

Variable displacement vane pump with hydraulic pressure compensator

# PHP



Series Name	Displacement [cm <sup>3</sup> /r]	Flow rate at 1450rpm [l/min]	Max. Pressure [bar]
01 PHP 05-16	16	23	250
01 PHP 1-20	20	29	250
01 PHP 1-25	25	36	250
01 PHP 1-32	32	47	250
01 PHP 2-40	40	58	250
01 PHP 2-50	50	73	250
01 PHP 2-63	63	92	250
01 PHP 3-80	80	116	250
01 PHP 3-100	100	145	250
01 PHP 3-120	120	174	250

## General description

PHP pumps are high pressure variable displacement vane pumps equipped with hydraulic pressure regulating device that allow you to instantly adjust the flow rate accordingly to circuit requirements. Variable displacement vane pumps are volumetric type so they deliver a maximum flow rate equivalent to its displacement for their speed of rotation. Operating pressure is due to pressure loads encountered by the fluid within the system. When the outlet pressure (on the system) equals the pump setting pressure, the flow rate is adjusted to the values required by the system. When this value is achieved, pump reduces its flow rate to zero, keeping the pressure almost constant. In zero flow conditions, pump delivers oil only to compensate any possible drain and piloting.

The series of PHP pumps, like all other Berarma variable displacement vane pumps, ensure:

- Silent running
- High efficiency
- Long working life
- Economy and simplification of hydraulic system
- Modular design
- Energy saving

The important performance increase guarantees:

- High operating pressure
- Excellent displacement dynamic control

The main innovation of the new series of 01 PHP pumps is the internal pump cartridge, designed to obtain perfect axial balancing, both in terms of hydrostatic compensation of the distribution plates and the fluid flow-rate from inlet to outlet.

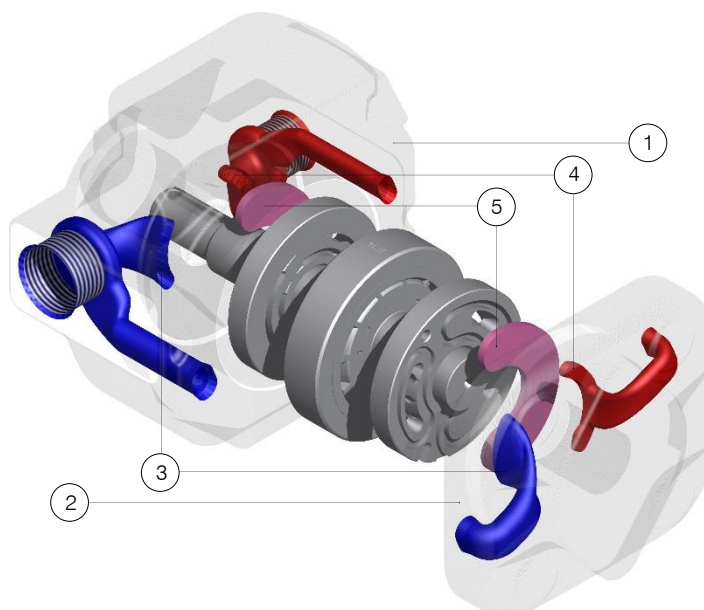
The series of PHP pumps is supplied with:

- ISO standard mounting flanges and shafts
- Gas BSP and/or SAE 3000 standard port connections
- Max. flow regulator unit to mechanically reduce pump max. displacement
- Different types of devices for hydraulic, electric and proportional control for flow rate and / or pressure
- Thru drive shaft (only with the option "A") to arrange combined pumps between Berarma pumps or the main other types of pump available on the fluid power market

Considering the features outlined above, the new series of PHP pumps is one of a kind, suitable for applications that require higher performances than the standard use of variable displacement vane pumps.

What makes the Berarma PHP series pumps a unique product of its kind?

- 250 bar operating pressure
- Double inlet and outlet pipes in the internal cartridge of the pump
- Double hydrostatic compensation in axial direction on the distribution plates
- New functional concept of the pressure compensator device (reduction of pressure peak values and response time)
- Innovative shapes and design
- Wear reduction of the internal pump cartridge parts



### Definition of pump components

- (1) Body
- (2) Cover
- (3) Double inlet pipe
- (4) Double outlet pipe
- (5) Double hydrostatic compensation

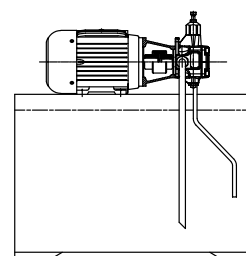
## Technical data

Size	05	1	2	3
Geometric displacement according to ISO 3662 (cm³/r)	16	20 ÷ 25 ÷ 32	40 ÷ 50 ÷ 63	80 ÷ 100 ÷ 120
Actual displacement (cm³/r) Due to manufacturing tolerances, the value can vary by approx. ±3%	17	21 ÷ 26 ÷ 33	42 ÷ 51 ÷ 63	80 ÷ 100 ÷ 123
Maximum working pressure (bar) Pressure peak exceeding 30% (10% only for size 3) of the maximum operating pressure must be eliminated by adopting the appropriate measures	250			
Pressure setting range (bar)	H: 20 ÷ 250			H: 30 ÷ 250
Permitted maximum drain port pressure (bar)	1			
Inlet pressure (bar)	0.8 ÷ 1.5 absolute			
Speed range (rpm)	800 ÷ 1800		800 ÷ 1500 1800 allowed with pressure up to 160bar	
Rotation direction	R: right (clockwise) viewed from shaft end			
Load on drive shaft	NO RADIAL OR AXIAL LOADS ALLOWED			
Hydraulic fluid for other fluids please contact Berarma technical sales service	HM according to ISO 6743-4 HLP according to DIN 51524-2			
	HEES according to ISO 15380 FPM-Viton seals ÷ Pmax 160bar			
	HFD according to ISO 12922 FPM-Viton seals ÷ Pmax 160bar			
	HFC according to ISO 12922 water <40% ÷ NBR seals ÷ Pmax 100bar ÷ Vmax 1000rpm ÷ Temp. <40°C			
Viscosity range (cSt, mm²/s)	22 ÷ 68 at operating temperature			
Starting viscosity under full flow conditions (cSt, mm²/s)	400 max.			
Viscosity index according to ISO 2909	100 min.			
Inlet fluid temperature range (°C)	+15 / +60 ÷ pay attention to viscosity range			
Maximum acceptable fluid contamination level	20/18/15 according to ISO 4406 CLASS 9 according to NAS 1638			
Recommended fluid contamination level for a longer pump working life	18/16/13 according to ISO 4406 CLASS 7 according to NAS 1638			
Moment of inertia (kgm²)	0.00019	0.0005	0.00909	0.015
	Weight single pump (kg)			
Standard control	16.4	19.1	44.8	55.2
PCS002 control	18.5	21.2	46.9	57.3
PCS003 control	18	20.8	46.4	56.9
PCS004 control	19	21.9	47.5	58
PCS005 control	17.9	20.6	46.3	56.7
PCS006 control	-	-	44.9	55.3
PCLS001 control	18.9	21.6	47.3	57.8
PCLS002 control	19.3	22.1	47.5	58.2
PCLS003 control	18.9	21.6	47.3	57.7
PCLS004 control	20	22.7	48.4	58.8
PCLS005 control	18.7	21.5	47.2	57.6
For further information and/or different operating conditions please contact Berarma technical sales service				

For further information and/or different operating conditions please contact Berarma technical sales service

## Installation and start-up

For the installation and start-up of Berarma pumps please refer to related **Document INSTALLATION AND START-UP INSTRUCTIONS** available on our website and provided in hard copy with every pump supplied.



## Ordering code

Series Name	Size Displacement	Flange	Pressure setting	Rotation	Seals	Options	Pressure controls
<b>01 PHP</b>	<b>2 – 50</b>	<b>F</b>	<b>H</b>	<b>R</b>	<b>M</b>	<b>A</b>	<b>PCS003</b>

Code	Size	Displacement cm <sup>3</sup> /r
<b>05 – 16</b>	05	16
<b>1 – 20</b>	1	20
<b>1 – 25</b>	1	25
<b>1 – 32</b>	1	32
<b>2 – 40</b>	2	40
<b>2 – 50</b>	2	50
<b>2 – 63</b>	2	63
<b>3 – 80</b>	3	80
<b>3 – 100</b>	3	100
<b>3 – 120</b>	3	120

Code	Flange	Ports
<b>F</b>	ISO 3019-2 4 holes	Gas BSP / SAE 3000
<b>FGR2</b> <small>only for size 05</small>	Rectangular gear pump 2	Gas BSP

Code	Pressure setting (bar)
<b>H</b>	20 ÷ 250 for size 05,1 and 2 30 ÷ 250 for size 3

Code	Rotation direction
<b>R</b>	Right (cw) view from shaft end

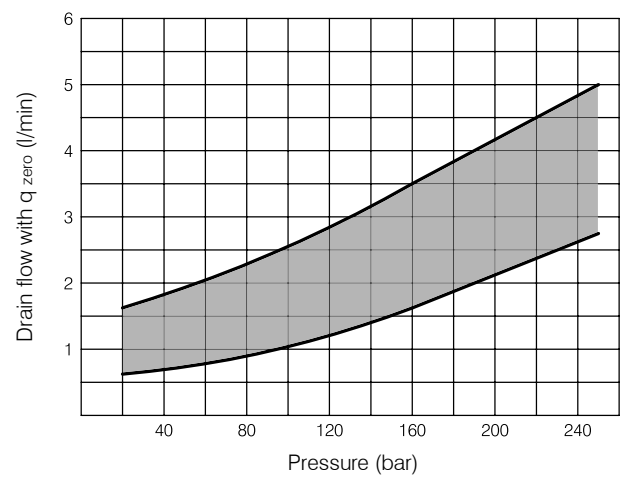
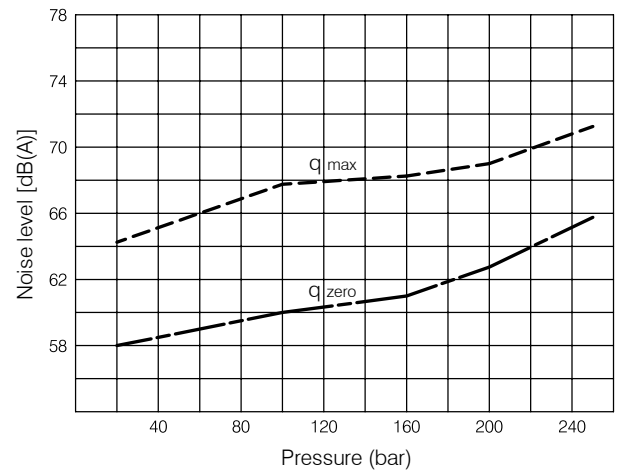
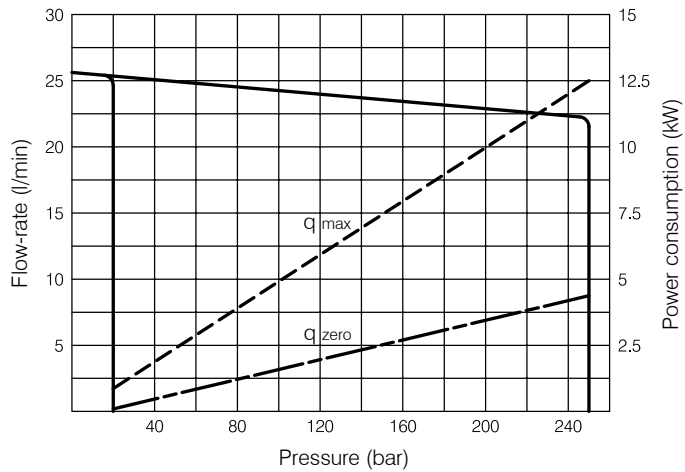
Code	Seals
<b>M</b>	NBR
<b>E</b>	FPM – Viton

Code	Option
<b>/</b>	Omit for no option
<b>A</b>	Thru drive shaft for combined pumps (only for flange <b>F</b> )

Code	Pressure control
<b>/</b>	Single stage of pressure
<b>PCS002</b>	Single stage of pressure with remote control
<b>PCS003</b>	Two stages of pressure, one with fixed setting at the minimum pressure
<b>PCS004</b>	Two stages of pressure, both adjustable
<b>PCS005</b>	Proportional pressure control
<b>PCS006</b> <small>only for size 2-3</small>	Single stage of pressure with minimum displacement limiter control
<b>PCLS001</b>	<b>Load Sensing</b> control with single stage of pressure
<b>PCLS002</b>	<b>Load Sensing</b> control with single stage of pressure with remote control
<b>PCLS003</b>	<b>Load Sensing</b> control with two stages of pressure, one with fixed setting at the minimum pressure
<b>PCLS004</b>	<b>Load Sensing</b> control with two stages of pressure, both adjustable
<b>PCLS005</b>	<b>Load Sensing</b> with proportional pressure control

## Characteristic curves

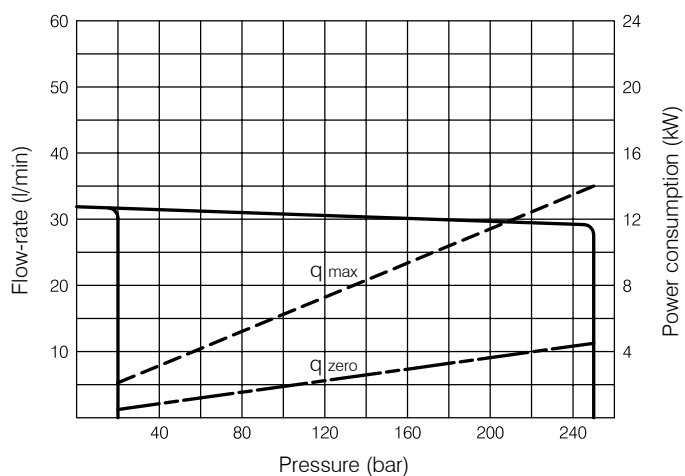
01 PHP 05-16



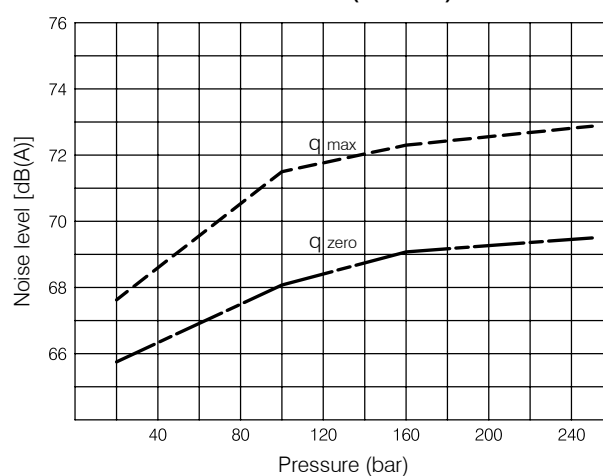
Indicative values measured on Berarma test stand, referring to 1500 rpm with HM hydraulic oil according to ISO 6743-4, ISO VG 46 according to ISO 3448, temperature 40 °C. Sound level meter placed 1 meter from the pump with flexible coupling.

## Characteristic curves

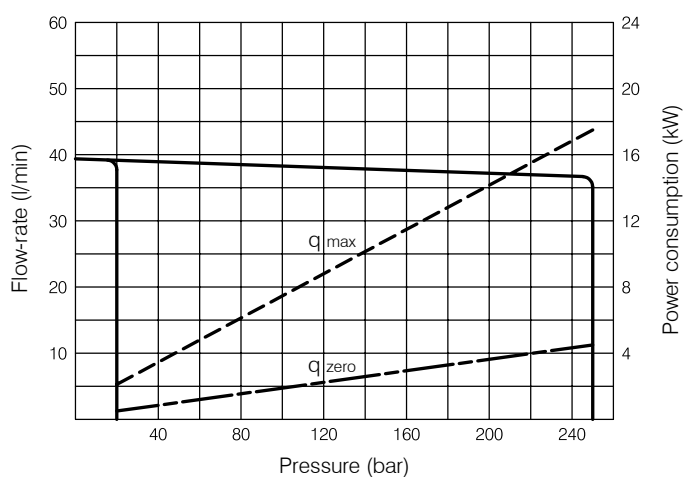
01 PHP 1-20



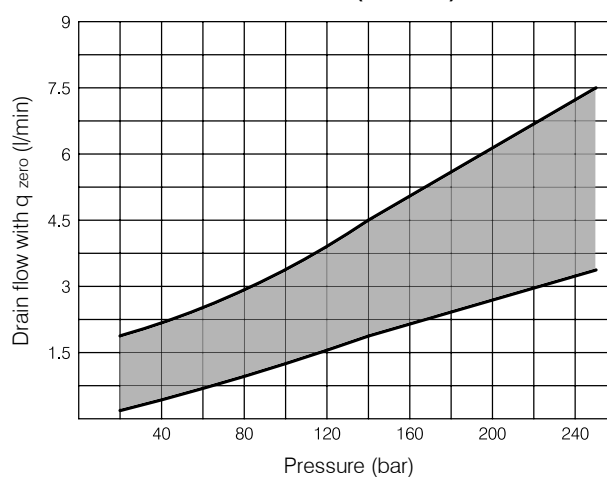
01 PHP 1-(20-25-32)



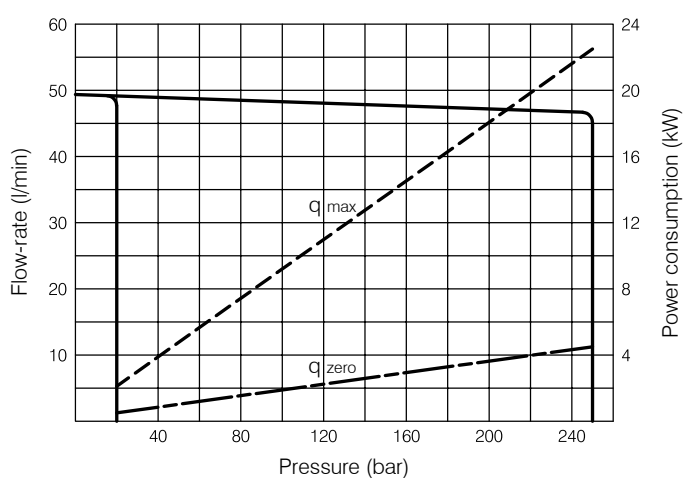
01 PHP 1-25



01 PHP 1-(20-25-32)



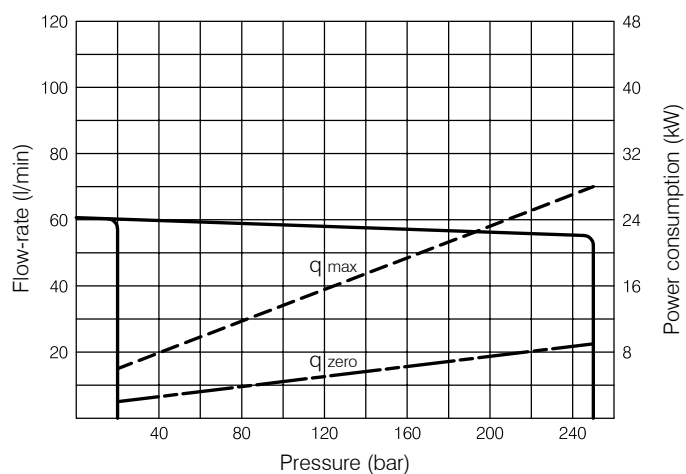
01 PHP 1-32



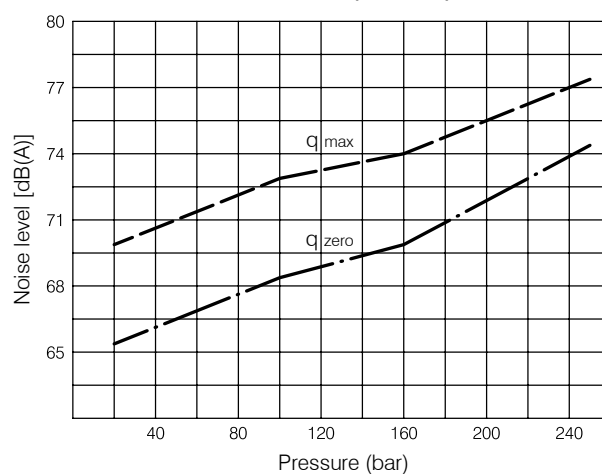
Indicative values measured on Berarma test stand, referring to 1500 rpm with HM hydraulic oil according to ISO 6743-4, ISO VG 46 according to ISO 3448, temperature 40 °C. Sound level meter placed 1 meter from the pump with flexible coupling.

## Characteristic curves

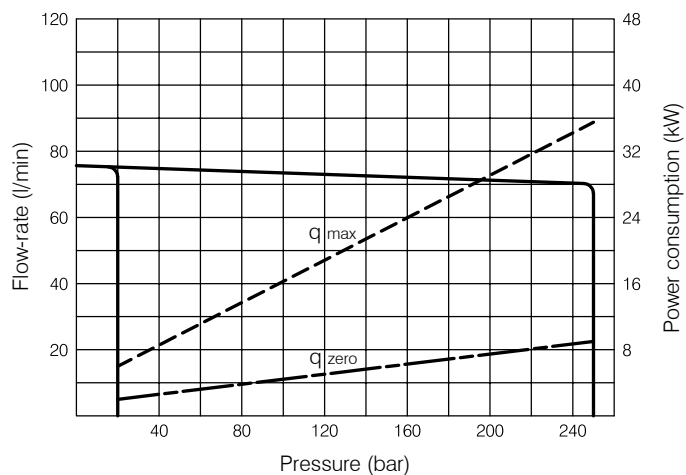
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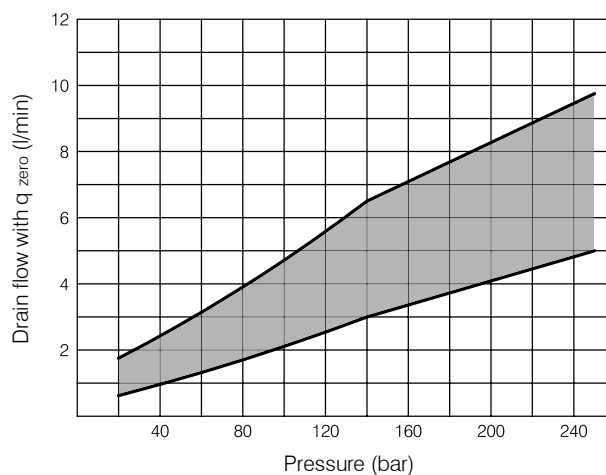
**01 PHP 2-(40-50-63)**



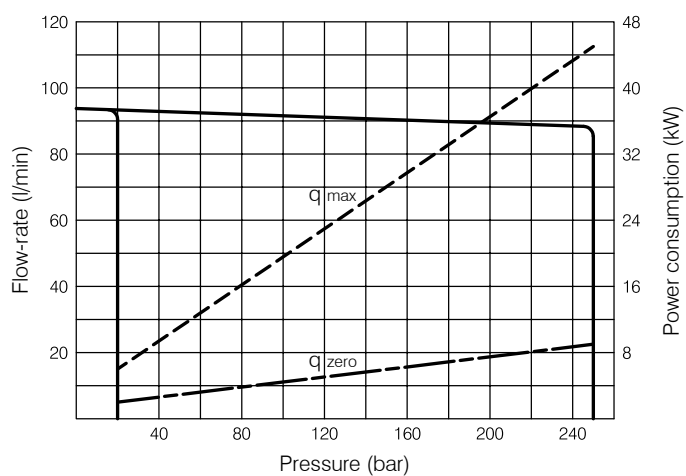
**01 PHP 2-50**



**01 PHP 2-(40-50-63)**



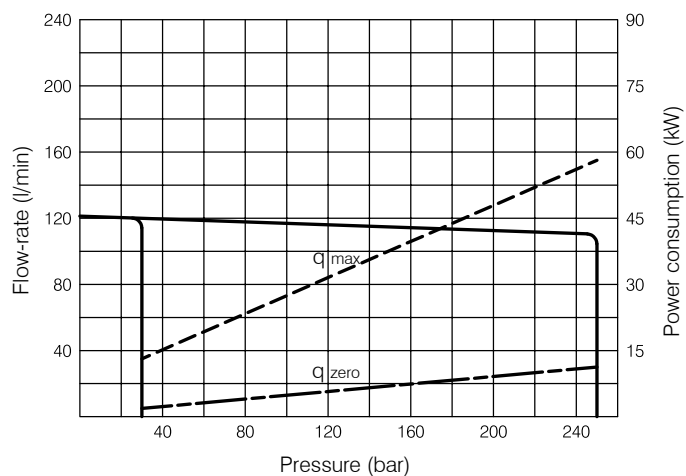
**01 PHP 2-63**



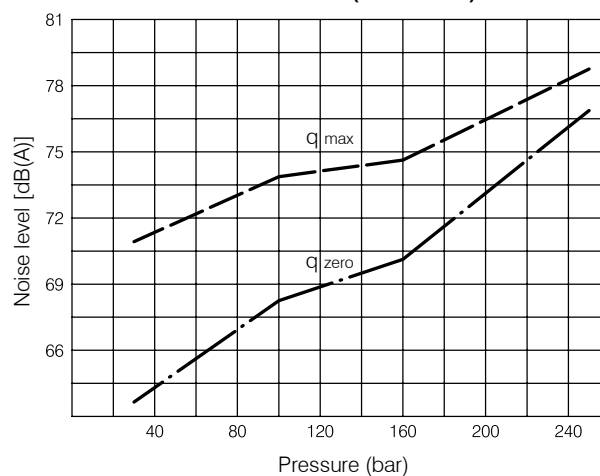
Indicative values measured on Berarma test stand, referring to 1500 rpm with HM hydraulic oil according to ISO 6743-4, ISO VG 46 according to ISO 3448, temperature 40 °C. Sound level meter placed 1 meter from the pump with flexible coupling.

## Characteristic curves

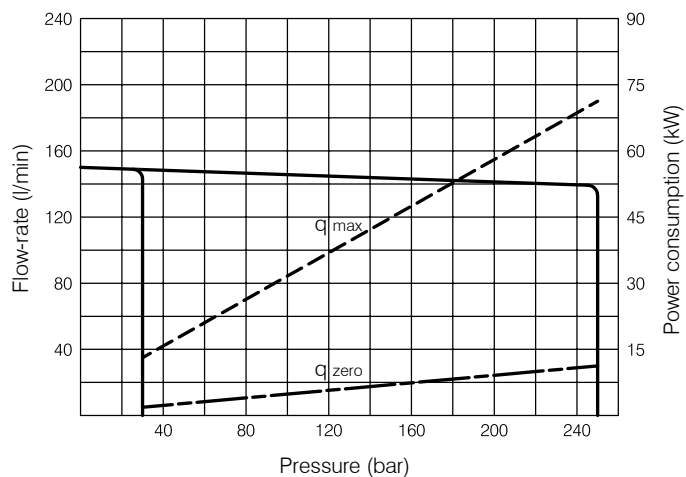
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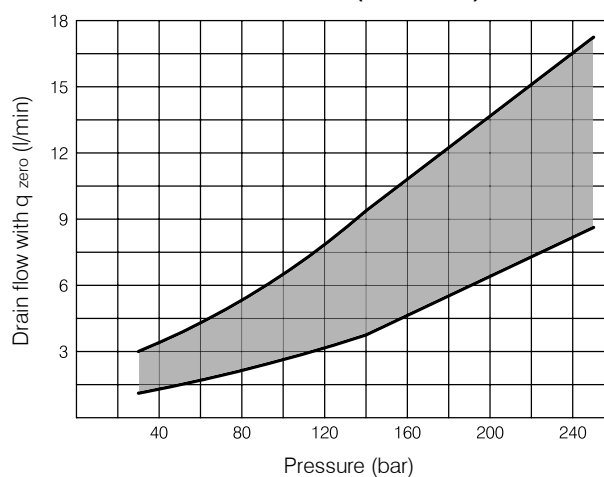
**01 PHP 3-(80-100-120)**



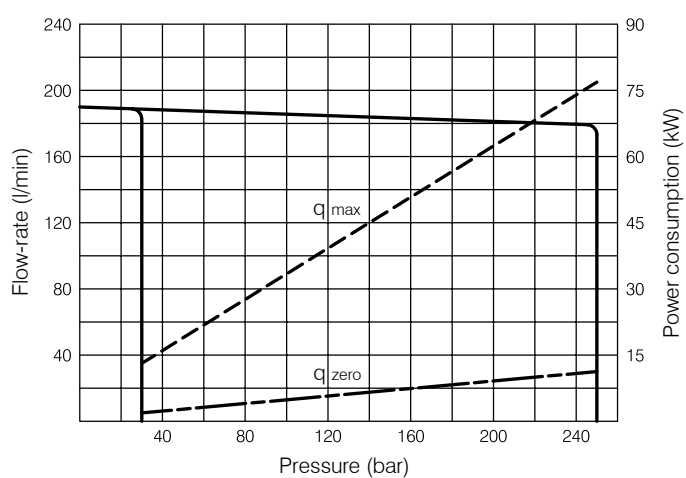
**01 PHP 3-100**



**01 PHP 3-(80-100-120)**



**01 PHP 3-120**

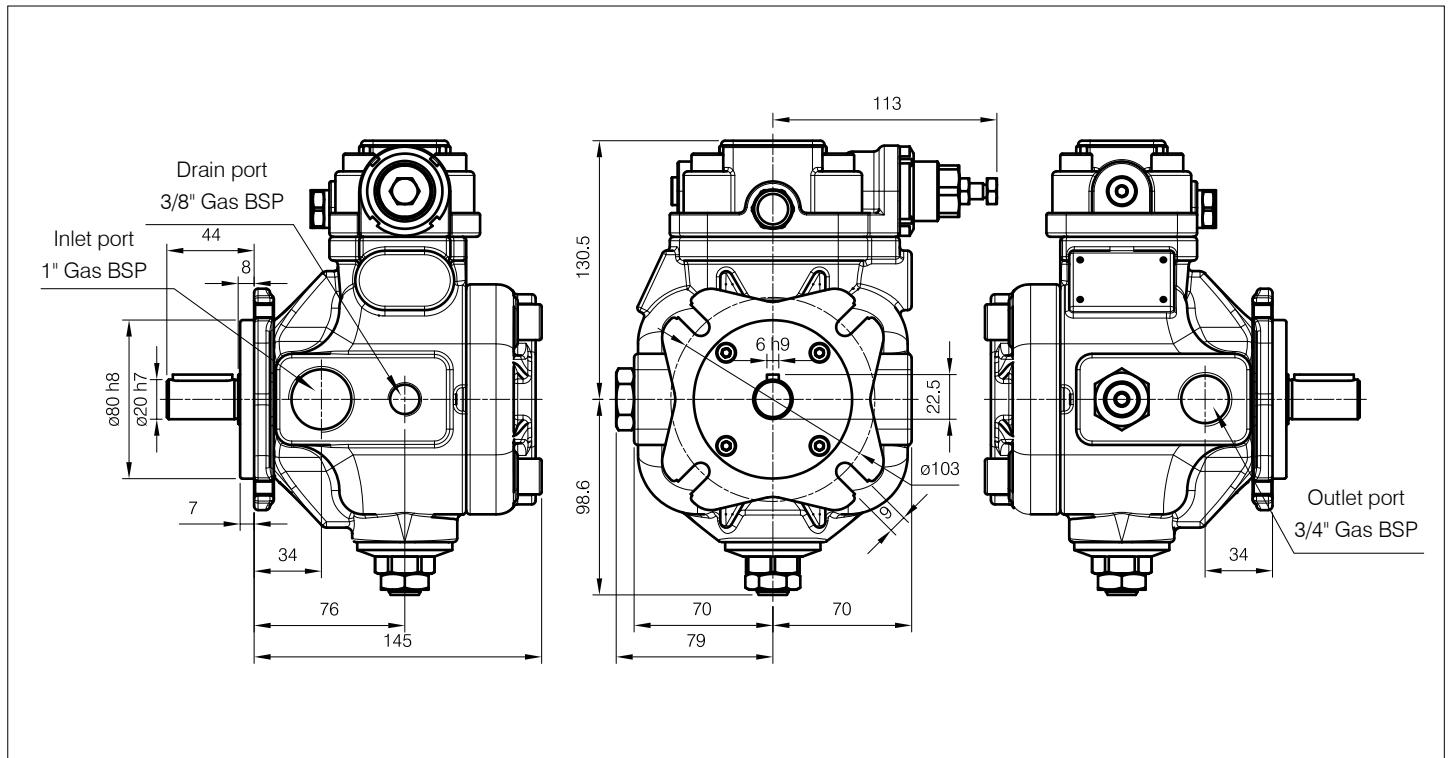


Indicative values measured on Berarma test stand, referring to 1500 rpm with HM hydraulic oil according to ISO 6743-4, ISO VG 46 according to ISO 3448, temperature 40 °C. Sound level meter placed 1 meter from the pump with flexible coupling.

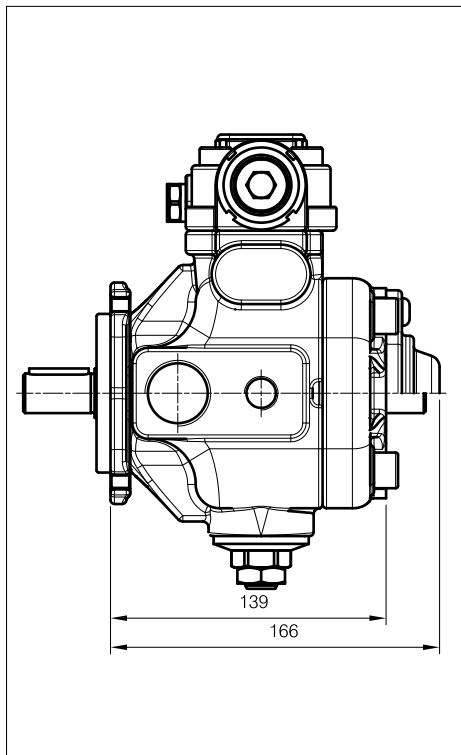


## Overall dimensions

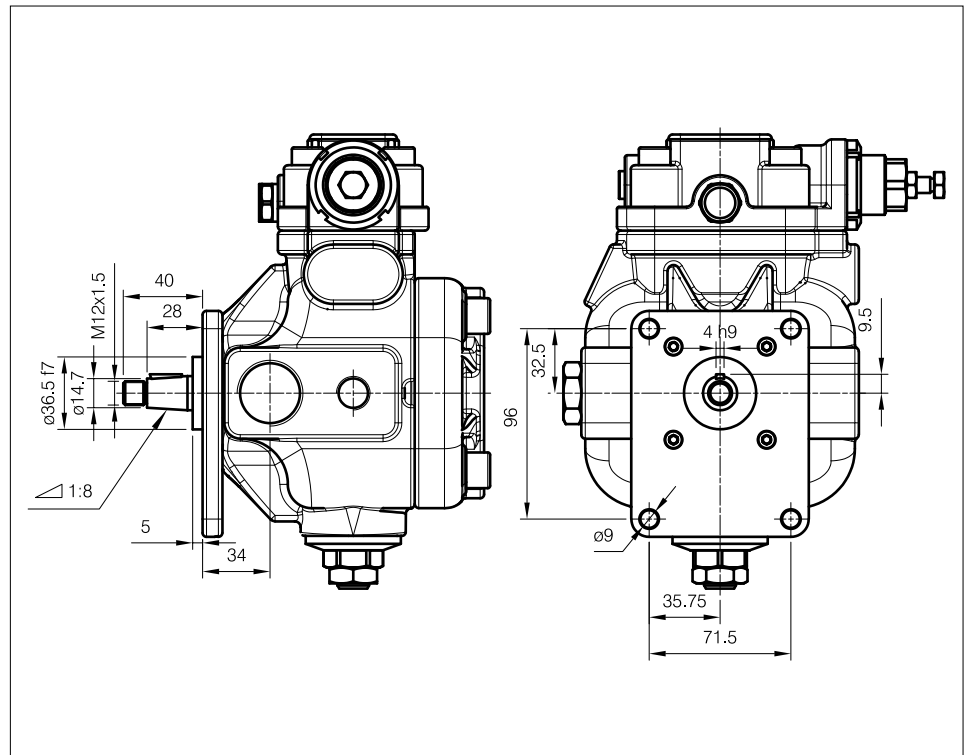
01 PHP 05-16 – Flange “F”



01 PHP 05-16 – Flange “F” + Option “A”



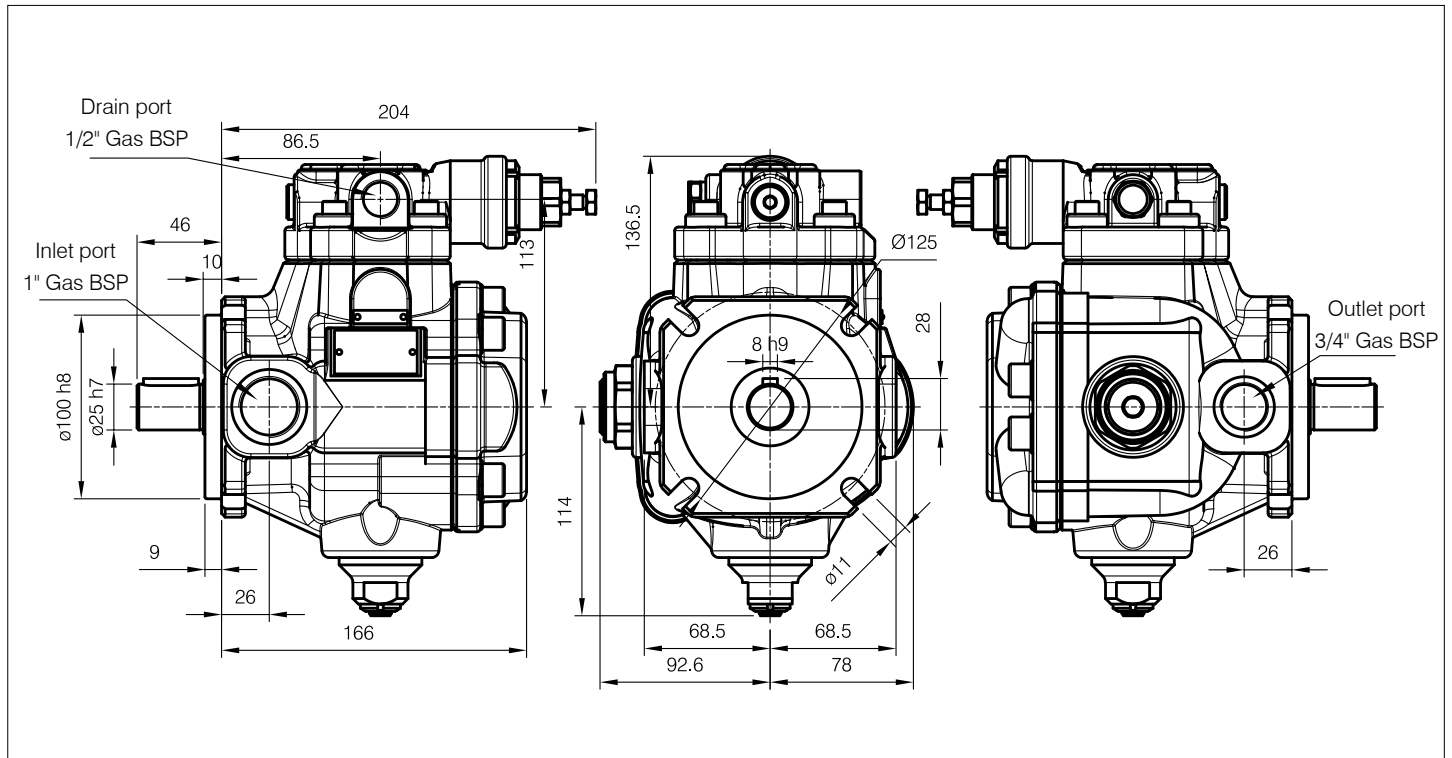
01 PHP 05-16 – Flange “FGR2”



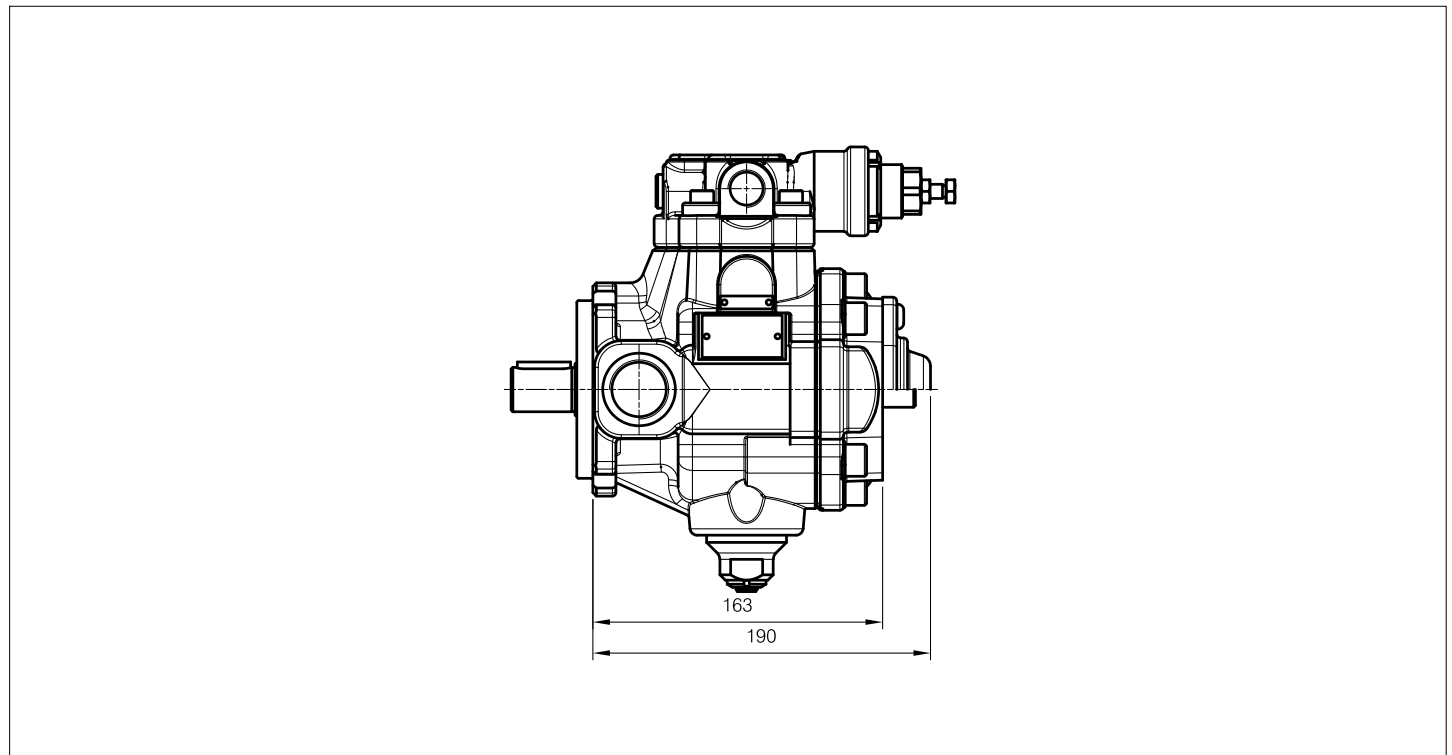
For information, please refer to related **Catalog COUPLINGS and ACCESSORIES**

## Overall dimensions

01 PHP 1-(20-25-32)



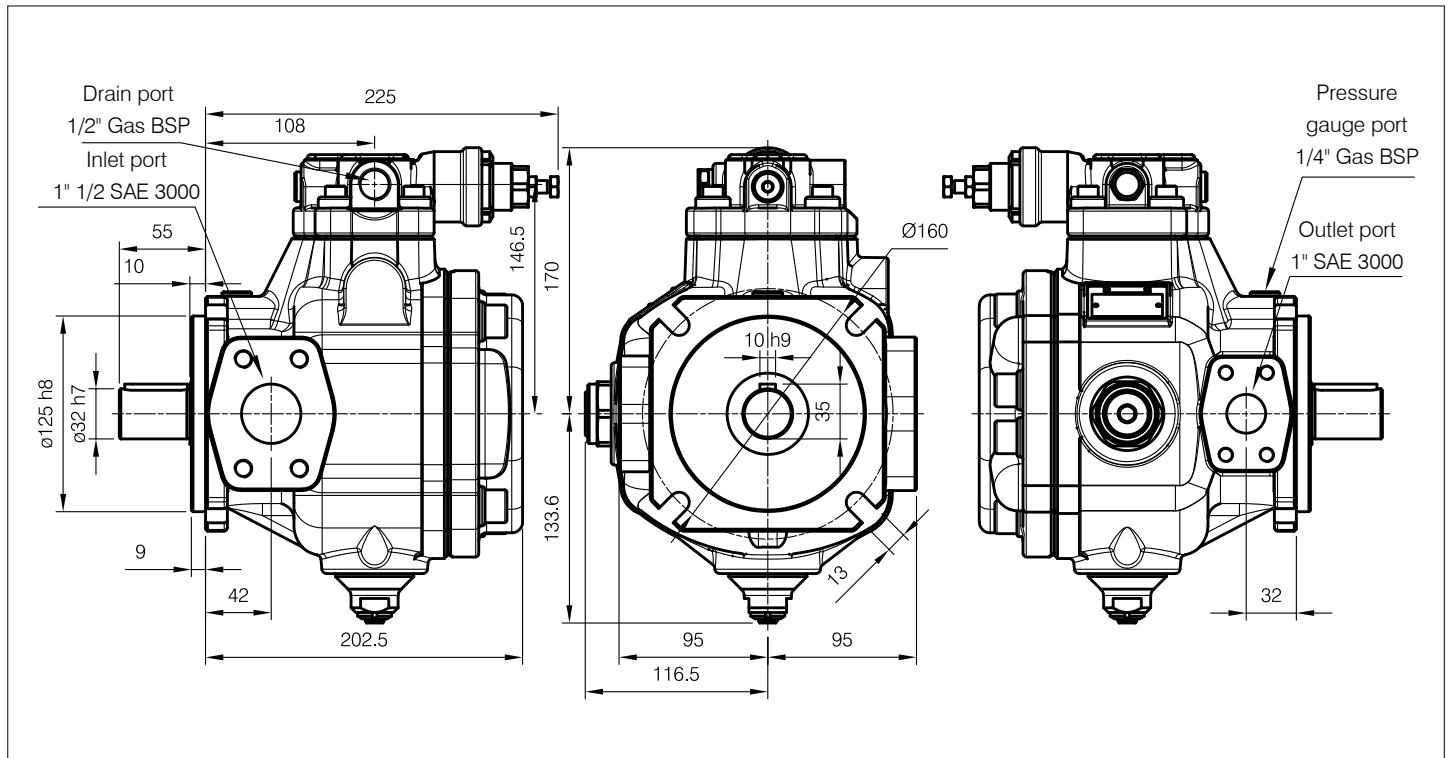
01 PHP 1-(20-25-32) + Option "A"



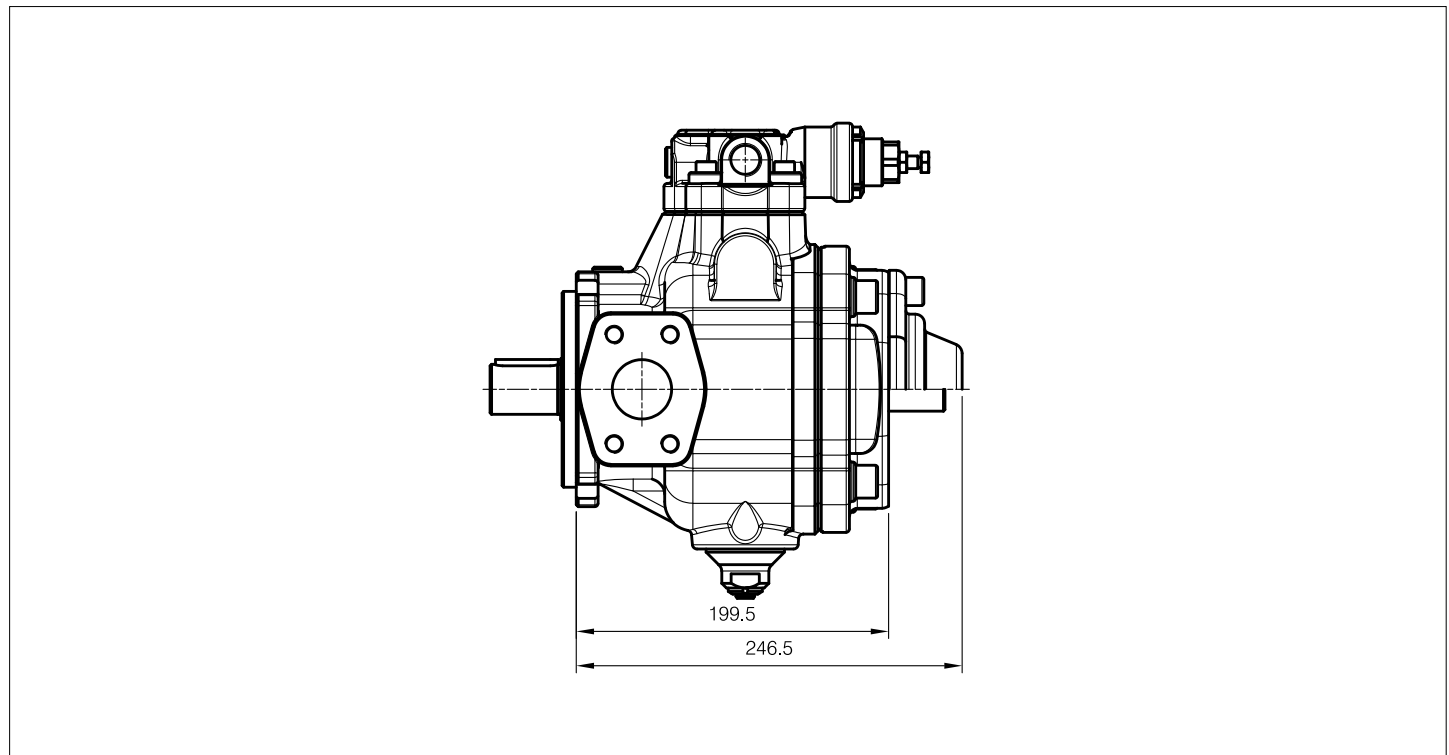
For information, please refer to related **Catalog COUPLINGS and ACCESSORIES**

## Overall dimensions

01 PHP 2-(40-50-63)



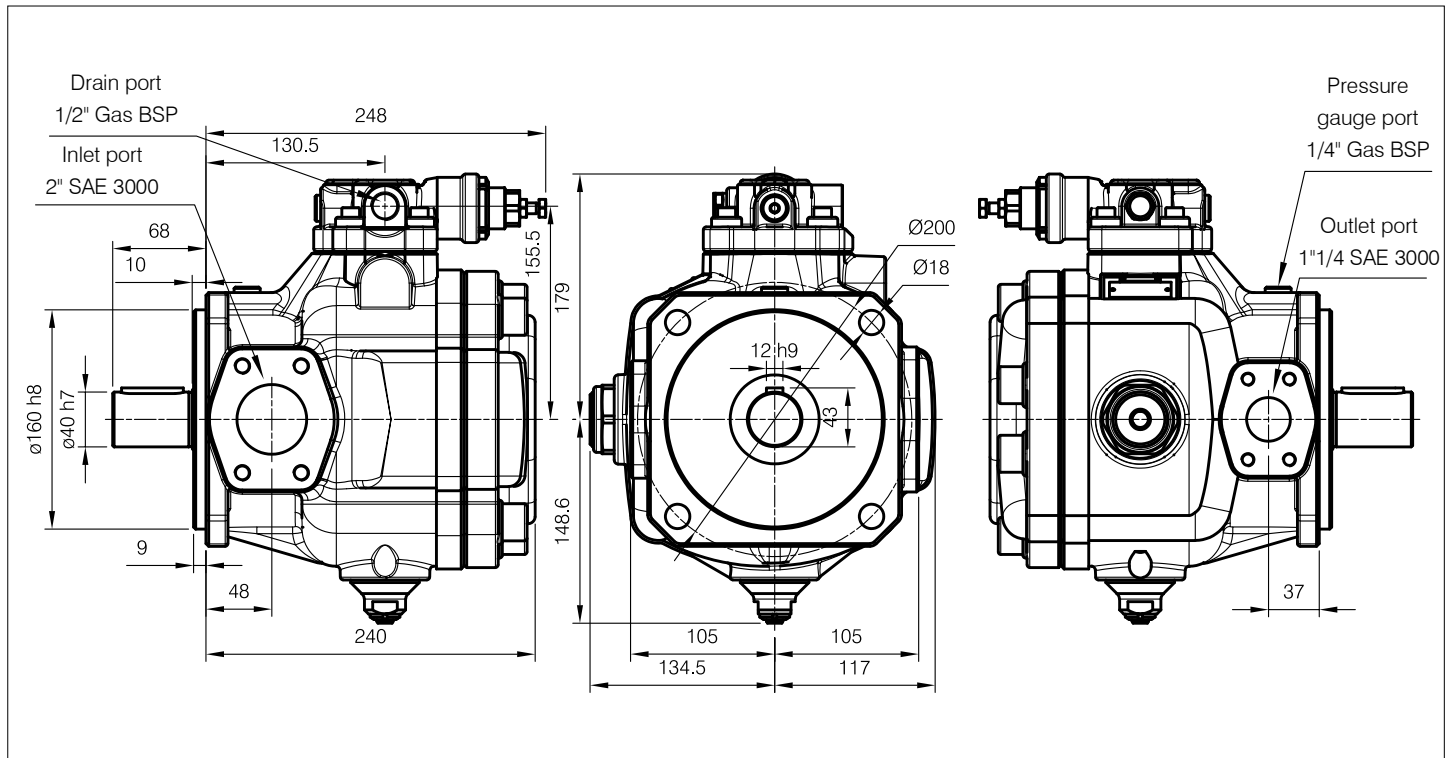
01 PHP 2-(40-50-63) + Option "A"



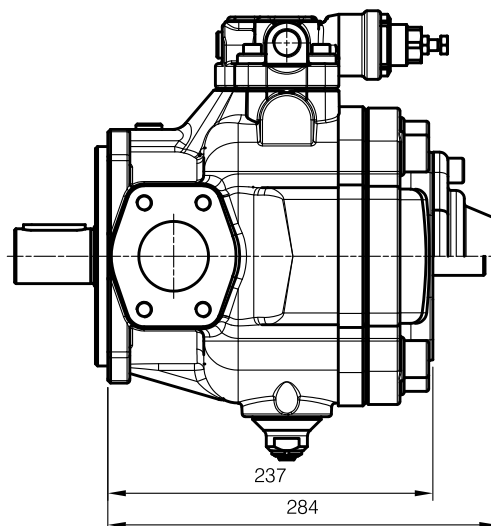
For information, please refer to related **Catalog COUPLINGS and ACCESSORIES**

## Overall dimensions

01 PHP 3-(80-100-120)



01 PHP 3-(80-100-120) + Option "A"



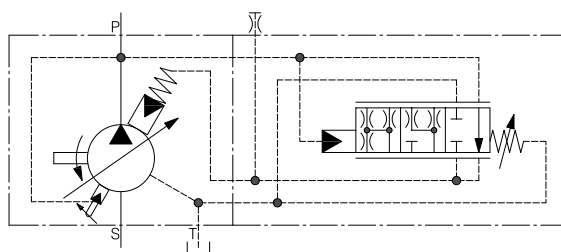
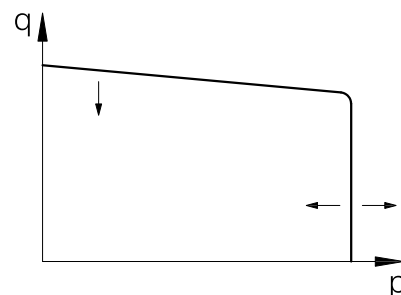
For information, please refer to related **Catalog COUPLINGS and ACCESSORIES**

## Standard control

### Single stage of pressure

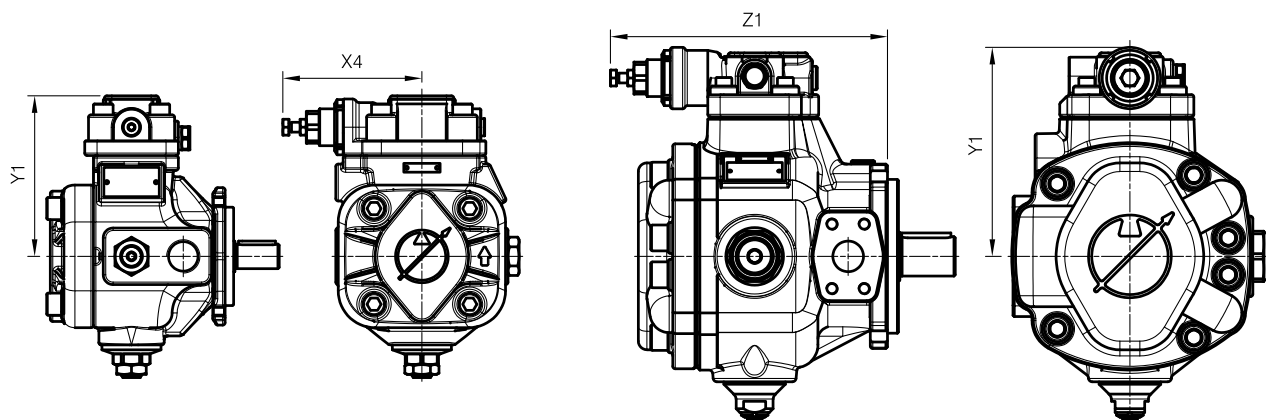
This standard control enables the pump displacement to be adjusted (until zero flow setting condition) according to the flow rate required by the hydraulic system, keeping the working pressure constant and equal to the value set on the compensator device.

The pressure value setting of the compensator device is adjusted by means of the pressure setting screw and locked using the locknut.



01 PHP 05

01 PHP 1-2-3



Size	X4	Y1	Z1
01 PHP 05	113	130.5	-
01 PHP 1	-	136.5	204
01 PHP 2	-	170	225
01 PHP 3	-	179	248

For further information see related documentation on Berarma website or contact Berarma technical sales service

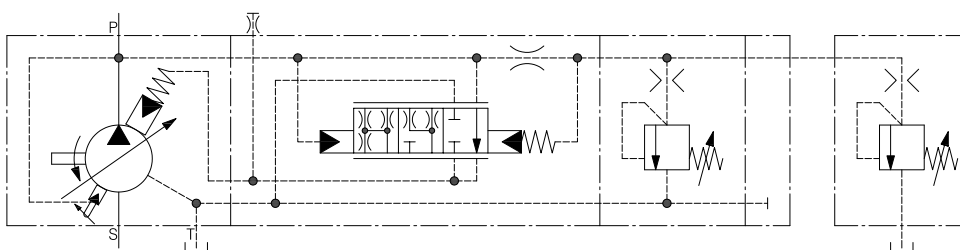
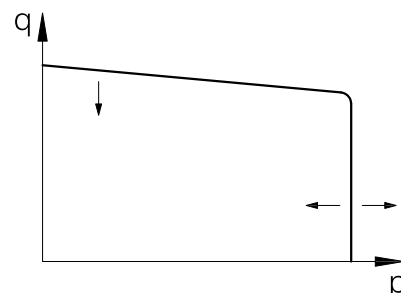
## PCS002 control

### Single stage of pressure with remote control

The function of this control is the same as the standard control function with the possibility of adjusting the working pressure by means of an additional maximum pressure relief valve (**not supplied**) installed in a remote position, far from the pump.

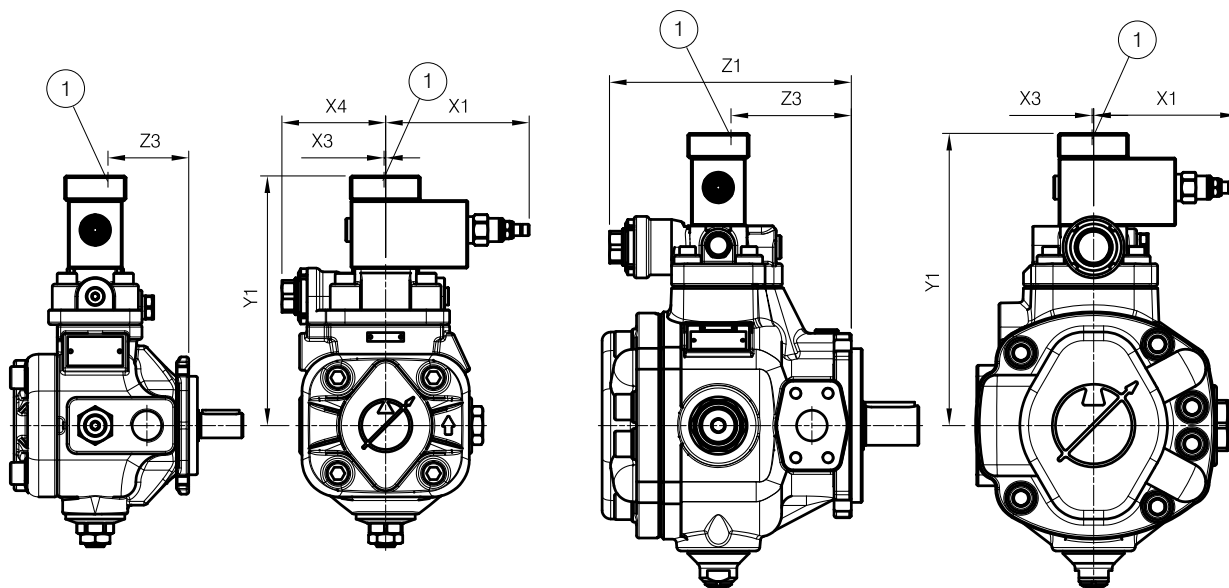
Control performances depends on the additional valve type and on its distance from the pump.

To obtain the best performance, it is recommended to use maximum pressure relief valves with flow rates from 2 to 5 l / min and not to exceed 5 meters of pipe length.



01 PHP 05

01 PHP 1-2-3



#### Ports

- ① Remote control – 1/4" Gas BSP

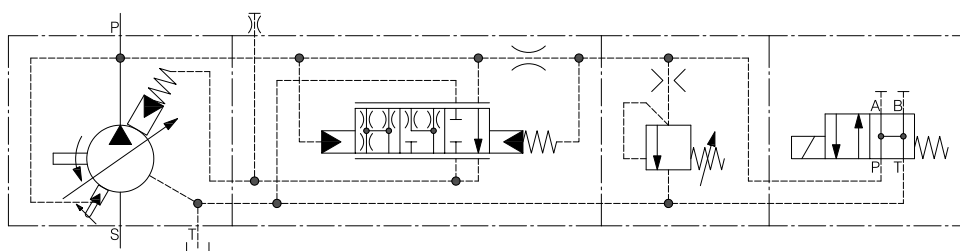
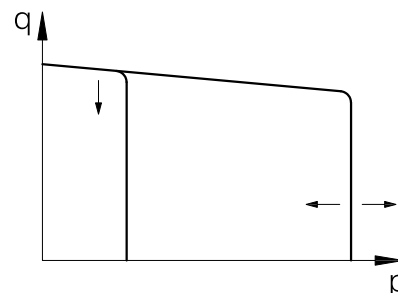
Size	X1	X3	X4	Y1	Z1	Z3
01 PHP 05	116.7	1.3	84.3	203	-	65.7
01 PHP 1	116.7	1.3	-	204	175	76.2
01 PHP 2	116.7	1.3	-	237.5	196.5	97.7
01 PHP 3	116.7	1.3	-	246.5	219	120.2

For further information see related documentation on Berarma website or contact Berarma technical sales service

## PCS003 control

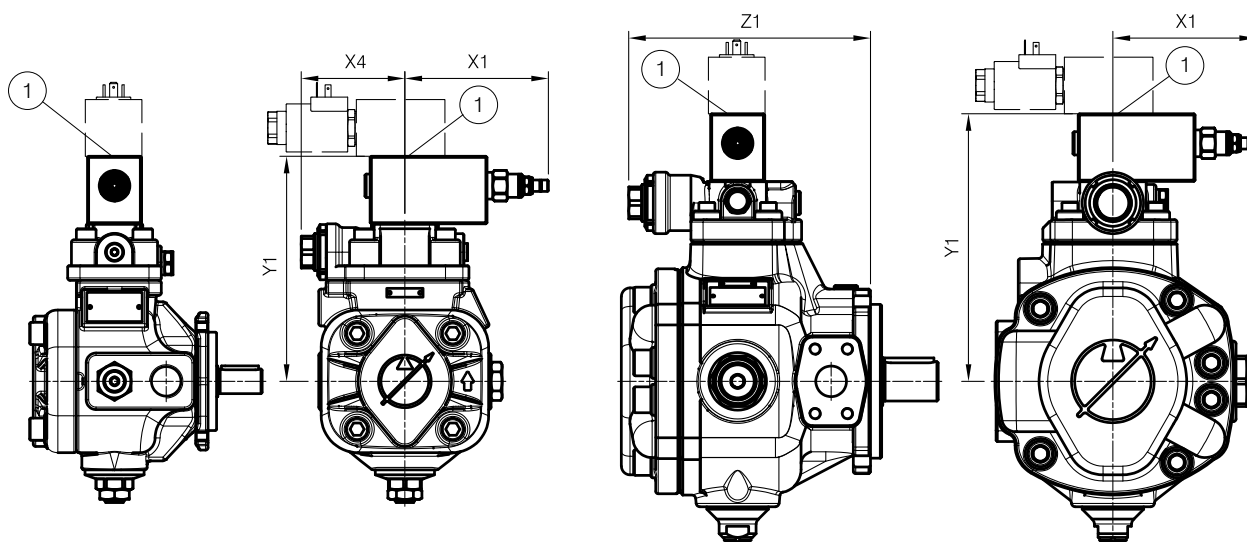
### Two stages of pressure, one with fixed setting at the minimum pressure

The function of this control is the same as the standard control with the possibility to mount a directional control valve ISO 4401-03 (CETOP 03 – NG6) (**not supplied**) on the top of the compensator in order to switch between two working pressure levels, one of which is fixed at the minimum pressure. Control performance depends on the type of additional directional control valve.



01 PHP 05

01 PHP 1-2-3



### Ports

- ① Directional valve – Mounting surface ISO 4401-03 (CETOP-03 – NG6)

Size	X1	X4	Y1	Z1
01 PHP 05	116.7	84.3	183	-
01 PHP 1	116.7	-	184	175
01 PHP 2	116.7	-	217.5	196.5
01 PHP 3	116.7	-	226.5	219

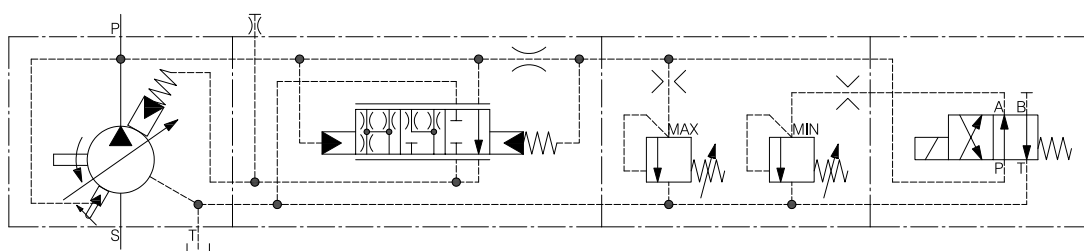
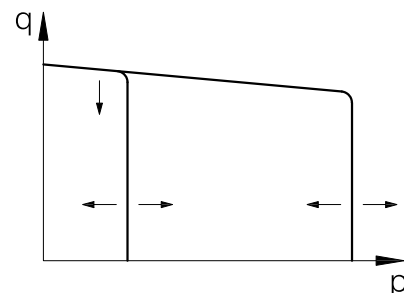
For further information see related documentation on Berarma website or contact Berarma technical sales service

## PCS004 control

### Two stages of pressure, both adjustable

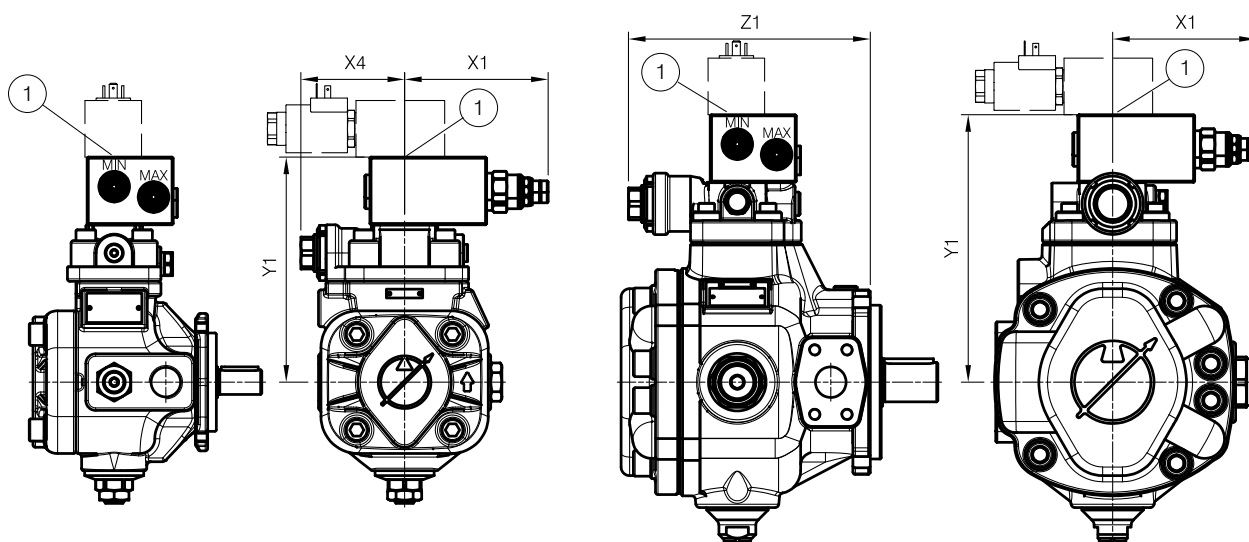
The function of this control is the same as the standard control with the possibility to mount a directional control valve ISO 4401-03 (CETOP 03 – NG6) **(not supplied)** on the top of the compensator in order to switch between two adjustable working pressure levels.

Control performance depends on the type of additional directional control valve.



01 PHP 05

01 PHP 1-2-3



### Ports

- ① Directional valve – Mounting surface ISO 4401-03 (CETOP-03 – NG6)

Size	X1	X4	Y1	Z1
01 PHP 05	116.7	84.3	183	-
01 PHP 1	116.7	-	184	175
01 PHP 2	116.7	-	217.5	196.5
01 PHP 3	116.7	-	226.5	219

For further information see related documentation on Berarma website or contact Berarma technical sales service



## PCS005 control

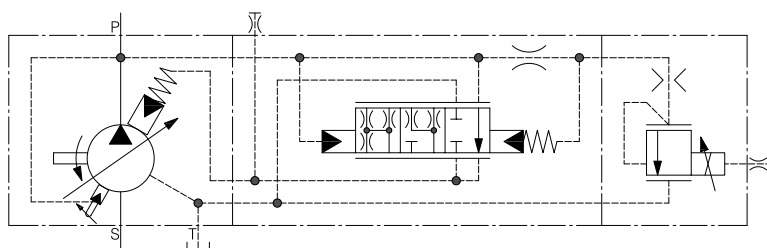
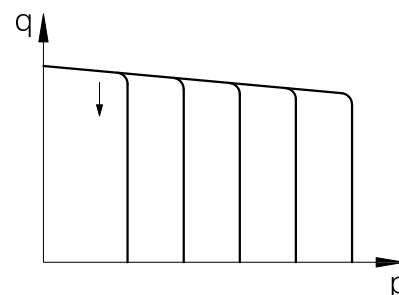
### Proportional pressure control

The function of this control is the same as the standard control with the possibility of adjusting the pump working pressure in a proportional way.

The pressure adjustment is obtained through an electric signal to the proportional valve installed on the pump.

Control performance depends on the control electronics of the proportional valve (**not supplied**).

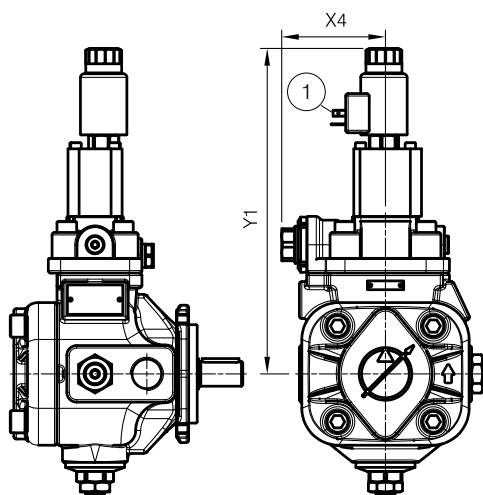
**Only on request** is available the coil with integrated electronic unit.



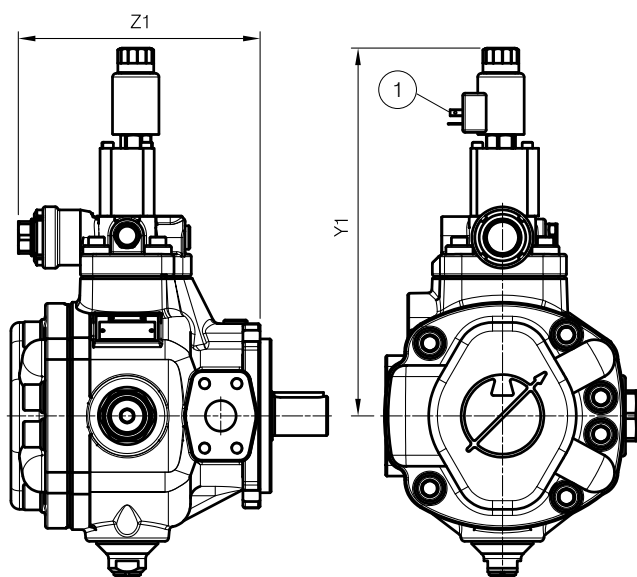
\* Depends on electronic control unit type

Electrical properties	
Supply voltage	24 VDC $\pm 10\%$
Maximum current	590 mA
Power consumption	22 W
Nominal coil resistance at 50°C	37.2 $\Omega \pm 5\%$
Nominal coil resistance at 20°C	26.2 $\Omega \pm 5\%$
Max coil temperature at 20°C	105°C
Protection class	IP65
Recommended Dither frequency	160 – 200 Hz*
Linearity, hysteresis, repeatability	< 5%*
Connections	DIN 43650 type A

01 PHP 05



01 PHP 1-2-3



### Ports

- (1) Proportional valve – Connector DIN 43650 type A

Size	X4	Y1	Z1
01 PHP 05	84.3	264.5	-
01 PHP 1	-	265.5	175
01 PHP 2	-	299	196.5
01 PHP 3	-	308	219

For further information see related documentation on Berarma website or contact Berarma technical sales service

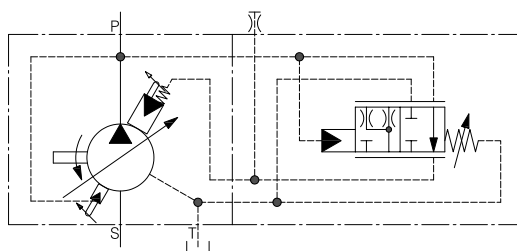
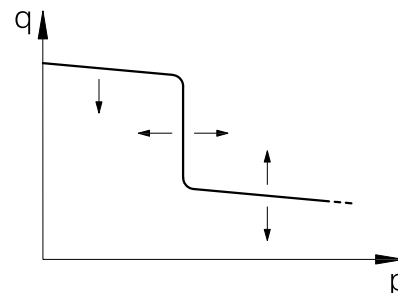
## PCS006 control

### Single stage of pressure with minimum displacement limiter control

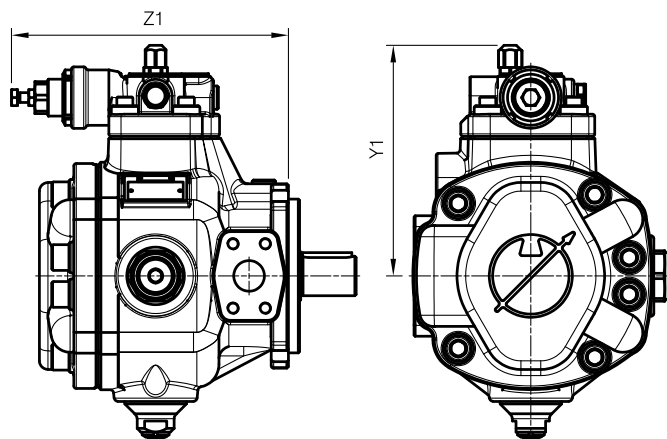
The function of this control, **available only for size 2 and 3 pumps**, is the same as the standard control with the possibility of limiting the minimum residual displacement by means of a register.

This control allows to obtain a two-speed system depending by the working pressure, using only one pump instead of two. This allows the simplification of the hydraulic circuit, the reduction of costs and energy savings.

**WARNING:** For this type of control it is **mandatory** to insert a maximum pressure valve with correct flow rate compared to the residual flow rate pump setting. The minimum displacement limiter device prevents the pump to reach the zero flow condition and therefore pressure cut-off.



### 01 PHP 2-3



Size	Y1	Z1
01 PHP 05	-	-
01 PHP 1	-	-
01 PHP 2	187.5	225
01 PHP 3	196.5	248

For further information see related documentation on Berarma website or contact Berarma technical sales service

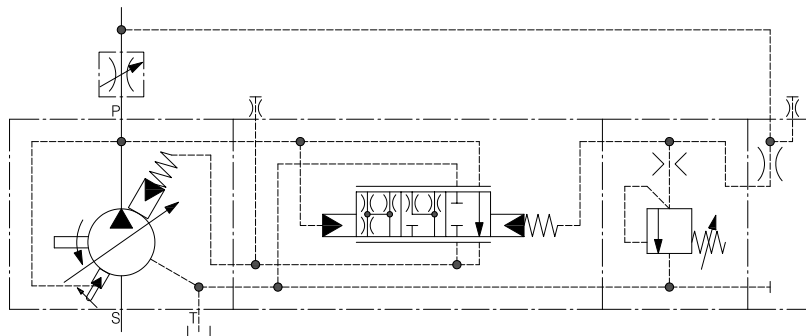
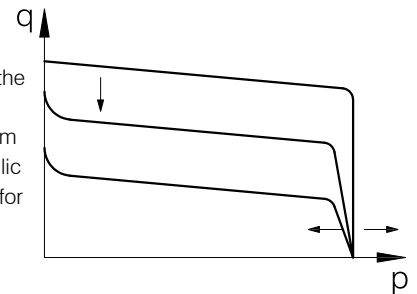
## PCLS001 control

### Load Sensing control with single stage of pressure

The Load Sensing control system adds to the pressure setting adjustment system of the compensator device, the possibility to regulate the pump flow-rate according to the pressure difference  $\Delta p$  measured before and after a throttle valve. The pilot pressure of the Load Sensing compensator device is taken from the pump outlet line after throttle valve (**not supplied**) and before the actuators. Changing the position of the throttle valve, with a fixed pressure drop equal to the differential pressure  $\Delta p$  value, the Load Sensing system automatically adjusts the pump displacement independently of pressure variations that occur in the hydraulic system. The Load Sensing control produces a notable reduction in displaced power and is recommended for use in applications where there are significant variations in torque (force) and speed.

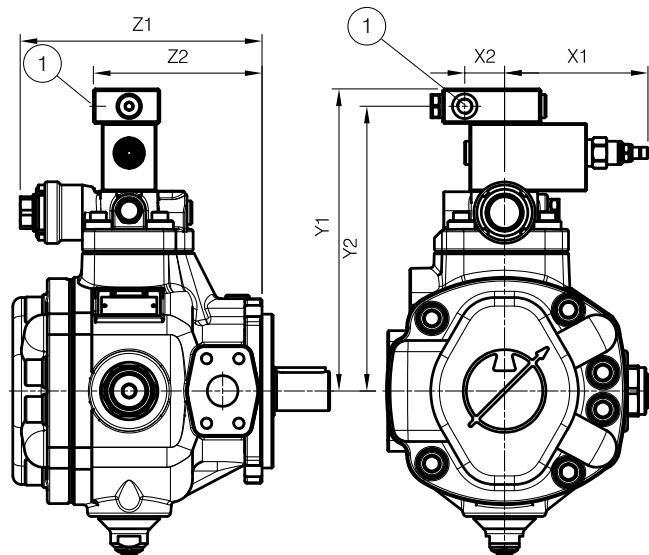
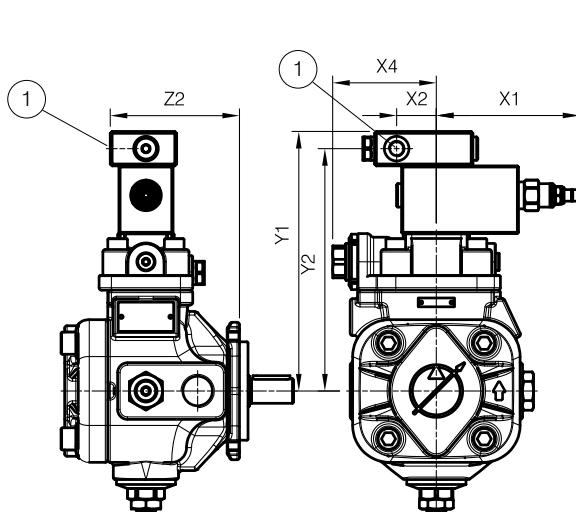
When the throttle valve is completely closed, the pump will be in zero flow condition, keeping the working pressure constant and equal to the differential pressure  $\Delta p$  value.

Control performance depends on the type of throttle valve and on the length / dimensions of the Load Sensing pilot pressure line. To obtain the best performance, it is recommended to not to exceed 5 meters of pipe length.



01 PHP 05

01 PHP 1-2-3



#### Ports

- 1 Load Sensing – 1/4" Gas BSP

Size	X1	X2	X4	Y1	Y2	Z1	Z2
01 PHP 05	116.7	32.3	84.3	211	197	-	105
01 PHP 1	116.7	32.3	-	212	198	175	115.5
01 PHP 2	116.7	32.3	-	245.5	231.5	196.5	137
01 PHP 3	116.7	32.3	-	254.5	240.5	219	159.5

For further information see related documentation on Berarma website or contact Berarma technical sales service

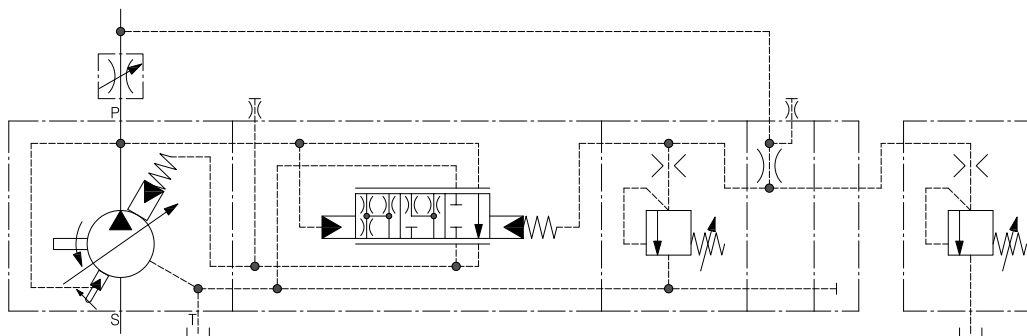
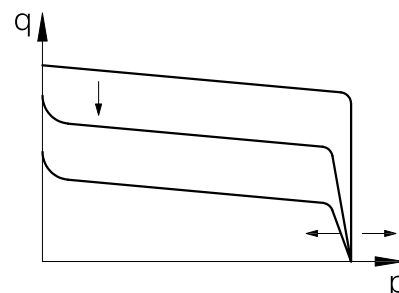
## PCLS002 control

### Load Sensing control with single stage of pressure with remote control

The function of this control is the same as the PCLS001 control with the possibility of adjusting the working pressure by means of an additional maximum pressure relief valve (**not supplied**) installed in a remote position, far from the pump.

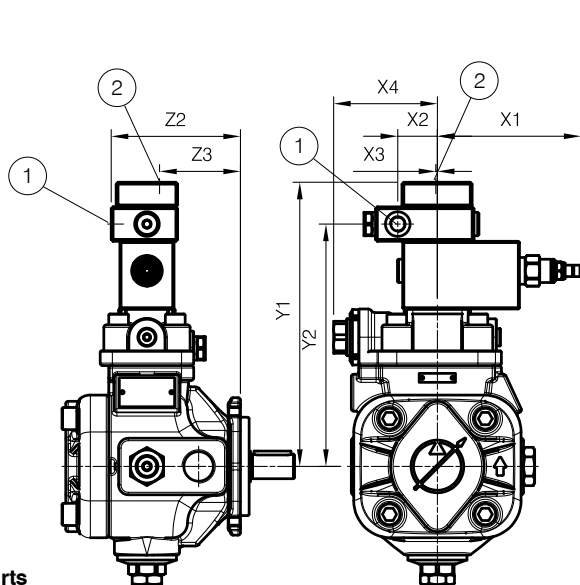
Control performances depends on the type of throttle valve and additional valve type (**not supplied**) and on the length / dimensions of signal pipes.

To obtain the best performance, it is recommended to use maximum pressure relief valves with flow rates from 2 to 5 l / min and not to exceed 5 meters of pipe length.



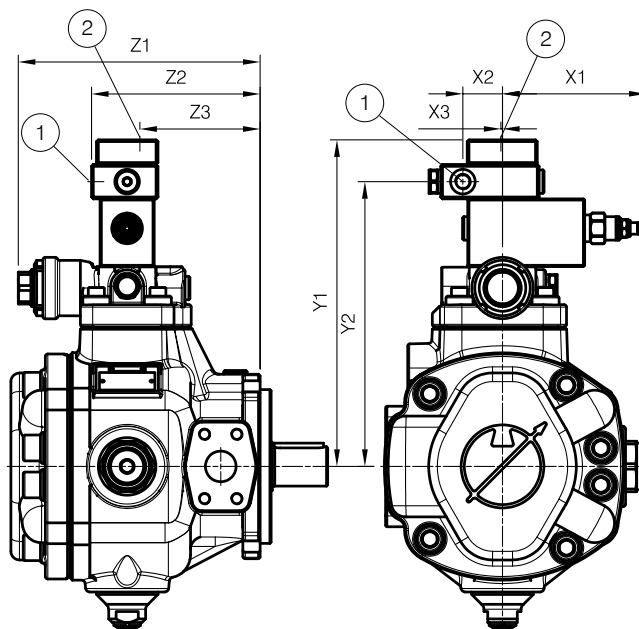
01 PHP 05

01 PHP 1-2-3



#### Ports

- ① Load Sensing – 1/4" Gas BSP
- ② Remote control – 1/4" Gas BSP



Size	X1	X2	X3	X4	Y1	Y2	Z1	Z2	Z3
01 PHP 05	116.7	32.3	1.3	84.3	231	197	-	105	65.7
01 PHP 1	116.7	32.3	1.3	-	232	198	175	115.5	76.2
01 PHP 2	116.7	32.3	1.3	-	265.5	231.5	196.5	137	97.7
01 PHP 3	116.7	32.3	1.3	-	274.5	240.5	219	159.5	120.2

For further information see related documentation on Berarma website or contact Berarma technical sales service

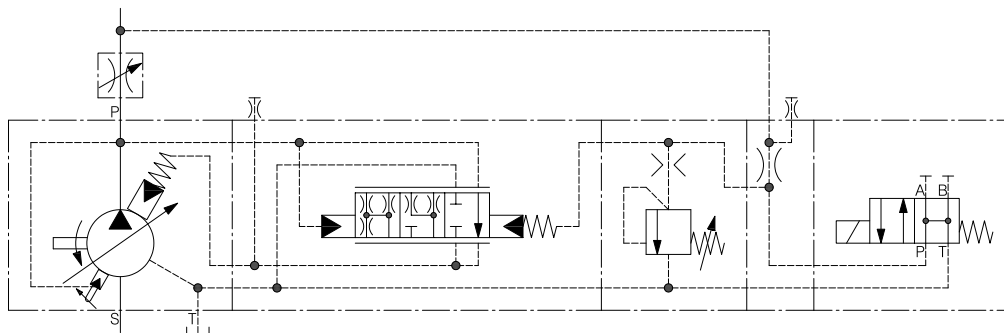
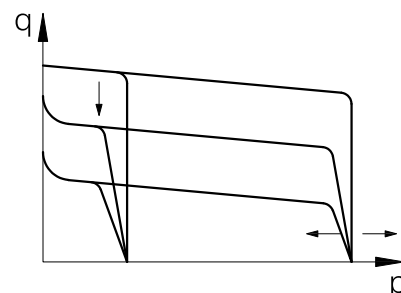
## PCLS003 control

### Load Sensing control with two stages of pressure, one with fixed setting at the minimum pressure

The function of this control is the same as the PCLS001 control with the possibility to mount a directional control valve ISO 4401-03 (CETOP 03 – NG6) (**not supplied**) on the top of the compensator in order to switch between two working pressure levels, one of which is fixed at the minimum pressure.

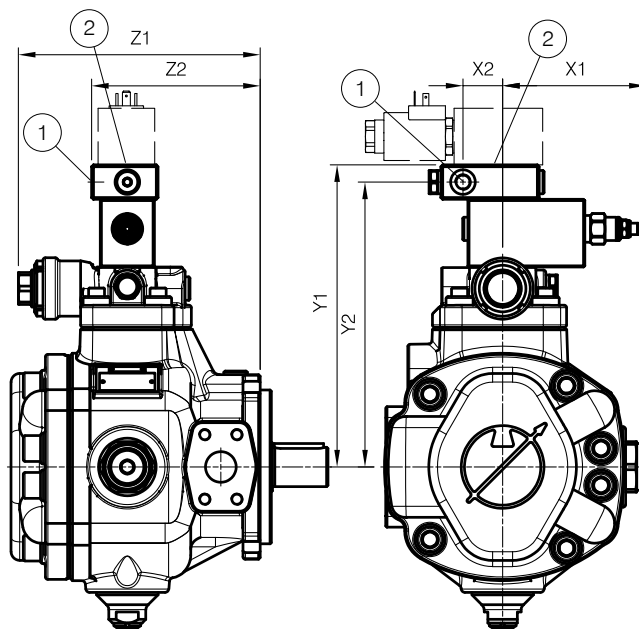
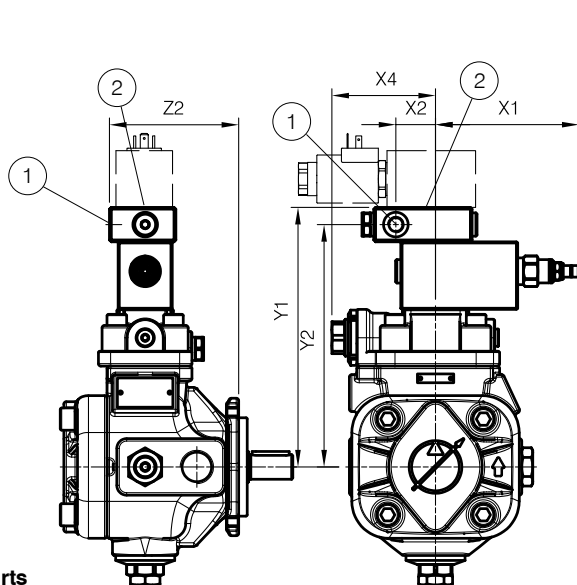
Control performances depends on the type of throttle valve and additional directional control valve (**not supplied**) and on the length / dimensions of signal pipe.

To obtain the best performance, it is recommended to not to exceed 5 meters of pipe length.



01 PHP 05

01 PHP 1-2-3



#### Ports

- ① Load Sensing – 1/4" Gas BSP
- ② Directional valve – Mounting surface ISO 4401-03 (CETOP-03 – NG6)

Size	X1	X2	X4	Y1	Y2	Z1	Z2
01 PHP 05	116.7	32.3	84.3	211	197	-	105
01 PHP 1	116.7	32.3	-	212	198	175	115.5
01 PHP 2	116.7	32.3	-	245.5	231.5	196.5	137
01 PHP 3	116.7	32.3	-	254.5	240.5	219	159.5

For further information see related documentation on Berarma website or contact Berarma technical sales service

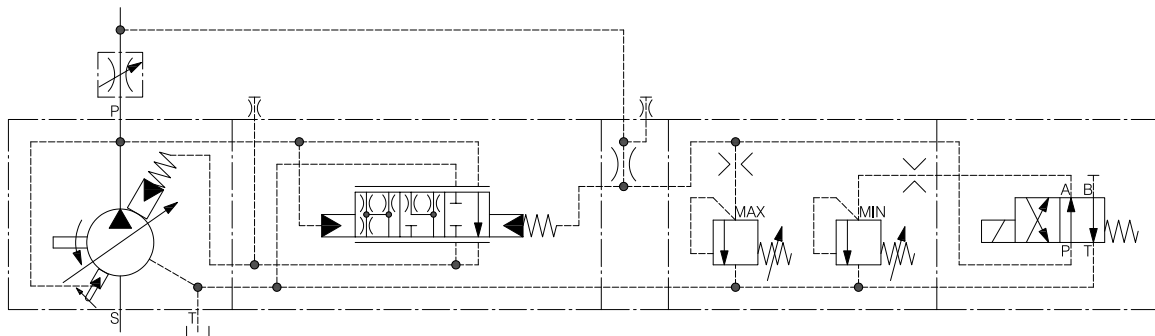
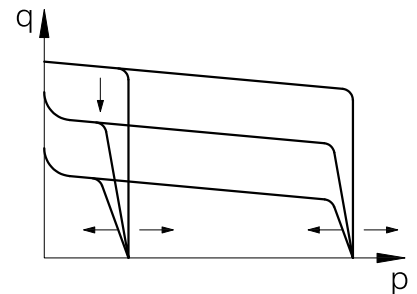
## PCLS004 control

### Load Sensing control with two stages of pressure, both adjustable

The function of this control is the same as the PCLS001 control with the possibility to mount a directional control valve ISO 4401-03 (CETOP 03 – NG6) (**not supplied**) on the top of the compensator in order to switch between two adjustable working pressure levels.

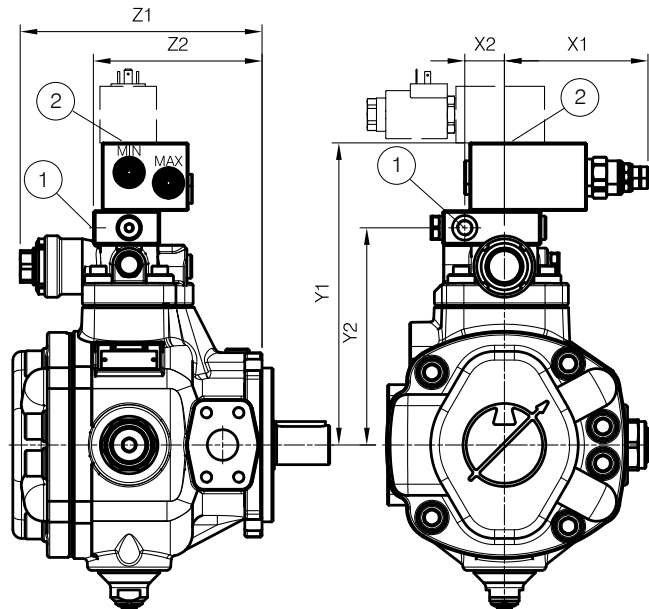
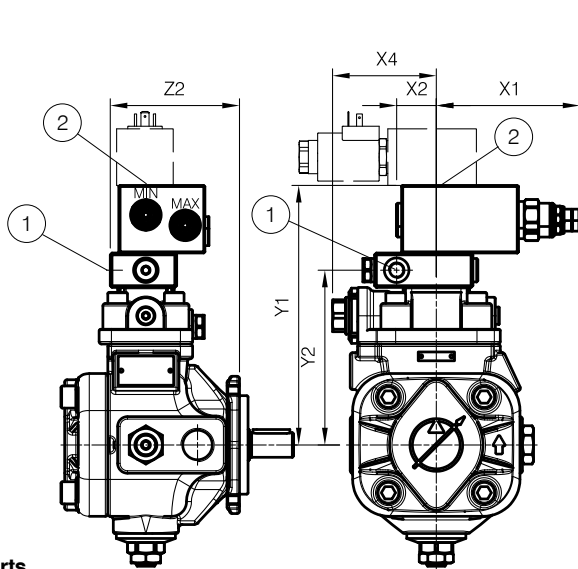
Control performances depends on the type of throttle valve and additional directional control valve (**not supplied**) and on the length / dimensions of signal pipe.

To obtain the best performance, it is recommended to not to exceed 5 meters of pipe length.



01 PHP 05

01 PHP 1-2-3



#### Ports

- ① Load Sensing – 1/4" Gas BSP
- ② Directional valve – Mounting surface ISO 4401-03 (CETOP-03 – NG6)

Size	X1	X2	X4	Y1	Y2	Z1	Z2
01 PHP 05	116.7	32.3	84.3	211	142	-	105
01 PHP 1	116.7	32.3	-	212	143	175	115.5
01 PHP 2	116.7	32.3	-	245.5	176.5	196.5	137
01 PHP 3	116.7	32.3	-	254.5	185.5	219	159.5

For further information see related documentation on Berarma website or contact Berarma technical sales service

## PCLS005 control

### Load Sensing with proportional pressure control

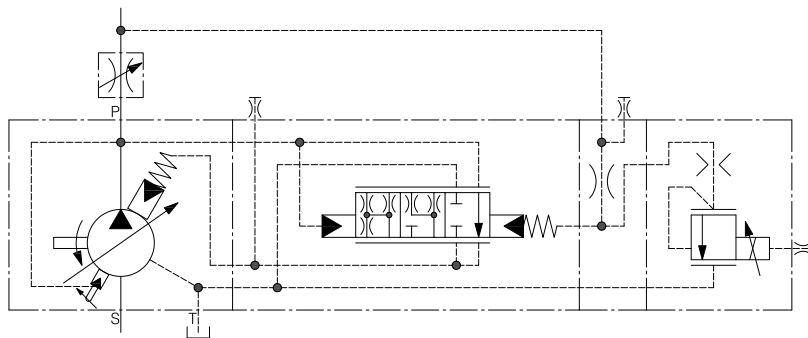
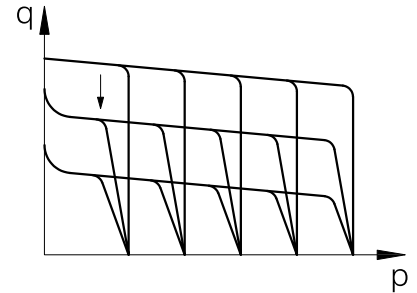
The function of this control is the same as the PCLS001 control with the possibility of adjusting the pump working pressure in a proportional way.

The pressure adjustment is obtained through an electric signal to the proportional valve installed on the pump.

Control performance depends on the type of throttle valve and on the control electronics of the proportional valve (**not supplied**) and on the length / dimensions of signal pipe.

To obtain the best performance, it is recommended to not exceed 5 meters of pipe length.

**Only on request** is available the coil with integrated electronic unit.

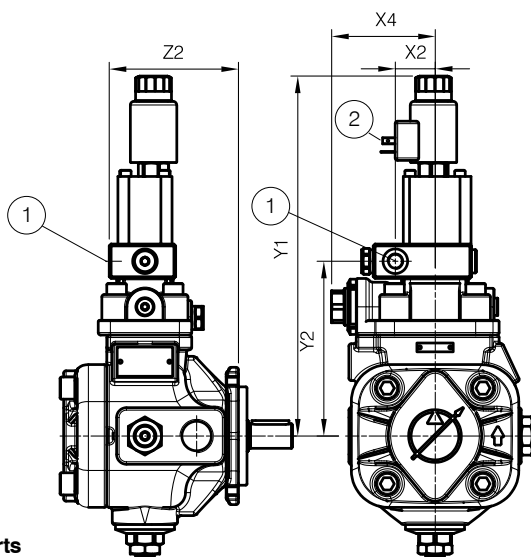


\* Depends on electronic control unit type

Electrical properties	
Supply voltage	24 VDC $\pm 10\%$
Maximum current	590 mA
Power consumption	22 W
Nominal coil resistance at 50°C	37.2 $\Omega \pm 5\%$
Nominal coil resistance at 20°C	26.2 $\Omega \pm 5\%$
Max coil temperature at 20°C	105°C
Protection class	IP65
Recommended Dither frequency	160 – 200 Hz*
Linearity, hysteresis, repeatability	< 5%*
Connections	DIN 43650 type A

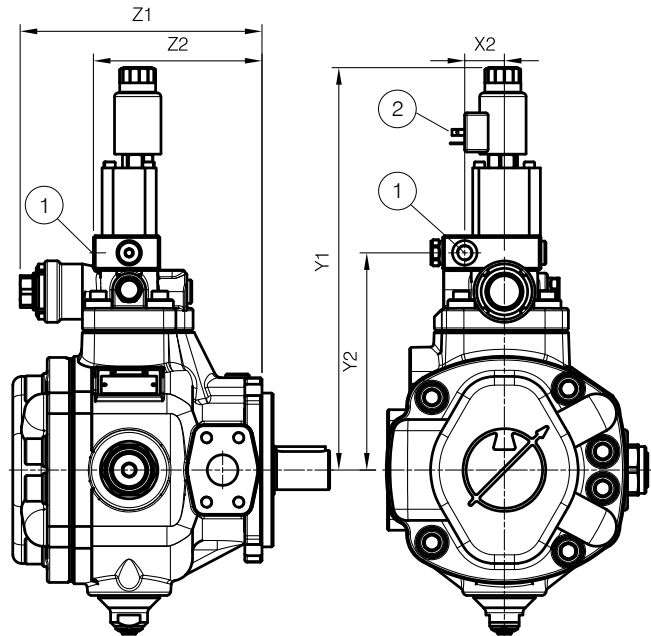
01 PHP 05

01 PHP 1-2-3



#### Ports

- ① Load Sensing – 1/4" Gas BSP
- ② Proportional valve – Connection DIN 43650 type A



Size	X2	X4	Y1	Y2	Z1	Z2
01 PHP 05	32.3	84.3	292.5	142	-	105
01 PHP 1	32.3	-	293.5	143	175	115.5
01 PHP 2	32.3	-	327	176.5	196.5	137
01 PHP 3	32.3	-	336	185.5	219	159.5

For further information see related documentation on Berarma website or contact Berarma technical sales service

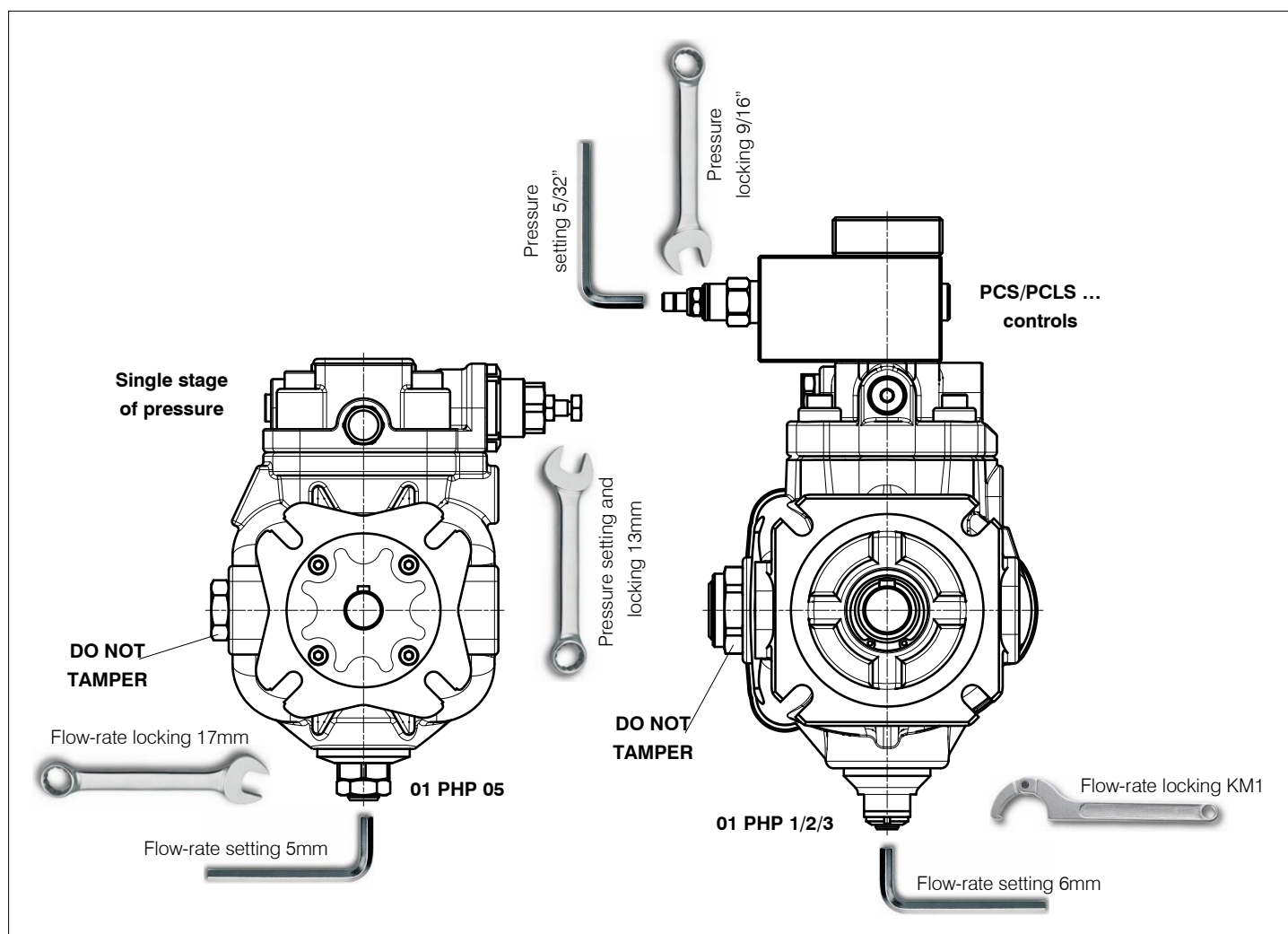
## Settings

### Pressure

Berarma PHP pumps can be equipped with different types of hydraulic pressure devices, through which it is possible to adjust the maximum working pressure of the pump. By screwing clockwise, the pressure increases.

### Warning

Do not go out of the pressure setting range.



### Flow rate

All Berarma pumps are equipped with a flow regulator device that allow the mechanical reduction of the maximum pump displacement compared to the nominal value. By screwing clockwise, the flow rate decreases.

### Warning

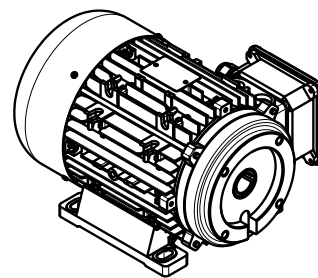
If the flow regulator device is set to less than 50% of the nominal displacement, the pump can only start on condition that the system and pump are completely filled with fluid.

Pump type	Actual displacement (cm <sup>3</sup> /r)	Reduced displacement by screw turn (cm <sup>3</sup> /r)	Minimum displacement (cm <sup>3</sup> /r)
01 PHP 05 - <b>16</b>	17	11	3.3
01 PHP 1 - <b>20</b>	21	10	9.5
01 PHP 1 - <b>25</b>	26	10	15
01 PHP 1 - <b>32</b>	33	10	19
01 PHP 2 - <b>40</b>	42	16	27.5
01 PHP 2 - <b>50</b>	51	16	35.5
01 PHP 2 - <b>63</b>	63	16	43.5
01 PHP 3 - <b>80</b>	80	16	63
01 PHP 3 - <b>100</b>	100	16	80
01 PHP 3 - <b>120</b>	120	16	100
Indicative values influenced by manufacturing tolerances			

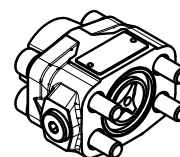


## Accessories

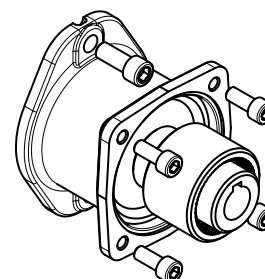
Electric motors with special flange and hollow shaft for direct coupling with Berarma pumps size 05 and 1.  
For information, please refer to related **GMP Catalog**



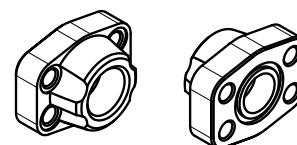
Non return valves integrated on SAE flange, ideal to be installed on Berarma Berarma pump size 2 and 3 outlet port or for installation on hydraulic systems.  
For information, please refer to related **NRV Catalog**



Coupling unit that allow to arrange combined pumps between Berarma pumps or the main other types of pump available on the fluid power market.  
For information, please refer to related **COUPLINGS and ACCESSORIES Catalog**



SAE 3000 flanges ideal to be installed on Berarma pump size 2 and 3 inlet and outlet ports.  
For information, please refer to related **COUPLINGS and ACCESSORIES Catalog**



Key Lock kit for pressure setting.  
Available only for PHP pumps with single stage of pressure.  
For information, please refer to related **COUPLINGS and ACCESSORIES Catalog**

