EBARA

Vertical High-speed Pump

EBARA GREAT PUMPS CO.,LTD

Overview

The high-speed centrifugal pumps are novel chemical process pumps which can replace reciprocating pumps and multi-stage centrifugal pumps in areas of small flow rates and high heads and are widely used in petroleum, chemical, electricity, metallurgical, papermaking, pharmaceutical, food and environmental protection industries.

Range of Performance

Model	ELG201	ELG202	ELG211	ELG222
Maximum Flow Rate (m^3/h)	75	90	48	90
Maximum Head (m)	85	154	810	1,850
Maximum Suction Pressure (MPa)	2	7	3	7
Maximum Working Pressure (MPa)	3	15	8	15
Maximum Output Power of Prime Motor (kW)	45	55	37	160
Working Temperature (℃)	-15-+150	-45-+150	-130-+260	-130-+260

Structural Characteristics

• They are still of high efficiency in regions of small flow rates and high heads.

Since gears are used to increase the speed, the rotational speed of the single-stage impeller is improved greatly so as to improve the pump head. Replacing multi-stage pump units by single-stage pump units can eliminate mechanical and volumetric losses caused by inter-stage seals and wear ring seals. Compared with other centrifugal pumps with the same flow rate and head specifications, ELG high-speed pumps are more efficient.

• Stable Performance

Since the components have less contact with the pumped liquids, it greatly reduces mechanical breakdowns and corrosions. Specially designed single-stage open impellers have an axial force close to zero. The larger clearance (1.0-2.0mm) between open blades and the pump body can ensure the transport of all slurry and liquids of high viscosity but hardly influence the pump performance.

• Convenient Installation

The pump occupies a small area during vertical installation, which is directly connected to pipelines (indoors and outdoors). There is no necessary of on-site alignment. When the power of the equipped motor is over 75kW, the pump is assembled into the vertical mechanism. The machine frame is provided with adjustable bolts for centering adjustment of the pump and the motor. It is easy and convenient to install.

• Easy On-site Maintenance

Single-stage pumps are more convenient than multi-stage pumps in terms of maintenance. The maintenance can be done on the field. A special hoisting screw stem is provided inside the machine frame, by which the spacer coupler and the gearbox

can be removed without dismantling the electric motor. And then sealing elements, impellers and shaft sleeves can be replaced. With few pump parts and good interchangeability, the pump can be repaired by personnel without any professional training. Only with their fitter abilities, they are able to do maintenance and repair work like disassembly and re-assembly.

• Fast Delivery According to User Requirements

Within the range of performance of ELG series, under the condition of the same overall dimensions, we can provide the best solutions to pump performance for users by changing the rotational speed, the diameter of the impeller and the size of the diffuser. Since 95% of the parts and components of ELG vertical high-speed pumps are standard and common in use, our company can meet all user requirements on performance and specifications and provide fast delivery services.

Range of Application

The ELG high-speed pumps are suitable for the transport of corrosive fluid media with viscosity less than 500cP as well as solid particles of certain concentration Main purposes include:

• Petrochemical Industry and Petroleum Refining

Transport media, load materials, feed reactors, recycle and replenish materials, and wash vessels.

• Power Generation

Conduct the primary feeding and constant-pressure drop operations of fuel boilers; supply water for boilers and avoid overheating and condensation; and act as the fuel pumps of gas turbine generators.

• Inorganic Chemistry

Inorganic acid treatment, high-pressure washing, boiler feeding and synthetic fiber treatment

• Combustible Gas Treatment

Coal gasification, natural gas, liquefied natural gas, synthetic natural gas treatment, regeneration of molecular sieves, and refrigeration and liquefaction

• Papermaking

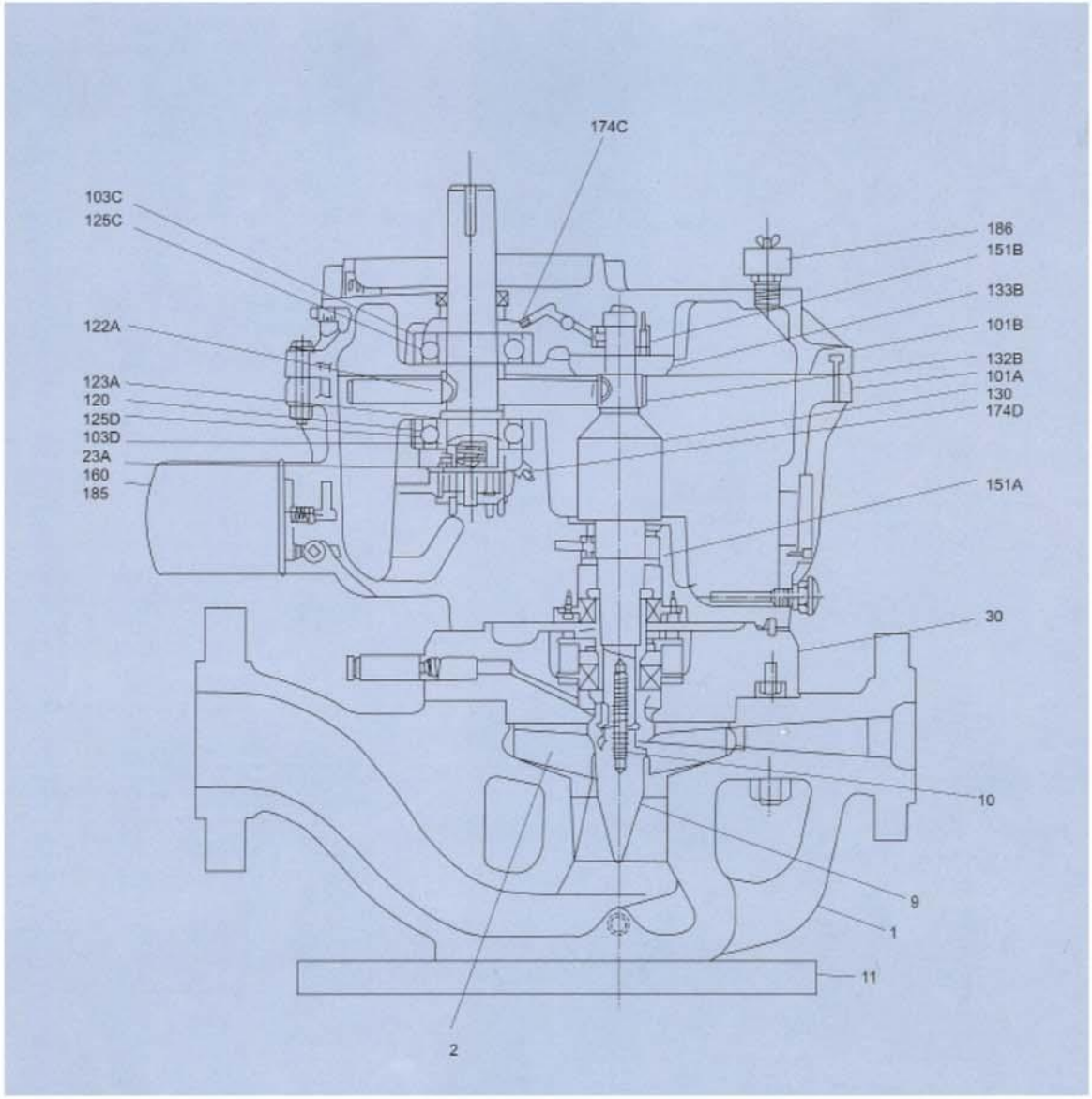
Washing operation, high pressure spraying operation, mechanical atomization of sulfite liquid effluent, boiler feeding, and prevention of overheating and condensation

• Environmental Protection

Dehumidifying pumps of flue washing systems, treatment of underground liquid waste, removal of solid particles and sewage treatment

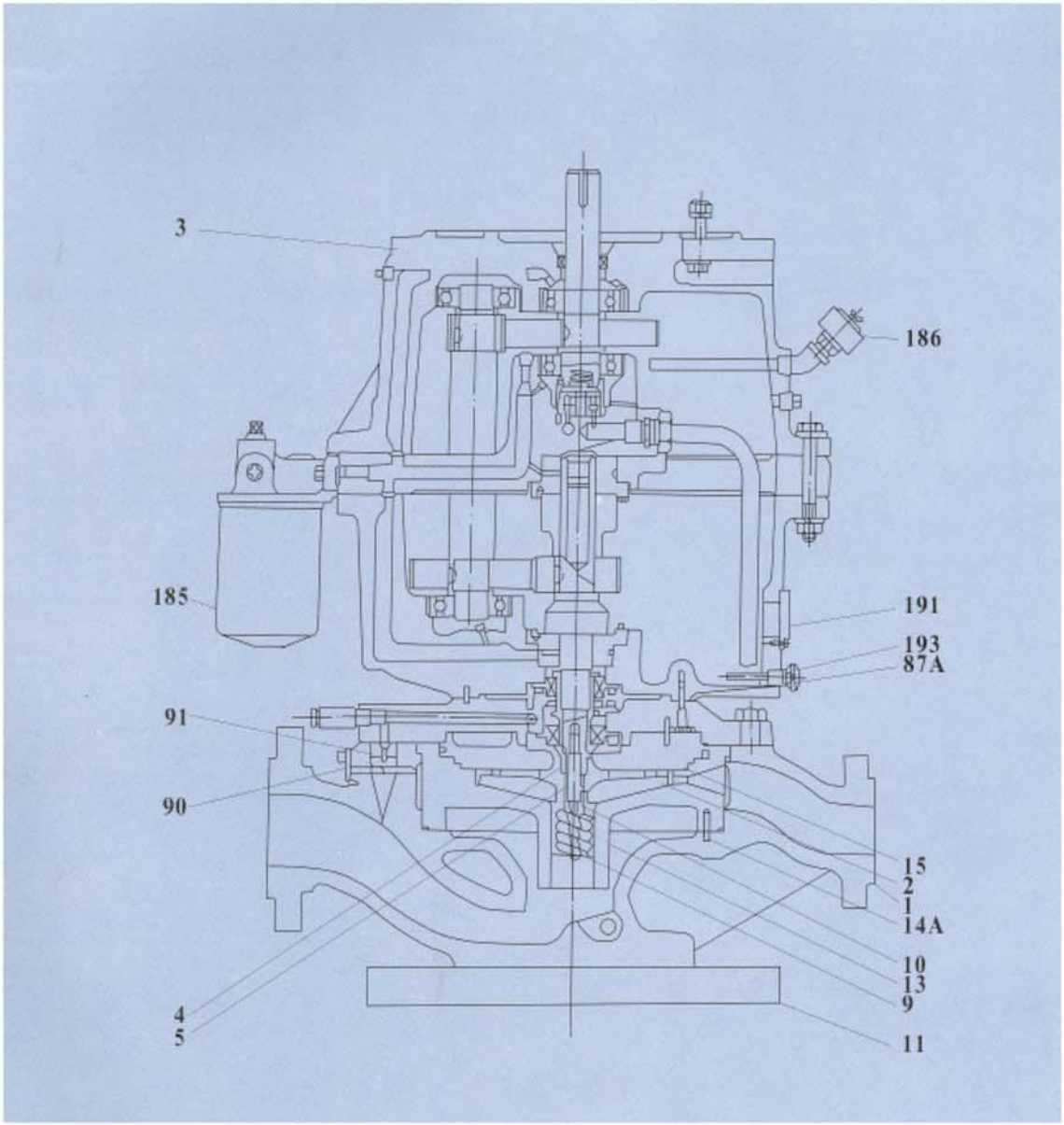
• Others

Oilfield flooding, descaling of steel rolling mills, high pressure hydraulic coal mining of coal mines, circulating water in pharmaceutical and food processing, boiler feeding etc.



Structural Drawing of ELG211 Series

1	Pump Body
2	Impeller
185	Oil Filter
186	Air Filter
9	Inducer
10	Inducer Screw Bolt
11	Pump Baseplate
23A	Lubricating Oil Pump Spring
30	Airtight Box
101A	Gearbox Cover
101B	Gearbox Body
103C	Bearing Block
103D	Bearing
120	Low-speed Shaft
122A	Large Gear
123A	Spacer Sleeve
125C	Bearing
125D	Bearing
130	High-speed Shaft
132B	Small Gear
133B	Thrust Pad
151A	Radial Sliding Bearing
151B	Radial Sliding Bearing
160	Lubricating Oil Pump
174C	Nozzle
174D	Nozzle



Structural Drawing of ELG222 **Series**

1	Pump Body
2	Impeller
3	Two-stage Speed Increasing Gear
4	Impeller Key
5	Impeller Stop Spacer
9	Inducer
10	Inducer Screw Bolt
11	Pump Baseplate
13	Diffuser
14A	Locating Pin
15	Diffuser Cover
87A	Spacer
90	Separator Throttle Disc
91	Separator Connector
185	Oil Filter
186	Air Filter
191	Sight Glass
193	Temperature Gauge

Performance Chart

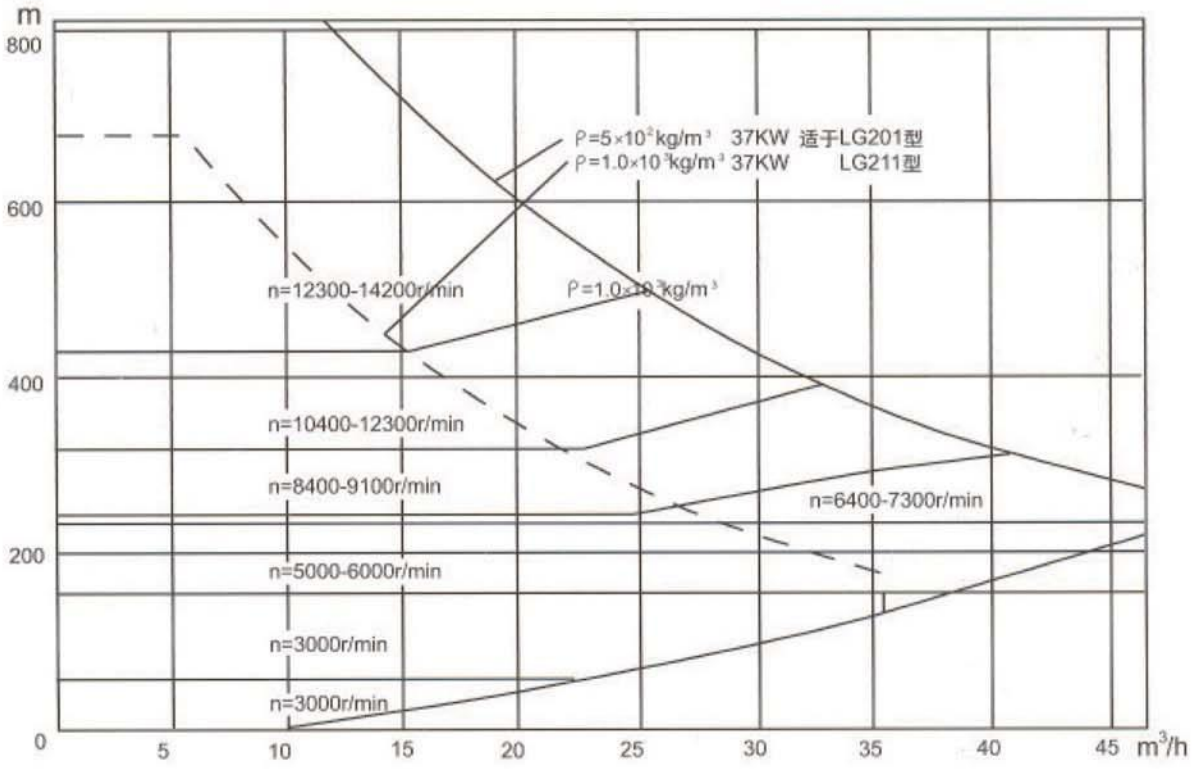


Figure 1（Suitable for ELG201 Series and ELG211 Series）

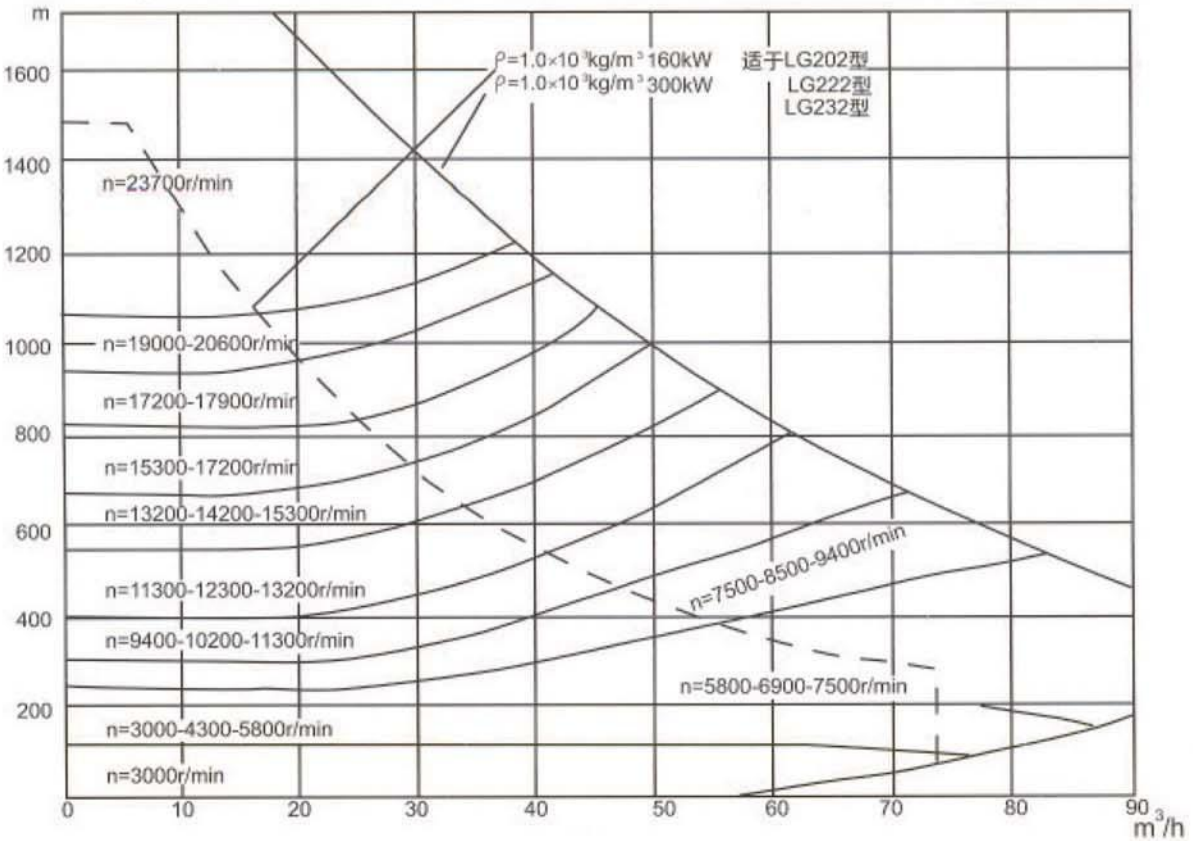


Figure 2 （Suitable for ELG202 series, ELG222 series ）

Model Label

E LG [a]-[b]/[c]-[d]-[e][f][g] h

ELG----- Vertical High-speed Pump

a-------Pump Structure Characteristics. It consists of a three-digit number: the first digit means the pole number of the electric motor. The second digit represents the type of the gearbox: the digit 1 represents the No. 1 gearbox with single-stage speed increase and maximum working power of 7kW; the digit 2 represents the No. 2 gearbox with two-stage speed increase and maximum working power of 160kW; the digit 3 represents the No. 3 gearbox with two-stage speed increase and maximum working power of 300kW; the digit 0 means that there is no gearbox and the electric motor is directly coupled with the pump. The third digit indicates the type of the pump body: the digit 1 represents the No. 1 bump body with a maximum flow rate of 48m^3/h; the digit No. 2 represents the No. 2 pump body with a maximum flow rate of 90m^3/h.

b------Flow Rate (m^3/h)

c------Head (m)

d-------Power of the Equipped Motor (kW)

e------Rotational Speed of the Pump (n/100.r/min)

f-----Codes for Basic Materials of Wet Parts

I - ZG25

II -ZG1Cr13Ni

III -ZG0 Cr18 Ni12Mo2Ti

IV -Hastelloy

g------Mechanical Seal Type

D Single End Face Mechanical Seal

S Double-end Face Mechanical Seal

C Tandem Mechanical Seal

h------- Special Requirements. Use T to indicate the extra supply of the inducer and separator.

For example:

With the Inducer

Single End Face Mechanical Seal

Category III Material ZG0 Cr18 Ni12Mo2Ti

Rotational Speed 23,700r/min

Motor Power 160kW

Head 1430m

Flow Rate 6m^3/h

No. 2 Pump Body

No. 2 Gearbox (two-stage speed increase and maximum working power 160kW)

Pole Number; the rotational speed is 2,950r/min for the two-pole motor

Pump Type: Vertical High-speed Pump

Mechanical Seal Structures

• There are two basic mechanical seal structures for pumps and speed-increasing gearboxes separately. Both structures are extremely compact and easy to assemble and disassemble.

•In order to avoid the influence of the centrifugal force caused by high-speed rotation, only the high-speed rotation side (the high-speed shaft) is installed with the rotatory sealing ring. The wedge-shaped PTFE ring with the automatic centering floating plate, the stationary ring and the stationary ring adaptor are all installed on the stationary side inside the pump so the performance is quite stable.

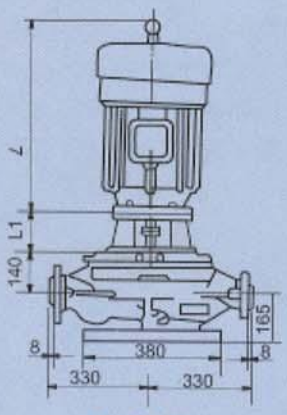
• The seal chamber is well designed to control the axial dimension's influence on the high-speed pump due to the increased rotational speed of the shaft. Therefore, although the axial dimension is shorter, it can be provided with three types of seals and guarantee various washing, liquid discharging, heating and cooling functions.

• In order to avoid changes of contact pressure of the seal surface caused by changes of lateral pressure of the seal, the seal adopts the seal of fluid pressure balance type, and makes the leaking direction opposite to the direction of the centrifugal force of the seal.

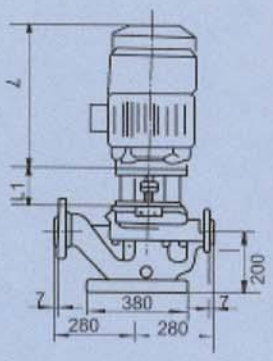
• Although the pump is a high-lift pump, the peripheral pressure of the mechanical seal is almost close to the inlet pressure, which is one of the strengths of high-speed pumps.

The side mechanical seals of ELG pumps have three basic structures, namely, the single end mechanical seal, the double-end mechanical seal and the tandem mechanical seal. According to working conditions, users can choose the best structure at will. Together with various peripheral auxiliary devices of the seal, it can meet requirements of various working conditions.

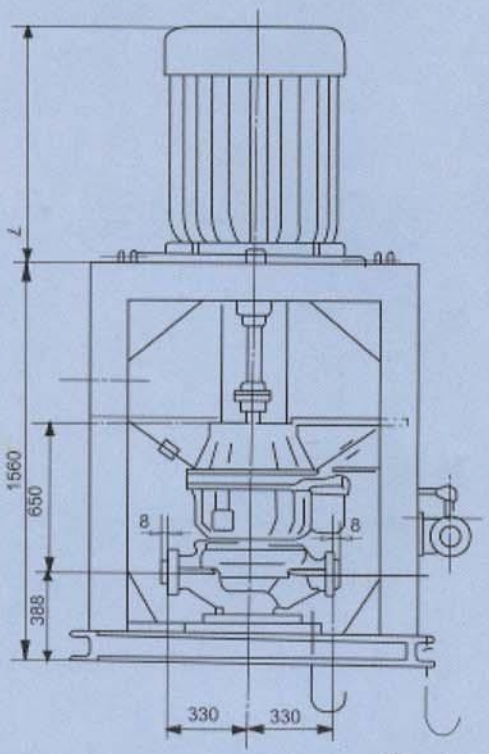
Installation Dimensions (for reference only)

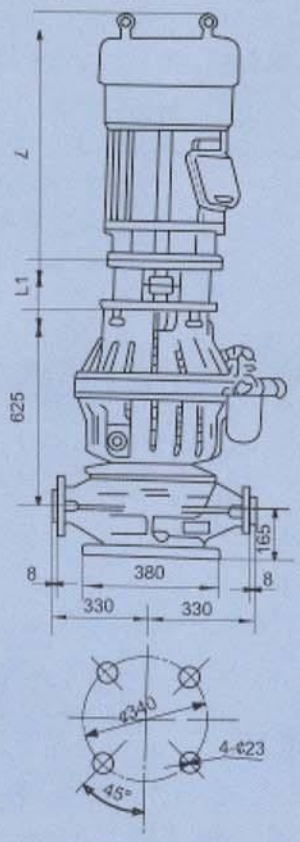


ELG202

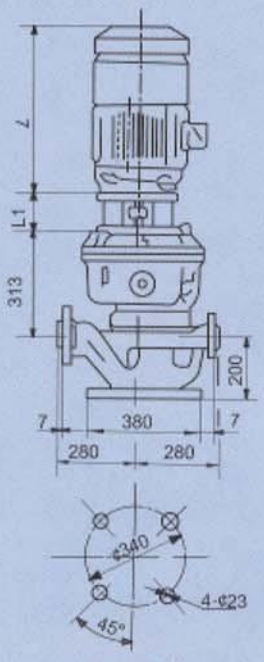


ELG201

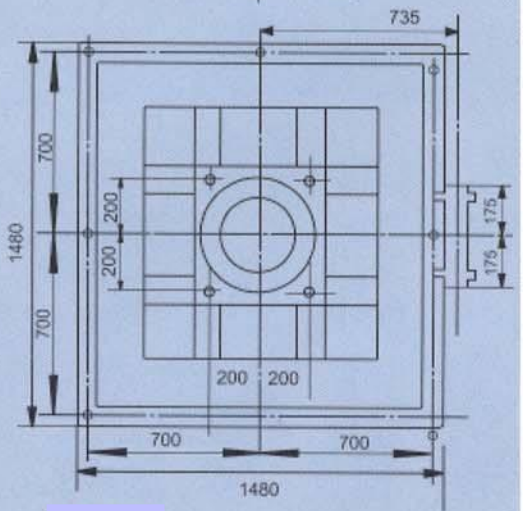




ELG222



ELG211



ELG222

Example of Pump Model Selection

• Example of Use Conditions

Flow Rate Q=8.5m^3/h Head H=380m Inlet Pressure P1=0.06MPa NPSHa=4m

Pumped liquid: Water Density ρ=1.0×10^3kg/m^3 Temperature: 40 °C

• Preliminary Model Selection

The follow methods are only used by users for preliminary model selection:

a. Use the ELG high-speed pump performance chart (refer to the Figure 1); find the point of Q=8.5m^3/h in the coordinate axis of the flow rate Q; find the point of H=380m in the coordinate axis of the head H; and draw a perpendicular line and a horizontal line through the two points respectively to get the intersection M. If the point M is within the curve range of ρ=1.0×10^3kg/m^3, the basic pump model is ELG211-8.5/380.

b. If the intersection of Q and H is within the curve range of ρ=1.0×10^3 -5×10^2kg/m^3 (refer to the Figure 1), it is necessary to calculate the shaft power P and the motor power.

c. If the motor power is over 37kW, it is necessary to choose the pump model according to the performance chart (refer to the Figure 2) as the above.

• Final Model Selection

On the basis of preliminary model selection, the manufacturer finally decides on the rotational speed of the pump and the motor power according to the conditions like the type, density and temperature of pumping fluid as well as the design data. At the same time, the manufacturer also decides on the material of the pump and the type of the mechanical seal, and makes a decision on whether there should be an inducer and a cyclone separator.

Based on this example, the pump model should be ELG211-8.5/380-30-123IID.

Note: since this series pumps are of good adaptability in terms of their performance and structure, the final model selection must be approved by the manufacturer.

• Product Performance Data Table

For users' convenience, the data table shows some of the common product models and performance data in the Figures 1 and 2 for reference (the density ρ is1$0^3$kg/m^3, unless otherwise it is specified).

Supply Range of Complete Sets of Equipment

• Pump;

• Prime Motor: According to user requirements, an explosion-proof motor or a common motor can be provided;

• Foundation bolts;

• Coupler;

• Companion flanges for the pump outlet and inlet;

• According to user requirements, provide part of the cooling pipe system but without any auxiliary pump.

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Company Profile

EBARA GREAT PUMPS CO.,LTD. Is a joint venture invested by Ebara Corporation, Japan and the Zhejiang Great Industry Share Co., Ltd. The fist investment is 12.2 million U.S. dollar, and 51%of the investment is from Ebara, 49%is from Great.

Being a centrifugal-pump manufacture in the beginning, Ebara was founded in 1912. Up to now, its product line has grown to turbo machinery, including fans, blowers, turbines, and a variety of other equipments such as environment related products and precision machinery. At present, as a specialist in the manufacture of turbo machinery, Ebara is not only a transnational manufacturer of machinery, but a global engineering company that devotes itself to link technologies and products effectively as well. Ebara, by manufacturing and distributing products, strives to promote the safe and effective use of environmental resources and then contributes to create a society in which people can lead happier and healthier lives.

Zhejiang Great Industry Share Co., Ltd., established in 1993, is a new and hi-tech enterprise which manufactures hi-temperature, h-pressure and hi-speed special centrifugal pumps and general service pumps. Great all along serves the industrial fields such as petroleum and petrochemical with advanced administration faith, excellent products as well as high responsibility, so as to rapidly become a high-reputation centrifugal-pump manufacturer in such fields.

The joint venture will introduce all series of advanced technologies of designing and developing API610 Process pumps and general service pumps fromEbara. Replying n Ebara powerful professional technology and Great principle which is “the customers are uppermost”, the joint venture, facing the global market, designs, develops and manufactures high-quality centrifugal pumps, for the purpose of supplying customer satisfaction with the newest contemporary achievements and precise, efficient and overall service.

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