

Honeywell

***INSTALLATION MANUAL
(Preliminary)***

BENDIX/KING[®]

KXP 2290

***MODE S
TRANSPONDER***

***MANUAL NUMBER 006-10689-0000
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Part Number: 006-10689-XXXX

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SECTION I GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical, and electrical characteristics of the Honeywell KXP 2290 Mode S Transponder. Installation and check out procedures are also included. Information relative to the maintenance, alignment, and procurement of the replacement parts may be found in the KXP 2290 Maintenance/Overhaul Manual, P/N 006-15689-XXXX. The only current KXP 2290 installation option is as a part of the APEX system. The KXP 2290 is blind-mounted and shares a mounting rack with the KMC 2210 APEX controller. For additional information relating to the APEX system, refer to the APEX System Manual 006-10667-XXXX.

1.2 EQUIPMENT DESCRIPTION

The KXP 2290 is a Mode S Transponder that is capable of non-diversity or diversity operation. The KXP 2290 Mode S Transponder is designed to meet TSO-C112, ETSO-2C112a for a Class 2A ATCRBS/Mode Select Airborne Transponder System. It replies to ATCRBS Mode A and C, Intermode, and Mode S interrogations.

Since the KXP 2290 is a Class 2A transponder, it can handle Comm A & Comm B Mode S data link protocols. The KXP 2290 is compliant with TSO-C112 Class 2A and ETSO-2C112a requirements. The EUROCAE ED-73B transponder functionality is Level 2 (Surveillance and Comm A/B) and the marking is level 2s. Additionally the ED-73B defined class is "CLASS 1". The KXP 2290 is also designed to meet the Enhanced Surveillance mandated in Europe.

The KXP 2290 has the ability to receive an 8-digit alphanumeric Flight ID code. The flight crew enters the Flight ID information via the APEX control panel.

The KXP 2290 uses ARINC 735A TCAS interface protocol to interface with TCAS II. As a peripheral to the TCAS II processor, the transponder receives and replies to short and long Air-to-Air surveillance and TCAS Coordination interrogations. Also, it receives and replies to Ground-to-Air surveillance and Comm-A interrogations directed to TCAS.

Top and bottom antennas provide the diversity option that allow compatibility with TCAS. The diversity option allows selection of signal receptions from either the top or the bottom antenna based on the characteristics of the received interrogation signals. This improves air-to-air surveillance and communication. An Optional top-mounted omnidirectional antenna is required for diversity.

The KXP 2290 contains BITE (Built In Test Equipment) so the operational health of the unit is constantly monitored. When a critical fault is detected, the unit will notify the APEX system. The unit stores detected failures in non-volatile memory for later review. The unit also has a temperature sensor and a timer so that faults can be time stamped and temperature data can be collected and stored.

1.3 TECHNICAL CHARACTERISTICS

1.3.1 KXP 2290 TECHNICAL CHARACTERISTICS

TSO COMPLIANCE:	TSO-C112, ETSO-2C112a
SOFTWARE CERTIFICATION CATEGORY:	RTCA/DO-178B SOFTWARE LEVEL "B"
ENVIRONMENTAL CATEGORIES:	SEE ENVIRONMENTAL QUALIFICATIONS APPENDIX
PHYSICAL DIMENSIONS:	SEE FIGURE 2-2 KXP 2290 INSTALLATION DRAWING
WEIGHT:	SEE FIGURE 2-2 KXP 2290 INSTALLATION DRAWING
MOUNTING:	BLIND-MOUNT (SHARES RACK WITH KMC 2210)
TEMPERATURE:	SEE ENVIRONMENTAL QUALIFICATIONS APPENDIX
ALTITUDE:	SEE ENVIRONMENTAL QUALIFICATIONS APPENDIX
COOLING:	NO FORCED-AIR COOLING REQUIRED.
POWER INPUT:	18-32 VOLTS, 30 WATTS

1.3.2 ANTENNA

The KXP 2290 will work with any conventional ATCRBS blade or quarter-wave monopole type antenna provided it is certified to TSO-C112/ETSO-2C112a. A representative type is the Honeywell KA 61 antenna, P/N 071-00221-0010 (BNC) or 071-00221-0020 (TNC). Refer to [FIGURE 2-4 KA 61 INSTALLATION DRAWING](#) for KA 61 technical characteristics, installation, and certification information.

NOTE:

Two antennas (top and bottom) are required for diversity operation.

1.4 UNITS AND ACCESSORIES SUPPLIED

1.4.1 CONFIGURATIONS AVAILABLE

P/N 066-01198-0101 is the only version of the KXP 2290 that is currently available.

1.4.2 KXP 2290 INSTALLATION KIT

The KXP 2290 Transponder shares a mounting rack with the KMC 2210 APEX controller; therefore, installation kits P/N 050-03683-0000 and P/N 050-03670-0000 are both required to install the KXP 2290. Installation kit P/N 050-03683-0000 contains the following parts:

PN	DESCRIPTION	REV
050-03683-0000	KXP 2290 INSTALLATION KIT	D

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	-0000
J1	030-03296-0000		HI DENSITY SUBD44P	EA	1.00
J2	030-00101-0002		PANEL MOUNT PLUG	EA	1.00
J3	030-00101-0002		PANEL MOUNT PLUG	EA	1.00
	001-01299-0000		INSTRUCTION FOR HARNESS ASSEMBLY PARTS	RF	.00
	030-01466-0001		CONN, D-SUB, CONTACT, 22AWG, CRIMP, FEMALE	EA	44.00
	047-11179-0002		STRAIN RELIEF CLAMP MED	EA	1.00
	057-05944-0060		KIT TSO LABEL, KXP 2290	EA	1.00
	073-01076-0004		BACK PLATE W/HARDWARE	EA	1.00
	073-01120-0002		SUB-D25 BACKSHELL W/FINISH	EA	1.00
	073-01121-0002		SUB-D25 BACKSHELL COVER W/FINISH	EA	1.00
	076-03189-0001		SCREW 100DEG FHP 2-56 X 3/8 SPECIAL	EA	4.00
	089-05903-0004		SCR PHP 4-40X1/4	EA	2.00
	089-06008-0004		SCR FHP 4-40X1/4	EA	2.00
	089-08303-0000		WASHER	EA	2.00
	090-00019-0007		RING RTNR .438	EA	2.00
	155-01786-0000		INSTALLATION DRAWING KMC 2210/KXP2290	RF	.00
	200-10452-0000		BAR CLAMP ASSEMBLY -25	EA	1.00

Installation kit P/N 050-03670-0000 contains the following parts:

PN	DESCRIPTION	REV
050-03670-0000	KMC 2210 INSTALLATION KIT	C

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	-0000
J1	030-03296-0006		CONN, D-SUB, RECPT, HSNQ, SN PLATE, 26 POS	EA	1.00
	001-01299-0000		INSTRUCTION FOR HARNESS ASSEMBLY PARTS	RF	.00
	030-01466-0001		CONN, D-SUB, CONTACT, 22AWG, CRIMP, FEMALE	EA	26.00
	047-11179-0002		STRAIN RELIEF CLAMP MED	EA	1.00
	047-12880-0006		RACK WITH HARDWARE	EA	1.00
	057-05944-0054		TSO LABEL KMC 2210	EA	1.00
	073-01118-0002		SUB-D15 BACKSHELL W/FINISH	EA	1.00
	073-01119-0002		SUB-D15 BACKSHELL COVER W/FINISH	EA	1.00
	076-03189-0001		SCREW 100DEG FHP 2-56 X 3/8 SPECIAL	EA	4.00
	076-03192-0001		SCREW, 100DEG FHP 4-40 X 3/8	EA	2.00
	076-03193-0001		SPACER, W/FINISH	EA	2.00
	155-01786-0000		INSTALLATION DRAWING KMC 2210/KXP2290	RF	.00
	200-10452-0001		BAR CLAMP ASSEMBLY -15	EA	1.00

Shield braids must be clamped to the connector backshell using bar clamp assembly P/N 200-10452-0000 which contains the following parts. See [FIGURE 2-2 KXP 2290 INSTALLATION DRAWING](#) and [FIGURE 2-3 KXP 2290 BAR CLAMP ASSEMBLY DRAWING](#) for additional information.

PN	DESCRIPTION	REV
200-10452-0000	BAR CLAMP ASSEMBLY -25	-

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	-0000
REF1	300-10452-0000		BAR CLAMP ASSEMBLY KMC 2220	RF	.00
	047-11178-0001		BACKSHELL BAR CLAMP LONG	EA	1.00
	076-03190-0001		SCREW PHP 4-40 X 7/16 SPECIAL	EA	2.00
	187-01943-0001		BACKSHELL GASKET LONG	EA	1.00

1.5 ACCESSORIES REQUIRED, BUT NOT SUPPLIED

Each antenna will require a connector and a length of coaxial cable to connect it to the KXP 2290 transponder.

NOTE:

Connector 030-00101-0002, which accommodates RG-400 cable, is included in the installation kit. Connector P/N 030-00102-0001 is for larger diameter cables i.e. P/N 024-00072-0000 and is not included.

NOTE:

The transmission line loss design value for the KXP 2290 is 0.5 to 2.0 dB. Total line loss between the unit and the antenna must be within this specification. The following are three antenna cable connection options for the KXP 2290; however, they may not have line loss specifications within tolerance in all installations. Refer to [\(8\) Antenna Transmission Line Loss Considerations](#) in [SECTION II INSTALLATION](#) for specific cabling information and to ensure a proper line loss value.

Use the following parts for installations using [FIGURE 2-8 RG-400 CABLE CONNECTIONS DRAWING](#).

HONEYWELL PART NUMBER	DESCRIPTION	QUANTITY
030-00101-0002	Connector, Coax	1
024-00051-0060	Cable, Coax	11 ft.
030-00005-0000	Connector, Coax Mod Type BNC	1

Use the following parts for installations using [FIGURE 2-9 ECS/ECS-RG-400 CABLE CONNECTIONS DRAWING](#). (ECS cable only)

HONEYWELL PART NUMBER	DESCRIPTION	QUANTITY
030-00102-0001	Connector, Type Unit	1
024-00072-0000	Cable, Coax	25 ft.
030-00435-0000	Connector, Antenna	1

Use the following parts for installations using [FIGURE 2-9 ECS/ECS-RG-400 CABLE CONNECTIONS DRAWING](#). (ECS cable with RG-400 cable).

HONEYWELL PART NUMBER	DESCRIPTION	QUANTITY
030-00101-0002	Connector Type Unit	1
024-00051-0060	Cable, Coax	6 in.
024-00071-0000	Cable, Coax	32.5 ft.
030-00138-0000	Connector, Unit extension to antenna connector	6 in.
030-00434-0000	Connector, Antenna	2

1.6 LICENSING REQUIREMENTS

This equipment has been type accepted by the FCC and entered on the type accepted equipment list, as FCC ID: ASYKXP2290??.

For non-US registered aircraft, follow applicable licensing requirements as required.

1.7 CONTINUED AIRWORTHINESS INSTRUCTIONS

1.7.1 EQUIPMENT

FAA requires that transponders, including the KXP 2290, be tested and inspected and found to comply with Federal Aviation Regulation (FAR) Appendix F of Part 43 of chapter 91.413, ATC transponder tests and inspections. This requirement is applicable previous to or at the time of installation of a new unit and again at two year intervals for any unit.

Other than the FAR noted above, there are no periodic service requirements necessary to maintain continued airworthiness. No maintenance is required until the equipment does not properly perform its intended function. When service is required, a complete performance test should be accomplished following any repair action. Consult the appropriate unit Maintenance/Overhaul Manual for complete performance test information.

1.7.2 WIRES/COAX CABLES

During on-condition or regularly scheduled maintenance, inspect the wires and coax cables following the guidelines listed in AC 43,13-1 Chapter 15 as necessary.

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SECTION II INSTALLATION

2.1 GENERAL INFORMATION

This section contains suggestions and factors to consider before installing the KXP 2290 Mode S Transponder. Close adherence to these suggestions will assure a more satisfactory performance from the equipment.

The conditions and test required for the TSO and MOPS approval of this article are minimum performance standards. It is the responsibility of those installing this article either on or with a specified type or class of aircraft to determine that the aircraft installation conditions are within the TSO and MOPS standards. These articles must have separate approval for installation in an aircraft. Any features in this equipment outside the requirements of this applicable TSO and MOPS must be evaluated and approved as part of the installation approval. The article may be installed only if performed under 14 CFR part 43 or the applicable airworthiness requirements.

2.2 UNPACKING AND INSPECTING EQUIPMENT

Exercise extreme caution when unpacking the unit. Make a visual inspection of the unit for evidence of damage incurred during shipment. If a claim for a damage is to be made, save the shipping container to substantiate the claim. When all equipment is removed, place all packing materials in the shipping container for future storage or reshipment of the unit.

2.3 EQUIPMENT INSTALLATION

2.3.1 GENERAL

The following paragraphs contain information pertaining to the initial installation of the KXP 2290 Mode S Transponder, including instructions concerning the location and mounting of the supporting antenna(s).

The equipment should be installed in the aircraft in a manner consistent with acceptable workmanship and engineering practices and in accordance with the instructions set forth in this publication. To ensure that the system has been properly and safely installed in the aircraft, the installer should make a through visual inspection and conduct an overall operational check of the system on the ground prior to flight.

CAUTION:

AFTER INSTALLATION OF THE CABLING AND BEFORE INSTALLATION OF THE EQUIPMENT, A CHECK SHOULD BE MADE WITH THE AIRCRAFT PRIMARY POWER SUPPLIED TO THE MOUNTING CONNECTOR TO ENSURE THAT POWER IS APPLIED ONLY TO THE PINS SPECIFIED IN THE INTERCONNECTION DRAWING, [FIGURE 2-5 KXP 2290 INTERCONNECTION DRAWING](#).

The installation should be installed in accordance with standards established by the customer's installing agency and existing conditions as to unit location and type of installation. However, the following suggestions should be considered before installing the system. Close adherence to these suggestions will assure a more satisfactory performance from the equipment.

The installing agency will supply and fabricate all external cables. The connectors required are supplied by Honeywell.

NOTE:

The TSO identifies the minimum performance standards, tests, and other conditions applicable for issuance of design and production approval of the article. The TSO applicant is responsible for documenting all limitations and conditions suitable for installation of the article. An applicant requesting approval for installation of the article within a specific type or class of product is responsible for determining environmental and functional compatibility.

2.3.2 KXP 2290 INTERCONNECTION AND CABLE HARNESS FABRICATION

2.3.2.1 General

The KXP 2290 Mode S Transponder receives primary power from the aircraft power source. Power connections, voltage requirements, and circuit breaker requirements are shown on the interconnect diagrams ([FIGURE 2-5 KXP 2290 INTERCONNECTION DRAWING](#)).

The length of the wires to parallel pins should be approximately the same length, so that the best distribution of current can be effected. Honeywell recommends that all wires, including spares as shown on the interconnect diagram be included in the fabrication of the wiring harness. However; if full wiring is not desired, the installer should ensure that the minimum wiring requirements for the features and functions to be used have been incorporated.

When cables are installed in the aircraft, they must be supported firmly enough to prevent movement and should be carefully protected against chaffing. Additional protection should also be provided in all locations where the cable may be subjected to abuse.

In wire bundles, the cabling should not be tied tightly together as this tends to increase the possibility of noise pickup and similar interference. When routing cables through the aircraft the cables should cross high level rf lines at right angles.

Prior to installing any equipment, make a continuity check of all wires and cables associated with the system. Then apply power and check for proper voltages at system connectors, and then remove power before completing the installation.

Please note the following guidelines:

- (1) The installing facility will supply and fabricate all external cables. The required connectors are supplied as part of the installation kit (P/N 050-03451-0000).
- (2) The KXP 2290 must be kept a minimum of three feet from the antenna(s). Additionally, the antenna coax cable(s) should not be bundled with the other wiring harnesses to the KXP 2290.

- (3) The length and routing of the external cables must be carefully planned before attempting the actual installation. Avoid sharp bends or locating the cable near aircraft control cables. The cables should be of a length to allow for a "maintenance loop". That is, the length should be adequate to access and extend the connectors aft of the panel for future maintenance purposes. Excess cabling should be secured and stowed by tie-wrapping until such maintenance is required.
- (4) The cables should be supported firmly enough to prevent movement. They should be carefully protected wherever one may chafe against another or against some other object. Extra protection should be provided in all locations where the cables may be subject to abuse. Shields on shielded wires should be grounded as shown on the system interconnection diagrams.
- (5) Shields should be carried through any obstruction via a thru-bulkhead connector. If shielding cannot be carried through by use of a bulkhead/connector pin, precautions should be taken to ensure each segment of the shielded lead be grounded at only one point. A ground connection of not more than two inches in length should be used. The preceding discussion does not apply to coaxial and quadraxial cable.
- (6) Avoid routing cabling near high noise and high power sources.
- (7) Do not route the transponder antenna coax(s) near ADF sense or loop antenna cables.
- (8) Antenna Transmission Line Loss Considerations

NOTE:

The total losses in the coaxial cable run and interconnects between the antenna(s) and the KXP 2290 transponder must not be less than 0.5 dB and must not be more than 2.0 dB at 1030MHz.

NOTE:

The antenna cabling information noted in this section, in particular by [FIGURE 2-8 RG-400 CABLE CONNECTIONS DRAWING](#), [FIGURE 2-9 ECS/ECS-RG-400 CABLE CONNECTIONS DRAWING](#), [FIGURE 2-10 CABLE CONNECTOR DRAWING](#), [FIGURE 2-11 TYPE "N" AND "C" CONNECTOR ASSEMBLY DRAWING](#), and [FIGURE 2-12 BNC CONNECTOR ASSEMBLY DRAWING](#), is provided as possible antenna connection solutions and is provided for reference only. While the options noted in the figures will be applicable to many installations, adherence to the following sub-sections will ensure that the total cable/interconnection losses are within specification.

- (a) Consult manufacturer's coaxial cable data sheet specifications. Using the length of the top and/or bottom antenna cables and the manufacturer specified dB loss per foot of cable type, select a particular type or types of cable that meet the top and bottom cable loss limitations. In anticipation of aging factors, it is advisable to select a cable type that has an insertion loss that when combined with interconnect losses will equal a dB loss significantly lower than 2 dB.
- (b) In diversity installations, it is conceivable that the type of cable selected to meet the dB loss requirements of the top antenna cable will be different than the type of cable selection required to meet the dB loss requirements of the bottom antenna. For example: if the antenna run to one antenna is relatively lengthy, and the antenna run to the other antenna is relatively short, the longer run may require low loss antenna cable to meet the less than 2 dB antenna cable/interconnect requirement while the short run may require a relatively higher loss cable to exceed the 0.5 dB antenna cable/interconnect loss requirement

NOTE:

For installations with diversity transponder antennas (top and bottom) the cable lengths must be within 10 feet of each other.

- (c) Consult manufacturer's data sheets to determine the nanosecond delay per foot (at 1030 MHz) for the type or types of cable selected.

2.3.2.2 Primary Power and Circuit Breaker Requirements and Wiring

The KXP 2290 transponder receives primary power from the aircraft power circuit breakers. The KXP 2290 is designed to operate over the range of 18-32V dc. Power connections, wire sizes, and circuit breaker requirements are shown on the interconnection diagrams [FIGURE 2-5 KXP 2290 INTERCONNECTION DRAWING](#).

2.3.3 EQUIPMENT LOCATION

Care should be exercised to avoid mounting components near equipment operating with high pulse current or high power outputs such as radar and satellite communications equipment. In general, the equipment should be installed in a location convenient for operation, inspection, and maintenance, and in an area consistent with the TSO environmental limits.

Refer to the mechanical installation drawing ([FIGURE 2-2 KXP 2290 INSTALLATION DRAWING](#)), cable and connector assembly diagrams ([FIGURE 2-7 RF CONNECTOR DRAWING](#), [FIGURE 2-8 RG-400 CABLE CONNECTIONS DRAWING](#), [FIGURE 2-9 ECS/ECS-RG-400 CABLE CONNECTIONS DRAWING](#), [FIGURE 2-10 CABLE CONNECTOR DRAWING](#), [FIGURE 2-11 TYPE "N" AND "C" CONNECTOR ASSEMBLY DRAWING](#), [FIGURE 2-12 BNC CONNECTOR ASSEMBLY DRAWING](#)), interconnection drawing(s) ([FIGURE 2-5 KXP 2290 INTERCONNECTION DRAWING](#)), and connector pin assignments diagrams ([FIGURE 2-1 MAIN CONNECTOR - JKXP2290-1](#), [TABLE 2-2 JKXP2290-1 PIN FUNCTION LIST](#)) as required. Determine the mounting location for system components following the guidelines below.

2.3.3.1 Transponder And Mounting Tray Locations

The KXP 2290 Mode S Transponder shares a mounting tray with the Honeywell APEX KMC 2210 controller and is part of the APEX cockpit panel configuration.

Except for antenna cables the lengths of the cables from the KXP 2290 transponder mounting tray connector to other system units are not critical because unit interfaces are designed with high impedance inputs, low impedance outputs, and low noise susceptibility characteristics.

2.3.3.2 Antenna(s)

The antenna(s) should be well removed from other antenna projections, the engine(s), and propeller(s). It should also be well removed from landing gear doors, access doors, or other openings which will break the ground plane for the antenna(s). The surface directly beneath the antenna(s) should be a flat plane over as large an area as possible.

A back-up plate for each antenna should be used for added strength on thin-skinned aircraft.

The antenna(s) need to be within 5 degrees of the centerline

To prevent rf interference, the antenna(s) must be physically mounted a minimum distance of three feet from the KXP 2290 and the wiring harness.

The transponder antenna(s) should be mounted a minimum of 30 inches away from the TCAS or DME antennas and four feet from the ADF sense antenna.

Where practical, plan the antenna location(s) to keep cable lengths as short as possible and avoid sharp bends in the cable to minimize the VSWR.

Avoid running other cables or wires near the antenna cable(s).

On pressurized aircraft, the antenna(s) should be sealed using an approved sealant, such as RTV No. 3145 (P/N 016-01082-0000) or equivalent, around the connector and mounting hardware.

The antenna mounting(s) should be sealed from the outside for moisture protection using RTV or equivalent.

Mount the antenna(s) in as clean an environment as possible, away from exhaust gases and oils. The antenna(s) should be kept clean. If left dirty (oil covered), the range of the transponder may be affected.

For installations with diversity transponder antennas (top and bottom) the distance between the top and bottom antennas on the horizontal plane of the aircraft fuselage must not exceed 25 feet (7.62m).

2.3.4 KXP 2290 INSTALLATION

2.3.4.1 General

The mounting tray for the transponder/control unit should be mounted using the dimensions specified in the outline and mounting drawing, [FIGURE 2-2 KXP 2290 INSTALLATION DRAWING](#). KXP 2290 wiring should be per the system interconnect diagram, [FIGURE 2-5 KXP 2290 INTERCONNECTION DRAWING](#).

2.3.4.2 Transponder

- (1) Slide the transponder into the tray until the front lobe touches the mounting tray.
- (2) Turn the Allen wrench clockwise until the rear lobe engages the mounting tray slot. Continue turning the wrench clockwise until tight.

CAUTION:
DO NOT OVERTIGHTEN THE LOCKING FASTENER

- (3) For removal, turn the 3-32 inch Allen wrench counter-clockwise until the unit disengages from the mounting tray slot. If all connectors are removed, the unit can be pulled completely out of the rack.

For additional KXP 2290 installation information, refer to [FIGURE 2-2 KXP 2290 INSTALLATION DRAWING](#) as required

2.3.4.3 Aircraft Address Programming Options

The Mode S aircraft address and maximum airspeed data must be programmed for use for the KXP 2290. This information is received from the APEX system via the ARINC 429 bus.

NOTE:

THE AIRCRAFT MODE S ADDRESS MUST BE OBTAINED FROM FAA AND PROGRAMMED INTO THE KXP 2290. FOR US REGISTERED AIRCRAFT, THE ICAO AIRCRAFT ADDRESS CODE CAN BE FOUND ON THE AIRCRAFT REGISTRATION.

AIRCRAFT MODE S ADDRESSES MAY BE OBTAINED BY CALLING THE FAA AIRMAN AND AIRCRAFT REGISTRY DIVISION AT (405)-954-3116. IF THREE (3) OR MORE ADDRESSES ARE NEEDED, WRITE TO AIRCRAFT REGISTRATION BRANCH, ANV-450, P.O. BOX 25082, OKLAHOMA CITY, OK 73125.

2.3.4.4 Antenna

For KA 61 antenna installation information, refer to [FIGURE 2-4 KA 61 INSTALLATION DRAWING](#). For other L-band blade antenna outline drawings, installation procedures, and mounting dimensions, refer to the manufacturer's instructions.

2.3.5 CRIMP TOOL INFORMATION

The following is a listing of crimp tools and accessories for use with the KXP 2290.

SOURCE *	CRIMP TOOL	POSITIONER 22-30 AWG **	INSERTION/EXTRACTION TOOL
HONEYWELL	005-02012-0034	Not Available	Not Available
MIL-SPEC	M22520/2-01	M22520/2-06	M81969/1-04 ***
DANIELS MFG.	AFM8 (M22520/2-01)	K41 (M22520/2-06)	
POSITRONICS	9507-0-0	9502-3 (K41)	
ASTRO (BUCHANAN)	615717 (M22520/2-01)	615722 (M22520/2-06)	

* All source tools and positioners are to Mil-Spec Standard and are interchangeable.

** Positioner wire gauge (AWG) refers to barrel only.

*** SUPERCEDES MIL SPEC P/N M24308/18-1. ORDER FROM POSITRONICS, DANIELS, OR ASTRO BY MIL SPEC P/N.

NOTE: Selections in parentheses denote optional ordering number from source.

Vendor Ordering Information:

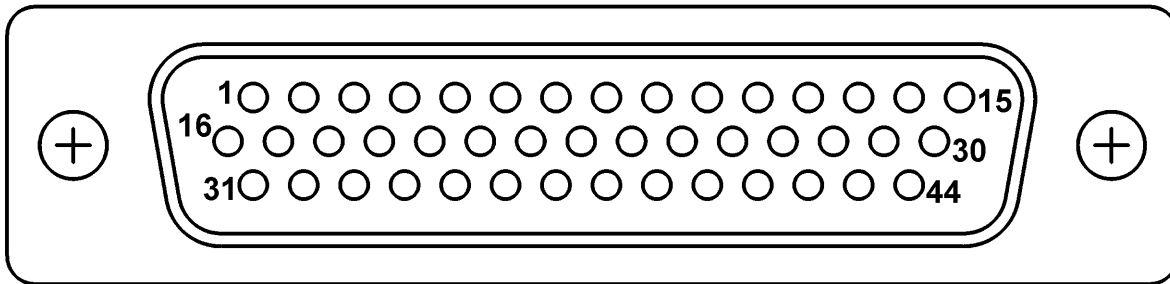
Astro Tool Company
 21615 SW TV Hwy, Beaverton, OR 97006
 (503) 642-9853 * Fax: 503-591-7766 * Email: sales@astrotool.com

Daniels Manufacturing Company (DMC)
 526 Thorpe Road, Orlando, FL 32824-8133 USA
 Tel: 407-855-6161 * Fax: 407-855-6884 * Email: dmc@dmctools.com

Positronics Industries, Inc.
 423 N. Campbell Ave P.O. Box 8247, Springfield, MO 65801
 Tel: 800-641-4054 * Fax: 417-866-4115 * Email: info@connectpositronics.com

TABLE 2-1 SIZE 22 HIGH DENSITY D-SUB CONTACT TOOLS

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**FIGURE 2-1 MAIN CONNECTOR - JKXP2290-1
Front View**

Pin #	I/O	Description	Specification
1	I	+28 Vdc Power In	Aircraft Power +18 to +32 Vdc
2	I	Ext Standby ~	Discrete input. GND (< 10 ohms-to-ground) on this pin forces the unit to Standby. Resistance-to-ground > 100K on this pin keeps the present mode.
3	I	TCAS 429 RX - A	TCAS II compatibility
4	I	Spare 1 429 RX - A	Reserved
5	I	Spare 2 429 RX - A	Reserved
6	I	Spare 3 429 RX - A	Reserved
7	I	XPDR 1/2	Reserved
8	I	Serial Data In	Reserved
9	O	Serial Clk	Reserved
10	I	Conc 429 RX - A	Concentrated A429 input bus
11	I	Spare 4 429 RX - A	Reserved
12	I	GPS 1 429 RX - A	GPS ARINC 429 input
13	I	GPS 2 429 RX - A	GPS ARINC 429 input
14	O	GP 2 429 TX - B	Reserved
15	O	GP 2 429 TX - A	Reserved
16	I	+28 Vdc Power Return	Aircraft Ground
17	I	+28 Vdc Power In	Aircraft Power +18 to +32 Vdc
18	I	TCAS 429 RX - B	TCAS II compatibility
19	I	Spare 1 429 RX - B	Reserved
20	I	Spare 2 429 RX - B	Reserved
21	I	Spare 3 429 RX - B	Reserved
22	I	RS232 Return	Reserved

TABLE 2-2 JKXP2290-1 PIN FUNCTION LIST

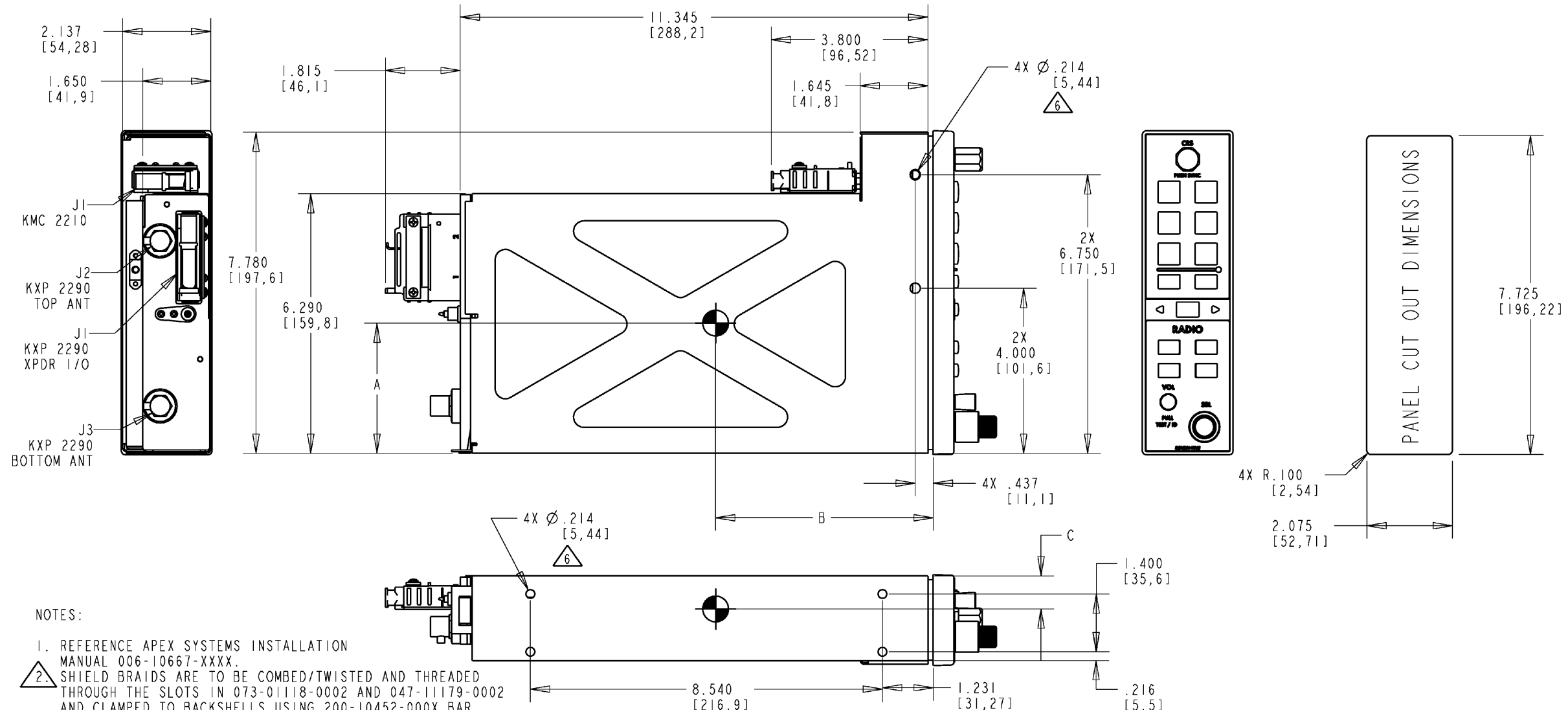
Pin #	I/O	Description	Specification
23	I	Ext Ident	Reserved
24	I	Ext Air/Gnd	Reserved
25	I	Conc 429 RX - B	Concentrated A429 input bus
26	I	Spare 4 429 RX - B	Reserved
27	I	GPS 1 429 RX - B	GPS ARINC 429 input
28	I	GPS 2 429 RX - B	GPS ARINC 429 input
29	O	GP 1 429 TX - B	General Purpose A429 output bus
30	O	GP 1 429 TX - A	General Purpose A429 output bus
31	I	+28 Vdc Power Return	Aircraft Ground
32	I	GPS Mark 1 - A	GPS Time Mark for precision ADS-B
33	I	GPS Mark 1 - B	GPS Time Mark for precision ADS-B
34	I	GPS Mark 2 - A	GPS Time Mark for precision ADS-B
35	O	Serial Data Out	Reserved
36	I	GPS Mark 2 - B	GPS Time Mark for precision ADS-B
37	I	XPDR 1/2 Parity	Reserved
38	O	+ 3.3 Vdc	Reserved
39	O	EXT EEPROM CS	Reserved
40	I	RS232 Diag - RX	Diagnosis Input
41	O	RS232 Diag - TX	Diagnosis Output
42	I/O	ARINC Supr I-0	As an input: voltage ≥ 18 V and ≤ 70 V will cause suppression. A steady state voltage ≥ 18 V will cause the suppression to cease. As an output: this pin will go ≥ 18 V when the transponder transmits. This line conforms to ARINC 718A Attachment 6.
43	O	TCAS 429 TX - A	TCAS II compatibility
44	O	TCAS 429 TX - B	TCAS II compatibility

TABLE 2-2 JKXP2290-1 PIN FUNCTION LIST

NOTE: Do not connect to pins marked “Reserved” as the functionality is for future application.

Connector	Pin	I/O	Description
JKXP2290-2	J2	I/O	RX/TX Port - Bottom Antenna (BNC)
JKXP2290-3	J3	I/O	RX/TX Port - Top Antenna (BNC)

TABLE 2-3 ANTENNA CONNECTORS AND DESCRIPTIONS



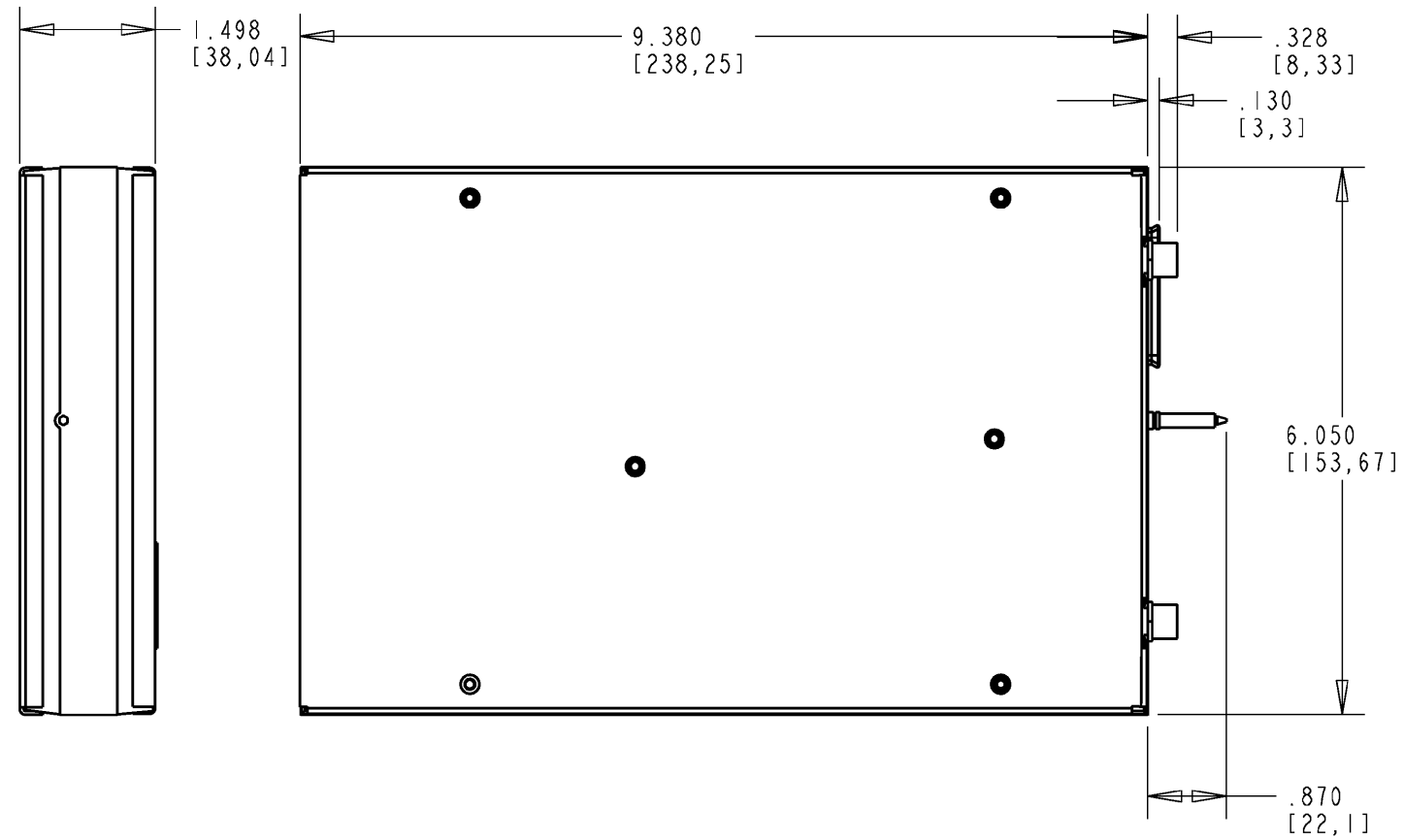
NOTES:

1. REFERENCE APEX SYSTEMS INSTALLATION MANUAL 006-10667-XXXX.
2. SHIELD BRAIDS ARE TO BE COMBED/TWISTED AND THREADED THROUGH THE SLOTS IN 073-01118-0002 AND 047-11179-0002 AND CLAMPED TO BACKSHELLS USING 200-10452-000X BAR CLAMP ASSEMBLIES.
3. CENTER OF GRAVITY (CG) LOCATIONS ARE APPROXIMATE AND DO NOT INCLUDE MATING CABLES.
4. DIMENSIONS ARE IN INCHES[MILLIMETERS]
5. IF A GROUND BOND OF 2.5 MILLIOHM MAX IMPEDENCE CANNOT BE ACHIEVED THROUGH THE MOUNTING SURFACES THE INSTALLER MAY USE A BOND STRAP FROM THE CONNECTOR HOUSING(S) TO THE AIRFRAME.
6. SECURE RACK WITH EIGHT STAINLESS STEEL FLATHEAD 100 DEG #6-32 SCREWS, SUCH AS MS24693-CXX (NOT INCLUDED).
7. REMOVE PROTECTIVE COVERS FROM CONNECTORS AND LOCKING ROD PRIOR TO INSTALLATION. REMOVE PROTECTIVE BEZEL COVER AFTER INSTALLATION.

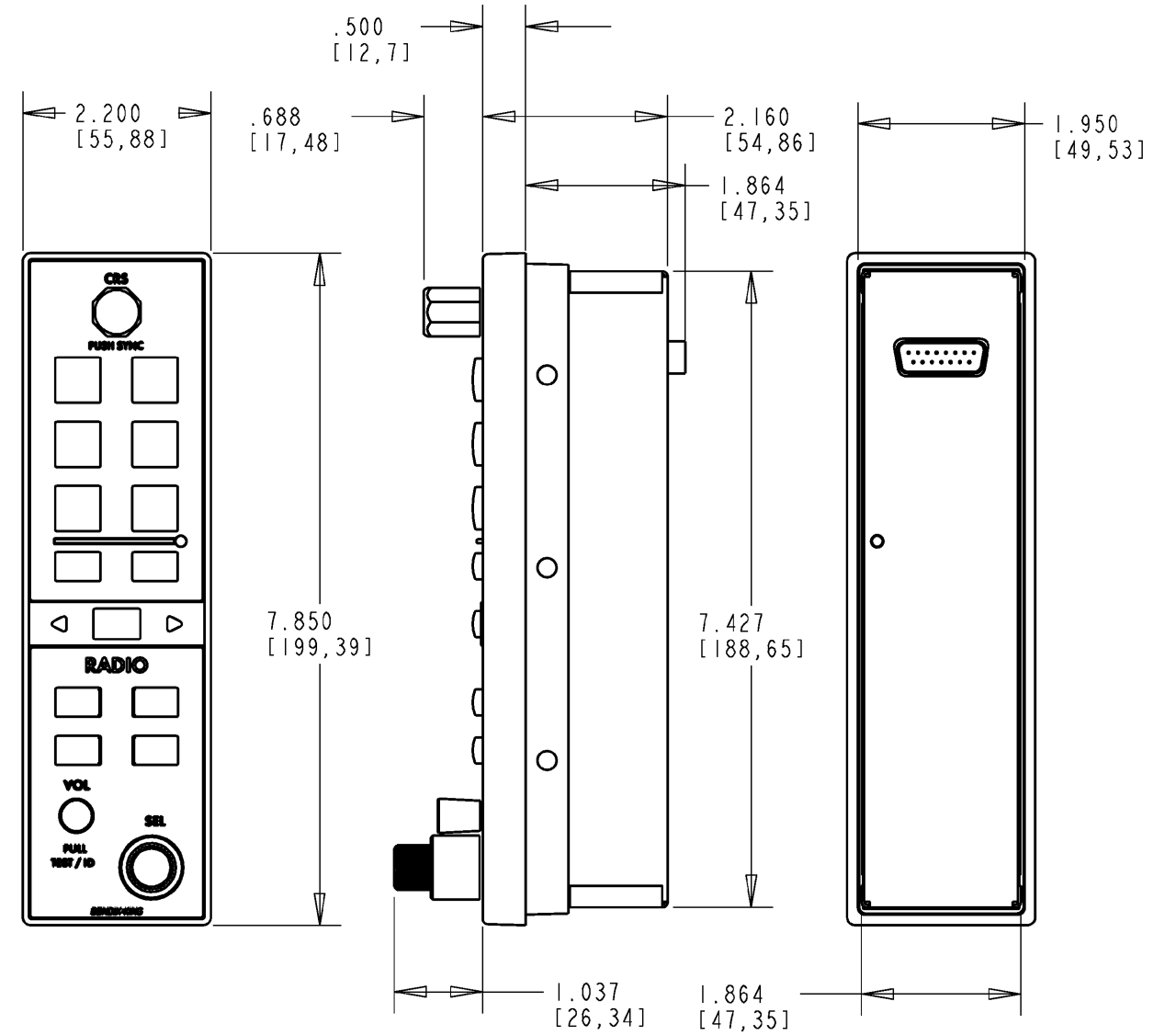
FOR KMC 2210 INSTALLATION ONLY THIS DRAWING NOT COMPLETE WITHOUT PARTS LIST 050-03670-0000
 FOR KMC 2210 AND KXP 2290 INSTALLATION THIS DRAWING NOT COMPLETE WITHOUT PARTS LIST 050-03670-0000 AND 050-03683-0000

	WEIGHT ±15%	CENTER OF GRAVITY		
		DIM A ±.15	DIM B ±.15	DIM C ±.15
KMC2210/KXP2290	5.11 lbs	3.20 [81.3]	5.27 [133.9]	.80 [20.3]
KMC2210 ONLY	1.82 lbs	3.76 [95.5]	2.28 [58.0]	.80 [20.3]

FIGURE 2-2 KXP 2290 INSTALLATION DRAWING
(Dwg. 155-01786-0000 Rev. B, Sheet 1 of 4)



KXP 2290
DIMENSIONS FOR REFERENCE ONLY



KMC 2210
DIMENSIONS FOR REFERENCE ONLY

FIGURE 2-2 KXP 2290 INSTALLATION DRAWING
(Dwg. 155-01786-0000 Rev. B, Sheet 2 of 4)

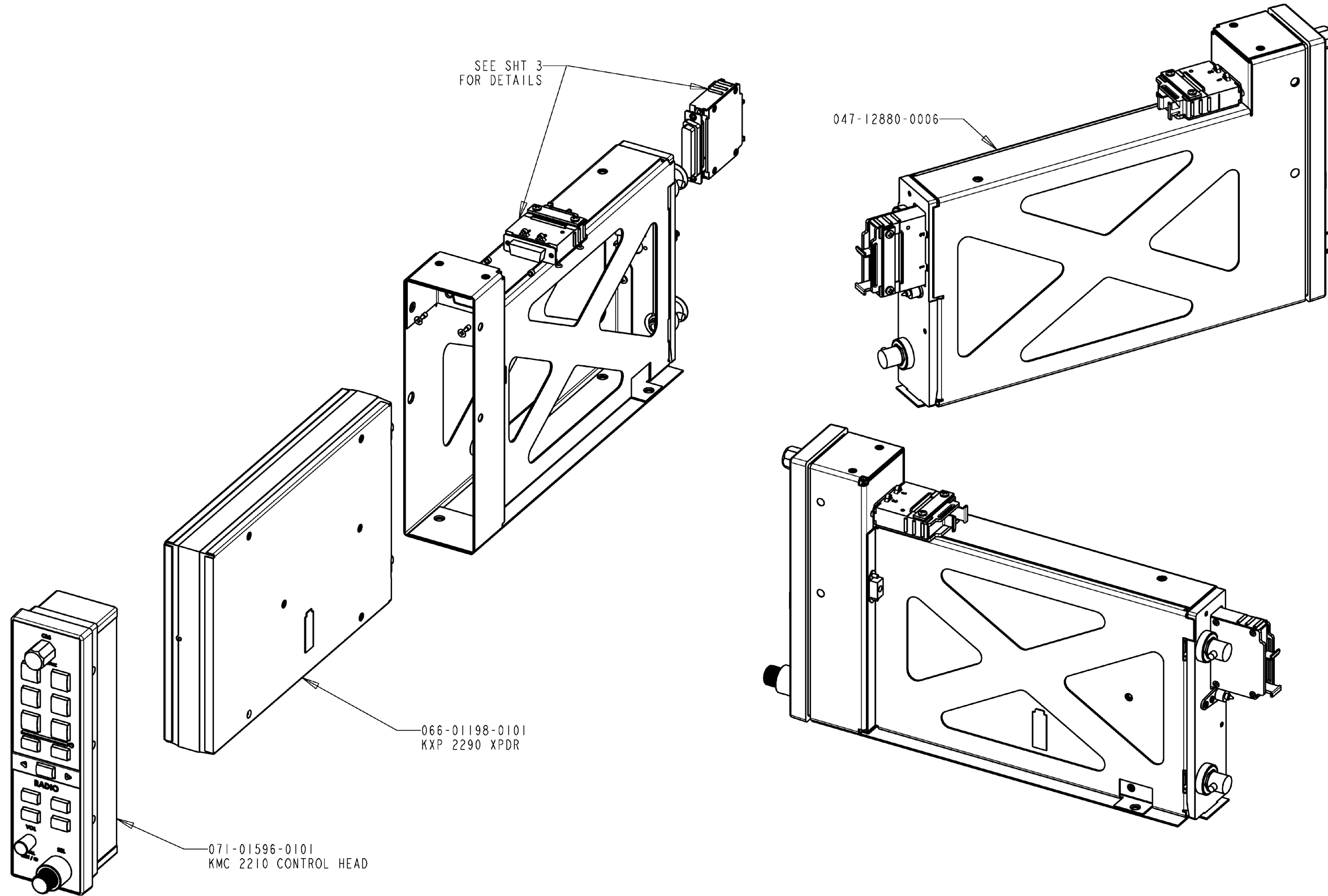


FIGURE 2-2 KXP 2290 INSTALLATION DRAWING
(Dwg. 155-01786-0000 Rev. B, Sheet 3 of 4)

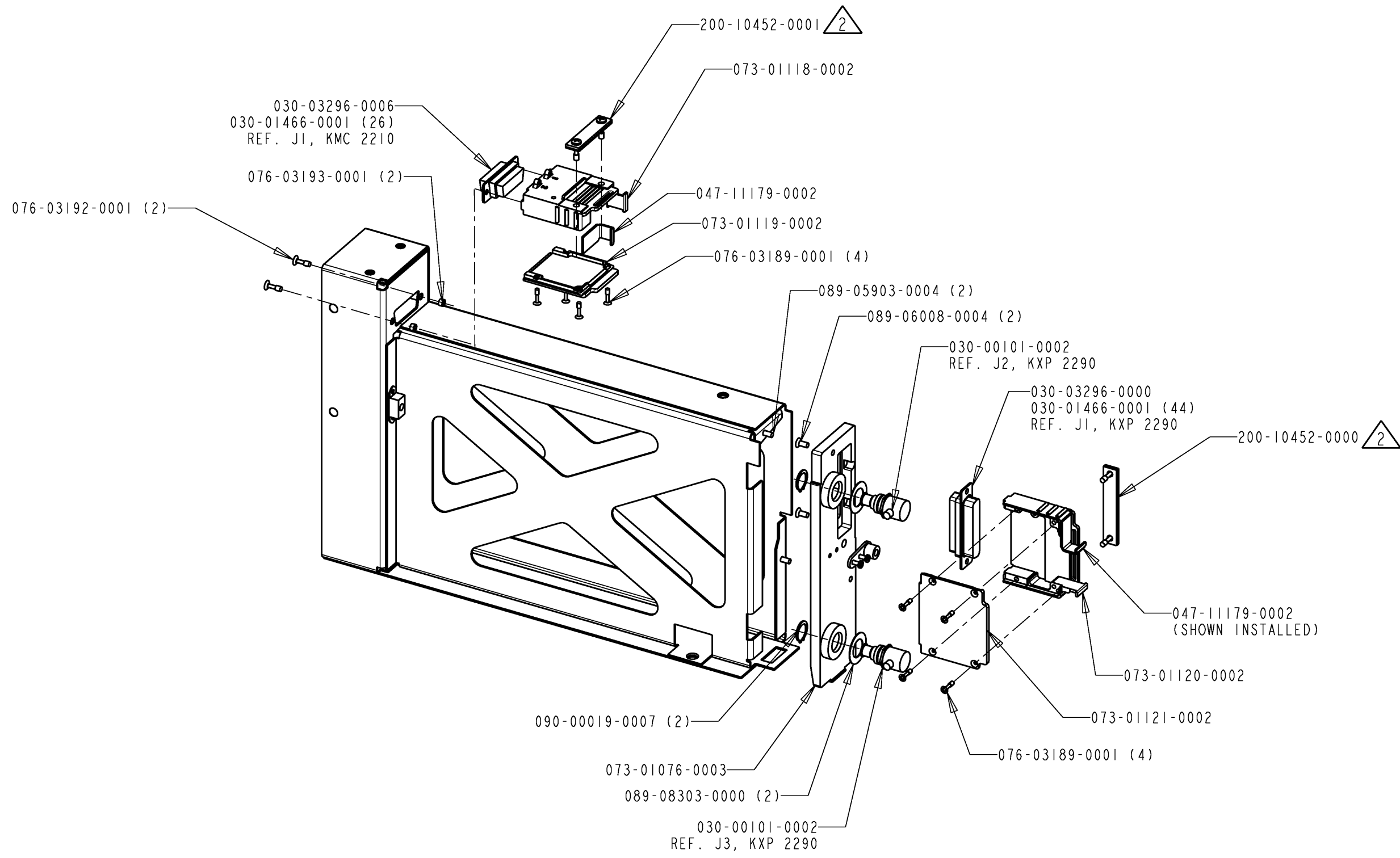
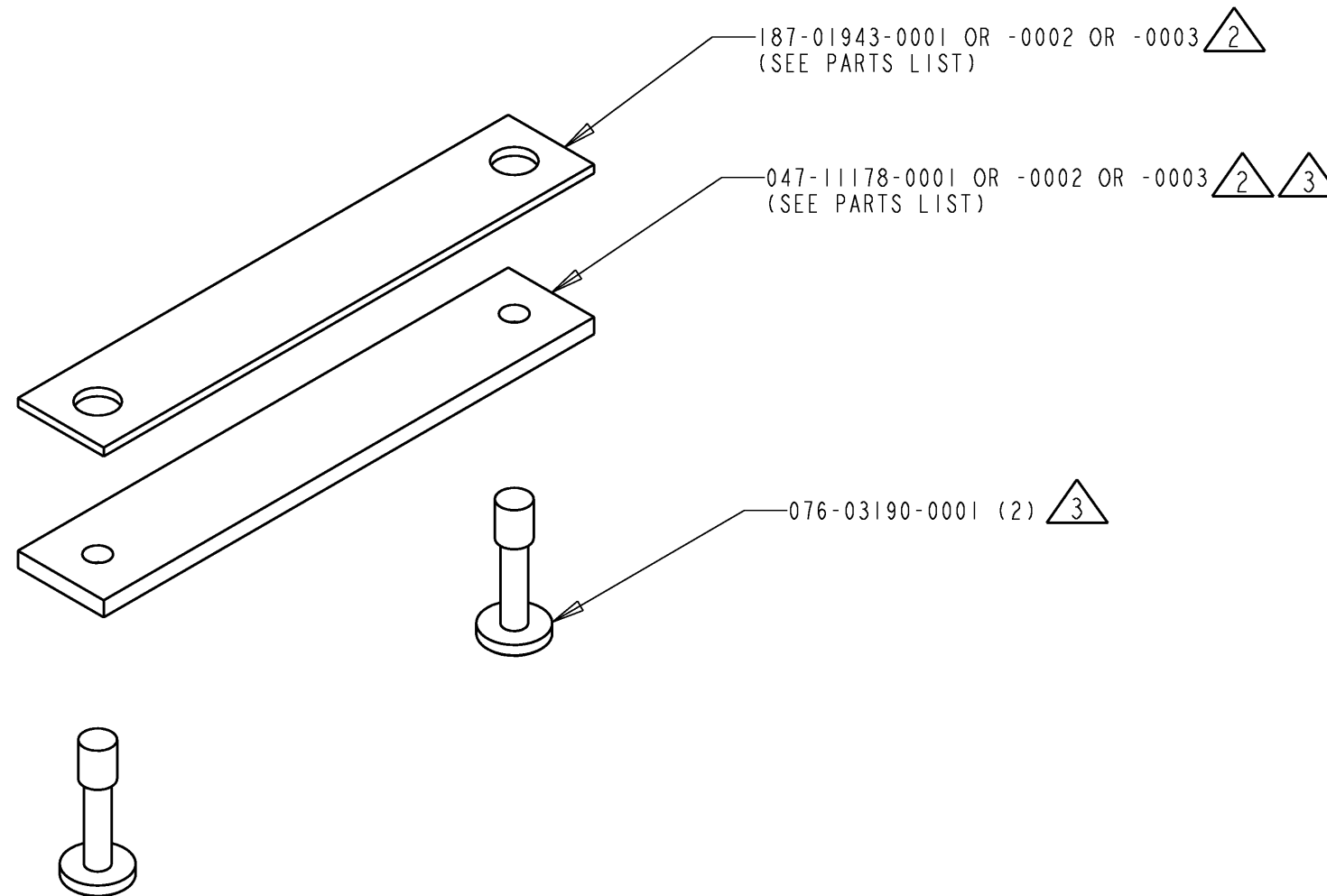


FIGURE 2-2 KXP 2290 INSTALLATION DRAWING
(Dwg. 155-01786-0000 Rev. B, Sheet 4 of 4)



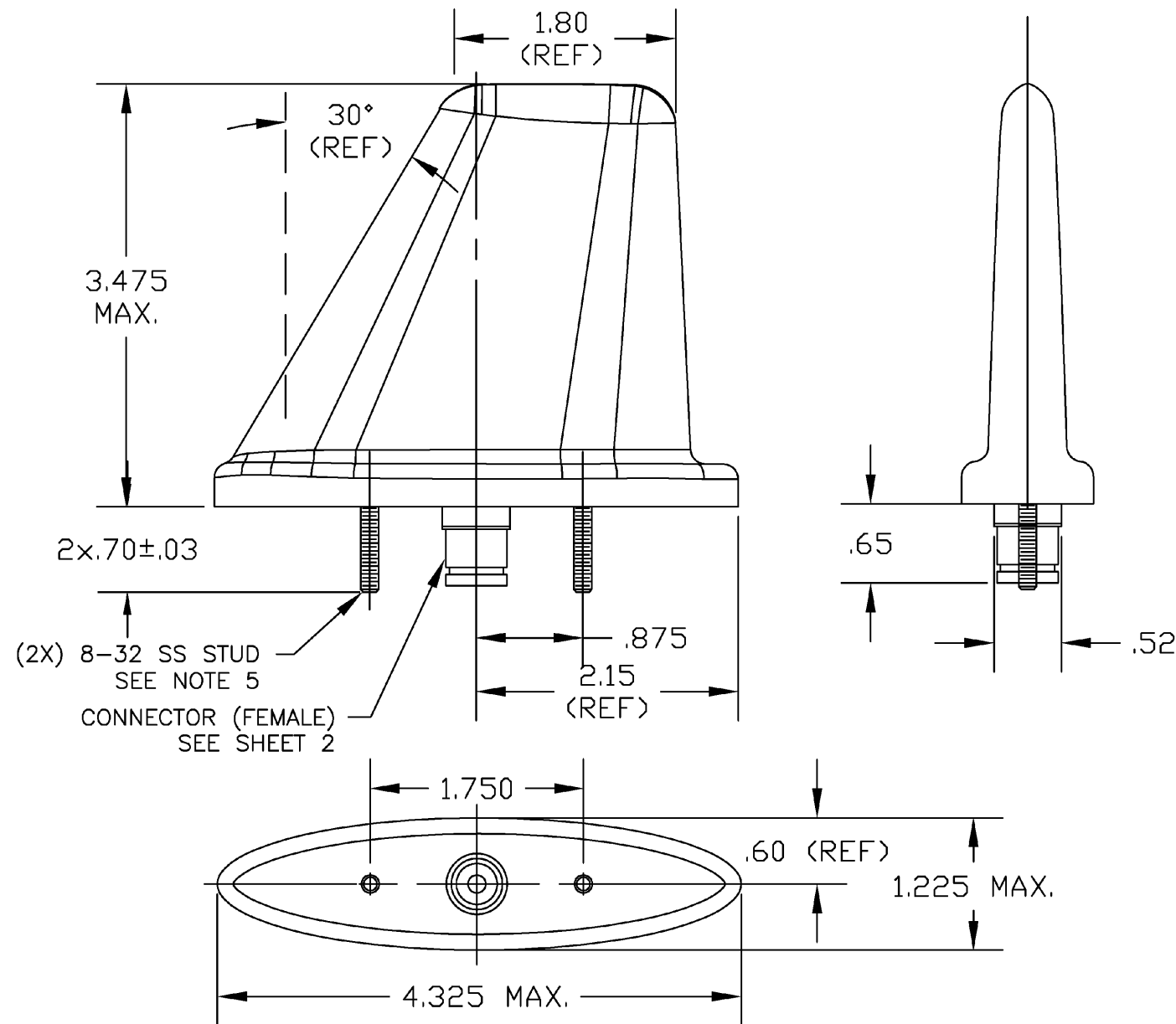
NOTES:

1. THIS DRAWING IS NOT COMPLETE WITHOUT PARTS LIST 200-10452-0000/0002.

△ PEEL LINER AND ADHERE 187-01943-XXXX TO 047-11178-XXXX, APPROXIMATELY ALIGNING THE EDGES.

△ THREAD 076-03190-0001 SCREWS THROUGH TAPPED HOLES IN 047-11178-XXXX.

**FIGURE 2-3 KXP 2290 BAR CLAMP ASSEMBLY DRAWING
(300-10452-0000, Rev. -)**



1. RF Performance Characteristics:

- Frequency: 960 to 1220 MHz.
- VSWR: 1.5:1 Max @ 960 to 1220 MHz.
1.3:1 Max @ 1025 to 1150 MHz.
- Polarization: Vertical
- Radiation Pattern: Equivalent of $\lambda/4$ Stub
- RF Power: 500 Watts pulse power @ 55,000 FT altitude
(30uS pulse width, PRF 125 pulses per second)
- Lightning Protection: DC grounded (< 50mW from RF pin to base plate)

2. Weight:

0.40 LBS (MAX)

3. Construction:

Molded radome filled with an EPOXY resin fill and painted with white enamel.

4. Color:

White Semi-gloss per FED STD 17925

5. Mounting Studs:

8-32 Studs must withstand 9 in-lb (min) torque

6. Rated Air Speed:

350 Knot EAS with 15 Degrees side slip

7. TSO Categories:

C66c, C74c, C112, C118, C147

8. DO160D ENV CAT:

[D2X]ACB[SCMYL,RG]XRFXXSXXXXXX[XXXX][2A]AX

9. Item 2: Material:

Aluminum sheet, #2024-T3, .040" THK

Finish:

Clear Iridite, Mil-C-5541

Marking:

Vendor Part No. to be stamped approximately as shown.

10. Item 3: Material:

#60 White paper coated with removable adhesive and paper liner, or equivalent.

Marking:

Vendor part number identification located approximately as shown.

11. Dimensions, Item 1, Antenna:

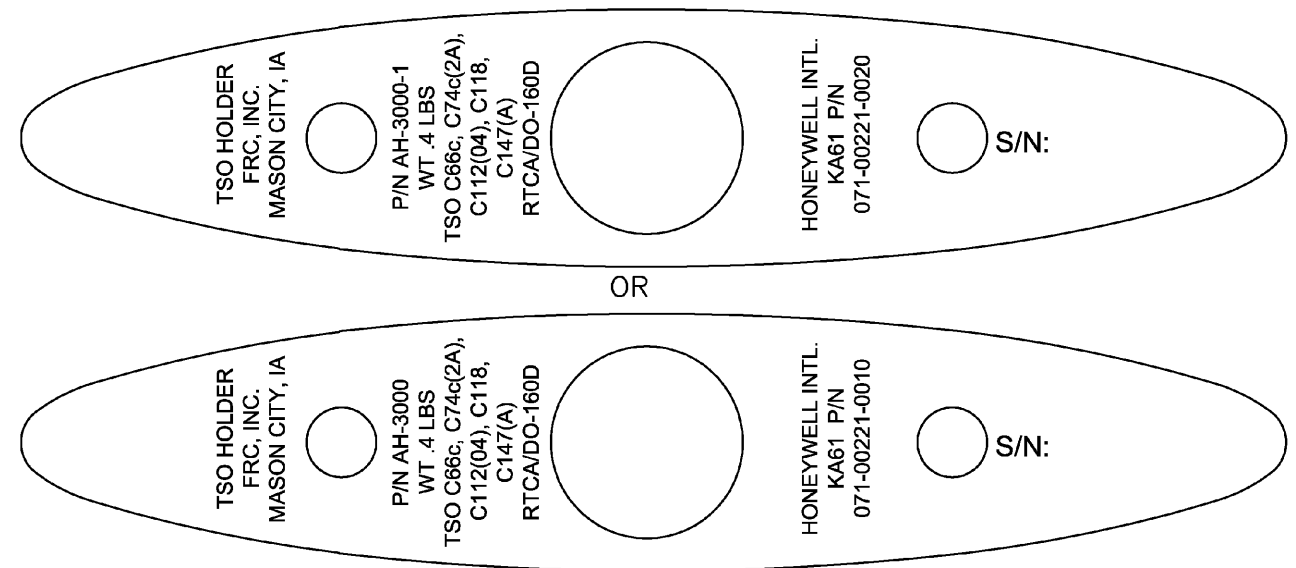
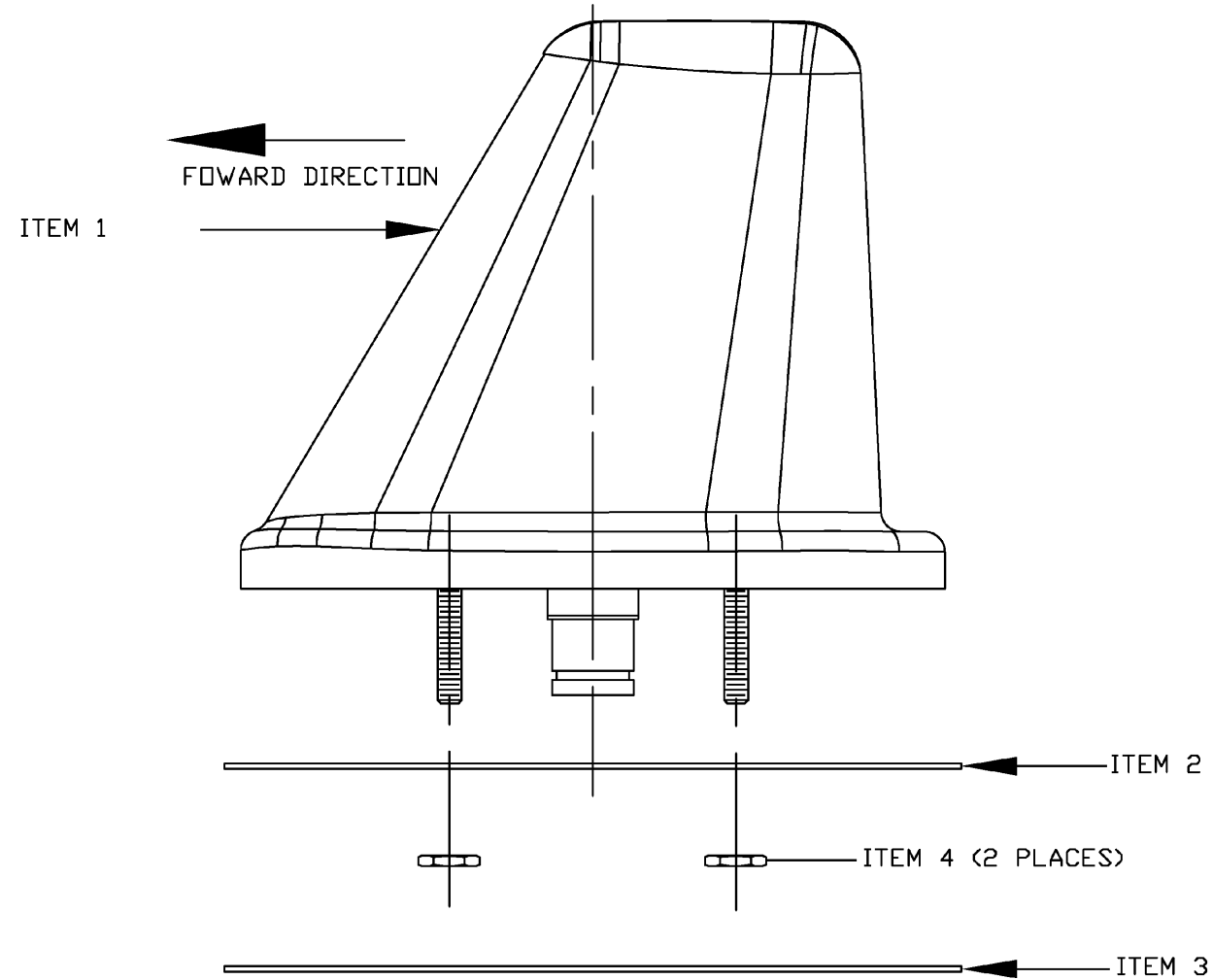


FIGURE 2-4 KA 61 INSTALLATION DRAWING
(Sheet 1 of 2)

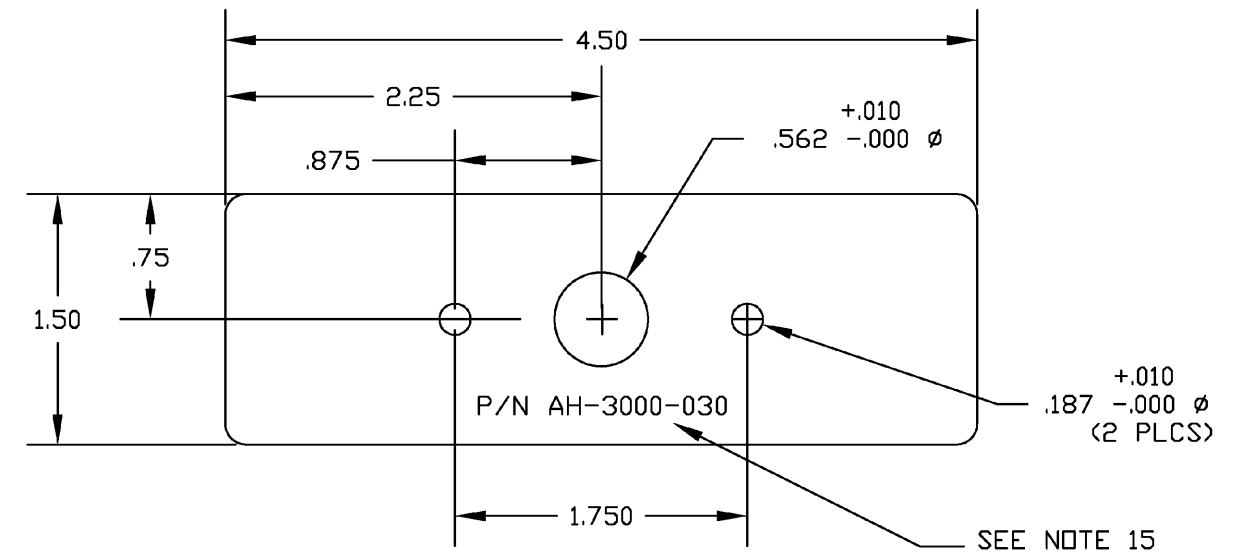
Product List:

Each antenna assembly shall include the following items:

Qty	Item No.	FRC P/N	Description
1	1	071-00221-0010	BNC L-Band Antenna
1	1	071-00221-0020	TNC L-Band Antenna
1	2	AH-3000-030	Backing Plate
1	3	AH-3000-040	Installation Template
2	4	8-32	Self Locking Cadmium Plated Carbon Hex Nut
1	5	Install-AH-3000	Installation Instructions (not shown)



DIMENSIONS, ITEM 2, BACKING PLATE:



DIMENSIONS, ITEM 3, INSTALLATION TEMPLATE:

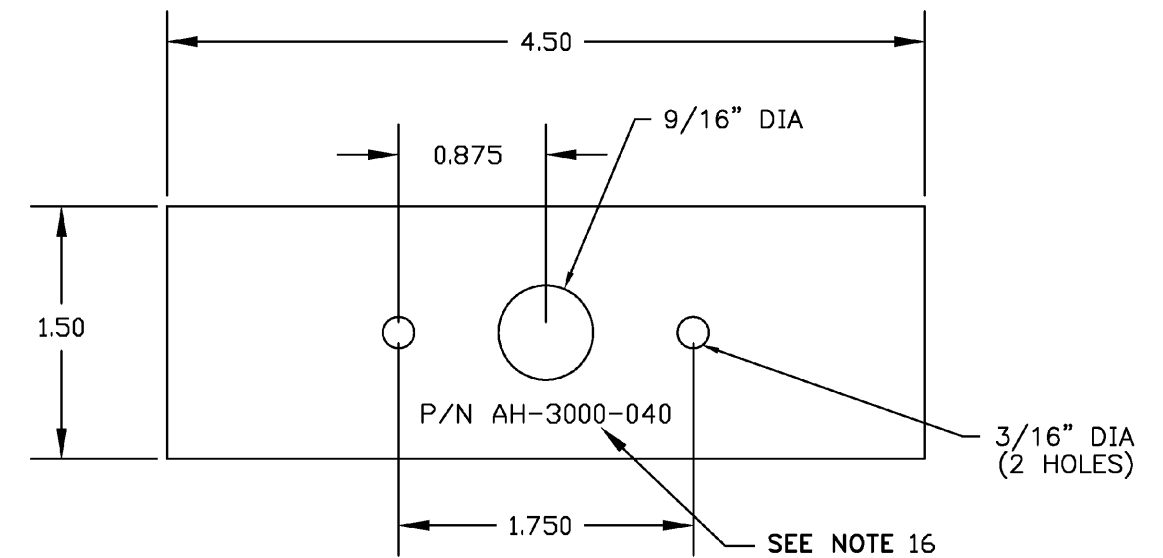

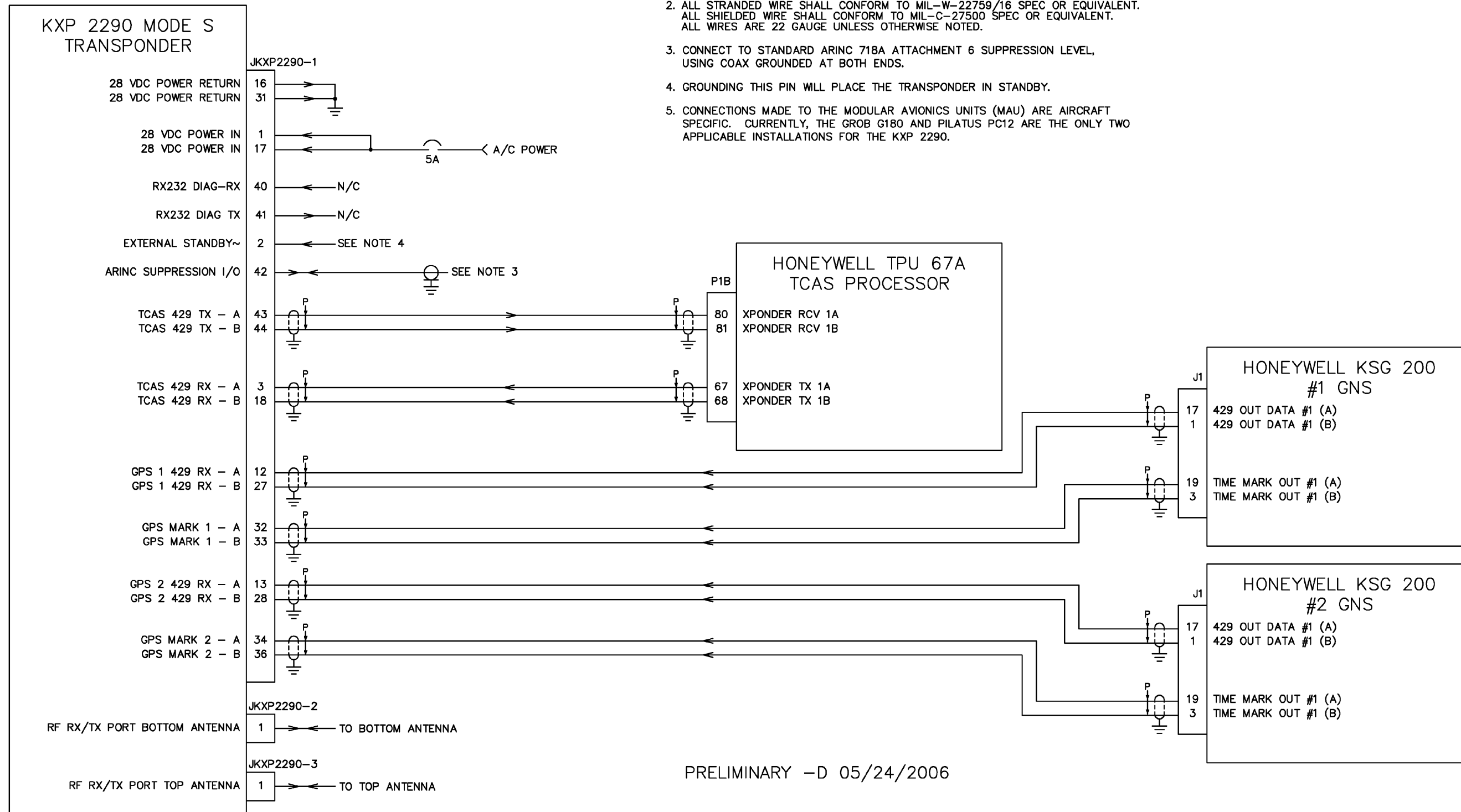


FIGURE 2-4 KA 61 INSTALLATION DRAWING
(Sheet 2 of 2)

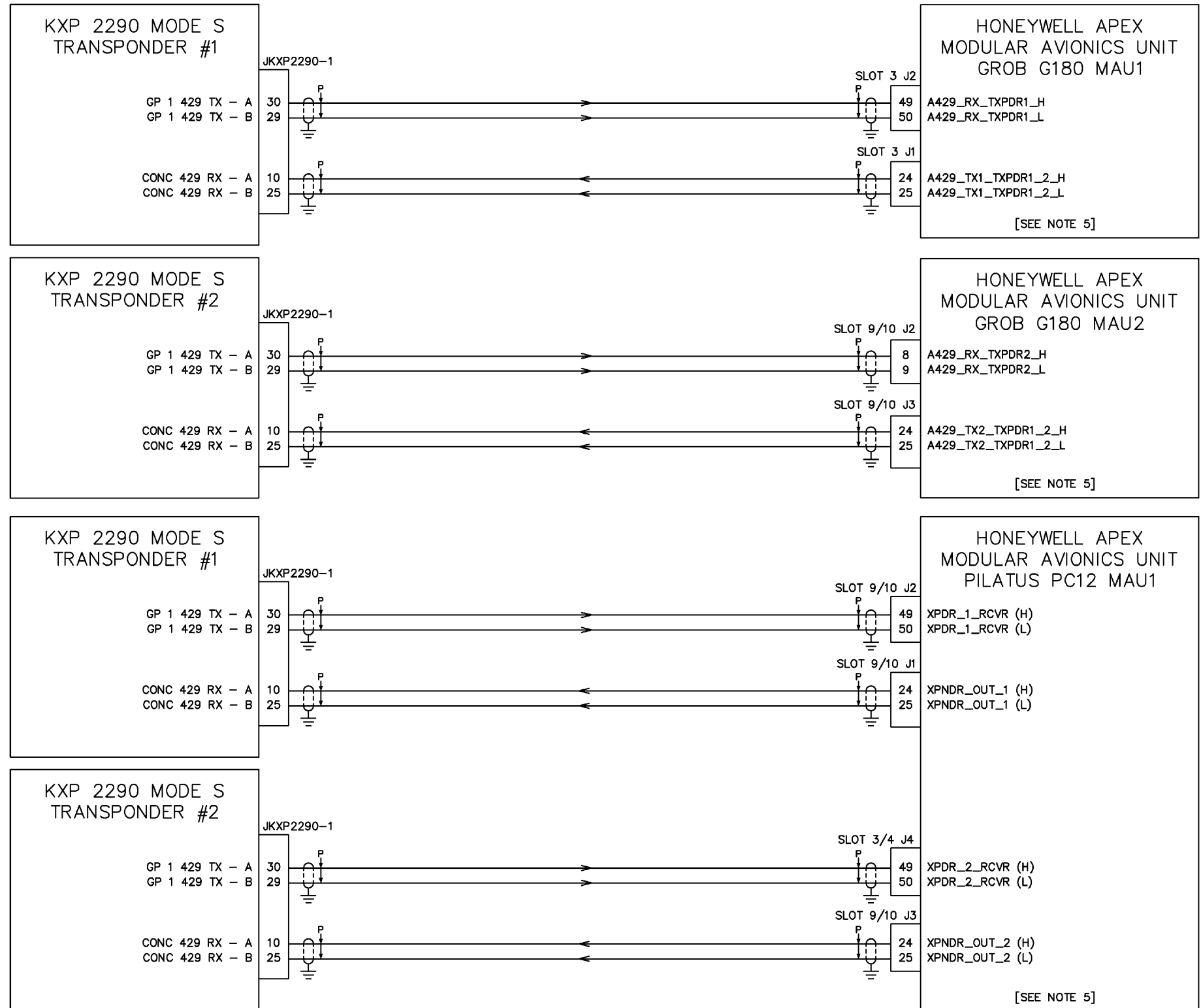
NOTES:

1.  CONNECT THE SHIELD/PIN TO AIRCRAFT GROUND WITH AS SHORT A CONDUCTOR AS PRACTICAL.
2. ALL STRANDED WIRE SHALL CONFORM TO MIL-W-22759/16 SPEC OR EQUIVALENT. ALL SHIELDED WIRE SHALL CONFORM TO MIL-C-27500 SPEC OR EQUIVALENT. ALL WIRES ARE 22 GAUGE UNLESS OTHERWISE NOTED.
3. CONNECT TO STANDARD ARINC 718A ATTACHMENT 6 SUPPRESSION LEVEL, USING COAX GROUNDED AT BOTH ENDS.
4. GROUNDING THIS PIN WILL PLACE THE TRANSPONDER IN STANDBY.
5. CONNECTIONS MADE TO THE MODULAR AVIONICS UNITS (MAU) ARE AIRCRAFT SPECIFIC. CURRENTLY, THE GROB G180 AND PILATUS PC12 ARE THE ONLY TWO APPLICABLE INSTALLATIONS FOR THE KXP 2290.



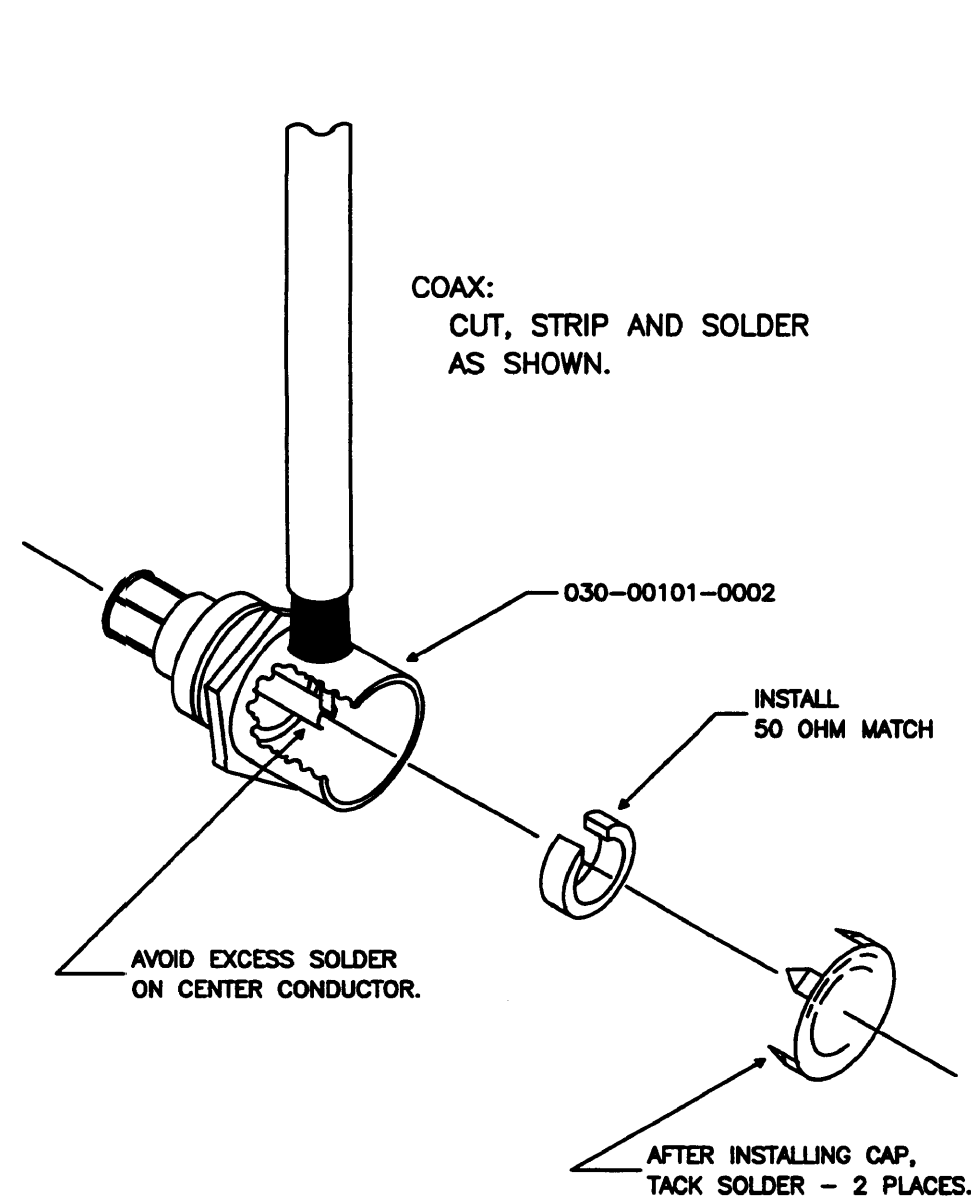
PRELIMINARY -D 05/24/2006

FIGURE 2-5 KXP 2290 INTERCONNECTION DRAWING
(Dwg. 155-0xxxx-000x Rev. -, Sheet 1 of 2)



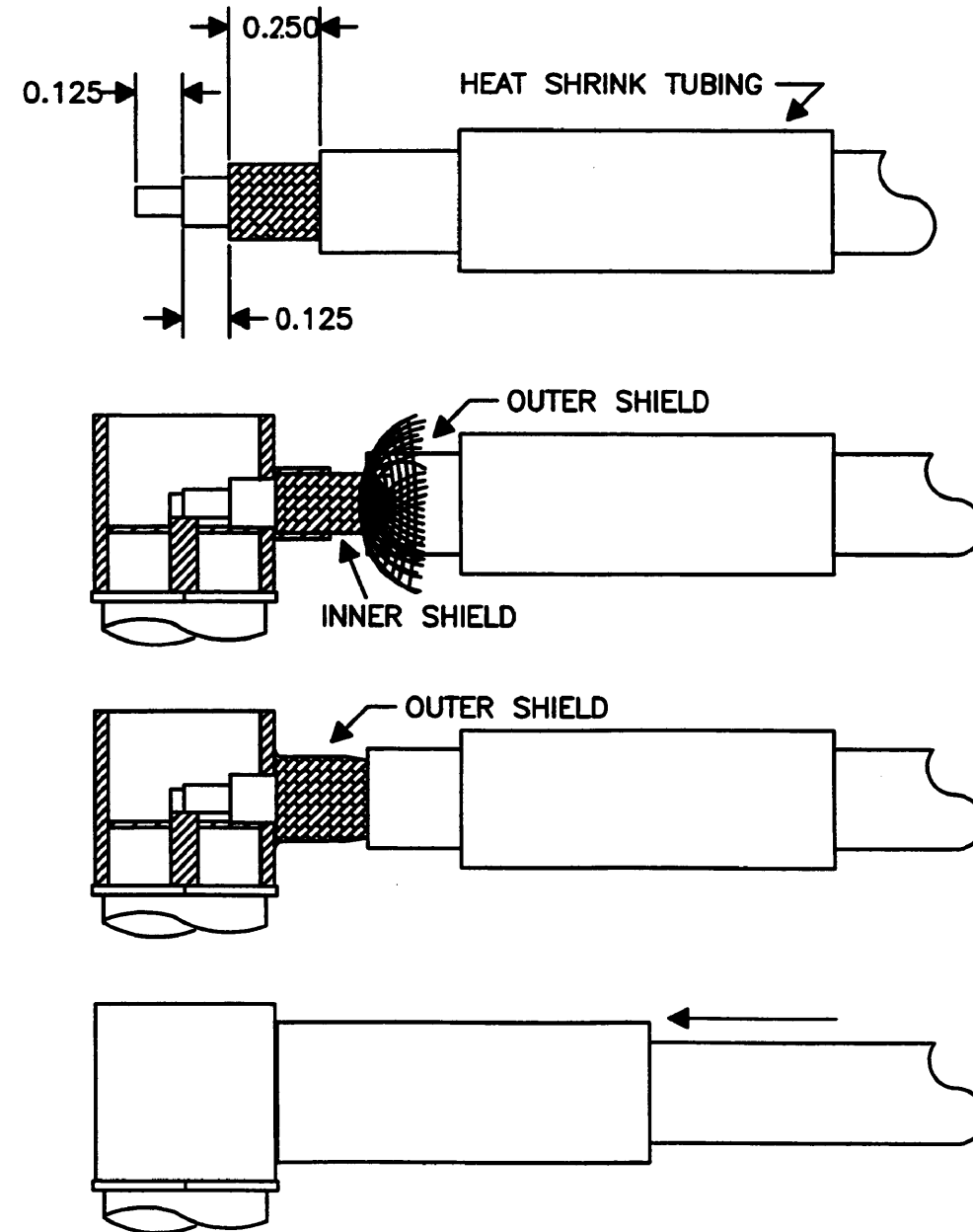
PRELIMINARY -D 05/24/2006

FIGURE 2-6 KXP 2290 INTERCONNECTION DRAWING
 (Dwg. 155-0xxxx-000x Rev. -, Sheet 2 of 2)



NOTES:

1. WHEN SOLDERING, AVOID APPLYING EXCESS HEAT TO CONNECTOR BODY, HEAT SINK SPRING CONTACTS, AND CENTER CONDUCTOR INSULATOR.



1. STRIP CABLE (P/N 024-00051-0060) OR (P/N 024-00072-0000) * AND PLACE 1" HEAT SHRINK TUBING (P/N 150-00025-0010) OVER COAX.

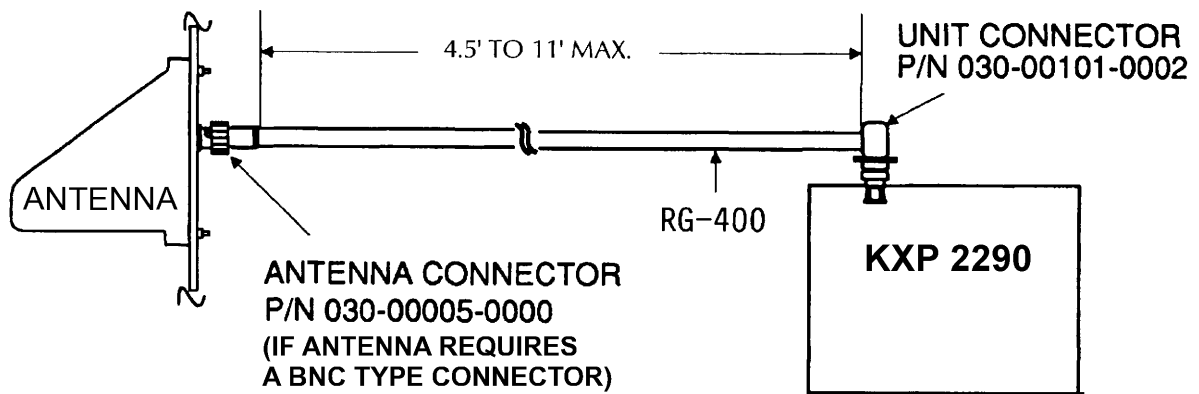
SOLDER CENTER CONTACT AND SOLDER INNER SHIELD INSIDE. SEE NOTE 1.

3. SOLDER OUTER SHIELD OUTSIDE. SEE NOTE 1.

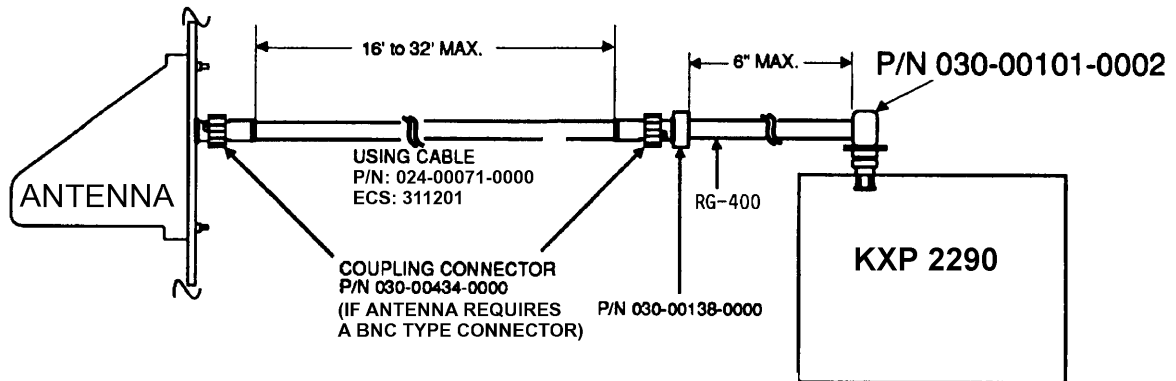
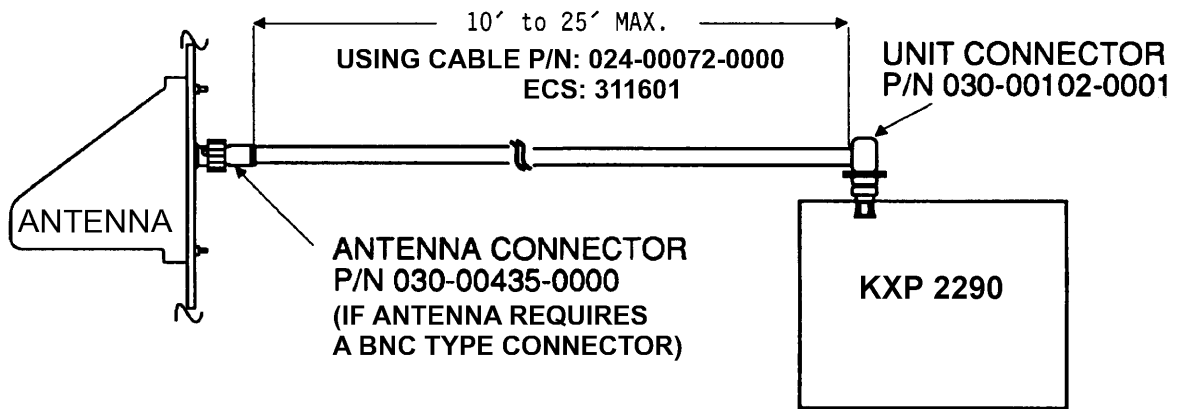
4. SLIDE HEAT SHRINK TUBING FORWARD (FLUSH WITH CONNECTOR) AND ADD HEAT TO SHRINK THE TUBING.

USE CONNECTOR 030-00101-0002 FOR CABLE:
RG-400 HONEYWELL P/N 024-00051-0060
* FOR ECS CABLE P/N 311601
HONEYWELL P/N 024-00072-0000,
USE CONNECTOR 030-00102-0001

FIGURE 2-7 RF CONNECTOR DRAWING



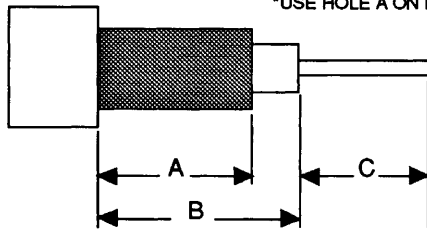
**FIGURE 2-8 RG-400 CABLE CONNECTIONS DRAWING
(Option For Short Antenna Cable Lengths)**



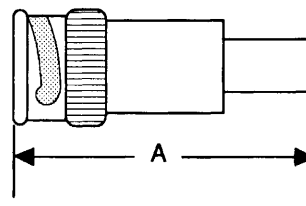
**FIGURE 2-9 ECS/ECS-RG-400 CABLE CONNECTIONS DRAWING
(Options For Longer Antenna Cable Lengths)**

CRIMP TOOL CHART			
CONTACT		TUBE	
TURR HEAD	CABLE	TOOL FRAME	TOOL DIE
SOLDER	311201	M22520/5-01	M22520/5-33
SOLDER	311601	M22520/5-01	M22520/5-19*

*USE HOLE A ON DIE #M22520/5-19 FOR CABLE P/N 311601

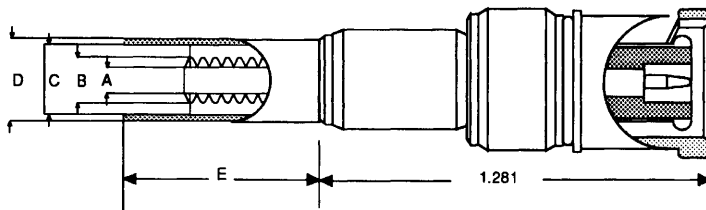


STRIPPING DIMENSIONS			
CABLE	A	B	C
311201	.40	.53	.21
311601	.40	.55	.78



ECS P/N	CABLE	DIMENSION A
CBS122	311201	1.94

PART NUMBER	A	B	C	D	E
CBS922	.152	.228	.261	.297	.750



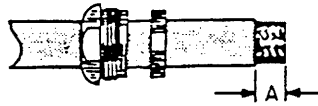
INSTALLATION INSTRUCTIONS:

1. SLIDE TUBE ONTO CABLE
2. CUT OUTER JACKET (SEE CHART)
3. STRIP LENGTH OF CENTER CONDUCTOR (SEE CHART)
4. INSTALL CENTER PIN
5. FLAIR OUT WIRE BRAID
6. CUT INNER SHIELD
7. PUSH BODY ON FIRMLY UNTIL CENTER PIN SEATS
8. TRIM EXCESS BRAID AND PUSH TUBE ONTO CONNECTOR
9. CRIMP TUBE

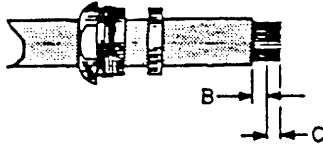
NOTE: DO NOT NICK BRAID OF CENTER CONDUCTOR

CONNECTOR CROSS REFERENCE CHART		
	TED	ECS
030-00435-0000	4-10-154 SOLDER	CBS 922 CRIMP
030-00434-0000	4-10-153 SOLDER	CBS 122 CRIMP
		ECS REQUIRES CRIMPING TOOLS. SEE CRIMP TOOL CHART.

FIGURE 2-10 CABLE CONNECTOR DRAWING



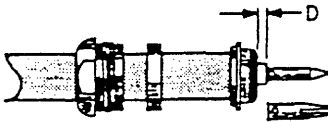
Place nut and gasket over cable and cut jacket to dimension shown.



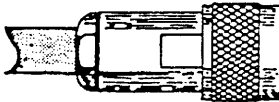
Comb out braid and fold out. Cut cable dielectric to dimension shown. Tin center conductor.



Pull braid wires forward and taper toward center conductor. Place clamp over braid and push back against cable jacket.



Fold back braid wires as shown, trim to proper length (D) and form over clamp as shown. Solder contact to center conductor.



Insert cable and parts into connector body. Make sure sharp edge of clamp seats properly in gasket. Tighten nut.

EXAMPLE

PART NUMBER	SIZE	DIMENSION			
		A	B	C	D
	RG/U CABLE				
024-00075-0000	393	9/32	1/8	5/32	3/64
024-00051-0060	400	9/32	1/8	5/32	3/64

FIGURE 2-11 TYPE "N" AND "C" CONNECTOR ASSEMBLY DRAWING

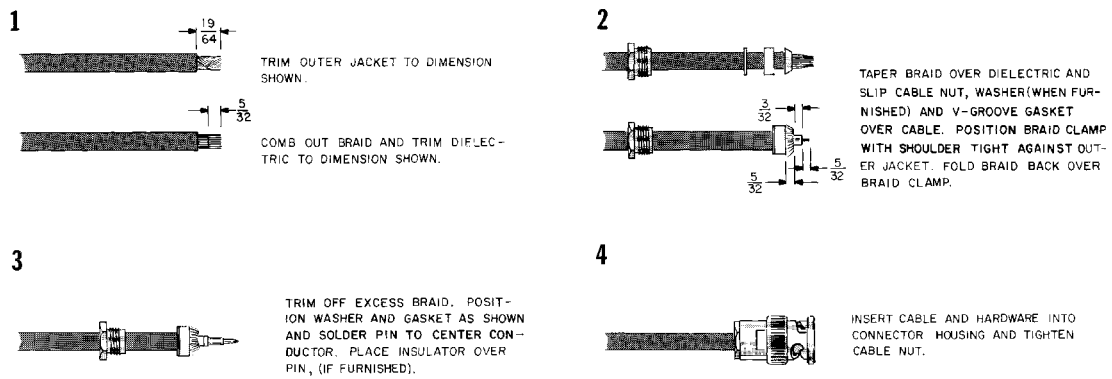


FIGURE 2-12 BNC CONNECTOR ASSEMBLY DRAWING

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2.4 POST-INSTALLATION CHECKS

2.4.1 TRANSPONDER SYSTEM CHECKOUT

The post-installation test is used to apply power and functionally checkout the system. Successful completion of the post-installation test verifies the proper operation of the KXP 2290 Mode S Transponder System.

TABLE 2-4 INSPECTION/CHECK PROCEDURE is a visual inspection/check procedure that should be performed after system installation as part of a system checkout. A post-installation test per paragraph 2.4.1.2 Post-Installation Checkout/Operation should be performed. In addition, the procedure should be used as a periodic maintenance inspection check.

EQUIPMENT	INSPECTION/CHECK PROCEDURE
KXP 2290 Mode S Transponder	A. Inspect external surface for damage. B. Check that the unit is securely installed and that retaining mechanism is securely tightened. C. Ensure that all connections in the mounting tray are properly mounted and secure.
Antennas	A. Inspect external surfaces for damage. B. Check that antenna is properly mounted and mounting screws are tight. C. Ensure that antenna coaxial cable connectors are properly mated and secure.

TABLE 2-4 INSPECTION/CHECK PROCEDURE

2.4.1.1 Inspection

Perform the following inspection on the overall system:

- (1) Check that cables do not interfere with aircraft controls or other equipment.
- (2) Check cabling for proper routing and check security of tie-down points. Inspect and adjust cable runs to ensure that cables are not strained, kinked, or severely twisted and are not exposed to rough or sharp surfaces.

2.4.1.2 Post-Installation Checkout/Operation

(1) General

Installation of the transponder system requires three stages of testing to ensure the proper operation of the Mode S transponder. Initially, prior to the installation of the transponder and antenna, a system interwiring check should be performed. This check verifies that the aircraft and all transponder interconnections are correct, before power is applied. After the units are installed a visual inspection of the equipment and connections is made. Finally, a post-Installation test is performed.

(2) System Interwiring Check

To check the aircraft and transponder system interconnections proceed as follows:

- (a) Check that all cables and interwiring are installed in accordance with the Interwiring and Cable Harness Fabrication instructions (paragraph [2.3.2 KXP 2290 INTERCONNECTION AND CABLE HARNESS FABRICATION](#)).
- (b) Using the interconnect diagram (see [FIGURE 2-5 KXP 2290 INTERCONNECTION DRAWING](#)), check wiring for proper destination, opens, and shorts.
- (c) Check rf cables for insertion loss and VSWR.

(3) Visual Inspection

In conjunction with system installation, perform the inspection/check procedure ([TABLE 2-4 INSPECTION/CHECK PROCEDURE](#)).

(4) Post-Installation Test

Perform the ATC transponder tests and inspections noted in section [1.7.1 EQUIPMENT](#) (per Federal Aviation Regulation Part 43).

**SECTION III
OPERATION****3.1 GENERAL**

The only current operational function of the KXP 2290 is as a part of the Honeywell APEX system. Consult the applicable APEX system operation handbook(s) as required.

THIS PAGE IS RESERVED

ENVIRONMENTAL QUALIFICATIONS APPENDIX

ENVIRONMENTAL QUALIFICATION FORM(S)

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