P20 and P21 Series Air Conditioning Cutout Controls Installation Guide

997-780 Rev. B

2022-12-20

Description

The P20 and P21 Series air conditioning cutout controls activate a switch above or below adjustable setpoint ranges, to facilitate control based on air pressure.

P20BB-1

A low pressure control with a single-pole, single-throw (SPST) switch with lockout that requires a manual reset.

Factory settings:

The contacts open on a pressure drop to 40 psig (276 kPa). The range of cutout is 7 psig to 150 psig (48 kPa to 1,034 kPa).

P20DB-1

A high pressure control with an SPST switch with lockout that requires a manual reset.

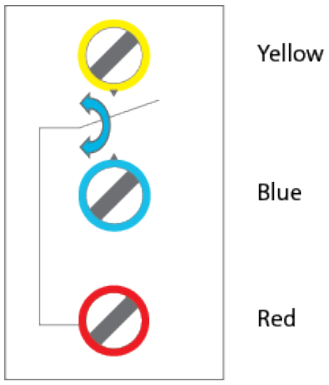
Factory settings:

The contacts open on a pressure rise to 400 psig (2,758 kPa). The range of cutout is 100 psig to 425 psig (690 kPa to 2,930 kPa).

P20EB-1

A low pressure control with a single-pole double-throw (SPDT) switch with automatic reset.

Figure 1: P20EB-1 terminals



- The red to yellow contacts open with a pressure drop, and close with a pressure increase.
- The red to blue contacts close with a pressure drop, and open with a pressure increase.

Factory settings:

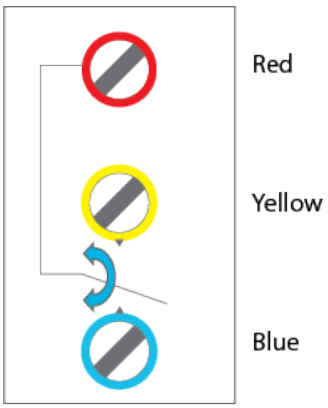
The red to yellow contacts open at 40 psig (276 kPa), and close at 70 psig (483 kPa).

The differential is factory set at 30 psig (207 kPa). The cutout adjustment range is 7 psig to 150 psig (48 kPa to 1,034 kPa).

P20EB-2

A high pressure control with SPDT contacts with automatic reset.

Figure 2: P20EB-2 terminals



- The red to yellow contacts close with a pressure increase, and open with a pressure drop.
- The red to blue contacts open with a pressure increase, and close with a pressure drop.

Factory settings:

The red to blue contacts open at 400 psig (2,758 kPa), and close at 330 psig (2,275 kPa).

The differential is factory set at 70 psig (483 kPa). The cutout adjustment range is 100 psig to 425 psig (690 kPa to 2,930 kPa).

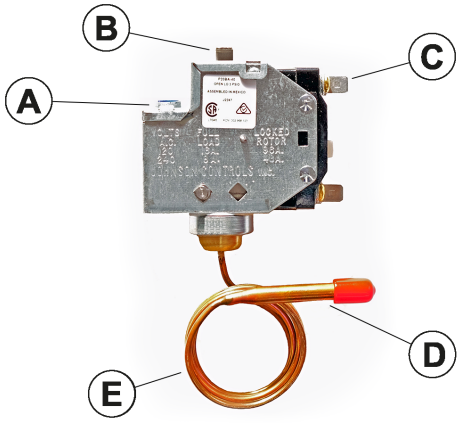
Installation

⚠ CAUTION

Risk of electric shock

Disconnect the power supply before attempting to disconnect the old control and before connections are made to the new control to prevent possible electrical shock or damage to the equipment.

Figure 3: P20 Air Conditioning Cutout Control



Callout	Description
A	Range adjustment
B	Reset lever
C	Quick-connect terminals
D	Flare extension
E	Capillary

Wiring the terminals

- Quick-connect terminals are supplied as standard. If you do not use quick-connect terminals, remove and salvage the terminal screws from the removed control. Remove the provided connectors and use existing quick-connector terminals.
- If there are special quick-connect terminals on the control that you replace, reuse the connectors.

Note: Use the supplied terminal screws (8-32 x 1/4 in. binder head). The substitution of other screws may cause problems in making correct connections.

Figure 4: Cutoff point

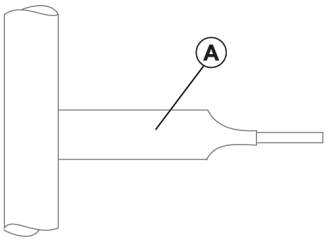
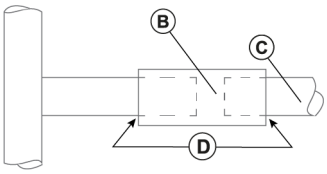


Figure 5: Solder points



Callout	Description
A	Cutoff point
B	Sweat coupling
C	New control
D	95-5 solder

Installing the pressure connection

When you install the flare extension, observe the following guidance:

- Flare nuts are not provided. If the replaced control uses flare nuts, remove any existing flare nuts, install them on the new control with a 1/4 in. flare extension and complete the connection.
- If the existing control has a 1/4 in. flare extension silver-soldered into the system, cut it off from the system as far as possible from the point of connection and use a 1/4 in. sweat coupling as shown. See Figure 4 and Figure 5. Clean the parts before you solder to obtain a good join.

When you install the pressure connection, observe the following guidance:

- If the present installation uses more than a 36 in. capillary, use an additional length of 1/4 in. tubing attached to the system to a point near the control, and attach the control as shown in Figure 5 or use flare nuts and a flare union.
- If the present installation does not use a 1/4 in. flare extension, but has a capillary silver-soldered directly into the system, it is necessary to remove the flare extension from the replacement control and re-solder it into the system. Take extreme care when you cut the capillary so you do not close the opening. Groove the capillary with a knife or tube cutter and break the tube.

  Note: Ensure that the tubing is inserted far enough that the solder does not run over the end of the tubing, sealing off the capillary.

Note: Do not use too much solder, use enough to seal the joint.

- If the original equipment uses a flare extension with a 90 degree bend, cut the line off beyond the bend or use a 1/4 in. 90 degree sweat elbow instead of a sweat coupling.

Brackets

- Salvage the existing bracket when you replace the P20.
- A special bracket is included to replace controls from other manufacturers with P20 controls.
- Use the screws provided with the replacement control for mounting.

Settings

To adjust the settings:

1. Adjust the range.
   - To increase the cutout setting, turn the range adjustment screw clockwise, as shown in .
   - To lower the cutout setting, turn the range adjustment screw counter-clockwise.
2. Ensure that the differential of the suggested replacement is satisfactory for the specific application.

Note: Duplicate the original equipment manufacturer's settings when you replace the controls.

Note: One complete counter-clockwise turn of the range adjustment screw lowers the setting approximately:

- Low pressure range: 7 psig to 150 psig (48 kPa to 1,034 kPa), lowers 20 psig (138 kPa).
- High pressure range: 100 psig to 450 psig (690 kPa to 3,103 kPa), lowers 100 psig (690 kPa).

General

If the 36 in. capillary tube is not needed for a hookup, uncoil it enough to use it and secure the surplus capillary so it does not vibrate or rub against any metal surface where friction can damage the capillary.

Note: Vibration of copper tubing causes work hardening, crystallization, and breakage. Broken capillary tubes leak refrigerant and cause unnecessary delay due to repair times.

Checkout procedure

Before you leave the installation, ensure you observe at least three complete operating cycles to confirm that all components function correctly.

Electrical rating table

Table 1: P20 and P21 electrical ratings

Description	Volts AC 60 Hz			
	120	**208**	**240**	**277**
Full load amps	16.0	9.2	8.0	7.0
Lock rotor amps	96.0	55.2	48.0	42.0
Resistive amps	16.0	16.0	16.0	–
Pilot duty	125 VA at 24 VAC, 720 VA at 120 VAC to 277 VAC			

Conformity declaration information

Table 2: P20 and P21 conformity information

Information	Description	
Purpose of control	High and low pressure control	
Mounting the control	Direct by two 6-32 tapped holes on 11/16 in. centers	
Earthing the control	–	
Type 1 or Type 2 action	P20DA, P20GA Manual reset	Type 2.BJ Micro-disconnection
	P20CA, P20CE, P20EA Automatic reset	Type 2.B Micro-disconnection
	All other models	Type 1.B Micro-disconnection
External pollution situation	Pollution degree 3	
Rated impulse voltage	4,000 VAC	

Product warranty

This product is covered by a limited warranty, details of which can be found at www.johnsoncontrols.com/buildingswarranty.

Single point of contact

APAC	EU	UK	NA/SA
JOHNSON CONTROLS C/O CONTROLS PRODUCT MANAGEMENT NO. 32 CHANGJIANG RD NEW DISTRICT WUXI JIANGSU PROVINCE 214028 CHINA	JOHNSON CONTROLS VOLTAWEG 20 6101 XK ECHT THE NETHERLANDS	JOHNSON CONTROLS TYCO PARK GRIMSHAW LANE MANCHESTER M40 2WL UNITED KINGDOM	JOHNSON CONTROLS 5757 N GREEN BAY AVE. GLENDALE, WI 53209 USA

Contact information

Contact your local Johnson Controls representative: www.johnsoncontrols.com/locations

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