

# PRODUCT MANUAL

## CV,CVF,CVL Vertical Multistage Centrifugal Pump 50Hz



Type Y attachment – Damaged supply cords to be replaced by the manufacturer, service agent or similarly qualified person to avoid hazard.

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 This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.



**BEFORE BEGINNING INSTALLATION PROCEDURES, THESE INSTALLATION AND OPERATING INSTRUCTIONS SHOULD BE STUDIED CAREFULLY. THE INSTALLATION AND OPERATION SHOULD ALSO BE IN ACCORDANCE WITH LOCAL REGULATIONS AND ACCEPTED CODES OF GOOD PRACTICE.**

## 1. Handling



The motors of CV, CVF, CVL 1,2,3,4,5,10,15 and 20 pumps are supplied with lifting eyes which must not be used for lifting the entire pump.

When the entire pump is to be lifted, observe the following:

- CV,CVF,CVL 1,2,3,4,5,10,15 and 20 pumps fitted with standard motors should be lifted in the pump head by means of straps or the like.
- CV, CVF32, 45, 64 and 90 pumps fitted with standard motors up to and including 11kW should be lifted by means of the eye nut fitted to the pump head.
- CV,CVF32,45,64 and 90 fitted with motors of 15 kW and up should be lifted by means of the eye bolts fitted to the motor flange.
- For other motor makes than those mentioned above, it is recommended to lift the pump in the pump head by means of straps.

## 2. Type designation

CVF/CVFV/CV/CVV/CVL 1,2,3,4,5,10,15,20 and 32.....

**CVF 32 -10 -1-F-J1-A-A01-I-E-HUCV-C**

Model \_\_\_\_\_  
**CVF:** Pump body made of casting stainless steel, cartridge seal

**CVFV:** Pump body made of casting stainless steel, normal structure seal

**CV:** Pump body made of cast iron, cartridge seal

**CVV:** Pump body made of cast iron, normal structure seal

**CVL :** Pump body made of stamping stainless steel, normal structure seal

Nominal flow(m<sup>3</sup>/h) \_\_\_\_\_

Number of impellers \_\_\_\_\_

Small impeller (0 means no) \_\_\_\_\_

Pump body \_\_\_\_\_

Pump cover / mechanical \_\_\_\_\_

Frame \_\_\_\_\_

Motor \_\_\_\_\_

Outer sleeve,Hydraulic stack,impeller \_\_\_\_\_

Plastic parts \_\_\_\_\_

Mechanical seal \_\_\_\_\_

Shaft material \_\_\_\_\_

**F-B2-A-A01-I-E-HUCV-C**

Pump body code —  
**CVF1,2,3,4,5,10,15,20 series**  
F: + cast stainless steel pump body  
G: + cast iron flange  
H: + cast stainless steel pump body  
I: + fixed welding stainless steel flange  
K: cast stainless steel pump body+  
fixed welding punching flange  
P: cast stainless steel(PJE)  
S: cast stainless steel (union):  
T: cylinder thread  
U: cast stainless steel (union):  
V: cone thread  
W: cast stainless steel (union):  
X: NPT thread  
**CVF32,45,64,90,120,150,200 series**  
F: cast stainless steel pump body  
G: +cast iron ativity flange  
H: cast stainless steel pump body  
I: +cast stainless steel ativity flange  
**CV1,2,3,4,5,10,15,20 series**  
J: cast iron pump body  
F: +cast iron fixed flange  
**CV32,45,64,90,120,150,200 series**  
F: cast iron pump body  
F: +cast iron ativity flange  
**CVL 1,2,3,4,5,10,15,20 series**  
F: punching pump body+cast iron  
G: flange  
H: punching pump body+cast  
I: stainless steel flange  
J: punching pump body+cast  
K: +cast stainless steel fixed flange  
L: punching pump body+ punching  
M: welding fixed flange  
N: punching pump body+(PJE)  
O: punching pump body+cast (union):  
P: cylinder thread  
Q: punching pump body+cast (union):  
R: cone thread  
S: punching pump body+cast (union):  
T: NPT thread

Pump cover / sealing machine code —

**CVF1,2,3,4,5,10,15,20 series**

J1: cartridge type mechanical seal

**CVF32,45,64,90,120,150,200 series**

J1: + cast stainless steel pump cover

cartridge type mechanical seal

F1: + cast stainless steel pump cover

+ cast iron press cover

**CVFV1,2,3,4,5,10,15,20 series**

B2: + cast iron pump cover

**CV1,2,3,4,5,10,15,20,32,45,64,90,**

**120,150,200 series**

H1: cartridge type mechanical seal

+ cast iron pump cover

**CVV1,2,3,4,5,10,15,20 series**

H2: + cast stainless steel pump cover

**CVL 1,2,3,4,5,10,15,20 series**

B2: + punching pump cover

Frame —

A: Small flange frame

(Pump head for V18 type motor)

B: The large flange frame

(pump head for V1 type motor)

Motor —

Outer sleeve, Hydraulic stack, impeller —

I: SUS304

G: SUS316 —

The connection model of pipeline —

E : EPDM

V: Viton

N: NBR —

Mechanical seal —

H : type mechanical

B: separate type mechanical

Q: Silicon carbide

U:Tungsten carbide

C: graphite

E:EPDM

V:Viton —

Pump shaft material code —

A:SUS304

B:SUS316

C:SUS431

D:2Cr13 —

### 3. Applications

Stainless steel vertical multistage centrifugal pump, types CV,CVF,CVL ,are designed for a wide range of applications.

#### 3.1 Features

Features: high efficiency, low noise, compact structure, small size, light weight, optimization design, reliable seal, easy operation, etc.

#### 3.2 Applications

Low viscosity, neutral, non-flammable, non-explosive liquids, not containing solid particles or fibres. The liquid must not attack the pump material chemically.

- Boiler feed and condensate systems.
- Water treatment, reverse osmosis systems, ultrafiltration systems.
- Food and beverage industry.
- Water supply in high-rise buildings.
- Irrigation in agriculture, nursery, golf course.
- Fire fighting systems.
- Industrial cleaning systems.
- liquid transfer, circulation and enhance.
- Hot and cold water.

#### 3.3 Working conditions

- Liquid temperature: Low temperature : -20°C~+15°C  
Normal temperature : +15°C~+70°C  
Hot water: +70°C~+104°C
- Flow range: 0.4~120m<sup>3</sup>/h
- Maximum pressure: 30bar
- pH value range: PH3~9
- Maximum ambient temperature: +50°C
- Maximum elevation: ≤1000m

#### 3.4 Pumped liquids

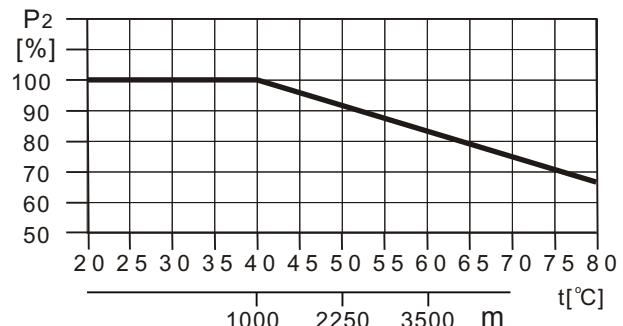
Thin, non-flammable, non-explosive liquids, not containing solid particles or fibres. The liquid must not attack the pump material chemically. When pumping liquids with a density and/or viscosity higher than that of water, oversized motors must be used, if required.  
-CV,CVF For liquid transfer, circulation and pressure boosting of cold or hot clean liquids.  
-CVN In systems where all parts in contact with the liquid must be made of high-grade stainless steel, CVN pumps must be used.

### 4. Technical data

#### 4.1 ambient temperature

Maximum +40°C. If the ambient temperature exceeds +40°C or if the motor is located 1000 metres above sea level, the motor output( $P_2$ ) must be reduced due to the low density and consequently low cooling effect of the air(Figure 1). In such cases, it may be necessary to use a motor with a higher output.

Fig.1 Relationship between motor output ( $P_2$ ) and ambient temperature



Example:

Figure 1 shows that  $P_2$  must be reduced to 88% when the pump is installed 3500 metres above sea level. At an ambient temperature of 70°C,  $P_2$  must be reduced to 78% of the output.

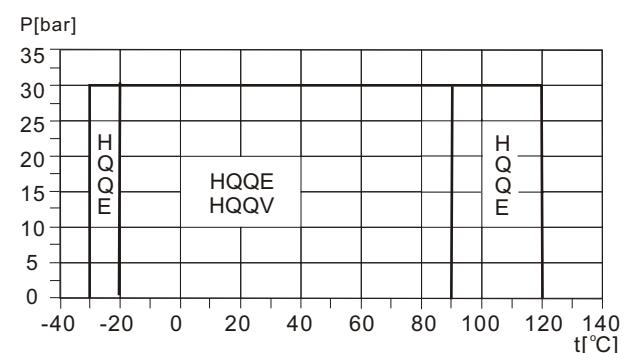
#### 4.2 Liquid temperature

See fig.5, page 4, which indicates the relationship between liquid temperature and maximum permissible operating pressure.

Note: The maximum permissible operating pressure and liquid temperature ranges apply to the pump only.

#### 4.3 Maximum permissible operating pressure and liquid temperature for the shaft seal

Fig.2 CV/CVF/CVN/CVL 1to20 and CV,CVF 32 to 90



#### 4.4 Minimum inlet pressure

The maximum suction lift “H” in metres head can be calculated as follows:

$$H = Pb \times 10.2 - NPSH - H_f - H_v - H_s$$

$Pb$  = Barometric pressure in bar.(Barometric pressure can be set to 1 bar). In closed systems,  $Pb$  indicates the system pressure in bar.

$NPSH$  = Net Positive Suction Head in metres head  
(to be read from the NPSH curve on page 18 at the highest flow the pump will be delivering).

$H_f$  = Friction loss in suction pipe in metres head at the highest flow the pump will be delivering.

$H_v$  = Vapour pressure in metres head.

$H_s$  = Safety margin = minimum 0.5 metres head

If the calculated "H" is positive, the pump can operate at a suction lift of maximum "H" metres head. If the calculated "H" is negative, an inlet pressure of minimum "H" metres head is required.

There must be a pressure equal to the calculated "H" during operation.

Example:

$P_b = 1\text{ bar}$

Pump type: CVF10, 50Hz

Flow rate:  $10\text{ m}^3/\text{h}$

NPSH (from page 18): 2.1 metres head.

Liquid temperature:  $+50^\circ\text{C}$

$H_v$  (from fig.4): 1.3 metres head

$$H = P_b \times 10.2 - \text{NPSH} - H_f - H_v - H_s$$

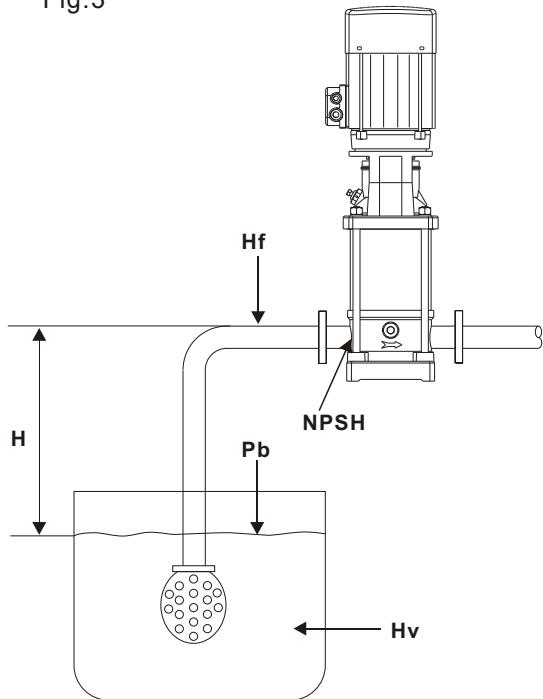
$$H = 1 \times 10.2 - 2.1 - 3.0 - 1.3 - 0.5 = 3.3 \text{ (metres head)}$$

This means that the pump can operate at a suction lift of maximum 3.3 metres head.

Pressure calculated in bar:  $3.3 \times 0.0981 = 0.324\text{ bar}$

Pressure calculated in kpa:  $3.3 \times 9.81 = 32.4\text{ kpa}$

Fig.3



#### 4.5 Maximum inlet pressure

Figure 2. (Page 20) shows the maximum permissible inlet pressure. However, the actual inlet pressure+ pressure when the pump is running against a closed valve must always be lower than the maximum permissible operating pressure.

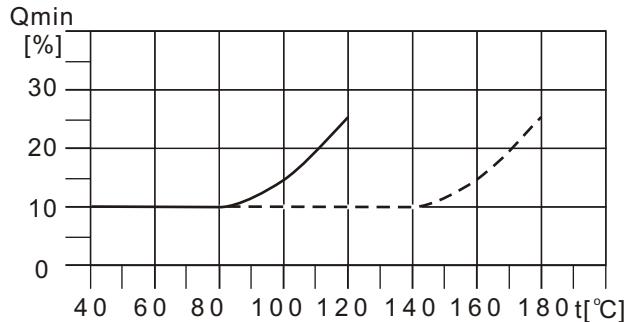
The pumps are pressure-tested at a pressure of 1.5 times the value stated in fig2 (page.20).

#### 4.6 Minimum flow rate

Due to the risk of overheating, the pump should not be used at flows below the minimum flow rate.

The curve below shows the minimum flow rate as a percentage of the nominal flow rate in relation to the liquid temperature.

Fig.4 Air-cooled top.



Note: The pump must never operate against a closed discharge valve.

#### 4.7 Electrical data

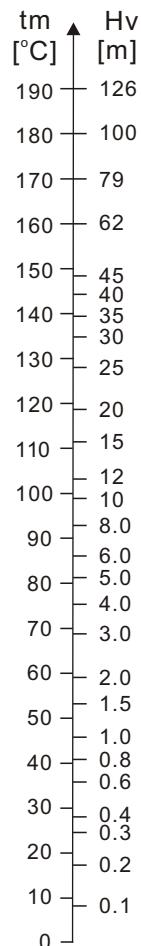
See motor nameplate

#### 4.8 Frequency of starts and stops

Motor up to and including 4kW: Maximum 100 times per hour.

Motors of 5.5kW and up: Maximum 20 timers per hour.

Fig 5: Vaporization Pressure



#### 4.9 Dimensions and weights

Dimensions: See fig. 3 page 21.

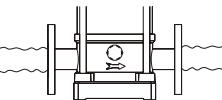
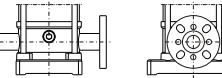
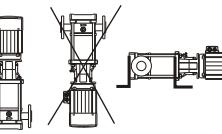
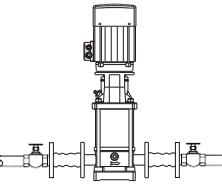
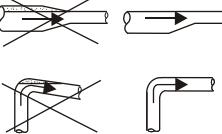
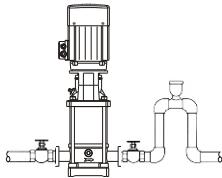
Weights: See label on the packing.

#### 4.10 Sound level

See fig 1

#### 5. Installation

When installing the pump. Follow the procedure below in order to avoid damaging the pump.

Step	Action
	Arrows on the pump base show the direction of flow of liquid through the pump
	Page 21 shows: -Dimension of the base -Pipework connection -Diameter and position of foundation bolts
	The pump can be installed vertically or horizontally. Ensure that an adequate supply of cool air reaches the motor cooling fan. However, the motor must never fall below the horizontal plane.
	To minimize possible noise from the pump, it is advisable to fit expansion joints either side of the pump and anti-vibration mountings between foundation and pump. Isolating valves should be fitted either side of the pump to avoid draining the system if the pump needs to be cleaned, repaired or replaced. The pump must always be protected against backflow by means of a non-return valve (foot valve)
	Install the pipes so that air locks are avoided, especially on the suction side of the pump.
	In the case of installation in which: -The discharge pipe slopes downwards away from the pump. -There is a risk of siphon effect -Protection against backflow of unclean liquids is necessary. A vacuum valve must be fitted close to the pump.
	 The pump is available to install outside, but there is suitable protection.

#### 6. Electrical connection

- The motor should be grounding.
- 
- Before removing the terminal box cover and before any removal/dismantling of the pump, make sure that the electricity supply has been switched off.
- Single phase motor incorporate a thermal protector, Three phase motor must be connected to a motor starter.
- 
- The electrical connection should be carried out by an authorized electrician in accordance with local regulations.

The operating voltage and frequency are marked on the motor nameplate. Make sure that the motor is suitable for the electricity supply on which it will be used.

As standard the terminal box is mounted on the suction side of the pump.

Terminal box can be turned to four positions, in 0°, 90°, 180°, 270°, steps:

- 1.If necessary, remove the coupling guards, Do not remove the coupling.
- 2.Remove the bolts securing the motor to the pump.
- 3.Turn the motor to the required position.
- 4.Replace and tighten the bolts.

5.Replace the coupling guards.

The electrical connection should be carried out as shown in the diagram inside the terminal box cover.

**Table 1: Motor noise**

Motor [kW]	50Hz
	$\bar{L}_{pA}$ [dB(A)]
0.37	53
0.55	53
0.75	53
1.1	55
1.5	58
2.2	58
3.0	59
4.0	66
5.5	73
7.5	73
11	75
15	70
18.5	70
22	69
30	73
37	73
45	73

## 7. Start-up



Read the warning mark before start-up.

Note: Do not start the pump until it has been filled with liquid and vented. If the pump runs dry, the pump bearing and the shaft seal may be damaged.

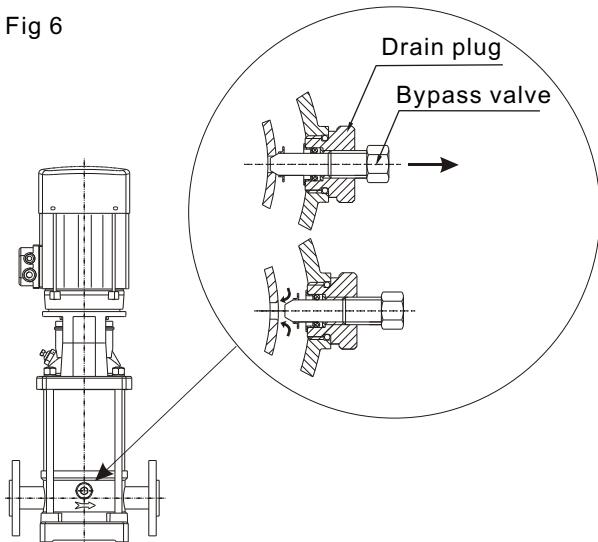


Pay attention to the direction of the vent hole and take care to ensure that the escaping water does not cause injury to persons or damage to the motor or other components. In hot-water installation, special attention should be paid to the risk of injury caused by scalding hot water. Follow the instruction on Page 22.

CV, CVF, CVL 1, 2, 3, 4, 5

For these pumps, it is advisable to open the bypass valve during start-up. The bypass valve connects the suction and discharge sides of the pump, thus making the filling procedure easier. When the operation is stable, the bypass valve can be closed. When pumping liquids containing air, it is advisable to leave the bypass valve open if the operating pressure is lower than 6 bar. If the operating pressure constantly exceeds 6 bar, the bypass valve must be closed. Otherwise the material at the opening will be worn because of the high liquid velocity.

Fig 6



### Check below procedures before starting pump

- Tighten foundation bolt.
- Pump fill with water.
- Voltage is right.
- Turn the motor to the required position.
- All pipes are connect tightening under normal water supply.
- Inlet pipe's valve is open; Outlet valve will be opened after pump starting.
- Heck the working pressure if installed pressure gage.
- Check controller. If pump is controlled by pressure switch, check and adjust on/off pressure. Through pressure switch, check motor's Ampere that no more than admitted Ampere.

## 8. Maintenance



Before starting work on the pump, make sure that all power supplies to the pump have been switched off and that they cannot be accidentally switched on.

Pump bearings and shaft seal are maintenance-free.

### Motor bearing

Motors which are not fitted with grease nipples are maintenance-free. Motor fitted with grease nipples should be lubricated with high-temperature lithium-based grease. See the instruction on the fan cover. In the case of seasonal operation (motor is idle for more than 6 months of the year). It is recommended to grease the motor when the pump is taken out of operation.

Install the pump according to the instruction makes pump work effectively and less maintenance.

-Mechanical seal auto adjust, interface between stationary ring and rotation ring lubricated and cooled by the pumping liquid.

-Sliding bearing lubricated by the pumping liquid.

## 9. Frost protection



Pumps which are not being used during periods of frost should be drained to avoid damage.

Drain the pump by loosening the vent screw in the pump head and by removing the drain plug from the base. Care must be taken to ensure that the escaping water does not cause injury to persons or damage to the motor or other components. In hot-water installations, special attention should be paid to the risk of injury caused by scalding hot water. Do not tighten the vent screw and replace the drain plug until the pump is to be used again.

CV, CVF, CVL 1, 2, 3, 4, 5

Before replacing the drain plug in the base, screw the bypass valve out against the stop. See fig.6. Fill the drain plug by tightening the large union nut followed by the bypass valve.

## 10. Disposal

See the exploded drawing(P25-27)

## 11. Fault finding chart



Before removing the terminal box cover and before any removal/dismantling of the pump. Make sure the electricity supply has been switched off and that it cannot be accidentally switched on.

Fault	Cause	Remedy
Motor does not run when started	<ul style="list-style-type: none"> <li>- Supply failure.</li> <li>- Fuses are blown.</li> <li>- Motor starter overload has tripped out.</li> <li>- Thermal protection has tripped out.</li> <li>- Main contacts in motor starter are not making contact or the coil is faulty</li> <li>- Control circuit is defective.</li> <li>- Motor is defective</li> </ul>	<ul style="list-style-type: none"> <li>- Connect the electricity supply.</li> <li>- Replace fuses.</li> <li>- Reactivate the motor protection.</li> <li>- Reactivate the thermal protection.</li> <li>- Replace contacts or magnetic coil.</li> <li>- Repair the control circuit.</li> <li>- Replace the motor</li> </ul>
Motor starter overload trips out immediately when supply is switched on	<ul style="list-style-type: none"> <li>- One fuse/automatic circuit breaker is blown.</li> <li>- Contacts in motor starter overload are faulty.</li> <li>- Cable connection is loose or faulty.</li> <li>- Motor winding is defective.</li> <li>- Pump mechanically blocked.</li> <li>- Overload setting is too low.</li> </ul>	<ul style="list-style-type: none"> <li>- Cut in the fuse.</li> <li>- Replace motor starter contacts.</li> <li>- Fasten or replace the cable connection.</li> <li>- Replace the motor.</li> <li>- Remove the mechanical blocking of the pump.</li> <li>- Set the motor starter correctly.</li> </ul>
Motor starter overload trips out occasionally.	<ul style="list-style-type: none"> <li>- Overload setting is too low.</li> <li>- Low voltage at peak times.</li> </ul>	<ul style="list-style-type: none"> <li>- Set the motor starter correctly.</li> <li>- Check the electricity supply.</li> </ul>
Motor starter has not tripped out but the pump does not run.	<ul style="list-style-type: none"> <li>- Supply failure.</li> <li>- Fuses are blown.</li> <li>- Thermal protection has tripped out.</li> <li>- Main contacts in motor starter are not making contact or the coil is faulty</li> <li>- Control circuit is defective.</li> </ul>	<ul style="list-style-type: none"> <li>- Connect the electricity supply.</li> <li>- Replace fuses.</li> <li>- Reactivate the thermal protection.</li> <li>- Replace contacts or magnetic coil.</li> <li>- Repair the control circuit.</li> </ul>
Pump capacity not constant	<ul style="list-style-type: none"> <li>- Pump inlet pressure is too low (cavitation).</li> <li>- Suction pipe/pump partly blocked by impurities.</li> <li>- Pump draws in air.</li> </ul>	<ul style="list-style-type: none"> <li>- Check the suction conditions.</li> <li>- Clean the pump or the pump pipe.</li> <li>- Check the suction conditions.</li> </ul>
Pump runs but gives no water	<ul style="list-style-type: none"> <li>- Suction pipe/pump blocked by impurities.</li> <li>- Foot or non-return valve blocked in closed position.</li> <li>- Leakage in suction pipe.</li> <li>- Air in suction pipe or pump.</li> <li>- Motor rotates in the wrong direction.</li> </ul>	<ul style="list-style-type: none"> <li>- Clean the pump or suction pipe.</li> <li>- Repair the foot or non-return valve.</li> <li>- Repair the suction pipe.</li> <li>- Check the suction conditions.</li> <li>- Change the direction of rotation of the motor.</li> </ul>
Pump runs back-wards when switched off.	<ul style="list-style-type: none"> <li>- Leakage in suction pipe.</li> <li>- Foot or non-return valve is defective.</li> </ul>	<ul style="list-style-type: none"> <li>- Repair the suction pipe.</li> <li>- Repair the foot or non-return valve.</li> </ul>
Leakage in shaft seal.	<ul style="list-style-type: none"> <li>- Shaft seal is defective.</li> </ul>	<ul style="list-style-type: none"> <li>- Replace the shaft seal.</li> </ul>
Noise	<ul style="list-style-type: none"> <li>- Cavitation occurs in the pump.</li> <li>- Pump does not rotate freely (frictional resistance) because of the incorrect pump shaft position</li> <li>- System head and pump head ratio too low.</li> <li>- Frequency converter not run</li> </ul>	<ul style="list-style-type: none"> <li>- Check the suction conditions.</li> <li>- Adjust the pump shaft.</li> <li>- Improve system or choose a right pump.</li> <li>- Check the frequency converter operation.</li> </ul>

## 12. Disposal

Disposal of this product or parts of it must be carried out according to the following guidelines:  
Use the local public or private waste collection service.

## 13. Model and Power(50Hz)

Model	Power $P_2$ (kW)	Voltage (V)
CVL 1-2	0.37	1 × 220-240V/3 × 220/380V
CVL 1-3	0.37	1 × 220-240V/3 × 220/380V
CVL 1-4	0.37	1 × 220-240V/3 × 220/380V
CVL 1-5	0.37	1 × 220-240V/3 × 220/380V
CVL 1-6	0.37	1 × 220-240V/3 × 220/380V
CVL 1-7	0.37	1 × 220-240V/3 × 220/380V
CVL 1-8	0.55	1 × 220-240V/3 × 220/380V
CVL 1-9	0.55	1 × 220-240V/3 × 220/380V
CVL 1-10	0.55	1 × 220-240V/3 × 220/380V
CVL 1-11	0.55	1 × 220-240V/3 × 220/380V
CVL 1-12	0.75	1 × 220-240V/3 × 220/380V
CVL 1-13	0.75	1 × 220-240V/3 × 220/380V
CVL 1-15	0.75	1 × 220-240V/3 × 220/380V
CVL 1-17	1.1	1 × 220-240V/3 × 220/380V
CVL 1-19	1.1	1 × 220-240V/3 × 220/380V
CVL 1-21	1.1	1 × 220-240V/3 × 220/380V
CVL 1-23	1.1	1 × 220-240V/3 × 220/380V
CVL 1-25	1.5	1 × 220-240V/3 × 220/380V
CVL 1-27	1.5	1 × 220-240V/3 × 220/380V
CVL 1-30	1.5	1 × 220-240V/3 × 220/380V
CVL 1-33	2.2	1 × 220-240V/3 × 220/380V
CVL 1-36	2.2	1 × 220-240V/3 × 220/380V

Model	Power $P_2$ (kW)	Voltage (V)
CVL 3-2	0.37	1 × 220-240V/3 × 220/380V
CVL 3-3	0.37	1 × 220-240V/3 × 220/380V
CVL 3-4	0.37	1 × 220-240V/3 × 220/380V
CVL 3-5	0.37	1 × 220-240V/3 × 220/380V
CVL 3-6	0.55	1 × 220-240V/3 × 220/380V
CVL 3-7	0.55	1 × 220-240V/3 × 220/380V
CVL 3-8	0.75	1 × 220-240V/3 × 220/380V
CVL 3-9	0.75	1 × 220-240V/3 × 220/380V
CVL 3-10	0.75	1 × 220-240V/3 × 220/380V
CVL 3-11	1.1	1 × 220-240V/3 × 220/380V
CVL 3-12	1.1	1 × 220-240V/3 × 220/380V
CVL 3-13	1.1	1 × 220-240V/3 × 220/380V
CVL 3-15	1.1	1 × 220-240V/3 × 220/380V
CVL 3-17	1.5	1 × 220-240V/3 × 220/380V
CVL 3-19	1.5	1 × 220-240V/3 × 220/380V
CVL 3-21	2.2	1 × 220-240V/3 × 220/380V
CVL 3-23	2.2	1 × 220-240V/3 × 220/380V
CVL 3-25	2.2	1 × 220-240V/3 × 220/380V
CVL 3-27	2.2	1 × 220-240V/3 × 220/380V
CVL 3-29	2.2	1 × 220-240V/3 × 220/380V
CVL 3-31	3.0	3 × 220/380V
CVL 3-33	3.0	3 × 220/380V
CVL 3-36	3.0	3 × 220/380V

## Model and Power(50Hz)

Model	Power P <sub>2</sub> (kW)	Voltage (V)
CVL 5-2	0.37	1×220-240V/3×220/380V
CVL 5-3	0.55	1×220-240V/3×220/380V
CVL 5-4	0.55	1×220-240V/3×220/380V
CVL 5-5	0.75	1×220-240V/3×220/380V
CVL 5-6	1.1	1×220-240V/3×220/380V
CVL 5-7	1.1	1×220-240V/3×220/380V
CVL 5-8	1.1	1×220-240V/3×220/380V
CVL 5-9	1.5	1×220-240V/3×220/380V
CVL 5-10	1.5	1×220-240V/3×220/380V
CVL 5-11	2.2	1×220-240V/3×220/380V
CVL 5-12	2.2	1×220-240V/3×220/380V
CVL 5-13	2.2	1×220-240V/3×220/380V
CVL 5-14	2.2	1×220-240V/3×220/380V
CVL 5-15	2.2	1×220-240V/3×220/380V
CVL 5-16	2.2	1×220-240V/3×220/380V
CVL 5-18	3.0	3×220/380V
CVL 5-20	3.0	3×220/380V
CVL 5-22	4.0	3×380/660V
CVL 5-24	4.0	3×380/660V
CVL 5-26	4.0	3×380/660V
CVL 5-29	4.0	3×380/660V
CVL 5-32	5.5	3×380/660V
CVL 5-36	5.5	3×380/660V

Model	Power P <sub>2</sub> (kW)	Voltage (V)
CVL 10-1	0.37	1×220-240V/3×220/380V
CVL 10-2	0.75	1×220-240V/3×220/380V
CVL 10-3	1.1	1×220-240V/3×220/380V
CVL 10-4	1.5	1×220-240V/3×220/380V
CVL 10-5	2.2	1×220-240V/3×220/380V
CVL 10-6	2.2	1×220-240V/3×220/380V
CVL 10-7	3.0	3×220/380V
CVL 10-8	3.0	3×220/380V
CVL 10-9	3.0	3×220/380V
CVL 10-10	4.0	3×380/660V
CVL 10-12	4.0	3×380/660V
CVL 10-14	5.5	3×380/660V
CVL 10-16	5.5	3×380/660V
CVL 10-18	7.5	3×380/660V
CVL 10-20	7.5	3×380/660V
CVL 10-22	7.5	3×380/660V

Model	Power P <sub>2</sub> (kW)	Voltage (V)
CVL 15-1	1.1	1×220-240V/3×220/380V
CVL 15-2	2.2	1×220-240V/3×220/380V
CVL 15-3	3.0	3×220/380V
CVL 15-4	4.0	3×380/660V
CVL 15-5	4.0	3×380/660V
CVL 15-6	5.5	3×380/660V
CVL 15-7	5.5	3×380/660V
CVL 15-8	7.5	3×380/660V
CVL 15-9	7.5	3×380/660V
CVL 15-10	11	3×380/660V
CVL 15-12	11	3×380/660V
CVL 15-14	11	3×380/660V
CVL 15-17	15	3×380/660V

Model	Power P <sub>2</sub> (kW)	Voltage (V)
CVL 20-1	1.1	1×220-240V/3×220/380V
CVL 20-2	2.2	1×220-240V/3×220/380V
CVL 20-3	4.0	3×380/660V
CVL 20-4	5.5	3×380/660V
CVL 20-5	5.5	3×380/660V
CVL 20-6	7.5	3×380/660V
CVL 20-7	7.5	3×380/660V
CVL 20-8	11	3×380/660V
CVL 20-10	11	3×380/660V
CVL 20-12	15	3×380/660V
CVL 20-14	15	3×380/660V
CVL 20-17	18.5	3×380/660V

## Model and Power(50Hz)

Model	Power $P_2$ (kW)	Voltage (V)
CV(F)1-2	0.37	1 × 220-240V/3 × 220/380V
CV(F)1-3	0.37	1 × 220-240V/3 × 220/380V
CV(F)1-4	0.37	1 × 220-240V/3 × 220/380V
CV(F)1-5	0.37	1 × 220-240V/3 × 220/380V
CV(F)1-6	0.37	1 × 220-240V/3 × 220/380V
CV(F)1-7	0.37	1 × 220-240V/3 × 220/380V
CV(F)1-8	0.55	1 × 220-240V/3 × 220/380V
CV(F)1-9	0.55	1 × 220-240V/3 × 220/380V
CV(F)1-10	0.55	1 × 220-240V/3 × 220/380V
CV(F)1-11	0.55	1 × 220-240V/3 × 220/380V
CV(F)1-12	0.75	1 × 220-240V/3 × 220/380V
CV(F)1-13	0.75	1 × 220-240V/3 × 220/380V
CV(F)1-15	0.75	1 × 220-240V/3 × 220/380V
CV(F)1-17	1.1	1 × 220-240V/3 × 220/380V
CV(F)1-19	1.1	1 × 220-240V/3 × 220/380V
CV(F)1-21	1.1	1 × 220-240V/3 × 220/380V
CV(F)1-23	1.1	1 × 220-240V/3 × 220/380V
CV(F)1-25	1.5	1 × 220-240V/3 × 220/380V
CV(F)1-27	1.5	1 × 220-240V/3 × 220/380V
CV(F)1-30	1.5	1 × 220-240V/3 × 220/380V
CV(F)1-33	2.2	1 × 220-240V/3 × 220/380V
CV(F)1-36	2.2	1 × 220-240V/3 × 220/380V

Model	Power $P_2$ (kW)	Voltage (V)
CV(F)3-2	0.37	1 × 220-240V/3 × 220/380V
CV(F)3-3	0.37	1 × 220-240V/3 × 220/380V
CV(F)3-4	0.37	1 × 220-240V/3 × 220/380V
CV(F)3-5	0.37	1 × 220-240V/3 × 220/380V
CV(F)3-6	0.55	1 × 220-240V/3 × 220/380V
CV(F)3-7	0.55	1 × 220-240V/3 × 220/380V
CV(F)3-8	0.75	1 × 220-240V/3 × 220/380V
CV(F)3-9	0.75	1 × 220-240V/3 × 220/380V
CV(F)3-10	0.75	1 × 220-240V/3 × 220/380V
CV(F)3-11	1.1	1 × 220-240V/3 × 220/380V
CV(F)3-12	1.1	1 × 220-240V/3 × 220/380V
CV(F)3-13	1.1	1 × 220-240V/3 × 220/380V
CV(F)3-15	1.1	1 × 220-240V/3 × 220/380V
CV(F)3-17	1.5	1 × 220-240V/3 × 220/380V
CV(F)3-19	1.5	1 × 220-240V/3 × 220/380V
CV(F)3-21	2.2	1 × 220-240V/3 × 220/380V
CV(F)3-23	2.2	1 × 220-240V/3 × 220/380V
CV(F)3-25	2.2	1 × 220-240V/3 × 220/380V
CV(F)3-27	2.2	1 × 220-240V/3 × 220/380V
CV(F)3-29	2.2	1 × 220-240V/3 × 220/380V
CV(F)3-31	3.0	3 × 220/380V
CV(F)3-33	3.0	3 × 220/380V
CV(F)3-36	3.0	3 × 220/380V

## Model and Power(50Hz)

Model	Power P <sub>2</sub> (kW)	Voltage (V)
CV(F)5-2	0.37	1×220-240V/3×220/380V
CV(F)5-3	0.55	1×220-240V/3×220/380V
CV(F)5-4	0.55	1×220-240V/3×220/380V
CV(F)5-5	0.75	1×220-240V/3×220/380V
CV(F)5-6	1.1	1×220-240V/3×220/380V
CV(F)5-7	1.1	1×220-240V/3×220/380V
CV(F)5-8	1.1	1×220-240V/3×220/380V
CV(F)5-9	1.5	1×220-240V/3×220/380V
CV(F)5-10	1.5	1×220-240V/3×220/380V
CV(F)5-11	2.2	1×220-240V/3×220/380V
CV(F)5-12	2.2	1×220-240V/3×220/380V
CV(F)5-13	2.2	1×220-240V/3×220/380V
CV(F)5-14	2.2	1×220-240V/3×220/380V
CV(F)5-15	2.2	1×220-240V/3×220/380V
CV(F)5-16	2.2	1×220-240V/3×220/380V
CV(F)5-18	3.0	3×220/380V
CV(F)5-20	3.0	3×220/380V
CV(F)5-22	4.0	3×380/660V
CV(F)5-24	4.0	3×380/660V
CV(F)5-26	4.0	3×380/660V
CV(F)5-29	4.0	3×380/660V
CV(F)5-32	5.5	3×380/660V
CV(F)5-36	5.5	3×380/660V

Model	Power P <sub>2</sub> (kW)	Voltage (V)
CV(F)10-1	0.37	1×220-240V/3×220/380V
CV(F)10-2	0.75	1×220-240V/3×220/380V
CV(F)10-3	1.1	1×220-240V/3×220/380V
CV(F)10-4	1.5	1×220-240V/3×220/380V
CV(F)10-5	2.2	1×220-240V/3×220/380V
CV(F)10-6	2.2	1×220-240V/3×220/380V
CV(F)10-7	3.0	3×220/380V
CV(F)10-8	3.0	3×220/380V
CV(F)10-9	3.0	3×220/380V
CV(F)10-10	4.0	3×380/660V
CV(F)10-12	4.0	3×380/660V
CV(F)10-14	5.5	3×380/660V
CV(F)10-16	5.5	3×380/660V
CV(F)10-18	7.5	3×380/660V
CV(F)10-20	7.5	3×380/660V
CV(F)10-22	7.5	3×380/660V

Model	Power P <sub>2</sub> (kW)	Voltage (V)
CV(F)15-1	1.1	1×220-240V/3×220/380V
CV(F)15-2	2.2	1×220-240V/3×220/380V
CV(F)15-3	3.0	3×220/380V
CV(F)15-4	4.0	3×380/660V
CV(F)15-5	4.0	3×380/660V
CV(F)15-6	5.5	3×380/660V
CV(F)15-7	5.5	3×380/660V
CV(F)15-8	7.5	3×380/660V
CV(F)15-9	7.5	3×380/660V
CV(F)15-10	11	3×380/660V
CV(F)15-12	11	3×380/660V
CV(F)15-14	11	3×380/660V
CV(F)15-17	15	3×380/660V

Model	Power P <sub>2</sub> (kW)	Voltage (V)
CV(F)20-1	1.1	1×220-240V/3×220/380V
CV(F)20-2	2.2	1×220-240V/3×220/380V
CV(F)20-3	4.0	3×380/660V
CV(F)20-4	5.5	3×380/660V
CV(F)20-5	5.5	3×380/660V
CV(F)20-6	7.5	3×380/660V
CV(F)20-7	7.5	3×380/660V
CV(F)20-8	11	3×380/660V
CV(F)20-10	11	3×380/660V
CV(F)20-12	15	3×380/660V
CV(F)20-14	15	3×380/660V
CV(F)20-17	18.5	3×380/660V

## Model and Power(50Hz)

Model	Power P <sub>2</sub> (kW)	Voltage (V)
CV(F)32-1-1	1.5	3 × 220/380V
CV(F)32-1	2.2	3 × 220/380V
CV(F)32-2-2	3.0	3 × 220/380V
CV(F)32-2	4.0	3 × 380/660V
CV(F)32-3-2	5.5	3 × 380/660V
CV(F)32-3	5.5	3 × 380/660V
CV(F)32-4-2	7.5	3 × 380/660V
CV(F)32-4	7.5	3 × 380/660V
CV(F)32-5-2	11	3 × 380/660V
CV(F)32-5	11	3 × 380/660V
CV(F)32-6-2	11	3 × 380/660V
CV(F)32-6	11	3 × 380/660V
CV(F)32-7-2	15	3 × 380/660V
CV(F)32-7	15	3 × 380/660V
CV(F)32-8-2	15	3 × 380/660V
CV(F)32-8	15	3 × 380/660V
CV(F)32-9-2	18.5	3 × 380/660V
CV(F)32-9	18.5	3 × 380/660V
CV(F)32-10-2	18.5	3 × 380/660V
CV(F)32-10	18.5	3 × 380/660V
CV(F)32-11-2	22	3 × 380/660V
CV(F)32-11	22	3 × 380/660V
CV(F)32-12-2	22	3 × 380/660V
CV(F)32-12	22	3 × 380/660V
CV(F)32-13-2	30	3 × 380/660V
CV(F)32-13	30	3 × 380/660V
CV(F)32-14-2	30	3 × 380/660V
CV(F)32-14	30	3 × 380/660V

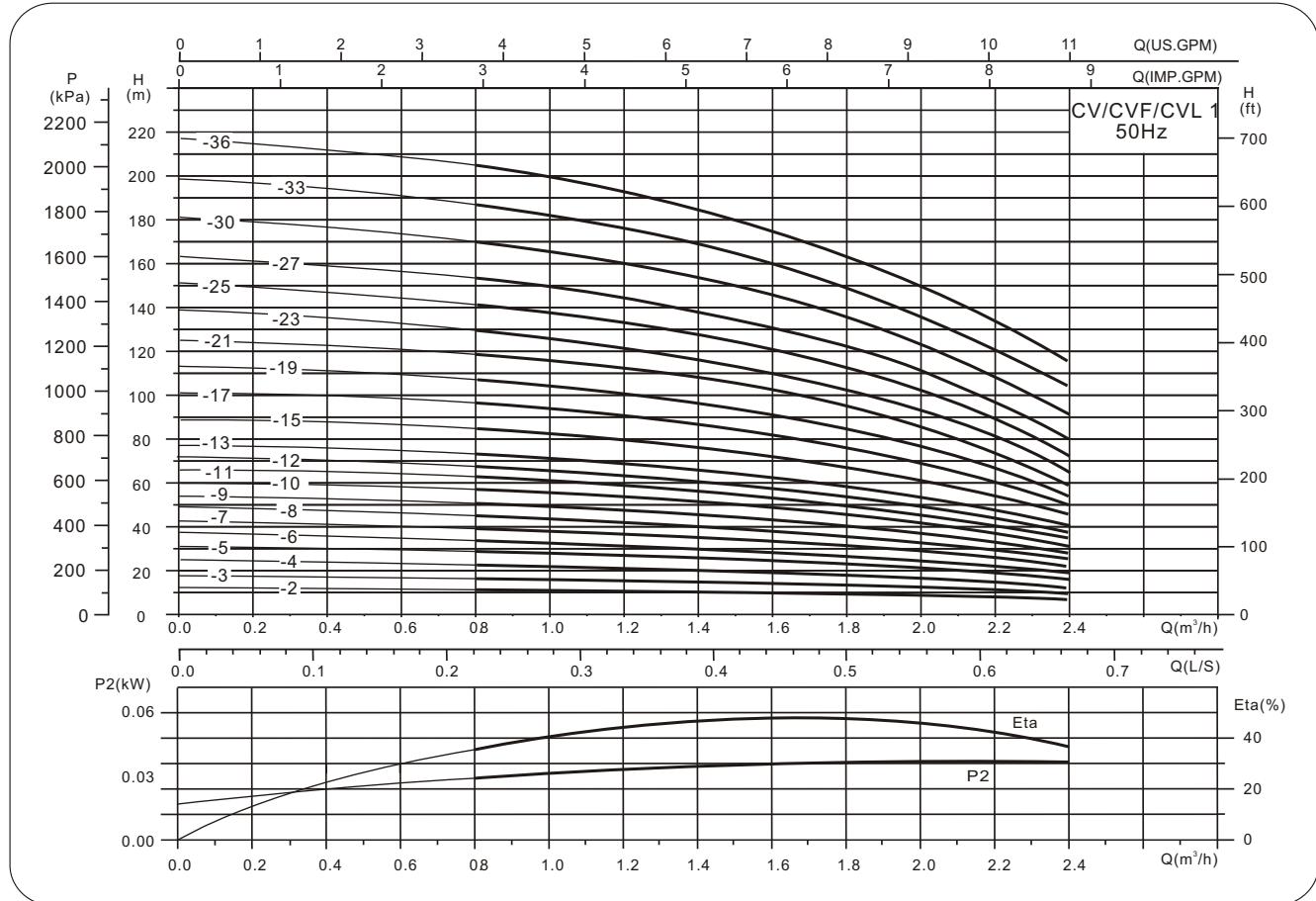
Model	Power P <sub>2</sub> (kW)	Voltage (V)
CV(F)45-1-1	3.0	3 × 220/380V
CV(F)45-1	4.0	3 × 380/660V
CV(F)45-2-2	5.5	3 × 380/660V
CV(F)45-2	7.5	3 × 380/660V
CV(F)45-3-2	11	3 × 380/660V
CV(F)45-3	11	3 × 380/660V
CV(F)45-4-2	15	3 × 380/660V
CV(F)45-4	15	3 × 380/660V
CV(F)45-5-2	18.5	3 × 380/660V
CV(F)45-5	18.5	3 × 380/660V
CV(F)45-6-2	22	3 × 380/660V
CV(F)45-6	22	3 × 380/660V
CV(F)45-7-2	30	3 × 380/660V
CV(F)45-7	30	3 × 380/660V
CV(F)45-8-2	30	3 × 380/660V
CV(F)45-8	30	3 × 380/660V
CV(F)45-9-2	30	3 × 380/660V
CV(F)45-9	37	3 × 380/660V
CV(F)45-10-2	37	3 × 380/660V
CV(F)45-10	37	3 × 380/660V
CV(F)45-11-2	45	3 × 380/660V
CV(F)45-11	45	3 × 380/660V
CV(F)45-12-2	45	3 × 380/660V
CV(F)45-12	45	3 × 380/660V
CV(F)45-13-2	45	3 × 380/660V

## Model and Power(50Hz)

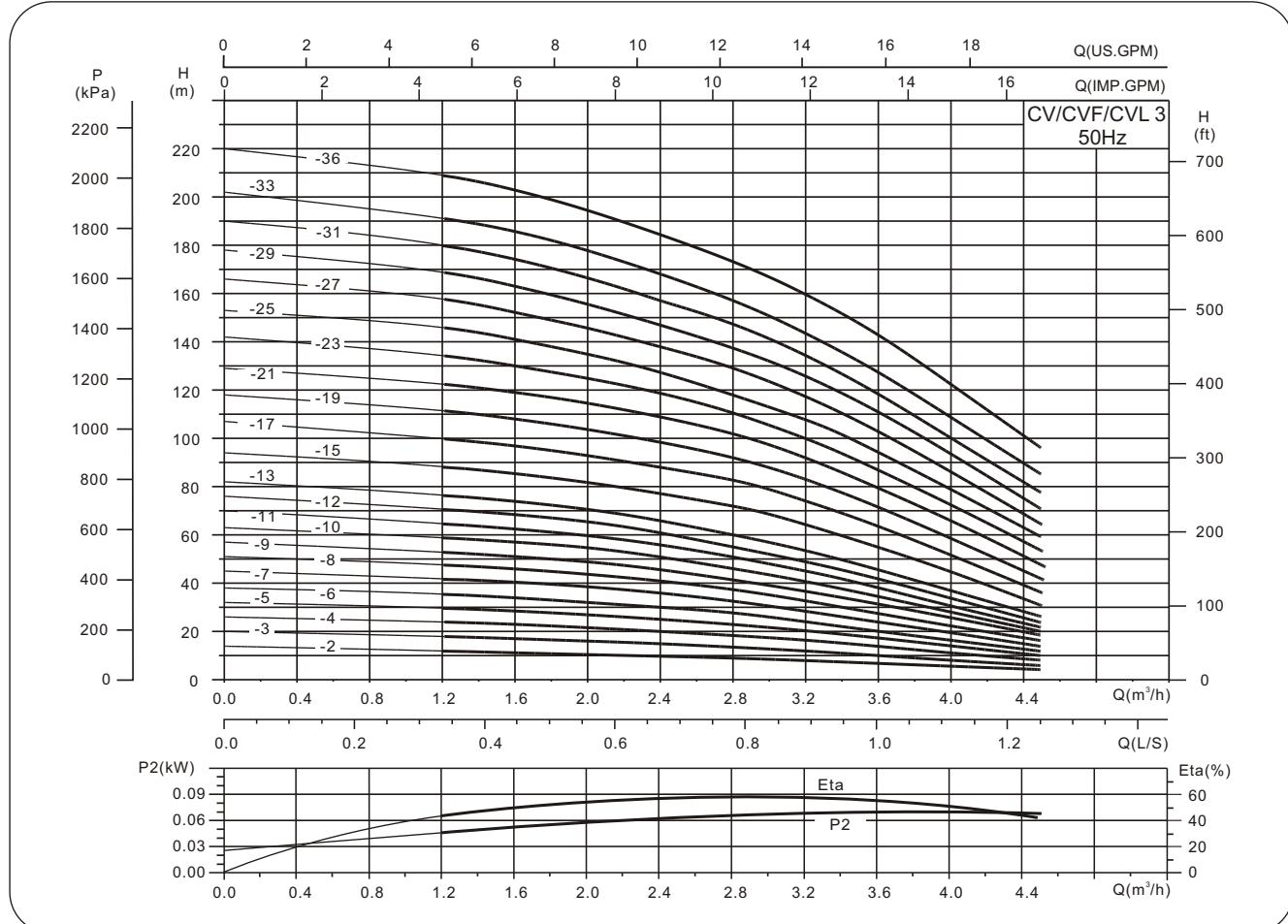
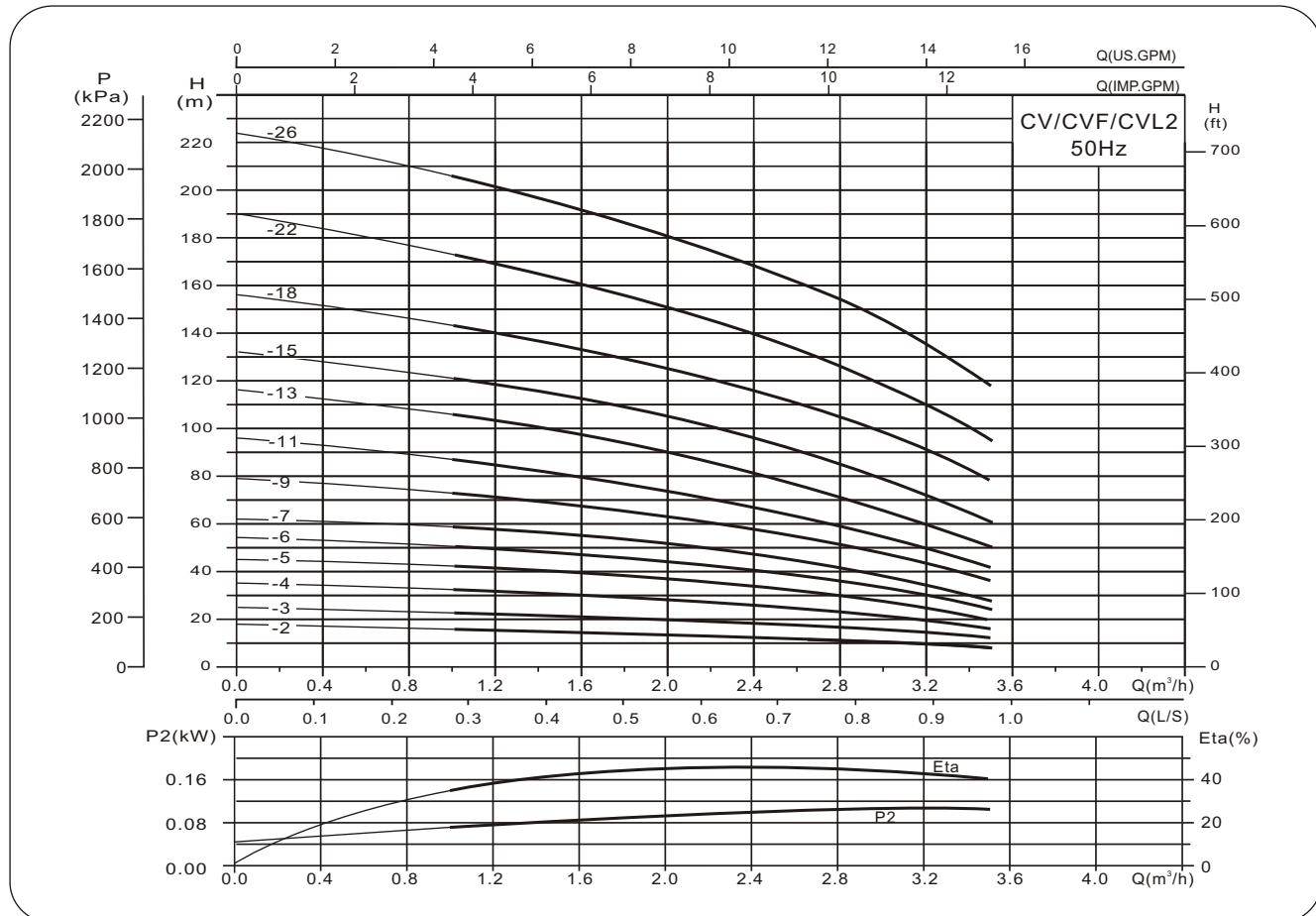
Model	Power $P_2$ (kW)	Voltage (V)
CV(F)64-1-1	4.0	$3 \times 380/660V$
CV(F)64-1	5.5	$3 \times 380/660V$
CV(F)64-2-2	7.5	$3 \times 380/660V$
CV(F)64-2-1	11	$3 \times 380/660V$
CV(F)64-2	11	$3 \times 380/660V$
CV(F)64-3-2	15	$3 \times 380/660V$
CV(F)64-3-1	15	$3 \times 380/660V$
CV(F)64-3	18.5	$3 \times 380/660V$
CV(F)64-4-2	18.5	$3 \times 380/660V$
CV(F)64-4-1	22	$3 \times 380/660V$
CV(F)64-4	22	$3 \times 380/660V$
CV(F)64-5-2	30	$3 \times 380/660V$
CV(F)64-5-1	30	$3 \times 380/660V$
CV(F)64-5	30	$3 \times 380/660V$
CV(F)64-6-2	30	$3 \times 380/660V$
CV(F)64-6-1	37	$3 \times 380/660V$
CV(F)64-6	37	$3 \times 380/660V$
CV(F)64-7-2	37	$3 \times 380/660V$
CV(F)64-7-1	37	$3 \times 380/660V$
CV(F)64-7	45	$3 \times 380/660V$
CV(F)64-8-2	45	$3 \times 380/660V$
CV(F)64-8-1	45	$3 \times 380/660V$

Model	Power $P_2$ (kW)	Voltage (V)
CV(F)90-1-1	5.5	$3 \times 380/660V$
CV(F)90-1	7.5	$3 \times 380/660V$
CV(F)90-2-2	11	$3 \times 380/660V$
CV(F)90-2	15	$3 \times 380/660V$
CV(F)90-3-2	18.5	$3 \times 380/660V$
CV(F)90-3	22	$3 \times 380/660V$
CV(F)90-4-2	30	$3 \times 380/660V$
CV(F)90-4	30	$3 \times 380/660V$
CV(F)90-5-2	37	$3 \times 380/660V$
CV(F)90-5	37	$3 \times 380/660V$
CV(F)90-6-2	45	$3 \times 380/660V$
CV(F)90-6	45	$3 \times 380/660V$

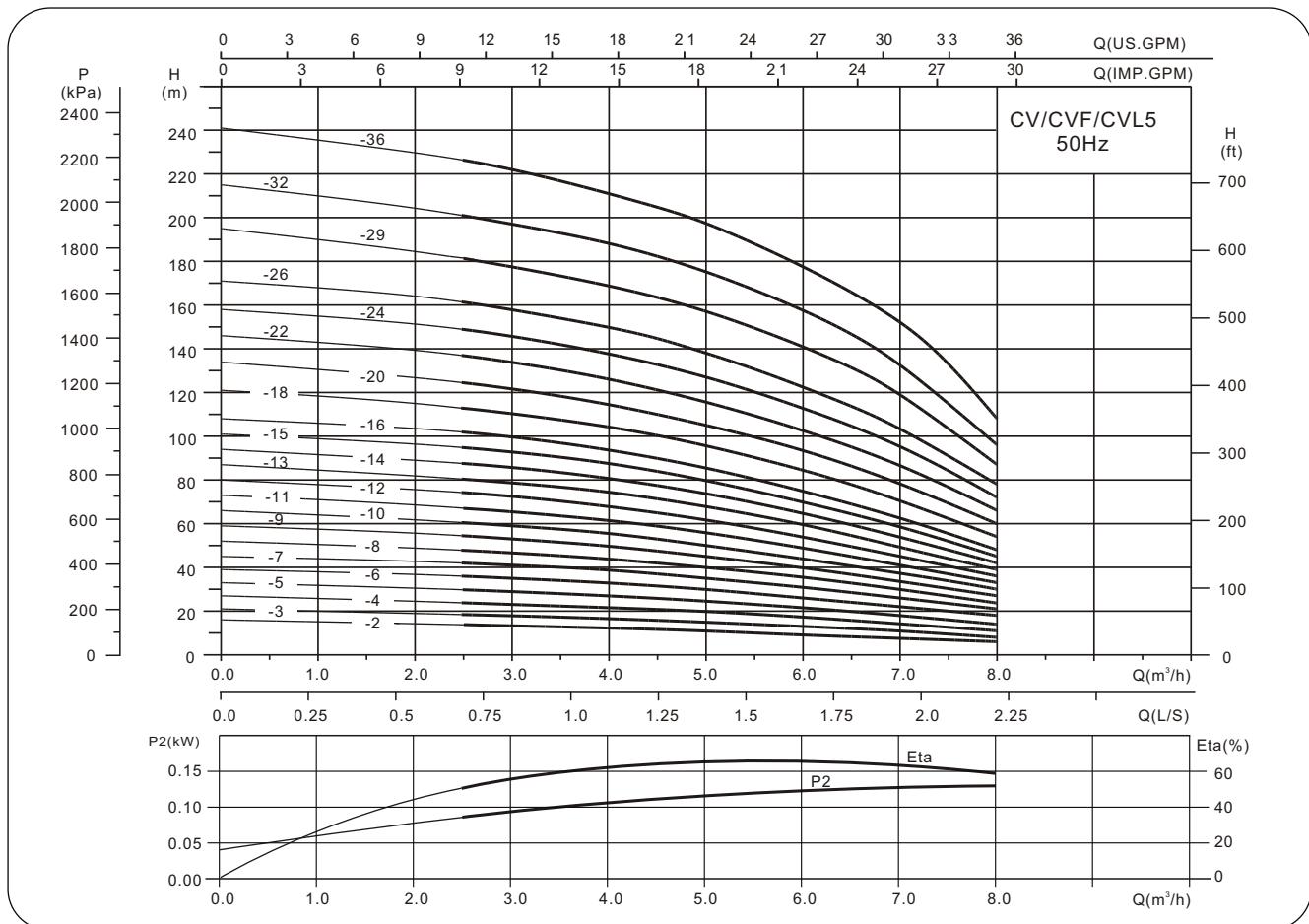
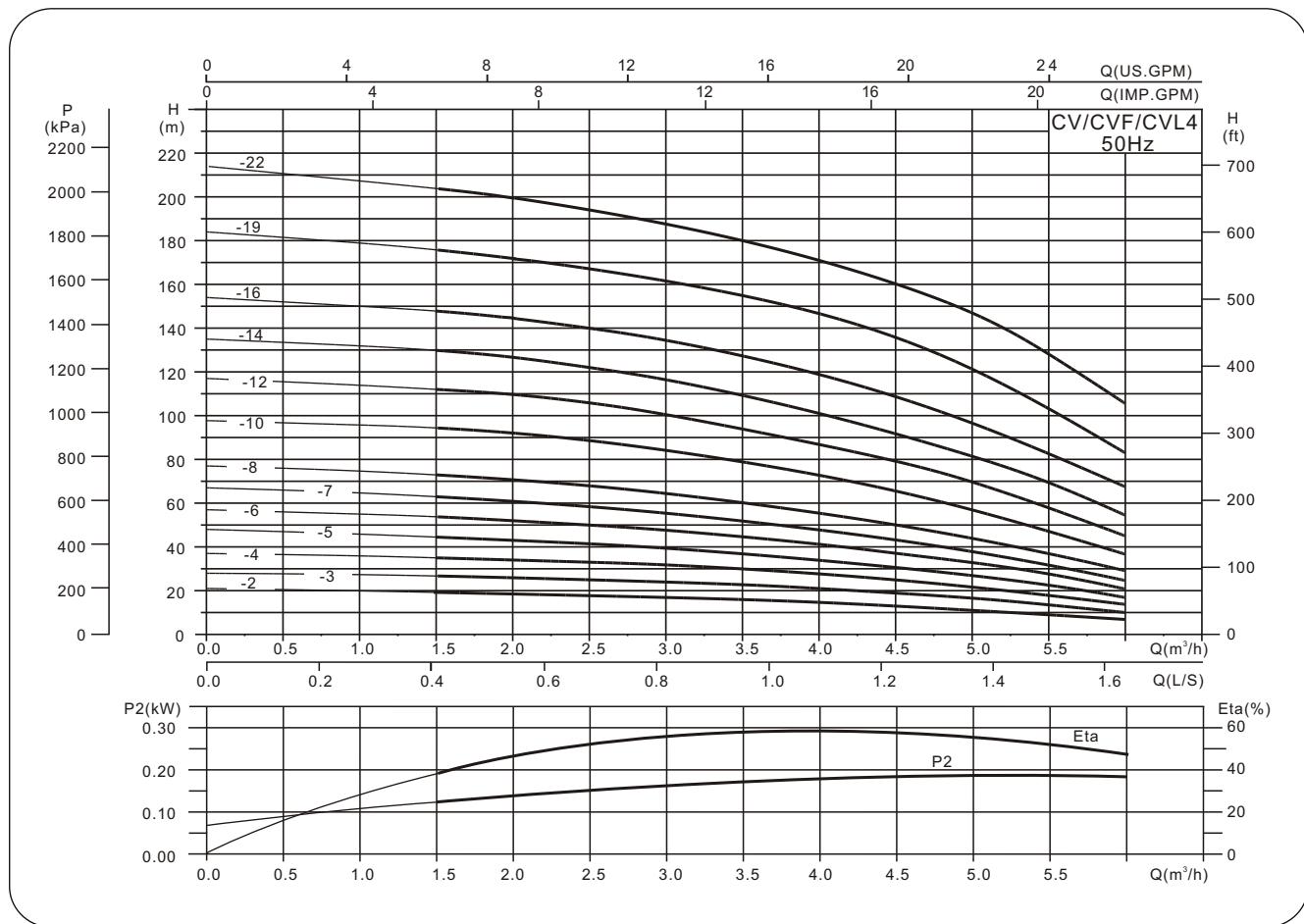
## 14.Pump performance curve



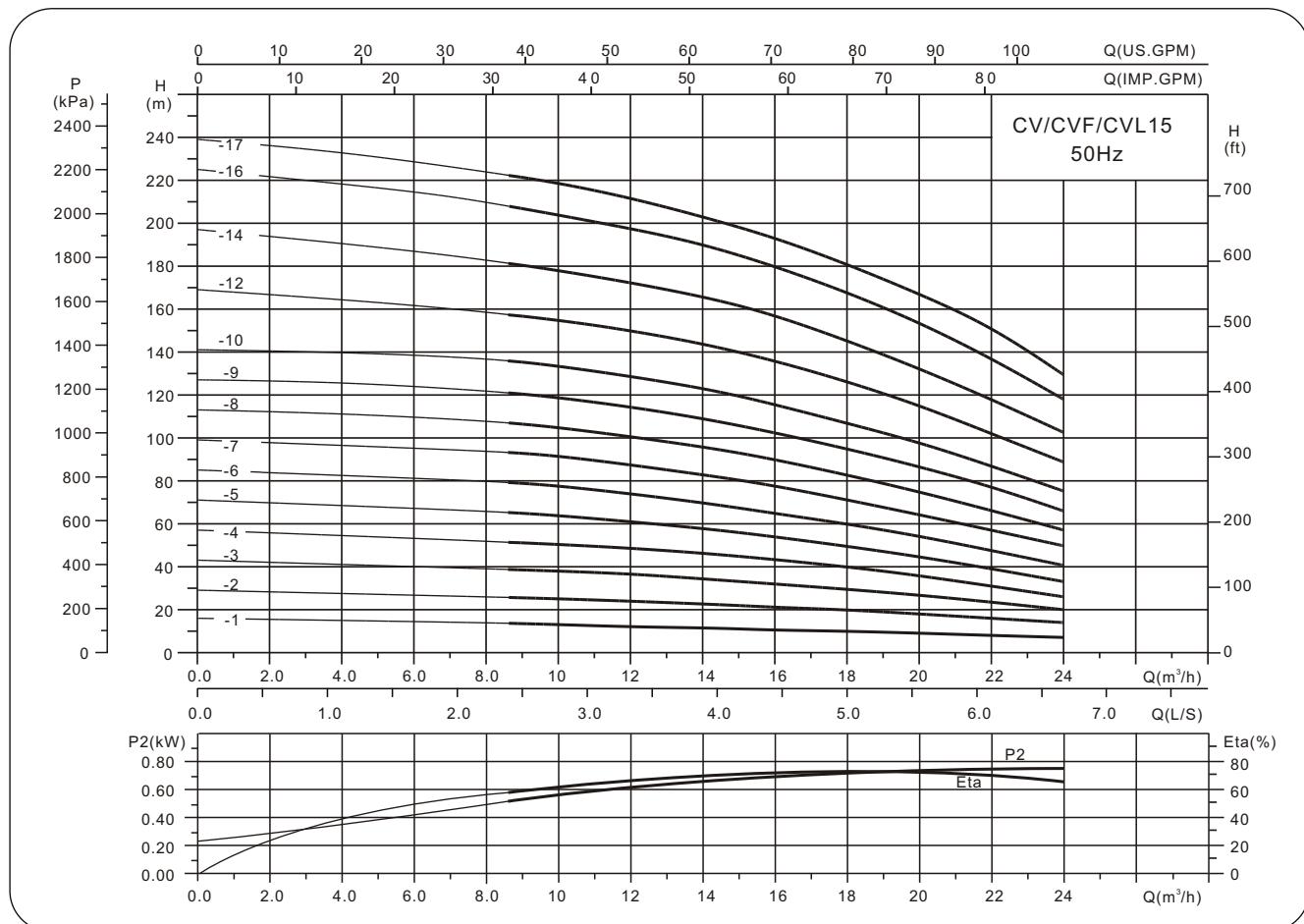
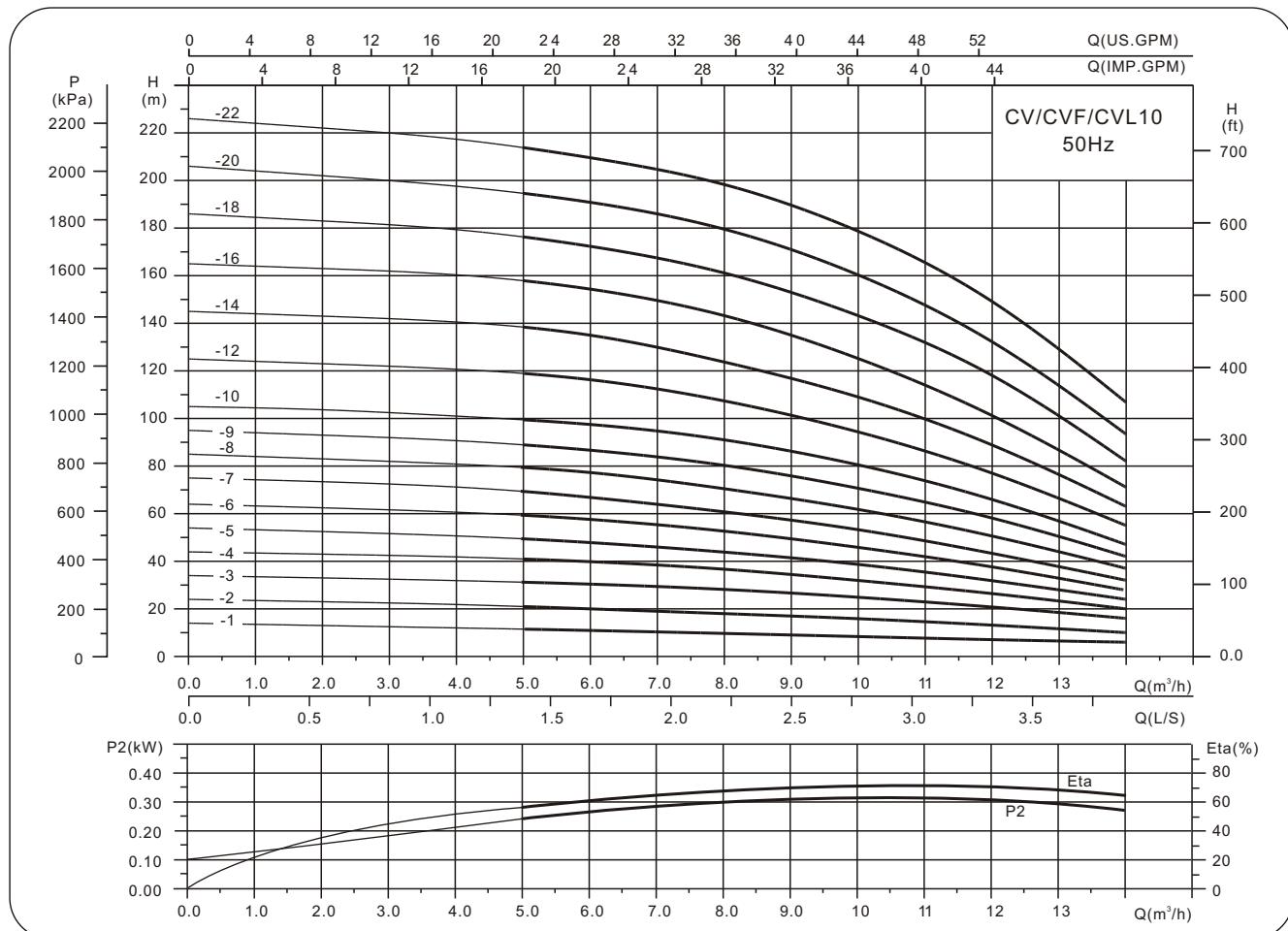
## Pump performance curve



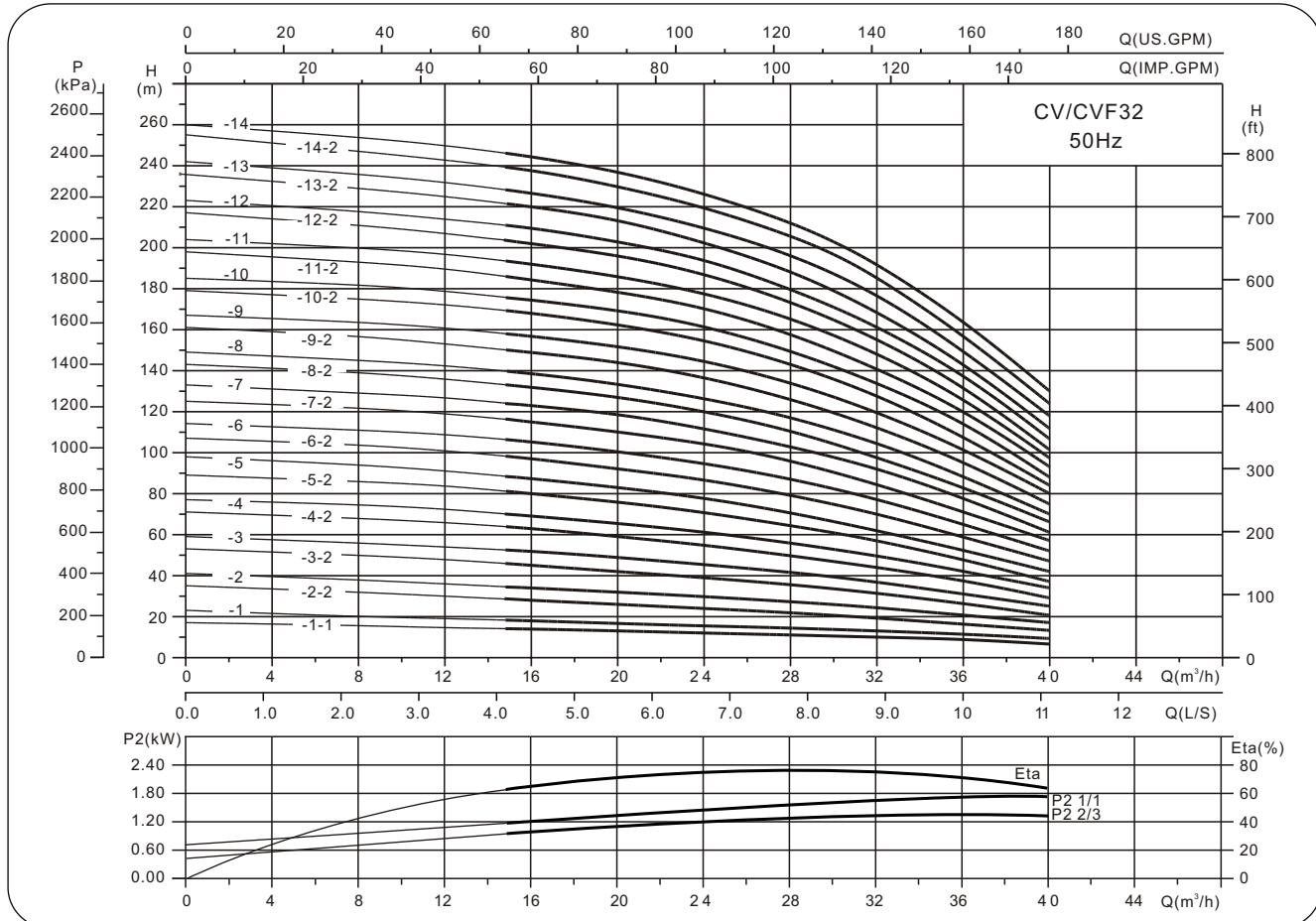
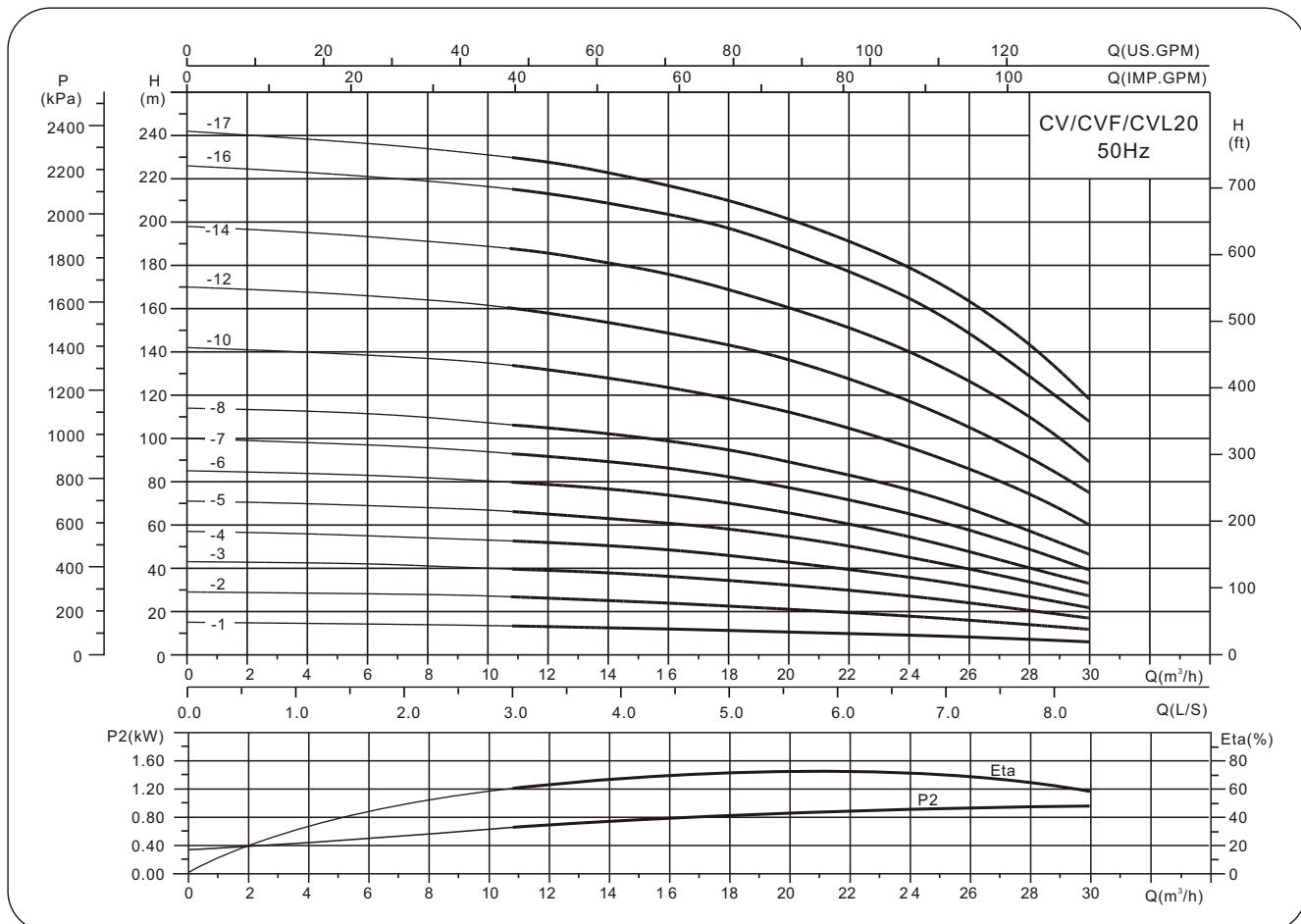
## Pump performance curve



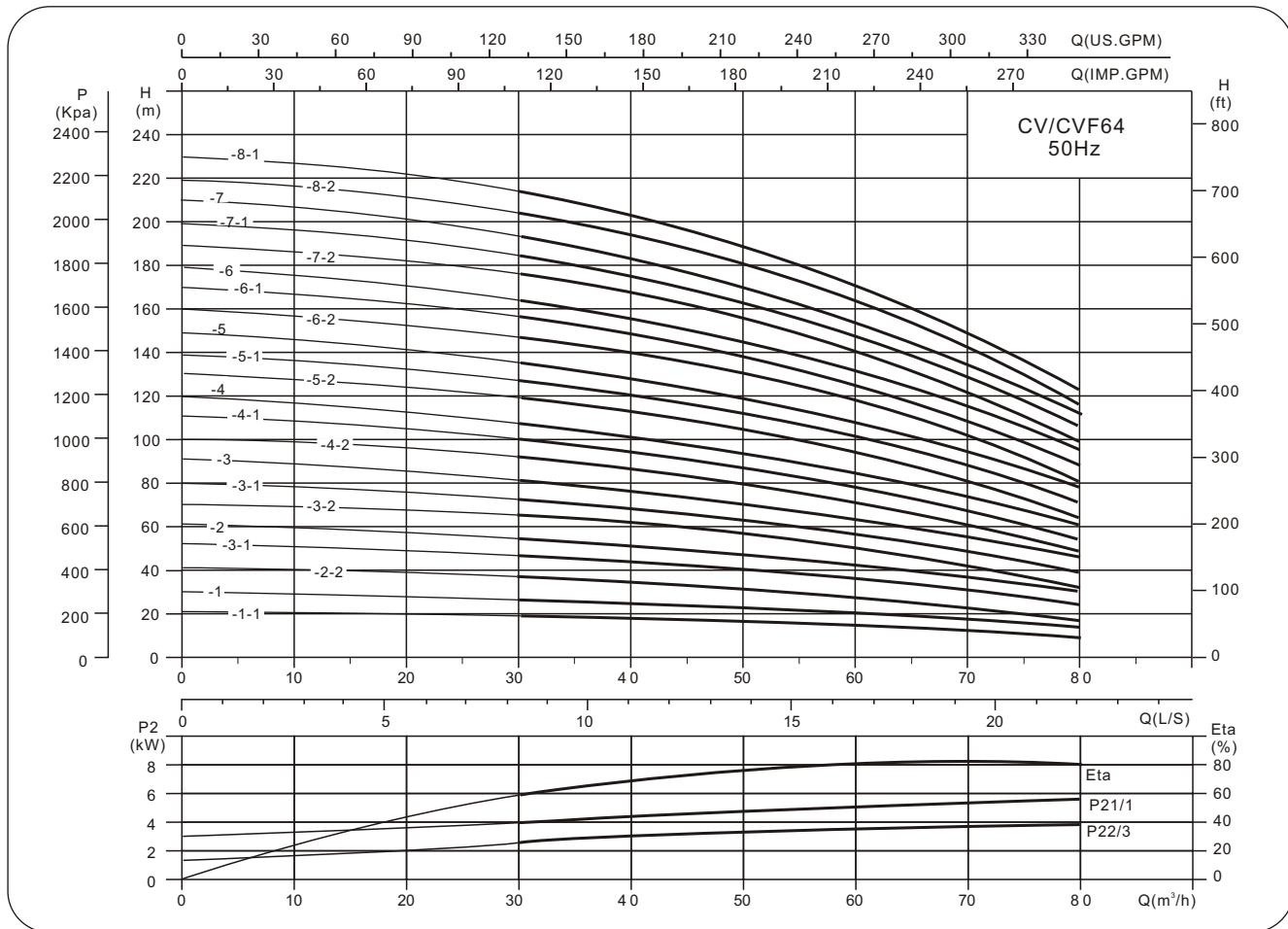
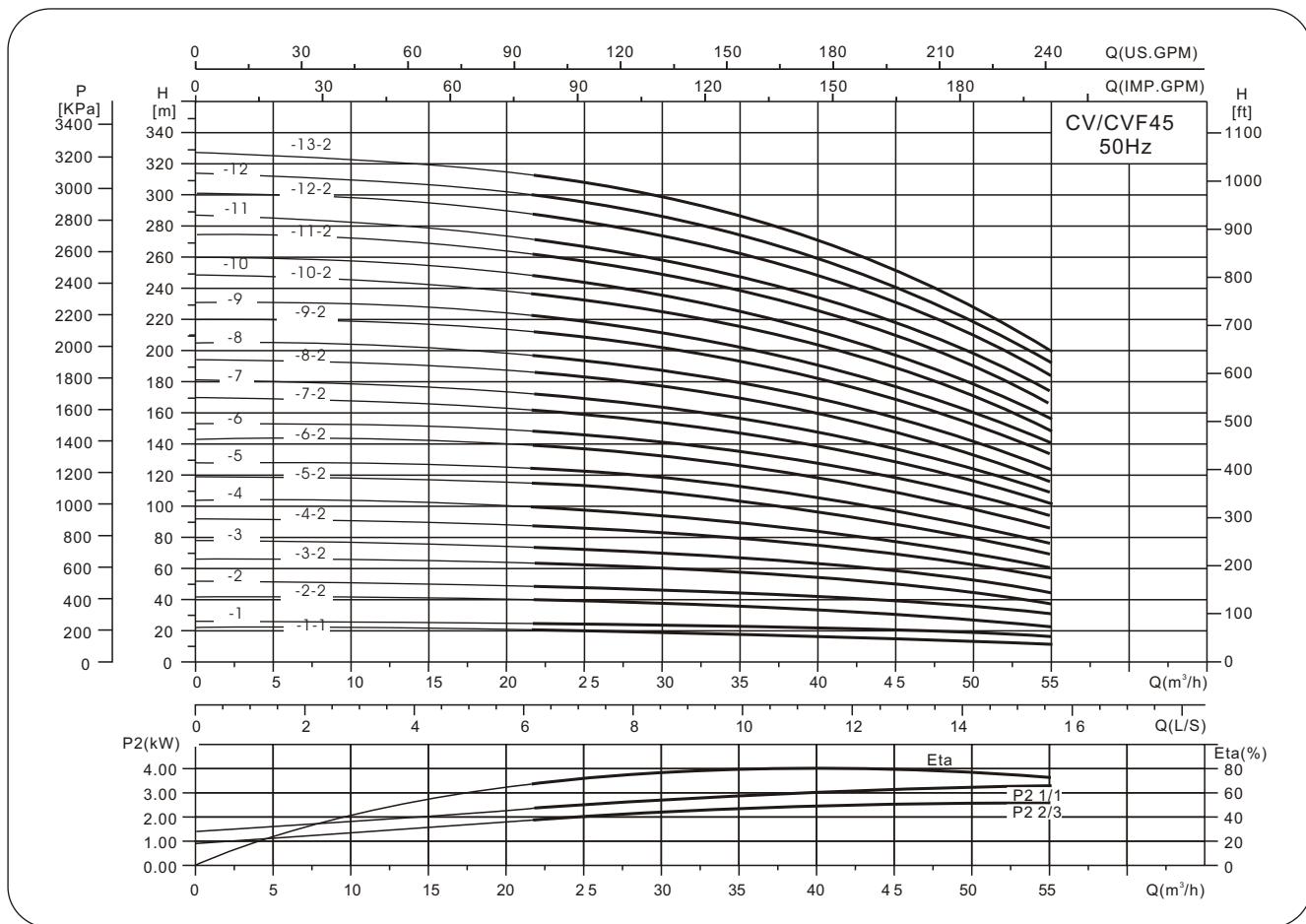
## Pump performance curve



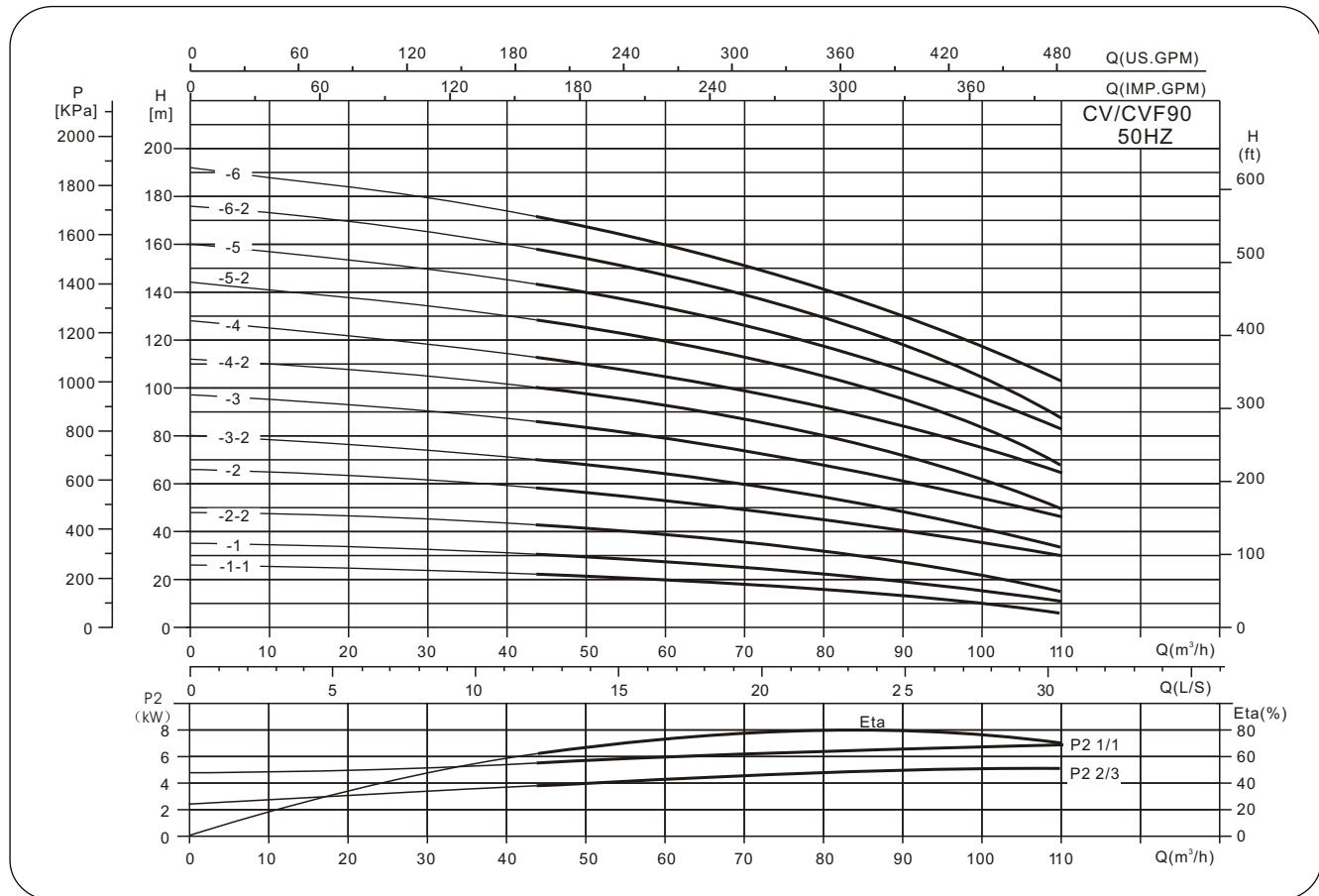
## Pump performance curve



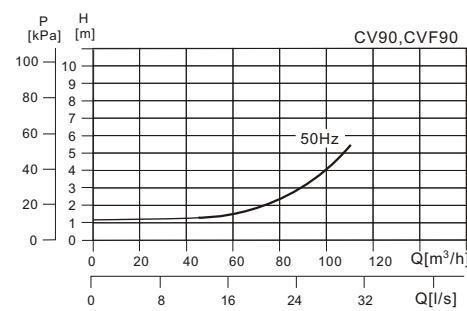
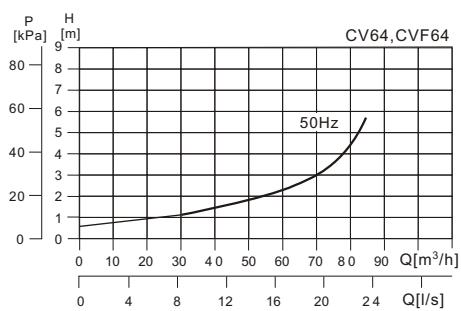
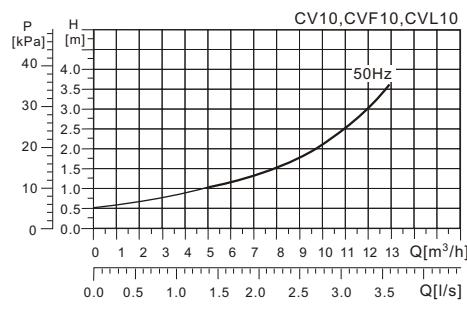
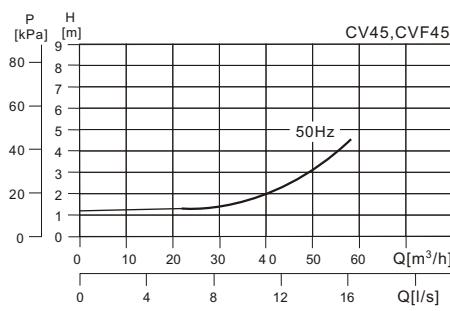
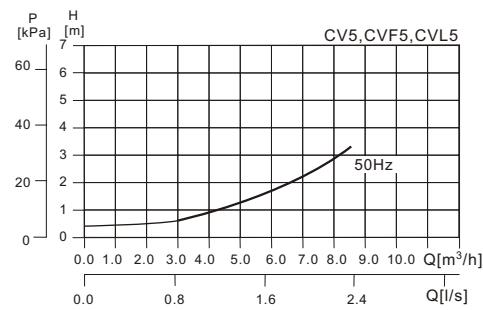
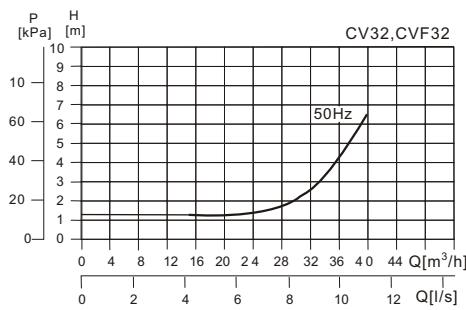
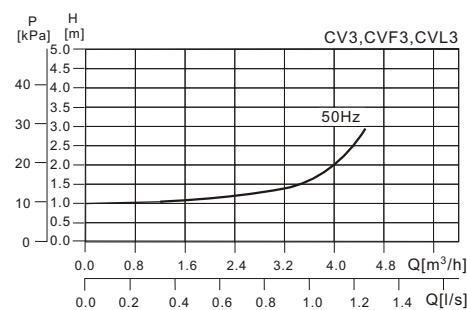
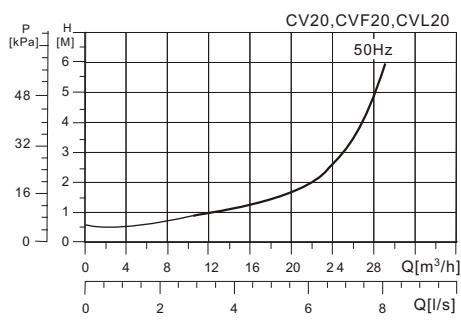
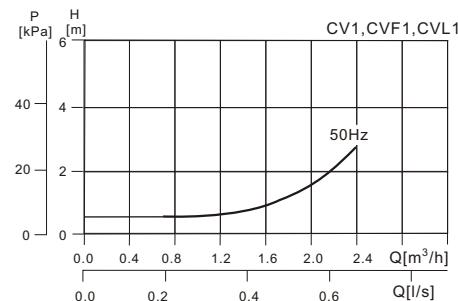
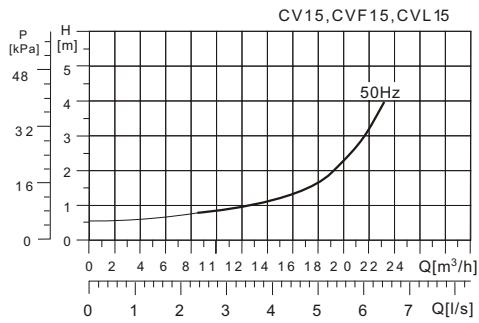
## Pump performance curve



## Pump performance curve

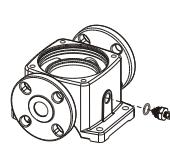


## 15.NPSH performance curve

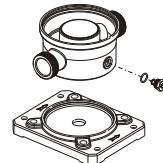


**Sheet 1****Maximum permissible operating pressure and liquid temperature range**

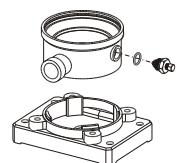
DIN-FGJ



UNION



PJE



	Max. permissible operating pressure	Liquid temperature range
CV,CVF,CVL1	25bar	-20 °Cto+104 °C
CV,CVF,CVL2	25bar	-20 °Cto+104 °C
CV,CVF,CVL3	25bar	-20 °Cto+104 °C
CV,CVF,CVL4	25bar	-20 °Cto+104 °C
CV,CVF,CVL5	25bar	-20 °Cto+104 °C
CV,CVF,CVL10-1→CV,CVF,CVL10-16	16bar	-20 °Cto+104 °C
CV,CVF,CVL10-17→CV,CVF,CVL10-22	22bar	-20 °Cto+104 °C
CV,CVF,CVL15-1→ CV,CVF,CVL15-10	16bar	-20 °Cto+104 °C
CV,CVF,CVL15-12→CV,CVF,CVL15-17	25bar	-20 °Cto+104 °C
CV,CVF,CVL20-1→ CV,CVF,CVL20-10	16bar	-20 °Cto+104 °C
CV,CVF,CVL20-12→ CV,CVF,CVL20-17	16bar	-20 °Cto+104 °C
CV,CVF32-1-1→ CV,CVF32-7	16bar	-20 °Cto+104 °C
CV,CVF32-8-2→CV,CVF32-12	25bar	-20 °Cto+104 °C
CV,CVF32-13-2→CV,CVF32-14	30bar	-20 °Cto+104 °C
CV,CVF45-1-1→CV,CVF45-5	16bar	-20 °Cto+104 °C
CV,CVF45-6-2→CV,CVF45-9	25bar	-20 °Cto+104 °C
CV,CVF45-10-2→CV,CVF45-13-2	33bar	-20 °Cto+104 °C
CV,CVF64-1-1→CV,CVF64-5	16bar	-20 °Cto+104 °C
CV,CVF64-6-2→CV,CVF-64-8-1	25bar	-20 °Cto+104 °C
CV,CVF90-1-1→CV,CVF90-4	16bar	-20 °Cto+104 °C
CV,CVF90-5-2→CV,CVF90-6	25bar	-20 °Cto+104 °C

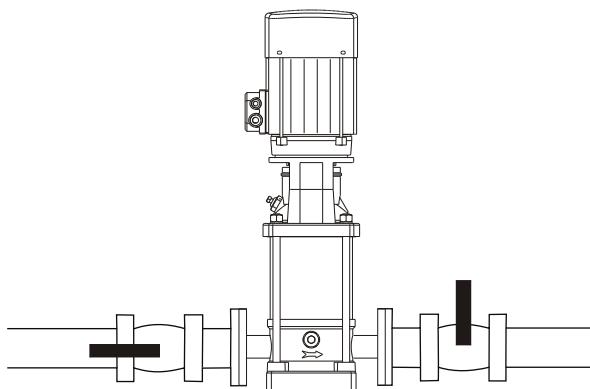
**Sheet 2**  
**CV,CVF and CVL maximum inlet pressure**

<b>50HZ</b>	
<b>CV,CVF,CVL 1</b>	
CV,CVF,CVL1-2 → CV,CVF,CVL1-36	10bar
<b>CV,CVF,CVL 2</b>	
CV,CVF,CVL2-2 → CV,CVF,CVL2-26	10bar
<b>CV,CVF,CVL 3</b>	
CV,CVF,CVL3-2 → CV,CVF,CVL3-29	10bar
CV,CVF,CVL3-31 → CV,CVF,CVL3-36	15bar
<b>CV,CVF,CVL 4</b>	
CV,CVF,CVL4-2 → CV,CVF,CVL4-22	15bar
<b>CV,CVF,CVL 5</b>	
CV,CVF,CVL5-2 → CV,CVF,CVL5-16	10bar
CV,CVF,CVL5-18 → CV,CVF,CVL5-36	15bar
<b>CV,CVF,CVL 10</b>	
CV,CVF,CVL10-1 → CV,CVF,CVL10-6	8bar
CV,CVF,CVL10-7 → CV,CVF,CVL10-22	10bar
<b>CV,CVF,CVL 15</b>	
CV,CVF,CVL15-1 → CV,CVF,CVL15-3	8bar
CV,CVF,CVL15-4 → CV,CVF,CVL15-17	10bar
<b>CV,CVF,CVL20</b>	
CV,CVF,CVL20-1 → CV,CVF,CVL20-3	8bar
CV,CVF,CVL20-4 → CV,CVF,CVL20-17	10bar
<b>CV,CVF32</b>	
CV,CVF32-1-1→ CV,CVF32-4	4bar
CV,CVF32-5-2→ CV,CVF32-10	10bar
CV,CVF32-11-2→ CV,CVF32-14	15bar
<b>CV,CVF45</b>	
CV,CVF45-1-1→ CV,CVF45-2	4bar
CV,CVF45-3-2→ CV,CVF45-5	10bar
CV,CVF45-6-2→ CV,CVF5-13-2	15bar
<b>CV,CVF64</b>	
CV,CVF64-1-1→ CV,CVF64-2-2	4bar
CV,CVF64-2-1→ CV,CVF64-4-2	10bar
CV,CVF64-4-1→ CV,CVF64-8-1	15bar
<b>CV,CVF90</b>	
CV,CVF90-1-1→ CV,CVF90-1	4bar
CV,CVF90-2-2→ CV,CVF90-2-3	10bar
CV,CVF90-3→ CV,CVF90-6	15bar

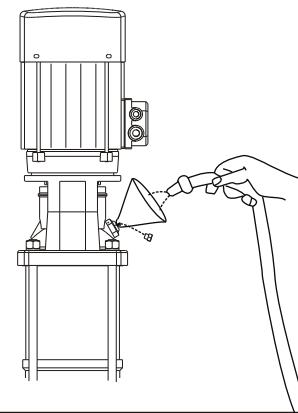
	(PJE)			(UNION)			(DIN-FGJ)		
	L [mm]	H [mm]	D [mm]	L [mm]	H [mm]	D [mm]	L [mm]	H [mm]	DN
	[mm]	[mm]							
CV 1				250	75	25/32	100	145	180
CVF,CVL 1	210	50	42.2	210	50	1 1/4	250	75	150
CV2				250	75	25/32	100	145	180
CVF,CVL 2	210	50	42.2	210	50	1 1/4	250	75	150
CV 3				250	75	25/32	100	145	180
CVF,CVL 3	210	50	42.2	210	50	1 1/4	250	75	150
CV4				250	75	25/32	100	145	180
CVF,CVL 4	210	50	42.2	210	50	1 1/4	250	75	150
CV5				250	75	25/32	100	145	180
CVF,CVL 5	210	50	42.2	210	50	1 1/4	250	75	150
CV 10				280	80	40	130	178	215
CVF,CVL 10	261	80	60.1	261	80	2	280	80	40
CV 15				300	90	50	130	176	215
CVF,CVL 15	261	80	60.1	261	80	2	300	90	50
CV 20				300	90	50	130	176	215
CVF,CVL 20	261	80	60.1	261	80	2	300	90	50
CV 32				320	105	65	170	223	240
CVF32				320	105	65	170	226	240
CV 45				365	140	80	190	248	266
CVF45				365	140	80	190	251	266
CV 64				365	140	100	190	248	266
CVF64				365	140	100	190	251	266
CV 90				380	140	100	199	261	280
CVF90				380	140	100	199	261	280

## Attach diagram 1: start step:

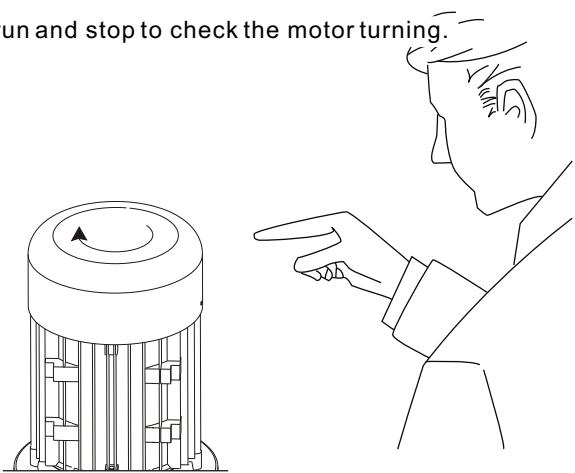
1. open inlet valve, close outlet valve.



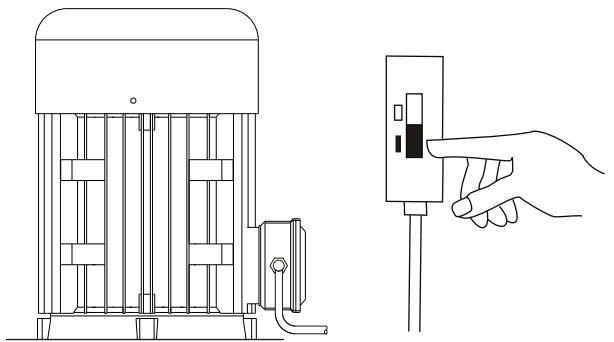
2. open priming plug and fill water.



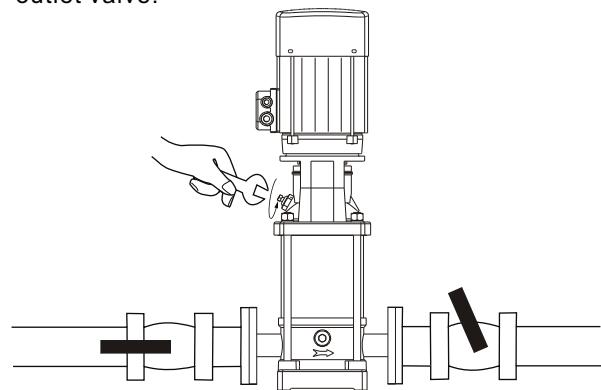
3. run and stop to check the motor turning.



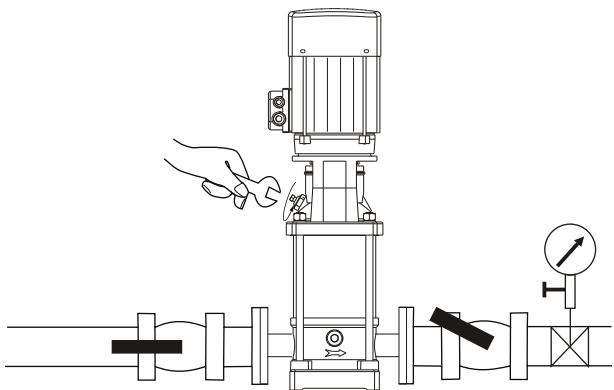
4. start motor.



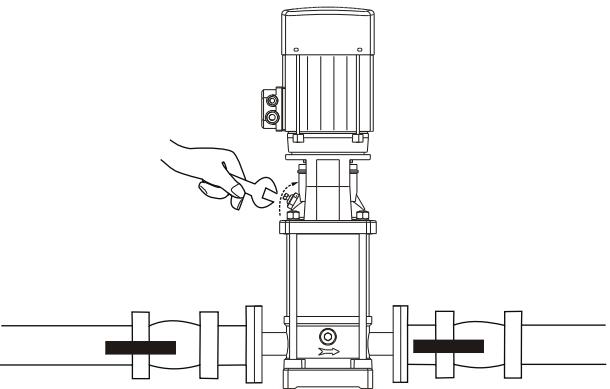
5. screw loose the exhaust valve slowly till open outlet valve.



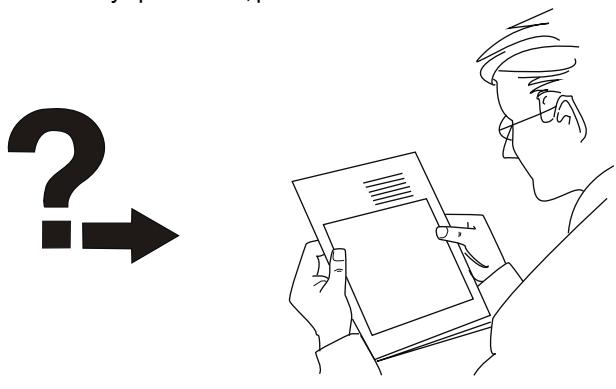
6. adjust the outlet valve pressure to you need.



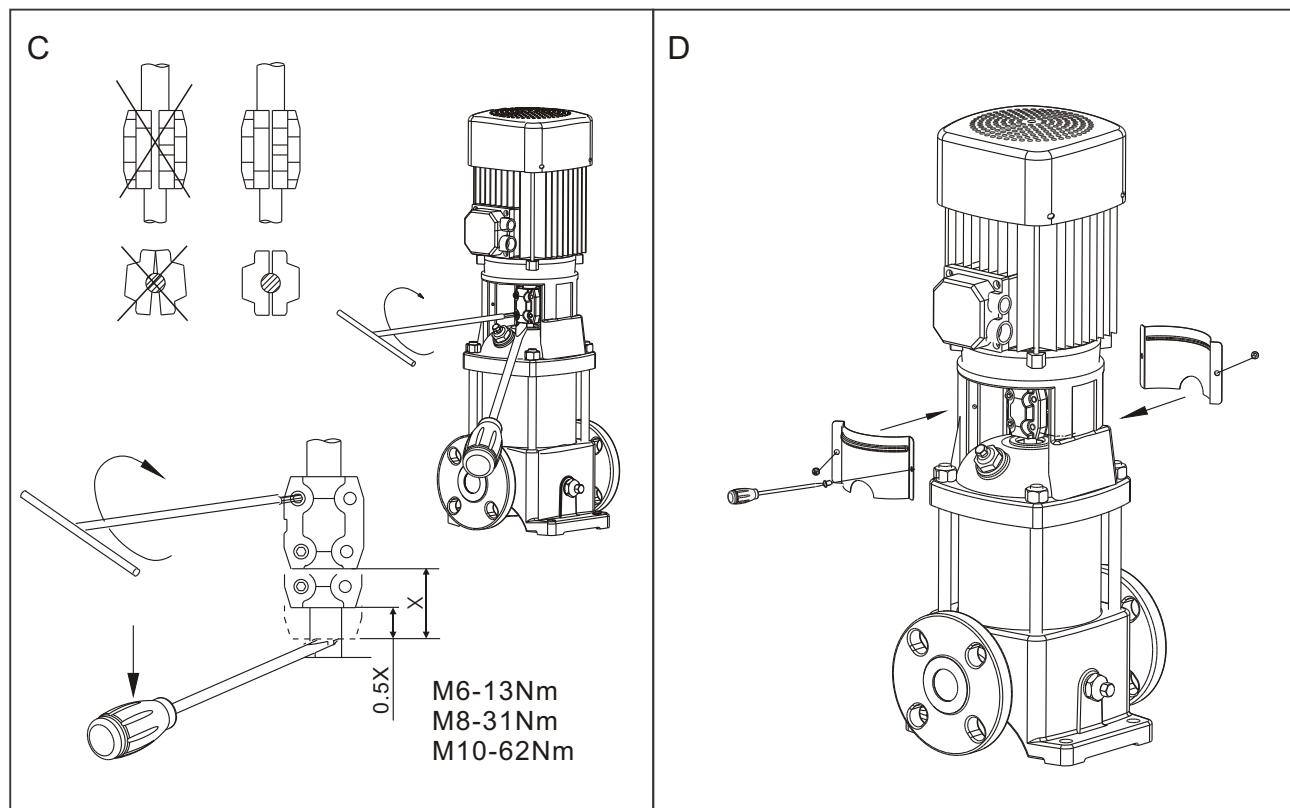
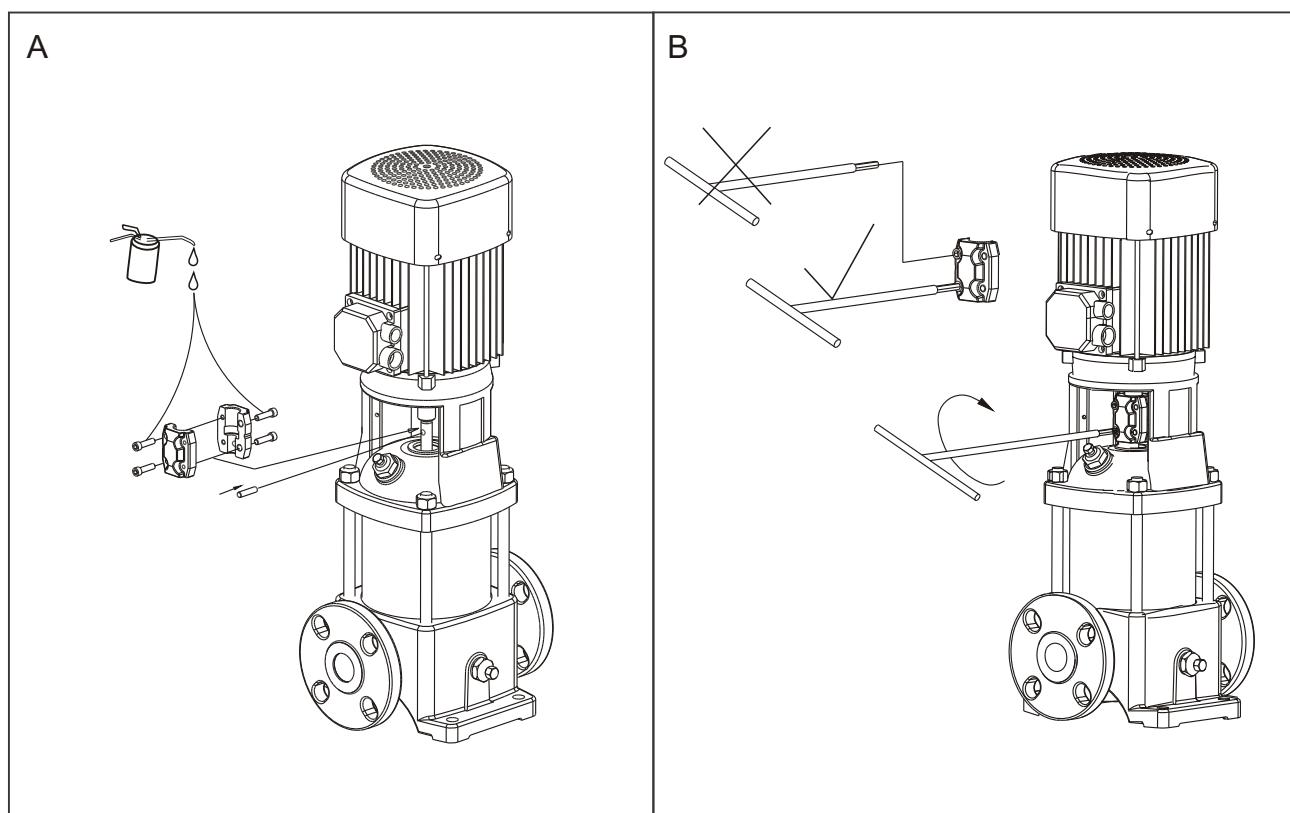
7. screw down exhaust valve.



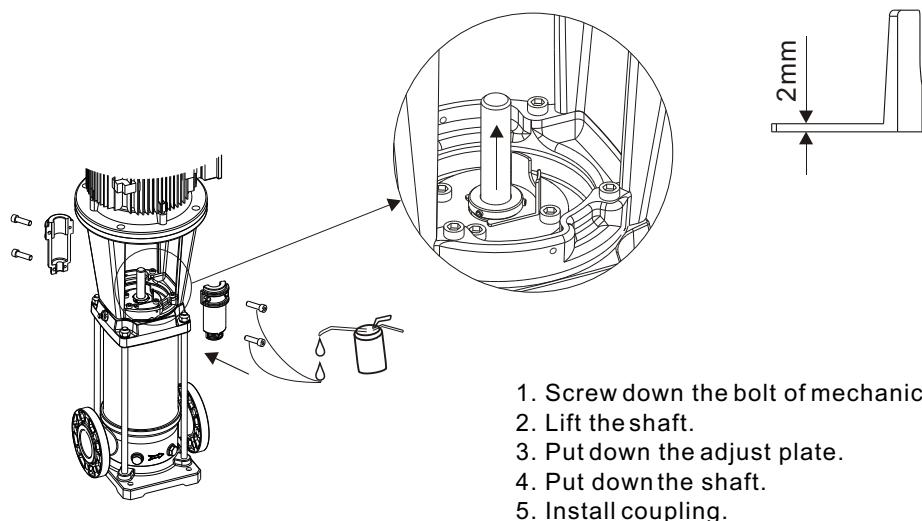
8. If have any questions, please check the instructions.



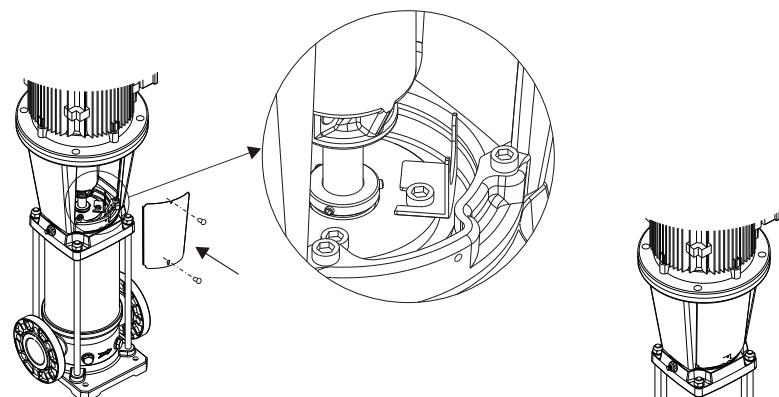
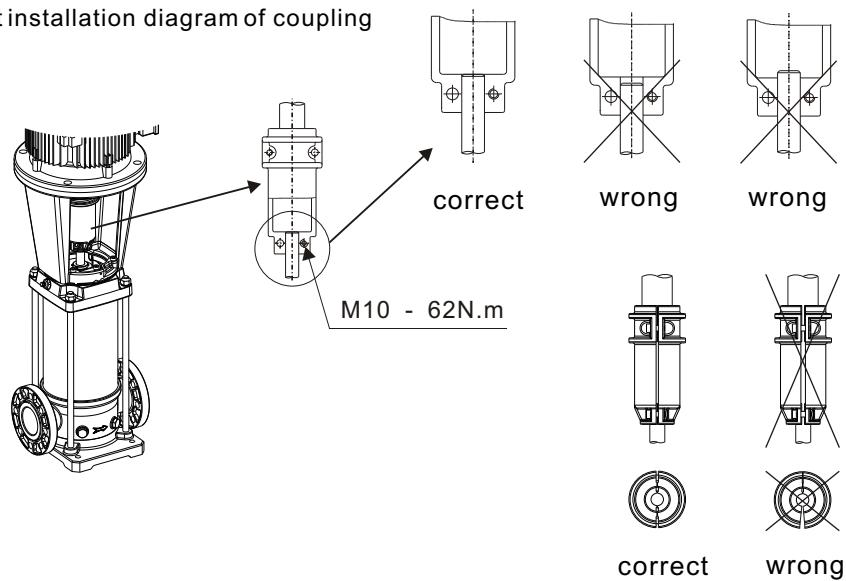
**Attach diagram 2: CV,CVF,CVL1、2、3、4、5、10、15、20 coupling installation diagram**



**Attach diagram3 : CV, CVF32、45、64、90 coupling installation diagram.**

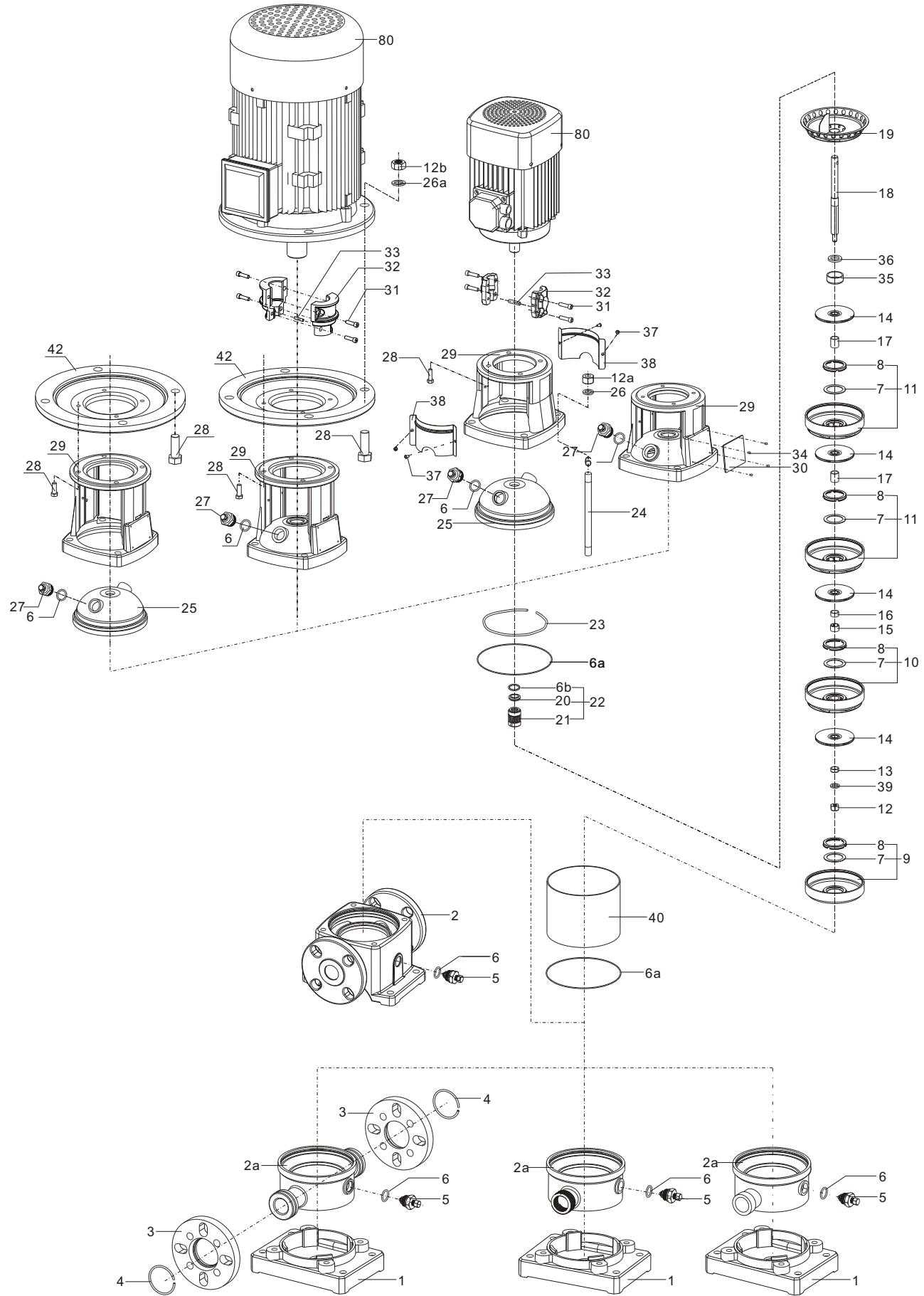


The correct installation diagram of coupling

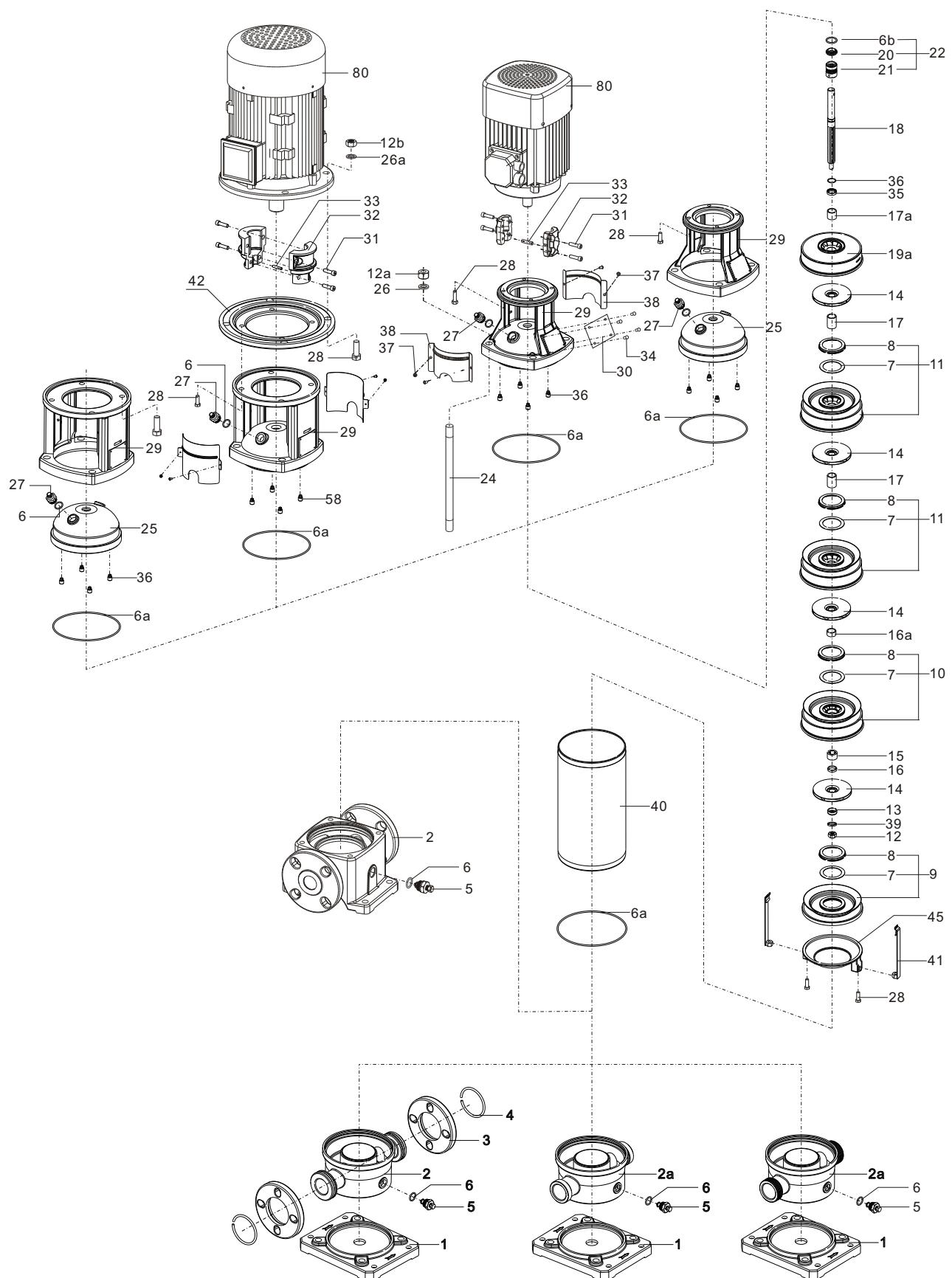


1. Take out adjust plate, put it in the position as diagram indication.
2. Install guard cover.

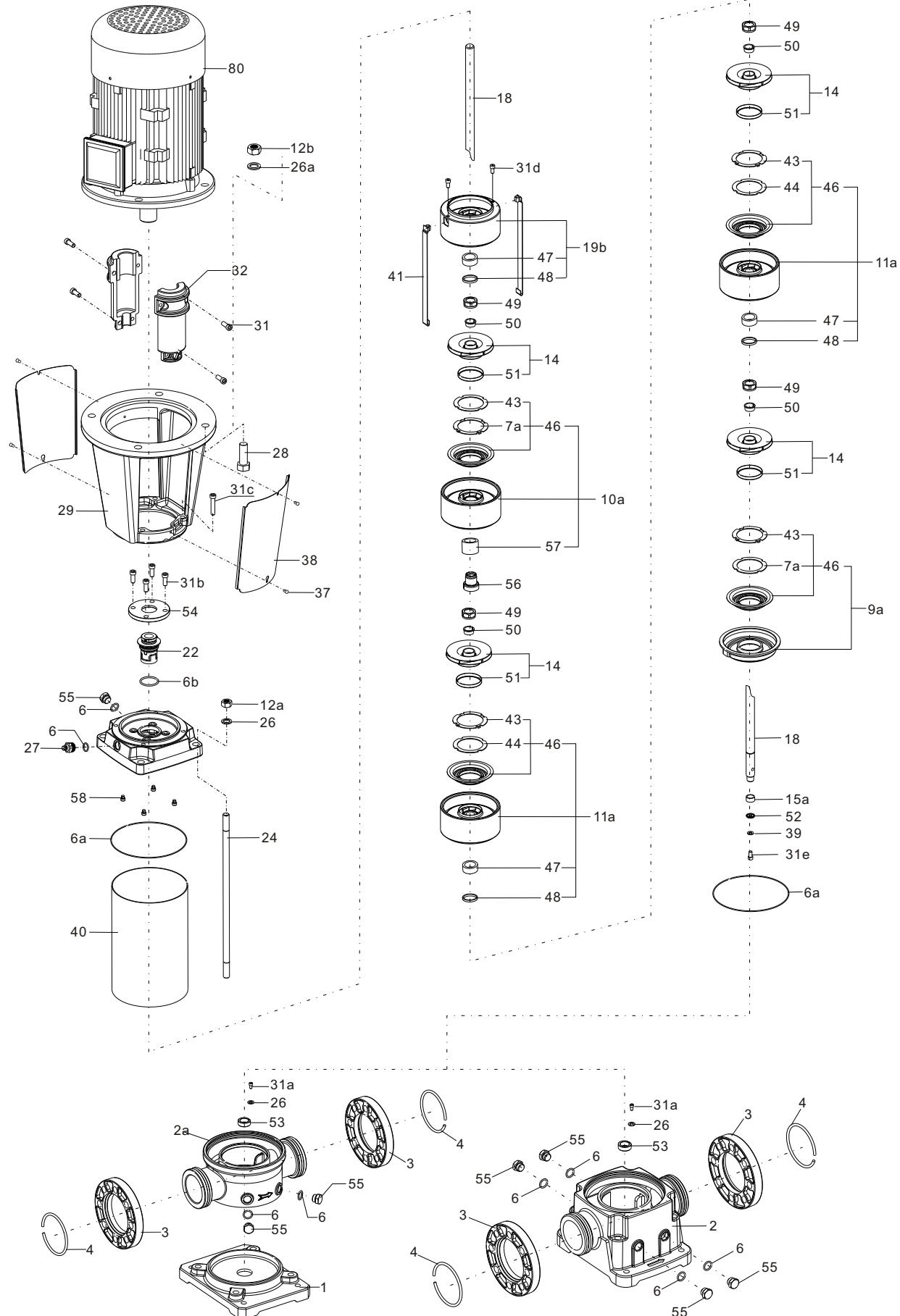
**Attach diagram 4: CV, CVF, CVL1, 2, 3, 4 and 5 Exploded drawing**



**Attach diagram 4: CV, CVF, CVL10, 15 and20 Exploded drawing**



**Attach diagram 4: CV, CVF32, 45, 64 and90 Exploded drawing**



No.	Description	Material
1	Base	Cast iron
2	Pump housing	Cast iron
2a	Pump housing	SUS304
3	Flange	Cast iron
4	Circlip	SUS201
5	Drainage	SUS304
6	O-ring	NBR
6a	O-ring	NBR
6b	O-ring	NBR
7	Sealing	Ptfe
7a	Sealing	Ptfe
8	Sealing plate	SUS304
9	Inlet section	SUS304
9a	Inlet section	SUS304
10	Support diffuser	SUS304
10a	Support diffuser	SUS304
11	Diffuser	SUS304
11a	Diffuser	SUS304
12	Nut	Zinc
12a	Nut	Zinc
12b	Nut	Zinc
13	Impeller sleeve	SUS304
14	Impeller	SUS304
15	Bearing sleeve	Tungsten carbide
15a	Bearing sleeve	Tungsten carbide
16	Short sleeve I	SUS304
16a	Short sleeve II	SUS304
17	longer sleeve	SUS304
17a	longer sleeve	SUS304
18	Shaft	SUS431
19	Outlet section	SUS304
19a	Outlet section	SUS304
19b	Outlet section	SUS304
20	Stationary seal ring	Carbon
21	Rotation ring	Tungsten carbide
22	Mechanical seal	Carbon/tungsten carbide/viton
23	Elastic ring	SUS304
24	Bolt stud	Zinc
25	Pump cover	SUS304
26	Pad	SUS304

No.	Description	Material
27	Air plug	SUS304
28	Bolt	Zinc
28a	Bolt	Zinc
29	Motor frame	HT200
30	Nameplate	Aluminum
31	Screw bolt	Zinc
31a	Screw bolt	Zinc
31b	Screw bolt	Zinc
31c	Screw bolt	Zinc
31d	Screw bolt	Zinc
31e	Screw bolt	Zinc
32	Shaft coupling	QT450-10
33	Screw	Zinc
34	Nail	H62
35	Clip sleeve	SUS304
36	Clip ring	SUS304
37	Screw	SUS304
38	Coupling guard	SUS304
39	Spring pad	SUS304
40	Outer sleeve	SUS304
41	Link group	SUS304
42	Motor flange	Cast iron
43	Gasket	NBR
44	Oval flange	Cast iron
45	Fix cover	SUS304
46	Neck ring	SUS304
47	Liner	PTFE
48	Support ring	SUS304
49	Nut	SUS304
50	Cone	SUS304
51	Wear ring for impeller	SUS304
52	Pressing sleeve	SUS304
53	Sliding bearing	Tungsten carbide
54	Gland cover	Cast steel
55	Drainage	SUS304
56	Bearing sleeve	Tungsten carbide+SUS304
57	Sliding bearing	Tungsten carbide
58	Micelle	Viton
80	Motor	

The technical data are subject to amend without notice.

**Edition:2013.08**