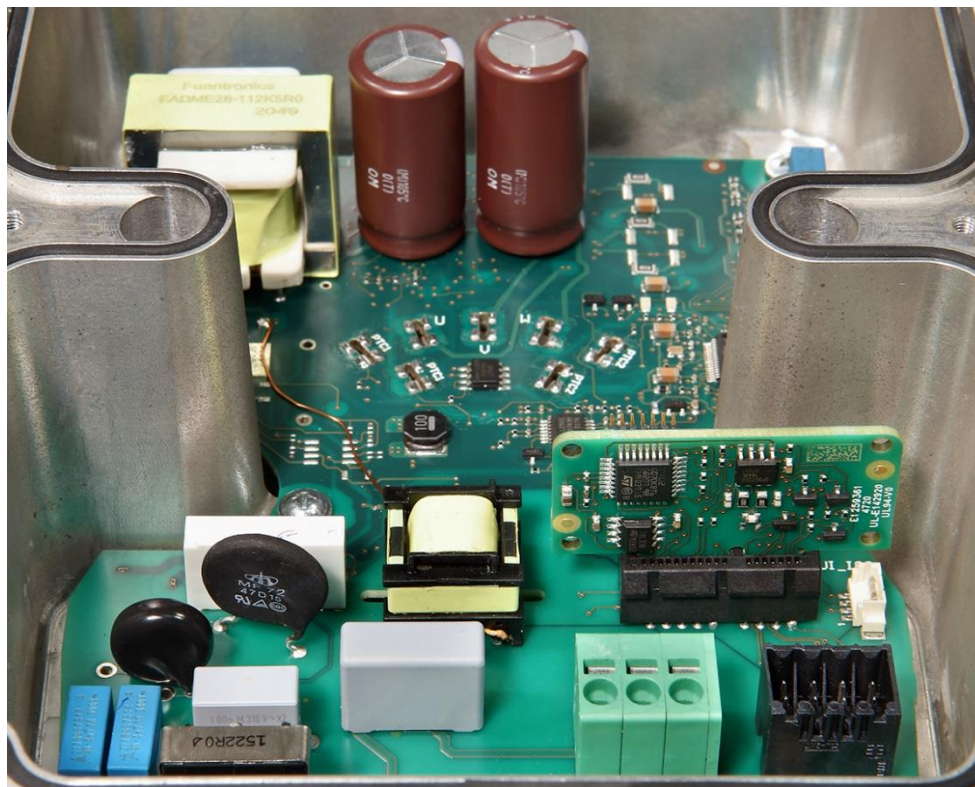
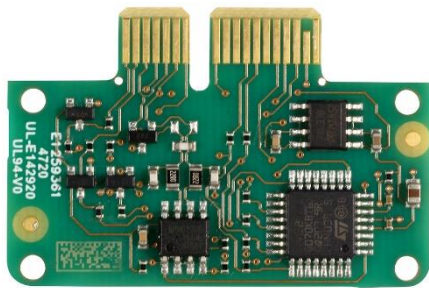


OPTIMA CIRCULATION PUMP ACM & CCM MODULES USER MANUAL



WARNINGS AND SYMBOLS 3

Symbols and Warning TypesError! Bookmark not defined.

GENERAL..... ERROR! BOOKMARK NOT DEFINED.

Definition of Additional Module.....Error! Bookmark not defined.

Term of Use of Additional Modules.....Error! Bookmark not defined.

TRANSPORTATION, STORAGE AND OPERATING CONDITIONS ERROR! BOOKMARK NOT DEFINED.

MODULE ASSEMBLY 5

PositioningError! Bookmark not defined.

CablingError! Bookmark not defined.

SCREEN AND SETTINGS 12

2.1 2 Digit Screen.....Error! Bookmark not defined.

2.2 Advanced ScreenError! Bookmark not defined.

Warning/Error ScreenError! Bookmark not defined.

3. WARRANTY, MAINTENANCE, SERVICE ERROR! BOOKMARK NOT DEFINED.

4. SCRAPING AND RECYCLING 19

Read this booklet carefully. The information given here; It covers the issues that are necessary for practitioners and users in the assembly, use and maintenance of the device.

Caution!

Please review this booklet carefully when you need any information for your further applications.

Alarko-Carrier, the manufacturer of the Optima pump and its additional modules; with its 68 years of experience in the fields of heating, cooling, ventilation, water treatment and pressurization, it is at your service with its nationwide dealer and service network. If you need any information about your device or have a problem, it will be sufficient to contact Alarko-Carrier authorized services.

The information given on the following pages applies to all types of Optima pumps and add-on modules.

Warnings and Symbols

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children should not play with the device. Cleaning and user maintenance should not be made by children without supervision.

Symbols and Warning Types



Failure to heed these warnings could result in death or serious injury.



Failure to heed these warnings may result in death or serious injury from electric shock.

Caution!

If these warnings are not taken into account, the safe and secure operation of the pump may be disrupted.

Abbreviations

Abbreviation	Explanation	Details
ACM	Analog Control Module	0-10V Control
CCM	Communication Control Module	BACnet MS/TP & Modbus RTU & Multi Pump
BMS	Building Management System	BMS
CE	Conformité Européenne	CE Certificate
SN	Serial Number	Serial Number
PN	Product Number	Product Number

General

Definition of Modules

In the Optima series, 125W, 190W and 300W models have been launched as low-budget and consumer-oriented. In this context, two additional control modules named CCM (Communication Control Module) and ACM (Analog Control Module) have been designed and these modules can work in harmony with cards of all powers.

Analog Control Module, It provides the opportunity to control the instantaneous speed of the pump via the PWM signal or the 0-10V control signal. In addition, thanks to the relay structure on it, the faults on the pump can be transferred to the building management system instantly.

Communication Module, It is a structure that provides communication between the control card of the pump and the building management system over BACnet and Modbus protocols via serial communication protocols (RS-485) and allows certain parameters on the pump to be changed or monitored. This module also has Multi Pump feature which includes preloaded scenarios.

Terms of Use of Modules



AMC and CCM modules cannot be used at the same time! The same expansion slot on the main controller is common for these 2 different modules!



In order to avoid possible communication problems, it is recommended to use a terminating resistor at the end of the communication line!

Transport, Storage and Working Conditions

Transport and Storage Ambient Temperature: -10°C +70°C

Working Conditions: Temperature: -10 °C 85 °C (25 °C Nominal). **Humidity:** 5 %RH 90 %RH

During transportation and storage, the modules must be protected against shocks, moisture and freezing.

Caution!

Incorrect transportation and storage may cause damage to the product.

When unpacked, it should be checked that the module is the model suitable for the order and whether it is damaged during transportation.

If the module is damaged, it should not be used without consulting Alarko-Carrier authorized service.

Module Assembly



Additional module mechanical and electrical installation of Alarko pumps should be done by authorized service in accordance with the principles and related standards specified in this user manual.

Caution!

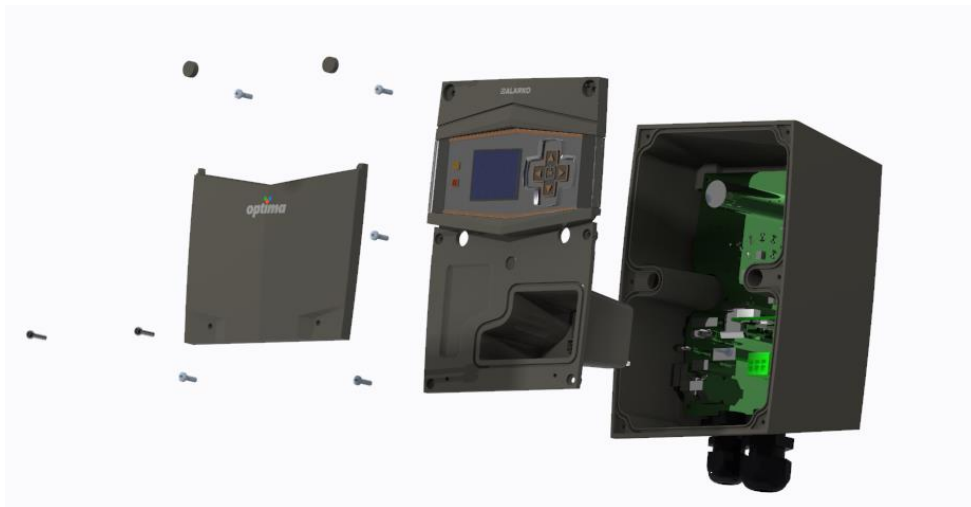
Before starting the installation, contamination in the piping system should be checked and if there is any contamination, it should be cleaned.

Positioning

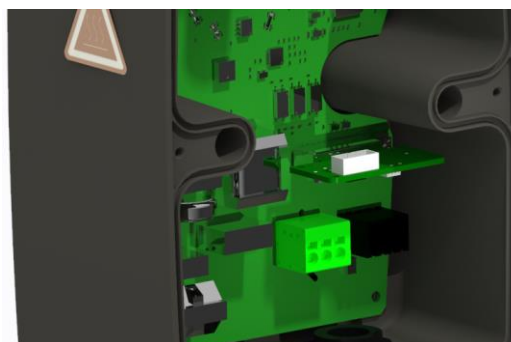


During module placement, the additional module must be firmly seated in the socket.

The following figures should be considered while mounting the module. (See 1, 2)



1



2

Cabling

In the pump ecosystem on which additional modules are installed, a signal cable with the following features should be used while wiring between pumps.

	5/8	4/10	4/8	4/4	3/12-180	3/10-180	3/7-180	2/10-180
Cable	3 x 1 mm ²							

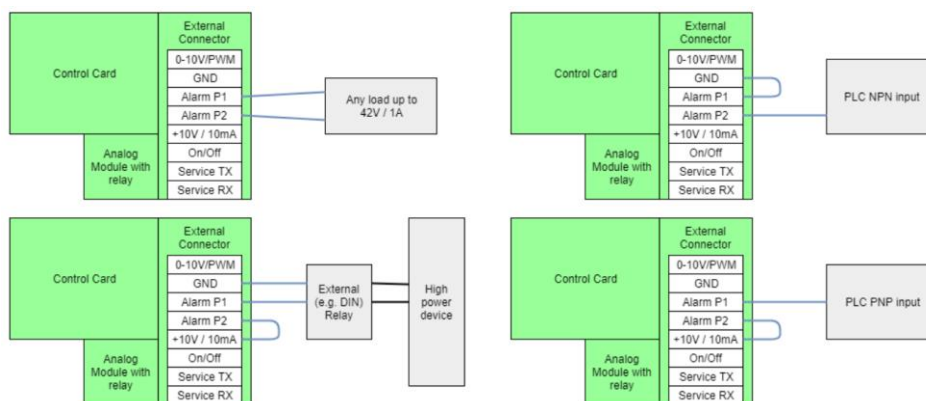


ACM, Analog Control Module

Analog Control Module,

- To an analog input capable of receiving PWM or 0-10V input signal,
- A digital input (0V - 24V) that can receive a digital on/off input,
- A digital output capable of sending alarm information to an external device,

This module can be used in simple building automation system applications or control panel applications with a circuit installed with a speed switch.



The Analog Control Module is connected to the control card of the pump via communication.

Electrical Characteristic

See. Main controller connector pinouts:

Service Tx	GND	Digital Input	Service Rx
5	6	7	8
1	2	3	4

PWM/ 0-10V +10V (10mA) Relay Relay

Digital Input

- The Analog Control Module has a digital input to turn the pump on and off.
- The input voltage range of the digital input is from 0V to 24V.
- If a voltage of more than 5V is applied to the digital input, the pump is stopped.
- The sensitivity of the digital input is 0.5V.



The 'default' behavior of the pump is to be active. A fault in the wiring (short circuit or interruption) or a fault in the digital input supply can cause the pump to not operate as intended!



A voltage less than 5V will turn on the pump at the rate set by the PWM or Analog 0-10V input.

Analog Input

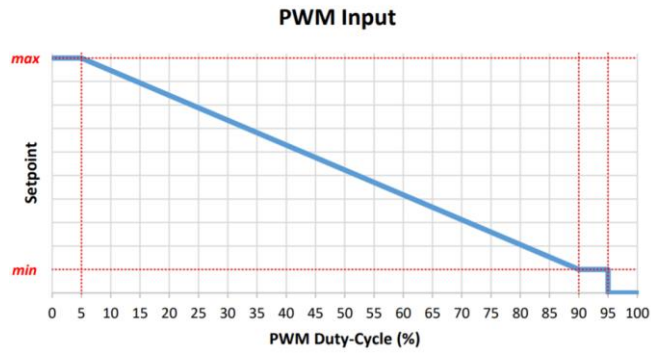
- PWM control adjusts speed setpoint in Constant Speed mode.
- The input voltage range of PWM is 0VDC to 10VDC.
- PWM control input frequency should be between 100 Hz and 5000 Hz.
- The PWM control duty cycle should be in the range of 0% to 100%.



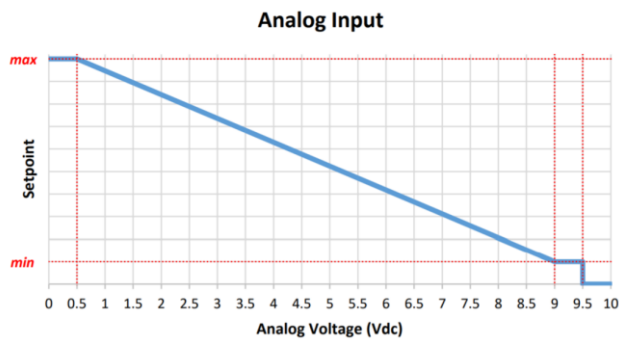
Accuracy of the speed setpoint will be within 3% of the PWM duty cycle.



An accuracy of 3% corresponds to approximately 100 rpm.



- 0-10V signal sets speed setpoint in Constant Speed mode.
- The operating voltage limits of the analog input will be between 0 Vdc and 10 Vdc.



Accuracy of the speed setpoint should be within 6% of the analog input voltage.



An accuracy of 3% corresponds to approximately 100 rpm.

Digital Output

- The alarm contact will be open when there is no fault.
- The alarm contact will be closed in case of a fault until the fault is cleared.



The alarm contact supports 0VDC - 42VDC up to 1A.



The maximum switching current is limited by the rated current of the External device.

CCM, Communication

Three features of the Communication Control Module:

- Modbus RTU,
- BACnet MS/TP,
- Multi/Double Pump,

They are mods and these mods will not run parallel to each other. The Communication Control Module must be configured separately for Modbus mode, BACnet mode, or Multipump mode.

Electrical Characteristic

See. Main controller connector pinouts:

Service Tx	GND	reserved	Service Rx
5	6	7	8
1	2	3	4
RS485 P	RS485 N	RS485 P (link)	RS485 N (link)

Communication Control Module supports RS485 protocol for external communication. The RS485 interface is used to connect external Modbus/BACnet devices to the pump.

- The RS485 bus voltage is 3.3V.
- The RS485 interface supports data rates up to 250 kbps.
- Maximum RS485 line length is 2 meters.
- The maximum number of devices on the RS485 bus is 32.
- Communication Control Module, RS485 bus terminating resistor is recommended.
- The required RS485 termination must be applied at the bus ends.

Caution!

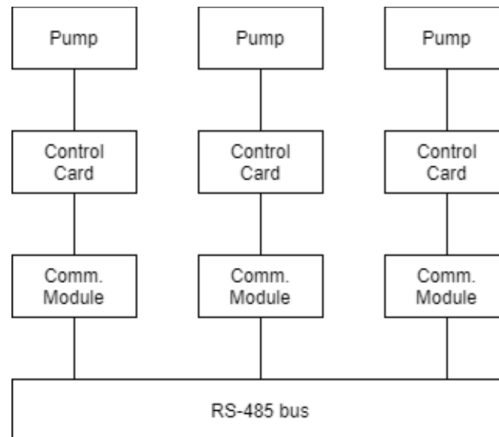
The Communication Control Module will also be used to connect multiple pumps.

OPERATING MODES

Multi/Double Pump Mode

Communication Control Module(s) must be installed on other pumps in order to operate the pumps in Multipump mode.

eg. Here is an example of the 3-pump Multipump mode:



- Multipump mode supports from 1 pump to 8 pumps in a single network.
- In a valid Multi-Pump configuration, a maximum of 1 pump must be defined as “master” in a network.
- Each pump in the network will be manually assigned a unique ID by the user. Master pump is considered to have ID 0, Slave 1 to have ID 1, and Slave 2 to have ID 2.
- In Multipump mode, each pump must be configured separately.
- Multi-Pump operation is only supported for a pump network of the same type as:
 - FS - YESS HECC -125 190 300W Control Board
 - Different pump types have different limitations in terms of speed and power.

Multipump mode supports "**Master/Slave**" operation mode.

Multipump mode supports "**Main/Standby**" operation mode.

Multi-Pump mode supports "**Pump Cycling**" operation mode.

Caution!

All pumps in the Multipump network must use the Master pump's operating mode, setpoint and Multipump mode!

Master/Slave Mode

This section contains requirements for Master/Slave mode.

- In "Master/Slave" mode, all pumps in the whole network that are connected to each other will be active if there is no error in the Master pump.
- In "Master/Slave" mode, a pump disconnected from other pumps in the system will continue to run its motor with its current operating mode and setpoint.

Main/Standby & Pump Cycling Mode

This section contains common requirements for both Main/Standby and Pump Cycling.

- In "Main/Standby" and "Pump Cycling" modes, 1 pump in the Multipump network will be designated as "active pump" for a period of time.
- Only the active pump can operate in the specified operating mode and setpoint; All other (inactive) pumps are idle.
- In "Main/Standby" and "Pump Cycling" modes, more than 1 pump can be active for a maximum of 60 seconds during pump change.
- In "Main/Standby" and "Pump Cycling" mode, the Multi-Pump network is considered to be divided into several sections when one or more pumps are out of order or disconnected from the network. Only one of these networks will become "active network" and the rest will become "inactive network(s)".

Caution!

Remember that power outages are no different than connection failures to other pumps in the system!

- All pumps in the "active network" will continue to Multipump operation. All pumps in the "inactive network" will be disabled. This avoids the situation where more than one pump is running at the same time.
- In "Main/Standby" mode, the pump with the lowest Multipump ID will be the active pump if there are no active faults.
- In "Pump Cycling" mode, the active pump in the network will cycle every 24 hours. The timer runs only when the (Master) pump is powered up. There is no battery powered clock on the pump to keep the wall clock when the pump is not running!
- In "Pump Cycling" mode, a pump with an error on it will be skipped.

Network Stopping

When a network is running in Multipump mode, it is possible to "pause" it. Pausing the master pump causes all other pumps in the network to be paused.

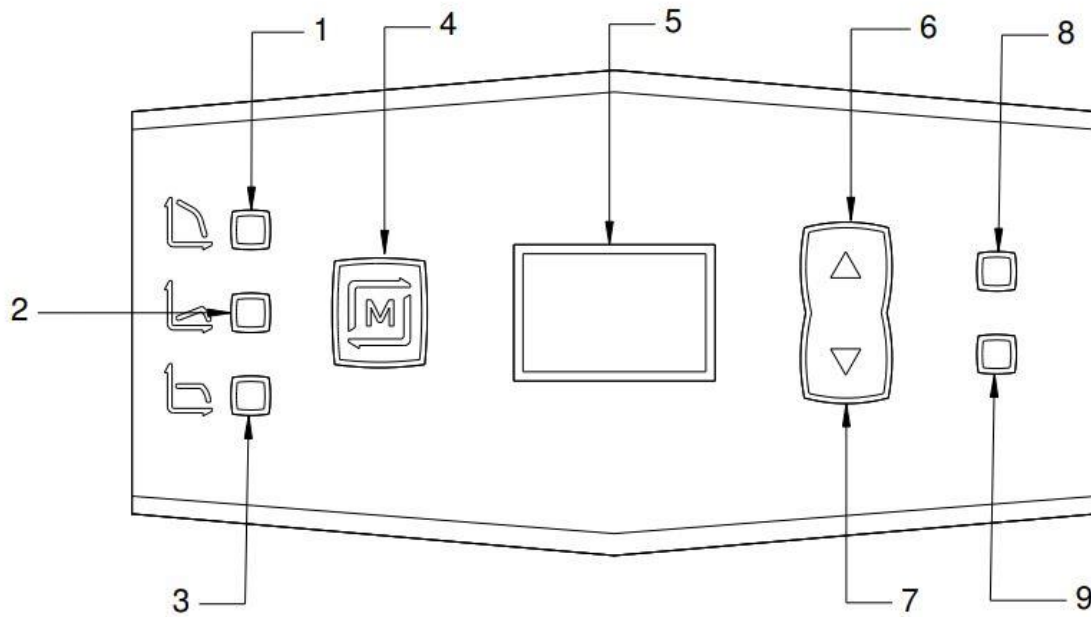
When the network is paused, it is possible to 'unpause' the network. Reactivating the master pump causes other pumps in the network to continue as previously configured.

Screen and Settings

The control screen provides information about the pump status and allows the desired operating mode to be set. Optima circulation pumps are offered to users with 3 different options: two-digit display, graphic display and no display.

2.1 Two Digit Screen

The two-digit circulation pump display consists of five LED indicators, three control keys and a two-digit LED display. See Figure 7.1.



Şekil 7.1

Indicator and keys on the control screen:

1. Manual Operation LED: Lights up when the pump is operating in manual operation mode.
2. Variable Pressure LED: Lights up when the pump is operating in variable pressure mode.
3. Constant Pressure LED: Lights up when the pump is operating in constant pressure mode.
4. "MENU" Key: Allows switching between operating modes.
5. Two Digit LED Display: Shows pump operating information and warning/error messages.
6. "Up" Key
7. "Down" Key
8. Warning/Error LED (RED): Flashes in warning status. It lights up continuously in case of malfunction.
9. Remote Controller LED (YELLOW): Blinks when signal from CCM module.

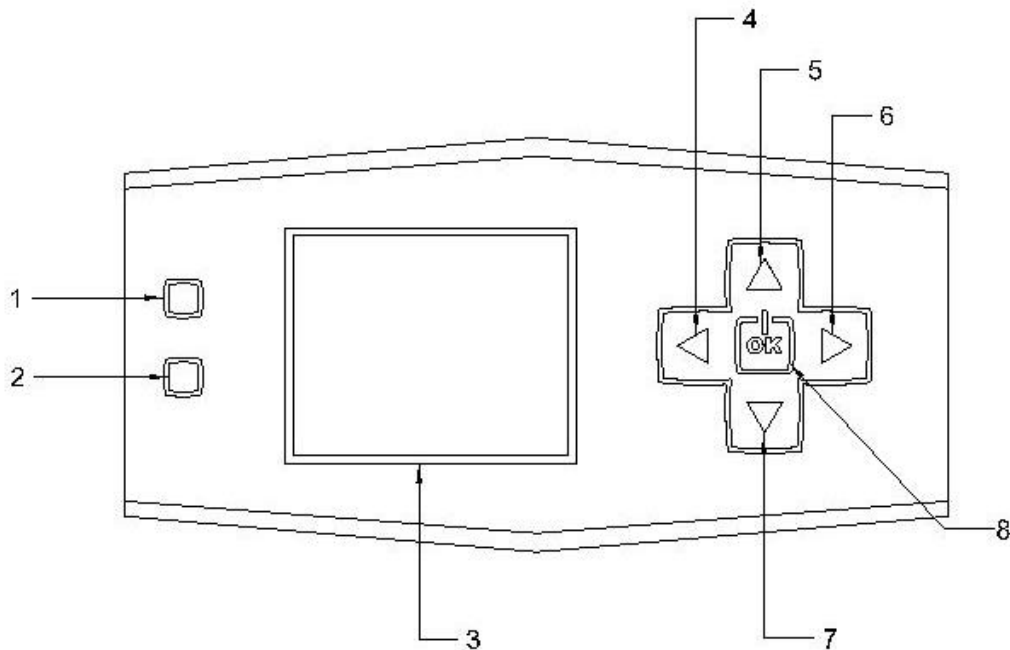
The main screen is as follows:

X X → Shows operating mode information and warning/error messages.

By pressing the "MENU" button on this screen, you can switch between variable pressure, constant pressure and manual operating modes.

2.2 ADVANCED SCREEN

The circulation pump display with the advanced display consists of two TFT displays, five control keys and one advanced TFT display. See Figure 7.2.

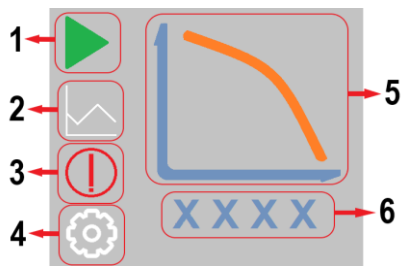


Şekil 7.2

Indicator and keys on the control screen:

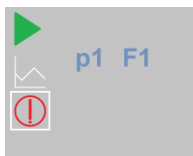
1. Warning/Error LED (RED): Flashes in warning status. It lights up continuously in case of malfunction.
2. Remote Controller LED (YELLOW): Blinks when signal is received from CCM module.
3. TFT Display: Shows pump operating information and warning/error messages.
4. "Left" Key
5. "Up" Key
6. "Right" Key
7. "Down" Key
8. "OK" Key: Allows selection between sub-menus.

The main screen is as follows:



- The number 1 icon is the Start/Stop icon. Used for starting/stopping and pausing the pump.
- Number 2 icon is the working mode setting icon. It provides the transition to the user interface where the operating modes are set.
- Icon number 3 appears on the screen in case of malfunction/error and gives the user access to the details of the malfunction/error information.
- **Icon number 4 shows the information on the screen during the operation of the pump integrated with the building automation system. When the CCM module is installed on the board, the corresponding icon appears on the screen..**
- Field 5 shows the pump's operating mode graphically.
- Area 6 shows the instantaneous speed of the pump.

Warning and Error Codes



In case the pump gives a warning/error, the Warning/Error LED No. 1 lights up and the "Warning/Error" icon appears on the screen with an exclamation point in a red circle.

Warning/Error codes are displayed on the LED screen.

If more than one "Warning/Error" occurs, highlight the "Warning/Error" icon and press the "OK" button. Then check the other codes on the screen with the help of the arrow keys.

P X → Messages beginning with the letter "P" indicate pump warnings.

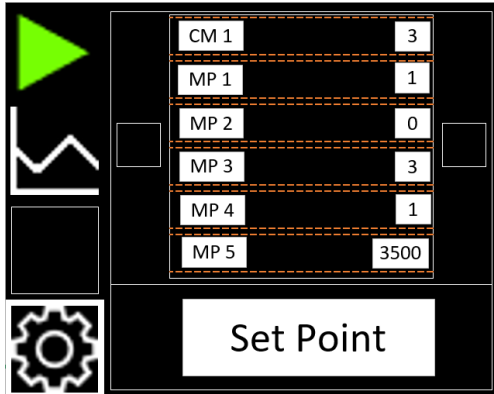
E/F X → Messages starting with the letter "E" and "F" indicate pump errors.

For detailed information about Warning/Error codes, see pump user manual.

Parameters

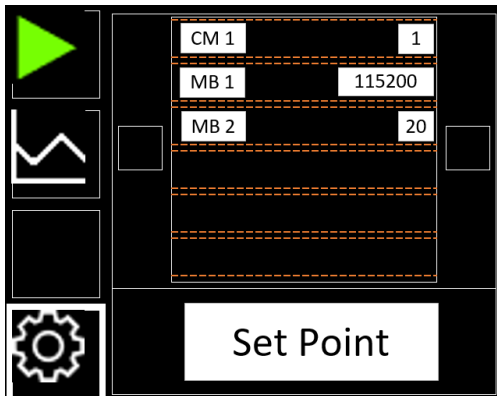
Multi/Double Pump Mode

After the CCM module is inserted into the expansion slot, the icon in the lower left corner appears on the pump's screen. Multi/Double Pump parameter settings can be made via this icon.



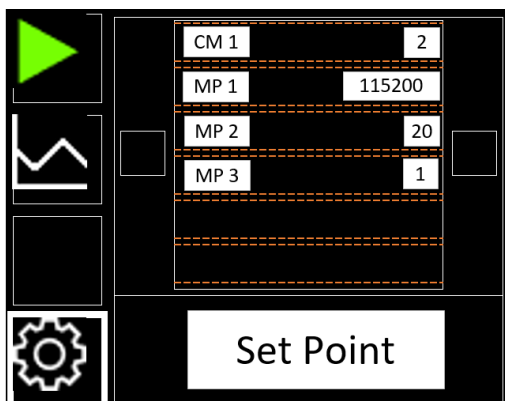
Modbus Mode

After the CCM module is inserted into the expansion slot, the icon in the lower left corner appears on the pump's screen. Modbus parameter settings can be made via this icon.



BACnet Modu

After the CCM module is inserted into the expansion slot, the icon in the lower left corner appears on the pump's screen. BACnet parameter settings can be made via this icon.



User Interface Codes

The following parameters can be adjusted as needed after the CCM module is inserted into the expansion slot, via the advanced or simple screen.

Parameter	Explanation	Details
CM1	CCM Operating Mode:	Multi/Double Pump, Modbus, BACnet
MB1	Serial Communication Baud Rate:	9600, 19200, 38400, 57600, 76800, 115200
MB2	MAC Address:	1 - 32
MB3	Parity:	Odd, Even, None
MP1	Multi/Double Pump Mode:	Master/Slave, Main/Standby, Pump Cycling
MP2	Multi/Double Pump ID:	0 - 7
MP3	Multi/Double Pump Network Size:	2 - 8
MP4	Pump Operating Mode:	Constant Speed, Full Automatic, Half Automatic
MP5	Pump Speed Set:	Min. Max. Speed
MP6	Operating Point:	1.0 – 12.0

(CCM_PROTOCOL) **CM1 X** (1: Modbus, 2: BACnet, 3: Multipump)

If CM1 = 1:

- (CCM_BAUD_RATE) **MB1 X** (1:9600,2:19200,3:38400,4:57600,5:76800,6:115200)
- (CCM_MAC_ADDRESS) **MB2 XX** (1 - 32)

If CM1 = 2:

- (CCM_BAUD_RATE) **MB1 X** (1:9600,2:19200,3:38400,4:57600,5:76800,6:115200)
- (CCM_MAC_ADDRESS) **MB2 XX** (1 - 32)
- (CCM_MODBUS_PARITY) **MB3 X** (1:ODD,2:EVEN,3:NONE)

If CM1 = 3:

- (CCM_MULTIPUMP_MODE) **MP1 X** (1:Master/Slave,2: Main/Standby,3:Pump Cycling)
- (CCM_MULTIPUMP_ID) **MP2 X** (0 - 7) (1 master, up to 7 slaves)
- (CCM_MULTIPUMP_NETWORK_SIZE) **MP3 X** (2 - 8) (1 master and at least 1 slave, up to 7 slaves)
- (OPERATING_MODE) **MP4 X** (1: Constant Speed, 2: Full Automatic, 3: Half Automatic)

If MP4 = 1:

- (SPEED_SETPOINT) **MP5 XXXX** (min speed - max speed)

If MP4 = 2 or 3:

- (HEAD_SETPOINT) **MP6 XX.X** (1.0 - 12.0)

Modbus & BACnet Register List

No	Category	Modbus ref	BACnet ref	Name	Modbus data type	BACnet data type	R/W	Remarks
1	Interface	-	-	Protocol	Holding Register	Multi-state Value	RW	Switch between Modbus or BACnet on next startup. For BACnet, alternatively can be proprietary
2	Interface	8.2.3	8.2.3	Baud rate	Holding Register	Network Port	RW	At least 9600 and 19200 required for Modbus, 9600 and 38400 required for BACnet. (Note that Modbus and BACnet have different default baud rates.) For BACnet, this is a property
3	Interface	8.2.4	-	Data frame	Holding Register	N/A	RW	of Network Port in latest BACnet Parity and stop bits enum for Modbus. BACnet always required to be 8-1-none for compliance. Optionally it can still be changed even in BACnet mode (as Multi-state
4	Interface	8.2.2	8.2.2	MAC address	Holding Register	Network Port	RW	For BACnet, could use writeable MAC_Address property of Network
5	Pump	6.2.7.3.1	6.2.1.0	Set Value	Holding Register	Analog Value	RW	
6	Pump	6.2.7.3.40	6.2.3.0 -	Pump Command	Holding Register	Depends	RW	Depends on exact behavior
			6.2.3.3					
7	Pump	6.2.7.3.42	6.2.14.0	Operation Mode	Holding Register	Multi-state Value	RW	
8	Pump	6.2.7.3.300	6.2.13.2	Bus Command Timer	Holding Register	Multi-state Value	RW	
9	Pump	N/A	N/A	Bus Command Timer	Holding Register	Analog Value	RW	
10	Pump	6.2.7.3.408	6.2.1.5	PID Kp	Holding Register	Analog Value	RW	
11	Pump	6.2.7.3.409	6.2.1.6	PID Ti	Holding Register	Analog Value	RW	
12	Master pump	6.2.7.4.1	6.2.0.3	Master current pressure	Input Register	Analog Input	R	
13	Master pump	6.2.7.4.2	6.2.0.2	Master flow rate	Input Register	Analog Input	R	
14	Master pump	6.2.7.4.3	6.2.0.7	Master total power	Input Register	Accumulator	R	Optionally can be Analog Input
15	Master pump	6.2.7.4.4	6.2.0.4	Master current power	Input Register	Analog Input	R	
16	Master pump	6.2.7.4.5	6.2.0.6	Master operation hours	Input Register	Analog Input	R	Optionally can be Accumulator

17	Master pump	6.2.7.4.6	N/A	Master electrical current	Input Register	Analog Input	R	
18	Master pump	6.2.7.4.7	6.2.0.1	Master current speed	Input Register	Analog Input	R	
19	Pump	6.2.7.4.8	6.2.0.5	Fluid temperature	Input Register	Analog Input	R	
20	Master Pump	6.2.7.4.16 6.2.7.4.17	N/A N/A	Master pump is frequency regulated Master pump type	Discrete Input Input Register	Binary Input Multi-state Input	R R	
21	Pump	6.2.7.4.18	6.2.0.9	Speed max	Input Register	N/A	R	For BACnet, could use Max_Pres_Value and
22	Pump	6.2.7.4.19	6.2.0.8	Speed min	Input Register	N/A	R	See above
23	Pump	6.2.7.4.20	6.2.0.14	Pressure Max Δp -c	Input Register	Analog Input	R	For BACnet, could use Max_Pres_Value and Min_Pres_Value property of pressure instead. Maybe split
24	Pump	6.2.7.4.21	6.2.0.13	Pressure Min Δp -c	Input Register	Analog Input	R	See above
25	Pump	6.2.7.4.22	6.2.0.11	Pressure Max Δp -v	Input Register	Analog Input	R	See above
26	Pump	6.2.7.4.23	6.2.0.10	Pressure Min Δp -v	Input Register	Analog Input	R	See above
27	Pump	6.2.7.4.24	6.2.0.12	Flow Max	Input Register	Analog Input	R	For BACnet, could use Max_Pres_Value and
28	Pump	6.2.7.4.25	N/A	Flow Min	Input Register	Analog Input	R	See above
29	Pump	6.2.7.4.26	N/A	Supported errors	Input Register	Depends	R	Depends on exact behavior. Note: Removed in recent ref versions.
30	Pump	6.2.7.4.27	N/A	Supported service	Input Register	Depends	R	See above
31	Pump	6.2.7.4.28	6.2.0.15	Power Max	Input Register	N/A	R	For BACnet, could use Max_Pres_Value of current power
32	Pump	6.2.7.4.35	N/A	Service message / state diagnostics	Input Register	Depends	R	Depends on exact behavior, may be more appropriate to define as set of
33	Pump	6.2.7.4.36	N/A	Error type	Input Register	Depends	R	Depends on exact behavior
34	Pump	6.2.7.4.37	N/A	Error message	Input Register	Depends	R	Depends on exact behavior
35	Pump	6.2.7.4.39	N/A	State diagnostics	Input Register	Depends	R	Depends on exact behavior
36	Pump	6.2.7.4.404	N/A	Operation status	Input Register	Depends	R	Depends on exact behavior
37	Slave pump	6.2.7.4.9	N/A	Dual pump operating	Input Register	Analog Input	R	Optionally can be Accumulator
38	Slave pump	6.2.7.4.65	N/A	Slave current pressure	Input Register	Analog Input	R	
39	Slave pump	6.2.7.4.66	N/A	Slave flow rate	Input Register	Analog Input	R	
40	Slave pump	6.2.7.4.67	N/A	Slave total power	Input Register	Accumulator	R	Optionally can be Analog Input
41	Slave pump	6.2.7.4.68	N/A	Slave current power	Input Register	Analog Input	R	
42	Slave pump	6.2.7.4.69	N/A	Slave operating hours	Input Register	Analog Input	R	Optionally can be Accumulator
43	Slave pump	6.2.7.4.70	N/A	Slave electrical current	Input Register	Analog Input	R	

44	Slave pump	6.2.7.4.71	N/A	Slave current speed	Input Register	Analog Input	R	
45	Slave pump	6.2.7.4.80	N/A	Slave pump is frequency	Input Register	Multi-state Input	R	
46	Slave pump	6.2.7.4.81	N/A	Slave pump type	Input Register	Multi-state Input	R	
47	Slave pump	6.2.7.4.100	N/A	Slave error type	Input Register	Depends	R	Depends on exact behavior
48	Slave pump	6.2.7.4.102	N/A	Slave pump status	Input Register	Depends	R	Depends on exact behavior
49	Master pump	6.2.7.4.940	6.2.13.1	Master error message	Input Register	Depends	R	Depends on exact behavior
50	Slave pump	6.2.7.4.950	N/A	Slave error message	Input Register	Depends	R	Depends on exact behavior
51	Miscellaneous	N/A	N/A	Soft Reset	Coil / Holding	N/A	R	Modbus command to soft-reset
					Register			device and apply interface changes.
								BACnet can use ReinitializeDevice

3. Warranty, Maintenance and Service

Alarko Circulation Pumps accessories are guaranteed for 2 (two) years against material and factory workmanship faults, provided that the warnings, assembly and usage principles specified in the standards are followed. Defects caused by irregularities in the electricity supply are not covered by the warranty.

During the warranty period, the warranty certificate must be kept and shown to the Alarko-Carrier authorized service when necessary.

Visit www.alarko-carrier.com.tr or call 444 0 128 Alarko Carrier hotline when you encounter any problem or want to learn the nearest authorized service.

Caution!

ACM & CCM Modules must be installed and commissioned by expert services!

4. Scrapping and Recycling

Authorized services or related recycling facilities can be used for the disposal of the pump.

The warnings and instructions in Section 12 must be observed when disassembling the pump for disposal.

Disposal of the pump or pump parts must be done in an environmentally friendly manner and in accordance with the relevant regulations.