

Mild Fan General Catalog

# CMF

# ***TERAL***



60Hz



**TERAL INC.**

## Applications

### CMF3-SOB (No.2 to 6)

- For air conditioning, equipment cooling and kitchen exhaust, etc.

### CMF3-RS (No.6 1/2 or higher)

- For air conditioning, air supply and exhaust in factories, etc.

### CMF3-OB

- For ventilation of heated air drying furnaces, dust collectors and sorting machines, equipment cooling, air supply, exhaust and air conditioning in factories, boiler forced draft fans (FDF), etc.

### CMF3-HOH

- For furnaces and boilers forced draft fan (FDF), equipment cooling, etc.

### CMFII-VOH

- For dust collectors, paint booth exhaust, etc.

### CMFII-MOB

- For dust collector, induction (inducted draft fans, IDF), equipment cooling, dryers, etc.

### CMFII-RD

- For air conditioning and ventilation, etc., in building, apartment complexes, hospitals and schools, etc.

## Features

### CMF3-SOB (No.2 to 6)

- Energy saving fan equipped with top runner (equivalent to IE3) motor
- Lineup including CMF3L that offer superior performance for high air volume applications  
Blowing capacity boosted by around 10% using low-pressure compared with standard models
- Impeller GD2 reduced by around 30% compared with conventional models
- With use of heat-resistant specifications, fan available for gas of Max. 90°C
- Space-saving compared with OB type

### CMF3-RS (No.6 1/2 or higher)

- Energy saving fan equipped with top runner (equivalent to IE3) motor
- Achieves high efficiency with high air flow, high pressure fan  
Newly developed impeller ideal for high air flow applications
- Operating noise lowered by between 2 and 7 dB compared with conventional models
- Can be selected with electric motors under 1 rank compared with conventional models
- Approximately 15% lighter than conventional models
- Relative space-saving with straddle mounted type

### CMF3-OB

- Energy saving fan equipped with top runner (equivalent to IE3) motor
- Lineup including CMF3L that offer superior performance for high air volume applications (No.6 or lower)  
Blowing capacity boosted by around 10% using low-pressure compared with standard models
- Achieves 80% or higher efficiency with high air flow, high pressure fan (No.6 1/2 or higher)  
Can be selected with electric motors under 1 rank compared with conventional models  
In addition, can be selected with electric motors under 1 rank compared with conventional models
- Operating noise lowered by between 6 and 9 dB compared with conventional models
- Impeller GD2 reduced by around 30% compared with conventional models
- Standard specification available for using gas with temperature range of 0 to 90°C
- With use of heat-resistant specifications, fan available for gas of Max. 400°C (No.6 or lower)  
No.6 1/2 or higher available for gas of Max. 350°C

### CMF3-HOH

- Energy saving fan equipped with top runner (equivalent to IE3) motor
- Impeller GD2 (inertia mass) reduced by around 28% with series average.
- Motor models added for expanded choice range (Special order model available for gas of Max. 150°C)
- Space-saving

### CMFII-VOH

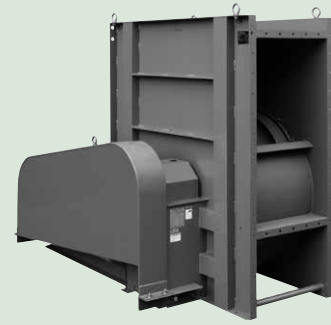
- Space-saving

### CMFII-MOB

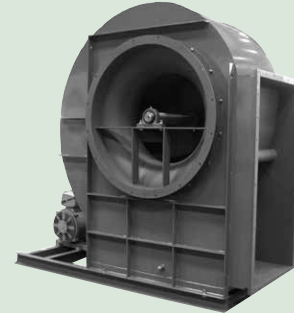
- Low vibration and high durability by direct coupling

### CMFII-RD

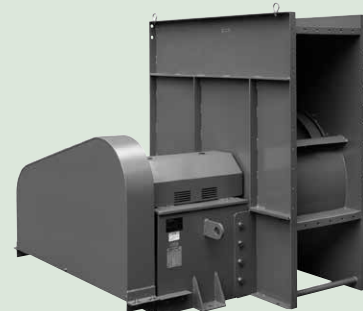
- Double inlet allows for high air flow and space-saving in vertical direction



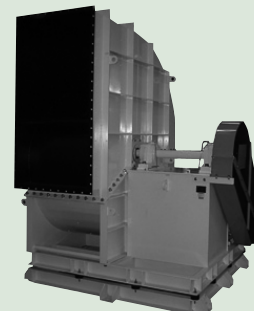
SOB



RS



OB



OB



HOH

※Please note that the above image is a representative example and may differ partially from the actual device.

## ■ Features

# Energy Saving and Low Noise!!

## ● Contributes to energy conservation.

As fans consume a lot of energy and are important industrial products, fans finished to a high degree of perfection are always in demand. We have now developed the CMF3 series of high performance mild fans, offering low operating noise and vibrations in addition to high efficiency and reduced energy consumption. CMF3 feature 10% higher efficiency than our previous models to reach maximum efficiency of 85%. We hope the series will help customers with their energy-saving efforts.

## Lightweight and Compact

### Weight reduced by 30%!

We have achieved designs that are 30% lighter and more compact than our previous models.

## High Efficiency and Low Noise

The impeller is designed based on the fluid design technologies we have developed over many years as well as cutting-edge fluid analysis and verification performed on actual equipment. In addition to the improved performance, we have also achieved lower operating noise. Operating noise has been reduced by 6dB compared with our previous models.

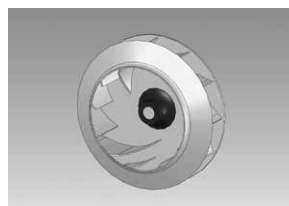
## Safety Considerations

### We have introduced quality control based on Section IX of the ASME international standard!

We have accurately calculated and evaluated impeller strength not only according to the base materials but by also analyzing the stress on welded joints and notches. In addition, we have introduced quality control based on Section IX of the ASME standards for welds to ensure that our products can be used with peace of mind.

## Limit Load Properties

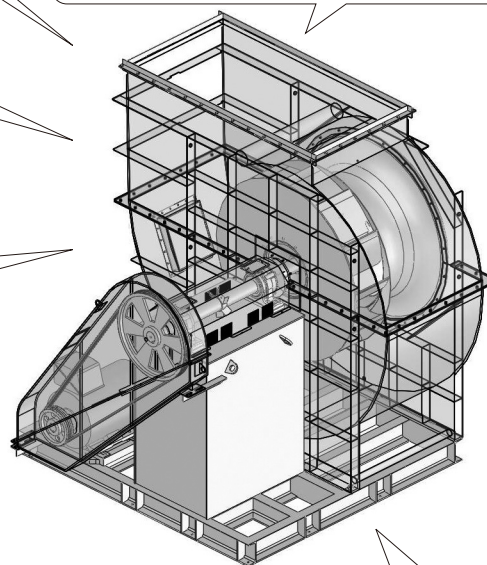
We have developed the ideal impeller with limit load properties that are well suited in the high-pressure zone.



## Reduced Inertia Mass

### Up to 30% reduction!

We have achieved up to a 30% reduction in impeller inertia mass in the series by taking fluid characteristics as well as start-up performance into account.



## .....Example of Energy conservation Calculation.....

Cost reduction of JPY2,793,900 when the total operating power is 1,382kW/h and 10hr/day for 300 days at a plant using nine units.

## Example Calculations of Energy Saving Effects

|                                   | Previous Model                                                       | New Model |
|-----------------------------------|----------------------------------------------------------------------|-----------|
| Total motor output                | 1382kW                                                               | 1243kW    |
| Output reduction                  | 139kW – approx.. 10% reduction                                       |           |
| Operating conditions              | 10 hours / day, 300 days of operation per year<br>3,000 hours / year |           |
| Electricity rate (per kWh)        | 6.7 yen / kWh *1                                                     |           |
| CO2 emission intensity            | 0.339kg – CO2 / kWh *2                                               |           |
| Annual energy cost savings        | 2,793,900 yen                                                        |           |
| Annual reduction in CO2 emissions | Approx. 141 tons                                                     |           |

\*1 Differs depending on electricity contract

\*2 TEPCO calculation (FY2006)

## Low Vibration

### Thoroughly eliminating causes other than impeller unbalance!

Causes of vibrations in rotating machinery include unbalanced rotating bodies (impellers) and a unique frequency of vibration of the rotating body and bearing stand.

With the introduction of the latest eigenvalue analysis technologies we have used eigenvalues of the rotating body and bearing stand to develop a design that is higher than the maximum rotation frequency.

## Patented

Impeller with reduced stress concentration on the blades

## ■ Model type description

## CMF3 - No.2 - TH - R - SOB - ND - e

① ② ③ ④ ⑤ ⑥ ⑦

① Mild Fan CMF3, CMF3L, CMFII

② Size

③ Discharge Direction – TH: Top horizontal, TV: Top vertical, BH: Bottom horizontal, TUS: Top, upper diagonal 45°, BV: Bottom vertical

④ Rotating Direction (viewed from motor pulley side) R: Right rotation, L: Left rotation

⑤ Transmission Method – HOH-S: Direct driven (horizontal electric motor), VOH: Direct driven (vertical flange mounted motor), SOB: Belt driven (single suction overhang mounted impeller), RS: Belt driven (single suction straddle mounted impeller), OB: Belt driven (single suction overhang mounted impeller), MOB: Direct coupling (single suction overhang mounted impeller), RD: Belt driven (double inlet straddle mounted impeller)

⑥ Installation Method – None: Standard (HOH / VOH only), B: Floor Type (SOB, RS, OB, MOB, RD)

A: No common base (SOB, RS, OB, RD), D: Floor type vibration-proof, I: Ceiling mounted vibration-proof, ND: Floor type vibration-proof (with seismic stopper), KI: Ceiling mounted vibration-proof (with seismic stopper), NI: Hanging frame type vibration-proof (with seismic stopper)

⑦ Motor efficiency e: Top runner efficiency (equivalent to IE3)

## Standard Specifications / Special Specifications / Standard Accessories / Special Accessories

● Standard specification, ◎ Special specification, — Not supported

| Model                    |                                                     |                                          | CMF3-SOB-e<br>CMF3L-SOB-e        | CMF3-RS -e | CMF3-OB-e<br>CMF3L-OB-e | CMF3-OB -e | CMF3-HOH-e | CMF II-VOH-e | CMF II-MOB-e | CMF II-RD-e |
|--------------------------|-----------------------------------------------------|------------------------------------------|----------------------------------|------------|-------------------------|------------|------------|--------------|--------------|-------------|
| Size                     |                                                     |                                          | No.2~6                           | No.6.5~10  | No.2~6                  | No.6.5~12  | No.2~6     | No.2~6       | No.2~6       | No.2~8      |
| Transmission method      | Direct-coupled motor (including direct driven type) |                                          | —                                | —          | —                       | —          | ●          | ●            | ●            | —           |
|                          | Belt driven                                         | Single suction straddle mounted impeller | —                                | ●          | —                       | —          | —          | —            | —            | —           |
|                          |                                                     | Single suction overhang mounted impeller | ●                                | —          | ●                       | ●          | —          | —            | —            | —           |
|                          |                                                     | Double suction straddle mounted impeller | —                                | —          | —                       | —          | —          | —            | —            | ●           |
| Handling gas temperature | Clean air                                           | 0 ~ 40°C                                 | ●                                | ●          | ●                       | ●          | ●          | ●            | ●            | ●           |
|                          |                                                     | 41 ~ 90°C                                | ●                                | —          | ●                       | ●          | ●          | —            | ●            | —           |
|                          |                                                     | 91 ~ 200°C                               | —                                | —          | ◎*1                     | ◎*2        | ◎*3        | —            | ◎*2          | —           |
|                          |                                                     | 201 ~ 250°C                              | —                                | —          | ◎*1                     | ◎*4        | —          | —            | ◎*4          | —           |
|                          |                                                     | 251 ~ 350°C                              | —                                | —          | ◎*5                     | ◎*5        | —          | —            | ◎*5          | —           |
| Structure                | Impeller                                            | Backward curved (Turbo)                  | ●                                | ●          | ●                       | ●          | ●          | ●            | ●            | ●           |
|                          |                                                     | Sealed type bearing                      | —                                | —          | —                       | —          | —          | —            | —            | —           |
|                          | Bearing                                             | Open type bearing                        | —                                | —          | ●                       | ●          | —          | —            | ●            | —           |
|                          |                                                     | Pillow block unit                        | ●                                | ●          | —                       | —          | —          | —            | —            | ●           |
|                          | Suction port                                        | Copper sheet winding                     | —                                | —          | ◎                       | ◎          | ◎          | —            | ◎            | —           |
|                          |                                                     | Sheet packing type                       | —                                | —          | ●                       | ●          | ◎          | —            | ●            | —           |
|                          | Shaft seal                                          | Bypass type                              | —                                | —          | —                       | —          | —          | —            | —            | —           |
|                          |                                                     | Labyrinth (sheet packing)                | —                                | —          | ◎                       | ◎          | —          | —            | ◎            | —           |
|                          | Companion flange                                    | Discharge side *6                        | ●                                | ●          | ●                       | ●          | ●          | ●            | ●            | ●           |
|                          |                                                     | Suction side *6                          | ●                                | ●          | ●                       | ●          | ●          | ●            | ●            | ●           |
|                          | Casing                                              | Drain                                    | Socket attachment                | ●          | ●                       | ●          | ●          | —            | ●            | ●           |
|                          |                                                     |                                          | Socket mounting: with cock/valve | ◎          | ◎                       | ◎          | ◎          | —            | ◎            | ◎           |
|                          |                                                     | Inspection hole                          | Tightening by bolts and nuts     | ◎          | ◎                       | ●          | ●          | ●            | ●            | ◎           |
|                          |                                                     |                                          | One-touch type                   | —          | ◎                       | —          | ◎          | —            | ◎            | ◎           |
|                          |                                                     | Plate thickness change                   | 1 rank UP_ABC plate *7           | —          | —                       | —          | —          | —            | —            | —           |
|                          |                                                     |                                          | 1 rank UP_C plate only *7        | —          | —                       | —          | —          | —            | —            | —           |
|                          |                                                     | Change to special discharge direction    | Bottom Vertical (BV-R/BV-L)      | —          | —                       | —          | —          | —            | ◎            | ◎           |
|                          |                                                     |                                          | Upper diagonal 45° (TUS)         | —          | —                       | —          | —          | —            | ◎            | ◎           |
|                          |                                                     | Lagging                                  | Nut mounting                     | —          | ◎                       | —          | ◎          | —            | ◎            | —           |
|                          |                                                     |                                          | Main part t=75mm                 | —          | ◎                       | —          | ◎          | —            | ◎            | —           |
|                          |                                                     | Split casing                             | —                                | ◎*8        | —                       | ◎*8        | —          | —            | ◎*9          | ◎*9         |
|                          | Bearing guard                                       | Standard (sealed type)                   | ●                                | ●*10       | ●                       | ●          | —          | —            | ●            | —           |
|                          |                                                     | With inspection hole                     | ◎                                | —          | ◎                       | ◎          | —          | —            | ◎            | —           |
|                          |                                                     | With acrylic inspection hole             | ◎                                | —          | ◎                       | ◎          | —          | —            | ◎            | —           |
|                          |                                                     | With one-touch inspection hole           | ◎                                | —          | ◎                       | ◎          | —          | —            | ◎            | —           |
|                          | Belt guard                                          | Made of steel plate (without back cover) | ●                                | ●          | ●                       | ●          | —          | —            | —            | ●           |
|                          |                                                     | Sealed type (with back cover)            | ◎                                | ◎          | ◎                       | ●          | —          | —            | —            | ◎           |
|                          |                                                     | With rotation speed measuring hole       | ◎*11                             | ●          | ◎                       | ●          | —          | —            | —            | —           |
|                          |                                                     | With inspection hole                     | ◎                                | ◎          | ◎                       | ●          | —          | —            | —            | ◎           |
|                          |                                                     | With acrylic inspection hole             | ◎                                | ◎          | ◎                       | ◎          | —          | —            | —            | —           |
|                          |                                                     | With one-touch inspection hole           | ◎                                | ◎          | ◎                       | ◎          | —          | —            | —            | ◎           |
|                          |                                                     | Front expand metal                       | ◎                                | ◎          | ◎                       | ◎          | —          | —            | —            | ●           |
|                          |                                                     | Split type                               | ◎                                | ◎          | ◎                       | ◎          | —          | —            | —            | ◎           |
|                          | V-belt                                              | High safety type                         | ◎                                | ◎          | ◎                       | ◎          | —          | —            | —            | ◎           |
|                          |                                                     | Change to red label                      | ◎                                | ◎          | ◎                       | ●          | —          | —            | —            | ◎           |
|                          | Motor opposite side *12                             | Changed to energy-saving red label       | ◎                                | ◎          | ◎                       | ◎          | —          | —            | —            | ◎           |
|                          |                                                     | —                                        | ◎                                | ◎          | ◎                       | ◎          | —          | —            | —            | ◎           |
|                          | Lubrication pipes                                   | Pulley side, opposite pulley side        | ◎                                | ◎          | ◎                       | ◎          | —          | —            | ◎            | ◎           |
|                          | Common base                                         | With base seat for post-installed anchor | —                                | ◎          | —                       | ◎          | ◎          | —            | ◎            | ◎           |
|                          |                                                     | Standard material (SS400)                | ◎                                | ◎          | ◎                       | ◎          | ◎          | ◎            | ◎            | ◎           |
|                          | Suction wire mesh                                   | —                                        | —                                | —          | ◎                       | ◎          | ◎          | —            | ◎            | —           |
|                          |                                                     | Made of SUS304                           | —                                | —          | ◎                       | ◎          | ◎          | —            | ◎            | —           |

\*1 "Heat-resistant silver painting, internal clearance C3 bearing (opposite pulley side), with heat radiation vane" as a heat-resistant measure.

\*2 "Heat-resistant silver painting, with heat radiation plate" as a heat-resistant measure.

\*3 Handling gas temperature: Max. 150°C "with shaft seal"

\*4 "Heat-resistant silver painting, with heat radiation vane" as a heat-resistant measure.

\*5 "Heat-resistant silver painting, bearing internal clearance C3 (opposite pulley side), with heat radiation vane and cooling vane" as a heat-resistant measures.

\*6 SOB/RS/RD types have rivet holes for duct fixing, while OB/HOH/VOH/MOB types do not.

\*7 Select a turbo fan (CTF2/3), etc.

\*8 The split casing is standard for No. 9 or higher.

\*9 Available only for No. 4.5 or higher.

\*10 Attached only on the pulley side. "Attached as standard for outdoor use, not for indoor use."

\*11 No. 3 and 4 include a rotation speed measuring hole as standard.

\*12 Applicable to TV only. Other items need to be considered each time.

## ■ Standard Specifications / Special Specifications / Standard Accessories / Special Accessories

● Standard specification, ◎ Special specification, — Not supported

| Model                   |                                                                                                                                               | CMF3-SOB-e<br>CMF3L-SOB-e | CMF3-RS -e | CMF3-OB-e<br>CMF3L-OB-e | CMF3-OB -e       | CMF3-HOH-e       | CMF II-VOH-e | CMF II-MOB-e | CMF II-RD-e |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------|-------------------------|------------------|------------------|--------------|--------------|-------------|
| Size                    |                                                                                                                                               | No.2~6                    | No.6.5~10  | No.2~6                  | No.6.5~12        | No.2~6           | No.2~6       | No.2~6       | No.2~8      |
| Material                | Casing : impeller :SS400, SPHC, Main shaft :S45C<br>(Motor shaft for HOH/VOH type is made of S35C)                                            | —                         | —          | —                       | —                | —                | ●            | ●            | ●           |
|                         | Casing : SS400, SPHC, impeller : SPHC, SM570<br>(High tensile strength steel plate)<br>Main shaft : S45C(Motor shaft of HOH/VOH type is S35C) | ●                         | ●          | ●                       | ●                | ●                | —            | —            | —           |
|                         | Casing/impeller/main shaft :SUS304 <sup>(※13, ※14)</sup>                                                                                      | —                         | —          | ◎                       | ◎                | ◎ <sup>※15</sup> | —            | ◎            | —           |
|                         | Casing/impeller/main shaft :SUS316 etc. <sup>(※13, ※14)</sup>                                                                                 | —                         | —          | ◎                       | ◎                | —                | —            | ◎            | —           |
|                         | SUS304 other than gas-contact part <sup>(※13, ※16)</sup>                                                                                      | —                         | —          | ◎                       | ◎                | ◎                | —            | ◎            | —           |
|                         | Casing and impeller: steel part: S-TEN (sulfuric acid resistant steel) <sup>※7</sup>                                                          | —                         | —          | —                       | —                | —                | —            | —            | —           |
| Installation location   | Indoors (ambient temperature 0 to 40°C, relative humidity 85% or less)                                                                        | ●                         | ●          | ●                       | ●                | ●                | ●            | ●            | ●           |
|                         | Outdoors (ambient temperature 0 to 40°C, relative humidity 85% or less)                                                                       | ◎                         | ◎          | ◎                       | ◎                | ◎                | ◎            | ◎            | ◎           |
| Installation method     | Floor type (B)                                                                                                                                | ●                         | ●          | ●                       | ●                | ●                | —            | ●            | ●           |
|                         | Vibration-proof floor type (D/ND) <sup>※17</sup>                                                                                              | ◎                         | ◎          | ◎                       | ◎                | ◎                | —            | ◎            | ◎           |
|                         | Ceiling mounted type (G/I/KI) <sup>※18</sup>                                                                                                  | ◎                         | —          | ◎                       | —                | ◎                | —            | —            | ◎           |
|                         | Ceiling mounted type with vibration isolator<br>(NI: Vibration-proof hanging frame type) <sup>※17, ※18</sup>                                  | ◎                         | —          | ◎                       | —                | ◎                | —            | —            | ◎           |
|                         | Equipment mounting                                                                                                                            | —                         | —          | —                       | —                | —                | ●            | —            | —           |
| Electric motor          | Totally-enclosed fan-cooled indoor type 3φ 200V IE3                                                                                           | ●                         | ●          | ●                       | ●                | ●                | ●            | ●            | ●           |
|                         | Totally-enclosed fan-cooled outdoor type                                                                                                      | ◎                         | ◎          | ◎                       | ◎                | ◎                | ◎            | ◎            | ◎           |
|                         | Different voltage                                                                                                                             | ◎                         | ◎          | ◎                       | ◎                | ◎                | ◎            | ◎            | ◎           |
|                         | Increased safety explosion-proof/flameproof                                                                                                   | ◎                         | ◎          | ◎                       | ◎                | ◎                | ◎            | ◎            | ◎           |
| Painting <sup>※19</sup> | Painting on the inside and outside surfaces: Polyester resin-based powder coating 7.5BG5/1.5                                                  | ●                         | ●          | ●                       | ●                | ●                | ●            | ●            | ●           |
|                         | Heat-resistant silver painting                                                                                                                | —                         | —          | ◎                       | ◎                | ◎                | —            | ◎            | —           |
|                         | Epoxy resin coating <sup>※20</sup>                                                                                                            | ◎                         | ◎          | ◎                       | ◎                | ◎                | ◎            | ◎            | ◎           |
|                         | PVC coating                                                                                                                                   | ◎                         | ◎          | ◎                       | ◎                | ◎                | ◎            | ◎            | ◎           |
|                         | Salt-resistant coating                                                                                                                        | ◎                         | ◎          | ◎                       | ◎                | ◎                | ◎            | ◎            | ◎           |
|                         | Specified paint color                                                                                                                         | ◎                         | ◎          | ◎                       | ◎                | ◎                | ◎            | ◎            | ◎           |
|                         | Common base (B-D base) Hot-dip galvanization (zinc-doped)                                                                                     | ◎ <sup>※21</sup>          | ◎          | ◎ <sup>※21</sup>        | ◎ <sup>※21</sup> | ◎ <sup>※21</sup> | —            | ◎            | ◎           |

※7 Select turbo fan (CTF II/3), etc.

※13 Parts made of Stainless steel are, in principle, unpainted.

※14 It is also possible to change the material of only specified parts. (e.g. only the impeller is made of SUS316, while the casing and main shaft is made of SUS304.)

※15 Except for main shaft. Available only for HOH-S, and unavailable for HOH-F.

※16 This applies to base, bearing stand, belt guard, bearing guard, and coupling guard. (Depends on the model.)

※17 Available with vibration isolation rubber, spring vibration isolator and earthquake-resistant stopper bolt.

※18 Available only for No. 4 or less.

※19 Motor manufacturer's painting specification is applied to the motor.

※20 Epoxy resin painting is not available for outdoor installation. For outdoor installation, if equivalent corrosion resistance is required, salt-resistant painting can be used.

※21 Hot dip-galvanization is applied to vibration absorber base (D base) only.

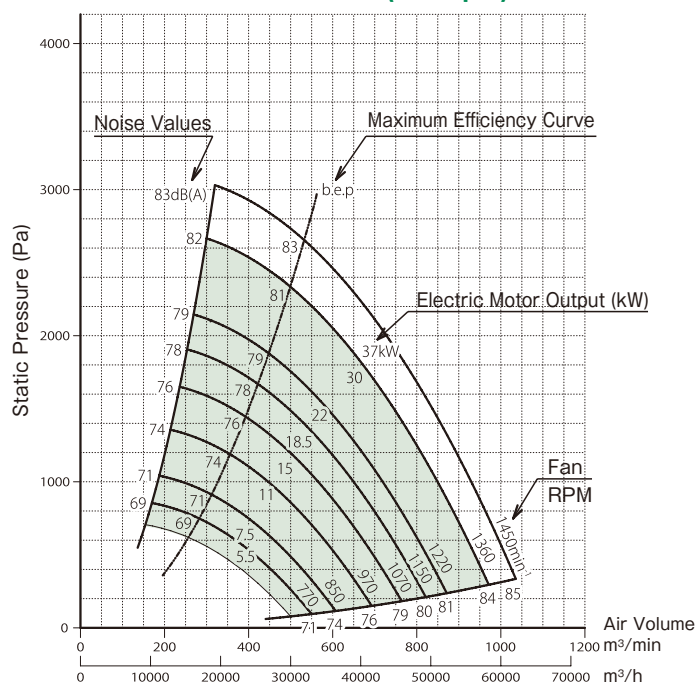
## ■ Discharge Rotation Direction (viewed from electric motor side)

|   | R (right rotation)                 | L (left rotation)                  |
|---|------------------------------------|------------------------------------|
| 1 | TH-R (top horizontal discharge)    | TH-L (top horizontal discharge)    |
| 2 | TV-R (top vertical discharge)      | TV-L (top vertical discharge)      |
| 3 | BH-R (bottom horizontal discharge) | BH-L (bottom horizontal discharge) |

## ■ Discharge Rotation Direction (viewed from pulley side)

|   | R (right rotation)                 | L (left rotation)                  |
|---|------------------------------------|------------------------------------|
| 1 | TH-R (top horizontal discharge)    | TH-L (top horizontal discharge)    |
| 2 | TV-R (top vertical discharge)      | TV-L (top vertical discharge)      |
| 3 | BH-R (bottom horizontal discharge) | BH-L (bottom horizontal discharge) |

## ■ How to use selection chart (Example) CMF3-No.6



Fan performance is indicated with figures measured in accordance to JIS B 8330 Testing methods for turbo-fans.

As the performance curves shown in this catalog are all shown under standard conditions (air conditions with temperature of 20°C, absolute pressure of 101.3 kPa, and relative humidity of 65%), when gases temperatures is other than 20°C, please make selections according to the pressures derived from the following formula.

$$P' = P \times \frac{\text{Absolute Temperature} + t}{\text{Absolute temperature} + 20} = P \times \frac{273 + t}{293}$$

Where

P': Static pressure to be applied to the selection chart (static pressure at 20°C) (Pa)

P: Required static pressure at t °C (Pa)

t: Suction air temperature (°C)

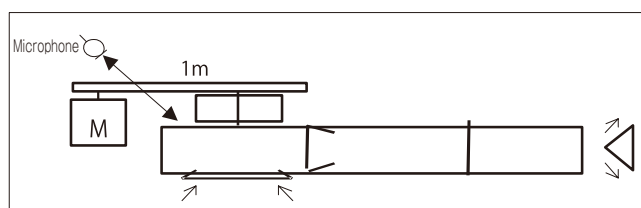
When the suction air temperature drops below 20°C, please make allowances for the electric motor outputs described in the catalog based on "3.5% when 10°C" and "7.5% when 0°C" as a guide.

## ■ Precautions for inverter operation

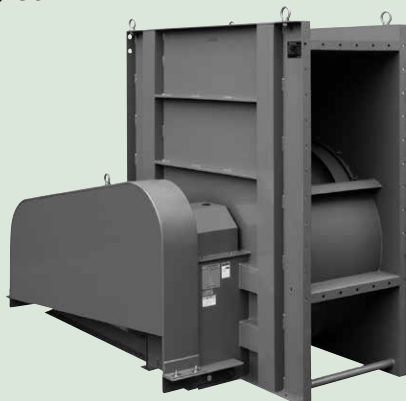
- (1) When you use a product with an inverter, please notify us of this fact before placing an order. Inverter operation may not be possible using an electric motor according to standard specifications.
- (2) The factory settings of commercial available inverters are not suitable for fans. When using an inverter with the factory settings, abnormal vibrations or fans damage may occur. Please make sure to reference the following information and configure the inverter settings before operation. Abnormal operation may be solved by modifying the inverter settings.
  - <Inverter Setting Values (for reference purposes)>
  - ① Basic Frequency: Set to specification frequency (frequency listed on the nameplate)
  - ② Maximum Frequency: Set to specification frequency (frequency listed on the nameplate)
  - ③ Maximum Output Voltage: Set to rated voltage of the electric motor
  - ④ Upper Limit Frequency: Set to specification frequency (frequency listed on the face plate)
  - ⑤ Lower Limit Frequency: If operated at a frequency lower than 25-30 Hz, the electric motor may not run, may generate heat and inverter output may become unstable.
  - ⑥ V/F Characteristics: Set to torque reduced by a factor of 2)
  - ⑦ Acceleration / Deceleration Time: Set to 30-40 seconds. If started or stopped in a shorter time, the inverter may trip.
- (3) When using with an inverter, please check that there are no abnormalities under any of the frequencies to be used during trial operation. If operated under conditions with abnormal vibrations, fan damage or other issues may occur. To avoid abnormal vibration, make the settings of the inverter to enable the frequency jump function for eigenvalue of the resonance frequency values of the fan, motor, fan + base.

## ■ Noise Values

- Suction end open, discharge connected to duct
- Sound from side at a position one meter away from the main unit
- Displayed on decibel dB (A) scale



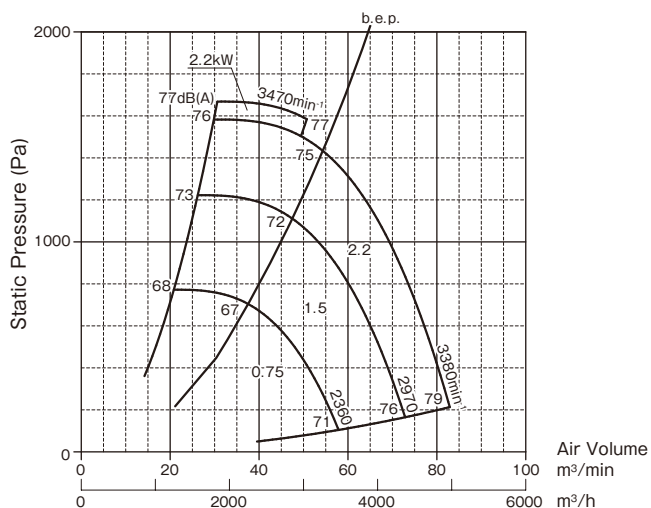
CMF3(L)-SOB



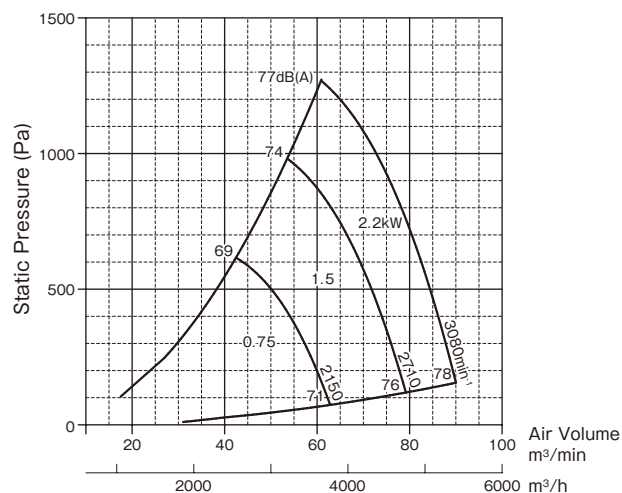
※Please note that the above image is a representative example and may differ partially from the actual device.

## Selection chart

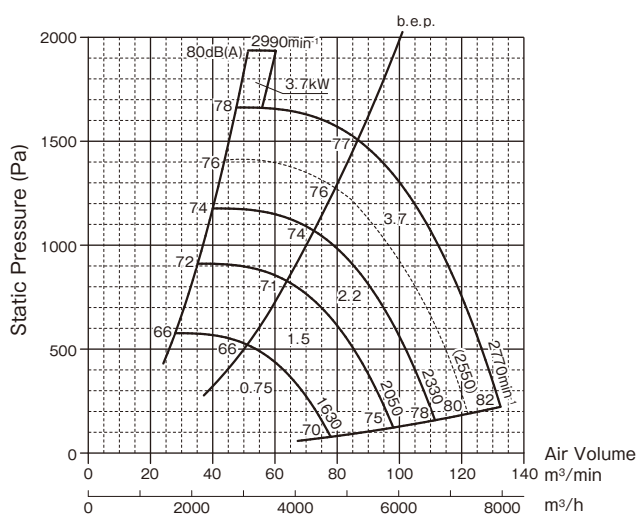
CMF3-No.2



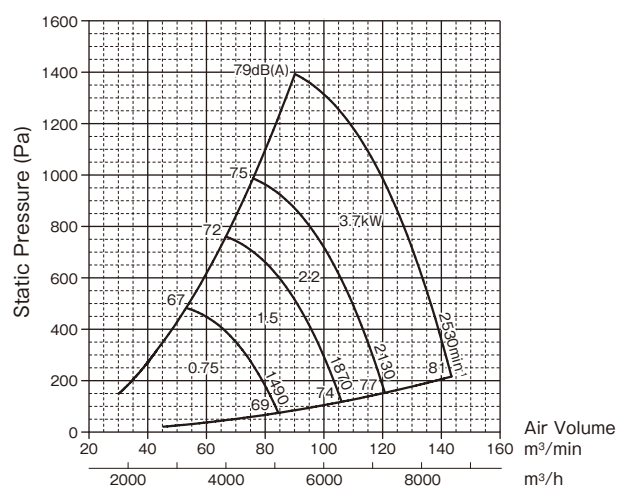
CMF3L-No.2



CMF3-No.2½

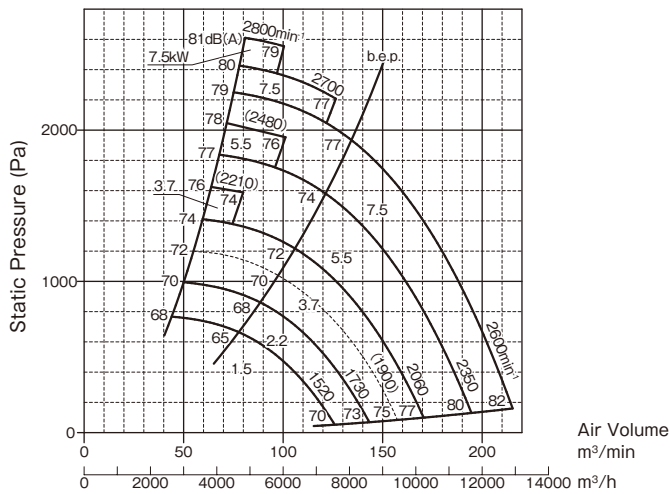


CMF3L-No.2½



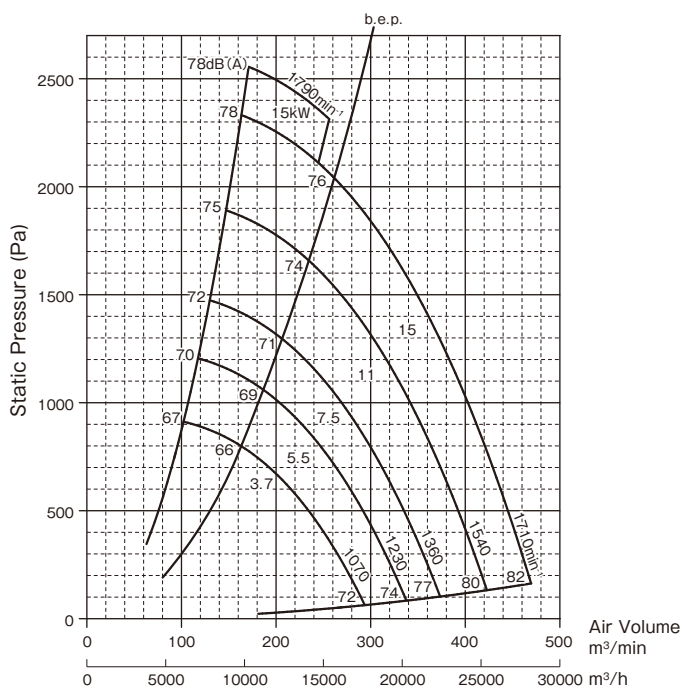
## ■ Selection chart

CMF3-No.3

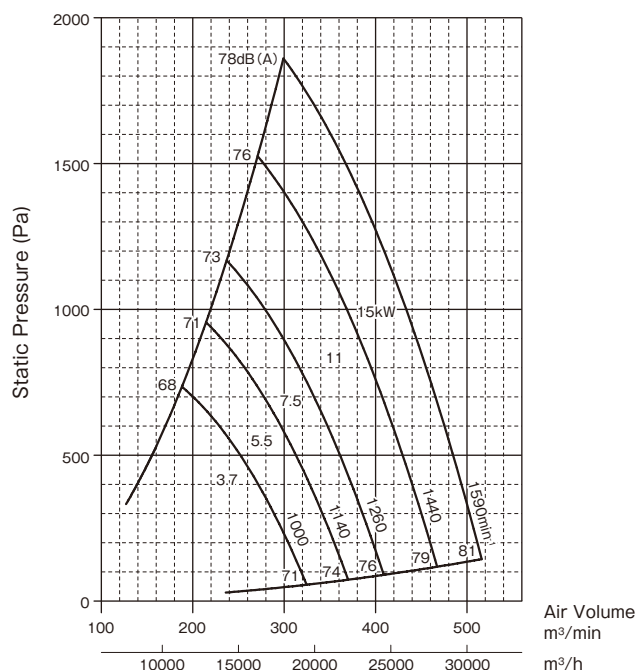


#### Selection chart

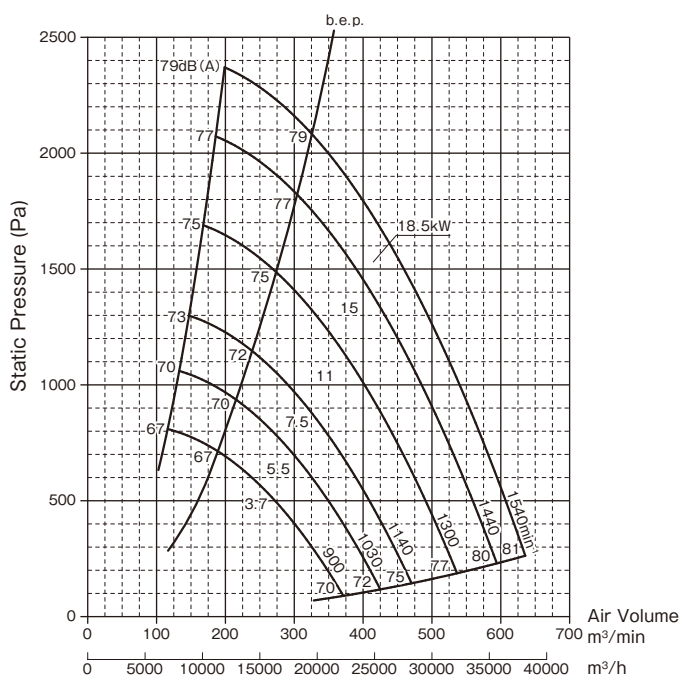
##### CMF3-No.4½



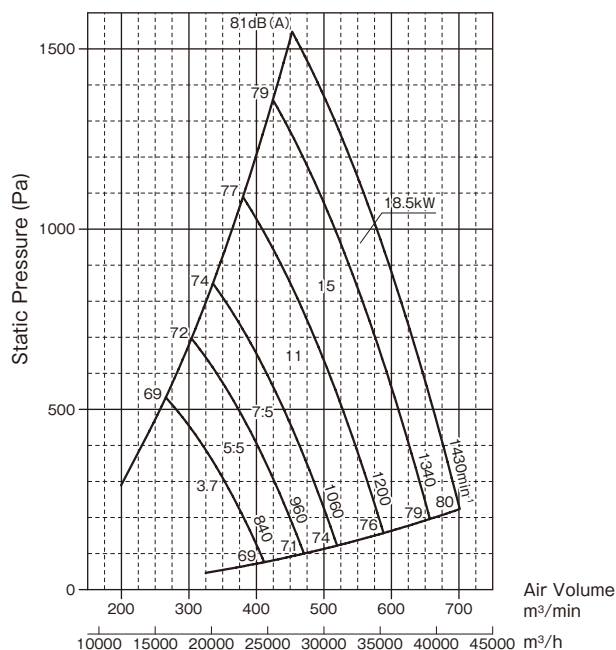
##### CMF3L-No.4½



##### CMF3-No.5

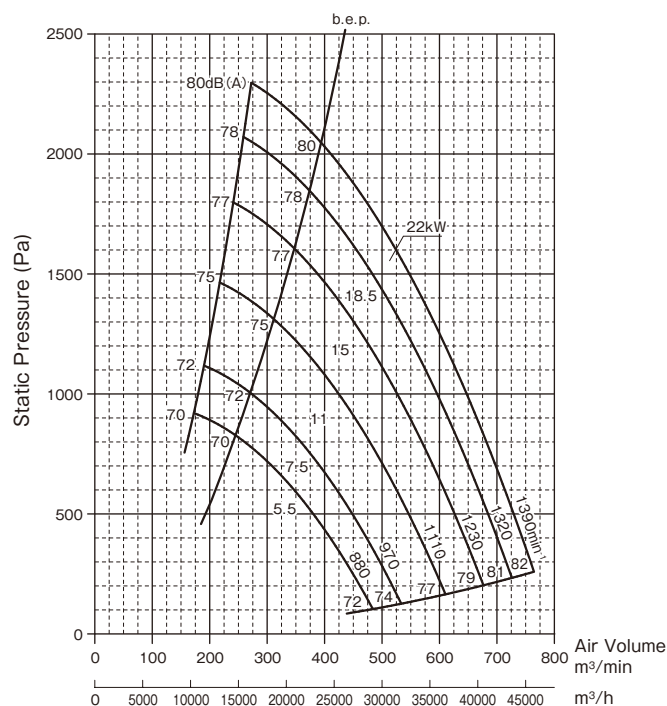


##### CMF3L-No.5

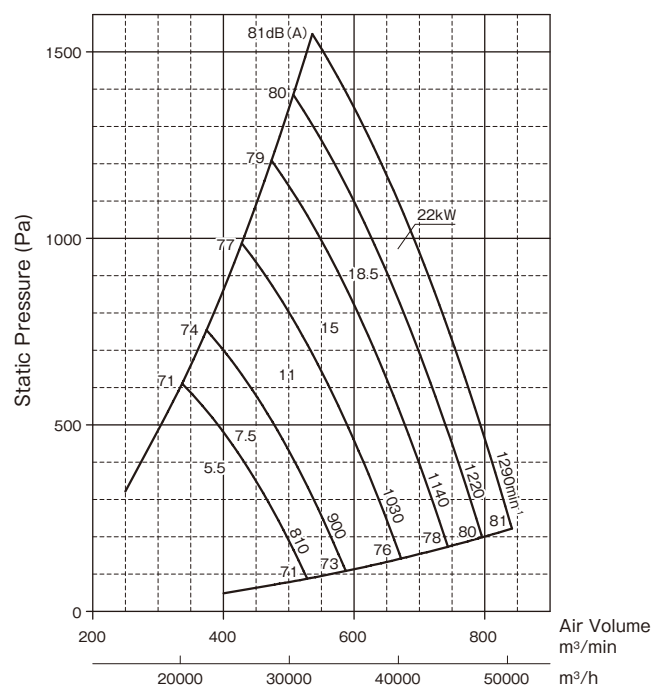


## ■ Selection chart

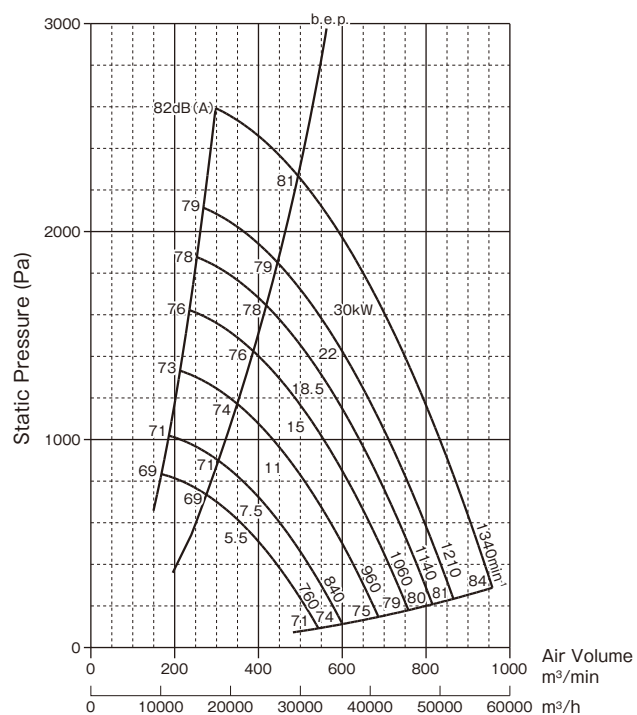
CMF3-No.5½



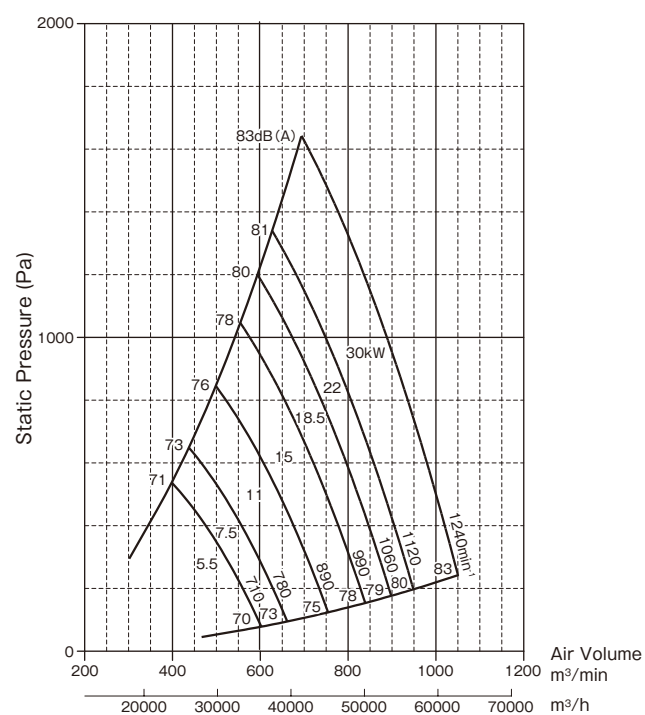
CMF3L-No.5½



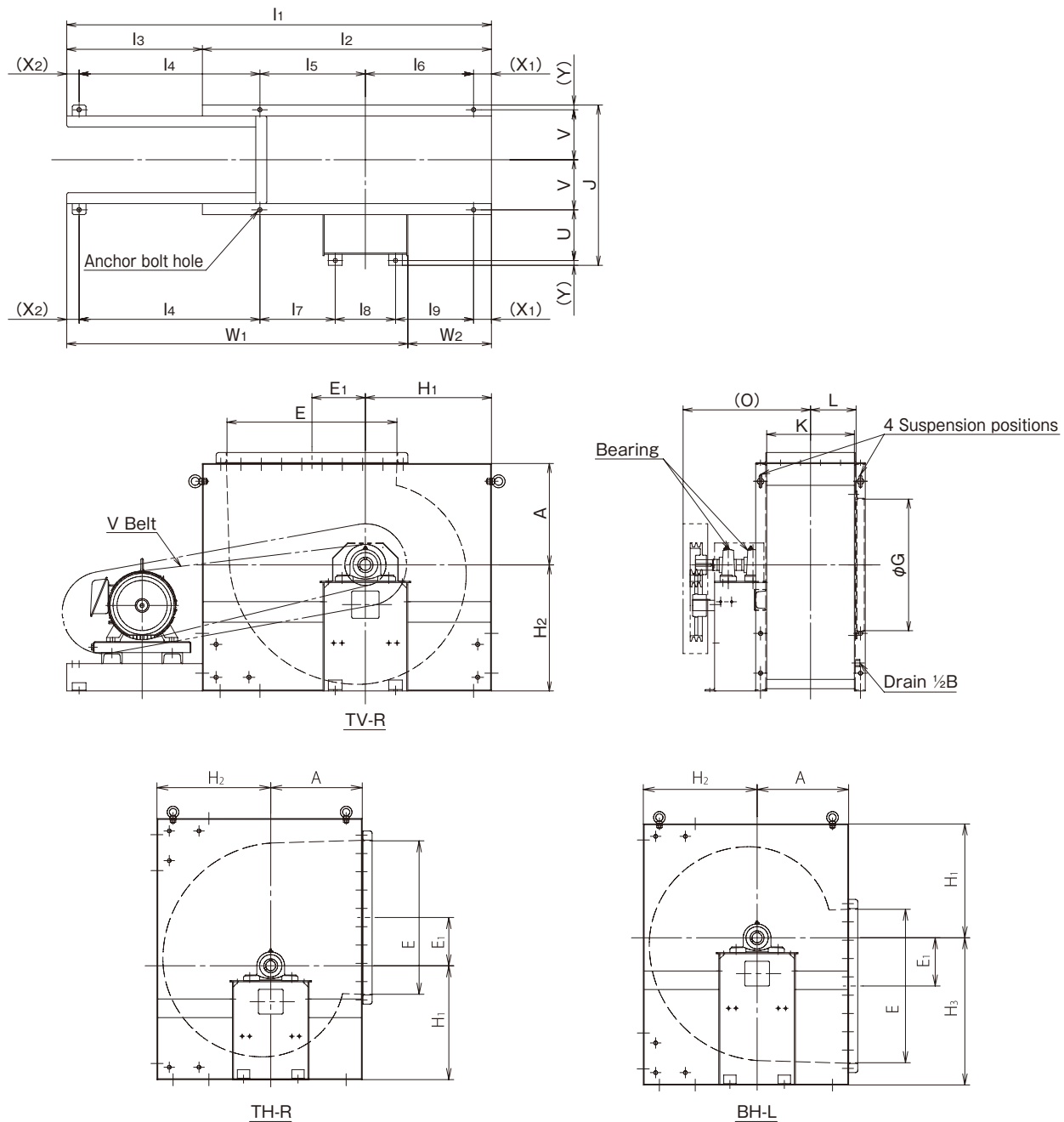
CMF3-No.6



CMF3L-No.6



#### ■ Assembly drawing (No.2~3, -B)



#### ■ Dimensions

(Unit: mm)

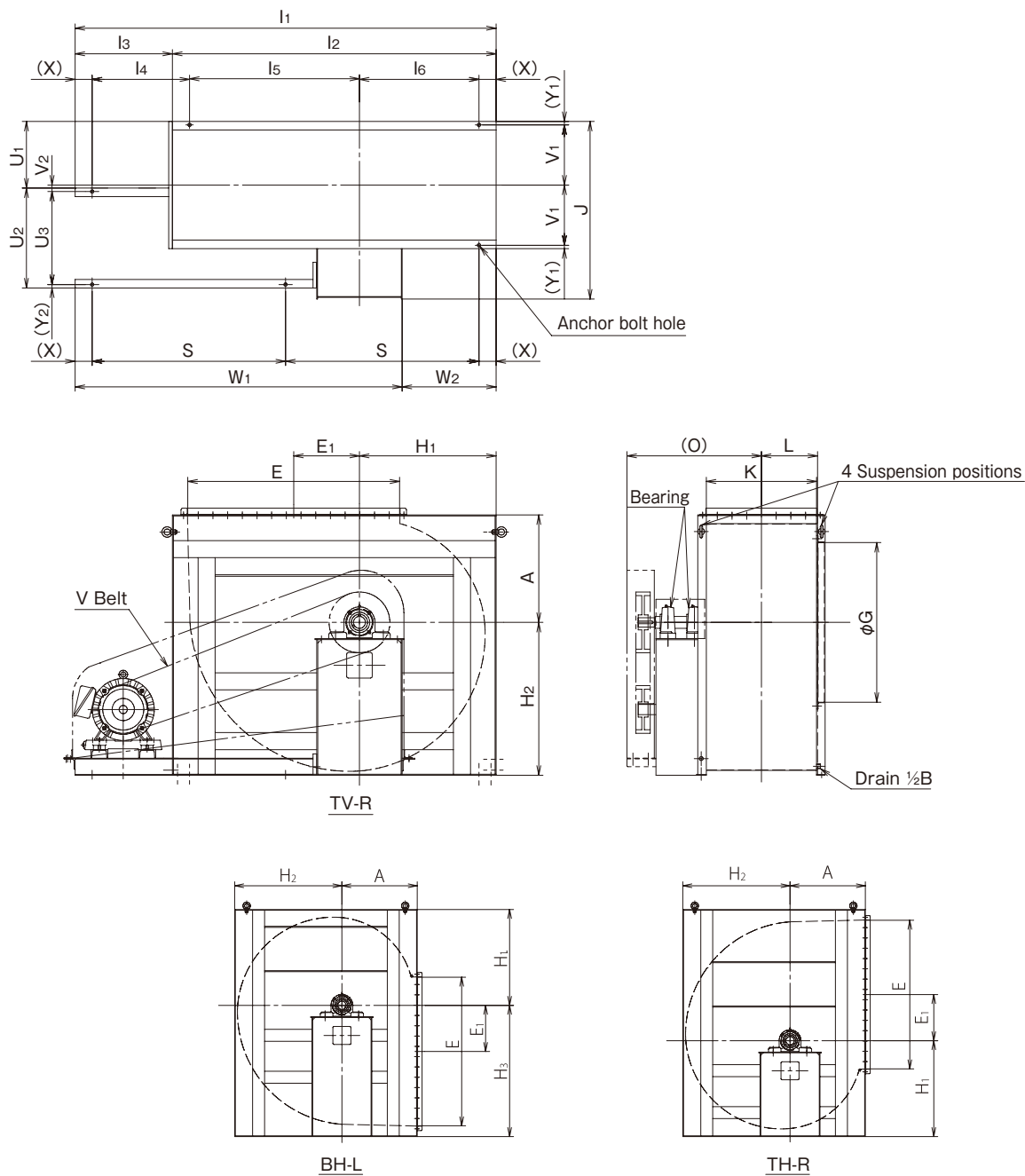
| No. | Main Unit |                |                |                |                |       |     | Suction Companion Flange | Discharge Companion Flange |     | Bearing     |                      | Max. Rotational Speed (min-1) (50/60Hz) | Max. Motor Output (kW) (max. frame no.) | Approximate Weight (Excluding Motor and Pulley) |
|-----|-----------|----------------|----------------|----------------|----------------|-------|-----|--------------------------|----------------------------|-----|-------------|----------------------|-----------------------------------------|-----------------------------------------|-------------------------------------------------|
|     | A         | E <sub>1</sub> | H <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | L     | O   | G                        | E                          | K   | Pulley Side | Opposite Pulley Side |                                         |                                         |                                                 |
| 2   | 260       | 132.5          | 300            | 300            | 420            | 112   | 323 | 310                      | 415                        | 210 | UCP306      | UCP306               | 3470                                    | 2.2 (100L)                              | 87kg                                            |
| 2½  | 310       | 157.5          | 390            | 390            | 495            | 140.5 | 350 | 400                      | 515                        | 270 | UCP306      | UCP306               | 2990                                    | 3.7 (112M)                              | 106kg                                           |
| 3   | 370       | 195            | 460            | 460            | 595            | 166.5 | 465 | 480                      | 620                        | 320 | UCP308      | UCP308               | 2800                                    | 7.5 (132M)                              | 162kg                                           |

| No. | Base           |                |                |                |                |                |                |                |                |                |                |                |                |                |                |                |                |                |                |                |                |                |                |     |       |                |                |      |                     |
|-----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|-------|----------------|----------------|------|---------------------|
|     | TV-R           |                |                |                |                |                |                |                |                |                |                |                | TH-R/BH-L      |                |                |                |                |                |                |                |                |                | TH-R/TV-R/BH-L |     |       |                |                |      | Anchor bolt<br>hole |
|     | l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | l <sub>4</sub> | l <sub>5</sub> | l <sub>6</sub> | l <sub>7</sub> | l <sub>8</sub> | l <sub>9</sub> | W <sub>1</sub> | W <sub>2</sub> | l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | l <sub>4</sub> | l <sub>5</sub> | l <sub>6</sub> | l <sub>7</sub> | l <sub>8</sub> | l <sub>9</sub> | W <sub>1</sub> | W <sub>2</sub> | J              | U   | V     | X <sub>1</sub> | X <sub>2</sub> | Y    |                     |
| 2   | 1155           | 720            | 435            | 510            | 300            | 245            | 200            | 200            | 145            | 1000           | 155            | 995            | 560            | 435            | 510            | 180            | 205            | 80             | 200            | 105            | 880            | 115            | 410            | 140 | 112.5 | 55             | 45             | 12.5 | 8×φ12               |
| 2½  | 1330           | 885            | 445            | 580            | 315            | 335            | 215            | 200            | 235            | 1085           | 245            | 1145           | 700            | 445            | 580            | 210            | 255            | 110            | 200            | 155            | 980            | 165            | 470            | 140 | 152.2 | 55             | 45             | 12.5 | 8×φ12               |
| 3   | 1550           | 1055           | 495            | 660            | 385            | 395            | 275            | 220            | 285            | 1245           | 305            | 1325           | 830            | 495            | 660            | 250            | 305            | 140            | 220            | 195            | 1110           | 215            | 585            | 185 | 182.5 | 65             | 45             | 17.5 | 8×φ15               |

※TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.

※Refer to the companion flange dimensional drawings for companion flange dimensions.

## ■ Assembly drawing (No.3½~6, -B)



## ■ Dimensions

(Unit: mm)

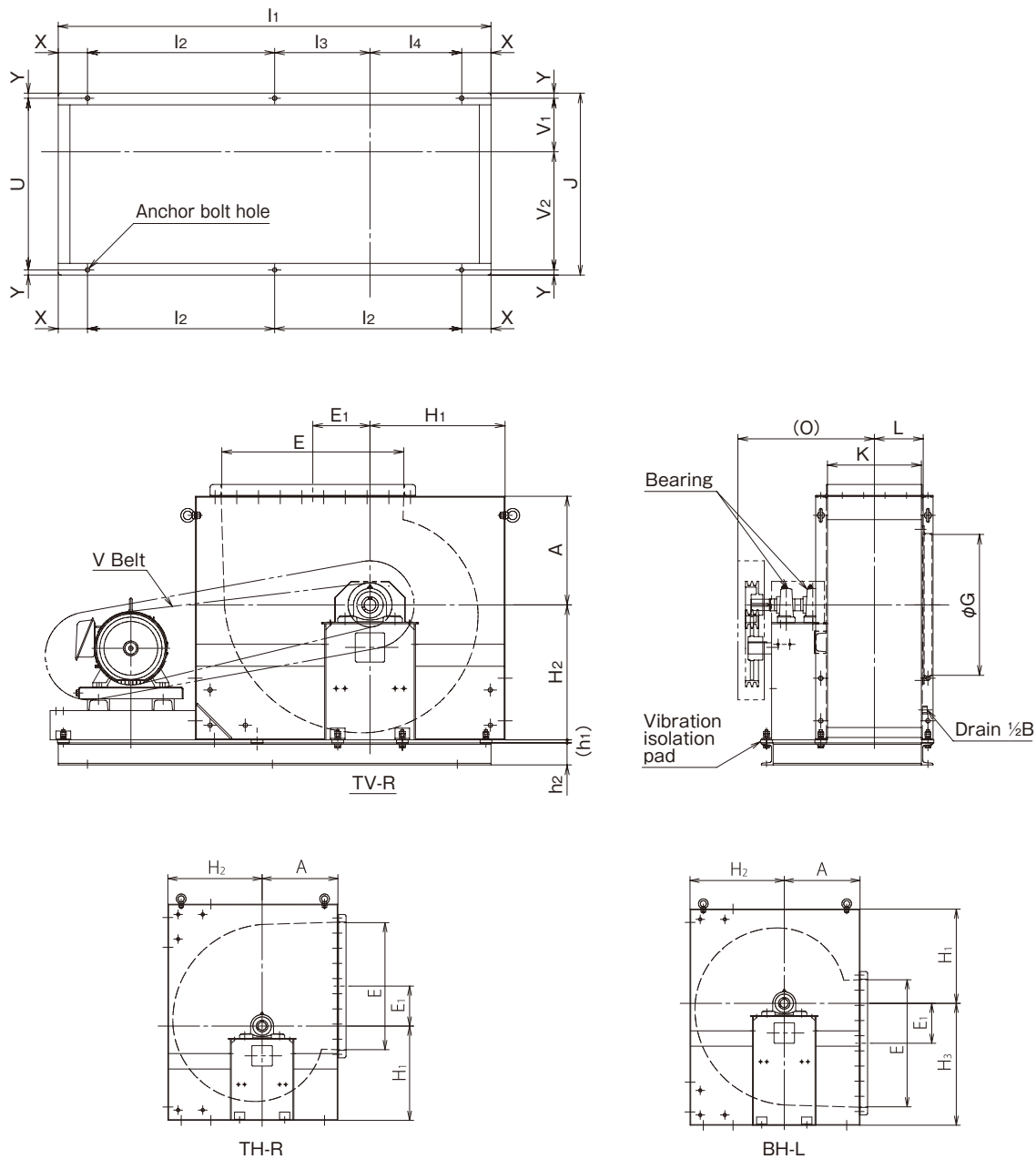
| No. | Main Unit |       |     |     |      |       |     | Suction Companion Flange | Discharge Companion Flange |     | Bearing     |                      | Max. Rotational Speed (50/60Hz) | Max. Motor Output (kW) (max. frame no.) | Approximate Weight (Excluding Motor and Pulley) |
|-----|-----------|-------|-----|-----|------|-------|-----|--------------------------|----------------------------|-----|-------------|----------------------|---------------------------------|-----------------------------------------|-------------------------------------------------|
|     | A         | E1    | H1  | H2  | H3   | L     | O   | G                        | E                          | K   | Pulley Side | Opposite Pulley Side |                                 |                                         |                                                 |
| 3½  | 430       | 227.5 | 540 | 540 | 680  | 194   | 546 | 550                      | 725                        | 375 | UCP309      | UCP309               | 2090                            | 7.5 (132M)                              | 204kg                                           |
| 4   | 500       | 260   | 600 | 600 | 765  | 221.5 | 588 | 630                      | 830                        | 430 | UCP310      | UCP310               | 1950                            | 11 (160M)                               | 248kg                                           |
| 4½  | 550       | 292.5 | 600 | 675 | 870  | 248.5 | 683 | 710                      | 930                        | 485 | UCP310      | UCP310               | 1790                            | 15 (160L)                               | 401kg                                           |
| 5   | 575       | 322.5 | 670 | 750 | 920  | 276   | 735 | 780                      | 1035                       | 540 | UCP312      | UCP312               | 1560                            | 18.5 (180M)                             | 490kg                                           |
| 5½  | 600       | 355   | 740 | 820 | 1010 | 301   | 764 | 860                      | 1140                       | 590 | UCP313      | UCP313               | 1410                            | 22 (180M)                               | 557kg                                           |
| 6   | 629       | 385   | 800 | 895 | 1095 | 328.5 | 803 | 935                      | 1240                       | 645 | UCP314      | UCP314               | 1360                            | 30 (180L)                               | 639kg                                           |

| No. | Base           |                |                |                |                |                |                |                |        |                |                |                |                |                |                |                |                |       |                |                |                |                |                |                |     |                |                |                     |
|-----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----------------|----------------|---------------------|
|     | TV-R           |                |                |                |                |                |                |                |        | TH-R/BH-L      |                |                |                |                |                |                |                |       | TH-R/TV-R/BH-L |                |                |                |                |                |     |                |                | Anchor bolt<br>hole |
|     | I <sub>1</sub> | I <sub>2</sub> | I <sub>3</sub> | I <sub>4</sub> | I <sub>5</sub> | I <sub>6</sub> | W <sub>1</sub> | W <sub>2</sub> | S      | I <sub>1</sub> | I <sub>2</sub> | I <sub>3</sub> | I <sub>4</sub> | I <sub>5</sub> | I <sub>6</sub> | W <sub>1</sub> | W <sub>2</sub> | S     | J              | U <sub>1</sub> | U <sub>2</sub> | U <sub>3</sub> | V <sub>1</sub> | V <sub>2</sub> | X   | Y <sub>1</sub> | Y <sub>2</sub> |                     |
| 3½  | 1720           | 1220           | 500            | 500            | 615            | 475            | 1355           | 365            | 795    | 1470           | 970            | 500            | 500            | 475            | 365            | 1215           | 255            | 670   | 652            | 292            | 350            | 315            | 210            | 80             | 65  | (19)           | 17.5           | 6×φ15               |
| 4   | 1965           | 1365           | 600            | 600            | 700            | 535            | 1555           | 410            | 917.5  | 1700           | 1100           | 600            | 600            | 535            | 435            | 1390           | 310            | 785   | 722            | 292            | 420            | 385            | 237.5          | 52.5           | 65  | (19)           | 17.5           | 6×φ15               |
| 4½  | 1970           | 1470           | 500            | 500            | 770            | 500            | 1560           | 410            | 885    | 1725           | 1225           | 500            | 500            | 575            | 450            | 1365           | 360            | 762.5 | 790            | 240            | 535            | 495            | 272.5          | 32.5           | 100 | 20             | 20             | 6×φ19               |
| 5   | 2110           | 1590           | 520            | 520            | 820            | 570            | 1660           | 450            | 955    | 1845           | 1325           | 520            | 520            | 650            | 475            | 1490           | 355            | 822.5 | 870            | 320            | 535            | 495            | 300            | 20             | 100 | 20             | 20             | 6×φ19               |
| 5½  | 2300           | 1750           | 550            | 550            | 910            | 640            | 1800           | 500            | 1050   | 1970           | 1420           | 550            | 550            | 720            | 500            | 1610           | 360            | 885   | 925            | 375            | 535            | 495            | 325            | 50             | 100 | 20             | 20             | 6×φ19               |
| 6   | 2465           | 1895           | 570            | 570            | 995            | 700            | 1915           | 550            | 1132.5 | 2094           | 1524           | 570            | 570            | 795            | 529            | 1715           | 379            | 947   | 990            | 390            | 585            | 545            | 352.5          | 37.5           | 100 | 20             | 20             | 6×φ19               |

\*TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.

\*Refer to the companion flange dimensional drawings for companion flange dimensions.

#### ■ Assembly drawing (No.2~3, -ND(D))



#### ■ Dimensions

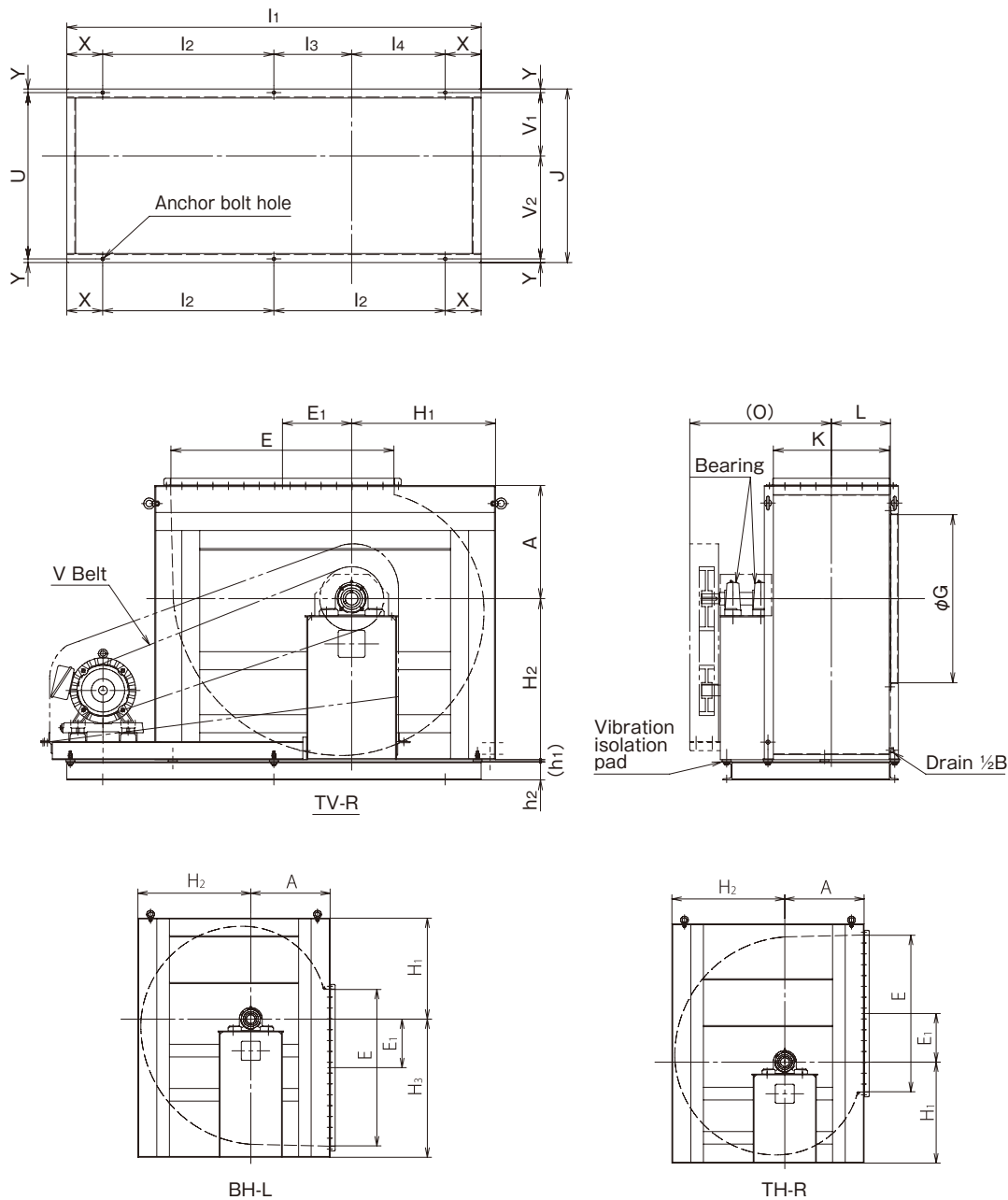
(Unit: mm)

| No. | Main Unit |                |                |                |                |       |     | Suction Companion Flange | Discharge Companion Flange |     | Bearing     |                      | Max. Rotational Speed (min <sup>-1</sup> ) (50/60Hz) | Max. Motor Output (kW) (max. frame no.) | Approximate Weight (Excluding Motor and Pulley) |
|-----|-----------|----------------|----------------|----------------|----------------|-------|-----|--------------------------|----------------------------|-----|-------------|----------------------|------------------------------------------------------|-----------------------------------------|-------------------------------------------------|
|     | A         | E <sub>1</sub> | H <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | L     | O   | G                        | E                          | K   | Pulley side | Opposite Pulley Side |                                                      |                                         |                                                 |
| 2   | 260       | 132.5          | 300            | 300            | 420            | 112   | 320 | 310                      | 415                        | 210 | UCP306      | UCP306               | 3470                                                 | 2.2 (100L)                              | 106kg                                           |
| 2½  | 310       | 157.5          | 390            | 390            | 495            | 140.5 | 350 | 400                      | 515                        | 270 | UCP306      | UCP306               | 2990                                                 | 3.7 (112M)                              | 128kg                                           |
| 3   | 370       | 195            | 460            | 460            | 595            | 166.5 | 474 | 480                      | 620                        | 320 | UCP308      | UCP308               | 2800                                                 | 7.5 (132M)                              | 189kg                                           |

| No. | Base           |                |                |                |                |                |                |                |                |     |                |                |     |      |                |                | Anchor bolt<br>hole |
|-----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----------------|----------------|-----|------|----------------|----------------|---------------------|
|     | TV-R           |                |                |                | TH-R/BH-L      |                |                |                | TV-R/TH-R/BH-L |     |                |                |     |      |                |                |                     |
|     | l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | l <sub>4</sub> | l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | l <sub>4</sub> | J              | U   | V <sub>1</sub> | V <sub>2</sub> | X   | Y    | h <sub>1</sub> | h <sub>2</sub> |                     |
| 2   | 1090           | 495            | 282.5          | 212.2          | 930            | 415            | 242.5          | 172.5          | 420            | 385 | 122.5          | 262.5          | 50  | 17.5 | 16             | 75             | 6×φ12               |
| 2½  | 1265           | 582.5          | 280            | 302.5          | 1080           | 490            | 267.5          | 222.5          | 480            | 445 | 152.5          | 292.5          | 50  | 17.5 | 16             | 75             | 6×φ12               |
| 3   | 1475           | 637.5          | 325            | 312.5          | 1250           | 525            | 302.5          | 222.5          | 585            | 550 | 182.5          | 367.5          | 100 | 17.5 | 16             | 75             | 6×φ15               |

※TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.  
 ※Refer to the companion flange dimensional drawings for companion flange dimensions.

## ■ Assembly drawing (No.3½~6, -ND(D))



## ■ Dimensions

(Unit: mm)

| No. | Main Unit |                |                |                |                |       |     | Suction Companion Flange | Discharge Companion Flange | Bearing |             | Max. Rotational Speed (50/60Hz) | Max. Motor Output (kW) (max. frame no.) | Approximate Weight (Excluding Motor and Pulley) |
|-----|-----------|----------------|----------------|----------------|----------------|-------|-----|--------------------------|----------------------------|---------|-------------|---------------------------------|-----------------------------------------|-------------------------------------------------|
|     | A         | E <sub>1</sub> | H <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | L     | O   | G                        | E                          | K       | Pulley Side | Opposite Pulley Side            |                                         |                                                 |
| 3½  | 430       | 227.5          | 540            | 540            | 680            | 194   | 546 | 550                      | 725                        | 375     | UCP309      | UCP309                          | 2090                                    | 7.5 (132M)                                      |
| 4   | 500       | 260            | 600            | 600            | 765            | 221.5 | 588 | 630                      | 830                        | 430     | UCP310      | UCP310                          | 1950                                    | 11 (160M)                                       |
| 4½  | 550       | 292.5          | 600            | 675            | 870            | 248.5 | 683 | 710                      | 930                        | 485     | UCP310      | UCP310                          | 1790                                    | 15 (160L)                                       |
| 5   | 575       | 322.5          | 670            | 750            | 920            | 276   | 735 | 780                      | 1035                       | 540     | UCP312      | UCP312                          | 1560                                    | 18.5 (180M)                                     |
| 5½  | 600       | 355            | 740            | 820            | 1010           | 301   | 764 | 860                      | 1140                       | 590     | UCP313      | UCP313                          | 1410                                    | 22 (180M)                                       |
| 6   | 629       | 385            | 800            | 895            | 1095           | 328.5 | 803 | 935                      | 1240                       | 645     | UCP314      | UCP314                          | 1360                                    | 30 (180L)                                       |

| No. | Base           |                |                |                |                |                |                |                |                |     |                |                |     |      |                |                |       | Anchor bolt<br>hole |
|-----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----------------|----------------|-----|------|----------------|----------------|-------|---------------------|
|     | TV-R           |                |                |                | TH-R/BH-L      |                |                |                | TH-R/TV-R/BH-L |     |                |                |     |      |                |                |       |                     |
|     | l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | l <sub>4</sub> | l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | l <sub>4</sub> | J              | U   | V <sub>1</sub> | V <sub>2</sub> | X   | Y    | h <sub>1</sub> | h <sub>2</sub> |       |                     |
| 3½  | 1625           | 712.5          | 320            | 392.5          | 1375           | 587.5          | 305            | 282.5          | 640            | 605 | 210            | 395            | 100 | 17.5 | 16             | 75             | 6×φ15 |                     |
| 4   | 1870           | 835            | 382.5          | 452.5          | 1605           | 702.5          | 350            | 352.5          | 710            | 675 | 237.5          | 437.5          | 100 | 17.5 | 16             | 75             | 6×φ15 |                     |
| 4½  | 1810           | 730            | 385            | 345            | 1585           | 607.5          | 312.5          | 295            | 775            | 735 | 272.5          | 462.5          | 175 | 20   | 18             | 100            | 6×φ19 |                     |
| 5   | 1950           | 800            | 385            | 415            | 1685           | 667.5          | 347.5          | 320            | 855            | 815 | 300            | 515            | 175 | 20   | 18             | 100            | 6×φ19 |                     |
| 5½  | 2140           | 870            | 410            | 460            | 1810           | 705            | 385            | 320            | 910            | 870 | 325            | 545            | 200 | 20   | 18             | 100            | 6×φ19 |                     |
| 6   | 2305           | 952.5          | 432.5          | 520            | 1934           | 767            | 418            | 349            | 975            | 935 | 352.5          | 582.5          | 200 | 20   | 18             | 100            | 6×φ19 |                     |

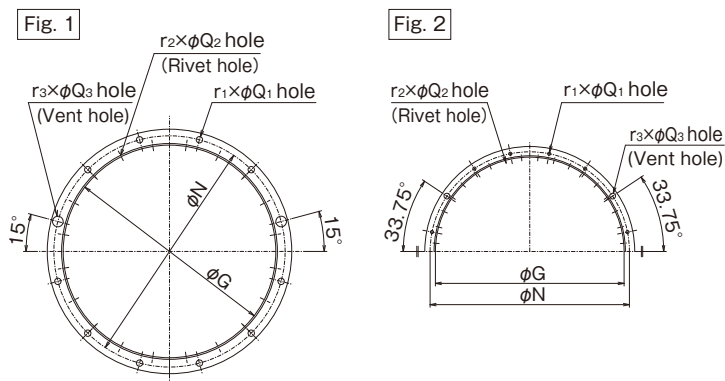
※TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.

※Refer to the companion flange dimensional drawing for companion flange dimensions.

### Companion Flange Dimensional Drawing

Suction Companion Flange

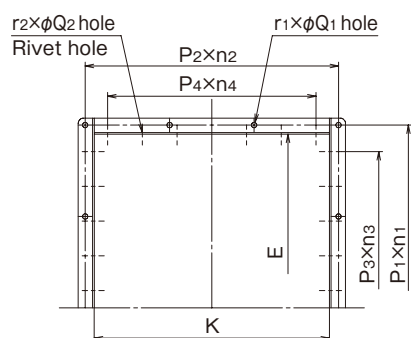
(Unit: mm)



| No. | G   | N   | r1×Q1 | r2×Q2<br>Rivet hole | r3×Q3<br>Escape hole | Steel material<br>size | Fig.<br>No. |
|-----|-----|-----|-------|---------------------|----------------------|------------------------|-------------|
| 2   | 310 | 350 | 10×10 | 16×4.9              | 2×15                 | L30×30×3               | 1           |
| 2½  | 400 | 435 | 10×12 | 20×4.9              | 2×20                 | L30×30×3               |             |
| 3   | 480 | 515 | 10×12 | 24×4.9              | 2×20                 | L30×30×3               |             |
| 3½  | 550 | 590 | 10×12 | 28×4.9              | 2×20                 | L40×40×3               | 2           |
| 4   | 630 | 670 | 12×12 | 32×4.9              | 4×20                 | L40×40×3               |             |
| 4½  | 710 | 750 | 12×12 | 36×4.9              | 4×20                 | L40×40×3               |             |
| 5   | 780 | 825 | 12×12 | 40×4.9              | 4×20                 | L40×40×3               |             |
| 5½  | 860 | 905 | 12×12 | 44×4.9              | 4×20                 | L40×40×3               | 2           |
| 6   | 935 | 980 | 12×12 | 48×4.9              | 4×20                 | L40×40×3               |             |

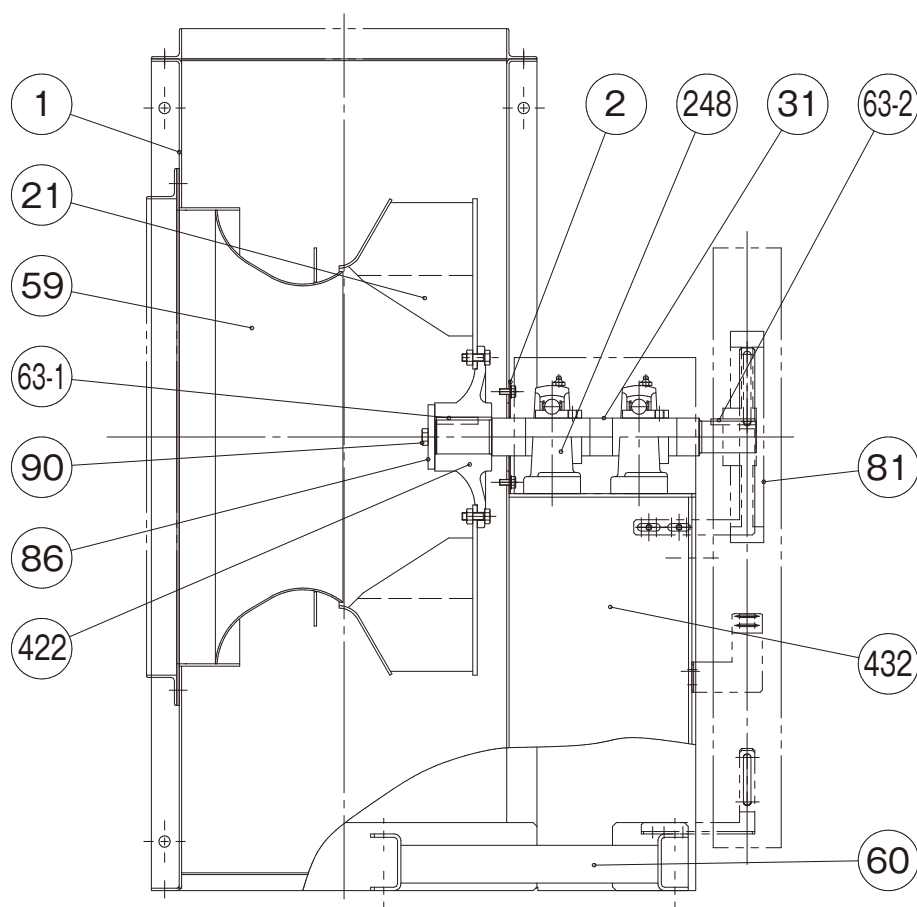
Discharge Companion Flange

(Unit: mm)



| No. | E    | K   | P1 × n1 | P2 × n2 | P3 × n3<br>Rivet hole pitch | P4 × n4<br>Rivet hole pitch | r1 × Q1 | r2 × Q2<br>Rivet hole | Steel material<br>size |
|-----|------|-----|---------|---------|-----------------------------|-----------------------------|---------|-----------------------|------------------------|
| 2   | 415  | 210 | 90 × 5  | 82 × 3  | 62 × 6                      | 62 × 2                      | 16×10   | 20×4.9                | L30×30×3               |
| 2½  | 515  | 270 | 92 × 6  | 76.5×4  | 58 × 8                      | 58 × 4                      | 20×10   | 28×4.9                | L30×30×3               |
| 3   | 620  | 320 | 74 × 9  | 73 × 5  | 63 × 9                      | 63 × 4                      | 28×12   | 30×4.9                | L40×40×3               |
| 3½  | 725  | 375 | 77 × 10 | 84 × 5  | 62×11                       | 62 × 5                      | 30×12   | 36×4.9                | L40×40×3               |
| 4   | 830  | 430 | 87.5×10 | 95 × 5  | 64×12                       | 64 × 6                      | 30×12   | 40×4.9                | L40×40×3               |
| 4½  | 930  | 485 | 97.5×10 | 88.5×6  | 62×14                       | 62 × 7                      | 32×12   | 46×4.9                | L40×40×3               |
| 5   | 1035 | 540 | 98 × 11 | 97.5×6  | 62×16                       | 62 × 8                      | 34×12   | 52×4.9                | L40×40×3               |
| 5½  | 1140 | 590 | 91 × 13 | 91 × 7  | 60×18                       | 60 × 9                      | 40×12   | 58×4.9                | L40×40×3               |
| 6   | 1240 | 645 | 86 × 15 | 86 × 8  | 60×20                       | 60×10                       | 46×15   | 64×4.9                | L40×40×3               |

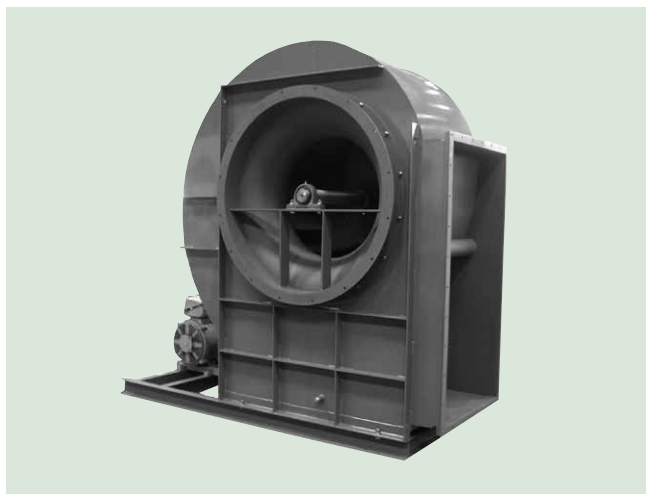
### Internal structure drawing



| Code | Part name                 | Qty | Material     |
|------|---------------------------|-----|--------------|
| 1    | Casing                    | 1   | SPHC · SS400 |
| 21   | Impeller                  | 1   | SPHC · SM570 |
| 422  | Impeller Boss             | 1   | FCD450       |
| 86   | Impeller retaining washer | 1   | SS400        |
| 90   | Impeller Tap Bolt         | 1   | SWCH         |
| 63-1 | Impeller Key              | 1   | S45C         |
| 59   | Suction opening           | 1   | SPHC         |

| Code | Part name    | Qty | Material     |
|------|--------------|-----|--------------|
| 31   | Shaft        | 1   | S45C         |
| 81   | V Pulley     | 1   | FC200        |
| 63-2 | V Pulley Key | 1   | S45C         |
| 432  | Bearing base | 1   | SPHC         |
| 60   | Common Base  | 1   | SPHC · SS400 |
| 2    | Casing Cover | 1   | SPHC         |

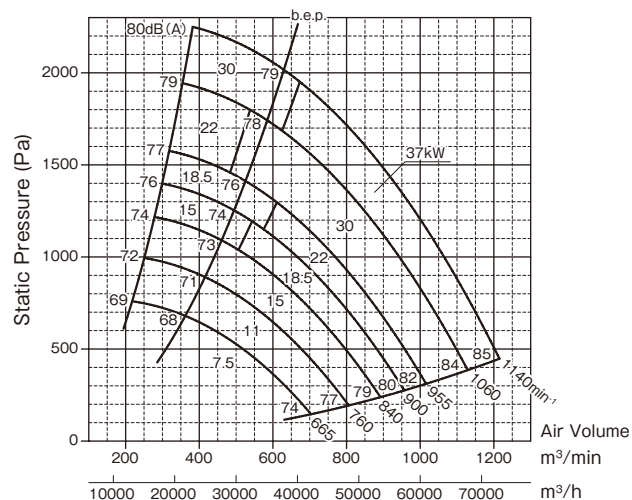
| Code | Part name    | Qty | Material | No.2   | No.2½  | No.3   | No.3½  | No.4   | No.4½  | No.5   | No.5½  | No.6   |
|------|--------------|-----|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 248  | Pillow Block | 2   | SUJ      | UCP306 | UCP306 | UCP308 | UCP309 | UCP310 | UCP310 | UCP312 | UCP313 | UCP314 |



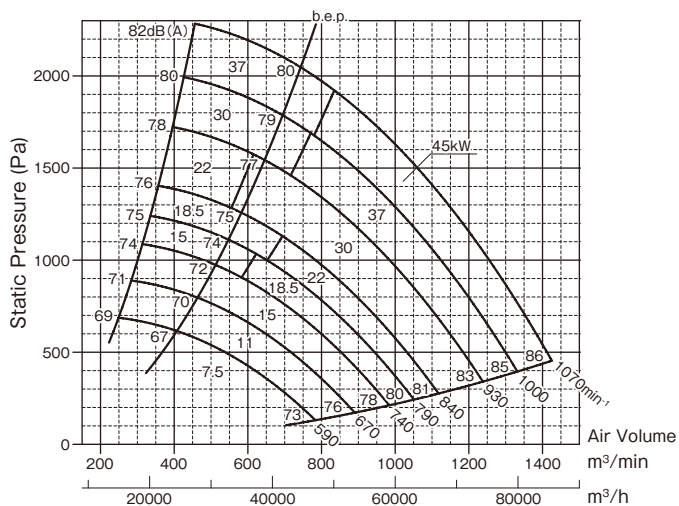
※Please note that the above image is a representative example and may differ partially from the actual device.

### Selection chart

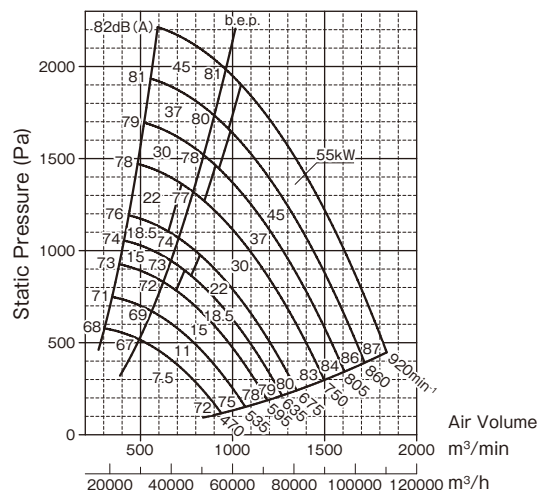
#### No.6½



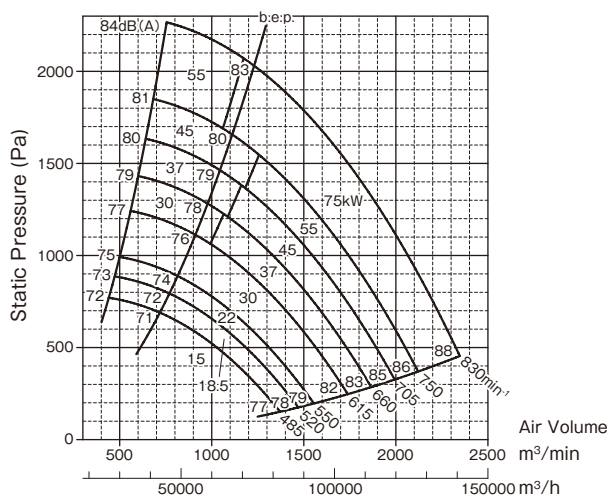
#### No.7



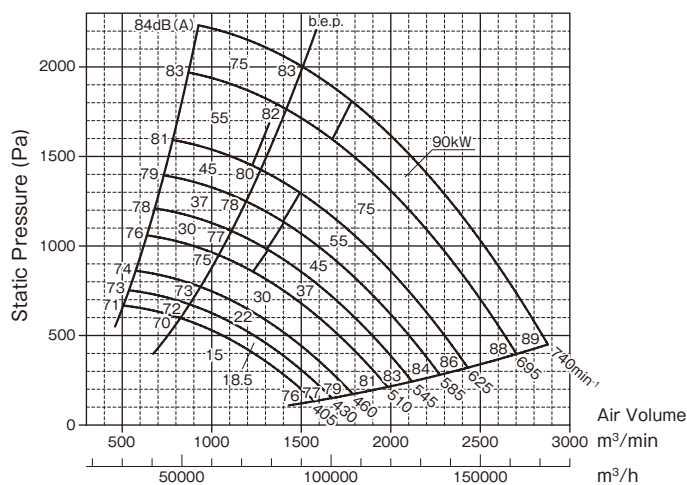
#### No.8



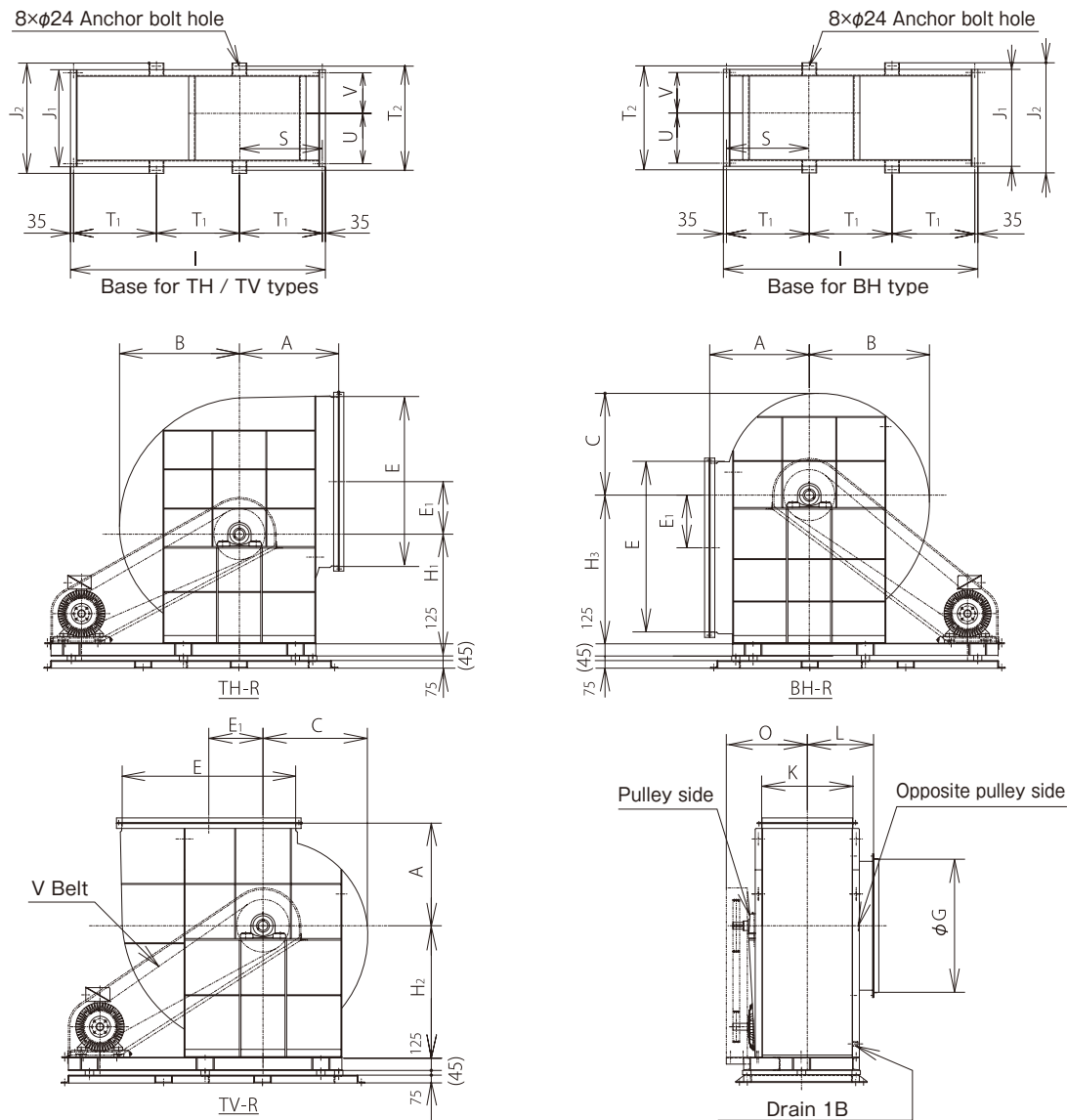
#### No.9



#### No.10



## ■ Assembly drawing (No.6½~8)



※The drawing shows D installation method (floor type vibration-proof). B type (with common base) has only the common base, and does not include a vibration isolation base.

## ■ Dimensions

(Unit: mm)

| No. | Main Unit |      |      |                |                |                |                |     |     | Suction Companion Flange | Discharge Companion Flange |     | Bearing     |                      | Max. Rotational Speed (50/60Hz) | Max. Motor Output (kW) (max. frame no.) | Approximate Weight (Excluding Motor and Pulley) |
|-----|-----------|------|------|----------------|----------------|----------------|----------------|-----|-----|--------------------------|----------------------------|-----|-------------|----------------------|---------------------------------|-----------------------------------------|-------------------------------------------------|
|     | A         | B    | C    | E <sub>1</sub> | H <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | L   | O   | G                        | E                          | K   | Pulley Side | Opposite Pulley Side |                                 |                                         |                                                 |
| 6½  | 790       | 1005 | 815  | 420            | 840            | 1020           | 1170           | 550 | 690 | 1030                     | 1345                       | 700 | UCP315      | UCP213               | 1120/1140                       | 37 (200L)                               | 900kg                                           |
| 7   | 855       | 1080 | 875  | 450            | 935            | 1090           | 1260           | 575 | 720 | 1105                     | 1450                       | 750 | UCP316      | UCP214               | 1050/1070                       | 45 (200L)                               | 1050kg                                          |
| 8   | 975       | 1235 | 1000 | 515.5          | 1070           | 1250           | 1450           | 630 | 770 | 1265                     | 1655                       | 860 | UCP318      | UCP214               | 920/920                         | 55 (225S)                               | 1300kg                                          |

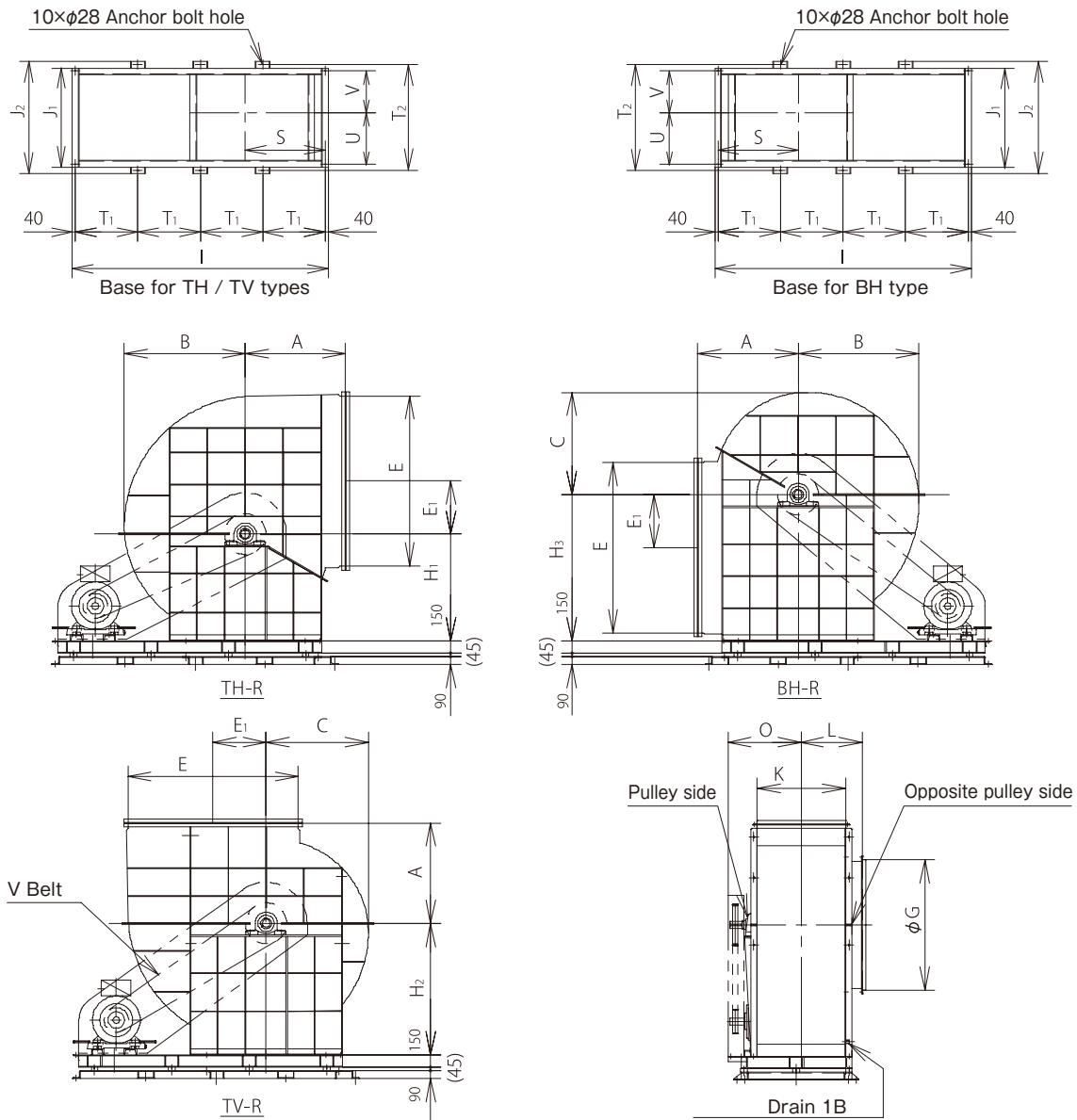
| No. | Base |                |                |     |                |                |     |     |
|-----|------|----------------|----------------|-----|----------------|----------------|-----|-----|
|     | I    | J <sub>1</sub> | J <sub>2</sub> | S   | T <sub>1</sub> | T <sub>2</sub> | U   | V   |
| 6½  | 2530 | 940            | 1090           | 775 | 820            | 1020           | 490 | 380 |
| 7   | 2620 | 990            | 1140           | 815 | 850            | 1070           | 515 | 405 |
| 8   | 2890 | 1100           | 1250           | 935 | 940            | 1180           | 570 | 460 |

※TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.

※Split type casing is also available.

※Refer to the companion flange dimensional drawing for companion flange dimensions.

#### ■ Assembly drawing (No.9~10)



※The drawing shows D installation method (floor type vibration-proof). B type (with common base) has only the common base, and does not include a vibration isolation base.

#### ■ Dimensions

(Unit: mm)

| No. | Main Unit |      |      |                |                |                |                |     |     | Suction Companion Flange | Discharge Companion Flange |      | Bearing     |                      | Max. Rotational Speed (50/60Hz) | Max. Motor Output (kW) (max. frame no.) | Approximate Weight (Excluding Motor and Pulley) |
|-----|-----------|------|------|----------------|----------------|----------------|----------------|-----|-----|--------------------------|----------------------------|------|-------------|----------------------|---------------------------------|-----------------------------------------|-------------------------------------------------|
|     | A         | B    | C    | E <sub>1</sub> | H <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | L   | O   | G                        | E                          | K    | Pulley Side | Opposite Pulley Side |                                 |                                         |                                                 |
| 9   | 1100      | 1330 | 1120 | 580.5          | 1200           | 1450           | 1700           | 683 | 870 | 1425                     | 1860                       | 965  | UCP319      | UCP317               | 830                             | 75 (250S)                               | 1900kg                                          |
| 10  | 1220      | 1470 | 1240 | 645            | 1300           | 1600           | 1780           | 738 | 920 | 1580                     | 2070                       | 1075 | UCP320      | UCP318               | 740                             | 90 (250M)                               | 2300kg                                          |

| No. | Base |                |                |      |                |                |       |       |
|-----|------|----------------|----------------|------|----------------|----------------|-------|-------|
|     | I    | J <sub>1</sub> | J <sub>2</sub> | S    | T <sub>1</sub> | T <sub>2</sub> | U     | V     |
| 9   | 3280 | 1235           | 1415           | 990  | 800            | 1335           | 637.5 | 517.5 |
| 10  | 3480 | 1345           | 1525           | 1090 | 850            | 1445           | 692.5 | 572.5 |

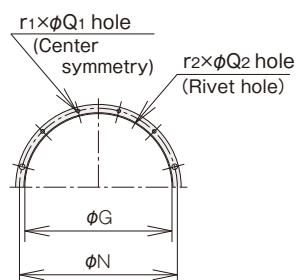
※TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.

※Split type casing is also available.

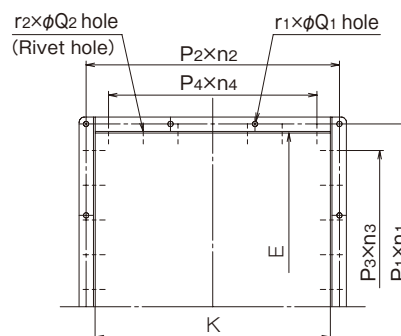
※Refer to the companion flange dimensional drawing for companion flange dimensions.

## Companion Flange Dimensional Drawing

Suction Companion Flange



Discharge Companion Flange



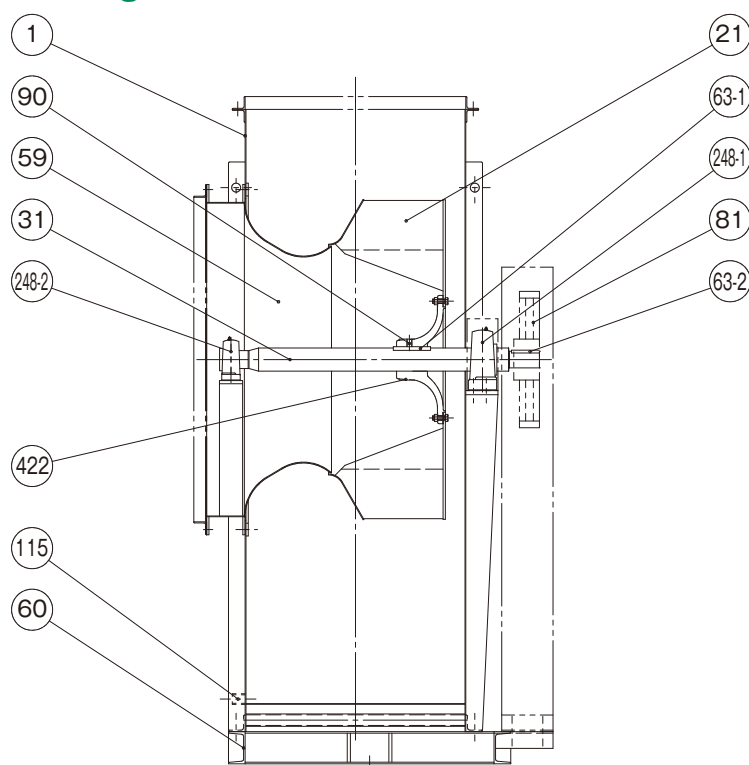
(Unit: mm)

| No. | G    | N    | r <sub>1</sub> × Q <sub>1</sub> | r <sub>2</sub> × Q <sub>2</sub><br>Rivet hole | Steel material<br>size |
|-----|------|------|---------------------------------|-----------------------------------------------|------------------------|
| 6½  | 1030 | 1090 | 16×15                           | 52×4.9                                        | L50×50×4               |
| 7   | 1105 | 1165 | 16×15                           | 56×4.9                                        | L50×50×4               |
| 8   | 1265 | 1325 | 16×15                           | 64×4.9                                        | L50×50×4               |
| 9   | 1425 | 1485 | 20×15                           | 72×4.9                                        | L50×50×4               |
| 10  | 1580 | 1640 | 20×15                           | 80×4.9                                        | L50×50×4               |

(Unit: mm)

| No. | E    | K    | P <sub>1</sub> × n <sub>1</sub> | P <sub>2</sub> × n <sub>2</sub> | P <sub>3</sub> × n <sub>3</sub><br>Rivet hole pitch | P <sub>4</sub> × n <sub>4</sub><br>Rivet hole pitch | r <sub>1</sub> × Q <sub>1</sub> | r <sub>2</sub> × Q <sub>2</sub><br>Rivet hole | Steel material<br>size |
|-----|------|------|---------------------------------|---------------------------------|-----------------------------------------------------|-----------------------------------------------------|---------------------------------|-----------------------------------------------|------------------------|
| 6½  | 1345 | 700  | 175 × 8                         | 152×5                           | 62×21                                               | 62×10                                               | 26×15                           | 66×4.9                                        | L50×50×4               |
| 7   | 1450 | 750  | 168 × 9                         | 162×5                           | 64×22                                               | 64×11                                               | 28×15                           | 70×4.9                                        | L50×50×4               |
| 8   | 1655 | 860  | 171 ×10                         | 153×6                           | 62×26                                               | 62×13                                               | 32×15                           | 82×4.9                                        | L50×50×4               |
| 9   | 1860 | 965  | 160 ×12                         | 170×6                           | 65×28                                               | 65×14                                               | 36×15                           | 88×4.9                                        | L50×50×4               |
| 10  | 2070 | 1075 | 177.5×12                        | 162×7                           | 63×32                                               | 63×16                                               | 38×15                           | 100×4.9                                       | L50×50×4               |

## Internal structure drawing

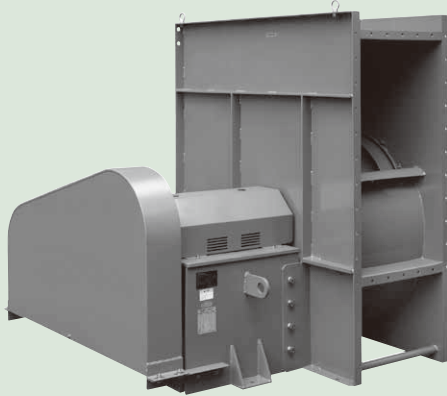


| Code | Part name         | Qty | Material            |
|------|-------------------|-----|---------------------|
| 1    | Casing            | 1   | SPHC · SS400        |
| 21   | Impeller          | 1   | SM (JFE-HITEN590SA) |
| 422  | Impeller Boss     | 1   | FCD450 (FCD400)     |
| 90   | Impeller Tap Bolt | 2   | SS400               |
| 63-1 | Impeller Key      | 1   | S45C                |
| 59   | Suction opening   | 1   | SPHC · SS400        |

| Code | Part name    | Qty | Material |
|------|--------------|-----|----------|
| 31   | Shaft        | 1   | S45C     |
| 81   | V Pulley     | 1   | FC200    |
| 63-2 | V Pulley Key | 1   | S45C     |
| 60   | Common Base  | 1   | SS400    |
| 115  | Drain        | 1   | SS400    |

| Code  | Part name    | Qty | Material | No.6½  | No.7   | No.8   | No.9   | No.10  |
|-------|--------------|-----|----------|--------|--------|--------|--------|--------|
| 248-1 | Pillow Block | 1   | SUJ      | UCP315 | UCP316 | UCP318 | UCP319 | UCP320 |
| 248-2 | Pillow Block | 1   | SUJ      | UCP213 | UCP214 | UCP214 | UCP317 | UCP318 |

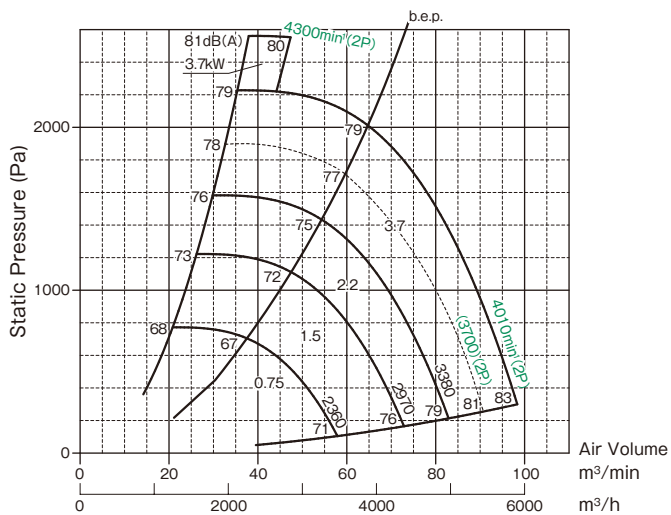
CMF3(L)-OB



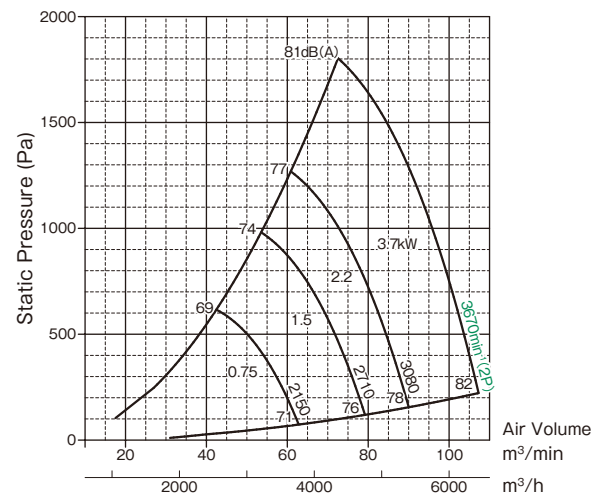
※Please note that the above image is a representative example and may differ partially from the actual device.

### ■ Selection chart ※Rates of rotation indicated in green are for two poles.

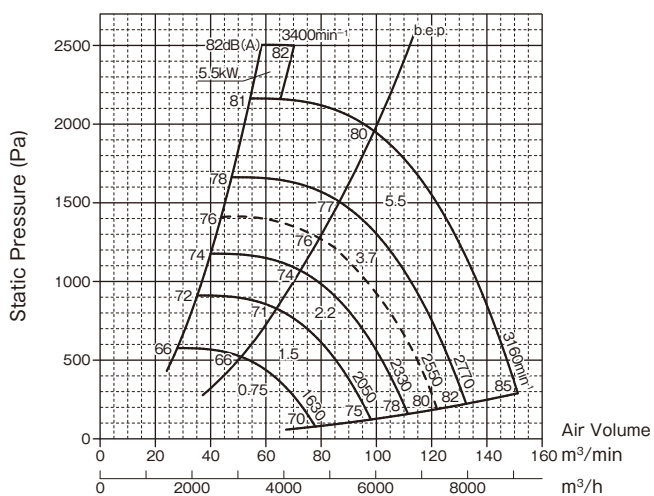
CMF3-No.2



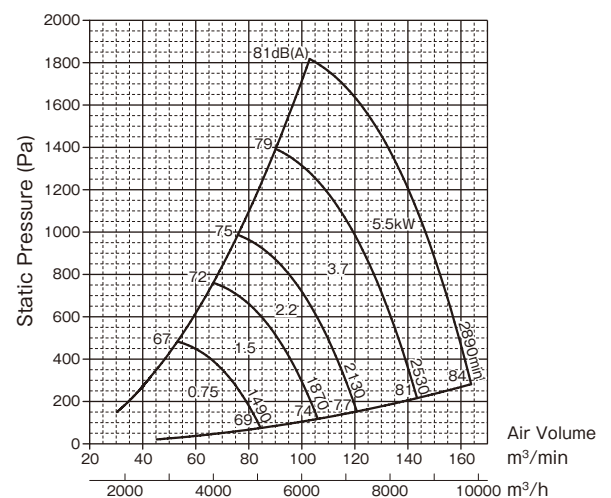
CMF3L-No.2



CMF3-No.2½

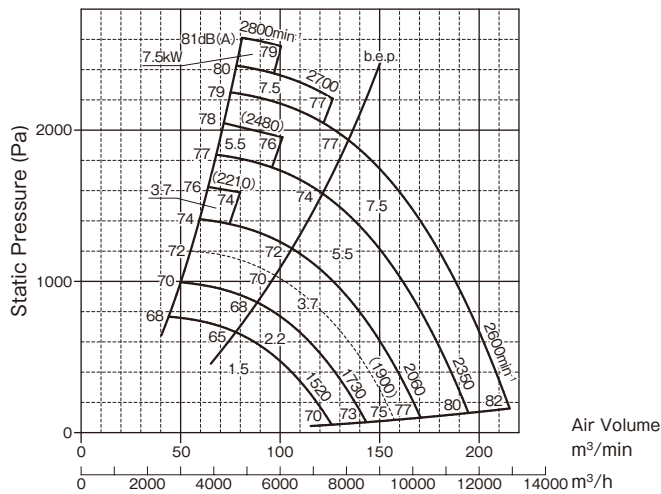


CMF3L-No.2½

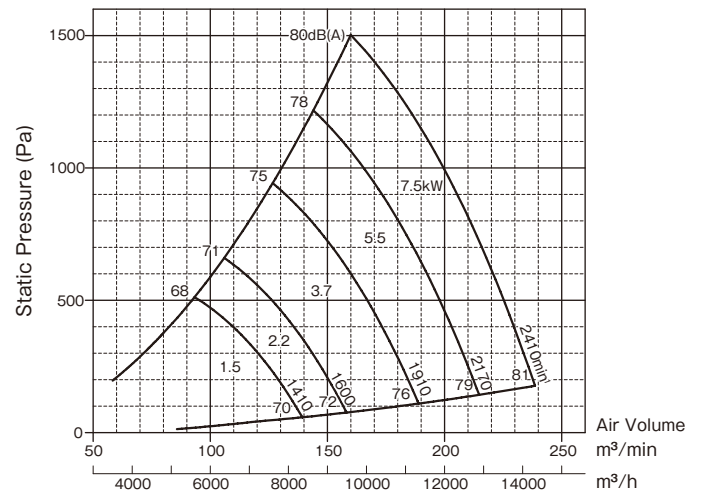


## ■ Selection chart

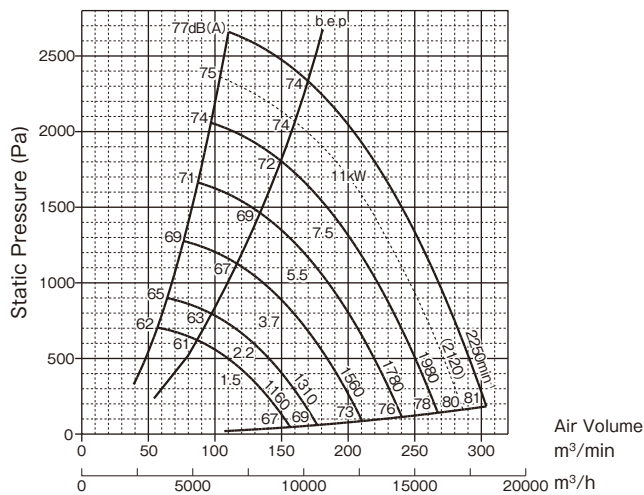
CMF3-No.3



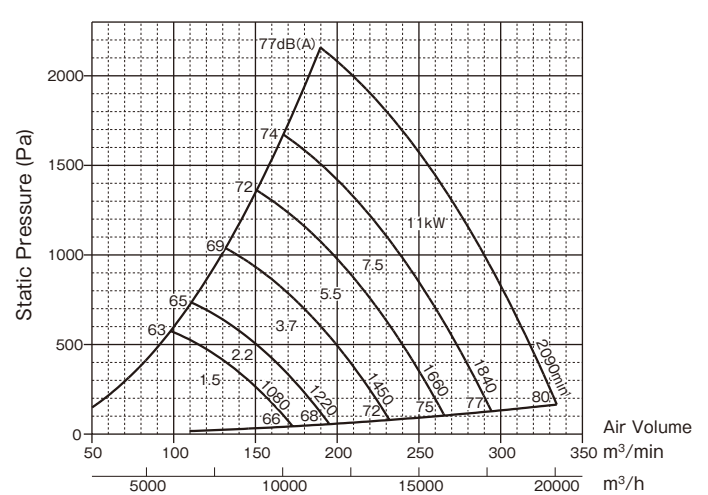
CMF3L-No.3



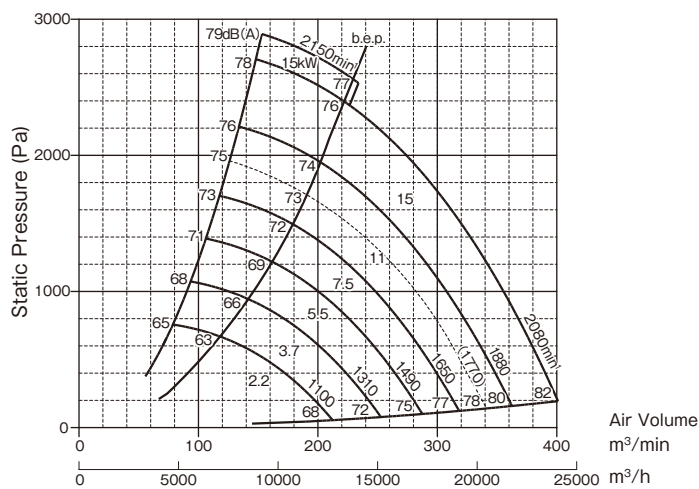
CMF3-No.3½



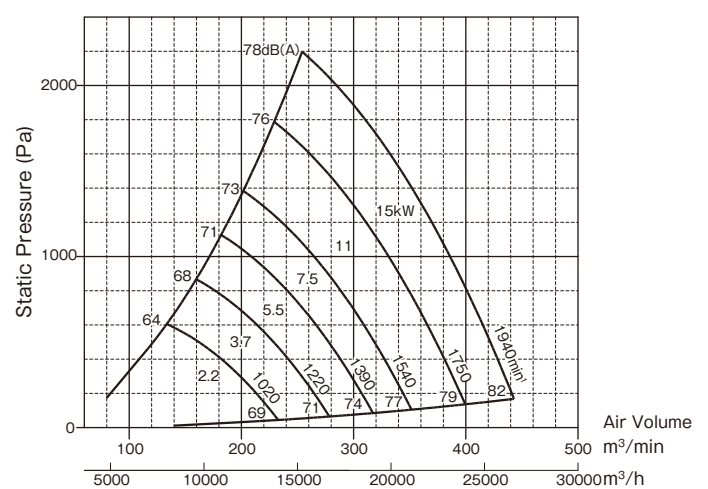
CMF3L-No.3½



CMF3-No.4

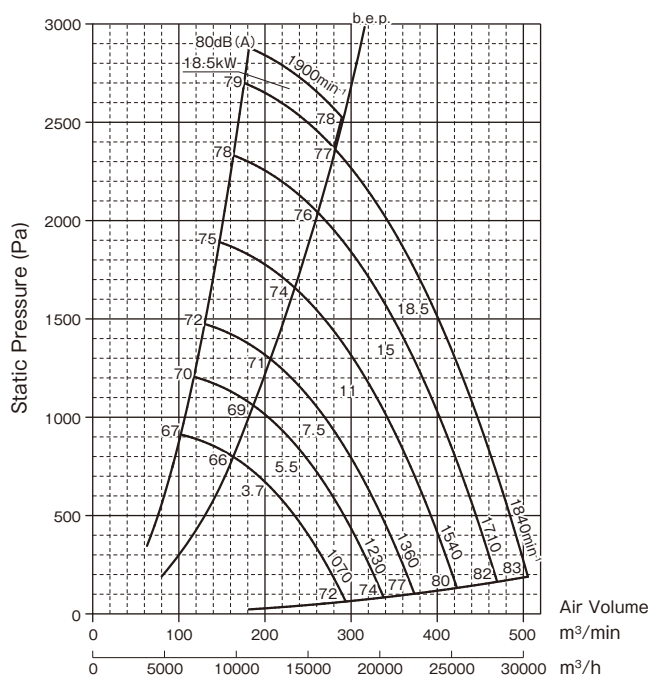


CMF3L-No.4



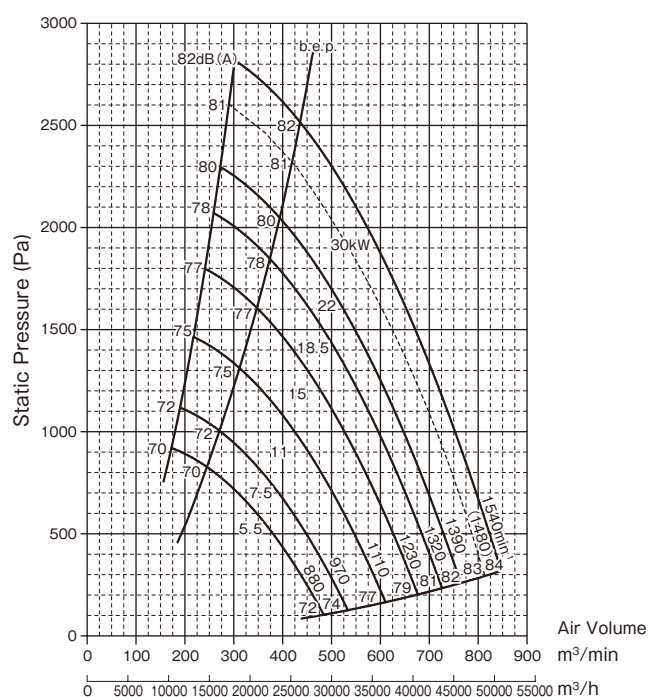
#### Selection chart

CMF3-No.4½

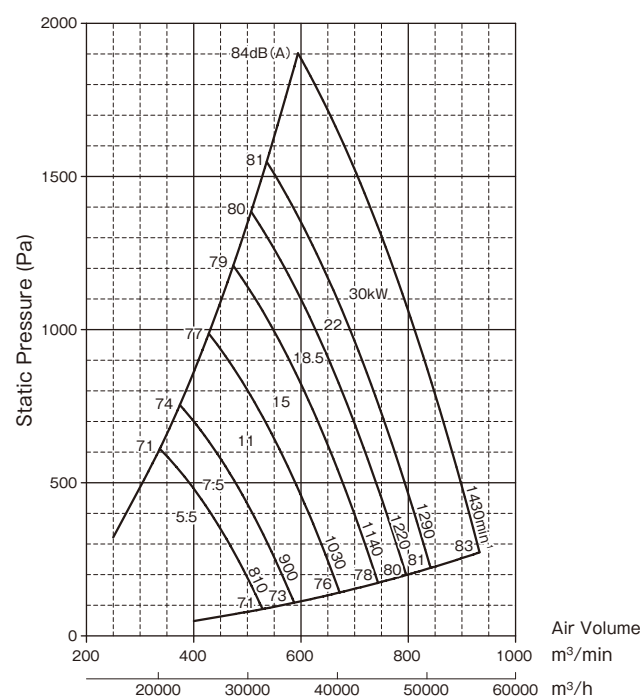


## ■ Selection chart

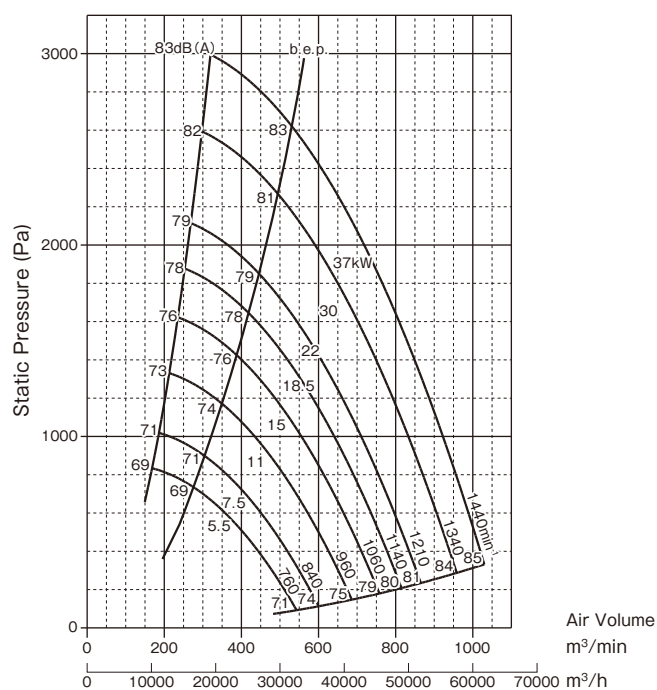
CMF3-No.5½



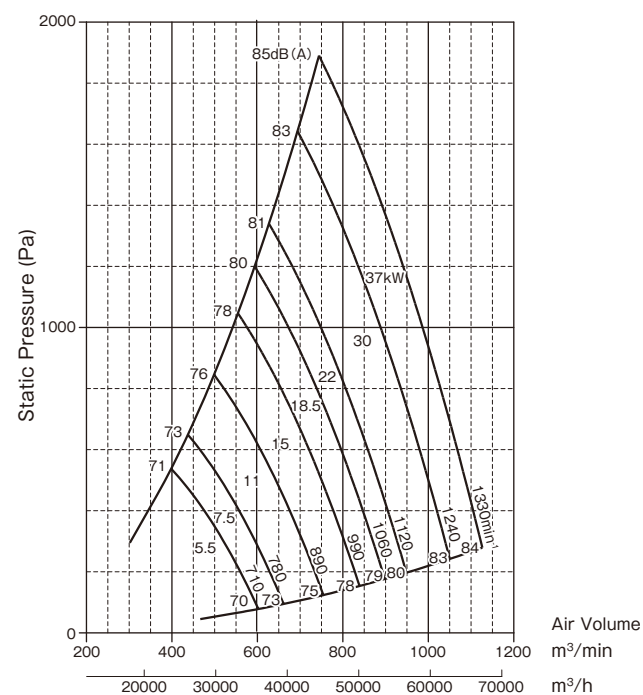
CMF3L-No.5½

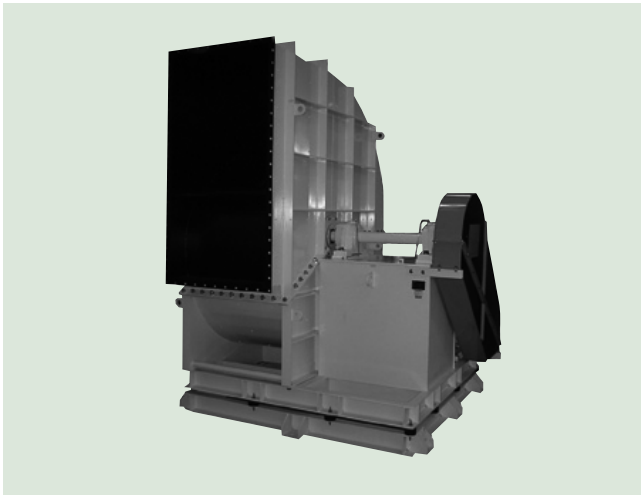


CMF3-No.6



CMF3L-No.6

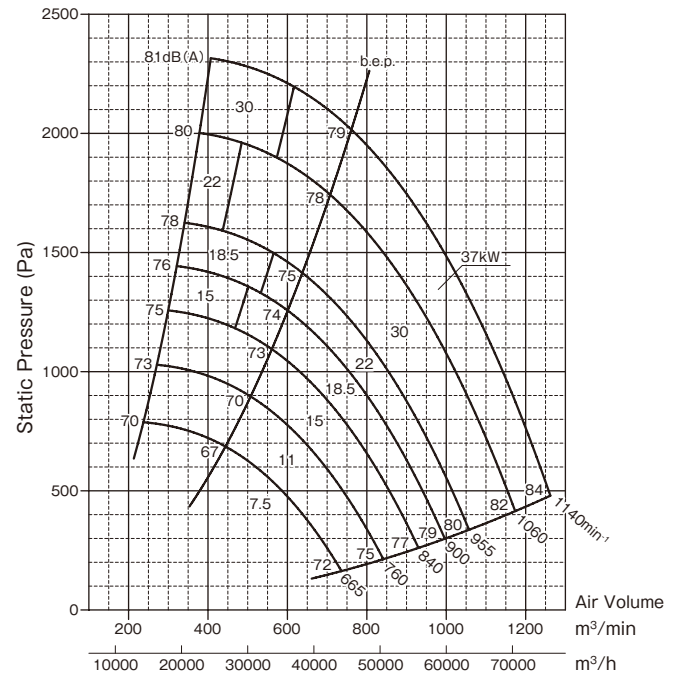




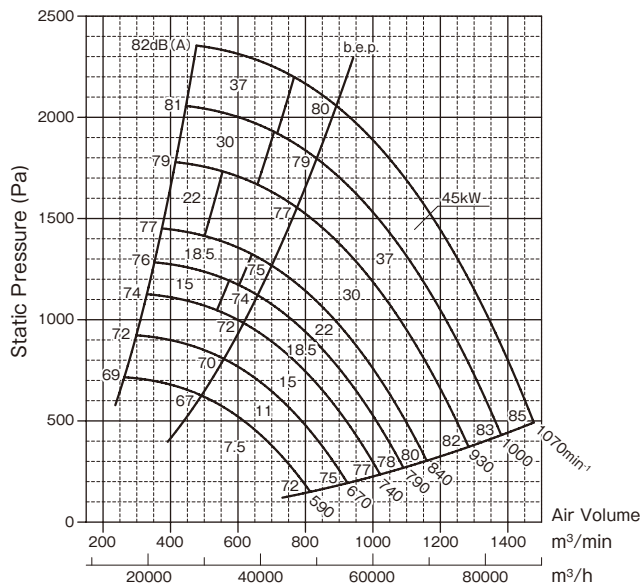
※Please note that the above image is a representative example and may differ partially from the actual device.

### Selection chart

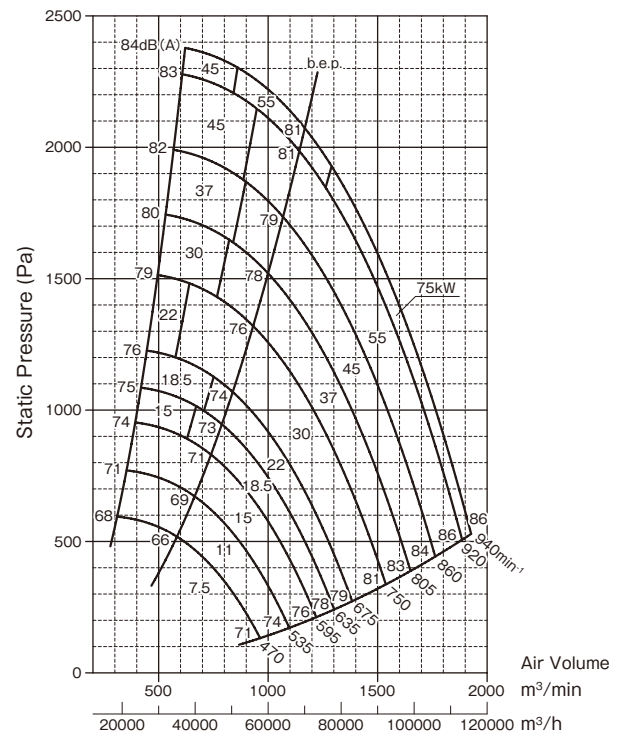
#### No.6½



#### No.7



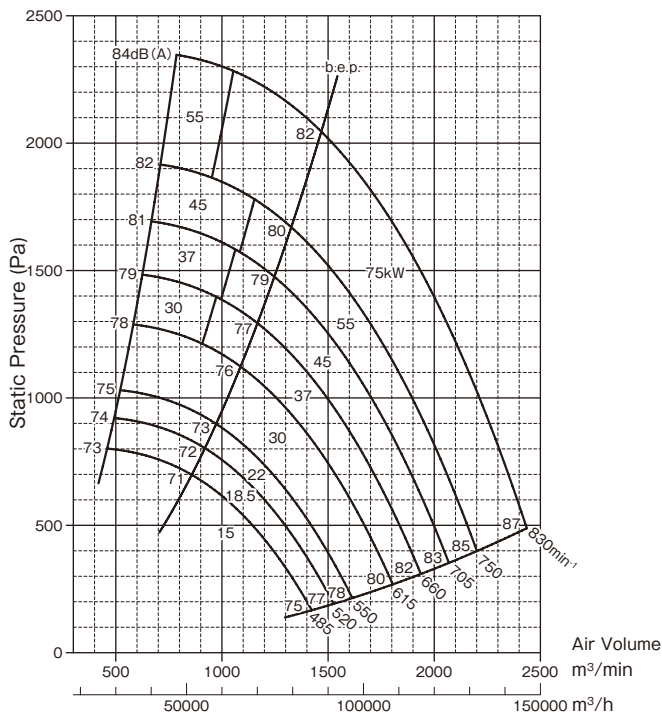
#### No.8



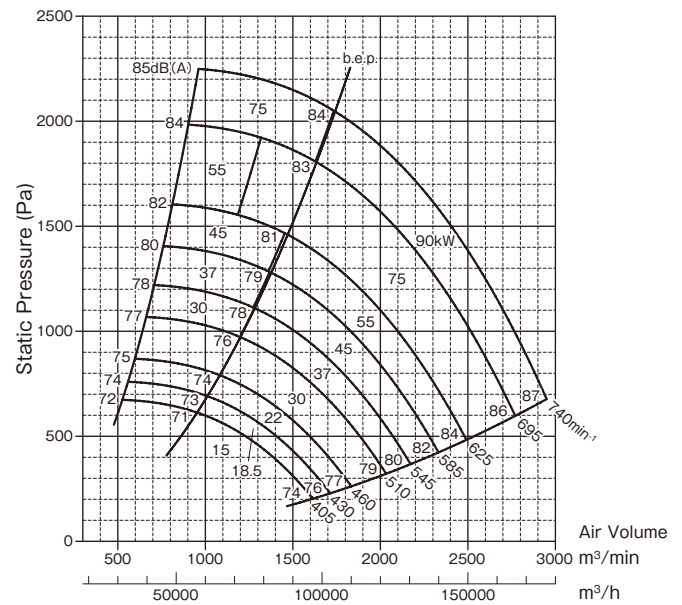
## ■ Selection chart

※Rotational speeds indicated in white text on a green background are for 6 poles.

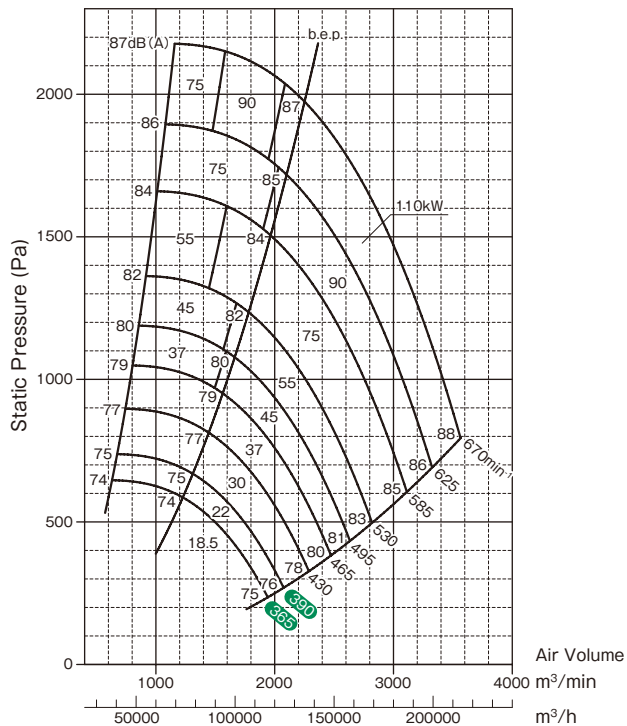
No.9



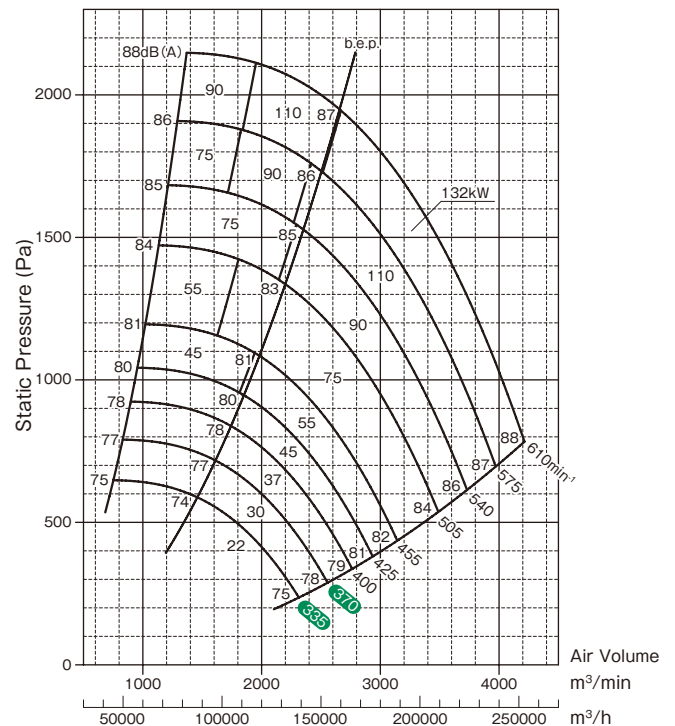
No.10



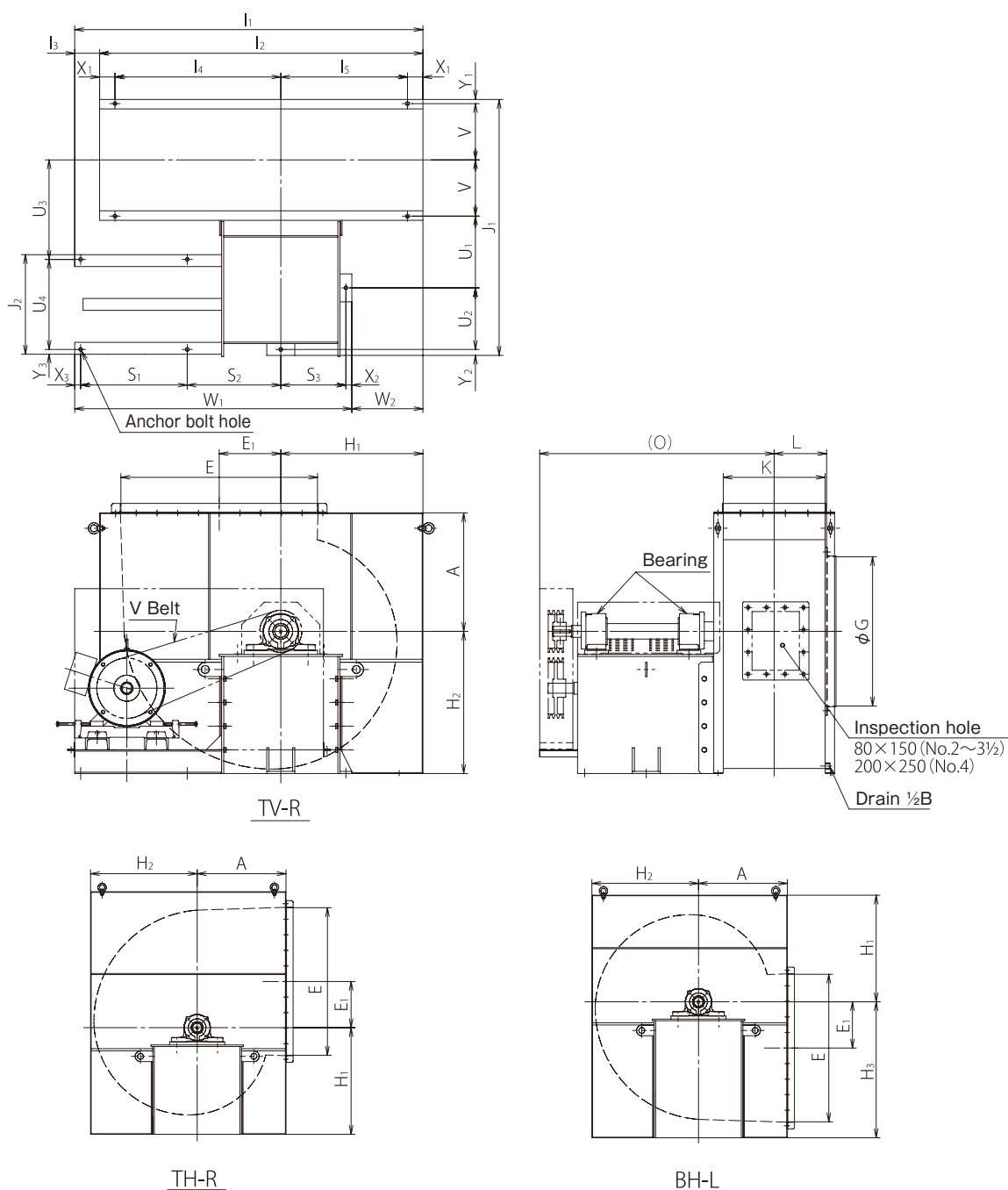
No.11



No.12



#### ■ Assembly drawing (No.2~4, -B type)



#### ■ Dimensions

(Unit: mm)

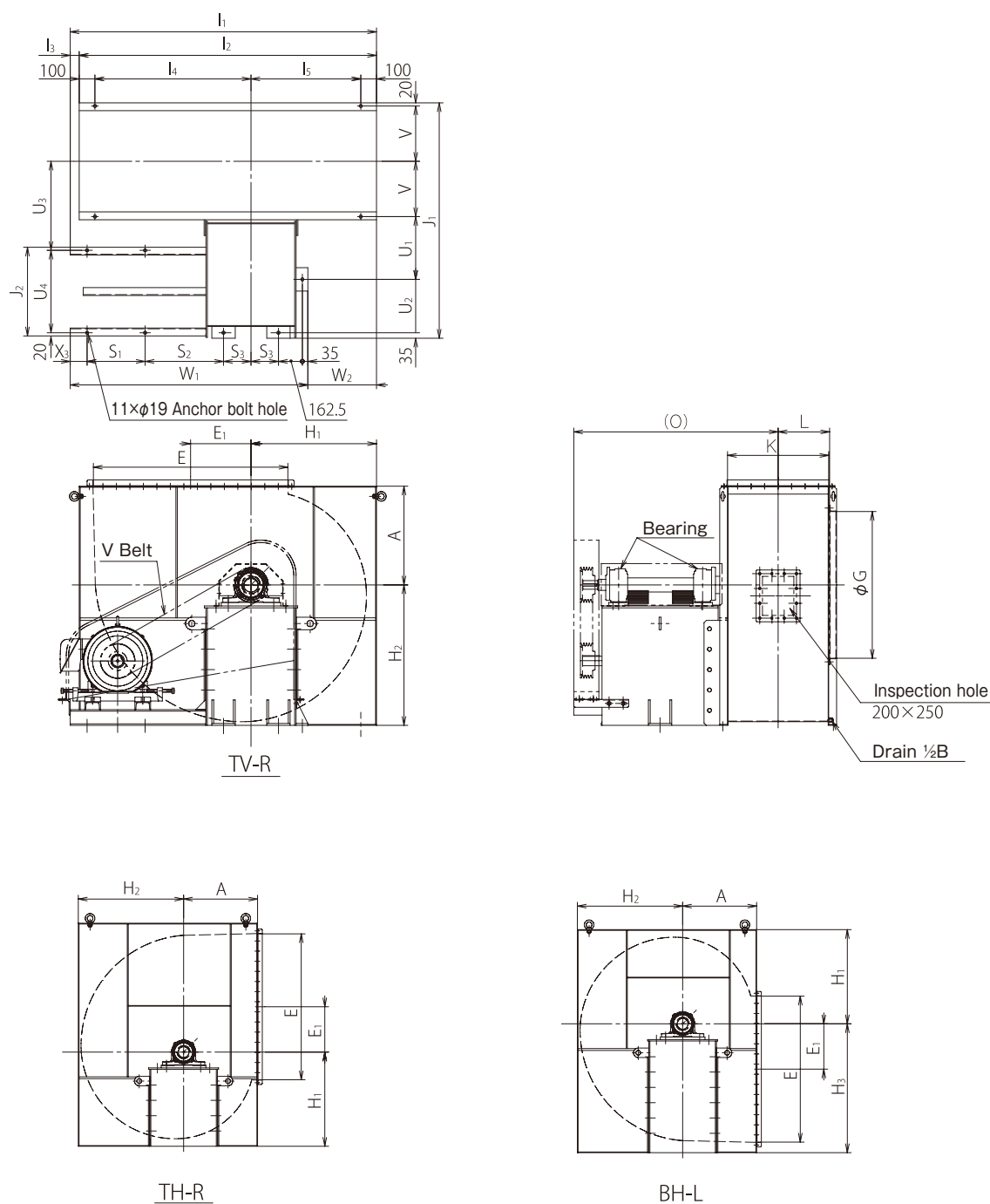
| No. | Main Unit |                |                |                |                |       |      | Suction Companion Flange | Discharge Companion Flange | Bearing |             | Max. Rotational Speed (50/60Hz) | Max. Motor Output (kW) (max. frame no.) | Approximate Weight (Excluding Motor and Pulley) | Base  |                |                |                |                |                |                |
|-----|-----------|----------------|----------------|----------------|----------------|-------|------|--------------------------|----------------------------|---------|-------------|---------------------------------|-----------------------------------------|-------------------------------------------------|-------|----------------|----------------|----------------|----------------|----------------|----------------|
|     | A         | E <sub>1</sub> | H <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | L     | O    | G                        | E                          | K       | Pulley Side | Opposite Pulley Side            |                                         |                                                 |       | TV-R           |                |                |                |                |                |
|     |           |                |                |                |                |       |      |                          |                            |         |             |                                 |                                         |                                                 |       | I <sub>1</sub> | I <sub>2</sub> | I <sub>3</sub> | I <sub>4</sub> | I <sub>5</sub> | W <sub>2</sub> |
| 2   | 260       | 132.5          | 300            | 300            | 420            | 112   | 669  | 310                      | 415                        | 210     | 6307        | 6210                            | 4300                                    | 3.7(112M)                                       | 121kg | 857.5          | 720            | 137.5          | 365            | 245            | 82.5           |
| 2½  | 310       | 157.5          | 390            | 390            | 495            | 140.5 | 720  | 400                      | 515                        | 270     | 6308        | 6211                            | 3400                                    | 5.5(132S)                                       | 162kg | 997.5          | 885            | 112.5          | 440            | 335            | 172.5          |
| 3   | 370       | 195            | 460            | 460            | 595            | 166.5 | 884  | 480                      | 620                        | 320     | 6309        | 6212                            | 2800                                    | 7.5(132M)                                       | 251kg | 1277.5         | 1055           | 222.5          | 530            | 395            | 170            |
| 3½  | 430       | 227.5          | 540            | 540            | 680            | 194   | 916  | 550                      | 725                        | 375     | 6310        | 6213                            | 2370                                    | 11(160M)                                        | 349kg | 1410           | 1220           | 190            | 615            | 475            | 250            |
| 4   | 500       | 260            | 600            | 600            | 765            | 221.5 | 1009 | 630                      | 830                        | 430     | 6311        | 6214                            | 2150                                    | 15(160L)                                        | 405kg | 1470           | 1365           | 105            | 700            | 535            | 300            |

| No. | Base           |                |                |                |                |                |                |                |                |                |                |                |                |                |                |       |                |                |                |                |                |                |                | Anchor bolt<br>hole |
|-----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------------|
|     | TH-R/BH-L      |                |                |                |                |                | TH-R/TV-R/BH-L |                |                |                |                |                |                |                |                |       |                |                |                |                |                |                |                |                     |
|     | I <sub>1</sub> | I <sub>2</sub> | I <sub>3</sub> | I <sub>4</sub> | I <sub>5</sub> | W <sub>2</sub> | J <sub>1</sub> | J <sub>2</sub> | S <sub>1</sub> | S <sub>2</sub> | S <sub>3</sub> | U <sub>1</sub> | U <sub>2</sub> | U <sub>3</sub> | U <sub>4</sub> | V     | W <sub>1</sub> | X <sub>1</sub> | X <sub>2</sub> | X <sub>3</sub> | Y <sub>1</sub> | Y <sub>2</sub> | Y <sub>3</sub> |                     |
| 2   | 817.5          | 560            | 257.5          | 245            | 205            | 42.5           | 675            | 257.5          | 310            | 230            | 200            | 225            | 170            | 295            | 222.5          | 122.5 | 775            | 55             | 17.5           | 17.5           | 12.5           | 17.5           | 17.5           | 10×φ12              |
| 2½  | 917.5          | 700            | 217.5          | 335            | 255            | 92.5           | 735            | 307.5          | 360            | 230            | 200            | 205            | 190            | 275            | 272.5          | 152.5 | 825            | 55             | 17.5           | 17.5           | 12.5           | 17.5           | 17.5           | 10×φ12              |
| 3   | 1187.5         | 830            | 357.5          | 395            | 305            | 80             | 915            | 330            | 455            | 345            | 265            | 272.5          | 230            | 390            | 295            | 182.5 | 1107.5         | 65             | 25             | 17.5           | 17.5           | 25             | 17.5           | 10×φ15              |
| 3½  | 1300           | 970            | 330            | 475            | 365            | 140            | 972            | 380            | 455            | 395            | 265            | 272.5          | 230            | 372.5          | 340            | 210   | 1160           | 65             | 25             | 20             | (19)           | 25             | 20             | 10×φ15              |
| 4   | 1370           | 1100           | 270            | 535            | 435            | 200            | 1087           | 420            | 455            | 395            | 275            | 302.5          | 260            | 420            | 380            | 237.5 | 1170           | 65             | 25             | 20             | (19)           | 25             | 20             | 10×φ15              |

※TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.

※Refer to the companion flange dimensional drawing for companion flange dimensions.

## ■ Assembly drawing (No.4½~6, -B type)



## ■ Dimensions

(Unit: mm)

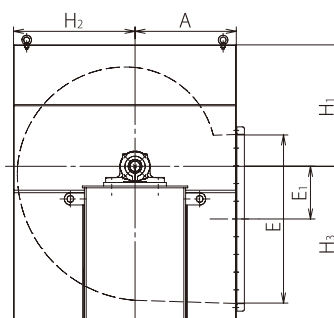
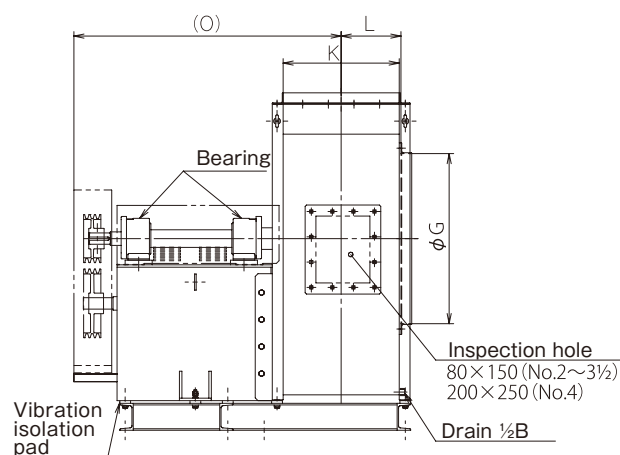
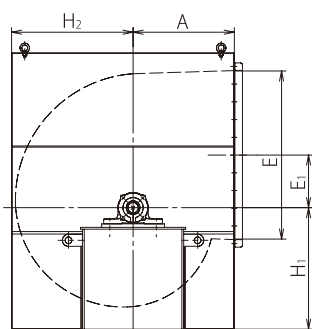
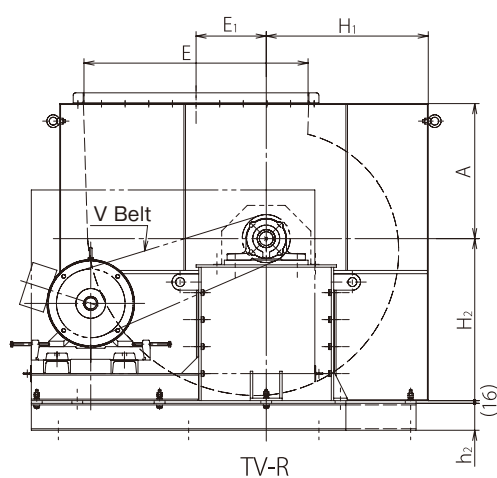
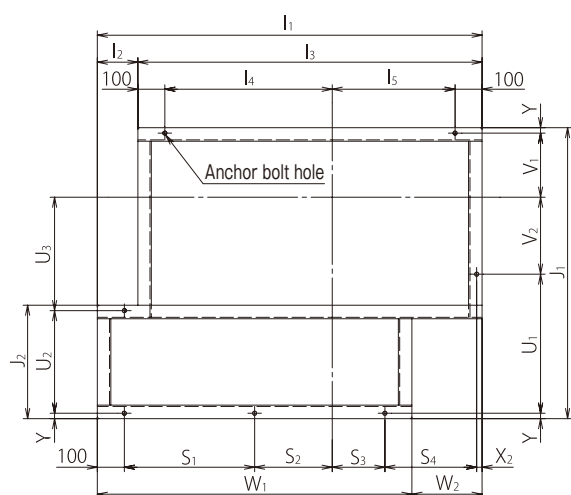
| No. | Main Unit |                |                |                |                |       |      |     | Suction Companion Flange | Discharge Companion Flange | Bearing     |                      | Max. Rotational Speed (50/60Hz) | Max. Motor Output (kW) (max. frame no.) | Approximate Weight (Excluding Motor and Pulley) | Base           |                |                |                |                |                |
|-----|-----------|----------------|----------------|----------------|----------------|-------|------|-----|--------------------------|----------------------------|-------------|----------------------|---------------------------------|-----------------------------------------|-------------------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
|     | A         | E <sub>1</sub> | H <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | L     | O    | G   | E                        | K                          | Pulley Side | Opposite Pulley Side |                                 |                                         |                                                 | TV-R           |                |                |                |                |                |
|     |           |                |                |                |                |       |      |     |                          |                            |             |                      |                                 |                                         |                                                 | l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | l <sub>4</sub> | l <sub>5</sub> | W <sub>2</sub> |
| 4½  | 550       | 292.5          | 600            | 675            | 870            | 248.5 | 1072 | 710 | 930                      | 485                        | 6312        | 6215                 | 1920                            | 18.5 (180M)                             | 543kg                                           | 1580           | 1470           | 110            | 770            | 500            | 275            |
| 5   | 575       | 322.5          | 670            | 750            | 920            | 276   | 1174 | 780 | 1035                     | 540                        | 6313        | 6216                 | 1650                            | 22 (180M)                               | 635kg                                           | 1670           | 1590           | 80             | 820            | 570            | 325            |
| 5½  | 600       | 355            | 740            | 820            | 1010           | 301   | 1199 | 860 | 1140                     | 590                        | 6314        | 6217                 | 1560                            | 30 (180L)                               | 722kg                                           | 1740           | 1750           | -10            | 910            | 640            | 395            |
| 6   | 629       | 385            | 800            | 895            | 1095           | 328.5 | 1332 | 935 | 1240                     | 645                        | 6316        | 6219                 | 1450                            | 37 (200L)                               | 873kg                                           | 1952.5         | 1895           | 57.5           | 995            | 700            | 437.5          |

| No. | Base           |                |                |                |                |                |                |                |                |                | TH-R/TV-R/BH-L |                |                |                |                |                |                |                |  |  |
|-----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--|--|
|     | TH-R/BH-L      |                |                |                |                | TH-R/TV-R/BH-L |                |                |                |                | TH-R/TV-R/BH-L |                |                |                |                | TH-R/TV-R/BH-L |                |                |  |  |
|     | l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | l <sub>4</sub> | l <sub>5</sub> | W <sub>2</sub> | J <sub>1</sub> | J <sub>2</sub> | S <sub>1</sub> | S <sub>2</sub> | S <sub>3</sub> | U <sub>1</sub> | U <sub>2</sub> | U <sub>3</sub> | U <sub>4</sub> | V              | W <sub>1</sub> | X <sub>3</sub> |  |  |
| 4½  | 1530           | 1225           | 305            | 575            | 450            | 225            | 1165           | 420            | 290            | 455            | 127.5          | 305            | 260            | 457.5          | 380            | 272.5          | 1305           | 107.5          |  |  |
| 5   | 1575           | 1325           | 250            | 650            | 475            | 230            | 1290           | 420            | 320            | 425            | 147.5          | 340            | 295            | 555            | 380            | 300            | 1345           | 107.5          |  |  |
| 5½  | 1600           | 1420           | 180            | 720            | 500            | 255            | 1340           | 460            | 350            | 425            | 147.5          | 340            | 295            | 540            | 420            | 325            | 1345           | 77.5           |  |  |
| 6   | 1781.5         | 1524           | 257.5          | 795            | 529            | 266.5          | 1500           | 565            | 370            | 510            | 165            | 400            | 340            | 567.5          | 525            | 352.5          | 1515           | 107.5          |  |  |

\*TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.

\*Refer to the companion flange dimensional drawing for companion flange dimensions.

■ **Assembly drawing (No.2~4, -ND(D) type)**



## ■ Dimensions

(Unit: mm)

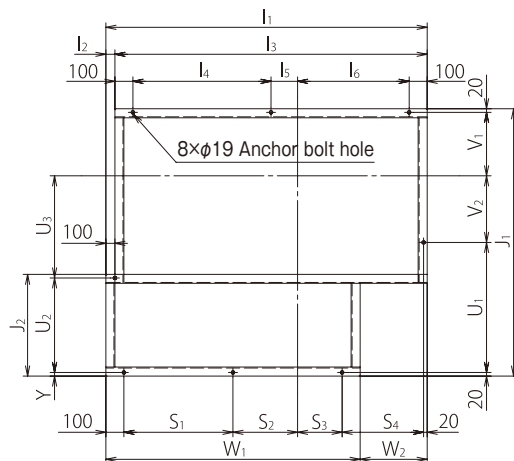
| No. | Main Unit |                |                |                |                |       |      | Suction Companion Flange | Discharge Companion Flange |     | Bearing     |                      | Max. Rotational Speed (60/60Hz) | Max. Motor Output (kW) (max. frame no.) | Approximate Weight (Excluding Motor and Pulley) | Base |                |                |                |                |                |                |
|-----|-----------|----------------|----------------|----------------|----------------|-------|------|--------------------------|----------------------------|-----|-------------|----------------------|---------------------------------|-----------------------------------------|-------------------------------------------------|------|----------------|----------------|----------------|----------------|----------------|----------------|
|     |           |                |                |                |                |       |      |                          |                            |     |             |                      |                                 |                                         |                                                 | TV-R |                |                |                |                |                |                |
|     | A         | E <sub>1</sub> | H <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | L     | O    | G                        | E                          | K   | Pulley Side | Opposite Pulley Side |                                 |                                         |                                                 |      | I <sub>1</sub> | I <sub>2</sub> | I <sub>3</sub> | I <sub>4</sub> | I <sub>5</sub> | S <sub>4</sub> |
| 2   | 260       | 132.5          | 300            | 300            | 420            | 112   | 669  | 310                      | 415                        | 210 | 6307        | 6210                 | 4300                            | 3.7(112M)                               | 143kg                                           | 820  | 175            | 645            | 282.5          | 162.5          | 127.5          | 45             |
| 2½  | 310       | 157.5          | 390            | 390            | 495            | 140.5 | 720  | 400                      | 515                        | 270 | 6308        | 6211                 | 3400                            | 5.5(132S)                               | 187kg                                           | 960  | 150            | 810            | 357.5          | 252.5          | 217.5          | 135            |
| 3   | 370       | 195            | 460            | 460            | 595            | 166.5 | 884  | 480                      | 620                        | 320 | 6309        | 6212                 | 2800                            | 7.5(132M)                               | 283kg                                           | 1230 | 270            | 960            | 447.5          | 312.5          | 212.5          | 130            |
| 3½  | 430       | 227.5          | 540            | 540            | 680            | 194   | 916  | 550                      | 725                        | 375 | 6310        | 6213                 | 2370                            | 11(160M)                                | 385kg                                           | 1365 | 235            | 1130           | 535            | 395            | 290            | 210            |
| 4   | 500       | 260            | 600            | 600            | 765            | 221.5 | 1009 | 630                      | 830                        | 430 | 6311        | 6214                 | 2150                            | 15(160L)                                | 456kg                                           | 1425 | 150            | 1275           | 620            | 455            | 340            | 260            |

| No. | Base           |                |                |                |                |                |                |                |                |                |                |                |                |                |                |                |                |                |                |      |                |        | Anchor bolt hole |
|-----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------|----------------|--------|------------------|
|     | TH-R/BH-L      |                |                |                |                |                |                | TH-R/TV-R/BH-L |                |                |                |                |                |                |                |                |                |                |                |      |                |        |                  |
|     | l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | l <sub>4</sub> | l <sub>5</sub> | S <sub>4</sub> | W <sub>2</sub> | J <sub>1</sub> | J <sub>2</sub> | S <sub>1</sub> | S <sub>2</sub> | S <sub>3</sub> | U <sub>1</sub> | U <sub>2</sub> | U <sub>3</sub> | V <sub>1</sub> | V <sub>2</sub> | W <sub>1</sub> | X <sub>2</sub> | Y    | h <sub>2</sub> |        |                  |
| 2   | 780            | 295            | 485            | 162.5          | 122.5          | 87.5           | 5              | 675            | 257.5          | 457.5          | —              | 117.5          | 320            | 222.5          | 295            | 122.5          | 197.5          | 775            | 17.5           | 17.5 | 75             | 6×φ 12 |                  |
| 2½  | 880            | 255            | 625            | 252.5          | 172.5          | 137.5          | 55             | 735            | 307.5          | 507.5          | —              | 117.5          | 350            | 272.5          | 275            | 152.5          | 197.5          | 825            | 17.5           | 17.5 | 75             | 6×φ 12 |                  |
| 3   | 1140           | 405            | 735            | 312.5          | 222.5          | 122.5          | 40             | 902.5          | 330            | 450            | 267.5          | 182.5          | 435            | 295            | 390            | 182.5          | 250            | 1100           | 17.5           | 17.5 | 75             | 7×φ 15 |                  |
| 3½  | 1255           | 375            | 880            | 395            | 285            | 180            | 100            | 962.5          | 380            | 477.5          | 292.5          | 185            | 462.5          | 340            | 372.5          | 210            | 255            | 1155           | 20             | 20   | 100            | 7×φ 15 |                  |
| 4   | 1325           | 315            | 1010           | 455            | 355            | 240            | 160            | 1077.5         | 420            | 492.5          | 287.5          | 195            | 515            | 380            | 420            | 237.5          | 285            | 1165           | 20             | 20   | 100            | 7×φ 15 |                  |

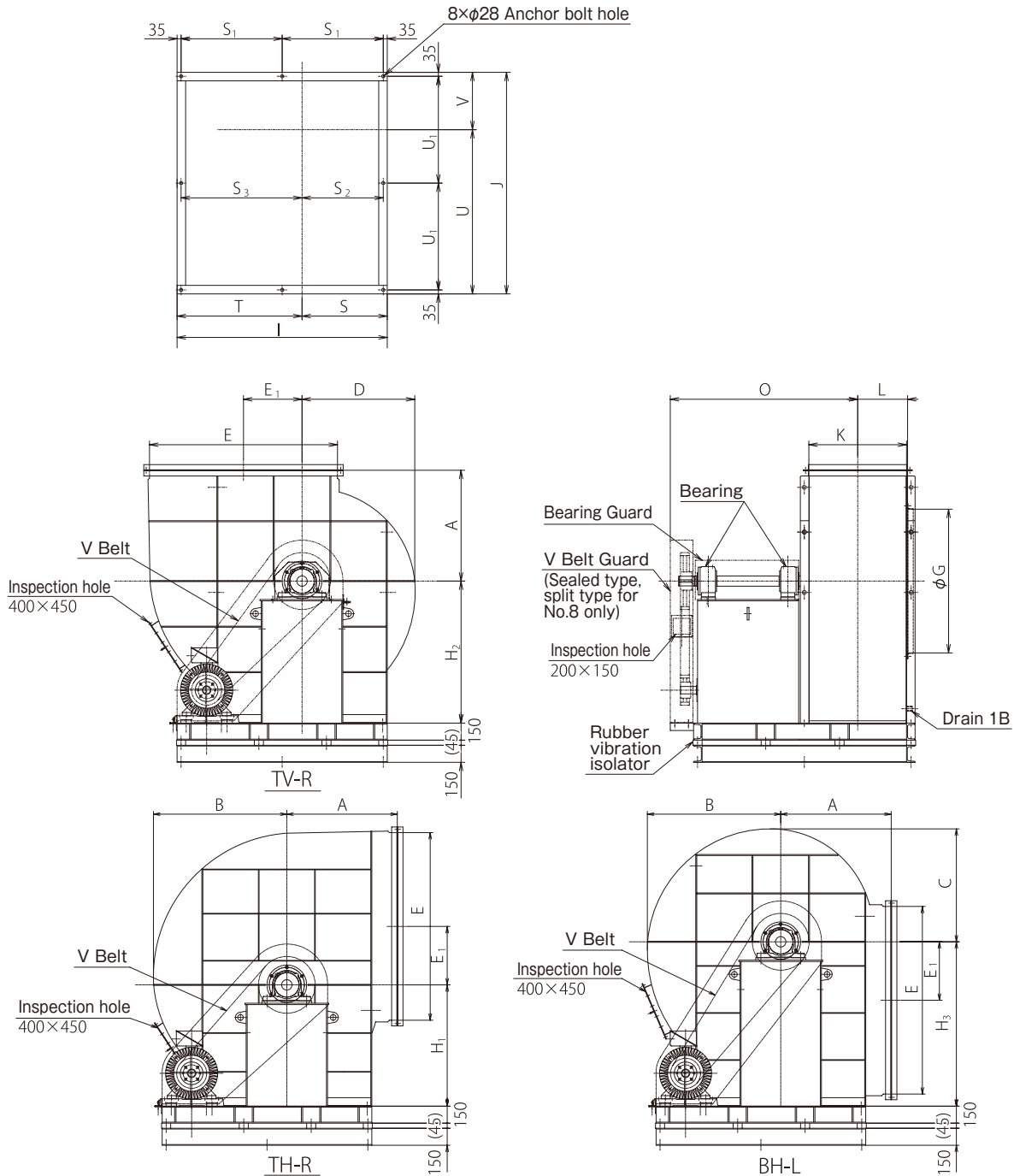
※TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.

\*Refer to the companion flange dimensional drawing for companion flange dimensions.

## ■ Assembly drawing (No.4½~6, -ND(D)type)



#### ■ Assembly drawing (No.6½~8)



※The drawing shows D installation method (floor type vibration-proof). B type (with common base) has only the common base, and does not include a vibration isolation base.

#### ■ Dimensions

(Unit: mm)

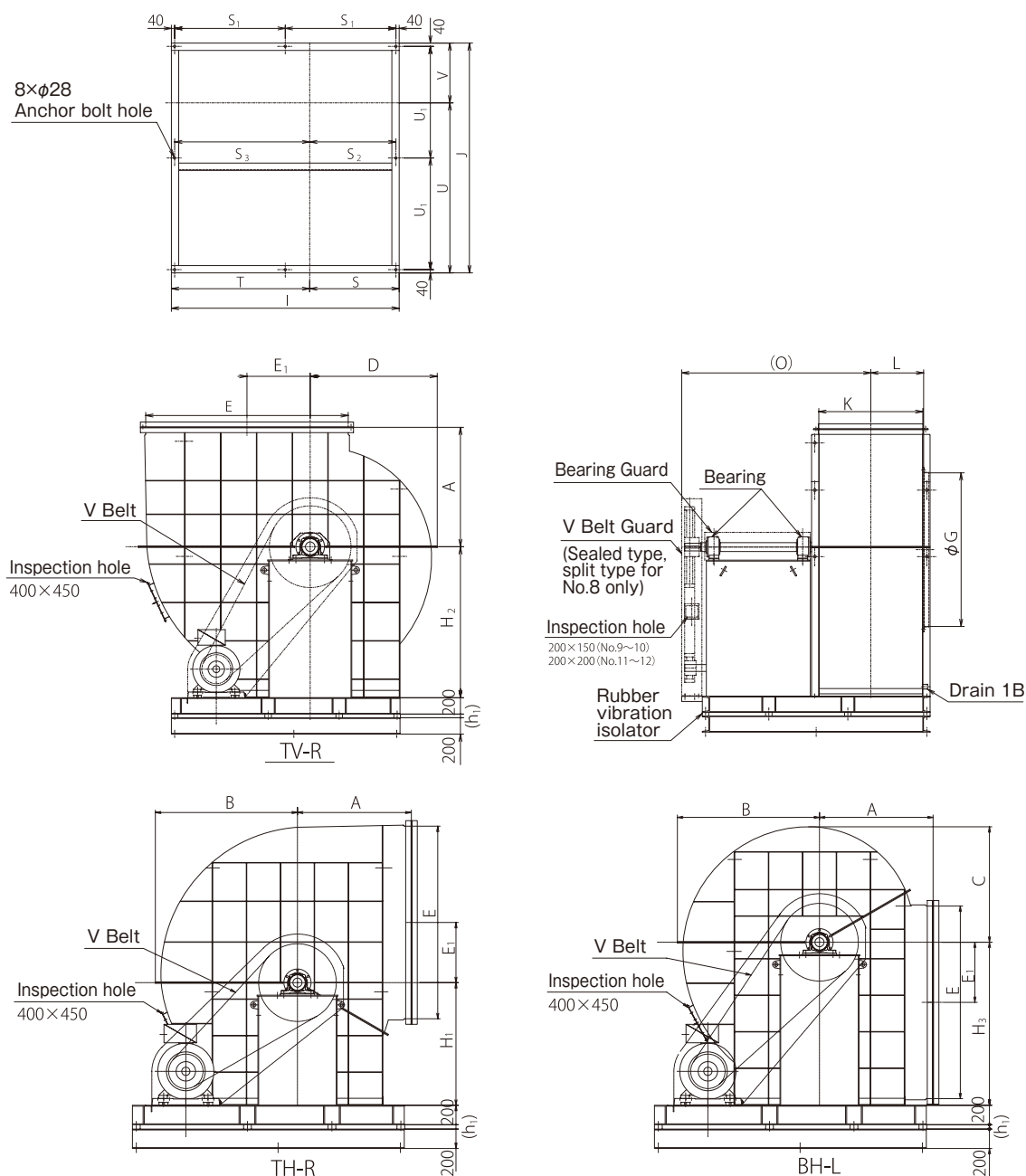
| No. | Main Unit |      |      |      |                |                |                |                |     |      | Suction Companion Flange | Discharge Companion Flange |     | Bearing     |                      | Max. Rotational Speed (min <sup>-1</sup> ) (50/60Hz) | Electric Motor Output (kW) | Approximate Weight (Excluding Motor and Pulley) |
|-----|-----------|------|------|------|----------------|----------------|----------------|----------------|-----|------|--------------------------|----------------------------|-----|-------------|----------------------|------------------------------------------------------|----------------------------|-------------------------------------------------|
|     | A         | B    | C    | D    | E <sub>1</sub> | H <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | L   | O    | G                        | E                          | K   | Pulley Side | Opposite Pulley Side |                                                      |                            |                                                 |
| 6½  | 790       | 1005 | 815  | 870  | 420            | 840            | 1020           | 1170           | 360 | 1480 | 1030                     | 1345                       | 700 | 1318K       |                      | 1120/1140                                            | 7.5~37                     | 1470kg                                          |
| 7   | 855       | 1080 | 875  | 935  | 450            | 935            | 1090           | 1260           | 385 | 1510 | 1105                     | 1450                       | 750 | 1318K       |                      | 1050/1070                                            | 7.5~45                     | 1580kg                                          |
| 8   | 975       | 1235 | 1000 | 1055 | 515.5          | 1070           | 1250           | 1450           | 440 | 1660 | 1265                     | 1655                       | 860 | 1320K       |                      | 940/940                                              | 7.5~75                     | 1980kg                                          |

| No. | Base |      |     |                |                |                |      |      |                |     |
|-----|------|------|-----|----------------|----------------|----------------|------|------|----------------|-----|
|     | I    | J    | S   | S <sub>1</sub> | S <sub>2</sub> | S <sub>3</sub> | T    | U    | U <sub>1</sub> | V   |
| 6½  | 1635 | 1690 | 625 | 782.5          | 590            | 975            | 1010 | 1265 | 810            | 425 |
| 7   | 1685 | 1740 | 675 | 807.5          | 640            | 975            | 1010 | 1290 | 835            | 450 |
| 8   | 1850 | 1950 | 750 | 890            | 715            | 1065           | 1100 | 1445 | 940            | 505 |

※TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.  
 ※Split type casing is also available.

※Refer to the companion flange dimensional drawing for companion flange dimensions.

## ■ Assembly drawing (No.9~12)



※The drawing shows D installation method (floor type vibration-proof). B type (with common base) has only the common base, and does not include a vibration isolation base.

## ■ Dimensions

(Unit: mm)

| No. | Main Unit |      |      |      |                |                |                |                |     |      | Suction Companion Flange | Discharge Companion Flange |      | Bearing     |                      | Max. Rotational Speed (min <sup>-1</sup> ) (50/60Hz) | Electric Motor Output (kW) | Approximate Weight (Excluding Motor and Pulley) |
|-----|-----------|------|------|------|----------------|----------------|----------------|----------------|-----|------|--------------------------|----------------------------|------|-------------|----------------------|------------------------------------------------------|----------------------------|-------------------------------------------------|
|     | A         | B    | C    | D    | E <sub>1</sub> | H <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | L   | O    | G                        | E                          | K    | Pulley Side | Opposite Pulley Side |                                                      |                            |                                                 |
| 9   | 1100      | 1400 | 1120 | 1200 | 580.5          | 1200           | 1450           | 1700           | 492 | 1900 | 1425                     | 1860                       | 965  | 22224K      |                      | 830                                                  | 15~75                      | 3100kg                                          |
| 10  | 1220      | 1550 | 1240 | 1320 | 645            | 1300           | 1600           | 1780           | 547 | 2050 | 1580                     | 2070                       | 1075 | 22224K      |                      | 740                                                  | 15~90                      | 3600kg                                          |
| 11  | 1340      | 1690 | 1370 | 1440 | 710            | 1450           | 1700           | 1930           | 600 | 2250 | 1740                     | 2275                       | 1180 | 22224K      |                      | 670                                                  | 18.5~110                   | 4400kg                                          |
| 12  | 1460      | 1830 | 1490 | 1560 | 774.5          | 1580           | 1850           | 2100           | 655 | 2400 | 1905                     | 2480                       | 1290 | 22224K      |                      | 610                                                  | 22~132                     | 5200kg                                          |

| No. | Base |      |      |                |                |                |      |        |                |       |
|-----|------|------|------|----------------|----------------|----------------|------|--------|----------------|-------|
|     | I    | J    | S    | S <sub>1</sub> | S <sub>2</sub> | S <sub>3</sub> | T    | U      | U <sub>1</sub> | V     |
| 9   | 2395 | 2200 | 825  | 1157.5         | 785            | 1530           | 1570 | 1627.5 | 1060           | 572.5 |
| 10  | 2575 | 2410 | 925  | 1247.5         | 885            | 1610           | 1650 | 1782.5 | 1165           | 627.5 |
| 11  | 2700 | 2615 | 1000 | 1310           | 960            | 1660           | 1700 | 1935   | 1267.5         | 680   |
| 12  | 2800 | 2825 | 1100 | 1360           | 1060           | 1660           | 1700 | 2090   | 1372.5         | 735   |

※TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.

※Split type casing is used for delivery.

※Refer to the companion flange dimensional drawing for companion flange dimensions.

#### Companion Flange Dimensional Drawing

Suction Companion Flange

(Unit: mm)

Fig. 1

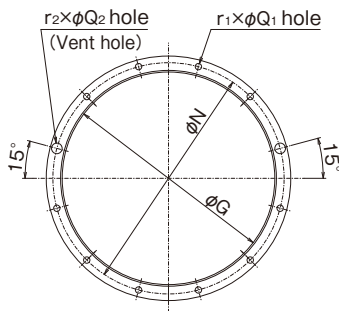


Fig. 2

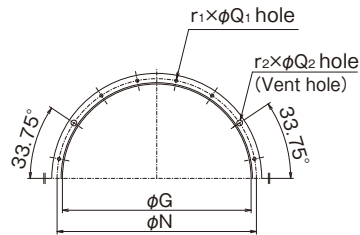


Fig. 3

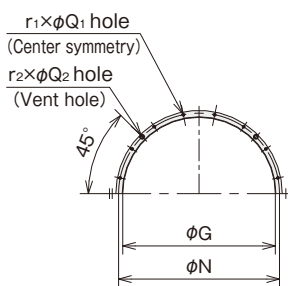
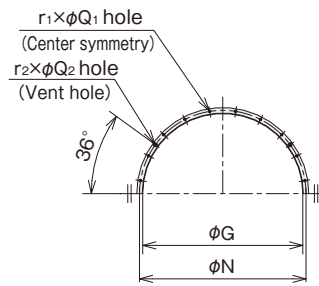


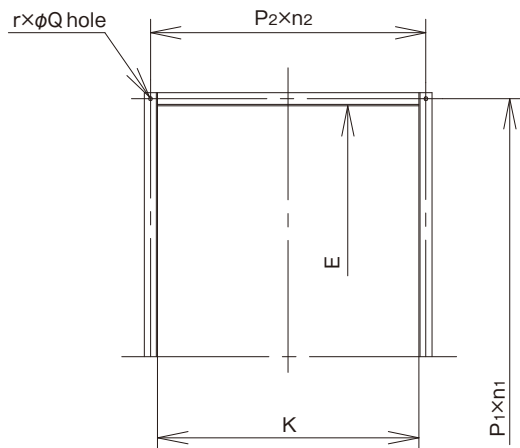
Fig. 4



| No. | G    | N    | $r_1 \times Q_1$ | $r_2 \times Q_2$<br>Vent hole | Steel material size | Fig. No. |
|-----|------|------|------------------|-------------------------------|---------------------|----------|
| 2   | 310  | 350  | 10×10            | 2×15                          | L30×30×3            | 1        |
| 2½  | 400  | 435  | 10×12            | 2×20                          | L30×30×3            |          |
| 3   | 480  | 515  | 10×12            | 2×20                          | L30×30×3            |          |
| 3½  | 550  | 590  | 10×12            | 2×20                          | L40×40×3            | 2        |
| 4   | 630  | 670  | 12×12            | 4×20                          | L40×40×3            |          |
| 4½  | 710  | 750  | 12×12            | 4×20                          | L40×40×3            |          |
| 5   | 780  | 825  | 12×12            | 4×20                          | L40×40×3            |          |
| 5½  | 860  | 905  | 12×12            | 4×20                          | L40×40×3            | 3        |
| 6   | 935  | 980  | 12×12            | 4×20                          | L40×40×3            |          |
| 6½  | 1030 | 1090 | 16×15            | 4×30                          | L50×50×4            |          |
| 7   | 1105 | 1165 | 16×15            | 4×30                          | L50×50×4            | 4        |
| 8   | 1265 | 1325 | 16×15            | 4×30                          | L50×50×4            |          |
| 9   | 1425 | 1485 | 20×15            | 4×30                          | L50×50×4            |          |
| 10  | 1580 | 1640 | 20×15            | 4×30                          | L50×50×4            |          |
| 11  | 1740 | 1810 | 20×19            | 4×36                          | L65×65×6            |          |
| 12  | 1905 | 1975 | 20×19            | 4×36                          | L65×65×6            |          |

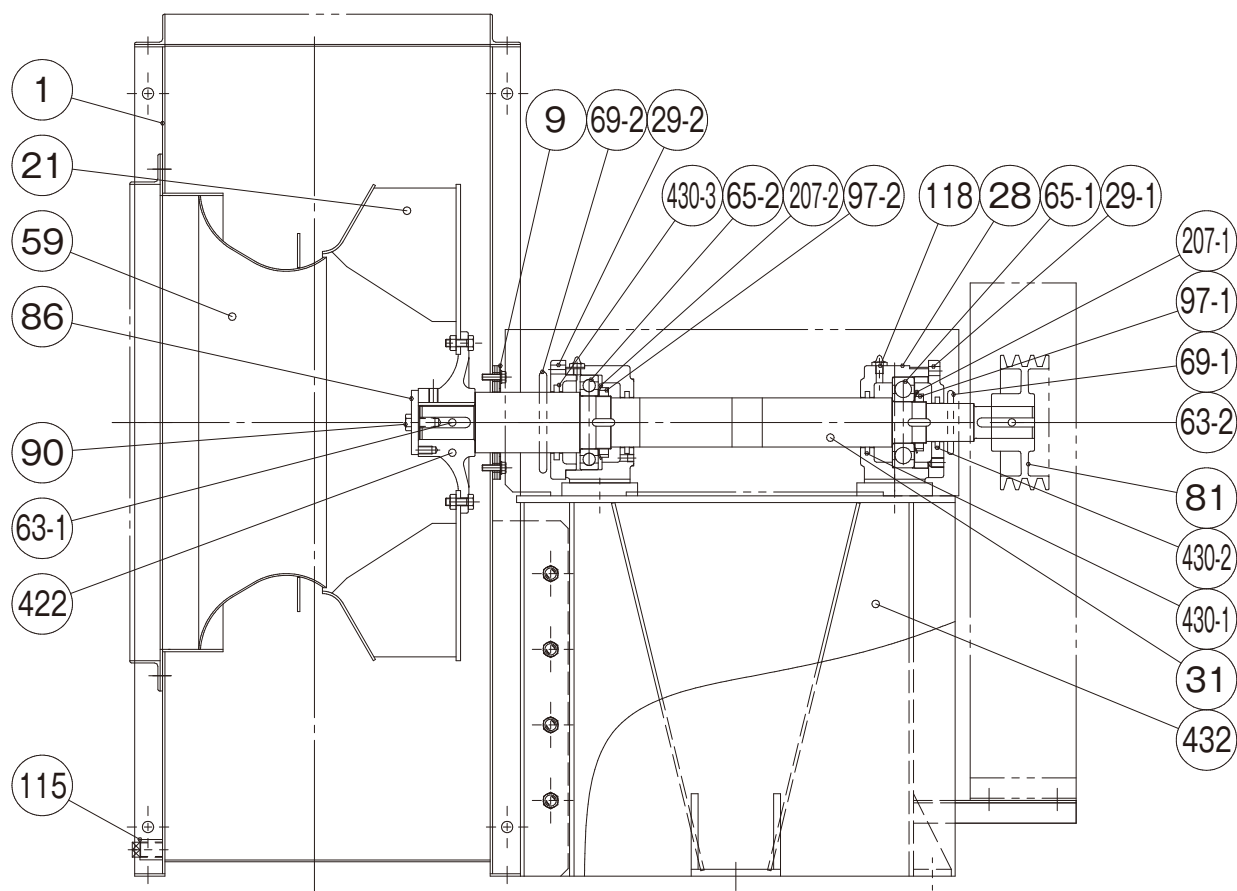
Discharge Companion Flange

(Unit: mm)



| No. | E    | K    | $P_1 \times n_1$ | $P_2 \times n_2$ | $r \times Q$ | Steel material size |
|-----|------|------|------------------|------------------|--------------|---------------------|
| 2   | 415  | 210  | 90 × 5           | 82 × 3           | 16×10        | L30×30×3            |
| 2½  | 515  | 270  | 92 × 6           | 76.5×4           | 20×10        | L30×30×3            |
| 3   | 620  | 320  | 74 × 9           | 73 × 5           | 28×12        | L40×40×3            |
| 3½  | 725  | 375  | 77 × 10          | 84 × 5           | 30×12        | L40×40×3            |
| 4   | 830  | 430  | 87.5×10          | 95 × 5           | 30×12        | L40×40×3            |
| 4½  | 930  | 485  | 97.5×10          | 88.5×6           | 32×12        | L40×40×3            |
| 5   | 1035 | 540  | 98 × 11          | 97.5×6           | 34×12        | L40×40×3            |
| 5½  | 1140 | 590  | 91 × 13          | 91 × 7           | 40×12        | L40×40×3            |
| 6   | 1240 | 645  | 86 × 15          | 86 × 8           | 46×15        | L40×40×3            |
| 6½  | 1345 | 700  | 175 × 8          | 152 × 5          | 26×15        | L50×50×4            |
| 7   | 1450 | 750  | 168 × 9          | 162 × 5          | 28×15        | L50×50×4            |
| 8   | 1655 | 860  | 171 × 10         | 153 × 6          | 32×15        | L50×50×4            |
| 9   | 1860 | 965  | 160 × 12         | 170 × 6          | 36×15        | L50×50×4            |
| 10  | 2070 | 1075 | 177.5×12         | 162 × 7          | 38×15        | L50×50×4            |
| 11  | 2275 | 1180 | 167.5×14         | 178 × 7          | 42×19        | L65×65×6            |
| 12  | 2480 | 1290 | 170 × 15         | 170 × 8          | 46×19        | L65×65×6            |

## Internal structure drawing



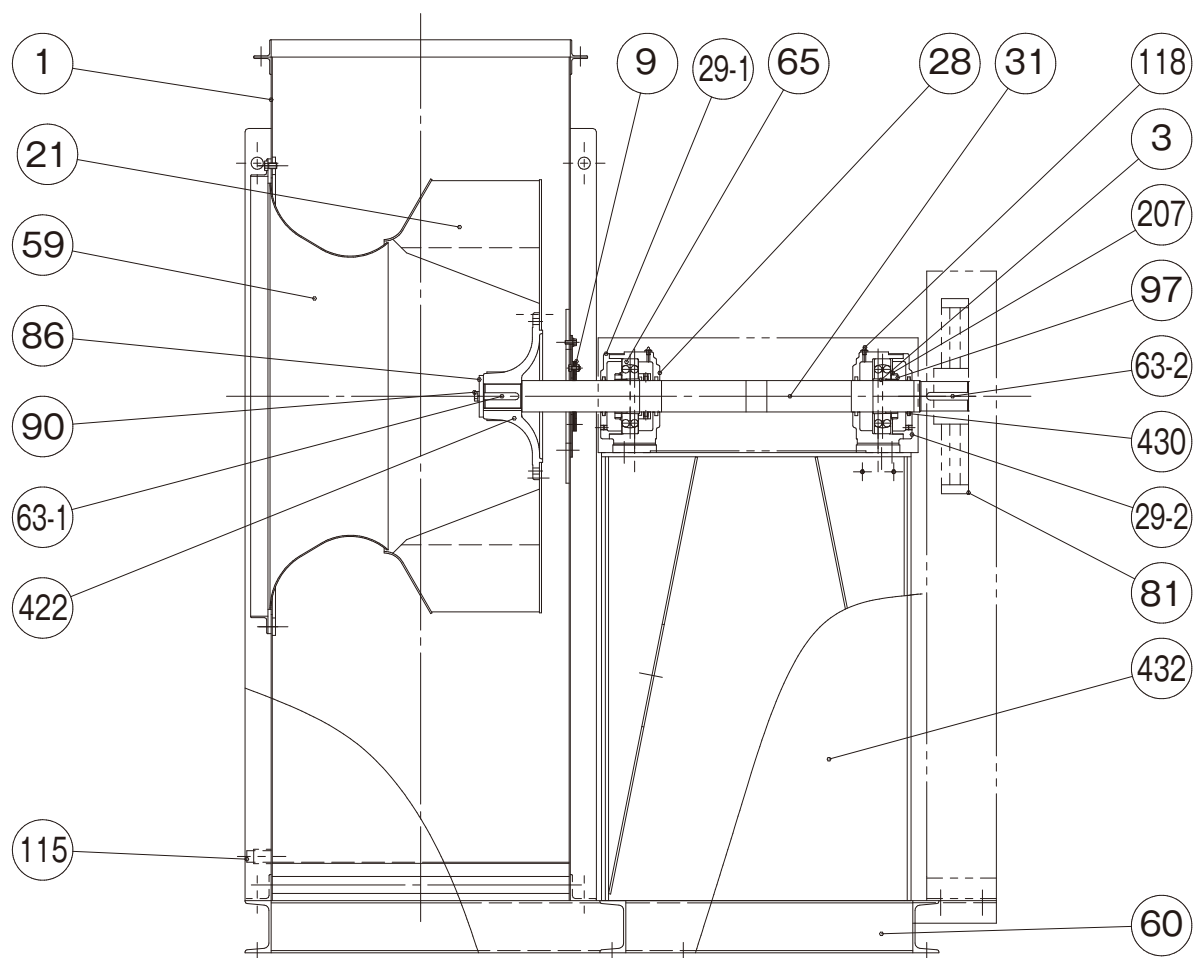
| Code | Part name                 | Qty | Material     |
|------|---------------------------|-----|--------------|
| 1    | Casing                    | 1   | SPHC · SS400 |
| 21   | Impeller                  | 1   | SPHC · SM570 |
| 422  | Impeller Boss             | 1   | FCD450       |
| 86   | Impeller retaining washer | 1   | SS400        |
| 90   | Impeller Tap Bolt         | 1   | SWCH         |
| 63-1 | Impeller Key              | 1   | S45C         |
| 59   | Suction opening           | 1   | SPHC         |
| 31   | Shaft                     | 1   | S45C         |
| 28   | Bearing Case              | 2   | FC200        |

| Code | Part name     | Qty | Material     |
|------|---------------|-----|--------------|
| 29-1 | Bearing Cap A | 1   | FC200        |
| 29-2 | Bearing Cap C | 1   | FC200        |
| 118  | Grease Nipple | 2   | C3604B       |
| 81   | V Pulley      | 1   | FC200        |
| 63-2 | V Pulley Key  | 1   | S45C         |
| 432  | Bearing base  | 1   | SPHC · SS400 |
| 115  | Drain         | 1   | SS400        |
| 9    | Shaft Seal    |     |              |

| Code  | Part name      | Qty | Material | No.2 | No.2½ | No.3 | No.3½ | No.4 | No.4½  | No.5   | No.5½  | No.6   |
|-------|----------------|-----|----------|------|-------|------|-------|------|--------|--------|--------|--------|
| 65-1  | Ball Bearing   | 1   | SUJ      | 6307 | 6308  | 6309 | 6310  | 6311 | 6312   | 6313   | 6314   | 6316   |
| 65-2  | Ball Bearing   | 1   | SUJ      | 6210 | 6211  | 6212 | 6213  | 6214 | 6215   | 6216   | 6217   | 6219   |
| 97-1  | Bearing Nut    | 1   | SS400    | AN07 | AN08  | AN09 | AN10  | AN11 | AN12   | AN13   | AN14   | AN16   |
| 97-2  | Bearing Nut    | 1   | SS400    | AN10 | AN11  | AN12 | AN13  | AN14 | AN15   | AN16   | AN17   | AN19   |
| 207-1 | Bearing Washer | 1   | SS400    | AW07 | AW08  | AW09 | AW10  | AW11 | AW12   | AW13   | AW14   | AW16   |
| 207-2 | Bearing Washer | 1   | SS400    | AW10 | AW11  | AW12 | AW13  | AW14 | AW15   | AW16   | AW17   | AW19   |
| 430-1 | Felt Ring      | 2   | FELT     | Fi10 | Fi11  | Fi12 | Fi13  | Fi15 | Fi16.5 | Fi17.5 | Fi18.5 | Fi20.5 |
| 430-2 | Felt Ring      | 1   | FELT     | Fi07 | Fi08  | Fi09 | Fi10  | Fi11 | Fi12   | Fi13   | Fi15   | Fi16   |
| 430-3 | Felt Ring      | 1   | FELT     | Fi13 | Fi15  | Fi16 | Fi17  | Fi18 | Fi19   | Fi20   | Fi21   | Fi24   |
| 69-1  | Deflector      | 1   | CR       | P30  | P35   | P40  | P45   | P50  | P55    | P60    | P65    | P70    |
| 69-2  | Deflector      | 1   | CR       | P60  | P65   | P70  | P75   | P80  | P85    | P90    | P95    | P110   |

Codes 69-1 and 69-2 are only included with outdoor specifications.

#### Internal structure drawing (No.6½~8)



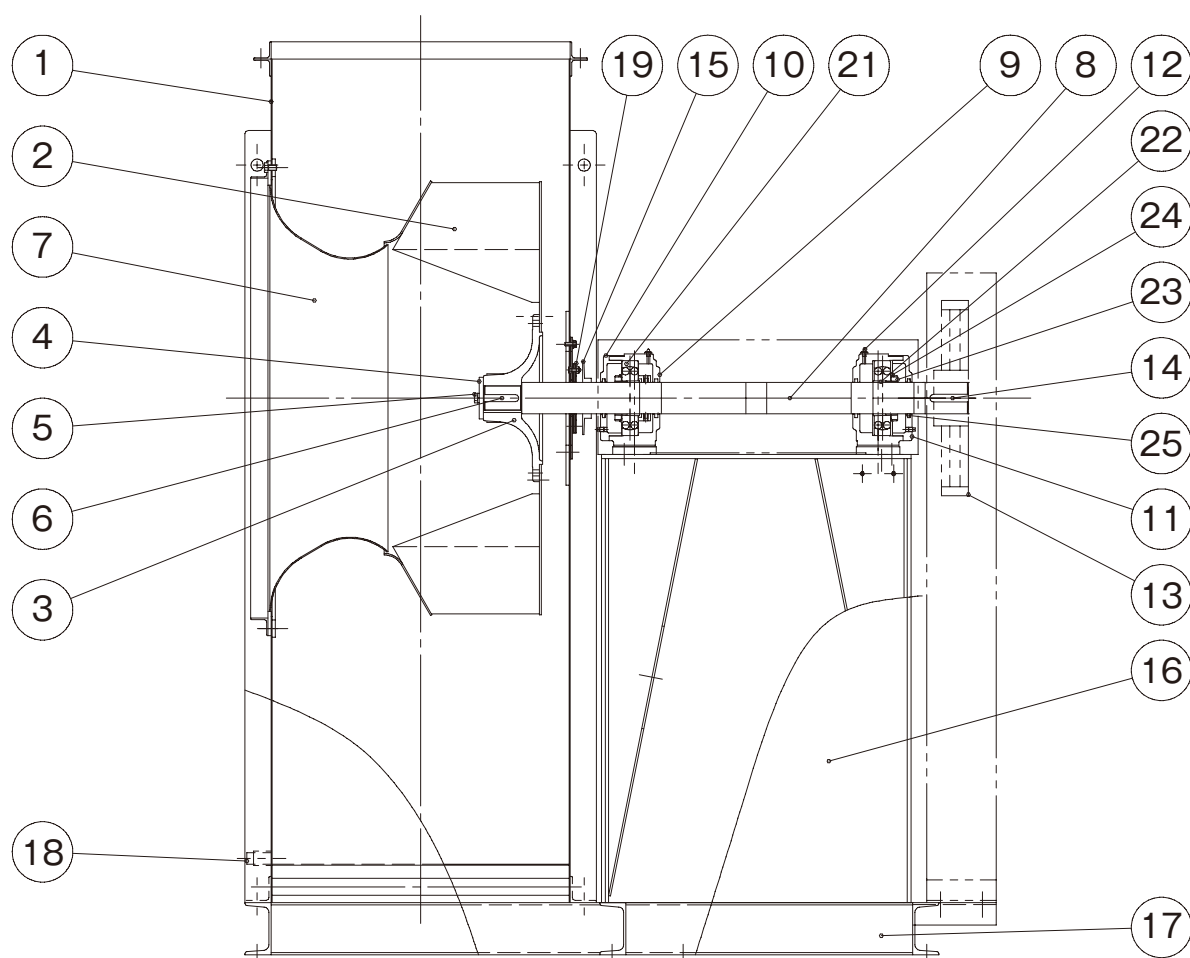
| Code | Part name                 | Qty | Material            |
|------|---------------------------|-----|---------------------|
| 1    | Casing                    | 1   | SPHC · SS400        |
| 21   | Impeller                  | 1   | SM (JFE-HITEN590SA) |
| 422  | Impeller Boss             | 1   | FCD450 (FCD400)     |
| 86   | Impeller retaining washer | 1   | SS400               |
| 90   | Impeller Tap Bolt         | 1   | SWCH                |
| 63-1 | Impeller Key              | 1   | S45C                |
| 59   | Suction opening           | 1   | SPHC · SS400        |
| 31   | Shaft                     | 1   | S45C                |
| 28   | Bearing Case              | 2   | FC200               |

| Code | Part name     | Qty | Material     |
|------|---------------|-----|--------------|
| 29-1 | Bearing Cap A | 1   | FC200        |
| 29-2 | Bearing Cap C | 1   | FC200        |
| 118  | Grease Nipple | 2   | C3604B       |
| 81   | V Pulley      | 1   | FC200        |
| 63-2 | V Pulley Key  | 1   | S45C         |
| 432  | Bearing base  | 1   | SPHC · SS400 |
| 60   | Common Base   | 1   | SS400        |
| 115  | Drain         | 1   | SS400        |
| 9    | Shaft Seal    | 1   |              |

| Code | Part name      | Qty | Material | No.6½ | No.7  | No.8  |
|------|----------------|-----|----------|-------|-------|-------|
| 65   | Bearing        | 2   | SUU2     | 1318K | 1318K | 1320K |
| 3    | Adapter        | 2   | SS400    | H318X | H318X | H320X |
| 97   | Bearing Nut    | 2   | SS400    | AN18  | AN18  | AN20  |
| 207  | Bearing Washer | 2   | SS400    | AW18  | AW18  | AW20  |
| 430  | Felt Ring      | 4   | FELT     | Fi18  | Fi18  | Fi20  |

※Applies to air temperatures of 0 - 90°C.

# Internal structure drawing (No.6½~8)



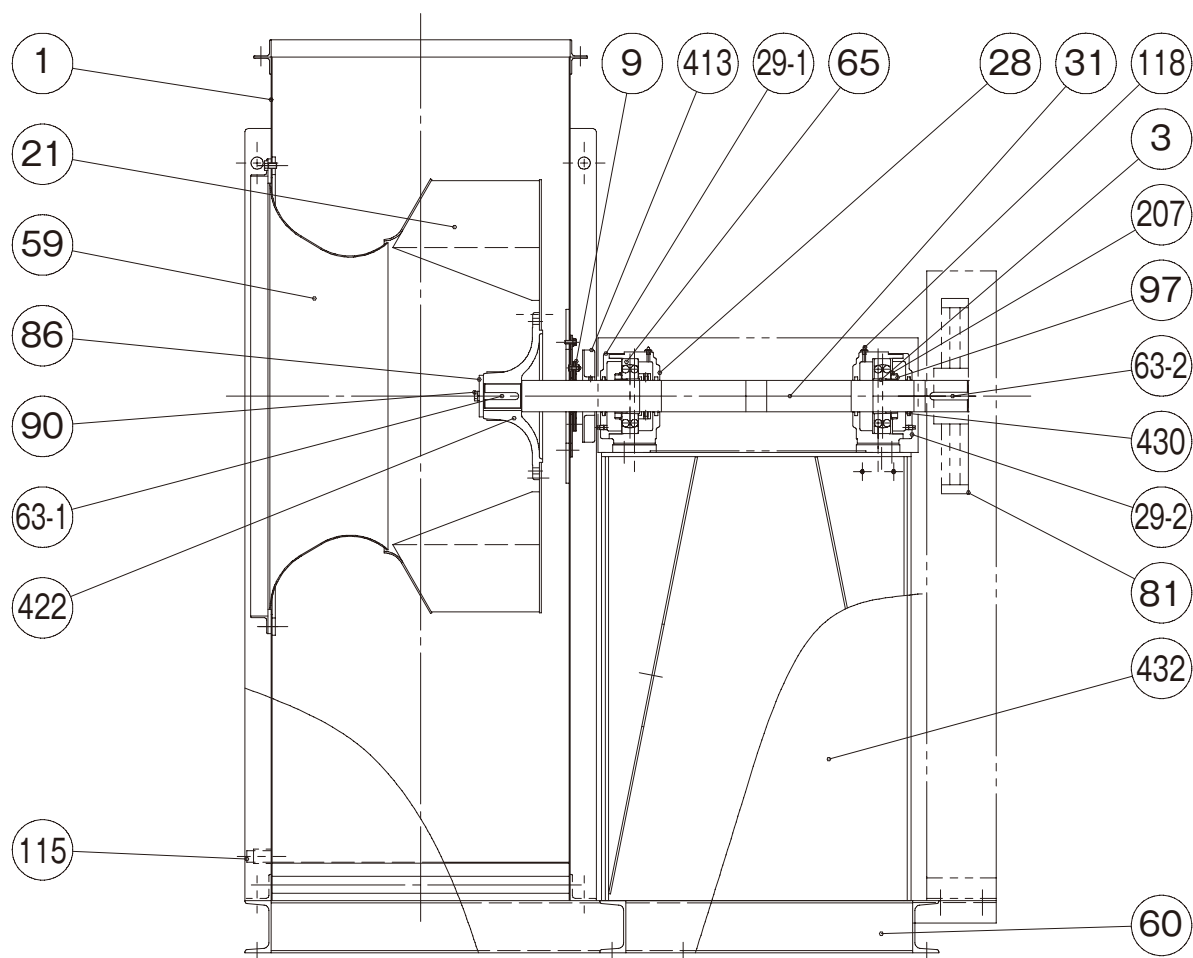
| Code | Part name                 | Qty | Material            |
|------|---------------------------|-----|---------------------|
| 1    | Casing                    | 1   | SPHC · SS400        |
| 2    | Impeller                  | 1   | SM (JFE-HITEN590SA) |
| 3    | Impeller Boss             | 1   | FCD450 (FCD400)     |
| 4    | Impeller retaining washer | 1   | SS400               |
| 5    | Impeller Tap Bolt         | 1   | SWCH                |
| 6    | Impeller Key              | 1   | S45C                |
| 7    | Suction opening           | 1   | SPHC · SS400        |
| 8    | Main Shaft                | 1   | S45C                |
| 9    | Bearing Case              | 2   | FC200               |
| 10   | Bearing Cap A             | 1   | FC200               |

| Code | Part name            | Qty | Material     |
|------|----------------------|-----|--------------|
| 11   | Bearing Cap C        | 1   | FC200        |
| 12   | Grease Nipple        | 2   | C3604B       |
| 13   | V Pulley             | 1   | FC200        |
| 14   | V Pulley Key         | 1   | S45C         |
| 15   | Heat-radiating plate | 1   | FC200        |
| 16   | Bearing base         | 1   | SPHC · SS400 |
| 17   | Common Base          | 1   | SS400        |
| 18   | Drain                | 1   | SS400        |
| 19   | Shaft Seal           | 1   |              |

| Code | Part name      | Qty | Material | No.6½ | No.7  | No.8  |
|------|----------------|-----|----------|-------|-------|-------|
| 21   | Bearing        | 2   | SUJ2     | 1318K | 1318K | 1320K |
| 22   | Adapter        | 2   | SS400    | H318X | H318X | H320X |
| 23   | Bearing Nut    | 2   | SS400    | AN18  | AN18  | AN20  |
| 24   | Bearing Washer | 2   | SS400    | AW18  | AW18  | AW20  |
| 25   | Felt Ring      | 4   | FELT     | Fi18  | Fi18  | Fi20  |

※Applies to air temperatures of 91 - 200°C.

#### Internal structure drawing (No.6½~8)



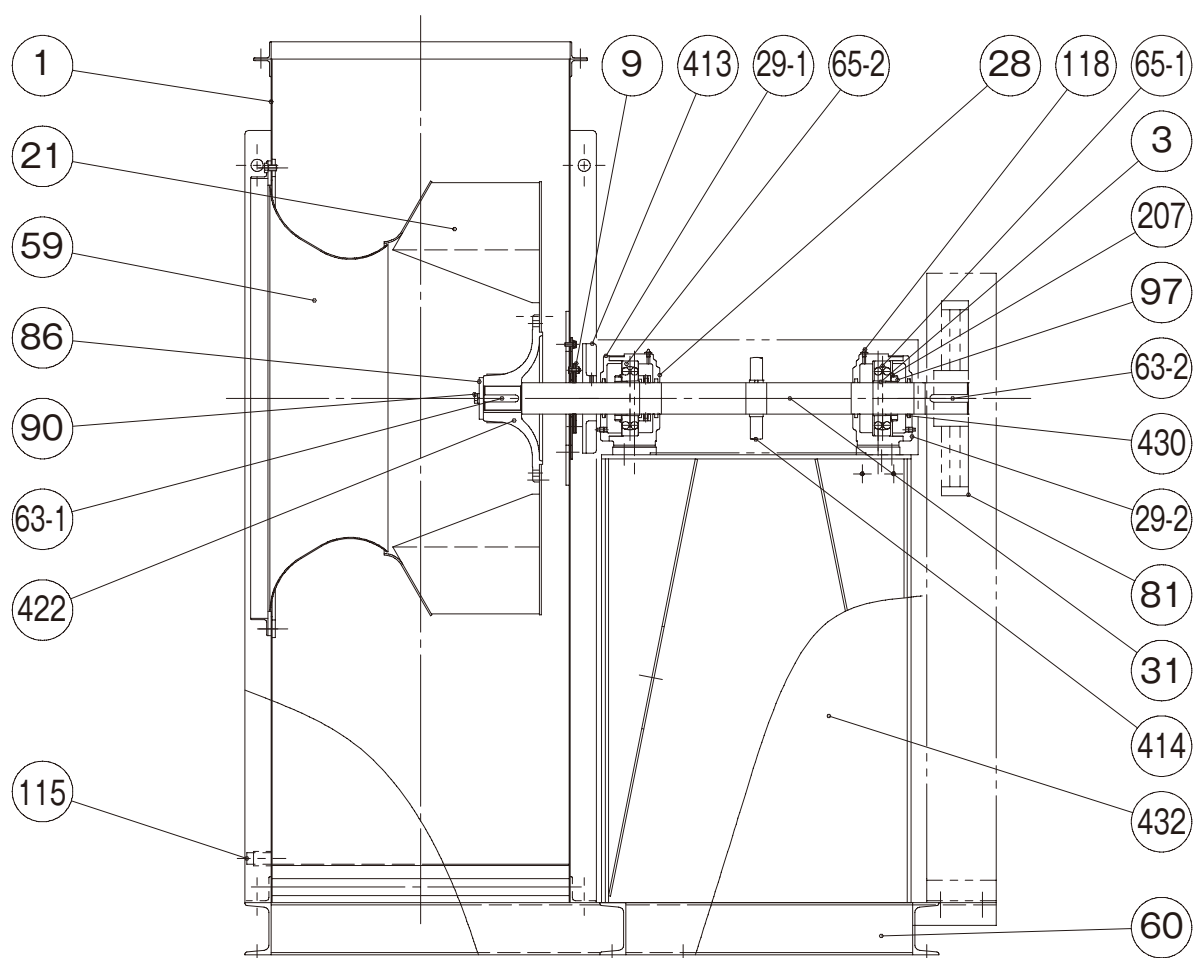
| Code | Part name                 | Qty | Material            |
|------|---------------------------|-----|---------------------|
| 1    | Casing                    | 1   | SPHC · SS400        |
| 21   | Impeller                  | 1   | SM (JFE-HITEN590SA) |
| 422  | Impeller Boss             | 1   | FCD450 (FCD400)     |
| 86   | Impeller retaining washer | 1   | SS400               |
| 90   | Impeller Tap Bolt         | 1   | SWCH                |
| 63-1 | Impeller Key              | 1   | S45C                |
| 59   | Suction opening           | 1   | SPHC · SS400        |
| 31   | Shaft                     | 1   | S45C                |
| 28   | Bearing Case              | 2   | FC200               |
| 29-1 | Bearing Cap A             | 1   | FC200               |

| Code | Part name            | Qty | Material     |
|------|----------------------|-----|--------------|
| 29-2 | Bearing Cap C        | 1   | FC200        |
| 118  | Grease Nipple        | 2   | C3604B       |
| 81   | V Pulley             | 1   | FC200        |
| 63-2 | V Pulley Key         | 1   | S45C         |
| 413  | Heat-radiating plate | 1   | AC3A-F       |
| 432  | Bearing base         | 1   | SPHC · SS400 |
| 60   | Common Base          | 1   | SS400        |
| 115  | Drain                | 1   | SS400        |
| 9    | Shaft Seal           | 1   |              |

| Code | Part name      | Qty | Material | No.6½ | No.7  | No.8  |
|------|----------------|-----|----------|-------|-------|-------|
| 65   | Bearing        | 2   | SUJ2     | 1318K | 1318K | 1320K |
| 3    | Adapter        | 2   | SS400    | H318X | H318X | H320X |
| 97   | Bearing Nut    | 2   | SS400    | AN18  | AN18  | AN20  |
| 207  | Bearing Washer | 2   | SS400    | AW18  | AW18  | AW20  |
| 430  | Felt Ring      | 4   | FELT     | Fi18  | Fi18  | Fi20  |

※Applies to air temperatures of 201 - 250°C.

# Internal structure drawing (No.6½~8)



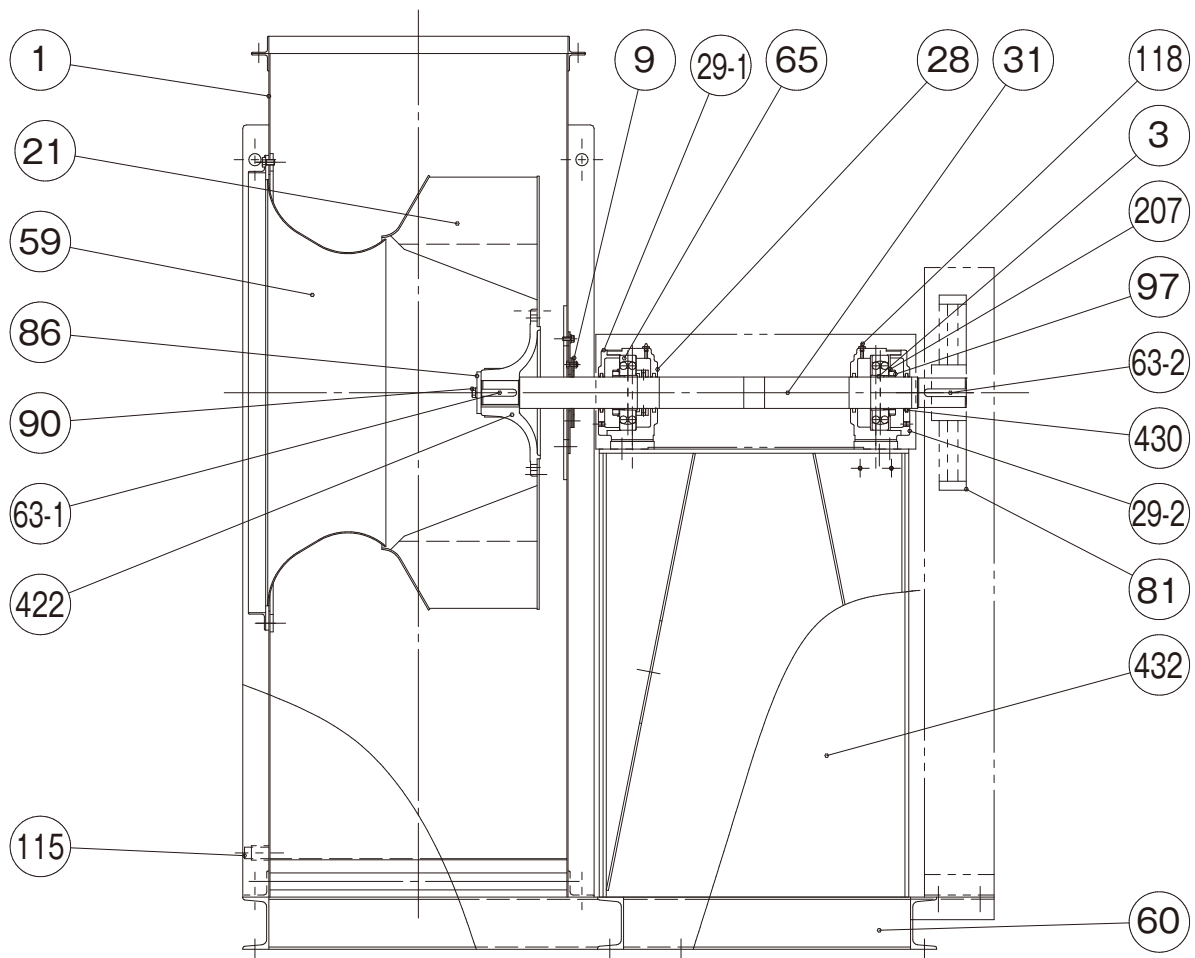
| Code | Part name                 | Qty | Material            |
|------|---------------------------|-----|---------------------|
| 1    | Casing                    | 1   | SPHC · SS400        |
| 21   | Impeller                  | 1   | SM (JFE-HITEN590SA) |
| 422  | Impeller Boss             | 1   | FCD450 (FCD400)     |
| 86   | Impeller retaining washer | 1   | SS400               |
| 90   | Impeller Tap Bolt         | 1   | SWCH                |
| 63-1 | Impeller Key              | 1   | S45C                |
| 59   | Suction opening           | 1   | SPHC · SS400        |
| 31   | Shaft                     | 1   | S45C                |
| 28   | Bearing Case              | 2   | FC200               |
| 29-1 | Bearing Cap A             | 1   | FC200               |

| Code | Part name          | Qty | Material     |
|------|--------------------|-----|--------------|
| 29-2 | Bearing Cap C      | 1   | FC200        |
| 118  | Grease Nipple      | 2   | C3604B       |
| 81   | V Pulley           | 1   | FC200        |
| 63-2 | V Pulley Key       | 1   | S45C         |
| 413  | Heat-radiating fin | 1   | AC3A-F       |
| 414  | Cooling fin        | 1   | SS400        |
| 432  | Bearing base       | 1   | SPHC · SS400 |
| 60   | Common Base        | 1   | SS400        |
| 115  | Drain              | 1   | SS400        |
| 9    | Shaft Seal         | 1   |              |

| Code | Part name      | Qty | Material | No.6½   | No.7    | No.8    |
|------|----------------|-----|----------|---------|---------|---------|
| 65-1 | Bearing        | 1   | SUU2     | 1318K   | 1318K   | 1320K   |
| 65-2 | Bearing        | 1   | SUU2     | 1318KC3 | 1318KC3 | 1320KC3 |
| 3    | Adapter        | 2   | SS400    | H318X   | H318X   | H320X   |
| 97   | Bearing Nut    | 2   | SS400    | AN18    | AN18    | AN20    |
| 207  | Bearing Washer | 2   | SS400    | AW18    | AW18    | AW20    |
| 430  | Felt Ring      | 4   | FELT     | Fi18    | Fi18    | Fi20    |

※Applies to air temperatures of 251 - 350°C.

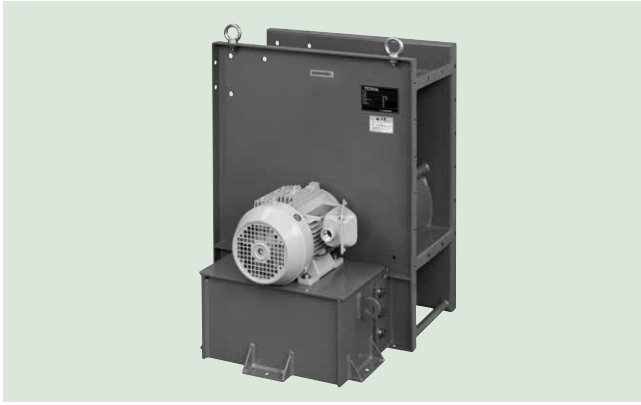
#### Internal structure drawing (No.9~12)



| Code | Part name                 | Qty | Material            |
|------|---------------------------|-----|---------------------|
| 1    | Casing                    | 1   | SPHC · SS400        |
| 21   | Impeller                  | 1   | SM (JFE-HITEN590SA) |
| 422  | Impeller Boss             | 1   | FCD450              |
| 86   | Impeller retaining washer | 1   | SS400               |
| 90   | Impeller Tap Bolt         | 1   | SWCH                |
| 63-1 | Impeller Key              | 1   | S45C                |
| 59   | Suction opening           | 1   | SPHC · SS400        |
| 31   | Shaft                     | 1   | S45C                |
| 28   | Bearing Case              | 2   | FC200               |

| Code | Part name     | Qty | Material     |
|------|---------------|-----|--------------|
| 29-1 | Bearing Cap A | 1   | FC200        |
| 29-2 | Bearing Cap C | 1   | FC200        |
| 118  | Grease Nipple | 2   | C3604B       |
| 81   | V Pulley      | 1   | FC200        |
| 63-2 | V Pulley Key  | 1   | S45C         |
| 432  | Bearing base  | 1   | SPHC · SS400 |
| 60   | Common Base   | 1   | SS400        |
| 115  | Drain         | 1   | SS400        |
| 9    | Shaft Seal    | 1   |              |

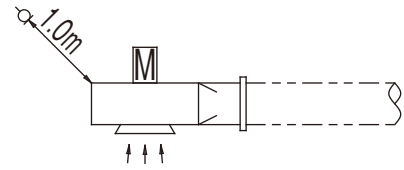
| Code | Part name      | Qty | Material | No.9   | No.10  | No.11  | No.12  |
|------|----------------|-----|----------|--------|--------|--------|--------|
| 65   | Bearing        | 2   | SUU2     | 22224K | 22224K | 22224K | 22224K |
| 3    | Adapter        | 2   | SS400    | H3124X | H3124X | H3124X | H3124X |
| 97   | Bearing Nut    | 2   | SS400    | AN24   | AN24   | AN24   | AN24   |
| 207  | Bearing Washer | 2   | SS400    | AW24   | AW24   | AW24   | AW24   |
| 430  | Felt Ring      | 4   | FELT     | Fi24   | Fi24   | Fi24   | Fi24   |



※Please note that the above image is a representative example and may differ partially from the actual device.

### Noise Measurement Values

The noise values in the selection chart represent ambient noise values in dB (A) from one meter away from the main unit. Noise values indicate values at the maximum efficiency point.



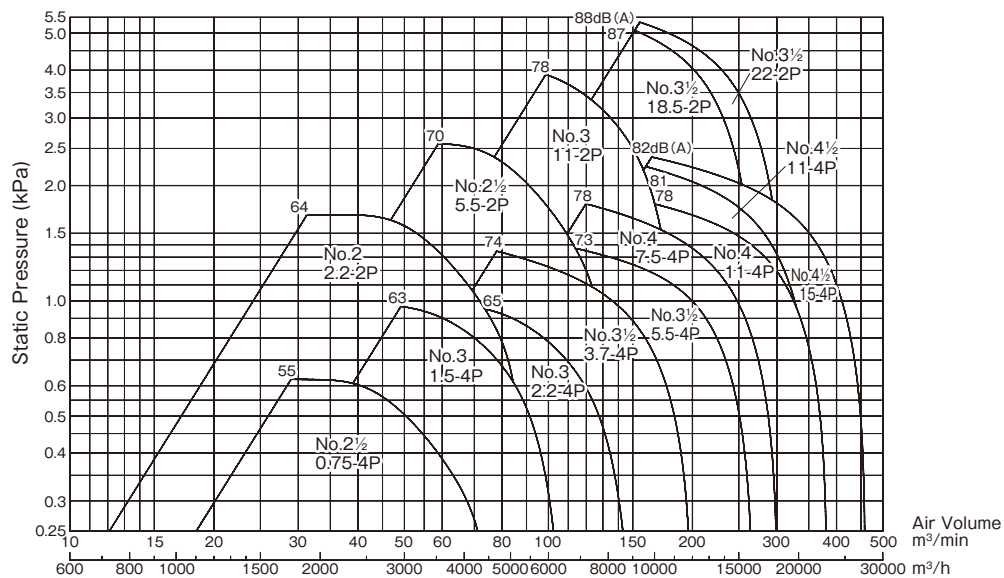
### Selection chart

#### Display Example

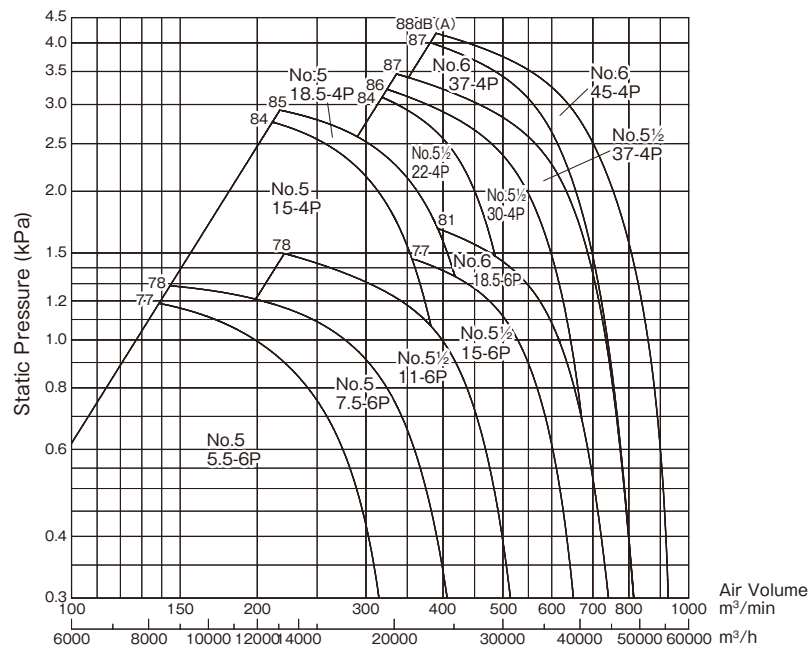
**No.6 37 - 4P**

Size Output (kW) No. of Poles

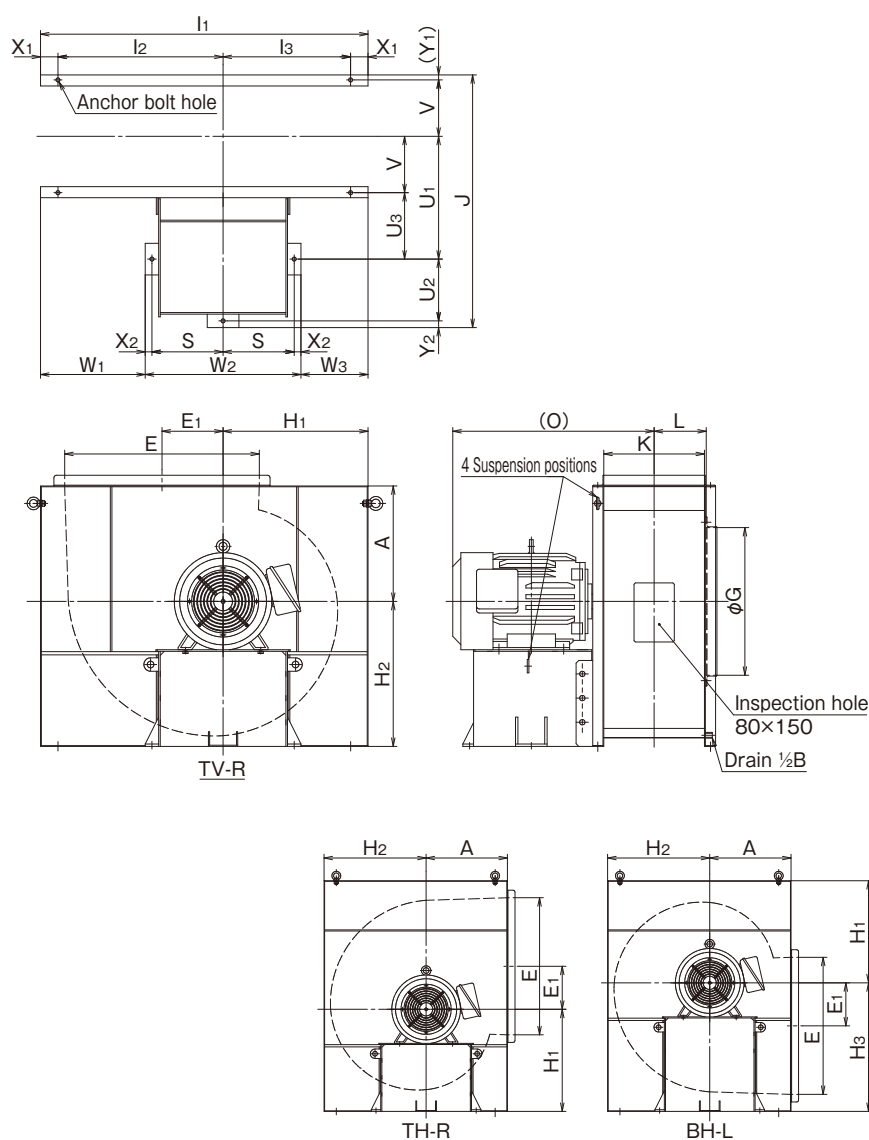
#### ●CMF3-No.2~4½-HOH (2P, 4P)



#### ●CMF3-No.5~6-HOH (4P, 6P)



#### ■ Assembly drawing (No.2~3½)



#### ■ Dimensions

(Unit: mm)

| No. | Main Unit |                |                |                |                |       |     | Suction Companion Flange | Discharge Companion Flange |     | Maximum Rotational Speed (50/60Hz) | Max. Motor Output (kW) (max. frame no.) (50/60Hz) | Approximate Weight (excluding motor) |
|-----|-----------|----------------|----------------|----------------|----------------|-------|-----|--------------------------|----------------------------|-----|------------------------------------|---------------------------------------------------|--------------------------------------|
|     | A         | E <sub>1</sub> | H <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | L     | O   | G                        | E                          | K   |                                    |                                                   |                                      |
| 2   | 260       | 132.5          | 300            | 300            | 420            | 112   | 411 | 310                      | 415                        | 210 | 2870/3440                          | 1.5 (90L) / 2.2 (90L)                             | 73kg                                 |
| 2½  | 310       | 157.5          | 390            | 390            | 495            | 140.5 | 550 | 400                      | 515                        | 270 | 2910/3490                          | 3.7 (112M) / 5.5 (132S)                           | 95kg                                 |
| 3   | 370       | 195            | 460            | 460            | 595            | 166.5 | 714 | 480                      | 620                        | 320 | 2920/3500                          | 7.5 (132S) / 11 (160M)                            | 148kg                                |
| 3½  | 430       | 227.5          | 540            | 540            | 680            | 194   | 799 | 550                      | 725                        | 375 | 2920/3500                          | 15 (160M) / 22 (180M)                             | 198kg                                |

| No. | Base           |                |                |                |                |                |                |                |                |                |                |     |       |                |                |                |                |                |                |                |                |       | Anchor bolt<br>hole |
|-----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-------|---------------------|
|     | TV-R           |                |                |                |                | TH-R/BH-L      |                |                |                |                | TV-R/TH-R/BH-L |     |       |                |                |                |                |                |                |                |                |       |                     |
|     | l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | W <sub>1</sub> | W <sub>3</sub> | l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | W <sub>1</sub> | W <sub>3</sub> | J              | S   | V     | U <sub>1</sub> | U <sub>2</sub> | U <sub>3</sub> | W <sub>2</sub> | X <sub>1</sub> | X <sub>2</sub> | Y <sub>1</sub> | Y <sub>2</sub> |       |                     |
| 2   | 720            | 365            | 245            | 202.5          | 82.5           | 560            | 245            | 205            | 82.5           | 42.5           | 500            | 200 | 122.5 | 247.5          | 100            | —              | 435            | 55             | 17.5           | 12.5           | 17.5           | 5×φ12 |                     |
| 2½  | 885            | 440            | 335            | 277.5          | 172.5          | 700            | 335            | 255            | 172.5          | 92.5           | 620            | 200 | 152.5 | 277.5          | 160            | —              | 435            | 55             | 17.5           | 12.5           | 17.5           | 5×φ12 |                     |
| 3   | 1055           | 530            | 395            | 305            | 170            | 830            | 395            | 305            | 170            | 80             | 785            | 265 | 182.5 | 362.5          | 197.5          | —              | 580            | 65             | 25             | 17.5           | 25             | 5×φ15 |                     |
| 3½  | 1220           | 615            | 475            | 390            | 250            | 970            | 475            | 365            | 250            | 140            | 942            | 265 | 210   | 457.5          | 230            | 247.5          | 580            | 65             | 25             | 19             | 25             | 7×φ15 |                     |

※TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.

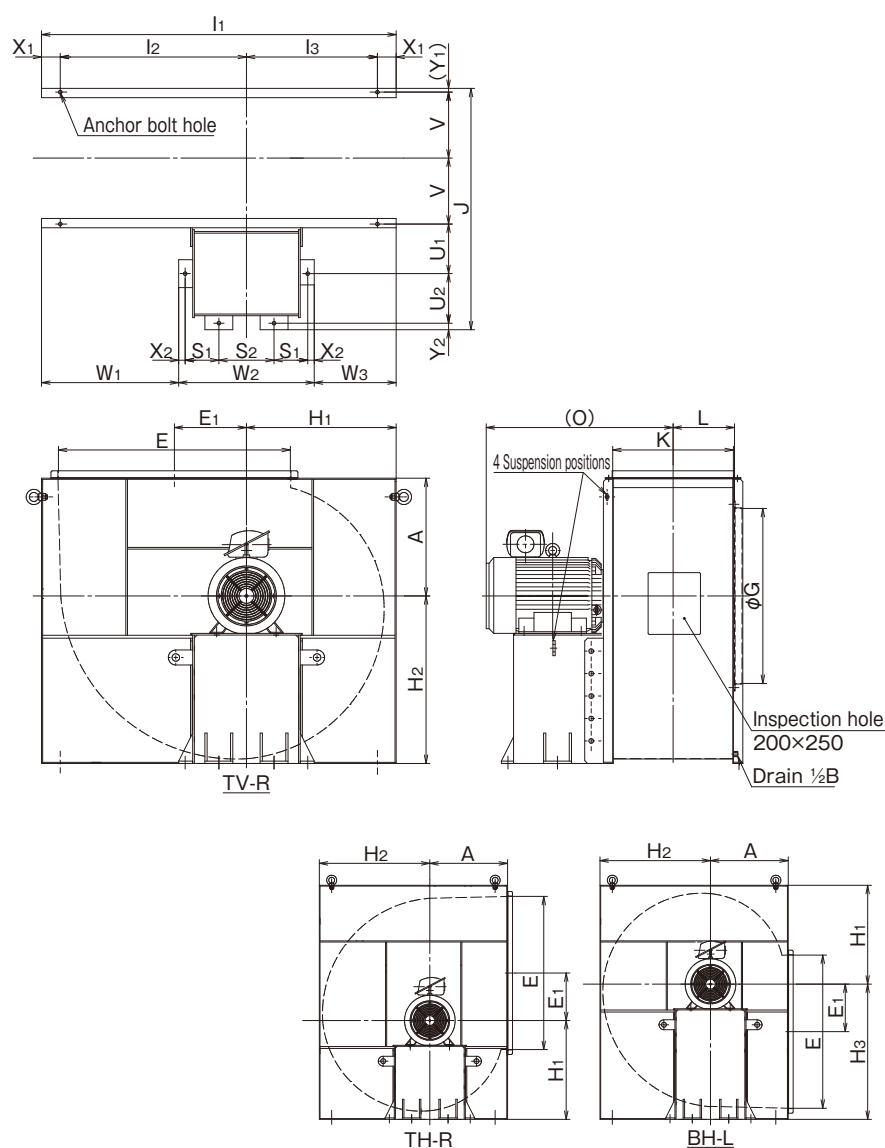
※Dimensions in parentheses vary depending on motors.

※If you use the fan with an inverter, make the settings of the inverter to enable the frequency jump function for eigenvalue of the resonance frequency values of the fan, motor, fan + base, and other parts to avoid abnormal vibration.

※Please be careful if a thermal overload relay is used, tripping may occur during starting due to the starting performance of the fan.

※Refer to the companion flange dimensional drawing for companion flange dimensions.

## ■ Assembly drawing (No.4~6)



## ■ Dimensions

(Unit: mm)

| No. | Main Unit |                |                |                |                |       |      | Suction Companion Flange | Discharge Companion Flange |     | Maximum Rotational Speed (50/60Hz) | Max. Motor Output (kW) (max. frame no.) (50/60Hz) | Approximate Weight (excluding motor) |
|-----|-----------|----------------|----------------|----------------|----------------|-------|------|--------------------------|----------------------------|-----|------------------------------------|---------------------------------------------------|--------------------------------------|
|     | A         | E <sub>1</sub> | H <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | L     | O    | G                        | E                          | K   |                                    |                                                   |                                      |
| 4   | 500       | 260            | 600            | 600            | 765            | 221.5 | 735  | 630                      | 830                        | 430 | 1430/1730                          | 5.5 (132S)/11 (160M)                              | 288kg                                |
| 4½  | 550       | 292.5          | 600            | 675            | 870            | 248.5 | 797  | 710                      | 930                        | 485 | 1440/1730                          | 11 (160M)/15 (160L)                               | 384kg                                |
| 5   | 575       | 322.5          | 670            | 750            | 920            | 276   | 881  | 780                      | 1035                       | 540 | 1430/1750                          | 15 (160L)/18.5 (180M)                             | 447kg                                |
| 5½  | 600       | 355            | 740            | 820            | 1010           | 301   | 1018 | 860                      | 1140                       | 590 | 1460/1760                          | 30 (180L)/37 (200L)                               | 532kg                                |
| 6   | 629       | 385            | 800            | 895            | 1095           | 328.5 | 1039 | 935                      | 1240                       | 645 | 1460/1760                          | 37 (200L)/45 (200L)                               | 608kg                                |

| No. | Base           |                |                |                |                |                |                |                |                |                |                |                |                |       |                |                |                |                |                |                |                |       |                     |
|-----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-------|---------------------|
|     | TV-R           |                |                |                |                | TH-R/BH-L      |                |                |                |                | TV-R/TH-R/BH-L |                |                |       |                |                |                |                |                |                |                |       | Anchor bolt<br>hole |
|     | l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | W <sub>1</sub> | W <sub>3</sub> | l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | W <sub>1</sub> | W <sub>3</sub> | J              | S <sub>1</sub> | S <sub>2</sub> | V     | U <sub>1</sub> | U <sub>2</sub> | W <sub>2</sub> | X <sub>1</sub> | X <sub>2</sub> | Y <sub>1</sub> | Y <sub>2</sub> |       |                     |
| 4   | 1365           | 700            | 535            | 465            | 300            | 1100           | 535            | 435            | 300            | 200            | 927            | 180            | 190            | 237.5 | 207.5          | 200            | 600            | 65             | 25             | 19             | 25             | 8×φ15 |                     |
| 4½  | 1470           | 770            | 500            | 545            | 275            | 1225           | 575            | 450            | 350            | 225            | 1050           | 175            | 230            | 272.5 | 235            | 215            | 650            | 100            | 35             | 20             | 35             | 8×φ19 |                     |
| 5   | 1590           | 820            | 570            | 575            | 325            | 1325           | 650            | 475            | 405            | 230            | 1105           | 180            | 260            | 300   | 235            | 215            | 690            | 100            | 35             | 20             | 35             | 8×φ19 |                     |
| 5½  | 1750           | 910            | 640            | 665            | 395            | 1420           | 720            | 500            | 475            | 255            | 1235           | 180            | 260            | 325   | 265            | 265            | 690            | 100            | 35             | 20             | 35             | 8×φ19 |                     |
| 6   | 1895           | 995            | 700            | 732.5          | 437.5          | 1524           | 795            | 529            | 532.5          | 266.5          | 1290           | 180            | 295            | 352.5 | 265            | 265            | 725            | 100            | 35             | 20             | 35             | 8×φ19 |                     |

※TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.

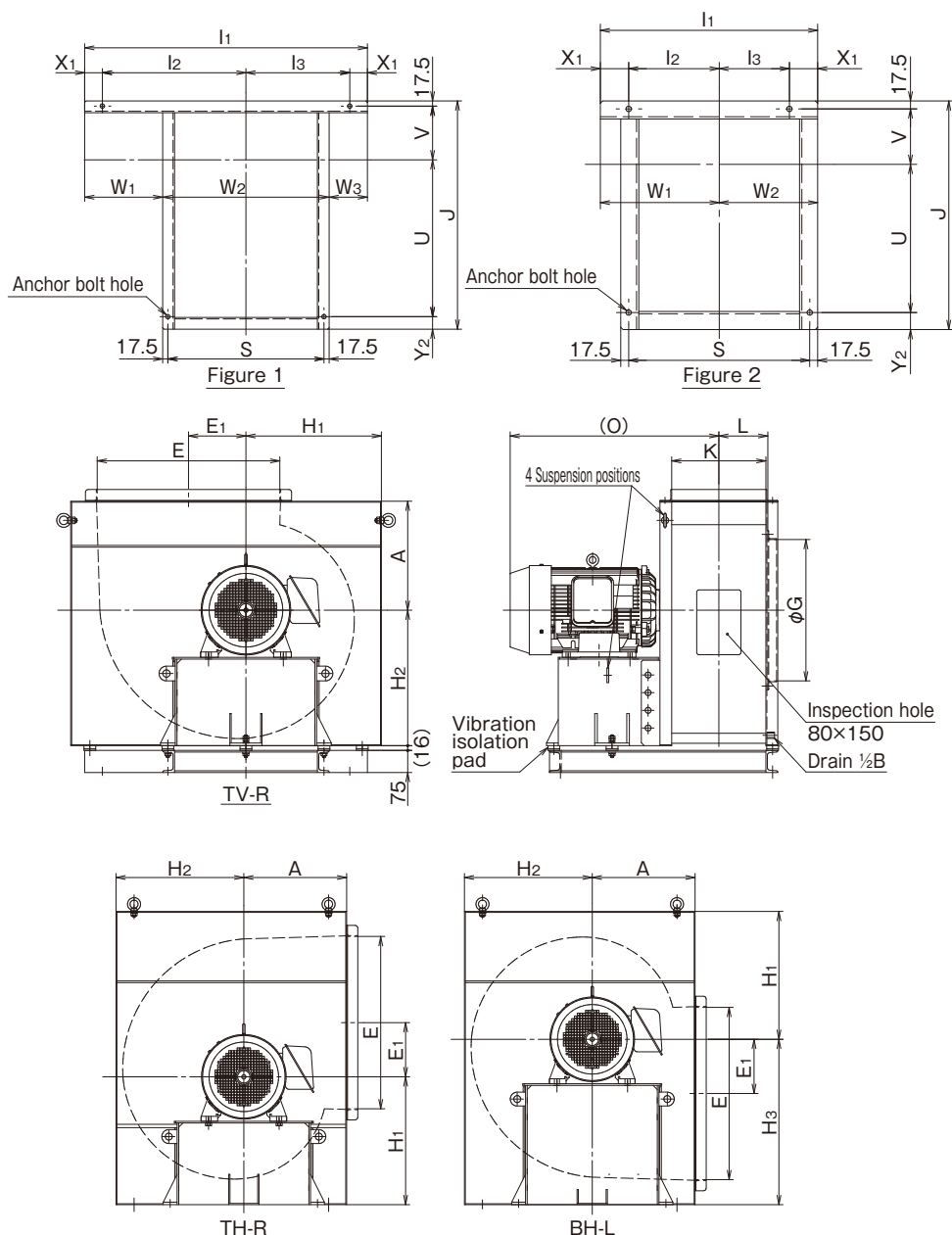
※Dimensions in parentheses vary depending on motors.

※If you use the fan with an inverter, make the settings of the inverter to enable the frequency jump function for eigenvalue of the resonance frequency values of the fan, motor, fan + base, and other parts to avoid abnormal vibration.

※Please be careful if a thermal overload relay is used, tripping may occur during starting due to the starting performance of the fan.

※Refer to the companion flange dimensional drawing for companion flange dimensions.

#### ■ Assembly drawing (No.2~3, -ND(D))



#### ■ Dimensions

(Unit: mm)

| No. | Main Unit |       |     |     |     |       |     | Suction<br>Companion<br>Flange | Discharge<br>Companion<br>Flange |     | Maximum<br>Rotational<br>Speed<br>(50/60Hz) | Max. Motor<br>Output (kW)<br>(max. frame no.)<br>(50/60Hz) | Approximate Weight<br>(excluding<br>motor) | Base |     |       |       |     |     |      |
|-----|-----------|-------|-----|-----|-----|-------|-----|--------------------------------|----------------------------------|-----|---------------------------------------------|------------------------------------------------------------|--------------------------------------------|------|-----|-------|-------|-----|-----|------|
|     |           |       |     |     |     |       |     |                                |                                  |     |                                             |                                                            |                                            | TV-R |     |       |       |     |     |      |
|     | A         | E1    | H1  | H2  | H3  | L     | O   | G                              | E                                | K   | Diagram                                     | I1                                                         | I2                                         | I3   | W1  | W3    | X1    |     |     |      |
| 2   | 260       | 132.5 | 300 | 300 | 420 | 112   | 411 | 310                            | 415                              | 210 | 2870/3440                                   | 1.5(90L)/2.2(90L)                                          | 86kg                                       | 1    | 645 | 320   | 200   | 165 | 45  | 62.5 |
| 2½  | 310       | 157.5 | 390 | 390 | 495 | 140.5 | 550 | 400                            | 515                              | 270 | 2910/3490                                   | 3.7(112M)/5.5(132S)                                        | 109kg                                      | 1    | 810 | 397.5 | 292.5 | 240 | 135 | 60   |
| 3   | 370       | 195   | 460 | 460 | 595 | 166.5 | 714 | 480                            | 620                              | 320 | 2920/3500                                   | 7.5(132S)/11(160M)                                         | 167kg                                      | 1    | 960 | 487.5 | 352.5 | 265 | 130 | 60   |

| No. | Base      |                |                |                |                |                |                |                |     |       |       |                |                |       |                     |                 |
|-----|-----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|-------|-------|----------------|----------------|-------|---------------------|-----------------|
|     | TH-R/BH-L |                |                |                |                |                |                | TV-R/TH-R/BH-L |     |       |       |                |                |       | Anchor bolt<br>hole | Stopper<br>bolt |
|     | Diagram   | I <sub>1</sub> | I <sub>2</sub> | I <sub>3</sub> | W <sub>1</sub> | W <sub>3</sub> | X <sub>1</sub> | J              | S   | U     | V     | W <sub>2</sub> | Y <sub>2</sub> |       |                     |                 |
| 2   | 2         | 480            | 200            | 155            | 45             | —              | 62.5           | 505            | 400 | 327.5 | 122.5 | 435            | 37.5           | 4×φ12 | 5×M8                |                 |
| 2½  | 1         | 625            | 280            | 200            | 135            | 55             | 72.5           | 625            | 400 | 417.5 | 152.5 | 435            | 37.5           | 4×φ12 | 5×M8                |                 |
| 3   | 1         | 735            | 355            | 265            | 130            | 40             | 57.5           | 775            | 530 | 532.5 | 182.5 | 565            | 42.5           | 4×φ15 | 5×M10               |                 |

※TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.

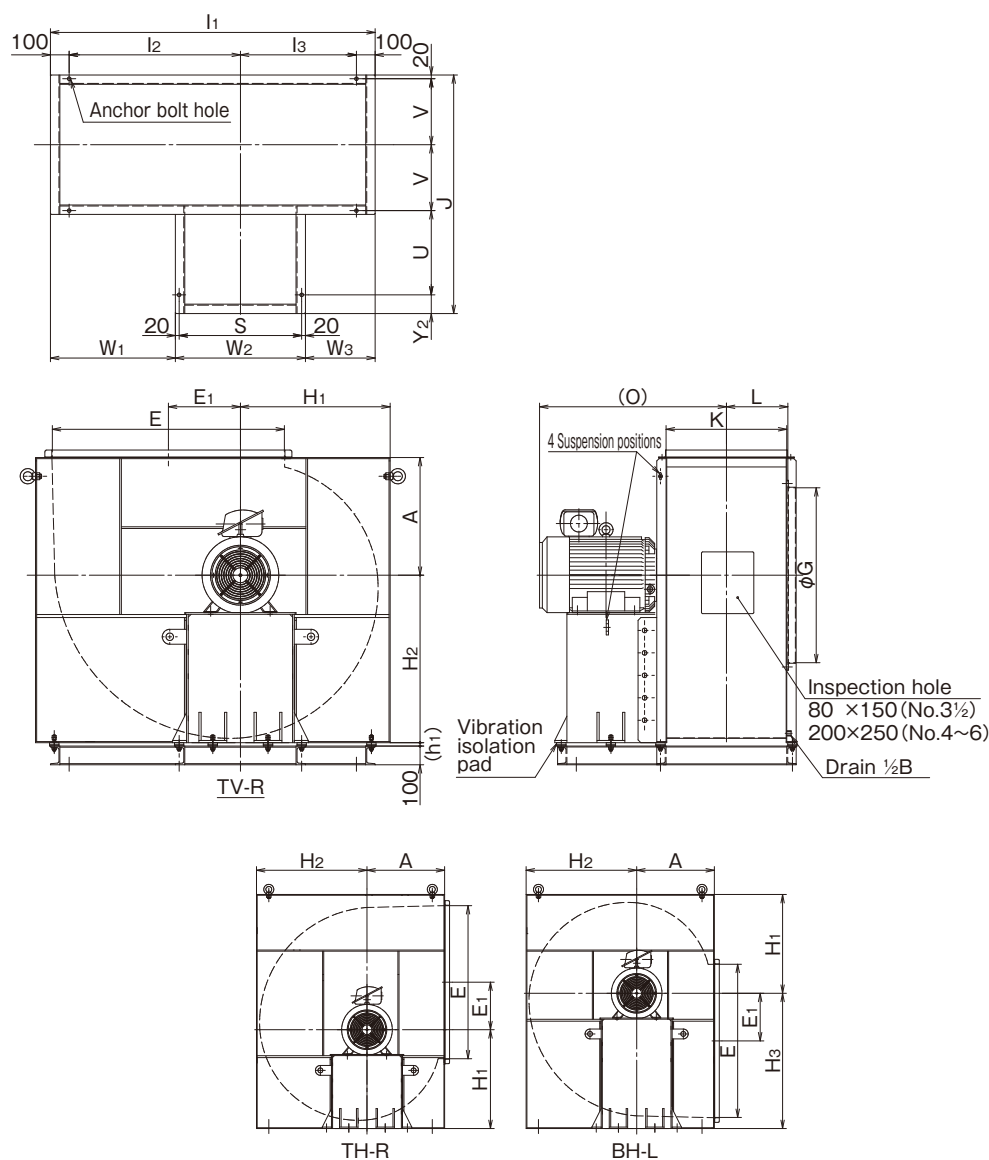
※Dimensions in parentheses vary depending on motors.

※If you use the fan with an inverter, make the settings of the inverter to enable the frequency jump function for eigenvalue of the resonance frequency values of the fan, motor, fan + base, and other parts to avoid abnormal vibration.

※Please be careful if a thermal overload relay is used, tripping may occur during starting due to the starting performance of the fan.

※Refer to the companion flange dimensional drawing for companion flange dimensions.

## ■ Assembly drawing (No.3½~6, -ND(D))



## ■ Dimensions

(Unit: mm)

| No. | Main Unit |                |                |                |                |       |      | Suction Companion Flange | Discharge Companion Flange |     | Maximum Rotational Speed (50/60Hz) | Max. Motor Output (kW) (max. frame no.) | Approximate Weight (excluding motor) | Base |     |     |       |       |
|-----|-----------|----------------|----------------|----------------|----------------|-------|------|--------------------------|----------------------------|-----|------------------------------------|-----------------------------------------|--------------------------------------|------|-----|-----|-------|-------|
|     | A         | E <sub>1</sub> | H <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | L     | O    |                          | E                          | K   |                                    |                                         |                                      | TV-R |     |     |       |       |
| 3½  | 430       | 227.5          | 540            | 540            | 680            | 194   | 799  | 550                      | 725                        | 375 | 2920/3500                          | 15(160M)/22(180M)                       | 235kg                                | 1130 | 535 | 395 | 350   | 210   |
| 4   | 500       | 260            | 600            | 600            | 765            | 221.5 | 735  | 630                      | 830                        | 430 | 1430/1730                          | 5.5(132S)/11(160M)                      | 328kg                                | 1275 | 620 | 455 | 425   | 260   |
| 4½  | 550       | 292.5          | 600            | 675            | 870            | 248.5 | 797  | 710                      | 930                        | 485 | 1430/1730                          | 11(160M)/15(160L)                       | 427kg                                | 1310 | 690 | 420 | 480   | 210   |
| 5   | 575       | 322.5          | 670            | 750            | 920            | 276   | 881  | 780                      | 1035                       | 540 | 1430/1750                          | 15(160L)/18.5(180M)                     | 494kg                                | 1430 | 740 | 490 | 510   | 260   |
| 5½  | 600       | 355            | 740            | 820            | 1010           | 301   | 1018 | 860                      | 1140                       | 590 | 1460/1760                          | 30(180L)/37(200L)                       | 584kg                                | 1590 | 830 | 560 | 600   | 330   |
| 6   | 629       | 385            | 800            | 895            | 1095           | 328.5 | 1039 | 935                      | 1240                       | 645 | 1460/1760                          | 37(200L)/45(200L)                       | 662kg                                | 1735 | 915 | 620 | 667.5 | 372.5 |

| No. | Base           |                |                |                |                |                |     |     |       |                |                |                |       |                     |                 |
|-----|----------------|----------------|----------------|----------------|----------------|----------------|-----|-----|-------|----------------|----------------|----------------|-------|---------------------|-----------------|
|     | TH-R/BH-L      |                |                |                |                | TV-R/TH-R/BH-L |     |     |       |                |                |                |       | Anchor bolt<br>hole | Stopper<br>bolt |
|     | l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | W <sub>1</sub> | W <sub>3</sub> | J              | S   | U   | V     | W <sub>2</sub> | Y <sub>2</sub> | h <sub>1</sub> |       |                     |                 |
| 3½  | 880            | 425            | 315            | 210            | 100            | 940            | 530 | 450 | 210   | 570            | 50             | 16             | 6×φ15 | 7×M10               |                 |
| 4   | 1010           | 455            | 355            | 260            | 160            | 920            | 550 | 375 | 237.5 | 590            | 50             | 16             | 6×φ15 | 8×M10               |                 |
| 4½  | 1065           | 495            | 370            | 285            | 160            | 1035           | 580 | 420 | 272.5 | 620            | 50             | 18             | 6×φ19 | 8×M12               |                 |
| 5   | 1165           | 570            | 395            | 340            | 165            | 1090           | 620 | 370 | 300   | 660            | 100            | 18             | 6×φ19 | 8×M12               |                 |
| 5½  | 1260           | 640            | 420            | 410            | 190            | 1220           | 620 | 450 | 325   | 660            | 100            | 18             | 6×φ19 | 8×M12               |                 |
| 6   | 1364           | 715            | 449            | 467.5          | 201.5          | 1275           | 655 | 450 | 352.5 | 695            | 100            | 18             | 6×φ19 | 9×M12               |                 |

※TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.

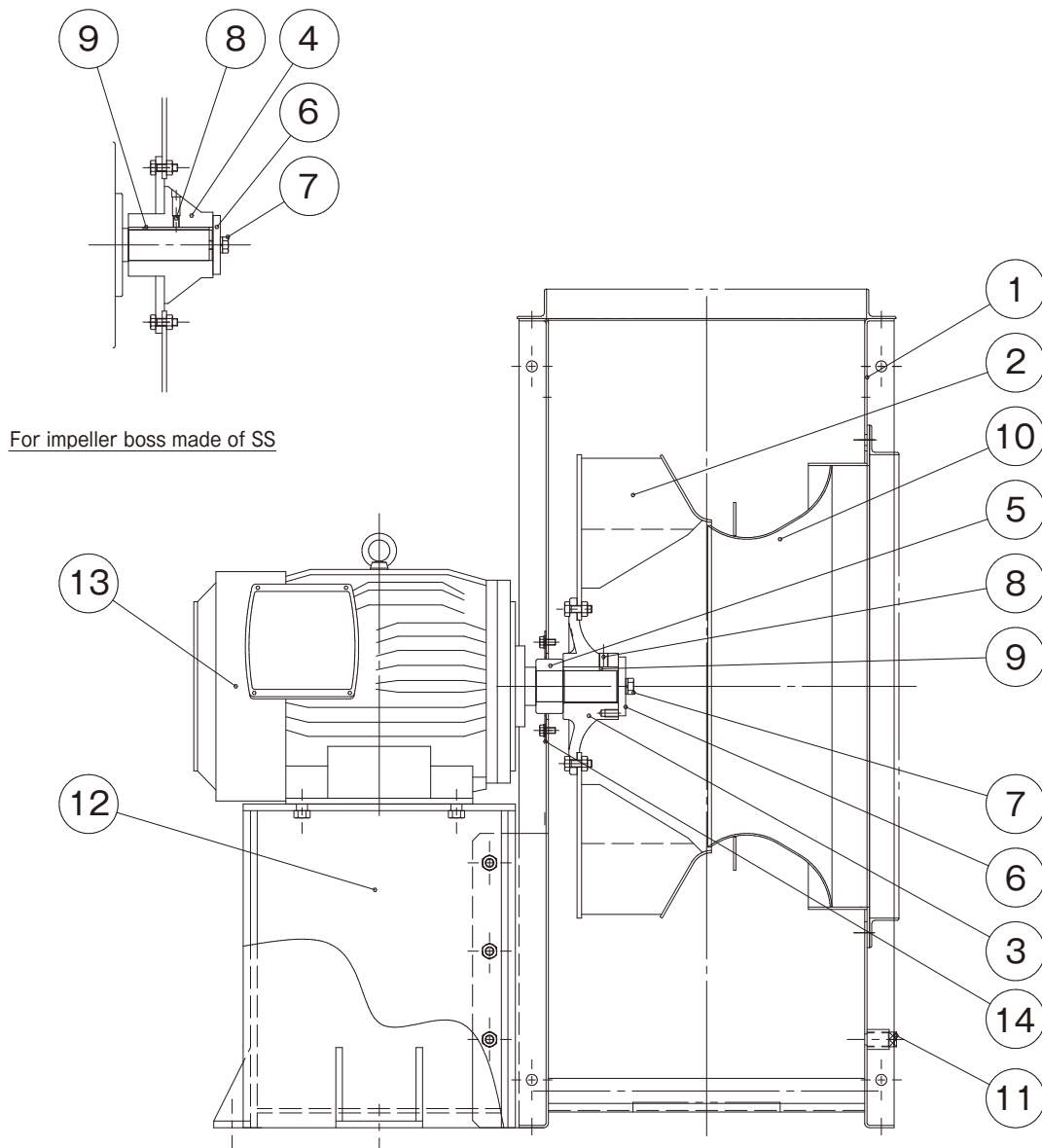
※Dimensions in parentheses vary depending on motors.

※If you use the fan with an inverter, make the settings of the inverter to enable the frequency jump function for eigenvalue of the resonance frequency values of the fan, motor, fan + base, and other parts to avoid abnormal vibration.

※Please be careful if a thermal overload relay is used, tripping may occur during starting due to the starting performance of the fan.

※Refer to the companion flange dimensional drawing for companion flange dimensions.

#### Internal structure drawing

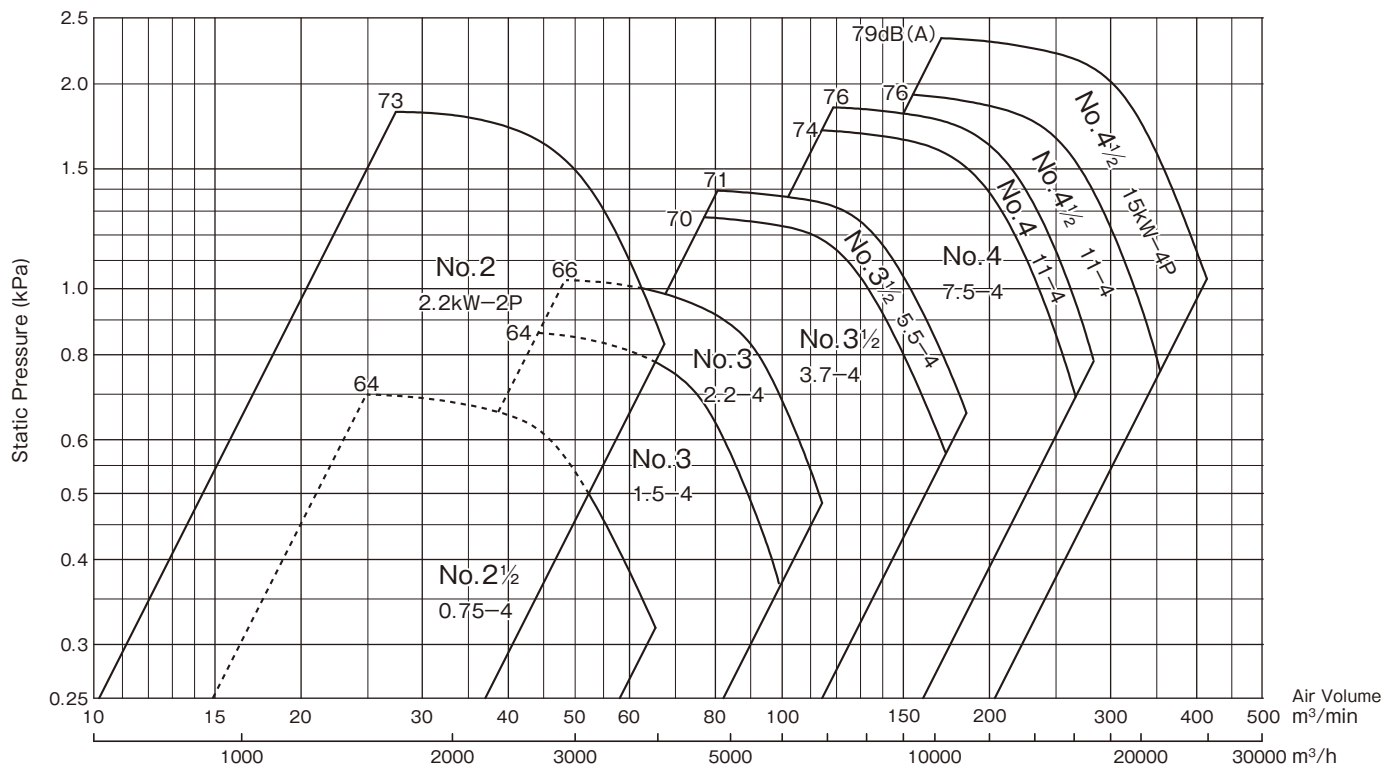


| Code | Part name                 | Qty | Material   |
|------|---------------------------|-----|------------|
| 1    | Casing                    | 1   | SPHC+SS400 |
| 2    | Impeller                  | 1   | SPHC+SM570 |
| 3    | Impeller Boss A           | 1   | FCD450     |
| 4    | Impeller Boss B           | 1   | SS400      |
| 5    | Spacer                    | 1   | SS400      |
| 6    | Impeller retaining washer | 1   | SS400      |
| 7    | Impeller Tap Bolt         | 1   | SWCH       |

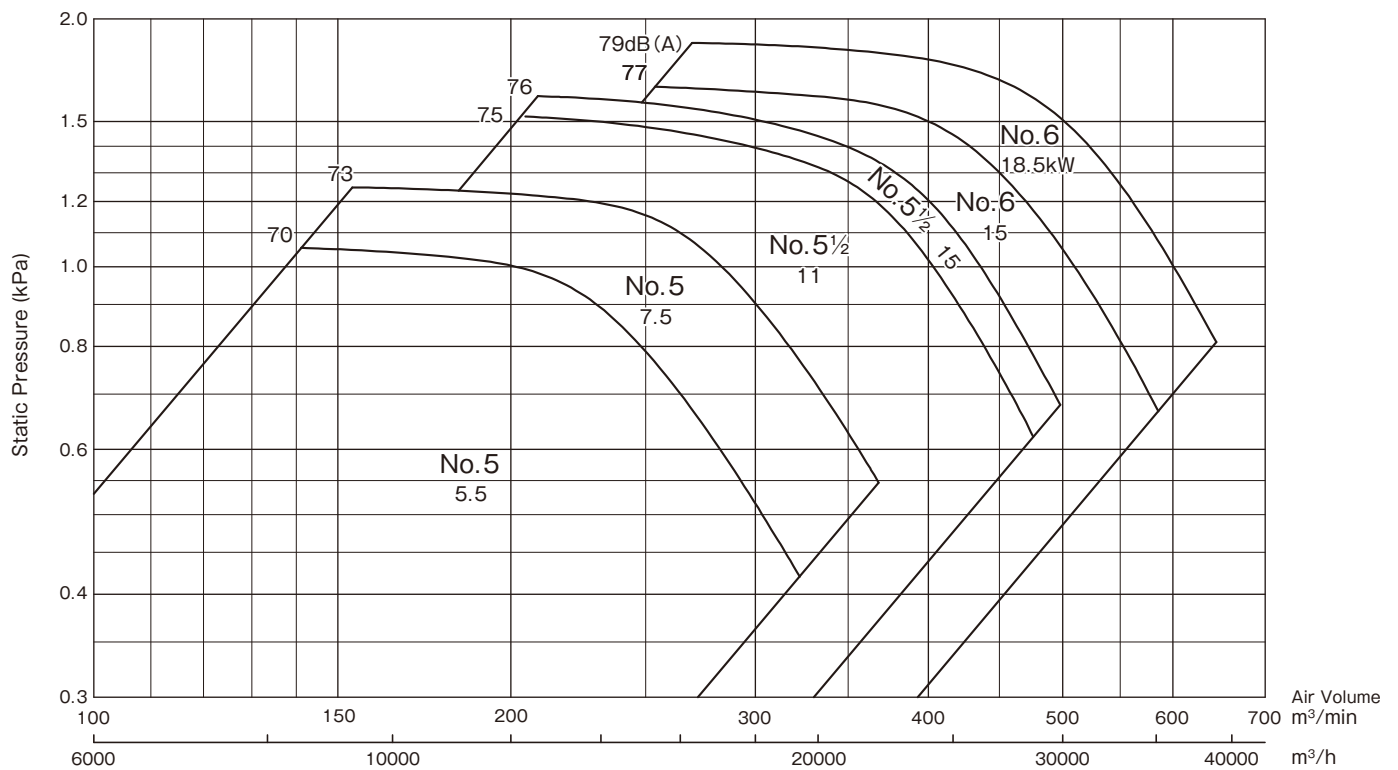
| Code | Part name             | Qty | Material   |
|------|-----------------------|-----|------------|
| 8    | Hexagonal Socket Bolt | 1   | SCM435     |
| 9    | Impeller Key          | 1   | S45C       |
| 10   | Suction opening       | 1   | SPHC+SS400 |
| 11   | Drain                 | 1   | SS400      |
| 12   | Electric Motor Base   | 1   | SPHC+SS400 |
| 13   | Electric Motor        | 1   |            |
| 14   | Casing Cover          | 1   | SPHC       |

## ■ Selection chart

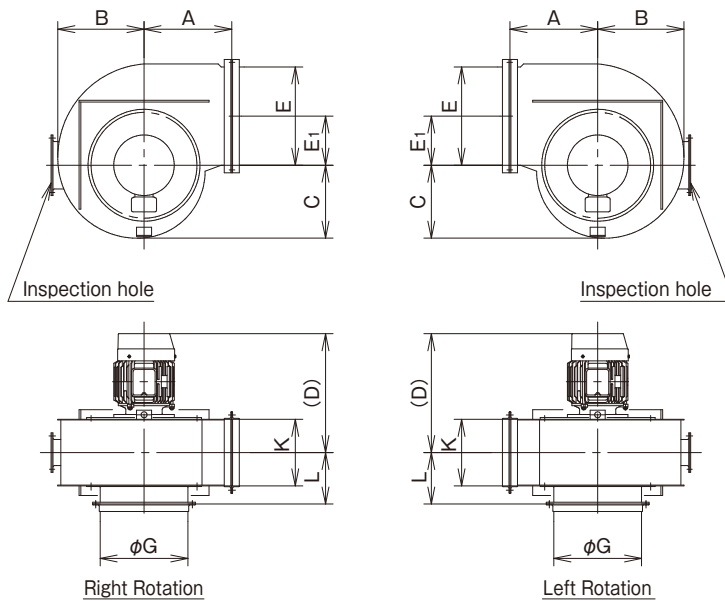
## ● 2P, 4P



## ● 6P



#### ■ Assembly drawing



#### ■ Dimensions

(Unit: mm)

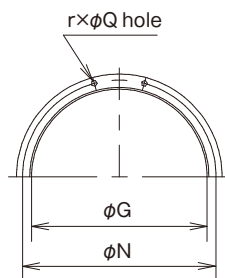
| No. | Main Unit |     |     |      |                |     | Suction Companion Flange | Discharge Companion Flange |     | Inspection hole | Motor Output (kW) x No. of Poles (P) |           | Approximate Weight (excluding motor) |
|-----|-----------|-----|-----|------|----------------|-----|--------------------------|----------------------------|-----|-----------------|--------------------------------------|-----------|--------------------------------------|
|     | A         | B   | C   | D    | E <sub>1</sub> | L   |                          | G                          | E   |                 | 50Hz                                 | 60Hz      |                                      |
| 2   | 290       | 285 | 245 | 405  | 162.5          | 170 |                          | 290                        | 325 | 220             | 1.5×2                                | 2.2×2     | 40kg                                 |
| 2½  | 330       | 355 | 300 | 500  | 202.5          | 228 |                          | 380                        | 405 | 275             | 2.2·3.7×2                            | 0.75×4    | 65kg                                 |
| 3   | 390       | 425 | 360 | 505  | 242.5          | 255 |                          | 450                        | 485 | 330             | 0.75·1.5×4                           | 1.5·2.2×4 | 95kg                                 |
| 3½  | 440       | 495 | 415 | 605  | 285            | 283 |                          | 520                        | 570 | 385             | 2.2·3.7×4                            | 3.7·5.5×4 | 135kg                                |
| 4   | 510       | 560 | 475 | 735  | 325            | 310 |                          | 600                        | 650 | 440             | 3.7·5.5×4                            | 7.5·11×4  | 210kg                                |
| 4½  | 550       | 630 | 530 | 805  | 365            | 338 |                          | 670                        | 730 | 495             | 7.5·11×4                             | 11·15×4   | 265kg                                |
| 5   | 590       | 700 | 590 | 835  | 407.5          | 375 |                          | 750                        | 815 | 550             | 11·15×4                              | 5.5·7.5×6 | 345kg                                |
| 5½  | 650       | 770 | 645 | 930  | 447.5          | 403 |                          | 820                        | 895 | 605             | 22·30×4                              | 11·15×6   | 410kg                                |
| 6   | 700       | 835 | 705 | 1045 | 487.5          | 430 |                          | 900                        | 975 | 660             | 30·37×4                              | 15·18.5×6 | 470kg                                |

※Dimensions in parentheses vary depending on motors.

※Refer to the companion flange dimensional drawing for companion flange dimensions.

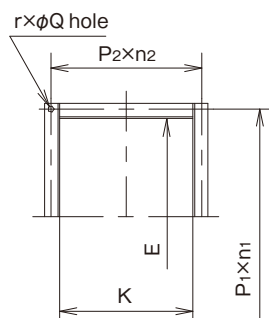
#### ■ Companion Flange Dimensional Drawing

Suction Companion Flange



| No. | G   | N   | r × Q | Steel material size |
|-----|-----|-----|-------|---------------------|
| 2   | 290 | 320 | 12×10 | L25×25×3            |
| 2½  | 380 | 415 | 12×12 | L30×30×3            |
| 3   | 450 | 485 | 12×12 | L30×30×3            |
| 3½  | 520 | 565 | 16×15 | L40×40×5            |
| 4   | 600 | 645 | 16×15 | L40×40×5            |
| 4½  | 670 | 715 | 16×15 | L40×40×5            |
| 5   | 750 | 795 | 16×15 | L40×40×5            |
| 5½  | 820 | 865 | 16×15 | L40×40×5            |
| 6   | 900 | 945 | 16×15 | L40×40×5            |

Discharge Companion Flange



| No. | E   | K   | P <sub>1</sub> × n <sub>1</sub> | P <sub>2</sub> × n <sub>2</sub> | r × Q | Steel material size |
|-----|-----|-----|---------------------------------|---------------------------------|-------|---------------------|
| 2   | 325 | 220 | 89 ×4                           | 83×3                            | 14×10 | L25×25×3            |
| 2½  | 405 | 275 | 87 ×5                           | 76×4                            | 18×10 | L25×25×3            |
| 3   | 485 | 330 | 87 ×6                           | 73×5                            | 22×12 | L30×30×3            |
| 3½  | 570 | 385 | 75.5×8                          | 84×5                            | 26×12 | L30×30×3            |
| 4   | 650 | 440 | 87 ×8                           | 97×5                            | 26×12 | L40×40×5            |
| 4½  | 730 | 495 | 97 ×8                           | 90×6                            | 28×12 | L40×40×5            |
| 5   | 815 | 550 | 86 ×10                          | 99×6                            | 32×12 | L40×40×5            |
| 5½  | 895 | 605 | 94 ×10                          | 93×7                            | 34×12 | L40×40×5            |
| 6   | 975 | 660 | 85 ×12                          | 88×8                            | 40×15 | L40×40×5            |

### Internal structure drawing

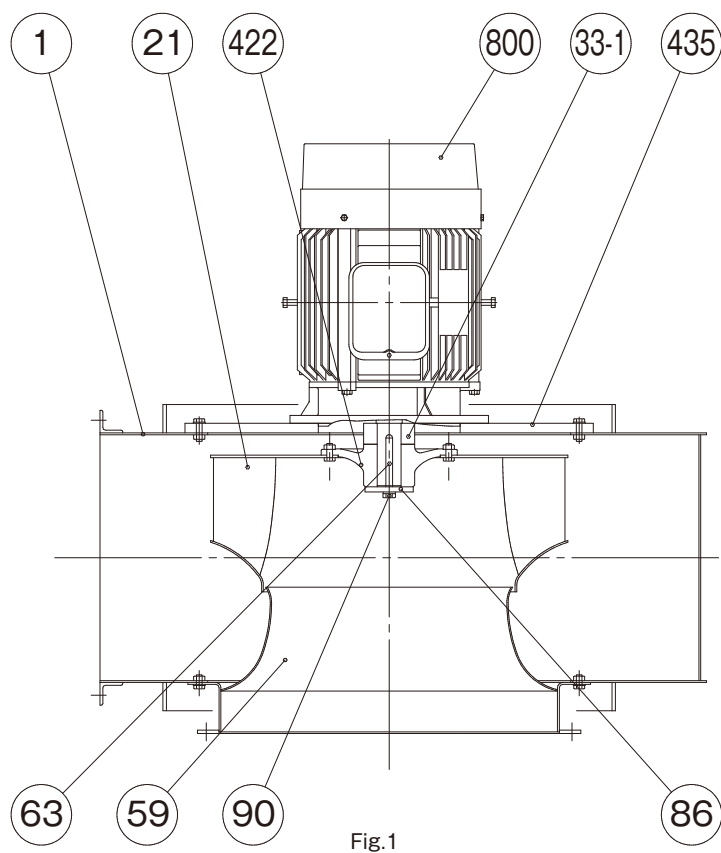


Fig.1

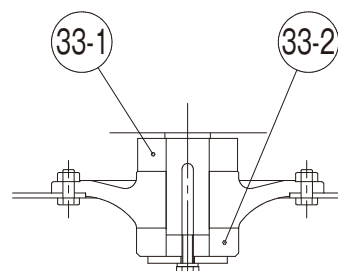


Fig.2

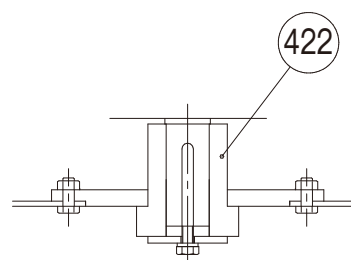


Fig.3

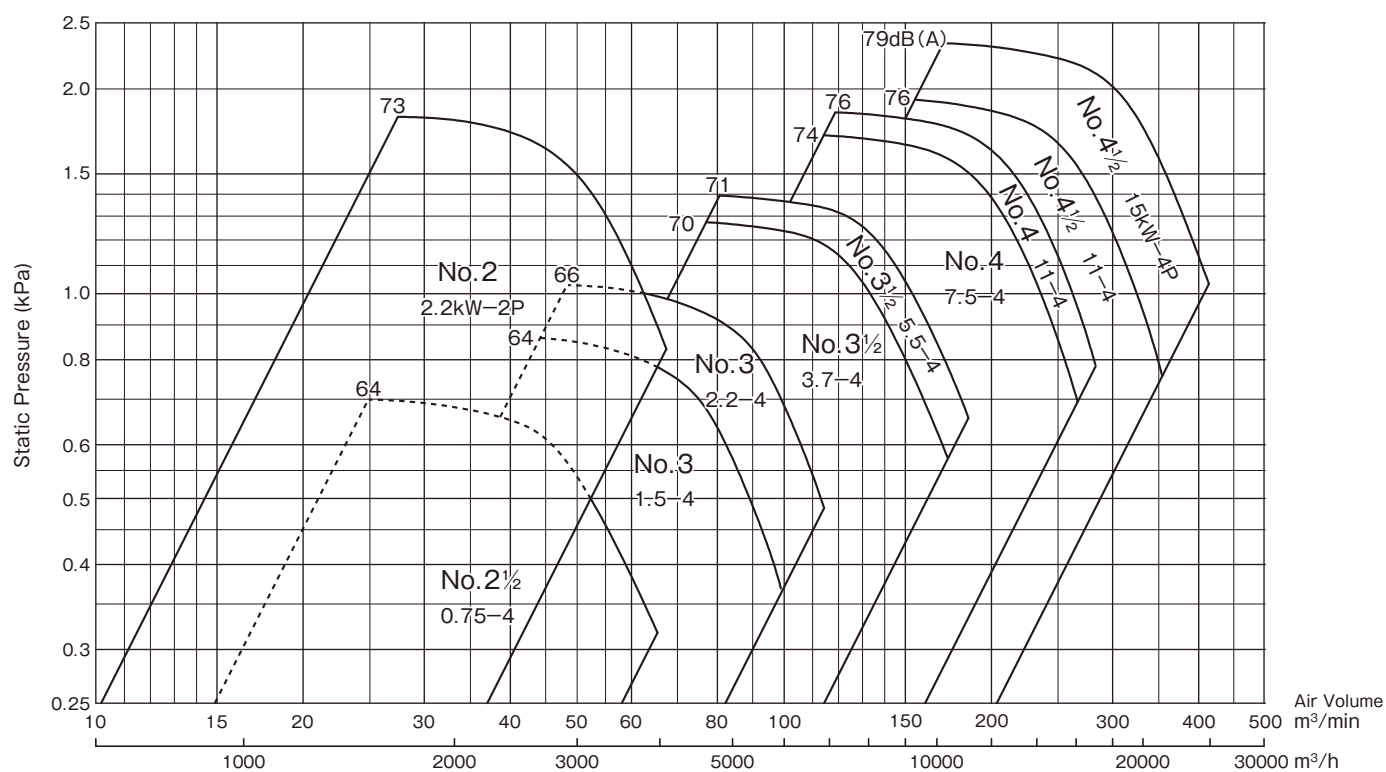
| Code | Part name                 | Qty | Material |
|------|---------------------------|-----|----------|
| 1    | Casing                    | 1   | SS400    |
| 21   | Impeller                  | 1   | SS400    |
| 422  | Impeller Boss             | 1   | FCD400   |
| 63   | Impeller Key              | 1   | S45C     |
| 86   | Impeller retaining washer | 1   | SS400    |
| 90   | Impeller Tap Bolt         | 1   | SS400    |

| Code | Part name                 | Qty | Material |
|------|---------------------------|-----|----------|
| 59   | Suction opening           | 1   | SS400    |
| 435  | Electric Motor Base Plate | 1   | SS400    |
| 33-1 | Spacer                    | 1   | SS400    |
| 33-2 | Spacer                    | 1   | SS400    |
| 800  | Electric Motor            | 1   |          |

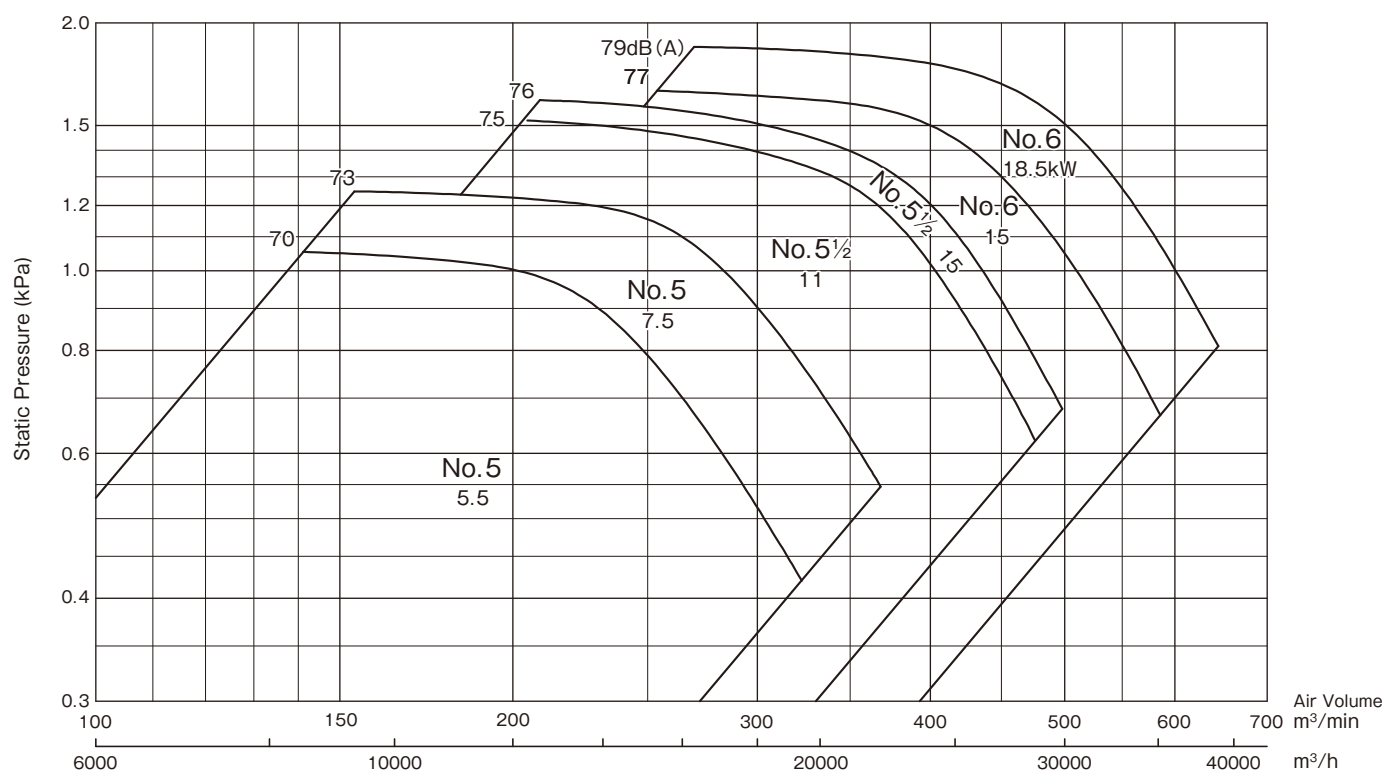
| Boss Shape - Electric Motor |                |    |      |     |                |    |      |     |                |    |      |
|-----------------------------|----------------|----|------|-----|----------------|----|------|-----|----------------|----|------|
| No.                         | Electric Motor |    | Fig. | No. | Electric Motor |    | Fig. | No. | Electric Motor |    | Fig. |
| 2                           | 1.5kW          | 2P | 3    | 4   | 3.7kW          | 4P | 3    | 5½  | 11kW           | 6P | 1    |
|                             | 2.2kW          | 2P | 3    |     | 5.5kW          | 4P | 1    |     | 15kW           | 6P | 1    |
| 2½                          | 0.75kW         | 4P | 3    |     | 7.5kW          | 4P | 1    |     | 18.5 · 22kW    | 4P | 1    |
|                             | 2.2kW          | 2P | 3    |     | 11kW           | 4P | 2    |     | 30kW           | 4P | 1    |
|                             | 3.7kW          | 2P | 3    | 4½  | 7.5kW          | 4P | 1    | 6   | 15kW           | 6P | 1    |
| 3                           | 0.75kW         | 4P | 3    |     | 11kW           | 4P | 2    |     | 18.5kW         | 6P | 1    |
|                             | 1.5kW          | 4P | 3    |     | 15kW           | 4P | 2    |     | 30kW           | 4P | 1    |
|                             | 2.2kW          | 4P | 3    |     | 5.5kW          | 6P | 3    |     | 37kW           | 4P | 2    |
| 3½                          | 2.2kW          | 4P | 3    | 5   | 7.5kW          | 6P | 1    |     |                |    |      |
|                             | 3.7kW          | 4P | 3    |     | 11kW           | 4P | 1    |     |                |    |      |
|                             | 5.5kW          | 4P | 1    |     | 15kW           | 4P | 1    |     |                |    |      |
|                             |                |    |      |     |                |    |      |     |                |    |      |

#### Selection chart

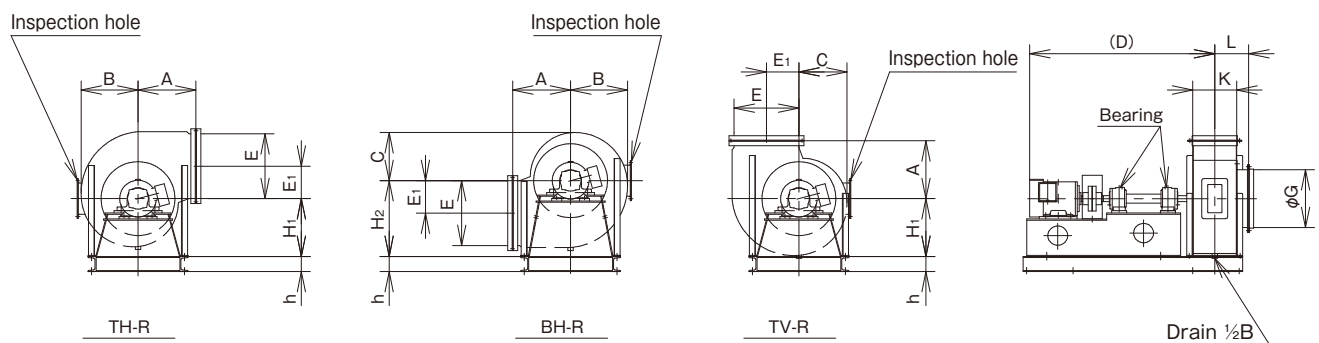
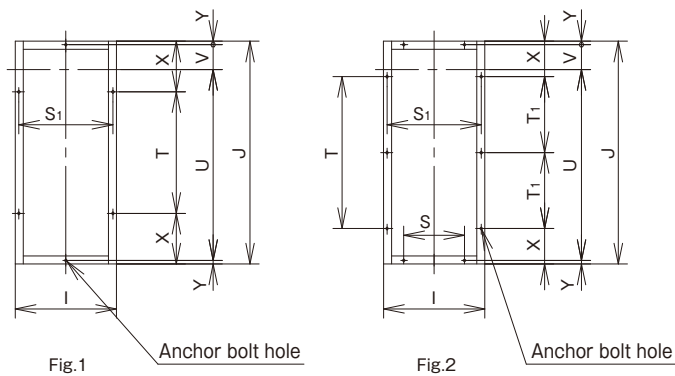
##### ●2P, 4P



##### ●6P



## ■ Assembly drawing



## ■ Dimensions

(Unit: mm)

| No. | Main Unit |     |     |      |                |                |                |     | Suction Companion Flange | Discharge Companion Flange |     | Inspection hole | Bearing | Motor Output (kW) x No. of Poles (P) |           | Approximate Weight (excluding motor) |
|-----|-----------|-----|-----|------|----------------|----------------|----------------|-----|--------------------------|----------------------------|-----|-----------------|---------|--------------------------------------|-----------|--------------------------------------|
|     | A         | B   | C   | D    | E <sub>1</sub> | H <sub>1</sub> | H <sub>2</sub> | L   |                          | E                          | K   |                 |         | 50Hz                                 | 60Hz      |                                      |
| 2   | 290       | 285 | 245 | 945  | 162.5          | 290            | 380            | 170 | 290                      | 325                        | 220 | 150×80          | 6307    | 1.5×2                                | 2.2×2     | 140kg                                |
| 2½  | 330       | 355 | 300 | 1070 | 202.5          | 365            | 460            | 228 | 380                      | 405                        | 275 | 150×80          | 6308    | 2.2·3.7×2                            | 0.75×4    | 180kg                                |
| 3   | 390       | 425 | 360 | 1150 | 242.5          | 440            | 550            | 255 | 450                      | 485                        | 330 | 150×80          | 6309    | 0.75·1.5×4                           | 1.5·2.2×4 | 265kg                                |
| 3½  | 440       | 495 | 415 | 1310 | 285            | 510            | 645            | 283 | 520                      | 570                        | 385 | 150×80          | 6310    | 2.2·3.7×4                            | 3.7·5.5×4 | 360kg                                |
| 4   | 510       | 560 | 475 | 1530 | 325            | 580            | 730            | 310 | 600                      | 650                        | 440 | 200×250         | 6311    | 3.7·5.5×4                            | 7.5·11×4  | 520kg                                |
| 4½  | 550       | 630 | 530 | 1650 | 365            | 650            | 820            | 338 | 670                      | 730                        | 495 | 200×250         | 6312    | 7.5·11×4                             | 11·15×4   | 650kg                                |
| 5   | 590       | 700 | 590 | 1750 | 407.5          | 720            | 900            | 375 | 750                      | 815                        | 550 | 200×250         | 6313    | 11·15×4                              | 5.5·7.5×6 | 800kg                                |
| 5½  | 650       | 770 | 645 | 1910 | 447.5          | 790            | 980            | 403 | 820                      | 895                        | 605 | 200×250         | 6314    | 22·30×4                              | 11·15×6   | 1150kg                               |
| 6   | 700       | 835 | 705 | 2140 | 487.5          | 860            | 1060           | 430 | 900                      | 975                        | 660 | 200×250         | 6316    | 30·37×4                              | 15·18.5×6 | 1370kg                               |

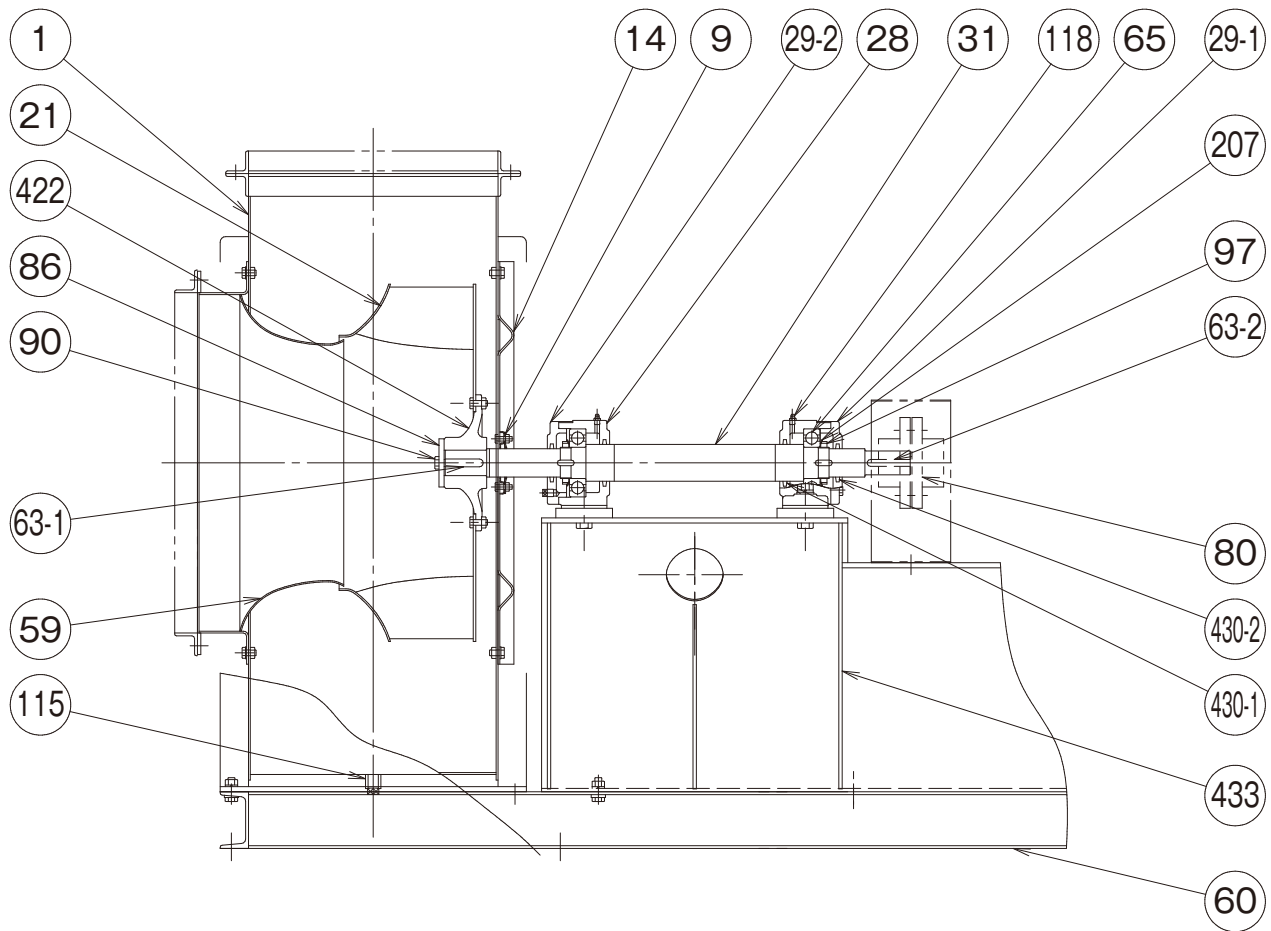
| No. | Base   |      |      |     |                |     |                |     |        |       |      |     |                  |
|-----|--------|------|------|-----|----------------|-----|----------------|-----|--------|-------|------|-----|------------------|
|     | Fig.No | I    | J    | S   | S <sub>1</sub> | T   | T <sub>1</sub> | X   | U      | V     | Y    | h   | Anchor bolt hole |
| 2   | 1      | 500  | 1100 | —   | 465            | 600 | —              | 250 | 942.5  | 122.5 | 17.5 | 75  | 6×φ15            |
| 2½  |        | 585  | 1220 | —   | 550            | 720 | —              | 250 | 1035   | 150   | 17.5 | 75  | 6×φ15            |
| 3   | 2      | 680  | 1320 | 480 | 640            | 520 | —              | 400 | 1095   | 185   | 20   | 100 | 8×φ19            |
| 3½  |        | 780  | 1550 | 530 | 740            | 750 | —              | 400 | 1297.5 | 212.5 | 20   | 100 | 8×φ19            |
| 4   |        | 900  | 1720 | 600 | 860            | —   | 510            | 350 | 1430   | 250   | 20   | 100 | 10×φ19           |
| 4½  |        | 990  | 1880 | 690 | 930            | —   | 590            | 350 | 1552.5 | 267.5 | 30   | 125 | 10×φ24           |
| 5   |        | 1070 | 2050 | 720 | 1010           | —   | 675            | 350 | 1695   | 295   | 30   | 125 | 10×φ24           |
| 5½  |        | 1180 | 2150 | 830 | 1120           | —   | 675            | 400 | 1767.5 | 322.5 | 30   | 125 | 10×φ24           |
| 6   |        | 1280 | 2400 | 880 | 1220           | —   | 800            | 400 | 1990   | 350   | 30   | 125 | 10×φ24           |

※TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.

※(D) dimensions vary depending on the electric motor.

※Refer to the companion flange dimensional drawing for companion flange dimensions.

#### Internal structure drawing



| Code | Part name                 | Qty | Material     |
|------|---------------------------|-----|--------------|
| 1    | Casing                    | 1   | SPHC · SS400 |
| 21   | Impeller                  | 1   | SS400        |
| 422  | Impeller Boss             | 1   | FCD400       |
| 86   | Impeller retaining washer | 1   | SS400        |
| 90   | Impeller Tap Bolt         | 1   | SWRM         |
| 63-1 | Impeller Key              | 1   | S45C         |
| 59   | Suction opening           | 1   | SPHE · SS400 |
| 14   | Casing Cover              | 1   | SPHC         |
| 31   | Shaft                     | 1   | S45C         |
| 28   | Bearing Case              | 2   | FC200        |

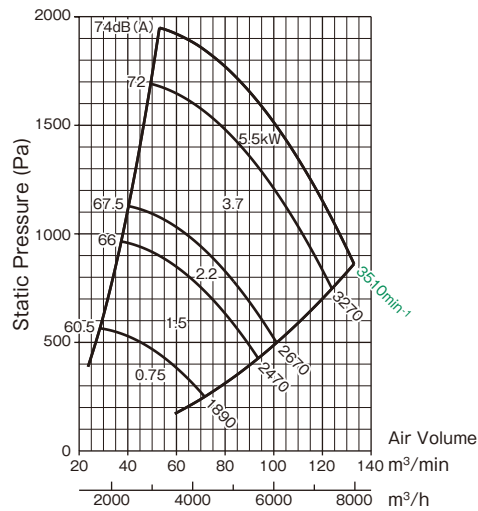
| Code | Part name                   | Qty | Material |
|------|-----------------------------|-----|----------|
| 29-1 | Bearing Cap A               | 1   | FC200    |
| 29-2 | Bearing Cap C               | 1   | FC200    |
| 118  | Grease Nipple               | 2   | C3604B   |
| 80   | Cap Ring                    | 1   |          |
| 63-2 | Cap Ring Key                | 1   | S45C     |
| 433  | Bearing Electric Motor Base | 1   | SS400    |
| 60   | Common Base                 | 1   | SS400    |
| 115  | Drain                       | 1   | SS400    |
| 9    | Shaft Seal                  | 1   |          |

| Code  | Part name      | Qty | Material | No.2 | No.2½ | No.3 | No.3½ | No.4 | No.4½ | No.5 | No.5½ | No.6 |
|-------|----------------|-----|----------|------|-------|------|-------|------|-------|------|-------|------|
| 65    | Ball Bearing   | 2   | SUJ      | 6307 | 6308  | 6309 | 6310  | 6311 | 6312  | 6313 | 6314  | 6316 |
| 97    | Bearing Nut    | 2   | SS400    | AN07 | AN08  | AN09 | AN10  | AN11 | AN12  | AN13 | AN14  | AN16 |
| 207   | Bearing Washer | 2   | SS400    | AW07 | AW08  | AW09 | AW10  | AW11 | AW12  | AW13 | AW14  | AW16 |
| 430-1 | Felt Ring      | 2   | FELT     | Fi10 | Fi11  | Fi12 | Fi13  | Fi15 | Fi16  | Fi17 | Fi18  | Fi20 |
| 430-2 | Felt Ring      | 2   | FELT     | Fi7  | Fi8   | Fi9  | Fi10  | Fi11 | Fi12  | Fi13 | Fi15  | Fi16 |

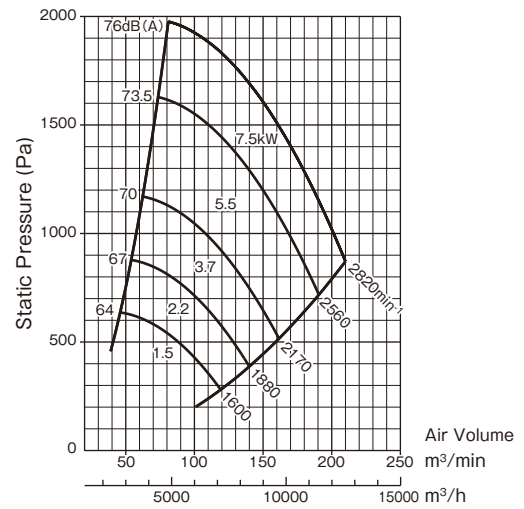
## ■ Selection chart

\*Rotational speeds indicated in green text are for 2 poles.

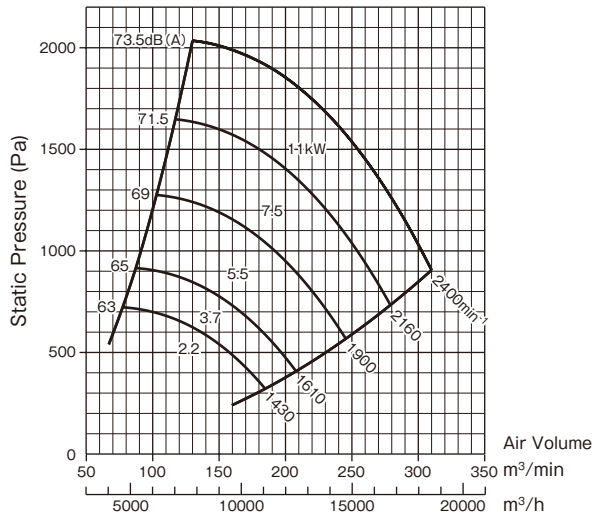
## No.2



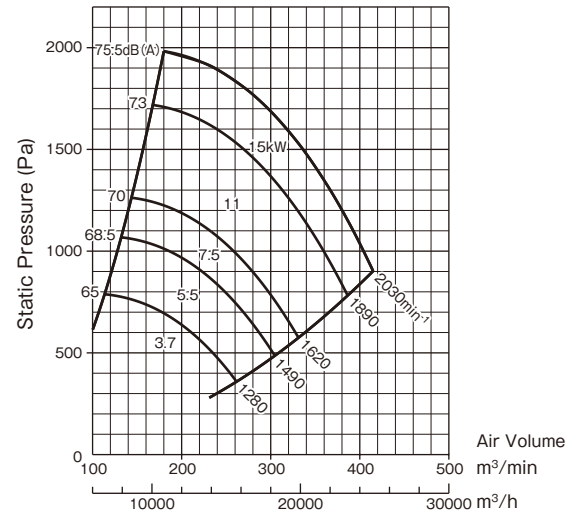
## No.2½



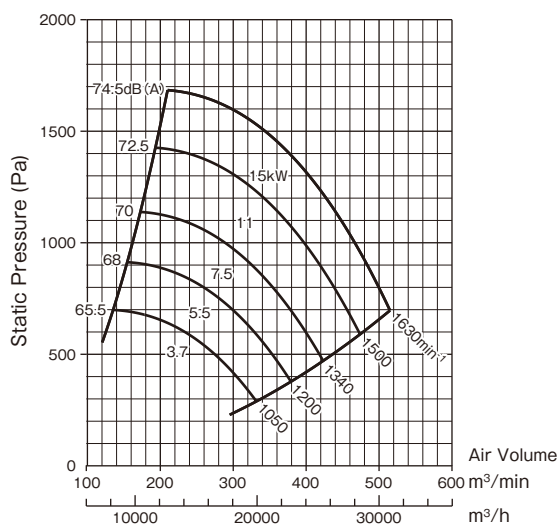
## No.3



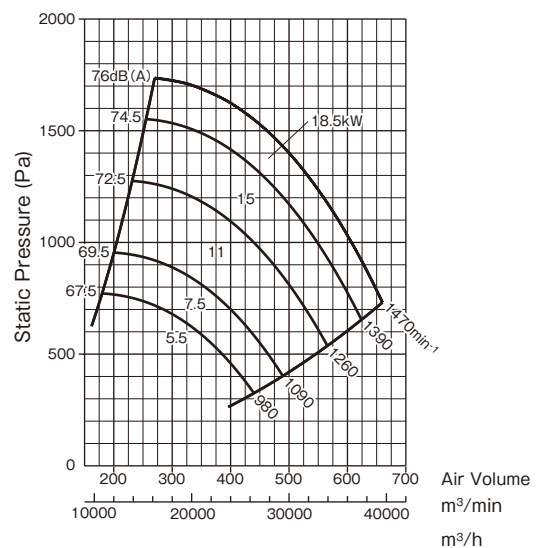
## No.3½



## No.4

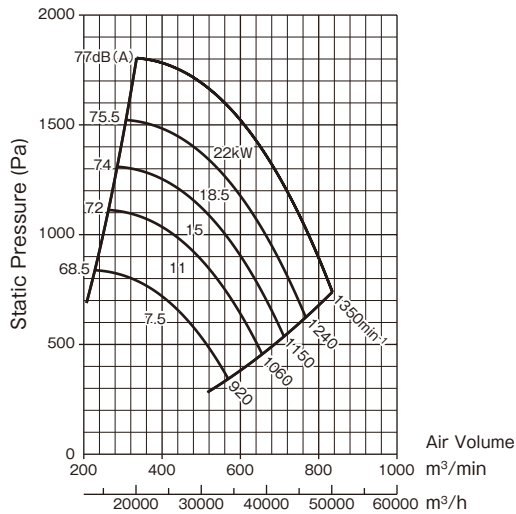


## No.4½

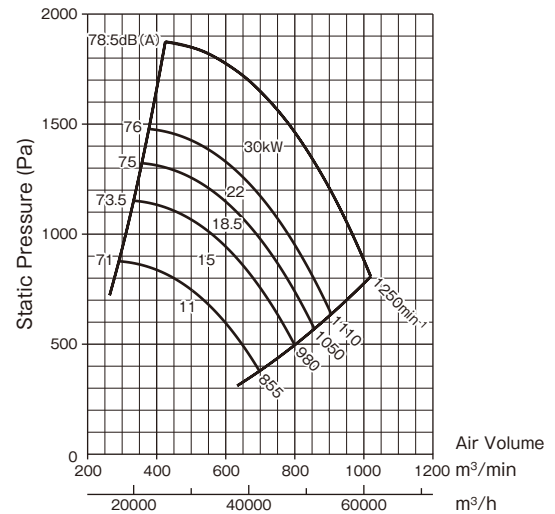


### Selection chart

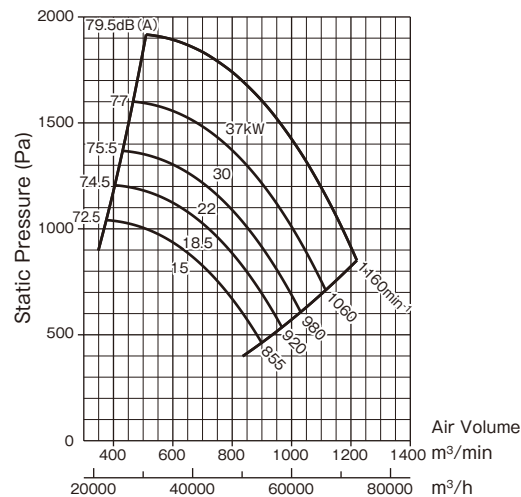
#### No.5



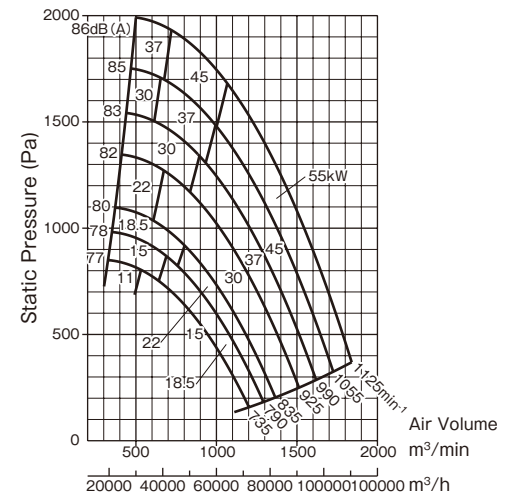
#### No.5½



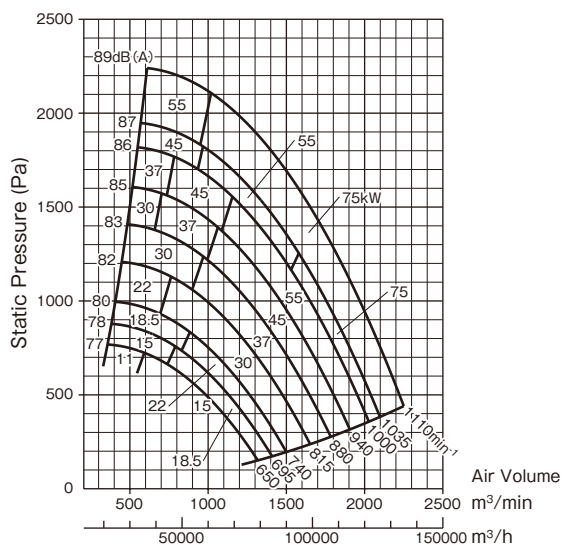
#### No.6



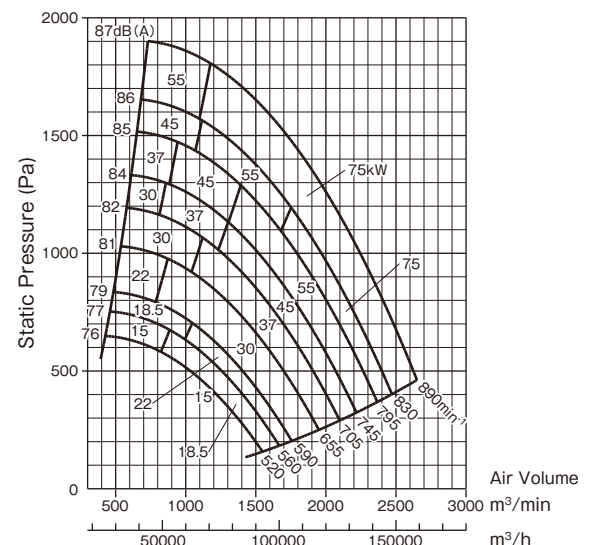
#### No.6½



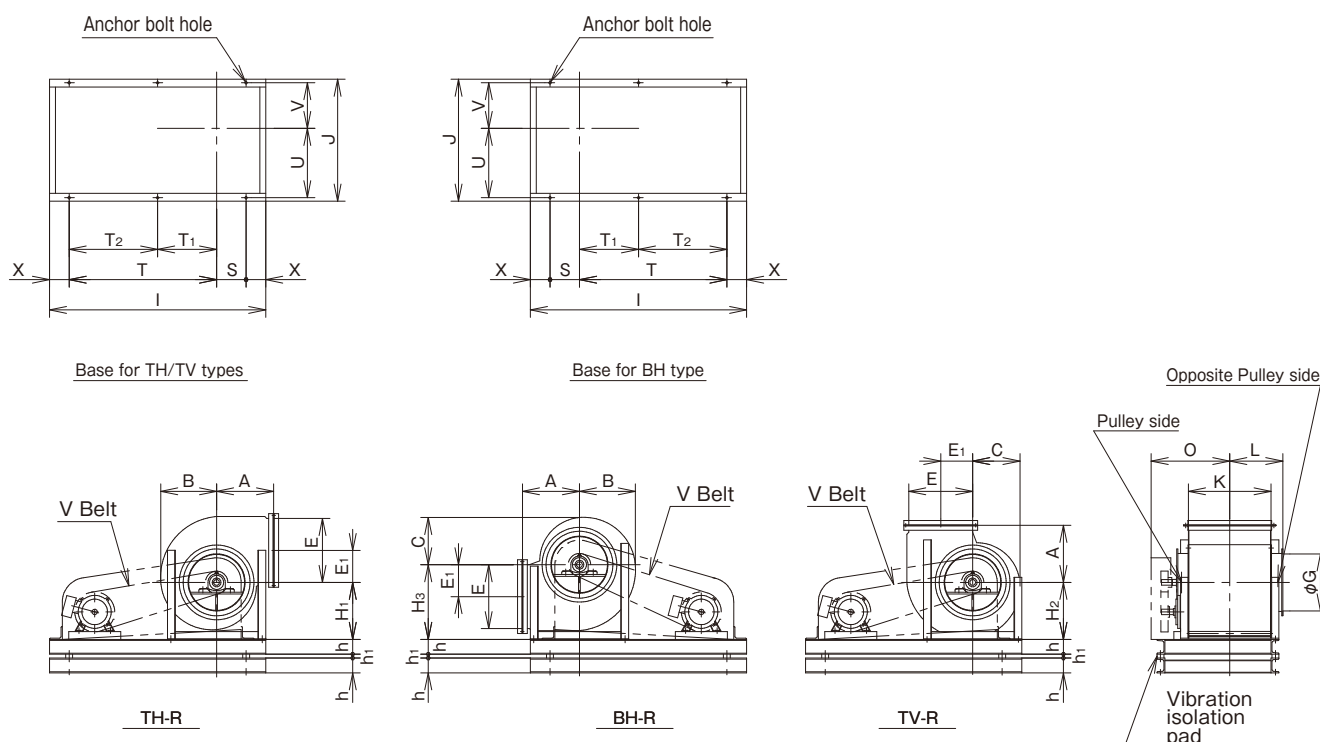
#### No.7



#### No.8



## ■ Assembly drawing (No.2~4)



## ■ Dimensions

(Unit: mm)

| No. | Main Unit |     |     |                |     |                |                |                |     |     | Discharge Companion Flange |     | Bearing     |                      | Maximum Rotational Speed | Max. Electric Motor |           | Approximate Weight (excluding motor) |
|-----|-----------|-----|-----|----------------|-----|----------------|----------------|----------------|-----|-----|----------------------------|-----|-------------|----------------------|--------------------------|---------------------|-----------|--------------------------------------|
|     | A         | B   | C   | E <sub>1</sub> | G   | H <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | L   | O   | E                          | K   | Pulley side | Opposite Pulley side |                          | Output              | Frame No. |                                      |
| 2   | 290       | 285 | 245 | 162.5          | 290 | 290            | 290            | 380            | 270 | 430 | 325                        | 420 | UCP306      | UCP204               | 3570min <sup>-1</sup>    | 5.5kW               | 132S      | 135kg                                |
| 2½  | 330       | 355 | 300 | 202.5          | 380 | 365            | 365            | 460            | 360 | 530 | 405                        | 540 | UCP307      | UCP205               | 2820min <sup>-1</sup>    | 7.5kW               | 132M      | 195kg                                |
| 3   | 390       | 425 | 360 | 242.5          | 450 | 380            | 440            | 550            | 415 | 595 | 485                        | 650 | UCP308      | UCP206               | 2400min <sup>-1</sup>    | 11kW                | 160M      | 265kg                                |
| 3½  | 440       | 495 | 415 | 285            | 520 | 440            | 510            | 645            | 468 | 670 | 570                        | 755 | UCP309      | UCP207               | 2050min <sup>-1</sup>    | 15kW                | 160L      | 375kg                                |
| 4   | 510       | 560 | 475 | 325            | 600 | 490            | 580            | 730            | 515 | 700 | 650                        | 850 | UCP310      | UCP208               | 1640min <sup>-1</sup>    | 15kW                | 160L      | 500kg                                |

| No. | Base |      |       |       |                |                |       |       |     |     |                |                  |
|-----|------|------|-------|-------|----------------|----------------|-------|-------|-----|-----|----------------|------------------|
|     | I    | J    | S     | T     | T <sub>1</sub> | T <sub>2</sub> | U     | V     | X   | h   | h <sub>1</sub> | Anchor bolt hole |
| 2   | 1100 | 620  | 150   | 750   | —              | —              | 352.5 | 232.5 | 100 | 75  | 18             | 4-φ15            |
| 2½  | 1250 | 770  | 192.5 | 857.5 | —              | —              | 442.5 | 292.5 | 100 | 75  | 18             | 4-φ15            |
| 3   | 1500 | 890  | 190   | 1010  | —              | —              | 507.5 | 347.5 | 150 | 75  | 27             | 4-φ15            |
| 3½  | 1600 | 1020 | 240   | —     | 410            | 650            | 572.5 | 407.5 | 150 | 100 | 27             | 6-φ19            |
| 4   | 1750 | 1100 | 300   | —     | 425            | 725            | 605   | 455   | 150 | 100 | 27             | 6-φ19            |

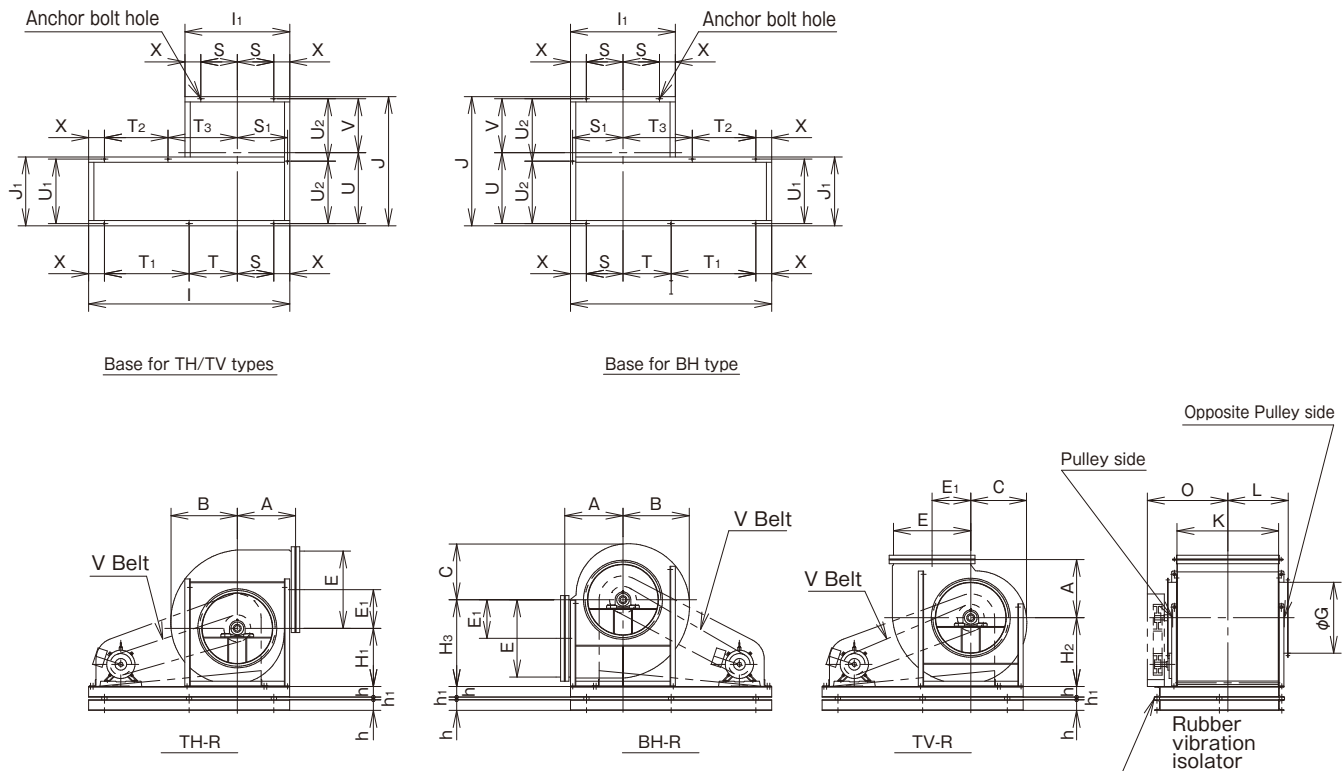
※TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.

※Refer to the companion flange dimensional drawing for companion flange dimensions.

If a thermal relay is used as an overload protection device for the products with the size and motor output shown in the right table, tripping may occur during starting due to the starting performance of the fan. Please use the delayed thermal relay.

|       |       |              |       |       |              |
|-------|-------|--------------|-------|-------|--------------|
| 50 Hz | No.3  | 2.2kW        | 60 Hz | No.3  | 2.2kW        |
|       | No.3½ | 3.7kW, 5.5kW |       | No.3½ | 3.7kW        |
|       | No.4  | 3.7kW, 5.5kW |       | No.4  | 3.7kW, 5.5kW |

## ■ Assembly drawing (No.4½~6)



## ■ Dimensions

(Unit: mm)

| No. | Main Unit |     |     |                |     |                |                |                |     |     | Discharge Companion Flange |      | Bearing     |                      | Maximum Rotational Speed | Max. Motor Output |           | Approximate Weight (excluding motor) |
|-----|-----------|-----|-----|----------------|-----|----------------|----------------|----------------|-----|-----|----------------------------|------|-------------|----------------------|--------------------------|-------------------|-----------|--------------------------------------|
|     | A         | B   | C   | E <sub>1</sub> | G   | H <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | L   | O   | E                          | K    | Pulley side | Opposite Pulley side |                          | Output            | Frame No. |                                      |
| 4½  | 550       | 630 | 530 | 365            | 670 | 550            | 650            | 820            | 570 | 785 | 730                        | 960  | UCP311      | UCP209               | 1470min <sup>-1</sup>    | 18.5kW            | 180M      | 630kg                                |
| 5   | 590       | 700 | 590 | 407.5          | 750 | 610            | 720            | 900            | 633 | 865 | 815                        | 1065 | UCP312      | UCP210               | 1350min <sup>-1</sup>    | 22kW              | 180M      | 790kg                                |
| 5½  | 650       | 770 | 645 | 447.5          | 820 | 665            | 790            | 980            | 688 | 915 | 895                        | 1175 | UCP313      | UCP211               | 1250min <sup>-1</sup>    | 30kW              | 180L      | 1000kg                               |
| 6   | 700       | 835 | 705 | 487.5          | 900 | 730            | 860            | 1060           | 743 | 970 | 975                        | 1285 | UCP314      | UCP212               | 1160min <sup>-1</sup>    | 37kW              | 200L      | 1135kg                               |

| No. | Base |                |      |                |     |                |     |                |                |                |       |                |                |       |     |     |                |                  |
|-----|------|----------------|------|----------------|-----|----------------|-----|----------------|----------------|----------------|-------|----------------|----------------|-------|-----|-----|----------------|------------------|
|     | I    | I <sub>1</sub> | J    | J <sub>1</sub> | S   | S <sub>1</sub> | T   | T <sub>1</sub> | T <sub>2</sub> | T <sub>3</sub> | U     | U <sub>1</sub> | U <sub>2</sub> | V     | X   | h   | h <sub>1</sub> | Anchor bolt hole |
| 4½  | 1900 | 990            | 1220 | 650            | 345 | 475            | 455 | 800            | 600            | 655            | 670   | 610            | 590            | 510   | 150 | 100 | 27             | 8-ø 19           |
| 5   | 2000 | 1070           | 1350 | 650            | 360 | 515            | 465 | 825            | 600            | 690            | 747.5 | 610            | 655            | 562.5 | 175 | 100 | 27             | 8-ø 19           |
| 5½  | 2150 | 1180           | 1480 | 700            | 415 | 560            | 485 | 900            | 650            | 735            | 797.5 | 640            | 710            | 622.5 | 175 | 125 | 34             | 8-ø 24           |
| 6   | 2300 | 1280           | 1590 | 750            | 465 | 610            | 510 | 975            | 700            | 785            | 852.5 | 690            | 765            | 677.5 | 175 | 125 | 34             | 8-ø 24           |

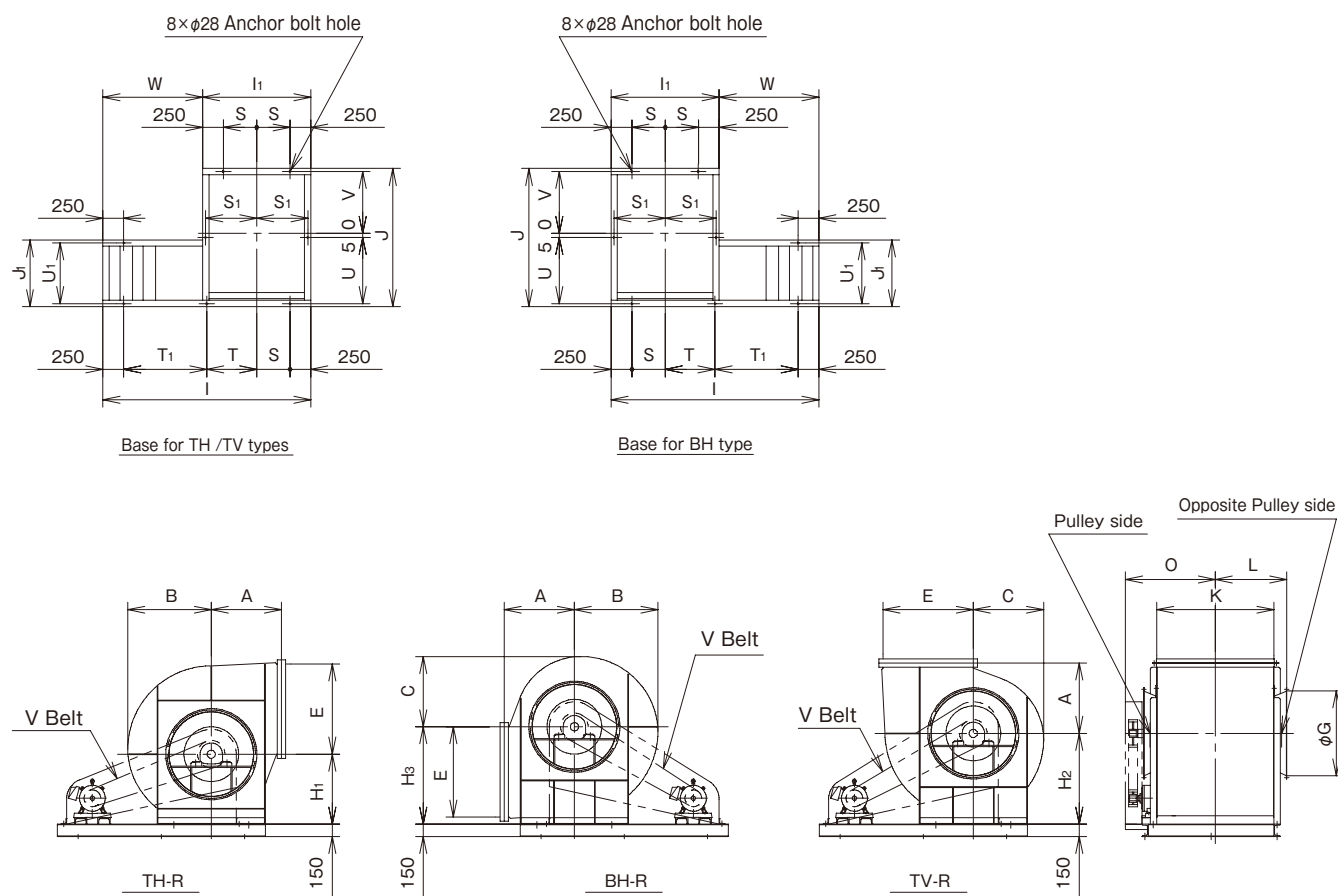
※TV-L, TH-L and BH-R types that are different in discharge direction are also available as a standard.

※Refer to the companion flange dimensional drawing for companion flange dimensions.

If a thermal relay is used as an overload protection device for the products with the size and motor output shown in the right table, tripping may occur during starting due to the starting performance of the fan. Therefore, please use the delayed thermal relay.

|       |       |              |       |       |              |
|-------|-------|--------------|-------|-------|--------------|
| 50 Hz | No.4½ | 5.5kW, 7.5kW | 60 Hz | No.4½ | 5.5kW, 7.5kW |
|       | No.5  | 7.5kW, 11kW  |       | No.5  | 7.5kW, 11kW  |
|       | No.5½ | 11kW         |       | No.5½ | 11kW         |
|       | No.6  | —            |       | No.6  | 11kW         |

## ■ Assembly drawing (No.6½~8)



## ■ Dimensions

(Unit: mm)

| No. | Main Unit |      |      |      |                |                |                |      |      |      | Discharge Companion Flange |             | Bearing              |                      | Maximum Rotational Speed | Max. Motor Output |        | Approximate Weight (excluding motor) |
|-----|-----------|------|------|------|----------------|----------------|----------------|------|------|------|----------------------------|-------------|----------------------|----------------------|--------------------------|-------------------|--------|--------------------------------------|
|     | A         | B    | C    | G    | H <sub>1</sub> | H <sub>2</sub> | H <sub>3</sub> | L    | O    | E    | K                          | Pulley side | Opposite Pulley side | Output               |                          | Frame No.         |        |                                      |
| 6½  | 845       | 1003 | 841  | 1020 | 840            | 1090           | 1170           | 860  | 1080 | 1085 | 1410                       | UCP320      | UCP316               | 990min <sup>-1</sup> | 37kW                     | 200L              | 1900kg |                                      |
| 7   | 915       | 1082 | 907  | 1100 | 935            | 1090           | 1260           | 910  | 1170 | 1170 | 1510                       | UCP322      | UCP318               | 880min <sup>-1</sup> | 37kW                     | 200L              | 2150kg |                                      |
| 8   | 1040      | 1231 | 1031 | 1250 | 1070           | 1250           | 1450           | 1070 | 1310 | 1340 | 1730                       | UCP324      | UCP320               | 830min <sup>-1</sup> | 75kW                     | 250S              | 2750kg |                                      |

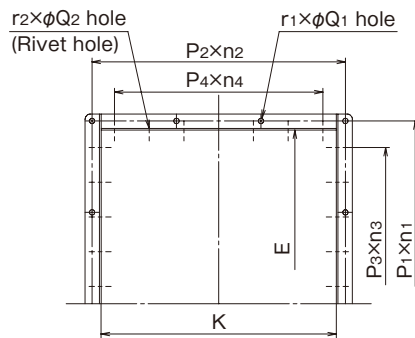
| No. | Base |                |      |                |     |                |     |                |      |                |     |      |
|-----|------|----------------|------|----------------|-----|----------------|-----|----------------|------|----------------|-----|------|
|     | I    | I <sub>1</sub> | J    | J <sub>1</sub> | S   | S <sub>1</sub> | T   | T <sub>1</sub> | U    | U <sub>1</sub> | V   | W    |
| 6½  | 2500 | 1300           | 1660 | 800            | 400 | 615            | 600 | 1000           | 795  | 730            | 745 | 1200 |
| 7   | 2700 | 1420           | 1800 | 900            | 460 | 675            | 640 | 1100           | 885  | 830            | 795 | 1280 |
| 8   | 3000 | 1500           | 2050 | 1000           | 500 | 715            | 750 | 1250           | 1025 | 930            | 905 | 1500 |

Note) If a thermal relay is used as an overload protection device, tripping may occur during starting due to the starting performance of the fan. Therefore, please use the delayed thermal relay.

#### Companion Flange Dimensional Drawing

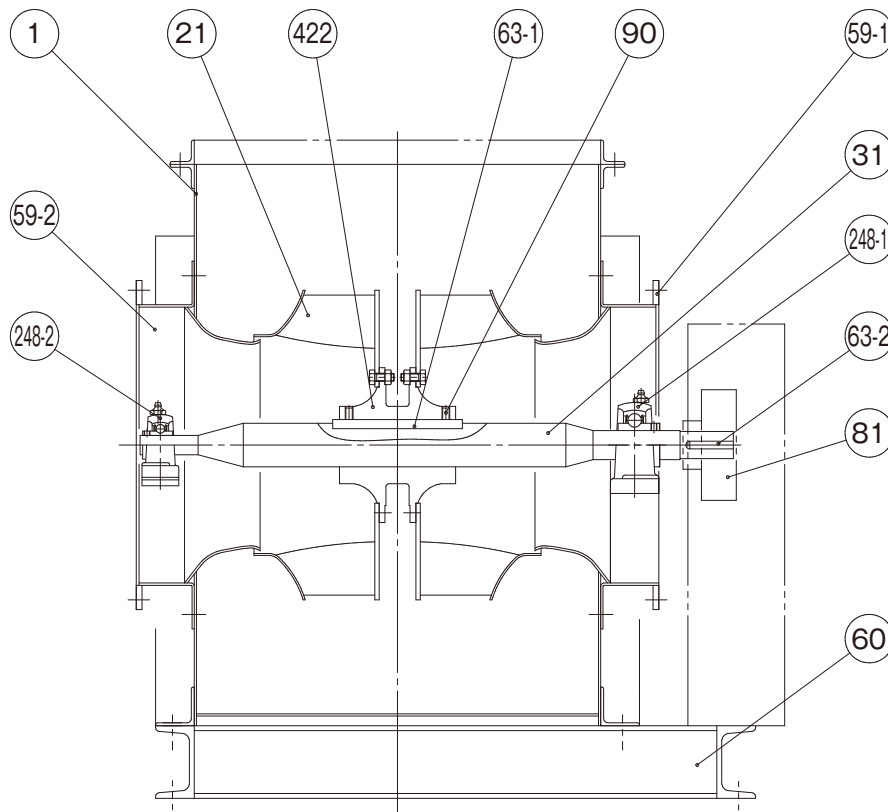
Discharge Companion Flange

(Unit: mm)



| No. | E    | K    | P <sub>1</sub> × n <sub>1</sub> | P <sub>2</sub> × n <sub>2</sub> | P <sub>3</sub> × n <sub>3</sub><br>(Rivet hole pitch) | P <sub>4</sub> × n <sub>4</sub><br>(Rivet hole pitch) | r <sub>1</sub> × Q <sub>1</sub> | r <sub>2</sub> × Q <sub>2</sub><br>(Rivet hole) | Steel material size |
|-----|------|------|---------------------------------|---------------------------------|-------------------------------------------------------|-------------------------------------------------------|---------------------------------|-------------------------------------------------|---------------------|
| 2   | 325  | 420  | 89 × 4                          | 90 × 5                          | 62 × 4                                                | 62 × 6                                                | 18 × 10                         | 24 × 4.9                                        | L25 × 25 × 3        |
| 2½  | 405  | 540  | 87 × 5                          | 95 × 6                          | 60 × 6                                                | 60 × 8                                                | 22 × 10                         | 32 × 4.9                                        | L25 × 25 × 3        |
| 3   | 485  | 650  | 87 × 6                          | 98 × 7                          | 65 × 7                                                | 65 × 9                                                | 26 × 12                         | 36 × 4.9                                        | L30 × 30 × 3        |
| 3½  | 570  | 755  | 75.5 × 8                        | 99 × 8                          | 65 × 8                                                | 65 × 11                                               | 32 × 12                         | 42 × 4.9                                        | L30 × 30 × 3        |
| 4   | 650  | 850  | 87 × 8                          | 89.5 × 10                       | 65 × 9                                                | 65 × 12                                               | 36 × 12                         | 46 × 4.9                                        | L40 × 40 × 5        |
| 4½  | 730  | 960  | 97 × 8                          | 84 × 12                         | 65 × 10                                               | 65 × 14                                               | 40 × 12                         | 52 × 4.9                                        | L40 × 40 × 5        |
| 5   | 815  | 1065 | 86 × 10                         | 92.5 × 12                       | 65 × 12                                               | 65 × 15                                               | 44 × 12                         | 58 × 4.9                                        | L40 × 40 × 5        |
| 5½  | 895  | 1175 | 94 × 10                         | 94 × 13                         | 65 × 13                                               | 65 × 17                                               | 46 × 12                         | 64 × 4.9                                        | L40 × 40 × 5        |
| 6   | 975  | 1285 | 85 × 12                         | 95 × 14                         | 65 × 14                                               | 65 × 19                                               | 52 × 15                         | 70 × 4.9                                        | L40 × 40 × 5        |
| 6½  | 1085 | 1410 | 142 × 8                         | 147 × 10                        | 64 × 16                                               | 64 × 21                                               | 36 × 15                         | 78 × 4.9                                        | L50 × 50 × 4        |
| 7   | 1170 | 1510 | 157 × 7                         | 174 × 9                         | 64 × 17                                               | 64 × 23                                               | 32 × 15                         | 84 × 4.9                                        | L50 × 50 × 6        |
| 8   | 1340 | 1730 | 176 × 8                         | 180 × 10                        | 62 × 21                                               | 62 × 27                                               | 36 × 19                         | 100 × 4.9                                       | L65 × 65 × 6        |

#### Internal structure drawing (No.2~6)



| Code | Part name                 | Qty | Material     |
|------|---------------------------|-----|--------------|
| 1    | Casing                    | 1   | SPHC · SS400 |
| 21   | Impeller                  | 1   | SS400        |
| 422  | Impeller Boss             | 1   | FCD400       |
| 90   | Impeller retaining washer | 1   | SS400        |
| 63-1 | Impeller Key              | 1   | S45C         |
| 59-1 | Suction Vent              | 1   | SPHC · SS400 |

| Code | Part name       | Qty | Material     |
|------|-----------------|-----|--------------|
| 59-2 | Suction opening | 1   | SPHC · SS400 |
| 31   | Shaft           | 1   | S45C         |
| 81   | V Pulley        | 1   | FC200        |
| 63-2 | V Pulley Key    | 1   | S45C         |
| 60   | Common Base     | 1   | SS400        |

| Code  | Part name    | Qty | Material | No.2   | No.2½  | No.3   | No.3½  | No.4   | No.4½  | No.5   | No.5½  | No.6   |
|-------|--------------|-----|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 248-1 | Pillow Block | 1   | SUJ      | UCP306 | UCP307 | UCP308 | UCP309 | UCP310 | UCP311 | UCP312 | UCP313 | UCP314 |
| 248-2 | Pillow Block | 1   | SUJ      | UCP204 | UCP205 | UCP206 | UCP207 | UCP208 | UCP209 | UCP210 | UCP211 | UCP212 |

## This image shows a full page of a handwriting practice worksheet. It consists of multiple rows of horizontal dashed lines spaced evenly down the page, providing a guide for letter height and placement. The background is plain white, and there are no margins or additional markings.





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