

P20 Adjustable Pressure Switch

For Air-Conditioning and Heat Pump Applications

Product Bulletin

The P20 series high and low limit (cut-out) controls for all non-corrosive refrigerants are compact pressure controls ideally suited for commercial or residential packaged air conditioning units, heat pumps, small water chillers, ice cube machines and other applications where a semi fixed setting is acceptable or required and where mounting space is limited.

The P20 series includes auto reset as well as manual reset models and is factory set.

A special setting tool is available while also field (screwdriver) adjustable models can be chosen.



Features

- **Field proven reliability**
More than half a million in use today
- **Reset tab must be released before restart (Trip free manual reset)**
Override of control function is not possible
- **Compact design**
Less cabinet space needed
- **Enclosed dust-tight switch**
Prevents contacts pollution
- **SPDT contact with special terminals**
Can be used either as quick or as screw terminals
- **Test pressure 53 bar**
Test strength far above severe operating and standby conditions
- **Designed for at least 300000 cycles**
Accurate repeatability and long life

Note: The controls are intended to control equipment under normal operating conditions. Where failure or malfunctioning of the controls could lead to an abnormal operating condition that could cause personal injury or damage to the equipment or other property, other devices (limit or safety controls) or systems (alarm or supervisory systems) intended to warn of or protect against failure or malfunctioning of the controls must be incorporated into and maintained as part of the control system.

Description

The P20 series are available in three categories (see “Type number selection” table):

- 1. Universal replacement models.** These models are individually packed and can be purchased in any quantity. The models are provided with an extra second suffix number “C” The models are field adjustable by use of the special wrench WRN12-1 (must be ordered separately).
- 2. Basic models.** These are factory set but can be adjusted by use of a special wrench (see “Accessories”). They can be purchased in bulkpack of 50 pcs each.
- 3. Special (OEM) models.** For yearly order quantities above 1000 pcs these models can have optional constructions like:
 - Screwdriver adjustment
 - 120 cm capillary
 - Range -0.6 to 7 bar
 - Range 14 to 42 bar (R410A applications)
 - Other pressure connection style

The minimum shipping quantity from factory is 250 pieces per model (5 boxes). Please contact your Johnson Controls representative.

Installation

The P20 controls can be installed in any convenient location provided that the ambient conditions are suitable for the IP00 enclosure, within the specified limits regarding temperature and humidity and normal pollution situation. Each control is provided with 2 mounting screws (6-32UNC x 4.5 mm thread).

For easy mounting different types of mounting brackets are available (see “Accessories”).

Adjustment

All models are factory set. Models can be field adjusted by use of a special wrench (see “Accessories”).

The differential is not adjustable but can be selected from the “Differential Specifications” matrices.

Range

The indicated range means from the “minimal low switchpoint” up to the maximum “high switch point”. This means that the “differential” cannot be at the outside of the indicated range.

Contact functions

Low Pressure version

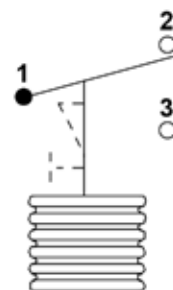


Figure 1: 1 - 2 open on pressure decrease

High Pressure version

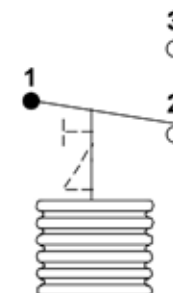


Figure 2: 1 - 2 open on pressure increase

Accessories

The following accessories are available:

- Adjusting wrench WRN12-1 for adjustment of all models. (Fig. 8)
- Clip-on terminal cover. (Fig. 9)
- Mounting plate BKT116-4000 for single P20. (Fig. 10)
- Mounting bracket 210-25R for single P20, angled version. (Fig. 11)

Type number selection

P20EA-9650K

P20 **E** **A** -9 **6** **5** 0 **K**

This is the model number suffix that indicates the selected switch point (see "Differential Specification" matrices - horizontal line). The figures given at the intersection of this horizontal line and the selected differential column indicates the pressure differential that belongs to the selected switch point. The model suffix is indicated in the "Differential Specification" matrices. The above mentioned model P20EA-9650K indicates:

- Auto reset
- Basic model (special adjustment tool WRN12-1 needed)
- Connection style 13
- Differential AM equals 1.2 bar
- High switch point 16 bar.

Pressure differential

This is indicated in the "Differential Specification" matrices. The differential code is indicated by two characters. Each differential code compares with a digit as indicated below. (Not valid for manual reset models).

Differential digit in model number	Differential Code	
1	AL	LP Models
2	BL	
3	CL	
4	DL	
5	AM	HP Models
6	BM	
7	CM	
6	BR	HP (R410A) Models
7	CR	
8	DR	

Pressure connection style

(see "Type number selection table")

1	Style 45A
5	Style 50, 51 or customer special
6	Style 13
9	Style 34

A	Basic and universal models (only adjustable with special wrench)
L	Provided with bellows for R410A application (HP only)

E	Auto reset
F	Manual reset lockout low
G	Manual reset lockout high

Differential specification matrix for LP models, values in bar

Low switch point	Differential code				Model suffix
	AL (1)	BL (2)	CL (3)	DL (4)	
0.5	0.9	1.5	2.0	2.6	A
1	0.9	1.5	2.0	2.6	B
1.5	0.9	1.5	2.0	2.7	C
2	0.9	1.5	2.1	2.7	D
2.5	0.9	1.5	2.1	2.8	E
3	0.9	1.5	2.1	2.8	F
3.5	0.9	1.5	2.1	2.8	G
4	0.9	1.5	2.1	2.9	H
4.5	0.9	1.5	2.1	2.9	K
5	0.9	1.5	2.1	3.0	L
5.5	1.0	1.6	2.2	3.0	M
6	1.0	1.6	2.2	3.0	N
6.5	1.0	1.6	2.2	3.1	P
7	1.0	1.6	2.2	3.1	Q
7.5	1.0	1.6	2.2	X	R
8	1.0	1.6	X	X	S

Differential specification matrix for HP models, values in bar

High switch point	Differential code				Model suffix
	AM (5)	BM (6)	CM (7)	DM (8)	
8	1.0	X	X	X	A
9	1.1	X	X	X	B
10	1.1	2.8	X	X	C
11	1.1	2.8	4.2	X	D
12	1.1	2.9	4.3	X	E
13	1.2	2.9	4.3	6.1	F
14	1.2	2.9	4.4	6.2	G
15	1.2	3.0	4.4	6.3	H
16	1.2	3.1	4.5	6.4	K
17	1.2	3.1	4.6	6.5	L
18	1.3	3.1	4.6	6.5	M
19	1.3	3.1	4.7	6.6	N
20	1.3	3.2	4.7	6.7	P
21	1.3	3.2	4.8	6.8	Q
22	1.3	3.3	4.9	6.9	R
23	1.4	3.3	4.9	7.0	S
24	1.4	3.3	5.0	7.1	T
25	1.4	3.4	5.0	7.2	U
26	1.4	3.4	5.1	7.3	V
27	1.4	3.5	5.2	7.4	W
28	1.5	3.5	5.2	7.5	X
29	1.5	3.5	5.2	7.6	Y

Differential tolerances *:

AL ± 50%	CL ± 26%
BL ± 34%	DL ± 20%
AM ± 30%	CM ± 21%
BM ± 24%	DM ± 18%

* But not less than 0.4 bar.

Switch point tolerances:

LP models ± 3 % but not less than 0.2 bar.
 HP models ± 2 % but not less than 0.4 bar.

Differential specification matrix for R410A/HP models, values in bar

High switch point	Differential code			Model suffix
	BR (6)	CR (7)	DR (8)	
18	3,8	X	X	A
19	3,8	X	X	B
20	3,8	6,0	X	C
21	3,8	6,0	X	D
22	3,8	6,1	7,8	E
23	3,8	6,1	7,9	F
24	3,8	6,1	8,0	G
25	3,9	6,2	8,0	H
26	3,9	6,2	8,1	I
27	3,9	6,2	8,2	J
28	3,9	6,3	8,3	K
29	3,9	6,3	8,3	L
30	3,9	6,3	8,4	M
31	3,9	6,3	8,4	N
32	3,9	6,4	8,5	O
33	4,0	6,4	8,6	P
34	4,0	6,4	8,7	Q
35	4,0	6,4	8,7	R
36	4,0	6,5	8,8	S
37	4,0	6,5	8,9	T
38	4,0	6,5	9,0	U
39	4,0	6,5	9,0	V
40	4,0	6,5	9,1	W
41	4,0	6,5	9,2	X
42	4,0	6,5	9,2	Y

Differential tolerances *:**BR ± 0,9 bar CR ± 1,1 bar DR ± 1,5 bar****Switch point tolerances:****R410A/HP models ± 0,7 bar.**

Type number selection table

Ordering Codes	Range (*) (bar)	Differential code	Pressure connector	Contact function	Factory set at	Max. working pressure
Universal replacement models						
P20EA-9530FC	0.5 - 10	CL	Style 50	Fig. 1	3 bar	20 bar
P20EA-9630FC	0.5 - 10	CL	Style 13	Fig. 1	3 bar	20 bar
P20EA-9570XC	7 - 29	CM	Style 50	Fig. 2	28 bar	38 bar
P20EA-9670XC	7 - 29	CM	Style 13	Fig. 2	28 bar	38 bar
P20EL-9670TC	14 - 42	CR	Style 13	Fig. 2	37 bar	48 bar
P20FA-9510FC	0.5 - 10	man. reset ⁽¹⁾	Style 50	Fig. 1	3 bar	20 bar
P20FA-9610FC	0.5 - 10	man. reset ⁽¹⁾	Style 13	Fig. 1	3 bar	20 bar
P20GA-9550XC	7 - 29	man. reset ⁽²⁾	Style 50	Fig. 2	28 bar	38 bar
P20GA-9650XC	7 - 29	man. reset ⁽²⁾	Style 13	Fig. 2	28 bar	38 bar
P20GL-9650TC	14 - 42	man. reset ⁽²⁾	Style 13	Fig. 2	37 bar	48 bar
Low pressure, auto reset models						
P20EA-9610 (**)	0.5 - 10	AL	Style 13	Fig. 1	(**)	20 bar
P20EA-9120 (**)	0.5 - 10	BL	Style 45A	Fig. 1	(**)	20 bar
P20EA-9620 (**)	0.5 - 10	BL	Style 13	Fig. 1	(**)	20 bar
P20EA-9130 (**)	0.5 - 10	CL	Style 45A	Fig. 1	(**)	20 bar
P20EA-9630 (**)	0.5 - 10	CL	Style 13	Fig. 1	(**)	20 bar
P20EA-9640 (**)	0.5 - 10	DL	Style 13	Fig. 1	(**)	20 bar
P20EA-9910 (**)	0.5 - 10	AL	Style 34	Fig. 1	(**)	20 bar
P20EA-9920 (**)	0.5 - 10	BL	Style 34	Fig. 1	(**)	20 bar
P20EA-9930 (**)	0.5 - 10	CL	Style 34	Fig. 1	(**)	20 bar
P20EA-9940 (**)	0.5 - 10	DL	Style 34	Fig. 1	(**)	20 bar
Low pressure, manual reset models						
P20FA-9610 (**)	0.5 - 10	man. reset ⁽¹⁾	Style 13	Fig. 1	(**)	20 bar
High pressure, auto reset models						
P20EA-9650 (**)	7 - 29	AM	Style 13	Fig. 2	(**)	38 bar
P20EA-9160 (**)	7 - 29	BM	Style 45A	Fig. 2	(**)	38 bar
P20EA-9660 (**)	7 - 29	BM	Style 13	Fig. 2	(**)	38 bar
P20EA-9170 (**)	7 - 29	CM	Style 45A	Fig. 2	(**)	38 bar
P20EA-9670 (**)	7 - 29	CM	Style 13	Fig. 2	(**)	38 bar
P20EA-9680 (**)	7 - 29	DM	Style 13	Fig. 2	(**)	38 bar
P20EA-9950 (**)	7 - 29	AM	Style 34	Fig. 2	(**)	38 bar
P20EA-9960 (**)	7 - 29	BM	Style 34	Fig. 2	(**)	38 bar
P20EA-9970 (**)	7 - 29	CM	Style 34	Fig. 2	(**)	38 bar
P20EA-9980 (**)	7 - 29	DM	Style 34	Fig. 2	(**)	38 bar
High pressure, manual reset models						
P20GA-9150 (**)	7 - 29	man. reset ⁽²⁾	Style 45A	Fig. 2	(**)	38 bar
P20GA-9550 (**)	7 - 29	man. reset ⁽²⁾	Style 50	Fig. 2	(**)	38 bar
P20GA-9650 (**)	7 - 29	man. reset ⁽²⁾	Style 13	Fig. 2	(**)	38 bar
P20GA-9950 (**)	7 - 29	man. reset ⁽²⁾	Style 34	Fig. 2	(**)	38 bar
High pressure, auto reset models for R410A applications						
P20EL-9660 (**)	14-42	BR	Style 13	Fig. 2	(**)	48 bar
P20EL-9160 (**)	14-42	BR	Style 45A	Fig. 2	(**)	48 bar
P20EL-9960 (**)	14-42	BR	Style 34	Fig. 2	(**)	48 bar
P20EL-9670 (**)	14-42	CR	Style 13	Fig. 2	(**)	48 bar
P20EL-9170 (**)	14-42	CR	Style 45A	Fig. 2	(**)	48 bar
P20EL-9970 (**)	14-42	CR	Style 34	Fig. 2	(**)	48 bar
P20EL-9680 (**)	14-42	DR	Style 13	Fig. 2	(**)	48 bar
P20EL-9180 (**)	14-42	DR	Style 45a	Fig. 2	(**)	48 bar
P20EL-9980 (**)	14-42	DR	Style 34	Fig. 2	(**)	48 bar
High pressure, manual reset models for R410A applications						
P20GL-9650 (**)	14-42	man. reset ⁽²⁾	Style 13	Fig. 2	(**)	48 bar
P20GL-9150 (**)	14-42	man. reset ⁽²⁾	Style 45A	Fig. 2	(**)	48 bar
P20GL-9950 (**)	14-42	man. reset ⁽²⁾	Style 34	Fig. 2	(**)	48 bar

Note

(*) Minimum low switch point to maximum high switch point.

(**) When ordering specify setting by adding the model suffix.

⁽¹⁾ Reset possible ≥ 3 bar above low switch point

⁽²⁾ Reset possible ≥ 7 bar below high switch point.

Repair and replacement

Repair is not possible. In case of an improperly functioning control, please check with your nearest supplier. When contacting the supplier for a replacement you should state the type/model number of the control. This number can be found on the data plate.

Pressure connections

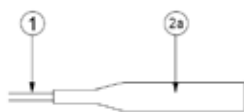


Figure 3: Style 34

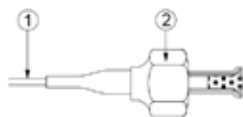


Figure 4: Style 45A
(incl. valve depressor mounted into capillary flare section)

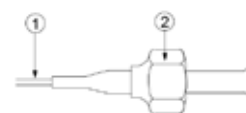


Figure 5: Style 13
(without valve depressor)

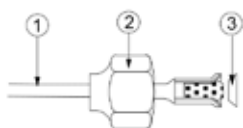


Figure 6: Style 50
(incl. valve depressor mounted into machined flare)

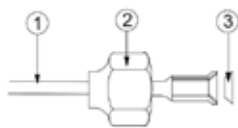


Figure 7: Style 51
(machined flare excl. valve depressor)

1. 90 cm capillary.
2. 7/16 - 20 UNF flare nut.
- 2a. 1/4" tube ODM for braze connection.
3. copper seal ring

Accessories (optional, has to be ordered separately)



Figure 8: Adjusting wrench WRN12-1



Figure 9: Clip-on Bakelite terminal cover 210-604R

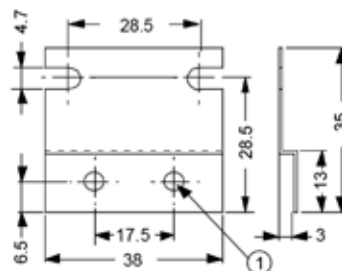


Figure 10: Mounting plate BKT116-4000 (single)

①: mounting holes for P20 Ø 4 mm

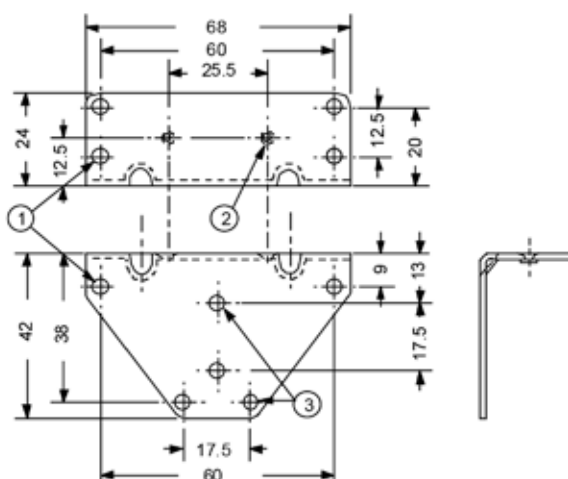


Figure 11: Mounting bracket 210-25R (single)

- ① Mounting holes Ø 4 mm
- ② Extruded holes 8 - 32 UNC thread
- ③ Mounting holes for P20 Ø 4 mm

Dimensions (mm)

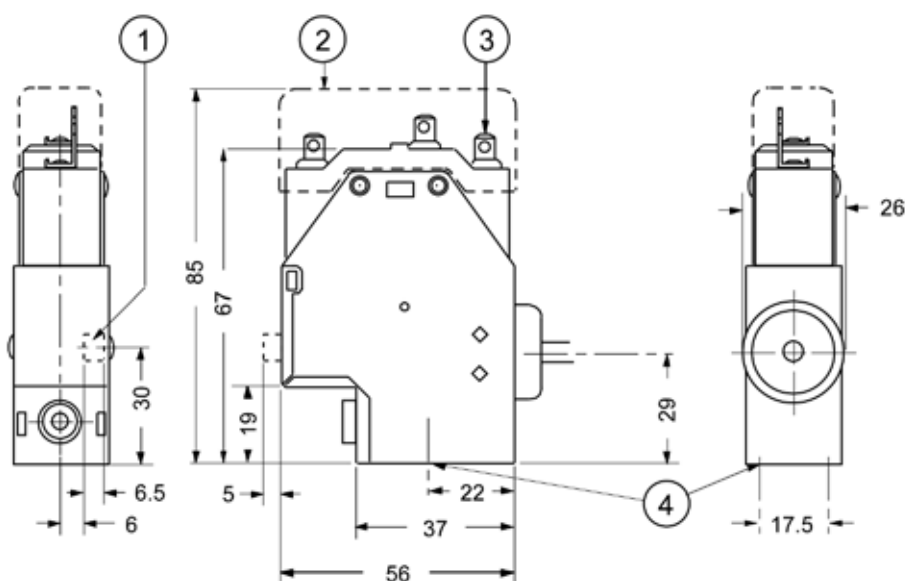


Figure 12: Dimensions Standard Controls

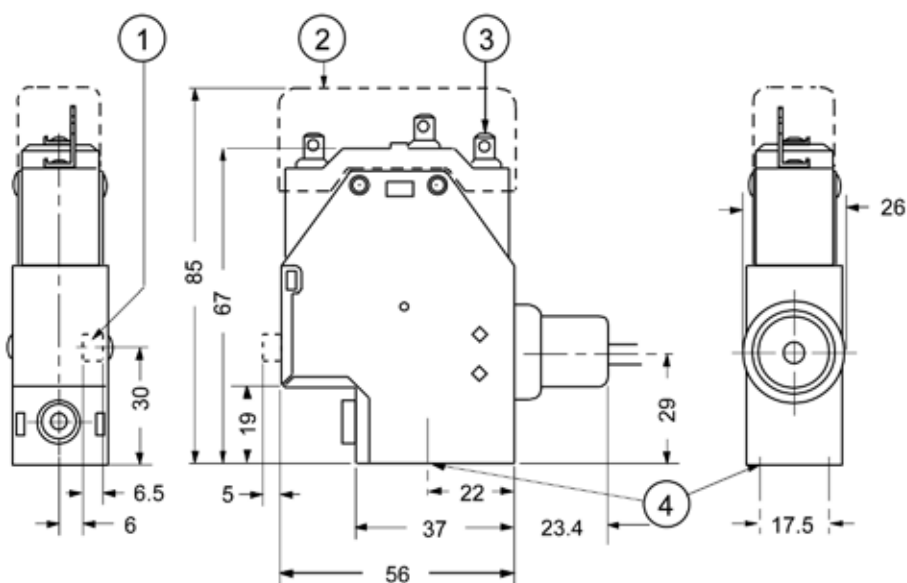


Figure 13: Dimensions R410A (HP) models

- ① Reset lever, for manual reset models only
- ② Height of control if 210-604R is used
- ③ Terminals can be used as quick connectors (6.3 mm) as well as screw connections
- ④ 2 Mounting holes 6 - 32 UNC thread (2 screws 6-32UNC x 4,5 mm provided with each control).

Technical Specifications

Type Number	See "Type Number selection" table
Operating Range	
<i>LP models</i>	0.5 – 10 bar
<i>HP models</i>	7 – 29 bar
<i>R410A/HP models</i>	14 – 42 bar
Pressure connections	90 cm capillary, Styles 13, 34, 45A, 50 and 51
Switch points and differentials	See "Differential Specification" matrices
Adjustment	Wrench adjustment
Ambient Temperature	from -35°C to +55 °C
Ambient humidity	10 to 95% RH (non-condensing)
Test pressure	53 bar max.
Minimum burst pressure	200 bar
Protection Class	IP00
Electrical Rating	15(8)A 230 Vac
Contact	SPDT snap-acting switch
Wiring Connections	Screw terminals 1 up till 2.5 mm ² Quick connector type 6.3 mm
Material	
<i>Case</i>	Cold rolled steel, zinc plated with dichromate dip
<i>Capillary</i>	Copper
Packaging	50 controls per box
Shipping Weight	15 kg per box
Dimensions	See "Dimensions" drawings
CE Compliance	Johnson Controls, Inc., declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU. RoHS Directive 2011/65/EU.

Note

1 bar = 100 kPa ≈ 14.5 psi.

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.



Building Efficiency

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