### 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**
  
  \[
  \begin{array}{cccccccc}
  \text{VZ} & \times & \times & \times & \text{A} & \times & \text{R} & \times & \times \\
  1 & 2 & 3 & 4 & 7 & 10 & 11 & 12
  \end{array}
  \]

- **Combination control**
  
  \[
  \begin{array}{cccccccc}
  \text{VZ} & \times & \times & \times & \text{C} & \times & \times & \times & \times & \times & \times & \times & \times & \times & \times & \times & \times & \times & \times \\
  1 & 2 & 3 & 4 & 7 & 8 & 9 & 10 & 11
  \end{array}
  \]

1. **Model No.**
   VZ: VZ series piston pump

2. **Pump capacity**
   - 50: 50.2 cm³/rev
   - 63: 63.0 cm³/rev
   - 80: 79.6 cm³/rev
   - 100: 104.6 cm³/rev
   - 130: 135.9 cm³/rev

3. **Control method I (Refer to Page A-4 for the applicable models.)**
   - A: Pressure compensator control
   - C: Combination control

4. **Pressure adjustment range**
   - 1: 1.5 to 7 MPa (15 to 70 kgf/cm²)
   - 2: 1.5 to 14 MPa (15 to 140 kgf/cm²)
   - 3: 3.5 to 21 MPa (35 to 210 kgf/cm²)
   - 4: 3.5 to 28 MPa (35 to 280 kgf/cm²)

5. **Low pressure adjustment range**
   - 1: 1.5 to 7 MPa (15 to 70 kgf/cm²)
   - 2: 1.5 to 14 MPa (15 to 140 kgf/cm²)
   - 3: 3.5 to 21 MPa (35 to 210 kgf/cm²)
   - 4: 3.5 to 28 MPa (35 to 280 kgf/cm²)

6. **High pressure adjustment range**
   - 1: 1.5 to 7 MPa (15 to 70 kgf/cm²)
   - 2: 1.5 to 14 MPa (15 to 140 kgf/cm²)
   - 3: 3.5 to 21 MPa (35 to 210 kgf/cm²)
   - 4: 3.5 to 28 MPa (35 to 280 kgf/cm²)

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**
   - 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
    - 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.

Note: *
- Only petroleum-based hydraulic fluids are acceptable for the VZ series.
- The combination control is not applicable to VZ130.
- The 4th pattern of the pressure adjustment range (3.5 to 28 MPa {35 to 280 kgf/cm²}) applies only to VZ50, VZ63, VZ80, and VZ100.
- 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

#### Pressure adjustment range

<table>
<thead>
<tr>
<th>Code</th>
<th>Pressure adjustment range MPa (kgf/cm²)</th>
<th>Without remote control system</th>
<th>With remote control system</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.5 to 7 (15 to 70)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2</td>
<td>1.5 to 14 (15 to 140)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>3</td>
<td>2 to 21 (20 to 210)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>3</td>
<td>3.5 to 21 (135 to 210)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4</td>
<td>2 to 28 (20 to 280)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4</td>
<td>3.5 to 28 (35 to 280)</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

#### Combination control

##### Low pressure adjustment range

<table>
<thead>
<tr>
<th>Code</th>
<th>Pressure adjustment range MPa (kgf/cm²)</th>
<th>Without remote control system</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.5 to 7 (15 to 70)</td>
<td>✓</td>
</tr>
<tr>
<td>2</td>
<td>1.5 to 14 (15 to 140)</td>
<td>✓</td>
</tr>
<tr>
<td>3</td>
<td>3.5 to 21 (35 to 210)</td>
<td>✓</td>
</tr>
<tr>
<td>4</td>
<td>3.5 to 28 (35 to 280)</td>
<td>✓</td>
</tr>
</tbody>
</table>

##### High pressure adjustment range

<table>
<thead>
<tr>
<th>Code</th>
<th>Pressure adjustment range MPa (kgf/cm²)</th>
<th>Without remote control system</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.5 to 7 (15 to 70)</td>
<td>✓</td>
</tr>
<tr>
<td>2</td>
<td>1.5 to 14 (15 to 140)</td>
<td>✓</td>
</tr>
<tr>
<td>3</td>
<td>3.5 to 21 (35 to 210)</td>
<td>✓</td>
</tr>
<tr>
<td>4</td>
<td>3.5 to 28 (35 to 280)</td>
<td>✓</td>
</tr>
</tbody>
</table>

#### Specifications

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Theoretical discharge rate cm³/rev</th>
<th>Maximum operating pressure MPa (kgf/cm²)</th>
<th>Permissible rotational speed min⁻¹</th>
<th>Discharge rate adjustment range 1800min⁻¹ L/min</th>
<th>Mass (Control method A) kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>VZ50</td>
<td>50.2</td>
<td>28 (280)</td>
<td>500 to 1800</td>
<td>0 to 90</td>
<td>40</td>
</tr>
<tr>
<td>VZ63</td>
<td>63.0</td>
<td>28 (280)</td>
<td>500 to 1800</td>
<td>0 to 113</td>
<td>47</td>
</tr>
<tr>
<td>VZ80</td>
<td>79.6</td>
<td>28 (280)</td>
<td>500 to 1800</td>
<td>0 to 143</td>
<td>55</td>
</tr>
<tr>
<td>VZ100</td>
<td>104.6</td>
<td>28 (280)</td>
<td>500 to 1800</td>
<td>0 to 188</td>
<td>75</td>
</tr>
<tr>
<td>VZ130</td>
<td>135.9</td>
<td>21 (210)</td>
<td>500 to 1800</td>
<td>0 to 244</td>
<td>105</td>
</tr>
</tbody>
</table>

*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.*
**Pressure adjustment methods**

- **Pressure compensator control**

![Diagram](diagram1.png)

- **Combination control**

![Diagram](diagram2.png)

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

<table>
<thead>
<tr>
<th>Pressure type</th>
<th>Low pressure adjustment range</th>
<th>High pressure adjustment range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.5 to 7 MPa (15 to 70 kgf/cm²)</td>
<td>1.5 to 7 MPa (15 to 70 kgf/cm²)</td>
</tr>
<tr>
<td>2</td>
<td>1.5 to 14 MPa (15 to 140 kgf/cm²)</td>
<td>1.5 to 14 MPa (15 to 140 kgf/cm²)</td>
</tr>
<tr>
<td>3</td>
<td>3.5 to 21 MPa (35 to 210 kgf/cm²)</td>
<td>3.5 to 21 MPa (35 to 210 kgf/cm²)</td>
</tr>
<tr>
<td>4</td>
<td>3.5 to 28 MPa (35 to 280 kgf/cm²)</td>
<td>3.5 to 28 MPa (35 to 280 kgf/cm²)</td>
</tr>
</tbody>
</table>

- The exact characteristics of the solenoid operated type combination control will be as shown to the right.

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

**Variation of discharge pressure**

- VZ50, VZ63, VZ80, VZ100

As shown in the graph to the right

- VZ130: As shown in the table below

<table>
<thead>
<tr>
<th>Pressure adjustment range code</th>
<th>Discharge pressure variation/one revolution of the pressure adjusting screw</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.5 MPa/revolution</td>
</tr>
<tr>
<td>2</td>
<td>4.6 MPa/revolution</td>
</tr>
<tr>
<td>3</td>
<td>7.9 MPa/revolution</td>
</tr>
</tbody>
</table>

- 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 (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.

<table>
<thead>
<tr>
<th>Pump model</th>
<th>Scale °</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low quantity adjusting screw</td>
</tr>
<tr>
<td>VZ50C</td>
<td>0 to 10</td>
</tr>
<tr>
<td>VZ63C</td>
<td>0 to 10</td>
</tr>
<tr>
<td>VZ80C</td>
<td>0 to 10</td>
</tr>
<tr>
<td>VZ100C</td>
<td>0 to 10</td>
</tr>
</tbody>
</table>

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 cm³/rev for the low quantity range (QL) and 75 cm³/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 cm³/rev, which is 5°, and adjust the low quantity adjusting screw accordingly.
2. Then, read the value for QH = 75 cm³/rev on the line for 5° of QL, which is 11°, 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 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.

<table>
<thead>
<tr>
<th>Pump model</th>
<th>Low quantity (QL) setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>VZ50C</td>
<td>Scale position: 4°</td>
</tr>
<tr>
<td>VZ63C</td>
<td>Scale position: 4°</td>
</tr>
<tr>
<td>VZ80C</td>
<td>Scale position: 4°</td>
</tr>
<tr>
<td>VZ100C</td>
<td>Scale position: 4°</td>
</tr>
</tbody>
</table>

#### 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).

- **VZ50C**
- **VZ63C**
- **VZ80C**
- **VZ100C**
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**General performance (1800 min⁻¹)**

Discharge rate setting: maximum

![Graphs showing efficiency and pressure for VZ50, VZ63, VZ80, VZ100, VZ130]

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⁻¹)**

![Graphs showing shaft input and pressure for VZ50, VZ63, VZ80, VZ100, VZ130]
General performance ($1500 \text{ min}^{-1}$)  \hspace{1cm} 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 ($1500 \text{ min}^{-1}$)
Shaft input characteristics (1800 min⁻¹)

Drainage volume characteristics (1800 min⁻¹)
Contact Details
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Shaft input characteristics (1500 min⁻¹)

Drainage volume characteristics (1500 min⁻¹)
Noise characteristics (JIS B 8350, measuring position: 1 m from pump front)

<table>
<thead>
<tr>
<th>Input rotational speed</th>
<th>Fluid used</th>
<th>Oil temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1800 min⁻¹ 1500 min⁻¹</td>
<td>Equivalent to ISO VG32</td>
<td>50°C</td>
</tr>
</tbody>
</table>

![Graphs showing noise level vs. pressure for different models (VZ50, VZ63, VZ80, VZ100, VZ130).](image-url)
External dimension diagram

VZ50A×RX-10

Pressure adjusting screw
(clockwise: pressure increase)
Hexagonal flat lock nut: 32

Discharge rate adjusting screw
(clockwise: discharge rate decrease)
Hexagonal flat lock nut: 16

Suction port
Size 1½ split flange boss
(SAE J518)

Discharge port
Size 1 split flange boss
(SAE J518)

Effective thread depth 27
M12 \times 1.75

Effective thread depth 22
M10 \times 1.5

PC valve

Oil filler port on the case
Drain port
Rc½

Mass: 40 kg

VZ50A4RX-10RC

Vent port
\frac{1}{4}-20UNF-2B
SAE straight thread, O-ring boss
(For the optional \frac{1}{4}-20UNF flare joint, refer to Page S-4.)

PC differential pressure adjusting screw
(factory adjusted)

PC remote control valve

Oil filler port on the case
Drain port
Rc½

Mass: 40.5 kg
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External dimension diagram

VZ50C×RHX-10

Low pressure adjusting screw (P₁)
Socket for hex key: 8
Hexagonal flat lock nut: 32

High pressure adjusting screw (P₂)
Socket for hex key: 8
Hexagonal flat lock nut: 32

Suction port
Size 1½ split flange boss
(SAE J518)

Discharge port
Size 1 split flange boss
(SAE J518)

Discharge rate adjusting screw
(low quantity)

Discharge rate adjusting screw
(high quantity)

Oil filler port on the case

Drain port
RC½

Effective thread depth 27

M12 × 1.75

127 maximum

138

95

69.9

224

63.8

148

78

55.5

38

55.5

38

148

78

55.5

Mass: 45 kg

VZ50C×RJ×X-10

Low pressure adjusting screw (P₁)
Socket for hex key: 8
Hexagonal flat lock nut: 32

High pressure adjusting screw (P₂)
Socket for hex key: 8
Hexagonal flat lock nut: 32

Suction port
Size 1½ split flange boss
(SAE J518)

Discharge port
Size 1 split flange boss
(SAE J518)

Discharge rate adjusting screw
(low quantity)

Discharge rate adjusting screw
(high quantity)

Oil filler port on the case

Cable diameter ø6 to ø10

Solenoid
KSO-GO2-2B××××C

Effective thread depth 27

M12 × 1.75

219 maximum

127 maximum

216.5

95

256

148

78

127 maximum

138

95

69.9

224

63.8

148

78

55.5

38

55.5

38

148

78

55.5

Mass: 46.5 kg
External dimension diagram

VZ63A×RX-10

Pressure adjusting screw
Socket for hex key: 8
Hexagonal flat lock nut: 32

Discharge rate adjusting screw
Socket for hex key: 5
Hexagonal flat lock nut: 16

Suction port
Size 1½ split flange boss (SAE J518)

Discharge port
Size 1 split flange boss (SAE J518)

Mass: 47 kg

VZ63A4RX-10RC

Vent port
¾-20UNF-2B
SAE straight thread, O-ring boss
(For the optional ¾-20UNF flare joint, refer to Page S-4.)

PC differential pressure adjusting screw
(factory adjusted)

PC remote control valve

Mass: 47.5 kg
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External dimension diagram

VZ63C××RHX-10

Low pressure adjusting screw (P₁)
Socket for hex key: 8
Hexagonal flat lock nut: 32

High pressure adjusting screw (P₂)
Socket for hex key: 8
Hexagonal flat lock nut: 32

Oil filler port on the case

Drain port

Discharge rate adjusting screw
(low quantity)

Discharge rate adjusting screw
(high quantity)

Suction port
Size 1½ split flange boss
(SAE J518)

Discharge port
Size 1 split flange boss
(SAE J518)

Effective thread depth 27
M12 x 1.75

Effective thread depth 22
M10 x 1.5

Mass: 54 kg

VZ63C××RJ×X-10

Low pressure adjusting screw (P₁)
Socket for hex key: 8
Hexagonal flat lock nut: 32

High pressure adjusting screw (P₂)
Socket for hex key: 8
Hexagonal flat lock nut: 32

Oil filler port on the case

Drain port

Discharge rate adjusting screw
(low quantity)

Discharge rate adjusting screw
(high quantity)

Suction port
Size 1½ split flange boss
(SAE J518)

Discharge port
Size 1 split flange boss
(SAE J518)

Effective thread depth 27
M12 x 1.75

Effective thread depth 22
M10 x 1.5

Mass: 55.5 kg
External dimension diagram

VZ80A×RX-10

Pressure adjusting screw (clockwise: pressure increase)
Socket for hex key: 8
Hexagonal flat lock nut: 32

Oil filler port on the case

Discharge port
Size 1¼ split flange boss (SAE J518)
Effective thread depth 27
M12 × 1.75

Discharge rate adjusting screw (clockwise: discharge rate decrease)
Socket for hex key: 6
Hexagonal flat lock nut: 18

Oil filler port on the case

Drain port

VZ80A4RX-10RC

Vent port
½-20UNF-2B
SAE straight thread, O-ring boss
(For the optional ½-20UNF flare joint, refer to Page S-4.)

PC differential pressure adjusting screw (factory adjusted)

PC remote control valve

Discharge port
Size 1¼ split flange boss (SAE J518)
Effective thread depth 28
M10 × 1.5

Discharge rate adjusting screw (clockwise: discharge rate decrease)
Socket for hex key: 6
Hexagonal flat lock nut: 18

Oil filler port on the case

Drain port

Mass: 55 kg
**External dimension diagram**

**VZ100A×RX-10**

- **Pressure adjusting screw**
  - (clockwise: pressure increase)
  - Socket for hex key: 8
  - Hexagonal flat lock nut: 32

- **Effective thread depth**
  - 104 maximum
  - M12 × 1.75

- **PC valve**
  - φ50.8

- **Suction port**
  - Size 2 split flange boss (SAE J518)
  - φ15 ± 0.4

- **Discharge port**
  - Size 1 1/4 split flange boss (SAE J518)
  - φ127.00

- **Oil filler port on the case**
  - Rc 3/4

- **Drain port**
  - φ44.5 ± 0.13

- **Discharge rate adjusting screw**
  - (clockwise: discharge rate decrease)
  - Socket for hex key: 6
  - Hexagonal flat lock nut: 18

- **PC remote control valve**
  - φ50.8

- **PC differential pressure adjusting screw**
  - (factory adjusted)

- **Mass**: 75 kg

**VZ100A4RX-10RC**

- **Vent port**
  - 1/4-20UNF-2B
  - SAE straight thread, O-ring boss
  - (For the optional 1/4-20UNF flare joint, refer to Page S-4.)

- **PC remote control valve**
  - φ50.8

- **Discharge rate adjusting screw**
  - (clockwise: discharge rate decrease)
  - Socket for hex key: 6
  - Hexagonal flat lock nut: 18

- **Mass**: 75.5 kg
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External dimension diagram

VZ100C×RHX-10

Low pressure adjusting screw (P₁)
Socket for hex key: 8
Hexagonal flat lock nut: 32

High pressure adjusting screw (P₂)
Socket for hex key: 8
Hexagonal flat lock nut: 32

Mass: 80 kg

VZ100C×RJ×X-10

Low pressure adjusting screw (P₁)
Socket for hex key: 8
Hexagonal flat lock nut: 32

High pressure adjusting screw (P₂)
Socket for hex key: 8
Hexagonal flat lock nut: 32

Mass: 81.5 kg
External dimension diagram

VZ130A&RX-10

Mass: 105 kg

VZ130A&RX-10RC

Mass: 105 kg