JOHNSON CONTROLS

P-5215
Differential Pressure Transmitter

Features and Benefits

- **Ultra Sensitive Feedback Circuit**
  - **Enhances System Performance by Ensuring a High Degree of Linearity and Accuracy**
  - **Improves System Integrity by Minimizing Hysteresis, Thus Providing Repeatable, Predictable Output Results**
- **Wide Variety of Models Available**
  - **Satisfies Many Applications Including Static Pressure Control, Fan Matching, and Liquid Level Control**
  - **Allows Precise Matching of Transmitter to Application, Resulting in More Accurate Control**
  - **Product Line Includes Bi-Directional Range Model, Ideal for Clean Room Applications**
- **Rugged Design**
  - **Standard Enclosure Eliminates Need for Panel Mounting**
  - **Barbed Fittings Ensure All Air Connections are Secure**

Fig. 1: P-5215 Differential Pressure Transmitter

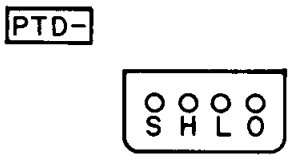
The P-5215 Differential Pressure Transmitter accurately measures differential pressure and converts the measurement into a proportional 3 to 15 PSIG (21 to 105 kPa) output signal. This instrument can be used in a variety of control applications including static, velocity, and differential pressure control.

Operation

The P-5215 is used with the low input acting as a reference less than, greater than, or equal to atmospheric pressure. As the differential between the low and high inputs increases, an internal mechanism will proportionally increase the output signal of the P-5215. The output at zero differential is 3 PSIG (21 kPa). When the differential reaches its maximum, as defined by the range, the output will be 15 PSIG (105 kPa).

Note: The P-5215-4, with a range of -.05 to .05 in. WG (-12.45 to 12.45 Pa), is an exception to this rule. The output for the P-5215-4 is 3 PSIG when the pressure to the high input "H" connection is .05 in. WG *less than* the pressure to the low input "L" connection, and 15 PSIG when the pressure to the "H" connection is .05 in. WG *greater than* the pressure to the "L" connection. The output at zero differential is 9 PSIG (63 kPa).

Application and Drawing Identification



Part No. 24-3281-3, Rev. D
Code No. LIT-7171220

Specifications

Product		P-5215 Differential Pressure Transmitter
Models*	**P-5215-4**	–.05 to .05 in. WG (–12.45 to 12.45 Pa)
	P-5215-5	0 to 0.1 in. WG (0 to.24.9 Pa)
	P-5215-6	0 to .25 in. WG (0 to 62.25 Pa)
	P-5215-7	0 to 0.5 in. WG (0 to 124.5 Pa)
	P-5215-8	0 to 1.0 in. WG (0 to 249 Pa)
	P-5215-9	0 to 2.0 in. WG (0 to 498 Pa)
	P-5215-10	0 to 5.0 in. WG (0 to 1245 Pa)
Action		Proportional, Direct Acting
Supply Pressure		18 to 22 PSIG (126 to 154 kPa), 20 PSIG (140 kPa) Nominal, Allowable Variation 0.5 PSI (3.5 kPa), Air Supply Must Be Clean, Dry, and Oil Free
Output Pressure		3 to 15 PSIG (21 to 105 kPa)
Maximum Differential Pressure		10 in. WG (2490 Pa)
Maximum Pressure		15 in. WG (3735 Pa) Applied to Either Port
Air Consumption		35 SCIM (9.6 mL/s)
Output Flow Capacity		45 SCIM (12.3 mL/s)
Ambient Temp Limits	**Operating**	50 to 110°F (10 to 43°C)
	Storage	–20 to 135°F (–29 to 57°C)
Air Connections	**Supply "S" and Output "O"**	Barbed Fittings for 5/32 or 1/4 in. O.D. Polytubing
	High Input "H" and Low Input "L"	Barbed Fittings for 3/8 in. O.D. Polytubing
Materials	**Enclosure**	Cast Aluminum and Brass
	Feedback Relay	Polysulfone
	Gasket	Buna-N-Nylon
Accessories (Order Separately)		See Table 1
Shipping Weight		3.8 lb (1.7 kg)

***For other ranges, refer to Reference Data P-5215 #2; minimum span .08 in. WG (19.9 Pa), maximum span 10 in. WG (2490 Pa).**

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 damage resulting from misapplication or misuse of its products.

Table 1: Accessories (Order Separately)

Description	Shipping Weight lb*	Code Number
3 in. (76 mm) Pocket Level	0.3	JC 348
9 in. (229 mm) Torpedo Level	0.8	JC 350
Selector Switch	0.4	S-2300-2
Gradual Switch	0.7	S-224-1
Air Pressure Gage, 0 to 30 PSIG (0 to 210 kPa)	.01	G-2010-5
Air Pressure Indicator	—	P-5500 Series
Adjustable Restrictor	.04	R-3710-2010

*** lb x 0.045 = kg**

Table 2: Cross-Reference Guide

Differential Pressure Range	-.05 to .05 in. WG (-12.45 to 12.45 Pa)	0 to 0.1 in. WG (0 to 24.9 Pa)	0 to .25 in. WG (0 to 62.25 Pa)	0 to 0.5 in. WG (0 to 124.5 Pa)	0 to 1.0 in. WG (0 to 249 Pa)	0 to 2.0 in. WG (0 to 498 Pa)	0 to 5.0 in. WG (0 to 1245 Pa)
Johnson Controls	**P-5215-4***	**P-5215-5***	**P-5215-6***	**P-5215-7***	**P-5215-8***	**P-5215-9***	**P-5215-10***
Honeywell	—	—	—	—	—	—	PP905B-1008 PP904A-1001** PP904A-1035** P091** P0900**
Robertshaw (Uni-Line)	—	—	P323-0025 (2323-505)	—	P323-01 (2323-503) R76-1 (2325-001)** P321-01 (2321-401)** P324-101 (2324-101)** P324-201 (2324-201)**	P323-02 (2323-501)	P323-03 (2323-500) P323-10 (2323-504) P323-07 (2323-502) P322-08 (2323-504)**
Barber-Colman	—	—	—	—	—	—	PKS-2011 PP-1012** PP-3013** PP-3113**
Powers	PT 141-0590	—	—	—	PT 141-0591 PR 269-1066** PR 269-1068**	—	PT 141-0592 PT 141-0593 PT 187-1000 PT 187-1001 PR 269-1067** PR 269-1069**
UPC	—	—	—	—	VLP 202-10**	—	VLP 203-10**
ITT	—	—	—	—	—	PM 500D41 PM 500D42	PM 500D43 PC 400D45** PC 400R45**
JCII-Essen	—	—	—	—	—	PMND 030/30 PT-5050-3330 PMND 0/60 PT-5050-3060	PDP** PDPV** PMND 0/300 PT-5050-3000
Discontinued Johnson Controls	—	—	—	—	—	R-302-1** R-302-2** R-302-3** R-302-4** R-302-5** R-302-6** R-302-13** R-302-14** R-302-15** R-302-16** R-302-17** R-302-18** R-302-40** R-302-41**	R-302-7** R-302-8** R-302-9** R-302-10** R-302-11** R-302-12** R-302-42** R-302-43**

***Differential pressure range of replacement P-5215 may not exactly match the differential pressure range of the device being changed out.**
****Unit changeout requires a receiver-controller in addition to the P-5215.**

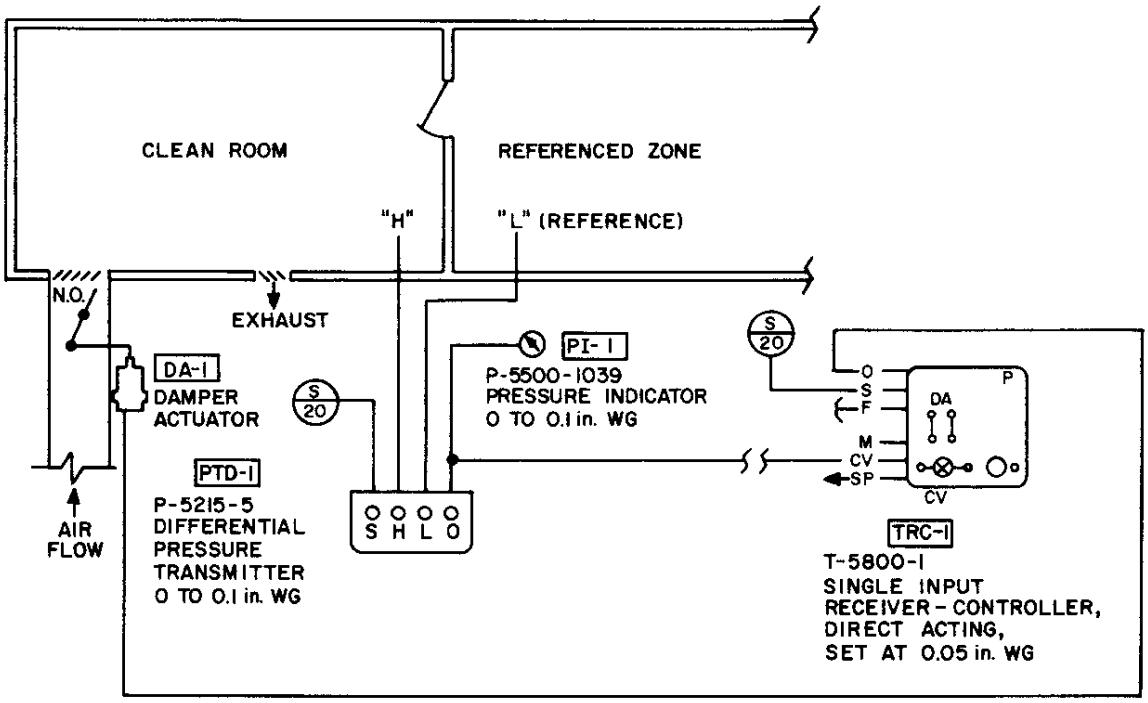


Fig. 2: Typical Clean Room Application Using P-5215

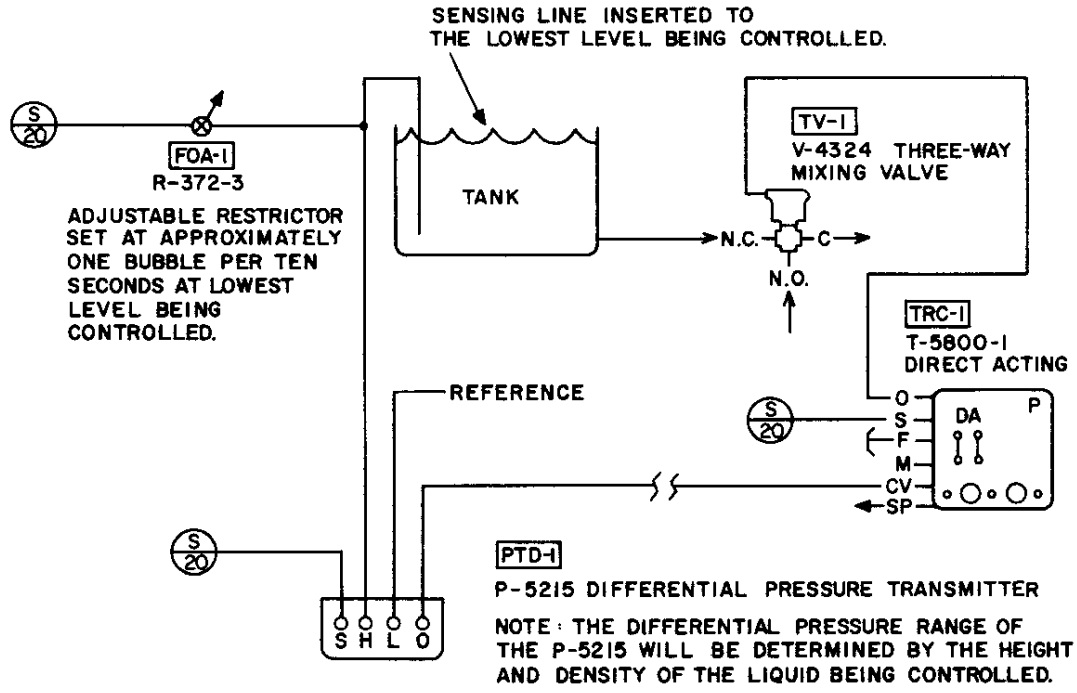


Fig. 3: Typical Liquid Level Control Application Using P-5215

Installation

The P-5215 Differential Pressure Transmitter is factory calibrated in the vertical position; therefore, the unit MUST BE MOUNTED WITHIN 15 ANGULAR DEGREES OF THE VERTICAL POSITION as indicated in Fig. 4. **Note: It is recommended that a level be used to obtain this vertical position.**

Refer to Table 3 for a list of items required to perform installation and commissioning. In order to maintain factory calibration, it is recommended that the sensing line lengths do not exceed the parameters listed in Table 4.

Note: Since the P-5215 is a temperature sensitive device, it should only be installed in a conditioned space.

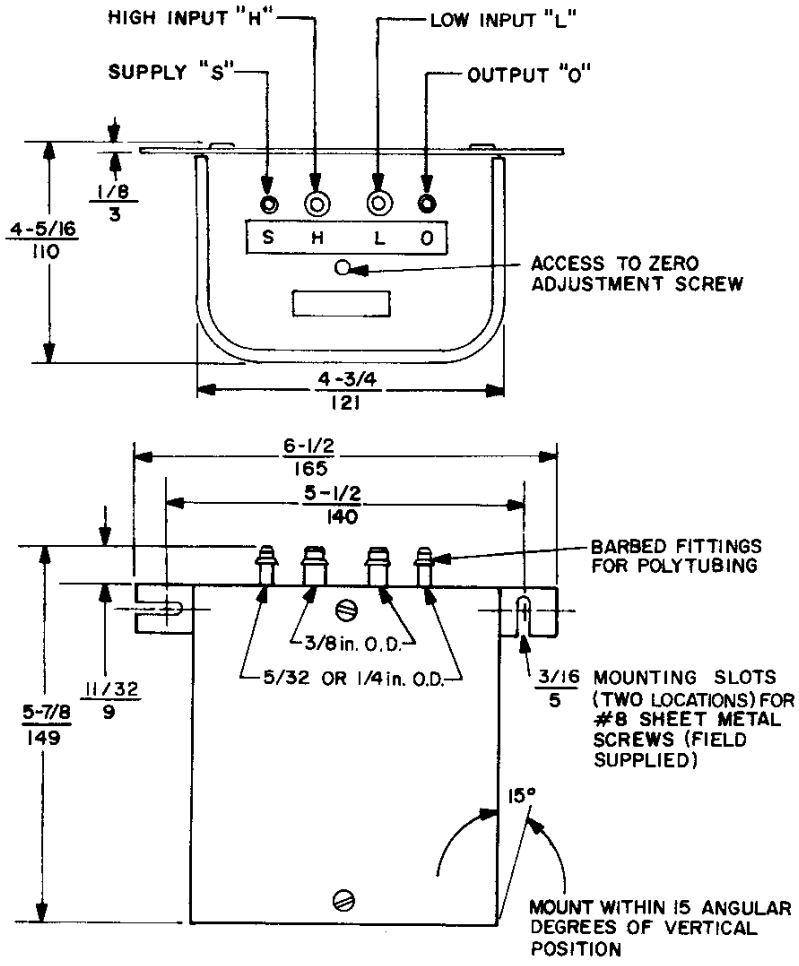


Fig. 4: P-5215 Dimensions $\frac{\text{in.}}{\text{mm}}$

Table 3: Items Required for Installation and Commissioning

Quantity	Description
1	Drill with 5/32 in. Drill Bit
2	#8 Sheet Metal Screws
1	3/16 in. Blade Screwdriver
1	Level (JC 348 or JC 350)

Table 4: Maximum Low Pressure Line Lengths to Maintain Factory Calibration

Tubing Size (O.D.)	Maximum Sensing Line Length
3/8 in.	100 ft (30.5 m)
1/2 in.	300 ft (91.4 m)

Commissioning Procedure on Next page

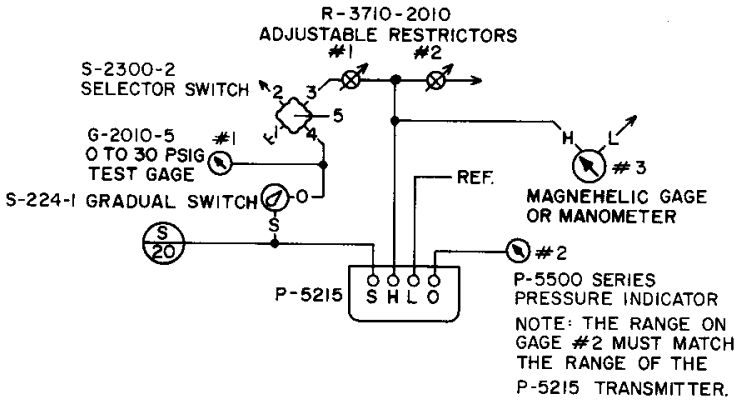


Fig. 5: Test Divider Circuit

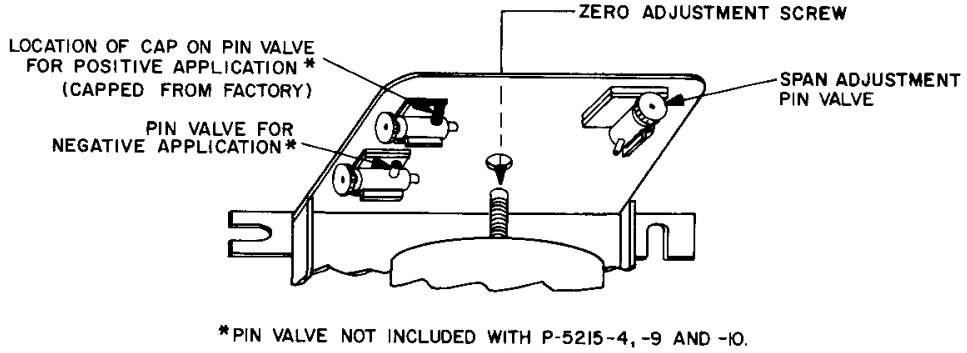


Fig. 6: P-5215 Adjustments
(Internal View with Cover Removed)

Commissioning

Pre-Commissioning Setup

1. Loosen the two cover holding screws and remove the P-5215 cover.
2. Furnish 20 PSIG (140 kPa) supply air to the "S" connection.

   Note: It is recommended that the P-5215 be allowed to settle out for approximately 24 hours before it can be commissioned.
3. Hook up a test divider circuit as shown in Fig. 5.
4. In positive applications, for models P-5215-5, -6, -7, and -8 only, check that the rubber cap is located on the positive pin valve (see Fig. 6). In negative applications, move the rubber cap from the positive pin valve to the negative pin valve.
5. Turn the knob of the S-2300-2 Selector Switch clockwise until it reaches its mechanical stop.

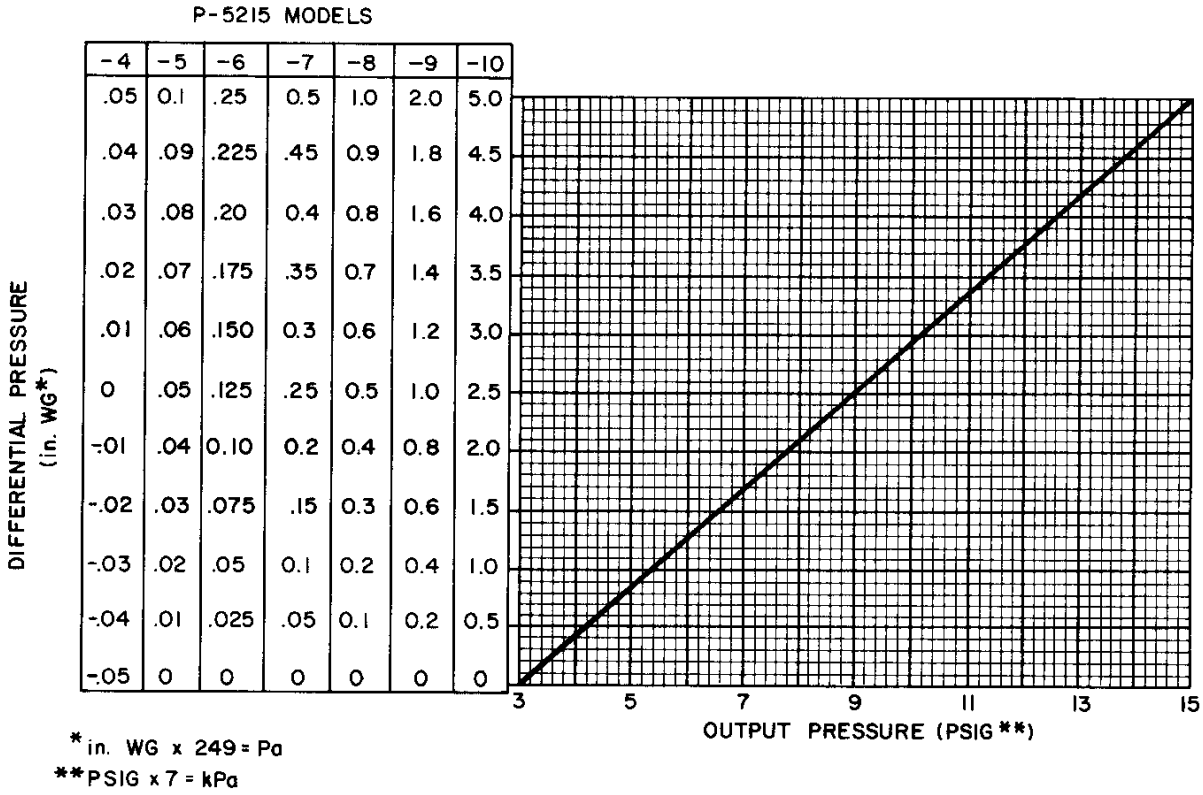
Zeroing the Transmitter

6. Adjust the magnehelic gage or manometer (gage #3) to 0 in. WG. Using a 3/16 in. blade screwdriver on the zero adjustment screw identified in Fig. 6, adjust the output of the P-5215 to 3 PSIG (21 kPa), as read on test gage #2.

Setting Maximum Design Differential Pressure

7. Start with 0 PSIG output from the S-224-1 Gradual Switch, as read on test gage #1. Fully close adjustable restrictor #1.

   Slowly increase the pressure from the S-224-1 Gradual Switch to 15 PSIG (105 kPa), as read on test gage #1. Slowly open adjustable restrictor #1 to provide 100% of the transmitter range, as read on the magnehelic gage or manometer (gage #3).
8. Turn the knob of the S-2300-2 Selector Switch counterclockwise until it reaches its mechanical stop.



-4	-5	-6	-7	-8	-9	-10
.05	0.1	.25	0.5	1.0	2.0	5.0
.04	.09	.225	.45	0.9	1.8	4.5
.03	.08	.20	0.4	0.8	1.6	4.0
.02	.07	.175	.35	0.7	1.4	3.5
.01	.06	.150	0.3	0.6	1.2	3.0
0	.05	.125	.25	0.5	1.0	2.5
-.01	.04	0.10	0.2	0.4	0.8	2.0
-.02	.03	.075	.15	0.3	0.6	1.5
-.03	.02	.05	0.1	0.2	0.4	1.0
-.04	.01	.025	.05	0.1	0.2	0.5
-.05	0	0	0	0	0	0

Fig. 7: Differential Pressure vs Output Pressure

9. Noting the desired maximum differential pressure, determine the proper transmitter output from the graph in Fig. 7. Be sure to use the scale on the graph that matches the range of the transmitter. If 15 PSIG (105 kPa) has not been achieved, proceed to Step 10; if 15 PSIG has been achieved, proceed to Step 11.
10. If the output pressure is under 15 PSIG (105 kPa), turn the span adjustment pin valve on the P-5215 counterclockwise 1/4 turn or until 15 PSIG is achieved.

    If the output pressure is above 15 PSIG, turn the span adjustment pin valve clockwise as described above. If desired, repeat Steps 5 through 9 to fine tune the instrument.
11. **Note: In order to check the midpoint of the P-5215-4 only, it is necessary to disconnect the high and low sensing lines.**

    Slowly close adjustable restrictor #1 until the midpoint of the transmitter range is reached. Example: On a transmitter with a differential pressure range of 0 to 2 in. WG (0 to 498 Pa), the midpoint would be 1 in. WG (249 Pa).

    Output test gage #2 should read 9 PSIG (63 kPa). If not, turn the zero adjustment screw on the P-5215 until the output pressure, as read on test gage #2, equals 9 PSIG.
12. Disconnect the test divider circuit and reinstall the P-5215 cover.

Repair Information

Field repairs must not be made. For a replacement P-5215, contact the nearest Johnson Controls branch office.

Notes

JOHNSON CONTROLS

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