



# "PV11R" SERIES

## Fixed Displacement- Single

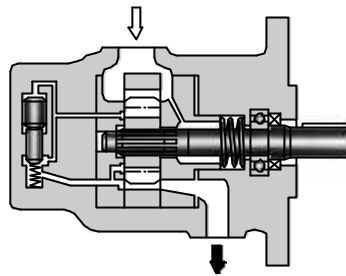
### PV11R10/PV11R20

# VANE PUMPS

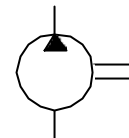


Up to 40 MPa (5800 PSI), 22.1 cm<sup>3</sup>/rev (1.349 CU.IN./rev)

These pumps are of completely unique design for extra high pressure applications. The excessive wear to the vanes and camring which usually occurs in shch high pressure vane pumps has been solved by means of adopting the special methods in both mechanical construction aspects and lubrication systems.



Graphic Symbol



### Model Number Designation

| F-   | PV11R10       | -12                                       | -L                | -R                    | A                       | A                      | -20           | *           |
|--|---------------|---|-------------------|-----------------------|-------------------------|------------------------|---------------|-------------|
| Special Seals  | Series Number | Nominal Displacement cm <sup>3</sup> /rev | Mounting          | Direction of Rotation | Discharge Port Position | Suction Port Position  | Design Number | Design Std. |
| F:<br>For phosphate ester type fluids (Omit if not required) | PV11R10       | 2<br>5<br>7<br>10<br>12                   | L:<br>Foot Mtg.   | R:<br>Clockwise       | A:<br>Upwards (Normal)  | A:<br>Upwards (Normal) | 20            | Refer to 2  |
|  | PV11R20       | 15<br>19<br>22                            | F:<br>Flange Mtg. |                       |                         |                        | 20            |             |

1. Available to supply pump with anti-clockwise rotation. Consult Yuken for details.

2. Design Standards: None.....Japanese Standard "JIS" & European Design Standard 90.....N. American Design Sandard

### Pipe Flange Kits

Pipe flange kits are available. When ordering, specify the kit number from the table below.

| Pump Model Numbers | Name of Port | Pipe Flange Kit Numbers |                          |                            |  |                            |  |                            |
|--------------------|--------------|-------------------------|--------------------------|----------------------------|--|----------------------------|--|----------------------------|
|                    |              | Threaded Connection     |                          |                            | Socket Welding                                   |                            | Butt Welding                                     |                            |
|                    |              | Japanese Standard "JIS" | European Design Standard | N.American Design Standard | Japanese Standard "JIS" European Design Standard | N.American Design Standard | Japanese Standard "JIS" European Design Standard | N.American Design Standard |
| PV11R10            | Suction      | F5-08-A-10              | F5-08-A-1080             | F5-08-A-1090               | F5-08-B-10                                       | F5-08-B-1090               | F5-08-C-10                                       | F5-08-C-1090               |
| PV11R20            | Discharge    | —                       | —                        | —                          | F6-04W-B-M-10                                    | F6-04W-B-U-1090            | —  | —                          |

Note: 1) Special seals (Viton seals) are required when phosphate ester type fluids are used (prefix "F-" to the pipe flange kit number when ordering.).

Note: 2) Details specifications of pipe flange kits are given in the Catalogue No. Pub. EC-3001.

■ Specifications

■ Maximum Operating Pressure

| Model Numbers | Geometric Displacement<br>cm <sup>3</sup> /rev (CU.IN./rev) | Maximum Operating Pressure MPa(PSI)    |            |  |               |                        |                  |
|---------------|---|--|------------|--|---------------|------------------------|------------------|
|               |   | Petroleum Base Oils                    |            | Water Containing Fluids                    |               |                        | Synthetic Fluids |
|               |   | Anti-Wear Type                         | R & O Type | Anti-Wear Type Water Glycols <sup>★1</sup> | Water Glycols | Water in Oil Emulsions | Phosphate Esters |
| PV11R10-2     | 2.2 (.134)  | 31.5 (4570) <sup>★2</sup><br>40 (5800) | 25 (3630)  | 25 (3630)                                  | 7 (1020)      | 7 (1020)               | 25 (3630)        |
| PV11R10-5     | 4.5 (.275)  |  |            |  |               |                        |                  |
| PV11R10-7     | 6.8 (.415)  |  |            |  |               |                        |                  |
| PV11R10-10    | 9.7 (.592)  |  |            |  |               |                        |                  |
| PV11R10-12    | 12.1 (.738)   |  |            |  |               |                        |                  |
| PV11R20-15    | 15.2 (.915)   | 35 (5100)                              | 25 (3630)  | 25 (3630)                                  | 7 (1020)      | 7 (1020)               | 25 (3630)        |
| PV11R20-19    | 19.0 (1.)   |  |            |  |               |                        |                  |
| PV11R20-22    | 22.1 (1.59)   |  |            |  |               |                        |                  |

★1. For the brands of anti-wear type water-glycols, see the item of "Hydraulic Fluids" on page 3.      ★2. For pressures above 25 MPa (3630 PSI), hold the speed above 1450 r/min.

■ Shaft Speed Range

| Model Numbers  | Shaft Speed Range r/min |                  |                         |                  |                  |
|----------------|-------------------------|------------------|-------------------------|------------------|------------------|
|                | Max.                    |                  |                         |                  | Min.             |
|                | Petroleum Base Oils     |                  | Water-Containing Fluids | Synthetic Fluids |                  |
| Anti-Wear Type | R & O Type              | Phosphate Esters |                         |                  |                  |
| PV11R10-2      | 3000                    | 1800             | 1200                    | 1200             | 950 <sup>★</sup> |
| PV11R10-5      |                         |                  |                         |                  |                  |
| PV11R10-7      |                         |                  |                         |                  |                  |
| PV11R10-10     |                         |                  |                         |                  |                  |
| PV11R10-12     |                         |                  |                         |                  |                  |
| PV11R10-15     | 2000                    | 1800             | 1200                    | 1200             | 800 <sup>★</sup> |
| PV11R10-19     | 1800                    |                  |                         |                  | 800 <sup>★</sup> |

★ For starting at low speed, the maximum viscosity is limited. For details, see the item of "Hydraulic Fluids" on page 3.

■ Mass

| Model Numbers | Approx. Mass kg(lbs.) |             |
|---------------|-----------------------|-------------|
|               | Flange Mtg.           | Foot Mtg.   |
| PV11R10       | 16.4 (36.2)           | 19.4 (42.8) |
| PV11R20       | 16.4 (36.2)           | 19.4 (42.8) |

■ Output Flow & Input Power

Characteristics are described on the pages as shown on the table below. Please see the pages concerned.

| Model Numbers | Typical Pump Characteristics described on the Pages below |
|---------------|---|
| PV11R10       | 5, 6  |
| PV11R20       | 6   |

**Hydraulic Fluids**

**1. Type of hydraulic fluids**

Any type of hydraulic fluids listed in the Table 1 below can be used. However, the specifications of the pumps such as maximum pressure and maximum pump speed may be changed according to the type of hydraulic fluids to be used. For details, please refer to the specifications of the pump concerned.

**Type of hydraulic fluids** (Table 1)

| Type of Fluids          | Descriptions  |  |
|-------------------------|---|--|
| Petroleum Base Oils     | Use anti-wear type oils or R&O type oils (equivalent to ISO VG32 or 46).  |  |
| Synthetic Fluids        | Use phosphate ester type fluids. When phosphate ester type fluid is used, prefix "F-" to the model number because the special seals (fluororubber) are required to be used. |  |
| Water Containing Fluids | Water-Glycols   | Standard pumps can be used without conditions. However, if any type other than those in Table 2 is |
|                         | Water in Oil Emulsions  | Standard pumps can be used without conditions.   |

**Anti-wear type water-glycols** (Table 2)

| Fluid Manufacturer           | Commercial Trade Name                  |
|------------------------------|--|
| Mobil                        | Mobil Hydrofluid HFC 46                |
| JAPAN ENERGY CORP.           | JOMOHydoria                            |
| NIPPON OIL CO. , LTD         | HYRAND FRX 46                          |
| Showa Shell Sekiyu K. K.     | Irus Fluid C<br>G-W Fluid 46           |
| MATSUMURA OIL RESEARCH CORP. | HYDOL HAW                              |
| COSMO OIL CO. , LTD.         | COSMO FLUID HQ 46<br>COSMO FLUID GS 46 |

**2. Fluid viscosity and temperature**

Use the hydraulic fluids which satisfy the recommended viscosity and oil temperature given in the Table 3 below. However, please note that if any of the pumps listed in the Table 4 is started at low speed, the maximum fluid viscosity is limited.

**Fluid viscosity and temperature** (Table 3)

| Fluid               | Temperature °C (°F) | Viscosity mm <sup>2</sup> /s(SSU) |
|---------------------|---------------------|-----------------------------------|
| Petroleum Base Oils | 0-70 (32-158)       | 20-400 (100-1800)                 |
| Phosphate Esters    |                     |                                   |
| Water Glycols       | 0-50 (32-122)       |                                   |
| Water in Oil        | 5-50 (41-122)       |                                   |

**Maximum viscosity for low start-up speed** (Table 4)

| Pump Type        | Start-up Speed r/min | Max. Viscosity mm <sup>2</sup> /s (SSU) |
|------------------|----------------------|---|
| PV11R10, PV11R20 | 600                  | 100 (455)                               |
|                  | 950                  | 200 (910)                               |

**3. Control of contamination**

Contamination of hydraulic fluids results in pump failures and reduced pump lives. Carry out sufficient contamination control for hydraulic fluids and keep contamination level within NAS class 12.

Also, use a 100µm (150-mesh) tank filter on the suction side, more than 50 mm (2 in.) away from the tank bottom.

**Instructions**

**1. Alignment of shaft**

Employ a flexible coupling whenever possible, and avoid any stress from bending or thrust.

Maximum permissible misalignment is less than 0.1 mm (.004 inches) TIR and maximum permissible misangular is less than 0.2°.

**2. Suction pressures**

Set the suction pressure at pump inlet port at the value given in the table below. Furthermore, use the pipes in the suction side having the diameter as indicated on the installation drawings. In case where the pump is installed on the tank or at the position higher than the tank top cover, the height of the suction port of the pump should be less than 1 metre (3.3 ft.) from the oil level {less than 0.8 metre (2.6 ft.) in case of using phosphate ester fluids or water containing fluids}.

(Table 5)

| Model Numbers  | Suction Pressure              |  |                     |
|----------------|-------------------------------|--|---------------------|
|                | Minimum                       |  | Maximum             |
|                | Petroleum base oil            | Phosphate ester type fluid<br>water containing fluid |                     |
| PV11R, PV11R20 | -20kPa<br>(5.9 in. Hg Vacuum) | -16kPa<br>(4.7 in. Hg Vacuum)                        | +30 kPa (+4.3 PSIG) |

**3. Precautions at starting**

At an initial operation or at an operation after a long rest, the pump may have difficulty in sucking up fluid.

In such cases, an air bleed valve should be installed beforehand on the discharge side (model No. ST1004-\*10\*, Catalogue No. Pub. EC-3001.), or discharge air by slightly slackening the connection on the discharge side.

At starting, operate the pump intermittently as far as possible with no load.

For fluid viscosity at starting, see the item of "Hydraulic Fluids".

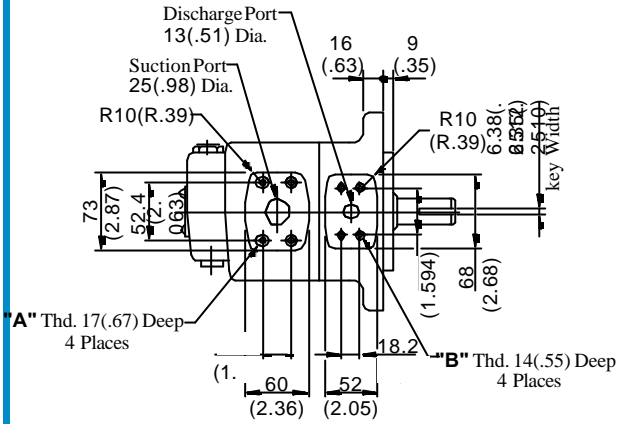
**4. Other precautions**

If a PV11R series single pump is used at speed below 1200 r/min, install the pump with the suction port upside so that the pump can suck up fluid easily at starting.

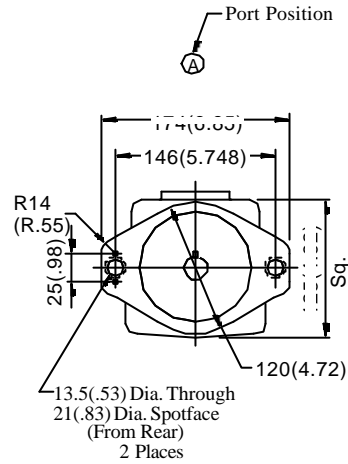
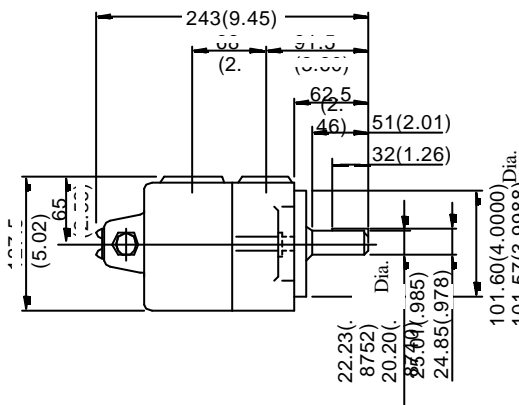
#### Flange Mtg.

PV11R10-\*-F-RAA-20/2090

PV11R20-\*-F-RAA-20/2090



| Model Numbers              | "A" Thd.   | "B" Thd.    |
|----------------------------|------------|-------------|
| PV11R10/PV11R20-*-F-RAA-20 | M10        | M8          |
| PV11R10/PV11R20-*-F-RAA-   | 3/8-16 UNC | 5/16-18 UNC |

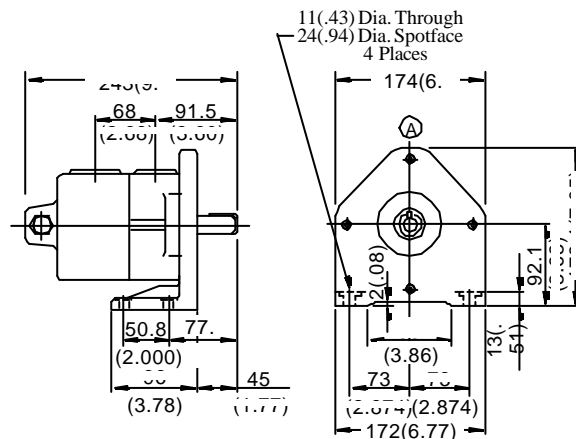


**DIMENSIONS IN  
MILLIMETRES (INCHES)**

#### Foot Mtg.

PV11R10-\*-L-RAA-20/2090

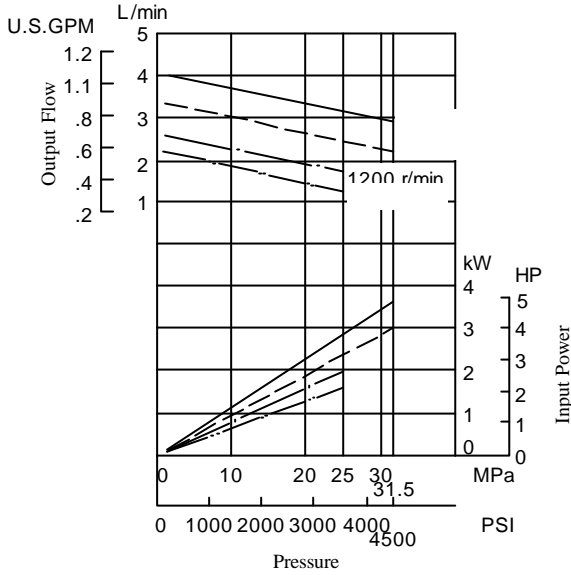
PV11R20-\*-L-RAA-20/2090



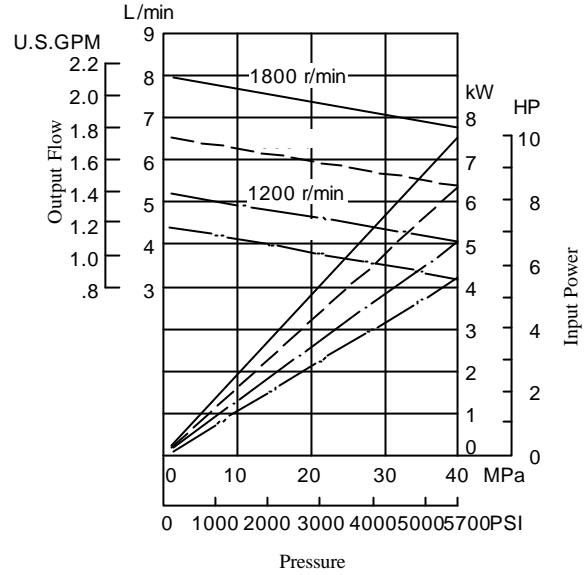
For other dimensions, refer to "Flange Mtg."

Viscosity 20 mm<sup>2</sup>/s (100 SSU) [ISO VG32 Oils, 50°C (122°F)]

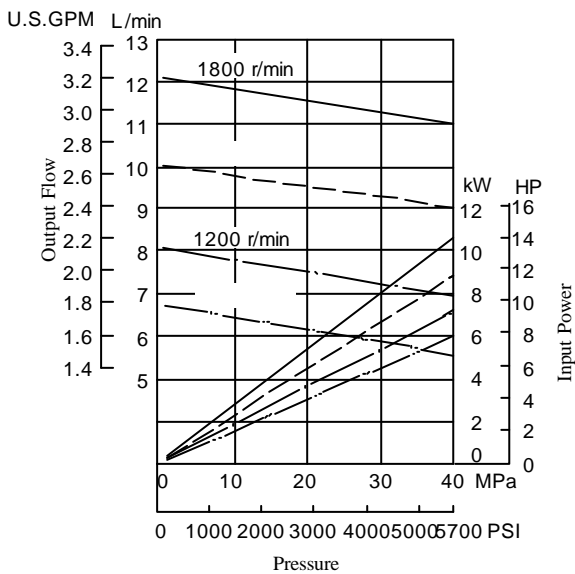
**PV11R10-2**



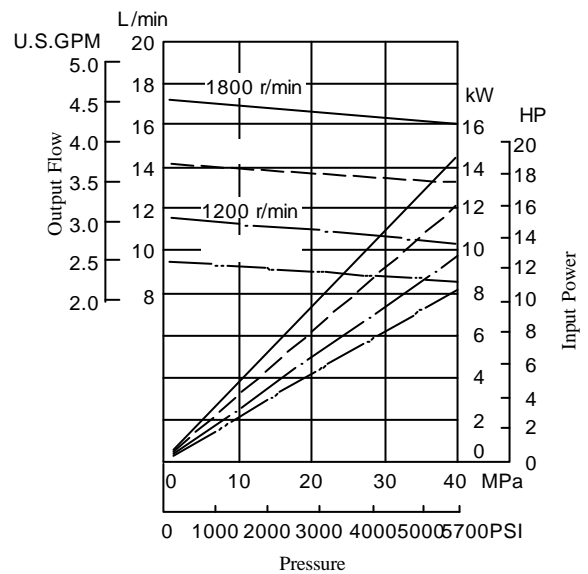
**PV11R10-5**



**PV11R10-7**

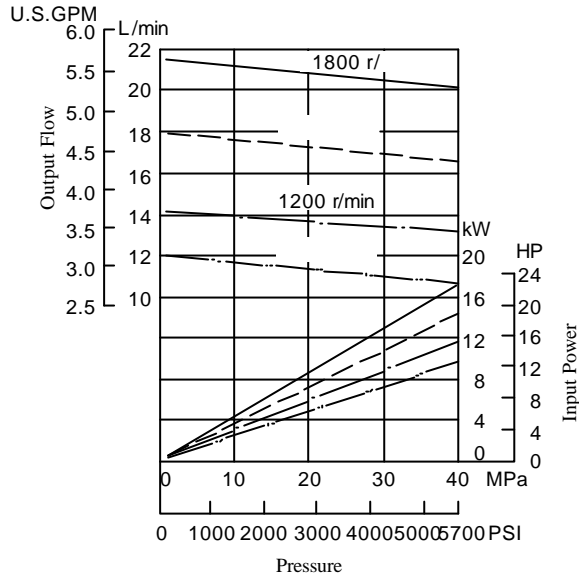


**PV11R10-10**

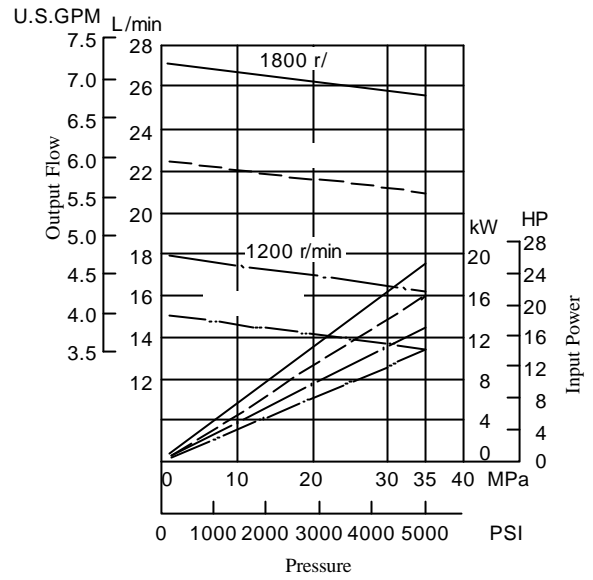


Viscosity 20 mm<sup>2</sup>/s (100 SSU) [ISO VG32 Oils, 50°C (122°F)]

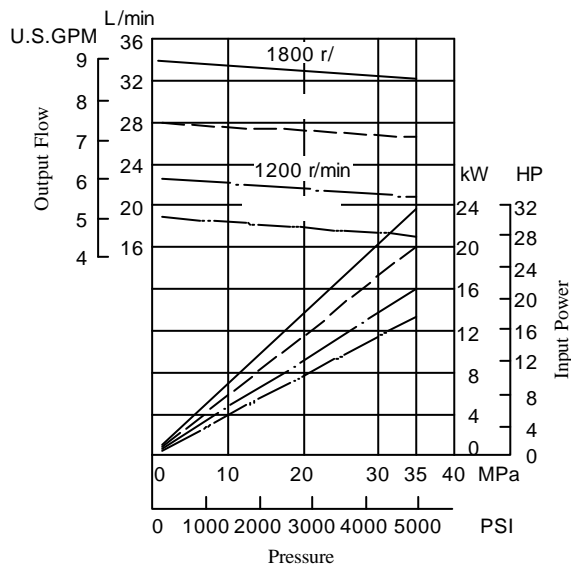
**PV11R10-12**



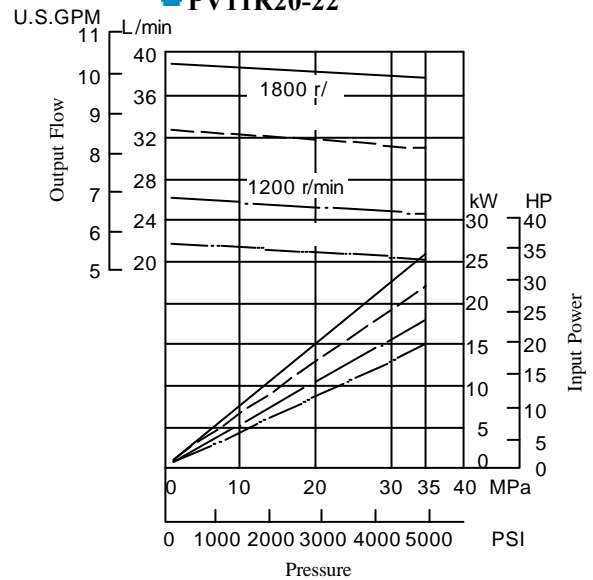
**PV11R20-15**



**PV11R20-19**



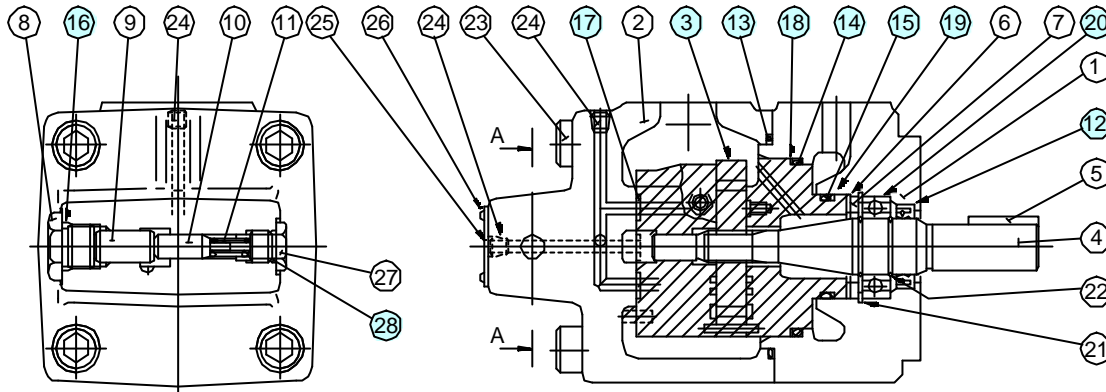
**PV11R20-22**



PV11R10-\*-\*-RAA-20/2090  
PV11R20-\*-\*-RAA-20/2090

### CAUTION

When making replacement of seals, bearings or cartridge kits, please do it carefully after reading through the relevant instructions in the Operator's Manual.



Section A-A

#### Cartridge Kits

| Model Numbers                | Cartridge Kit No.                   |
|------------------------------|-------------------------------------|
| PV11R10-2-*-RAA-20/<br>2090  | CPV11R10-2-R-20<br>CPV11R10-5-R-20  |
| PV11R10-5-*-RAA-20/<br>2090  | CPV11R10-7-R-20<br>CPV11R10-10-R-20 |
| PV11R10-7-*-RAA-20/<br>2090  | CPV11R10-12-R-20                    |
| PV11R10-10-*-RAA-20/<br>2090 | CPV11R20-15-R-20                    |

#### Seals & Bearing

| Item | Name of Parts | Part Numbers     | Qty. |
|------|---------------|------------------|------|
|      |               | PV11R10, PV11R20 |      |
| 12   | Oil Seal      | ISD 25 38 8      | 1    |
| 13   | O-Ring        | SO-NB-G95        | 1    |
| 14   | O-Ring        | SO-NB-G75        | 1    |
| 15   | O-Ring        | SO-NB-P42        | 1    |
| 16   | O-Ring        | SO-NB-P18        | 1    |
| 17   | O-Ring        | SO-NB-P9         | 3    |
| 18   | Back Up Ring  | SO-BE-G75        | 1    |
| 19   | Back Up Ring  | SO-BB-P42        | 1    |
| 20   | Bearing       | 6005             | 1    |
| 28   | O-Ring        | SO-NB-P11        | 1    |

Notes: 1) Item Nos. 12, 13 and 17 (o-rings) and 18 and 19 (back up rings) are included in the cartridge kit.

2) For pumps for phosphate ester type hydraulic fluids, different cartridge kit and seals from the above are used. Please contact us.

★ When ordering seals, please specify the seal kit number (Kit No.: KS-PV11R10-20).