

A

## PISTON PUMPS

|                  | Model No.    | Maximum operating pressure<br>MPa {kgf/cm <sup>2</sup> } |          | Theoretical discharge rate<br>cm <sup>3</sup> /rev |   |   |    |    |     |     |      |  |  |  |  |  |  |             |             | Permissible rotational speed<br>min <sup>-1</sup> | Page |
|------------------|--------------|----------------------------------------------------------|----------|----------------------------------------------------|---|---|----|----|-----|-----|------|--|--|--|--|--|--|-------------|-------------|---------------------------------------------------|------|
|                  |              |                                                          |          | 0                                                  | 1 | 5 | 10 | 50 | 100 | 500 | 1000 |  |  |  |  |  |  |             |             |                                                   |      |
| V series         | V8           | 7 {70}                                                   |          | 8.0                                                |   |   |    |    |     |     |      |  |  |  |  |  |  |             | 500 to 1800 | A-8                                               |      |
|                  | V15          | 21 {210}                                                 |          | 14.8                                               |   |   |    |    |     |     |      |  |  |  |  |  |  |             |             |                                                   |      |
|                  | V15 (Type Y) | 7 {70}                                                   |          |                                                    |   |   |    |    |     |     |      |  |  |  |  |  |  |             |             |                                                   |      |
|                  | V23          | 25 {250}                                                 |          | 23.0                                               |   |   |    |    |     |     |      |  |  |  |  |  |  |             |             |                                                   |      |
|                  | V38          |                                                          |          | 37.7                                               |   |   |    |    |     |     |      |  |  |  |  |  |  |             |             |                                                   |      |
|                  | V50          | 21 {210}                                                 |          | 51.6                                               |   |   |    |    |     |     |      |  |  |  |  |  |  |             |             |                                                   |      |
|                  | V70          |                                                          |          | 69.8                                               |   |   |    |    |     |     |      |  |  |  |  |  |  |             |             |                                                   |      |
| VZ series        | VZ50         | 28 {280}                                                 |          | 50.2                                               |   |   |    |    |     |     |      |  |  |  |  |  |  | 500 to 1800 | A-44        |                                                   |      |
|                  | VZ63         |                                                          |          | 63.0                                               |   |   |    |    |     |     |      |  |  |  |  |  |  |             |             |                                                   |      |
|                  | VZ80         |                                                          |          | 79.6                                               |   |   |    |    |     |     |      |  |  |  |  |  |  |             |             |                                                   |      |
|                  | VZ100        |                                                          |          | 104.6                                              |   |   |    |    |     |     |      |  |  |  |  |  |  |             |             |                                                   |      |
|                  | VZ130        | 21 {210}                                                 |          | 135.9                                              |   |   |    |    |     |     |      |  |  |  |  |  |  |             |             |                                                   |      |
| Twin pump series | VD×-8A       | Shaft side V8                                            | 7 {70}   | 8                                                  |   |   |    |    |     |     |      |  |  |  |  |  |  | 600 to 1800 | A-65        |                                                   |      |
|                  |              | End side DS10P                                           | 7 {70}   | 2.77 to 12.3                                       |   |   |    |    |     |     |      |  |  |  |  |  |  |             |             |                                                   |      |
|                  | VD×-15A      | Shaft side V15                                           | 21 {210} | 14.8                                               |   |   |    |    |     |     |      |  |  |  |  |  |  |             |             |                                                   |      |
|                  |              | End side DS10P                                           | 7 {70}   | 2.77 to 12.3                                       |   |   |    |    |     |     |      |  |  |  |  |  |  |             |             |                                                   |      |
|                  | VD×-38A      | Shaft side V38                                           | 21 {210} | 37.7                                               |   |   |    |    |     |     |      |  |  |  |  |  |  |             |             |                                                   |      |
|                  |              | End side DS10P                                           | 7 {70}   | 2.77 to 12.3                                       |   |   |    |    |     |     |      |  |  |  |  |  |  |             |             |                                                   |      |
|                  | V1515A       | Shaft side V15                                           | 21 {210} | 14.8                                               |   |   |    |    |     |     |      |  |  |  |  |  |  | 500 to 1800 | A-67        |                                                   |      |
|                  |              | End side V15                                             | 14 {140} | 14.8                                               |   |   |    |    |     |     |      |  |  |  |  |  |  |             |             |                                                   |      |

## Contact Details

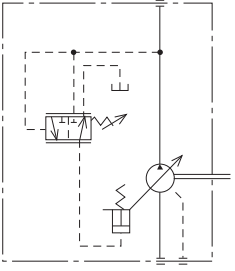
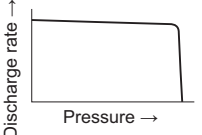
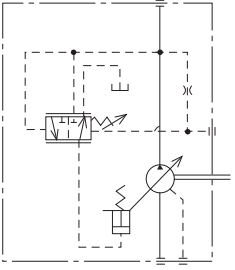
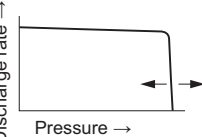
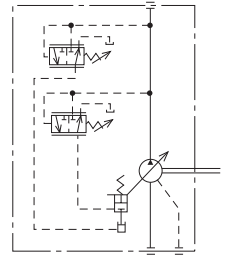
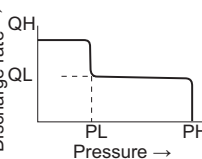
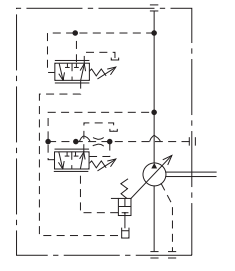
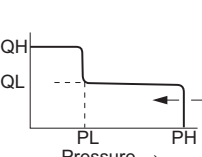
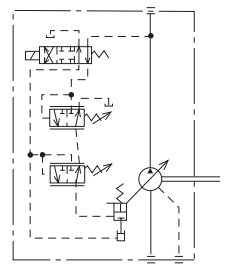
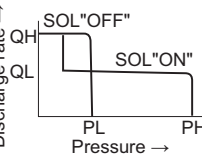
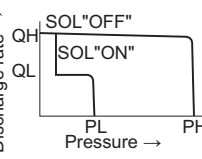
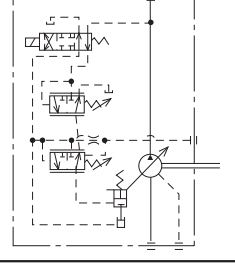
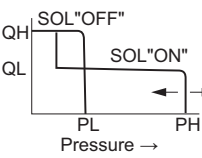
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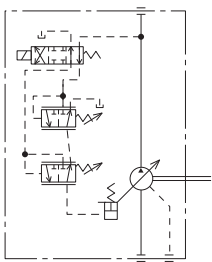
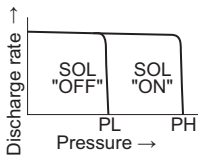
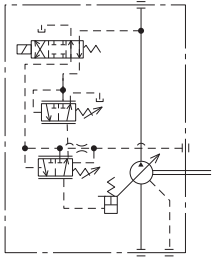
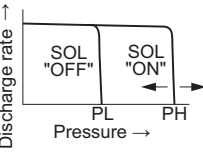
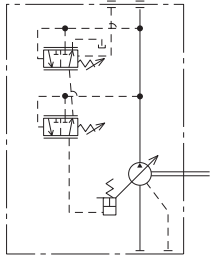
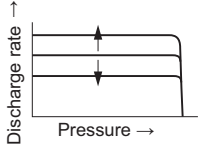
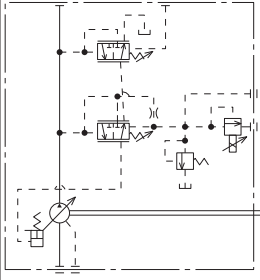
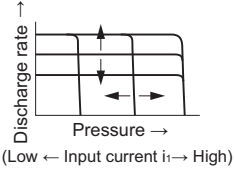
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## Control method

| Control method                                                                  |       | JIS graphic symbols for hydraulic system                                            | Characteristics                                                                     | Features/Application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control                                                                         | Code  |                                                                                     |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Pressure compensator control                                                    | A     |    |    | <ul style="list-style-type: none"> <li>When the discharge pressure approaches the preset full-cutoff pressure, the discharge rate automatically decreases to the level required to maintain the preset pressure.</li> <li>The full-cutoff pressure and discharge rate can be manually adjusted.</li> </ul>                                                                                                                                                                                                                                                                                                             |
| Remote pressure compensator control                                             | A-RC  |    |    | <ul style="list-style-type: none"> <li>The full-cutoff pressure can be adjusted through remote operation of the remote control relief valve.</li> <li>The discharge rate can be manually adjusted.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                          |
| Combination control (pressure feedback method) (*1)                             | CH    |   |   | <ul style="list-style-type: none"> <li>This control method achieves both low-pressure high-flow-rate control and high-pressure low-flow-rate control with a single pump and this helps reduce power consumption and suppress oil temperature rise.</li> <li>When the discharge pressure approaches the preset pressure PL, the discharge rate automatically decreases to QL.</li> <li>The discharge rate automatically changes according to increase/decrease of the actuator pressure and this enables switching of the feedrate.</li> <li>The feedrate switches to a low value at the start of machining.</li> </ul> |
| Combination control with remote pressure compensator (pressure feedback method) | CH-RC |  |  | <ul style="list-style-type: none"> <li>The high pressure can be remotely adjusted using the remote control relief valve.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Combination control (solenoid operated method) (*1)                             | CJ    |  |  | <ul style="list-style-type: none"> <li>The control mode can be switched between high-pressure low-flow-rate control and low-pressure high-flow-rate control by turning the solenoid on and off and this enables switching between high and low actuator feedrates.</li> <li>Machining can be started after switching to the low feedrate.</li> </ul>                                                                                                                                                                                                                                                                   |
|                                                                                 |       |                                                                                     |  | <ul style="list-style-type: none"> <li>Two types of variable pump characteristics (high-pressure high-flow-rate and low-pressure low-flow-rate) can be selected by turning the solenoid on and off.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                         |
| Combination control with remote pressure compensator (solenoid operated method) | CJ-RC |  |  | <ul style="list-style-type: none"> <li>The high pressure can be remotely adjusted using the remote control relief valve.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## Control method

| Control method                                         |      | JIS graphic symbols for hydraulic system                                            | Characteristics                                                                     | Features/Application                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------|------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control                                                | Code |                                                                                     |                                                                                     |                                                                                                                                                                                                                                                                                                                                 |
| Dual pressure control (*1)                             | D    |    |    | <ul style="list-style-type: none"> <li>Two different full-cutoff pressures (high/low) can be selected by turning the solenoid on and off.</li> <li>Two different pressures can be set while maintaining a constant actuator feedrate.</li> <li>The full-cutoff pressure and discharge rate can be manually adjusted.</li> </ul> |
| Dual pressure control with remote pressure compensator | D-RC |    |    | <ul style="list-style-type: none"> <li>The high pressure can be remotely adjusted using the remote control relief valve.</li> </ul>                                                                                                                                                                                             |
| Power match control                                    | SA   |   |  | <ul style="list-style-type: none"> <li>Combining this control method with a proportional control valve achieves energy efficient control of a pump, where the minimum pressure and flow rate to operate the actuator are supplied.</li> </ul>                                                                                   |
|                                                        | SAJS |  |  | <ul style="list-style-type: none"> <li>This control method enables control of the full-cutoff pressure in proportion to the current input to the electromagnetic proportional relief valve, in addition to the functions provided with the SA type control.</li> </ul>                                                          |

Note: \*1 Some models are available with a control function to set the pump in a feathering status (status where low pressure is cut off) by operating a solenoid valve. This function is effective for saving energy while the machine is at a stop. Please consult us about detailed information.

## Contact Details

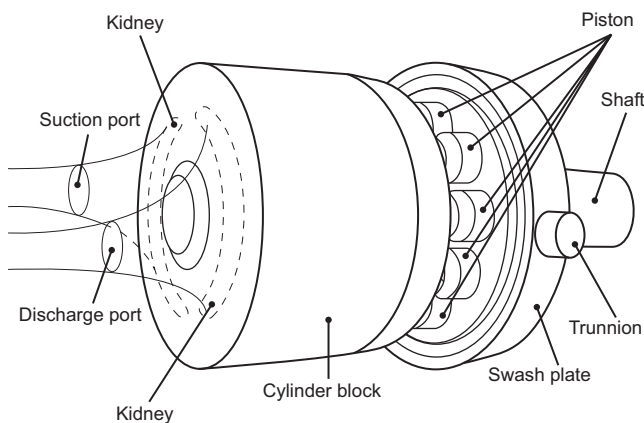
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## Operating principle of variable displacement piston pumps



**Swash plate type variable displacement pump**

- When the shaft is rotated by an electric motor or an engine, the cylinder block is rotated on the valve plate surface while maintaining a slight clearance, and the pistons contained in the cylinder block reciprocate following the swash plate. The volume of the oil chamber varies with the reciprocating movement of the pistons, sucking in and discharging oil.
- During the suction process, an amount of oil corresponding to the piston stroke is drawn through the suction port of the end-cap, passing through the valve plate port of the cylinder block, while the piston moves from the bottom dead point to the top dead point.  
During the discharge process, oil is forced out through the discharge port of the end-cap, passing through the valve plate port, while the piston moves from the top dead point to the bottom dead point.
- One rotation of the cylinder block performs one suctioning and discharging cycle, and continuous pumping operation can be achieved by rotating the shaft connected to the cylinder block.

## Models

|           | Model No. | Piping direction | Control method |       |    |       |    |       |   |      |       |       |
|-----------|-----------|------------------|----------------|-------|----|-------|----|-------|---|------|-------|-------|
|           |           |                  | A              | A-RC  | CH | CH-RC | CJ | CJ-RC | D | D-RC | SA    | SAJS  |
| V series  | V8        | Side port        | R              | -     | -  | -     | -  | -     | - | -    | -     | -     |
|           | V15       | Side port        | R (L)          | R (L) | R  | R     | R  | R     | R | R    | R (L) | -     |
|           |           | Axial port       | R (L)          | R (L) | -  | -     | -  | -     | - | -    | R (L) | -     |
|           | V23       | Side port        | R (L)          | R (L) | R  | R     | R  | R     | R | R    | R (L) | R     |
|           |           | Axial port       | R (L)          | R (L) | -  | -     | -  | -     | - | -    | R (L) | -     |
|           | V38       | Side port        | R (L)          | R (L) | R  | R     | R  | R     | R | R    | R (L) | R (L) |
|           |           | Axial port       | R (L)          | R (L) | -  | -     | -  | -     | - | -    | R (L) | -     |
| VZ series | V50       | Side port        | R (L)          | R (L) | -  | -     | -  | -     | - | -    | R (L) | R (L) |
|           | V70       | Side port        | R (L)          | R (L) | R  | -     | -  | -     | - | -    | R (L) | R     |
|           | VZ50      | Side port        | R              | R     | R  | -     | R  | -     | - | -    | -     | -     |
|           | VZ63      | Side port        | R              | R     | R  | -     | R  | -     | - | -    | -     | -     |
|           | VZ80      | Side port        | R              | R     | R  | -     | R  | -     | - | -    | -     | -     |
|           | VZ100     | Side port        | R              | R     | R  | -     | R  | -     | - | -    | -     | -     |
|           | VZ130     | Side port        | R              | R     | -  | -     | -  | -     | - | -    | -     | -     |

Note: R in the table indicates clockwise rotation of the shaft and L indicates counterclockwise rotation, when viewed from the shaft end.

## Models compatible with fire-resistant hydraulic oil

| Model No. | Hydraulic oil                       | Control method |      |    |       |    |       |   |      |    |      |
|-----------|-------------------------------------|----------------|------|----|-------|----|-------|---|------|----|------|
|           |                                     | A              | A-RC | CH | CH-RC | CJ | CJ-RC | D | D-RC | SA | SAJS |
| V8        | Water-glycol hydraulic fluid (W)    | —              | —    | —  | —     | —  | —     | — | —    | —  | —    |
|           | Phosphate ester hydraulic fluid (F) | —              | —    | —  | —     | —  | —     | — | —    | —  | —    |
| V15       | Water-glycol hydraulic fluid (W)    | ✓              | ✓    | ✓  | ✓     | ✓  | ✓     | ✓ | ✓    | ✓  | —    |
|           | Phosphate ester hydraulic fluid (F) | ✓              | ✓    | ✓  | ✓     | ✓  | ✓     | ✓ | ✓    | ✓  | —    |
| V23       | Water-glycol hydraulic fluid (W)    | ✓              | ✓    | ✓  | ✓     | ✓  | ✓     | ✓ | ✓    | ✓  | ✓    |
|           | Phosphate ester hydraulic fluid (F) | ✓              | ✓    | ✓  | ✓     | ✓  | ✓     | ✓ | ✓    | ✓  | —    |
| V38       | Water-glycol hydraulic fluid (W)    | ✓              | ✓    | ✓  | ✓     | ✓  | ✓     | ✓ | ✓    | ✓  | ✓    |
|           | Phosphate ester hydraulic fluid (F) | ✓              | ✓    | ✓  | ✓     | ✓  | ✓     | ✓ | ✓    | ✓  | —    |
| V50       | Water-glycol hydraulic fluid (W)    | ✓              | ✓    | —  | —     | —  | —     | — | —    | ✓  | ✓    |
|           | Phosphate ester hydraulic fluid (F) | ✓              | ✓    | —  | —     | —  | —     | — | —    | ✓  | —    |
| V70       | Water-glycol hydraulic fluid (W)    | ✓              | ✓    | ✓  | —     | —  | —     | — | —    | ✓  | ✓    |
|           | Phosphate ester hydraulic fluid (F) | ✓              | ✓    | ✓  | —     | —  | —     | — | —    | ✓  | —    |

Note: There are no models for flame-resistant hydraulic oil in the VZ series.

### ●Conditions of use

When using flame-resistant hydraulic oil, use the product under the following conditions.

| Hydraulic oil                       | Rotational Speed<br>min <sup>-1</sup> | Operating pressure<br>MPa {kgf/cm <sup>2</sup> } |          | Oil temperature | Suction filter<br>Filter | Suction pressure<br>kPa {mmHg} |
|-------------------------------------|---------------------------------------|--------------------------------------------------|----------|-----------------|--------------------------|--------------------------------|
|                                     |                                       | Maximum                                          | Rated    |                 |                          |                                |
| Water-glycol hydraulic fluid (W)    | 800 to 1200                           | 17.5 {175}                                       | 14 {140} | 45°C maximum    | 100 meshes per inch      | No lower than<br>-10 {-75}     |
|                                     | 1200 to 1800                          | 14 {140}                                         | 14 {140} |                 |                          |                                |
| Phosphate ester hydraulic fluid (F) | 800 to 1800                           | 21 {210}                                         | 14 {140} | 50°C maximum    | 100 meshes per inch      | No lower than<br>-10 {-75}     |

## Handling

### ●Hydraulic oil

- For pressures of up to 7 MPa {70 kgf/cm<sup>2</sup>}, use a general-purpose hydraulic oil (R&O) or wear-resistant hydraulic oil equivalent to ISO VG32 to 68.
- For pressures higher than 7 MPa {70 kgf/cm<sup>2</sup>}, use wear-resistant hydraulic oil equivalent to ISO VG32 to 68.
- Operate the unit in an environment where both the following conditions are satisfied: viscosity range from 15 to 400 mm<sup>2</sup>/s {cSt} and oil temperature from 0 to 60°C.
- Contamination of the hydraulic fluid causes pump trouble and reduces the service life, so pay due attention to controlling contamination and ensure that it goes no higher than NAS contamination class 9.

### ●Installation and alignment

- Ensure that the eccentricity of the drive shaft and pump shaft is no greater than 0.05 mm (TIR), and run the pump with no force acting perpendicularly on the pump shaft.  
Misalignment between the shaft centers will cause damage to bearings and oil seals, generate noise and vibration, and lead to pump accidents.
- Avoid crosswise drive using a belt, chain or gears (it will cause noise generation or damage to the bearings).

### ●Filters

- Use a suction filter with 150 meshes per inch at the inlet side.
- In the return line to the tank at the discharge side, use a line filter with a filtration accuracy of 25 μm or better.  
For discharge pressures of 14 MPa {140 kgf/cm<sup>2</sup>} and greater, use a line filter with a filtration accuracy of 10 μm.

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## Handling

### ● Piping

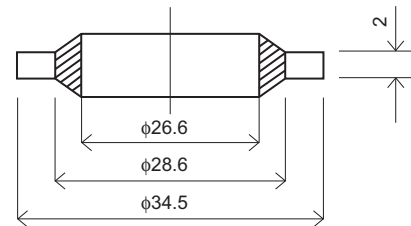
- When using steel pipes for piping, take care not to force the pump off center.  
Forcing the pump off center with pipes may cause abnormal noise.

| Model No.      | V series                       |                   |                             |                                 |                                                                                    |
|----------------|--------------------------------|-------------------|-----------------------------|---------------------------------|------------------------------------------------------------------------------------|
|                | V8                             | V15, V23          | V15 (Type Y)                | V38                             | V50, 70                                                                            |
| Suction port   | G $\frac{3}{4}$<br>Bonded seal | G1<br>O-ring boss | SHA15/SSA20<br>(JIS B 2291) | G1 $\frac{1}{4}$<br>O-ring boss | Size 1 $\frac{1}{2}$ split flange boss<br>(SAE J518 STANDARD)<br>(PRESSURE SERIES) |
| Discharge port | G $\frac{3}{4}$<br>Bonded seal | G1<br>O-ring boss | Rc $\frac{3}{8}$            | G1 $\frac{1}{4}$<br>O-ring boss | Size 1 $\frac{1}{2}$ split flange boss<br>(SAE J518 STANDARD)<br>(PRESSURE SERIES) |
| O-ring used    | —                              | JIS B 2401 1BP29  | —                           | JIS B 2401 1BP38                | —                                                                                  |

| Model No.      | VZ series                                                                          |                                                                                    |                                                                                    |
|----------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|                | VZ50, VZ63                                                                         | VZ80, VZ100                                                                        | VZ130                                                                              |
| Suction port   | Size 1 $\frac{1}{2}$ split flange boss<br>(SAE J518 STANDARD)<br>(PRESSURE SERIES) | Size 2 split flange boss<br>(SAE J518 STANDARD)<br>(PRESSURE SERIES)               | Size 2 $\frac{1}{2}$ split flange boss<br>(SAE J518 STANDARD)<br>(PRESSURE SERIES) |
| Discharge port | Size 1 split flange boss<br>(SAE J518 STANDARD)<br>(PRESSURE SERIES)               | Size 1 $\frac{1}{2}$ split flange boss<br>(SAE J518 STANDARD)<br>(PRESSURE SERIES) | Size 1 $\frac{1}{2}$ split flange boss<br>(SAE J518 STANDARD)<br>(PRESSURE SERIES) |

- Bonded seal model (manufacturer: IHARA SCIENCE CORPORATION)

| Nominal model | Nominal designation of applicable thread |
|---------------|------------------------------------------|
| KP-C-05       | G $\frac{3}{4}$                          |



### ● Drain piping

- Isolate drain piping from other returning lines do not merge it with them and arrange it such that the pressure inside the pump case can be maintained at no greater than 0.035 MPa {0.35 kgf/cm<sup>2</sup>} for the V series and 0.1 MPa {1 kgf/cm<sup>2</sup>} for the VZ series.
- Merge the return line of the drain piping lower than the tank oil level and as far as possible from the suction line.

| Model No.          | V series                                    |                                            |                                            | VZ series                                 |                                            |
|--------------------|---------------------------------------------|--------------------------------------------|--------------------------------------------|-------------------------------------------|--------------------------------------------|
|                    | V8, V15, V23                                | V38                                        | V50, V70                                   | VZ50                                      | VZ63, VZ80<br>VZ100, VZ130                 |
| Size of pipe joint | Rc $\frac{3}{8}$<br>I.D. $\phi$ 8.5 minimum | Rc $\frac{1}{2}$<br>I.D. $\phi$ 12 minimum | Rc $\frac{3}{4}$<br>I.D. $\phi$ 16 minimum | Rc $\frac{1}{2}$<br>I.D. $\phi$ 2 minimum | Rc $\frac{3}{4}$<br>I.D. $\phi$ 16 minimum |
| Pipe I.D.          | $\phi$ 12 minimum                           | $\phi$ 15 minimum                          | $\phi$ 19 minimum                          | $\phi$ 15 minimum                         | $\phi$ 19 minimum                          |
| Drain pipe length  | 1 m maximum                                 | 1 m maximum                                | 1 m maximum                                | 1 m maximum                               | 1 m maximum                                |

### ● At start

- Fill the pump case with hydraulic fluid through the filler port before starting the pump. Use the same hydraulic fluid as for the hydraulic circuit.

| Model No.                                | V series |     |     |     |      |      | VZ series |      |      |       |       |
|------------------------------------------|----------|-----|-----|-----|------|------|-----------|------|------|-------|-------|
|                                          | V8       | V15 | V23 | V38 | V50  | V70  | VZ50      | VZ63 | VZ80 | VZ100 | VZ130 |
| Pump case filling volume cm <sup>3</sup> | 250      | 500 | 500 | 900 | 2000 | 2000 | 1000      | 1400 | 1500 | 2000  | 2500  |

- After checking that all hydraulic circuits and electrical circuits are ready for operation, set the hydraulic circuit at the load side in the no-load status or connect an unloading circuit before starting the pump.

## Handling

### ● At start

- Check that the pump rotates in the direction of the arrow showing the direction of rotation.
- When the pump is driven for the first time, turn the power switch to the motor on and off a few times to let the air out of the piping and then run it continuously at full speed. Noise may be observed until the air has been completely removed but this is not abnormal.

### ● Suction pressure

- Maintain the suction pressure no lower than  $-16.7 \text{ kPa}$   $\{-125 \text{ mmHg}\}$ .
- High suction pressures will generate cavitation and cause damage to the parts, noise, and vibration, resulting in a shorter pump service life.

# V series Piston Pump



## Features

- **Low noise**
  - Low noise operation over the entire pressure range has been realized in each series.
- **High efficiency**
  - Fluid temperature rise can be reduced due to the smaller power loss. This means that the tank can be designed in a small size.
- **High reliability**
  - High responsiveness, high stability, and long life make it possible to increase the reliability of the main machine.

## Nomenclature

### ● Pressure compensator control

|   |   |   |   |   |   |    |    |   |   |    |   |    |   |
|---|---|---|---|---|---|----|----|---|---|----|---|----|---|
| ※ | - | V | ※ | ※ | A | ※  | ※  | ※ | - | ※  | ※ | ※  | ※ |
| 1 |   | 2 | 3 | 4 | 5 | 12 | 15 |   |   | 16 |   | 17 |   |

### ● Combination control (pressure feedback method)

|   |   |   |   |   |   |   |    |    |    |   |   |    |   |    |   |
|---|---|---|---|---|---|---|----|----|----|---|---|----|---|----|---|
| ※ | - | V | ※ | ※ | C | ※ | ※  | R  | H  | X | - | ※  | ※ | ※  | ※ |
| 1 |   | 2 | 3 | 4 | 7 | 8 | 12 | 13 | 15 |   |   | 16 |   | 17 |   |

### ● Combination control (solenoid operated method)

|   |   |   |   |   |   |   |    |    |    |    |   |   |    |   |    |   |
|---|---|---|---|---|---|---|----|----|----|----|---|---|----|---|----|---|
| ※ | - | V | ※ | ※ | C | ※ | ※  | R  | J  | ※  | X | - | ※  | ※ | ※  | ※ |
| 1 |   | 2 | 3 | 4 | 7 | 8 | 12 | 13 | 14 | 15 |   |   | 16 |   | 17 |   |

### ● Dual pressure control

|   |   |   |   |   |   |    |    |    |    |   |   |    |   |    |   |
|---|---|---|---|---|---|----|----|----|----|---|---|----|---|----|---|
| ※ | - | V | ※ | ※ | D | ※  | ※  | R  | ※  | X | - | ※  | ※ | ※  | ※ |
| 1 |   | 2 | 3 | 4 | 9 | 10 | 12 | 14 | 15 |   |   | 16 |   | 17 |   |

### ● Power-match control

|   |   |   |   |   |    |    |    |    |   |   |    |   |
|---|---|---|---|---|----|----|----|----|---|---|----|---|
| ※ | - | V | ※ | ※ | SA | ※  | ※  | ※  | ※ | - | ※  | ※ |
| 1 |   | 2 | 3 | 4 | 6  | 11 | 12 | 15 |   |   | 16 |   |

#### 1 Applicable fluid code (Refer to Page A-5 for the applicable models and conditions of use)

No designation: Petroleum-based hydraulic fluid  
 W: Water-glycol hydraulic fluid  
 F: Phosphate ester hydraulic fluid

#### 2 Model No.

V: V series piston pump

#### 3 Pump capacity

8: 8.0 cm<sup>3</sup>/rev  
 15: 14.8 cm<sup>3</sup>/rev  
 23: 23.0 cm<sup>3</sup>/rev  
 38: 37.7 cm<sup>3</sup>/rev  
 50: 51.6 cm<sup>3</sup>/rev  
 70: 69.8 cm<sup>3</sup>/rev

#### 4 Control method I (Refer to Page A-4 for the applicable models)

A: Pressure compensator control  
 C: Combination control  
 D: Dual pressure control  
 SA: Power-match control

#### 5 6 Pressure adjustment range (See the pressure adjustment range table)

#### 7 9 Low pressure adjustment range (See the pressure adjustment range table)

#### 8 10 High pressure adjustment range (See the pressure adjustment range table)

#### 11 FC valve differential pressure

A: 0.7 MPa { 7 kgf/cm<sup>2</sup> }  
 B: 1.4 MPa { 14 kgf/cm<sup>2</sup> }  
 C: 2.1 MPa { 21 kgf/cm<sup>2</sup> }

#### 12 Direction of rotation, when viewed from the shaft end (Refer to Page A-4 for the applicable models)

R: Clockwise (rightward)  
 L: Counterclockwise (leftward)

\*The direction of rotation (rightward or leftward) cannot be changed.

#### 13 Control method II

H: Pressure feedback method  
 J: Solenoid operated method

#### 14 Voltage code for the solenoid valve

A: AC 100 V (50/60 Hz), AC 110 V (60 Hz)  
 B: AC 200 V (50/60 Hz), AC 220 V (60 Hz)  
 N: DC 12 V  
 P: DC 24 V

#### 15 Piping direction (Refer to Page A-4 for the applicable models)

No designation: Axial port  
 X: Side port

#### 16 Design No. (The design No. is subject to change) \*1

20: Pump model V8, V50  
 95: Pump model V15, V38  
 30: Pump model V23  
 <When control method I is A, CH, or SA>  
 35: Pump model V23  
 <When control method I is CJ or D>  
 60: Pump model V70

#### Control method III

17 No designation: Without remote control system  
 RC: With remote control system

Note:\*1 Refer to Page A-68 for information on forward/backward compatibility.

Refer to Page N-2 for hydraulic unit piston packs incorporating V series piston pumps, Page N-17 for NDJ series new DAIPACKs, Page N-22 for ND series Mini-packs, Page N-27 for ND series new DAIPACKs, and Page N-30 for the NT series SSS MARK-II.

## Models and pressure adjustment range table

### ● Pressure compensator control (4 = A)

#### 5 Pressure adjustment range

| Code | Pressure adjustment range<br>MPa {kgf/cm <sup>2</sup> } | Without remote control system |     |     |     |     |     | With remote control system |     |     |     |     |
|------|---------------------------------------------------------|-------------------------------|-----|-----|-----|-----|-----|----------------------------|-----|-----|-----|-----|
|      |                                                         | V8                            | V15 | V23 | V38 | V50 | V70 | V15                        | V23 | V38 | V50 | V70 |
| 1    | 0.8 to 7 {8 to 70}                                      | ✓                             | ✓   | ✓   | ✓   | –   | –   | –                          | –   | –   | –   | –   |
| 1    | 1.5 to 7 {15 to 70}                                     | –                             | –   | –   | –   | ✓   | ✓   | –                          | –   | –   | –   | –   |
| 2    | 1.5 to 14 {15 to 140}                                   | –                             | ✓   | ✓   | ✓   | ✓   | ✓   | –                          | –   | –   | –   | –   |
| 3    | 1.5 to 21 {15 to 210}                                   | –                             | –   | –   | –   | –   | –   | ✓                          | –   | –   | –   | –   |
| 3    | 2 to 21 {20 to 210}                                     | –                             | –   | –   | –   | –   | –   | –                          | –   | –   | ✓   | ✓   |
| 3    | 3.5 to 21 {35 to 210}                                   | –                             | ✓   | ✓   | ✓   | ✓   | ✓   | –                          | –   | –   | –   | –   |
| 4    | 1.5 to 25 {15 to 250}                                   | –                             | –   | –   | –   | –   | –   | –                          | ✓   | ✓   | –   | –   |
| 4    | 3.5 to 25 {35 to 250}                                   | –                             | –   | ✓   | ✓   | –   | –   | –                          | –   | –   | –   | –   |

### ● Combination control [4 = C, 13 = H (self-regulation method) or 13 = J (solenoid operated method)]

#### 7 Low pressure adjustment range

| Code | Pressure adjustment range<br>MPa {kgf/cm <sup>2</sup> } | Pressure feedback method |     |     |     | Solenoid operated method |     |     |
|------|---------------------------------------------------------|--------------------------|-----|-----|-----|--------------------------|-----|-----|
|      |                                                         | V15                      | V23 | V38 | V70 | V15                      | V23 | V38 |
| 1    | 1.5 to 7 {15 to 70}                                     | –                        | –   | –   | ✓   | ✓                        | ✓   | ✓   |
| 1    | 2.5 to 7 {25 to 70}                                     | ✓                        | ✓   | ✓   | –   | –                        | –   | –   |
| 2    | 1.5 to 14 {15 to 140}                                   | –                        | –   | –   | ✓   | ✓                        | ✓   | ✓   |
| 2    | 2.5 to 14 {25 to 140}                                   | ✓                        | ✓   | ✓   | –   | –                        | –   | –   |

#### 8 High pressure adjustment range

| Code | Pressure adjustment range<br>MPa {kgf/cm <sup>2</sup> } | Without remote control system |     |     |     |                          |     | With remote control system |     |     |     |                          |     |     |     |
|------|---------------------------------------------------------|-------------------------------|-----|-----|-----|--------------------------|-----|----------------------------|-----|-----|-----|--------------------------|-----|-----|-----|
|      |                                                         | Pressure feedback method      |     |     |     | Solenoid operated method |     | Pressure feedback method   |     |     |     | Solenoid operated method |     |     |     |
|      |                                                         | V15                           | V23 | V38 | V70 | V15                      | V23 | V38                        | V15 | V23 | V38 | V70                      | V15 | V23 | V38 |
| 1    | 1.5 to 7 {15 to 70}                                     | –                             | –   | –   | ✓   | ✓                        | ✓   | ✓                          | –   | –   | –   | –                        | –   | –   | –   |
| 1    | 2.5 to 7 {25 to 70}                                     | ✓                             | ✓   | ✓   | –   | –                        | –   | –                          | –   | –   | –   | –                        | –   | –   | –   |
| 2    | 1.5 to 14 {15 to 140}                                   | –                             | –   | –   | ✓   | ✓                        | ✓   | ✓                          | –   | –   | –   | –                        | –   | –   | –   |
| 2    | 2.5 to 14 {25 to 140}                                   | ✓                             | ✓   | ✓   | –   | –                        | –   | –                          | –   | –   | –   | –                        | –   | –   | –   |
| 3    | 2.0 to 21 {20 to 210}                                   | –                             | –   | –   | –   | –                        | –   | –                          | –   | –   | –   | –                        | ✓   | –   | –   |
| 3    | 2.5 to 21 {25 to 210}                                   | –                             | –   | –   | –   | –                        | –   | –                          | ✓   | –   | –   | ✓                        | –   | –   | –   |
| 3    | 3.5 to 21 {35 to 210}                                   | ✓                             | ✓   | ✓   | ✓   | ✓                        | ✓   | ✓                          | –   | –   | –   | –                        | –   | –   | –   |
| 4    | 2.0 to 25 {20 to 250}                                   | –                             | –   | –   | –   | –                        | –   | –                          | –   | –   | –   | –                        | –   | ✓   | ✓   |
| 4    | 2.5 to 25 {25 to 250}                                   | –                             | –   | –   | –   | –                        | –   | –                          | –   | ✓   | ✓   | –                        | –   | –   | –   |
| 4    | 3.5 to 25 {35 to 250}                                   | –                             | ✓   | ✓   | –   | –                        | ✓   | ✓                          | –   | –   | –   | –                        | –   | –   | –   |

### ● Dual pressure control (4 = D)

#### 9 Low pressure adjustment range

| Code | Pressure adjustment range<br>MPa {kgf/cm <sup>2</sup> } | V15 | V23 | V38 |
|------|---------------------------------------------------------|-----|-----|-----|
| 1    | 1.5 to 7 {15 to 70}                                     | ✓   | ✓   | ✓   |
| 2    | 1.5 to 14 {15 to 140}                                   | ✓   | ✓   | ✓   |

Note: If both low and high pressure adjustment ranges are the 1st pattern, the pressure adjustment range becomes 0.8 to 7 MPa {8 to 70 kgf/cm<sup>2</sup>}.

### ● Power-match control (4 = SA)

#### 6 Pressure adjustment range

| Code | Pressure adjustment range<br>MPa {kgf/cm <sup>2</sup> } | V15 | V23 | V38 | V50 | V70 |
|------|---------------------------------------------------------|-----|-----|-----|-----|-----|
| 1    | 0.8 to 7 {8 to 70}                                      | ✓   | ✓   | ✓   | –   | –   |
| 1    | 1.5 to 7 {15 to 70}                                     | –   | –   | –   | ✓   | ✓   |
| 2    | 1.5 to 14 {15 to 140}                                   | ✓   | ✓   | ✓   | ✓   | ✓   |
| 3    | 3.5 to 21 {35 to 210}                                   | ✓   | ✓   | ✓   | ✓   | ✓   |
| 4    | 3.5 to 25 {35 to 250}                                   | –   | ✓   | ✓   | –   | –   |

#### 10 High pressure adjustment range

| Code | Pressure adjustment range<br>MPa {kgf/cm <sup>2</sup> } | Without remote control system |     |     | With remote control system |     |     |
|------|---------------------------------------------------------|-------------------------------|-----|-----|----------------------------|-----|-----|
|      |                                                         | V15                           | V23 | V38 | V15                        | V23 | V38 |
| 1    | 1.5 to 7 {15 to 70}                                     | ✓                             | ✓   | ✓   | –                          | –   | –   |
| 2    | 1.5 to 14 {15 to 140}                                   | ✓                             | ✓   | ✓   | –                          | –   | –   |
| 3    | 2.5 to 21 {25 to 210}                                   | –                             | –   | –   | ✓                          | –   | –   |
| 3    | 3.5 to 21 {35 to 210}                                   | ✓                             | ✓   | ✓   | –                          | –   | –   |
| 4    | 2.5 to 25 {25 to 250}                                   | –                             | –   | –   | –                          | ✓   | ✓   |
| 4    | 3.5 to 25 {35 to 250}                                   | –                             | ✓   | ✓   | –                          | –   | –   |

## Contact Details

Before using the product, please check the guide pages at the front of this catalog.

Internet

<http://www.daikinpmc.com/en/>

For latest information, PDF catalogs and operation manuals

## Nomenclature

※ - V ※ ※ SAJS - ※ ※ X - ※ ※

1 2 3 4 5 6 7 8

### 1 Applicable fluid code

No designation: Petroleum-based hydraulic fluid  
W: Water-glycol hydraulic fluid

### 2 Model No.

V: V series piston pump

### 3 Pump capacity

23: 23.0 cm<sup>3</sup>/rev  
38: 37.7 cm<sup>3</sup>/rev  
50: 51.6 cm<sup>3</sup>/rev  
70: 69.8 cm<sup>3</sup>/rev

### 4 Control method

SAJS: Power-match control

### 5 Pressure adjustment range

A: Up to 14 MPa {140 kgf/cm<sup>2</sup>}  
B: Up to 17.5 MPa {175 kgf/cm<sup>2</sup>}  
C: Up to 21 MPa {210 kgf/cm<sup>2</sup>}  
\* The minimum adjustment pressure varies depending on the model.

### 6 Direction of rotation, when viewed from the shaft end (Refer to Page A-4 for the applicable models)

R: Clockwise (rightward)  
L: Counterclockwise (leftward)

### 7 Piping direction

X: Side port

### 8 Design number (The design number is subject to change)

30: Pump model V23  
95: Pump model V38  
20: Pump model V50  
60: Pump model V70

※ - V 15 A 1 R Y - 95

1 2 3 4 5 6 7 8

### 1 Applicable fluid code

No designation: Petroleum-based hydraulic fluid  
W: Water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid

### 2 Model No.

V: V series piston pump

### 3 Pump capacity

15: 14.8 cm<sup>3</sup>/rev

### 4 Control method

A: Pressure compensator control

### 5 Pressure adjustment range

1: 0.8 to 7 MPa {8 to 70 kgf/cm<sup>2</sup>}

### 6 Direction of rotation, when viewed from the shaft end

R: Clockwise (rightward)

### Piping port

Y: Suction port: Flange  
Discharge port: Taper pipe threads

### 8 Design No. (The design No. is subject to change) \*1

Note: \*1 Refer to Page A-69 for information on forward/backward compatibility.

## Specifications

| Model No.    | Theoretical discharge rate<br>cm <sup>3</sup> /rev | Maximum operating pressure<br>MPa {kgf/cm <sup>2</sup> } | Permissible rotational speed<br>min <sup>-1</sup> | Discharge rate adjustment range<br>1800 min <sup>-1</sup><br>L/min |             | Mass (Control method A)<br>kg |           |
|--------------|----------------------------------------------------|----------------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------|-------------|-------------------------------|-----------|
|              |                                                    |                                                          |                                                   | Axial port                                                         | Side port   | Axial port                    | Side port |
| V8           | 8.0                                                | 7 { 70 }                                                 | 500 to 1800                                       | 2 to 14.4                                                          |             | —                             | 8.9       |
| V15          | 14.8                                               | 21 {210}                                                 | 500 to 1800                                       | 4.5 to 26.6                                                        | 7.5 to 26.6 | 12.8                          | 14.5      |
| V15 (Type Y) | 14.8                                               | 7 { 70 }                                                 | 500 to 1800                                       | 4.5 to 26.6                                                        |             | 13.5                          |           |
| V23          | 23.0                                               | 25 {250}                                                 | 500 to 1800                                       | 12 to 41.4                                                         |             | 18.4                          | 21.5      |
| V38          | 37.7                                               | 25 {250}                                                 | 500 to 1800                                       | 34 to 68                                                           | 36.5 to 68  | 24.4                          | 26        |
| V50          | 51.6                                               | 21 {210}                                                 | 500 to 1800                                       | 0 to 93                                                            |             | —                             | 50        |
| V70          | 69.8                                               | 21 {210}                                                 | 500 to 1800                                       | 13 to 126                                                          |             | —                             | 55        |

Note: JR-G (T) 02 and JRP-G02 are recommended for the remote control system's relief valve.

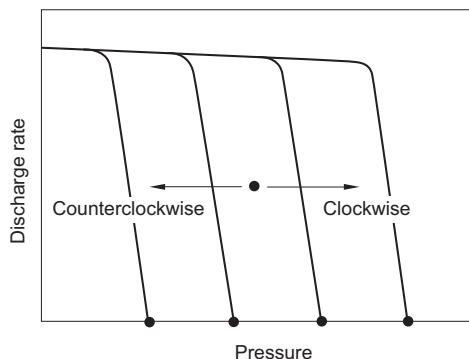
If the vent port is blocked, the pressure compensation structure does not work and the pump operates at a fixed pressure.

- Foot supports and piping flanges are not provided with the pump. Order them separately as required by referring to Pages S-2 and S-4.

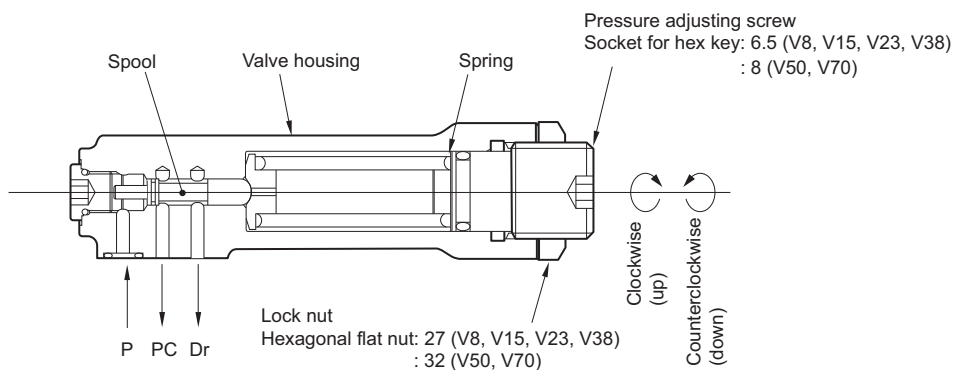
## Relationship between number of revolutions of the pressure adjusting screw and variation of discharge pressure

● The discharge pressure can be set to the desired value by turning the pressure adjusting screw of the PC valve.

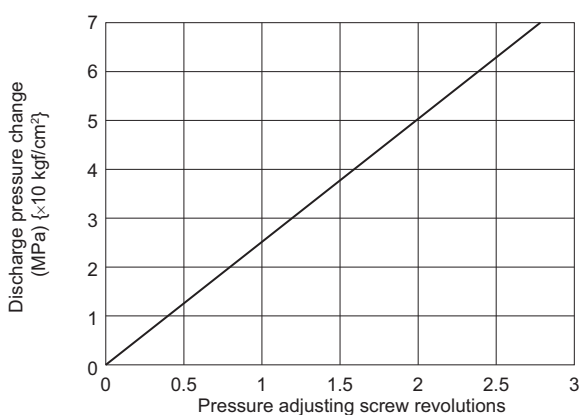
- Turning the adjusting screw clockwise increases the pressure.
- Turning the adjusting screw counterclockwise decreases the pressure.



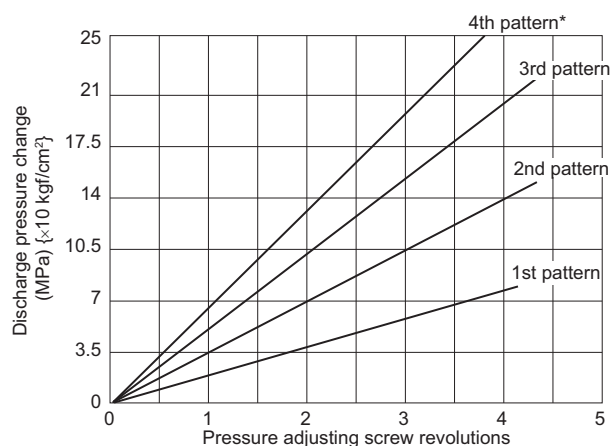
PC valve



V8

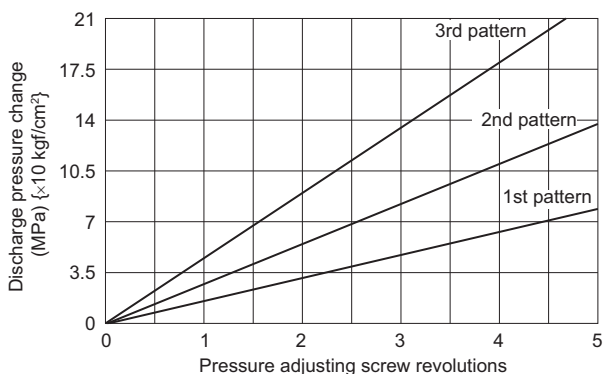


V15, 23, 38



\* The 4th pattern applies to V23 and V38.

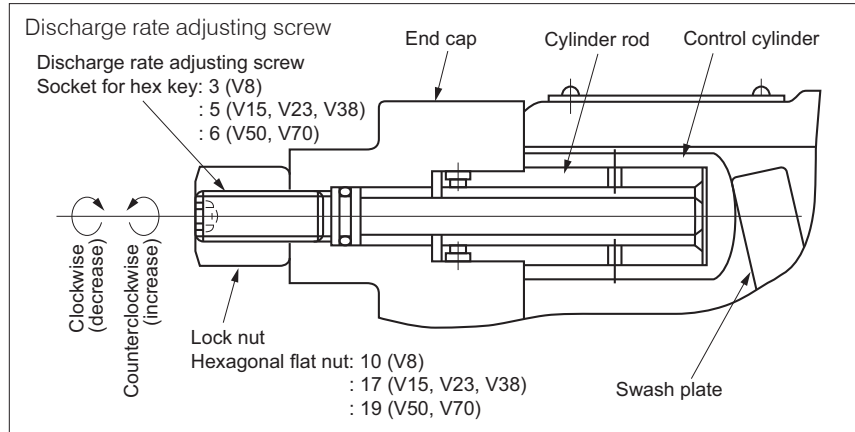
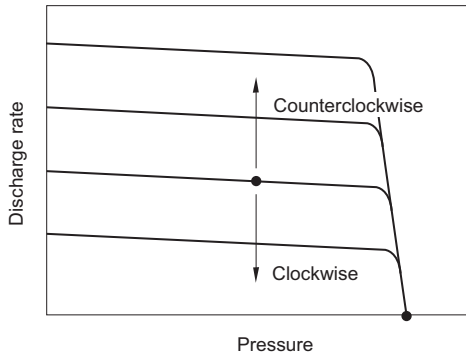
V50, 70



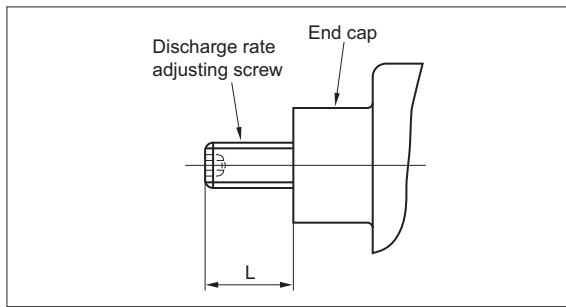
- Excessive loosening of the pressure adjusting screw may cause oil to leak from the threaded section or parts to spring out. Do not loosen the screw beyond the pressure adjustment range.
- The 1st to 4th patterns correspond to the pressure adjustment range designation codes 1 to 4.

## Relationship between the protruding length of the discharge rate adjusting screw and the discharge rate ( 4 = A, D, SA)

- The maximum discharge rate can be set to the desired value by turning the discharge rate adjusting screw at the end cap.
  - Turning the adjusting screw clockwise decreases the discharge rate.
  - Turning the adjusting screw counterclockwise increases the discharge rate.

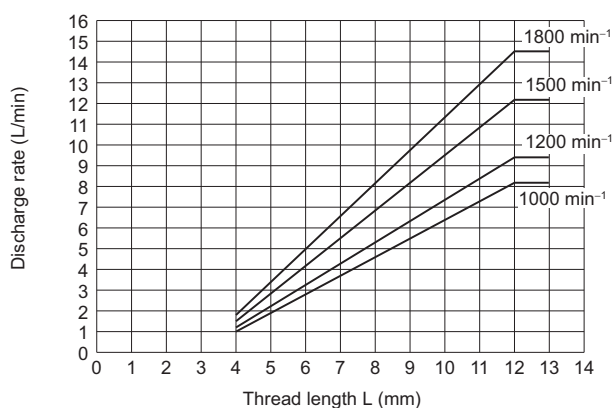


- The discharge rate can be roughly judged from the protruding length of the discharge rate adjusting screw (L).

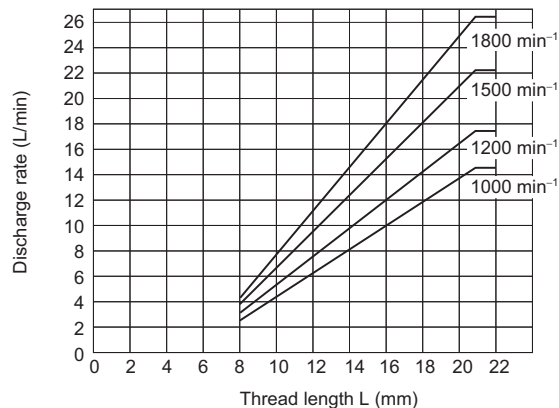


- Overtightening of the discharge rate adjusting screw may cause oil to leak from the threaded section. Do not tighten the screw beyond the adjustment range.

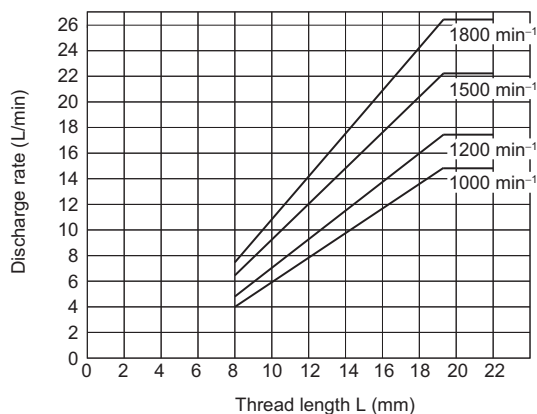
V8 side port



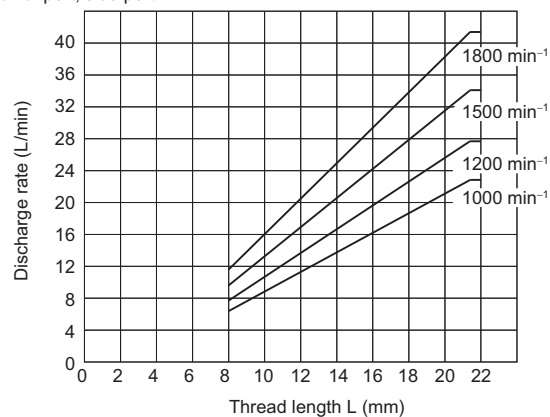
V15 axial port, V15 (type Y)



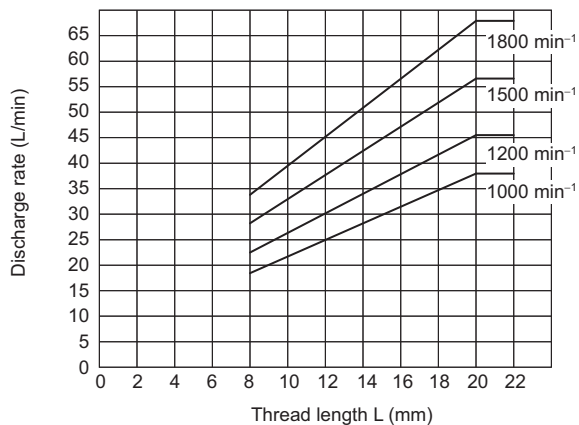
V15 side port



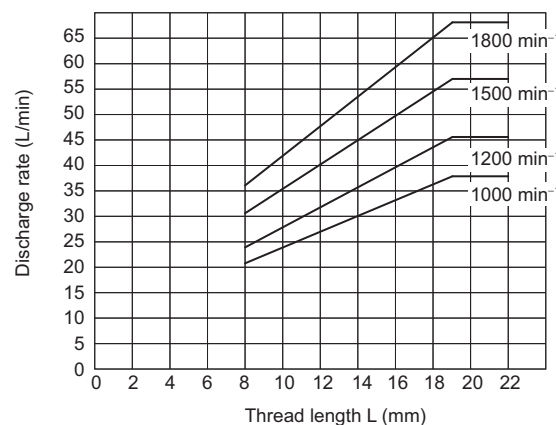
V23 axial port, side port



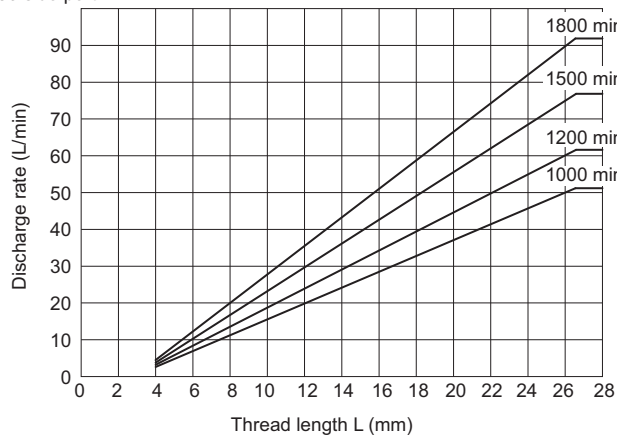
V38 axial port



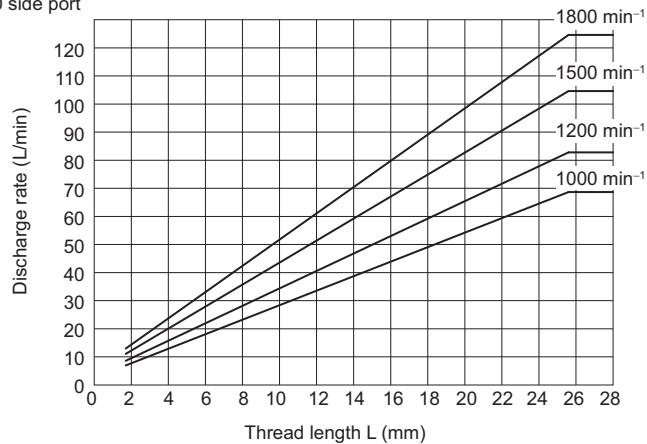
V38 side port



V50 side port



V70 side port



## Relationship between the protruding length of the discharge rate adjusting screw and the discharge rate (4 = C)

### ● Discharge rate adjustment in combination control

The discharge rate for both the low quantity (QL) and high quantity (QH) ranges can be adjusted as follows:

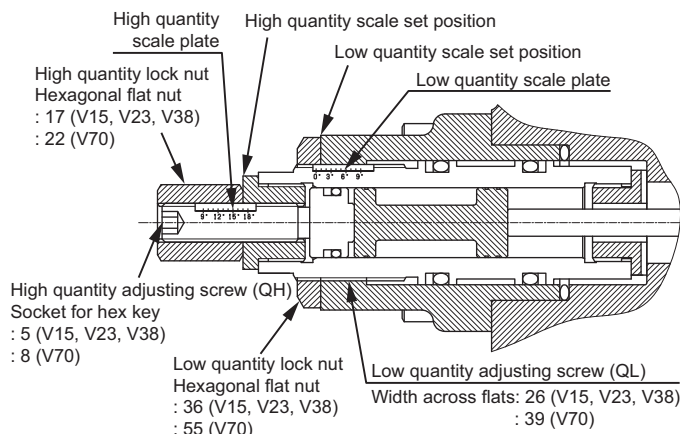
- Turning the adjusting screw clockwise decreases the discharge rate.
- Turning the adjusting screw counterclockwise increases the discharge rate.

The discharge rate adjusting screws are provided with scales on the nameplates as shown below.

| Pump model | Scale °                      |                               |
|------------|------------------------------|-------------------------------|
|            | Low quantity adjusting screw | High quantity adjusting screw |
| V15C       | 0 to 7                       | 5 to 15                       |
| V23C       | 0 to 9                       | 8 to 17                       |
| V38C       | 0 to 9                       | 9 to 18                       |
| V70C       | 0 to 9                       | 6 to 18                       |

(Scale graduation: 1°)

Note: The high quantity adjustment range may be restricted due to the setting for the low quantity range.  
See the graphs on Page A-15 for details.



Adjust the discharge rate according to the relevant discharge rate adjustment graph by following the procedure below.

- (1) For the low quantity range, read the value for the desired discharge rate on the graph and turn the low quantity adjusting screw to set the scale position to the read value.
- (2) For the high quantity range, read the value for the desired discharge rate on the line corresponding to the value for the low quantity range on the graph and turn the high quantity adjusting screw to set the scale position to the read value.
- (3) When adjusting only the high quantity range, loosen the lock nut and adjust as described above.
- (4) When adjusting only the low quantity range, loosen the lock nut on the high quantity adjustment screw and adjust the setting for the low quantity range as described above while holding the high quantity adjusting screw in place with a hex key.

### ■ Example of adjustment

Example: When adjusting the discharge rate of V15C at 1500 min<sup>-1</sup> to 7 L/min for the low quantity range (QL) and 18 L/min for the high quantity range (QH)

- From the discharge rate adjustment graph for V15C at 1500 min<sup>-1</sup>, first read the value for QL = 7 L/min, which is 4, and adjust the low quantity adjusting screw accordingly.
- Then, read the value for QH = 18 L/min on the line for 4 of QL, which is 7, and adjust the high quantity adjusting screw accordingly.

The setting values indicated above may change slightly depending on the conditions of use (fluid temperature, hydraulic fluid type, etc.)

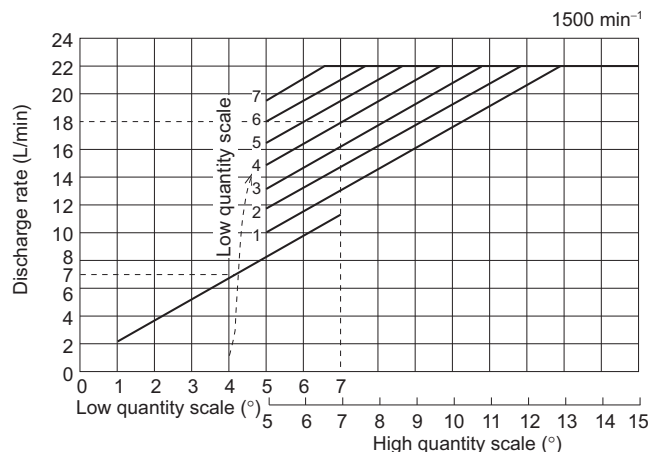
For final fine adjustment, repeat the adjustment described above and achieve the setting appropriate for the actual application.

### Factory settings

The discharge rate for the high quantity range is factory adjusted to the maximum discharge rate and the discharge rate for the low quantity range is factory adjusted as follows.

| Pump model | Low quantity (QL) setting |
|------------|---------------------------|
| V15C       | Scale position: 3°        |
| V23C       | Scale position: 3°        |
| V38C       | Scale position: 2°        |
| V70C       | Scale position: 1.5°      |

Discharge rate adjustment graph for V15C in combination control



## Contact Details

Before using the product, please check the guide pages at the front of this catalog.

Internet

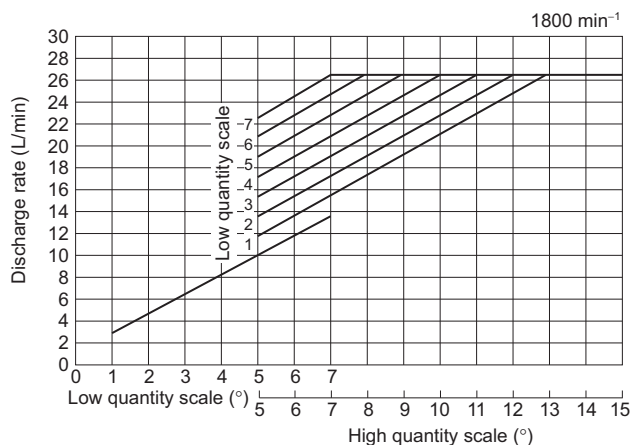
<http://www.daikinpmc.com/en/>

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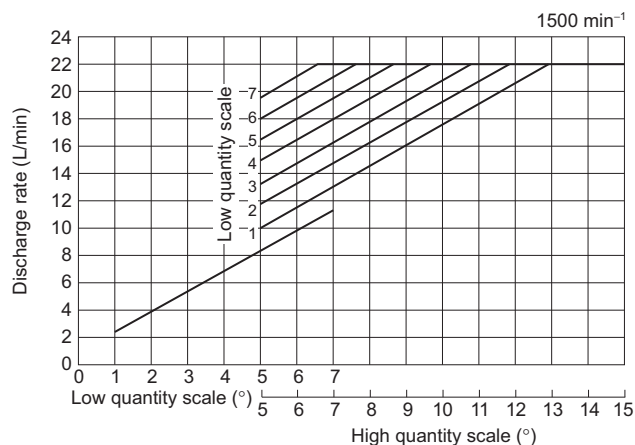
A

PISTON PUMPS

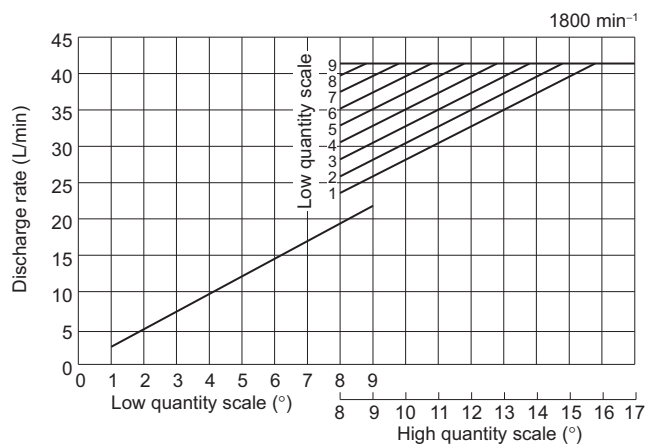
V15C combination control (1800 min<sup>-1</sup>)



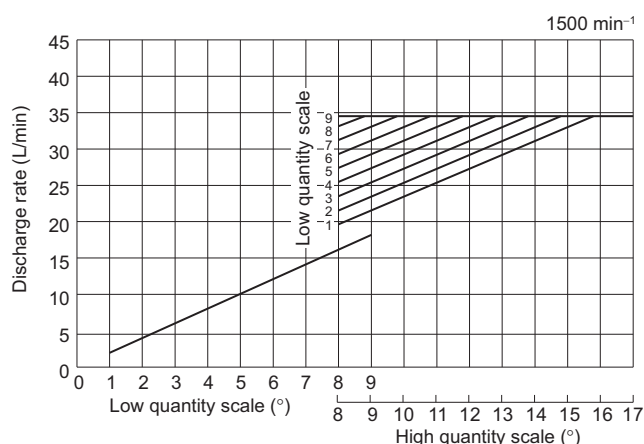
V15C combination control (1500 min<sup>-1</sup>)



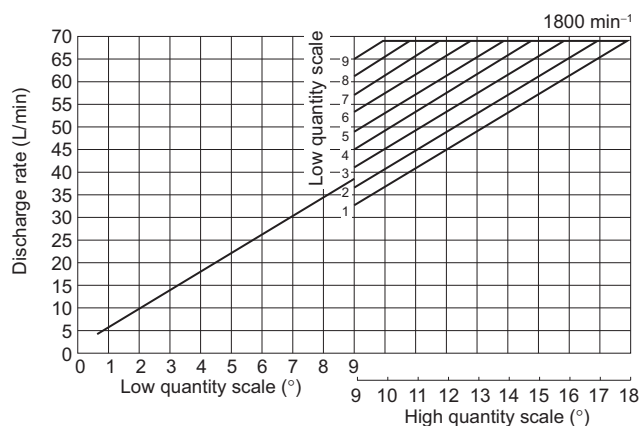
V23C combination control (1800 min<sup>-1</sup>)



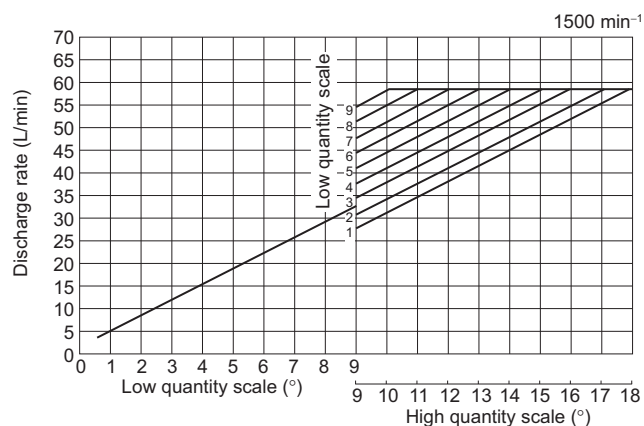
V23C combination control (1500 min<sup>-1</sup>)



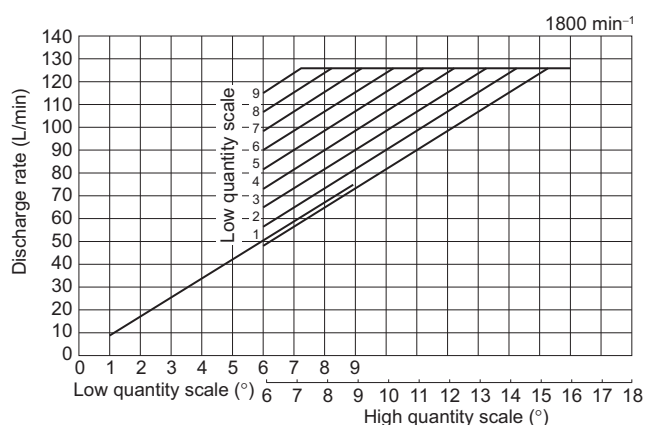
V38C combination control (1800 min<sup>-1</sup>)



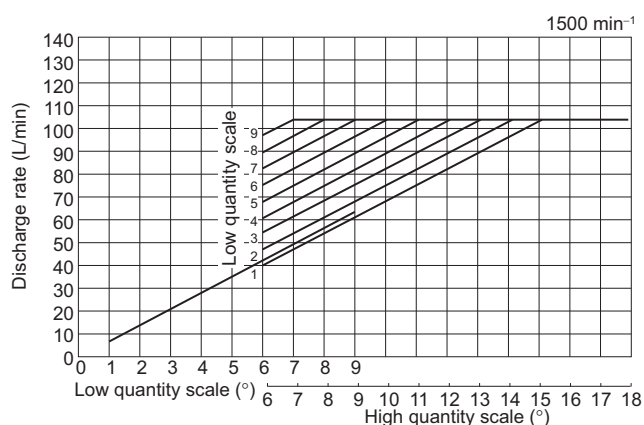
V38C combination control (1500 min<sup>-1</sup>)



V70C combination control (1800 min<sup>-1</sup>)



V70C combination control (1500 min<sup>-1</sup>)



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Internet

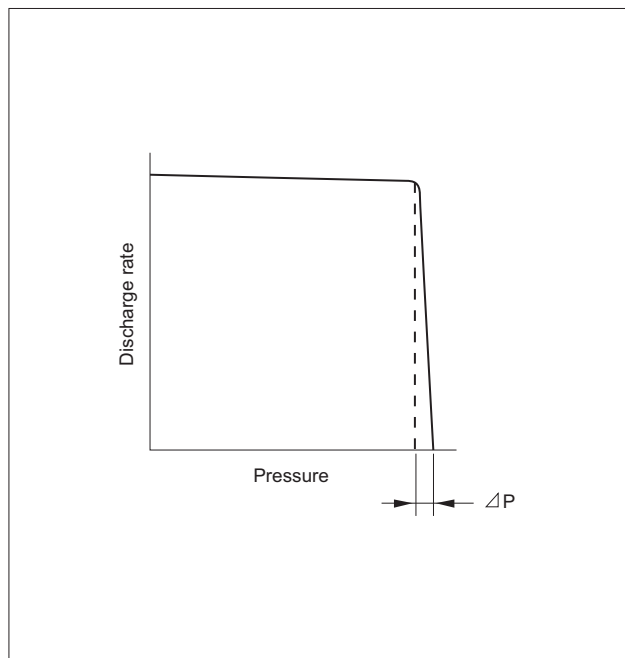
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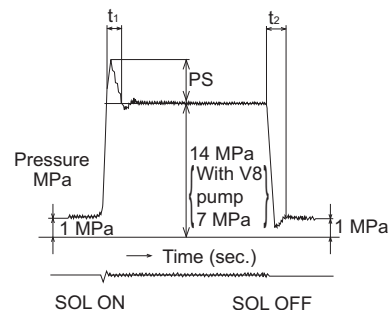
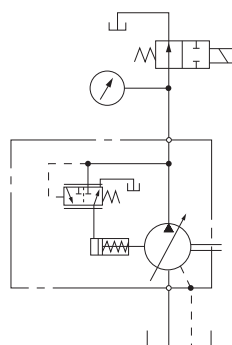
## Pressure compensator characteristics

### ● Sharp cutoff characteristics

- The pressure gradient at cutoff is no greater than 0.5 MPa {5 kgf/cm<sup>2</sup>}
- Sharp and stable cutoff characteristics are achieved.



## Response characteristics



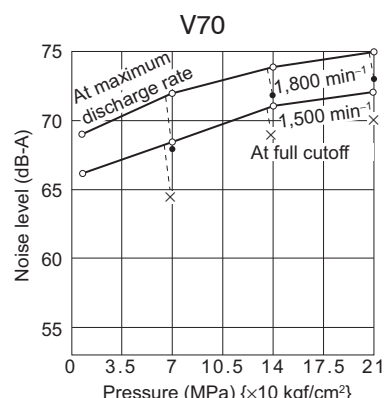
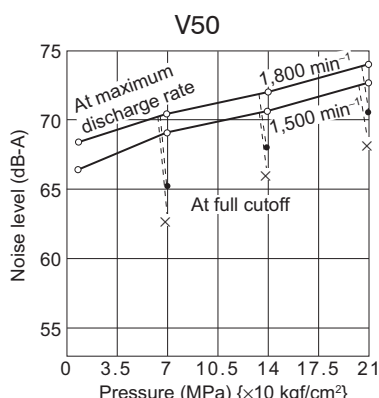
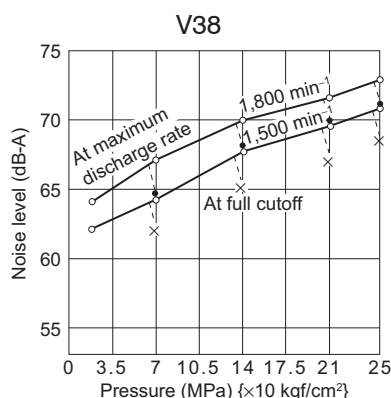
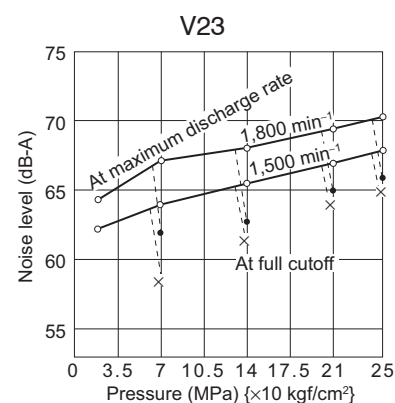
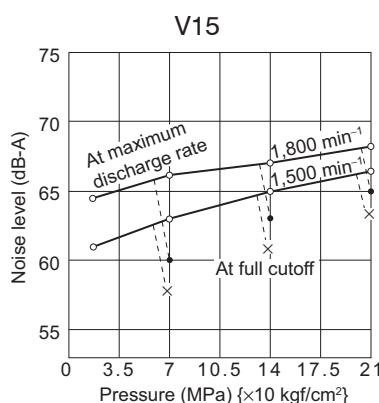
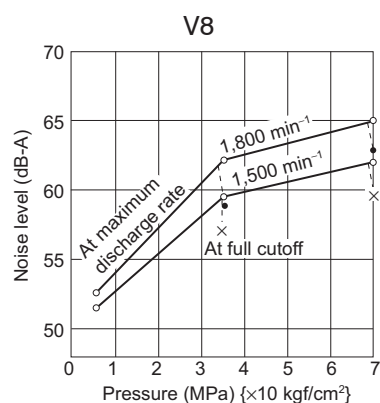
| Model | Response time sec. |              | Surge pressure MPa |
|-------|--------------------|--------------|--------------------|
|       | $t_1$              | $t_2$        | Ps                 |
| V8    | 0.04 to 0.05       | 0.05 to 0.07 | 2.5 to 4           |
| V15   | 0.04 to 0.05       | 0.05 to 0.07 | 2.5 to 4           |
| V23   | 0.05 to 0.06       | 0.05 to 0.07 | 3.5 to 7           |
| V38   | 0.05 to 0.09       | 0.05 to 0.07 | 5.5 to 9           |
| V50   | 0.06 to 0.09       | 0.06 to 0.09 | 6 to 10            |
| V70   | 0.06 to 0.09       | 0.06 to 0.09 | 6.5 to 10          |

## Noise characteristics (JIS B 8350, measuring position: 1 m from pump front)

| Input rotational speed                        | Fluid used             | Oil temperature |
|-----------------------------------------------|------------------------|-----------------|
| 1800 min <sup>-1</sup> 1500 min <sup>-1</sup> | Equivalent to ISO VG32 | 50°C            |

● At full-cutoff at 1800 min<sup>-1</sup>

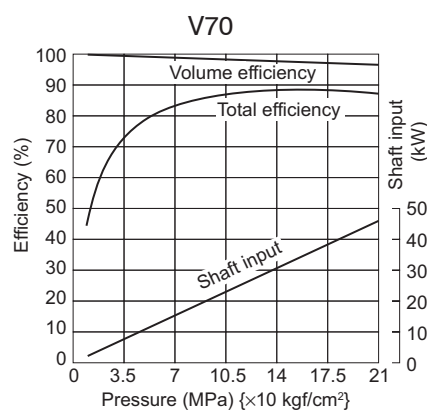
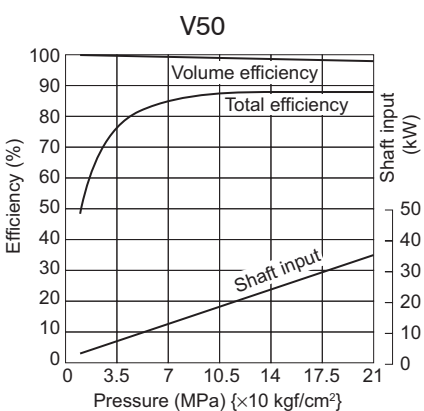
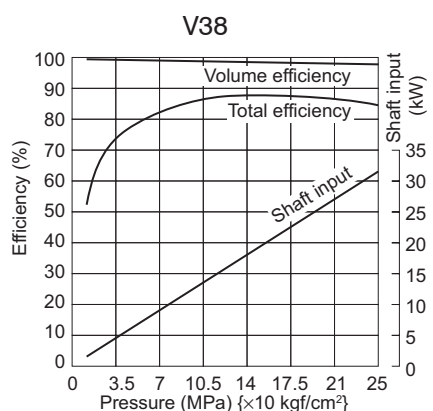
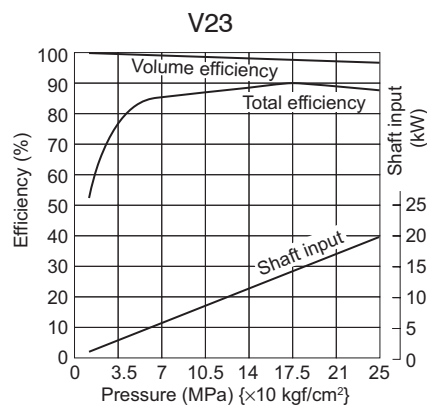
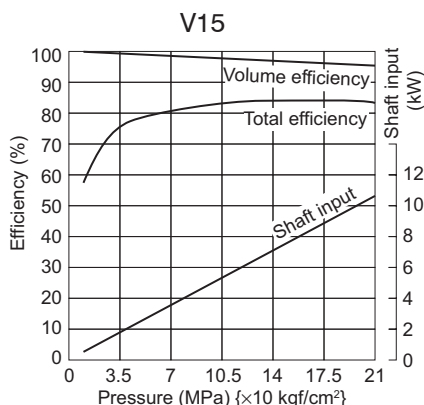
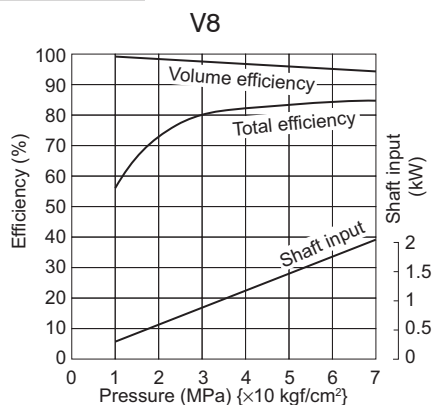
× At full-cutoff at 1500 min<sup>-1</sup>



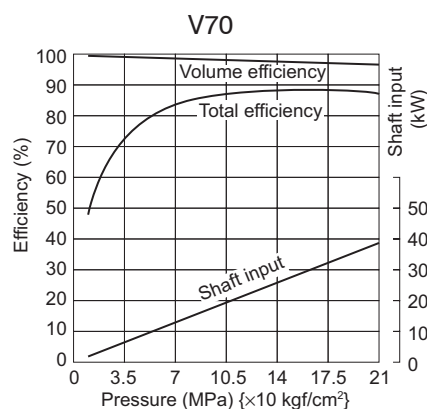
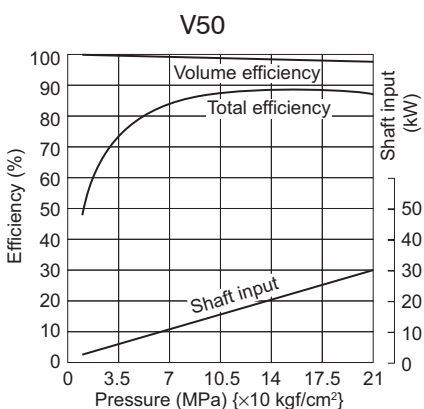
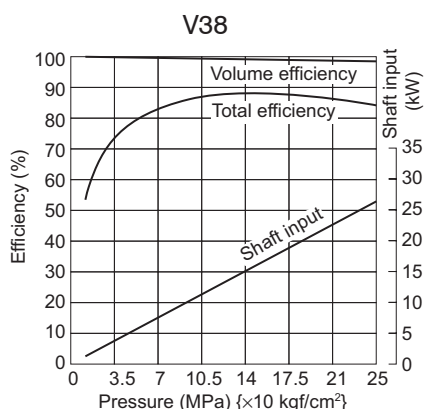
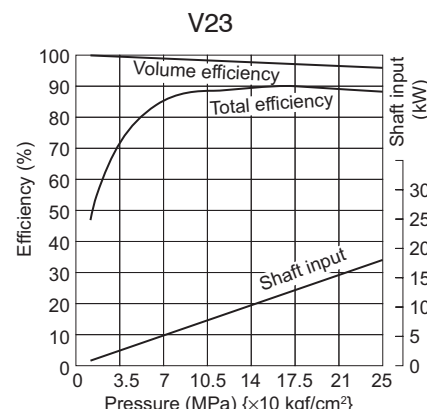
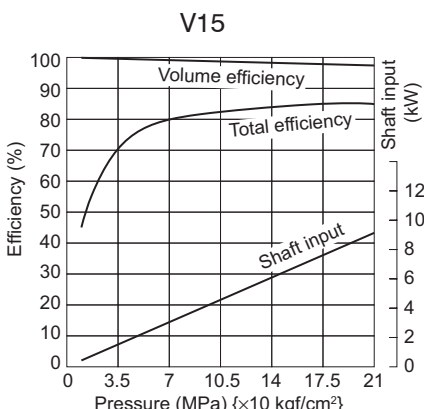
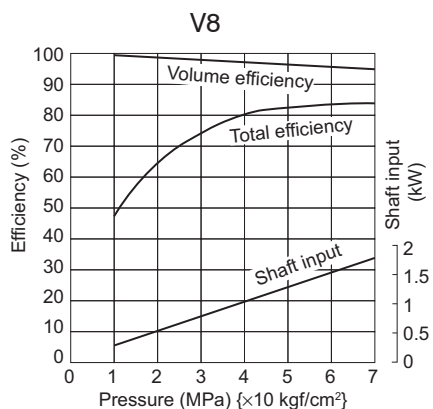
## General performance

Discharge rate setting: maximum, Fluid used: ISO VG32, Fluid temperature: 50°C

1800 min<sup>-1</sup>



1500 min<sup>-1</sup>



Note: The efficiency varies depending on the discharge rate setting. When selecting the motor capacity, refer to the shaft input characteristics on Page A-19.

## Contact Details

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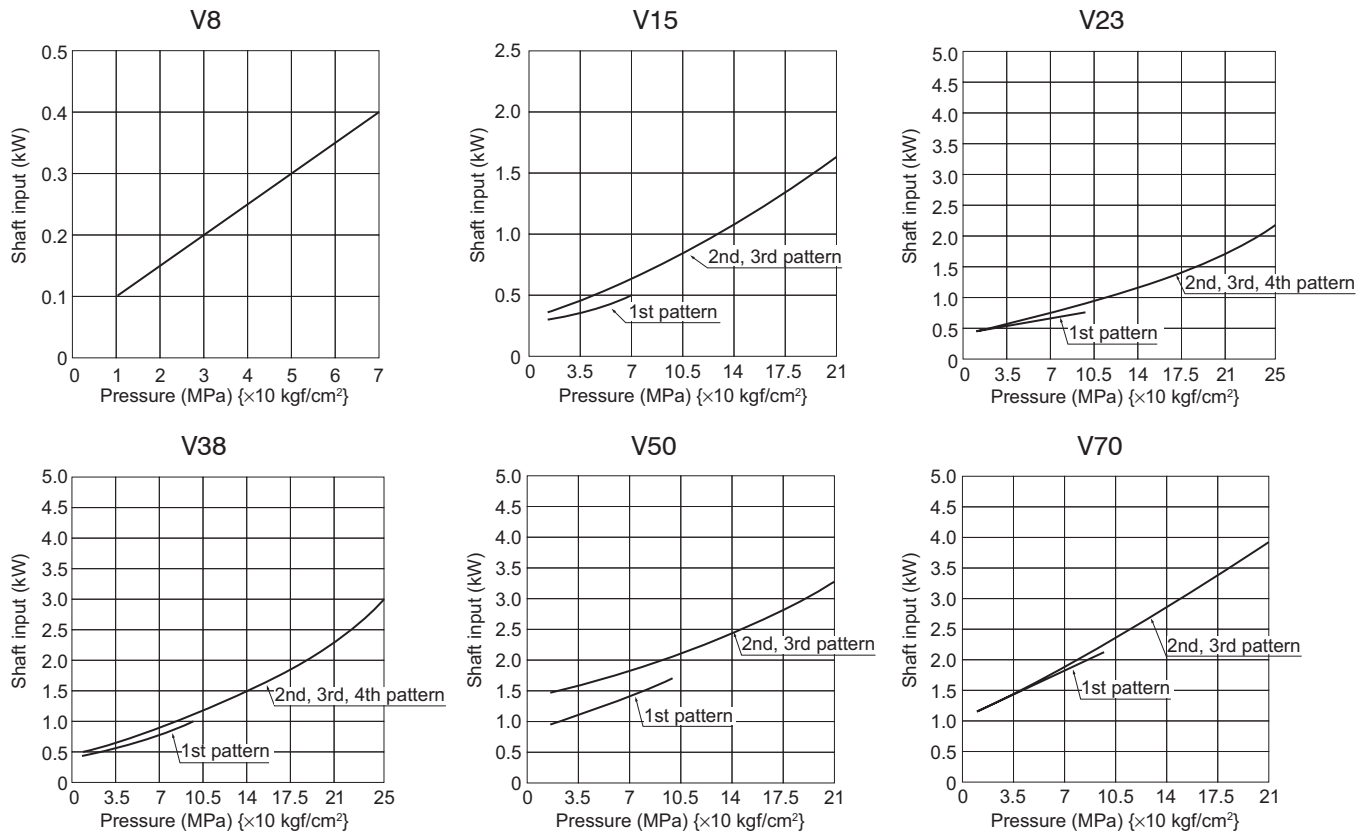
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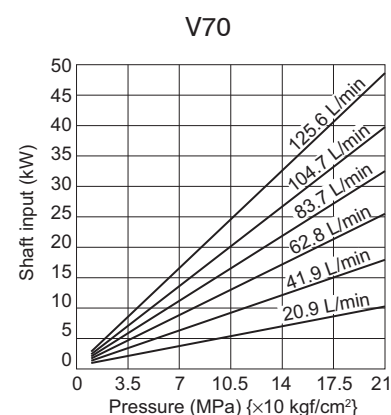
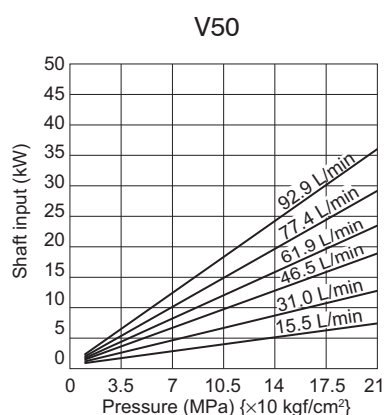
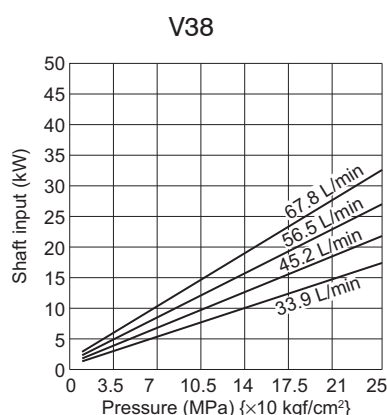
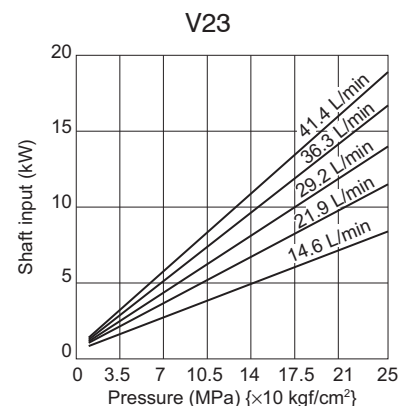
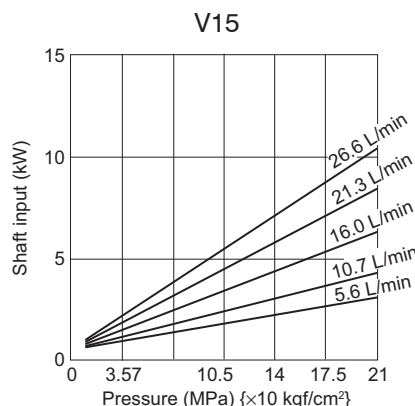
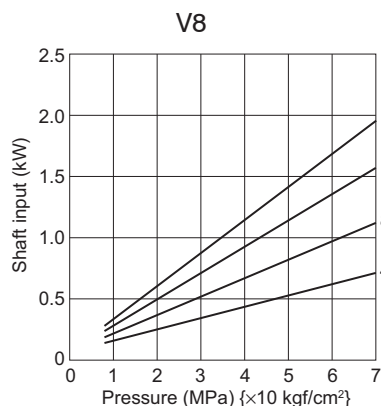
## Shaft input characteristics at full cutoff

Common to 1800 min<sup>-1</sup> and 1500 min<sup>-1</sup> Fluid used: ISO VG32, Fluid Temperature: 50°C



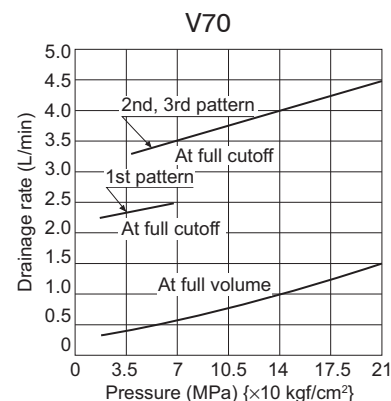
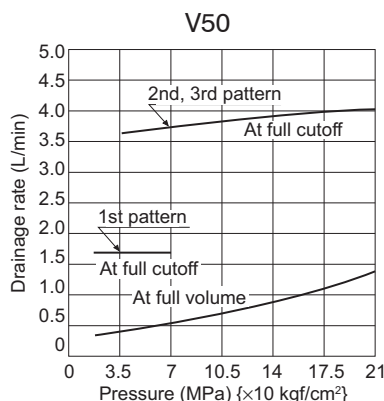
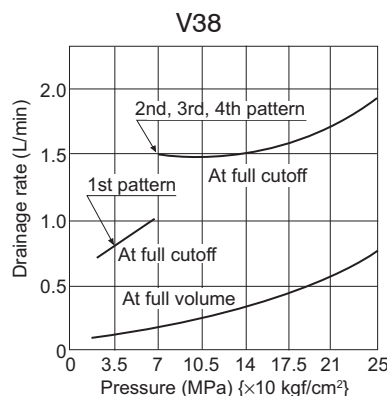
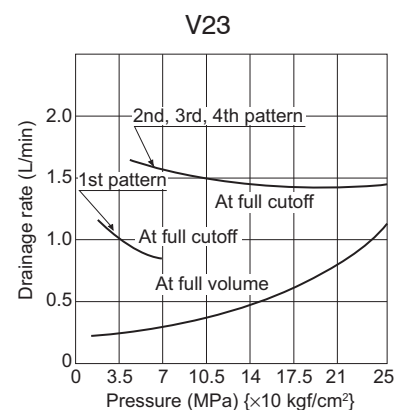
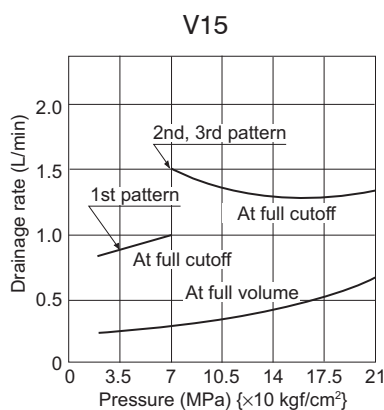
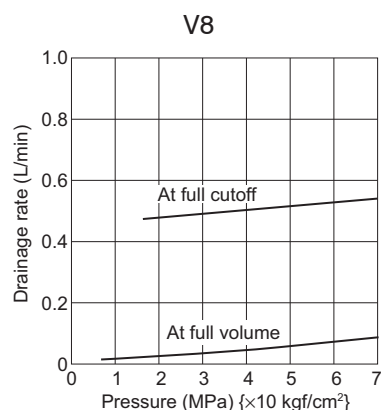
## Shaft input characteristics

Common to 1800 min<sup>-1</sup> and 1500 min<sup>-1</sup> Fluid used: ISO VG32, Fluid Temperature: 50°C



## Drainage volume characteristics

Common to 1800 min<sup>-1</sup> and 1500 min<sup>-1</sup> Fluid used: ISO VG32, Fluid Temperature: 50°C



## Contact Details

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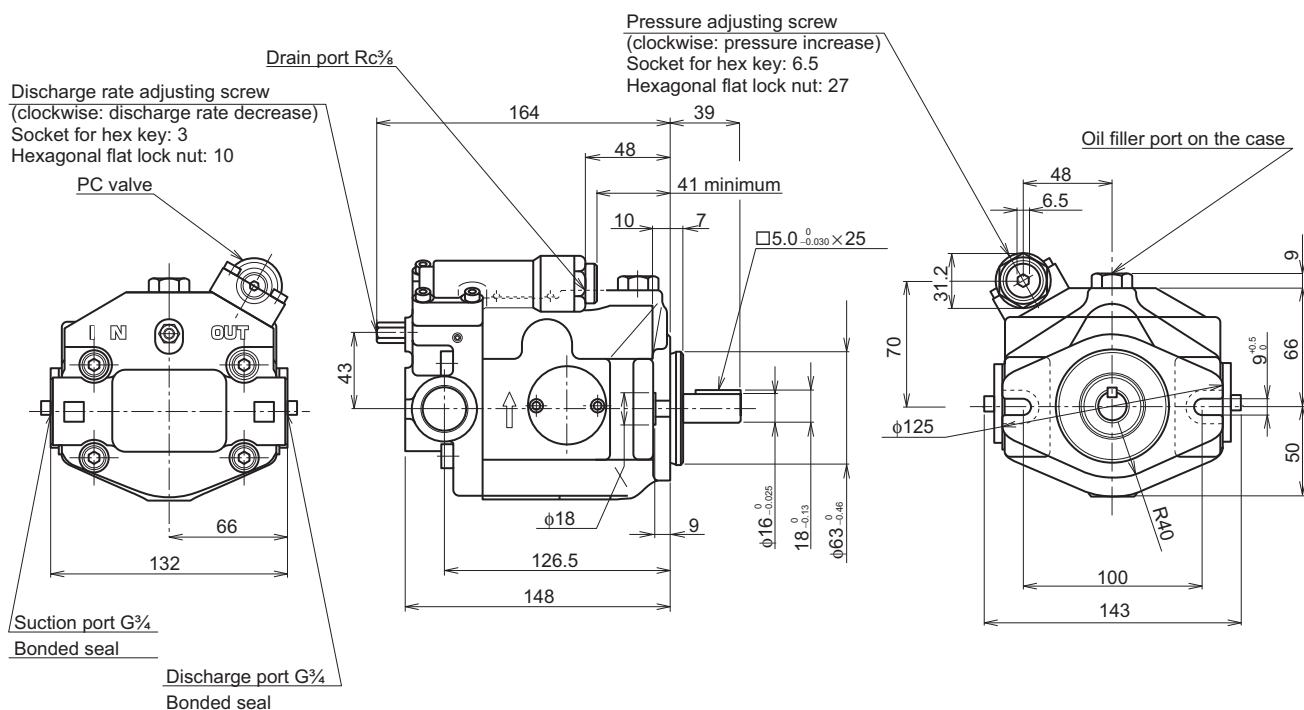
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## External dimension diagram

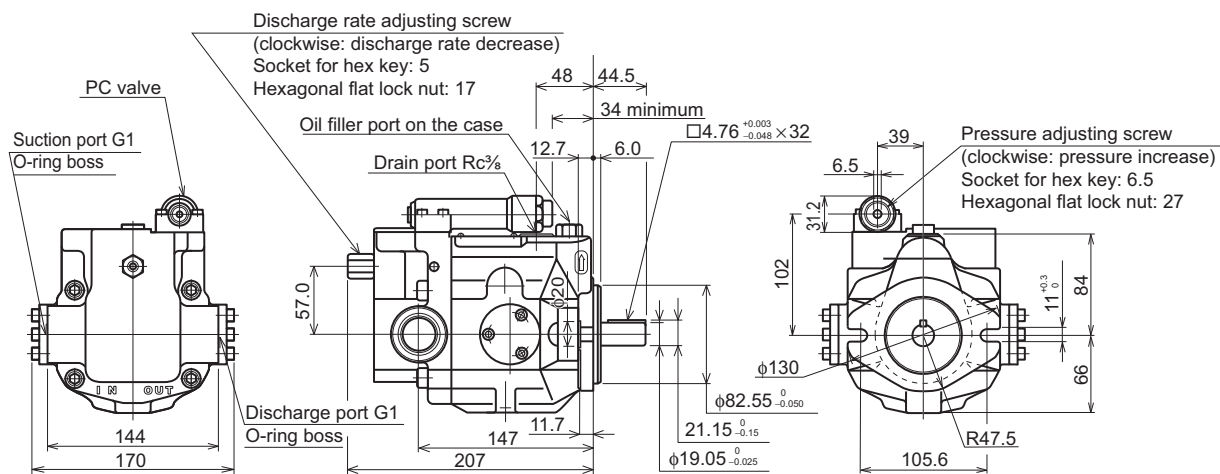
V8A1RX-20



Mass: 8.9 kg

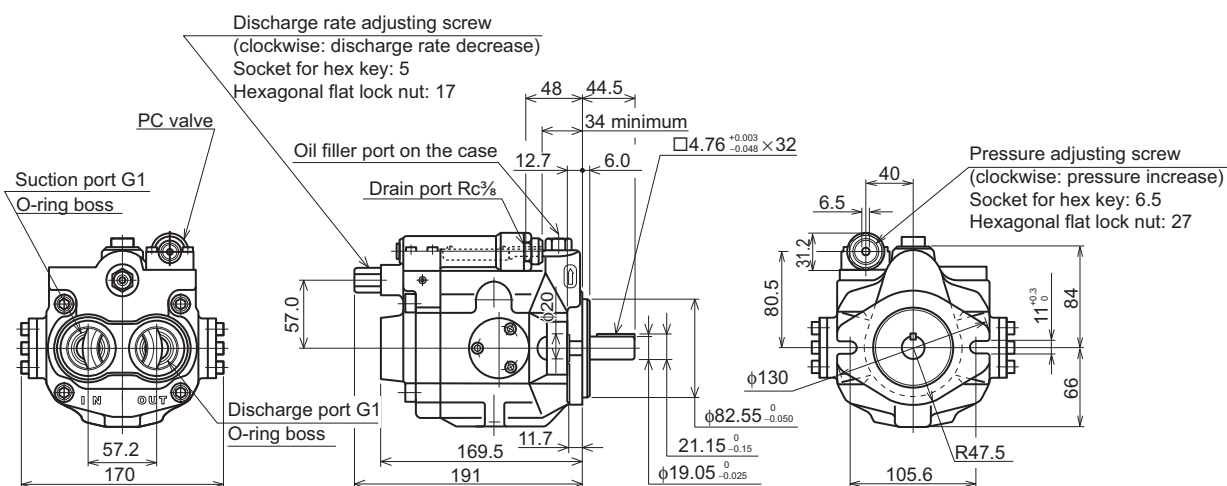
## External dimension diagram

### V15A×RX-95



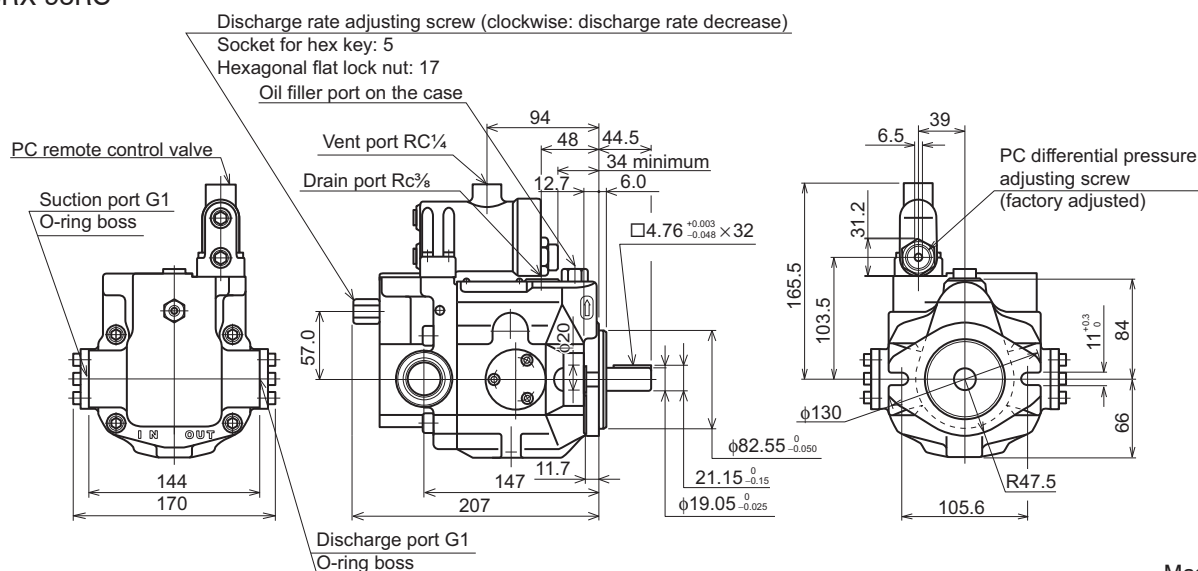
Mass: 14.5 kg

### V15A×R-95



Mass: 12.8 kg

### V15A3RX-95RC



Mass: 16 kg

## Contact Details

Before using the product, please check the guide pages at the front of this catalog.

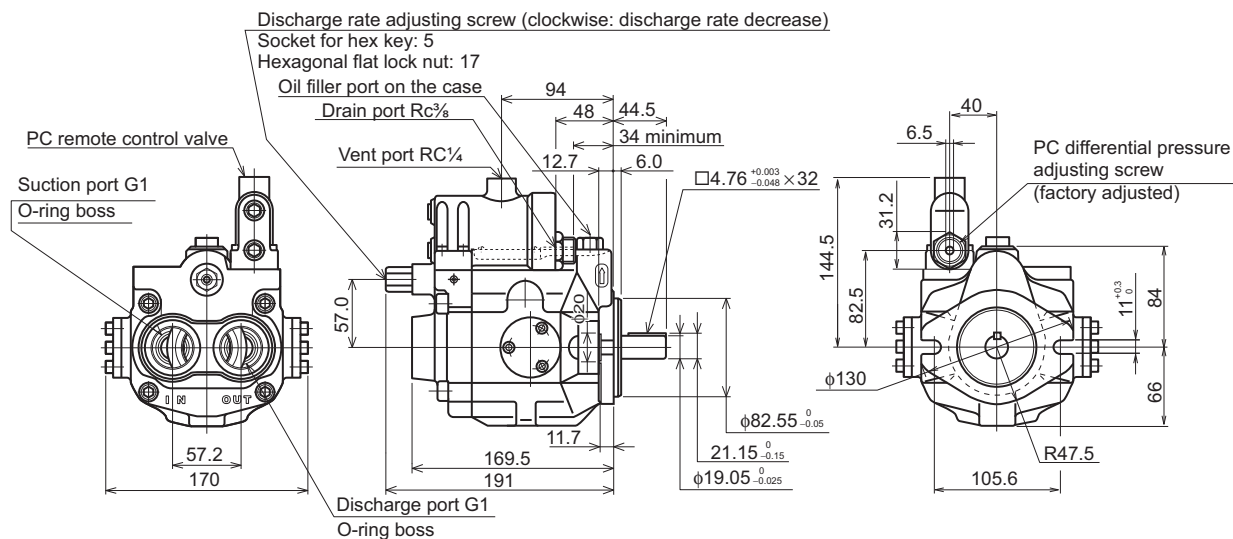
Internet

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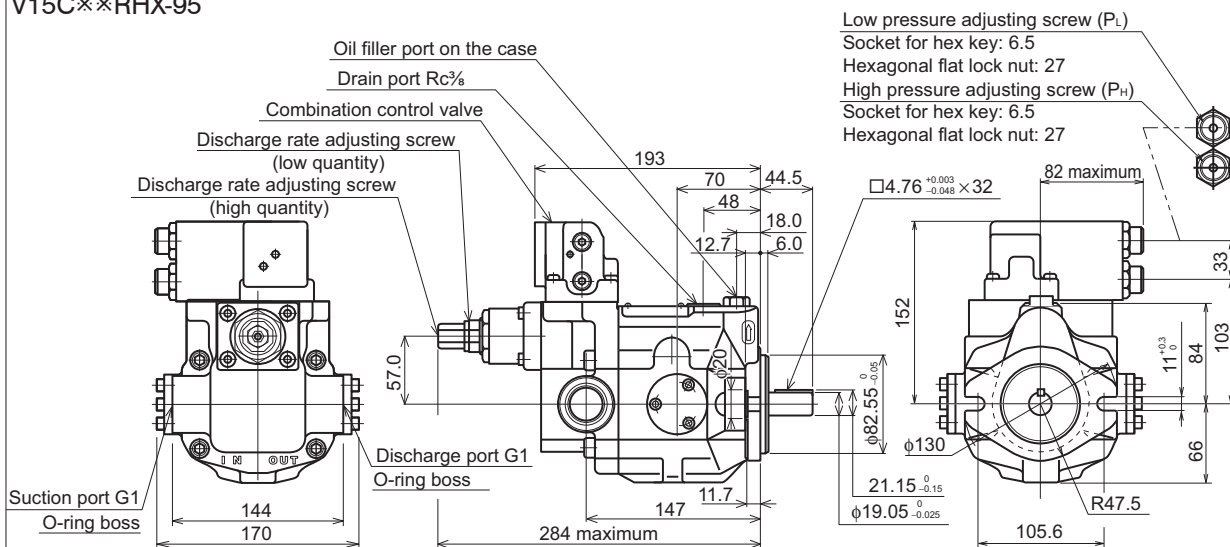
## External dimension diagram

### V15A3R-95RC



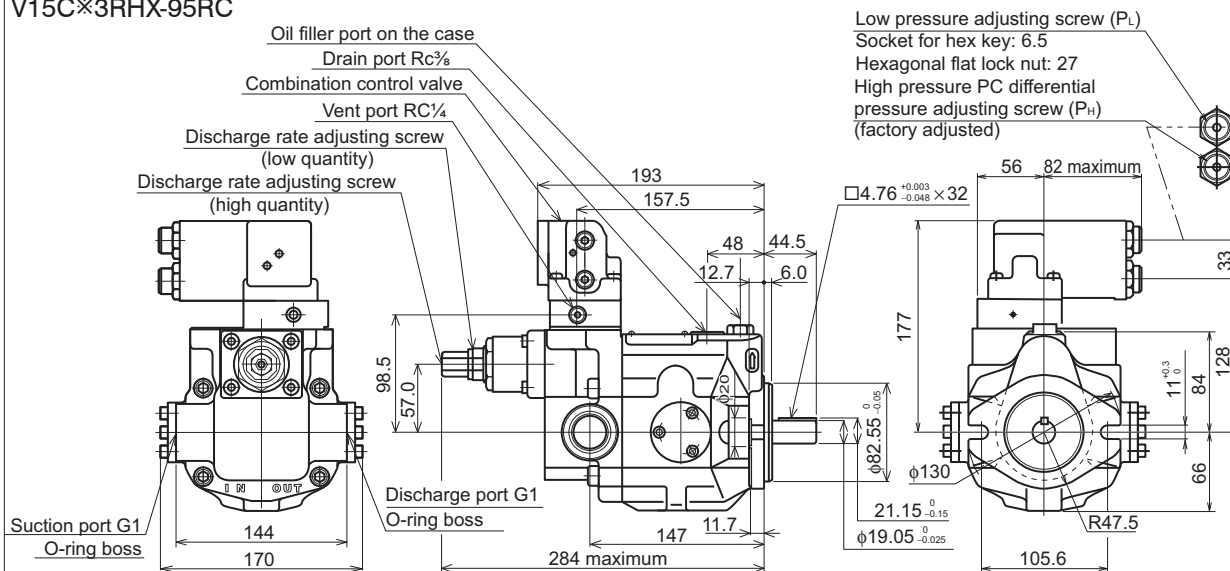
Mass: 14.3 kg

### V15C×RHX-95



Mass: 17.6 kg

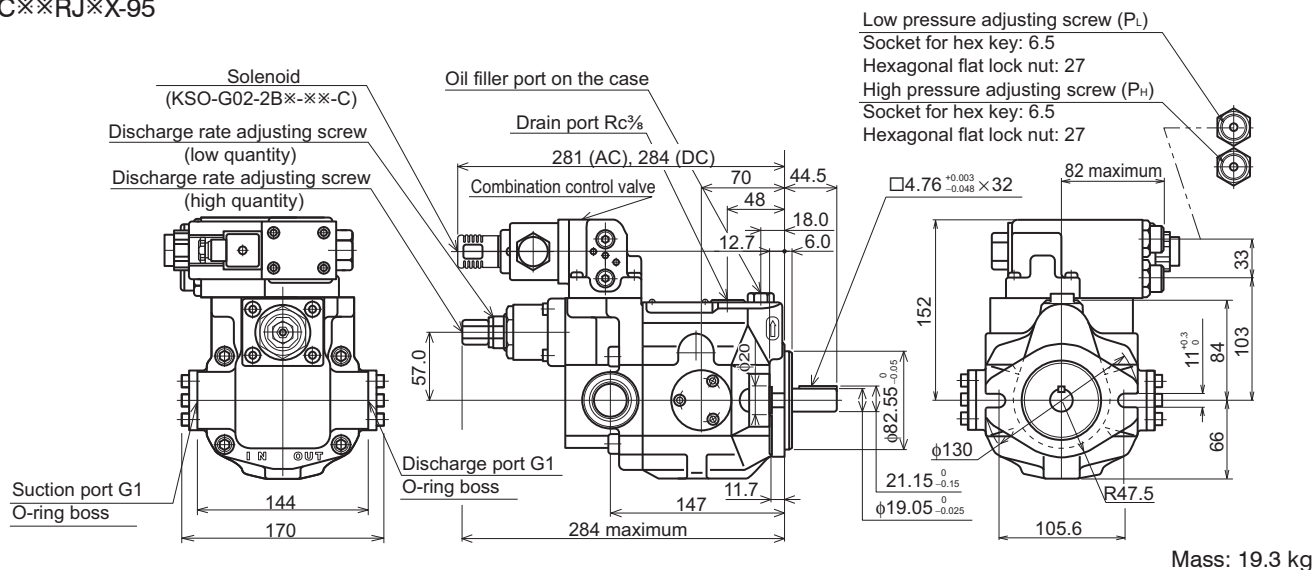
### V15C×3RHX-95RC



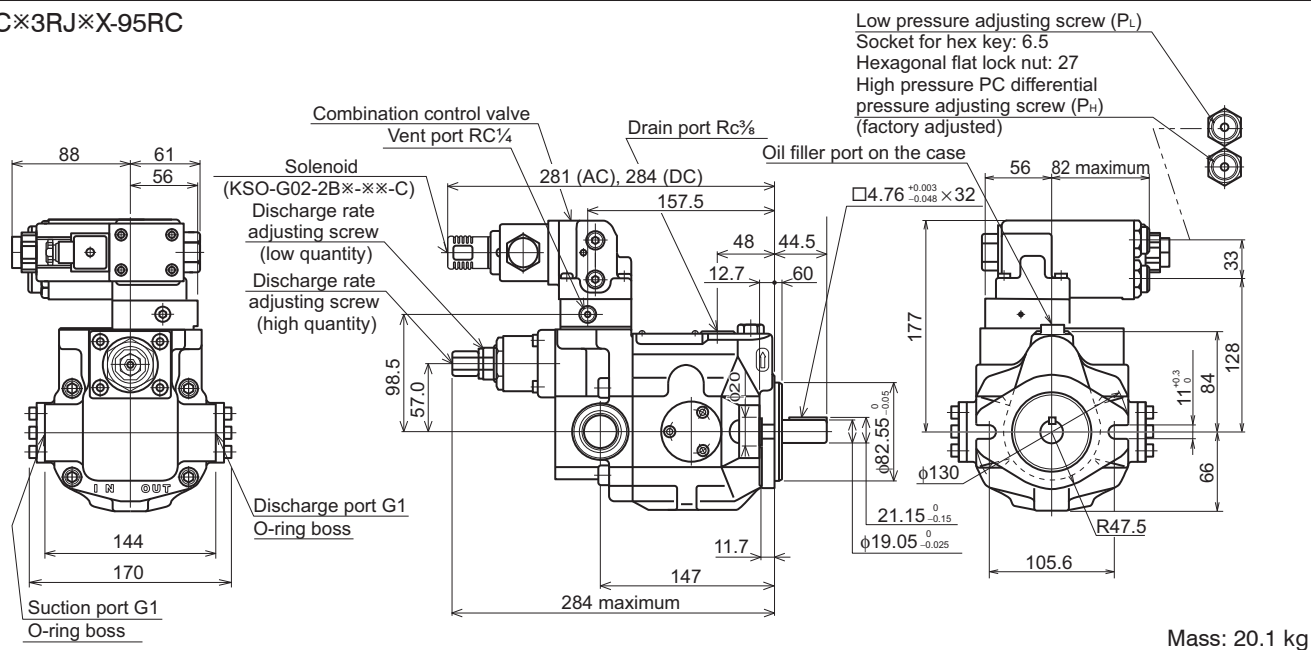
Mass: 18.4 kg

## External dimension diagram

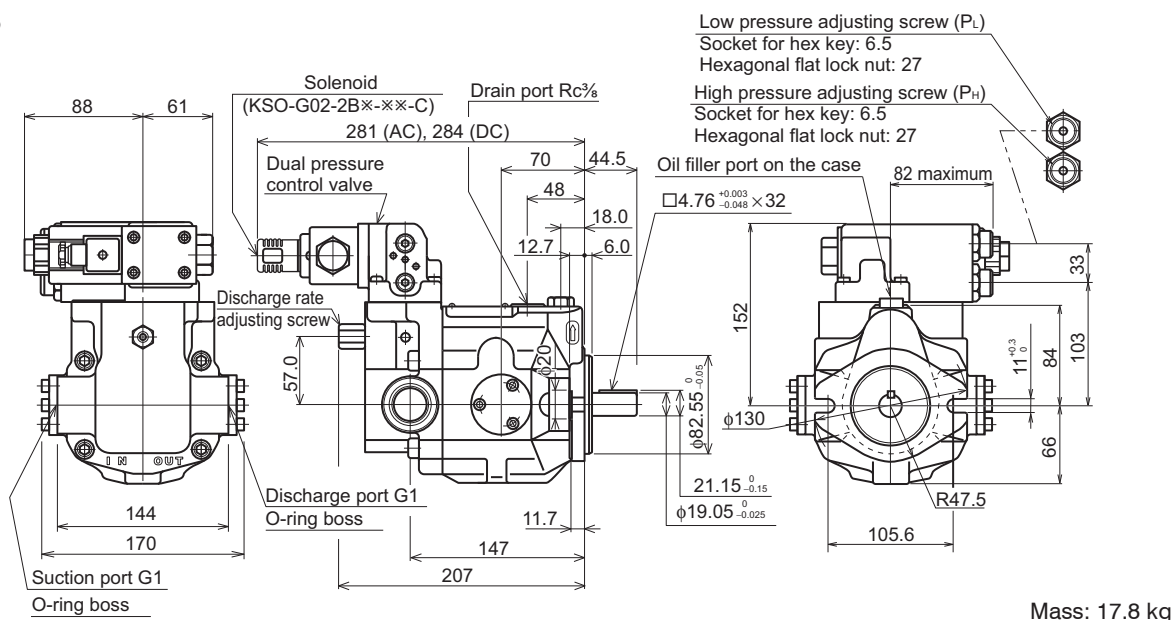
### V15C\*\*RJ\*\*X-95



### V15C\*3RJ\*X-95RC



### V15D\*\*R\*\*X-95



## Contact Details

Before using the product, please check the guide pages at the front of this catalog.

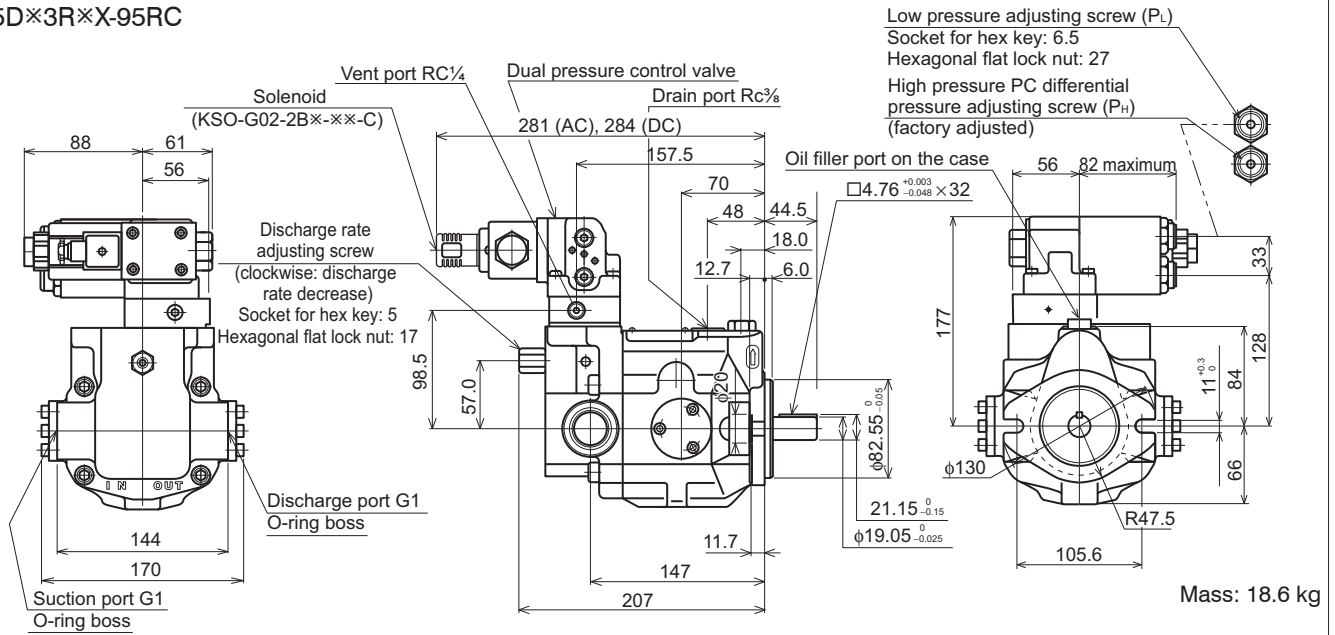
Internet

<http://www.daikinpmc.com/en/>

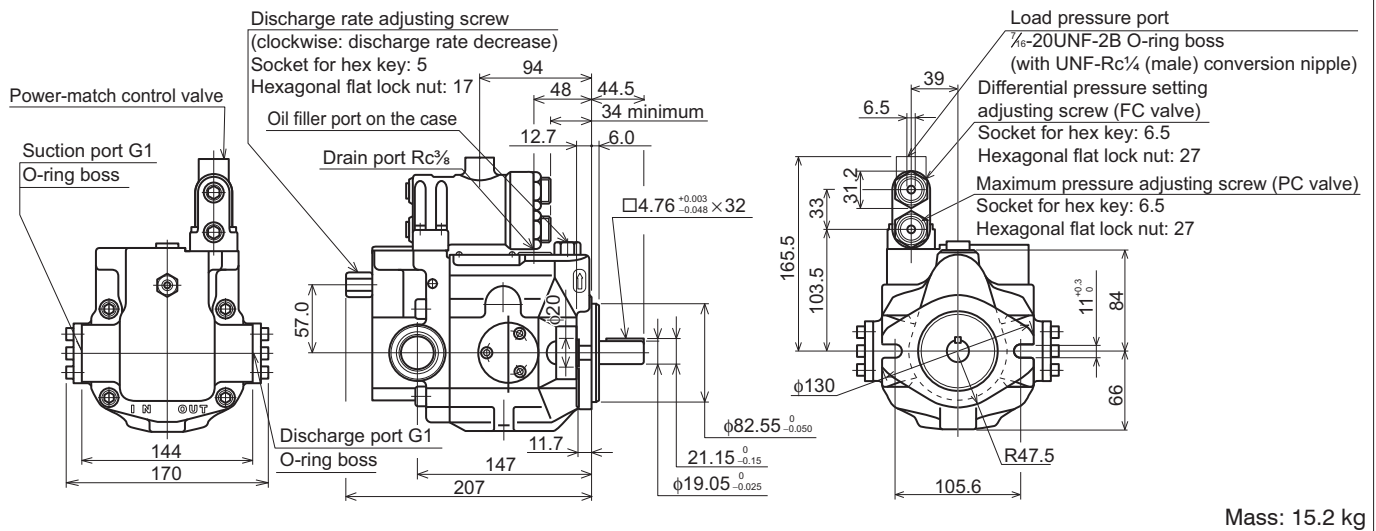
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## External dimension diagram

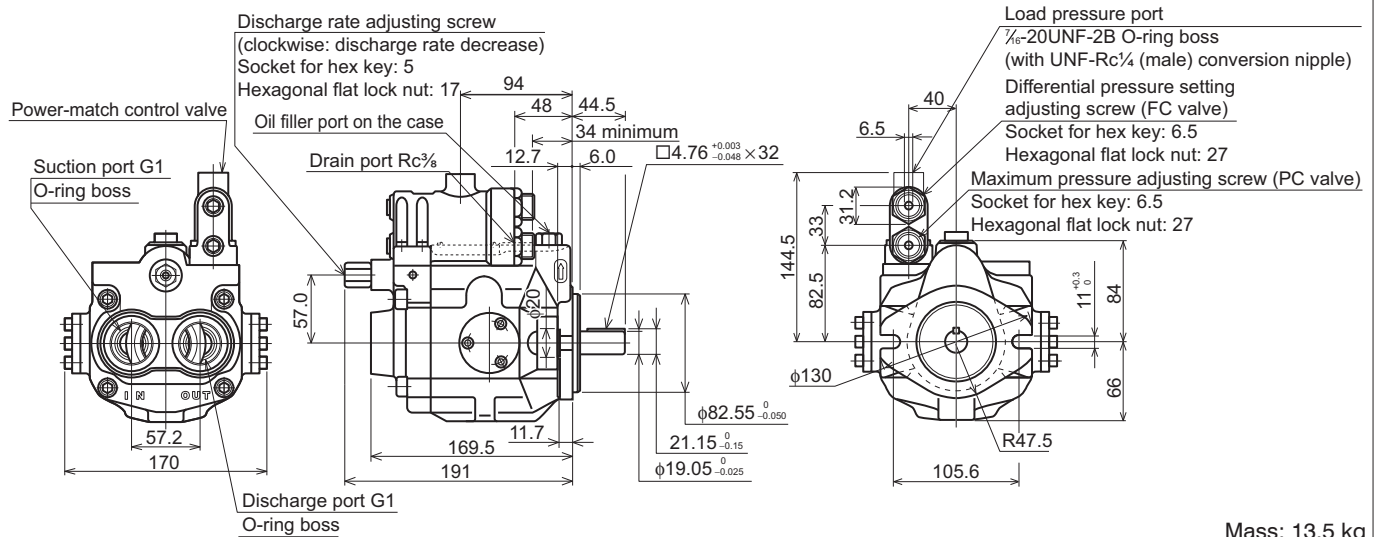
### V15D※3R※X-95RC



### V15SA※RX-95

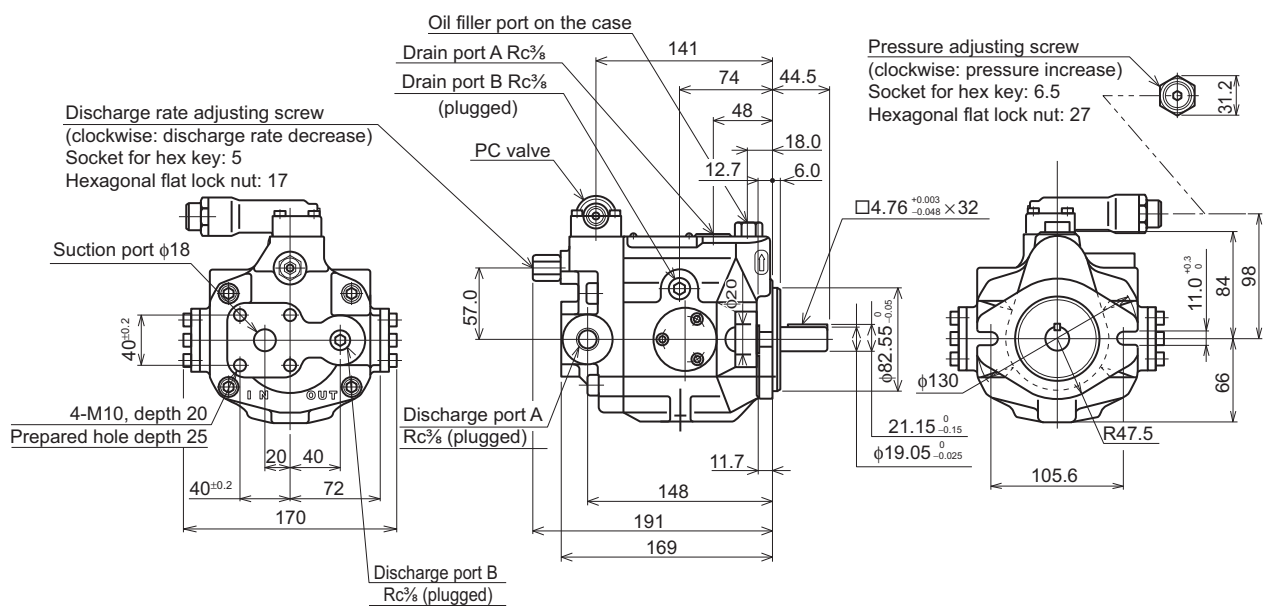


### V15SA※R-95



## External dimension diagram

V15A1RY-95



Mass: 13.5 kg

\* Use SHA15 or SSA20 pipe flange (JIS B 2291) or equivalent at the suction side.

## Contact Details

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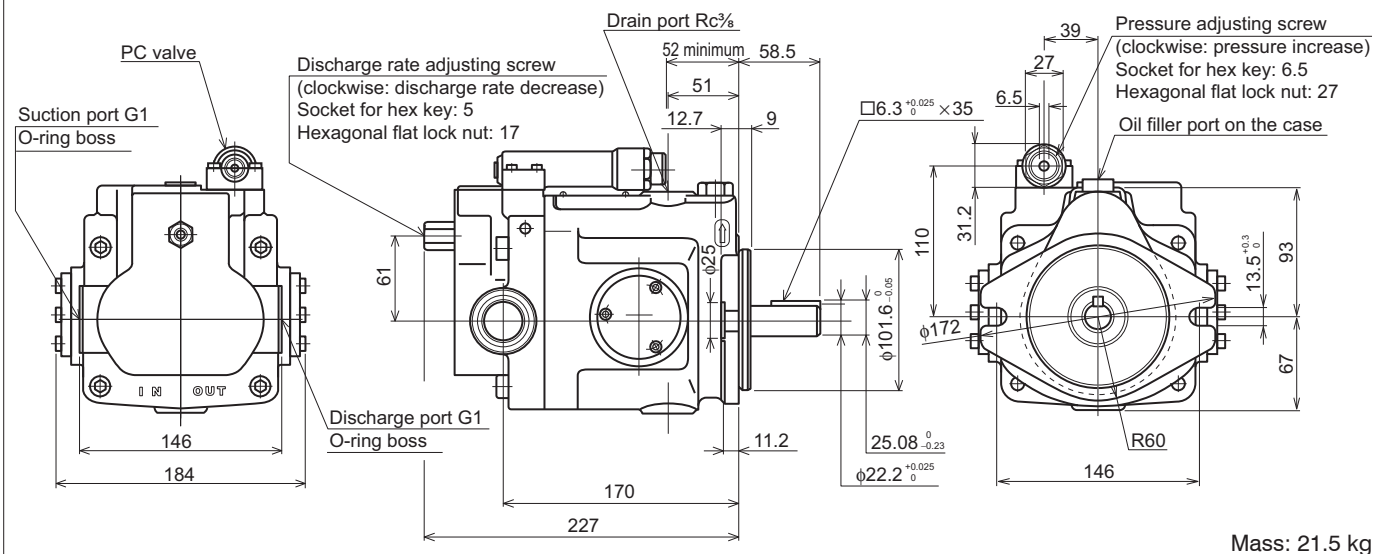
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<http://www.daikinpmc.com/en/>

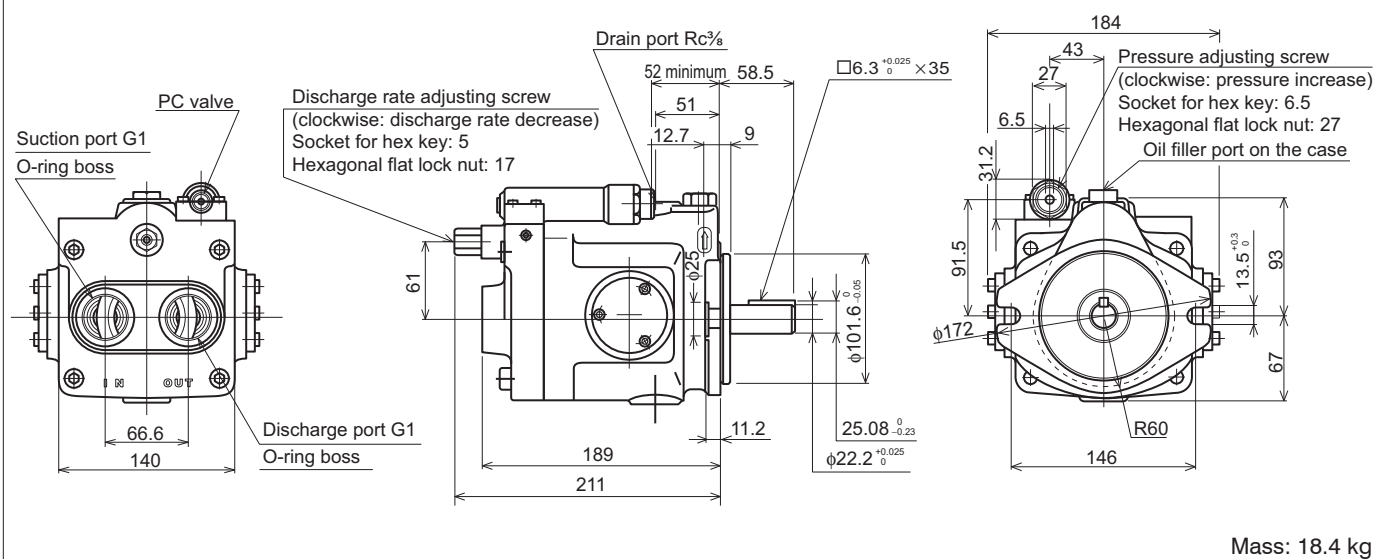
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## External dimension diagram

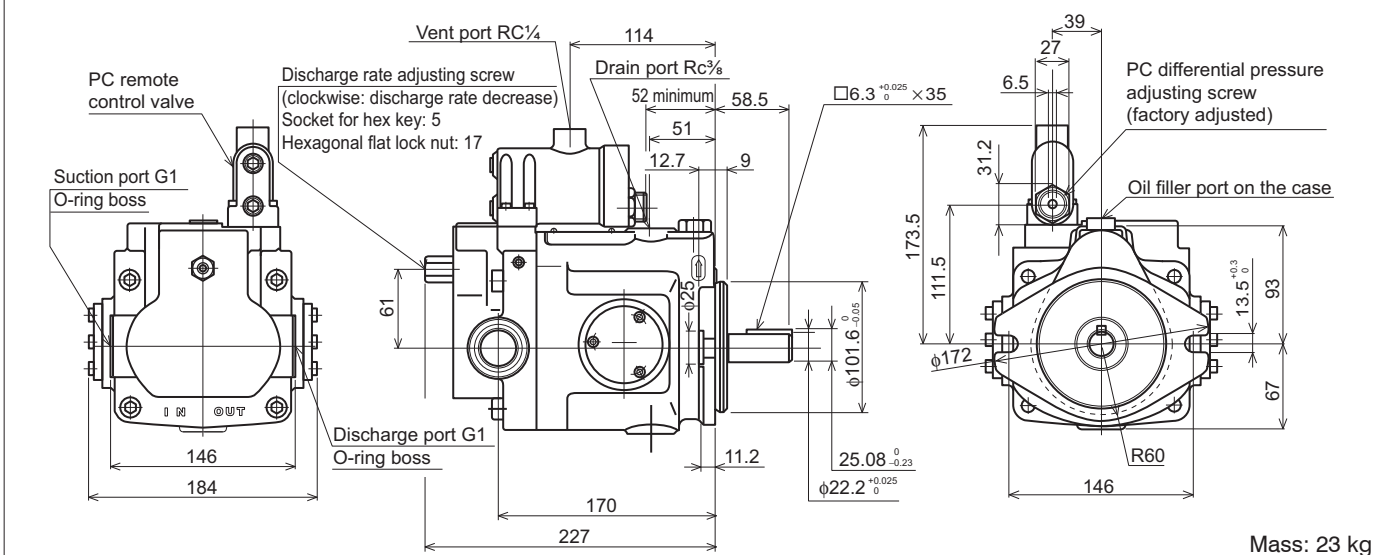
### V23A×RX-30



### V23A×R-30

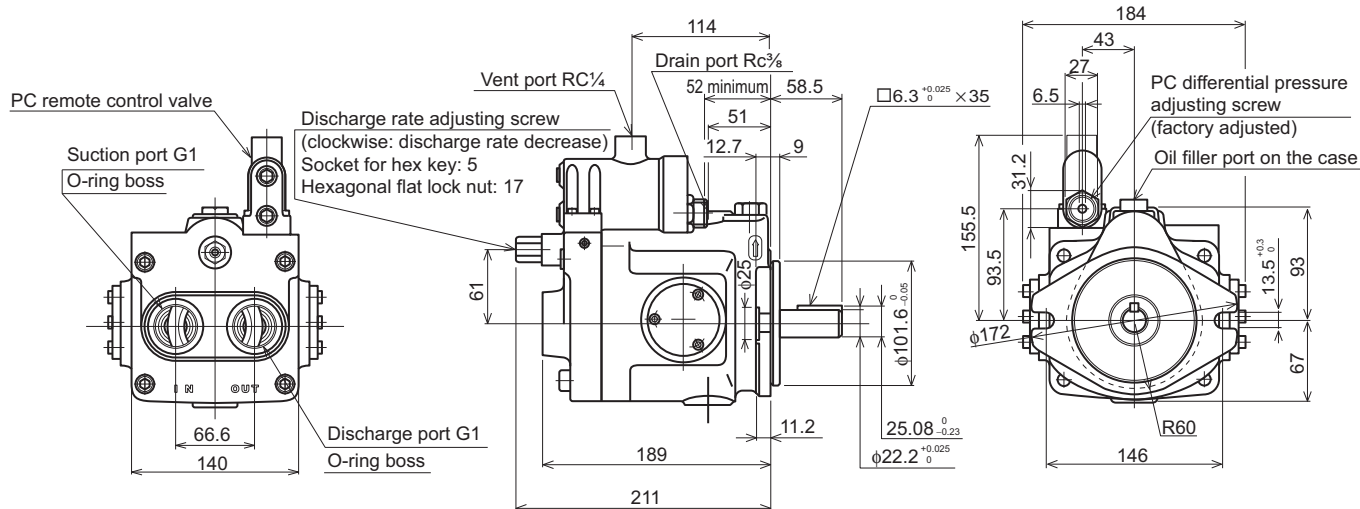


### V23A4RX-30RC

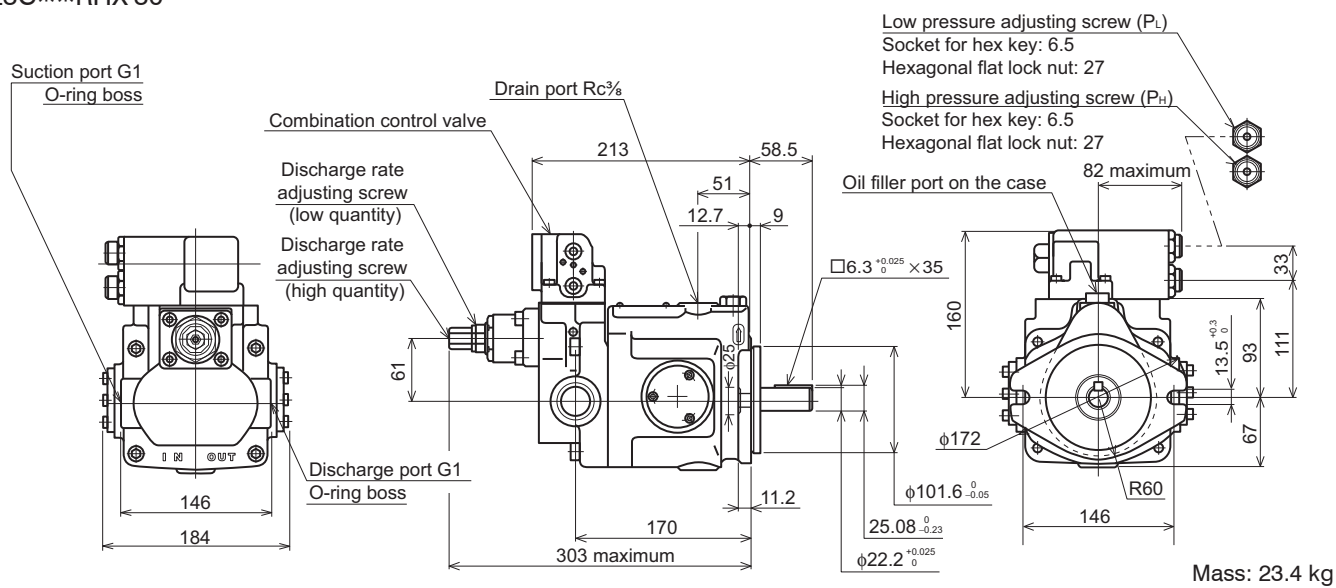


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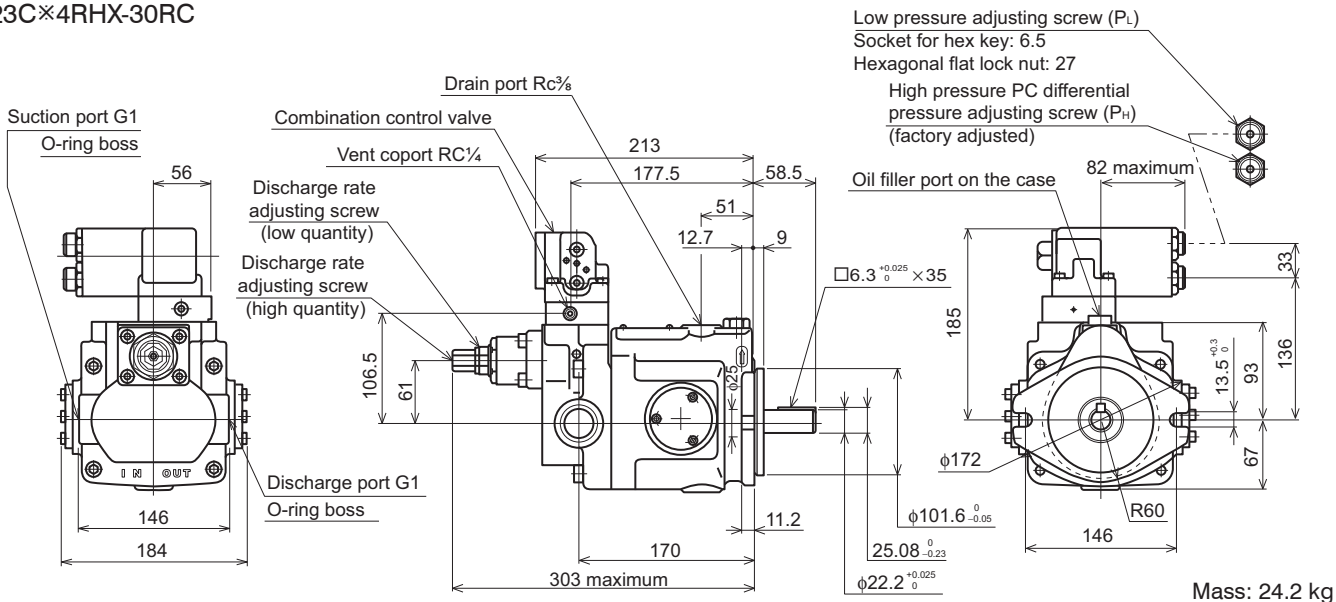
### V23A4R-30RC



### V23C×RHX-30



### V23C×4RHX-30RC



## Contact Details

Before using the product, please check the guide pages at the front of this catalog.

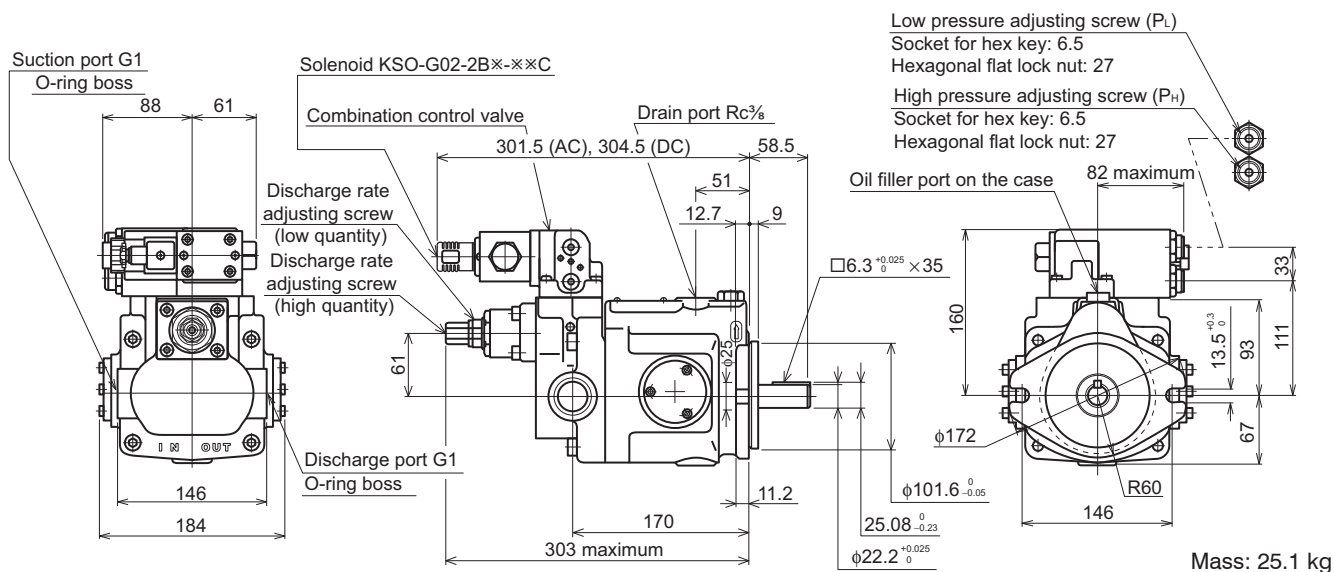
Internet

<http://www.daikinpmc.com/en/>

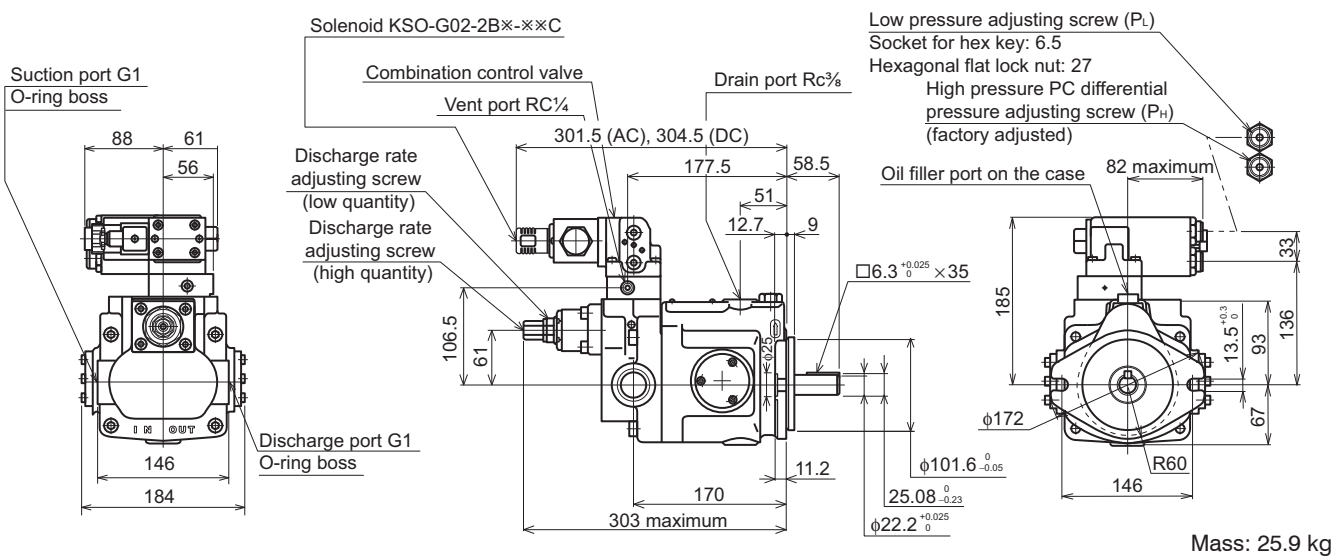
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## External dimension diagram

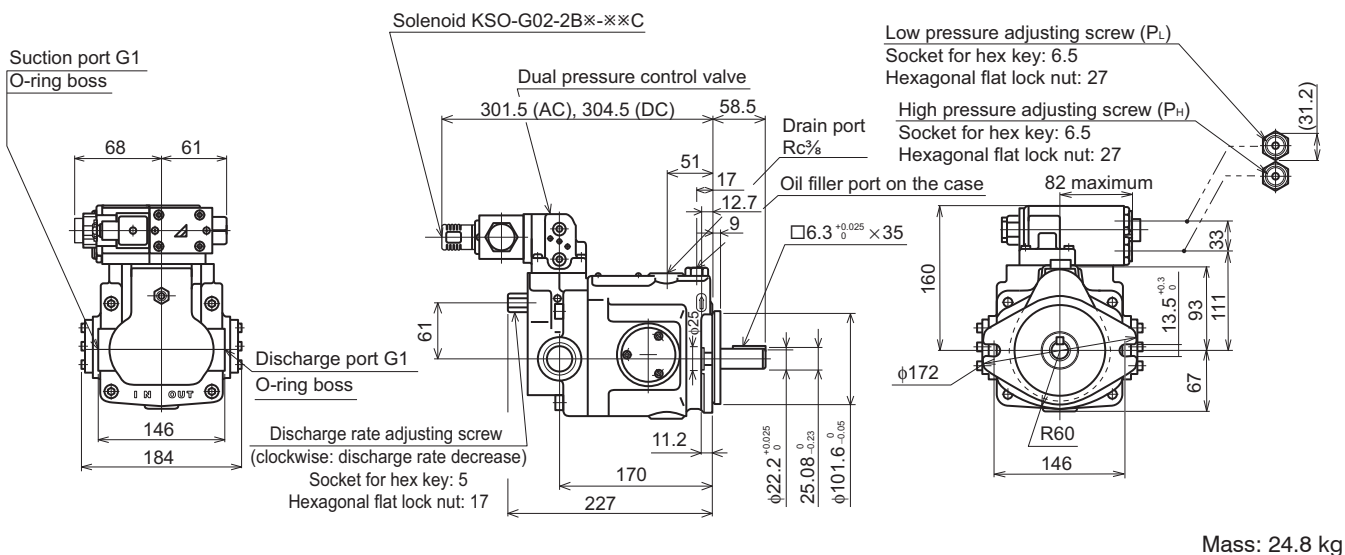
### V23C※RJ※X-35



### V23C※4RJ※X-35RC

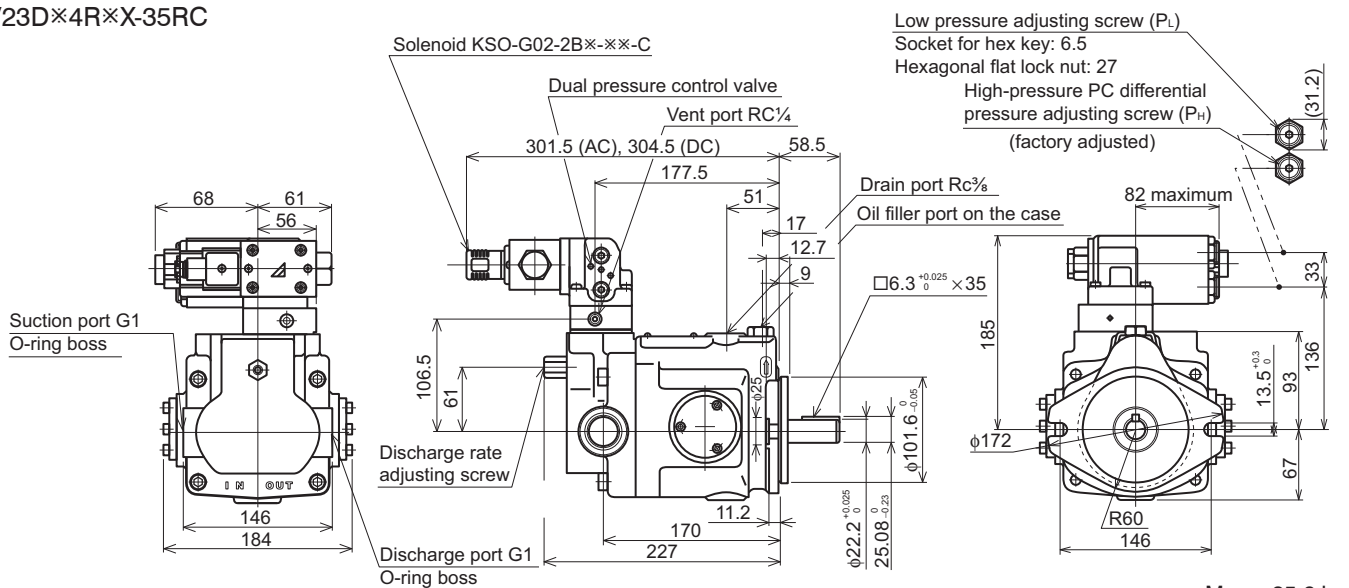


### V23D※R※X-35

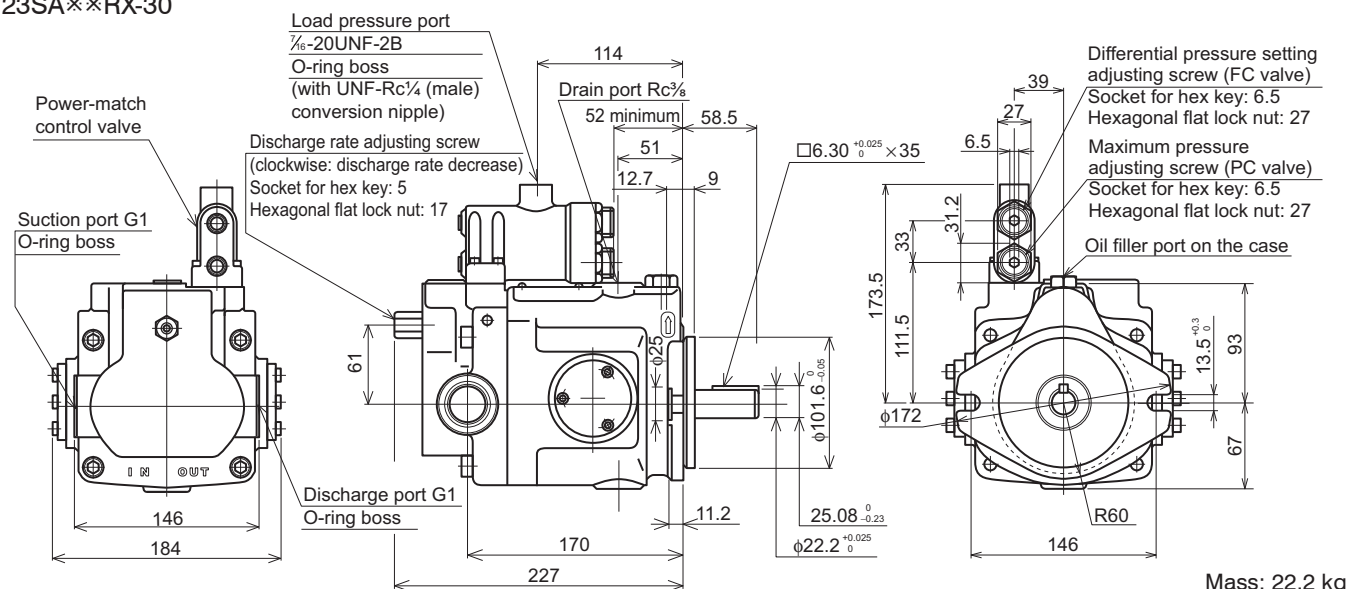


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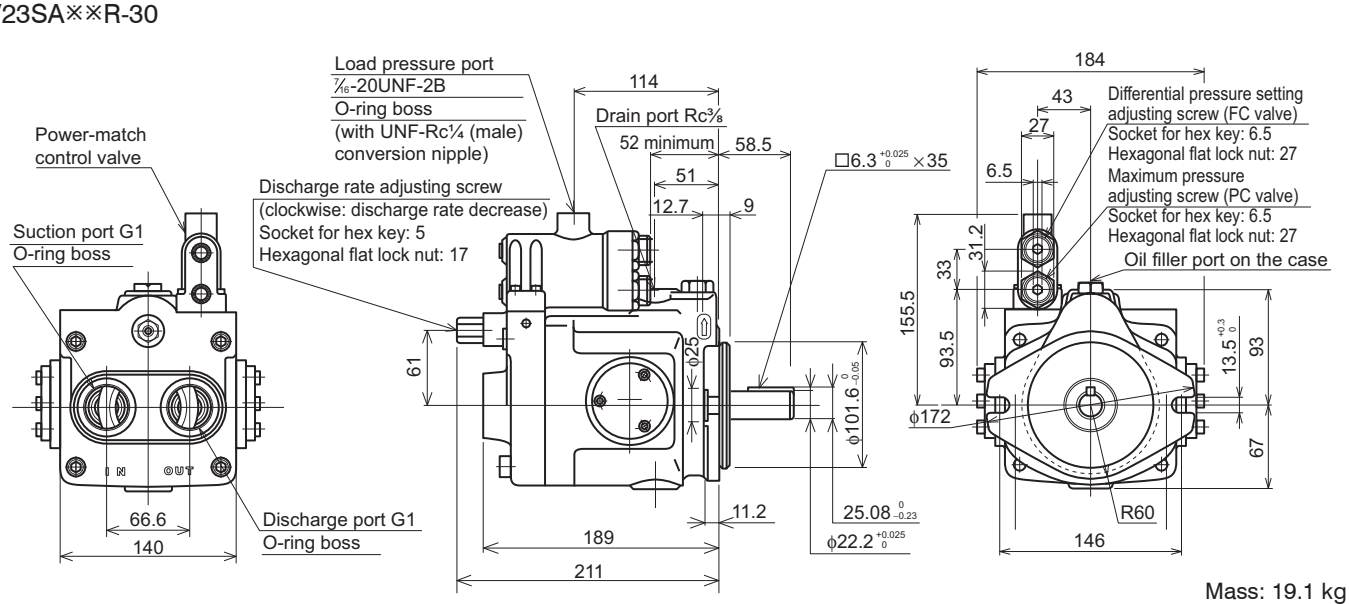
### V23D×4R×X-35RC



### V23SA××RX-30



### V23SA××R-30



## Contact Details

Before using the product, please check the guide pages at the front of this catalog.

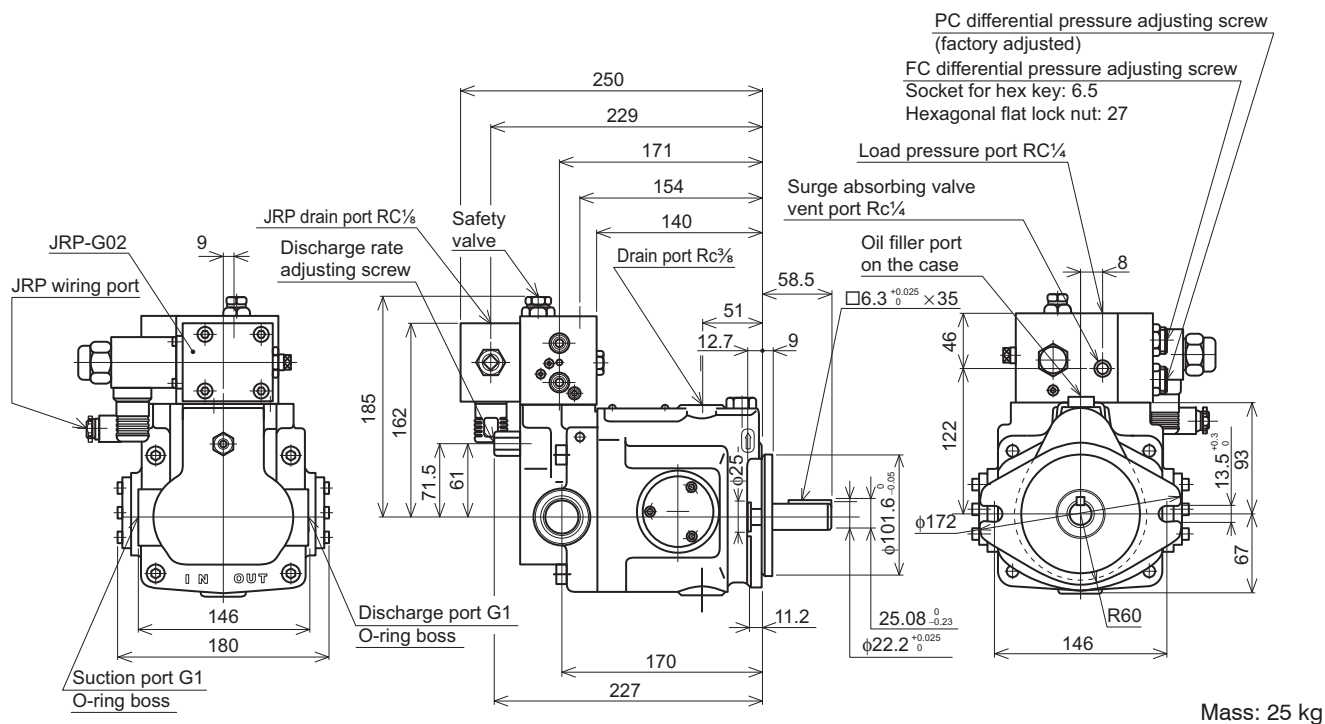
Internet

<http://www.daikinpmc.com/en/>

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## External dimension diagram

V23SAJS-※RX-30



## Contact Details

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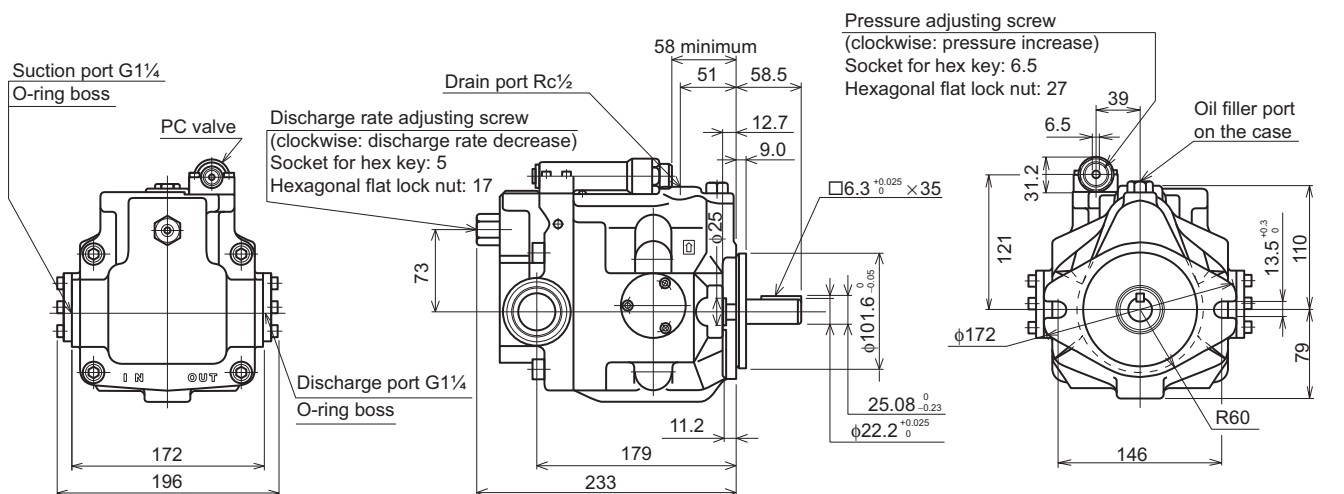
Internet

<http://www.daikinpmc.com/en/>

For latest information, PDF catalogs and operation manuals

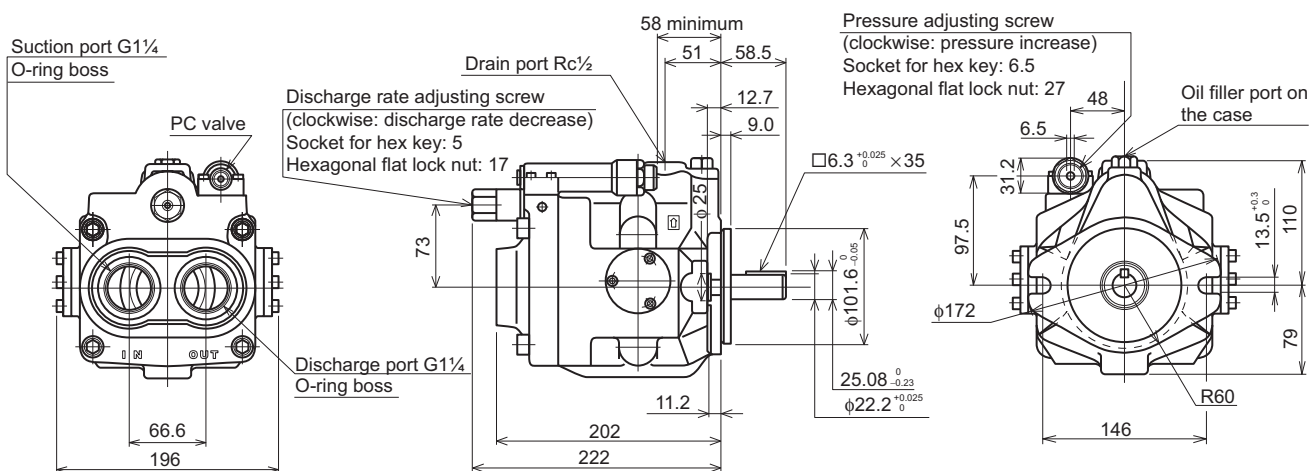
## External dimension diagram

### V38A×RX-95



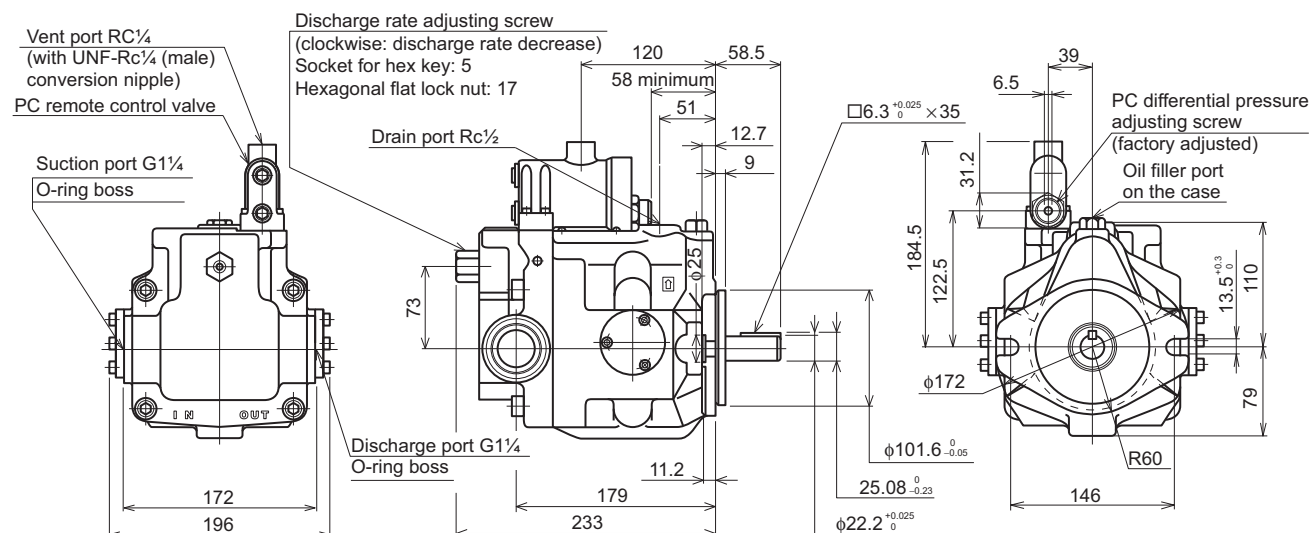
Mass: 26 kg

### V38A×R-95



Mass: 24.4 kg

### V38A4RX-95RC



Mass: 28.7 kg

## Contact Details

Before using the product, please check the guide pages at the front of this catalog.

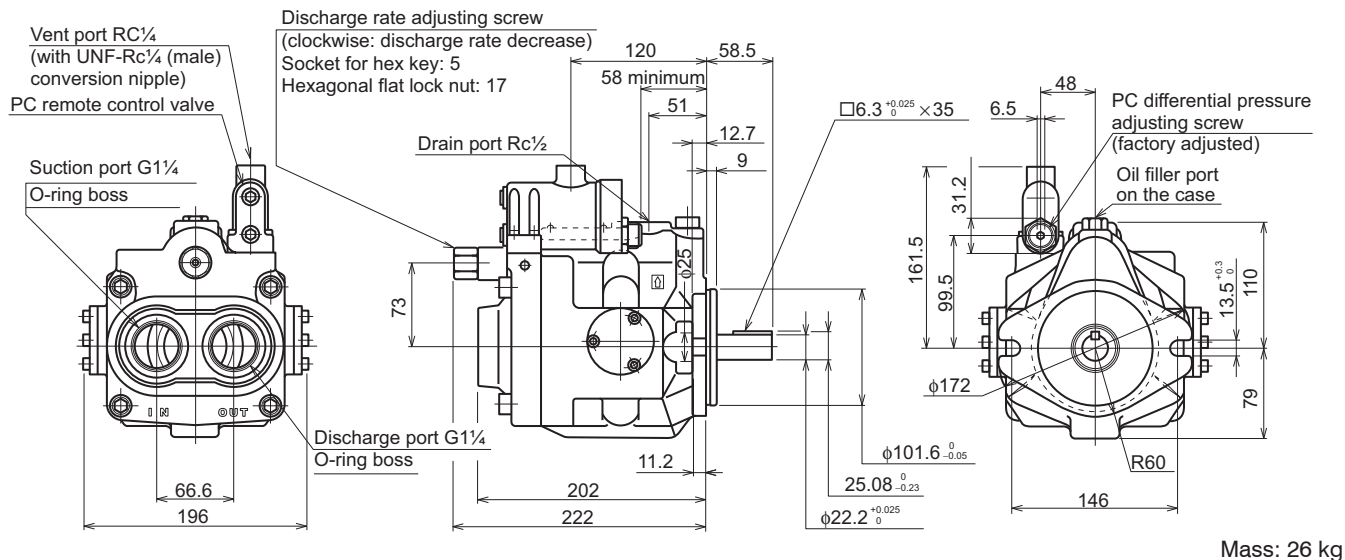
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<http://www.daikinpmc.com/en/>

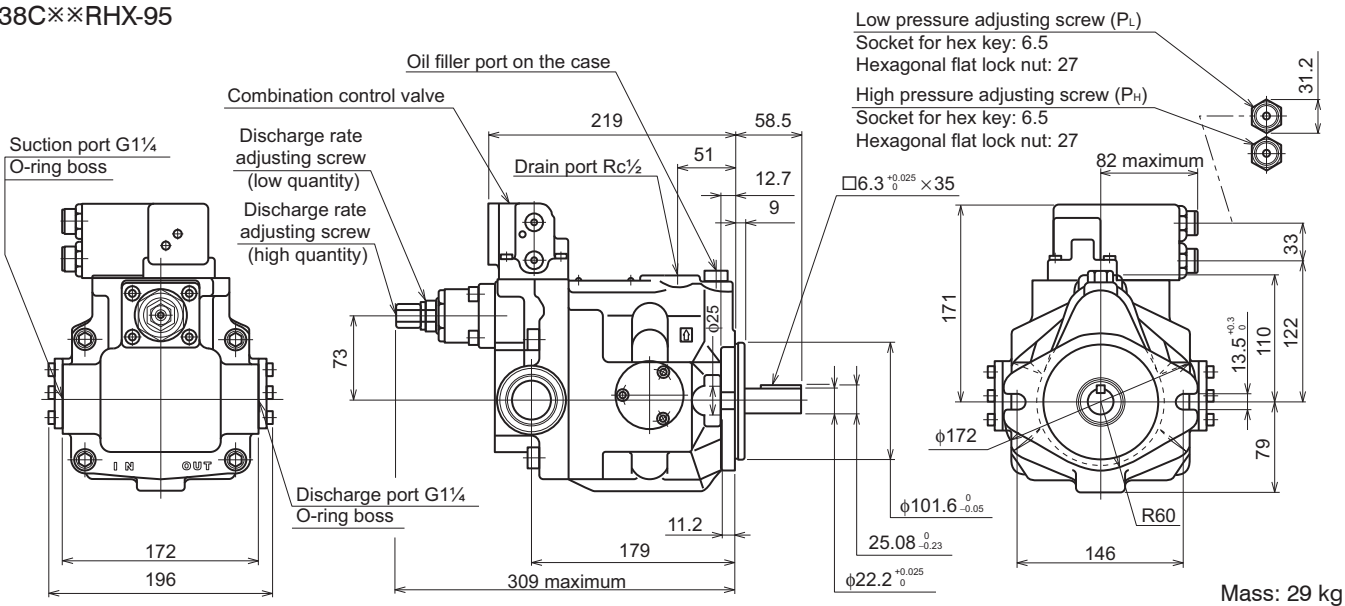
For latest information, PDF catalogs and operation manuals

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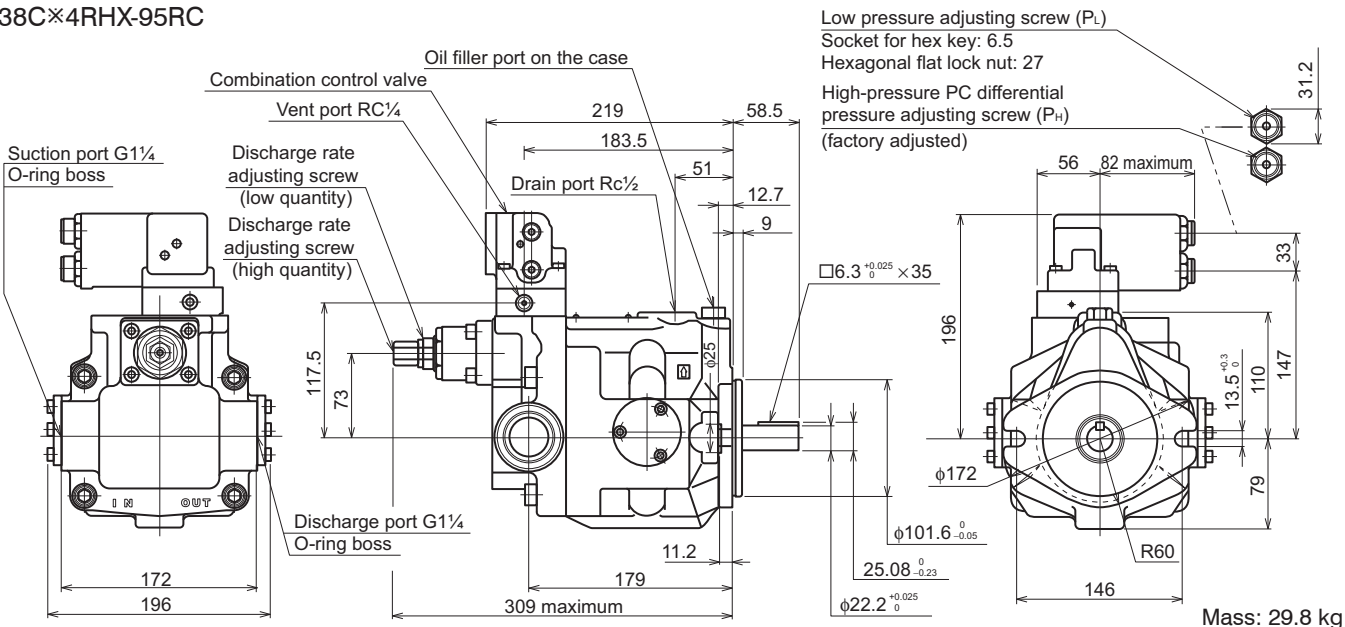
### V38A4R-95RC



### V38C×RHX-95

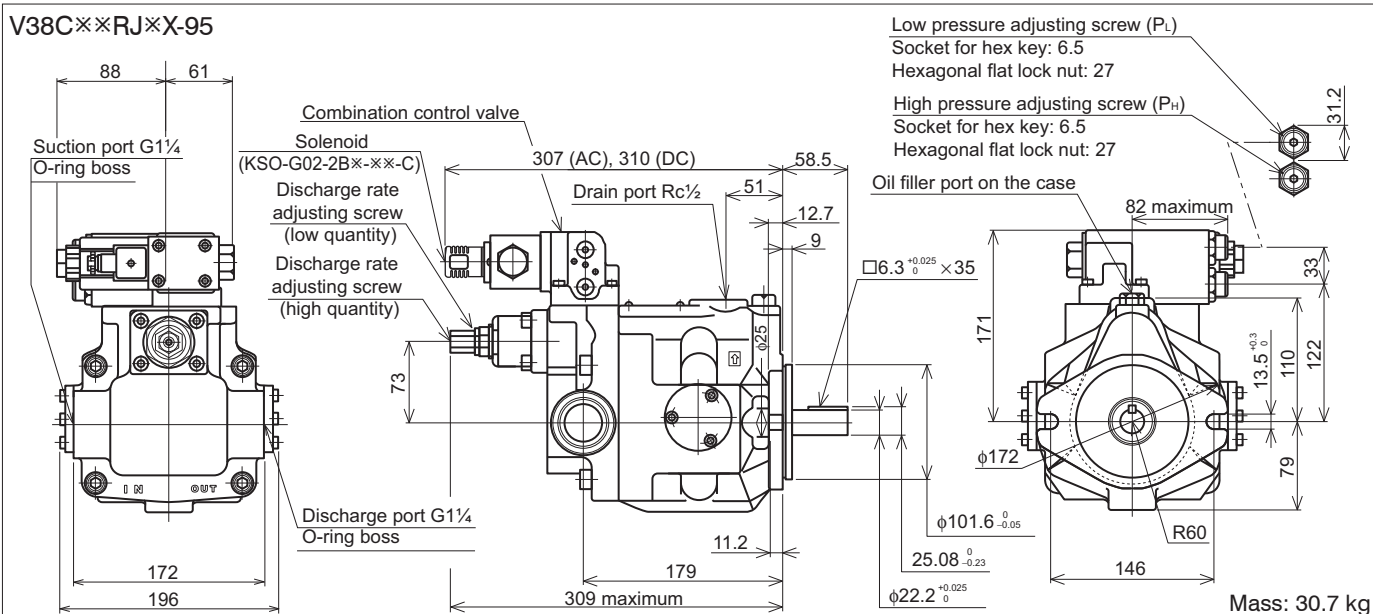


### V38C×4RHX-95RC

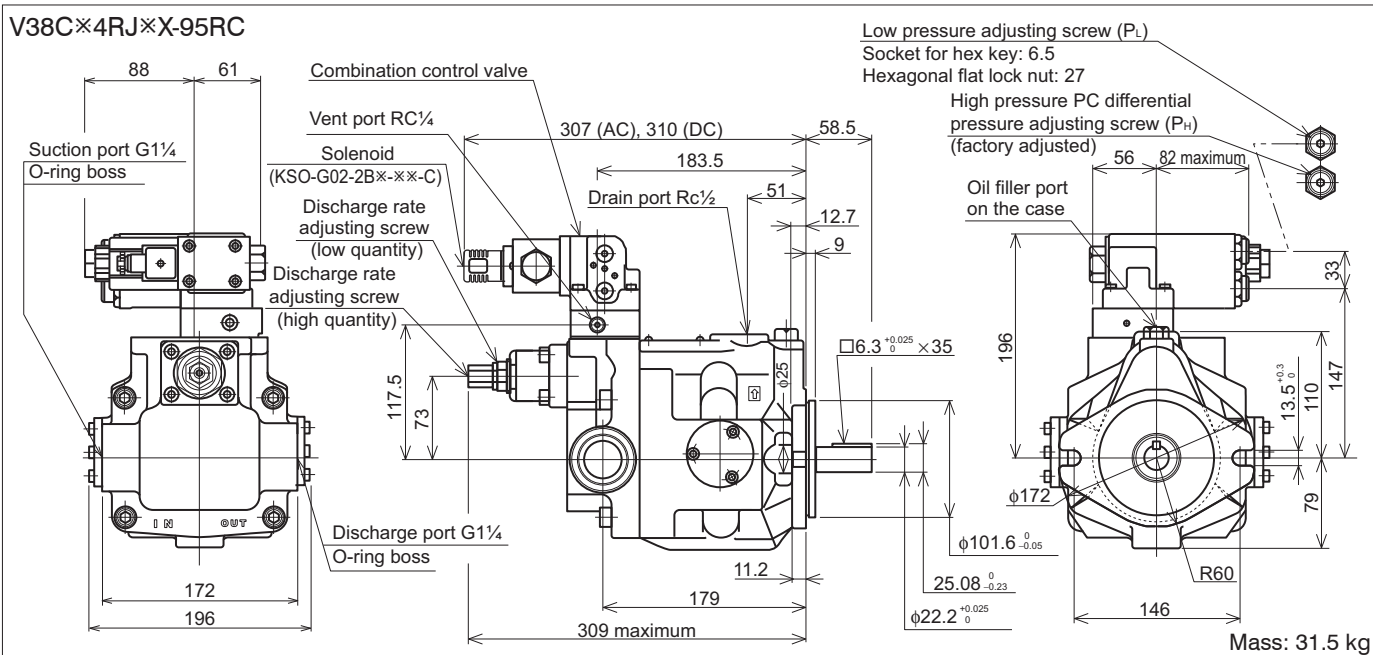


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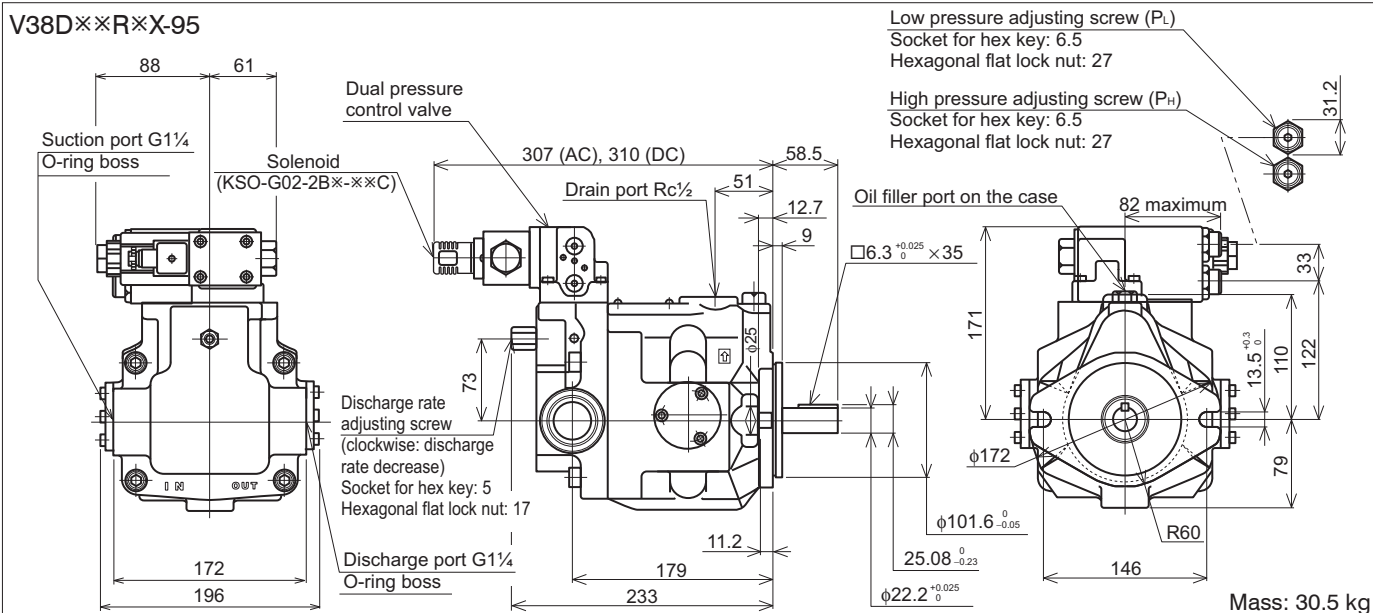
### V38C×RJ×X-95



### V38C×4RJ×X-95RC



### V38D×R×X-95



## Contact Details

Before using the product, please check the guide pages at the front of this catalog.

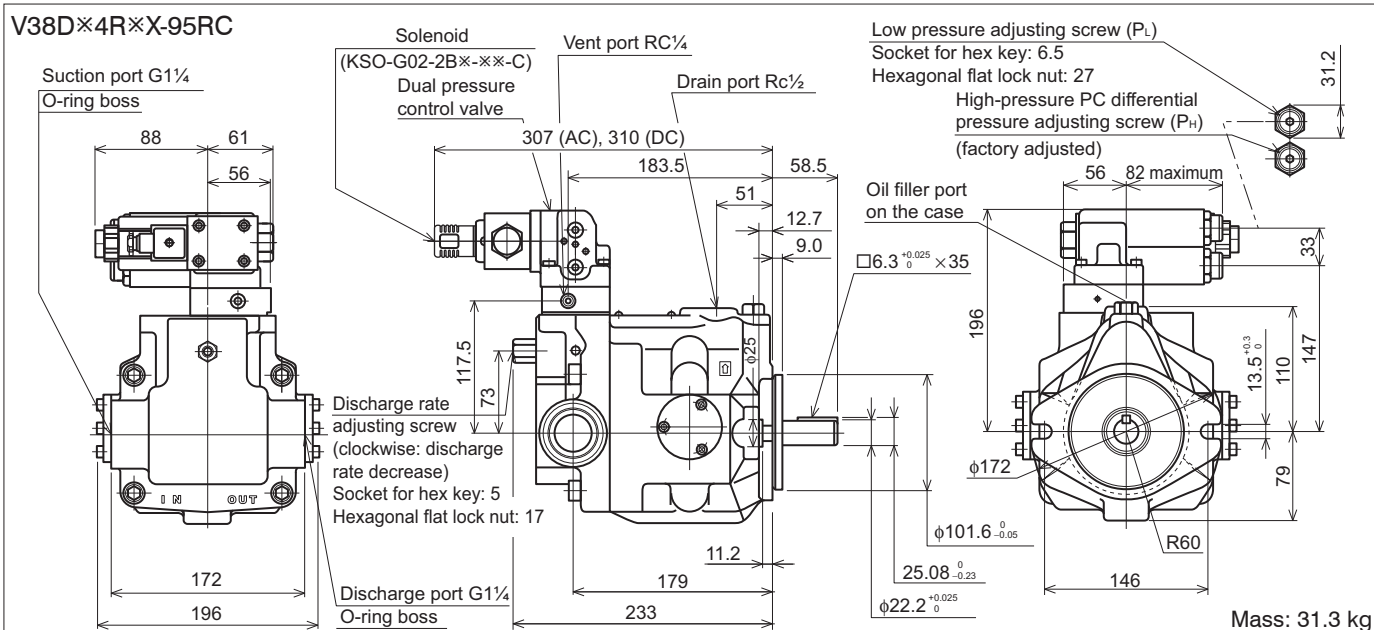
Internet

<http://www.daikinpmc.com/en/>

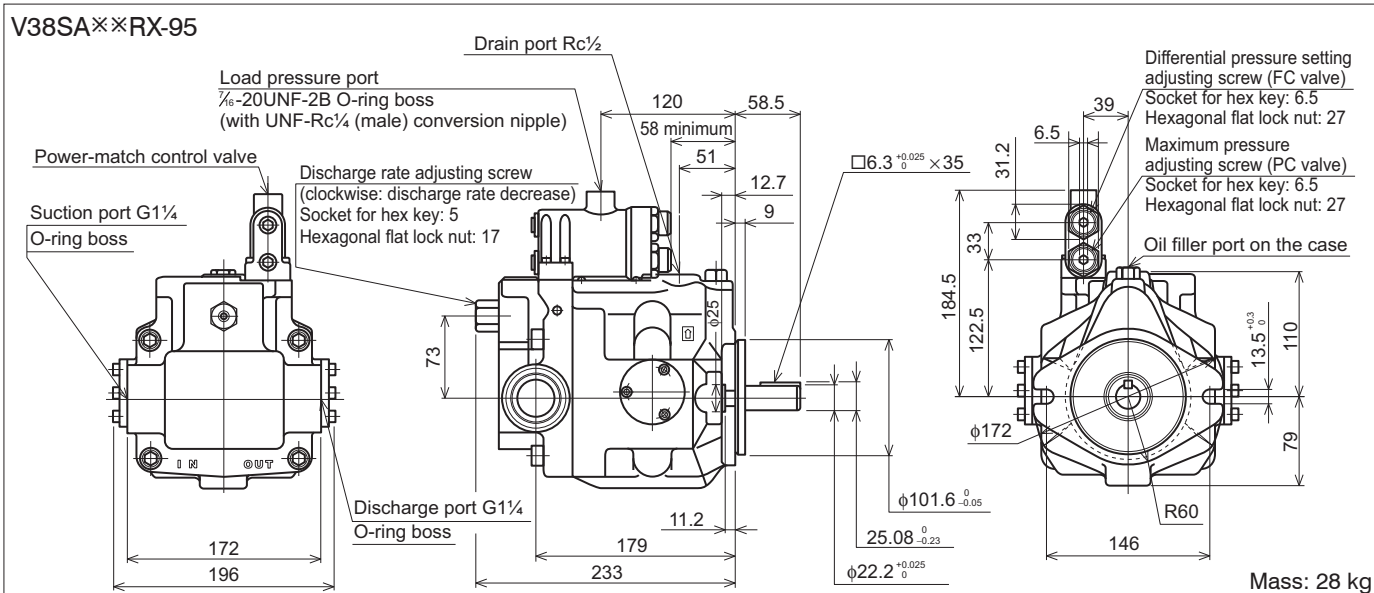
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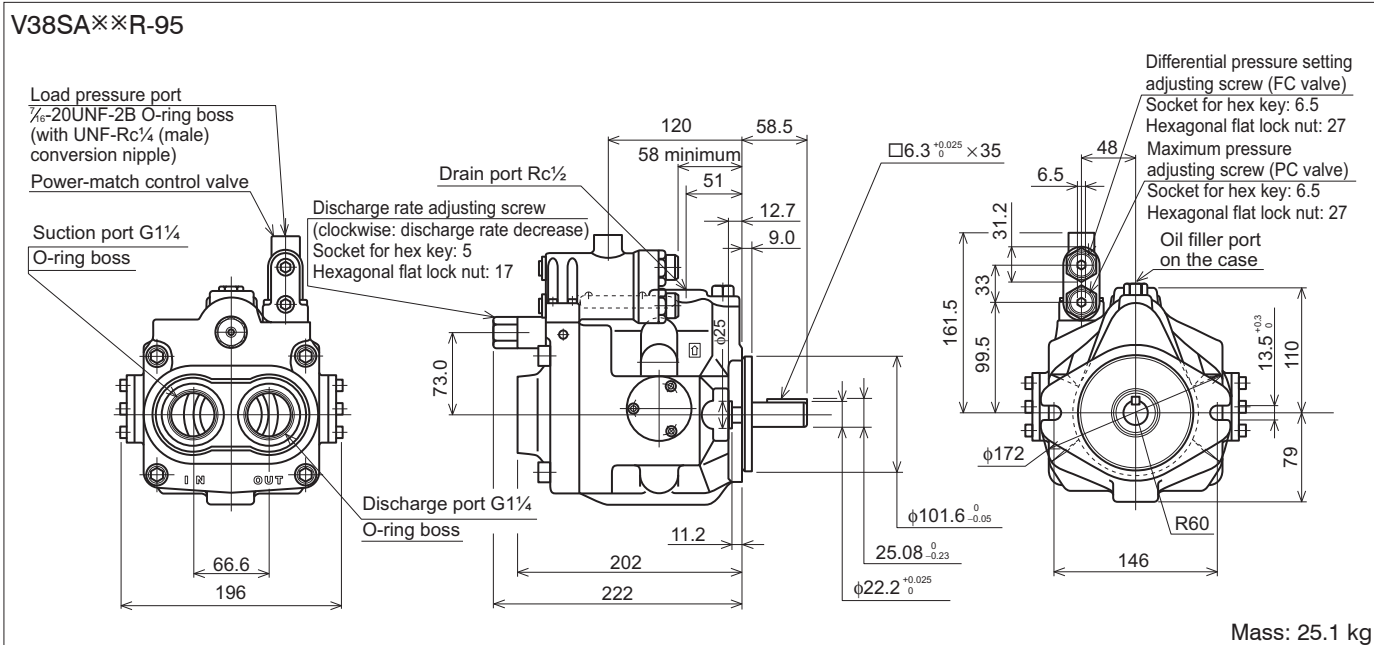
### V38D×4R×X-95RC



### V38SA×RX-95

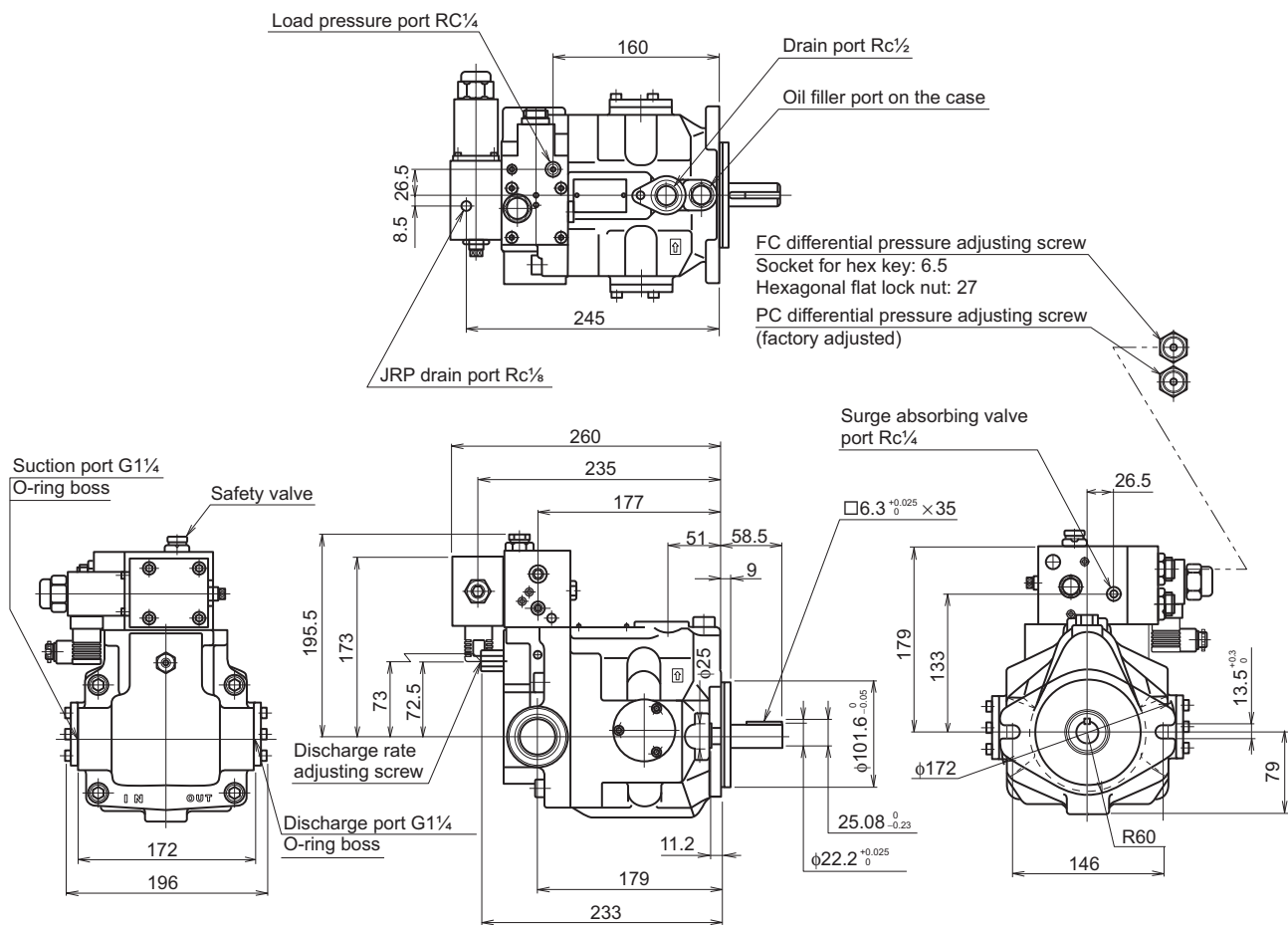


### V38SA×R-95



## External dimension diagram

V38SAJS-※RX-95



Mass: 32 kg

## Contact Details

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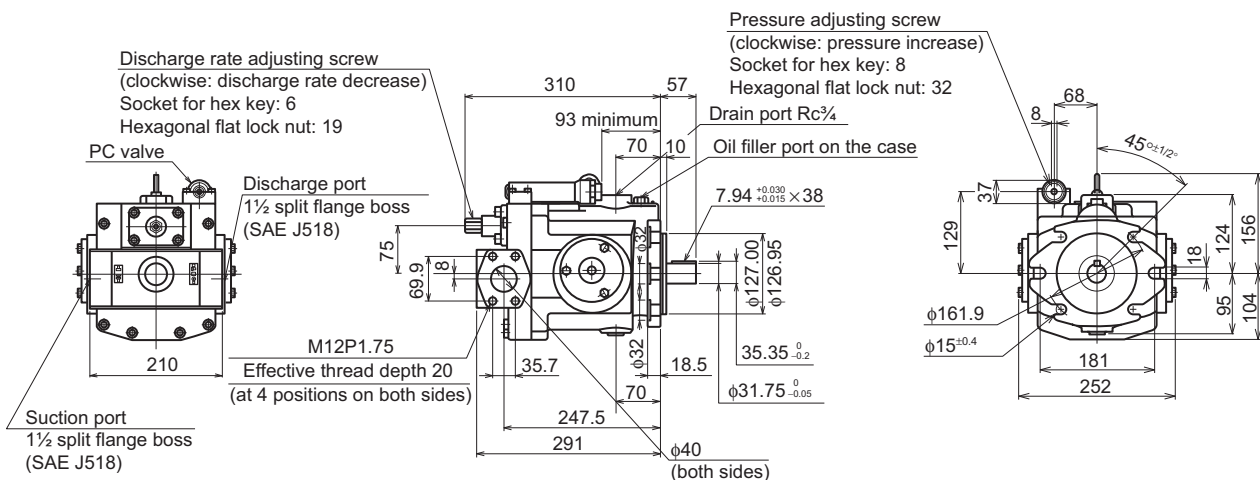
Internet

<http://www.daikinpmc.com/en/>

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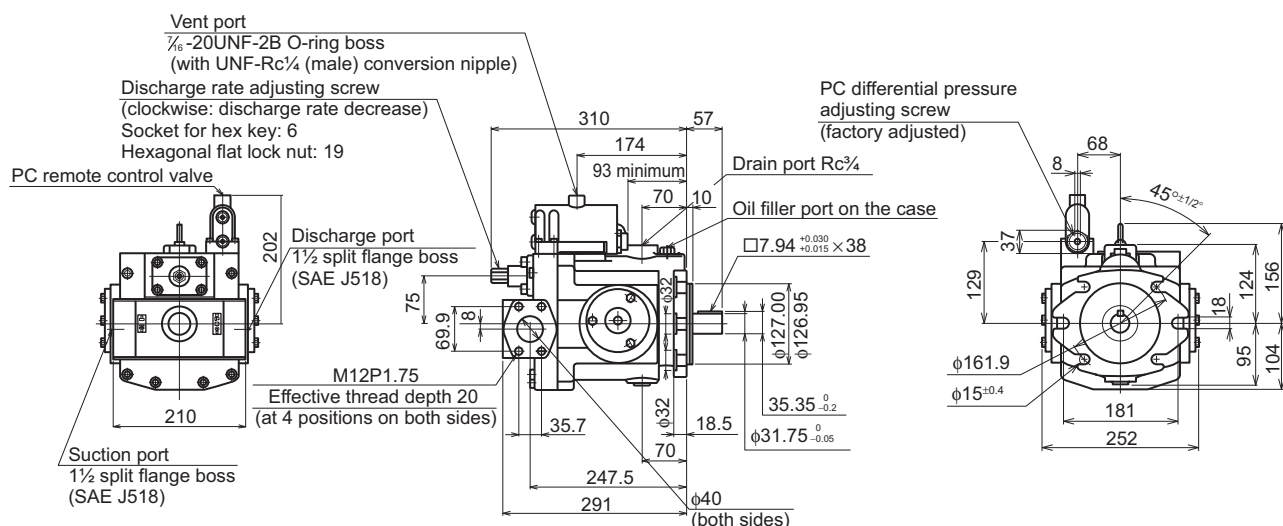
## External dimension diagram

### V50A×RX-20



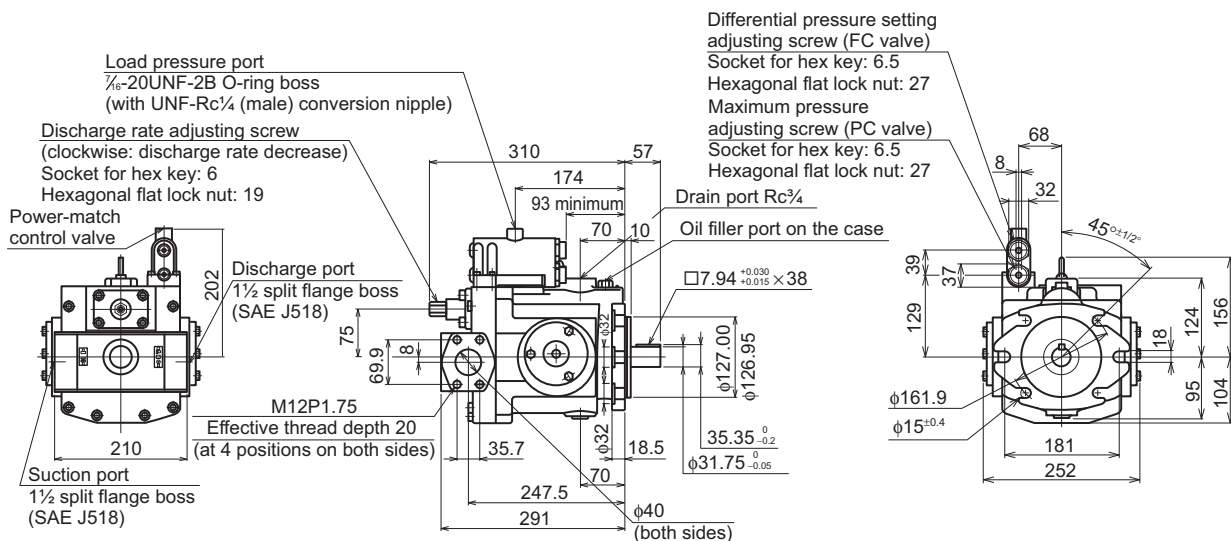
Mass: 50 kg

### V50A3RX-20RC



Mass: 52.1 kg

### V50SA×RX-20



Mass: 53.5 kg

## Contact Details

Before using the product, please check the guide pages at the front of this catalog.

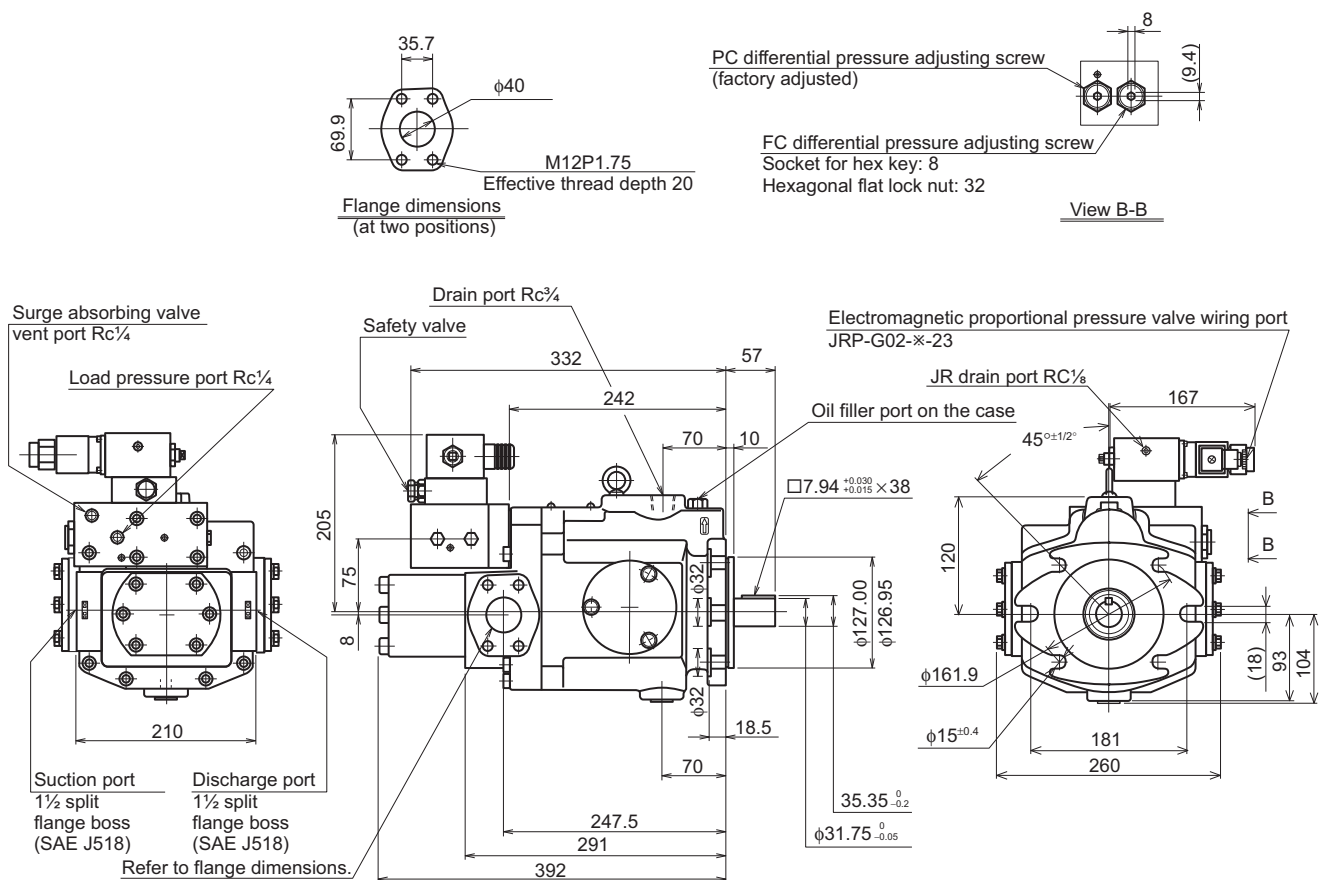
Internet

<http://www.daikinpmc.com/en/>

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## External dimension diagram

V50SAJS-※RX-20



## Contact Details

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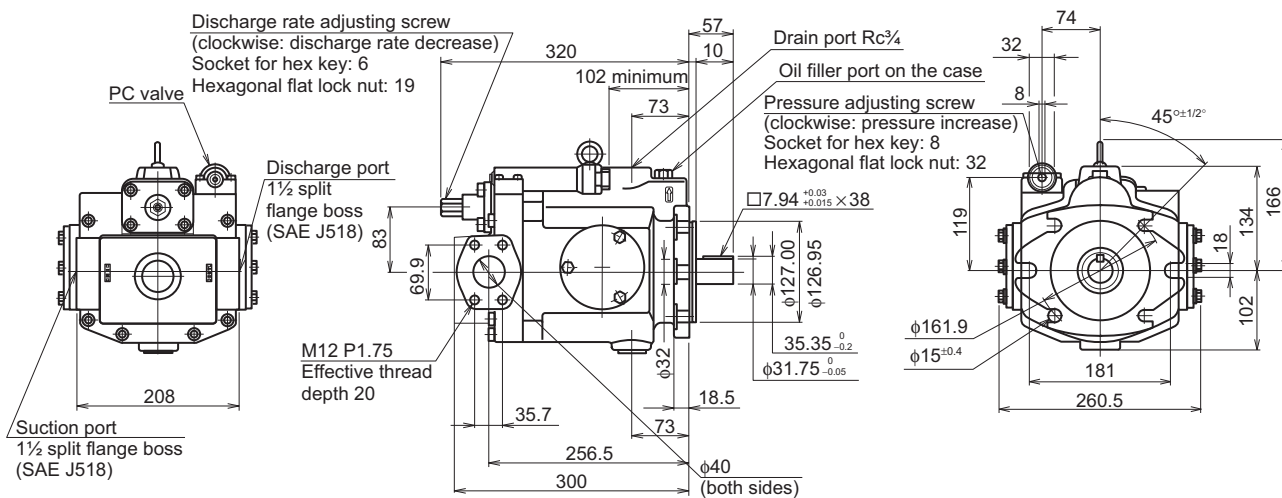
Internet

<http://www.daikinpmc.com/en/>

For latest information, PDF catalogs and operation manuals

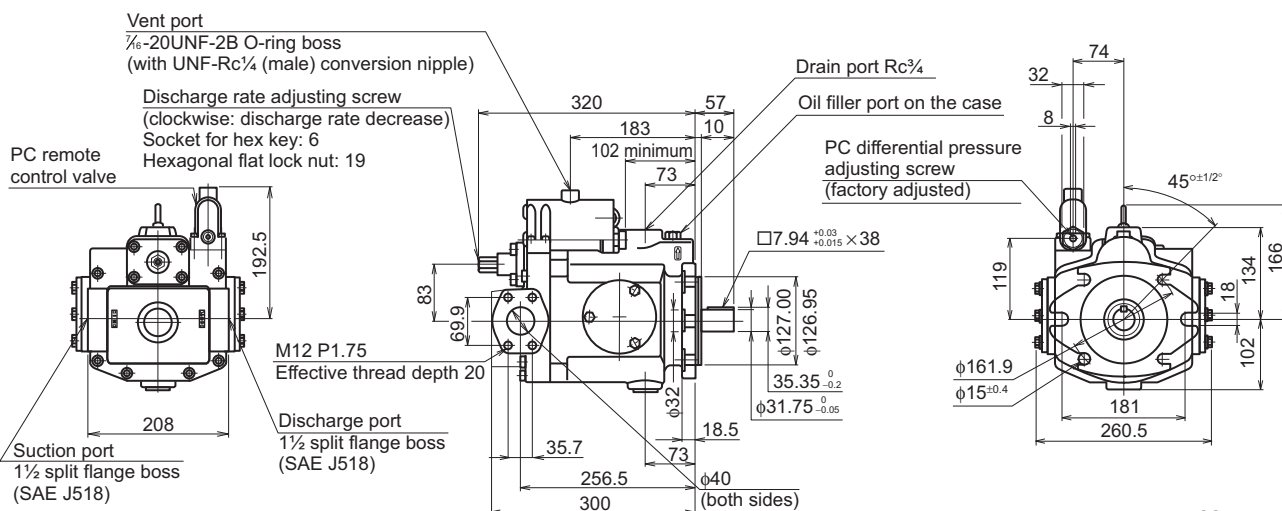
## External dimension diagram

### V70A×RX-60



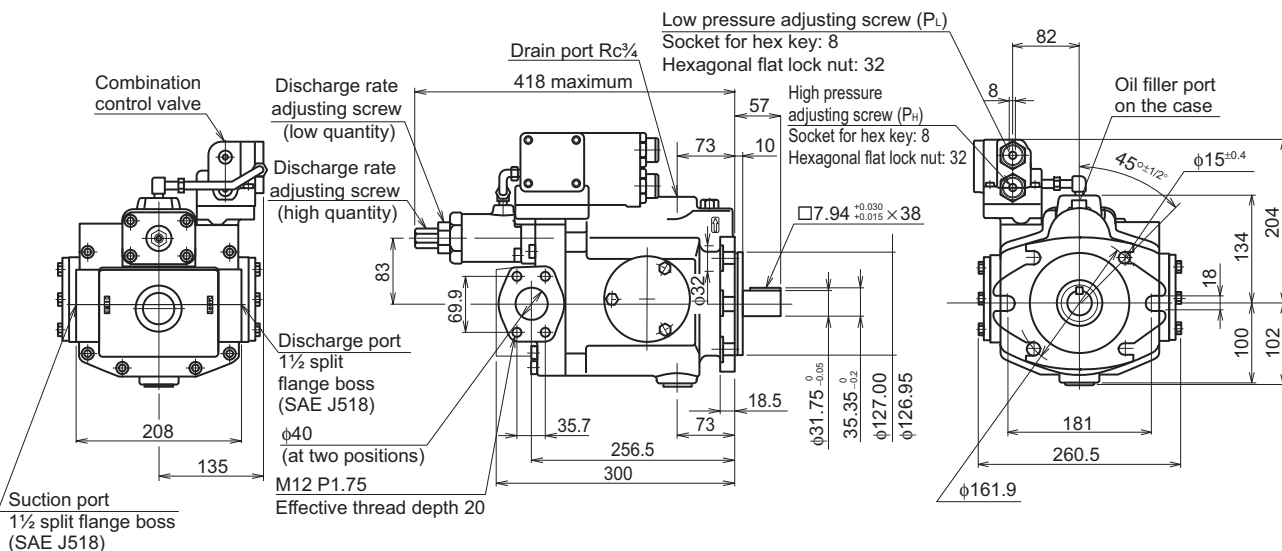
Mass: 55 kg

### V70A3RX-60RC



Mass: 57 kg

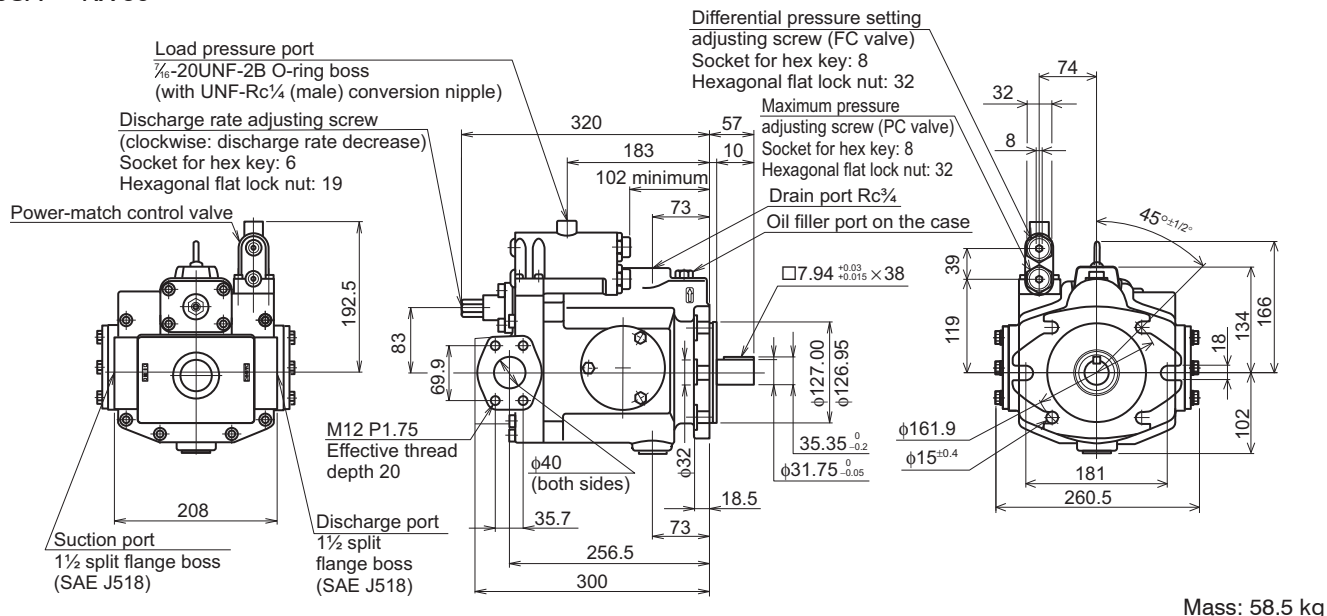
### V70C××RHX-60



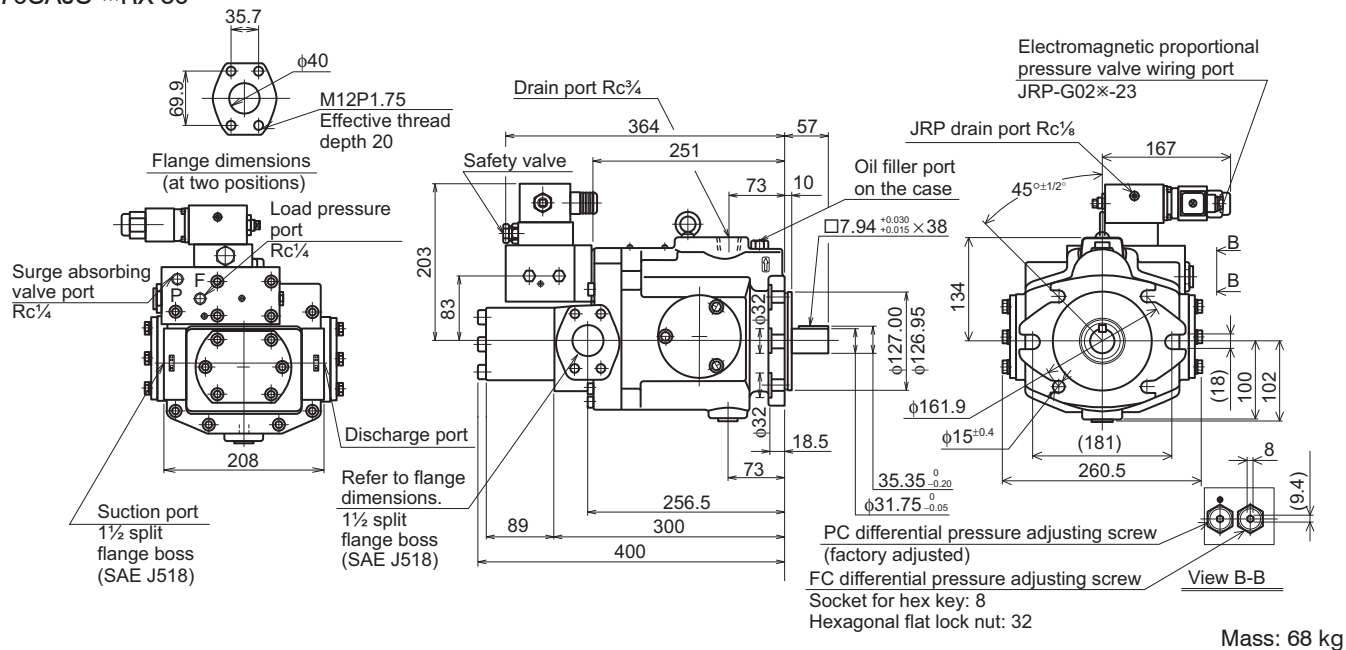
Mass: 59.3 kg

## External dimension diagram

### V70SA※RX-60



### V70SAJS-※RX-60



## Contact Details

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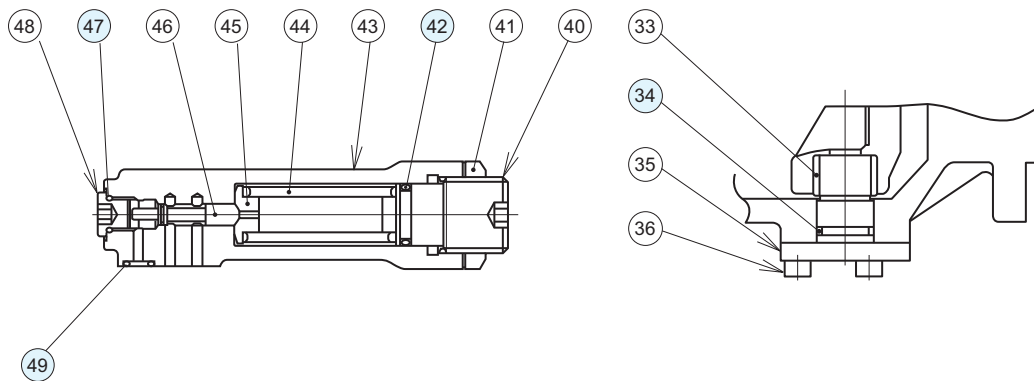
Internet

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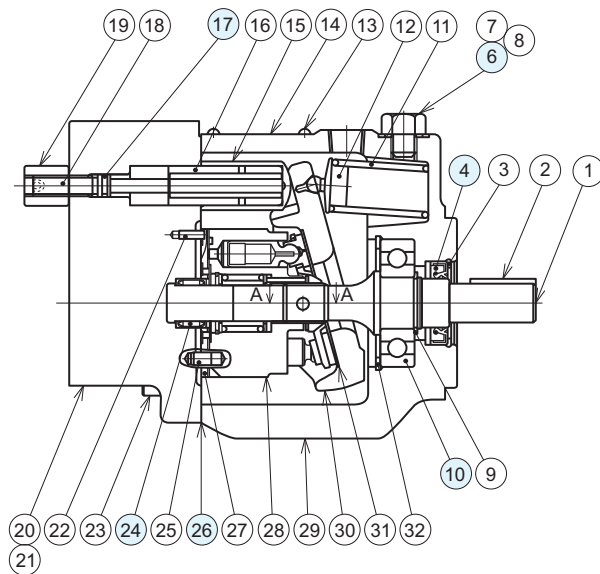
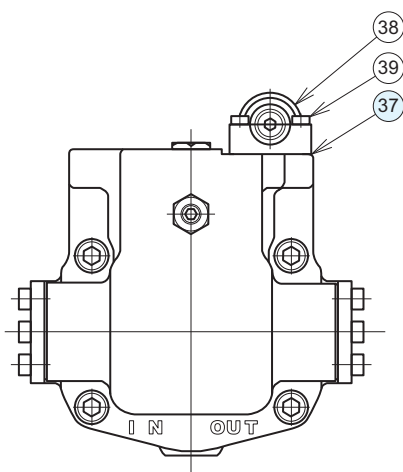
## Sectional structural diagram

V8, V15



38 Detail of PC valve assembly

Section A-A  
Detail of trunion



V8 Seal/bearing table

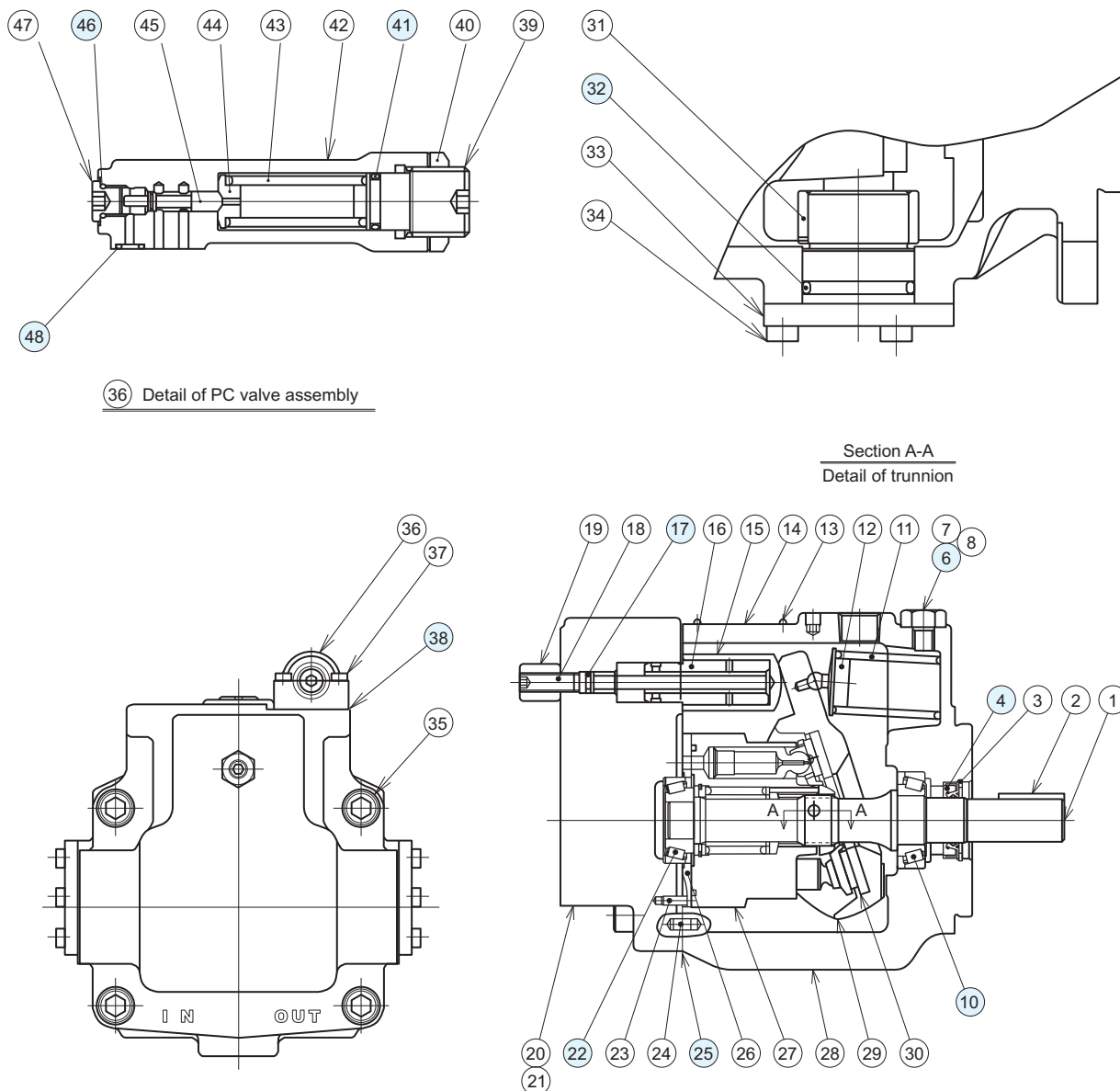
| Part No. | Name           | Specifications         | Material | Quantity |
|----------|----------------|------------------------|----------|----------|
| 4        | Oil seal       | TCV19358               | NBR      | 1        |
| 6        | Sealing washer | WF12192                | NBR      | 1        |
| 10       | Ball bearing   | 6004                   |          | 1        |
| 17       | O-ring         | JIS B 2401 1A-P4       | NBR      | 1        |
| 24       | Needle bearing | HK1210                 |          | 1        |
| 26       | Gasket         | 1730500 (special part) |          | 1        |
| 34       | O-ring         | JIS B 2401 1A-P20      | NBR      | 2        |
| 37       | Gasket         | 1741116 (special part) |          | 1        |
| 42       | O-ring         | JIS B 2401 1B-P14      | NBR      | 1        |
| 47       | O-ring         | AS568-903 (HS90)       | NBR      | 1        |
| 49       | O-ring         | JIS B 2401 1B-P6       | NBR      | 1        |

V15 Seal/bearing table

| Part No. | Name           | Specifications         | Material | Quantity |
|----------|----------------|------------------------|----------|----------|
| 4        | Oil seal       | TCV24408               | NBR      | 1        |
| 6        | Sealing washer | WF12192                | NBR      | 1        |
| 10       | Ball bearing   | 6305                   |          | 1        |
| 17       | O-ring         | JIS B 2401 1A-P8       | NBR      | 1        |
| 24       | Needle bearing | FJL1715                |          | 1        |
| 26       | Gasket         | 1730390 (special part) |          | 1        |
| 34       | O-ring         | JIS B 2401 1A-P18      | NBR      | 2        |
| 37       | Gasket         | 1740698 (special part) |          | 1        |
| 42       | O-ring         | JIS B 2401 1B-P14      | NBR      | 1        |
| 47       | O-ring         | AS568-903 (HS90)       | NBR      | 1        |
| 49       | O-ring         | JIS B 2401 1B-P6       | NBR      | 1        |

## Sectional structural diagram

V23, V38



V23 Seal/bearing table

| Part No. | Name                   | Specifications                         | Material | Quantity |
|----------|------------------------|----------------------------------------|----------|----------|
| 4        | Oil seal               | TCV24408                               | NBR      | 1        |
| 6        | Sealing washer         | WF12192                                | NBR      | 1        |
| 10       | Tapered roller bearing | Cup: 4T-L44610/<br>Cone: 4T-L44643     |          | 1        |
| 17       | O-ring                 | JIS B 2401 1A-P8                       | NBR      | 1        |
| 22       | Tapered roller bearing | Cup: 4T- LM11710/<br>Cone: 4T- LM11749 |          | 1        |
| 25       | Gasket                 | 1730511 (special part)                 |          | 1        |
| 32       | O-ring                 | JIS B 2401 1A-G30                      | NBR      | 2        |
| 38       | Gasket                 | 1740698 (special part)                 |          | 1        |
| 41       | O-ring                 | JIS B 2401 1B-P14                      | NBR      | 1        |
| 46       | O-ring                 | AS568-903 (HS90)                       | NBR      | 1        |
| 48       | O-ring                 | JIS B 2401 1B-P6                       | NBR      | 1        |

V38 Seal/bearing table

| Part No. | Name                   | Specifications                         | Material | Quantity |
|----------|------------------------|----------------------------------------|----------|----------|
| 4        | Oil seal               | TCV24408                               | NBR      | 1        |
| 6        | Sealing washer         | WF12192                                | NBR      | 1        |
| 10       | Tapered roller bearing | Cup: 4T-L44610/<br>Cone: 4T-L44643     |          | 1        |
| 17       | O-ring                 | JIS B 2401 1A-P8                       | NBR      | 1        |
| 22       | Tapered roller bearing | Cup: 4T- LM11910/<br>Cone: 4T- LM11949 |          | 1        |
| 25       | Gasket                 | 1730500 (special part)                 |          | 1        |
| 32       | O-ring                 | JIS B 2401 1A-G30                      | NBR      | 2        |
| 38       | Gasket                 | 1740698 (special part)                 |          | 1        |
| 41       | O-ring                 | JIS B 2401 1B-P14                      | NBR      | 1        |
| 46       | O-ring                 | AS568-903 (HS90)                       | NBR      | 1        |
| 48       | O-ring                 | JIS B 2401 1B-P6                       | NBR      | 1        |

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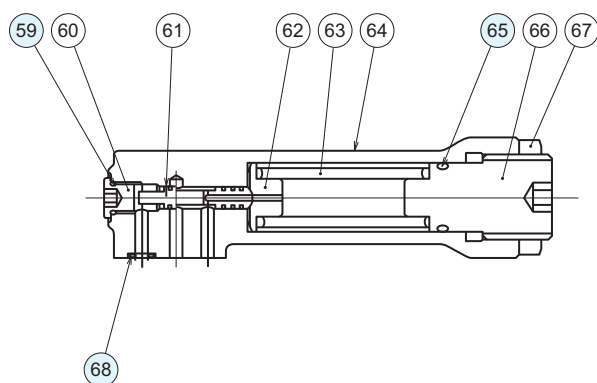
Internet

<http://www.daikinpmc.com/en/>

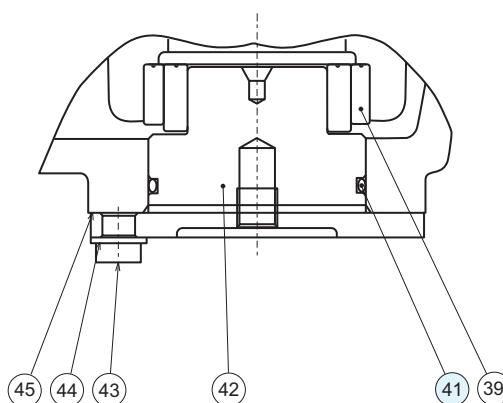
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## Sectional structural diagram

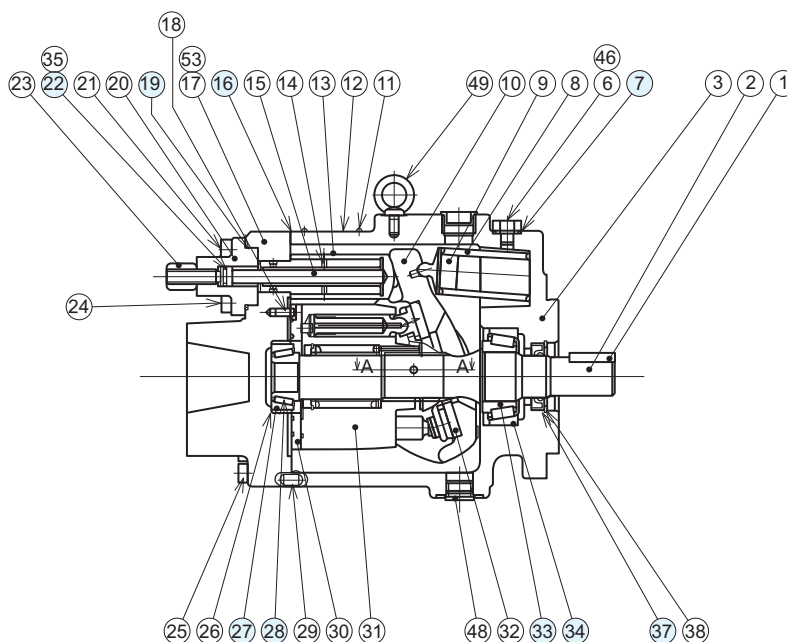
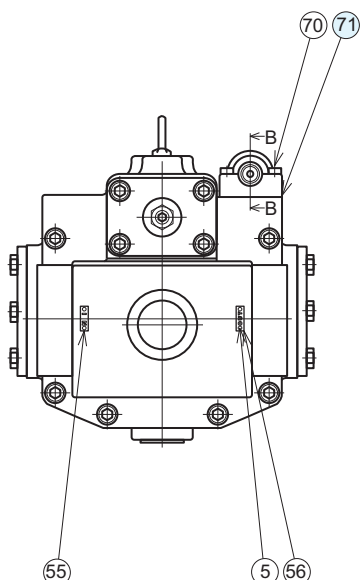
V50, V70



(58) Detail of PC valve assembly



Section A-A  
Detail of trunnion



V50 Seal/bearing table

| Part No. | Name                   | Specifications         | Material | Quantity |
|----------|------------------------|------------------------|----------|----------|
| 7        | Sealing washer         | WF12192                | NBR      | 1        |
| 16       | Gasket                 | 1020257 (special part) |          | 1        |
| 19       | O-ring                 | JIS B 2401 1A-G50      | NBR      | 1        |
| 22       | O-ring                 | JIS B 2401 1A-P12      | NBR      | 1        |
| 27       | Tapered roller bearing | Cup: 21212 Sa          |          | 1        |
| 28       | Tapered roller bearing | Cone: 21075 Sa         |          | 1        |
| 33       | Tapered roller bearing | Cone: 4T-344A P × 2    |          | 1        |
| 34       | Tapered roller bearing | Cup: 4T-332 P × 2      |          | 1        |
| 37       | Oil seal               | TCV355511              | NBR      | 1        |
| 41       | O-ring                 | AS568-228 (HS70)       | NBR      | 2        |
| 59       | O-ring                 | AS568-903 (HS90)       | NBR      | 1        |
| 65       | O-ring                 | JIS B 2401 1A-P18      | NBR      | 1        |
| 68       | O-ring                 | JIS B 2401 1B-P6       | NBR      | 1        |
| 71       | Gasket                 | 1740975 (special part) |          | 1        |

V70 Seal/bearing table

| Part No. | Name                   | Specifications         | Material | Quantity |
|----------|------------------------|------------------------|----------|----------|
| 7        | Sealing washer         | WF12192                | NBR      | 1        |
| 16       | Gasket                 | 1730446 (special part) |          | 1        |
| 19       | O-ring                 | JIS B 2401 1A-G50      | NBR      | 1        |
| 22       | O-ring                 | JIS B 2401 1A-P12      | NBR      | 1        |
| 27       | Tapered roller bearing | Cup: 4T-M84210         |          | 1        |
| 28       | Tapered roller bearing | Cone: 4T-M84249        |          | 1        |
| 33       | Tapered roller bearing | Cone: 4T-3386          |          | 1        |
| 34       | Tapered roller bearing | Cup: 4T-3320           |          | 1        |
| 37       | Oil seal               | TCV355511              | NBR      | 1        |
| 41       | O-ring                 | AS568-230 (HS70)       | NBR      | 2        |
| 59       | O-ring                 | AS568-903 (HS90)       | NBR      | 1        |
| 65       | O-ring                 | JIS B 2401 1A-P18      | NBR      | 1        |
| 68       | O-ring                 | JIS B 2401 1B-P6       | NBR      | 1        |
| 71       | Gasket                 | 1740975 (special part) |          | 1        |

Contact Details

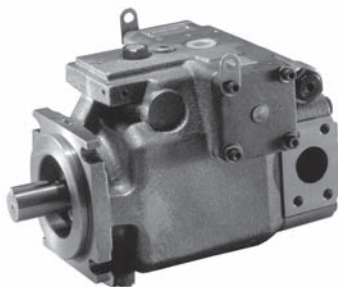
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# VZ series Piston Pump



## Features

### ● Highly intensified output

Adopting the cradle swash plate has achieved high pressure in a compact and light-weight body, resulting in increased output per unit weight.

### ● Low noise

While increasing the rigidity of the swash plate structure, the noise level has been substantially reduced thanks to the housing geometry resulting from the state-of-the-art measurement and analysis technologies.

### ● High efficiency

The spherical valve plate and optimum hydraulic balance realize stable and highly efficient operation over a broad range of operation conditions.

### ● Long life

Adopting the spherical valve plate with its superior abrasion resistance has improved the anti-contaminant characteristics.

## Nomenclature

### ● Pressure compensator control

VZ    × × ×    A    ×    R    X    -    10    × ×  
1    2    3    4    7    10    11    12

### ● Combination control

VZ    × × ×    C    ×    ×    R    ×    ×    X    -    10  
1    2    3    5    6    7    8    9    10    11

#### 1 Model No.

VZ: VZ series piston pump \*1

#### 2 Pump capacity

50: 50.2 cm<sup>3</sup>/rev  
63: 63.0 cm<sup>3</sup>/rev  
80: 79.6 cm<sup>3</sup>/rev  
100: 104.6 cm<sup>3</sup>/rev  
130: 135.9 cm<sup>3</sup>/rev

#### 3 Control method I (Refer to Page A-4 for the applicable models.)

A: Pressure compensator control  
C: Combination control \*2

#### 4 Pressure adjustment range

1: 1.5 to 7 MPa {15 to 70 kgf/cm<sup>2</sup>}  
2: 1.5 to 14 MPa {15 to 140 kgf/cm<sup>2</sup>}  
3: 3.5 to 21 MPa {35 to 210 kgf/cm<sup>2</sup>}  
4: 3.5 to 28 MPa {35 to 280 kgf/cm<sup>2</sup>} \*3

#### 5 Low pressure adjustment range

1: 1.5 to 7 MPa {15 to 70 kgf/cm<sup>2</sup>}  
2: 1.5 to 14 MPa {15 to 140 kgf/cm<sup>2</sup>}  
3: 3.5 to 21 MPa {35 to 210 kgf/cm<sup>2</sup>}  
4: 3.5 to 28 MPa {35 to 280 kgf/cm<sup>2</sup>} \*3

#### 6 High pressure adjustment range

1: 1.5 to 7 MPa {15 to 70 kgf/cm<sup>2</sup>}  
2: 1.5 to 14 MPa {15 to 140 kgf/cm<sup>2</sup>}  
3: 3.5 to 21 MPa {35 to 210 kgf/cm<sup>2</sup>}  
4: 3.5 to 28 MPa {35 to 280 kgf/cm<sup>2</sup>} \*3

#### 7 Direction of rotation, when viewed from the shaft end

R: Clockwise (rightward)

#### 8 Control method II

H: Pressure feedback method  
J: Solenoid operated method

#### 9 Voltage code for the solenoid valve

<Applied only when control method II is J>  
A: AC 100 V (50/60 Hz), AC 110 V (60 Hz)  
B: AC 200 V (50/60 Hz), AC 220 V (60 Hz)  
P: DC 12 V

#### 10 Piping direction

X: Side port

#### 11 Design No. (The design No. is subject to change)

#### 12 Control method III

No designation: Without remote control system  
RC: With remote control system \*4  
<Applied only when control method I is A>

Note: \*1 Only petroleum-based hydraulic fluids are acceptable for the VZ series.

\*2 The combination control is not applicable to VZ130.

\*3 The 4th pattern of the pressure adjustment range (3.5 to 28 MPa {35 to 280 kgf/cm<sup>2</sup>}) applies only to VZ50, VZ63, VZ80, and VZ100.

\*4 The pressure adjustment range with a remote control system is the 4th pattern only (but the 3rd pattern for VZ130).

Note: JR-G (T) 02 and JRP-G02 are recommended for the remote control system's relief valve.

If the vent port is blocked, the pressure compensation structure does not work and the pump operates at a fixed pressure.

● Foot supports and piping flanges are not provided with the pump. Order them separately as required by referring to Pages S-2 to S-4.

## Models and pressure adjustment range table

### ● Pressure compensator control

#### 4 Pressure adjustment range

| Code | Pressure adjustment range<br>MPa {kgf/cm <sup>2</sup> } | Without remote control system |      |      |       |       | With remote control system |      |      |       |       |
|------|---------------------------------------------------------|-------------------------------|------|------|-------|-------|----------------------------|------|------|-------|-------|
|      |                                                         | VZ50                          | VZ63 | VZ80 | VZ100 | VZ130 | VZ50                       | VZ63 | VZ80 | VZ100 | VZ130 |
| 1    | 1.5 to 7 { 15 to 70}                                    | ✓                             | ✓    | ✓    | ✓     | ✓     | –                          | –    | –    | –     | –     |
| 2    | 1.5 to 14 { 15 to 140}                                  | ✓                             | ✓    | ✓    | ✓     | ✓     | –                          | –    | –    | –     | –     |
| 3    | 2 to 21 { 20 to 210}                                    | –                             | –    | –    | –     | –     | –                          | –    | –    | –     | ✓     |
| 3    | 3.5 to 21 {135 to 210}                                  | ✓                             | ✓    | ✓    | ✓     | ✓     | –                          | –    | –    | –     | –     |
| 4    | 2 to 28 { 20 to 280}                                    | –                             | –    | –    | –     | –     | ✓                          | ✓    | ✓    | ✓     | –     |
| 4    | 3.5 to 28 { 35 to 280}                                  | ✓                             | ✓    | ✓    | ✓     | –     | –                          | –    | –    | –     | –     |

### ● Combination control

#### 5 Low pressure adjustment range

| Code | Pressure adjustment range<br>MPa {kgf/cm <sup>2</sup> } | Without remote control system |      |      |       |
|------|---------------------------------------------------------|-------------------------------|------|------|-------|
|      |                                                         | VZ50                          | VZ63 | VZ80 | VZ100 |
| 1    | 1.5 to 7 {15 to 70}                                     | ✓                             | ✓    | ✓    | ✓     |
| 2    | 1.5 to 14 {15 to 140}                                   | ✓                             | ✓    | ✓    | ✓     |
| 3    | 3.5 to 21 {35 to 210}                                   | ✓                             | ✓    | ✓    | ✓     |
| 4    | 3.5 to 28 {35 to 280}                                   | ✓                             | ✓    | ✓    | ✓     |

#### 6 High pressure adjustment range

| Code | Pressure adjustment range<br>MPa {kgf/cm <sup>2</sup> } | Without remote control system |      |      |       |                          |      |      |       |
|------|---------------------------------------------------------|-------------------------------|------|------|-------|--------------------------|------|------|-------|
|      |                                                         | Pressure feedback method      |      |      |       | Solenoid operated method |      |      |       |
|      |                                                         | VZ50                          | VZ63 | VZ80 | VZ100 | VZ50                     | VZ63 | VZ80 | VZ100 |
| 1    | 1.5 to 7 {15 to 70}                                     | ✓                             | ✓    | ✓    | ✓     | ✓                        | ✓    | ✓    | ✓     |
| 2    | 1.5 to 14 {15 to 140}                                   | ✓                             | ✓    | ✓    | ✓     | ✓                        | ✓    | ✓    | ✓     |
| 3    | 3.5 to 21 {35 to 210}                                   | ✓                             | ✓    | ✓    | ✓     | ✓                        | ✓    | ✓    | ✓     |
| 4    | 3.5 to 28 {35 to 280}                                   | ✓                             | ✓    | ✓    | ✓     | ✓                        | ✓    | ✓    | ✓     |

## Specifications

| Model No. | Theoretical discharge rate<br>cm <sup>3</sup> /rev | Maximum operating pressure<br>MPa {kgf/cm <sup>2</sup> } | Permissible rotational speed<br>min <sup>-1</sup> | Discharge rate adjustment range<br>1800min <sup>-1</sup><br>L/min | Mass<br>(Control method A)<br>kg |
|-----------|----------------------------------------------------|----------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------|----------------------------------|
| VZ50      | 50.2                                               | 28 {280}                                                 | 500 to 1800                                       | 0 to 90                                                           | 40                               |
| VZ63      | 63.0                                               | 28 {280}                                                 | 500 to 1800                                       | 0 to 113                                                          | 47                               |
| VZ80      | 79.6                                               | 28 {280}                                                 | 500 to 1800                                       | 0 to 143                                                          | 55                               |
| VZ100     | 104.6                                              | 28 {280}                                                 | 500 to 1800                                       | 0 to 188                                                          | 75                               |
| VZ130     | 135.9                                              | 21 {210}                                                 | 500 to 1800                                       | 0 to 244                                                          | 105                              |

- Foot supports and piping flanges are not provided with the pump. Order them separately as required by referring to Pages S-2 to S-4.

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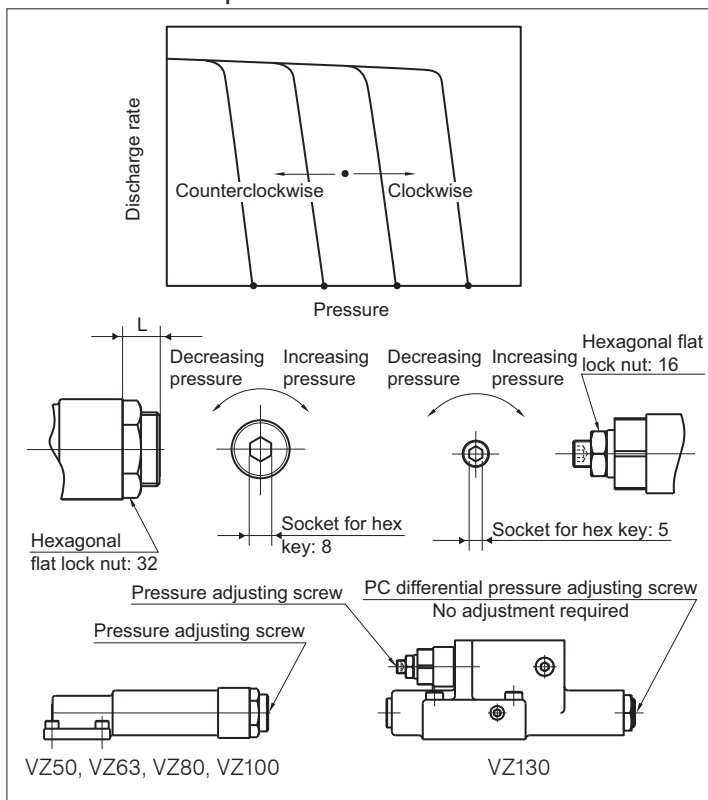
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## Pressure adjustment methods

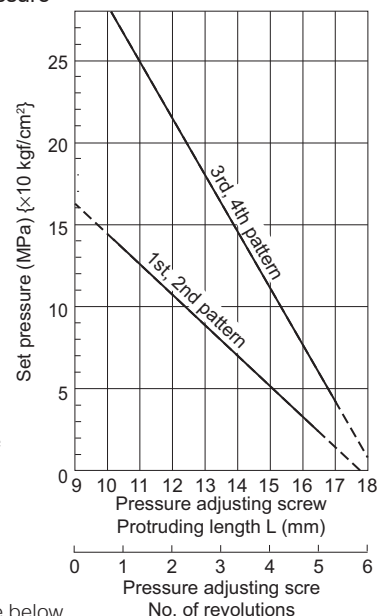
### ● Pressure compensator control



#### Variation of discharge pressure

VZ50, VZ63  
VZ80, VZ100

As shown in the graph to the right

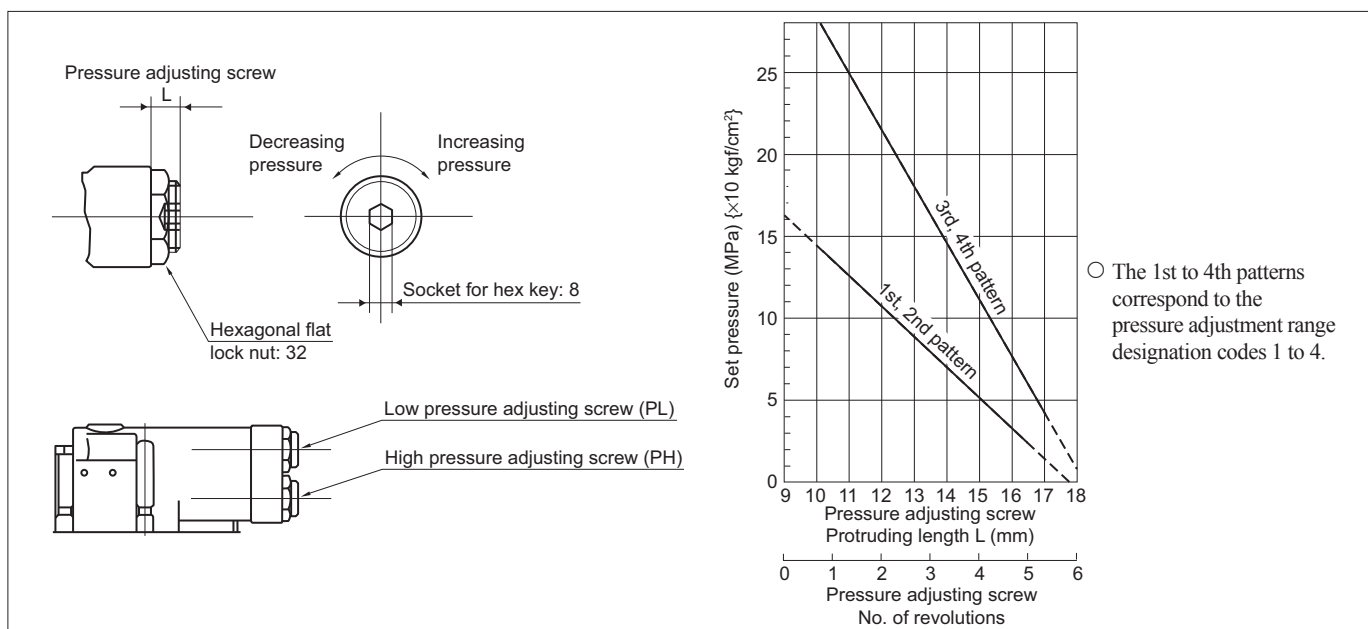


○ The 1st to 4th patterns correspond to the pressure adjustment range designation codes 1 to 4.

VZ130: As shown in the table below

| Pressure adjustment range code | Discharge pressure variation/one revolution of the pressure adjusting screw |
|--------------------------------|-----------------------------------------------------------------------------|
| 1                              | 2.5 MPa/revolution                                                          |
| 2                              | 4.6 MPa/revolution                                                          |
| 3                              | 7.9 MPa/revolution                                                          |

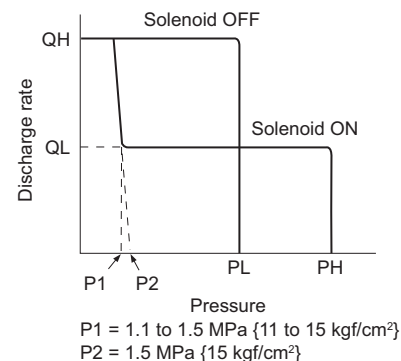
### ● Combination control



Pressure adjustment range [Common to the pressure feedback method (CH) and solenoid operated method (CJ)]

| Pressure type | Low pressure adjustment range                  | High pressure adjustment range                 |
|---------------|------------------------------------------------|------------------------------------------------|
| 1             | 1.5 to 7 MPa {15 to 70 kgf/cm <sup>2</sup> }   | 1.5 to 7 MPa {15 to 70 kgf/cm <sup>2</sup> }   |
| 2             | 1.5 to 14 MPa {15 to 140 kgf/cm <sup>2</sup> } | 1.5 to 14 MPa {15 to 140 kgf/cm <sup>2</sup> } |
| 3             | 3.5 to 21 MPa {35 to 210 kgf/cm <sup>2</sup> } | 3.5 to 21 MPa {35 to 210 kgf/cm <sup>2</sup> } |
| 4             | 3.5 to 28 MPa {35 to 280 kgf/cm <sup>2</sup> } | 3.5 to 28 MPa {35 to 280 kgf/cm <sup>2</sup> } |

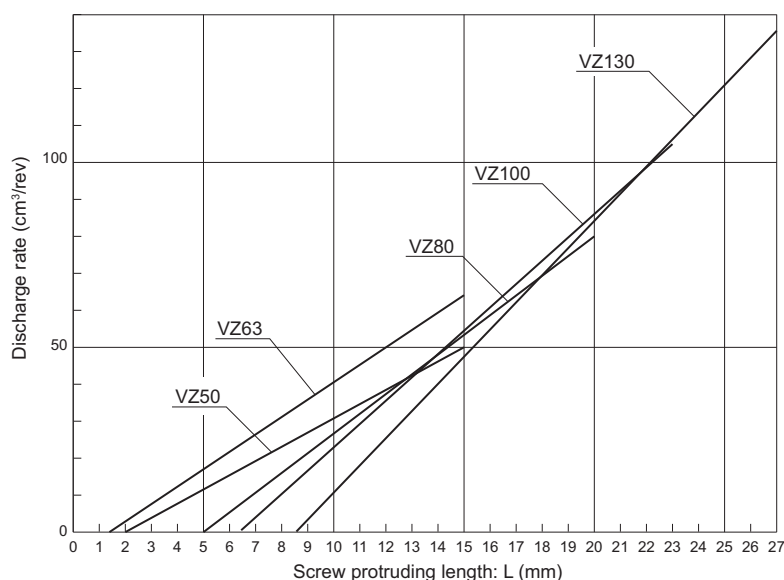
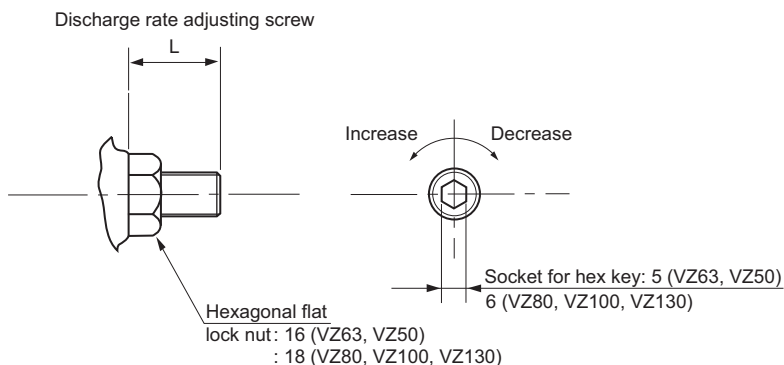
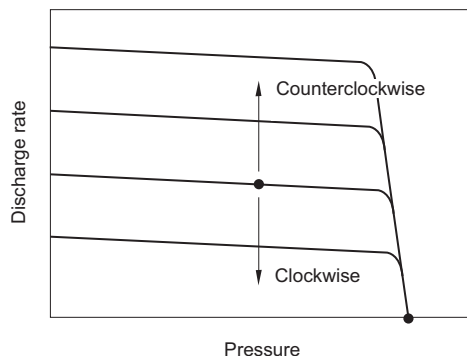
● The exact characteristics of the solenoid operated type combination control will be as shown to the right. To be more specific, even if the solenoid is turned on to switch to high pressure operation the discharge rate will not switch to the low quantity range (QL) until the pressure in the circuit reaches the pressure P1 that overcomes the bias spring force that inclines the swash plate.



## Relationship between the protruding length of the discharge rate adjusting screw and the discharge rate (pressure compensator control)

The maximum discharge rate can be set to the desired value by turning the discharge rate adjusting screw at the side of the housing.

- Turning the adjusting screw clockwise decreases the discharge rate.
- Turning the adjusting screw counterclockwise increases the discharge rate.



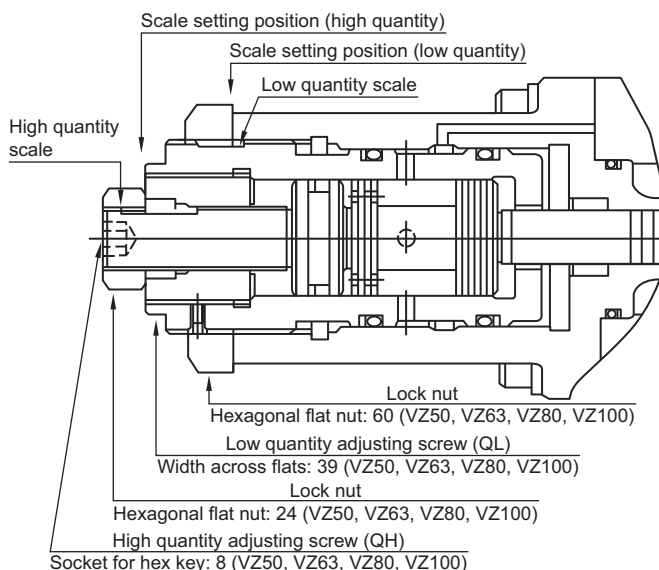
## Relationship between the protruding length of the discharge rate adjusting screw and the discharge rate (combination control)

- The discharge rate adjusting screws are provided with scales as shown below.
- Turning the adjusting screw clockwise decreases the discharge rate.
- Turning the adjusting screw counterclockwise increases the discharge rate.

| Pump model | Scale °                      |                               |
|------------|------------------------------|-------------------------------|
|            | Low quantity adjusting screw | High quantity adjusting screw |
| VZ50C      | 0 to 10                      | 0 to 17                       |
| VZ63C      | 0 to 10                      | 0 to 17                       |
| VZ80C      | 0 to 10                      | 0 to 17                       |
| VZ100C     | 0 to 10                      | 0 to 17                       |

(Scale graduation: 1°)

Note: The high quantity adjustment range may be restricted due to the setting for the low quantity range.  
See the graphs on Page A-49 for details.



### Adjust the discharge rate according to the relevant discharge rate adjustment graph by following the procedure below.

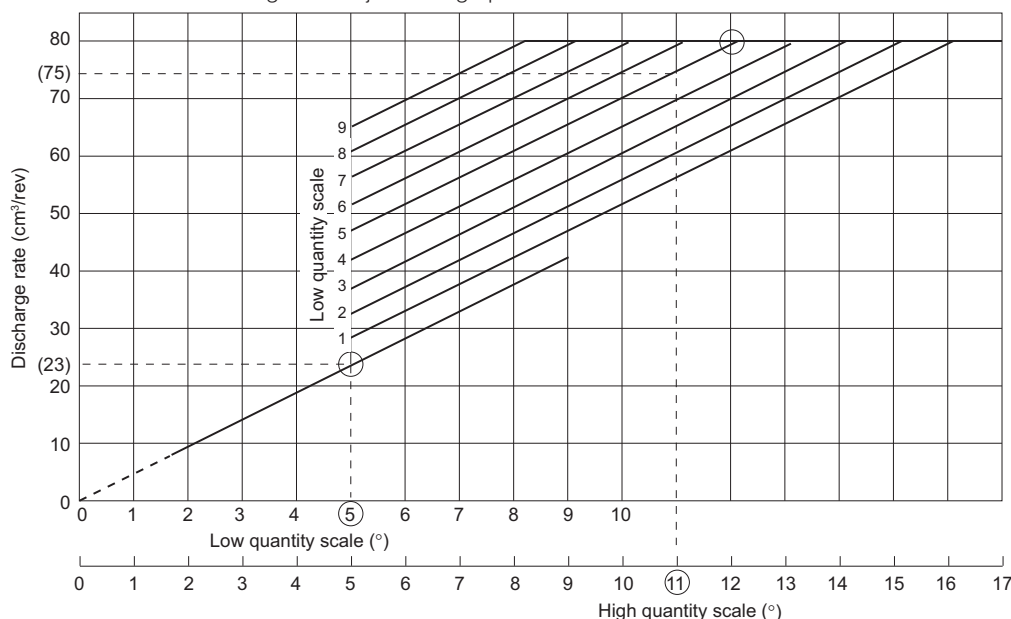
- For the low quantity range, read the value for the desired discharge rate on the graph and turn the low quantity adjusting screw to set the scale position to the read value.
- For the high quantity range, read the value for the desired discharge rate on the line corresponding to the value for the low quantity range on the graph and turn the high quantity adjusting screw to set the scale position to the read value.
- When adjusting only the high quantity range, loosen the lock nut and adjust as described above.
- When adjusting only the low quantity range, loosen the lock nut on the high quantity adjustment screw and adjust the setting for the low quantity range as described above while holding the high quantity adjusting screw in place with a hex key.

### Example of adjustment

When adjusting the discharge rate of VZ80C to 23 cm<sup>3</sup>/rev for the low quantity range (QL) and 75 cm<sup>3</sup>/rev for the high quantity range (QH)

- (1) From the discharge rate adjustment graph for VZ80C in combination control, first read the value for QL = 23 cm<sup>3</sup>/rev, which is 5°, and adjust the low quantity adjusting screw accordingly.
- (2) Then, read the value for QH = 75 cm<sup>3</sup>/rev on the line for 5° of QL, which is 11°, and adjust the high quantity adjusting screw accordingly.

Discharge rate adjustment graph for VZ80C in combination control



- The setting values indicated above may change slightly depending on the conditions of use (fluid temperature, hydraulic fluid type, etc.)  
For final fine adjustment, repeat the adjustment described above and achieve the setting appropriate for the actual application.

## ■ Factory setting of discharge rate

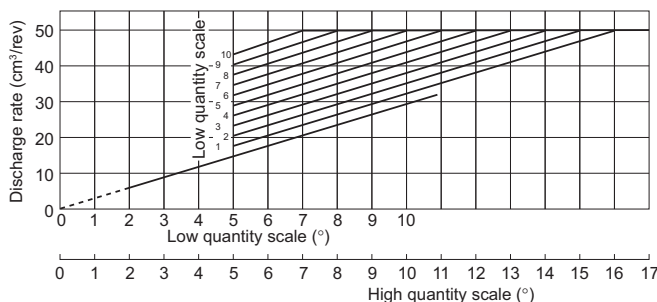
The discharge rate for the high quantity range is factory adjusted to the maximum discharge rate and the discharge rate for the low quantity range is factory adjusted as follows.

| Pump model | Low quantity (QL) setting |
|------------|---------------------------|
| VZ50C      | Scale position: 4°        |
| VZ63C      | Scale position: 4°        |
| VZ80C      | Scale position: 4°        |
| VZ100C     | Scale position: 4°        |

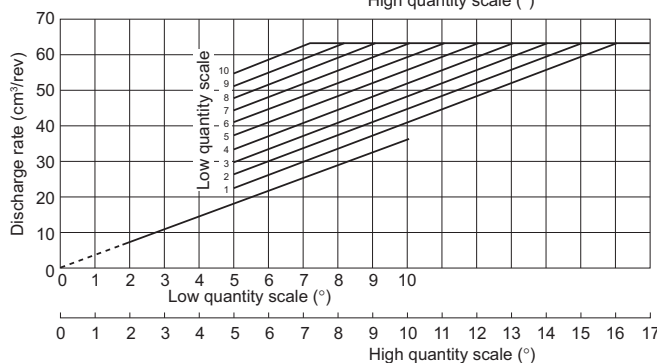
## Discharge rate adjustment graph in combination control

Linear adjustment of the discharge rate for the low quantity range is not possible below the adjustment range (section indicated by the dashed line).

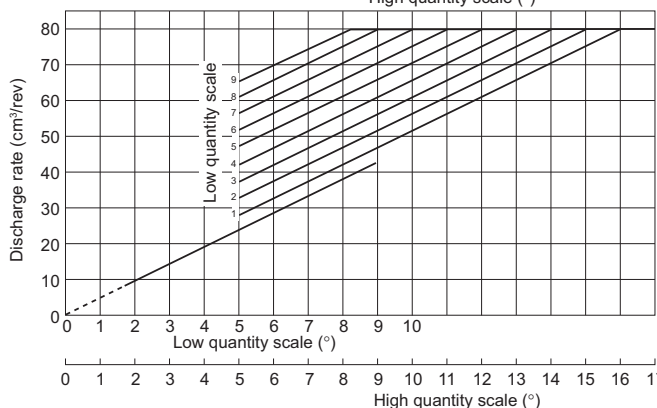
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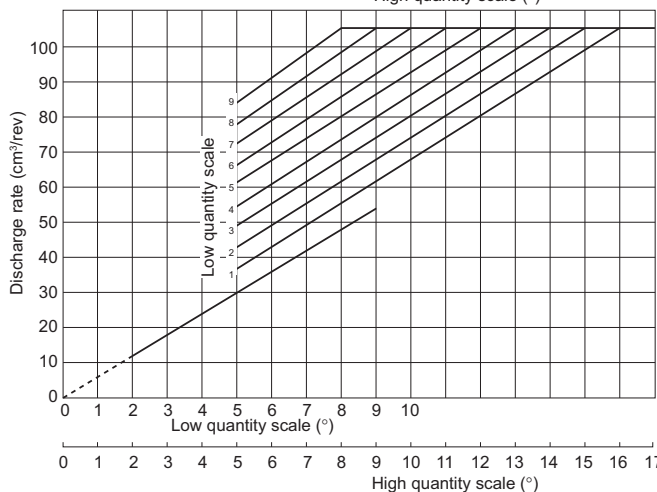
VZ63C



VZ80C



VZ100C



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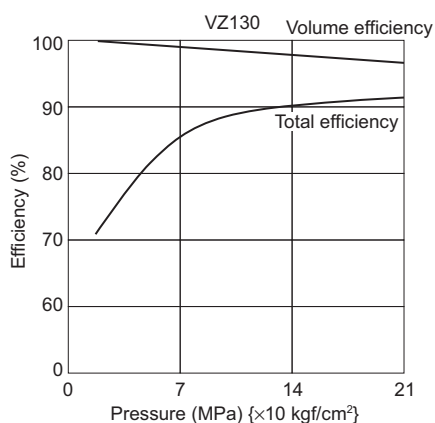
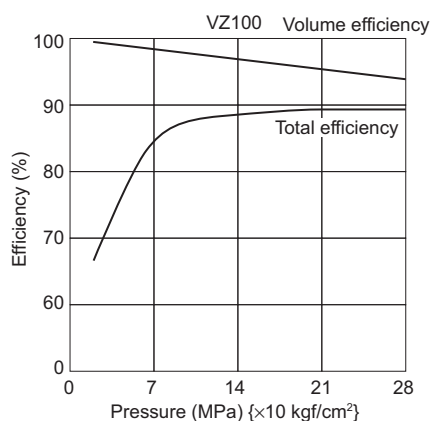
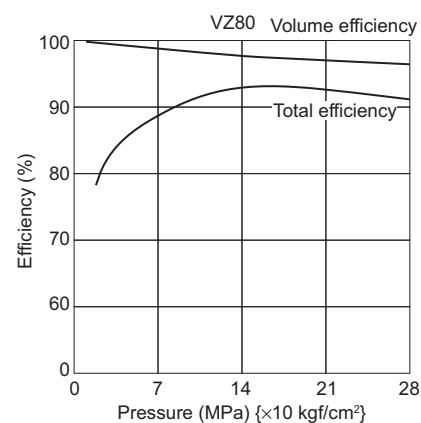
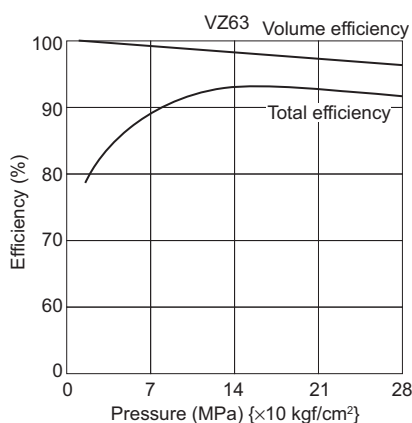
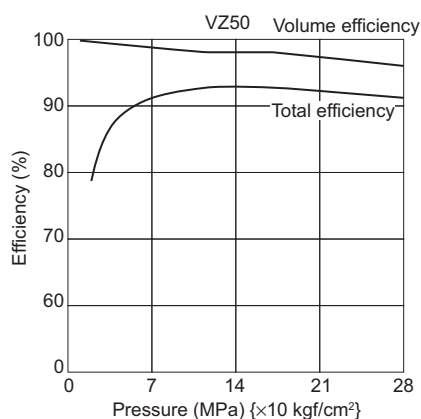
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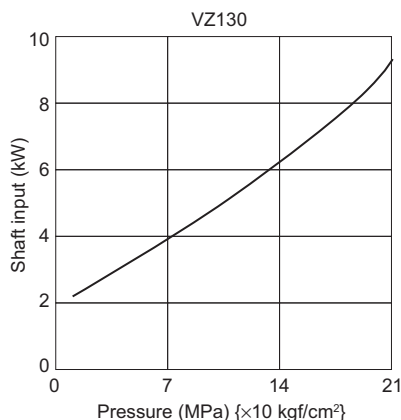
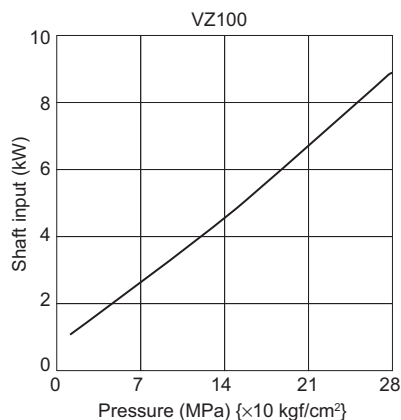
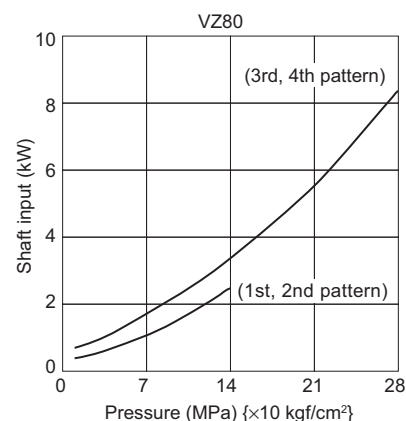
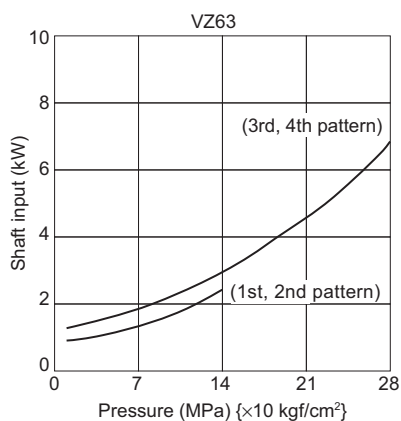
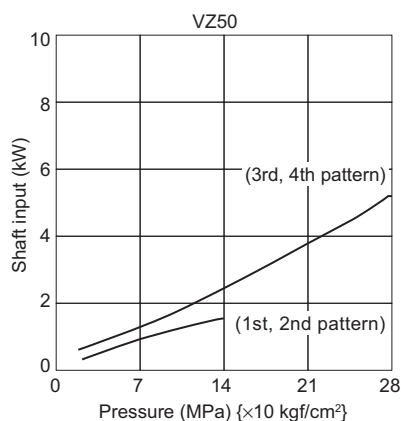
## General performance (1800 min<sup>-1</sup>)

## Discharge rate setting: maximum



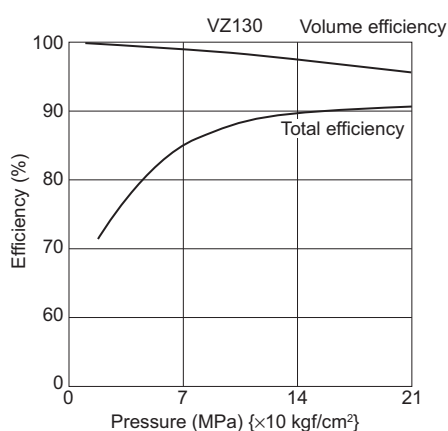
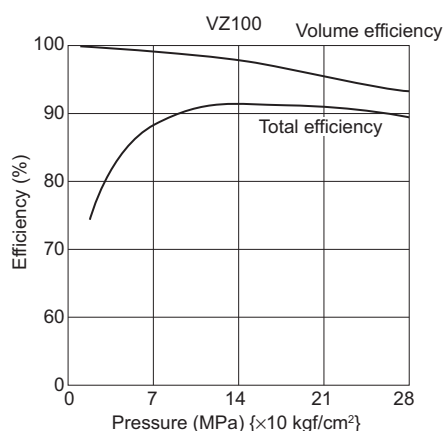
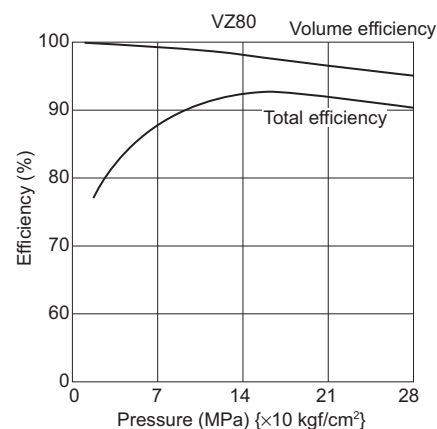
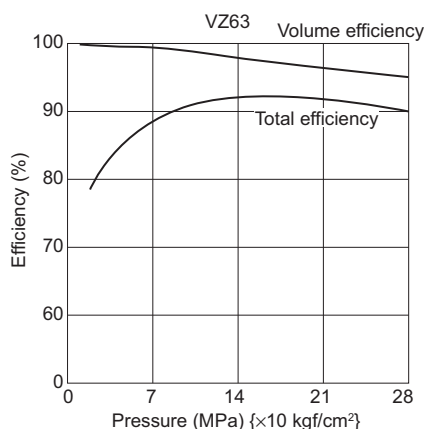
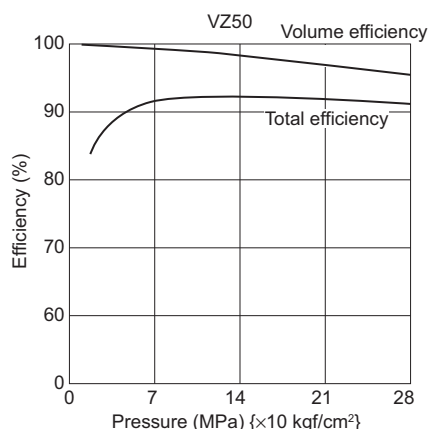
Note: The efficiency varies depending on the discharge rate setting. When selecting the motor capacity, refer to the shaft input characteristics on Page A-52.

## Shaft input characteristics at full cutoff (1800 min<sup>-1</sup>)



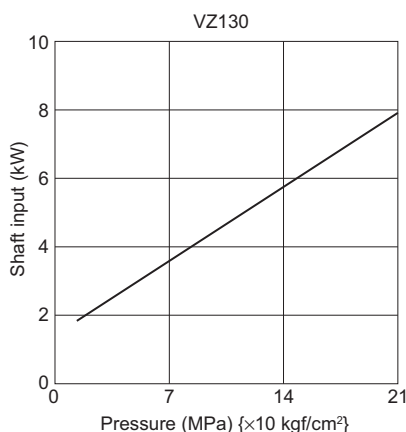
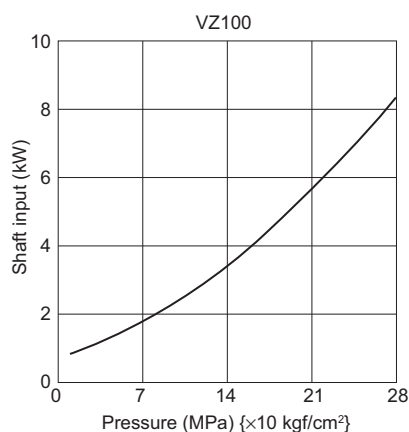
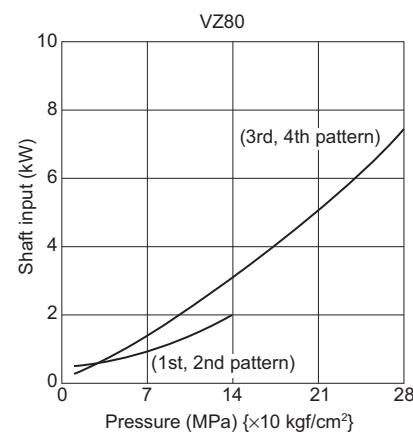
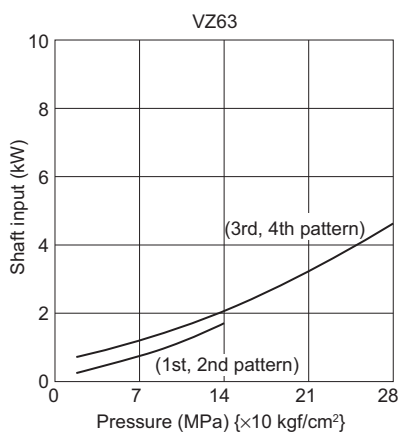
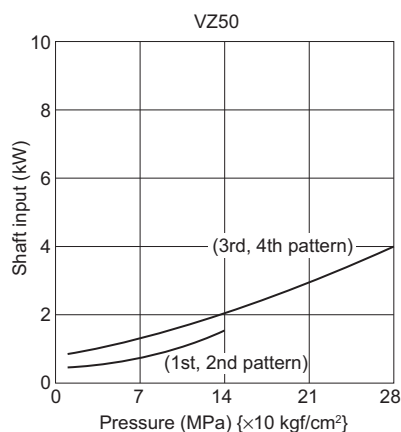
## General performance (1500 min<sup>-1</sup>)

## Discharge rate setting: maximum



Note: The efficiency varies depending on the discharge rate setting. When selecting the motor capacity, refer to the shaft input characteristics on Page A-53.

## Shaft input characteristics at full cutoff (1500 min<sup>-1</sup>)



## Contact Details

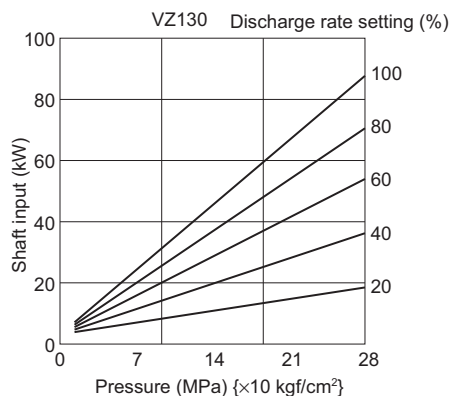
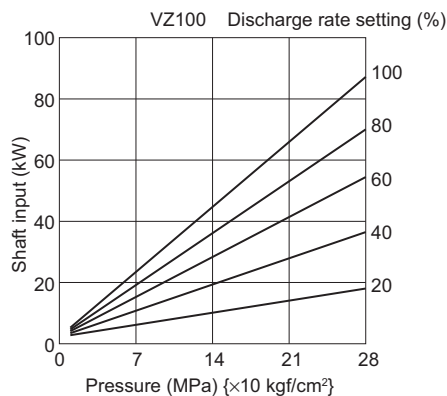
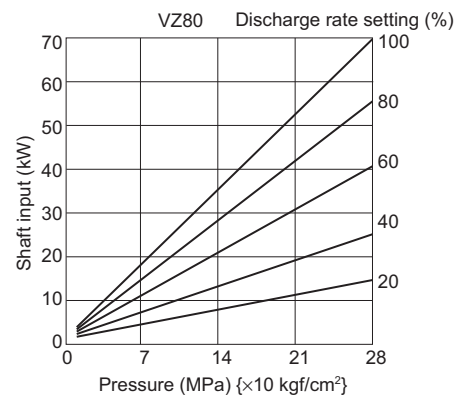
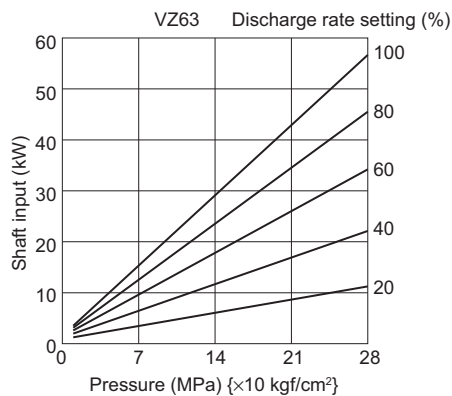
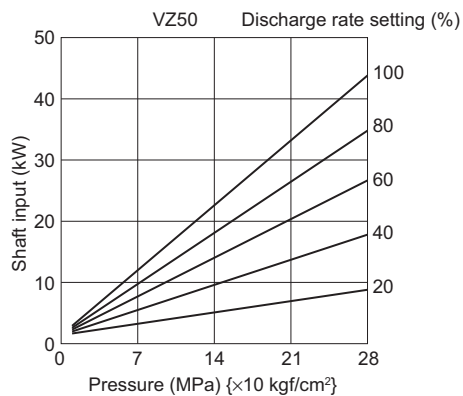
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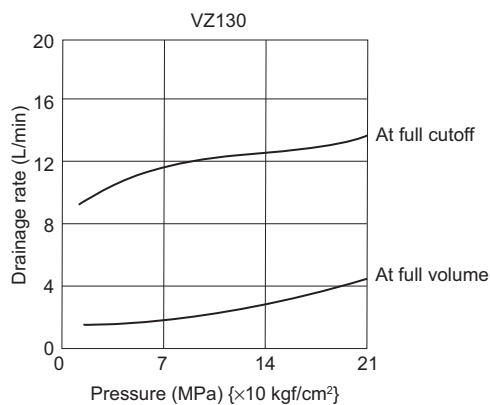
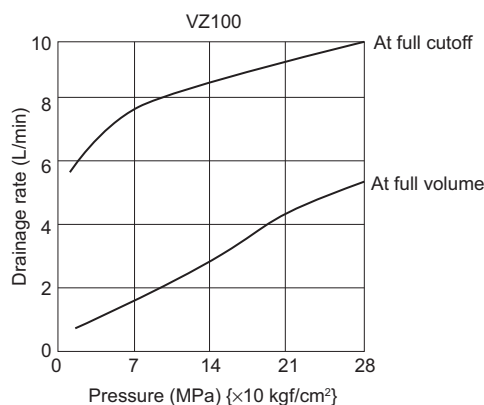
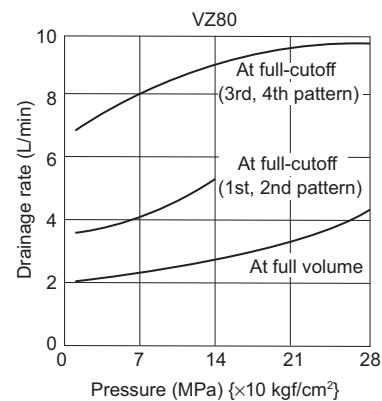
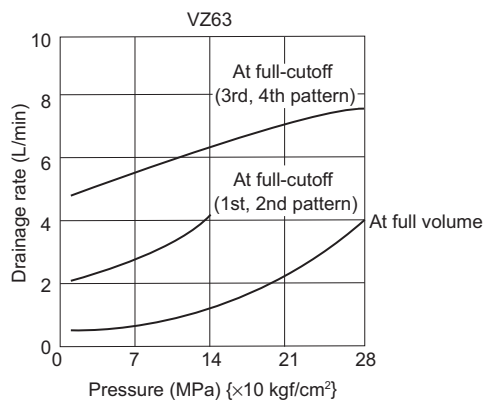
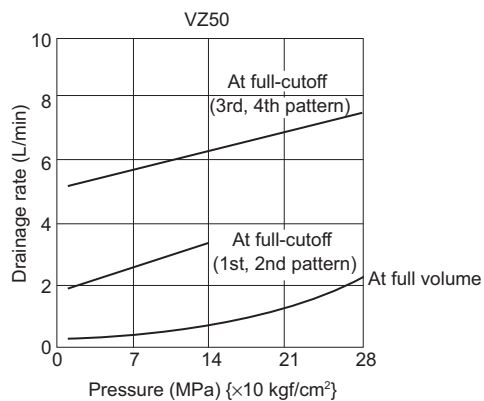
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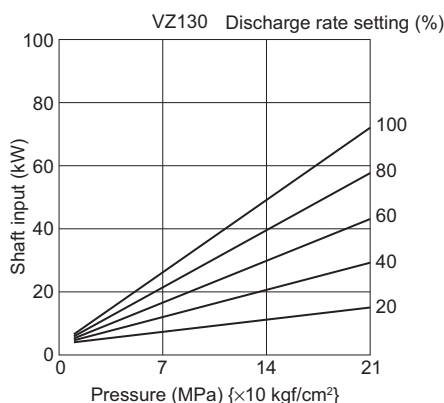
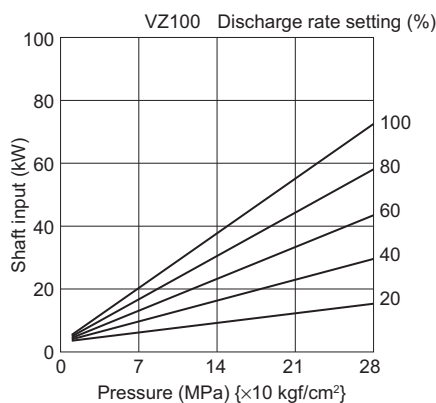
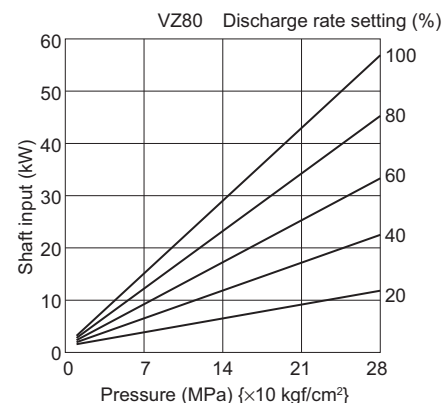
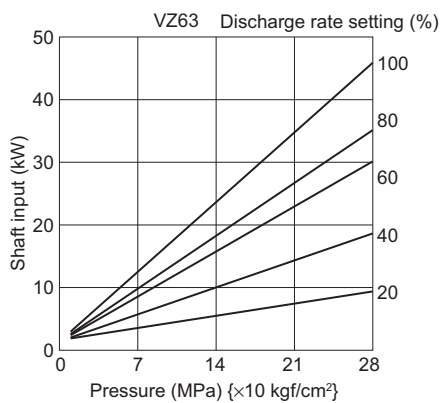
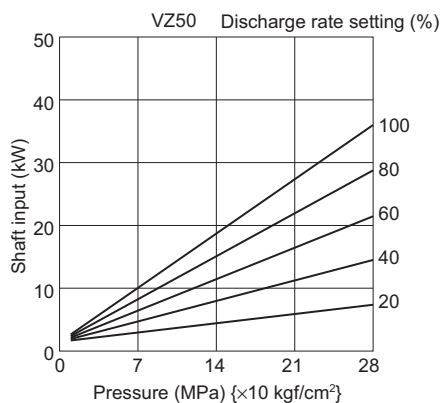
## Shaft input characteristics (1800 min<sup>-1</sup>)



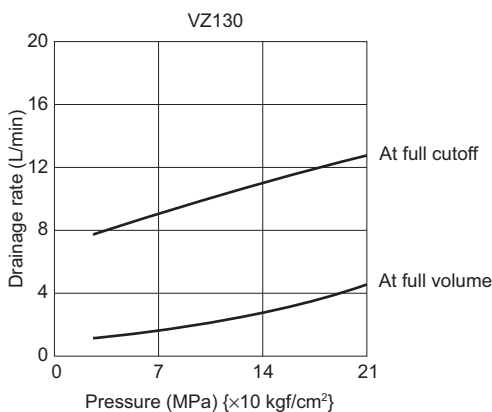
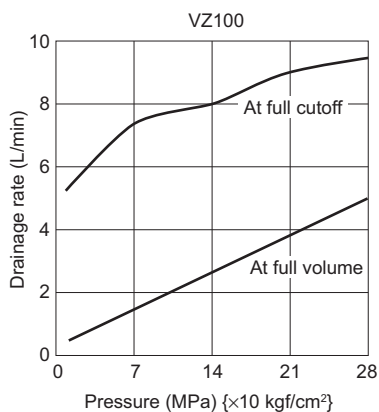
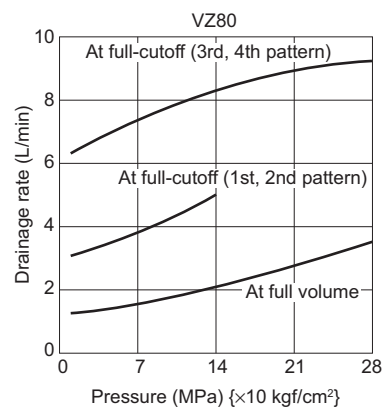
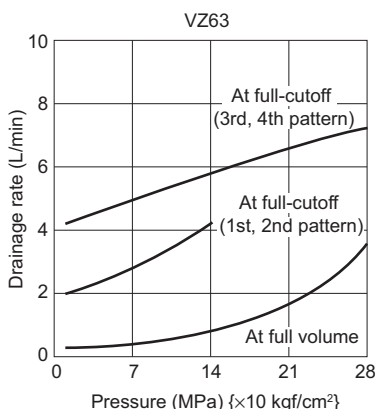
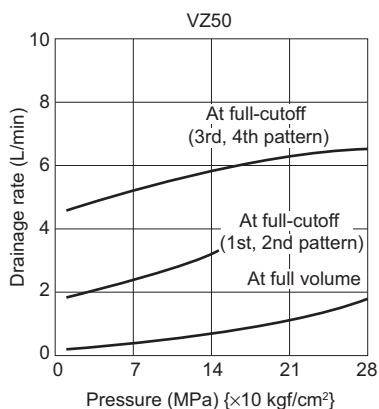
## Drainage volume characteristics (1800 min<sup>-1</sup>)



## Shaft input characteristics (1500 min<sup>-1</sup>)



## Drainage volume characteristics (1500 min<sup>-1</sup>)



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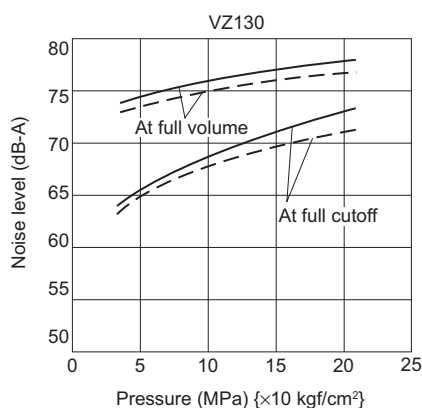
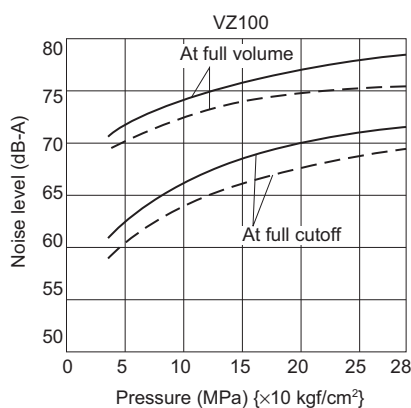
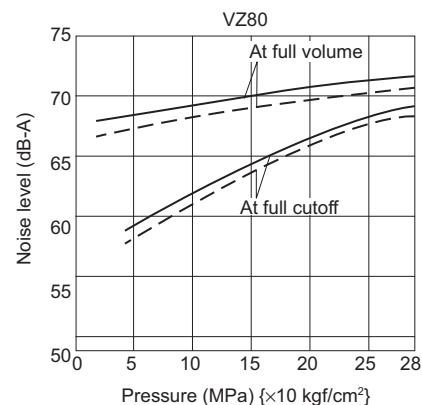
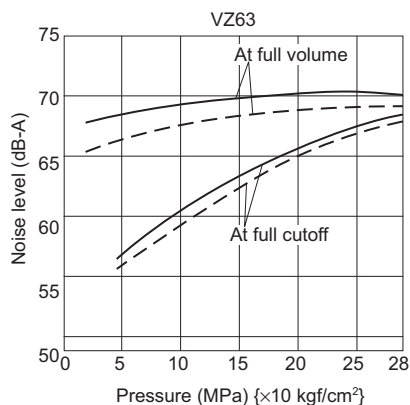
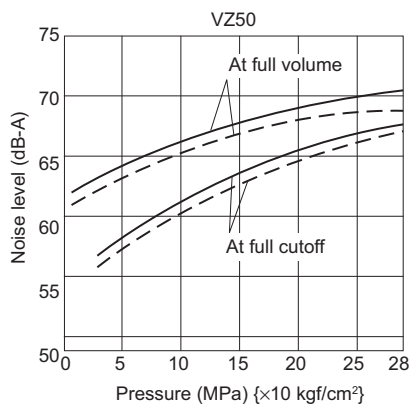
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## Noise characteristics (JIS B 8350, measuring position: 1 m from pump front)

| Input rotational speed                        | Fluid used             | Oil temperature |
|-----------------------------------------------|------------------------|-----------------|
| 1800 min <sup>-1</sup> 1500 min <sup>-1</sup> | Equivalent to ISO VG32 | 50°C            |

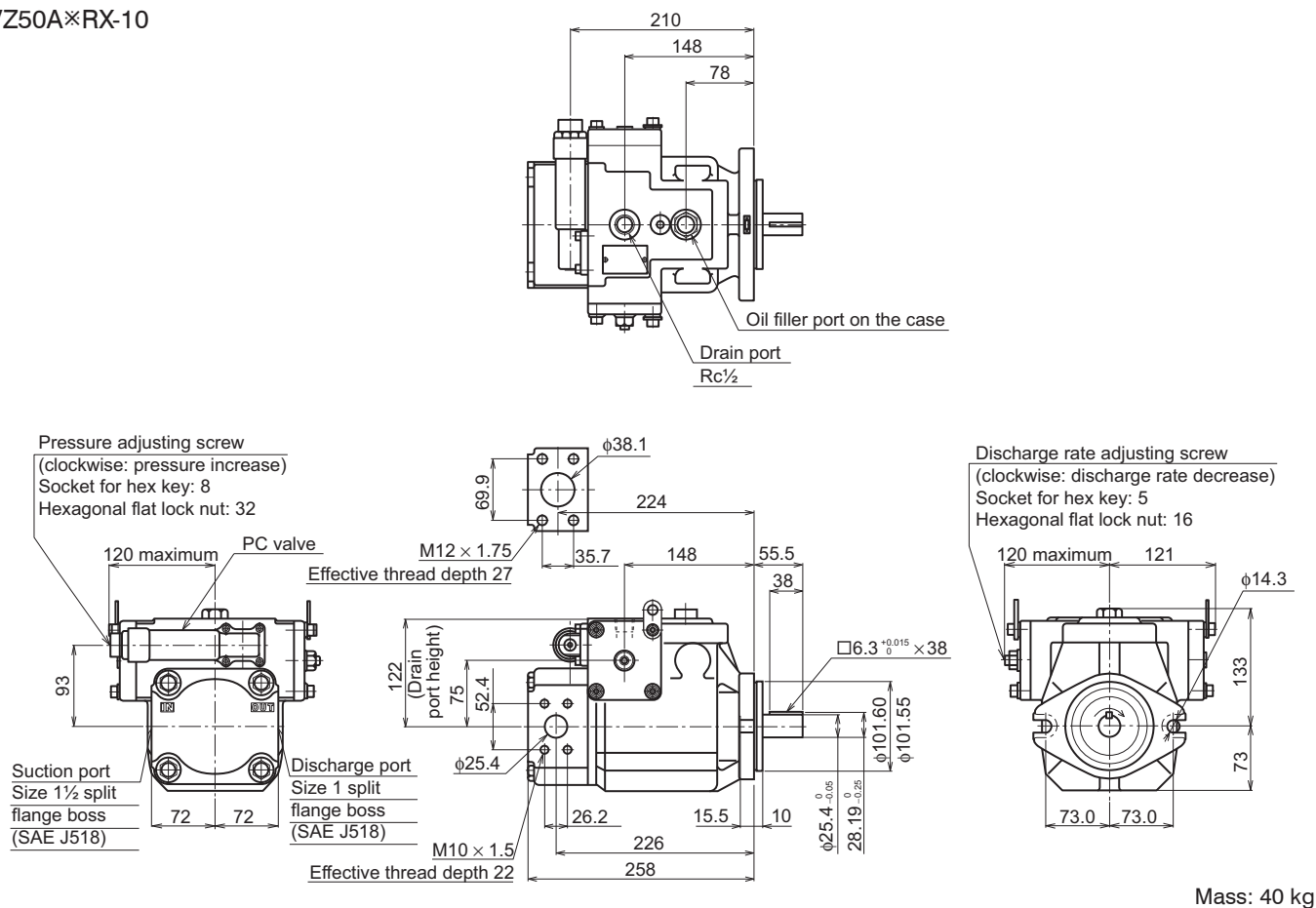
--- 1500 min<sup>-1</sup>

— 1800 min<sup>-1</sup>



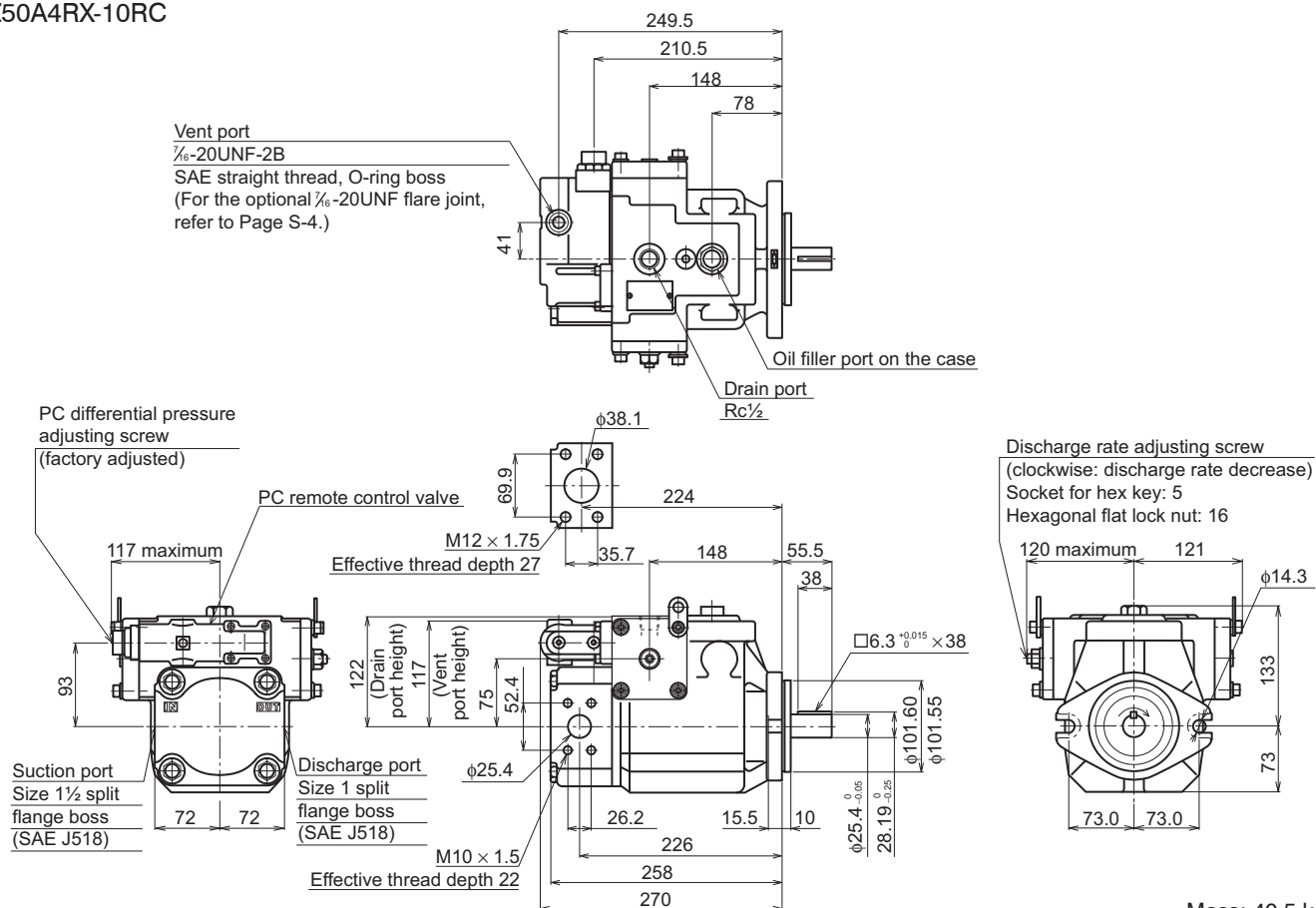
### External dimension diagram

VZ50A※RX-10



Mass: 40 kg

## VZ50A4RX-10RC



Mass: 40.5 kg

## Contact Details

Before using the product, please check the guide pages at the front of this catalog.

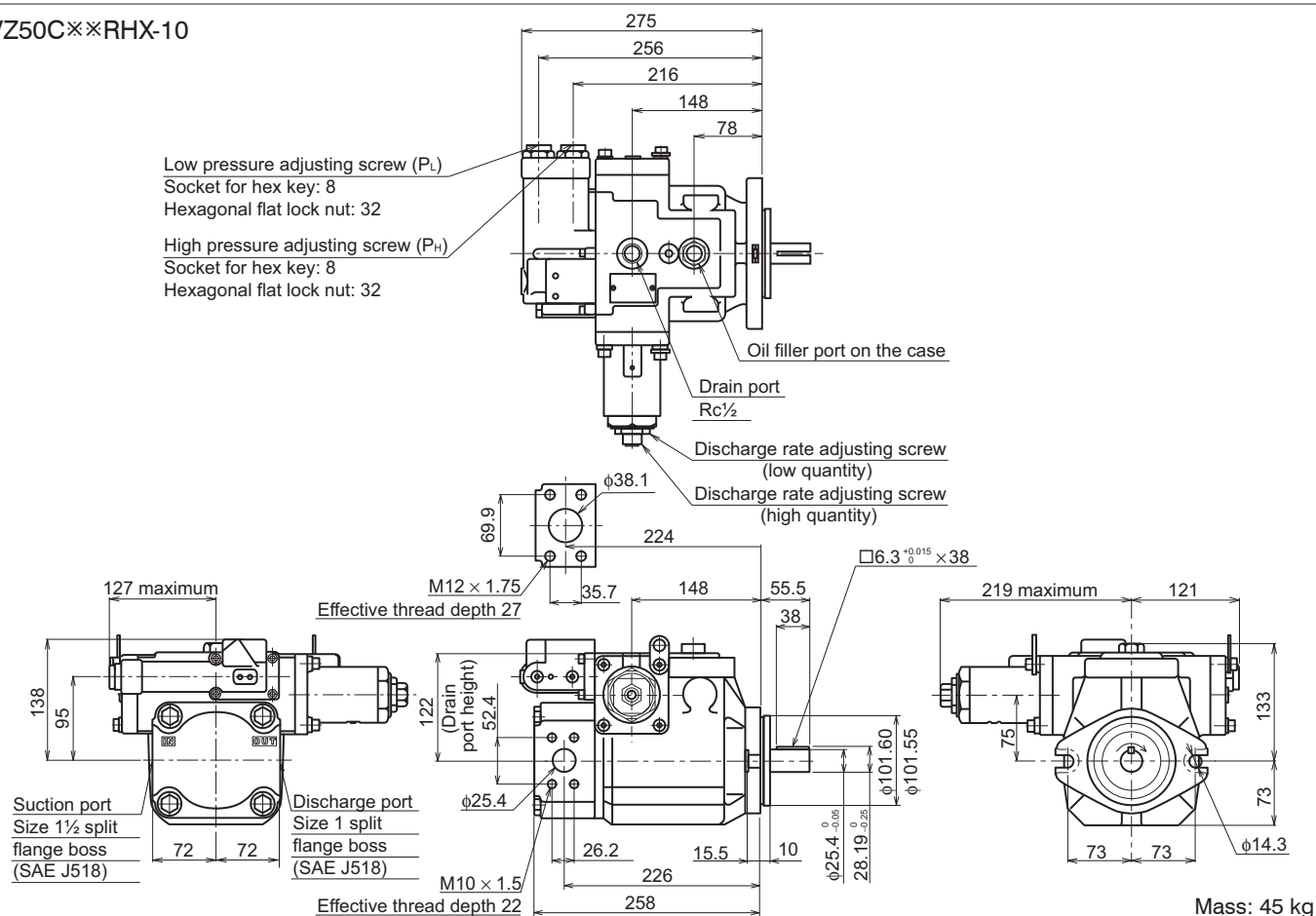
Internet

<http://www.daikinpmc.com/en/>

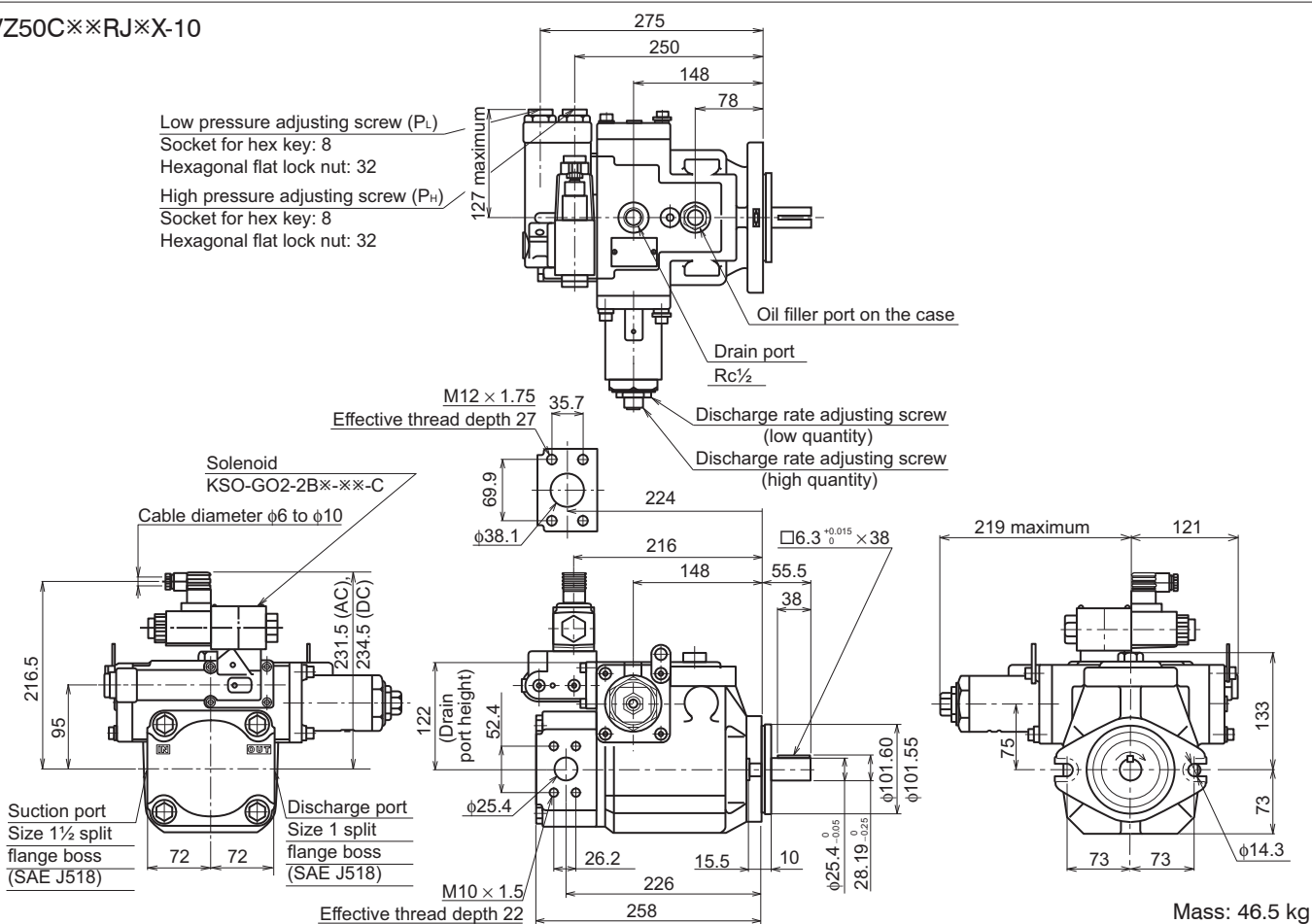
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## External dimension diagram

### VZ50C※※RHX-10



### VZ50C※※RJ※X-10



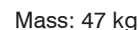
Before using the product, please check the guide pages at the front of this catalog.

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A

VZ63A※RX-10



## VZ63A4RX-10RC



## Contact Details

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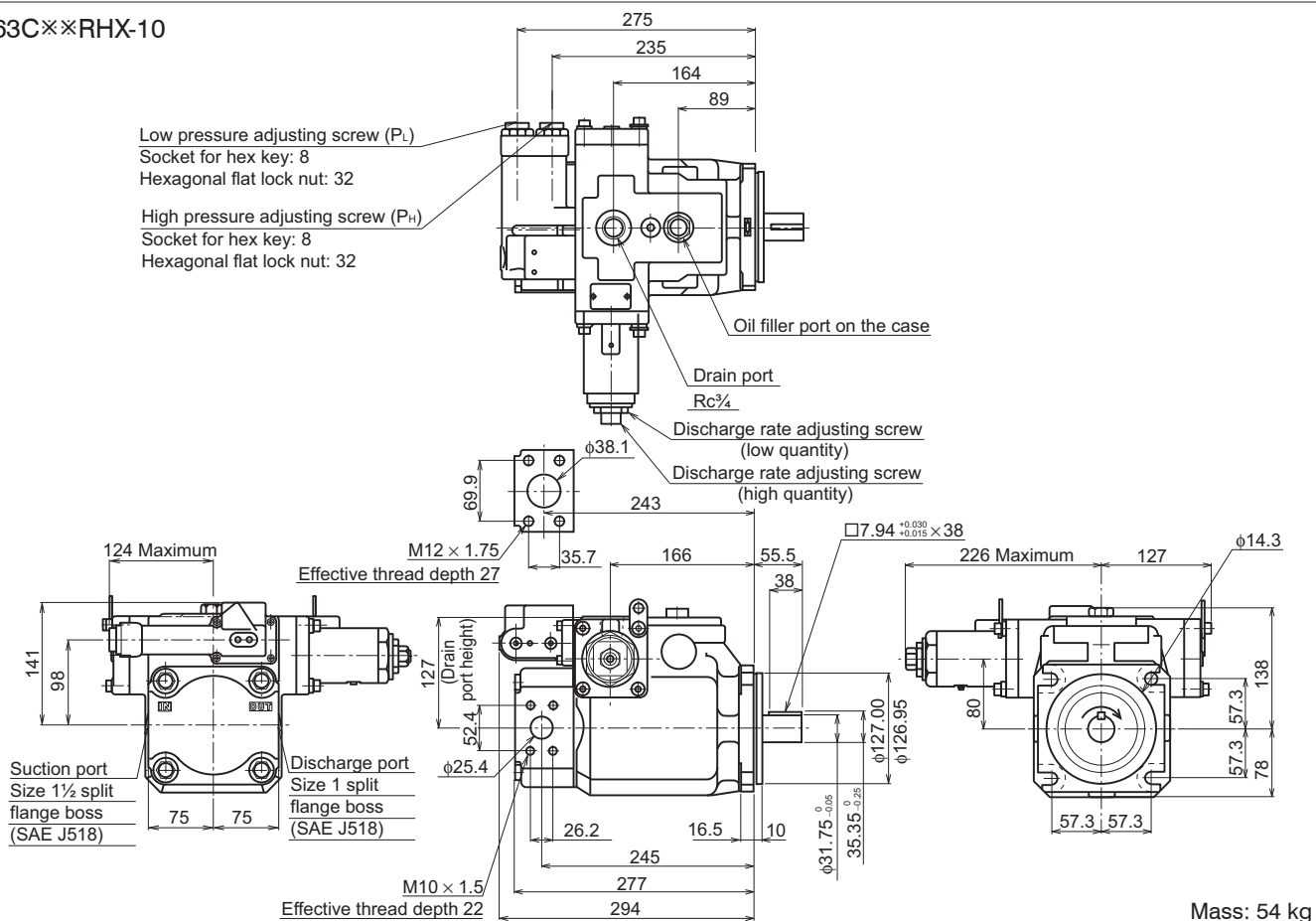
Internet

<http://www.daikinpmc.com/en/>

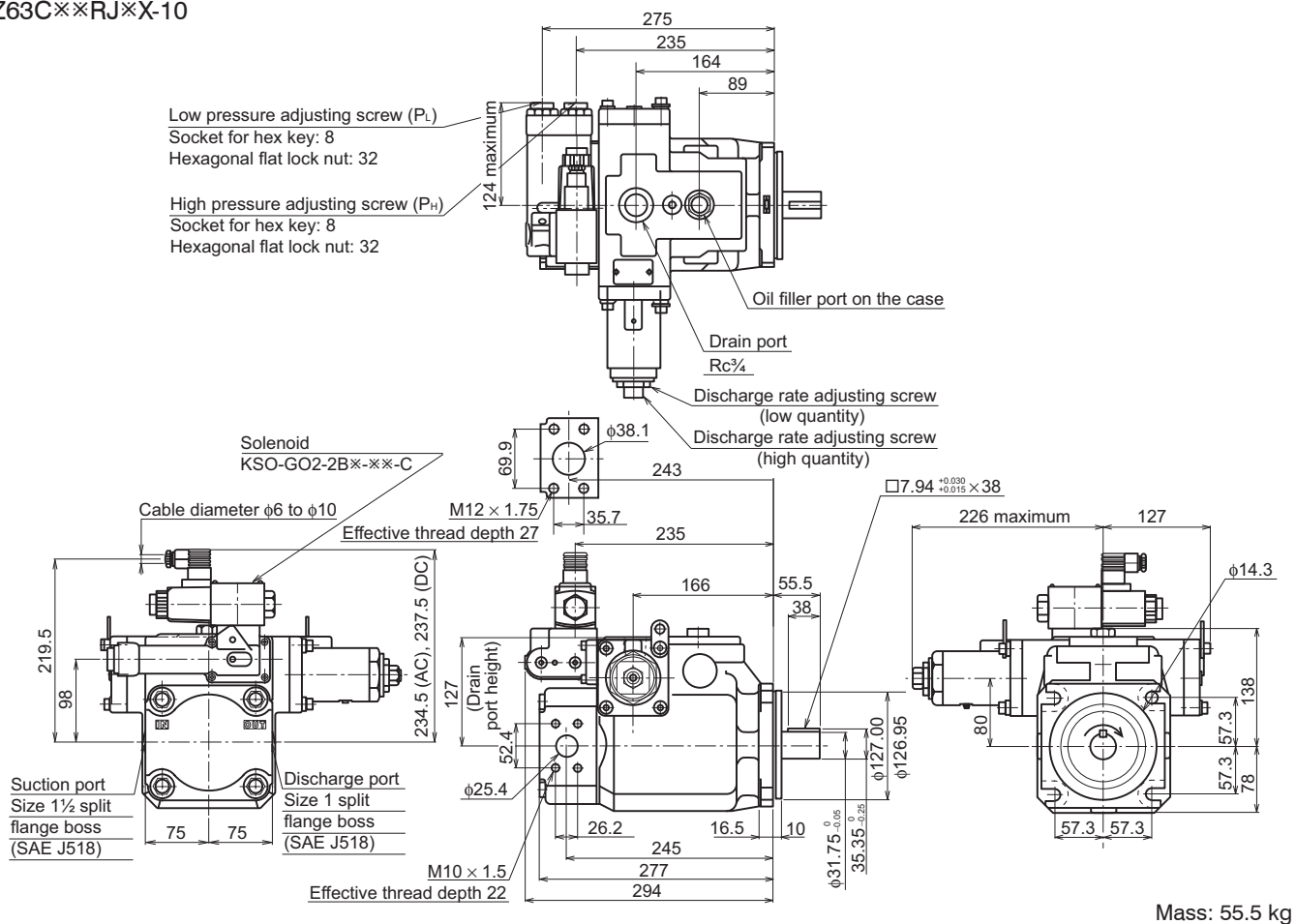
For latest information, PDF catalogs and operation manuals

## External dimension diagram

### VZ63C※※RHX-10



### VZ63C※※RJ※X-10



## Contact Details

Before using the product, please check the guide pages at the front of this catalog.

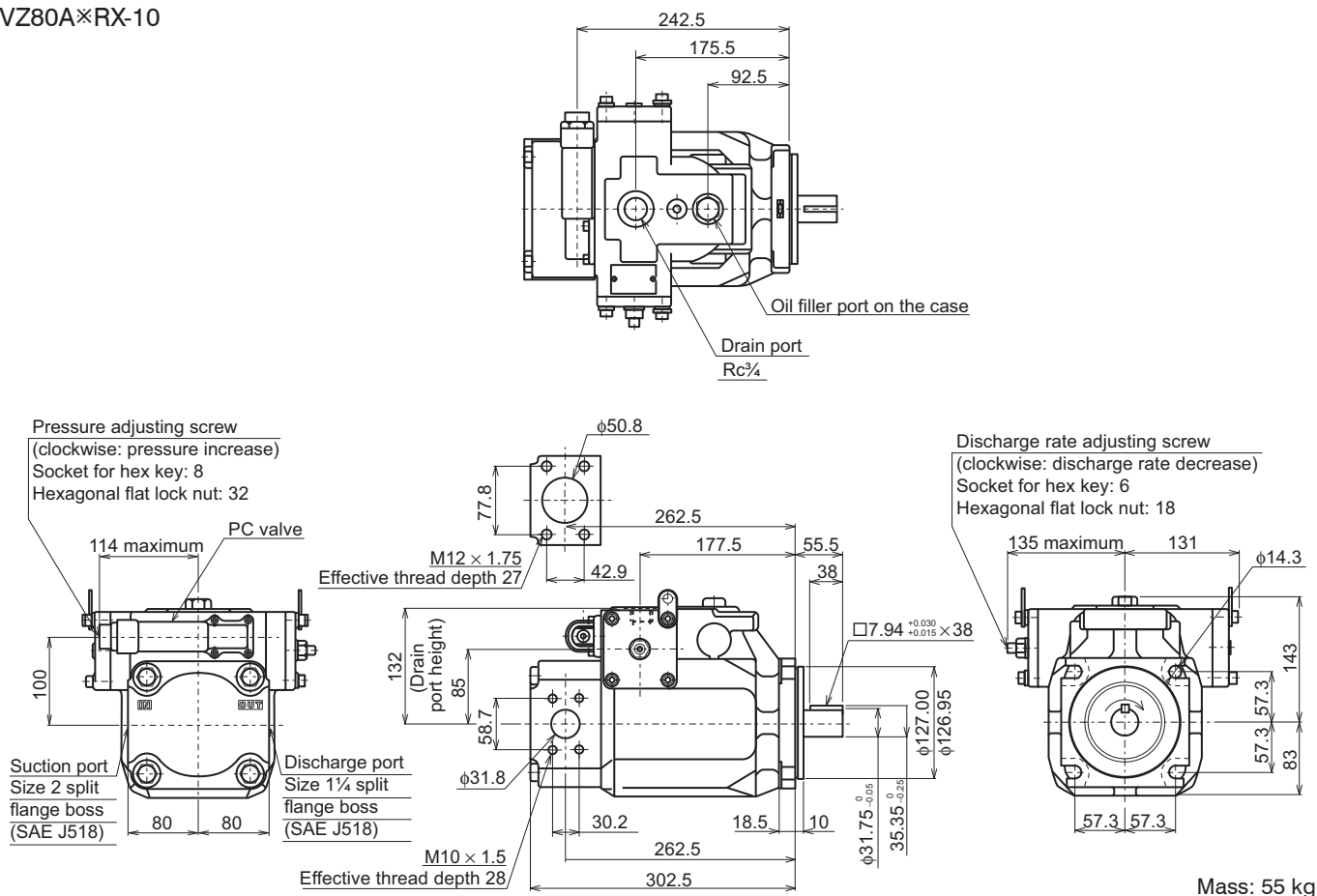
Internet

<http://www.daikinpmc.com/en/>

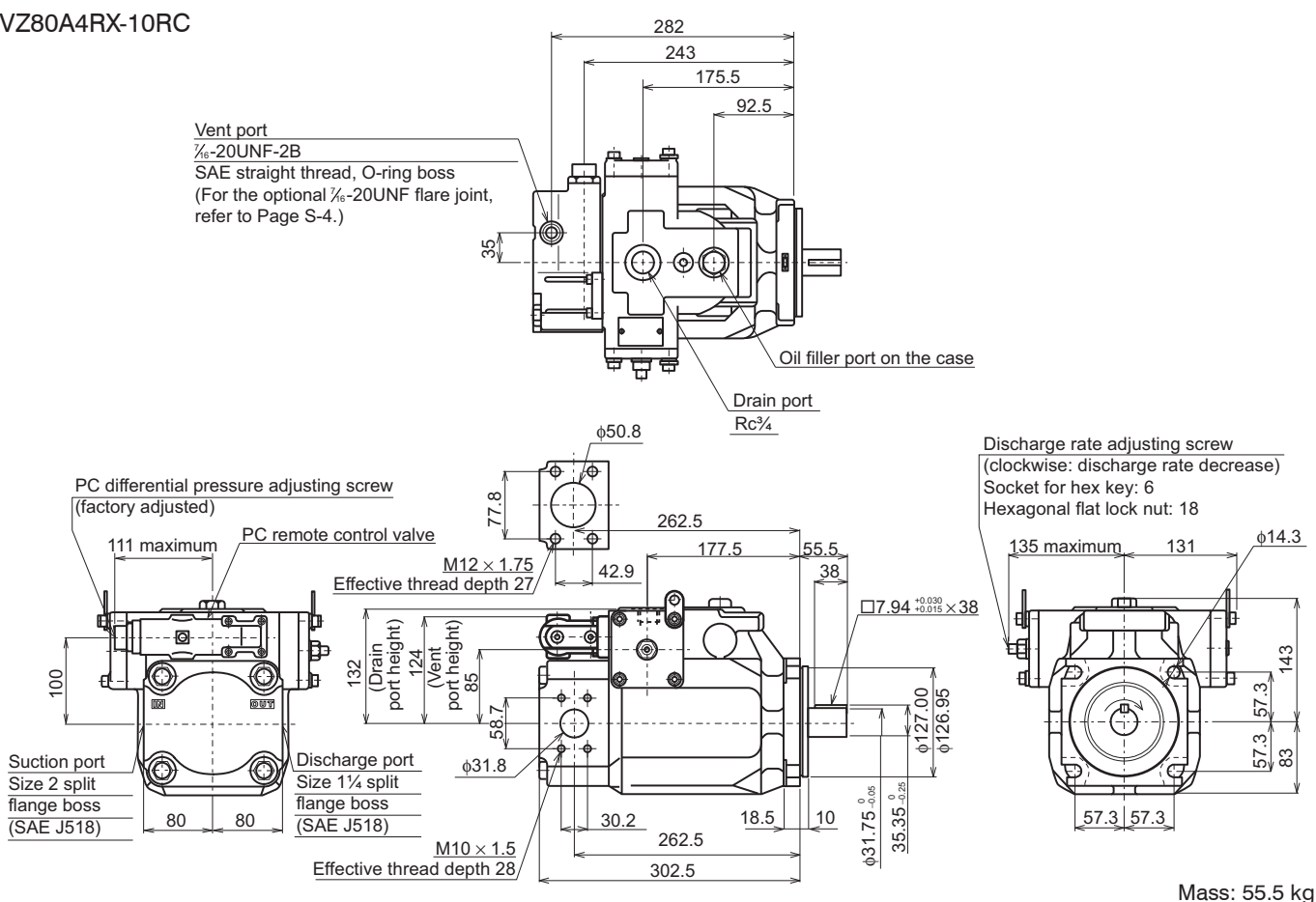
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## External dimension diagram

### VZ80A×RX-10



### VZ80A4RX-10RC



## Contact Details

Before using the product, please check the guide pages at the front of this catalog.

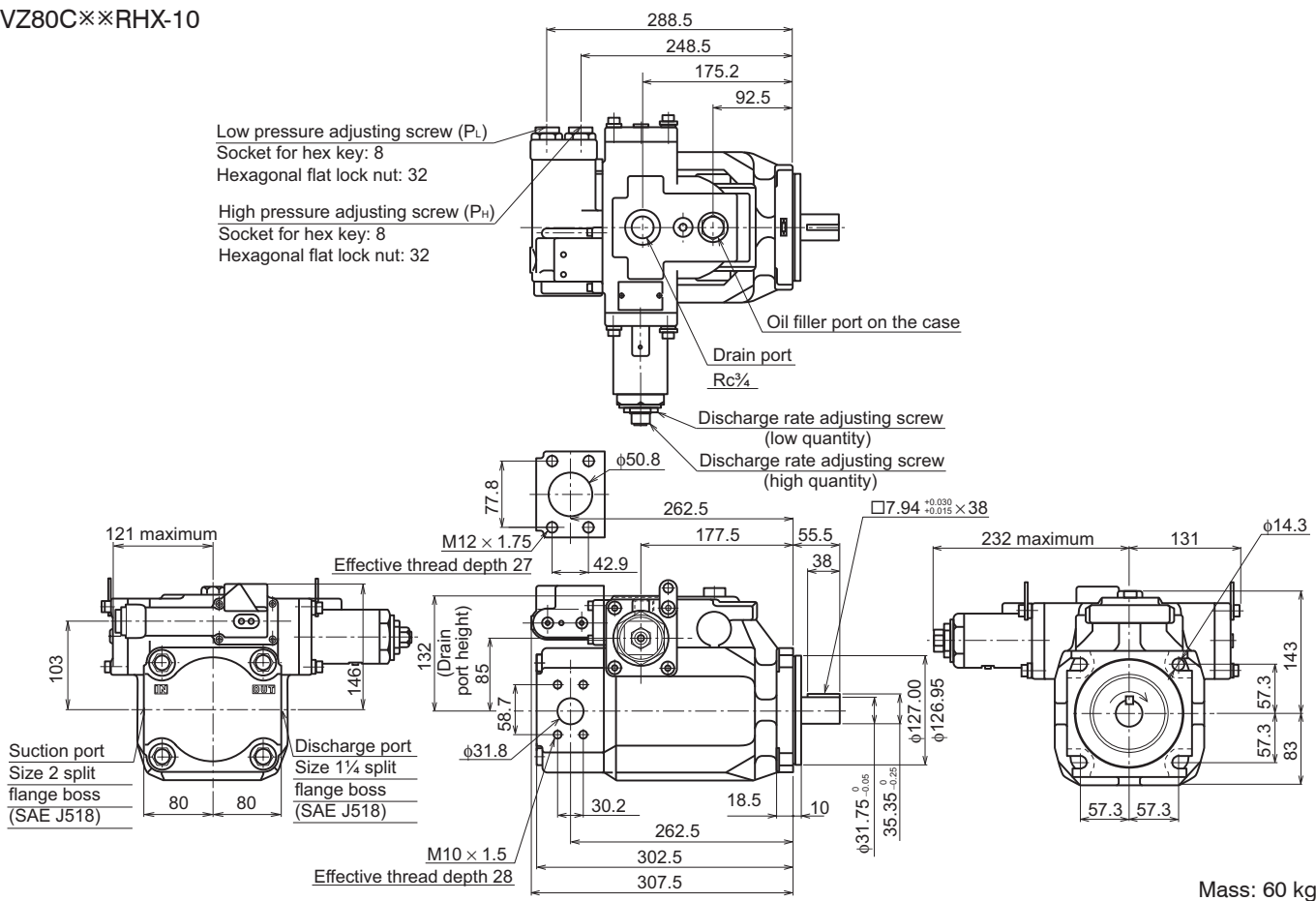
Internet

<http://www.daikinpmc.com/en/>

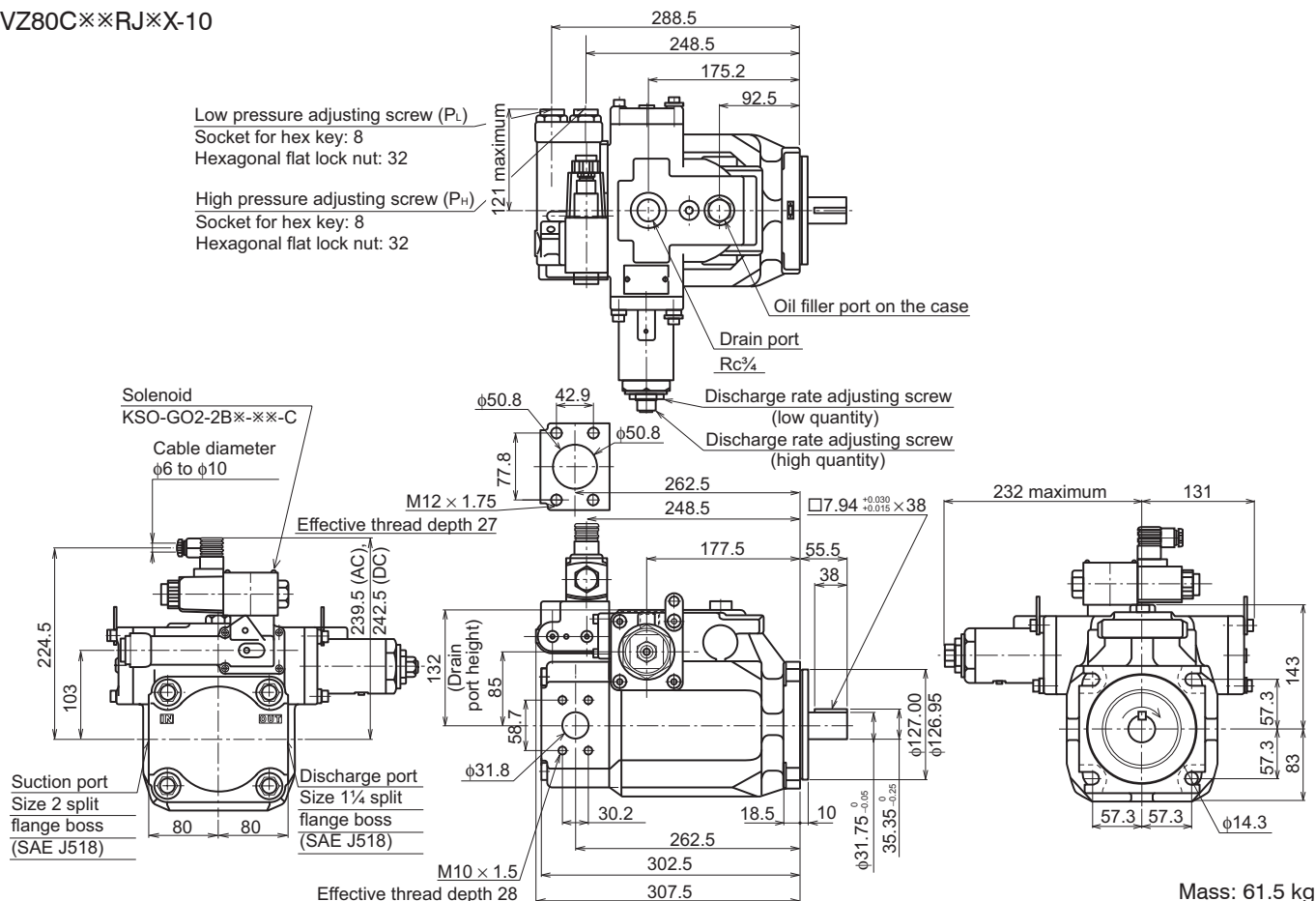
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## External dimension diagram

### VZ80C※RHX-10



### VZ80C※RJ※X-10



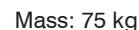
Before using the product, please check the guide pages at the front of this catalog.

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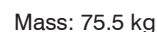
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A

## VZ100A※RX-10



|                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------|
| Vent port                                                                                                       |
| $\frac{7}{16}$ -20UNF-2B                                                                                        |
| SAE straight thread, O-ring boss<br>(For the optional $\frac{7}{16}$ -20UNF flare joint,<br>refer to Page S-4.) |

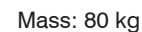


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VZ100C\*\*RHX-10



**Z100C\*\*RJ\*\*X-10**

Low pressure adjusting screw ( $P_L$ )  
 Socket for hex key: 8  
 Hexagonal flat lock nut: 32

High pressure adjusting screw ( $P_H$ )  
 Socket for hex key: 8  
 Hexagonal flat lock nut: 32

Oil filler port on the case

Drain port  
 $Rc\frac{3}{4}$

Discharge rate adjusting screw (low quantity)

Discharge rate adjusting screw (high quantity)

Solenoid  
 KSO-G02-2B\*-\*\*C

Cable diameter  
 $\phi 6$  to  $\phi 10$

Discharge port  
 Size  $1\frac{1}{4}$  split flange boss (SAE J518)

Suction port  
 Size 2 split flange boss (SAE J518)

M12  $\times$  1.75  
 Effective thread depth 27

M12  $\times$  1.75  
 Effective thread depth 28

Turning direction

Dimensions (mm):

- Top view: 326, 286, 168, 95
- Front view: 234.5, 116, 249.5 (AC), 252.5 (DC), 90, 90
- Side view: 274, 188, 99.5, 73, 12.45, 127.00, 126.95, 318, 274, 17, 30.18, 58.72, 77.77,  $\phi 50.8$ , 42.88
- Bottom view: 265 maximum, 150, 145, 57.3, 57.3,  $\phi 15 \pm 0.4$ , 92, 57.3, 57.3
- Other dimensions:  $\phi 6$  to  $\phi 10$ ,  $\phi 30$ ,  $\phi 44.450$ ,  $\phi 44.400$ ,  $49.3 \pm 0.13$ ,  $11.11^{+0.025}_0 \times 73$

Mass: 81.5 kg

## Contact Details

Before using the product, please check the guide pages at the front of this catalog.

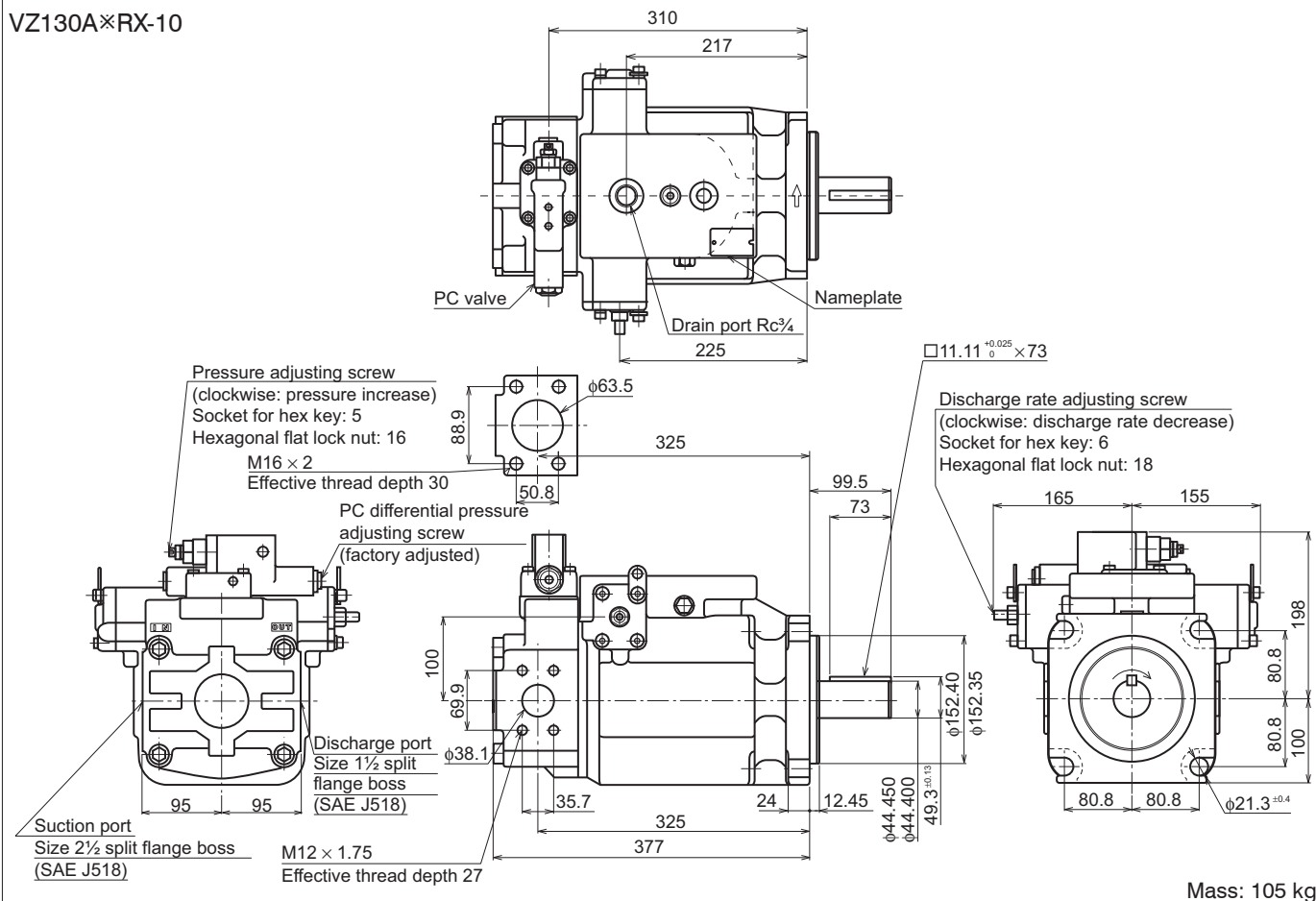
Internet

<http://www.daikinpmc.com/en/>

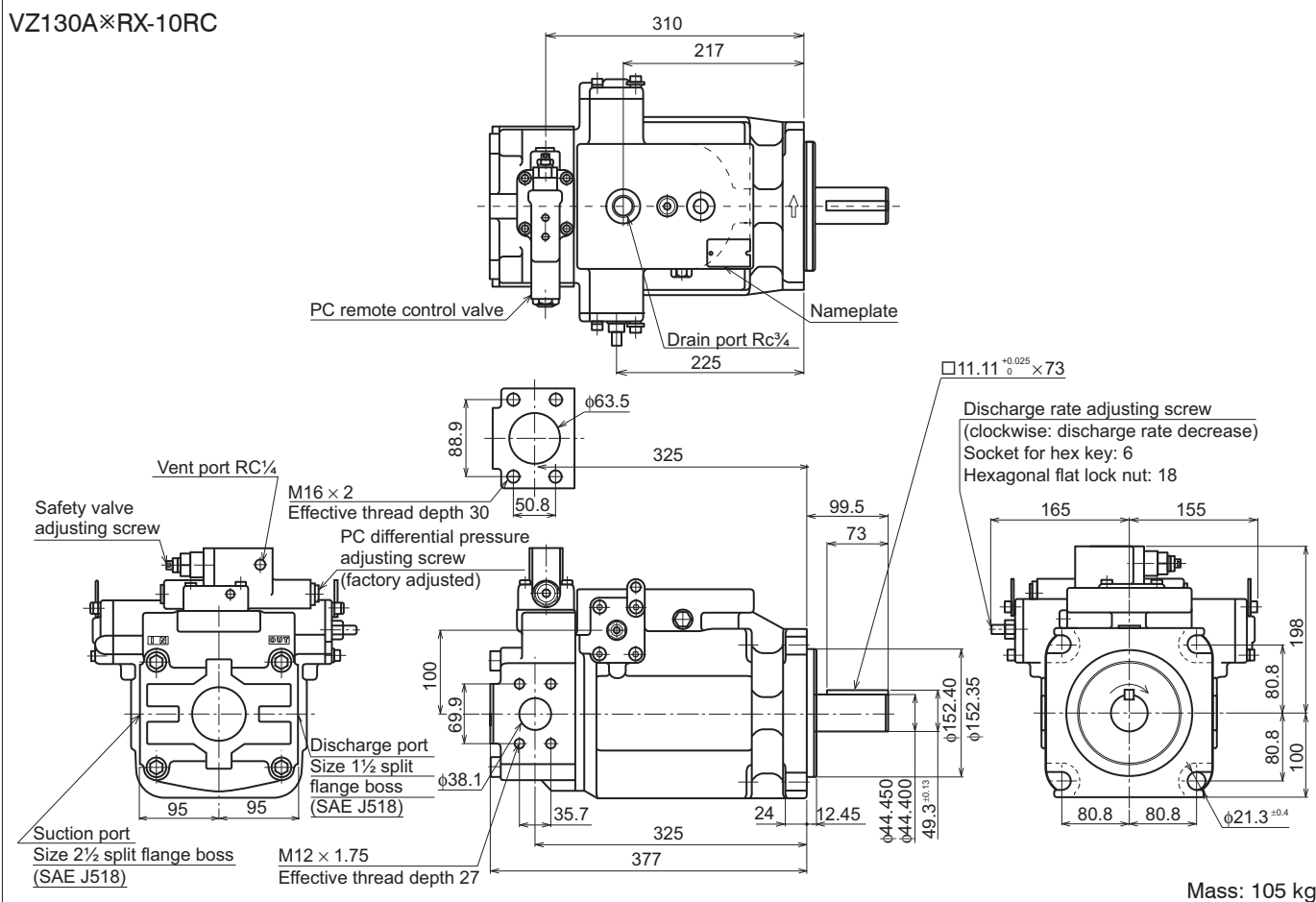
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## External dimension diagram

### VZ130A×RX-10



### VZ130A×RX-10RC



## Contact Details

Before using the product, please check the guide pages at the front of this catalog.

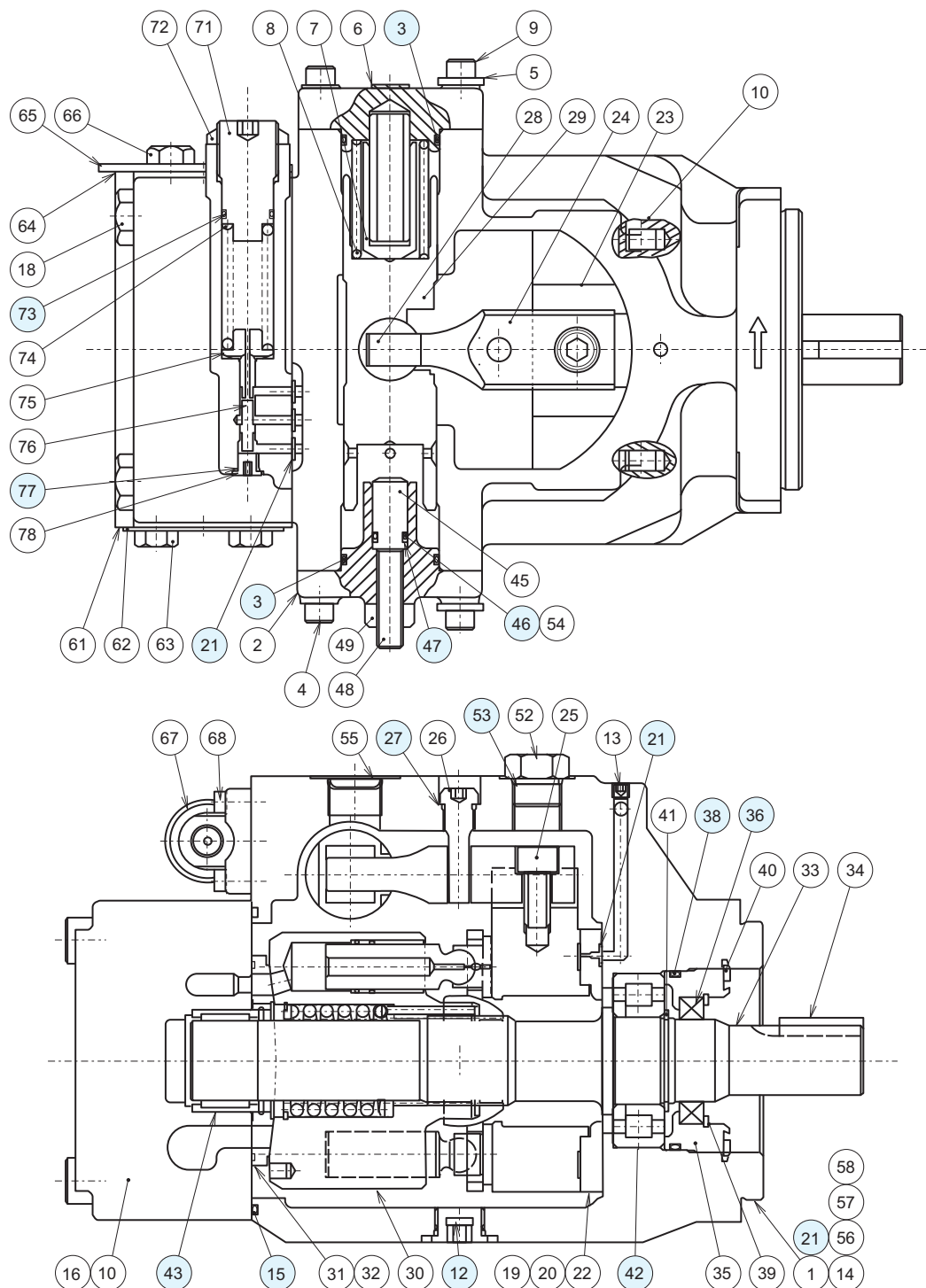
Internet

<http://www.daikinpmc.com/en/>

For latest information, PDF catalogs and operation manuals

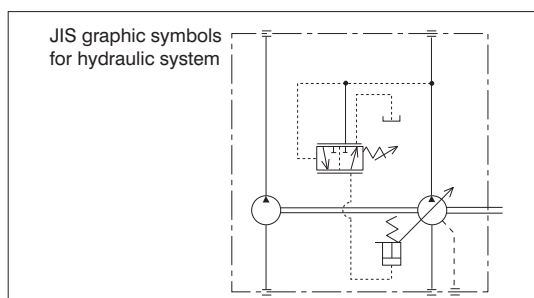
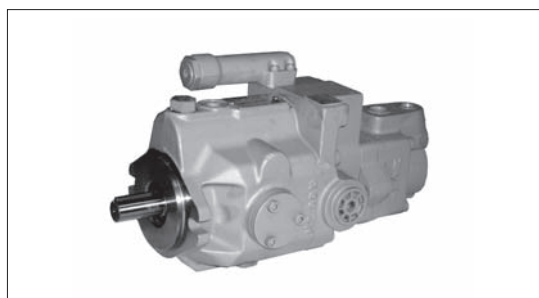
## Sectional structural diagram

VZ80



|         |                         | VZ130                | VZ100                | VZ80               | VZ63               | VZ50               |          |          |
|---------|-------------------------|----------------------|----------------------|--------------------|--------------------|--------------------|----------|----------|
| PartNo. | Part name               | Specifications       |                      |                    |                    |                    | Material | Quantity |
| 3       | O-ring                  | JIS B 2401 1B-G45    |                      | JIS B 2401 1B-G40  | JIS B 2401 1B-G35  |                    | NBR      | 2        |
| 12      | O-ring                  | AS568-910 (HS90)     |                      |                    |                    | AS568-908 (HS90)   | NBR      | 1        |
| 15      | O-ring                  | JIS B 2401 1A-G160   | JIS B 2401 1A-G150   | JIS B 2401 1B-G135 | JIS B 2401 1B-G125 | JIS B 2401 1B-G120 | NBR      | 1        |
| 21      | O-ring                  | JIS B 2401 1B-P7     |                      |                    |                    |                    | NBR      | 6        |
| 27      | O-ring                  | AS568-908 (HS90)     |                      |                    |                    |                    | NBR      | 1        |
| 36      | Oil seal                | TCN487012            |                      | TCV385811          |                    | TCV284811          | NBR      | 1        |
| 38      | O-ring                  | AS568-238 (HS70)     |                      | AS568-234 (HS70)   |                    |                    | NBR      | 1        |
| 42      | Cylinder roller bearing | NUP2210G1C3          | NUP2210G1C3          | NUP2208C3          | NUP208C3           | NUP2206C3          |          | 1        |
| 43      | Needle bearing          | NK43/30RV1+IR384330C | NK40/30RV1+IR354030C | NK37/30RV1         | NK32/30RV2         | NK29/30RV1         |          | 1        |
| 46      | O-ring                  | JIS B 2401 1B-P12    |                      |                    | JIS B 2401 1B-P10A |                    | NBR      | 1        |
| 47      | Backup ring             | JIS B 2407 T2P12     |                      |                    | JIS B 2407 T2P10A  |                    |          | 1        |
| 53      | O-ring                  | AS568-910 (HS90)     |                      |                    |                    |                    | NBR      | 1        |
| 73      | O-ring                  |                      | JIS B 2401 1B-P20    |                    |                    |                    | NBR      | 1        |
| 77      | O-ring                  |                      | AS568-903 (HS90)     |                    |                    |                    | NBR      | 1        |

# VD series Dual Pump



## Nomenclature

**VD**   **※**   **-**   **※※**   **A**   **※**   **R**   **-**   **※※**  
**1**   **2**   **3**   **4**   **5**   **6**   **7**

### 1 Model No.

VD: VD series Dual Pump

### 2 Vane pump capacity code

1: DS11P  
 2: DS12P  
 3: DS13P  
 4: DS14P

### 3 Piston pump capacity code

8: V 8 ( 8.0 cm<sup>3</sup>/rev)  
 15: V15 (14.8 cm<sup>3</sup>/rev)  
 38: V38 (37.7 cm<sup>3</sup>/rev)

### 4 Control method

A: Pressure compensator control

### 5 Pressure adjustment range (piston pump)

1: 0.8 to 7 MPa { 8 to 70 kgf/cm<sup>2</sup> }  
 2: 1.5 to 14 MPa { 15 to 140 kgf/cm<sup>2</sup> }  
 3: 3.5 to 21 MPa { 35 to 210 kgf/cm<sup>2</sup> }

### 6 Direction of rotation, when viewed from the shaft end

R: Clockwise (rightward)

### 7 Design No. (The design No. is subject to change)

30: Pump model VD※-8A1R  
 95: Pump model VD※-15A※R, VD※-38A※R

## Vane Pump Specifications

| Model code | [Conditions] Input rotational speed: 1800 min <sup>-1</sup> , Fluid used: equivalent to ISO VG32, Fluid temperature: 40°C |                                    |                                    |                                    |                                     |                                    |                                    |                                    |                                    |  |
|------------|---------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------|------------------------------------|-------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|--|
|            | Discharge rate L/min                                                                                                      |                                    |                                    |                                    | Shaft input kW                      |                                    |                                    |                                    |                                    |  |
|            | 0.4 MPa<br>{4 kgf/cm <sup>2</sup> }                                                                                       | 3 MPa<br>{30 kgf/cm <sup>2</sup> } | 5 MPa<br>{50 kgf/cm <sup>2</sup> } | 7 MPa<br>{70 kgf/cm <sup>2</sup> } | 0.4 MPa<br>{4 kgf/cm <sup>2</sup> } | 1 MPa<br>{10 kgf/cm <sup>2</sup> } | 3 MPa<br>{30 kgf/cm <sup>2</sup> } | 5 MPa<br>{50 kgf/cm <sup>2</sup> } | 7 MPa<br>{70 kgf/cm <sup>2</sup> } |  |
| DS11P      | 5.0                                                                                                                       | 4.5                                | 4.1                                | 3.9                                | 0.15                                | 0.28                               | 0.55                               | 0.82                               | 1.1                                |  |
| DS12P      | 7.7                                                                                                                       | 7.2                                | 6.7                                | 6.5                                | 0.20                                | 0.40                               | 0.75                               | 1.12                               | 1.5                                |  |
| DS13P      | 12.6                                                                                                                      | 11.8                               | 11.5                               | 11.0                               | 0.25                                | 0.50                               | 1.05                               | 1.55                               | 2.1                                |  |
| DS14P      | 22.1                                                                                                                      | 21.2                               | 20.5                               | 20.0                               | 0.35                                | 0.77                               | 1.65                               | 2.50                               | 3.4                                |  |

Note: Vane pump models

DS1※P-20S5: For VD※-8A1R-30, DS1※P-20S2: For VD※-15A※R-95 or VD※-38A※R-95

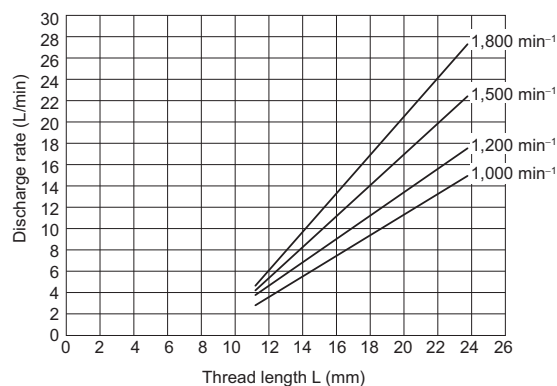
## Piston Pump Specifications

### Relationship between the protruding length of the discharge rate adjusting screw and the discharge rate

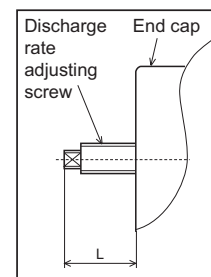
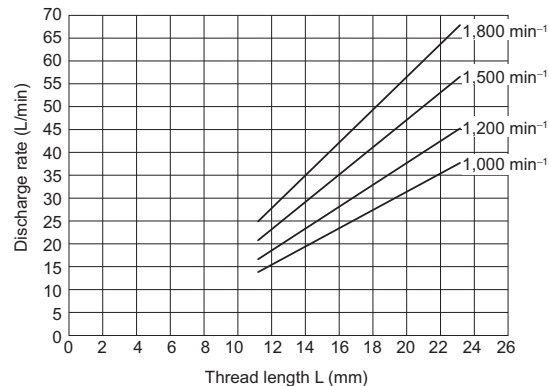
● The discharge rate can be roughly judged from the protruding length of the discharge rate adjusting screw (L).

(Note: The discharge rate for VD※-8A1R-30 cannot be adjusted.)

VD※-15A※R-95



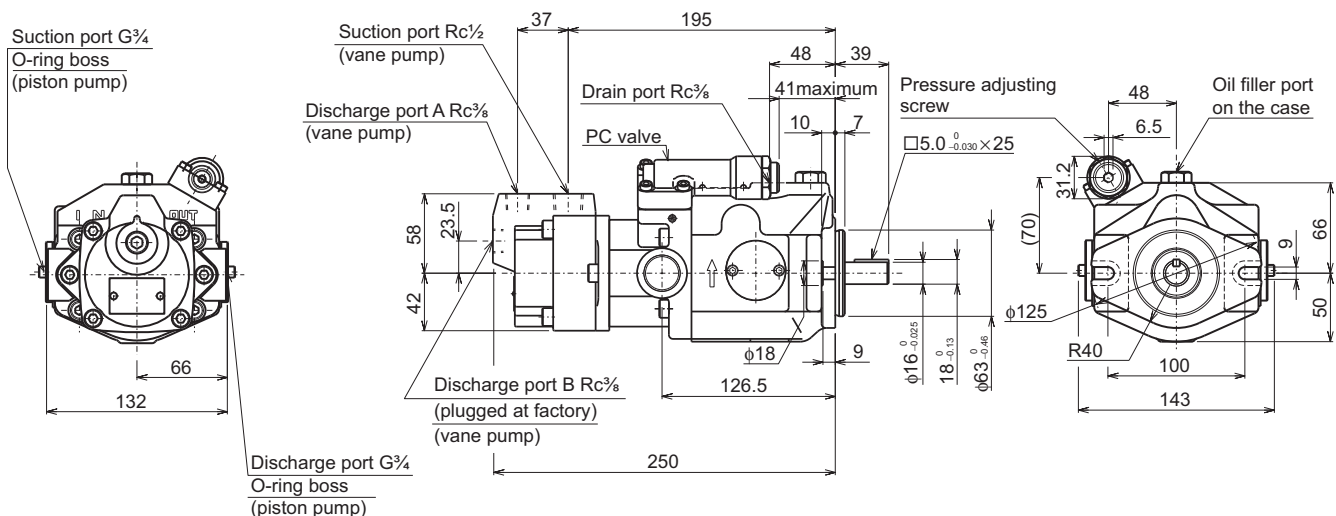
VD※-38A※R-95



Refer to Page A-8 for other detailed specifications.

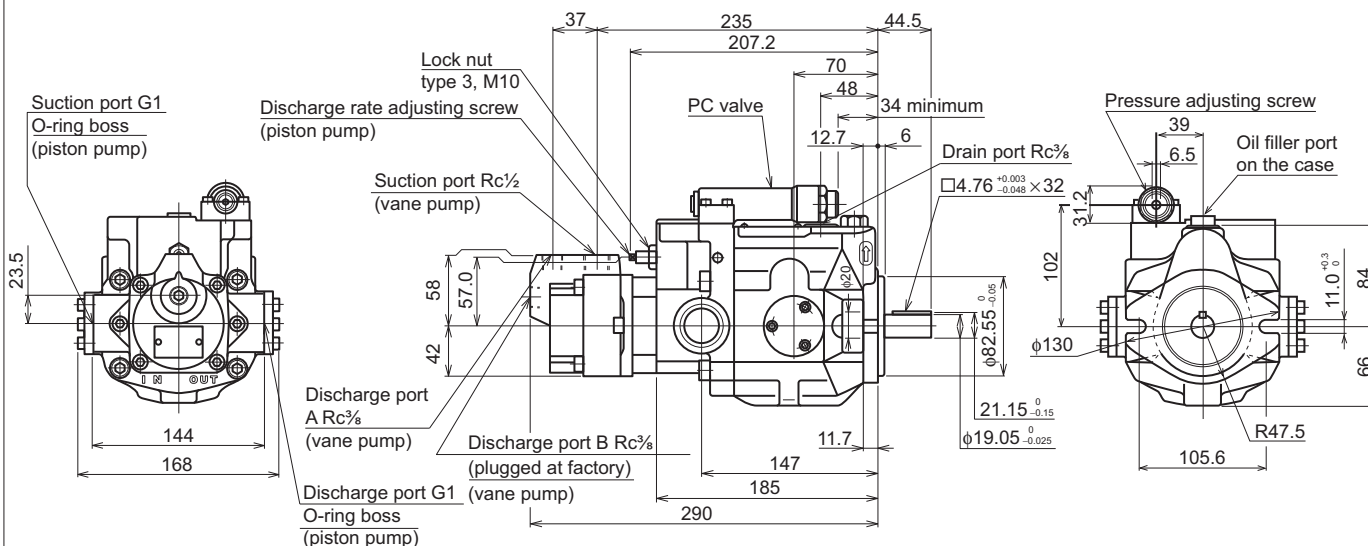
## External dimension diagram

### VD\*-8A1R-30



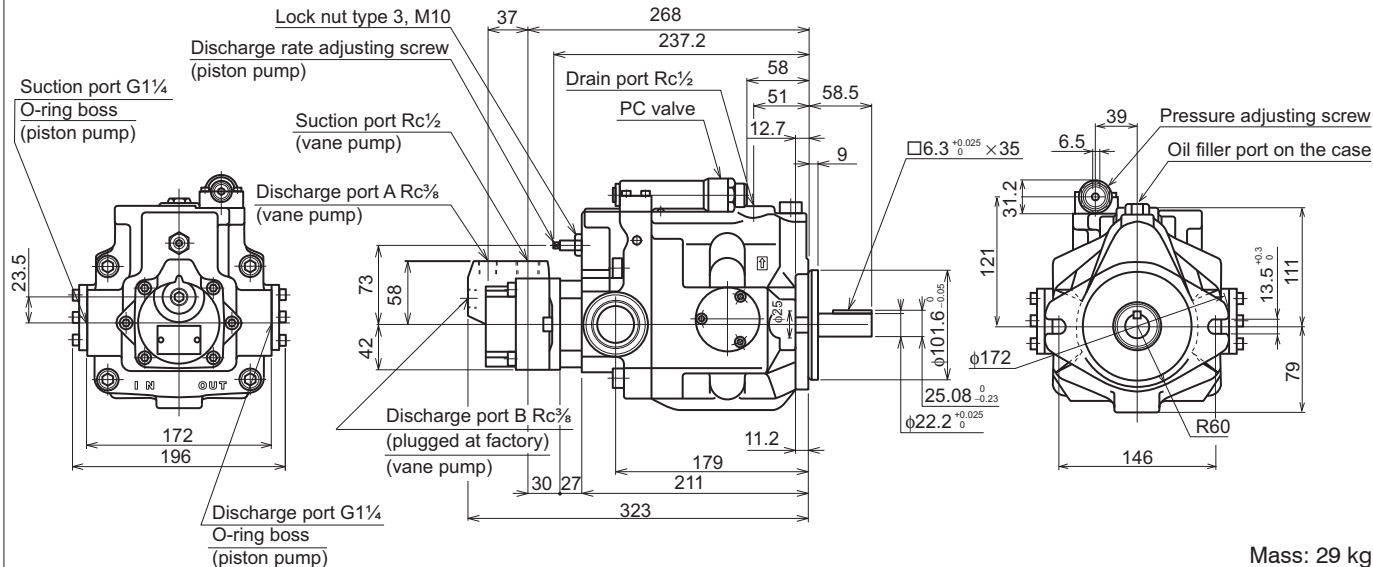
Mass: 13 kg

### VD\*-15A\*R-95



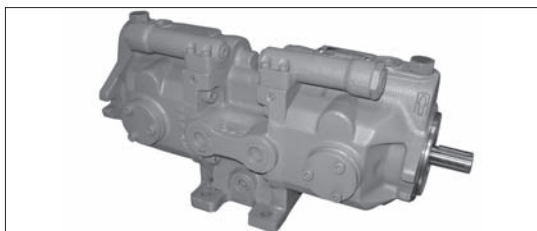
Mass: 17.2 kg

### VD\*-38A\*R-95

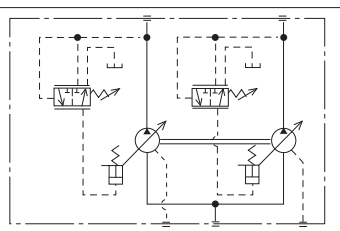


Mass: 29 kg

# V1515 series Dual Pump



JIS graphic symbols for hydraulic system



## Nomenclature

**V1515 A × × R - 95**

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|

### 1 Model No.

V1515: V1515 series dual pump  
 Pump capacity:  $14.8 \text{ cm}^3 \times 2$   
 Not provided with a discharge rate adjusting screw

### 2 Control method

A: Pressure compensator control

### 3 Pump pressure adjustment range at end side

1: 0.8 to 7 MPa { 8 to 70 kgf/cm<sup>2</sup> }  
 2: 1.5 to 14 MPa { 15 to 140 kgf/cm<sup>2</sup> }

### 4 Pump pressure adjustment range at shaft side

1: 0.8 to 7 MPa { 8 to 70 kgf/cm<sup>2</sup> }  
 2: 1.5 to 14 MPa { 15 to 140 kgf/cm<sup>2</sup> }  
 3: 3.5 to 21 MPa { 35 to 210 kgf/cm<sup>2</sup> }

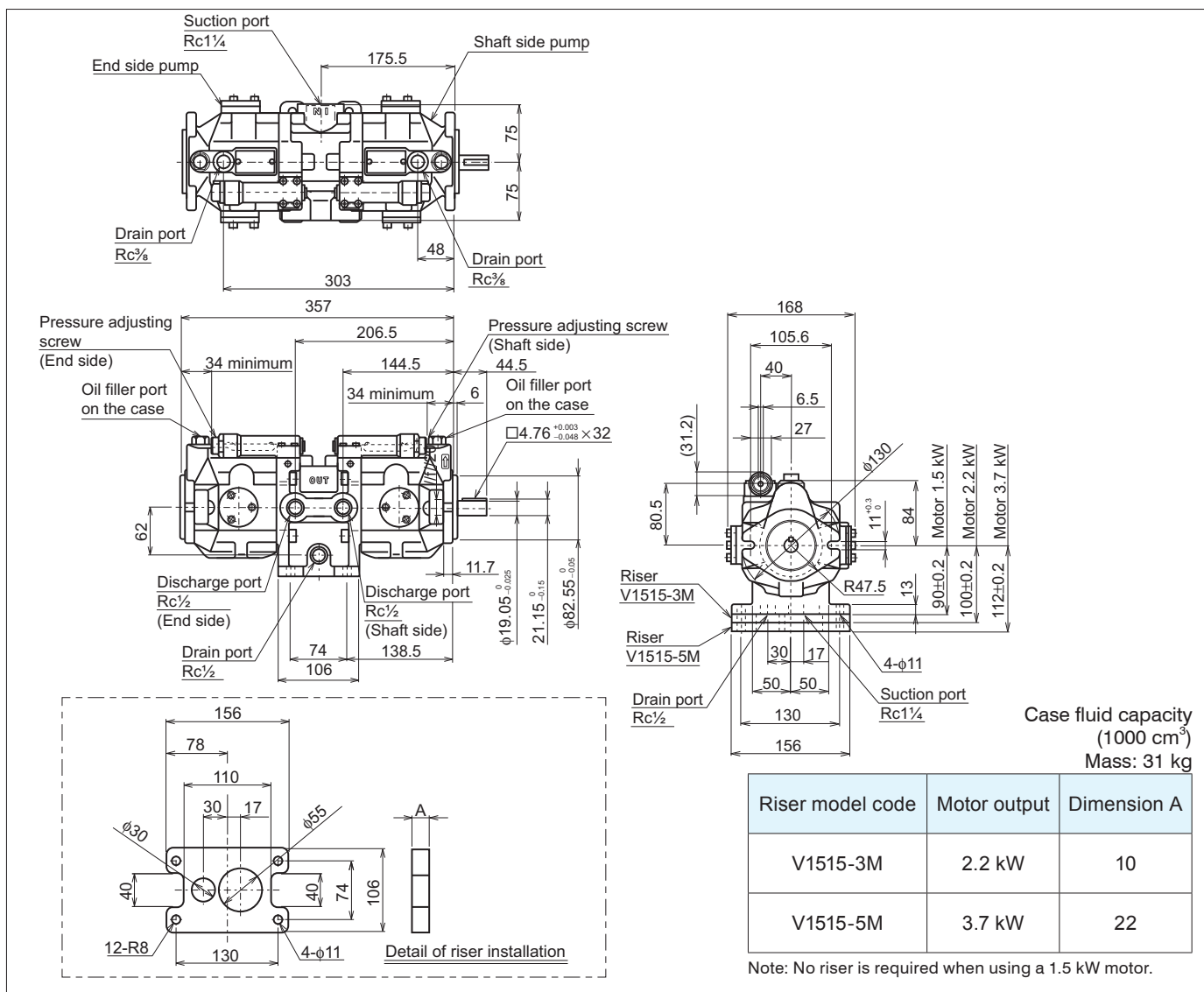
### 5 Direction of rotation, when viewed from the shaft end

R: Clockwise (rightward)

### 6 Design No. (The design No. is subject to change)

Note: Risers are not provided with the pump. Order them separately as required by referring to the drawing below.

## External dimension diagram



## Contact Details

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## Forward/backward compatibility of products subject to model changes

### ● Piston pump (V8A)

| Model code of currently used product | Installation compatibility with current design (No. 20) | Notes                                    |
|--------------------------------------|---------------------------------------------------------|------------------------------------------|
| V8A1RX-10                            | Compatible                                              | The external dimensions differ. (See *1) |
| V8A1RXT-10                           | Compatible                                              | The external dimensions differ. (See *1) |

The compatibility is indicated in the table as follows:

Compatible: Installation compatibility provided (The external dimensions differ.)

V8A1RXT-※※ is dedicated to motor pumps.

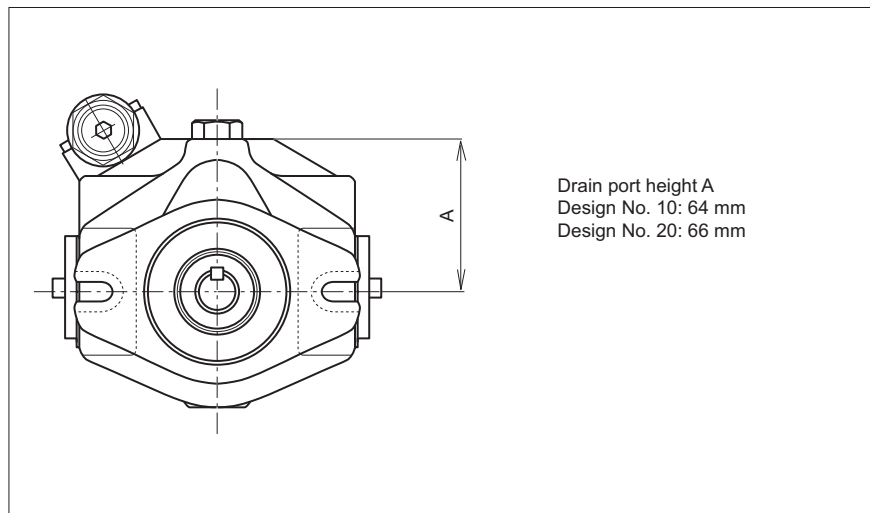
Note: T: Tongue shaft

### <Time line of design numbers>

| Design No. change | Details of change                                                                       |
|-------------------|-----------------------------------------------------------------------------------------|
| 10 → 20           | Pump drain port height: 64 mm → 66 mm, Mass: 7.9 kg → 8.9 kg<br>(See the drawing below) |

\*1

### External drawing



## Forward/backward compatibility of products subject to model changes

### ● Piston pump (V15A)

| Model code of currently used product | Installation compatibility with current design (No. 95) | Notes                                                                                          |
|--------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------|
| V15A×R-10                            | Not compatible                                          | The piping positions (see external dimensions) and connection methods differ. (See *1 and *2.) |
| V15A×R-40                            | Partly compatible                                       | The connection methods and external dimensions differ. (See *2 and *3.)                        |
| V15A×R-80                            | Compatible                                              | External dimensions differ. (See *3 and *4.)                                                   |
| V15A×R-85                            | Compatible                                              | External dimensions differ. (See *4.)                                                          |
| V15A×RX-10                           | Not compatible                                          | The piping positions (see external dimensions) and connection methods differ. (See *1 and *2.) |
| V15A×RX-40                           | Partly compatible                                       | The connection methods and external dimensions differ. (See *2 and *3.)                        |
| V15A×RX-80                           | Compatible                                              | External dimensions differ. (See *3 and *4.)                                                   |
| V15A×RX-85                           | Compatible                                              | External dimensions differ. (See *4.)                                                          |
| V15A1RY-85                           | Compatible                                              | External dimensions differ. (See *4.)                                                          |

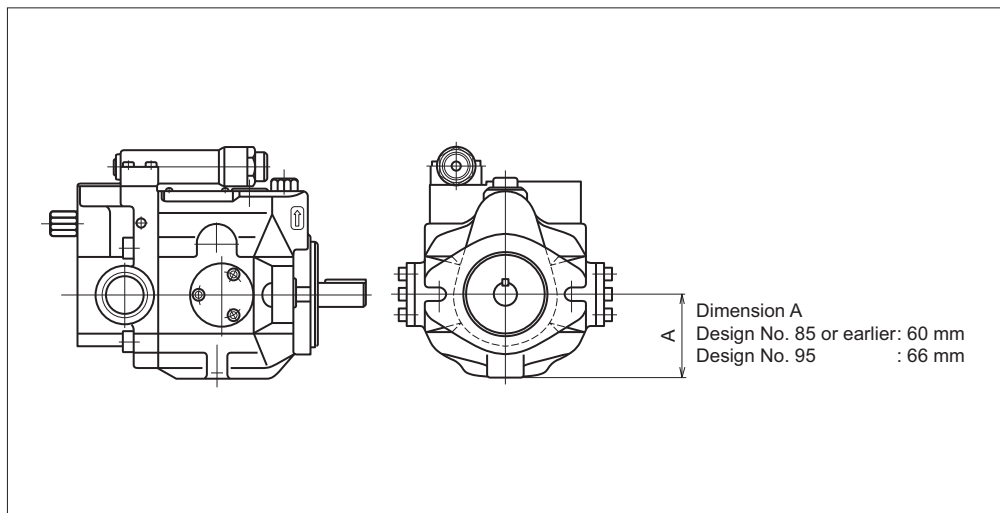
The compatibility is indicated in the table as follows:

- Compatible: Installation compatibility provided (The external dimensions differ.)
- Partly compatible: Installation compatibility provided (Some piping needs to be corrected.)
- Not compatible: Installation compatibility not provided

### <Time line of design numbers>

| Design No. change | Details of change                                                                                                                                                           |    |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 10 → 40           | Piping positions changed                                                                                                                                                    | *1 |
| 40 → 80           | Piping method changed: bonded seal → O-ring boss                                                                                                                            | *2 |
| 80 → 85           | Housing changed (housing communalized by adding V15A1RY)                                                                                                                    | *3 |
| 85 → 95           | Bottom part dimension: 60 mm → 66 mm (See the drawing below)<br>Mass: 11.3 kg → 12.5 kg for V15A×R-95, 12.8 kg → 14.5kg for V15A×RX-95,<br>12.8 kg → 13.5 kg for V15A1RY-95 | *4 |

### External drawing



## Contact Details

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## Forward/backward compatibility of products subject to model changes

### ● Piston pump (V23A)

| Model code of currently used product | Installation compatibility with current design (No. 30) | Notes                                                                                   |
|--------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------|
| V23A×R-10                            | Not compatible                                          | The piping positions (see external dimensions) and connection methods differ. (See *1.) |
| V23A×R-20                            | Partly compatible                                       | The connection methods differ. (See *1.)                                                |
| V23A×RX-10                           | Not compatible                                          | The piping positions (see external dimensions) and connection methods differ. (See *1.) |
| V23A×RX-20                           | Partly compatible                                       | The connection methods differ. (See *1.)                                                |

The compatibility is indicated in the table as follows:

Partly compatible: Installation compatibility provided (Some piping needs to be corrected.)

### <Time line of design numbers>

| Design No. change | Details of change                                | Remarks |
|-------------------|--------------------------------------------------|---------|
| 10 → 20           |                                                  |         |
| 20 → 30           | Piping method changed: bonded seal → O-ring boss | *1      |

### ● Piston pump (V38A)

| Model code of currently used product | Installation compatibility with current design (No. 95) | Notes                                                                                          |
|--------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------|
| V38A×R-10                            | Not compatible                                          | The piping positions (see external dimensions) and connection methods differ. (See *2 and *3.) |
| V38A×R-50                            | Partly compatible                                       | The connection methods and external dimensions differ. (See *3 and *4.)                        |
| V38A×R-80                            | Compatible                                              | External dimensions differ. (See *4.)                                                          |
| V38A×RX-10                           | Not compatible                                          | The piping positions (see external dimensions) and connection methods differ. (See *2 and *3.) |
| V38A×RX-50                           | Partly compatible                                       | The connection methods and external dimensions differ. (See *3 and *4.)                        |
| V38A×RX-80                           | Compatible                                              | External dimensions differ. (See *4.)                                                          |

The compatibility is indicated in the table as follows:

Compatible: Installation compatibility provided (The external dimensions differ.)

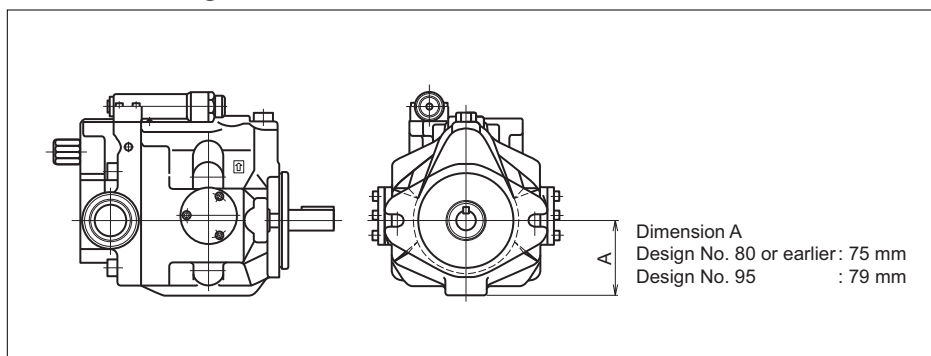
Partly compatible: Installation compatibility provided (Some piping needs to be corrected.)

Not compatible: Installation compatibility not provided

### <Time line of design numbers>

| Design No. change | Details of change                                                                                                                 |    |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------|----|
| 10 → 50           | Piping positions changed                                                                                                          | *2 |
| 50 → 80           | Piping method changed: bonded seal → O-ring boss                                                                                  | *3 |
| 80 → 95           | Bottom part dimension: 75 mm → 79 mm (See the drawing below)<br>Mass: 22 kg → 22.4 kg for V38A×R-95, 23 kg → 26 kg for V38A×RX-95 | *4 |

### External drawing



## Forward/backward compatibility of products subject to model changes

### ● Piston pump (V50A)

| Model code of currently used product | Installation compatibility with current design (No. 20) | Notes |
|--------------------------------------|---------------------------------------------------------|-------|
| V50A×RX-10                           | Fully compatible                                        |       |

The compatibility is indicated in the table as follows:

Fully compatible: Installation compatibility provided

### ● Piston pump (V70A)

| Model code of currently used product | Installation compatibility with current design (No. 60) | Notes                                                           |
|--------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------|
| V70A×RX-20                           | Partly compatible                                       | The connection positions of the piping flange differ. (See *1.) |
| V70A×RX-30                           | Fully compatible                                        |                                                                 |
| V70A×RX-40                           | Fully compatible                                        |                                                                 |
| V70A×RX-50                           | Fully compatible                                        |                                                                 |

The compatibility is indicated in the table as follows:

Fully compatible: Installation compatibility provided

Partly compatible: Installation compatibility provided (Some piping needs to be corrected.)

### <Time line of design numbers>

| Design No. change | Details of change                                                    |    |
|-------------------|----------------------------------------------------------------------|----|
| 20 → 30           | Flange's width across flats: 204 mm → 208 mm (See the drawing below) | *1 |
| 30 → 40           |                                                                      |    |
| 40 → 50           |                                                                      |    |
| 50 → 60           |                                                                      |    |

### External drawing

