



ELECTRONIC AND AVIONICS SYSTEMS

INSTALLATION MANUAL

BENDIX/KING®

KY 196B

***VHF COMMUNICATIONS
TRANSCIVER***

MANUAL NUMBER 006-10570-0000

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PRELIMINARY

BENDIX/KING
KY 196B
VHF COMMUNICATIONS TRANSCEIVER

SECTION I
GENERAL INFORMATION

Paragraph	Page
1.1 INTRODUCTION	1-1
1.2 DESCRIPTION OF EQUIPMENT	1-1
1.3 TECHNICAL CHARACTERISTICS	1-1
1.4 UNITS AND ACCESSORIES SUPPLIED	1-4
1.5 ACCESSORIES REQUIRED, BUT NOT SUPPLIED	1-5
1.6 LICENSE REQUIREMENTS	1-6

SECTION II
INSTALLATION

2.1 GENERAL INFORMATION	2-1
2.2 UNPACKING AND INSPECTING EQUIPMENT	2-1
2.3 EQUIPMENT INSTALLATION	2-1
2.3.1 AVIONICS COOLING REQUIREMENTS	2-1
2.3.2 MOUNTING RACK INSTALLATION	2-2
2.3.3 ANTENNA INSTALLATION	2-2
2.3.4 CABLE HARNESS AND CONNECTOR ASSEMBLY	2-2
2.3.5 KY 196B INSTALLATION	2-3
2.4 POST INSTALLATION CHECKS	2-6

SECTION III
OPERATION

3.1 GENERAL INFORMATION	3-1
3.1.1 TURN ON	3-1
3.1.2 TRANSMIT INDICATOR	3-1
3.1.3 MODES OF OPERATION	3-1
3.1.4 REMOTE FREQUENCY TRANSFER	3-3
3.1.5 REMOTE CHANNEL INCREMENT	3-3
3.1.6 DIM SELECT	3-3
3.1.7 DISPLAY ADJUST MODE	3-3

BENDIX/KING
KY 196B
VHF COMMUNICATIONS TRANSCEIVER

SECTION I
GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical, and electrical characteristics of the BENDIX/KING KY 196B VHF Communications Transceiver. Installation and operating procedures are also included. Information relative to the maintenance, alignment, and procurement of replacement parts may be found in the KY 196B Maintenance/Overhaul Manual.

1.2 DESCRIPTION OF EQUIPMENT

The KY 196B VHF Comm Transceiver consists electrically of five sections: receiver, transmitter, synthesizer, display circuitry, and the microprocessor board. The KY 196B operates at 28VDC and features 16 Watts of transmitter power.

The KY 196B is available with 8.33 KHz or 25KHz receiver selectivity, diffused display lenses, backlit bezel nomenclature, and operating ranges of 118.000 to 136.9916 MHz. See Paragraph 1.4 below for descriptions of specific flavors.

The KY 196B has the capability of programming up to nine memory channel frequencies for later recall. Channel frequency information is stored in non-volatile memory so the when the radio is turned off and then back on, channel information is retained. Both units also have the capability of remote transfer of Use and Standby frequencies, and remote recall of channel frequency information.

1.3 TECHNICAL CHARACTERISTICS

SPECIFICATION	CHARACTERISTIC
TSO COMPLIANCE:	
Transmitter:	
KY 196B (flavors -0101, -0201)	TSO C37c, DO-186 Class 3 TSO C37c, DO-186a Class 5
Receiver:	
KY 196B (flavors -0101, -0201)	TSO C38c, DO-186 Classes C & D TSO C38c, DO-186a Class E
ENVIRONMENTAL DATA:	See TSO Appendix
PHYSICAL DIMENSIONS:	
Height:	1.35 in (3.43 cm)
Width:	6.312 in (16.032 cm)
Depth (behind aircraft panel):	10.776 in (25.847 cm)
WEIGHT:	
With rack	3.2 lbs (1.45 Kg), ± 0.2 lbs (0.09 Kg.)
Without rack	3.0 lbs (1.3 Kg), ± 0.2 lbs (0.09 Kg.)
MOUNTING:	Panel mounted, no shock mounting required

BENDIX/KING
KY 196B
VHF COMMUNICATIONS TRANSCEIVER

RECEIVER	
RECEIVER SENSITIVITY:	2 μ V (hard) shall produce not less than 6dB S+N/N with 1KHz tone modulated 30% (with compressor disabled).
RECEIVER SELECTIVITY:	
Class C, D (flavors -0101, -0201)	6dB bandwidth at not less than 8.0 KHz on each side. 40dB bandwidth with no more than 17.0 KHz on each side. 60dB bandwidth with no more than 22.0 KHz on each side.
Class E (flavors -0101, -0201)	6 dB bandwidth at not less than 2.778 kHz on each side. 60 dB bandwidth at not more than 7.37 kHz on each side.
RECEIVER OUTPUT:	100mW minimum into 500 Ω minimum.
AGC CHARACTERISTIC:	From 5 μ V to 10,000 μ V audio output will not vary more than 3dB.
SQUELCH:	Automatic squelch (internally adjustable carrier-to-noise setting) with manual disable.
SPURIOUS RESPONSES AND CROSS MODULATION PRODUCTS:	At least 80dB down.
INTERCOM INPUT:	The mic is connected to the intercom input. The receiver is operational and mic audio appears at the audio output along with receive audio. 100mVRMS of mic audio into 100 Ω is required for 100mW output.

BENDIX/KING
KY 196B
VHF COMMUNICATIONS TRANSCEIVER

1.5 ACCESSORIES REQUIRED, BUT NOT SUPPLIED

- A. Communications antenna and cables.
- B. Headphones: 500Ω nominal impedance.
- C. Microphone: Low impedance carbon or dynamic with transistorized preamp.
- D. For 13.75V operation of the KY 196B a 14-to-28V converter such as the KGS Electronics Model RB-125 or equivalent may be used. The RB-125 is available from BENDIX/KING under PN 068-01016-0003.

1.6 LICENSE REQUIREMENTS

The transmitter, as installed in the aircraft, requires an Aircraft Radio Station License. This license is obtained by filing FCC Form 404, Aircraft Radio Station License Application, which may be obtained from your local FCC Field Office. The KY 196B may be operated for up to 30 days without a station license after filing Form 404 while awaiting the receipt of the radio license if a copy of FCC Form 404 is kept in the aircraft.

This equipment has been type accepted by the FCC and entered on their list of type accepted equipment as AlliedSignal KY 196B, and must be identified as AlliedSignal KY 196B on FCC Form 404.

CAUTION

THE VHF TRANSMITTER IN THIS EQUIPMENT IS GUARANTEED TO MEET FEDERAL COMMUNICATIONS COMMISSION ACCEPTANCE OVER THE OPERATING TEMPERATURE RANGE ONLY WHEN AN ALLIEDSIGNAL CRYSTAL IS USED IN THE STABILIZED MASTER OSCILLATOR.

USE OF OTHER THAN AN ALLIEDSIGNAL CRYSTAL IS CONSIDERED AN UNAUTHORIZED MODIFICATION AND MAY VOID THE WARRANTY.

The Federal Communications Commission requires that the operator of the transmitter of this equipment hold a Restricted Radio Telephone Operator Permit (FCC Form 753) or higher class license. A permit may be obtained by a US citizen from the nearest field office of the FCC; no examination is required.

BENDIX/KING
KY 196B
VHF COMMUNICATIONS TRANSCEIVER

SECTION II
INSTALLATION

2.1 GENERAL INFORMATION

This section contains suggestions and factors to consider before installing the KY 196B. Close adherence to these suggestions will assure more satisfactory performance from the equipment.

2.2 UNPACKING AND INSPECTING EQUIPMENT

Unpack the equipment carefully and inspect each item for evidence of damage incurred during shipment. If a damage claim must be filed, save the shipping container and all packing materials to substantiate your claim. The claim should be filed with the transportation company as soon as possible. The shipping container and packing material should be saved in any case in the event that storage or reshipment of the equipment is necessary.

2.3 EQUIPMENT INSTALLATION

The KY 196B installation will conform to standards designated by the customer, installing agency, and existing conditions as to the unit location and type of installation. However, the following suggestions should be considered before installing the KY 196B. The installing agency will supply and fabricate all external cables. The connectors required are supplied by AlliedSignal. Interconnect diagrams are included in this manual as Figures 2-5 through 2-10. Refer to table below for compatible installations.

Current installation ->	KY96A	KY196
KY196B	YES *1 *3	YES *2

*1 Display brightness controlled by dimmer bus not photocell.

*2 Button/Bezel backlighting not operative.

*3 If installation utilizes external audio amplifier.

NOTE: 064-01084-0201 is not compatible with other KY 96A/196A/197A installations.

NOTE

Use good quality stranded wire with at least 600V insulation that will not support a flame.

2.3.1 AVIONICS COOLING REQUIREMENTS FOR PANEL MOUNTED EQUIPMENT

The most important contribution to improved reliability of avionics equipment is to limit the maximum operating temperature of each unit. While modern designs consume less total energy, the heat dissipated per unit volume (Watts/cubic inch) remains much the same due to contemporary high density packaging techniques. While each individual unit may or may not require forced air cooling, the combined heat generated by several units operating in a typical panel or rack can significantly degrade the reliability of the equipment if provisions for adequate cooling are not incorporated in the initial installation.

BENDIX/KING
KY 196B
VHF COMMUNICATIONS TRANSCEIVER

If single-jaw crimpers are being used, move the contact terminal/conductor assembly to locate the terminal's insulation tabs on the anvil of the crimp tool. Crimp again until the jaws are fully closed or a sufficient crimp is obtained to the insulation.

B. Contact Insertion into Molex Connector Housing

After the contact terminals have been installed on the wiring harness, the contact terminals can be inserted into the proper location in the connector housing (PN 030-01094-0080). The terminal cannot be inserted upside down. Be sure to push the terminal all the way in until a click can be felt or heard. The self-locking feature can be tested by gently pulling on the wire.

C. Location of Polarizing Key in Housing

Prior to insertion of connector into rear of unit, check polarizing key position between contacts 8 and 9. Refer to Figure 2-4 to check correct position of polarizing key.

D. Extraction of Contact from Molex Connector

1. Slip the flat narrow blade of a Molex HT-1884 contact ejector tool, PN 047-05099-0001, under the contact on the mating side of the connector. By turning the connector upside down one can see the blade slide into the stop.
2. When the ejector is slid into place, the retaining tab of the contact is raised, allowing the contact to be removed by pulling moderately on the lead.
3. Neither the contact or position is damaged by removing a contact; however, the contact should be visually checked before reinstalling to be certain that retaining tab "A" extends as shown in Figure 2-1 for retention in connector.

E. Coax Connector

Refer to Figure 2-2 for instructions for mounting the right angle coaxial BNC connector to the coax cable. Install the connector into the mounting rack.

2.3.5 KY 196B INSTALLATION

- A. Looking at the top of the unit, make sure the front lobe of the hold-down device is in a vertical position.
- B. Slide the unit into the mounting rack until the front lobe touches the mounting rack.
- C. Insert a 3/32" Allen wrench through the hole in the front panel to engage the locking screw. Turn clockwise until the rear lobe engages the mounting rack. Continue turning until the unit is secure in the mounting rack. **DO NOT OVERTIGHTEN.**
- D. To remove the unit turn the locking screw counterclockwise, using a 3/32" Allen wrench, until the unit disengages from the mounting rack. Pull the unit out of the mounting rack by pulling on the indentations on each side of the unit's bezel.

BENDIX/KING
KY 196B
VHF COMMUNICATIONS TRANSCEIVER

2.4 POST INSTALLATION CHECKS

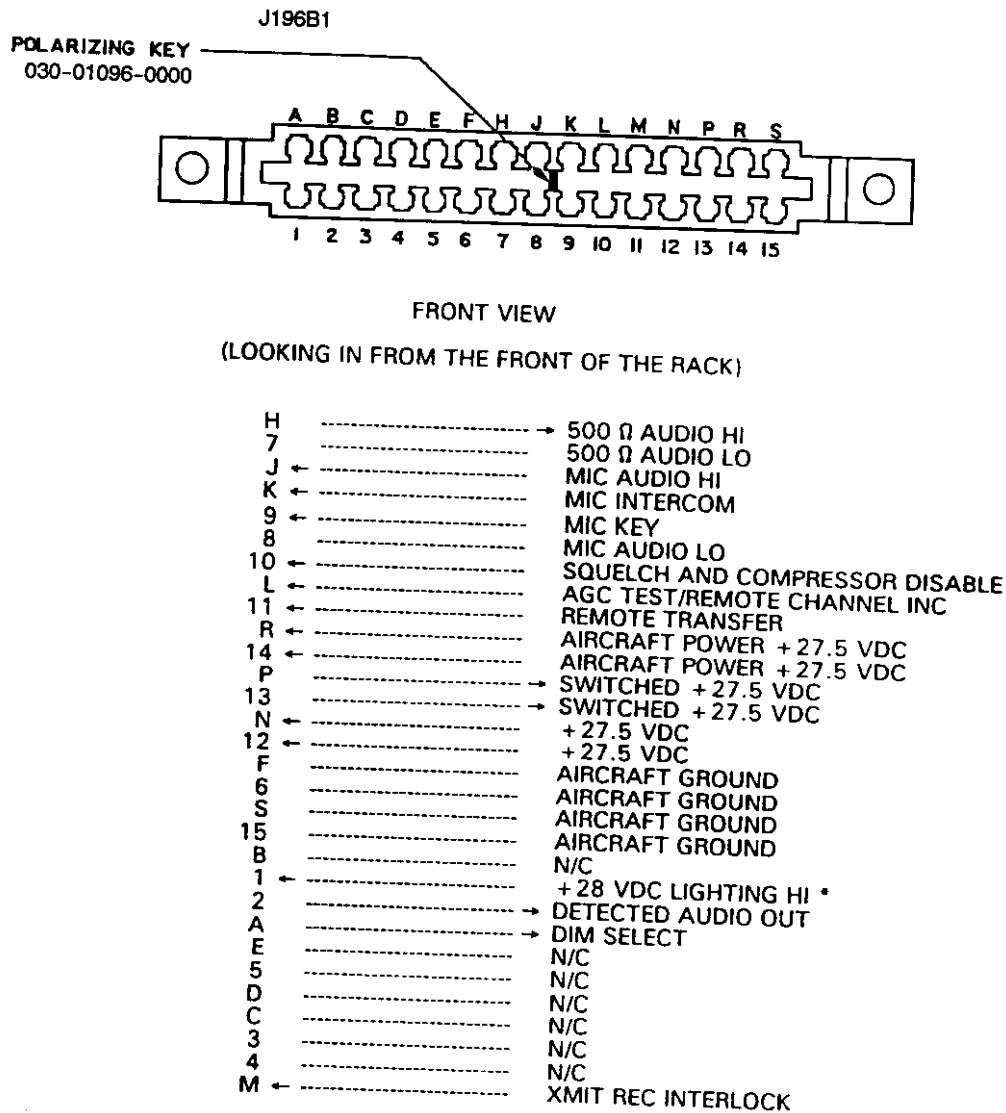
An operational performance flight test is recommended after the installation is completed to insure satisfactory performance of the equipment in its normal environment. Check all aircraft control movements to be sure no electrical cables interfere with their operation. To check the communications transceiver, maintain an appropriate altitude and contact a ground station facility at a range of at least 50 nautical miles. Then contact a ground station close in. Pull the volume control out to defeat the automatic squelch feature and listen for any unusual electrical noise which would reduce the comm receiver sensitivity by increasing the squelch threshold. If possible, verify the communications capability on both the high and low end of the VHF comm band.

NOTE

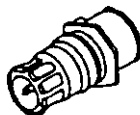
As an added precaution before the flight, check the antenna. VSWR should be checked with an in-line type wattmeter inserted in the coaxial transmission line between the transceiver and the antenna. Any problem with the antenna installation will most likely be seen as a high reflected power. A VSWR of 3:1 will result in a 25% loss of power.

The brightness of the display can be set for the most pleasing intensity by placing the unit in Dimmer Adjust mode during low light level conditions. See Paragraph 3.1 of this manual for Dimmer Adjust mode operating instructions.

BENDIX/KING
KY 196B
VHF COMMUNICATIONS TRANSCEIVER



J196B2



E401 -----> ANTENNA

* PIN 1 IS 5VDC LIGHTING HI ON 064-01084-0201.

FIGURE 2-8 KY 196B PIN FUNCTION AND LOCATION DIAGRAM

BENDIX/KING
KY 196B
VHF COMMUNICATIONS TRANSCEIVER

SECTION III
OPERATION

3.1 GENERAL INFORMATION

For a detailed description of the operating controls of the KY 196B refer to the 'Silver Crown +' pilots guide (P/N 006-18110-0000) or the aircraft's flight manual supplement. Control layout is shown in Figure 3-1.

3.1.1 TURN ON

To turn on the radio rotate the Volume (VOL) knob clockwise from the OFF position. When power is activated the Use and Standby (STBY) windows will display the frequencies and/or mode stored in the non-volatile memory before power down.

After activating power, pull the VOL knob out to override the automatic squelch and rotate the VOL knob to the desired audio level. Push the VOL knob back in to activate the automatic squelch.

CAUTION

THE KY 196B SHOULD BE TURNED ON ONLY AFTER
ENGINE STARTUP. THIS IS A SIMPLE PRECAUTION
WHICH HELPS PROTECT THE SOLID STATE CIRCUITRY
AND EXTENDS THE OPERATING LIFE OF YOUR AVIONICS
EQUIPMENT.

3.1.2 TRANSMIT INDICATOR

During Comm transmissions, a T will appear between the USE and STBY windows to indicate that the transceiver is in the Transmit mode of operation.

3.1.3 MODES OF OPERATION

A. Frequency Mode

Frequency selection is accomplished in the Standby Entry mode by changing the frequency display in the STBY window of the display with the tuning knobs, and then transferring the selected frequency into the USE window by pressing the Transfer button. The larger tuning knob will increment or decrement the MHz portion of the display in 1MHz steps with rollover at each band edge (118.000MHz or 136.975MHz). the smaller tuning knob will increment or decrement the KHz portion of the display in 25 KHz steps with the knob pushed in or will tune both the 8.33 KHz and 25 KHz channels with the knob pulled out. While in the Standby Entry mode, the transceiver remains tuned to the frequency displayed in the USE window at all times.

B. Channel Mode

Momentarily pressing the Channel (CHAN) button while in the Frequency mode puts the radio in the Channel mode. The last active frequency remains tuned and displayed in the USE window. The last used channel number is displayed in the channel digit unless no channels have been programmed, in which case the radio defaults to Channel 1 and dashes are displayed in the STBY window. Turning either tuning knob changes the channel number and corresponding frequency in the STBY window.

The channels will only increment and decrement to channels that have been programmed. If there has been no activity for five seconds the radio will return to Frequency mode and the channel frequency is placed in the STBY window. Pressing the CHAN button before the

BENDIX/KING
KY 196B
VHF COMMUNICATIONS TRANSCEIVER

Momentarily pushing the Transfer button returns the radio to Standby Frequency Entry. The Standby frequency prior to Active Entry mode remains unchanged.

3.1.4 REMOTE FREQUENCY TRANSFER

The Remote Frequency Transfer button operates identically to the front panel Transfer button with the exception that holding the Remote Transfer button for two seconds does not place the radio in the Active Entry mode.

3.1.5 REMOTE CHANNEL INCREMENT

Pressing the Remote Channel button will cause the system to enter the Channel mode of operation and will increment the channel from the previous channel number used.

3.1.6 DIM SELECT

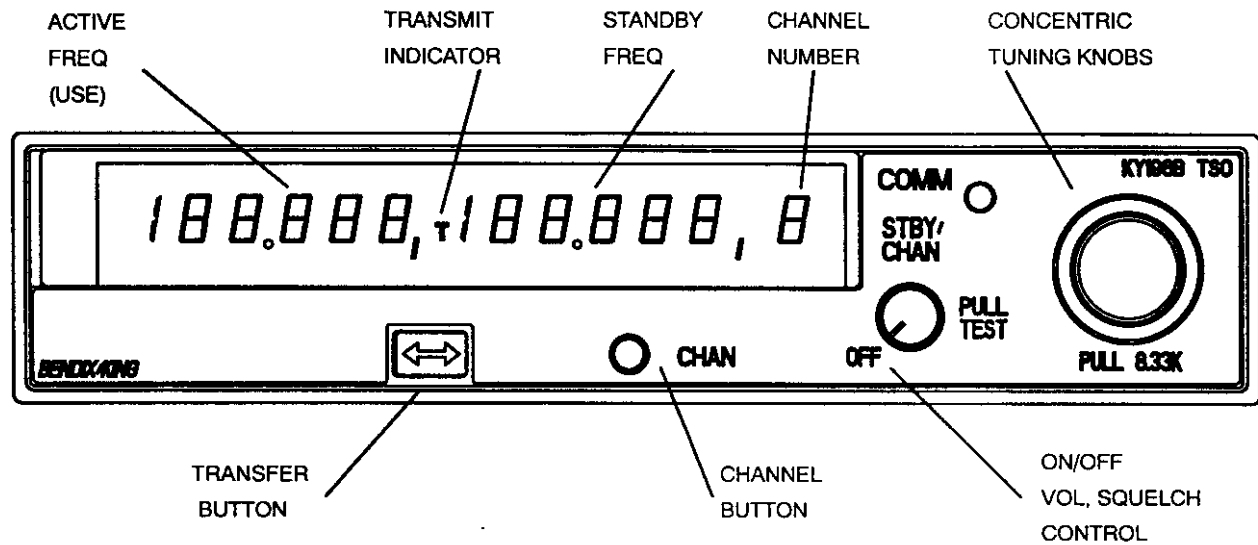
DIM SELECT LINE STATUS	DISPLAY STATUS
KY 196B	MAX BRIGHT FOLLOW PHOTOCCELL DIMMER BUS
+28VDC	
OPEN	
GND	

3.1.7 DISPLAY ADJUST MODE

Press and hold the Channel button, when the unit enters program mode, press and hold the transfer button for more than 2 seconds so that DA 1 replaces the frequency in the USE window. The unit is now in display adjust mode, refer to the table below for a description of the 3 DA modes and ranges of operation. The increment and decrement knobs are used to set the proper value in the STANDBY window. Momentarily pressing the CHAN button increments the unit thru the 3 display adjust modes (DA 1 Thru DA 3). Press the transfer button to exit display adjust mode.

MODE	RANGE	DESCRIPTION
DA 1	1 to 8	Display brightness (1=fast, 8=slow)
DA 2	0 to 64	Response to dimmer photocell (0=dim, 64=bright)
DA 3	0 to 255	Display age compensation for brightness (0=dim, 255=bright)

BENDIX/KING
KY 196B
VHF COMMUNICATIONS TRANSCEIVER



064-01084-0101

NOTE: All knob and control locations/functions are identical between various flavors.

FIGURE 3-1 KY 196B VHF COMMUNICATIONS TRANSCEIVERS

BENDIX/KING
KY 196B
VHF COMMUNICATIONS TRANSCEIVER

TSO APPENDIX

RTCA DO-160B
ENVIRONMENTAL QUALIFICATION
FORMS

RTCA DO-160B

ENVIRONMENTAL QUALIFICATION FORM

NOMENCLATURE: KY 196B 8.33 KHz / 25 KHz VHF Communications Transceiver

PART NUMBER: 064-01084-0201 8.33 kHz VHF COM (CNI 5000 version)
 064-01084-0101 8.33 kHz VHF COM (5G version) Silver Crown
 050-02600-0000 Installation Kit
 047-08512-0004 Mounting Tray

TSO NUMBER: C37c (DO-186/a Classes 3 and 5)
 C38c (DO-186/a Classes C,D and E)

MANUFACTURER'S SPECIFICATION: MPS 004-01084-80

MANUFACTURER: ALLIEDSIGNAL AVIONICS INC.

ADDRESS: One Technology Center
 23500 West 105th Street
 Olathe, Kansas 66061
 USA

CONDITIONS	DO-160B PARAGRAPH	CONDUCTED TESTS
Temperature and Altitude	4.0	Category A1D1 (Temp. -20°C/+55°C, Alt. 50K) (Decomp., 8K to 50K < 15 sec.) (Overpressure, 170 kPa) (Loss of Cooling, Not Applicable)
Temperature Variation	5.0	Category C
Humidity	6.0	Category B
Shock	7.0	7.2 and 7.3
Vibration	8.0	Category KPS
Explosion	9.0	Category X (Not Tested)
Waterproofness	10.0	Category X (Not Tested)
Fluids Susceptibility	11.0	Category X (Not Tested)
Sand and Dust	12.0	Category X (Not Tested)
Fungus	13.0	Category X (Not Tested)
Salt Spray	14.0	Category X (Not Tested)
Magnetic Effect	15.0	Class Z
Power Input	16.0	Category B
Voltage Spike Conducted	17.0	Category AB
Audio Frequency Conducted Susceptibility	18.0	Category BZ
Induced Signal Susceptibility	19.0	Category Z
Radio Frequency Susceptibility	20.0	Category A
Emission of Radio Frequency Energy	21.0	Category B
Lightning Induced Transient Susceptibility	22.0	Category X

REVISION HISTORY

Revision	CO #	Description of Change	
Date			
-	PRN	Original Issue	12-98

1. 1. 1.

2. 2. 2.

3. 3. 3.

4. 4. 4.