VPS series

Vertical Multistage Centrifugal Pump

Introduction

VPS/VPSI is a high-efficiency and energy-saving vertical multi-stage centrifugal pump. The centrifugal force generated by the impeller of the rotary pump drives the fluid to transfer. Its pump body and motor are composed of main shaft, impeller, diffuser, pump case and mechanical seal, and connected bycoupling. VPS/VPSI series can be used as booster pump alone or as auxiliary booster equipment in the booster system of construction and industry. Its piping structure ensures that the pump is directly installed in the same horizontal piping system with the same diameter in and out. This design makes the structure and piping of the pump more compact. VPS/VPSI series vertical multi-stage centrifugal pump can be installed vertically or horizontally on pipeline according to different installation space. In the case of horizontal installation, the pump needs to be added with fixed module to ensure the stability of the pump during operation.

Pump materials

- Cast iron
- Stainless steel (AISI304 / I316)
- Duplex stainless steel (2205)

Pipe connection

- DIN flange, ANSI flange
- Thread
- Tri-Clamp
- Oval flange

Motor

- Totally enclosed, fan-cooled, 2-pole standard motors
- Enclosure class: IP55
- Insulation class: F
- Voltage
  - 3 x 220-240 / 380-415 V
  - 1 x 220-240V
- Available with single-phase motors (0.37-2.2kW)

Performance curves

- The motors used for the measurements are based on 2900rpm or 2950rpm
- Tolerance to ISO 9906
- Measurement have been made with airless water at a temperature of 20°C
- The curves apply to the kinematic viscosity of 1 mm^2/s
- Select a best efficiency of the pump which is operating within the bold curve of the pump performance

Liquid temperature °C

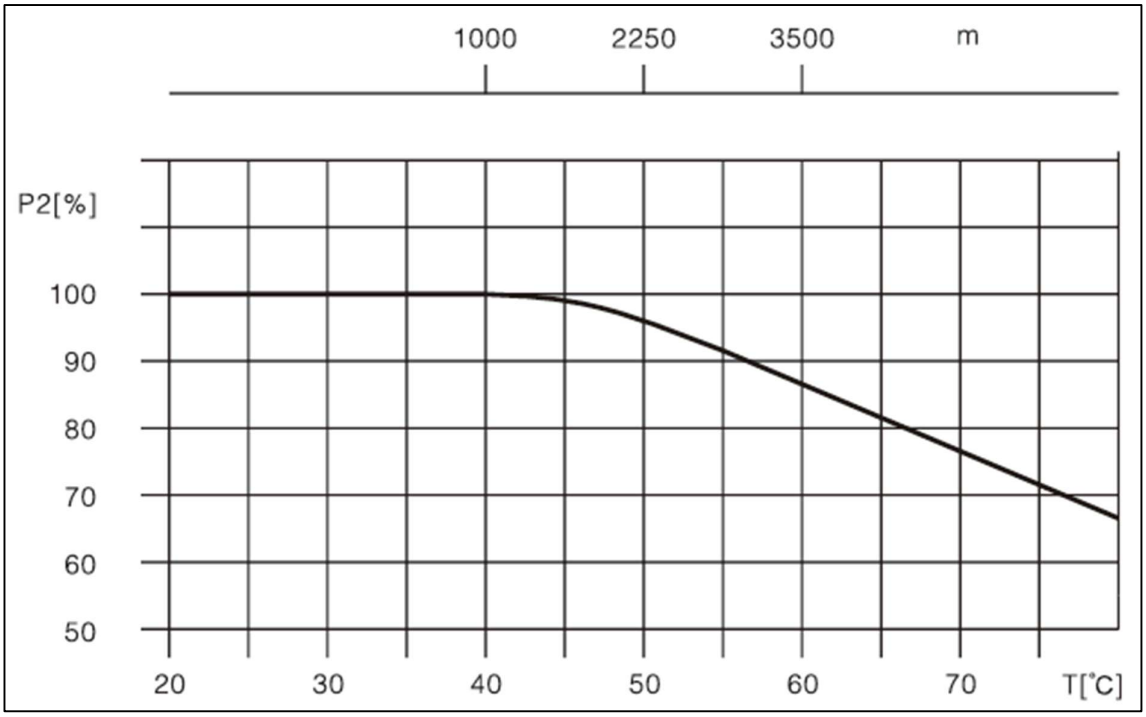
- Normal temperature pump: -15°C to +70°C
- Hot temperature pump: -15°C to +120°C

Pump operating conditions

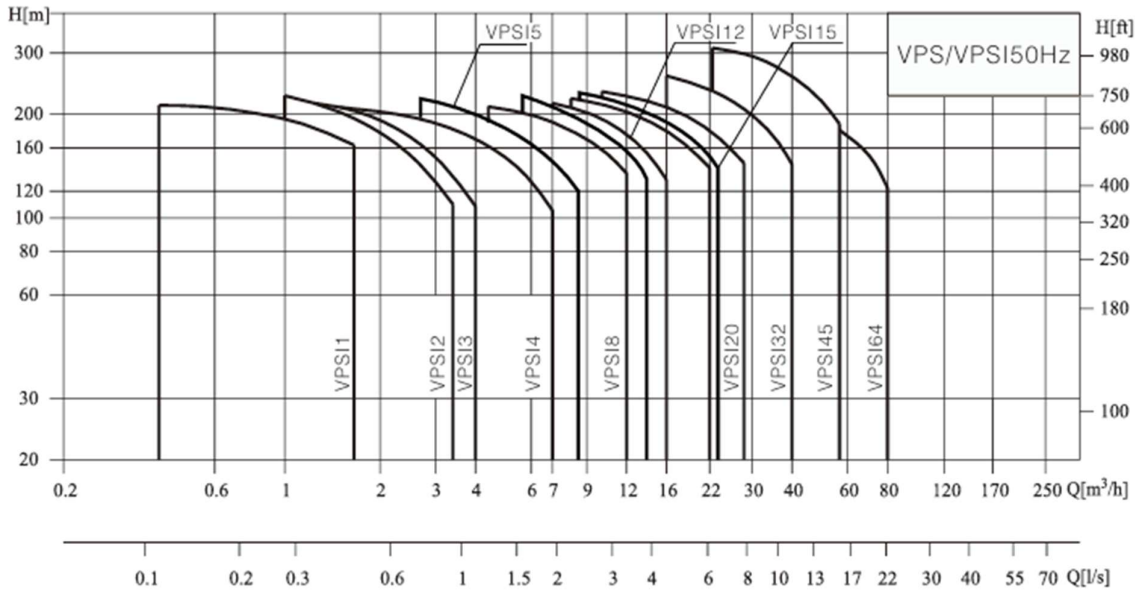
- Pumping liquids which are thin, clean, non-flammable, non-combustible or non-explosive liquids, not containing sold particles or fibers
- Maximum ambient temperature: +40°C
- Maximum altitude above sea level: 1000m

Ambient temperature

If the ambient temperature exceeds 40°C or the pump is installed at an altitude exceeding 1000m, the motor output power P2 will decrease. In such cases, it is necessary to use a motor with a higher rated output.



Pump Performance range



Minimum inlet pressure, NPSH

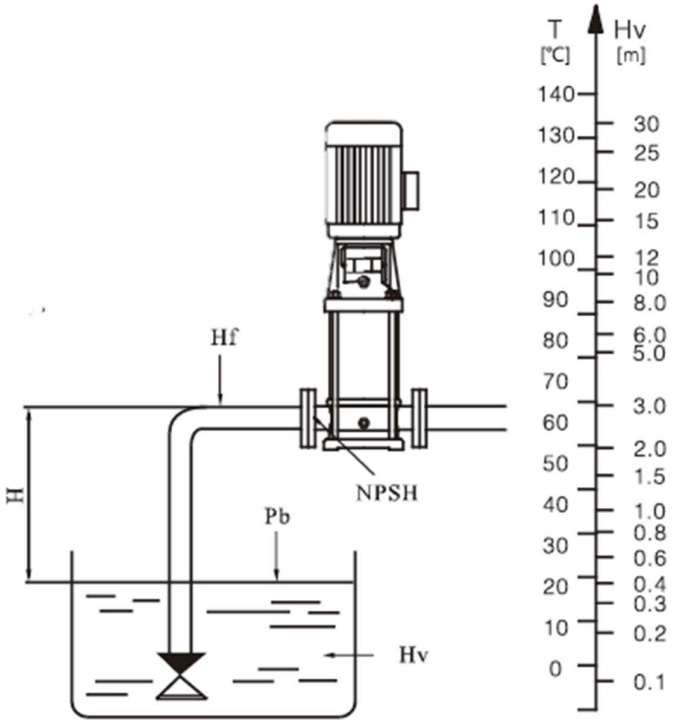
Cavitation may occur if the following conditions exist during the operation of pumps:

- The water tank or pool is lower than the water pump inlet;
- High liquid temperature;
- Actual flow significantly greater than rated flow;
- Pressure in the pump is lower than the vaporization pressure of the conveying liquid

To avoid cavitation, make sure there is a minimum pressure on the inlet side of the pump. The maximum suction rage H (m) can be calculated as follows:

- Pb = Atmospheric pressure (atmospheric pressure can be set to 1 bar); In a closed system, Pb is system pressure
- Hf = Net positive suction head (can be read from the maximum possible flow rate of the pump on the NPSH curve)
- Hf = Pipeline loss at inlet
- Hv = Vaporization pressure
- Hs = Safety margin = Minimum 0.5m head

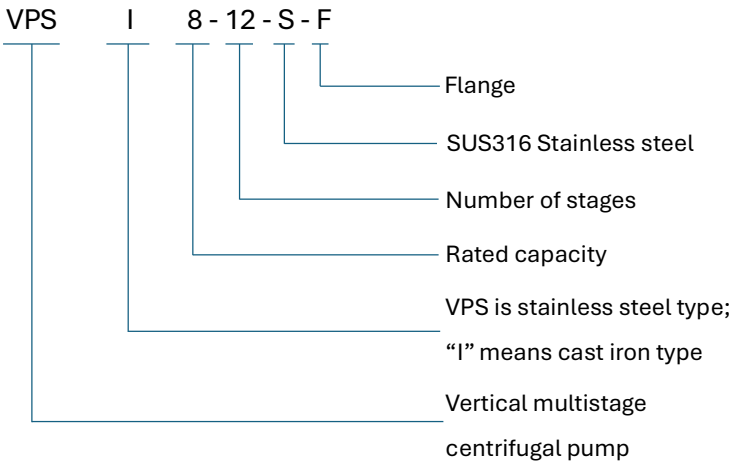
If the calculated value of H is positive, the pump can be operated at the maximum suction rage H.
If the calculated H is negative, there must be a head with minimum inlet pressure H.

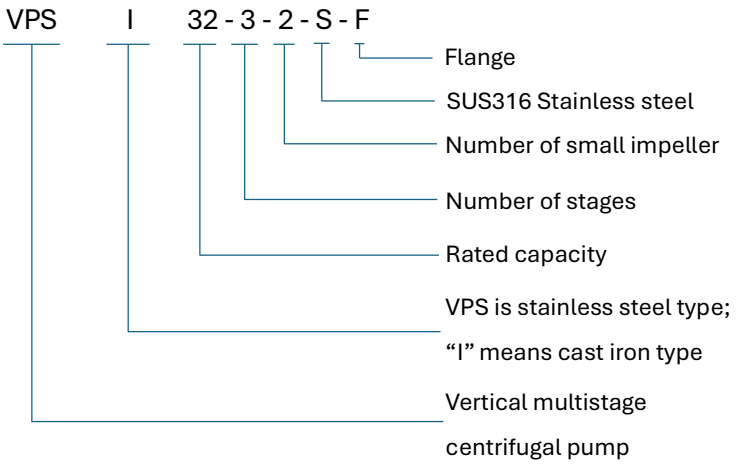


Minimum inlet pressure

Definition of model

VPS (I) 1,2,3,4,5,8,12,15,20





Motor

- IE3 High efficiency motor
- More stable performance and longer life of motor
- Less noise and less vibration than IE2
- More energy saving and environment protection
- Full-enclosed ari-blast two-pole standard motor
- Protection class: IP55
- Insulation class: F
- Standard voltage: 60Hz
  - 3 x 220-230 / 346-440 V
  - 3 x 220-255 / 380-440 V
  - 3 x 220-277 / 380-480 V

Applications

Water supply

- Water filter
- Supercharging
- Pressurization of hotels
- Industrial pressurization

Industrial boosting

- Cleaning system
- High pressure flushing system
- Firefighting system
- Car cleaning equipment

Industrial liquid transport

- Cooling air conditioning system
- Boiler feed water
- Condensing system and cooling tower
- Machine tool cooling lubrication system

Water treatment

- Ultrafiltration system
- Reverse osmosis system
- Distillation system
- Separator
- Swimming pool

Irrigation

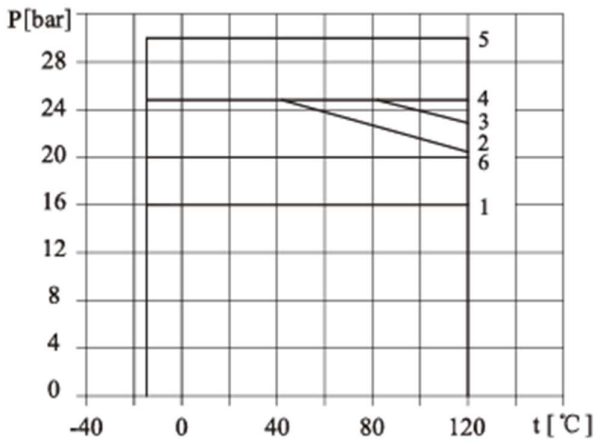
- Regional irrigation
- Sprinkler irrigation
- Drip irrigation
- Greenhouse irrigation

Operation conditions

- Thin, clean, non-flammable and non-explosive liquid containing no solid granules and fibers
- Liquid temperature
  - Normal: -15 to +70°C
  - Hot water type: -15 to +105°C
- Ambient temperature: up to +40°C
- Altitude: up to 1000m

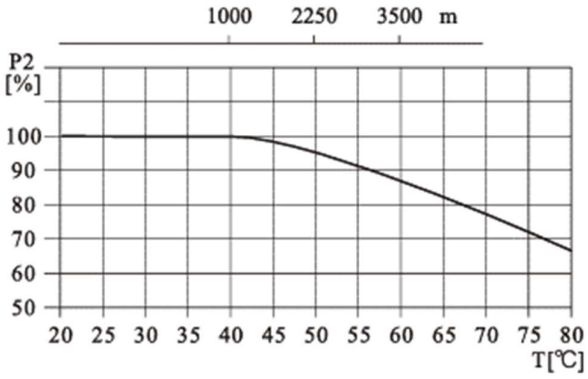
Max working pressure

The following figure shows the limitation of pressure and temperature, which shall be in the scope as shown in the figure



Max ambient temperature

When the pump operates under ambient temperature higher than 40°C or under altitude higher than 1000m, because of low air density and poor cooling effects, the motor output power P2 will be decreased to certain extent. If the pump is operated under the above-said conditions, it should be equipped with motor of higher power

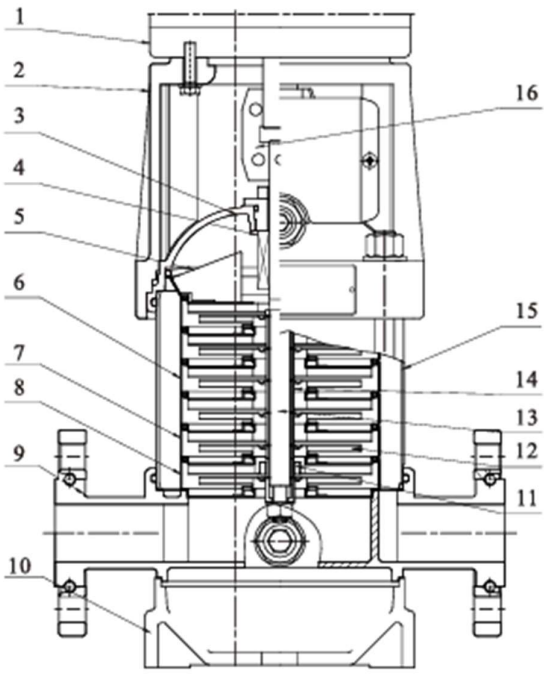


Model	Curve number
VPS(I) 1,2,3,4,5 Flange	2
VPS(I) 1,2,3,4,5 Oval Flange	1
VPS(I) 1,2,3,4,5	2
VPS(I) 8,12,15,20 Flange	3
VPS(I) 8,12,15,20 Oval Flange	1
VPS(I) 8,12,15,20	3
VPS(I) 32	
• 32-10-1 ~ 32-50-2	1
• 32-50 ~ 32-90-2	4
• 32-90 ~ 32-100-2	5
VPS(I) 45	
• 45-10-1 ~ 45-30	1
• 45-40-2 ~ 45-60	4
• 45-70-2 ~ 45-70	5
VPS(I) 65	
• 64-10-1 ~ 64-30	1
• 64-40-2 ~ 64-50-2	4

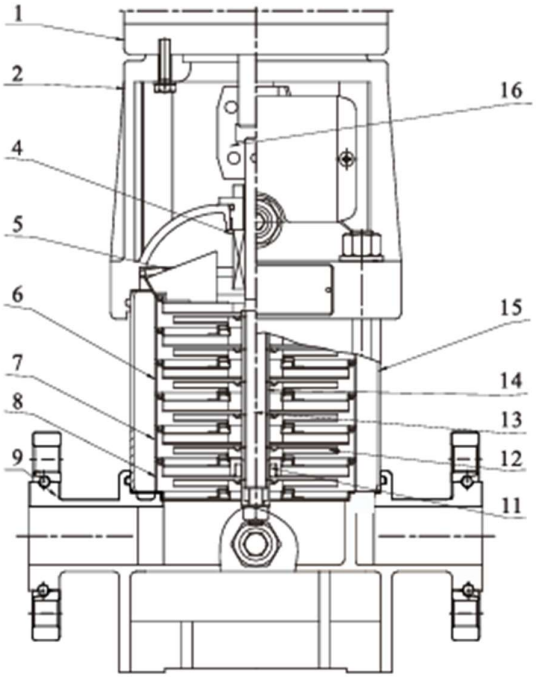
Parameter	VPS(I)1	VPS(I)2	VPS(I)3	VPS(I)4	VPS(I)5	VPS(I)8	VPS(I)12	VPS(I)15	VPS(I)20
Rated flow rate [m^3/h]	1	2	3	4	5	8	12	15	20
Rated flow rate [l/h]	0.28	0.56	0.83	1.1	1.39	2.2	3.3	4.17	5.6
Flow rate [m^3/h]	0.4~1.8	1~3.5	1.2~4	1.5~7	2.5~8.5	5~12	7~16	8~23	10~28
Rated flow rate [l/h]	0.11~0.5	0.28~0.97	0.33~1.1	0.42~1.9	0.69~2.36	1.39~3.3	1.9~4.4	2.22~6.39	2.8~7.8
Maximum pressure [bar]	21	23	22	21	24	21	22	23	23
Power [kW]	0.37~2.2	0.37~3	0.37~3	0.37~4	0.37~5.5	0.75~7.5	1.5~11	1.1~15	1.1~18.5
Temperature range [°C]	-15 ~ 105								
Highest efficiency [%]	44	46	50	58	63	62	63	73	69
VPS Pipe connection									
DIN flange	DN25	DN25	DN25	DN32	DN32	DN40	DN50	DN50	DN50
Thread	R_1 1.25”	R_1 1.25”	R_1 1.25”	R_1 1.25”	R_1 1.25”	R_1 2”	R_1 2”	R_1 2”	R_1 2”
Clamp connection	DN32	DN32	DN32	DN32	DN32	DN50	DN50	DN50	DN50
VPS(I) Pipe connection									
DIN flange	DN25	DN25	DN25	DN32	DN32	DN40	DN50	DN50	DN50
Oval flange	R_p1	R_p1	R_p1	$R_p1.25$	$R_p1.25$	$R_p1.5$	$R_p1.5$	$R_p1.5$	$R_p1.5$

Parameter	VPS(I)32	VPS(I)45	VPS(I)64
Rated flow rate [m^3/h]	32	45	64
Rated flow rate [l/h]	8.9	12.5	17.8
Flow rate [m^3/h]	16 ~ 40	25 ~ 55	30 ~ 80
Rated flow rate [l/h]	4.4 ~ 11	6.9 ~ 15.3	8 ~ 22
Maximum pressure [bar]	26	30	22
Power [kW]	1.5 ~ 30	3 ~ 45	4 ~ 45
Temperature range [°C]	-15 ~ 105		
Highest efficiency [%]	74	75	76
Pipe connection			
DIN flange	DN65	DN80	DN100

Structure VPS / VPSI 1,2,3,4,5



VPS

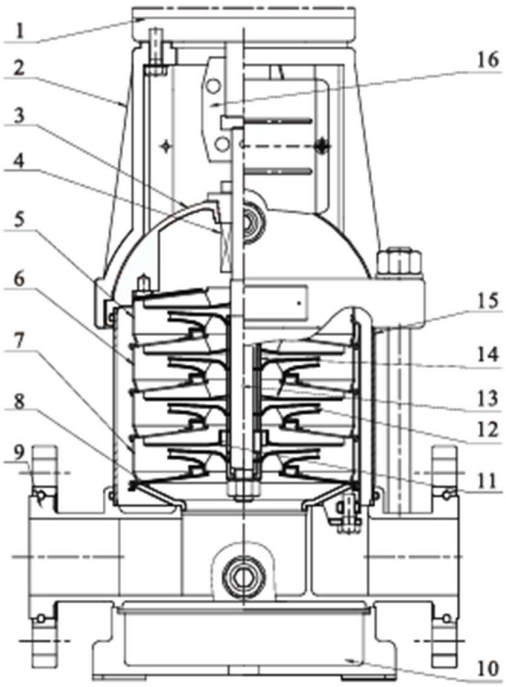


VPSI

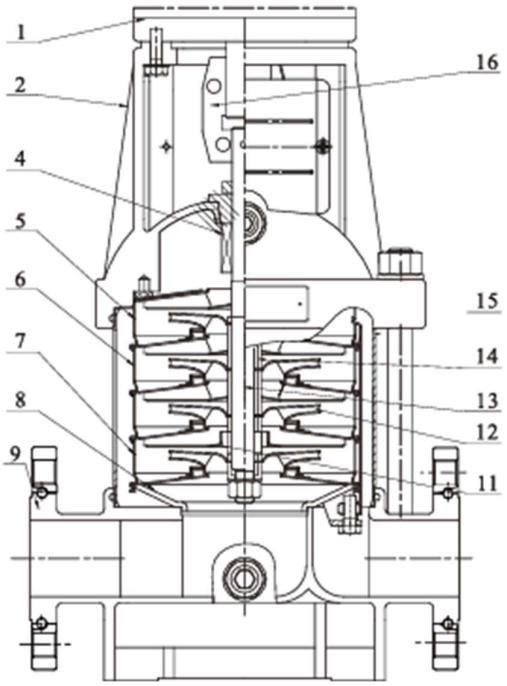
Materials VPS / VPSI 1,2,3,4,5

No.	Spare parts	Materials		GB		EN DIN		AISI / ASTM	
		VPSI	VPS	VPSI	VPS	VPSI	VPS	VPSI	VPS
1	Motor	/		/		/		/	
2	Bracket	Cast iron / Ductile cast iron		GB9439-HT200 / GB1348-QT500-7		EN1561 EN-GJL-200 / EN1563 EN-GJS-500-7		ASTM258 / ASTM A536 65-45-12	
3	Seal base	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
4	Mechanical seal	/		/		/		/	
5	Top diffuser	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
6	Diffuser	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
7	Support diffuser	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
8	Coupling	Ductile cast iron		GB 1348-QT500-7		EN 1563 EN-GJS-500-7		ASTM A536 65-45-12	
9	Impeller	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
10	Cylinder	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
11	Shaft	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
12	Bearing	WC		/		/		/	
13	Inducer	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
14	Intel & outlet chamber	Cast iron / Stainless steel		GB 9349-HT200 / GB / T20878-06Cr19Ni10		EN 1561 EN-GJL-200 / EN 1563 EN-GJS-500-7		ASTM258 / AISI304	
15	Base	Cast iron		GB 9439-HT200		EN 1561 EN-GJL-200		ASTM25B	

Structure VPS / VPSI 8,12,15,20



VPS



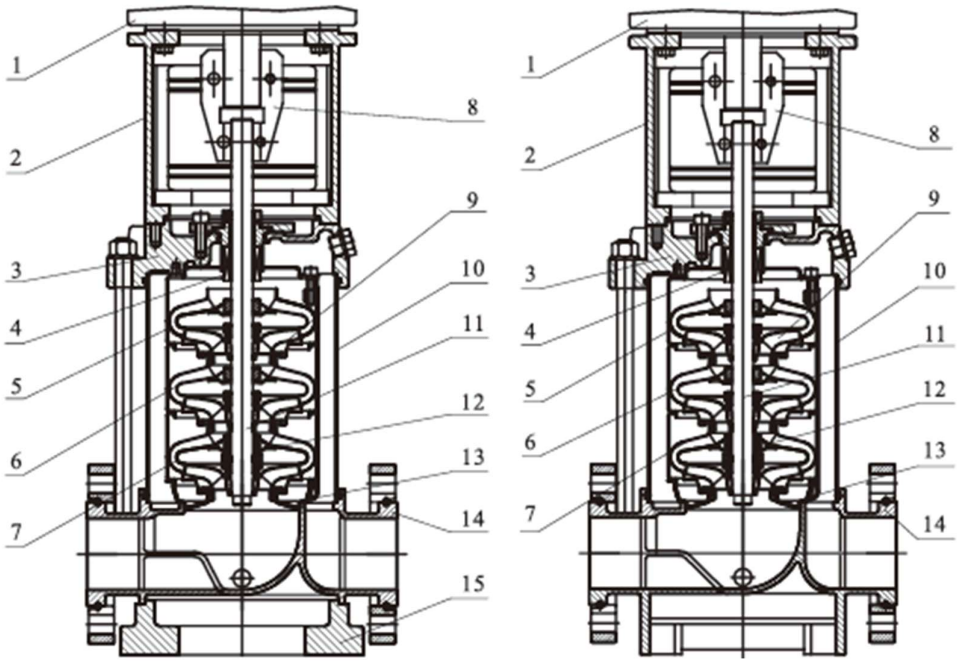
VPSI

Materials VPS / VPSI 8,12,15,20

No.	Spare parts	Materials		GB		EN DIN		AISI / ASTM	
		VPSI	VPS	VPSI	VPS	VPSI	VPS	VPSI	VPS
1	Motor	/		/		/		/	
2	Bracket	Cast iron / Ductile cast iron		GB9439-HT200 / GB1348-QT500-7		EN1561 EN-GJL-200 / EN1563 EN-GJS-500-7		ASTM258 / ASTM A536 65-45-12	
3	Seal base	Ductile cast iron / Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
4	Mechanical seal	/		/		/		/	
5	Top diffuser	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
6	Diffuser	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
7	Support diffuser	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
8	Coupling	Ductile cast iron		GB 1348-QT500-7		EN 1563 EN-GJS-500-7		ASTM A536 65-45-12	
9	Impeller	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	

10	Cylinder	Stainless steel	GB / T20878-06Cr19Ni10	EN 10088-1.4301	AISI304
11	Shaft	Stainless steel	GB / T20878-06Cr19Ni10	EN 10088-1.4301	AISI304
12	Bearing	WC	/	/	/
13	Inducer	Stainless steel	GB / T20878-06Cr19Ni10	EN 10088-1.4301	AISI304
14	Intel & outlet chamber	Cast iron / Stainless steel	GB 9349-HT200 / GB / T20878-06Cr19Ni10	EN 1561 EN-GJL-200 / EN 1563 EN-GJS-500-7	ASTM258 / AISI304
15	Base	Cast iron	GB 9439-HT200	EN 1561 EN-GJL-200	ASTM25B

Structure VPS / VPSI 32,45,64



VPS **VPSI**

Materials VPS / VPSI 32,45,64

No.	Spare parts	Materials		GB		EN DIN		AISI / ASTM	
		VPSI	VPS	VPSI	VPS	VPSI	VPS	VPSI	VPS
1	Motor	/		/		/		/	
2	Bracket	Cast iron / Ductile cast iron		GB9439-HT200 / GB1348-QT500-7		EN1561 EN-GJL-200 / EN1563 EN-GJS-500-7		ASTM258 / ASTM A536 65-45-12	
3	Seal base	Ductile cast iron / Stainless steel		GB 1348-QT500-7 / GB / T20878-06Cr19Ni10		EN 1563 EN-GJS-500-7 / EN 10088-1.4301		STM A536 65-45-12 / AISI304	
4	Mechanical seal	/		/		/		/	
5	Top diffuser	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
6	Diffuser	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
7	Support diffuser	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
8	Coupling	Ductile cast iron		GB 1348-QT500-7		EN 1563 EN-GJS-500-7		ASTM A536 65-45-12	
9	Impeller	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
10	Cylinder	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
11	Shaft	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
12	Bearing	WC		/		/		/	
13	Inducer	Stainless steel		GB / T20878-06Cr19Ni10		EN 10088-1.4301		AISI304	
14	Intel & outlet chamber	Ductile cast iron / Stainless steel		GB 1348-QT500-7 / GB /T20878-06Cr19Ni10		EN 1563 EN-GJS-500-7 / EN 10088-1.4301		STM A536 65-45-12 / AISI304	
15	Base	Cast iron		GB 9439-HT200		EN 1561 EN-GJL-200		ASTM25B	