machine may only be connected to a correctly installed plug socket. When connecting extension cables, ensure you are using cable with proper minimum cross-sections. The machine must not be started if any electrical component or accessory (cable, plug, switch etc.) is defective. Only qualified personnel must carry out all electrical repairs.

Use only watertight cable, plugs and sockets. Any electrical installation should be made only by a qualified electrician.

The machine must be equipped with certified safety equipment at 500 bar.



Always check and ensure that the machine and its accessories (hoses, cables, fittings, spray handle, nozzle etc.) are in good working condition before start-up.



The maximum permissible pressure and temperature are printed on the highpressure hose. In case of damage, replace immediately with original approved hoses.

If during operation you observe any leakage, abnormal noise or any other malfunction, stop the machine and get it serviced.

You should not attempt to repair and reuse damaged high-pressure hoses.

You should only use original spare parts and accessories.



You should carry out only the maintenance works described in this manual and use only original parts approved by the manufacturer.

Do not make any modifications to machine and ensure it is regularly serviced as per its maintenance schedule.

Repair works to be carried out by qualified personnel only.

Never suck up solvent liquids such as thinners, petrol or oil as the resulting spray is highly inflammable, explosive and toxic.



Always ensure the machine is placed in a stable position and cannot move. Do not operate the machine without water or with insufficient quantity of water, as such shortages may result in damage of the pump.

Do not cover the machine and ensure adequate air circulation.

Always store the machine in places where it will not be exposed to frost.

Use only original spare parts for maintaining the machine. Repairs should be done only by qualified personnel.

After works, the machine should be stored not being exposed to harsh and corrosive environment and secured against unauthorized use.

Never exceed the maximum working pressure of the machine!



• Location of equipment

Your water jetting unit is designed to be placed and operated under normal environmental conditions according to DIN 500100-1 and DIN 50014.

When you transport the high pressure cleaner on vehicles or trucks please fasten it on a suitable transport pallet.

Before operating please check that installation is proper.

- a) Do not operate HPCE DYNAMIS 500+ in places with explosion or fire danger.
- b) Secure that installation is horizontal and steady.
- c) Secure against scrolling.
- d) Check oil level.

Type plate and serial number

The below type plate is located on the floor plate of the machine next to the inlet water filter. The type plate includes the manufacturing year (in this example '**2023'**) and the serial number (in this example '**UD50000123'**).

	UNITOR	
	by Wilhelmsen	
Type: HPCE DYNAMIS 500+	Part No : 720131	
Power:	16kW 32,6A@380V/50 Hz	
Power:	19kW 32,6A@440V/60 Hz	
Max. Working Pressure:	500 Bar	
Max. Volume:	18 lt/min @ 380 V	
Max. Volume:	21 lt/min @ 440 V	
Manufactured:	2021	
Machine dry weight:	186 kgs	
Serial Number:	UD50000123	
Made in EU		



Introduction

This manual or part of it should not be reproduced without the written approval of the manufacturer. Every effort has been made to ensure that the information in this manual is both accurate and current. However, we reserve the right to change, alter or otherwise improve the product and its documentation at any time without prior notice.

Manufacturer's warranty is limited to repair or replacement of faulty parts at the time of manufacture. To maintain the machine in perfect condition, it is important that the periodical maintenance procedure is performed.



Warning

Please carefully read this manual before starting the machine for the first time and keep this manual in a safe place. We cannot be held responsible for damages or malfunctions due to not reading this manual.

This machine is a high-pressure water jetting equipment which produces a water jet under high pressure and can cause severe injuries. Complete understanding of this manual is absolutely necessary to prevent injuries and damages to persons, objects and/or the equipment.

This manual includes basic information that has to be respected at all times concerning the installation, start up, operations and maintenance of the machine. It has to be therefore read carefully by the operator and should always be on site.



Attention

ABSOLUTELY NO PERSON OR ANY BODY PART SHOULD BE BETWEEN THE MACHINE/SPRAY LANCE AND THE TARGET AREA FOR CLEANING WHILE THE MACHINE IS IN OPERATION. THERE IS NO SAFE DISTANCE FOR TOUCHING OR FEELING THE HIGH-PRESSURE WATER JET WITH HUMAN BODY PARTS.



Water quality requirements

The environment temperature when the high-pressure cleaner operates should be min +4°C and max + 40°C.

Notes on the requirements for the water used.

<u>The STANDARD pumps work with clean, soft water, at a maximum temperature of 40°C, and only for</u> <u>short periods, up to 60°C.</u>

Temperature

Max. 40° C inflow temperature.

рΗ

The pH value must be between 6.5 and 9.5.

Conductivity

Conductivity at 20°C must be below 2000 μ S/cm.

Purity The water must be free of abrasive and particulate materials.

NOTE:

It is the responsibility of the operator to ensure that the water quality is per requirements. Prolonged usage of the machine with poor water quality will lead to severe damages of the machine.



Details about lifting means



Instructions for lifting process

- The water tank must be empty.
- Check water tank valve before lifting the machine.
- The high-pressure hose must be lifted separately.



Lifting should only be done with certified lifting straps according to **EN 1492-1 (Flat woven webbing sling).**



Machine Description



- 1. INOX frame
- 2. Handle
- 3. Water tank inlet
- 4. Lifting eyes
- 5. High pressure gauge
- 6. Unloader bypass valve
- 7. HP pump
- 8. Rear wheels with brake
- 9. Water tank
- 10. Unitor cover
- 11. Electric motor
- 12. Electrical cabinet
- 13. Front wheels





- 14. Handle
- 15. Water tank
- 16. Unitor cover
- 17. Inox frame
- 18. Electrical cabinet
- 19. Electric motor
- 20. Front wheels
- 21. HP lance and spray handle
- 22. Overfill drain
- 23. Overfill drain hose
- 24. Inlet water cartridge filter
- 25. HP pump
- 26. Rear wheels with brake





- 27. Water tank inlet
- 28. Thermal valve
- 29. HP outlet fitting, 24mm
- 30. Unloader bypass valve
- 31. LP hose from tank to pump
- 32. High pressure gauge
- 33. Safety valve with drain hose
- 34. High pressure connection set (x2)
- 35. High pressure pump





- 36. Water filter, inlet pressure gauge
- 37. Water tank mesh filter
- 38. Pump oil level indicator
- 39. Water filter, outlet pressure gauge
- 40. Water tank drain valve
- 41. HP hose bend protector





- 42. Unloader hose
- 43. Pump oil filler
- 44. Pump oil drain
- 45. Handle
- 46. Water tank inspection cover
- 47. Overfill drain
- 48. Water inlet connection ³/^{''} with GEKA coupling
- 49. Inlet water cartridge filter



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- 50. Thermal valve
- 51. Water tank overfill valve
- 52. Water tank drain
- 53. Water tank outlet



- 54. Bypass water diffuser
- 55. Low water level switch



Electrical Control Cabinet



- 1. Terminal ground 6mm²
- 2. Fuse Terminal
- 3. Terminal 4mm²
- 4. Mini relay with base
- 5. Timer
- 6. Hour meter
- 7. Breaker 3P
- 8. Relay 38A
- 9. Thermal relay
- 10. Transformer 440V / 24V





- 11. Low water level indication lamp
- 12. Start/Stop push button (with white indication lamp)
- 13. Emergency stop button



Electrical Diagram





Description and Function of the Safety Installations

• Unloader Valve for Bypass Mode

The high-pressure valve limits the operating pressure. When the maximum operating pressure is exceeded or the handle is closed, the unloader valve administrates the water over a bypass connector back to the water tank through the water diffuser.

• <u>Safety Valve</u>

The safety valve limits the maximum operating pressure to 550 Bar. If the maximum operating pressure exceeds the specified limit due to closing of the spray handle the unloader valve receives a switching surge and the channels the water through its bypass.

In case of excessive pressure more than the permittable limit for any other reason, the safety valve is activated and allows to leak through it, thus reducing the pressure.

• Protection against freezing

Freeze can destroy equipment which has not been emptied completely of water.

To protect the machine against frost it must be stored with antifreeze fluid filled inside the water tank. Fill approximately 4lt into the water tank and run the machine without high pressure hose in order to fill the pump with antifreeze liquid.

In order to reach the antifreeze in all the parts please start the machine 2-3 times, till antifreeze comes out of the high-pressure outlet.



Operating the machine



Check points before start-up

- Place the high-pressure cleaner on a plain and secure it against rolling.
- Check the oil level of the high-pressure pump. If it is too low, refill oil. (Pump oil specification: SAE 15W40 ISO VG100 DIN 51524)
- Maximum oil level from the high-pressure pump is on the top mark of the oil dip stick or in the middle of the window.
- Do not overfill the pump with oil.
- Electrical mains voltage/frequency should be the same with the electrical data of the machine. Recommended ship-side breaker: 50A, class D or K.
- Check general condition of the machine and accessories to be in good order (cable, power & water connectors, hoses, handle, lance, nozzle etc.)

Attention: Use only original nozzles with the machine.

Water connections

Connect the water intake hose on the high-pressure cleaner.

Connection installed ¾" with GEKA coupling.

Always secure sufficient water supply, keep it well above the operational water flow. Minimum input feed water requirement is an average of **22 liters/minute or 1320 liters/hour**



Insufficient water supply will cause machine to stop.

Connection of high-pressure hose

Screw the female M22 coupling to the high-pressure outlet of the machine, use two spanner size 27 to fasten. The male 3/8" coupling must be screw to the inlet swivel of the spray handle, use one spanner size 22 and one 24.

Electrical connection

The voltage shown on the motor plate should correspond to the source.



1. 380 V/50 Hz/3 ph - max 50 A 2. 440 V/60 Hz/3 ph - max 50 A

Use the correct dimension of electric cable wire in case you connect an extension cable. For cable extension lengths up to 50mtr, the cross section of the wire to be used is 6mm^2 .





Operation

The electrical system is equipped with direct online (DOL) starter.

- Connect the cable to the appropriate power supply.
- Connect the water supply hose to the $\frac{3}{4}$ GEKA coupling.
- Ensure that the lance is connected to the high-pressure hose without a nozzle.
- Open supply water tab and fill the water tank (air will bleed out of the filter through the water tank and overfill drain).
- Push the green start button, the machine will start.
- In case the machine stops after 2-3 seconds it means there is low water level in the tank.
- Activate spray handle trigger. The pump at first empties the machine from air. After a while, water comes out of the spray lance. Hold firmly the handle until a steady jet of water is ejected.
- Release the spray handle trigger and switch off machine by pressing the red stop button.
- Connect the nozzle into the spray lance.
- Push the green start button and the machine will start.
- Your Unitor[™] HPCE Dynamis+ is now ready for operation at 500 bar.



HPCE Dynamis 500+ is a zero-pressure system in the bypass or power-off mode. When the machine is started the first time in each operation, there is a few seconds delay in the water jetting operation getting started.

ALWAYS TARGET THE SPRAY LANCE TO A SAFE LOCATION ON THE GROUND EVEN IF THE WATER JETTING ACTION IS DELAYED BY FEW SECONDS (20-25s).

Stopping

- Close spray handle.
- Push the red stop button.
- Shut off water supply.
- Disconnect the machine's electric cable from the electric power source.
- Store the machine and its accessories in a safe, frost protected and dry area away from harsh, corrosive environment.

! ATTENTION

Danger – Caution

In case you stop work for more than 30 minutes, machine must be stopped.

When handle is closed, machine is running in circulation mode. If in this working condition the water temperature exceeds 55°C the tank thermo valve opens, releases small amounts of hot water and same amount of cold water will enters.



Maintenance Plan

In order achieve a long and trouble-free service life the machine requires a minimum amount of care and maintenance.

Maintenance works must be carried out only with stopped motor, disconnected power supply and pressure-free hoses. Danger of injury!

Daily inspection – Testing

For the safety of the machine and operator please check following points:

- Oil level at the pump.
- Visual inspection of the machine and its equipment/accessories (hoses, handle, lance, fittings, electrical components, other equipment).
- Inspection for proper air ventilation from the back of the motor.
- High pressure pump.
- Pressure gauges.
- High pressure hoses.
- High pressure handle.
- Electric cable.
- Function of Emergency stop button.
- Water filter, check and replace if contaminated or differential pressure exceeds 1bar.
- Check for leakages.

Weekly inspection – Testing

- First oil change of high-pressure pump after 50 working hours (hour meter is installed inside the electrical cabinet) and then every 500 working hours.
- Checking of oil level of high-pressure pump.



- Replacing of water filter.
- Inspecting and cleaning of water tank mesh filter.
- After 30 operating hours, check electrical board screws and tight in case of loose screws.

6-Month inspection



- Inspect pump oil appearance and change oil after every 500 hours, after the first change.
- Check electrical board screws and tight in case of loose screws.
- Water tank to be drained and cleaned from inside.





12-Month inspection



• Pump oil seals and valves should be replaced at least once a year as a part of preventive maintenance for efficient machine performance.

Replacement of Water Filter



- Unscrew the plastic transparent cover of the filter housing with the included tool/spanner.
- Remove the old dirty filter and insert the new original 7" cartridge filter.
- Screw back filters housing with the supplied filter tool/spanner.

Time interval for replacing the filter depends on supplied water quality. In case of poor water quality and existence of particles and soil, the filter change should be done frequently – may be even daily.



• Disposal of the oil of the pump crankcase and disposal of parts and components of the machine should be done according to regulations.



Troubleshooting

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
 	Incorrect power supply	Check power supply (breaker 50 A)
Pump motor does		Motor protection activated, check
not run	Missing one phase	reason for motor overload
	Empty water tank ('No Water' lamp is activated in	Ensure sufficient feed water supply to
	the control panel)	the tank
High pressure shock		Replace Unloader valve – please note
in case of release	Unloader valve did not operate	that Unloader valve settings are fixed,
trigger from band	correct	and unloader valve must not be repaired
		Replace seal kit
Unloader valve		
switched all	Look in HD bose, bandle or in	Soal the loak by changing O rings of
the time during	the sheek value of the unleader value	I bendle er unleader volve
handle is		
closed		
HP-pump is very		*
noisy	Supply water temperature too high	Supply water with lower temperature
Water Clogging at		Check and replace filter cartage and
the Eilter		always ensure a differential pressure of
	Poor feed water quality	less than 1Bar
/ 	Suction pressure valves are dirty	Clean the valves
Lower/No water jet	Gaskets are dry and brittle	Replace gaskets
pressure	Suction pipe coupling is leaking	Replace and ventilate
	Clogged or worn-out high-pressure nozzle	Clean/replace high pressure nozzle



DECLARATION OF CONFORMITY

	F
Company	Wilhelmsen Ships Service AS
	1366 Lysaker, Norway
Product	Unitor [™] HPCE Dynamis 500+
Туре	High Pressure Water Jetting Machine
Product Number	720131
Year of CE Marking	2023

We herewith ensure and declare that this product has been designed, manufactured, tested and is compliant to meet the requirements of the following European Directives and Standards:

Standards	EN 1829-1:2021
	EN ISO 12100:2010
Related to Applicable	2006/42/EC (MD)
Directives	2014/35/EU(LVD)
	2014/30/EU(EMC)
	2009/125/EC(ECO DESIGN)
Date: 01/09/2023	Kounnamas Nikolaos
	Head of Product Management - Cleaning