ALARKO

OPTIMA CIRCULATION PUMP INSTALLATION AND OPERATING INSTRUCTIONS

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CIRCULATION PUMP INSTALLATION AND OPERATING INSTRUCTIONS

INDEX

1. CAUTION

Read this manual carefully. The information given here comprises essential issues which is required for the pump operators or users.

CAUTION! If you need any information later on, please refer to this manual

The manufacturer of the Optima pumps, Alarko-Carrier, provides customer service and retailing operations on the fields of heating, cooling, ventilation, water treatment and pressurization nationwide with its 60 years of experience. Please contact your authorized Alarko-Carrier customer service if you need any information or encounter a problem.

The details in the following pages apply to all of the Optima types.

2. 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 shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

2.1 Types of Symbols and Warnings

If these warnings are not taken into account, it may result in death or injury.

If these warnings are not taken into account, serious injuries or death may occur due to electric shock.

CAUTION!

If these warnings are not taken into account, safe operation or the protection of the pump may fail.

3. GENERAL

3.1 Description of the Pump

Alarko Optima is a brand new type of circulation pump which regulates its speed according to the system needs by the ECM (Electronic Commutated Motor) technology and the controller on it, as well as saves energy with its various types of operating mode choices. The operating modes are manual, constant pressure and variable pressure. See section 7.1 and 9. The pump operates according to the operating mode and head settings which are set from the controller.

The main components and their materials are given in the following figure and table.

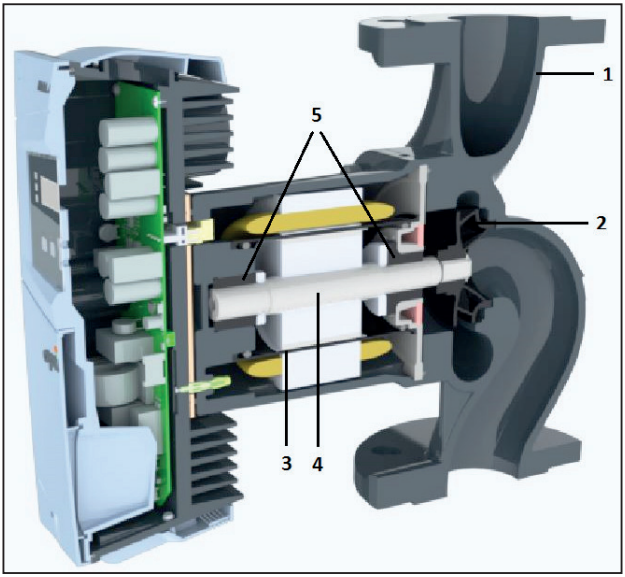


Figure 3.1: Cross-section Drawing of the Pump

No	Component	Material
1	Pump housing	Cast iron (EN-GJL-200)
2	Impeller	Plastic (modified PPO - %30 GF)
3	Rotor can	Composite
4	Shaft	Stainless steel (1.4021 or 1.4034)
5	Bearings	Carbon (metal impregnated)

Table 3.1: List of the Main Components

3.2 Applications (Intended Use)

Alarko Optima pumps are developed for the circulation and pressurization of the water flowing in the heating and air conditioning systems located in the residential, commercial and industrial establishments

CAUTION! Optima pumps can be used only for the purposes that are stated in this manual. The manufacturer and the dealer are not responsible for the results of the misuse.

3.3 Pumped Liquids

As the liquid, only water should be used. It should be free from solid particles and is not mixed with any additives, e.g. anti-freeze. To avoid any kind of scaling or corrosion, the water within the system should meet the criteria below:

Total Heating Output [kW]	Sum of Alkaline Earths [mol/m^3]	Total hardness [^{0}d]	pH value at 25°C	Oxygen [mg/litre]	Electrical Conductivity at 25°C [µS/cm]
... ≤ 50	≤ 3.0	≤ 16.8	8.2 – 10.0	< 0.02	< 100
50 < ... ≤ 200	≤ 2.0	≤ 11.2			
200 < ... ≤ 600	≤ 1.5	≤ 8.4			
600 < ...	≤ 0.02	≤ 0.11			

Table 3.2: Properties of the water used in heating systems[1]

[1]Source: VDI 2035 – Part 1 and 2

3.4 Operating Conditions

Input Voltage: Single Phase 230 Volts AC (± 10%) and 50 Hz (earth protected).

Water Temperature: Up to +110°C.

System Pressure: For minimum and maximum water pressure see Table 5.2 and Table 5.3

Ambient Temperature: -10°C to +40°C

The conditions (voltage, pressure, temperature) of the pump while operating should be between the limits given above

3.5 Insulation Shells

The insulation shell is designed to mitigate the thermal losses in heating systems and delivered with the pump. It is made of polypropylene foam and thoroughly mounted on the pump by its perfectly fitting design.

Remove the insulation shells from the housing before the pump installation. See Figure 3.2.

Figure 3.2: Insulation shells

4. CONTENTS OF THE PACKAGE, LIFTING, TRANSPORTATION AND STORAGE

4.1 Contents of the Package

The package contains the following:

- Pump
- Insulation shells
- Manual
- Certificate of Warranty
- 2 pieces of gasket
- 1 pieces of O-ring

CAUTION! Do not throw away the insulation shells.

4.2 Lifting

Ambient Temperature during the Transportation and Storage: -25°C to +40°C.

The pump should be protected from moisture, impacts and frost during the transport and storage.

Do not lift the pump from the controller box.

4.3 Transportation and Storage

Ambient Temperature during the Transportation and Storage: -25°C to +40°C.

The pump should be protected from moisture, impacts and frost during the transport and storage.

CAUTION! Improper transportation or storage may lead to damage to the product.

It is advised to check and examine the product whether it is the ordered type and delivered undamaged.

If the pump is damaged or deformed, it should not be used without an approval of the Alarko-Carrier customer services.

5. PUMP DETAILS

5.1 Nameplate Data

The information given in the nameplate is shown below:

Figure 5.1: Sample of a Nameplate

Number	Description
1	First digit of the nominal flange diameter
2	Max. head
3	Production year
4	Min. and Max. power
5	Temperature class
6	Enclosure class
7	Input frequency
8	Input voltage
9	Serial number
10	Max. system pressure
11	Acquired standards
12	Max. current
13	Energy Efficiency Index (EEI)

Table 5.1: Description of the Nameplate Data

5.2 Technical Data

	8 / 12	6 / 12	5 / 12	5 / 9	4 / 12	5 / 8	4 / 4
Max. Head [m]	see Appendix						
Max. Flow [m^3/h]	see Appendix						
Speed [rpm]	900 – 3300	900 – 3300	1400 – 4600	1400 – 4100	1400 – 4600	1400 – 4800	1600 –3700
Input Voltage and Frequency	1~ 230 V AC ± 10%, 50 Hz, PE						
Nominal Current [A]	7	4.5	3.3	2.3	2.5	1.5	0.7
Power Consumption [W]	40 – 1540	30 – 1000	26 – 730	40 – 505	33 – 550	10 – 350	12 – 160
Energy Efficiency Index (EEI)	≤ 0.23						
Insulation Class	F						
Enclosure Class	IP 44						
Temperature Class	TF 110						
Max. System Pressure [3]	PN 6 or PN 10[1]	PN 6/10[2]					
Emitted sound pressure	< 56 dB (A) (depending on the type)						
Relative Humidity	< %90						
Pump Dimensions	see Appendix						

[1] There are different pumps for each pressure values.
[2] The pump is suitable for both pressure values.
[3] These values are declared by Alarko-Carrier for heating systems.

Table 5.2: Technical Data

In order to avoid the noise and damage due to the cavitation, the minimum inlet pressure values are given on the table below.

Minimum inlet pressure values	Water Temperature			
	50°C	75°C	95°C	110°C
	0,5 bar	0,8 bar	1,3 bar	2,0 bar

Table 5.3: Minimum Inlet Water Pressure Values

5.3 Parallel/Back-up Operation

When installing more than one pump for back-up or parallel operation, a check valve must be connected for each pump.

6. PUMP INSTALLATION

Mechanical and electrical installation must be carried out by qualified personnel and in accordance with the instructions on this manual and also with applicable regulations.

CAUTION! Before any installation, the pipework should be checked for contamination and flushed if there is any.

6.1 Positioning

The pump should be installed into the pipework without any strain or bearing the weight of the pipework.

The figures given below are to be taken into consideration during the installation.

The motor shaft must be parallel to the ground.

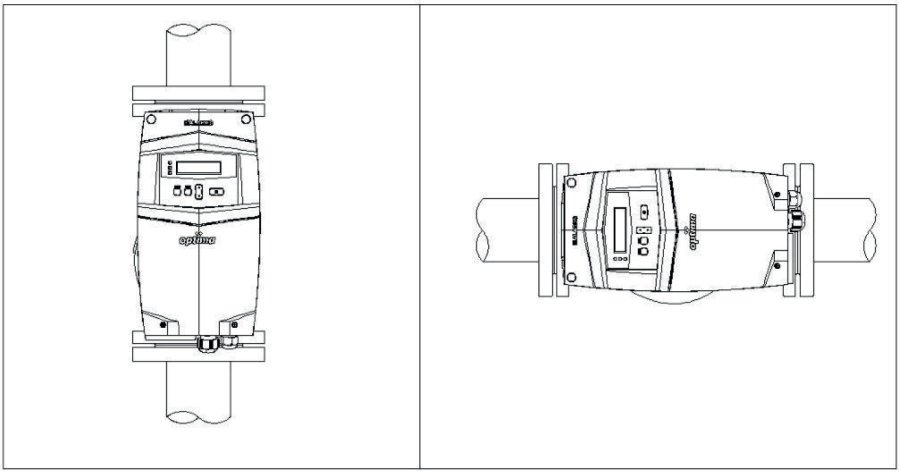


Figure 6.1: Correct Pump Positions While Vertically and Horizontally Installed to the Pipework

The pump must be not perpendicular to the ground.

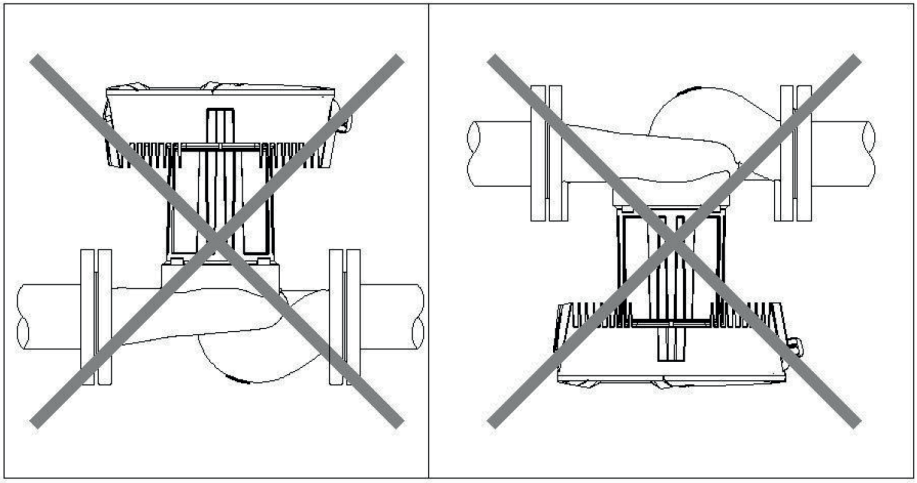


Figure 6.2: Incorrect Pump Positions

The position of the control box can be changed in order to see and use the display easier. To adjust the position, the 4 bolts, which hook the motor housing and pump housing together, are removed and the motor housing is adjusted by rotating it to the appropriate one from the allowed positions and reconnected to the pump housing with bolts.

Do not separate the motor housing from pump housing. Rotation process should be done carefully and slowly. Seal damage causes leakage.

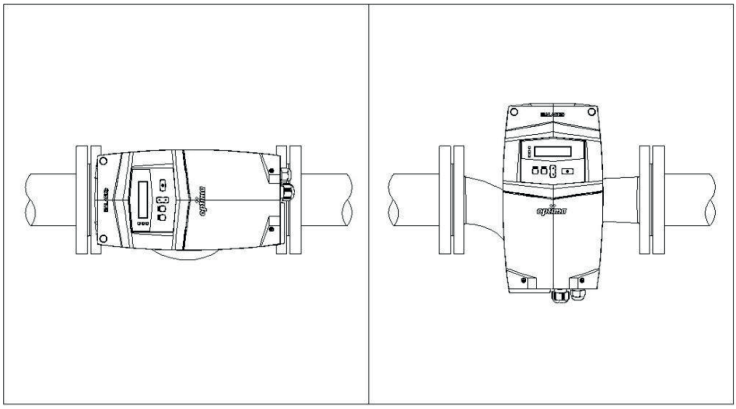
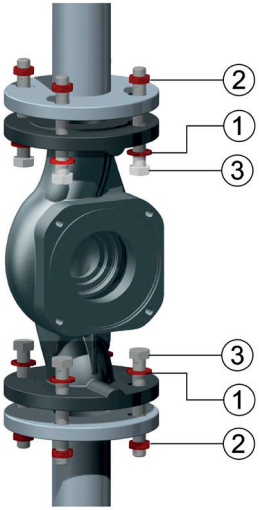


Figure 5.3: Control Box Position Adjustment

6.2 Mechanical Installation

1. Make sure that all the piping of the system must be done before beginning the installation.
2. Close the valves on the inlet and outlet side to isolate the pump from water flow.
3. Check the coherence of the system pressure and the min. & max. pressure values of the pump. See Section 5.2.
4. Mount the pump to the pipes while taking the arrow on the pump housing into consideration. The water flow of the system and the arrow on the housing must be in the same direction.
5. Place the gaskets of the pump onto the both sides. Make sure that the gaskets do not prevent any water flow.
6. Use the washers, bolts and nuts given in the Table 6.1 to fix the pump to the pipes.

7. Check the Figure 6.4 for washer, bolt and nut order. See Table 6.1 for the recommended tightening torques for the bolts used in the pump fixing.



1	**Washer**
2	**Nut**
3	**Bolt**

Figure 6.4: The Order of the Washer, Bolt and Nuts

Pressure	Bolt and Nut Type	Recommended Tightening Torque Value
PN 6	M12	40 Nm - 60 Nm
PN 10	M16	70 Nm - 90 Nm

Table 6.1: Recommended Tightening Torque Values

8. After completing the connection, open the isolating valves of inlet and outlet sides and check if there is any leaking.
9. Make sure that the four condensate drain grooves around the pump are open. See Figure 6.5.

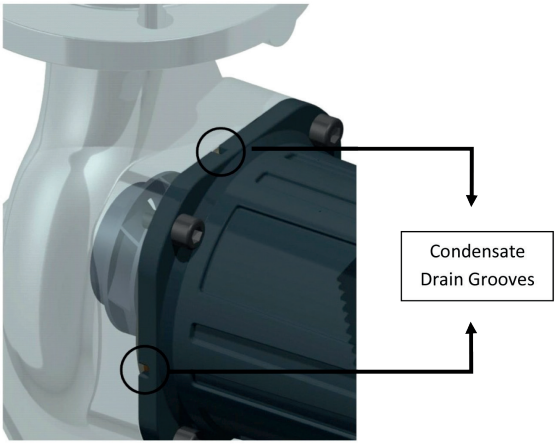


Figure 6.5: Condensate Drain Grooves

10. After the installation is completed, place the insulation shells as shown in Figure 6.6.

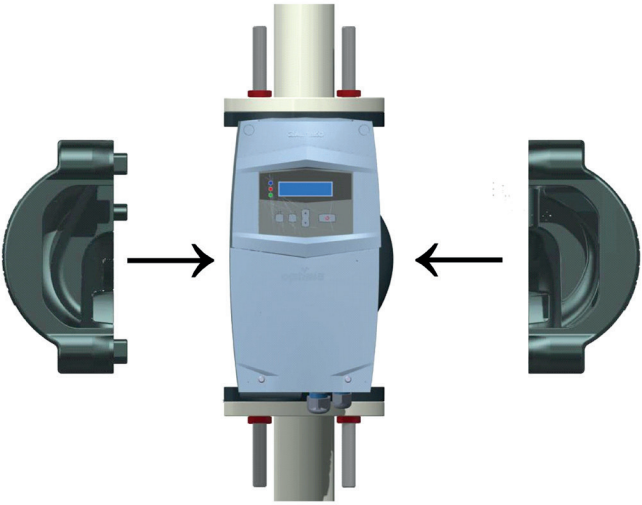


Figure 6.6: Placing the Insulation Shells

6.3 Filling and Venting

In order to ensure the pump to operate efficiently also without any damage and noise, the air in the system must be vented and the system pressure must be between the values given in Table 5.2 and Table 5.3. To fully vent the air from the system, the pump can be run for a while.

Air venting should not be done by loosening any bolts of motor or pump housing.

6.4 Cable/Fuse Selection and Electrical Installation

Electrical installation must be carried out by qualified personnel and in accordance with the instructions on this manual and also with applicable regulations.

Before working on the pump, all poles of the power supply must be disconnected.

The mains connection must have an earthing system. If not, the pump should not be run.

For cable and fuse selection, Table 6.2 should be considered.

	8 / 12	6 / 12	5 / 12	5 / 9	4 / 12	5 / 8	4 / 4
Cable	3 x 1.5 mm^2 or 3 x 2.5 mm^2						
Fuse	16 A	10 A				2 A	

Table 6.2: Cable and Fuse Values

Electrical connection diagram is given at Figure 6.7:

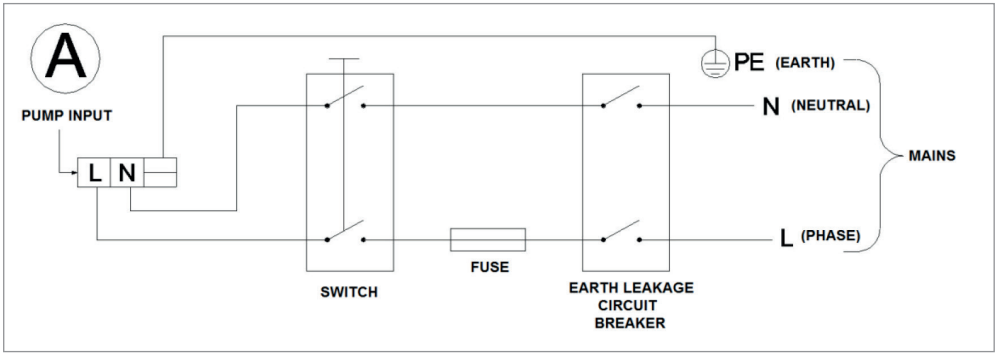


Figure 6.7: Electrical Connection Diagram

1. Check the phase and neutral outlets of the mains.
2. Attach cable ferrules to the cable tips appropriate to the cable diameter.
3. Take out the cover of the cable gland.
4. Remove the screws of the bottom cover. See Figure 6.8.

Figure 6.8: Removal of the Bottom Cover

5. Pull the power supply cable through the no.1 cable gland shown in Figure 6.9.

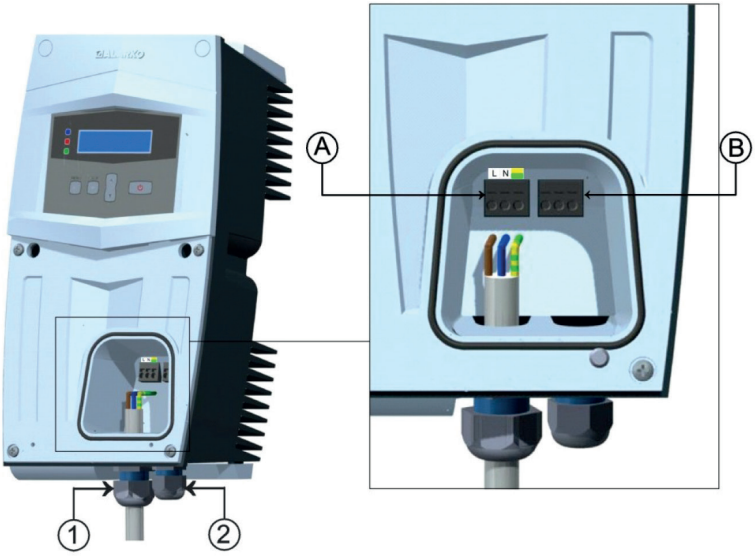


Figure 6.9: Cable Gland View

6. Connect the power supply cables to the socket named as “A” in Figure 6.9 appropriately, as shown in Figure 6.7.
7. Tighten the cable gland and make sure that the connection side of the cable is loose enough.
8. Refit the cover. See Figure 6.10.

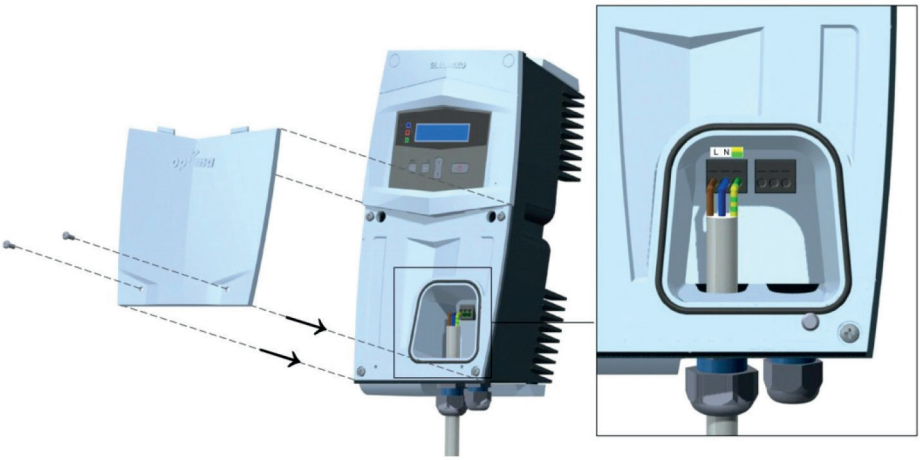


Figure 6.10: Refitting the Bottom Cover

The power cable should not be in contact with the pump or pipeline.

The voltage value of the mains must be in between the limits given in Table 5.2.

It is recommended to use a residual-current device (RCD) to protect the user and the pump. The RCD should be chosen according to the nominal voltage and current of the pump and it should be able to trip on high frequency leakages (type B) (The tripping current should be lower than 3.5mA according to the EN 60335).

7. DISPLAY AND SETTINGS

The display of the Optima pumps has two text rows, three LEDs and five control buttons. See Figure 7.1.

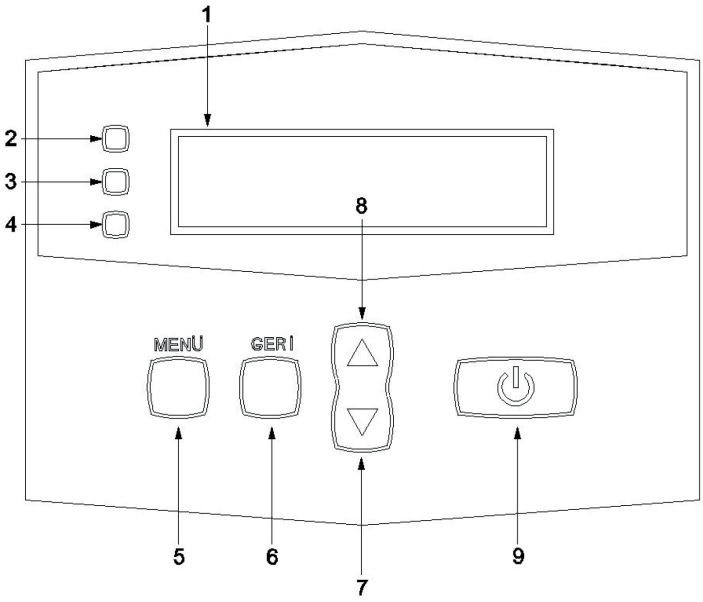
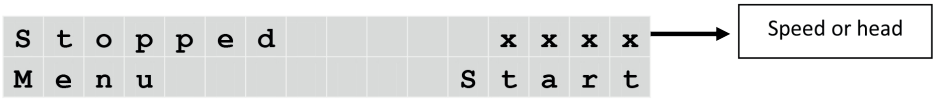


Figure 7.1: Control Display Layout

The control display shows the information about the pump status and allows the user to set the desired mode to operation. The layout of the buttons and display:

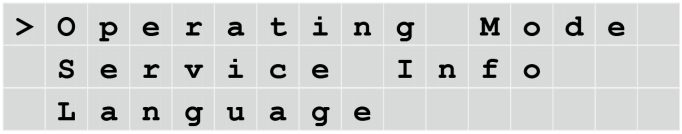
1. Two row OLED Display
2. Remote Control LED (YELLOW)
3. Fault LED (RED): It is on when there is a fault.
4. Power LED (GREEN): It is on as long as the power is on.
5. “MENU” Button: To navigate through the menu and save the settings.
6. “Back” Button
7. “Down” Button
8. “Up” Button
9. “POWER” Button: To start and stop the pump.

The main menu is shown below:



It is navigated through the submenus with “MENU” button. Submenus are:

- Operating Mode
- Service Info
- Language



To go to the submenus, navigate through the menu with the “>” sign by “Up” and “Down” buttons and press “MENU” button.

7.1 Operating Modes

After selecting the “Operating Mode”, the display is shown below.

```
> Manual
  Const.  Pressure
  Var.  Pressure
```

In this submenu, there are three different operating modes. To select an operating mode, the “MENU” button is pressed. The detailed performance curves of different operating modes are given in Appendix. See Section 9 for explanation and selection criteria for the operating modes.

7.1.1 Manual Operating Mode

After selecting the “Operating Mode”, the display is shown below.

```
Manual                +
Speed: xxxx           -
```

The desired speed is modified by “Up” and “Down” buttons with 50 rpm intervals. The speed is saved with pressing “MENU” button for two seconds.

```
Stored
Manual  RPM  xxxx
```

The image above is shown when the selected speed is saved. Pressing “Back” button navigates the user to the upper menu.

The image below is shown when manual mode is selected:

```
Running  M      xxxx  →  Speed
Menu             Stop
```

7.1.2 Constant Pressure Operating Mode

```
Const.  Pressure      +
Head: xx.x            -
```

The desired head is modified by “Up” and “Down” buttons with 0.5m intervals. The head is saved with pressing “MENU” button for two seconds.

```
Stored
Head  xx.x
```

The image above is shown when the selected head is saved. Pressing “Back” button navigates the user to the upper menu.

The image below is shown when constant pressure mode is selected:

```
Running  CP   xx.x
Menu             Stop
```

→ Head

7.1.3 Variable Pressure Operating Mode

```
Var.  Pressure   +
Head: xx.x       -
```

The desired head is modified by “Up” and “Down” buttons with 0.5m intervals. The head is saved with pressing “MENU” button for two seconds.

```
Stored
Head  xx.x
```

The image above is shown when the selected head is saved. Pressing “Back” button navigates the user to the upper menu.

The image below is shown when constant pressure mode is selected:

```
Running  VP   xx.x
Menu             Stop
```

→ Head

7.2 Service Info

```
  Operating Mode
> Service  Info
  Language
```

In this submenu, the errors and warnings which occur in the pump are shown. Refer to the Section 11 for fault handling.

The symbol in front of the fault shows the description of the fault:

- " ! " exclamation point indicates that the pump is still in error state. In this state pump does not run.
- "A" letter indicates that a fault was occurred and the pump resumed automatically after 5 minutes standby.

An example for an error is given below:

```
Warning: Volt. Low
Menu
```

7.3 Language

```
  Operating Mode
  Service  Info
> Language
```

In this option, there are languages choices which are used in the pump.

```
> English
  Turkce
```

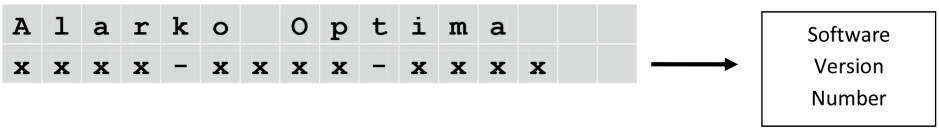
The desired language is modified by "Up" and "Down" buttons. To save the language, "MENU" button is pressed for two seconds.

The desired language is modified by "Up" and "Down" buttons. To save the language, "MENU" button is pressed for two seconds.

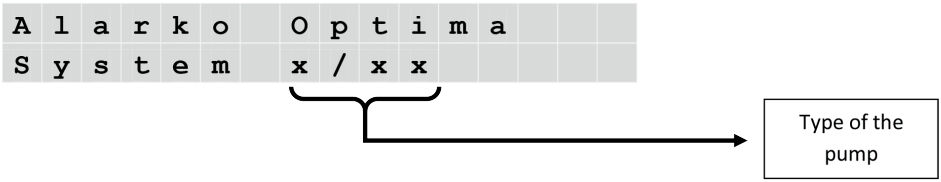
8. FIRST START-UP, CONTINUOUS OPERATION AND SHUT-DOWN

Depending on the water temperature in the pipe system, any part of the pump is subject to high temperatures. In case of a contact to the non-plastic surfaces, there is a risk of burn and fire.

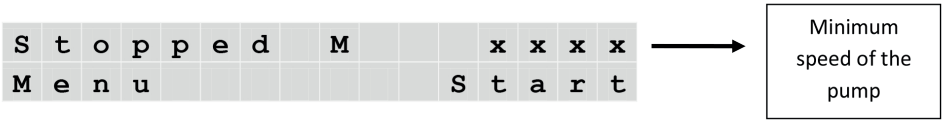
- Fill the system with water in minimum pressure and vent the air. For minimum pressure values see Table 5.3.
- Check the voltage values of the mains and compare with Table 5.2.
- Switch on the power to the pump.
- At first start-up the display is shown below:



- After one second:



- After one second minimum speed at manual mode is set for commissioning.



- Press “POWER” button to start the pump. To change the operating mode or speed / head, see Section 7.
- The display goes into the sleep mode after 15 minutes if the buttons are not pressed. Meanwhile, the pump continues to operate. The main menu is shown by pressing any button.
- In case of a power outage, the pump saves its last operating mode settings and resumes operating with those settings.
- To stop the pump, press “POWER” button.

9. OPERATING MODES AND SELECTION CRITERIA

Optima circulation pumps save energy with its various types of operating mode choices, which they track the curves of system needs by the ECM technology.

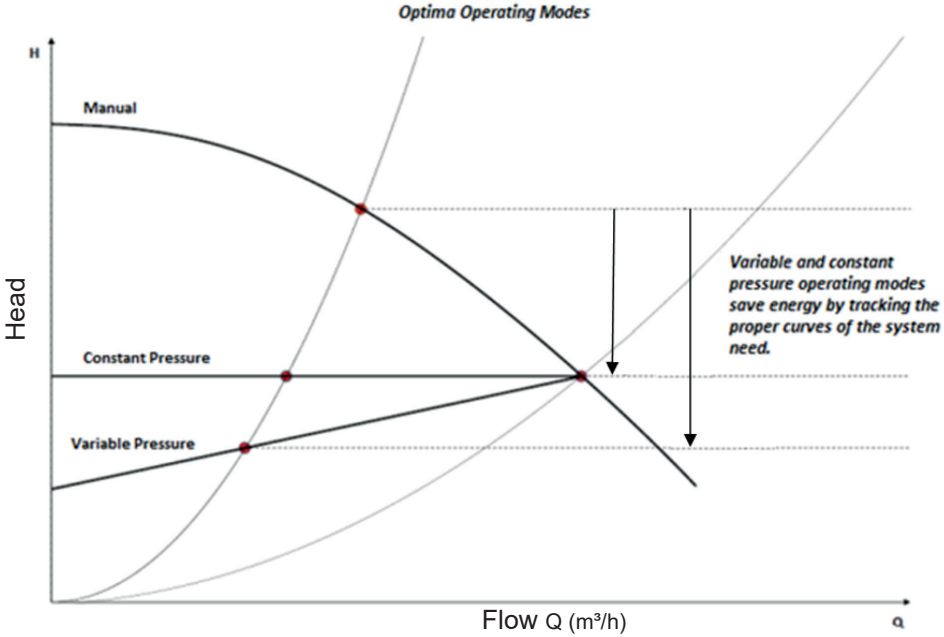


Figure 9.1: Optima Operating Modes

When the flow decreases (the operating point shifts to the left);

- the head increases in manual mode.
- the speed decreases and the head remains stable in constant pressure mode.
- the speed decreases and the head declines linearly until the half value of the selected head.

9.1 Manual Operating Mode

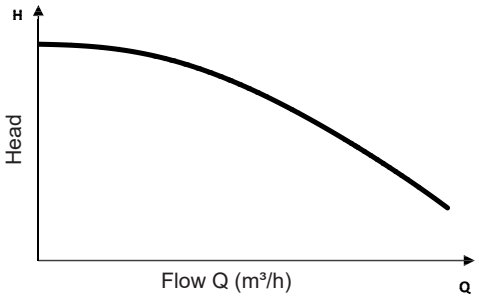


Figure 9.2: The curve of the Manual Mode

In this operating mode, the pump sets its speed fixed on the selected rpm. The speed is set by 50 rpm intervals.

9.2 Constant Pressure Operating Mode

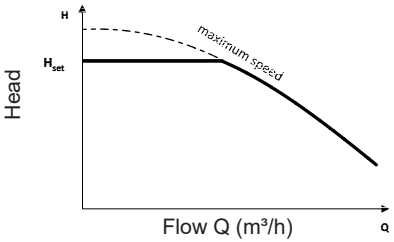


Figure 9.3: The curve of the Constant Pressure Mode

In this operating mode, the pump sets its speed to keep the selected head value (H_{set}) stable.

How to select the H_{set} value is given below:

- The operating point (the head and flow) of the system is determined.
- If the head is a multiple of 0.5, the exact value of the system is selected as H_{set}.
- If the head is not a multiple of 0.5, the closest value is selected as H_{set}.

In the following graph, the curves of the operating modes are drawn with 1 meter intervals. The head can be set by 0.5m intervals on the display.

According to the rule given above:

• A is set at 7.5m

• B is set at 7.5m

• C is set at 8m

• D is set at 8m

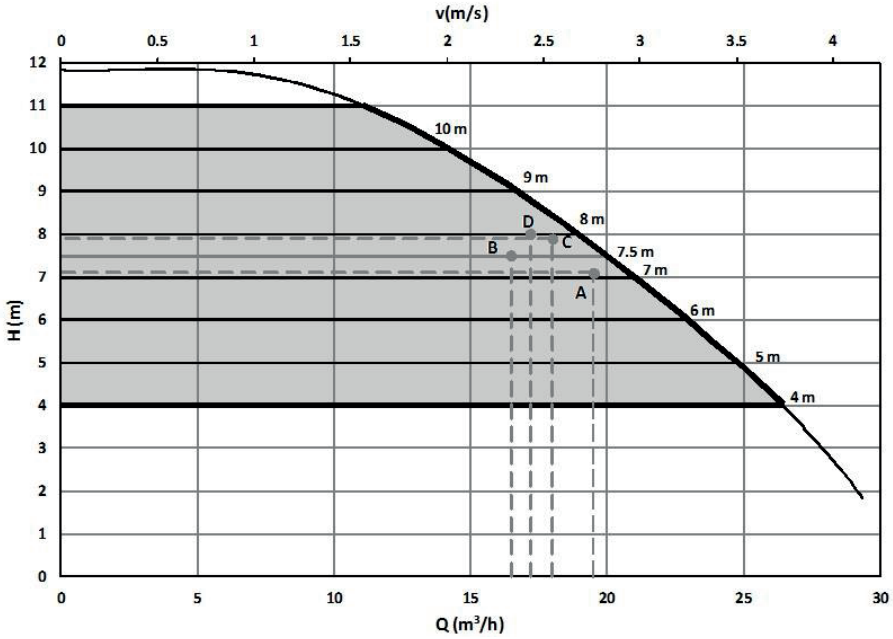


Figure 9.4: Example of the Constant Pressure Mode

9.3 Variable Pressure Operating Mode

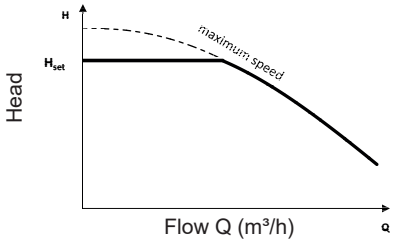


Figure 9.5: The curve of the Variable Pressure Mode

In this operating mode, the pump sets its speed by tracking a line between the selected head value (H_{set}) and half of it, depending on the flow changes in the system.

How to select the H_{set} value is given below:

- The operating point (the head and flow) of the system is determined.
- If the head is a multiple of 0.5, the exact value of the system is selected as H_{set}.

- If the head is not a multiple of 0.5, the closest value is selected as H_{set}.

In the following graph, the curves of the operating modes are drawn with 1 meter intervals. The head can be set by 0.5m intervals on the display.

According to the rule given above:

• A is set at 8.5m

• B is set at 8.5m

• C is set at 9m

• D is set at 9m

The figure below is given as an example:

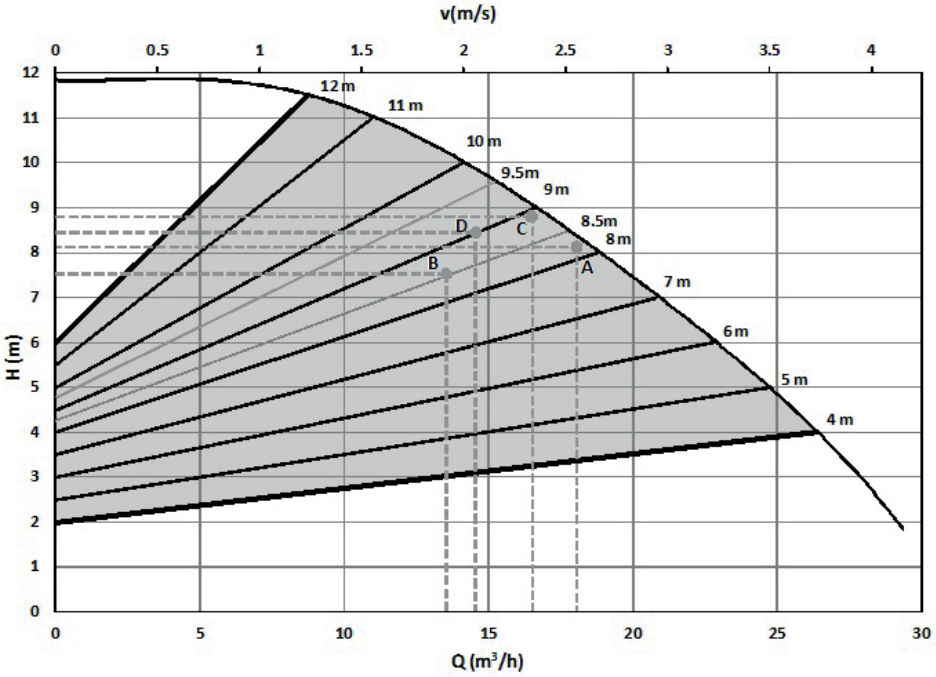


Figure 9.6: Example of the Variable Pressure Mode

9.4 Operating Mode Selection Criteria

The selection of the operating modes is based on the criteria which are given below:

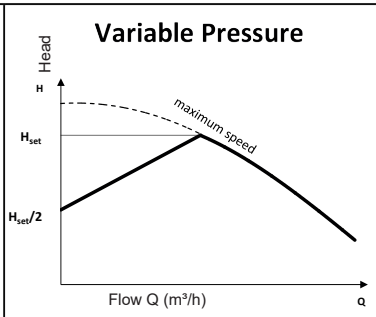
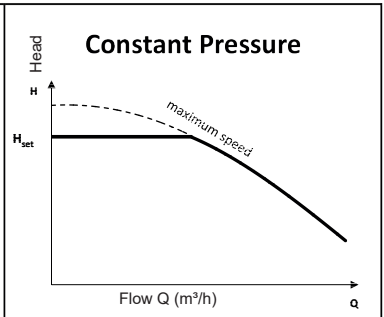
		
Two-Pipe Systems with Thermostatic Valves	* Delivery head loss > 4mSS * Very long distribution pipes * High head losses in the system * Differential pressure losses in the system * Strongly throttled pipe balancing valves	* Delivery head loss < 2mSS * Natural circulation (low pressure loss, large pipe dimensions) * Low friction losses in the system
Single-Pipe Heating Systems		* Systems with thermostatic valves * Systems with thermostatic valves and strongly throttled pipe balancing valves
Floor Heating Systems	* Systems with thermostatic valves and high pressure losses * Strongly throttled pipe balancing valves	* Systems with thermostatic valves and low pressure losses
Heating Systems with Condensing Boilers	* Secondary circuits * High pressure losses * Strongly throttled pipe balancing valves	* Primary circuits * Low pressure losses * Natural circulation (low pressure losses, large pipe dimensions)

Table 9.1: Operating Mode Selection Criteria

10. Warranty, Maintenance and Service

Providing that the warnings, mounting and usage principals stated in this manual are applied, Alarko Optima Pumps are warranted to be free from defects in materials and manufacturing workmanship under normal use and service for a period of 2 (two) years. The malfunctions due to the imbalances in the electrical supply are outside of the scope of warranty.

Warranty document will be filled by Alarko Carrier Authorized Seller where the user purchased the product and one sheet of the document will be given to the user.

In warranty period, the warranty document must be saved and must be shown to the Alarko Carrier Authorized Service if necessary.

The lifespan specified by the Ministry of Science, Industry and Technology for those products is 10 (ten) years. According to the related rules, manufacturing and seller companies commit to serve and supply spare parts for the product in this warranty period.

Optima pumps do not need any special maintenance since the shaft and bearings rotate in water.

Please visit www.alarko-carrier.com.tr or call +90 212 444 0 128 if you encounter a problem or want to know the nearest customer service location.

11. FAULTS, CAUSES AND REMEDIES

If any impeditive state occurs for the pumping operation, the pump automatically stops, gives a warning or error code and no. 3 red LED becomes ON (See Figure 7.1). It is possible to troubleshoot the problem with the fault codes. See Table 11.1.

CAUTION! Do not interfere in the buttons or display if any error occurs.

1. The pump stands by for 5 minutes after a warning/fault occurs.
2. If the cause of the warning/fault disappears after 5 minutes, the pump resumes operating. If the cause proceeds, the warning/fault is given once more.
3. Warning/fault code is stored in the service menu.
4. In case of the “Volt.Hi.” and “Volt.Low”, the pump gives a warning. After 5 warning within 24 hours, those warnings are logged as an error.
5. 5 errors within 24 hours are logged as service error.

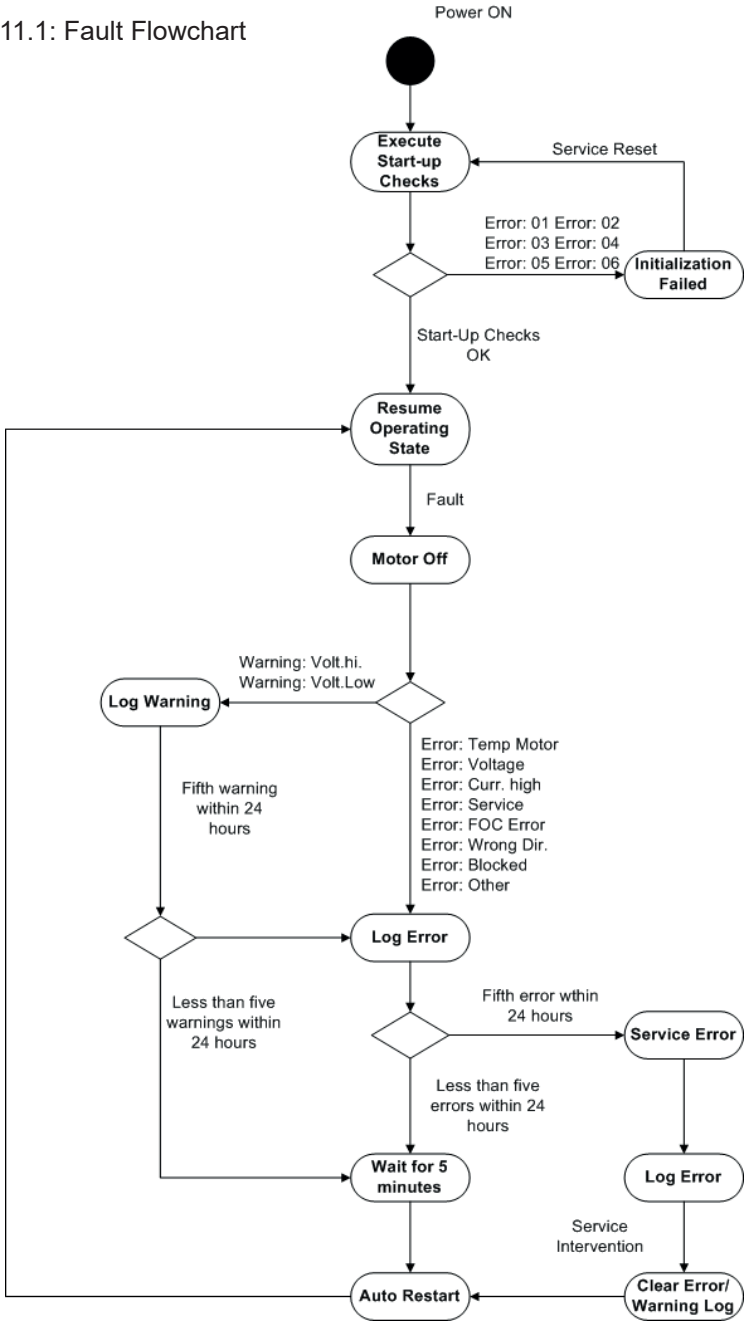
CAUTION! In case of the service error the pump cannot be started, it needs a customer service intervention.

Error or Warning Code&No	Cause	Remedy
Error: 01	The software and hardware are not compatible	Request customer service.
Error: 02	Hardware error	Request customer service.
Error: 03	The motor is not connected	Request customer service.
Error: 04	Motor temperature sensor error	Request customer service.
Error: 05	Software error	Request customer service.
Error: 06	Hardware error	Request customer service.
Error: Temp Motor	High temperature at the stator windings due to the motor overload and/or high winding temperature	- Check the water temperature if it is between the limits. - Wait until the error state ends.
Error: Temp Contr	High temperature at the stator windings due to the motor overload and/or high winding temperature	- Check the ambient temperature and enhance the ambient ventilation. - Check the water temperature if it is between the limits. - Wait until the error state ends.
Error: Voltage	5 voltage warnings within 24 hours	- Check the input voltage if it is between the limits. - Wait until the error state ends.
Error: Curr. high	The pump draws too much current	Wait until the error state ends.
Error: Service	5 any kind of errors within 24 hours	Request customer service
Error: FOC Error	The stator and shaft do not rotate at synchronous speed	- Check the directions of the arrow on the housing and the flow of the water - Wait until the error state ends.
Error: Blocked	Locked shaft due to the contamination around the rotor	Wait until the error state ends.
Warning: Volt.Hi.	High voltage from the power supply	Measure the mains voltages to check whether it is between the limits
Warning: Volt.Low	Low voltage from the power supply	Measure the mains voltages to check whether it is between the limits
Warning: Rev. Flow	Motor is forced with a reverse rotation flow	See 5.5 Parallel/Back-up Operation

Table 11.1: Error and Warning Codes

The fault flowchart of the pump is given below:

Figure 11.1: Fault Flowchart



12. DISMANTLING

Dismantling of the pump must be carried out by qualified personnel and in accordance with the instructions on this manual and also with applicable regulations.

Before dismantling, switch off the power supply. All dismantling process must be done while the power is OFF.

Wait until the display is completely turned off.

If the temperature of the system water is high, wait until the water is cooled off or drain the water cautiously.

Take the warnings and instructions in Section 4.2 and 6 into consideration while dismantling.

In the pump dismantling process, in cases where the motor body is separated from the pump body, the O-ring between the motor body and the pump body should be replaced with a new one. There is one spare O-ring in the packaging box.

Dismantling of the rotor from the pump motor must only be done by technical staff, since the rotor has very powerful magnets mounted on it. Otherwise, it may cause injuries.

Pump rotor has a strong magnetic field. Therefore, after dismantling from the pump motor, below effects can occur:
- Usage failure in electronic devices,
- Strong attraction of metals and magnetic materials,
- Risk of injury due to the effects above.

- Close the valves on the inlet and outlet side to isolate the pump from water flow.
- Remove the bolts, nuts, washers and then the pump housing.

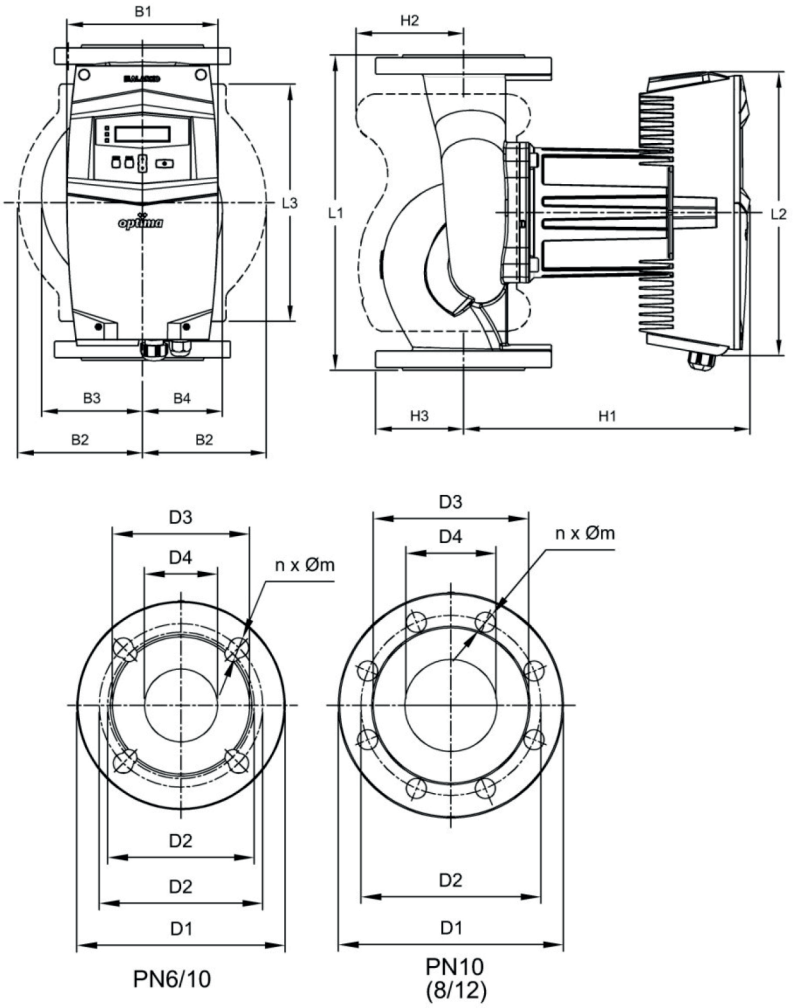
13. DISPOSAL

For the disposal of the pump, authorized technical services or related recycling facilities can be used.

Warnings and cautions in Section 11 must be taken into consideration while dismantling the pump.

Disposal of the pump or pump parts must be performed considering the environmental impact and in accordance with the related regulations.

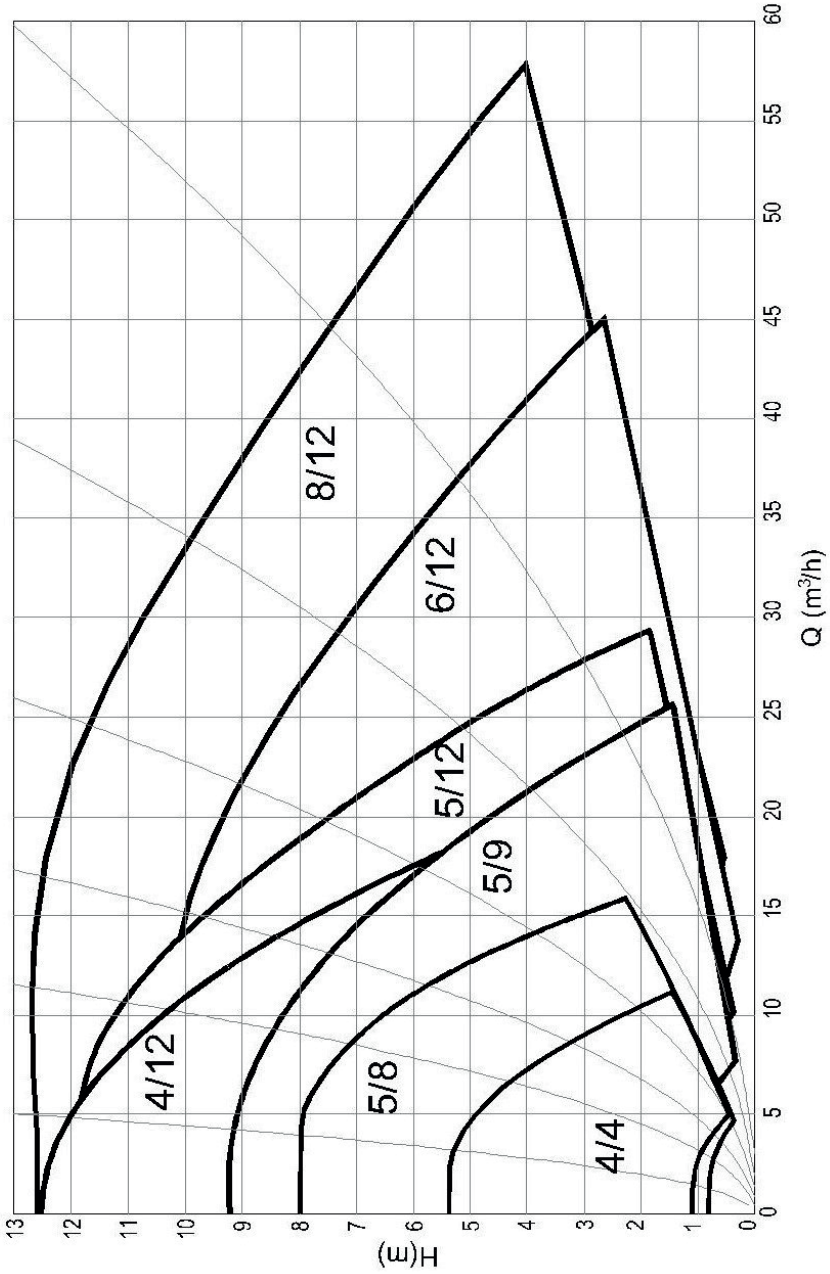
14. APPENDIX



PUMP TYPE	D1 (mm)	D2 (mm)		D3 (mm)	D4 (mm)	n x Øm (mm)		B1 (mm)	B2 (mm)	B3 (mm)	B4 (mm)	L1 (mm)	L2 (mm)	L3 (mm)	H1 (mm)	H2 (mm)	H3 (mm)	Weight (kg)
		PN6	PN10			PN6	PN10											
Optima 8/12	200	150	160	138	80	4x18	8x18	172	142	115	90.9	360	325	271	350.5	122.3	100	31
Optima 6/12	185	130	145	122	65	4x14	4x18	172	129	102.8	81.5	340	325	270	322	115	92.5	28
Optima 5/9-12	166	110	125	103	50	4x14	4x18	139	107	80.6	65.2	280	253.2	200	247.6	89.3	83	15
Optima 4/12	151	100	110	88	40	4x14	4x18	139	97.5	71.2	63.6	250	253.2	180	243	85.6	75.5	14
Optima 5/8	166	110	125	102	50	4x14	4x18	113	94	67	53	240	204	170	233	75	83	12
Optima 4/4	151	100	110	88	40	4x14	4x18	113	92	66	53	220	204	156	227.2	83	75.5	10

Dimension Table

Pump Selection Curves



Performance Curves

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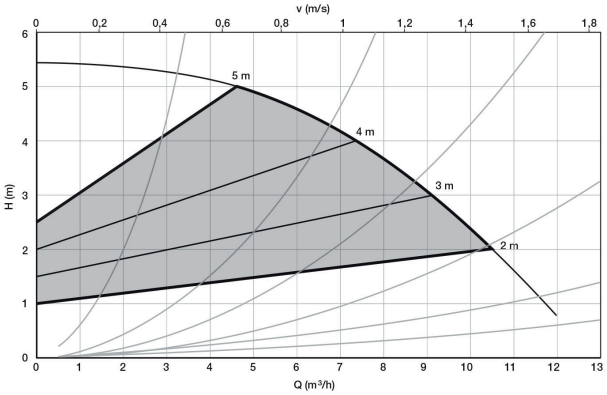
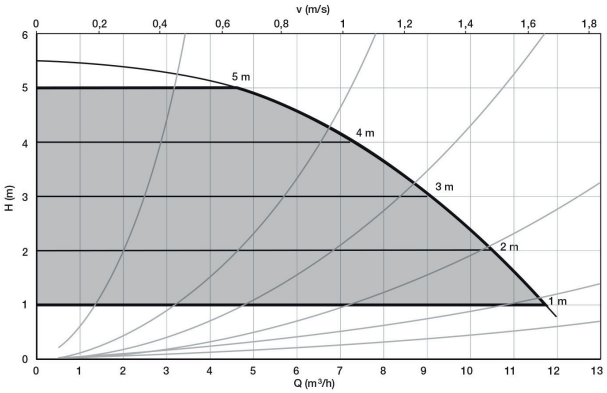
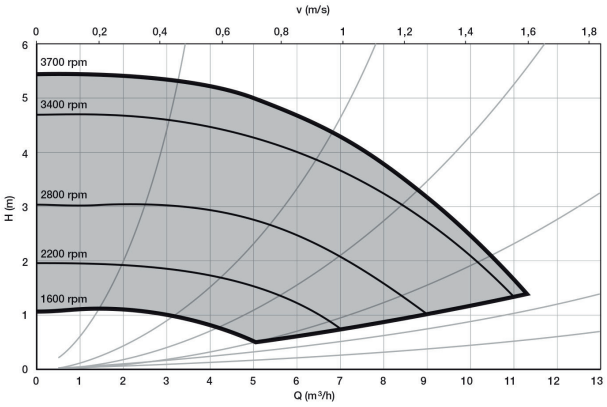
Variable Pressure Operating Mode



Constant Pressure Operating Mode



Manual Operating Mode



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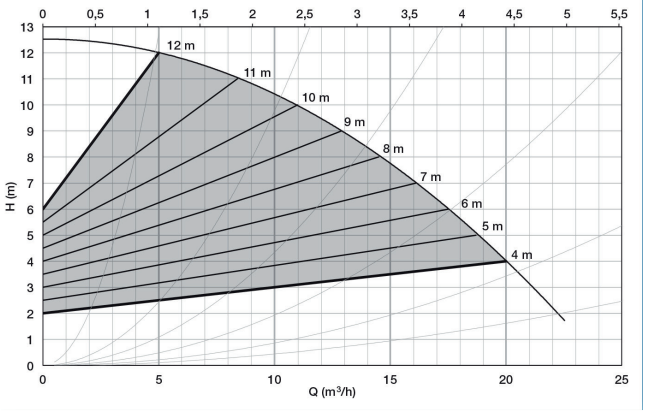
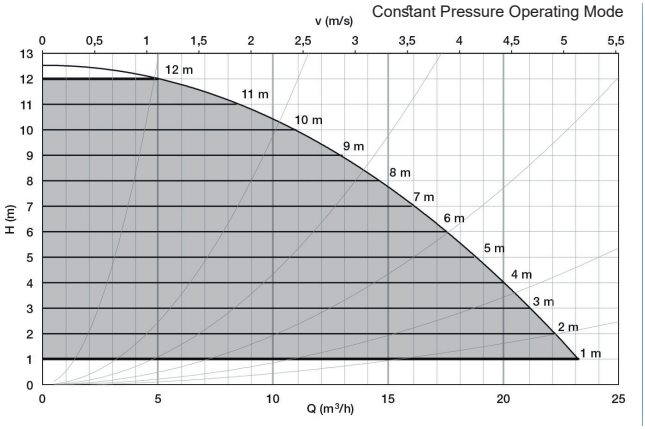
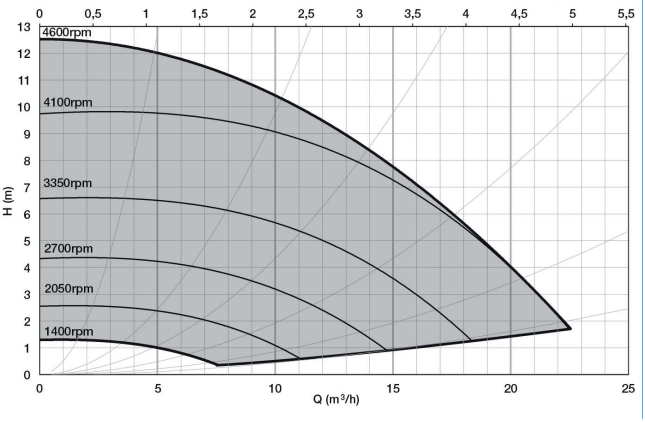
Variable Pressure Operating Mode



Constant Pressure Operating Mode

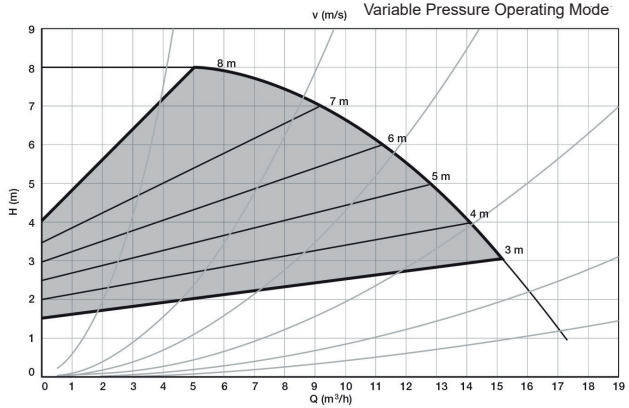


Manual Operating Mode

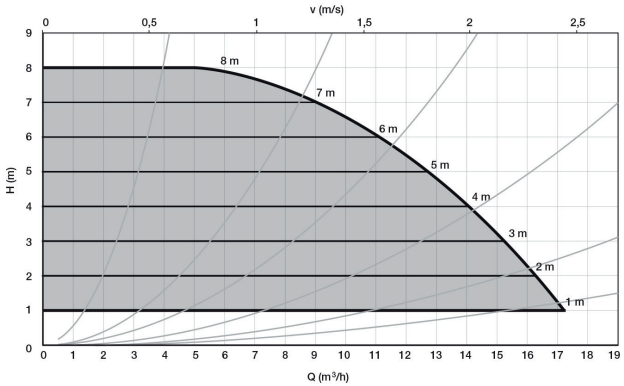


5/8

Variable Pressure Operating Mode



Constant Pressure Operating Mode



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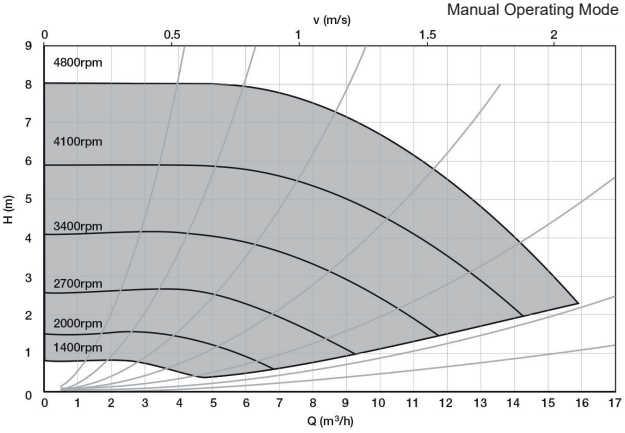
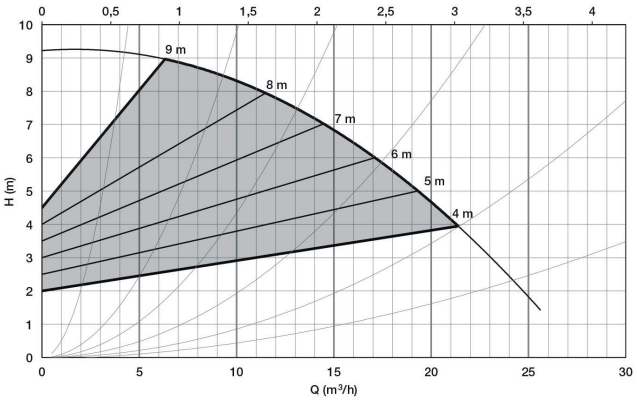
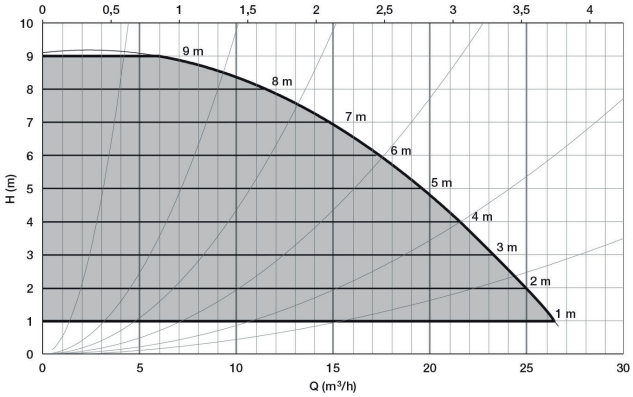


5/9

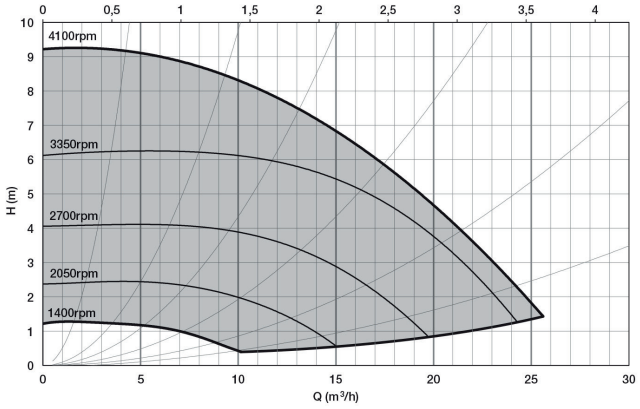
Variable Pressure Operating Mode



Constant Pressure Operating Mode



Manual Operating Mode



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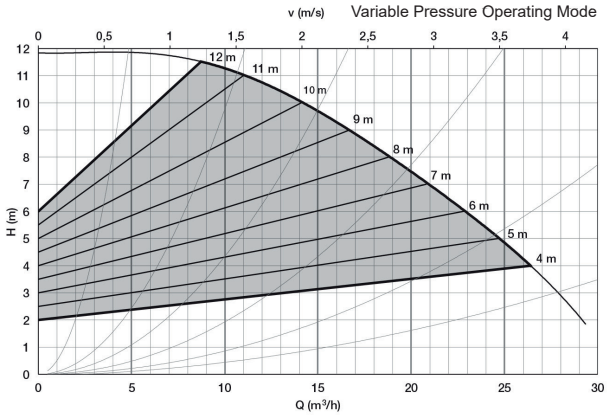
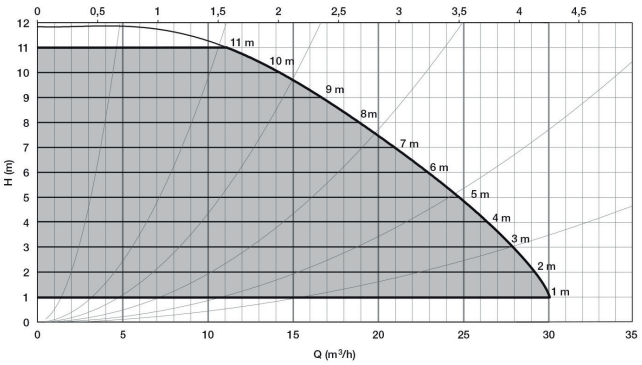
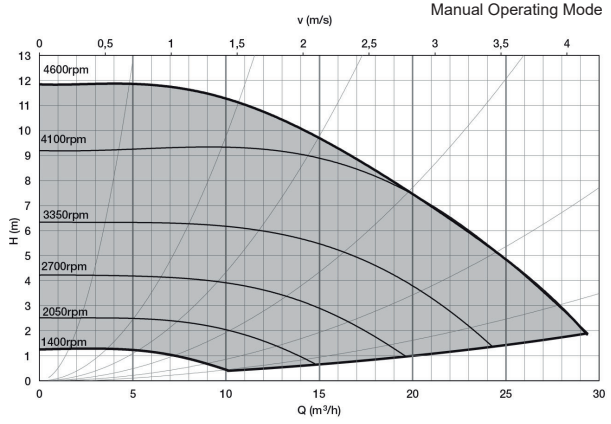
Variable Pressure Operating Mode



Constant Pressure Operating Mode



Manual Operating Mode



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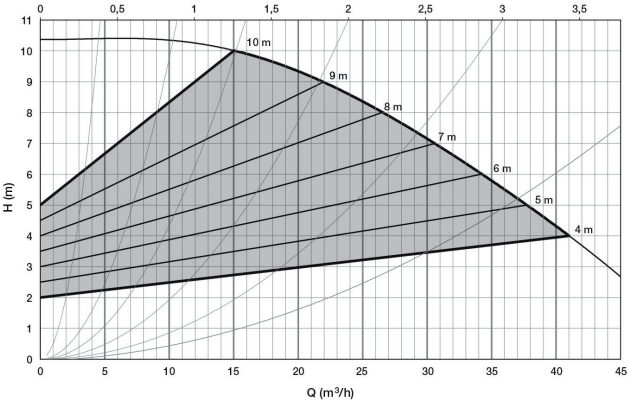
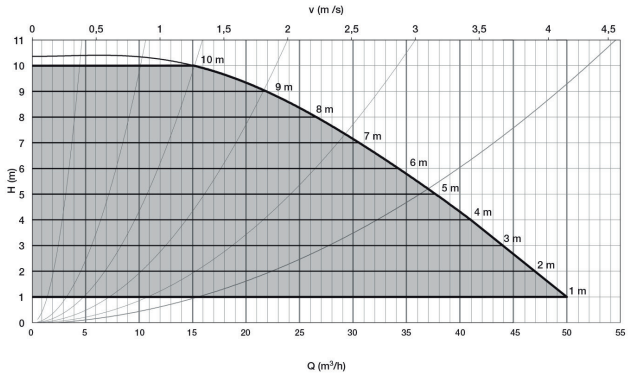
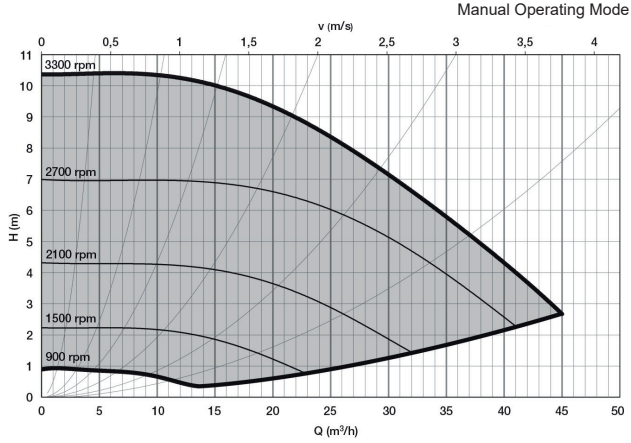
Variable Pressure Operating Mode



Constant Pressure Operating Mode



Manual Operating Mode



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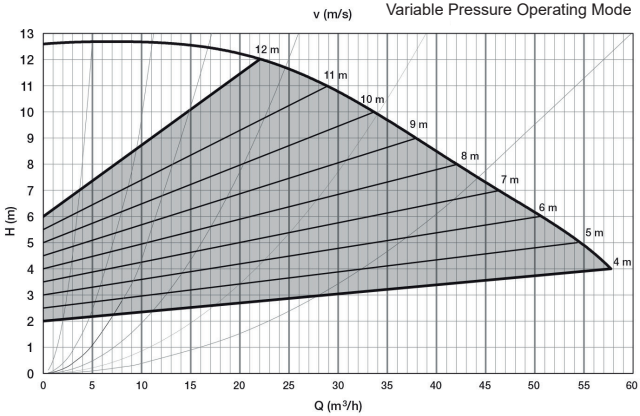
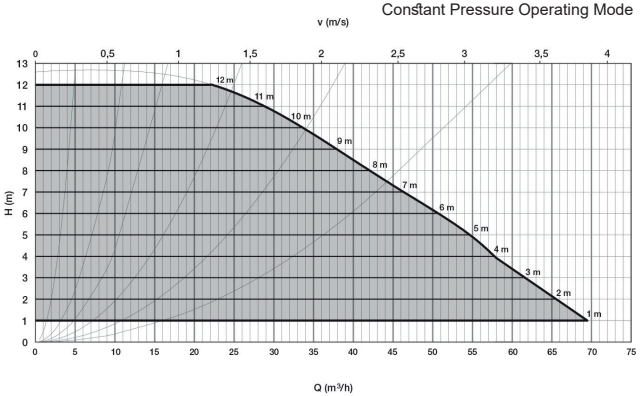
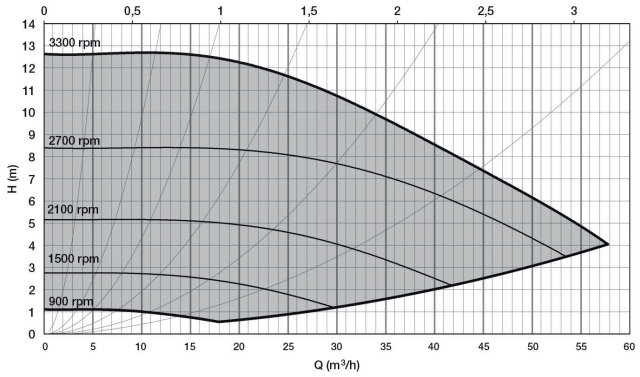
Variable Pressure Operating Mode



Constant Pressure Operating Mode



Manual Operating Mode



ALARKO

Carrier

ALARKO CARRIER
SANAYİ VE TİCARET A.Ş.

CE

EC DECLARATION OF CONFORMITY

MANUFACTURER

NAME : ALARKO CARRIER SANAYI VE TICARET A.Ş.
ADDRESS : Gebze Organize Sanayi Bölgesi Şahabettin Bilgisu Cd.
41480 Gebze / KOCAELI- TÜRKİYE
TEL : 0 262 648 60 00 **FAX :** 0 262 648 60 08 **WEB:** www.alarko-carrier.com.tr
Name and Address of the Person authorised to compile the technical file : Mrs. Begüm ÖĞÜT
ADDRESS : Gebze Organize Sanayi Bölgesi Şahabettin Bilgisu Cd.
41480 Gebze / KOCAELI- TÜRKİYE
TEL : 0 262 648 60 00 **FAX :** 0 262 648 60 08 **WEB:** www.alarko-carrier.com.tr
E-MAIL : engineering_quality@alarko-carrier.com.tr

The undersigned declares that the described products meet the essential requirements of the below mentioned standards as based on Machinery Directive 2006 / 42 / EC

The item of equipments which identified below has been subject to internal manufacturing checks with monitoring of the final assesment by ALARKO CARRIER SANAYI VE TICARET A.Ş.

MACHINE MODEL LIST: Optima Circulation Pumps

8-12, 6-12, 5-12, 5-9, 4-12, 5-8, 4-4

APPLICABLE DIRECTIVES:

2006 / 42 / EC MACHINERY SAFETY DIRECTIVE
2006 / 95 / EC LOW VOLTAGE DIRECTIVE
2004 / 108 / EC ELECTROMAGNETIC COMPATIBILITY DIRECTIVE
2009 / 125 / EC ECODESIGN DIRECTIVE

APPLICABLE REGULATIONS:

EN 60335-2-51:2003 + A2:2012
EN 16297-1:2012
EN 16297-2:2012
EN ISO 12100:2010
EN 60204-1:2006+A1:2009
EN 809:1998+A1:2009

SIGNED ON BEHALF OF THE MANUFACTURER

NAME : MURAT ÇOPUR
POSITION : VICE PRESIDENT - FACTORIES
PLACE/ DATE : TURKEY / 18.09.2015
SIGNATURE :

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SANAYİ VE TİCARET A.Ş.

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İZMİR : Şehit Fethibey Cad. No:55, Kat:13, 35210 Pasaport - İZMİR TÜRKİYE
Phone: (0232) 483 25 60 - Fax: (0232) 441 55 13
ADANA : Ziyapaşa Bulvarı Çelik Ap. No : 25/5-6, 01130 ADANA TÜRKİYE
Phone (0322) 457 62 23 - Fax: (0322) 453 05 84
ANTALYA : Mehmetçik Mahallesi Aspendos Bulvarı No: 79/5 - ANTALYA TÜRKİYE
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