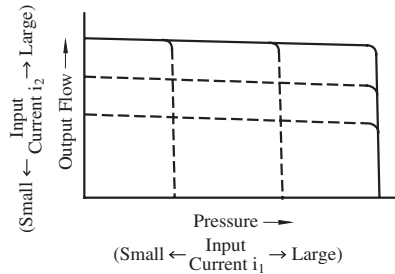


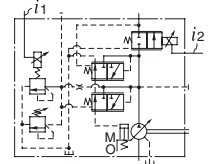
# "A" Series Variable Displacement Piston Pumps – Single Pump, Proportional Electro-Hydraulic Load Sensing Type



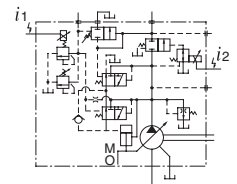
Performance Characteristics



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.
<b>A16</b> (15.8 cm <sup>3</sup> /rev)	<b>F:</b> Flange Mtg.	(Viewed from Shaft End)  <b>R:</b> Clockwise *1	<b>04:</b> Proportional Electro-Hydraulic Load Sensing Type	<b>B:</b> 1.5 - 6.9 (220 - 1000)	<b>K:</b> Keyed Shaft	<b>32</b>	Refer to ★2
<b>A22</b> (22.2 cm <sup>3</sup> /rev)				<b>C:</b> 1.5 - 15.7 (220 - 2280)			
<b>A37</b> (36.9 cm <sup>3</sup> /rev)				<b>H:</b> 1.5 - 20.6 (220 - 2990)			
<b>A56</b> (56.2 cm <sup>3</sup> /rev)				<b>B:</b> 2 - 6.9 (290 - 1000)			
				<b>C:</b> 2 - 15.7 (290 - 2280)		<b>32</b>	
				<b>H:</b> 2 - 20.6 (290 - 2990)		<b>32</b>	

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.	
<b>A70</b> (70.0 cm <sup>3</sup> /rev)	<b>F:</b> Flange Mtg.	(Viewed from Shaft End)  <b>R:</b> Clockwise *1	<b>04:</b> Proportional Electro-Hydraulic Load Sensing Type	<b>C:</b> 1.5 - 16 (220 - 2320)	<b>S:</b> Side Port	<b>60</b>	Refer to ★2	
<b>A90</b> (91.0 cm <sup>3</sup> /rev)								<b>H:</b> 1.5 - 21 (220 - 3050)
<b>A145</b> (145 cm <sup>3</sup> /rev)								

★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 <sup>*1</sup>	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 attention 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**

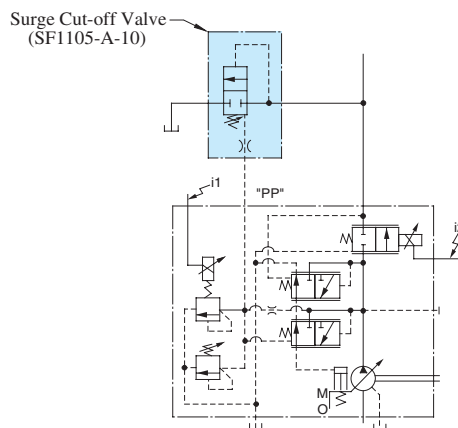
Position of cable departure can be changed. For details, refer to EDG-01 valve on [page 672](#).

**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.

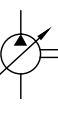


## Specifications

Descriptions		Model No.	A16	A22	A37	A56	A70	A90	A145	
Geometric Displacement		cm <sup>3</sup> /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 <sup>*2</sup>	16 (2320)	16 (2320)	16 (2320)	16 (2320)	21 (3050)	21 (3050)	21 (3050)	
		Intermittent <sup>*1</sup>	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 <sup>*5</sup> (0 → Max. Flow) ms	70	80	120	125	100	120	210	
		Hysteresis	3% or less <sup>*4</sup>							
		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 <sub>1</sub> <sup>*5</sup>	80	80	50	55	150	150	160
			t <sub>2</sub> <sup>*5</sup>	140	90	80	80	80	120	180
		Hysteresis	2% or less <sup>*4</sup>							
		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 <sup>*3</sup>		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.

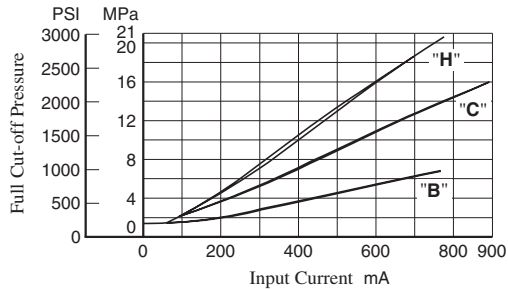
Model	Pres. Step Response		Loading Volume
	t <sub>1</sub>	t <sub>2</sub>	
A16, A22	1.5 → 16 MPa (220 → 2320 PSI)	16 → 1.5 MPa (2320 → 220 PSI)	High Pressure Hose 3/8" × 2 m (6.6 ft)
A37, A56	2.0 → 16 MPa (290 → 2320 PSI)	16 → 2.0 MPa (2320 → 290 PSI)	High Pressure Hose 3/4" × 2 m (6.6 ft)
A70, A90 A145	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 mm<sup>2</sup>/s (100 SSU) [ISO VG32 Oils, 50°C (122°F)]

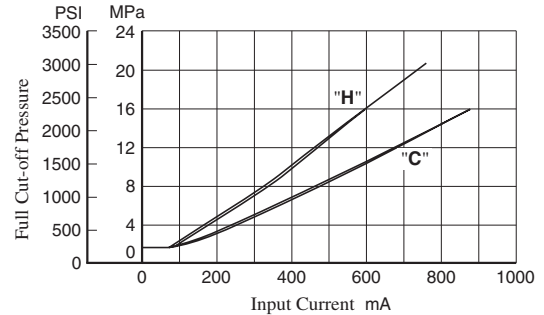
### Full Cut-off Pres. vs. Input Current

#### ● A16/A22/A37/A56



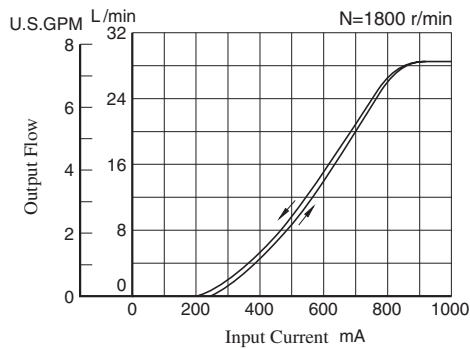
Note: Pressure adjustment range "H" is not available for A22.

#### ● A70/A90/A145

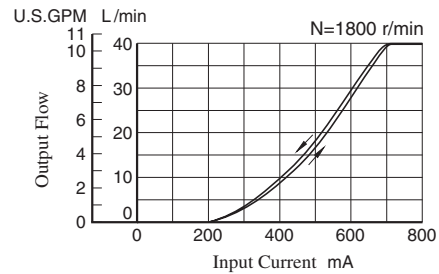


### Output Flow vs. Input Current

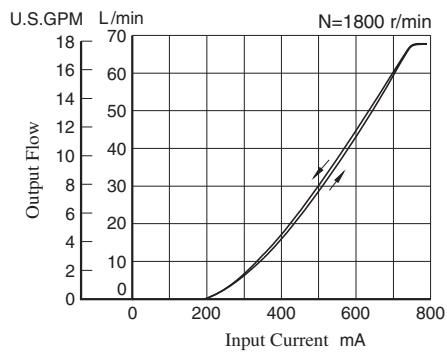
#### ● A16



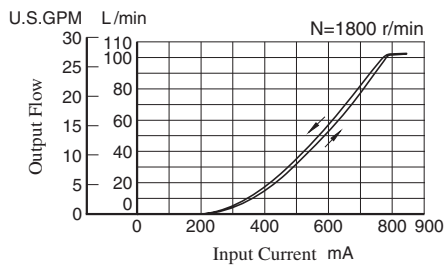
#### ● A22



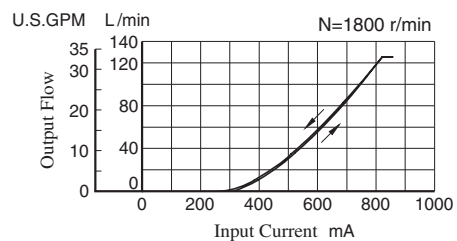
#### ● A37



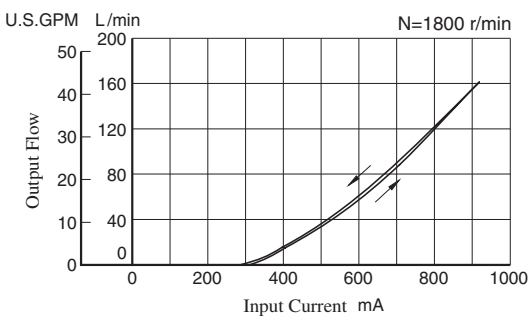
#### ● A56



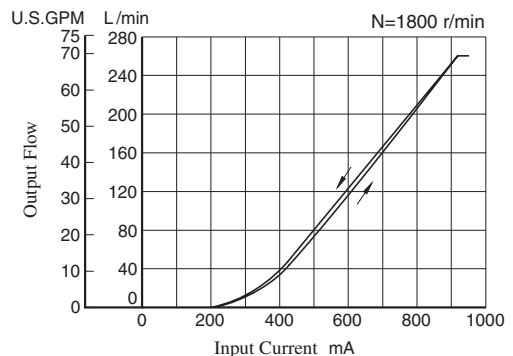
#### ● A70



#### ● A90

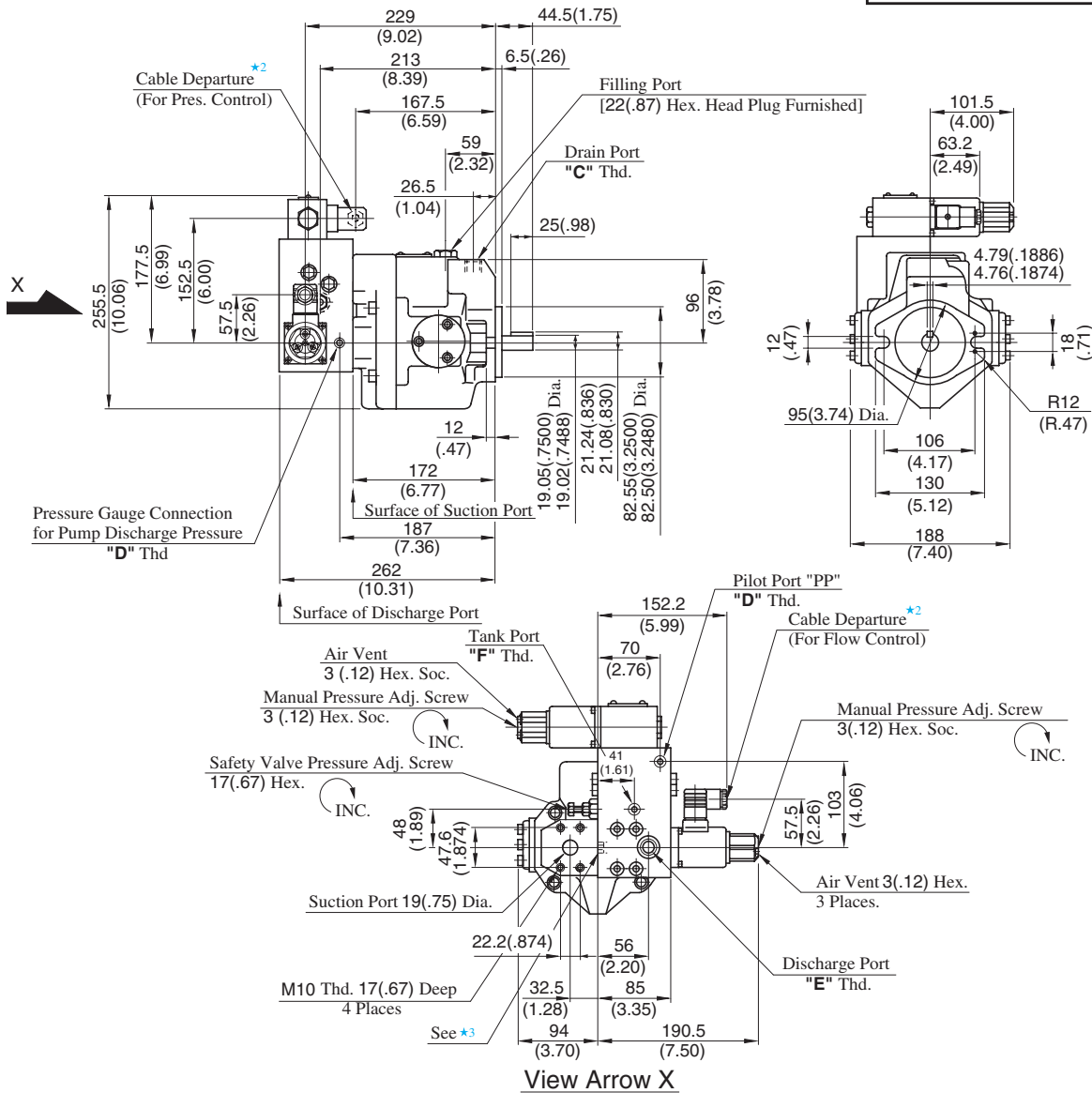


#### ● A145



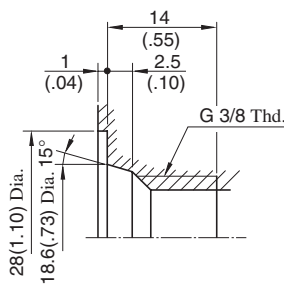
Flange Mtg. : A16-F-R-04-\*-K-32/3280  
A22-F-R-04-\*-K-32/3280

**DIMENSIONS IN  
MILLIMETRES (INCHES)**



Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	"F" Thd.
A16/A22-F-R-04-*-K-32	Rc 3/8	Rc 1/4	G 3/8*1	Rc 1/4
A16/A22-F-R-04-*-K-3280	3/8 BSP.F	1/4 BSP.Tr	3/8 BSP.F	1/4 BSP.F

★ 1. Detail of Discharge Port  
[For Japanese Standard]

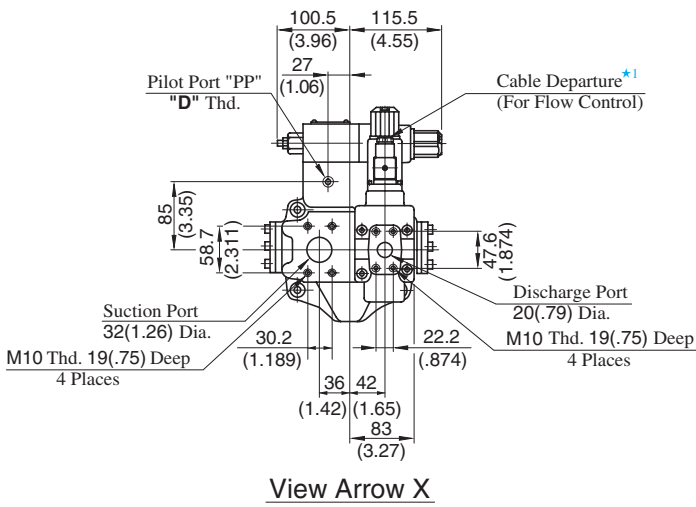
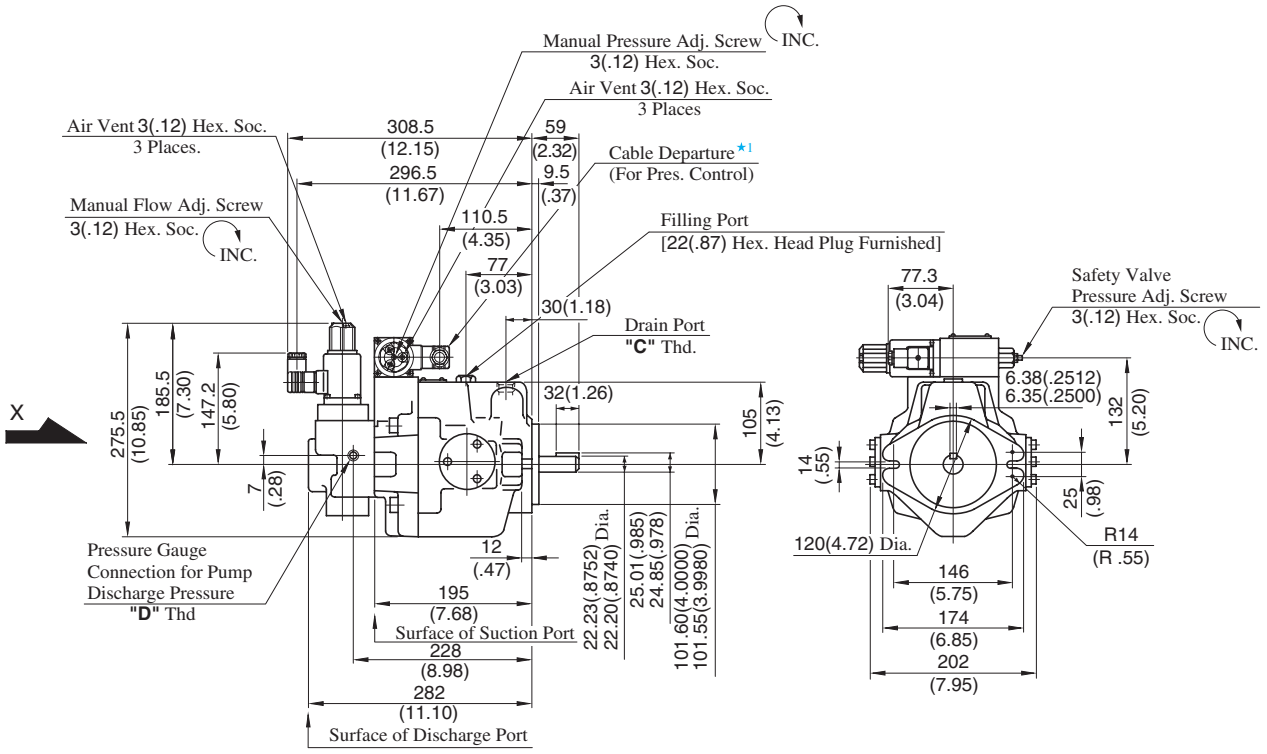


- ★ 2. Cable Applicable:  
Outside Dia.....8-10 mm (.31-.39 IN.)  
Conductor Area.....Not Exceeding 1.5 mm<sup>2</sup> (.0023 Sq. IN.)
- ★ 3. Do not touch the screw because it is adjusted at the time of shipment.

● **Foot Mounting Type**

Mounting bracket is common to that of pressure compensator model.  
Refer to page 45 for the dimensions of mounting bracket.

Flange Mtg. : A37-F-R-04-\*-K-32/3280

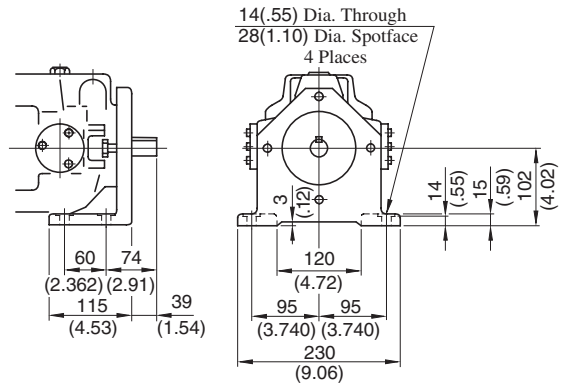


★ 1. Cable Applicable:  
 Outside Dia.....8-10 mm (.31-.39 IN.)  
 Conductor Area.....Not Exceeding 1.5 mm<sup>2</sup> (.0023 Sq. IN.)

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

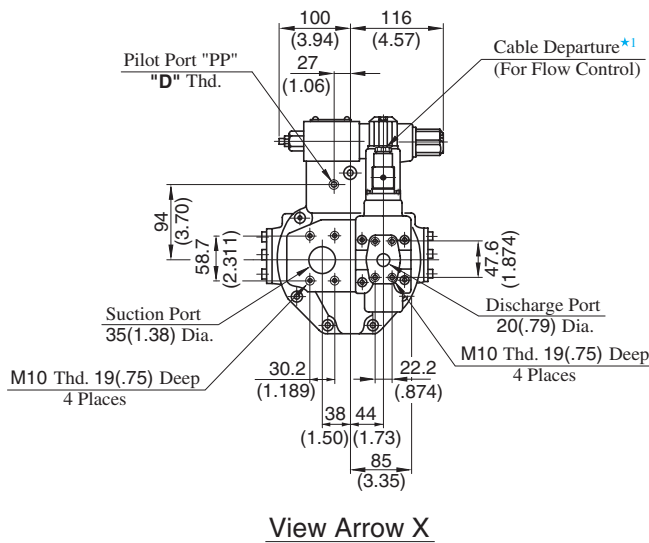
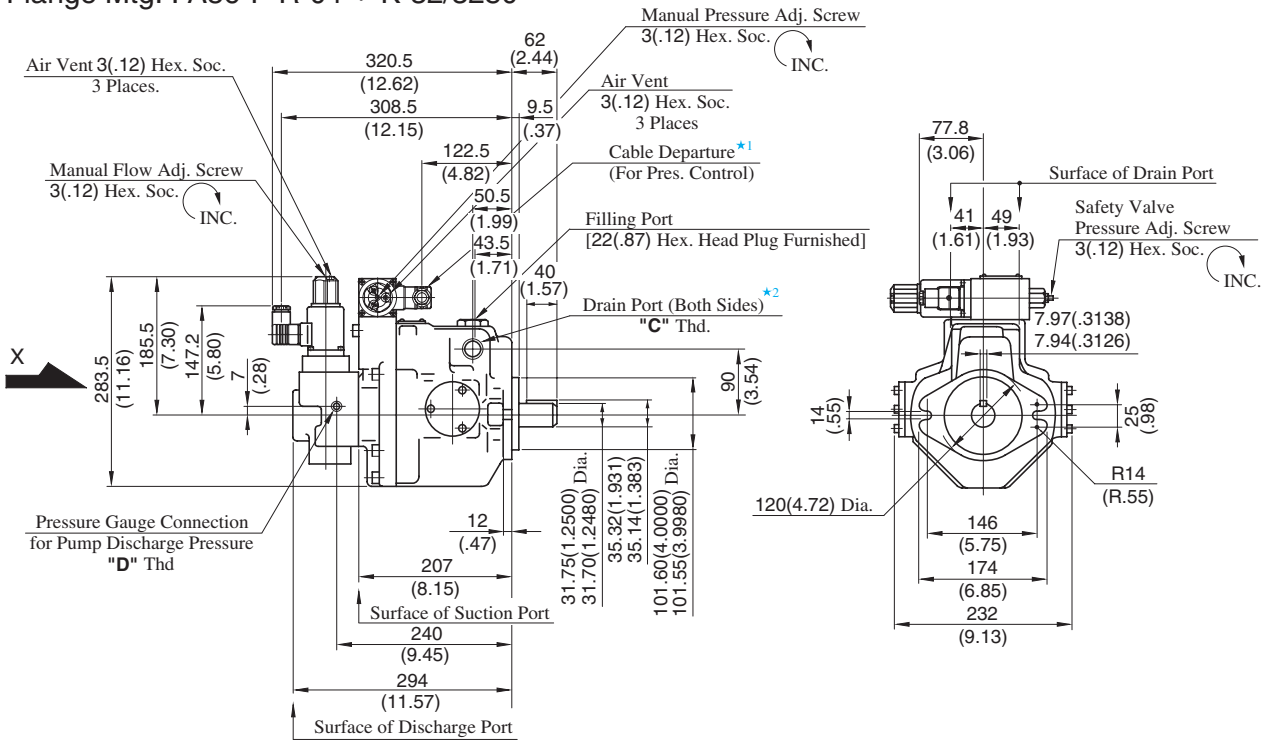
DIMENSIONS IN MILLIMETRES (INCHES)

Foot Mtg. : A37-L-R-04-\*-K-32/3280



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

**Flange Mtg. : A56-F-R-04-\*-K-32/3280**

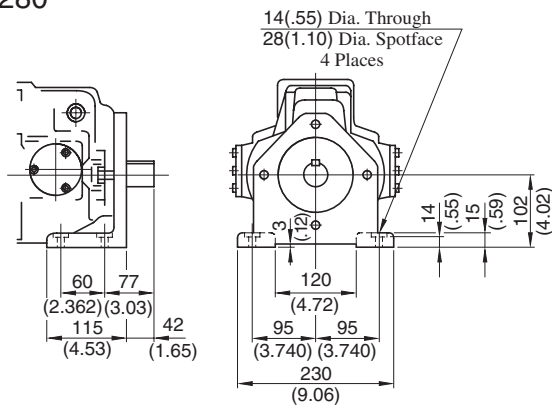


- ★ 1. Cable Applicable:  
Outside Dia.....8-10 mm (.31-.39 IN.)  
Conductor Area.....Not Exceeding 1.5 mm<sup>2</sup> (.0023 Sq. IN.)
- ★ 2. Use either port of two drain ports at your option.  
Keep the remaining port plugged.

Model Numbers	"C" Thd.	"D" Thd.
A56-F-R-04-*-K-32	Rc 3/4	Rc 1/4
A56-F-R-04-*-K-3280	3/4 BSP.F	1/4 BSP.Tr

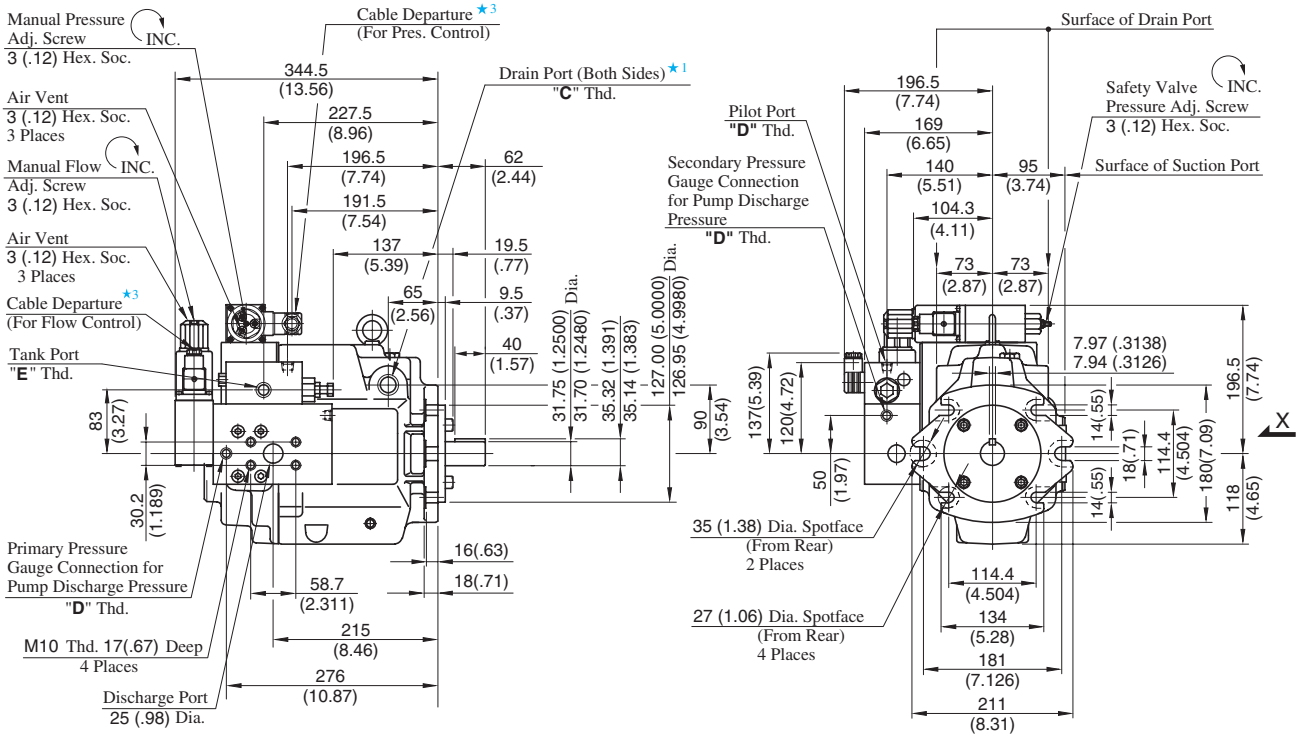
**DIMENSIONS IN MILLIMETRES (INCHES)**

**Foot Mtg. : A56-L-R-04-\*-K-32/3280**



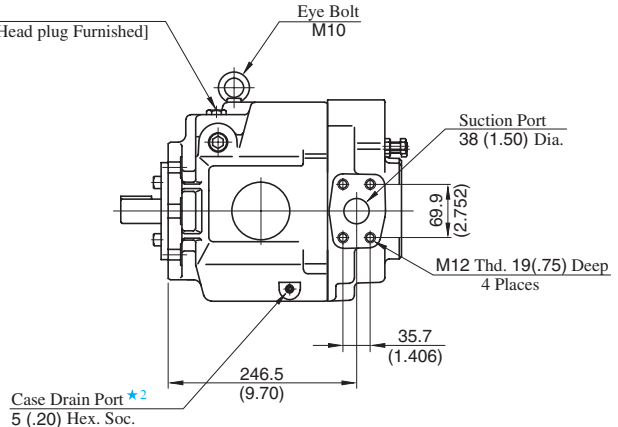
• For other dimensions, refer to "Flange Mtg. "

Flange Mtg. : A70-FR04\*S-60/6080



- ★ 1. Use either port of two drain ports at your option. Keep the remaining port plugged.
- ★ 2. Case drain port is available for use when draining hydraulic fluid from pump casing.
- ★ 3. Cable Applicable:  
Outside Dia.....8-10 mm (.31-.39 IN.)  
Conductor Area.....Not Exceeding 1.5 mm<sup>2</sup> (.0023 Sq. IN.)

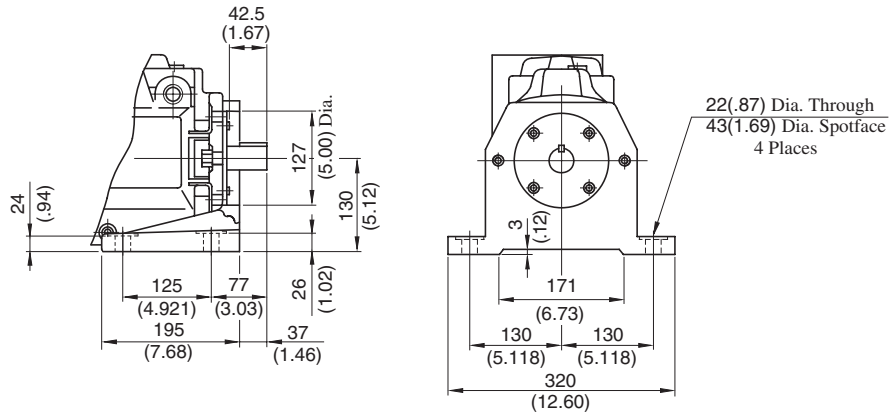
Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.
A70-FR04*S-60	Rc 3/4	Rc 1/4	Rc 3/8
A70-FR04*S-6080	3/4 BSP.F	1/4 BSP. Tr	3/8 BSP. F



View Arrow X

DIMENSIONS IN MILLIMETRES (INCHES)

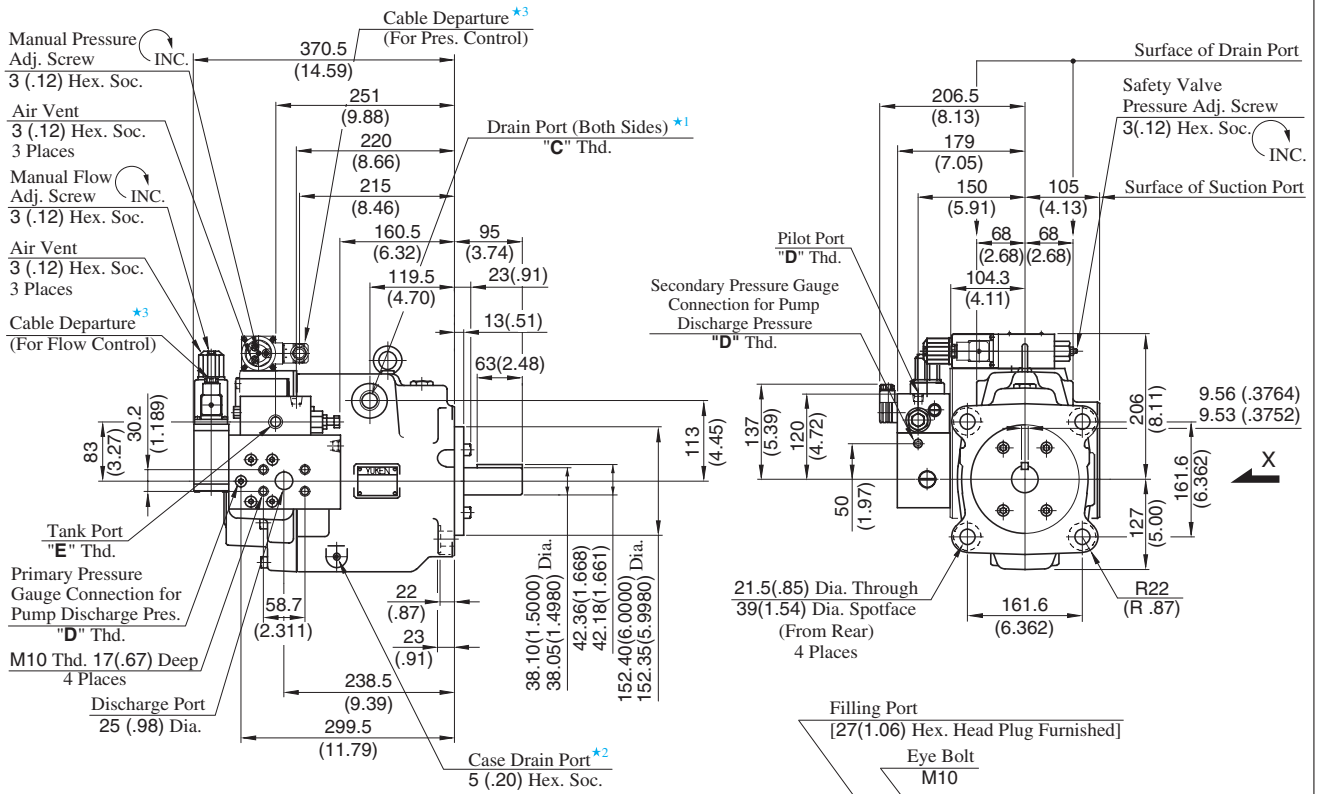
Foot Mtg.: A70-LR04\*S-60/6080



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

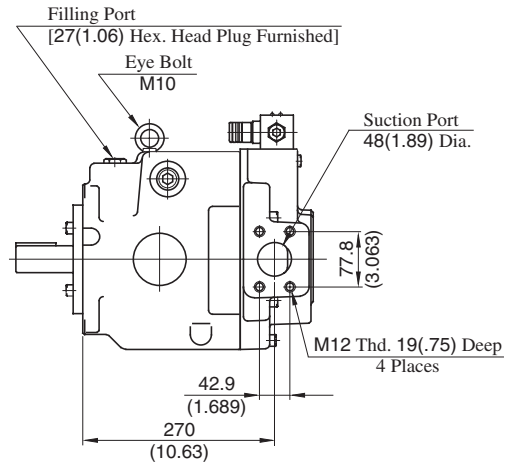


**Flange Mtg. : A90-FR04\*S-60/6080**



- ★ 1. Use either port of two drain ports at your option. Keep the remaining port plugged.
- ★ 2. Case drain port is available for use when draining hydraulic fluid from pump casing.
- ★ 3. Cable Applicable:  
 Outside Dia.....8-10 mm (.31-.39 IN.)  
 Conductor Area.....Not Exceeding 1.5 mm<sup>2</sup> (.0023 Sq. IN.)

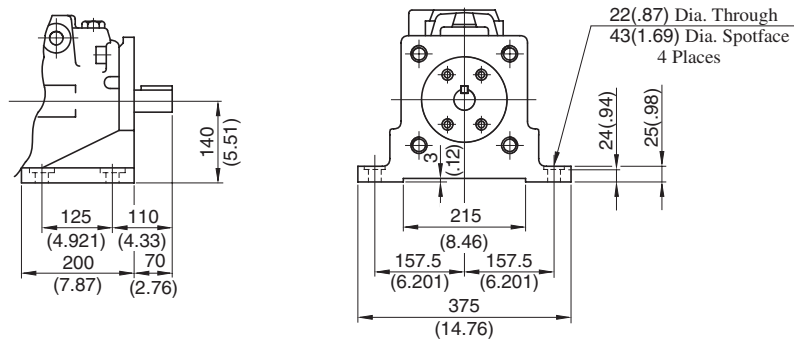
Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.
A90-FR04*S-60	Rc 3/4	Rc 1/4	Rc 3/8
A90-FR04*S-6080	3/4 BSP.F	1/4 BSP. Tr	3/8 BSP. F



**View Arrow X**

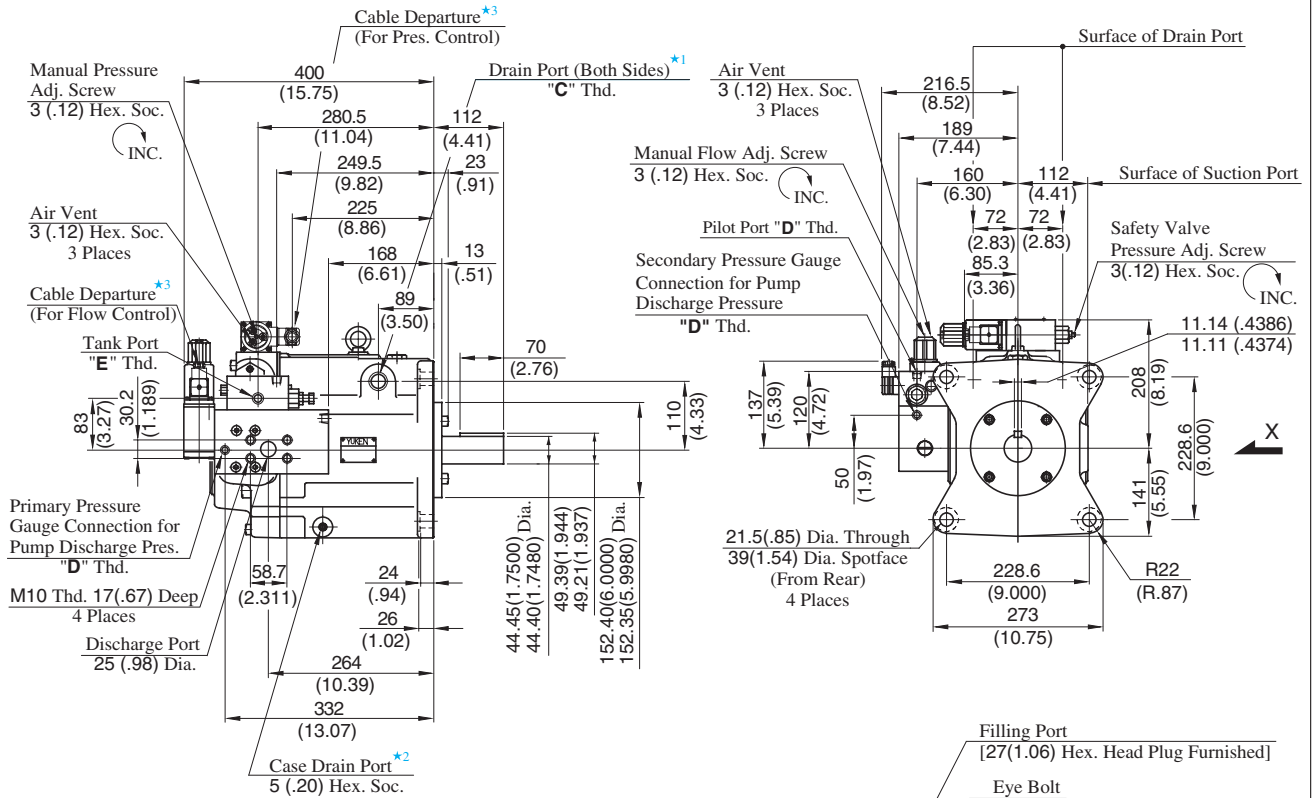
**DIMENSIONS IN MILLIMETRES (INCHES)**

**Foot Mtg.: A90-LR04\*S-60/6080**



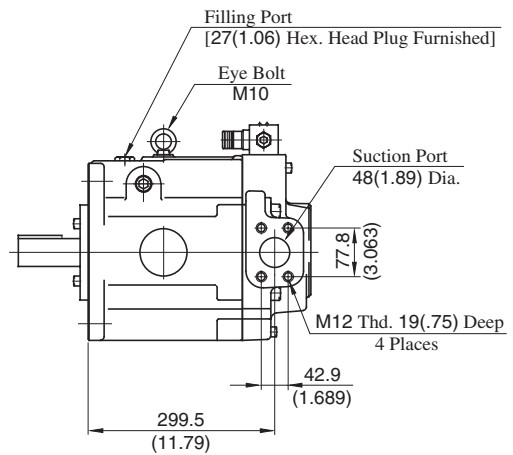
• For other dimensions, refer to "Flange Mtg.".

Flange Mtg. : A145-FR04\*S-60/6080



- ★ 1. Use either port of the two drain ports at your option. Keep the remaining port plugged.
- ★ 2. Case drain ports are available for use when draining hydraulic fluid from pump casing.
- ★ 3. Cable Applicable:  
Outside Dia.....8-10 mm (.31-.39 IN.)  
Conductor Area.....Not Exceeding 1.5 mm<sup>2</sup> (.0023 Sq. IN.)

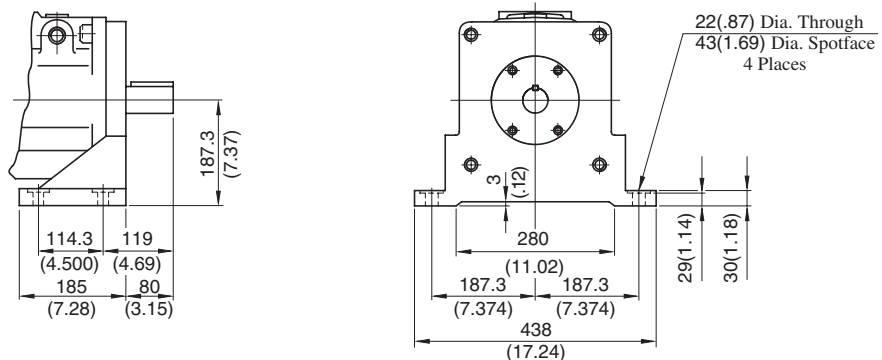
Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.
A145-FR04*S-60	Rc 3/4	Rc 1/4	Rc 3/8
A145-FR04*S-6080	3/4 BSP.F	1/4 BSP. Tr	3/8 BSP. F



View Arrow X

DIMENSIONS IN MILLIMETRES (INCHES)

Foot Mtg.: A145-LR04\*S-60/6080



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