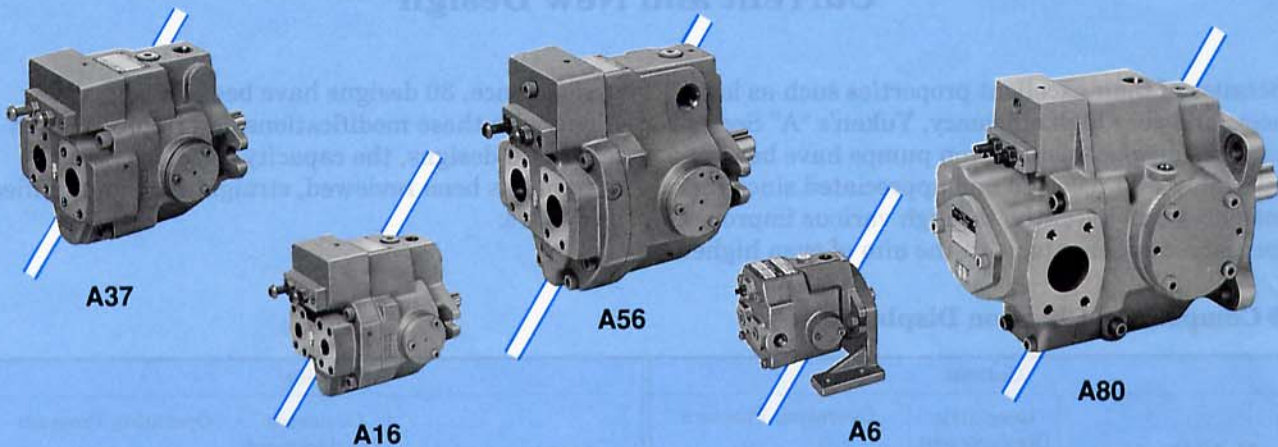


"A" Series Variable Displacement Piston Pumps



The "A" series variable displacement piston pumps are swash plate type axial piston pumps, developed by Yuken, providing low-noise with high-efficiency.

Ten different control types are available as standard models including a proportional electro-hydraulic pressure & flow control type composed of amplifiers, sensors and indicators.

Also, a wide range of displacements from 6.3 to 219 cm³/rev (.384 to 13.36 cu. in./rev) is available.

You can choose the optimum pump to meet your needs from the large selection available.

■ "A" Series Variable Displacement Piston Pumps

| Pump Type | Graphic Symbols | Geometric Displacement | | Maximum Operating pressure bar(PSI) | Page |
|----------------------------|-----------------|------------------------|-------------|--|------|
| | | cm ³ /rev | cu. in./rev | | |
| Single Pumps | | 1 | 1 | 50 (715) | 35 |
| | | 2 | 2 | 210 (3000) | |
| | | 5 | 5 | 160 (2285) | |
| | | 10 | 10 | 210 (3000) | |
| | | 20 | 20 | 210 (3000) | |
| | | 50 | 50 | 210 (3000) | |
| | | 100 | 100 | 175 (2500) | |
| Double Pump | | 1 | 1 | 210 (3000) | 104 |
| | | 2 | 2 | | |
| | | 5 | 5 | | |
| | | 10 | 10 | | |
| Variable/Fixed Double Pump | | 1 | 1 | 210 (3000) | 114 |
| | | 2 | 2 | | |
| | | 5 | 5 | | |
| | | 10 | 10 | | |

• Various control types are available such as pressure compensator type. Refer to page 36 and 37.

Interchangeability in Installation between Current and New Design

Because of their excellent properties such as low noise and very high efficiency, Yuken's "A" Series variable displacement piston pumps have been remarkably well received and appreciated since their introduction. Recently, through various improvements in components, with the aim of even higher

performance, 30 designs have been developed. Along with these modifications and improvements for the 30 designs, the capacity (displacement) system has been reviewed, straightened and unified as follows:

● Comparison Chart on Displacement

| Current | | | | New | | | |
|---------------------|--|---------------------------------|---------------|-----------------------|--|---------------------------------|---------------|
| Model Numbers | Geometric Displacement cm ³ /rev (cu.in./rev) | Operating Pressure bar (PSI) | | Model Numbers | Geometric Displacement cm ³ /rev (cu.in./rev) | Operating Pressure bar (PSI) | |
| | | Rated | Intermittent | | | Rated | Intermittent |
| A6-#-R-01-A-K-10# | 6.3 (.384) | 50 (715) | 50 (715) | A6-#-R-01-A-K-10# | 6.3 (.384) | 50 (715) | 50 (715) |
| A16-#-R-01-#-K-20# | 15.8 (.964) | 160 (2285) | 210 (3000) | A16-#-R-01-#-K-32# | 15.8 (.964) | 160 (2285) | 210 (3000) |
| A22-#-R-01-#-K-20# | 22.2 (1.355) | 100 (1430) | 140 (2000) | A22-#-R-01-#-K-32# | 22.2 (1.355) | 140 (2000) | 160 (2285) |
| A25-#-R-01-#-K-20# | 25.0 (1.526) | 160 (2285) | 210 (3000) | A37-#-R-01-#-K-32# | 36.9 (2.25) | 160 (2285) | 210 (3000) |
| A40-#-R-01-#-K-20# | 39.7 (2.42) | 160 (2285) | 210 (3000) | | | | |
| A50-#-R-01-#-K-10# | 56.2 (3.43) | 160 (2285) | 210 (3000) | A56-#-R-01-#-K-32# | 56.2 (3.43) | 160 (2285) | 210 (3000) |
| A63-#-R-01-#-K-10# | 63.3 (3.86) | 160 (2285) | 210 (3000) | | | | |
| A80-#-R-01-C-K-10# | 80.0 (4.88) | 160 (2285) | 160 (2285) | A80-#-R-01-#-S-K-30# | 83.0 (5.06) | 160 (2285) | 210 (3000) |
| A125-#-R-01-C-K-10# | 125 (7.63) | 160 (2285) | 160 (2285) | A125-#-R-01-#-S-K-30# | 125 (7.63) | 160 (2285) | 175 (2500) |
| A220-#-R-01-C-K-10# | 219 (13.36) | 160 (2285) | 160 (2285) | A220-#-R-01-#-K-10# | 219 (13.36) | 160 (2285) | 160 (2285) |

● Interchangeability in Installation

| Model Numbers | | Interchangeability in Installation | | | | |
|---------------------|-----------------------|------------------------------------|-----------------------------------|-------------|---------------------|------|
| Current | New | Mtg. Flange & Shaft End | Piping | | | Page |
| | | | Suction & Discharge Port Position | Pipe Flange | Drain Port Position | |
| A16-#-R-01-#-K-20# | A16-#-R-01-#-K-32# | Yes | Yes | Yes | Yes | 59 |
| A22-#-R-01-#-K-20# | A22-#-R-01-#-K-32# | Yes | Yes | Yes | Yes | 59 |
| A25-#-R-01-#-K-20# | A37-#-R-01-#-K-32# | Yes | No | Yes | No | 59 |
| A40-#-R-01-#-K-20# | | | | | | |
| A50-#-R-01-#-K-10# | A56-#-R-01-#-K-32# | Yes | Yes | Yes | No | 60 |
| A63-#-R-01-#-K-10# | | No | No | No | No | 61 |
| A80-#-R-01-C-K-10# | A80-#-R-01-#-S-K-30# | Yes | No | Yes | No | 61 |
| A125-#-R-01-C-K-10# | A125-#-R-01-#-S-K-30# | Yes | No | Yes | No | 62 |

● Refer to relevant page on dimensions detail.

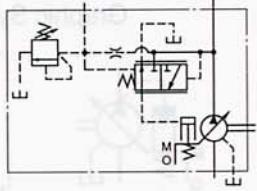
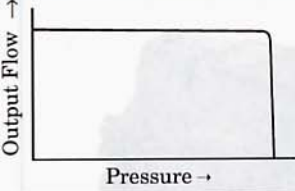
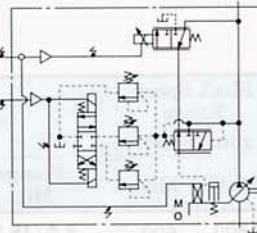
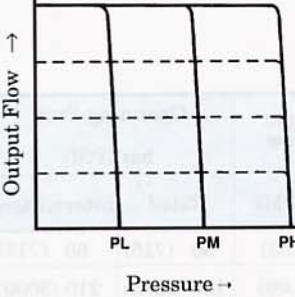
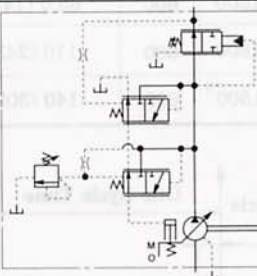
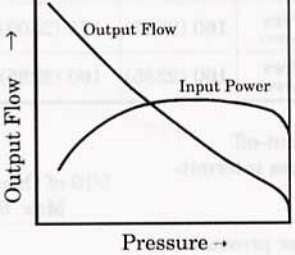
Control Type

Single Pumps

| Control Type | Graphic Symbols | Performance Characteristics | Explanation | Page |
|---|-----------------|-----------------------------|--|------|
| "01" Pressure Compensator Type | | | When the system pressure increases and comes close to the preset cut-off pressure, the pump flow decreases automatically while maintaining the set pressure as it is. | 38 |
| "02" Solenoid-two Pressure Control Type | | | This type of control is ideal for an application where the output power of the actuator has to be controlled in two different load pressures while keeping the actuator speed nearly constant. | 63 |
| "03" Pressure Compensator with Unloading Type | | | It is suitable for a situation where a long unloading time is required and heat generation and noise have to be kept at their lowest levels. | 69 |
| "04" Proportional Electro-Hydraulic Load Sensing Type | | | This is an energy-saving type control which regulates the pump flow and load pressure to be at absolute minimum necessary level to operate the actuator. Pump flow rate and cut-off pressure are controlled proportional to the input current to the control device on the pump and the input current is regulated by the specific amplifier. | 77 |
| "04EH" Proportional Electro-Hydraulic Pressure & Flow Control Type | | | This control type has been developed to unify amplifier, sensor and indicator (DPM) on to one pump unit. Flow and pressure can be controlled in proportion to input voltage by only one control valve. The features has been greatly improved by electrical feedback of swash plate tilt angle correspond to flow rate and load pressure to control valve. <ul style="list-style-type: none"> • Linearity of input-output characteristics is excellent and easy to set. • Hysteresis is lower, repeatability and reproducibility are fine. | 87 |
| "05" Two-Pressure Two-Flow Control Type by System Pres. | | | This type of control is suitable for an application like "Presses" where the changeover from rapid advance to feed is required just when the pressing (pressurizing) starts. | -* |
| "06" Two-Pressure Two-Flow Control Type by Solenoid Valve | | | This pump control is suitable for machining found on machine tool, where machining starts after the changeover from rapid advance, to feed has been made. | -* |

Control Type

Single Pumps

| Control Type | Graphic Symbols | Performance Characteristics | Explanation | Page |
|---|---|---|--|------|
| "07" Pilot Pressure Control Type Pressure Compensator |  |  | The pump is used in combination with the pilot relief valve or multistage pressure control valve. By controlling the pilot pressure, the full cut-off pressure can be remote-controlled according to your requirements. | 97 |
| "08E" Proportional Electro- Hydraulic Flow Control Type |  |  | <ul style="list-style-type: none"> Flow control With a hybridized sensor and amplifier which is mounted on the pump, the flow rate can be controlled in proportion to the input voltage. Being closed loop control, a high control accuracy can be obtained. Pressure control Pressure control can be made by selection of one of the following pressure setting types according to the requirements; one pressure setting type, two/three pressure setting type using a solenoid operated directional valve and pressure setting type by external pilot. In case of two/three pressure setting type, step control from one preset pressure to another or the other can be obtained by operation of the solenoid operated directional valve. In case of pressure setting by external pilot, proportional control can also be obtained by connecting a proportional electro-hydraulic pilot relief valve to the pump. | -* |
| "09" Constant Power Control Type |  |  | <ul style="list-style-type: none"> Pump input power can be controlled in accordance with the motor output. When the discharge pressure rises, the output flow decreases corresponding to the preset input power. The pump can act for function of 2 pumps, low-pressure large-flow and high-pressure small-flow. Therefore, the motor capacity can be reduced. | -* |

* Control type "05", "06", "08E" and "09" are not shown in this catalogue. Contact us for the details.

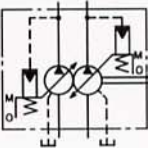
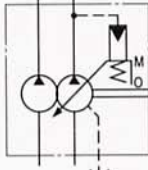
Availability of Control Type

Mark "○" in the table below refers to standard model.

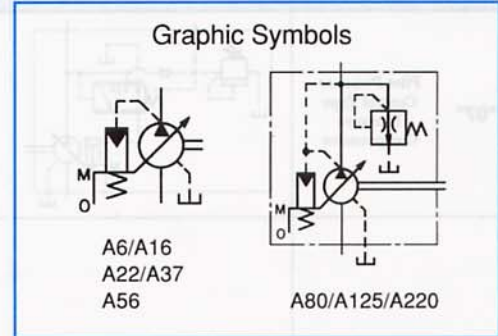
Single Pumps

| Model Number | Geometric Displacement cm ³ /rev (cu. in. /rev) | Control Type | | | | | | | | | |
|--------------|--|--------------|----|----|----|------|----|----|----|-----|----|
| | | 01 | 02 | 03 | 04 | 04EH | 05 | 06 | 07 | 08E | 09 |
| A6 | 6.3 (.384) | ○ | | | | | | | | ○ | |
| A16 | 15.8 (.964) | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | ○ | ○ |
| A22 | 22.2 (1.355) | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | ○ | ○ |
| A37 | 36.9 (2.25) | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | ○ | ○ |
| A56 | 56.2 (3.43) | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | ○ | ○ |
| A80 | 83.0 (5.06) | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | ○ | ○ |
| A125 | 125 (7.63) | ○ | | | | | | | | ○ | ○ |
| A220 | 219 (13.36) | ○ | ○ | ○ | | | | | | | |

Double Pump & Variable/Fixed Double Pump

| Control Type | Graphic Symbols | Explanation | Page |
|--|---|--|------|
| "01/01" Pressure Compensator Type |  | These double pump consist of two "A" series single pumps combined in tandem and driven by a common shaft. Fluid delivered from two separate ports can be either supplied to separate or common circuit according to the usage. | 104 |
| "01" Pressure Compensator + Fixed Vane Pump |  | These double pump consist of "A" series pumps and PV2R series vane pumps combined in tandem and driven by a common shaft. Fluid delivered from two separate ports can be either supplied to separate or common circuit according to the usage. | 114 |

“A” Series Variable Displacement Piston Pumps-Single Pump, Pressure Compensator Type



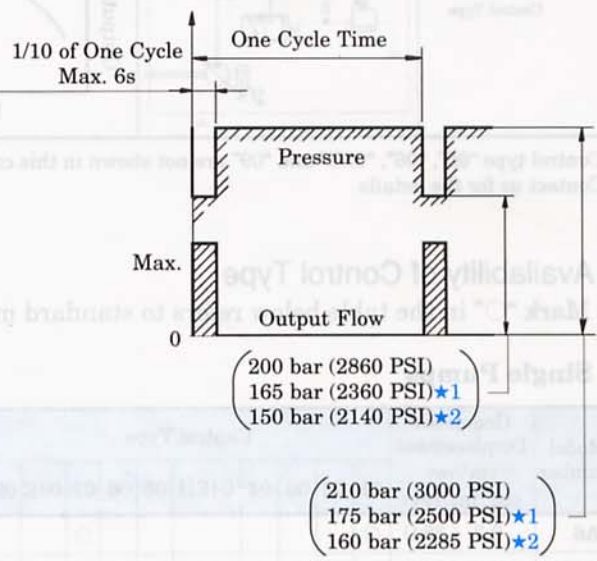
Ratings

| Model Numbers | Geometric Displacement cm ³ /rev (cu. in./rev) | Minimum Adj. Flow l/min (U.S. GPM) | Operating Pres. bar (PSI) | | Shaft Speed Range rpm (r/min) | | Mass kg (lbs) | |
|-----------------------|---|---|------------------------------|----------------------------|----------------------------------|------|------------------|-------------|
| | | | Rated ^{*2} | Intermittent ^{*1} | Max. | Min. | Flange Mtg. | Foot Mtg. |
| A6-#-R-01-A-K-10# | 6.3 (.384) | 2 (.53) | 50 (715) | 50 (715) | 1800 | 600 | 8.5 (18.7) | 10.7 (23.6) |
| A16-#-R-01-#-#-K-32# | 15.8 (.964) | 4 (1.06) | 160 (2285) | 210 (3000) | 1800 | 600 | 16.5 (36.4) | 18.7 (41.2) |
| A22-#-R-01-#-#-K-32# | 22.2 (1.355) | 6 (1.59) | 140 (2000) | 160 (2285) | 1800 | 600 | 16.5 (36.4) | 18.7 (41.2) |
| A37-#-R-01-#-#-K-32# | 36.9 (2.25) | 10 (2.64) | 160 (2285) | 210 (3000) | 1800 | 600 | 28.0 (61.7) | 32.3 (71.2) |
| A56-#-R-01-#-#-K-32# | 56.2 (3.43) | 12 (3.17) | 160 (2285) | 210 (3000) | 1800 | 600 | 35.0 (77.2) | 39.3 (86.7) |
| A80-#-R-01-#-S-K-30# | 83.0 (5.06) | 26 cm ³ /rev (1.59 cu. in./rev) | 160 (2285) | 210 (3000) | 1800 | 600 | 65.0 (143) | 85.5 (189) |
| A125-#-R-01-#-S-K-30# | 125 (7.63) | 60 cm ³ /rev (3.66 cu. in./rev) | 160 (2285) | 175 (2500) | 1800 | 600 | 110 (243) | 135 (298) |
| A220-#-R-01-C-K-10# | 219 (13.36) | 100 cm ³ /rev (6.1 cu. in./rev) | 160 (2285) | 160 (2285) | 1500 ^{*3} | 600 | 140 (309) | 165 (364) |

^{*1}. Whenever setting pressure, make sure the full cut-off pressure never exceeds the permissible maximum intermittent pressure.

^{*2}. Care should be taken in cases of used 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 1/10 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.

^{*3}. However, when operating the A220 pump with a shaft speed exceeding 1400 rpm (r/min), suction pressure is restricted in the range 0 to + 0.5 bar (0 to 7 PSIG).



★1 Applicable only for "A125"
 ★2 Applicable only for "A22"

PISTON PUMPS

Model Number Designation

| A16 | —F | —R | —01 | —B | —S | —K | —32 | * |
|------------------------------------|-------------------|-----------------------------|----------------------------------|--|---------------------|-------------------|---------------|-------------|
| Series Number | Mounting | Direction of Rotation | Control Type | Pres. Adj. Range bar (PSI) | Port Position | Shaft Extension | Design Number | Design Std. |
| A6 (6.3 cm ³ /rev) | F: Flange Mtg. | (Viewed from Shaft End) | 01: Pressure Compensator Type | A: 12-50 (170-715) | None: Axial Port | K: Keyed Shaft | 10 | Refer to *2 |
| A16 (15.8 cm ³ /rev) | | | | B: 12-70 (170-1000) C: 12-160 (170-2285) H: 12-210 (170-3000) | | | 32 | |
| A22 (22.2 cm ³ /rev) | L: Foot Mtg | R: Clockwise (Normal) *1 | 01: Pressure Compensator Type | B: 12-70 (170-1000) C: 12-160 (170-2285) | S: Side Port | K: Keyed Shaft | 32 | |
| A37 (36.9 cm ³ /rev) | | | | B: 12-70 (170-1000) C: 12-160 (170-2285) H: 12-210 (170-3000) | | | 32 | |
| A56 (56.2 cm ³ /rev) | L: Foot Mtg | R: Clockwise (Normal) *1 | 01: Pressure Compensator Type | B: 12-70 (170-1000) C: 12-160 (170-2285) H: 18-210 (260-3000) | S: Side Port | K: Keyed Shaft | 30 | |
| A80 (83 cm ³ /rev) | | | | B: 12-70 (170-1000) C: 15-160 (215-2285) H: 15-175 (215-2500) | | | 30 | |
| A125 (125 cm ³ /rev) | L: Foot Mtg | R: Clockwise (Normal) *1 | 01: Pressure Compensator Type | B: 12-70 (170-1000) C: 18-160 (260-2285) | None: Side Port | K: Keyed Shaft | 10 | |
| A220 (219 cm ³ /rev) | | | | B: 12-70 (170-1000) C: 18-160 (260-2285) | | | 10 | |

*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

Pipe Flange Kits

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

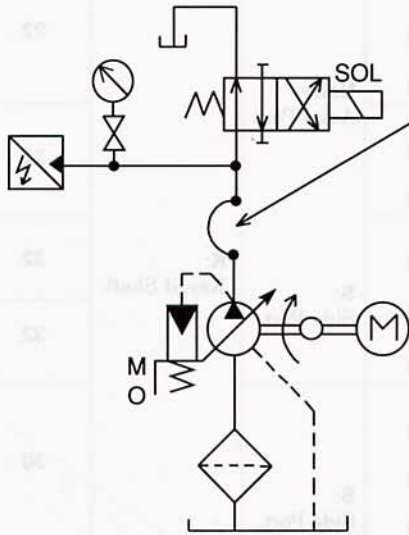
| Pump Model Numbers | Name of Port | Pipe Flange Kit Numbers | | | | |
|--------------------|--------------|-------------------------|-------------------|----------------------|--|----------------------|
| | | Threaded Connection | | | For Socket Welding | |
| | | Japanese Standard "JIS" | European Standard | N. American Standard | Japanese Standard "JIS" European Standard | N. American Standard |
| A16-#-R-01 | Suction | F5-06-A-10 | F5-06-A-1080 | F5-06-A-1090 | F5-06-B-10 | F5-06-B-1090 |
| | Discharge | F5-06-A-10 | F5-06-A-1080 | F5-06-A-1090 | F5-06-B-10 | F5-06-B-1090 |
| A22-#-R-01 | Suction | F5-06-A-10 | F5-06-A-1080 | F5-06-A-1090 | F5-06-B-10 | F5-06-B-1090 |
| | Discharge | F5-06-A-10 | F5-06-A-1080 | F5-06-A-1090 | F5-06-B-10 | F5-06-B-1090 |
| A37-#-R-01 | Suction | F5-10-A-10 | F5-10-A-1080 | F5-10-A-1090 | F5-10-B-10 | F5-10-B-1090 |
| | Discharge | F5-10-A-10 | F5-10-A-1080 | F5-10-A-1090 | F5-10-B-10 | F5-10-B-1090 |
| A56-#-R-01 | Suction | F5-10-A-10 | F5-10-A-1080 | F5-10-A-1090 | F5-10-B-10 | F5-10-B-1090 |
| | Discharge | F5-10-A-10 | F5-10-A-1080 | F5-10-A-1090 | F5-10-B-10 | F5-10-B-1090 |
| A80-#-R-01 | Suction | F5-16-A-10 | F5-16-A-1080 | F5-16-A-1090 | F5-16-B-10 | F5-16-B-1090 |
| | Discharge | F5-16W-A-10 | F5-16W-A-1080 | F5-16W-A-1090 | F5-16W-B-10 | F5-16W-B-1090 |
| A125-#-R-01 | Suction | F5-16-A-10 | F5-16-A-1080 | F5-16-A-1090 | F5-16-B-10 | F5-16-B-1090 |
| | Discharge | F5-16W-A-10 | F5-16W-A-1080 | F5-16W-A-1090 | F5-16W-B-10 | F5-16W-B-1090 |
| A220-#-R-01 | Suction | F5-24-A-10 | — | — | F5-24-B-10 | F5-24-B-1090 |
| | Discharge | F5-10-A-10 | F5-10-A-1080 | F5-10-A-1090 | F5-10-B-10 | F5-10-B-1090 |

• Detail of the pipe flange kit is described on page 766 .

Response Characteristics Change in Accordance with Circuits and Operating Conditions

Test Circuit and Conditions

Circuit



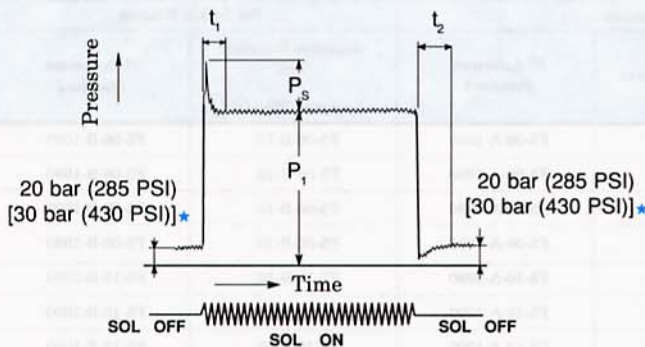
High Pressure Rubber Hose

| Model | Rubber Hose Size |
|--------------|----------------------------|
| A6 | 1/2" x 1200 mm (3.9 ft.) |
| A16 A22 | 3/4" x 700 mm (2.3 ft.) |
| A37 A56 | 3/4" x 2000 mm (6.6 ft.) |
| A80 | 3/4" x 3500 mm (11.5 ft.) |
| A125 A220 | 1-1/4" x 2000 mm (6.6 ft.) |

Conditions

Drive Speed: 1500 rpm (r/min)
 Hydraulic Fluid: ISO VG 32 oil
 Oil Temperature: 50 °C (122 °F) [Viscosity 20 cSt (100 SSU)]

Result of Measurement



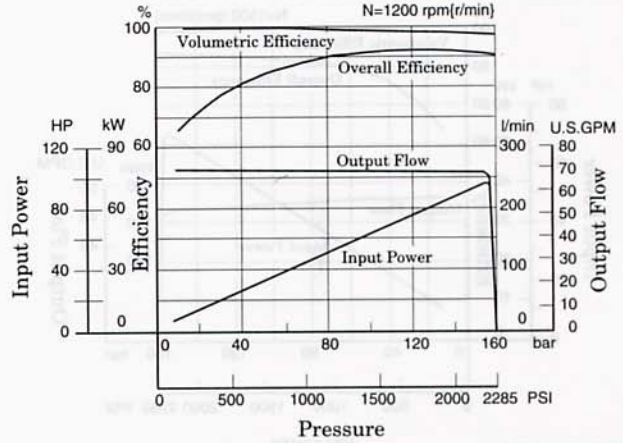
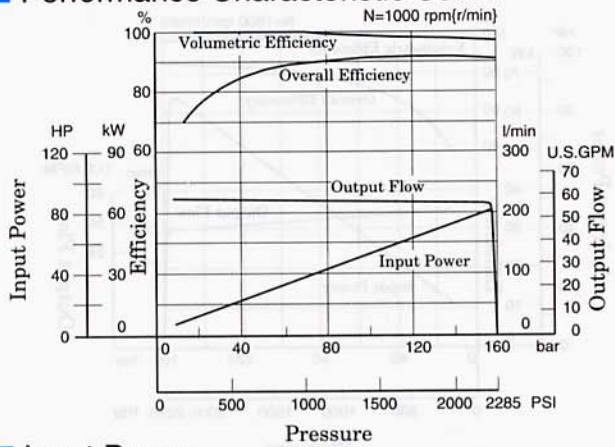
* Applicable only for "A80"

| Model | Full Cut-Off Pressure P_1 bar (PSI) | Response Time ms | | Overshoot Pressure P_s bar (PSI) |
|-------|---|---------------------|-------|--|
| | | t_1 | t_2 | |
| A6 | 50 (715) | 30 | 50 | 10 (143) |
| A16 | 160 (2285) | 38* | 59* | 38 (543) |
| A22 | 160 (2285) | 30* | 72* | 61 (871) |
| A37 | 160 (2285) | 40* | 78* | 82 (1171) |
| A56 | 160 (2285) | 38* | 88* | 80 (1143) |
| A80 | 160 (2285) | 34* | 90* | 101 (1443) |
| A125 | 160 (2285) | 29* | 59* | 73 (1043) |
| A220 | 160 (2285) | 35* | 88* | 102 (1457) |

* Response time except A6 is measured Yoke travel.

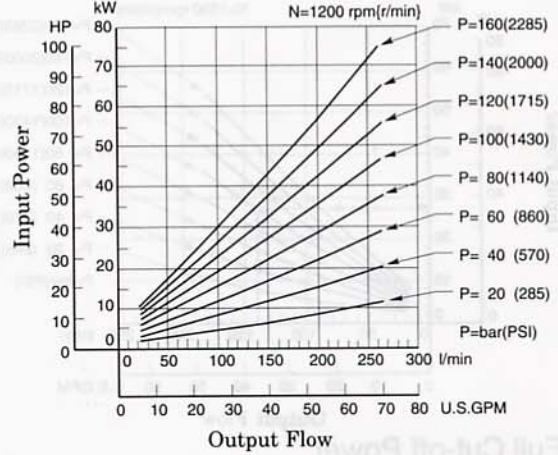
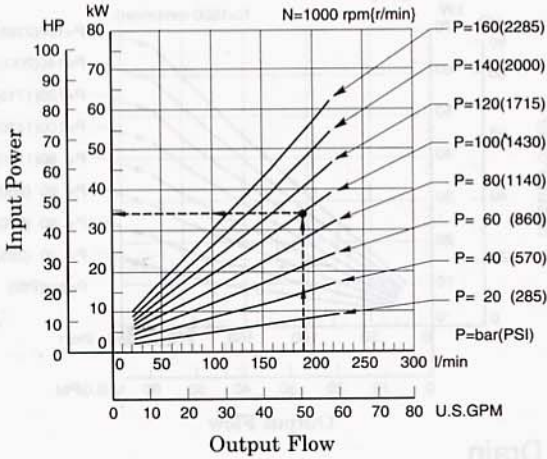
Typical Performance Characteristics of Type "A220" at Viscosity 20 cSt (100 SSU) [ISO VG32 Oils, 50°C (122°F)]

Performance Characteristic Curve

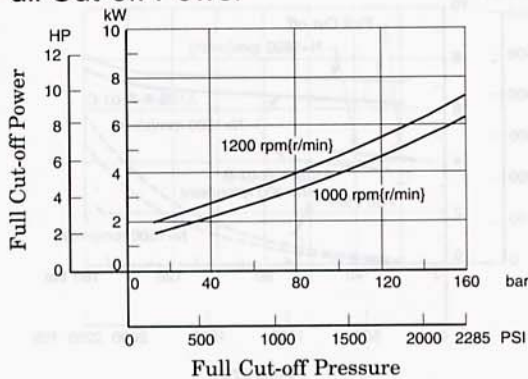


Input Power

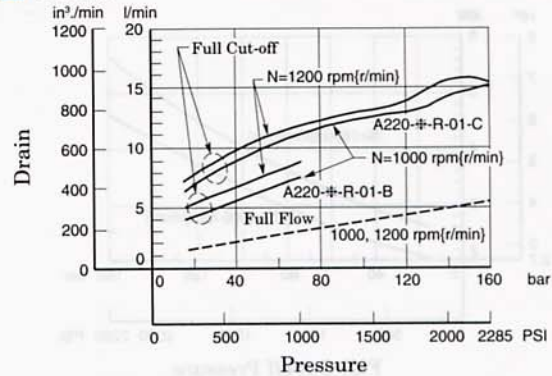
Example: At a pressure of under 100 bar (1430 PSI), a flow 190 l/min (50.2 U.S. GPM), and rotation 1000 rpm (r/min), the axial input becomes about 34 kW (45.6 HP) as shown the dotted line in the graph.



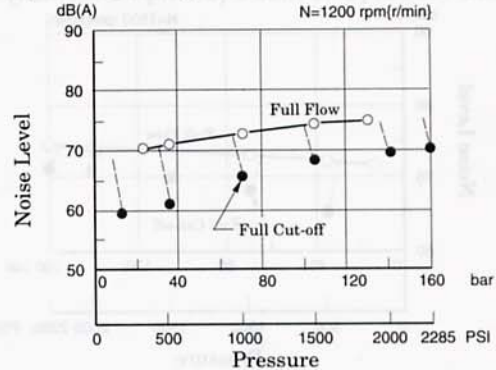
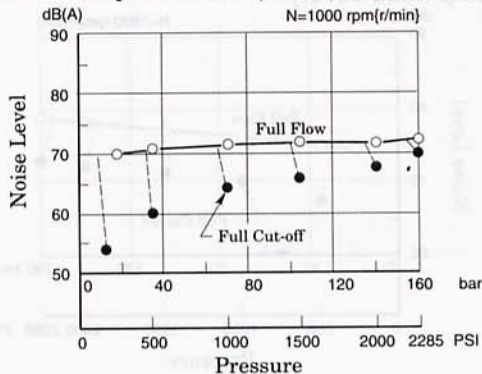
Full Cut-off Power



Drain

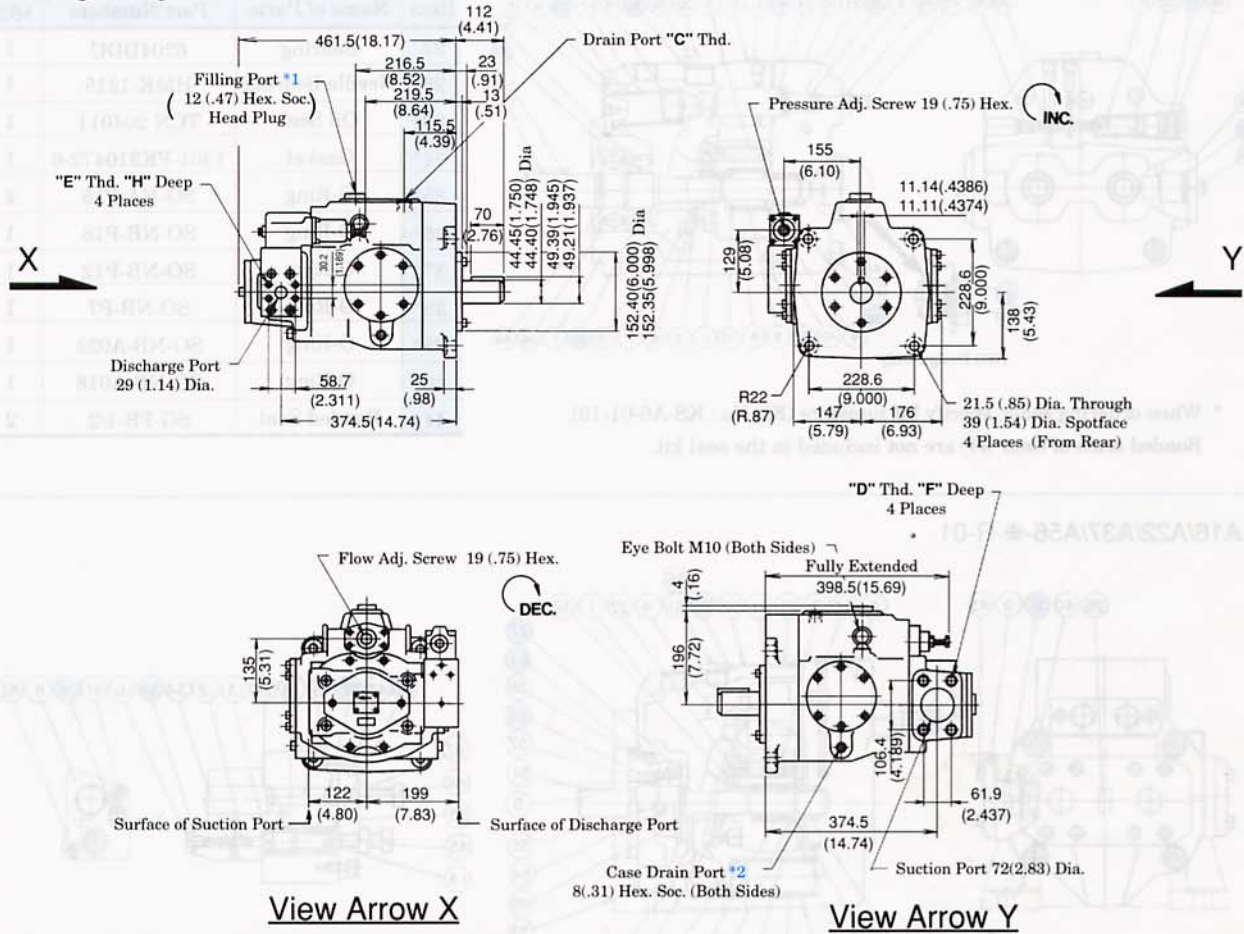


Noise Level [One metre (3.3 ft.) horizontally away from pump head cover]



Side Port Type

Flange Mtg.: A220-F-R-01- \ast -K-10/1080/1090

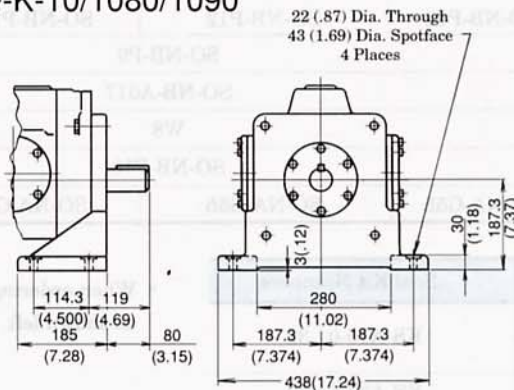


| Model Numbers | "C" Thd. | "D" Thd. | "E" Thd. | Dimensions mm (IN.) | |
|-----------------------------|----------|-----------|------------|---------------------|----------|
| | | | | F | H |
| A220-F-R-01- \ast -K-10 | Rc 1 | M16 | M10 | 19 (.75) | 19 (.75) |
| A220-F-R-01- \ast -K-1080 | 1 BSP.F | | | | |
| A220-F-R-01- \ast -K-1090 | 1 NPT | 5/8-11UNC | 7/16-14UNC | 21 (.83) | 20 (.79) |

- *1. Install the pump so that the "Filling Port" is at the top.
- *2. Case drain ports are available for use when draining hydraulic fluid from pump casing.

DIMENSIONS IN
MILLIMETRES (INCHES)

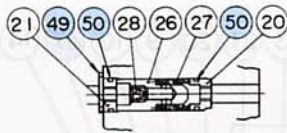
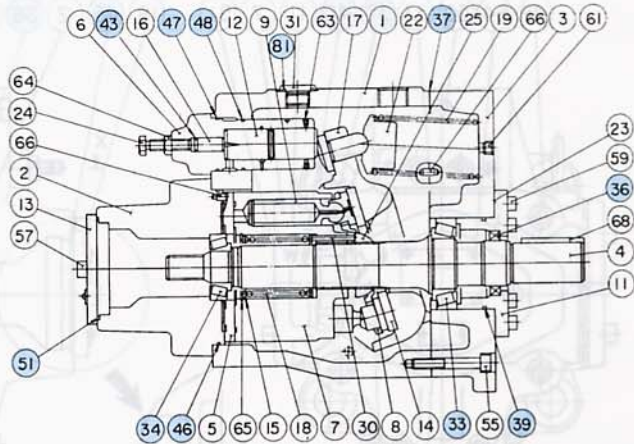
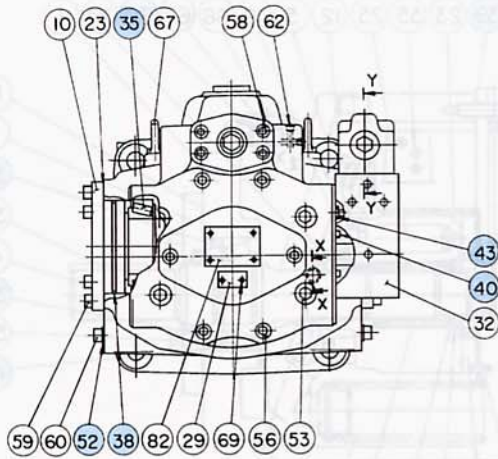
Foot Mtg.: A220-L-R-01- \ast -K-10/1080/1090



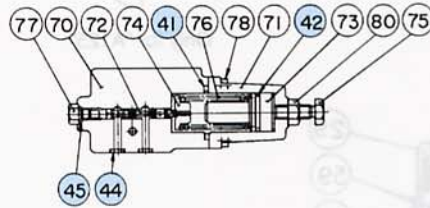
- For other dimensions, refer to "Flange Mtg."

List of Seals and Bearings

A220-✱-R-01



Sectional Detail X-X

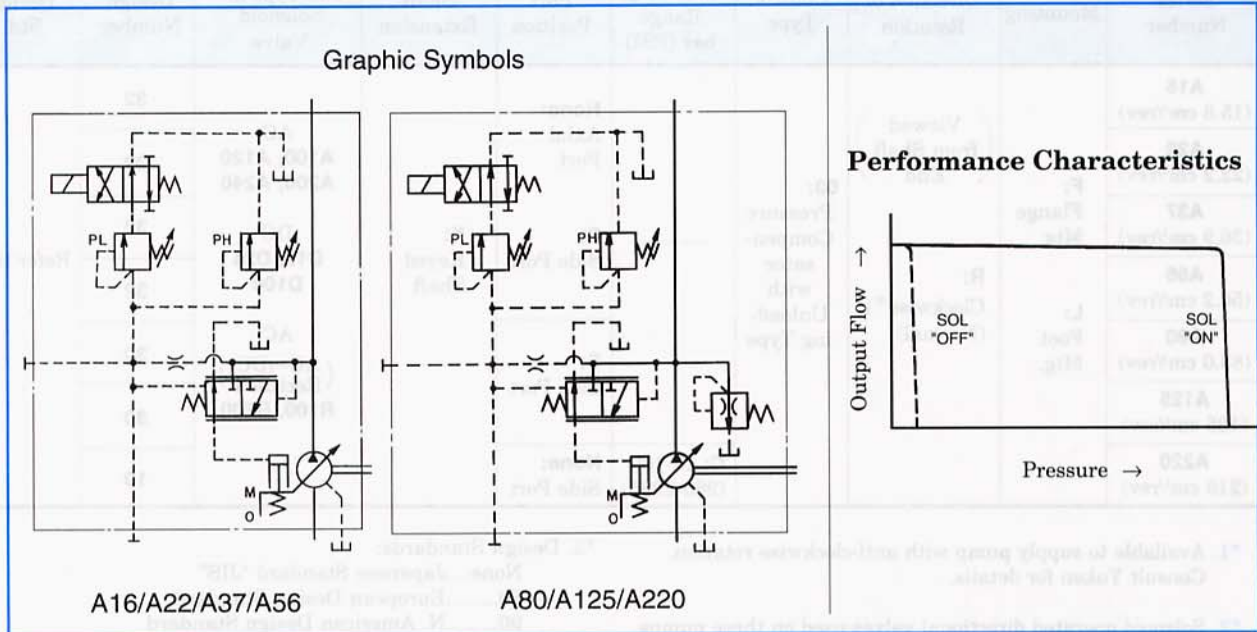


Section Y-Y

| Item | Name of Parts | Part Numbers | Qty. | Remarks |
|------|------------------------|------------------|------|--|
| 33 | Tapered Roller Bearing | 32211U | 1 | Included in Seal Kit (Kit No.: KS-A220-01-10) |
| 34 | Tapered Roller Bearing | 4T-32207 | 1 | |
| 35 | Tapered Roller Bearing | 3984/3920 | 2 | |
| 36 | Oil Seal | TCN507212 | 1 | |
| 37 | Gasket | 1313-PK211182-1 | 1 | |
| 38 | O-Ring | SO-NA-G105 | 2 | |
| 39 | O-Ring | SO-NA-G95 | 1 | |
| 40 | O-Ring | SO-NB-G55 | 1 | |
| 41 | O-Ring | SO-NA-G40 | 1 | |
| 42 | O-Ring | SO-NA-P26 | 1 | |
| 43 | O-Ring | SO-NB-P11 | 5 | |
| 44 | O-Ring | SO-NB-P9 | 4 | |
| 45 | O-Ring | SO-NB-P8 | 1 | |
| 46 | O-Ring | SO-NA-A165 | 1 | |
| 47 | O-Ring | SO-NB-A138 | 1 | |
| 48 | O-Ring | SO-NB-A137 | 1 | |
| 49 | O-Ring | SO-NB-A017 | 1 | |
| 50 | O-Ring | SO-NB-A013 | 2 | |
| 51 | O-Ring | S105 (NBR, Hs70) | 1 | |
| 52 | Seal Washer | SM-10 | 2 | |
| 81 | O-Ring | SO-NB-P30 | 1 | |

PISTON PUMPS

“A” Series Variable Displacement Piston Pumps - Single Pump, Pressure Compensator with Unloading Type



Ratings

| Model Numbers | Geometric Displacement cm ³ /rev (cu.in./rev) | Minimum Adj. Flow l/min (U.S.GPM) | Operating Pres. bar (PSI) | | Minimum Adj. Pres. and Unloading Pres. bar (PSI) | Shaft Speed Range rpm (r/min) | | Mass kg (lbs) | |
|-----------------------|--|---|------------------------------|----------------------------|---|----------------------------------|------|------------------|----------------|
| | | | Rated ^{*2} | Intermittent ^{*1} | | Max. | Min. | Flange Mtg. | Foot Mtg. |
| A16-#-R-03-#-K-#-32# | 15.8 (.964) | 4 (1.06) | 160 (2285) | 210 (3000) | 12 (170) | 1800 | 600 | 24.5 (54) | 26.7 (58.9) |
| A22-#-R-03-#-K-#-32# | 22.2 (1.355) | 6 (1.59) | 140 (2000) | 160 (2285) | 12 (170) | 1800 | 600 | 24.5 (54) | 26.7 (58.9) |
| A37-#-R-03-#-K-#-32# | 36.9 (2.25) | 10 (2.64) | 160 (2285) | 210 (3000) | 12 (170) | 1800 | 600 | 36 (79.4) | 40.3 (88.9) |
| A56-#-R-03-#-K-#-32# | 56.2 (3.43) | 12 (3.17) | 160 (2285) | 210 (3000) | 12 (170) | 1800 | 600 | 43 (94.8) | 47.3 (104) |
| A80-#-R-03-S-K-#-30# | 83.0 (5.06) | 26 cm ³ /rev (1.59 cu. in./rev) | 160 (2285) | 210 (3000) | 13 (185) | 1800 | 600 | 73 (161) | 93.5 (206) |
| A125-#-R-03-S-K-#-30# | 125 (7.63) | 60 cm ³ /rev (3.66 cu. in./rev) | 160 (2285) | 175 (2500) | 15 (215) | 1800 | 600 | 118 (260) | 143 (315) |
| A220-#-R-03-C-K-#-10# | 219 (13.36) | 100 cm ³ /rev (6.1 cu. in./rev) | 160 (2285) | 160 (2285) | 18 (260) | 1500 ^{*3} | 600 | 143 (315) | 168 (370) |

*1. Whenever setting pressure, make sure the full cut-off pressure never exceeds the permissible maximum intermittent pressure.

*2. When operating the pump exceeding the rated pressure, operating conditions are restricted. Refer to page 38 for the details.

*3. However, when operating the A220 pump with a shaft speed exceeding 1400 rpm (r/min), suction pressure is restricted in the range 0 to 0.5 bar (0 to 7 PSIG).

● Solenoid operated directional valves used on these pumps are YUKEN DSG-01 series (standard type). For detail specifications of solenoid operated directional valves, refer to page 362.

Model Number Designation

| A16 | —F | —R | —03 | —* | —S | —K | —A100 | —32 | * |
|------------------------------------|--|--|---|----------------------------|---------------------|-------------------|---|---------------|------------------------|
| Series Number | Mounting | Direction of Rotation | Control Type | Pres. Adj. Range bar (PSI) | Port Position | Shaft Extension | Coil Type of Solenoid Valve ^{*2} | Design Number | Design Std. |
| A16 (15.8 cm ³ /rev) | F: Flange Mtg. L: Foot Mtg. | (Viewed from Shaft End) R: Clockwise ^{*1} (Normal) | 03: Pressure Compensator with Unloading Type | C: 18-160 (260-2285) | None: Axial Port | K: Keyed Shaft | AC A100, A120 A200, A240 DC D12, D24 D100 AC (AC→DC Rectified) R100, R200 | 32 | Refer to ^{*3} |
| A22 (22.2 cm ³ /rev) | | | | | 32 | | | | |
| A37 (36.9 cm ³ /rev) | | | | | S: Side Port | | | 32 | |
| A56 (56.2 cm ³ /rev) | | | | | S: Side Port | | | 32 | |
| A80 (83.0 cm ³ /rev) | | | | | S: Side Port | | | 30 | |
| A125 (125 cm ³ /rev) | | | | | S: Side Port | | | 30 | |
| A220 (219 cm ³ /rev) | | | | | None: Side Port | | | 10 | |

^{*1}. Available to supply pump with anti-clockwise rotation. Consult Yuken for details.

^{*2}. Solenoid operated directional valves used on these pumps are YUKEN DSG-01 series (standard type). For detail specifications of solenoid operated directional valves, refer to page 362.

^{*3}. Design Standards:

None... Japanese Standard "JIS"
80.....European Design Standard
90.....N. American Design Standard

Performance Characteristics

For performance characteristics, refer to models of pressure compensator type on page 42 to 48.

Pipe Flange Kits

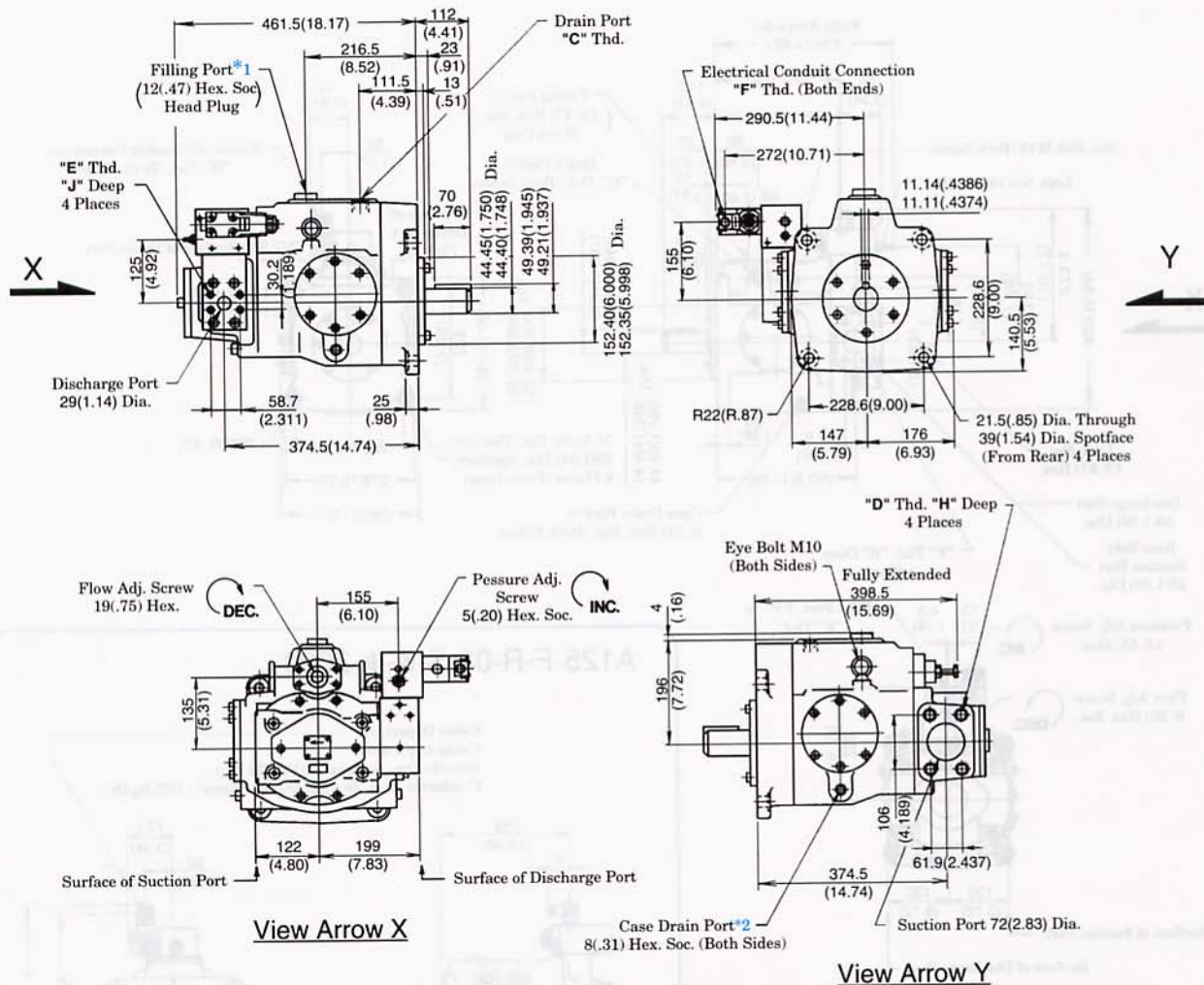
Pipe flange kits are available. When ordering, specify kits from the table below.

| Pump Model Numbers | Name of Port | Pipe Flange Kit Numbers | | | | |
|--------------------|--------------|-------------------------|-------------------|----------------------|--|----------------------|
| | | Threaded Connection | | | For Socket Welding | |
| | | Japanese Standard "JIS" | European Standard | N. American Standard | Japanese Standard "JIS" European Standard | N. American Standard |
| A16-*-R-03 | Suction | F5-06-A-10 | F5-06-A-1080 | F5-06-A-1090 | F5-06-B-10 | F5-06-B-1090 |
| | Discharge | F5-06-A-10 | F5-06-A-1080 | F5-06-A-1090 | F5-06-B-10 | F5-06-B-1090 |
| A22-*-R-03 | Suction | F5-06-A-10 | F5-06-A-1080 | F5-06-A-1090 | F5-06-B-10 | F5-06-B-1090 |
| | Discharge | F5-06-A-10 | F5-06-A-1080 | F5-06-A-1090 | F5-06-B-10 | F5-06-B-1090 |
| A37-*-R-03 | Suction | F5-10-A-10 | F5-10-A-1080 | F5-10-A-1090 | F5-10-B-10 | F5-10-B-1090 |
| | Discharge | F5-10-A-10 | F5-10-A-1080 | F5-10-A-1090 | F5-10-B-10 | F5-10-B-1090 |
| A56-*-R-03 | Suction | F5-10-A-10 | F5-10-A-1080 | F5-10-A-1090 | F5-10-B-10 | F5-10-B-1090 |
| | Discharge | F5-10-A-10 | F5-10-A-1080 | F5-10-A-1090 | F5-10-B-10 | F5-10-B-1090 |
| A80-*-R-03 | Suction | F5-16-A-10 | F5-16-A-1080 | F5-16-A-1090 | F5-16-B-10 | F5-16-B-1090 |
| | Discharge | F5-16W-A-10 | F5-16W-A-1080 | F5-16W-A-1090 | F5-16W-B-10 | F5-16W-B-1090 |
| A125-*-R-03 | Suction | F5-16-A-10 | F5-16-A-1080 | F5-16-A-1090 | F5-16-B-10 | F5-16-B-1090 |
| | Discharge | F5-16W-A-10 | F5-16W-A-1080 | F5-16W-A-1090 | F5-16W-B-10 | F5-16W-B-1090 |
| A220-*-R-03 | Suction | F5-24-A-10 | — | — | F5-24-B-10 | F5-24-B-1090 |
| | Discharge | F5-10-A-10 | F5-10-A-1080 | F5-10-A-1090 | F5-10-B-10 | F5-10-B-1090 |

• Detail of the pipe flange kit is described on page 766.

Flange Mtg.: A220-F-R-03-C-K- \ast -10/1090

DIMENSIONS IN
MILLIMETERS (INCHES)

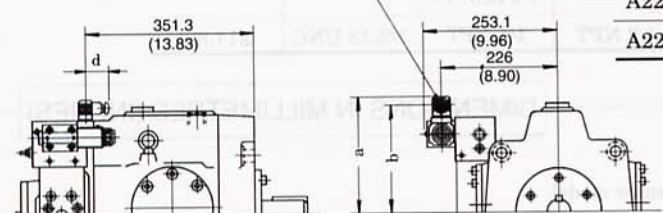


| Model Numbers | "C" Thd. | "D" Thd. | "E" Thd. | "F" Thd. | mm (IN.) | |
|-------------------------------|----------|-----------|------------|----------|----------|----------|
| | | | | | H | J |
| A220-F-R-03-C-K- \ast -10 | Rc 1 | M16 | M10 | G 1/2 | 19 (.75) | 19 (.75) |
| A220-F-R-03-C-K- \ast -1080 | 1 BSP.F | | | | | |
| A220-F-R-03-C-K- \ast -1090 | 1 NPT | 5/8-11UNC | 7/16-14UNC | 1/2 NPT | 21 (.83) | 20 (.79) |

***1.** Install the pump so that the "Filling Port" is at the top.
***2.** Case drain ports are available for use when draining hydraulic fluid from pump casing.

A220-F-R-03-C-K- \ast -1080

Cable Departure
 Cable Applicable:
 Outside Dia...8-10mm (.315-.394 IN.)
 Conductor Area...Not Exceeding 1.5mm²(.002 Sq.IN.)



| Model Numbers | mm (IN.) | | |
|--------------------------------|------------|--------------|-----------|
| | a | b | d |
| A220-F-R-03-C-K-A \ast -1080 | 215 (8.46) | 203 (7.99) | 39 (1.54) |
| A220-F-R-03-C-K-D \ast -1080 | 226 (8.90) | 214 (8.43) | 39 (1.54) |
| A220-F-R-03-C-K-R \ast -1080 | 229 (9.02) | 207.2 (8.16) | 53 (2.09) |

● **Foot Mounting Type**
 Mounting bracket is common to that of pressure compensator model.
 Refer to page 55 for the dimensions of mounting bracket.

For other dimensions, refer to 30/3090 design.

“A” Series Variable Displacement Piston Pumps- Single Pump, Proportional Electro-Hydraulic Load Sensing Type

Graphic Symbols

A16/A22/A37

A56

A80/A125/A220

Performance Characteristics

Output Flow →
(Small ← Current i_1 → Large)

Pressure →
(Small ← Current i_2 → Large)

Model Number Designation

| A80 | -F | -R | -04 | -C | -S | -K | -30 | * |
|---|-----------------------------|---------------------------|--|---|-------------------------------|-----------------------------|---------------|-------------|
| Series Number | Mounting | Direction of Rotation | Control Type | Pres. Adj. Range bar (PSI) | Port Position | Shaft Extension | Design Number | Design Std. |
| A16 (15.8 cm ³ /rev) | F: Flange Mtg. | R: *1 Clockwise | 04: Proportional Electro-Hydraulic Load Sensing | B: 15- 70 (215-1000) C: 15-160 (215-2285) H: 15-210 (215-3000) | None: Axial Port | K: Keyed Shaft | 32 | Refer to *2 |
| A22 (22.2 cm ³ /rev) | | | | B: 15- 70 (215-1000) C: 15-160 (215-2285) | | | 32 | |
| A37 (36.9 cm ³ /rev) | | | | B: 20- 70 (285-1000) C: 20-160 (285-2285) H: 20-210 (285-3000) | | | 32 | |
| A56 (56.2 cm ³ /rev) | L: Foot Mtg. | | | B: 15- 70 (215-1000) C: 17-160 (240-2285) H: 17-210 (240-3000) | S: Side Port | | 32 | |
| A80 (83 cm ³ /rev) | | | | B: 15- 70 (215-1000) C: 17-160 (240-2285) H: 17-175 (240-2500) | | | 30 | |
| A125 (125 cm ³ /rev) | | | | B: 15- 70 (215-1000) C: 18-160 (260-2285) | 30 | | | |
| A220 (219 cm ³ /rev) | | | | B: 15- 70 (215-1000) C: 18-160 (260-2285) | 30 | | | |

*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

Ratings

| Descriptions | | Model No. | A16 | A22 | A37 | A56 | A80 | A125 | A220 | |
|------------------------------------|-------------|---|--|------------------------|------------------------|-------------------------|-------------------------|-------------------------|----------------------------|------------------|
| Geometric Displacement | | cm ³ /rev (cu. in./rev) | 15.8 (.964) | 22.2 (1.355) | 36.9 (2.25) | 56.2 (3.43) | 83.0 (5.06) | 125 (7.63) | 219 (13.36) | |
| Operating Pres. bar (PSI) | | Rated *2 | 160 (2285) | 140 (2000) | 160 (2285) | 160 (2285) | 160 (2285) | 160 (2285) | 160 (2285) | |
| | | Intermittent *1 | 210 (3000) | 160 (2285) | 210 (3000) | 210 (3000) | 210 (3000) | 175 (2500) | 160 (2285) | |
| Shaft Speed Range rpm (r/min) | | Max. | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1500 *4 | |
| | | Min. | 600 | 600 | 600 | 600 | 600 | 600 | 600 | |
| Flow Control | | Flow Adj. Range l/min (U.S. GPM) | 1 - 28.4 (.26 - 7.5) | 1 - 40 (.26 - 10.6) | 1 - 66 (.26 - 17.4) | 1 - 101 (.26 - 26.7) | 1 - 149 (.26 - 39.4) | 1 - 225 (.26 - 59.4) | 3 - 328 (.26 - 86.7) | |
| | | Min. Pres. Required for Flow Adj. bar (PSI) | 15 (215) | 15 (215) | 15 (215) | 15 (215) | 15 (215) | 15 (215) | 15 (215) | |
| | | Differential Pres. (Discharge Pres. — Load Pres.) bar (PSI) | 3.7 (53) | | | 3.7 (53) | | | | |
| | | Step Response (0 → Max. Flow) ms | 70 *6 | 80 *6 | 120 *6 | 125 *6 | 160 *6 | 195 *6 | 170 *6 | |
| | | Hysteresis | Less than 3% *5 | | | | | | | |
| | | Rated Current mA | 900 | 700 | 740 | 790 | 650 | 750 | 870 | |
| | | Coil Resistance Ω [20°C (68°F)] | 10 | | | | | | | |
| Pres. Control | | Pres. Adj. Range bar (PSI) | Refer to Model Number Designation | | | | | | | |
| | | Step Response ms | 20 → 160 bar (285 → 2285 PSI) | 80 *6 | 80 *6 | 50 *6 | 55 *6 | 100 *6 | 200 *6 | 135 *6 |
| | | | 160 → 20 bar (2285 → 285 PSI) | 140 *6 | 90 *6 | 80 *6 | 80 *6 | 130 *6 | 120 *6 | 140 *6 |
| | | Hysteresis | Less than 2% | | | | | | | |
| | | Rated Current mA | (Pres. Adj. Range) B: 770, C: 880, H: 790 | | | | | | B: 770 C: 880 H: 650 | B: 770 C: 880 |
| Coil Resistance Ω [20°C (68°F)] | 10 | | | | | | | | | |
| Applicable Amplifier Model *3 | | AME-D2-1010-#-10 | | | | | | | | |
| Mass kg (lbs) | Flange Mtg. | 28.5 (62.8) | 28.5 (62.8) | 38 (83.8) | 45 (99.2) | 80 (176) | 125 (276) | 155 (342) | | |
| | Foot Mtg. | 30.7 (67.7) | 30.7 (67.7) | 42.3 (93.3) | 49.3 (109) | 100.5 (222) | 150 (331) | 180 (397) | | |

*1. Whenever setting pressure, make sure the full cut-off pressure never exceeds the permissible maximum intermittent pressure.

*2. When operating the pump exceeding the rated pressure, operating conditions are restricted. Refer to page 38 for the details.

*3. For detail specifications of power amplifiers, refer to page 723.

*4. However, when operating the A220 pump with a shaft speed exceeding 1400 rpm (r/min), suction pressure is restricted in the range 0 to 0.5 bar (0 to 7 PSIG).

*5. The figures mentioned in the above table are those obtained using Yuken's amplifier.

*6. Step response depends on circuit and operating conditions. Data shown in the table above is an example based on following condition.

| Model | Loading Volume |
|-----------------|---|
| A16, A22 | High Pressure Hose 3/8" x 2 m (6.6 ft) |
| A37, A56 | High Pressure Hose 3/4" x 2 m (6.6 ft) |
| A80, A125, A220 | High Pressure Hose 1-1/4" x 2 m (6.6 ft) |

■ Pipe Flange Kits

Pipe flange kits are available.

When ordering, specify kits from the table below.

| Pump Model Numbers | Name of Port | Pipe Flange Kit Numbers | | | | |
|---------------------------|--------------|-------------------------|-------------------|----------------------|---|----------------------|
| | | Threaded Connection | | | For Socket Welding | |
| | | Japanese Standard "JIS" | European Standard | N. American Standard | Japanese Standard "JIS" European Standard | N. American Standard |
| A16-#-R-04 | Suction | F5-06-A-10 | F5-06-A-1080 | F5-06-A-1090 | F5-06-B-10 | F5-06-B-1090 |
| A22-#-R-04 | Discharge | _____* | _____* | _____* | _____* | _____* |
| A37-#-R-04 | Suction | F5-10-A-10 | F5-10-A-1080 | F5-10-A-1090 | F5-10-B-10 | F5-10-B-1090 |
| A56-#-R-04 | Discharge | F5-06-A-10 | F5-06-A-1080 | F5-06-A-1090 | F5-06-B-10 | F5-06-B-1090 |
| A80-#-R-04 A125-#-R-04 | Suction | F5-16-A-10 | F5-16-A-1080 | F5-16-A-1090 | F5-16-B-10 | F5-16-B-1090 |
| | Discharge | F5-10-A-10 | F5-10-A-1080 | F5-10-A-1090 | F5-10-B-10 | F5-10-B-1090 |
| | Tank | F5-06-A-10 | F5-06-A-1080 | F5-06-A-1090 | F5-06-B-10 | F5-06-B-1090 |
| A220-#-R-04 | Suction | F5-24-A-10 | _____ | _____ | F5-24-B-10 | F5-24-B-1090 |
| | Discharge | F5-10-A-10 | F5-10-A-1080 | F5-10-A-1090 | F5-10-B-10 | F5-10-B-1090 |
| | Tank | F5-06-A-10 | F5-06-A-1080 | F5-06-A-1090 | F5-06-B-10 | F5-06-B-1090 |

* Discharge port for pump model "A16" and "A22" is available only with threaded connections.

- Detail of the pipe flange kit is described on page 766 .

■ Care in Application

• Mounting

Install the Pump so that the "Filling Port" is at the top.

• Bleeding Air

In order to get steadily controlled pressure and flow, bleed air by loosening the air vent screw and fill solenoid armature with operating oil.

- **Manual Adjustment Screws** may be used for initial running adjustment or in case of electrical failures in order to adjust pressure and flow temporarily. In case of normal use, put the manual adjustment screws back in their preset positions.

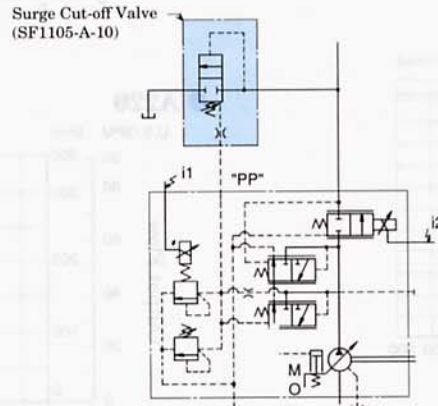
- **Position of cable Departure** can be changed. For details, refer to the installation drawing of EDG-01 valve on page 645 .

• Connection of Surge Cut-off Valve to "A" Series Pump (For A16 to A56 Type)

If using surge cut-off valve (SF1105-A-10), connect between pilot port "PP" of this pump and port "PP" of surge cut-off valve as pilot piping. (refer to drawing below)

Inside diameter of pipe should be more than 8 mm (.32 in.).

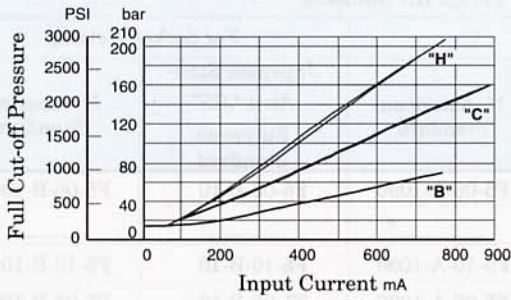
Consult Yuken on detail of surge cut-off valve.



Typical Performance Characteristics at viscosity 20 cSt(100 SSU) {ISO VG32 oils, 50 °C(122°F)}

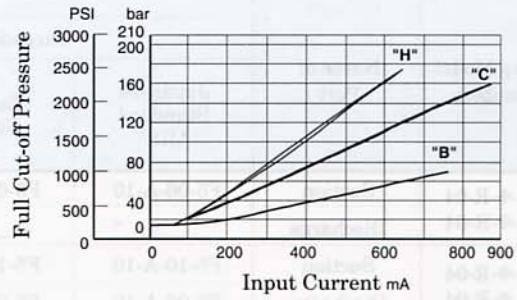
■ Full Cut-off Pres. vs. Input Current

● **A16/A22/A37/A56/A80/A220**



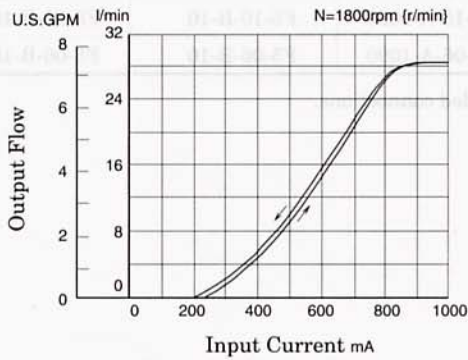
Note: Pressure adjustment range "H" is not available for A22 and A220.

● **A125**

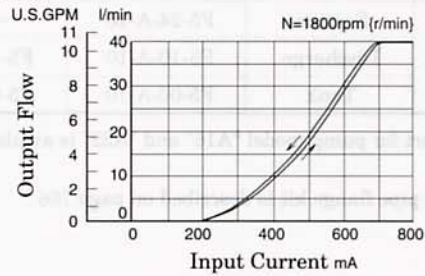


■ Output Flow vs. Input Current

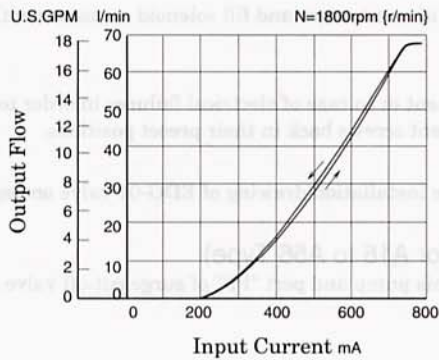
● **A16**



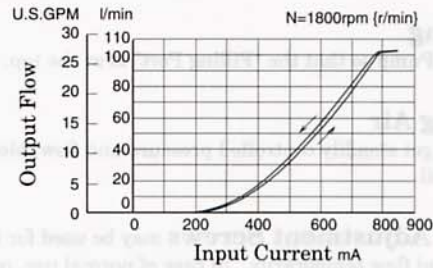
● **A22**



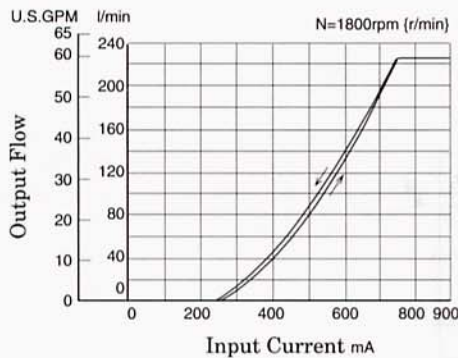
● **A37**



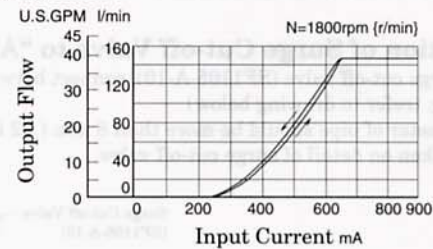
● **A56**



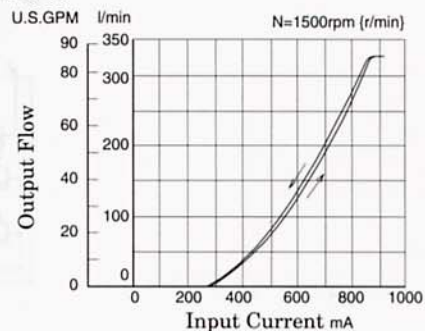
● **A125**



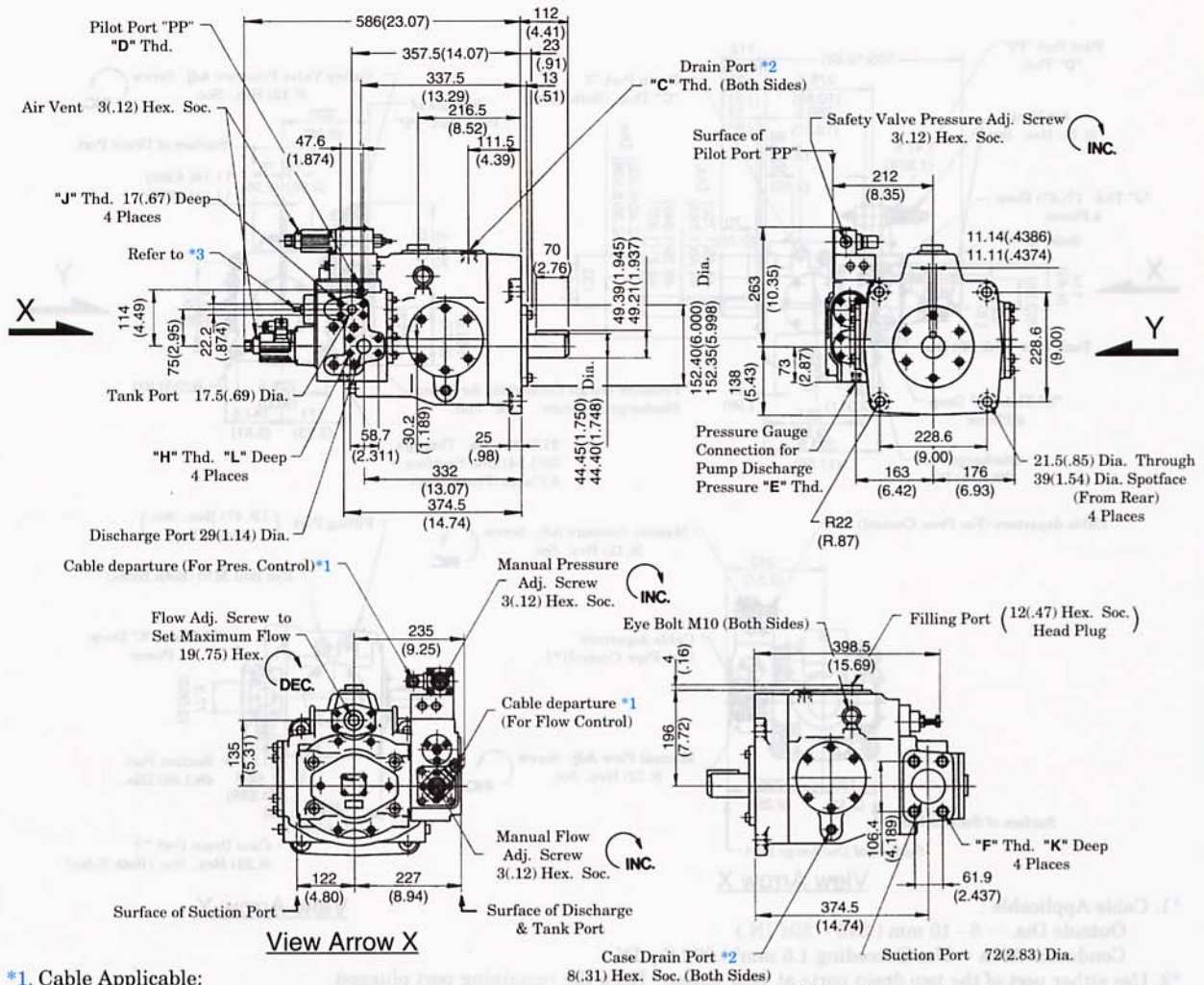
● **A80**



● **A220**



Flange Mtg. : A220-F-R-04-~~*~~-K-10/1080/1090



*1. Cable Applicable:

- Outside Dia. 8 - 10 mm (.315 - .394 IN.)
- Conductor Area Not exceeding 1.5 mm² (.002 Sq. IN.)

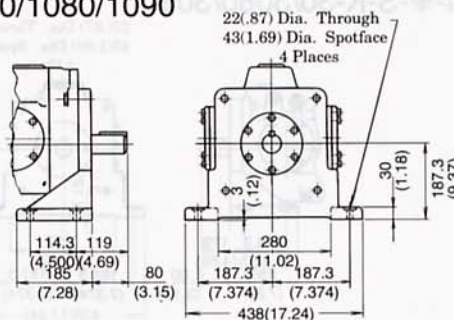
*2. Case drain ports are available for use when draining hydraulic fluid from pump casing.

*3. Do not touch the screw because it is adjusted at the time of shipment.

| Model Numbers | "C" Thd. | "D" Thd. | "E" Thd. | "F" Thd. | "H" Thd. | "J" Thd. | mm (IN.) | |
|-----------------------------------|----------|-------------|------------|-----------|------------|-----------|----------|----------|
| | | | | | | | K | L |
| A220-F-R-04- * -K-10 | Rc 1 | Rc 1/4 | Rc 3/8 | M16 | M10 | M10 | 19 (.75) | 19 (.75) |
| A220-F-R-04- * -K-1080 | 1 BSP.F | 1/4 BSP. Tr | 3/8 BSP.Tr | | | | | |
| A220-F-R-04- * -K-1090 | 1 NPT | 1/4 NPT | 3/8 NPT | 5/8-11UNC | 7/16-14UNC | 3/8-16UNC | 21 (.83) | 20 (.79) |

DIMENSIONS IN MILLIMETRES (INCHES)

Foot Mtg. : A220-L-R-04-~~*~~-K-10/1080/1090



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