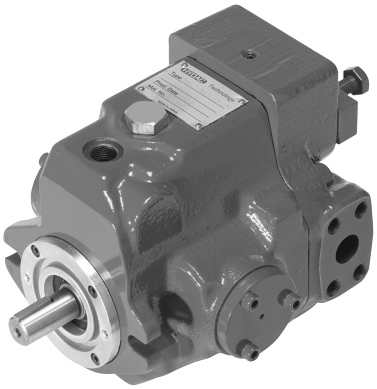


2.5 LIGHT DUTY SERIES

CONTENTS PPV103

ORDERING CODE

2.5.1 Light Duty Series

PPV103 – 16 – F R 01 H S K – 32 80 – XXXX

Axial piston pump
Light Duty Series

Size

10	10.0 cm³/rev
16	15.8 cm³/rev
22	22.2 cm³/rev
37	36.9 cm³/rev
56	56.2 cm³/rev
70	70.0 cm³/rev (only with control type 07)
90	91.0 cm³/rev (only with control type 07)
145	145.0 cm³/rev (only with control type 07)

Mounting type

F	Flange mounting

Shaft rotation

R	Clockwise viewed from shaft end

Control type

01	Pressure compensator
07	Remote pressure compensator

Pressure setting range (only for control type 01)

B	12 - 70 bar
C	12 - 160 bar (size 16/22/37/56) 20 - 160 bar (size 10)
H	12 - 210 bar (size 16/37/56) 20 - 210 bar (size 10)

Port position

S	Side port (not for size 10) Axial port (only size 16/22/37/56)
–	Side and axial ports (only size 10)

Shaft extension

K	Parallel keyed shaft

Design number

12	Size 10
32	Size 16/22/37/56
60	Size 70/90/145

Design standard

80	European Design Standard
950	North American Standard

Modification number

XXXX	Determined by manufacturer

2.5.2 Specifications

Pump size			10	16	22	37	56	70	90	145
Geometric displacement		[cm³/rev]	10.0	15.8	22.2	36.9	56.2	70.0	91.0	145.0
Pressure	Rated	[bar]	160					250		
	Peak		210		160	210		250		
Drive speed	Min.	[rpm]	600							
	max.		1800							
Power (1500 rpm, 160 bar)		[kW]	5	7	8.5*	17	25	31	38	62
Drive torque (160 bar)		[Nm]	32	45	55*	108	159	198	242	395
Pre-fill oil volume		[cm³]	370	600	600	1200	1200	2100	2500	3300
Approx. weight with pressure compensator		[kg]	8.5	16.5	16.5	28.0	35.0	—	—	—
Approx. weight. with remote pressure compensator			8.5	21.0	21.0	29.0	36.0	60.3	77.5	94.0

* size 22 at 140 bar

2.5.3 Hydraulic fluids

The pump series is designed for use with

HL Hydraulic oil
(normal mineral oil)
and
HLP Hydraulic oils of the R&O type
(Rust and Oxidation inhibitor)

For use with other fluids, please contact HYDAC.

2.5.4 Viscosity range

Normal operating viscosity: 20 - 400 cSt (mm²/s)

Maximum viscosity (cold start): 1000 cSt (mm²/s)

2.5.5 Temperature range

-20 to +95 °C

Note:
The highest fluid temperature will be at the drain port of the pump, up to 20 °C higher than in the reservoir.

2.5.6 Specifications for special fluids

Operating fluid	Size	Operating pressure [bar]		Drive speed [rpm]		Temperature range [°C]	Viscosity range [cSt]	Design number*2
		Rated	Intermittent	Rated	max.			
Water glycol Water > 35 % Polymer solution (HFC)	16-56	140	160 / 140*1	1200	1800*2	0 - 50	20 - 200	30
	70-145	210	210					30
Phosphate ester synthetic (HFD-R)	16-56	140	160 / 140*1	1200	1800*2	0 - 60		80
	70-145	210	210					
Polyolester synthetic (HFD-U)	16-56	160	160	1800	1800	0 - 60		
	70-145	250	250					

*1 – Size 22

*2 – As the specific gravity of water-glycol and phosphate ester fluids is higher than one, an overhead reservoir is required when pumps are operated at 1500 rpm or more

2.5.7 Seals

The pump series is equipped with fluorocarbon (FPM) seals as standard.

Exception: Size 10 with Nitrile (NBR)

If special hydraulic fluids are used, the seal material must be changed if required.

2.5.8 Filtration

For maximum service life of the pump and system components, the system should be protected from contamination by effective filtration.

Cleanliness class to NAS 1638 Class 10 (21/19/16 ISO 4406:1999) or cleaner.

2.5.9 Adjustments

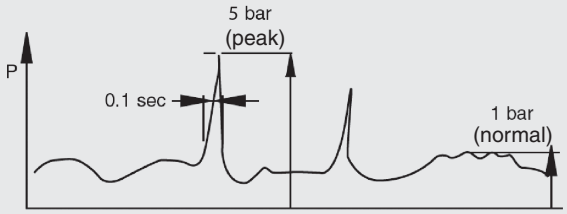
The units are supplied with a minimum discharge pressure and maximum flow rate setting. Pressure and flow rate can be adjusted using the adjustment screws to meet your system requirements.

	Volume		Pressure
	Volume adjustment screw rate	Min. adjustable displacement	Pressure adjustment screw rate
Pump size	[cm³ per turn]	[cm³/rev]	[bar per turn]
PPV103-10*01B	1.1	2.0	29
PPV103-10*01C/H	1.1	2.0	54
PPV103-16*01B	1.4	4.0	35
PPV103-16*01C	1.4	4.0	65
PPV103-16*01H	1.4	4.0	79
PPV103-22*01B	2.0	6.0	35
PPV103-22*01C	2.0	6.0	65
PPV103-37*01B	2.9	10	35
PPV103-37*01C	2.9	10	65
PPV103-37*01H	2.9	10	79
PPV103-56*01B	3.9	12	35
PPV103-56*01C	3.9	12	65
PPV103-56*01H	3.9	12	79
PPV103-70*07	4.4	30	
PPV103-90*07	4.8	56	
PPV103-145*07	7.2	83	

2.5.10 Installation notes

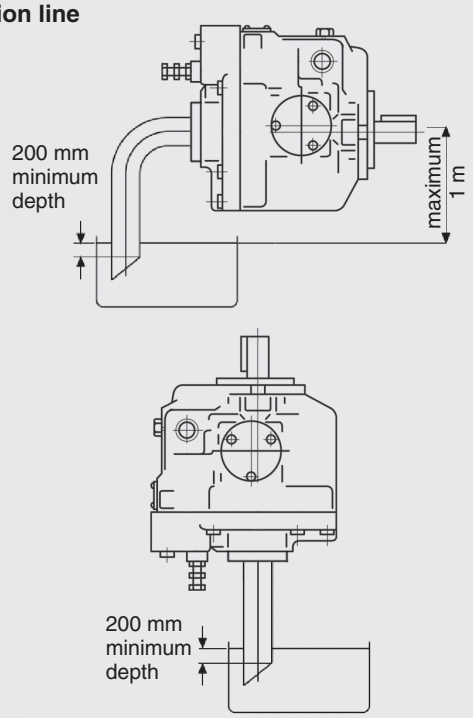
The pump should be installed horizontally with the case drain line initially rising above the level of the pump before continuing to the tank as shown in the diagram below. Do not connect the drain line to the suction line.

The top drain port should always be used and the internal diameter of the drain line should be equal to or larger than the drain port to minimise pressure in the pump case. The pressure in the pump case should not exceed 1 bar as shown in the diagram below. Peak pressure should never exceed 5 bar.



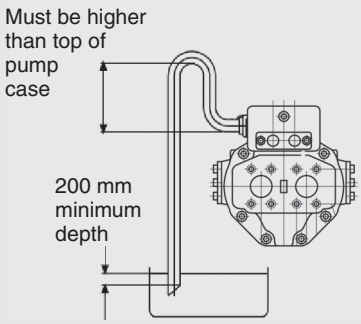
Installing the pump above the tank

Suction line



Drain line

"Goose neck" configuration ensures the oil remains in the pump case.



Precautions:

- The distance between the suction and drain pipes must be 200 mm minimum.
- Suction and drain pipes must be immersed at least 200 mm below the lowest oil level under operating conditions.
- The distance between the oil surface and the centre of the shaft must not exceed 1 m.
- The oil in the pump case must be refilled if the pump has not been operated for one month or longer.
- When installing a HYDAC pump always ensure that the fluid in the pump is prevented from draining away during stoppages.

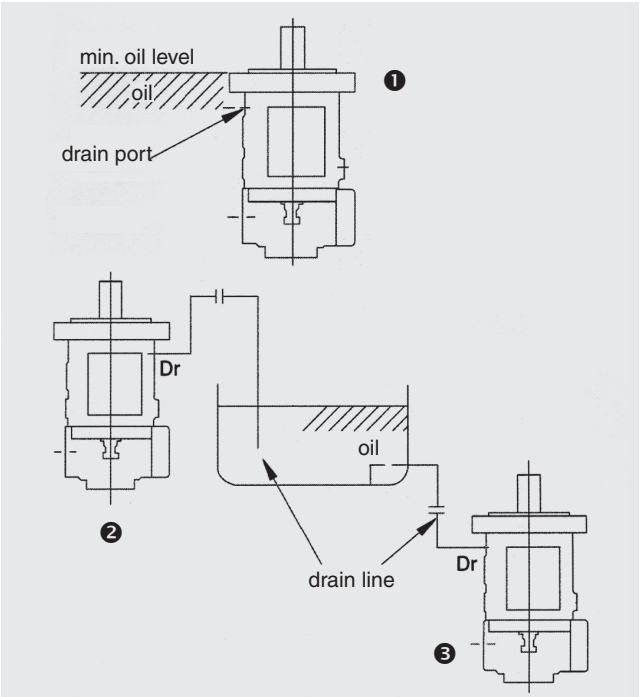
Installing the pump vertically

For applications requiring vertical installation (shaft at the top) please connect lines as shown in the diagram below.

The oil level in the tank should be higher than the pump mounting flange (see diagram ❶). If the oil level in the tank is lower than the pump mounting flange then the drain line should be installed as shown in diagram ❷.

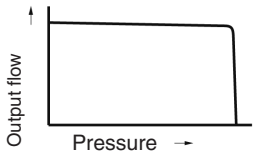
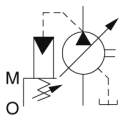
Once the pump is installed in the tank and immersed in the oil, the drain ports must be open to provide adequate lubrication to the internal components.

If the pump is installed outside the tank, there must be a separate drain line to the tank (diagram ❸). If the drain line is higher than the oil level, fill the line with oil before commissioning.

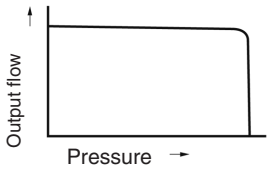
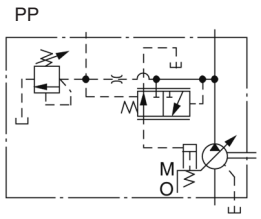


CONTROL OPTIONS

2.5.11 Standard pressure control

Description	Performance characteristics	Symbol
● When the system pressure increases and comes close to the preset cut-off pressure, the pump flow decreases automatically and the set pressure is maintained.		

2.5.12 Remote pressure control

Description	Performance characteristics	Symbol
● The pump is used in combination with the pilot relief valve or multistage pressure control valve. By controlling the pilot pressure, the full cut-off pressure can be remote-controlled according to your requirements.		

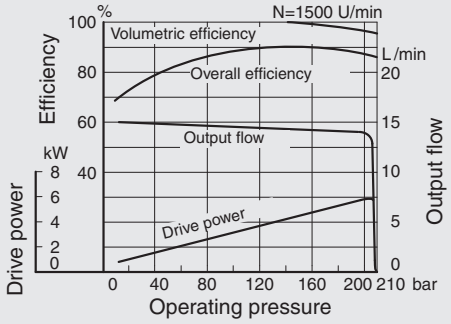
Recommended valve for use with remote pressure control

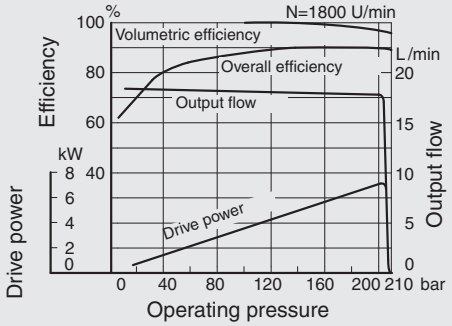
Type:	Part no.:
DB3E-02X-350V	397405

2.5.13 Availability of control type

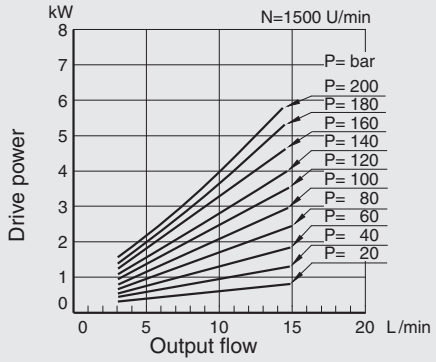
Pump size	Geometric displacement cm³/rev	01 Standard pressure control	07 Remote pressure control
PPV103-10	10.0	•	•
PPV103-16	15.8	•	•
PPV103-22	22.2	•	•
PPV103-37	36.9	•	•
PPV103-56	56.2	•	•
PPV103-70	70.0		•
PPV103-90	91.0		•
PPV103-145	145.0		•

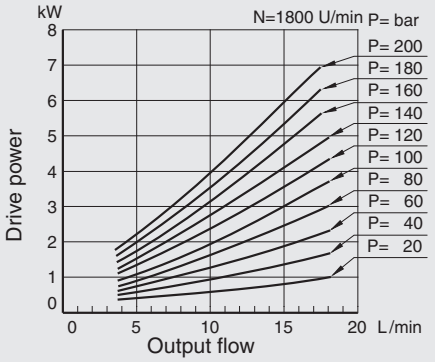
● Performance characteristic curve



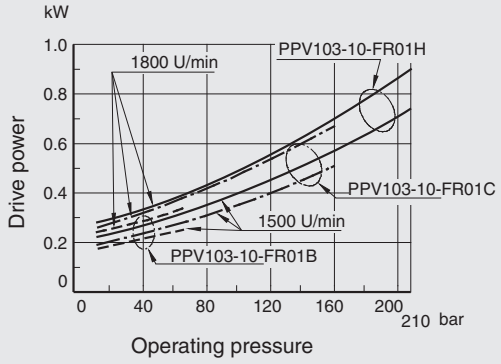


● Drive power

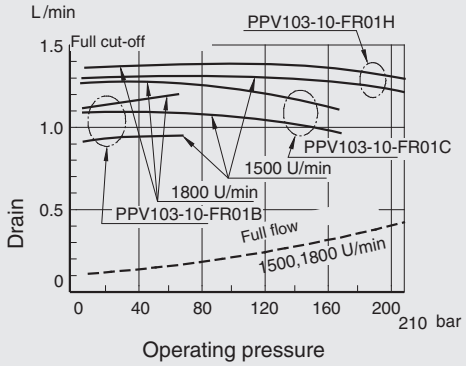




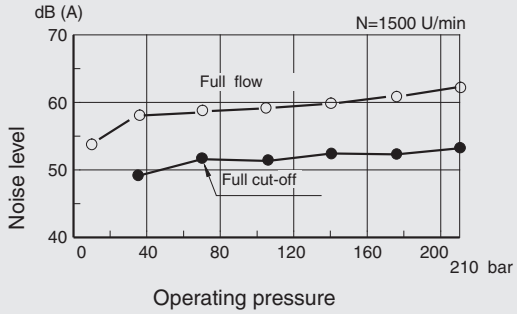
● Full cut-off power

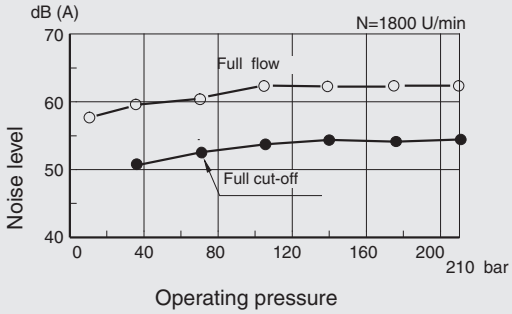


● Drain



● Noise level

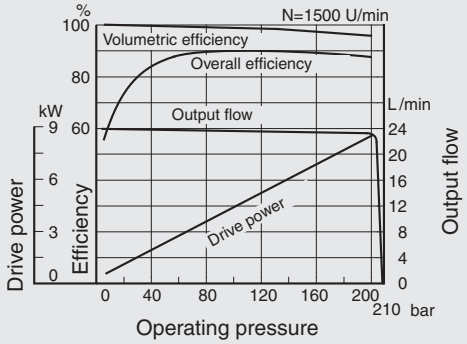


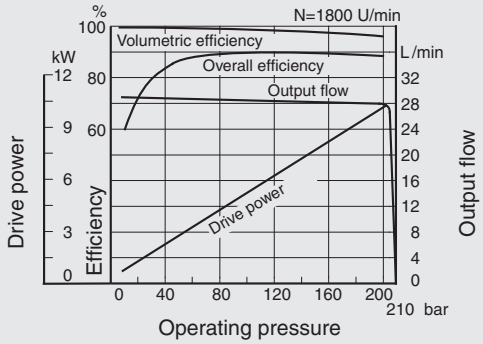


* measured with noise level meter 1 metre away from pump in an anechoic room using a flexible coupling to DIN45635

2.5.15 PPV103-16

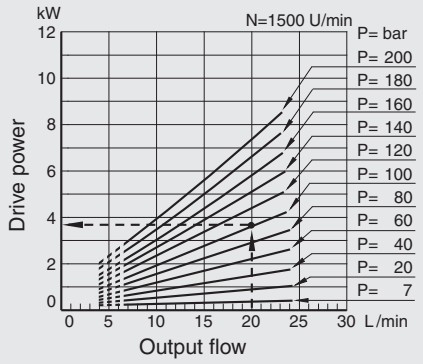
● Performance characteristic curve

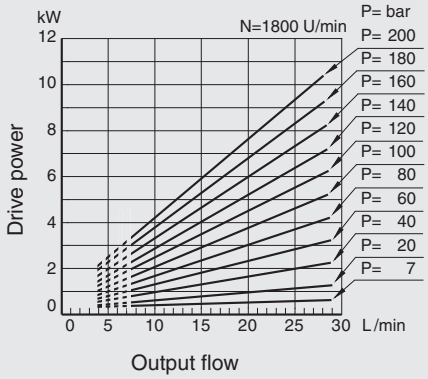




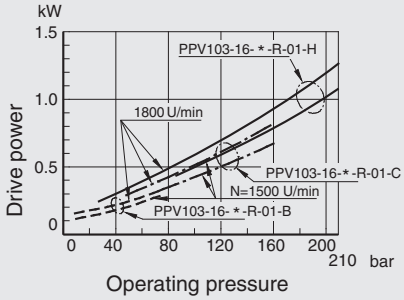
● Drive power

Example: For an operating pressure of 100 bar, an output flow of 20 l/min at 1500 rpm, the input power is approx. 3.7 kW

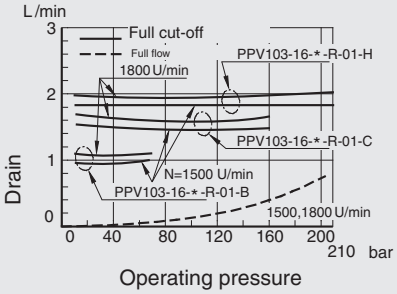




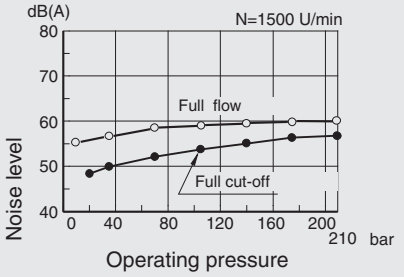
● Full cut-off power

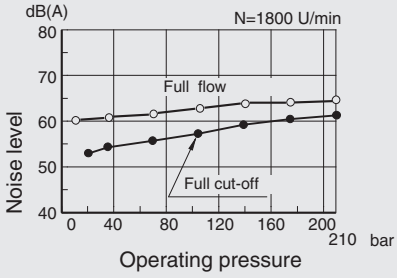


● Drain



● Noise level

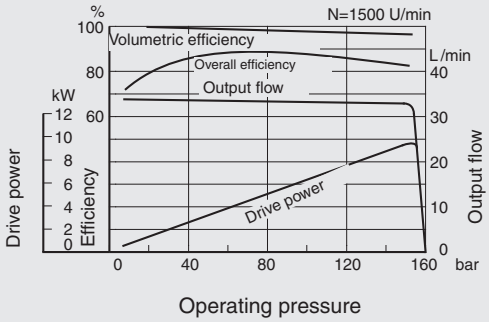


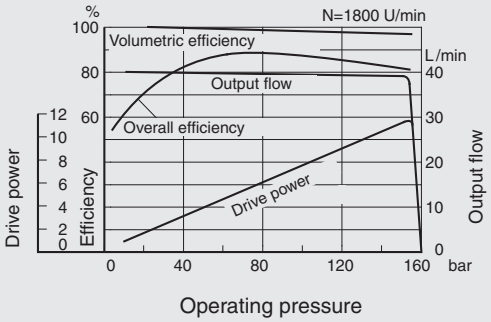


* measured with noise level meter 1 metre away from pump in an anechoic room using a flexible coupling to DIN45635

2.5.16 PPV103-22

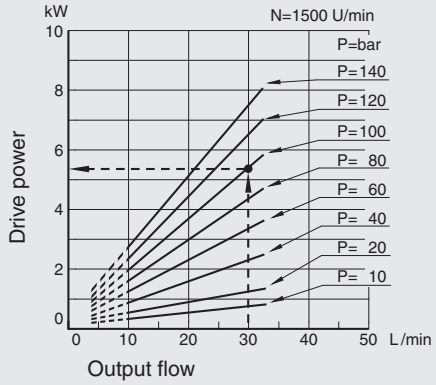
● Performance characteristic curve

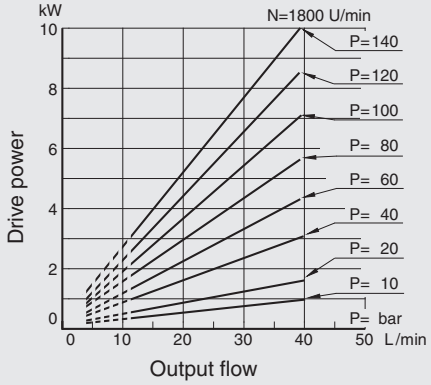




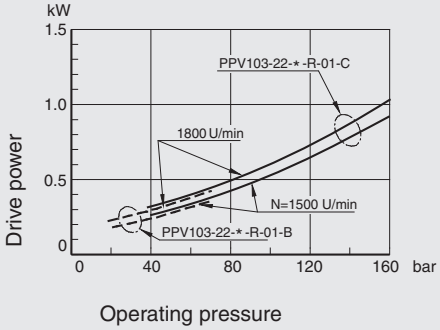
● Drive power

Example: For an operating pressure of 100 bar, an output flow of 30 l/min at 1500 rpm, the input power is approx. 5.4 kW

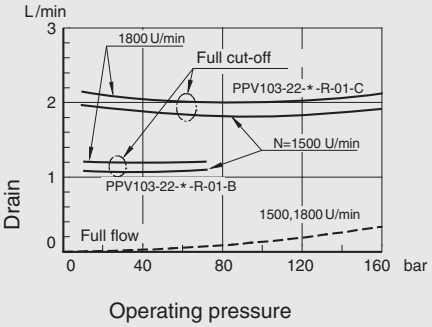




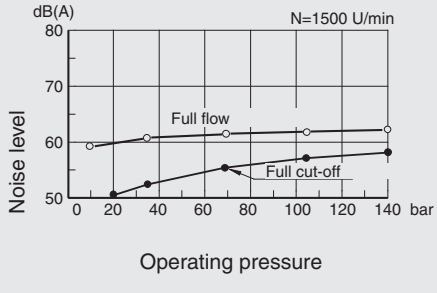
● Full cut-off power

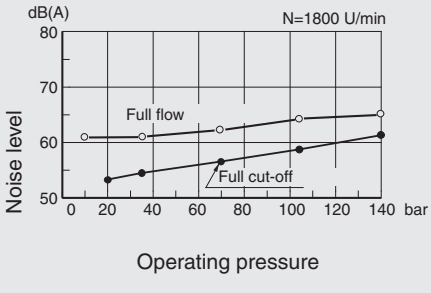


● Drain



● Noise level

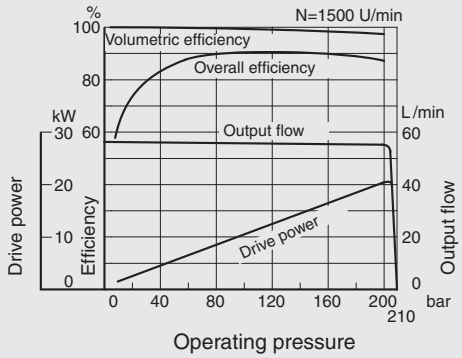


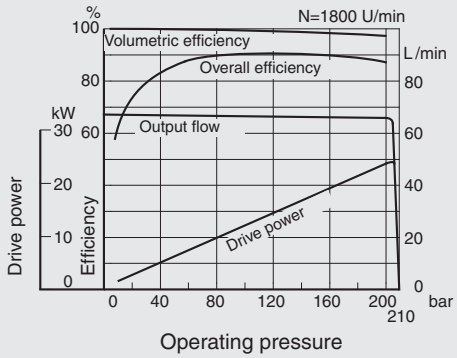


* measured with noise level meter 1 metre away from pump in an anechoic room using a flexible coupling to DIN45635

2.5.17 PPV103-37

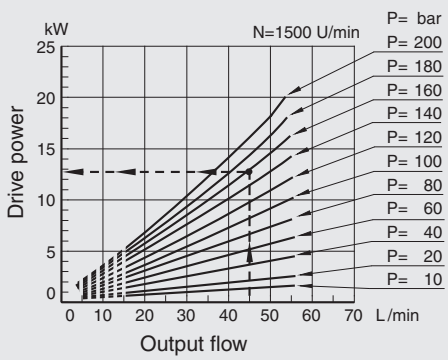
● Performance characteristic curve

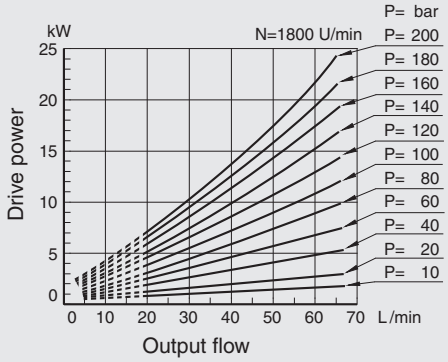




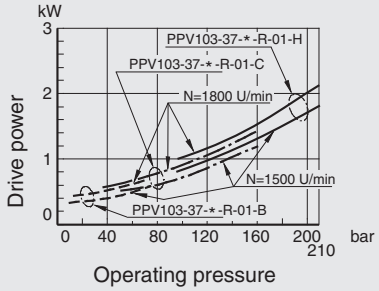
● Drive power

Example: For an operating pressure of 160 bar, an output flow of 45 l/min at 1500 rpm, the input power is approx. 12.6 kW

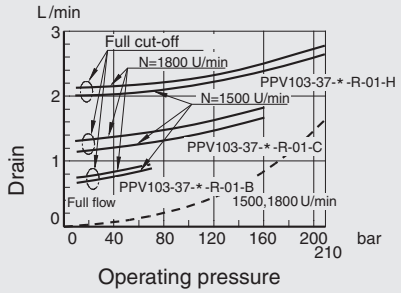




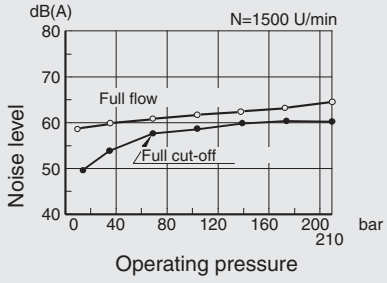
● Full cut-off power

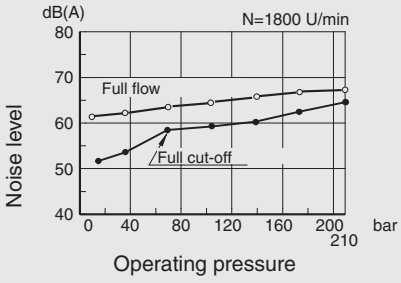


● Drain



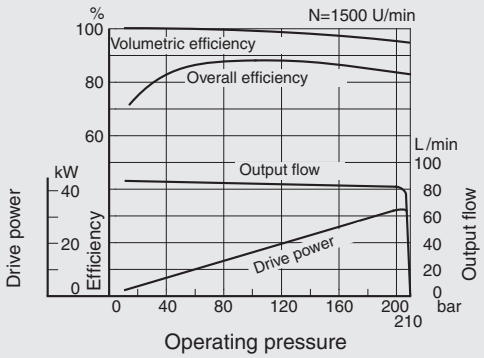
● Noise level

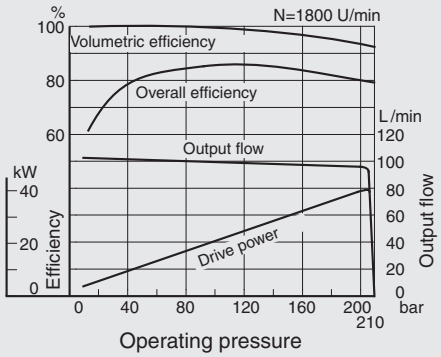




* measured with noise level meter 1 metre away from pump in an anechoic room using a flexible coupling to DIN45635

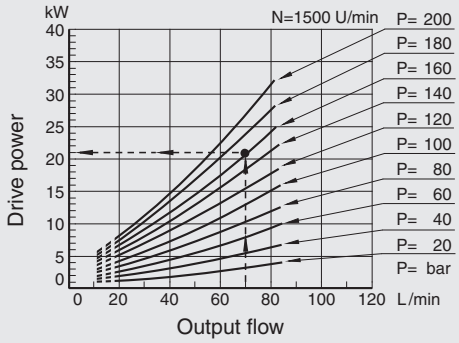
● Performance characteristic curve

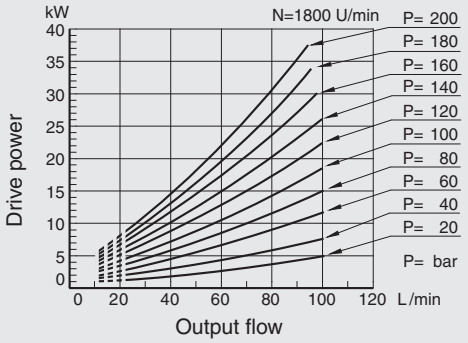




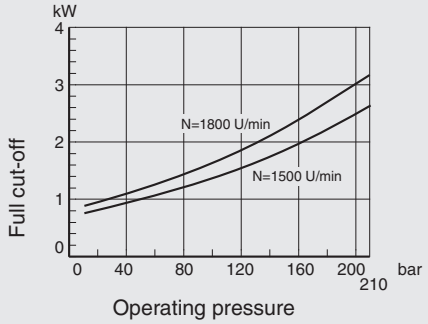
● Drive power

Example: For an operating pressure of 160 bar, an output flow of 70 l/min at 1500 rpm, the input power is approx. 20.8 kW

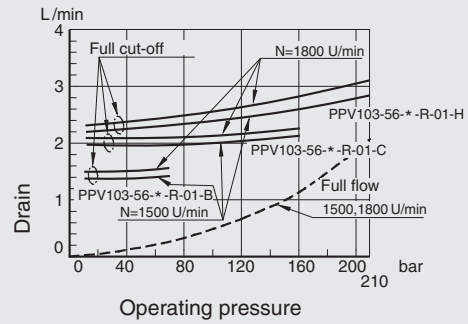




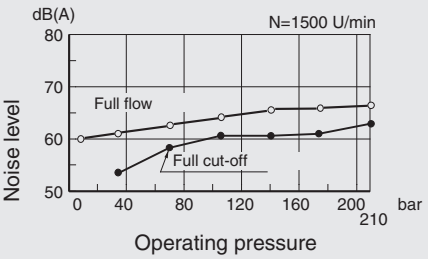
● Full cut-off power

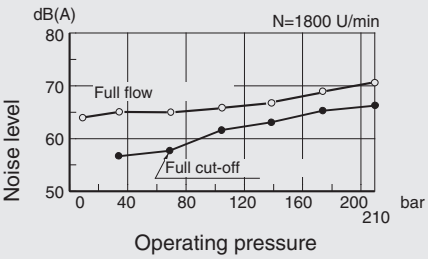


● Drain



● Noise level

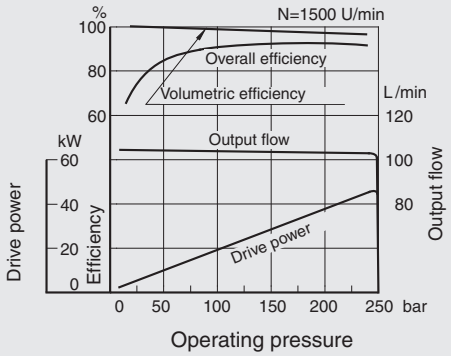


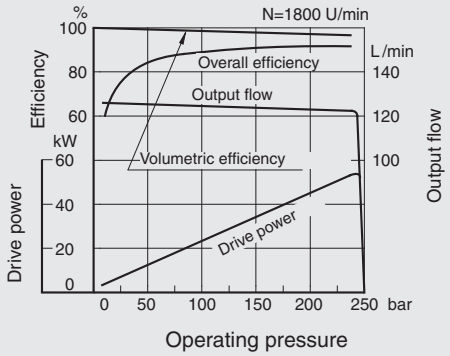


* measured with noise level meter 1 metre away from pump in an anechoic room using a flexible coupling to DIN45635

2.5.19 PPV103-70

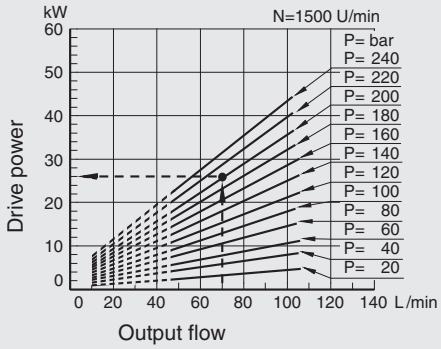
● Performance characteristic curve

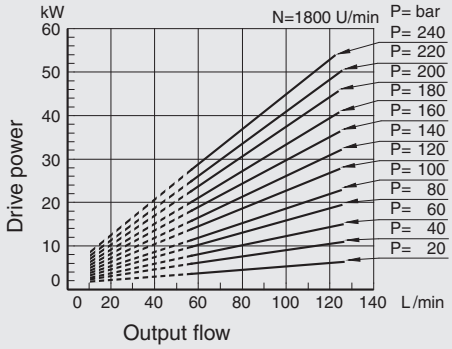




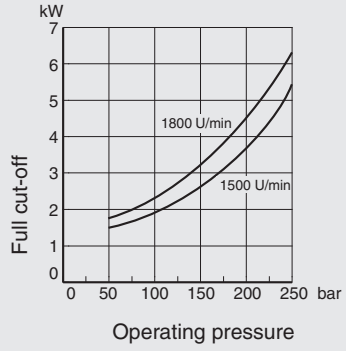
● Drive power

Example: For an operating pressure of 200 bar, an output flow of 70 l/min at 1500 rpm, the input power is approx. 26 kW

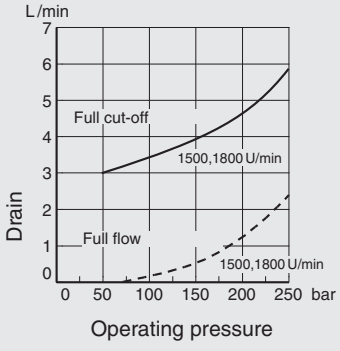




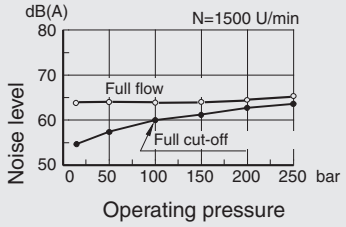
● Full cut-off power

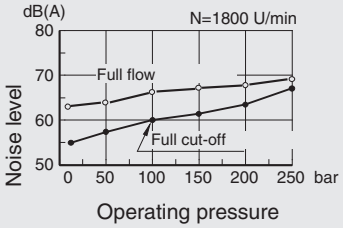


● Drain



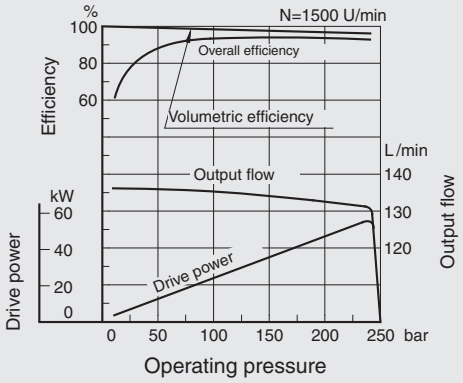
● Noise level

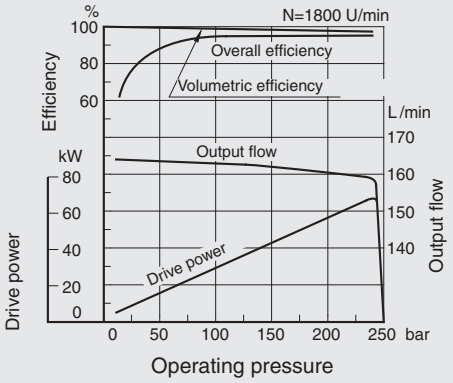




* measured with noise level meter 1 metre away from pump in an anechoic room using a flexible coupling to DIN45635

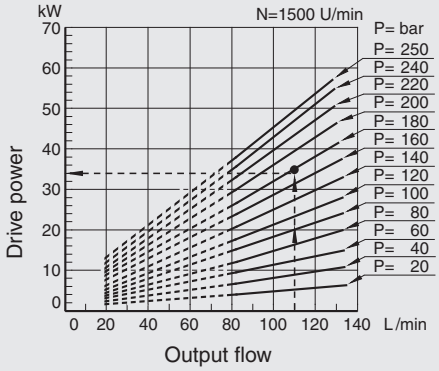
● Performance characteristic curve

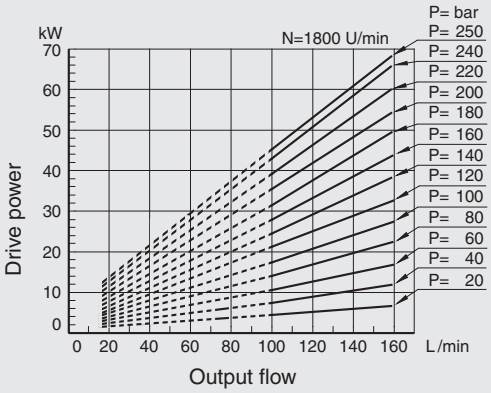




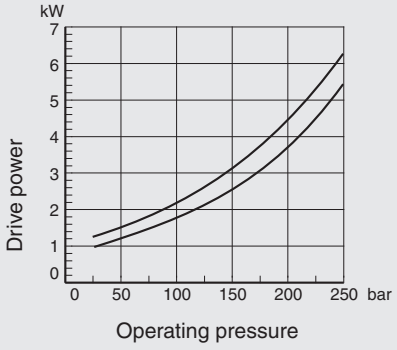
● Drive power

Example: For an operating pressure of 180 bar, an output flow of 110 l/min at 1500 rpm, the input power is approx. 34 kW

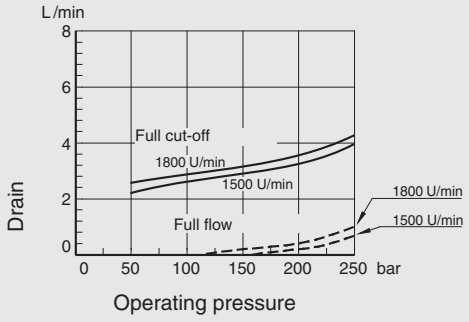




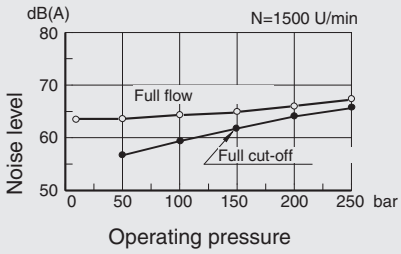
● Full cut-off power

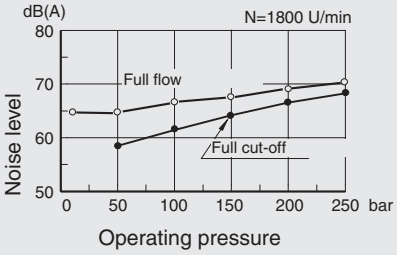


● Drain



● Noise level

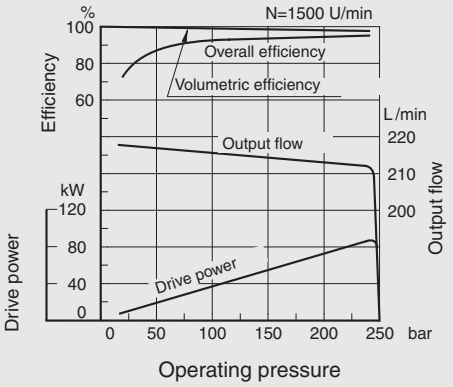


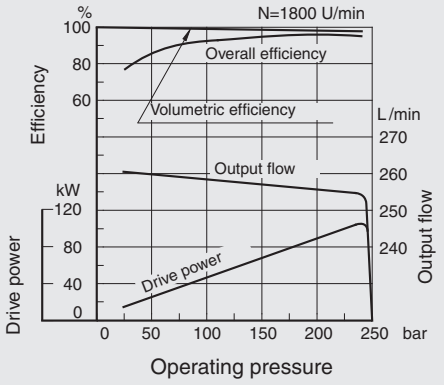


* measured with noise level meter 1 metre away from pump in an anechoic room using a flexible coupling to DIN45635

2.5.21 PPV103-145

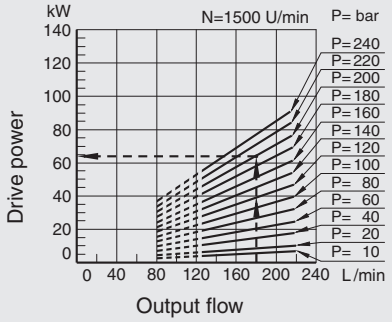
● Performance characteristic curve

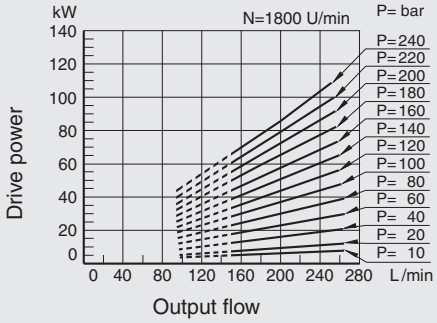




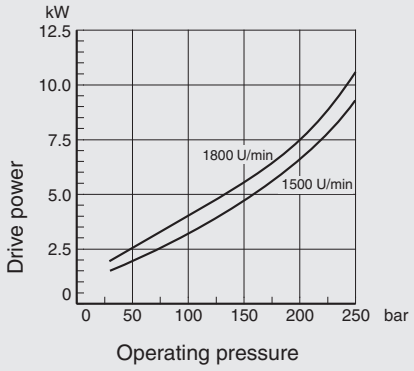
● Drive power

Example: For an operating pressure of 200 bar, an output flow of 180 l/min at 1500 rpm, the input power is approx. 64 kW

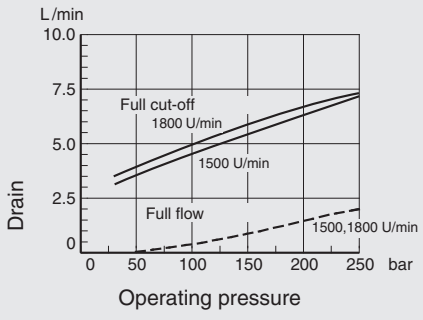




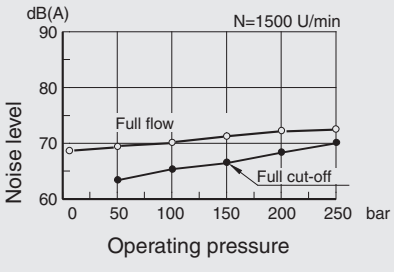
● Full cut-off power

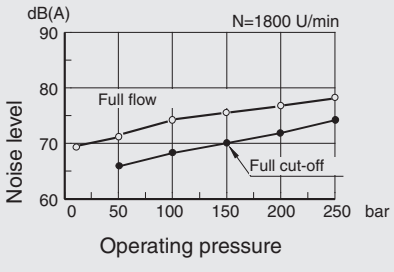


● Drain



● Noise level



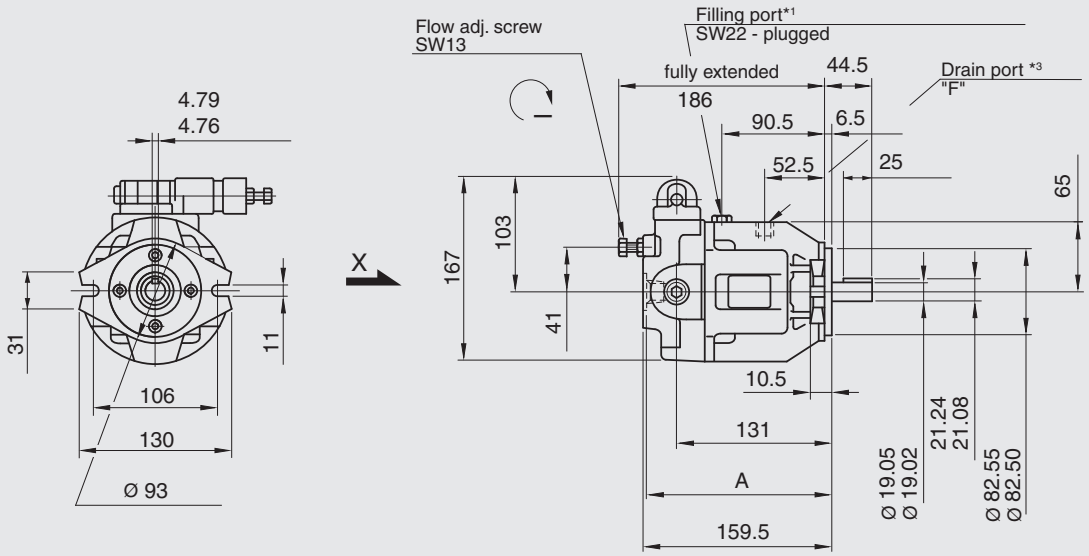


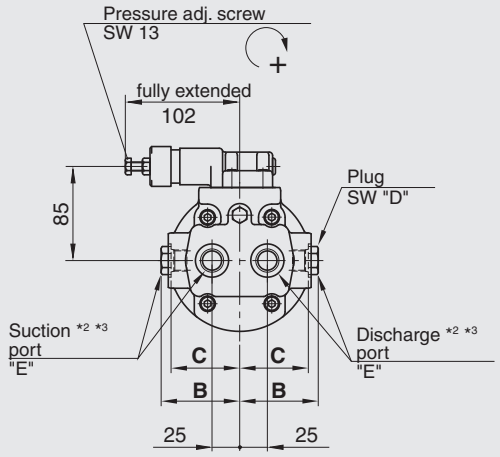
* measured with noise level meter 1 metre away from pump in an anechoic room using a flexible coupling to DIN45635

DIMENSIONS

2.5.22 PPV103-10

PPV103-10 with pressure control 01





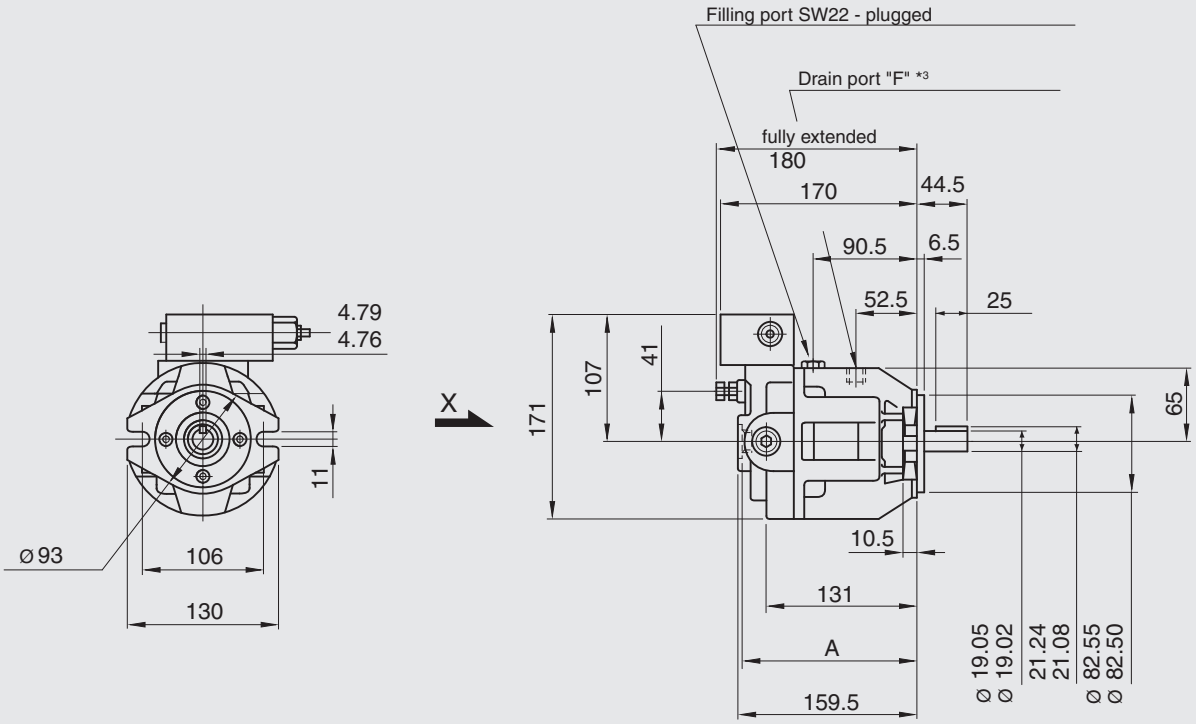
View X

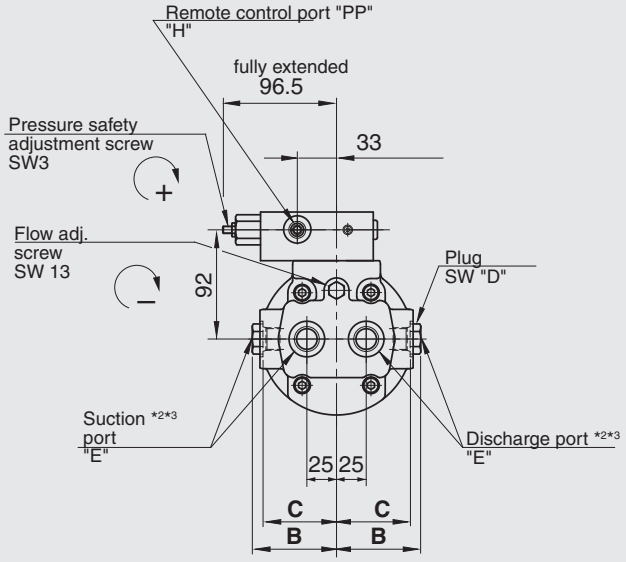
*1 Install the pump with the filling port at the top.
*2 Side and axial suction and discharge ports. Plug any ports that are not required.
*3 Torques for the suction, discharge and drain ports are given in the table below.

Model numbers	Dimensions mm				Thread size	
	A	B	C	D	E	F
PPV103-10 ... 1280 European Standard	159	72	64	27	1/2 BSP.F	3/8 BSP.F
PPV103-10 ... 12950 North American Standard	157	71	62	22	3/4-16 UNF	9/16-18 UNF

Model numbers	Torque Nm	
	Suction and discharge port	Drain port
PPV103-10 ...1280	56-62	33-36
PPV103-10 ...12950	47-51	40-50

PPV103-10 with remote pressure control 07



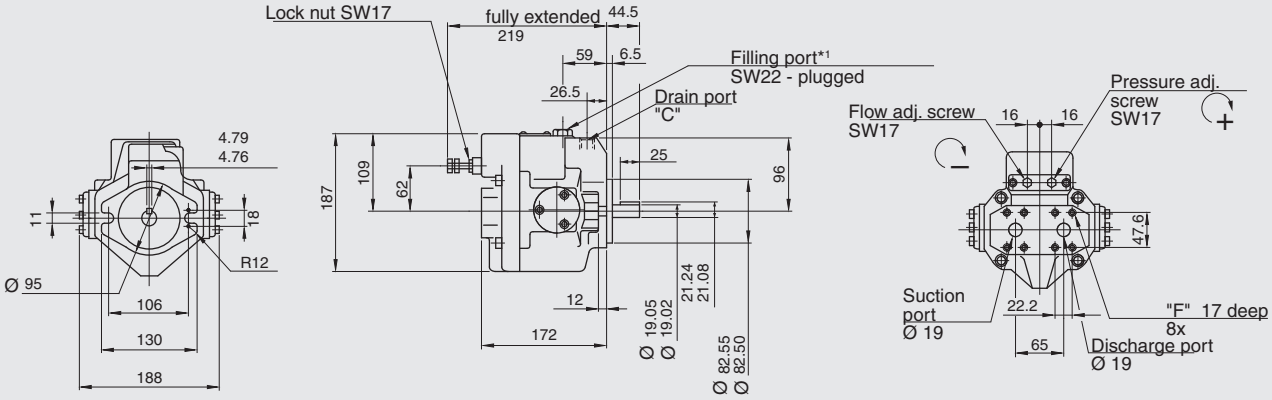


View X

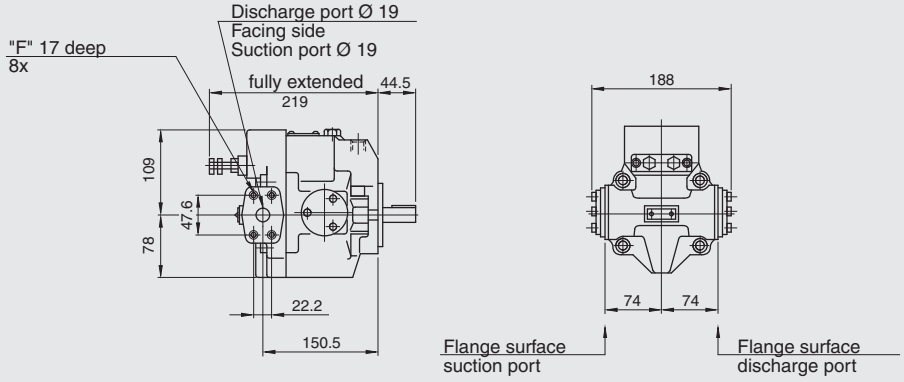
*1 Install the pump with the filling port at the top.
*2 Side and axial suction and discharge ports. Plug any ports that are not required.
*3 Torques for the suction, discharge and drain ports are given in the table on page 154.

Model numbers	Dimensions mm A	B	C	D	Thread size E	F	H
PPV103-10 ...1280 European Standard	159	72	64	22	1/2 BSP.F	3/8 BSP.F	1/4 BSP.Tr
PPV103-10 ...12950 North American Standard	157	71	62	27	3/4-16 UNF	9/16-18 UNF	7/16-20 UNF

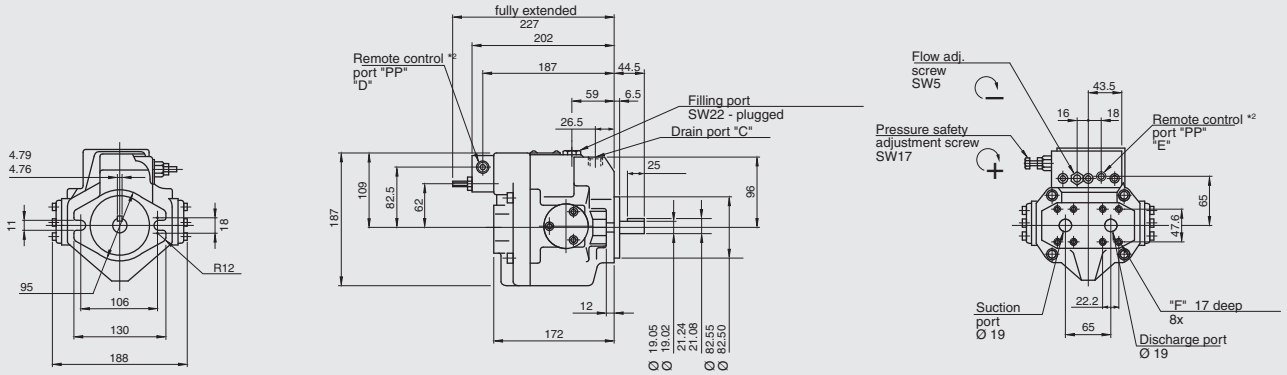
PPV103-16 / -22 with pressure control 01



Side port option



PPV103-16 / -22 with remote pressure control 07

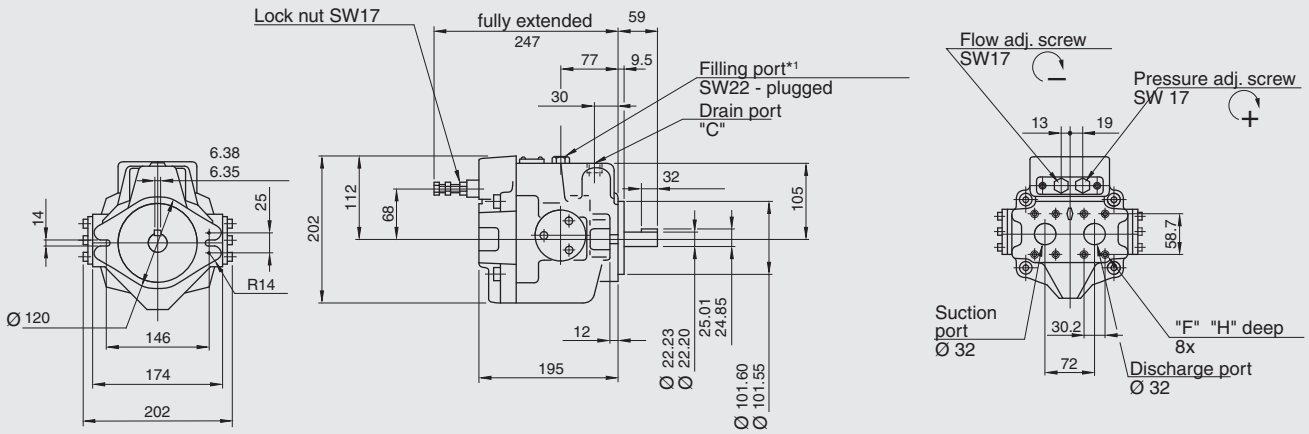


*1 Install the pump with the filling port at the top.
*2 Plug any ports that are not required.

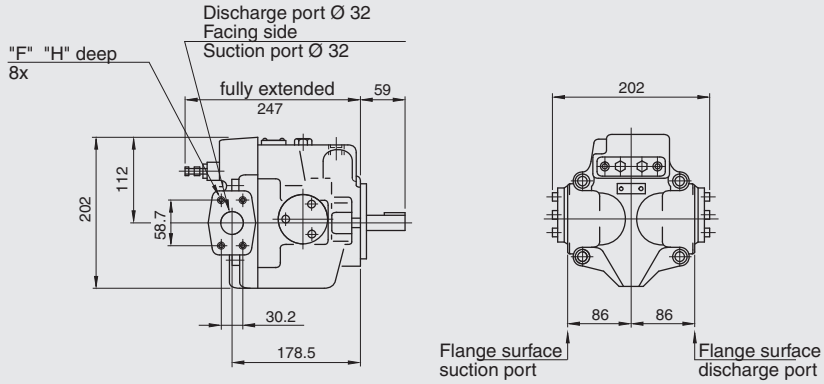
Model numbers	"C" Thread	"D" Thread	"E" Thread	"F" Thread
PPV103-16 / -22 ...3280	3/8 BSP.F	3/8 BSP.F	1/4 BSP.Tr	M10
PPV103-16 / -22 ...3290	3/4-16 UNF	9/16-18 UNF	7/16-20 UNF	3/8-16 UNC

2.5.24 PPV103-37

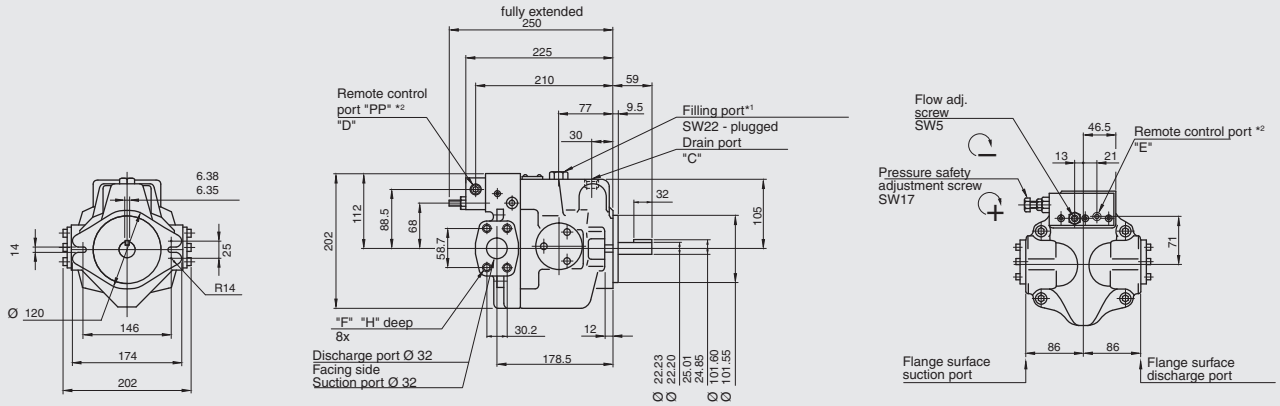
PPV103-37 with pressure control 01



Side port option



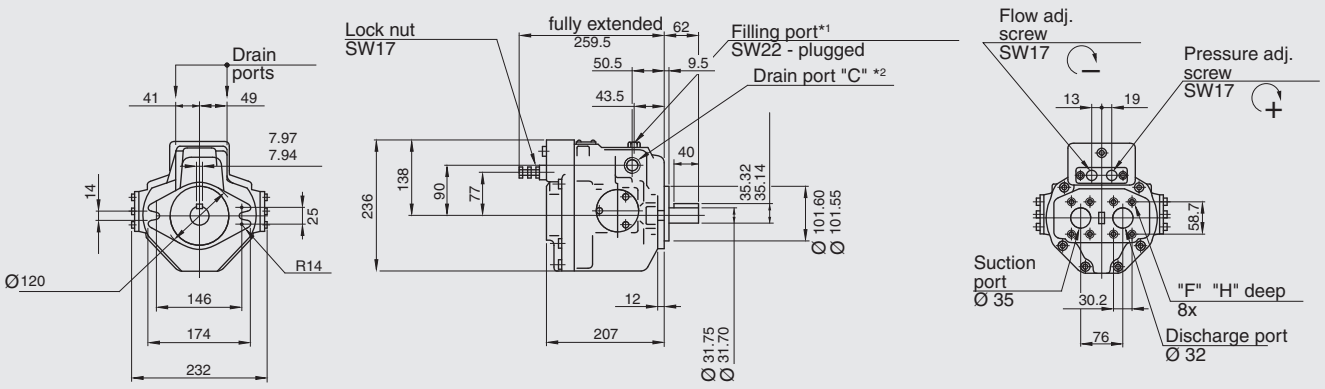
PPV103-37 with remote pressure control 07



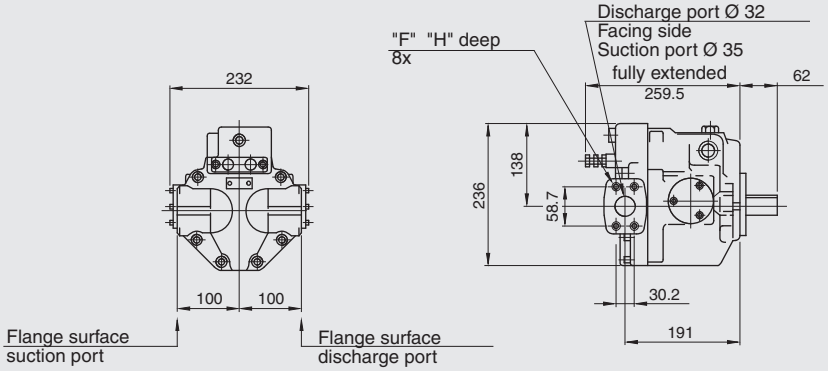
*1 Install the pump with the filling port at the top.
*2 Plug any ports that are not required.

Model numbers	"C" Thread	"D" Thread	"E" Thread	"F" Thread	"H" mm
PPV103-37 ...3280	1/2 BSP.F	3/8 BSP.F	1/4 BSP.Tr	M10	19
PPV103-37 ...3290	7/8-14 UNF	9/16-18 UNF	7/16-20 UNF	7/16-14 UNC	20

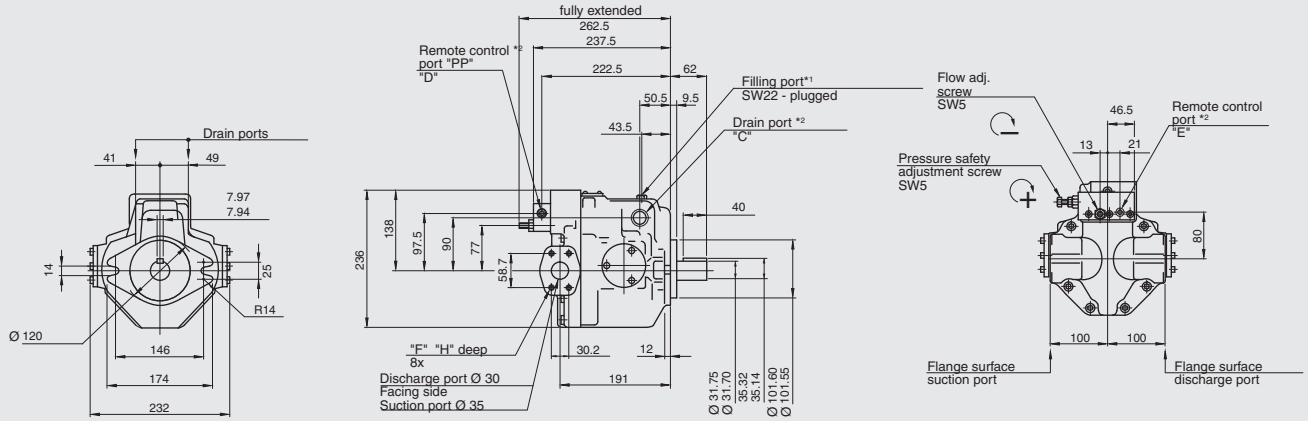
PPV103-56 with pressure control 01



Side port option



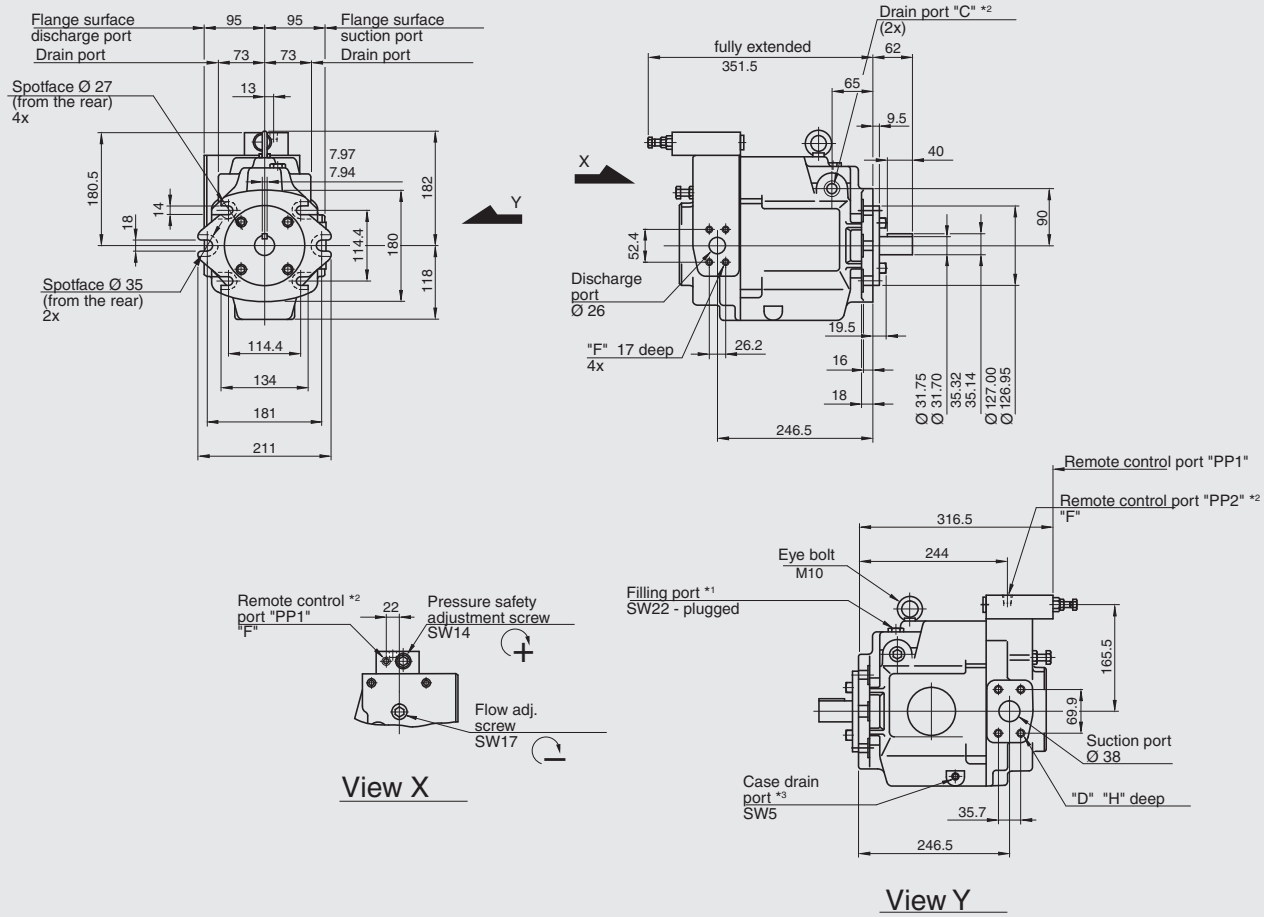
PPV103-56 with remote pressure control 07



*1 Install the pump with the filling port at the top.
*2 Plug any ports that are not required.

Model numbers	"C" Thread	"D" Thread	"E" Thread	"F" Thread	"H" mm
PPV103-56 ...3280	3/4 BSP.F	3/8 BSP.F	1/4 BSP.Tr	M10	19
PPV103-56 ...3290	1 1/16-12 UN	9/16-18 UNF	7/16-20 UNF	7/16-14 UNC	20

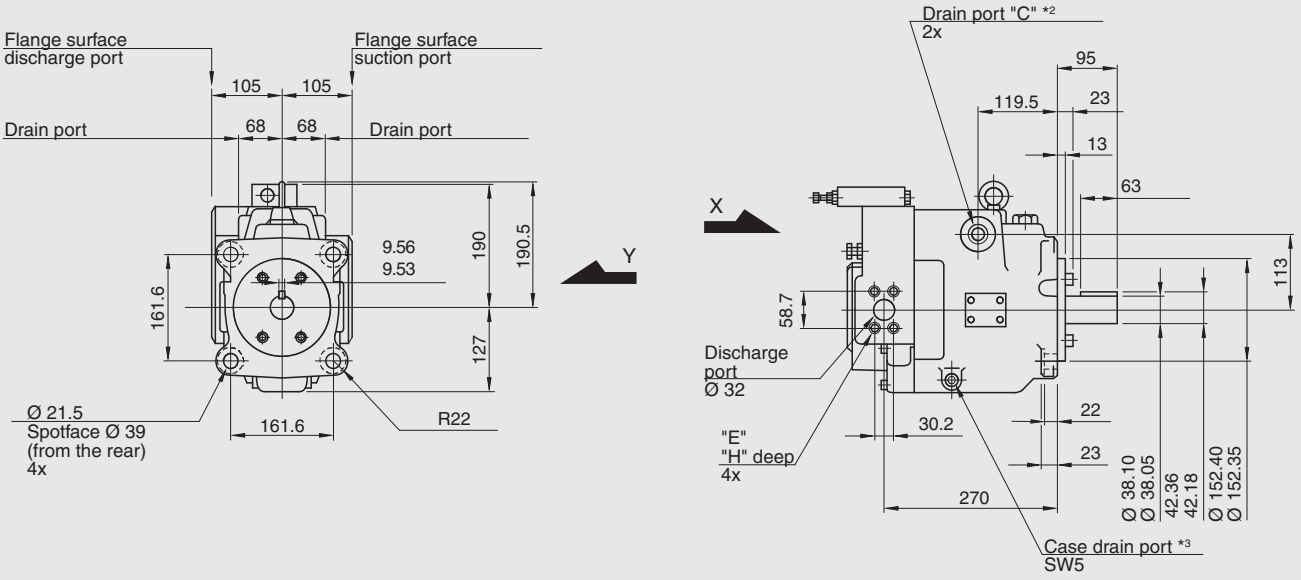
PPV103-70 with remote pressure control 07

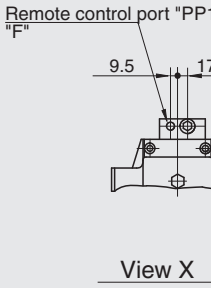


*1 Install the pump with the filling port at the top.
*2 Plug any ports that are not required.
*3 Drain port for draining fluid from the case.

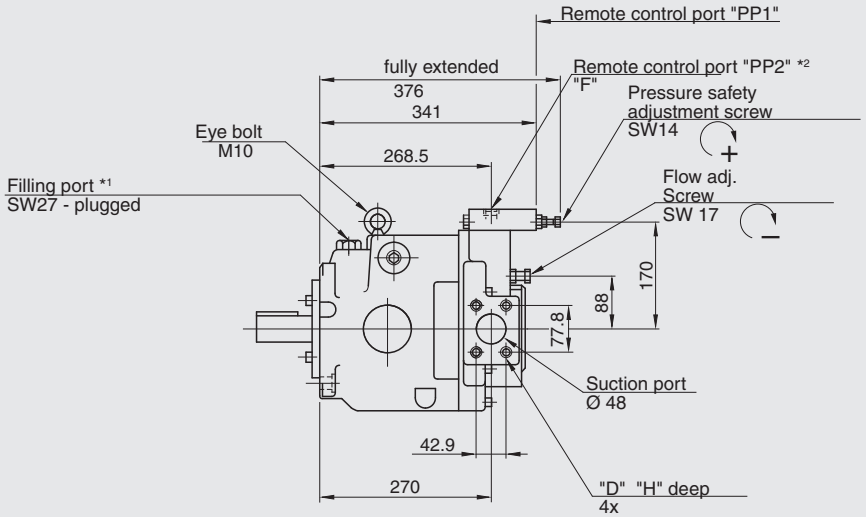
Model numbers	"C" Thread	"D" Thread	"E" Thread	"F" Thread	"H" mm
PPV103-70 ...6080	3/4 BSP.F	M12	M10	1/4 BSP.Tr	19
PPV103-70 ...60950	1 1/16-12 UN	1/2-13 UNC	3/8-16 UNC	7/16-20 UNF	21

PPV103-90 with remote pressure control 07





View X



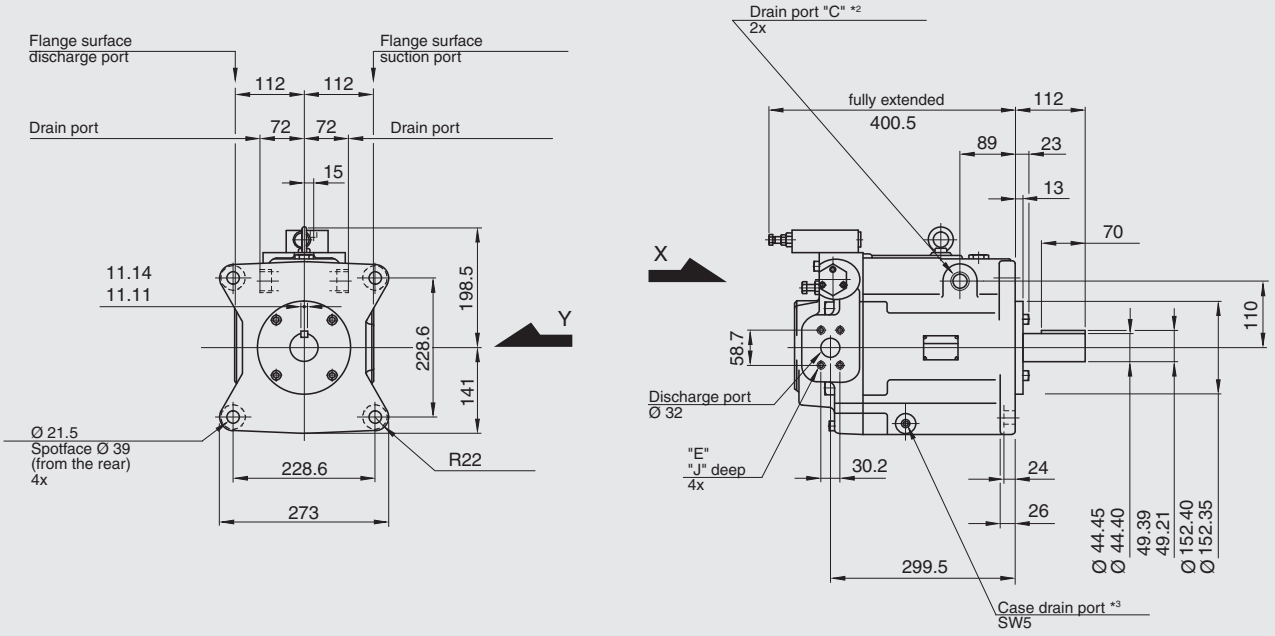
View Y

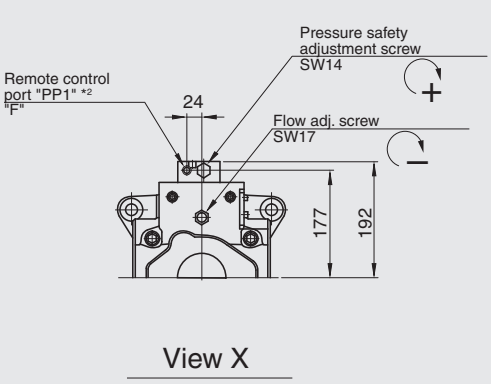
*1 Install the pump with the filling port at the top.
*2 Plug any ports that are not required.
*3 Drain port for draining fluid from the case.

Model numbers	"C" Thread	"D" Thread	"E" Thread	"F" Thread	"H" mm
PPV103-90 ...6080	3/4 BSP.F	M12	M10	1/4 BSP.Tr	19
PPV103-90 ...60950	1 1/16-12 UN	1/2-13 UNC	7/16-14 UNC	7/16-20 UNF	21

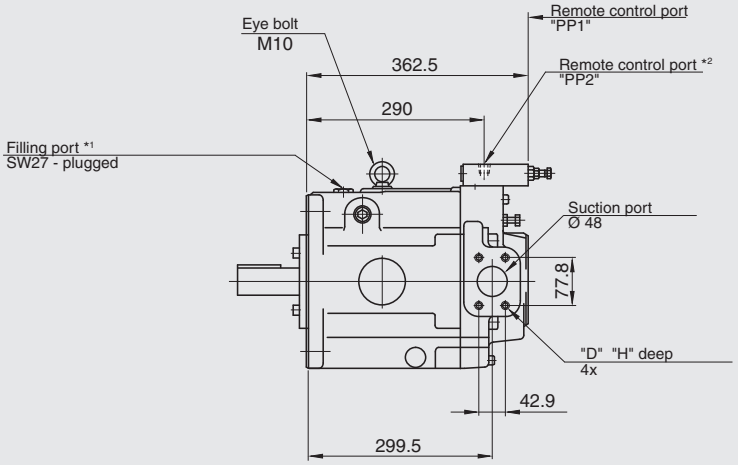
2.5.28 PPV103-145

PPV103-145 with remote pressure control 07





View X



View Y

*1 Install the pump with the filling port at the top.
*2 Plug any ports that are not required.
*3 Drain port for draining fluid from the case.

Model numbers	"C" Thread	"D" Thread	"E" Thread	"F" Thread	"H" mm	"J" mm
PPV103-145 ...6080	3/4 BSP.F	M12	M10	1/4 BSP.Tr	19	19
PPV103-145 ...60950	1 1/16-12 UN	1/2-13 UNC	7/16-14 UNC	7/16-20 UNF	21	20