

Pressure Booster System

Installation/Operating Manual

Hydro-Unit Premium Line

Hydro-Unit Premium Line DOL CC
Hydro-Unit Premium Line VFD CM CC
Hydro-Unit Premium Line VFD MM CC



Legal information/Copyright

Original operating manual Hydro-Unit Premium Line

All rights reserved. The contents provided herein must neither be distributed, copied, reproduced, edited or processed for any other purpose, nor otherwise transmitted, published or made available to a third party without the manufacturer's express written consent.

Subject to technical modification without prior notice.

© Duijvelaar Pompen, Alphen aan den Rijn, Netherlands 05/10/2018

Contents

	Glossary.....	5
1	General.....	6
	1.1 Principles	6
	1.2 Installation of partly completed machinery.....	6
	1.3 Target group	6
	1.4 Other applicable documents	6
	1.5 Symbols	6
	1.6 Key to safety symbols/markings	7
2	Safety	8
	2.1 General	8
	2.2 Intended use	8
	2.2.1 Prevention of foreseeable misuse	8
	2.3 Personnel qualification and personnel training	8
	2.4 Consequences and risks caused by non-compliance with this manual.....	9
	2.5 Safety awareness	9
	2.6 Safety information for the operator/user	9
	2.7 Safety information for maintenance, inspection and installation.....	9
	2.8 Unauthorised modes of operation.....	10
3	Software Changes.....	11
4	Transport/Temporary Storage/Disposal	12
	4.1 Checking the condition upon delivery	12
	4.2 Transport.....	12
	4.3 Storage/preservation	12
	4.4 Return to supplier	13
	4.5 Disposal	13
5	Description	14
	5.1 General description.....	14
	5.2 Designation	14
	5.3 Name plate	14
	5.4 Design details	15
	5.5 Configuration and function	16
	5.6 Noise characteristics.....	17
	5.7 Scope of supply	17
	5.8 Dimensions and weights.....	18
	5.9 Terminal wiring diagram.....	18
	5.10 Potential equalisation.....	18
6	Installation at Site	19
	6.1 Installation.....	19
	6.2 Checks to be carried out prior to installation.....	19
	6.3 Installing the pressure booster system	19
	6.4 Connecting the piping	20
	6.4.1 Fitting an expansion joint.....	20
	6.4.2 Installing a pressure reducer	20
	6.5 Connection to power supply	21
	6.5.1 Sizing the power cable	21
	6.5.2 Connecting the pressure booster system.....	22
	6.5.3 Volt-free contacts	22



7	Commissioning/Start-up/Shutdown	23
7.1	Commissioning/Start-up	23
7.1.1	Prerequisites for commissioning/start-up	23
7.1.2	Dry running protection	23
7.1.3	Commissioning/start-up of pressure booster system	23
7.2	Switching on the pressure booster system	24
7.3	Checklist for commissioning/start-up	25
7.4	Shutdown	25
8	Operating the Pressure Booster System	26
8.1	Hydro-Unit Premium Line DOL CC, VFD CM CC, VFD MM CC	26
8.1.1	Control panel	26
8.1.2	Menu structure	28
8.1.3	Access levels	29
8.1.4	Displaying and changing parameters	29
8.1.5	Displaying messages	30
8.1.6	Description of parameters	31
8.1.7	Quick menu	35
8.1.8	Saving and restoring settings	35
8.1.9	Alerts and warnings	36
8.1.10	Connecting the Remote OFF contact	36
8.1.11	Connecting the fire alert	37
8.1.12	Charging the accumulator	37
8.1.13	Energy-saving mode	37
8.1.14	Flow detection	38
8.1.15	Connecting the ambient temperature monitoring device (option)	38
8.1.16	Digital inputs for remote reset, setpoint changeover and check run (option)	38
9	Servicing/Maintenance	39
9.1	General information/Safety regulations	39
9.1.1	Inspection contract	40
9.2	Servicing/Inspection	40
9.2.1	Supervision of operation	40
9.2.2	Checklist for inspection work	41
9.2.3	Setting the pre-charge pressure	41
9.2.4	Replacing the non-return valve	42
9.2.5	Mounting the manifold in a mirrored position	44
10	Trouble-shooting	48
11	Related Documents	50
11.1	General assembly drawings/exploded views with list of components	50
11.1.1	Hydro-Unit Premium Line DOL CC	50
11.1.2	Hydro-Unit Premium Line VFD CM CC	51
11.1.3	Hydro-Unit Premium Line VFD MM CC	52
12	EU Declaration of Conformity	53
13	Certificate of Decontamination	54
14	Commissioning report	55
	Index	56

Glossary

Accumulator

The accumulator serves to compensate for pressure losses in the piping system downstream of the pressure booster system which may be caused by the consumption of small quantities of water. As a result, the frequency of starts of the pressure booster system is minimised.

Certificate of decontamination

A certificate of decontamination is enclosed by the customer when returning the product to the manufacturer to certify that the product has been properly drained to eliminate any environmental and health hazards arising from components in contact with the fluid handled.

Charging the accumulator

Option offered by speed-controlled pressure booster systems of filling a discharge-side accumulator before the last pump stops.

Energy-saving mode

Setting designed to avoid the energetically inefficient operation of a pump at minimum water consumption.

IE3

Efficiency class to IEC 60034-30: 3 = Premium Efficiency (IE = International Efficiency)

1 General

1.1 Principles

This operating manual is valid for the type series and variants indicated on the front cover.

The manual describes the proper and safe use of this equipment in all phases of operation.

The name plate indicates the type series, the main operating data and the serial number. The serial number uniquely describes the product and is used as identification in all further business processes.

In the event of damage, immediately contact your nearest DP Service centre to maintain the right to claim under warranty.

1.2 Installation of partly completed machinery

To install partly completed machinery supplied by DP refer to the sub-sections under Servicing/Maintenance.

1.3 Target group

This operating manual is aimed at the target group of trained and qualified specialist technical personnel. [⇒ Section 2.3, Page 8]


1.4 Other applicable documents

Table 1: Overview of other applicable documents

Document	Contents
Sub-supplier product literature	Operating manuals, logic diagram and other product literature of accessories and integrated machinery components







1.5 Symbols

Table 2: Symbols used in this manual

Symbol	Description
✓	Conditions which need to be fulfilled before proceeding with the step-by-step instructions
▷	Safety instructions
⇒	Result of an action
⇨	Cross-references
1.	Step-by-step instructions
2.	
	Note Recommendations and important information on how to handle the product

1.6 Key to safety symbols/markings

Table 3: Definition of safety symbols/markings

Symbol	Description
 DANGER	DANGER This signal word indicates a high-risk hazard which, if not avoided, will result in death or serious injury.
 WARNING	WARNING This signal word indicates a medium-risk hazard which, if not avoided, could result in death or serious injury.
 CAUTION	CAUTION This signal word indicates a hazard which, if not avoided, could result in damage to the machine and its functions.
	General hazard In conjunction with one of the signal words this symbol indicates a hazard which will or could result in death or serious injury.
	Electrical hazard In conjunction with one of the signal words this symbol indicates a hazard involving electrical voltage and identifies information about protection against electrical voltage.
	Machine damage In conjunction with the signal word CAUTION this symbol indicates a hazard for the machine and its functions.

2 Safety



DANGER

All the information contained in this section refers to hazardous situations.

In addition to the present general safety information the action-related safety information given in the other sections must be observed.

2.1 General

This operating manual contains general installation, operating and maintenance instructions that must be observed to ensure safe operation of the system and prevent personal injury and damage to property.

The safety information in all sections of this manual must be complied with.

The operating manual must be read and understood by the responsible specialist personnel/operators prior to installation and commissioning.

The contents of this operating manual must be available to the specialist personnel at the site at all times.

Information attached directly to the product must always be complied with and kept in a perfectly legible condition at all times. This applies to, for example:

- Arrow indicating the direction of rotation
- Markings for connections
- Name plate

The operator is responsible for ensuring compliance with all local regulations not taken into account in this operating manual.

2.2 Intended use

- The pressure booster system must only be operated within the operating limits described in the other applicable documents.
- Only operate pressure booster systems which are in perfect technical condition.
- Do not operate partially assembled pressure booster systems.
- The pressure booster system must only handle the fluids described in the product literature of the respective design variant.
- Never operate the pressure booster system without the fluid to be handled.
- Observe the information on minimum flow rates specified in the product literature (to prevent overheating, bearing damage, etc).
- Observe the maximum flow rates indicated in the data sheet or product literature (to prevent overheating, cavitation damage, bearing damage, etc).
- Do not throttle the flow rate on the suction side of the pressure booster system (to prevent cavitation damage).
- Consult the manufacturer about any other modes of operation not described in the product literature.

2.2.1 Prevention of foreseeable misuse

- Never exceed the permissible application and operating limits specified in the product literature regarding pressure, temperature, etc.
- Observe all safety information and instructions in this manual.

2.3 Personnel qualification and personnel training

All personnel involved must be fully qualified to install, operate, maintain and inspect the machinery this manual refers to.

The responsibilities, competence and supervision of all personnel involved in installation, operation, maintenance and inspection must be clearly defined by the operator.

Deficits in knowledge must be rectified by means of training and instruction provided by sufficiently trained specialist personnel. If required, the operator can commission the manufacturer/supplier to train the personnel.

Training on the pressure booster system must always be supervised by technical specialist personnel.

2.4 Consequences and risks caused by non-compliance with this manual

- Non-compliance with these operating instructions will lead to forfeiture of warranty cover and of any and all rights to claims for damages.
- Non-compliance can, for example, have the following consequences:
 - Hazards to persons due to electrical, thermal, mechanical and chemical effects and explosions
 - Failure of important product functions
 - Failure of prescribed maintenance and servicing practices
 - Hazard to the environment due to leakage of hazardous substances

2.5 Safety awareness

In addition to the safety information contained in this manual and the intended use, the following safety regulations shall be complied with:

- Accident prevention, health regulations and safety regulations
- Explosion protection regulations
- Safety regulations for handling hazardous substances
- Applicable standards, directives and laws

2.6 Safety information for the operator/user

- Fit protective equipment (e.g. contact guards) supplied by the operator for hot, cold or moving parts, and check that the equipment functions properly.
- Do not remove any protective equipment (e.g. contact guards) during operation.
- Eliminate all electrical hazards. (In this respect refer to the applicable national safety regulations and/or regulations issued by the local energy supply companies.)
- If shutting down the pump does not increase potential risk, fit an emergency-stop control device in the immediate vicinity of the pump (set) during pump set installation.

2.7 Safety information for maintenance, inspection and installation

- Modifications or alterations of the pressure booster system are only permitted with the manufacturer's prior consent.
- Use only original spare parts or parts authorised by the manufacturer. The use of other parts can invalidate any liability of the manufacturer for resulting damage.
- The operator ensures that maintenance, inspection and installation is performed by authorised, qualified specialist personnel who are thoroughly familiar with the manual.
- Carry out work on the pressure booster system during standstill only.
- The pump casing must have cooled down to ambient temperature.
- Pump pressure must have been released and the pump must have been drained.

-
- When taking the pressure booster system out of service always adhere to the procedure described in the manual.
 - Decontaminate pressure booster systems which handle fluids posing a health hazard.
 - As soon as the work has been completed, re-install and/or re-activate any safety-relevant and protective devices. Before returning the product to service, observe all instructions on commissioning.
 - Make sure the pressure booster system cannot be accessed by unauthorised persons (e.g. children).
 - Prior to opening the device, pull the mains plug and wait for at least 10 minutes.

2.8 Unauthorised modes of operation

Always observe the limits stated in the product literature.

The warranty relating to the operating reliability and safety of the pressure booster system supplied is only valid if the equipment is used in accordance with its intended use.

[⇒ Section 2.2, Page 8]

3 Software Changes

The software has been specially created for this product and thoroughly tested. Making changes or additions to the software or parts of the software is prohibited. This does not, however, apply to software updates supplied by DP.

4 Transport/Temporary Storage/Disposal

4.1 Checking the condition upon delivery

1. On transfer of goods, check each packaging unit for damage.
2. In the event of in-transit damage, assess the exact damage, document it and notify DP or the supplying dealer and the insurer about the damage in writing immediately.

4.2 Transport



NOTE

The pressure booster system is bolted to a pallet and wrapped in plastic film for shipping and temporary storage. All connecting points are capped.



DANGER

Pressure booster system tipping over

Danger to life from falling pressure booster system!

- Never suspend the pressure booster system by its power cable.
- Do not lift the pressure booster system by its manifold.
- Observe the applicable local accident prevention regulations.
- Observe the information on weights, centre of gravity and fastening points.
- Use suitable and permitted transport equipment, e.g. crane, forklift or pallet jack.

- ✓ The pressure booster system has been checked for in-transit damage.
1. Make sure the transport equipment is suitable for safely carrying the indicated load.
 2. Transport the pressure booster system to the place of installation.
 3. Attach the pressure booster system to the lifting tackle. Lift it off the pallet. Dispose of the pallet.
 4. Use suitable lifting equipment to lift the pressure booster system and carefully place it down at the place of installation.

4.3 Storage/preservation

If commissioning is to take place some time after delivery, we recommend that the following measures be taken when storing the pressure booster system:



CAUTION

Damage during storage due to frost, moisture, dirt, UV radiation or vermin

Corrosion/contamination of pressure booster system!

- Store the pressure booster system in a frost-proof room. Do not store outdoors.



CAUTION

Wet, contaminated or damaged openings and connections

Leakage or damage of the pressure booster system!

- Only open the openings of the pressure booster system at the time of installation.

Store the pressure booster system in a dry, protected room where the atmospheric humidity is as constant as possible.

4.4 Return to supplier

1. Drain the pressure booster system as per operating instructions.
2. Always flush and clean the pressure booster system, particularly if it has been used for handling noxious, explosive, hot or other hazardous fluids.
3. If the pressure booster system has handled fluids whose residues could lead to corrosion damage in the presence of atmospheric humidity or could ignite upon contact with oxygen, the pressure booster system must also be neutralised, and anhydrous inert gas must be blown through the pressure booster system to ensure drying.
4. Always complete and enclose a certificate of decontamination when returning the pressure booster system. [⇒ Section 13, Page 54]
Always indicate any safety and decontamination measures taken.

4.5 Disposal



WARNING

Fluids handled, consumables and supplies which are hot and/or pose a health hazard

Hazard to persons and the environment!

- Collect and properly dispose of flushing fluid and any fluid residues.
- Wear safety clothing and a protective mask if required.
- Observe all legal regulations on the disposal of fluids posing a health hazard.

1. Dismantle the pressure booster system.
Collect greases and other lubricants during dismantling.
2. Separate and sort the pump materials, e.g. by:
 - Metals
 - Plastics
 - Electronic waste
 - Greases and other lubricants
3. Dispose of materials in accordance with local regulations or in another controlled manner.

5 Description

5.1 General description

- Pressure booster system

5.2 Designation

Example: Premium Line HU3 DPV 15/8 B VFD MM CC

Table 4: Designation key

Code	Description	
Hydro-Unit Premium Line	Type series	
HU3	Number of pumps	
DPV 15	Pump size	
8 B	Number of pump stages	
VFD MM CC	Design	
	DOL CC	Fixed speed pressure booster system
	VFD CM CC	Pressure booster system with cabinet-mounted variable speed system
	VFD MM CC	Pressure booster system with variable speed system and SuPremE motor

5.3 Name plate

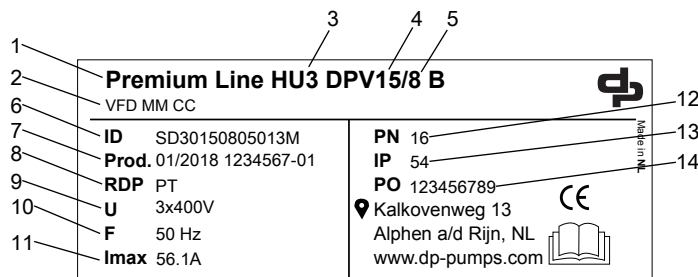


Fig. 1: Name plate (example)

1	Type series	8	Dry running protection
2	Design	9	Power supply voltage
3	Number of pumps	10	Power supply frequency
4	Size	11	Maximum current input
5	Number of stages	12	Maximum operating pressure
6	Serial number	13	Enclosure
7	Month of production / year of production, consecutive number	14	Order number

5.4 Design details

Design

- Compact system mounted on a common base frame
- One or more vertical high-pressure pumps with variable speed system
- Hydraulic components made of stainless steel / brass for high operating reliability

Multiple pump system:

- Check valve per pump
- Discharge-side gate valve per pump
- Suction-side gate valve per pump

Hydro-Unit Premium Line DOL CC:

- Power contactor per pump

Hydro-Unit Premium Line VFD CM CC, VFD MM CC:

- One frequency inverter per pump

Installation

- Stationary dry installation

Drive

Hydro-Unit Premium Line DOL CC, VFD CM CC:

- Electric motor
- Efficiency class IE3 to IEC 60034-30

Hydro-Unit Premium Line VFD MM CC:

- Magnetless synchronous reluctance motor
- Efficiency class IE5 to IEC 60034-30
- SuPremE

Automation

- Control cabinet IP54
 - Sheet steel housing: colour RAL 7035
 - Megacontrol
 - Graphical display with operating panel
 - Three LEDs signalling the operating status
 - Lockable master switch (repair switch)
 - Motor protection switch per pump
 - Service interface for Servicetool

5.5 Configuration and function



Fig. 2: Hydro-Unit Premium Line

1	Control cabinet
2	Control unit
3	Vertical high-pressure pumps
4	Membrane-type accumulator
5	Manifold
6	Baseplate

Design Fully automatic pressure booster system with two or three vertical high-pressure pumps (3) for ensuring the required supply pressure

Function Hydro-Unit Premium Line DOL CC:

Either two or three pumps are controlled and monitored by a micro-processor control unit (Megacontrol). The first pump is started up when the pressure falls below the set start-up pressure. Additional pumps are sequenced in automatically in line with actual demand. When demand decreases, the pumps are sequenced out again as the stop pressure (start-up pressure + delta p) is reached. The pump that has been started up first will be stopped first. The pumps are automatically started up in a different order for each new cycle. The actual pressure is measured by an analog pressure measuring device (pressure transmitter). The function of this pressure transmitter is monitored (live-zero). This ensures equal distribution of pump operating hours.

If a duty pump fails, the next pump is started up immediately. A fault is output, which can be reported via volt-free contacts (e.g. to the control station).

The operating status is displayed via LEDs.

- Green: system ready for operation
- Yellow: warning
- Red: alert

2 volt-free contacts on terminals are provided for reporting warnings and alerts.

Hydro-Unit Premium Line VFD CM CC, VFD MM CC:

Either one or more pumps are controlled and monitored by a micro-processor control unit (Megacontrol). Each pump is operated on a frequency inverter and controlled by the control unit so as to ensure a constant discharge pressure of the pressure booster system. As the demand increases or decreases, peak load pumps are started and stopped automatically. As soon as the demand increases again after one pump has been stopped, another pump which has not been in operation before is started up. When the last pump has been stopped and the demand increases again, the next pump in line is started up on a frequency inverter. The stand-by pump is also included in the alternating cycle. The standard setting is for the pressure booster system to start automatically as a function of pressure. As long as the pressure booster system is in operation, the pumps are started and stopped as a function of demand (standard setting). In this way it is ensured that the individual pumps operate only in line with actual demand. If the demand drops towards 0, the pressure booster system slowly runs down to the stop point.

The operating status is displayed via LEDs.

- Green: system ready for operation
- Yellow: warning
- Red: alert

2 volt-free contacts on terminals are provided for reporting warnings and alerts.

5.6 Noise characteristics

The pressure booster systems are available with different numbers of pumps and different pump sizes.

Therefore, the expected total sound pressure level in dB(A) needs to be calculated.

1. Refer to the pumps' operating manual for the noise characteristics of the individual pumps.
2. Calculate the expected total sound pressure level.

Table 5: Calculating the expected total sound pressure level

Number of pumps	Expected total sound pressure level
Single pump	See pump operating manual
2 pumps	+3 dB(A)
3 pumps	+4,5 dB(A)
Total	dB(A)

Table 6: Example of calculating the expected total sound pressure level

Number of pumps	Expected total sound pressure level
Single pump	48 dB(A)
2 pumps	+3 dB(A)
Total	51 dB(A)

The expected total sound pressure level of 51 dB(A) for this configuration may develop when both pumps are running under full-load conditions.

5.7 Scope of supply

Depending on the model, the following items are included in the scope of supply:

- 2 or 3 vertical high-pressure centrifugal pumps with oval flange
- Powder-coated / epoxy resin-coated steel baseplate
- Integrated check valve per pump
- Discharge-side gate valve per pump
- Suction-side gate valve per pump
- Suction-side manifold and discharge-side manifold made of stainless steel

- Pressure transmitter on the discharge side
- Pressure gauge
- Dry running protection switch on the inlet pressure side
- Membrane-type accumulator on the discharge side, approved for drinking water
- Control cabinet IP54
 - Sheet steel housing: colour RAL 7035
 - Parameterisable Megacontrol control unit
 - Graphical display with operating panel
 - Three LEDs signalling the operating status
 - Lockable master switch (repair switch)
 - Motor protection switch per pump
 - One frequency inverter per pump
 - Service interface for Servicetool

5.8 Dimensions and weights

For dimensions and weights refer to the outline drawings of the pressure booster system.

5.9 Terminal wiring diagram

For the terminal assignment refer to the circuit diagram.

5.10 Potential equalisation



Fig. 3: Earth symbol

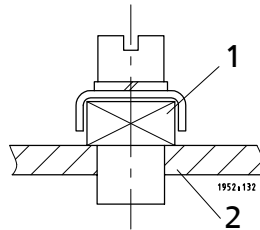


Fig. 4: PE terminal

1	Earthing terminal	2	Baseplate
---	-------------------	---	-----------

6 Installation at Site

6.1 Installation

Install pressure booster systems either in the technical equipment room or in a well-ventilated, frost-free, lockable room used for no other purpose. No harmful gases are allowed to enter the installation room. An adequately sized drain (leading to a sewer or equivalent) must be provided.

The pressure booster system is designed for a maximum ambient temperature of 0 °C to +40 °C¹⁾ at a relative humidity of 50 %.



NOTE

Do not install pressure booster systems next to sleeping or living quarters.

The anti-vibration mounting of the pressure booster system provides adequate insulation against solid-borne noise. If expansion joints (see accessories) are used for damping vibrations, their fatigue strength (endurance limit) must be given due consideration. Expansion joints must be easily replaceable.

6.2 Checks to be carried out prior to installation

Place of installation



WARNING

Installation on mounting surfaces which are unsecured and cannot support the load

Personal injury and damage to property!

- Use a concrete of compressive strength class C12/15 which meets the requirements of exposure class X0 to EN 206-1.
- The mounting surface must have set and must be completely horizontal and even.
- Observe the weights indicated.



NOTE

The anti-vibration mounts of the pressure booster system provide adequate insulation against solid-borne noise.

1. Check the structural requirements.
All structural work required must have been prepared in accordance with the dimensions stated in the outline drawing.

6.3 Installing the pressure booster system



WARNING

Top-heavy pressure booster system

Risk of personal injury by pressure booster system tipping over!

- Pressure booster systems awaiting final installation must be secured against tipping over.
- Firmly anchor the pressure booster system.

1) Hydro-Unit Premium Line VFD CM CC: +30 °C

Remove all packaging before installing the pressure booster system. Connect the pressure booster system's inlet line and discharge line to the corresponding site distribution lines.



NOTE

In order to avoid transmission of piping forces onto the pressure booster system and transmission of solid-borne noise, we recommend installing length-limited expansion joints.

Allow sufficient space for maintenance and repair work.

- ✓ All structural work required has been checked.
- ✓ The dimensions of the concrete foundation are correct, and the concrete has set firmly.
 1. Mark out the anchoring holes on the floor as shown in the outline drawing.
 2. Drill the holes (max. diameter: 12 mm).
 3. Insert plug fixings of appropriate size.
 4. Set the pressure booster system down in its correct installation position.
 5. Use suitable bolts to firmly anchor the pressure booster system.

6.4 Connecting the piping

Make sure that piping is installed without transmitting any stresses or strains. The use of length-limited expansion joints (KSB accessory) is advisable.

6.4.1 Fitting an expansion joint



⚠ DANGER

Sparks and radiant heat

Fire hazard!

- Take suitable precautions to protect the expansion joint if any welding work is carried out nearby.



CAUTION

Leaking expansion joint

Flooding of installation room!

- Regularly check for cracks or blisters, exposed fabric or other defects.

- ✓ The expansion joint has a length limiter with solid-borne sound insulation so as to be able to absorb reaction forces.
 1. Install the expansion joint in the piping free of twist or distortion. Never use the expansion joint to compensate for misalignment or mismatch of the piping.
 2. Tighten the bolts evenly and crosswise during assembly. The ends of the bolts must not protrude from the flange.
 3. Do not apply paint to the expansion joint. Protect it from any contact with oil.
 4. The position of the expansion joint within the pressure booster system must allow easy access and inspection and it must, therefore, not be insulated along with the piping.
 5. Expansion joints are subject to wear.

6.4.2 Installing a pressure reducer



NOTE

A pipe length of approximately 600 mm must be provided on the inlet side to accommodate a pressure reducer, if necessary.



NOTE

A pressure reducer must be installed

- if the inlet pressure fluctuation is too high for the pressure booster system to operate as intended or
- if the total pressure (inlet pressure plus shut-off head) of the pressure booster system exceeds the design pressure.

The maximum pump discharge pressure at zero flow point is reached in manual mode.

A minimum pressure gradient of 5 metres is required for the pressure reducer to fulfill its function. The pressure downstream of the pressure reducer (downstream pressure) is the basic parameter for determining the pump head.

For example:

The inlet pressure fluctuates between 4 and 8 bar. A pressure reducer is needed upstream of the pressure booster system on the inlet side.

Min. inlet pressure (p_{inl}) = 4 bar

Min. pressure gradient = 0.5 bar

Downstream pressure = 3.5 bar.

6.5 Connection to power supply



⚠ DANGER

Electrical connection work by unqualified personnel

Danger of death from electric shock!

- Always have the electrical connections installed by a trained and qualified electrician.
- Observe regulations IEC 60364.



⚠ WARNING

Incorrect connection to the mains

Damage to the mains network, short circuit!

- Observe the technical specifications of the local energy supply companies.



NOTE

A motor protection device is recommended.



NOTE

If a residual current device is installed, observe the operating manual for the frequency inverter.

The circuit diagrams for the pressure booster system are included in the control cabinet, where they must remain when not in use.

The product literature of the switchgear and controlgear assembly supplied with the pressure booster system includes a list of the electrical components installed. When ordering spare parts for electrical components, please always indicate the circuit diagram number.

6.5.1 Sizing the power cable

The cross-section of the power cable must be sized for the total rated power requirement.

6.5.2 Connecting the pressure booster system

Connect the pressure booster system to the power supply as per the enclosed circuit diagram.
Observe the data on the name plate.

6.5.3 Volt-free contacts

Volt-free contacts are provided for the following messages:

- Warning
- Alert

The terminals are marked in the circuit diagram and in the switchgear and controlgear assembly.

7 Commissioning/Start-up/Shutdown

7.1 Commissioning/Start-up

7.1.1 Prerequisites for commissioning/start-up

Before commissioning/start-up of the pressure booster system make sure that the following requirements are met:

- The pressure booster system has been properly connected to the electric power supply and is equipped with all protection devices.
- All relevant regulations applicable in the country of use are complied with.



NOTE

The competent authorities must be informed in due time prior to commissioning/test running the system.

7.1.2 Dry running protection

Pressure booster systems are fitted with a pressure switch as dry running protection device.

A float switch whose volt-free contact closes the circuit in upper float position can be connected to the control system as dry running protection. Follow the float switch manufacturer's instructions on how to set the float switch levels.

Table 7: Levels for dry running protection

Dry running protection device	Stop pressure	Start-up pressure
	[bar]	[bar]
Pressure switch	0,2	1,1

7.1.3 Commissioning/start-up of pressure booster system



NOTE

The pressure booster systems undergo hydraulic testing with water at the factory and are drained carefully before shipment. However, for technical reasons the presence of some residual water is unavoidable. The hydraulic connections are closed in as-supplied condition. They must only be opened immediately before installation. Refer to EN 806 before commissioning/starting up the pressure booster system. After an extended pre-installation period, in particular, flushing or even professional disinfection is recommended. For extensive or branched piping systems the pressure booster system should preferably be flushed either before installation, or flushing should be restricted to a limited area.



CAUTION

Foreign matter in the piping

Damage to the pumps/pressure booster system!

- Before commissioning/starting (or even test running) the pressure booster system, make sure that there is no foreign matter in the pressure booster system or piping.



NOTE

Commissioning of the pressure booster system - even test running - shall only be carried out in full compliance with all pertinent VDE (German Association of Electrical Engineers) regulations.



CAUTION

Operation without the fluid to be handled

Damage to the pump!

- Prime the pressure booster system with the fluid to be handled.

- ✓ The pipe unions between the pump and the piping have been re-tightened.
 - ✓ The flange bolting has been checked for firm seating.
 - ✓ The cooling air inlet and outlet openings on the motor are unobstructed.
 - ✓ All shut-off valves of the pressure booster system are open.
 - ✓ The pre-charge pressure of the membrane-type accumulator has been checked. [⇒ Section 9.2.3, Page 41]
1. Set the master switch to "0"; unlock all motor protection switches (if applicable).
 2. Provide connection to power supply.
 3. Open/loosen the vent plugs on the pumps (refer to the pump's installation/operating manual).
 4. Slowly open the inlet-side shut-off element and prime the pressure booster system until the fluid to be handled escapes through all vent holes.
 5. Insert and slightly tighten the pump vent plugs.
 6. Switch on all motor protection switches.
 7. Switch on the master switch.
 8. Start one pump after the other in manual mode, checking the direction of rotation. The direction of rotation must match the rotation arrow on the motor. If the pump runs in the wrong direction of rotation, interchange two phases at the motor terminal strip.
 9. Open the discharge-side shut-off element.
 10. Then re-tighten the vent plug firmly.
 11. Check that the pumps are running smoothly.
 12. Close the discharge-side shut-off element, causing all pumps to stop.



NOTE

Minor leakage of the mechanical seals during commissioning is normal and will cease after a short period of operation.

7.2 Switching on the pressure booster system

Switch on the master switch to energise the pressure booster system. The green LED on the control panel lights up, indicating the system's readiness for operation.



CAUTION

Pressure booster system not set to requirements

Damage to the pump/pressure booster system!

- Adjust the settings of the pressure booster system to the pressure conditions at the site.
- Set the functions as required.

7.3 Checklist for commissioning/start-up

Table 8: Checklist

Actions	Done
1 Read the operating manual.	
2 Verify the power supply against the name plate data.	
3 Check the earthing system (taking measurements).	
4 Check the mechanical connection to the water mains. Re-tighten the flange bolting and pipe unions.	
5 Prime and vent the pressure booster system from the inlet side.	
6 Check the inlet pressure.	
7 Check whether all cables are still firmly connected to the terminals inside the control unit.	
8 Compare the set values of the motor protection switches with the name plate data; if required, readjust.	
9 Briefly start up one pump after the other in manual mode and compare the direction of rotation at the fanwheel with the arrow indicating the direction of rotation.	
10 Check the start and stop pressure; re-adjust if necessary.	
11 Check that the dry running protection equipment is working properly.	
12 Vent the pumps for a second time after they have been running for 5 to 10 minutes.	
13 Check the pre-charge pressure of the (membrane-type) accumulator.	
14 Record all system conditions that do not correspond to our specifications or to the purchase order in the commissioning report (i.e. no dry running protection or inlet pressure + max. pressure of pressure booster system higher than 16 bar).	
15 Complete the commissioning report together with the operator/user and instruct the operator/user as to the function of the unit.	

7.4 Shutdown



NOTE

As long as the pressure booster system is out of operation, water is supplied directly at p_{ini} through the pressure booster system.

Set the master switch to "0".



NOTE

Drain the pressure booster system for prolonged shutdown.

8 Operating the Pressure Booster System

8.1 Hydro-Unit Premium Line DOL CC, VFD CM CC, VFD MM CC



CAUTION

Incorrect operation

Water supply is not assured!

- Make sure to comply with all local regulations, particularly the EC Machinery Directive and the EC Directive on Low-Voltage Equipment.

The pressure booster system is factory-set to the start-up pressure and stop pressure indicated on the name plate.

The settings can be modified via the control panel if necessary.



NOTE

The factory settings are permanently stored in the control unit. Should an incorrect setting result in pressure booster system failure, the factory settings can be restored. [⇒ Section 8.1.8.2, Page 35]



NOTE

The settings made at the site can be saved and loaded when required. [⇒ Section 8.1.8.1, Page 35] [⇒ Section 8.1.8.2, Page 35]

8.1.1 Control panel

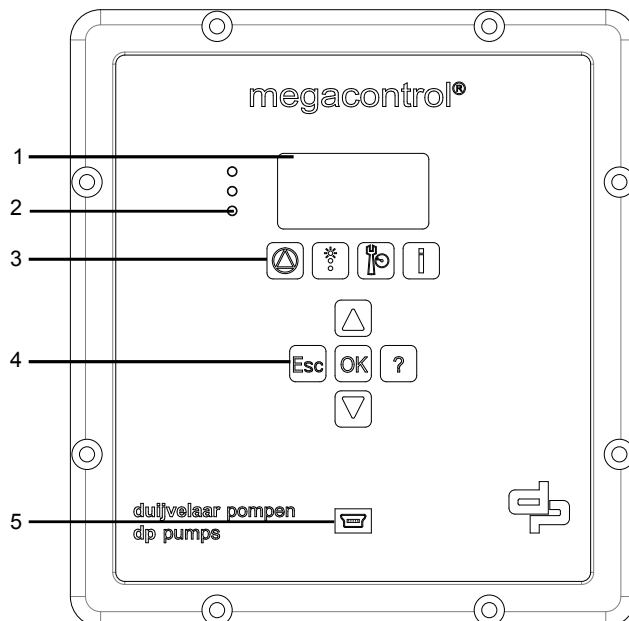


Fig. 5: Control panel

1	Display
2	LEDs with traffic light function
3	Function keys
4	Navigation keys
5	Service interface

8.1.1.1 Display

The six-row display contains the following information:

Parameter No./pump	Access level
Current selection	
Parameter information	
Date, time	

Fig. 6: Control unit: Display elements

Display element	Description
Parameter No./Pump	Shows the number of the parameter or pump selected
Current selection	Shows the current parameter in plain text
Parameter information	List of selectable parameters/parameter information
Access level	Shows the current access level: Blank = Standard (limited access to parameters) C = Customer, access to main parameters S = Service F = Factory
Date, time	Shows the set date and time

Example: Setpoint adaptation at "Customer" access level:

3-5	C
Pressure	
Setpoint Bandwidth Accumulator pressure Max. setpoint	
22-05 13:40	




Fig. 7: Display: Setpoint adaptation

The number of the current menu or parameter is always displayed at the top left of the screen. This number indicates the path through the menu levels and thus enables the user to quickly locate parameters. See "Displaying and changing parameters".

8.1.1.2 LEDs

The "traffic light" LEDs provide information about the pump system's operating status.





Table 9: LED description

LED	Description
	Red: One or more than one alert is active
	Amber: One or more than one warning is active
	Green: Trouble-free operation

8.1.1.3 Function keys

Use the function keys for direct access to the elements of the first menu level.






Table 10: Assignment of function keys

Key	Function
	Operation
	Diagnosis
	Settings
	Information

8.1.1.4 Navigation keys

For navigating the menus and confirming settings:

Table 11: Control unit: navigation keys

Key	Description
 	Arrow keys: <ul style="list-style-type: none"> - Move up/down in the menu options. - Increase/decrease a numerical value. - Scroll up/down.
	Escape key: <ul style="list-style-type: none"> - Cancel an entry without saving it. - Move up one menu level.
	OK key: <ul style="list-style-type: none"> - Click "OK" on the start screen to open the quick menu. - Confirm entries. - Confirm a menu selection. - Move to the next digit when entering numerals.
	Help key: <ul style="list-style-type: none"> - Displays a help text for each selected menu option.

8.1.1.5 Service interface

The service interface allows a PC/Notebook to be connected via a special cable (USB - RS232).

The pressure booster system can be parameterised by using the Service-Tool software. The control unit can also be updated via this interface.

8.1.2 Menu structure

Main menu: logo/actual value display

Main menu	Key	Sub-menu	Menu display
➔	Operation	➔ General	System pressure System load % RDP switch present/not present Inlet pressure Level content % Level height m Ambient temp. Digital inputs
		➔ Pumps	Operating mode of pumps Display pump load Display thermal protection
		➔ Time and statistics	Operating hours Service interval Current min. runtime

Main menu	Key	Sub-menu	Menu display
➔	Diagnosis	➔ General	Display messages Show history Acknowledge faults Clear history
➔	Settings	➔ Control panel	Basic settings CAN configuration Service interface Logo
		➔ Control unit	Login Service
		➔ System configuration	Number of pumps Configuration suction side Configuration operating mode
		➔ System settings	Suction side Discharge side Configuration of frequency inverter
		➔ Pressure configuration	Configuration setpoint and dry running protection
		➔ Timer settings	Operation check run / alternative setpoint
		➔ Time/date	
		➔ Program outputs	
		➔ Messages	
➔	Information	➔ Control module	Serial number Material number Firmware Parameter set Hardware version

8.1.3 Access levels

Various access levels have been defined to prevent unintentional or unauthorised access to the pressure booster system parameters.

"Standard" level Unless users log on to one of the other access levels, they will only have limited access to parameters.

"Customer" level Access level for expert users.
This level enables access to all the parameters required for commissioning. You must enter the password under (3-2-1-1) Login to gain access.
"C" is displayed.
If password protection is deactivated via parameter 3-2-1-2, this access level becomes the "Standard" access level.
The password is "7353".

"Service" level Access level for service personnel.
You must enter the password under (3-2-1-1) Login to gain access.
"S" is displayed.

"Factory" level Access level for the manufacturer only.
"F" is displayed.



NOTE





If no keys are pressed for ten minutes, the system will automatically return to the "Standard" access level.

8.1.4 Displaying and changing parameters

The parameter numbers identify the navigation path, which helps you find a particular parameter quickly and easily.

The first digit of the parameter number indicates the first menu level, which is called up directly via the four function keys.

Table 12: Assignment of function keys

Key	Function
	Operation
	Diagnosis
	Settings
	Information


Subsequent steps are carried out via the navigation keys.

Example: parameter 3-5-1 Setpoint




First, enter the customer password. [⇒ Section 8.1.3, Page 29]

Then change the setpoint as follows:



First digit of the parameter number: 3-5-1

	Press the third function key for Settings. 3-1 appears on the top left of the screen.
---	---


Second digit of the parameter number: 3-5-1

	Change the display 3-1 (top left) to 3-5 by pressing the navigation keys.
	Confirm the selection by pressing OK. 3-5-1 appears on the top left of the screen. You have reached the required parameter.
	To change this parameter, press OK again.



Numbers can then be entered digit by digit from left to right.

	Increase value
	Reduce value

The bar above the entry displays the value currently being entered in relation to the value range.

	Confirm the selected value by pressing OK. The cursor moves to the next position (second position from the left).
---	---

Make the settings for the subsequent positions as described above and then

	press OK to save the new parameter value.
	Press ESC several times to return to the main display. The new set value is now active.

8.1.5 Displaying messages

All monitoring and protective functions trigger warnings or alerts. These are signalled by the yellow or red LED and connected to the relay outputs.

- All current messages can be displayed in the Diagnosis menu under 2-1-1 and acknowledged individually if the cause of the fault has gone.
- The history of messages can be accessed in the Diagnosis menu under 2-1-2. It indicates the start and end of a fault.
- The list of fault messages can be acknowledged in the Diagnosis menu under 2-1-3.
- The history of messages can be deleted in the Diagnosis menu under 2-1-4. For this step, you have to login at the "Service" level.

When the pressure booster system is reset (by switching the pressure booster system off and on with the master switch), all alerts are acknowledged automatically. Acknowledging alerts may cause the system to re-start.

8.1.6 Description of parameters

8.1.6.1 Parameter group 1 "Operation"

Access via the "Operation" function key



Fig. 8: Operation key

Parameters starting with the digit "1" indicate current operating conditions. Exception: Parameter 1-2-1, which can be used to start and stop individual pumps in manual mode.

Parameter	Description
1-1-1	Operating pressure
1-1-2	System load 0 to 300 %, depending on the number of pumps in operation.
1-1-3	Indicates whether a dry running protection device is connected or not.
1-1-7	Ambient temperature, if "Temperature" function has been selected under 3-3-4, WSD.
1-1-8	<i>For Service only.</i> Status of digital inputs.
1-1-10	Power down speed. If the rotational speed of the variable-speed pump drops below this speed (set under 3-11-3), the pump will stop. Only active if energy-saving mode has been activated under 3-11-1.
1-2-1	Operating mode. After the pump has been selected (by entering the pump number), it can be run either in automatic mode, in manual mode (for 10 seconds), or switched off. If the pump was switched off via this parameter, the same parameter will have to be used to return the pump to automatic mode again. This pump cannot be switched on again by means of a voltage reset! If a pump has been operated in manual mode via this parameter, it will automatically return to its previous operating mode after 10 seconds.
1-2-2	Pump load indicates the load per pump.
1-2-3	<i>For Service only.</i> Thermal fail. flags.
1-2-4	Running hours pump.
1-2-5	<i>For Service only.</i> Number of pump starts.

8.1.6.2 Parameter group 2 "Diagnosis"

Access via the "Diagnosis" function key



Fig. 9: Diagnosis key

Parameters starting with the digit "2" are used for fault diagnosis.

Parameter	Description
2-1-1	Displaying messages. Current faults are displayed. A ring next to the fault means that the fault has gone but has not been acknowledged yet. A ring filled with a dot means that the fault is still active but cannot be acknowledged.
2-1-2	Displaying history. The last six faults are displayed. A ring next to the fault means that the fault has gone but has not been acknowledged yet. A ring filled with a dot means that the fault is still active but cannot be acknowledged.
2-1-3	Acknowledging faults.
2-1-4	<i>For Service only.</i> Deleting the fault history.

31 / 60

8.1.6.3 Parameter group 3 "Settings"

Access via the "Settings" function key



Fig. 10: Settings key

This key is used to change parameters which are required to adjust the pressure booster system to site conditions if the data specified in the purchase order no longer applies or if accessories or supplementary equipment have been retrofitted.

Parameter	Description
3-1	Control panel
3-1-1	Basic settings of the control panel. Parameters 3-1-1-1 and 3-1-1-2 can be changed at the <i>Standard</i> access level.
3-1-1-1	Language settings
3-1-1-2	Backlight settings for the display: 3-1-1-2-1 serves to select the backlighting modes "Always ON" or "Timer-based". If "Timer-based" is selected, the backlight time can be set from 0 to 999 seconds under 3-1-1-2-2.
3-1-1-3	<i>Service only</i> : Displayed units for pressure (3-1-1-3-1), fill level (3-1-1-3-2) and temperature (3-1-1-3-3).
3-1-2	<i>Service only</i> : Field bus type and address.
3-1-3	<i>Factory only</i> : Service interface settings.
3-1-4	<i>Factory only</i> : Logo on start screen.
3-2	Control unit
3-2-1	Login. The various login levels can be selected under 3-2-1-1. The password for the "Customer" level is 7353. The password prompt for this access level can be deactivated under 3-2-1-2.
3-2-2	Service. 3-2-2 provides access to the parameters required for saving and restoring settings.
3-2-2-1	"Customer" level. Resetting the pressure booster system to the factory settings it was delivered with.
3-2-2-2	"Service" level. Resetting the service interval
3-2-2-3	"Customer" level. Resetting to the settings made at the site and saved under 3-2-2-4.
3-2-2-4	"Customer" level. Saving the settings made at the site.
3-2-2-5	"Factory" level. Saving the factory settings the pressure booster system is delivered with.
3-2-2-6	"Factory" level. Resetting to default settings.
3-3	System configuration All parameters can be changed at "Service" level.
3-3-1	Number of pumps in the system.
3-3-2	The "inlet" configuration defines the type of dry running protection used (by pressure switch, pressure sensor or flow monitoring), or whether the individual inlet tank levels are processed and whether inflow into the tank is controlled by means of a proportional valve or gate valve (on/off valve).
3-3-3	"Discharge" configuration. Defines the control method (cascade operation, frequency inverter, jockey pumps).
3-3-4	WSD. Presently, only the ambient temperature can be analysed. If "Temperature" is selected, a Pt1000 can be connected, and the measured temperature will be shown on the display. If the temperature exceeds the value entered under 3-4-4-3, a warning is output.
3-4	System settings All parameters can be changed at "Service" level.
3-4-1	Inlet
3-4-1-1	Sensor press. 4 mA. Lower sensor limit, factory setting: 0 bar.
3-4-1-2	Sensor press. 20 mA. Upper sensor limit. Factory setting: 10 bar.
3-4-1-3	Automatic RDP reset. Control unit response when lack of water signal has gone. Factory setting: automatic reset.
3-4-1-4	Inlet tank configuration if inlet tank has been selected under 3-3-2.
3-4-1-4-1	0 % level. Input of inlet tank level in cm or m (depending on setting made under 3-1-1-3-2) at 0 % of sensor signal.
3-4-1-4-2	100 % level. Input of inlet tank level in cm or m (depending on setting made under 3-1-1-3-2) at 100 % of sensor signal.
3-4-1-4-3	Sensor level. Sensor distance from tank floor.
3-4-1-4-4	Low level shut down. At this level the pressure booster system stops owing to lack of water.
3-4-1-4-5	Low level reset. At this level the pressure booster system starts again.
3-4-1-4-6	Critical water level. Level at which a warning is output: tank is almost empty.
3-4-1-4-7	High water level. Level at which a warning is output: high-water level is reached.
3-4-1-4-8	Threshold
3-4-1-4-8-1	Threshold 1: ON
3-4-1-4-8-2	Threshold 1: OFF
3-4-1-4-8-3	Threshold 1: ON
3-4-1-4-8-4	Threshold 1: OFF
3-4-1-4-9	Supply valve ON/OFF. These parameters define the levels at which the supply valve is opened and closed, respectively. Level 1A is an alternative level which is activated under 3-7-9 and 3-7-10.
3-4-1-4-9-1	Level 1 open. Level at which the gate valve is to open.

Parameter	Description
3-4-1-4-9-2	Level 1 closed. Level at which the gate valve is to close.
3-4-1-4-9-3	Level 1A open. Level at which the gate valve is to open.
3-4-1-4-9-4	Level 1A closed. Level at which the gate valve is to close.
3-4-1-4-10	Supply valve prop.
3-4-1-4-10-1	Level setpoint 1. This parameter defines the level at which the proportional valve is fully open.
3-4-1-4-10-2	Level setpoint 1 A. This parameter defines the alternative level at which the proportional valve is fully open. The alternative level is activated under 3-7-9 and 3-7-10.
3-4-1-4-10-3	Hysteresis
3-4-1-4-10-4	Sample time
3-4-2	Discharge
3-4-2-1	Sensor press. 4 mA. Lower sensor limit, factory setting: 0 bar.
3-4-2-2	Sensor press. 20 mA. Upper sensor limit. Factory setting: 16 bar.
3-4-2-3	Pumps ON sensor fail. This parameter defines the control unit response if the sensor current drops below 4 mA. A number between 0 and 6 is input. 0 means that all pumps are stopped, 1 means that one pump is running, 6 means that six pumps are running.
3-4-2-4	Max power. This parameter defines the maximum number of pumps allowed to run at the same time. Input is in number of pumps x 100 %.
3-4-3	Variable freq. drive
3-4-3-1	Communication. Configuration of communication protocol used by control unit and frequency inverter.
3-4-3-2	Proportional const. Proportional amplification factor of controller. The higher the value, the higher the amplification.
3-4-3-3	Integral time. Integration time of controller. The higher the value, the faster the controller.
3-4-3-4	Differential const. Not used in pressure boosting applications.
3-4-3-5	No-flow detection. Parameters determining the pressure booster system's stopping behaviour at zero flow.
3-4-3-5-1	No-flow bandwidth. Permissible deviation of actual value from setpoint (settable from 2 to 18 %) interpreted as constant pressure at zero flow by the control unit.
3-4-3-5-2	No-flow time. Period (settable from 4 to 20 s) during which the deviation set under 3-4-3-5-1 must be valid for the control unit to identify zero flow.
3-4-3-5-3	No-flow step. Value must not be changed for pressure booster systems!
3-4-4	WSD settings. Only the temperature monitoring function is supported at the moment.
3-4-4-3	Average room temp. A warning is output if this temperature is exceeded.
3-5	Pressure
3-5-1	"Customer" level. Set point. Pressure at which the pumps start.
3-5-3	"Customer" level. Bandwidth. Value in bar (standard: 0.05 bar) of permissible deviation of actual value from setpoint.
3-5-4	"Customer" level. Accumulation press. Value added to the actual value before the last pump is stopped.
3-5-5	"Service" level. Max. set point.
3-5-6	"Service" level. Hmax. Maximum pump head at zero flow.
3-5-8	"Service" level. Average inlet press. This parameter indicates the inlet pressure of the system if a pressure switch is used as dry running protection device.
3-5-9	"Customer" level. Adapt. setpoint. Activated under 3-7-8 "Clock adapt setp."
3-5-10	Delta p. This parameter defines by how many bar the setpoint is increased or decreased per running pump. For difficult site conditions only.
3-5-11	"Customer" level. High pressure alarm. This parameter defines the maximum pressure at which a warning is to be output.
3-5-12	"Customer" level. High pressure action. This parameter defines the control unit's response when the pressure set under 3-5-11 is reached. Selection options: "Stop pumps" or "Message only".
3-5-13	"Customer" level. Low pressure alarm. This parameter defines the minimum pressure at which a warning is to be output.
3-5-14	"Service" level. Low pressure action. This parameter defines the control unit's response when the pressure set under 3-5-13 is reached. Selection options: "Stop pumps" or "Message only".
3-5-15	"Service" level. Shut down RDP. Can only be selected when a pressure sensor has been selected as dry running protection. This parameter defines the pressure at which a lack-of-water message is to be output.
3-5-16	"Service" level. Reset RDP. Can only be selected when a pressure sensor has been selected as dry running protection. This parameter defines the pressure at which the lack of water has gone.

Parameter	Description
3-5-17	"Service" level. Press. Flow Control. Can only be selected if flow monitoring has been selected for dry running protection. Lack of water is detected when the flow sensor detects zero flow and the pressure on the discharge side falls below the setpoint minus the value entered here.
3-6	Timer settings All parameters can be changed at "Service" level.
3-6-1	Opt. pump starts/h. Permissible pump starts per hour.
3-6-2	Min. run time. Minimum run time of the pump, even if the period between the start and stop command is shorter.
3-6-3	Min. run time corr. Value added to the minimum run time if the number of pump starts is exceeded.
3-6-4	Max. run time. Period after which the pumps will be changed over in any case.
3-6-5	Start delay. Time between the start command and the actual pump start.
3-6-6	Stop delay. Time between the stop command and the actual pump stop.
3-6-8	RDP delay. Time between lack-of-water signal and pump stop.
3-6-9	High/low alarm delay. Time between the occurrence of a fault and the associated warning/alert.
3-7	Time/Date All parameters except 3-7-7 and 3-7-11 can be changed at "Customer" level.
3-7-1	Date
3-7-2	Time
3-7-3	Check run mode. Set according to requirements: System does not perform check run (set to OFF), performs check run at given interval (set to "Interval-based"), every day at the same time (Time of day based) or at a given time on a given day of week (Time of week based).
3-7-4	Check run interval. Can only be selected when "Interval" has been selected under 3-7-3. Interval to be entered in seconds.
3-7-5	Check run at (daily). Can only be selected if "Time of day based" has been selected under 3-7-3.
3-7-6	Check run at (weekly). Can only be selected if "Time of week based" has been selected under 3-7-3. Enter hour, minute and weekday.
3-7-7	Check run duration. Duration of check run of each pump.
3-7-8	Clock adapt setp.
3-7-8-1	Adaptation mode. Set according to requirements: no alternative setpoint (set to OFF), every day at the same time ("Adapt ON/OFF ev. day") or at a given time on a given day of week ("Adapt. ON/OFF per day").
3-7-8-2	Change ON/OFF times. Can only be selected if "Adapt ON/OFF ev. day" has been selected under 3-7-8-1. Enter hour and minute for activating and deactivating the alternative setpoint.
3-7-8-3	Select day of week. Can only be selected if "Adapt ON/OFF per day" has been selected under 3-7-8-1. Enter the weekday.
3-7-8-4	Change ON/OFF times. Can only be selected if "Adapt ON/OFF per day" has been selected under 3-7-8-1. Enter hour and minute for activating and deactivating the alternative setpoint.
3-7-9	Date adapt level On. Month from which the alternative level specified under 3-4-1-4, Level configuration, is to be activated.
3-7-10	Date adapt level Off. Month from which the alternative level specified under 3-4-1-4, Level configuration, is to be deactivated.
3-7-11	Maintenance interval. Enter the number of operating hours after which maintenance is to be performed.
3-10	Main menu "Customer" level. Set the information to be displayed in the main menu.
3-11	Energy Saving Mode All parameters can be changed at "Service" level.
3-11-1	Energy Saving Mode ON/OFF. This parameter serves to activate/deactivate the energy-saving mode.
3-11-2	Direct Off. This parameter defines whether, upon reaching the "power down speed", the pressure booster system stops after the delay set under 3-11-4 or flow detection is started.
3-11-3	Power down speed. Enter the pump load at which the last pump is to stop.
3-11-4	Time Direct Off.

8.1.6.4 Parameter group 4 "Information"

Access via the "Information" function key



Fig. 11: Information key

Parameters starting with the digit "4" provide information on:

Parameter	Description
4-1-1	Serial number
4-1-2	Product ID (displayed at "Factory" level only)
4-1-3	Firmware
4-1-4	Parameter set
4-1-5	HW version

8.1.7 Quick menu

The following main parameters, which may be required for adapting the pressure booster system to site conditions, can be called directly via the Quick Menu, which can be accessed directly from the start screen by pressing the OK key:

- PIN
- Proportional constant
- Integral constant
- Differential constant
- Setpoint
- Bandwidth
- Accumulator pressure
- Delta P
- High pressure alarm
- Low pressure alarm
- Min. run time
- Start delay
- Stop delay
- RDP delay
- High/low alarm delay

8.1.8 Saving and restoring settings

Users have to be logged in at "Customer" level to save and restore settings.

8.1.8.1 Saving settings

The changes made to the control unit parameters at the site can be saved under 3-2-2-4.

8.1.8.2 Restoring settings

Three types of settings can be restored if the system does not operate any more as a result of incorrect settings made at the site.

- Parameter 3-2-2-1 Resetting to factory settings. The control unit is reset to the values and settings the pressure booster system was delivered with.
- Parameter 3-2-2-3: Resetting to the site-specific settings.
- Parameter 3-2-2-6: Resetting to default settings ("Factory" level only). The control unit is reset to the pressure booster system type (no settings for pressure, dry running protection, etc.)

8.1.9 Alerts and warnings

Alert	Description
Failure PT. Dis.	Fault at discharge-side sensor (current < 4 mA). Replace sensor and reset system.
Br. wire sens.dis	Fault at discharge-side sensor (defective sensor or broken wire). Replace sensor and reset system.
Sys. press. too low	System pressure below minimum value (3-5-13) for too long.
Sys. press. too high	System pressure above maximum value (3-5-11) for too long.
No water	Insufficient water or water pressure on suction side.
More pumps fail	High-priority thermal alert.
Failure valve	Thermal fault of valve for inlet tank supply (current too high).
Inlet sensor fail	Fault at inlet sensor (pressure or level value < 4 mA - Replace sensor and reset system).
Br. wire sens.inl	Fault at inlet-side sensor (defective sensor or broken wire). Replace sensor and reset system.
Fire alarm	Alert when the "external ON" contact opens.
Warning	Description
Fail. several FCs	Faults on several frequency inverters.
Maintenance required	Customer service required.
Failure Pump 1	Thermal fault of pump 1 (temperature too high).
Failure Pump 2	Thermal fault of pump 2 (temperature too high).
Failure Pump 3	Thermal fault of pump 3 (temperature too high).
P1 out of order	1st pump set to manual OFF (parameter 1-2-1). Deactivate by selecting automatic mode.
P2 out of order	2nd pump set to manual OFF (parameter 1-2-1). Deactivate by selecting automatic mode.
P3 out of order	3rd pump set to manual OFF (parameter 1-2-1). Deactivate by selecting automatic mode.
High water level	Water level in inlet tank too high.
Crit. water level	Water level in inlet tank critical (almost empty).
Low water level	Water level in inlet tank too low (system stopped by dry running protection).
Spurious data	Unknown data received from frequency inverter.
Serial framing	Frame error.
Serial parity	Serial parity error.
Serial time out	Communication time out.
Unrequest message	Unrequested message received from frequency inverter.
Buffer overrun	Buffer overrun message of frequency inverter log.
Failure FC 1	
24 V out of range	Internal 24 V outside valid range.
Failure FC 2	
Failure FC 3	
5V out of range	Internal 5 V outside valid range.
3 V out of range	Internal 3 V outside valid range.
External OFF	Warning when opening the "external OFF" contactor.
Curr. temp. too high	Ambient temperature (parameter 3-4-4-3) exceeded.
Failure VFD	

8.1.10 Connecting the Remote OFF contact

The remote-OFF connection is a NC contact. When this contact opens, all pumps which are in operation are sequenced out after the set stop delay, and a warning is output (yellow LED).

When this contact closes, the pumps are started up again in line with demand, and the warning is cleared.
Wiring see circuit diagram.

8.1.11 Connecting the fire alert

The fire alert connection is a NC contact. When this contact opens, all pumps are sequenced in after the set start delay and an alert (red LED) is output. The dry running protection and remote-OFF functions are ignored.

When this contact closes, the pumps are sequenced out again in line with demand. The alert is cleared. Wiring see circuit diagram.

8.1.12 Charging the accumulator

The "Charge accumulator" function can be activated at parameter 3-5-4. Before the last pump stops the actual value is increased by the value entered here, in order to fill the accumulator located on the discharge side of the pressure booster system.
If "0" is entered the function is deactivated.

8.1.13 Energy-saving mode

In energy-saving mode (-> Parameter 3-11 ff.) the energetically inefficient operation of a single pump at minimum water consumption can be reduced.



CAUTION

Hunting (excessive starting/stopping) of pressure booster system

Damage to the pumps!

- Only activate the energy-saving mode if a sufficiently sized accumulator is fitted on the discharge side.



NOTE

No recommendation can be given for the parameters of the energy-saving mode.

The values depend on the system installed and can only be defined at the operational pressure booster system installed on site.

Making settings:

1. Close the discharge-side shut-off valve slowly until only a single pump is left running and delivering a small amount of water.
2. Read the pump load in parameter 1-1-2.
3. Activate "Charge accumulator" in parameter 3-5-4. [⇒ Section 8.1.12, Page 37]
4. Set parameter 3-11-1 to "ON".
5. Set parameter 3-11-2, "Direct OFF", to "ON".
The setting "OFF" (flow detection) should only be selected for difficult site conditions and by an expert.

6. Enter the value read under item 2 in parameter 3-11-3.
7. Set parameter 3-11-4 to define the period the pump is to keep on running in order to charge the accumulator before stopping.
8. Keep changing parameters 3-11-3 and 3-11-4 to obtain the required pump stopping behaviour.

8.1.14 Flow detection

When only one pump is operated, the control unit checks whether a liquid volume is being pumped. To this end, the rotational speed is reduced slightly every 10 seconds. If the control unit detects that the actual value is within a settable bandwidth (-> parameter 3-4-3-5-1) during a settable period (-> parameter 3-4-3-5-2), the "Charge accumulator" function is carried out and the pump stops.

8.1.15 Connecting the ambient temperature monitoring device (option)

If ambient temperature monitoring has been selected under parameter 3-3-4, WSD, a Pt1000 sensor must be connected. The ambient temperature can be read on the display. A warning can be output if a set temperature has been exceeded, see parameter 3-4-4-3.



NOTE

This function cannot be used in conjunction with digital inputs for remote reset, setpoint changeover and check run!

8.1.16 Digital inputs for remote reset, setpoint changeover and check run (option)

If "OFF" (standard setting) has been selected at parameter 3-3-4, WSD, the WSD inputs 1 to 3 can be used for the following functions:

- Remote reset, activated by pulse to terminals.
- Setpoint changeover (see parameter 3-5-9), activated by closing of contact, deactivated by opening of contact.
- Check run, pulse-activated.



NOTE

This function cannot be used in conjunction with ambient temperature monitoring.

9 Servicing/Maintenance

9.1 General information/Safety regulations

The operator ensures that maintenance, inspection and installation is performed by authorised, qualified specialist personnel who are thoroughly familiar with the manual.



⚠ DANGER

Unintentional start-up of pressure booster system

Danger to life!

- The pressure booster system must be de-energised before repair or maintenance work is carried out. Switching off the motor protection switch will **not de-energise the motor power cables reliably**.



⚠ WARNING

Improper lifting/moving of heavy assemblies or components

Personal injury and damage to property!

- Use suitable transport devices, lifting equipment and lifting tackle to move heavy assemblies or components.



⚠ WARNING

Unintentional start-up of pressure booster system

Risk of injury by moving parts!

- Make sure the pressure booster system has been de-energised before commencing work on the pressure booster system.
- Make sure that the pressure booster system cannot be started up unintentionally.



⚠ WARNING

Unqualified personnel performing work on the pressure booster system

Risk of personal injury!

- Always have repair and maintenance work performed by specially trained, qualified personnel.



CAUTION

Incorrectly serviced pressure booster system

Function of pressure booster system not guaranteed!

- Regularly service the pressure booster system.
- Prepare a maintenance schedule for the pressure booster system, with special emphasis on lubricants, shaft seals and pump couplings.

Observe the general safety instructions and information.

Observe the operating manual of the pump when performing work on the pumps.

In the event of damage you can always contact our service staff.

A regular maintenance schedule will help avoid expensive repairs and contribute to trouble-free, reliable operation of the pressure booster system with a minimum of maintenance expenditure and work.

Never use force when dismantling and re-assembling the pressure booster system.

9.1.1 Inspection contract

For all inspection and servicing work to be carried out at regular intervals we recommend taking out the maintenance contract offered. Get in touch with your Service Partner for details.

Checklist for commissioning/start-up, checklist for inspection [⇒ Section 7.3, Page 25]
[⇒ Section 9.2.2, Page 41]

9.2 Servicing/Inspection

9.2.1 Supervision of operation



CAUTION

Increased wear due to dry running

Damage to the pump set!

- Never operate the pump set without liquid fill.
- Never close the shut-off element in the suction line and/or supply line during pump operation.



CAUTION

Impermissibly high temperature of fluid handled

Damage to the pump!

- Prolonged operation against a closed shut-off element is not permitted (heating up of the fluid).
- Observe the temperature limits in the data sheet and in the section on operating limits.

While the system is in operation, observe and check the following:

- Check the test run (if activated).
- Compare the start and stop pressures of the pumps with the data on the name plate (using the pressure gauge).
- Compare the pre-charge pressure of the accumulator with the recommended data.
[⇒ Section 9.2.3, Page 41]
Close the shut-off elements under the accumulator and drain the accumulator via the drain valve.
Remove the protective cap of the accumulator valve and check the pre-charge pressure with the aid of a tyre pressure gauge.
Add nitrogen as necessary.



WARNING

Wrong gas

Danger of poisoning!

- Use only nitrogen to charge the accumulator.

- Check the rolling element bearings for running noises.
Vibrations, noise and an increase in current input occurring during unchanged operating conditions indicate wear.
- Monitor the correct functioning of any auxiliary connections.

9.2.2 Checklist for inspection work

In the event that you decide to conduct your own inspections, proceed according to the following checklist at least once a year:

1. Check the pump and drive for smooth running and the mechanical seal for integrity.
2. Check the shut-off, drain and check valves for proper functioning and tightness.
3. Clean the strainer in the pressure reducer (if applicable).
4. Check the expansion joints (if any) for wear.
5. Verify the pre-charge pressure and, if required, check the accumulator for integrity. [⇒ Section 9.2.3, Page 41]
6. Check the automatic switching functionality.
7. Check the start and stop points of the pressure booster system.
8. Check the water inflow, lack-of-water monitoring and pressure reducer.

9.2.3 Setting the pre-charge pressure



WARNING

Wrong gas

Danger of poisoning!

- Use only nitrogen to charge the accumulator.

The pre-charge pressure in the accumulator should be set to a value below the set start-up pressure.

The setting can be effected via a valve located under the cover at the top of the accumulator.

Example: Pre-charge pressure 10 % lower than start-up pressure

Pre-charge pressure of accumulator $p = 0.9 \times p_{\text{start}}$

p_{start} = start-up pressure of pressure booster system

Recommendation

The stated values are average values. Tests on accumulators have shown that the best storage volumes are achieved with the following factors:

pressures >3 bar: factor 0.9 and

pressures <3 bar: factor 0.8

Example:

$p_{\text{start}} = 5$ bar: pre-charge pressure $5 \times 0.9 = 4.5$ bar

$p_{\text{start}} = 2$ bar: pre-charge pressure $2 \times 0.8 = 1.6$ bar



CAUTION

Pre-charge pressure too high

Damage to accumulator!

- Observe data provided by accumulator manufacturer (see name plate or operating manual of accumulator).

9.2.4 Replacing the non-return valve



⚠ DANGER

Voltage at the pressure booster system

Danger to life!

- Prior to opening the device, wait at least 10 minutes for any residual voltage to dissipate.

1. De-energise the pump set and secure it against unintentional start-up. Comply with the local regulations.
2. Close the shut-off valve of the pump.
3. Place a suitable container under the drain connection.
4. Open the drain connections. To do so, observe the pump's operating manual.

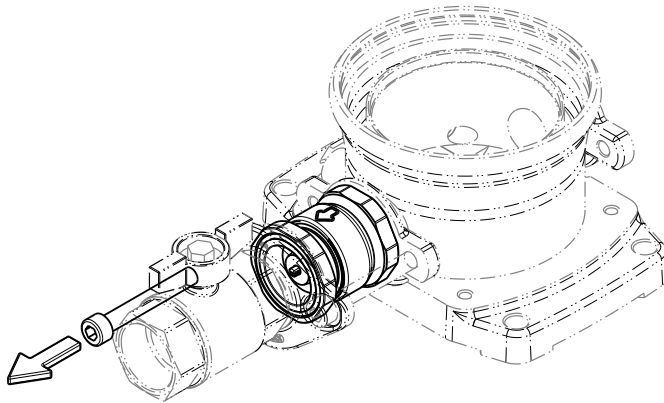


Fig. 12: Removing the screw

5. Remove the screw.

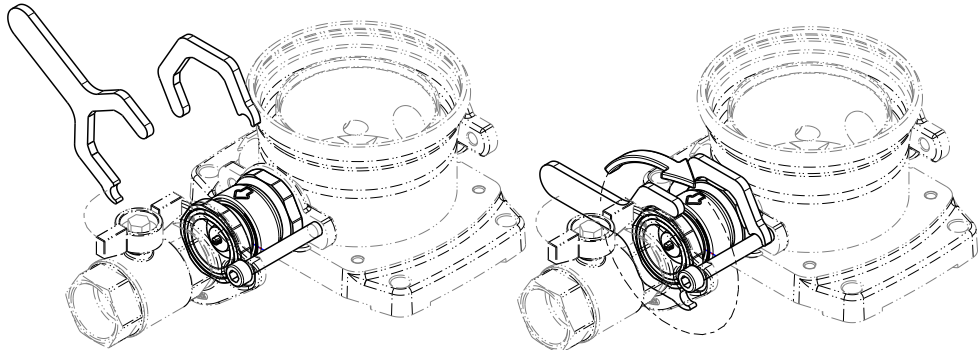


Fig. 13: Screwing the valve's body parts into each other

6. Use a suitable tool to screw the body parts of the non-return valve into each other to shorten the length of the body.

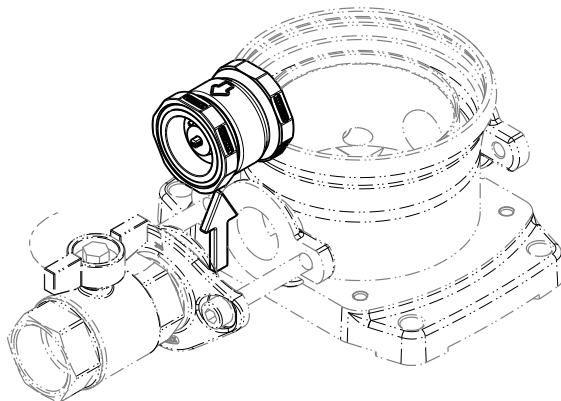


Fig. 14: Removing the body

7. Remove the body of the non-return valve.
8. Remove the insert check valve including O-rings.
9. Remove excessive contamination or deposits with a clean cloth.
10. Re-insert the insert check valve into the body. Apply a sealant to new O-rings. See table below.

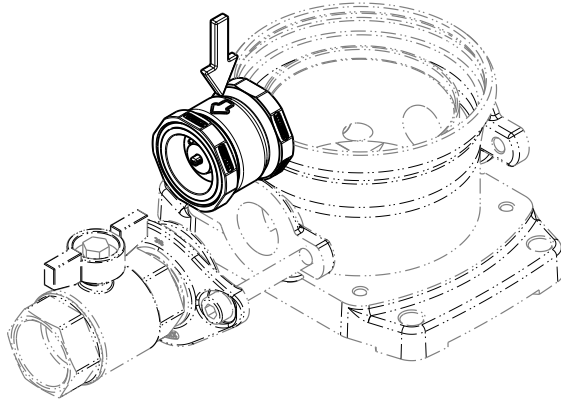


Fig. 15: Mounting the body

11. Mount the body of the non-return valve.

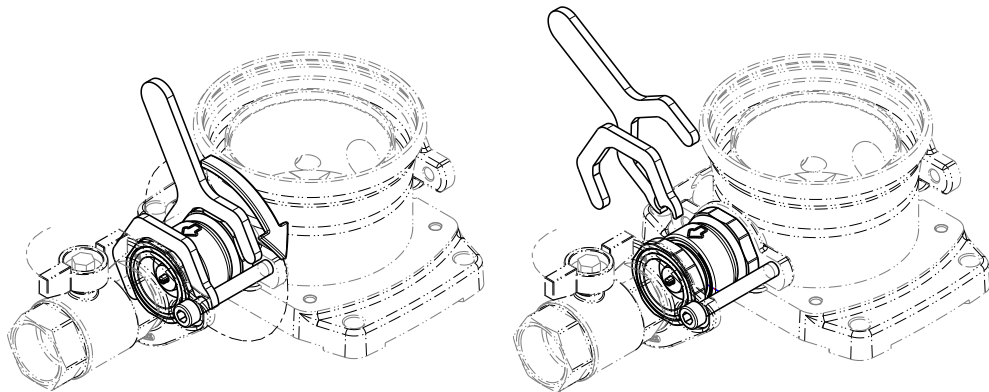


Fig. 16: Loosening the screwed connection of the body parts

12. Use a suitable tool to loosen the screwed connection of the body parts of the non-return valve to extend the body length.



Fig. 17: Verifying the alignment

13. Verify the correct alignment.

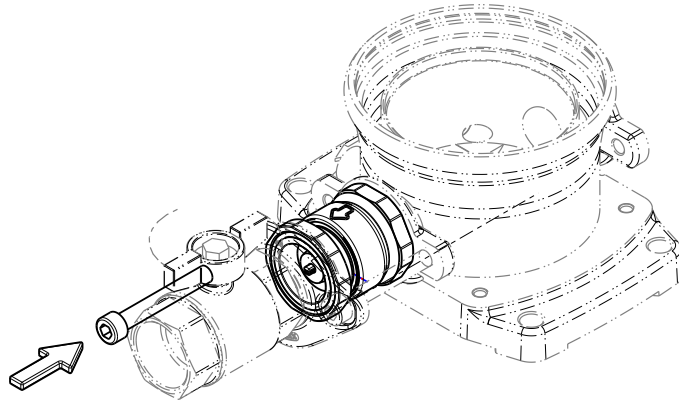


Fig. 18: Fitting the screw

14. Fit and tighten the screw.

15. Close the drain plugs of the pump. Properly dispose of the fluid collected.

16. Slowly open the shut-off valve and check for any leakage.

Table 13: Spare parts for servicing non-return valves, per pump

Material number	Description	Non-return valve	O-rings	Sealant for O-rings (not water-soluble)
71630405	ER non-return valve DN 32	Watts industries IN 032 DN 32	1x Eriks 12711456 2x Eriks 12711457	Molykote® G-5511 ²⁾
71630410	ER non-return valve DN 50	Watts industries IN 050 DN 50	1x Eriks 12192264 2x Eriks 12711459	

9.2.5 Mounting the manifold in a mirrored position



⚠ DANGER

Voltage at the pressure booster system

Danger to life!

- Prior to opening the device, wait at least 10 minutes for any residual voltage to dissipate.

1. De-energise the pump set and secure it against unintentional start-up. Comply with the local regulations.
2. Close the shut-off valves in the discharge line and suction line of the pressure booster system.
3. Place a suitable container under the drain connections.
4. Open the drain connections. To do so, observe the pump's operating manual.

2) Sealant for taps

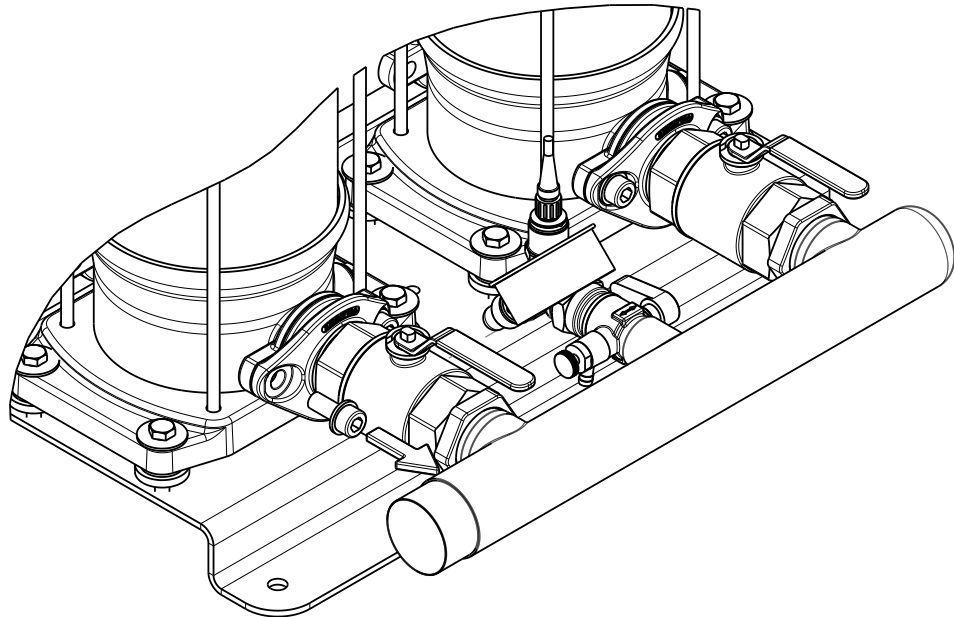


Fig. 19: Removing the bolts

5. Remove the bolts connecting the two oval flanges to the pumps.

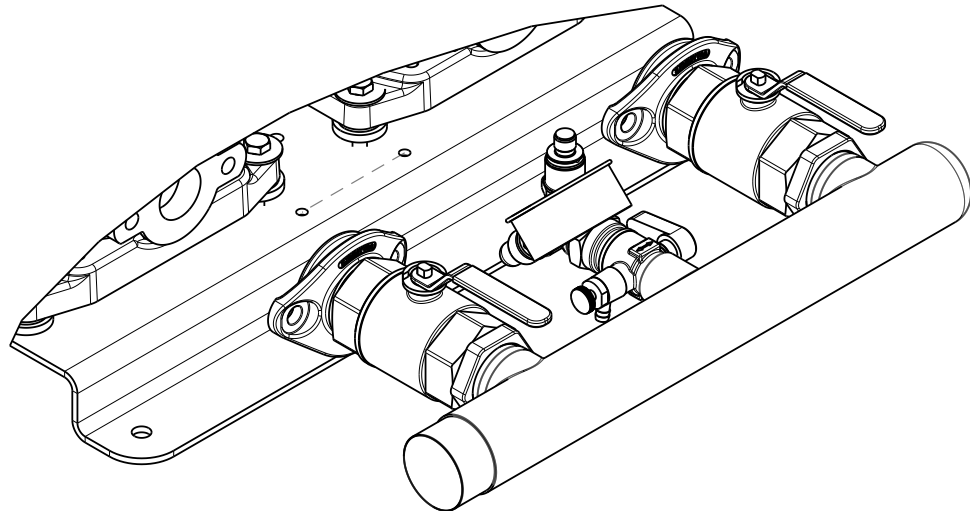


Fig. 20: Removing the manifold

6. Remove the complete manifold including valves

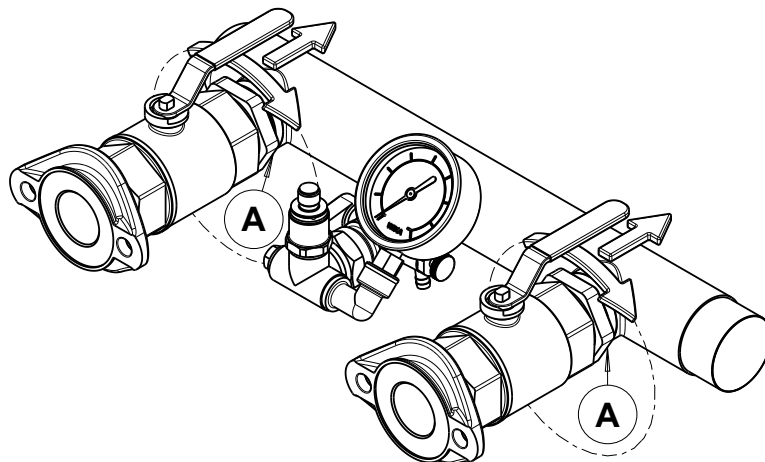


Fig. 21: Loosening the EF locknuts

A	EF locknut
---	------------

7. Loosen the EF locknuts at the shut-off valves by half a turn, exposing the O-ring.

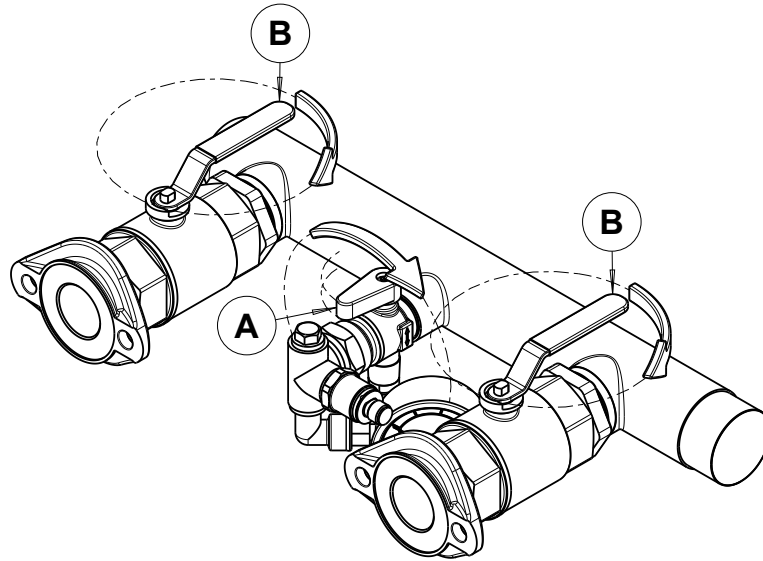


Fig. 22: Turning the pressure measuring set

A	Pressure measuring set
B	Lever of the shut-off valve

8. Close the lever of the shut-off valve about half way to enable the 180° turn required in the next step.

9. Turn the pressure measuring set by 90°.



NOTE

For some variants, the pressure gauge or a pressure sensor need to be removed to be able to turn the pressure measuring set.

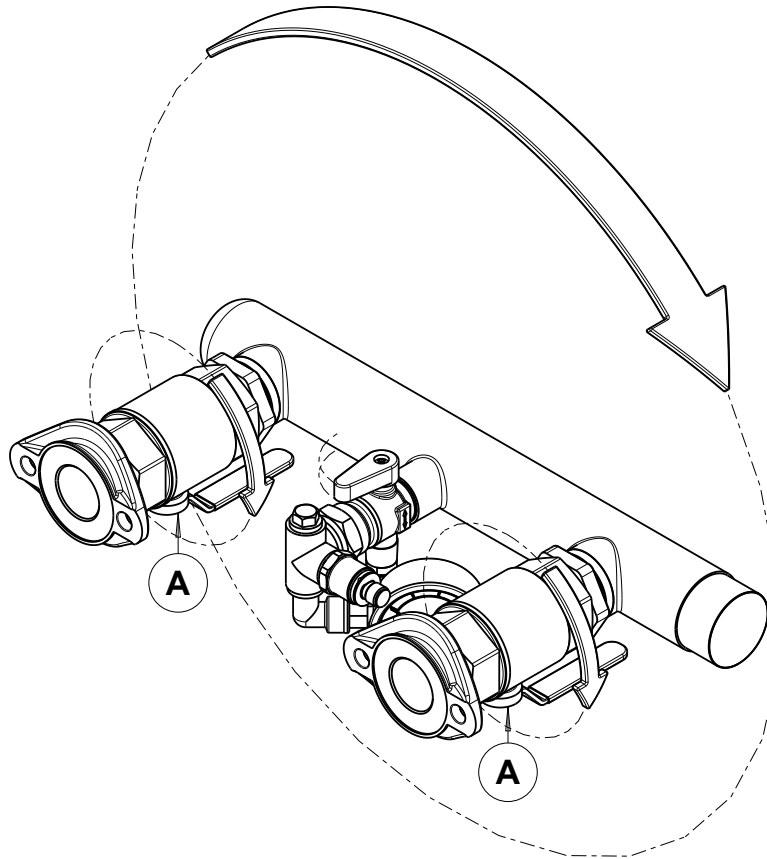


Fig. 23: Turning the shut-off valves

A	Shut-off valve
---	----------------

10. Turn the shut-off valves by 180°. Now, turn the complete manifold including valves by 180°.

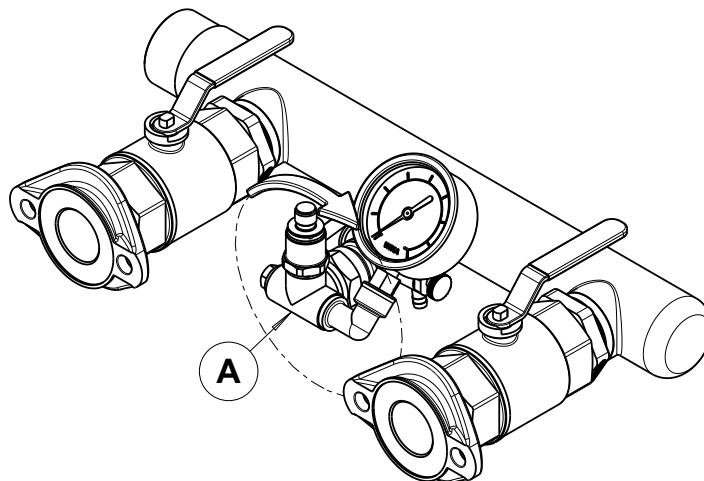


Fig. 24: Turning the pressure measuring set

A	Pressure measuring set
---	------------------------

11. Turn the pressure measuring set by a last 90°.

12. If the pressure gauge and/or pressure sensors have been removed, connect them again.

⇒ The manifold is now fitted in a mirrored position.

10 Trouble-shooting



WARNING Improper work to remedy faults

Risk of injury!

- For any work performed to remedy faults, observe the relevant information given in this operating manual and/or in the product literature provided by the accessories manufacturer.



NOTE

Before performing any work on the pump's internal parts during the warranty period please always consult the manufacturer. Our after-sales service will be at your disposal. Non-compliance will lead to forfeiture of any and all rights to claims for damages.

If problems occur that are not described in the following table, consultation with the DP customer service is required.

- A** Pumps fail to start in automatic mode or cut out shortly after start-up. Lack of water is indicated.
- B** Pressure booster system does not start up.
- C** Pumps running but not delivering water.
- D** Insufficient delivery of pressure booster system.
- E** Discharge-side pressure too low.
- F** Discharge-side pressure too high.
- G** Leakage at mechanical seal.
- H** One/several pumps/motors overheated.
- I** Motor protection switch(es) triggered. Warning LED lit.
- J** Pump(s) do(es) not stop.
- K** Pumps start too often (more than 30 starts per pump and hour).
- L** One/several pumps/motors overheated.

Table 14: Trouble-shooting

A	B	C	D	E	F	G	H	I	J	K	L	Possible cause	Remedy ³⁾
-	-	X	X	-	-	-	X	-	X	-	-	Pumps and/or piping are not completely vented or primed.	Vent and/or prime.
X	X	X	X	X	-	-	X	-	-	X	-	Shut-off valves (partially) closed	Check, open as necessary.
X	-	-	X	X	-	-	-	-	X	X	-	Strainer clogged (inlet-side pressure reducer)	Clean.
X	-	-	X	X	X	-	-	-	X	X	-	Inlet-side pressure reducer set incorrectly	Check, adjust as necessary.
-	-	X	X	X	-	-	X	X	X	X	-	Check valve in bypass line defective	Replace.
X	X	-	-	-	-	-	-	-	-	-	-	Inlet-side shut-off valve closed	Check, open as necessary.
-	X	-	-	-	-	-	X	-	X	-	-	Discharge-side shut-off valve closed or defective	Check, open as necessary.
X	-	-	X	X	-	-	X	-	X	X	-	Inlet pressure lower than stated in the purchase order	Contact KSB.
-	X	-	-	-	X	-	-	-	-	-	-	Inlet pressure higher than stated in the purchase order	Contact KSB.

3) The pump pressure must be released before attempting to remedy faults on parts which are subjected to pressure. Disconnect the pump from the power supply!

A	B	C	D	E	F	G	H	I	J	K	L	Possible cause	Remedy ³⁾
X	-	-	X	X	-	-	-	-	X	-	-	Start-up pressure set too high	Check setting.
-	X	-	-	X	X	-	X	-	X	-	X	Pressure transmitter set incorrectly or defective	Check setting.
-	-	-	-	-	-	-	X	-	-	X	X	Pre-charge pressure of the accumulator too low	Restore nitrogen cushion.
-	-	-	-	-	-	-	X	-	-	X	X	Defective accumulator	Check integrity/replace, if necessary.
-	-	-	-	-	-	X	-	-	-	-	-	Defective mechanical seal	Replace.
X	-	-	-	-	-	-	X	-	X	-	-	Suction-side pressure switch set incorrectly or defective	Check setting.
-	-	X	X	X	-	-	X	X	X	X	-	Defective check valve in the pressure booster system	Check, replace sealing element as necessary.
-	-	-	-	X	-	-	-	X	X	-	X	Water extraction higher than stated in the purchase order	Contact KSB.
-	X	-	-	-	-	-	-	X	-	-	X	Motor protection switch triggered or set incorrectly, or pump seized	Compare setting with the motor's rating plate data.
-	-	-	-	-	-	-	-	-	-	X	-	Delay setting too short	Check setting.
-	X	-	-	-	-	-	-	-	-	-	-	Mains supply interrupted	Check and remedy defect/check fuse.
-	X	-	-	-	-	-	-	-	-	-	-	Control current fuse tripped (control cabinet)	Determine cause and reset.
-	X	-	-	-	-	-	-	X	-	-	-	Main fuse on (owner-supplied) distribution board loose or blown; fuses possibly too small or too fast	Check fuses and replace as necessary. Measure the motor current.
-	-	-	-	-	-	-	-	X	-	-	-	Intermittent voltage fluctuations	Press reset and fault acknowledgement key.
-	X	-	-	-	-	-	-	-	-	-	-	Phase failure	Check individual phases; replace fuse, if necessary.
X	-	-	-	-	-	-	-	-	-	-	-	Inlet tank empty or float switch defective / disconnected	Check and remedy defect.

11 Related Documents

11.1 General assembly drawings/exploded views with list of components

11.1.1 Hydro-Unit Premium Line DOL CC

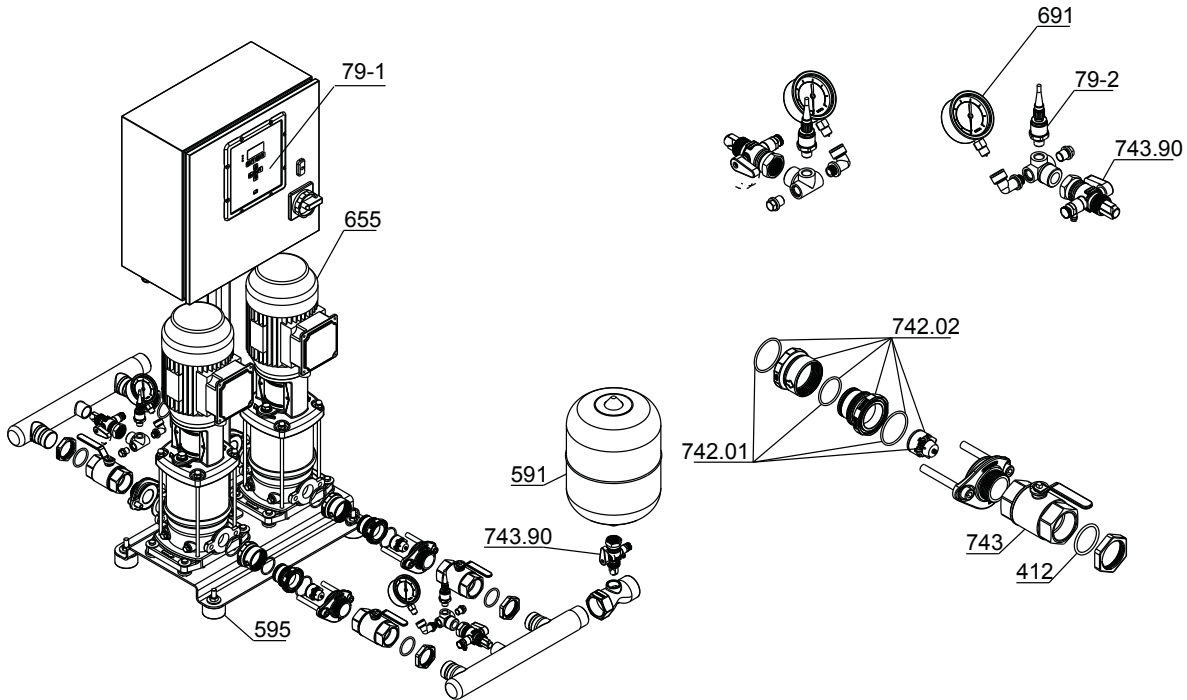


Fig. 25: Hydro-Unit Premium Line DOL CC

Table 15: List of components

Part No.	Description	Part No.	Description
79-1	Automatic control unit	655	Pump
79-2	Measuring transducer	691	Pressure gauge
412	O-ring	742.01/.02	Check valve
591	Accumulator	743/.90	Ball/plug valve
595	Anti-vibration pad		

The individual parts of the pump set are shown in the product literature of the pump set.

11.1.2 Hydro-Unit Premium Line VFD CM CC

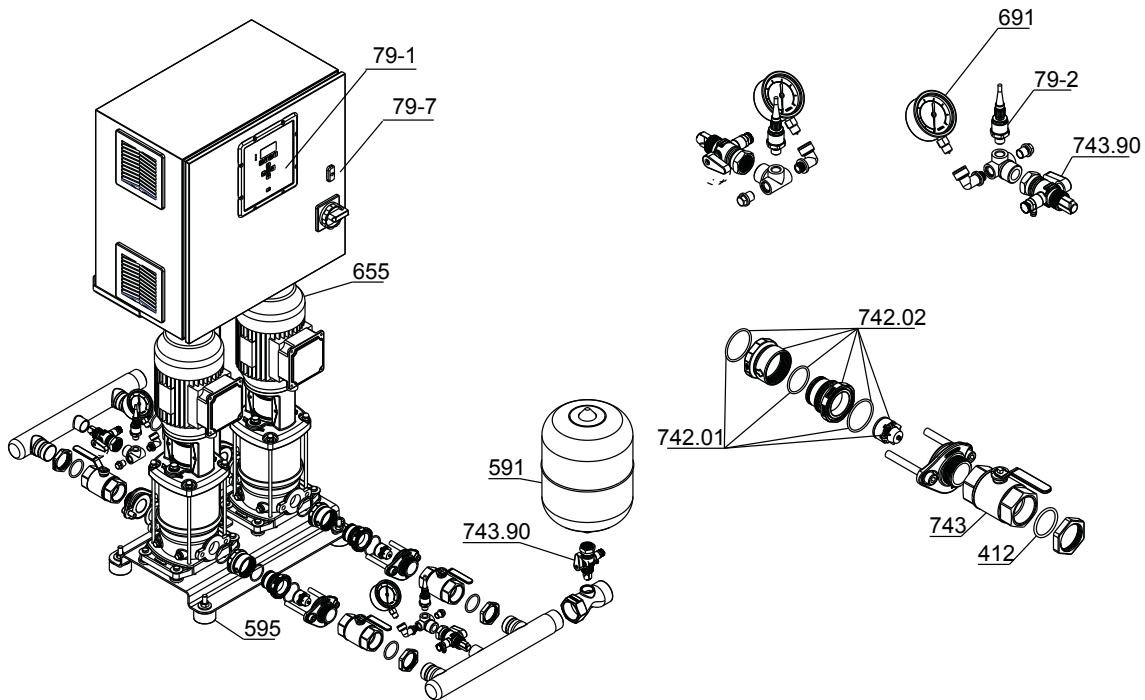


Fig. 26: Hydro-Unit Premium Line VFD CM CC

Table 16: List of components

Part No.	Description	Part No.	Description
79-1	Automatic control unit	595	Anti-vibration pad
79-2	Measuring transducer	655	Pump
79-7	Variable speed system	691	Pressure gauge
412	O-ring	742.01/02	Check valve
591	Accumulator	743/.90	Ball/plug valve

The individual parts of the pump set are shown in the product literature of the pump set.

11.1.3 Hydro-Unit Premium Line VFD MM CC

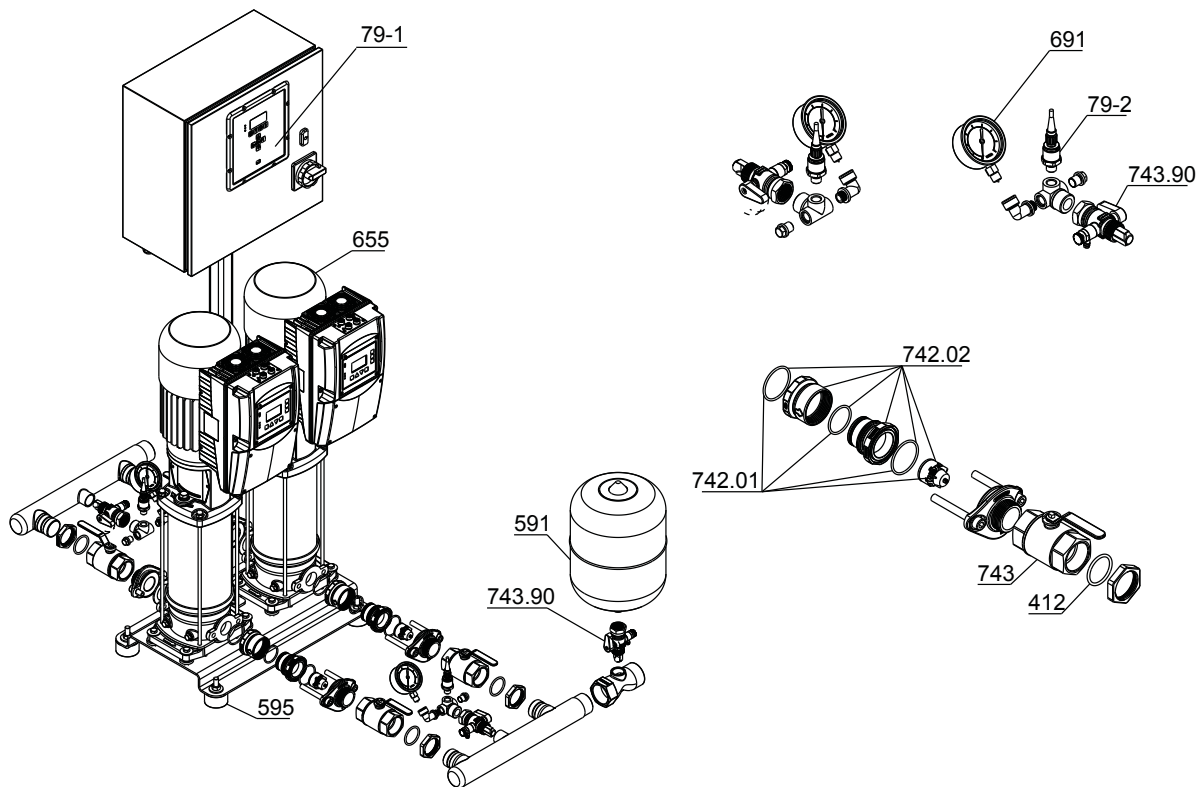


Fig. 27: Hydro-Unit Premium Line VFD MM CC

Table 17: List of components

Part No.	Description	Part No.	Description
79-1	Automatic control unit	655	Pump
79-2	Measuring transducer	691	Pressure gauge
412	O-ring	742.01/.02	Check valve
591	Accumulator	743/.90	Ball/plug valve
595	Anti-vibration pad		

The individual parts of the pump set are shown in the product literature of the pump set.

12 EU Declaration of Conformity

Manufacturer:

D.P. Industries B.V.
Kalkovenweg 13
2401 LJ Alphen aan den Rijn (The Netherlands)

The manufacturer herewith declares that **the product**:

Hydro-Unit Premium Line (DOL CC, VFD CM CC, VFD MM CC)

Serial numbers: 06/2018 0000000-0001 - 52/2020 9999999-9999

- is in conformity with the provisions of the following Directives as amended from time to time:
 - Pump set: EC Machinery Directive 2006/42/EC
 - Pump set: Electromagnetic Compatibility Directive 2014/30/EU

The manufacturer also declares that

- the following harmonised international standards have been applied:
 - ISO 12100
 - EN 809
 - EN 60204-1
 - EN 806-2

Person authorised to compile the technical file:

Menno Schaap
Manager Product Development
D.P. Industries B.V.
Kalkovenweg 13
2401 LJ Alphen aan den Rijn (The Netherlands)

The EU Declaration of Conformity was issued in/on:

Alphen aan den Rijn, 1 June 2018



Menno Schaap
Manager Product Development
D.P. Industries B.V.
2401 LJ Alphen aan den Rijn

13 Certificate of Decontamination

Type:

Order number/









Order item number⁴⁾:

Delivery date:

Field of application:

Fluid handled⁴⁾:

Please tick where applicable⁴⁾:

- | | | | |
|--|--|---|--|
| 
<input type="checkbox"/>
Radioactive | 
<input type="checkbox"/>
Explosive | 
<input type="checkbox"/>
Corrosive | 
<input type="checkbox"/>
Toxic |
| 
<input type="checkbox"/>
Harmful | 
<input type="checkbox"/>
Bio-hazardous | 
<input type="checkbox"/>
Highly flammable | 
<input type="checkbox"/>
Safe |

Reason for return⁴⁾:

Comments:

.....

The product/accessories have been carefully drained, cleaned and decontaminated inside and outside prior to dispatch/ placing at your disposal.

We herewith declare that this product is free from hazardous chemicals, biological and radioactive substances.

For mag-drive pumps, the inner rotor unit (impeller, casing cover, bearing ring carrier, plain bearing, inner rotor) has been removed from the pump and cleaned. In cases of containment shroud leakage, the outer rotor, bearing bracket lantern, leakage barrier and bearing bracket or adapter have also been cleaned.

For canned motor pumps, the rotor and plain bearing have been removed from the pump for cleaning. In cases of leakage at the stator can, the stator space has been examined for fluid leakage; if fluid handled has penetrated the stator space, it has been removed.

- No special safety precautions are required for further handling.
- The following safety precautions are required for flushing fluids, fluid residues and disposal:

.....

.....

54 / 60

We confirm that the above data and information are correct and complete and that dispatch is effected in accordance with the relevant legal provisions.

.....
Place, date and signature

.....
Address

.....
Company stamp

4) Required fields

14 Commissioning report

The DP pressure booster system specified below was today commissioned by the undersigned, authorised DP customer service engineer who created this report.

Pressure booster system details

Type series
 Size
 Serial number
 Order No.

Purchaser/place of installation

Purchaser	Place of installation
Name
Address
.....

Operating data

For further details please refer to the circuit diagram.

Start-up pressure p_{start} bar
 Setpoint Delta p
 Minimum runtime
 Inlet pressure monitoring $p_{inl} - x$
 (setting of inlet pressure switch)
 Stop pressure p_{stop} bar
 Inlet pressure p_{inl} [bar]
 Pre-charge pressure of accumulator $p_{pre-charge}$ [bar]

The system operator/operator's representative herewith confirms to have received instructions on how to operate and service the pressure booster system. The relevant circuit diagrams and operating instructions have been handed over.

Non-conformities found during commissioning	Deadline for remedial action
Non-conformity 1
.....
.....
.....

Name of DP representative	Name of purchaser or representative
Place	Date
.....



Index

A

Accumulator charging	37
Alerts	36
Automation	15

C

Certificate of decontamination	54
Commissioning	23
Control panel	26

D

Design	15
Designation	14
Disposal	13
Drive	15

E

Energy-saving mode	37
Event of damage	6

F

Faults	
Causes and remedies	48
Flow detection	38

I

Installation	15
Installation at site	19
Intended use	8

K

Key to safety symbols/markings	7
--------------------------------	---

L

LEDs	27
------	----

N

Navigation keys	28
-----------------	----

O

Operating limits	8
Other applicable documents	6

P

Partly completed machinery	6
----------------------------	---

Q

Quick menu	35
------------	----

R

Return to supplier	13
--------------------	----

S

Safety	8
Safety awareness	9
Scope of supply	17
Setting the setpoint	30

W

Warnings	7, 36
Warranty claims	6

DP Pumps

P.O. Box 28
2400 AA Alphen aan den Rijn
The Netherlands

t (0172) 48 83 88
f (0172) 46 89 30

dp@dp-pumps.com
www.dp-pumps.com

05/10/2018

BE00001012 (1983.812/01-EN)

