Hydro-Unit

Installation and operating instructions
series: Cube CC(MF)

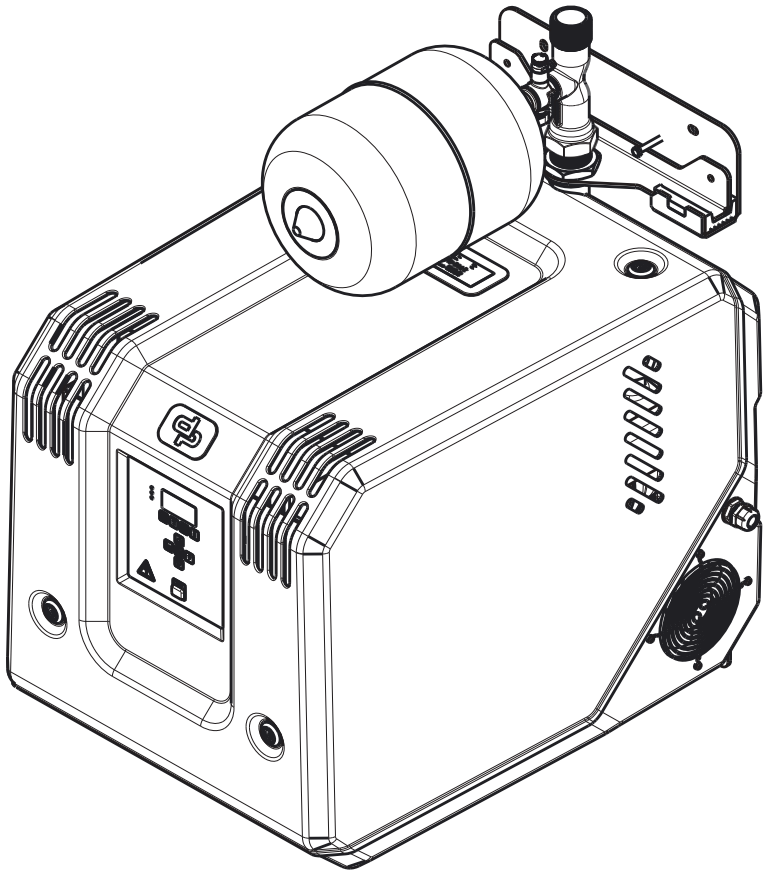


Table of Contents

1 Manual introduction

1.1 Preface

This manual contains important information for reliable, proper and efficient operation. Compliance with the operating instructions is of vital importance to ensure reliability and a long service life of the product and to avoid any risks.
The first chapters contain information about this manual and safety in general. The following chapters provide information about normal use, installation, maintenance and repairs of the product. The annex contains the declaration(s) of conformity.

- Make yourself familiar with the content.
- Accurately follow the directions and instructions.
- Never change the sequence of the operations to be carried out.
- Keep this manual or a copy of it together with the logbook in a fixed place near the product which can be accessed by all personnel.

1.2 Icons and symbols

In this manual and in all accompanying documentation the following icons and symbols are used.

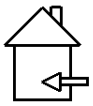
WARNING
Danger of electric tension. Safety sign to IEC 417 - 5036

WARNING
Operations or procedures, if carried out without caution, may cause personal injury or damage to the installation. General hazard sign according to ISO 7000-0434.

READ THE (SUPPLEMENTARY) DOCUMENTATION
Read the user and operating instructions.

ATTENTION
Is used to introduce safety instructions whose non-observance may lead to damage to the installation and its functions.

ENVIRONMENTAL INSTRUCTION
Remarks with respect to the environment.



FOR INDOOR USE ONLY

Connect the Hydro-Unit Cube only indoors.

WEEE MARKING
Marking of electrical and electronic equipment in accordance with Article 15(2) of Directive 2012/19/EU.

2 Identification, service and technical support

2.1 Identification, service and technical support

The name plate indicates the type series / size, main operating data and identification number. Please quote this information in all queries, repeat orders and particularly when ordering spare parts. If you need any additional information or instructions exceeding the scope of this manual or in case of damage please contact DP-Pumps's nearest customer service centre.

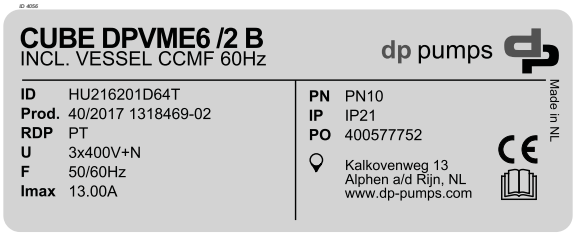


Figure 1: Example: Identification sticker

Table 1: sticker identification

Indication	Meaning
Cube DPVME6/2 B	Installation type
MF 60Hz	Controller type and start-up method
ID	Article number
Prod.	Production week/year and number
RDP	Run-dry protection type
U	Voltage
F	Mains frequency of the installation
Imax	Maximum current consumption of the installation
PN	Pressure class and design
IP	International Protection class
PO	Purchase order number

The following address data are available for service and technical support:

Table 2: Address service department

DP-Pumps Kalkovenweg 13 2401 LJ Alphen a/d Rijn The Netherlands	Tel: +31 172 488388 Internet: www.dp-pumps.com E-mail: dp@dp-pumps.com

2.2 Supplementary documentation

This version is valid from firmware Cube-Control version V1.7.1. Apart from this manual, the additional documentation given below is available as well:

Table 3: Supplementary documentation

Document	Code
General terms of delivery	119 / 1998
Manual Megacontrol	BE00000508
Technical information	97004457

Also see: www.dp-pumps.com

Table 4: Cube-Control versions

Firm ware version (see parameter: 4-1-3)	Manual version
Cube-Control III V 1.52	01-2013
Cube-Control III V 1.57	01-2014
Cube-Control III V 1.6.2	06-2015
Cube-Control III V 1.7.1	05-2016
Cube-Control III V 1.9.0	07-2018

Also see: www.dp-pumps.com

3 Warranty

3.1 Terms of warranty

The warranty period is settled by the terms of your contract or at least by the general terms and conditions of sales.

ATTENTION
Modifications or alterations of the product supplied are only permitted after consultation with the manufacturer. Original spare parts and accessories authorized by the manufacturer ensure safety. The use of other parts can invalidate any liability of the manufacturer for consequential damage.

ATTENTION
The warranty relating to the operating reliability and safety of the product supplied is only valid if the product is used in accordance with its designated use as described in the following sections of this manual. The limits stated in the data sheet must not be exceeded under any circumstances.

The warranty becomes invalid if one or more of the points below occur.

- The buyer makes modifications himself.
- The buyer carries out repairs himself or has these carried out by a third party.
- The product has been handled or maintained improperly.
- The product has non original DP-Pumps spare parts fitted.

DP-Pumps repairs defects under warranty when:

- They are caused by flaws in the design, the material or the production.
- They are reported within the warranty period.

Other terms of warranty have been included in the general terms of delivery, which are available upon request.

4 Safety and environment

4.1 General

This DP-Pumps product has been developed using state-of-the-art technology and is manufactured with utmost care and is subject to continuous quality control.
DP-Pumps does not accept any liability for damage or injury caused by not following the directions and instructions in this manual or by carelessness during the installation, use or maintenance of the product.
Non-compliance with the safety instructions can jeopardize the safety of personnel, the environment and the product itself. Non-compliance with these safety instructions will also lead to forfeiture of any and all rights to claims for damages.
Non-compliance can result in:

- failure of important pump/system functions,
- failure of prescribed maintenance or service,
- injury caused by electrical, mechanical and chemical effects,
- leakage to the environment of hazardous substances,
- explosions.

Depending on the application, extra safety measures may be required. Contact DP-Pumps if a potential danger arises during use.

ATTENTION
The owner of the product is responsible for compliance with the local safety regulations and internal company guidelines.

ATTENTION
Not only must the general safety instructions laid down in this chapter on "Safety" be complied with, but also the safety instructions outlined under specific headings.

ATTENTION
Persons and/or children who are not qualified to do work on the product should only have access to the product under the supervision of a properly trained person.

4.2 Users

All personnel involved in the operation, maintenance, inspection and installation of the product must be fully qualified to carry out the work involved and be aware of all applicable responsibilities, authorisations and supervisions. If the personnel in question is not in possession of the required know-how, appropriate training and instruction must be provided. The operator may require the manufacturer/supplier to provide sufficient training and/or instructions. The operator is responsible for ensuring that the contents of the operating instructions are fully understood by the responsible personnel.

4.3 Safety provisions

The product has been designed with the greatest possible care. Original parts and accessories meet the safety regulations. Modifications in the construction or the use of non-original parts may lead to a safety risk.

ATTENTION
Make sure that the product operates within its working range. Only then the product performance is guaranteed.

4.3.1 Labels on the product

The icons, warnings and instructions applied to the product are part of the safety provisions. The labels may not be removed or covered. Labels must remain legible during the entire life of the product. Replace damaged labels immediately.

4.4 Safety precautions

4.4.1 During normal use

- For questions regarding the power supply contact the local electricity company.
- Isolate possible hot parts to avoid injury through direct contact.
- Place when applicable always undeformed coupling guards to protect the coupling before starting the pump. Avoid the contact of the coupling guards with the rotating coupling.
- Always close the terminal box of the motor.
- Always close the control panel where applicable

4.4.2 During installation, maintenance and repair

Only authorised personnel may install, maintain and inspect the product and repair electrical components. Observe the local safety regulations.

WARNING
Touching the electrical parts may be fatal - even after the equipment has been disconnected from the power supply. Also make sure that other voltage inputs (linkage of DC intermediate circuit) are disconnected. Please note that there may be high voltage on the DC link even when the LEDs are off.
Wait for all kind of power types for at least four minutes before touching potentially live parts of the applied frequency converter.
A shorter time is allowed only if indicated on the installation.

WARNING
The in Figure 2 A part of the print lay-out of the Cube-Control and figure 33 Print lay Cube-Control shown connectors have a high voltage!

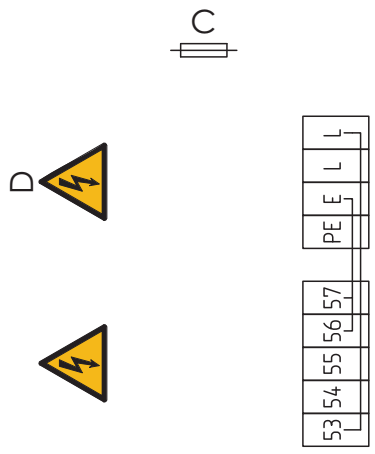


Figure 2: A part of the print lay-out of the Cube-Control

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Table 5: Description print lay out Cube-Control

Connector	No on board	No	Description
Supply	L02	53	L1/1
	VAL	54	Valve
	FAN	55	Fan
	N2	56	E
	N3	57	E
	PE	PE	PE
	N1	E	E
	L1	L	L1
	L01	L	L1/1
C			Fuse 1 A
D			Supply 230 V

WARNING
The leakage current of the used frequency converter exceeds 3.5 mA. Based on IEC 61800-5-1 a reinforced earth connection (PE) must be realized by a copper wire of at least 10 mm2, or an additional PE-wire - with the same cross section as the mains wiring cable - which is to be connected separately.

WARNING
At places where a residual current device (RCD - Residual Current Device) is used for extra protection, only the RCD of type B (time delayed) may used on the power supply site. See also Danfoss application note on RCD, MN.90.Gx.yy.
Grounding of the used frequency converter and RCDs must always follow national and local regulations.

WARNING
Always disconnect the energy supply to the installation first, before install, maintenance and repairs. Secure this disconnection.

WARNING
Surfaces of a pump can be hot after continuous or intermittent operation.

WARNING
Secure the area before starting a pump to avoid hazardous situations with rotating parts.

WARNING
Take utmost care when handling dangerous liquids. Avoid danger to persons or the environment when conducting repairs, draining liquids or venting. It is strongly recommended to place a leakage tray under the pump.

ATTENTION
See table 6 Specification of the working range

WARNING
Immediately after completing the work, all safety-relevant and protective devices must be re-installed and / or re-activated.

WARNING
Please observe all instructions set out in the chapter "Commissioning" before returning the product to service.

4.5 Return to supplier

- Drain the pressure booster system as per operating instructions.
- Always flush and clean the pressure booster system, particularly if it has been used for handling noxious, explosive, hot or other hazardous fluids.
- 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.
- Always complete and enclose a certificate of decontamination when returning the pressure booster system, see chapter 13.6 Certificate of Decontamination.
  Always indicate any safety and decontamination measures taken.

ATTENTION
If required, a blank certificate of decontamination can be downloaded from the web site at: www.dp-pumps.com/certificates-of-decontamination

4.6 Environmental aspects

4.6.1 General

The products of DP-Pumps are designed to function in an environmentally friendly way during their entire lifetime. Therefore, when applicable, always use biodegradable lubricants for maintenance.

ENVIRONMENTAL INSTRUCTION
Always act according to the laws, by-laws regulations and instructions with respect to health, safety and the environment.

4.6.2 Product information as per Regulation No. 1907/2006 (REACH)

For information as per chemicals Regulation (EC) No. 1907/2006 (REACH), see www.dp-pumps.com/reach.

4.6.3 Dismantling

The owner is responsible for the dismantling and environmentally friendly disposal of the product.

ENVIRONMENTAL INSTRUCTION
Ask at the local government about the re-use or the environmentally friendly processing of discarded materials.

WEEE MARKING
Electrical or electronic equipment marked with the adjacent symbol must not be disposed of in household waste at the end of its service life. Contact your local waste disposal partner for returns. If the used electrical or electronic equipment contains personal data, the operator is responsible for deleting it before the equipment is returned.

5 Introduction

5.1 General

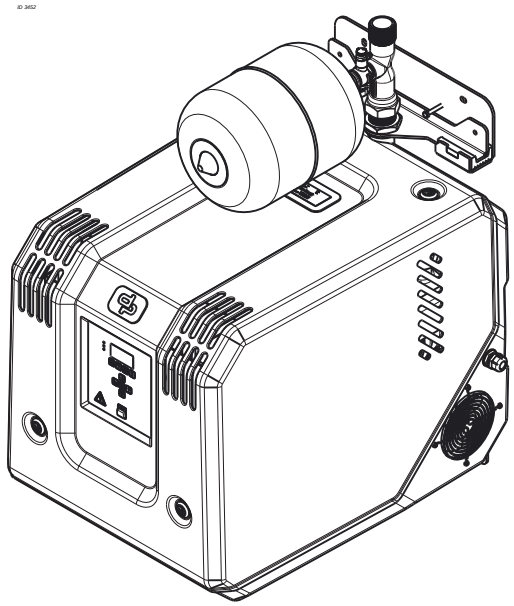

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Figure 3: Type Hydro-Unit Cube installation

The installation of type Hydro-Unit Cube are produced in DP-Pumps.

5.2 Intended use

The installation Hydro-Unit Cube is suitable for increasing the pressure in (drinking)water. Only for indoor use.

Any other or further use of the installation is not in conformity with its intended use. DP-Pumps does not accept any liability for any damage or injury resulting from this. The installation has been produced in accordance with the actual standards and guidelines. Use the installation exclusively in a perfect technical state, in conformity with the intended use described below.

The *Intended use* as laid down in ISO 12100:2010 is the use for which the technical product is intended according to the specifications of the manufacturer. The use of the product has been described in the available documentation and information. Always observe the instructions as given in the installation and operating instructions. When in doubt the product must be used as becomes evident from its construction, version and function.

5.3 Working range

The working range of the installation can be summarised as follows:

Table 6: Specification of the working range

Type	Hydro-Unit Cube
Ambient temperature [°C]	0 - 30
Liquid temperature [°C]	+4 - 40[1]
Maximum working pressure [kPa]	1.000
	Unless indicated otherwise
Supply pressure	Non-cavitation[1]. Minimum: 120 kPa Maximum: supply pressure plus pump pressure together may not exceed 1000 kPa
Maximum height [m]	1000 above sea level
Weight [kg]	85
IP class	IP21
Premium fuse [A]	16 slow
Humidity	20-90 % (not condensed)

1. Contact your supplier for more detailed advice.

Table 7: Specific applications

Type	Area of application
Hydro-Unit Cube	(Drinking) water supply systems. For indoor use.

5.4 Operation

5.4.1 Standard operation

The Cube-Control is an intelligent control unit for different components of pressurization systems consisting out of a maximum of 2 pumps. The required system pressure is sensed by a pressure sensor on the outlet side of the installation.

When as a result of a decreasing water volume the pressure drops below the pressure set point, a pump will be switched on.

When the required system pressure has been reached, the pumps are switched off one at a time. The minimum run time is optimized constantly, which results in a considerable energy saving.

5.4.2 Operation without a pre-pressure vessel

The Hydro-Unit Cube works optimal with a pre pressure vessel. Take care of the following points if the Hydro-Unit Cube MF is delivered without a pre-pressure vessel:

- the installation has to be taken in commissioning by an expert;
- the piping system has to be checked on leakage;
- periodic control on leakage;
- take over the set up values from table 8 Parameter settings Hydro-Unit Cube without pre-pressure vessel in the controller;

Table 8: Parameter settings Hydro-Unit Cube without pre-pressure vessel

Parameters	Settings
3-4-2-4	100 %
3-5-3	20 kPa
3-5-4	50 kPa

Without the use of a pre-pressure vessel only one pump is full operating. It will consume more energy due the increased operating time of the pump if no pre-pressure vessel is used.

5.4.3 Custom settings

The Cube-Control can be set by using the control panel (Human Interface or HMI). It is protected against unauthorized use by a password.

The service port can be used to optimize the installation settings. (see parameter list in BE00000508)

WARNING
If using the service port, use always the special service cable to access the parameters

The special service port cable (77870161) can be ordered separately.

5.4.4 Number of operating hours per pump

The current number of operating hours of a pump determines which pump will be switched on or off next. The pump with the fewest operating hours will be switched on first and the pump with the most operating hours will be switched off first. This makes sure that all pumps have an equal number of operating hours, including the backup pump.

5.4.5 Test run

In order to prevent pumps from standing still for a longer period of time, an automatic test run procedure is provided as a standard.

5.4.6 Temperature-sensor (option)

When the Cube-Control is fitted with a temperature sensor, it can generate a temperature-dependent failure message.

Not Urgent:
- An not urgent alarm is generated when the ambient temperature exceeds the set temperature.

Urgent:
- An urgent alarm is generated when the average temperature of one day, comes above the set temperature.

5.4.7 Monitoring pre-pressure of suction side by:

Pressure sensor in supply manifold (standard)
A pressure sensor is installed in the supply manifold. This sensor register the pre-pressure for:

- The PID control.
- Reading of the display.
- The run-dry protection.

5.4.8 Water detection operation

The Hydro-Unit Cube is provided with a water detection system. The electrode pins are mounted in the drip tray at the same side of the external fault signal connector. If water contacts the pins the Cube-Control gives an urgent alarm. The alarm is signalled by the red LED at the front. The fault can be retrieved in the diagnostic menu. This urgent alarm can be read from the dry contact in the urgent / not urgent connector at the side of the Cube housing.

5.4.9 Drain opportunities

The Hydro-Unit Cube is equipped with a drip pan with overflow. If the leak has been rectified the tank can be drained by unscrewing the screws in the corner of the drip tray.

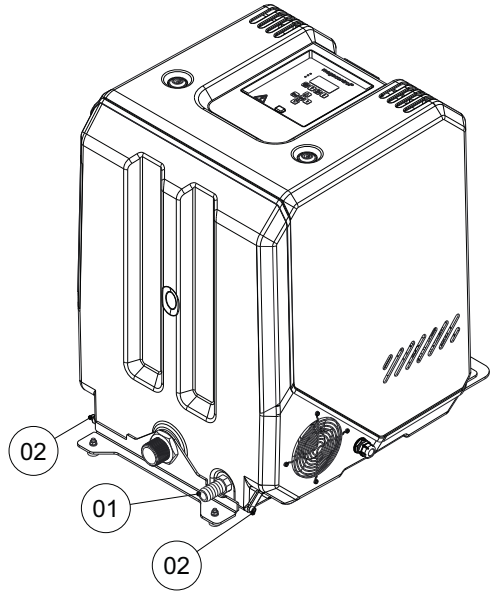

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Figure 4: Detail drip pan

Table 9: Drip pan

POS. nr.	Description
01	Overflow
02	Drain plug

6 Transport

6.1 Transport

WARNING
Lift the installation using a hoisting device.

WARNING
The installation must be hoisted according to the applicable hoisting guidelines. Only qualified personnel is allowed to hoist the installation.

Always observe the instructions as indicated by the labels on the installation.

1. Transport the installation in the position indicated on the pallet or packaging.
2. Check if the installation is stable.
3. Observe the instructions on the packaging (if present).

6.2 Storage

6.2.1 Preparations for storage

1. Protect the system against the risk of frost.
2. Store the installation in a frost-free environment.
3. Place the installation in the position as indicated on the packaging.

7 Installation instructions

7.1 Positioning of the installation

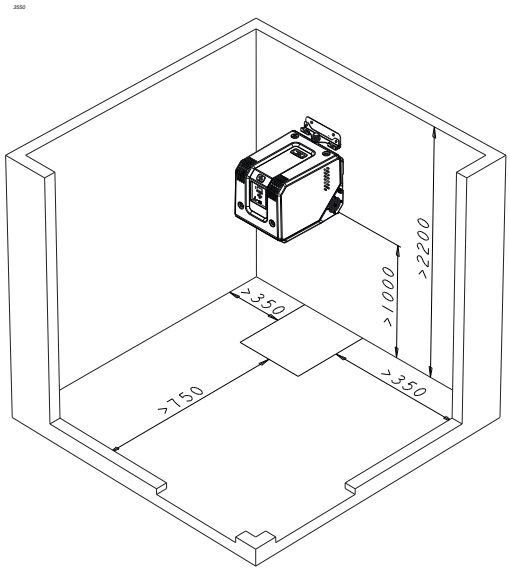

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Figure 5: Vertical positioning of the installation

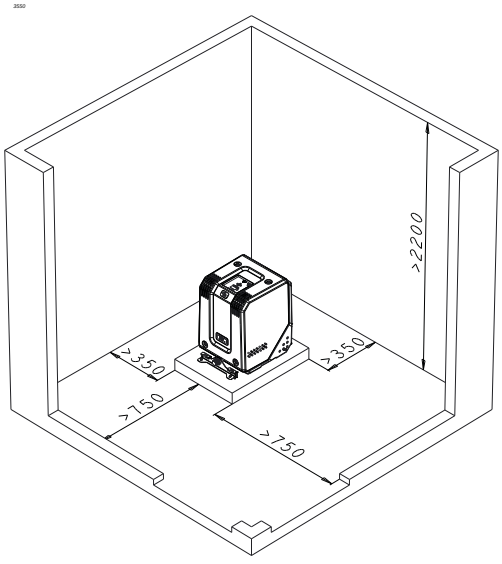

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Figure 6: Horizontal positioning of the installation

Set the installation preferable in an environment with at least the following properties:

Table 10: Area and foundation requirements

Item	Requirements

Area[1]	• The location in the technical area should be done in consultation with the waterworks
	• The area in which the installation will be placed must:
	  • easily accessible and lockable;
	  • clean, dry, frost-free, cool[2] and ventilated and can be provided with light;
	• The installation should be easily accessible and good arranged so that it is easily to operate, inspect, repair without danger. See: point 6
	• The technical area shall be provided with a drain floor (if necessary using an automatic pump).
	• The circuit diagram, installation and operating instructions must be visible and placed close to the pumps.
	• Place the installation preferably in one of the corners, without an access door, of the technical area (shown in the drawing below). The clear height of the technical area must be at least 2.20 m.

Foundation[1]	• The installation must be free from the walls. • The concrete surface should be smooth levelled. • The foundation must be large enough to carry all supports.

1. The installation area must be in conformity with EN 1717 and EN 13077 - chapter 'installation areas'.
2. Cool is defined as a temperature of between 4 °C and 25 °C, and preferably lower than 20 °C.

- Connect the suction line to the supply line (indicated with sticker).
- Connect the discharge line to the discharge line of the building (indicated with sticker).

To reduce the noise level, proceed as follows:

- Place the installation on silent blocks (option).
- Connect the supply and discharge lines correctly.
- Install an expansion joint in the supply and discharge lines (option).
- Place a filter in the supply line in the case of contaminants.
- Manifolds must be connected free of tension, which means the supply and discharge pipes should be supported.
- Diameter of the supply pipes must be large enough.

ATTENTION
OBLIGATION!! FIT BEFORE AND AFTER THE INSTALLATION A VALVE. IT PREVENTS TO DRAIN ALL BUILDING PIPING IN CASE OF REPAIRS

7.1.1 Indicators

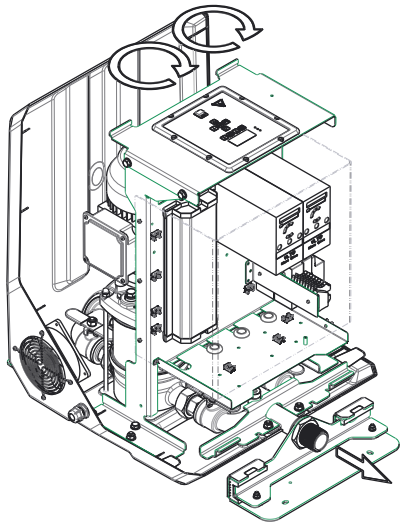

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Figure 7: Indicators

The two rotating arrows at the top of the drawing indicate the rotating direction of the motors. The arrow at the bottom right of the drawing shows the direction of the liquid flow.

7.1.2 Flow direction

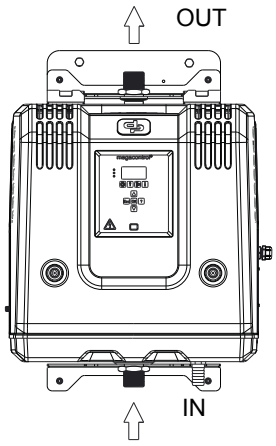

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Figure 8: Flow direction

Connect the installation in flow direction. For connection dimensions, see the identification sticker.

7.2 Disassemble the hood

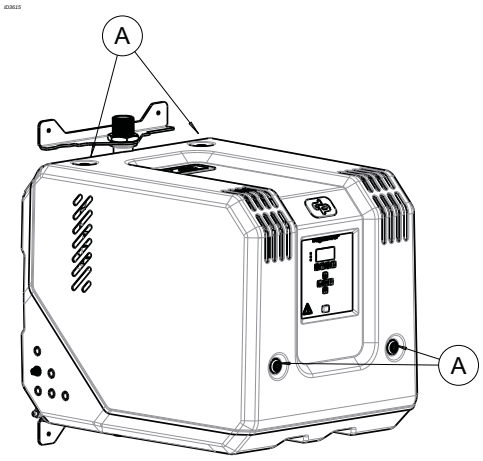

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Figure 9: Disassemble the hood

- Loosen the 4 locks (A) see fig. 9 Disassemble the hood;
- remove the hood angled, see fig. 10 (Dis)assemble vertical.

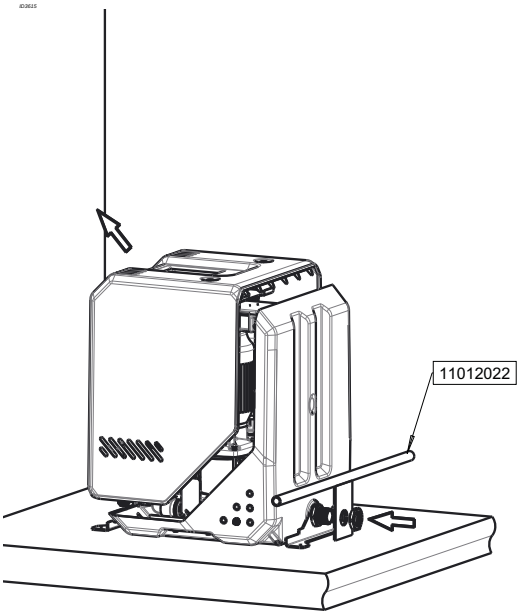

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Figure 10: (Dis)assemble vertical

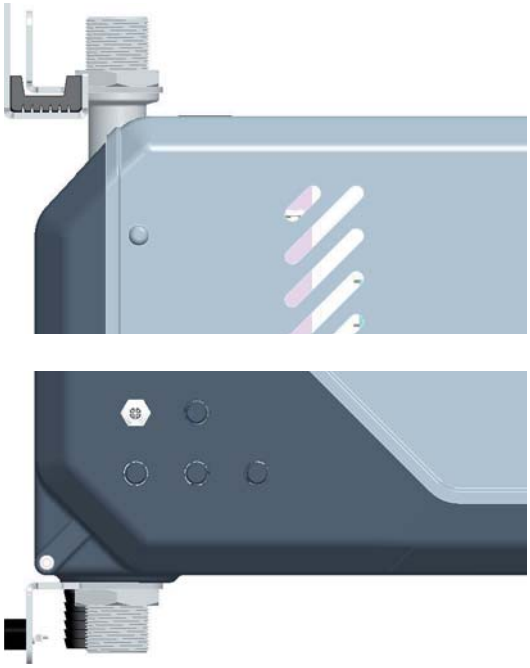

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Figure 12: Mounting shock absorbers (vertical)

7.3 Mounting shock absorbers

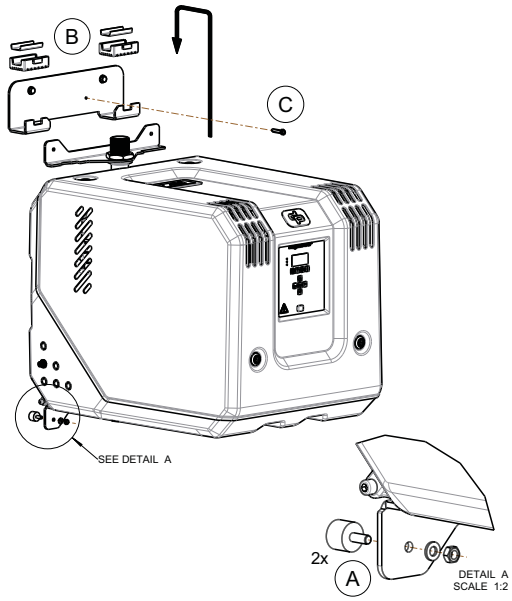

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Figure 11: Mounting shock absorbers (vertical)

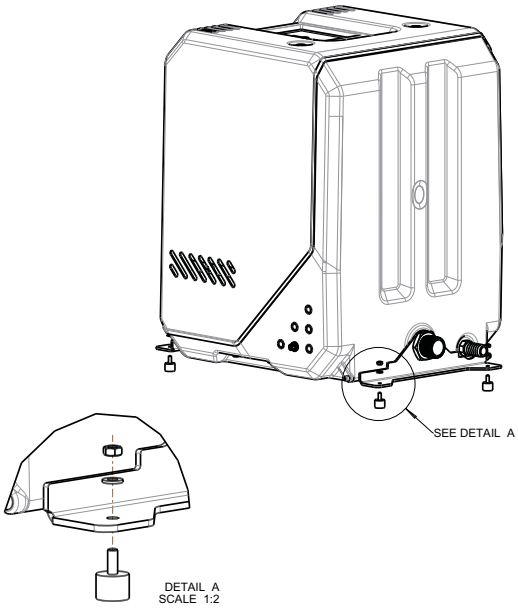

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Figure 13: Mounting shock absorbers (horizontal)

7.4 Mounting the drain

The hydro-CUBE unit is provided with a discharge. The drain is designed to carry off any leaking water.

WARNING
It must be ensured that the overflow is always the highest point, so that the water can flow out freely. A hose or pipe from the Hydro-Unit Cube must always be below grade.

- 3/4 "Connecting below grade!

The drain discharge must also be an open connection in accordance with EN 1717, it will prevent filling the pump installation in case of an overflow of the sewage installation.

7.5 Wall mounting of the unit (option)

WARNING
The wall must be able to carry the unit of 85 kg

ATTENTION
Use only fasteners which are suitable for the used wall.

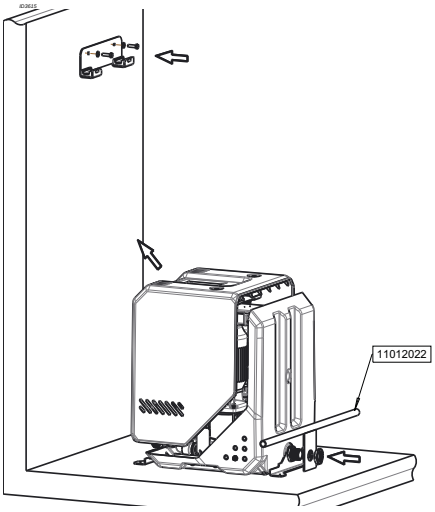

Figure 14: Step 1 of 4 vertical mounting

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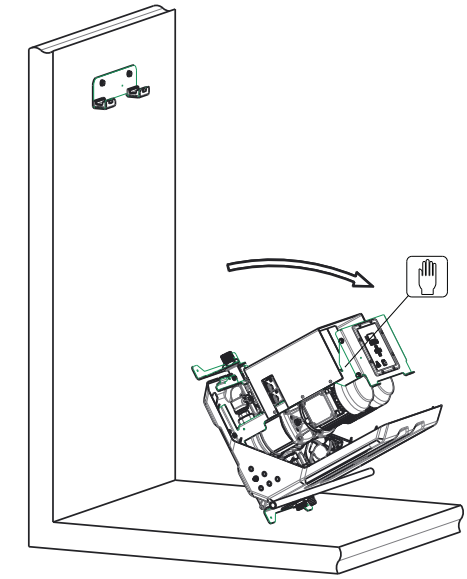

Figure 15: Step 2 of 4 vertical mounting

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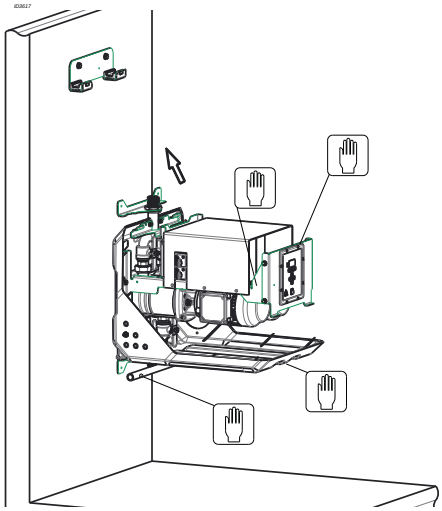

Figure 16: Step 3 of 4 vertical mounting

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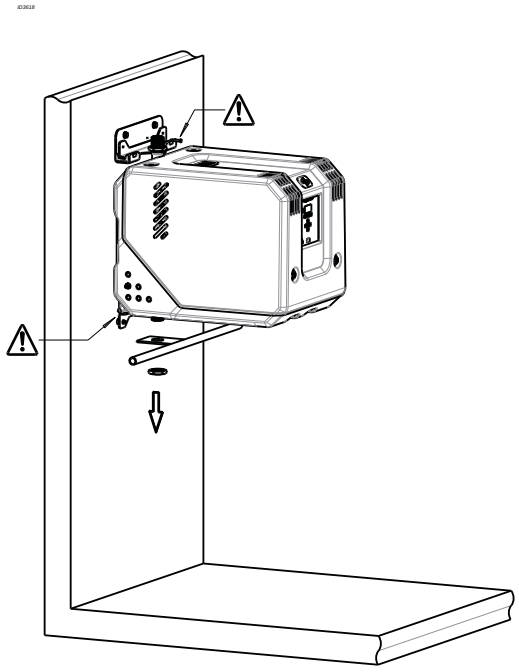

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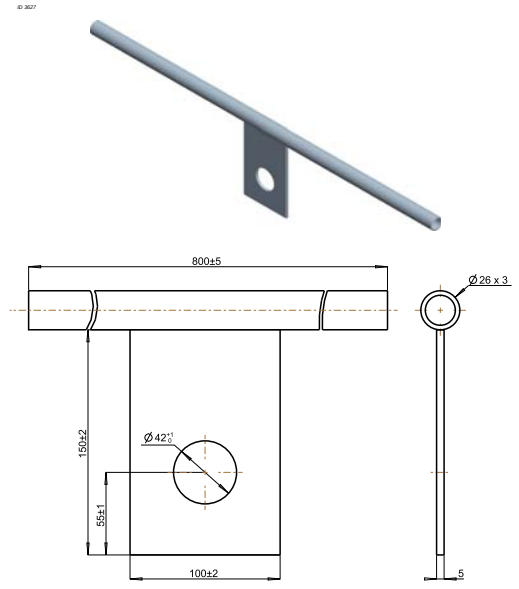
Figure 17: Step 4 of 4 vertical mounting

ATTENTION
Use special tools.



11012022

Figure 18: Mounting tool

7.6 Electrical installation

WARNING
Only authorized personnel is allowed to connect the installation electrically in accordance with the local regulations.

WARNING
Fuses
These values are specified in the data sheet and technical data. See also Table 6 Specification of the working range.

Electrical connections

- Make sure that the motor specifications correspond with the power supply to which the pump motor is connected. Consult "Electrical diagrams" in the annexes for the correct connection diagram.
- Connect the motor using a motor safety switch.
- Close the hood after the installation is completed.
- Earthing:

WARNING
The frame of the Hydro-Unit Cube has an earth connection. This earth connection must directly connected to the central earthing point of the building. It is necessary to check periodically the earth connection and protect it against corrosion by an electrically conductive agent, like MOLYKOTE® HSC PLUS.

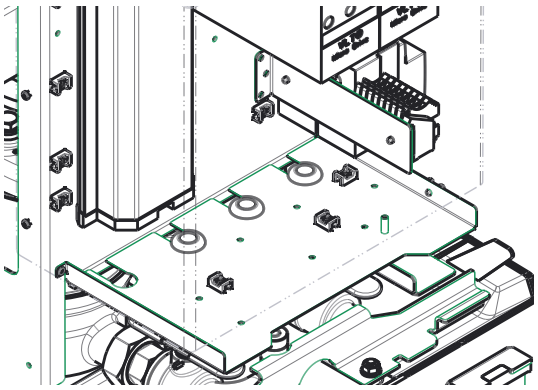


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Figure 19: Earthing boss

WARNING
In systems equipped with a frequency converter, the earthing boss must be connected before connecting the power. See also: WARNING LEAKAGE. Note the residual voltage!

7.6.1 RDP and Alarm connections

ATTENTION
If the Cube is equipped with a running dry protection (option (OV11012065)), an external RDP (not included) must be connected. Without an external RDP (e.g. floating switch) the Cube will not start. A M12 male connector is supplied when the Cube is equipped with an external RDP. The wires of the external RDP need to be connected to connection 1 & 4 of the M12 male connector.

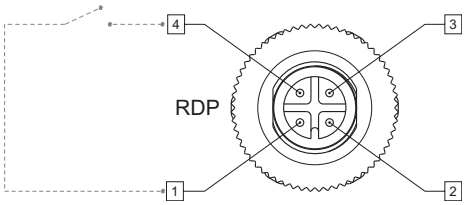

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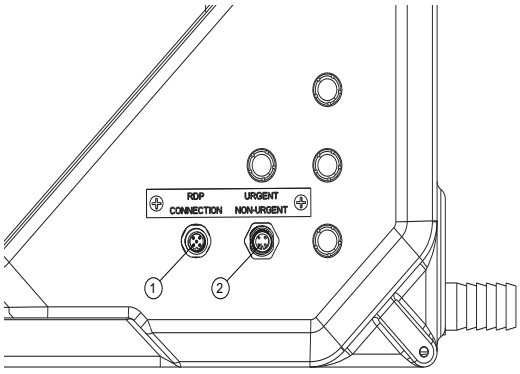
Figure 20: M12 Male connector

Table 11: Description of the RDP connector

Number	Status	Function
1	NO	+24 V DC (output)
2	Not used	No use
3	Not used	No use
4	NO	HOOK-UP

The M12 Male connector (connected to an external RDP) is connected on the side of the Cube



20160876

Figure 21: RDP and Alarm connections on the right side of the Cube

Table 12: RDP & Alarm connectors

Number	Connector	Function
1	RDP	Run-dry protection
2	Urgent / Not-Urgent	External alarm

7.6.2 Using the Pressure Transmitter (PT) instead of the Run Dry Protection (RDP)

The Cube can be delivered upon request with an activated external RDP (OV10022917). An Example of an external RDP is a float-switch in a reservoir. This optional version has a deactivated PT in the suction side. Depending upon the application (whenever inlet pressure >0.2 bar is available at all times) a choice can be made to re-activate the PT instead of using the external RDP. This must be carried out by an authorized service representative. Procedure to re-activate the PT

- Bridge connections 1&4 on the supplied M12 male connector (figure 20 M12 Male connector)

Modify the following parameters with the servicetool and/or service password and respect local requirements:

Table 13: Set up parameters

Parameter		Value
3-3-2	Inlet	Pressure
3-5-15	Shut down RDP	Inlet pressure -0.5 Bar[1]
3-5-16	Reset RDP	Inlet pressure -0.2 Bar
3-6-8	RDP delay	30 (or shorter when desired)

1. Minimum value ≥ 0.2

7.7 Commissioning

WARNING
Without liquid the system may never turned on. The pumps must be deaerated by the vent plug in motor stool of the pump.

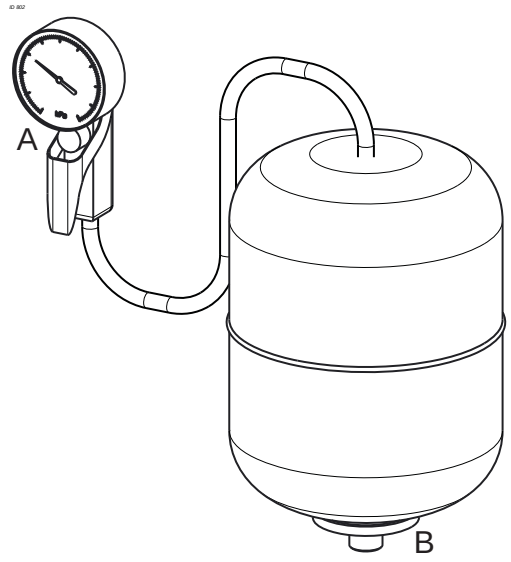
Before you start the system:

WARNING
High current leakage, earthing is necessary before the power is connected!

WARNING
Rinse and / or disinfect the plant in accordance with local requirements.

7.7.1 Pre-pressure of the pressure vessel

For a correct functioning of the installation, the pre-pressure in the pressure vessel must be 50 kPa lower than the switch-on pressure. Proceed as follows to determine the pre-pressure:



20130619

Figure 22: Pre-pressure check at pre-pressure vessel

1. Measure the pressure (A) in the vessel when there is no pressure on the waterside (B).
2. Fill the vessel with nitrogen or air. Preferably use nitrogen.

WARNING
Before putting the installation into use, first put the pressure vessel under pressure. Consult the annexes for the correct setting.

WARNING
Maximum allowed pre-charge pressure: 200kPa below the pressure class (PN)

8 Operating

8.1 Control panel (HMI)

The control panel comprises a back-lit display, function, navigation, and operating keys, LED's, and 2 access points for the service interface. The display shows important information for pump system operation. Data can be displayed in plain text and parameters can be set.

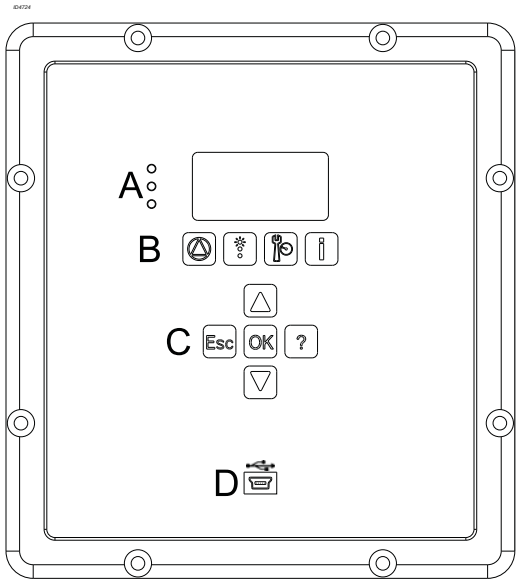


Figure 23: Front Cube-Control

Table 14: Traffic lights

A: LED's
The "traffic light" signals provide information about the pump system's operating status. LED's:
• Red: Alert / urgent alarm is active. • Amber: Warning / non-urgent alarm is active. • Green: O.K. / trouble-free operation.

Table 15: Function keys

B: Function keys	
You can use the function keys to access the elements at the first menu level directly: Operation, Diagnosis, Settings and Information.	
	**Operation**
	**Diagnosis**
	**Settings**
	**Information**

Table 16: Navigation keys

C: Navigation keys	
The navigation keys are used for navigating in the menu and for confirming settings.	
	**Up or Down** • Move up / down through the root menu (displays the measured values of the system input); • Move up / down through the menu options or; • Increase / decrease a value when you are entering numerals.
	**Escape key** • Delete / reset entry (the entry is not saved); • Return to the previous menu level.
	**OK key** • Access to the quick menu; • Confirm a setting; • Confirm a menu selection. • Go to the next number when you are entering numerals.
	**Help key** • Displays a help text for each selected menu option.

D: USB Service interface
The service interface allows a PC / Notebook to be connected with use of the special service port cable. The Cube-Control PC software can be used to configure and parameterize the pump system if you do not have access to a control panel. The Cube-Control software can also be updated via this interface.

8.1.1 Display

The 7-row display contains the following information:

Table 17: Display rows

	Display	Meaning
1	**1-1**-1	Displays the selected parameter no.
2	**Parameter / Function**	Parameter name, Function key: • Operation • Diagnosis • Settings • Info
3	**Parameter name**	List of selectable parameters
4	**Level**	Operating level: • All • User • Service • Factory
		“Scroll bar” within the list of selectable parameters
5	**MM-DD 00:00**	Current date and time

The number of the current menu or parameter is displayed in the top left of the screen. This number indicates the path through the menu levels and, therefore, allows you to quickly locate parameters (see “Parameter list”).

The date and time is displayed in the bottom right of the screen. If a fault occurs, this is displayed in the bottom line and alternating with the date and time.

8.1.2 Continuous display

When in operation the most common values, like the system pressure are shown on the display continuously. By pushing the navigation buttons Up and Down all selected values are passing by. In Parameter setting **3-10 “Root menu”** these values can be selected as preset value. The selected values are marked with a “ √ “

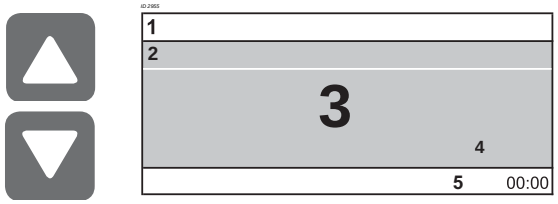


Table 18: Display example

	Display
1	**1**-1-1
2	System pressure
3	525
4	kPa
5	**MM-DD 00:00**

8.1.2.1 Quick menu

Having access to the most used parameters a Quick menu can be entered by pressing the OK key.

8.1.3 Access levels

To prevent accidental or unauthorized access to the Cube-Control parameters, various access levels have been defined.

Table 19: Access levels

Access levels:	Explanation:
Standard	Unless users log on to one of the access levels, they will only have limited access to parameters.
User	Access level for expert users. It enables access to all the parameters required for commissioning. You have to enter a password under 3-2-1 “Log in”. The standard password for users is **7353**.
Service	Access level for service technicians. You have to enter a password under 3-2-1 Log in.
Factory	Access level for the manufacturer only.

ATTENTION
If no keys are pressed for ten minutes, the system automatically returns to the default access level.

8.1.4 Displaying and changing parameters

The parameter numbers contain 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 can be called up directly via the four function keys. Subsequent steps are carried out via the navigation keys.

1--Operation 2--Diagnosis 3--Settings 4--Info

Example: Parameter 3-5-10 Delta p correction:

First digit of parameter number: **3**-5-10
3 Settings 5 Pressure 10 Delta p correction
 Press the third function key for Settings. **3-1** appears in the top left of the screen.
Second digit of parameter number: **3-5**-10
3 Settings **5 Pressure** 10 Delta p correction
 Change the display **3-1** on the screen (top left) to **3-5** by pressing the navigation keys.
 To confirm the selection, press OK. **3-5** appears in the top left of the screen.
Third digit of parameter number: **3-5-10**
3 Settings **5 Pressure** **10 Delta p correction**
 Change the display **3-5-1** on the screen (top left) to **3-5-10** by pressing the navigation keys.
 To confirm the selection, press OK. **3-5-10** appears in the top left of the screen.

8.2 Manual operation of the pumps

By pressing the Quick access key “**Operation**”, information like system pressure and pump load can be retrieved. Also, the pump operating mode like **Automatic**, **Manual** and **Disabled** can be alternated / selected. Subsequent steps are carried out by using the navigation keys.

Example: Parameter 1-2-1 (Pumps) Operation mode:

First digit of parameter number: **1**-2-1
1 Operation 2 Pumps 1 Operation mode
 Press the first function key for Operation. **1-1** appears in the top left of the screen.
Second digit of parameter number: **1-2**-1
1 Operation **2 Pumps** 1 Operation mode
 Change the display **1-1** on the screen (top left) to **1-2** by pressing the navigation keys.
 To confirm the selection, press OK. **1-2** appears in the top left of the screen.
Third digit of parameter number: **1-2-1**
1 Operation **2 Pumps** **1 Operation mode**
 To confirm the selection, press OK. **1-2-1** appears in the top left of the screen.
 Select the **pump number** by pressing the navigation keys.
 To confirm the selection, press OK.
 Select the operation mode **manual (on (10 s))**.
 To confirm the selection, press OK.

The selected pump will run for a period of 10 seconds and stops. The pump operation mode is changed to **Disabled (off)** This is to avoid that the pump runs unprotected.

8.2.1 Putting the pump into automatic operation again

The pump has to be put in operation again by selecting the **Automatic mode**.

	Stay in the selected parameter **1-2-1 Operation mode** and press OK.
	Select the **pump number** again by pressing the navigation keys.
	To confirm the selection, press OK.
	Select the operation mode **Automatic**.
	To confirm the selection, press OK.

8.3 Retrieve and reset a fault

Information about faults can be retrieved by pressing the 'diagnosis' hot key

Example: Parameter 2-1-1 Current messages

	Press the diagnosis key. **2-1 General** appears in the display.
	Press the OK key. 2-1-1 Current messages appears in the display.
	Press the OK key again. The list with the current faults or the message 'no faults' appears in the display.

When there is a fault that has a circle with a dot in it, the fault is still active

 No Water

When there is a fault that has an open circle, the fault is not active, but has not been acknowledged yet.

 No Water

When there is a fault that has a circle with a dot in it and a check mark following the fault message, the fault is still active and the fault has been acknowledged as well. When the fault is remedied now, it will be reset immediately.
Example: Parameter 2-1-2 History

	Press the diagnosis key. **2-1 General** appears in the display.
	Press the OK key. The display then shows 2-1-1 Current messages; 2-1-2 History.
	You can select History by pressing the navigation key.
	Press the OK key. The list of faults from the past appears.
	You can select the fault by pressing the navigation key.
	Press the OK key. The below listed information becomes visible.

The following information about the fault is known:
- Date and time of occurrence of the fault
- Date and time of acknowledgement of the fault
- Date and time of remedy of the fault

9 Maintenance

9.1 Introduction

WARNING
Observe the general safety precautions for installation, maintenance and repair.

Regular maintenance is necessary for correct operation of the installation. For maintenance of the installation, please contact your supplier. A draft maintenance contract is available upon request.

9.2 Lubrication

Standard motors are provided with maintenance free sealed bearings.

9.3 Maintaining the pump for an extended period of non-operation

Turn the shaft every three months. This protects the seals from seizure.

Protect the pump if there is a risk of frost. Proceed as follows:

1. Close all pump valves.
2. Drain each pump and/or the system.
3. Remove all plugs from the pump.
4. Open the shut-off and fill/air vent plug, if present.

Let inspect the pump(s) or unit, after a storage period of 6 months or longer, before use again.

9.4 Cleaning instruction

The Hydro-Unit Cube and Cube-Control can be cleaned with a dry rag.

WARNING
The installation must be turned off first.

10 Hydro-Unit configuration

10.1 Hydro-Unit CC

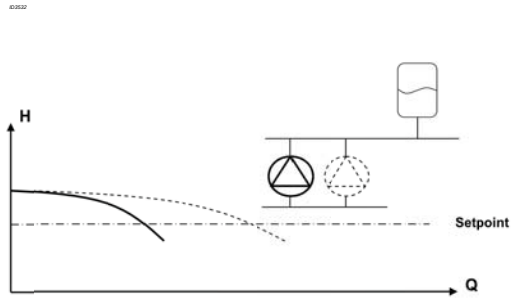


Figure 24: 1 pump operation

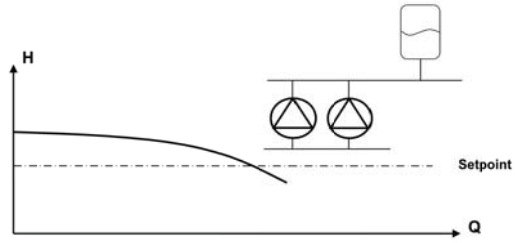


Figure 25: 2 pumps operation

When as a result of a increasing water volume the pressure drops below the pressure set point, a pump will be switched on. When the required system pressure has been reached, the pumps are switched off one at a time. The minimum run time related switch-off delay is optimized constantly, which results in a considerable energy saving.

Table 20: Specific parameter settings CC

Parameter		Value
3-3-1	Number of pumps	2. 2 Pumps
3-3-2	Inlet	1. Switch 2. Pressure
3-3-3	Discharge	1. Fixed Speed
3-3-5	Leakage detection	1. ON
3-5-1	Set point	380 kPa
3-5-3	Bandwidth	30 kPa
3-6-2	Min. run time	90 s
3-6-3	Min. run time cor.	10 s
3-6-8	Run-dry delay	1 s switch 30 s pressure

10.2 Hydro-Unit CCHR

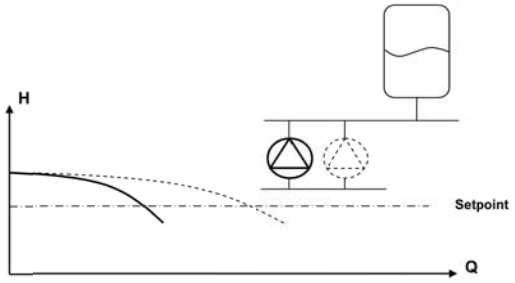


Figure 26: 1 pump operation

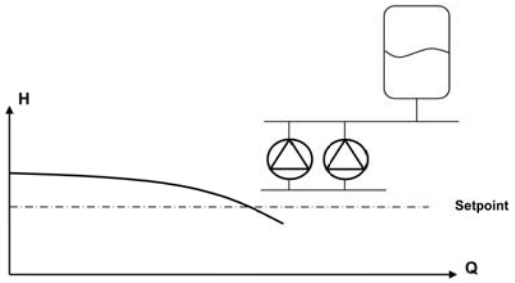


Figure 27: 2 pumps operation

When as a result of a increasing water volume the pressure drops below the pressure set point, a pump will be switched on. When the required system pressure has been reached, the pumps are switched off one at a time. The minimum run time related switch-off delay is optimized constantly, which results in a considerable energy saving.

Table 21: Specific parameter settings CCHR

Parameter		Value
3-3-1	Number of pumps	2. 2 Pumps
3-3-2	Inlet	1. Switch 2. Pressure
3-3-3	Discharge	1. Fixed Speed
3-3-5	Leakage detection	1. On
3-5-1	Set point	380 kPa
3-5-3	Bandwidth	50 kPa
3-6-2	Min. run time	1 s
3-6-3	Min. run time cor.	10 s
3-6-8	Run-dry delay	1 s switch 30 s pressure

10.3 Hydro-Unit CCMF

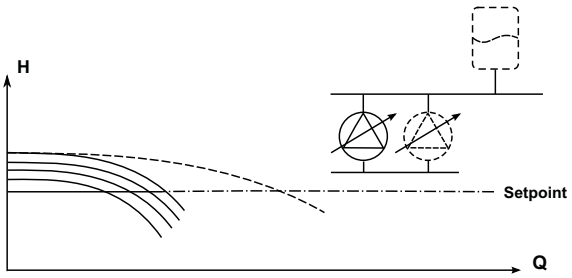


Figure 28: 1 pump in operation, variable

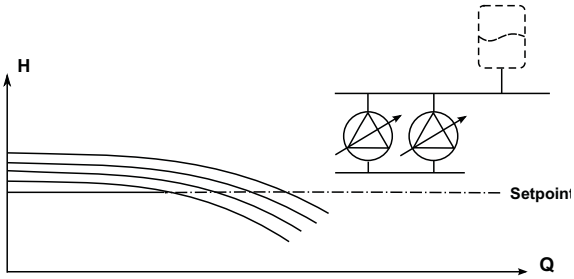


Figure 29: 2 pumps in operation, variable

The Hydro-Unit CCMF is equipped with one variable frequency drive. If the Hydro-Unit is rotation-controlled, the required system pressure is sensed by a pressure sensor on the outlet side of the installation. An integrated adjustable PID-controller in the software of the Cube-Control ensures that the system pressure remains constant by successively switching on or off one or more (whether or not) rotation-controlled pumps with delay. A pump is only switched on when 100 % or respectively 0 % of the speed has been reached.

Table 22: Specific parameter settings CCMF

Parameter		Value
3-3-1	Number of pumps	2. 2 pumps
3-3-2	Inlet	1. Switch 2. Pressure
3-3-3	Discharge	1. VFD fixed all
3-3-5	Leakage detection	1 ON
3-4-3-1	Communication	2. RS485 Danfoss microdrive
3-4-3-2	Proportional const.	3.00
3-4-3-3	Integral const.	0.90
3-5-1	Set point	380 kPa
3-5-3	Bandwidth	10
3-5-4	Accumulation press.	30 kPa
3-6-2	Min. run time	1 s
3-6-3	Min. run time corr.	0 s
3-6-8	Run-dry delay	1 s switch 30 s pressure

10.4 Explanation parameters

10.4.1 Pressure set points

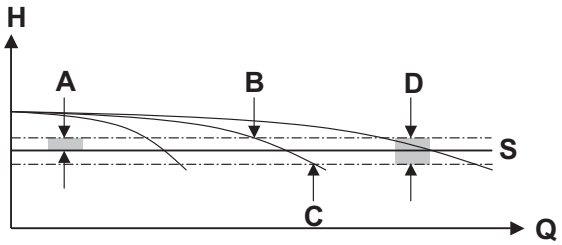


Table 23: Parameters pressure set points fixed speed

ID		
S	3-5-1	Setpoint
A	3-5-2	Hysteresis
B		Cut-out
C		Cut-in
D		2 x hysteresis

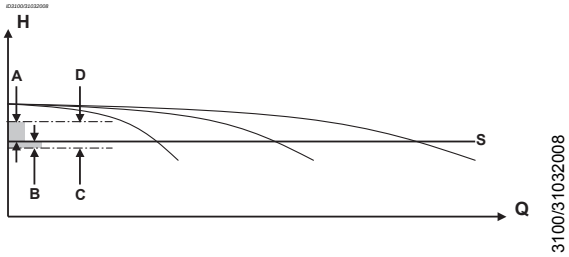


Table 24: Parameters variable speed variable speed

ID	Parameter	
A	3-5-4	Accumulation pressure
B	3-5-3	Band width
C		Cut-in 1st pump
D		Cut-out last pump
S	3-5-1	Setpoint

11 Parameters

11.1 Parameter list

The parameters of the main menu are related to the standard (default) settings of the installation. The standard (default) settings can be adjusted where necessary and may also be reset whenever required. On the basis of the standard set parameters, an installation will operate as it should. Additional, extra parameters may be used, e.g. those under 'advanced', 'pressure', 'delays' and 'clock'. In order to use these additional parameters, you should activate the corresponding sub menus.

ATTENTION
For unit-specific values see: 'Factory settings'.

ATTENTION
Certain parameters are not visible, depending on the configuration.

Table 25: Access level parameter list

Access level	Read	Write
Everybody	e	e
User	c	c
Service	s	s
Factory	f	f
Nobody		n
Development	d	d

11.1.1 Parameter list

For the parameter list: See BE00000508 Control units chapter 10

12 Failures

12.1 Failure messages Cube-Control

Table 26: Faults list Cube-Control

Failure message:	Explanation:	Failure output:
Failure PT. Dis.	Failure Pressure Transmitter discharge side (value >20mA) replace PT and reset system	Urgent
Sys. press.to low	System pressure to long under minimum value (3-5-13)	Urgent[1]
Sys press.to high	System pressure to long above maximum value (3-5-11)	Urgent[1]
Sys. press.to low	System pressure to long under minimum value (3-5-13)	Not urgent[2]
Sys press.to high	System pressure to long above maximum value (3-5-11)	Not urgent[2]
No water	No sufficient water or -pressure available at suction side	Urgent[1]
No water	No sufficient water or -pressure available at suction side	Not urgent[2]
Maintenance req.	Maintenance is required	Not urgent
More pumps fail	More than two pumps out of order	Urgent
No refresh tank #	No water refreshm in tank # (sensed by the flow detector) check precharged air pressure	Urgent
Aver temp to high	Average room temperature to high (sensed by the temperature sensor)	Urgent
Curr temp to high	Current room temperature to high (sensed by the temperature sensor)	Not urgent
Temp.failure Pump #	Failure pump #. Solve problem and reset the system	Not urgent
Failure valve	Failure supply valve. Solve problem and reset the system	Urgent
Inlet sensor fail	Failure inlet Sensor for level or pressure. (signal out of range) replace Sensor and reset system.	Urgent
High water level	Water level in receiver tank to high	Not urgent
Crit. water level	Water level in receiver tank critical (near to empty)	Not urgent
Low water level	Water level in receiver tank to low (system shut down for run dry protection)	Urgent[1]
Low water level	Water level in receiver tank to low (system shut down for run dry protection)	Not urgent[2]
Comm. Error FC #	Communication to variable frequency drive # is broken	Not urgent
Incor. check sum F #	FC # Incorrect check sum within the protocol	Not urgent
Temp. sensor fail	Failure Room Temperature Sensor. replace R.T.S. and reset system	Not urgent
24V out of range	Failure message due to internal 24V supply out of range	Not urgent
5V out of range	failure message due to internal 5V supply out of range	Not urgent
3V out of range	Failure message due to internal 3V supply out of range	Not urgent
External off	Failure message due to an external off command	Not Urgent
Fire alarm	Failure message due to an external fire alarm command	Urgent
Failure VFD	Failure of the VFD drive at discharge mode VFD change-over or VFD fixed one	Urgent
Br. Wire Sens.dis	Failure Pressure Transmitter discharge side (value lower then 4mA) connect or replace Pressure Transmitter and reset system	Urgent
Br. Wire Sens.Inl	Failure inlet Sensor for level or pressure. (wire break detection) Replace Sensor and reset system.	Urgent
Fail. several FCs	Failure for more than one FC occurs	Urgent
Leakage	There is a leakage in the unit. Solve problem and reset the system	Urgent
Eeprom HW Error	The Eeprom data was not saved due to HW problem	Urgent
Manual off Pump # off		Not urgent
Manual On Pump #		Not urgent
More Pumps off		Not urgent

Failure message:	Explanation:	Failure output:
Internal Failure P#		Not urgent
Mains Failure P#		Not urgent
Over voltageP#		Not urgent
Under voltage P#		Not urgent
Overload Failure P#		Not urgent
Brake resistor P#		Not urgent
Temp. Failure P#		Not urgent
ATM Failure P#		Not urgent
Flushing		Not urgent
Valve opened oftenly		Urgent
Circuit Fail. FC#		Not urgent
Ext. Power Operation	External power supply operation	Not urgent
Setpoint Reduction	Automatic Setpoint Reduction because of inlet pressure dropdown	Not urgent
Factory Test		Urgent
MPO Failure	Incorrect switching point configured or sensor failure	Not urgent
ASR Shutdown	Automatic Setpoint Reduction Shutdown because of inlet pressure dropdown	Urgent
BC IO not connected		Not urgent
Occured:	Failures that have occurred recently.	
Acknowledged:	Failures that got acknowledged.	
Cleared:	Failures that got cleared	
Data:		
No failures		

1. Manual alarm reset = Urgent.
2. Automatic alarm reset = Not urgent.

12.2 Failure table Hydro-Unit

WARNING
Observe the general safety precautions for installation, maintenance and repair.

Problem	Possible cause	Possible solution	Checkpoints
Leakage along the shaft.	Shaft seal worn.	Replace the shaft seal.	Check the pump for fouling.
	Pump has been operated without water.	Replace the shaft seal.	
Pump is vibrating and produces a lot of noise.	There is no water in the pump.	Fill and de-aerate the pump.	
	No water supply.	Restore the water supply.	Check if the supply pipes are not clogged.
	Bearings of pump and/or motor defective.	Have the bearings replaced by a certified company.	
	Hydraulic assembly defective.	Replace the hydraulic assembly.	
Installation / pump does not start.	No voltage on the connecting clamps.	Check the power supply.	• Circuit • Main switch • Fuses
	Thermal motor safety switch triggered	Reset the thermal motor safety. Contact the supplier, if this problem occurs more often	
	Run-dry protection triggered.	Restore the water supply. Reset the installation.	
	Pressure set point incorrect.	Adjust the pressure set-point.	
Installation / pump supplies insufficient capacity and/or pressure.	There is air in the pump.	Vent the pump.	
	Capacity of water meter in the supply line is too small.	Increase the capacity of the water meter.	
	Discharge and/or suction shut-off valve is closed.	Open both shut-off valves.	
	System resistance too high.	Adjust the set points	
		Let the supplier check the system	
Pumps continuously start and stop.	Pressure vessel(s) leaky or incorrect pre-pressure.	Have your supplier check the installation.	

13 Annexes

13.1 P&ID

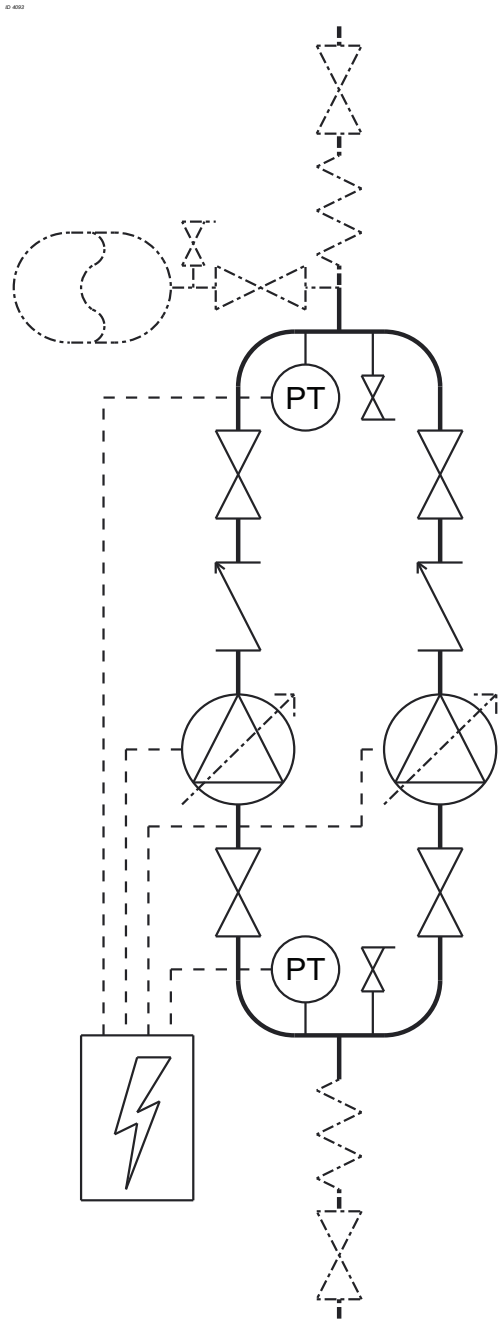


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Figure 30: HU MF P&ID

13.2 Connections Cube-Control

13.2.1 Urgent Not-Urgent connector

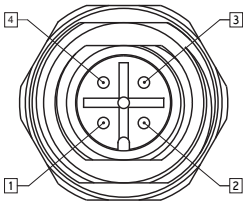

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Figure 31: Connector

Table 27: Description of the connection

Number	Status	Function
1	NC	Not urgent
2	NC	Urgent
3	Common	Urgent
4	Common	Not urgent

ATTENTION
The alarm contacts are closed by a fault or by no power.

13.2.2 External Running Dry Protection connector (optional)

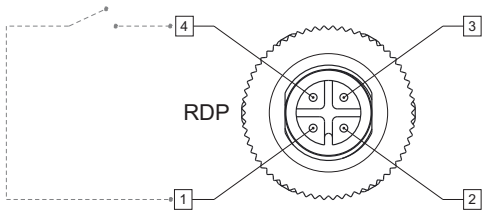

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Figure 32: M12 Male connector

Table 28: Description of the RDP connector

Number	Status	Function
1	NO	+24 V DC (output)
2	Not used	No use
3	Not used	No use
4	NO	HOOK-UP

13.3 Print lay out Cube-Control

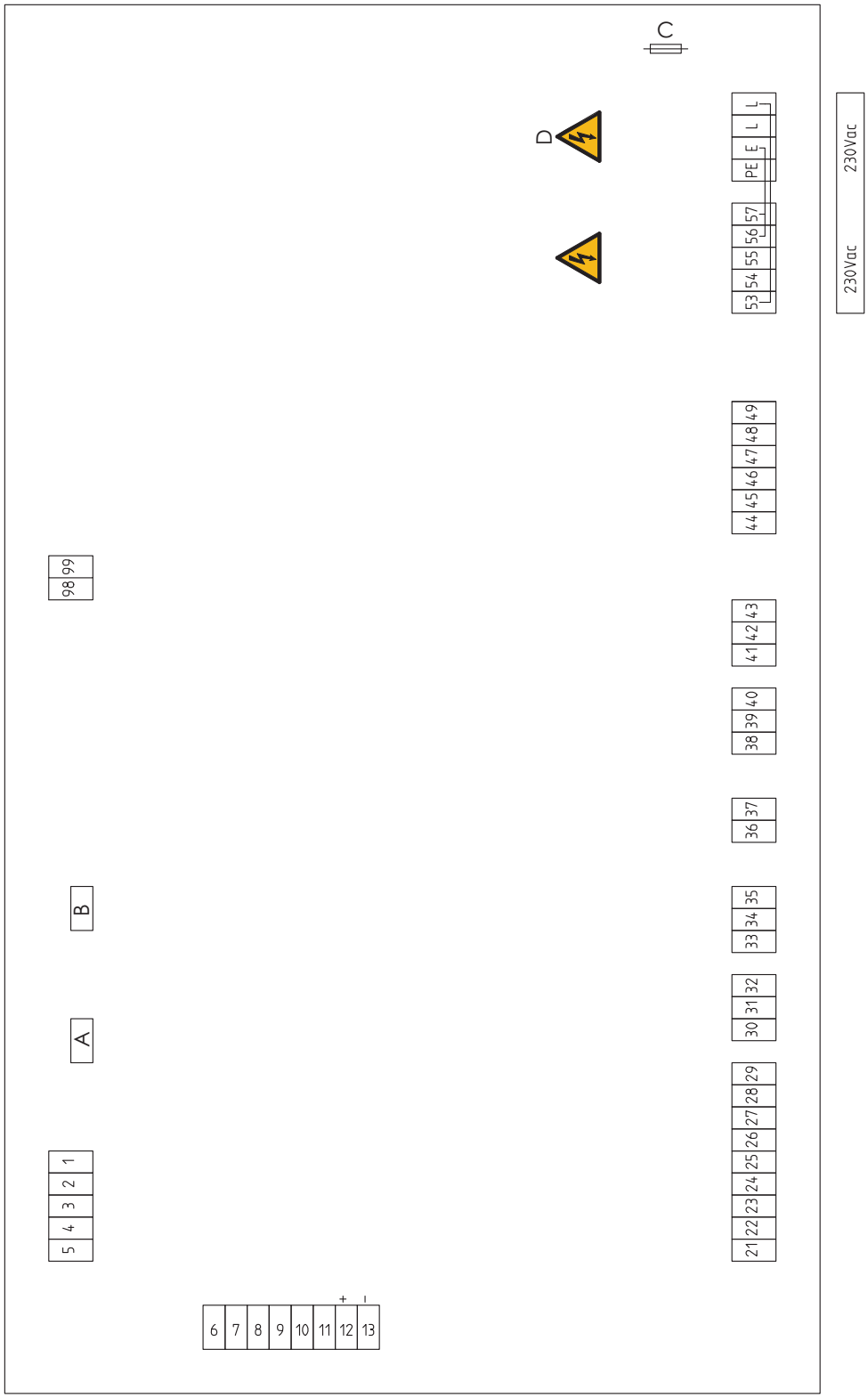

Figure 33: Print lay Cube-Control

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Table 29: Description print lay out Cube-Control

Connector	Mark on board	No	Description
RS485	T+	1	BUS TERM
	T-	2	BUS TERM
	L/B	3	RS485-B
	H/A	4	RS485-A
	GCR	5	RS485-GND_2
	G_T	6	WSD1
	Tin	7	
	I3b	8	WSD2
	I3a	9	
	I2b	10	WSD3
	I2a	11	
+	I1b	12	Temp. Sensor
-	I1a	13	
	C1L	21	CAN1-L
	C1H	22	CAN1-H
	GC1	23	CAN1-GND
	I4	24	Failure Pump 1 14
	I5	25	Failure Pump 2 15
	I6	26	Run-dry Protection
	I7	27	External stop 17
	I8	28	Fire Alarm 18
	COM	29	Common
Suction	+V1	30	24 V
	Ai1	31	4-20 mA
	G_2	32	Gnd
Pressure	+V2	33	24 V
	Ai2	34	4-20 mA
	G_2	35	GND
	MD1	36	Moisture Sensor
	MD2	37	Moisture Sensor
NC	1x	38	Failure not urgent[1]
C	O1c	39	
NO	O1y	40	
NC	O2x	41	Failure urgent[1]
C	O2c	42	
NO	O2y	43	
	O3c	44	Common
	O3d	45	Common
	O3y	46	Start P1
	O4c	47	Common
	04d	48	Common
	O4y	49	Start P2
	L02	53	L1/1
	VAL	54	Valve
	FAN	55	Fan
	N2	56	E
	N3	57	E
	PE	PE	PE
	N1	E	E
	L1	L	L1
	L01	L	L1/1
	+24	99	+24 V (max. 200 mA)
	G_3	98	GND
A			Service
B			HMI RJ45
C			FUSE 1 A
D			Supply 230 Vac

1. Connection 38/39 and 41/42 are closed by failure and/ or no power supply

13.4 Connection instructions pressure vessel (optional) temperature sensor PT1000

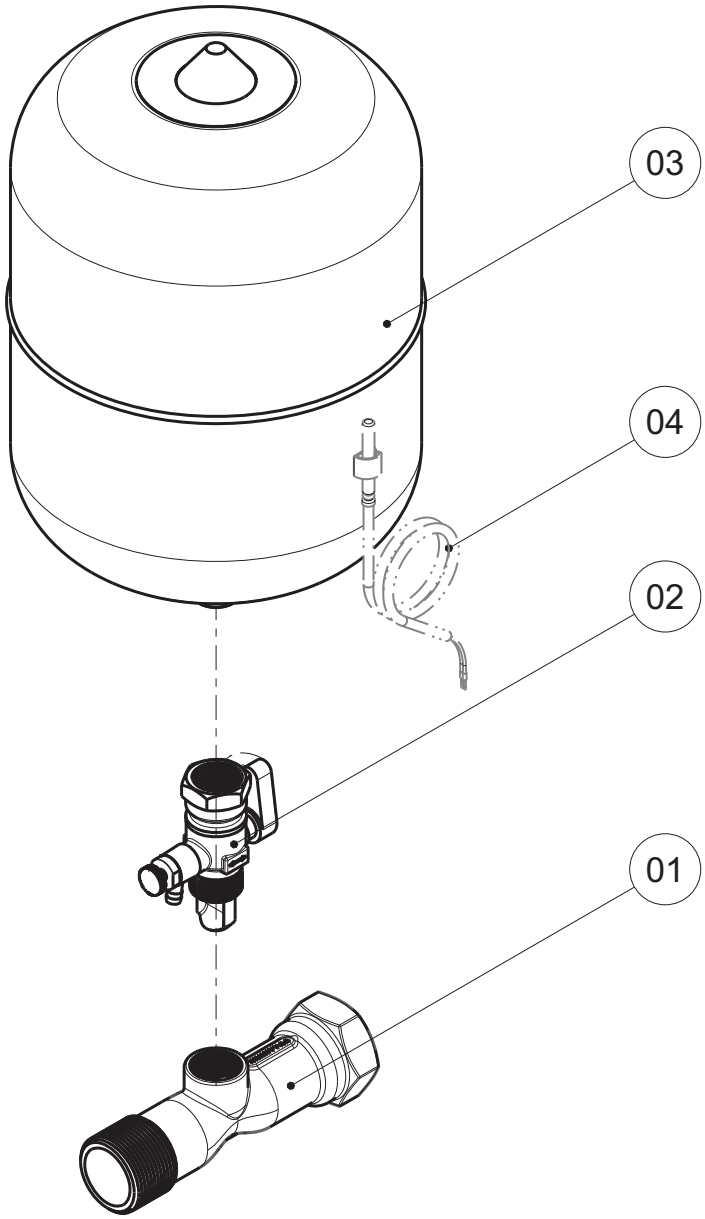

Figure 34: instruction drawing vessel connection.

POS.NR	Description
01	Connection piece
02	Ball valve
03	Pressure vessel
04	Temperature sensor PT1000

13.5 EC declaration of conformity

Undersigned:

D.P. Industries B.V.
Kalkovenweg 13
2401 LJ Alphen aan den Rijn, The Netherlands
Tel: (+31)(0)-172-48 83 88

Declares as manufacturer entirely on his own responsibility, that the product:

Product: Hydro-Unit
Type: Cube CC(MF)

Serial number: 25/2020 1000000-01 [...] 52/2022 9999999-99

to which this declaration refers, comply with the following standards:

- EN 809+A1/C1:2010
- EN ISO 12100:2010
- IEC 60204-1:2006

according to the stipulations of:

- Machine directive 2006/42/EC
- EMC directive 2014/30/EU
- RoHS 2011/65/EU

If the installation is used as a stand-alone product, it is subject to this declaration of conformity.

If the installation is built in into an appliance or assembled with other equipment in certain installations, it shall not be put into operation until a declaration has been issued with respect to the appliance concerned that this appliance complies with the directives listed above.

Alphen aan den Rijn,
2017-01-31

Authorized representative
M.H. Schaap, Manager Competence Centre Products

13.6 Certificate of Decontamination

Type: _____

Order number: _____

Delivery date: _____

Applications: _____

Fluid handled: _____

Please tick where applicable:

☐ Corrosive

☐ Oxidising

☐ Flammable

☐ Explosive

☐ Hazardous to health

☐ Seriously hazardous to health

☐ Toxic

☐ Radioactive

☐ Bio-hazardous

☐ Safe

Reason(s) for return: _____

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.

☐ No special safety precautions are required for further handling.

☐ The following safety precautions are required for flushing fluids, residual fluids and disposal:

_____

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

dp pumps

dp pumps
P.O. Box 28
2400 AA Alphen aan den Rijn (NL)

t (+31-172) 48 83 88

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

2020-08

BE00000516-D / EN

Original instructions