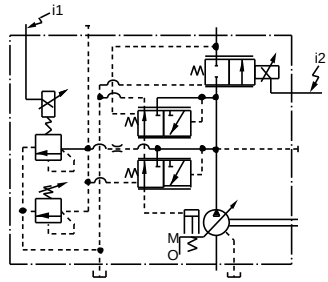
YUKEN

"A" Series Piston Pumps
Variable Displacement-Single Pumps
Proportional Electro-Hydraulic Load-Sensing Type
A16 / A22 / A37 / A56 / A70 / A90 / A145

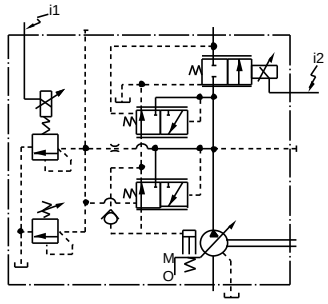
PISTON PUMPS

Model Number Designation

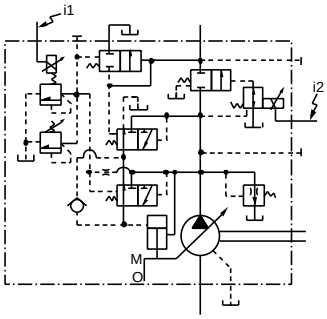
Graphic Symbols



A16/A22/A37

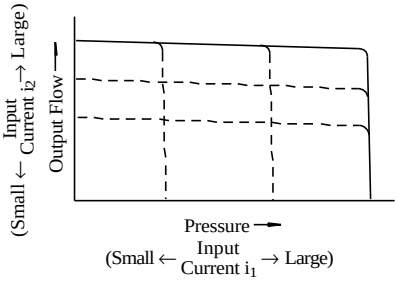


A56



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.
A16 (15.8 cm^3/rev)	**F:** Flange Mtg. **L:** Foot Mtg.	(Viewed from Shaft End) **R:** ★1 Clockwise	**04:** Proportional Electro-Hydraulic Load Sensing	**B:** 1.5 - 7 (220 - 1020) **C:** 1.5 - 16 (220 - 2320) **H:** 1.5 - 21 (220 - 3050)	**K:** Keyed Shaft	**32**	Refer to ★2
A22 (22.2 cm^3/rev)				**B:** 1.5 - 7 (220 - 1020) **C:** 1.5 - 16 (220 - 2320)		**32**	
A37 (36.9 cm^3/rev)				**B:** 2 - 7 (290 - 1020) **C:** 2 - 16 (290 - 2320) **H:** 2 - 21 (290 - 3050)		**32**	
A56 (56.2 cm^3/rev)						**32**	

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.
A70 (70.0 cm^3/rev)	**F:** Flange Mtg. **L:** Foot Mtg.	(Viewed from Shaft End) **R:** ★1 Clockwise	**04:** Proportional Electro-Hydraulic Load Sensing	**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
90..... N. American Design Standard

Pipe Flange Kits

Pipe flange kits are available.
When ordering, specify the kit nuneber 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	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 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 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

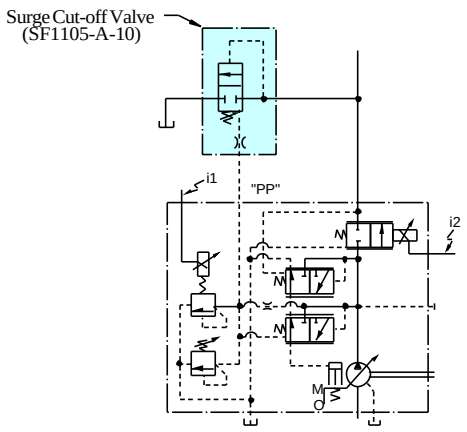
Manual adjustment screws may be used for initial running adjustment or in case of electrical failures in order to adjust pressure and flow temporarily. In case of normal use, put the manual adjustment screws back in their preset positions.

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.



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 Pres. 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		Less than 3% ★4						
	Rated Current	mA	900	700	740	790	820	920	920
	Coil Resistance [20℃ (68℉)]	Ω	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		Less than 2% ★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℃ (68℉)]	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 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.

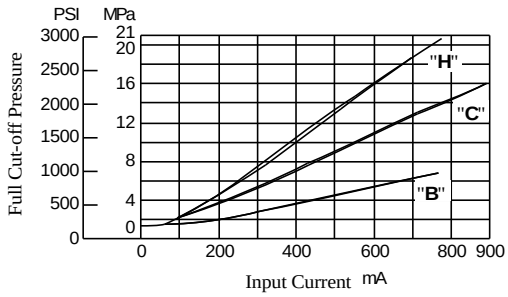
★5. Step response depends on circuit and operating conditions. Data shown in the table above is an example based on the condition right.

Model	Pres. Step Response		Loading Volume
	t_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 mm^2/s (100 SSU) [ISO VG32 Oils, 50℃ (122℉)]

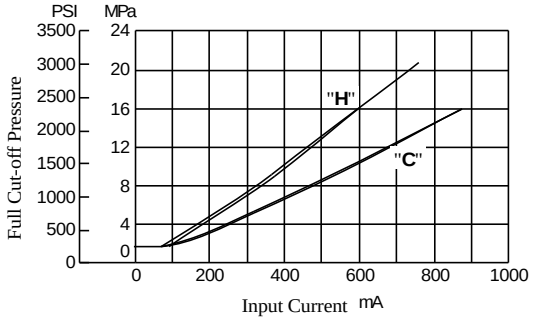
Full Cut-off Pres. vs. Input Current

A16/A22/A37/A56



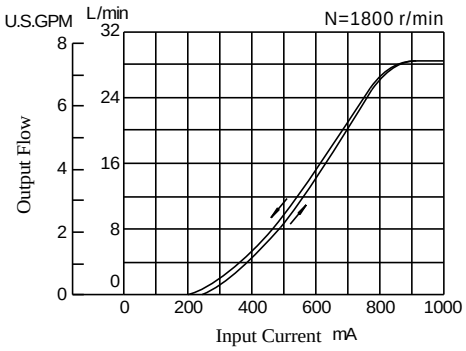
Note: Pressure adjustment range "H" is not available for A22.

A70/A90/A145

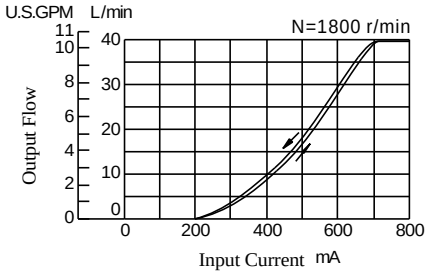


Output Flow vs. Input Current

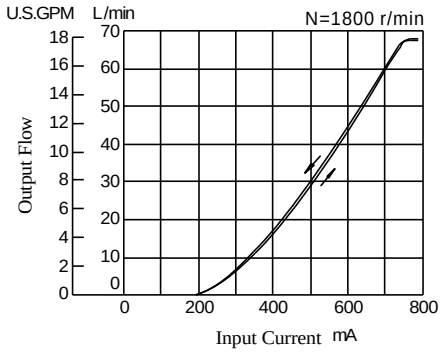
A16



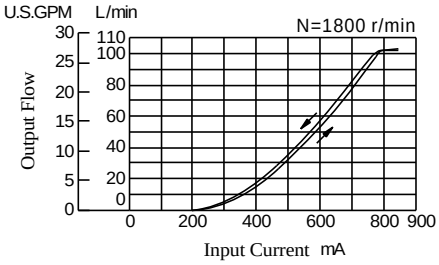
A22



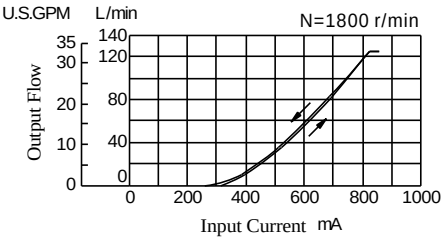
A37



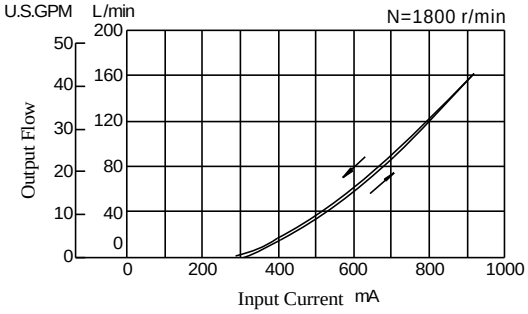
A56



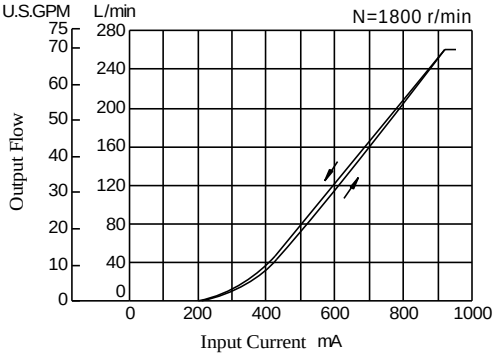
A70



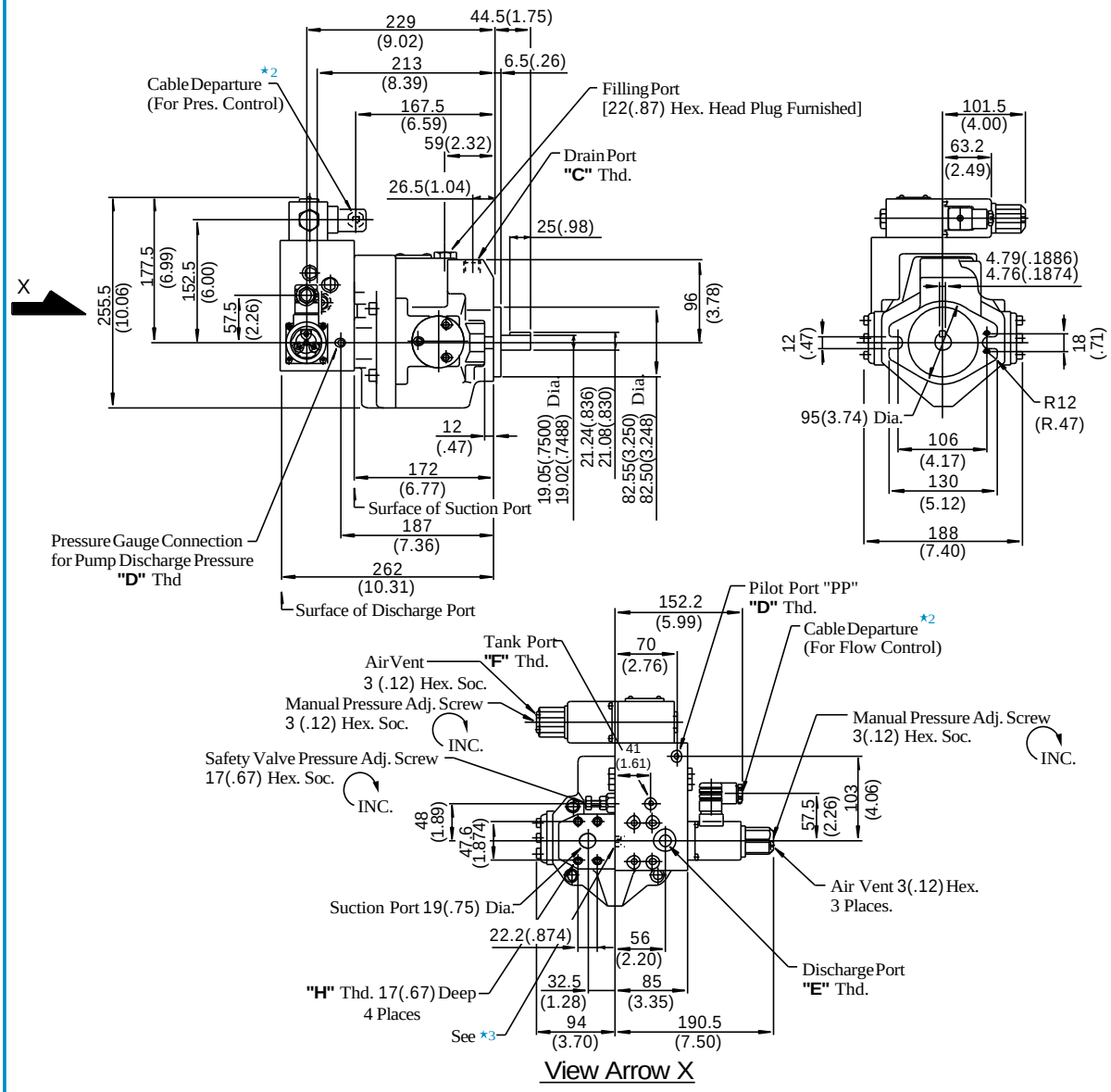
A90



A145



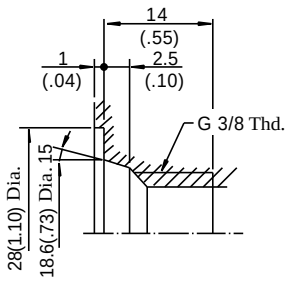
Flange Mtg : A16-F-R-04-⁎-K-32/3280/3290
A22-F-R-04-⁎-K-32/3280/3290



View Arrow X

Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	"F" Thd.	"H" Thd.
A16/A22-F-R-04-⁎-K-32	Rc3/8	Rc1/4	G3/8 ★1	Rc1/4	M10
A16/A22-F-R-04-⁎-K-	3/8BSP.F	1/4BSP.Tr	3/8BSP.F	1/4BSP.F	
3280	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^2 (.002 Sq. IN.)

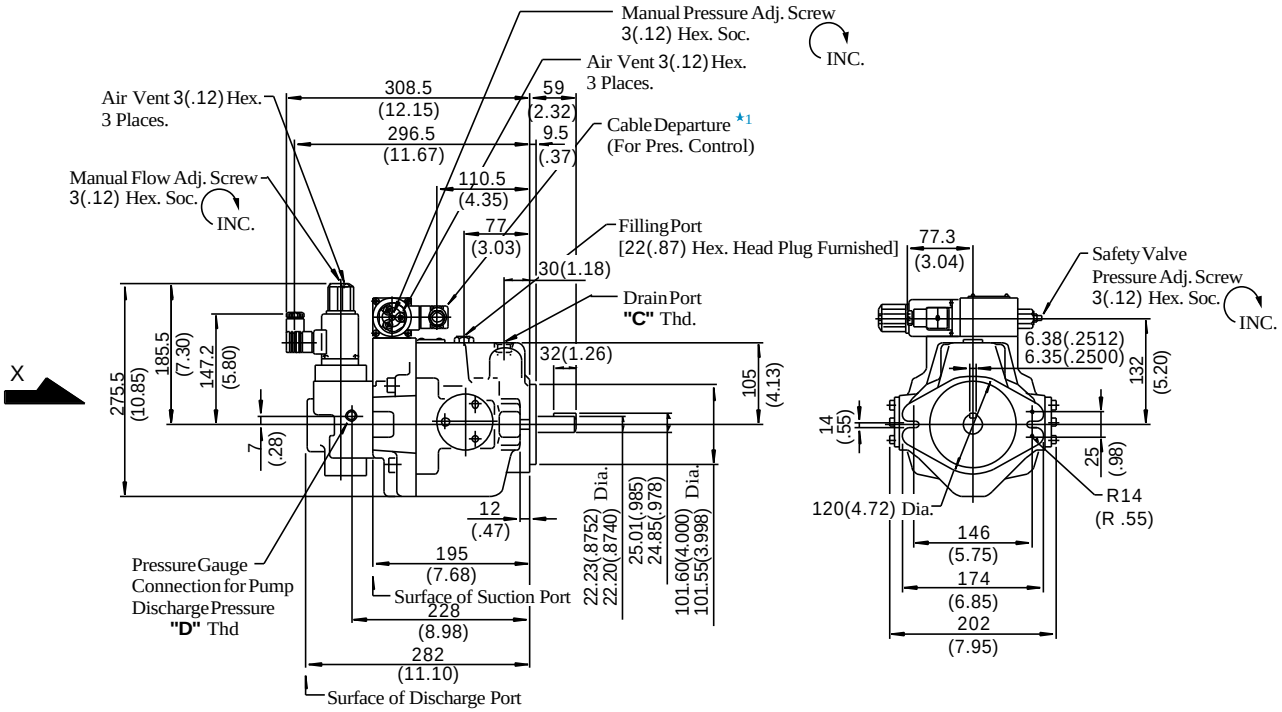
★3. Do not touch the screw because it is adjusted at the time of shipment.

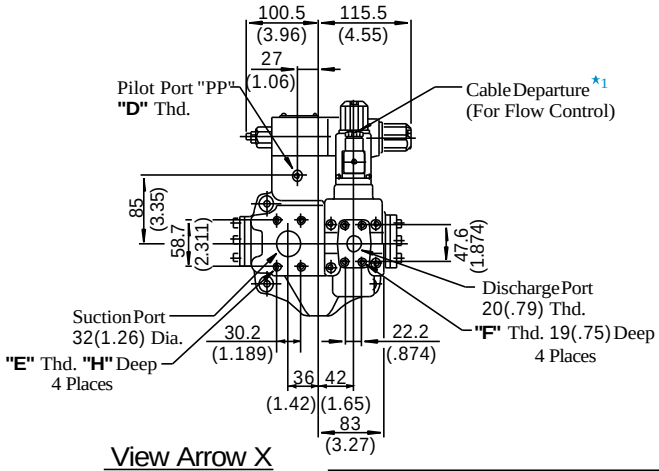
DIMENSIONS IN MILLIMETRES (INCHES)

● **Foot Mounting Type**

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

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





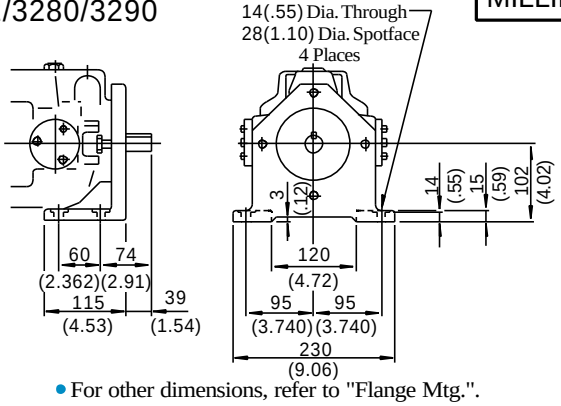
View Arrow X

★1. Cable Applicable:
Outside Dia.....8-10 mm (.31-.39 IN.)
Conductor Area.....Not Exceeding 1.5 mm^2 (.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-	1/2 BSP.F	1/4 BSP.Tr			
3280	1/2 NPT	1/4 NPT	7/16-14 UNC	3/8-16 UNC	20 (.79)

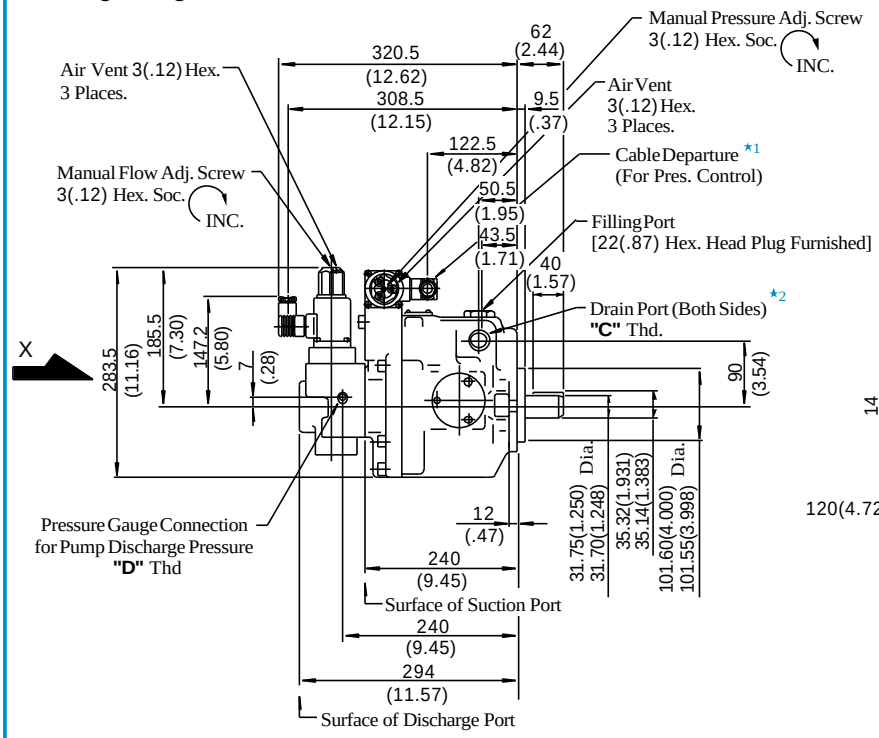
DIMENSIONS IN MILLIMETRES (INCHES)

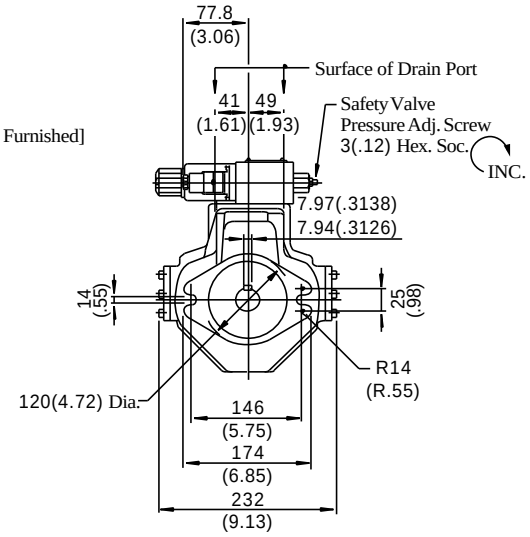
Foot Mtg. : A37-L-R-04-∗-K-32/3280/3290

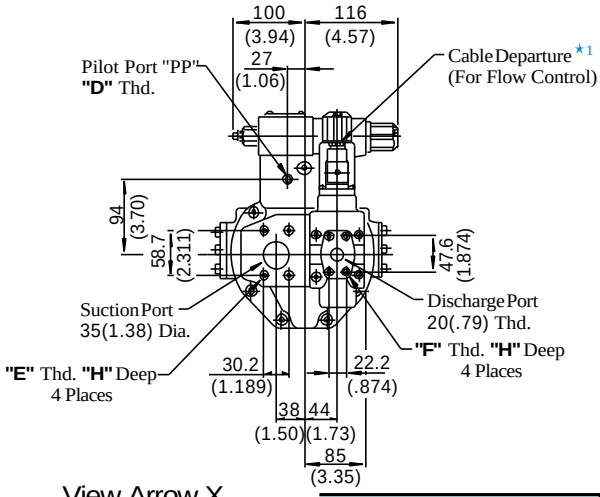


● For other dimensions, refer to "Flange Mtg.".

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^2 (.002 Sq. IN.)

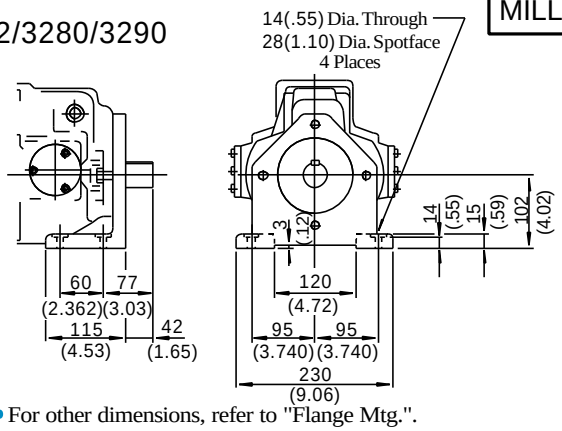
★2. Use either port of two pilot and drain ports at your option. Keep the remaining port plugged. Note that on the European Design Standard (3280 Design), only the left side, as viewed from the shaft end, of the drain port is machined.

View Arrow X

Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	"F" Thd.	"H" mm (IN.)
A56-F-R-04-∗-K-32	Rc3/4	Rc1/4	M10	M10	19 (.75)
A56-F-R-04-∗-K-	3/4BSP.F	1/4BSP.Tr			
3280	3/4 NPT	1/4 NPT	7/16-14 UNC	3/8-16 UNC	20 (.79)

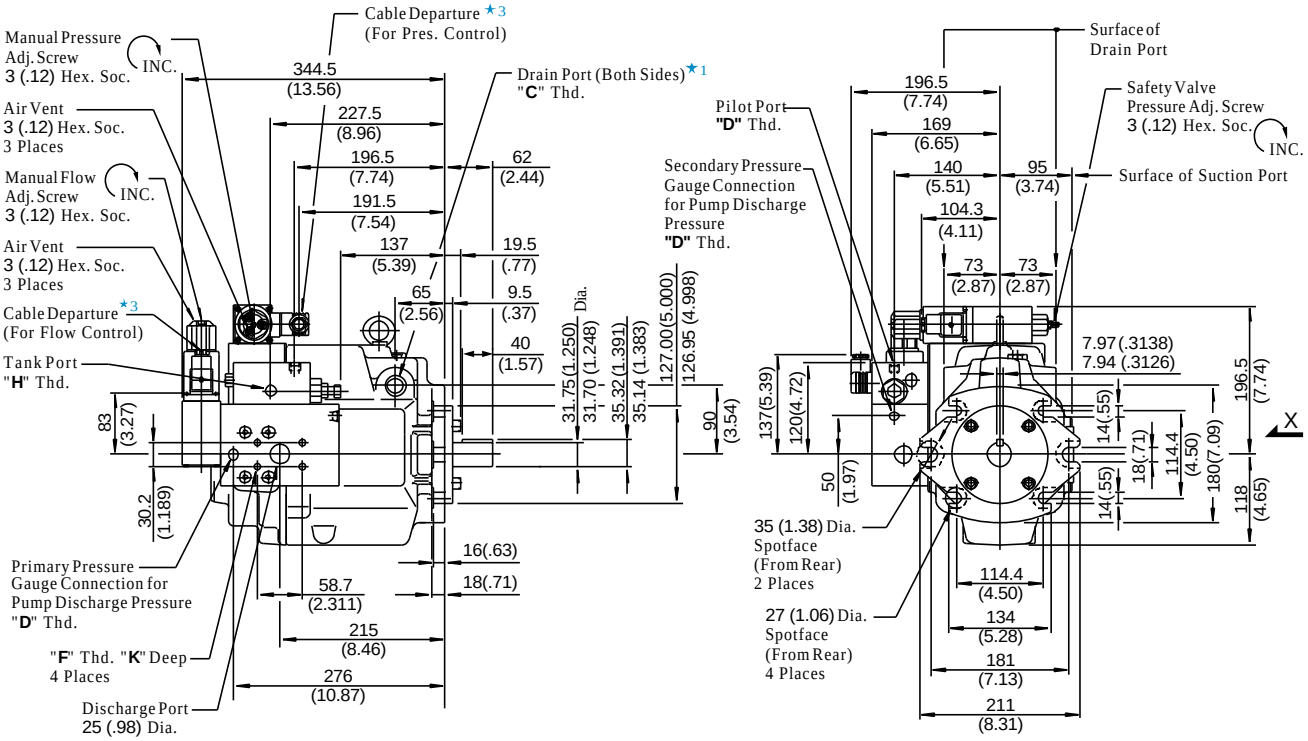
DIMENSIONS IN MILLIMETRES (INCHES)

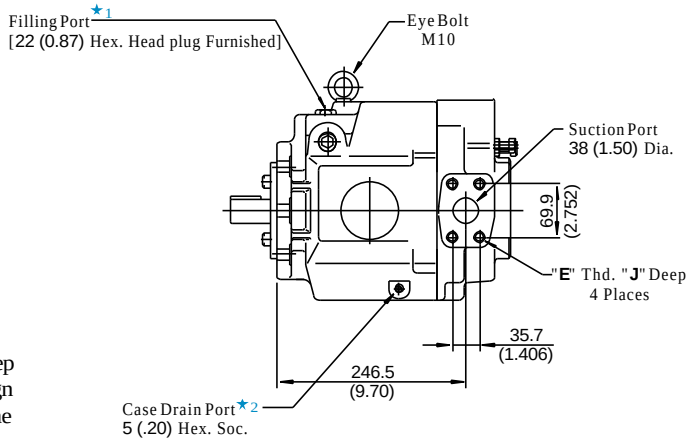
Foot Mtg. : A56-L-R-04-∗-K-32/3280/3290



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

Flange Mtg. : A70-FR04∗S-60/6080/6090





View Arrow X

★1. Use either port of two pilot and 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.

★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^2 (.002 Sq. IN.)

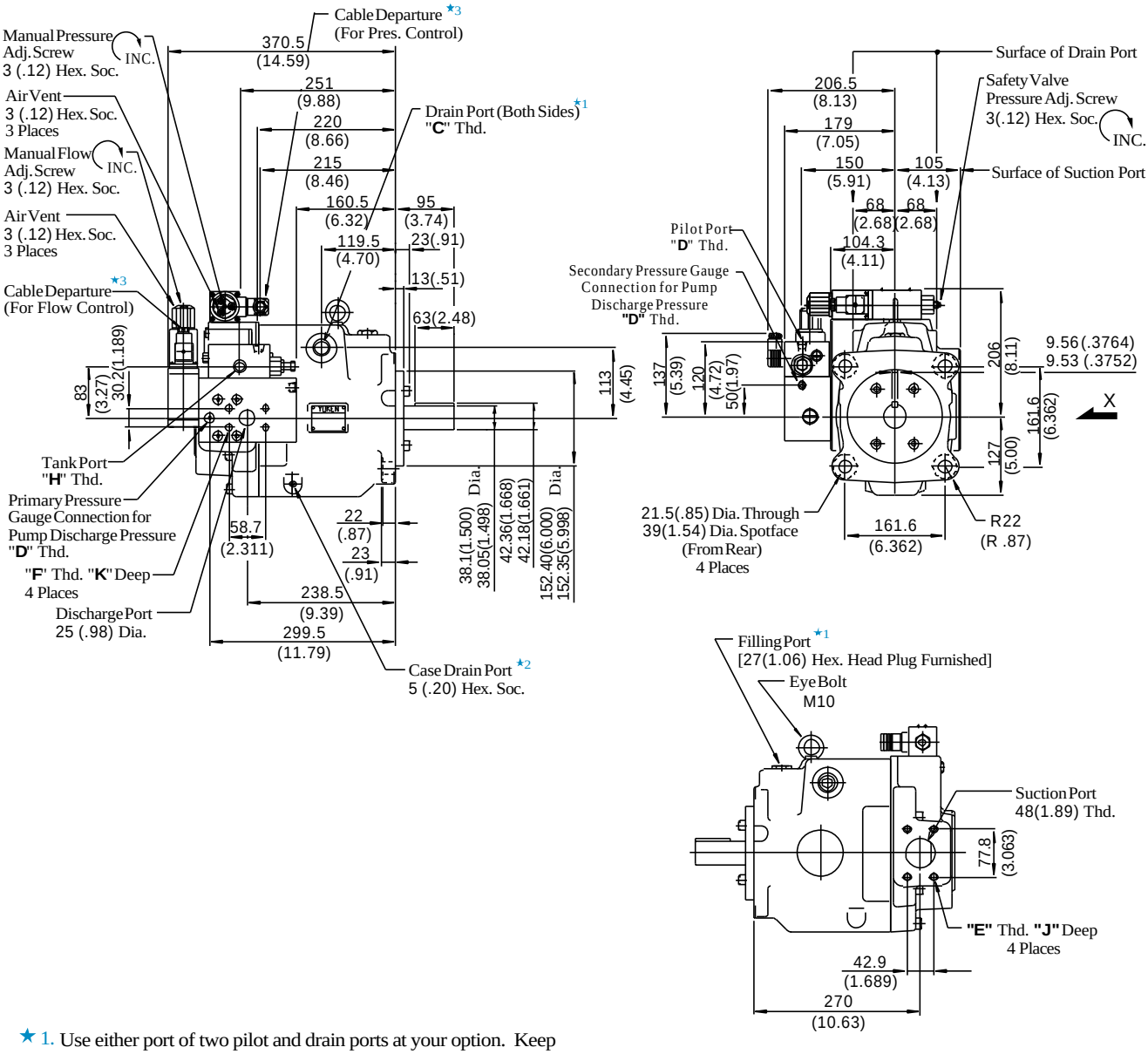
Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	"F" Thd.	"H" Thd.	J mm (IN.)	K mm (IN.)
A70-FR04∗S-60	Rc3/4	Rc1/4	M12	M10	Rc3/8	19 (.75)	17 (.67)
A70-FR04∗S-	3/4BSP.F	1/4BSP.Tr			3/8BSP.F		
6080	3/4 NPT	1/4 NPT	1/2-13 UNC	7/16-14 UNC	3/8 NPT	21 (.83)	20 (.79)

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-FR04∗S-60/6080/6090



View Arrow X

★1. Use either port of two pilot and 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.

★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^2 (.002 Sq. IN.)

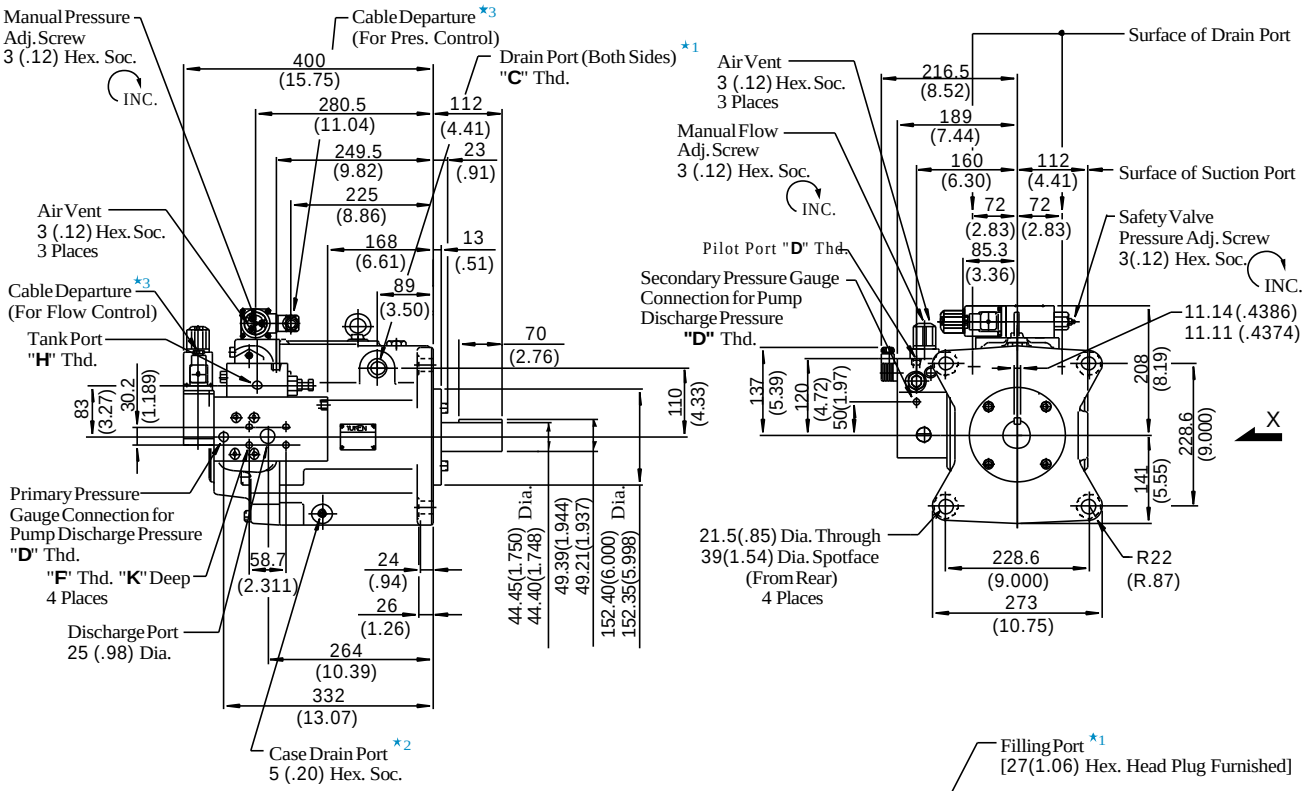
Model Numbers	"C" Thd.	"D" Thd.	"E" Thd.	"F" Thd.	"H" Thd.	J mm (IN.)	K mm (IN.)
A90-FR04∗S-60	Rc3/4	Rc1/4	M12	M10	Rc3/8	19 (.75)	17 (.67)
A90-FR04∗S-	3/4BSP.F	1/4BSP.Tr			3/8BSP.F		
6080	3/4 NPT	1/4 NPT	1/2-13 UNC	7/16-14 UNC	3/8 NPT	21 (.83)	20 (.79)

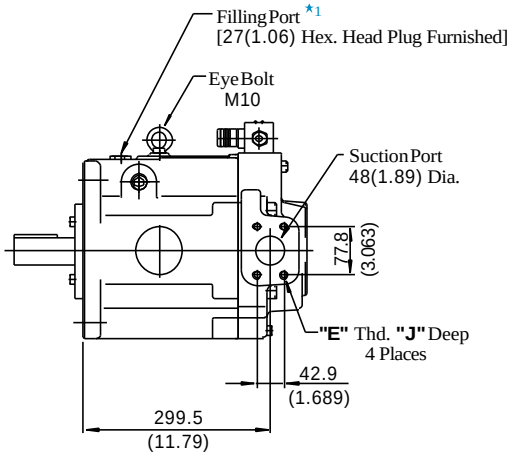
DIMENSIONS IN MILLIMETRES (INCHES)

● Foot Mounting Type

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

Flange Mtg. : A145-FR04∗S-60/6080/6090





View Arrow X

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DIMENSIONS IN MILLIMETRES (INCHES)

● Foot Mounting Type

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