

Proportional Controller Types P2P and P2N

Application

For *stepless capacity control of air compressors:*

Both proportional controller types P2P and P2N are designed to govern capacity control devices of compressors, speed control devices of engines, bleed valves, and bypass valves.

Other applications:

Proportional controllers types P2P can also be used as a relief valve or a signal pressure limiter.

⚠ Attention! Never attempt to disassemble a cylinder whilst under pressure!

Portable screw compressor with P2P

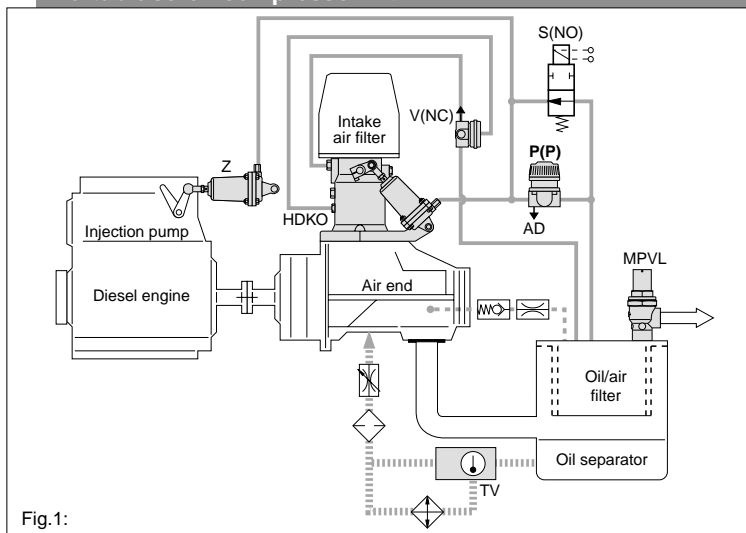


Fig.1:

Stationary screw compressor with P2N

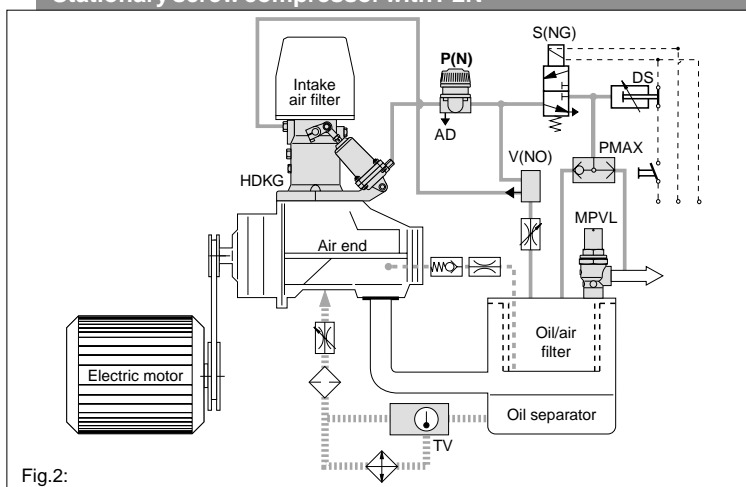


Fig.2:



Installation

The types P2PE and P2NE have connections with European standard threads. Types P2PA and P2NA have connections with NPTF/NPSF-threads.

Inlet E is connected to the discharge pressure line of the compressor or to an air receiver via a signal pressure line. The pressure line is also the air supply line of the controller and has to be dimensioned accordingly (see *Details*).

Outlet A is connected to the signal pressure line for governing suction control valves, bleed valves, venting valves, servo cylinders, and other control devices.

Outlet nozzle (AD): Air consumed by control devices is vented via the outlet nozzle. Proportional controllers with outlet nozzle in the housing are available. If a proportional controller without outlet nozzle in the housing is used, an outlet nozzle has to be installed in a T-fitting located in the signal pressure line.

Ordering details:

1. *Type and article no.:*

It is necessary to state both type and article no.

The second digit of the article no. is the number of the controller spring. Article numbers of controller executions with outlet nozzle in the housing have two hyphens. The diameter of the outlet nozzle is indicated by the number after the second hyphen.

Ordering example for P2NE with control spring no. 2 and outlet nozzle diameter 1.50 mm: P2NE, 22-542404-150

2. *Ordering by specifying data:*

- Desired set point (e. g. discharge pressure at full load),
- Desired proportional band (control band) at signal pressure range,
- Quantity of air to be blown off at idling (P2P types)
- Servo pressure/air quantity to govern control components.
- With or without bracket.

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Details

Controller type		P2P1E	P2P2E	P2P3E	P2P5E	P2NE
Controller nozzle ¹⁾ ; DN	mm	1	2	3	5	N (0 - 3)
Max. working pressure PS	bar (g)	16				
Operating pressure	bar (g)	2 to 15	2 to 15	2 to 15	2 to 13	3 to 13
Minimum inner diameter of air supply line (E)	mm	4	4	5	7	5
Operating mode (control signal)		positive acting (direct acting) diagram 1				negative (inverse) acting diagram 2
Pressure range of control spring	bar (g)	spring 1: 2 to 7 spring 2: 5 to 15				spring 1: 3 to 7 spring 2: 6 to 13
Temperature range	°C	operating temperature: +20 to +70 at start-up: from -20 at emergency stop: up to +100				
Medium		oily pressurized air, filtered • recommended compressed air quality according to DIN ISO 8573-1, class 5 Reference oil: see www.hoerbigerkompresortechnik.de				
Proportional band ²⁾ and outlet nozzle (AD)	%	3 to 20 of pressure at inlet E, depending on operating pressure, controller nozzle and outlet nozzle (AD)				
Reproducibility of signal pressure at outlet A	%	±1 to ±2 of the maximum pressure at inlet E, depending on proportional range				
Hysteresis	%	±1 to ±2 of the maximum pressure at inlet E, depending on proportional range				
Air consumption	NI/min	depends on the control pressure at outlet A and the diameter of the outlet nozzle (AD)				
Installation attitude		optional				
Installation dimensions		Fig.5 and 6 for executions with bracket and executions without bracket				
Materials		aluminium alloy, brass, corrosion resistant steel plated steel, oil-resistant perbunane				
Weight	kg	Al-die cast versions: 0.38 (0.46 with bracket) brass versions: 0.59 (0.65 with bracket)				

¹⁾ Marked at the bottom of the housing. ²⁾ Selection of proportional band depends on compressor data. For advice please send data.

Dimensions (mm) P2NE

Installation dimensions of executions with NPT-thread (not pictured) are identical, al-die cast version

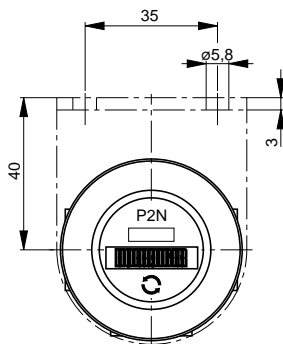
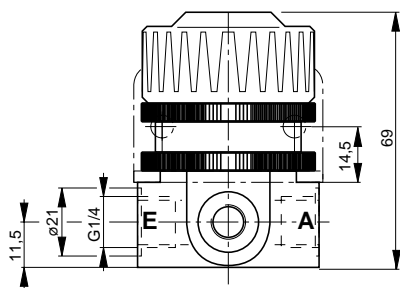


Fig.6

Control signal of P2P

(positive acting controllers)

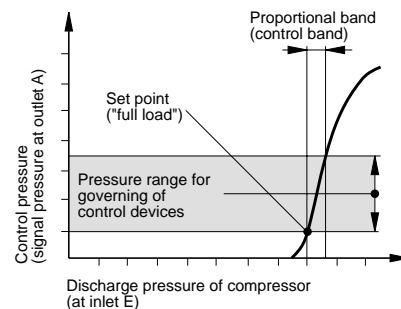


Diagram 1

Control signal of P2N

(negative acting controllers)

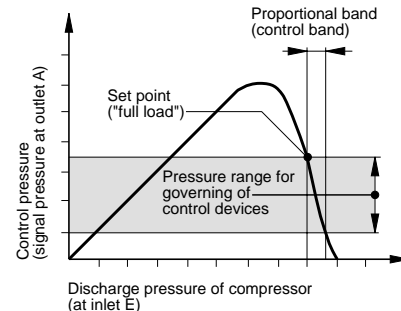


Diagram 2

Operation

Types P2P and P2N applied as proportional controllers:

The pressure at inlet E is transformed directly to an analogue pneumatic signal at outlet A. Within the control band of the controller this signal is proportional to an increasing or decreasing pressure at inlet E.

Types P2P give a rising control signal at A on increasing pressure at E (positive acting or direct acting - see diagram 1).

Types P2N give a rising control signal at A on decreasing pressure at E (negative acting or inverse acting - see diagram 2).

Types P2P applied as small relief valve or signal pressure limiter:

The controller nozzle opens steplessly, if the pressure at inlet E exceeds the set point. The amount of air vented via the outlet A is proportional to the increasing pressure at inlet E.

Types P2P applied as proportional controller plus bleed valve:
Some executions of direct acting controllers may be used for both stepless capacity control and zero load bypass on small or medium sized compressors.

Adjustment

Set point:

The set point, i. e. the desired pressure at which the control system starts acting, is adjusted by turning the hand wheel (2). The controller is adjusted during the commissioning period of the compressor:

- The set point is increased to a higher pressure, when the hand wheel (2) is turned to the right (clockwise).
- The set point is decreased to a lower pressure, when the hand wheel (2) is turned to the left (counter-clockwise).
- The direction of turning the hand wheel (2) should be maintained when the set point is adjusted.

Proportional band (control band):

The inlet pressure range at E from the set point („full load“) to the termination point of the control system („idling“) is defined by several items of the controller.

The proportional band is increased by installing an outlet nozzle with a larger diameter.

The proportional band is decreased by installing an outlet nozzle with a smaller diameter.

The set point is to be readjusted when the outlet nozzle has been exchanged.

Some executions of proportional controllers are equipped with an outlet nozzle (not pictured). If a proportional controller without built-in outlet nozzle is used, the outlet nozzle (AD) has to be installed in a T-fitting in the signal pressure line.

Maintenance:

The service manual W216RCC contains information regarding the maintenance intervals. While disassembling the valve for inspection, cleaning or retrofitting purposes, also refer to the respective information contained in the service manual W216RCC. For the actual service manuals visit our homepage www.hoerbigerkompresortechnik.de

P2PE

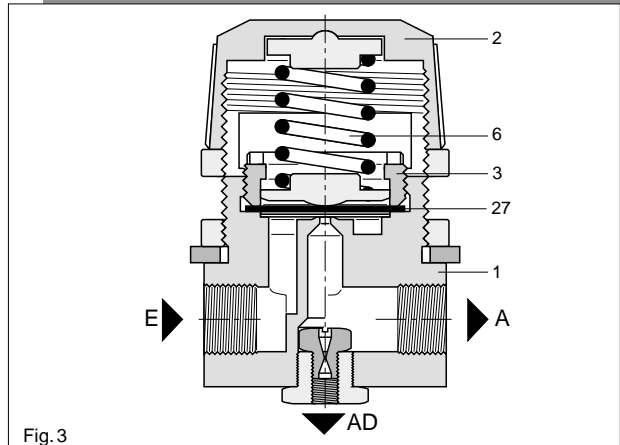


Fig. 3

P2NE

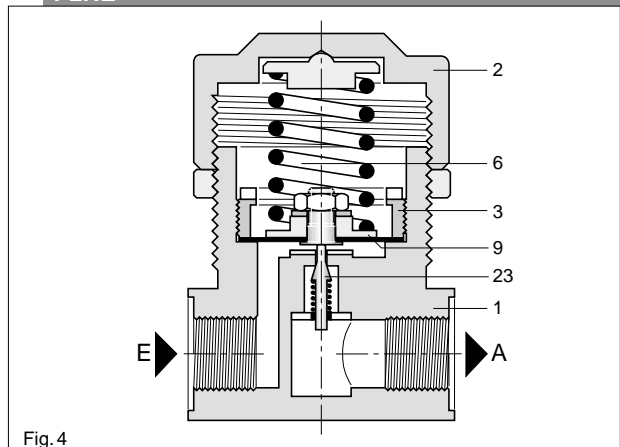


Fig. 4

Dimensions (mm) P2PE

Installation dimensions of executions with NPT-thread (not pictured) are identical, brass version

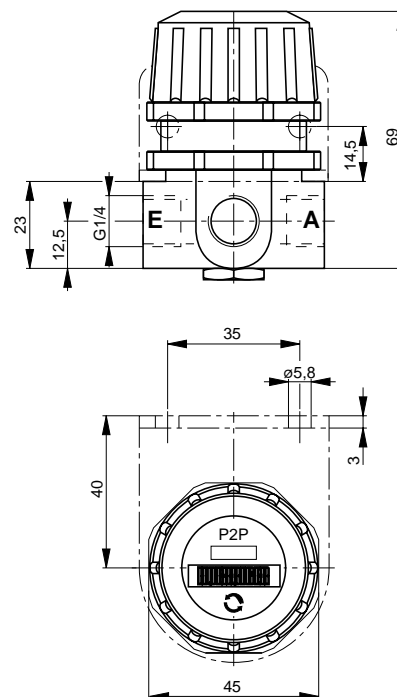


Fig. 5