KOLMEKS

PUMP CATALOGUE

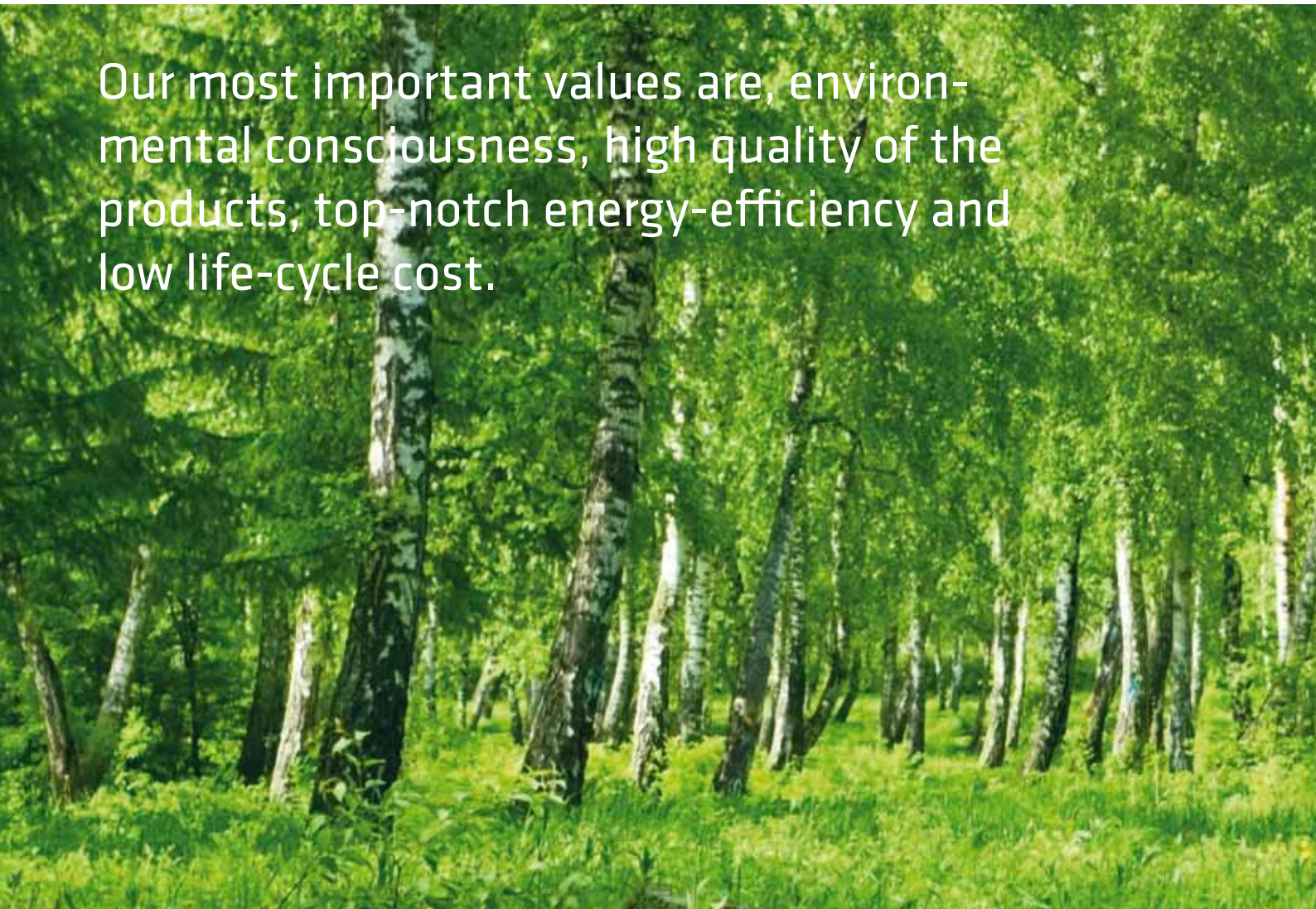
Kolmeks Ltd is a Finnish pump and electric motor manufacturer and part of the privately owned Brandt Group. It is one of the most successful companies in the pump business in Finland, operating in three main business areas; pumps, electric motors and HVAC systems. Kolmeks specializes in centrifugal pumps for application in heating and air-conditioning. In addition, Kolmeks' products are used in district heating plants as well as in district heating primary circulation systems.

Kolmeks – Efficient reliability

In industry, the pumps are typically used in the pulp, paper and chemical industries as well as in other process industries. Notably, the major part of Finnish spas and swimming halls are equipped with Kolmeks' bronze pumps suitable for chlorinated water.

The pumps and their motors are designed and manufactured in Finland and they meet the demands of the Eco Design directive in force as from 2013.

Kolmeks was also among the first Finnish companies to have received the ISO 9001 quality certificate and the ISO 14001 environmental certificate.



Pump ranges

Kolmeks has two ranges of pumps with integrated frequency control; the SC- and TC-ranges. The smallest pump with integrated frequency control is 0,08 kW, the largest 22 kW. In addition all of the pumps are suited for control by external frequency control.

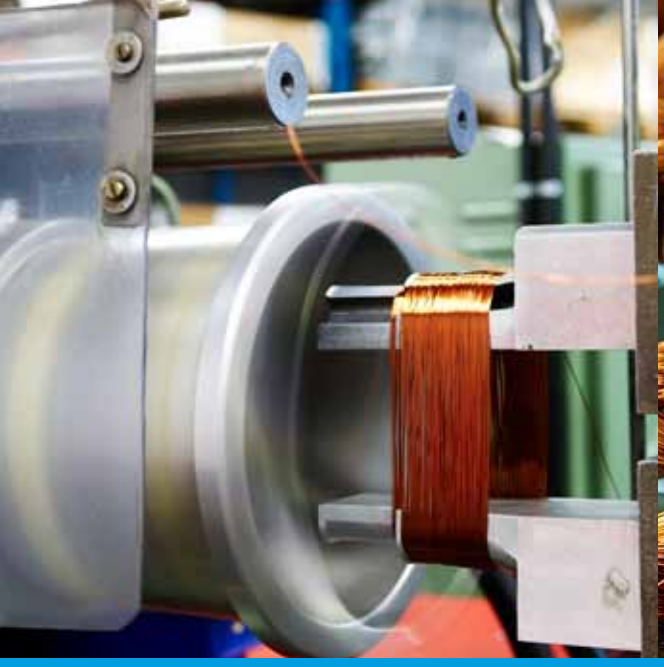
Kolmeks pumps are available in four different materials; grey cast iron, nodular cast iron, bronze and stainless steel casting. The pumps are also available with several different shaft sealing solutions – which makes them suitable for numerous pumping applications.

Finnish internationalism

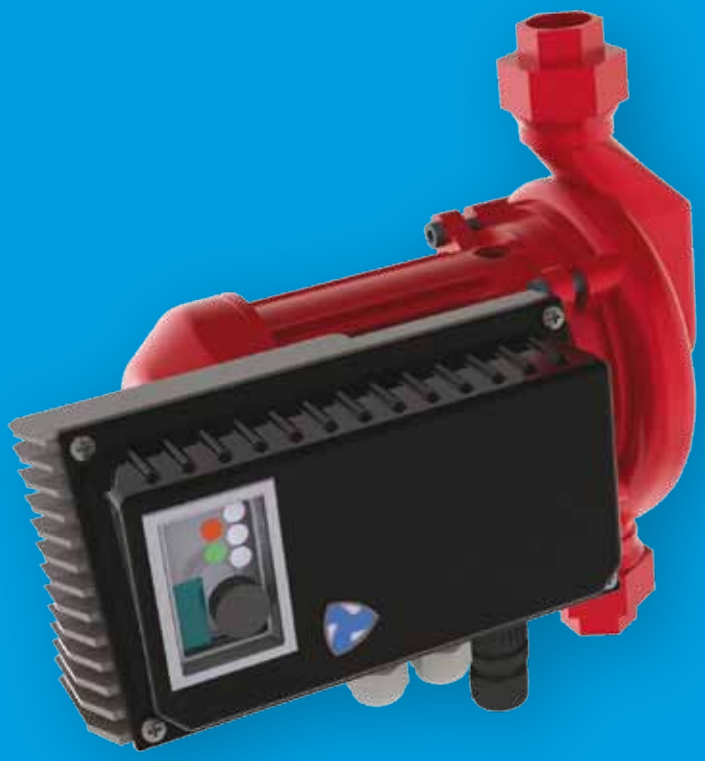
In Finland, the market share of Kolmeks is, obviously, very large. A large part, however, of Kolmeks' pumps end up to be exported, to all major European countries, including Russia. More and more Kolmeks products are also being exported to Middle-Eastern, Asian and African countries.

Ask us about our products and services! We will be more than happy to provide you with solutions

www.kolmeks.com



KOLMEKS
EFFICIENT RELIABILITY



INLINE PUMPS WITH INTEGRATED SC FREQUENCY CONVERTER, 1x230V

AE- series, threaded G3/4 – G1 ¼

L- and AL- series, flanged DN32 – DN100

www.kolmeks.com

General technical data

SC Series of Kolmeks circulation pumps and variable speed controlled centrifugal pumps with integrated frequency converter.

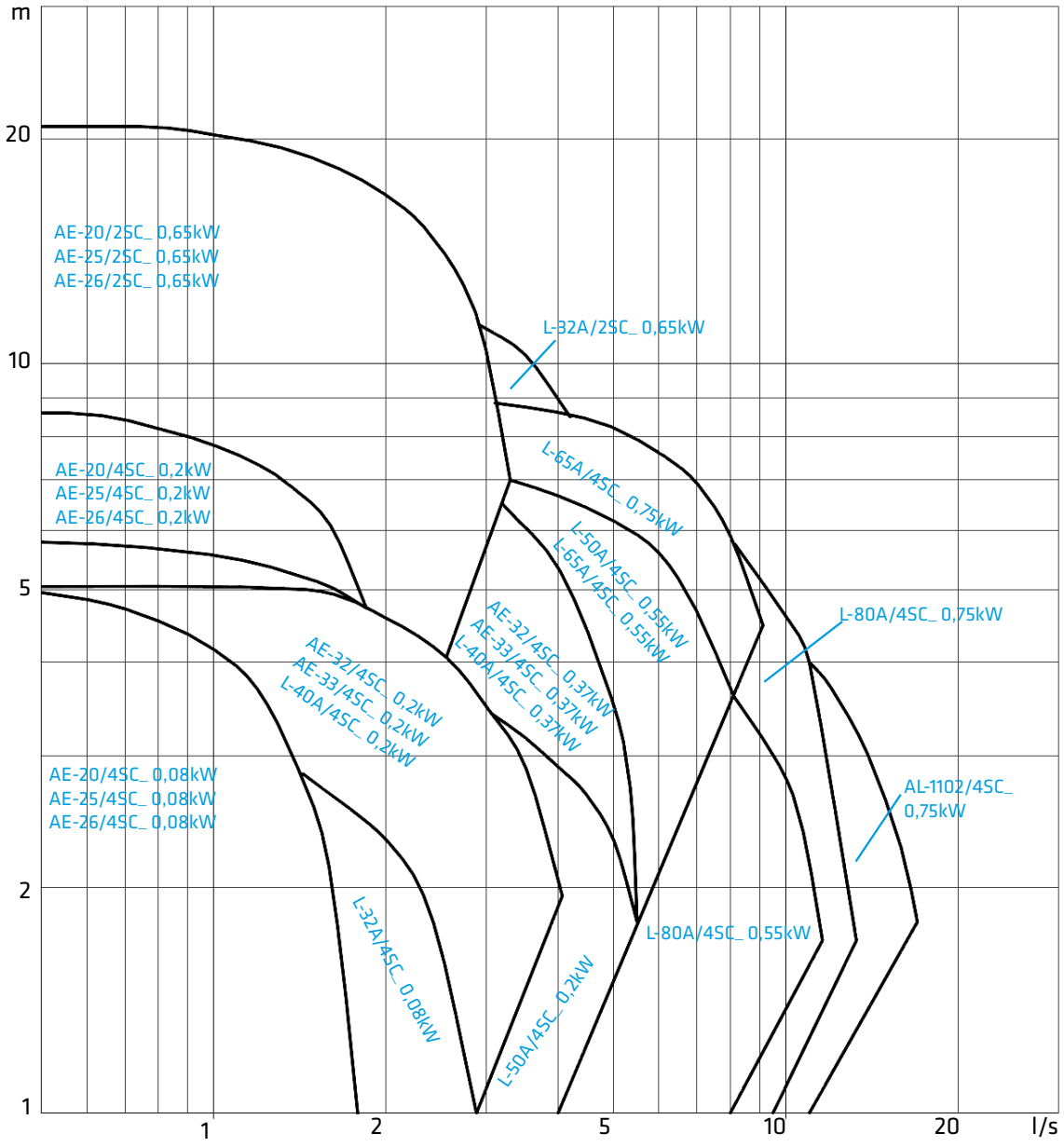
Applications

Cast iron SC series pumps can be used as circulation, pressure boosting and transfer pumps for clean liquids.

- Bronze SC pumps can be used as domestic hot water, circulation, pressure boosting and transfer pumps for clean , oxygen-rich and some slightly aggressive liquids.
- Stainless steel AISI316 SC pumps can be used as circulation, pressure boosting and transfer pumps for clean and aggressive liquids.

The most common applications of the SC pump series are heating, ventilation, cooling and heat recovery systems, heat exchangers, pressure boosting, district heating plants, ice rinks, swimming pools, spas and industrial processes.

Quick Selection Chart



Structure

Pump

SC series pumps are monoblock-structured centrifugal pumps with a dry asynchronous motor. A frequency converter is integrated into the motor. The pump impeller is installed directly onto the shaft of the electric motor (no separate couplings).

Electric motor

The electric motor of an SC pump is a three-phase Kolmeks asynchronous motor designed for pump and frequency converter operation, which guarantees high starting torque and low energy consumption. The electric motor is highly efficient and has low noise levels.

Supply voltage:	1 x 230 V, 50 Hz
Enclosure class:	IP 54
Insulation class:	F
Duty type:	Continuous duty (S1)
Ambient temperature:	0°C ... +40°C (max. +35°C diurnal average)

Connections

Flanged:

The flanges of SC pump fit counter-flanges dimensioned according to ISO 7005.

Threaded:

The SC pump threads are dimensioned according to Standard ISO 228/1.

Seals

The standard shaft seal of an SC series pump is a single mechanical seal. The pump housing seal is O-ring or a gasket. Other seal options are available by request.

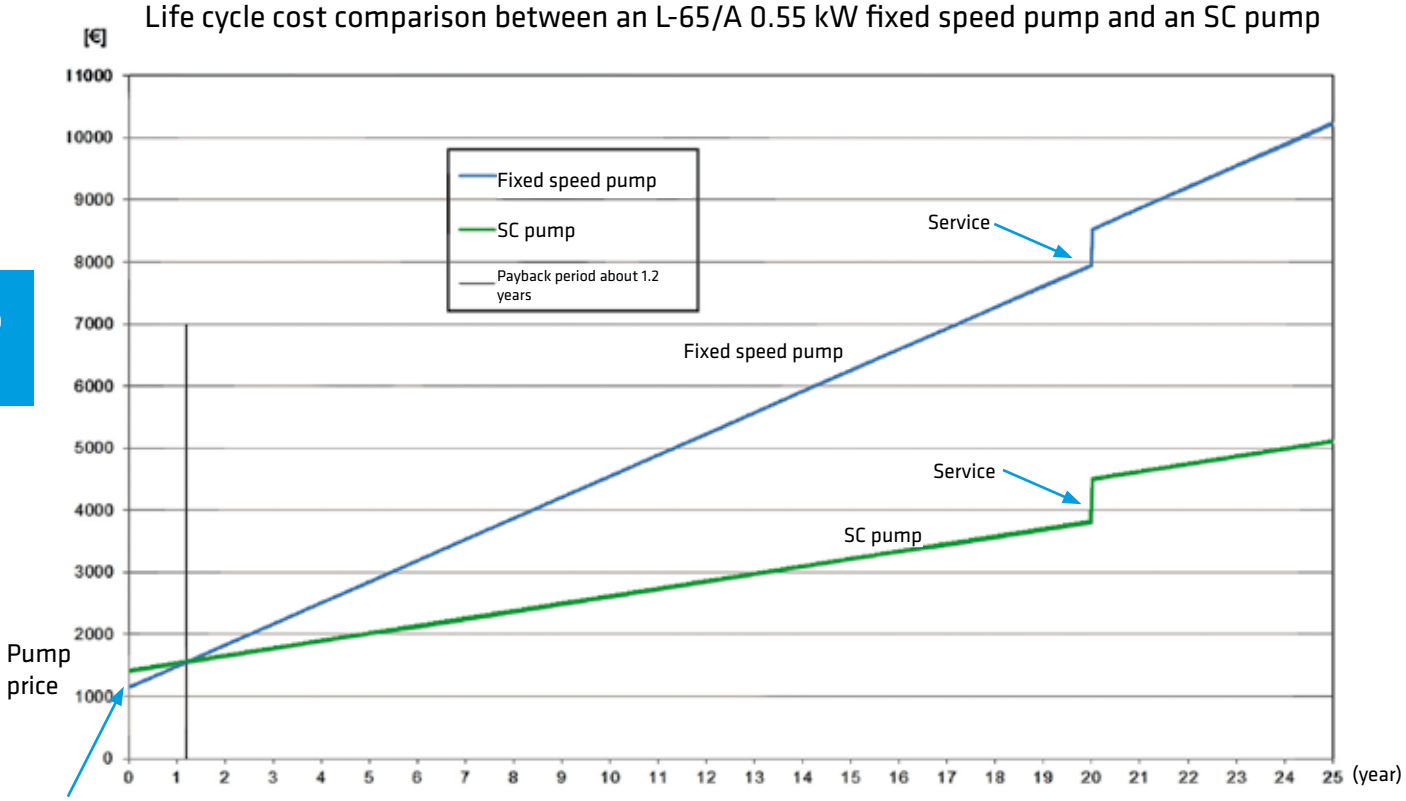
Advantages of selecting an SC pump

- The pump is adjusted manually / automatically adjusts its duty to match the requirements of the system
- The duty point, and therefore the electric power consumption, is determined by actual flow requirements, resulting in reduced running and life cycle costs.
- Depending on pump size, the payback period compared to a fixed speed pump is 0.5–2.5 years (see example).

L-65A/4 0.55kW constant speed
L-65A/4SCG 0.55kW with integrated frequency converter

Accumulative cost

Life cycle cost comparison between an L-65/A 0.55 kW fixed speed pump and an SC pump



Price difference between constant speed and SC pump (purchase price)

Use of energy

Cost-benefit analysis, Q=6l/s, H=35kPa

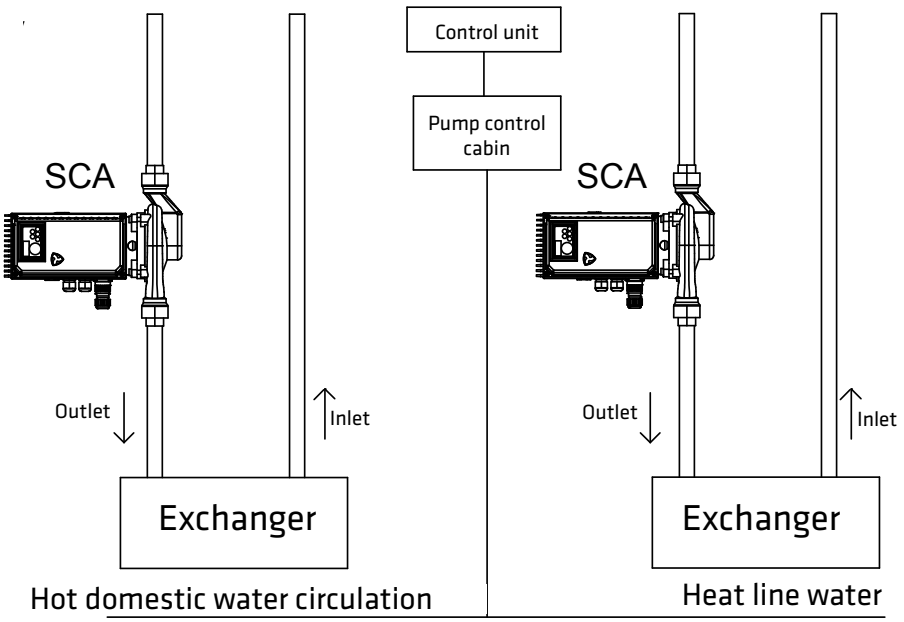
Kolmeks recommendation for pumps in district heating circulation systems

As the payback period for installing a Kolmeks SC variable speed pump is short, Kolmeks recommends the use of variable speed pumps in new systems and the replacement of fixed speed pumps with variable speed pumps in existing systems.

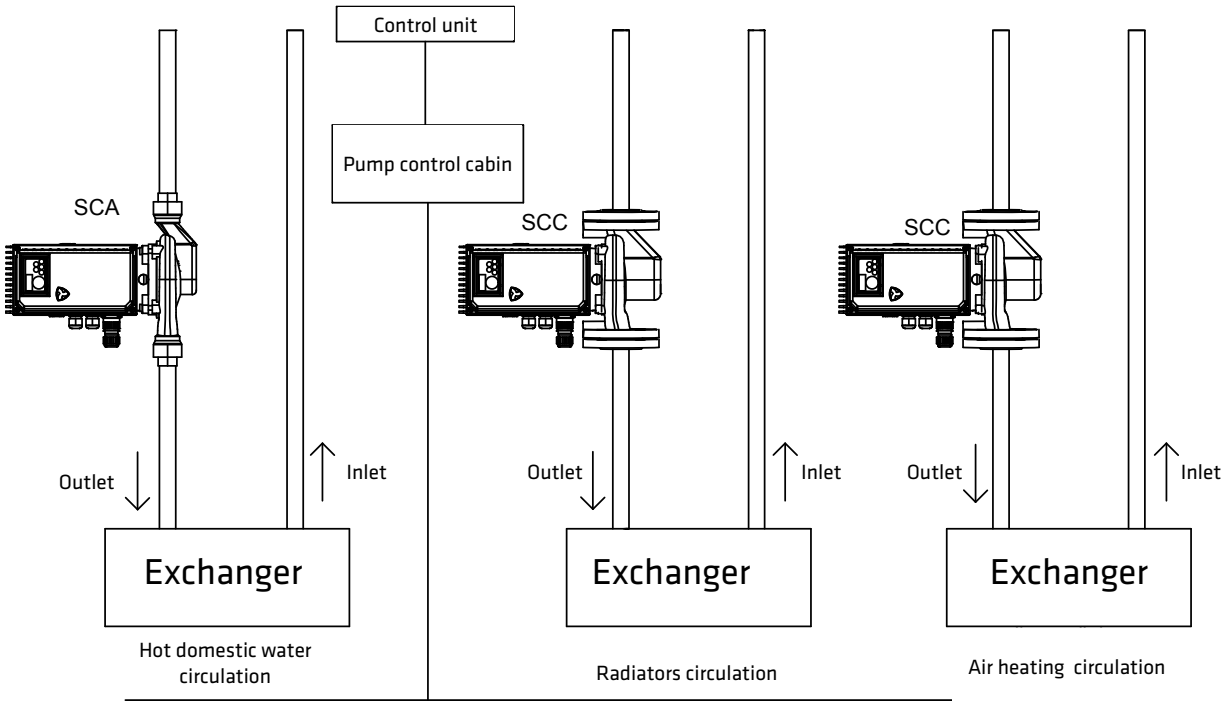
District heating system with two secondary circuits

Supply for all pumps
1 x 230 V

Advantages of an SC pump
- Alarms to BMS
- Duty point can be adjusted in one step
- Operates according to system requirements (radiator and air heating circulation)
- Energy savings
- Reliable operation



District heating system with three secondary circuits



Examples of Kolmeks recommendations for pumps in district heating circulation systems

Standard materials and fields of application for SC pumps

Connection size G or DN	Grey cast iron EN-GJL-200 PN10	Nodular cast iron EN-GJS-400 PN16	Bronze CuSn10Zn2 PN10	Stainless steel AISI 316 PN 16	Shaft seal PN10 Ø [mm] materials	O-ring size [mm]	O-ring material	Motor [kW]
G 3/4	AE-20/4 SC_	no	no	no	12, carbon/SiC Viton	123 X 2,5	NBR	0,08 and 0,2
	AE-20/2 SC_	no	no	no	12, carbon/SiC Viton	123 X 2,5	NBR	0,65
G 1	AE-25/4 SC_	no	AEP-25/4 SC_	no	12, carbon/SiC Viton	123 X 2,5	NBR	0,08 and 0,2
	AE-26/4 SC_	no	AEP-26/4 SC_	no	12, carbon/SiC Viton	123 X 2,5	NBR	0,08 and 0,2
	AE-25/2 SC_	no	AEP-25/2 SC_	no	12, carbon/SiC Viton	123 X 2,5	NBR	0,65
	AE-26/2 SC_	no	AEP-26/2 SC_	no	12, carbon/SiC Viton	123 X 2,5	NBR	0,65
G 1 1/4	AE-32/4 SC_	no	AEP-32/4 SC_	no	12, carbon/SiC Viton	145 X 2,5	NBR	0,2-0,37
	AE-33/4 SC_	no	AEP-33/4 SC_	no	12, carbon/SiC Viton	145 X 2,5	NBR	0,2-0,37
DN 32	L-32/4 SC_	no	no	no	12, carbon/SiC EPDM	100 X 2,5	NBR	0,08 and 0,2
	L-32/2 SC_	no	no	no	12, carbon/SiC EPDM	100 X 2,5	NBR	0,65
DN 40	L-40A/4 SC_	no	no	no	12, carbon/SiC EPDM	145 X 2,5	NBR	0,2-0,37
DN 50	L-50A/4 SC_	no	LP-50A/4 SC_	no	12, carbon/SiC EPDM	150 X 3	NBR	0,2 and 0,55
DN 65	L-65A/4 SC_	LH-65A/4 SC_	no	no	18, carbon/SiC EPDM	179,3 X 5,7	EPDM	0,55 and 0,75
DN 80	L-80A/4 SC_	LH-80A/4 SC_	no	no	18, carbon/SiC EPDM	179,3 X 5,7	EPDM	0,55 and 0,75
DN 100	AL-1102/4 SC_	ALH-1102/4 SC_	ALP-1102/4 SC_	ALS-1102/4 SC_	18, carbon/SiC EPDM	179,3 X 5,7	EPDM	0,75

Operating temperature -15...+95 °C
PN10 = Max. working pressure 10bar, grey cast iron and bronze
PN16 = Max. working pressure 16bar, nodular cast iron and stainless steel

Rating plate information

Additional accessories:
T = Seal for aggressive liquids (external)
H = Flushing
KT = Double mechanical seal
Sn = Non-standard mechanical seal
Kn = Non-standard surface treatment

Special impeller material:
PM = Bronze
SS = stainless steel AISI316

Pump type
Serial number, Pressure class
Duty point, Max liquid temperature
Motor type
Nominal voltage and current
Rotation speed, insulating and enclosure class
Manufacturer, Country of origin

Motor code marking
Impeller size
Electrical power at duty point
Supply voltage phase number, frequency and duty type
Nominal shaft power
Minimum efficiency index (MEI)
Bearing types, CE marking

3

1 2 3 4 5

AL - 110 2 / 4 SC B

L P - 50 A / 4 SC C

1) Pump series:
AE-, L-, AL-

2) Material of housing, sealing flange and impeller:
no letter = Grey cast iron EN-GJL-200
H = Nodular cast iron EN-GJS-400
P = Bronze CuSn10Zn2
S = Stainless steel AISI 316

3) Flange DN size:
20 = 3/4"
25 = 1"
32 = DN 32
40 = DN 40
50 = DN 50
65 = DN 65
80 = DN 80
110 = DN 100

4) Electric motor pole number:
2 = rotation speed 50 r/s (50 Hz)
4 = rotation speed 25 r/s (50 Hz)
rotation speed 30 r/s (60 Hz)
rotation speed 32.5 r/s (65 Hz)

5) SC = SC frequency converter integrated into pump
Pump adjustment method:
SCA, SCB, SCC, SCD, SCF, SCG, SCM
(see Adjustment and connections)

Pump installation

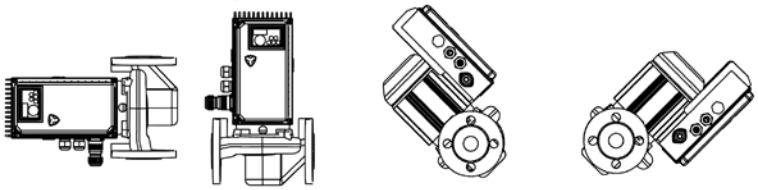
The pump can be installed in the piping without additional support. The position of the motor unit and therefore the location of the frequency converter box can be changed by detaching the motor unit from the pump housing and turning it to the required position, within certain limitations.

Ensure the following when installing the pump:

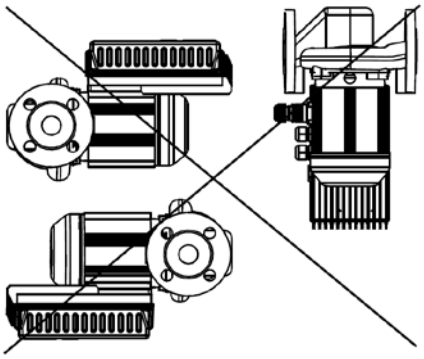
- Enough room for control, service and inspections
- The installation position should be chosen such that the display is readable; a separate control panel can be used if required.
- Possibility to use lifting and transfer devices if required
- Shut-off valves on both sides of the pump
- The pump must be installed in such a position that the frequency converter of the pump is not in the immediate vicinity of a hot pipe.

Operating positions

Permitted operating positions



Prohibited operating positions



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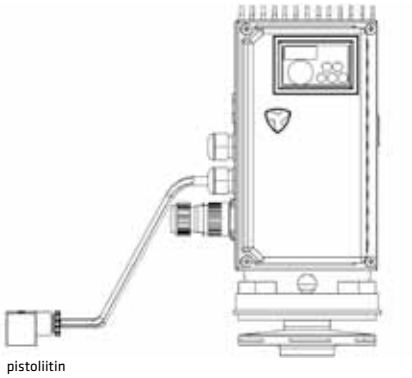
Motor units:



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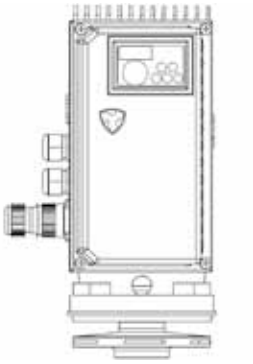
SCB, SCC, SCD and SCF pumps

The complete pump motor unit is a new spare motor unit which includes:
- Electric motor
- Frequency converter
- Transmitter quick connection plug with wires
- Sealing flange
- Impeller
- Seals

When replacing the motor unit, no piping or electrical work is required, as there is no need to detach the pump housing, and the power supply is connected using a quick connection plug. There is also no need to detach the transmitter or its tubes. Only the cap screw of the plug connector at the top of the transmitter is opened, which enables the plug connector and its wiring to be pulled out. In the new motor unit, the connection plug is pre-wired, which allows quick replacement of the transmitter electrical connection.



SCA and SCG pumps

The complete pump motor unit is a new spare motor unit which includes:
- Electric motor
- Frequency converter
- Sealing flange
- Impeller
- Seals

Control methods and control connections

SC pump I/Os (inputs and outputs)

Terminal 4	Programmable 4-20 mA, 0–5 VDC, 0–10 VDC analog input (voltage/current selection switch)
Terminal 2	Programmable 0–10 VDC, 0–5 VDC analog input
Terminals STF, STR, RH, RM, RL	Programmable digital inputs
Terminal PC	24 VDC voltage supply for digital inputs and feedback transmitter (max. 100 mA)
Terminal 10	5 VDC voltage supply for potentiometer
Terminal 5	Signal ground
AM / 5	Programmable analog output
Relay output, Terminals A,B, C	Fault indication (programmable relay output), potential free change-over contacts max. 230 VAC / 0.3 A, cos fii 0.4, max. 30 VAC / 0.3 A
Transistor output, Terminals RUN, SE	Load 27 V / 0.1 A, voltage loss 3.4 V

Terminal factory settings

Terminal 4	Programmed as feedback input 4–20 mA or not in use depending on the pump control method
Terminal 2:	0–10 VDC direct speed reference or controller reference depending on control method used, or not in use.
Terminal STF:	Jumper between terminals PC–STF open/closed = pump off/on
Terminal STR:	Not in use
Terminal RH:	Dry running protection in the SCD version
Terminal RM:	Jogging operation. PC – RM open/closed = normal operation / runs forced at 40 Hz frequency.
AM / 5:	Analog output 0–10 VDC. SCCVAK (direct speed reference from automation) and in SCG versions programmed as frequency. SCB, SCC, SCCVAK (differential pressure reference from automation), in SCD and SCF version programmed as feedback.
Relay output, Terminals A,B ja C:	The relay output is programmed with fault information. The relay draws: Terminals A and C connected, when the pump runs or voltage is connected to it. Terminals B and C connected, when the device is in fault mode or dead.

SCA pump: Direct speed reference by potentiometer

Applications

For systems with no continuous automatic adjustment requirement and a constant duty point, such as domestic hot water circulation systems, for example.

Accessories

Pump and frequency converter.

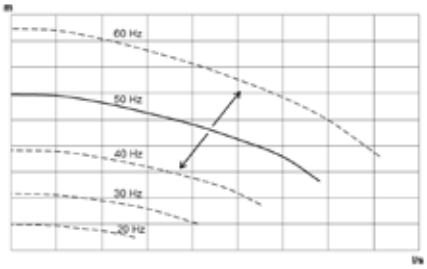
Operating principle

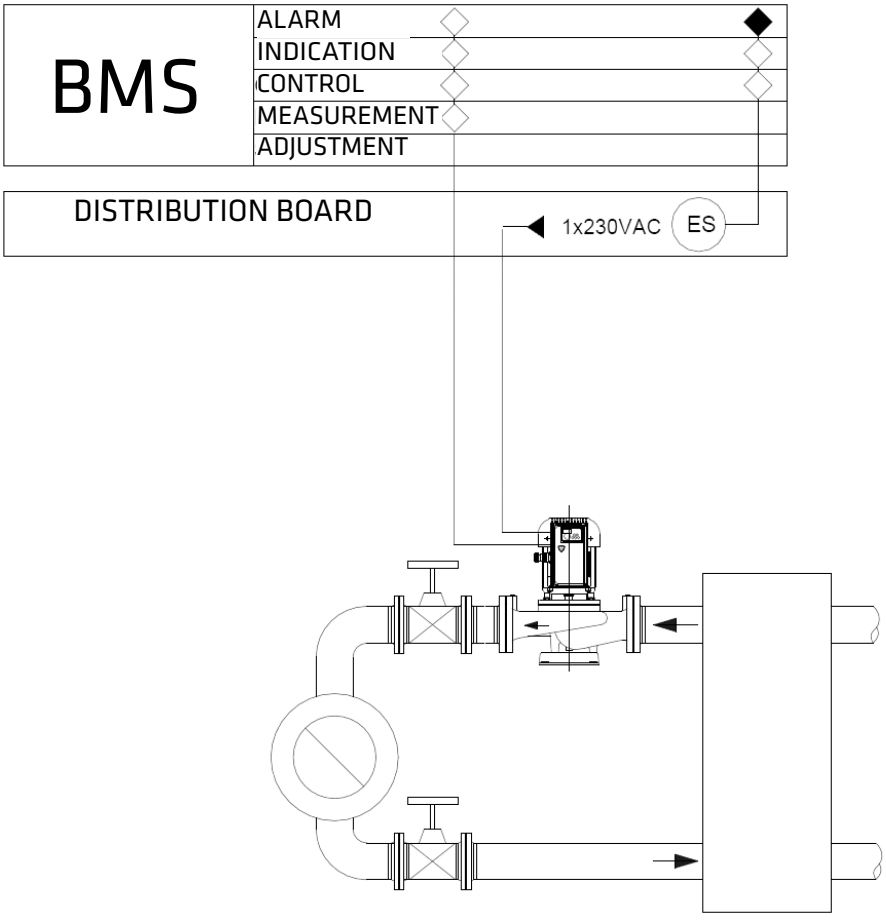
The rotation speed of the pump is set in one step using the buttons on the frequency converter when commissioning the pump. The desired frequency is selected using the control panel potentiometer, and is saved by pushing the SET button. The pump rotates at a constant set rotation speed. As the pump is running, it is possible to select the motor current (A) or start frequency (Hz) on the display by pushing the SET button. Panel use can be locked by pushing the MODE button for 2 seconds. The panel can be unlocked in the same way.

Pump curve

The pump QH curve equals the QH curve of a standard speed pump.

Standard control connections, PU / EXT COMBINED OPERATION MODE





SCB pump: Constant differential pressure across pump

Applications

For circulation systems where flow rates vary and the majority of pressure loss is created at consumption targets. For example, heating and cooling systems and pressure boosting in parallel circulation systems.

Accessories

Pump, frequency converter, differential pressure transmitter and measurement pipes installed in the suction and discharge flanges of the pump.

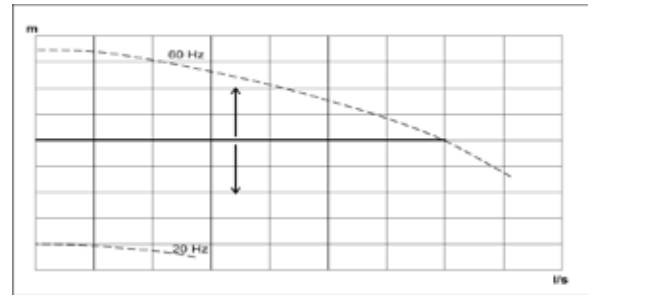
Operating principle and system adjustment

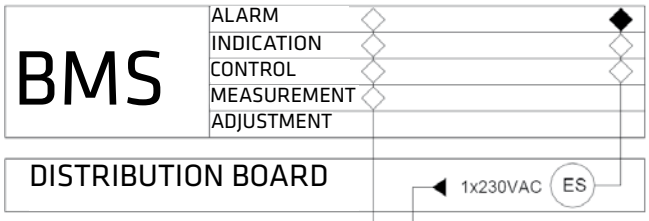
Constant differential pressure is maintained between the pump flanges, and is set to Parameter 133 of the frequency converter as percentages of the maximum measurement value of the differential pressure transmitter (mentioned in the differential pressure transmitter). As the pump rotates, it is possible to select the start frequency (Hz), motor current (A) or differential pressure feedback (% of the maximum measurement value of the differential pressure transmitter) on the display by pushing the SET button. Panel use can be locked by pushing the MODE button for 2 seconds. The panel can be unlocked in the same way.

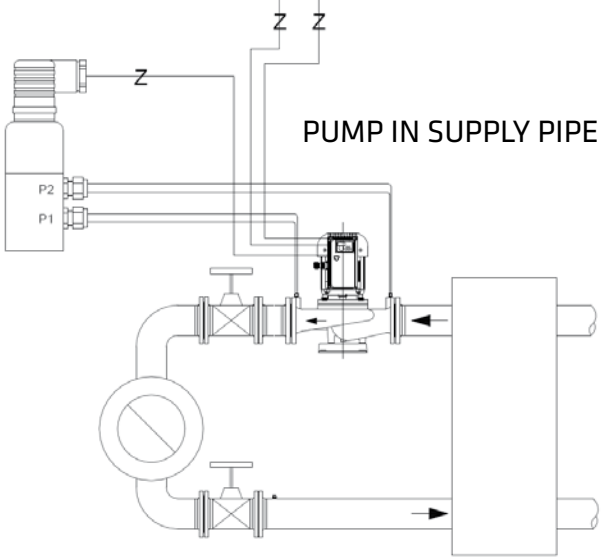
Pump curve

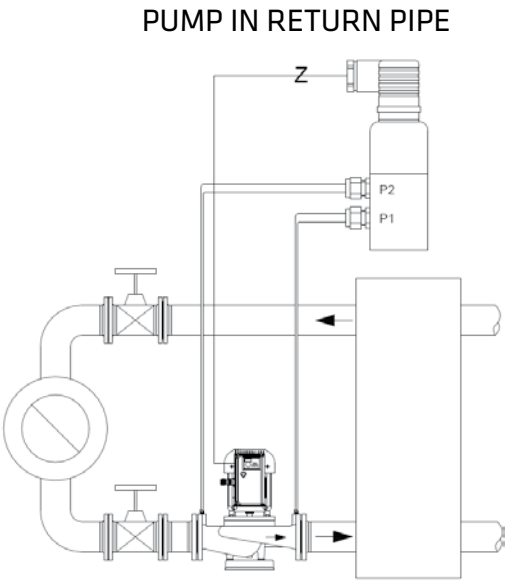
The QH curve of the pump is horizontal, which is applicable for circulation systems where the pressure loss of the heat source is low in relation to the total pressure loss.

Standard control connections, PU / EXT COMBINED OPERATION MODE









SCC pump: Constant differential pressure in piping

Applications

For circulation systems where flow rates vary significantly and the majority of pressure loss is created at consumption targets. For example, heating and cooling systems and pressure boosting in parallel circulation systems.

Accessories

Pump, frequency converter, differential pressure transmitter with pipes, one of which is installed in the suction or pressure flange in the pump and the other in the system's inlet or outlet pipe.

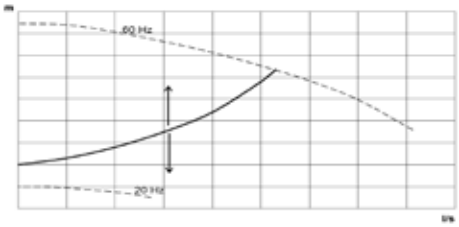
Operating principle and system adjustment

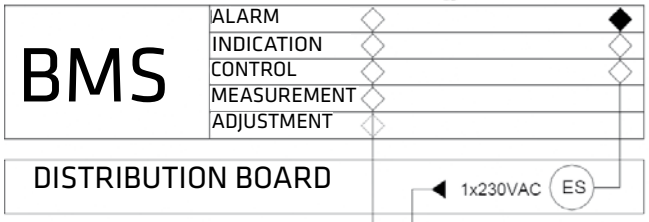
Constant differential pressure is maintained over the inlet and outlet lines of the system, and is set to Parameter 133 of the frequency converter as percentages of the maximum measurement value of the differential pressure transmitter (mentioned in the transmitter). As the pump rotates, it is possible to select the frequency (Hz), motor current (A) or differential pressure feedback (% of the maximum measurement value of the differential pressure transmitter) on the display by pushing the SET button. Panel use can be locked by pushing the MODE button for 2 seconds. The panel can be unlocked in the same way.

Pump curve

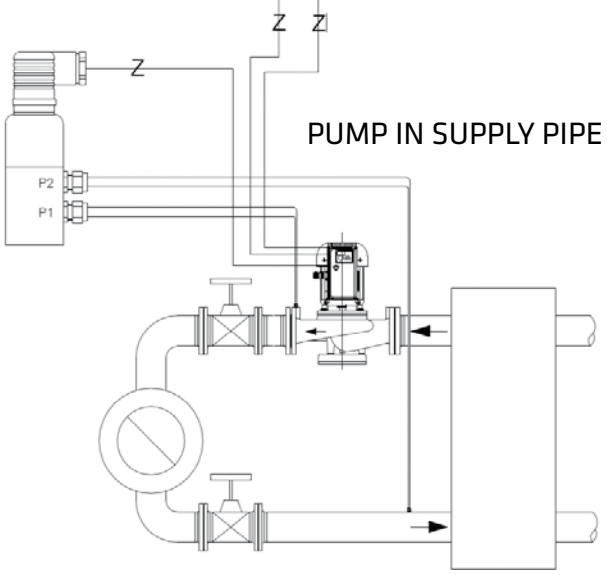
The pump QH curve is automatically square. The shape of the QH curve depends on the relation of the heat source pressure loss to the total pressure loss of the circulation system. The larger the share of the heat exchanger pressure loss is in relation to the circulation system's total pressure loss, the steeper the QH curve is.

Standard control connections, PU / EXT COMBINED OPERATION MODE

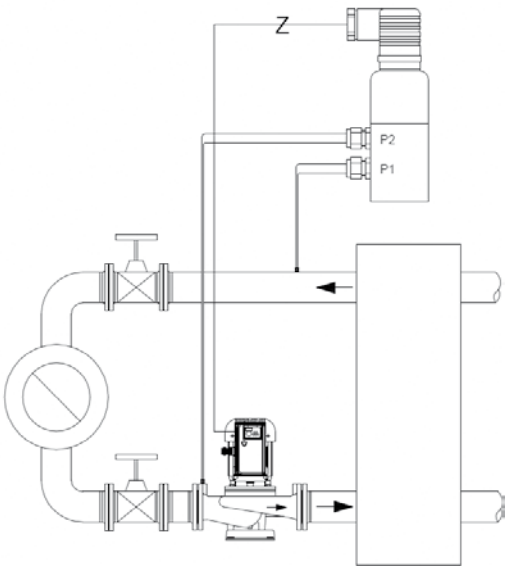




PUMP IN SUPPLY PIPE



PUMP IN RETURN PIPE



SCCVAK pump: Constant differential pressure in piping by BMS PI-controller

Operating principle (speed reference to pump as voltage signal 0–10 V)

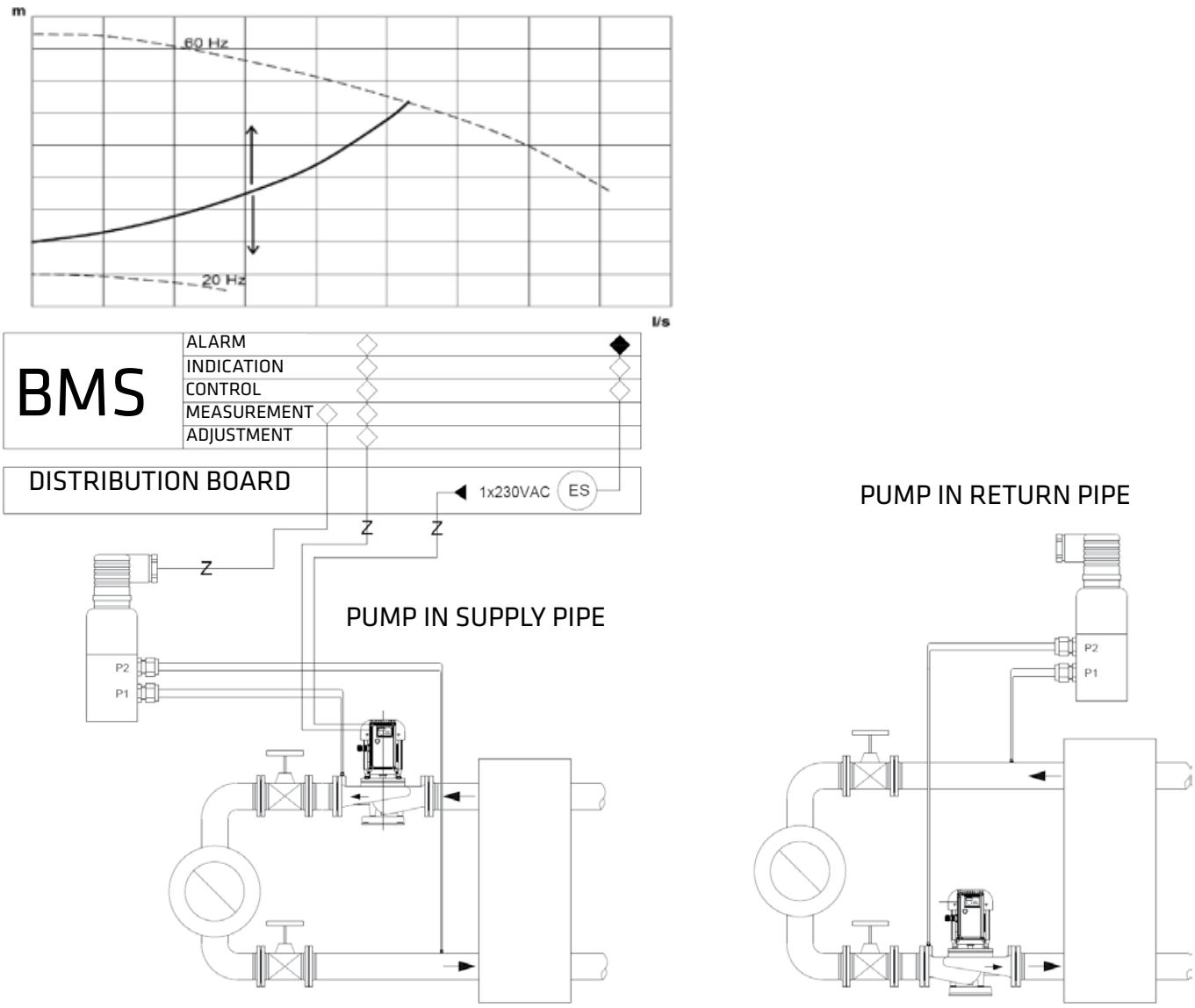
Constant differential pressure is maintained over the return and supply pipe of the system by setting it in the BMS (direct speed reference to pump as voltage or current signal). The differential pressure feedback measurement is connected to the BMS.

System adjustment/balancing

When adjusting and balancing the system, the differential pressure transmitter is connected to the BMS. The main control valve is fully opened and the flow is adjusted using the frequency converter display by entering the correct frequency. When the system is balanced and the desired flow is obtained, the differential pressure value of the differential pressure transmitter is read in the BMS and programmed into the BMS as a reference value.

Alternatively, the accurate constant differential pressure value can be accessed when the pump is SCC connected (see previous section). A wire loop must be installed between Terminals PC and RL (control run). When the system is balanced and the correct flow is obtained, the reference value of differential pressure (m) can be read (Parameter 133). It is programmed into the BMS as a reference value.

Standard control connections, EXT OPERATION MODE



SCCVAK pump: Constant differential pressure in piping by frequency converter PI-controller

Operating principle

Constant differential pressure is maintained over the inlet and outlet line of the system by setting it in the BMS (differential pressure reference value as voltage current signal 0–10 V). These connections and operation are the same as for the SCC pump: Constant differential pressure in piping, but here, instead of using the keyboard, the differential pressure reference value is set externally from the BMS between terminals 2 and 5 (Parameter 133 = 9999).

NOTE! If the BMS is not operational when pumping is required, set the differential pressure using Parameter 133 (see SCC pump).

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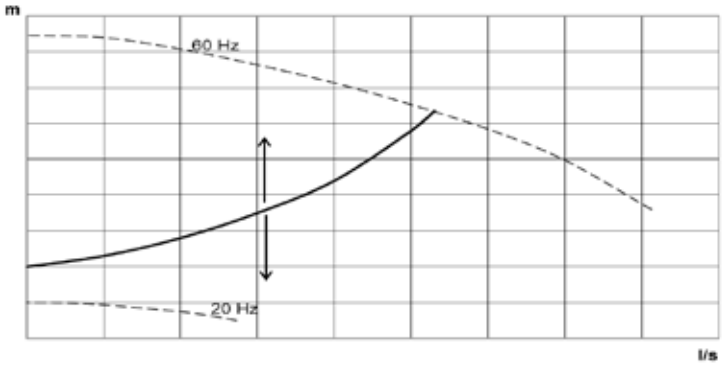
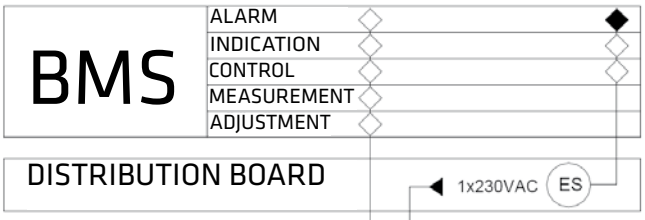
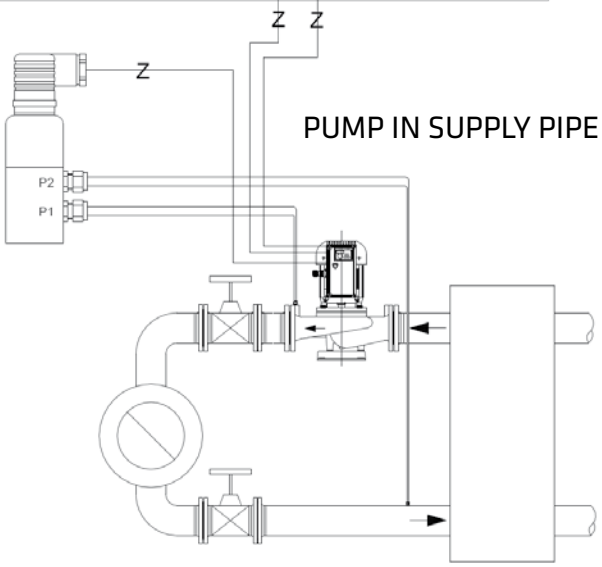
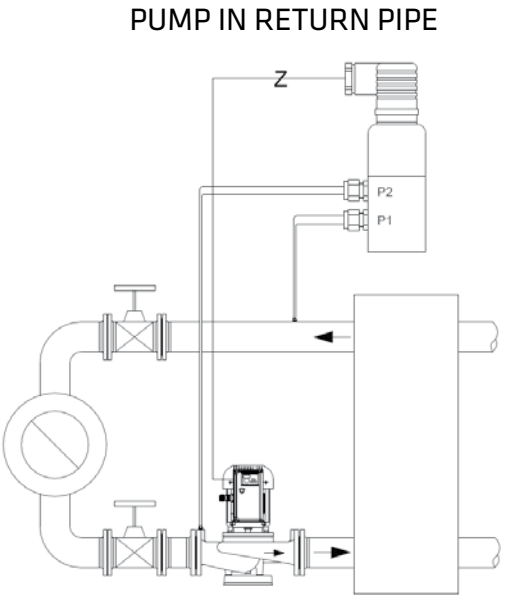
Standard control connections, PU / EXT COMBINED OPERATION MODE









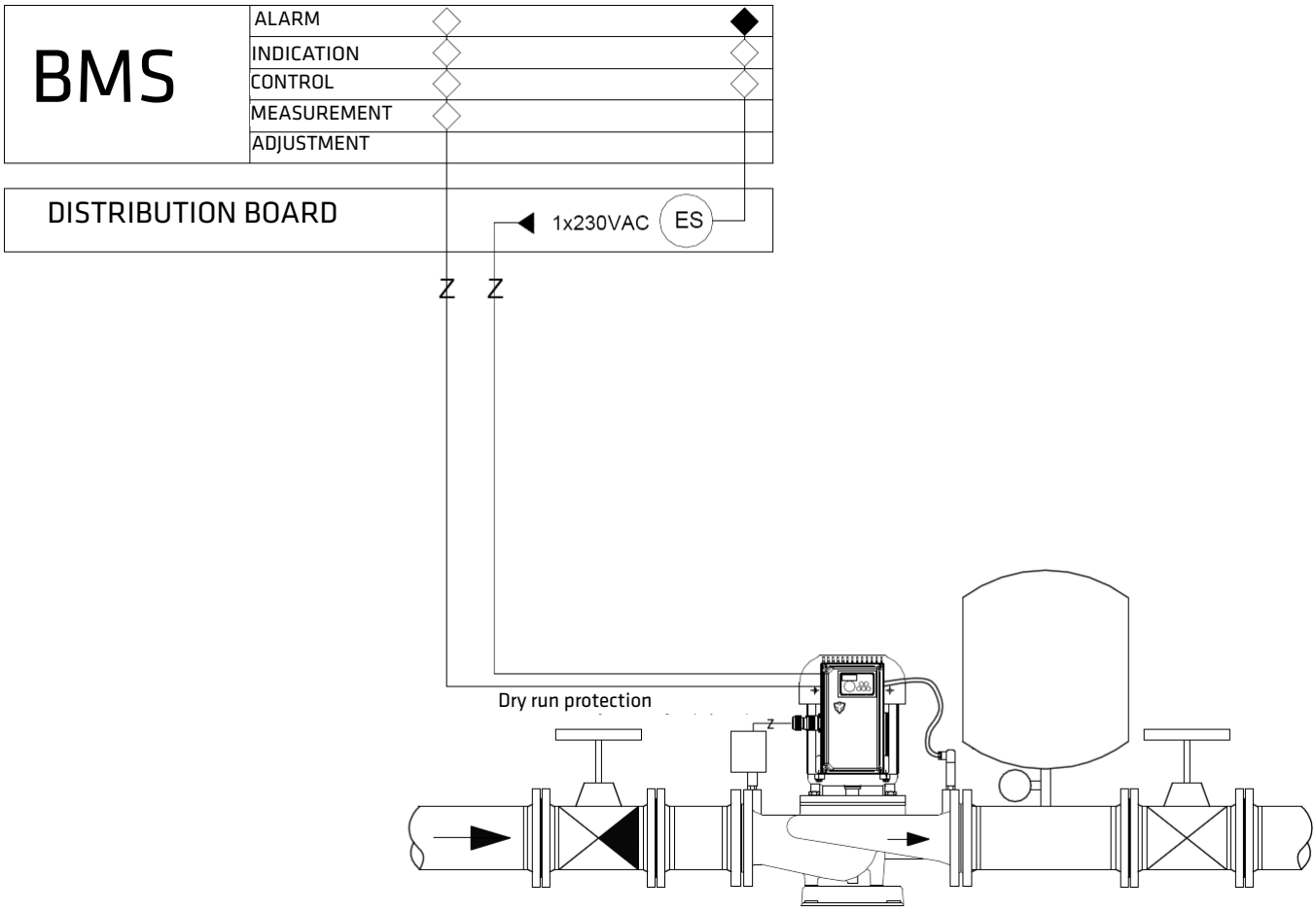
SCD pump: Constant pressure in discharge flange (pressure boosting)

Applications
For pressure boosting and other open systems which require a constant pressure.

Accessories
Pump, frequency converter and pressure transmitter which is installed either on the pump discharge flange or consumption point.

Operating principle
The pump maintains constant pressure at the installation point of the pressure transmitter. The pressure is set to Parameter 133 of the frequency converter as percentages of the maximum measurement value of the differential pressure transmitter (found in the pressure transmitter). As the pump rotates, it is possible to select the frequency (Hz), motor current (A) or pressure feedback (% of the maximum measurement value of the pressure transmitter) on the display by pushing the SET button. Panel use can be locked by pushing the MODE button for 2 seconds. The panel can be unlocked in the same way.

Standard control connections, PU / EXT COMBINED OPERATION MODE



SCF pump: Constant temperature

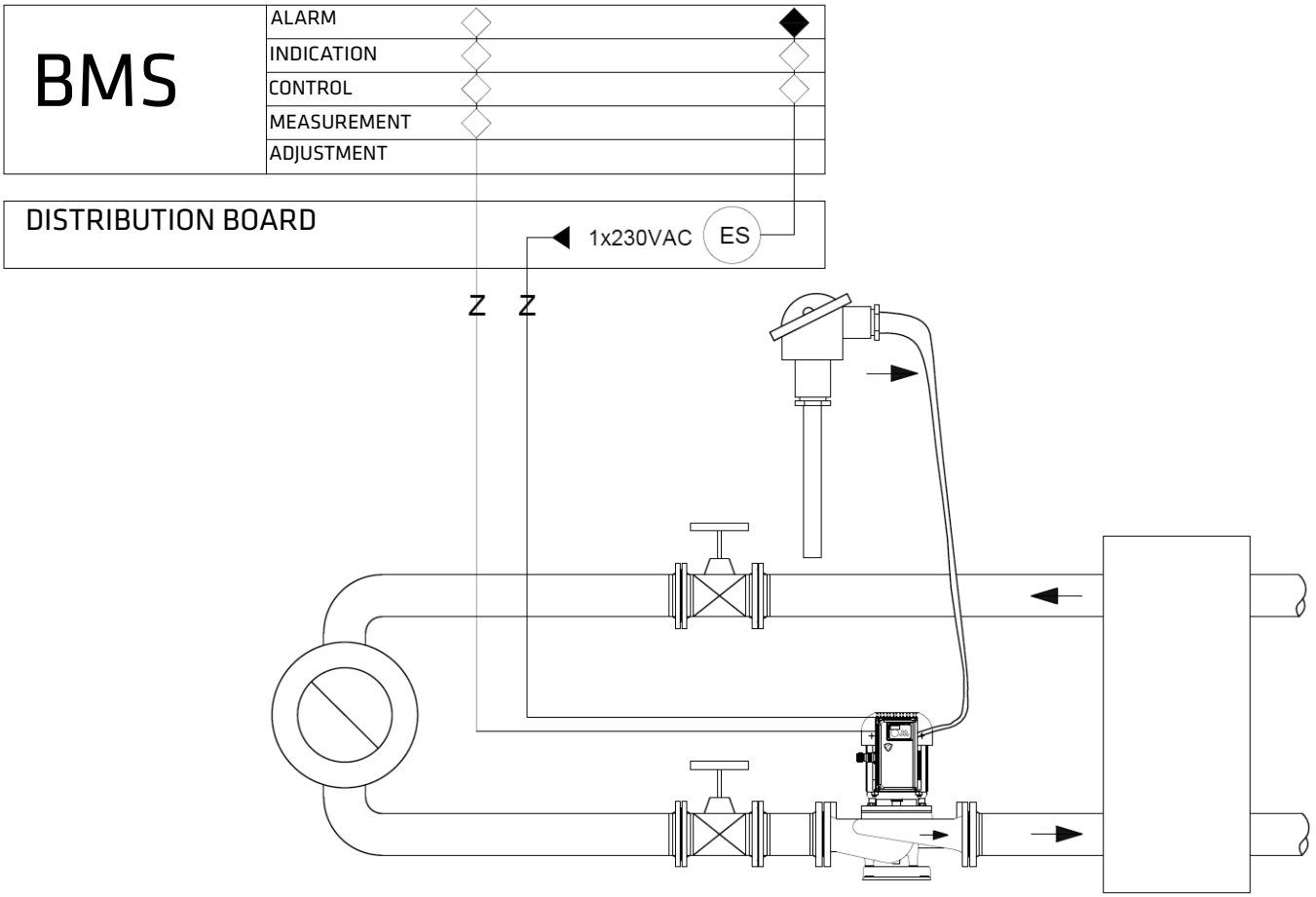
Applications
For heating or cooling systems which maintain constant temperature by adjusting the flow rate.

Accessories
Pump, frequency converter and temperature transmitter.

Operating principle
The system maintains a constant temperature which is set to Parameter 133 as percentages of the maximum measurement value of the temperature transmitter (found in the temperature transmitter). As the pump rotates, it is possible to select the frequency (Hz), motor current (A) or temperature feedback (% of the maximum measurement value of the temperature transmitter) on the display by pushing the SET button. Panel use can be locked by pushing the MODE button for two seconds. The panel can be opened in the same way.

NOTE! Please state the adjustment direction when ordering the pump. Normal when pumping is decreased as the temperature (feedback) increases, inverse when pumping is increased as the temperature increases. 128 => normal = 20, inverse = 21).

Standard control connections, PU / EXT COMBINED OPERATION MODE



SCG pump: Pump speed controlled by external automation

For systems with varying flow rates and/or in which the flow rate is adjusted using the pump. The pump is controlled centrally or by a separate controller.

Accessories

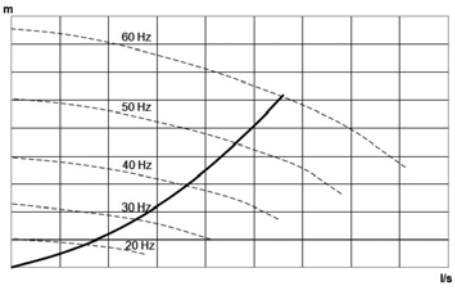
Pump and frequency converter.

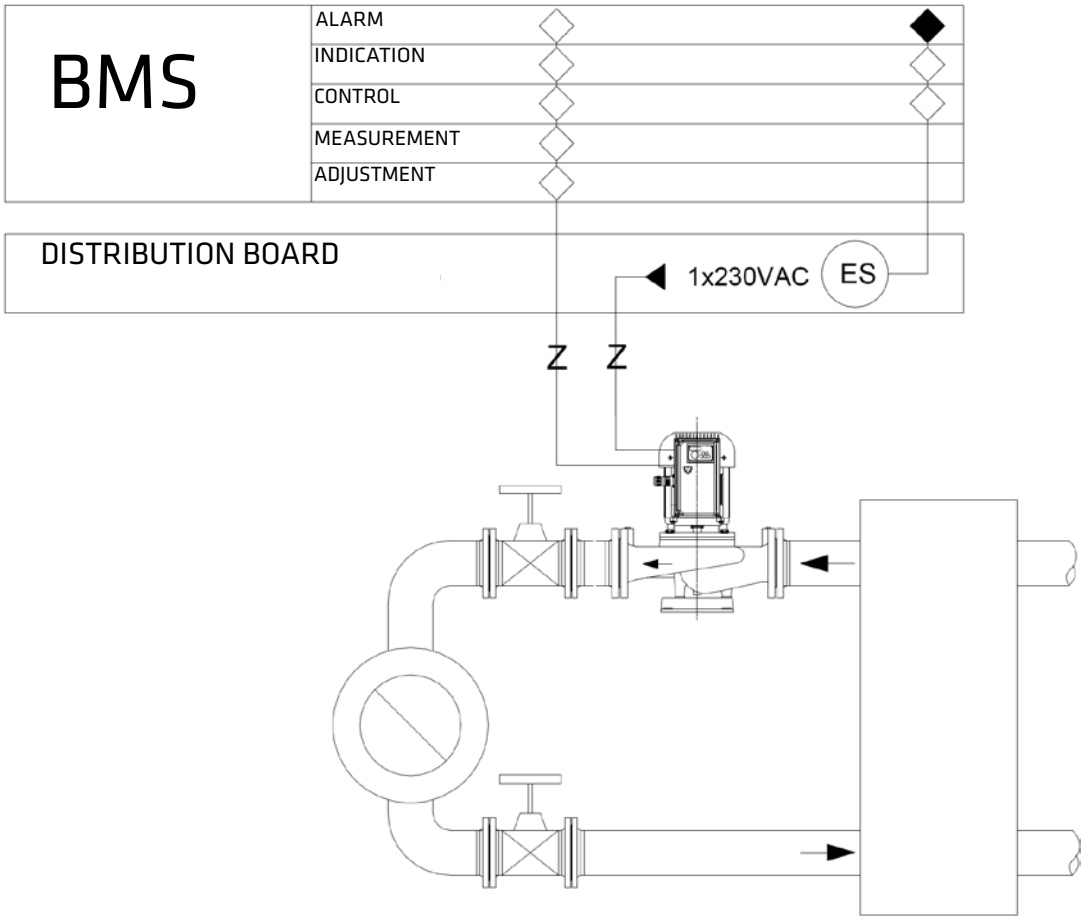
Operating principle

The pump is given a direct speed reference externally e.g. from the BMS, a separate controller, process control, etc.

NOTE! If the BMS is not operational when pumping is required, use Parameter 79 to select PU/EXT combined operation (Par 79: 0=>3). After this, the standard speed of the pump can be set in the same way as for an SCA pump.

Standard control connections, EXT OPERATION MODE





SCM pump: Automation controlled pump with MODBUS RTU bus

For systems with varying flow rates and/or in which the flow rate is adjusted by the pump. The pump is controlled centrally or by a separate controller.

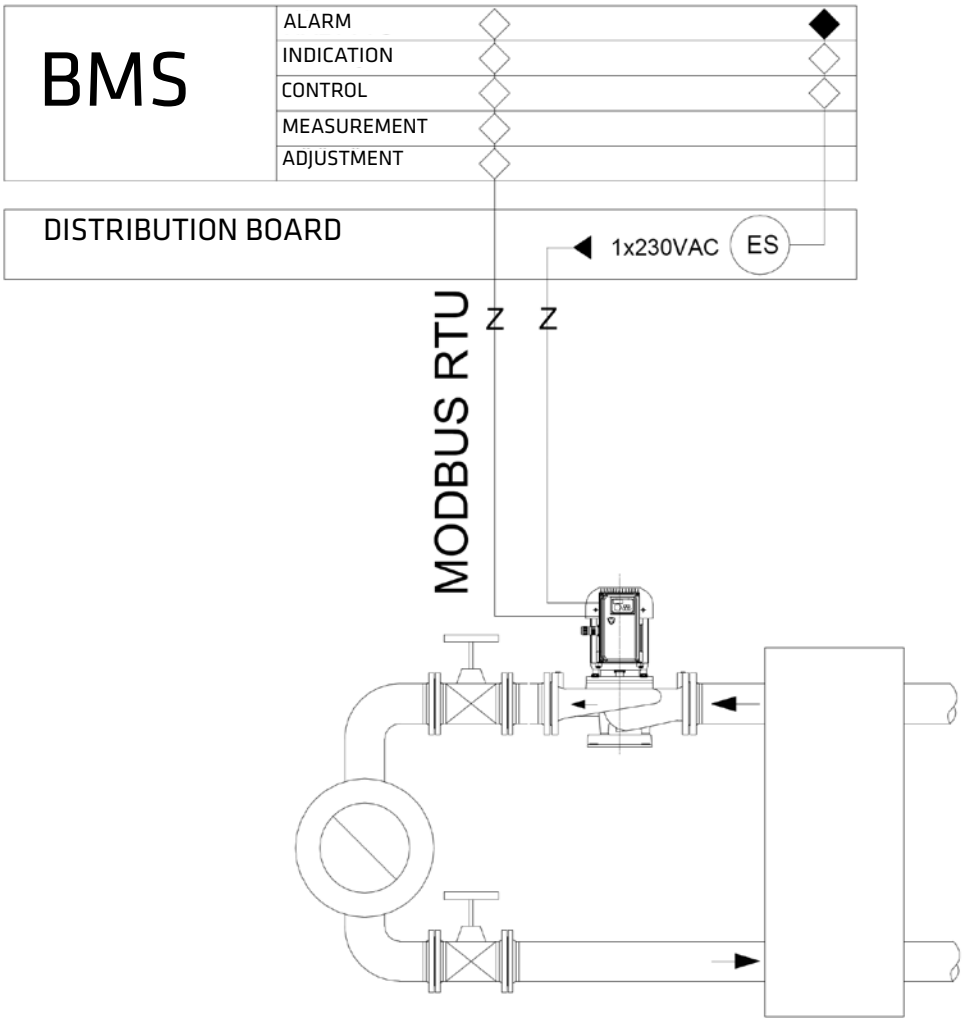
Accessories

Pump and frequency converter.

Operating principle

The adjustment, control, measurement, indication and alarms of the pump frequency converter is carried out externally using building automation, process control, or by means of MODBUS RTU bus functions.

Standard control connections, NET COMBINED OPERATION MODE



Local control panel

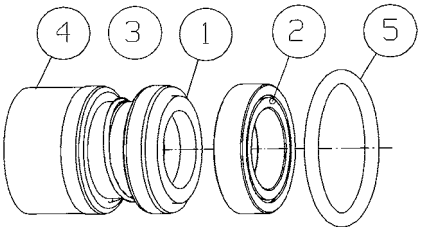
A separate local control panel is available as an accessory for the SC pump. The control panel is equipped with cables which can control and monitor all operations of the SC pump. It makes it easier to set frequency converter parameters if the positioning of the pump makes it difficult to see the keyboard, for example.

Service and spare parts

The pump does not require regular service. The shaft seal is a mechanical seal. It is a part which undergoes wear and which must be replaced if it starts to leak. Please note that the leakage of a few drops per hour can be quite normal, especially when pumping water-glycol mixtures.

Seal kits

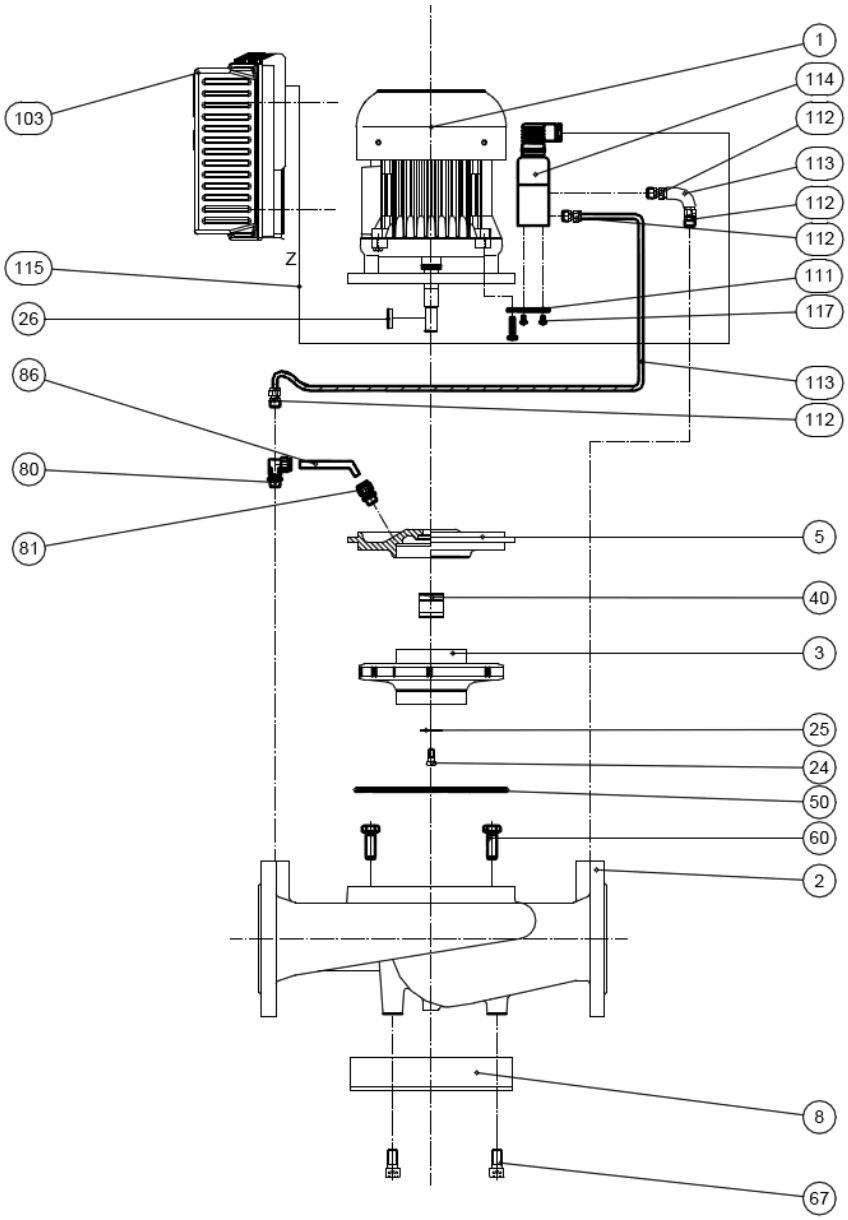
Pump type	Seal mm	Housing O-ring / gasket mm
AE_-25/-26 SC_	12	123x2,5
L_-32A SC_	12	100x2,5
L_-40A SC_, AE_-32/-33 SC_	12	145x2,5
L_-50A SC_	12	150x3
L_-65A SC_, L_-80A SC_, AL_-1102 SC_	18	179,3x5,7



1 Rotating ring
2 Stationary ring
3 Body/bellows
4 Spring
5 O-ring

Bearings in pump motors are pre-lubricated and can withstand several years of continuous use. If a motor malfunction occurs, we recommend replacing the whole motor unit.

Other parts

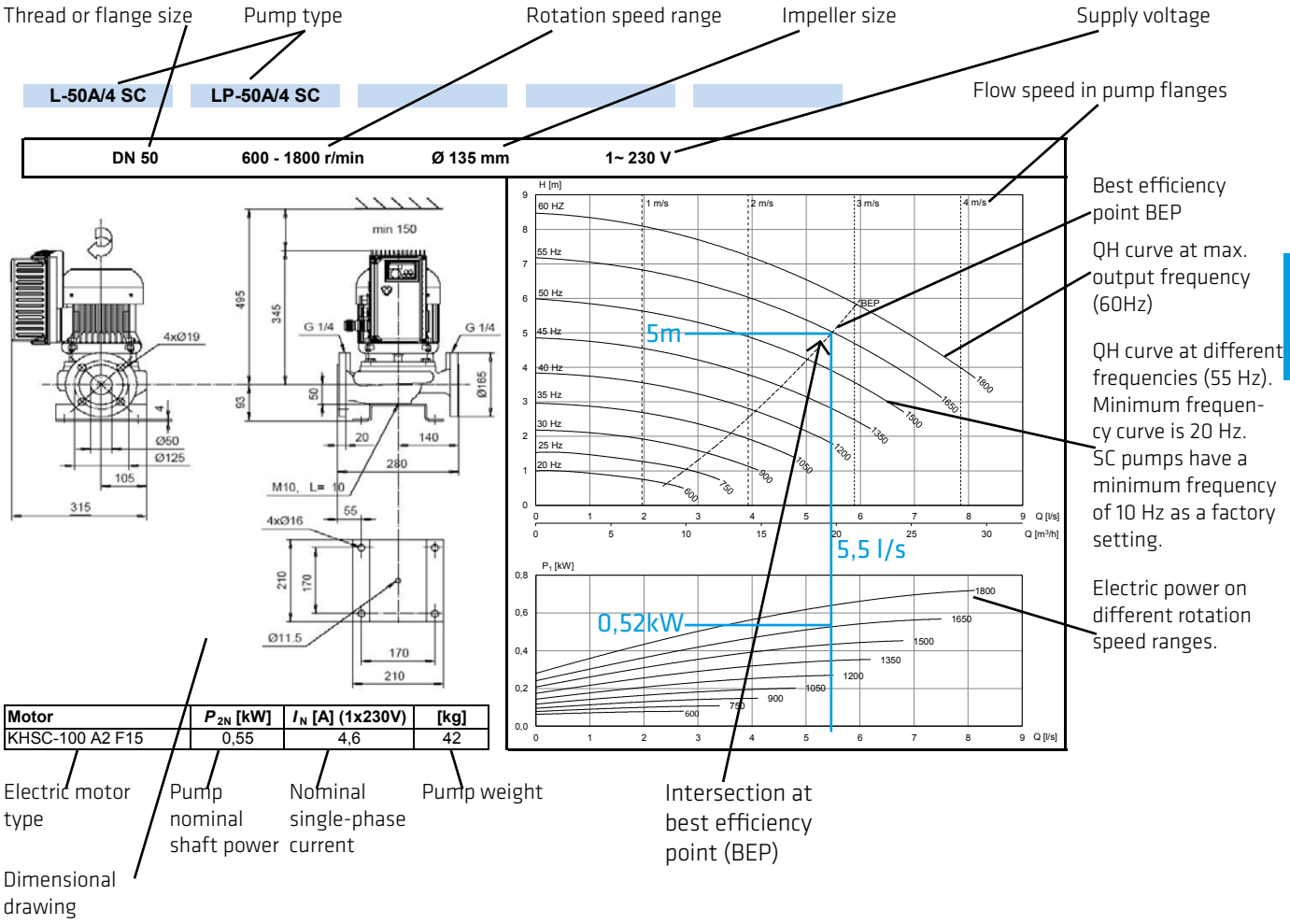


1 Electric motor
2 Pump housing
3 Impeller
5 Sealing flange
8 Foot
24 Screw or nut
25 Washer
26 Key
40 Shaft seal
50 Housing O-ring
60 Nut / Screw
67 Screw
80 Pipe union (LH and ALH series)
81 Pipe union (LH and ALH series)
86 Pipe (LH and ALH series)
103 Frequency converter
111 Fixing plate (SCB, SCC)
112 Pipe joints (SCB, SCC)
113 Pipes (SCB, SCC)
114 Transmitter for differential pressure (SCB, SCC), pressure (SCD) or temperature (SCF)
115 Cable (SCB, SCC, SCD, SCF)
117 Screws (SCB, SCC)

WHEN ORDERING SPARE PARTS, PLEASE STATE THE PUMP TYPE, SERIAL NUMBER, DUTY POINT, IMPELLER SIZE, ELECTRIC MOTOR TYPE AND POWER. THESE CAN BE FOUND ON THE RATING PLATE.

Reading curves:

Characteristic curves apply to +20°C water. Liquids whose viscosity differs from that of water must be taken into account when dimensioning the pump. Please contact Kolmeks for further information.



An example of selecting a pump:

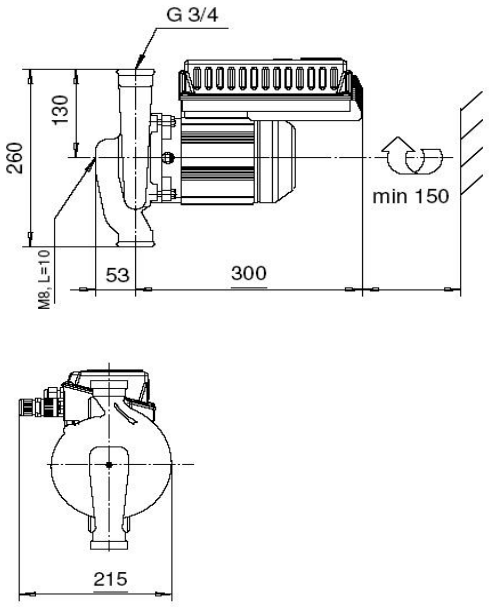
Duty point 5.5 l/s, 50kPa (5m)

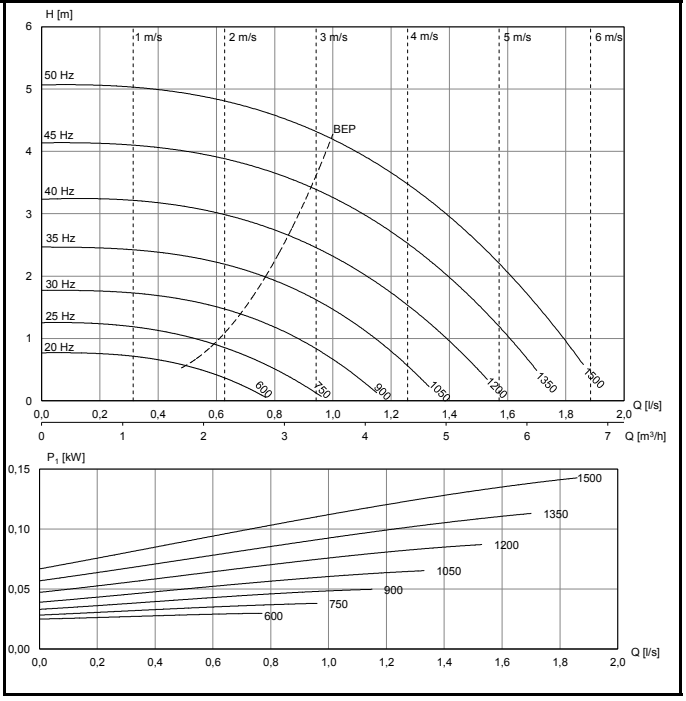
1. Find a pump size with a BEP (best efficiency point) which is as close as possible to the required duty point.
2. Ensure that the output 5.5 l/s and head 5m intersect at the best efficiency point.
3. The best energy efficiency and lowest energy consumption are obtained by following the above steps.
4. If needed, it is possible to read the input power of the device on the P1 curve. In this case, the input power is 0.52 kW at the desired duty point.

NOTE! Liquid density and viscosity affect the amount of power required. Please check that the motor power is sufficient for liquids with a higher density and viscosity than water.

AE-20/4 SC

G 3/4 | **600-1500 r/min** | **Ø 125 mm** | **1~ 230 V**

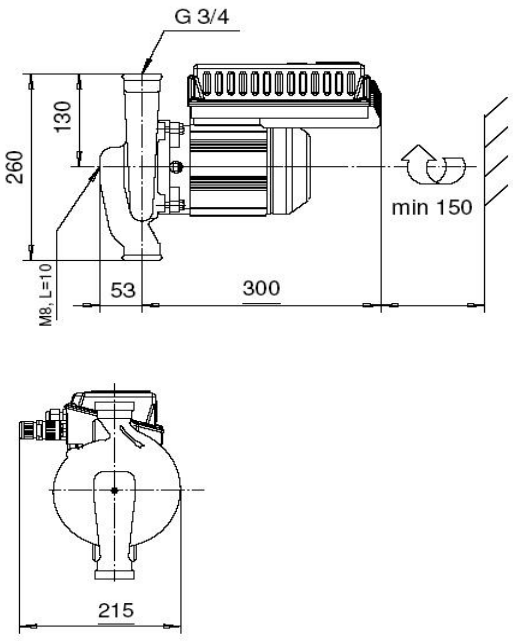


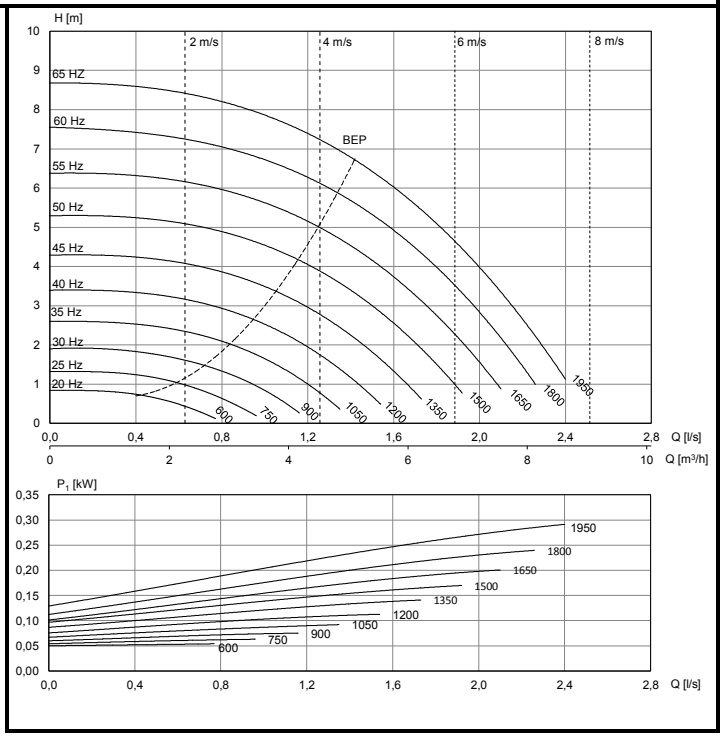


Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
OPSC-742 N12	0,08	1,1	15

AE-20/4 SC

G 3/4 | **600 - 1950 r/min** | **Ø 125 mm** | **1~ 230 V**

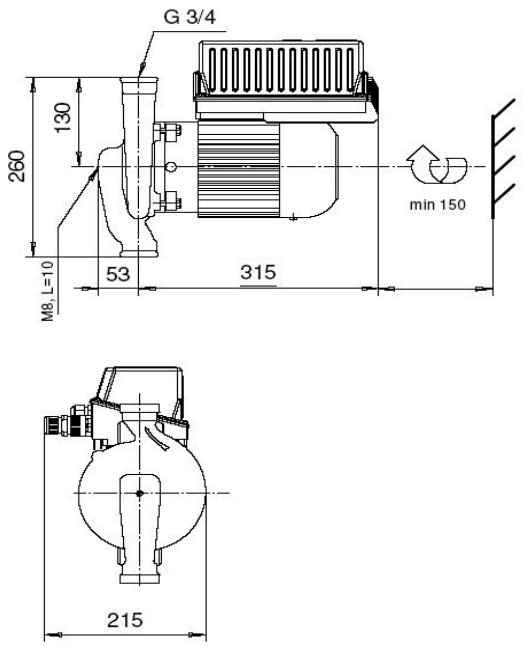


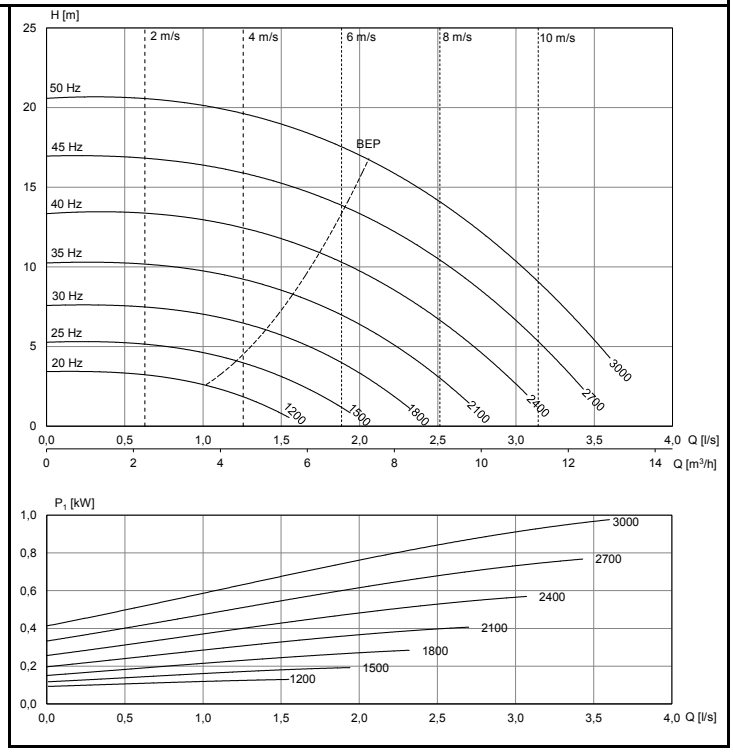


Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
OPSC-752 N12	0,2	2,1	15

AE-20/2 SC

G 3/4	1200 - 3000 r/min	Ø 125 mm	1~ 230 V

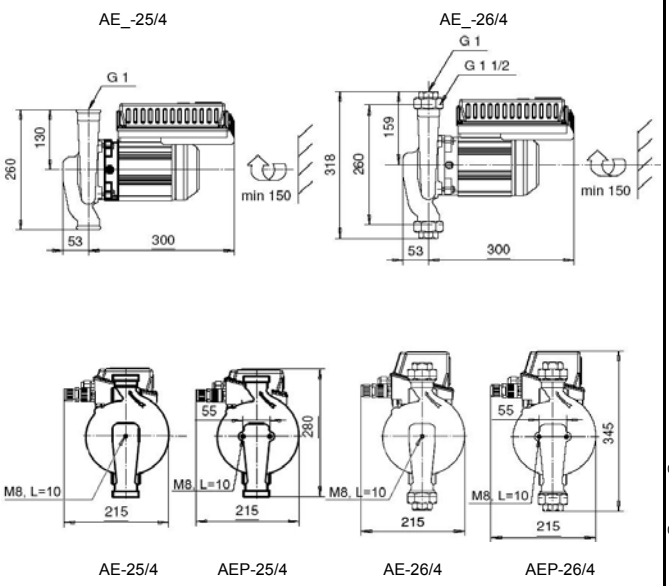


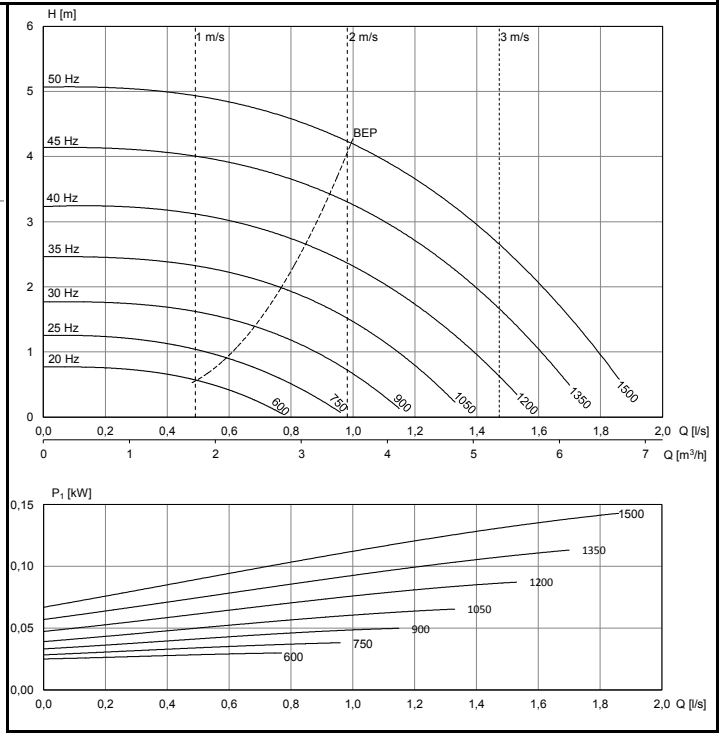


Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
KHSC-841 N12	0,65	6,0	19

AE-25/4 SC | AEP-25/4 SC | AE-26/4 SC | AEP-26/4 SC

G 1	600 - 1500 r/min	Ø 125 mm	1~ 230 V

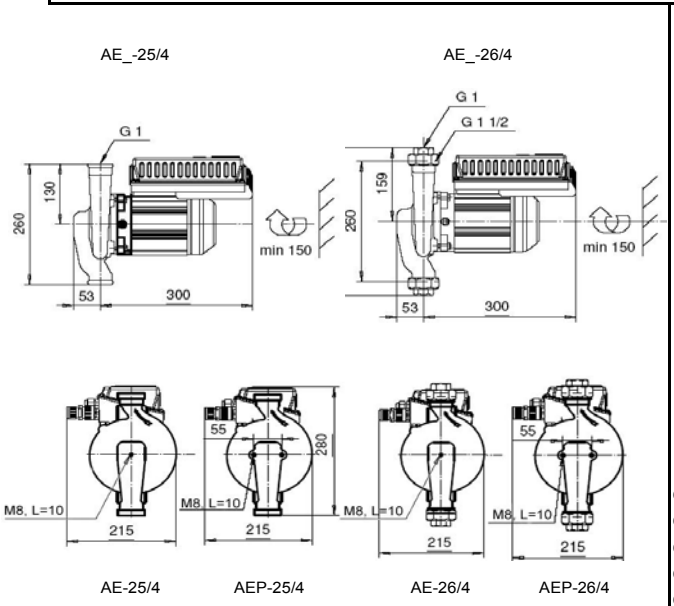




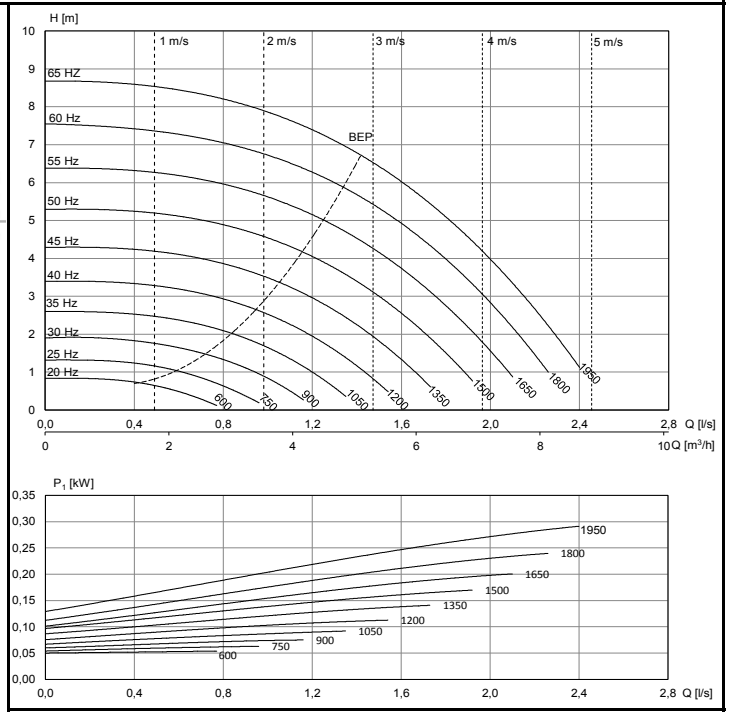
Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
OPSC-742 N12	0,08	1,1	14

AE-25/4 SC | AEP-25/4 SC | AE-26/4 SC | AEP-26/4 SC

G 1 | 600 - 1950 r/min | Ø 125 mm | 1~ 230 V



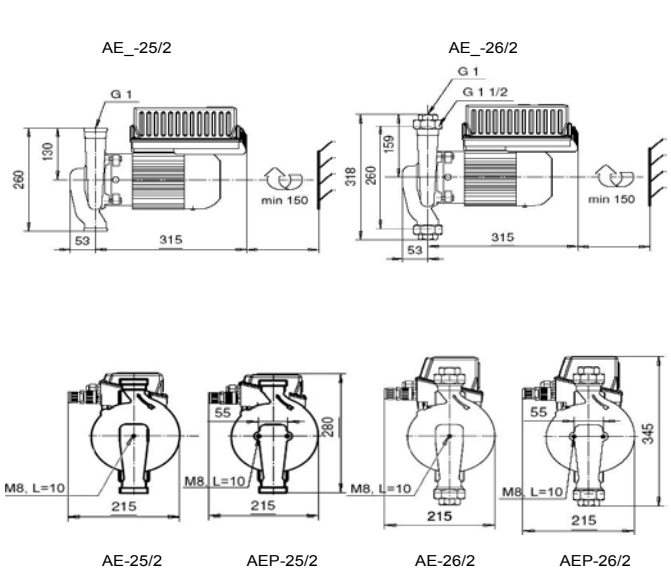
AE-25/4 AEP-25/4 AE-26/4 AEP-26/4



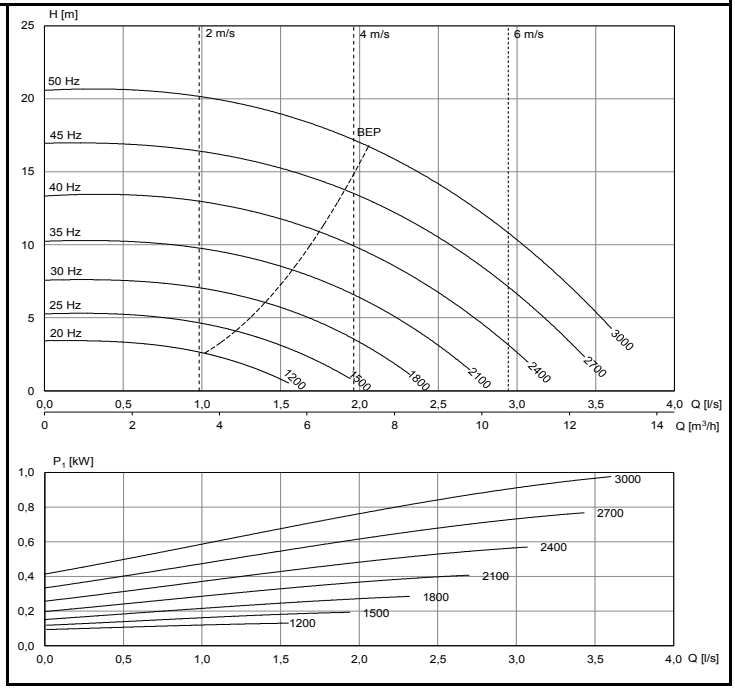
Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
OPSC-752 N12	0,2	2,1	15

AE-25/2 SC | AEP-25/2 SC | AE-26/2 SC | AEP-26/2 SC

G 1 | 1200 - 3000 r/min | Ø 125 mm | 1~ 230 V



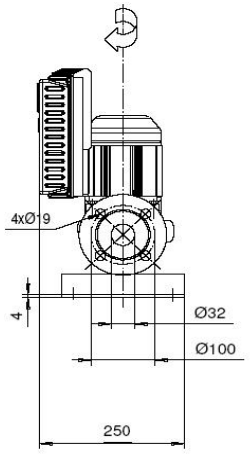
AE-25/2 AEP-25/2 AE-26/2 AEP-26/2

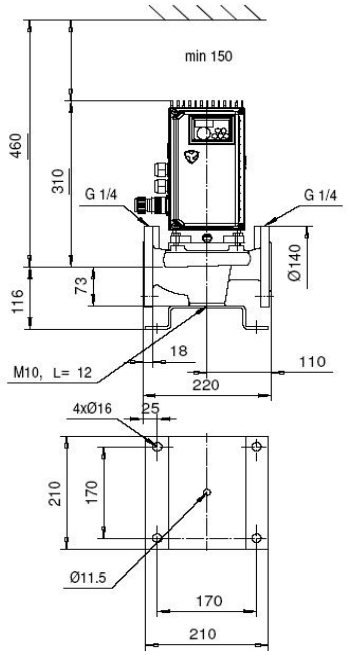


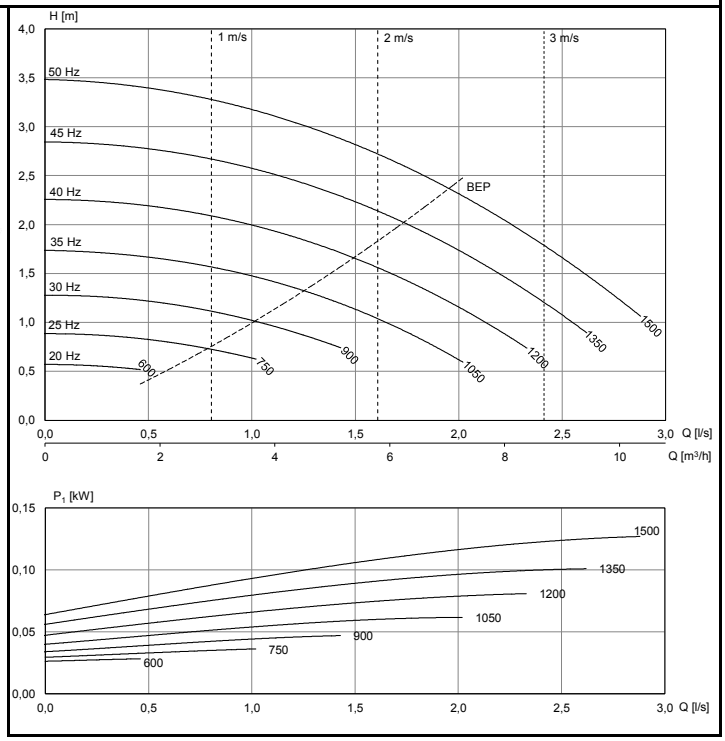
Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
KHSC-841 N12	0,65	6,0	19

L-32A/4 SC

DN 32 | **600 - 1500 r/min** | **Ø 105 mm** | **1~ 230 V**



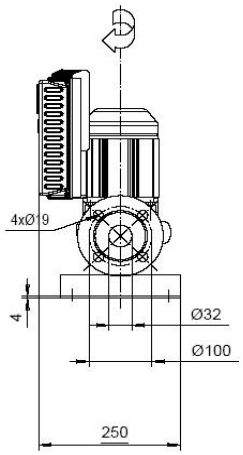


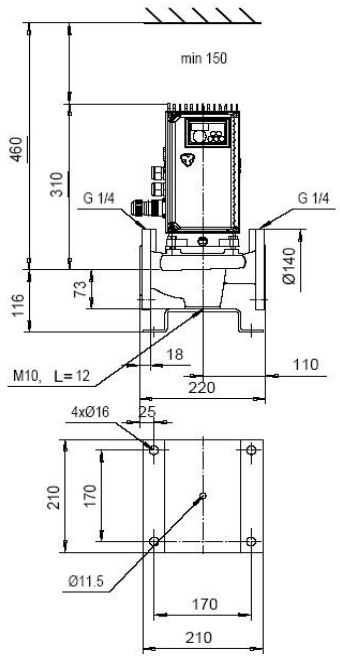


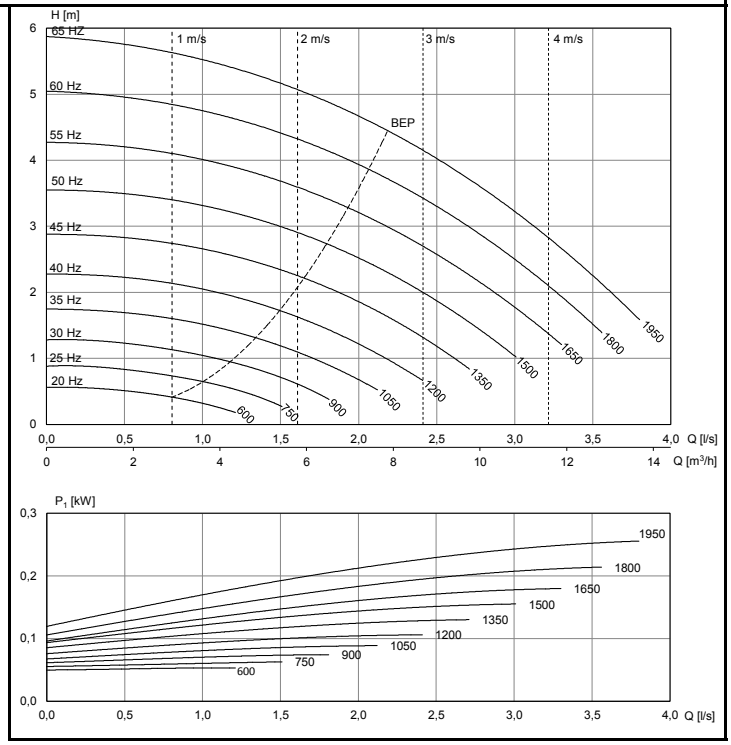
Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
OPSC-742 N12	0,08	1,1	14

L-32A/4 SC

DN 32 | **600 - 1950 r/min** | **Ø 105 mm** | **1~ 230 V**



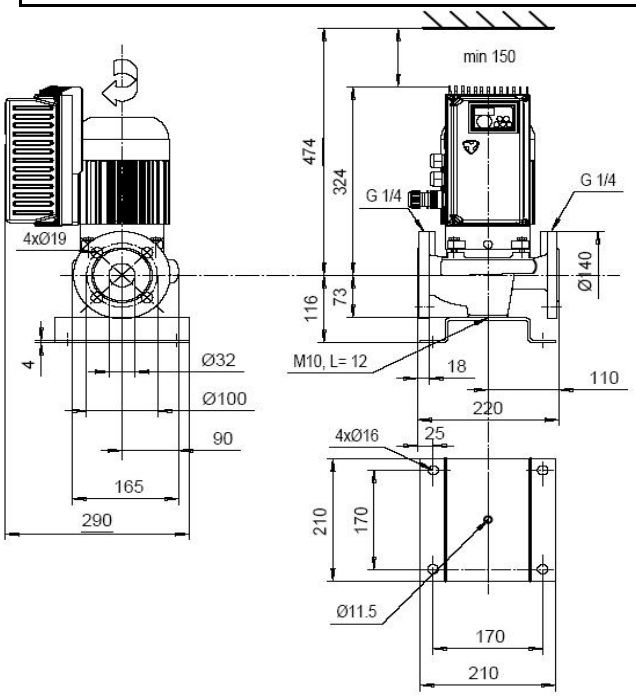


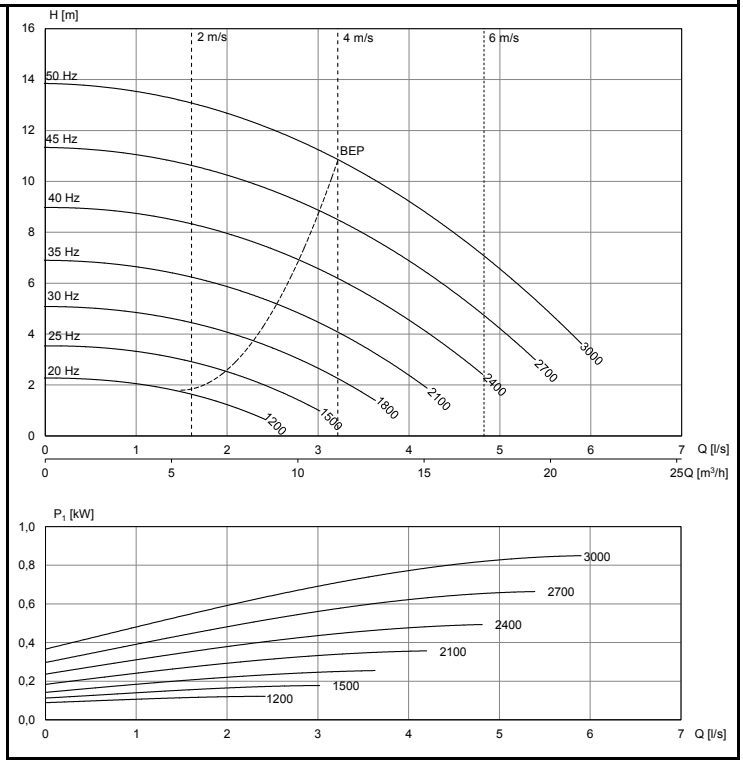


Motor 230V	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
OPSC-752 N12	0,2	2,1	19

L-32A/2 SC

DN 32 | **1200 - 3000 r/min** | **Ø 105 mm** | **1~ 230 V**

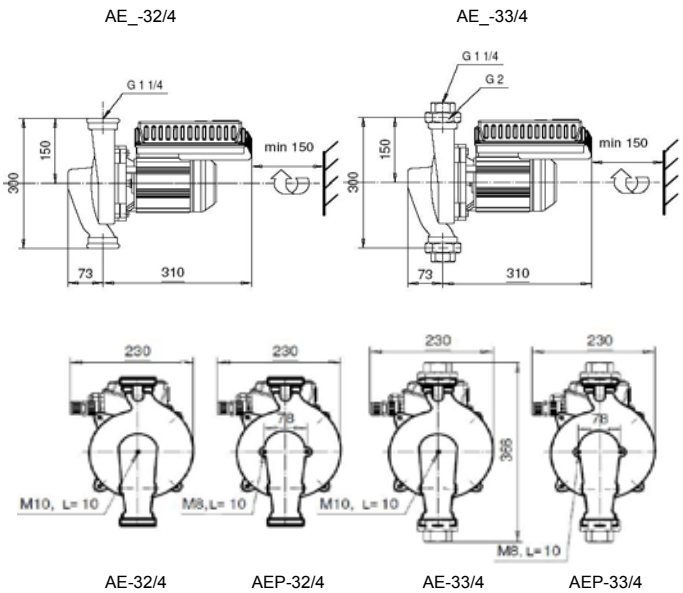


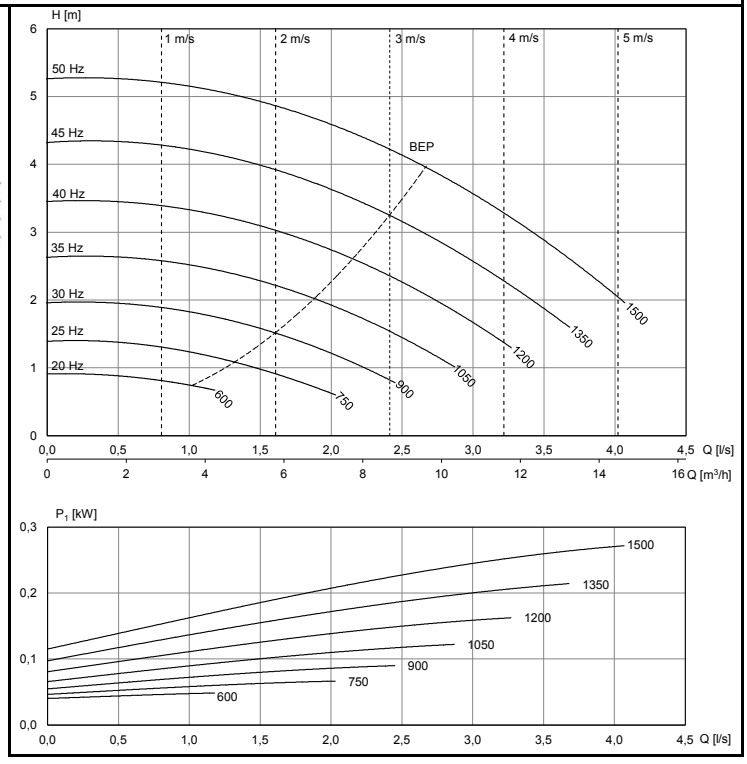


Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
KHSC-841 N12	0,65	6,0	24

AE-32/4 SC | AEP-32/4 SC | AE-33/4 SC | AEP-33/4 SC

G 1 1/4 | **600 - 1500 r/min** | **Ø 130 mm** | **1~ 230 V**

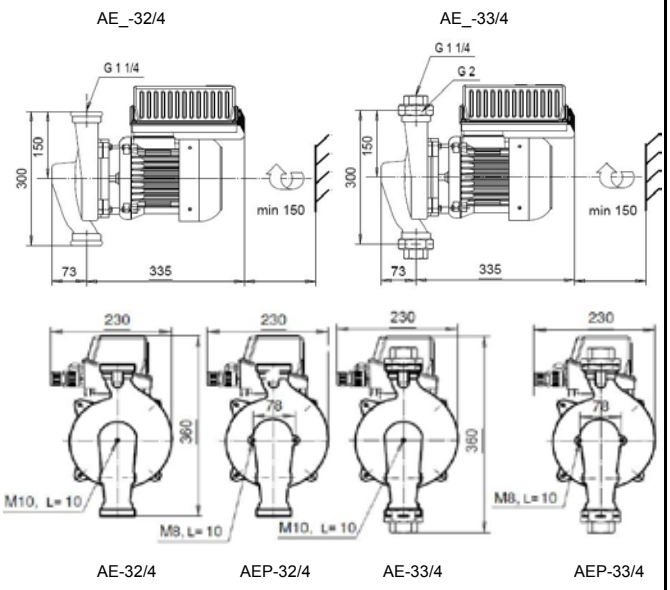


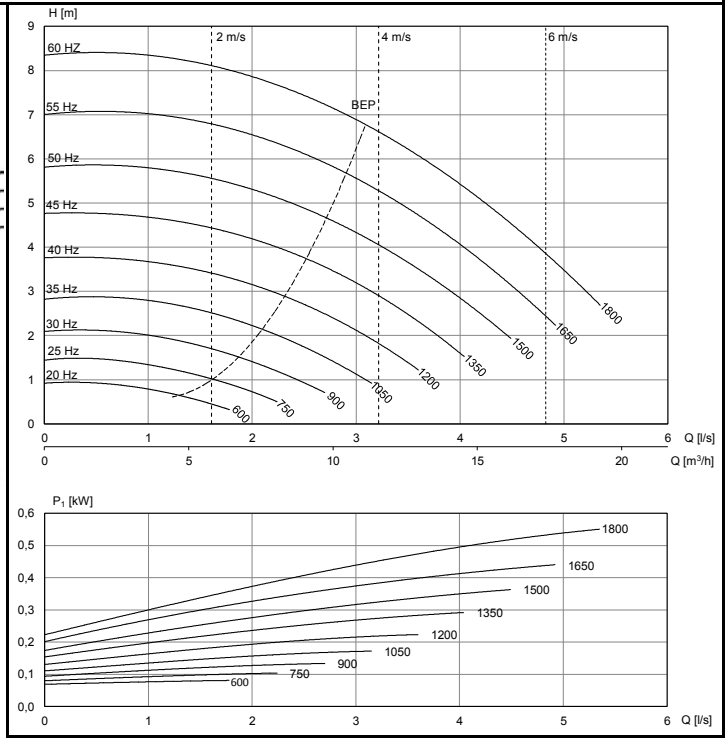


Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
OPSC-752 N13	0,2	2,1	20

AE-32/4 SC | **AEP-32/4 SC** | **AE-33/4 SC** | **AEP-33/4 SC**

G 1 1/4 | **600 - 1800 r/min** | **Ø 135 mm** | **1~ 230 V**

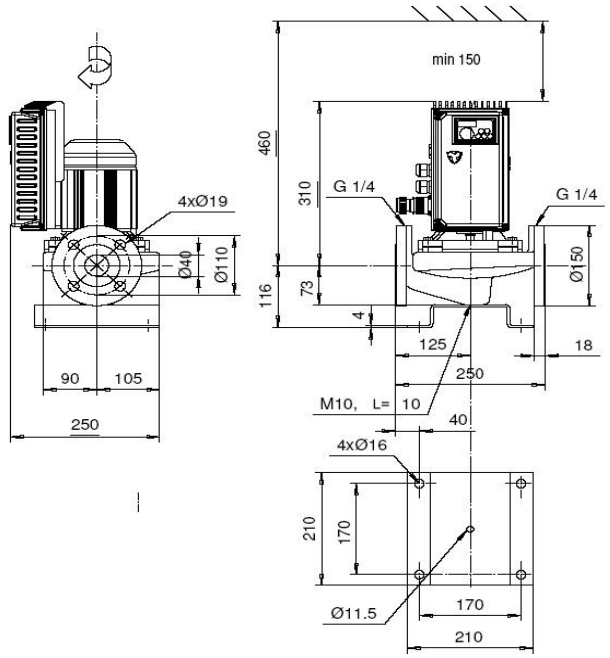


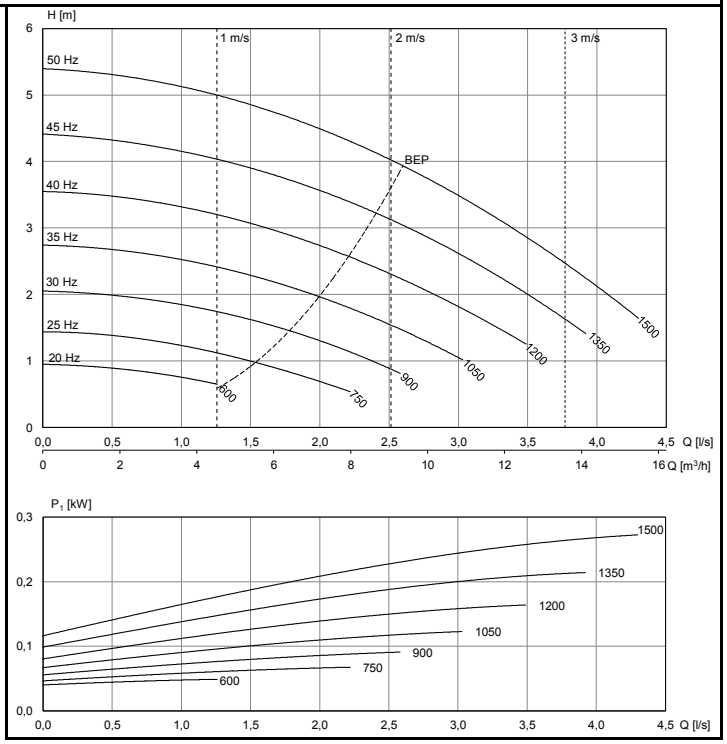


Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
KHSC-100 A2 N13	0,37	3,6	35

L-40A/4 SC

DN 40 | **600 - 1500 r/min** | **Ø 130 mm** | **1~ 230 V**

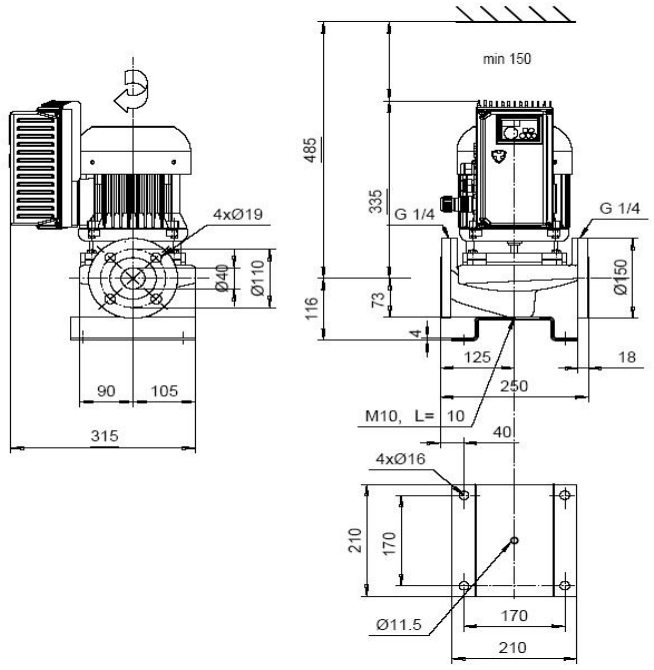


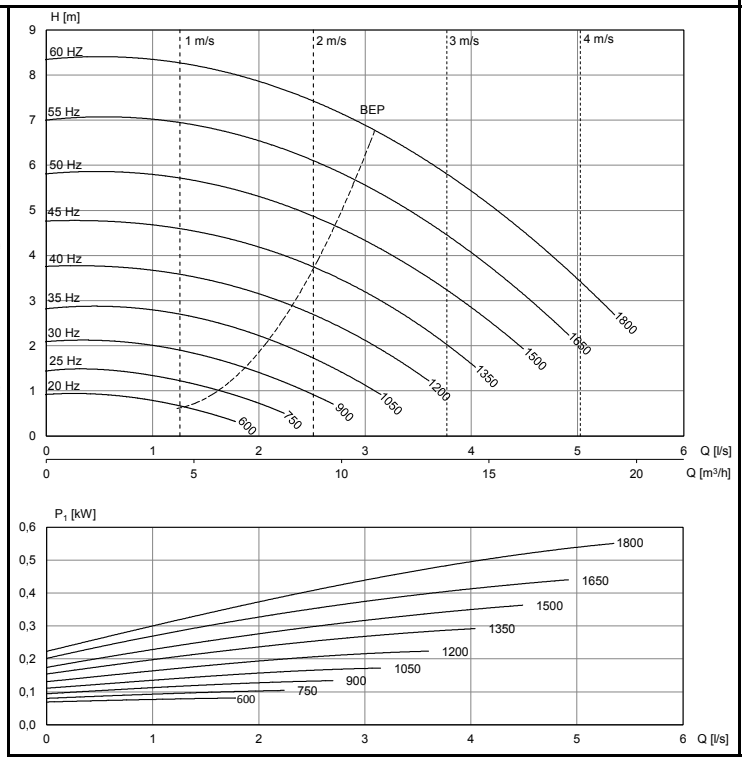


Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
OPSC-752 N13	0,2	2,1	24

L-40A/4 SC

DN 40 | **600 - 1800 r/min** | **Ø 135 mm** | **1~ 230 V**

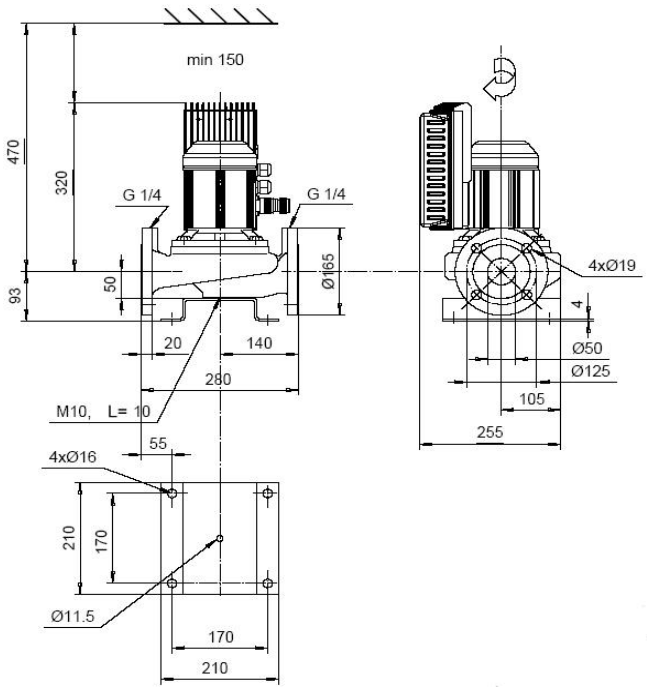


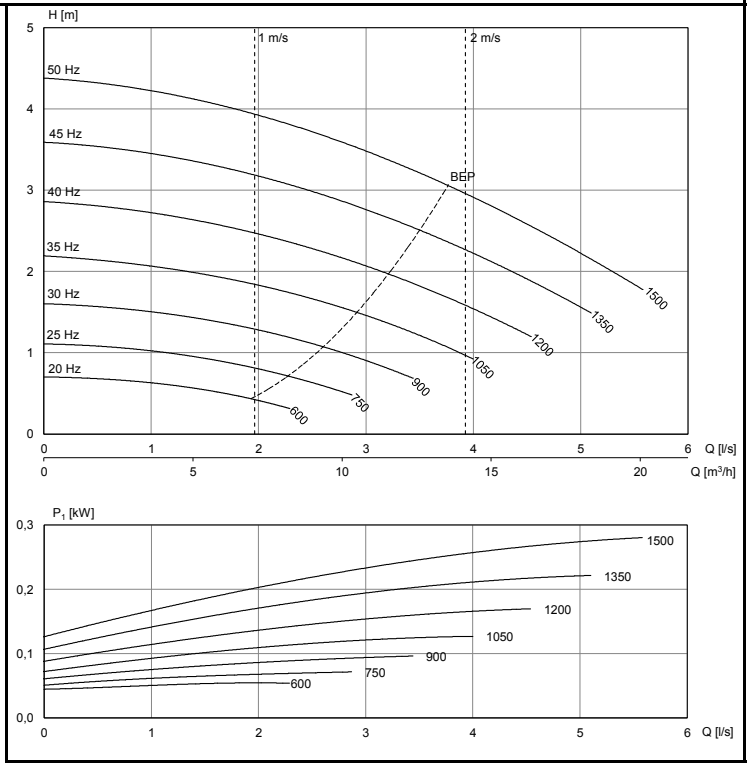


Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
KHSC-100 A2 N13	0,37	3,6	40

L-50A/4 SC | LP-50A/4 SC

DN 50 | **600 - 1500 r/min** | **Ø 120 mm** | **1~ 230 V**

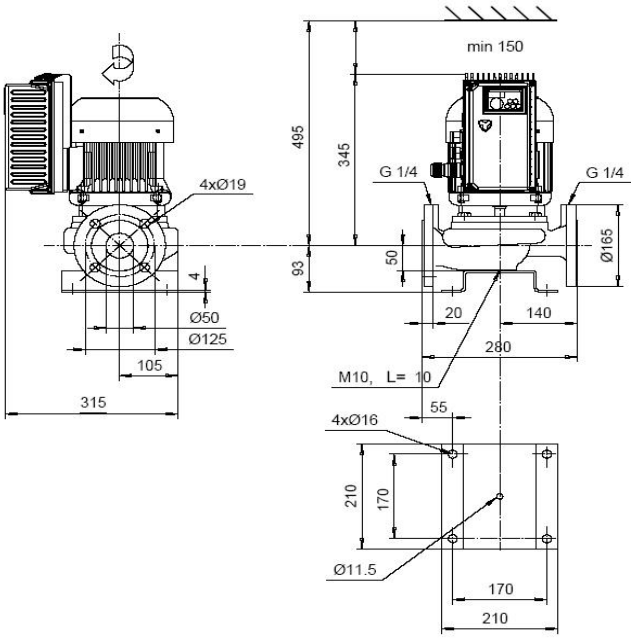


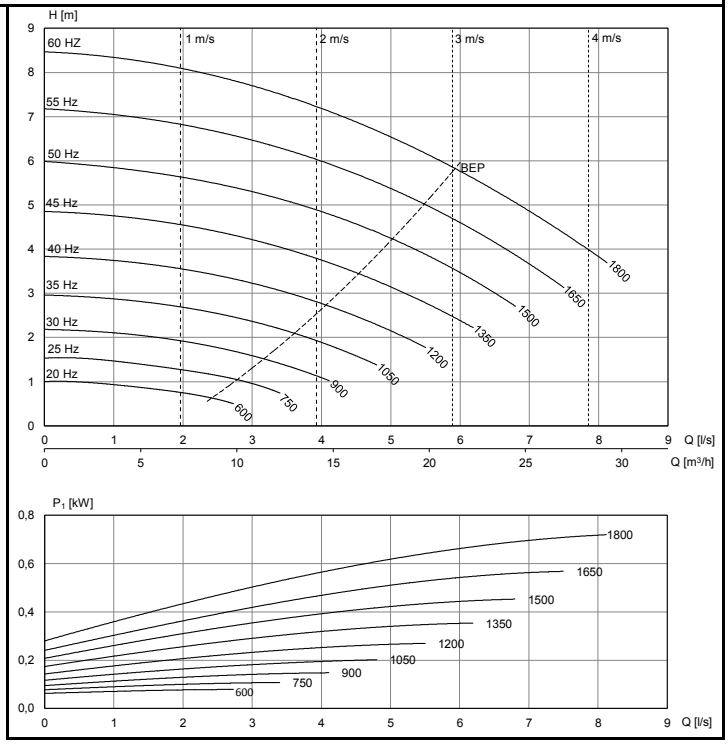


Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
OPSC-752 F15	0,2	2,1	26

L-50A/4 SC **LP-50A/4 SC**

DN 50 **600 - 1800 r/min** **Ø 135 mm** **1~ 230 V**

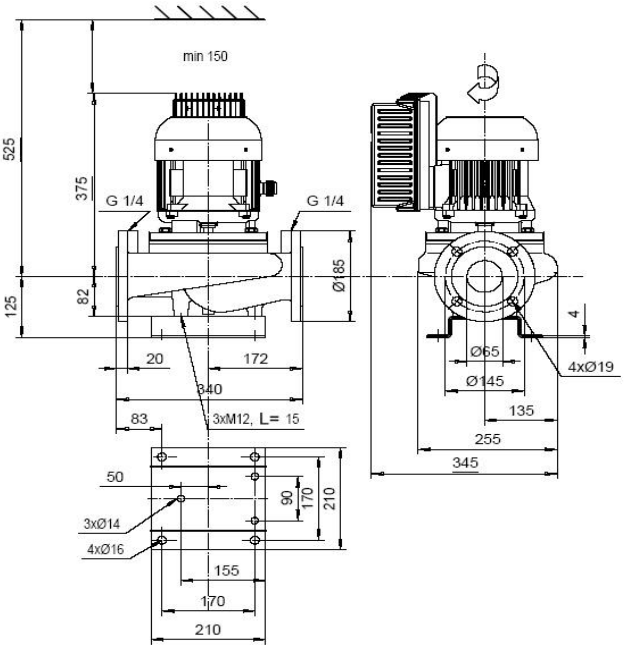


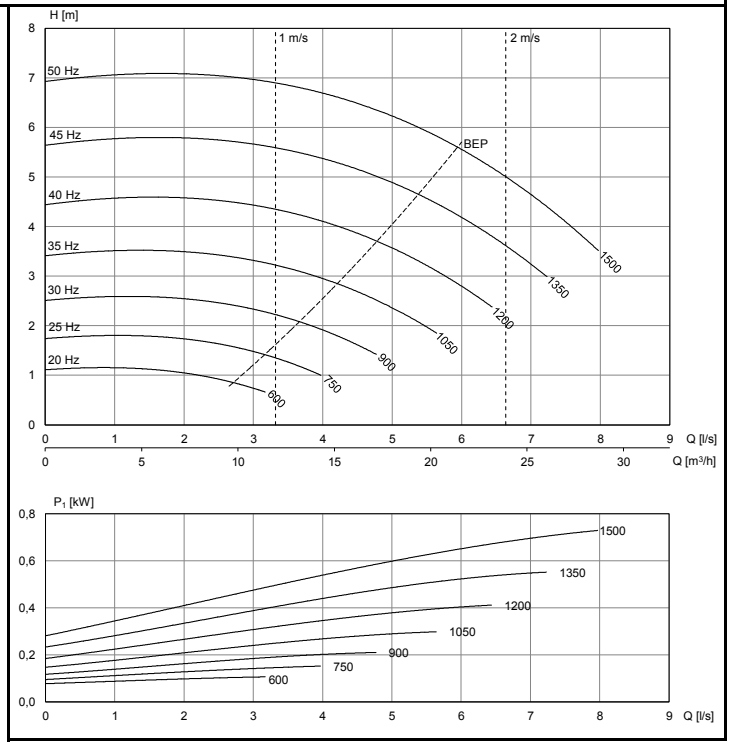


Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
KHSC-100 A2 F15	0,55	4,6	42

L-65A/4 SC **LH-65A/4 SC**

DN 65 **600 - 1500 r/min** **Ø 148 mm** **1~ 230 V**

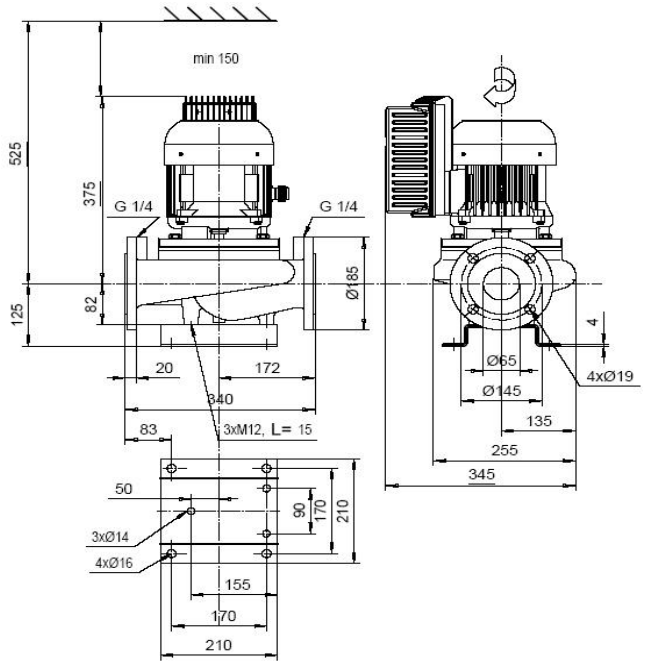


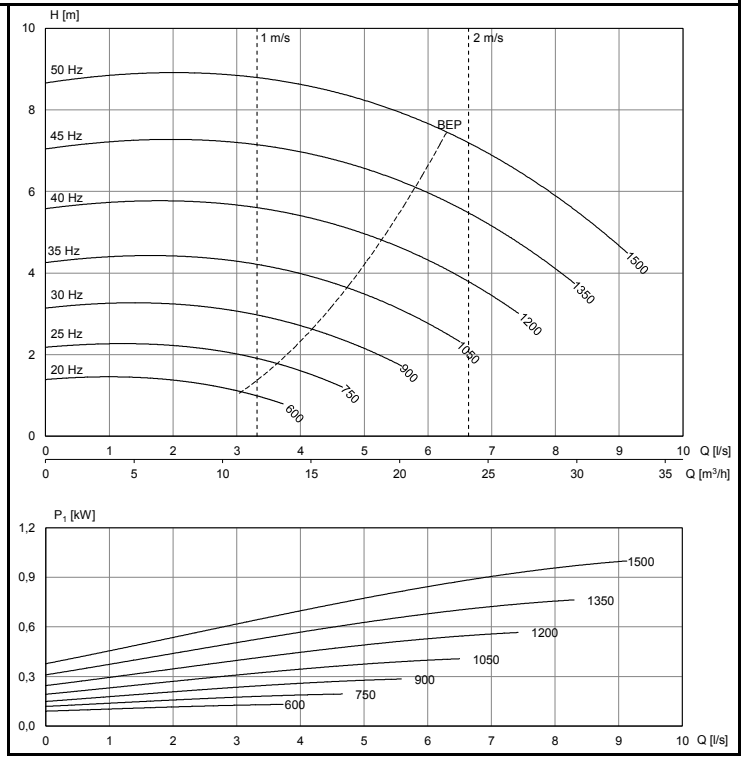


Motor	P_{2N} [kW]	I_N [A]	[kg]
KHSC-100 A2 F19	0,55	4,6	47

L-65A/4 SC | LH-65A/4 SC

DN 65 | 600 - 1500 r/min | Ø 164 mm | 1~ 230 V

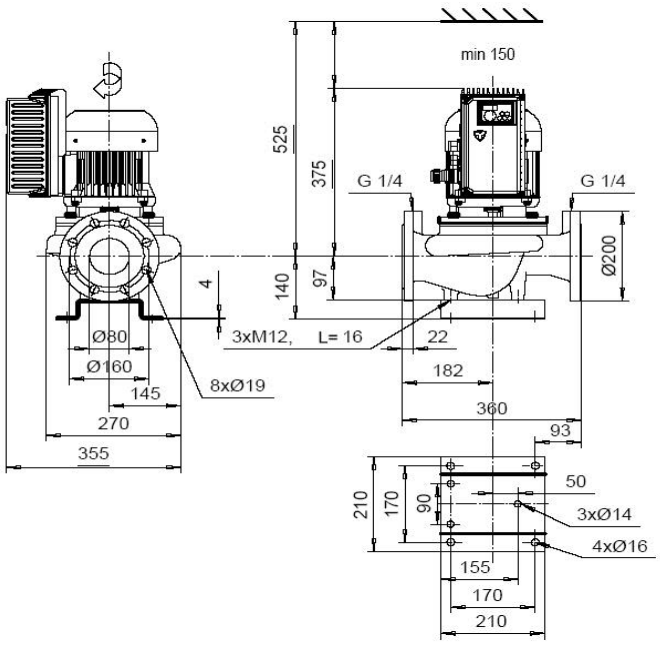


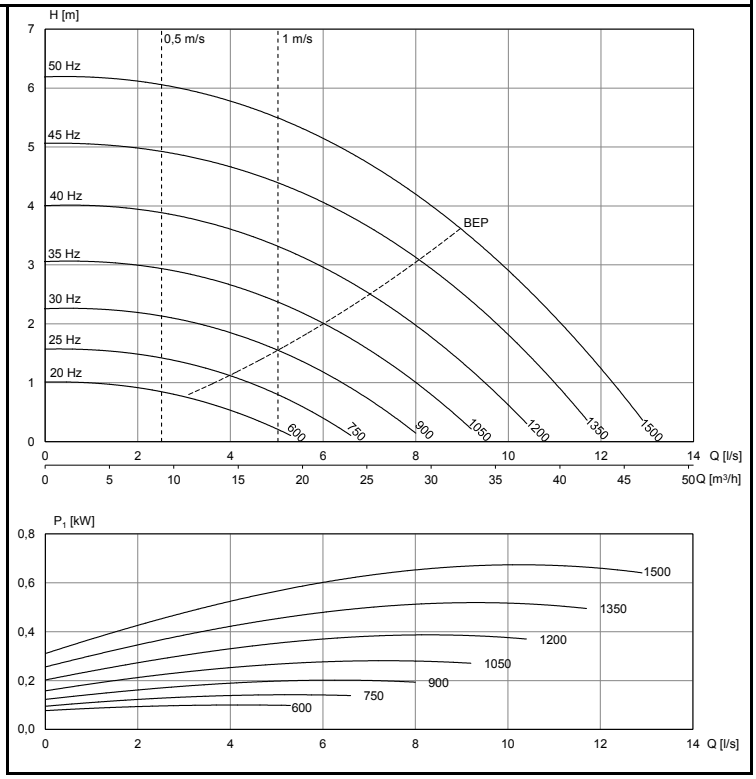


Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
KHSC-100 B2 F19	0,75	6,1	47

L-80A/4 SC | LH-80A/4 SC

DN 80 | 600 - 1500 r/min | Ø 147 mm | 1~ 230 V

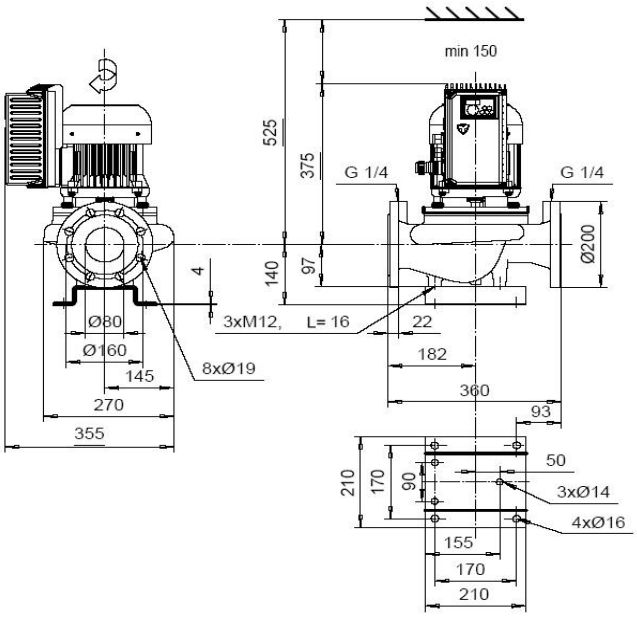


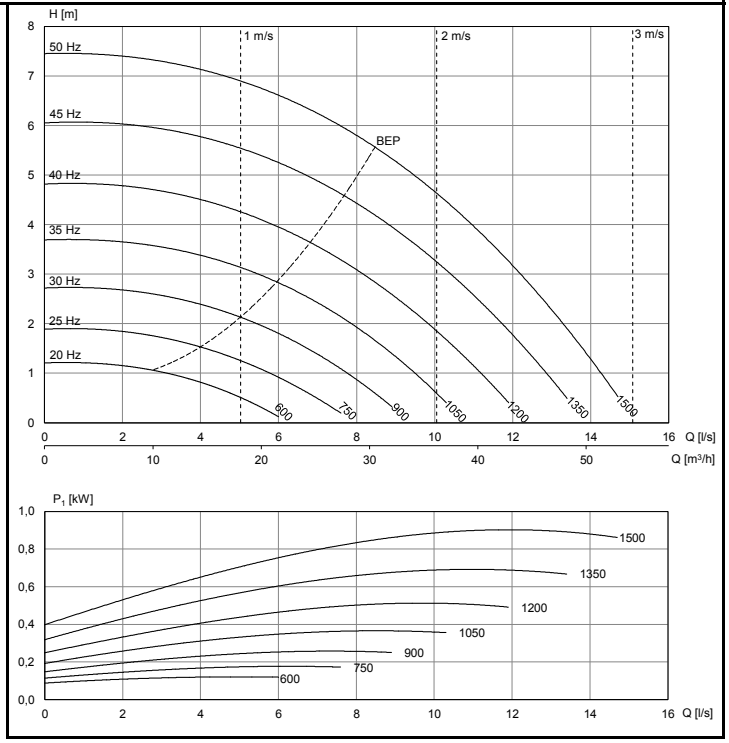


Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
KHSC-100 A2 F19	0,55	4,6	48

L-80A/4 SC **LH-80A/4 SC**

DN 80	600 - 1500 r/min	Ø 158 mm	1~ 230 V

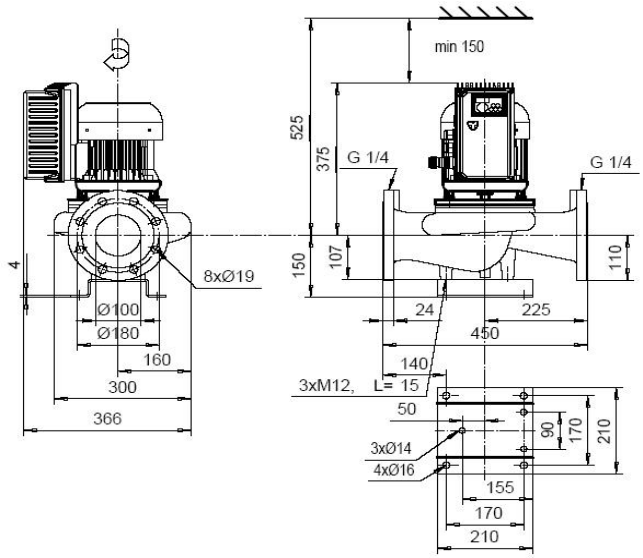


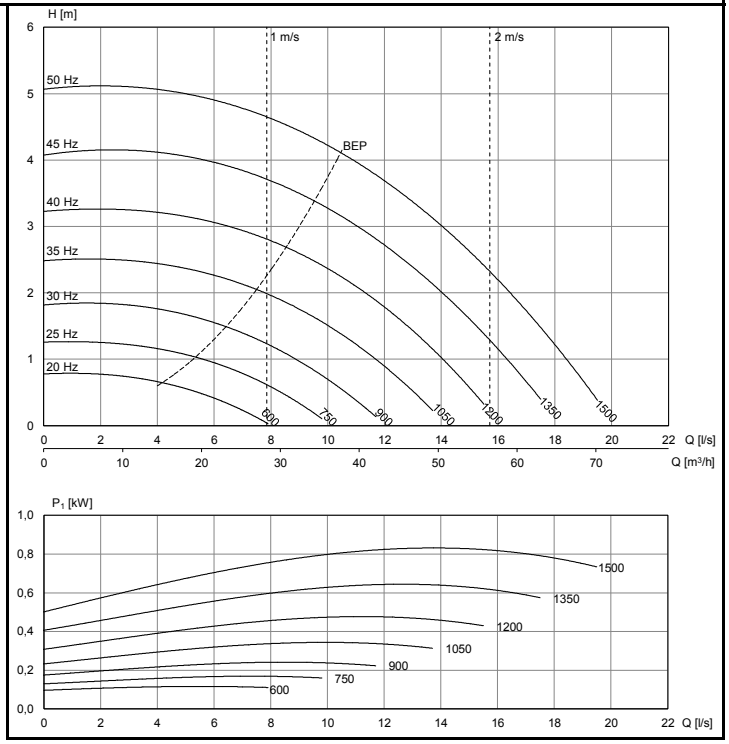


Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
KHSC-100 B2 F19	0,75	6,1	48

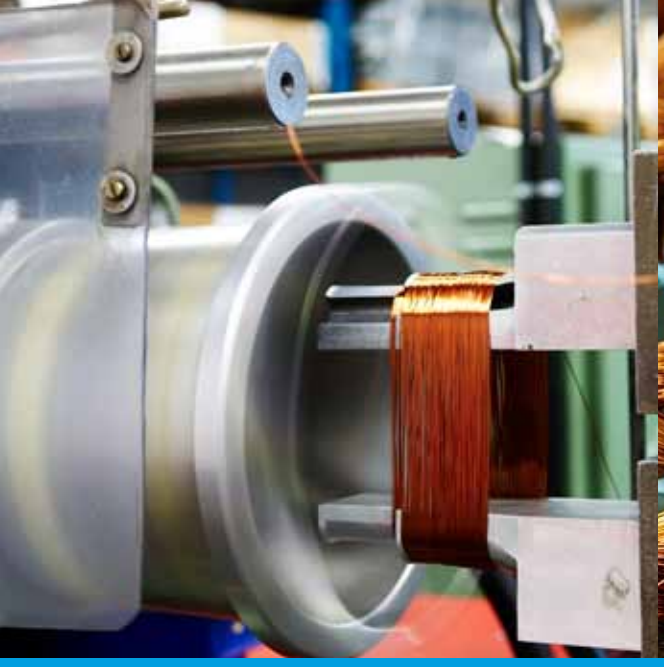
AL-1102/4 SC **ALH-1102/4 SC** **ALP-1102/4 SC** **ALS-1102/4 SC**

DN 100	600 - 1500 r/min	Ø 142 mm	1~ 230 V





Motor	P_{2N} [kW]	I_N [A] (1x230V)	[kg]
KHSC-100 B2 F19	0,75	6,1	59



KOLMEKS
EFFICIENT RELIABILITY

INLINE PUMPS WITH FIXED-SPEED MOTOR, 3x400V

AE-series, threaded G3/4 - G1$^{1}/_{4}$

L_-, AL_- and AKN-series, flanged DN32 - DN300

www.kolmeks.com

General technical data

AE series pumps:

- Centrifugal pumps equipped with thread connections.
- Pumps can be used as circulation, pressure boosting and transfer pumps for clean liquids.

L, AL and AKN series pumps:

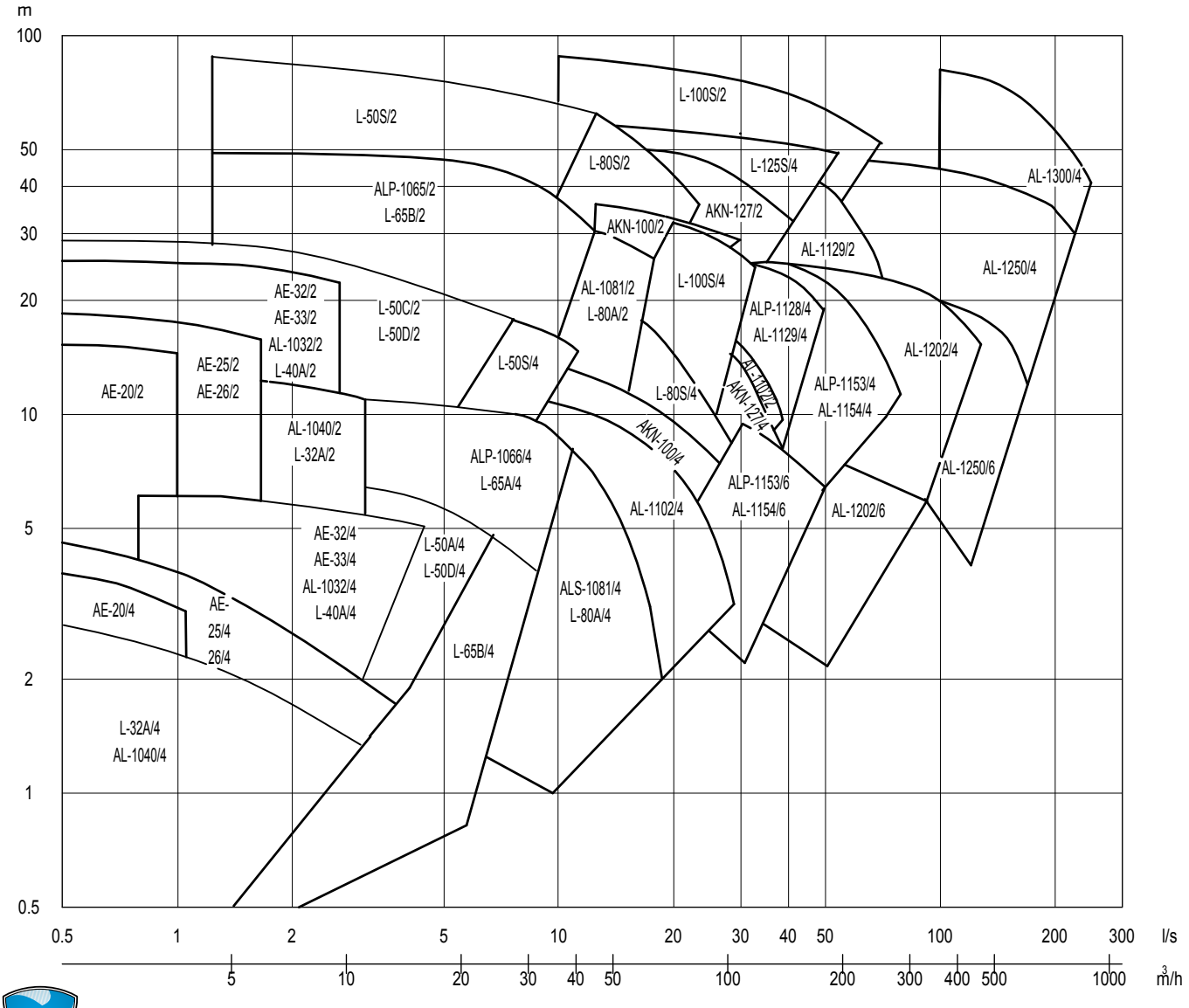
- Inline centrifugal pumps equipped with flange connections.

Applications:

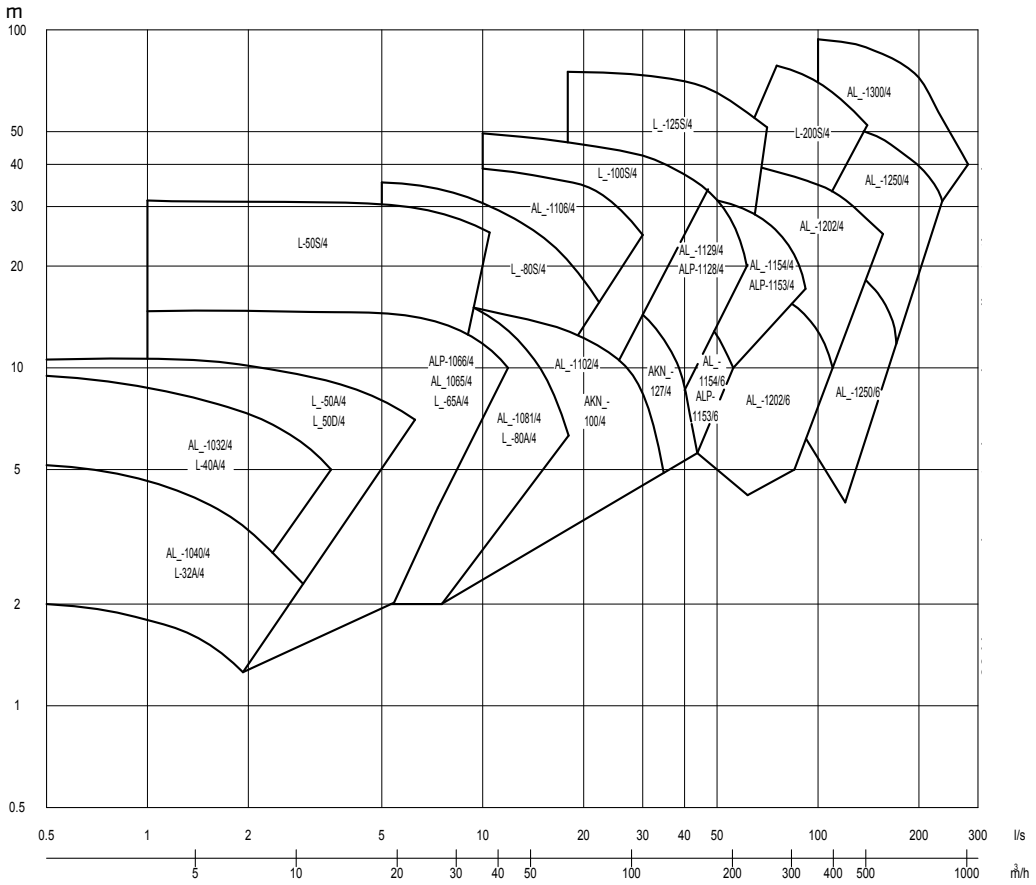
- Grey cast iron (L, AL and AKN) pumps can be used as circulation, pressure boosting and transfer pumps for clean liquids.
- Nodular cast iron (LH, ALH and AKNH) pumps can be used in power plants and as pressure boosting pumps for primary district heating.
- Bronze (LP and ALP) pumps can be used as domestic hot water, circulation, pressure boosting and transfer pumps for clean oxygen-rich and some slightly aggressive liquids.
- Stainless steel AISI316 (LS and ALS) pumps can be used as circulation, pressure boosting and transfer pumps for acid and alkaline liquids.

Note! The suitability of materials and seals for the liquid to be pumped must always be confirmed when selecting a pump.

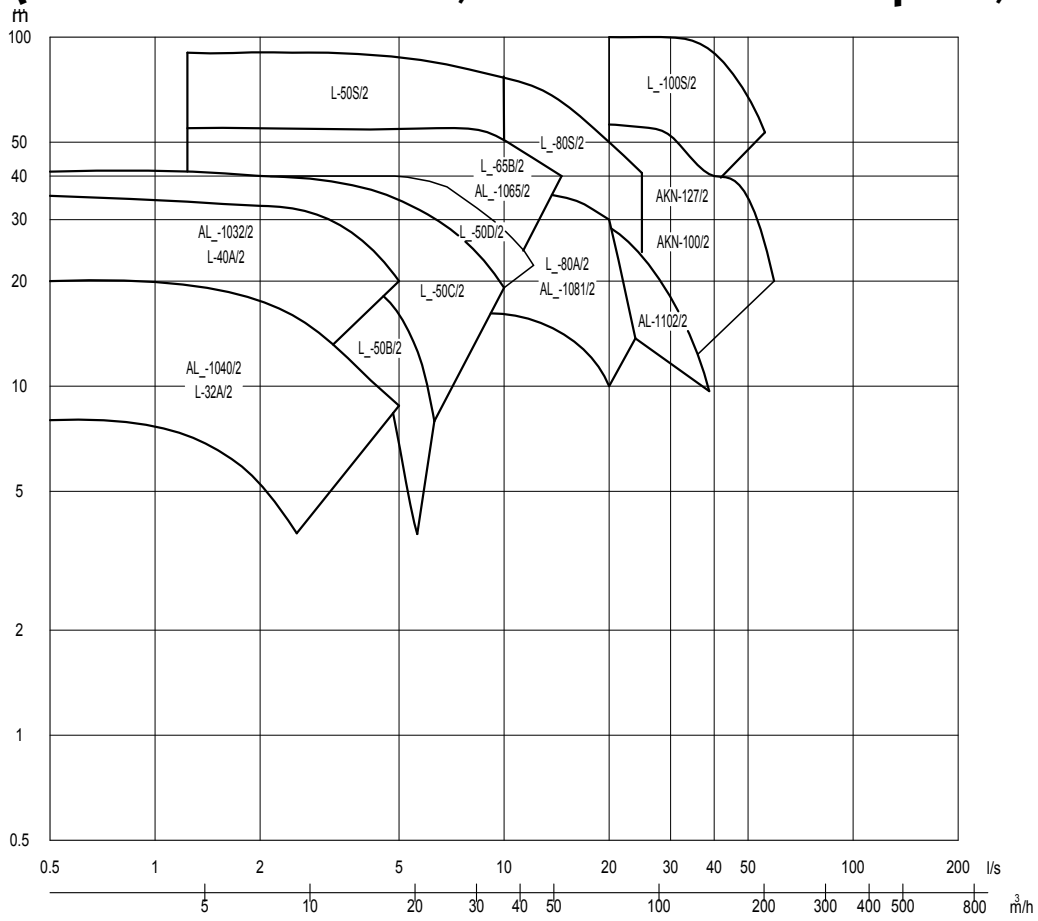
Quick Selection Chart AE-, L- and AKN-series, 50Hz



Quick Selection Chart L-, AL- and AKN-series 4- ja 6-poles, 60Hz



Quick Selection Chart L-, AL- and AKN-series 2-poles, 60Hz



4

Standard materials and fields of application AE_- / L_- / AL_- / AKN_-pumps

Connection G or DN	Grey cast iron EN-GJL-200, PN10	Nodular cast iron EN-GJS-400, PN16	Bronze CuSn10Zn2, PN10	Stainless steel AISI 316, PN 16	Stainless steel SS 2378-254 SMO	Shaft seal, PN10 Ø [mm], materials	O-ring Size [mm]	O-ring Material	Motor [kW]
G 3/4	AE-20/4	no	no	no	no	12, carbon/SiC Viton	123 X 2,5	NBR	0,03-0,08
- " -	AE-20/2	no	no	no	no	12, carbon/SiC Viton	123 X 2,5	NBR	0,25-1,1
G 1	AE-25/4, -26/4	no	AEP-25/4, -26/4	no	no	12, carbon/SiC Viton	123 X 2,5	NBR	0,05-0,08
- " -	AE-25/2, -26/2	no	AEP-25/2, -26/2	no	no	12, carbon/SiC Viton	123 X 2,5	NBR	0,25-1,1
G 1 1/4	AE-32/4, -33/4	no	AEP-32/4, -33/4	no	no	12, carbon/SiC Viton	145 X 2,5	NBR	0,2-0,37
- " -	AE-32/2, -33/2	no	AEP-32/2, -33/2	no	no	12, carbon/SiC Viton	145 X 2,5	NBR	1,1-1,5
DN 32	L-32/4	no	no	no	no	12, carbon/SiC EPDM	100 X 2,5	NBR	0,05-0,2
	L-32/2	no	no	no	no	12, carbon/SiC EPDM	100 X 2,5	NBR	0,25-1,1
	no	no	no	ALS-1032/4	no	12, carbon/SiC EPDM	145 X 2,5	NBR	0,2-0,37
	no	no	no	ALS-1032/2	no	12, carbon/SiC EPDM	145 X 2,5	NBR	1,1-1,5
DN 40	no	no	no	ALS-1040/4	no	12, carbon/SiC EPDM	100 X 2,5	NBR	0,05-0,2
	no	no	no	ALS-1040/2	no	12, carbon/SiC EPDM	100 X 2,5	NBR	0,25-1,1
	L-40A/4	no	no	no	no	12, carbon/SiC EPDM	145 X 2,5	NBR	0,2-0,37
	L-40A/2	no	no	no	no	12, carbon/SiC EPDM	145 X 2,5	NBR	1,1-1,5
DN 50	L-50A/4	no	LP-50A/4	no	no	12, carbon/SiC EPDM	150 X 3	NBR	0,2-0,55
	L-50B/2	no	LP-50B/2	no	no	12, carbon/SiC EPDM	150 X 3	NBR	1,1
	no	LH-50D/4	no	no	no	18, carbon/SiC EPDM	150 X3	NBR	0,37-0,55
	L-50D/2	LH-50D/2	LP-50D/2	no	no	18, carbon/SiC EPDM	150 X 3	NBR	1,5-4
	L-50C/2	LH-50C/2	LP-50C/2	no	no	18, carbon/SiC EPDM	150 X 3	NBR	1,5-4
	L-50S/4	LH-50S/4	no	no	no	28, carbon/SiC EPDM	265 X 4	EPDM	1,1-5,5
	L-50S/2	LH-50S/2	no	no	no	28, carbon/SiC EPDM	265 X 4	EPDM	5,5-18,5
DN 65	L-65A/4	LH-65A/4	no	no	no	18, carbon/SiC EPDM	179,3 X 5,7	EPDM	0,2-3
	no	no	no	LS-65B/4	no	18, carbon/SiC EPDM	179,3 X 5,7	EPDM	0,2-3
	L-65B/2	LH-65B/2	no	LS-65B/2	no	18, carbon/SiC EPDM	179,3 X 5,7	EPDM	1,5-7,5
	no	no	ALP-1066/4	no	no	18, carbon/SiC EPDM	179,3 X 5,7	EPDM	0,37-3
	no	no	ALP-1065/2	no	no	18, carbon/SiC EPDM	179,3 X 5,7	EPDM	1,5-7,5
DN 80	L-80A/4	LH-80A/4	no	no	no	18, carbon/SiC EPDM	179,3 X 5,7	EPDM	0,37-3
	L-80A/2	LH-80A/2	no	no	no	18, carbon/SiC EPDM	179,3 X 5,7	EPDM	2,2-7,5
	no	no	no	ALS-1081/4	no	18, carbon/SiC EPDM	179,3 X 5,7	EPDM	0,37-3
	no	no	no	ALS-1081/2	no	18, carbon/SiC EPDM	179,3 X 5,7	EPDM	2,2-7,5
	L-80S/4	LH-80S/4	no	no	no	28, carbon/SiC EPDM	265 X 4	EPDM	1,1-7,5
	L-80S/2	LH-80S/2	no	no	no	28, carbon/SiC EPDM	265 X 4	EPDM	7,5-18,5
DN 100	AL-1102/4	ALH-1102/4	ALP-1102/4	ALS-1102/4	no	18, carbon/SiC EPDM	179,3 X 5,7	EPDM	0,55-3
	AL-1102/2	ALH-1102/2	ALP-1102/2	ALS-1102/2	no	18, carbon/SiC EPDM	179,3 X 5,7	EPDM	4-7,5
	AKN-100/4	AKNH-100/4	no	no	no	25, carbon/SiC EPDM	240 X 3	NBR	1,5-3
	AKN-100/2	AKNH-100/2	no	no	no	25, carbon/SiC EPDM	240 X 3	NBR	7,5-22
	AL-1106/4	ALH-1106/4	no	ALS-1106/4	no	32, carbon/SiC EPDM	309/295X1	gasket	3-18,5
	L-100S/4	LH-100S/4	LP-100S/4	no	no	32, carbon/SiC EPDM	315 x 6,3	EPDM	3-22
	L-100S/2	LH-100S/2	LP-100S/2	no	no	32, carbon/SiC EPDM	315 x 6,3	EPDM	15-37
	L-100S/2	LH-100S/2	LP-100S/2	no	no	40, carbon/SiC EPDM	315 x 6,3	EPDM	45
DN 125	AKN-127/4	AKNH-127/4	no	no	no	32, carbon/SiC EPDM	240 X 3	NBR	4-11
	AKN-127/2	AKNH-127/2	no	no	no	32, carbon/SiC EPDM	240 X 3	NBR	11-22
	AL-1129/4	ALH-1129/4	no	ALS-1129/4	ALM-1129/4	32, carbon/SiC EPDM	309/295X1	gasket	3-22
	AL-1129/2	ALH-1129/2	no	ALS-1129/2	ALM-1129/2	32, carbon/SiC EPDM	309/295X1	gasket	30-37
	no	no	ALP-1128/4	no	no	32, carbon/SiC EPDM	309/295X1	gasket	3-22
	no	no	ALP-1128/2	no	no	32, carbon/SiC EPDM	309/295X1	gasket	30-37
	L-125S/4	LH-125S/4	no	LS-125S/4	no	40, carbon/SiC EPDM	405 X 7	EPDM	18,5-37
	L-125S/4	LH-125S/4	no	LS-125S/4	no	50, carbon/SiC EPDM	405 X 7	EPDM	45-55
DN 150	no	no	ALP-1153/6	no	no	32, carbon/SiC EPDM	309/295X1	gasket	5,5-11
	no	no	ALP-1153/4	no	no	32, carbon/SiC EPDM	309/295X1	gasket	4-30
	AL-1154/6	ALH-1154/6	no	ALS-1154/6	ALM-1154/6	32, carbon/SiC EPDM	309/295X1	gasket	5,5-11
	AL-1154/4	ALH-1154/4	no	ALS-1154/4	ALM-1154/4	32, carbon/SiC EPDM	309/295X1	gasket	4-30
DN 200	AL-1202/6	ALH-1202/6	ALP-1202/6	ALS-1202/6	ALM-1202/6	32, carbon/SiC EPDM	315 x 6,3	EPDM	4-11
	AL-1202/6	ALH-1202/6	ALP-1202/6	ALS-1202/6	ALM-1202/6	40, carbon/SiC EPDM	315 x 6,3	EPDM	15-18,5
	AL-1202/4	ALH-1202/4	ALP-1202/4	ALS-1202/4	ALM-1202/4	32, carbon/SiC EPDM	315 x 6,3	EPDM	15-18,5
	AL-1202/4	ALH-1202/4	ALP-1202/4	ALS-1202/4	ALM-1202/4	40, carbon/SiC EPDM	315 x 6,3	EPDM	22-37
	AL-1202/4	ALH-1202/4	ALP-1202/4	ALS-1202/4	ALM-1202/4	50, carbon/SiC EPDM	315 x 6,3	EPDM	45
DN 250	AL-1250/6	ALH-1250/6	ALP-1250/6	ALS-1250/6	no	40, carbon/SiC EPDM	405 X 7	EPDM	15-22
	AL-1250/6	ALH-1250/6	ALP-1250/6	ALS-1250/6	no	50, carbon/SiC EPDM	405 X 7	EPDM	30
	AL-1250/4	ALH-1250/4	ALP-1250/4	ALS-1250/4	no	40, carbon/SiC EPDM	405 X 7	EPDM	37
	AL-1250/4	ALH-1250/4	ALP-1250/4	ALS-1250/4	no	50, carbon/SiC EPDM	405 X 7	EPDM	45-55
	AL-1250/4	ALH-1250/4	ALP-1250/4	ALS-1250/4	no	65, carbon/SiC EPDM	405 X 7	EPDM	75-110
DN 300	AL-1300/4	ALH-1300/4	no	ALS-1300/4	no	75, carbon/ceramic. EPDM	475 X 8	EPDM	110-160

Series	Pressure class / temperature [°C]	Housing material Name	Marking	Sealing flange	Impeller	Pump shaft	Difference in materials
AE / L / AL / AKN	PN10 / -15...+120	grey cast iron	EN-GJL-200	EN-GJL-200	EN-GJL-200	AISI329	AE / L_-32 impeller Noryl GFN2 AL_-1300 impeller EN-GJS-400
LH / ALH / AKNH	PN16 / -15...+180 (depending on seal constrution)	nodular cast iron	EN-GJS-400	EN-GJS-400	EN-GJL-200	AISI329	ALH-1300 impeller EN-GJS-400
AEP / LP / ALP	PN10 / -15...+120	bronze	CuSn10Zn2	CuSn10Zn2	CuSn10Zn2	AISI329	Bronze impeller available to all pumps
LS / ALS	PN16 / -15...+180 (depending on seal construction)	stainless steel	AISI316	AISI316	AISI316	AISI329	On special request also SS2324 (AISI 329) ja SS2378 "SMO" (LM / ALM-pumps)

Standard shaft material is Stainless steel AISI 329. In LM / ALM-pumps shaft material is Stainless steel SMO, SS2378.

Structure

Pump

AE, L and AL series pumps are monoblock centrifugal pumps equipped with a dry asynchronous motor. The pump impeller is installed directly onto the shaft of the electric motor (no separate couplings).

Electric motor

The electric motor of AE, L and AL series pump is a Kolmeks asynchronous designed for pump use. The electric motor is highly efficient and has low noise levels. The electric motor is suitable for frequency converter use.

Standard voltages:	400/230 V, 50 Hz	0,03–3 kW	
	690/400 V, 50 Hz	4–160 kW	
Enclosure classes:	IP 54	0,03–3 kW	1000, 1500r/min
		0,25–4 kW	3000r/min
	IP55	4–160 kW	1000, 1500r/min
		5,5–55 kW	3000r/min
Insulation class:	F		
Duty type:	S1 (continuous duty)		
Ambient temperature:	max. +45°C		

NOTE! **Kolmeks electric motors are available with other enclosure classes and voltages by request.**

Connections

The AE series pump is equipped with G thread connections according to ISO 228/1.
The L, AL and AKN series pump is equipped with flanged connections (PN10 or PN16) according to ISO 7005 Flanges to ANSI/JIS standards are available on request.

Seals

The shaft seal of an AE series pump is a single mechanical seal. The pump housing seal is an O-ring

The standard shaft seal on L, AL and AKN series pumps is a single mechanical seal. The pump housing seal is an O-ring or gasket.

By request, there are several seal materials and structure alternatives available depending on the properties and temperature of the liquid.

Standard surface treatment

The pumps are painted according to Standard SFS-EN ISO 12944-5, AY100/1-FeSa2½. The colour is RAL3020. Epoxy surface treatment and colour alternatives are available by request.

Rating plate

Material:
P = Bronze
H = Nodular Cast Iron
S = Stainless steel

Accessories:
X = Pump without baseplate
P = Single phase motor
N = Seal kit no.7
T = External shaft seal
H = Recirculation
KT = Double shaft seal
Sn = Non-standard shaft seal
Kn = Non-standard surface treatment
Ln = Motor thermal protectors
En = Other difference (e.g. EXE)
Vn = Special voltage

Non-standard material of impeller:
PM = Bronze
SS = Stainless steel AISI316

Pump type
Serial number,
Duty point and max. temperature of liquid
Minimum efficiency index (MEI)
Motor type
Nominal voltages and currents
Bearing types,

Motor code
Pressure class and impeller diameter
Electrical power at duty point (if required)
Continuous duty
Nominal power and rotation speed
Enclosure and insulation class
Efficiency of electric motor
Manufacturer, Country and CE marking

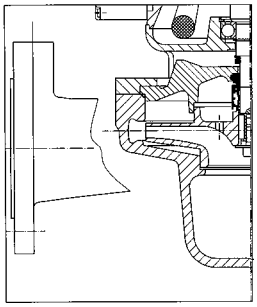
4

Seal structure alternatives

Standard structure

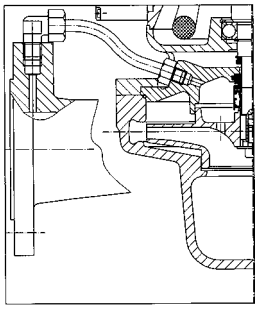
- Single mechanical seal
- Max. operating temperature +120°C.

The standard-constructed shaft seal can also be used for water-glycol mixtures and most other indirect refrigeration systems. The recommended glycol is propylene glycol and the concentration can be up to 50%. Most often, a concentration of 30–40% is adequate.



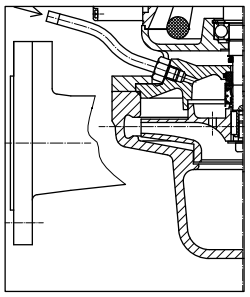
Internal flushing

- Single mechanical seal
- Recirculation from the discharge flange of the pump to the seal chamber which flushes the seal
- Max. +150°C water
- Available for flange sizes DN50 ... DN300. . This is indicated with an additional marking 'H' in the pump type e.g. LS-65B/4H.



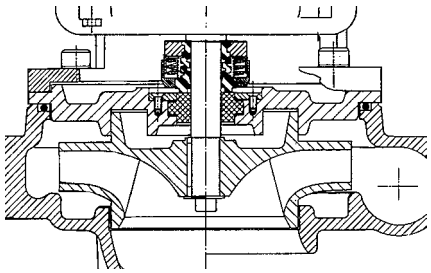
External flushing

- Single mechanical seal
- Plugged pipe to the seal chamber using which, it is possible to flush the seal with external pressure if required
- Available for flange sizes DN 50–300 pumps
- Crystallising and accumulative liquids



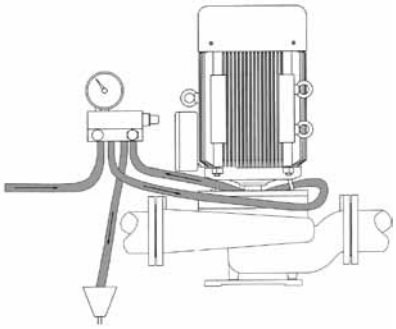
External seal

- Externally-mounted single mechanical Teflon bellows
- Available for flange sizes DN 65–300 ALS pumps
- Extremely corrosive liquids, e.g. sulphuric acid
- Marking 'T' in the pump type e.g. ALS-1065/4T
- NOTE! Maximum working pressure 10 bar



Double mechanical seal system (cartridge)

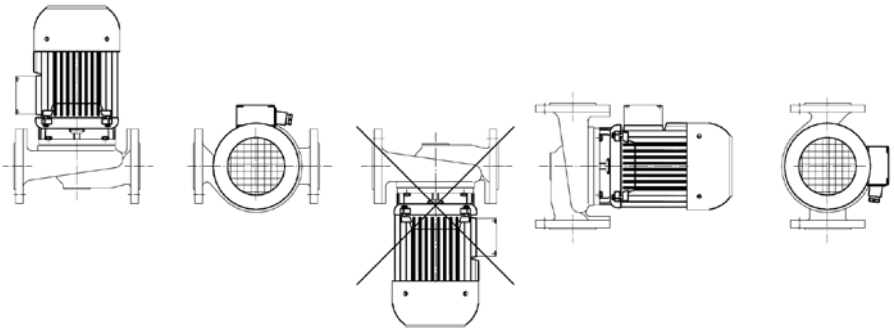
- Two opposing seals with sealing liquid brought from outside (circulation). The pressure of the liquid can be lower or higher than that of the liquid being pumped
- Available for flange sizes DN 65–300 pumps
- Max. operating temperature +180°C for water
- Requires a separate seal water monitoring unit (available from Kolmeks)
- Marking 'KT' in the pump type e.g. ALS-1154/4KT
- Hot, crystallising and accumulative liquids



Installation

Ensure the following when installing the pump:
- Enough room for service and inspection
- Possibility to use lifting and transfer devices if required
- Shut-off valves on both sides of the pump, allowing the position of the motor unit and the electrical terminal connection box to be changed by removing the motor unit from the pump housing and by installing it in the required position ---(not applicable when using internal seal flushing, marking 'H' which is standard in the LH/ALH series)

Kolmeks inline pumps are suitable for both vertical and horizontal pipe mounted positions. Small pumps are usually installed without a base in a vertical or horizontal position. Large pumps are installed with the base in a vertical position.



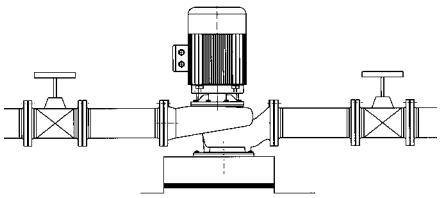
When selecting a method of installation, please consider at least the following:

- Enough room for installation and service
- Piping strength, rigidity and support
- Vibration and noise level requirements
- Pump installability
- Pump serviceability
  - number of service personnel and availability of lifting equipment
  - pump weight

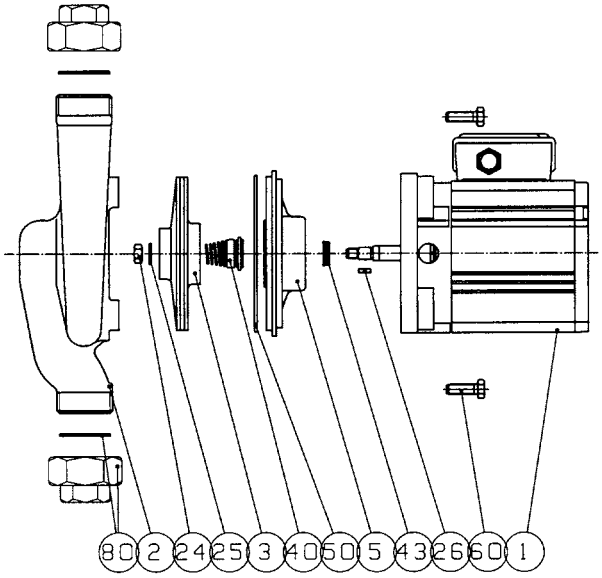
Size	Power
DN 15 ... 50	max. 2,2 kW
DN 65	4 kW
DN 80	4 kW
DN 100	7,5 kW
DN 125	7,5 kW

Recommended general limits without the base:

Large pumps are fastened by their foot onto a freely moving concrete plinth, which is separated from the floor.by a 20-mm thick rubber or cork mat for example. The weight of the concrete base must be about 1.5 times the weight of the pump.



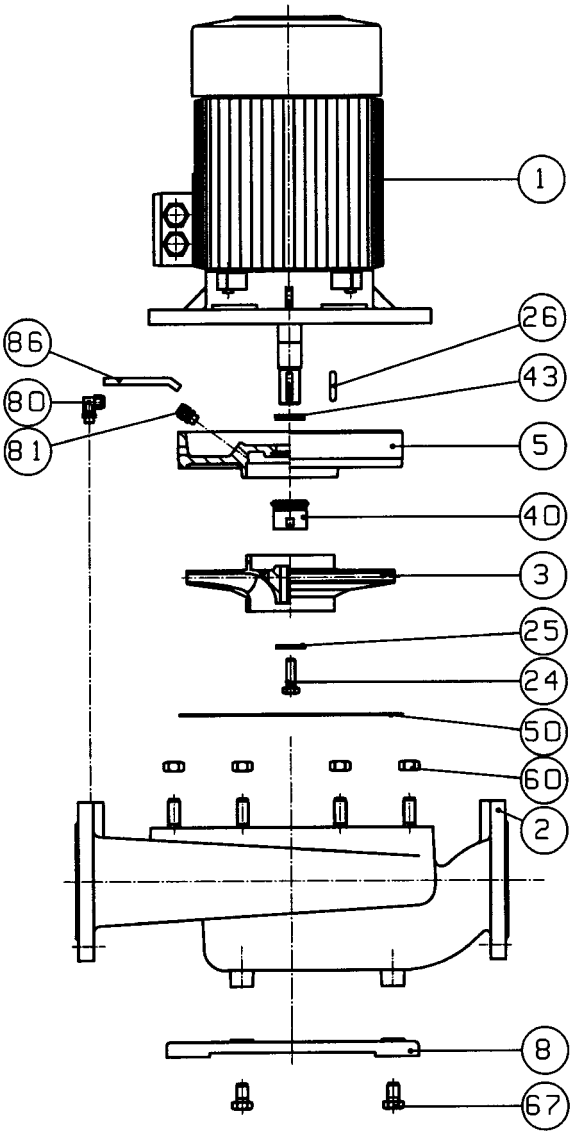
Pump service



Parts for AE-pumps

1	Electric motor
2	Pump housing
3	Impeller
5	Sealing flange
24	Nut / Screw
25	Washer
26	Key
40	Mechanical seal
43	V-ring
50	O-ring / gasket
60	Nut / Screw
80	Pipe joint (AE-26, AE-33)

4



Parts for L_-, AL_-, ja AKN- pumps

1	Electric motor
2	Pump housing
3	Impeller
5	Sealing flange
8	Base plate (not always)
24	Nut / Screw
25	Washer
26	Key
40	Mechanical seal
43	V-ring (not always)
50	O-ring / gasket
60	Nut / screw
67	Screw
80	Pipe joint (ALH-serie)
81	Pipe joint (ALH-serie)
86	Pipe (ALH-serie)

Motor unit

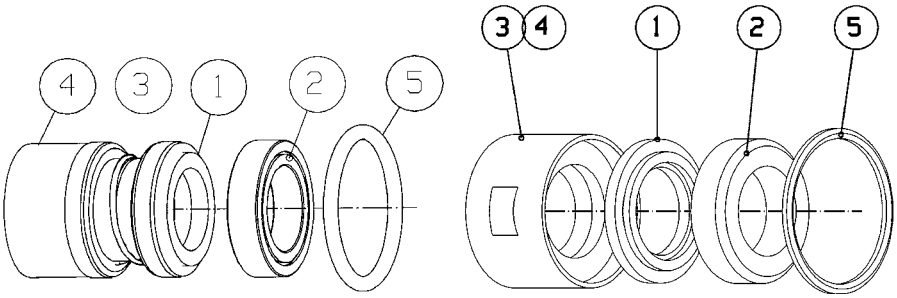
The pump motor unit is a new stand-by operation unit which includes:

1) Motor
2) Sealing flange
3) Impeller
4) Seals

If a motor malfunction or a seal leak occurs, replacing the motor unit is simple and quick and does not require long periods of stoppage. No procedures need to be carried out on the piping, because there is no need to detach the pump housing.

Shaft seal

If a seal leak occurs in a new pump, e.g. during commissioning , it is possible to replace only the shaft seal with a new one.



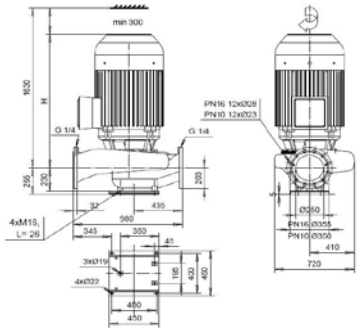
Parts of single mechanical shaft seal

1	Rotating ring
2	Stationary ring
3	Body/bellows
4	Spring
5	O-ring

Reading curves and selecting a pump

AL-1250/4 **ALH-1250/4** **ALP-1250/4** **ALS-1250/4** **ALM-1250/4**

AL_-1250/4 DN250



	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	KZ-224 J2 F41	37	67,0	580	880
	KZ-225 K2 F42	45	81,1	610	900
	KZ-256 J2 F42	55	98,7	690	950
	KZ-287 J2 F43	75	133,9	850	1020
	KZ-288 K2 F43	90	158,5	920	1070
	KZR-314 H2 F43	110	193,2	1210	1330
60Hz	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KZ-225 K2 F42	45 (54)	84,0 (83,8)	610	900
	KZ-256 J2 F42	55 (66)	102,1 (100,9)	690	950
	KZ-287 J2 F43	75 (90)	138,6 (139,0)	850	1020
	KZ-288 K2 F43	90 (105)	156,2 (159,6)	920	1070
	KZR-314 H2 F43	110 (132)	199,9 (198,2)	1210	1330

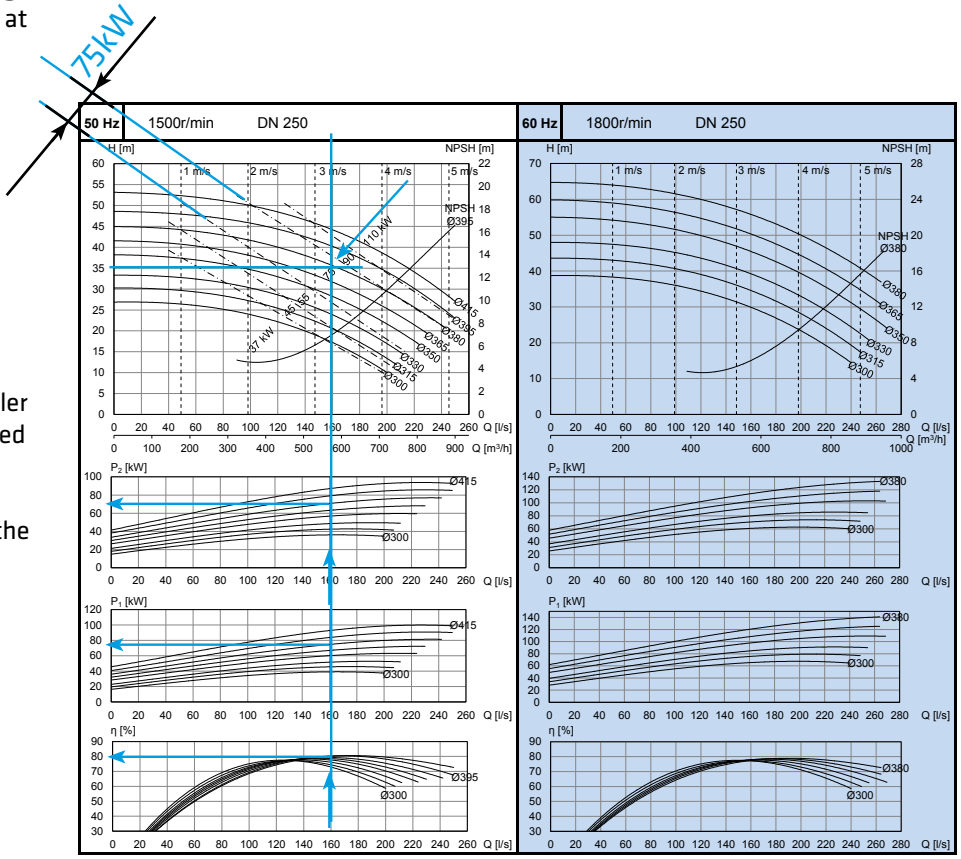
Selecting a fixed speed pump from 50 Hz pump curve (curves on the left)
E.g. duty point: flow =160 l/s, head = 35 m, liquid: water +20°C.

1. Use the quick selection chart at the beginning of the catalogue or browse through the product catalogue in order to find a pump of the correct size range such that the required flow 160 l/s is at the best efficiency point (η = 80%).

2. Select the impeller size [Ø= mm] from the QH curve such that a vertical line is drawn at the point of 160 l/s flow through all curves and, equivalently, a horizontal line at the point of 35m head.

3. Find the impeller size at the intersection= 380 mm. Note! If the intersection falls between two impeller sizes, the impeller diameter is selected halfway between the two sizes.

4. Read the nominal shaft power of the motor from the section in which the QH curve is.
In this example, the motor nominal shaft power is P2N = 75 kW.
According to the shaft power P2, P2 = 71 kW, the motor nominal power becomes P2N = 75 kW (the closest highest motor nominal power).



5. Check the nominal current of the electric motor from the column on the right-hand side of the nominal power column in the table, IN = 133.9 A. Select an overload protection for the motor according to nominal current.

6. Read the pump weight from the same table [kg] = 850 kg.

7. For energy calculation, read the electrical power of the device = P1 [kW], from the P1 curve with a required flow of Q = 160 l/s and at the point of the selected impeller size, Ø = 380 mm.
In this example, the device electrical power is P1= 74 kW.

8. Energy costs = Electrical power P1 [kW] x energy price [€/ kWh] x operating time [h].

Characteristic curves apply to +20°C water.

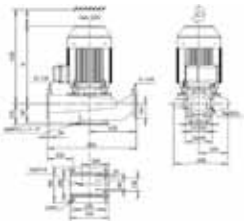
Note! Please contact Kolmeks for additional information on the following issues!

1. When pumping liquids whose viscosity differs from that of water, the effect of viscosity must be considered in pump selection.
2. Liquid density is directly proportional to the power requirement. The sufficiency of motor power must be checked for liquids denser than water.

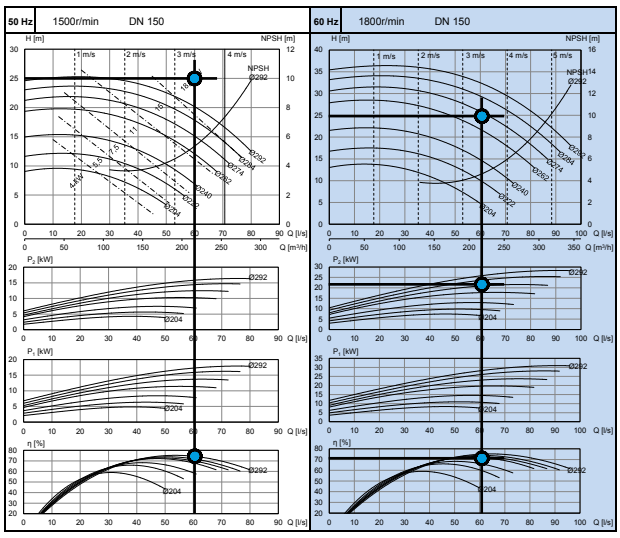
Selecting an optimal pump for frequency converter operation from a 60Hz curve

CORRECTLY-SIZED PUMP

AL-1154/4 **ALH-1154/4** **ALS-1154/4** **ALM-1154/4**

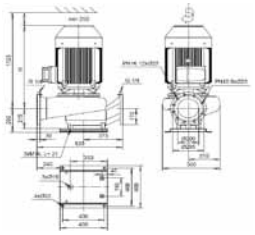


	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	KH-132 C2 F31	4	8,13	177	500
	KH-132 E2 F31	5,5	10,95	184	500
	KH-133 G2 F31	7,5	14,88	196	550
	KZ-165 F2 F31	11	20,75	250	660
	KZ-165 G2 F31	15	28,10	255	660
	KZ-186 G2 BF31	18,5	34,40	295	720
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60Hz	KH-132 C2 F31	4 (4,8)	8,17 (8,30)	177	500
	KH-132 E2 F31	5,5 (6,6)	11,00 (11,15)	184	500
	KH-133 G2 F31	7,5 (9)	14,80 (15,47)	196	550
	KZ-165 F2 F31	11 (13)	21,35 (21,35)	250	660
	KZ-165 G2 F31	15 (18)	29,10 (28,75)	255	660
	KZ-186 G2 BF31	18,5 (22)	35,30 (35,10)	295	720
	KZ-186 K2 BF31	22 (26)	41,60 (41,00)	310	720
	KZ-205 K2 F31	30 (30)	57,60 (57,10)	370	780

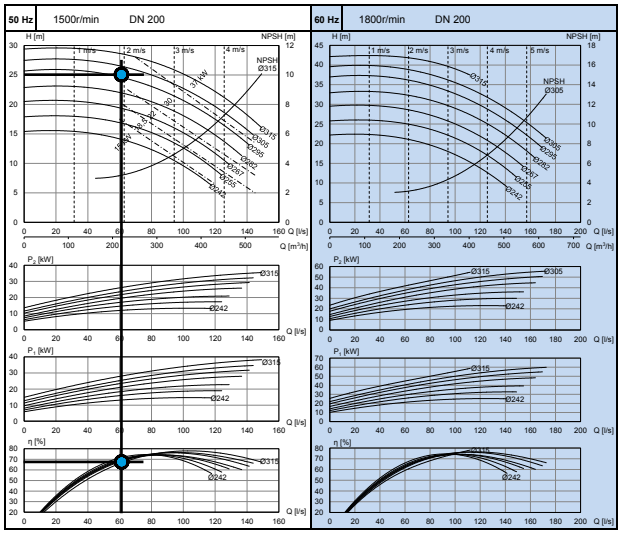


OVERSIZED PUMP

AL-1202/4 **ALH-1202/4** **ALP-1202/4** **ALS-1202/4** **ALM-1202/4**



	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	KZ-165 G2 F31	15	28,1	325	720
	KZ-186 G2 BF31	18,5	34,4	365	780
	KZ-186 K2 BF32	22	40,3	380	780
	KZ-205 K2 F32	30	55,2	435	830
	KZ-224 J2 F32	37	67,0	485	840
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60Hz	KZ-186 G2 BF31	18,5 (22)	35,30 (35,10)	365	780
	KZ-186 K2 BF32	22 (26)	41,60 (41,00)	380	780
	KZ-205 K2 F32	30 (36)	57,60 (57,10)	435	830
	KZ-224 J2 F32	37 (44)	69,50 (68,60)	485	840
	KZ-225 K2 F33	45 (54)	84,00 (83,80)	510	880



E.g. duty point: flow = 60 l/s, head = 25 m, pumped liquid being water +20°C.

1. Use the quick selection chart at the beginning of the catalogue or check the datasheets in the product catalogue to find a pump in the correct size range such that the required flow is in the best efficiency point. The AL-1154/4 pump is selected because its efficiency is the best in the required duty point η = 75%.
2. The duty point is outside the operating range of the AL-1154/4 50 Hz pump.
3. Usually when selecting the pump from the 50 Hz curve to the required duty point (Q = 60 l/s, 25 m), the next largest pump is selected.
   In the above example, we choose AL-1202/4, Ø300mm, P2N = 30 kW, η = 67%. This is an oversized pump whose best flow range is within 100–120 l/s, where its efficiency is the highest η = 80 %.
4. Select the pump AL-1154/4 from the 60 Hz curve, whereby the impeller is Ø274mm.The nominal motor shaft power P2N is selected according to the shaft power curve P2.
   Shaft power P2 = 21 kW and the next higher nominal power is P2N = 22 kW.
   In this example, we choose AL-1154/4, Ø274mm, P2N = 22 kW, η = 75%.

QH curves are available for 50 Hz and 60 Hz on the same datasheet in order to facilitate the customer's selection of the most energy efficient pump for frequency converter operation.

How does careful pump selection benefit the customer?

1. The pump saves energy, because it has been selected from the range of the best efficiency.
2. The total purchase cost is lower, because the pump, the electric motor and the frequency converter are one size smaller.
3. The pumps are designed to operate at the best efficiency where they run with low noise and vibration and have a long service life.
4. A smaller pump saves energy in partial flows, because its efficiency is better for the entire operating range.

NPSH and cavitation

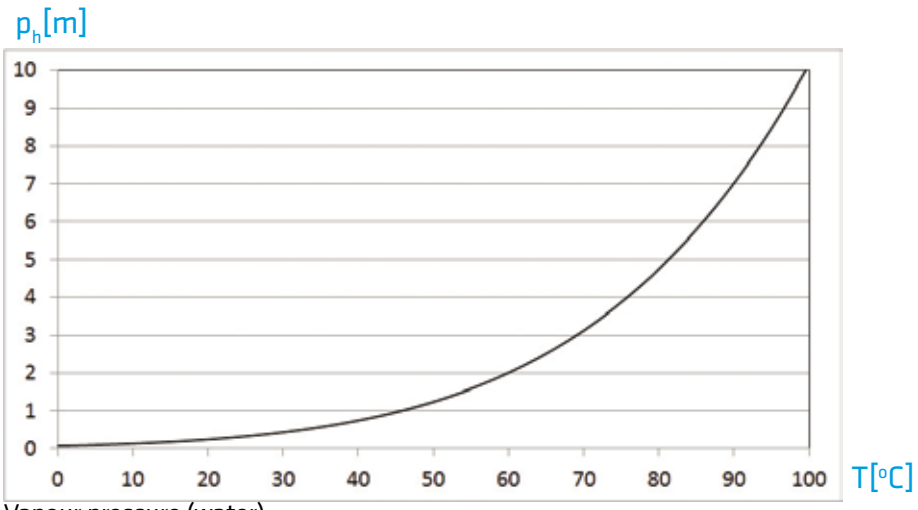
$NPSH_{re} < NPSH_{av}$

$NPSH_{re} < p + h - h_{suction} - p_h$

$NPSH_{re} < p_{suction} - p_h$

The $NPSH_{av}$ value of a system refers to the actual difference between inlet pressure (in the suction flange) and vapour pressure of the liquid being pumped. The $NPSH_{re}$ value required of the pump must be smaller than the $NPSH_{av}$ value in order to prevent cavitation from occurring. A safety margin of 0.5 m must be added to the measurement value.

$NPSH_{av}$ = difference between available inlet pressure (in suction flange) and vapour pressure of liquid being pumped
$NPSH_{re}$ = NPSH value required by the pump
p = Absolute air pressure
p_h = Absolute liquid vapour pressure at the operating temperature
h = Liquid geodetic suction head
$h_{suction}$ = Pressure losses in suction pipes
$p_{suction}$ = Absolute suction pressure



Vapour pressure (water)

At normal air pressure levels (10 m water column, 1,013 mbar = 760 mm Hg), clean water boils at 100°C. It can be seen from the curve that water boils at 60°C when the absolute pressure is 2 m wc (i.e. 8 m wc below atmospheric pressure). The boiling point of water at less than 40°C can be achieved at a very low pressure. Vice versa, at the top of Mount Everest, where air pressure is about 0.6 bar (6 m), water boils at +85°C.

Example:

Open tank (p = air pressure = 10 m) where the water temperature is + 90°C (ph = 7 m), suction pipe losses 1 m and liquid suction head flange +2 m. The pump duty point 20 l/s, 7.8 m.

Is the selected pump suitable for the use in question? An example of calculation:

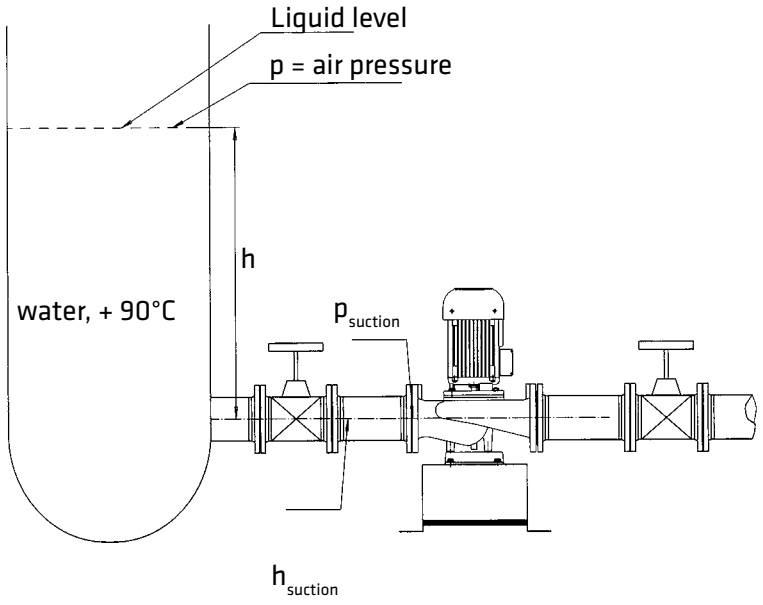
Pump type: AL_-1102/4/Ø188 2,2 kW

$NPSH_{re} < p + h - h_{suction} - p_h$

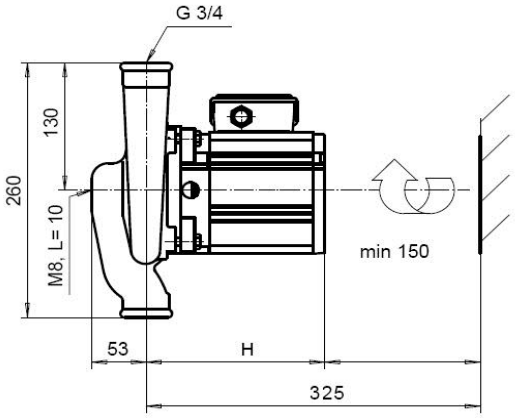
$NPSH_{re} < 10\ m + 2\ m - 1\ m - 7\ m$

$NPSH_{re} < 4\ m$

When observing the safety margin 0.5 m, the $NPSH_{re}$ value of the pump must be smaller than 3.5 m in order to prevent the pump from cavitating. $NPSH_{re}$ of pump AL_-1102/4/Ø188 = 2.7 m, whereby it will not cavitate.



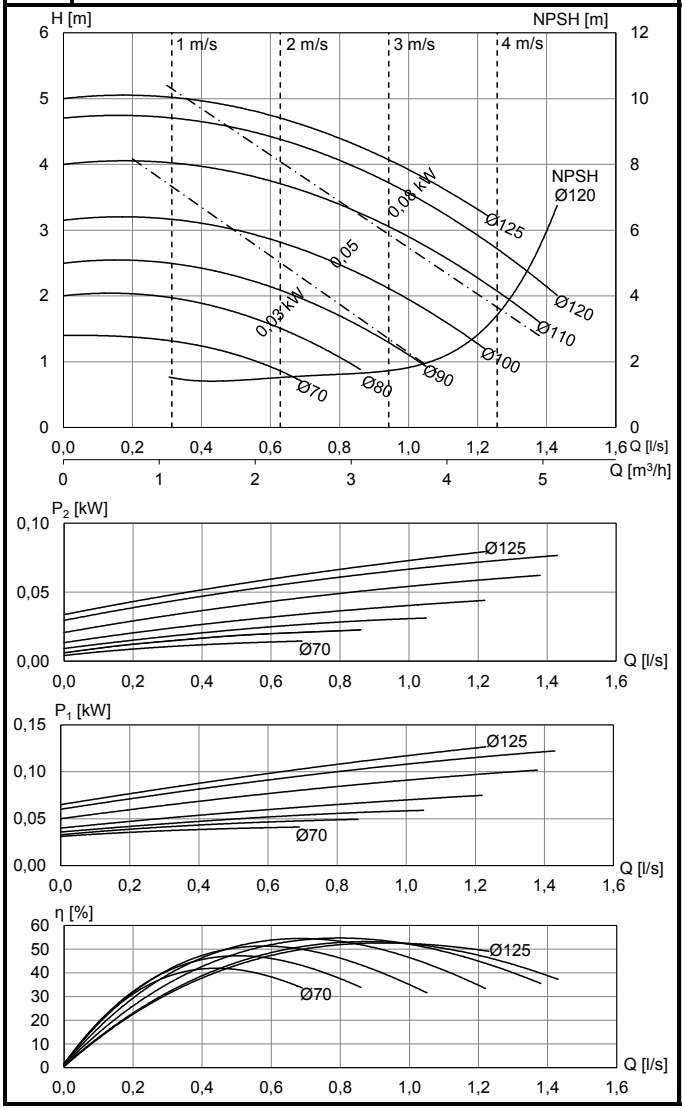
AE-20/4



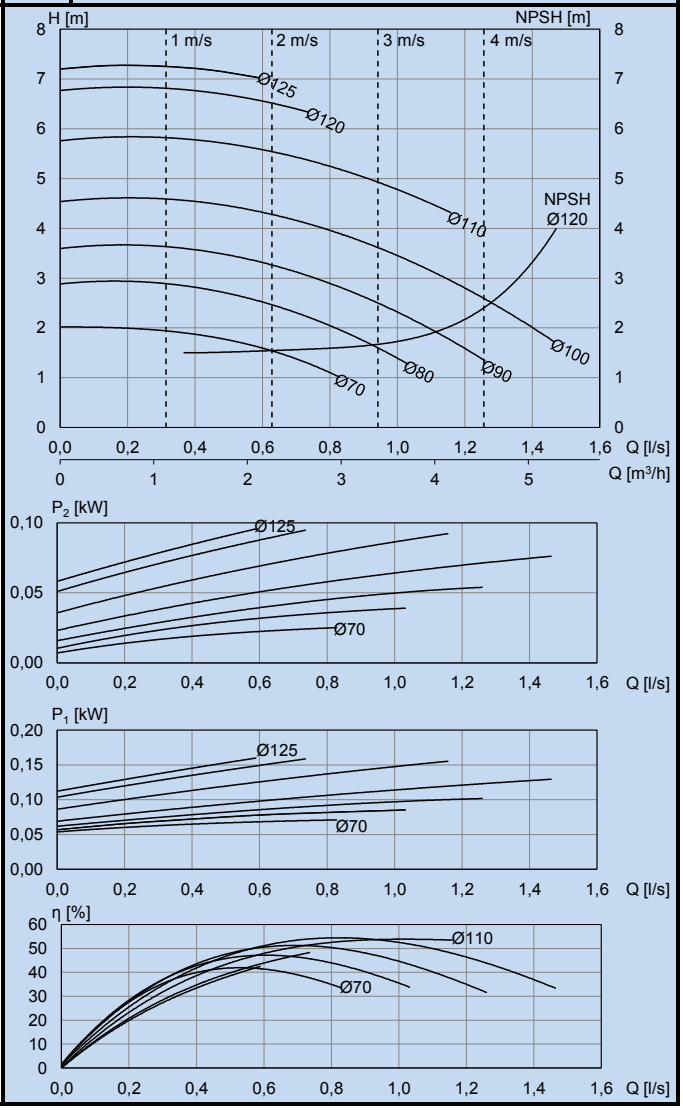
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	OP-732 N12	0,03	0,18	10	175
	OP-732 B N12	0,05	0,21	10	175
	OP-742 N12	0,08	0,28	10,5	175
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60Hz	OP-732 B N12	0,05 (0,06)	0,22 (0,22)	10	175
	OP-742 N12	0,08 (0,09)	0,28 (0,28)	10,5	175

4

50 Hz 1500r/min G 3/4

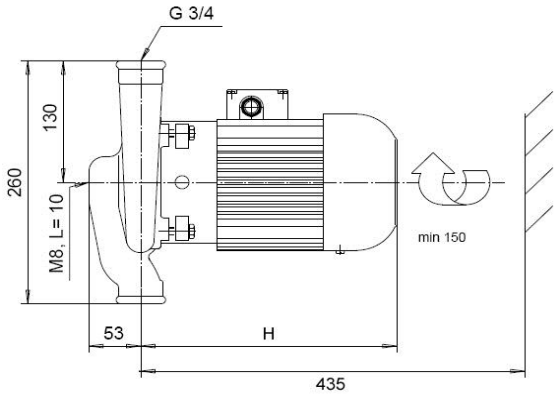


60 Hz 1800r/min G 3/4



AE-20/2

	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	OP-741 N12	0,25	0,7	10,5	215
	OKN-841 D N12	0,65	1,75	14,5	260
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60Hz	OP-741 N12	0,25 (0,3)	0,7 (0,7)	10,5	215
	OKN-841 D N12	0,65 (0,75)	1,6 (1,6)	14,5	260
	KH-871 N12	1,1 (1,3)	2,35 (2,50)	20	295



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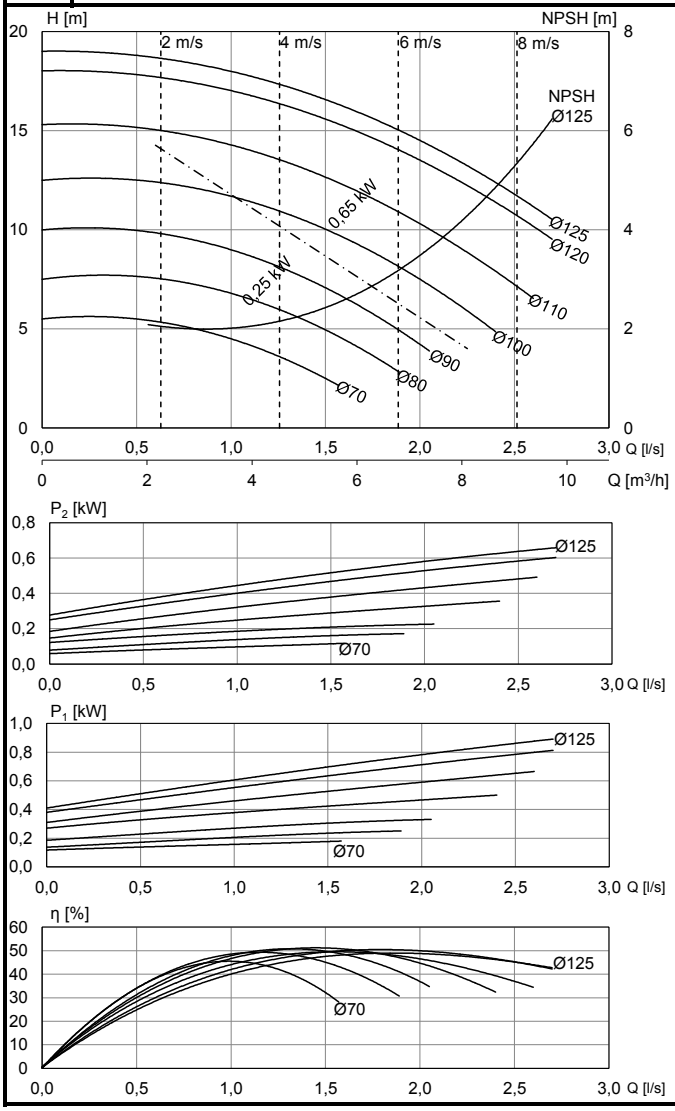
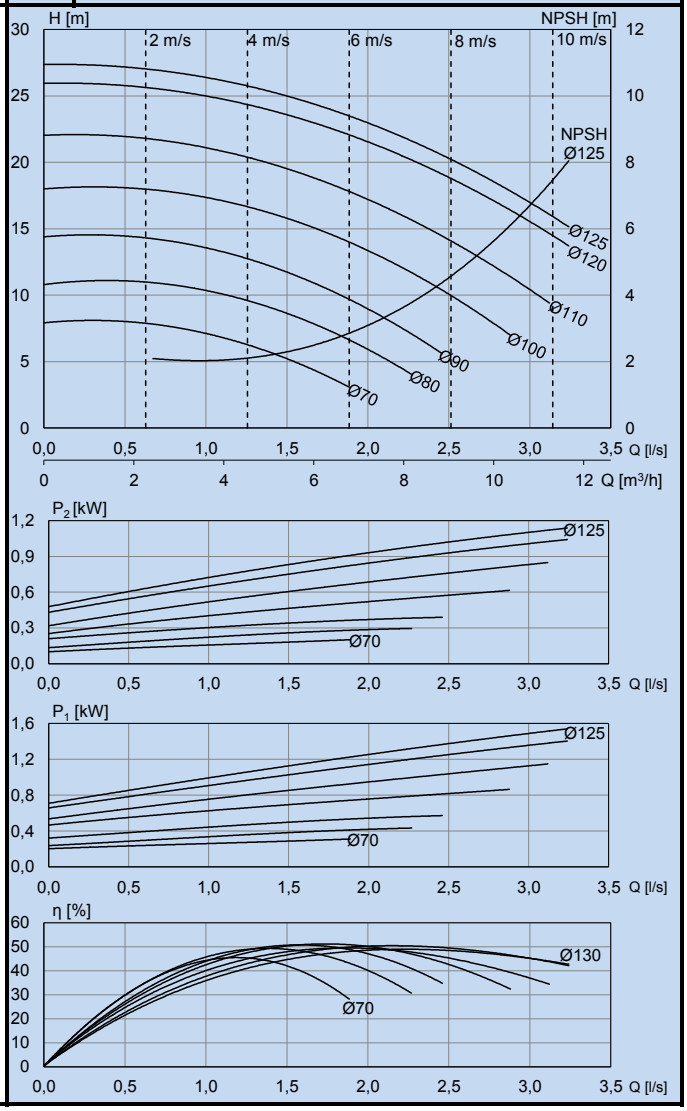
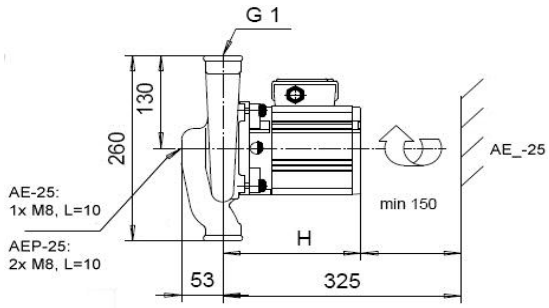
50 Hz 3000r/min G 3/4

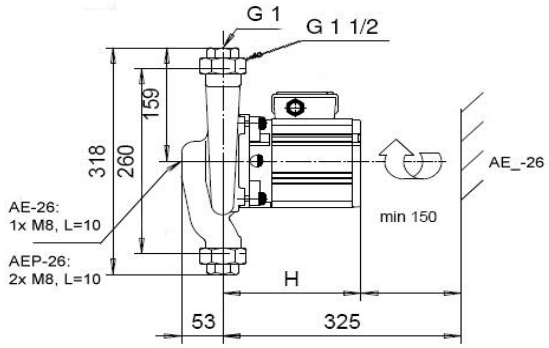


60 Hz 3600r/min G 3/4

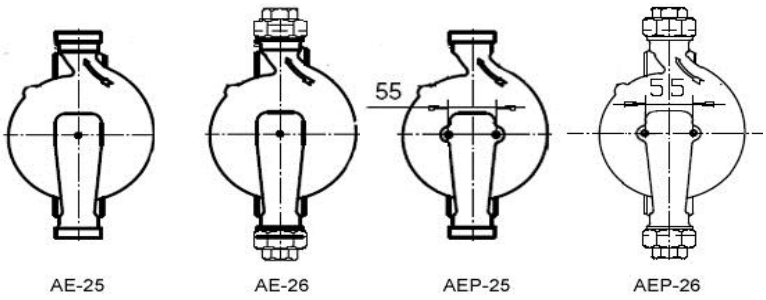


AE-25/4 | AE-26/4 | AEP-25/4 | AEP-26/4

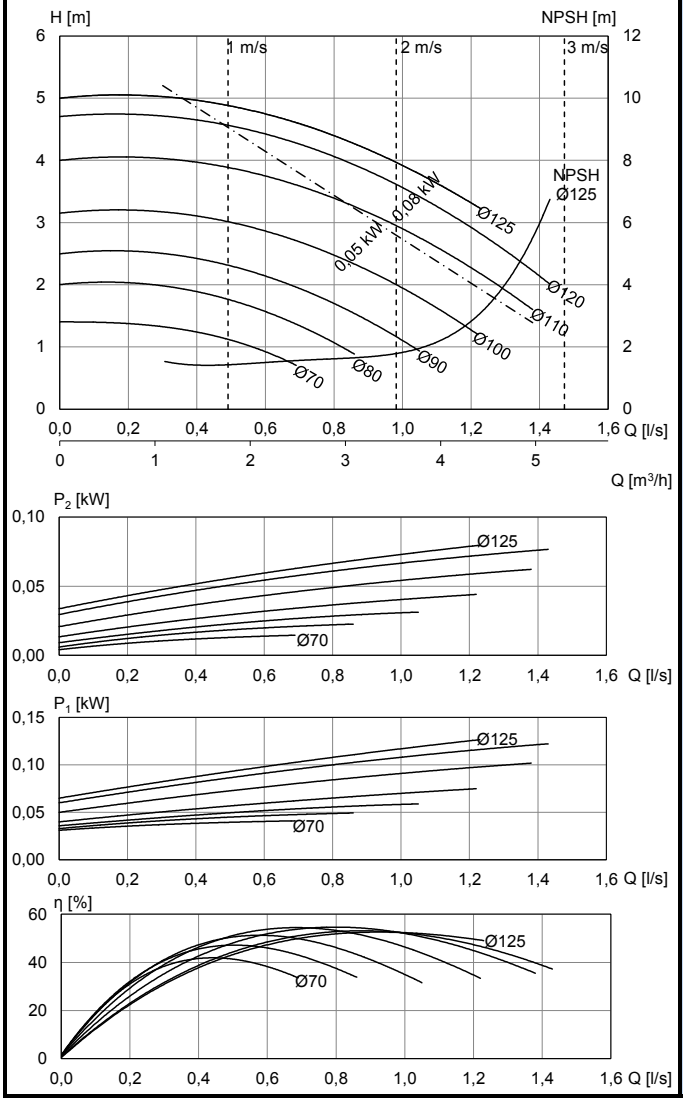




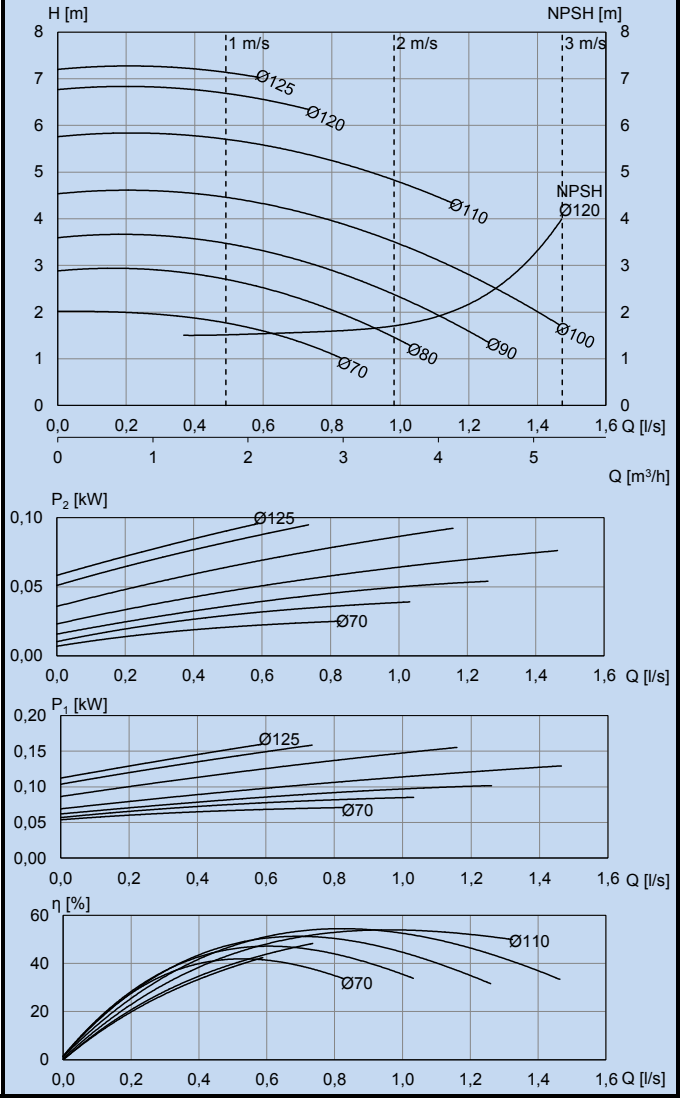
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	OP-732 B N12	0,05	0,21	9,5	175
	OP-742 N12	0,08	0,28	10,5	175
60HZ	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	OP-732 B N12	0,05 (0,06)	0,22 (0,22)	9,5	175
	OP-742 N12	0,08 (0,09)	0,28 (0,28)	10,5	175



50 Hz 1500r/min G 1

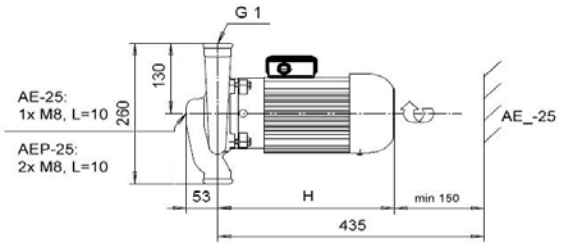


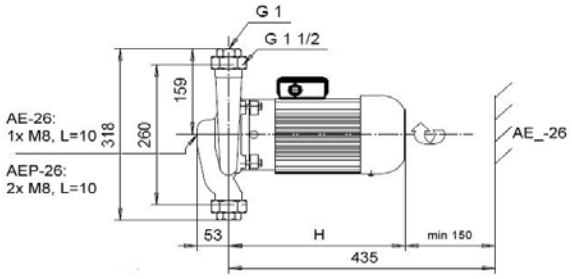
60 Hz 1800r/min G 1



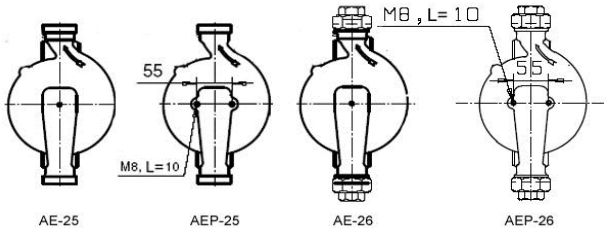
4

AE-25/2 AE-26/2 AEP-25/2 AEP-26/2



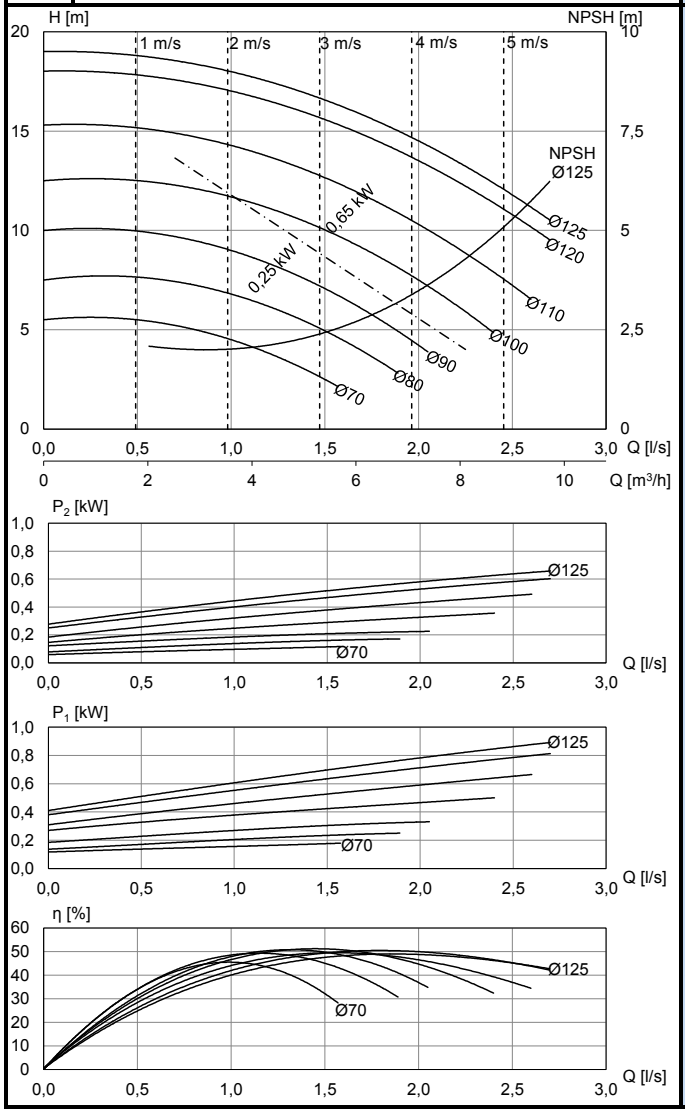


	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	OP-741 N12	0,25	0,70	10,5	215
	OKN-841 D N12	0,65	1,75	14,5	260
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	OP-741 N12	0,25 (0,3)	0,70 (0,70)	10,5	215
	OKN-841 D N12	0,65 (0,75)	1,60 (1,60)	14,5	260
	KH-871 N12	1,1 (1,3)	2,35 (2,50)	17	295

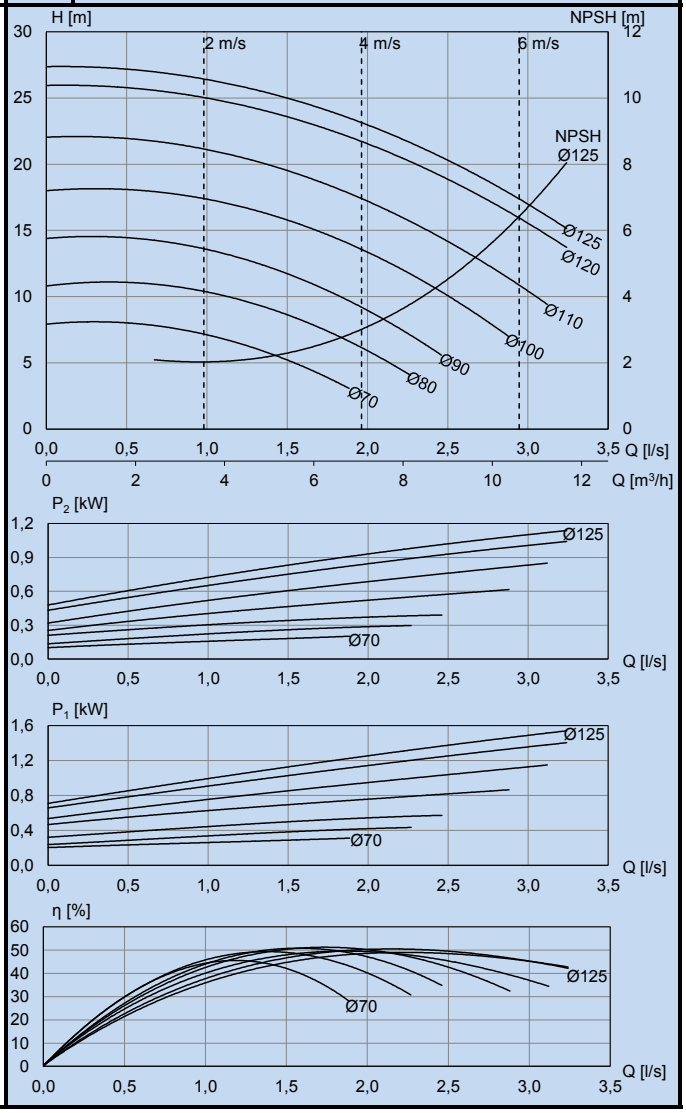


4

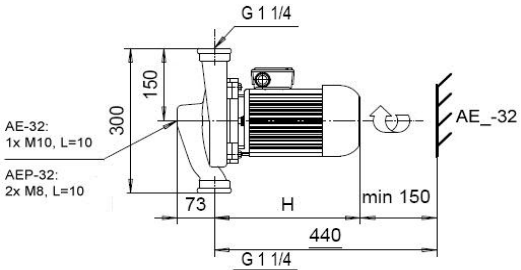
50 Hz 3000r/min G 1

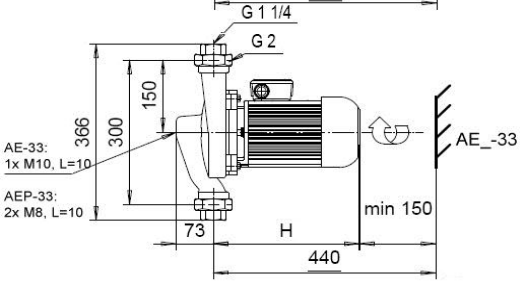


60 Hz 3600r/min G 1

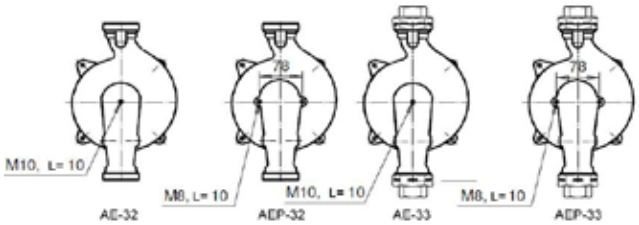


AE-32/4 AE-33/4 AEP-32/4 AEP-33/4



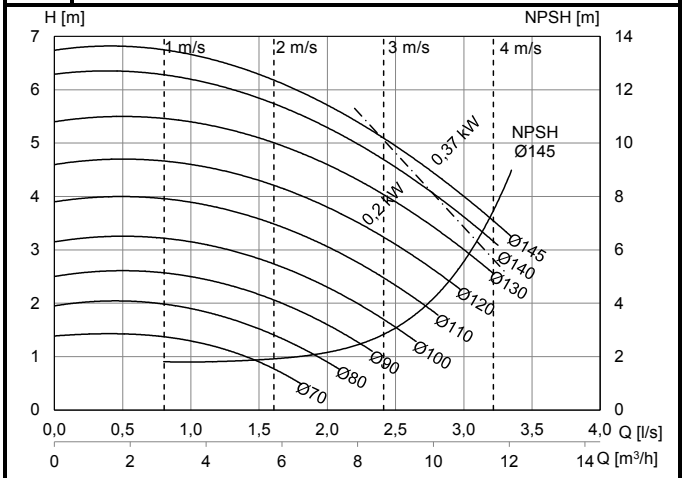


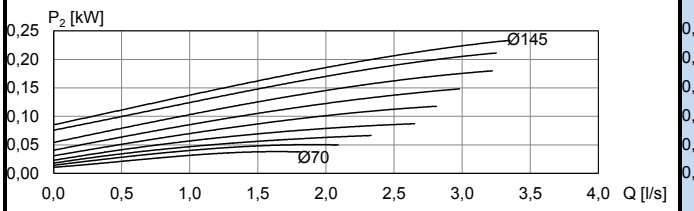
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	OP-752 N13	0,2	0,65	16	240
	OKN-862L D N13	0,37	1,15	20	290
60HZ	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	OP-752 N13	0,2 (0,24)	0,65 (0,65)	16	240
	OKN-862L D N13	0,37 (0,44)	1,15 (1,15)	20	290

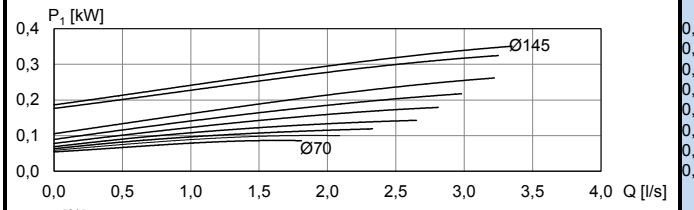


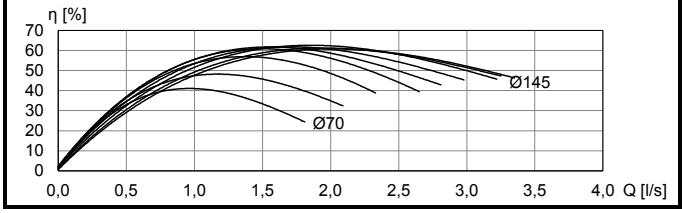
4

50 Hz 1500r/min G 1 1/4

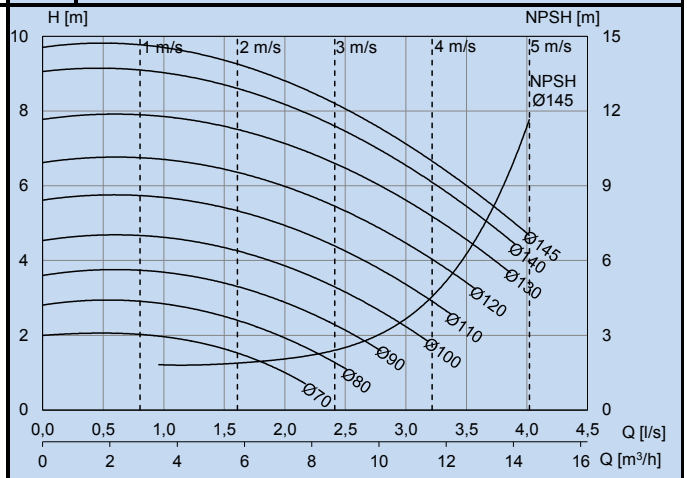


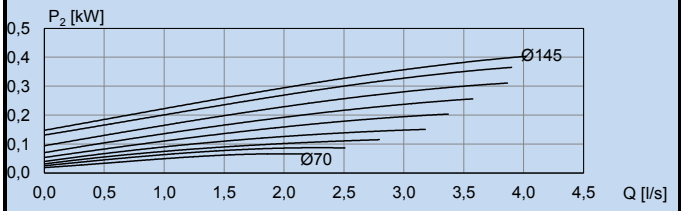


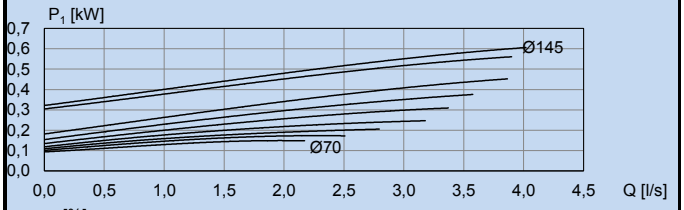


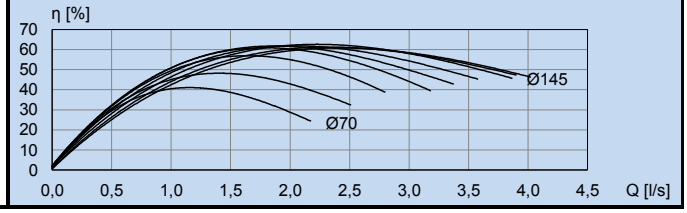


60 Hz 1800r/min G 1 1/4



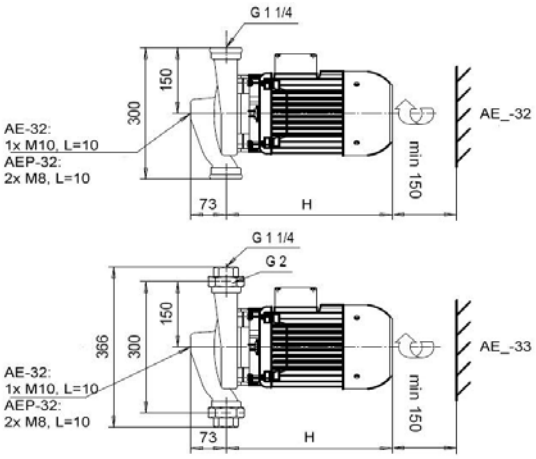


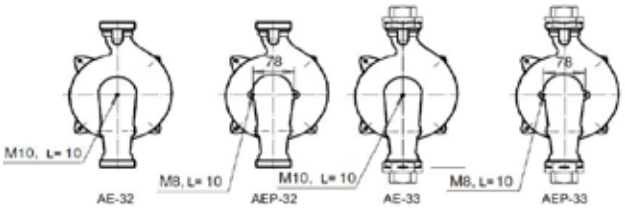




AE-32/2 AE-33/2 AEP-32/2 AEP-33/2

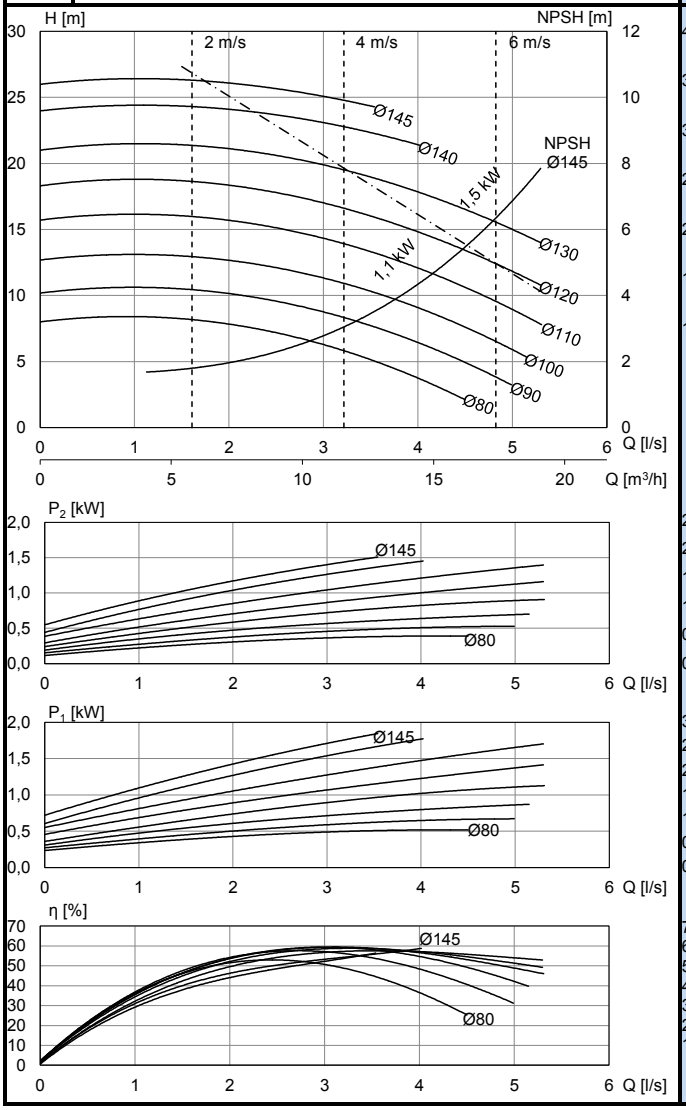
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KH-871 N13	1,1	2,55	21	295
	KH-101 C1 N13	1,5	2,95	32	335
60HZ	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KH-871 N13	1,1 (1,3)	2,35 (2,50)	21	295
	KH-101 C1 N13	1,5 (1,8)	2,98 (3,02)	32	335



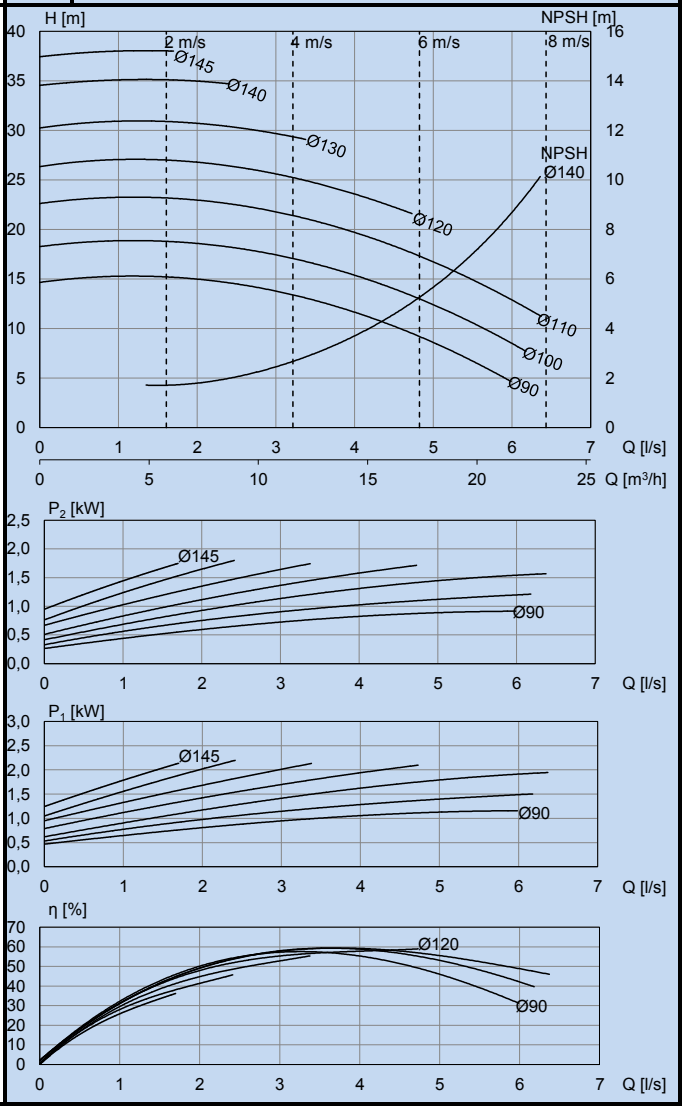


4

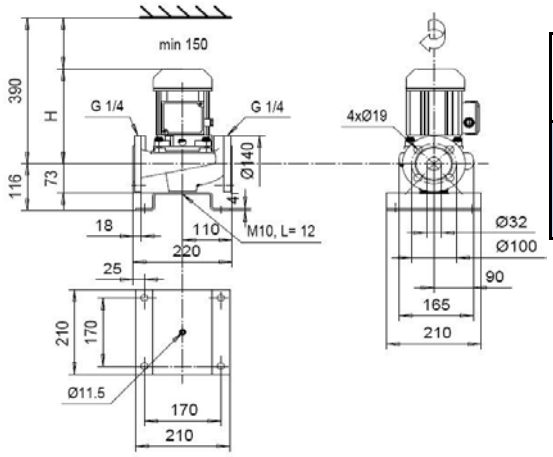
50 Hz 3000r/min G 1 1/4



60 Hz 3600r/min G 1 1/4



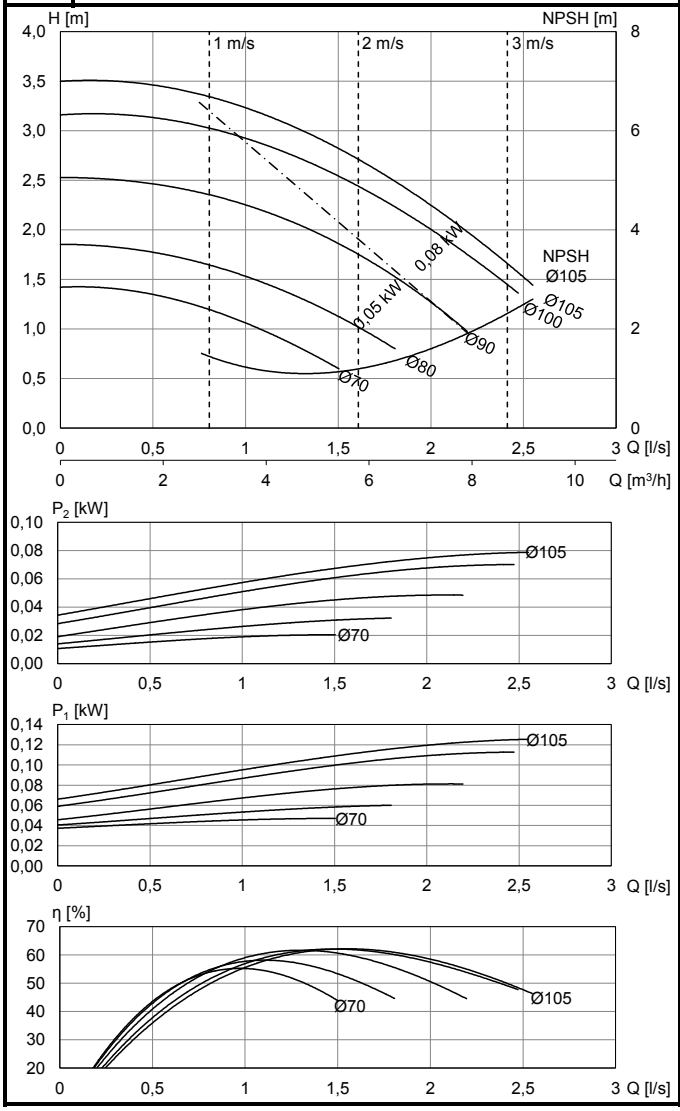
L-32A/4



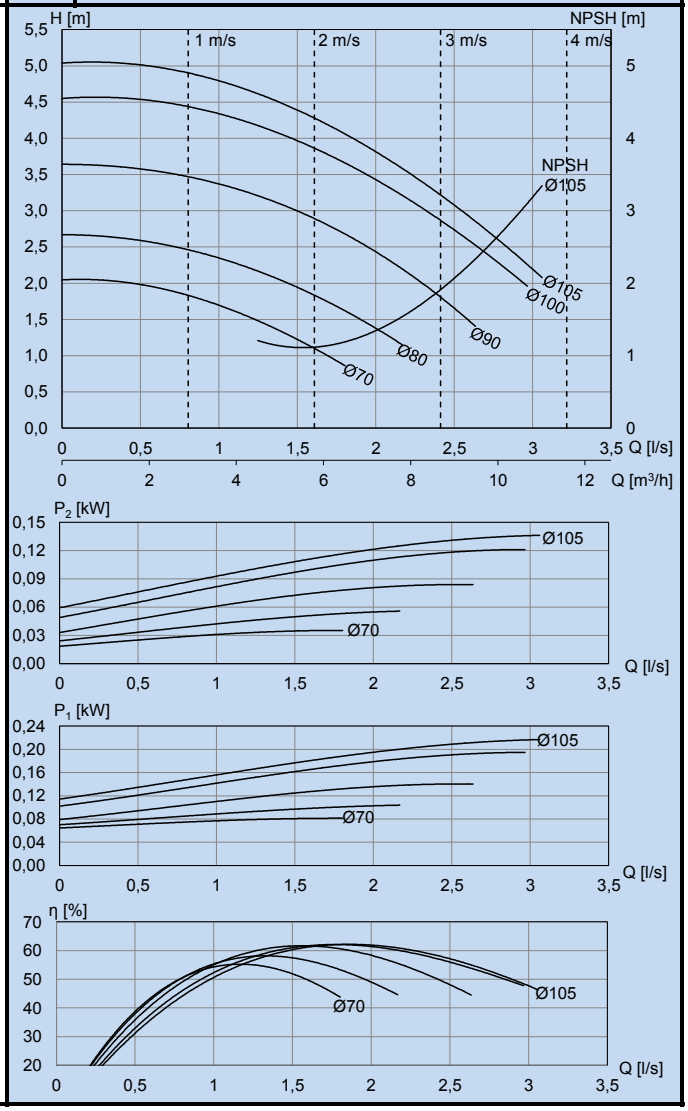
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	OP-732 B N12	0,05	0,21	16	185
	OP-742 N12	0,08	0,28	16,5	185
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	OP-732 B N12	0,05 (0,06)	0,22 (0,22)	16	185
	OP-742 N12	0,08 (0,09)	0,28 (0,28)	16,5	185
	OP-752 N12	0,2 (0,24)	0,65 (0,65)	19	240

4

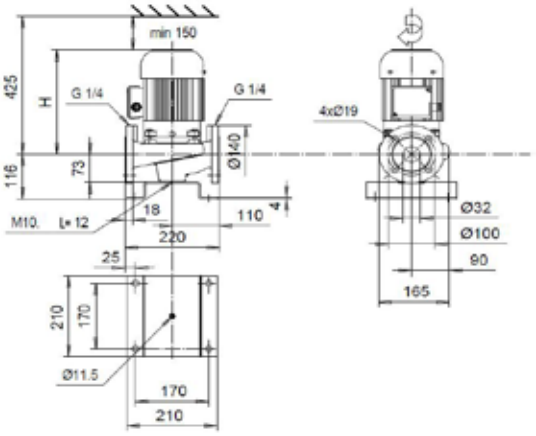
50 Hz 1500r/min DN 32



60 Hz 1800r/min DN 32



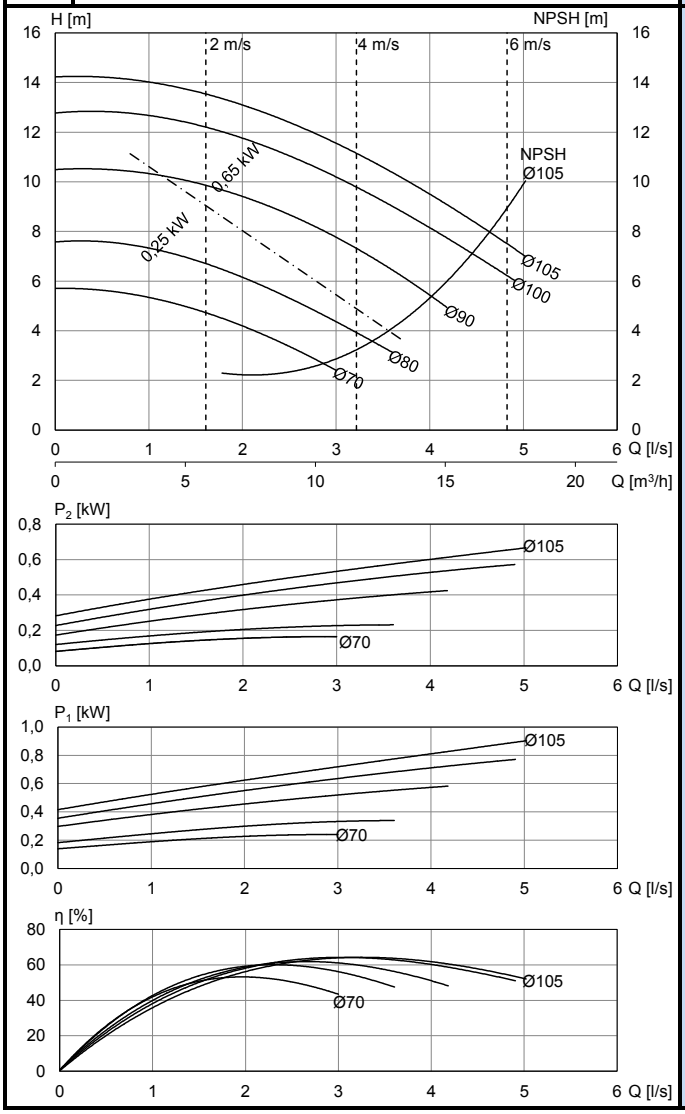
L-32A/2



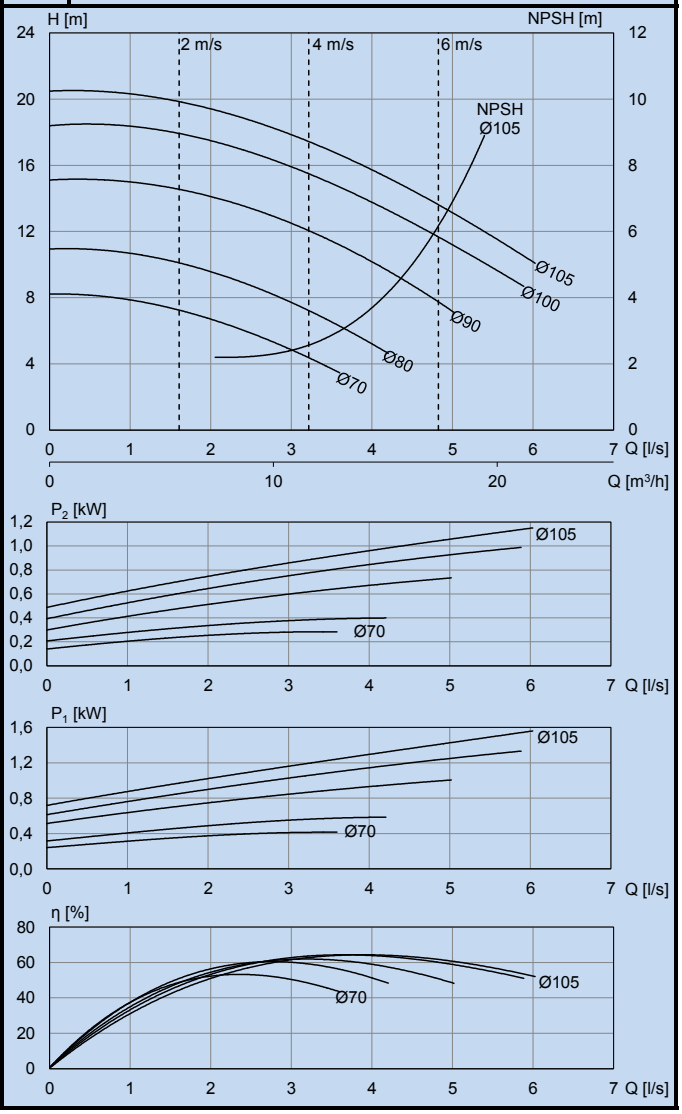
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	OP-741 N12	0,25	0,7	17	225
	OKN-841 D N12	0,65	1,75	21	275
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60Hz	OP-741 N12	0,25 (0,3)	0,7 (0,7)	17	225
	OKN-841 D N12	0,65 (0,75)	1,6 (1,6)	21	275
	KH-871 N12	1,1 (1,3)	2,35 (2,5)	24	295

4

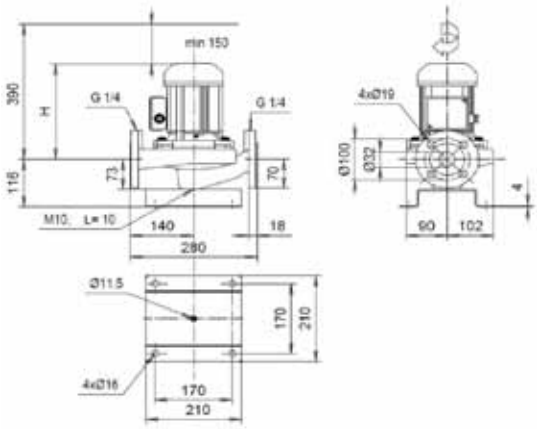
50 Hz 3000r/min DN 32



60 Hz 3600r/min DN 32

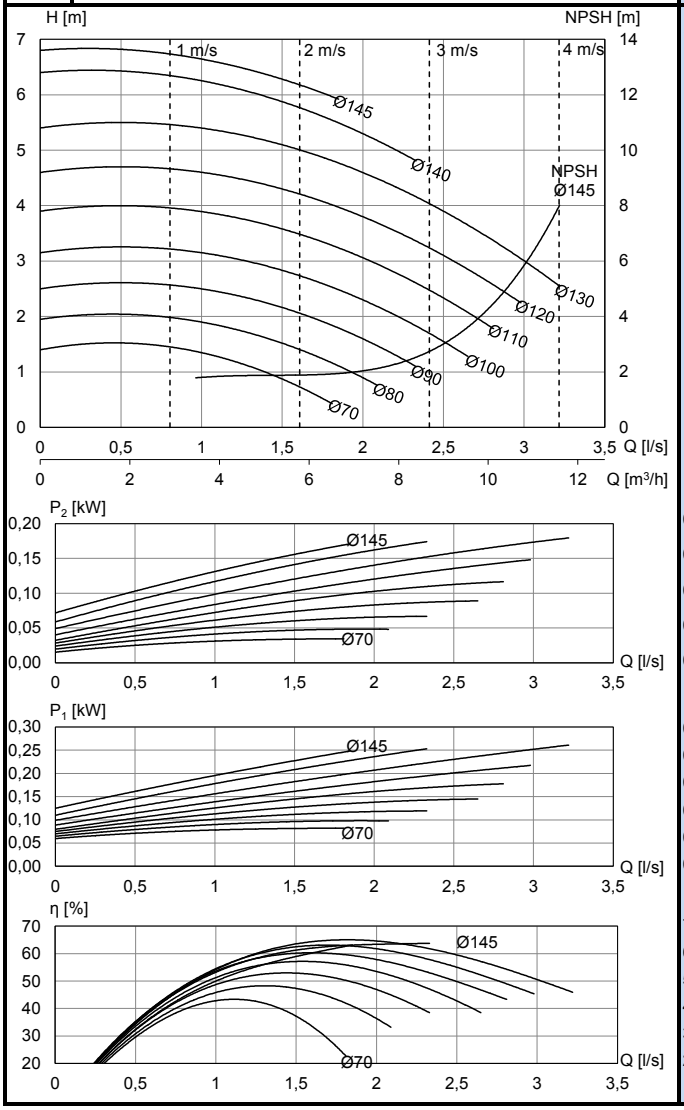


ALS-1032/4

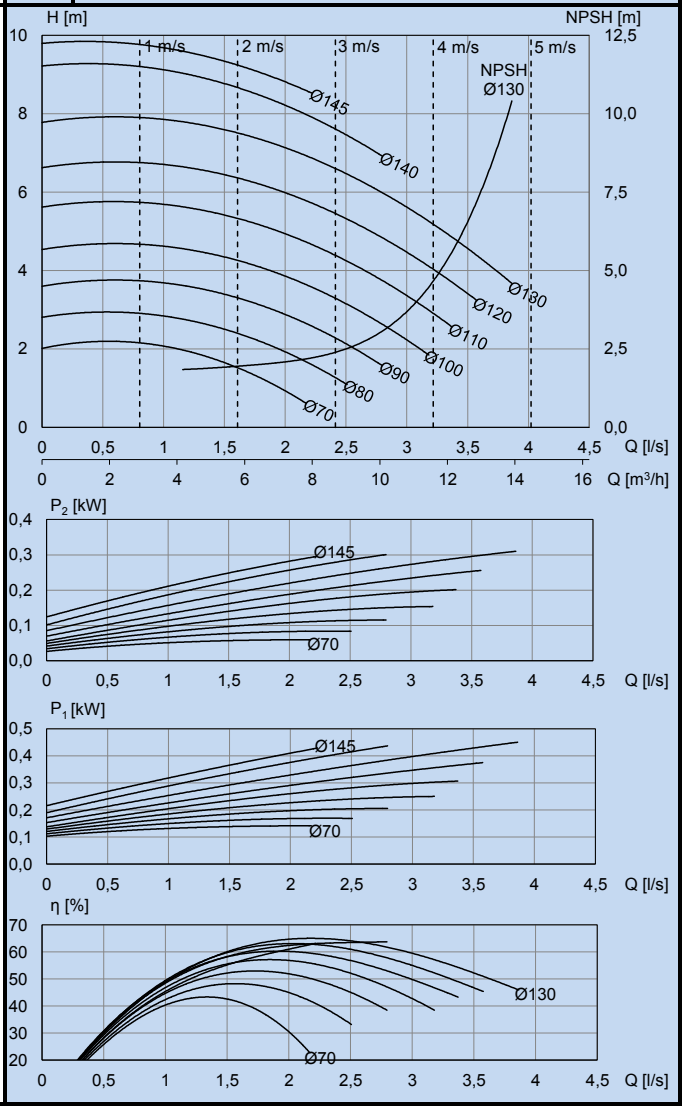


	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	OP-752 N13	0,2	0,65	22	240
	OKN-862L D N13	0,37	1,15	26	290
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	OP-752 N13	0,2 (0,24)	0,65 (0,65)	22	240
	OKN-862L D N13	0,37 (0,44)	1,15 (1,15)	26	290

50 Hz 1500r/min DN 32



60 Hz 1800r/min DN 32



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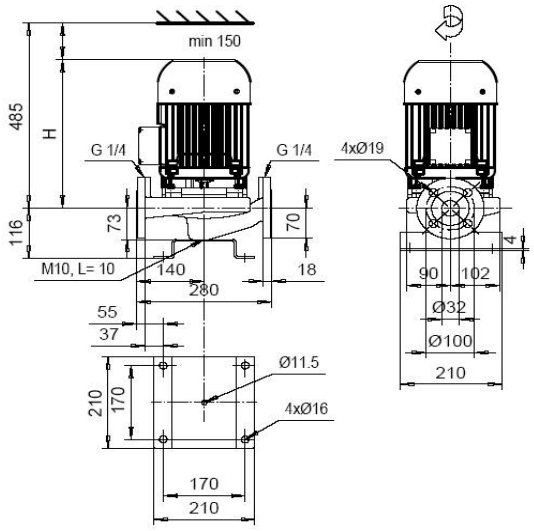
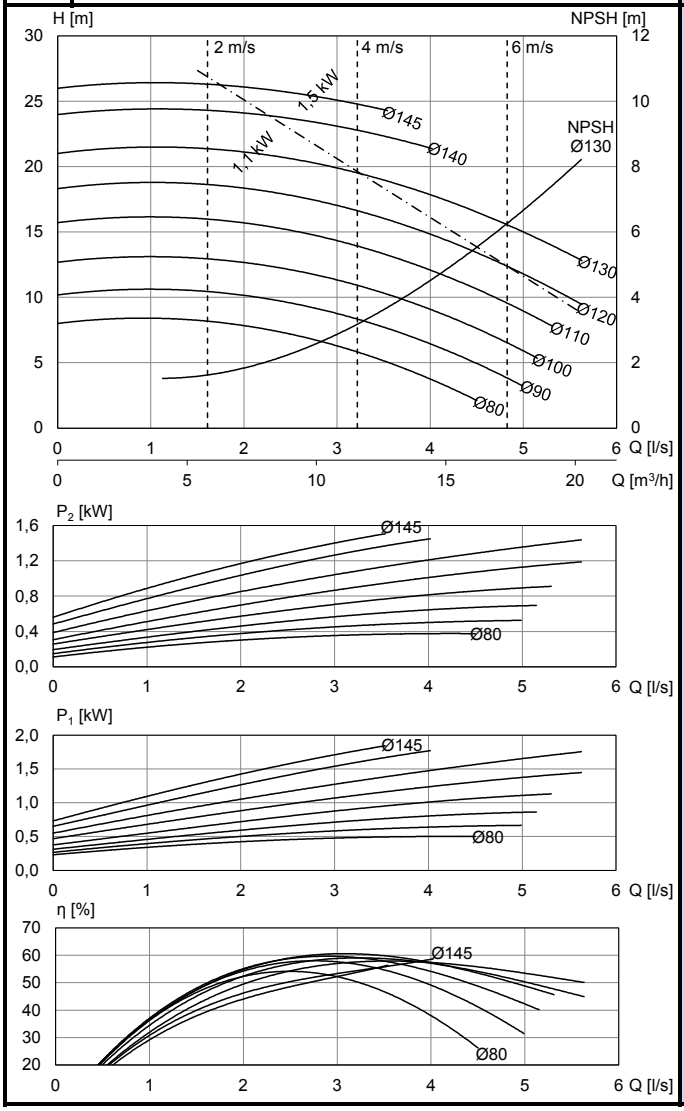
ALS-1032/2



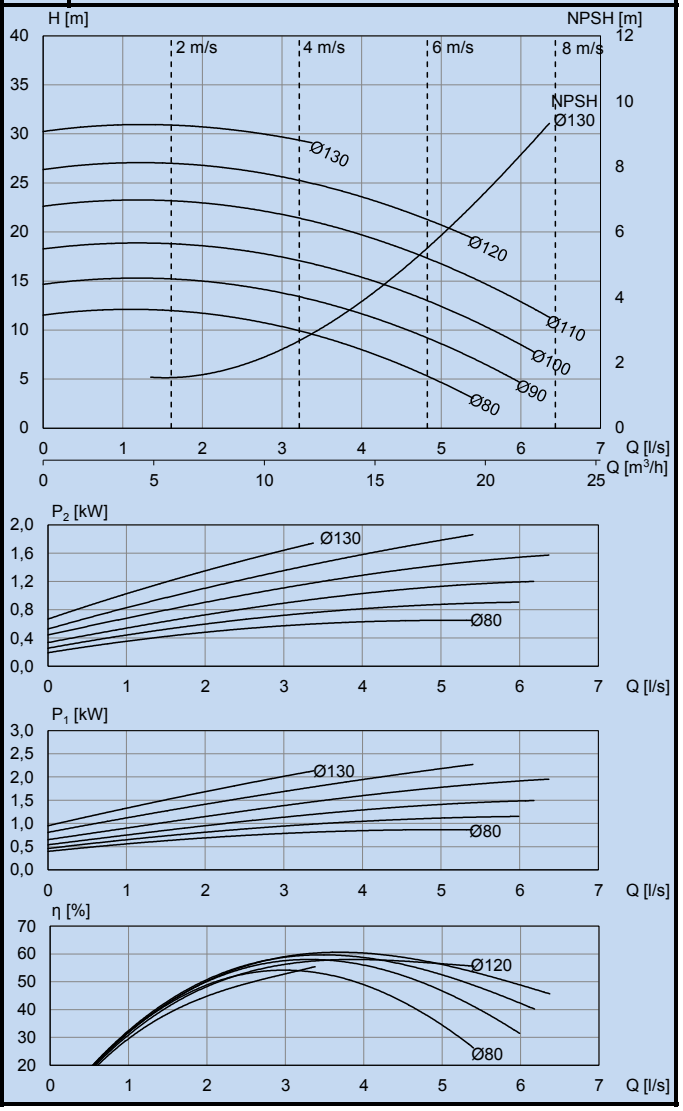
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KH-871 N13	1,1	2,55	27	295
	KH-101 C1 N13	1,5	2,95	39	335
60HZ	**Motor 380-400V(460-480V)**	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
	KH-871 N13	1,1 (1,3)	2,35 (2,50)	27	295
	KH-101 C1 N13	1,5 (1,8)	2,98 (3,02)	39	335

4

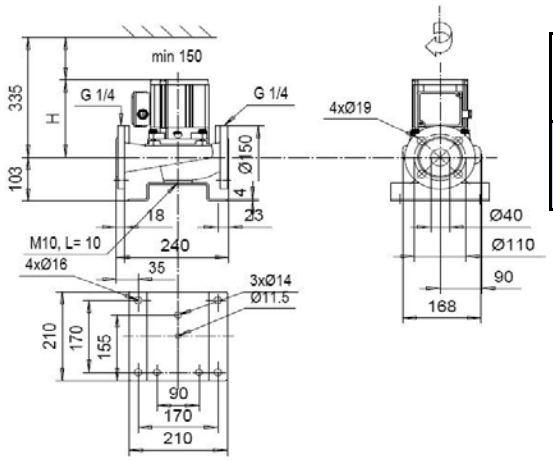
50 Hz 3000r/min DN 32



60 Hz 3600r/min DN 32

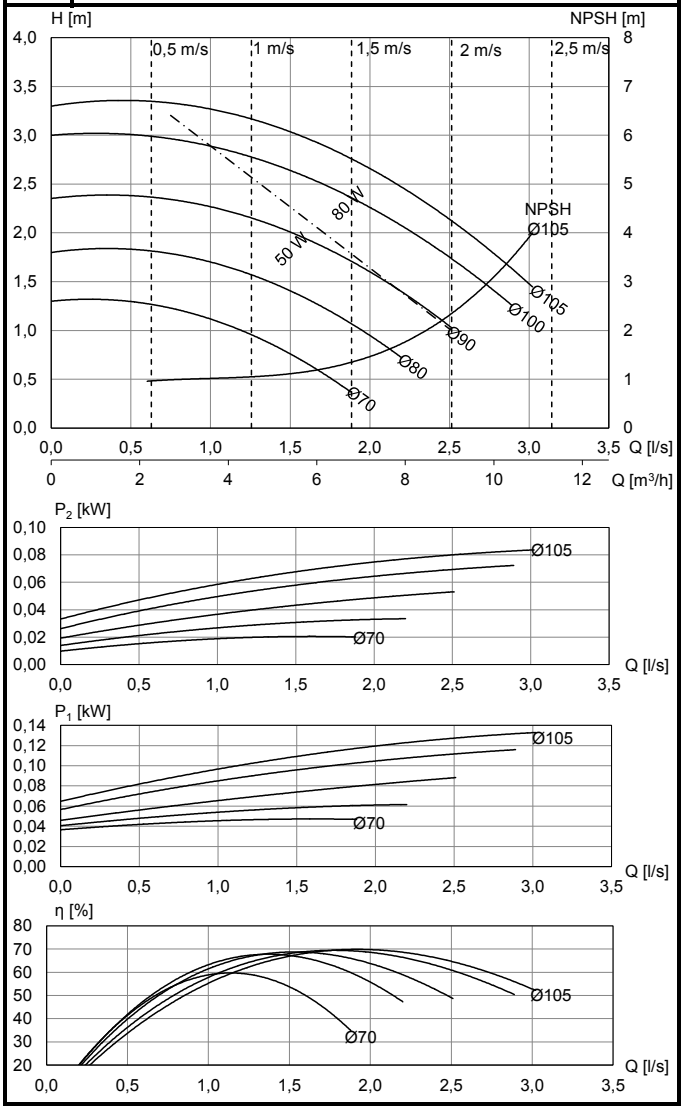


ALS-1040/4

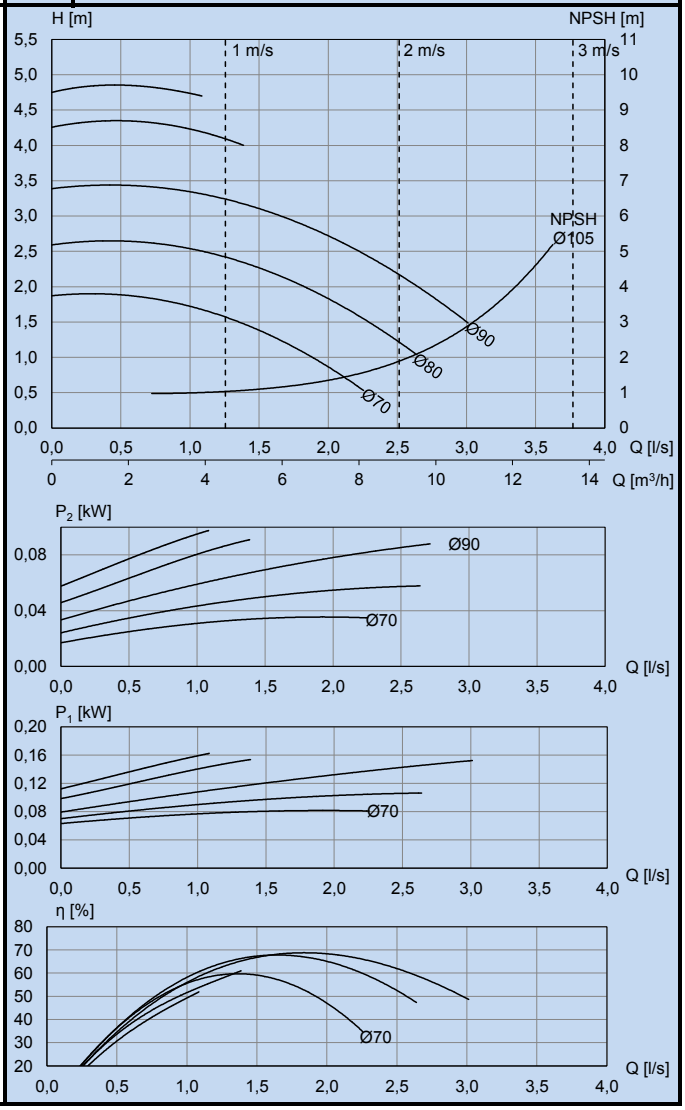


	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	OP-732 B N12	0,05	0,21	17	185
	OP-742 N12	0,08	0,28	18	185
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	OP-732 B N12	0,05 (0,06)	0,22 (0,22)	17	185
	OP-742 N12	0,08 (0,09)	0,28 (0,28)	18	185

50 Hz 1500r/min DN 40



60 Hz 1800r/min DN 40



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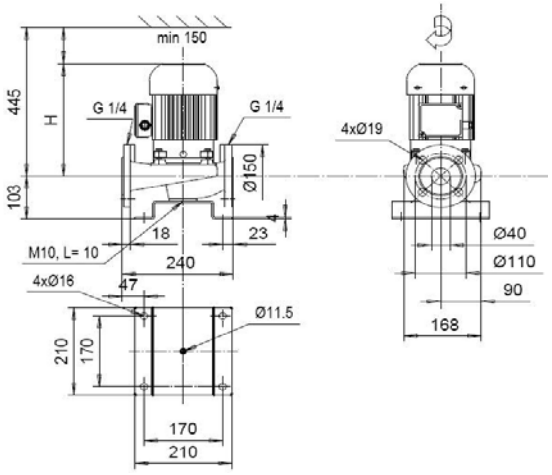
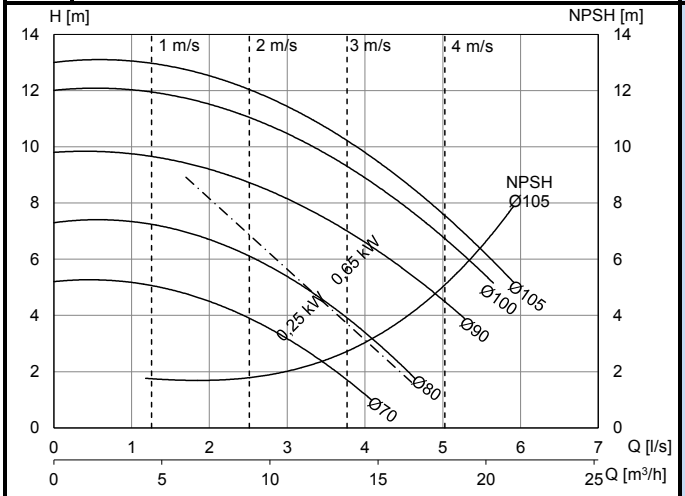
ALS-1040/2

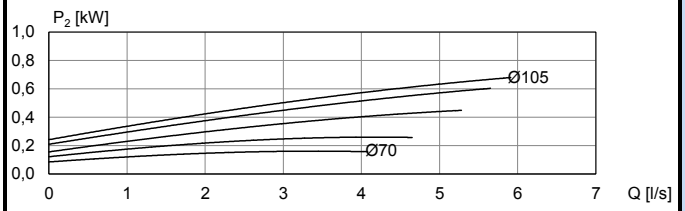


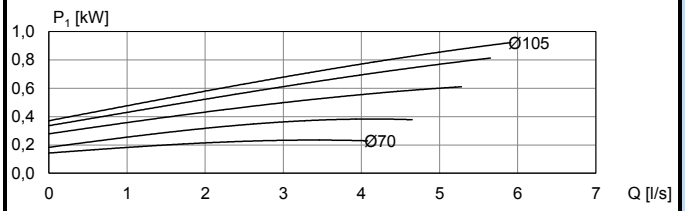
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	OP-741 N12	0,25	0,7	18	225
	OKN-841 D N12	0,65	1,75	22	275
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	OP-741 N12	0,25 (0,3)	0,7 (0,7)	18	225
	OKN-841 D N12	0,65 (0,75)	1,6 (1,6)	22	275
	KH-871 N12	1,1 (1,3)	2,4 (2,5)	24	295

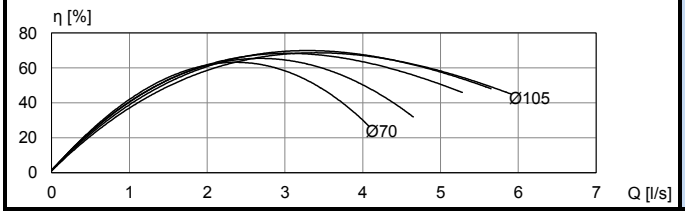
4

50 Hz 3000r/min DN 40

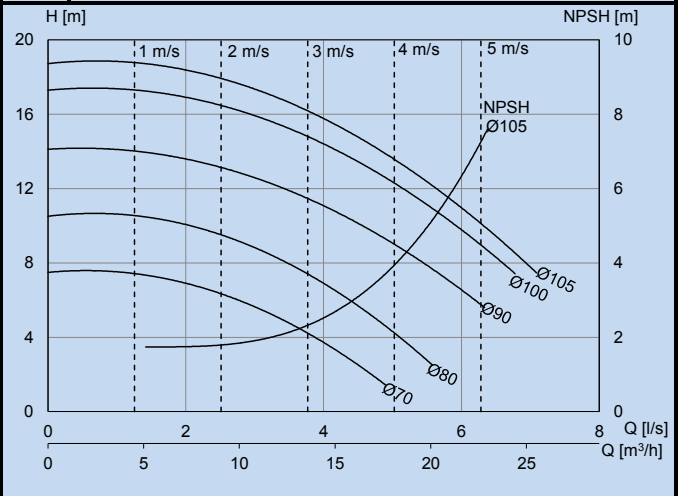


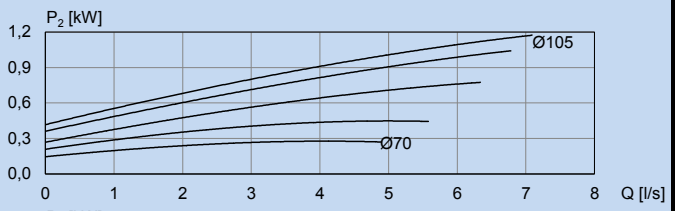


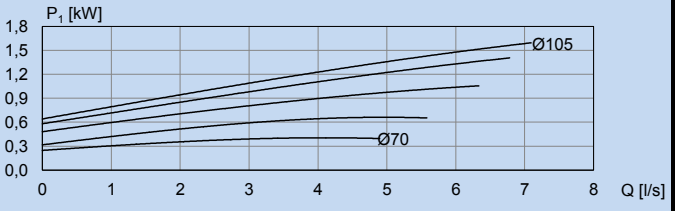


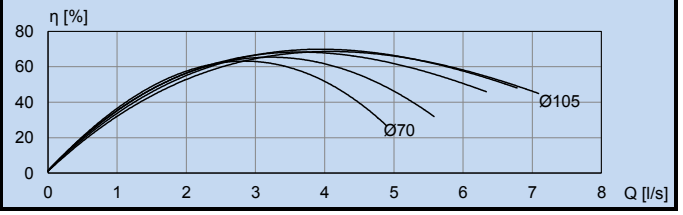


60 Hz 3600r/min DN 40

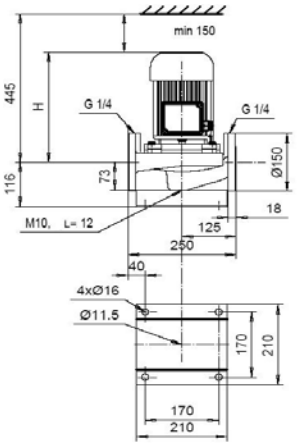


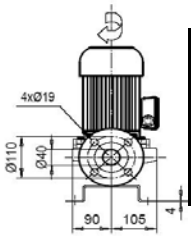






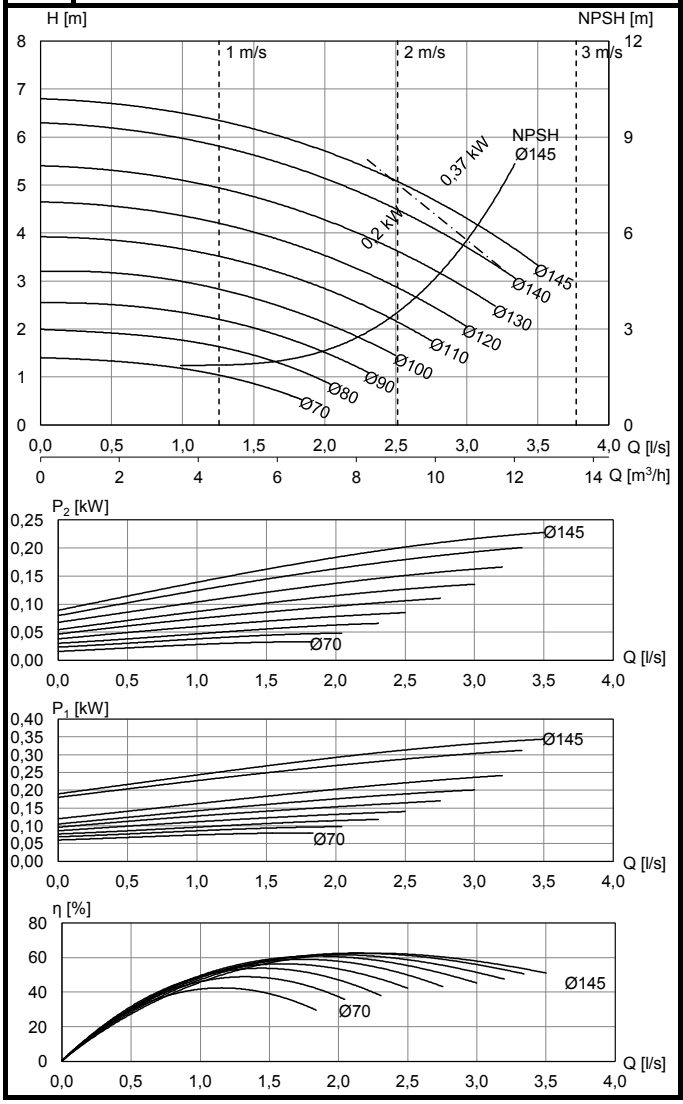
L-40A/4



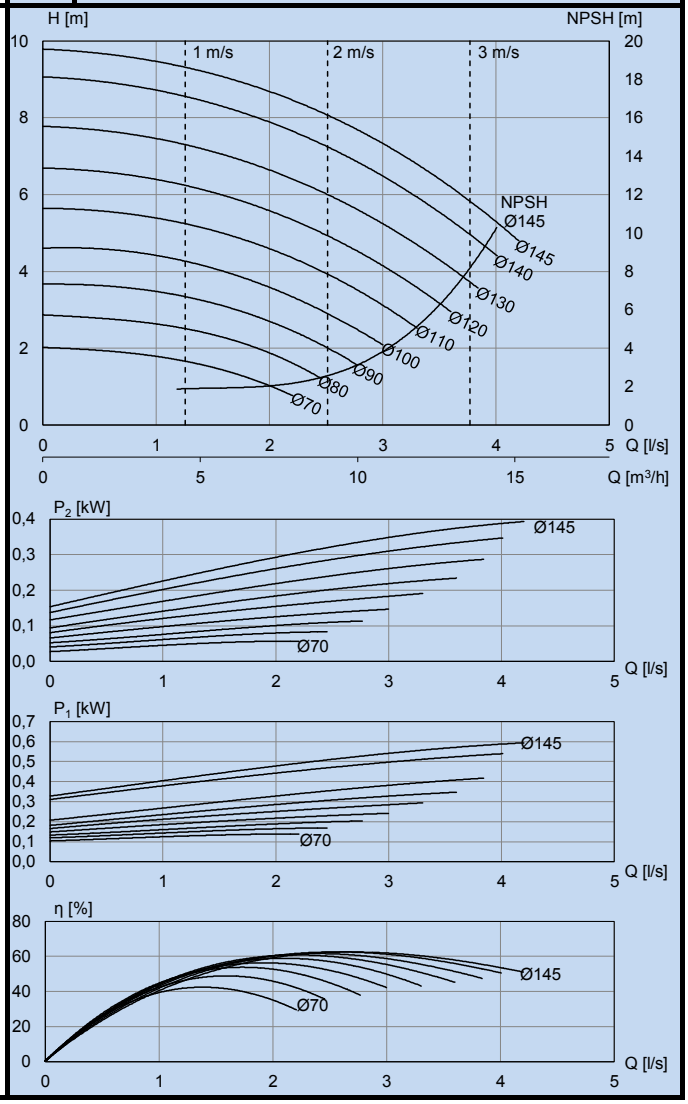


	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	OP-752 N13	0,2	0,65	21	240
	OKN-862L D N13	0,37	1,15	25	295
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	OP-752 N13	0,2 (0,24)	0,65 (0,65)	21	240
	OKN-862L D N13	0,37 (0,44)	1,15 (1,15)	25	295

50 Hz 1500r/min DN 40



60 Hz 1800r/min DN 40



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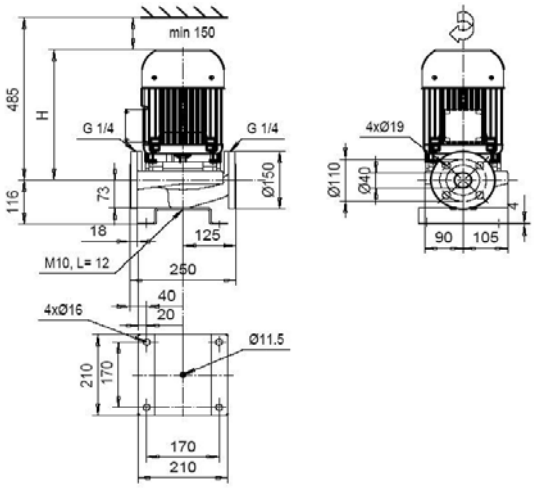
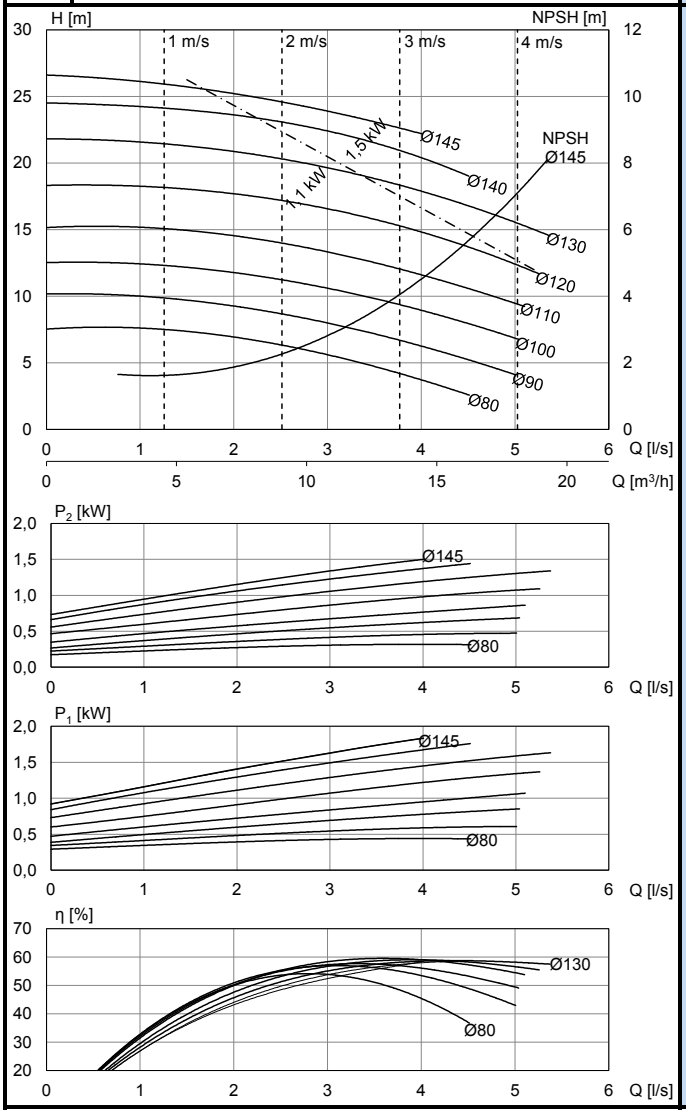
L-40A/2



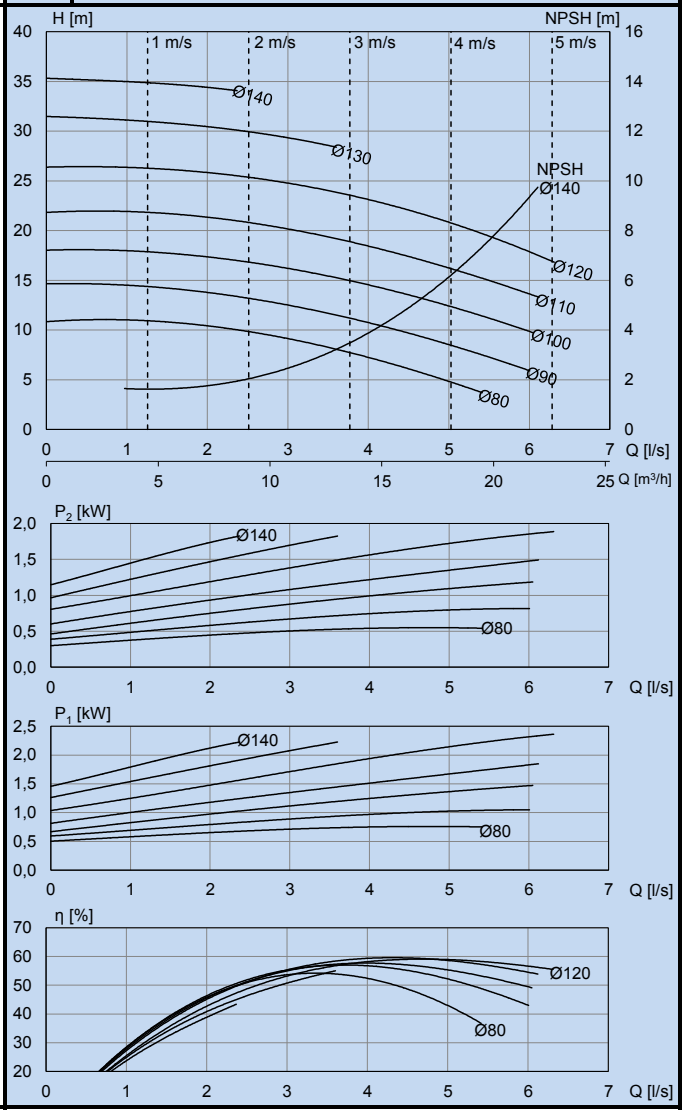
50HZ	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
	KH-871 N13	1,1	2,55	26	295
	KH-101 C1 N13	1,5	2,95	37	335
60HZ	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KH-871 N13	1,1 (1,3)	2,35 (2,50)	26	295
	KH-101 C1 N13	1,5 (1,8)	2,98 (3,02)	37	335

4

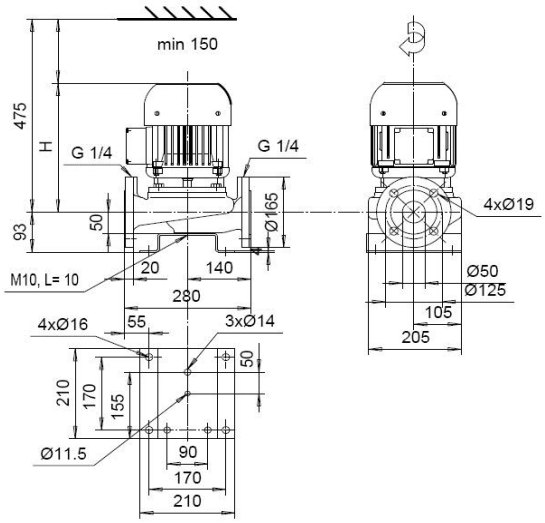
50 Hz 3000r/min DN 40



60 Hz 3600r/min DN 40

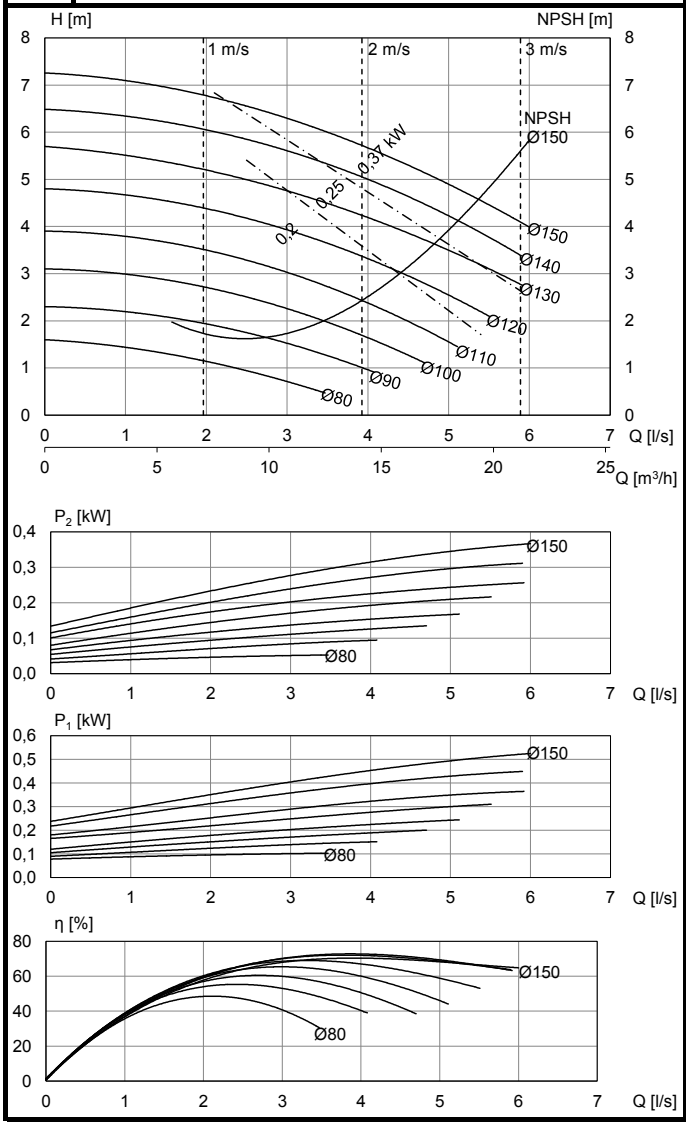


L-50A/4 LP-50A/4

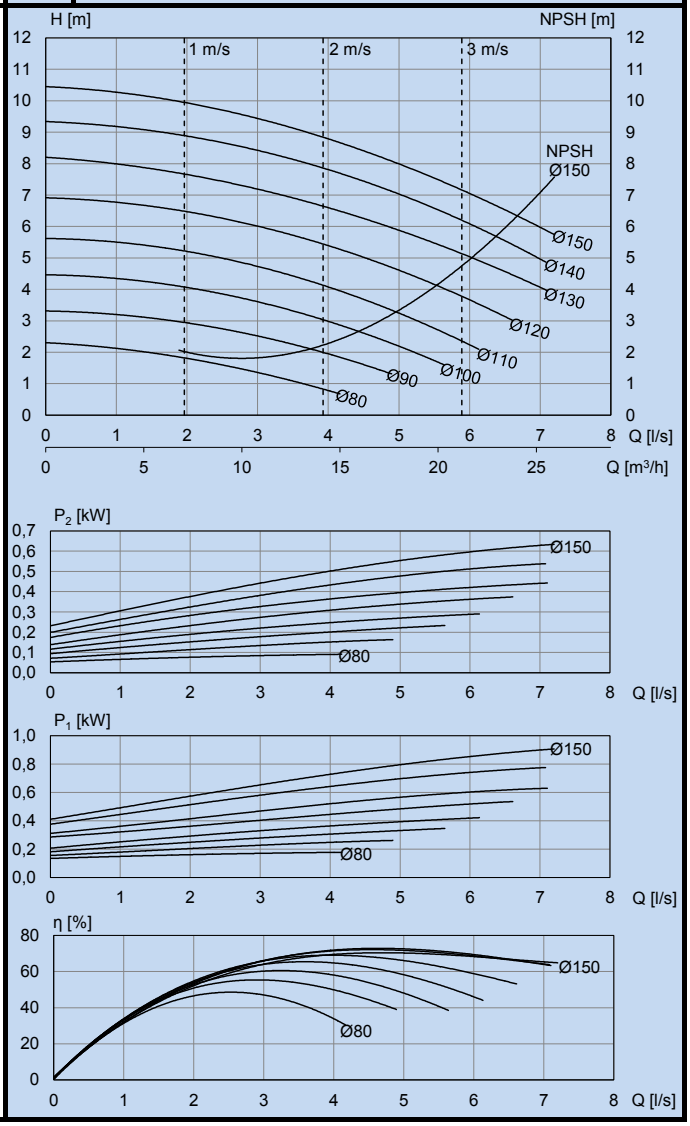


	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	OP-752 F15	0,2	0,65	23	250
	OP-762 F15	0,25	0,82	24	250
	OKN-862 D F15	0,37	1,15	27	280
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	OP-752 F15	0,2 (0,24)	0,65 (0,65)	23	250
	OP-762 F15	0,25 (0,3)	0,82 (0,82)	24	250
	OKN-862 D F15	0,37 (0,44)	1,15 (1,15)	27	280
	KH-100 A2 F15	0,55 (0,66)	1,28 (1,30)	35	325

50 Hz 1500r/min DN 50

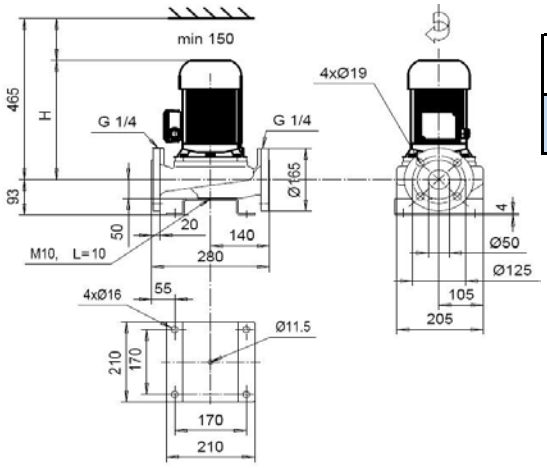


60 Hz 1800r/min DN 50



4

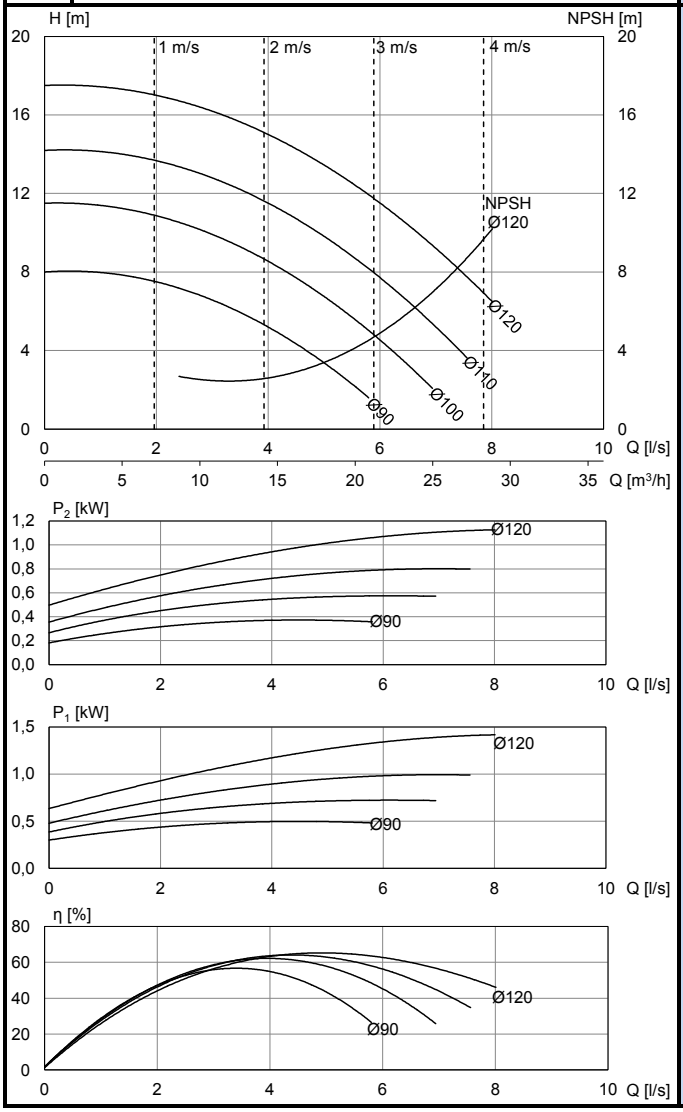
L-50B/2 | LH-50B/2 | LP-50B/2



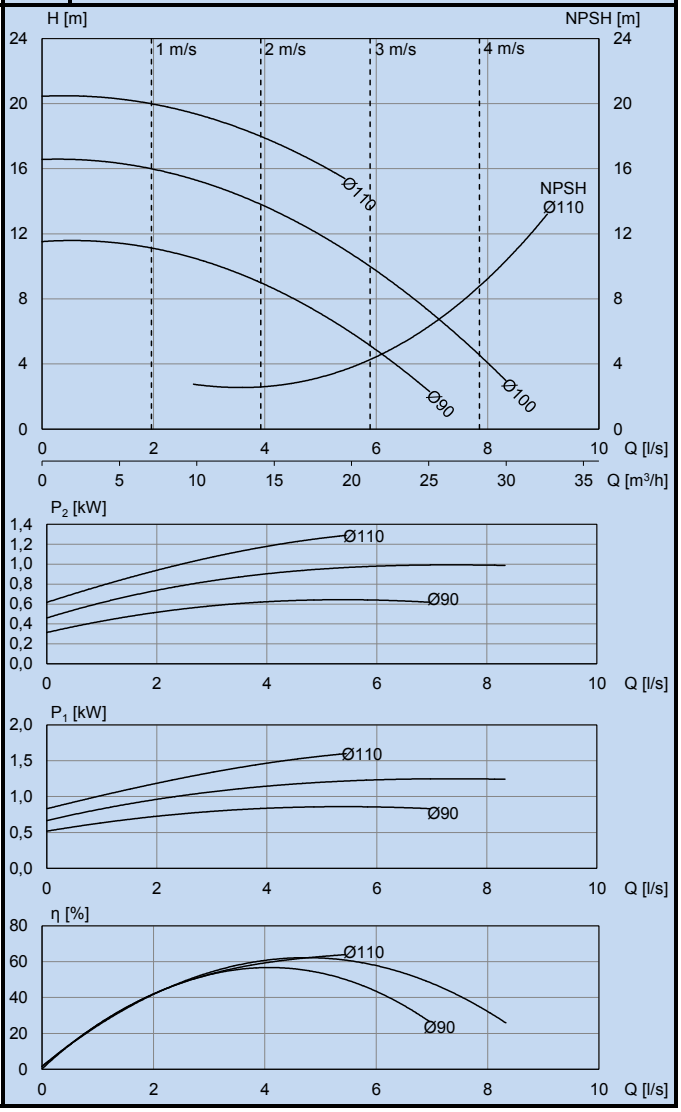
50HZ	**Motor 400V**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KH-871 F15	1,1	2,55	30	315
60HZ	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KH-871 F15	1,1 (1,3)	2,35 (2,50)	30	315

4

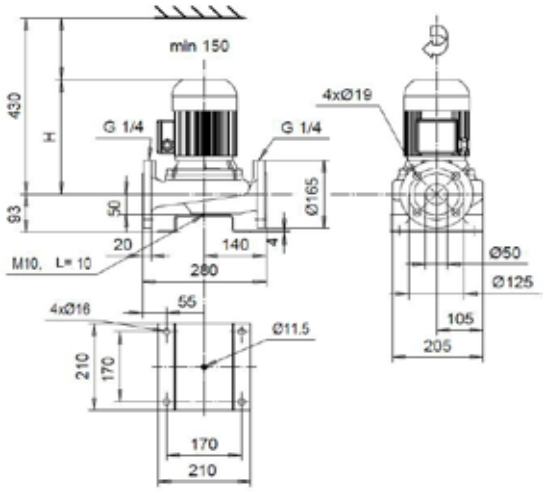
50 Hz 3000r/min DN 50



60 Hz 3600r/min DN 50

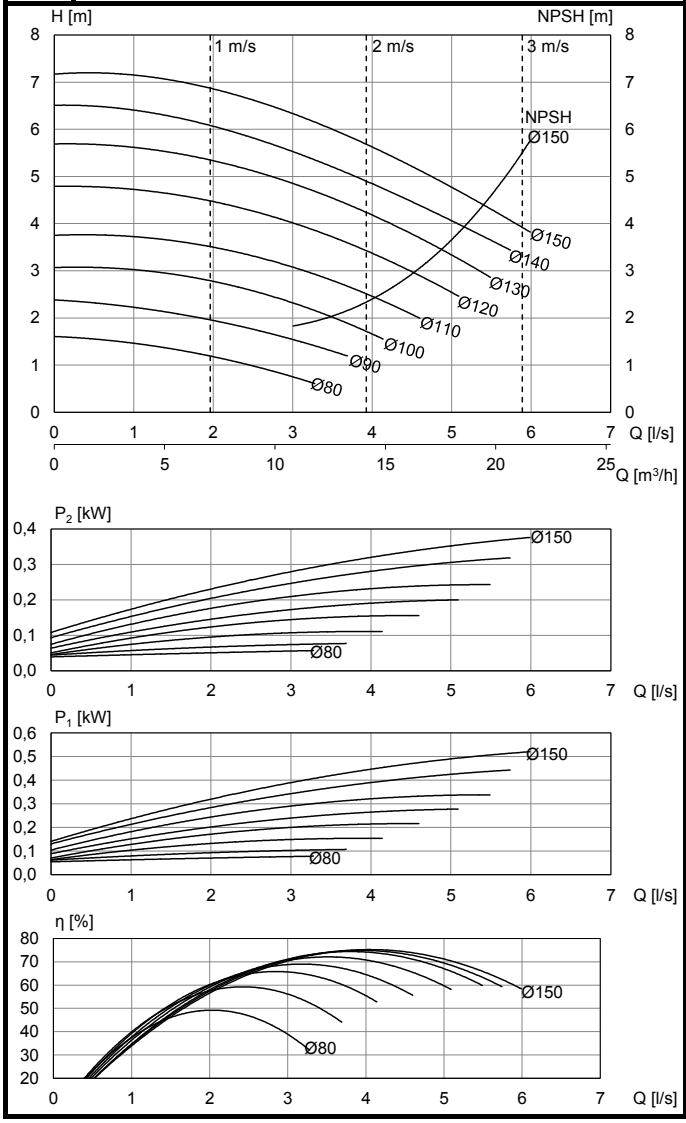


L-50D/4 | LH-50D/4 | LP-50D/4

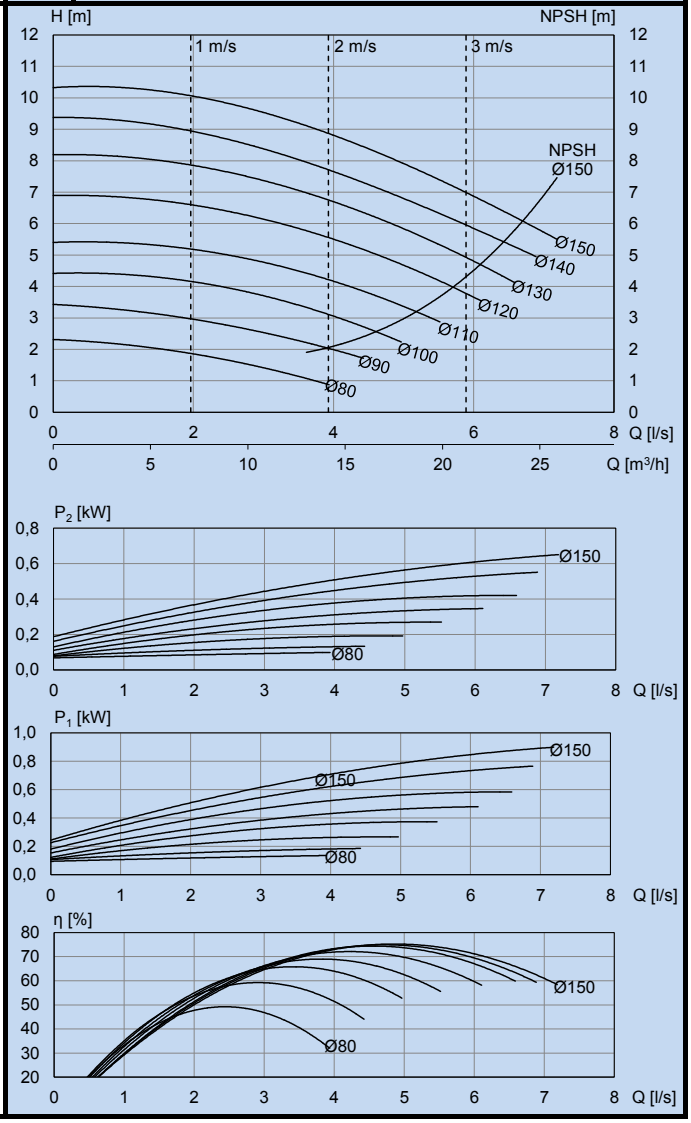


50HZ	**Motor 400V**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	OKN-862L D F16	0,37	1,15	30	280
60HZ	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	OKN-862L D F16	0,37 (0,44)	1,15 (1,15)	30	280
	KH-100 A2 F15	0,55 (0,66)	1,28 (1,30)	35	325

50 Hz 1500r/min DN 50



60 Hz 1800r/min DN 50



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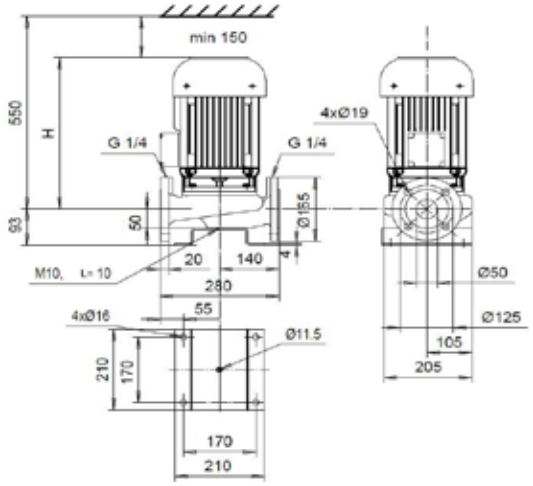
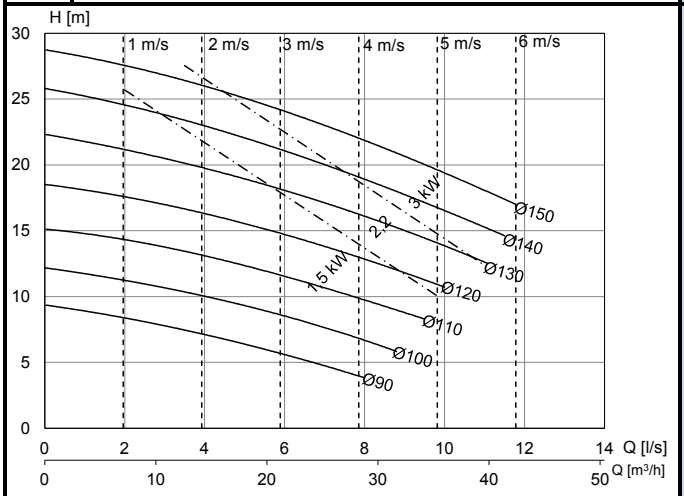
L-50D/2 | LH-50D/2 | LP-50D/2

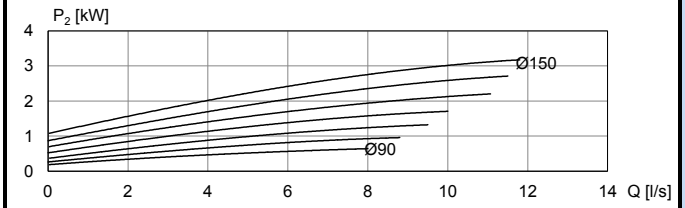


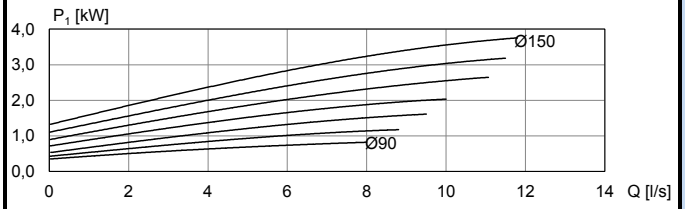
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	KH-101 C1 F16	1,5	2,95	40	355
	KH-101 D1 F16	2,2	4,28	43	355
	KH-112 C1 F16	3	6,05	49	400
60Hz	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KH-101 C1 F16	1,5 (1,8)	2,98 (3,02)	40	355
	KH-101 D1 F16	2,2 (2,6)	4,35 (4,33)	43	355
	KH-112 C1 F16	3 (3,6)	6,0 (6,05)	49	400
	KH-112 E1 F16	4 (4,8)	7,9 (8,0)	54	400

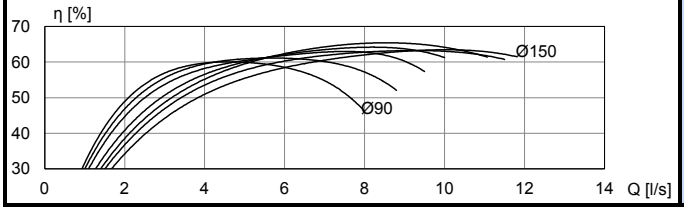
4

50 Hz 3000r/min DN 50

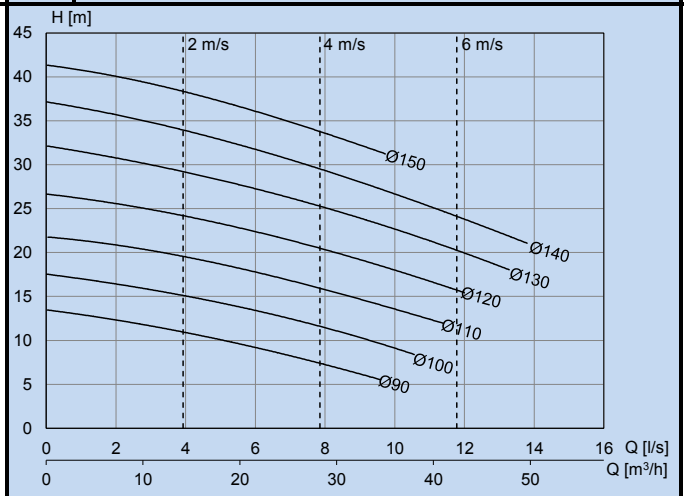


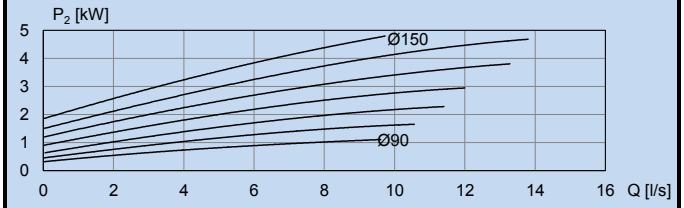


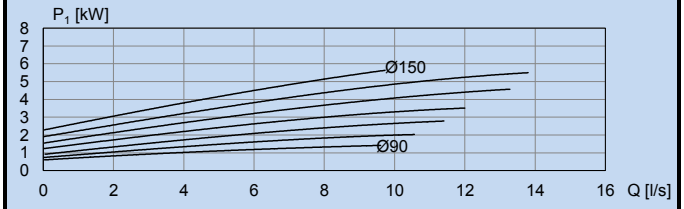


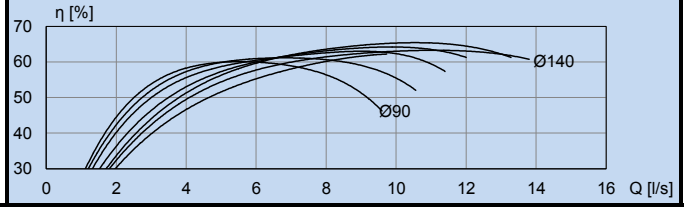


60 Hz 3600r/min DN 50

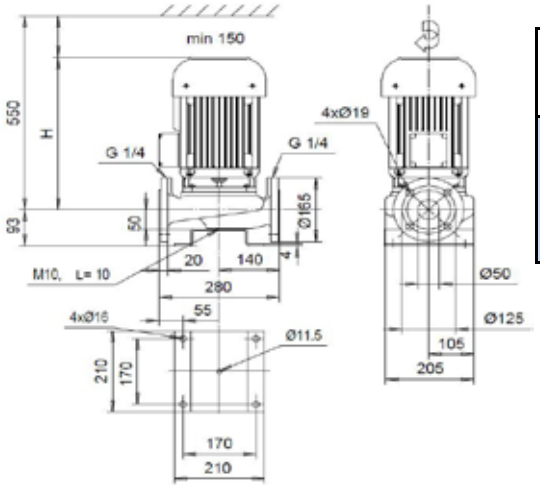






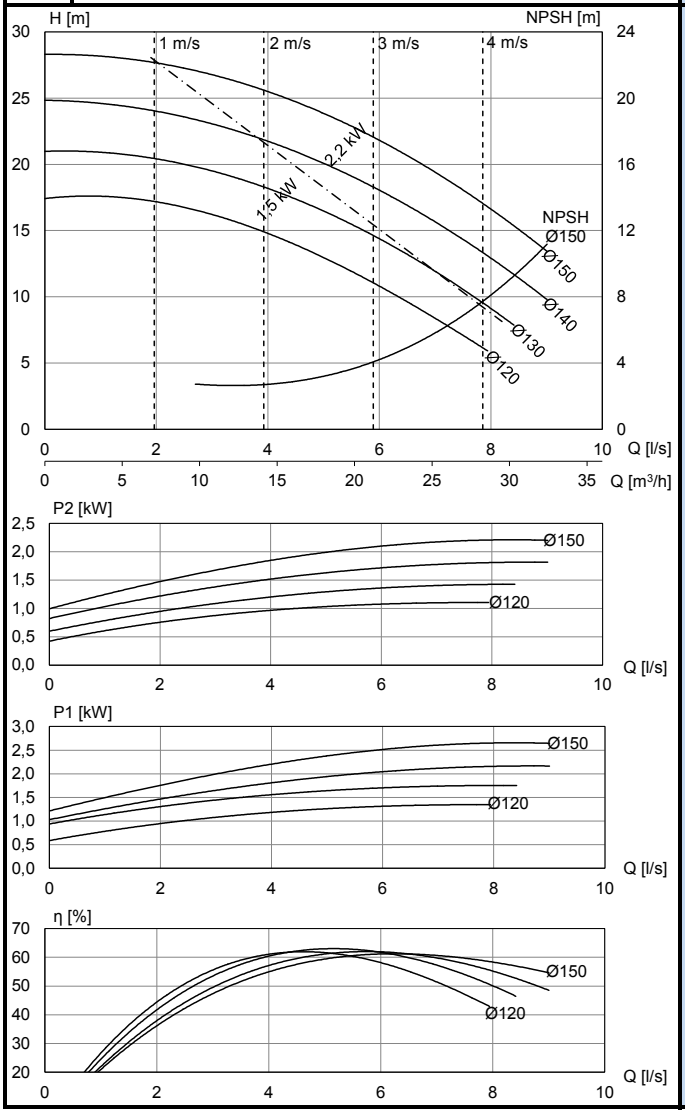


L-50C/2 | LH-50C/2 | LP-50C/2

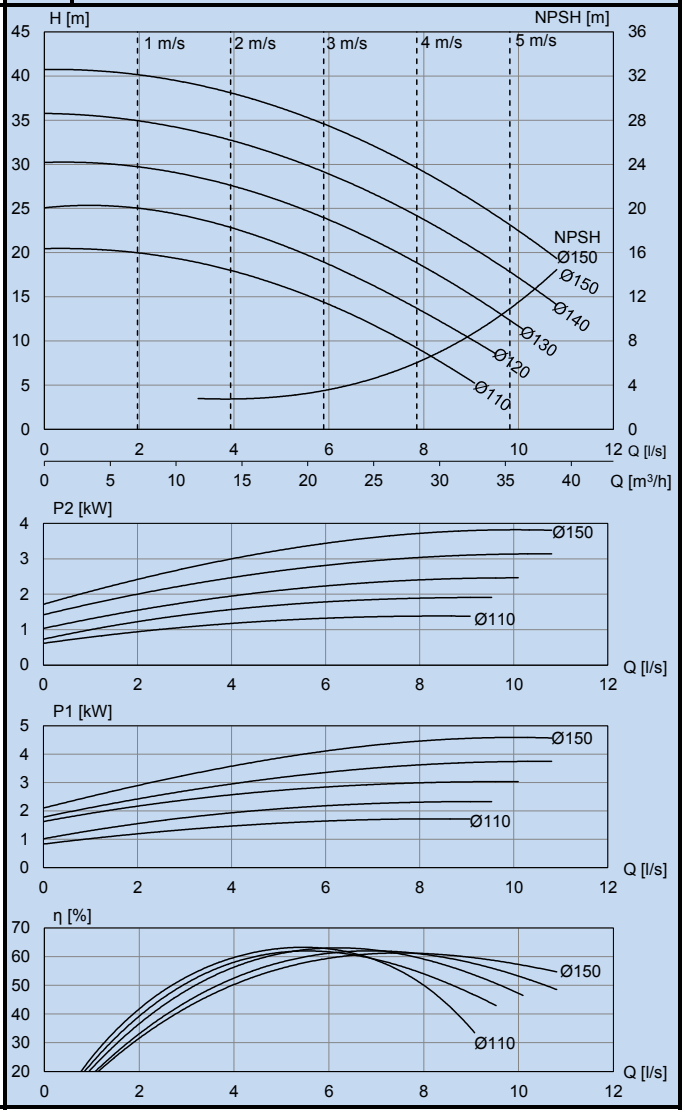


	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	KH-101 C1 F16	1,5	2,95	40	355
	KH-101 D1 F16	2,2	4,28	43	355
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60Hz	KH-101 C1 F16	1,5 (1,8)	2,98 (3,02)	40	355
	KH-101 D1 F16	2,2 (2,6)	4,35 (4,33)	43	355
	KH-112 C1 F16	3 (3,6)	6,00 (6,05)	49	400
	KH-112 E1 F16	4 (4,8)	7,9 (8,0)	54	400

50 Hz 3000r/min DN 50



60 Hz 3600r/min DN 50



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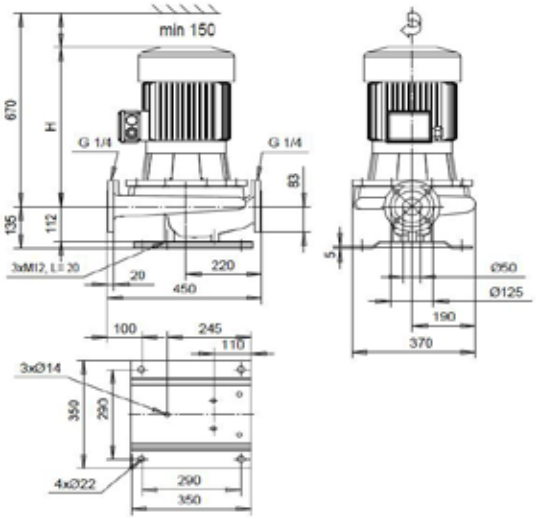
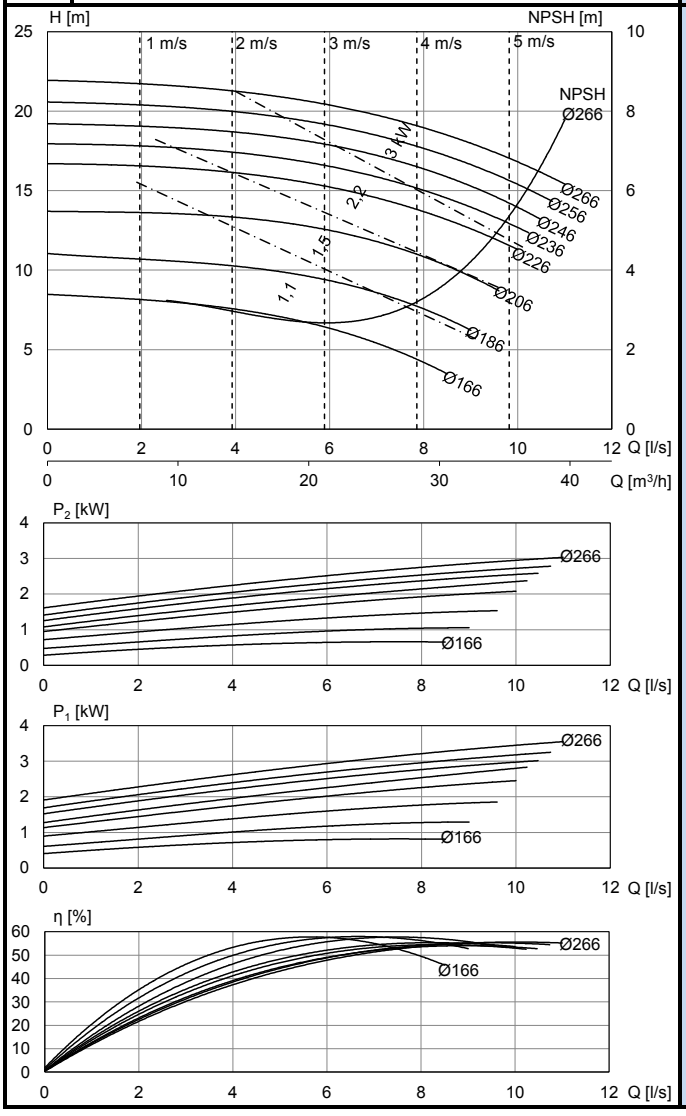
L-50S/4 LH-50S/4



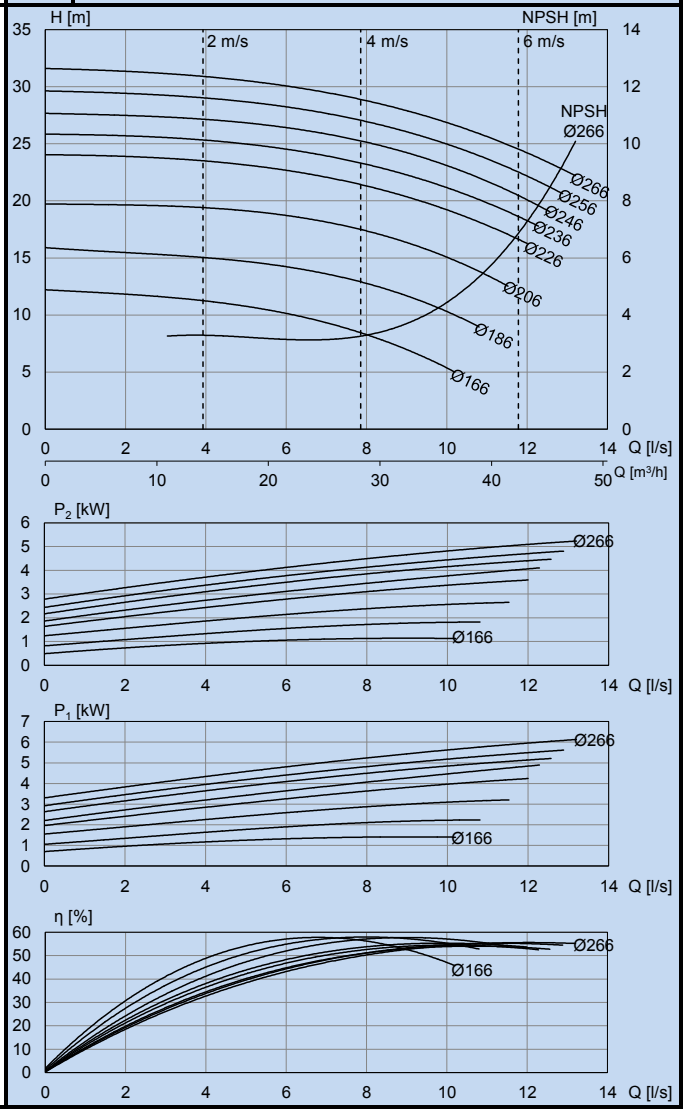
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KH-101 C2 F29	1,1	2,44	85	430
	KH-101 D2 F29	1,5	3,27	88	430
	KH-112 C2 F29	2,2	4,60	93	475
	KH-112 E2 F29	3	6,25	98	475
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	KH-101 C2 F29	1,1 (1,3)	2,43 (2,43)	85	430
	KH-101 D2 F29	1,5 (1,8)	3,23 (3,32)	88	430
	KH-112 C2 F29	2,2 (2,6)	4,55 (4,60)	93	475
	KH-112 E2 F29	3 (3,6)	6,15 (6,25)	98	475
	KH-132 C2 F29	4 (4,8)	8,17 (8,30)	125	520
	KH-132 E2 F29	5,5 (6,6)	11,00 (11,15)	130	520

4

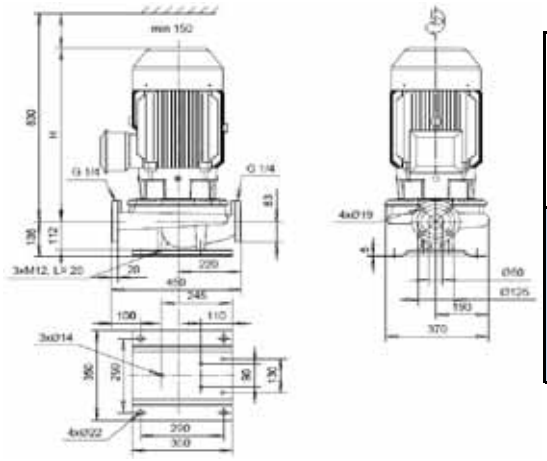
50 Hz 1500r/min DN 50



60 Hz 1800r/min DN 50



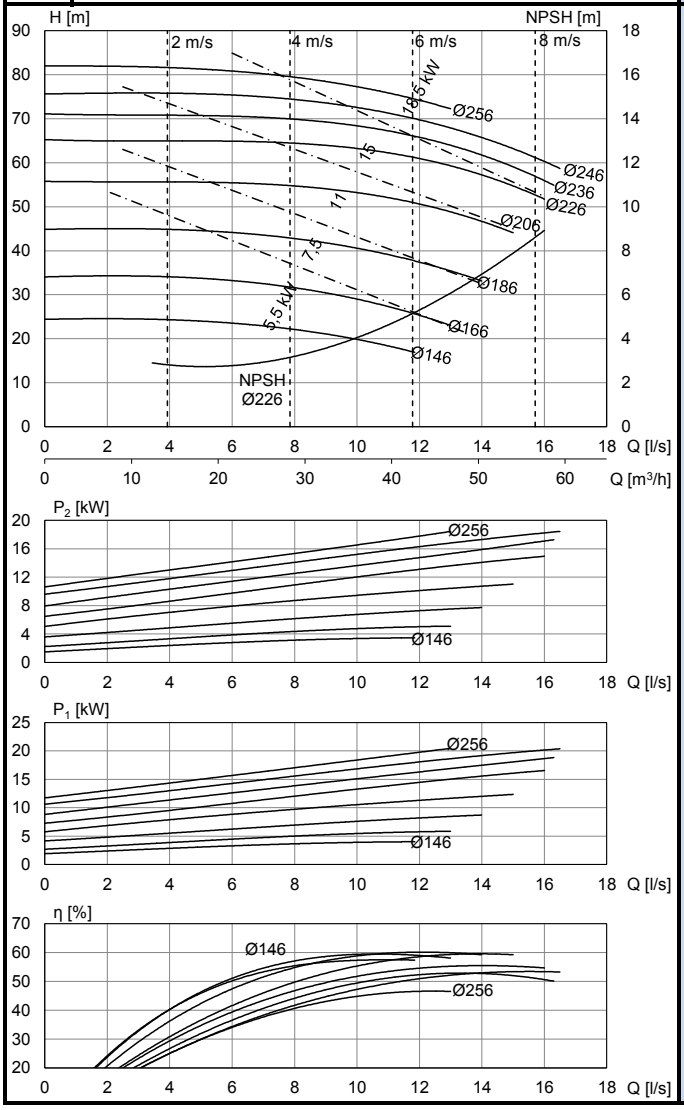
L-50S/2 LH-50S/2



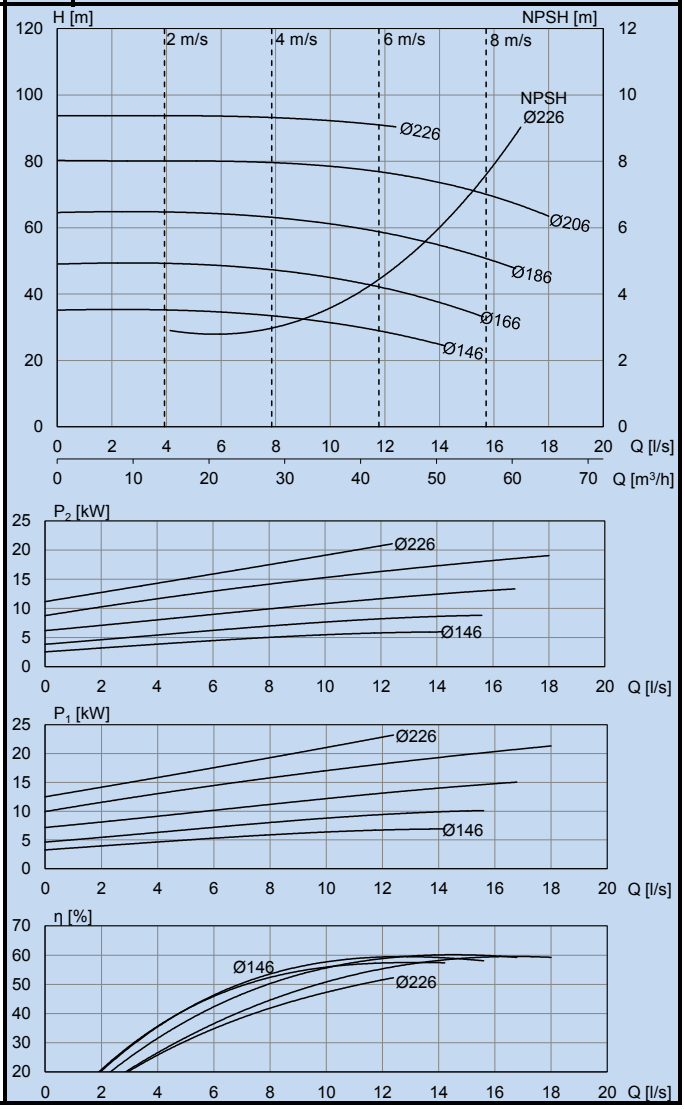
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	KH-132 C1 F29	5,5	10,20	125	520
	KH-132 E1 F29	7,5	13,75	135	520
	KZ-165 E1 F29	11	20,20	185	680
	KZ-165 F1 F29	15	26,95	190	680
	KZ-165A H1 F29	18,5	32,60	195	680
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60Hz	KH-132 C1 F29	5,5 (6,6)	10,25 (10,40)	125	520
	KH-132 E1 F29	7,5 (9)	13,80 (14,05)	135	520
	KZ-165 E1 F29	11 (13)	20,60 (20,30)	185	680
	KZ-165 F1 F29	15 (18)	28,05 (27,90)	190	680
	KZ-165A H1 F29	18,5 (22)	33,90 (33,60)	195	680

4

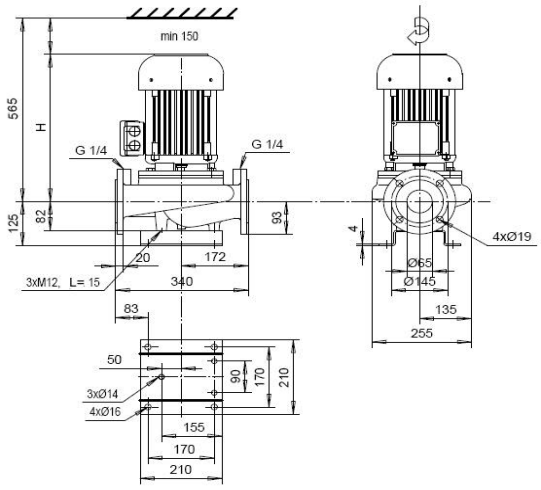
50 Hz 3000r/min DN 50



60 Hz 3600r/min DN 50



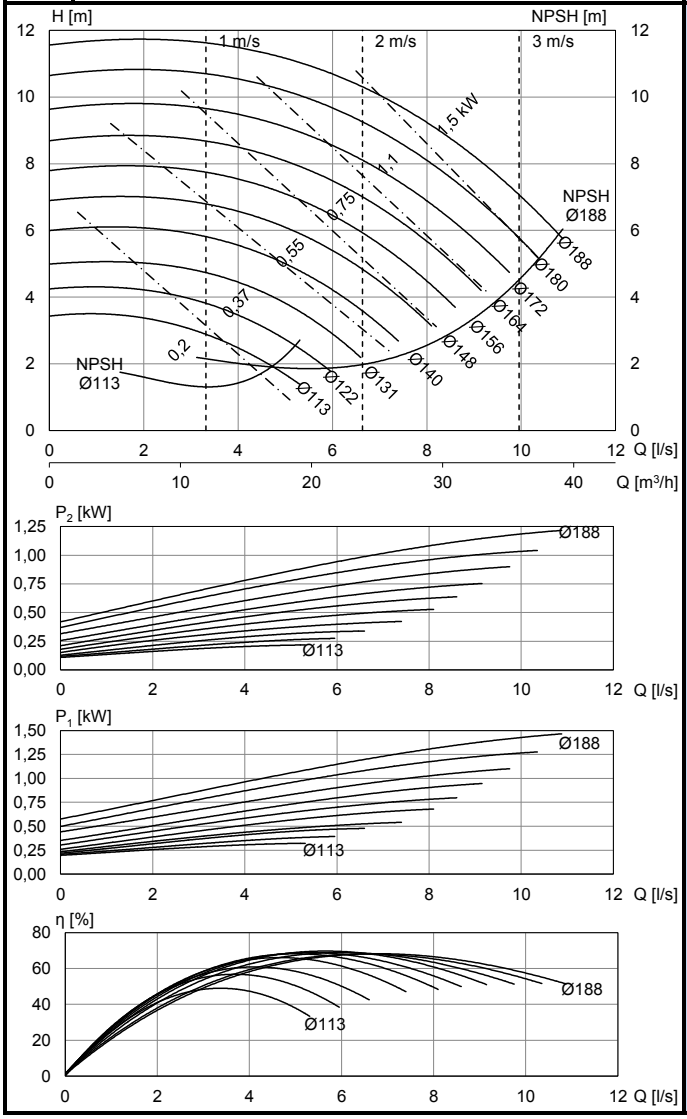
L-65A/4 LH-65A/4



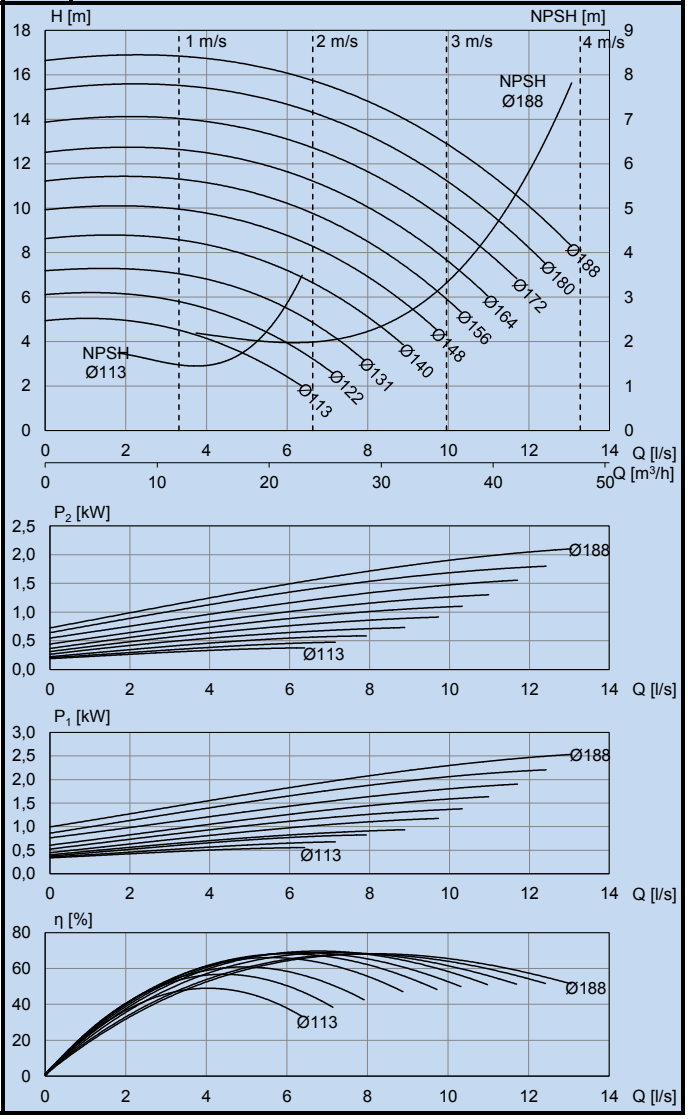
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	OKN-852 D F19	0,2	0,75	37	310
	OKN-852 D F19	0,37	1	37	310
	KH-100 A2 F19	0,55	1,27	45	320
	KH-100 B2 F19	0,75	1,74	45	320
	KH-101 C2 F19	1,1	2,44	50	370
	KH-101 D2 F19	1,5	3,27	52	370
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60Hz	OKN-852 D F19	0,37 (0,44)	1 (1)	37	310
	KH-100 A2 F19	0,55 (0,66)	1,28 (1,30)	45	320
	KH-100 B2 F19	0,75 (0,9)	1,70 (1,74)	45	320
	KH-101 C2 F19	1,1 (1,3)	2,43 (2,43)	50	370
	KH-101 D2 F19	1,5 (1,8)	3,23 (3,32)	52	370
	KH-112 C2 F19	2,2 (2,6)	4,55 (4,60)	58	415
	KH-112 E2 F19	3 (3,6)	6,15 (6,25)	62	415

4

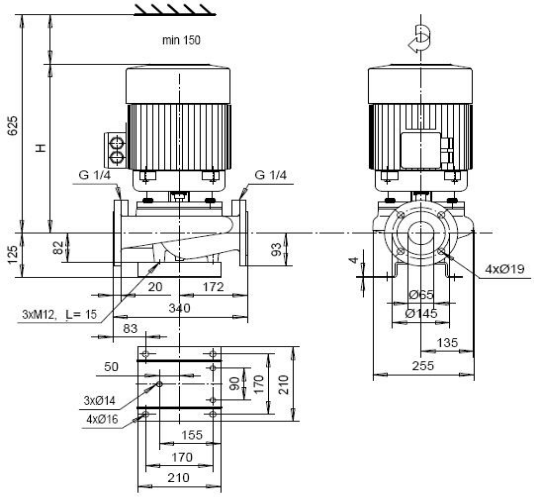
50 Hz 1500r/min DN 65



60 Hz 1800r/min DN 65

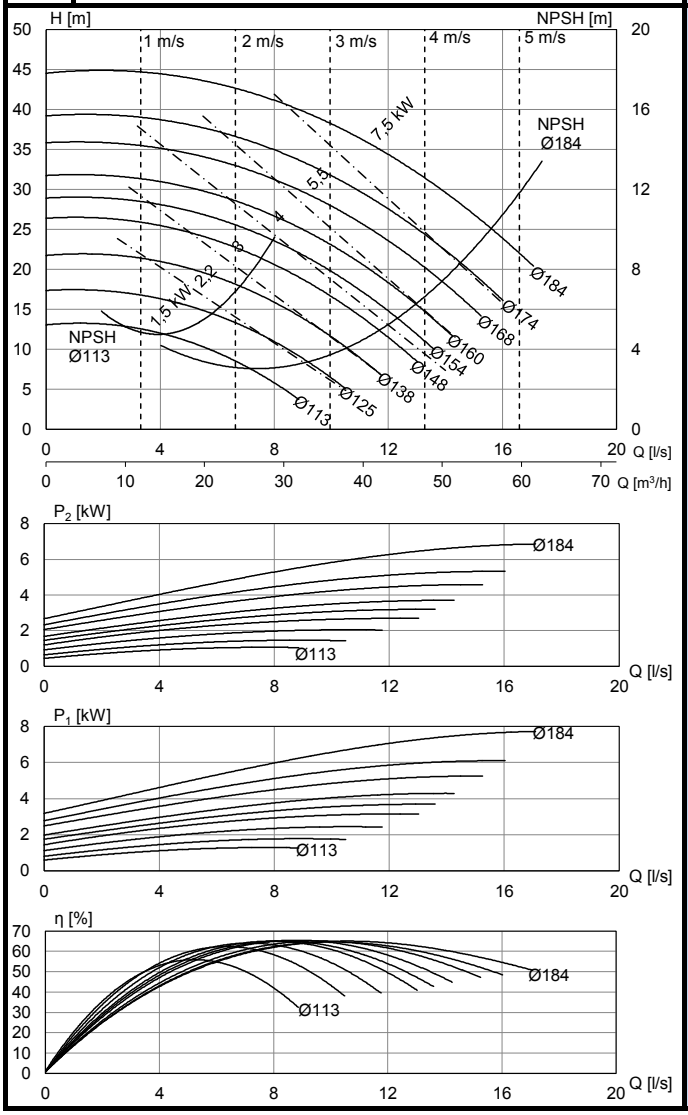


L-65B/2 LH-65B/2 LS-65B/2

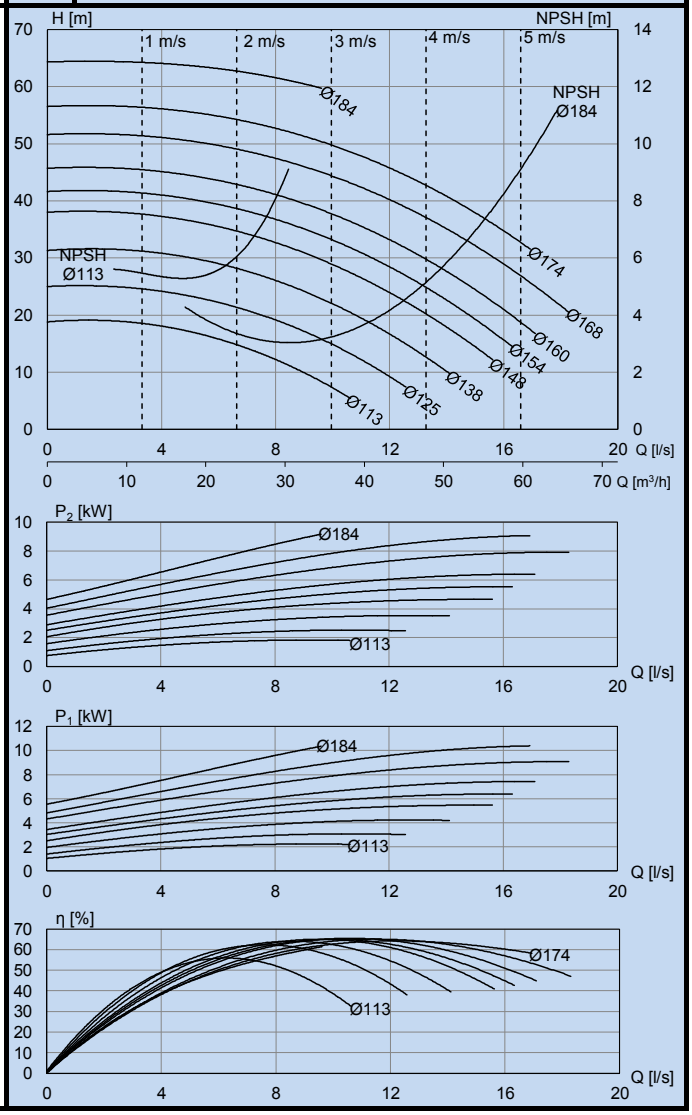


	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KH-101 C1 F19	1,5	2,95	50	370
	KH-101 D1 F19	2,2	4,28	52	370
	KH-112 C1 F19	3,0	6,05	58	415
	KH-112 E1 F19	4,0	7,95	63	415
	KH-132 C1 F19	5,5	10,20	87	475
	KH-132 E1 F19	7,5	13,75	95	475
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	KH-101 C1 F19	1,5 (1,8)	2,98 (3,02)	50	370
	KH-101 D1 F19	2,2 (2,6)	4,35 (4,33)	52	370
	KH-112 C1 F19	3 (3,6)	6,00 (6,05)	58	415
	KH-112 E1 F19	4 (4,8)	7,90 (8,00)	63	415
	KH-132 C1 F19	5,5 (6,6)	10,25 (10,40)	87	475
	KH-132 E1 F19	7,5 (9)	13,80 (14,05)	95	475

50 Hz 3000r/min DN 65

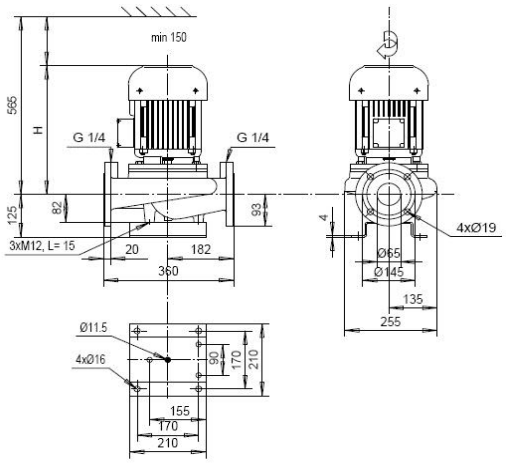


60 Hz 3600r/min DN 65



4

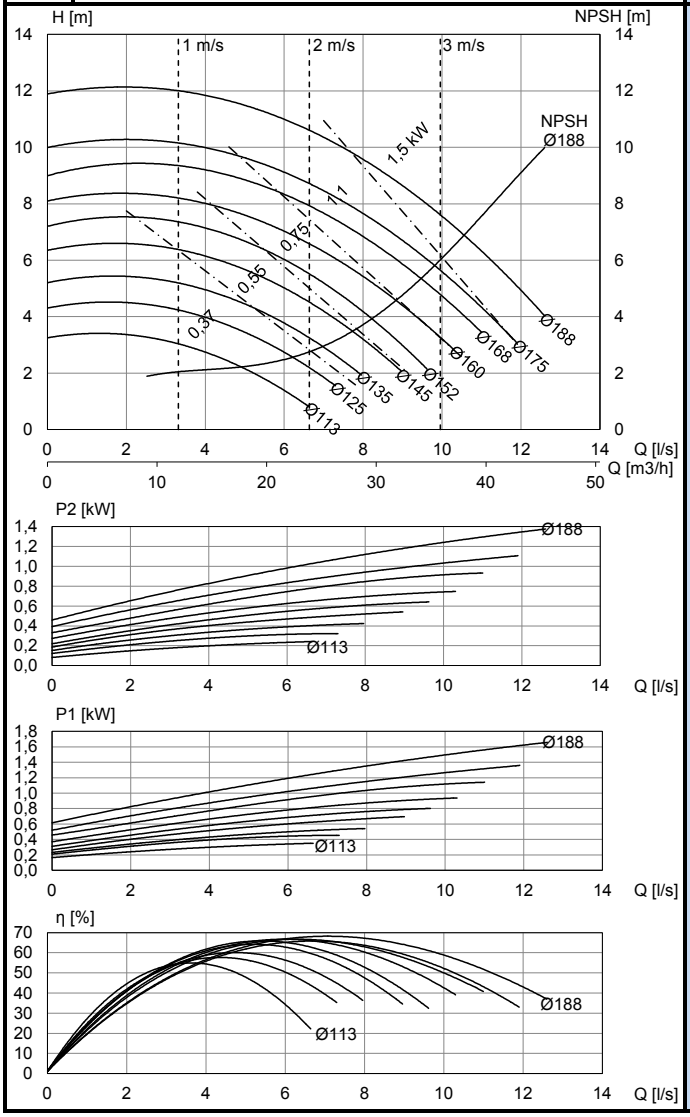
ALP-1066/4



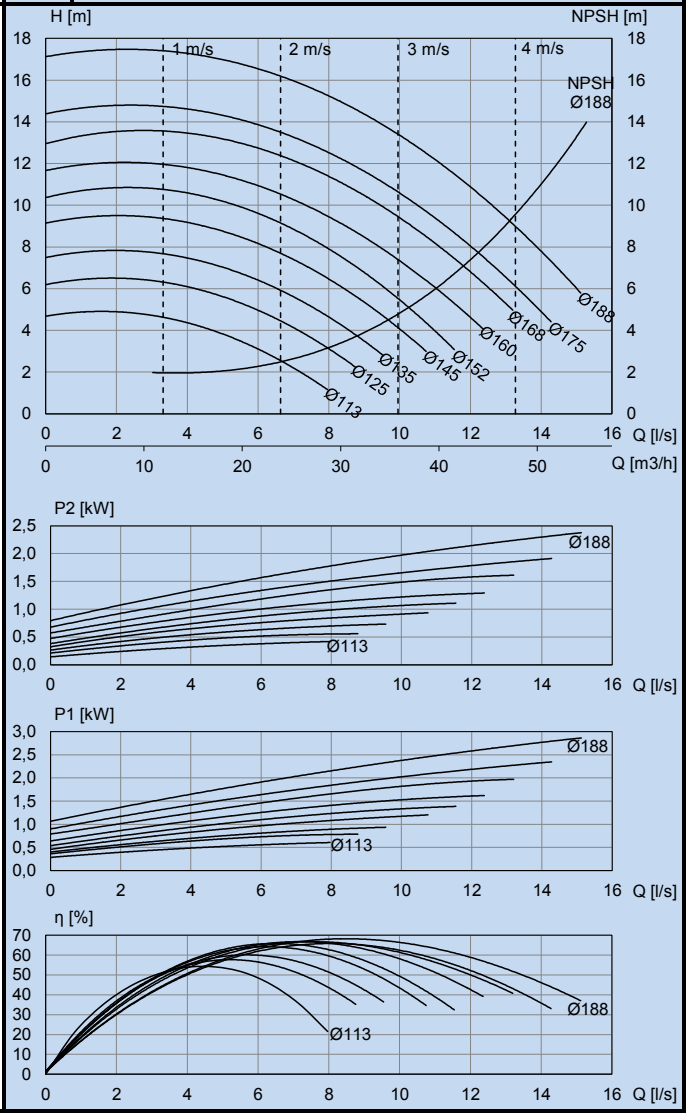
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	OKN-852 D F19	0,37	1,0	37	310
	KH-100 A2 F19	0,55	1,27	44	320
	KH-100 B2 F19	0,75	1,74	44	320
	KH-101 C2 F19	1,1	2,44	48	370
	KH-101 D2 F19	1,5	3,27	52	370
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	OKN-852 D F19	0,37 (0,44)	1 (1)	37	310
	KH-100 A2 F19	0,55 (0,66)	1,28 (1,3)	44	320
	KH-100 B2 F19	0,75 (0,9)	1,70 (1,74)	44	320
	KH-101 C2 F19	1,1 (1,3)	2,43 (2,43)	48	370
	KH-101 D2 F19	1,5 (1,8)	3,23 (3,32)	52	370
	KH-112 C2 F19	2,2 (2,6)	4,55 (4,6)	58	415
	KH-112 E2 F19	3 (3,6)	6,15 (6,25)	62	415

4

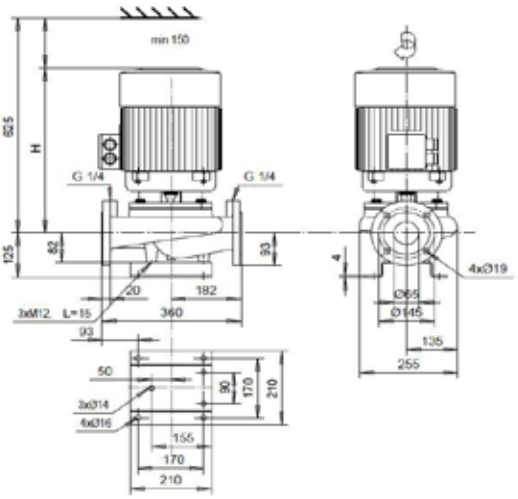
50 Hz 1500r/min DN 65



60 Hz 1800r/min DN 65



ALP-1065/2



	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KH-101 C1 F19	1,5	2,95	51	370
	KH-101 D1 F19	2,2	4,28	52	370
	KH-112 C1 F19	3	6,05	58	415
	KH-112 E1 F19	4	7,95	62	415
	KH-132 C1 F19	5,5	10,20	86	475
	KH-132 E1 F19	7,5	13,75	94	475
60HZ	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KH-101 D1 F19	2,2 (2,6)	4,35 (4,33)	52	370
	KH-112 C1 F19	3 (3,6)	6,00 (6,05)	58	415
	KH-112 E1 F19	4 (4,8)	7,90 (8,00)	62	415
	KH-132 C1 F19	5,5 (6,6)	10,25 (10,40)	86	475
	KH-132 E1 F19	7,5 (9)	13,80 (14,05)	94	475

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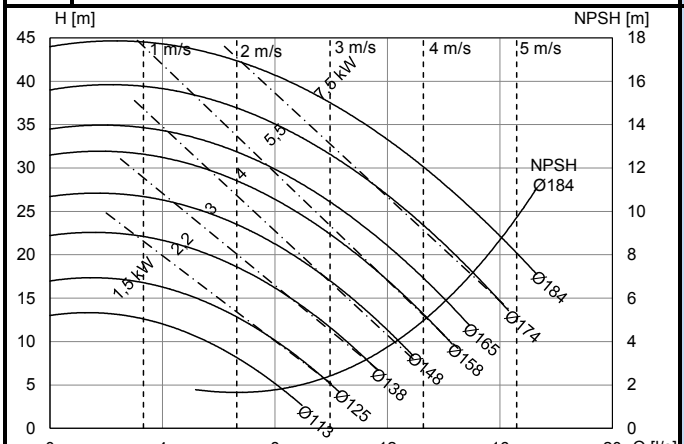
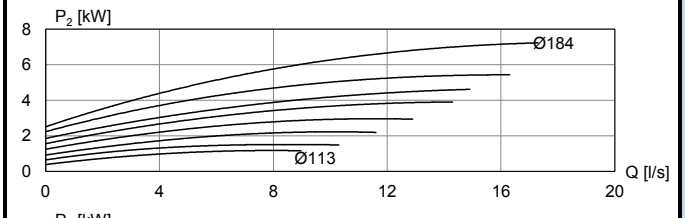
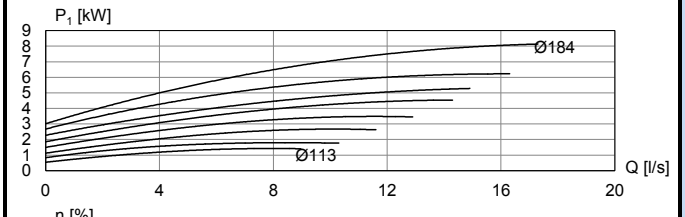
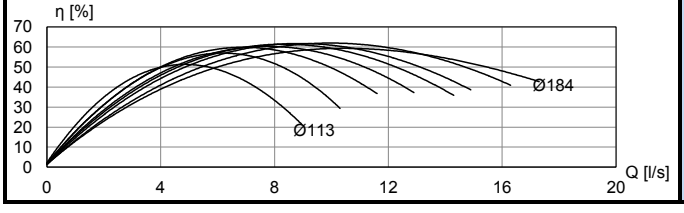
50 Hz 3000r/min DN 65

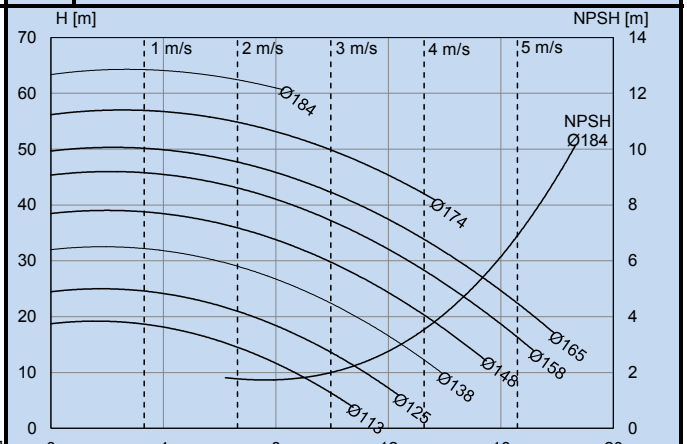


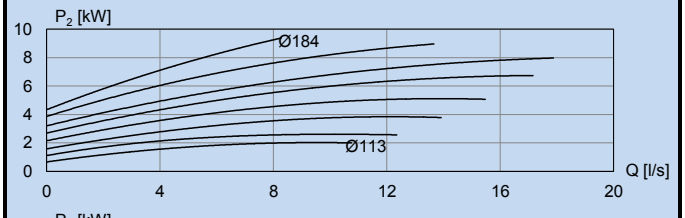


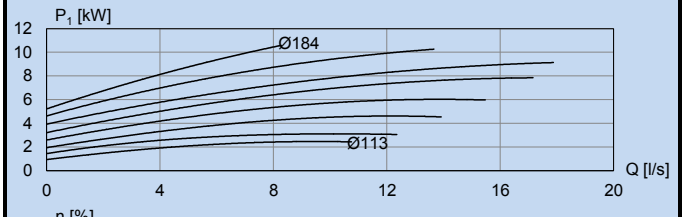


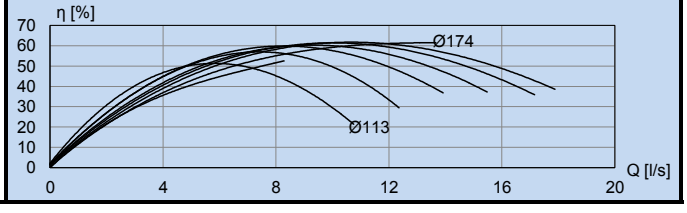


60 Hz 3600r/min DN 65

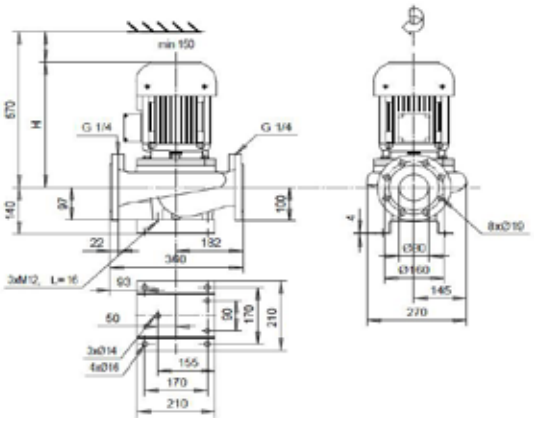








L-80A/4 LH-80A/4



	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	OKN-852 D F19	0,37	1,0	38	315
	KH-100 A2 F19	0,55	1,27	46	325
	KH-100 B2 F19	0,75	1,74	46	325
	KH-101 C2 F19	1,1	2,44	51	375
	KH-101 D2 F19	1,5	3,27	54	375
	KH-112 C2 F19	2,2	4,60	60	420
	KH-112 E2 F19	3	6,25	64	420
60Hz	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KH-100 A2 F19	0,55 (0,66)	1,27 (1,30)	46	325
	KH-100 B2 F19	0,75 (0,9)	1,74 (1,74)	46	325
	KH-101 C2 F19	1,1 (1,3)	2,43 (2,43)	51	375
	KH-101 D2 F19	1,5 (1,8)	3,23 (3,32)	54	375
	KH-112 C2 F19	2,2 (2,6)	4,55 (4,6)	60	420
	KH-112 E2 F19	3 (3,6)	6,15 (6,25)	64	420

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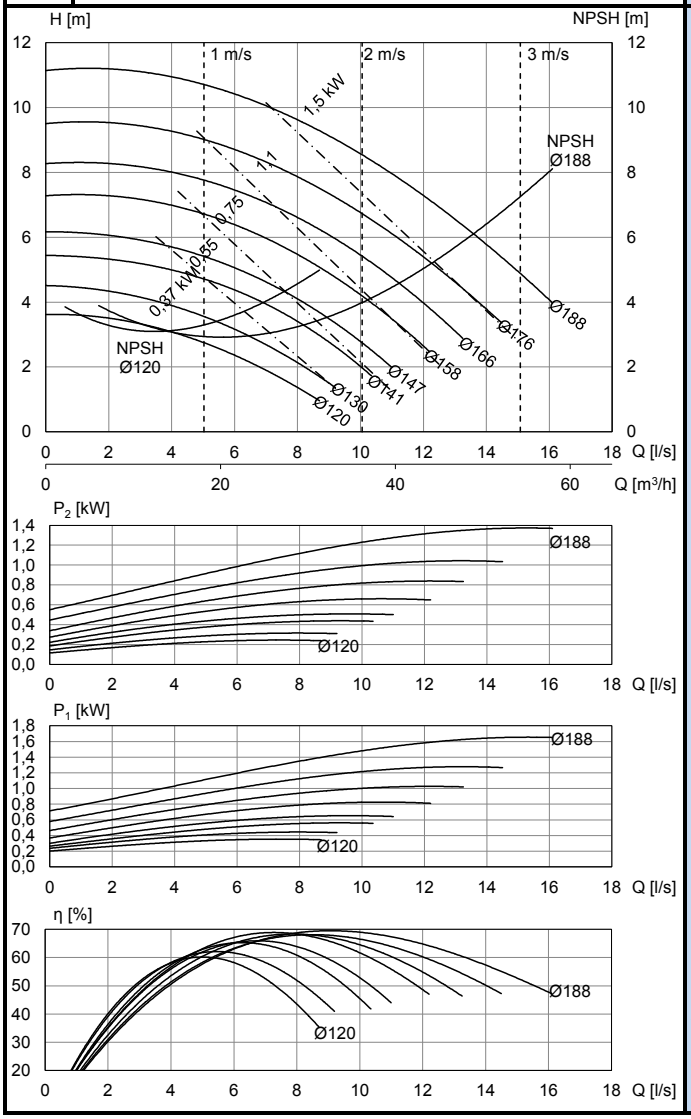
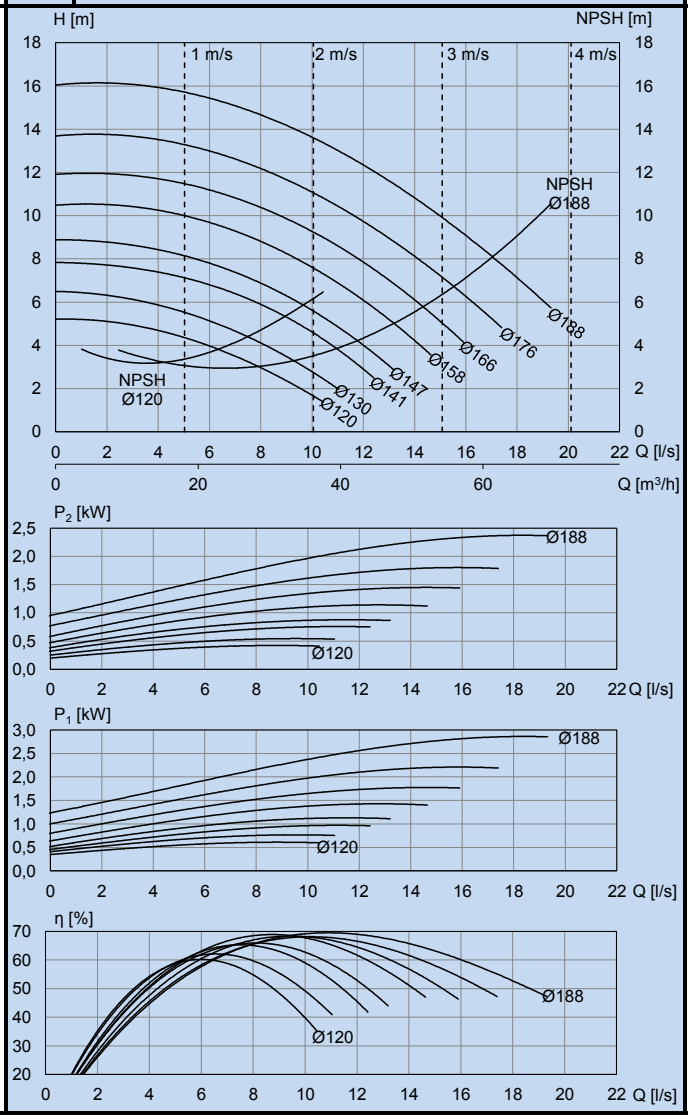
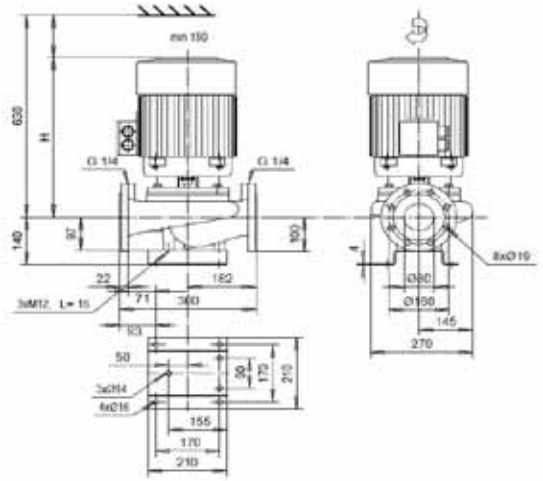
50 Hz 1500r/min DN 80



60 Hz 1800r/min DN 80

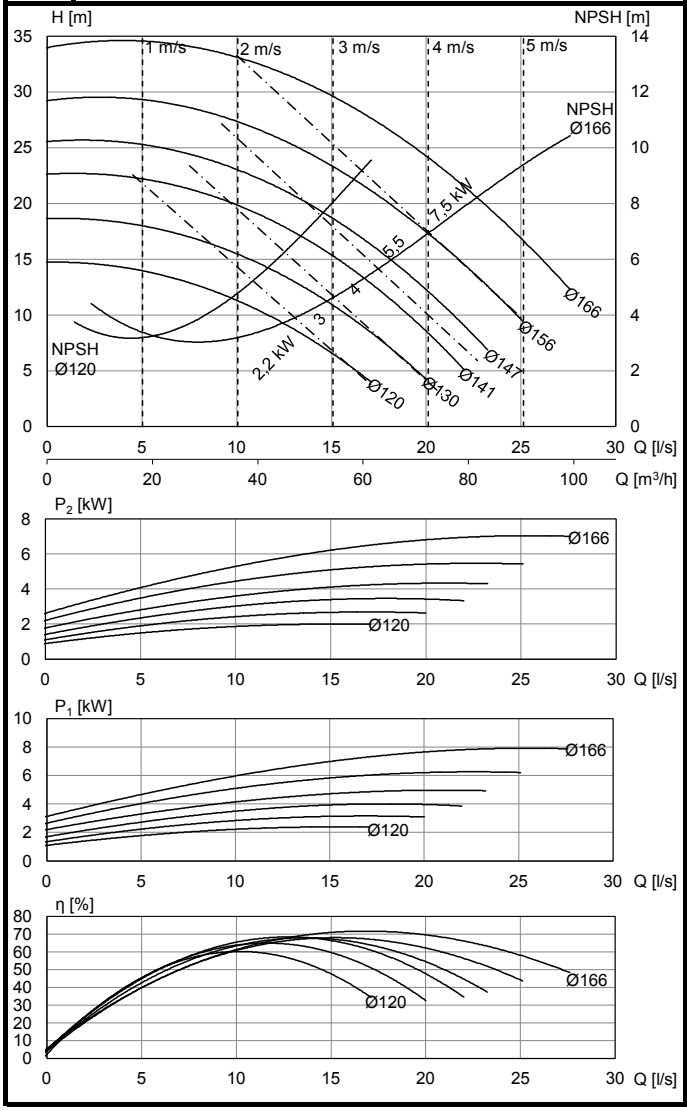


L-80A/2 LH-80A/2

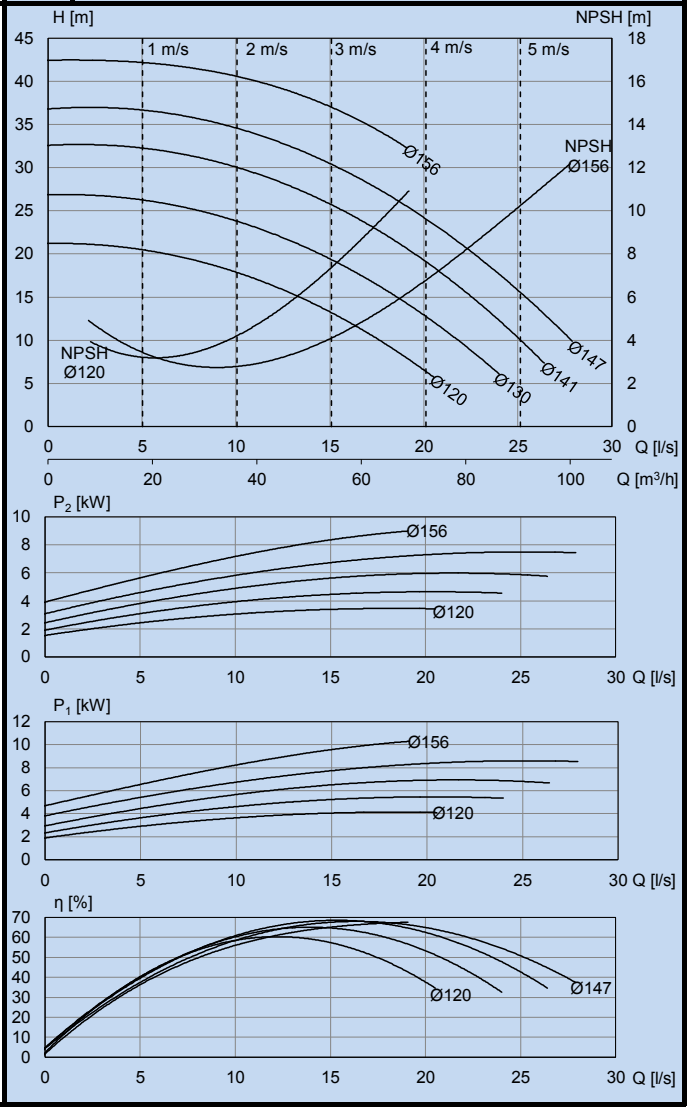


	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	KH-101 D1 F19	2,2	4,28	54	375
	KH-112 C1 F19	3	6,05	60	420
	KH-112 E1 F19	4	7,95	64	420
	KH-132 C1 F19	5,5	10,2	88	480
	KH-132 E1 F19	7,5	13,75	96	480
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60Hz	KH-112 C1 F19	3 (3,6)	6,00 (6,05)	60	420
	KH-112 E1 F19	4 (4,8)	7,9 (8,0)	64	420
	KH-132 C1 F19	5,5 (6,6)	10,25 (10,40)	88	480
	KH-132 E1 F19	7,5 (9)	13,80 (14,05)	96	480

50 Hz 3000r/min DN 80



60 Hz 3600r/min DN 80



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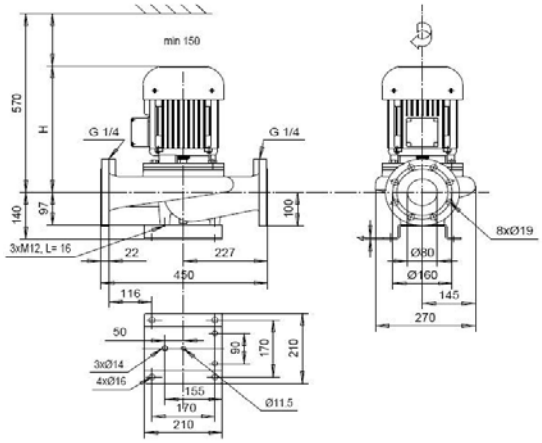
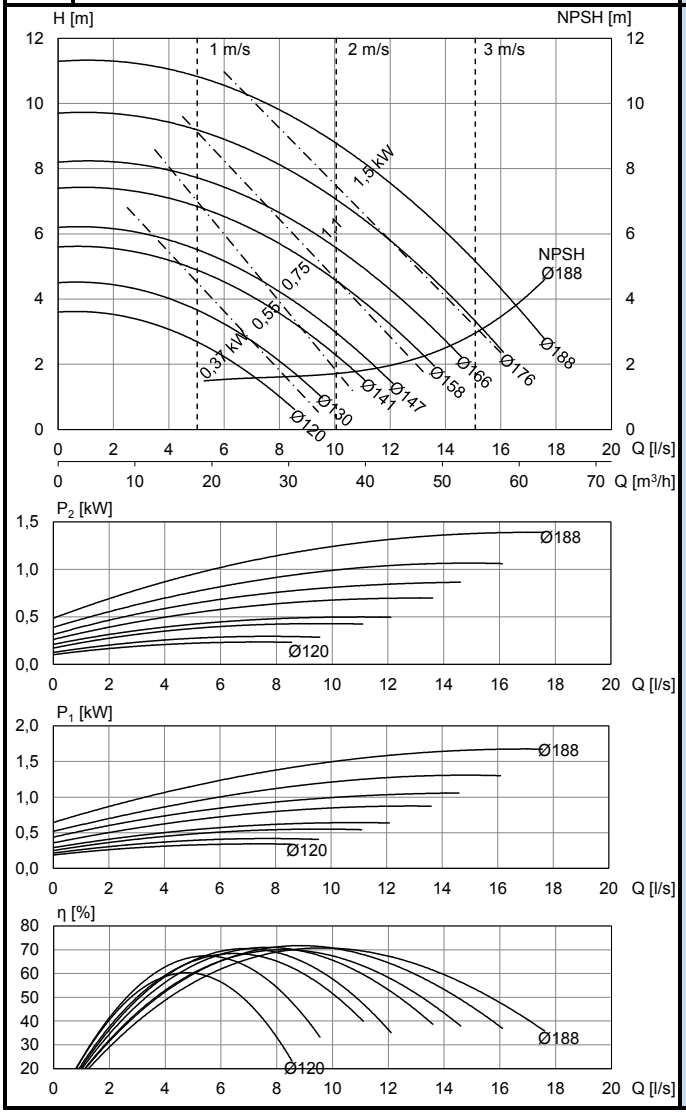
ALS-1081/4



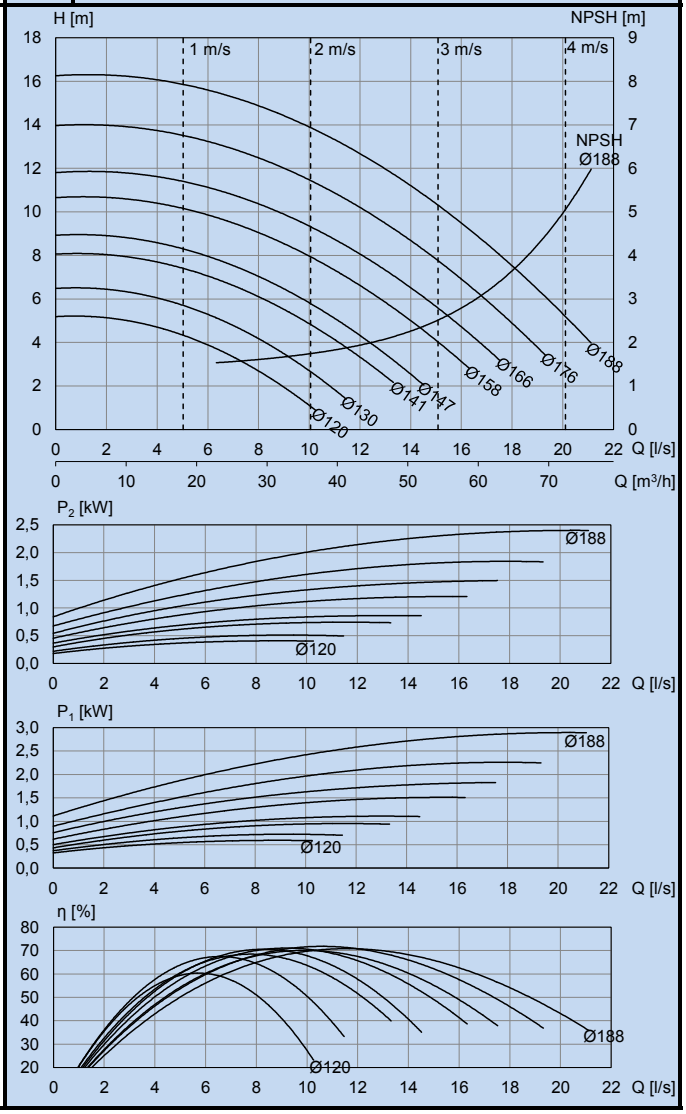
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	OKN-852 D F19	0,37	1,0	43	315
	KH-100 A2 F19	0,55	1,27	50	325
	KH-100 B2 F19	0,75	1,74	50	325
	KH-101 C2 F19	1,1	2,44	54	375
	KH-101 D2 F19	1,5	3,27	58	375
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60Hz	OKN-852 D F19	0,37 (0,44)	1,0 (1,0)	43	315
	KH-100 A2 F19	0,55 (0,66)	1,28 (1,3)	50	325
	KH-100 B2 F19	0,75 (0,9)	1,7 (1,74)	50	325
	KH-101 C2 F19	1,1 (1,3)	2,43 (2,43)	54	375
	KH-101 D2 F19	1,5 (1,8)	3,23 (3,32)	58	375
	KH-112 C2 F19	2,2 (2,6)	4,55 (4,60)	64	420
	KH-112 E2 F19	3 (3,6)	6,15 (6,25)	68	420

4

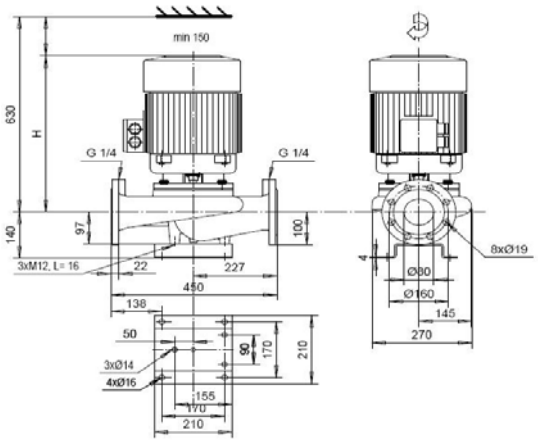
50 Hz 1500r/min DN 80



60 Hz 1800r/min DN 80

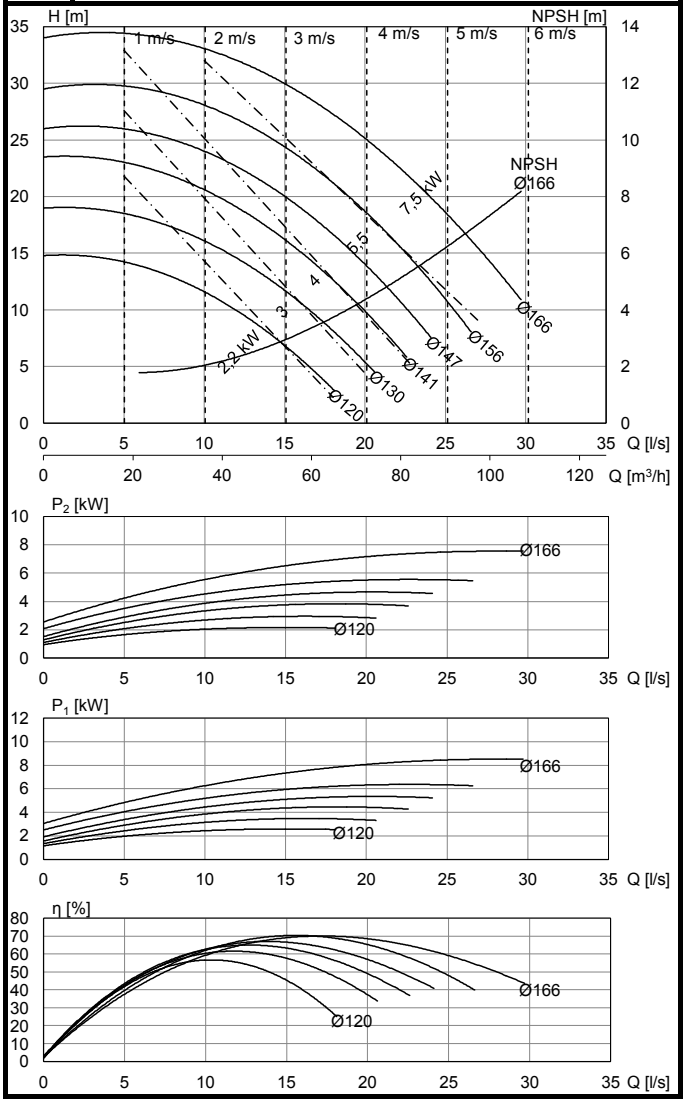


ALS-1081/2

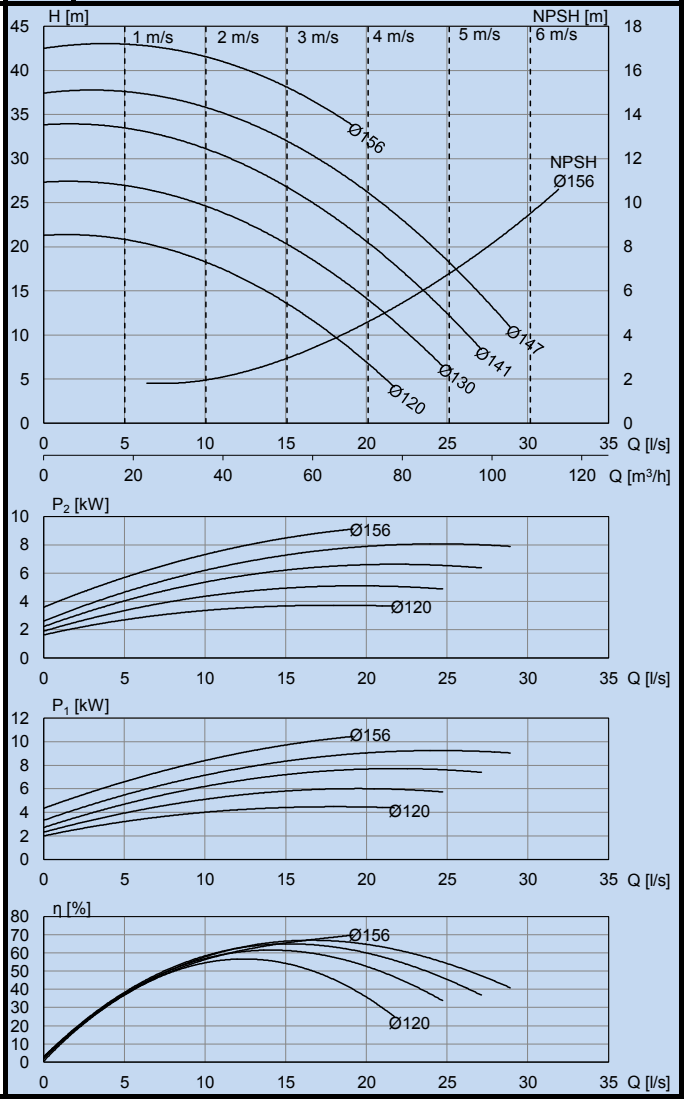


	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KH-101 D1 F19	2,2	4,28	58	375
	KH-112 C1 F19	3	6,05	64	420
	KH-112 E1 F19	4	7,95	68	420
	KH-132 C1 F19	5,5	10,20	92	480
	KH-132 E1 F19	7,5	13,75	99	480
60HZ	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KH-112 C1 F19	3 (3,6)	6,00 (6,05)	64	420
	KH-112 E1 F19	4 (4,8)	7,90 (8,00)	68	420
	KH-132 C1 F19	5,5 (6,6)	10,25 (10,40)	92	480
	KH-132 E1 F19	7,5 (9)	13,80 (14,05)	99	480

50 Hz 3000r/min DN 80



60 Hz 3600r/min DN 80



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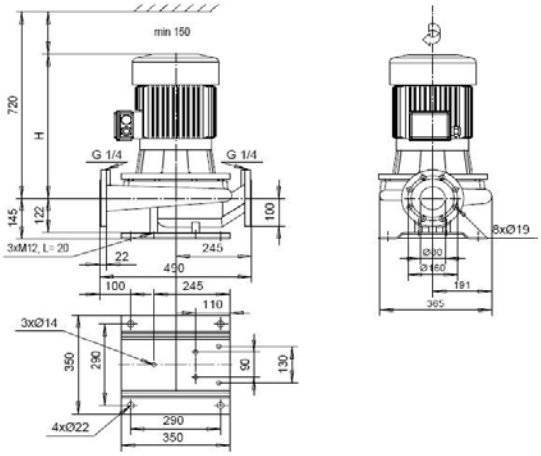
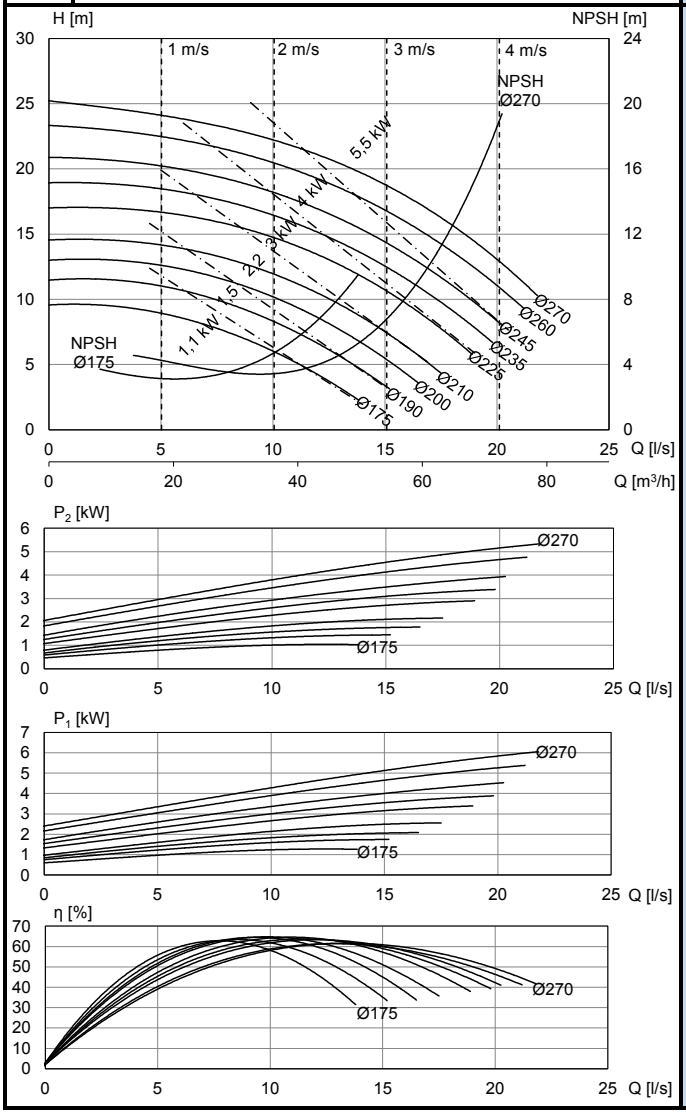
L-80S/4 | LH-80S/4



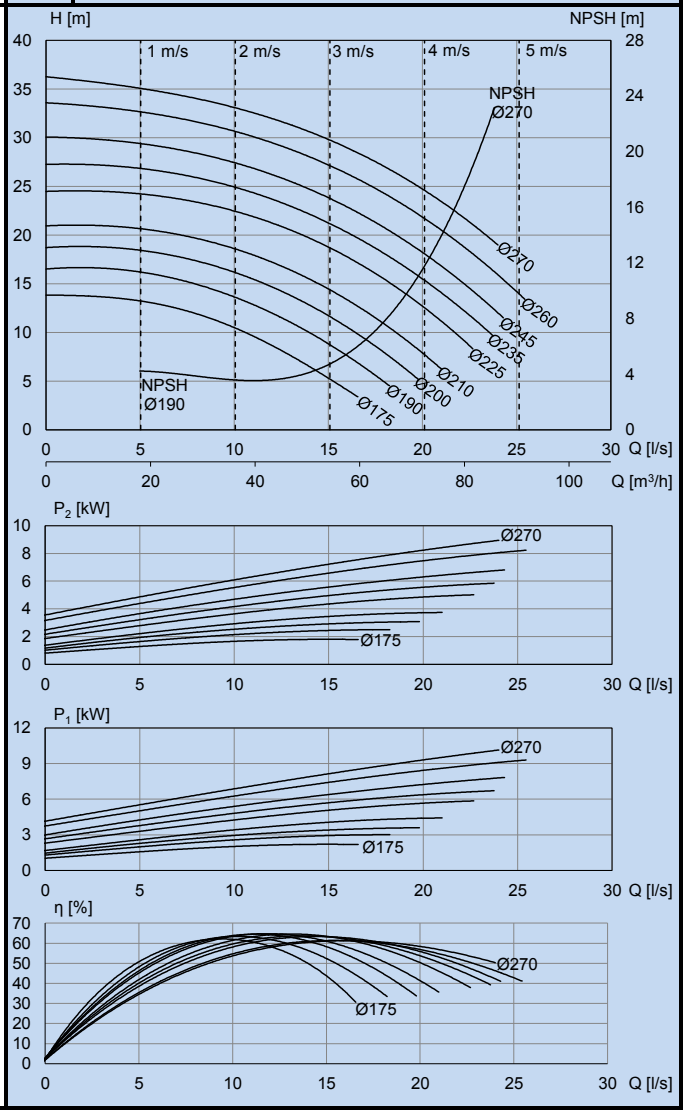
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KH-101 C2 F29	1,1	2,44	86	430
	KH-101 D2 F29	1,5	3,27	89	430
	KH-112 C2 F29	2,2	4,6	94	475
	KH-112 E2 F29	3	6,25	99	475
	KH-132 C2 F29	4	8,13	125	520
	KH-132 E2 F29	5,5	10,95	135	520
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	KH-101 D2 F29	1,5 (1,8)	3,23 (3,32)	89	430
	KH-112 C2 F29	2,2 (2,6)	4,55 (4,6)	94	475
	KH-112 E2 F29	3 (3,6)	6,15 (6,25)	99	475
	KH-132 C2 F29	4 (4,8)	8,17 (8,3)	125	520
	KH-132 E2 F29	5,5 (6,6)	11,00 (11,15)	135	520
	KH-133 G2 F29	7,5 (9)	14,80 (15,47)	147	570

4

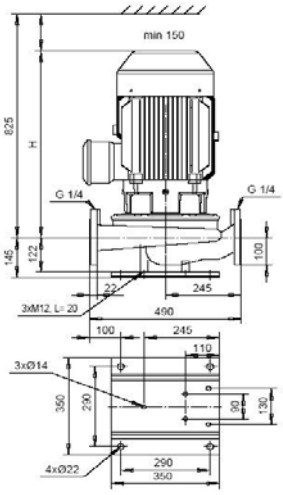
50 Hz 1500r/min DN 80

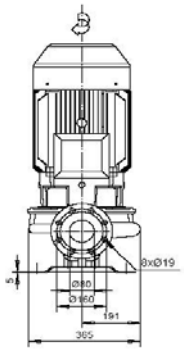


60 Hz 1800r/min DN 80



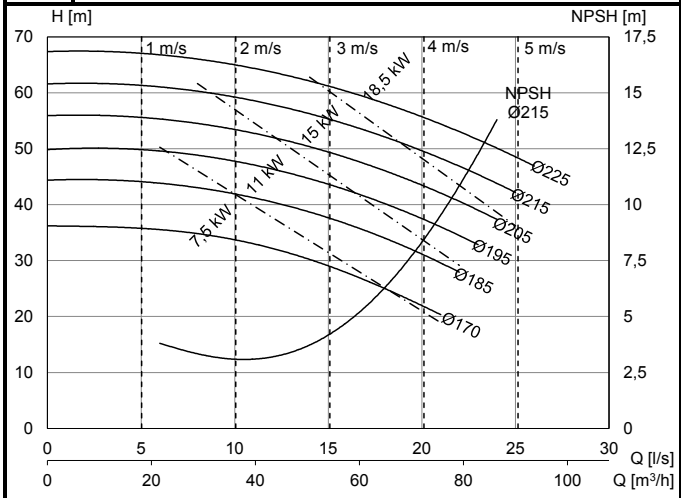
L-80S/2 LH-80S/2

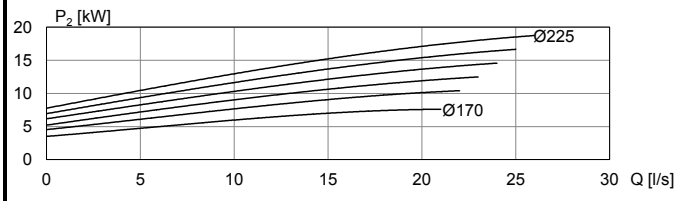


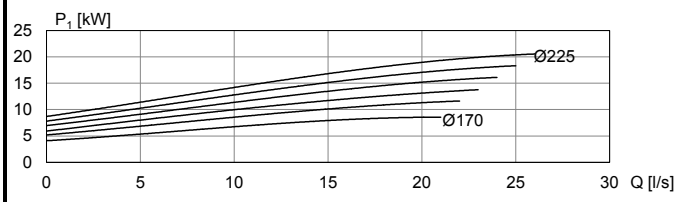


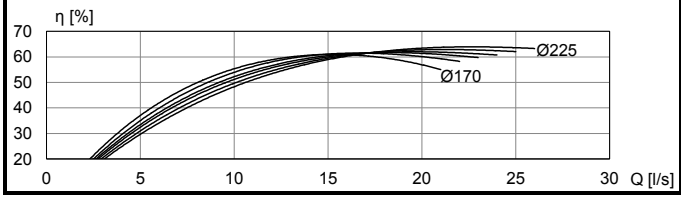
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	KH-132 E1 F29	7,5	13,75	130	520
	KZ-165 E1 F29	11	20,2	185	680
	KZ-165 F1 F29	15	26,95	190	680
	KZ-165A H1 F29	18,5	32,6	195	680
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60Hz	KH-132 E1 F29	7,5 (9)	13,8 (14,05)	130	520
	KZ-165 E1 F29	11 (13)	20,6 (20,3)	185	680
	KZ-165 F1 F29	15 (18)	28,05 (27,9)	190	680
	KZ-165A H1 F29	18,5 (22)	33,9 (33,6)	195	680

50 Hz 3000r/min DN 80

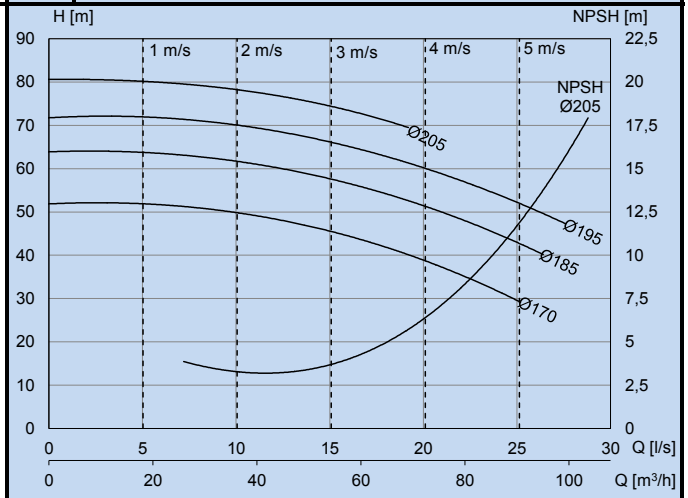


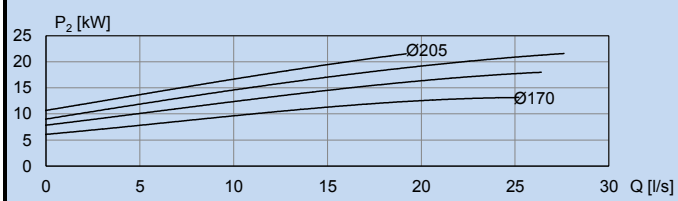


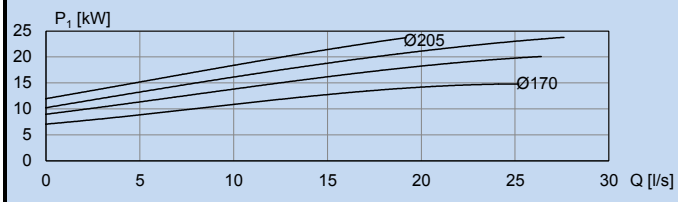


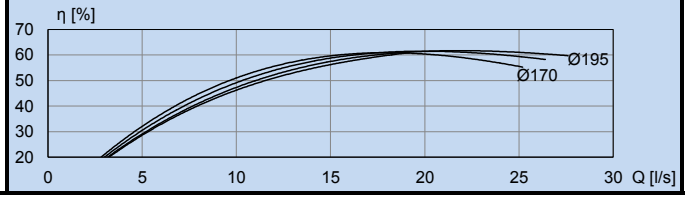


60 Hz 3600r/min DN 80









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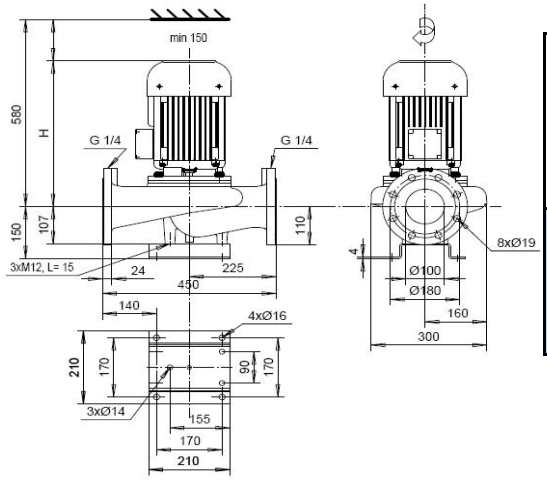
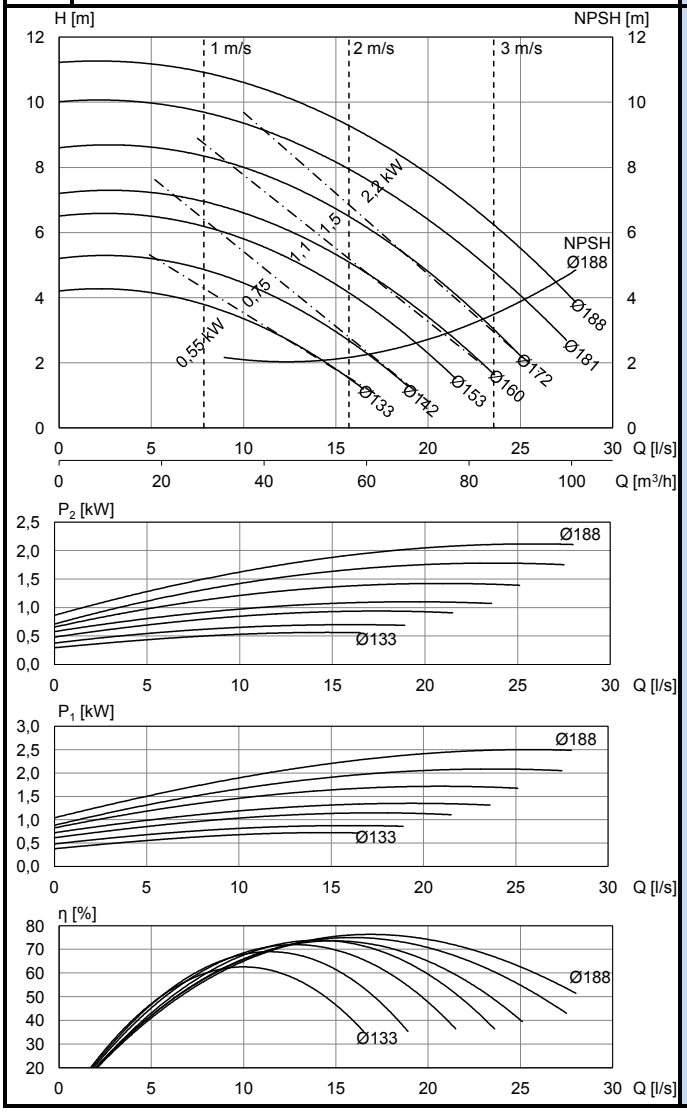
AL-1102/4 ALH-1102/4 ALP-1102/4 ALS-1102/4

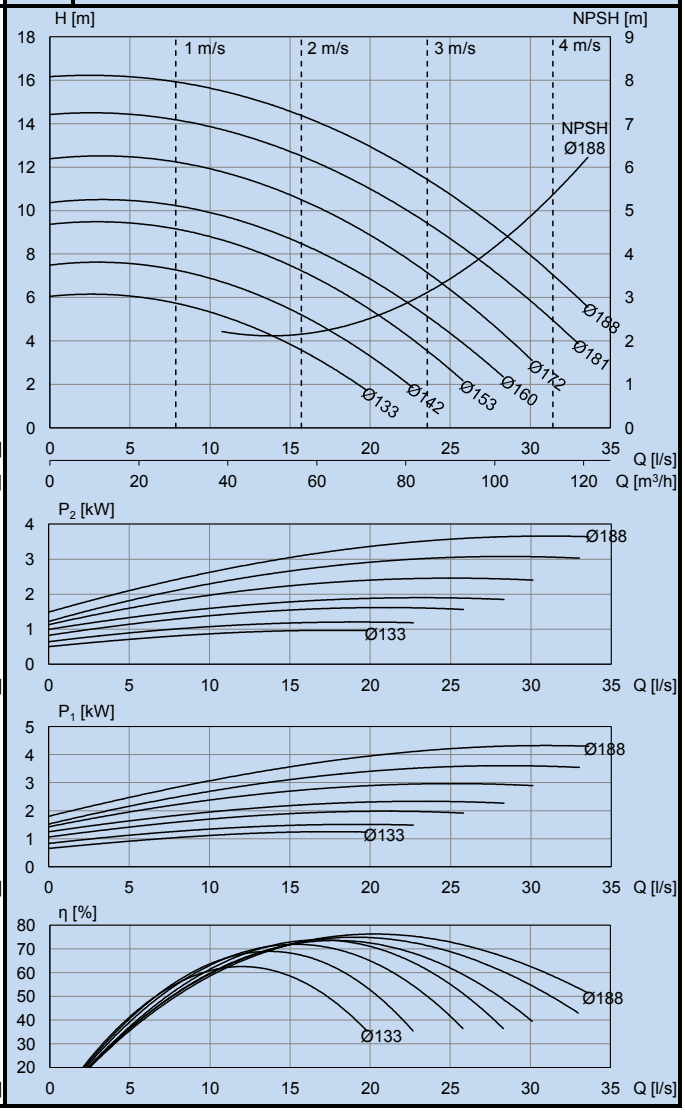


	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	KH-100 A2 F19	0,55	1,27	55	335
	KH-100 B2 F19	0,75	1,74	55	335
	KH-101 C2 F19	1,1	2,44	60	385
	KH-101 D2 F19	1,5	3,27	63	385
	KH-112 C2 F19	2,2	4,60	69	430
60Hz	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KH-101 C2 F19	1,1 (1,3)	2,43 (2,43)	60	385
	KH-101 D2 F19	1,5 (1,8)	3,23 (3,32)	63	385
	KH-112 C2 F19	2,2 (2,6)	4,55 (4,60)	69	430
	KH-112 E2 F19	3 (3,6)	6,15 (6,25)	72	430

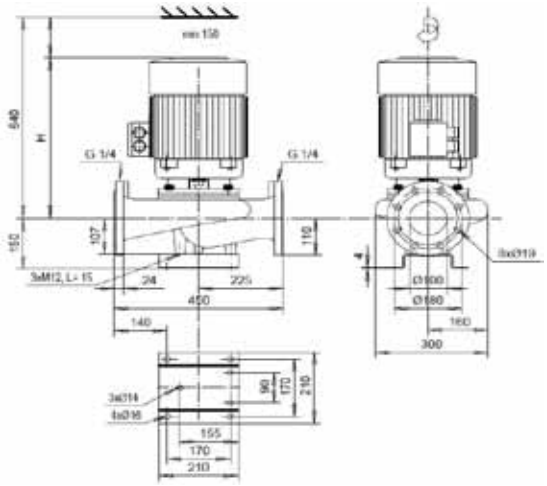
50 Hz 1500r/min DN 100



60 Hz 1800r/min DN 100



AL-1102/2 ALH-1102/2 ALP-1102/2 ALS-1102/2



	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KH-112 E1 F19	4	7,95	73	430
	KH-132 C1 F19	5,5	10,2	98	490
	KH-132 E1 F19	7,5	13,75	105	490
60HZ	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KH-132 C1 F19	5,5 (6,6)	10,25 (10,40)	98	490
	KH-132 E1 F19	7,5 (9)	13,80 (14,05)	105	490

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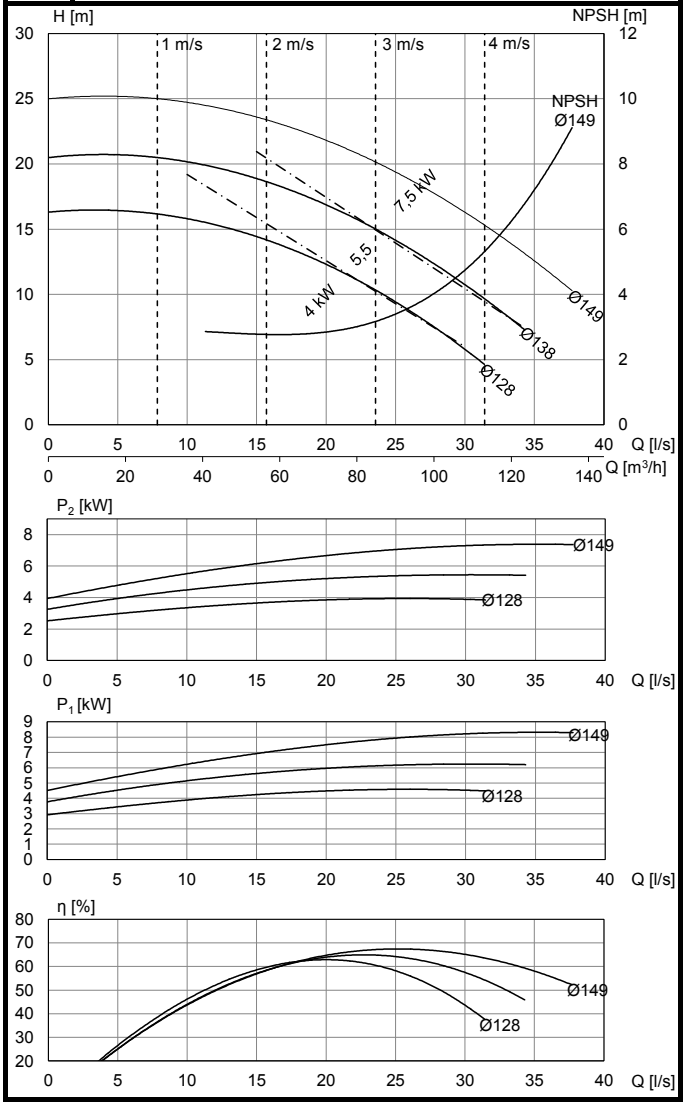
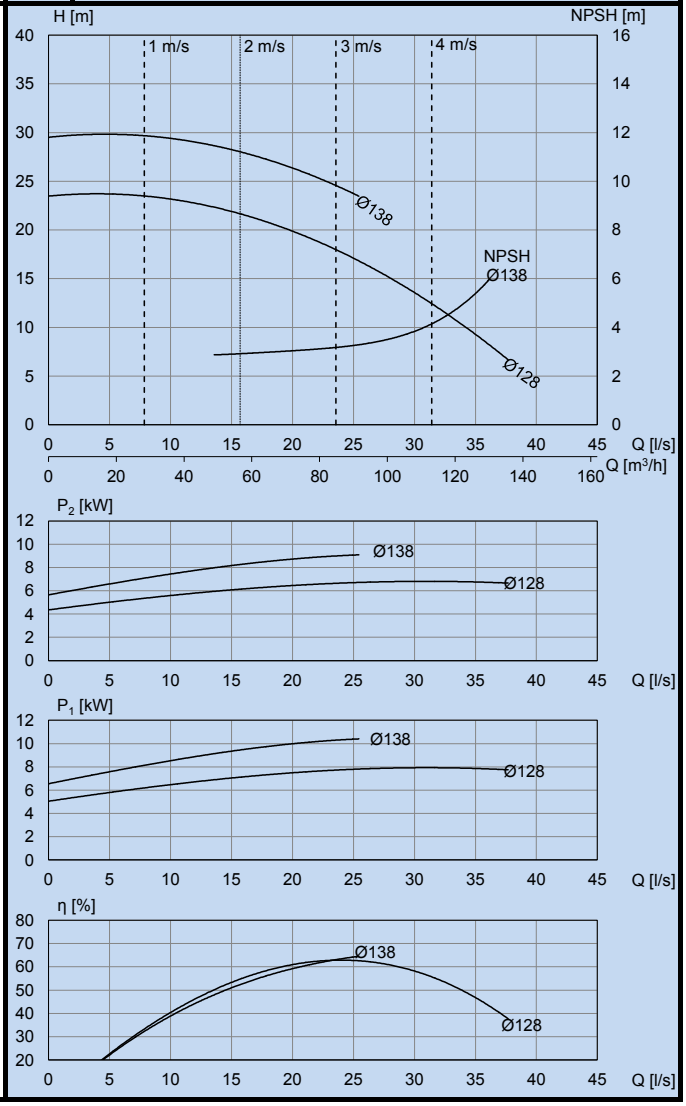
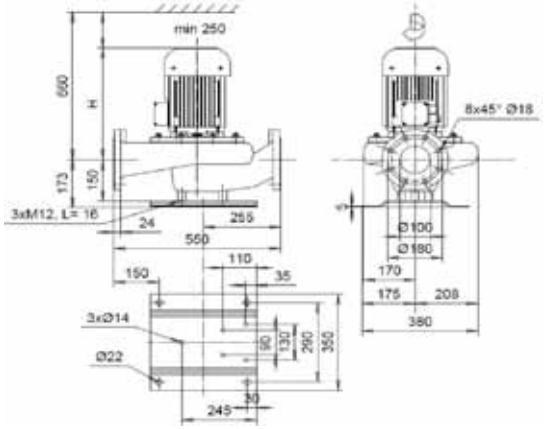
50 Hz 3000r/min DN 100



60 Hz 3600r/min DN 100



AKN-100/4 **AKNH-100/4**



	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	KH-101 D2 N26	1,5	3,27	83	365
	KH-112 C2 N26	2,2	4,60	89	410
	KH-112 E2 N26	3	6,25	93	410
60Hz	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KH-101 D2 N26	1,5 (1,8)	3,23 (3,32)	83	365
	KH-112 C2 N26	2,2 (2,6)	4,55 (4,60)	89	410
	KH-112 E2 N26	3 (3,6)	6,15 (6,25)	93	410

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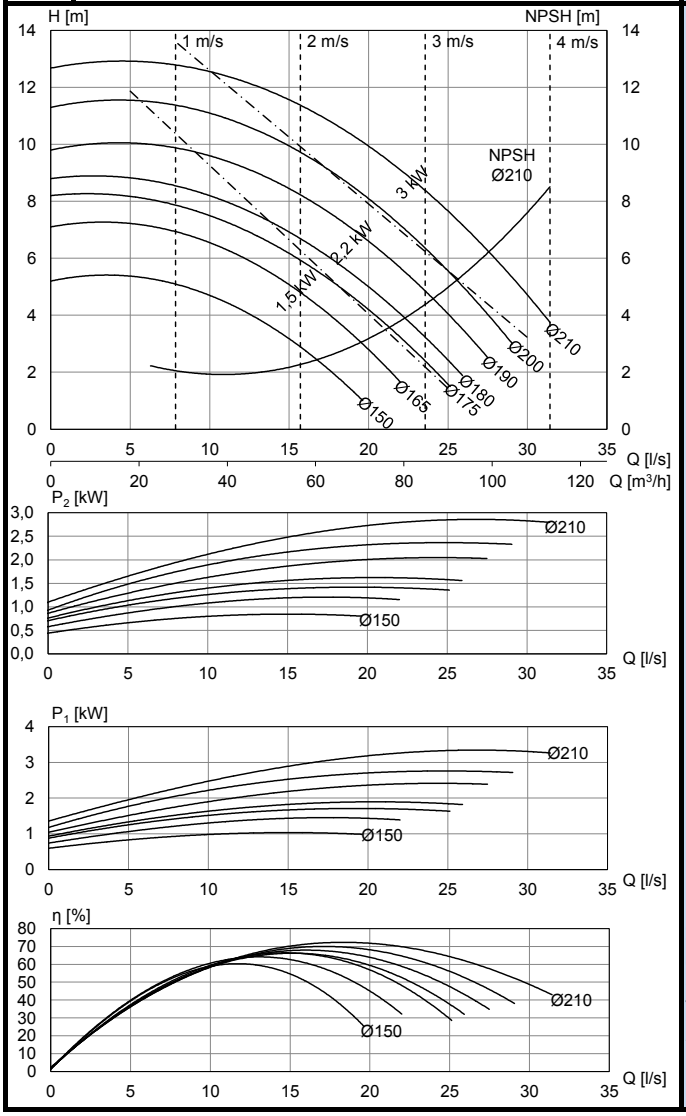
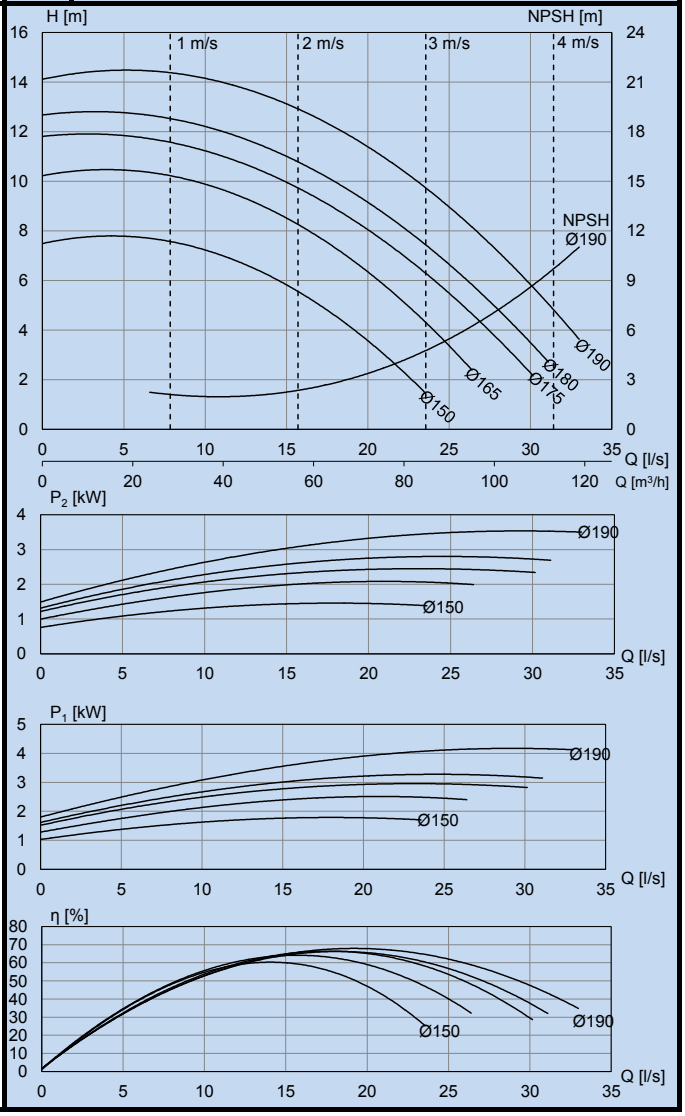
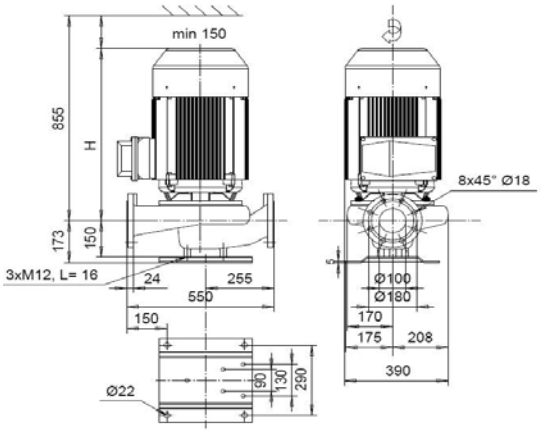
50 Hz 1500r/min DN 100



60 Hz 1800r/min DN 100

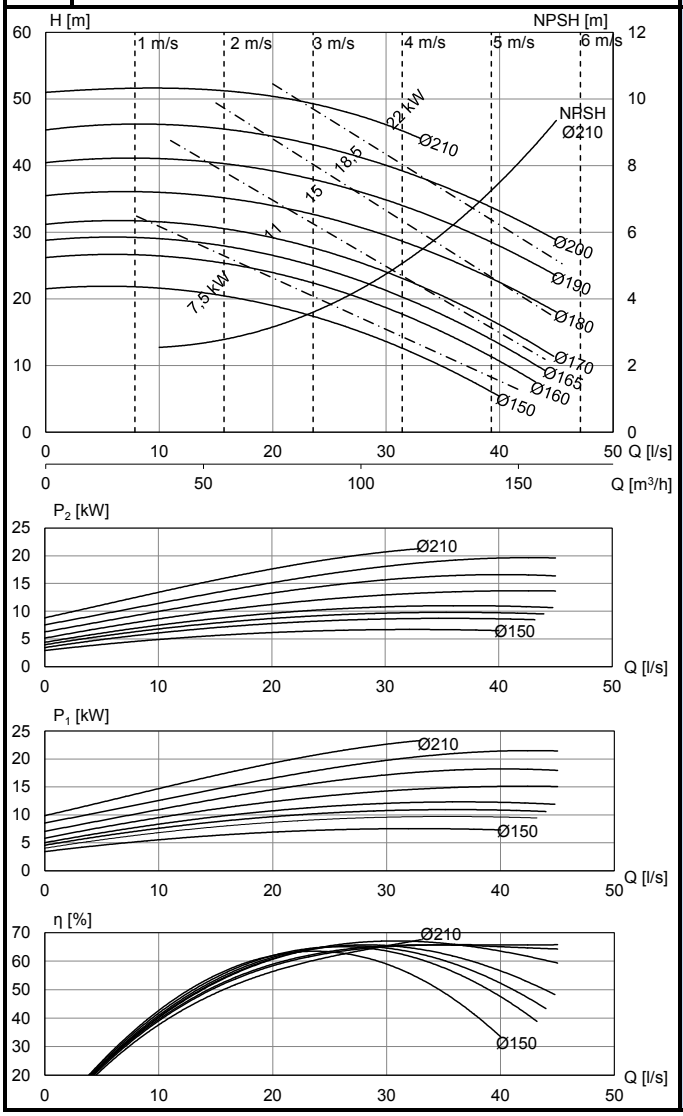


AKN-100/2 AKNH-100/2

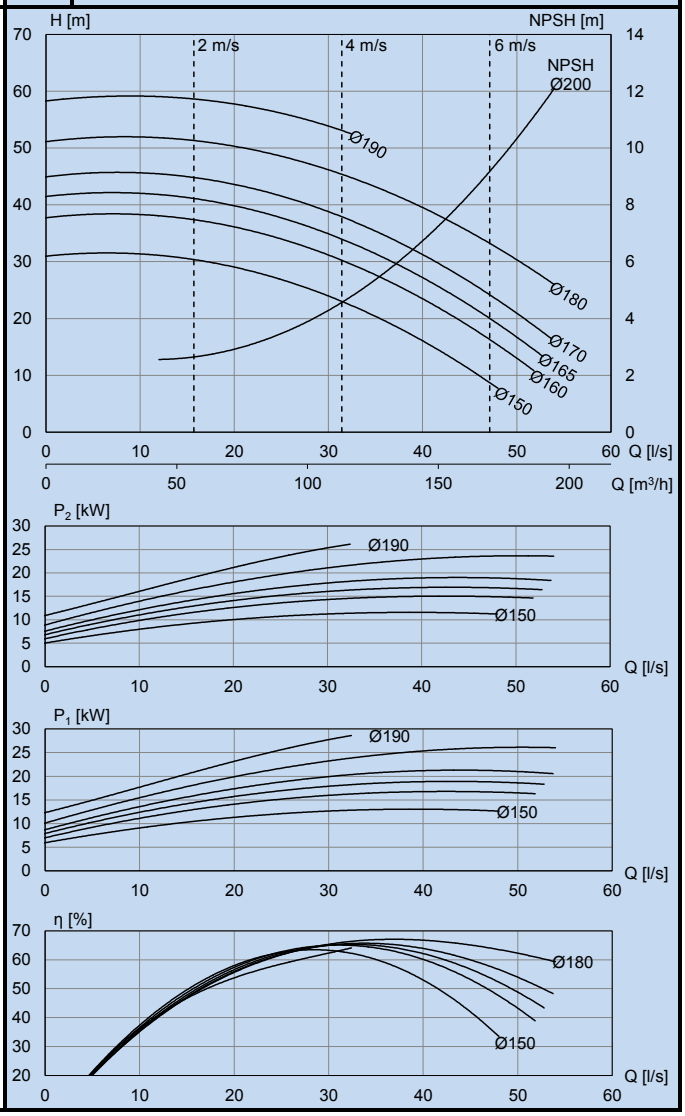


	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KH-132 E1 N26	7,5	13,75	125	465
	KZ-165 E1 N26	11	20,20	185	640
	KZ-165 F1 N26	15	26,95	190	640
	KZ-165A H1 N26	18,5	32,60	205	640
	KZ-186 J1 N26	22	38,60	250	710
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	KZ-165 E1 N26	11 (13)	20,60 (20,30)	185	640
	KZ-165 F1 N26	15 (18)	28,05 (27,90)	190	640
	KZ-165A H1 N26	18,5 (22)	33,90 (33,60)	205	640
	KZ-186 J1 N26	22 (26)	40,30 (39,60)	250	710

50 Hz 3000r/min DN 100



60 Hz 3600r/min DN 100



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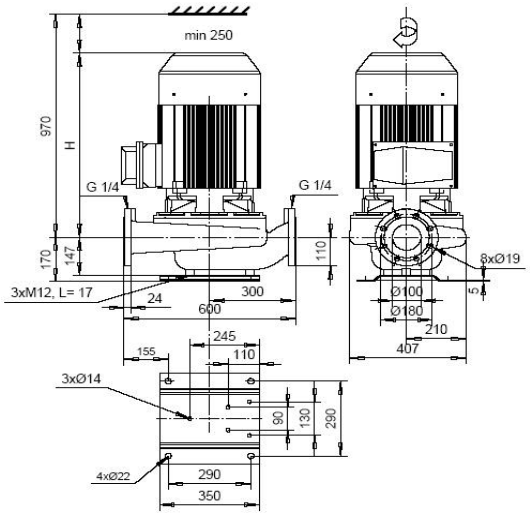
AL-1106/4 ALH-1106/4 ALS-1106/4



	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	KH-112 E2 F31	3	6,25	126	430
	KH-132 C2 F31	4	8,13	153	495
	KH-132 E2 F31	5,5	10,95	160	495
	KH-133 G2 F31	7,5	14,88	172	550
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60Hz	KH-112 E2 F31	3 (3,6)	6,15 (6,25)	126	430
	KH-132 C2 F31	4 (4,8)	8,17 (8,30)	153	495
	KH-132 E2 F31	5,5 (6,6)	11,00 (11,15)	160	495
	KH-133 G2 F31	7,5 (9)	14,80 (15,47)	172	550
	KZ-165 F2 F31	11 (13)	21,35 (21,35)	230	655
	KZ-165 G2 F31	15 (18)	29,10 (28,75)	235	655
	KZ-186 G2 BF31	18,5 (22)	35,30 (35,10)	275	715

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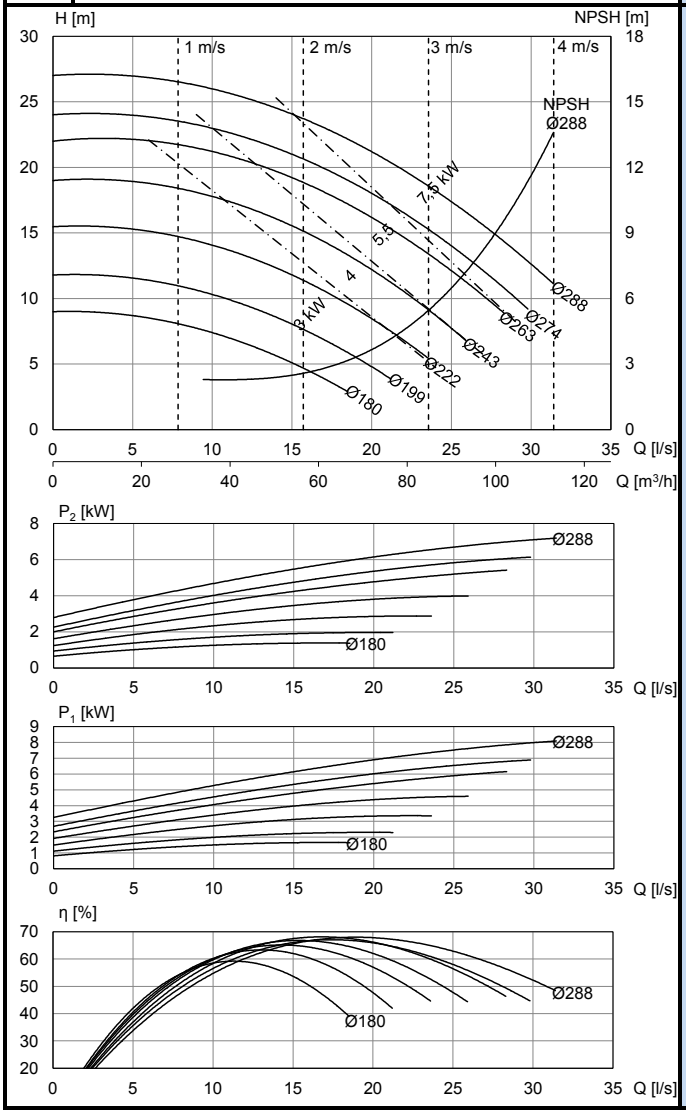
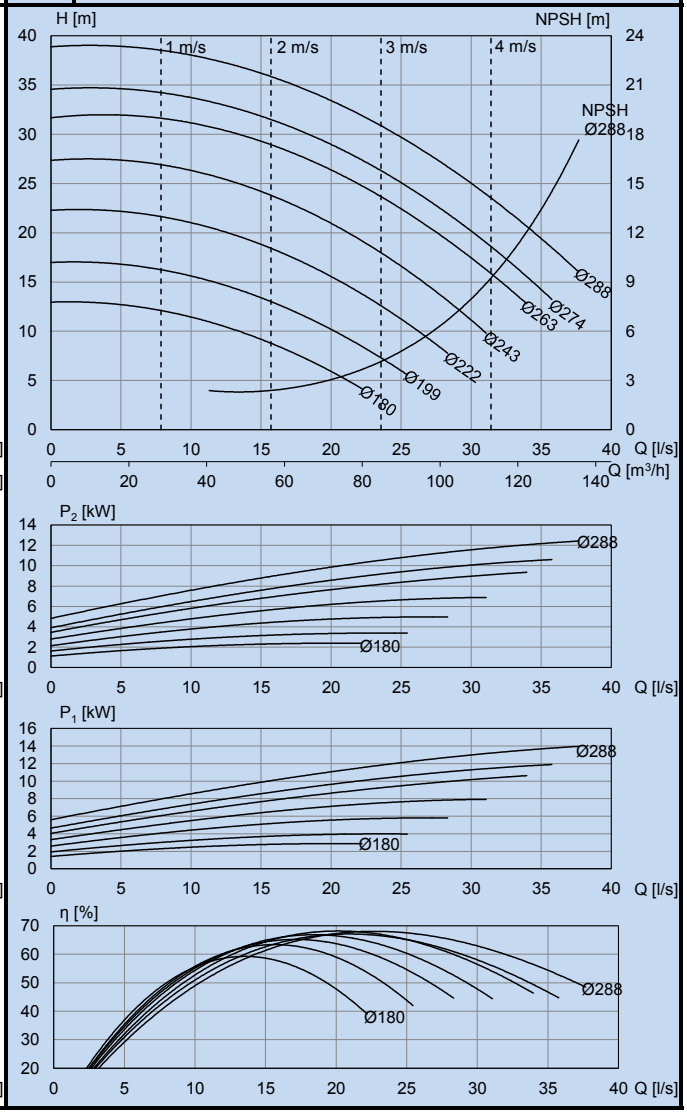
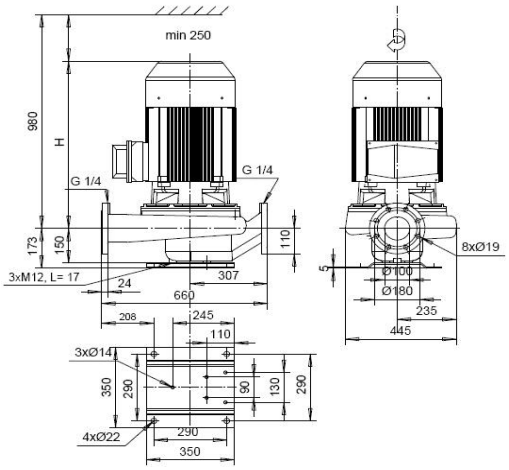
50 Hz 1500r/min DN 100



60 Hz 1800r/min DN 100

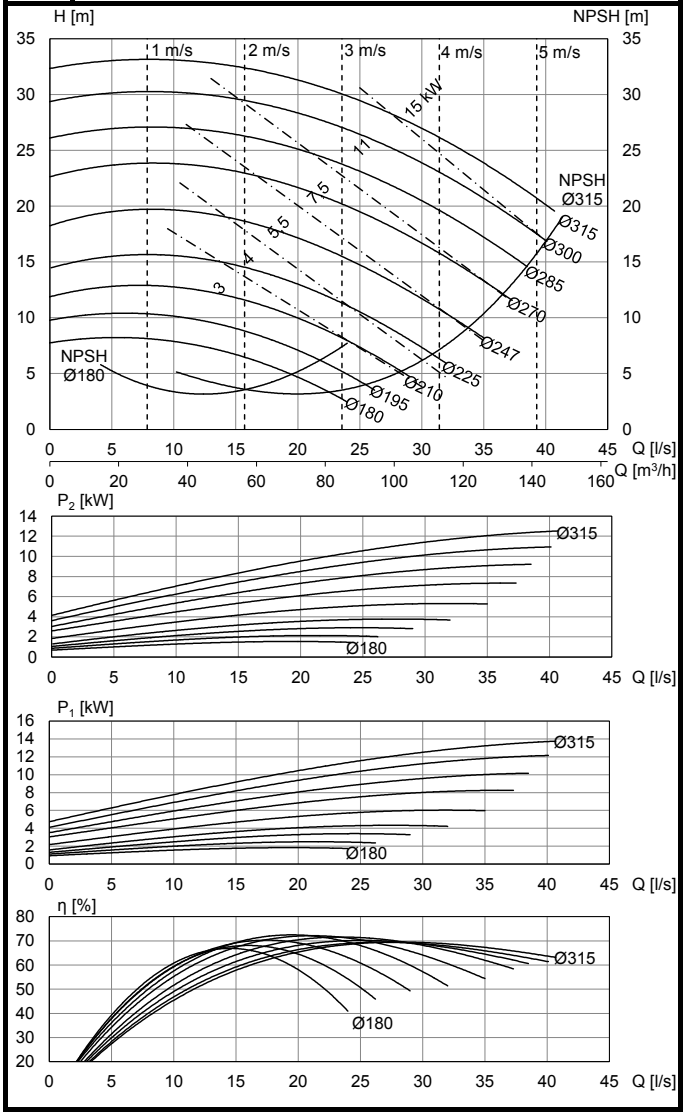


L-100S/4 | LH-100S/4 | LP-100S/4

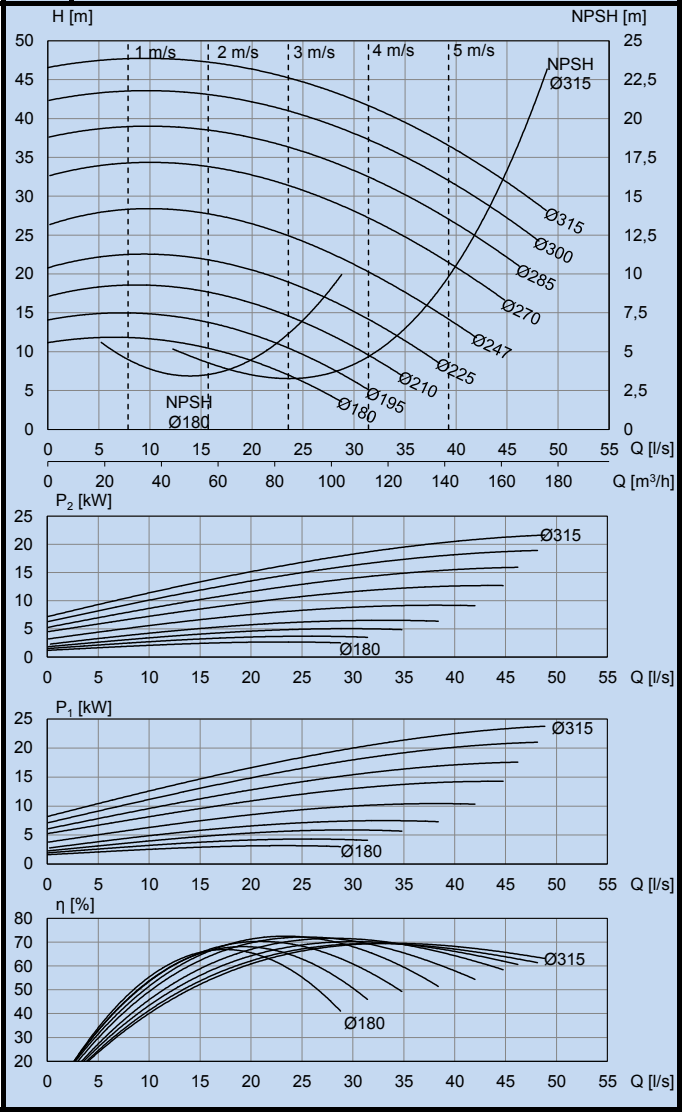


	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KH-112 E2 F31	3	6,25	140	440
	KH-132 C2 F31	4	8,13	165	510
	KH-132 E2 F31	5,5	10,95	175	510
	KH-133 G2 F31	7,5	14,88	185	560
	KZ-165 F2 F31	11	20,75	240	670
	KZ-165 G2 F31	15	28,10	245	670
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	KH-112 E2 F31	3 (3,6)	6,15 (6,25)	140	440
	KH-132 C2 F31	4 (4,8)	8,17 (8,30)	165	510
	KH-132 E2 F31	5,5 (6,6)	11,00 (11,15)	175	510
	KH-133 G2 F31	7,5 (9)	14,80 (15,47)	185	560
	KZ-165 F2 F31	11 (13)	21,35 (21,35)	240	670
	KZ-165 G2 F31	15 (18)	29,10 (28,75)	245	670
	KZ-186 G2 BF31	18,5 (22)	35,30 (35,10)	290	730
	KZ-186 K2 BF31	22 (26)	41,60 (41,00)	300	730

50 Hz 1500r/min DN 100



60 Hz 1800r/min DN 100



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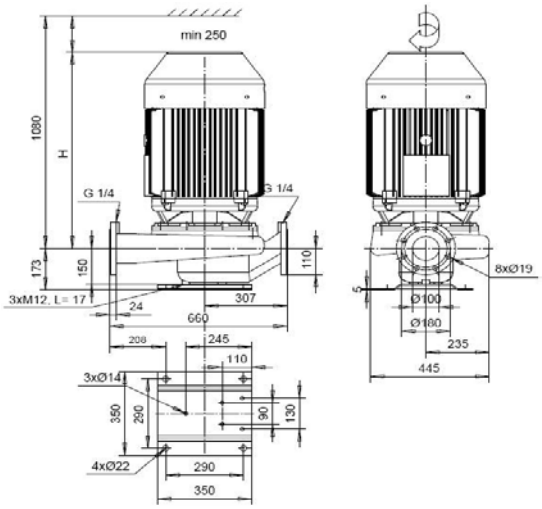
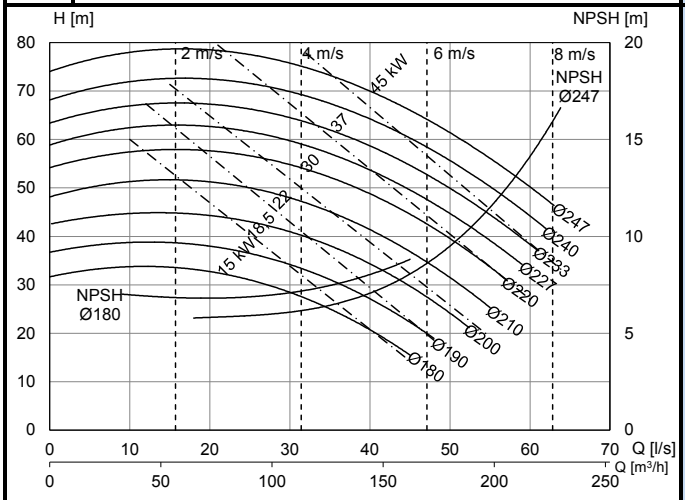
L-100S/2 | LH-100S/2 | LP-100S/2

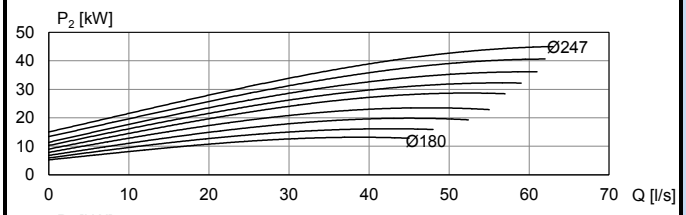


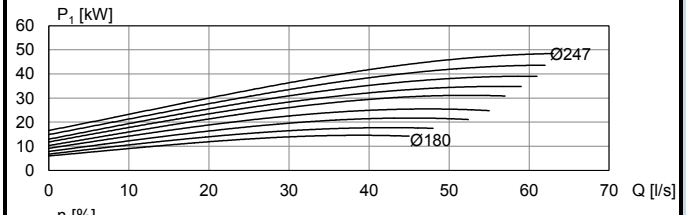
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KZ-165 F1 F31	15	26,95	235	670
	KZ-165A H1 F31	18,5	32,6	240	670
	KZ-186 J1 BF31	22	38,6	295	730
	KZ-205 H1 F31	30	53,5	340	780
	KZ-205 J1 F31	37	65,6	360	780
	KZ-225 H1 F32	45	77,7	430	830
60HZ	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KZ-165 F1 F31	15 (18)	28,05 (27,9)	235	670
	KZ-165A H1 F31	18,5 (22)	33,9 (33,6)	240	670
	KZ-186 J1 BF31	22 (26)	40,3 (39,6)	295	730
	KZ-205 H1 F31	30 (36)	55,8 (55,6)	340	780
	KZ-205 J1 F31	37 (44)	68,3 (66,8)	360	780
	KZ-225 H1 F32	45 (54)	80,8 (81,0)	430	830

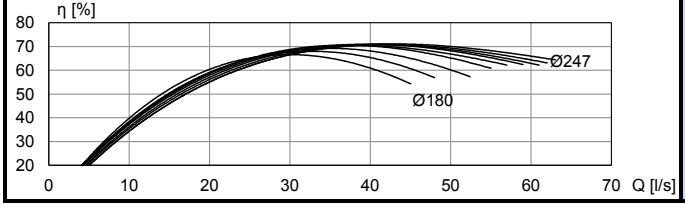
4

50 Hz 3000r/min DN 100

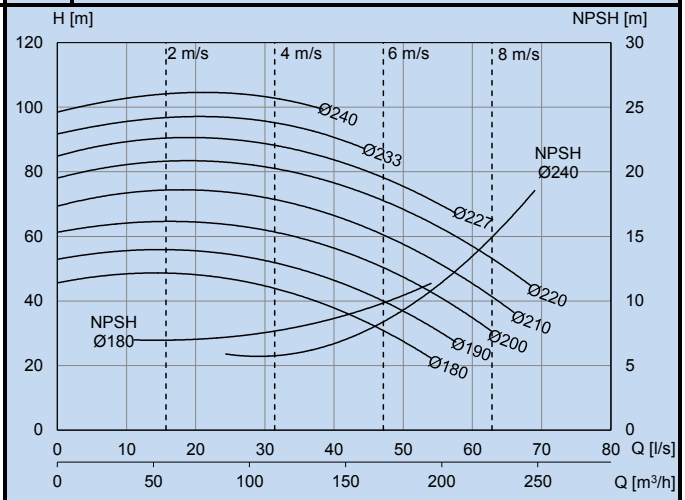


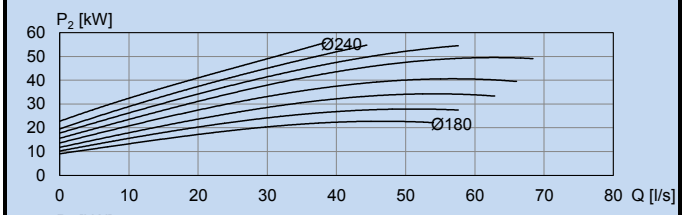


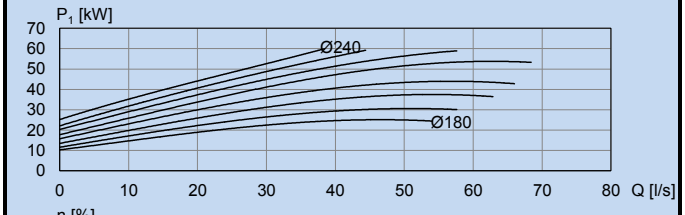


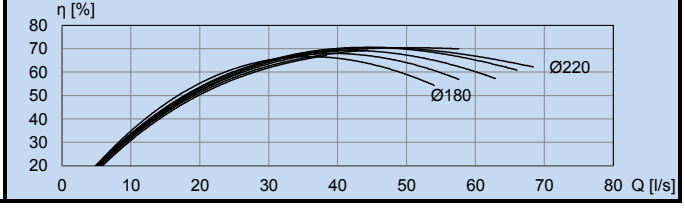


60 Hz 3600r/min DN 100

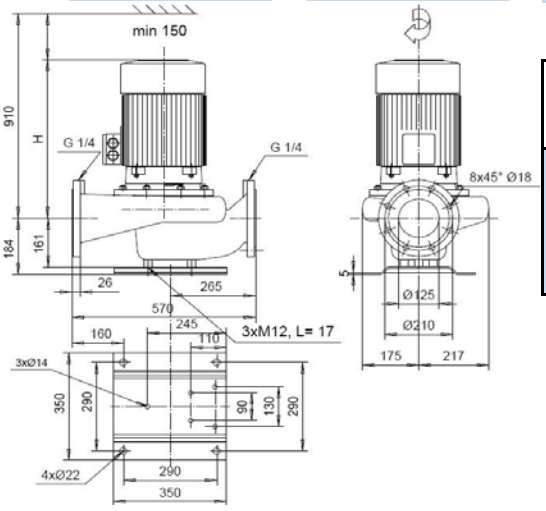








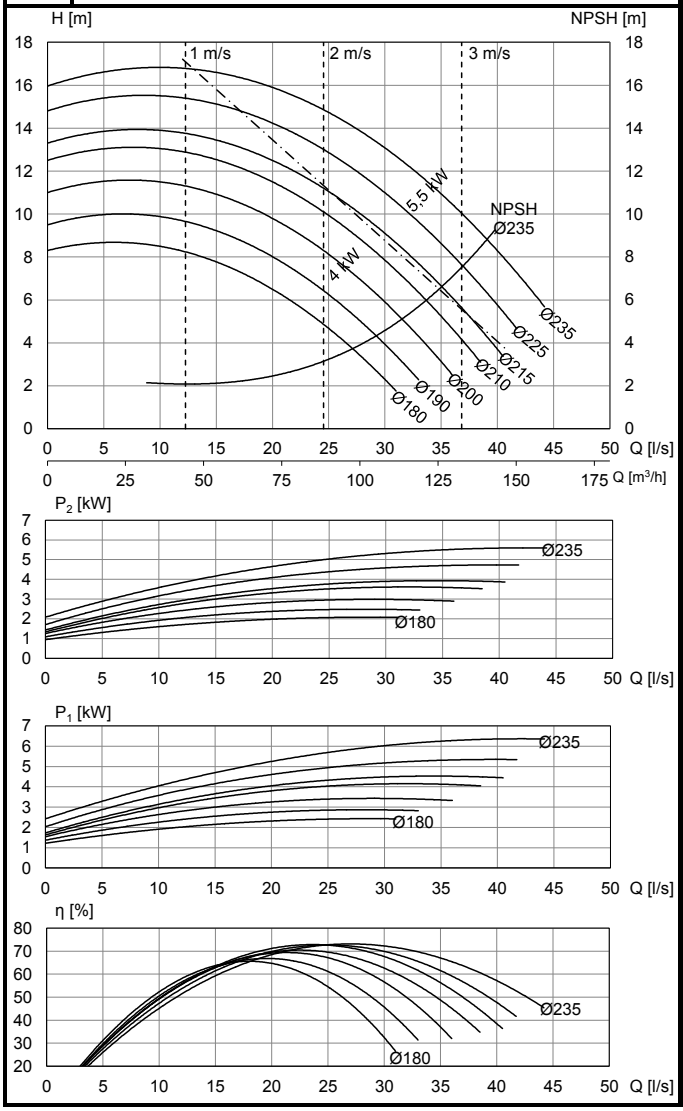
AKN-127/4 AKNH-127/4



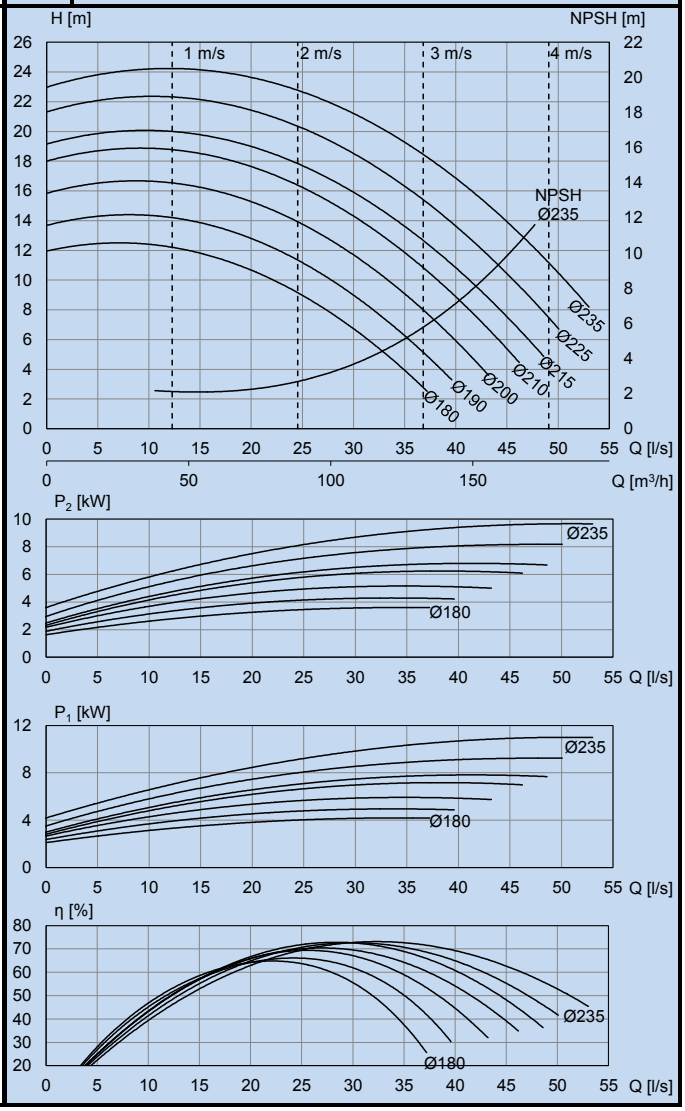
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KH-132 C2 N27	4	8,13	135	470
	KH-132 E2 N27	5,5	10,95	145	470
60HZ	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KH-132 C2 N27	4 (4,8)	8,17 (8,30)	135	470
	KH-132 E2 N27	5,5 (6,6)	11,00 (11,15)	145	470
	KH-133 G2 N27	7,5 (9)	14,8 (15,47)	157	520
	KZ-165 F2 N27	11 (13)	21,35 (21,35)	170	660

4

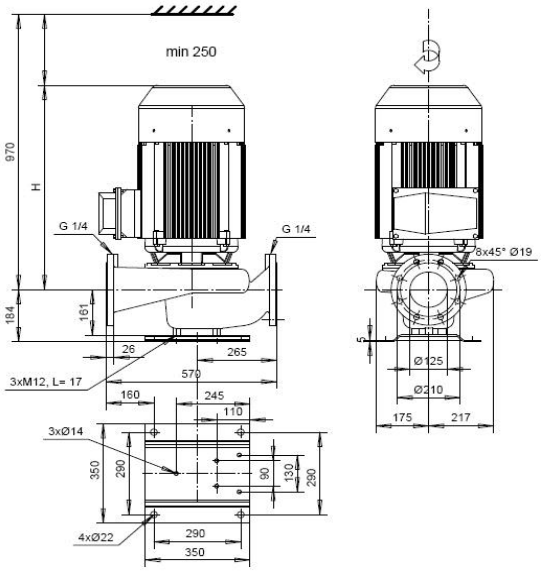
50 Hz 1500r/min DN 125



60 Hz 1800r/min DN 125



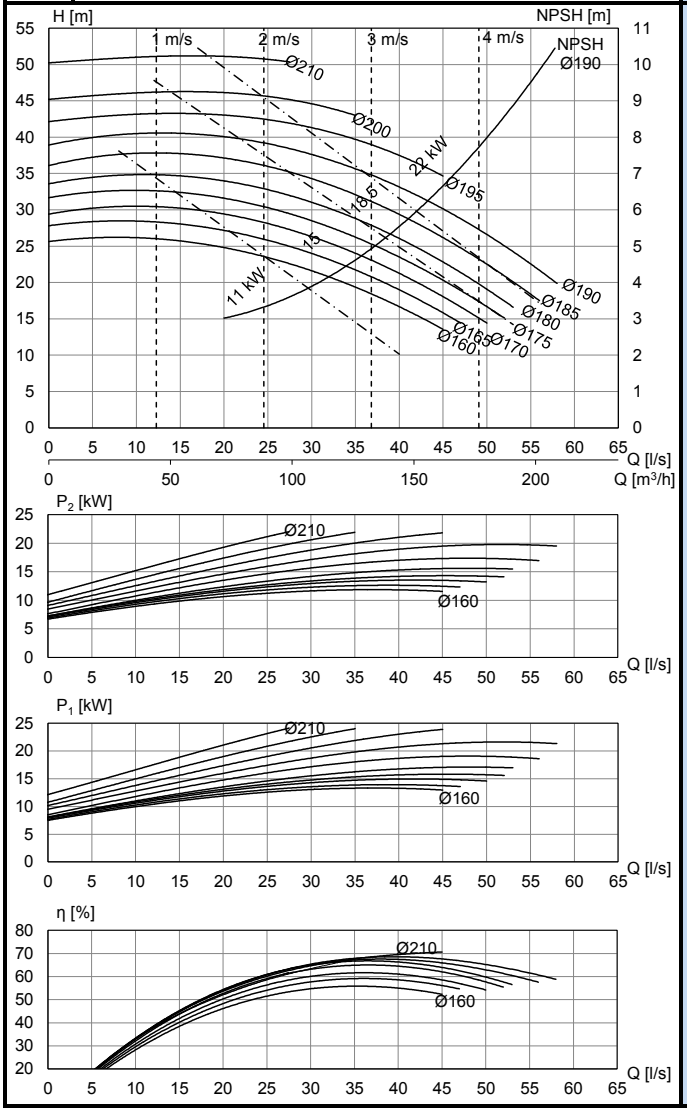
AKN-127/2 AKNH-127/2



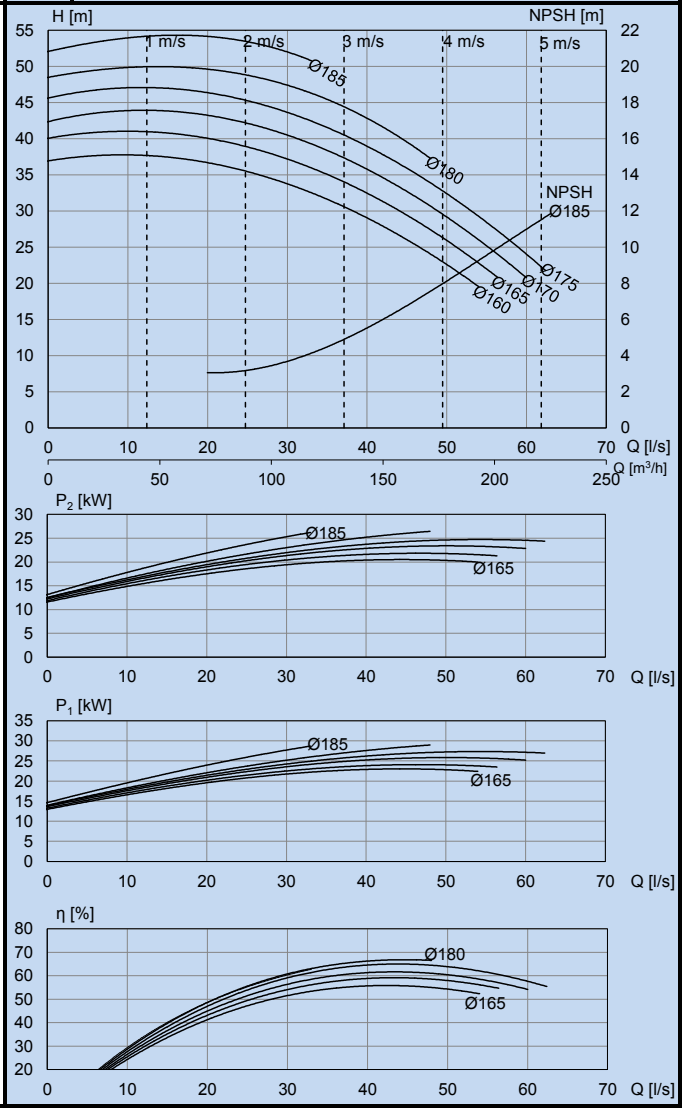
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	KZ-165 E1 N27	11	20,2	200	650
	KZ-165 F1 N27	15	26,95	205	650
	KZ-165A H1 N27	18,5	32,6	210	650
	KZ-186 J1 N27	22	38,6	265	720
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60Hz	KZ-165 F1 N27	15 (18)	28,05 (27,9)	205	650
	KZ-165A H1 N27	18,5 (22)	33,9 (33,6)	210	650
	KZ-186 J1 N27	22 (26)	40,3 (39,6)	265	720

4

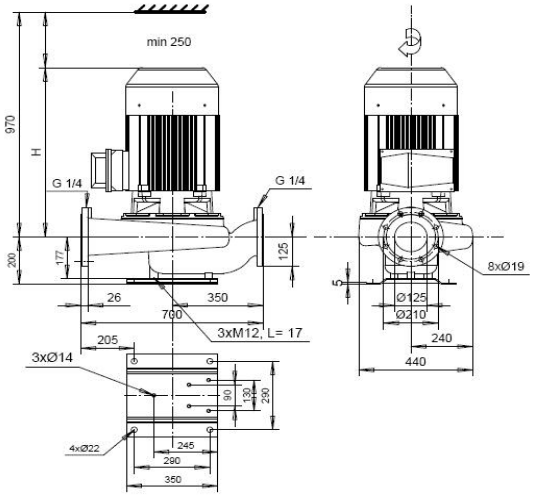
50 Hz 3000r/min DN 125



60 Hz 3600r/min DN 125



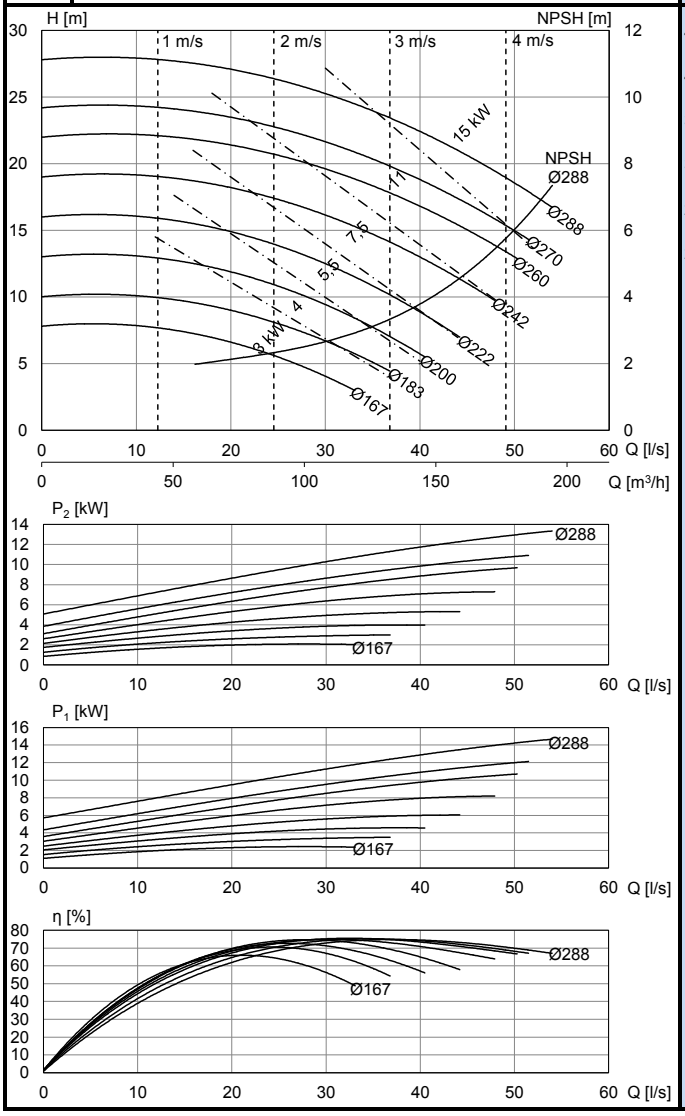
AL-1129/4 ALH-1129/4 ALS-1129/4 ALM-1129/4



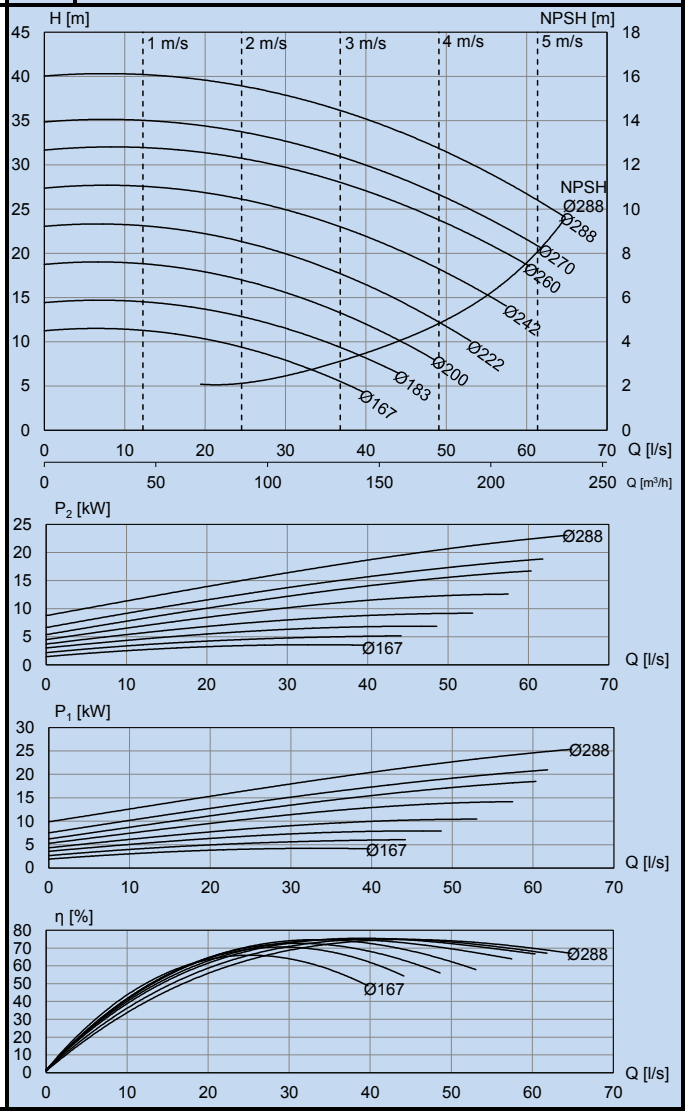
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KH-112 E2 F31	3	6,25	136	440
	KH-132 C2 F31	4	8,13	164	500
	KH-132 E2 F31	5,5	10,95	171	500
	KH-133 G2 F31	7,5	14,88	183	550
	KZ-165 F2 F31	11	20,75	240	660
	KZ-165 G2 F31	15	28,10	245	660
60HZ	**Motor 380-400V(460-480V)**	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
	KH-132 C2 F31	4 (4,8)	8,17 (8,30)	164	500
	KH-132 E2 F31	5,5 (6,6)	11,00 (11,15)	171	500
	KH-133 G2 F31	7,5 (9)	14,80 (15,47)	183	550
	KZ-165 F2 F31	11 (13)	21,35 (21,35)	240	660
	KZ-165 G2 F31	15 (18)	29,10 (28,75)	245	660
	KZ-186 G2 BF31	18,5 (22)	35,30 (35,10)	285	720
	KZ-186 K2 BF32	22 (26)	41,60 (41,00)	295	720

4

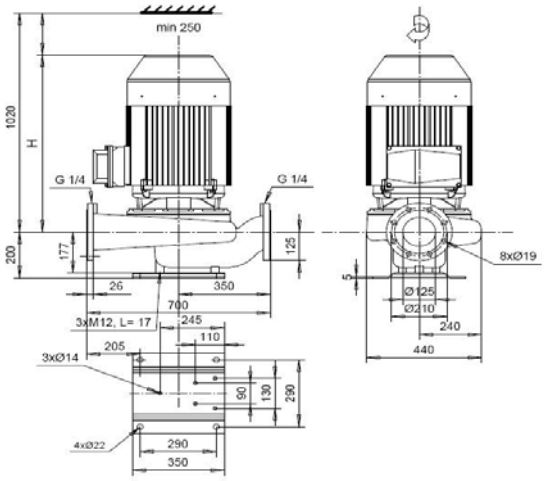
50 Hz 1500r/min DN 125



60 Hz 1800r/min DN 125



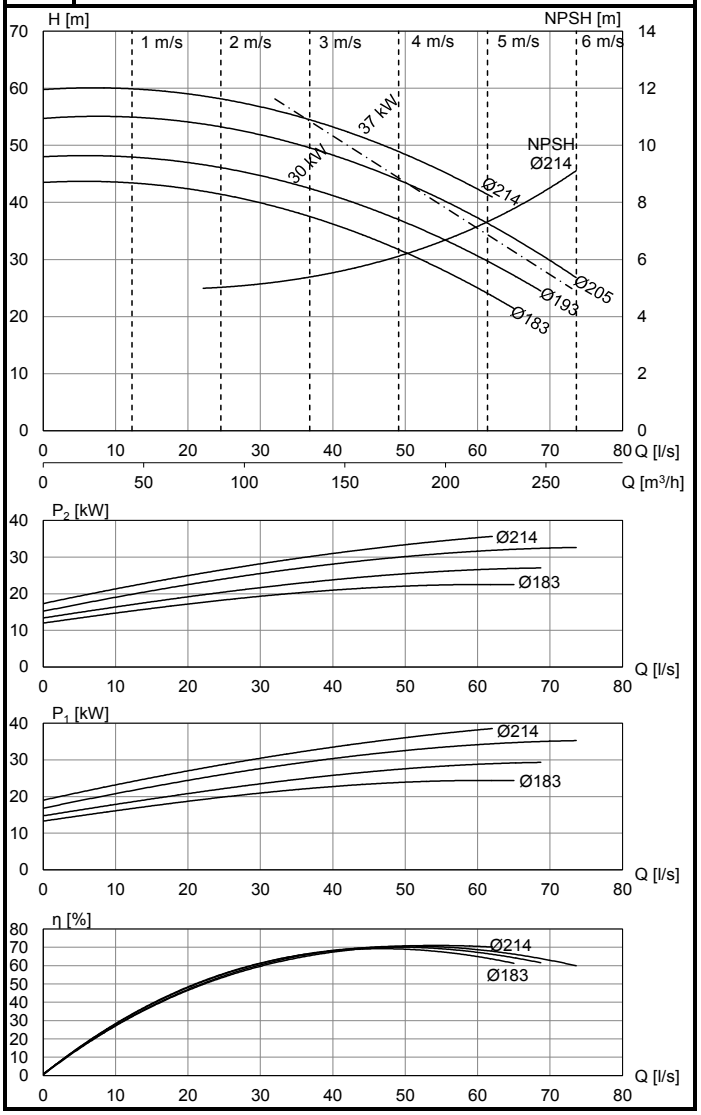
AL-1129/2 ALH-1129/2 ALS-1129/2 ALM-1129/2



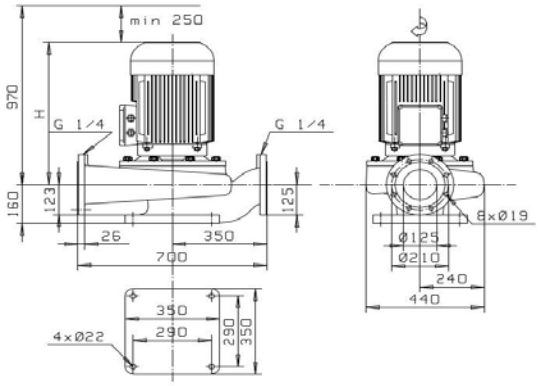
50HZ	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
	KZ-205 H1 F31	30	53,5	340	770
	KZ-205 J1 F31	37	65,6	365	770

4

50 Hz 3000r/min DN 125

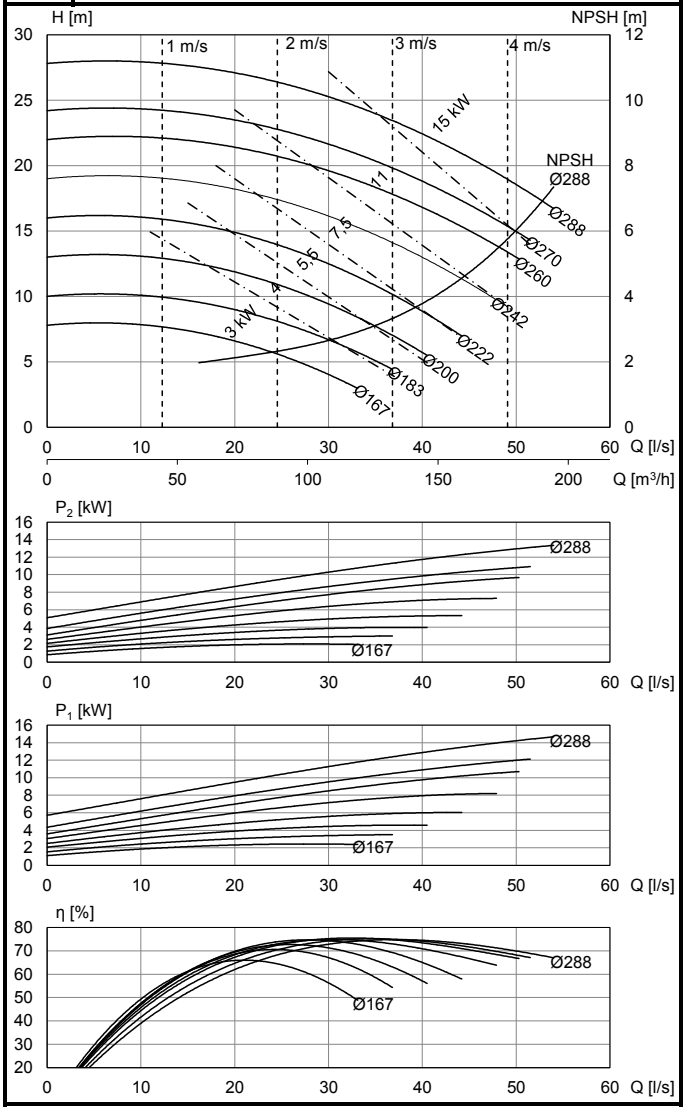


ALP-1128/4

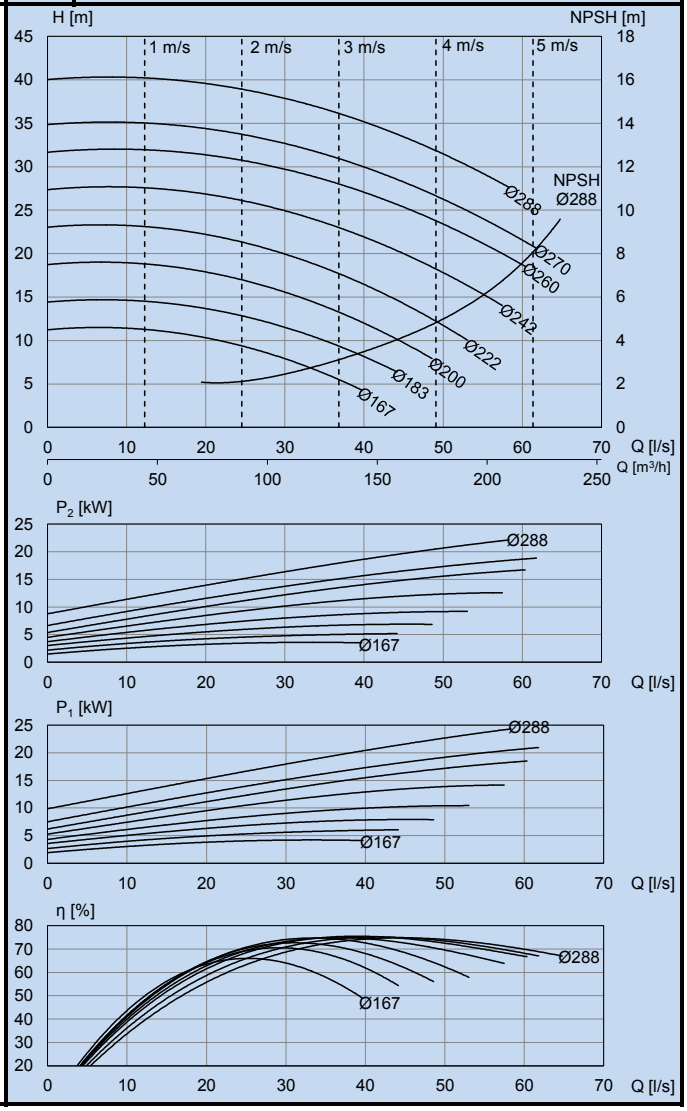


	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KH-112 E2 F31	3	6,25	136	435
	KH-132 C2 F31	4	8,13	164	500
	KH-132 E2 F31	5,5	10,95	171	500
	KH-133 G2 F31	7,5	14,88	183	550
	KZ-165 F2 F31	11	20,75	240	660
	KZ-165 G2 F31	15	28,10	245	660
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	KH-112 E2 F31	3 (3,6)	6,15 (6,25)	136	435
	KH-132 C2 F31	4 (4,8)	8,17 (8,30)	164	500
	KH-132 E2 F31	5,5 (6,6)	11,00 (11,15)	171	500
	KH-133 G2 F31	7,5 (9)	14,80 (15,47)	183	550
	KZ-165 F2 F31	11 (13)	21,35 (21,35)	240	660
	KZ-165 G2 F31	15 (18)	29,10 (28,75)	245	660
	KZ-186 G2 BF31	18,5 (22)	35,30 (35,10)	285	720
	KZ-186 K2 BF31	22 (26)	41,60 (41,00)	295	720

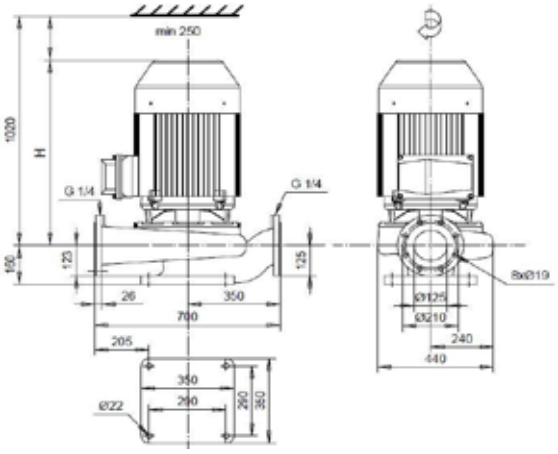
50 Hz 1500r/min DN 125



60 Hz 1800r/min DN 125



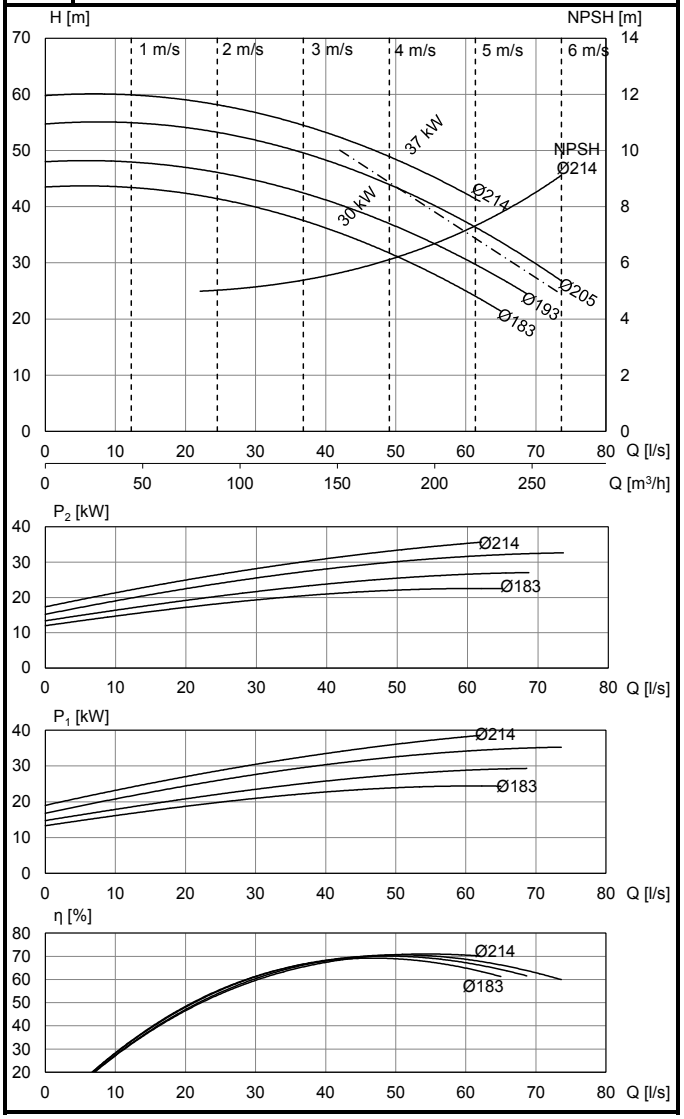
ALP-1128/2



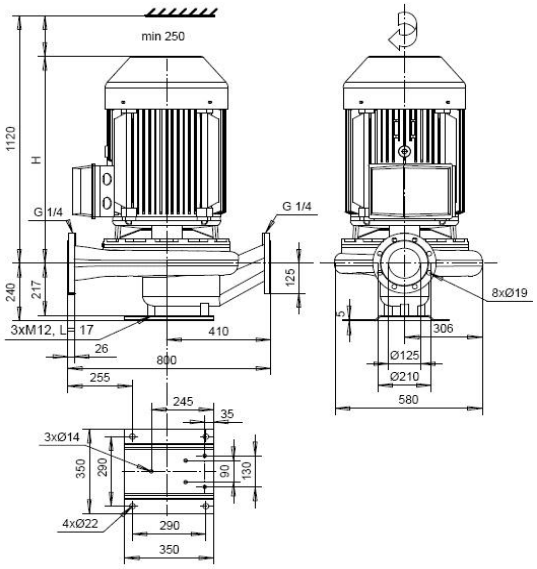
50HZ	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
	KZ-205 H1 F31	30	53,5	340	770
	KZ-205 J1 F31	37	65,6	360	770

4

50 Hz 3000r/min DN 125

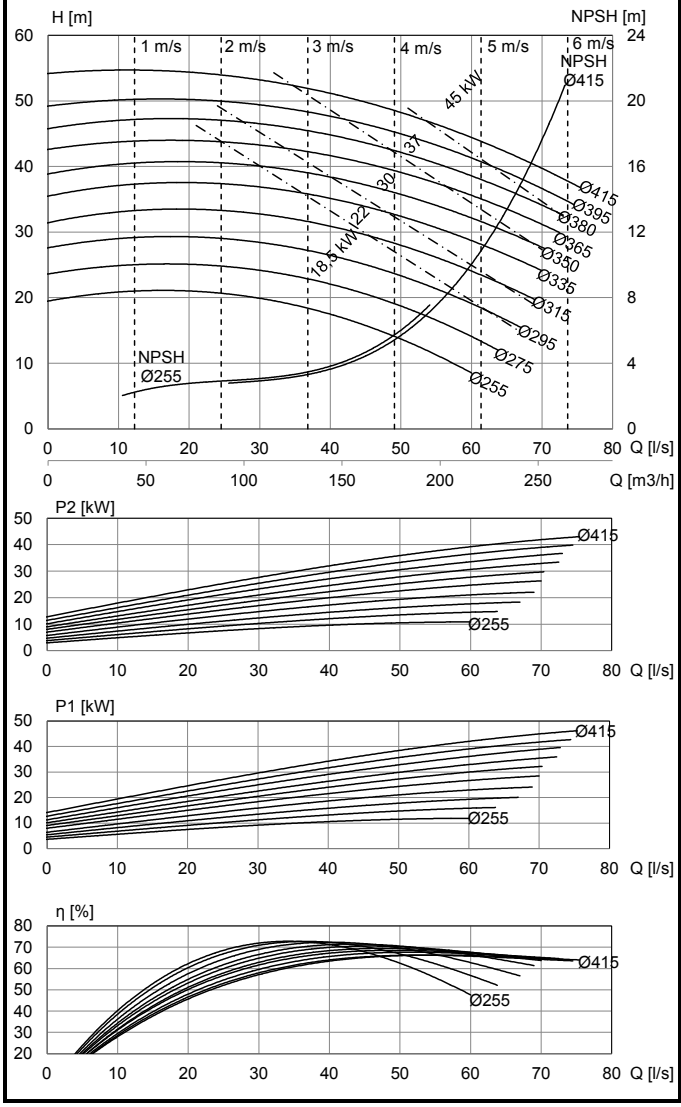


L-125S/4 LH-125S/4 LS-125S/4

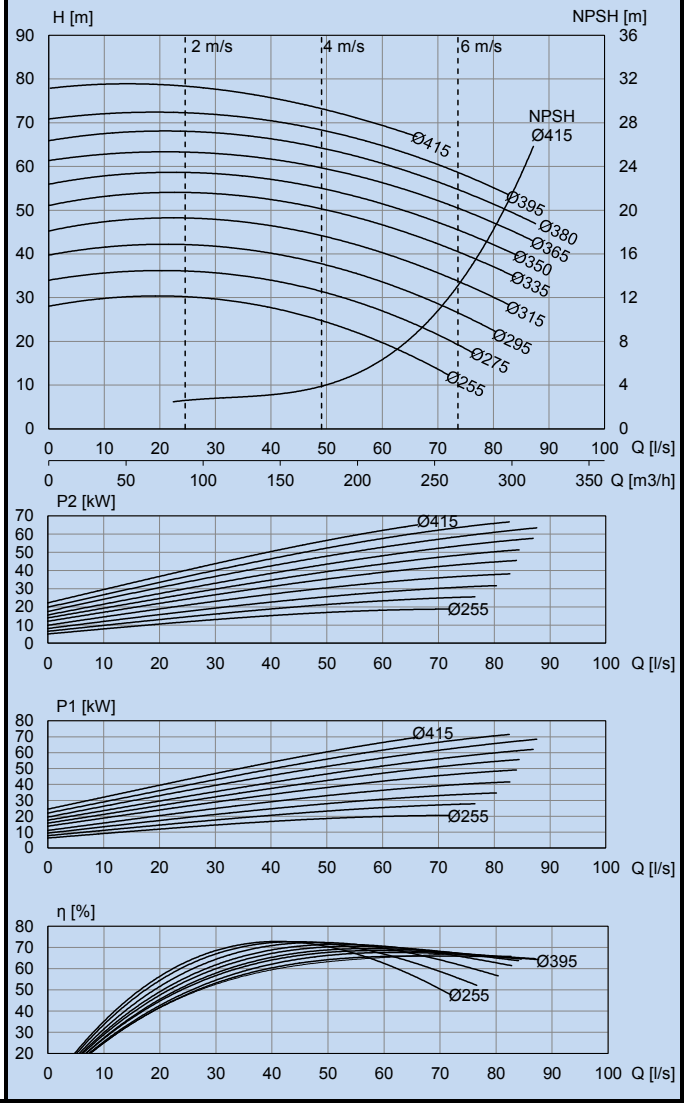


	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KZ-186 G2 F41	18,5	34,4	340	730
	KZ-186 K2 F41	22	40,3	350	730
	KZ-205 K2 F41	30	55,2	405	800
	KZ-224 J2 F41	37	67,0	455	800
	KZ-225 K2 F42	45	81,1	485	830
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	KZ-186 G2 F41	18,5 (22)	35,3 (35,1)	340	730
	KZ-186 K2 F41	22 (26)	41,6 (41,0)	350	730
	KZ-205 K2 F41	30 (36)	57,6 (57,1)	405	800
	KZ-224 J2 F41	37 (44)	69,5 (68,6)	455	800
	KZ-225 K2 F42	45 (54)	84,0 (83,8)	485	830
	KZ-256 J2 F42	55 (66)	102,1 (100,9)	570	870

50 Hz 1500r/min DN 125



60 Hz 1800r/min DN 125



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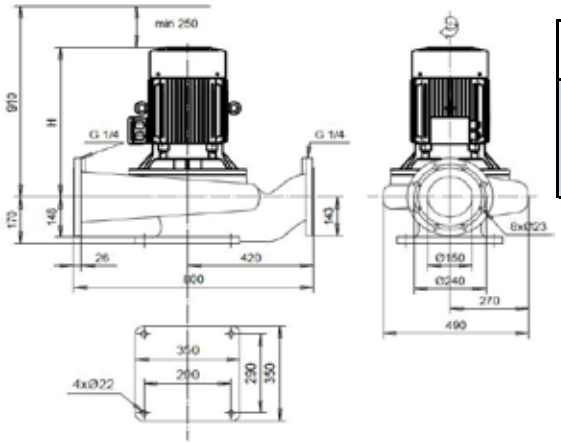
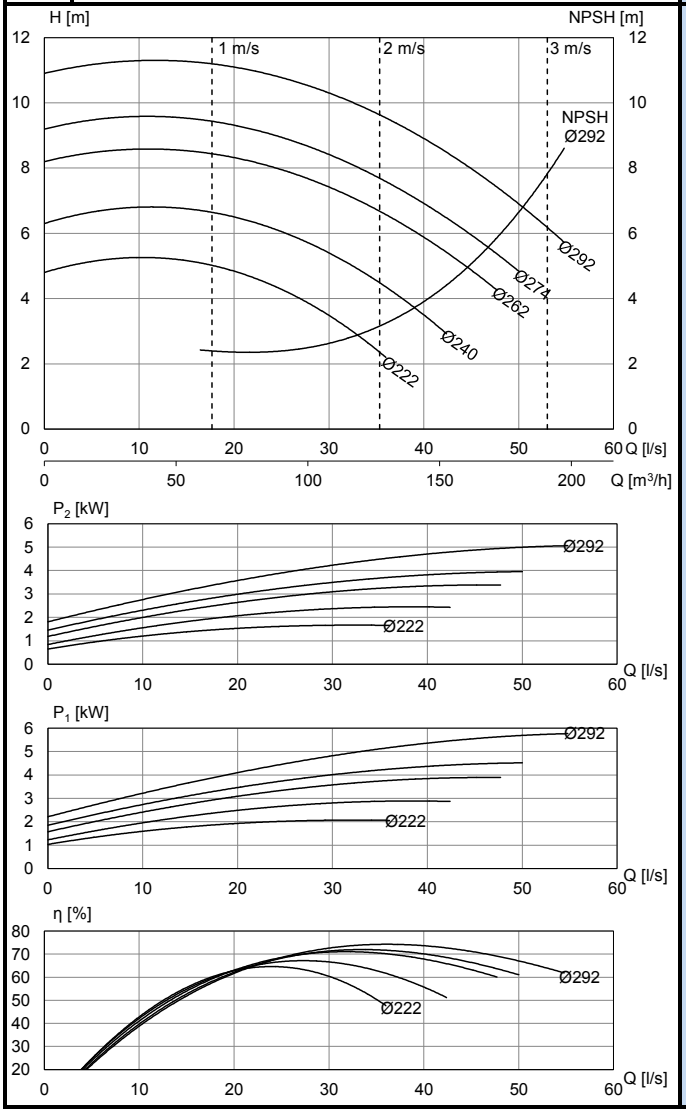
ALP-1153/6



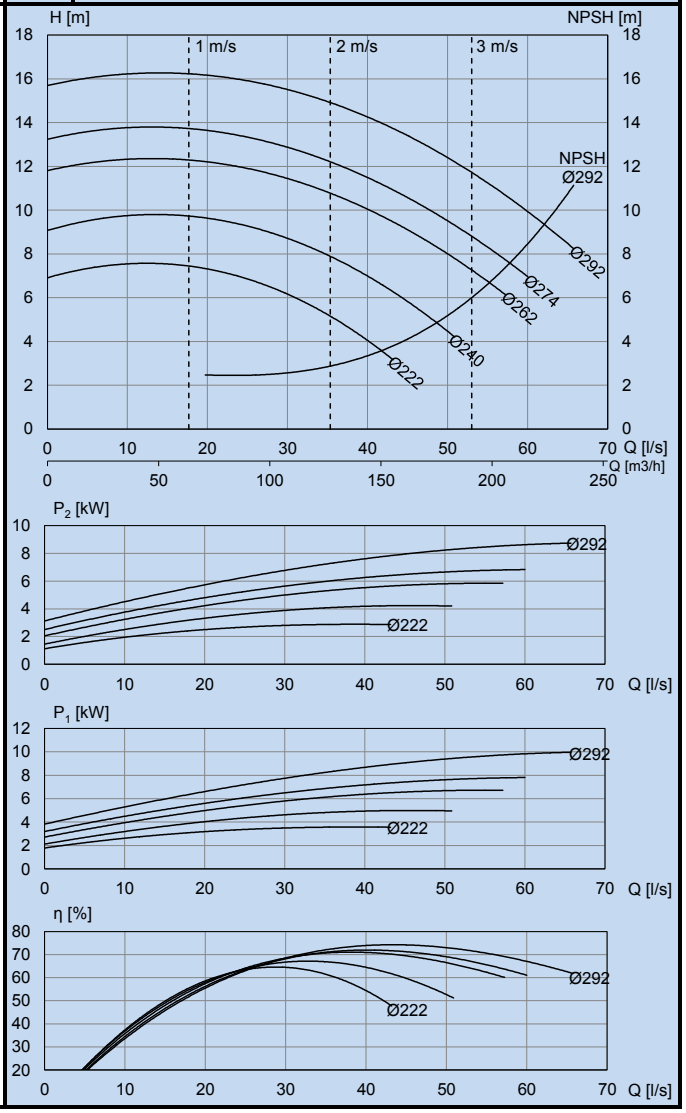
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	KH-133 G3 F31	5,5	12,30	200	550
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60Hz	KH-133 G3 F31	5,5 (6,6)	11,53 (12,18)	200	550
	KZ-165 G3 F31	7,5 (9)	16,30 (17,40)	250	660
	KZ-165 G3 F31	11 (13)	22,90 (23,20)	250	660

4

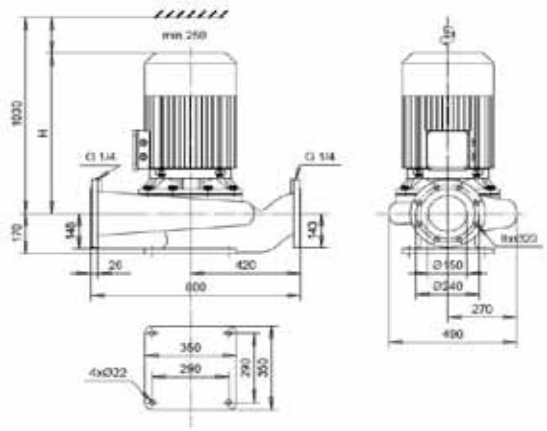
50 Hz 1000r/min DN 150



60 Hz 1200r/min DN 150

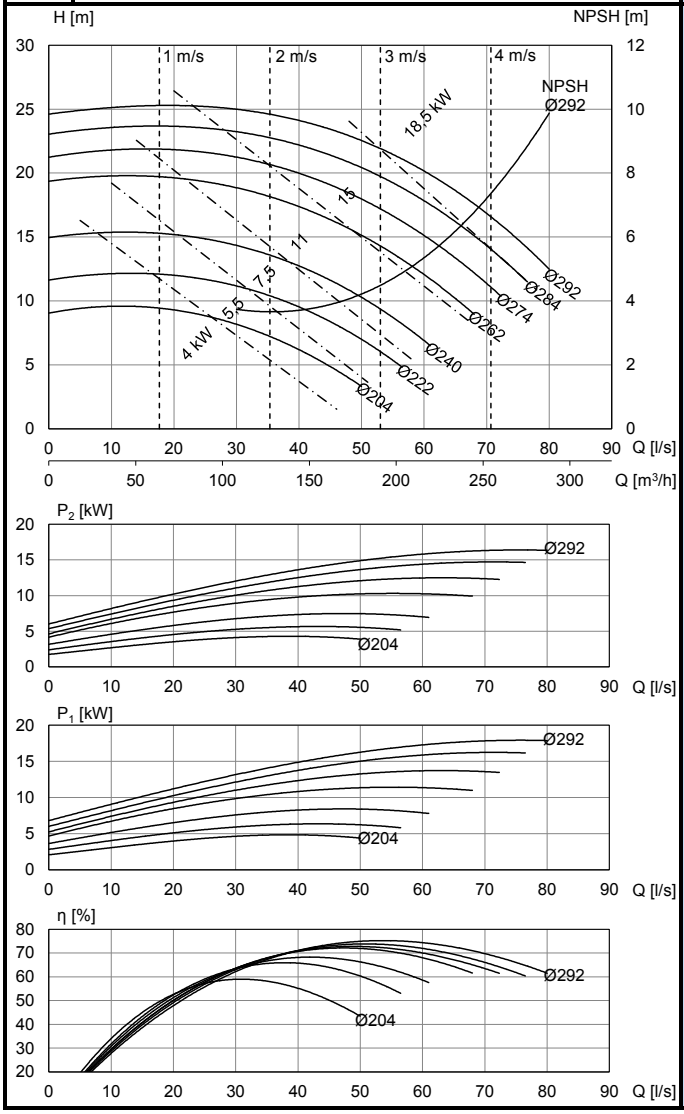


ALP-1153/4

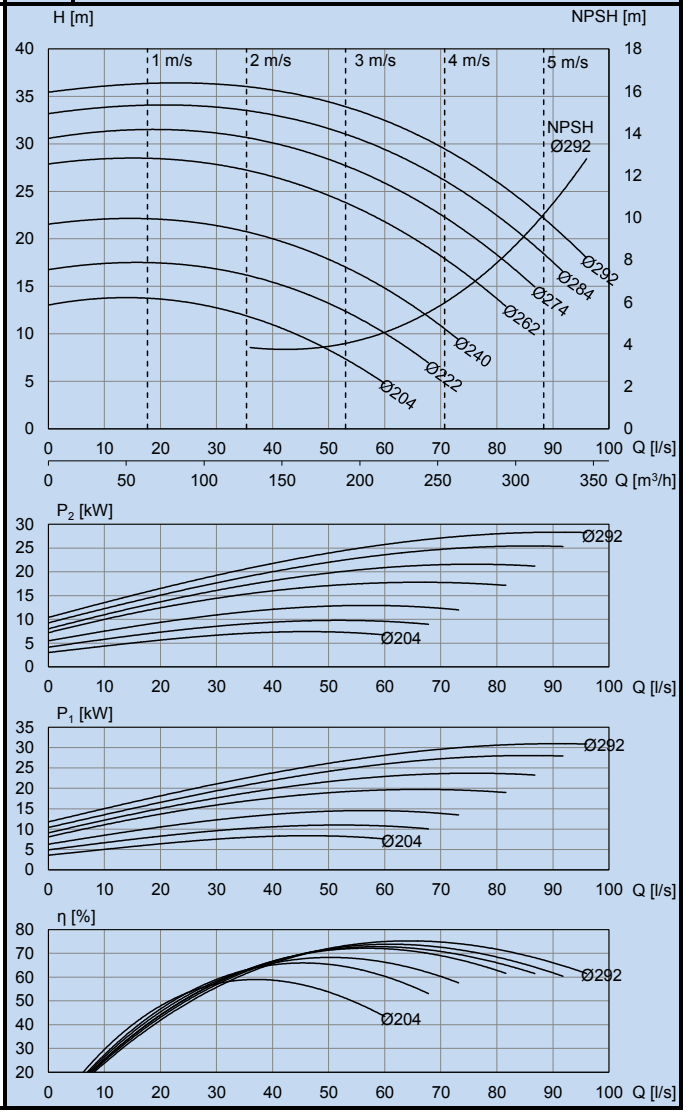


	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KH-132 C2 F31	4	8,13	177	500
	KH-132 E2 F31	5,5	10,95	184	500
	KH-133 G2 F31	7,5	14,88	196	550
	KZ-165 F2 F31	11	20,75	250	660
	KZ-165 G2 F31	15	28,1	255	660
	KZ-186 G2 BF31	18,5	34,4	295	720
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	KH-132 C2 F31	4 (4,8)	8,17 (8,30)	177	500
	KH-132 E2 F31	5,5 (6,6)	11,00 (11,15)	184	500
	KH-133 G2 F31	7,5 (9)	14,80 (15,47)	196	550
	KZ-165 F2 F31	11 (13)	21,35 (21,35)	250	660
	KZ-165 G2 F31	15 (18)	29,10 (28,75)	255	660
	KZ-186 G2 BF31	18,5 (22)	35,30 (35,10)	295	720
	KZ-186 K2 BF31	22 (26)	41,60 (41,00)	310	720
	KZ-205 K2 F31	30 (30)	57,60 (57,60)	370	780

50 Hz 1500r/min DN 150

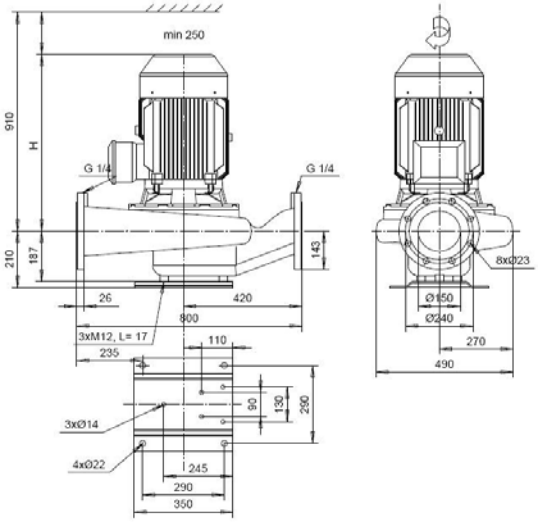


60 Hz 1800r/min DN 150



4

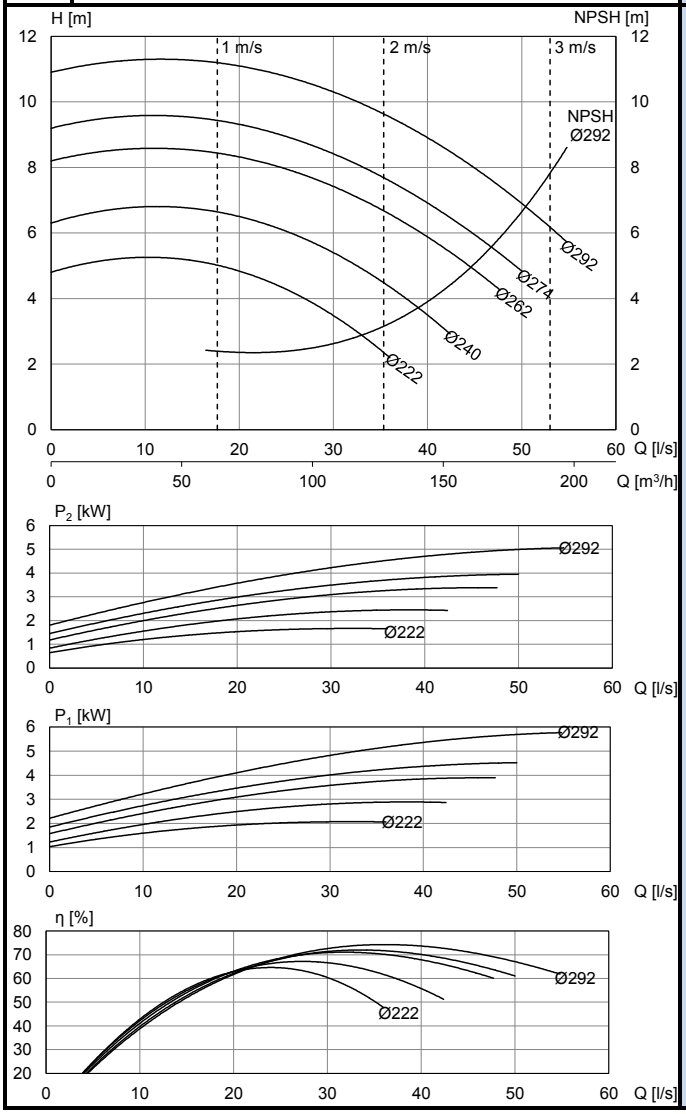
AL-1154/6 ALH-1154/6 ALS-1154/6 ALM-1154/6



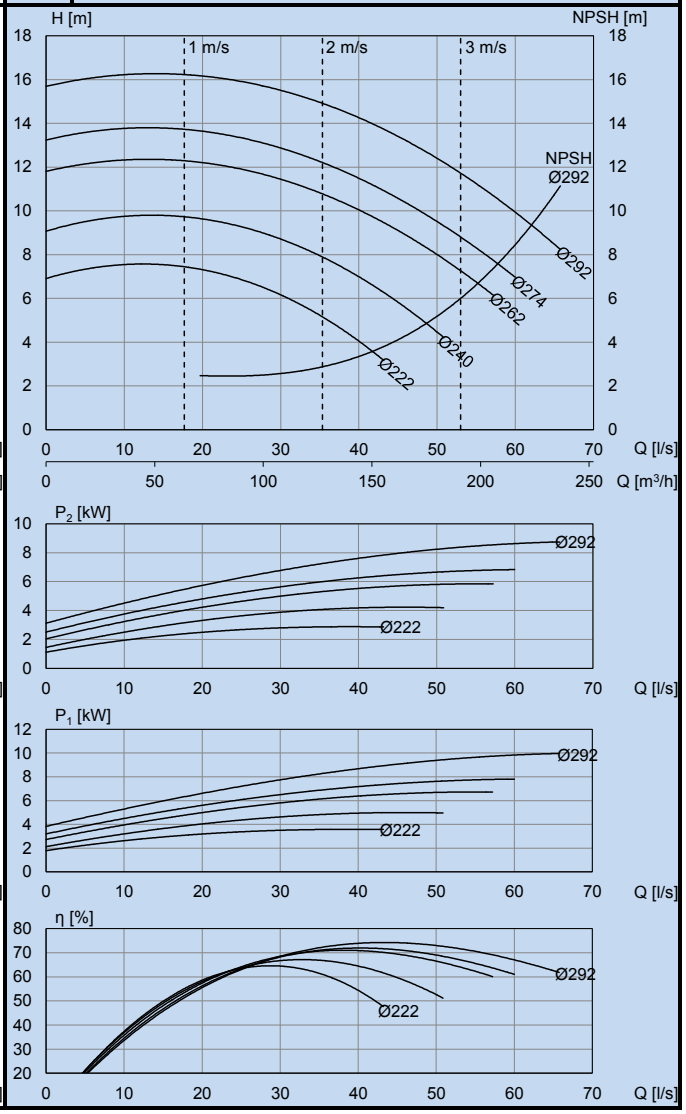
50HZ	**Motor 400V**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KH-133 G3 F31	5,5	12,30	200	550
60HZ	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KH-133 G3 F31	5,5 (6,6)	11,53 (12,18)	200	550
	KZ-165 G3 F31	7,5 (9)	16,30 (17,40)	250	660
	KZ-165 G3 F31	11 (13)	22,90 (23,20)	250	660

4

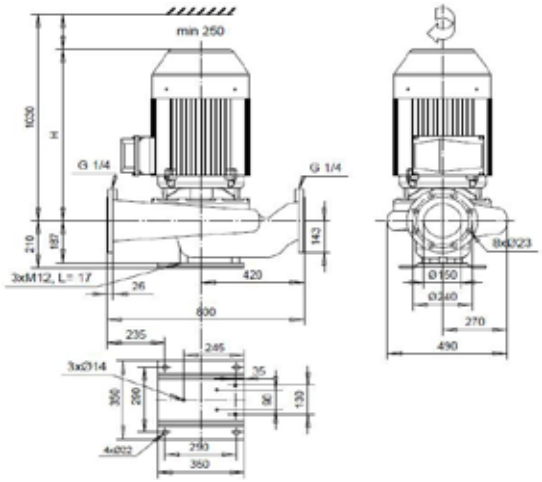
50 Hz 1000r/min DN 150



60 Hz 1200r/min DN 150



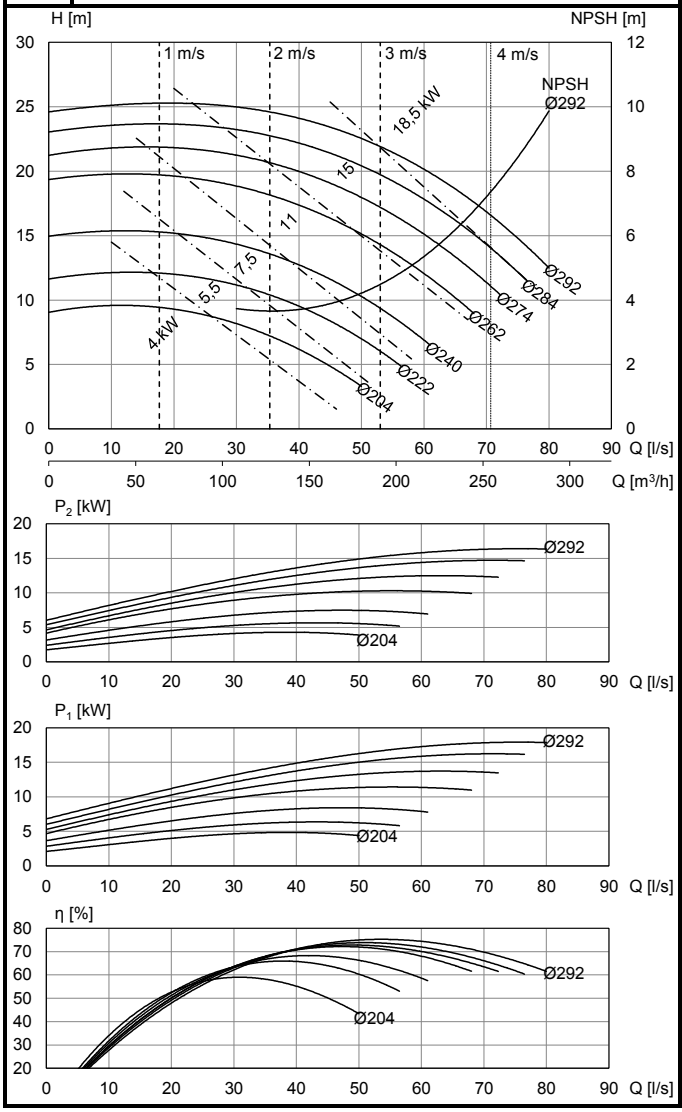
AL-1154/4 ALH-1154/4 ALS-1154/4 ALM-1154/4



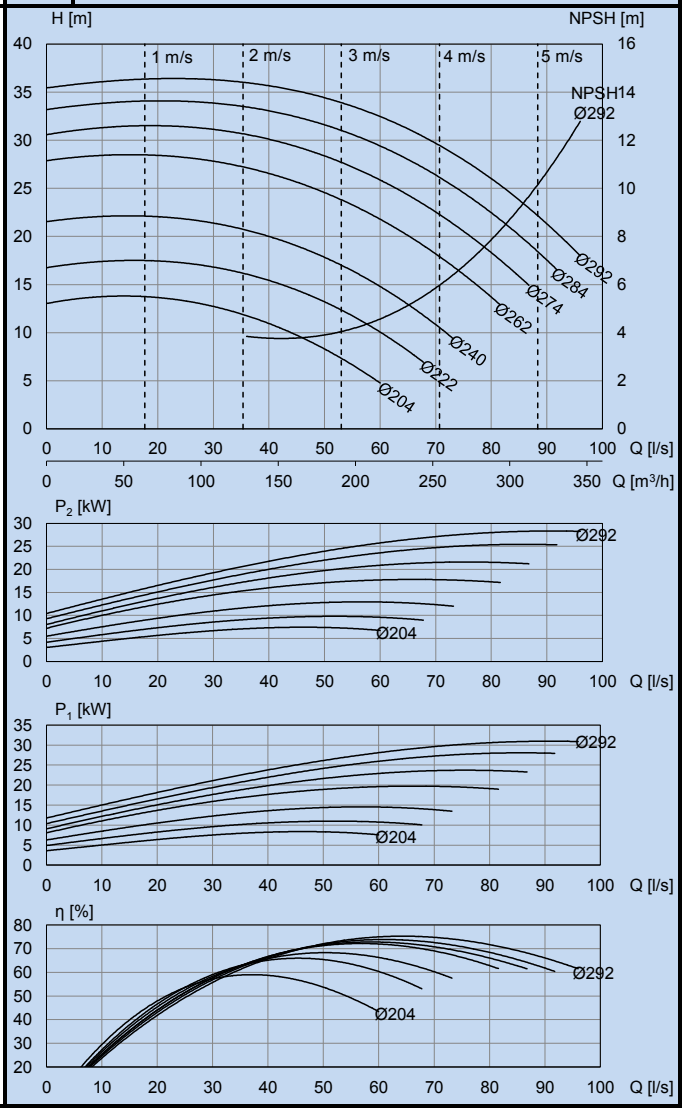
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KH-132 C2 F31	4	8,13	177	500
	KH-132 E2 F31	5,5	10,95	184	500
	KH-133 G2 F31	7,5	14,88	196	550
	KZ-165 F2 F31	11	20,75	250	660
	KZ-165 G2 F31	15	28,10	255	660
	KZ-186 G2 BF31	18,5	34,40	295	720
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	KH-132 C2 F31	4 (4,8)	8,17 (8,30)	177	500
	KH-132 E2 F31	5,5 (6,6)	11,00 (11,15)	184	500
	KH-133 G2 F31	7,5 (9)	14,80 (15,47)	196	550
	KZ-165 F2 F31	11 (13)	21,35 (21,35)	250	660
	KZ-165 G2 F31	15 (18)	29,10 (28,75)	255	660
	KZ-186 G2 BF31	18,5 (22)	35,30 (35,10)	295	720
	KZ-186 K2 BF31	22 (26)	41,60 (41,00)	310	720
	KZ-205 K2 F31	30 (30)	57,60 (57,10)	370	780

4

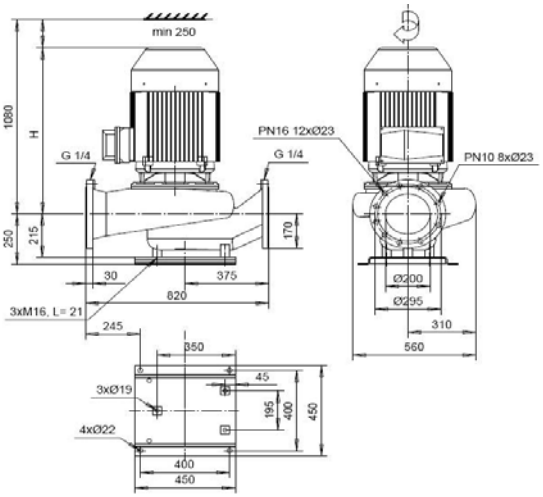
50 Hz 1500r/min DN 150



60 Hz 1800r/min DN 150



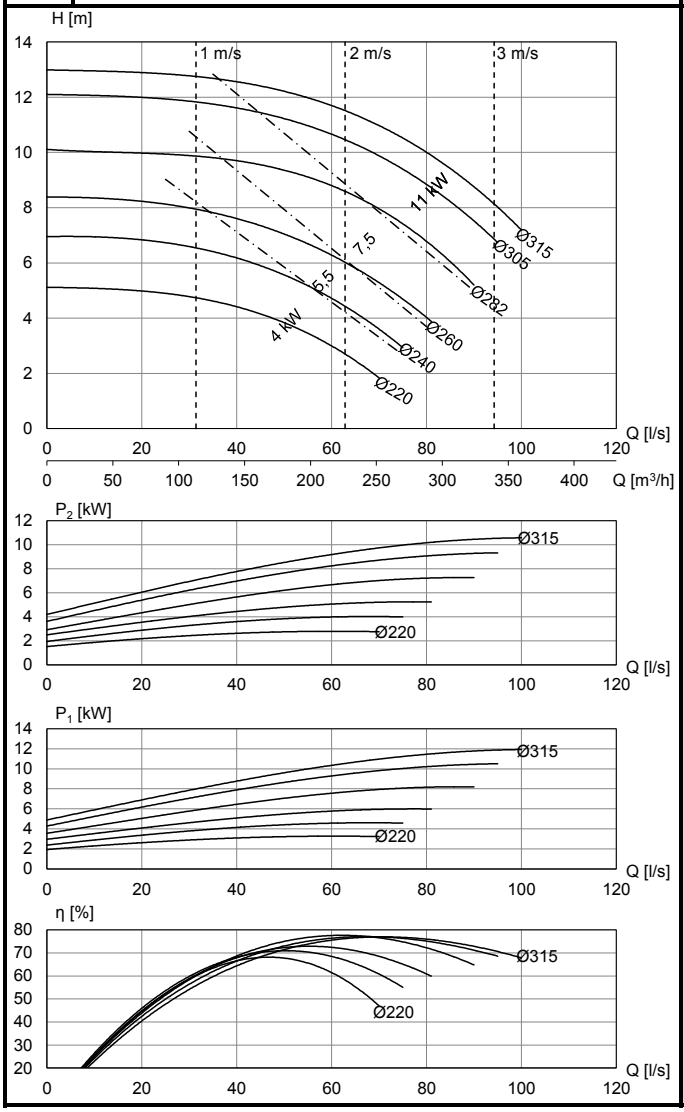
AL-1202/6 ALH-1202/6 ALP-1202/6 ALS-1202/6 ALM-1202/6



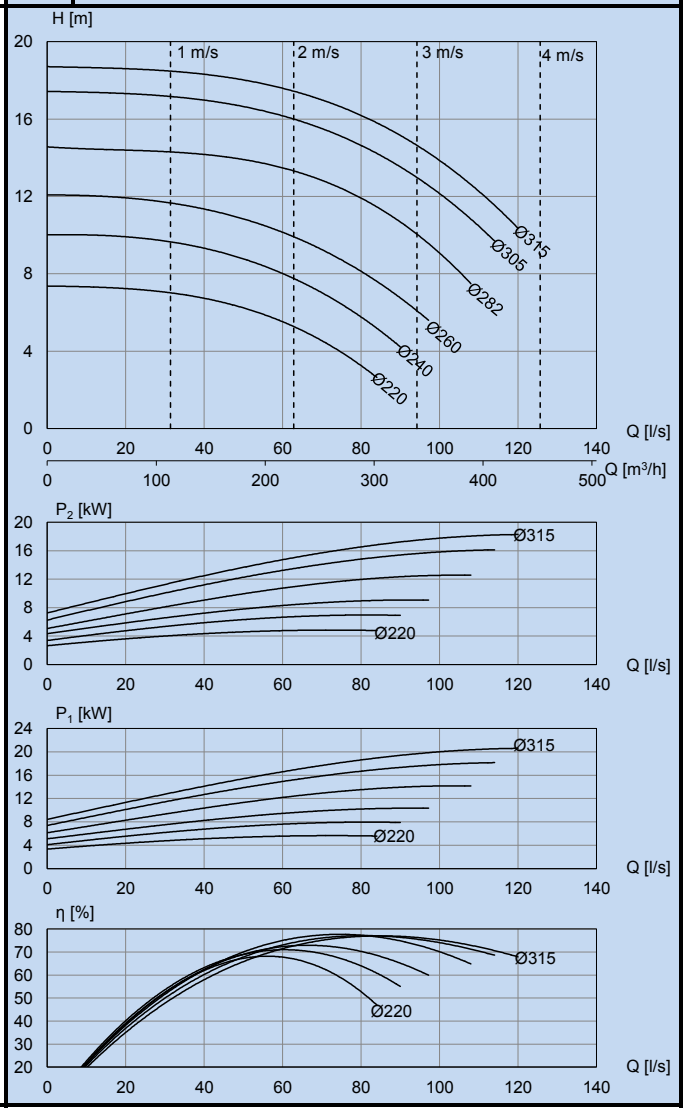
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50Hz	KH-133 G3 F31	4	10,2	275	610
	KH-133 G3 F31	5,5	12,3	275	610
	KZ-165 G3 F31	7,5	17,7	320	720
	KZ-165 G3 F31	11	23,3	320	720
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60Hz	KH-133 G3 F31	4 (4,8)	9,89 (10,28)	275	610
	KH-133 G3 F31	5,5 (6,6)	11,53 (12,18)	275	610
	KZ-165 G3 F31	7,5 (9)	16,30 (17,40)	320	720
	KZ-165 G3 F31	11 (13)	22,00 (23,20)	320	720
	KZ-205 G3 F32	15 (18,5)	30,80 (31,30)	440	830
	KZ-205 G3 F32	18,5 (22)	37,40 (36,00)	440	830

4

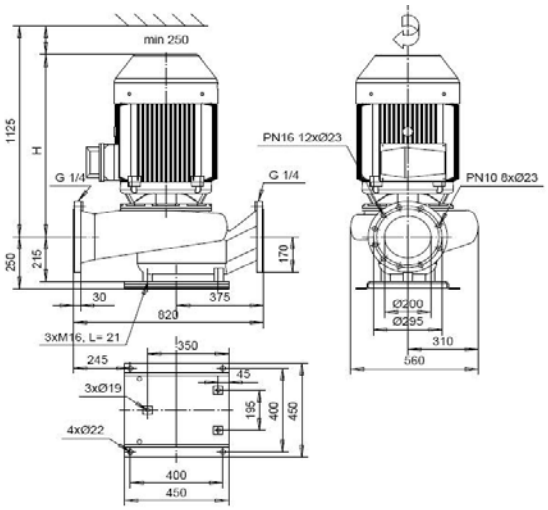
50 Hz 1000r/min DN 200



60 Hz 1200r/min DN 200



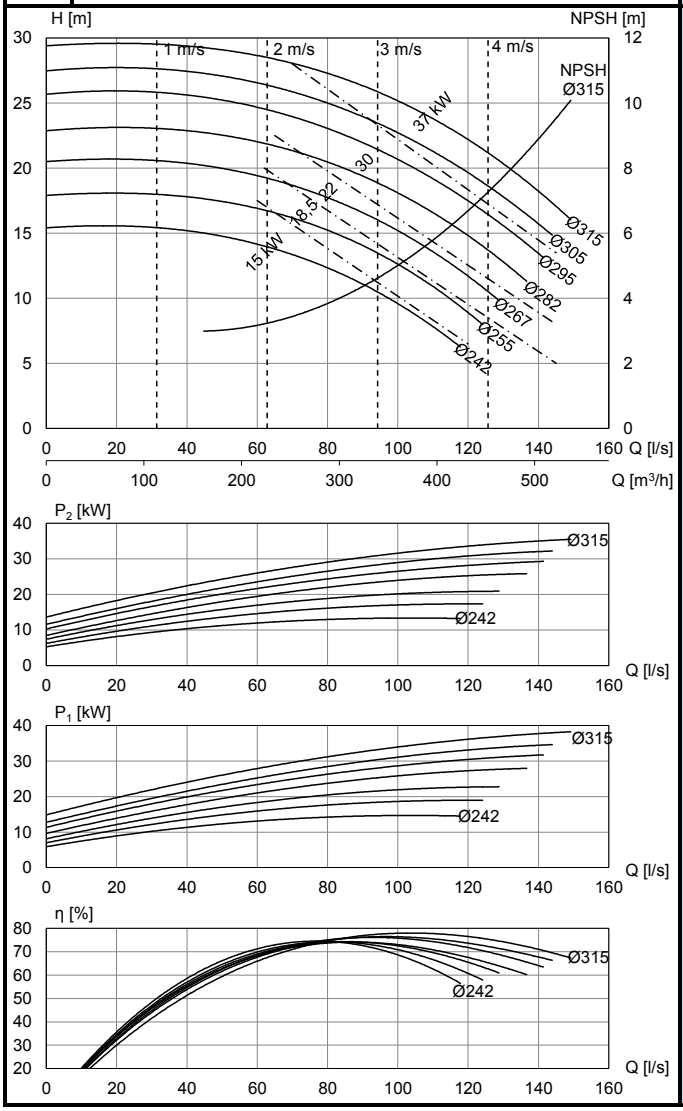
AL-1202/4 ALH-1202/4 ALP-1202/4 ALS-1202/4 ALM-1202/4



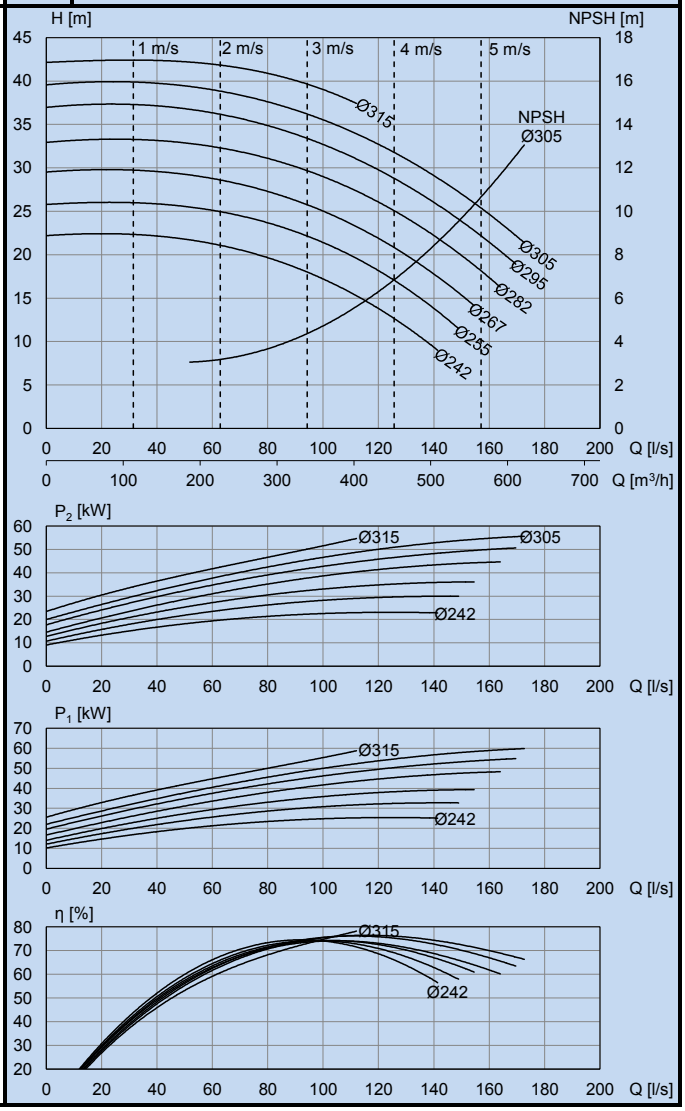
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KZ-165 G2 F31	15	28,1	325	720
	KZ-186 G2 BF31	18,5	34,4	365	780
	KZ-186 K2 BF32	22	40,3	380	780
	KZ-205 K2 F32	30	55,2	435	830
	KZ-224 J2 F32	37	67,0	485	840
60HZ	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KZ-186 G2 BF31	18,5 (22)	35,30 (35,10)	365	780
	KZ-186 K2 BF32	22 (26)	41,60 (41,00)	380	780
	KZ-205 K2 F32	30 (36)	57,60 (57,10)	435	830
	KZ-224 J2 F32	37 (44)	69,50 (68,60)	485	840
	KZ-225 K2 F33	45 (54)	84,00 (83,80)	510	880

4

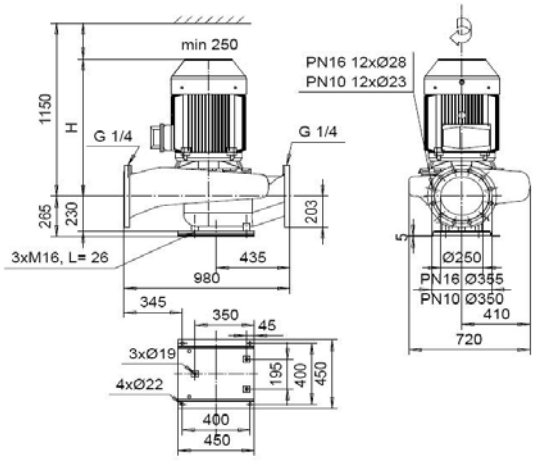
50 Hz 1500r/min DN 200



60 Hz 1800r/min DN 200



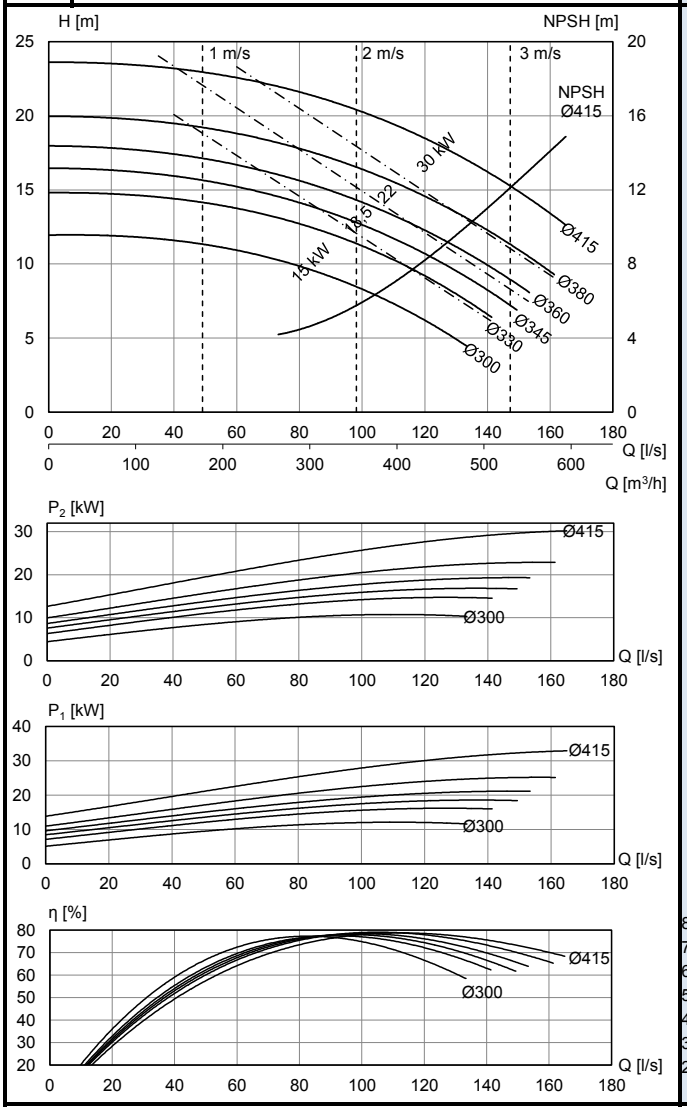
AL-1250/6 ALH-1250/6 ALP-1250/6 ALS-1250/6



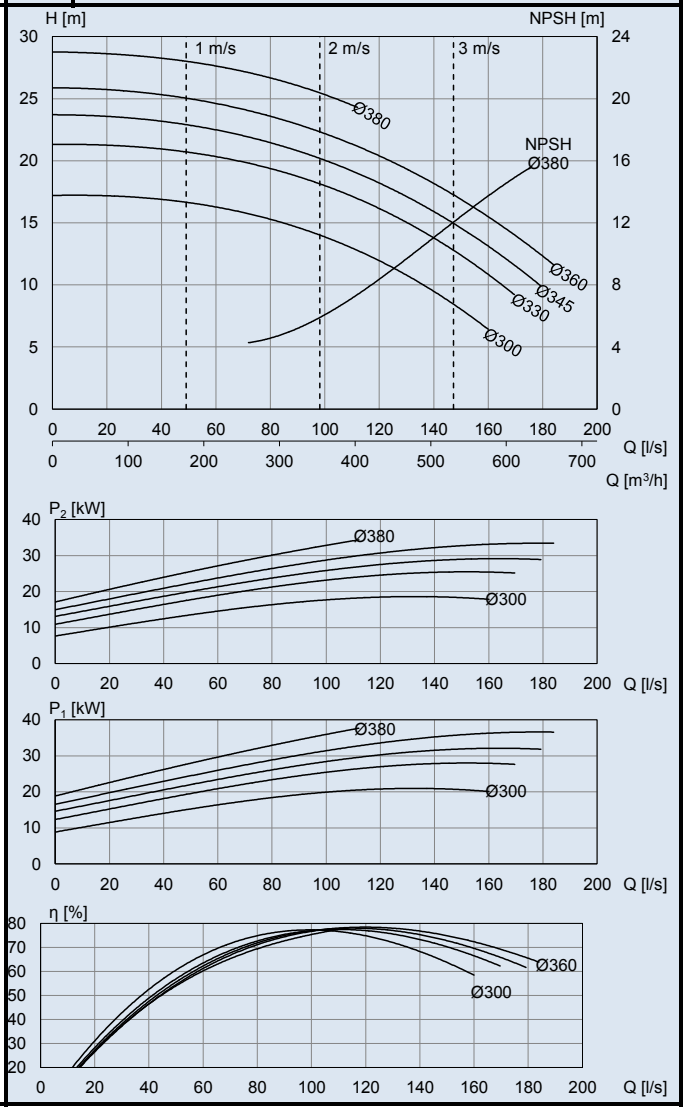
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KZ-205 G3 F41	15	29,7	540	880
	KZ-205 G3 F41	18,5	36,4	540	880
	KZ-205 H3 F41	22	42,1	550	880
	KZ-225 G3 F42	30	56,2	620	900
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	KZ-205 G3 F41	18,5 (22)	37,4 (36,0)	540	880
	KZ-205 H3 F41	22 (26)	43,4 (42,5)	550	880
	KZ-225 G3 F42	30 (36)	58,3 (57,8)	620	900

4

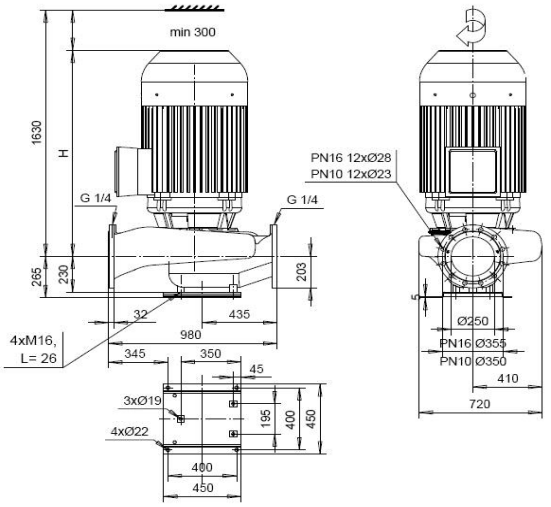
50 Hz 1000r/min DN 250



60 Hz 1200r/min DN250



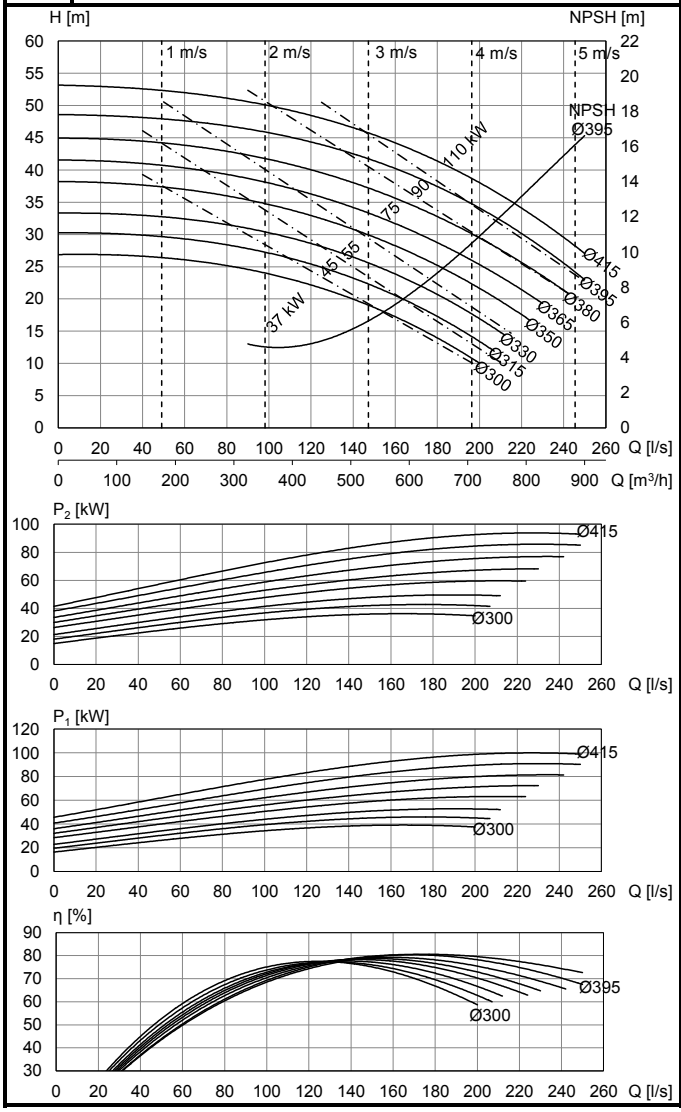
AL-1250/4 ALH-1250/4 ALP-1250/4 ALS-1250/4 ALM-1250/4



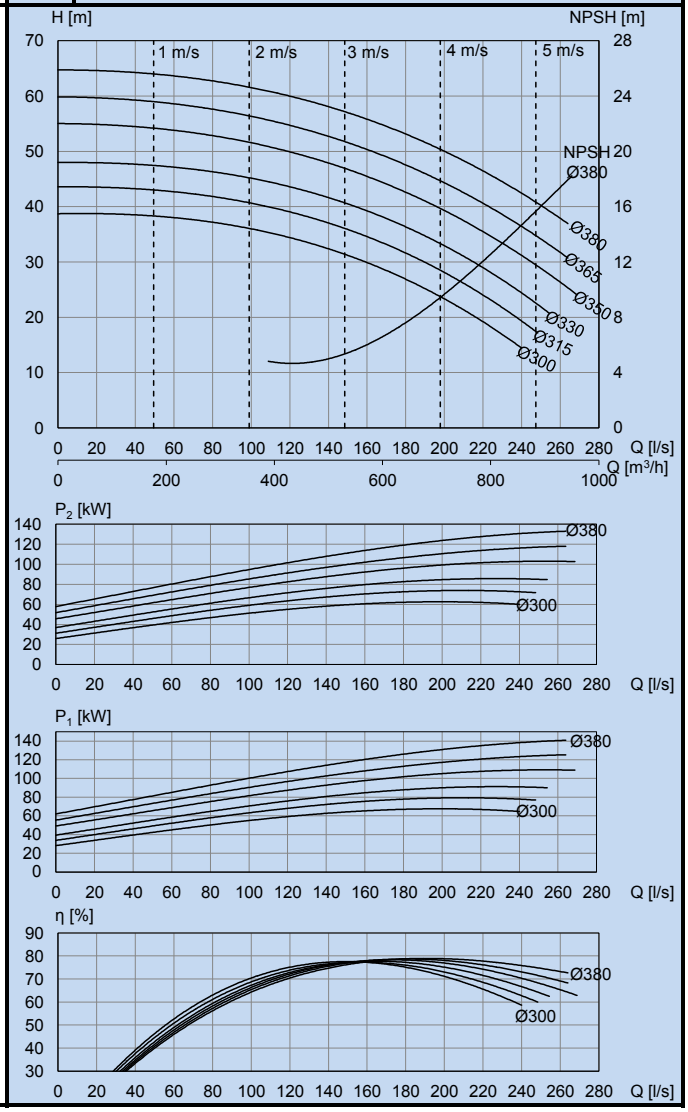
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KZ-224 J2 F41	37	67,0	580	880
	KZ-225 K2 F42	45	81,1	610	900
	KZ-256 J2 F42	55	98,7	690	950
	KZ-287 J2 F43	75	133,9	850	1020
	KZ-288 K2 F43	90	158,5	920	1070
	KZR-314 H2 F43	110	193,2	1210	1330
60HZ	**Motor 380-400V(460-480V)**	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
	KZ-225 K2 F42	45 (54)	84,0 (83,8)	610	900
	KZ-256 J2 F42	55 (66)	102,1 (100,9)	690	950
	KZ-287 J2 F43	75 (90)	138,6 (139,0)	850	1020
	KZ-288 K2 F43	90 (105)	156,2 (159,6)	920	1070
	KZR-314 H2 F43	110 (132)	199,9 (198,2)	1210	1330

4

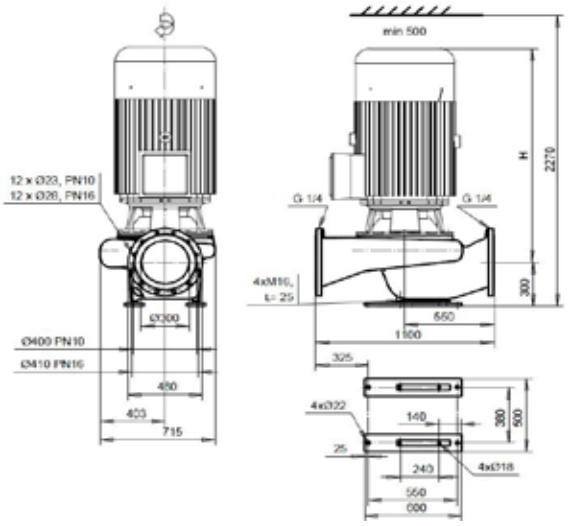
50 Hz 1500r/min DN 250



60 Hz 1800r/min DN 250



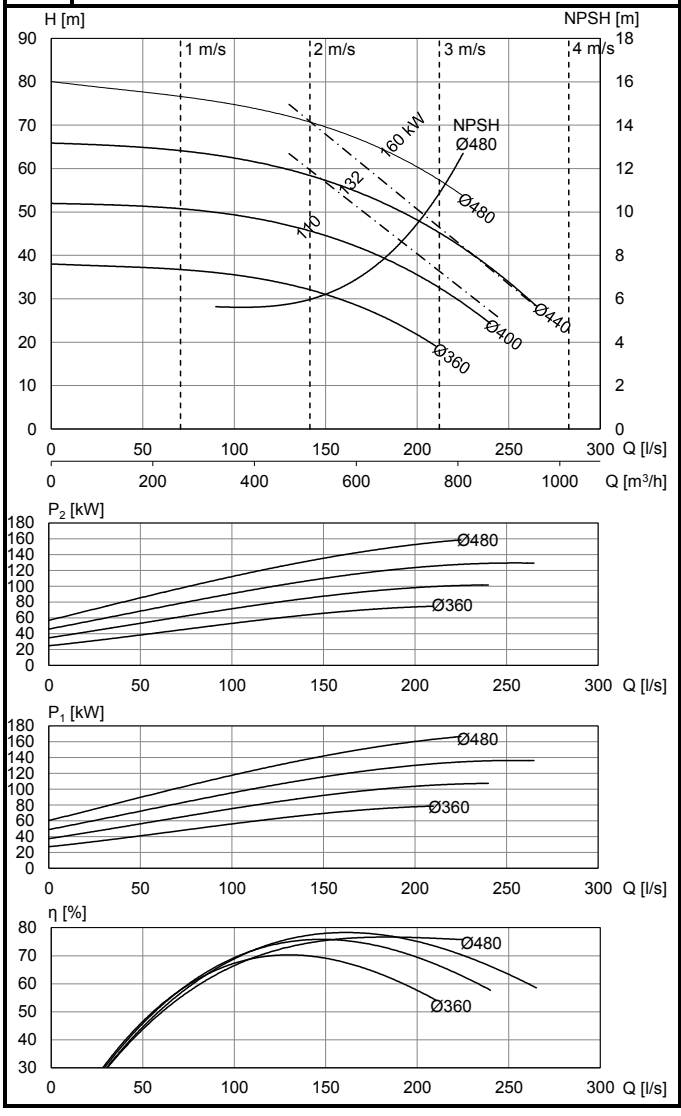
AL-1300/4 ALH-1300/4 ALS-1300/4



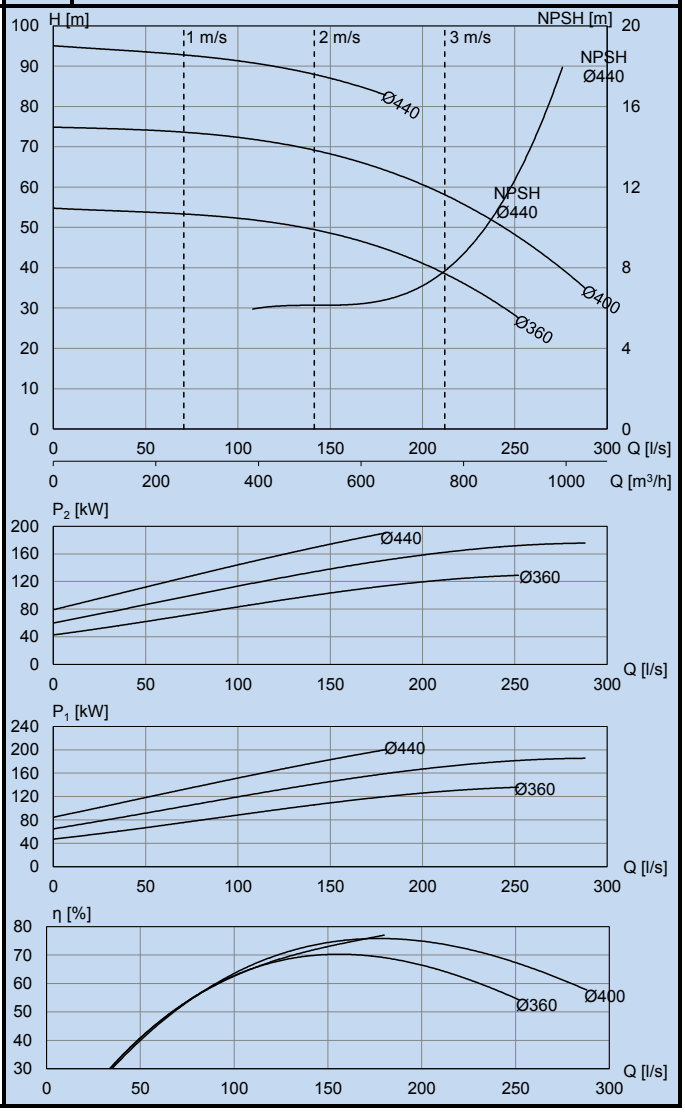
	Motor 400V	P_{2N} [kW]	I_N [A]	[kg]	H [mm]
50HZ	KZR-314 H2 F53	110	193,20	1470	1360
	KZR-316 J2 F53	132	231,20	1590	1470
	KZR-316 K2 F53	160	279,70	1660	1470
	Motor 380-400V(460-480V)	**P_{2N} [kW]**	**I_N [A]**	**[kg]**	**H [mm]**
60HZ	KZR-314 H2 F53	110 (132)	199,9 (198,2)	1470	1360
	KZR-316 J2 F53	132 (158)	242,6 (242,5)	1590	1470
	KZR-316 K2 F53	160 (190)	290,5 (287,3)	1660	1470

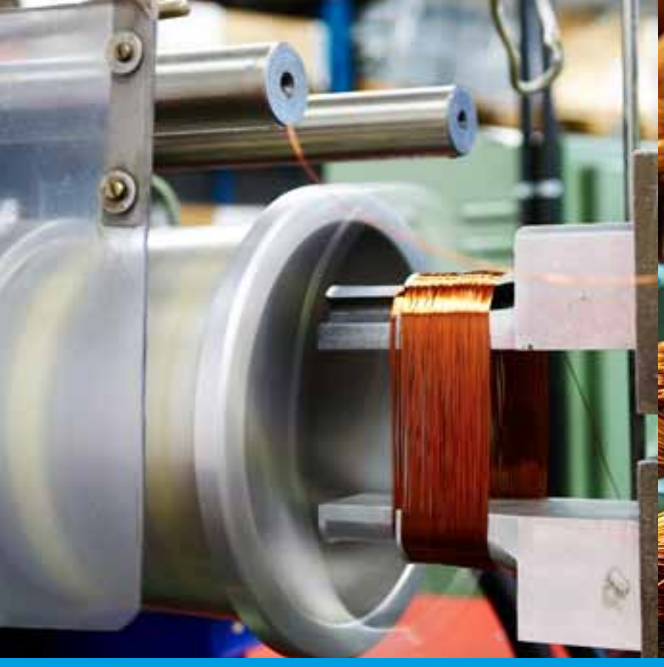
4

50 Hz 1500r/min DN 300



60 Hz 1800r/min DN 300





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PUMP ACCESSORIES, SPECIAL SURFACE TREATMENTS AND DOCUMENTATION

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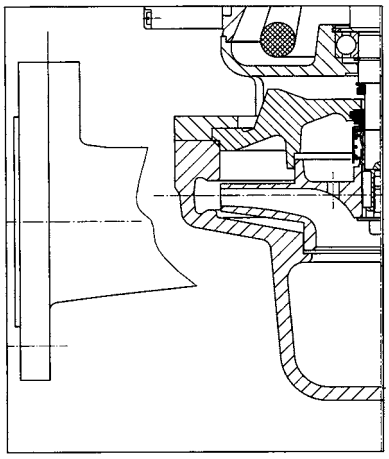
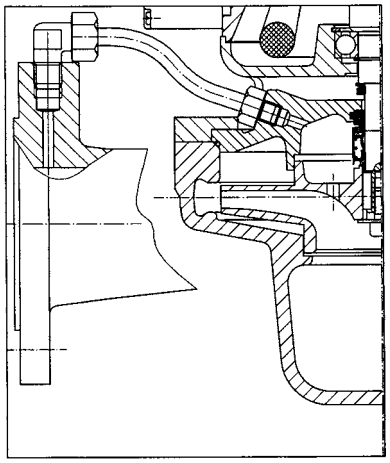
Seal constructions and materials

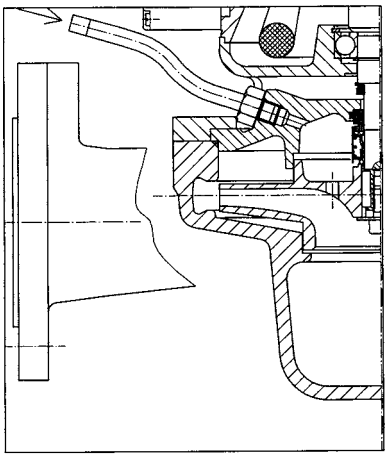
1. Single mechanical seals



Standard construction



Internal flushing



External flushing

Standard materials for single mechanical seal (Series No 7)

Rotating ring	Carbon	
Stationary ring	Silicon carbide or ceramic (depending on seal size / pump type)	
Elastomers	EPDM or Viton (depending on seal size / pump type)	
Metal parts	Stainless steel	AISI 304 (10–12mm seals)
	Stainless steel	AISI 316 (over 12mm seals)

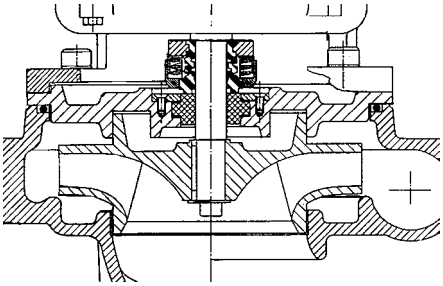
Material suitability for different liquids

Rotating ring/Stationary ring	**Liquid**	**Liquid temperature range**
Carbon/Ceramic	Water	max. +120°C, standard construction
Carbon/Silicon carbide	Water	0 ... +120°C, standard construction
	Water	0 ... +150°C, with internal flushing
	Freezium (refrigeration system)	-15 ... +40°C, standard construction
	Glycol (refrigeration system)	-15 ... +40°C, standard construction
Rotating ring/Stationary ring	**Liquid to be pumped**	**Temperature range of liquid**
Silicon carbide/Silicon carbide	Erosive liquids	-15 ... +120°C, standard construction
		-15 ... +150°C, internal flushing
	Calcium chloride (saline solution)	-15 ... +30°C, standard construction
Antimony carbon/Silicon carbide	Demineralised water	0 ... +120°C, standard construction

Rubber materials: suitability for different liquids

Rubber	EPDM	- mostly used - -40°C-+150°C (+180°C double mech. seal) - water, freezium, glycol, calciumchloride - note! not oil resistant!
	NITRIL	- -40°C-+90°C - oil resistant
	VITON	-20°C-+200°C - note. water max. +100°C - heat transfer oils, dissolvents, special cases - used as standard in pumps with thread connection

2. Single external mechanical seal



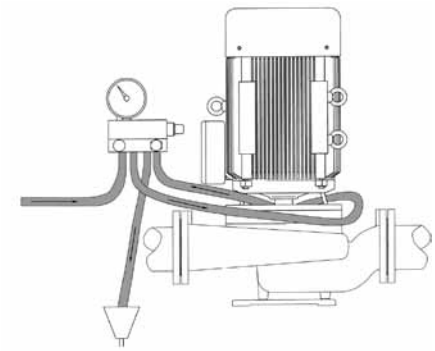
- Single mechanical Teflon seal which is installed outside the pump
- Available DN65-300 acid-proof pumps
- Used for acids and other aggressive liquids (e.g. sulphuric acid 98%)
- Note! The maximum operating pressure is 10 bar (if the maximum operating pressure is exceeded, the seal will open)
- Liquid temperature -15 ... +120°C
- Marking 'T' e.g. ALS-1065/4T

Materials

Rotating ring	Teflon PTFE
Stationary ring	Ceramic

All parts which come into contact with liquid are made of Teflon.

3. Double mechanical seal



Two opposing seals with outside sealing liquid brought from outside (circulation), the pressure of which can be lower or higher than that of the liquid being pumped. If it is desired that no seal water enters the process, the pressure of the seal water is then set lower than that of the liquid being pumped. If the seal water is allowed to enter the process, the pressure of seal water can be higher than that of the liquid being pumped.

- Available for DN 65-300 pumps
- Operating temperature with water max. +180°C (other liquids defined separately)
- Requires a separate seal water monitoring unit, see above (Kolmeks can deliver)
- Marking 'KT' e.g. ALS-1154/4KT
- Hot, crystallising and accumulative liquids
- Momentary dry running of the pump is allowed

Standard materials

Seal size	Liquid side	Atmosphere side	Metal parts
18mm	SiC / SiC / EPDM	Carbon / SiC / EPDM	AISI 316 / 329
25–65mm	SiC / SiC / PTFE	Carbon / SiC / EPDM	AISI 316 / 329

Special materials

18mm	SiC / SiC / VITON	Carbon / SiC / VITON	AISI 316 / 329
32–65mm	SiC / SiC / PTFE	Carbon / SiC / EPDM	254 SMO

Other sizes and materials available by request.

Available colours and special surface treatments

Standard surface treatment:

In Finland, the pumps are delivered in red, colour RAL3020. The painting is carried out according to SFS-EN ISO 12944-5 which includes both primer and finishing. Marking AY100/1-FeSa2½.

The following Kolmeks colours are also available at no extra cost: Grey RAL7030, Black RAL9017 and Blue RAL5010. The painting is carried out according to SFS-EN ISO 12944-5 which includes both primer and finishing.
Marking AY100/1-FeSa2½.

Special surface treatments and special colours:

1. Epoxy paint

Epoxy paint job with required paint thickness, e.g. 160, 240, 280 or 300µm. The painting carried out according to Standard SFS5873 which includes one or more coats of primer and one coat of finishing. Marking EP 240/3FeSt2 (primer 2x80µm + finishing 1x80µm).

Epoxy painting can be carried out on both on the inside and outside if the pump housing. The motor can also be painted from the outside.

2. Customized colour
Standard painting can also be carried out in custom colours. In such cases the painting is carried out according to Standard SFS-EN ISO 12944-5 which includes both primer and finishing. Marking AY100/1-FeSa2½.

Painting system markings:
Painting system markings are described in Standard SFS-EN ISO 12944-5.
Paint type, e.g. AY = Acrylic paint, EP = Epoxy paints, EPZn (R) = Zinc epoxy paint etc.
For example __EP 240/3FeSa 2½ 02
ABBREVIATIONS:
__ = Paint manufacturer code
EP = Epoxy paint
240/3 = Nominal coat thickness / number of paint coats
Fe = Foundation (steel or cast iron surface)
Sa 2½ = Preparation (here spray cleaning)
02 = Quality of mechanical treatment

Accessories, special voltages and non-standard enclosure classes of electric motor

PTC thermistors
Installed 3 pieces/motor (one for each phase). Standard in 75–160kW motors. Operates like a switch, closed below the limiting temperature and open above the limiting temperature.

Can only be connected to a protection system, relay or frequency converter input designed for a PTC thermistor. May not be connected to a 230 V control circuit because its voltage tolerance is only a couple of volts. Quick and accurate indication of limiting temperature, resets once the temperature is slightly below the limiting temperature. Colours indicate the limiting temperature (stock temperatures +130 ... +140°C.) Several temperature alternatives (e.g. 110, 120, 140, 155°C etc.) can be ordered by request. A demanding target requires thermistors for two temperatures in the same motor e.g. 3 pieces for 140°C alarm and 3 pieces for 150°C stoppage.

Thermal protector (thermal contactor)
Coil's internal thermal protector bi-metal switch +140°C. Can be installed 1 piece/motor or 3 pieces/motor (one for each phase).

A small mechanical switch is opened by temperature. Most commonly used for small motors, 1 piece/motor, and for 3 pieces/motor in large motors. The switches are wired to the terminal box where series connections are connected. When a connection malfunctions, the faulty one can be bypassed and the protection is still sufficient. Can also be connected directly to a 230 V control circuit. Can be connected to most PTC thermistor circuits. Reasonably large temperature difference in between switch on and off and therefore not usually used in place of a thermistor. Available for other temperatures by request.

PT100 (PT-1000) or KTY sensors
The pump motors can be delivered either with KTY or PT100 temperature sensors.

Motor anticondesation heater
One-phase resistor/230V. If required, the heating element can be installed on the motor windings if condensation water occurs during their operation. Heating is usually on only when the pump is stopped. Typical applications are pumps in refrigeration systems, pumps installed outdoors and other pumps which occasionally run in conditions where condensation water is formed. The operating voltage is usually 230 V, but other voltages are also available to order. Heating power is determined by motor size. In exceptional circumstances, heating power according to conditions at the site. In some cases, at about -30 °C, solution pumps might require larger power and additional heating, including when the motor is running.

Thermocouple TC
Thermocouples TC i.e. thermoelement. Usually K type. A pair of thermoelements used for temperature measurement, the voltage of which indicates the temperature or, more accurately, the temperature difference between the connection and free ends. Note! The term thermocouple (or thermoelement) must not be confused with the term thermistor and other temperature measuring sensors.

Tropical protection
Includes a rain cap and a protective oil film inside the motor

Curve plate
Quick connection plug R
EMC cable inlets (frequency converter operations)

Drain connection G3/8"
Used if the housing needs to be drained after the pumping session.

Temp Coat - pump external coating
Used in c refrigeration systems when the temperature is below 0°C. Can be applied to the external surfaces of the sealing flange and the pump housing.

Ceramic N-end bearing for frequency converter operations of over 90 kW (standard over 110 kW motors)
Vibration measurement nipples SPM
Standard voltages

1x230V, 50Hz	0,05–1,5kW	3x400/230 V, 50 Hz	0,03–3 kW	3x690/400 V, 50 Hz	4–160 kW

Special voltages
According to request by customer. Maximum 690V. Example 42V, 110V, 120V, 380V, 500V etc. Availale as 1-phase and 3-phase.

Standard enclosure classes

IP 54	0,03–3 kW	1000, 1500r/min	0,25–4 kW	3000r/min
IP55	4–160 kW	1000, 1500r/min	5,5–55 kW	3000r/min

Special enclosure classes
IP 55 also available for small pumps
IP 65
Pressure measurement connections in flanges size 1/4" (standard in inline pumps)

Belzona coating
Used when pumping particularly erosive liquids. The maximum operating temperature is +90°C. If the temperature of the liquid being pumped is higher than +60°C, a double coating is applied. Can be applied inside the pump housing and to the internal surfaces of the sealing flange.

Urethane insulation of sealing flange
Used in refrigeration systems when the temperature is below 0°C. Can only be applied to the outer surfaces of the sealing flange.

Non-standard flanges
If required, the pumps can be delivered with ANSI, NP6 and PN16 borings. PN10 flanges are standard. (DN32-150 flanges are the same PN10 and PN16.)

Pumping without a foot valve when the liquid level is below the pump
- The pump is equipped with an automatic aspirator which fills the suction pipe before the pump starts, making pumping possible without a foot valve.
- After the pumping has stopped, the suction pipe empties. As pumping starts again, the aspirator fills the suction pipe before the pump starts.
- An advantage is smaller energy consumption, because there is no suction loss caused by the foot valve. As the suction pipe empties after the pumping has stopped, there is no risk of freezing in winter. The aspirator can therefore be used in various outdoor applications. The device is commonly used in water supply plants, decking washing water pumps, bilge pumps and various industrial applications.
- The device requires compressed air to operate.
- Several sizes are available. The device size is dependent on the pumping capacity of the system. The device is delivered separately with the pump and the delivery includes all connections and pipes required for installation.

Packaging and documentation

1. Packaging

- As a standard, the pump is delivered in a reinforced cardboard box. If there are several pumps, the packages are fastened onto disposable pallets in order to avoid possible freight damages.
- By request, the pumps can be delivered in export packages or sea export packages.

2. Documentation

Documents delivered free of charge

- Installation and operating instructions are included with the pumps.
- At the order stage and if needed, one set of documentation which includes installation and operating instructions, a datasheet and a product specification is included free of charge.
- Certificate of Compliance '2.1' SFS-EN 10204
- Copies of the ISO 9001 quality certificate, an ISO 14001 environmental certificate, and a Russian TR certificate with Kolmeks stamp can be delivered free-of-charge,
- A spare part list/spare part recommendation for delivered pumps

Documents delivered at extra cost:

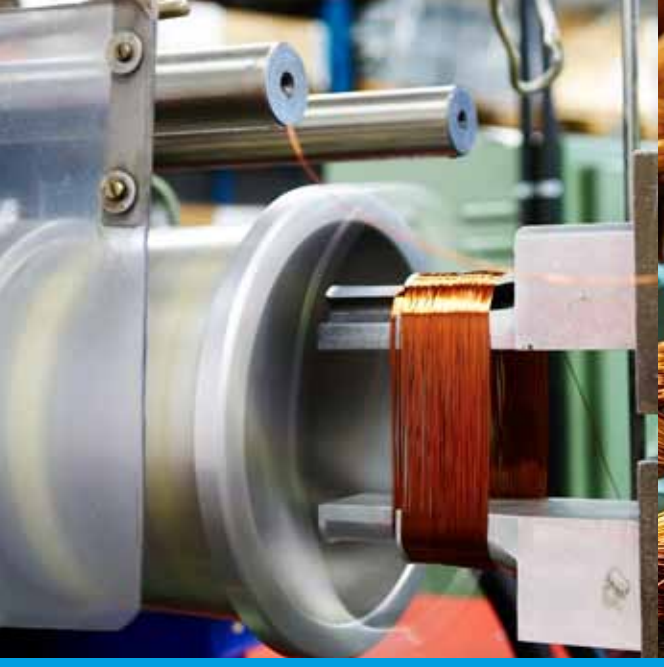
- Detailed datasheet
- Detailed assembly drawing + parts list
- Testing record, see Test runs
- Classification Society Certificate (start costs + testing costs + rating institution costs)
- Notarised Russian TR product certificate
- Copy witnessed by certifier of Russian TR product certificate
- Material Certificate '2.2' SFS-EN 10204
- Material certificate of specific casting batch. NOTE! Material certificate must be ordered in good time.
- Copies: 1 set free of charge, extra sets are charged separately.
- Inspection Certificate '3.1' SFS-EN 10204 i.e. pump-specific test run (start costs + testing costs) specific data sheet
  --> Contents of material certificate:
  Statement on conformity of the order and results of delivery-specific inspection.
  --> Certifier of material certificate:
  Representative authorised by the manufacturer independent of production department.

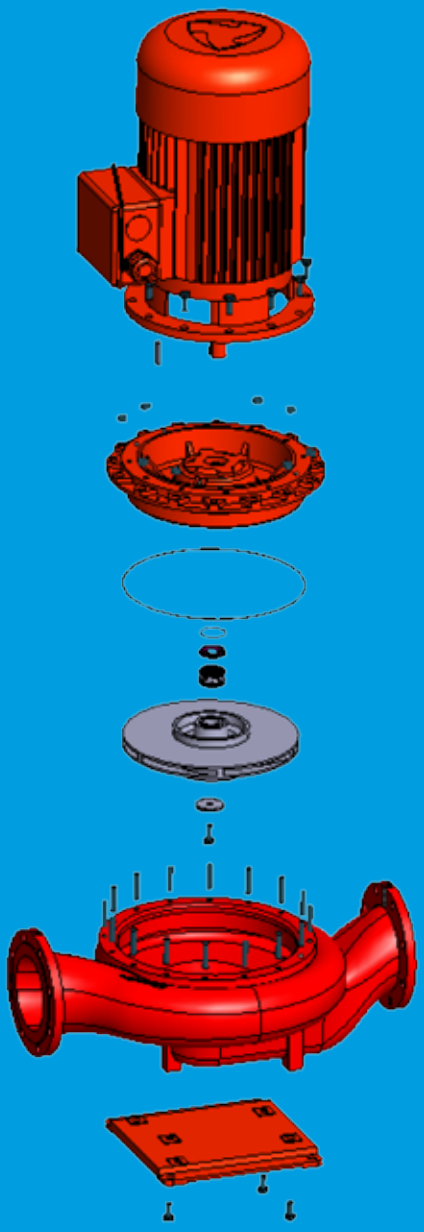
- Acknowledgement of receipt '3.2' SFS-EN 10204 i.e. pump-specific test run
  --> Contents of material certificate:
  Statement on conformity of the order and results of delivery-specific inspection.
  --> Certifier of material certificate
  Representative authorised by the manufacturer independent of production department and representative authorised by the purchaser or inspector as specified in regulations issued by public authorities.

Note! Documentation must be requested at the order stage, not after the delivery.

3. Test runs and pressure tests

- Test run without pressure test (start costs + cost per test)
- Pressure test (cost per test is charged)





KOLMEKS

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PUMP SERVICE

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General notes

Kolmeks pumps do not require regular service. The pump shaft seal is a mechanical seal (not used in wet motor pumps). It is a part which undergoes wear and which must be replaced if it starts to leak. Please note that a leakage of a few drops per hour can be quite normal, especially when pumping water-glycol mixtures.
The pump motor bearings are pre-lubricated and can thus withstand several years of continuous use. In case of any motor malfunction, we recommend replacing the whole motor unit.

Motor unit replacement

The pump motor unit includes: motor, sealing flange, impeller and seals.

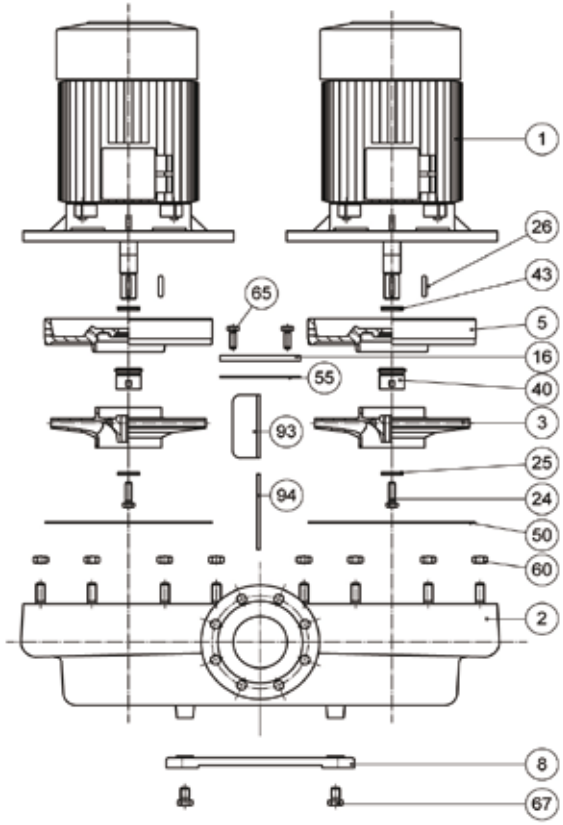
If a motor malfunction or a seal leak occurs, replacing the motor unit is simple and quick and does not require long periods of stand-by or operation downtime. There is no need to carry out procedures on the piping, because there is no need to detach the pump housing.

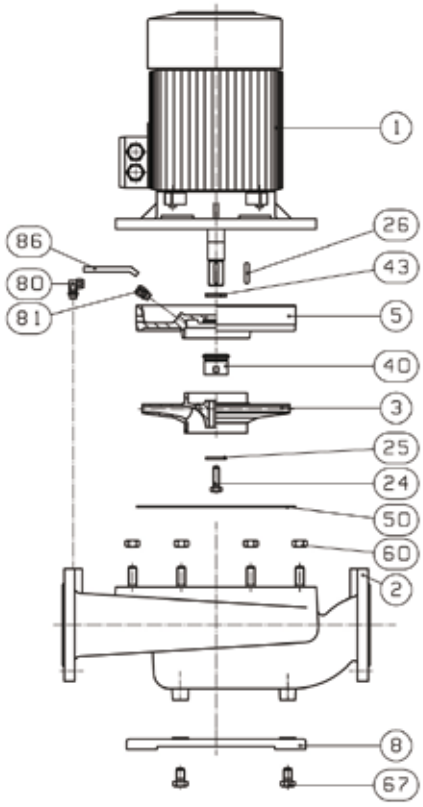
Seal kits and O-rings for SC frequency converter pumps

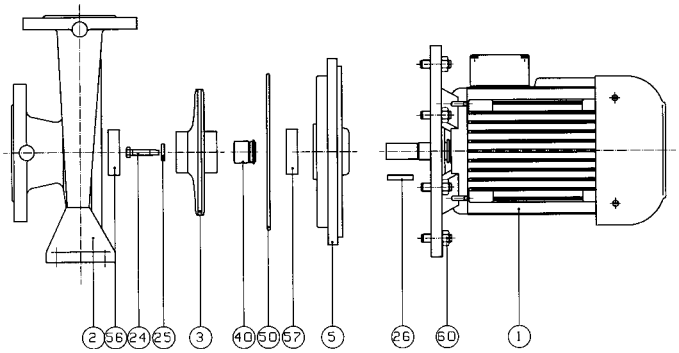
Connection G or DN	Grey cast iron EN-GJL-200 PN10	Nodular cast iron EN-GJS-400 PN16	Bronze CuSn10Zn2 PN10	Stainless steel AISI 316 PN 16	Shaft seal, PN10 Ø [mm] materials	O-ring Size [mm]	O-ring Material	Motor [kW]
G 3/4	AE-20/4 SC_	no	no	no	12, carbon/ SiC Viton	123 X 2,5	NBR	0,08 and 0,2
	AE-20/2 SC_	no	no	no	12, carbon/ SiC Viton	123 X 2,5	NBR	0,65
G 1	AE-25/4 SC_	no	AEP-25/4 SC_	no	12, carbon/ SiC Viton	123 X 2,5	NBR	0,08 and 0,2
	AE-26/4 SC_	no	AEP-26/4 SC_	no	12, carbon/ SiC Viton	123 X 2,5	NBR	0,08 and 0,2
	AE-25/2 SC_	no	AEP-25/2 SC_	no	12, carbon/ SiC Viton	123 X 2,5	NBR	0,65
	AE-26/2 SC_	no	AEP-26/2 SC_	no	12, carbon/ SiC Viton	123 X 2,5	NBR	0,65
G 1 1/4	AE-32/4 SC_	no	AEP-32/4 SC_	no	12, carbon/ SiC Viton	145 X 2,5	NBR	0,2-0,37
	AE-33/4 SC_	no	AEP-33/4 SC_	no	12, carbon/ SiC Viton	145 X 2,5	NBR	0,2-0,37
DN 32	L-32/4 SC_	no	no	no	12, carbon/ SiC EPDM	100 X 2,5	NBR	0,08 and 0,2
	L-32/2 SC_	no	no	no	12, carbon/ SiC EPDM	100 X 2,5	NBR	0,65
DN 40	L-40A/4 SC_	no	no	no	12, carbon/ SiC EPDM	145 X 2,5	NBR	0,2-0,37
DN 50	L-50A/4 SC_	no	LP-50A/4 SC_	no	12, carbon/ SiC EPDM	150 X 3	NBR	0,2 and 0,55
DN 65	L-65A/4 SC_	LH-65A/4 SC_	no	no	18, carbon/ SiC EPDM	179,3 X 5,7	EPDM	0,55 and 0,75
DN 80	L-80A/4 SC_	LH-80A/4 SC_	no	no	18, carbon/ SiC EPDM	179,3 X 5,7	EPDM	0,55 and 0,75
DN 100	AL-1102/4 SC_	ALH-1102/4 SC_	ALP-1102/4 SC_	ALS-1102/4 SC_	18, carbon/ SiC EPDM	179,3 X 5,7	EPDM	0,75

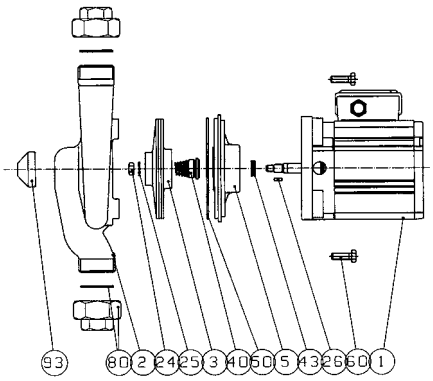
Spare parts

No.	NAME	No.	NAME
1	Electric motor	**40**	Mechanical seal
2	pump housing	**50**	O-ring / Gasket
3	Impeller	**55**	Gasget (AT- and T-series)
5	Sealing flange	**56/57**	Wear ring (N-series)
8	Base plate	**60**	Nut / Screw
16	Cover (AT- and T-series)	**65**	Screw (AT- and T-series)
24	Nut / Screw	**67**	Screw
25	Washer	**80**	Pipe joint (AMK-25,-26, AHV-25, AE-26,-33, AP-33)
26	Key	**80/81**	Pipe joint (ALH-series)
		86	Pipe (ALH-series)
		93	Flap device (AT- and T-series)
		94	Pin (AT- and T-series)









Replacing motor unit for pumps less than 1.5 kW

Note! Only an authorized person may carry out the replacement.

Starting situation. The pump is running normally.

1) Stop the pump, open any possible safety switch and remove fuses. Ensure that no one is able to switch the current on, even by accident, during the replacement. Close the valves.

2) Detach the motor cable. Open the screws/bolts of the operating unit.

3) Lift the operation unit from the pump housing. Watch out for hot water!

4) Replace the gasket/O-ring of the housing.

5) Install a new motor unit. Tighten the screws/bolts of the unit evenly.

6) Connect the motor cable and open the valves. Start the pump and check the direction of rotation. Vent the system. Monitor the operation of the pump.

Replacing motor unit for pumps over 1.5 kW

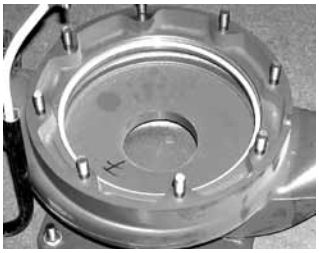
Note! Only an authorized person may carry out the replacement.

Starting situation: The pump is running normally.

1) Stop the pump, open a possible safety switch and remove fuses. Ensure that no one is able to switch the current on, even by accident, during the replacement. Close the valves.

2) Close the valves and detach the connecting cable of the motor. Next, detach the flush pipe (in ALH pumps). Open the screws/bolts of the operation unit.

3) Lift the operation unit by means of a hoist. Watch out for hot water!



4) Replace the gasket/O-ring of the housing.

5) Install a new motor unit. Tighten the screws/bolts of the unit evenly.

6) Connect the motor cable and open the valves. Start the pump and check the direction of rotation. Vent the system. Monitor the operation of the pump.

Replacing impeller

1) Detach the motor unit as usual (see Replacing motor and replacement motor unit).

2) Install the motor unit in a vertical position.

3) Open the screw/bolt of the impeller.

4) Use screwdrivers to detach the impeller.

5) Use an extractor if necessary.

6) The motor unit is without an impeller. Replace the shaft seal when necessary (see Replacing a shaft seal).

7) Install a new impeller. If required, you can lightly tap the impeller with a rubber mallet until flush with the ridge. Tighten the screw/bolt of the impeller.

8) Attach the motor unit as usual.

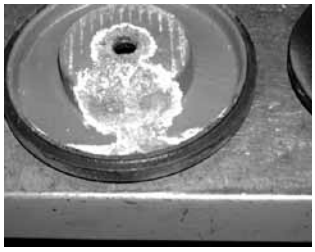
Replacing shaft seal

Detaching seal

Stop the pump and close the shut-off valves. Detach the motor unit from the pump housing. (see replacing motor unit). Detach the impeller of the pump (see Replacing an impeller).

Starting situation. The motor unit with the impeller detached.

1) Detach the shaft seal using two screwdrivers. Do not damage the sealing surface of the shaft.



2) Also detach the sealing flange from the motor front plate using two screwdrivers. If needed, replace the sealing flange with a new one.

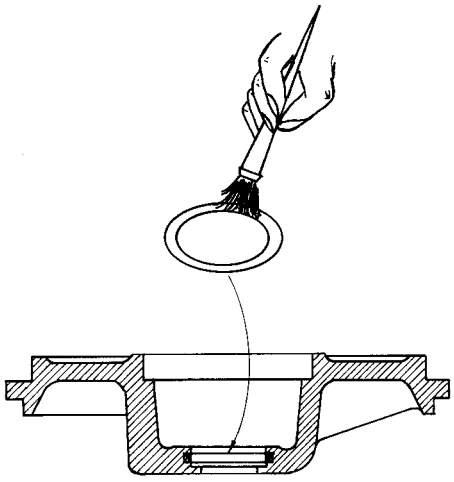
3) The motor unit disassembled, with installation tools.

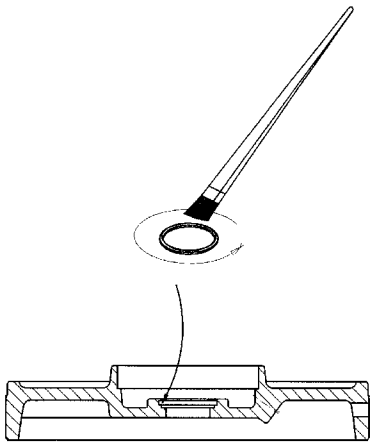
Installing mechanical seal

Lubricating and installing O-ring

NOTE! Touch the seal parts with clean hands only, and as little as possible and with extreme care.

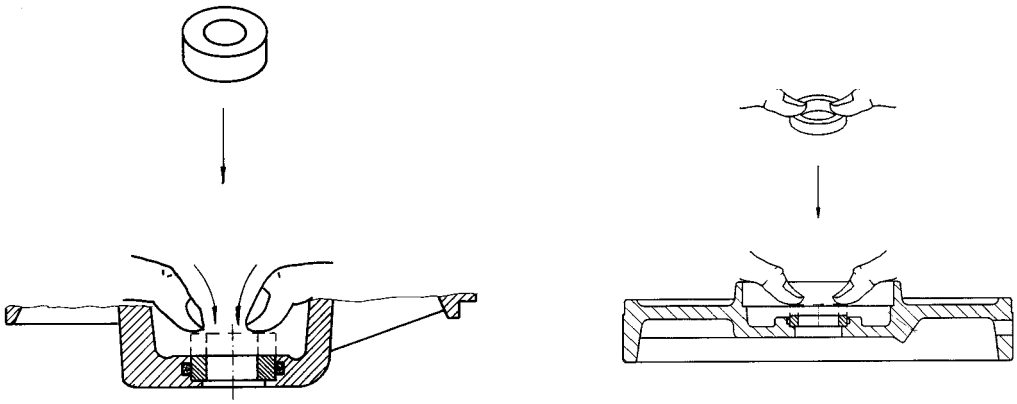
Check the housing and O-ring groove for the stationary ring in the sealing flange are clean. Check the O-ring and lubricate it with soap water, not with oil. Then install the O-ring in the groove of the sealing flange (in the stationary ring for BO- and BP-marked seals).





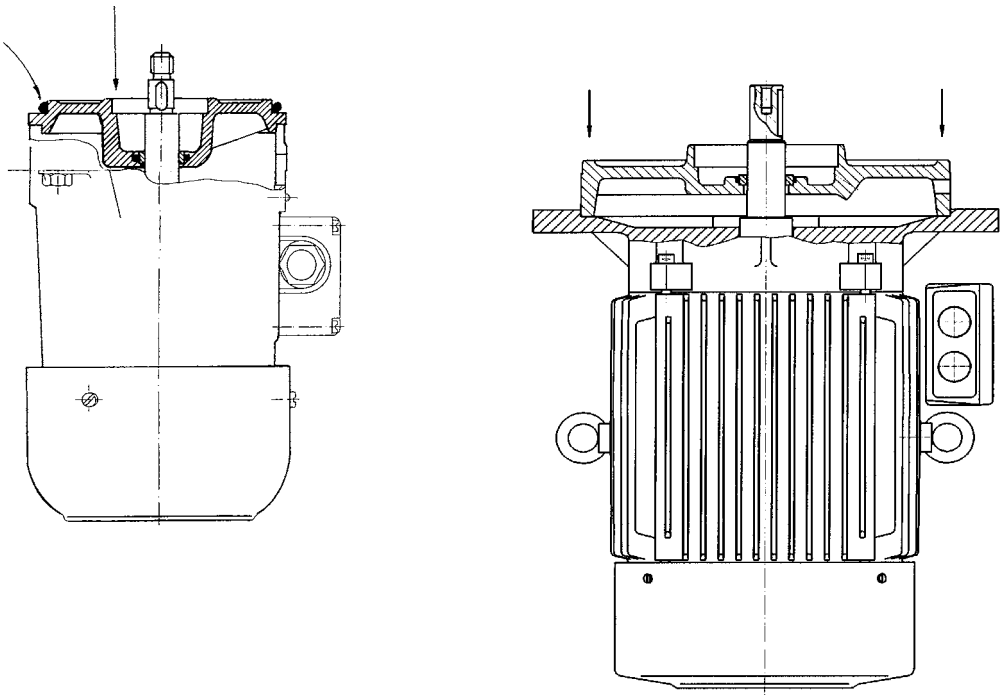
Pressing stationary ring into the sealing flange

Check that the stationary ring is undamaged, clean, smooth and not scratched. If the stationary ring is packed in protective foil, detach it with a knife, carefully minding the rotating surface. Then, remove the grease with a dry and clean cloth. Press the stationary ring into the sealing flange with the smoother surface facing you (the pump). Ensure that the O-ring does not push the ring out. If this happens, use more lubrication. Finally, clean the rotating surface of the stationary ring with a clean and lint-free cloth or towel which is dampened with a suitable organic solvent, e.g. methyl alcohol or spirit. Alternatively, the stationary ring can be installed with a clean lint-free cloth without fingers touching the rotating surface. Finally, the rotating surface should be blown clean with compressed air.

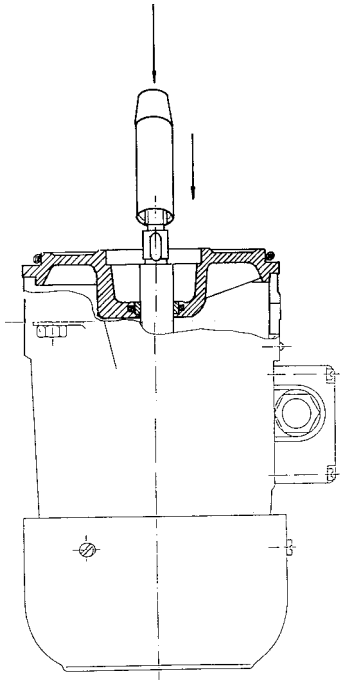


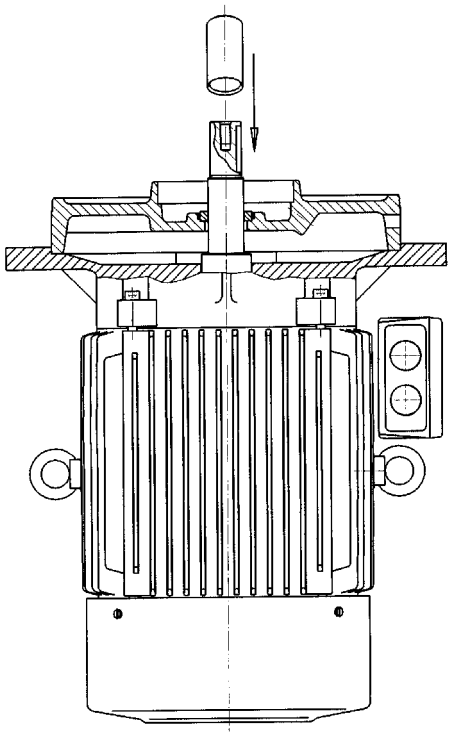
Installing sealing flange onto D-end motor flange

Install the sealing flange onto the motor. Place the assembly sleeve of the installation tool so that it forms a shaft extension. In large pumps, first install the sealing flange onto the motor and then the stationary ring (BO- and BP-marked seals).



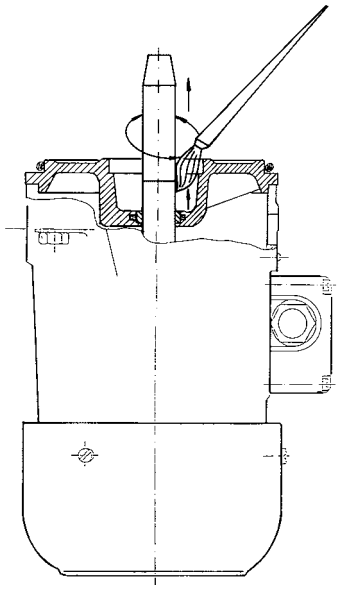
Assembly sleeve as shaft extension

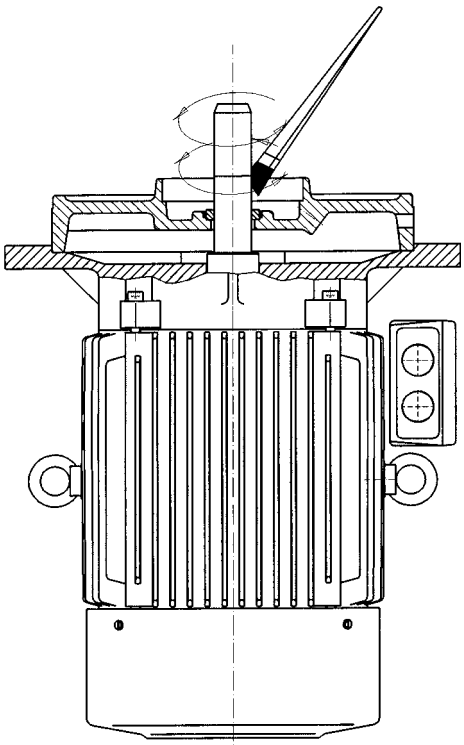




Soaping assembly sleeve

Check that the seal body, bellows and rotating ring are clean and undamaged. If the rotating surface of the rotating ring is dirty, clean it with a clean and lint-free cloth which is dampened with a suitable organic solvent, e.g. methyl alcohol or spirit. Lubricate the shaft and the seal elastomer bellows suitably with soapy water, not with oil.

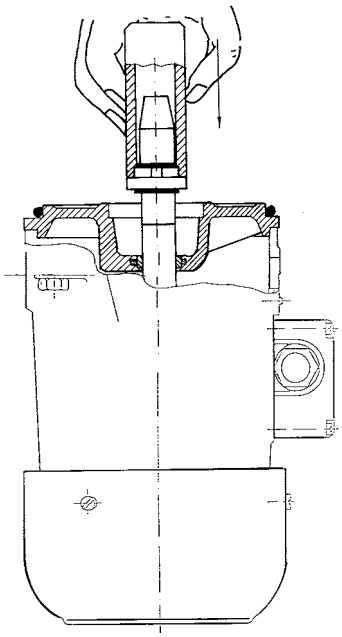


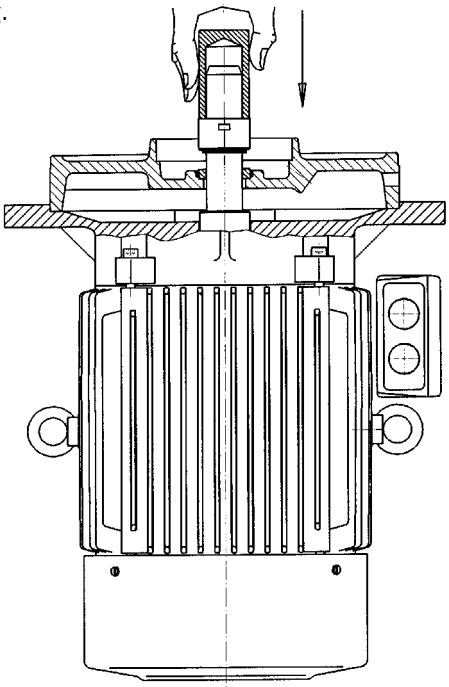


Pushing bellows onto shaft

Detach the spring (if separate) and, using even pressure, push the bellows onto the shaft using the installation mandrel until the rotating surfaces meet. Do not press too hard. If the spring is attached to the frame, install the whole seal onto the shaft from its bellows part (end of seal) by pushing with a suitable sleeve. If the rotating ring of the seal does not stay fast in the seal, install it first and ensure that when installing the seal frame, the frame and the rotating ring are in place correctly.

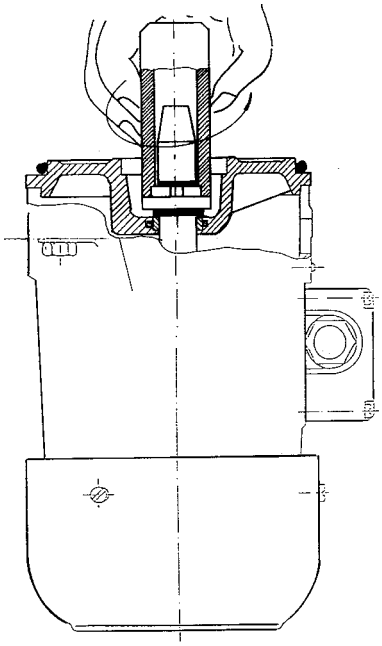
Note! Do not touch the rotating surface of the rotating ring.

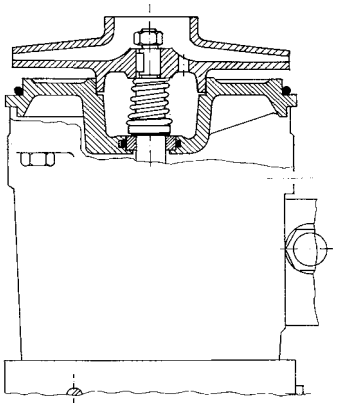


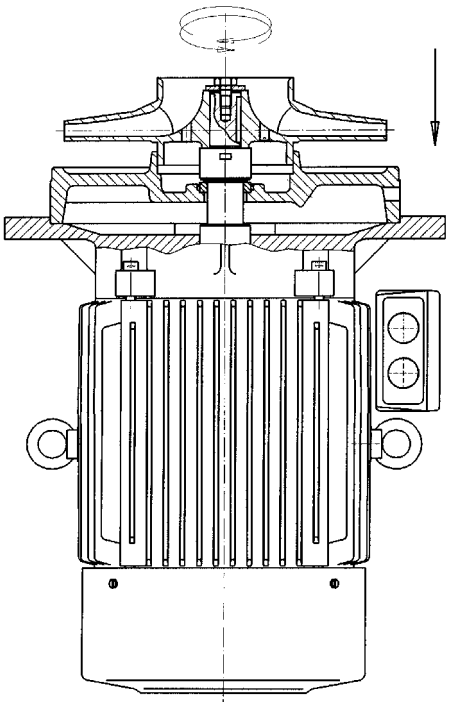


Installing spring, back plate and impeller

Rotate the shaft sligtly and carefully and ensure that the seal fits well. Then, install spring, back plate (if separate) and impeller.







Kolmeks and the new energy efficiency directive

Kolmeks dry motor driven pumps fulfil all energy efficiency requirements in force as from the beginning of 2013. The basis for these requirements is the EcoDesign directive which harmonises the requirements for energy consuming and energy-related products.

The EcoDesign directive - 2009/125/EC October 21st 2009

Establishes a framework for the setting of Community EcoDesign requirements for energy-related products by contributing to sustainable development by increasing energy efficiency and the level of protection of the environment, while at the same time increasing the security of the energy supply.

The Directive provides for the setting of requirements which the energy-related products covered by implementing measures, i.e. measures adopted pursuant to the Directive laying down EcoDesign requirements for defined products or for environmental aspects thereof, must fulfil in order to be placed on the market and / or put into service.

Commission Regulations implementing the Directive with regard to EcoDesign requirements have been issued for water pumps as well as for electric motors.

All Kolmeks' pumps fulfil said energy efficiency requirements.

Kolmeks dry motor driven pumps Regulation (EU) No 547/2012, June 25th 2012

Regulation 547/2012 sets minimum efficiency requirements (MEI = minimum efficiency index), as well as information requirements for rotodynamic water pumps in Annex II of the Regulation, and shall the requirements apply in accordance with the following timetable. MEI means the dimensionless scale unit for hydraulic pump efficiency at best efficiency point (BEP), part load (PL) and over load (OL)

Requirements are implemented in two phases

From January 1st 2013 water pumps shall have a minimum efficiency of MEI ≥0.1
and shall the information requirements set out be fulfilled

From January 1st 2015 water pumps shall have a minimum efficiency of MEI≥0.4

The efficiency of a pump with a trimmed impeller is usually lower than that of a pump with the full impeller diameter. The trimming of the impeller will adapt the pump to a fixed duty point, leading to reduced energy consumption. The minimum efficiency index (MEI) is based on the full impeller diameter.

The operation of a water pump with variable duty points may be more efficient and economic when controlled, for example, by the use of a variable speed drive that matches the pump duty to the system

The most efficient water pumps have a MEI of ≥ 0.70

More information on the comparative efficiency of pumps can be found at
www.europump.org/efficiencychartsMEI ≥ 0,4

All pumps in this catalogue fulfil the minimum requirements set by the Directive and it's implementing regulations

Kolmeks electric motors
Regulation (EC) No 640/2009, July 22nd 2009

Regulation 640/2009 sets minimum efficiency levels (IE class) for electric motors. The IE class defines directly the minimum efficiency (as a percentage) based on the number of poles and the rated output power of the motor.

The efficiency level of the motor shall be visibly displayed on the motor, for example IE2 – 94,9 %.

Requirements are implemented in phases

Since June 16th 2011 IE2 is required for motors from 0.75kW to 375 kW.

From January 1st 2015 IE3 is required for motors from 7.5 kW to 375 kW and IE2 is allowed only in combination with a variable speed drive.

From January 1st 2017 IE3 is required for all motors from 0.75 kW to 375 kW) and IE2 is allowed only in combination with a variable speed drive.

All Kolmeks manufactured motors meet at least IE2 level requirements.

We will gladly supply You with more information and answer any questions regarding the new energy efficiency requirements