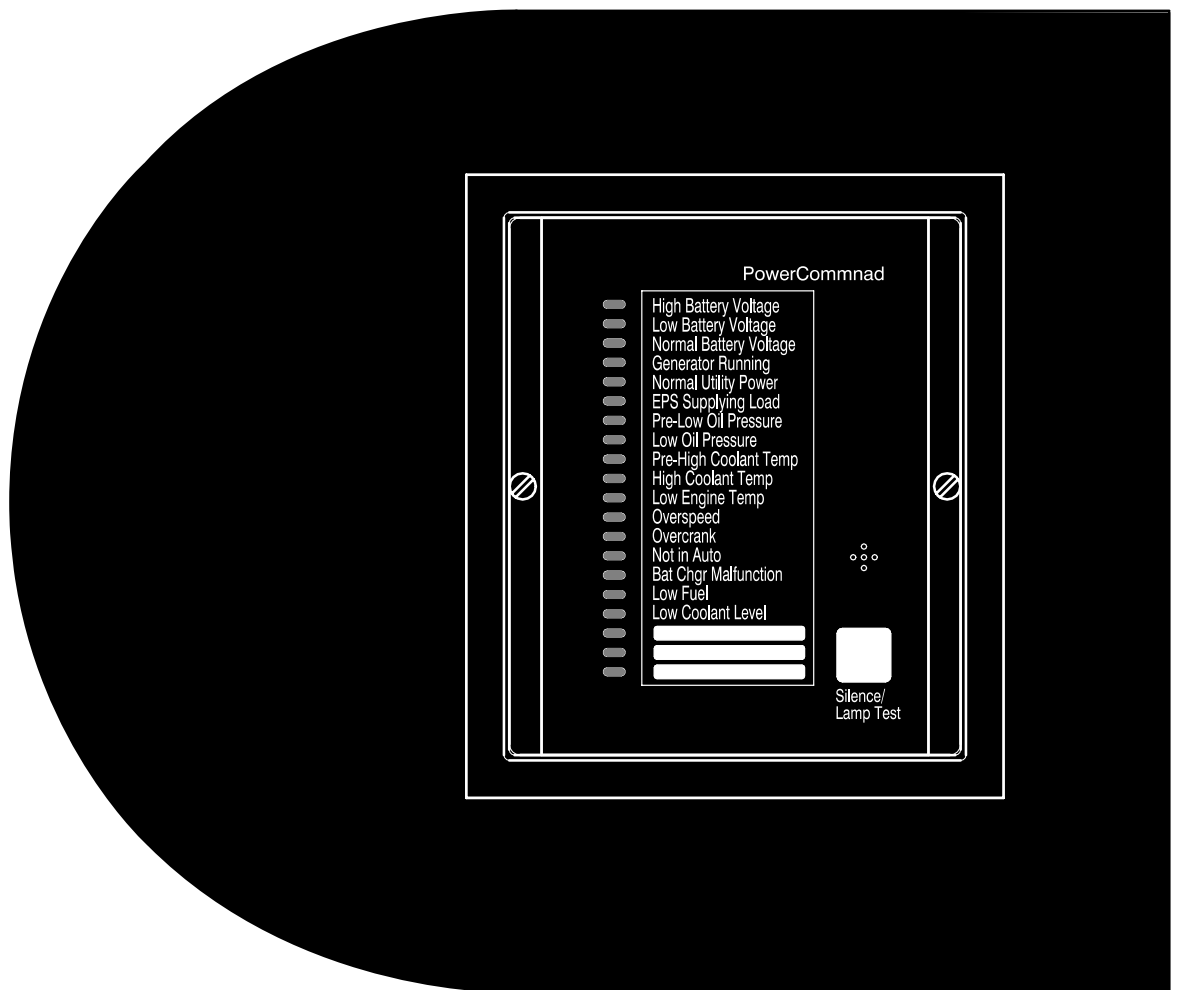


Operator's Manual

300-4510 ANN (Negative Signal)

300-4511 ANP (Positive Signal)

Remote Alarm Annunciators



Safety Precautions

⚠WARNING *High voltage is deadly. Installation and service of the alarm annunciator involves working with high voltage equipment. Installation and service must be performed by qualified personnel. Disconnect the utility line from the transfer switch and disconnect power from the battery charger, day tank and any other power equipment where connections are to be made.*

⚠WARNING *Accidental starting of the generator set while working on it can cause severe injury or death. Disconnect the battery cables to prevent accidental starting. Always disconnect the negative (-) cable first, and connect it last, to prevent arcing if a tool accidentally touches the frame or other grounded metal parts of the set while connecting or disconnecting the positive (+) cable. Arcing can ignite explosive hydrogen gas given off by the battery and cause severe injury.*

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Introduction

ABOUT THIS MANUAL

This manual provides information for operating, installing, selecting customer options and troubleshooting the remote alarm annunciator. A parts list is also included for all available service parts. Study this manual carefully and observe all warnings and cautions. Installing the control properly will contribute to better performance and safer operation.

HOW TO OBTAIN SERVICE

When the remote alarm annunciator requires servicing, contact the nearest dealer or distributor. Factory-trained Parts and Service representatives are ready to handle all your service needs.

If you are unable to locate a dealer or distributor, consult the Yellow Pages. Typically, our distributors are listed under:

GENERATORS-ELECTRIC or
ELECTRICAL PRODUCTS

For the name of your local Cummins Power Generation distributor in the United States or Canada, call 1-800-888-6626 (this automated service utilizes touch-tone phones only).

For outside North America, call Cummins Power Generation at 1-763-574-5000, 7:30 AM to 4:00 PM, Central Standard Time, Monday through Friday. Or, send a fax using the fax number 1-763-574-8087.

WARNING

INCORRECT SERVICE OR PARTS REPLACEMENT CAN RESULT IN SEVERE PERSONAL INJURY, DEATH, AND/OR EQUIPMENT DAMAGE. SERVICE PERSONNEL MUST BE QUALIFIED TO PERFORM ELECTRICAL AND/OR MECHANICAL SERVICE.

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Description

GENERAL

The series ANP and ANN remote alarm annunciators (Figure 1) provide lamps and a horn to announce the operating status and fault conditions of an emergency power system. ANP annunciators are positive (+) signal, and ANN annunciators are negative (–) signal devices. They are designed for connections to 12 VDC or 24 VDC control systems. Make certain that the polarity and voltage of the annunciator match that of the emergency power system.

OPERATION

- Normal status is announced by the NORMAL UTILITY POWER and NORMAL BATTERY VOLTAGE lamps.
- Table 1 lists the conditions monitored by the annunciator and the corresponding lamp/horn signals.
- Push the SILENCE–LAMP TEST button to silence the horn. Several annunciators serving one emergency power system can be interconnected so that all the horns can be silenced from any location. Subsequent faults will cause the horn to sound again.
- All test lamps should light when the SILENCE–LAMP TEST button is pressed.
- Pressing the SILENCE–LAMP TEST button does not reset the switch or sensor that is providing the fault signal. Correct the fault and the annunciator lamp will then go out.

⚠WARNING *Faulty service of the equipment monitored by the annunciator can lead to severe injury or death from electrocution and equipment or property damage due to fire. Service must be performed by qualified personnel.*

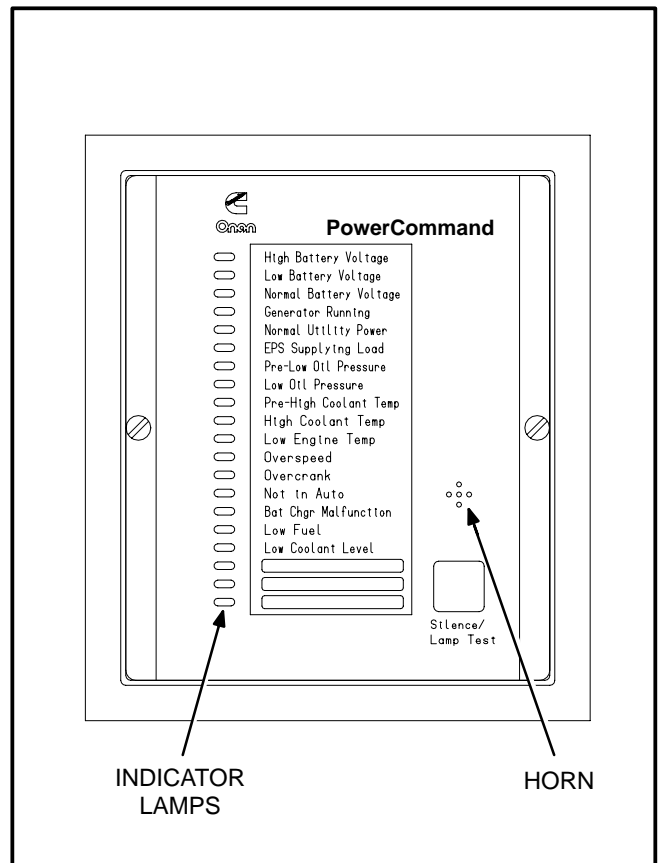


FIGURE 1. ANNUNCIATOR

TABLE 1. ANNUNCIATOR CONDITIONS MONITORED

INPUT TERMINAL (STANDARD LEGEND)	LAMP COLOR ⁴	CONDITION INDICATED	HORN
TB2-1 (High Battery Voltage ¹)	Red	Battery voltage too high (overcharging)	No
TB2-2 (Low Battery Voltage ¹)	Red	Battery voltage too low (charger failure)	No
TB2-3 (Normal Battery Voltage ¹)	Green	Battery voltage OK	No
TB1-4 (Generator Running)	Green	Generator has output voltage	No
TB1-5 (Normal Utility Power)	Green	Utility power supplying the load	No
TB1-6 (EPS Supplying Load)	Green	GenSet supplying the load	No
TB1-7 (Pre-Low Oil Pressure)	Yellow ²	Oil Pressure approaching Minimum	Yes ³
TB1-8 (Low Oil Pressure)	Red ²	GenSet has shut down due to low oil pressure	Yes ³
TB1-9 (Pre-High Coolant Temp)	Yellow ²	Engine coolant approaching maximum temp.	Yes ³
TB1-10 (High Coolant Temp)	Red ²	GenSet has shut down due to high coolant temp.	Yes ³
TB1-11 (Low Engine Temp)	Red ²	Engine coolant heater has malfunctioned	Yes ³
TB1-12 (Overspeed)	Red ²	Engine has shut down due to overspeed	Yes ³
TB1-13 (Overcrank)	Red ²	Engine fails to start after full cranking cycle	Yes ³
TB1-14 (Not in Auto)	Red ²	Switch on control not in Auto position – GenSet will not start automatically	Yes ³
TB1-15 (Bat Chgr Malfunction)	Red ²	Battery charger is signaling a failure	No ³
TB1-16 (Low Fuel)	Red ²	Fuel Level below preset minimum	Yes ³
TB2-4 (Low Coolant Level)	Red ²	Coolant level below preset minimum	Yes ³
TB1-17 (Customer Fault 1)	Red ²	Customer selected fault condition	Yes ³
TB2-5 (Customer Fault 2)	Red ²	Customer selected fault condition	Yes ³
TB2-6 (Customer Fault 3)	Red ²	Customer selected fault condition	Yes ³

Notes:

1. Preset for High, Low and Normal Battery indication. Customer selected inputs can be used in place of these indications. Refer to Customer Options.
2. Annunciator lamp can be flashed with a 0.3 to 3 Hz square wave input signal. Refer to Customer Options and Signal Level Requirements.
3. Preset horn operation is shown. Horn annunciation is selectable, refer to Customer Options.
4. The lamps are all replaceable and the lamp colors can be changed.

Signal Level Requirements

Positive: At least 5 volts DC, but not more than 50 volts DC.

Negative: Inputs are at 12/24 VDC when open, external contact must sink 35 mA at 1 VDC or less for proper alarm operation.

Battery Voltage Specification

Low Battery Voltage Setting: 12.5 ± 0.5 VDC for 12-volt system; 25 ± 1 VDC for 24-volt system

High Battery Voltage Setting: 16 ± 0.5 VDC for 12-volt system; 32 ± 1 VDC for 24-volt system

Installation

1. Remove the junction box from the back of the annunciator and mount the box securely to the wall at the desired location (Figure 2). For flush mounting, the front edges of the box should be flush with the surface of the wall. Be sure to check for wiring or plumbing behind the wall before cutting or drilling.
2. Before making any wiring connections, disconnect the utility line from the transfer switch. Make sure the genset cannot start by pressing the RUN/STOP switch to STOP and by disconnecting the starting battery (negative [-] battery cable first). Disconnect the power to the battery charger. See the *Safety Precautions* section.
3. Route the wiring from the annunciator to the genset, transfer switch and battery charger (Figure 3). Refer to Table 2 for wire gauge size vs. distance. Do not route wiring in the same conduit as AC wiring. Allow pigtails of at least 12 inches (304 mm) at each end for connections.
4. Connect the auxiliary switches of the transfer switch, the battery charger malfunction switch and the customer faults to GROUND for negative signal ANN annunciators and to B+ for positive signal ANP annunciators (Figure 3).
5. When two or more annunciators serve the same emergency power system, interconnect all the terminals marked TB1-20 so that the horns can all be silenced and lamps tested from any location.
6. When the wiring is complete, secure the annunciator to the junction box with the screws provided with the annunciator.
7. Reconnect the utility line to the transfer switch, reconnect battery (negative [-] battery cable last), reconnect battery charger and return the generator set to automatic standby.
8. Push the SILENCE-LAMP TEST button. All indicator lamps should light.

TABLE 2. MAXIMUM WIRE LENGTH BETWEEN GENERATOR SET AND ANNUNCIATOR

Wire* Size (AWG)	Distance In Feet (One Way)	
	12V	24V
18	625 (190m)	2130 (650m)
16	1000 (305m)	3400 (1036m)
14	1600 (488m)	5400 (1646m)

* Copper Wire

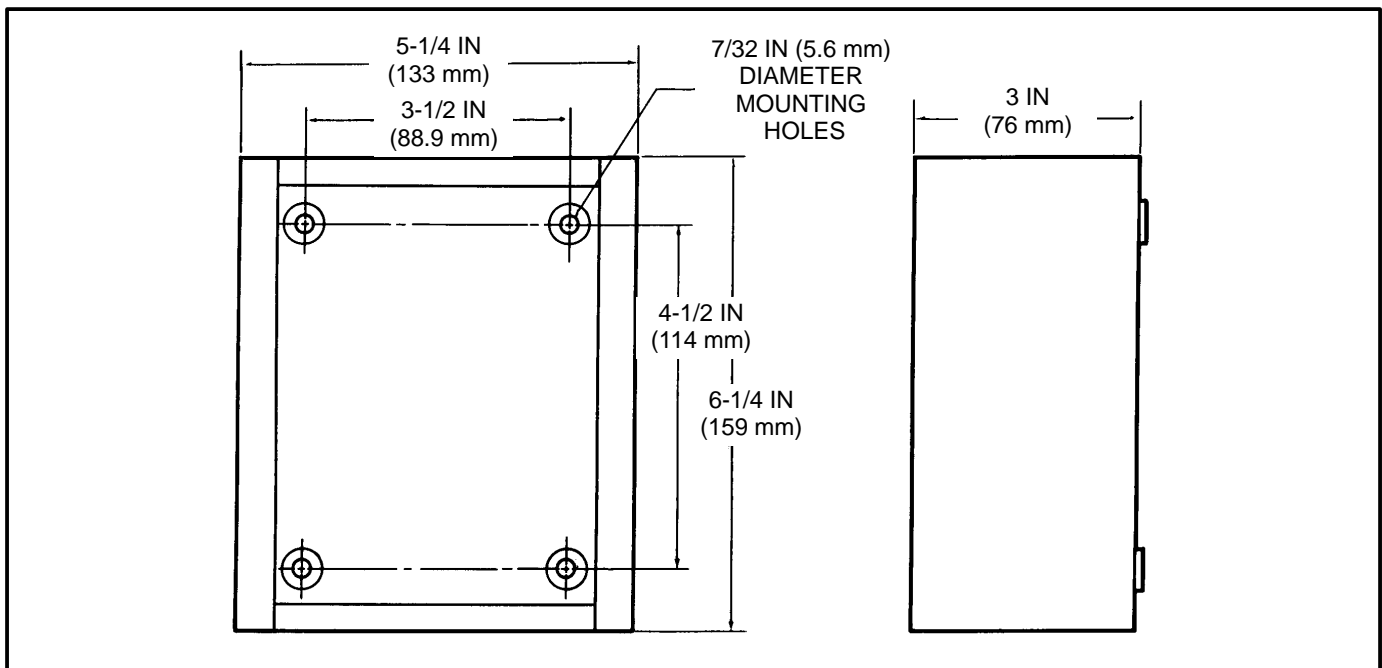
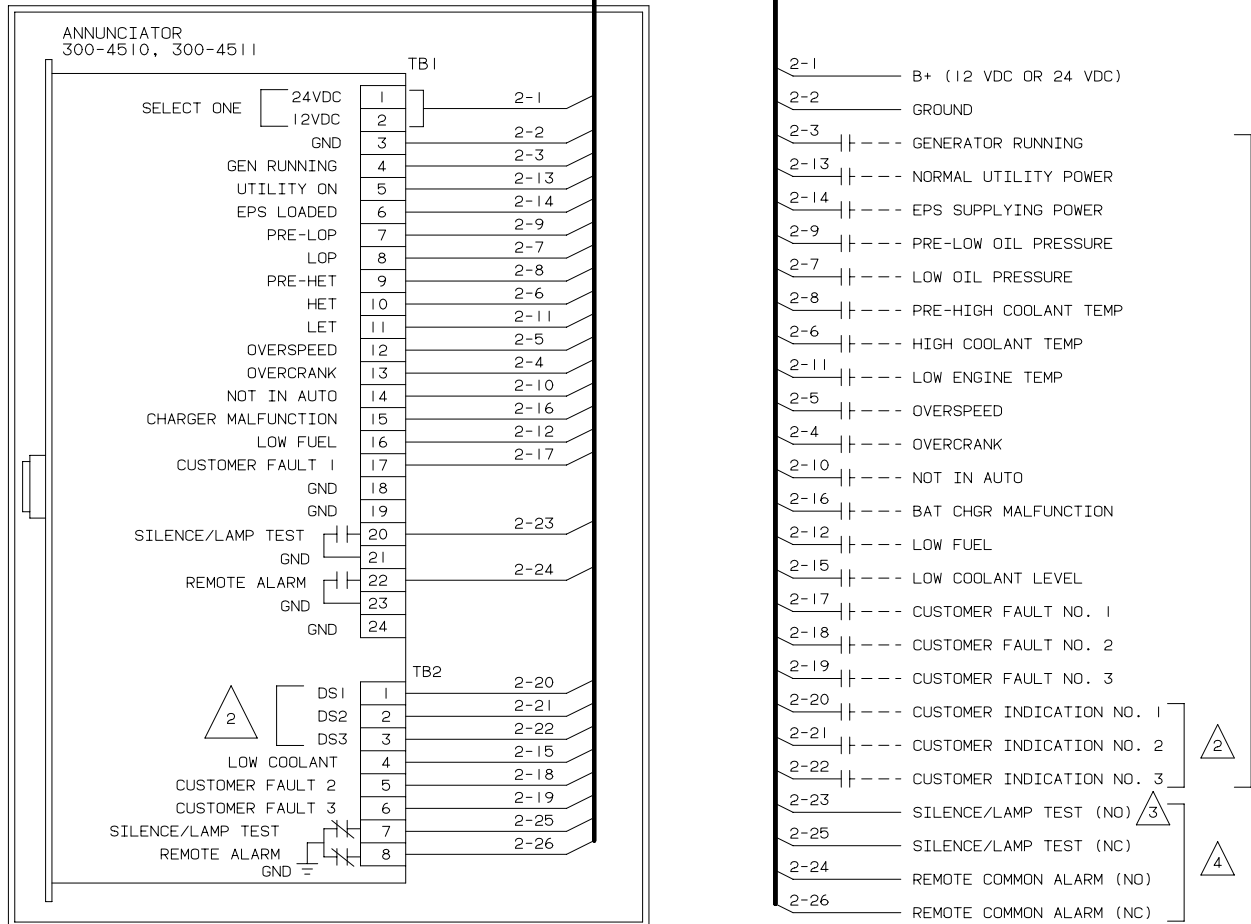


FIGURE 2. ANNUNCIATOR BOX OUTLINE



NOTES:

1. CONNECT TO GND (2-2) FOR 0300-4510
CONNECT TO B+ (2-1) FOR 0300-4511
2. CUSTOMER INDICATIONS ARE OPTIONAL. INTERNAL DIP SWITCH SELECTION IS REQUIRED AND THE BATTERY VOLTAGE INDICATION WILL BE LOST.
3. SILENCE/LAMP TEST (NO) SERVES AS BOTH INPUT AND OUTPUT FOR THE ALARM SILENCE AND LAMP TEST SIGNAL. CONNECT TO LIKE TERMINALS ON EACH ANNUNCIATOR.
4. REMOTE COMMON ALARM & SILENCE/LAMP TEST CONTACTS.
CONTACT RATING----- 2A @ 30 VDC.
TRACE RATING----- 2A TOTAL FROM ALL RELAY CONTACTS.
5. SEE GENSET WIRING DIAGRAM TO VERIFY GENSET INTERCONNECTION. FOR ONAN GENSETS SEE WIRING DIAGRAM (0630-1345)

FIGURE 3. INTERCONNECTION DIAGRAM

Customer Options

OPTIONS

Modifications can be made to change some annunciator lamp and alarm indications. The individual LED lamp bars can be replaced to change color or for service repair (see Annunciator Lamp Replacement). Also customer indications and customer faults can be added. The annunciator has connections for remote Silence/Lamp Test and Remote Alarm. The following sections describe how to make modifications and utilize optional features.

Annunciator Alarm Modification

Each of the bottom 14 annunciator audible alarms can be individually set to ON or OFF. Setting the individual switch (specified in Table 3) to the ON position allows the fault to turn the audible alarm on. Setting the individual switch to the OFF position turns the audible alarm feature off. Refer to Figure 4 for switch location and settings.

TABLE 3. AUDIBLE ALARM SETTINGS

INPUT TERMINAL (FAULT LEGEND)	AUDIBLE ALARM SWITCH
TB1-7 (Pre-Low Oil Pressure)	S1-8
TB1-8 (Low Oil Pressure)	S1-7
TB1-9 (Pre-High Coolant Temp)	S1-6
TB1-10 (High Coolant Temp)	S1-5
TB1-11 (Low Engine Temp)	S1-4
TB1-12 (Overspeed)	S1-3
TB1-13 (Overcrank)	S1-2
TB1-14 (Not In Auto)	S1-1
TB1-15 (Bat Chgr Malfunction)	S2-6
TB1-16 (Low Fuel)	S2-5
TB2-4 (Low Coolant Level)	S2-3
TB1-17 (Customer Fault 1)	S2-4
TB2-5 (Customer Fault 2)	S2-2
TB2-6 (Customer Fault 3)	S2-1

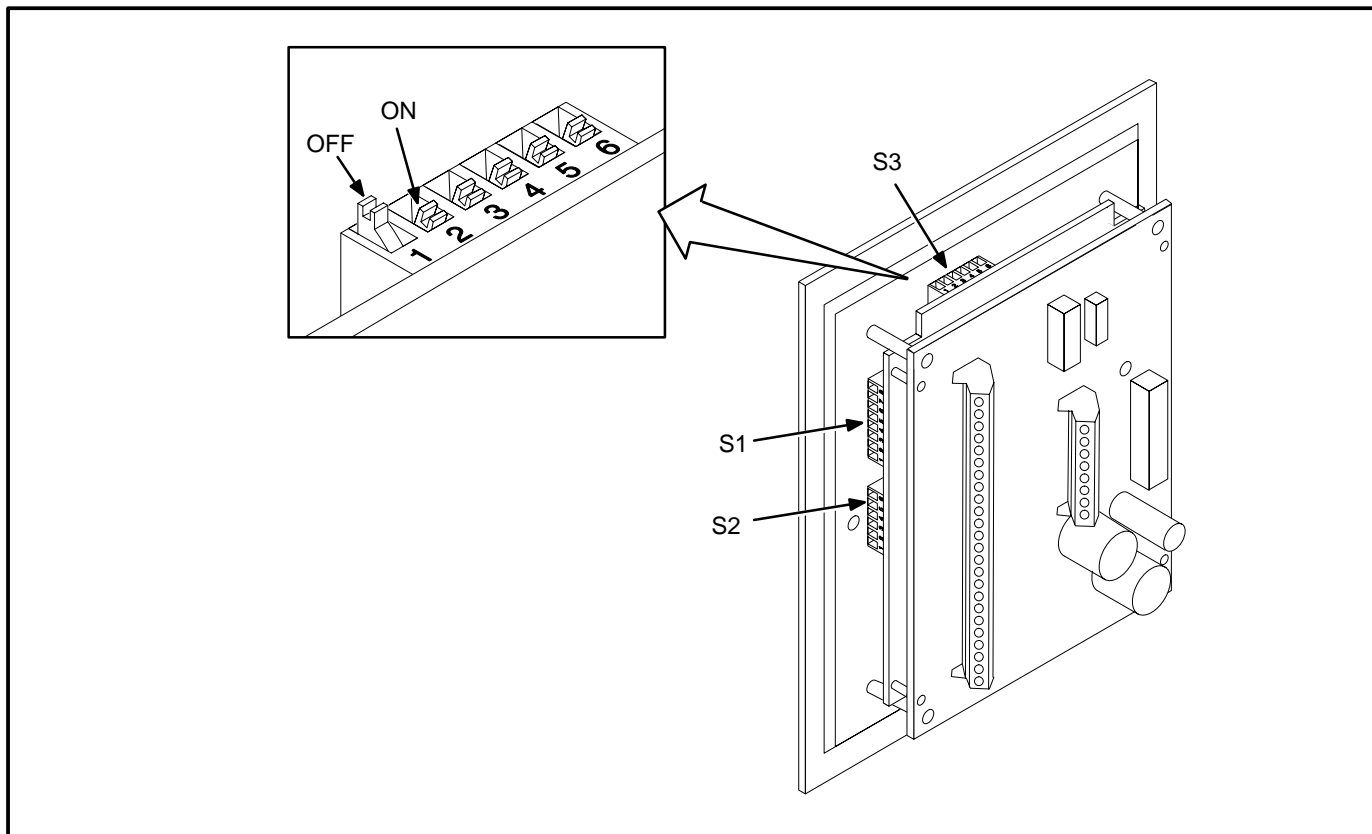


FIGURE 4. MODIFICATION SWITCH LOCATIONS

Annunciator Lamp Modification

The customer can supply flashing inputs for each of the lamps. For proper fault alarming, the bottom 14 lamps (TB1-7 thru TB1-17 and TB2-4 thru TB2-6) must receive a square wave input signal of 0.3 to 3 Hz. Refer to Figure 3 and Table 1.

Annunciator Lamp Replacement

To access the lamps, remove the annunciator panel from the control box. Disconnect the ribbon cable connector J4 from the PCB assembly and remove the PCB assembly mounting screws (Figure 5). Pull the old lamp out from the socket. Insert the new lamp making sure the polarizing dot on the replacement lamp is aligned with the corresponding dot on the printed circuit board (Figure 5).

Customer Faults

Three customer faults are available for annunciation (both light and audible alarm) of the customers specified conditions. Add the fault description to the control panel. Refer to Figure 3 for interconnect locations.

Customer Indication

The High, Low, or Normal Battery Voltage indications can be replaced with customer specified indications (light indication only). Add the fault description to the control panel. Refer to Figure 3 for interconnect locations. Change the S3 switch settings as shown in Table 4 to change from the standard battery voltage indications to customer specified indications.

TABLE 4. CUSTOMER INDICATION SWITCH S3 SETTINGS

INDICATION LEGEND (LAMP)	S3 SWITCH SETTINGS
Customer Indication 1 (DS-1)	S3-1 OFF S3-4 ON
Customer Indication 2 (DS-2)	S3-3 OFF S3-6 ON
Customer Indication 3 (DS-3)	S3-2 OFF S3-5 ON

Note: Switch settings are reversed to use the High, Low or Normal Battery Voltage indications.

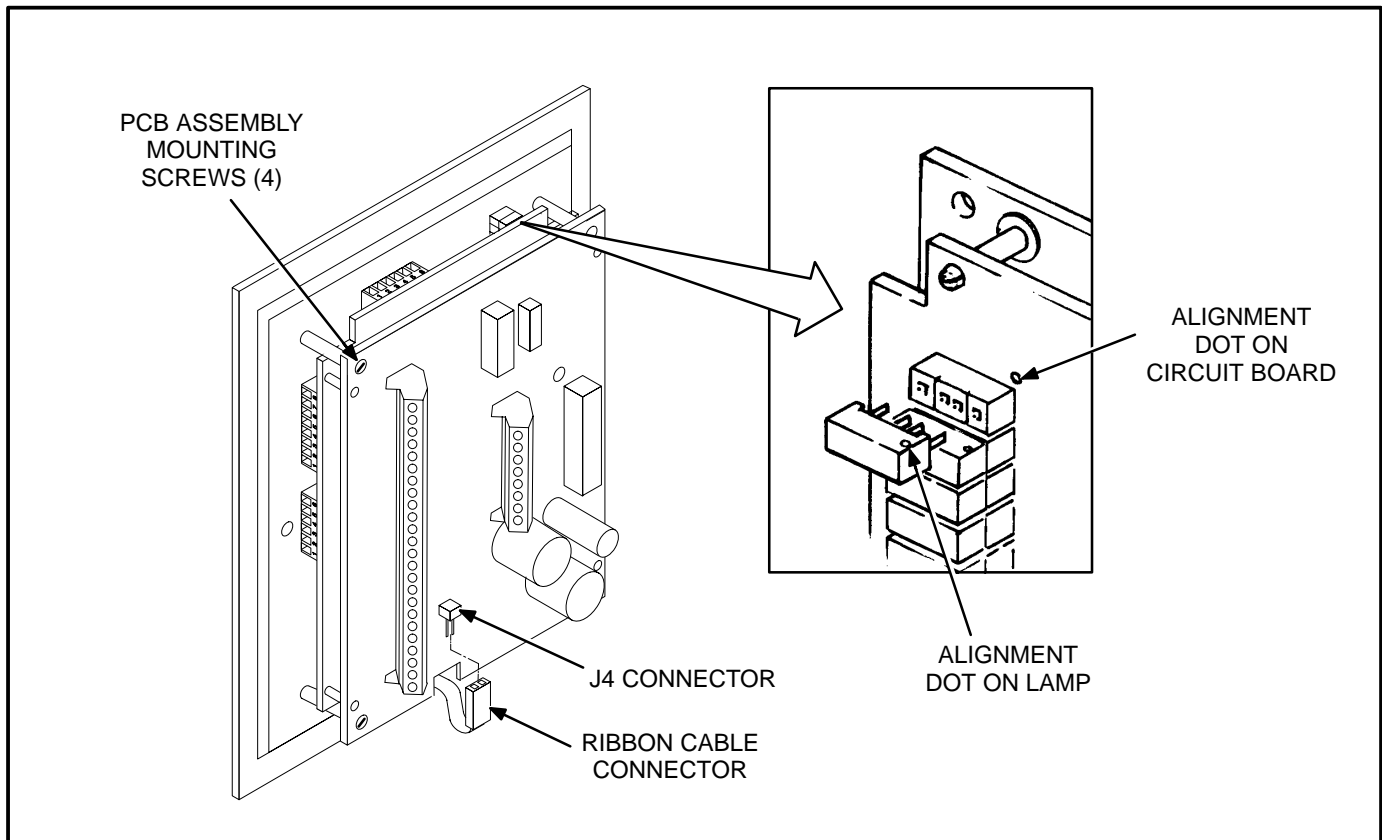


FIGURE 5. MODIFICATION SWITCH LOCATIONS

Remote Silence/Lamp Test

Two remote Silence/Lamp Test connections are available (refer to Figure 3). One Silence/Lamp Test has normally open contacts (connection TB1-20) and is used as both input and output for the Silence/Lamp Test function. The other Silence/Lamp Test has normally closed contacts (connection TB2-7) and can only be used as an output for the Silence/Lamp Test function. Both contacts are rated at 2 amps maximum.

Remote Alarm

Two remote alarm connections are available (refer to Figure 3). One remote alarm has normally open contacts (connection TB1-22) and the other has normally closed contacts (connection TB2-8). Both contacts are rated at 2 amps maximum.

Troubleshooting

PRE-CHECK

Verify that the power supply voltage is between 13 and 15.5 VDC for 12-volt systems (TB1-2 to TB1-3); and between 26 and 31 VDC for 24-volt systems (TB1-1 to TB1-3). See Figure 3 for power supply connection terminals.

Confirm that the annunciator is either Positive or Negative by removing the front panel and observing the word Positive or Negative printed on the circuit board below TB1-24 (Figure 6). Make sure that the signal being supplied matches the annunciator control being used.

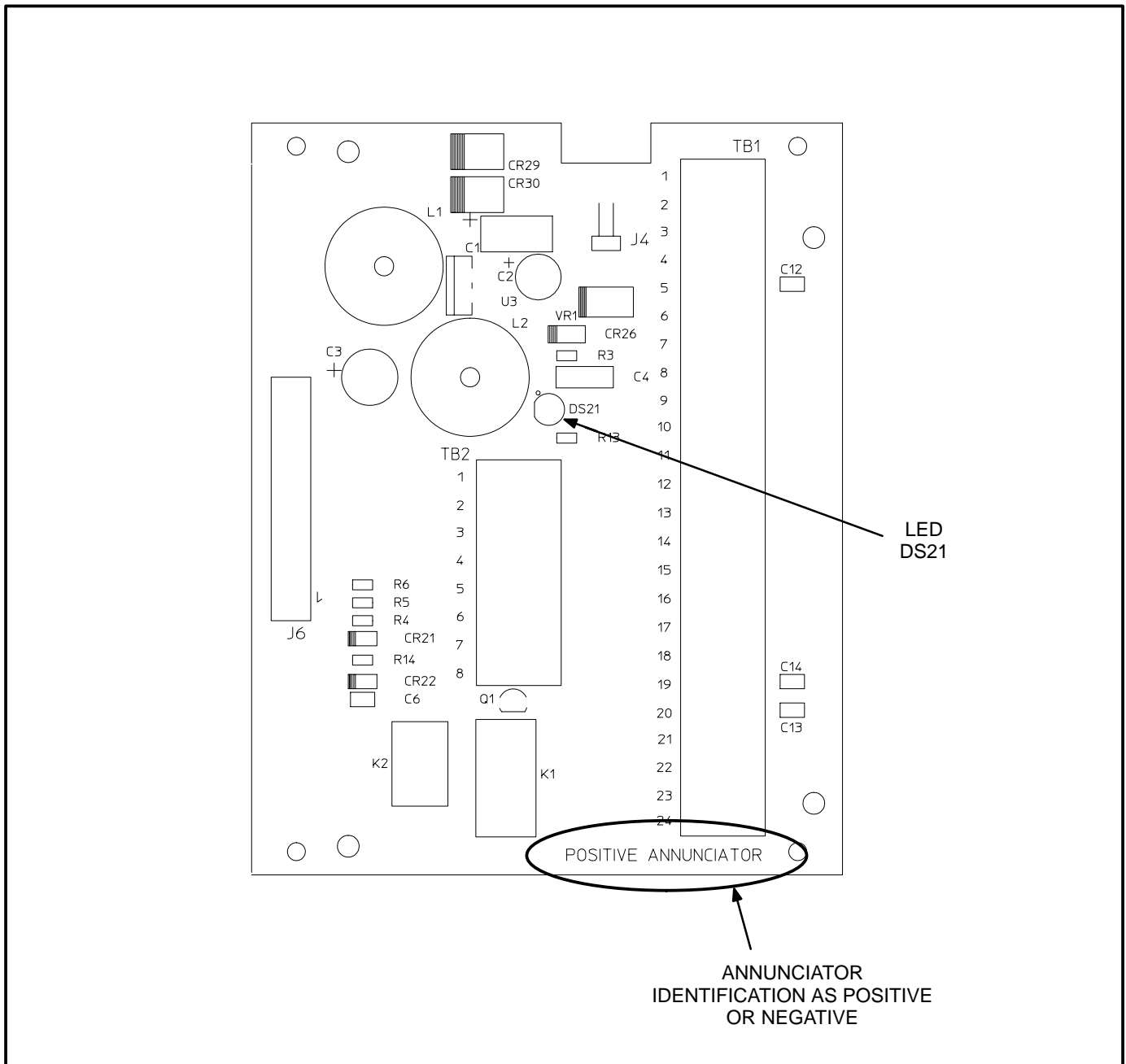


FIGURE 6. ANNUNCIATOR IDENTIFICATION

TROUBLESHOOTING

Incorrect Battery Voltage Sensing

If incorrect or no battery voltage indication appears, perform the following checks.

1. Verify that for 24-volt systems, B+ is connected to TB1-1 and for 12-volt systems, B+ is connected TB1-2. Also make sure that the ground (Gnd) connection is made to TB1-3.

Only one B+ connections should be made, TB1-1 or TB1-2, the other connection should be open.

2. Confirm that S3 switch settings are in the following positions (refer to Figure 4):

S3-1: ON	S3-4: OFF
S3-2: ON	S3-5: OFF
S3-3: ON	S3-6: OFF

3. If the failure still exists, the PCB assembly is defective.

All Indicators Fail to Light

If the indicators fail to light when the Silence/Lamp Test button is pressed, then perform the following checks:

1. Verify that the J4 connector (membrane panel ribbon cable to PCB assembly) is secure (Figure 5). Press the Silence/Lamp Test pad.
2. If the problem continues, momentarily jumper the J4 pins together. If all the indicators light when J4 pins are jumpered together, the membrane touch panel is defective.
3. If the failure still exists, the PCB assembly is defective.

One or More Failed Indicators

If one or more indicators fail to light when the Silence/Lamp Test button is pressed, perform the following checks:

1. Remove the PCB assembly from the front panel and disconnect the J4 ribbon cable from the PCB assembly.
2. Verify the orientation of each failed lamp. Make sure the polarizing dot on the lamp is aligned with the corresponding dot on the printed circuit board (Figure 5).

3. If the lamp still fails to light, replace the lamp. If the failure still exists, the PCB assembly is defective.

Input Fails to Light Lamp

If a lamp fails to light when the corresponding input is activated, but the lamp does light during the lamp test, then verify the input connections.

1. With a positive annunciator board, apply B+ to the respective input and verify that the lamp fails to light.
With a negative annunciator board, apply ground (Gnd) to the respective input and verify that the lamp fails to light.
2. If the lamp lights with the proper input, check for a poor connection or defective lead back to the signal source. If the lamp does not light and the lamp is good, the PCB assembly is defective.

Alarm Failure

If a fault fails to signal an audible alarm, but does light the lamp, perform the following checks.

Note: If both the alarm and lamp fail to light, perform the checks under Input Fails to Light Lamp.

1. Check S2 and S3 switch positions using Table 3 and Figure 4. Verify that the input's corresponding audible alarm switch (S1 or S2) is set to ON.
2. Apply power to the annunciator and verify that the control is running, LED DS21 should be flashing (Figure 6). If LED DS21 is not flashing, the PCB assembly is defective.
3. Verify that during the fault input condition, the remote alarm (N.O.) output (TB-22) becomes grounded.
4. If step one through three check good, insert a pin through the holes in the membrane switch and tap the horn. This action may free the piezo element and allow it to vibrate. Sometimes after extreme temperature changes the piezo element becomes jammed and is unable to vibrate.
5. If the audible alarm still fails to sound, the PCB assembly is defective.

Remote/Silence Lamp Test Connection

If the local annunciator fails to silence the alarm horns or test the lamps of the remote interconnected annunciators, then verify that the Silence/Lamp Test (N.O.) terminals (TB1-20) are interconnected.

Parts Information

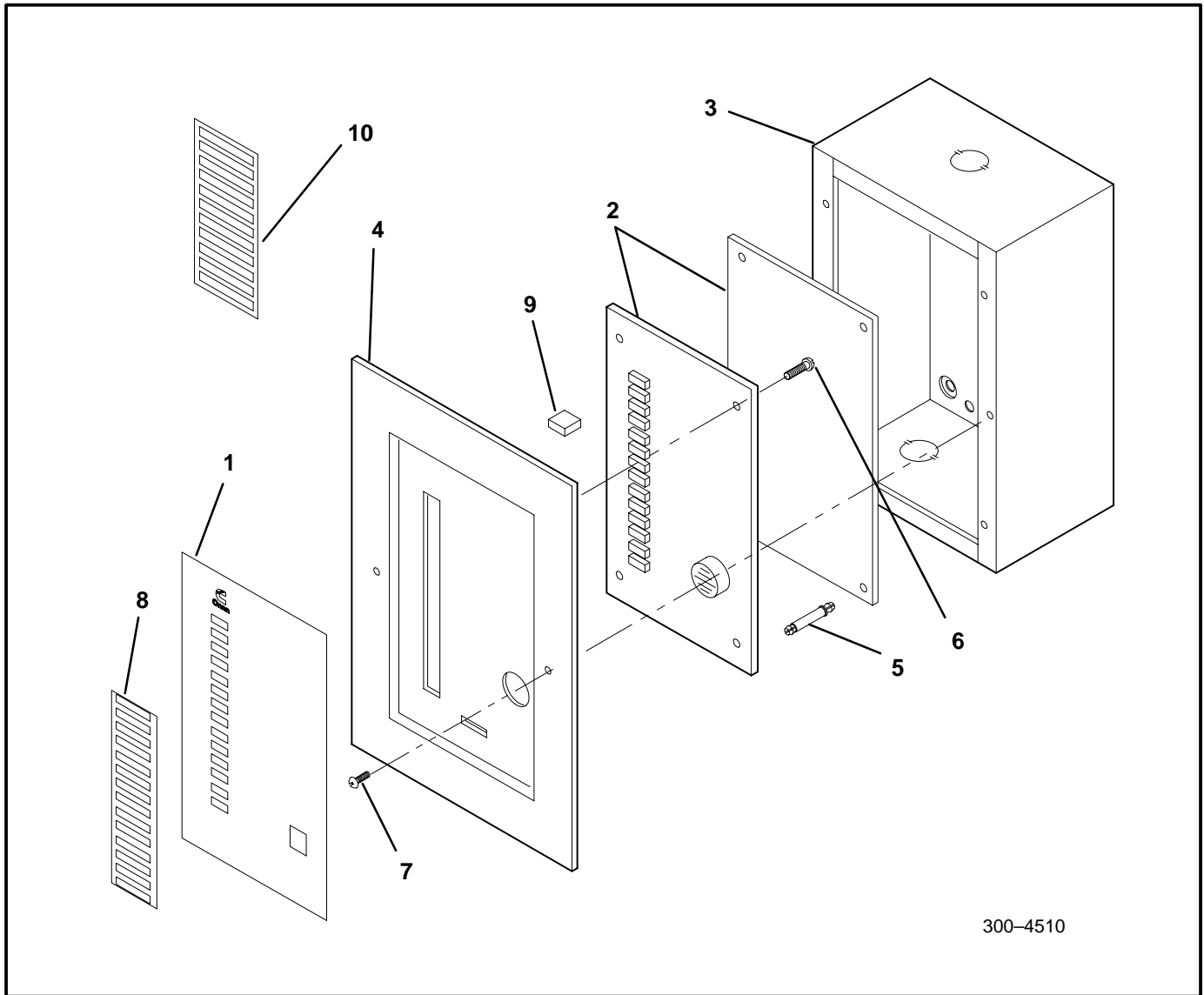


FIGURE 7. ANP & ANN ANNUNCIATOR PARTS

REF NO.	PART NO.	QTY USED	PART DESCRIPTION	REF NO.	PART NO.	QTY USED	PART DESCRIPTION
			Annunciator Assembly, Complete	6	812-0029	4	Screw, Machine – Round Head (#6-32 x 3/8)
	300-4510	1	Negative (Ground) Signal	7	812-0863	2	Screw, Machine – Round Head (#6-32 x 1/4) (Black)
	300-4511	1	Positive Signal	8	326-5376	1	Card, Insert – Membrane Lamp, Indicator
1	300-4507	1	Panel, Membrane	9	322-0435	14	Red
2	300-4651-01	1	Board, PC – Annunciator Negative (Ground) Signal		322-0434	2	Amber
	300-4651-02	1	Positive Signal		322-0433	4	Green
3	301-3090	1	Box, Control	10	098-6902	1	Label, Self Adhesive
4	319-2376	1	Panel, Annunciator				
5	332-3332-04	4	Post, Circuit Board				

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