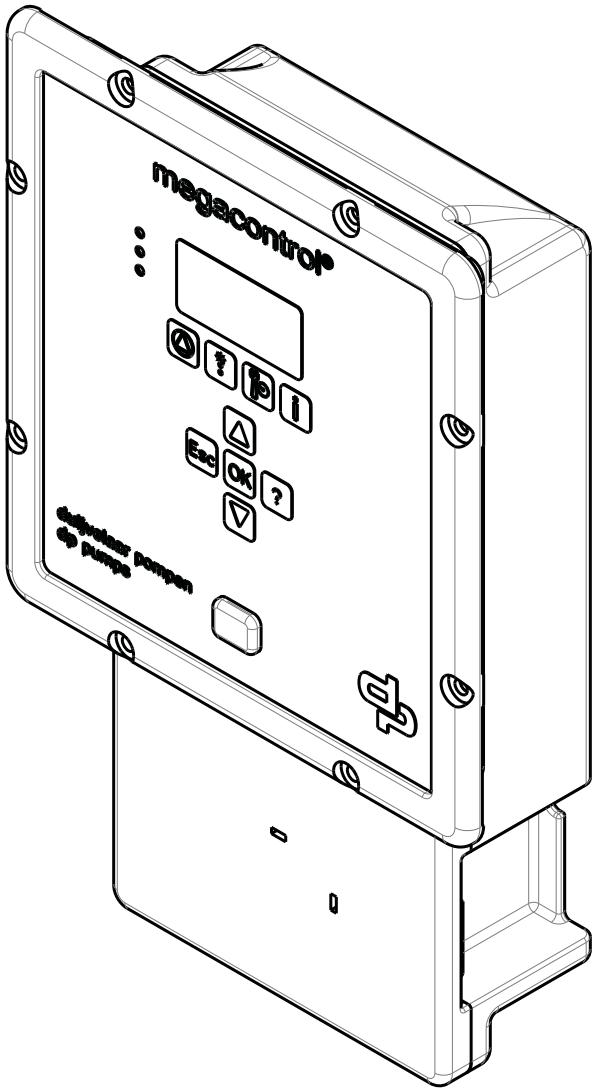
LENNTECH
WATER TREATMENT SOLUTIONS

Control units

Installation and operating instructions
Series: Megacontrol



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1 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 Voltage. Safety sign according to IEC 417 - 5036

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

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

ENVIRONMENTAL INSTRUCTION
Remarks with respect to the environment.

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

2 Identification, service and technical support

2.1 Identification, service and technical support

The system is identified based on the text “Megacontrol ” as given on the front of the system.
Table 1: Control unit

Indication	Meaning
Megacontrol	Type of Control unit

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 Fax: +31 172 468930 Internet: www.dp-pumps.com E-mail: dp@dp-pumps.com

2.2 Supplementary documentation

This version is valid from Megacontrol 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 WSD-Sensor	BE00000250
Modbus	BE00000584
Profibus	BE00000585

Also see: www.dp-pumps.com

Table 4: Megacontrol versions

Firm ware version (see parameter: 4-1-3)	Manual version
Megacontrol V 1.52	01-2013
Megacontrol V 1.57	01-2014
Megacontrol V 1.6.2	06-2015
Megacontrol V 1.7.1	05-2016

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.

4.2 Environmental aspects

4.2.1 General

This product of DP-Pumps is designed to function in an environmentally friendly way during their entire life.

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

4.2.2 Dismantling

Dismantle the product and dispose of it in an environmentally friendly way. The owner is responsible for this.

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

ENVIRONMENTAL INSTRUCTION
All components of the Megacontrol are manufactured in accordance with RoHS II directive 2011/65/EU.

5 Introduction

5.1 General

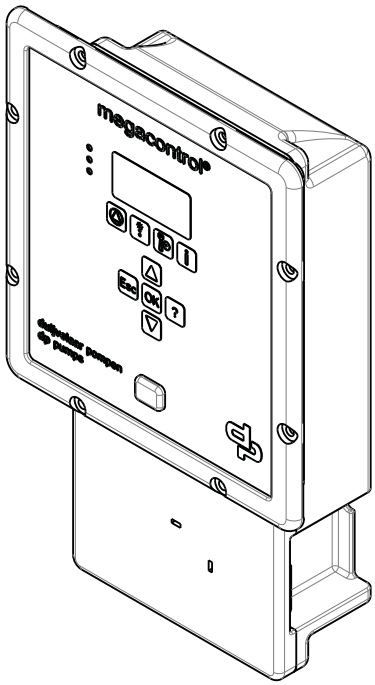

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Figure 1: Control units of the type Megacontrol

Control units of the type Megacontrol are manufactured by DP-Pumps.

5.2 Intended use

The control unit is suitable for controlling a Hydro-Unit consisting of 1, 2, 3, 4, 5 or 6 pumps within the indicated working range (see “Working range“).

Any other or further use of the control unit is not in conformity with its intended use. DP-Pumps does not accept any liability for any damage or injury resulting from this. The control unit has been produced in accordance with the current standards and guidelines. Use the control unit 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 / information. Always observe the instructions 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 control unit can be summarized as follows:

Table 5: Working range of the Megacontrol

Type	Megacontrol
Maximum ambient temperature [°C]	50
Relative atmospheric humidity [%]	20 - 90 (no condensation)
Voltage [V]	1 x 230 V AC ± 5%
Frequency [Hz]	50/60

Table 6: Specific applications of the Megacontrol

Type	Application area
Megacontrol	Building possible in the installations listed below:
	• Hydro-Unit® with 1 - 6 pumps
	• Break-Unit with 1 - 6 pumps
	• Fire-Unit with 1 - 6 pumps

5.3.1 WSD-Sensor (option)

The working range of the WSD-Sensor can be summarized as follows:

Table 7: Working range of the WSD-Sensor

Type	WSD-Sensor
Maximum ambient temperature [°C]	30
Relative atmospheric humidity [%]	-
Voltage [V]	-
Frequency [Hz]	-
Medium temperature [°C]	5 - 30
Switching flow [l/min]	± 14

Table 8: Specific applications WSD

Type	Applications
WSD	Installations with a maximum of 3 membrane switch vessels.

5.4 Functioning

5.4.1 Standard operation

The Megacontrol is an intelligent control unit for different components of pressurization systems consisting out of a maximum of 6 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 Custom made settings

The Megacontrol can be programmed through the human machine interface (HMI) operating panel and has been protected against unauthorized use by a password.

Also, the service port provides access to the parameters of the program which can be used to optimize the functionality of the installation, (see: “Parameter list”).

WARNING
For access to the parameters of the program using the service port, always use the special service port cable!

The special service port cable (Art. nr. 6147117698) can by ordered separately.

5.4.3 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.

5.4.4 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.

5.4.5 Functioning WSD-Sensor (option)

In combination with the Megacontrol, the WSD can generate a failure message when, during a (adjustable) period of time, insufficient refreshment of the membrane switch vessel occurs.

The failure message is generated when:
- Insufficient refreshment occurs;
- The membrane of the membrane switch vessel is defective;
- There is no air left in the membrane switch vessel;
- The installation is not set / installed correctly.

5.4.6 Temperature-sensor (option)

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

6 Transport

6.1 Transport and storage

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

ATTENTION
Store the control unit in a dry and dust-free place.

7 Installation

7.1 Mechanical installation

ATTENTION
Contact the supplier if parts are missing or damaged.

Build in the control unit using suitable fastening material. Consult the annex “Built-in diagram" for the correct overall dimensions.

7.2 Electrical installation

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

Electrical connections

- Make sure that the electric control unit specifications correspond with the power supply to which is connected.
- Consult the annex "Electrical diagram" for a list of all electrical power points.

7.2.1 Recommended RS485-termination for Megacontrol

The new board for Megacontrol is based on a new hardware platform. One new feature is, that the clamps for the external RS485-bus (J301) will now benefit the advantage of galvanic isolated bus- and GND-lines.

A RS485-termination with 1…6 “DANFOSS Micro-Drives”

1 Megacontrol : keep the termination clamps on the Megacontrol T+ / T- open
2 Microdrives: switch the bus termination to position on, on each Micro Drive.

B1 RS485-termination with 1…2 “DANFOSS AQUA Drives”

1 Megacontrol : keep the termination clampson the Megacontrol T+ / T- open
2 AQUA Drive: switch the bus termination to position on, on each AQUA Drive

B2 RS485-termination with 3…6 “DANFOSS AQUA Drives”

1 Megacontrol : keep the termination clamps on the Megacontrol T+ / T- open
2 AQUA Drive: set the bus termination only on the last AQUA Drive
3 External termination: Place, near to the Megacontrol, an external active bus termination, like normally used for Profibus, for example: 6ES7 972-0DA00-0AA0 or FBCon DP M12 Term 24V

7.2.2 Parameter settings of the frequency converters

At the configuration VFD fixed all (parameter 3-3-3) you can set the selected VFD (parameter 3-4-3-1). Before you can set the VFD you have to disable the pump by pump in 'Operating mode: off' (parameter 1-2-1).
By setting the VFD's using the Megacontrol use the following sequence:

Table 9: Megacontrol parameter

No	Parameter	Description
1	3-4-3-20	Motor speed unit Hz
2	3-4-3-13	P nominal of VFD
3	3-4-3-14	U nominal of VFD
4	3-4-3-15	F nominal of VFD
5	3-4-3-16	I nominal of VFD
6	3-4-3-17	RPM nominal of VFD
7	3-4-3-9	VFD Ramp-Up
8	3-4-3-10	VFD Ramp-Down
9	3-4-3-11	VFD min. frequency
10	3-4-3-12	VFD max. frequency

After entering these parameters, the other parameters can be set at their discretion. Always check the correct setting of the frequency converters parameters.

7.2.3 Using contactors

ATTENTION
Always place, using contactors and/or auxiliary relays, a suitable RC filter or varistor across the coil, e.g. Siemens 3RT29-16-1CD00

7.3 Commissioning

The control unit is fully programmed and preset with factory default settings. Use the control panel, or the service port to access the parameters of the program which can be used to optimize the functionality of the installation, (see: “Parameter list”).

8 Operation

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.

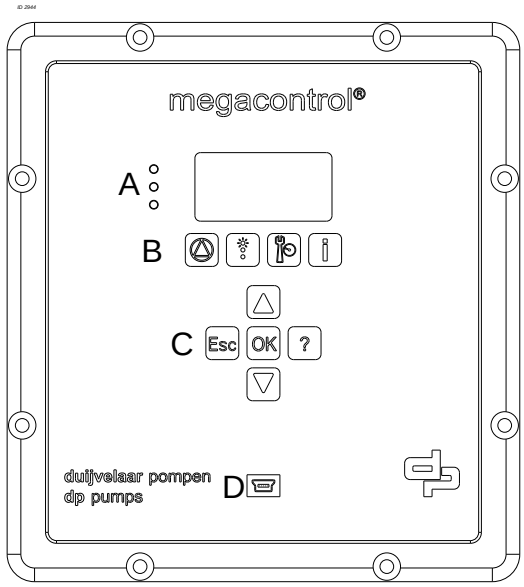

Figure 2: Front Megacontrol

Table 10: 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 11: 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 12: 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: Service interface RS232
The service interface allows a PC / Notebook to be connected with use of the special service port cable. The Megacontrol PC software can be used to configure and parameterize the pump system if you do not have access to a control panel. The Megacontrol software can also be updated via this interface. A second service interface is located on the back side of the controller.

8.1.1 Display

The 7-row display contains the following information:

Table 13: 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-YY 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 “ √ “

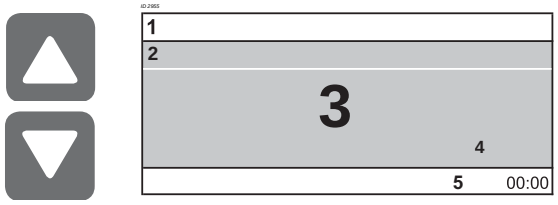

Table 14: Display example

	Display
1	**1**-1-1
2	System pressure
3	525
4	kPa
5	**MM-JJ 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 Megacontrol parameters, various access levels have been defined.

Table 15: 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**.

OK	Stay in the selected parameter **1-2-1 Operation mode** and press OK.
▲	Select the **pump number** again by pressing the navigation keys.
OK	To confirm the selection, press OK.
▼	Select the operation mode **Automatic**.
OK	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.
OK	Press the OK key. 2-1-1 Current messages appears in the display.
OK	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.
OK	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.
OK	Press the OK key. The list of faults from the past appears.
▼	You can select the fault by pressing the navigation key.
OK	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 Hydro-unit configuration

9.1 Hydro-Unit MC

ATTENTION
See factory settings 3-2-2-1

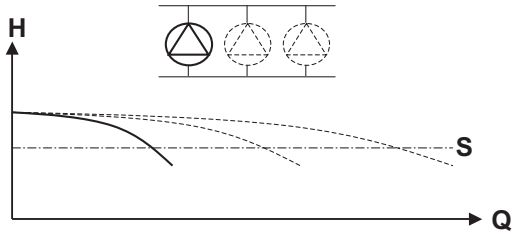

Figure 3: 1 pump operation

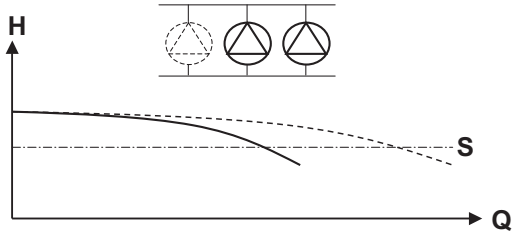

Figure 4: 2 pump operation

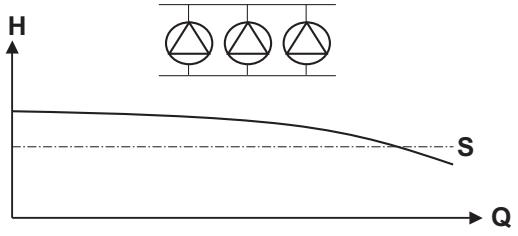

Figure 5: 3 pump operation

When as a result of an 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 16: Specific parameter settings MC

Parameter		Value
3-3-1	Number of pumps	1 2 **3** 4 5 6
3-3-2	Inlet	Switch Pressure Level / valve ON-OFF Level / valve prop.
3-3-3	Discharge	Fixed Speed
3-5-1	Set point	... kPa
3-5-3	Bandwidth	30
3-5-13	Low pressure alarm	100
3-6-1	Opt. pump starts/h	10
3-6-2	Min. run time	Default 180 s
		DOL ≤ 2.2 kW 90 s
3-6-3	Min. run time corr.	10 s
3-6-8	Run-dry delay	Default 30 s
		Float/level control 1 s

9.2 Hydro-Unit MC ++

ATTENTION
See factory settings 3-2-2-1

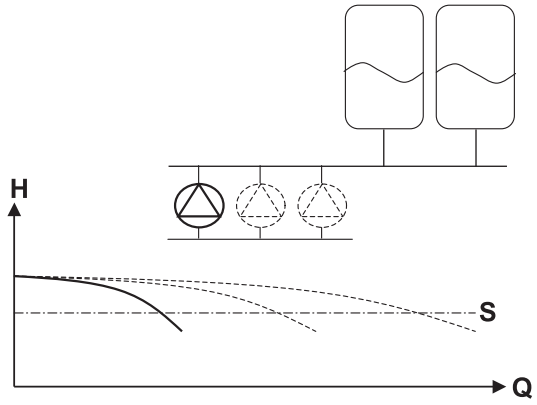

Figure 6: 1 pump operation

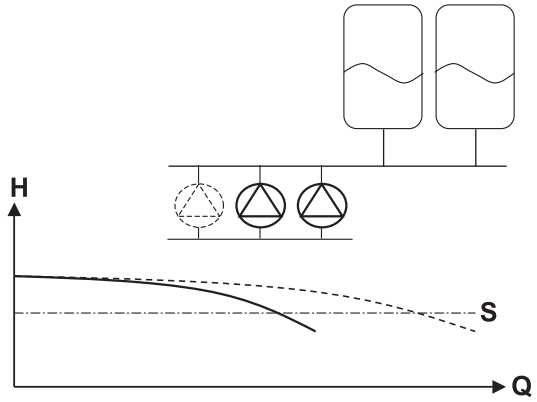

Figure 7: 2 pump operation

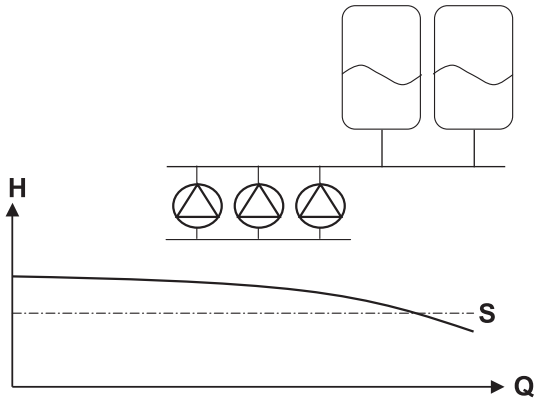

Figure 8: 3 pump operation

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 17: Specific parameter settings MC ++

Parameter		Value
3-3-1	Number of pumps	1 2 3 4 5 6
3-3-2	Inlet	Switch Pressure Level / valve ON-OFF Level / valve prop.
3-3-3	Discharge	Fixed Speed
3-5-1	Set point	.... kPa
3-5-3	Bandwidth	50
3-5-13	Low pressure alarm	100 kPa
3-6-1	Opt. pump starts/h	30
3-6-2	Min. run time	1 s
3-6-3	Min. run time cor.	1 s
3-6-8	Run-dry delay	Default 30 s
		Float/level control 1 s

9.3 Hydro-Unit MCJ

ATTENTION
See factory settings 3-2-2-1

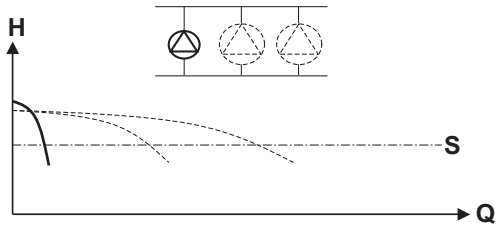

Figure 9: 1 jockey pump operation

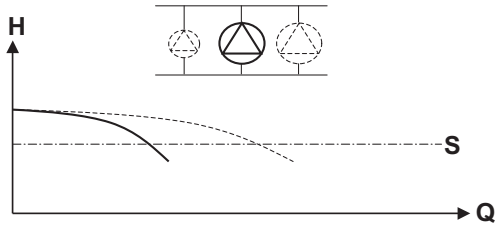

Figure 10: 1 main pump operation

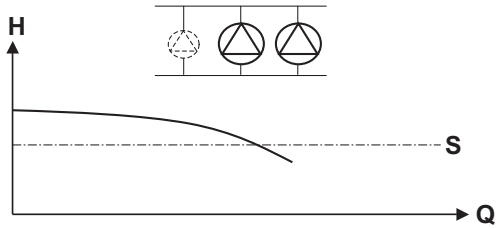

Figure 11: 2 main pumps operation

The Hydro-Unit MCJ is fitted with a jockey pump, especially suited for installations with strongly fluctuating water consumption. The jockey pump is a smaller pump with less capacity but the same pressure as the main pumps of the installation. The jockey pump will be started first. If the water consumption is larger than the capacity of the jockey pump, one or more main pumps will be switched on, whereas the jockey pump is switched off. If the capacity of the main pumps is not sufficient, in case of a large water consumption, the jockey pump will also be switched on. A Hydro-Unit can also be fitted with 2 jockey pumps which are each other's backups.

Table 18: Specific parameter settings MCJ

Parameter		Value
3-3-1	Number of pumps	1 2 3 4 5 6
3-3-2	Inlet	Switch Pressure Level / valve ON-OFF Level / valve prop.
3-3-3	Discharge	One Jockey
3-5-1	Set point	.... kPa
3-5-3	Bandwidth	30
3-5-13	Low pressure alarm	100 kPa
3-6-1	Opt. pump starts/h	30
3-6-2	Min. run time	Default 180 s
		DOL ≤ 2.2 kW 90 s
3-6-3	Min. run time corr.	10 s
3-6-8	Run-dry delay	Default 30 s
		Float/level control 1 s

9.4 Hydro-Unit MCF

ATTENTION
See factory settings 3-2-2-1

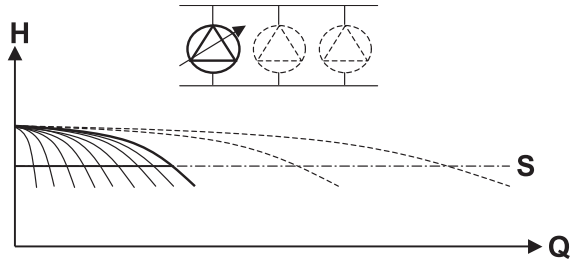

Figure 12: 1 pump operation, 1 pump variable

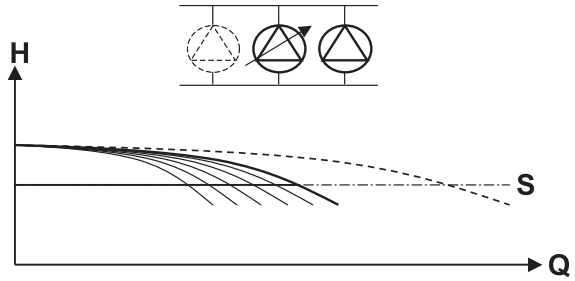

Figure 13: 2 pump operation, 1 pump variable

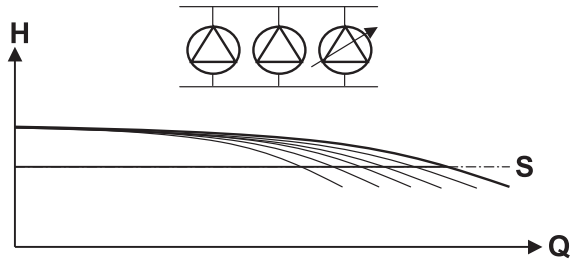

Figure 14: 3 pump operation, 1 pump variable

The Hydro-Unit MCF 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 Megacontrol 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 19: Specific parameter settings MCF

Parameter		Value
3-3-1	Number of pumps	1 2 3 4 5 6
3-3-2	Inlet	Switch Pressure Level / valve ON-OFF Level / valve prop.
3-3-3	Discharge	VFD change-over
3-4-3-1	Communication	Analog 0-20 mA / 4-20 mA
3-4-3-2	Proportional const.	3
3-4-3-3	Integral const.	0.9
3-5-1	Set point	.... kPa
3-5-3	Bandwidth	10
3-5-4	Accumulation press.	30 kPa
3-5-13	Low pressure alarm	100 kPa
3-6-1	Opt. pump starts/h	30
3-6-2	Min. run time	1 s
3-6-3	Min. run time corr.	0 s
3-6-8	Run-dry delay	Default 30 s
		Float/level control 1 s

9.5 Hydro-Unit MCMF

ATTENTION
See factory settings 3-2-2-1

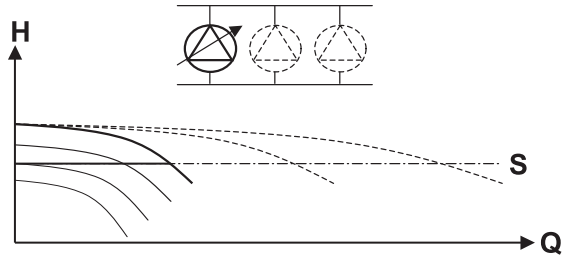

Figure 15: 1 pump operation, 1 pump variable

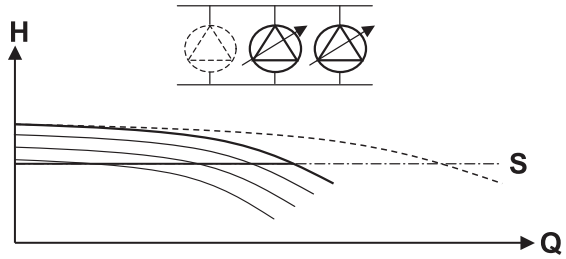

Figure 16: 2 pump operation, 2 pump variable

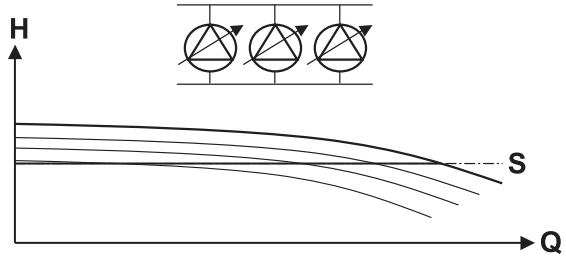

Figure 17: 3 pump operation, 3 pump variable

The Hydro-Unit MCMF is equipped with multiple variable frequency drives. 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 Megacontrol 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 20: Specific parameter settings MCMF

Parameter		Value
3-3-1	Number of pumps	1 2 3 4 5 6
3-3-2	Inlet	Switch Pressure Level / valve ON-OFF Level / valve prop.
3-3-3	Discharge	VFD fixed all
3-4-3-1	Communication	Danfoss VLT 2800 Danfoss MicroDrive Danfoss AquaDrive
3-4-3-2	Proportional const.	3
3-4-3-3	Integral time.	0.9
3-4-3-4	Differential time.	0
3-4-3-5-1	No flow bandwidth 0-1000 kPa	6
	0-2500 kPa	16
3-4-3-5-3	No flow step	1
3-4-3-9	VFD Ramp-Up	3
3-4-3-10	VFD Ramp-Down	3
3-4-3-11	VFD min. frequency	30
3-4-3-12	VFD max. frequency	160
3-4-3-13	P nominal of VFD	1500 See VFD
3-4-3-14	U nominal of VFD	400 See VFD
3-4-3-15	F nominal of VFD	50/60
3-4-3-16	I nominal of VFD	4 See VFD
3-4-3-17	RPM nominal of VFD	2880 See motor name plate
3-5-1	Set point	.... kPa
3-5-3	Bandwidth	10
3-5-4	Accumulation press.	30 kPa
3-5-13	Low pressure alarm	100 kPa
3-6-1	Opt. pump starts/h	30
3-6-2	Min. run time	1 s
3-6-3	Min. run time corr.	0 s
3-6-8	Run-dry delay	Default 30 s
		Float/level control 1 s

9.6 Hydro-Unit PumpDrive 2 Eco

ATTENTION
See factory settings 3-2-2-1

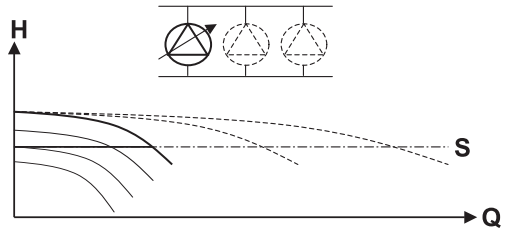

Figure 18: 1 pump operation, 1 pump variable

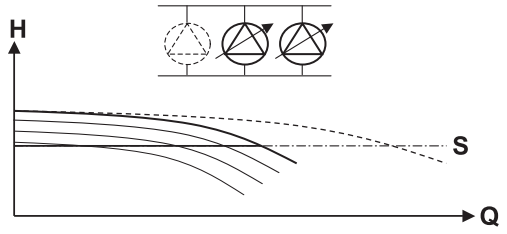

Figure 19: 2 pump operation, 2 pump variable

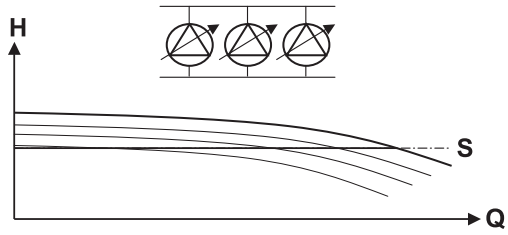

Figure 20: 3 pump operation, 3 pump variable

The Hydro-Unit Megacontrol is equipped with multiple variable frequency drives. 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 Megacontrol 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 21: Specific parameter settings Megacontrol

Parameter		Value
3-1-1-3-1	Pressure	kPa
3-3-1	Number of pumps	1 2
3-3-2	Inlet	Switch
3-3-3	Discharge	VFD fixed all
3-4-2-1	Sensor press. 4 mA	See pressure transmitter
3-4-2-2	Sensor press. 20 mA	See pressure transmitter
3-4-2-3	Pumps ON sensor fail	1
3-4-2-4	Max power	Limitation of the maximum power / maximum system load (1 pump is 100%)
3-4-3-1	Communication	PumpDrive 2
3-4-3-2	Proportional const.	3
3-4-3-3	Integral time.	0.9
3-4-3-4	Differential time.	0
3-4-3-5-1	No flow bandwidth 0-1000 kPa	6
	0-2500 kPa	16
3-4-3-5-2	No flow time	16
3-4-3-5-3	No flow step	3
3-4-3-5-4	No flow max. power	100
3-4-3-9	VFD Ramp-Up	Depends on motor size
3-4-3-10	VFD Ramp-Down	Depends on motor size
3-4-3-11	VFD min. frequency	30 Hz
3-4-3-12	VFD max. frequency	50/60 Hz
3-4-3-13	P nominal of VFD	Motorpower W
3-4-3-14	U nominal of VFD	400 V
3-4-3-15	F nominal of VFD	50/60 Hz
3-4-3-16	I nominal of VFD	Imax motor (by correct Fand U) / Imax VFD
3-4-3-17	RPM nominal of VFD	RPM at the correct F
3-5-1	Set point	400
3-5-3	Bandwidth	With pressure vessel 10 kPa / Without pressure vessel 20 kPa
3-5-4	Accumulation press.	30 kPa
3-5-5	Max.set point	See pressure class
3-5-11	High pressure alarm	See pressure class
3-5-13	Low pressure alarm	100 kPa
3-6-1	Opt. pump starts/h	30
3-6-2	Min. run time	10
3-6-3	Min. run time corr.	0
3-6-8	RDP delay	Default 30 s
		Float-level control 1 s

Table 22: Parameter list PumpDrive 2 Eco

Parameter	Description	Help text	Factory setting
3-1-2-2	Operating Keys Require Login	Direct access to the MAN, OFF, AUTO and FUNC operating keys can be disabled via this parameter.	1=ON
3-2-1	Nominal Motor Data	-	-
3-2-1-1	Nominal Motor Power	Nominal power of motor as per name plate	Minimum to maximum limit of value range set in kW
3-2-1-2	Nominal Motor Voltage	Nominal voltage of motor as per name plate	Minimum to maximum limit of value range set in V
3-2-1-3	Nominal Motor Frequency	Nominal frequency of motor as per name plate	Minimum to maximum limit of value range set in Hz
3-2-1-4	Nominal Motor Current	Nominal current of motor as per name plate	Minimum to maximum limit of value range set in A
3-2-1-5	Nominal Motor Speed	Nominal speed of motor as per name plate	Minimum to maximum limit of value range set in rpm
3-2-1-6	Nominal Cos Phi Value	Cos phi of motor at nominal power	0.00...1.00
3-2-2	Motor Speed Limitation	-	-
3-2-2-1	Minimum Motor Speed	-	3-11-1-1...3-2-2-2 (rpm)
3-2-2-2	Maximum Motor Speed	-	3-2-2-1...3-11-1-2 (rpm)
3-2-3	Thermal Motor Protection	-	-
3-2-3-1	PTC Analysis	Motor temperature monitoring	OFF ON
3-2-3-2	Thermal Motor Protection Behaviour	Behaviour for detection of excessive motor temperature	Self-acknowledging Non-self-acknowledging (Service Tool only)
3-2-4	Motor Direction of Rotation	Setting the direction of rotation of the motor with respect to the motor shaft	0=Clockwise 1=Anti-clockwise
3-3-1	Motor Control Method	Selecting the control method	Asynchronous Motor Vector Control
3-3-3-1	Start Automatic Motor Adaptation	2. Standard AMA: The extended motor data is determined by taking a measurement with the motor being at a standstill.	Standard AMA - Motor at Standstill
3-6	Open-loop and Closed- loop Control	-	-
3-6-1	Type of Control	Selecting the control method. The controller is deactivated when OFF (Open- loop Control) is selected.	1=Discharge Pressure
3-6-5-1	Fixed Speed 1	Fixed speed selectable via digital inputs	3-2-2-1...3-2-2-2
3-7-1	Role in Multiple Pump System	Selecting the role of the frequency inverter in a multiple pump configuration. The active master control device is responsible for starting and stopping pumps, as well as for open-loop and closed-loop control. All input variables required for open-loop or closed-loop control must be connected to the master control device and all redundant master control devices. The redundant master control device which is to serve as the active master control is selected automatically based on a configurable transfer time. Auxiliary control devices and redundant master control devices receive their control value from the master control device.	1=Auxiliary Control

Para-meter	Description	Help text	Factory setting
3-8-6-1	Digital Input 1 Function	Configurable function of digital input 1	No Function Control Digital Bit 0
3-8-6-2	Digital Input 2 Function	Configurable function of digital input 2	No Function Control Digital Bit 0
3-8-6-3	Digital Input 3 Function	Configurable function of digital input 3	No Function
3-9-8-1	Flow Rate Estimation	Activation of flow rate estimation	0=OFF
3-10-10-2	Upper Limit	Defining the upper limit value for warning. When the upper limit value is exceeded, a warning is triggered after the time delay has lapsed.	3-10-10-1...3-11-8-2 50/60 Hz
4-1-1	Device ID	User-defined device name for identifying the drive. The control panel just allows read-only access to this parameter. The device name can only be changed via the ServiceTool/APP.	1 - 6

9.7 Hydro-Unit Level control

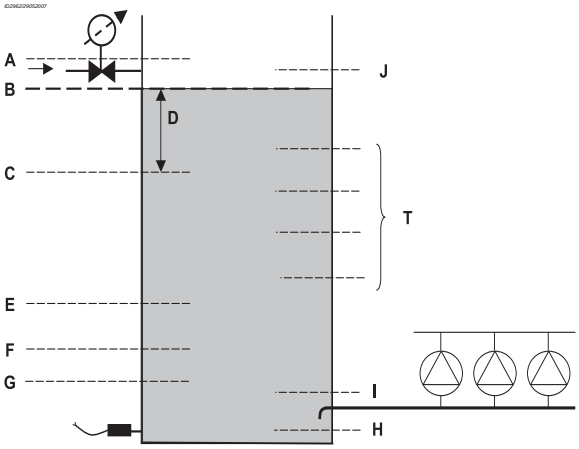

Figure 21: Megacontrol Level control

Table 23: Parameters supply valve ON/OFF

ID	Parameter	
	3-4-1-4-9	**Supply valve ON/OFF**
A	3-4-1-4-7	High water level
B	3-4-1-4-9-2	Level 1 closed
	3-4-1-4-9-4	Level 1A closed
C	3-4-1-4-9-1	Level 1 open
	3-4-1-4-9-3	Level 1A open
E	3-4-1-4-6	Critical water level
F	3-4-1-4-5	Low level reset
G	3-4-1-4-4	Low level shutdown

Table 24: Parameters supply valve prop.

ID	Parameter	
	3-4-1-4-10	**Supply valve prop.**
A	3-4-1-4-7	High water level
	3-4-1-4-10-1	Level setpoint 1
	3-4-1-4-10-2	Level setpoint 1A
	3-4-1-4-10-6	Open band
D	3-4-1-4-10-3	Hysteresis
E	3-4-1-4-6	Critical water level
F	3-4-1-4-5	Low level reset
G	3-4-1-4-4	Low level shutdown

Table 25: Parameters general.

ID	Parameter	
H	3-4-1-4-3	Sensor level
I	3-4-1-4-1	0% level
J	3-4-1-4-2	100% level

Table 26: Parameters threshold

ID	Parameter	
	3-4-1-4-8	**Threshold**
T	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 2 ON
	3-4-1-4-8-4	Threshold 2 OFF

ATTENTION
Treshold 1/2 contacts are only available with MCIII 6 pumps version by using max. 4 pumps.

9.8 Explanation of parameters

9.8.1 Pressure settings set points

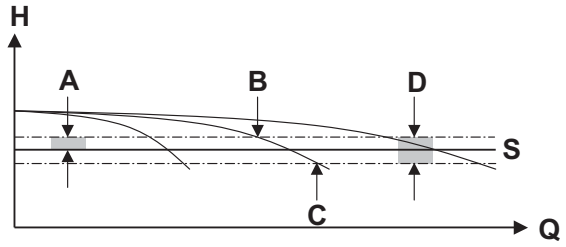

Figure 22: Pressure settings set points fixed speed

Table 27: Pressure settings set points fixed speed

ID	Parameter	
S	3-5-1	Set point
A	3-5-3	Bandwidth
B		Switch-off pressure
C		Switch-on pressure
D		2 x bandwidth

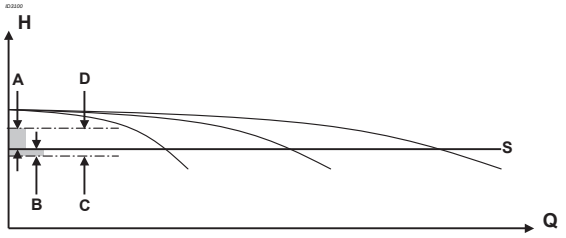

Figure 23: Pressure settings set points variable speed

Table 28: Pressure settings set points variable speed

ID	Parameter	
A	3-5-4	Accumulation pressure
B	3-5-3	Bandwidth
C		Switch-on pressure 1st pump
D		Switch-off pressure last pump
S	3-5-1	Set point

9.8.2 Delta P + correction

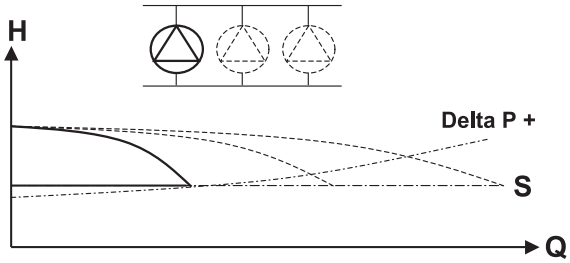

Figure 24: 1-pump operation

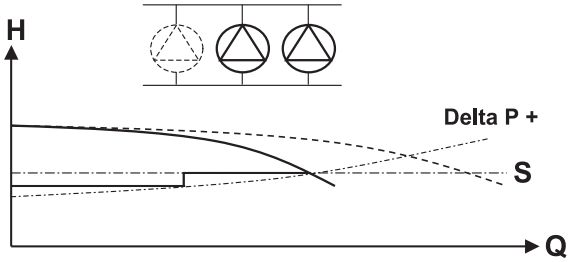

Figure 25: 2-pumps operation

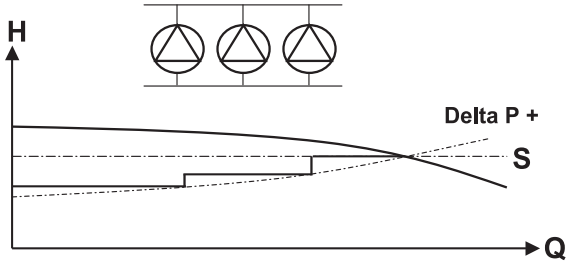

Figure 26: 3-pumps operation

Table 29: Parameters set points

ID	Parameter	
S	3-5-1	Set point
+	3-5-10	Delta P

Delta P +

$$y = \frac{\Delta p}{(n^2-1)} x^2 + SP - \frac{\Delta p}{(n^2-1)}$$

SP = Set point

y = New set point

Δp = Delta P (always positive)

n = Total number of pumps of the installation

x = Number of pumps switched on

9.8.3 Delta P - correction

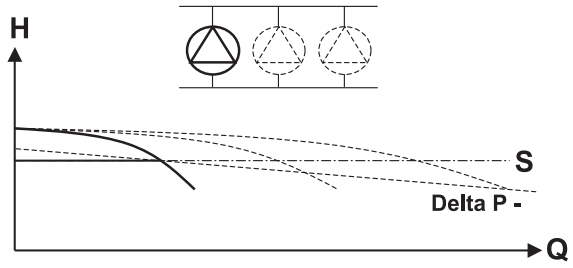

Figure 27: 1-pump operation

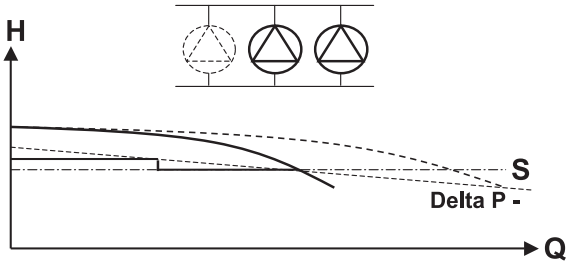

Figure 28: 2-pumps operation

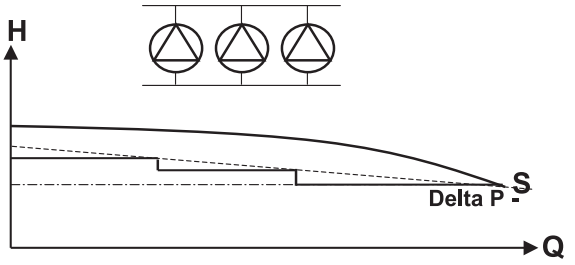

Figure 29: 3-pumps operation

Table 30: Parameters set points

ID	Parameter	
S	3-5-1	Set point
-	3-5-10	Delta P

Delta P -

$$y = \frac{\Delta p}{(1\text{-}n)} \times + SP - \frac{\Delta p}{(1\text{-}n)}$$

SP = Set point

y = New set point

Δp = Delta P (always positive)

n = Total number of pumps of the installation

x = Number of pumps switched on

9.8.4 Special input/output

Table 31: Special input/output

Input		
External off (27-29 NC)[1] [2]	The unit can be switched off through an external contact.	3-8-1-13 ON/OFF
Fire Alarm (28-29 NC)[3] [2]	All pumps can be switched on through an external contact.	3-8-1-14 ON/OFF
Function TH.FAIL. P1[2]		3-8-1-4 ON/OFF
Function TH.FAIL. P2[2]		3-8-1-5 ON/OFF
Function TH.FAIL. P3[2]		3-8-1-6 ON/OFF
Function TH.FAIL. P4[2]		3-8-1-7 ON/OFF
Function TH.FAIL. P5[2]		3-8-1-8 ON/OFF
Function TH.FAIL. P6[2]		3-8-1-9 ON/OFF
Input1 (connection WSD1 6-7)[4]	Only active when WSD parameter 3-3-4 is on 1 (off) or on 8 (temp).	See parameter 3-8-1-1 for extra functions if this input isn't used for the WSD function
Input2 (connection WSD2 8-9)	Only active when WSD parameter 3-3-4 is not on 3, 4, 6 or 7.	See parameter 3-8-1-2 for extra functions if this input isn't used for the WSD function
Input3 (connection WSD3 10-11)[3]	Only active when WSD parameter 3-3-4 is not on 4 or 7.	See parameter 3-8-1-3 for extra functions if this input isn't used for the WSD function

1. the entire control keeps functioning, but the pumps will be switched off.
2. This hardware function can be disabled. Default is enabled

3. Fire alarm has higher priority over all other alarms and will turn the pump ON.
4. This is a pulse contact

9.8.4.1 Definable I/O Par. 3-8

9.8.4.1.1 Definable inputs Par. 3-8-1

Inputs Par. 3-8-1-1/2/3 digital input on the WSD 1 to 3 hardware connections are only available when no function is chosen in par. 3-3-4 WSD

Function None:
No function is chosen the normal WSD 1 to 3 function is active see par. 3-3-4 WSD

Function Check run:
Extra parameter needed
Par. 3-7-3 Check run mode (Digital Input)
With this configuration, switching the digital input (WSD 1 to 3) will activate a check run for the pumps.

Function Alternate set point:
Extra parameter needed
Par. 3-5-9 Adapt. Set point (value of the set point)
With this configuration, switching the digital input (WSD 1 to 3) will activate an alternative set point.

Function Leakage:
With this configuration, switching the digital input (WSD 1 to 3) will create an urgent or non-urgent alarm for an external leakage alarm. A special relay is needed for leakage detection.

Function Remote Acknowledge:
With this configuration of the digital input (WSD 1 to 3) you can reset an alarm on the Megacontrol (only when the problem is solved).

Function By-pass valve:
With this function of the selected digital input (WSD 1 to 3) you can detect a signal of, for instance, a flow switch; based on this signal a by-pass valve may be opened. see also par. 3-14.

Function External power operation:
Extra parameter needed
Par. 3-4-2-5 Max power external operation (100%,200% etc.)
With this configuration of the digital input (WSD 1 to 3) you can reduce the number of pumps that can run, for instance in generator mode.

Input Par. 3-8-1-4
Function TH. FAIL P1
With this function you can activate or deactivate the digital input for thermal failure of pump 1
Deactivation of this input is only recommended in combination with the use of a VFD per pump.
If this function is activated you must connect a thermal failure signal of pump 1 or make a wire bridge between the com of the digital inputs and TH.FAIL P1 input.

Input Par. 3-8-1-5
Function TH. FAIL P2
With this function you can activate or deactivate the digital input for thermal failure of pump 2
Deactivation of this input is only recommended in combination with the use of a VFD per pump.
If this function is activated you must connect a thermal failure signal of pump 2 or make a wire bridge between the com of the digital inputs and TH.FAIL P2 input.

Input Par. 3-8-1-6
Function TH. FAIL P3
With this function you can activate or deactivate the digital input for thermal failure of pump 3
Deactivation of this input is only recommended in combination with the use of a VFD per pump.
If this function is activated you must connect a thermal failure signal of pump 3 or make a wire bridge between the com of the digital inputs and TH.FAIL P3 input.

Input Par. 3-8-1-7
Function TH. FAIL P4
With this function you can activate or deactivate the digital input for thermal failure of pump 4
Deactivation of this input is only recommended in combination with the use of a VFD per pump.
If this function is activated you must connect a thermal failure signal of pump 4 or make a wire bridge between the com of the digital inputs and TH.FAIL P4 input.

Input Par. 3-8-1-8
Function TH. FAIL P5
With this function you can activate or deactivate the digital input for thermal failure of pump 5
Deactivation of this input is only recommended in combination with the use of a VFD per pump.
If this function is activated you must connect a thermal failure signal of pump 5 or make a wire bridge between the com of the digital inputs and TH.FAIL P5 input.

Input Par. 3-8-1-9
Function TH. FAIL P6

With this function you can activate or deactivate the digital input for thermal failure of pump 6
Deactivation of this input is only recommended in combination with the use of a VFD per pump.
If this function is activated you must connect a thermal failure signal of pump 6 or make a wire bridge between the com of the digital inputs and TH.FAIL P6 input.

Input Par. 3-8-1-10
Function RDP
With this function you can activate or deactivate the digital input for run-dry protection via a digital contact e.g. Floater switch.
Deactivation of this input is only recommended in combination with the use of another protection device like a pressure transmitter on the suction side.If this function is activated you must connect a run-dry protection contact or make a wire bridge between the com of the digital inputs and the RDP input.

Input Par. 3-8-1-11
Function TFR
With this function you can activate or deactivate the digital input for the thermal failure of the VFD in the configuration VFD changeover.
If this function is activated you must connect a thermal failure signal from the VFD or make a wire bridge between the com of the digital inputs and the TFR input.

Input Par. 3-8-1-12
Function TVA
With this function you can activate or deactivate the digital input for the thermal failure of the supply valve in the configuration Level valve on/off.
If this function is activated you must connect a thermal failure signal of the supply valve or make a wire bridge between the com of the digital inputs and the TVA input.

Input Par. 3-8-1-13
Function Off
With this function you can activate or deactivate the digital input for the external off function.
If this function is activated you must connect an external signal off or make a wire bridge between the com of the digital inputs and the OFF input.

Input Par. 3-8-1-14
Function Fire
With this function you can activate or deactivate the digital input for the external fire function.
If this function is activated you must connect an external signal for fire alarm or make a wire bridge between the com of the digital inputs and the FIRE input.

9.8.4.1.2 Definable outputs Par. 3-8-2

Table 32: Special outputs

Parameter	Output		See param. for the function
3-8-2-1	Output1	P4	3-8-2-1
3-8-2-2	Output2	P5	3-8-2-2
3-8-2-3	Output3	P6	3-8-2-3
3-8-2-4	Output4	FR4	3-8-2-4
3-8-2-5	Output5	FR5	3-8-2-5
3-8-2-6	Output6	FR6	3-8-2-6

ATTENTION
Special outputs only available with the 6 pumps Megacontrol. They are only available if the connection is not occupied by a pump.

Output Par. 3-8-2-1/2/3/4/5/6 These digital outputs of pump 4/5/6 are only available when no pump function is selected to its output.

Function None:
No function is chosen the normal pump function is active (see parameter 3-3-1 number of pumps)

Function Treshold relay 1:
The function threshold relay is only available when in parameter 3-3-2 Inlet the function valve on/off or prop. is chosen.
Only after choosing the function “threshold relay”, the following parameters will be visible
Par. 3-4-1-4-8-1 Treshold 1 on
Par. 3-4-1-4-8-2 Treshold 1 off
With this configuration of the selected digital output (P4/P6 and FR4/FR6) you have an extra contact for control or signalling.

Function Treshold relay 2:
The function threshold relay is only available when in parameter 3-3-2 Inlet the function valve on/off or prop. is chosen.
Only after choosing the function “threshold relay”, the following parameters will be visible
Par. 3-4-1-4-8-3 Treshold 2 on
Par. 3-4-1-4-8-4 Treshold 2 off
With this configuration of the selected digital output (P4/P6 and FR4/FR6) you have an extra contact for control or signalling.

Function Input valve:

With this function the selected digital output (P4/P6 and FR4/FR6) follows the digital output of the valve on/off (digital output VA).

Function By-pass valve:
With this function the selected digital output (P4/P6 and FR4/FR6) can switch a valve see also par. 3-14

Function RDP alarm O/P:
With this function the selected digital output (P4/P6 and FR4/FR6) gives an alarm when the run-dry protection is activated, this is only applicable for run-dry contacts by float-switch or suction pressure transmitter.
See also par. 3-3-2 Inlet (switch or pressure).

Function Low water level:
With this function the selected digital output (P4/P6 and FR4/FR6) gives an alarm when the run-dry protection is activated, this only applicable for run-dry contact level transmitter.
See also par. 3-3-2 Inlet (valve on/off/ valve prop.).

Output Par. 3-8-2-7 Operation/Fail Relay
The function of the digital outputs are only available with par. 3-4-3-1 Communication PumpDrive 2.

Function: On/Off
Digital output of J602 P1/P2/P3 and J104 P4/P5/P6 are used for an external VFD running signal.
Digital output of J601 P1/P2/P3 and J103 P4/P5/P6 are used for an external VFD failure signal. (See figure 37 Megacontrol Lay-out 1-3 (1-6) pumps)

Output Par. 3-8-2-8 Conf. FR AO
If this output isn't used for par. 3-3-3 Discharge VFD changeover you can connect an analogue input to this analogue output or the system load to this output.

Function: System pressure:
The signal 4-20 mA of the discharge pressure transmitter is available to the output and can be used, for instance in a BMS, to indicate the discharge pressure (4-20 mA) at a distance.

Function: Inlet pressure:
The signal 4-20 mA of the suction pressure transmitter is available to the output and can be used, for instance in a BMS, to indicate the inlet pressure (4-20 mA) at a distance.

Function system load:
The system load is as 4-20 mA available, for instance in a BMS, for an indication of the pumps that are running.

Function level height:
The signal 4-20 mA of the level transmitter is available to the output and can be used, for instance in a BMS, to indicate the level pressure (4-20 mA) at a distance.

Output Par. 3-8-2-10 Conf. Valve AO
If this output isn't used for par. 3-3-2 Level on/off or Level prop. you can connect an analogue input to this analogue output or the system load to this output.

Function: System pressure:
The signal 4-20 mA of the discharge pressure transmitter is available to the output and can be used, for instance in a BMS, to indicate the discharge pressure (4-20 mA) at a distance.

Function: Inlet pressure:
The signal 4-20 mA of the suction pressure transmitter is available to the output and can be used, for instance in a BMS, to indicate the inlet pressure (4-20 mA) at a distance.

Function system load:
The system load is as 4-20 mA available, for instance in a BMS, for an indication of the pumps that are running.

Function level height:
The signal 4-20 mA of the level transmitter is available to the output and can be used, for instance in a BMS, to indicate the level pressure (4-20 mA) at a distance.

Pump changeover par. 3-13:
The function pump changeover is only applicable if par. 3-3-3 Discharge Fixed speed is selected.
When a pump is running continuously for instance circulation systems) the pump will switch over after a certain time (see par. 3-6-4 max run time) You can choose how the running pump must switch off.

Par. 3-13-1
Function underpressure:
Running pump must switch off before the 2e pump switch on (pressure drop is possible) delay time via Par. 3-13-2 Change over delay

Function overpressure:
Running pump must switch off after the 2e pump has switched on (pressure overshoot) delay time via Par. 3-13-2 Change over delay

Peak load pump par. 3-6-15:

In system whit a big difference in the flow/capacity of the pumps you can delay the switch on and switch off of the following pump(s)

Par. 3-6-15-1
Function Switch on delay
If a time is set in this parameter there is an delay to switch on the next pump after the discharge pressure has dropped beneath the set point.

Par. 3-6-15-2
Function Switch off delay
If a time is set in this parameter there is an delay to switch off the a pump after the discharge pressure is above the set point.

9.8.5 By Pass Valve par. 3-14

Par. 3-14-1

Function off:
No function is selected

Function Check run:
Extra parameters needed
Par. 3-14-2 Open delay
Par. 3-14-3 Close delay
Par. 3-8-2-1 / 3-8-2-6 Selection of the digital output witch can switch the by-pass valve.
With this function during the check run of the pump(s) a bypass valve is opened to avoid that the pump(s) are running hot.
With open delay you can determine when the bypass valve opens after the pump has started.
With close delay you can determine when the bypass valve must close before the pump must stop.

Function PT 1000:
Extra parameters needed
Par. 3-14-4 Temperature in Celsius
Par. 3-14-5 Flush time in seconds
Par.3-14-6 Attempts in 24 h
Par. 3-8-2-1 / 3-8-2-6 Selection of the digital output witch can switch the by-pass valve (flush valve)
With this function you can flush, for instance, a water tank when the medium temperature over a certain period is too high.
You can set the amount of attempts in 24 h when the temperature stays too high within this 24 h an urgent alarm will be raised.

Function Digital input:
Extra parameters needed
Par. 3-14-7 Minimum open time > in seconds
Par. 3-8-2-1 / 3-8-2-6 Selection of the digital output witch can switch the by-pass valve
With this configuration of the digital input you can switch an external bypass valve to create a minimal flow for the pump. Also is needed a contact from an external, for instance, flow switch.
When the pump is started also the by-pass valve is opened when the flow is sufficient the contact of the flow indicator switches off and the by-pass valve closes.
When the flow is reduced below a minimum the bypass valve opens again. If the pressure is above set point first the bypass valve will close and then the pump will stop.

Par. 3-4-1-4-10-6 Open band for a proportional valve
Function Level see par. 3-3-2 Inlet Level prop.
Par. 3-4-1-4-10-6 Open band in %
Par. 3-4-1-4-10-3 Hysteresis
Par. 3-4-1-4-10-1 Level set point 1
With this parameter you can give the proportional valve a minimum open signal
When the level in a tank is descending the proportional valve will start opening with this minimum band.
When the level is descending further the proportional valve will follow this signal to the value set in par. 3-4-1-4-10-3
When the level is raising the proportional valve will close till the value of the open band is reached.
Then proportional valve will be stopped (it remains open with the set value in par. 3-4-1-4-10-6)
When the level in the tank reaches the value of par. 3-4-1-4-10-1 the proportional valve will close immediately.

Par 3-4-3-28 Torque characteristics
Only applicable for the Danfoss VLT 2800

9.9 Break-Unit Megacontrol (Rainwater recovery)

It is possible to run three booster pumps and two rainwater pumps (only one running at the time) with the Control unit. Standard will be one or two booster pumps (only one running at the time) and one rainwater pump. The rainwater recovery unit is a separate variant of the 3-3-2 parameter.

ATTENTION
See factory settings 3-2-2-1

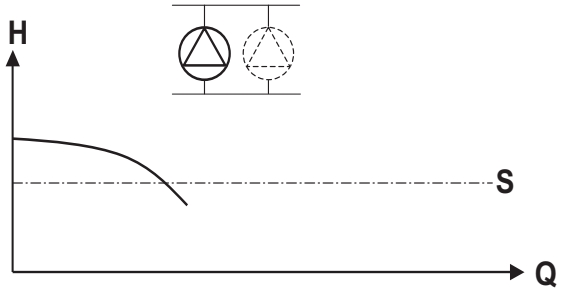

Figure 30: 1 pump operation

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

Table 33: Specific parameter settings Megacontrol

Parameter		Value
3-3-1	Number of pumps	1 2
3-3-2	Inlet	Rainwater
3-3-3	Discharge	Fixed Speed
3-4-1-4-11	Water supply control	
3-4-1-4-11-1	Level RW-pump Off	90% (B)[1]
3-4-1-4-11-2	Level RW-pump On	70% (C)[1]
3-4-1-4-11-3	Level DW-valve open	40% (X)[1]
3-4-1-4-11-4	Overflow protection	On
3-4-1-6	Potable water inlet	
3-4-1-6-1	Refresh intervall	336 h
3-4-1-6-2	Force refresh	Off
3-4-1-6-3	Refresh duration	10 s
3-4-1-7	Rainwater inlet	
3-4-1-7-1	Number of pumps	1
3-4-1-7-2	Max. Pumpstarts	30
3-4-1-7-3	Max. run time	1800 s
3-4-1-7-4	Check run interval	172800
3-4-1-7-5	Check run duration	2
3-5-1	Set point	400 kPa
3-5-3	Bandwidth	30
3-6-2	Min. run time	Default 180 s
		DOL ≤ 2.2 kW 90 s
3-6-3	Min. run time corr.	10 s
3-6-8	Run-dry delay	Float/level control 1

1. See Figure 31

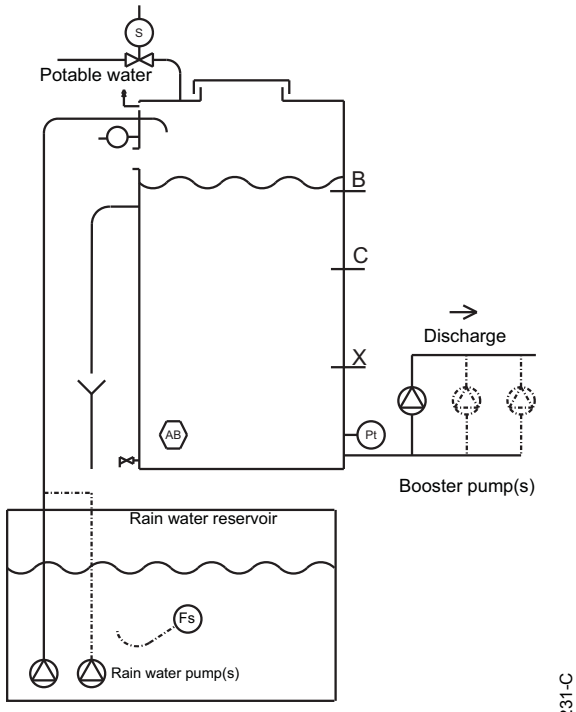

Figure 31: Example level indication

9.9.1 Explanation of parameters

9.9.1.1 Pressure settings set points

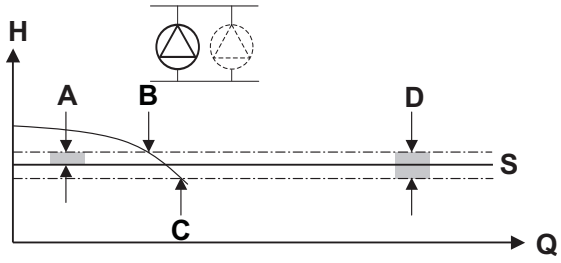

Figure 32: Pressure settings set points fixed speed

Table 34: Pressure settings set points fixed speed

ID	Parameter	
S	3-5-1	Set point
A	3-5-3	Bandwidth
B		Switch-off pressure
C		Switch-on pressure
D		2 x bandwidth

9.9.1.2 Delta P + correction

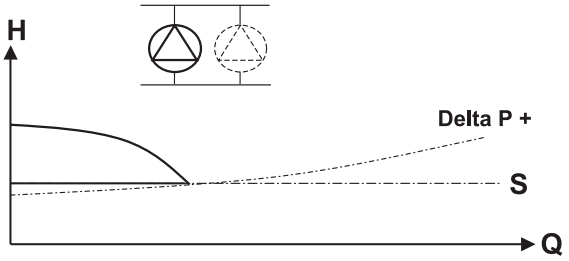

Figure 33: 1-pump on 1 pump stand-by

Table 35: Parameters set points

ID	Parameter	
S	3-5-1	Set point
+	3-5-10	Delta P

Delta P +

$$y = \frac{\Delta p}{(n^2-1)} x^2 + SP - \frac{\Delta p}{(n^2-1)}$$

SP = Set point

y = New set point

Δp = Delta P (always positive)

n = Total number of pumps of the installation

x = Number of pumps switched on

9.9.1.3 Delta P - correction

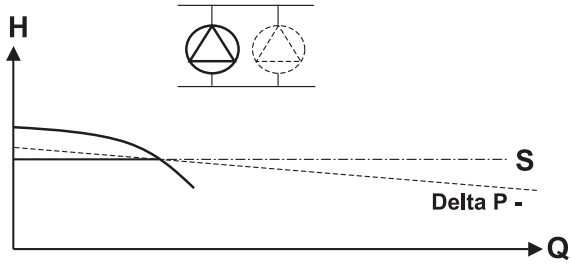

Figure 34: 1-pump on 1 pump stand-by

Table 36: Parameters set points

ID	Parameter	
S	3-5-1	Set point
-	3-5-10	Delta P

Delta P -

$$y = \frac{\Delta p}{(1-n)} x + SP - \frac{\Delta p}{(1-n)}$$

SP = Set point

y = New set point

Δp = Delta P (always positive)

n = Total number of pumps of the installation

x = Number of pumps switched on

9.9.2 Special input/output

Table 37: Special input/output

Input		
External from (27-29 NC)[1]	The unit can be switched off through an external contact.	
Fire Alarm (28-29 NC)[2]	All pumps can be switched on through an external contact.	
Input1 (connection WSD1 6-7)[3]	Only active when WSD parameter 3-3-4 is on 1 (off) or on 8 (temp).	See parameter 3-8-1-1 for extra functions if this input isn't used for the WSD function
Input2 (connection WSD2 8-9)[3]	Only active when WSD parameter 3-3-4 is not on 3, 4, 6 or 7.	See parameter 3-8-1-2 for extra functions if this input isn't used for the WSD function
Input3 (connection WSD3 10-11)[3]	Only active when WSD parameter 3-3-4 is not on 4 or 7.	See parameter 3-8-1-3 for extra functions if this input isn't used for the WSD function

1. the entire control keeps functioning, but the pumps will be switched off.
2. Fire alarm has higher priority over external contact ‘off’.
3. This is a pulse contact for WSD functions, for other applications, it can be used as NC contact.

10 Parameters

10.1 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 38: 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

10.1.1 Operation (Quick access button "pump")

Table 39: Parameter list Megacontrol version 1.7.1

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
1	Operation		e	n	Operating status and information
1-1	System		e	n	Information on the operating status and measure-ments of the complete system
1-1-1	System pressure		e	n	Actual system pressure (discharge side)
1-1-2	System load		e	n	Actual load in % of all pumps in operation (100% is one pump full speed)
1-1-3	RDP switch	**not present** present	e	n	Presence of a run dry protection signal by means of a pressure switch or float switch
1-1-4	Inlet pressure		e	n	Actual pressure at the inlet connection (suction side)
1-1-5	Level content in %		e	n	Actual water level in the receiver tank in % of the content (Storage tank at suction side)
1-1-6	Level height		e	n	Actual water height in the receiver tank (storage tank at suction side)
1-1-7	Ambient temp. (WSD)		e	n	Actual ambient temperature when temperature sensor is available (WSD functionality)
1-1-8	Digital inputs		s	s	Displaying the activity status of all the digital inputs 0 = not active 1 = active

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
1-1-9.1	Position suppl.valve		e	n	Position of the supply valve proportional 0% ... 100%
1-1-9.2	Position suppl.valve	**closed** open	e	n	Position of the supply valve 1 = open 2 = closed
1-1-10	Power down speed		s	n	Calculated power down speed if NFD is running in energy saving mode
1-1-11	state NFC	**nfdMin** nfdInactive nfdStableTime nfdGoingDown nfdFinished nfdMax	d	n	Shows the current state of the no flow detection.
1-1-12	used setpoint		d	n	used setpoint
1-1-13	NTC Temperature		d	n	On board NTC temperature
1-1-14	WSD pulses tank 1		e	n	WSD Pulse count of the tank 1
1-1-15	WSD pulses tank 2		e	n	WSD Pulse count of the tank 2
1-1-16	WSD pulses tank 3		e	n	WSD Pulse count of the tank 3
1-2	Pumps		e	n	Information on the operating status and measurements of the selected pump
1-2-1	Operating mode		e	e	Displaying operating mode of the selected pump
1-2-1.1.1 #0-0	Pump number	**1** 3	e	e	Selection of the pump of which the operating mode is required
1-2-1.2.1 #1-0	Operating mode	Automatic Manual (on 10s) **Disabled (off)**	e	e	Operating mode of the selected pump (continuous active) - Automatic - Manual (on) - Disabled (off)
1-2-2	Pump load		e	n	Displaying the load of the selected pump
1-2-3	Thermal fail. flags		s	n	Displaying the activity status of all thermal protection inputs 0 = not active 1 = active
1-2-4	Running hours pump		e	n	Displaying the total running hours per pump in HHHHHH MM
1-2-5	Number of pumpstarts		c	n	Displaying the total numbers of starts per pump
1-2-6	Rainwater pumps		e	n	Information on the operating status of rainwater pumps
1-2-6-1	Fill up to RW-p Off		e	e	Function to fill water reservoir up to level B with rain water.
1-2-6-2	Manual Run		e	e	Perform a manual run for a given duration.
1-2-6-2.1.1 #0-0	Rainwater pump	**1** 2	e	e	Selection of the pump of which the operating mode is required
1-2-6-2.2.1 #1-0	Duration (s)	1 **2** 3600	e	e	Duration of the manual run in seconds
1-2-6-3	Pump 1		e	n	Information on the operating status of rainwater pump 1
1-2-6-3-1	Mode	**OFF** ON	e	e	Off: Rainwater pump 1 is not used. On: Rainwater pump 1 is used
1-2-6-3-2	State	**OFF** ON	e	n	ON: pump is running, OFF: Pump is not running
1-2-6-3-3	Runtime	**0** 9000000	e	n	Accumulated Runtime of rainwater pump 1

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
1-2-6-3-4	Starts	**0** 9000000	e	n	Amount of pump starts of rainwater pump 1
1-2-6-4	Pump 2		e	n	Information on the operating status of rainwater pump 2
1-2-6-4-1	Mode	**OFF** ON	e	e	Off: Rainwater pump 2 is not used. On: Rainwater pump 2 is used
1-2-6-4-2	State	**OFF** ON	e	n	ON: pump is running, OFF: Pump is not running
1-2-6-4-3	Runtime	**0** 9000000	e	n	Accumulated Runtime of rainwater pump 2
1-2-6-4-4	Starts	**0** 9000000	e	n	Amount of pump starts of rainwater pump 2
1-3	Time and statistics		e	n	Operating time and statistics
1-3-1	Act runtime Op hours		e	n	Operating hours of the system in HHHHHH
1-3-2	Time to service		e	n	Period of time until next service / maintenance
1-3-3	Act Minimum Runtime		e	n	Actual minimum pump runtime in seconds
1-4	Debugging		f	f	
1-4-1	Reset cause	**No Reset** Power ON Reset Ext. Watchdog Reset Watchdog Reset Software Reset	f	n	
1-4-2	Power ON res. count		f	n	Power On reset counter
1-4-3	ExtWatchdogResCount		f	n	ExtWatchdogResCount
1-4-4	Software res. count		f	n	Software reset counter
1-4-5	Clear reset cause		f	f	Clear reset cause counter
1-4-6	OS Error		f	n	OS Error
1-4-7	hmiRamUsed		d	n	
1-4-8	hmiRomUsed		d	n	
1-4-9	hmi temperature		d	n	
1-4-10	ioRamUsed		d	n	
1-4-11	ioRomUsed		d	n	
1-4-12	Pump Load O/P	**OFF** ON	n	n	
1-4-13	PID Output		d	n	
1-4-14	PID before MinMax		d	n	
1-4-15	MPO Electrical Power		d	n	
1-4-16	MPO Shaft Power		d	n	
1-4-17	MPO Trigger Reason		d	n	
1-4-18	MPO Shaft Power P1		d	n	
1-4-19	MPO Shaft Power P2		d	n	

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
1-4-20	MPO Shaft Power P3		d	n	
1-4-21	MPO Shaft Power P4		d	n	
1-4-22	MPO Shaft Power P5		d	n	
1-4-23	MPO Shaft Power P6		d	n	
1-4-24	Debug Mode	**no debugging** 0x0A041 in minutes	d	d	

1. Bold is Factory setting.

10.1.2 Diagnosis (Quick access button "traffic light")

Table 40: Parameter list Megacontrol version 1.7.1

Parameter	Display text	Value description Min./Max.	Read	Write	Help text
2	Diagnosis		e	n	Monitoring and diagnosis
2-1	General		e	n	General diagnosis and monitoring functions
2-1-1	Active Messages		e	c	Actual failure and warning messages
2-1-2	History		e	n	History of all failure and warning messages
2-1-3	Acknowledge All		e	e	Accept / Acknowledge all failure and warning messages
2-1-4	Clear History		s	s	Deleting the history of all failure and warning messages

10.1.3 Settings (Quick access button "tool set")

Table 41: Parameter list Megacontrol version 1.7.1

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3	Settings		e	n	Settings
3-1	HMI		e	n	Human Machine Interface (HMI)
3-1-1	Basic settings		e	n	Basic settings for HMI
3-1-1-1	Language	**English** Deutsch Nederlands Francais polish Türk	e	e	Language settings
3-1-1-2	Backlight		e	e	Backlight settings
3-1-1-2-1	Mode	Always on **Timed off**	e	e	The configuration of the display backlight (Note: a long-term illumination will shorten the life time)
3-1-1-2-2	Backlight Time	10 **600** 999	e	s	Timer setting for automatic ending the back-light after use
3-1-1-3	Displayed units		e	n	Setting of the required units in which the system values will be displayed

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-1-1-3-1	Pressure	**kPa** bar PSI feet mwc	e	s	Unit for the pressure values
3-1-1-3-2	Height	**cm** m	e	s	Unit for the values of the water level height in the receiver tank (storage tank at suction side)
3-1-1-3-3	Temperature	**°C** °F	e	s	Unit of the temperature when temperature sensor is available (WSD functionality)
3-1-1-4	LCD Contrast		e	e	Setting of the LCD contrast
3-1-1-4.1.1 #0-0	contrast	5 **13** 20	e	e	
3-1-2	Fieldbus		n	n	Fieldbus Settings
3-1-2-1	Fieldbus Type	**no module** Profibus Modbus	n	n	Type of the connected fieldbus module
3-1-4	Logo		s	n	Setting of the required logo at system (reboot)
3-1-4-1	Logo	**dp** None	s	s	Setting of the required logo at system (reboot
3-2	Device		e	n	Device-specific settings
3-2-1	Login		e	n	Login to have access to the required user level
3-2-1-1.1	PIN		e	n	Enter access level and personal identification number
3-2-1-1.1.1 #0-0	Access Level	**User Level** Service Level Factory Level	e	e	Access Level
3-2-1-1.1.2 #0-1	PIN acceptance	**0** 9999	e	e	PIN acceptance message
#0-0	Login	**Login ok** Login failed	e	e	Login
3-2-1-1.2	PIN		f	n	Enter access level and personal identification number
3-2-1-1.2.1 #0-0	Access Level	**User Level** Service Level Factory Level Development Level	f	f	Access Level
3-2-1-1.2.2 #0-1	PIN acceptance	**0** 9999	f	f	PIN acceptance message
#0-0	Login	**Login ok** Login failed	f	e	Login
3-2-1-2	Login required	no **yes**	c	c	Login procedure required yes/no
3-2-2	Service		c	n	Service settings
3-2-2-1	Factory setting		c	c	Reset to factory basic / default parameter settings
#0-0	Reset default param.	**Reset ok** No set available	c	c	Reset to basic / default parameter settings
3-2-2-2	Reset Srv Interval		s	s	Reset the service interval
#0-0	Reset Srv Interval	OK Failed	s	s	Reset the service interval
3-2-2-3	Customer setting		c	c	Load locally saved parameters

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
#0-0	Load loc. param.	Reset ok No set available	c	c	Load locally saved parameters
3-2-2-4	Save custom. setting		c	c	Save of the customer setting
3-2-2-5	Save factory setting		f	f	Save of the factory settings
3-2-2-6	Default setting		s	s	Reset to default setting
3-2-2-6.1.1 #0-0	Reset default param.	**default** Hyamat K Hyamat V Hyamat SVP HyaEco VP	s	s	Reset to basic / default parameter settings
3-2-2-7	Edit Pump Opera. hrs		s	s	Edit Pumps operating hours
3-2-2-7.1.1 #0-0	Pump number	**1** 3	s	s	Pump number
3-2-2-7.2.1 #1-0	Hours	**0** 500000	s	s	Hours
3-2-2-7.2.2 #1-1	Minutes	**0** 59	s	s	Minutes
3-2-2-7.2.3 #1-2	Seconds	**0** 59	s	s	Seconds
3-2-2-8	Reset Sys. Oper. hrs		s	s	Reset the system operating hours
#0-0	Reset Oper. hours	**OK** Failed	s	s	Reset the system operating hours
3-2-2-9	Reset hrs/starts		s	s	Reset pump operating hours and pump starts
3-2-2-9.1.1 #0-0	Pump number	**1** 3	s	s	Pump number
3-2-2-10	Rainwater pumps		s	s	
3-2-2-10-1	Reset hrs/starts		s	s	Reset pump operating hours and pump starts
3-2-2-10-1.1.1 #0-0	Pump number	**1** 2	s	s	Pump number
3-2-3	Factory Test		f	n	
3-2-3-1	Factory Test		f	f	
3-2-3-1.1.1 #0-0	Test result	**Failed** Passed	f	f	
3-3	Configuration		e	n	System configuration
3-3-1	Number of pumps	1 **3** 6	e	s	Total number of pumps in the system
3-3-2	Inlet	**Switch** Pressure Flow Control Level / valve on-off Level / valve prop. Rainwater	e	s	Setting of the applicable configuration at the inlet connection (suction side of the system)
3-3-3	Discharge	**Fixed speed** One jockey Two jockey VFD chang-over VFD fixed all	e	s	Setting of the applicable configuration at the discharge connection (pressure side of the system)

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-3-4	WSD	**OFF** 1 tank 2 tanks 3 tanks 1 tank + temp 2 tanks + temp 3 tanks + temp Temperature	e	s	Setting of the applicable configuration of the WSD: (membrane tank refreshments and ambient temp.)
3-3-5	Leakage detection	ON **OFF**	e	s	Leakage detection
3-3-6	MPO Functionality	**OFF** ON	s	s	Synchron pump operation
3-3-7	PumpMode int/ext	**Internal** External	e	s	Pump mode is either Internaly (Via HMI or Service) or externaly (via digital input) changed.
3-4	System settings		e	n	System parameter settings
3-4-1	Inlet		e	n	Parameter setting for the inlet connection (suction side of the system)
3-4-1-1	Sensor press. 4 mA	-100 **0** 1000	e	s	Measured value at 4mA
3-4-1-2	Sensor press. 20 mA	0 **1000** 9999	e	s	Measured value at 20mA
3-4-1-3	Damp. Time Inlet	100 **200** 2000	f	f	Damping time for smoothing the measured value, to compensate peaks in the measured values
3-4-1-4	Level config		e	s	Parameter setting for the level control in the receiver tank (storage tank at suction side)
3-4-1-4-1	0% level	**0** 99	e	s	Lowest possible level in the receiver tank at which no air is sucked in. In relation to the bottom
3-4-1-4-2	100% level	0 **200** 999	e	s	Highest possible level in the receiver tank before overflow is triggered. In relation to the bottom.
3-4-1-4-3	Sensor level	-100 **0** 999	e	s	The position where the level sensor is located in the receiver tank. In relation to the bottom.
3-4-1-4-4	Low level shut down	0 **10** 99.9	e	s	Low water level to protect the pumps for dry running. (system shut down)
3-4-1-4-5	Low level reset	0 **15** 99.9	e	s	Reset level to reset the system after low level shut down
3-4-1-4-6	Critical water level	0 **30** 99.9	e	s	Critical level at which the tank threatens to become empty. (back-up storage left)
3-4-1-4-7	High water level	0 **105** 199.9	e	s	High water level at which the tank threatens to become over-full
3-4-1-4-8	Threshold		e	s	Menu for having one or two extra contacts switched at a level set as required
3-4-1-4-8-1	Threshold 1 ON	0 **50** 199.9	e	s	Water level at which the relays output becomes ""high""

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-4-1-4-8-2	Threshold 1 OFF	0 **50** 199.9	e	s	Water level at which the relays output becomes ""low""
3-4-1-4-8-3	Threshold 2 ON	0 **40** 199.9	e	s	Water level at which the relays output becomes ""high""
3-4-1-4-8-4	Threshold 2 OFF	0 **40** 199.9	e	s	Water level at which the relays output becomes ""low""
3-4-1-4-9	Supply valve ON/OFF		e	n	The supply valve open/closed with which the receiver tank is filled
3-4-1-4-9-1	Level 1 open	0 **70** 99.9	e	s	Level in the receiver tank at which the supply valve is opened
3-4-1-4-9-2	Level 1 closed	0 **90** 99.9	e	s	Level in the receiver tank at which the supply valve is closed
3-4-1-4-9-3	Level 1A open	0 **40** 99.9	e	s	Alternative level (Clock alternated) in the receiver tank at which the supply valve is opened
3-4-1-4-9-4	Level 1A closed	0 **60** 99.9	e	s	Alternative level (Clock alternated) in the receiver tank at which the supply valve is closed
3-4-1-4-10	Supply valve prop.		e	n	The supply valve proportional opened with which the receiver tank is filled
3-4-1-4-10-1	Level setpoint 1	0 **80** 99.9	e	s	Maximum level in the receiver tank at which the proportional valve is fully closed
3-4-1-4-10-2	Level setpoint 1A	0 **40** 99.9	e	s	Alternative level (Clock alternated) in the receiver tank at which the proportional valve is fully closed
3-4-1-4-10-3	Hysteresis	0 **15** 99.9	e	s	Differential level in the receiver tank at which the proportional valve is fully opened
3-4-1-4-10-4	Sample time	0 **10** 99	e	s	Time between the level measurements controlling the proportional valve position
3-4-1-4-10-5	Analog output	**4-20 mA** 0-20 mA	e	s	Analog output configuration, 4-20mA / 0-20mA
3-4-1-4-10-6	Open band	0 **2** 15	e	s	Band below the setpoints 1 and 1A, at which the prop. control of the valve is suppressed.
3-4-1-4-11	Water supply control		e	s	
3-4-1-4-11-1	Level RW-pump Off	70 **90** 99.9	e	s	Level in the tank at which the rainwater pump is switched off.
3-4-1-4-11-2	Level RW-Pumpe On	40 **70** 90	e	s	Level in the tank at which the rainwater pump is switched on and the potable water inlet valve is closed.
3-4-1-4-11-3	Level DW-valve open	0 **40** 70	e	s	Level in the tank at which the potable water inlet valve is opened.
3-4-1-4-11-4	Overflow protection	**OFF** ON	e	s	Overflow protection to stop any water inlet if digital input "Leakage" is activated.

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-4-1-5	Auto. Setpoint Redu.		e	n	Automatic setpoint reduction by low inlet pressure
3-4-1-5-1	ASR function	**OFF** ON	e	s	Automatic setpoint reduction function
3-4-1-5-2	Switch on point	100 **200** 400	e	s	The pumps are switched On, if inlet pressure is above switch-On point for more then Switch-On time
3-4-1-5-3	Inlet Set point	**100** 400	e	s	Inlet setpoint used for automatic reduction by low inlet pressure
3-4-1-5-4	Switch off point	0 **90** 100	e	s	The pumps are switched off, if inlet pressure is below switch-off point for more then switch-off time
3-4-1-5-5	Proportional const.	0 **3** 10	e	s	Proportional amplification factor the system pressure is controlled with
3-4-1-5-6	Integral time	0 **0.9** 60	e	s	Speed with which the deviation of the required system pressure is adjusted
3-4-1-5-7	Differential time	**0** 99.99	e	s	The level of damping with which the deviation of the required system pressure is controlled
3-4-1-5-8	ARW delay factor	5/100	d	d	Setting for ARW control, sampletime factor tarw >= 5 * ts
3-4-1-5-9	Switch On time	0 **5** 60	s	s	Switching on time after Automatic setpoint reduction shutdown alarm
3-4-1-5-10	Switch Off time	0 **5** 60	s	s	Shutdown is not actived if the inlet pressure is not less then set value for switch-off time
3-4-1-6	Potable water inlet		e	s	
3-4-1-6-1	Refresh intervall	0 **336** 999	e	s	Time duration between two potable water refreshment sequences of the inlet
3-4-1-6-2	Force refresh	**OFF** ON	e	s	Forced potable water refrehment of the inlet also if water level in tank is higher than level B.
3-4-1-6-3	Refresh duration	0 **10** 300	e	s	Time duration for potable water refreshment of the inlet
3-4-1-7	Rainwater inlet		e	s	
3-4-1-7-1	Number of pumps	1 **2**	e	s	Number of rainwater pumps
3-4-1-7-2	Max. pumpstarts	1 **30** 60	e	s	Maximum allowed starts per hour of rainwater pump
3-4-1-7-3	Max. run time	0 **1800** 3600	e	s	Maximum continuous run time of the rainwater pump. After this time the rainwater pump will be forced to change over.
3-4-1-7-4	Check run interval	0 **172800** 2592000	e	s	The interval time between the check runs applicable for rain water pumps not operating.
3-4-1-7-5	Check run duration	0 **2** 60	e	s	The check-run time per pump.
3-4-2	Discharge		e	s	Discharge pressure settings

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-4-2-1	Sensor press. 4 mA	-100 **0** 1000	e	s	Measured value at 4mA
3-4-2-2	Sensor press. 20 mA	0 **1000** 9999	e	s	Measured value at 20mA
3-4-2-3	Pumps ON sensor fail	**0** 3	e	s	Number of pumps that is started in case of a failure of the pressure sensor on the discharge side.
3-4-2-4.1	Max power	0 **600**	n	e	dummy to map slection ENUM to UINT16
3-4-2-4.2	Max power	100% 200% **300%** 400% 500% 600%	e	s	Limitation of the maximum power / maximum system load (1 pump is 100%)
3-4-2-5.1	Max power ext. oper.	0 **600**	n	e	dummy item to map selection ENUM to UINT16
3-4-2-5.2	Max power ext. oper.	100% 200% **300%** 400% 500% 600%	e	s	Limitation of the maximum power / maximum system load, when external power supply operation is active
3-4-2-6	Damp. Time P. Sensor	100 **200** 2000	f	f	Damping time for smoothing the measured value, to compensate peaks in the measured values
3-4-3	Variable freq. drive		e	n	Configuration of variable frequency drive
3-4-3-1	Communication	**None** Analog 4-20mA Analog 0-20mA PumpDrive 1 PumpDrive 2 Danfoss VLT 2800 Danfoss MicroDrive Danfoss AquaDrive	e	s	Configuration of the communication protocol of the frequency converter
3-4-3-2	Proportional const.	0 **3** 100	e	s	Proportional amplification factor the system pressure is controlled with
3-4-3-3	Integral time	0 **0.9** 60	e	s	Speed with which the deviation of the required system pressure is adjusted
3-4-3-4	Differential time	**0** 99.99	e	s	The level of damping with which the deviation of the required system pressure is controlled
3-4-3-5	No flow detection		e	s	Accuracy of which the minimum water demand ""no-flow"" is detected (System switch-off procedure)
3-4-3-5-1	No flow bandwith	0 **6** 50	s	s	Bandwith of the no flow detection
3-4-3-5-2	No flow time	0 **16** 600	s	s	Time of the no flow detection in s
3-4-3-5-3	No flow step	1 **3** 50	s	s	Step height of the no flow detection in %

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-4-3-5-4	No flow max. power	0 **100**	s	s	No flow detection is active below this Pump load in %
3-4-3-9	VFD Ramp-Up	0.1 **3** 999	e	s	Setting of the ramp-up of the VFD
3-4-3-10	VFD Ramp-Down	0.1 **3** 999	e	s	Setting of the ramp-down of the VFD
3-4-3-11	VFD min. frequency	0 **30** 140	e	s	Minimum frequency of the VFD
3-4-3-12	VFD max. frequency	30 **50** 140	e	s	Maximum frequency of the VFD
3-4-3-13	P nominal of VFD	0 **1500** 100000	e	s	nominal power of the VFD
3-4-3-14	U nominal of VFD	0 **400** 500	e	s	nominal voltage of the VFD
3-4-3-15	F nominal of VFD	**50** 140	e	s	nominal frequency of the VFD
3-4-3-16	I nominal of VFD	0 **4** 450	e	s	nominal current of the VFD
3-4-3-17	RPM nominal of VFD	0 **2880** 10000	e	s	nominal speed of the VFD
3-4-3-18	BCC Failure DelayCnt	0 **1** 200	d	d	BCC Failure Delay Count
3-4-3-19	ARW delay factor	5 **50** 200	d	d	Setting for ARW control, sampletime factor tarw >= 5 * ts
3-4-3-20	Motor Speed Unit	**RPM** Hz	e	s	Unit of motor speed
3-4-3-21	Digital I/P 33 func.	**No Function** Coasting stop inv.	e	s	Selection of digital input
3-4-3-22	Digital I/P 29 func.	**No Function** Jog Function Jog Function	e	s	Selection of digital input
3-4-3-23	Jog frequency	30 **50**	e	s	Motor speed manual mode
3-4-3-24	Jog ramp time	0.04 **5** 3600	e	s	Ramp time
3-4-3-25	Costing select	Digital Input Bus Digital And Bus **Digital Or Bus**	e	s	Selection manual mode
3-4-3-26	Start select	Digital Input Bus Digital And Bus **Digital Or Bus**	e	s	Selection start signal

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-4-3-27	Slip Compensation	-400 **0** 399	e	s	Slip Compensation of the VFD
3-4-3-28	Torque Characterist.	Constant torque Low,Medium,High **Low, const. start** Medium, const. start High, const. start Special Motor Mode	e	s	
3-4-3-29	Fuction Relay 1	**No Function** Drive ready Drive running	e	s	
3-4-3-30	Fuction Relay 2	**No Function** Drive ready	e	s	
3-4-4	WSD settings		e	n	WSD functionality settings
3-4-4-1	Nbr of refreshments	0 **30** 99	e	s	Numbers of refreshments of the membrane tank. (water entering the tank)
3-4-4-2	Refresh time span	0 **24** 999	e	s	Time span of the numbers of refreshments
3-4-4-3	Average room temp.	0 **25** 50	e	s	Average (pump) room temperature.
3-4-4-4	Room temp. time span	0 **24** 999	e	s	Time span of average (pump) room temperature
3-4-5	MPO settings		e	c	MPO functionality settings
3-4-5-1	High Load Profile	Linear **Cube**	c	d	High load profile
3-4-5-2	Rated Freq	45 **50**	e	s	
3-4-5-3	Switch On Freq.	31 **49** 50	e	s	
3-4-5-4	Switch Off Freq.	30 **31** 49	e	s	
3-4-5-5	Cubic setting		e	s	Cubic Paramter settings
3-4-5-5-1	Power 1	0 **1.5** 100	e	s	
3-4-5-5-2	Power 2	0 **1.5** 100	e	s	
3-4-5-6	Linear setting		e	s	Linear Paramter settings
3-4-5-6-1	Power 1	0 **1.5** 100	e	s	
3-4-5-6-2	Power 2	0 **1.5** 100	e	s	

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-4-5-6-3	Power 3	0 **1.5** 100	e	s	
3-4-5-6-4	Power 4	0 **1.5** 100	e	s	
3-4-5-7	Motor settings		e	n	Motor Paramters settings
3-4-5-7-1	Rated Motor Power	0 **1.5** 110	e	s	Motor rating plate
3-4-5-7-2	Rated Motor Speed	300 **1425** 3600	e	s	Motor rating plate
3-4-5-7-3	Rated Freq	45 **50**	e	s	Motor rating plate
3-4-5-7-4	Rated Current	0.1 **10** 999	e	s	Motor rating plate
3-4-5-7-5	Rated Cosphi	0.1 **0.81** 0.99	e	s	Motor rating plate
3-4-5-8	Pump parameters		e	n	Pump Paramters settings
3-4-5-8-1	Rated Pump Speed	300 **2900** 36000	e	s	Pump rating speed
3-5	Pressure		e	n	System pressure settings
3-5-1	Set point	0 **400** 1000	e	c	System pressure set point
3-5-3	Bandwidth	0 **5** 999	e	c	Bandwidth
3-5-4	Accumulation press.	0 **30** 999	e	c	Membrane tank (water) pressure accumulation prior to the system switch-off
3-5-5	Max.set point	400 **1000**	e	s	Upper limit for the setpoint value to be set by the customer
3-5-9	Adapt. setpoint	0 **400** 1000	e	c	Alternative setpoint alternating by clock settings.
3-5-10	Delta p	-999 **0** 999	e	c	Quadratic function to correct the setpoint when a pump is switching on or off
3-5-11	High pressure alarm	400 **1000**	e	c	Upper limit value for the system pressure to shut down or notification only (signal)
3-5-12	High pressure action		e	c	Selection parameter to define the action at system over-pressure (shut down or signal only)
3-5-12.1.1 #0-0	High pressure action	**shutdown pumps** only message	e	c	Selection parameter to define the action at system over-pressure (shut down or signal only)
3-5-13	Low pressure alarm	**0** 400	e	c	Under limit value for the system pressure to shut down or notification only (signal)

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-5-14	Low pressure action		e	c	Selection parameter to define the action at system under-pressure (shut down or signal only)
3-5-14.1.1 #0-0	Low pressure action	**shutdown pumps** only message	e	c	Selection parameter to define the action at system under-pressure (shut down or signal only)
3-5-15	Shut down RDP	-100 **20** 80	e	c	Low inlet pressure or level to protect the pumps for dry running. (system shut down)
3-5-16	Reset RDP	20 **80** 9999	e	c	Reset pressure or level to reset the system after run dry protection shut down
3-5-17	Press. Flow Control	0 **100** 1000	e	s	Failure no water available gets active if setpoint - adjusted pressure is exeeded
3-6	Timer settings		e	n	Timer parameter configuration
3-6-1	Opt. pump starts /h	0 **10** 99	e	s	The optimum nrs of pump starts per hour. The minimum run time will be automatically corrected.
3-6-2	Min. run time	0 **180** 999	e	c	The minimum time of the pump to run. (the run time correction will not drop below this value)
3-6-3	Min. run time corr.	0 **10** 99	e	s	Adapting the Minimum run time to optimize the required number of pump starts per hour.
3-6-4	Max. run time	0 **86400** 604800	e	s	Maximum continuous run time of the pump. After this time the pump will be forced to change over.
3-6-5	Start delay	0 **1** 999	e	s	Start delay to switch the pumps on when pressure remains low
3-6-6	Stop delay	0 **1** 999	e	s	Stop delay to switch the pumps off when pressure remains high.
3-6-8	RDP delay	0 **10** 999	e	s	Delay time after run-dry protection to shut down the system
3-6-9	High/low alarm delay	10 **60** 999	e	s	Permitted time of setpoint pressure deviation > too high or too low system pressure.
3-6-10	WSD 1 pulse length	0 **4** 99	e	s	Length in time of the water flow detection device (flow position) digital input 1
3-6-11	WSD 2 pulse length	0 **4** 99	e	s	Length in time of the water flow detection device (flow position) digital input 2
3-6-12	WSD 3 pulse length	0 **4** 99	e	s	Length in time of the water flow detection device (flow position) digital input 3
3-6-13	Sys. start up delay	0 **10** 32	s	s	Delay time for starting up system
3-6-14	Jockey min. run time	**0** 999	s	s	The minimum time of the Jockey pump to run.
3-6-15	Peak load pump		c	n	Behaviour of peak load pump

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-6-15-1	Switch on delay	**0** 240	c	c	Debounce time to avoid switching On the pump, when actual value is less then setpoint minus bandwidth
3-6-15-2	Switch off delay	**0** 240	c	c	Debounce time to avoid switching Off the pump, when actual value is more then setpoint plus bandwidth
3-7	Time/Date		e	n	Date and time
3-7-1	Date		e	c	Setting the date
3-7-1.1.1 #0-0	Year	1970 **2007** 2099	e	c	Setting the actual Year
3-7-1.1.2 #0-1	Month	**1** 12	e	c	Setting the actual Month
3-7-1.1.3 #0-2	Day	**1** 31	e	c	Setting the actual Day
3-7-2	Time		e	c	Setting the time
3-7-2.1.1 #0-0	Time	**0** 86399	e	c	Setting the time HH:MM:SS
3-7-3	Check run mode	OFF Digital Input **Interval based** Time of day based Time of week based	e	c	Select how and when a checkrun should be performed. (check run only on pumps which did not run)
3-7-4	Check run interval	30 **86400** 100000	e	s	The interval between the check runs Applicable for pumps not operation for 24h.
3-7-5	Check run at		e	c	Setting the clock when a check run is required. Applicable for pumps not operation for 24h.
3-7-5.1.1 #0-0	Hours	**0** 23	e	c	Setting the hours of the check run clock
3-7-5.1.2 #0-1	Minutes	**0** 59	e	c	Setting the minutes of the check run clock
3-7-6	Check run at		e	c	Setting the date and clock when a check run is required. Applicable for pumps not operation for 24h.
3-7-6.1.1 #0-0	Hours	**0** 23	e	c	Setting the hours of the check run clock
3-7-6.1.2 #0-1	Minutes	**0** 59	e	c	Setting the minutes of the check run clock
3-7-6.1.3 #0-2	Day	**Sunday** Monday Tuesday Wednesday Thursday Friday Saturday	e	c	Setting the day of the check run clock
3-7-7	Check run duration	**0** 30	e	s	The check-run time per pump. (one at the time and alternating)
3-7-8	Clock adapt setp.		e	n	Alternative setpoint which will be active on clock settings

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-7-8-1	Adaptation mode	**OFF** Adapt ON/OFF ev. day Adapt.ON/OFF per day	e	c	Setting the adaptation mode of the alternative set-point.
3-7-8-2	Change on/off times		e	c	The alternation to an alternative setpoint becomes active/ will be undo at the selected time.
3-7-8-2.1.1 #0-0	Hours adapt setp.ON	**0** 23	e	c	Setting the hours at which the alternation to a alternative setpoint becomes active
3-7-8-2.1.2 #0-1	Min adapt setp.ON	**0** 59	e	c	Setting the minutes at which the alternation to a alternative setpoint becomes active
3-7-8-2.1.3 #0-2	Hours adapt setp.OFF	**0** 23	e	c	Setting the hours at which the alternation to a alternative setpoint will be undo
3-7-8-2.1.4 #0-3	Min adapt setp.OFF	**0** 59	e	c	Setting the minutes at which the alternation to a alternative setpoint will be undo
3-7-8-3	Select day of week	**Sunday** Monday Tuesday Wednesday Thursday Friday Saturday	e	c	Setting the day at which the alternation to a alter-native setpoint becomes active
3-7-8-4	Change on/off times		e	c	The setpoint alternation becomes active/ will be undo at the selected time of the selected day's)
3-7-8-4.1.1 #0-0	Hours adapt setp.ON	**0** 23	e	c	Setting the hours at which the alternation to a alternative setpoint becomes active
3-7-8-4.1.2 #0-1	Min adapt setp.ON	**0** 59	e	c	Setting the minutes at which the alternation to a alternative setpoint becomes active
3-7-8-4.1.3 #0-2	Hours adapt setp.OFF	**0** 23	e	c	Setting the hours at which the alternation to a alternative setpoint will be undo
3-7-8-4.1.4 #0-3	Min adapt setp.OFF	**0** 59	e	c	Setting the minutes at which the alternation to a alternative setpoint will be undo
3-7-9	Date adapt level On		e	c	The level setpoint alternation becomes active at the selected day's) and Month's)
3-7-9.1.1 #0-0	Month adapt level On	**OFF** January February March April May June July August September October November December	e	c	The level setpoint alternation becomes active at the selected Month's
3-7-9.1.2 #0-1	Day adapt level On	**1** 31	e	c	The level setpoint alternation becomes active at the selected day of the selected Month's)
3-7-10	Date adapt level Off		e	c	The level setpoint alternation will be undo at the selected day's) and Month's)

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-7-10.1.1 #0-0	Month adapt lev Off	**OFF** January February March April May June July August September October November December	e	c	The level setpoint alternation will be undo at the selected Month's
3-7-10.1.2 #0-1	Day adapt level Off	**1** 31	e	c	The level setpoint alternation will be undo at the selected day of the selected Month's)
3-7-11	Maintenance interval		s	s	Setting the service / maintenance days left for the system.
3-7-11.1.1 #0-0	Maintenance interval	**0** 3000	s	s	Setting the service / maintenance days left for the system.
3-8	Definable I/O		s	s	Configuration of the relays outputs
3-8-1	Inputs		s	n	Configurable inputs
3-8-1-1	Conf. WSD1 (DI)	**None** Check run mode Alternate Setpoint Leakage Remote acknowledge By-pass valve Ext. power operation	s	s	Configuration of digital input WSD1
3-8-1-2	Conf. WSD2 (DI)	**None** Check run mode Alternate Setpoint Leakage Remote acknowledge By-pass valve Ext. power operation	s	s	Configuration of digital input WSD2
3-8-1-3	Conf. WSD3 (DI)	**None** Check run mode Alternate Setpoint Leakage Remote acknowledge By-pass valve Ext. power operation	s	s	Configuration of digital input WSD3
3-8-1-4	Function TH.FAIL P1	OFF **ON**	s	s	Functionality of digital input TH.FAIL P1
3-8-1-5	Function TH.FAIL P2	OFF **ON**	s	s	Functionality of digital input TH.FAIL P2
3-8-1-6	Function TH.FAIL P3	OFF **ON**	s	s	Functionality of digital input TH.FAIL P3
3-8-1-7	Function TH.FAIL P4	OFF **ON**	s	s	Functionality of digital input TH.FAIL P4
3-8-1-8	Function TH.FAIL P5	OFF **ON**	s	s	Functionality of digital input TH.FAIL P5
3-8-1-9	Function TH.FAIL P6	OFF **ON**	s	s	Functionality of digital input TH.FAIL P6

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-8-1-10	Function RDP	OFF **ON**	s	s	Functionality of digital input RDP
3-8-1-11	Function TFR	OFF **ON**	s	s	Functionality of digital input TFR
3-8-1-12	Function TVA	OFF **ON**	s	s	Functionality of digital input TVA
3-8-1-13	Functionality OFF	OFF **ON**	s	s	Evaluation of digital input OFF
3-8-1-14	Function FIRE	**OFF** ON	s	s	Functionality of digital input FIRE
3-8-2	Outputs		s	n	Configurable outputs
3-8-2-1	Conf. P4 (DO)	**None** Threshold relay 1 Threshold relay 2 Input valve By-pass valve RDP Alarm O/P Low water level Operational avail.	s	s	Configuration of digital output P4
3-8-2-2	Conf. P5 (DO)	**None** Threshold relay 1 Threshold relay 2 Input valve By-pass valve RDP Alarm O/P Low water level Operational avail.	s	s	Configuration of digital output P5
3-8-2-3	Conf. P6 (DO)	**None** Threshold relay 1 Threshold relay 2 Input valve By-pass valve RDP Alarm O/P Low water level Operational avail.	s	s	Configuration of digital output P6
3-8-2-4	Conf. FR4 (DO)	**None** Threshold relay 1 Threshold relay 2 Input valve By-pass valve RDP Alarm O/P,Low water level Operational avail.	s	s	Configuration of digital output FR4
3-8-2-5	Conf. FR5 (DO)	**None** Threshold relay 1 Threshold relay 2 Input valve By-pass valve RDP Alarm O/P Low water level Operational avail.	s	s	Configuration of digital output FR5

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-8-2-6	Conf. FR6 (DO)	**None** Threshold relay 1 Threshold relay 2 Input valve By-pass valve RDP Alarm O/P Low water level Operational avail.	s	s	Configuration of digital output FR6
3-8-2-7	Opert./Fail. Relay	**OFF** ON	s	s	
3-8-2-8	Conf. FR (AO)	**None** System pressure System load Level height Inlet pressure	s	s	Configuration of analog output FR (AO)
3-8-2-9	Output Range (FR)	**4-20 mA** 0-20 mA	s	s	Configuration of output current of FR
3-8-2-10	Conf. VALVE (AO)	**None** System pressure System load Level height Inlet pressure	s	s	Configuration of analog output VALVE (AO)
3-8-2-11	Output Range (VALVE)	**4-20 mA** 0-20 mA	s	s	Configuration of output current of VALVE
3-9	Messages		s	n	Messages
3-9-1	Message Settings		s	s	List of all alerts
3-9-1.1.1 #0-0	failure id	**Failure PT. Dis.**	s	s	
		Sys. press.to low			
		Sys press.to high			
		No water			
		Maintenance req.			
		More pumps fail			
		No refresh tank #			
		Aver temp to high			
		Curr temp to high			
		Temp. Fail. Pump #			
		Failure valve			
		Inlet sensor fail			
		High water level			
		Crit. water level			
		Low water level			
		Comm. Error FC #			
		incor. check sum F#			
		Temp. sensor fail			
		24V out of range			
		5V out of range			
		3V out of range			
		External off			
		Fire alarm			

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
		Failure VFD			
		Br. Wire Sens.dis			
		Br. Wire Sens.Inl			
		Fail. several FCs			
		Leakage			
		Eeprom HW Error			
		Manual off Pump #			
		Manual On Pump #			
		More Pumps off			
		Internal Failure P#			
		Mains Failure P#			
		Over voltage P#			
		Under voltage P#			
		Overload Failure P#			
		Brake resistor P#			
		Temp. Failure P#			
		ATM Failure P#			
		Flushing			
		More Flush attemps			
		CIRCUIT Failure FC#			
		Ext. Power Operation			
		Setpoint Reduction			
		Factory Test			
		MPO Failure			
		ASR Shutdown			
		IO Board failure			
		Failure RW-pump #			
		No rainwater			
		Failure DW-valve			
		Starts/h RW-pump #			
		Use of potable water			
		Hygienic addition			
		Forced hyg. addition			
3-9-1.2.1 #1-0	Traffic Light	Green Amber **Red**	s	s	Fault classification: warning or alert
3-9-1.2.2 #1-1	Fault on Hold	**Disabled** Enabled	s	s	With / without automatic re-start
3-10	Root menu		c	n	Settings of Root Menu
3-10-1.1	Root Menu Settings		d	d	List of all root menu elements
3-10-1.1.1 #0-0	rootmenu selection	**1** 65	d	d	
3-10-1.1.1 #1-0	Traffic Light	**OFF** ON	d	d	Fault classification: warning or alert
3-10-1.2	Root Menu Settings		c	e	List of all root menu elements

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-11	Energy Saving Mode		s	n	Energy Saving Mode
3-11-1	Energy Saving Mode	**OFF** ON	s	s	Energy Saving Mode
3-11-2	direct off	**OFF** ON	s	s	Energy Saving Mode without NFD functionality is executed
3-11-3	Power down speed %	1 **30** 99	s	s	Calculated power down speed if NFD is running in energy saving mode in %
3-11-4	time direct off	0 **5** 9999	s	s	Time after the Energy Saving Mode without NFD functionality is executed
3-12	FC failure behavior		e	s	FC failure behavior
3-12-1	behavior	**OFF** Fixed Speed	s	s	behavior
3-12-2	Fixed Speed		s	n	Fixed Speed
3-12-2-1.1	Max power	100% 200% **300**% 400% 500% 600%	s	s	Limitation of the maximum power / maximum system load (1 pump is 100%)
3-12-2-1.2	Max power (dummy)	0 **300** 600	n	e	used for mapping of selection ENUM value to UIN16
3-12-2-2	Set point	0 **400** 1000	s	c	System pressure set point
3-12-2-3	Bandwidth	0 **30** 999	s	c	System pressure within doubled bandwidth
3-12-2-4	Min. run time	0 **30** 999	s	c	The minimum time of the pump to run. (the run time correction will not drop below this value)
3-12-2-5	Max. run time	0 **86400** 356400	s	s	Maximum continuous run time of the pump. After this time the pump will be forced to change over.
3-12-2-6	Start delay	0 **2** 999	s	s	Start delay to switch the pumps on when pressure remains low
3-13	Pump Changeover		e	s	Pump change due to maximum run time
3-13-1	Supply reaction	**Under pressure** Over pressure	e	s	Selection Under-/Oversupply
3-13-2	Changeover delay	**0** 10	e	s	Time delay between the changeover
3-14	By Pass Valve		e	s	By pass valve connected on the discharge side
3-14-1	Valve Function	**Off** Check run PT 1000 Digital Input	e	s	Function of the valve

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-14-2	Open delay	0 **2** 20	e	s	Time delay for opening the valve
3-14-3	Close delay	0 **2** 20	e	s	Time delay for closing the valve
3-14-4	Temperature	0 **20** 40	e	s	Above this temperature the valve will be opened
3-14-5	Flush Time	10 **120** 600	e	s	Time during the valve is opened
3-14-6	Attemps in 24Hrs	1 **2** 5	e	s	Number of attempts to open valave before an urgent alarm occurs
3-14-7	Min. open time	0 **2** 20	e	s	Minimal opening time for the valve
3-15	Fieldbus		c	n	Fieldbus Settings
3-15-1	Profibus		c	n	Profibus Settings
3-15-1-1	PB Slave Address	1 **126** 255	c	c	Profibus Slave Address
3-15-2	Modbus		c	n	Modbus Settings
3-15-2-1	MB Slave Address	1 **247**	c	c	Modbus Slave Address
3-15-2-2	Baudrate	9600 **19200**	c	c	

1. Bold is Factory setting.

10.1.4 Info (Quick access button "Info")

Table 42: Parameter list Megacontrol version 1.7.1

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
4	Info		e	n	Information
4-1	Device		e	n	Device control module
4-1-1	Serial Number		e	n	Serial number of the control module
4-1-2	Parameter Set		e	e	HMI parameter set version
4-2	IO Info		e	n	
4-2-1	IO Serial Number		e	n	
4-2-2	IO FW-Version		e	n	
4-2-3	IO FW-Revision		e	n	
4-2-4	IO HW-Revision		e	n	
4-3	HMI Info		e	e	

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
4-3-1	HMI Serial Number		e	n	
4-3-2	HMI FW-Version		e	n	
4-3-3	HMI FW-Revision		e	n	
4-3-4	HMI HW-Revision		e	n	
4-4	Profibus Info		e	e	
4-4-1	PB FW-Version		e	n	
4-4-2	PB FW-Revision		e	n	
4-4-3	PB HW-Revision		e	n	
4-5	Modbus Info		e	e	
4-5-1	MB FW-Version		e	n	
4-5-2	MB FW-Revision		e	n	
4-5-3	MB HW-Revision		e	n	

1. Bold is Factory setting.

10.1.5 Quick menu OK (Quick access button "OK")

Table 43: Parameter list Megacontrol version 1.7.1

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-2-1-1	PIN		e	n	Enter access level and personal identification number
	Access Level	**User Level** Service Level Factory Level	e	e	Access Level
	PIN acceptance	**0** 9999	e	e	PIN acceptance message
	Login	**Login ok** Login failed	e	e	Login
3-4-1-4-8-1	Threshold 1 ON	0 **50** 199.9	e	s	Water level at which the relays output becomes ""high""
3-4-1-4-8-2	Threshold 1 OFF	0 **50** 199.9	e	s	Water level at which the relays output becomes ""low""
3-4-1-4-8-3	Threshold 2 ON	0 **40** 199.9	e	s	Water level at which the relays output becomes ""high""
3-4-1-4-8-4	Threshold 2 OFF	0 **40** 199.9	e	s	Water level at which the relays output becomes ""low""
3-4-1-4-9-1	Level 1 open	0 **70** 99.9	e	s	Level in the receiver tank at which the supply valve is opened

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-4-1-4-9-2	Level 1 closed	0 **90** 99.9	e	s	Level in the receiver tank at which the supply valve is closed
3-4-1-4-10-1	Level setpoint 1	0 **80** 99.9	e	s	Maximum level in the receiver tank at which the proportional valve is fully closed
3-4-1-4-10-3	Hysteresis	0 **15** 99.9	e	s	Differential level in the receiver tank at which the proportional valve is fully opened
3-4-1-4-10-4	Sample time	0 **10** 99	e	s	Time between the level measurements controlling the proportional valve position
3-4-3-2	Proportional const.	0 **3** 100	e	s	Proportional amplification factor the system pressure is controlled with
3-4-3-3	Integral time	0 **0.9** 60	e	s	Speed with which the deviation of the required system pressure is adjusted
3-4-3-4	Differential time	**0** Max 99.99	e	s	The level of damping with which the deviation of the required system pressure is controlled
3-4-3-5-1	No flow bandwith	0 **6** 50	e	s	Bandwidth of the no flow detection
3-4-3-5-2	No flow time	0 **16** 600	e	s	Time of the no flow detection in s
3-4-3-9	VFD Ramp-Up	0.1 **3** Max 999	e	s	Setting of the ramp-up of the VFD
3-4-3-10	VFD Ramp-Down	0.1 **3** 999	e	s	Setting of the ramp-down of the VFD
3-4-3-11	VFD min. frequency	0 **30** 140	e	s	Minimum frequency of the VFD
3-5-1	Set point	0 **400** 1000	e	c	System pressure set point
3-5-3	Bandwidth	0 **5** 999	e	c	Bandwidth
3-5-4	Accumulation press.	0 **30** 999	e	c	Membrane tank (water) pressure accumulation prior to the system switch-off
3-5-10	Delta p	-999 **0** 999	e	c	Quadratic function to correct the setpoint when a pump is switching on or off
3-5-11	High pressure alarm	400 **1000**	e	c	Upper limit value for the system pressure to shut down or notification only (signal)
3-5-13	Low pressure alarm	**0** 400	e	c	Under limit value for the system pressure to shut down or notification only (signal)

Parameter	Display text	Value[1] description Min./Max.	Read	Write	Help text
3-6-2	Min. run time	0 **180** 999	e	c	The minimum time of the pump to run. (the run time correction will not drop below this value)
3-6-5	Start delay	0 **1** 999	e	s	Start delay to switch the pumps on when pressure remains low
3-6-6	Stop delay	0 **1** 999	e	s	Stop delay to switch the pumps off when pressure remains high.
3-6-8	RDP delay	0 **10** 999	e	s	Delay time after run-dry protection to shut down the system
3-6-9	High/low alarm delay	10 **60** 999	e	s	Permitted time of setpoint pressure deviation > too high or too low system pressure.

1. Bold is Factory setting.

11 Faults

11.1 Failure messages Megacontrol

Table 44: Faults list Megacontrol

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 too long under minimum value (3-5-13)	Urgent[1]
Sys press.to high	System pressure too long above maximum value (3-5-11)	Urgent[1]
Sys. press.to low	System pressure too long under minimum value (3-5-13)	Non urgent[2]
Sys press.to high	System pressure too long above maximum value (3-5-11)	Non 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	Non urgent[2]
Maintenance req.	Maintenance is required	Non 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)	Non urgent
Temp.failure Pump #	Failure pump #. Solve problem and reset the system	Non 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 too high	Non urgent
Crit. water level	Water level in receiver tank critical (near to empty)	Non urgent
Low water level	Water level in receiver tank too low (system shut down for run dry protection)	Urgent[1]
Low water level	Water level in receiver tank too low (system shut down for run dry protection)	Non urgent[2]
Comm. Error FC #	Communication to variable frequency drive # is broken	Non urgent
Incor. check sum F #	FC # Incorrect check sum within the protocol	Non urgent
Temp. sensor fail	Failure Room Temperature Sensor. replace R.T.S. and reset system	Non urgent
24V out of range	Failure message due to internal 24V supply out of range	Non urgent
5V out of range	failure message due to internal 5V supply out of range	Non urgent
3V out of range	Failure message due to internal 3V supply out of range	Non urgent
External off	Failure message due to an external off command	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		Not 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		
Failure RW-pump 1	Failure rainwater pump 1. Solve problem and reset the system.	Not urgent
Failure RW-pump 2	Failure rainwater pump 2. Solve problem and reset the system.	Not urgent
No rainwater	No rainwater is available.	Not urgent
Failure DW-valve	Failure of the drinking water inlet valve.	Not urgent
Starts/h RW-pump 1	Maximum starts per hour of rainwater pump 1 are exceeded.	
Starts/h RW-pump 2	Maximum starts per hour of rainwater pump 2 are exceeded.	
Use of potable water	Potable water was used.	Not urgent
Hygienic addition	The tank inlet was flushed with potable water.	Not urgent
Forced hyg. Addition	Flushing of tank inlet with potable water was forced.	Not urgent
Manual Off RW-pump 1		
Manual Off RW-pump 2		
Manual On RW-pump 1		
Manual On RW-pump 2		
Tank filling	The tank is filled due to a triggered start of the rainwater pumps.	
Hyg. add. Incomplete	Hygienic addition was incomplete, because tank was filled or failure of drinking water inlet valve.	
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.

11.2 Failure messages Danfoss VFD

ATTENTION
The error codes are displayed in the error log of the Megacontrol. For specific information about the error codes please consult the (technical) documentation of the VFD concerned.

Table 45: VLT 2800

Error code:	Explanation:	Warning:	Alarm:	Trip lock:
2	Live zero error (LIVE ZERO ERROR)	x	x	x
4	Mains phase loss (MAINS PHASE LOSS)	x	x	x
5	Voltage warning high (DC LINK VOLTAGE HIGH)	x		
6	Voltage warning low (DC LINK VOLTAGE LOW)	x		
7	Overvoltage (DC LINK OVERVOLTAGE)	x	x	x
8	Undervoltage (DC LINK UNDERVOLT)	x	x	x
9	Inverter overload (INVERTER TIME)	x	x	
10	Motor overloaded (MOTOR TIME)	x	x	
11	Motor thermistor (MOTOR THERMISTOR)	x	x	
12	Current limit (CURRENT LIMIT)	x	x	
13	Overcurrent (OVERCURRENT)	x	x	x
14	Earth fault (EARTH FAULT)		x	x
15	Switch mode fault (SWITCH MODE FAULT)		x	x
16	Short-circuit (CURR. SHORT CIRCUIT)		x	x
17	Serial communication timeout (STD BUS TIMEOUT)	x	x	
18	HPFB bus timeout (HPFB TIMEOUT)	x	x	
33	Out of frequency range (OUT FREQ RNG/ROT LIM)	x		
34	HPFB communication fault (PROFIBUS OPT. FAULT)	x	x	
35	Inrush fault (INRUSH FAULT)		x	x
36	Overtemperature (OVERTEMPERATURE)	x	x	
37-45	Internal fault (INTERNAL FAULT)		x	x
50	AMT not possible		x	
51	AMT fault re. nameplate data (AMT TYPE. DATA FAULT)		x	
54	AMT wrong motor (AMT WRONG MOTOR)		x	
55	AMT timeout (AMT TIMEOUT)		x	
56	AMT warning during AMT (AMT WARN. DURING AMT)		x	
99	Locked (LOCKED)	x		

Table 46: VLT Aquadrive FC200

Error code:	Explanation:	Warning:	Alarm/Trip:	Alarm/Trip Lock:
1	10 Volts low	X		
2	Live zero error	(X)	(X)	
3	No motor	(X)		
4	Mains phase loss		X	
5	DC link voltage high	X		
6	DC link voltage low	X		
7	DC over voltage	X	X	
8	DC under voltage	X	X	
9	Inverter overloaded	X	X	
10	Motor overload temperature	(X)	(X)	
11	Motor thermistor over temperature	(X)	(X)	

Error code:	Explanation:	Warning:	Alarm/Trip:	Alarm/Trip Lock:
12	Torque limit	X	X	
13	Over Current	X	X	X
14	Earth fault	X	X	X
15	Hardware mismatch		X	X
16	Short Circuit		X	X
17	Control word time out	(X)	(X)	
23	Internal fan fault	X		
24	External fan fault	X		
25	Brake resistor short-circuit	X		
26	Brake resistor power limit	(X)	(X)	
27	Brake chopper fault	X	X	
28	Brake check failed	(X)	(X)	
29	Heatsink temp	X	X	X
30	Motor phase U missing	(X)	(X)	(X)
31	Motor phase V missing	(X)	(X)	(X)
30	Motor phase W missing	(X)	(X)	(X)
33	Inrush fault		X	X
34	Field bus communication fault	X	X	
35	Out of frequency range	X	X	
36	Mains failure	X	X	
37	Phase imbalance	X	X	
38	Internal fault			
39	Heatsink sensor		X	X
40	Overload of digital output terminal 27	(X)		
41	Overload of Digital Output Terminal 29	(X)		
42	Overload of Digital Output On X30/6 or overload of digital output on X30/7	(X)		
46	Power card supply		X	X
47	24 V supply low	X	X	X
48	1.8 V supply low		X	X
49	Speed limit	X		
50	AMA calibration failed		X	
51	AMA check U_{nom} and I_{nom}		X	
52	AMA low I_{nom}		X	
53	AMA motor too big		X	
54	AMA motor too small		X	
55	AMA parameter out of range		X	
56	AMA interrupted by user		X	
57	AMA time out		X	
58	AMA internal fault	X	X	
59	Current limit	X		
60	External interlock	X		
62	Output frequency at maximum limit	X		
64	Voltage limit	X		
65	Control Board Over-temperature	X	X	X
66	Heat sink Temperature Low	X		
67	Option Configuration has Changed		X	

Error code:	Explanation:	Warning:	Alarm/Trip:	Alarm/Trip Lock:
68	Safe Stop Activated		X[1]	
69	Power Card Temp		X	X
70	Illegal FC configuration			X
71	PTC 1 safe stop	X	X[1]	
72	Dangerous Failure			X[1]
73	Safe Stop Auto Restart			
76	Power unit setup	X		
79	Illegal PS config		X	X
80	Drive Initialised to Default Value		X	
91	Analog input 54 wrong settings			X
92	No flow	X	X	
93	Dry pump	X	X	
94	End of curve	X	X	
95	Broken belt	X	X	
96	Start delayed	X		
97	Stop delayed	X		
98	Clock fault	X		
220	Overload trip		X	
243	Brake IGBT	X	X	
244	Heatsink temp	X	X	X
245	Heatsink sensor		X	X
246	Power card supply		X	X
247	Power card temp		X	X
248	Illegal PS config		X	X
250	New spare part			X
251	New Type Code		X	X

1. Can not be Auto reset via par. 14-20 Reset Mode
   A trip is the action when an alarm has appeared. The trip will coast the motor and can be reset by pressing the reset button or make a reset by a digital input (parameter group 5-1* (See Danfoss manual). The origin event that caused an alarm cannot damage the frequency converter or connected parts. A Trip Lock situation can only be reset by a power cycling.

Table 47: VLT Microdrive FC 51

Error code:	Explanation:	Warning:	Alarm:	Trip lock:	Error
2	Live zero error	X	X		
4	Mains phase loss[1]	X	X	X	
7	DC over voltage[1]	X	X		
8	DC under voltage[1]	X	X		
9	Inverter overloaded	X	X		
10	Motor ETR over temperature	X	X		
11	Motor thermistor over temperature	X	X		
12	Torque limit	X			
13	Over Current	X	X	X	
14	Earth fault		X	X	
16	Short Circuit		X	X	
17	Control word time out	X	X		
25	Brake resistor short-circuited		X	X	
27	Brake chopper short-circuit		X	X	
28	Brake check		X		

Error code:	Explanation:	Warning:	Alarm:	Trip lock:	Error
29	Power board over temp	X	X	X	
30	Motor phase U missing		X	X	
31	Motor phase V missing		X	X	
32	Motor phase W missing		X	X	
38	Internal fault		X	X	
44	Earth fault		X	X	
47	Control Voltage Fault		X	X	
51	AMT check U_{nom} and I_{nom}		X		
52	AMT low I_{nom}		X		
59	Current limit	X			
63	Mechanical Brake Low		X		
80	Drive Initialised to Default Value		X		
84	The connection between drive and LCP is lost				X
85	Button disabled				X
86	Copy fail				X
87	LCP data invalid				X
88	LCP data not compatible				X
89	Parameter read only				X
90	Parameter database busy				X
91	Parameter value is not valid in this mode				X
92	Parameter value exceeds the min/max limits				X
nw run	Not While RUNning				X
Err.	A wrong password was entered				X

1. These faults may be caused by mains distortions. Installing Danfoss Line Filter may rectify this problem.

12 Annexes

12.1 Megacontrol

Table 48: Technical specifications

Item	Value
Type of control	Megacontrol
Article number Megacontrol 1-3 pumps	77870550
Article number Megacontrol 1-6 pumps	77870551
Dimensions HxWxD [mm]	306.5 x 187 x 72.5
Connecting voltage [V]	230 ± 5%
Frequency [Hz]	50/60
Relay outputs [A]	1 max.
Analog inputs [mA]	4 - 20
Analog outputs [mA]	4 - 20
Safety class	IP55[1]
Display	7 lines x ....characters
Ambient temperature [°C]	50 max.
Atmospheric humidity [%]	20 - 90 (no condensation)
Fuse	250 V T315mA R508D80
Maximum altitude	1000 m above sea level

1. When built into a IP55 control panel.

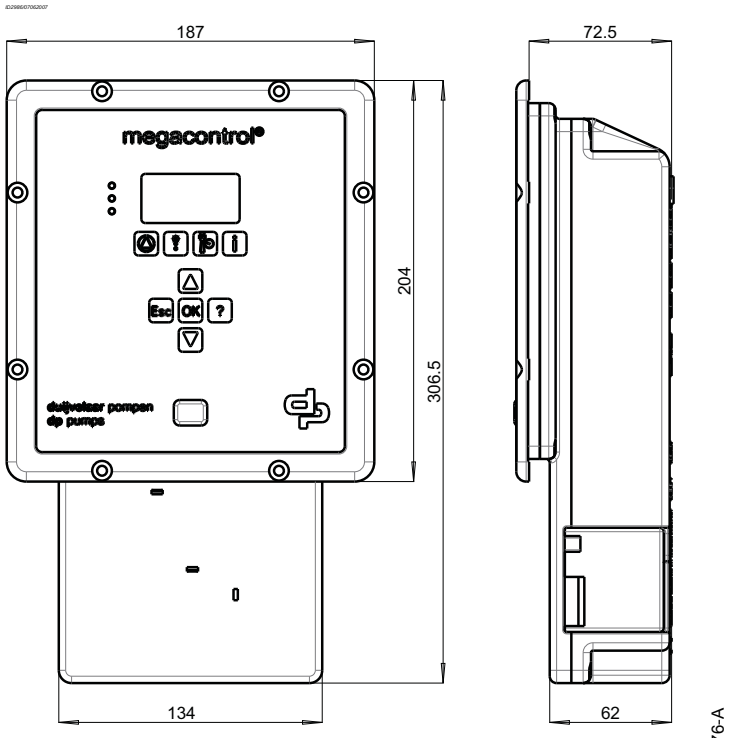

Figure 35: Megacontrol

12.2 Built-in diagram

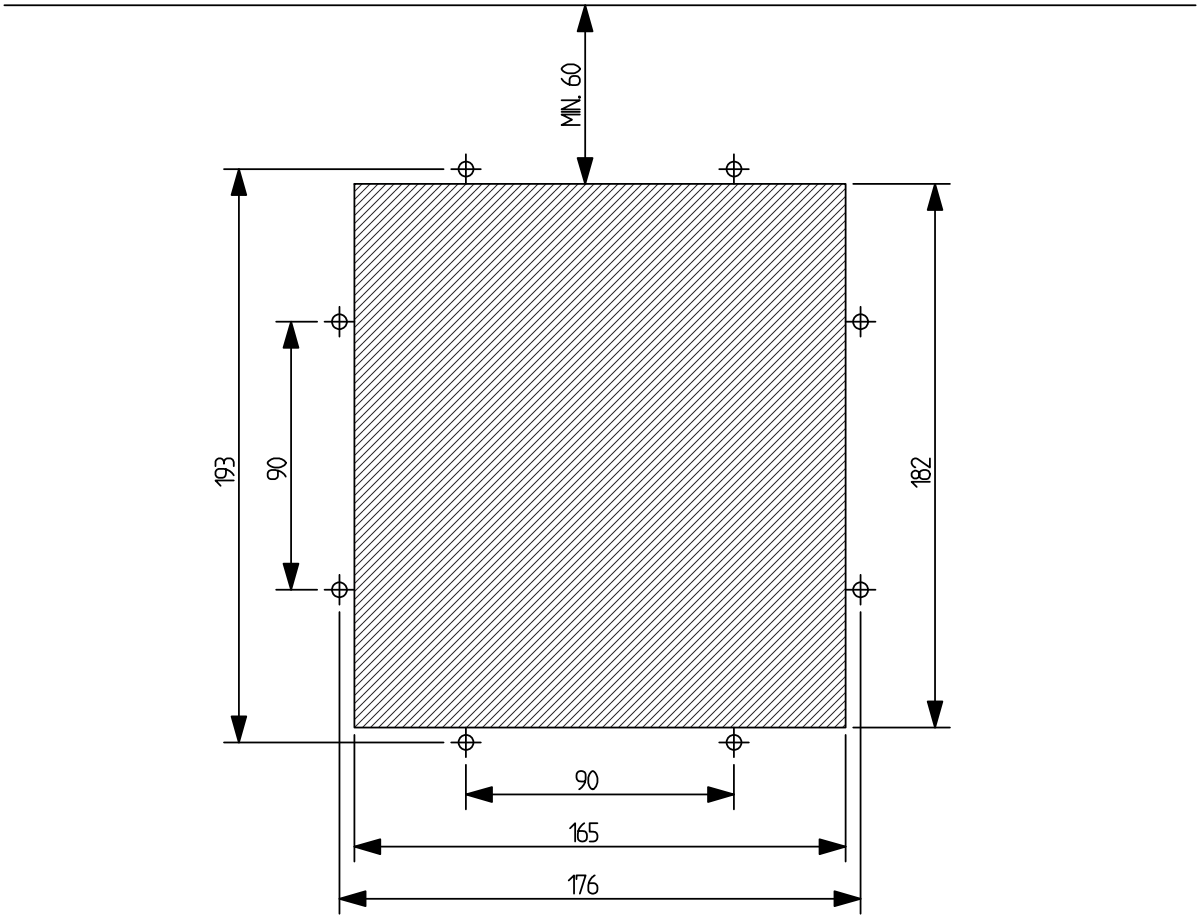

Figure 36: Built-in diagram

12.3 Electrical connections

Additional information on the RS485 bus: J302 to J301 and the use of a filter on the coil of contactors / auxiliary relays. See chapter: 7.2.3 Using contactors

ATTENTION
Connections for bus communication (RS485 A/B) to frequency converter are moved from J302 to J301 (see drawing fig.: 37 Megacontrol Lay-out 1-3 (1-6) pumps)

ATTENTION
Changes to the DIP switch settings of the bus termination of the frequency converter becomes only effective after switching off and then on again of the frequency converter.

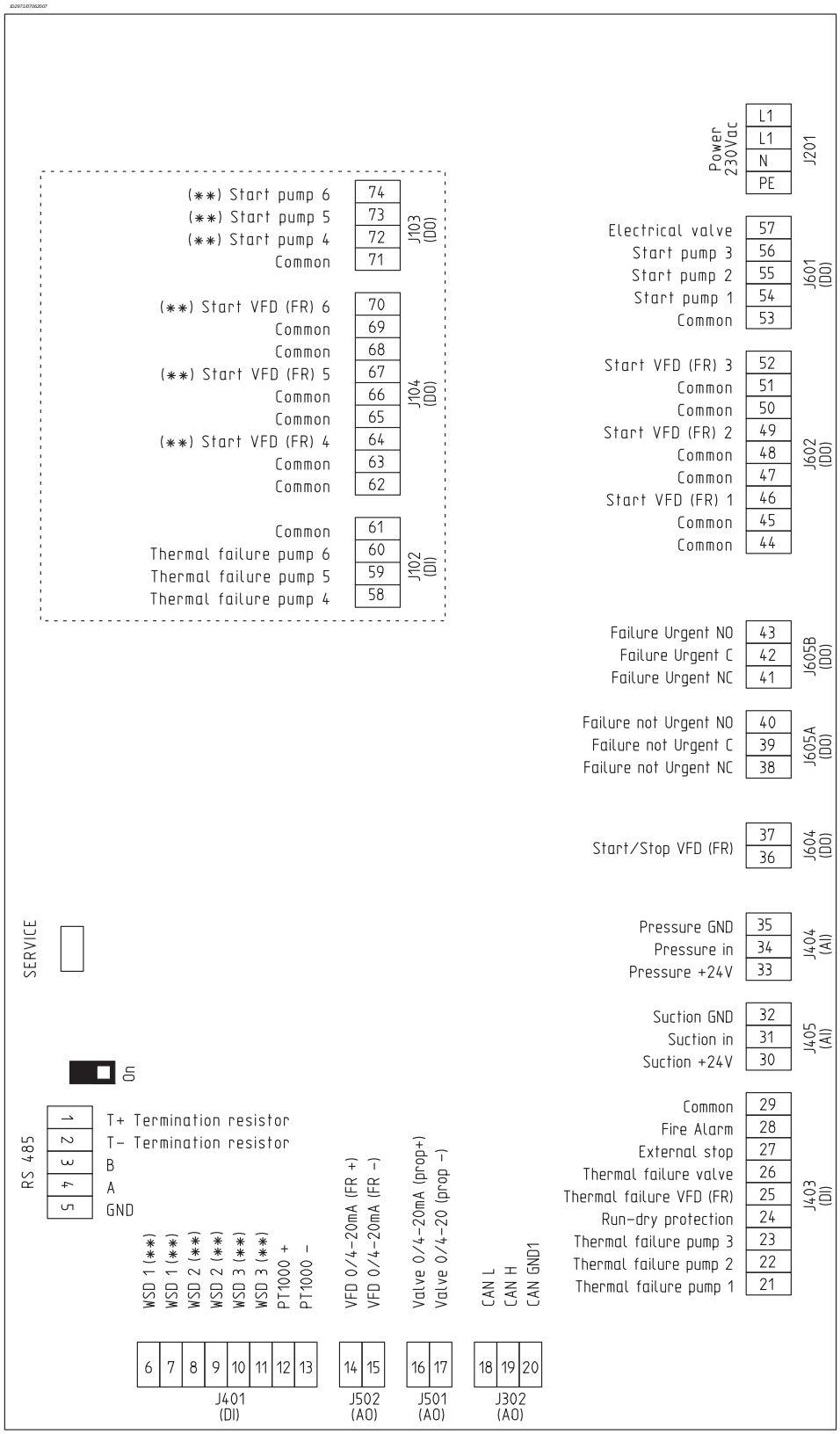

Figure 37: Megacontrol Lay-out 1-3 (1-6) pumps

* refers to table 49 Electrical connections

Table 49: Electrical connections

	Nr:	Code:	Connection:
RS 485	1	T+	Termination resistor
	2	T-	Termination resistor
	3	B	
	4	A	
	5	GND2	
J401	6[1]		WSD sensor 1
	7		
	8		WSD sensor 2
	9		
	10		WSD sensor 3
	11		
	12	+	Temperature sensor
	13	-	
J502	14	+	VFD
	15	-	
J501	16	+	Valve (prop)
	17	-	
J302	18	CAN L	RS485
	19	CAN M	
	20	CAN GND1	
J403	21		Thermal failure pump 1
	22		Thermal failure pump 2
	23		Thermal failure pump 3
	24		Run-dry protection
	25		Thermal failure VFD
	26		Thermal failure valve
	27		External stop
	28		Fire alarm
	29		Common 24 V
J405	30	24 V	Suction
	31	4-20 mA	
	32	GND	
J404	33	24 V	Pressure
	34	4-20 mA	
	35	GND	
J604	36		Start / stop VFD
	37		
J605A	38	NO	Failure not urgent
	39[4]	COM	
	40	NC	

	Nr:	Code:	Connection
J605B	41	NO	Failure urgent
	42	COM	
	43	NC	
J602	44		Common
	45		Common
	46		Start VFD 1
	47		Common
	48		Common
	49		Start VFD 2
	50		Common
	51		Common
	52		Start VFD 3
J601	53		Common
	54		Start pump 1
	55		Start pump 2
	56		Start pump 3
	57		Electric valve
J102	58[2]		Thermal failure pump 4
	59		Thermal failure pump 5
	60		Thermal failure pump 6
	61[3]		Common
J104	62		Common
	63		Common
	64		Start VFD 4
	65		Common
	66		Common
	67		Start VFD 5
	68		Common
	69		Common
	70		Start VFD 6
J103	71		Common
	72		Start pump 4
	73		Start pump 5
	74		Start pump 6
J201	L1		Power supply 230 Vac
	L1		
	N		
	PE		

1. Connections 6 to 11 can be used for definable inputs
2. Connections 58 up to 74 are only used with 4 to 6 pumps
3. Connections 61 to 74 can be used for definable outputs
4. Connections 39/40 and 42/43 are closed under normal use

12.4 EC declaration of conformity

Undersigned:

DP-Pumps
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(s):

Product: Control unit
Type: Megacontrol

to which this declaration refers, is in accordance with the following standards:

- EN 61000-6-1
- EN 61000-6-3
- EN 61000-6-4

according to the provisions of (when applicable):

- Low voltage directive 2014/35/EU
- EMC directive 2014/30/EU
- RoHS II 2011/65/EU

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

If the control unit is built in an appliance or is assembled together with other equipment in certain installations, then it should not be put into operation until a declaration has been given with respect to the appliance concerned that it complies with the directives listed above.

Alphen aan den Rijn,
01/06/2017

Authorized representative
M.H. Schaap, product development.

dp pumps

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Original instructions

Can be changed without prior notice