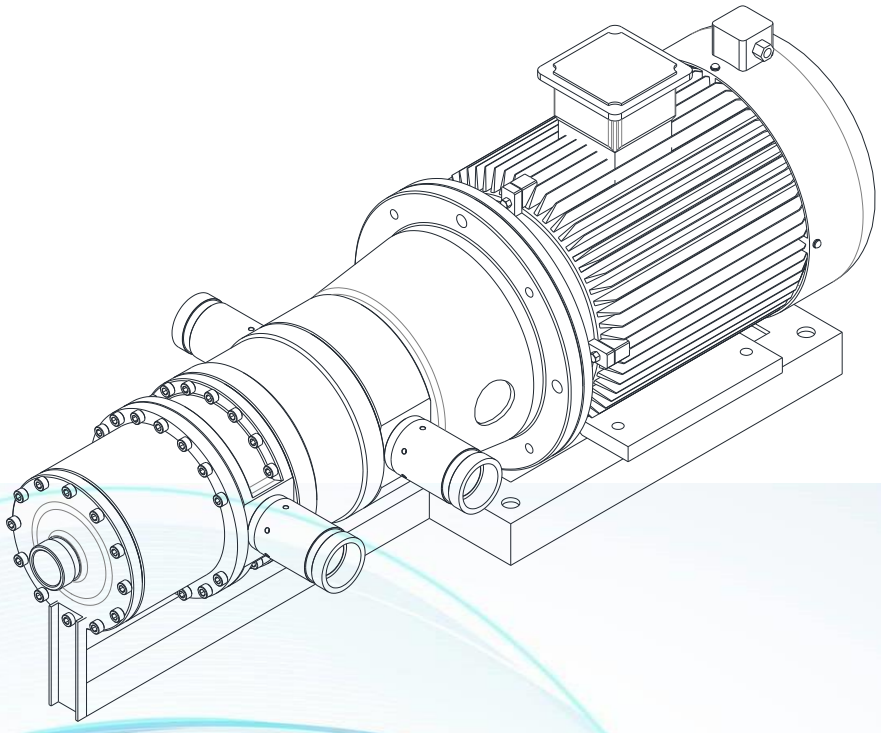
HEX (S) Energy Recovery Booster Pump

HEX (S) -20/60-3　　**HEX (S) -40/60-3**

HEX (S) -70/60-3

Golds Pump

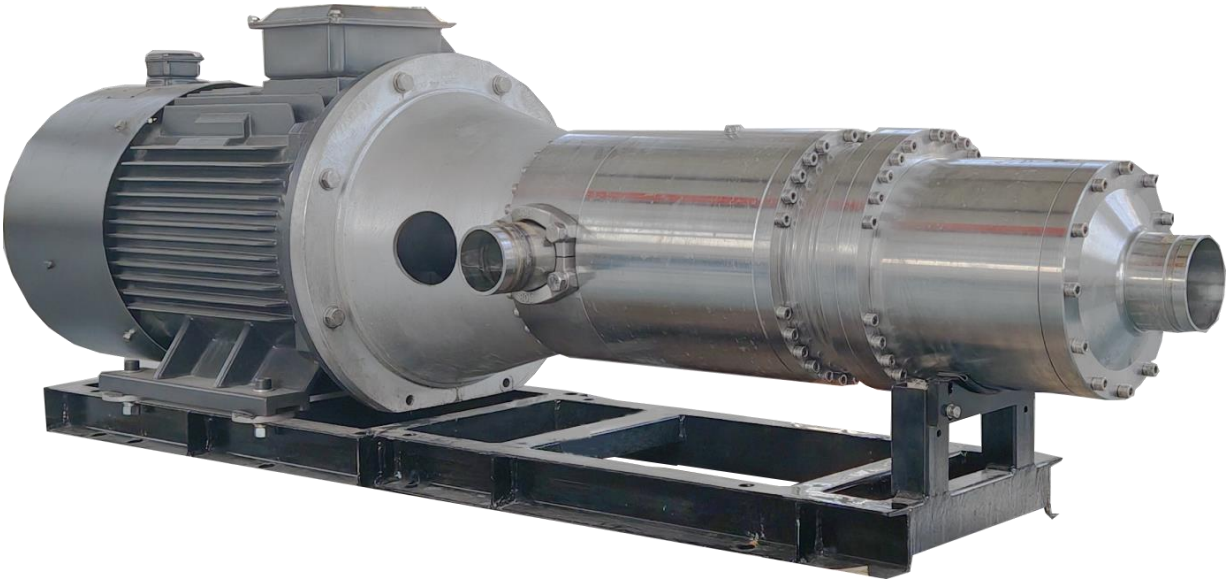


Chapter 1 Company Introduction

Our company was founded in 2004, after nearly 20 years of focus and innovation, committed to the development and production of high-pressure piston pump, complete the localization of high-pressure piston pump, the technical level and production scale has been among the forefront of the industry.

High pressure piston pump mainly used in industrial waste water zero discharge project, landfill leachate desalting treatment project, seawater and brackish water desalination equipment and engineering. coal mine and chemical wastewater treatment project, is the core fluid equipment of high-Pressure reverse osmosis system.

In the future, we will continue to focus on customer needs, focus on the research and development and innovation of core fluid equipment, and create more value for customers



Chapter 2 Brief Introduction of Energy Recovery Booster Pump

2.1 Overview

The energy recovery booster pump is a new type of energy recovery pump that integrates an isobaric exchanger and a high-pressure resistant volumetric booster pump. The isobaric pressure exchanger is based on the technology used in axial piston pumps, and the high-pressure booster pump is based on the principle of a vane pump, with a lightweight, compact design.

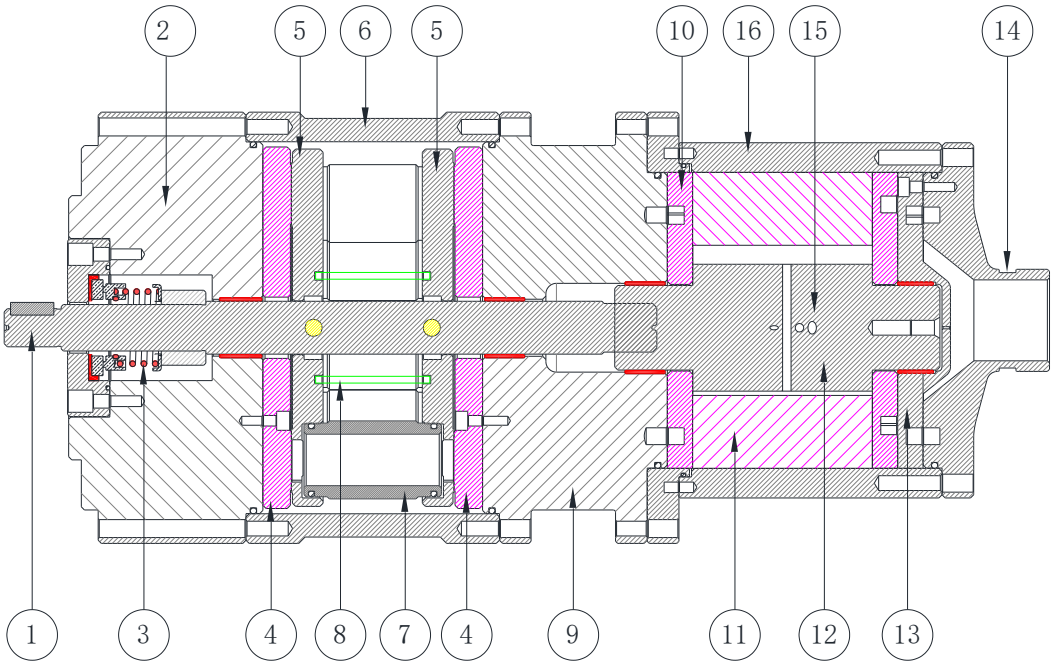
All components in the booster pump are designed with long maintenance cycles; while maintaining stability and efficiency, maintenance requirements are low.

The vane pump is a fixed displacement pump, and the flow rate is proportional to the rotation speed of the drive motor.

The motor controls the speed of the isobaric exchanger and coaxial booster pump to prevent overspeed/overcurrent.

The energy booster pump needs to be controlled by a heavy-duty constant torque inverter.

The following is a cross-sectional view of a HEX (S) (S) series energy recovery booster pump. For pumps with special specifications, please see the instructions for the corresponding pump.



1.Shaft	2.Connection flange	3.Mechanical seal	4.ER Port plate
5.Valve plate	6.ER housing	7. ER Rotor	8.Spring
9.Connection Flange	10.Booster Port Plate	11.Vane	12.Spacer
13.Coupling	14.Port Flange	15. Knockout Pin	16. Boost Pump Housing

2.2 Product Advantages

1) The smallest and lightest energy recovery booster pump on the market;

2) Few parts and easy maintenance;

3) Extremely high efficiency, energy saving and low operating cost;

4) No need to configure a high-pressure flow meter;

5) Using low-pressure mechanical seal, no need expensive high-pressure seal;

6)No risk of overspeed and overcurrent;

7)Easy modular maintenance and repair;

8)Small pulse and low noise;

9)Long service life: All parts of the pump are made from corrosion-resistant materials,

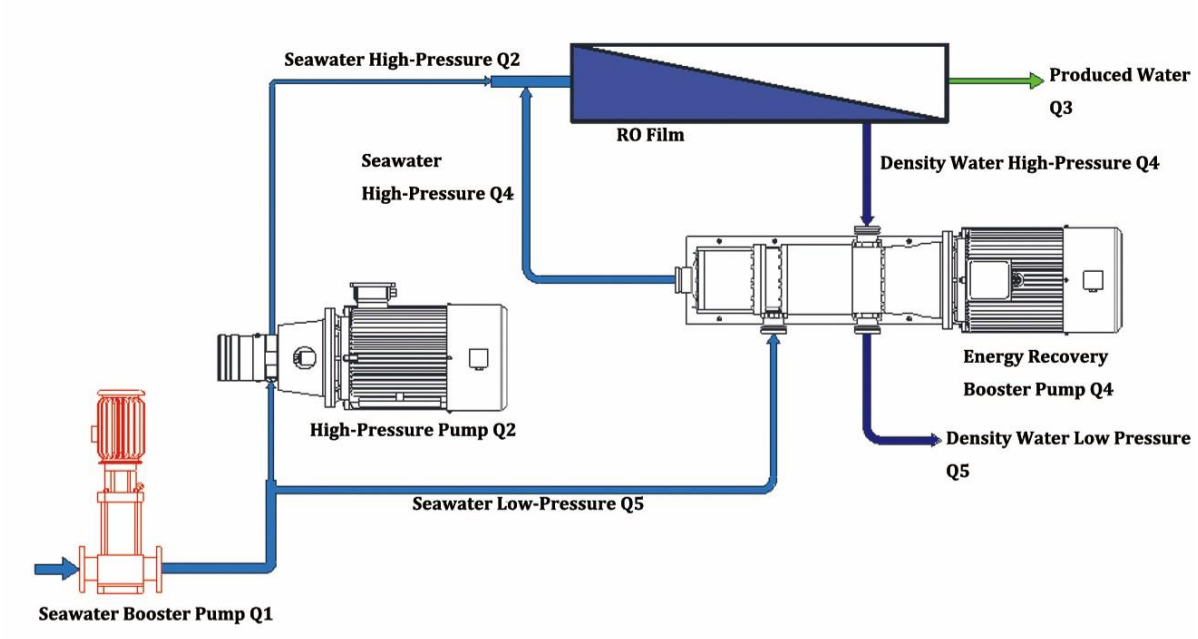
like Duplex stainless steel 2205 and Super Duplex Stainless Steel 2507, as well as carbon fiber reinforced polyetheretherketone(PEEK);

10) Maintenance-free: Using medium water for lubrication, no lubricating oil is required, eliminating daily maintenance and potential oil leakage pollution, green and environmentally friendly.

2.3 Application

HEX (S) series Energy recovery booster pumps are widely used in high-pressure reverse osmosis desalination systems in various places:

- ✓ Used for desalination of seawater and sub-seawater in islands and coastal areas
- ✓ Used for industrial wastewater desalination resource utilization, zero discharge of wastewater salt concentration
- ✓ Used for flue gas desalination wastewater treatment in coal-fired power plants and environmentally friendly power plant
- ✓ Used for coal mining and coal coking processing wastewater treatment



Chapter 3 Technical specification sheet

3.1 HEX (S) -20/60-3

HEX (S) model		HEX (S) -20/60-3
Geometric Displacement	cm^3/rev	273
	In^3/rev	16.7
Pressure		
Maximum pressure difference between high pressure inlet and outlet (high pressure in - high pressure out)1)	bar	5
	psi	72.5
Maximum high pressure inlet pressure	bar	80
	psi	1100
Minimum high pressure inlet pressure	bar	10
	psi	145
Minimum high pressure inlet intermittent pressure 2) 3)	bar	3
	psi	44
Maximum low pressure inlet pressure	bar	10
	psi	145
Minimum low pressure outlet pressure	bar	1
	psi	14.5
Maximum low pressure inlet intermittent pressure 3)	bar	10
	psi	145
Maximum high pressure outlet pressure	bar	80
	psi	1100
When the high-pressure flow is maximum, the low-pressure differential (low pressure in - low pressure out)	bar	0.9
	psi	13
Rotating Speed		
Minimum speed	rpm	500
Maximum speed	rpm	1500
Standard flow		
High pressure processing flow range at maximum pressure difference4)	m^3/h	7 ~ 23
	gpm	26 ~ 92
Maximum lubricant flow rate at 60bar	m^3/h	0.4
	gpm	1.8
Maximum low pressure outlet flow	m^3/h	33

	gpm	145
Medium temperature [5)]	℃	2 ~ 40
	°F	36 ~ 104
Ambient temperature	℃	0 ~ 50
	°F	32 ~ 122
Filtration requirements (nominal accuracy)[6)]		3μm
When the recovery rate is 40, the salt content in front of the membrane increases		2 ~ 3%
Weight	kg	63
	lb	139

1）When it is higher than the maximum pressure difference, a greater increase in continuous operating torque will reduce the life of the booster pump;

2）The pressure can reach this level only when starting up or flushing with fresh water;

3）Intermittent pressure is limited to less than 10 minutes every 6 hours;

4）Typical average flow rate at 60bar；

5）Depends on NaCL concentration；

6）See Chapter 7 Filtration.

3.2 HEX (S) -40/60-3

HEX (S) Model		HEX (S) -40/60-3
Geometric Displacement	cm^3/rev	560
	In^3/rev	34
Pressure		
Maximum pressure difference between high pressure inlet and outlet (high pressure in - high pressure out)1)	bar	5
	psi	72.5
Maximum high pressure inlet pressure	bar	80
	psi	1100
Minimum high pressure inlet pressure	bar	10
	psi	145
Minimum high pressure inlet intermittent pressure 2) 3)	bar	3
	psi	44
Maximum low pressure inlet pressure	bar	10
	psi	145
Minimum low pressure outlet pressure	bar	1
	psi	14.5
Maximum low pressure inlet intermittent pressure 3)	bar	10
	psi	145
Maximum high pressure outlet pressure	bar	80
	psi	1100
When the high-pressure flow is maximum, the low-pressure differential (low pressure in - low pressure out)	bar	1.2
	psi	17.5
Rotating Speed		
Minimum speed	rpm	500
Maximum speed	rpm	1500
Standard flow		
High pressure processing flow range at maximum pressure difference4)	m^3/h	17 ~ 50
	gpm	75 ~ 220
Maximum lubricant flow rate at 60bar	m^3/h	0.8
	gpm	3.5
Maximum low pressure outlet flow	m^3/h	74
	gpm	326

Medium temperature [5]	℃	2 ~ 40
	°F	36 ~ 104
Ambient temperature	℃	0 ~ 50
	°F	32 ~ 122
Filtration requirements (nominal accuracy)[6]		3μm
When the recovery rate is 40, the salt content in front of the membrane increases		2 ~ 3%
Weight	kg	130
	lb	287

1）When it is higher than the maximum pressure difference, a greater increase in continuous operating torque will reduce the life of the booster pump;

2）The pressure can reach this level only when starting up or flushing with fresh water;

3）Intermittent pressure is limited to less than 10 minutes every 6 hours;

4）Typical average flow rate at 60bar；

5）Depends on NaCL concentration；

6）See Chapter 7 Filtration.

3.3 HEX (S) -70/60-3

HEX Model		HEX (S) -70/60-3
Geometric Displacement	cm^3/rev	1440
	In^3/rev	87.8
Pressure		
Maximum pressure difference between high pressure inlet and outlet (high pressure in - high pressure out)1)	bar	5
	psi	72.5
Maximum high pressure inlet pressure	bar	80
	psi	1100
Minimum high pressure inlet pressure	bar	10
	psi	145
Minimum high pressure inlet intermittent pressure 2) 3)	bar	3
	psi	44
Maximum low pressure inlet pressure	bar	10
	psi	145
Minimum low pressure outlet pressure	bar	2
	psi	29
Maximum low pressure inlet intermittent pressure 3)	bar	10
	psi	145
Maximum high pressure outlet pressure	bar	80
	psi	1100
When the high-pressure flow is maximum, the low-pressure differential (low pressure in - low pressure out)	bar	1.8
	psi	26
Rotating Speed		
Minimum speed	rpm	500
Maximum speed	rpm	1000
Standard flow		
High pressure processing flow range at maximum pressure difference4)	m^3/h	43 ~ 86
	gpm	198 ~ 365
Maximum lubricant flow rate at 60bar	m^3/h	1.5
	gpm	6.6
Maximum low pressure outlet flow	m^3/h	124
	gpm	546
Medium temperature 5)	℃	2 ~ 40

	°F	36 ~ 104
Ambient temperature	°C	0 ~ 50
	°F	32 ~ 122
Filtration requirements (nominal accuracy)[6)]		3μm
When the recovery rate is 40, the salt content in front of the membrane increases		2 ~ 3%
Weight	kg	250
	lb	551

1) When it is higher than the maximum pressure difference, a greater increase in continuous operating torque will reduce the life of the booster pump;

2) The pressure can reach this level only when starting up or flushing with fresh water;

3) Intermittent pressure is limited to less than 10 minutes every 6 hours;

4) Typical average flow rate at 60bar ;

5) Depends on NaCL concentration ;

6) See Chapter 7 Filtration.

3.4 HEX(S)-20/60 Energy Recovery Booster Pump with Motor

HEX (S) Model		HEX (S) -20/60-3	
Motor Power/IEC Standard 380V/50Hz[1)]	kW	5.5	7.5
	HP	7.5	10
Connection Flange Size	IEC	132S	132M
	Pole	4	4
Motor Data			
Normal speed	rpm	1450	1450
380V Minimum Rotation Speed	rpm	500	500
380V Maximum Rotation Speed	rpm	1500	1500
380V Rated Current	A	11	15.2
Torque			
Motor torque at normal speed [2) 3)]	Nm	36	49
	lbf-ft	26.5	36
Motor torque at minimum speed [3)]	Nm	27	36
	lbf-ft	20	27
Motor maximum ambient temperature	℃	40	40
	°F	104	104
Motor insulation level	Class	F	F
Motor protection level	IP	55	55
Maximum sound pressure level[4)]	dB(A)	78	79
Weight	Kg	143	157
	lb	315	346

1)The three-phase asynchronous motor used follows the DIN-IEC and VDE 0530 standards; the voltage and frequency follow the IEC 38 standard. The motor is suitable for a variety of stable voltages: 380-420V, 50Hz or 440-480V, 60Hz tolerance ±5%, follows the VDE 0530 standard, and the coating follows the IEC 60721-2-1 standard. If the voltage is lower than 380V, we recommend using another power motor;

2) Due to the conversion of inertia and static friction of the HEX(S) booster pump, when the speed of the HEX(S) booster pump rises from 0 to the highest, the torque of the HEX(S) booster pump may exceed the allowable maximum operating torque. A frequency converter or soft start must be used to increase the speed.

3) Warning: It takes 15-30 seconds when the speed rises from 0 to the maximum; the starting torque of HEX(S) cannot exceed the maximum starting torque, and the inverter must output 140% of the starting torque;

4) Measured according to EN ISO 20361 part 6.2, A sound level 1m from the surface of the pump unit. Measure the noise of the entire booster pump at maximum pressure and speed.

3.5 HEX(S)-40/60 Energy Recovery Booster Pump with Motor

HEX (S) Model		HEX (S) -40/60-3	
Motor Power/IEC Standard 380V/50Hz[1)]	kW	15	18.5
	HP	20	25
Connection Flange Size	IEC	180L	180M
	Pole	6	4
Motor Data			
Normal speed	rpm	985	1450
380V Minimum Rotation Speed	rpm	500	500
380V Maximum Rotation Speed	rpm	1000	1500
380V Rated Current	A	31	36.3
Torque			
Motor torque at normal speed [2) 3)]	Nm	146	120
	lbf-ft	107	87.8
Motor torque at minimum speed [3)]	Nm	63	72
	lbf-ft	47	54
Motor maximum ambient temperature	℃	40	40
	℉	104	104
Motor insulation level	Class	F	F
Motor protection level	IP	55	55
Maximum sound pressure level[4)]	dB(A)	78	79
Weight	Kg	368	362
	lb	811	798

1)The three-phase asynchronous motor used follows the DIN-IEC and VDE 0530 standards; the voltage and frequency follow the IEC 38 standard. The motor is suitable for a variety of stable voltages: 380-420V, 50Hz or 440-480V, 60Hz tolerance ±5%, follows the VDE 0530 standard, and the coating follows the IEC 60721-2-1 standard. If the voltage is lower than 380V, we recommend using another power motor;

2) Due to the conversion of inertia and static friction of the HEX(S) booster pump, when the speed of the HEX(S) booster pump rises from 0 to the highest, the torque of the HEX(S) booster pump may exceed the allowable maximum operating torque. A frequency converter or soft start must be used to

increase the speed.

3) Warning: It takes 15-30 seconds when the speed rises from 0 to the maximum; the starting torque of HEX(S) cannot exceed the maximum starting torque, and the inverter must output 140% of the starting torque;

4) Measured according to EN ISO 20361 part 6.2, A sound level 1m from the surface of the pump unit. Measure the noise of the entire booster pump at maximum pressure and speed.

3.6 HEX(S)-70/60 Energy Recovery Booster Pump with Motor

HEX (S) Model		HEX (S) -70/60-3
Motor Power/IEC Standard 380V/50Hz[1]	kW	30
	HP	40
Connection Flange Size	IEC	225M
	Pole	6
Motor Data		
Normal speed	rpm	985
380V Minimum Rotation Speed	rpm	500
380V Maximum Rotation Speed	rpm	1000
380V Rated Current	A	60
Torque		
Motor torque at normal speed [2) 3)]	Nm	286
	lbf-ft	211
Motor torque at minimum speed [3)]	Nm	95
	lbf-ft	70
Motor maximum ambient temperature	°C	40
	°F	104
Motor insulation level	Class	F
Motor protection level	IP	54
Maximum sound pressure level[4)]	dB(A)	80
Weight	Kg	658
	lb	1450

1)The three-phase asynchronous motor used follows the DIN-IEC and VDE 0530 standards; the voltage and frequency follow the IEC 38 standard. The motor is suitable for a variety of stable voltages: 380-420V, 50Hz or 440-480V, 60Hz tolerance ±5%, follows the VDE 0530 standard, and the coating follows the IEC 60721-2-1 standard. If the voltage is lower than 380V, we recommend using another power motor;

2) Due to the conversion of inertia and static friction of the HEX(S) booster pump, when the speed of the HEX(S) booster pump rises from 0 to the highest, the torque of the HEX(S) booster pump may exceed the allowable maximum operating torque. A frequency converter or soft start must be used to

increase the speed.

3) Warning: It takes 15-30 seconds when the speed rises from 0 to the maximum; the starting torque of HEX(S) cannot exceed the maximum starting torque, and the inverter must output 140% of the starting torque;

4) Measured according to EN ISO 20361 part 6.2, A sound level 1m from the surface of the pump unit. Measure the noise of the entire booster pump at maximum pressure and speed.

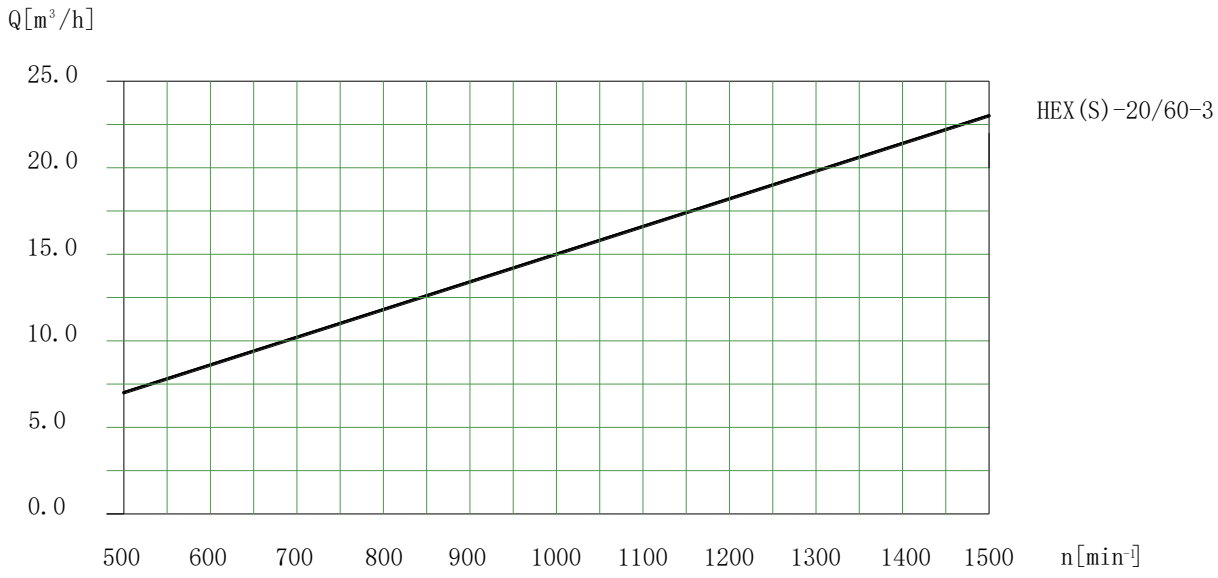
Chapter 4 Flow Rate at different rpm

If the required flow rate and speed (rpm) are known, it will be easy to select the most appropriate pump using the diagram below.

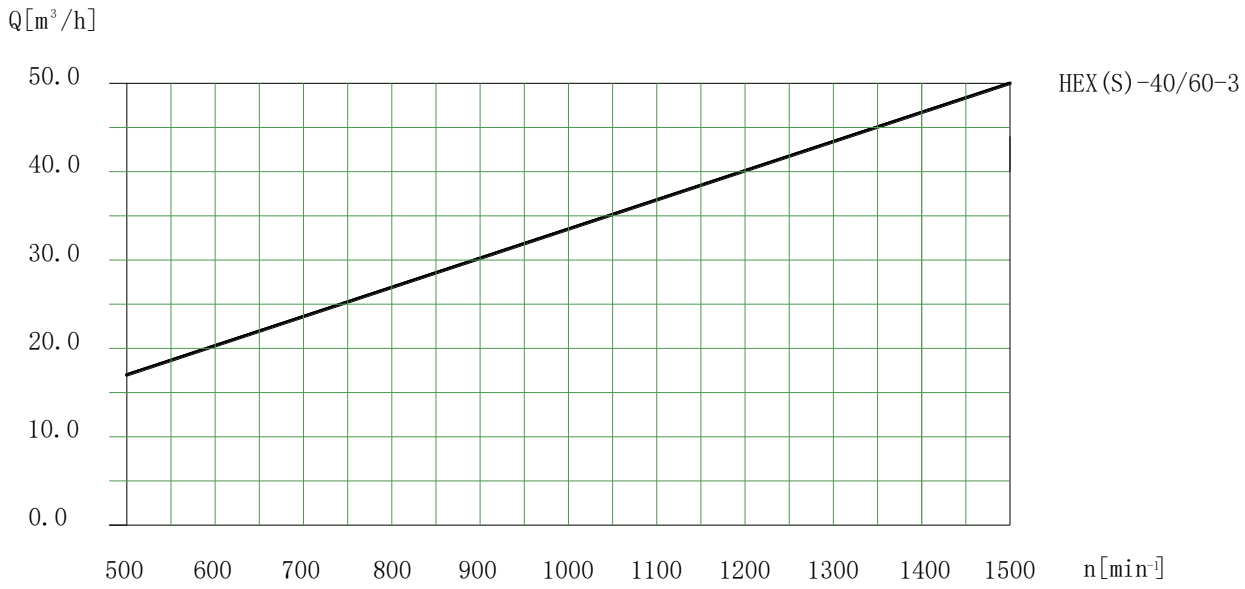
Not only that, the graph also shows that the flow rate can vary with the speed of the pump. The flow/speed ratio is fixed, and the required flow rate can be obtained by changing the speed to the corresponding value. Therefore, the required speed (rpm) can be determined using the following formula：

$$\text{Required flow}\ (m^3/h) = \frac{\text{rated flow}\ (m^3/h) \times \text{selected motor speed}\ (r/\min)}{\text{rated speed}\ (r/\min)}$$

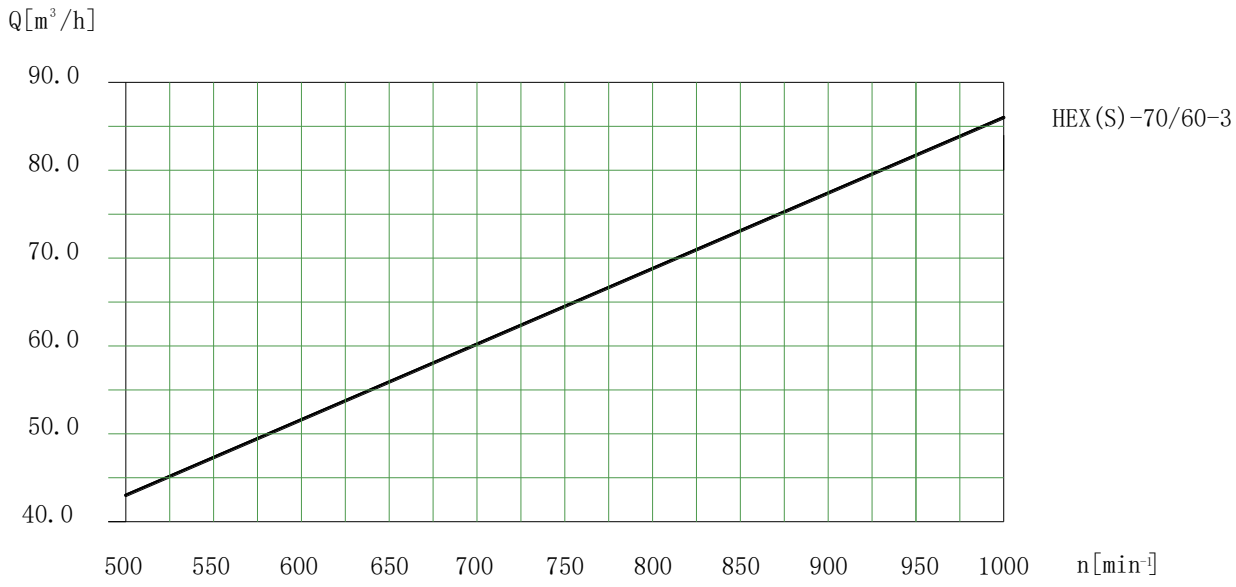
4.1 HEX（S）-20/60 Flow Curve



4.2 HEX（S）-40/60 Flow Curve



4.3 HEX（S）-70/60 Flow Curve



Chapter 5 Temperature and Corrosion

5.1 Operation

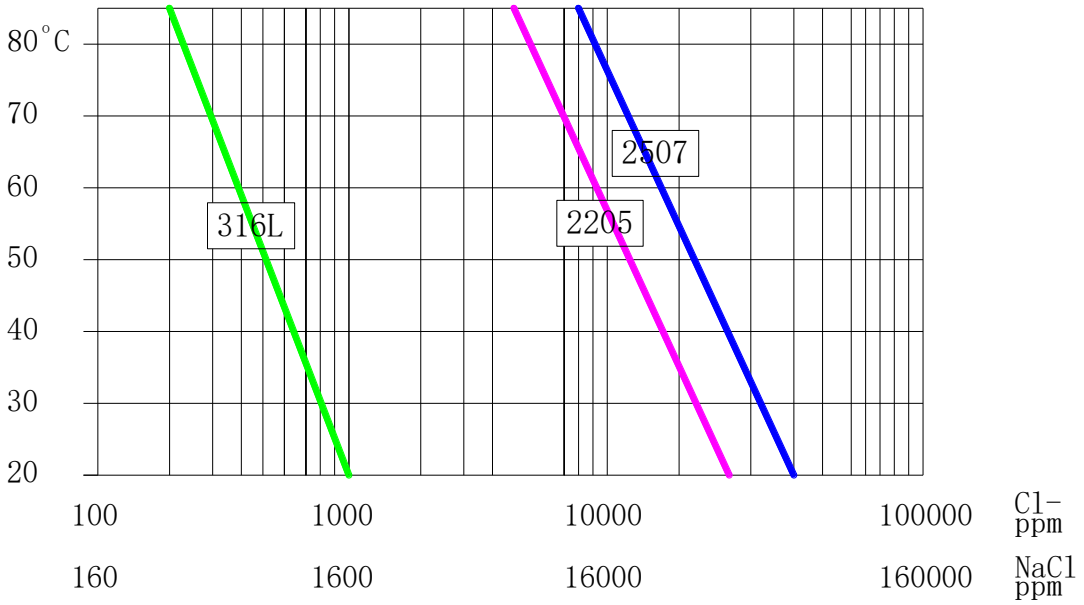
Fluid temperature：+2°C ~ +50°C，depend on the concentration of NaCl

Ambient temperature：0°C ~ +50°C

The following diagram shows the corrosion resistance of different types of stainless steel in relation to NaCL concentration and temperature.

HEX(S) Energy Recovery Booster Pumps are made of 2205 super duplex stainless steel with excellent corrosion resistance.

If the high pressure pump is operating under work under high salt content condition, use fresh water to flush the high pressure pump during shutdown to reduce the risk of corrosion.



5.2 Storage

Storage temperature：-40°C ~ +70°C（The pump has been emptied and sealed for storage）.

When the temperature is below 2°C, antifreeze is needed, recommends Dowcal-N from DuPont chemical or Chillsafe propylene glycol from Akerman Chemical

Chapter 6 Noise

The noise level of the HEX (S) series energy recovery booster pump is measured at the maximum speed, pressure 60bar, and boost pressure 3bar.

Since the pump (set) is usually mounted on a bell housing or base, the noise level can only be determined by the entire system. Therefore, it is extremely important to correctly install the pump set on the base with a shock absorber to reduce vibration and noise.

Generally speaking, the noise will decrease as the speed decreases, and vice versa.

Elastic hoses can be used to minimize vibration and noise.

The noise level can be influenced by the following factors:

1) Pressure, high pressure makes more noise than low pressure;
2) Speed of the pump, high speed makes more noise than low speed;
3) The rigid installation produces more noise than flexible installation;
4) Connecting the pipe directly to the pump increases more noise compared to connecting to a elastic hose;
5) Frequency converter, if the frequency converter is not set up correctly, the motor driven by the frequency converter will produce more noise.

Chapter 7 Filtration

To ensure optimal service intervals, proper filtration of the incoming water is crucial. Due to the very low viscosity of water, proper filtration of the inlet water is critical to minimizing pump wear in order to control internal leakage rates and improve component performance.

The main filter must have a filtration efficiency of 99.98% for particles above 10 µm. A precise depth filter element with a rated accuracy of 10 µm (absolute accuracy) and ß10 > 5000(equivalent to a filtration efficiency of 99.98%) is recommended. Filter bags and winding filter element typically have a filtration efficiency of only 90%, which means that for every 100,000 particles that reach the filter, only 10,000 pass through, compared to only 20 particles pass through the filters with an efficiency of 99.98% .

Chapter 8 Installation

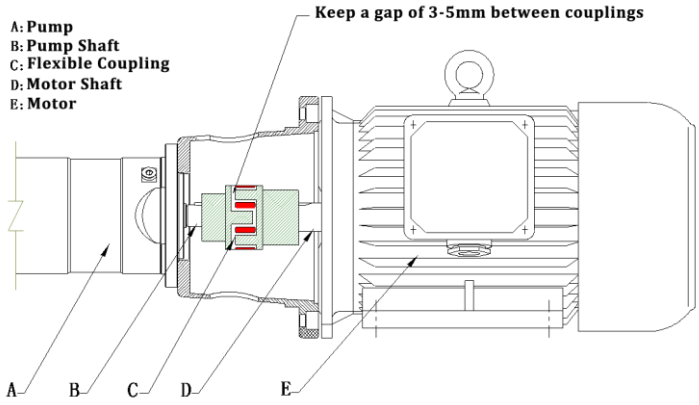
I stands for inlet and O stands for outlet. Pay attention to the inlet and outlet markings on the pump.

When the HEX (S) series energy recovery booster pump is installed horizontally, the bell housing cannot be used to support the weight of the pump head or motor. A bracket needs to be installed to support the pump head and not cause stress or load to the bell housing.

During installation, the coupling installation gap between the high-pressure pump and the motor must be at least 3-5mm.

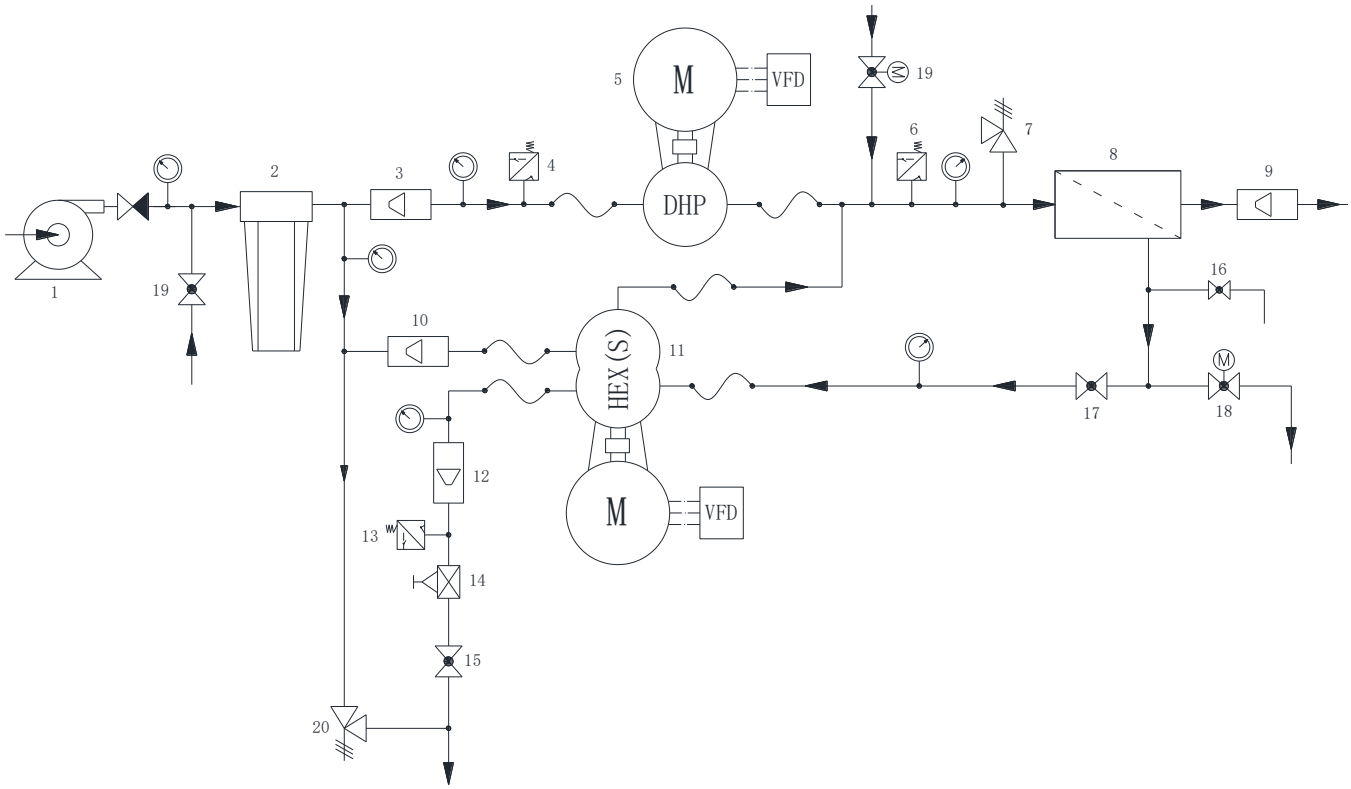
Note: The pump shaft must not have any axial or radial load forces.

The following figure shows how to connect the motor to the regenerative booster pump:



Chapter 9 Reverse Osmosis system with ERD

9.1 Reverse Osmosis System PID



① Install the inlet filter (2) before the HEX (S) Energy Recovery booster pump (11) and high-pressure plunger pump (5). See Chapter 7 - "Filtration" for instructions on how to select the appropriate filter. Thoroughly clean pipes and flush the system before starting.

② Install a low-pressure control switch (4) between the filter and pump inlet, and set 2 bar (29 psi) as the control point. When the pressure is below 2 bar (29 psi), the low-pressure switch must be able to shut down the HEX (S) Energy Recovery booster pump (11) and the high-pressure piston pump (5).

③ Determine the size of the inlet pipe to minimize pressure loss (that is, use pipes with large flow areas, shorten the pipe length as much as possible, and have as few bends/joints and fittings as possible to prevent pressure loss and turbulence). Use elastic hoses to minimize vibration and noise.

④ In order to balance the flow of high-pressure incoming water and low-pressure incoming water, a rotor flowmeter (12) is installed at the low-pressure inlet of the HEX (S) return booster pump.

⑤ To eliminate the risk of damage and cavitation, the low-pressure outlet of the HEX(S) recovery pump should always be at positive pressure: minimum 1.0 bar (14.5psi), maximum 10 bar (145psi). To avoid high/low pressure, it is recommended to install a pressure switch (13).

⑥ In order to control the pressure of the low-pressure outlet, a pressure and flow control valve (14) must be installed.

⑦ The high-pressure inlet and outlet of HEX (S) energy recovery booster pump and high-pressure piston pump use elastic hoses to minimize vibration and noise.

⑧ HEX (S) energy recovery booster pump and high-pressure piston pump use elastic hoses at the high-pressure inlet and outlet to minimize vibration and noise.

⑨ Install a frequency converter to control the speed of the HEX (S) energy recovery booster pump and high-pressure piston pump.

⑩ Although the HEX (S) Energy Recovery booster pump can automatically exhaust air, install an exhaust valve (16) at the highest point of the high-pressure pipeline to ensure that air is discharged from the system during the exhaust process.

11 The safety valve (7) protects the entire system from overpressure. When the pressure exceeds the maximum set pressure, the safety valve drains water to relieve pressure. In the case of a positive displacement pump, the high-pressure pump can generate high pressures that exceed the mechanical strength of the membrane housing, piping, and other accessories.

12 The safety valve (20) protects the low-pressure pipeline and avoids overpressure. When the pressure exceeds the maximum allowable pressure, the safety valve drains water to relieve pressure.

Unit conversion relationship：1.0Mpa = 10bar，1.0Mpa = 145psi

9.2 Notes on starting debugging

Before starting the pump, it is recommended that you flush the pipes and system thoroughly to remove any residue or foreign matter that may be present in them.

Before starting the pump, it is highly recommended that you bleed the air from the pump and system.

Test whether the steering direction of the booster pump is consistent with the arrow mark on the pump

9.3 Application Notes

① In order to extend the service life of the pump and maintain its pumping stability, please make sure that the medium working conditions match the required working conditions. To avoid wear and tear on the pump caused by particles, we strongly recommend that you install an appropriate filter in front of the pump (the main filter must have a filtration efficiency of 99.98% for particles above 10 μm).

② To avoid cavitation and dry running, it is recommended that you install a low-pressure protection switch before the pump inlet. Ensure that the water inlet pipe is not smaller than the water pump inlet diameter.

③ Frequency converter requirements: If the pump is used with a frequency converter, it is required that the frequency converter is heavy-load constant torque and the starting method is constant torque start (the water pump fan-specific frequency converter is not constant torque and may not be able to drive the positive displacement water pump; for example, ABB's ACS510 series frequency converter may not be able to drive the HEX (S) energy recovery booster pump. The same is true for other brands of water pump and fan-specific frequency converters. Please communicate with the frequency converter manufacturer for selection.

④ For a short shutdown of the pump that does not exceed 3 days, there is no need to flush as long as the pump is filled with overflow medium. If the pump is shut down for

more than 3 days, it is recommended that you flush the pump with fresh water. When the pump is shut down for more than 15 days, it is recommended that you flush the pump with fresh water containing fungicides.

⑤ If the pump is running under conditions with high salt content, it is recommended that you flush the pump with fresh water every time you stop the pump. During the cleaning process, start the high-pressure pump to discharge the concentrated salt water from the pump chamber to prevent the concentrated salt water from crystallizing and damaging the pump

⑥ If abnormal noise and vibration occur when the pump is running, please stop immediately and inspect the booster pump.

9.4 Operation Requirements

9.4.1 Basic Requirements

1. The low pressure water inlet flow rate of the Energy Recovery Booster Pump should be slightly greater than the flow rate of the high- pressure piston pump (within 10% of the excess flow rate).
2. Lift=Pressure of High-Pressure Raw Water Outlet-Pressure of High-Pressure Density Water Inlet (1 Bar=10 Meters, Lift Range 0-30 meters)
3. The High-Pressure Density Water Inlet flow rate and the High-Pressure Raw water Outlet Flow Rate are determined by the Rotation speed of the Energy Recovery Booster Pump. The higher the rotation speed, the lower the Recovery Rate.
4. The flow rate of the low-pressure density water is determined by the water supply flow rate of Raw water pump and the pressure difference of the control valve of the low-pressure outlet-The raw water inlet pipeline and the low-pressure density water outlet pipeline, and has nothing to do with the rotation speed of the Energy Recovery device. It is recommended that the pressure difference shall be controlled within 1Bar.
5. The Energy Recovery Booster Pump always starts before the High-pressure pump.
6. The high-pressure inlet pressure when the energy recovery booster pump starts is not

higher than 10Bar.

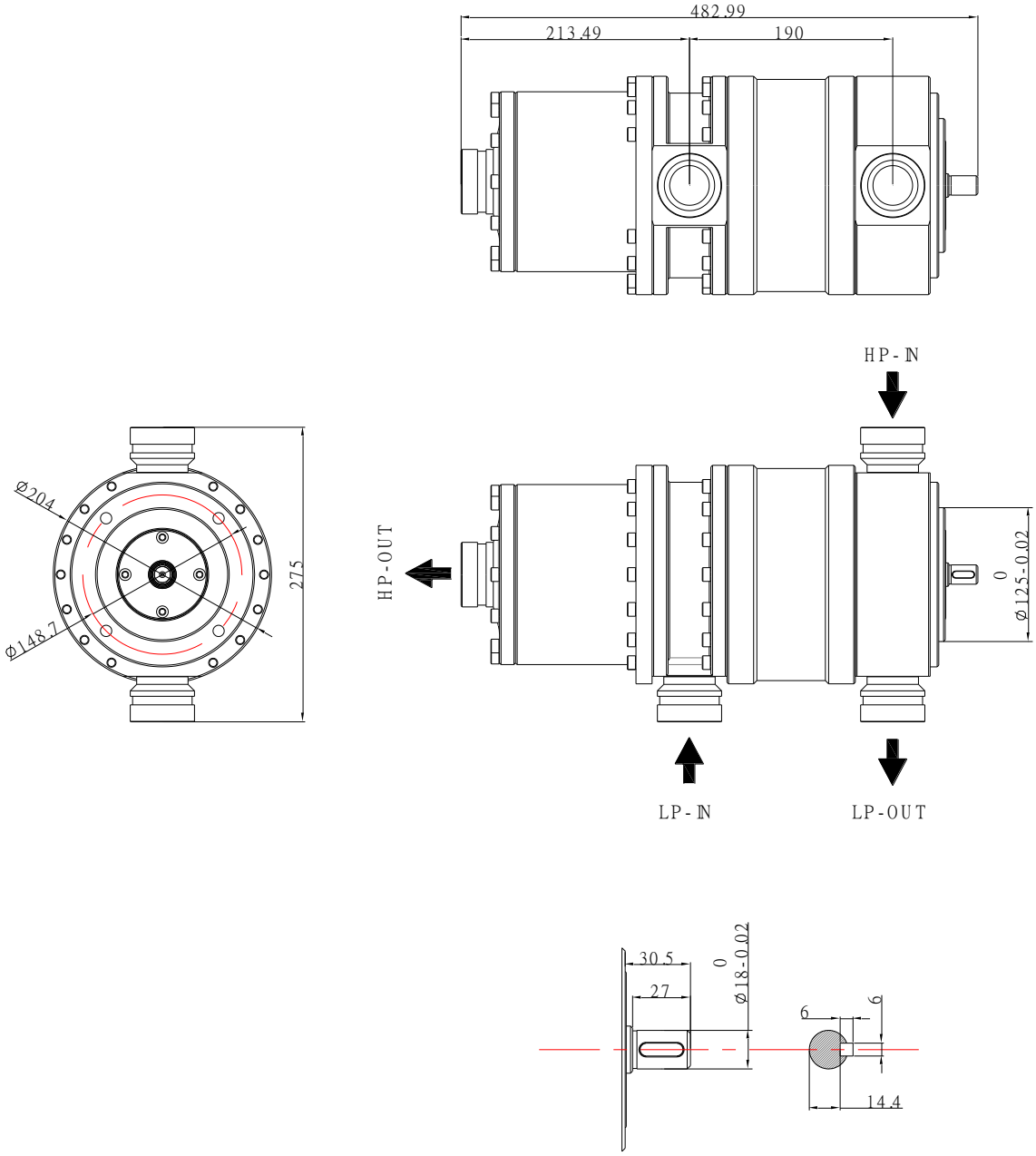
7. When the Energy Recovery Booster Pump is running stably, the high-pressure inlet pressure is not less than 3Bar.

9.4.2 Starting Steps

1. Check all valves of pipeline to ensure they are in the correct working position.
2. Start the Raw Water Pump and ensure its flow rate not higher than high-pressure flow rate.
3. Make sure all pipelines are filled with water, and exhaust the air in the pipeline through the pipeline exhaust valve and exhaust ports of high-pressure pump and energy recovery pump.
4. Start the Energy Recovery Pump slowly. The start time of Energy Recovery Pump is set at 15 ~ 30 Seconds. When Multiple Energy Recovery pumps are used in parallel, the next Energy Recovery pump shall be started in sequence after the front pump runs stably for 5 ~ 10 seconds.
5. After the Energy Recovery booster pump is started, it is recommended to run it for 2 minutes and use overflow flushing to drain out the residual air in the pipeline.
6. By adjusting the pressure control valve of low-pressure density water outlet pipeline, the pressure difference between the low-pressure raw water inlet and the low-pressure density water outlet is adjusted to meet the exchange requirements of raw water and density water.
7. By adjusting the frequency of the frequency converter, the speed of the pump can be adjusted to achieve the required flow rate.
8. Start the High-Pressure pump and the system pressure rises until the produced water flow rate is equal to the high-pressure pump flow rate.
9. Observe the raw water inflow rate and the high-pressure density water inflow flow again, and ensure that the raw water inflow flow is slightly higher than the density water inflow flow by adjusting the raw water pump flow or the low-pressure density water outlet pressure control valve.

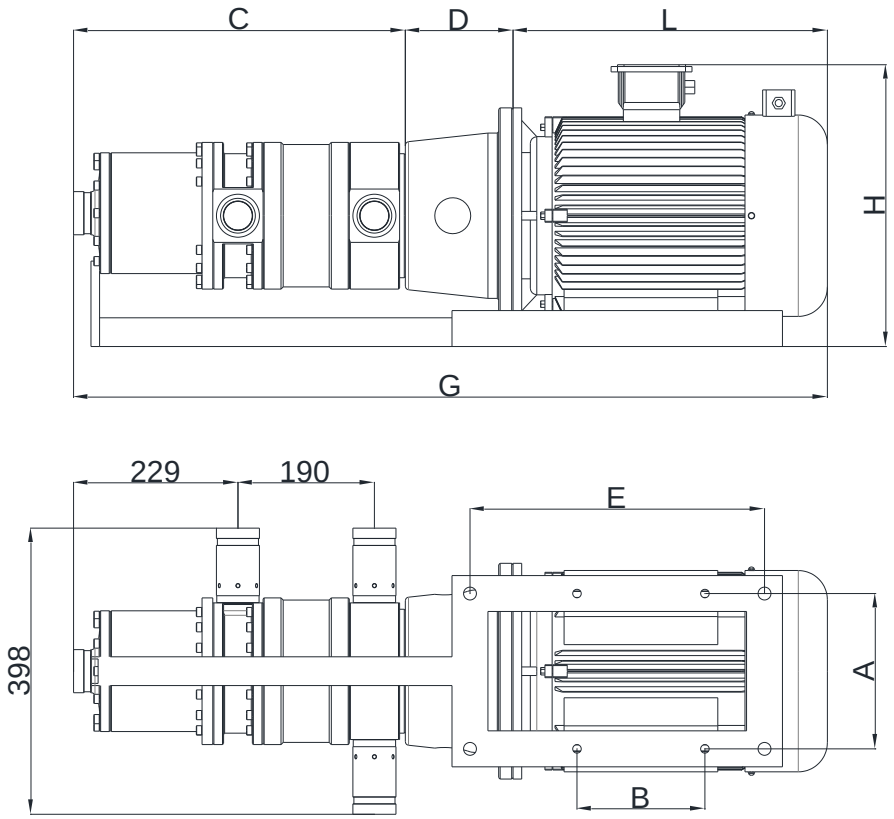
Chapter 10 Energy Recovery Booster Pump Dimension

10.1 HEX (S) -20/-60-3 Pump Head Dimension:



HEX (S) Model	HEX (S) -20/60-3
High Pressure interface size	Coupling connection，DN50
Low Pressure interface size	Coupling connection，DN50

10.2 HEX (S) -20/-60-3 pump dimension with motor

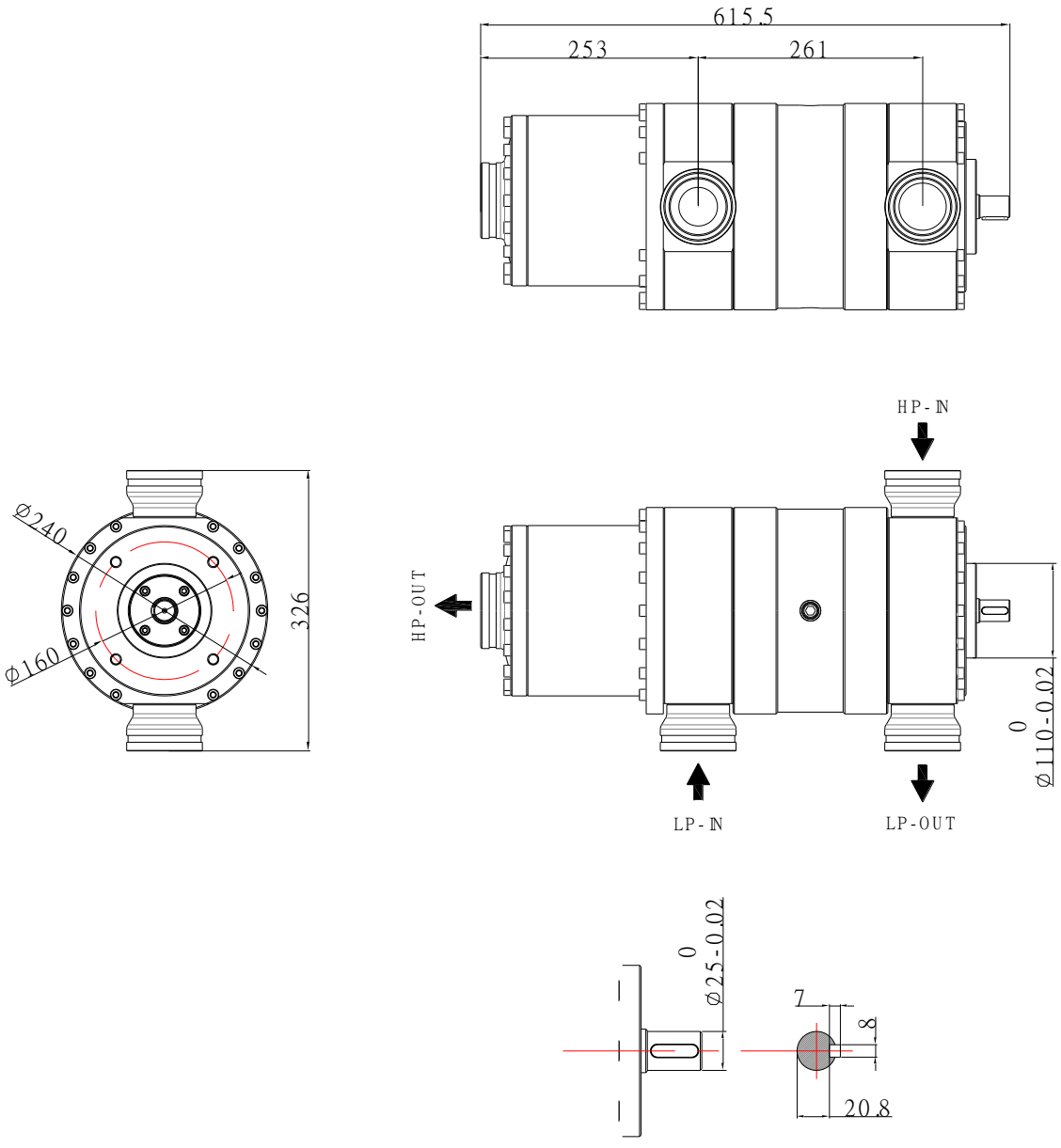


Complete device with independent fan motor (variable frequency motor)

Unit：mm

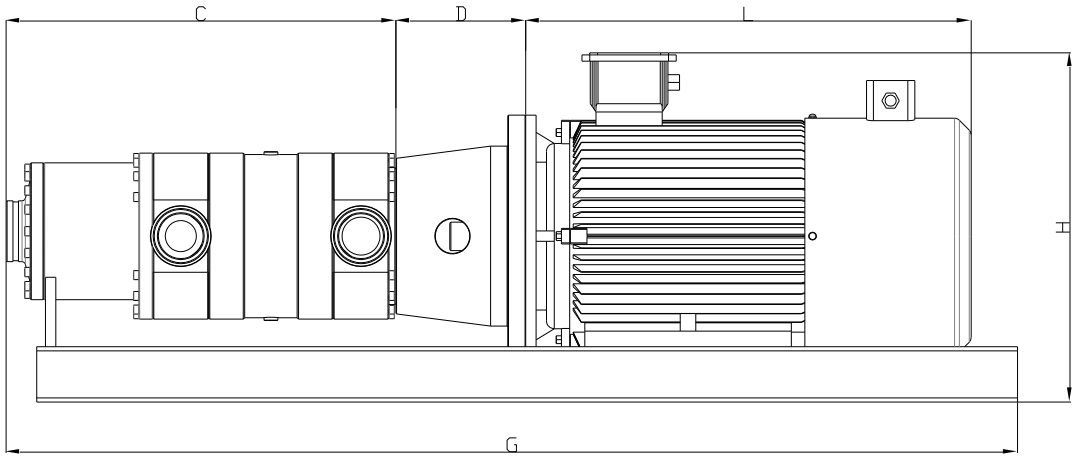
HEX(S)Model	A	B	C	D	E	H	L	G	IEC Motor
HEX(S)-20/60-3	216	140	455	155	380	400	520	878	5.5kW-4P
	216	178	455	155	410	400	560	918	7.5kW-4P

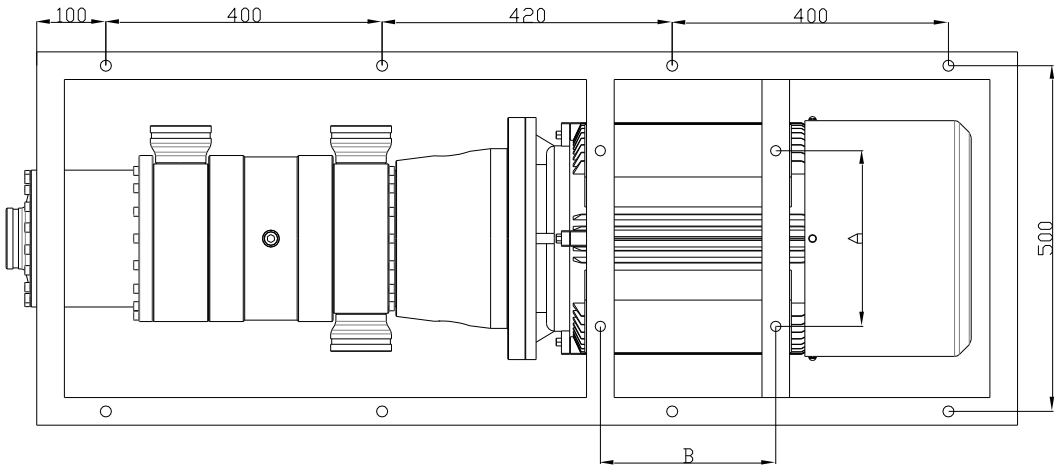
10.3 HEX (S) -40/-60-3 Pump Head Dimension



HEX (S) Model	HEX (S) -40/60-3
High Pressure interface size	Coupling connection , DN80
Low Pressure interface size	Coupling connection , DN80

10.4 HEX(S)-40/-60-3 pump dimension with motor



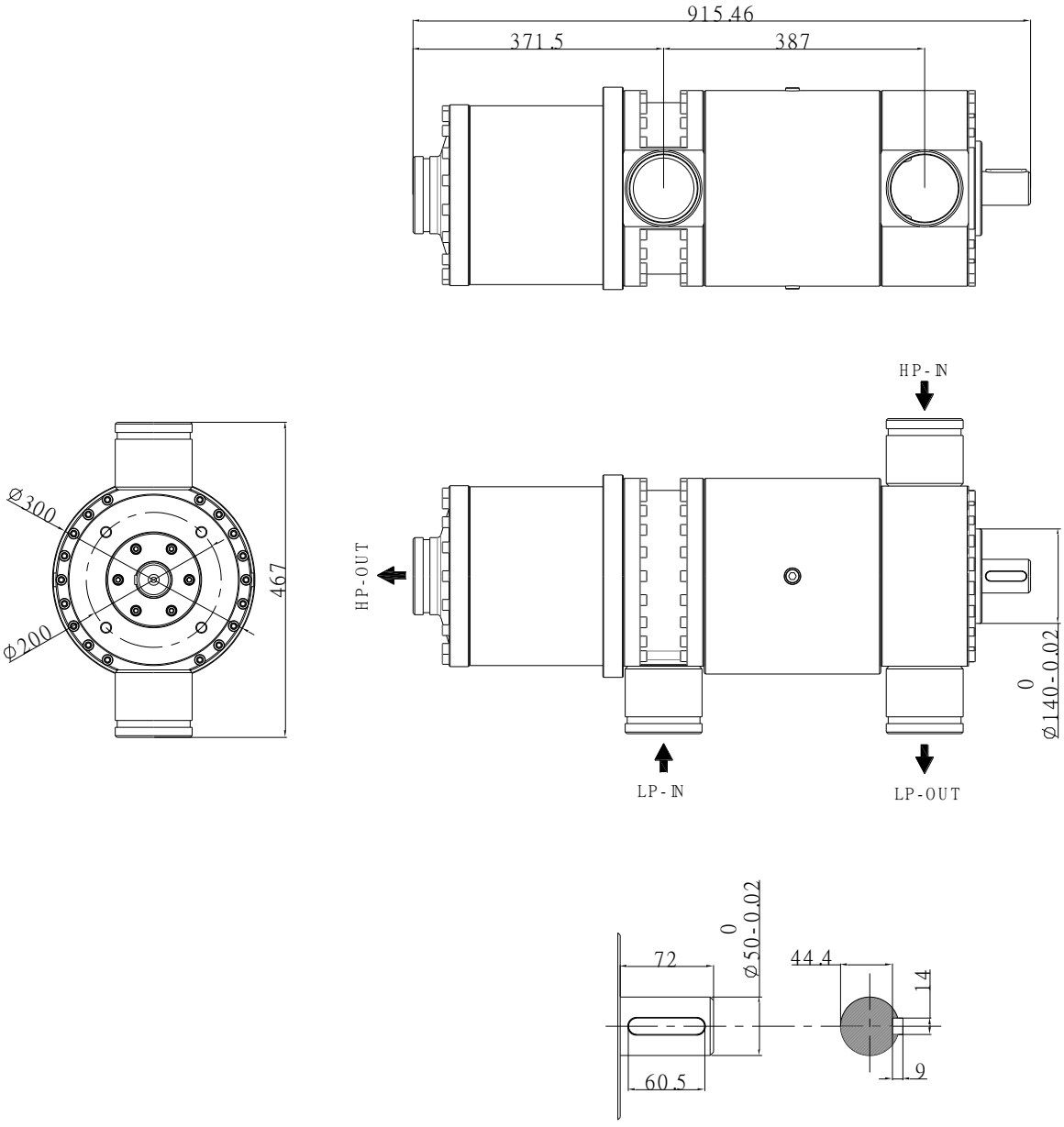


Complete device with independent fan motor (variable frequency motor)

Unit：mm

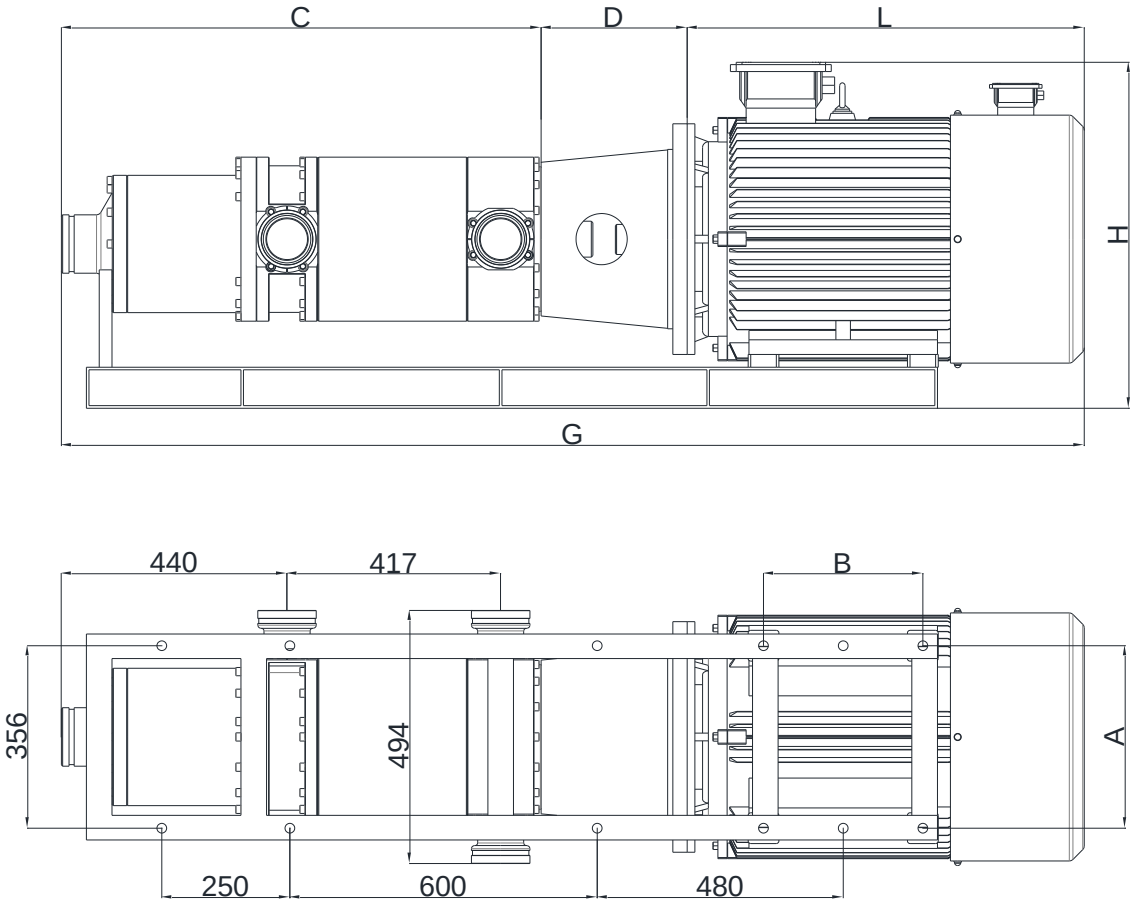
HEX(S)Model	A	B	C	D	H	L	G	IEC Motor
HEX（S）-40/60-3	279	279	565	188	445	735	1450	15kW-6P
	318	305	565	204	505	765	1500	18.5kW-6P

10.5 HEX（S）-70/-60-3 Pump Head Dimension



HEX(S)Model	HEX-70/60-3
High Pressure interface size	Coupling connection，DN100
Low Pressure interface size	Coupling connection，DN100

10.6 HEX(S)-70/-60-3 Pump dimension with Motor



Complete device with independent fan motor (variable frequency motor)

Unit：mm

HEX(S)Model	A	B	C	D	H	L	G	IEC Motor
HEX(S)-70/60-3	406	349	889	275	730	865	2029	30kW-6P

Chapter 11 Install Accessories

High Pressure hose joint and High-pressure Elastic hose

Technical Parameter

Coupling connection	DN20、DN25、DN32、DN40、DN50、DN65、DN80、DN100
Pump Connection	G1/2"、G3/4"、M42、M52、M60
Material	2205/2507 Duplex Stainless Steel
Medium	High salt wastewater, seawater and brackish water
Pressure	10MPa

Note: can be customized according to the customer needs

High pressure hose joint

High Pressure Elastic Hose

High-Pressure Piston Pump Input connector

Parameter

Coupling connection	DN20、DN25、DN32、DN40、DN50、DN65
Pump Connection	G1/2"、G3/4"、M42、M52、M60
Material	2205 Duplex Stainless Steel
Medium	High salt wastewater, seawater and brackish water
Pressure	10bar

Note: can be customized according to the customer needs

High-Pressure Connector

Chapter 12 Repair and Maintenance Services

Our products enjoy one-year free maintenance service from the date of delivery(except for artificial damage and improper use damage). At the same time, providing international and domestic similar HEX(S) maintenance and support service, with the concept of customers first and in the first time to solve the problem for the customer

Services Includes:

- ✧ HEX(S) Fault Check
- ✧ HEX(S) On-site Maintenance
- ✧ HEX(S) Back to Factory Repair
- ✧ HEX(S) Spare Parts Service
- ✧ HEX(S) Components Customization

Suggestion

Intensive design enables the HEX(S) series Energy Recovery booster pumps to provide long operating times, low maintenance requirements, and reduced life cycle costs.

If the HEX (S) series booster pump is operated under the specified pre-filtration, pressure and speed conditions, golds pump provides an 8,000-hour maintenance-free warranty, but it shall not exceed 18 months from the date of production.

To prevent complete pump damage, it is recommended to inspect the pump at most 8,000 hours, at which time any worn parts must be replaced.

Although the HEX (S) series Energy Recovery booster pump is made of 2205 duplex stainless steel/2507 super duplex stainless steel with excellent corrosion resistance, under high salt conditions, it is recommended to always flush the pump with fresh water when the system is shut down

Maintenance

The HEX (S) series Energy Recovery booster pump uses water as lubricant, so there is no oil in the pump.

If the pump is operated within the SAF 2507 curve shown in Section 5.1, it is expected that no component replacement will be required during the first 8000 hours of operation.

Repair