

LP916A-C Pneumatic Remote Bulb Thermostats

SERVICE DATA

GENERAL

DESCRIPTION

The LP916 Thermostats are bleed-type controllers with a fixed throttling range. They have a liquid-filled, remote thermal element.

APPLICATION

Typical applications for the LP916A are duct-mounted (Fig. 1) and mixed air control (Fig. 2). The LP916B is typically used for fan coil unit control (Fig. 3). Typical applications for the reverse acting LP916C are cooling coil control similar to Figure 1 or fan coil control (Fig. 4).

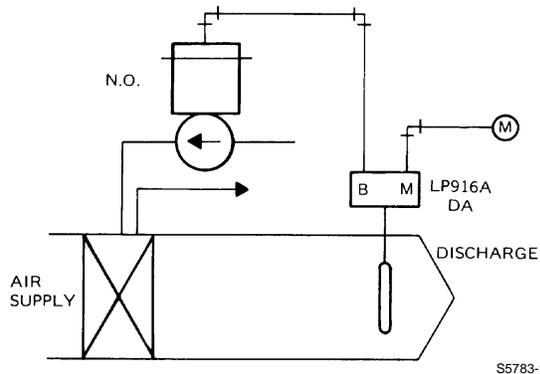


Fig. 1. Typical LP916A duct-mounted heating application.

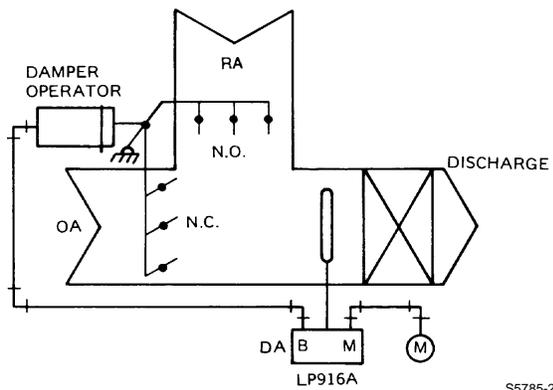


Fig. 2. Typical LP916A mixed air application.

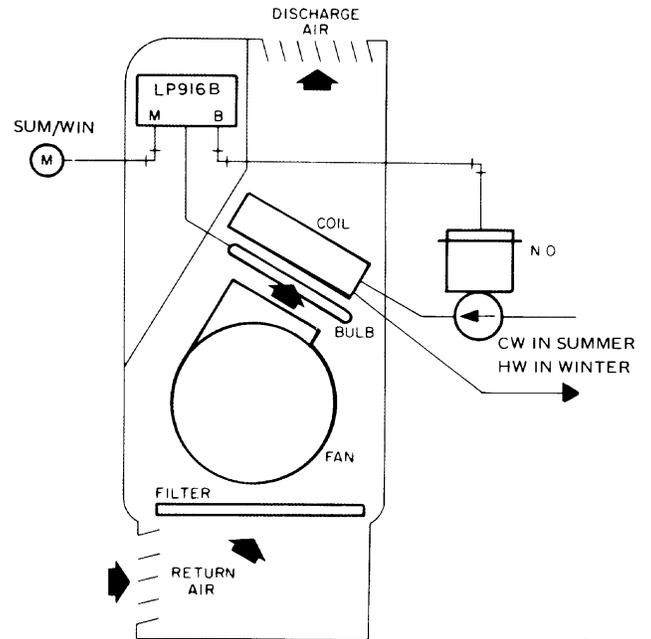
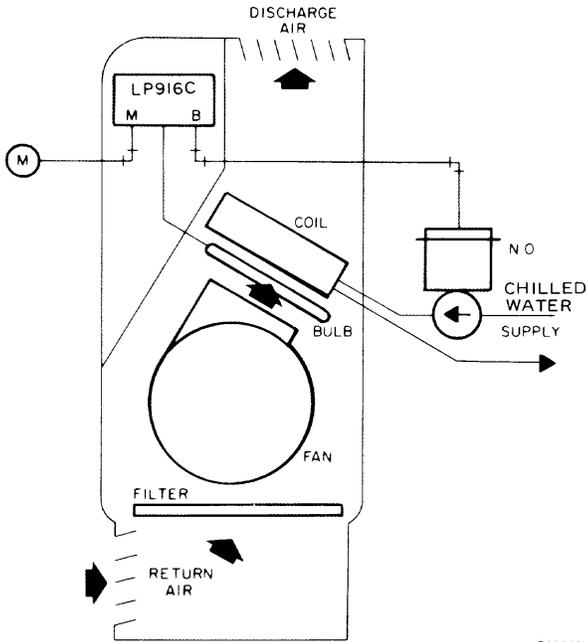


Fig. 3. Typical LP916B fan coil application, heating/cooling with seasonal changeover.





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Fig. 4. Typical LP916C fan coil application, cooling only.

SPECIFICATIONS

Models:

- LP916A: Direct Acting.
- LP916B: Reverse acting at 9 or 13 psi (62 or 90 kPa) supply pressure (Summer), direct acting at 18 psi (124 kPa) supply pressure (Winter).
- LP916C: Reverse Acting.

Maximum Safe Air Pressure:

25 psi (172 kPa).

Maximum Safe Temperature:

Duct-mounted models 190F (88C); all others 135F (57C).

Nominal Main-Line Pressure:

- LP916A & C: 18 psi (124 kPa).
- LP916B: 18 psi (124 kPa) heating, 9 or 13 psi (62 or 90 kPa) Cooling.

For other LP916 specifications refer to Table 1.

Table 1. LP916 Specifications.

| Model | Setpoint Range F/C | Throttling Range F/C | Restriction Size In. | Bulb Size Inches | Mounting Bracket |
|--|--------------------|----------------------|----------------------|------------------|------------------|
| LP916A1001  | 65-85F | 3.5F | 0.007 | 3/8 x 9 | Separate |
| LP916A1019 | 65-85F or 19-30C | 3.5F or 2C | 0.007 | 1/2 x 5 | Integral |
| LP916A1027  | 65-85F | 3.5F | 0.007 | 3/8 x 9 | Integral |
| LP916A1035  | 55-95F | 7.0F | 0.007 | 3/8 x 6-11/16 | Integral |
| LP916A1050  | 17-27C | 1.95C | 0.007 | 1/2 x 5 | Integral |
| LP916A1068  | 17-27C | 1.95C | 0.007 | 3/8 x 9 | Integral |
| LP916A1076  | 13-35C | 3.89C | 0.007 | 3/8 x 6-11/16 | Integral |
| LP916A1084  | 17-27C | 1.95C | 0.007 | 3/8 x 9 | Integral |
| LP916A1092  | 17-27C | 3.80C | 0.007 | 3/8 x 6-11/16 | Separate |
| LP916A1100  | 35-115F | 14.0F | 0.007 | 3/8 x 3-1/2 | Integral |
| LP916A1118  | 55-95F | 7.0F | 0.007 | 3/8 x 7 | Integral |
| LP916A1126 | 65-85F or 19-30C | 3.5F or 2C | 0.005 | 3/8 x 9 | Separate |
| LP916A1134 | 65-85F or 19-30C | 3.5F or 2C | 0.005 | 3/8 x 9 | Integral |
| LP916A1142  | 55-95F | 7.0F | 0.005 | 3/8 x 6-11/16 | Integral |
| LP916A1159  | 17-27C | 1.95C | 0.005 | 3/8 x 9 | Integral |
| LP916A1175 | 40-80F or 4-27C | 7.0F or 4C | 0.007 | 3/8 x 7 | Integral |
| LP916B1009  | 65-85F | 3.5F | 0.007 | 3/8 x 9 | Separate |
| LP916B1017 | 65-85F or 19-30C | 3.5F or 2C | 0.007 | 1/2 x 5 | Integral |
| LP916B1025  | 65-85F | 3.5F | 0.007 | 3/8 x 9 | Integral |
| LP916B1041  | 17-27C | 1.95C | 0.007 | 3/8 x 9 | Integral |
| LP916B1058 | 65-85F or 19-30C | 3.5F or 2C | 0.007 | 1/2 x 5 | Integral |
| LP916B1066  | 65-85F | 3.5F | 0.007 | 3/8 x 9 | Integral |
| LP916B1074 | 65-85F or 19-30C | 3.5F or 2C | 0.005 | 3/8 x 9 | Separate |
| LP916B1082 | 65-85F or 19-30C | 3.5F or 2C | 0.005 | 1/2 x 5 | Integral |
| LP916B1090  | 17-27C | 1.95C | 0.005 | 3/8 x 9 | Integral |
| LP916B1108 | 65-85F or 19-30C | 3.5F or 2C | 0.005 | 3/8 x 9 | Integral |
| LP916C1007  | 65-85F | 3.5F | 0.007 | 3/8 x 9 | Integral |
| LP916C1015  | 17-27C | 1.95C | 0.007 | 3/8 x 9 | Integral |
| LP916C1023 | 60-80F or 16-27C | 3.5F or 2C | 0.007 | 3/8 x 9 | Integral |
| LP916C1049  | 65-85F or 19-30C | 3.5F or 2C | 0.007 | 1/2 x 5 | Integral |
| LP916C1072  | 35-115F | 14.0F | 0.007 | 3/8 x 3-1/2 | Integral |
| LP916C1080  | 55-95F | 7.0F | 0.007 | 3/8 x 7 | Integral |
| LP916C1098 | 65-85F or 19-30C | 3.5F or 2C | 0.005 | 3/8 x 9 | Integral |
| LP916C1114  | 40-80F or 4-27C | 7.0F or 4C | 0.007 | 3/8 x 7 | Integral |

 Inactive or obsolete.

OPERATION

LP916A (Direct Acting)

When temperature at the sensing element falls below setpoint of the LP916A, branchline pressure to the normally open (n.o.) valve is lowered, and the valve is modulated open to maintain setpoint temperature.

LP916B (Reverse/Direct Acting)

With main-line pressure at 13 psi (90 kPa) for all except LP916B1058 which requires 9 psi (62 kPa), the LP916B operates reverse acting. As the sensed temperature increases, the branchline pressure decreases and chilled water flow increases with a n.o. valve.

With a high main-line pressure of 18 psi (124 kPa) or above, the LP916B operates direct acting. As the sensed temperature increases, the branchline pressure increases and hot water flow decreases with a n.o. valve.

LP916C (Reverse Acting)

When the LP916C is used with a normally open valve for cooling, branchline pressure drops with a rise in sensed air temperature and the n.o. valve is modulated open to maintain setpoint temperature.

MAINTENANCE

EQUIPMENT REQUIRED

- Commercial Cleaning Solvent or Degreaser.
- Gage Adaptor CCT729A.
- Gage 305965, 0 to 30 psi.
- 5/64-inch Hex wrench.

WARNING

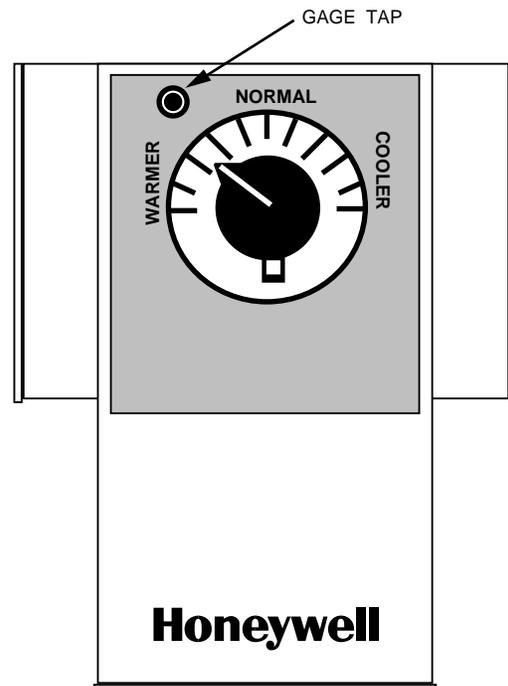
Careless handling of solvents can result in permanent damage to the respiratory system or skin. Avoid prolonged inhalation of vapors or contact with skin.

CLEANING

Remove cover. Use cleaning solvent to clean all surfaces. Clean the element and capillary tubing, making certain neither is damaged or kinked. Do not bend the capillary tubing in a short radius.

OPERATIONAL CHECK

Use gage adaptor. Insert the gage into the gage tap (Fig. 5) on the front of the device. Set main-line pressure to 18 psi (124 kPa), or 13 psi (90 kPa) for LP916B Summer application. Slowly turn the setpoint knob above and below bulb ambient temperature. The branchline pressure should vary from 3 to 13 psi (21 to 90 kPa) pressure, or 13 to 3 psi (90 to 21 kPa) for reverse acting application within the rated throttling range. If operation is not satisfactory, recalibrate and recheck (see CALIBRATION). Turning the knob to above 13 psi (90 kPa) should build branch line to within 2 psi (14 kPa) of main.



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Fig. 5. LP916 Gage tap location.

CALIBRATION CHECK

Set setpoint knob to temperature measured at bulb location. Branchline pressure should be 8 ± 1 psi (55 ± 7 kPa).

CALIBRATION

LP916A & C

- ❶ Apply 18 psi (124 kPa) main-line pressure.
- ❷ Measure temperature at sensing bulb location.
- ❸ Remove setpoint knob using 5/64-in hex wrench to loosen setscrew.
- ❹ Rotate setpoint shaft to achieve 8 psi (55 kPa) branchline pressure. Allow enough time for pressure build-up.
- ❺ Replace the knob and position the pointer to correspond to the temperature sensed by the remote bulb.

LP916B

- ❶ For direct action, follow Steps 1 through 5 for LP916A and C.
- ❷ For reverse action (except LP916B1058), apply 13 psi (90 kPa) main-line pressure. For the LP916B1058, apply 9 psi (62 kPa) main-line pressure.
- ❸ Adjust switchover lever stop (Fig. 6) to achieve 8 psi (55 kPa) branchline pressure when the setpoint knob is set to measured bulb temperature. For the LP916B1058 model, branchline pressure should be 6 psi (41 kPa).

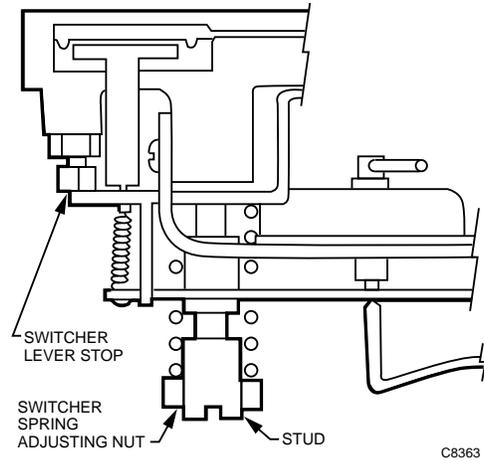
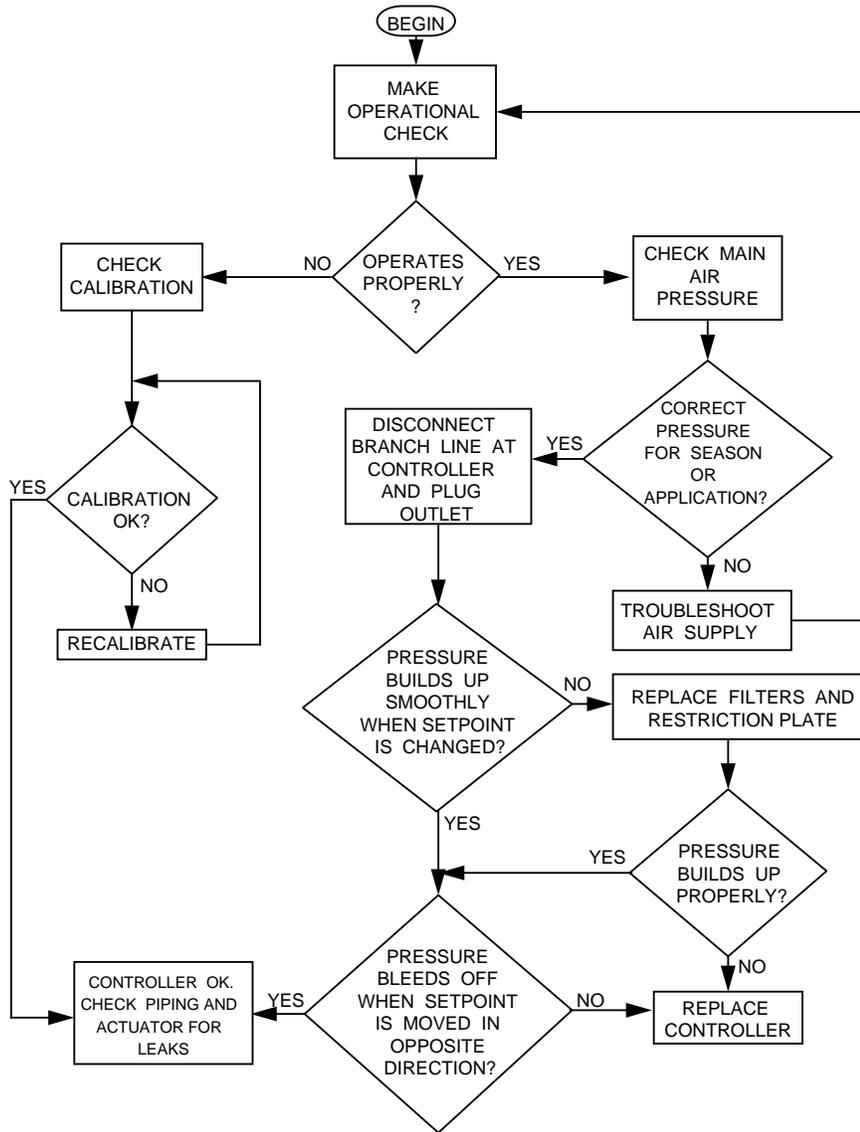


Fig. 6. LP916B Automatic switchover mechanism.

TROUBLESHOOTING

Before troubleshooting the LP916, check branchline piping and actuators for leaks.

Refer to Figure 7 to troubleshoot the LP916 Thermostat.



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Fig. 7. LP916 Troubleshooting flowchart.

REPAIR

The only repair recommended for the LP916 is the replacement of the plate and tube assembly, gaskets, restriction plate, and filters with connector assembly and gasket. Since February 1984, models have a different connector assembly with a single gasket, these are included in Repair Kit 14003113-002, as shown in Figure 8. All available parts are listed in the PARTS AND ACCESSORIES section.

EQUIPMENT REQUIRED

Gulmite Head Screw Wrench 316744-00021.

14003113-002 REPAIR KIT INSTALLATION

- 1 Turn off system air and remove LP916 from system.
- 2 Remove and save the three No. 8-32 x 7/16-in. pan head screws from the connector assembly (Fig. 8) or plate and tube assembly (Fig. 9 or 10).
- 3 Lift off the connector assembly and gasket or plate and tube assembly, restriction gasket, restriction plate, body gasket, and two filters and discard.
- 4 Place new gasket on body and align screw holes.
- 5 Position the new connector assembly on gasket and align screw holes. A 0.007 in. restriction may be used for models with a 0.005 in. restriction with no effect on operation except a slightly higher air consumption. If air consumption is a problem, connector assembly with a 0.005 in. restriction may be ordered and substituted.
- 6 Insert and tighten the three screws.
- 7 Make operational check (See OPERATIONAL CHECK).

NOTE: For 14003113-001 Repair Kit follow directions on package.

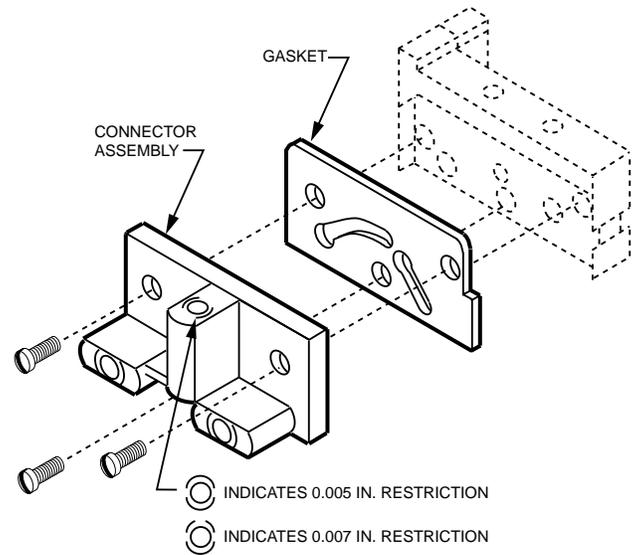


Fig. 8. Repair kit 14003113-002 (0.007 in. restriction included in kit).

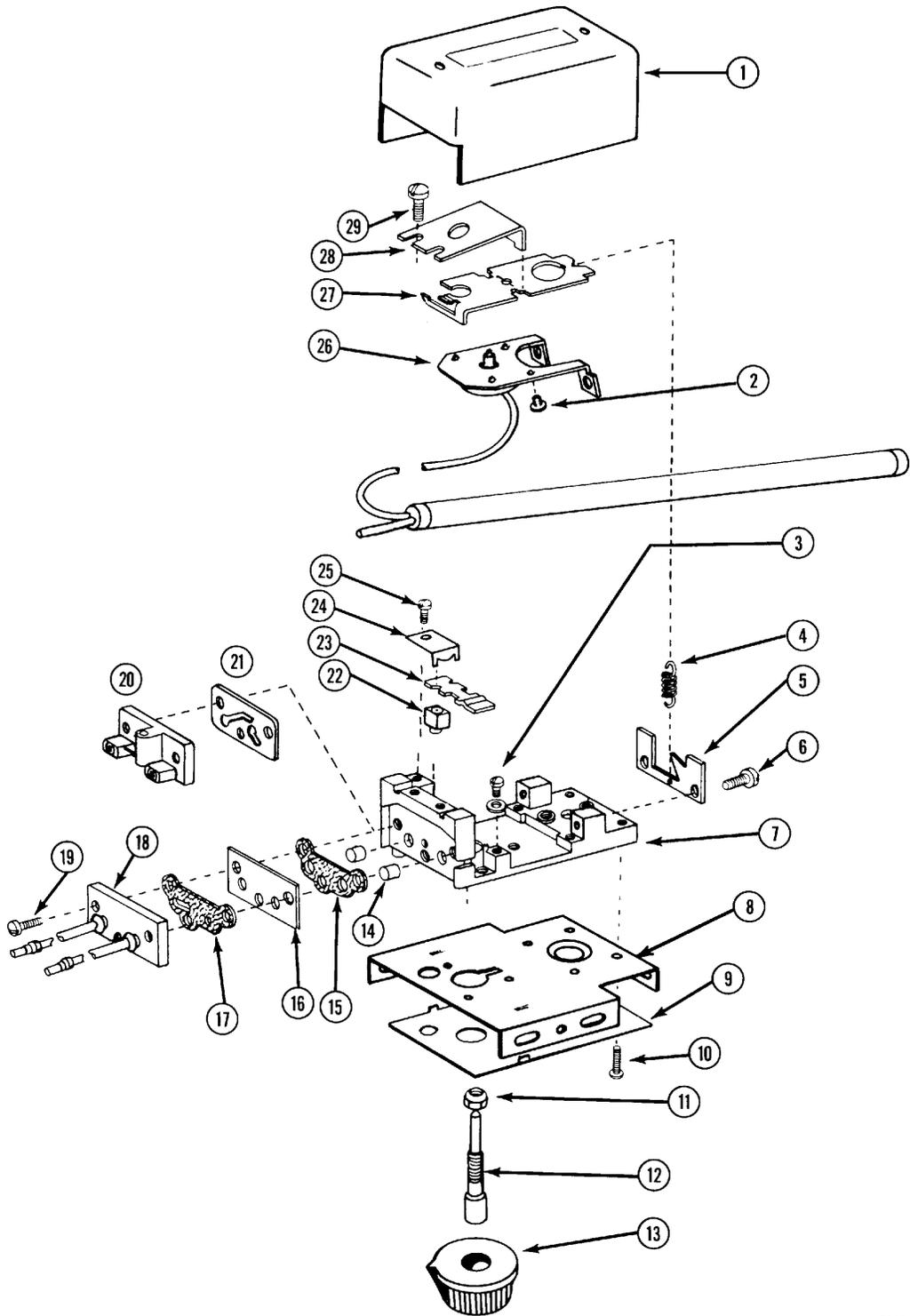
PARTS AND ACCESSORIES

PARTS LIST

See Figure 9 for LP916A & C exploded view and Figure 10 for LP916B exploded view. See Tables 2 and 3 for LP916A & C parts list and Tables 3 and 4 for LP916B parts list.

Table 2. LP916A and C Parts list (Fig. 9).

| Key | Part No. | Description |
|-----|--------------|--|
| 1 | 316294 | Cover |
| 2 | — | 6-32 x 3/16 in. rd-hd slotted screw |
| 3 | — | 6-32 x 1/4 in. pan-hd slotted screw with washer (2) |
| 4 | — | Spring |
| 5 | — | Plate |
| 6 | — | 6-32 x 0.31 (5/16) in. rd-hd slotted screw with washer (2) |
| 7 | — | Base |
| 8 | — | Baseplate |
| 9 | — | Scaleplate |
| 10 | — | 8-32 x 5/16 in. slotted pan-hd screw (7) |
| 11 | — | Palnut |
| 12 | — | Setpoint Shaft |
| 13 | — | Knob (includes 8-32 x 5/16 in. hex socket setscrew). Use 5/64 in. key to tighten. |
| 14 | 14003113-001 | Repair Kit—Consists of Filters, Body Gasket, 0.007 Restriction, and Restriction Gasket |
| 15 | — | Filters (2) |
| 16 | — | BodyGasket |
| 17 | — | 0.007 Restriction Plate |
| 18 | — | Restriction Gasket |
| 19 | — | Plate and Tube Assembly |
| 20 | 14004378-001 | 8-32 x 7/16 in. pan-hd slotted screw (3) |
| | 14004378-002 | Connector Assembly (0.007) |
| 21 | 14004376-001 | Connector Assembly (0.005) |
| | 14003113-002 | Gasket |
| 22 | — | Repair Kit—Consists of 14004378-001 Connector Assm. (0.007) & 14004376-001 Gasket |
| 23 | — | Nozzle |
| 24 | — | Flapper |
| 25 | — | Spring |
| 26 | — | 4-40 x 3/16 rd-hd slotted screw |
| | 316372A | Element and Lever Assembly (see Table 3) |
| | 316372B | Element and Lever Assembly (see Table 3) |
| | 316372C | Element and Lever Assembly (see Table 3) |
| 27 | — | Lever (LP916A) |
| | — | Lever (LP916C) |
| 28 | — | Spring |
| 29 | — | 8-32 x 5/16 in. pan-hd slotted screw with star lockwasher |



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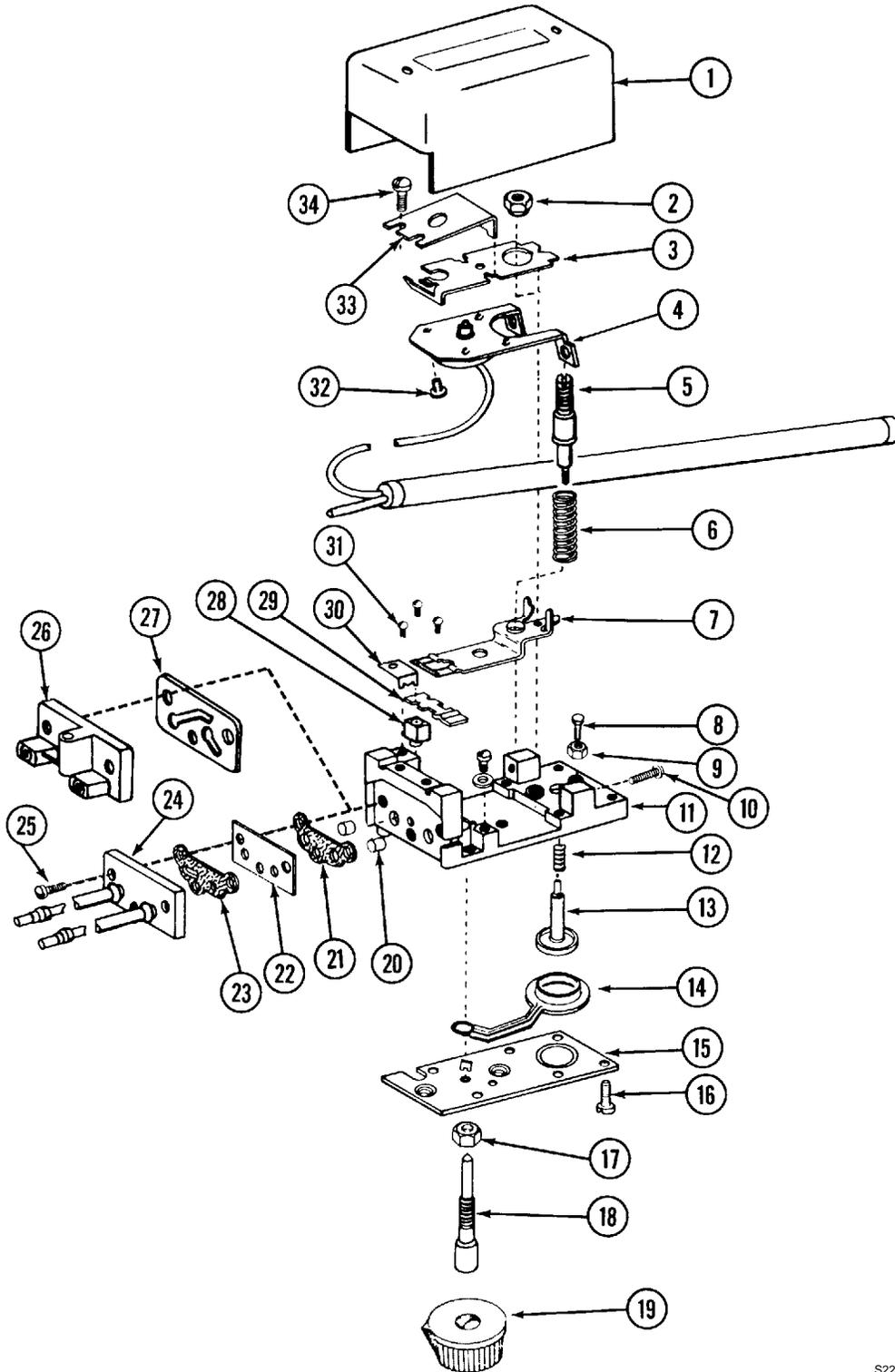
Fig. 9. LP916A and C Exploded view (See Tables 2 and 3).

Table 3. LP916A-C Element and lever assemblies.

| Assembly Part No. | Part No. | Bulb Size in. (mm) |
|-------------------|---|----------------------------|
| 316372A | A1001, A1027, A1068, B1009, B1025, B1041, B1066, C1007, C1023 | 3/8 x 9-1/2 (9.5 x 241) |
| 316372B | A1019, B1017, B1058, C1049 | 1/2 x 5-3/4 (13 x 146) |
| 316372Ç | A1035, A1076, A1118, A1126, A1134, A1142, A1159, A1175, B1074, B1082, B1090, B1108, C1080, C1098, C1114 | 3/8 x 6-3/4 (10 x 172) |

Table 4. LP916B Parts list (Fig. 10).

| Key | Part No. | Description |
|-----|-------------------------------|---|
| 1 | 316294 | Cover |
| 2 | — | Nut |
| 3 | — | Lever |
| 4 | 316372A 316372B 316372C | Element and Lever Assembly (see Table 3) Element and Lever Assembly (see Table 3) Element and Lever Assembly (see Table 3) |
| 5 | — | Stud |
| 6 | — | Spring |
| 7 | — | Lever |
| 8 | — | 4-48 x 3/16 in. hex-hd screw |
| 9 | — | 4-48 nut |
| 10 | — | 8-32 x 0.31 (5/16) in. rd-hd slotted screw with washer (2) |
| 11 | — | Base |
| 12 | — | Spring |
| 13 | — | Disc Assembly |
| 14 | — | Diaphragm |
| 15 | — | Baseplate |
| 16 | — | 8-32 x 5/16 in. slotted pan-hd screw (7) |
| 17 | — | Palnut |
| 18 | — | Setpoint Shaft |
| 19 | 316732 14003113-001 | Knob (includes 8-32 x 5/16 in. hex socket setscrew). Use 5/64 in. key to tighten. Repair Kit—Consists of Filters, Body Gasket, 0.007 Restriction, and Restriction Gasket |
| 20 | — | Filters (2) |
| 21 | — | BodyGasket |
| 22 | — | 0.007 Restriction Plate |
| 23 | — | Restriction Gasket |
| 24 | — | Plate and Tube Assembly. |
| 25 | — | 8-32 x 7/16 in. pan-hd slotted screw |
| 26 | 14004378-001 14004378-002 | Connector Assembly (0.007) Connector Assembly (0.005) |
| 27 | 14004376-001 14003113-002 | Gasket Repair Kit—Consists of 14004378-001 Connector Assm. (0.007) & 14004376-001 Gasket |
| 28 | — | Nozzle |
| 29 | — | Flapper |
| 30 | — | Spring |
| 31 | — | 4-40 x 3/16 in. rd-hd slotted screw (3). |
| 32 | — | 6-32 x 3/16 in. rd-hd slotted screw |
| 33 | — | Spring |
| 34 | — | 8-32 x 5/16 in. pan-hd slotted screw with star lockwasher (2) |



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Fig. 10. LP916B Exploded view.

ACCESSORIES

- ① Gage 305965 (0 to 30 psi).
- ② Gage Adaptor MQP729.
- ③ Internal Mounting Bracket AK3993.
- ④ Mounting Kits for fan coil units:
 - 316016A with small bracket.
 - 316016B with full length bracket.
 - 316016C with scaleplate, knob, and mounting screws only.

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