



ULTIMATE WATER JETTING SOLUTION

**C-110E C-170E C-200E**

Electric Powered Heavy Duty  
Cold Water High Pressure Cleaner

## USER GUIDE & SPARE PARTS MANUAL



## Table of contents

### Introductions

Congratulations on your purchase of the **DEN-SIN C-110E, C-170E & C-200E** High Pressure Cleaner.

**Read this user manual before you start up your High Pressure Cleaner the first time.**

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This machine is a High Pressure Cleaner producing water jet under high-pressure, which is why severe injuries can occur if the safety precautions are not observed. Therefore a full understanding of the contents of this instruction manual is required, in order to prevent injuries to you, objects and persons near by.

### Safety

The following symbols are used in this manual to indicate procedures that if not followed, may results in personal injuries or damage to equipment.



**WARNING** is used to alert the reader of procedures or practice which if not followed correctly could result in personal injuries.



**CAUTION** is used to alert the reader of procedures or practice which if not followed correctly could result in damage to machine or other equipment.



**NOTE** is used to highlight important information that may assist the reader carrying out the procedure or understanding the text.

**Version 20: June 2011**

### Revision History

No.	Date	Revision	Rev.No.
1	11/2010	Change Trigger gun from Ergo1000/1000 to Ergo 2000	18
2	05/2011	C-100E 230V/50Hz, Nozzle changed to 15045, was 1505	19
3	06/2011	Revised Pump Water Seal Kit	20

## Table of contents

### Table of contents

<b>Introductions</b>	<b>1</b>
Table of contents	2
<b>1. Getting acquainted with your High Pressure Cleaner</b>	<b>3</b>
Fast and efficient cleaning	3
Specifications	3
Applications	3
Unpacking	4
Installation	4
Operations	5
<b>2. Safety and protection information</b>	<b>6</b>
General safety & application guidelines	6
Safety devices	6
Important medical information	7
Safety precautions	8
<b>3. Maintenance and troubleshooting</b>	<b>9</b>
Maintenance	9
Trouble shooting	10
Service instructions	12
<b>4. Available accessories</b>	<b>15</b>
Accessories	15
ID-plate	15
<b>5. Spare parts lists</b>	<b>16</b>
Chassis assembly	16
Chassis assembly spare-parts list	17
Pump assembly	19
Pump assembly spare-parts list	20
Un-loader valve assembly	22
Un-loader valve assembly spare-parts list	23
Safety valve assembly C-200E	24
Safety valve assembly spare-parts list C-200E	24
Start up accumulator assembly C-110E	25
Start up accumulator assembly spare-parts list C-110E	25
Lance assembly	26
Lance assembly spare-parts list	26
Trigger gun assembly	27
Trigger gun assembly spare-parts list	27
Complete HP hose w/ Ergo 2000 trigger gun	27
Wiring diagrams	28
Recommended spare-parts	29
<b>6. Declaration and Warranty</b>	<b>30</b>
EU declaration of conformity	30
Warranty	30
7. Spare Parts Request Form	31
8. Maintenance Log Book	32



The information contained in this user guide is subject to change without notice.

## 1. Getting acquainted with your High Pressure Cleaner

## Fast and efficient cleaning

The **DEN-SIN** High Pressure Cleaners in the C-110E C-170E C-200E series enables you to get more cleaning done in less time.

This series of **DEN-SIN** High Pressure Cleaners offers you high performance yet a compact design. The compact design enables the machines to be agile within inconvenient places even at staircases, and the high performance gives you the opportunity to solve an array of cleaning tasks. The High Pressure Cleaners in this series are designed for industrial and offshore use as well as for cleaning contractors. All pump parts, fittings and pipes in contact with water are made of non-corrosive materials. Together with the ceramic pistons, long life seals and stainless steel valves, it ensures long life and high durability.

## Specifications

Model	Motor		Motor Speed rpm	Working Pressure		Flow Capacity		Power Supply Voltage	Dimensions LxWxH mm	Weight kg
	Hp	kW		psi	Bar	gpm	l/min			
C-110E	3.0	2.2	1400	1600	110	2.6	11.7	220/240/1ph/50Hz 110/220/1ph/60Hz	720x480x900	45
C-170E	6.0	4.4	1400	2465	170	3.4	15.2	380/415/3ph/50Hz 220/440/3ph/60Hz	720x480x900	46
C-200E	7.5	5.5	1400	2900	200	3.7	16.5	380/415/3ph/50Hz 220/440/3ph/60Hz	720x480x900	56

## Applications

These heavy-duty High Pressure Cleaners are capable of removing any kind of dirt:

Algae off concrete constructions  
Paint and graffiti off walls  
Dust, dirt, soil & mud off floors  
Oil & grease off engines and other mechanical parts  
Dirt and salt deposits off ship decks

And with the option for use of accessories even many more jobs are to be dealt with:

Sand-blasting  
Drain-cleaning  
Dispensing of soaps and chemicals  
Sludge pumping  
Extra long lances for hard to reach places  
Floor cleaning equipment  
Rotary brushes



This machine is only to be used for the purposes it is designed for. Any other use shall be considered improper and therefore potentially dangerous. The manufacturer is not to be held responsible for any damages caused by improper use.

## Unpacking

Remove the High Pressure Cleaner and its accessories from the packing material. For transport and packing reasons some accessories may be supplied disassembled.

Make sure all components are present:

- High-pressure machine itself
- Handle bar (partly attached)
- Wing nuts for the handle bar
- Electrical cord (attached)
- High pressure hose with Spray-gun trigger
- Double barrel lance (disassembled)
- Water inlet male hose coupling

## Installation

- Attach the handle bar (pos 8, page 16) to the machine using the wing nuts and bolts supplied, align the handle bar according to the cabinet molding.
- Mount the high-pressure hose on to the High Pressure Cleaner (pos. 30 page 20) by pulling back the retainer (pos. 24) on the high-pressure hose coupling, while sliding it on the male part (pos. 30 page 20) positioned on the front of the High Pressure Cleaner.
- Assemble the double barrel spray-lance (pos. 1 page 26). To mount the assembled spray-lance on to the Spray-gun trigger, pull forward the front of the Spray-gun trigger while sliding in the male swivel coupling part (pos. 13 page 26) of the spray-lance.
- Prepare the water supply for the High Pressure Cleaner, by attaching a hose to the supplied low pressure inlet male-coupling. Connect the other end of the water supply hose to a potable water tap. Open the tap.

**Notice:** Connection to the public mains water supply according to regulations.

- Before starting the machine, bleed out air by pulling the trigger-gun handle until any air has escaped the inlet hose.
- Put the power-plug into a main power supply socket. Turn on the power and the High Pressure Cleaner by turning the knob (pos. 9 page 16) clockwise to the I position.
- The high pressure cleaner is now ready for operation. The spray-gun lance is affected by a recoil force during operation – therefore keep a firm grip with both hands on the Spray-gun handle and the lance. Press the trigger and start cleaning.
- The pressure can be regulated by turning the high-pressure cock on the spray-gun lance. When using chemical injector, pressure must be adjusted to low.



Make sure your local power supply specifications are in accordance with the motors requirement. Refer to the ID-plate on the machine. Do Not run the High Pressure Cleaner without sufficient potable water supply as it can cause cavitation and serious damage to internal pump parts. Do not let the machine recycle the water (running with Spray-gun trigger not activated) for more than a few minutes, this can cause serious damage to the seals.

## Operations



To prevent accidents from happening, ensure the safety of the person(s) who uses the equipment and to protect bystanders and nearby placed inventory or machinery, a few safety precautions needs attention.

- 1) Treat the machine as a high-speed cutting tool.
- 2) Anyone under the age of 18 is NOT allowed to use the machine.
- 3) Always use a proper plug and socket specially designed with ground to earth wiring.
- 4) Only connect to an installation with earth wiring. A certified electrician shall make the installation. It is strongly recommended that the electric supply to the machine include a Residual Current Device/GFCI.
- 5) Always keep the High Pressure Cleaner and its accessories in good working condition. Check the machine for defects, especially the insulation on the electric cable. Do NOT start up the machine if there is any defect. Have the machine serviced.
- 6) When using the High Pressure Cleaner and its accessories, eye protection must be worn to protect against repelling or ricocheting matters causing eye damage.
- 7) Suitable clothing and footwear must be worn while using the equipment to protect the operator. Do not try to clean clothes or footwear with the machine.
- 8) Precautions must be made to keep bystanders away from the working range.
- 9) Do NOT spray-clean on yourself, others or live animals. The high-pressure beams are capable of making severe injuries.
- 10) Do NOT spray at electrical equipment OR the machine itself.
- 11) While repairing or servicing the equipment and its accessories always make sure the machine is turned off and disconnected from the main power supply.
- 12) Only allow instructed personnel to operate the machine.
- 13) Activating the trigger/gun can cause backward force therefore always hold spray lance with both hands.
- 14) When pausing during operation, turned off the main switch of the machine and ensures that the trigger/gun is locked.
- 15) Only use high-pressure hoses, connections and nozzles specified by DEN-SIN.
- 16) **IMPORTANT** – Do not use the machine in a possible explosive environment in accordance with EN-50014.



## 2. Safety and protection information

## General safety &amp; application guidelines

- 1) It is not allowed to clean asbestos containing surfaces with high-pressure, unless using special equipment.
- 2) Persons under the influence of alcohol, drugs or medicine should not operate the machine.
- 3) Do not touch plug and socket with wet hands.
- 4) This machine has been constructed for use with Nilfisk-ALTO detergents. The use of other detergents or chemicals may cause problems as to the operation and the safety.
- 5) When using detergents the instructions should always be strictly observed.
- 6) Always flush the machine with clean water after use of chemical/detergents.
- 7) Always unplug power supply when cleaning and maintaining the machine.
- 8) Do not use the machine if important parts are damaged – i.e. safety devices, high-pressure hoses, spray handle.
- 9) The user is obliged to observe all national working environment and working safety regulations concerning "operation of high-pressure washers".
- 10) It is not allowed to connect this machine directly to a potable water supply.
- 11) If the machine is to be connected to potable water supply it is strictly necessary to fit the machine with a water break tank, in accordance with EN1717.

## Safety devices

The machine is equipped with the following safety devices:

- 1) Stop button. The stop button (pos. 9 page 16) stops the machine when turned anti-clockwise to the 0 position.
- 2) Locking device on spray-gun handle. The locking device prevents the trigger from being activated when pulled out.




*\*Spray gun may change without notice*

- 3) Thermal sensor and over load relay. The thermal sensor and the overload relay protects the motor against overloading. The machine can be switched on again after a few minutes, when the sensor has cooled.

DO	DON'T

## Important medical information

Immediate hospital attention should be given personnel who sustain equipment related injuries while operating the system. In such cases, it is vital that medical personnel be apprised of all facts relevant to such injuries. Therefore, all operating personnel should be provided with waterproof emergency medical alert tags or cards, describing the nature of their work and the possibility of injury inherent in the use of water jetting equipment. The below example of a standard card can be photo copied, laminated and used as medical alert tag.



**WARNING**


Obtain medical treatment immediately for ANY high-pressure water-jet injuries.

Inform the doctor of the cause of the injury.


Show this card to the doctor.

**IMPORTANT  
MEDICAL INFORMATION**

This card is to be carried by personnel working with high-pressure water jetting equipment.



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**MEDICAL ALERT  
NOTE TO PHYSICIAN**

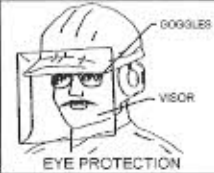





This patient may be suffering from a water jet injury. Evaluation and management should parallel that of a gunshot injury. The external manifestations of the injury cannot be used to predict the extent of internal damage. Initial management should include stabilization and a thorough neurovascular examination. X-rays can be used to access subcutaneous air and foreign bodies distant from the site of injury. Injuries to the extremities can involve extensive nerve, muscle, vessel damage, as well as cause a distal compartment syndrome. Injuries to the torso can involve internal organ damage. Surgical consultation should be obtained. Aggressive irrigation and debridement is recommended.

Surgical decompression and exploration may also be necessary. Angiographic irrigation studies are recommended pre-operatively if arterial injury is suspected. Bandages with a hygroscopic solution (MgSO<sub>4</sub>) and hyperbaric oxygen treatment have been used as adjunctive therapy to decrease pain, edema and subcutaneous emphysema. Unusual infections with uncommon organisms in immunocompetent patients have been seen; the source of the water is important in deciding on initial, empiric antibiotic treatment, and broad spectrum intravenous antibiotics should be administered. Cultures should be obtained.

## Safety precautions



The following protective clothing and devices should be worn both by personnel operating the water blaster system and equipment and by those working nearby:

<b>Eye protection-</b> Operators must wear visors and goggles to guard against spray and flying debris. A combination of both goggles and visor is advisable. And will protect the eyes and the face during both water-blasting as well as abrasive water-blasting	
<b>Head protection-</b> Helmets must be worn at all time by personnel within the work area. Helmet material must be able to withstand mechanical shock exceeding 10G in 8ms without fracturing.	
<b>Hand protection-</b> Shear proof gloves must be worn by the operator at all times. A glove combination of a cloth inner lining and a water tight outer layer is preferred.	
<b>Foot protection-</b> Safety footwear with steel toecaps minimum 0.5mm (0.02") thick must be worn. The toecap must cover at least 30% of the footwear length. Basic safety footwear must also be equipped with metatarsal guards to protect the instep. Safety boots are available in other designs than the illustration.	
<b>Hearing protection-</b> Operators and other personnel exposed to noise levels of more than 90-dBa for more than 1 hour must wear suitable ear protection. Ear plugs or ear muffs are usually sufficient.	
<b>Body protection-</b> Waterproof garments protect the operator only from spray and flying debris. They do NOT deflect direct jet impact. Therefore, an operator must take care never to point a water-jet either at them selves or other personnel.	

## 3. Maintenance and troubleshooting

## Maintenance

Subject	Matter / Procedure
Lubrication	<p><i>Before starting the pump, check the oil level in the pump. Change the oil after the first 50 working hours and then after every 500 working hours.</i></p> <p>Renewal of oil: Turn off the High Pressure Cleaner. Dismount the hexagon screw at the bottom of the pump housing (pos. 28 page <b>Error! Bookmark not defined.</b>). Allow the oil to drain into a waste oil-tray. Remount the hexagon screw and add oil through the oil inlet on top of the pump (pos. 14 page <b>Error! Bookmark not defined.</b>) until the red point of the oil control glass has been reached. Approx. 0.4kg of oil, type SAE 15W40, is to be used.</p> <p><b>Notice:</b> Do not dispose of used oil in drain.</p>
Cleaning	<p><i>Use a damp cloth to wipe the cabinet and handlebar. Do not use detergent cleaning chemicals.</i></p> <p><b>Notice:</b> To prevent electrical shock. <b>DO NOT SPRAY DIRECTLY UPON THE MACHINE WITH HIGH PRESSURE.</b></p> <p><i>Occasionally clean the fan cover positioned at the back of the motor to ensure sufficient airflow.</i></p> <p><i>Do NOT operate the machine with damaged or removed fan cover.</i></p>
Inspection	<p><i>To prevent electrical shock and spills of leaking water. Check electrical cord and high pressure hose for wear and cracks. Keep coupling parts free of dirt to ensure long life of O-ring seals preventing water leaks.</i></p> <p><b>Notice:</b> To prevent damage on hoses and cord, be careful not to have them run over by heavy vehicles or squeezed in door openings etc. Replace if necessary.</p>
Storage	<p>Be sure the cleaner is kept frost-free, if not possible flush the pump of the cleaner with antifreeze fluids.</p>

## Trouble shooting

Symptom	Cause and Rectification
When the main switch is turned on the High Pressure Cleaner will not run.	<p><i>Fault somewhere in the power supply.</i></p> <p>Make sure the socket is inserted correctly. Inspect cord for cracks and wears. Check if fuse is blown, replace if necessary.</p>
The motor is humming but the pump does not start.	<p><i>Too low voltage, one phase is missing (on three phase model only) High-pressure pump is blocked.</i></p> <p>Check the mains voltage.</p> <p>Check the connection box voltage with a meter.</p> <p>With the machine turned off, turn the motor, at the fan, if it remains blocked check the pump.</p>
The pressure drops and the High Pressure Cleaner works irregularly.	<p><i>The strain filter is clogged or the water supply from the tap is insufficient.</i></p> <p>Clean the strain water filter.</p> <p>If there isn't enough water-flow through the tap, the machine should suck from a filled water vat or tank.</p>
The pump continuously stops and starts, when the spray-gun trigger is activated.	<p><i>The high pressure nozzle is partly clogged.</i></p> <p>Turn off the High Pressure Cleaner, dismantle the high-pressure nozzle and remove the extraneous matter. Replace if damaged.</p>
The high pressure cleaner does not reach the proper working pressure when the spray-gun handle is activated.	<p><i>The high-pressure nozzle is clogged or there is dirt in the by-pass valve. The pump sucks air.</i></p> <p>Turn off the High Pressure Cleaner. Clean the nozzle. Inspect the low pressure supply,</p> <p>or while the spray-gun trigger is activated turn the machine on again. Repeat the procedure again; now with the trigger released. If the problem still occurs, the by-pass valve should be dismantled and the extraneous matter removed.</p>
The High Pressure Cleaner only works with approximately 2/3 of the maximum pressure, and the high-pressure hose is vibrating.	<p><i>There is dirt in the valves.</i></p> <p>Turn off the High Pressure Cleaner. Dismantle the valve bolts and the valves, remove the dirt and check to ensure the valve flaps are movable and fits tightly.</p>

(Continues)



(Continued)

Symptom	Cause and Rectification
<b>Noisiness</b>	<i>The pump sucks air. One or more valve springs are broken or down. Extraneous matter in the valves. Crankcase or motor bearings worn out.</i>  Inspect the low-pressure supply. Replace springs. Clean the valves. Replace the bearings.
<b>Water in the oil</b>	<i>The O-ring casing is worn out. High moisture in the air (condensing inside the crankcase) The seals are completely worn out.</i>  Check or replace the O-ring. Renewal of the crankcase oil more often. Replace the seals.

When using chemical injector

**The High Pressure Cleaner does not suck chemicals**

*The chemical container is empty. The High Pressure Cleaner has not been set to low-pressure (on the double barrel lance cock). The low-pressure nozzle is clogged, or partly clogged. The non-return valve of the chemical injector is stuck.*

Ensure the chemical container contains sufficient fluid for proper suction.  
Set the spray-lance to low pressure by turning the cock on the lance counterclockwise.  
Clean or replace the low-pressure nozzle.  
Clean, correct or replace the non-return valve of the chemical injector.



NOTE

For any further inconveniences, not mentioned in this user guide or any damages of the machine, we strongly suggest you to make contact with your dealer for the repair or possible replacement of any original spare-parts.

**Service instructions**

Detach the high pressure hose, dump back hose, inlet hose, safety valve, and parts on the pump head before serving the pump.

(Please refer to Pump assembly (Page 17) unless otherwise stated.)

**Servicing the valves:**

1. Remove the valve cap (Pos: 2).
2. Inspect the valve cap O-Ring (Pos:1) for any damage, replace if necessary.
3. Use the needle nose pliers to remove the valve (Pos: 3).
4. Use a small probe to move the poppet up and down to assure that the valve is functioning properly and that no debris is stuck in the valve (Pos: 3).
5. To reassemble the valves proceed the other way round and tighten the cover screws with a torque wrench. (Referring to torque specification)

**Servicing the Packing/Seals:**

1. Remove the bolts (Pos: 38) on the head (Pos: 36) of the pump.
2. Place the screwdrivers between the head (Pos: 36) and crankcase (Pos: 9) of the pump, lifting one up and the other down. The head should start to lift off of the plungers (Pos: 23).



3. When you remove the head, some of the water seals have stayed on the plungers (Pos: 23) and some in the head (Pos: 36). To remove the seals from the plungers (Pos: 23), simply turn the assemblies and pull off.



- If the seal assemblies (Pos: 30-33) are in the head (Pos: 36) use the reversible pliers to grab the seal retainer on the outside ring, twist the retainer in either direction and lift out.



- Pull out the guide ring (Pos: 31) with your finger.
- Pull the high-pressure seal (Pos: 30) and support ring (Pos: 7) out of the head with your finger.
- The low-pressure seal (Pos: 33) is located in the brass seal retainer. Using the mechanics pick, go in between the seal and retainer and pull the seal straight out.
- Remove the seal retainer O-Ring (Pos: 32) with mechanics pick.
- To reassemble the packing and seals proceed the other way round and tighten the cover screws with a torque wrench. (Referring to torque specification)

#### Servicing the Plungers (Pos: 23):

Recommend to replace Piston kits, Support Rings kits, and Water Seals kits whenever servicing the plungers.

- Remove the plunger retainer nut (Pos: 25).
- Insert the gasket scraper between the copper washer (Pos: 24) and plunger (pos: 23) to remove the washer (Pos: 22).
- Twist and pull the plunger off the plunger rod.



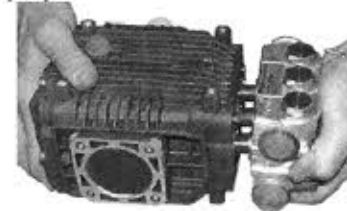
- Remove the plunger rod O-Ring (Pos: 21) with the mechanics pick.
- Remove the washer (Pos: 22). And clean any thread locker that is left on the plunger rod and retaining nut threads.
- To reassemble the plungers, proceed the other way round and tighten the cover screws with a torque wrench. (Referring to torque specification)

#### Pump head (Pos: 36) to drive end (Pos: 9) Installation:

- Turn the crankshaft to align the plungers as shown.



- Place the head evenly onto the plungers and push it until it makes contact with the drive end of the pump.



- Torque the head bolts (Pos: 38) as shown in the tightening sequence diagram.



#### Torque Specification:

Descriptions	Head (Pos: 38)	Piston Nut (Pos: 25)	Valve Cap (Pos: 2)
In .lbs	133	106	442
Kg.m/N.m	15	12	50



## 4. Available accessories

## Accessories

Accessories	part no.:
Chemical injector.	700550021
Rotary brush.	700550462
Foam injector	700550156
Foam lance.	700550464
Foam sprayer.	700550463
Extension hose with quick couplings. from 10 - 50 m	Please inquire
Industrial drain cleaner (1 front, 3 rear jets).	700550508
Container for sandblasting grid, including regulator.	Please inquire
Floor cleaner	700550465
Sludge pump.	700550198-700550201
Filter for suction from vat or tank with 3/4" hose nipple	700520049
Retractable hose reel.	700550208

Accessories	C110E 50HZ	C110E 60HZ	C170E 50HZ	C170E 60HZ	C200E 50/60HZ
**Double Barrel Lance	700550456	700550456	700550455	700550458	700550456
*Single Barrel Lance	700550449	700550449	700550448	700550451	700550449
**Short Double Barrel Lance	700550488	700550488	700550489	700550491	700550488
Single Barrel Lance with Rotating Nozzle	700551287	700550169	700550170	700551288	700550171
**Double Barrel Contractor Lance with side Regulator Handle	700551286	700551286	700550192	700550194	700551286
Single Barrel Lance with Multi-speed Nozzle	700551289	700550890	700550566	700551290	700550890
Industrial Sandblaster Kit with boron Carbide Nozzle	700550480	700550479	700550478	700550481	700550479

\* With Straight Jet Nozzle    \*\*With Fan Jet Nozzle

**Notice:** Always state type of High Pressure Cleaner along with the part no.: when ordering accessories or spare-parts.

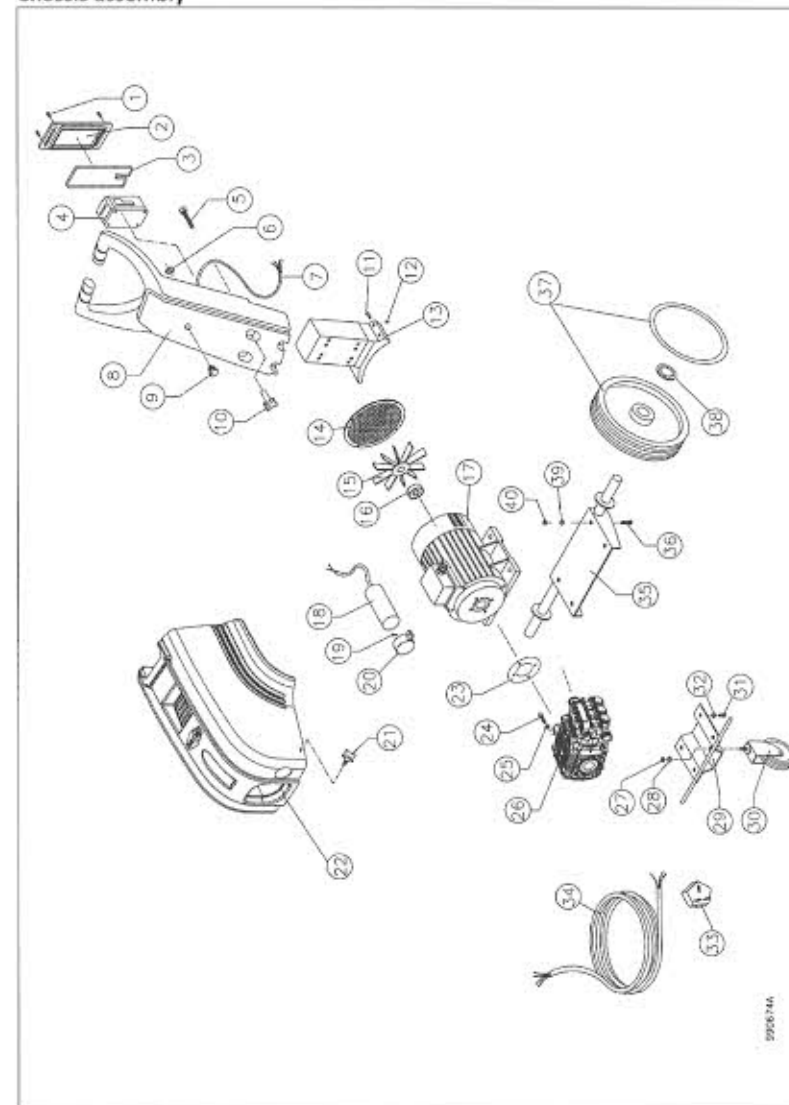
## ID-plate

Refer to the identification plate on the machine:



## 5. Spare parts lists

## Chassis assembly



## 5. Spare parts lists

## Chassis assembly spare-parts list

Pos.	Part no.	Qty.	Description:
1	700510040	4	Screw
2	700530109	1	Cover For El-Box
3	700530107	1	Gasket for El-Box
4	700530005	1	Overload Relay 16A C-110E 230V 50/60Hz C-170/200E 400/440V 50/60Hz
4	700530096	1	Overload Relay 22A C-170/200E 230V 60Hz
4	700530115	1	Overload Relay 27A C-110E 110V 60Hz
5	700510043	4	Bolt M6 x 35
6	700520026	1	Steel lock Ø14
7	700530130	1	Motor Cable C-110E 230V 50/60Hz
7	700530417	1	Motor Cable C-170/200E 230/400/440V 50/60Hz
7	700530371	1	Motor Cable C-110E 110V 60Hz
8	700520057	1	Handle
9	700530108	1	Switch Knob
10	700510050	4	Knob Screw Handle
11	700510051	4	Bolt M6 x 18
12	700510007	4	Locknut
13	700520060	1	Bracket For Handle C-110E C-170E
13	700520061	1	Bracket For Handle C-200E
14	700530239	1	Fan Cover For Motor C-110E C-170E
14	700530240	1	Fan Cover For Motor C-200E
15	700530389	1	Fan plastic C-110E
15	700530390	1	Fan plastic C-170E C-200E
16	700530002	1	Bearing For Motor C-110E C-170E
16	700530238	1	Bearing For Motor C-200E
17	700530530	1	Motor C-110E 230V 50/60Hz
17	700530532	1	Motor C-110E 110V 60Hz
17	700530588	1	Motor C-170E 220-440V 50/60Hz
17	700530685	1	Motor C-200E 400/440V 50Hz
17	700530686	1	Motor C-200E 400/440V 60Hz
17	700530137	1	Motor C-200E 220V 60Hz
18	700530012	1 / 4	Capacitor (1) C-110E 230V (4) C-110E 110V
19	700510002	1 / 4	Screw (1) C-110E 230V (4) C-110E 110V
20	700530011	1 / 4	Holder For Capacitor (1) C-110E 230V (4) C-110E 110V
21	700510010	2	Knob Screw Cabinet
22	700520510	1	Cabinet
23	700530693	1	Gasket for Motor-Pump
24	700510030	4	Bolt M8 x 25
25	700510034	4	Spring washer M8
25A	700510005	4	Flat washer M8
26	700560000	1	Pump complete C-110E 110/220V 60Hz
26	700560001	1	Pump complete C-110E 230V 50Hz
26	700560002	1	Pump complete C-170E 50/60Hz & C-200E 60Hz
26	700560003	1	Pump complete C-200E 50Hz
27	700510068	1	Locknut M12
28	700510067	1	Washer flat M12
29	700520504	1	Bracket For Castor Wheel
30	700520456	1	Castor Wheel With Brake
31	700510009	4	Bolt M8 x 16

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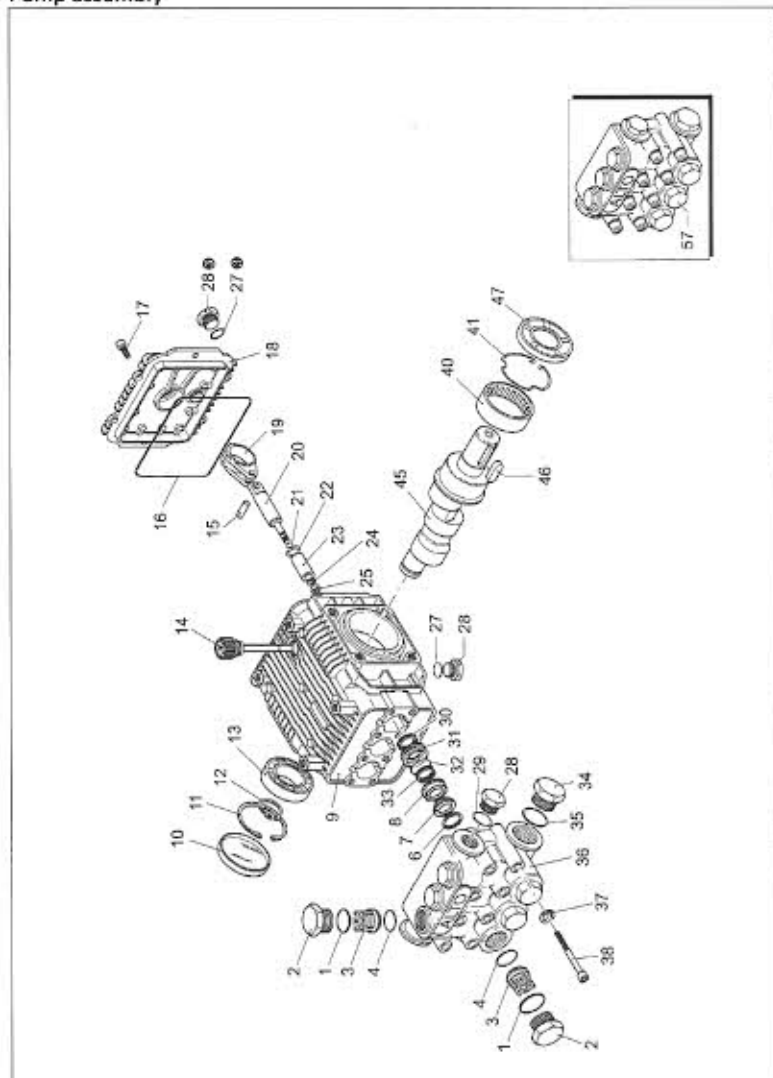
## 5. Spare parts lists

Continued

Pos.	Part no.	Qty.	Description:
32	700510034	4	Spring washer M8
32A	700510005	4	Washer M8
33	700530097	1	3 Pin Plug 13 Amp 1Ph (Optional) C-110E
34	700530007	1	Main Cable C-110E 230V 50/60Hz
34	700530261	1	Main Cable C-110E 110V 60Hz
34	700530015	1	Main Cable C-170E C-200E 415V 50Hz
34	700530370	1	Main Cable C-170E C-200E 230/440V 60Hz
35	700520519	1	Rear Wheel Bracket
36	700510011	4	Bolt M8 x 30
37	700520511	2	Wheel Cover
37A	700520511	2	Wheel
38	700520007	2	Star Lock
39	700510005	8	Washer M8
40	700510004	4	Locknut M8
*	700510178	4	Screw (for fan cover)
*	700530112	1	Closed End Wire Connector
*	700530122	3	Ring Terminal 2.5mm <sup>2</sup>

\*Not shown

## Pump assembly



## Pump assembly spare-parts list

Pos	Part no.:	Qty.:	Description:
1	700560012	6	O-ring
2	700560013	6	Plug
3	700560014	6	Complete valve
4	700560015	6	O-ring
6*	700560016	3	Support ring Ø15 C-110E 50/60Hz C-110E 110V 60Hz
6*	700560017	3	Support ring Ø18 C-170C-200E 50/60Hz
7*	700560018	3	Gasket Ø15 C-110E 50/60Hz C-110E 110V 60Hz
7*	700560019	3	Gasket Ø18 C-170C-200E 50/60Hz
8*	700560020	3	Piston guide Ø15 C-110E 50/60Hz C-110E 110V 60Hz
8*	700560021	3	Piston guide Ø18 C-170C-200E 50/60Hz
9	700560022	1	Pump body
10*	700560023	1	Cap
11	700560024	1	Circclip Ø52
12	700560025	1	Snap ring
13	700560026	1	Bearing
14	700560027	1	Oil Cap
15	700560028	3	Piston pin
16*	700560029	1	O-ring
17	700560030	6	Screw M6x16
18	700560031	1	Complete cover
19	700560032	3	Connecting rod
20	700560033	3	Guiding piston
21	700560034	3	O-ring
22	700560035	3	Spacer disc
23	700560036	3	Piston Ø15 C-110E 50/60Hz C-110E 110V 60Hz
23	700560037	3	Piston Ø18 C-170C-200E 50/60Hz
24	700560038	3	Piston washer
25	700560039	3	Nut M8
27	700560040	2	O-ring
28	700560041	3	G plug 3/8"
29	700560042	1	Washer
30*	700560043	3	Seal
31*	700560044	3	Rear piston guide Ø15 C-110E 50/60Hz C-110E 110V 60Hz
31*	700560045	3	Rear piston guide Ø18 C-170C-200E 50/60Hz
32*	700560046	3	O-ring
33*	700560047	3	Gasket Ø15 C-110E 50/60Hz C-110E 110V 60Hz
33*	700560048	3	Gasket Ø18 C-170C-200E 50/60Hz
34	700560049	1	G plug 1/2"
35	700560050	1	Washer
36	700560051	1	Head
37	700560052	8	Washer
38	700560053	8	Screw M6x60
40	700560054	1	Bearing
41	700560055	1	Snap ring
45	700560056	1	Crank shaft C-110E 110V/220V 60Hz, C-170E 50/60Hz & C-200E 60Hz
45	700560057	1	Crank shaft C-110E 230V 50Hz
45	700560058	1	Crank shaft C-200E 50Hz
46	700560059	1	Key for Ø18mm Shaft
46	700560066	1	Key for Ø24mm Shaft
47*	700560060	1	Seal

\* Sold as kit, refer to next page

Continued

# 5. Spare parts lists

Continued

Pos	Part no.:	Qty.:	Description:
57	700560061	1	Pump head pre-assembly (Ø15) C-110E 50/60Hz C-110E 110V 60Hz
57	700560062	1	Pump head pre-assembly (Ø18) C-170/C-200E 50/60Hz
1-47	700560000	1	Pump complete for C-110E 110V/220V 60Hz
1-47	700560001	1	Pump complete for C-110E 230V 50Hz
1-47	700560002	1	Pump complete for C-170E 50/60Hz & C-200E 60Hz
1-47	700560003	1	Pump complete for C-200E 50Hz

## Pump spare-parts kit

### a.) For All Models

Part no. / Kit description	Pos:	Qty.:	Individual components Part no.:
Kit A - 700560004 Pump Valves Kit (1 SET)	3	6	700560014
	4	6	700560015
Kit B - 700560011 Oil seals (1 SET)	10	1	700560023
	16	1	700560029
	30	3	700560043
	47	1	700560060

### b.) For C-110E (Ø15 Piston)

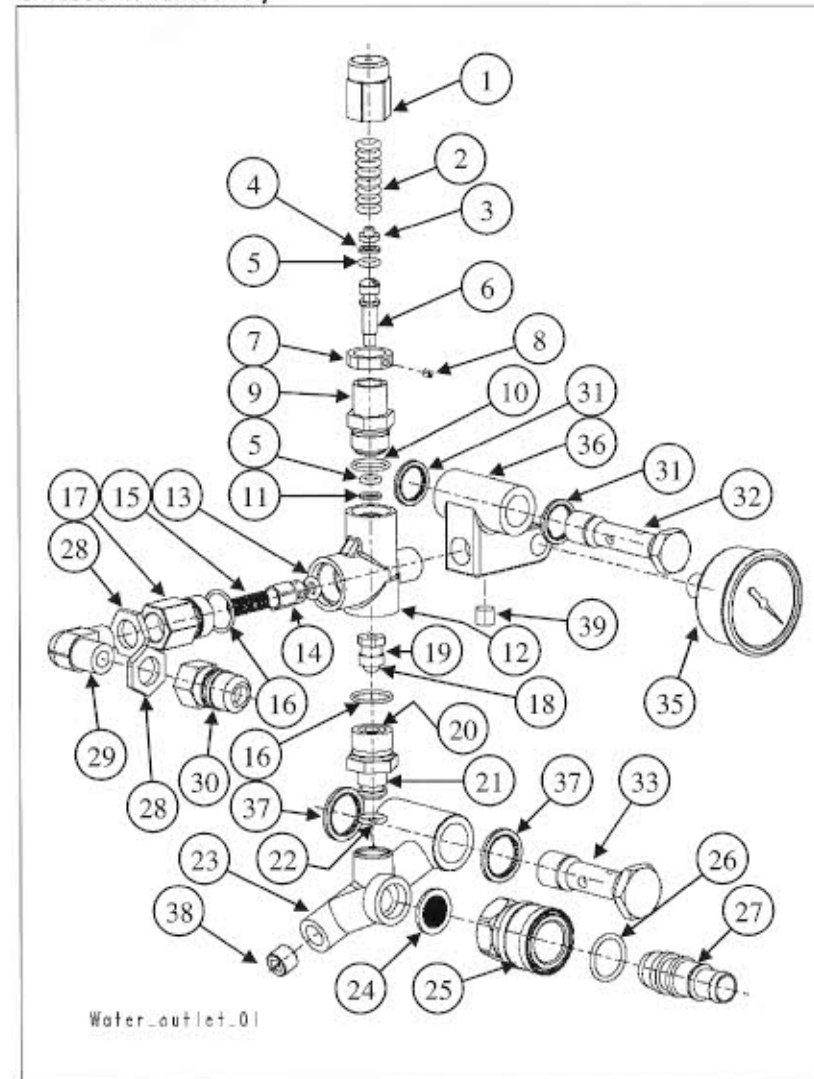
Part no. / Kit description	Pos:	Qty.:	Individual components Part no.:
Kit C - 700560005 Pistons (Ø15) (1 SET)	23	3	700560036
700560137 Water seals (Ø15) (1 SET)	32	3	O-Ring 23,52 x 1
	33	3	Gasket DM
	8	3	Piston Guide
	6	3	Support Ring
	7	3	Gasket W1
	31	3	Rear Piston Guide

### c.) For C-170E & C-200E (Ø18 Piston)

Part no. / Kit description	Pos:	Qty.:	Individual components Part no.:
Kit D - 700560008 Pistons (Ø18) (1 SET)	23	3	700560037
700560139 Water seals (Ø18) (1 SET)	32	3	O-Ring 23,52 x 1
	33	3	Gasket DM
	8	3	Piston Guide
	6	3	Support Ring
	7	3	Gasket W1
	31	3	Rear Piston Guide

# 5. Spare parts lists

## Un-loader valve assembly



## 5. Spare parts lists

## Un-loader valve assembly spare-parts list

Pos:	Part no.:	Qty.:	Description:
1	700540007	1	Brass Cap
2	700540008	1	Spring
3	700540009	1	Spring Seat
4	700540214	1	Back-Up Ring
5	700540209	2	O-Ring
6	700540213	1	Piston
7	700540212	1	Lock Nut
8	700540211	1	Screw
9	700540210	1	Piston Housing
10	700540160	1	O-Ring
11	700540208	1	Back-Up Ring
12	700540207	1	Housing For Un-Loader Valve
13	700540179	1	O-Ring
14	700540215	1	Check Valve
15	700540216	1	Spring
16	700550131	2	O-Ring
17	700540217	1	Outlet Fitting
18	700540206	1	Shutter
19	700540163	1	O-Ring
20	700540205	1	Valve Seat
21	700540203	1	Connector
22	700540031	1	O-Ring
23	700540738	1	Water Inlet
24	700540033	1	Strainer
25	700540034	1	Quick Coupling Female Inlet
26	700540035	1	O-Ring For Quick Coupling
27	700540036	1	Hose Nipple
28	700510136	2	Locknut 3/8"
29	700540025	1	Elbow
30	700540026	1	Quick Coupling Male Outlet
31	700550004	2	Dowty Seal 3/8"
32	700540734	1	Banjo Bolt 3/8"
33	700540736	1	Banjo Bolt 1/2" (high flow)
-	-	-	-
35	700540193	1	Pressure Gauge
36	700540737	1	Holder For Un-Loader Valve
1-22	700540187	1	Un-Loader Valve Complete
37	700540056	2	Dowty Seal 1/2"
38	700540194	1	Plug 1/4"
39	700540195	1	Plug 1/8"
*	700540186	2	Elbow 3/8" M-F

C-200E 50/60Hz

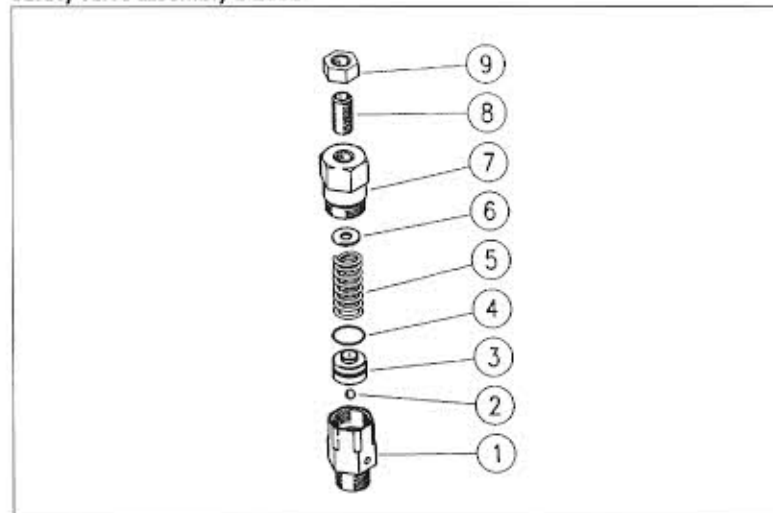
\* Not shown

## 5. Spare parts lists

## Repair kit un-loader valve

Part no. / Kit description	Pos:	Qty.:	Individual components Part no.:
700540321 Repair Kit Un-Loader Valve C-110, C-170, C-200 (1 SET)	4	1	700540214
	5	2	700540209
	10	1	700540160
	11	1	700540208
	13	1	700540179
	16	2	700540131
	18	1	700540206
	19	1	700540163
	20	1	700540205

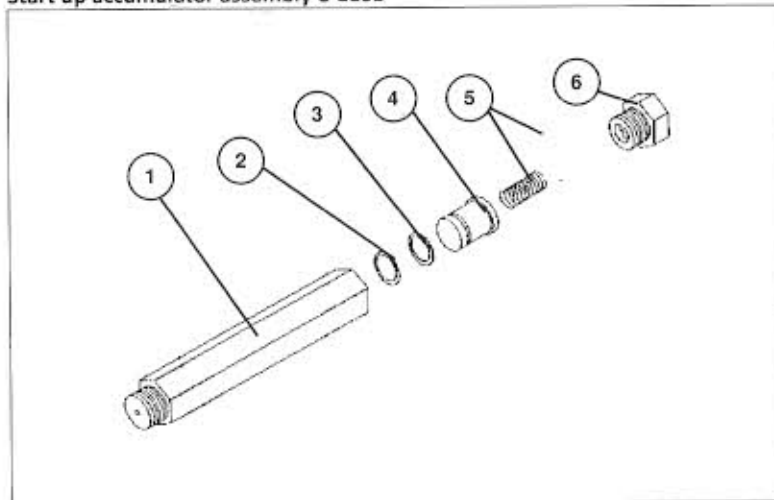
## Safety valve assembly C-200E



## Safety valve assembly spare-parts list C-200E

Pos:	Part no.:	Qty.:	Description:
1	700540119	1	Body Safety Valve 3/8"
2	700540115	1	Rubber Ball
3	700540121	1	Piston
4	700540120	1	O-Ring
5	700540122	1	Spring
6	700540123	1	Washer
7	700540124	1	Fitting
8	700540125	1	Adjusting Screw
9	700510008	1	Nut
1-9	700540110	1	Safety Valve Complete

## Start up accumulator assembly C-110E

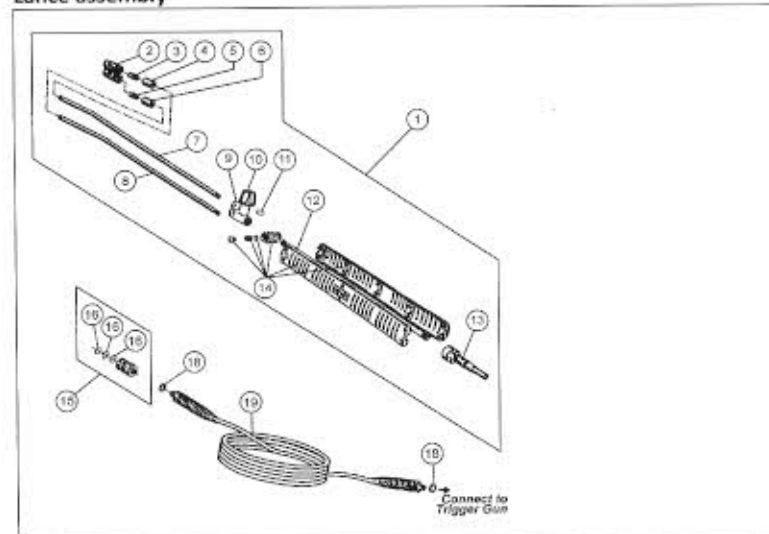


## Start up accumulator assembly spare-parts list C-110E

Pos.	Part no.:	Qty.:	Description:
1	700540743	1	Housing Accumulator
2	700540169	1	O-Ring
3	700540168	1	Back-Up Ring
4	700540744	1	Piston
5	700540914	1	Spring
6	700540742	1	Thrust Screw
1-6	700540915	1	Accumulator Complete
*	700550004	1	Dowty Seal 3/8"

\*Not shown

## Lance assembly

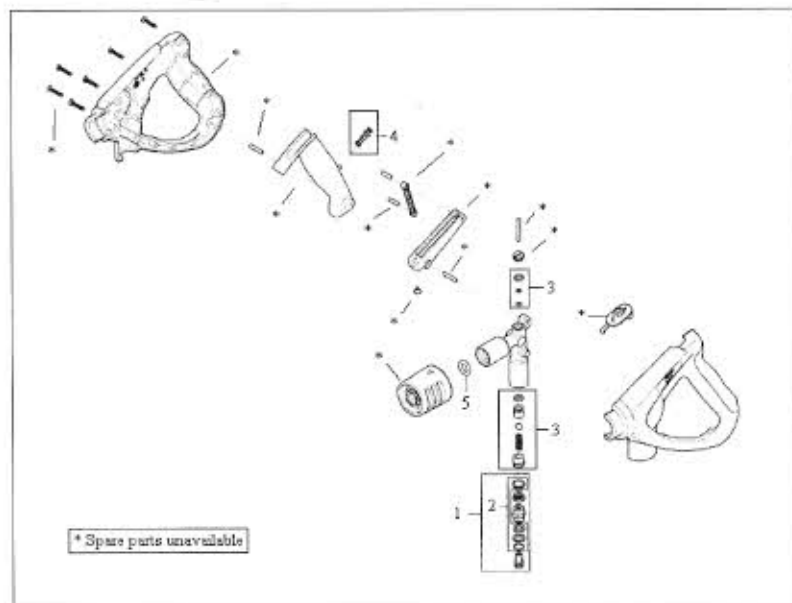


## Lance assembly spare-parts list

Pos.	Part no.:	Qty.:	Description:
1	700550455	1	Double Barrel Lance Complete C-170E 50Hz
1	700550456	1	Double Barrel Lance Complete C-110E 50/60Hz, C-200E 50/60Hz
1	700550458	1	Double Barrel Lance Complete C-170E 60Hz
2	700550077	1	Nozzle Guard Double
3	700550015	1	Nozzle 15045 C-110E 50/60Hz, C-200E 50/60 Hz
3	700550075	1	Nozzle 1504 C-170E 50Hz
3	700550057	1	Nozzle 15055 C-170E 60Hz
4	700550013	1	Bushing, High Pressure Nozzle Holder 1/4"
5	700550782	1	Nozzle Low Pressure
6	700550781	1	Bushing, Low Pressure Nozzle Holder 1/4" - 1/8"
7	700550012	1	Lance Pipe Top
8	700550572	1	Lance Pipe Bottom
9	700550011	1	Needle Valve Complete
10	700550575	1	Knob For Needle Valve
11	700550574	1	O-Ring For Needle Valve
12	700550591	1	Lance Pipe For Double Barrel Lance
13	700550259	1	Nipple, Quick Coupling Male
14	700550522	1	Lance Guard L+R Complete w/ Screws And Holder
15	700550003	1	Quick Coupling Female High Pressure
16	700540491	3	O-Ring
18	700550004	2	Dowty Seal 3/8"
19	700550039	1	High Pressure Hose 3/8" R1T 10m Length



## Trigger gun assembly



## Trigger gun assembly spare-parts list

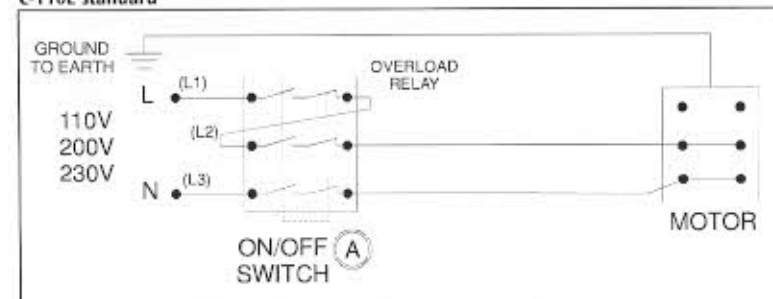
Pos:	Part no.:	Qty.:	Description:
1	101119485	1	Rep. Kit, Seals Swivel Joint
2			
3	31000121	1	Rep. Kit, Valve Housing Gasket
4	31000131	1	Spring
5	103004366	1	O-Ring

## Complete HP hose w/ Ergo 2000 trigger gun

Pos:	Part no.:	Qty.:	Description:
N/A	700551408	1	Hose HP 10 mtr. RIT + coupl. + ERGO trigger (Standard)

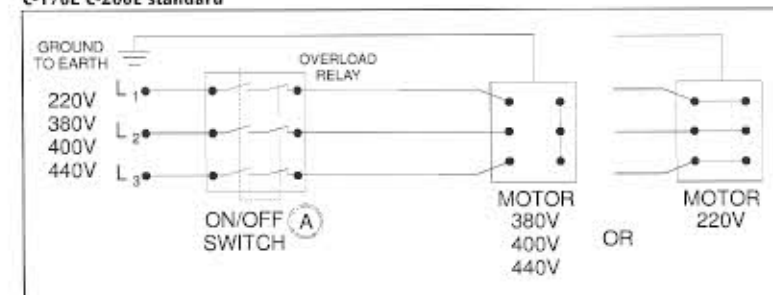
## Wiring diagrams

## C-110E standard



Pos:	Part no.:	Qty.:	Description:
A	700530005	1	On/Off Switch w/ Overload Relay 230V
A	700530115	1	On/Off Switch w/ Overload Relay 110V

## C-170E C-200E standard



Pos:	Part no.:	Qty.:	Description:
A	700530005	1	On/Off Switch w/ Overload Relay 380-415-440V
A	700530096	1	On/Off Switch w/ Overload Relay 230V

## 5. Spare parts lists

### Recommended spare-parts

In events where uninterrupted use of the machine is of critical importance, or when operating at remote locations, like in weekends, holidays, in rural areas or onboard ships at sea, it is recommended to stock a few essential spare-parts for field maintenance and repair.

For Machine:	Valve Kit x1	Pistons Kit x1	Oil Seals x1	Water Seals x1
C-110E 50Hz	700560004	700560005	700560011	700560006
C-110E 60Hz	700560004	700560005	700560011	700560006
C-170E 50Hz	700560004	700560008	700560011	700560009
C-170E 60Hz	700560004	700560008	700560011	700560009
C-200E 50Hz	700560004	700560008	700560011	700560009
C-200E 60Hz	700560004	700560008	700560011	700560009

For Machine:	Trigger Gun Rep. Kit Valve x1	O-ring Quick Coupling x4	O-ring Quick Coupling x2
C-110E 50Hz	101119486	700540035	700550002
C-110E 60Hz	101119486	700540035	700550002
C-170E 50Hz	101119486	700540035	700550002
C-170E 60Hz	101119486	700540035	700550002
C-200E 50Hz	101119486	700540035	700550002
C-200E 60Hz	101119486	700540035	700550002

For Machine:	Inlet Strainer x2	High Pressure Nozzle x1	Un-loader Valve Rep. Kit x1
C-110E 50Hz	700540033	700550015	700540321
C-110E 60Hz	700540033	700550015	700540321
C-170E 50Hz	700540033	700550075	700540321
C-170E 60Hz	700540033	700550057	700540321
C-200E 50Hz	700540033	700550015	700540321
C-200E 60Hz	700540033	700550015	700540321

## 6. Declaration and Warranty

### 6. Declaration and Warranty

#### EU declaration of conformity

 <b>EU Declaration of Conformity</b>	
Product:	Electric powered heavy duty cold water high-pressure cleaner
Type:	C-110E / C-170E / C-200E
Description:	220-240V 0~, 380-440V 0~, 50/60Hz, IP 54 110 / 170 / 200 [bar] 11 / 17 / 20 [MPa]
The design of the unit corresponds to the following pertinent regulations:	EC Machine Directive 2006/42/EC EC EMC Directive 2004/108/EC
Applied harmonized standards:	EN 12100-1, EN12100-2, EN 1829-1/EN 60335-2-79, EN 55014-1, EN 55014-2, EN 61000-3-2
Applied national standards and technical specifications:	DIN EN 60335-2-79
 Jørgen Holm Espersen General Manager	
DEN-SIN – a division Nilfisk-Advance Pte Ltd. No 22 Tuas Ave 2 Singapore 639453 Tel: +65 62681006 Fax: +65 62684916 Singapore, June 2010	

#### Warranty

DEN-SIN warrants all equipments of its manufacture furnished under this agreement to be free from defect in workmanship and material for a period of one year from the date of invoice of the equipment. This warranty does not cover normal wear and tear, consumable items, or part failures caused by (i) accident, (ii) abuse, or (iii) failure to maintain the DEN-SIN system containing the affected parts in accordance with DEN-SIN technical specification. All labour is the responsibility, and the expense of the Buyer. The liability of Seller under this warranty is limited, at Seller's option, solely to repair or replacement with equivalent articles. This warranty is condition upon (a) Seller being notified in writing by Buyer within one week after discovery of defects;

(b) the return of defective articles to Seller, transportation charges prepaid by Buyer; and (c) Seller's examination of such article disclosing to its satisfaction that such defects were not caused by negligence, misuse, improper maintenance, improper installation, accident, or unauthorized repair or alteration.

Accessories or equipment furnished by DEN-SIN but manufactured by others, shall carry the warranty that its manufacturer has conveyed to DEN-SIN, and which may be passed on to the purchaser. The original warranty period of any article, which has been repaired or replaced by DEN-SIN, shall not thereby be extended.

# 7. Spare Parts Request Form

## 7. Spare Parts Request Form

Company Name: \_\_\_\_\_  
 Delivery Address: \_\_\_\_\_  
 Country: \_\_\_\_\_ Postal Code: \_\_\_\_\_  
 Contact Name: \_\_\_\_\_ Contact Number: \_\_\_\_\_  
 Fax Number: \_\_\_\_\_ Mobile Number: \_\_\_\_\_  
 Email: \_\_\_\_\_

S/N	Part Number	Description	QTY	Machine Model or Serial Number
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Special Instructions: \_\_\_\_\_  
 \_\_\_\_\_

# 8. Maintenance Log Book

## 8. Maintenance Log Book

This maintenance logbook will assist you to keep track on the servicing of your equipment.  
 Please record after service your machine.

Purchase date of the machine: \_\_\_\_\_

S/N	Service Description	Date	Remarks
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