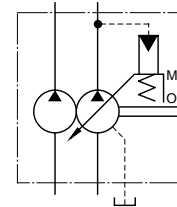


Model Number Designation



Graphic Symbol



Model Number Designation

| A16R1 | -F | R | Inboard Pump (Driven End) | | Outboard Pump | | | K | -32 | * |
|---------------|---|---|-------------------------------|---|--|-------------------------|-----------------------|-----------------|---------------|--|
| | | | 01 | B | -23 | A | A | | | |
| Series Number | Mounting | Direction of Rotation | Control Type | Pres. Adj. Range MPa(Psi) | Nominal Displacement cm ³ /rev | Discharge Port Position | Suction Port Position | Shaft Extension | Design Number | Design Std. |
| A16R1 | F: Flange Mtg. L: Foot Mtg. | (Viewed from Shaft End) R: ★ 1 Clockwise (Normal) | 01: Pressure Compensator Type | B: 1.2 - 7 (170 - 1020) C: 1.2 - 16 (170 - 2320) H: 1.2 - 21 (170 - 3050) | 6, 8 10, 12 14, 17 19, 23 25, 31 | A: Up | A: Up | K: Keyed Shaft | 32 | Refer to ★ 2 |
| A22R1 | | | | B: 1.2 - 7 (170 - 1020) C: 1.2 - 16 (170 - 2320) | | | | | 32 | |
| A37R1 | | | | B: 1.2 - 7 (170 - 1020) C: 1.2 - 16 (170 - 2320) H: 1.2 - 21 (170 - 3050) | | | | | 32 | |
| A56R1 | | | | B: 1.2 - 7 (170 - 1020) C: 1.2 - 16 (170 - 2320) H: 1.2 - 21 (170 - 3050) | | | | | 32 | |
| A70R1 | | | | B: 1.2 - 7 (170 - 1020) C: 1.5 - 16 (220 - 2320) H: 1.8 - 21 (260 - 3050) K: 2.0 - 28 (290 - 4060) | | | | | 60 | |
| A90R1 | | | | B: 1.2 - 7 (170 - 1020) C: 1.5 - 16 (220 - 2320) H: 1.8 - 21 (260 - 3050) K: 2.0 - 28 (290 - 4060) | | | | | 60 | |
| A145R1 | | | | B: 1.2 - 7 (170 - 1020) C: 1.5 - 16 (220 - 2320) H: 1.8 - 21 (260 - 3050) K: 2.0 - 28 (290 - 4060) | | | | | 60 | |
| A70R2 | | | | B: 1.2 - 7 (170 - 1020) C: 1.5 - 16 (220 - 2320) H: 1.8 - 21 (260 - 3050) K: 2.0 - 28 (290 - 4060) | | | | | 60 | |
| A90R2 | | | | B: 1.2 - 7 (170 - 1020) C: 1.5 - 16 (220 - 2320) H: 1.8 - 21 (260 - 3050) K: 2.0 - 28 (290 - 4060) | | | | | 60 | |
| A145R2 | B: 1.2 - 7 (170 - 1020) C: 1.5 - 16 (220 - 2320) H: 1.8 - 21 (260 - 3050) K: 2.0 - 28 (290 - 4060) | 60 | | | | | | | | |

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

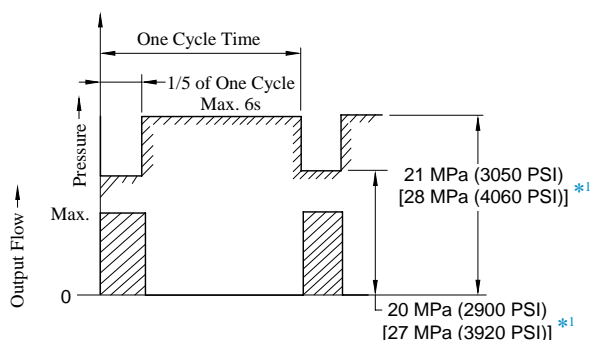
★2. Design Standards: None Japanese Standard "JIS"
80 European Design Standard
90 N. American Design Standard

Specifications

Specifications

| Model Numbers | Geometric Displacement cm ³ /rev (cu.in./rev) | Operating Pressure MPa (PSI) | | Shaft Speed Range r/min | | Approx. Mass kg (lbs.) | |
|------------------------------------|--|---------------------------------|----------------------------|----------------------------|------|---------------------------|----------------|
| | | Rated ^{*2} | Intermittent ^{*1} | Max. | Min. | Flange Mtg. | Foot Mtg. |
| A16R1-*R01*-*AAK-32* ^{*3} | Outboard Pump | Refer to the following page | | 1800 | 750 | 28.8 (63.5) | 31.0 (68.4) |
| | Inboard Pump | 15.8 (.964) | 16 (2320) 21 (3050) | | | | |
| A22R1-*R01*-*AAK-32* ^{*3} | Outboard Pump | Refer to the following page | | 1800 | 750 | 28.8 (63.5) | 31.0 (68.4) |
| | Inboard Pump | 22.2 (1.355) | 16 (2320) 16 (2320) | | | | |
| A37R1-*R01*-*AAK-32* ^{*3} | Outboard Pump | Refer to the following page | | 1800 | 750 | 39 (86.0) | 43.3 (95.5) |
| | Inboard Pump | 36.9 (2.25) | 16 (2320) 21 (3050) | | | | |
| A56R1-*R01*-*AAK-32* ^{*3} | Outboard Pump | Refer to the following page | | 1800 | 750 | 47 (104) | 51.3 (113) |
| | Inboard Pump | 56.2 (3.43) | 16 (2320) 21 (3050) | | | | |
| A70R1-*R01*-*AA-60* ^{*3} | Outboard Pump | Refer to the following page | | 1800 | 750 | 66 (146) | 78 (172) |
| | Inboard Pump | 70.0 (4.27) | 25 (3630) 28 (4060) | | | | |
| A90R1-*R01*-*AA-60* ^{*3} | Outboard Pump | Refer to the following page | | 1800 | 750 | 82 (181) | 105 (232) |
| | Inboard Pump | 91.0 (5.55) | 25 (3630) 28 (4060) | | | | |
| A145R1-*R01*-*AA-60* ^{*3} | Outboard Pump | Refer to the following page | | 1800 | 750 | 102 (225) | 129 (284) |
| | Inboard Pump | 145 (8.85) | 25 (3630) 28 (4060) | | | | |
| A70R2-*R01*-*AA-60* ^{*3} | Outboard Pump | Refer to the following page | | 1800 | 600 | 72.5 (160) | 84.5 (186) |
| | Inboard Pump | 70.0 (4.27) | 25 (3630) 28 (4060) | | | | |
| A90R2-*R01*-*AA-60* ^{*3} | Outboard Pump | Refer to the following page | | 1800 | 600 | 91.5 (202) | 112 (247) |
| | Inboard Pump | 91.0 (5.55) | 25 (3630) 28 (4060) | | | | |
| A145R2-*R01*-*AA-60* ^{*3} | Outboard Pump | Refer to the following page | | 1800 | 600 | 112 (247) | 137 (302) |
| | Inboard Pump | 145 (8.85) | 25 (3630) 28 (4060) | | | | |

- ★ 1. Whenever setting pressure, make sure the full cut-off pressure never exceeds the maximum intermittent pressure.
- ★ 2. Care should be taken in cases of use at a higher pressure than the rated pressure, because operating terms may be restricted. For example, if used as per maximum illustrated operating conditions, intermittent time at maximum flow is restricted to under 1/5 of one cycle time and under 6 seconds simultaneously. Conditions may vary according to the actual working pressure and delivery (inclination angle of the swash plate). Consult factory or Yuken sales representative for further information.



*1. Applicable only for A70R1/R2, A90R1/R2, A145R1/R2.

- ★ 3. The maximum input power of except "A56R1" pump must be restricted, because of the shaft strength. Refer to the following page.

■ Allowable Input Power

With the pumps listed in the table below, there is a limit to the sum of the input power of the inboard and outboard pumps because of shaft strength.

If both pumps are used for boosting at once, referring to the calculation formulas below, check that the displacements and discharge pressures of both pumps are within the allowable ranges.

$$Q1 \times P1 + Q2 \times P2 \leq L_M$$

Q1 : Displacement (cm³/rev)
P1 : Discharge Pressure (MPa) } Outboard Pump
Q2 : Displacement (cm³/rev)
P2 : Discharge Pressure (MPa) } Inboard Pump
L_M : See the table below

$$Q1 \times P1 + Q2 \times P2 \leq L_P$$

Q1 : Displacement (cu.in/rev)
P1 : Discharge Pressure (PSI) } Outboard Pump
Q2 : Displacement (cu.in/rev)
P2 : Discharge Pressure (PSI) } Inboard Pump
L_P : See the table below

| Model Numbers | L _M | L _P |
|---------------|----------------|----------------|
| A16R1/A22R1 | 523 | 4627 |
| A37R1 | 900 | 7963 |
| A70R1/A70R2 | 2408 | 21305 |
| A90R1/A90R2 | 4348 | 38470 |
| A145R1/A145R2 | 4739 | 41930 |

● Geometric Displacement and Max. Pressure of Outboard Pump

| Model Numbers | Geometric Displacement cm ³ /rev (cu.in./rev) | Max Pres. MPa (PSI) | | |
|---------------|--|---------------------|--------------|-----------|
| | | Anti-Wear Type | R & O Type | |
| A*R1-*R01*-6 | 5.8 (.354) | 21 *1 (3050) | 16 (2320) | |
| A*R1-*R01*-8 | 8.0 (.488) | | | |
| A*R1-*R01*-10 | 9.4 (.574) | | | |
| A*R1-*R01*-12 | 12.2 (.744) | | | |
| A*R1-*R01*-14 | 13.7 (.836) | | | |
| A*R1-*R01*-17 | 16.6 (1.013) | | | |
| A*R1-*R01*-19 | 18.6 (1.135) | | | |
| A*R1-*R01*-23 | 22.7 (1.385) | 17.5 (2540) | | |
| A*R1-*R01*-25 | 25.3 (1.544) | 15 (2180) | | 15 (2180) |
| A*R1-*R01*-31 | 31.0 (1.892) | 12 (1740) | | 12 (1740) |
| A*R2-*R01*-26 | 26.6 (1.623) | 21 (3050) | 14 (2030) | |
| A*R2-*R01*-33 | 33.3 (2.03) | | | |
| A*R2-*R01*-41 | 41.3 (2.52) | | | |
| A*R2-*R01*-47 | 47.2 (2.88) | 20 (2900) | | |
| A*R2-*R01*-53 | 52.5 (3.20) | 18 (2610) | | |
| A*R2-*R01*-59 | 58.2 (3.55) | 16 (2320) | | |
| A*R2-*R01*-65 | 64.7 (3.95) | 14 (2030) | | |

★ 1. When pump is operated pressure more than 16 MPa (2320 PSI), shaft speed should be more than 1450 r/min.

■ Instructions

● Suction Pressure of Outboard Pump

Permissible suction pressure at inlet port of the outboard pump (PV2R) is the range between -20 kPa and +30 kPa (5.9 in. Hg vacuum and +4.3 PSIG).

● Suction Piping of Outboard Pump

When the operating speed is less than 1200 r/min, the suction port of the outboard pump (PV2R) should be facing upwards to facilitate oil suction when starting.

● When Starting the pump at low speed

maximum viscosity is restricted. Refer to the table below.

| Model | Start-up Speed r/min | Max. Viscosity mm ² /s (SSU) |
|-------|-------------------------|--|
| A*R1 | 750 | 100 (465) |
| | 950 | 200 (930) |
| A*R2 | 600 | 100 (465) |
| | 950 | 200 (930) |

■ Performance Characteristics

Performance characteristics of inboard pump refer to relevant page for performance characteristics of "A" series single pumps excluding noise level characteristics.

Performance characteristics of outboard pump refer to "PV2R" series vane pump catalogue (catalogue No. Pub. EC-0118).

| Model | Performance Characteristics | |
|--------|--|--|
| | Inboard Pump | Outboard Pump |
| A16R1 | Same as Single Pump "A16", Refer to Page 10 | Same as Vane Type Single Pump "PV2R1". Refer to the Catalogue No. Pub.EC-0118. |
| A22R1 | Same as Single Pump "A22", Refer to Page 11 | |
| A37R1 | Same as Single Pump "A37", Refer to Page 12 | |
| A56R1 | Same as Single Pump "A56", Refer to Page 13 | |
| A70R1 | Same as Single Pump "A70", Refer to Page 14 | |
| A90R1 | Same as Single Pump "A90", Refer to Page 15 | |
| A145R1 | Same as Single Pump "A145", Refer to Page 16 | |
| A70R2 | Same as Single Pump "A70", Refer to Page 14 | Same as Vane Type Single Pump "PV2R2". Refer to the Catalogue No. Pub.EC-0118. |
| A90R2 | Same as Single Pump "A90", Refer to Page 15 | |
| A145R2 | Same as Single Pump "A145", Refer to Page 16 | |

■ Pipe Flange Kits

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

● For Inboard Pump ("A" Pump)

| Pump Model Numbers | Name of Port | Pipe Flange Kit Numbers | | | | | | |
|--------------------|--------------|-------------------------|----------------------|-------------------------|--|-------------------------|--|-------------------------|
| | | Threaded Connection | | | Socket Welding* | | Butt Welding | |
| | | Japanese Std. "JIS" | European Design Std. | N. American Design Std. | Japanese Std. "JIS" & European Design Std. | N. American Design Std. | Japanese Std. "JIS" & European Design Std. | N. American Design Std. |
| A16R1 | Suction | F5-06-A-10 | F5-06-A-1080 | F5-06-A-1090 | F5-06-B-10 | F5-06-B-1090 | F5-06-C-10 | F5-06-C-1090 |
| A22R1 | Discharge | F5-06-A-10 | F5-06-A-1080 | F5-06-A-1090 | F5-06-B-10 | F5-06-B-1090 | F5-06-C-10 | F5-06-C-1090 |
| A37R1 | Suction | F5-10-A-10 | F5-10-A-1080 | F5-10-A-1090 | F5-10-B-10 | F5-10-B-1090 | F5-10-C-10 | F5-10-C-1090 |
| A56R1 | Discharge | F5-10-A-10 | F5-10-A-1080 | F5-10-A-1090 | F5-10-B-10 | F5-10-B-1090 | F5-10-C-10 | F5-10-C-1090 |
| A70R1 | Suction | F5-12-A-10 | F5-12-A-1080 | F5-12-A-1090 | F5-12-B-10 | F5-12-B-1090 | F5-12-C-10 | F5-12-C-1090 |
| | Discharge | 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 |
| A90R1 | Suction | F5-16-A-10 | F5-16-A-1080 | F5-16-A-1090 | F5-16-B-10 | F5-16-B-1090 | F5-16-C-10 | F5-16-C-1090 |
| A145R1 | Discharge | F5-10-A-10 | F5-10-A-1080 | F5-10-A-1090 | F5-10-B-10 | F5-10-B-1090 | F5-10-C-10 | F5-10-C-1090 |

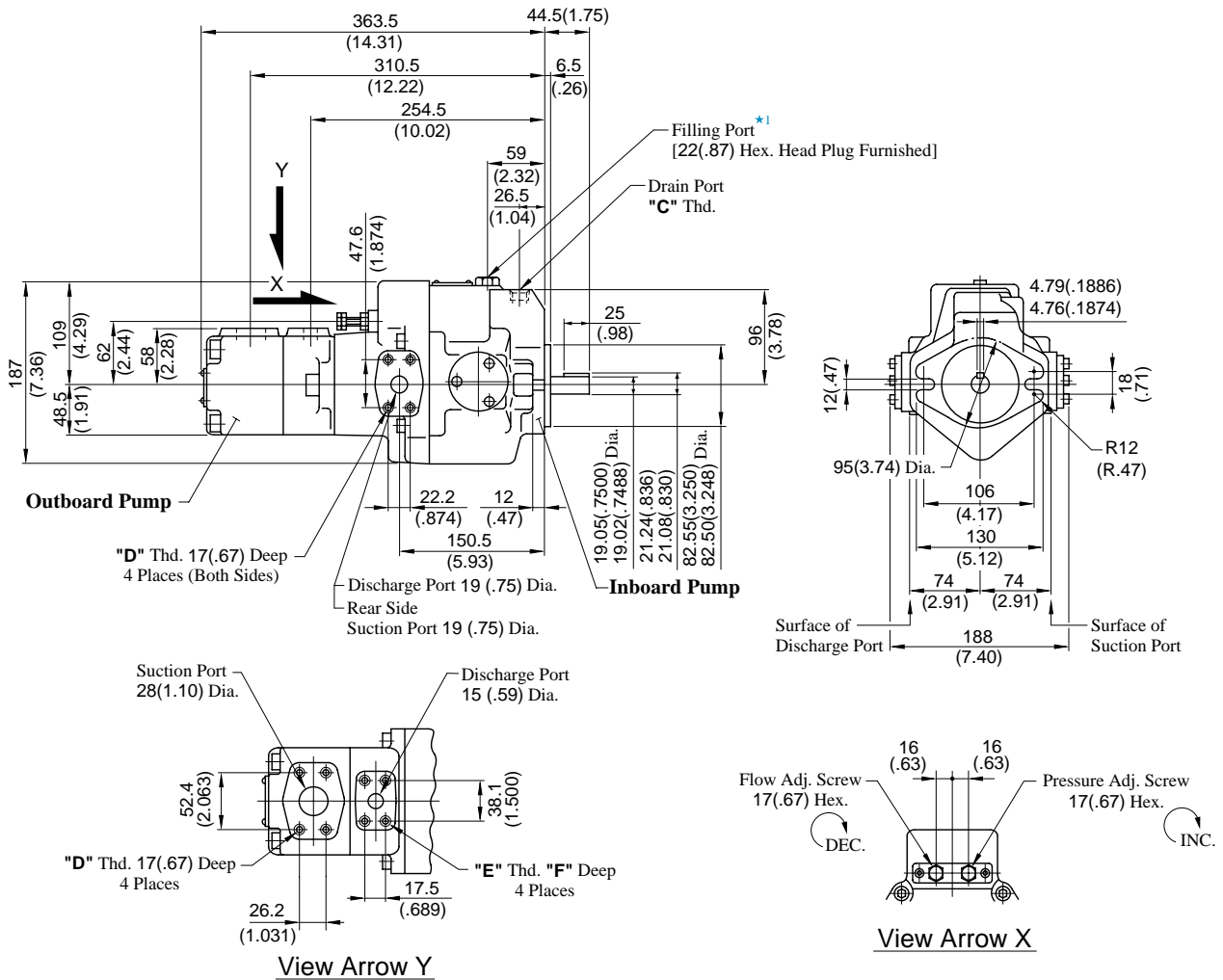
● For Outboard Pump (PV2R Pump)

| Pump Model Numbers | Name of Port | Pipe Flange Kit Numbers | | | | | | |
|--|--------------|-------------------------|----------------------|-------------------------|--|-------------------------|--|-------------------------|
| | | Threaded Connection | | | Socket Welding* | | Butt Welding | |
| | | Japanese Std. "JIS" | European Design Std. | N. American Design Std. | Japanese Std. "JIS" & European Design Std. | N. American Design Std. | Japanese Std. "JIS" & European Design Std. | N. American Design Std. |
| A16R1 A22R1 A37R1 A56R1 A70R1 A90R1 A145R1 | 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 |
| | Discharge | F5-04-A-10 | F5-04-A-1080 | F5-04-A-1090 | F5-04-B-10 | F5-04-B-1090 | F5-04-C-10 | F5-04-C-1090 |
| A70R2 A90R2 | Suction | F5-10-A-10 | F5-10-A-1080 | F5-10-A-1090 | F5-10-B-10 | F5-10-B-1090 | F5-10-C-10 | F5-10-C-1090 |
| A145R2 | Discharge | F5-06-A-10 | F5-06-A-1080 | F5-06-A-1090 | F5-06-B-10 | F5-06-B-1090 | F5-06-C-10 | F5-06-C-1090 |

* In case of using socket welding flanges, there is a case where the operating pressure should be set lower than the normal because of strength of the flanges. Therefore, please pay cautious attention to the operating pressure when the socket welding flanges are used.

● Details of the pipe flange kits are given in the Catalogue No. Pub. EC-3001.

Flange Mtg. : A16R1-FR01*-*AAK-32/3280/3290
A22R1-FR01*-*AAK-32/3280/3290

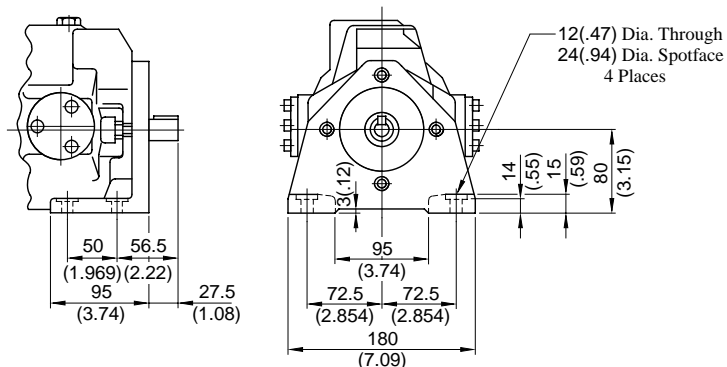


★ 1. Install the pump so that the "Filling Port" is at the top.

| Model Numbers | "C" Thd. | "D" Thd. | "E" Thd. | F mm (IN.) |
|-----------------------------|-----------|------------|-------------|------------|
| A16R1/A22R1-FR01*-*AAK-32 | Rc 3/8 | M10 | M8 | 14 (.55) |
| A16R1/A22R1-FR01*-*AAK-3280 | 3/8 BSP.F | | | |
| A16R1/A22R1-FR01*-*AAK-3290 | 3/8 NPT | 3/8-16 UNC | 5/16-18 UNC | 16 (.63) |

DIMENSIONS IN
MILLIMETRES (INCHES)

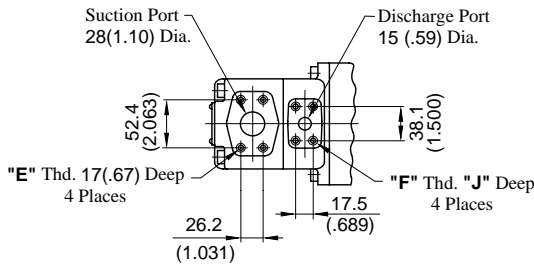
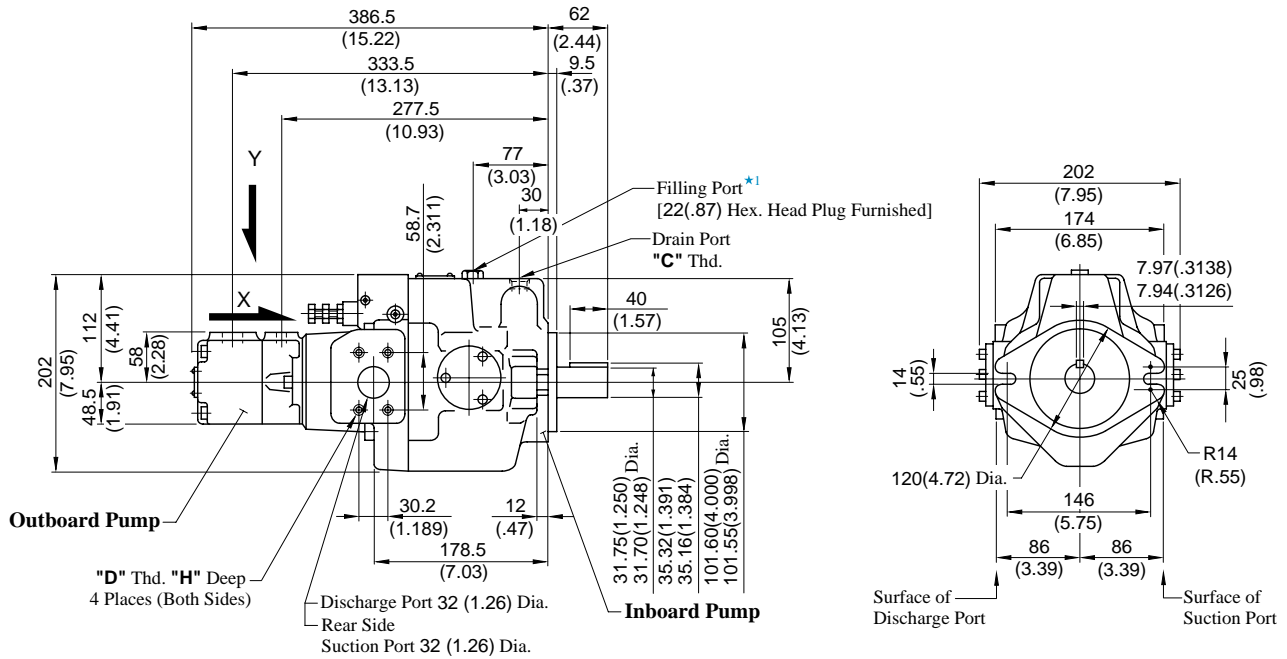
Foot Mtg. : A16R1-LR01*-*AAK-32/3280/3290
A22R1-LR01*-*AAK-32/3280/3290



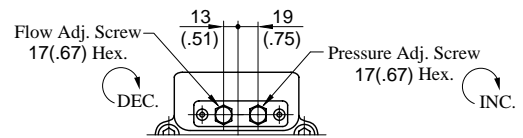
• For other dimensions, refer to "Flange Mtg.".

Installation Drawing

Flange Mtg. : A37R1-FR01*-*AAK-32/3280/3290



View Arrow Y



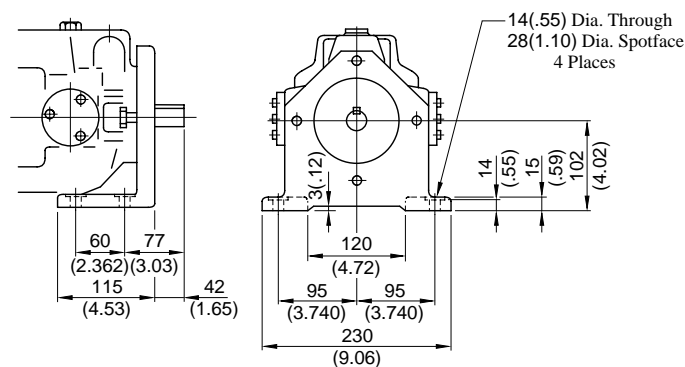
View Arrow X

★ 1. Install the pump so that the "Filling Port" is at the top.

| Model Numbers | "C" Thd. | "D" Thd. | "E" Thd. | "F" Thd. | mm (IN.) | |
|---------------------|-----------|-------------|------------|-------------|----------|----------|
| | | | | | H | J |
| A37R1-FR01*-*AAK-32 | Rc 1/2 | M10 | M10 | M8 | 19 (.75) | 14 (.55) |
| A37R1-FR01*-*AAK- | 1/2 BSP.F | | | | | |
| 3280 | 1/2 NPT | 7/16-14 UNC | 3/8-16 UNC | 5/16-18 UNC | 20 (.79) | 16 (.63) |

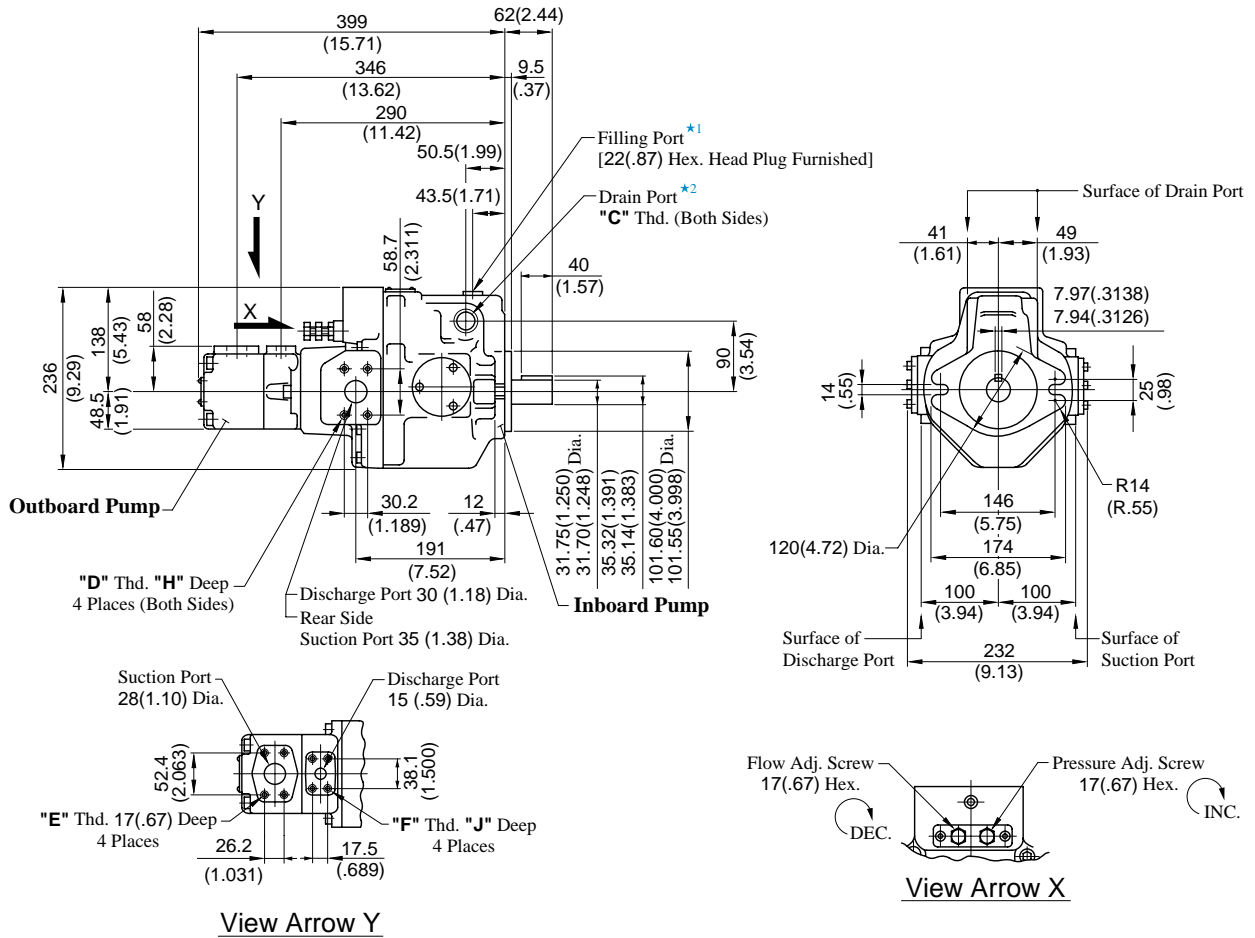
DIMENSIONS IN
MILLIMETRES (INCHES)

Foot Mtg. : A37R1-LR01*-*AAK-32/3280/3290



• For other dimensions, refer to "Flange Mtg."

Flange Mtg. : A56R1-FR01*-*AAK-32/3280/3290



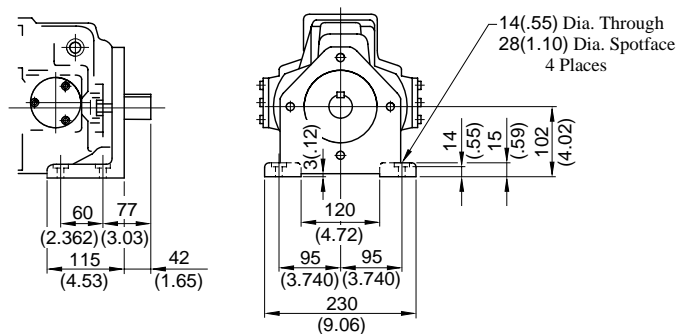
★ 1. Install the pump so that the "Filling Port" is at the top.

★ 2. Use either port of two drain ports of inboard pump at your option. Keep the remaining port plugged. Note that on the European design standard (3280 Design), only the left side, as viewed from the shaft end, of the drain port is machined.

| Model Numbers | "C" Thd. | "D" Thd. | "E" Thd. | "F" Thd. | mm (IN.) | |
|-----------------------|-----------|----------|----------|----------|----------|----------|
| | | | | | H | J |
| A56R1-FR01*-*AAK-32 | Rc 3/4 | M10 | M10 | M8 | 19 (.75) | 14 (.55) |
| A56R1-FR01*-*AAK-3280 | 3/4 BSP.F | | | | 20 (.79) | 16 (.63) |

DIMENSIONS IN
MILLIMETRES (INCHES)

Foot Mtg. : A56R1-LR01*-*AAK-32/3280/3290

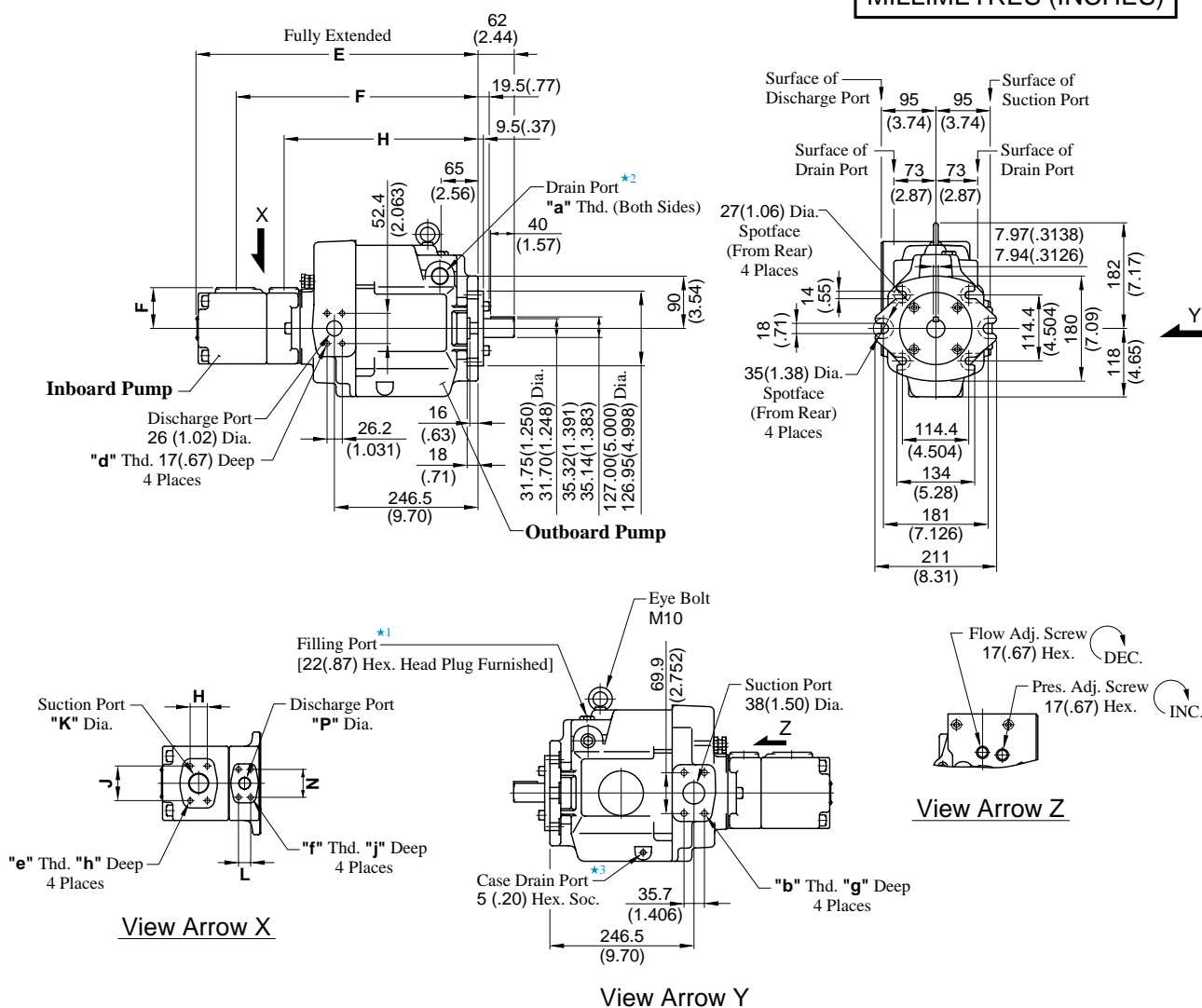


• For other dimensions, refer to "Flange Mtg.".

Installation Drawing

Flange Mtg. : A70R1-FR01*-*AA-60/6080/6090
A70R2-FR01*-*AA-60/6080/6090

**DIMENSIONS IN
MILLIMETRES (INCHES)**



- ★ 1. Install the pump so that the "Filling Port" is at the top.
- ★ 2. Use either port of two drain ports of inboard pump at your option. Keep the remaining port plugged. Note that on the European design standard (6080 Design), only the left side, as viewed from the shaft end, of the drain ports is machined.
- ★ 3. Case drain ports are available for use when draining hydraulic fluid from pump casing.

| Model Numbers | Dimensions mm (Inches) | | | | | | | | | |
|---------------------|------------------------|------------------|------------------|--------------|-----------------|-----------------|--------------|-----------------|-----------------|--------------|
| | C | D | E | F | H | J | K | L | N | P |
| A70R1-FR01*-*AA-60* | 439.5 (17.30) | 386.5 (15.22) | 330.5 (13.01) | 58 (2.28) | 26.2 (1.031) | 52.4 (2.063) | 28 (1.10) | 17.5 (0.689) | 38.1 (1.500) | 15 (0.59) |
| A70R2-FR01*-*AA-60* | 468.5 (18.44) | 413.5 (16.28) | 333.5 (13.13) | 70 (2.76) | 30.2 (1.189) | 58.7 (2.311) | 34 (1.34) | 22.2 (0.874) | 47.6 (1.874) | 21 (0.83) |

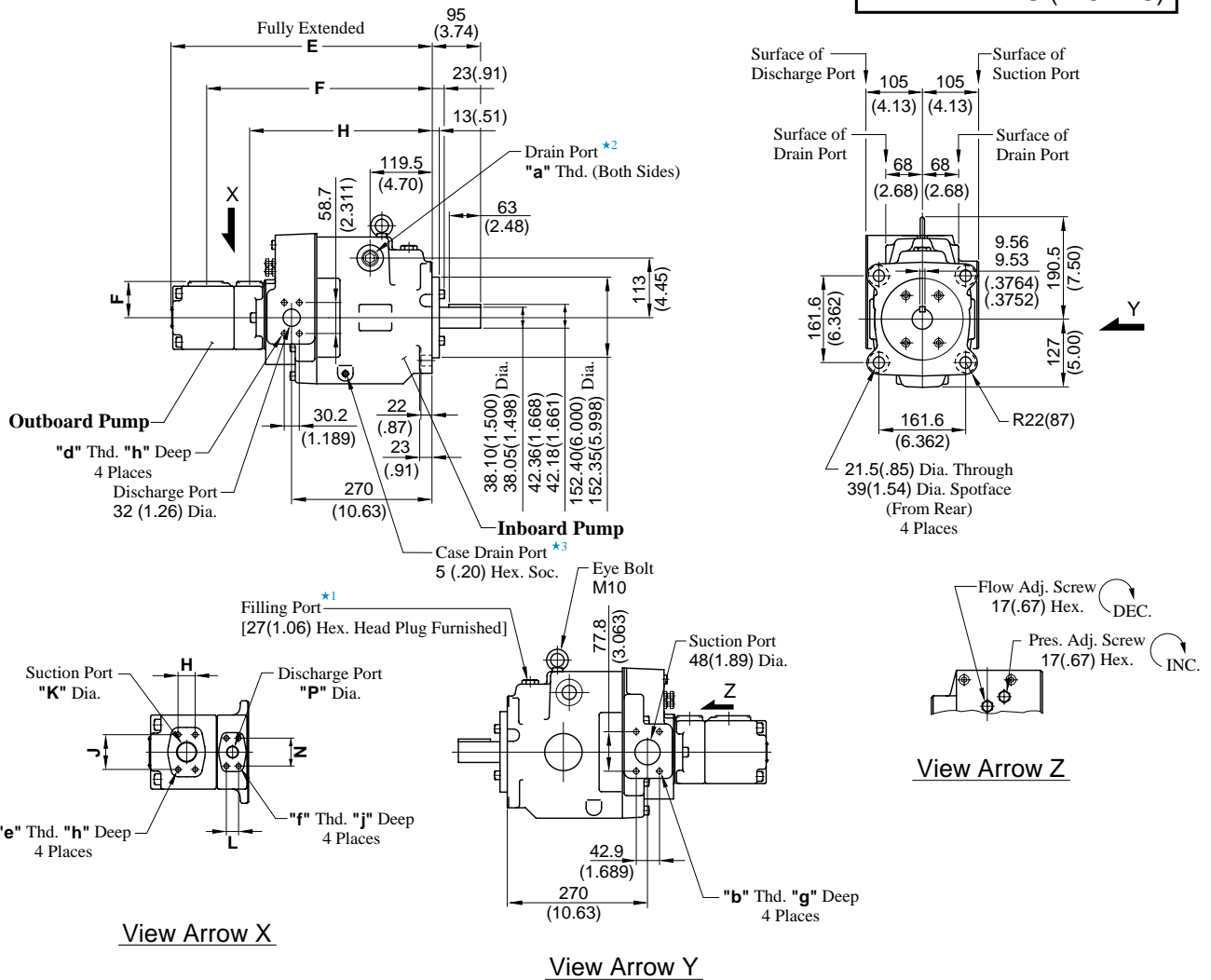
| Model Numbers | Thread Size | | | | | mm (Inches) | | | | |
|----------------------|-------------|------------|------------|-------------|-------------|-------------|-----------|-----------|--|--|
| | a | b | d | e | f | g | h | j | | |
| A70R1-FR01*-*AA-60 | Rc 3/4 | M12 | M10 | M10 | M8 | 19 (0.75) | 17 (0.67) | 14 (0.55) | | |
| A70R1-FR01*-*AA-6080 | 3/4 BSP.F | | | | | | | 16 (0.63) | | |
| A70R1-FR01*-*AA-6090 | 3/4 NPT | 1/2-13 UNC | 3/8-16 UNC | 3/8-16 UNC | 5/16-18 UNC | 21 (0.83) | | | | |
| A70R2-FR01*-*AA-60 | Rc 3/4 | M12 | M10 | M10 | M10 | 19 (0.75) | 19 (0.75) | 17 (0.67) | | |
| A70R2-FR01*-*AA-6080 | 3/4 BSP.F | | | | | | | | | |
| A70R2-FR01*-*AA-6090 | 3/4 NPT | 1/2-13 UNC | 3/8-16 UNC | 7/16-14 UNC | 3/8-16 UNC | 21 (0.83) | 20 (0.79) | | | |

● Foot Mounting Type

The mounting bracket is common to that of single pumps A70. Refer to page 21 for the dimensions of mounting bracket.

Flange Mtg. : A90R1-FR01*-*AA-60/6080/6090
A90R2-FR01*-*AA-60/6080/6090

DIMENSIONS IN
MILLIMETRES (INCHES)



- ★ 1. Install the pump so that the "Filling Port" is at the top.
- ★ 2. Use either port of two drain ports of inboard pump at your option. Keep the remaining port plugged. Note that on the European design standard (6080 Design), only the left side, as viewed from the shaft end, of the drain ports is machined.
- ★ 3. Case drain ports are available for use when draining hydraulic fluid from pump casing.

| Model Numbers | Dimensions mm (Inches) | | | | | | | | | |
|---------------------|------------------------|----------------|----------------|--------------|-----------------|-----------------|--------------|----------------|-----------------|-------------|
| | C | D | E | F | H | J | K | L | N | P |
| A90R1-FR01*-*AA-60* | 458 (18.03) | 405 (15.94) | 349 (13.74) | 58 (2.28) | 26.2 (1.031) | 52.4 (2.063) | 28 (1.10) | 17.5 (.689) | 38.1 (1.500) | 15 (.59) |
| A90R2-FR01*-*AA-60* | 497 (19.57) | 432 (17.01) | 352 (13.86) | 70 (2.76) | 30.2 (1.189) | 58.7 (2.311) | 34 (1.34) | 22.2 (.874) | 47.6 (1.874) | 21 (.83) |

| Model Numbers | Thread Size | | | | | | mm (Inches) | | | |
|----------------------|-------------|------------|-------------|-------------|-------------|----------|-------------|----------|--|--|
| | a | b | d | e | f | g | h | j | | |
| A90R1-FR01*-*AA-60 | Rc 3/4 | M12 | M10 | M10 | M8 | 19 (.75) | 17 (.67) | 14 (.55) | | |
| A90R1-FR01*-*AA-6080 | 3/4 BSP.F | | | | | | | 16 (.63) | | |
| A90R1-FR01*-*AA-6090 | 3/4 NPT | 1/2-13 UNC | 7/16-14 UNC | 3/8-16 UNC | 5/16-18 UNC | 21 (.83) | 17 (.67) | | | |
| A90R2-FR01*-*AA-60 | Rc 3/4 | M12 | M10 | M10 | M10 | 19 (.75) | 19 (.75) | 17 (.67) | | |
| A90R2-FR01*-*AA-6080 | 3/4 BSP.F | | | | | | | 20 (.79) | | |
| A90R2-FR01*-*AA-6090 | 3/4 NPT | 1/2-13 UNC | 7/16-14 UNC | 7/16-14 UNC | 3/8-16 UNC | 21 (.83) | 20 (.79) | | | |

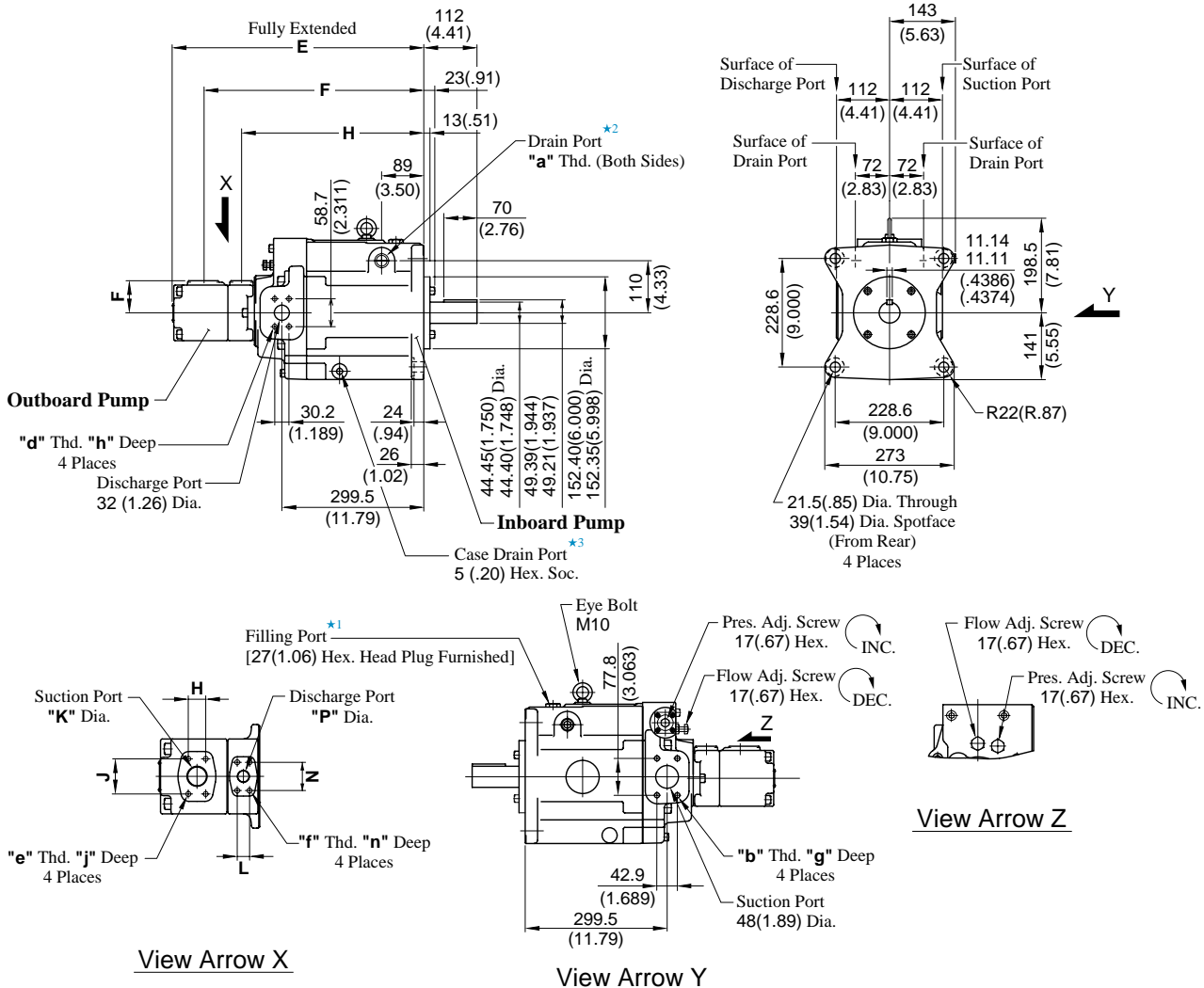
● Foot Mounting Type

The mounting bracket is common to that of single pumps A90. Refer to page 22 for the dimensions of mounting bracket.

Installation Drawing

Flange Mtg. : A145R1-FR01*-*AA-60/6080/6090
A145R2-FR01*-*AA-60/6080/6090

DIMENSIONS IN
MILLIMETRES (INCHES)



- ★ 1. Install the pump so that the "Filling Port" is at the top.
- ★ 2. Use either port of two drain ports of inboard pump at your option. Keep the remaining port plugged. Note that on the European design standard (6080 Design), only the left side, as viewed from the shaft end, of the drain ports is machined.
- ★ 3. Case drain ports are available for use when draining hydraulic fluid from pump casing.

| Model Numbers | Dimensions mm (Inches) | | | | | | | | | |
|----------------------|------------------------|------------------|------------------|--------------|-----------------|-----------------|--------------|----------------|-----------------|-------------|
| | C | D | E | F | H | J | K | L | N | P |
| A145R1-FR01*-*AA-60* | 491.5 (19.35) | 438.5 (17.26) | 382.5 (15.06) | 58 (2.28) | 26.2 (1.031) | 52.4 (2.063) | 28 (1.10) | 17.5 (.689) | 38.1 (1.500) | 15 (.59) |
| A145R2-FR01*-*AA-60* | 530.5 (20.89) | 465.5 (18.33) | 385.5 (15.18) | 70 (2.76) | 30.2 (1.189) | 58.7 (2.311) | 34 (1.34) | 22.2 (.874) | 47.6 (1.874) | 21 (.83) |

| Model Numbers | Thread Size | | | | | mm (Inches) | | | | |
|-----------------------|-------------|------------|-------------|-------------|-------------|-------------|----------|----------|----------|--|
| | a | b | d | e | f | g | h | j | n | |
| A145R1-FR01*-*AA-60 | Rc 3/4 | M12 | M10 | M10 | M8 | 19 (.75) | 19 (.75) | 17 (.67) | 14 (.55) | |
| A145R1-FR01*-*AA-6080 | 3/4 BSP.F | | | | | | | | | |
| A145R1-FR01*-*AA-6090 | 3/4 NPT | 1/2-13 UNC | 7/16-14 UNC | 3/8-16 UNC | 5/16-18 UNC | 21 (.83) | 20 (.79) | | 16 (.63) | |
| A145R2-FR01*-*AA-60 | Rc 3/4 | M12 | M10 | M10 | M10 | 19 (.75) | 19 (.75) | 19 (.75) | 17 (.67) | |
| A145R2-FR01*-*AA-6080 | 3/4 BSP.F | | | | | | | | | |
| A145R2-FR01*-*AA-6090 | 3/4 NPT | 1/2-13 UNC | 7/16-14 UNC | 7/16-14 UNC | 3/8-16 UNC | 21 (.83) | 20 (.79) | 20 (.79) | | |

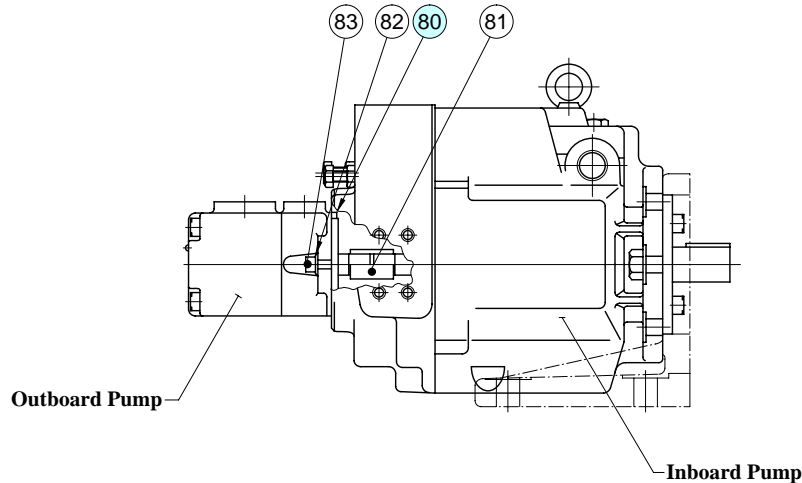
● Foot Mounting Type

The mounting bracket is common to that of single pumps A145. Refer to page 23 for the dimensions of mounting bracket.

A16R1-*R01*-*AAK-32/3280/3290
 A22R1-*R01*-*AAK-32/3280/3290
 A37R1-*R01*-*AAK-32/3280/3290
 A56R1-*R01*-*AAK-32/3280/3290
 A70R1/A70R02-*R01*-*AA-60/6080/6090
 A90R1/A90R02-*R01*-*AA-60/6080/6090
 A145R1/A145R02-*R01*-*AA-60/6080/6090

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.



● Seals

| Pump Model Numbers | Seal Kit Numbers | | | Part Numbers (Item 80 O-Ring) |
|-------------------------------|------------------|------------------|-------------------|----------------------------------|
| | Complete Kit | For Inboard Pump | For Outboard Pump | |
| A16R1-*R01*-*AAK-32/3280/3290 | KS-A16R1-01-32 | KS-A16-01-32 | KS-PV2R1-4010 | S85(NBR,Hs70) 1Req'd |
| A22R1-*R01*-*AAK-32/3280/3290 | KS-A22R1-01-32 | KS-A22-01-32 | | |
| A37R1-*R01*-*AAK-32/3280/3290 | KS-A37R1-01-32 | KS-A37-01-32 | | |
| A56R1-*R01*-*AAK-32/3280/3290 | KS-A56R1-01-32 | KS-A56-01-32 | | |
| A70R1-*R01*-*AA-60/6080/6090 | KS-A70R1-01-60 | KS-A70-01-60 | | |
| A90R1-*R01*-*AA-60/6080/6090 | KS-A90R1-01-60 | KS-A90-01-60 | | |
| A145R1-*R01*-*AA-60/6080/6090 | KS-A145R1-01-60 | KS-A145-01-60 | | |
| A70R2-*R01*-*AA-60/6080/6090 | KS-A70R2-01-60 | KS-A70-01-60 | KS-PV2R2-40 | S105(NBR,Hs70) 1Req'd |
| A90R2-*R01*-*AA-60/6080/6090 | KS-A90R2-01-60 | KS-A90-01-60 | | |
| A145R2-*R01*-*AA-60/6080/6090 | KS-A145R2-01-60 | KS-A145-01-60 | | |

Notes: 1) When ordering seals, please specify the seal kit number from the table above.

2) Complete seal kit consists of a seal kit for inboard pump, a seal kit for outboard pump and a piece of O-ring for item 80.

3) Seal kit and bearings for inboard pump are same as those for "A" series single pump. For details, please refer to the table below and see the chart on the page relevant to pump model number concerned.

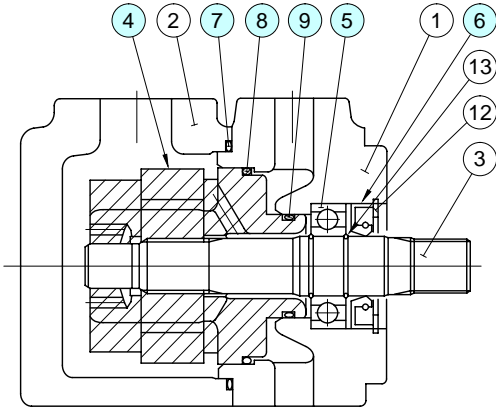
4) For details of seals and bearing for outboard pump, please see the chart on the following page.

| Model | Inboard Pump |
|---------------|--------------------------------------|
| A16R1 | Same as single pump "A16" (Page 25) |
| A22R1 | Same as single pump "A22" (Page 25) |
| A37R1 | Same as single pump "A37" (Page 25) |
| A56R1 | Same as single pump "A56" (Page 25) |
| A70R1/A70R2 | Same as single pump "A70" (Page 26) |
| A90R1/A90R2 | Same as single pump "A90" (Page 26) |
| A145R1/A145R2 | Same as single pump "A145" (Page 27) |

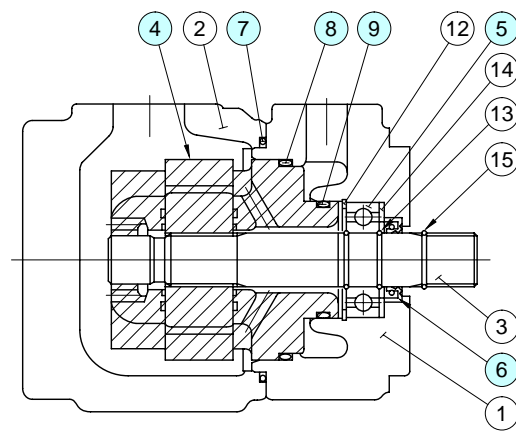
Spare Parts List

● Detail of Outboard Pump

A*R1



A*R2



● Sales & Bearing

| Item | Name of Parts | Part Numbers | | Qty. |
|------|---------------|--------------|------------|------|
| | | A*R1 | A*R2 | |
| 5 | Bearing | 6004 | 6205 | 1 |
| 6* | Oil Seal | SB 20428 | ISD 30428 | 1 |
| 7* | O-Ring | SO-NB-G80 | SO-NB-G105 | 1 |
| 8* | O-Ring | SO-NB-G60 | SO-NA-G85 | 1 |
| 9* | O-Ring | SO-NB-G30 | SO-NA-P46 | 1 |

Note: Item Nos. ⑧ and ⑨ (O-rings) are included in the cartridge kit.

★ When ordering seals as described in the table above, please specify the seal kit number referring to chart on the previous page.

● Cartridge Kits

| Model Numbers | ④ Cartridge Kit Numbers |
|--------------------------|-------------------------|
| A*R1-*R01*-6AAK-32*/60* | CPV2R1-6-R-40 |
| A*R1-*R01*-8AAK-32*/60* | CPV2R1-8-R-40 |
| A*R1-*R01*-10AAK-32*/60* | CPV2R1-10-R-40 |
| A*R1-*R01*-12AAK-32*/60* | CPV2R1-12-R-40 |
| A*R1-*R01*-14AAK-32*/60* | CPV2R1-14-R-40 |
| A*R1-*R01*-17AAK-32*/60* | CPV2R1-17-R-40 |
| A*R1-*R01*-19AAK-32*/60* | CPV2R1-19-R-40 |
| A*R1-*R01*-23AAK-32*/60* | CPV2R1-23-R-40 |
| A*R1-*R01*-25AAK-32*/60* | CPV2R1-25-R-40 |
| A*R1-*R01*-31AAK-32*/60* | CPV2R1-31-R-40 |
| A*R2-*R01*-26AA-60* | CPV2R2-26-R-40 |
| A*R2-*R01*-33AA-60* | CPV2R2-33-R-40 |
| A*R2-*R01*-41AA-60* | CPV2R2-41-R-40 |
| A*R2-*R01*-47AA-60* | CPV2R2-47-R-40 |
| A*R2-*R01*-53AA-60* | CPV2R2-53-R-40 |
| A*R2-*R01*-59AA-60* | CPV2R2-59-R-40 |
| A*R2-*R01*-65AA-60* | CPV2R2-65-R-40 |

⚠ 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.