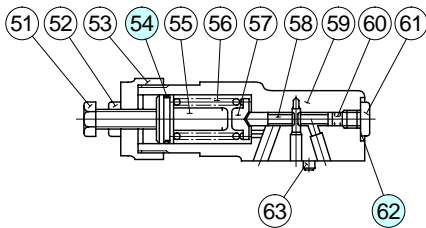
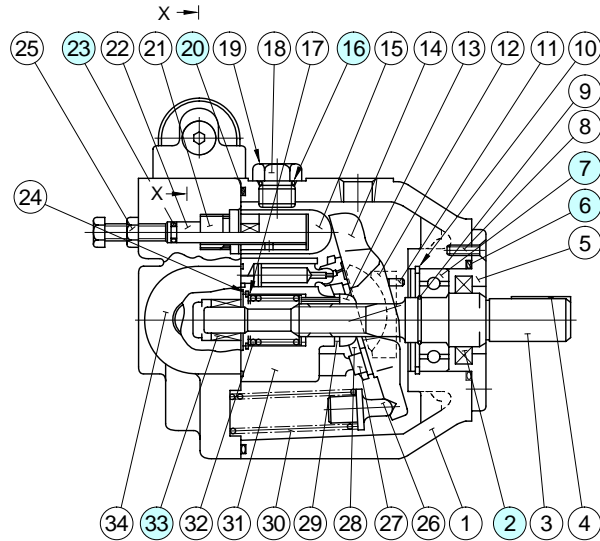
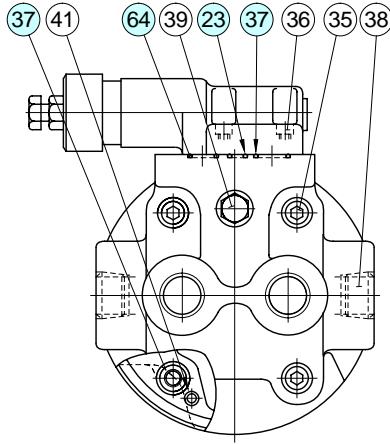


A10-FR01\*-12/1280/1290

#### CAUTION

When making replacement of seals or bearings, please do it carefully after reading through the relevant instructions in the Operator's Manual.



Section X-X

#### List of Seals & Bearings

Item	Name of Parts	Part Numbers	Qty.	
			Pres. Adj. Range	
			B	C & H
2*	Oil Seal	TCN24408Y	1	1
6*	O-Ring	SO-NA-G50	1	1
7	Bearing	6204	1	1
16*	O-Ring	SO-NB-P14	1	1
20*	O-Ring	SO-NB-G120	1	1
23*	O-Ring	SO-NB-P6	2	2
33	Bearing	HMK1215	1	1
37*	O-Ring	SO-NB-P12	6	5
54*	O-Ring	SO-NA-A018	1	1
62*	O-Ring	SO-NB-P10	1	1
64*	O-Ring	SO-NB-P9	—	1

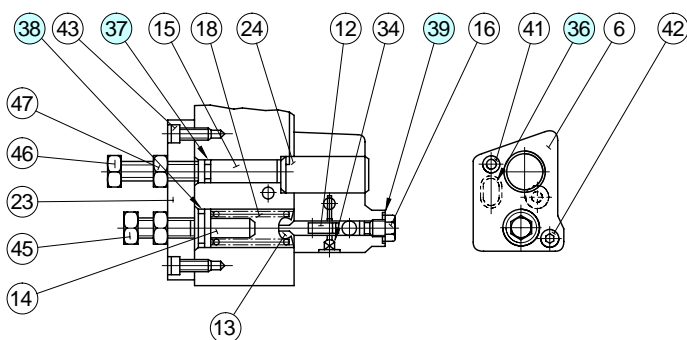
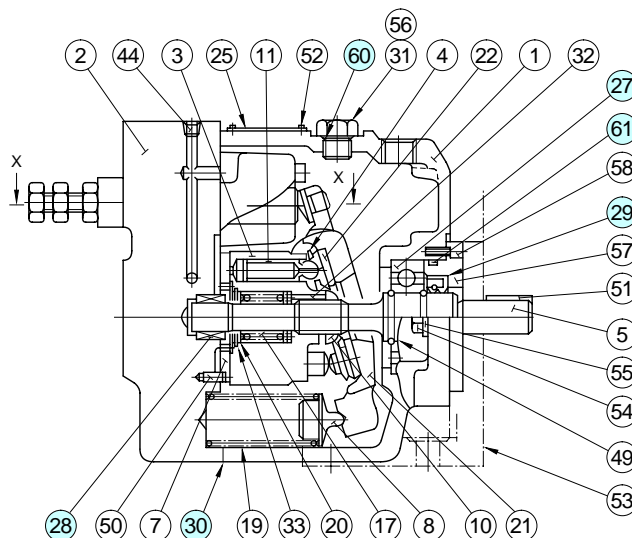
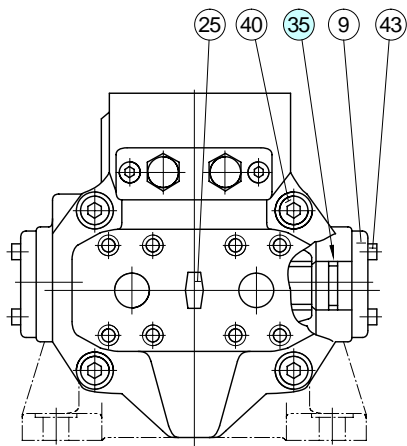
★ When ordering seals, please specify the seal kit number from the table below.

#### List of Seals Kits

Pump Model Numbers	Seal Kit Numbers
A10-FR01B-12/1280/1290	KS-A10-01B-12
A10-FR01C-12/1280/1290	KS-A10-01H-12
A10-FR01H-12/1280/1290	

### Spare Parts List

A16/A22/A37/A56-\*-R-01-\*-K-32/3280/3290



Section X-X

### CAUTION

When making replacement of seals or bearings, please do it carefully after reading through the relevant instructions in the Operator's Manual.

#### List of Seal 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-NB-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.

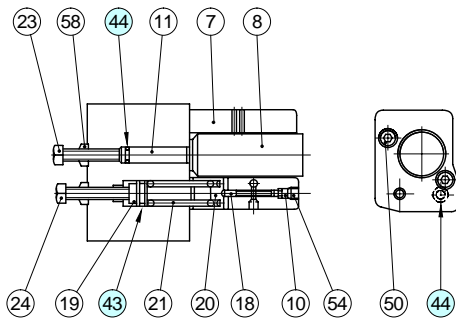
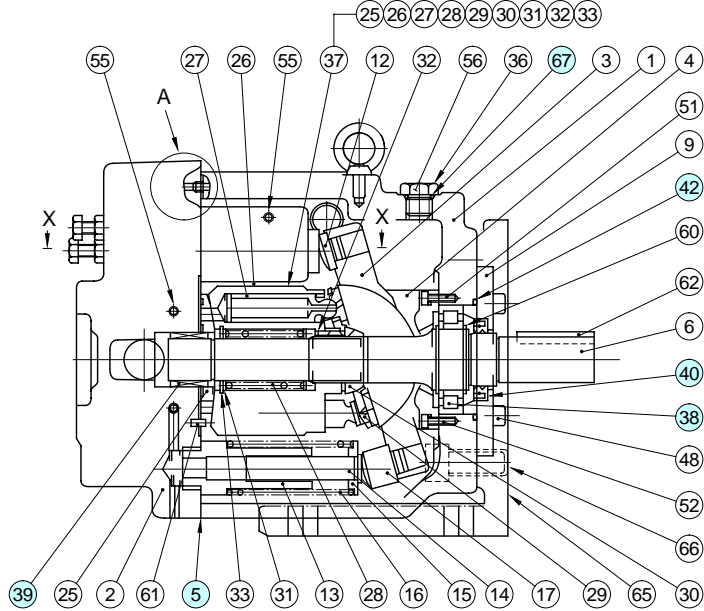
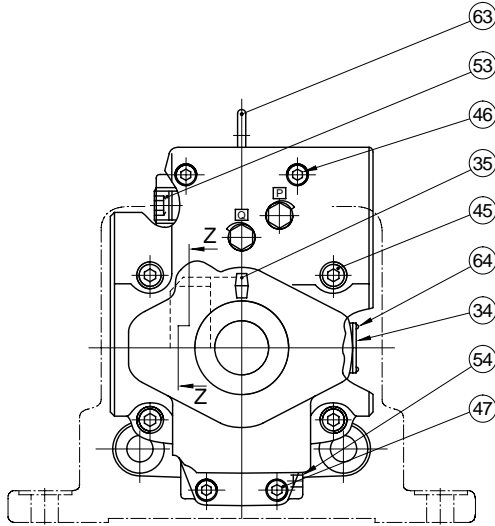
#### List of Seal Kits

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

A70/A90-\*R01\*S-60/6080/6090

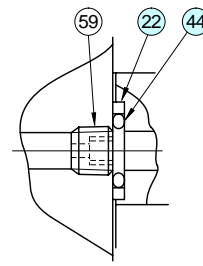
#### CAUTION

When making replacement of seals or bearings, please do it carefully after reading through the relevant instructions in the Operator's Manual.

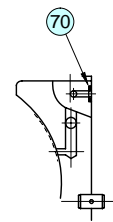


Section X-X

Section X-X  
(Only for "A70")



Detail "A"



Section Z-Z

#### List of Seals and Bearings

Item	Name of Parts	Part Numbers		Qty.
		A70-*R01*S	A90-*R01*S	
5*	Gasket	1314E-PK211972-5	1310E-PK211973-3	1
22	Back Up Ring	1310E-PK412440-0	1310E-PK412440-0	1
38	Bearing	NUP 208EX50	NUP 210E	1
39	Needle Bearing	HMK 3030V2	HMK 3530BV2	1
40*	Oil Seal	TCN 355511	TCN 456812	1
42*	O-Ring	SO-FA-G85	SO-FA-G95	1
43*	O-Ring	SO-NA-P18	SO-NA-P18	1
44*	O-Ring	SO-NB-P9	SO-NB-P9	3
67*	O-Ring	SO-NB-P14	SO-NB-P18	1
68*	Seal Washer	W10	—	1
70*	O-Ring	—	SO-NB-P5	1

#### List of Seal Kits

Pump Model Numbers	Seal Kit Numbers
A70-*R01*S-60*	KS-A70-01-60
A90-*R01*S-60*	KS-A90-01-60

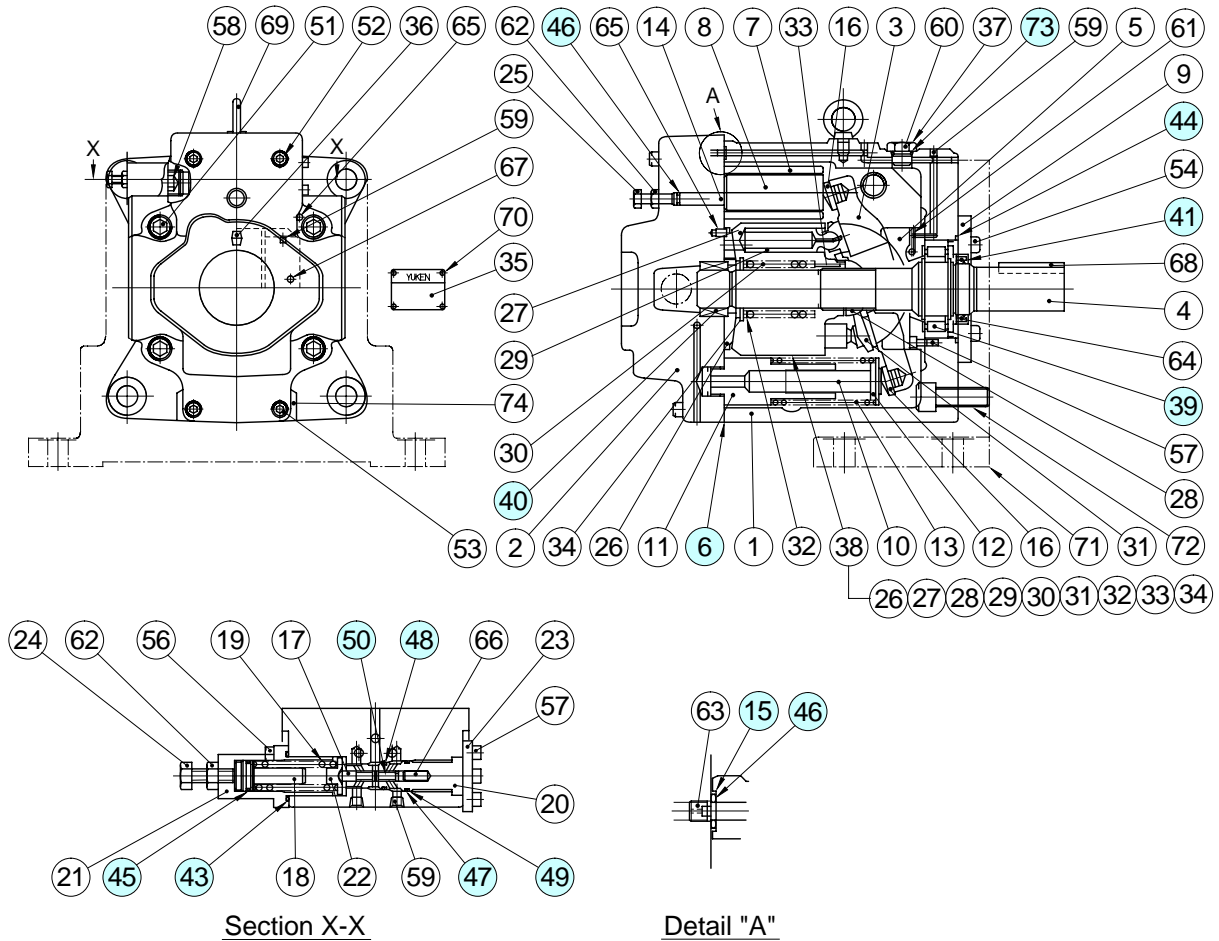
★ When ordering the seals, please specify the seal kit number from the table left.

### Spare Parts List

A145-\*R01\*S-60/6080/6090

#### CAUTION

When making replacement of seals or bearings, please do it carefully after reading through the relevant instructions in the Operator's Manual.



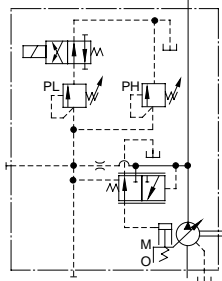
#### List of Seals and Bearings

Item	Name of Parts	Part Numbers	Qty.
6*	Gasket	1312-PK211974-1	1
15	Back Up Ring	1310E-PK412440-0	1
39	Bearing	NUP 2211ET2	1
40	Needle Bearing	8Q-NK38×55×30	1
41*	Oil Seal	TCN 507212	1
43*	O-Ring	S-31.5 (NBR, Hs70)	1
44*	O-Ring	SO-FA-G105	1
45*	O-Ring	SO-NA-P18	1
46*	O-Ring	SO-NB-P9	2
47*	O-Ring	SO-NB-A017	1
48*	O-Ring	SO-NB-A016	1
49	Back Up Ring	For SO-NB-A017	1
50	Back Up Ring	For SO-NB-A016	1
73*	O-Ring	SO-NB-P18	1

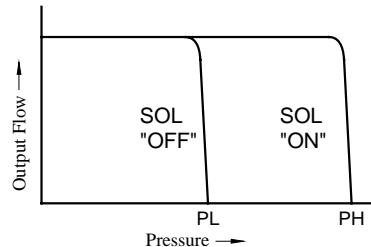
★ When ordering seals, please specify the kit number "KS-A145-01-60".

### Specifications

Graphic Symbol



Performance Characteristics



### Specifications

Model Numbers	Geometric Displacement cm <sup>3</sup> /rev (cu. in. /rev)	Minimum Adj. Flow cm <sup>3</sup> /rev (cu. in. /rev)	Operating Pres. MPa (PSI)		Minimum Adj. Pres. MPa (PSI)	Shaft Speed Range r/min		Approx. Mass kg (lbs.)	
			Rated <sup>*2</sup>	Intermittent <sup>*1</sup>		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 6 for the details.

### Solenoid Ratings

Electric Source	Coil Type	Frequency (Hz)	Voltage (V)		Current & Power at Rated Voltage		
			Source Rating	Serviceable Range	Inrush* (A)	Holding (A)	Power (W)
AC	A100	50	100	80 - 110	2.42	0.51	—
			100	90 - 120	2.14	0.37	
			110		2.35	0.44	
	A120	50	120	96 - 132	2.02	0.42	
			108 - 144	1.78	0.31		
	A200	50	200	160 - 220	1.21	0.25	
			200	180 - 240	1.07	0.19	
			220		1.18	0.22	
	A240	50	240	192 - 264	1.01	0.21	
			216 - 288	0.89	0.15		
DC (K Series)	D12	—	12	10.8 - 13.2	—	2.45	29
			24	21.6 - 26.4		1.23	
			48	43.2 - 52.8		0.61	
AC→DC Rectified	R100	50/60	100	90 - 110	—	0.33	29
			200	180 - 220		0.16	

★ Inrush current in the above table shows rms values at maximum stroke.

### Model Number Designation

#### ■ 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.
<b>A16</b> (15.8 cm <sup>3</sup> /rev)	<b>F:</b> Flange Mtg.	(Viewed from) (Shaft End)	<b>02:</b> Solenoid Two Pressure Control Type	<b>None:</b> Axial Port <sup>*2</sup>	<b>K:</b> Keyed Shaft	<b>AC</b> A100,A120 A200,A240  <b>DC</b> D12,D24 D48 (AC→DC Rectified) R100,R200	<b>32</b>	Refer to <sup>*3</sup>
<b>A22</b> (22.2 cm <sup>3</sup> /rev)							<b>32</b>	
<b>A37</b> (36.9 cm <sup>3</sup> /rev)							<b>32</b>	
<b>A56</b> (56.2 cm <sup>3</sup> /rev)							<b>32</b>	
	<b>L:</b> Foot Mtg.	<b>R:</b> Clockwise <sup>*1</sup> (Normal)		<b>S:</b> Side Port				

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.
<b>A70</b> (70 cm <sup>3</sup> /rev)	<b>F:</b> Flange Mtg.	(Viewed from) (Shaft End)	<b>02:</b> Solenoid Two Pressure Control Type	<b>S:</b> Side Port	<b>AC</b> A100,A120 A200,A240  <b>DC</b> D12,D24 D48 (AC→DC Rectified) R100,R200	<b>60</b>	Refer to <sup>*3</sup>
<b>A90</b> (91.0 cm <sup>3</sup> /rev)						<b>60</b>	
<b>A145</b> (145 cm <sup>3</sup> /rev)						<b>60</b>	
	<b>L:</b> Foot Mtg.	<b>R:</b> Clockwise <sup>*1</sup> (Normal)					

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

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

★2. The axial port is not available to the N. American Design Standard of A37 and A56 series.

#### ■ Performance Characteristics

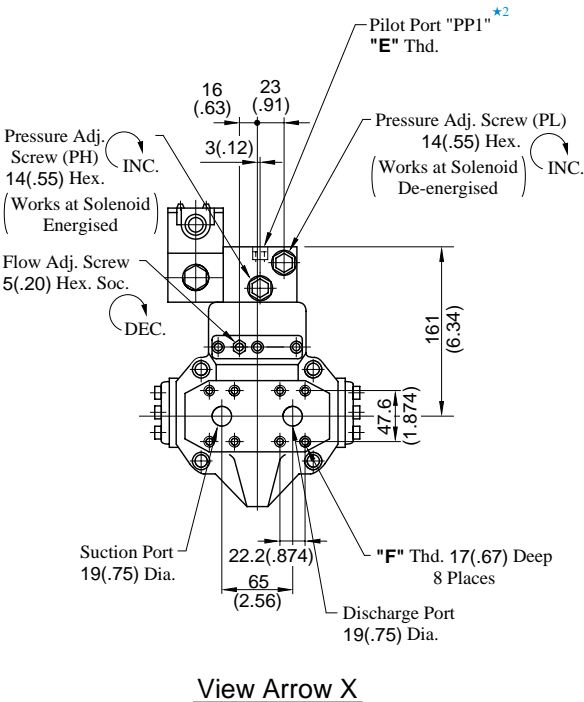
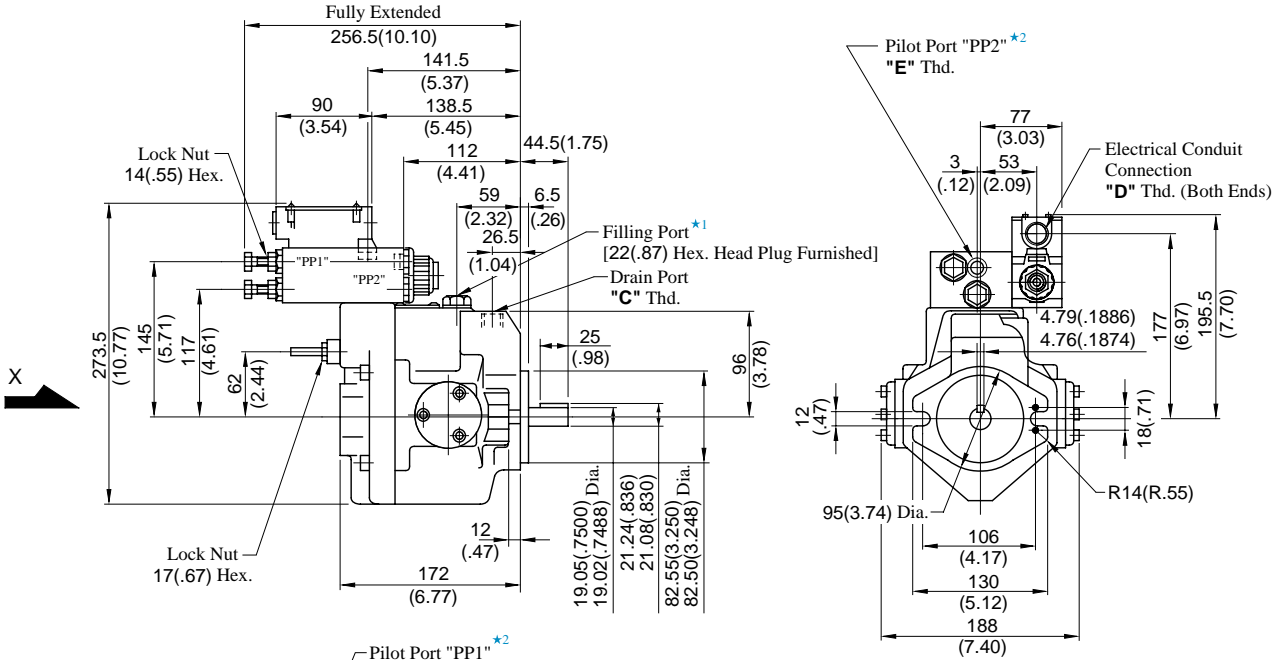
For performance characteristics, refer to models of pressure compensator type on page 10 to 16.

#### ■ Pipe Flange Kit

For pipe flange, refer to form of pressure compensator type on page 7.

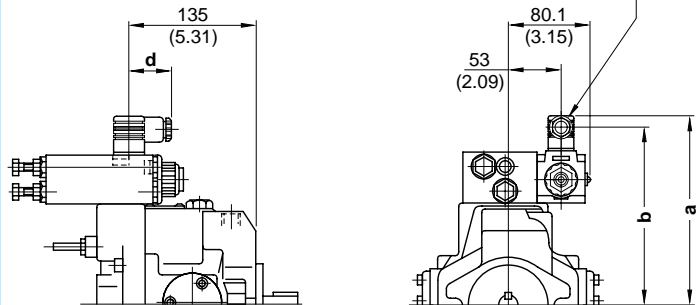
#### Axial Port Type

Flange Mtg.: A16-F-R-02-K-\*-32/3290  
A22-F-R-02-K-\*-32/3290



A16-F-R-02-K-\*-3280  
A22-F-R-02-K-\*-3280

Cable Departure  
Cable Applicable:  
Outside Dia. .... 8-10mm(.31-.39 in.)  
Conductor Area ..... Not Exceeding 1.5mm<sup>2</sup>(.002 Sq. IN.)



Model Numbers	mm (IN.)		
	a	b	d
A16/A22-F-R-02-K-A*- 3280	194 (7.64)	182. (7.17)	39 (1.54)
A16/A22-F-R-02-K-D*-	205 (8.07)	193 (7.60)	39 (1.54)
	208 (8.19)	186.2 (7.33)	53 (2.09)

• For other dimensions, refer to 32/3290 design.

- ★ 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.

Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	"F" Thd.
A16/A22-F-R-02-K-*-32	Rc 3/8	G 1/2	Rc 1/4	M10
A16/A22-F-R-02-K-*-3280	3/8 BSP.F	—	1/4 BSP. Tr	
A16/A22-F-R-02-K-*-3290	3/8 NPT	1/2 NPT	1/4 NPT	3/8-16 UNC

DIMENSIONS IN MILLIMETRES (INCHES)

#### • Side Port Type

Port mounting dimensions are the same as those of pressure compensator model. Refer to page 18 for port mounting dimensions.

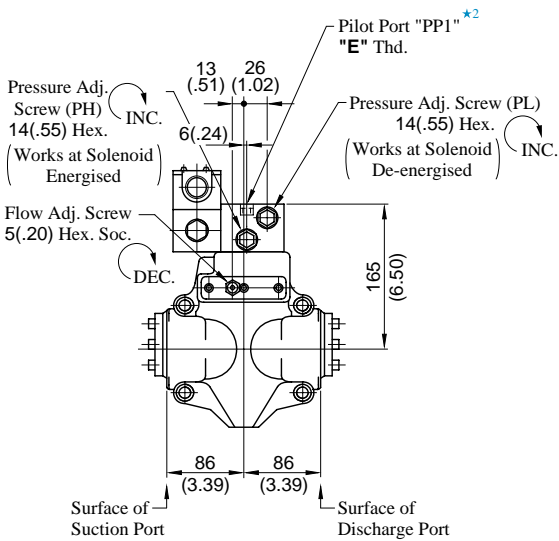
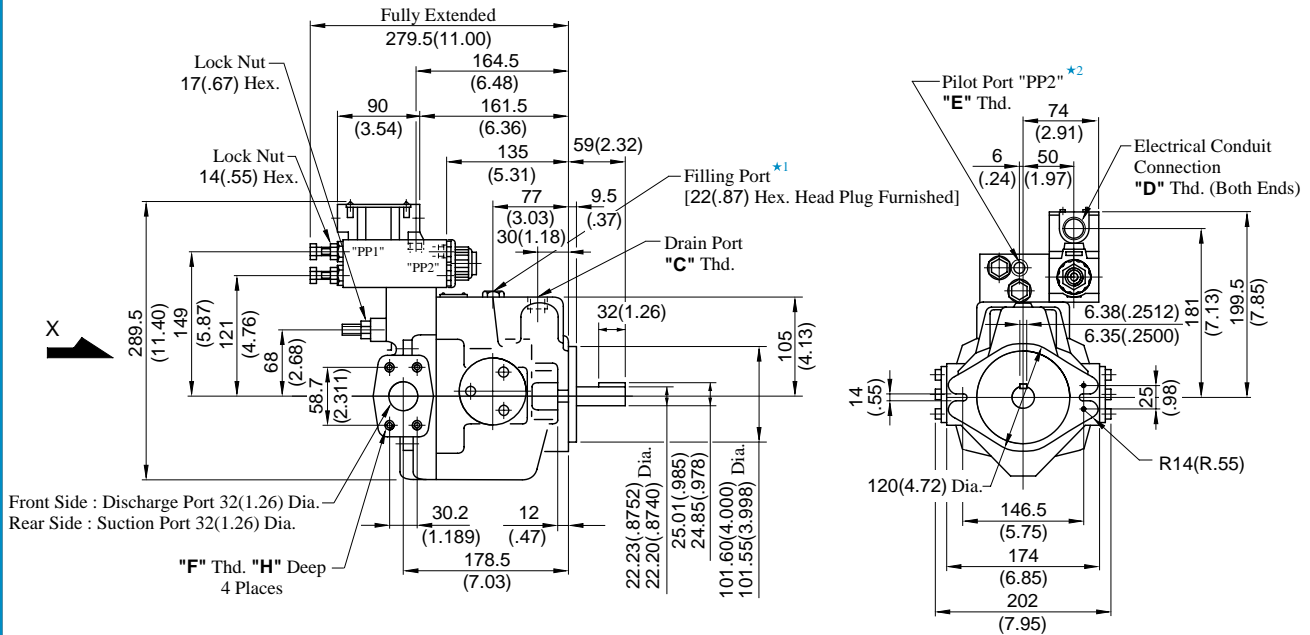
#### • Foot Mounting Type

Mounting bracket is common to that of pressure compensator model. Refer to page 18 for the dimensions of mounting bracket.

### Installation Drawing

#### Side Port Type

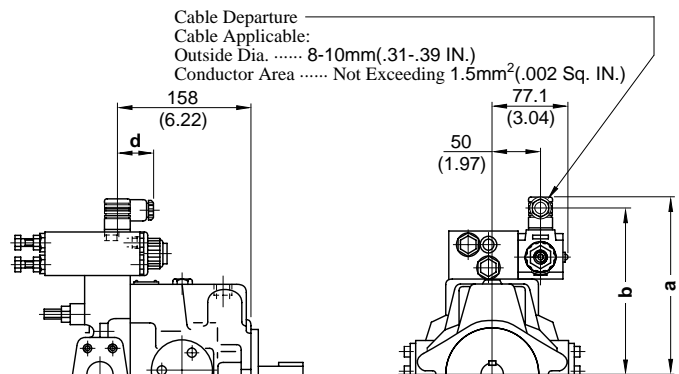
Flange Mtg. : A37-F-R-02-S-K\*-32/3290



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.

#### A37-F-R-02-S-K\*-3280



Model Numbers	mm (IN.)		
	a	b	d
A37-F-R-02-S-K-A*-3280	198 (7.80)	186 (7.32)	39 (1.54)
A37-F-R-02-S-K-D*-3280	209 (8.23)	197 (7.76)	39 (1.54)
A37-F-R-02-S-K-R*-3280	212 (8.35)	190.2 (7.49)	53 (2.09)

• For other dimensions, refer to 32/3290 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-*-3290	1/2 NPT	1/2 NPT	1/4 NPT	7/16-14 UNC	20 (.79)

### DIMENSIONS IN MILLIMETRES (INCHES)

#### • Axial Port Type

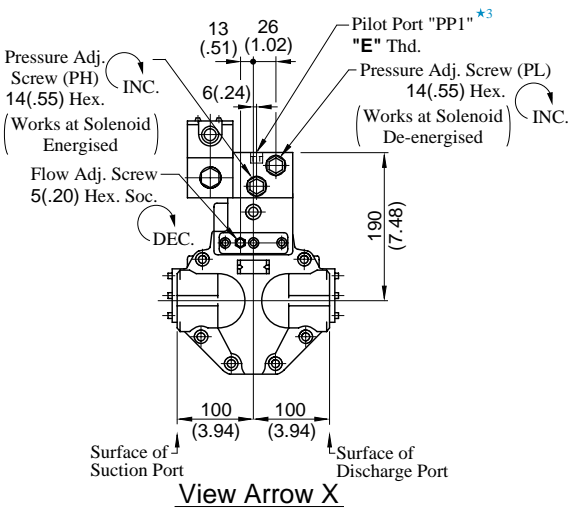
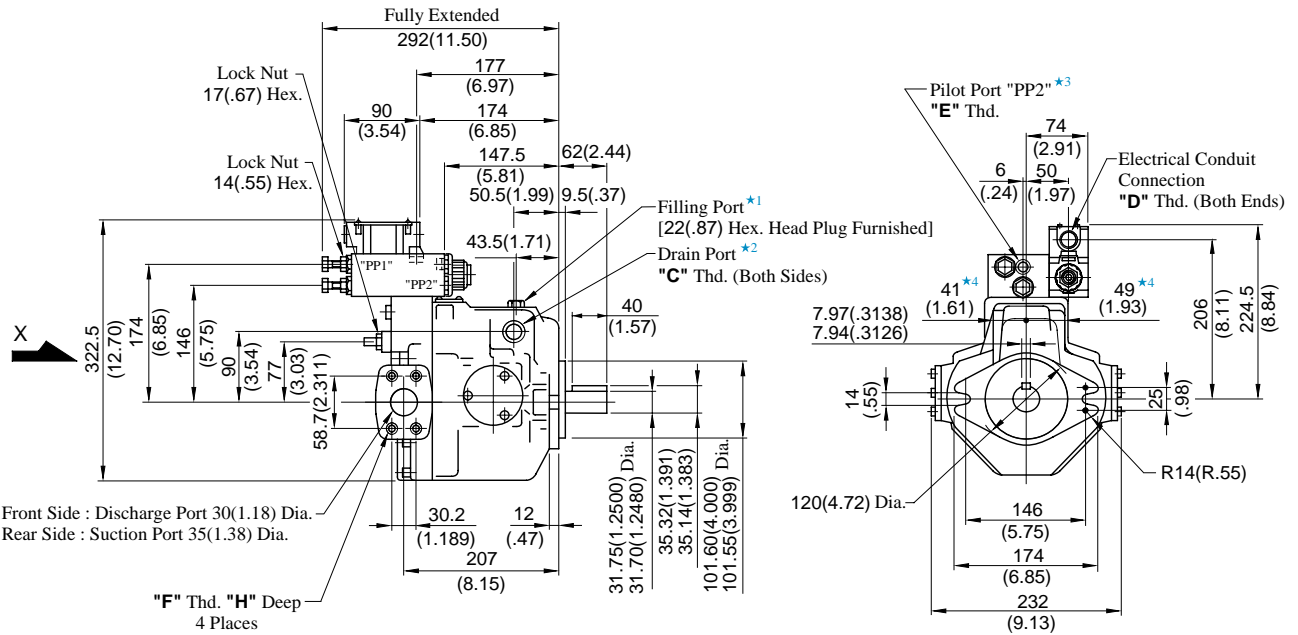
Port mounting dimensions are the same as those of pressure compensator model. Refer to page 19 for port mounting dimensions.

#### • Foot Mounting Type

Mounting bracket is common to that of pressure compensator model. Refer to page 19 for the dimensions of mounting bracket.

#### Side Port Type

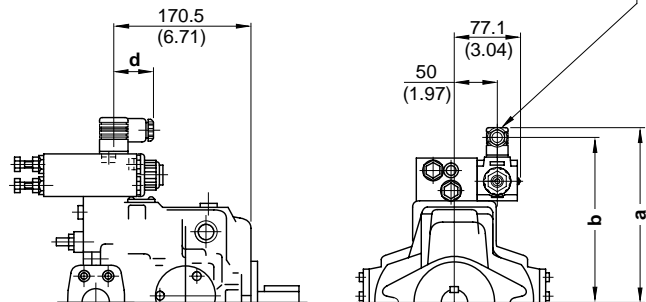
Flange Mtg.: A56-F-R-02-S-K-\*-32/3290



- ★ 1. Install the pump so that the "Filling Port" is at the top.
- ★ 2. Use either port of two drain ports at your option. Keep the remaining port plugged. Note that on the European Design Standard (3280 Design), only the left side, as viewed from the shaft end, of the drain port is machined.
- ★ 3. The pilot port provided is for connecting a control valve, if multistage pressure control is required.
- ★ 4. Dimensions show surface of drain port.

#### A56-F-R-02-S-K-\*-3280

Cable Departure  
Cable Applicable:  
Outside Dia. .... 8-10mm(.31-.39 IN.)  
Conductor Area ..... Not Exceeding 1.5mm<sup>2</sup>(.002 Sq. IN.)



Model Numbers	mm (IN.)		
	a	b	d
A56-F-R-02-S-K-A*-3280	223 (8.78)	211 (8.31)	39 (1.54)
A56-F-R-02-S-K-D*-3280	234 (9.21)	222 (8.74)	39 (1.54)
A56-F-R-02-S-K-R*-3280	237 (9.33)	215.2 (8.47)	53 (2.09)

• For other dimensions, refer to 32/3290 design.

Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	"F" Thd.	"H" mm (IN.)
A56-F-R-02-S-K-*-32	Rc 3/4	G 1/2	Rc 1/4	M10	19 (.75)
A56-F-R-02-S-K-*-3280	3/4 BSP.F	—	1/4 BSP. Tr		
A56-F-R-02-S-K-*-3290	3/4 NPT	1/2 NPT	1/4 NPT	7/16-14 UNC	20 (.79)

#### DIMENSIONS IN MILLIMETRES (INCHES)

#### • Axial Port Type

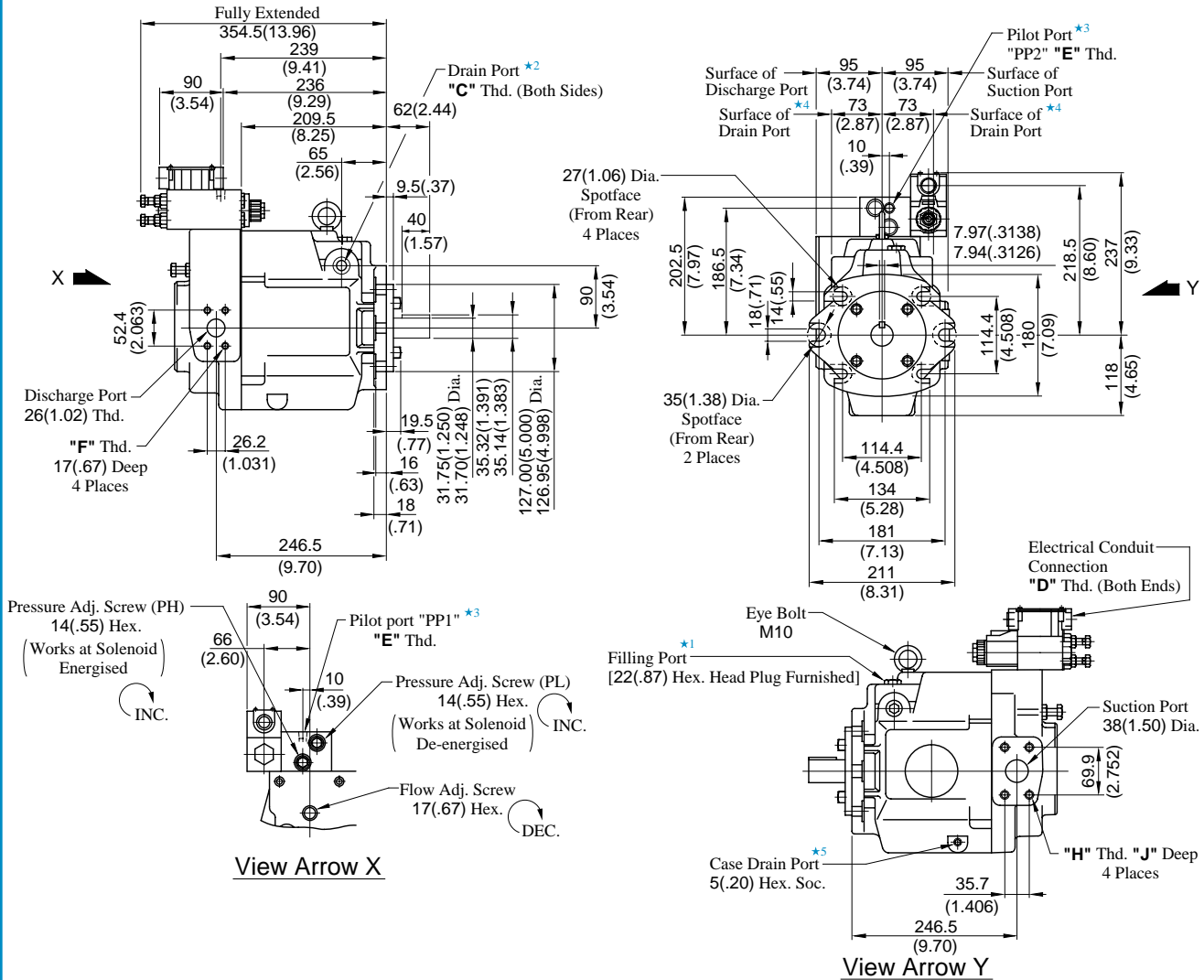
Port mounting dimensions are the same as those of pressure compensator model. Refer to page 20 for port mounting dimensions.

#### • Foot Mounting Type

Mounting bracket is common to that of pressure compensator model. Refer to page 20 for the dimensions of mounting bracket.

### Installation Drawing

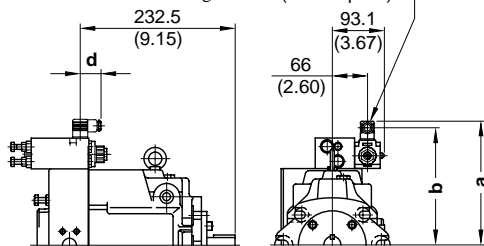
Flange Mtg. : A70-FR02S\*-60/6090



Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	"F" Thd.	"H" Thd.	"J" mm (IN.)
A70-FR02S*-60	Rc 3/4	G 1/2	Rc 1/4	M10	M12	19 (.75)
A70-FR02S*-6080	3/4 BSP.F	—	1/4 BSP. Tr			
A70-FR02S*-6090	3/4 NPT	1/2 NPT	1/4 NPT	7/16-14 UNC	1/2-13 UNC	21 (.83)

### A70-FR02S\*-6080

Cable Departure  
Cable Applicable:  
Outside Dia. .... 8-10mm (.31-.39 IN.)  
Conductor Area ..... Not Exceeding 1.5mm<sup>2</sup> (.002 Sq. IN.)



Model Numbers	mm (IN.)		
	a	b	d
A70-FR02SA*-6080	236 (9.29)	224 (8.82)	39 (1.54)
A70-FR02SD*-6080	247 (9.72)	235 (9.25)	39 (1.54)
A70-FR02SR*-6080	250 (9.84)	228.2 (8.98)	53 (2.09)

• For other dimensions, refer to 60/6090 design.

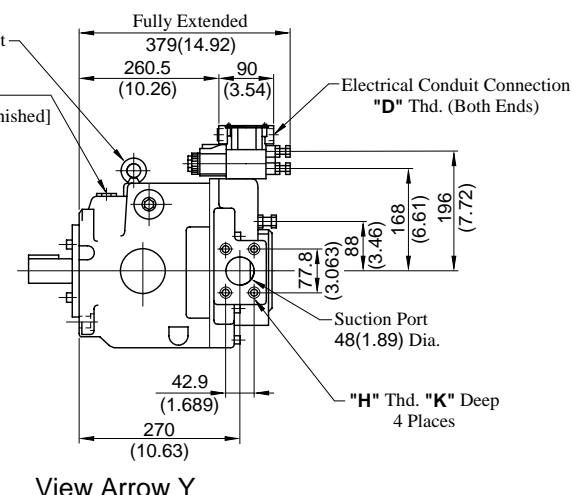
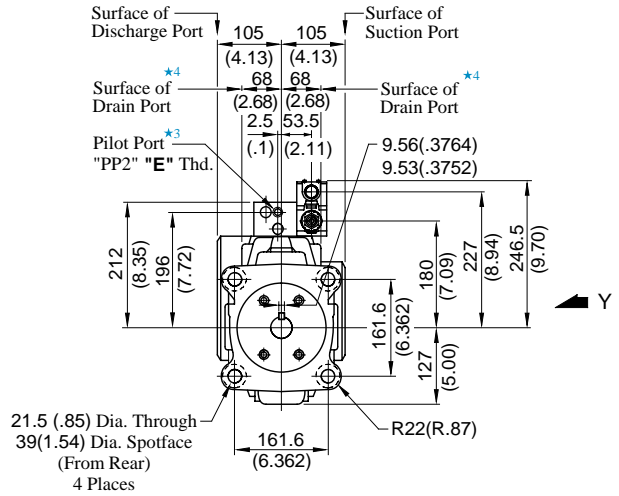
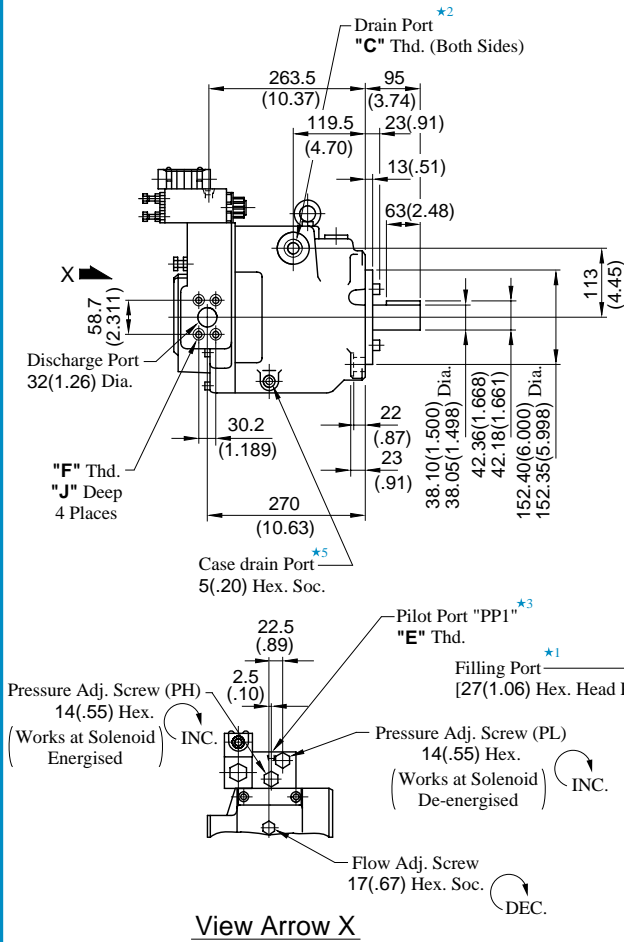
- ★ 1. Install the pump so that the "Filling Port" is at the top.
- ★ 2. Use either port of two drain ports at your option. Keep the remaining port plugged. Note that on the European Design Standard (6080 Design), only the left side, as viewed from the shaft end, of the drain port is machined.
- ★ 3. The pilot port provided is for connecting a control valve, if multistage pressure control is required.
- ★ 4. Dimensions show surface of drain port.
- ★ 5. Case drain port is available for use when draining hydraulic fluid from pump casing.

DIMENSIONS IN  
MILLIMETRES (INCHES)

### ● Foot Mounting Type

Mounting bracket is common to that of pressure compensator model. Refer to page 21 for the dimensions of mounting bracket.

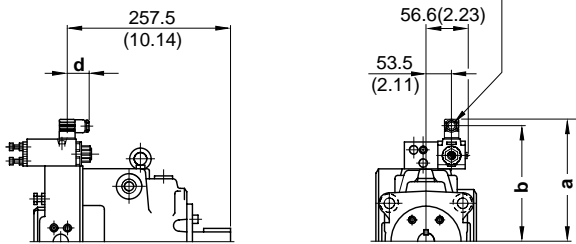
#### Flange Mtg.: A90-FR02S\*-60/6090



Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	"F" Thd.	"H" Thd.	"J" mm (IN.)	"K" mm (IN.)
A90-FR02S*-60	Rc 3/4	G 1/2	Rc 1/4	M10	M12	19 (.75)	19 (.75)
A90-FR02S*-6080	3/4 BSP.F	—	1/4 BSP. Tr				
A90-FR02S*-6090	3/4 NPT	1/2 NPT	1/4 NPT	7/16-14 UNC	1/2-13 UNC	20 (.79)	21 (.83)

#### A90-FR02S\*-6080

Cable Departure  
Cable Applicable:  
Outside Dia. .... 8-10mm (.31-.39 IN.)  
Conductor Area ..... Not Exceeding 1.5mm<sup>2</sup> (.002 Sq. IN.)



Model Numbers	mm (IN.)		
	a	b	d
A90-02FRSA*-6080	245 (9.65)	233 (9.17)	39 (1.54)
A90-02FRSD*-6080	256 (10.08)	244 (9.61)	39 (1.54)
A90-02FRSR*-6080	259 (10.20)	237.2 (9.34)	53 (2.09)

• For other dimensions, refer to 60/6090 design.

- ★ 1. Install the pump so that the "Filling Port" is at the top.
- ★ 2. Use either port of two drain ports at your option. Keep the remaining port plugged. Note that on the European Design Standard (6080 Design), only the left side, as viewed from the shaft end, of the drain port is machined.
- ★ 3. The pilot port provided is for connecting a control valve, if multistage pressure control is required.
- ★ 4. Dimensions show surface of drain port.
- ★ 5. Case drain port is available for use when draining hydraulic fluid from pump casing.

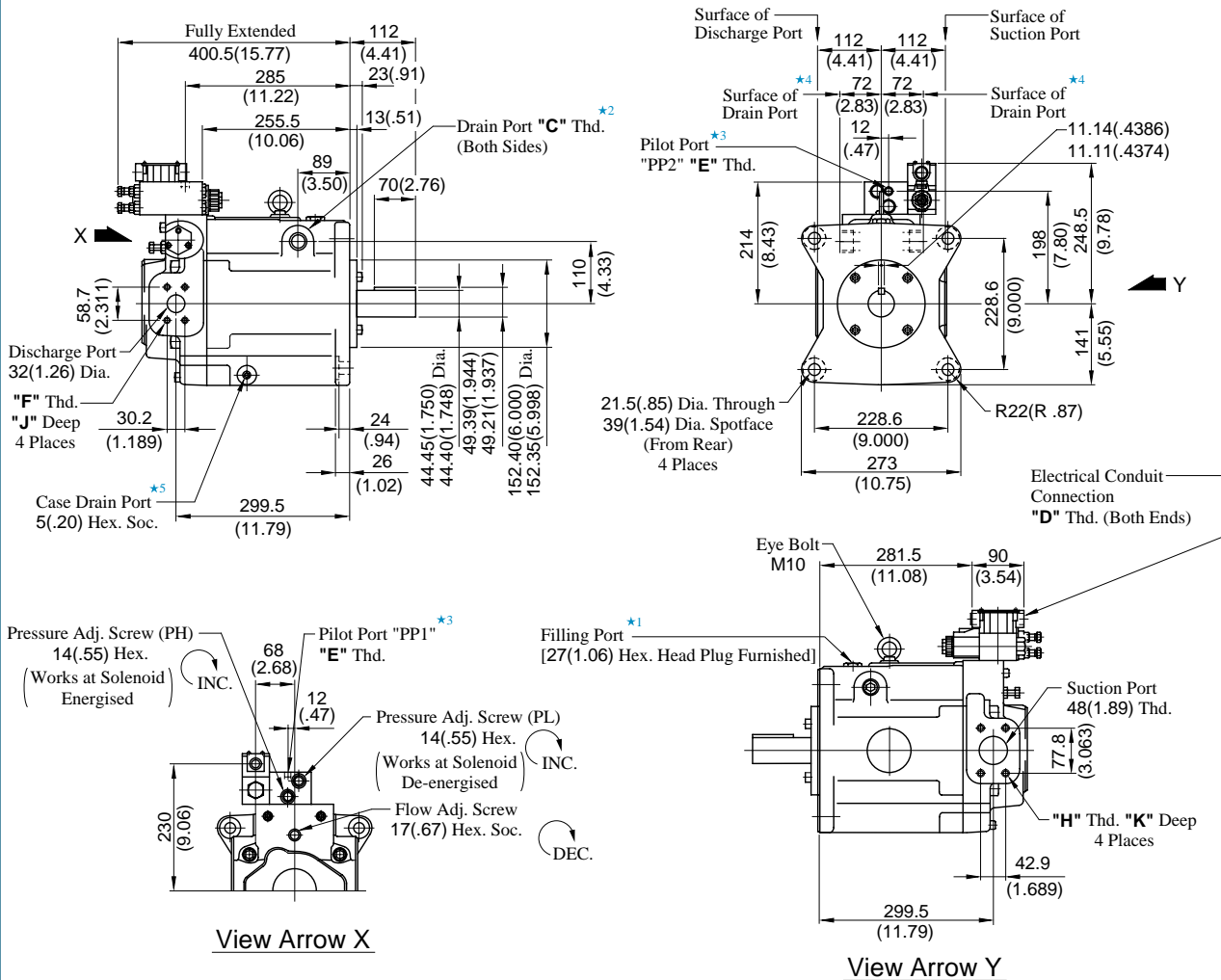
DIMENSIONS IN  
MILLIMETRES (INCHES)

#### ● Foot Mounting Type

Mounting bracket is common to that of pressure compensator model. Refer to page 22 for the dimensions of mounting bracket.

### Installation Drawing

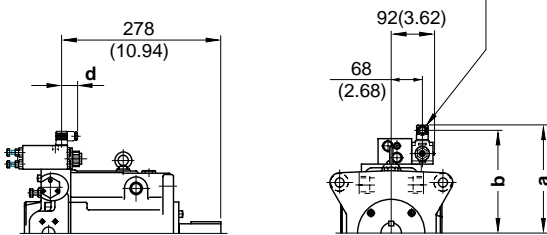
Flange Mtg. : A145-FR02S\*-60/6090



Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	"F" Thd.	"H" Thd.	"J" mm (IN.)	"K" mm (IN.)
A145-FR02S*-60	Rc 3/4	G 1/2	Rc 1/4	M10	M12	19 (.75)	19 (.75)
A145-FR02S*-6080	3/4 BSP.F	—	1/4 BSP. Tr				
A145-FR02S*-6090	3/4 NPT	1/2 NPT	1/4 NPT	7/16-14 UNC	1/2-13 UNC	20 (.79)	21 (.83)

### A145-FR02S\*-6080

Cable Departure  
Cable Applicable:  
Outside Dia. .... 8-10mm(.31-.39 IN.)  
Conductor Area ..... Not Exceeding 1.5mm<sup>2</sup>(.002 Sq. IN.)



Model Numbers	mm (IN.)		
	a	b	d
A145-FR02SA*-6080	247 (9.72)	235 (9.25)	39 (1.54)
A145-FR02SD*-6080	258 (10.16)	246 (9.69)	39 (1.54)
A145-FR02SR*-6080	261 (10.28)	239.2 (9.42)	53 (2.09)

• For other dimensions, refer to 60/6090 design.

- ★ 1. Install the pump so that the "Filling Port" is at the top.
- ★ 2. Use either port of two drain ports at your option. Keep the remaining port plugged. Note that on the European Design Standard (6080 Design), only the left side, as viewed from the shaft end, of the drain port is machined.
- ★ 3. The pilot port provided is for connecting a control valve, if multistage pressure control is required.
- ★ 4. Dimensions show surface of drain port.
- ★ 5. Case drain port is available for use when draining hydraulic fluid from pump casing.

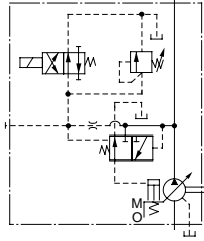
DIMENSIONS IN  
MILLIMETRES (INCHES)

### ● Foot Mounting Type

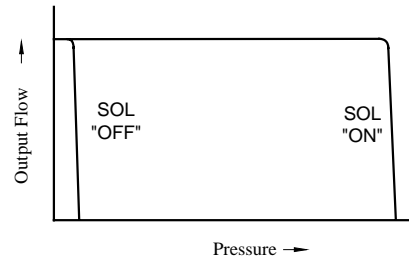
Mounting bracket is common to that of pressure compensator model. Refer to page 23 for the dimensions of mounting bracket.

**Specifications**

Graphic Symbol



Performance Characteristics



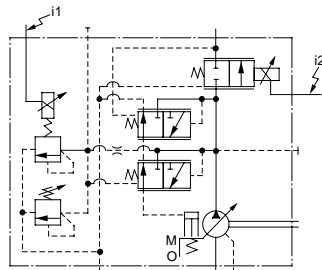
**Specifications**

Model Numbers	Geometric Displacement cm <sup>3</sup> /rev (cu. in. /rev)	Minimum Adj. Flow cm <sup>3</sup> /rev (cu. in. /rev)	Operating Pres. MPa (PSI)		Unloading Pres. 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*K-60*	70.0 (4.27)	30 (1.83)	25 (3630)	25 (3630)	1.2 (170)	1800	600
A90-*R03S*K-60*	91.0 (5.55)	56 (3.42)	25 (3630)	25 (3630)	1.2 (170)	1800	600
A145-*R03S*K-60*	145 (8.85)	83 (5.06)	25 (3630)	25 (3630)	1.2 (170)	1800	600

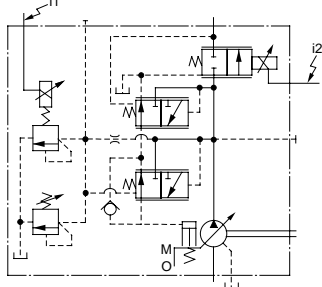
- Consult YUKEN for details.

### Model Number Designation

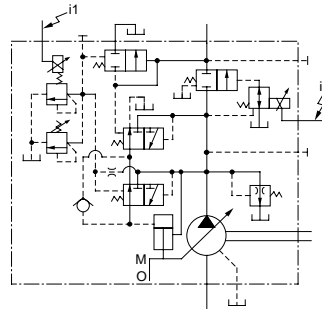
#### Graphic Symbols



A16/A22/A37

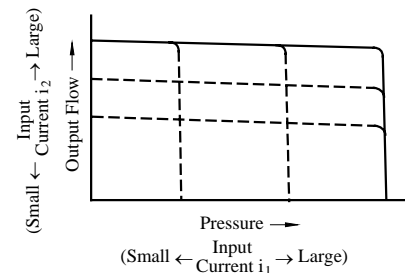


A56



A70/A90/A145

#### Performance Characteristics



#### Model Number Designation

A56	-F	-R	-04	-C	-K	-32	*
Series Number	Mounting	Direction of Rotation	Control Type	Pres. 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.  <b>L:</b> Foot Mtg.	(Viewed from Shaft End)  <b>R: ★1</b> Clockwise	<b>04:</b> Proportional Electro-Hydraulic Load Sensing	<b>B:</b> 1.5 - 7 (220 - 1020) <b>C:</b> 1.5 - 16 (220 - 2320) <b>H:</b> 1.5 - 21 (220 - 3050)	<b>K:</b> Keyed Shaft	<b>32</b>	Refer to ★2
<b>A22</b> (22.2 cm <sup>3</sup> /rev)				<b>B:</b> 1.5 - 7 (220 - 1020) <b>C:</b> 1.5 - 16 (220 - 2320)		<b>32</b>	
<b>A37</b> (36.9 cm <sup>3</sup> /rev)				<b>B:</b> 2 - 7 (290 - 1020) <b>C:</b> 2 - 16 (290 - 2320) <b>H:</b> 2 - 21 (290 - 3050)		<b>32</b>	
<b>A56</b> (56.2 cm <sup>3</sup> /rev)				<b>B:</b> 2 - 7 (290 - 1020) <b>C:</b> 2 - 16 (290 - 2320) <b>H:</b> 2 - 21 (290 - 3050)		<b>32</b>	

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

★1. Available to supply pump with anti-clockwise rotation. Consult ★2. Design Standards: None ..... Japanese Standard "JIS"  
 80 ..... European Design Standard  
 90 ..... N. American Design Standard  
 Yuken for details.

#### ■ 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	N. American Design Standard	Japanese Standard "JIS" & European Design Standard	N. American Design Standard	Japanese Standard "JIS" & European Design Standard	N. American Design Standard
A16-*-R-04 A22-*-R-04	Suction	F5-06-A-10	F5-06-A-1080	F5-06-A-1090	F5-06-B-10	F5-06-B-1090	F5-06-C-10	F5-06-C-1090
	Discharge	___*2	___*2	___*2	___*2	___*2	___*2	___*2
A37-*-R-04 A56-*-R-04	Suction	F5-10-A-10	F5-10-A-1080	F5-10-A-1090	F5-10-B-10	F5-10-B-1090	F5-10-C-10	F5-10-C-1090
	Discharge	F5-06-A-10	F5-06-A-1080	F5-06-A-1090	F5-06-B-10	F5-06-B-1090	F5-06-C-10	F5-06-C-1090
A70-*R04	Suction	F5-12-A-10	F5-12-A-1080	F5-12-A-1090	F5-12-B-10	F5-12-B-1090	F5-12-C-10	F5-12-C-1090
	Discharge	F5-10-A-10	F5-10-A-1080	F5-10-A-1090	F5-10-B-10	F5-10-B-1090	F5-10-C-10	F5-10-C-1090
A90-*R04 A145-*R04	Suction	F5-16-A-10	F5-16-A-1080	F5-16-A-1090	F5-16-B-10	F5-16-B-1090	F5-16-C-10	F5-16-C-1090
	Discharge	F5-10-A-10	F5-10-A-1080	F5-10-A-1090	F5-10-B-10	F5-10-B-1090	F5-10-C-10	F5-10-C-1090

★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 given in the Catalogue No. Pub. EC-3001.

#### ■ 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

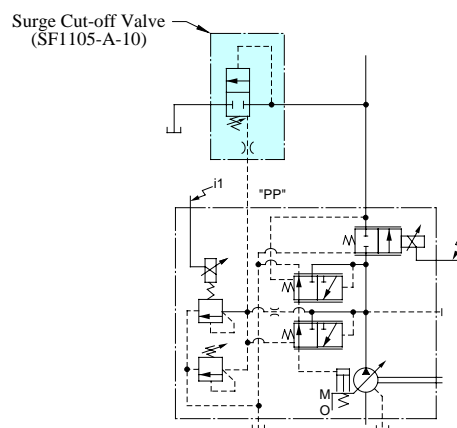
Position of cable departure can be changed. For details, refer to EDG-01 valve Catalogue No. Pub. EC-1302.

##### ● 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 Pres. 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		Less than 3% <sup>*4</sup>							
	Rated Current	mA	900	700	740	790	820	920	920	
	Coil Resistance [20°C (68°F)]	Ω	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		Less than 2% <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 6 for the details.
- ★ 3. For detail specifications of power amplifiers, refer to Catalogue No. Pub. EC-1305.
- ★ 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.

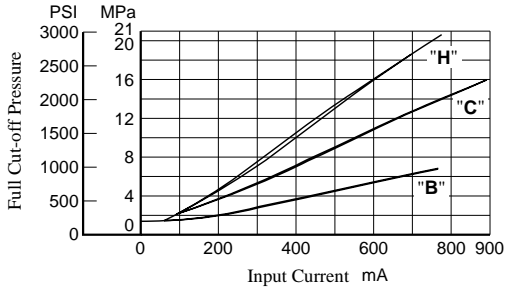
Model	Pres. Step Response		Loading Volume
	t <sub>1</sub>	t <sub>2</sub>	
A16, A22	1.5 → 16 MPa (220 → 2320 PSI)	16 → 1.5 MPa (2320 → 220 PSI)	High Pressure Hose 3/8" × 2 m (6.6 ft)
A37, A56	2.0 → 16 MPa (290 → 2320 PSI)	16 → 2.0 MPa (2320 → 290 PSI)	High Pressure Hose 3/4" × 2 m (6.6 ft)
A70, A90 A145	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 Pump Characteristics

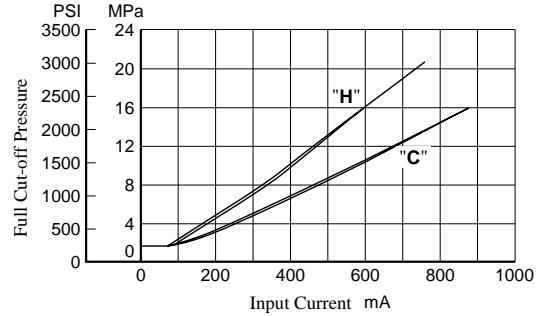
Typical Performance Characteristics at Viscosity 20 mm<sup>2</sup>/s (100 SSU) [ISO VG32 Oils, 50°C (122°F)]

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

##### ● A16/A22/A37/A56



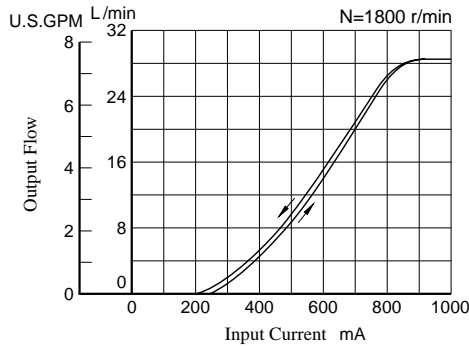
##### ● A70/A90/A145



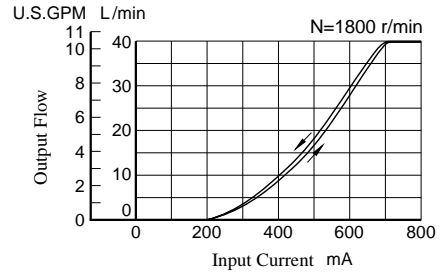
Note: Pressure adjustment range "H" is not available for A22.

#### Output Flow vs. Input Current

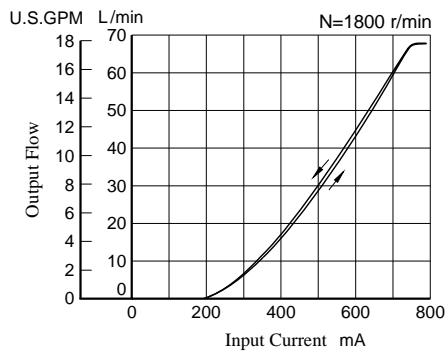
##### ● A16



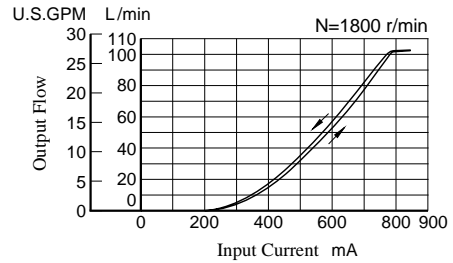
##### ● A22



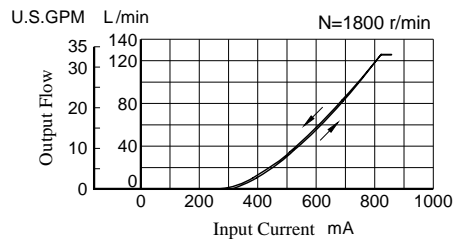
##### ● A37



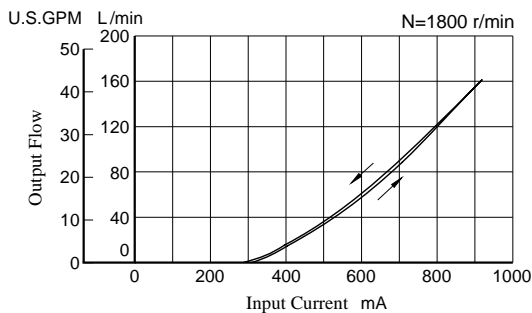
##### ● A56



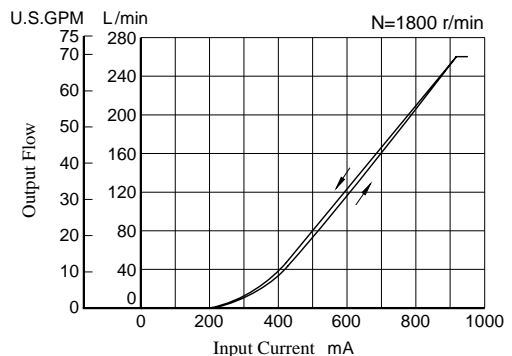
##### ● A70



##### ● A90

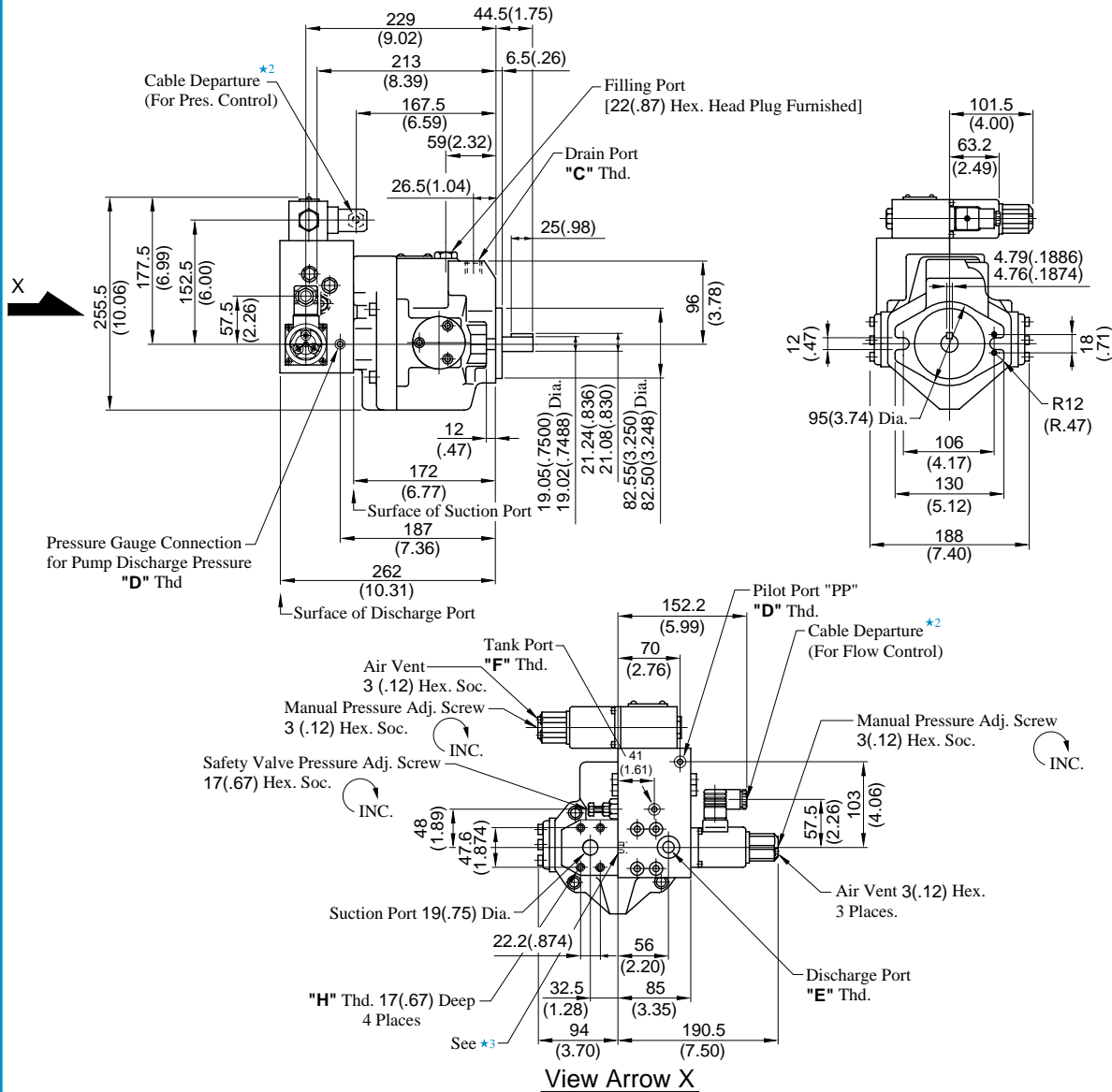


##### ● A145



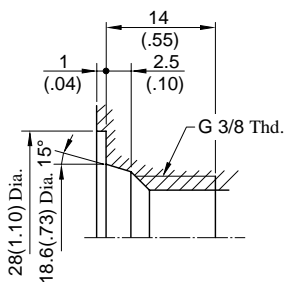
### Installation Drawing

Flange Mtg : A16-F-R-04-\*K-32/3280/3290  
A22-F-R-04-\*K-32/3280/3290



Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	"F" Thd.	"H" Thd.
A16/A22-F-R-04-*K-32	Rc 3/8	Rc 1/4	G 3/8*1	Rc 1/4	M10
A16/A22-F-R-04-*K-3280	3/8 BSP.F	1/4 BSP.Tr	3/8 BSP.F	1/4 BSP.F	
	3/8 NPT	1/4 NPT	3/8 NPT	1/4 NPT	3/8-16 UNC

\*1. Detail of Discharge Ports [For Japanese Standard]



- \*2. Cable Applicable:  
Outside Dia.....8-10 mm (.31-.39 IN.)  
Conductor Area.....Not Exceeding 1.5 mm<sup>2</sup> (.002 Sq. IN.)
- \*3. Do not touch the screw because it is adjusted at the time of shipment.

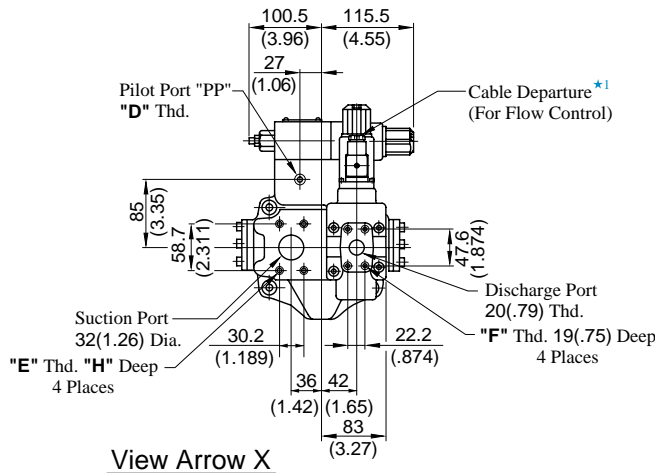
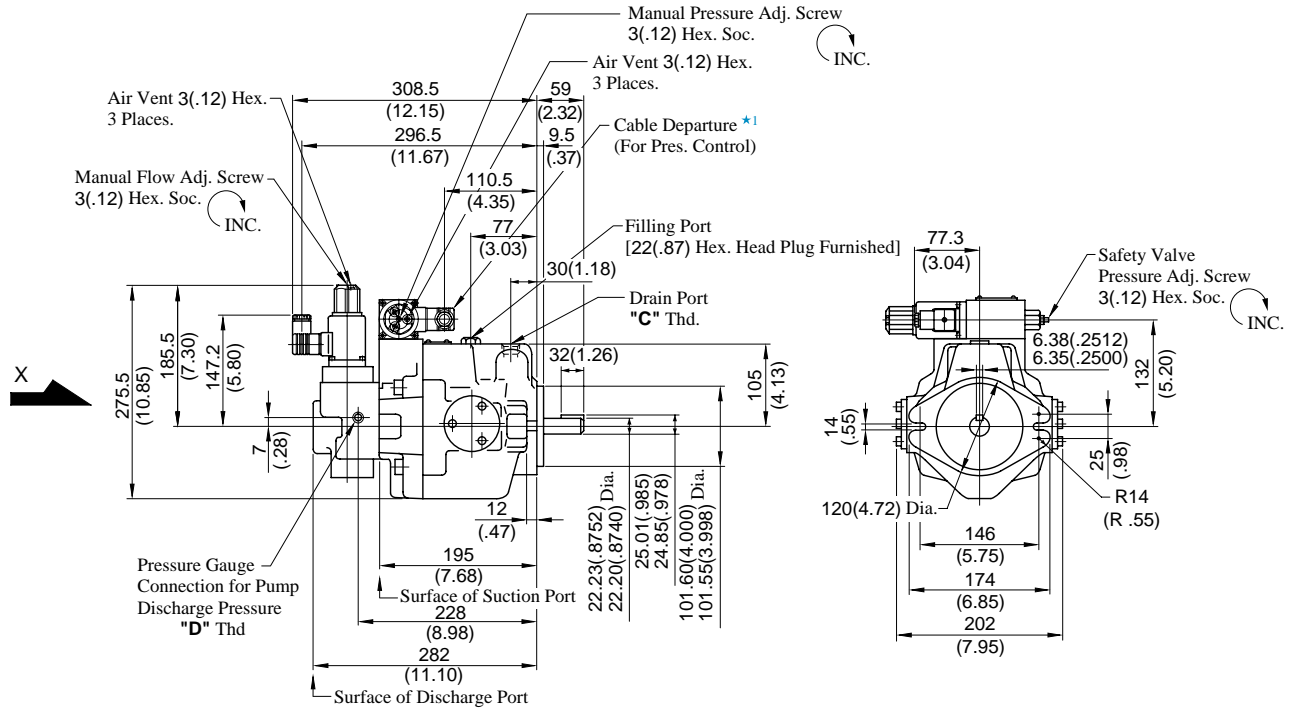
DIMENSIONS IN  
MILLIMETRES (INCHES)

#### ● Foot Mounting Type

Mounting bracket is common to that of pressure compensator model.  
Refer to page 18 for the dimensions of mounting bracket.

### Installation Drawing

Flange Mtg. : A37-F-R-04-\*K-32/3280/3290

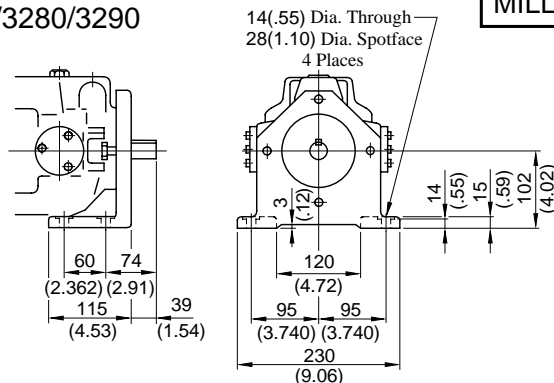


★ 1. Cable Applicable:  
Outside Dia.....8-10 mm (.31-.39 IN.)  
Conductor Area.....Not Exceeding 1.5 mm<sup>2</sup> (.002 Sq. IN.)

Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	"F" Thd.	"H" mm (IN.)
A37-F-R-04-*K-32	Rc 1/2	Rc 1/4	M10	M10	19 (.75)
A37-F-R-04-*K-3280	1/2 BSP.F	1/4 BSP.Tr			
A37-F-R-04-*K-3290	1/2 NPT	1/4 NPT	7/16-14 UNC	3/8-16 UNC	20 (.79)

DIMENSIONS IN  
MILLIMETRES (INCHES)

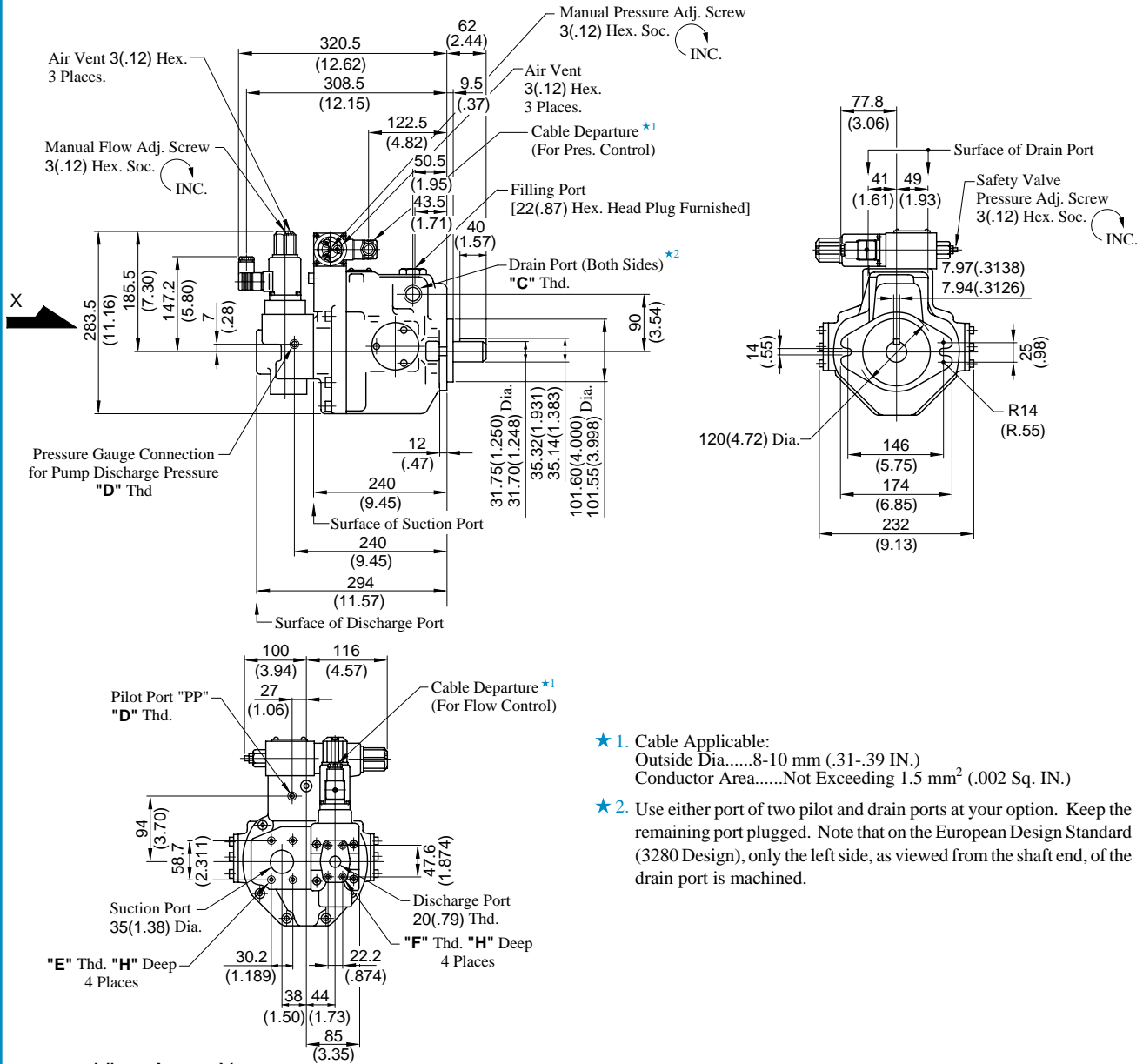
Foot Mtg. : A37-L-R-04-\*K-32/3280/3290



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

### Installation Drawing

Flange Mtg. : A56-F-R-04-*\**-K-32/3280/3290



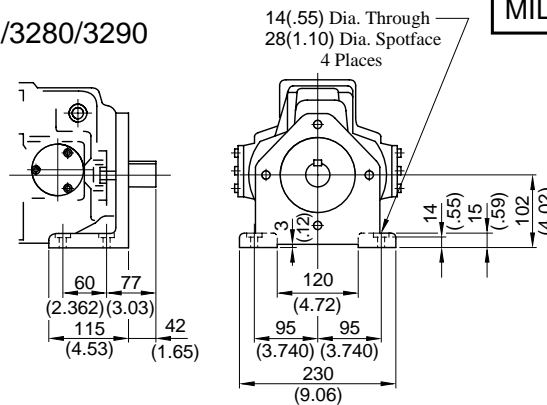
- ★ 1. Cable Applicable:  
Outside Dia.....8-10 mm (.31-.39 IN.)  
Conductor Area.....Not Exceeding 1.5 mm<sup>2</sup> (.002 Sq. IN.)
- ★ 2. Use either port of two pilot and drain ports at your option. Keep the remaining port plugged. Note that on the European Design Standard (3280 Design), only the left side, as viewed from the shaft end, of the drain port is machined.

View Arrow X

Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	"F" Thd.	"H" mm (IN.)
A56-F-R-04- <i>*</i> -K-32	Rc 3/4	Rc 1/4	M10	M10	19 (.75)
A56-F-R-04- <i>*</i> -K-3280	3/4 BSP.F	1/4 BSP.Tr			
A56-F-R-04- <i>*</i> -K-3290	3/4 NPT	1/4 NPT	7/16-14 UNC	3/8-16 UNC	20 (.79)

DIMENSIONS IN  
MILLIMETRES (INCHES)

Foot Mtg. : A56-L-R-04-*\**-K-32/3280/3290



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