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**OPTIMA**  
**8/12, 6/12, 6/9, 5/18**  
**5/12, 5/9, 5/10, 4/18, 4/12**  
**CIRCULATION PUMP**  
**OPERATING INSTRUCTION**

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# 1. CAUTION

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

<b>CAUTION</b>	<b>If you need any information later on, please refer to this manual</b>
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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 70 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 Optima 8/12, 6/12, 6/9, 5/18, 5/12, 5/9, 5/10, 4/18, 4/12 types.

# 2. WARNINGS AND SYMBOLS

Children shall not use or play with this appliance. Cleaning and user maintenance shall not be made by children. This appliance can be used by 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 if they understand the hazards involved.

## 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.**

<b>CAUTION</b>
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**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.

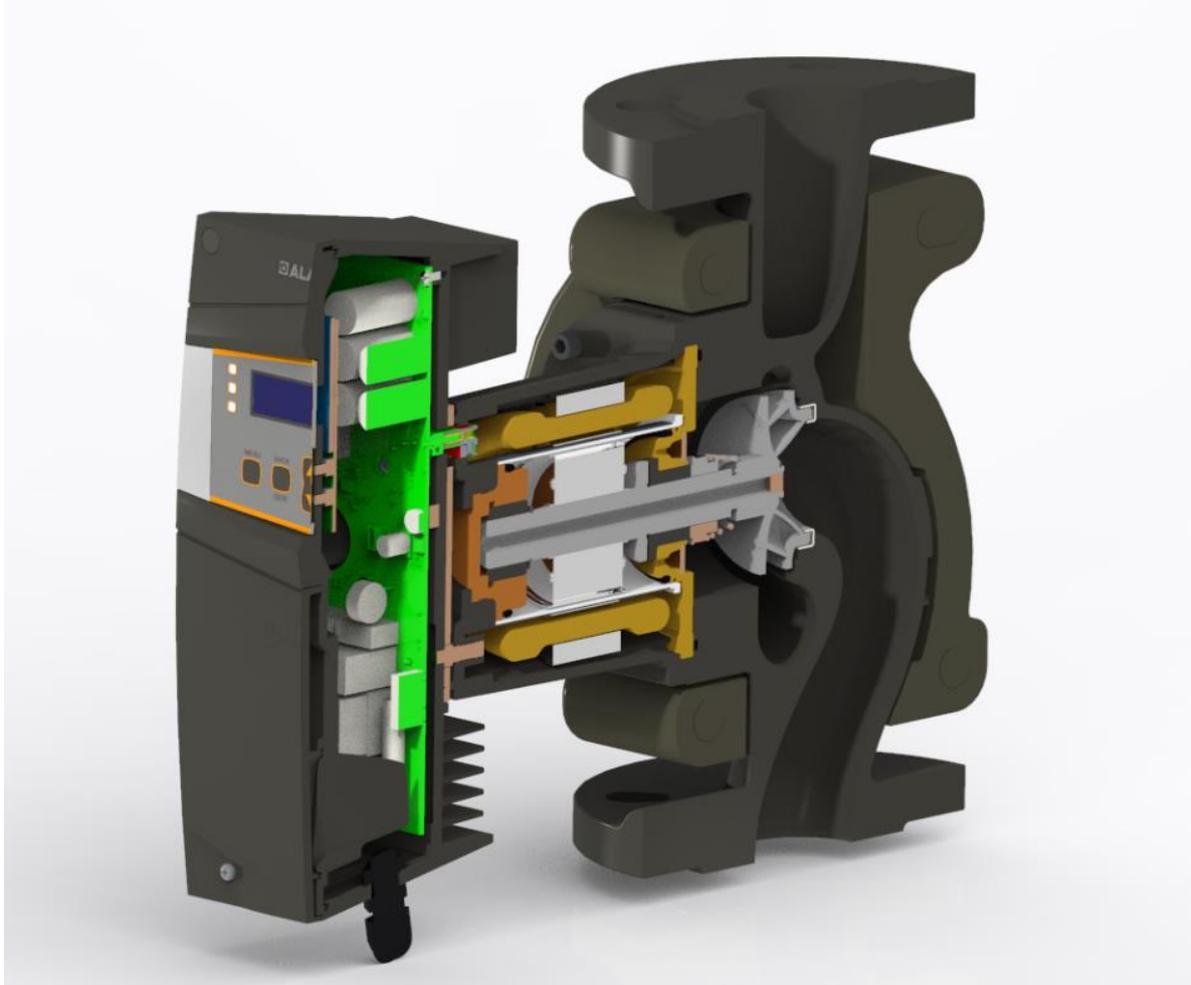


Figure 3.1: Cross-section Drawing of the Pump

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.

<b>CAUTION</b>	<b>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.</b>
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### 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 [mole/m <sup>3</sup> ]	Total hardness [°d]	pH value at 25°C	Oxygen [mg/liter]	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<sup>1</sup>

<sup>1</sup>Source: VDI 2035 – Part 1 and 2

The maximum allowable water-glycol mixture ratio for the pumped liquid is 1:1. It is convenient to use the type of ethylene glycol containing corrosion inhibitor.

Depending on the water-glycol mixture rate, the pump's maximum pressure is affected and its performance decreases according to the higher viscosity and liquid temperature. Pump adjustments should be made taking into account this situation. The effect of the water-glycol mixture on pump performance according to the mixture rate is shown in the Alarko Pump Selection Software.

To prevent glycol dissolution, do not exceed the maximum allowable fluid temperature in Section 3.4 and minimize operating time at high temperatures.

The water-glycol mixture should be checked at regular intervals to prevent corrosion and lime precipitation. If needed, glycol or water should be added to the system. In cases dilution of glycol is required, water should be added by following the instructions of the glycol supplier.

The system must be clean before adding the water-glycol mixture.

### 3.4 Operating Conditions

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.

**Input Voltage:** Single Phase 230 Volts AC ( $\pm 10\%$ ) and 50 Hz (earth protected).

**Water Temperature:**  $+2^{\circ}\text{C}$  to  $+110^{\circ}\text{C}$ .

**System Pressure:** For minimum and maximum water pressure see Table 4.2 and Table 4.3

**Ambient Temperature:**  $-10^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$



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 piece of O-ring (used between pump housing-motor housing)

**CAUTION**

**Do not throw away the insulation shells.**

## 4.2 Lifting

The pump should be lifted from the pump housing.



**Do not lift the pump from the controller box.**



**Lift the pump by observing the local lifting and handling regulations.**

## 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

The product label on the pump includes essential technical information such as the model code, serial number, electrical specifications (voltage, power, frequency), protection class, and production date. In addition, the label displays symbols representing the product's official conformity certifications.

The pump is certified with CE, TSE, and VDE marks, demonstrating its compliance with high safety and quality standards.<sup>1</sup>

- The CE mark indicates that the product has been manufactured in accordance with European Union directives and meets essential requirements for human health, user safety, and environmental protection.
- The TSE mark confirms that the product complies with the technical criteria set by the Turkish Standards Institution and fulfills the conditions necessary for safe use in Turkey.
- The VDE certificate shows that the product has been tested and approved by the independent Germany-based VDE testing institute in accordance with detailed requirements for electrical safety, electromagnetic compatibility (EMC), and product durability. This certification guarantees not only technical compliance but also high reliability and user safety.

These certifications confirm that the product can be used with confidence in both local and international markets in terms of quality, safety, and compliance.

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<sup>1</sup> The Optima 5/10 pump type is not covered by the VDE certificate.

The information given in the nameplate is shown below:

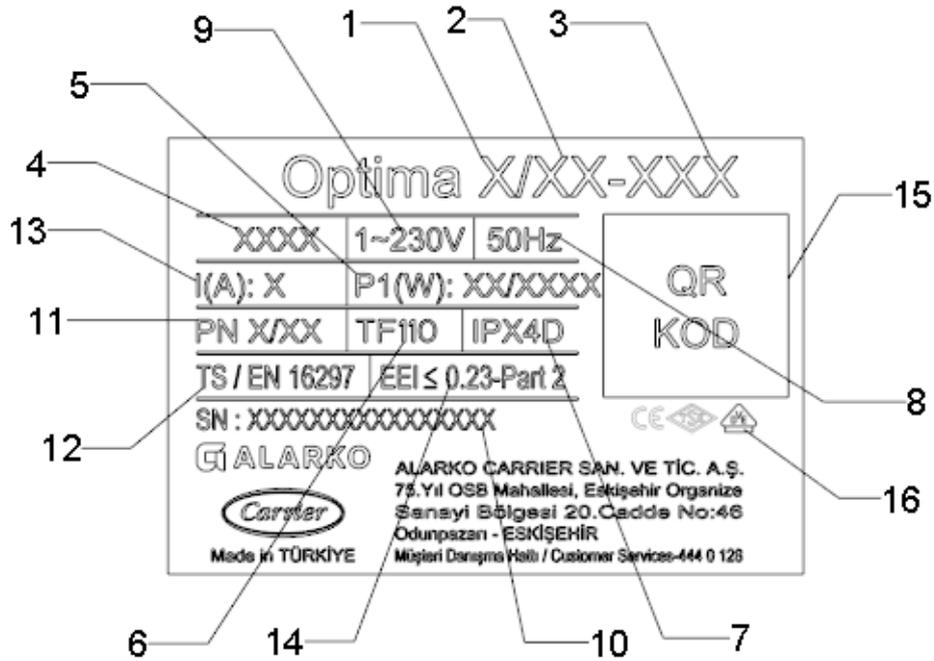


Figure 5.1: Sample of a Nameplate

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

Table 5.1: Description of the Nameplate Data

## 5.2 Technical Data

	8/12	6/12	6/9	5/18	5/12	5/9	5/10	4/18	4/12
Max. Head [m]	According to the type of pump, see Appendix								
Max. Flow [m <sup>3</sup> /h]	According to the type of pump, see Appendix								
Speed [rpm]	900 – 3300	900 – 3300	1400 – 4400	900 – 3500	1400 – 4600	1400 – 4100	1400-4400	900 – 3600	1400 – 4600
Input Voltage and Frequency	1~ 230 V AC ± %10, 50 Hz, PE								
Nominal Current [A]	7	4.5	2.9	5.9	3.3	2.3	3	4	2.5
Power Consumption [W]	40 – 1540	30 – 1000	23 – 640	36 – 1310	26 – 730	40 – 505	40-700	25 – 880	33 – 550
Energy Efficiency Index (EEI)	≤ 0.23								
Insulation Class	F								
Enclosure Class	IP 44								
Temperature Class	TF 110								
Max. System Pressure	PN 6 veyá PN 10 <sup>(1)</sup>	PN 6/10 <sup>(2)</sup>							
Emitted sound pressure	< 56 dB (according to the type of)								
Relative Humidity	< %90								
Pump Dimensions	See Appendix								

<sup>(1)</sup> There are different pumps for each pressure value.

<sup>(2)</sup> The pump is suitable for both pressure values.

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.

Nominal Diameter	Water Temperature			
	50°C	75°C	95°C	110°C
DN40	0,4 bar	0,7 bar	1,0 bar	1,5 bar
DN50	0,4 bar	0,7 bar	1,0 bar	1,5 bar
DN65	0,5 bar	0,8 bar	1,3 bar	2,0 bar
DN80	0,5 bar	0,8 bar	1,3 bar	2,0 bar

Table 5.3: Minimum Inlet Water Pressure Values

<b>CAUTION</b>	<b>The values listed in the table apply to pumps installed up to 300 meters above sea level. For higher altitudes add +0.01 bar/100m to the required relative inlet pressure.</b>
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## 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 pump must be connected to the pipework without any strain, do not bear the weight of the pipework and the motor shaft must be parallel to the ground.

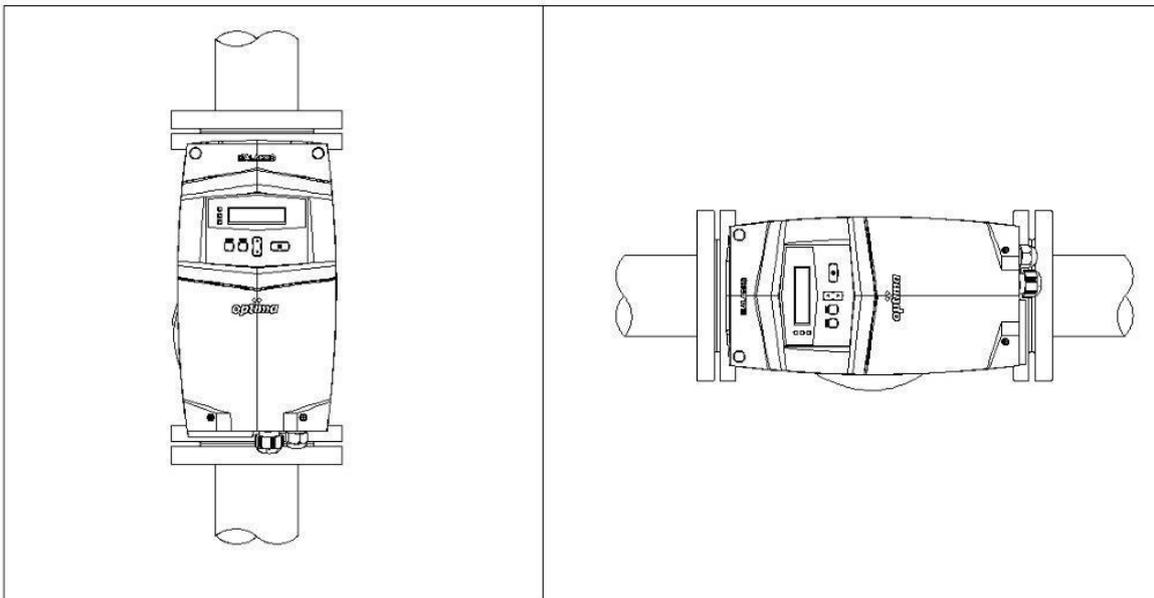


Figure 6.1: Correct Pump Positions While Vertically and Horizontally Installed to the Pipework

The pump must be not perpendicular to the ground.

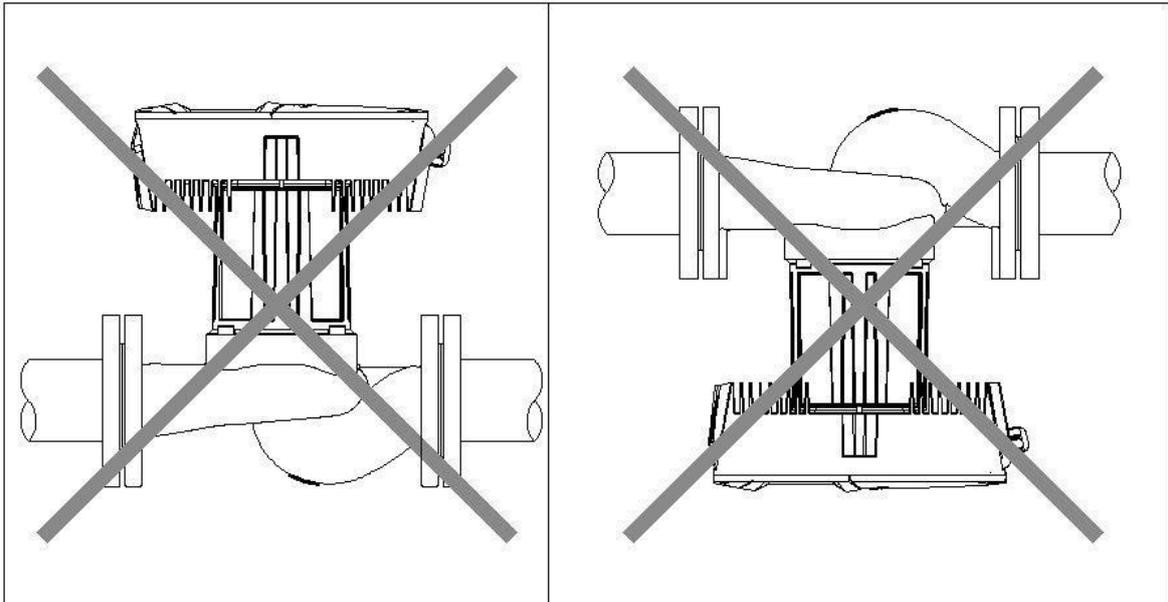


Figure 6.2: Incorrect Pump Positions

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 operation should be done carefully and slowly. Seal damage causes leakage.**

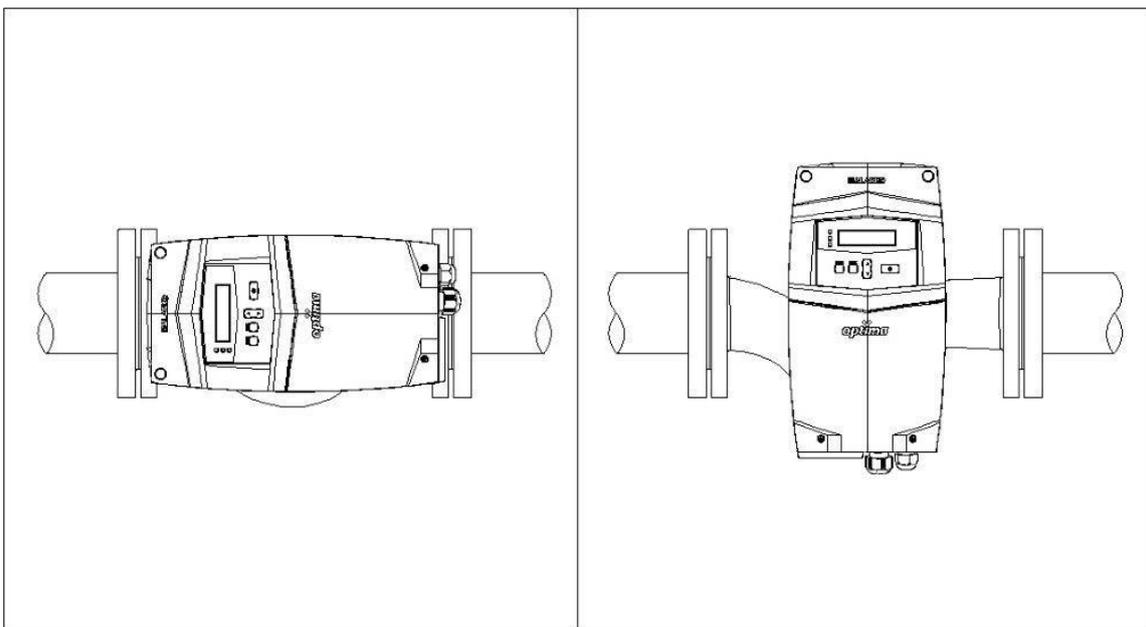


Figure 6.3: Control Box Position Adjustment

## 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 **Error! Reference source not found.**
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 **Error! Reference source not found.** to fix the pump to the pipes.
7. Check the **Error! Reference source not found.** for washer, bolt and nut order. See **Error! Reference source not found.** for the recommended tightening torques for the bolts used in the pump fixing.



<b>1</b>	<b>Washer</b>
<b>2</b>	<b>Nut</b>
<b>3</b>	<b>Bolt</b>

Figure 6.4 Flanged Pipe Connection

<b>Pressure</b>	<b>Bolt and Nut Type</b>	<b>Recommended Tightening Torque Value</b>
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 **Error! Reference source not found.**

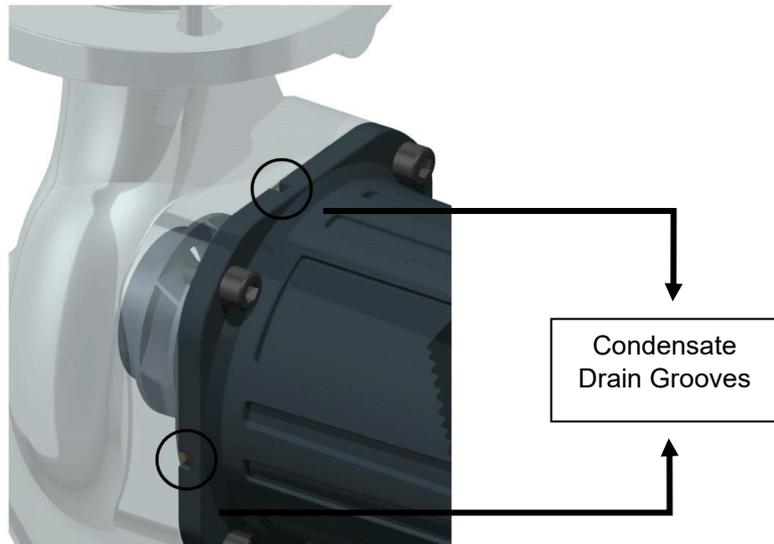


Figure 6.5: Condensate Drain Grooves

10. After the installation is completed, place the insulation shells as shown in **Error! Reference source not found..**



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	6/9	5/18	5 / 12	5 / 9	5/10	4/18	4 / 12
Cable	3 x 1.5 mm <sup>2</sup> veya 3 x 2.5 mm <sup>2</sup>								
Fuse	16 A	10A	16A	10 A					

Table 6.2: Cable and Fuse Values

Electrical connection diagram is given at Figure 6.7.

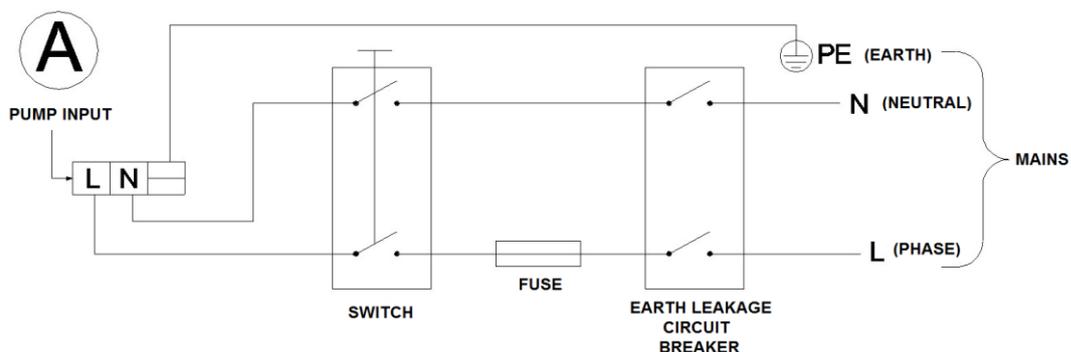


Figure 6.7: Electrical Connection Diagram

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 **Error! Reference source not found.8.**



Figure 6.8: Removal of the Bottom Cover

5. Pull the power supply cable through the no.1 cable gland shown in **Error! Reference source not found.9**.



Figure 6.9: Cable Gland View

6. Connect the power supply cables to the socket named as "A" in **Error! Reference source not found.9** appropriately, as shown in **Error! Reference source not found.7**.
7. Tighten the cable gland and make sure that the connection side of the cable is loose enough.
8. Refit the cover. See **Error! Reference source not found.0**.

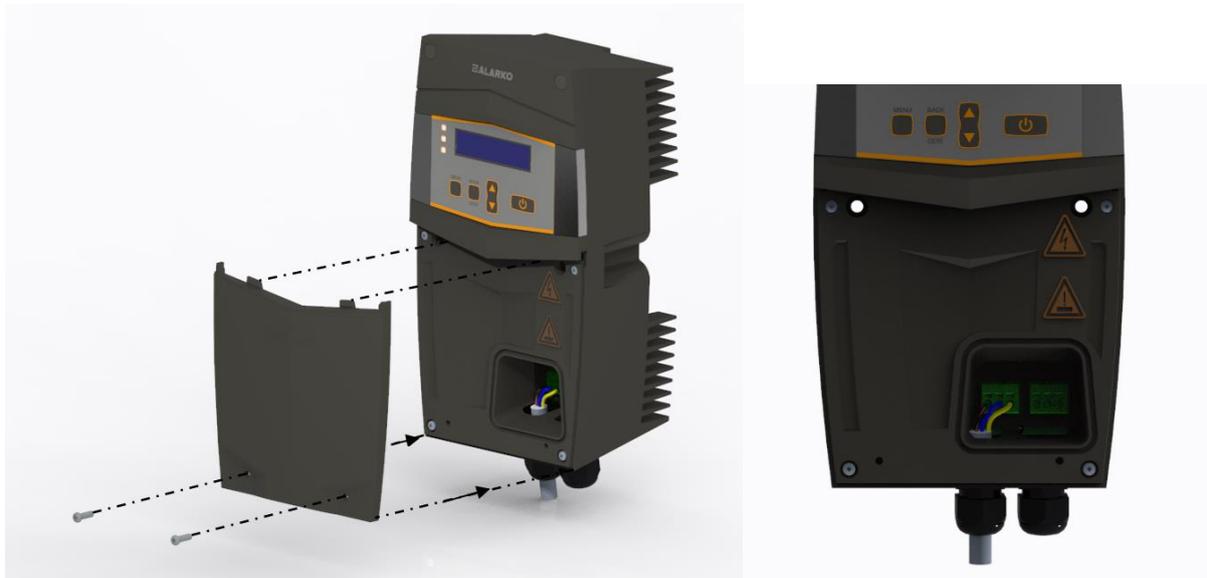


Figure 6.10: Refitting the Bottom Cover



**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 Error! Reference source not found..**

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).

### 6.5 Parallel/Back-up Operation

Whereas the CCM module is not operating or inactive, when installing more than one pump for back-up or parallel operation, a check valve must be connected for each pump.



>	O	p	e	r	a	t	i	n	g	M	o	d	e
	S	e	r	v	i	c	e	I	n	f	o		
	L	a	n	g	u	a	g	e					

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.

>	M	a	n	u	a	l								
	C	o	n	s	t	.	P	r	e	s	s	u	r	e
	V	a	r	.	P	r	e	s	s	u	r	e		

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

M	a	n	u	a	l									+
S	p	e	e	d	:	x	x	x	x					-

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.

S	t	o	r	e	d									
M	a	n	u	a	l	R	P	M	x	x	x	x		

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:

R	u	n	n	i	g	M				x	x	x	x	→	Speed
M	e	n	u							S	t	o	p		

#### 7.1.2 Constant Pressure Operating Mode

C	o	n	s	t	.	P	r	e	s	s	u	r	e	+
H	e	a	d	:	x	x	.	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.

S	t	o	r	e	d										
H	e	a	d		x	x	.	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:

R	u	n	n	i	n	g		C	P			x	x	.	x
M	e	n	u									S	t	o	p



### 7.1.3 Variable Pressure Operating Mode

V	a	r	.		P	r	e	s	s	u	r	e			+
H	e	a	d	:	x	x	.	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.

S	t	o	r	e	d										
H	e	a	d		x	x	.	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:

R	u	n	n	i	n	g		V	P			x	x	.	x
M	e	n	u									S	t	o	p



### 7.2 Service Info

	O	p	e	r	a	t	i	n	g		M	o	d	e	
>	S	e	r	v	i	c	e		I	n	f	o			
	L	a	n	g	u	a	g	e							

In this submenu, the errors and warnings which occur in the pump are shown. Refer to the Section 12 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:

W	a	r	n	i	n	g	:	V	o	l	t	.	L	o	w
M	e	n	u												

### 7.3 Language

	O	p	e	r	a	t	i	n	g		M	o	d	e	
	S	e	r	v	i	c	e		I	n	f	o			
>	L	a	n	g	u	a	g	e							

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

>	E	n	g	l	i	s	h								
	T	u	r	k	c	e									

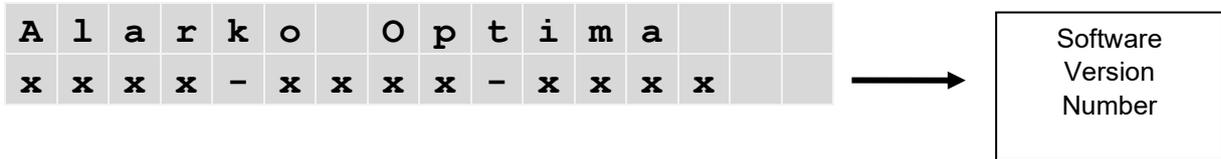
The desired language is modified by “Up” and “Down” buttons. To save the language, “MENU” button is pressed for two seconds.

## 8. FIRST START-UP, CONTINUOUS OPERATION AND SHUTDOWN

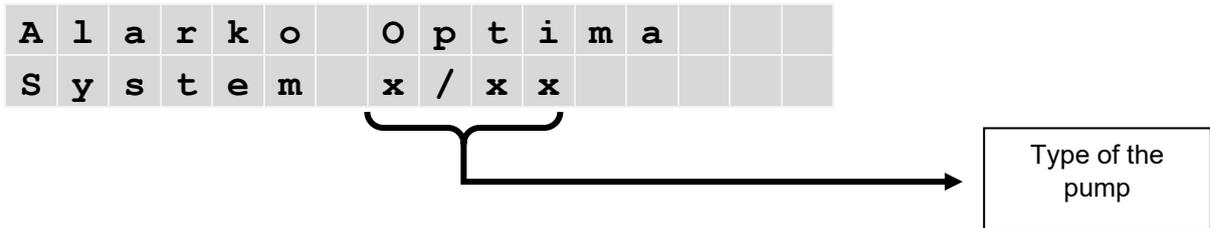


Depending on the water temperature in the pipe system, any part of the pump is subject to high temperatures. In case of a contact to the non-plastic surfaces, there is a risk of burn and conflagration.

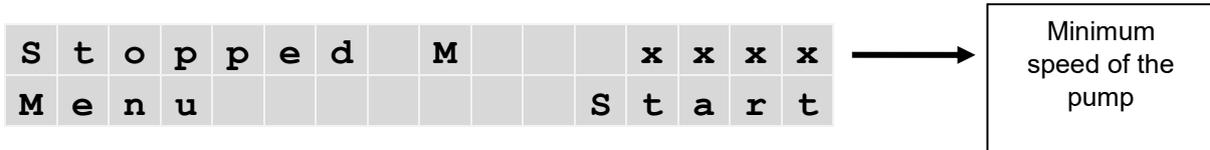
- Fill the system with water in minimum pressure and vent the air. For minimum pressure values see **Error! Reference source not found..**
- Check the voltage values of the mains and compare with **Error! Reference source not found..**
- Switch on the power to the pump.
- At first start-up the display 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.

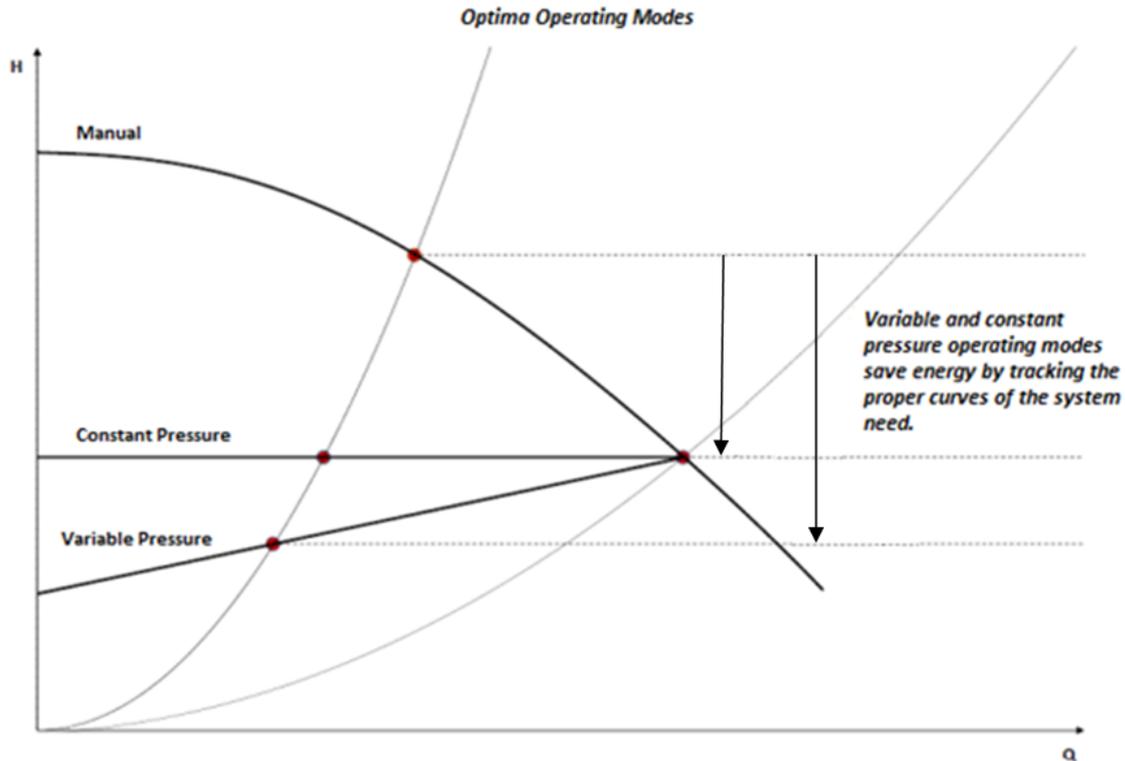


Figure 9.1: Optima Operating Modes

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

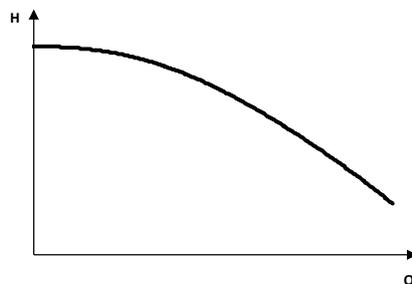


Figure 9.2: The curve of the Manual Mode

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

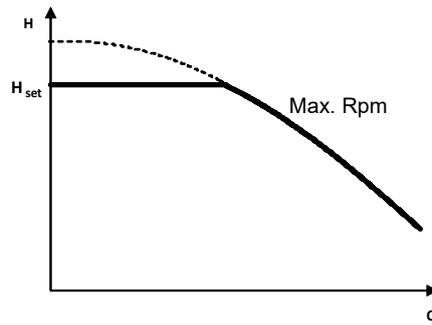


Figure 9.3: The curve of the Constant Pressure Mode

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**

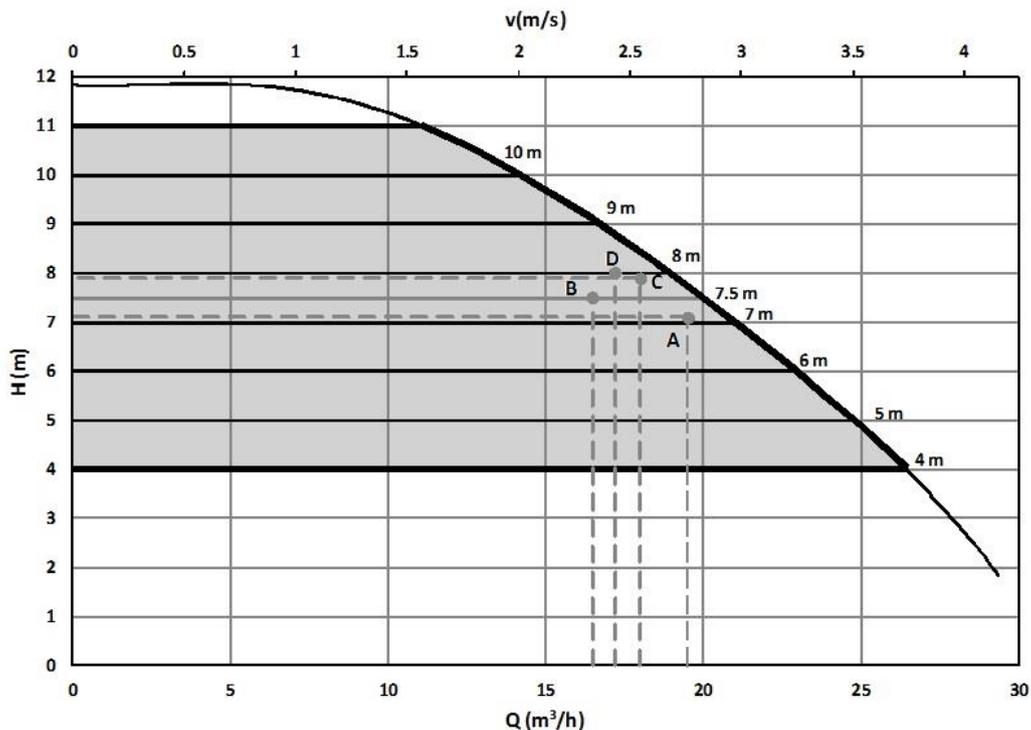


Figure 9.4: Example of the Constant Pressure Mode

### 9.3 Variable Pressure Operating Mode

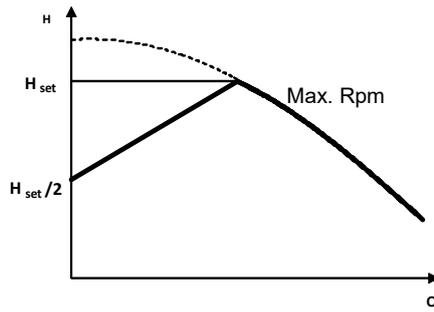


Figure 9.5: The curve of the Variable Pressure Mode

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:

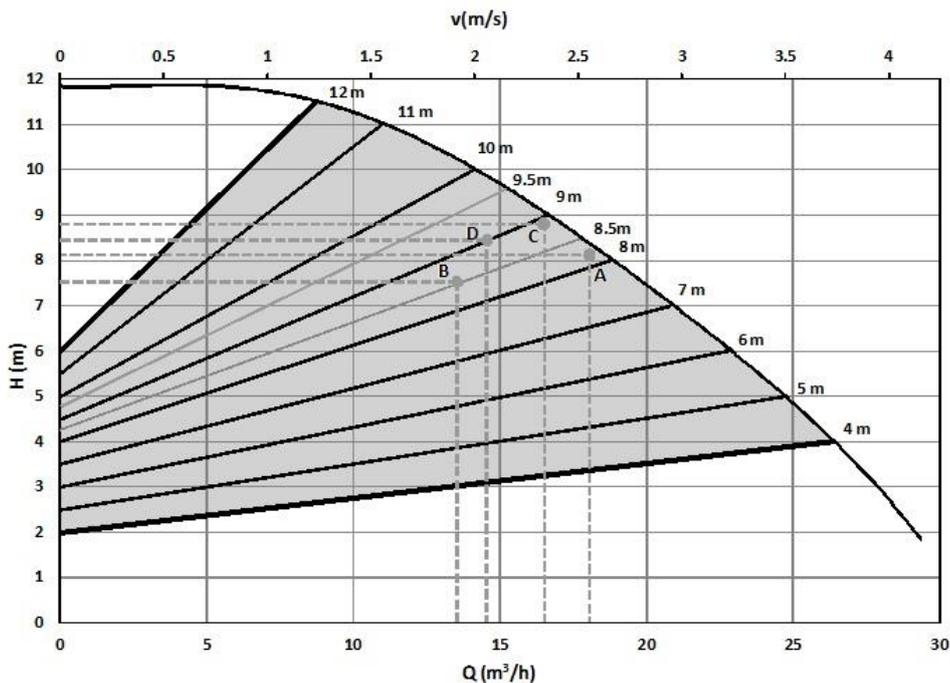


Figure 9.6: Example of the Variable Pressure Mode

## 9.4 Operating Mode Selection Criteria

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

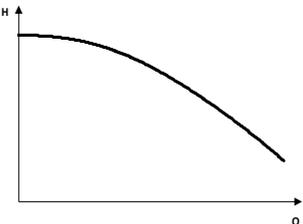
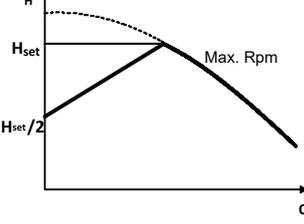
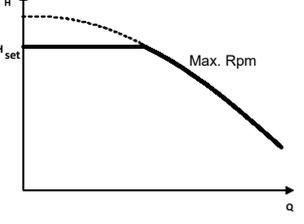
	Manual Operating Mode	Variable Pressure Operating Mode	Constant Pressure Operating Mode
			
Two-Pipe Systems with Thermostatic Valves		<ul style="list-style-type: none"> <li>* Delivery head loss &gt; 4mSS</li> <li>* Very long distribution pipes</li> <li>* High head losses in the system</li> <li>* Differential pressure losses in the system</li> <li>* Strongly throttled pipe balancing valves</li> </ul>	<ul style="list-style-type: none"> <li>* Delivery head loss &lt; 2mSS</li> <li>* Natural circulation (low pressure loss, large pipe dimensions)</li> <li>* Low friction losses in the system</li> </ul>
Single-Pipe Heating Systems	<ul style="list-style-type: none"> <li>* Systems without flow exchanger component (thermostatic radiator valve, two-way cutter valve etc.)</li> </ul>		<ul style="list-style-type: none"> <li>* Systems with thermostatic valves</li> <li>* Systems with thermostatic valves and strongly throttled pipe balancing valves</li> </ul>
Floor Heating Systems	<ul style="list-style-type: none"> <li>* Systems without flow exchanger component (thermostatic radiator valve, two-way cutter valve etc.)</li> </ul>	<ul style="list-style-type: none"> <li>* Systems with thermostatic valves and high pressure losses</li> <li>* Strongly throttled pipe balancing valves</li> </ul>	<ul style="list-style-type: none"> <li>* Systems with thermostatic valves and low pressure losses</li> </ul>
Heating Systems with Condensing Boilers		<ul style="list-style-type: none"> <li>* Secondary circuits</li> <li>* High pressure losses</li> <li>* Strongly throttled pipe balancing valves</li> </ul>	<ul style="list-style-type: none"> <li>* Primary circuits</li> <li>* Low pressure losses</li> <li>* Natural circulation (low pressure losses, large pipe dimensions)</li> </ul>
Flow and System Internal Resistance Non-Changing Systems	<ul style="list-style-type: none"> <li>* DWH (Boiler) applications</li> <li>* Plate heat exchanger storage tank applications</li> <li>* Recirculation applications where low pressure loss and flow changes occur</li> </ul>		

Table 9.1: Operating Mode Selection Criteria

## 10. ADDITIONAL ACCESSORIES

The pump can operate integrated into the building management system with optional control modules. In this context, the Communication Control Module (CCM) and Analogue Control Module (ACM) are available for users.

The Communication Control Module (CCM) is a structure that provides communication between the control board of the pump and the building management system via serial communication protocols (RS-485) by using BACnet and Modbus protocols and allows changing or monitoring certain parameters on the pump. This module also features Multi pump with pre-installed scenarios.

The Analogue Control Module (ACM) allows control of the actual speed of the pump via a PWM signal or a 0-10V control signal. It also has a relay-based structure on it that can immediately transmit faults of the pump to the building management system.

Refer to the ACM&CCM Additional Accessories Operating Instructions for detailed information about additional modules.

## 11. 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.

Minimum usage life 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](http://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.

## 12. FAULTS, CAUSES AND REMEDIES

### CAUTION

The troubleshooting must only be done by authorized service.



Before starting work, switch off the power supply.

Begin work 1 minute after switching off the power.

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

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	Input voltage at outside of the high or low voltage limits	- Check the input voltage if it is between the limits. - If the error continues, replace control card.
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: Rev. Flow	Motor is forced with a reverse rotation flow	See 5.5 Parallel/Back-up Operation

Table 12.1.

<b>CAUTION</b>	<b>Do not interfere in the buttons or display if any error occurs.</b>
----------------	--

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. 5 errors within 24 hours are logged as service error.

<b>CAUTION</b>	<b>In case of the service error the pump cannot be started, it needs a customer service intervention.</b>
----------------	---

<b>CAUTION</b>	<b>Obtain the spare parts from a customer service. Using of non-original spare parts cause a breach of warranty</b>
----------------	---

<b>Error or Warning Code&amp;No</b>	<b>Cause</b>	<b>Remedy</b>
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	<ul style="list-style-type: none"> <li>- Check the water temperature if it is between the limits.</li> <li>- Wait until the error state ends.</li> </ul>
Error: Temp Contr	High temperature at the stator windings due to the motor overload and/or high winding temperature	<ul style="list-style-type: none"> <li>- Check the ambient temperature and enhance the ambient ventilation.</li> <li>- Check the water temperature if it is between the limits.</li> <li>- Wait until the error state ends.</li> </ul>
Error: Voltage	Input voltage at outside of the high or low voltage limits	<ul style="list-style-type: none"> <li>- Check the input voltage if it is between the limits.</li> <li>- If the error continues, replace control card.</li> </ul>
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	<ul style="list-style-type: none"> <li>- Check the directions of the arrow on the housing and the flow of the water</li> <li>- Wait until the error state ends.</li> </ul>
Error: Blocked	Locked shaft due to the contamination around the rotor	Wait until the error state ends.
Warning: Rev. Flow	Motor is forced with a reverse rotation flow	See 5.5 Parallel/Back-up Operation

Table 12.1: Error and Warning Codes

The fault flowchart of the pump is given below:

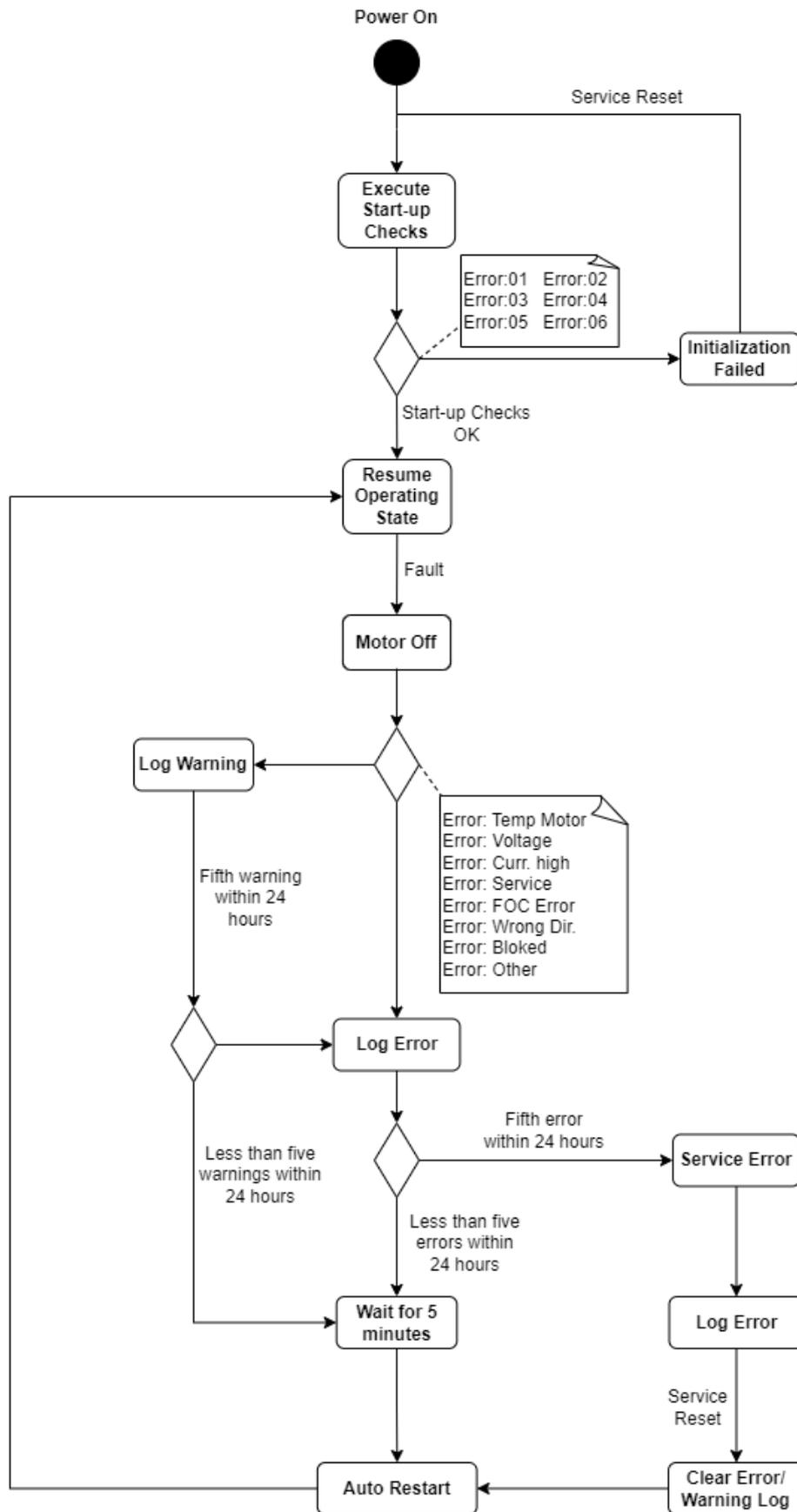


Figure 12.1: Fault Flowchart

## 13. 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.



During cleaning, maintenance, or replacement of parts, the pump shall be completely disconnected from its power source, and the disconnection has to be such that an operator can check from any of the points to which he has access that the power source remains disconnected.



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 Error! Reference source not found. and Error! Reference source not found. 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.

- Switch off the power to the pump.
- Wait 1 minute.
- Disconnect the power supply cable.
- 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.

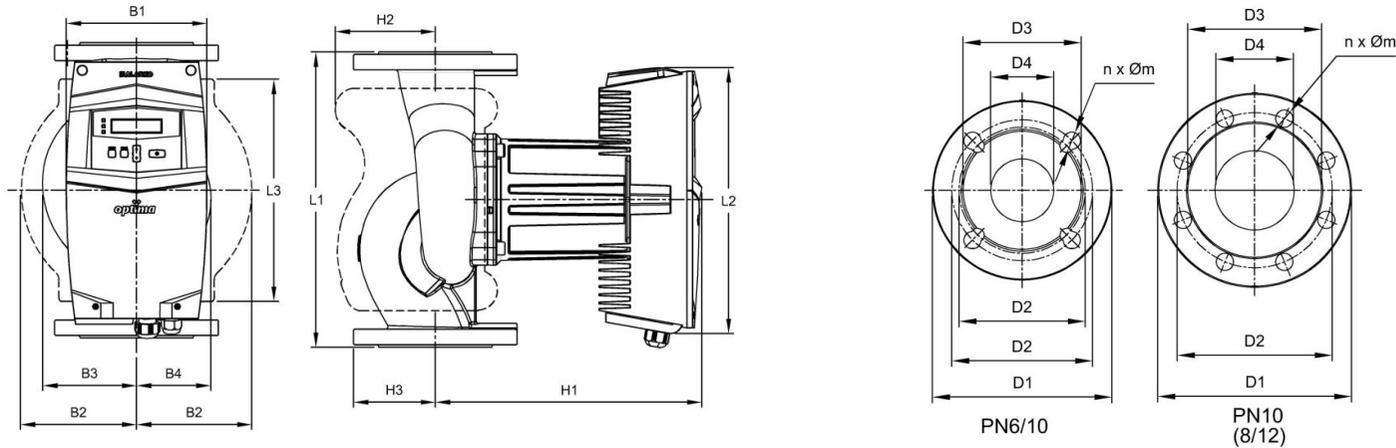
## **14. DISPOSAL**

For the disposal of the pump, authorized technical services or related recycling facilities can be used. Warnings and cautions in Section 13 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

- the pump shall be disconnected from its power source during cleaning or maintenance and when replacing parts
- It shall be clearly indicated that the disconnection has to be such that an operator can check from any of the points to which he has access that the power source remains disconnected.
- If this is not possible, due to the construction of the appliance or its installation, a disconnection with a locking system in the isolated position shall be provided.

# 15. APPANDIX

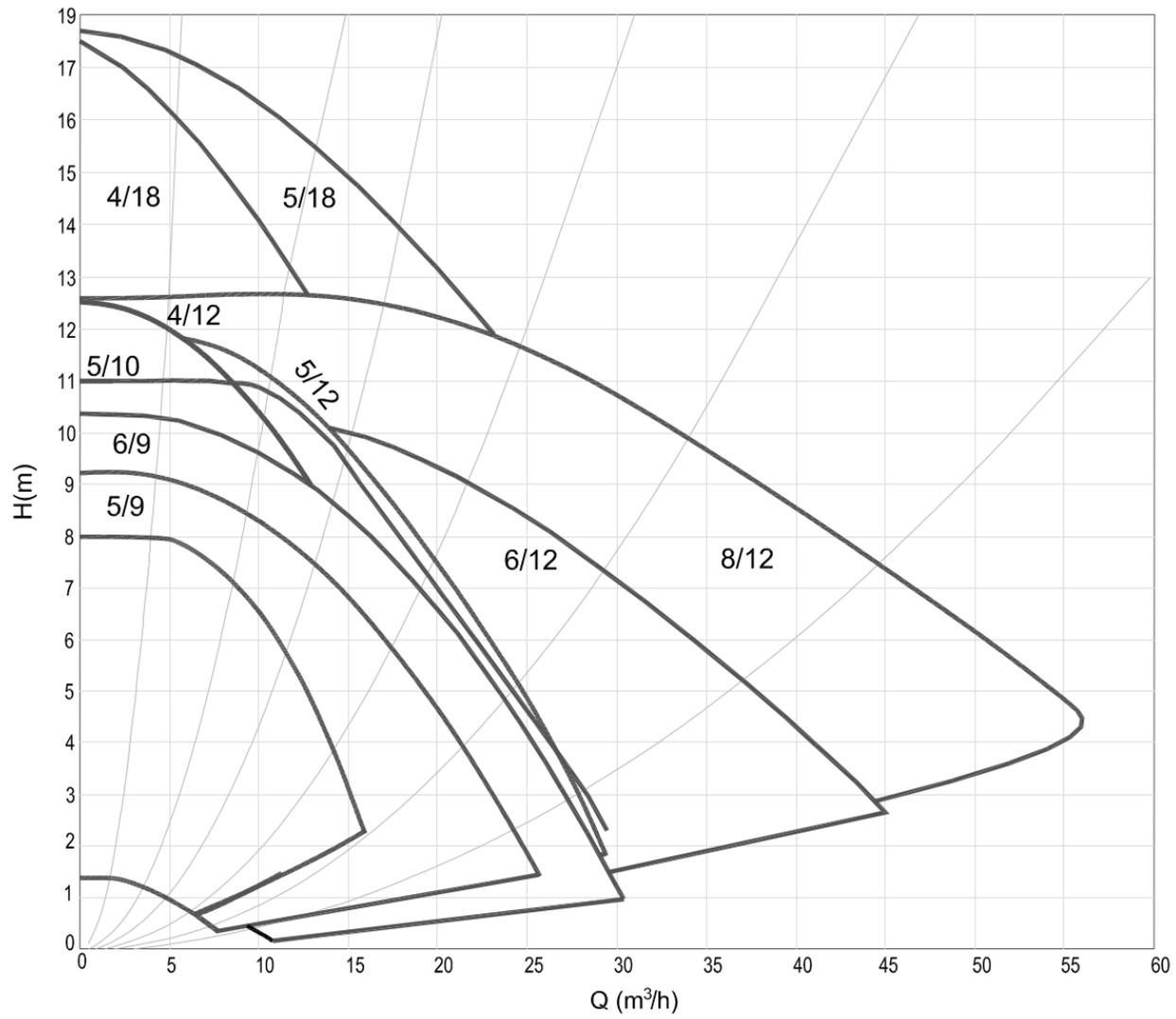
## 15.1 Dimensions



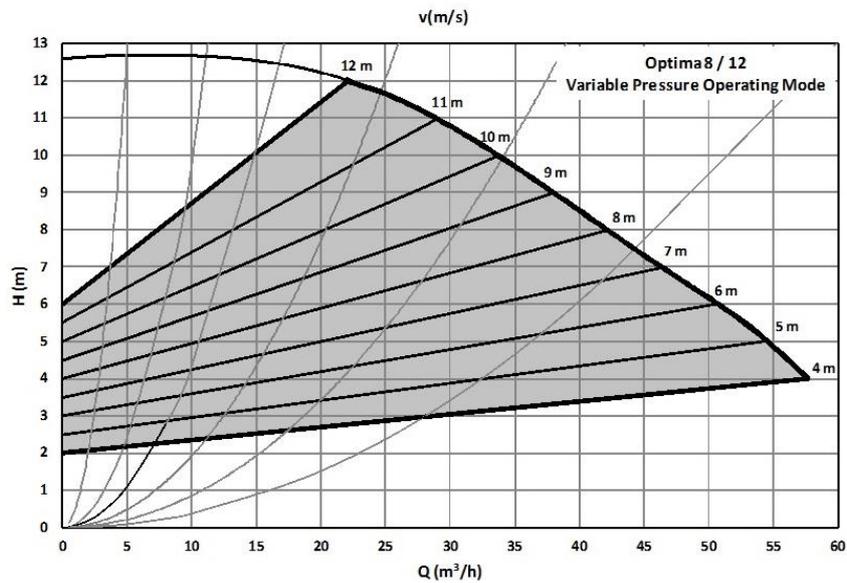
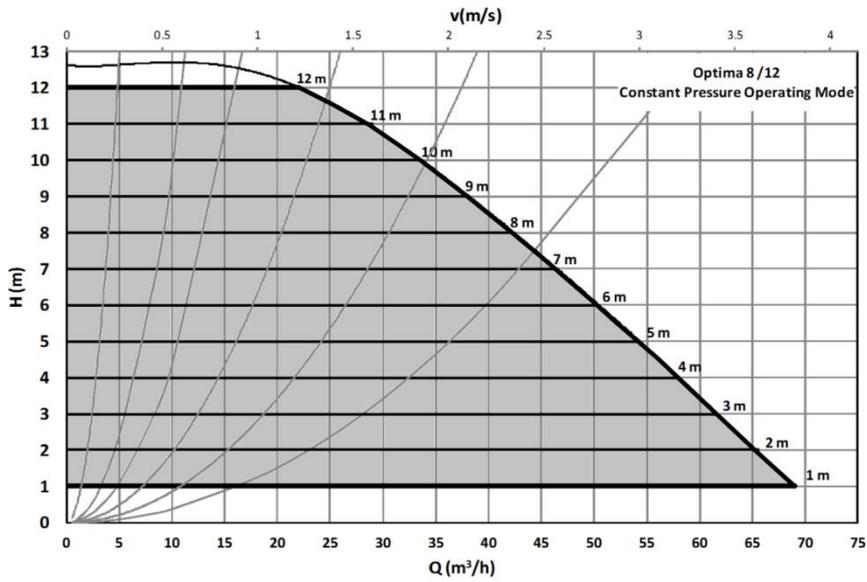
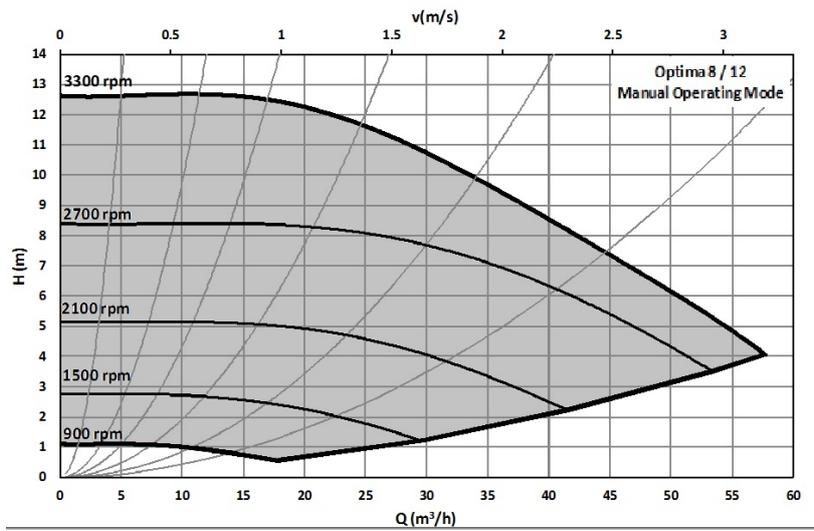
PUMP TYPE	D1 (mm)	D2 (mm)		D3 (mm)	D4 (mm)	n x Øm (mm)		B1 (mm)	B2 (mm)	B3 (mm)	B4 (mm)	L1 (mm)	L2 (mm)	L3 (mm)	H1 (mm)	H2 (mm)	H3 (mm)	Weight (kg)
		PN6	PN10			PN6	PN10											
Optima 8/12	200	150	160	138	80	4x18	8x18	172	142	115	90,9	360	325	271	350,5	122,3	100	31
Optima 6/12	185	130	145	122	65	4x14	4x18	172	129	102,8	81,5	340	325	270	322	115	92,5	28
Optima 6/9	185	130	145	122	65	4x14	4x18	139	107	80,6	65,2	280	253,2	200	247,6	88,4	92,5	16,8
Optima 5/18	166	110	125	103	50	4x14	4x18	139	128	97	80	340	253,2	270	314,5	121,5	83	25,8
Optima 5/9-10-12	166	110	125	103	50	4x14	4x18	139	107	80,6	65,2	280	253,2	200	247,6	89,3	83	15
Optima 4/18	151	100	110	88	40	4x14	4x18	139	118	84	80	250	253	190	309	121,5	75,5	21,2
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

Dimension Table

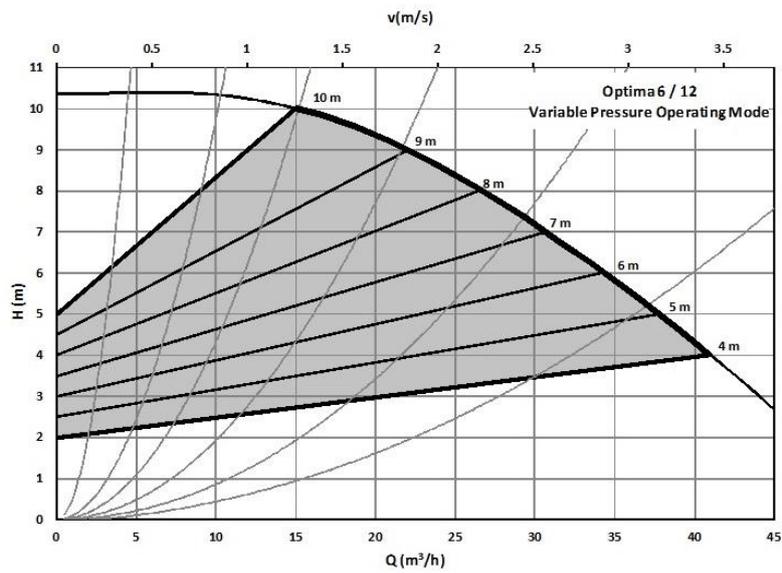
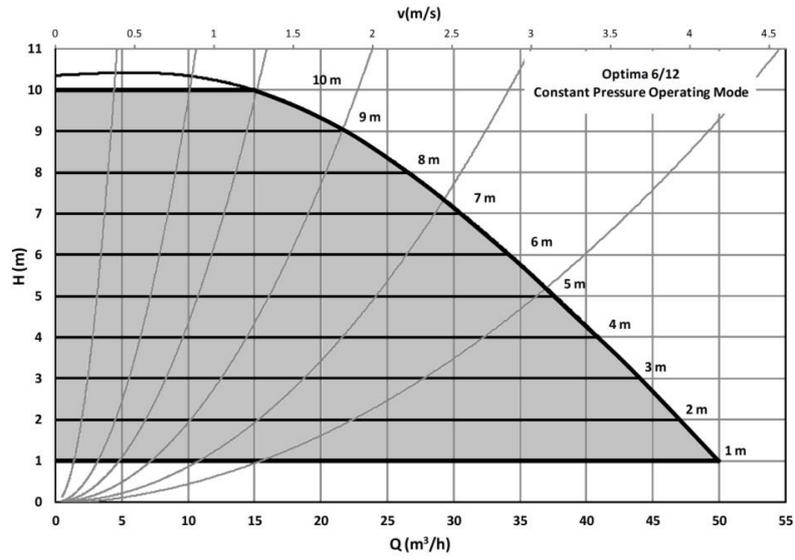
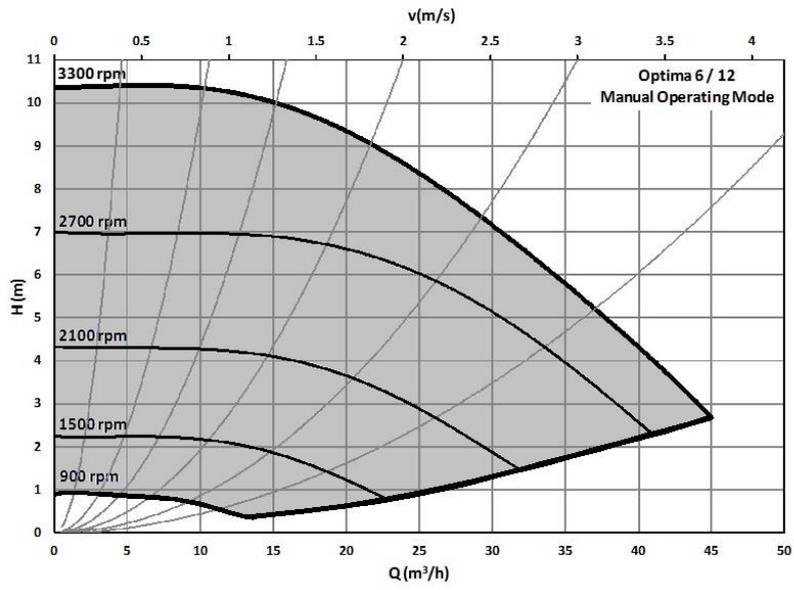
## 15.2 General Selection Chart and Performance Curves



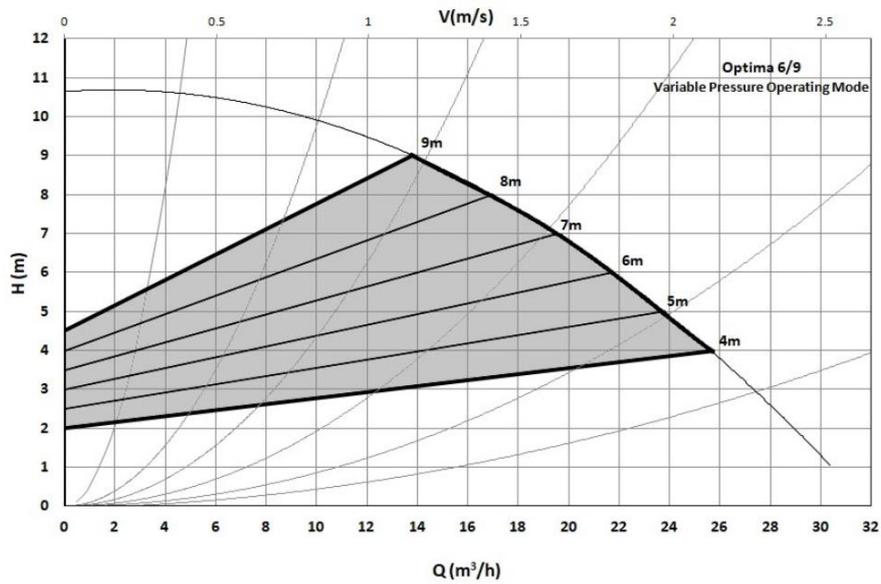
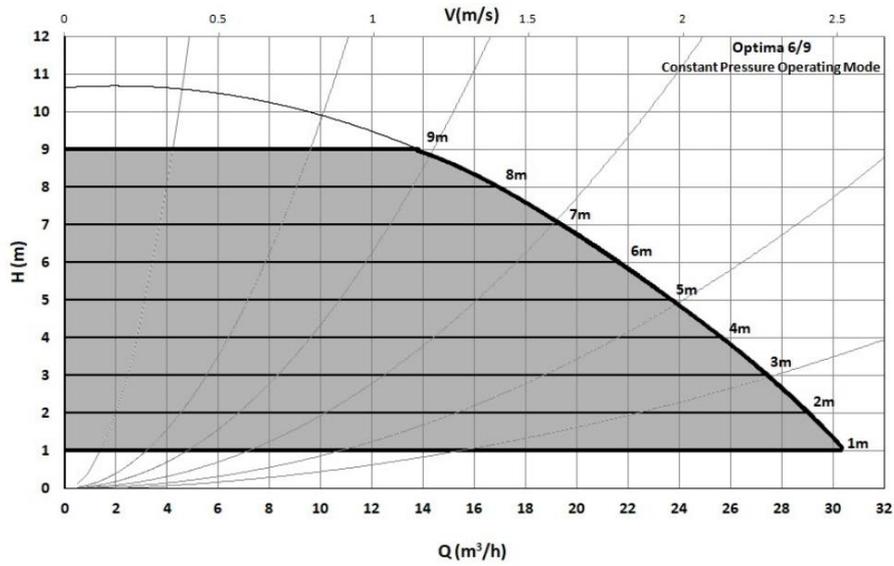
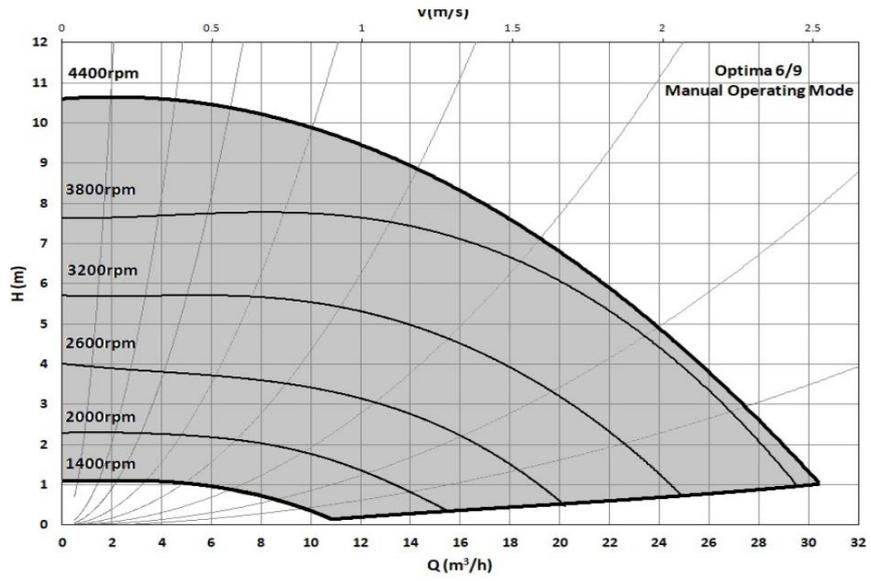
➤ OPTIMA 8/12



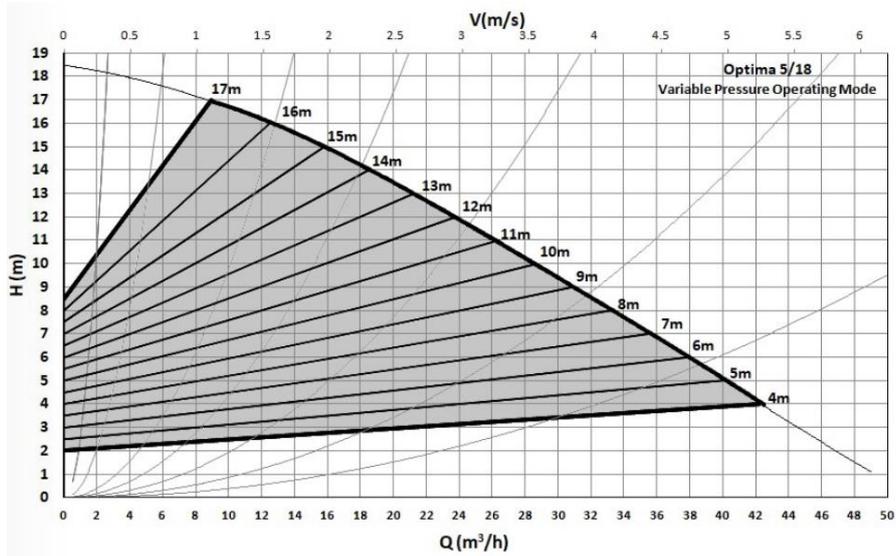
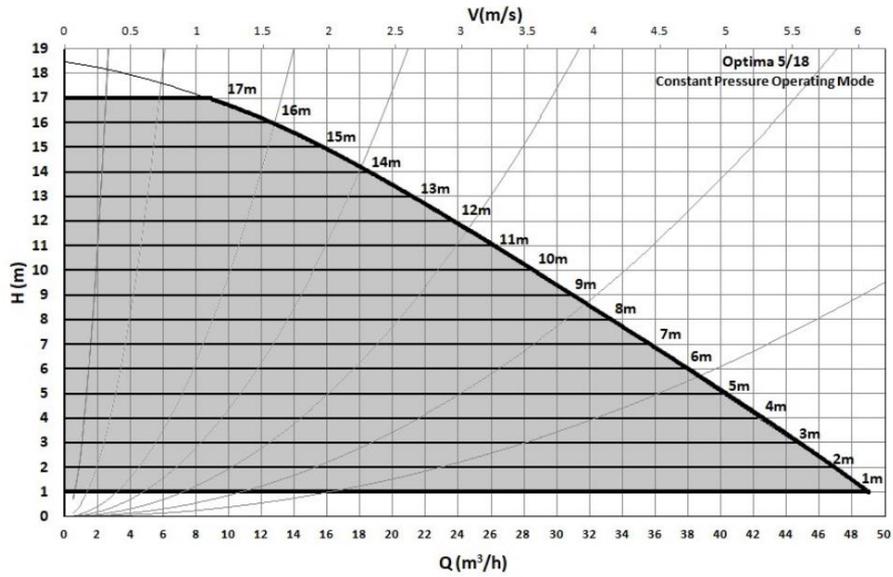
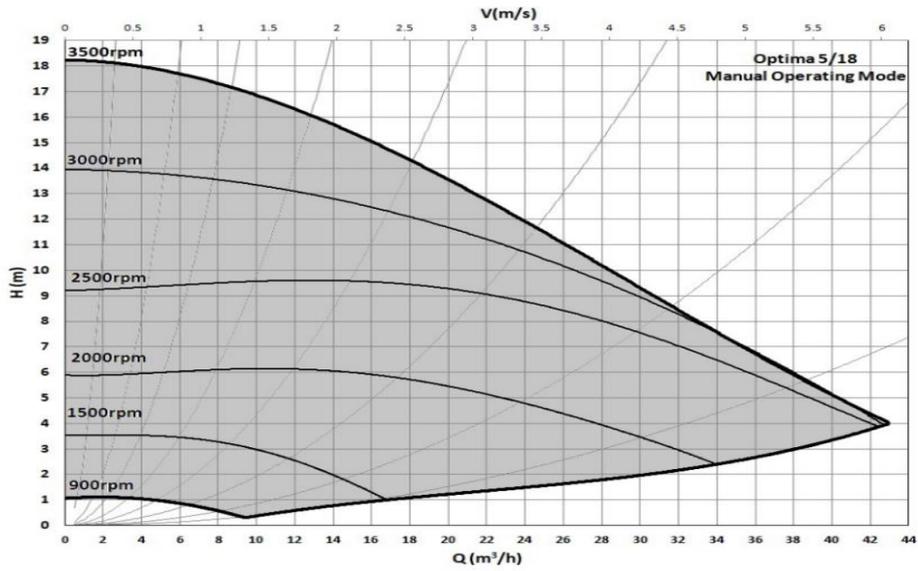
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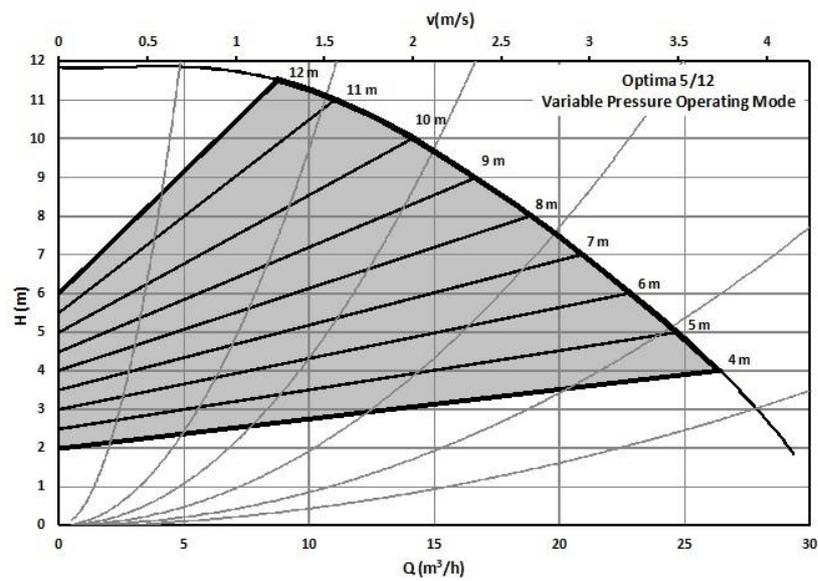
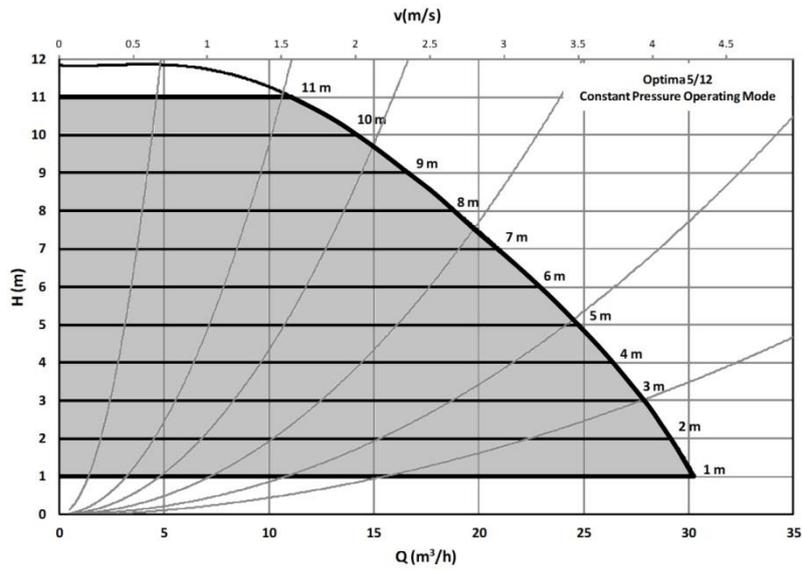
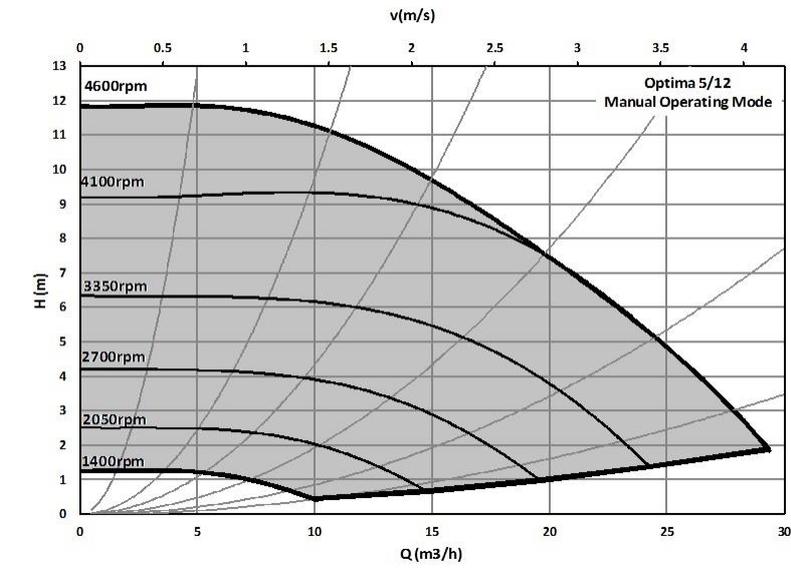
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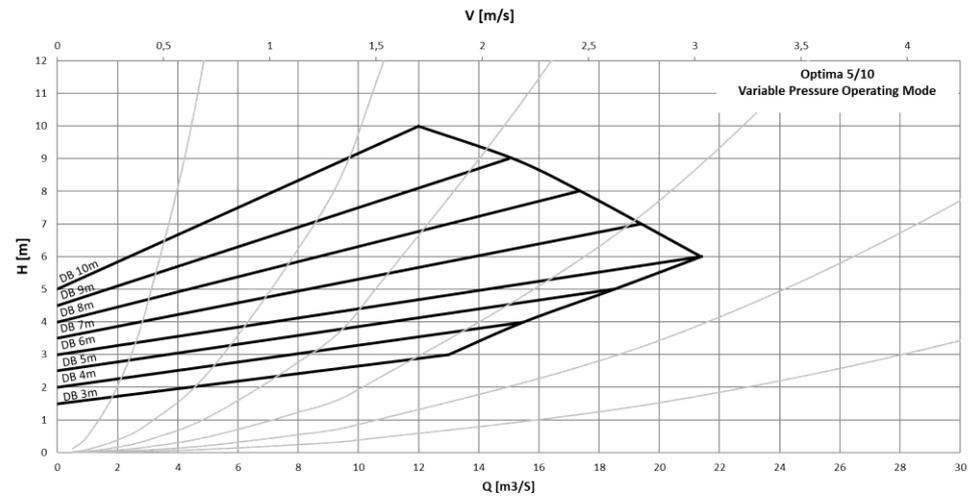
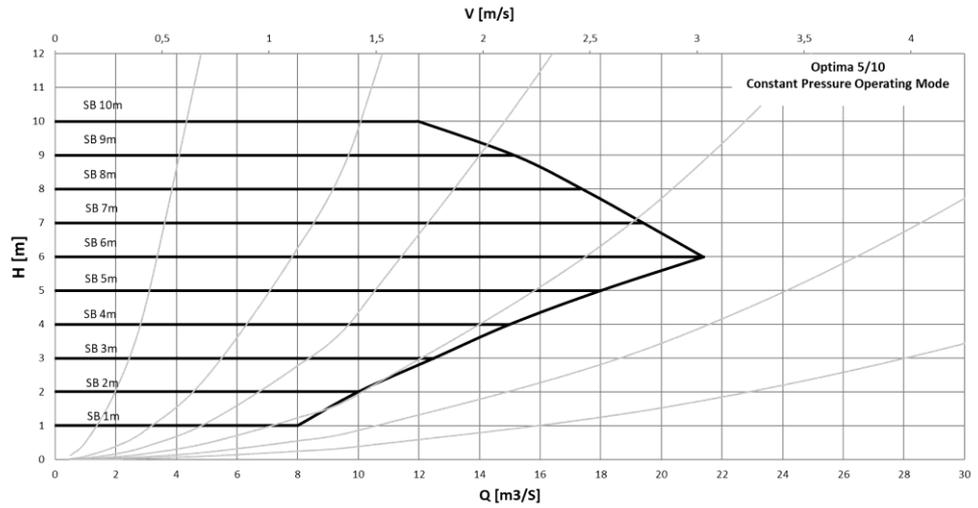
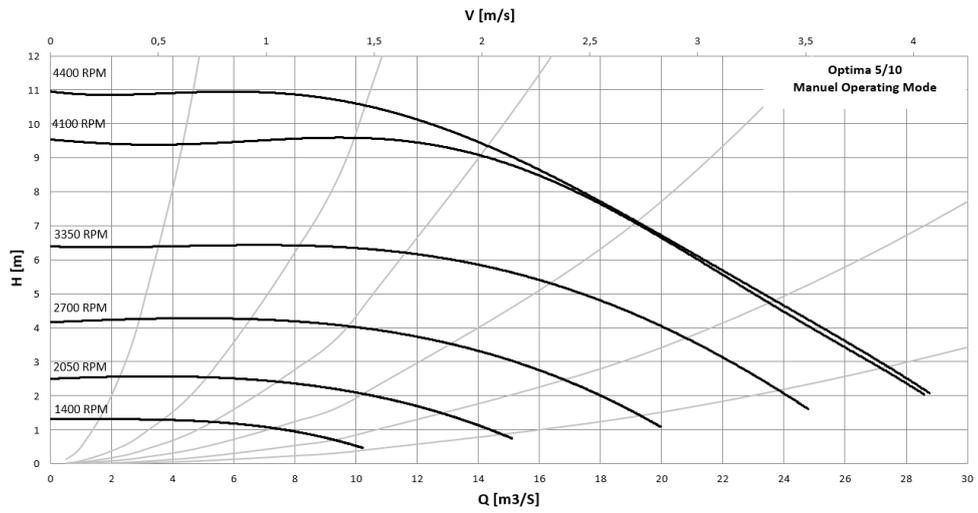
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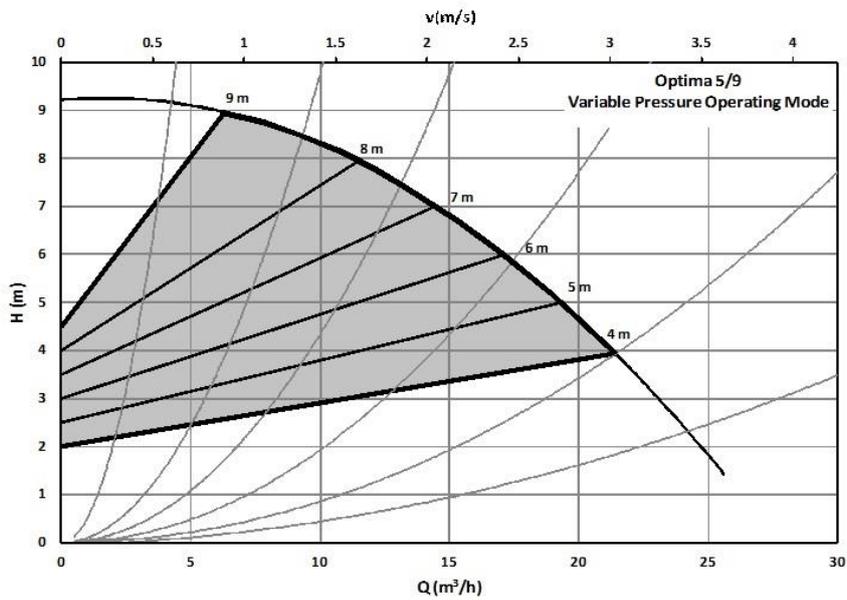
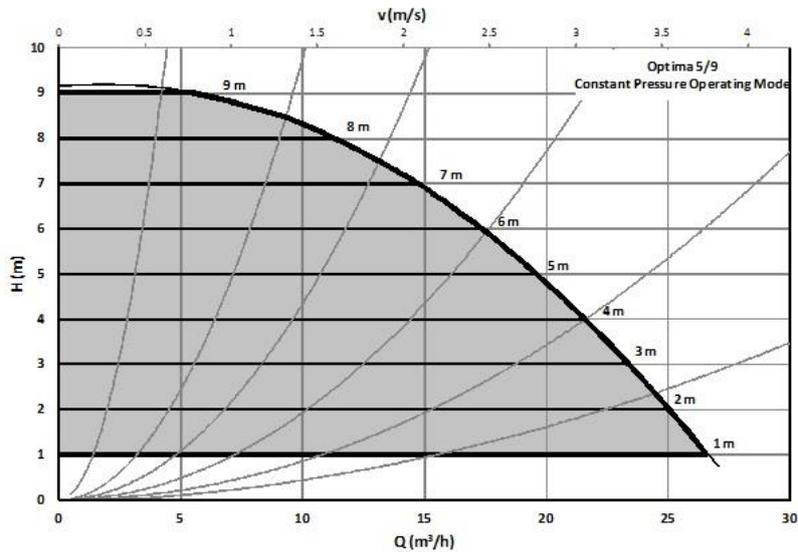
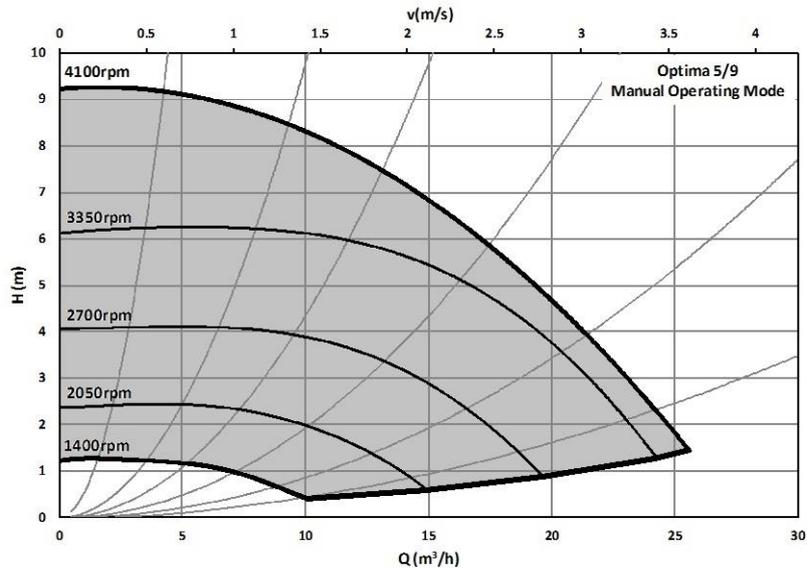
➤ OPTIMA 5/12



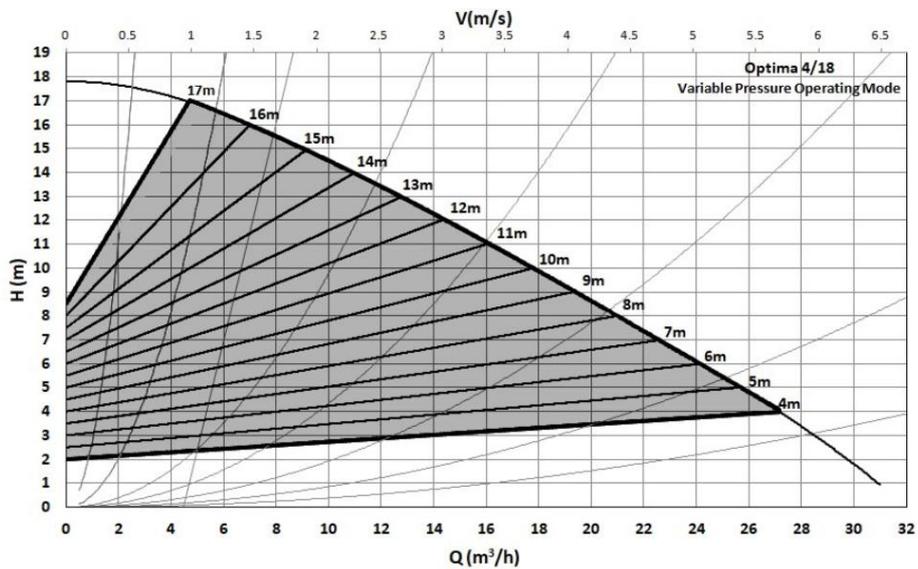
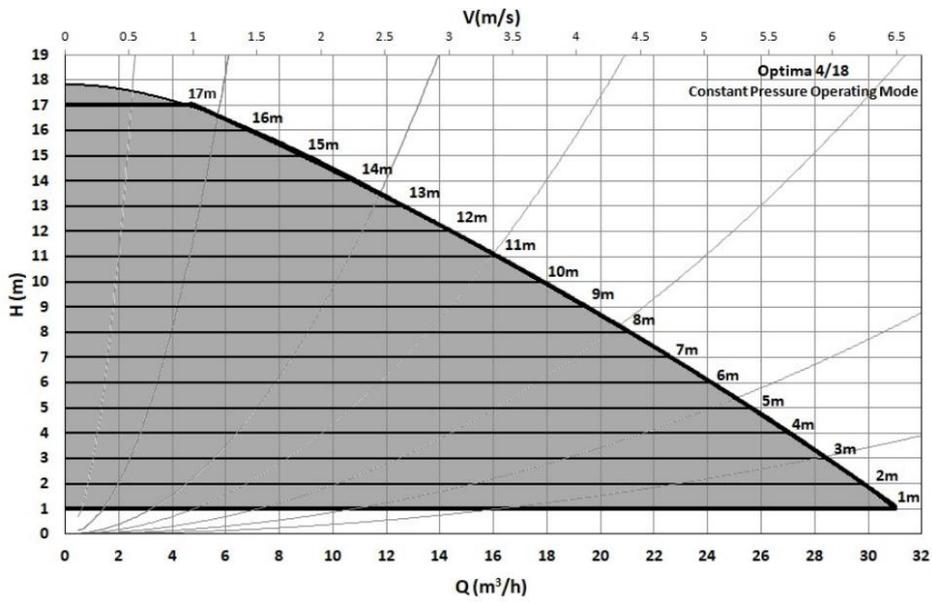
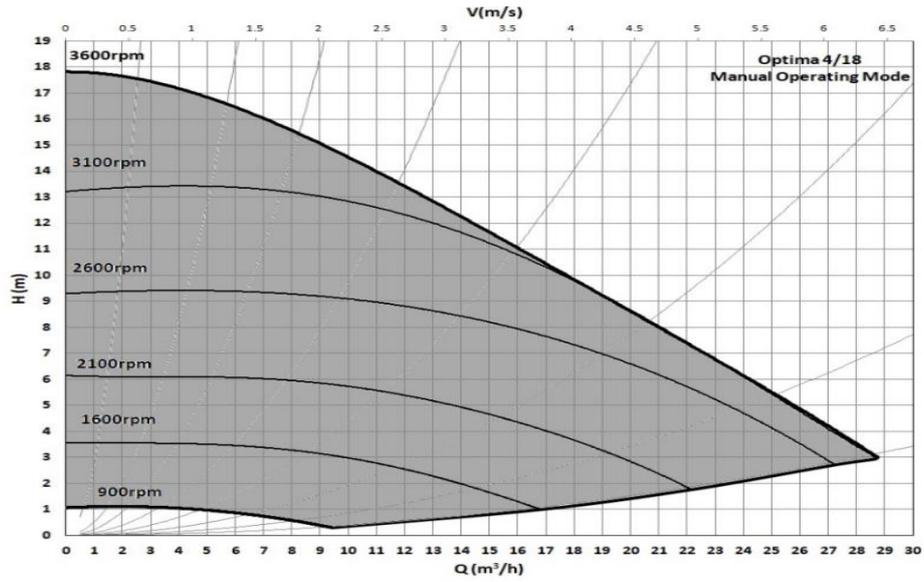
➤ **OPTIMA 5/10**



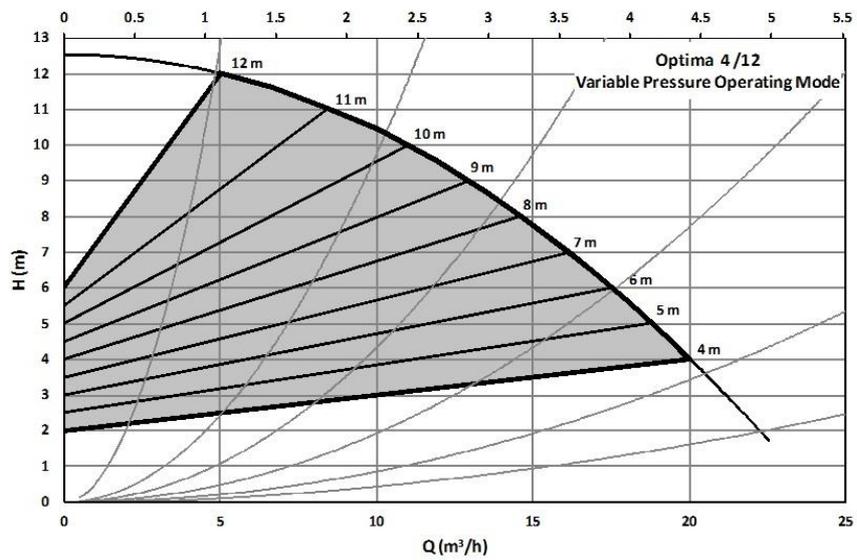
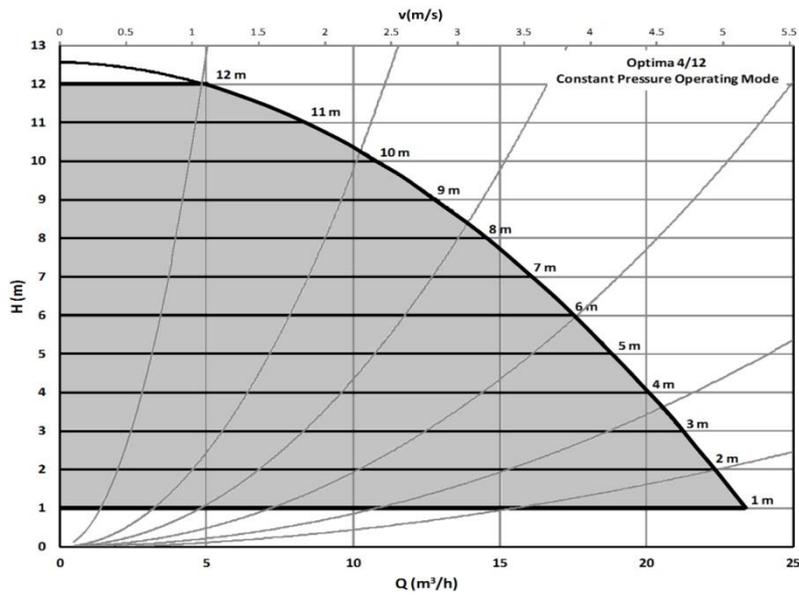
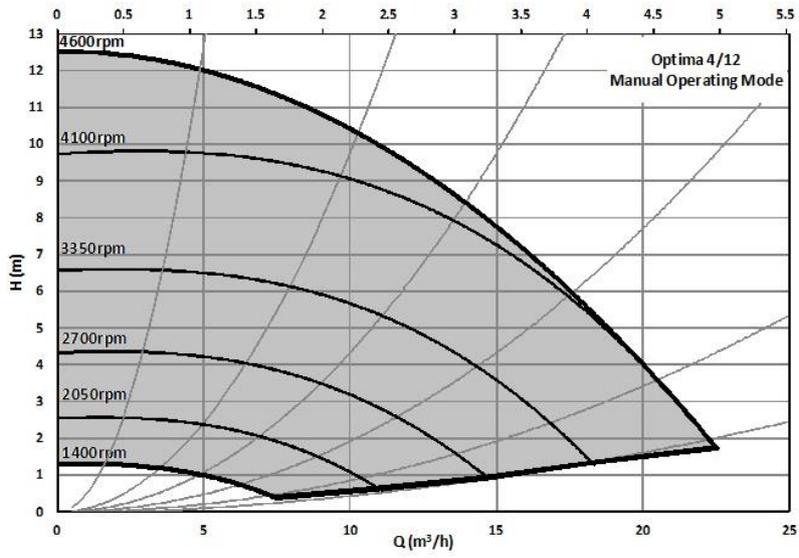
➤ OPTIMA 5/9



➤ OPTIMA 4/18



➤ OPTIMA 4/12



ALARKO



ALARKO CARRIER  
SANAYİ VE TİCARET A.Ş.



AT UYGUNLUK BEYANI

EC DECLARATION OF CONFORMITY

## ALARKO - CARRIER SAN. VE TİC. A.Ş.

75. Yıl OSB Mahallesi, Eskişehir Organize Sanayi Bölgesi 20. Cadde No: 46  
Odunpazarı - ESKİŞEHİR

Alarko Carrier San. ve Tic. A.Ş. tanımlanmış olan ürünlerin aşağıda bahsi geçen yönetmelikler ve standartların temel güvenlik gerekliliklerine uyum sağladığını beyan eder.

Alarko Carrier San. ve Tic. A.Ş. declares that the described products meet the essential safety requirements of the below mentioned directives and standards.

Bu beyan ürünün teslimat durumundaki son şekliyle geçerlidir. Son kullanıcı tarafından ürün üzerinde yapılacak herhangi bir modifikasyonda, bu beyan geçerliliğini yitirmiş olacaktır.

This declaration refers to the product in delivery status. Any modifications of the product by the end user shall invalidate this declaration.

### ÜRÜN TANIMI:

Sirkülasyon Pompaları

### MODEL/ TİP:

Optima 8/12 - 6/12 - 6/9 - 5/18 - 5/12 - 5/10 - 5/9 - 5/8 - 4/18 - 4/12 - 4/10 - 4/8 - 4/4 - 3/12-180 - 3/12-180 BR - 3/10-180 - 3/10-180 BR - 3/7-180 - 3/7-180 BR - 2/10-180

### YÖNETMELİKLER:

Makina Emniyeti Yönetmeliği 2006 / 42 / AT  
Alçak Gerilim Yönetmeliği 2014 / 35 / AB  
Elektromanyetik Uyumluluk Yönetmeliği 2014 / 30 / AB

### EQUIPMENT DESCRIPTION:

Circulation Pumps

### MODEL/ TYPE:

Optima 8/12 - 6/12 - 6/9 - 5/18 - 5/12 - 5/10 - 5/9 - 5/8 - 4/18 - 4/12 - 4/10 - 4/8 - 4/4 - 3/12-180 - 3/12-180 BR - 3/10-180 - 3/10-180 BR - 3/7-180 - 3/7-180 BR - 2/10-180

### DIRECTIVES:

Machinery Directive 2006 / 42 / EC  
Low Voltage Directive 2014 / 35 / EU  
Electromagnetic Compatibility Directive 2014 / 30 / EU

### UYGULANAN UYUMLAŞTIRILMIŞ STANDARTLAR:

TS - TS EN ISO 12100:2011, TS EN 60204-1:2018, TS EN 809+A1/AC:2011, TS EN IEC 60335-2-51:2024  
TS EN IEC 61000-3-2:2019, TS EN 61000-3-3:2014, TS EN IEC 61000-6-1:2019, TS EN IEC 61000-6-3:2021  
EN - EN ISO 12100:2010, EN 60204-1:2018, EN 809:1998+A1:2009/AC:2010, EN IEC 60335-2-51:2023  
EN IEC 61000-3-2:2019, EN 61000-3-3:2013, EN IEC 61000-6-1:2019, EN IEC 61000-6-3:2021

### Regulations Applied acc. to HARMONIZE STANDARDS:

### TEKNİK DOSYAYI HAZIRLAMAKLA YETKİLİ OLAN KİŞİ ADI VE ADRESİ - NAME AND ADDRESS OF THE PERSON AUTHORISED TO COMPILE THE TECHNICAL FILE:

AD\_SOYAD / NAME\_SURNAME  
ADRESİ- ADDRESS

: Murat Özgenc  
: GÖSB - Gebze Organize Sanayi Bölgesi, Şahabettin Bilgisu  
Cad. 41480 KOCAELİ / TURKEY

### İMALATÇI ADINA - SIGNED ON BEHALF OF THE MANUFACTURER

AD\_SOYAD- NAME\_SURNAME  
GÖREV - POSITION  
YER /TARİH - PLACE / DATE  
İMZA - SIGNATURE

: Murat Çopur  
: Genel Müdür Yrd./Fabrikalar - Deputy General Mng./Factories  
: Kocaeli / 05-05-2025

:

Note: Manufacturer reserves the right to change any product specifications without notice.

**ALARKO**



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SANAYİ VE TİCARET A.Ş.

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