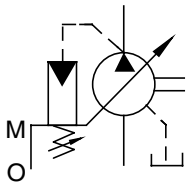
"A" Series Variable Displacement Piston Pumps – Single Pump, Pressure Compensator Type

Graphic Symbol



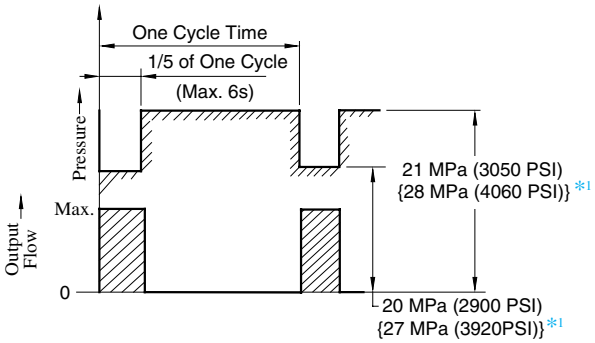
Specifications

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 Design Std. ★2	Japanese Std. "JIS" European Design Std.	N. American Design Std. ★2	Japanese Std. "JIS" European Design Std.	N. American Design Std. ★2
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.

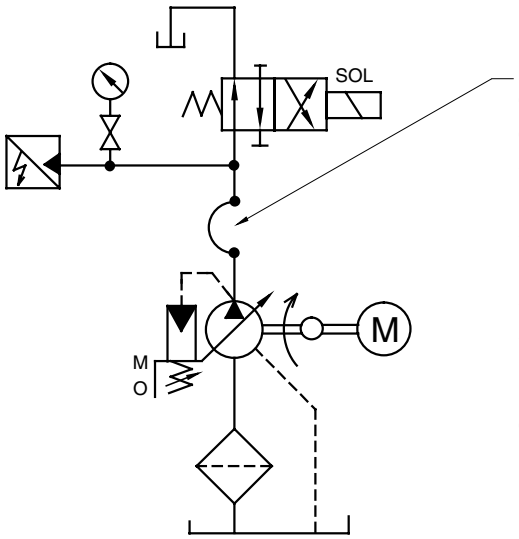
★2. As dimensions of the pipe flange mounting surface are conformed to SAE 4 Bolt Split Flange (Standard Pressure Series), pipe flanges conforming to the SAE Standards can be used.

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

Response Characteristics Change in Accordance with Circuits and Operating Conditions.

Test Circuit and Conditions

Circuit



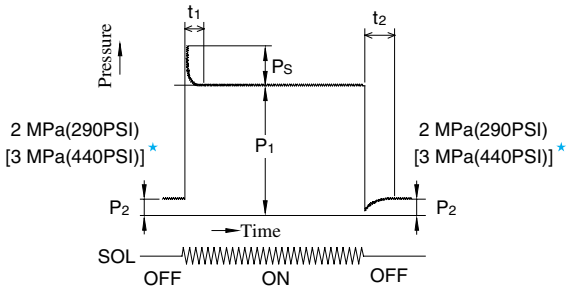
Conditions

Drive Speed : 1500 r/min
Hydraulic Fluid : ISO VG32 oil
Oil Temperature :A10-A56: 50 °C (122 °F) [Viscosity 20 mm^2/s (100 SSU)]
A70-A145: 40 °C (104 °F) [Viscosity 32 mm^2/s (150 SSU)]

High Pressure Rubber Hose

Model	Ruber Hose Size
A10	1/2" × 800 mm (2.6 ft.)
A16 A22	3/4" × 700 mm (2.3 ft.)
A37 A56	3/4" × 2000 mm (6.6 ft.)
A70	3/4" × 3500 mm (11.5 ft.)
A90 A145	3/4" × 3000 mm (9.8 ft.) + 1-1/4" × 2000 mm (6.6 ft.)

Result of Measurement



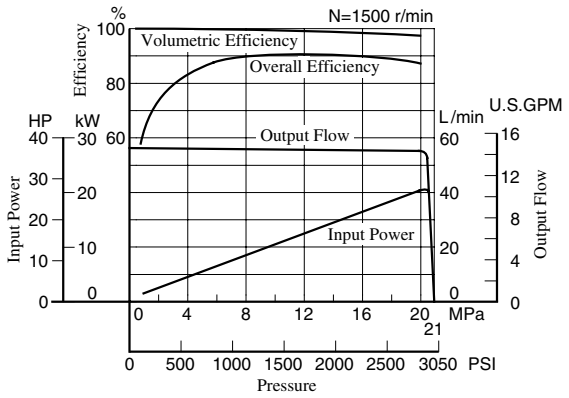
★ Applicable only for "A90/A145"

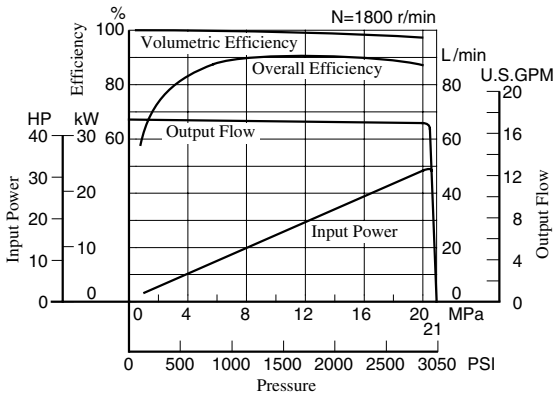
Model	Full Cut-off Pressure P_1 MPa (PSI)	Response Time ms		Overshoot Pressure P_S MPa (PSI)
		t_1	t_2	
A10	21 (3050)	100	75	2.6 (380)
A16	16 (2320)	38*	59*	3.6 (520)
A22	16 (2320)	30*	72*	5.9 (860)
A37	16 (2320)	40*	78*	7.8 (1130)
A56	16 (2320)	38*	88*	7.6 (1100)
A70	25 (3630)	80	100	7.8 (1130)
A90	25 (3630)	90	110	7.9 (1150)
A145	25 (3630)	100	150	8.8 (1280)

* Response time except A10, A70, A90 and A145 is measured Yoke travel.

Typical Performance Characteristics of Type "**A37**" at Viscosity 20 mm²/s (100 SSU) [ISO VG32 Oils, 50°C (122°F)]

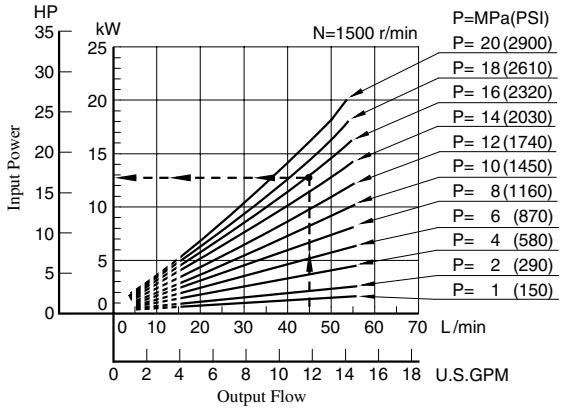
Performance Characteristic Curve

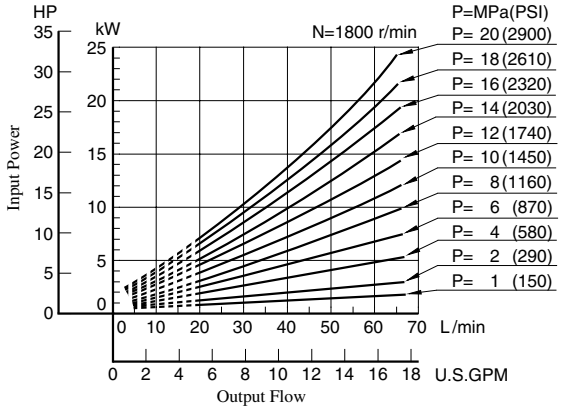




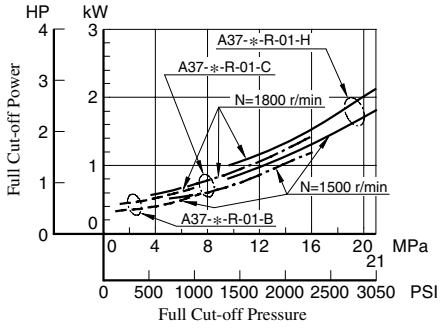
Input Power

Example: At a pressure of under 16 MPa (2320 PSI), a flow 45 L/min (11.9 U.S.GPM), and rotation 1500 r/min, the axial input becomes about 12.6 kW (16.9 HP) as shown the dotted line in the graph.

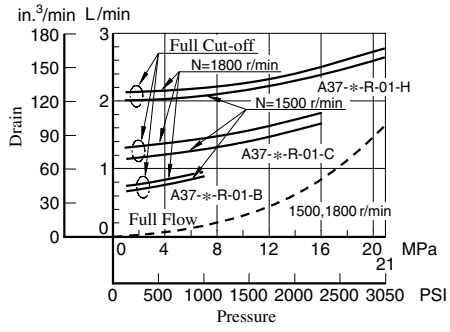




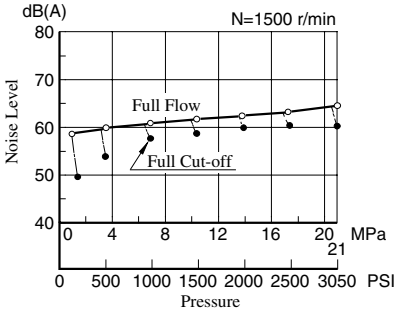
Full Cut-off Power

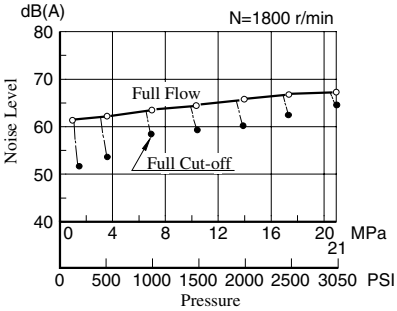


Drain



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

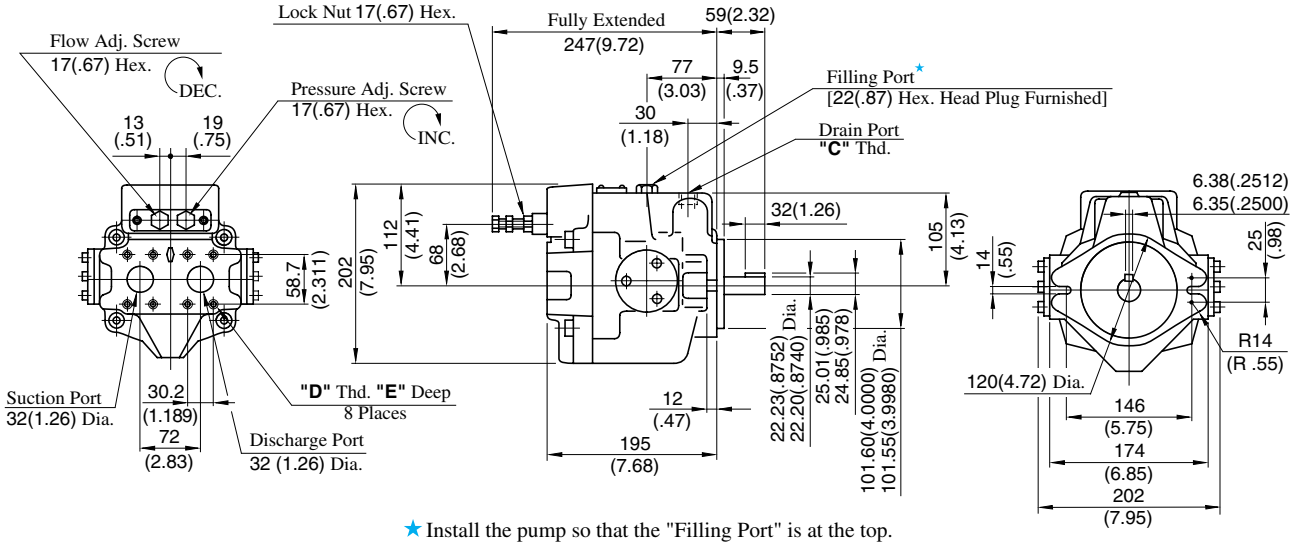




Axial Port Type

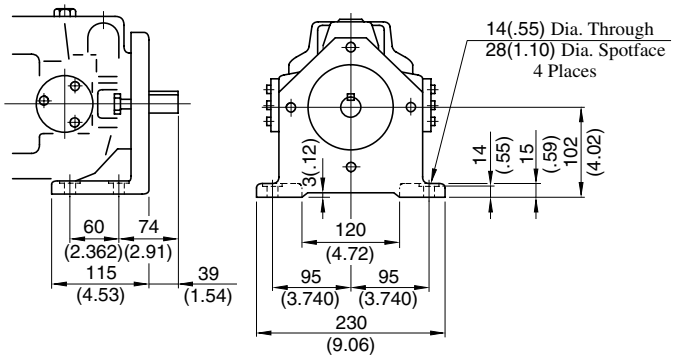
Flange Mtg.: A37-F-R-01-⁎-K-32/3280/32950

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

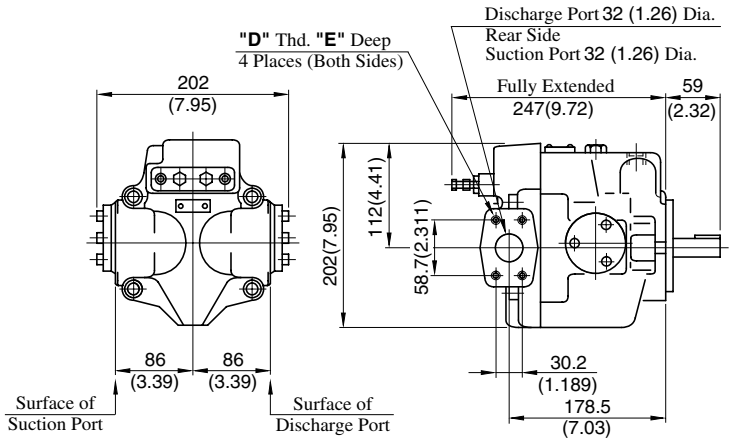


• For other dimensions, refer to "Flange Mtg.".

Side Port Type

DIMENSIONS IN MILLIMETRES (INCHES)

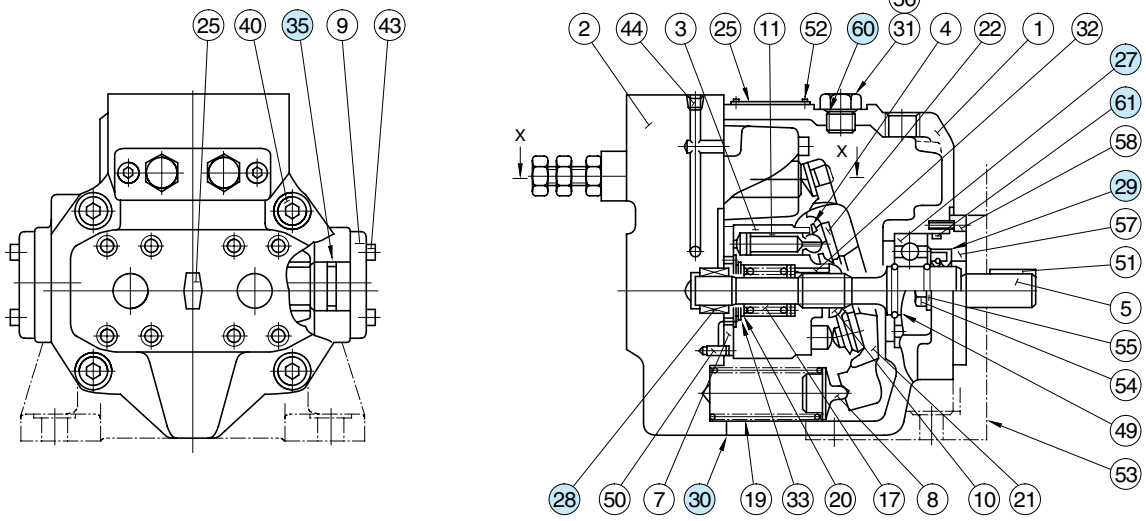
Flange Mtg.: A37-F-R-01-⁎-S-K-32/3280/32950

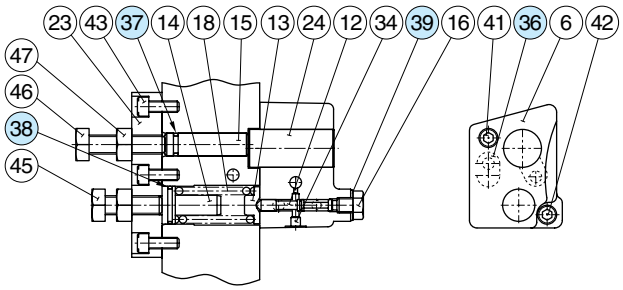


• For other dimensions, refer to "Axial Port Type".
• Foot Mtg. Type; Mounting bracket is common to that of "Axial Port Type".

Spare Parts List

A16/A22/A37/A56-∗-R-01-∗-∗-K-32/3280/32950





Section X-X

List of Seals and Bearings

Item	Name of Parts	Part Numbers				Qty.
		A16-∗-R-01	A22-∗-R-01	A37-∗-R-01	A56-∗-R-01	
27	Bearing	6305		6307	NUP 207E	1
28	Bearing	HMK 1715	Z30-1303-PK410300-8	HMK 2025V2	HMK 2530V2	1
29★	Oil Seal	TCN 254511		TCN 355511	TCN 355511	1
30★	Gasket	1303-PK211969-1		1316-PK211970-9	1307-PK211971-7	1
35★	O-Ring	SO-NA-G25		SO-NA-G30	SO-NA-P36	2
36★	O-Ring	SO-NB-P12		SO-NB-P10A		1
37★	O-Ring	SO-NB-P9				1
38★	O-Ring	SO-NA-A017				1
39★	Seal Washer	W8				1
60★	O-Ring	SO-NB-P14				1
61★	O-Ring	SO-NA-G55		SO-NA-G75		1

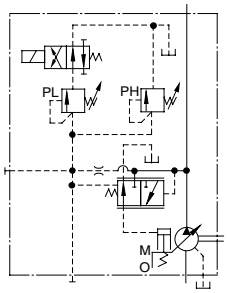
★When ordering seals, please specify the seal kit number from the table below.

List of Seal Kits

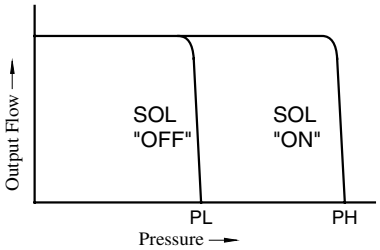
Pump Model Numbers	Seal Kit Numbers
A16-∗-R-01-∗-K-∗-32∗	KS-A16-01-32
A22-∗-R-01-∗-K-∗-32∗	
A37-∗-R-01-∗-K-∗-32∗	KS-A37-01-32
A56-∗-R-01-∗-K-∗-32∗	KS-A56-01-32

"A" Series Variable Displacement Piston Pumps – Single Pump, Solenoid Two Pressure Control Type

Graphic Symbol



Performance Characteristics



Specifications

Model Numbers	Geometric Displacement cm^3/rev (cu. in. /rev)	Minimum Adj. Flow cm^3/rev (cu. in. /rev)	Operating Pressure MPa (PSI)		Minimum Adj. Pres. MPa (PSI)	Shaft Speed Range r/min		Approx. Mass kg (lbs.)	
			Rated ★2	Intermittent ★1		Max.	Min.	Flange Mtg.	Foot Mtg.
A16-∗-R-02-∗-K∗-32∗	15.8 (.964)	4 (.244)	16 (2320)	21 (3050)	1.2 (170)	1800	600	24.5 (54.0)	26.7 (58.9)
A22-∗-R-02-∗-K∗-32∗	22.2 (1.355)	6 (.366)	16 (2320)	16 (2320)	1.2 (170)	1800	600	24.5 (54.0)	26.7 (58.9)
A37-∗-R-02-∗-K∗-32∗	36.9 (2.25)	10 (.61)	16 (2320)	21 (3050)	1.2 (170)	1800	600	36 (79.4)	40.3 (88.9)
A56-∗-R-02-∗-K∗-32∗	56.2 (3.43)	12 (.73)	16 (2320)	21 (3050)	1.2 (170)	1800	600	43 (94.8)	47.3 (104)
A70-∗R02S∗-60∗	70.0 (4.27)	30 (1.83)	25 (3630)	25 (3630)	2 (290)	1800	600	63.5 (140)	75.5 (166)
A90-∗R02S∗-60∗	91.0 (5.55)	56 (3.42)	25 (3630)	25 (3630)	2 (290)	1800	600	80.5 (178)	101 (223)
A145-∗R02S∗-60∗	145 (8.85)	83 (5.06)	25 (3630)	25 (3630)	2 (290)	1800	600	97.5 (215)	122.5 (270)

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

★2. When operating the pump exceeding the rated pressure, operating conditions are restricted. Refer to page 33 for the details.

Solenoid Ratings

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 345.

Model Number Designation

A16	-F	-R	-02	-S	-K	-A100	-32	✻
Series Number	Mounting	Direction of Rotation	Control Type	Port Position	Shaft Extension	Coil Type of Solenoid Valve	Design Number	Design Std.
A16 (15.8 cm^3/rev)	**F:** Flange Mtg.	(Viewed from Shaft End)	**02:** Solenoid Two Prsuure Control Type	**None:** Axial Port	**K:** Keyed Shaft	AC **A100, A120 A200, A240** DC **D12, D24 D48** R(AC→DC Rectified) **R100, R200**	**32**	Refer to★2
A22 (22.2 cm^3/rev)		**R:** Clockwise★1 (Normal)					**32**	
A37 (36.9 cm^3/rev)	**L:** Foot Mtg.			**S:** Side Port			**32**	
A56 (56.2 cm^3/rev)							**32**	

A70	-F	R	02	S	A100	-60	✻
Series Number	Mounting	Direction of Rotation	Control Type	Port Position	Coil Type of Solenoid Valve	Design Number	Design Std.
A70 (70.0 cm^3/rev)	**F:** Flange Mtg.	(Viewed from Shaft End)	**02:** Solenoid Two Prsuure Control Type	**S:** Side Port	AC **A100, A120 A200, A240** DC **D12, D24 D48** R(AC→DC Rectified) **R100, R200**	**60**	Refer to★2
A90 (91.0 cm^3/rev)		**R:** Clockwise★1 (Normal)				**60**	
A145 (145 cm^3/rev)	**L:** Foot Mtg.					**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

Performance Characteristics

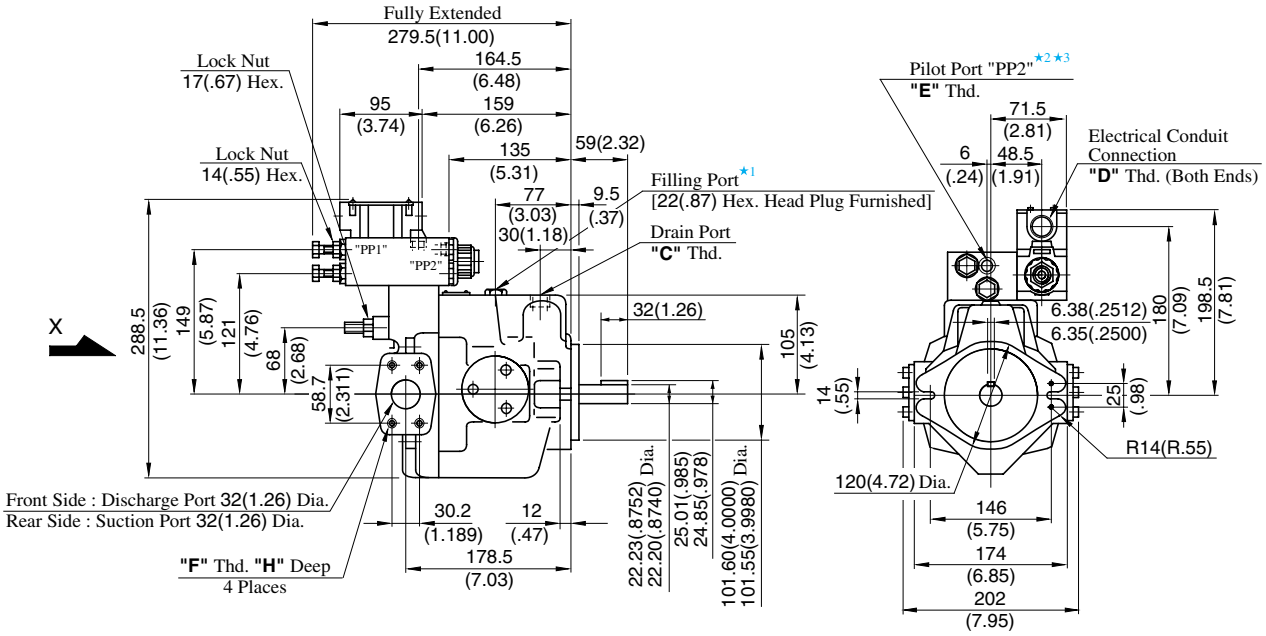
For performance characteristics, refer to models of pressure compensator type on page 37 to 43.

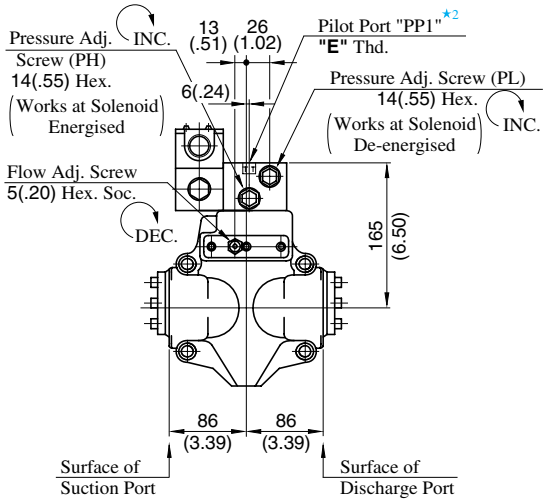
Pipe Flange Kits

For pipe flange, refer to form of pressure compensator type on page 34.

Side Port Type

Flange Mtg. : A37-F-R-02-S-K-✻-32/32950





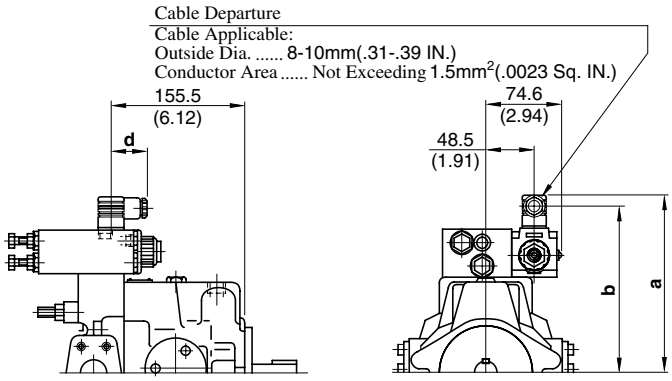
View Arrow X

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

★2. The pilot port provided is for connecting a control valve, if multistage pressure control is required.

★3. The pilot port "PP2" is not provided for N.American Design Standard.

A37-F-R-02-S-K-✻-3280



Model Numbers	mm (IN.)		
	a	b	d
A37-F-R-02-S-K-A✻-3280	197 (7.76)	185 (7.28)	39 (1.54)
A37-F-R-02-S-K-D✻-3280	208 (8.19)	196 (7.72)	39 (1.54)
A37-F-R-02-S-K-R✻-3280	211 (8.31)	189.2 (7.45)	53 (2.09)

• For other dimensions, refer to 32/32950 design.

Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	"F" Thd.	"H" mm (IN.)
A37-F-R-02-S-K-✻-32	Rc 1/2	G 1/2	Rc 1/4	M10	19 (.75)
A37-F-R-02-S-K-✻-3280	1/2 BSP.F	—	1/4 BSP. Tr		
A37-F-R-02-S-K-✻-32950	SAE #10	1/2 NPT	SAE #4	7/16-14 UNC	20 (.79)

DIMENSIONS IN MILLIMETRES (INCHES)

● **Axial Port Type**

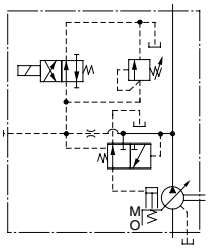
Port mounting dimensions are the same as those of pressure compensator model.
Refer to page 46 for port mounting dimensions.

● **Foot Mounting Type**

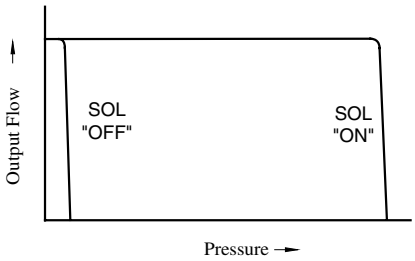
Mounting bracket is common to that of pressure compensator model.
Refer to page 46 for the dimensions of mounting bracket.

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

Graphic Symbol



Performance Characteristics



Specifications

Model Numbers	Geometric Displacement cm^3/rev (cu. in. /rev)	Minimum Adj. Flow cm^3/rev (cu. in. /rev)	Operating Pressure MPa (PSI)		Unloading Pressure MPa (PSI)	Shaft Speed Range r/min	
			Rated	Intermittent		Max.	Min.
A16-∗-R-03-∗-K-∗-32∗	15.8 (.964)	4 (.244)	16 (2320)	21 (3050)	1.2 (170)	1800	600
A22-∗-R-03-∗-K-∗-32∗	22.2 (1.355)	6 (.366)	16 (2320)	16 (2320)	1.2 (170)	1800	600
A37-∗-R-03-∗-K-∗-32∗	36.9 (2.25)	10 (.61)	16 (2320)	21 (3050)	1.2 (170)	1800	600
A56-∗-R-03-∗-K-∗-32∗	56.2 (3.43)	12 (.73)	16 (2320)	21 (3050)	1.2 (170)	1800	600
A70-∗R03S∗-60∗	70.0 (4.27)	30 (1.83)	25 (3630)	25 (3630)	1.2 (170)	1800	600
A90-∗R03S∗-60∗	91.0 (5.55)	56 (3.42)	25 (3630)	25 (3630)	1.2 (170)	1800	600
A145-∗R03S∗-60∗	145 (8.85)	83 (5.06)	25 (3630)	25 (3630)	1.2 (170)	1800	600

Model Number Designation

A16	-F	-R	-03	-S	-K	-A100	-32	∗
Series Number	Mounting	Direction of Rotation	Control Type	Port Position	Shaft Extension	Coil Type of Solenoid Valve	Design Number	Design Std.
A16 (15.8 cm^3/rev)	**F:** Flange Mtg.	(Viewed from Shaft End)	**03:** Pressure Compensator with Unloading Type	**None:** Axial Port	**K:** Keyed Shaft	AC **A100,A120 A200,A240** DC **D12,D24 D48** R(AC→DC Rectified) **R100,R200**	**32**	Refer to★2
A22 (22.2 cm^3/rev)							**32**	
A37 (36.9 cm^3/rev)	**L:** Foot Mtg.	**R:** Clockwise★1 (Normal)		**S:** Side Port			**32**	
A56 (56.2 cm^3/rev)							**32**	

A70	-F	R	03	S	A100	-60	∗
Series Number	Mounting	Direction of Rotation	Control Type	Port Position	Coil Type of Solenoid Valve	Design Number	Design Std.
A70 (70.0 cm^3/rev)	**F:** Flange Mtg.	(Viewed from Shaft End)	**03:** Pressure Compensator with Unloading Type	**S:** Side Port	AC **A100,A120 A200,A240** DC **D12,D24 D48** R(AC→DC Rectified) **R100,R200**	**60**	Refer to★2
A90 (91.0 cm^3/rev)						**60**	
A145 (145 cm^3/rev)	**L:** Foot Mtg.	**R:** Clockwise★1 (Normal)				**60**	

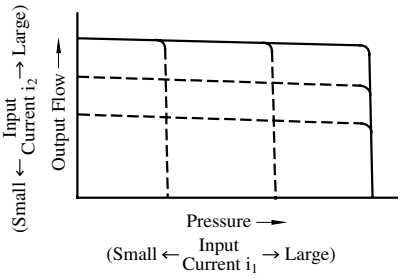
★1. Available to supply pump with anti-clockwise rotation. Consult Yuken for details.

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

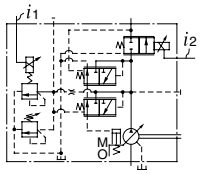
Consult Yuken when detailed material such as dimensions figures is required.

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

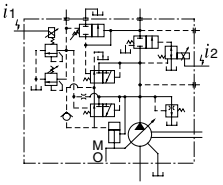
Performance Characteristics



Graphic Symbols



A16/A22/A37/A56



A70/A90/A145

Model Number Designation

A56	-F	-R	-04	-C	-K	-32	✻
Series Number	Mounting	Direction of Rotation	Control Type	Pressure Adj. Range MPa (PSI)	Shaft Extension	Design Number	Design Std.
A16 (15.8 cm^3/rev)	**F:** Flange Mtg. **L:** Foot Mtg.	(Viewed from Shaft End) **R:** Clockwise ★1	**04:** Proportional Electro-Hydraulic Load Sensing Type	**B:** 1.5 - 6.9 (220 - 1000) **C:** 1.5 - 15.7 (220 - 2280) **H:** 1.5 - 20.6 (220 - 2990)	**K:** Keyed Shaft	**32**	Refer to ★2
A22 (22.2 cm^3/rev)				**B:** 1.5 - 6.9 (220 - 1000) **C:** 1.5 - 15.7 (220 - 2280)		**32**	
A37 (36.9 cm^3/rev)				**B:** 2 - 6.9 (290 - 1000) **C:** 2 - 15.7 (290 - 2280) **H:** 2 - 20.6 (290 - 2990)		**32**	
A56 (56.2 cm^3/rev)						**32**	

A70	-F	R	04	C	S	-60	✻
Series Number	Mounting	Direction of Rotation	Control Type	Pressure Adj. Range MPa (PSI)	Port Position	Design Number	Design Std.
A70 (70.0 cm^3/rev)	**F:** Flange Mtg. **L:** Foot Mtg.	(Viewed from Shaft End) **R:** Clockwise ★1	**04:** Proportional Electro-Hydraulic Load Sensing Type	**C:** 1.5 - 16 (220 - 2320) **H:** 1.5 - 21 (220 - 3050)	**S:** Side Port	**60**	Refer to ★2
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

• Consult Yuken when "N. American Design Standard" is required.

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 Standard "JIS"	European Design Standard	Japanese Standard "JIS" & European Design Standard	Japanese Standard "JIS" & European Design Standard
A16-∗-R-04 A22-∗-R-04	Suction	F5-06-A-10	F5-06-A-1080	F5-06-B-10	F5-06-C-10
	Discharge	—★2	—★2	—★2	—★2
A37-∗-R-04 A56-∗-R-04	Suction	F5-10-A-10	F5-10-A-1080	F5-10-B-10	F5-10-C-10
	Discharge	F5-06-A-10	F5-06-A-1080	F5-06-B-10	F5-06-C-10
A70-∗R04	Suction	F5-12-A-10	F5-12-A-1080	F5-12-B-10	F5-12-C-10
	Discharge	F5-10-A-10	F5-10-A-1080	F5-10-B-10	F5-10-C-10
A90-∗R04 A145-∗R04	Suction	F5-16-A-10	F5-16-A-1080	F5-16-B-10	F5-16-C-10
	Discharge	F5-10-A-10	F5-10-A-1080	F5-10-B-10	F5-10-C-10

★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 attension to the operating pressure when the socket welding flanges are used.

★2. Discharge port for pump model "A16" and "A22" is available only the threaded connections.

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

Instructions

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

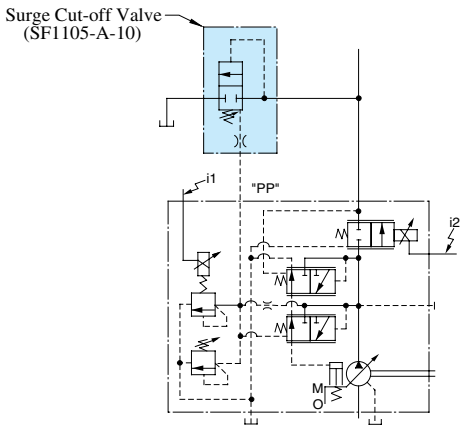
Manual adjustment screws may be used for initial running adjustment or in case of electrical failures in order to adjust pressure and flow temporarily. In case of normal use, put the manual adjustment screws back in their preset positions.

Position of Cable Departure

Position of cable departure can be changed. For details, refer to EDG-01 valve on page 672.

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 of detail of surge cut-off valve.



Specifications

Descriptions \ Model No.			A16	A22	A37	A56	A70	A90	A145
Geometric Displacement		cm^3/rev (cu. in./rev)	15.8 (.964)	22.2 (1.355)	36.9 (2.25)	56.2 (3.43)	70.0 (4.27)	91.0 (5.55)	145 (8.85)
Operating Pressure MPa (PSI)		Rated ★2	16 (2320)	16 (2320)	16 (2320)	16 (2320)	21 (3050)	21 (3050)	21 (3050)
		Intermittent ★1	21 (3050)	16 (2320)	21 (3050)	21 (3050)	21 (3050)	21 (3050)	21 (3050)
Shaft Speed Range r/min		Max.	1800	1800	1800	1800	1800	1800	1800
		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 - 126 (.26 - 33.3)	1 - 163 (.26 - 43.1)	2 - 261 (.53 - 69.0)
	Min Pres. Required for Flow Adj.	MPa (PSI)	1.5 (220)	1.5 (220)	1.5 (220)	2.0 (290)	1.0 (145)	1.0 (145)	1.0 (145)
	Differential Pres. (Discharge Pres. -Load Pres.)	MPa (PSI)	0.37 (55)				0.22 (30)		
	Step Response ★5 (0 → Max. Flow)	ms	70	80	120	125	100	120	210
	Hysteresis		3% or less ★4						
	Rated Current	mA	900	700	740	790	820	920	920
	Coil Resistance [20°C (68°F)]		10						
Pres. Control	Pres. Adj. Range	MPa (PSI)	Refer to Model Number Designation						
	Step Response ms	t_1 ★5	80	80	50	55	150	150	160
		t_2 ★5	140	90	80	80	80	120	180
	Hysteresis		2% or less ★4						
	Rated Current	mA	(Pres. Adj. Range) B: 770, C:880, H:790				C: 860 H: 765	C: 873 H: 765	C: 875 H: 755
	Coil Resistance [20°C (68°F)]	Ω	10						
Applicable Amplifier Model ★3			AME-D2-1010-∗-10						
Approx. Mass kg (lbs.)	Flange Mtg.		32 (70.6)	32 (70.6)	38 (83.8)	45 (99.2)	72.5 (160)	88.5 (195)	109.5 (241)
	Foot Mtg.		34.2 (75.4)	34.2 (75.4)	43.2 (95.3)	49.3 (109)	84.5 (186)	109 (240)	134.5 (297)

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

★2. When operating the pump exceeding the rated pressure, operating conditions are restricted. Refer to page 33 for the details.

★3. For detail specifications of power amplifiers, refer to page 780.

★4. The figure mentioned in the above table are those obtained using Yuken's amplifier.

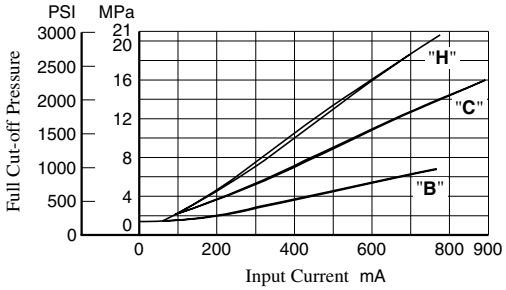
★5. Step response depends on circuit and operating conditions. Data shown in the table above is an example based on the condition right.

Model	Pres. Step Response		Loading Volume
	t_1	t_2	
A16, A22	1.5 → 16 MPa (220 → 2320 PSI)	16 → 1.5 MPa (2320 → 220 PSI)	High Pressure Hose 3/8" × 2 m (6.6 ft)
A37, A56	2.0 → 16 MPa (290 → 2320 PSI)	16 → 2.0 MPa (2320 → 290 PSI)	High Pressure Hose 3/4" × 2 m (6.6 ft)
A70, A90 A145	3.0 → 16 MPa (435 → 2320 PSI)	16 → 3.0 MPa (2320 → 435 PSI)	High Pressure Hose 1-1/4" × 2 m (6.6 ft)

Typical Performance Characteristics at Viscosity 20 mm²/s (100 SSU) [ISO VG32 Oils, 50°C (122°F)]

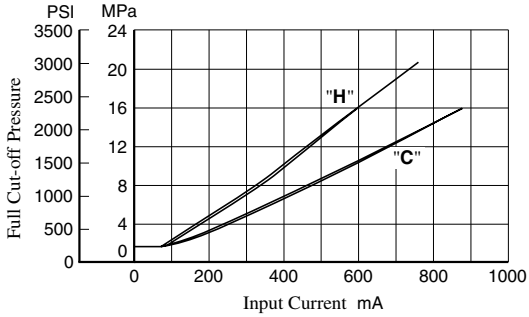
Full Cut-off Pres. vs. Input Current

A16/A22/A37/A56



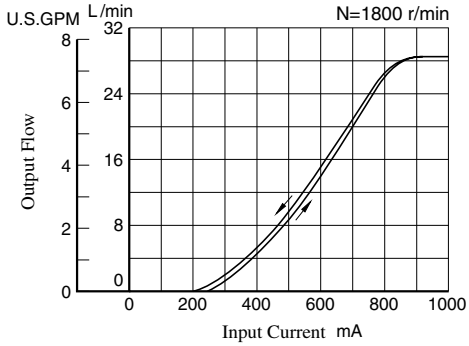
Note: Pressure adjustment range "H" is not available for A22.

A70/A90/A145

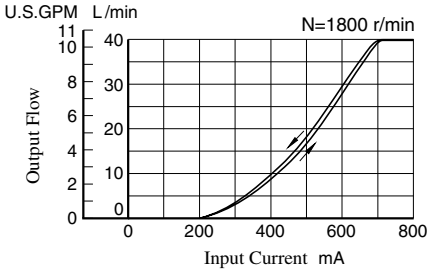


Output Flow vs. Input Current

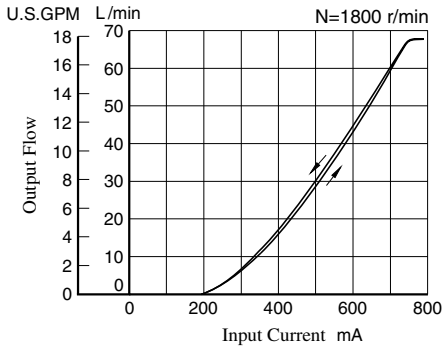
A16



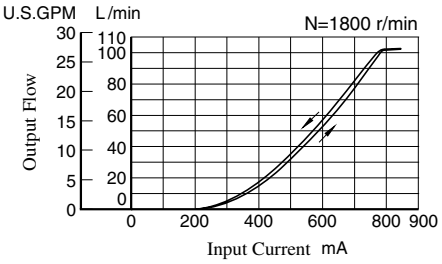
A22



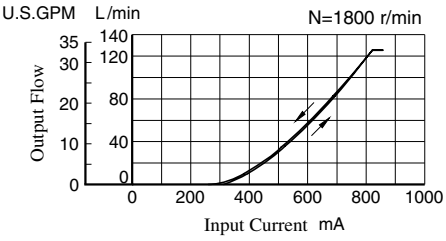
A37



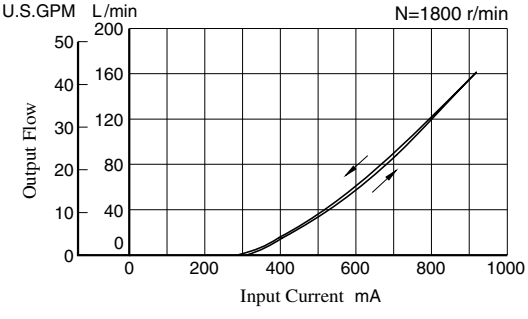
A56



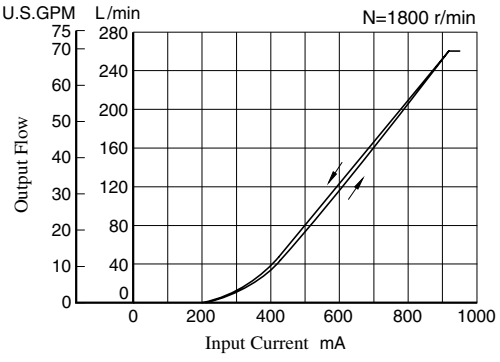
A70



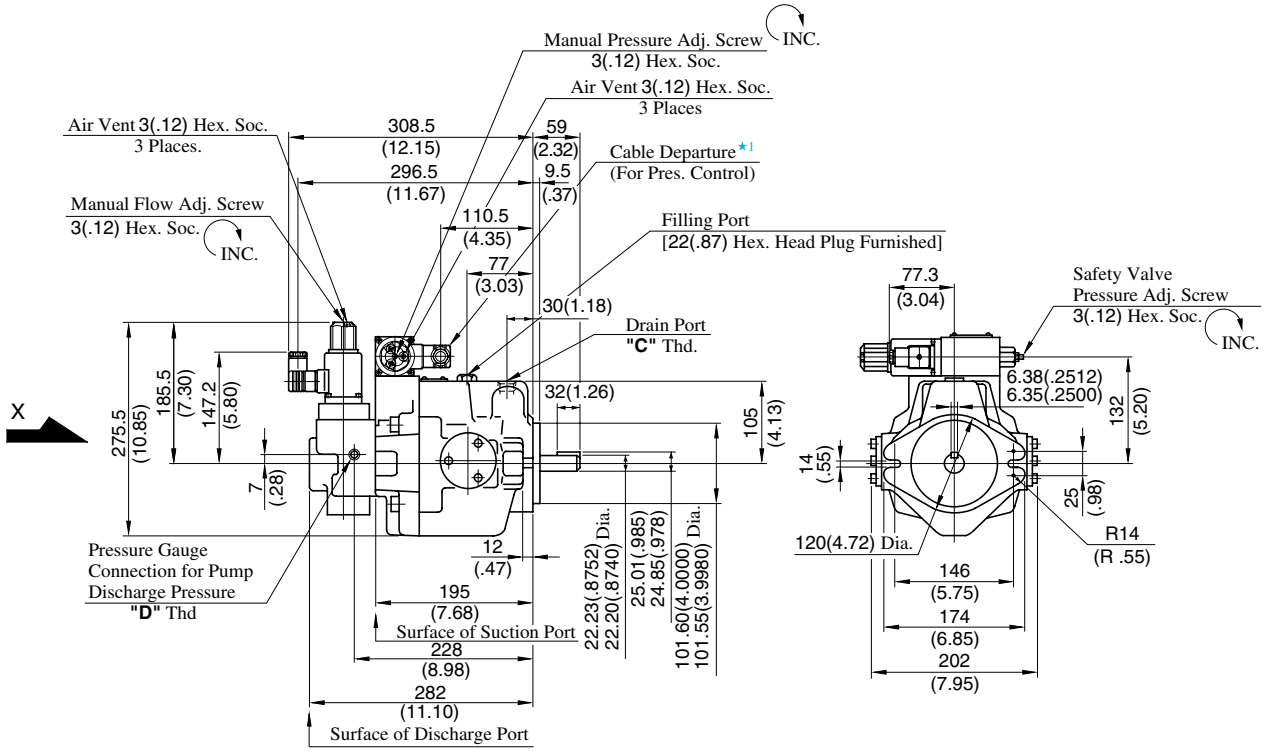
A90

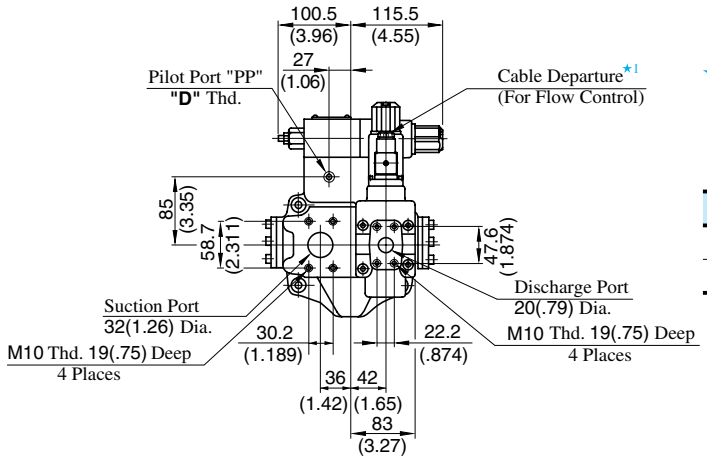


A145



Flange Mtg. : A37-F-R-04-⁎-K-32/3280





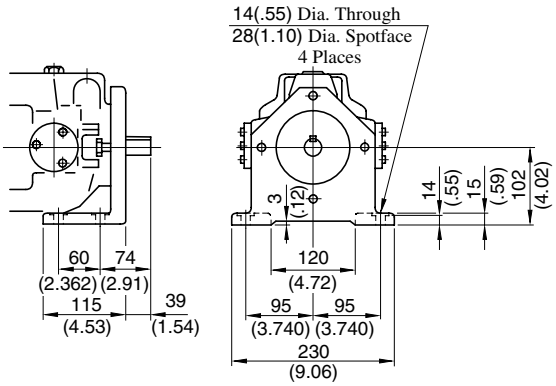
View Arrow X

★1. Cable Applicable:
Outside Dia.....8-10 mm (.31-.39 IN.)
Conductor Area.....Not Exceeding 1.5 mm^2 (.0023 Sq. IN.)

Model Numbers	"C" Thd.	"D" Thd.
A37-F-R-04-⁎-K-32	Rc 1/2	Rc 1/4
A37-F-R-04-⁎-K-3280	1/2 BSP.F	1/4 BSP.Tr

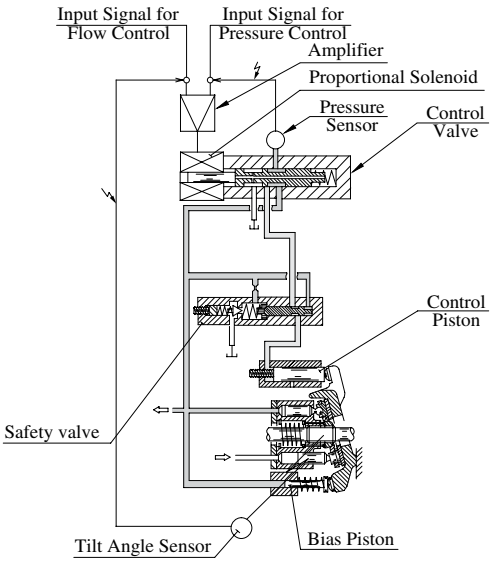
DIMENSIONS IN MILLIMETRES (INCHES)

Foot Mtg. : A37-L-R-04-⁎-K-32/3280

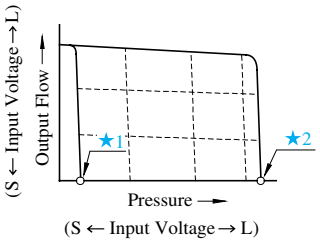


• For other dimensions, refer to "Flange Mtg.".

"A" Series Variable Displacement Piston Pumps – Single Pump, Electro-Hydraulic Proportional pressure & Flow Control Type



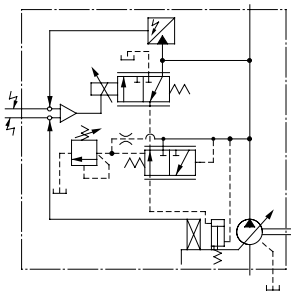
Performance Characteristics



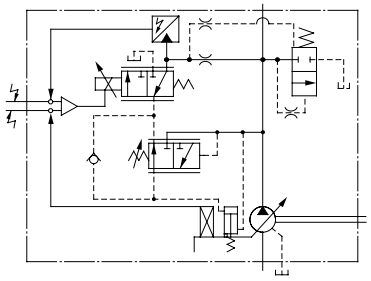
★1. Unloading pressure when input signal is 0 V.

★2. Safety valve setting pressure

Graphic Symbols



A16/A22/A37/A56



A70/A90/A145

Model Number Designation

A70	-F	R	04E	16	M	A	-60	-60	✻
Series Number	Mounting	Direction of Rotation	Control Type	Control Pressure at Input Signal is 5 V	Unit of Control Pressure	Type of ★2 Outboard Pump	Compensation Number ★3	Design Number	Design Std.
A16 (15.8 cm³/rev)	**F:** Flange Mtg.	(Viewed from Shaft End)	**04E:** Proportional Pressure & Flow Control Type	Use the same measure of the control pressure as shown on the right, 6.9 MPa specify within the range of maximum operating pressure	**M:** MPa **P:** PSI	—	**06**	**42**	Refer to ★4
A22 (22.2 cm³/rev)							**11**	**42**	
A37 (36.9 cm³/rev)						**None** ★2	**01**	**42**	
A56 (56.2 cm³/rev)							**02**	**42**	
A70 (70.0 cm³/rev)	**L:** Foot Mtg.	**R:** Clockwise (Normal) ★1				**A:** ★2 **B:** ★2	**60**	**60**	
A90 (91.0 cm³/rev)							**60**	**60**	
A145 (145.0 cm³/rev)							**60**	**60**	

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

★2. These pumps, except A16 and A22 types, can be connected to outboard pumps.
- A37/A56 type (outboard pump connection symbol: **None**): spigot diameter: 82.55 mm (3.250 in.) (A16, A22, and PV2R1).
- A70/A90/A145 type (outboard pump connection symbol: **"A"**): spigot diameter:82.55 mm (3.250 in.) (A16, A22, and PV2R1).
- A70/A90/A145 type (outboard pump connection symbol: **"B"**): spigot diameter:101.6 mm (4.000 in.)(A37 and PV2R2).

★3. Amplifier Compensation Number may differ according to the main machine conditions. Consult Yuken for detail.

★4. Design Standards: None ..... Japanese Standard "JIS"
80 ..... European Design Standard

• Consult Yuken when "N. American Design Standard" is required.

Specifications

Descriptions \ Model Numbers			A16	A22	A37	A56	A70	A90	A145
Geometric Displacement		cm^3/rev (cu. in./rev)	15.8 (.964)	22.2 (1.355)	36.9 (2.25)	56.2 (3.43)	70.0 (4.27)	91.0 (5.55)	145.0 (8.85)
Operating Pressure MPa (PSI)		Rated ★2	16 (2320)	16 (2320)	16 (2320)	16 (2320)	25 (3630)	25 (3630)	25 (3630)
		Intermittent ★1	21 (3050)	16 (2320)	21 (3050)	21 (3050)	28 (4060)	28 (4060)	28 (4060)
Shaft Speed Range		r/min	600 - 1800						
Flow Control	Max. Flow ★3	L/min (U.S. GPM)	28.4 (7.5)	40.0 (10.6)	66.4 (17.5)	101.0 (26.7)	126.0 (33.3)	163.0 (43.1)	261.0 (69.0)
	Min. Pres. Required for Flow Adj.	MPa (PSI)	2.0 (290) ★4						
	Hysteresis		1 % or less						
	Repeatability		1 % or less						
	Input Signal		Max. Flow / 5 V DC						
Pressure Control	Min. Adjustment Pressure	MPa (PSI)	0.7 (100)						
	Hysteresis		1 % or less						
	Repeatability		1 % or less						
	Input Signal		Specified Control Pressure / 5 V DC						
Coil Resistance		[@ 20°C (68 °F)]	10						
Input Impedance			Flow Control : 10 kΩ Pressure Control : 10 kΩ						
Supply Electric Power			24 V DC (21 - 28 V Included Ripple)						
Power Input (Max.)		W	30						
Output Signal		Flow	5 V DC/Max. Flow						
		Pressure	5 V DC/Specified Control Pressure						
Alarm Signal Output (Open Collector)			Voltage : Max. 30 V DC Current : Max. 40 mA						
Ambient Temperature		°C (°F)	0 - 50 (32 - 122) (With Circulated Air)						
Approx. Mass kg (lbs.)		Flange Mtg.	20.5 (45.2)	20.5 (45.2)	32.0 (70.6)	39.0 (86.0)	64.0 (141)	76.5 (169)	96.4 (213)
		Foot Mtg.	22.7 (50.1)	22.7 (50.1)	36.3 (80.0)	43.3 (95.5)	76.0 (168)	97.0 (214)	121.4 (268)

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

★2. When operating the pump exceeding the rated pressure, operating conditions are restricted.
Refer to page 33 for the details.

★3. Maximum flow differs to shaft speed.
The value listed above indicates shaft speed of 1800 r/min.
For other shaft speed calculate by the ratio of shaft speed.

★4. To secure the required minimum pressure, special sequence valves are available, to be directly installed at the discharge port of the pump. Consult Yuken for details.

Pipe Flange Kits

For Pipe flange, refer to form of pressure compensator type on page 34.

Instructions

- **Input Signal**

  The pump is on unload condition when the pump is operated without input signal voltage.

- **Electric Source**

  Always turn off electric source whenever the connector for swash plate tilt angle sensor is removed.

- **Compensation of Pump Maximum Regulated Flow at Frequency**

  If the same maximum flow is required at 50 Hz or 60 Hz, connect short plug in the amplifier to 60 Hz at the place where supplied frequency is 60 Hz. At this condition, maximum flow comes to the same value at 50 Hz.
  If short plug is used at 60 Hz without making the change, maximum flow increased in proportion to frequency.

- **Painting on Amp. Box and Solenoid**

  To maintain suitable radiation effect, the amp. Box and the solenoid of the control valve should not be painted.

Outboard Pumps

A37 to A145 type pumps, except A16 and A22, can be used as double pumps, by connecting an outboard pump on the cover side. See the table below for details.

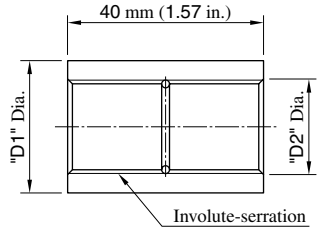
Connectable Outboard Pump

Outboard Pump Connection Symbol		Spigot Diameter for Connecting an Outboard Pump mm (in.)	Connectable Pump★
A37/A56	**None**	82.55 (2.500)	A16, A22, PV2R1
	"A"		
A70/A90/A145	**"B"**	101.6 (4.000)	A37, PV2R2

★ Connectable pumps shafts are involute-serrated design, not the standard parallel key slot design. For details, including pump dimensions and model numbers, consult Yuken.

Coupling

Please use assembly part number when ordering coupling assemblies for shaft connections to outboard pumps.



Outboard Pump Connection Symbol		Part Number of Coupling Ass'y	Dimensions mm (in.)		Serration Size (Nominal Dia.× No. of Teeth× Mojule)
			"D_1"	"D_2"	
A37/A56	**None**	098-PK412588-6	27 (1.06)	19.5 (.77)	18.75×24×0.75
	"A"				
A70/A90/A145	**"B"**	098-PK412623-1	36 (1.42)	26 (1.02)	25×24×1

Selecting an Outboard Pump Type

The maximum torque of outboard pumps is limited by shaft and coupling assembly strength. When determining the outboard pump type, the value of the displacement times the pressure for a particular pump should not exceed the value shown in the table below.

Pump Model No.	① Inboard Pump and Outboard Pump ($q_1\times P_1)+(q_2\times P_2$)	② Outboard Pump $q_2\times P_2$	
		Outboard pump connection symbol	
		"None"/"A"	**"B"**
A37	900(7963) and less	519(4592) and less	—
A56	1742(15413) and less		
A70	2408(21305) and less		935(8272) and less
A90	4348(38470) and less		977(8644) and less
A145	4739(41930) and less		951(8414) and less

- q_1, q_2 : Displacement cm^3/rev (cu.in./rev)
  P_1, P_2 : Pressure MPa (PSI)
- For selection of the appropriate pump, both values, ① and ②, should be satisfied.

Attachment

Amplifier

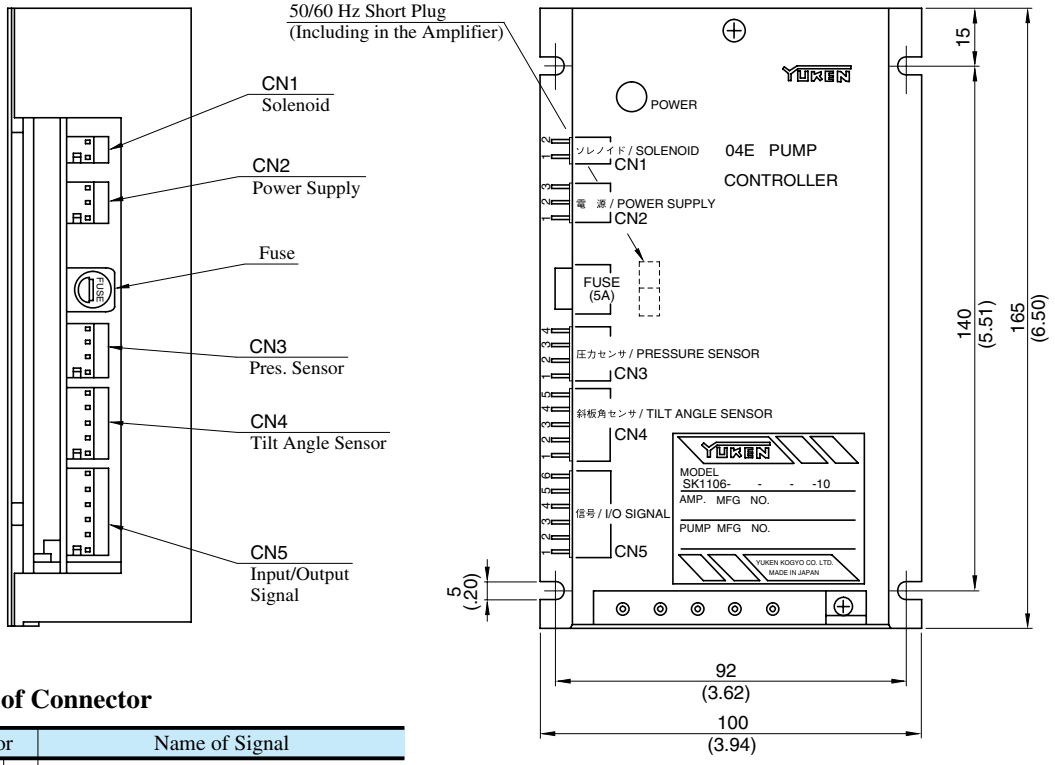
Pump Model Numbers	Amplifier Model Numbers	Control Pressure MPa (PSI)
A16-∗R04E★-06-42	SK1106-★-16-06-10	– 14.7 (– 2132)
	SK1106-★-16-06-1001	14.7 – 19.6 (2132 – 2842)
	SK1106-★-16-06-1002	19.6 – 21.0 (2842 – 3045)
A22-∗R04E★-11-42	SK1106-★-22-11-10	– 14.7 (– 2132)
	SK1106-★-22-11-1001	14.7 – 16.0 (2132 – 2320)
A37-∗R04E★-60-42	SK1106-★-37-60-10	– 14.7 (– 2132)
	SK1106-★-37-60-1001	14.7 – 19.6 (2132 – 2842)
	SK1106-★-37-60-1002	19.6 – 21.0 (2842 – 3045)
A56-∗R04E★-60-42	SK1106-★-56-60-10	– 14.7 (– 2132)
	SK1106-★-56-60-1001	14.7 – 19.6 (2132 – 2842)
	SK1106-★-56-60-1002	19.6 – 21.0 (2842 – 3045)
A70-∗R04E★∗-60-60	SK1106-★-70-60-10	– 14.7 (– 2132)
	SK1106-★-70-60-1001	14.7 – 19.6 (2132 – 2842)
	SK1106-★-70-60-1002	19.6 – 22.6 (2842 – 3277)
	SK1106-★-70-60-1003	22.6 – (3277 –)
A90-∗R04E★∗-60-60	SK1106-★-91-60-10	– 14.7 (– 2132)
	SK1106-★-91-60-1001	14.7 – 19.6 (2132 – 2842)
	SK1106-★-91-60-1002	19.6 – 22.6 (2842 – 3277)
	SK1106-★-91-60-1003	22.6 – (3277 –)
A145-∗R04E★∗-60-60	SK1106-★-145-60-10	– 14.7 (– 2132)
	SK1106-★-145-60-1001	14.7 – 19.6 (2132 – 2842)
	SK1106-★-145-60-1002	19.6 – 22.6 (2842 – 3277)
	SK1106-★-145-60-1003	22.6 – (3277 –)

Note 1. The symbol "★", shown with pump and amplifier model numbers, is the control pressure at input signal of 5 V.
2. Cable for pump-amplifier connection is not included. See Page 85 for details on ordering cables.

Amplifiers for Electro-Hydraulic Proportional Pressure & Flow Control Type Pumps (SK1106-★-∗-∗-10∗∗)

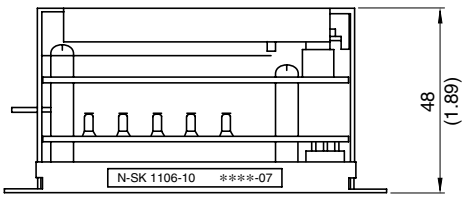
Specifications

Description \ Model No.	SK1106-★-∗-∗-10∗∗
Applicable Coil Resistance	10 Ω [at 20 °C (68 °F)]
Input Impedance	10 kΩ (PIN, QIN)
Power Supply	24 V DC (21 - 28 V Included Ripple)
Power Input (Max.)	30 W
Input Signal	Max. Flow/5V (QIN), Specified Pres./5V (PIN)
Output Signal for Sensor Monitor	5V/Max. Flow (SMQ), 5V/Specified Pres. (SMP)
Ambient Temperature	0 - 50 °C (32 - 122 °F)
Approx. Mass	450 g (1.0 lbs.)



Detail of Connector

Connector		Name of Signal	
CN1 Solenoid	1	Output to pilot valve solenoid	
	2		
CN2 Power Supply	1	0 [V]	(0V)
	2	+24 [V]	(24V)
	3	0 [V]	
CN3 Pres. Sensor	1	+5 [V]	Power Supply for Sensor
	2	0 [V]	
	3	Input Signal - Sensor	
	4	0 [V]	
CN4 Tilt Angle Sensor	1	+8 [V]	Power Supply for Sensor
	2	0 [V]	
	3	Input Signal - Sensor	
	4	0 [V]	
	5	—	
CN5 Input/ Output Signal	1	Input Signal - Flow	(Qin)
	2	Input Signal - Common	(COM)
	3	Input Signal - Pres.	(Pin)
	4	Output Signal - Sensor Monitor P	(SMP)
	5	Output Signal - Sensor Monitor Q	(SMQ)
	6	0 [V]	

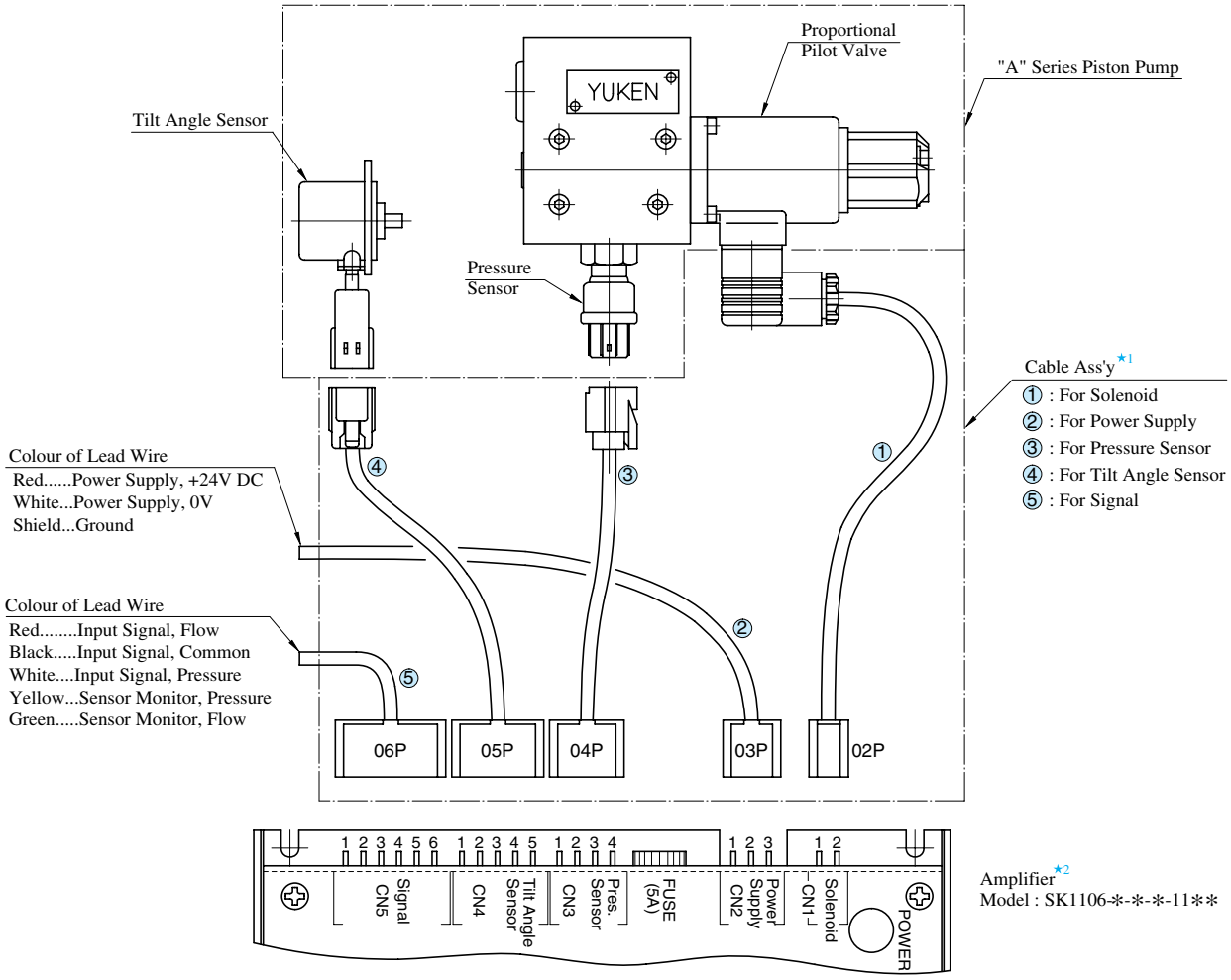


DIMENSIONS IN MILLIMETRES (INCHES)

Cable Connection Between Pump and Amplifier

The cable connections between the proportional pilot valve and the sensor of the pump and the attached amplifier (SK1106) are shown below.

The cable assemblies are not included in the pump assembly. Purchase separately with model number described in the below table if required.



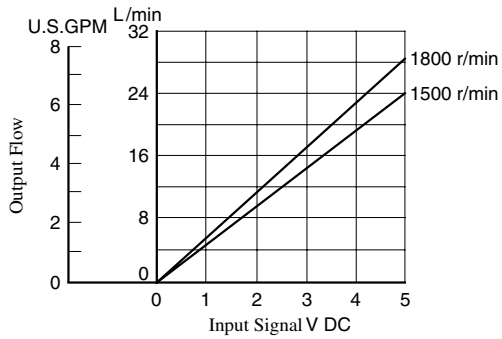
★1. Cable assemblies are available. When ordering, specify the cable ass'y model numbers from the table below.

Name of Cable Ass'y	Cable Ass'y Model Numbers		
	Approx. Length of Cable mm(ft.)		
	2000 (6.6)	5000 (16.4)	10000 (32.8)
① For Solenoid	SK1112-S-2-10	SK1112-S-5-10	SK1112-S-10-10
② For Power Supply	SK1112-V-2-10	SK1112-V-5-10	SK1112-V-10-10
③ For Pressure Sensor	SK1112-P-2-10	SK1112-P-5-10	SK1112-P-10-10
④ For Tilt Angle Sensor	SK1112-Q-2-10	SK1112-Q-5-10	SK1112-Q-10-10
⑤ For Signal	SK1112-C-2-10	SK1112-C-5-10	SK1112-C-10-10

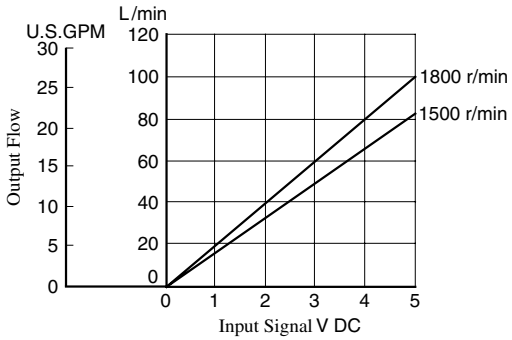
★2. For the details of amplifier, see the previous page.

Output Flow vs. Input Signal

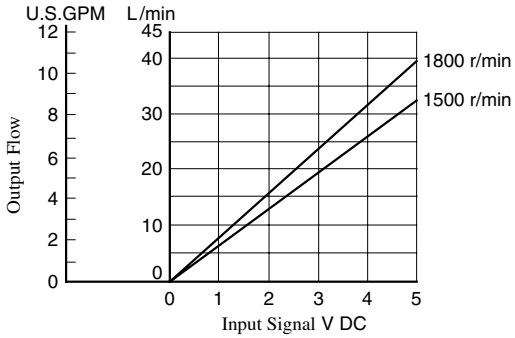
A16



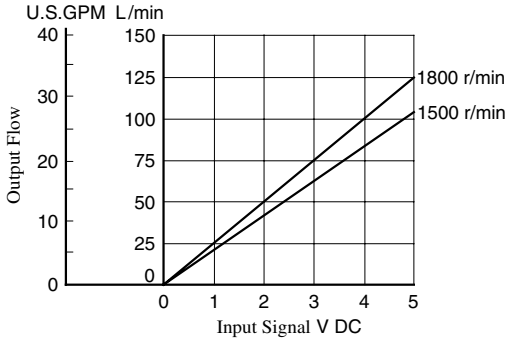
A56



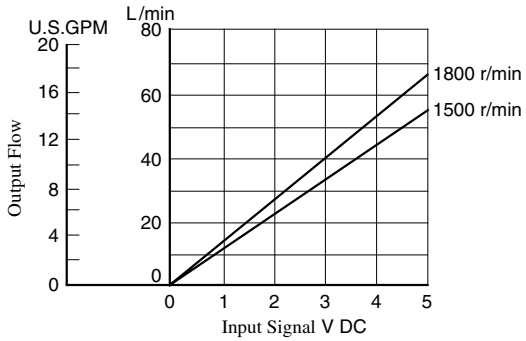
A22



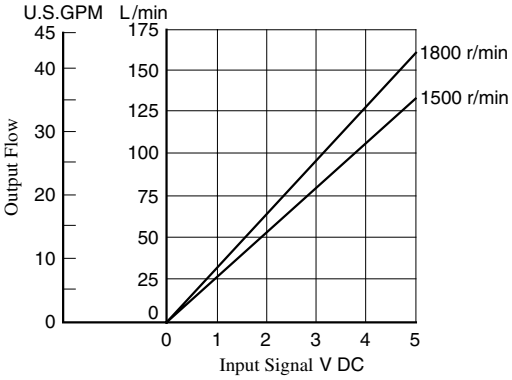
A70



A37

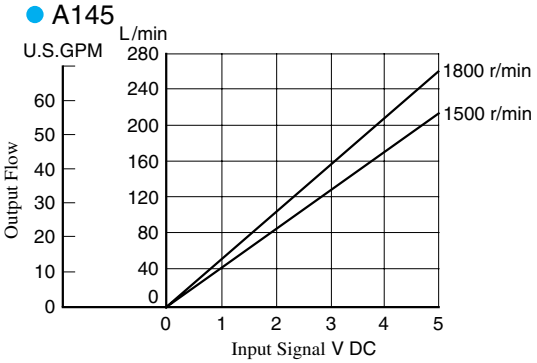


A90

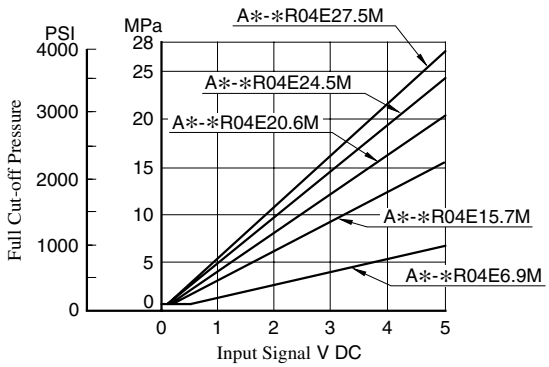


Note: Pump characteristics at 1800 r/min is the same as those at 1500 r/min where frequency is compensated.
(Refer to page 75.)

A145

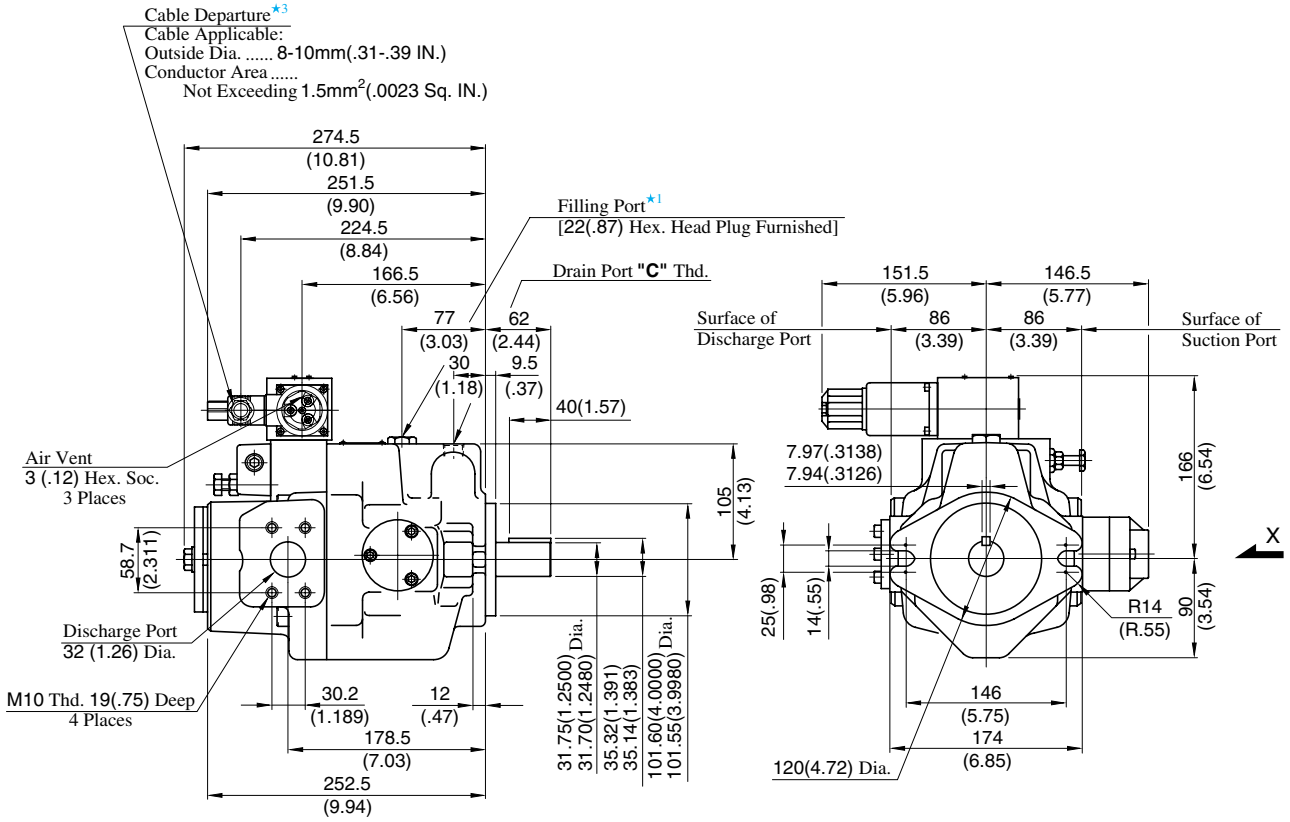


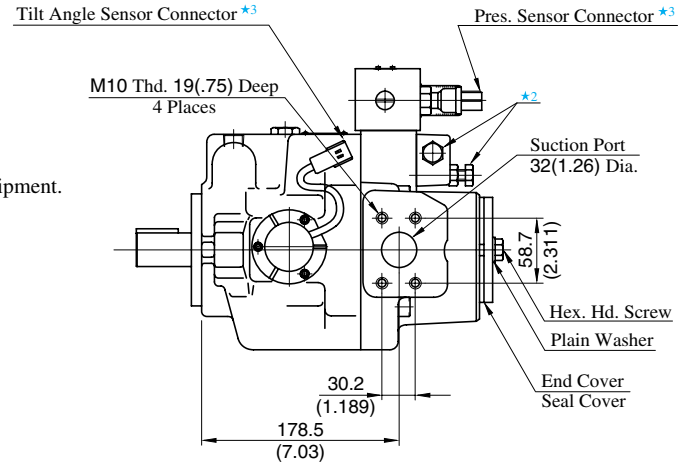
Full Cut-off Pres. vs. Input Signal



Refer to page 37 to 43 for performance characteristics of pressure compensator type excluding characteristics appeared on this catalogue.

Flange Mtg. : A37-FR04E✻-01-42/4280





View Arrow X

★1. Install the pump so that the "Filling Port" is at the top.
★2. Do not touch the screw because it is adjusted at the time of shipment.
★3. For cable connection with amplifiers, see page 85.

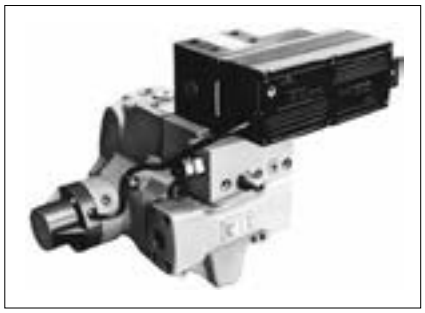
Model Numbers	"C" Thd.
A37-FR04E✻-01-42	Rc 1/2
A37-FR04E✻-01-4280	1/2 BSP.F

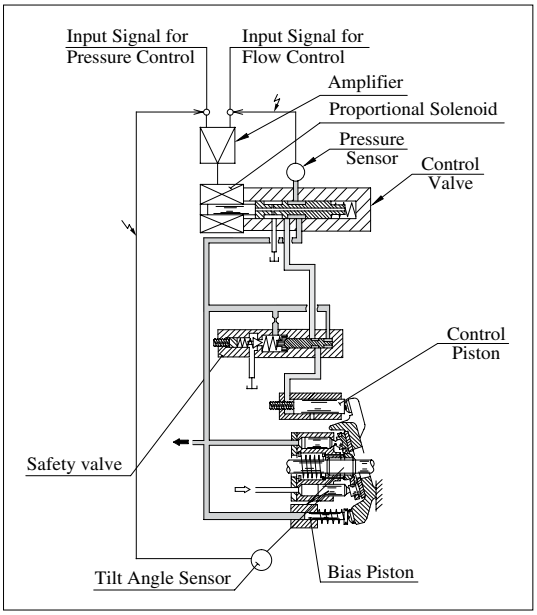
DIMENSIONS IN MILLIMETRES (INCHES)

● Foot Mounting Type

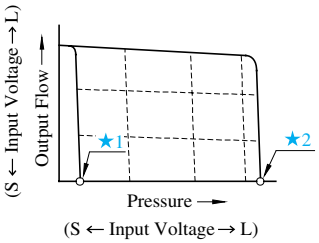
Mounting bracket is common to that of pressure compensator model.
Refer to page 46 for the dimensions of mounting bracket.

"A" Series Variable Displacement Piston Pumps – Single Pump, "OBE" Type Electro-Hydraulic Proportional Pressure & Flow Control Type





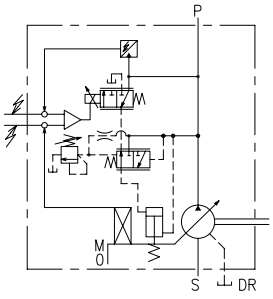
Performance Characteristics



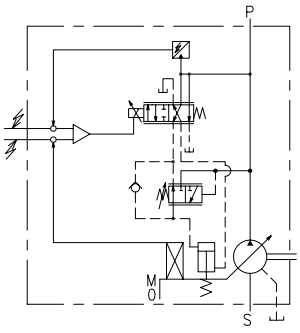
★1. Unloading pressure when input signal is 0 V.

★2. Safety valve setting pressure

Graphic Symbols



A16/A22/A37/A56



A70/A90/A145

Example of Specified Control Pressure

Control Pressure Symbol (EX.)		Control Pressure at Input Signal is 5 V		
		kgf/cm²	MPa	PSI
70	——	70	6.9	1000
105	——	105	10.3	1500
140	——	140	13.7	2000
175	——	175	17.2	2500
210	——	210	20.6	3000
——	7M	71.4	7	1015
——	16M	163.2	16	2320
——	21M	214.2	21	3045

Model Number Designation

A16	-F	R	04EH	70	R	S	-06	-42	*
Series Number	Mounting	Direction of Rotation	Control Type	Control Pressure at Input Signal is 5 V	Amplifier Direction	Port Position	Compensation Number ★2	Design Number	Design Std.
A16 (15.8 cm³/rev)	**F:** Flange Mtg.	(Viewed from Shaft End) **R:** Clockwise (Normal) ★1	**04EH:** "OBE" Type Proportional Pressure & Flow Control Type	Specify Control Pressure between 6.9 MPa and Maximum Operating Pressure (Refer to above Table)	——	**None:** Axial Port	**06**	**42**	Refer to ★3
A22 (22.2 cm³/rev)							**11**	**42**	
A37 (36.9 cm³/rev)						**S:** Side Port	**01**	**42**	
A56 (56.2 cm³/rev)							**02**	**42**	
A70 (70.0 cm³/rev)	**L:** Foot Mtg.				(Viewd from Shaft End) **R:** Right **L:** Left	**S:** Side Port	**60**	**60**	
A90 (91.0 cm³/rev)							**60**	**60**	
A145 (145.0 cm³/rev)							**60**	**60**	

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

★2. Amplifier Compensation Number may differ according to the main machine conditions. Consult Yuken for detail.

★3. Design Standards: None.....Japanese Standard "JIS"
950.....N.American Design Standard

Specifications

Descriptions \ Model Numbers			A16	A22	A37	A56	A70	A90	A145
Geometric Displacement		cm^3/rev (cu. in./rev)	15.8 (.964)	22.2 (1.355)	36.9 (2.25)	56.2 (3.43)	70.0 (4.27)	91.0 (5.55)	145.0 (8.85)
Operating Pressure MPa (PSI)		Rated ★2	16 (2320)	16 (2320)	16 (2320)	16 (2320)	25 (3625)	25 (3625)	25 (3625)
		Intermittent ★1	21 (3050)	16 (2320)	21 (3050)	21 (3050)	28 (4060)	28 (4060)	28 (4060)
Shaft Speed Range		r/min	600 - 1800						
Flow Control	Max. Flow ★3	L/min (U.S. GPM)	28.4 (7.5)	40.0 (10.6)	66.4 (17.5)	101.2 (26.7)	126.0 (33.3)	163.0 (43.1)	261.0 (69.0)
	Min. Pres. Required for Flow Adj.	MPa (PSI)	2.0 (290)						
	Hysteresis		1 % or less						
	Repeatability		1 % or less						
	Input Signal		Max. Flow / 5 V DC						
Pressure Control	Min. Adjustment Pressure	MPa (PSI)	0.7 (100)						
	Hysteresis		1 % or less						
	Repeatability		1 % or less						
	Input Signal		Specified Control Pressure / 5 V DC						
Coil Resistance		Ω [@ 20°C (68 °F)]	10						
Input Impedance			Flow Control : 10kΩ Pres. Control : 10kΩ						
Supply Electric Power			24 V DC (21 - 28 V Included Ripple)						
Power Input (Max.)		W	30						
Output Signal		Flow	5 V DC / Max. Flow						
		Pressure	5 V DC / Specified Control Pressure						
Alarm Signal Output (Open Collector)			Voltage : Max. 30 V DC Current : Max. 40 mA						
Ambient Temperature		°C (°F)	0 - 50 (32 - 122) (With Circulated Air)						
Mass		kg (lbs.) Flange Mtg.	20.7 (45.6)	20.7 (45.6)	32.2 (71)	39.2 (86.4)	64 (141)	76.5 (169)	98 (216)
		Foot Mtg.	22.9 (50.5)	22.9 (50.5)	36.5 (80.5)	43.5 (95.9)	76 (168)	97 (214)	123 (271)

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

★2. When operating the pump exceeding the rated pressure, operating conditions are restricted.
Refer to page 33 for the details.

★3. Maximum flow differs to shaft speed.
The value listed above indicates shaft speed of 1800 r/min.
For other shaft speed calculate by the ratio of shaft speed.

Pipe Flange Kits

For Pipe flange, refer to form of pressure compensator type on page 34.

Instructions

- **Input Signal**

  The pump is on unload condition when the pump is operated without input signal voltage.

- **Electric Source**

  Always turn off electric source whenever the connector for swash plate tilt angle sensor is removed.

- **Compensation of Pump Maximum Regulated Flow at Frequency**

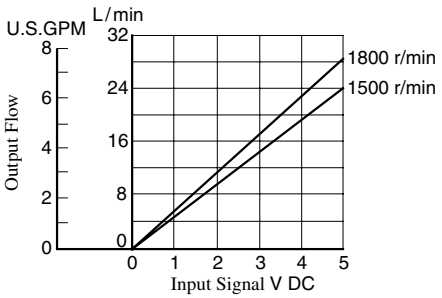
  If the same maximum flow is required at 50 Hz or 60 Hz, connect short plug in the amplifier to 60 Hz at the place where supplied frequency is 60 Hz. At this condition, maximum flow comes to the same value at 50 Hz.
  If short plug is used at 60 Hz without making the change, maximum flow increased in proportion to frequency.

- **Painting on Amp. Box and Solenoid**

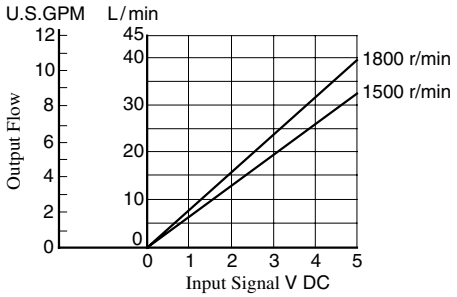
  To maintain suitable radiation effect, the amp. box and the solenoid of the control valve should not be painted.

Output Flow vs. Input Signal

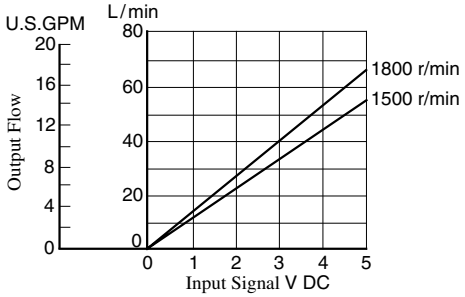
A16



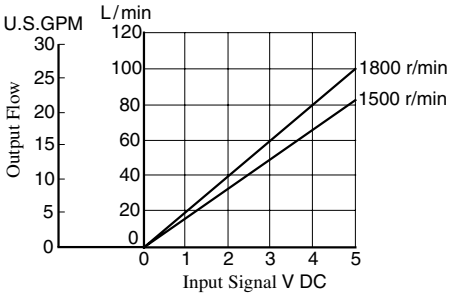
A22



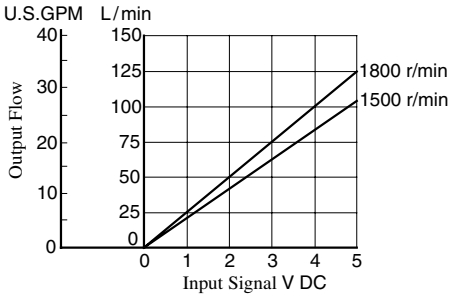
A37



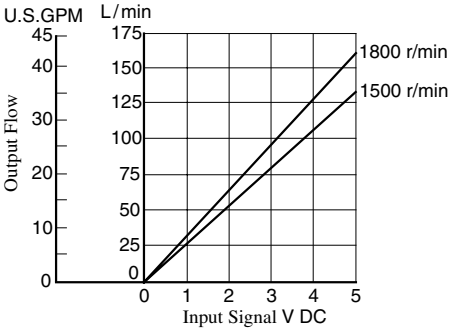
A56



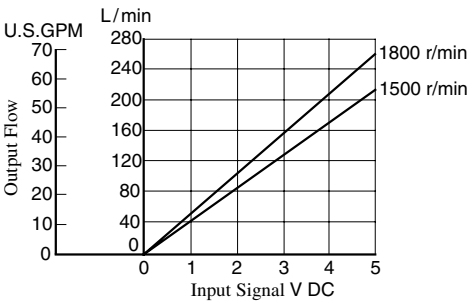
A70



A90

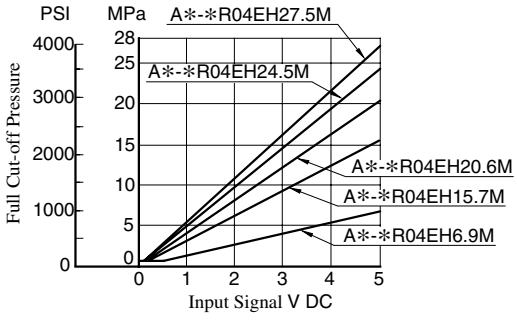


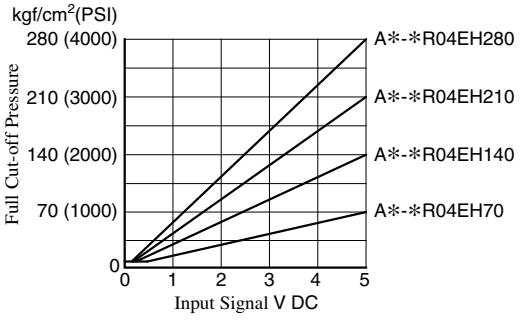
A145



Note: Pump characteristics at 1800 r/min is the same as those at 1500 r/min where frequency is compensated.
(Refer to page 87.)

Full Cut-off Pres. vs. Input Signal

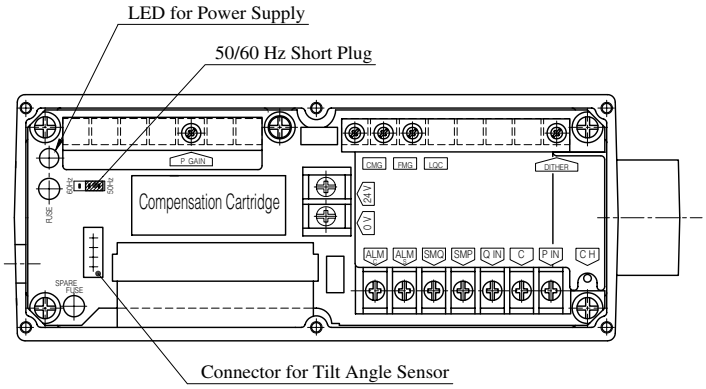




Refer to page 37 to 43 for performance characteristics of pressure compensator type excluding characteristics appeared on this catalogue.

Detail of Amplifier

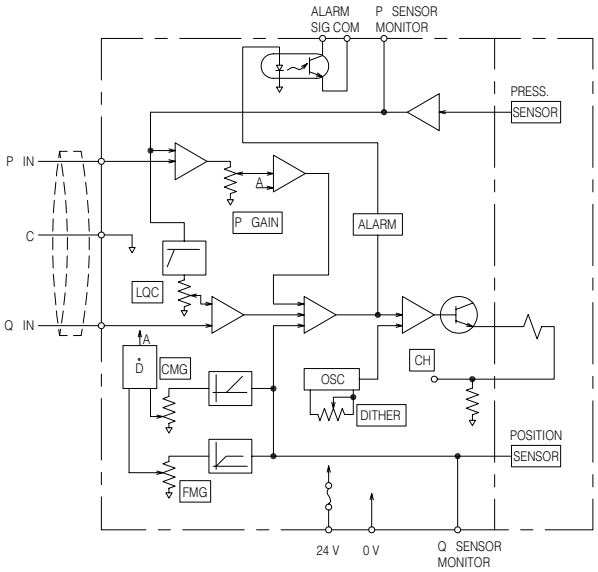
Connecting Terminal



Terminal	Name
P IN	Input Signal, Pressure (+)
C	Input Signal (COM)
Q IN	Input Signal, Flow (+)
SMP	Sensor Monitor Output, Pressure
SMQ	Sensor Monitor Output, Tilt Angle
0 V	Power Supply
24 V	
ALM S	Alarm Output
ALM C	Alarm Output (COM)
CH	Output Current Check (to COM)

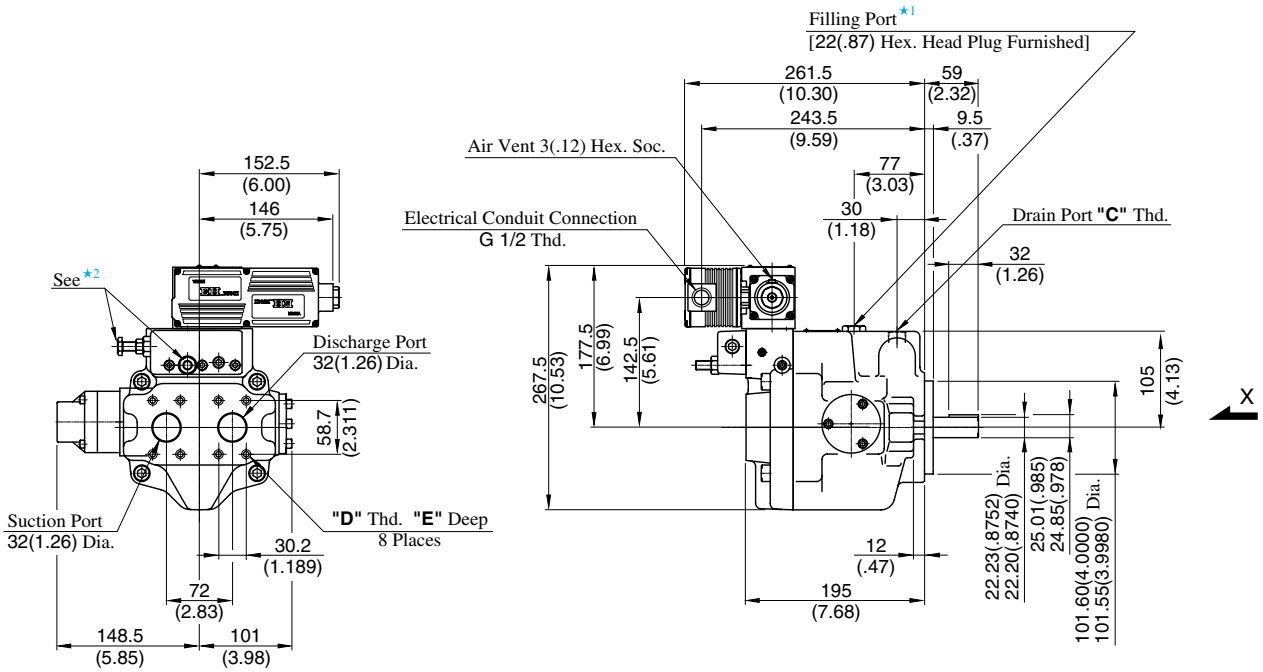
Note 1. For "SENSOR MONITOR" terminal, external instruments should have input impedance of more than 10 kΩ.
2. For "CH" terminal, external instruments should have input impedance of more than 10 kΩ.
3. Volume adjustment of "DITHER", "GAIN", "CMG", "FMG" and "LQC" is made at the time of shipment.
Adjustment at the customer is not required.
4. Use shielded cable for "Input" connection.
The ground of the shielded cable must be connected to input signal side.

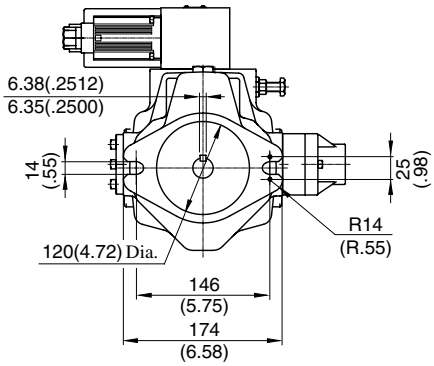
Circuit Schematic



Axial Port Type

Flange Mtg.: A37-FR04EH*-*-42/42950





View Arrow X

★1. Install the pump so that the "Filling Port" is at the top.
★2. Do not touch the screw because it is adjusted at the time of shipment.
★3. For detail of amplifier, refer to page 95.

Model Numbers	"C" Thd.	"D" Thd.	"E" mm (IN.)
A37-FR04EH*-*-42	Rc 1/2	M10	19 (.75)
A37-FR04EH*-*-42950	SAE #10	7/16-14 UNC	20 (.79)

DIMENSIONS IN MILLIMETRES (INCHES)

● Side Port Type

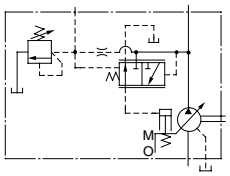
Port mounting dimensions are the same as those of pressure compensator model. Refer to page 46 for port mounting dimensions.

● Foot Mounting Type

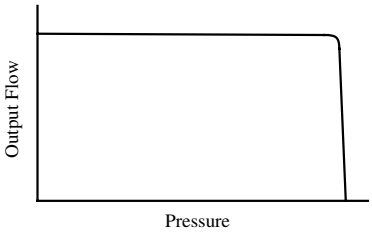
Mounting bracket is common to that of pressure compensator model. Refer to page 46 for the dimensions of mounting bracket.

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

Graphic Symbol



Performance Characteristics



Specifications

Model Numbers	Geometric Displacement cm^3/rev (cu. in. /rev)	Minimum Adj. Flow cm^3/rev (cu. in. /rev)	Operating Pressure MPa (PSI)		Minimum Adj. Pres. MPa (PSI)	Shaft Speed Range r/min		Approx. Mass kg (lbs.)	
			Rated ★2	Intermittent ★1		Max.	Min.	Flange Mtg.	Foot Mtg.
A10-FR07-12*	10.0 (.610)	2 (.122)	16 (2320)	21 (3050)	2.0 (290)	1800	600	8.5 (18.7)	10.7 (23.6)
A16-*-R-07-*-K-32*	15.8 (.964)	4 (.244)	16 (2320)	21 (3050)	1.2 (175)	1800	600	21 (46.3)	23.2 (51.2)
A22-*-R-07-*-K-32*	22.2 (1.355)	6 (.366)	16 (2320)	16 (2320)	1.2 (175)	1800	600	21 (46.3)	23.2 (51.2)
A37-*-R-07-*-K-32*	36.9 (2.25)	10 (.610)	16 (2320)	21 (3050)	1.2 (175)	1800	600	29 (63.9)	33.3 (73.4)
A56-*-R-07-*-K-32*	56.2 (3.43)	12 (.732)	16 (2320)	21 (3050)	1.2 (175)	1800	600	36 (79.4)	40.3 (88.9)
A70-*R07S-60*	70.0 (4.27)	30 (1.83)	25 (3630)	25 (3630)	2 (290)	1800	600	60.3 (133)	72.3 (159)
A90-*R07S-60*	91.0 (5.55)	56 (3.42)	25 (3630)	25 (3630)	2 (290)	1800	600	77.5 (171)	98 (216)
A145-*R07S-60*	145 (8.85)	83 (5.06)	25 (3630)	25 (3630)	2 (290)	1800	600	94 (207)	119 (262)

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

★2. When operating the pump exceeding the rated pressure, operating conditions are restricted.
Refer to page 33 for the details.

Model Number Designation

A16	-F	-R	-07	-S	-K	-32	✻
Series Number	Mounting	Direction of Rotation	Control Type	Port Position	Shaft Extension	Design Number	Design Std.
A16 (15.8 cm^3/rev)	**F:** Flange Mtg.	(Viewed from Shaft End)	**07:** Pilot Pressure Control Type Pressure Compensator	**None:** Axial Port	**K:** Keyed Shaft	**32**	Refer to★3
A22 (22.2 cm^3/rev)		**R:** Clockwise★1 (Normal)				**32**	
A37 (36.9 cm^3/rev)	**L:** Foot Mtg.			**S:** Side Port		**32**	
A56 (56.2 cm^3/rev)						**32**	

A70	-F	R	07	S	-60	✻
Series Number	Mounting	Direction of Rotation	Control Type	Port Position	Design Number	Design Std.
A10 (10.0 cm^3/rev)	**F:** Flange Mtg.★2	(Viewed from Shaft End)	**07:** Pilot Pressure Control Type Pressure Compensator	——	**12**	Refer to★3
A70 (70.0 cm^3/rev)	**F:** Flange Mtg. **L:** Foot Mtg.	**R:** Clockwise★1 (Normal)		**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. 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.

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

Note: The mounting bracket kit consists of a mounting bracket, 2 hex. bolts and 2 plain washer.

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

Performance Characteristics

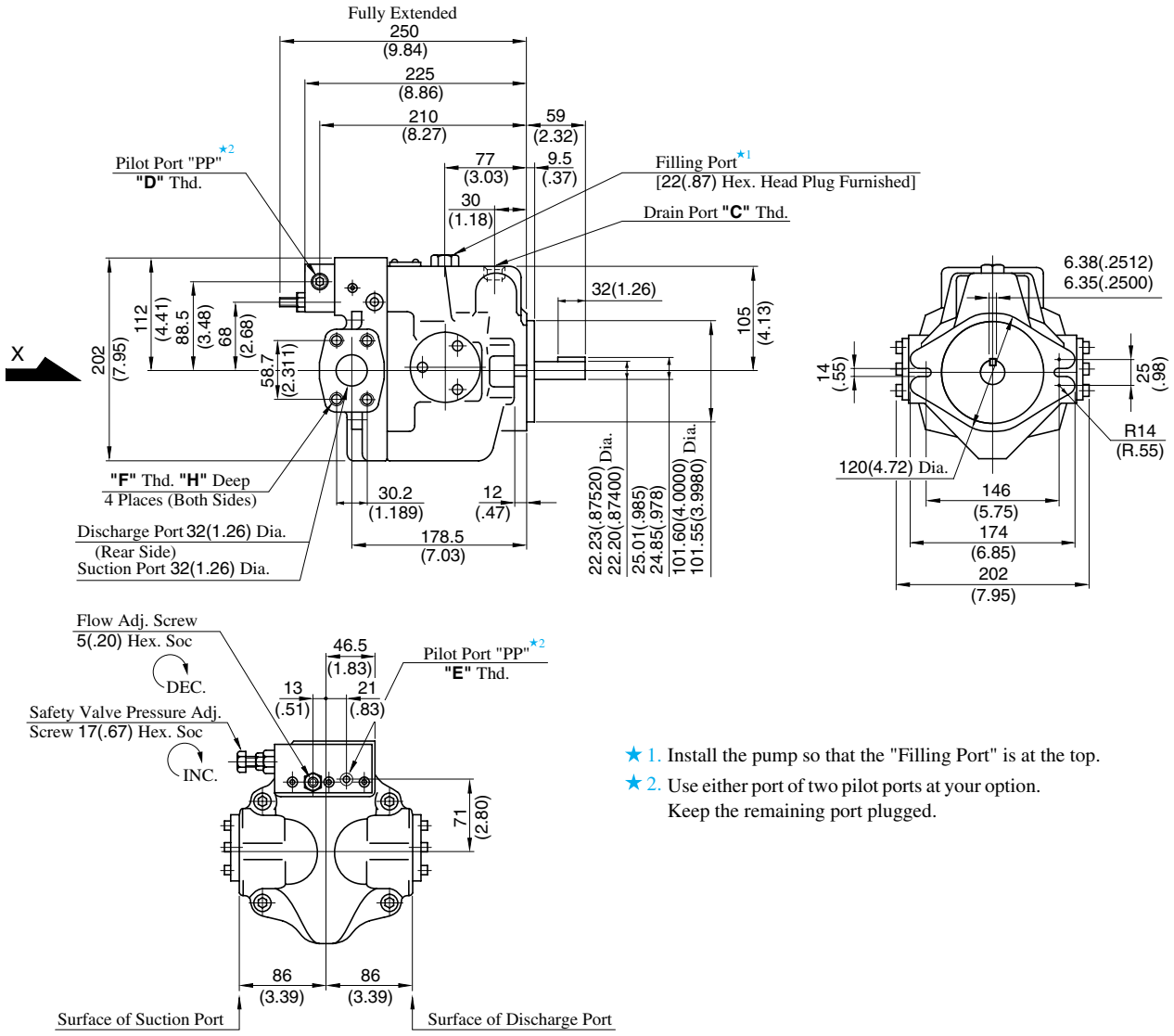
For performance characteristics, refer to models of pressure compensator type on page 36 to 43.

Pipe Flange Kit

For pipe flange, refer to form of pressure compensator type on page 34.

Side Port Type

Flange Mtg. : A37-F-R-07-S-K-32/3280/32950



View Arrow X

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

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

Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	"F" Thd.	"H" mm (IN.)
A37-F-R-07-S-K-32	Rc 1/2	Rc 3/8	Rc 1/4	M10	19 (.75)
A37-F-R-07-S-K-3280	1/2 BSP.F	3/8 BSP.F	1/4 BSP. Tr		
A37-F-R-07-S-K-32950	SAE #10	SAE #6	SAE #4	7/16-14 UNC	20 (.79)

DIMENSIONS IN MILLIMETRES (INCHES)

● Axial Port Type

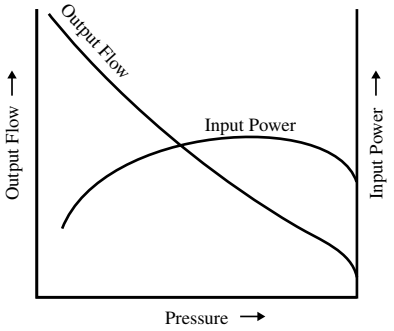
Port mounting dimensions are the same as those of pressure compensator model. Refer to page 46 for port mounting dimensions.

● Foot Mounting Type

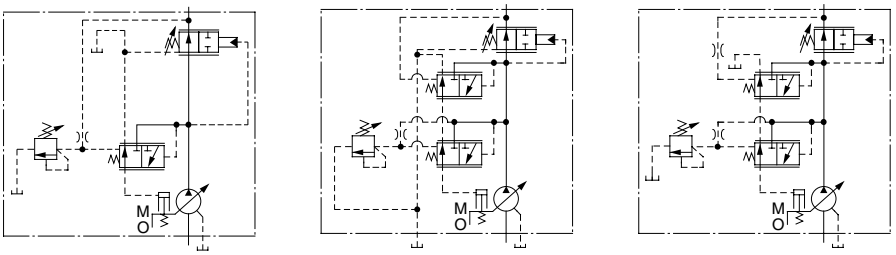
Mounting bracket is common to that of pressure compensator model. Refer to page 46 for the dimensions of mounting bracket.

"A" Series Variable Displacement Piston Pumps – Single Pump, Constant Power Control Type

Performance Characteristics



Graphic Symbols



A16 A37/A56 A70/A145

Specifications

Model Numbers	Geometric Displacement cm^3/rev (cu. in. /rev)	Minimum ★2 Adj. Flow cm^3/rev (cu. in. /rev)	Operating Pres. MPa (PSI)	Shaft Speed Range r/min		Approx. Mass kg (lbs.)	
			Max.	Max.	Min.	Flange Mtg.	Foot Mtg.
A16-∗-R-09-∗-∗-K-32∗	15.8 (.964)	—	21 (3050) ★1	1800	600	29.0 (63.9)	31.2 (68.8)
A37-∗-R-09-∗-∗-K-32∗	36.9 (2.25)	—	21 (3050) ★1	1800	600	37.0 (81.6)	41.3 (91.1)
A56-∗-R-09-∗-∗-K-32∗	56.2 (3.43)	—	21 (3050) ★1	1800	600	44.0 (97.0)	48.3 (107)
A70-∗R09∗S-60∗	70.0 (4.27)	30 (.295)	25 (3630)	1800	600	72.8 (161)	84.8 (187)
A145-∗R09∗S-60∗	145 (8.85)	83 (5.06)	25 (3630)	1800	600	110 (243)	135 (298)

★1. Maximum Operating Pressure of A16/A37/A56 varies according to Input Power Setting. See Model Number Designation for details.
★2. Minimum Adjustment Flow of A70/A145 is absolutely minimum flow that can be adjusted with Flow Adjustment Screw.

A90 type pump (91 cm^3/rev) is available. Ask Yuken for Details.

Model Number Designation

A16/A37/A56

A16	-F	-R	-09	-A	-16M	-K	-32	✻
Series Number	Mounting	Direction of Rotation	Control Type	Input Power Setting	Specify Control Pres. ★2	Shaft Extension	Design Number	Design Std.
A16 (15.8 cm³/rev)	**F:** Flange Mtg.	(Viewed from Shaft End)	**09:** Constant Power Control Type	**A:** 3.7 kW (5 HP) **B:** 5.5 kW (7.5 HP) **E:** 2.2 kW (3 HP) **F:** 1.5 kW (2 HP)	**7M :** 7 MPa (1020 PSI) **10.5M :** 10.5 MPa (1520 PSI) **14M :** 14 MPa (2030 PSI) **16M :** 16 MPa (2320 PSI) **17.5M :** 17.5 MPa (2540 PSI) **21M :** 21 MPa (3050 PSI)	**K:** Keyed Shaft	**32**	Refer to ★3
A37 (36.9 cm³/rev)				**A:** 3.7 kW (5 HP) **B:** 5.5 kW (7.5 HP) **C:** 7.5 kW (10 HP) **D:** 11 kW (15 HP)			**32**	
A56 (56.2 cm³/rev)	**L:** Foot Mtg.	**R:** Clockwise ★1 (Normal)		**A:** 3.7 kW (5 HP) **B:** 5.5 kW (7.5 HP) **C:** 7.5 kW (10 HP) **D:** 11 kW (15 HP) **E:** 15 kW (20 HP) **F:** 18.5 kW (25 HP) **G:** 22 kW (30 HP)			**32**	

A70/A145

A70	-F	R	09	A	S	-60	✻
Series Number	Mounting	Direction of Rotation	Control Type	Input Power Setting	Direction of Port	Design Number	Design Std.
A70 (70 cm³/rev)	**F:** Flange Mtg.	(Viewed from Shaft End)	**09:** Constant Power Control Type	**A:** 15 kW (20 HP) **B:** 18.5 kW (25 HP) **E :** 22 kW (30 HP) **F :** 30 kW (40 HP)	**S:** Side Port	**60**	Refer to ★3
A145 (145 cm³/rev)	**L:** Foot Mtg.	**R:** Clockwise ★1 (Normal)		**A:** 15 kW (20 HP) **B:** 18.5 kW (20 HP) **C:** 22 kW (30 HP) **D:** 30 kW (40 HP) **E :** 37 kW (50 HP) **F :** 45 kW (60 HP) **G:** 55 kW (75 HP) **H:** 75 kW (100 HP)		**60**	

★1. Available to supply pump with anti-clockwise rotation. Consult Yuken for details.
★2. Specify control pressure of A16/A37/A56 with lower than Maximum Operating Pressure depending on Input Power Setting.

Performance Characteristics / Model	Maximum Operating Pressure MPa (PSI)								
	1.5 kW (2 HP)	2.2 kW (3 HP)	3.7 kW (5 HP)	5.5 kW (7.5 HP)	7.5 kW (10 HP)	11 kW (15 HP)	15 kW (20 HP)	18.5 kW (25 HP)	22 kW(30 HP)
A16	10.5 (1520)	16 (2320)	21 (3050)	21 (3050)	—	—	—	—	—
A37	—	—	16 (2320)	21 (3050)	21 (3050)	21 (3050)	—	—	—
A56	—	—	10.5 (1520)	14 (2030)	17.5 (2540)	21 (3050)	21 (3050)	21 (3050)	21 (3050)

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

Pipe Flange Kits

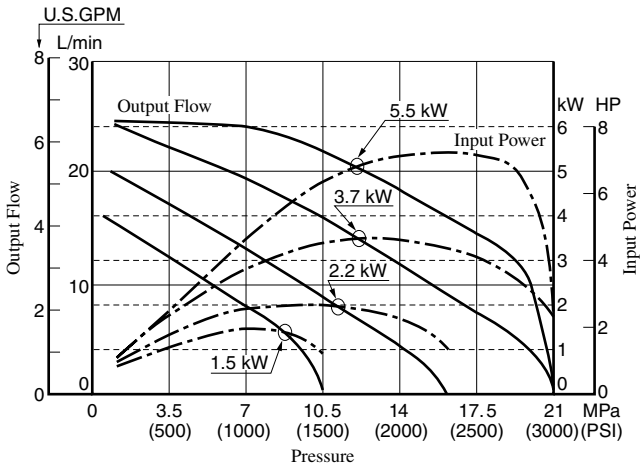
Pipe flange kits are available. When ordering, specify the kit number from the table below.

Pump Model Numbers	Name of Port	Pipe Flange Kit Numbers						
		Threaded Connection			Socket Welding ★1		Butt Welding	
		Japanese Std. "JIS"	European Design Std.	N. Ameraican Design Standard ★3	Japanese Std. "JIS" & European Design Std.	N. Ameraican Design Standard ★3	Japanese Std. "JIS" & European Design Std.	N. Ameraican Design Standard ★3
A16-✻-R-09	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	— ★2	— ★2	— ★2	— ★2	— ★2	— ★2	— ★2
A37-✻-R-09 A56-✻-R-09	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	F5-06-A-10	F5-06-A-1080	—	F5-06-B-10	F5-06-B-1090	F5-06-C-10	F5-06-C-1090
A70-✻-R-09	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
A145-✻-R-09	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

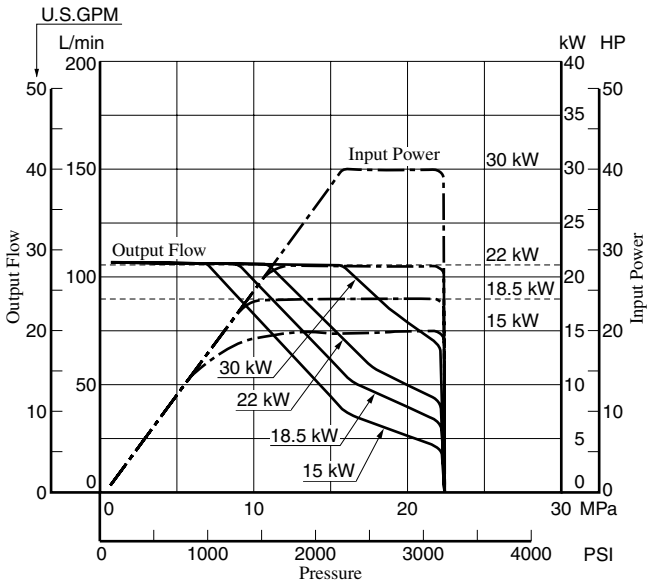
★1. In case of using socket welding flanges, there is a case where the operating pressure should be set lower than the normal because of strength of hat flanges. Therefore, please pay cautious attention to the operating pressure when the socket welding flanges are used.
★2. Discharge port for pump model "A16" is available only the threaded connections.
★3. 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.
• Detail of the pipe flange kits are shown on page 824.

Typical Performance Characteristics at 1500 r/min

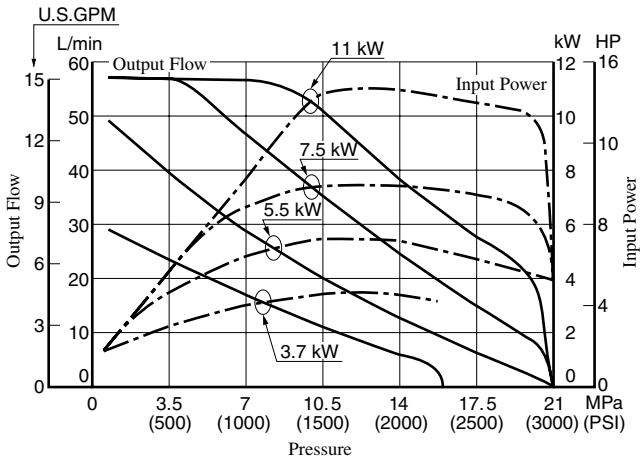
A16



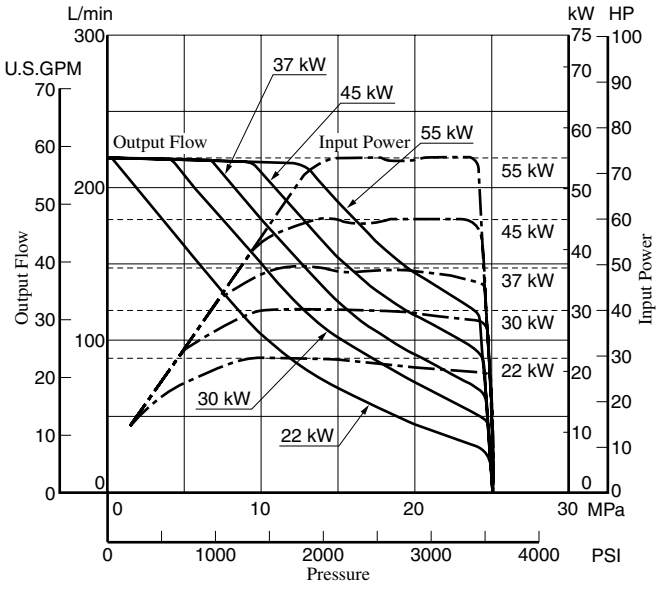
A70



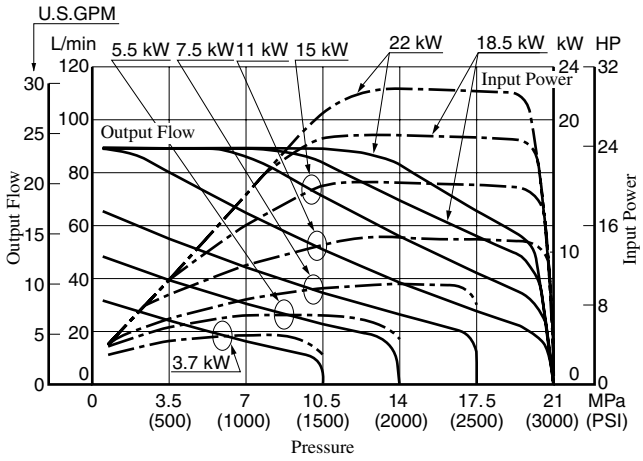
A37



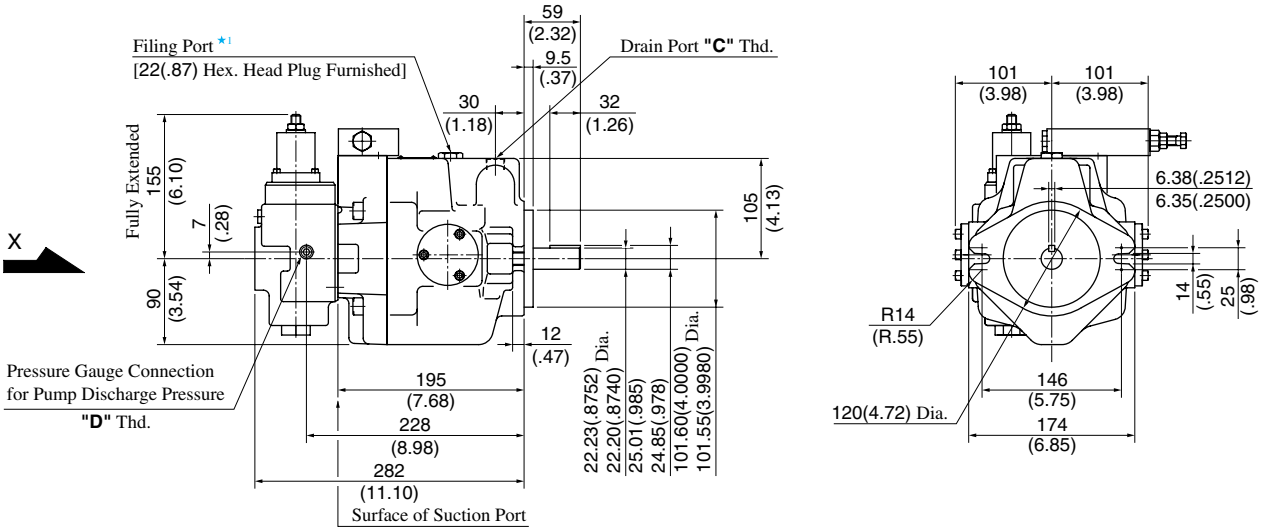
A145

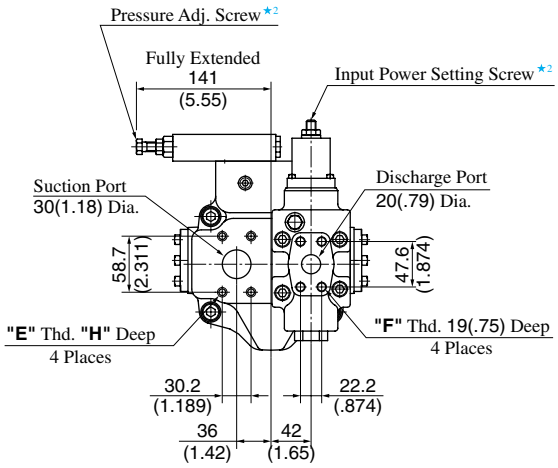


A56



Flange Mtg. : A37-F-R-09-✻-K-32/3280/32950





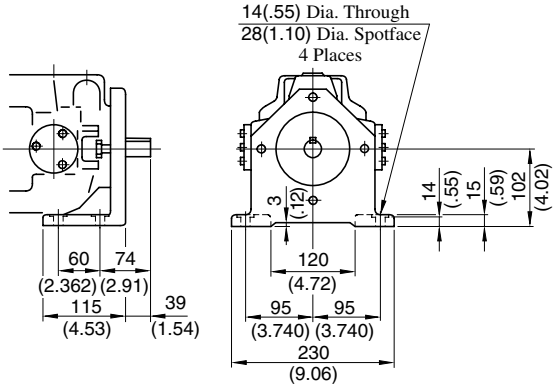
View Arrow X

★ 1. Install the pump so that the "Filling Port" is at the top.
★ 2. 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" mm (IN.)
A37-F-R-09-✻-K-32	Rc 1/2	Rc 1/4	M10	M10	19 (.75)
A37-F-R-09-✻-K-3280	1/2 BSP.F	1/4 BSP.Tr			
A37-F-R-09-✻-K-32950	SAE #10	SAE #4	7/16-14 UNC	3/8-16 UNC	20 (.79)

DIMENSIONS IN MILLIMETRES (INCHES)

Foot Mtg. : A37-L-R-09-✻-K-32/3280/32950



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