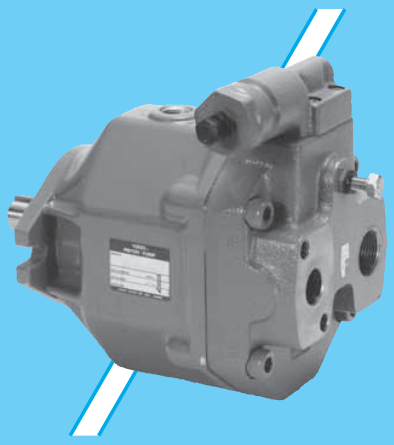
A

PISTON PUMPS

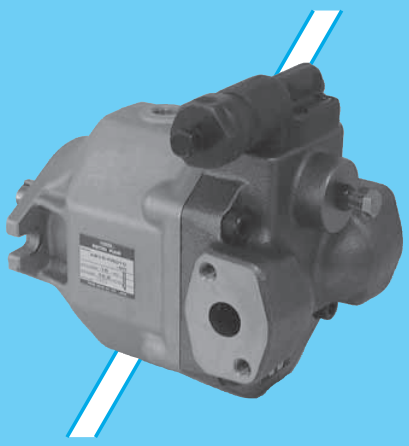
Yuken offers low noise/high efficiency, swash plate type variable displacement piston pumps. These pumps have been developed by Yuken's leading hydraulic engineers and provide a diverse lineup to meet a wide range of application requirements.

Caution : In the case of Water Glycol fluids, a slight oil leak occurs from the shaft seal part.
(Criterion: 500ml / 6 months of oil leakages.)
Install a tray appropriate capacity on the pump-base, please.

"AR" Series Variable Displacement Piston Pumps

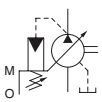
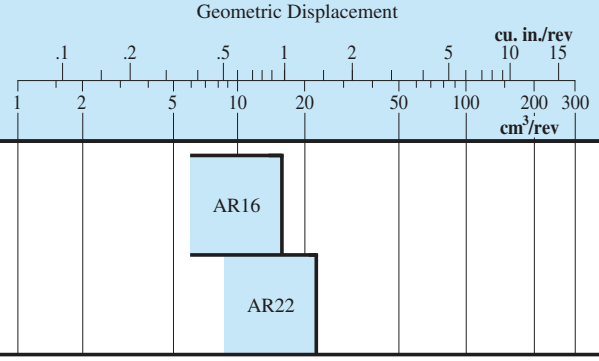


AR16
Axial Port Type

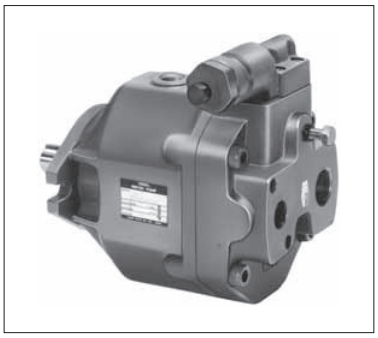


AR16
Side Port Type

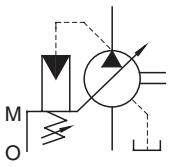
"AR" series variable displacement pump has been developed which the aim of even further the quietness in operation, smaller in size and lighter in mass and based on Yuken technology and engineering which put on market the "A" series pump which has a reputation for its quiet operation and high efficiency.

Pump Type	Graphic Symbol	Geometric Displacement	Maximum Operating Pressure MPa (PSI)	Page
"AR" Series Variable Diplacement Piston Pumps			16 (2320)	18

"AR" Series Variable Displacement Piston Pumps – Single Pump, Pressure Compensator Type



Graphic Symbol



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	Intermittent ★	Max.	Min.	
AR16-FR01∗-20/2080/20950	15.8 (.964)	16 (2320)		1800	600	9.8 (21.6)
AR22-FR01∗-20/2080/20950	22.2 (1.355)			1800	600	

★ When setting the pressure, make sure the full cut-off pressure never exceeds the maximum intermittent pressure.

Model Number Designation

AR16	-F	R	01	B	S	-20	∗
Series Number	Mounting	Direction of Rotation	Control Type	Pres. Adj. Range MPa (PSI)	Port Position	Design Number	Design Std.
AR16 (15.8 cm^3/rev)	**F:** Flange Mtg.	(Viewed from Shaft End) **R:** ★1 Clockwise (Normal)	**01:** Pressure Compensator Type	**B:** 1.2 - 7 {170 - 1020} **C:** 2.0 - 16 {290 - 2320}	**None:** Axial Port **S:** Side Port	**20**	Refer to ★2
AR22 (22.2 cm^3/rev)						**20**	

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

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

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	
		Japanese Standard "JIS"	European Design Standard	N. American Design Standard	Japanese Standard "JIS" European Design Standard	N. American Design Standard
AR16-FR01 AR22-FR01	Suction	F5-06-A-1021	F5-06-A-10801	F5-06-A-10950	F5-06-B-1021	F5-06-B-10901
	Discharge ★	————	————	————	————	————

★ Discharge port is available only for the threaded connections.
● Detail of the pipe flange kits are shown on page 24.

Mounting Bracket Kits

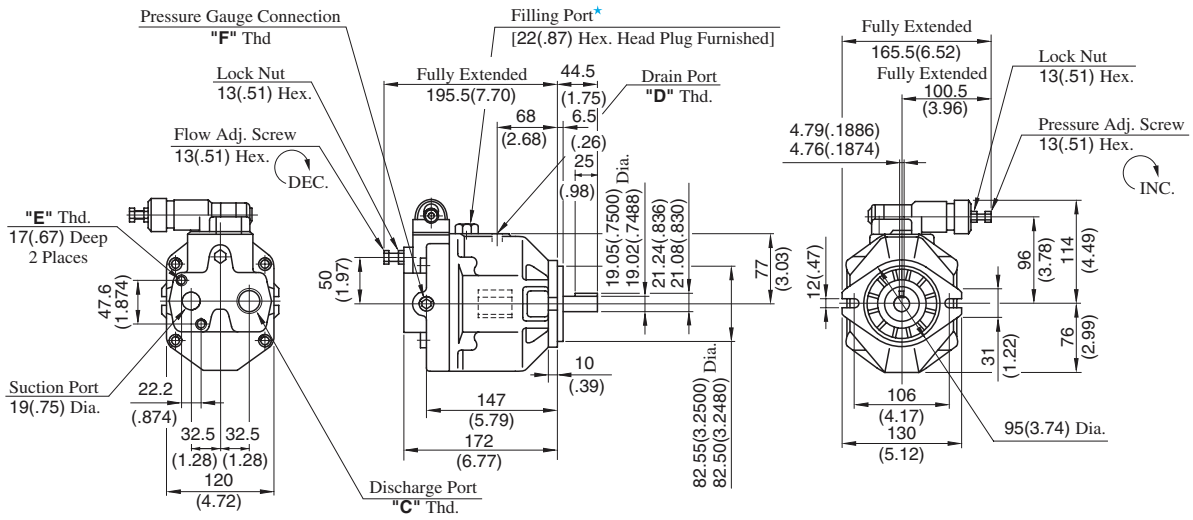
Mounting bracket available on separate order.
Refer to page 24 for dimennsions of the Mtg. bracket.

Pump Model Numbers	Mtg. Bracket Kit Numbers	Approx. Mass kg (lbs.)
AR16/AR22-FR01	LP-1A-10	2.2 (4.9)

Note: The mounting bracket kit consists of a mounting bracket, two hex. bolts and two plain washers.

AR16-FR01∗-20/2080/20950
AR22-FR01∗-20/2080/20950

Axial Port Type



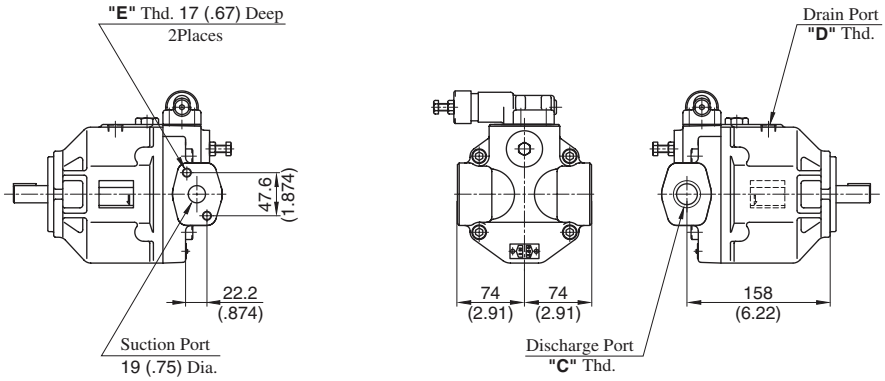
★ Install the pump so that the "Filling port" is at the top.

Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	"F" Thd.
AR16/AR22-FR01∗-20	Rc 3/4	Rc 3/8	M10	Rc 1/4
AR16/AR22-FR01∗-2080	3/4 BSP.F	3/8 BSP.F		1/4 BSP.Tr
AR16/AR22-FR01∗-20950	SAE #12	SAE #8	3/8-16 UNC	SAE #4

DIMENSIONS IN MILLIMETRES (INCHES)

AR16-FR01∗S-20/2080/20950
AR22-FR01∗S-20/2080/20950

Side Port Type



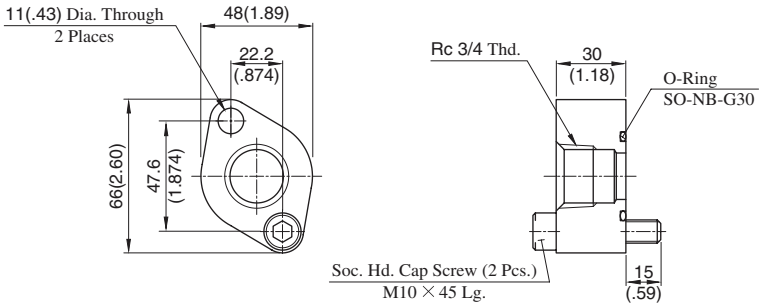
Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.
AR16/AR22-FR01∗S-20	Rc 3/4	Rc 3/8	M10
AR16/AR22-FR01∗S-2080	3/4 BSP.F	3/8 BSP.F	
AR16/AR22-FR01∗S-20950	SAE #12	SAE #8	3/8-16 UNC

• For other dimensions, refer to "Axial Port Type".

Pipe Flange Kit for Suction Port

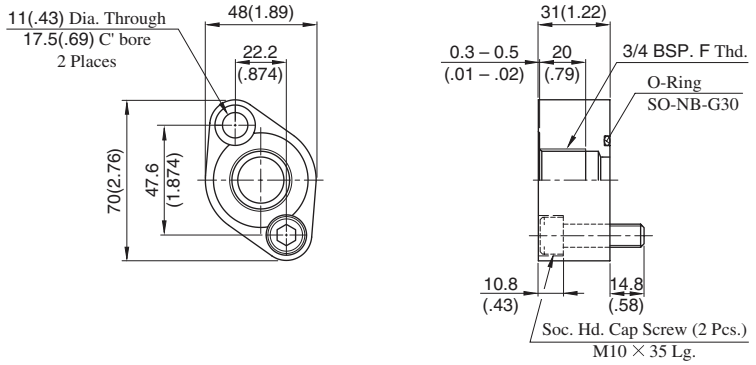
- Threaded Connection

Japanese Std. "JIS": F5-06-A-1021

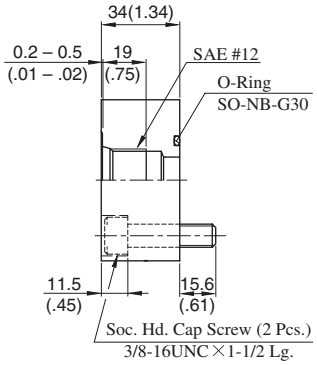


Approx. Mass ..... 0.5 kg (1.1 lbs.)

European Design Std.: F5-06-A-10801



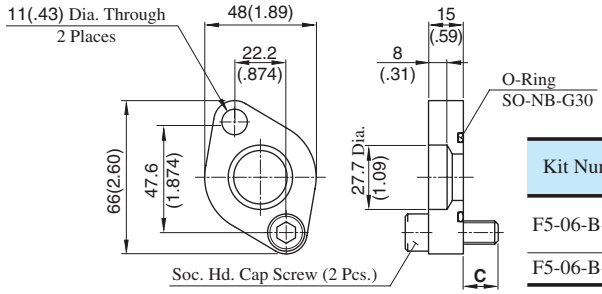
N. American Design Std.: F5-06-A-10950



- Socket Welding

Approx. Mass ..... 0.5 kg (1.1 lbs.)

F5-06-B-1021/10901

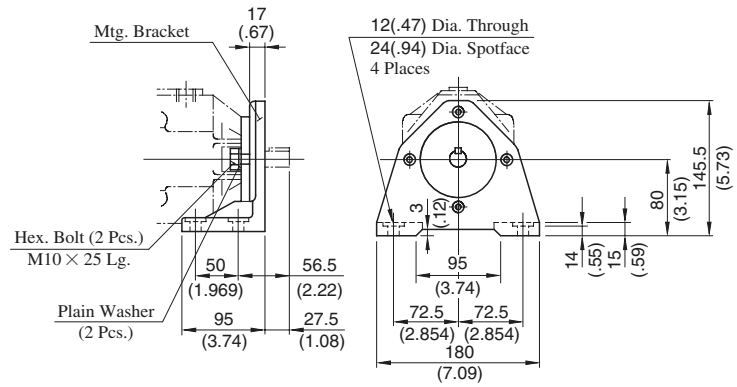


Kit Numbers	C mm (In.)	Soc. Hd. Cap Screw	Remarks
F5-06-B-1021	15 (.59)	M10 × 45Lg.	Japanese Std. "JIS" European Design Std.
F5-06-B-10901	16.75 (.66)	3/8-16 UNC × 1-1/4 Lg.	N. American Design Std.

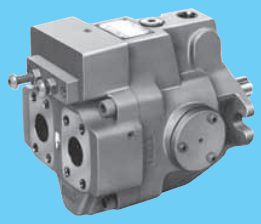
Approx. Mass ..... 0.3 kg (.66 lbs.)

DIMENSIONS IN MILLIMETRES (INCHES)

Mtg. Bracket Kit: LP-1A-10

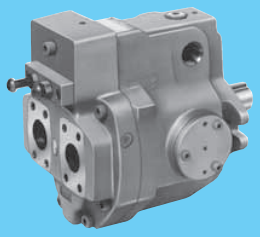


"A" Series Variable Displacement Piston Pumps



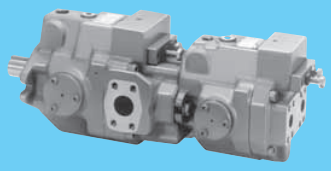
A37

A16



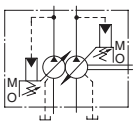
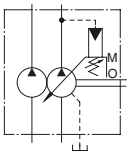
A56

A10



A1637

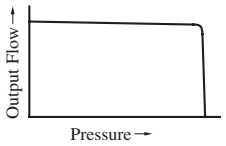
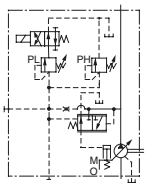
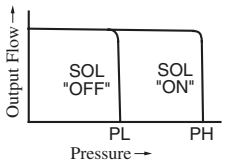
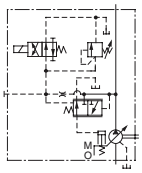
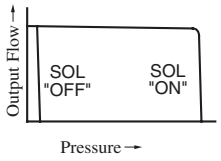
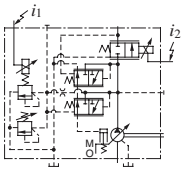
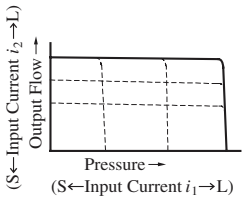
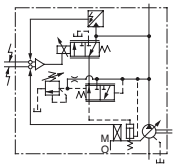
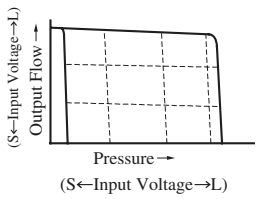
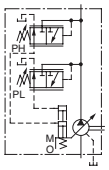
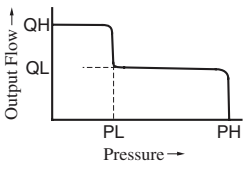
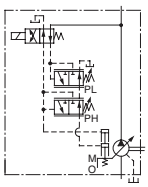
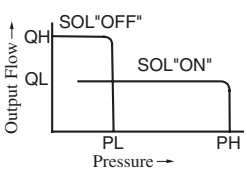
"A" Series Variable Displacement Piston Pumps

Pump Type	Graphic Symbols	Geometric Displacement (cu. in./rev: .1, .2, .5, 1, 2, 5, 10, 15 — cm³/rev: 1, 2, 5, 10, 20, 50, 100, 200, 300)	Maximum Operating Pressure MPa (PSI)	Page
Single Pumps		A10 A16 A22 A37 A56 A70 A90 A145 A220	21 (3050) 16 (2320) 21 (3050) 28 (4060) 16 (2320)	30
Double Pumps		Outboard Pump: A16, A37, A56 Inboard Pump: A16, A37, A56, A70, A90, A145, A220	28 (4060)★	113
Variable / Fixed Double Pumps		Outboard Pump: PV2R1, PV2R2 Inboard Pump: A16, A37, A56, A70, A90, A145, A220	28 (4060)★	115

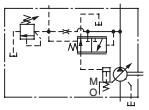
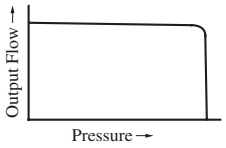
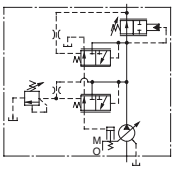
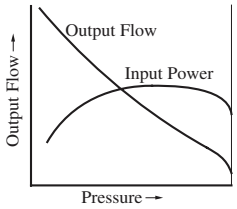
• Various control types are available such as pressure compensator type. Refer to page 31 and 32.

★ The maximum operating pressure for each double pump depends on its combination of pumps. Contact us for details.

Control Type

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.	33
"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.	55
"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. • The pump can be used in combination with the multistage pressure control valve.	63
"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 regurated by the specific amplifier.	64
"04E"	Electro-Hydraulic Proportional Pressure & Flow Control Type			This type of control has the pressure sensor and tilt angle sensor in the pump. The pump is used with the external amplifier (amplifier is integrated into pump in case of "04EH"). 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. • Linearity of input characteristics is excellent and easy to set. • Hysteresis is lower,repeatability and reproducibility are fine.	74
"04EH"	Electro-Hydraulic Proportional Pressure & Flow Control Type (OBE Type)				86
"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

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.	96
"09"	Constant Power Control Type			• Pump input power can be controlled in accordance with the motor output. • When the discharge pressure rise, the output flow decreases corresponding to the preset input power. • The pump can act for function of two pumps, low-pressure large-flow and high-pressure small-flow. Therefore, the motor capacity can be reduced.	105

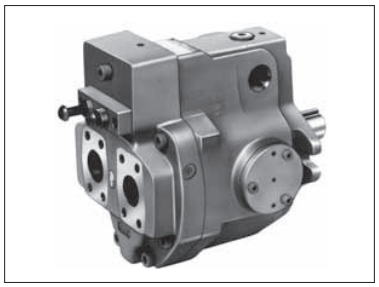
★Control type "05" and "06" are not shown in this catalogue. Contact us for the details.

Availability of Control Type

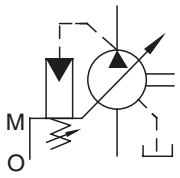
Mark "◯" in the table below refers to standard model.

Model Numbers	Geometric Displacement cm^3/rev (cu.in./rev)	Control Type									
		01	02	03	04	04E	04EH	05	06	07	09
A10	10.0 (.610)	◯								◯	
A16	15.8 (.964)	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯
A22	22.2 (1.355)	◯	◯	◯	◯	◯	◯		◯	◯	
A37	36.9 (2.25)	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯
A56	56.2 (3.43)	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯
A70	70.0 (4.27)	◯	◯	◯	◯	◯	◯		◯	◯	◯
A90	91.0 (5.55)	◯	◯	◯	◯	◯	◯		◯	◯	
A145	145 (8.85)	◯	◯	◯	◯	◯	◯		◯	◯	◯

"A" Series Variable Displacement Piston Pumps – Single Pump, Pressure Compensator Type



Graphic Symbol



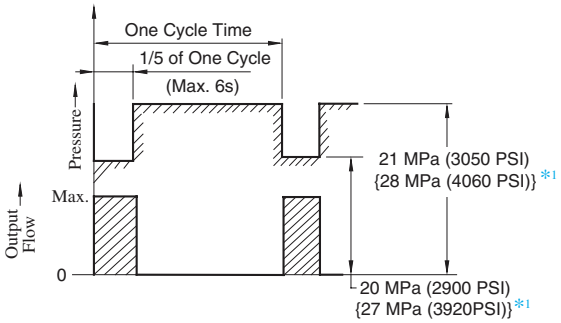
Specifications

Model Numbers	Geometric Displacement cm^3/rev (cu. in. /rev)	Minimum Adj. Flow cm^3/rev (cu. in. /rev)	Operating Presure MPa (PSI)		Shaft Speed Range r/min		Approx. Mass kg (lbs.)	
			Rated ★2	Intermittent ★1	Max.	Min.	Flange Mtg.	Foot Mtg.
A10-FR01B-12∗	10.0 (.610)	2 (.122)	16 (2320)	21 (3050)	1800	600	5.1 (11.2)	—
A10-FR01C/H-12∗							8.5 (18.7)	
A16-∗-R-01-∗-∗-K-32∗	15.8 (.964)	4 (.244)	16 (2320)	21 (3050)	1800	600	16.5 (36.4)	18.7 (41.2)
A22-∗-R-01-∗-∗-K-32∗	22.2 (1.355)	6 (.366)	16 (2320)	16 (2320)	1800	600	16.5 (36.4)	18.7 (41.2)
A37-∗-R-01-∗-∗-K-32∗	36.9 (2.25)	10 (.610)	16 (2320)	21 (3050)	1800	600	28.0 (61.7)	32.3 (71.2)
A56-∗-R-01-∗-∗-K-32∗	56.2 (3.43)	12 (.732)	16 (2320)	21 (3050)	1800	600	35.0 (77.2)	39.3 (86.7)
A70-∗R01∗S-60∗	70.0 (4.27)	30 (1.83)	25 (3630)	28 (4060)	1800	600	58.5 (129)	70.5 (155)
A90-∗R01∗S-60∗	91.0 (5.55)	56 (3.42)	25 (3630)	28 (4060)	1800	600	72.5 (160)	93 (205)
A145-∗R01∗S-60∗	145 (8.85)	83 (5.06)	25 (3630)	28 (4060)	1800	600	92.5 (204)	117.5 (259)

★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 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 1/5 of one cycle time and under six 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. The table above shows specifications for using petroleum based oils. Pumps (customized design) for special fluids are also available. Their operating pressure and maximum shaft speed however differ from the values in the table above depending on the fluid type.
Range of operating temperature and viscosities may differ from those of petroleum based oils due to their characteristics.



∗1. Applicable only for "A70/90/145"

Specifications and Design numbers for Special Fluids

Type of Fluids	Pump Series	Operating Pressure MPa (PSI)		Allowable Maximum Shaft Speed r/min		Temperature Range °C (°F)	Viscosity Range mm^2/s (SSU)	Design Numbers for Special Fluid (Occasion of Japanese Std. "JIS") ★3
		Rated	Intermittent	Rated	Max.			
Water-Glycols	A16 – A56	14(2030)	16(2320) {14(2030)} ★1	1200	(1800) ★2	0 - 50 (32 - 104)	20 - 200(98 - 927)	3230
	A70 – A145	21(3050)	21(3050)					6030
Phosphate Ester Type	A16 – A56	14(2030)	16(2320) {14(2030)} ★1	1200	(1800) ★2	0 - 60 (32 - 140)		3206
	A70 – A145	21(3050)	21(3050)					6006
Polyol Ester Type	A16 – A56	16(2320)	16(2320)	1800	1800	0 - 60 (32 - 140)	20 - 200(98 - 927)	32450
	A70 – A145	21(3050)	21(3050)					60450

★1. The figures in brackets are for A22 type.

★2. As the specific gravities of water-glycol fluids and phosphate ester type fluids are higher than one, an overhead reservoir is required when pumps are operated at 1500 r/min or more.

★3. For the design numbers of pumps for European Design and North American Design Standards, please contact us.

Model Number Designation

A16	-F	-R	-01	-B	-S	-K	-32	*
Series Number	Mounting	Direction of Rotation	Control Type	Pres. Adj. Range MPa (PSI)	Port Position	Shaft Extension	Design Number	Design Std.
A16 (15.8 cm^3/rev)	**F:** Flange Mtg. **L:** Foot Mtg.	(Viewed from Shaft End) **R:** Clockwise (Normal) ★1	**01:** Pressure Compensator Type	**B:** 1.2 - 7 (170 - 1020) **C:** 1.2 - 16 (170 - 2320) **H:** 1.2 - 21 (170 - 3050)	**None:** Axial Port **S:** Side Port	**K:** Keyed Shaft	**32**	Refer to ★2
A22 (22.2 cm^3/rev)				**B:** 1.2 - 7 (170 - 1020) **C:** 1.2 - 16 (170 - 2320)			**32**	
A37 (36.9 cm^3/rev)				**B:** 1.2 - 7 (170 - 1020) **C:** 1.2 - 16 (170 - 2320) **H:** 1.2 - 21 (170 - 3050)			**32**	
A56 (56.2 cm^3/rev)							**32**	

A70	-F	R	01	B	S	-60	*
Series Number	Mounting	Direction of Rotation	Control Type	Pres. Adj. Range MPa (PSI)	Port Position	Design Number	Design Std.
A10 (10.0 cm^3/rev)	**F:** Flange Mtg. ★3	(Viewed from Shaft End) **R:** Clockwise (Normal) ★1	**01:** Pressure Compensator Type	**B:** 1.2 - 7 (170 - 1020) ★4 **C:** 2.0 - 16 (290 - 2320) **H:** 2.0 - 21 (290 - 3050)	—	**12**	Refer to ★2
A70 (70.0 cm^3/rev)	**F:** Flange Mtg. **L:** Foot Mtg.			**B:** 1.2 - 7 (170 - 1020) **C:** 1.5 - 16 (220 - 2320) **H:** 1.8 - 21 (260 - 3050) **K:** 2.0 - 28 (290 - 4060)	**S:** Side Port	**60**	
A90 (91.0 cm^3/rev)						**60**	
A145 (145 cm^3/rev)						**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
950 ..... N. American Design Standard

★3. When A10 pump is used as the foot Mtg., order the Mtg. Bracket kit shown below separately. Refer to page 24 for dimensions of the Mtg. bracket.

Note: The mounting bracket kit consists of a mounting bracket, two hex. bolts and two plain washer.

Mtg. Bracket Kit Numbers	Approx. Mass kg (lbs.)
LP-1A-10	2.2 (4.9)

★4. The pressure adjustment range "B" is not available to the European Design Standard and the N. American Design Standard of "A10".

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 ★1		Butt Welding	
		Japanese Std. "JIS"	European Design Std.	N. American ★2 Design Std.	Japanese Std. "JIS" European Design Std.	N. American ★2 Design Std.	Japanese Std. "JIS" European Design Std.	N. American ★2 Design Std.
A16-∗-R-01 A22-∗-R-01	Suction	F5-06-A-10	F5-06-A-1080	—	F5-06-B-10	F5-06-B-1090	F5-06-C-10	F5-06-C-1090
	Discharge	F5-06-A-10	F5-06-A-1080		F5-06-B-10	F5-06-B-1090	F5-06-C-10	F5-06-C-1090
A37-∗-R-01 A56-∗-R-01	Suction	F5-10-A-10	F5-10-A-1080	—	F5-10-B-10	F5-10-B-1090	F5-10-C-10	F5-10-C-1090
	Discharge	F5-10-A-10	F5-10-A-1080		F5-10-B-10	F5-10-B-1090	F5-10-C-10	F5-10-C-1090
A70-∗R01	Suction	F5-12-A-10	F5-12-A-1080	—	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-B-10	F5-08-B-1090	F5-08-C-10	F5-08-C-1090
A90-∗R01 A145-∗R01	Suction	F5-16-A-10	F5-16-A-1080	—	F5-16-B-10	F5-16-B-1090	F5-16-C-10	F5-16-C-1090
	Discharge	F5-10-A-10	F5-10-A-1080		F5-10-B-10	F5-10-B-1090	F5-10-C-10	F5-10-C-1090

★1. 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.

★2. As dimensions of the pipe flange mounting surface are conformed to SAE 4 Bolt Split Flange (Standard Pressure Series), pipe flanges conforming to the SAE Standards can be used.

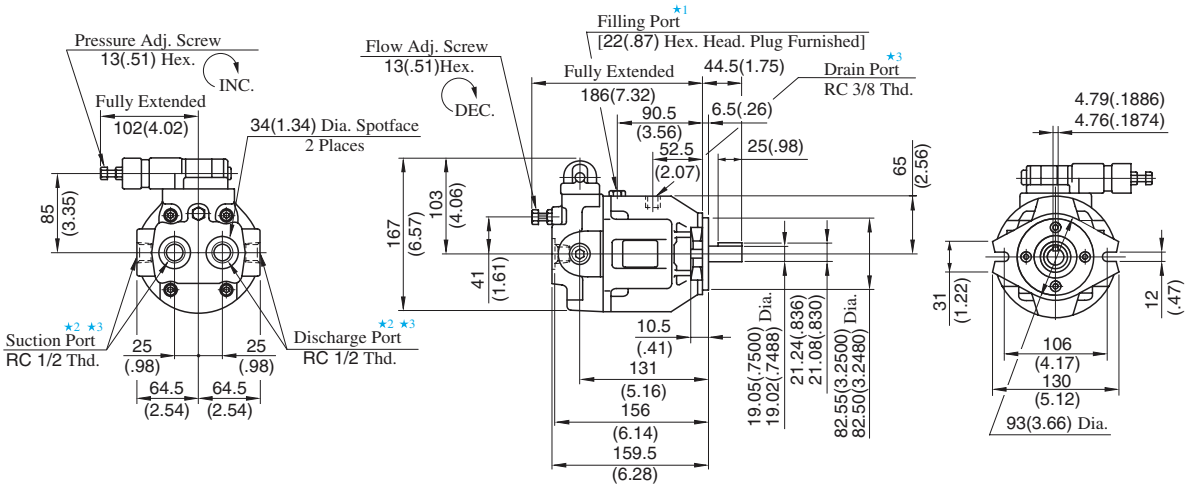
• Details of the pipe flange kits are shown on page 824.

Flange Mtg.

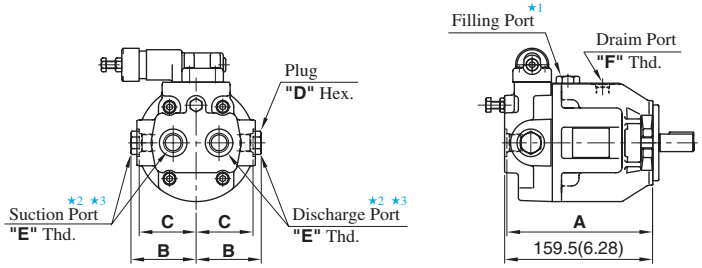
DIMENSIONS IN MILLIMETRES (INCHES)

Pressure Adjustment Range "C" & "H"

- **Japanese Standard "JIS":** A10-FR01-C/H-12



- **European Design Standard:** A10-FR01-C/H-1280
- **N. American Design Standard:** A10-FR01-C/H-12950

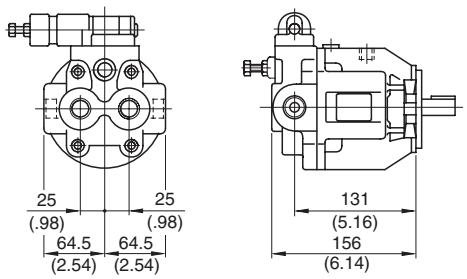


Model Numbers	Dimensions mm(Inches)				Thread Size	
	A	B	C	D	E	F
A10-FR01C/H-1280	159 (6.25)	72 (2.83)	64 (2.52)	27 (1.06)	1/2 BSP. F	3/8 BSP. F
A10-FR01C/H-12950	157 (6.18)	71 (2.80)	62 (2.44)	22 (.87)	SAE #8	SAE #6

- For other dimensions, refer to Japanese Standard "JIS".

Pressure Adjustment Range "B"

- **Japanese Standard "JIS":** A10-FR01-B-12



- For other dimensions, refer to above Pressure Adj. Range "C" & "H".

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

★2. Use either port of two suction and discharge ports at your option. Keep the remaining ports plugged.

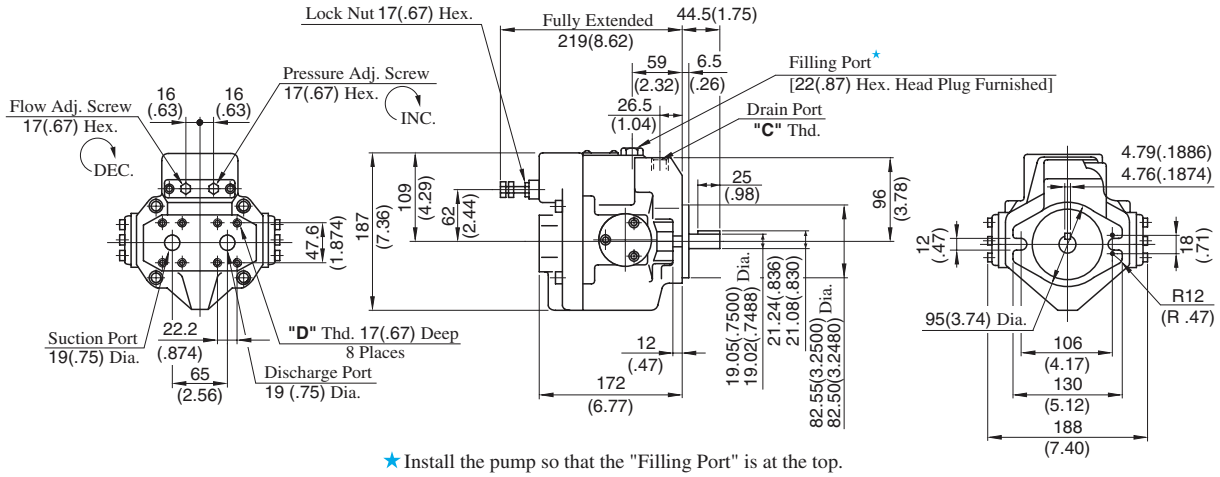
★3. As the tightening torques of suction, discharge and drain port fittings, conform to the below.

Model Numbers	Tightening Torque Nm(IN. lbs.)	
	Suction Port & Discharge Port	Drain Port
A10-FR01B/C/H-12	65-75 (575-664)	40-50 (354-443)
A10-FR01C/H-1280	56-62 (496-549)	33-36 (292-319)
A10-FR01C/H-12950	47-51 (363-451)	40-50 (354-443)

Axial Port Type

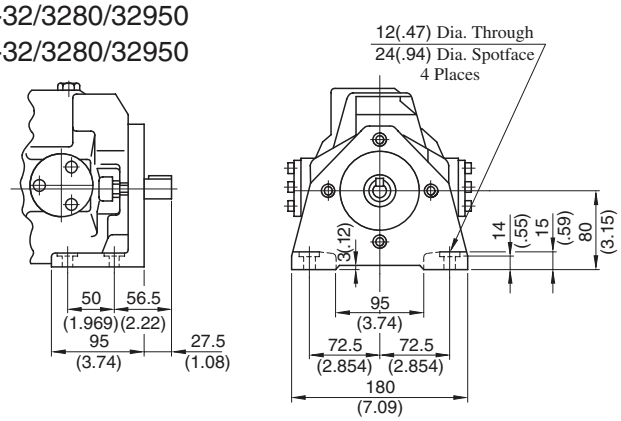
Flange Mtg.: A16-F-R-01-⁎-K-32/3280/32950
A22-F-R-01-⁎-K-32/3280/32950

Model Numbers	"C" Thd.	"D" Thd.
A16/A22-F-R-01-⁎-K-32	Rc 3/8	M 10
A16/A22-F-R-01-⁎-K-3280	3/8 BSP.F	
A16/A22-F-R-01-⁎-K-3290	SAE #8	3/8-16 UNC



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

Foot Mtg.: A16-L-R-01-⁎-K-32/3280/32950
A22-L-R-01-⁎-K-32/3280/32950

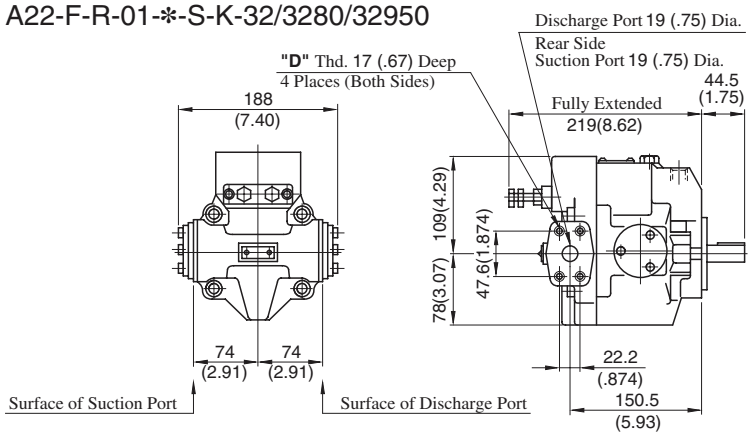


• For other dimensions, refer to "Flange Mtg.".

DIMENSIONS IN MILLIMETRES (INCHES)

Side Port Type

Flange Mtg.: A16-F-R-01-⁎-S-K-32/3280/32950
A22-F-R-01-⁎-S-K-32/3280/32950

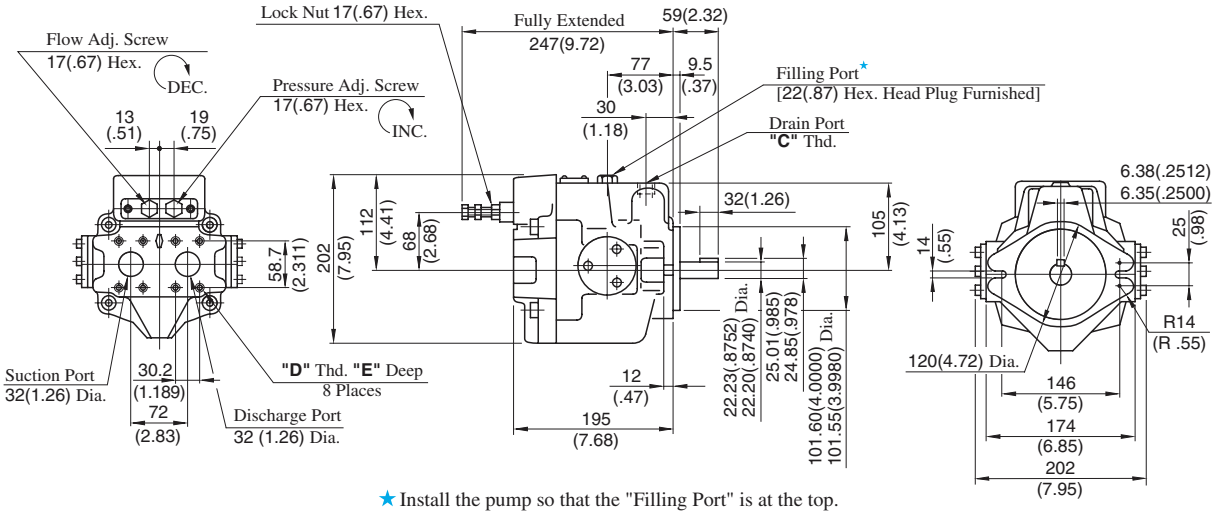


• For other dimensions, refer to "Axial Port Type".
• Foot Mtg. Type; Mounting bracket is common to that of "Axial Port Type".

Axial Port Type

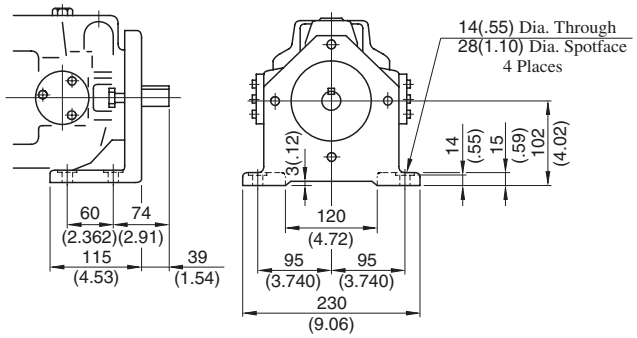
Flange Mtg.: A37-F-R-01-∗-K-32/3280/32950

Model Numbers	"C" Thd.	"D" Thd.	E mm (IN.)
A37-F-R-01-∗-K-32	Rc 1/2	M 10	19 (.75)
A37-F-R-01-∗-K-3280	1/2 BSP.F		
A37-F-R-01-∗-K-32950	SAE #10	7/16-14 UNC	20 (.79)



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

Foot Mtg.: A37-L-R-01-∗-K-32/3280/32950

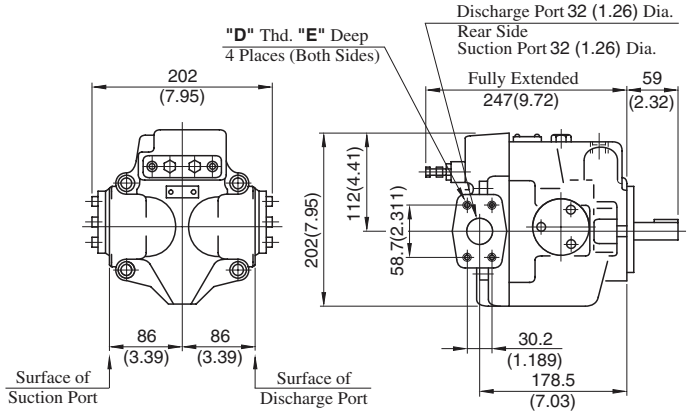


• For other dimensions, refer to "Flange Mtg.".

Side Port Type

DIMENSIONS IN MILLIMETRES (INCHES)

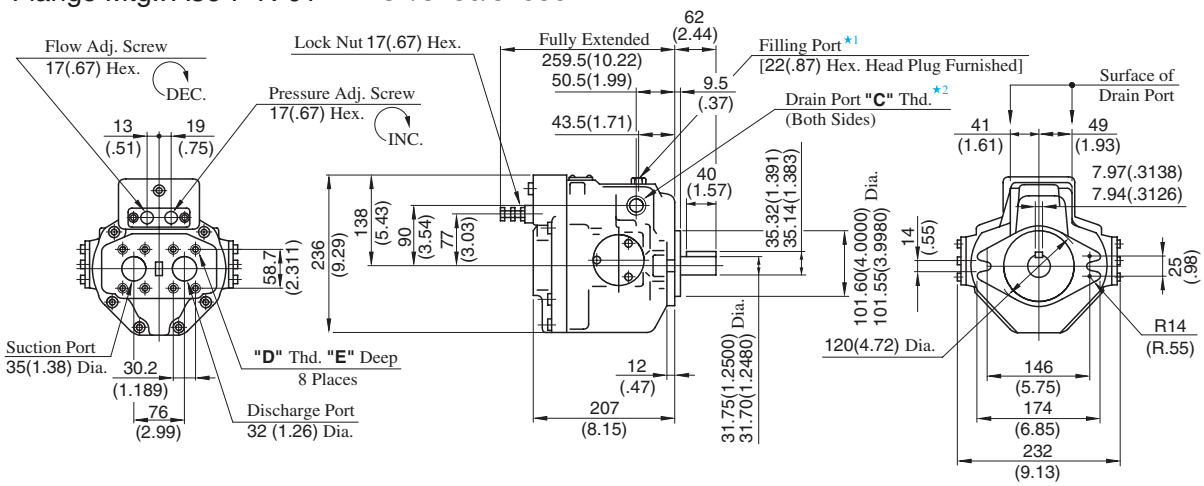
Flange Mtg.: A37-F-R-01-∗-S-K-32/3280/32950



• For other dimensions, refer to "Axial Port Type".
• Foot Mtg. Type; Mounting bracket is common to that of "Axial Port Type".

Axial Port Type

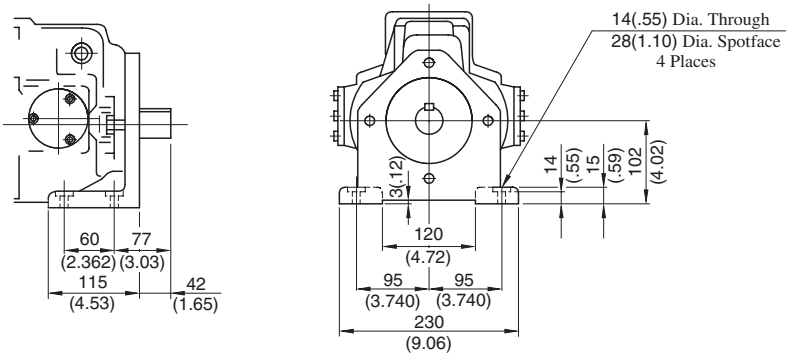
Flange Mtg.: A56-F-R-01-∗-K-32/3280/32950



Model Numbers	"C" Thd.	"D" Thd.	E mm (IN.)
A56-F-R-01-∗-K-32	Rc 3/4	M 10	19 (.75)
A56-F-R-01-∗-K-3280	3/4 BSP.F		
A56-F-R-01-∗-K-32950	SAE #12	7/16-14 UNC	20 (.79)

★1. Install the pump so that the "Filling Port" is at the top.
★2. Use either port of the two drain ports at your option. Keep the remaining port plugged.

Foot Mtg.: A56-L-R-01-∗-K-32/3280/32950

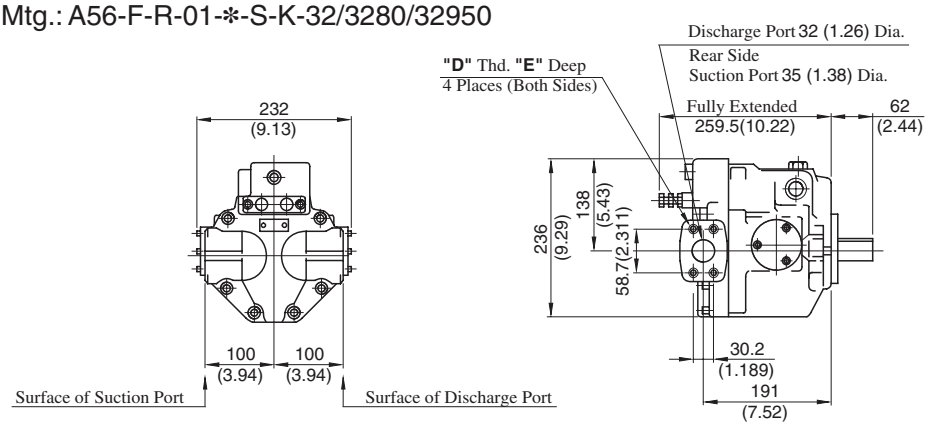


- For other dimensions, refer to "Flange Mtg.".

Side Port Type

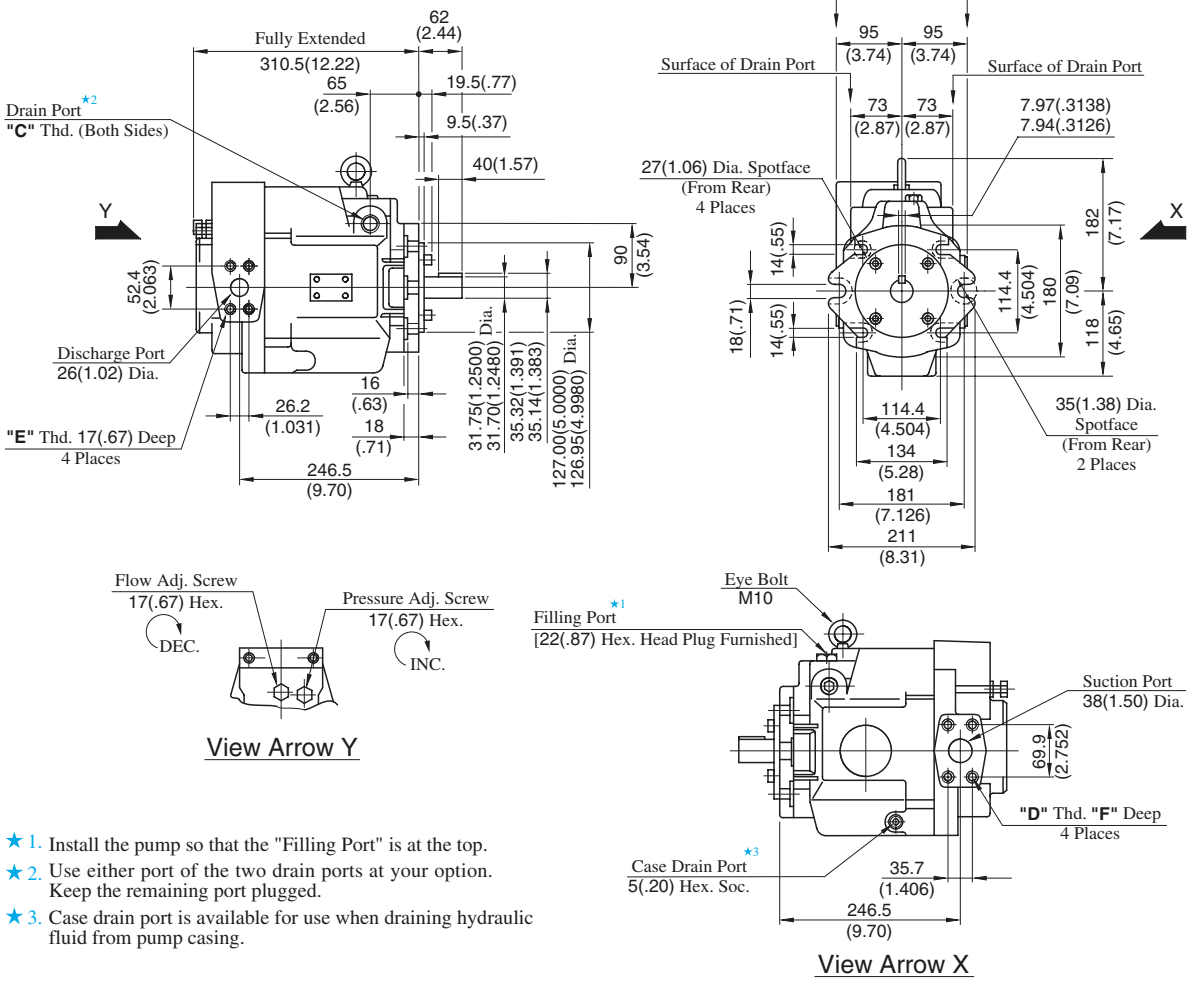
DIMENSIONS IN MILLIMETRES (INCHES)

Flange Mtg.: A56-F-R-01-∗-S-K-32/3280/32950



- For other dimensions, refer to "Axial Port Type".
- Foot Mtg. Type; Mounting bracket is common to that of "Axial Port Type".

Flange Mtg.: A70-FR01∗S-60/6080/60950

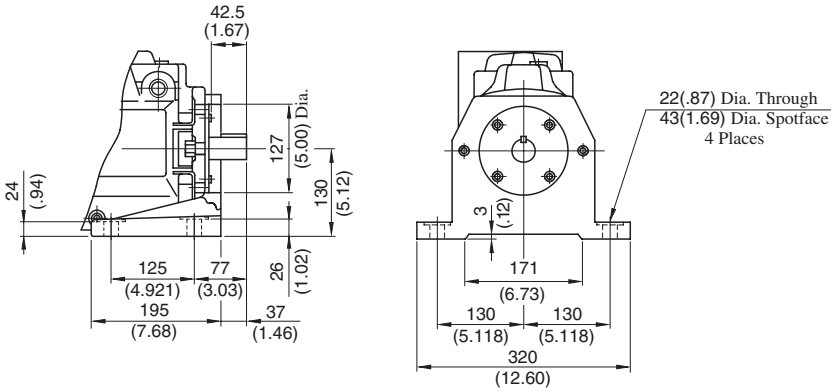


★1. Install the pump so that the "Filling Port" is at the top.
★2. Use either port of the two drain ports at your option. Keep the remaining port plugged.
★3. Case drain port is available for use when draining hydraulic fluid from pump casing.

Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	F mm (IN.)
A70-FR01∗S-60	Rc 3/4	M 12	M 10	19 (.75)
A70-FR01∗S-6080	3/4 BSP.F			
A70-FR01∗S-60950	SAE #12	1/2-13 UNC	3/8-16 UNC	21 (.83)

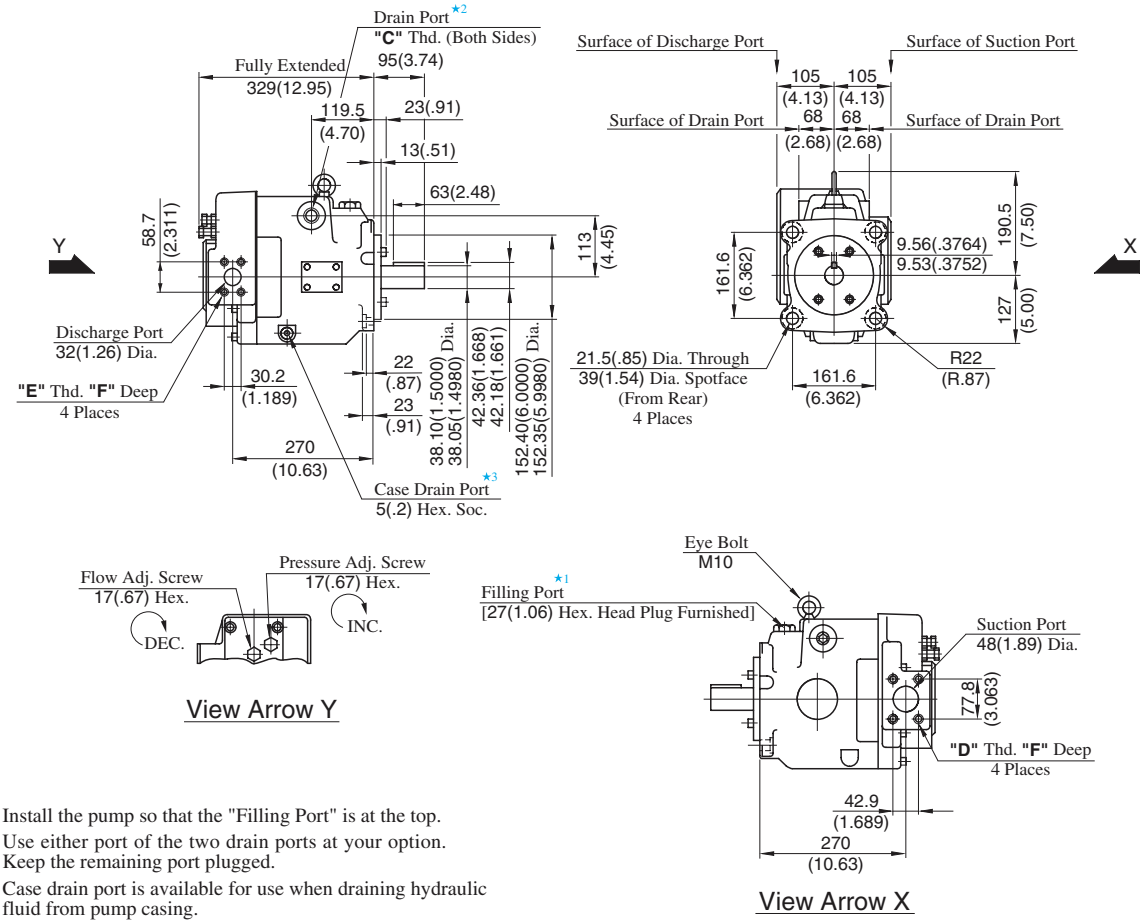
DIMENSIONS IN MILLIMETRES (INCHES)

Foot Mtg.: A70-LR01∗S-60/6080/60950



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

Flange Mtg.: A90-FR01∗S-60/6080/60950



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

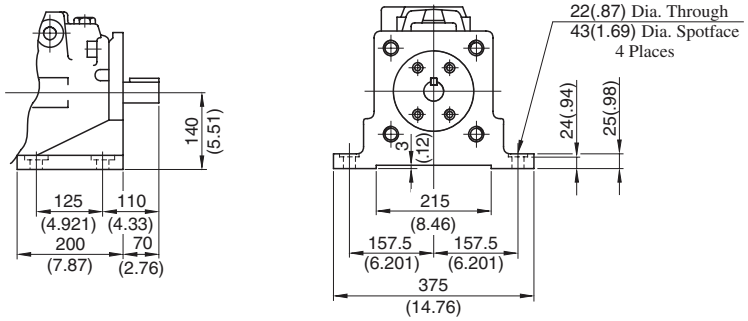
★2. Use either port of the two drain ports at your option. Keep the remaining port plugged.

★3. Case drain port is available for use when draining hydraulic fluid from pump casing.

Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	F mm (IN.)
A90-FR01∗S-60	Rc 3/4	M 12	M 10	19 (.75)
A90-FR01∗S-6080	3/4 BSP.F			
A90-FR01∗S-60950	SAE #12	1/2-13 UNC	7/16-14 UNC	21 (.83)

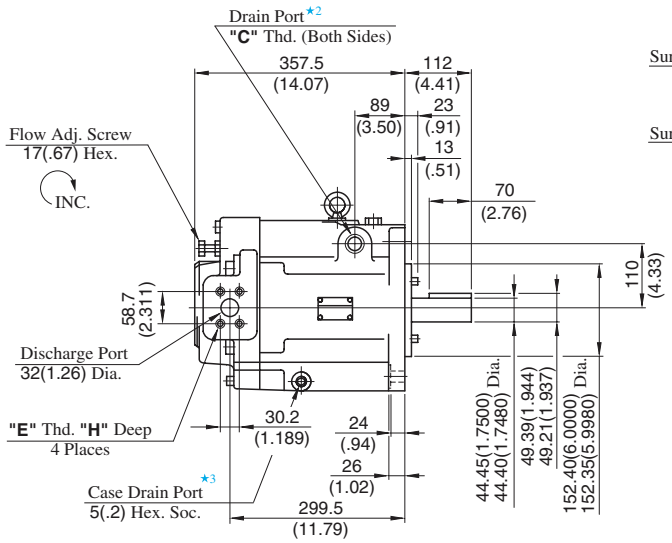
DIMENSIONS IN MILLIMETRES (INCHES)

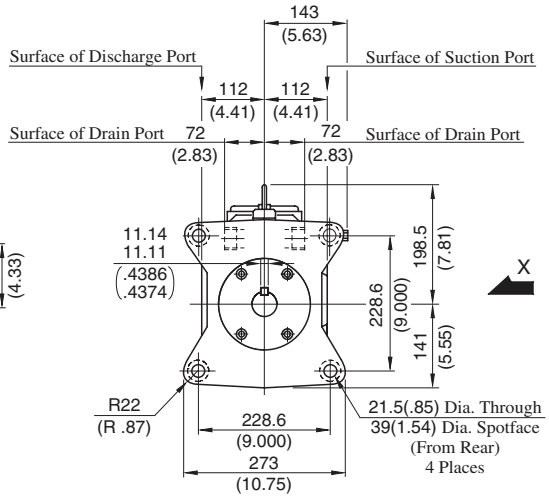
Foot Mtg.: A90-LR01∗S-60/6080/60950

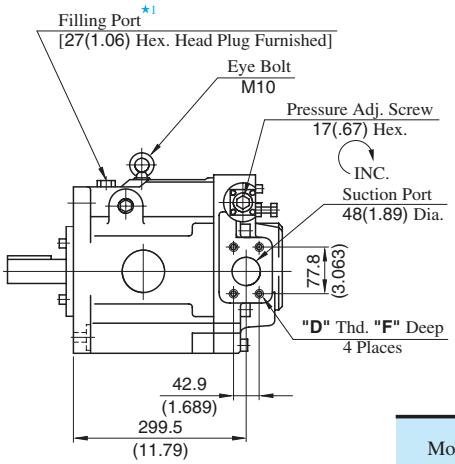


• For other dimensions, refer to "Flange Mtg.".

Flange Mtg.: A145-FR01∗S-60/6080/60950







View Arrow X

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

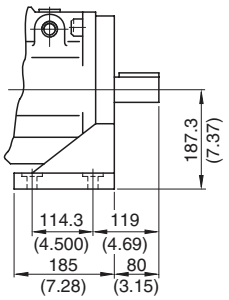
★2. Use either port of the two drain ports at your option. Keep the remaining port plugged.

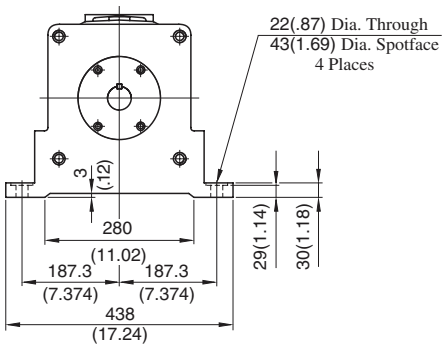
★3. Case drain port is available for use when draining hydraulic fluid from pump casing.

Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	Dimensions mm (IN.)	
				F	H
A145-FR01∗S-60	Rc 3/4	M 12	M 10	19 (.75)	19 (.75)
A145-FR01∗S-6080	3/4 BSP.F				
A145-FR01∗S-60950	SAE #12	1/2-13 UNC	7/16-14 UNC	21 (.83)	20 (.79)

DIMENSIONS IN MILLIMETRES (INCHES)

Foot Mtg.: A145-LR01∗S-60/6080/60950





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