mm) in E plane (bend along the short axis of the waveguide). The minimum allowable bend radius for the coax cable is 0.25 inch (6.35 mm). Refer to Figure 4-17.

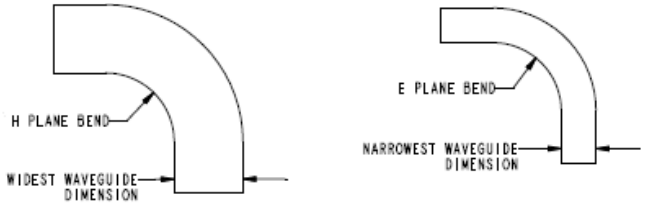


Figure 4-17. View of H Plane and E Plane Bends

(g) Connecting the TMA interface, KRFU Power, and Control Interface

Power and control signals for the TMA assembly are supplied from the KANDU and is connected to TMA J2 receptacle. Install location of KANDU is airframe specific. KANDU could be installed in unpressurized area near the tail empennage of the aircraft or inside pressurized area of the aircraft. In the case where the KANDU is installed inside the aircraft pressure vessel, the MODMAN to KRFU, the KANDU to KRFU and KANDU to TMA interconnect may be routed through a Bulkhead Interface connector.

Control signals for the KRFU are supplied from the KANDU and are connected to KRFU J2 receptacle. 115 VAC power supply for KRFU is supplied from aircraft power and is connected to KRFU J1 receptacle. IF TX and IF RX signals to KRFU are supplied from Modman. Refer to the TMA interconnection diagram Figure 4-34 for details.

1 Remove the protective covers from the TMA J2 and KANDU J2 receptacles. Visually inspect connectors and make sure that the pins are straight and not damaged.

a Clean the connectors with contact cleaner and connect the cable assembly for tail mount from KANDU J2 receptacle to TMA J2 receptacle.

b Make sure that the over braid of the cable assembly is terminated to connectors at both TMA and KANDU ends.

2 Remove the protective covers from the KRFU J2 and KANDU J3 receptacles. Visually inspect connectors and make sure that the pins are straight and undamaged.

a Clean the connectors with contact cleaner and connect the cable assembly for tail mount from KANDU J3 receptacle to KRFU J2 receptacle.

b Make sure that the over braid of the cable assembly is terminated to connectors at both KRFU and KANDU ends.

3 Remove the protective covers from the KRFU J5 and KRFU J6 receptacles. Visually inspect connector ends and make sure that there is no debris in central connector cavity.

a Clean the connectors with the contact cleaner before connecting.

(1) TX-IF connects from the Modman through the bulkhead J4B to KRFU J5.

(2) RX-IF connects from the Modman through the bulkhead J3B to KRFU J6.

b Make sure that the TX-IF coax cable is banded blue and RX-IF coax cable is banded green at connector ends.

c Make sure that the over braid of the cable assembly is terminated to connectors at both KRFU and Modman or the bulkhead interface feed through ends.

d The over braid can be terminated to connector shield/housing or directly to housing.

4 Make sure that all cable assembly routings are firmly held with wire clamps in accordance with the airframe specific wiring diagram and that there are no obstructions to the free movement of tail mount antenna.

On completion of LRU interconnection and applying power to TMA, the tail mount antenna will move in azimuth and elevation direction and move itself to its home position.

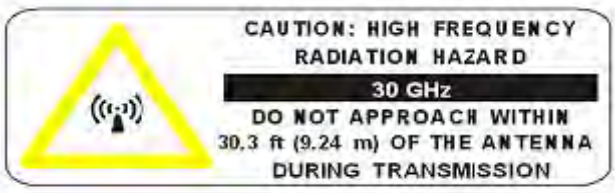
(h) Radome and Radome Fairing Installation with the TMA Interface Mount

Radome and fairing installation is aircraft specific. See aircraft specific SDIM for details.

NOTE: Before removing the Tail Mount Radome, Honeywell recommends manually steering the TMA to a safe antenna orientation position using the JetWave™ GUI. The TMA does not power down in a specific "Park" position, as there is insufficient time on power down to accomplish this. It instead "parks" wherever it is when power is applied, until the system is ready to operate and the antenna automatically starts steering towards the satellite.

(i) TMA Human Exposure to RF EM Fields

WARNING: THE JETWAVE™ SYSTEM IS A SOURCE OF NON-IONIZING RADIATION.



1 The Minimum Safe Distance:

- TMA = 30.3 feet (9.24 m).

NOTE: The minimum safe distance for occupational/controlled exposure is determined based on the computational method specified in FCC Office of Engineering and Technology; Bulletin Number 65, Edition 97-01: *Evaluating compliance with FCC Guidelines for human exposure to Radio Frequency Electromagnetic fields.*

2 The areas which the risk exists are based upon the location of the antenna. This means personnel operating on the apron, transient personnel, and the general population in the controlled exposure category will not be exposed to levels in excess of the limits. Maintenance personnel working close to the tail must be protected by disabling the transmitter before they approach that area of the aircraft.

3 The JetWave™ system incorporates three fail-safe features to limit the potential for human exposure to non-ionizing radiation:

a The system will not transmit unless the receiver is receiving a valid signal, therefore if the received signal were to become blocked the transmitter would be disabled.

b The antenna subsystem includes a hardware end-stop that prevents the antenna pointing more than 2 degrees below the horizontal.

(7) An input into the JetWave™ system wired on the aircraft to a switch in the aircraft, to disable the RF transmission. This switch would be used to prevent any radiation from the antenna in the event of aircraft operations in the vicinity of the antenna, for instance when de-icing the aircraft. This would be achieved by a defined procedure on the aircraft.

4.8 Tail Mount Antenna (If applicable)

A. Introduction

The TMA assembly is intended to be installed on the aircraft tail tip/empennage. For the JetWave™ system to correctly point the antenna, the installation offsets should not exceed more than 1° off heading, pitch or roll with respect to principal axis of aircraft. Depending on the airframe, the LRUs and assemblies that follow would be installed outside aircraft fuselage as part of tail mount OAE:

- The TMA assembly
- KRFU LRU
- Radome assembly
- Radome fairing (if required).
- RF interconnect components:
  - Tx waveguide
  - Rx coax
  - Rx coax to waveguide adapter
  - O-rings
  - waveguide and adapter attachment fasteners

The exact install location of the TMA assembly and KRFU is airframe specific.

The radome, radome fairing (if required), and TMA/KRFU to aircraft interface brackets are airframe specific; the related details are not covered in this manual.

The following factors must be considered when deciding where to install the antenna:

- Other antennas or equipment that may block the JetWave™ antenna from being able to see the satellite
- The JetWave™ antenna blocking other antennas
- Potential interference by the JetWave™ transmitted signal degrading the received signal of other aircraft RF systems
- Potential interference by other RF systems degrading the received signal of the JetWave™ system.

The TMA complies with form defined in JetWave™ TMA outline and installation drawing in Figure 4-30, the KRFU outline and installation drawing Figure 4-27 thru Figure 4-29, and the interconnect diagram in Figure 4-34.

Refer to Table 4-8 for special tools, fixtures, and equipment for the TMA installation.

Table 4-8. Special Tools for TMA Installation

Number	Description	Source
NA	Hoist system	Commercially available

Antenna clearance for swept volume is 12 inches (304.8 mm) minimum around dish sweep area.

B. TMA Installation General

Before installing any components or cabling, read all notes on drawings and read all installation procedures.

The installer must select the appropriate gauge of wire as specified in the TMA interconnection diagram in Figure 4-34 for power and control connections. Interconnect cables must be routed away from sources of potential electromagnetic interference.

The screws used to attach the waveguide flange to the underside of the TMA must not protrude more than 0.20 inches (0.508 cm) into the TMA base as indicated in the TMA outline and installation drawing. Refer to Figure 4-29, Note 15.

C. Advisories

The JetWave™ TMA and the KRFU subsystems include components that radiate RF and microwave emissions in the band between 29.0 and 30.0 GHz.

All service technicians and operators should be informed of the potential hazards of RF and microwave radiation. When installing and servicing equipment, exercise the safety precautions that follow.

WARNING: THIS EQUIPMENT RADIATES HIGH FREQUENCY RADIATION AND POSES A RADIATION HAZARD. CONSIDERING THE WORST CASE CONDITION OF 100 PERCENT REFLECTION FOR TAIL MOUNT ANTENNA, HONEYWELL DEEMS IT NECESSARY TO ASSURE OEM FUSELAGE ATTENUATION EXCEEDS 19.48 dB FOR TAIL MOUNTED ANTENNAS SYSTEM INSTALLATION. THIS IS THE MINIMUM ATTENUATION REQUIRED FROM THE AIRCRAFT FUSELAGE TO ATTENUATE THE

KA BAND RADIATION TO MEET A SAFE HUMAN EXPOSURE OF 1 MW/CM^2 INSIDE THE AIRCRAFT.

WARNING: SERVICE TECHNICIANS AND OPERATORS MUST EXERCISE CARE TO KEEP CLEAR OF THE ANTENNA'S BEAM WHILE PERFORMING OPERATIONAL TESTS OR INSTALLATION VERIFICATION PROCEDURES. DO NOT APPROACH WITHIN 30.3 FEET (9.24 METERS) OF THE TAIL MOUNT ANTENNA ASSEMBLY DURING RADIO FREQUENCY TRANSMISSION

WARNING: DURING ANTENNA OPERATION (TRANSMISSION), ENSURE MINIMUM EXPOSURE OF ALL PERSONNEL TO ANY REFLECTED, SCATTERED, OR DIRECT BEAMS.

WARNING: SERVICE TECHNICIANS MUST OBEY STANDARD SAFETY PRECAUTIONS, SUCH AS WEARING SAFETY GLASSES, TO PREVENT PERSONAL INJURY WHILE INSTALLING OR PERFORMING SERVICE ON THIS UNIT.

D. TMA Unpacking and Inspection

This section describes how to make sure that the equipment is in good condition after shipping. To unpack and inspect the equipment, do as follows:

(1) Unpack the equipment components from the shipping container.

(2) Make sure that all the components of the tail mount OAE subsystem as indicated on the parts list/bill of materials are included.

(3) Visually inspect the units for any shipping damage.

NOTE: Refer to Section 4.10 Inspection of Waveguide.

E. TMA Installation Kit Details

Other than the common components specified in Figure 4-15, the installation kit for waveguide and coax assemblies, wiring assemblies, brackets, clamps and mounting assembly will be airframe specific. Refer to airframe specific wiring diagram for details.

Table 4-9. TMA RF Interconnect Common Installation Components

PN	Description
SCD-90402677	WR42 to 2.92 mm coax adapter
MS29513-013	O-ring
MS29513-016	O-ring
90403559	Screw, waveguide and adapter mating flange attachment
MS51957-27	Screw, waveguide flange to TMA
NAS620C6	Washer, waveguide flange to TMA

CAUTION: THE TAIL MOUNT OAE ASSEMBLY IS ELECTROSTATIC-SENSITIVE. STANDARD ELECTROSTATIC-SENSITIVE HANDLING PROCEDURES MUST BE OBSERVED.

F. TMA Airframe Structural Modifications

For the installation of TMA, structural modifications to the tail empennage of the airframe may be required to accommodate the additional mass of the antenna assembly and aerodynamic loads.

The aerodynamic loads are dependent on the aircraft type and corresponding tail tip radome and lower fairing design/shape. Inertial and thermal loads also need to be accounted for. The installation location of the TMA and KRFU on the aircraft are installation specific and should be accounted for on any structural analysis that is carried out.

The appropriately qualified personnel should derive the loads and perform a structural analysis to verify the suitability of the modifications.

The installer is responsible for all structural modifications to the aircraft.

G. TMA Mounting Guidelines

This section describes the mounting guidelines for the tail mount OAE.

The radome installation is aircraft specific.

The airframe manufacturer can be consulted to determine the torque requirements for mounting the TMA assembly, KRFU, radome, and radome fairing for each unique installation.

H. TMA Physical Placement

The TMA and KRFU must be mounted on the top of the tail empennage for clear satellite communications. Figure 4-18 shows a typical installation location for the tail mount antenna assembly on an aircraft.

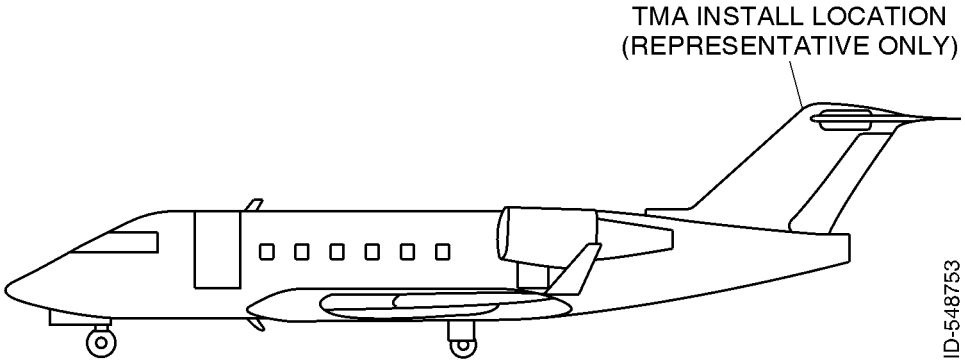


Figure 4-18. TMA Installation Location

I. TMA Interface Mount Brackets (if required)

Depending on the airframe, there may be a need to install a TMA to an airframe interface mount bracket, which adapts to the tail tip structure of the aircraft and in turn supplies a suitable installation base for the TMA assembly.

This is not detailed in this document as the requirement of antenna interface mount is air frame specific.

J. TMA Radome and Radome Fairing

Depending on the airframe, there may be a need to install radome fairing which adapts to the tail empennage of the aircraft.

This is not detailed in this document as the requirement of radome fairing is airframe specific.

K. TMA Assembly

The tail mount OAE assembly is typically mounted in the same location as the Ku SATCOM radio slot on the top of the aircraft tail/empennage.

Consult the airframe manufacturer for identification of appropriate airframe specific installation slots on the empennage.

The isometric rear and front views of the TMA assembly is shown in Figure 4-19.

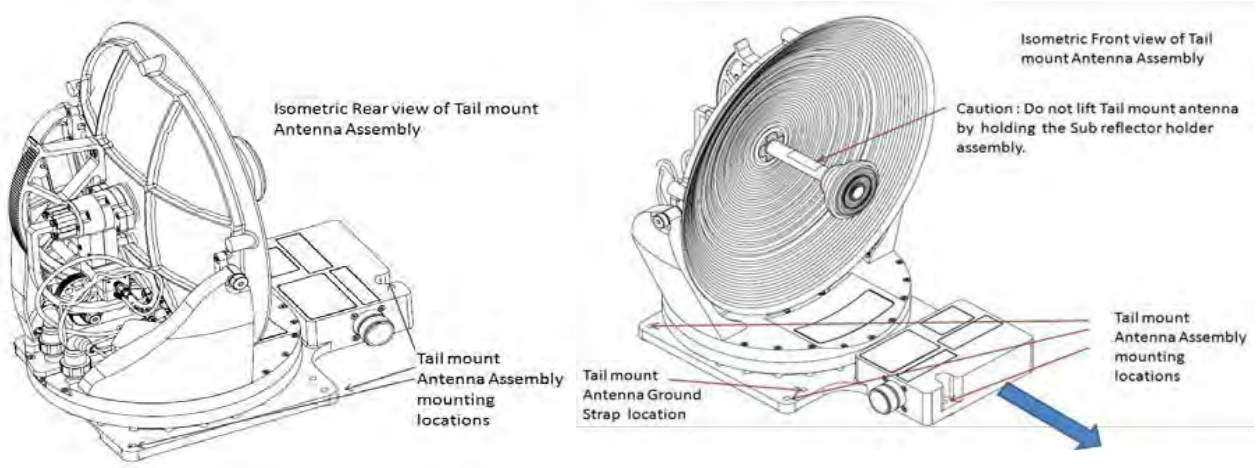


Figure 4-19. TMA Assembly Isometric View

The TMA assembly attaches to the base in five (05) locations. Refer to Figure 4-19 and Figure 4-30 for details.

L. TMA Assembly Orientation

Orientation of the TMA assembly is defined with respect to the principal axes of the aircraft. The TMA assembly is to be installed such that the TMA J2 connector side is located towards the front of aircraft as indicated by the arrow as shown in Figure 4-19.

4.9 Radome

The radome installation is aircraft specific. See aircraft specific SDIM for details.

Depending on the AIM selected, the radome gets installed differently.

With the A791 based AIM, the Radome will be installed on the A791 based AIM.

With the LAIM, the radome will be installed on the Radome skirt fairing assembly. Refer to Figure 4-20.

Electrical bonding from the Jetwave™ radome lightning diverters into the airframe must be less than 25 milliohms.

NOTE: The segmented diverter strips on Jetwave™ radomes do not have electrical continuity between the segments (buttons). Bonding measurements must be made at the diverter termination points on the radome (at the radome attachment fastener).

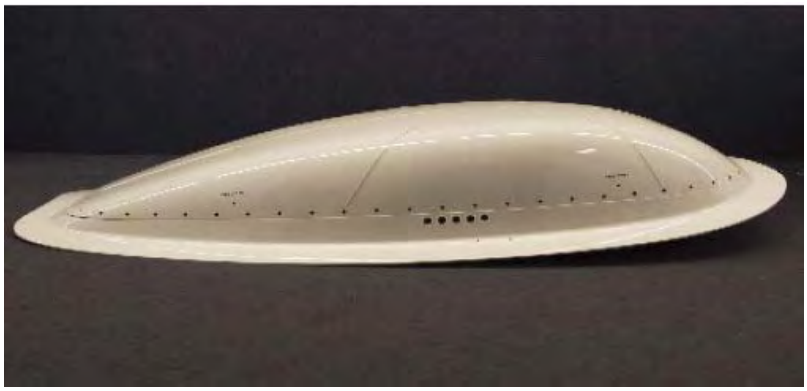
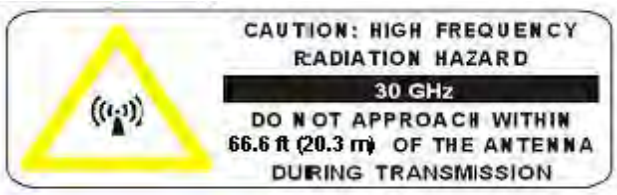


Figure 4-20. Radome Assembly Mounted on Radome Skirt Fairing (LAIM)

A. FMA Human Exposure to RF EM Fields

WARNING: THE JETWAVE™ SYSTEM IS A SOURCE OF NON-IONIZING RADIATION.



(1) The Minimum Safe Distance:

- FMA = 66.6 feet (20.3 m).

NOTE: The minimum safe distance for occupational/controlled exposure is determined based on the computational method specified in FCC Office of Engineering and Technology; Bulletin Number 65, Edition 97-01: *Evaluating compliance with FCC Guidelines for human exposure to Radio Frequency Electromagnetic fields.*

(2) The areas which the risk exists are based upon the location of the antenna. This means personnel operating on the apron, transient personnel, and the general population in the controlled exposure category will not be exposed to levels in excess of the limits. Maintenance personnel working close to the tail must be protected by disabling the transmitter before they approach that area of the aircraft.

(3) The JetWave™ system incorporates three fail-safe features to limit the potential for human exposure to non-ionizing radiation:

(a) The system will not transmit unless the receiver is receiving a valid signal, therefore if the received signal were to become blocked the transmitter would be disabled.

(b) The antenna subsystem includes a hardware end-stop that prevents the antenna from pointing more than 2° below its mounting plane.

(c) An input into the JetWave™ system wired on the aircraft to a switch in the aircraft, to disable the RF transmission. This switch would be used to prevent any radiation from the antenna in the event of aircraft operations in the vicinity of the antenna, for instance when de-icing the aircraft. This would be achieved by a defined procedure on the aircraft.

4.10 Inspection of Waveguide

Any waveguide received that contains more than one dent is unacceptable and must be returned to the vendor. Dents must not exhibit obvious signs of mechanical rework such as file marks or rough edges, where it is obvious that small tools have damaged what should be a precisely machined waveguide.

The very outer edge of the waveguide does not generally contain critical portions of the waveguide structure that affect performance. Therefore the outer edge of the waveguide may include small dents, marks, machine tool marks, etc so long as the damage does not structurally impair the waveguide. The outer surface may contain bending, tool marks or handling damage. A new waveguide that contains large numbers of dents or marks such that it appears not to be a new article shall be rejected and returned to the vendor. If more than 25% of the waveguide surface is marred in any way , the antenna must be rejected and returned to the vendor for rework.

Any evidence of nicks, surface pits, surface etching or scratches on the waveguide are acceptable as long as the flaw has been caused by the manufacturing process, i.e. brazing, cleaning, honing, a tool and no larger than 0.030 inch etc. The number or shape of the nicks, pits or scratches are not limited unless greater than 25% of the waveguide appears to have sustained overall damage of one or more types. Any waveguide having more than 25% of the surface damaged in this way is not acceptable and must be returned to the vendor.

The surface finish of the waveguide must not exceed 125 micro inch finish. All measurements will be made in an area free of braze material. The surface finish will not pertain to any area where excess braze material has flowed on the back of the waveguide.

4.11 Cabling and Drawings

Refer to Table 4-10 for the cabling requirements.

Table 4-10. Cabling Requirements

Cable	Conductor Type	Single Point	Multiple Point	Minimum Conductor Coverage by Shield
Power Lines	Twisted pair	NA	NA	NA
Ethernet Data	Quadrax, twisted pair	-	Yes	100%
RF	Coaxial, waveguide	-	Yes	100%
A429	Twisted pair, stranded	-	Yes	95%
RS-422	Twisted pair, shielded	-	Yes	100%
Discrete	Twisted pair, shielded, KANDU Single conductor, shielded, grounds	-	Yes	100%

When installing the JetWave™ system, follow the cabling requirements listed below:

- Ethernet LAN/WAN cables must meet flammability and TIA/EIA568-A CAT 5E requirements.
- Carlisle IT (ECS) 422404 or NF24Q100-01 is recommended for Quadrax connections.
- Twisted shielded pairs must meet ARINC 791 wiring requirements or equivalent.

Refer to Figure 4-34, thru Figure 4-37 for wire size recommendations.

Refer to Figure 4-21 for the Modman (PN 90400059-0001) outline and installation drawing.

Refer to Figure 4-22 for the Modman Variant 2 (PN 90400059-0002) outline and installation drawing.

Refer to Figure 4-23 for the APM (PN 90401592) outline and installation drawing.

Refer to Figure 4-24 for the APM (PN 90405762) outline and installation drawing.

Refer to Figure 4-25 for the KANDU (PN 90401657) outline and installation drawing.

Refer to Figure 4-26 for the KANDU Variant 2 (PN 90405004) outline and installation drawing.

Refer to Figure 4-27 for the KRFU (PN 90401573), conduction-cooled 1 (maximum operating temperature of 185°F (85°C)), outline and installation drawing.

Refer to Figure 4-28 for the KRFU (PN 90402347), conduction-cooled 2 (maximum operating temperature of 158°F (70°C)), outline and installation drawing.

Refer to Figure 4-29 for the KRFU (PN 90401571), forced air cooled, outline and installation drawing.

Refer to Figure 4-30 for the TMA (PN 90401428) outline and installation drawing.

Refer to Figure 4-31 for the FMA (PN 90000380ICD) outline and installation drawing.

Refer to Figure 4-32 for the Fuselage Mount Radome (PN 90401395) outline and installation drawing.

NOTE: The Fuselage Mount Radome is offered as a standard part and varying skirts can be used to adapt this to different airframe platforms. No Tail Mount Radome is depicted as this is airframe platform specific.

Refer to Figure 4-33 for the LAIM (PN 90404861) outline and installation drawing.

Refer to Figure 4-34 for the JetWave™ System - TMA (PN 90400189-0001) interconnect diagram.

Refer to Figure 4-35 for the JetWave™ System - FMA (KRFU inside aircraft fuselage) (PN 90400259-0001) interconnect diagram.

Refer to Figure 4-36 for the JetWave™ System - FMA (KRFU outside Aircraft Fuselage) (PN 90401047-1) interconnect diagram.

Refer to Figure 4-37 for the JetWave™ System - FMA (Alternative KRFU outside Aircraft fuselage) (PN 90405210) interconnect diagram.

TABLE 1. GXA MODMAN PART NUMBER

PART NUMBER	DESCRIPTION
90400012-0001	ASSY, GXA MODMAN

24. UNIT EXPORT CONTROL CLASSIFICATION NUMBER IS 7E994.

23. SPATIAL MODEL DEFINED BY 90400059-0001_REVF.STP

22. CAUTION LABEL: CAUTION 115 VAC.

21. TAMPER PROOF LABEL.

20. CAUTION LABEL: ESD DUST COVER.

19. CAUTION LABEL: ESD SENSITIVE.

18. DELETED.

17. MOD DOT LABEL.

16. HONEYWELL IDENTIFICATION LABEL INCLUDES:
    HONEYWELL NAME
    DESCRIPTION: ASSY, GXA MODMAN
    HARDWARE P/N: 90400012-0001
    REV: (CURRENT REVISION)
    S/N: (SERIAL NUMBER)
    DATE: (CURRENT DATE)
    WEIGHT: (WEIGHT IN kg AND lb)
    CAGE CODE: 38473
    MADE IN: CANADA
    TCCA MFG: 325-92

15. ENVIRONMENTAL CONDITIONS: SEE TABLE 3.

14. COOLING: BLOW-THROUGH/DRAW-THROUGH PER ARINC 600 LEVEL 1
    STANDARD: AIR FLOW AT 22 KG/HR AT 40°C
    WITH PRESSURE DROP OF 50±30Pa (5±3MM WATER)

13. CONNECTOR J1
    SEE TABLE 2 FOR CONNECTOR IDENTIFICATION.
    SEE SHEET 4 FOR CONNECTOR PIN OUTS.
    ARINC 600 INDEX CODE 52 (6,3,1) BLACK INDICATES RAISED PORTION.
    NOTE THAT AG1[CC,FF]/EG1[EE,JJ]/PG1[DD,GG] USE TWO CONNECTORS PER CONNECTION.

12. ELECTRICAL BONDING SHALL BE THROUGH CONTACT WITH THE
    BASE OF UNIT. BONDING TEST POINT AVAILABLE ON FRONT PANEL.
    DC BONDING RESISTANCE SHALL BE 2.5 MILLIOHMS OR LESS.

11. ELECTRICAL:
    INPUT POWER: 115 VAC, 320-800 Hz.
    POWER FACTOR: 0.813 MINIMUM LEADING; 0.679 MINIMUM LAGGING @0.1 KVA LOAD.
    POWER CONSUMPTION: 60W MAXIMUM AT 115 VAC (320-800Hz).
    CURRENT: 0.52A MAXIMUM AT 115 VAC, 400 Hz.
    POWER DISSIPATION: 59W MAXIMUM AT 115 VAC (320-800Hz).

10. THIS UNIT SHALL BE MOUNTED ONLY IN AN ARINC 600 TRAY WITH A MATCHING
    CONNECTOR SCHEME.

9. INDICATED AREAS ARE FREE FROM PAINT AND PRIMER.

8. FINISH:
    METAL TREATMENT: CHEMICAL CONVERSION COATED PER MIL-DTL-5541,
    TYPE II, CLASS 3
    EXTERIOR FINISH: PRISM POWDER COAT PB134LT (POLYESTER POWDER,
    SATIN SANTEX BLACK)APPLIED AND CURED PER MANUFACTURER'S INSTRUCTIONS.

7. MATERIAL:
    CHASSIS - ALUMINUM ALLOY 5052-H32, .063 THK PER QQ-A-250/8

6. ELECTROSTATIC DISCHARGE SENSITIVE (ESD), HANDLE PER IPC-A-610.

5. ⊕ DENOTES CENTRE OF GRAVITY - LOCATION IS APPROXIMATE.

4. WEIGHT: 14.0 LBS (6.35 KG) MAXIMUM.

3. DENOTES DIMENSION FROM FRONT PANEL TO REAR PANEL WALL.
    DIMENSION DOES NOT INCLUDE SCREW HEAD PROTRUSIONS AND CONNECTOR.

2. THIS UNIT MEETS THE DIMENSIONAL REQUIREMENTS OF A 4MCU PER
    ARINC SPECIFICATION 791.

1. DIMENSIONS AND TOLERANCES IAW Y14.5M-1994.

NOTES, UNLESS OTHERWISE SPECIFIED:

TABLE 2. GXA MODMAN CONNECTOR IDENTIFICATION 13

REF. DES	PART NUMBER	MATING CONNECTOR	REMARKS
J1	RADIALL 620601191	RADIALL NSXN2B875S00	J1-A TOP INSERT ARRANGEMENT Q11 (11X SIZE 8 QUADRAX)
			J1-B MIDDLE INSERT ARRANGEMENT 12002 (118X #22 CONTACTS, 2X SIZE 8 QUADRAX)
			J1-C BOTTOM INSERT ARRANGEMENT 12F5C2 (4X #12 CONTACTS, 1X #16 CONTACTS, 5X SIZE 16 OPTICAL, 2X SIZE 5 COAX)

TABLE 3. GXA MODMAN ENVIRONMENTAL QUALIFICATION REQUIREMENTS

ENVIRONMENTAL CONDITIONS	RTCA/DO-160G SPECIFICATION	REQUIREMENTS
OPERATING LOW TEMPERATURE	SECTION 4.0, CAT. A1	-15°C
OPERATING HIGH TEMPERATURE	SECTION 4.0, CAT. A1	+55°C
ALTITUDE	SECTION 4.0, CAT. A1	15000 FT
OVERPRESSURE	SECTION 4.0, CAT. A1	170 KPa (-15000 FT)
DECOMPRESSION	SECTION 4.0, CAT. A1	75.25 KPa (8 KFT) TO 9.12 KPa (55 KFT) WITHIN 15 SECONDS
TEMPERATURE VARIATION	SECTION 5.0, CAT. B	5°C MIN. PER MINUTE
HUMIDITY	SECTION 6.0, CAT. B	NON-OPERATING, 10 CYCLES 85% RH @ 38°C 95% RH @ 65°C
OPERATIONAL SHOCK	SECTION 7.0, CAT. B	3 SHOCKS OF 6G, 11MS, 6 DIRECTIONS
CRASH SAFETY SUSTAINED	SECTION 7.0, CAT. B	UP 3.0G, DOWN 6.0G, FORWARD 18.0G, AFT 1.5G SIDE 4.5G, 3 SECS
CRASH SAFETY IMPULSE	SECTION 7.0, CAT. B	1 SHOCK OF 20G, 11 MS, 6 DIRECTIONS
VIBRATION	SECTION 8.0, CAT. S	PERFORMANCE LEVEL CURVE B2
EXPLOSIVE ATMOSPHERE	SECTION 9.0, CAT. X	NOT APPLICABLE
WATERPROOFNESS	SECTION 10.0, CAT. Y	
FLUIDS SUSCEPTIBILITY	SECTION 11.0, CAT. X	NOT APPLICABLE
SAND AND DUST	SECTION 12.0, CAT. X	NOT APPLICABLE
FUNGUS RESISTANCE	SECTION 13.0, CAT. F	BY ANALYSIS
SALT FOG	SECTION 14.0, CAT. X	NOT APPLICABLE
ICING	SECTION 24.0, CAT. X	NOT APPLICABLE
ESD	SECTION 25.0, CAT. A	
FLAMMABILITY	SECTION 26.0, CAT. C	BY ANALYSIS

ID-601416 E90400059-0001-1-F

Figure 4-21. (Sheet 1 of 4) Modman Outline and Installation Drawing (90400059-0001, REV F)

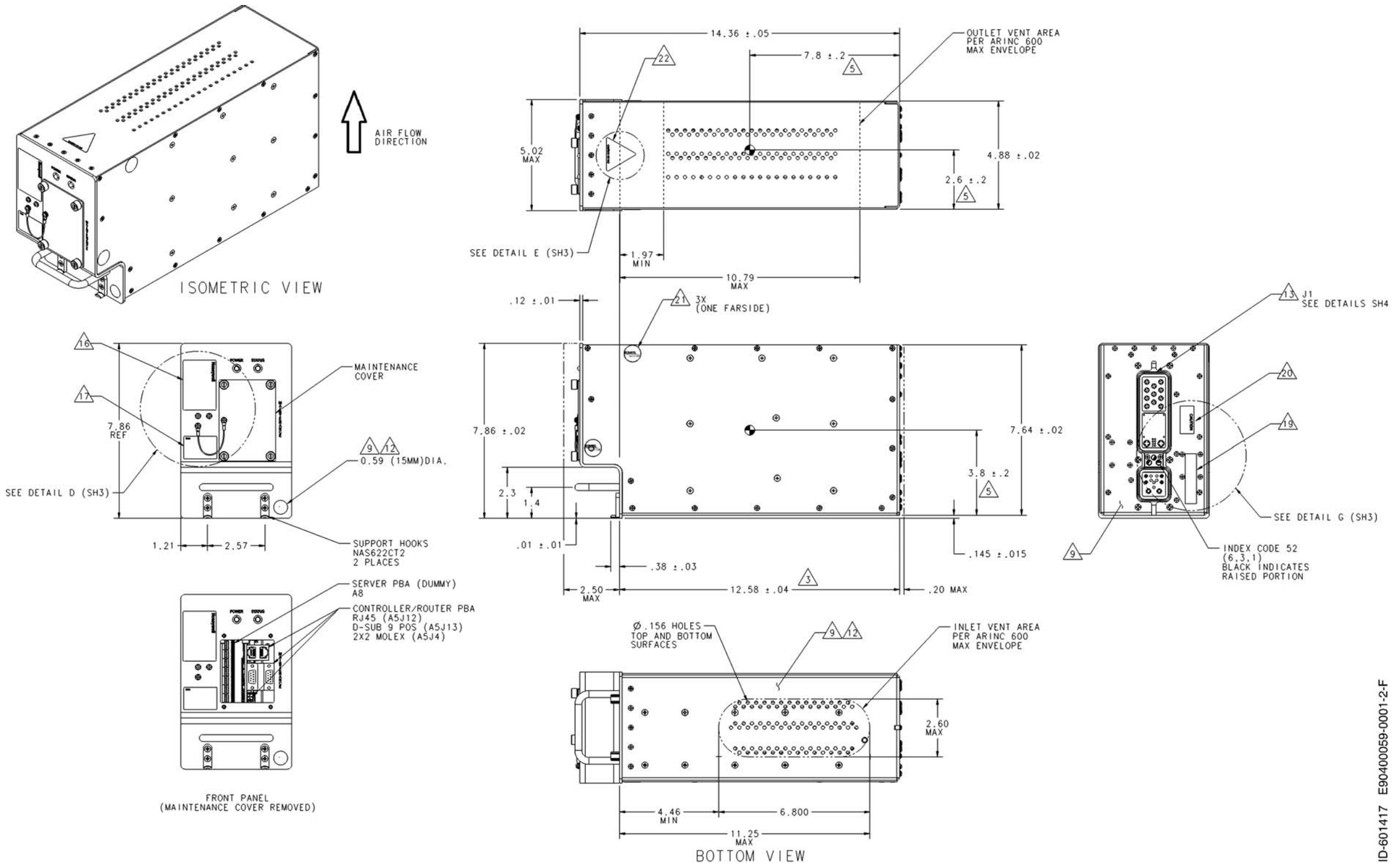
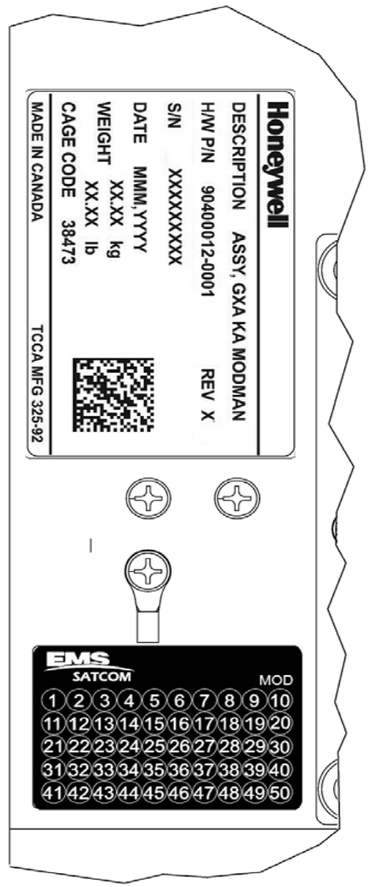
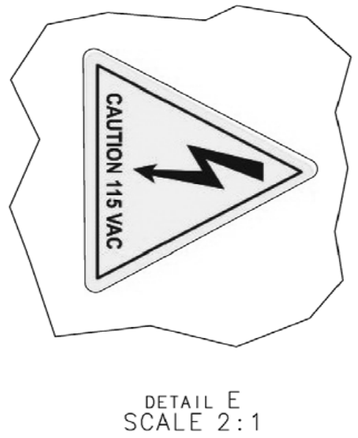


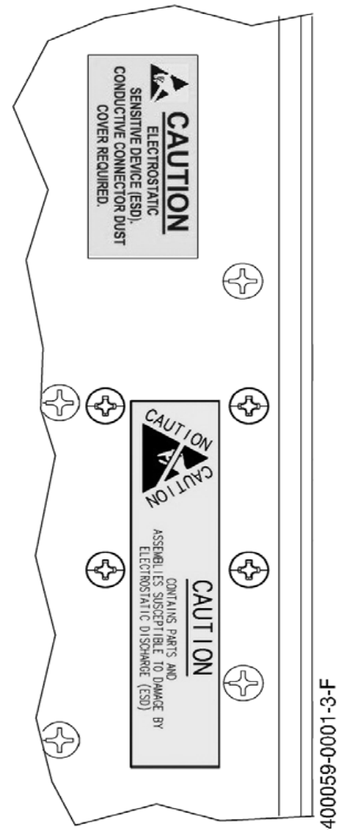
Figure 4-21. (Sheet 2 of 4) Modman Outline and Installation Drawing (90400059-0001, REV F)



DETAIL D
SCALE 2:1



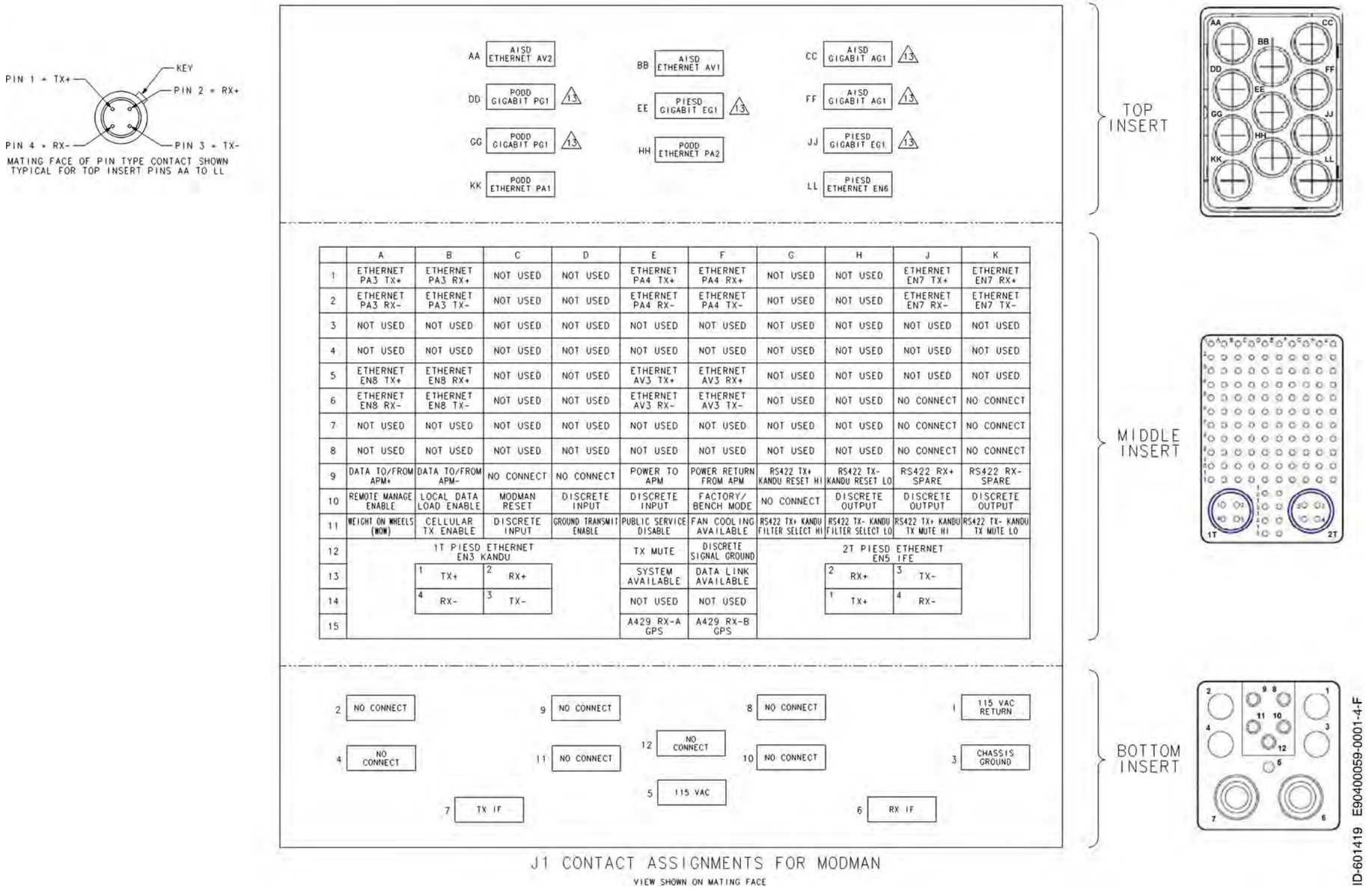
DETAIL E
SCALE 2:1



DETAIL G
SCALE 2:1

ID-602631 E90400059-0001-3-F

Figure 4-21. (Sheet 3 of 4) Modman Outline and Installation Drawing (90400059-0001, REV F)



	A	B	C	D	E	F	G	H	J	K
1	ETHERNET PA3 TX+	ETHERNET PA3 RX+	NOT USED	NOT USED	ETHERNET PA4 TX+	ETHERNET PA4 RX+	NOT USED	NOT USED	ETHERNET EN7 TX+	ETHERNET EN7 RX+
2	ETHERNET PA3 RX-	ETHERNET PA3 TX-	NOT USED	NOT USED	ETHERNET PA4 RX-	ETHERNET PA4 TX-	NOT USED	NOT USED	ETHERNET EN7 RX-	ETHERNET EN7 TX-
3	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
4	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
5	ETHERNET EN8 TX+	ETHERNET EN8 RX+	NOT USED	NOT USED	ETHERNET AV3 TX+	ETHERNET AV3 RX+	NOT USED	NOT USED	NOT USED	NOT USED
6	ETHERNET EN8 RX-	ETHERNET EN8 TX-	NOT USED	NOT USED	ETHERNET AV3 RX-	ETHERNET AV3 TX-	NOT USED	NOT USED	NO CONNECT	NO CONNECT
7	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NO CONNECT	NO CONNECT
8	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NO CONNECT	NO CONNECT
9	DATA TO/FROM APM+	DATA TO/FROM APM-	NO CONNECT	NO CONNECT	POWER TO APM	POWER RETURN FROM APM	RS422 TX+ KANDU RESET HI	RS422 TX- KANDU RESET LO	RS422 RX+ SPARE	RS422 RX- SPARE
10	REMOTE MANAGE ENABLE	LOCAL DATA LOAD ENABLE	MODMAN RESET	DISCRETE INPUT	DISCRETE INPUT	FACTORY/ BENCH MODE	NO CONNECT	DISCRETE OUTPUT	DISCRETE OUTPUT	DISCRETE OUTPUT
11	WEIGHT ON WHEELS (WOW)	CELLULAR TX ENABLE	DISCRETE INPUT	GROUND TRANSMIT ENABLE	PUBLIC SERVICE DISABLE	FAN COOLING AVAILABLE	RS422 TX+ KANDU FILTER SELECT HI	RS422 TX- KANDU FILTER SELECT LO	RS422 TX+ KANDU TX MUTE HI	RS422 TX- KANDU TX MUTE LO
12	1T PIESD ETHERNET EN3 KANDU				TX MUTE	DISCRETE SIGNAL GROUND	2T PIESD ETHERNET EN5 IFE			
13	1 TX+	2 RX+			SYSTEM AVAILABLE	DATA LINK AVAILABLE	2 RX+	3 TX-		
14	4 RX-	3 TX-			NOT USED	NOT USED	1 TX+	4 RX-		
15					A429 RX-A GPS	A429 RX-B GPS				

Figure 4-21. (Sheet 4 of 4) Modman Outline and Installation Drawing (90400059-0001, REV F)

25. ENVIRONMENTAL QUALIFICATION CHARACTERISTICS PER TS-90405204 GXA MODMAN AND APM ENVIRONMENTAL QUALIFICATION TEST PROCEDURE FOR BOEING.

24. UNIT EXPORT CONTROL CLASSIFICATION NUMBER IS 7E994.

23. SPATIAL MODEL DEFINED BY 90400059-0002_REVA.STP

22 CAUTION LABEL: CAUTION 115 VAC.

21 TAMPER PROOF LABEL.

20 CAUTION LABEL: ESD DUST COVER.

19 CAUTION LABEL: ESD SENSITIVE.

18 DELETED.

17 MOD DOT LABEL.

16 HONEYWELL IDENTIFICATION LABEL INCLUDES:
HONEYWELL NAME
DESCRIPTION: ASSY, GXA MODMAN
HARDWARE P/N: 90400012-0002
REV: (CURRENT REVISION)
S/N: (SERIAL NUMBER)
DATE: (CURRENT DATE)
WEIGHT: (WEIGHT IN kg AND lb)
CAGE CODE: 38473
MADE IN: CANADA
TCCA MFG: 325-92

15. INSTALLATION CLEARANCE: ARINC 600 STANDARD 4 MCU LRU.

14. COOLING: BLOW-THROUGH/DRAW-THROUGH.
STANDARD: AIR FLOW AT 22 KG/HR AT 40°C
WITH PRESSURE DROP OF 50±30Pa (5±3MM WATER)
FAN FILTRATION REQUIREMENTS: NONE

13 CONNECTOR J1
SEE TABLE 2 FOR CONNECTOR IDENTIFICATION.
SEE SHEET 4 FOR CONNECTOR PIN OUTS.
ARINC 600 INDEX CODE 52 (6,3,1) BLACK INDICATES RAISED PORTION.
NOTE THAT AG1[CC,FF]/EG1[EE,JJ]/PG1[DD,GG] USE TWO CONNECTORS PER CONNECTION.

12 ELECTRICAL BONDING SHALL BE THROUGH CONTACT WITH THE BASE OF UNIT.
BONDING TEST POINT AVAILABLE ON FRONT PANEL.
DC BONDING RESISTANCE SHALL BE 2.5 MILLIOHMS OR LESS.

11. ELECTRICAL:
INPUT POWER: 115 VAC, 360-800 Hz.
POWER FACTOR: 0.98 MINIMUM LEADING; 0.8 MINIMUM LAGGING @0.1 KVA LOAD.
POWER CONSUMPTION: 60W MAXIMUM AT 115 VAC (360-800Hz).
CURRENT: 0.52A MAXIMUM AT 115 VAC, 400 Hz.
POWER DISSIPATION: 59W MAXIMUM AT 115 VAC (360-800Hz).
NOTE: HONEYWELL RECOMMENDS THAT WIRING AND COOLING IS DESIGNED FOR 100 WATTS IN ORDER TO ALLOW FOR SEAMLESS UPGRADE TO THE MODMAN WITH ENHANCED CAPABILITY AT A LATER DATE.

10. THIS UNIT SHALL BE MOUNTED ONLY IN AN ARINC 600 TRAY WITH A MATCHING CONNECTOR SCHEME.

9 INDICATED AREAS ARE FREE FROM POWDER COAT FINISH.

8. FINISH:
METAL TREATMENT: CHEMICAL CONVERSION COATED PER MIL-DTL-5541, TYPE II, CLASS 3
EXTERIOR FINISH: PRISM POWDER COAT PBI34LT (POLYESTER POWDER, SATIN SANTEX BLACK)APPLIED AND CURED PER MANUFACTURER'S INSTRUCTIONS.

7. MATERIAL:
CHASSIS - ALUMINUM ALLOY 5052-H32, .063 THK PER AMS-QQ-A-250/8 OR AMS 4016.

6. ELECTROSTATIC DISCHARGE SENSITIVE (ESD), HANDLE PER IPC-A-610.

5 ⊕ DENOTES CENTRE OF GRAVITY - LOCATION IS APPROXIMATE.

4. WEIGHT: 14.0 LBS (6.35 KG) MAXIMUM.

3 DENOTES DIMENSION FROM FRONT PANEL TO REAR PANEL WALL.
DIMENSION DOES NOT INCLUDE SCREW HEAD PROTRUSIONS AND CONNECTOR.

2. THIS UNIT MEETS THE DIMENSIONAL REQUIREMENTS OF A 4 MCU PER ARINC SPECIFICATION 791.

1. DIMENSIONS AND TOLERANCES IAW Y14.5M-1994.

NOTES, UNLESS OTHERWISE SPECIFIED:

TABLE 1. GXA MODMAN PART NUMBER 13

PART NUMBER	DESCRIPTION
90400012-0002	ASSY, GXA MODMAN VAR 2

TABLE 2. GXA MODMAN CONNECTOR IDENTIFICATION

REF. DES	PART NUMBER	MATING CONNECTOR	REMARKS
J1	RADIALL 620601191	RADIALL NSXN2B875S00 WITH EMI BACKSHELL GLENAIR 527-025MP5A16B16C10D	J1-A TOP INSERT ARRANGEMENT Q11 (11X SIZE 8 QUADRAX)
			J1-B MIDDLE INSERT ARRANGEMENT 12002 (118X #22 CONTACTS, 2X SIZE 8 QUADRAX)
			J1-C BOTTOM INSERT ARRANGEMENT 12F5C2 (4X #12 CONTACTS, 1X #16 CONTACTS, 5X SIZE 16 OPTICAL, 2X SIZE 5 COAX)

ID-601420 E90400059-0002-1-A

Figure 4-22. (Sheet 1 of 4) Modman Outline and Installation Drawing Variant 2 (90400059-0002, REV A)

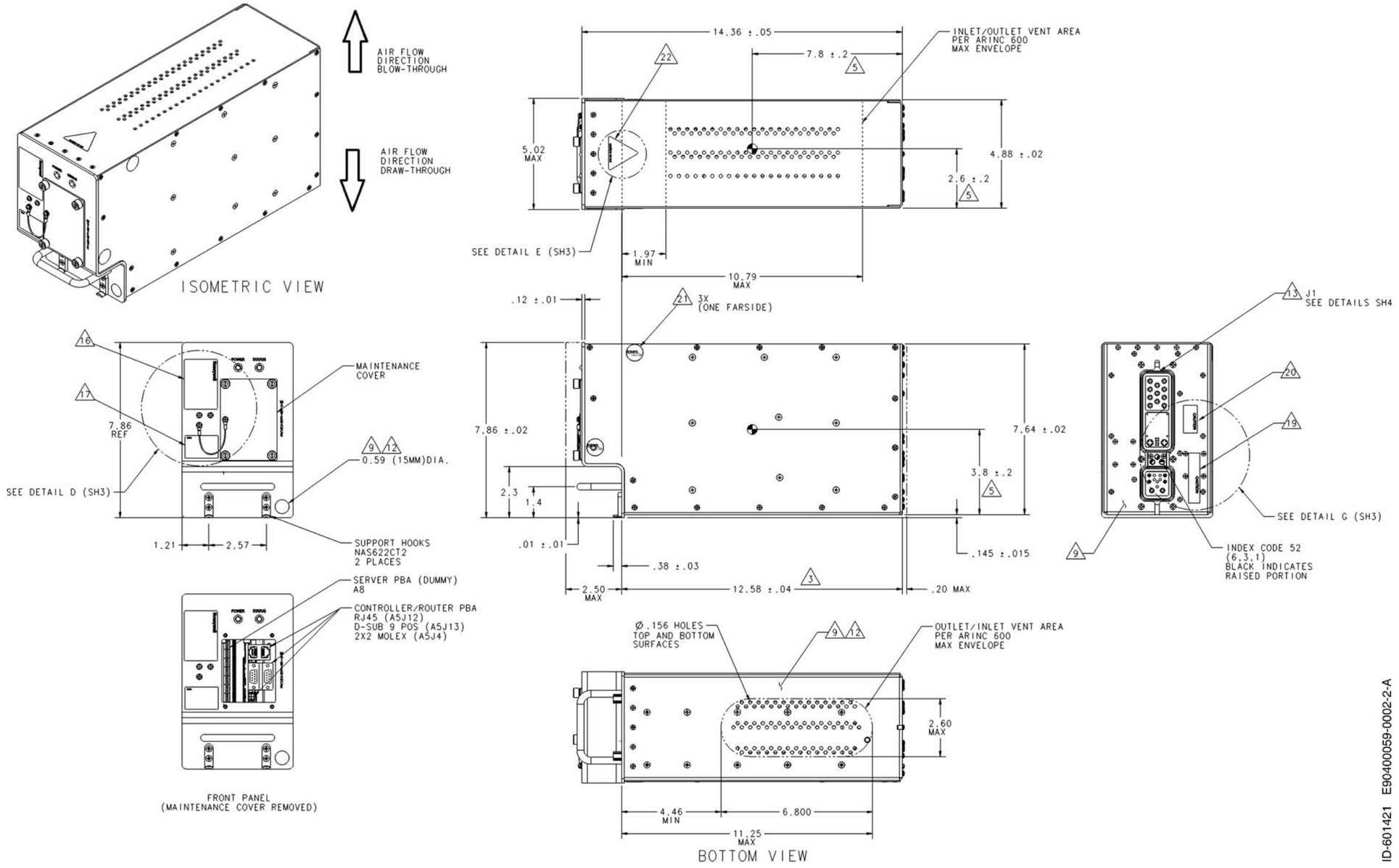


Figure 4-22. (Sheet 2 of 4) Modman Outline and Installation Drawing Variant 2 (90400059-0002, REV A)

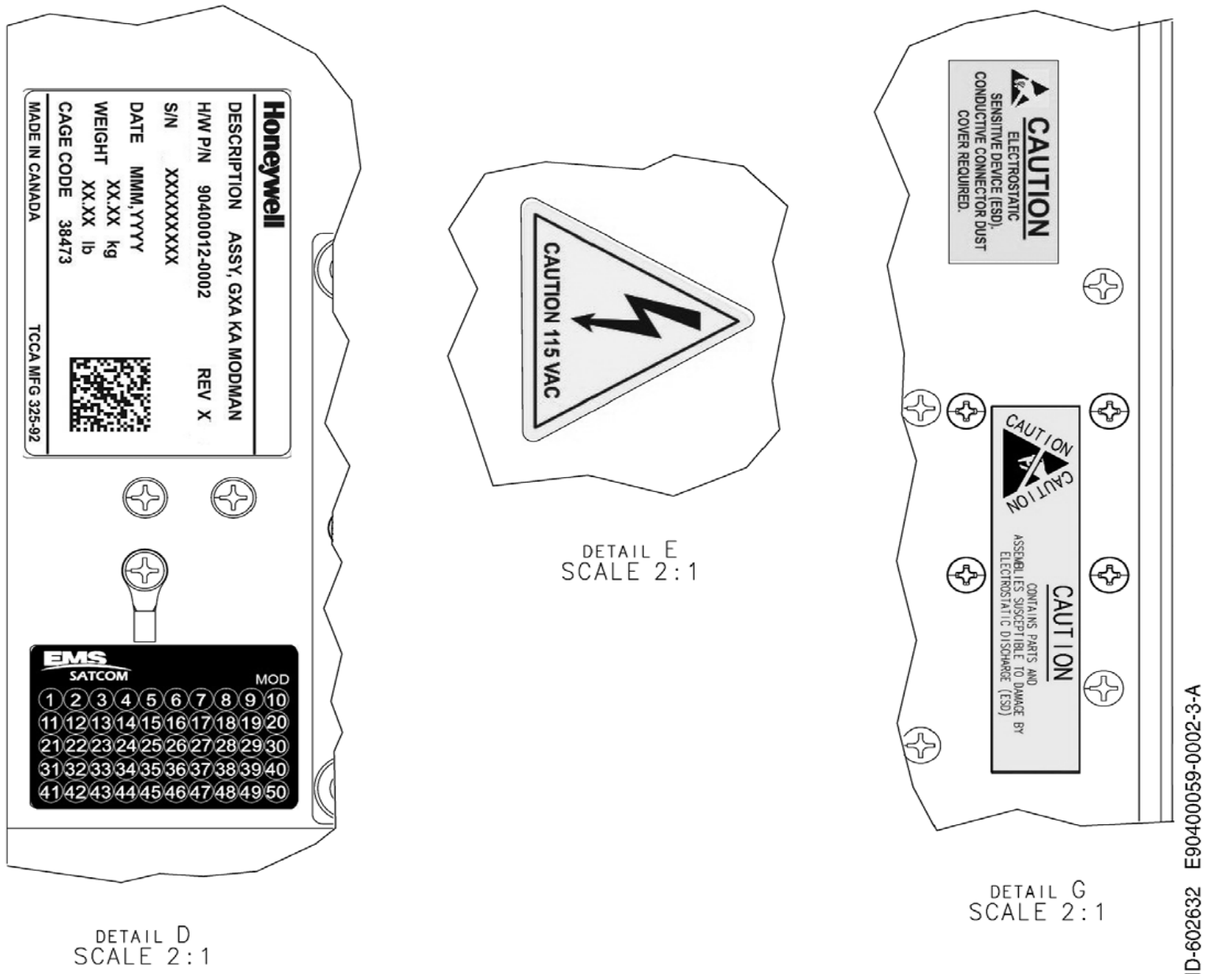
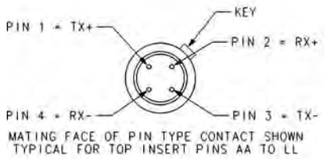


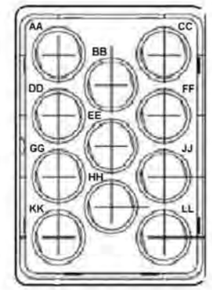
Figure 4-22. (Sheet 3 of 4) Modman Outline and Installation Drawing Variant 2 (90400059-0002, REV A)



MATING FACE OF PIN TYPE CONTACT SHOWN
TYPICAL FOR TOP INSERT PINS AA TO LL

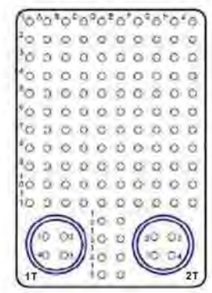
TOP INSERT

AA AISD ETHERNET AV2	BB AISD ETHERNET AV1	CC AISD GIGABIT AG1 (13)
DD PODD GIGABIT PG1 (13)	EE PIESD GIGABIT EG1 (13)	FF AISD GIGABIT AG1 (13)
GG PODD GIGABIT PG1 (13)	HH PODD ETHERNET PA2	JJ PIESD GIGABIT EG1 (13)
KK PODD ETHERNET PA1		LL PIESD ETHERNET EN6



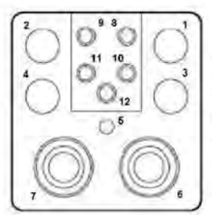
MIDDLE INSERT

	A	B	C	D	E	F	G	H	J	K
1	ETHERNET PA3 TX+	ETHERNET PA3 RX+	NOT USED	NOT USED	ETHERNET PA4 TX+	ETHERNET PA4 RX+	NOT USED	NOT USED	ETHERNET EN7 TX+	ETHERNET EN7 RX+
2	ETHERNET PA3 RX-	ETHERNET PA3 TX-	NOT USED	NOT USED	ETHERNET PA4 RX-	ETHERNET PA4 TX-	NOT USED	NOT USED	ETHERNET EN7 RX-	ETHERNET EN7 TX-
3	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
4	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
5	ETHERNET EN8 TX+	ETHERNET EN8 RX+	NOT USED	NOT USED	ETHERNET AV3 TX+	ETHERNET AV3 RX+	NOT USED	NOT USED	NOT USED	NOT USED
6	ETHERNET EN8 RX-	ETHERNET EN8 TX-	NOT USED	NOT USED	ETHERNET AV3 RX-	ETHERNET AV3 TX-	NOT USED	NOT USED	NO CONNECT	NO CONNECT
7	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NO CONNECT	NO CONNECT
8	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NO CONNECT	NO CONNECT
9	DATA TO/FROM APM+	DATA TO/FROM APM-	NO CONNECT	NO CONNECT	POWER TO APM	POWER RETURN FROM APM	RS422 TX+ KANDU RESET HI	RS422 TX- KANDU RESET LO	RS422 RX+ SPARE	RS422 RX- SPARE
10	REMOTE MANAGE ENABLE	LOCAL DATA LOAD ENABLE	MODMAN RESET	DISCRETE INPUT	DISCRETE INPUT	FACTORY/ BENCH MODE	NO CONNECT	DISCRETE OUTPUT	DISCRETE OUTPUT	DISCRETE OUTPUT
11	WEIGHT ON WHEELS (WOW)	CELLULAR TX ENABLE	DISCRETE INPUT	GROUND TRANSMIT ENABLE	PUBLIC SERVICE DISABLE	FAN COOLING AVAILABLE	RS422 TX+ KANDU FILTER SELECT HI	RS422 TX- KANDU FILTER SELECT LO	RS422 TX+ KANDU TX MUTE HI	RS422 TX- KANDU TX MUTE LO
12	1T PIESD ETHERNET EN3 KANDU				TX MUTE	DISCRETE SIGNAL GROUND	2T PIESD ETHERNET EN5 IFE			
13	1 TX+	2 RX+			SYSTEM AVAILABLE	DATA LINK AVAILABLE	2 RX+	3 TX-		
14	4 RX-	3 TX-			NOT USED	NOT USED	1 TX+	4 RX-		
15					A429 RX-A GPS	A429 RX-B GPS				



BOTTOM INSERT

2 NO CONNECT
9 NO CONNECT
8 NO CONNECT
1 115 VAC RETURN
4 NO CONNECT
11 NO CONNECT
12 NO CONNECT
10 NO CONNECT
3 CHASSIS GROUND
5 115 VAC
7 TX IF
6 RX IF



J1 CONTACT ASSIGNMENTS FOR MODMAN
VIEW SHOWN ON MATING FACE

ID-601423 E90400059-0002-4-A

Figure 4-22. (Sheet 4 of 4) Modman Outline and Installation Drawing Variant 2 (90400059-0002, REV A)

22. UNIT EXPORT CONTROL CLASSIFICATION NUMBER IS 7E994.

21. SPATIAL MODEL DEFINED BY 90401592_REVF.STP

△20 LOCATE VOID LABEL APPROXIMATELY WHERE SHOWN.

△19 LOCATE MOD DOT LABEL APPROXIMATELY WHERE SHOWN.

△18 LOCATE ESD CAUTION LABEL APPROXIMATELY WHERE SHOWN.

17. DELETED.

16. DELETED.

△15 LOCATE UNIT NAMEPLATE APPROXIMATELY WHERE SHOWN. HONEYWELL NAMEPLATE INCLUDES:
HONEYWELL NAME
PRODUCT NAME: ASSY,GXA APM
HARDWARE P/N: 90401121
REV: (CURRENT REV)
S/N: (SERIAL NUMBER)
DATE: (CURRENT DATE)
WEIGHT: (IN kg AND lb)
CAGE CODE: 38473
MADE IN: CANADA
TCCA MFG: 325-92

△14 ELECTROSTATIC SENSITIVE CONNECTOR DUST COVER (MS90376-12RB, NAS 831-12C, CAPLUGS CEC-12 OR EQUIVALENT).

13. ENVIRONMENTAL CONDITIONS: SEE TABLE 4.

12. COOLING: APM CAN OPERATE WITHOUT THE NEED OF ANY FORCED AIR COOLING.

△11 CONNECTOR J1
SEE TABLE 3 FOR CONNECTOR IDENTIFICATION
SEE TABLE 2 FOR CONNECTOR PIN OUTS.

△10 ELECTRICAL BONDING SHALL BE EITHER: THROUGH CONTACT WITH THE BASE OF UNIT; OR THROUGH A BONDING CABLE ATTACHED TO M3 EARTH STUD.

DC BONDING RESISTANCE SHALL BE 2.5 mΩ OR LESS.

9. MOUNTING FASTENERS TO BE .164-32 UNC-2A, CORROSION RESISTANT STEEL, MINIMUM ULTIMATE TENSILE STRENGTH OF 125 KSI.
TORQUE REQUIREMENTS FOR MOUNTING SCREWS ARE 25 IN-LBS MAX.

△8 BASE OF UNIT AND M3 EARTH STUD ARE FREE FROM PAINT AND PRIMER.

7. FINISH:
METAL TREATMENT: CHEMICAL CONVERSION COATED PER MIL-DTL-5541, TYPE II, CLASS 3
EXTERIOR FINISH: PRISM POWDER COAT PB134LT (POLYESTER POWDER, SATIN SANTEX BLACK)APPLIED AND CURED PER MANUFACTURER'S INSTRUCTIONS.

6. MATERIAL:
CHASSIS - ALUMINUM ALLOY 5052-H32 PER QQ-A-250/8

5. ELECTRICAL:
INPUT VOLTAGE: +4.2V DC NOMINAL SUPPLIED BY THE GXA MODMAN.
POWER CONSUMPTION : 0.3W (MAX)
POWER DISSIPATION : 0.3W (MAX).

△4 ⊕ INDICATES APPROXIMATE CENTRE OF GRAVITY

3. WEIGHT: 0.34 kg (12 OZ) MAXIMUM.

2. THIS UNIT MEETS THE DIMENSIONAL REQUIREMENTS OF ARINC 791-1.

1. DIMENSIONS AND TOLERANCES IAW Y14.5M-1994.

NOTES, UNLESS OTHERWISE SPECIFIED:

TABLE 1. GXA APM PART NUMBER

PART NUMBER	DESCRIPTION
90401121	ASSY, GXA APM

TABLE 2. J1 CONNECTOR CONTACT ASSIGNMENTS

PIN NUMBER	SIGNAL NAME
1	SERIAL DATA FROM [/TO] APM +
2	SERIAL DATA FROM [/TO] APM -
3	NC
4	NC
5	POWER TO APM (5V)
6	POWER RETURN FROM APM
7	CHASSIS GROUND
8-13	SPARE

TABLE 3. GXA APM CONNECTOR IDENTIFICATION

REF. DES	PART NUMBER	MATING CONNECTOR
J1	AMPHENOL D38999/20FB35PN	AMPHENOL D38999/26FB35SN OR EQUIVALENT.

TABLE 4. GXA APM ENVIRONMENTAL QUALIFICATION REQUIREMENTS

ENVIRONMENTAL CONDITIONS	RTCA/DO-160G SPECIFICATION	REQUIREMENTS
OPERATING LOW TEMPERATURE	SECTION 4.0, CAT. A1	-15°C
OPERATING HIGH TEMPERATURE	SECTION 4.0, CAT. A1	+55°C
ALTITUDE	SECTION 4.0, CAT. A1	15000 FT
OVERPRESSURE	SECTION 4.0, CAT. A1	199 KPa (-20000 FT)
DECOMPRESSION	SECTION 4.0, CAT. A1	75.25 KPa (8 KFT) TO 9.12 KPa (55 KFT) WITHIN 15 SECONDS
TEMPERATURE VARIATION	SECTION 5.0, CAT. B	5°C MIN. PER MINUTE
HUMIDITY	SECTION 6.0, CAT. B	NON-OPERATING, 10 CYCLES 85% RH @ 38°C 95% RH @ 65°C
OPERATIONAL SHOCK	SECTION 7.0, CAT. B	3 SHOCKS OF 6G, 11MS, 6 DIRECTIONS
CRASH SAFETY SUSTAINED	SECTION 7.0, CAT. B	18 G, 3 SECS, 6 DIRECTIONS
CRASH SAFETY IMPULSE	SECTION 7.0, CAT. B	1 SHOCK OF 20G, 11 MS, 6 DIRECTIONS
VIBRATION	SECTION 8.0, CAT. S	PERFORMANCE LEVEL CURVE B2
EXPLOSIVE ATMOSPHERE	SECTION 9.0, CAT. X	NOT APPLICABLE
WATERPROOFNESS	SECTION 10.0, CAT. Y	
FLUIDS SUSCEPTIBILITY	SECTION 11.0, CAT. X	NOT APPLICABLE
SAND AND DUST	SECTION 12.0, CAT. D	DUST SECTION 12.3.1
FUNGUS RESISTANCE	SECTION 13.0, CAT. F	BY ANALYSIS
SALT FOG	SECTION 14.0, CAT. X	NOT APPLICABLE
ICING	SECTION 24.0, CAT. X	NOT APPLICABLE
ESD	SECTION 25.0, CAT. A	
FLAMMABILITY	SECTION 26.0, CAT. C	

ID-601424 E90401592-1-F

Figure 4-23. (Sheet 1 of 2) APM Outline and Installation Drawing (90401592, REV F)

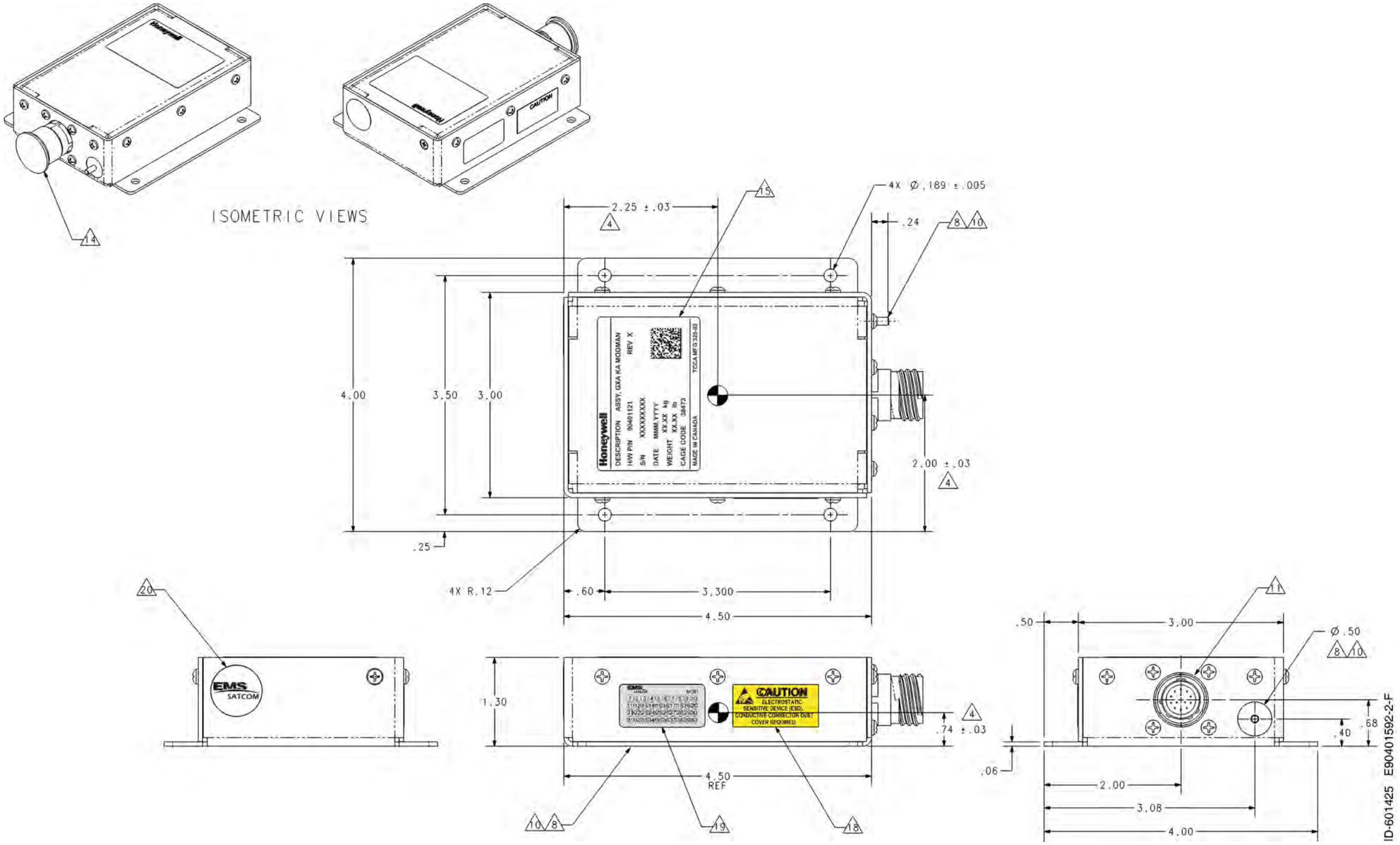


Figure 4-23. (Sheet 2 of 2) APM Outline and Installation Drawing (90401592, REV F)

NOTES:
Unless otherwise specified

1. Dimensions and tolerances IAW Y14.5M-1994.
2. This unit meets the dimensional requirements of ARINC 791-1.
3. Weight: 0.34 kg (0.75 lb) maximum.
4. ⌖ Indicates approximate center of gravity.
5. Electrical:
   Input voltage: +5 VDC nominal (min. required by APM 3.5 VDC) supplied by the GXA MODMAN
   Power consumption 0.3W (max)
   Power dissipation 0.3W (max)
   Cable length between MODMAN and APM shall not exceed 3 meters.
6. Material:
   Chassis - Aluminum alloy 5052-H32 per AMS-QQ-A-250/8.
7. Finish:
   Metal treatment: Chemical conversion coated per MIL-DTL-5541, Type II, Class 3
   Exterior finish: Prism powder coat PB134LT (polyester powder, satin santex black) applied and cured per manufacturer's instructions.
8. Base of unit and M3 earth stud are free from paint and primer.
9. Mounting fasteners to be 164-32 UNC-2A, corrosion resistant steel, minimum ultimate tensile strength of 125 KSI. Torque requirements for mounting screws are 25 in-lbs max.
10. Electrical bonding shall be either: through contact with the base of unit; or through a bonding cable attached to M3 earth stud. DC bonding resistance shall be 2.5 mΩ or less.
11. Connector J1
    See Table 3 for connector identification
    See Table 2 for connector pin outs.
12. Cooling: APM can operate without the need of any forced air cooling.
13. Environmental conditions: see Table 4.
14. Electrostatic sensitive connector dust cover (MS90376-12RB, NAS831-12C, Caplugs CEC-12 or equivalent).
15. Locate unit nameplate approximately where shown. Honeywell nameplate includes:
    Honeywell Name
    Product Name: ASSY, GXA APM
    Hardware P/N: 90401121
    Rev: (Current Rev)
    S/N: (Serial Number)
    Date: (Current Date)
    Weight: (in kg and lb)
    Cage Code: 38473
    Made in: Canada
    TCCA Mfg: 325-92
16. Sheet metal bend lines.
17. Deleted.
18. Locate ESD caution label approximately where shown.
19. Locate MOD DOT label approximately where shown.
20. Locate VOID label approximately where shown.
21. Spatial model defined by 90405762_REVA.STP
22. Unit export control classification number is 7E994.

TABLE II
J1 CONNECTOR CONTACT ASSIGNMENTS

PIN NUMBER	SIGNAL NAME
1	SERIAL DATA FROM [/TO] APM +
2	SERIAL DATA FROM [/TO] APM -
3	NC
4	NC
5	POWER TO APM (5V)
6	POWER RETURN FROM APM
7	CHASSIS GROUND
8-13	SPARE

TABLE I
GXA APM PART NUMBER

PART NUMBER	DESCRIPTION
90401121	ASSEMBLY, GXA APM

TABLE III
GXA APM CONNECTOR IDENTIFICATION

REF DES	PART NUMBER	MATING CONNECTOR
J1	AMPHENOL D38999/20FB35PN	AMPHENOL D38999/26FB35SN OR EQUIVALENT

TABLE IV
GXA APM ENVIRONMENTAL QUALIFICATION REQUIREMENTS

ENVIRONMENTAL CONDITIONS	RTCA/DO-160G SPECIFICATION	REQUIREMENTS
OPERATING LOW TEMPERATURE	SECTION 4.5, CAT. A2	-15°C
OPERATING HIGH TEMPERATURE	SECTION 4.5, CAT. A2	+70°C
ALTITUDE	D6-36440G V.1 SECTION 7.2.1.3	25,000 FT
OVERPRESSURE	SECTION 4.6	199 kPa (-20,000 FT)
DECOMPRESSION	D6-36440G V.1 SECTION 7.2.1.3	81.2 kPa (6,000 FT) TO 9.12 kPa (45,100 FT) WITHIN 2 SECONDS
TEMPERATURE VARIATION	SECTION 5.0, CAT. B	5°C MIN. PER MINUTE
HUMIDITY	SECTION 6.0, CAT. A	NON-OPERATING, 10 CYCLES 85% RH @ 38°C 95% RH @ 65°C
OPERATIONAL SHOCK	SECTION 7.0, CAT. A	3 SHOCKS OF 6G, 11MS, 6 DIRECTIONS
VIBRATION	SECTION 8.1, CAT. S	PERFORMANCE LEVEL CURVE B3
VIBRATION	SECTION 8.1	PERFORMANCE LEVEL CURVE C SUPPLEMENTAL TEST 13
EXPLOSIVE ATMOSPHERE	SECTION 9.0, CAT. X	NOT APPLICABLE
WATERPROOFNESS	SECTION 10.0, CAT. Y	
FLUIDS SUSCEPTIBILITY	SECTION 11.0, CAT. X	NOT APPLICABLE
SAND AND DUST	SECTION 12.0, CAT. D	DUST SECTION 12.3.1
FUNGUS RESISTANCE	SECTION 13.0, CAT. F	BY ANALYSIS
SALT FOG	SECTION 14.0, CAT. X	NOT APPLICABLE
ICING	SECTION 24.0, CAT. X	NOT APPLICABLE
ESD	SECTION 25.0, CAT. A	
FLAMMABILITY	SECTION 26.0, CAT. C	

ID-630516 E90405762-1-A

Figure 4-24. (Sheet 1 of 2) APM Outline and Installation Drawing (90405762, REV A)

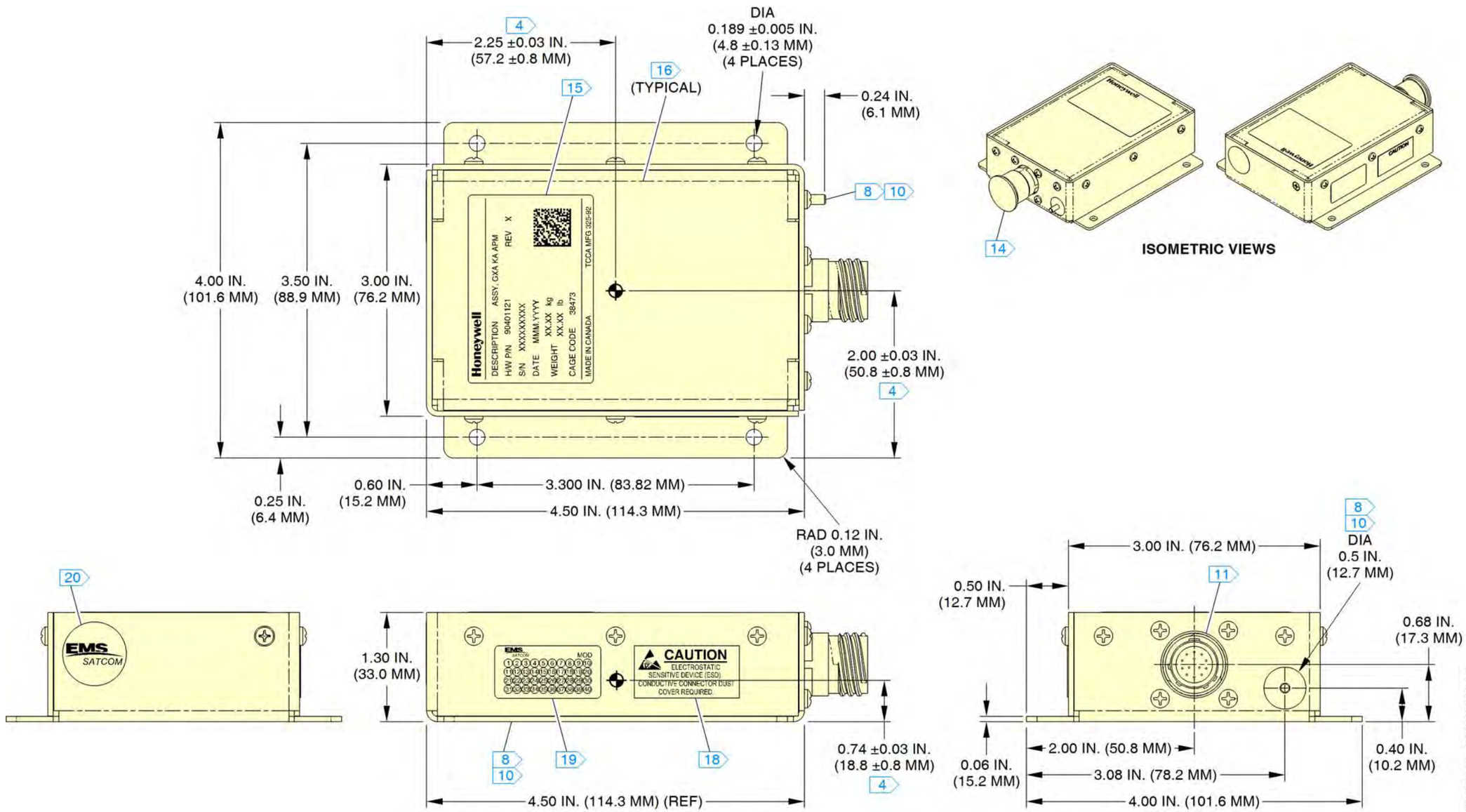
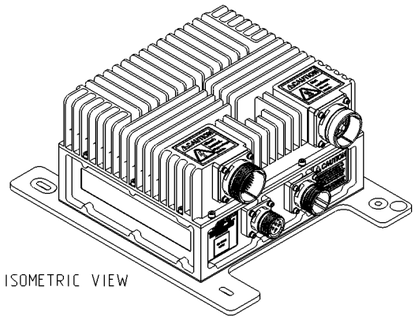
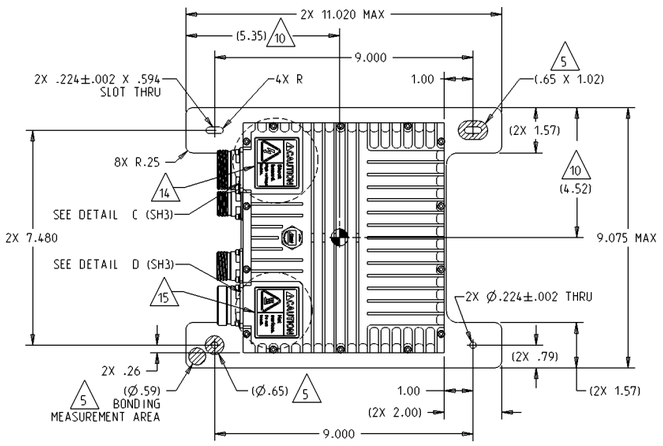
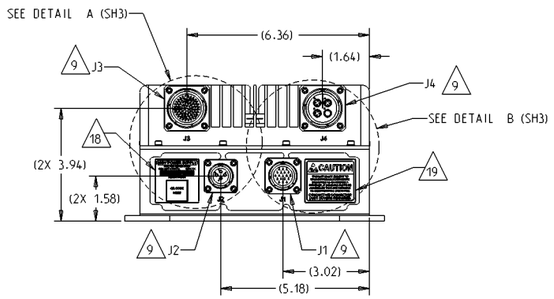
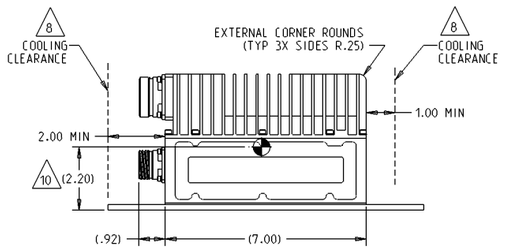


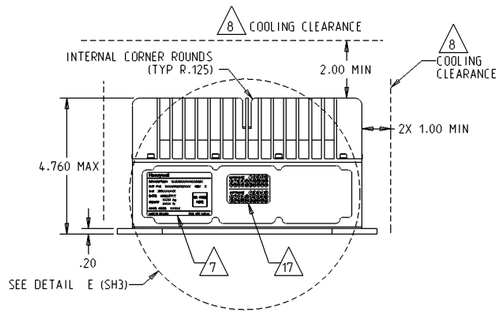
Figure 4-24. (Sheet 2 of 2) APM Outline and Installation Drawing (90405762, REV A)











11. ELECTROSTATIC DISCHARGE (ESD) SENSITIVE. HANDLE PER IPC-A-610.

10 ⊕ INDICATES CENTER OF GRAVITY.

9 J1, J2, J3 AND J4 CONNECTORS IDENTIFICATION AND CONTACTS ASSIGNMENT PER TABLE 2. 3. 4. 5 AND 6 ACCORDINGLY.

8 COOLING: NATURAL CONVECTION AND RADIATION ONLY. SEE COOLING CLEARANCE.

7 HONEYWELL IDENTIFICATION LABEL INCLUDES:
DESCRIPTION
H/W PART NUMBER AND REVISION
SERIAL NUMBER
DATE OF MANUFACTURE
WEIGHT
CAGE CODE
COUNTRY OF ORIGIN AND SITE TRANSPORT CANADA MFG CODE

6. POWER DISSIPATION AT 96-122VAC (320-800HZ): 50W MAX (CLASS A); 42W MAX (CLASS B).
POWER CONSUMPTION AT 96-122VAC (320-800HZ): 200W MAX (CLASS A); 115W MAX (CLASS B).
CURRENT DRAW IN AMPERES: 4.1A RMS MAXIMUM.
POWER FACTOR: GREATER THAN 0.98.

5 INDICATED SURFACE IS FOR ELECTRICAL BONDING VIA THE MOUNTING SCREWS. THE HATCHED AREAS ARE UNPAINTED BUT CHEM-FILM COATED PER NOTE 13. BONDING RESISTANCE FROM A POINT INSIDE THE INDICATED MEASUREMENT AREA TO THE SURFACE ON THE AIRCRAFT TO WHICH THE UNIT IS MOUNTED SHOULD BE LESS THAN 2.5 MILLIOHMS.

4. ASSOCIATED CAD DATA HAS BEEN MODELED TO NOMINAL DIMENSIONS. SPATIAL MODEL DEFINED BY 90401567_REVE.STP.

3. WEIGHT: 4.0 kg (8.7 lb) MAX.

2. DIMENSIONS SHOWN ARE FOR INSTALLATION PURPOSES ONLY.

1. DIMENSIONS AND TOLERANCES IN ACCORDANCE WITH ASME Y14.5M-1994.

NOTES. UNLESS OTHERWISE SPECIFIED:

22. UNIT EXPORT CONTROL CLASSIFICATION NUMBER IS 7A994.

21. UNIT SHALL BE INSTALLED USING ALL 4 MOUNTING HOLES AND MAY BE INSTALLED IN ANY ORIENTATION. RECOMMENDED FASTENERS TO BE .190-32 UNJF-3A. A286 CORROSION RESISTANT STEEL PER NAS1802.

19 CAUTION LABEL: ESD SENSITIVE.

18 WAVESTREAM IDENTIFICATION LABEL.

17 HONEYWELL MOD DOT LABEL.

16. ENVIRONMENTAL QUALIFICATION CHARACTERSTICS PER TABLE 7.

15 CAUTION LABEL: HOT SURFACE. DO NOT TOUCH.

14 CAUTION LABEL: SHOCK HAZARD. HIGH VOLTAGE INSIDE.

13. MATERIAL AND FINISH FOR CHASSIS:
AL ALLOY 6061-T6 IN ACCORDANCE WITH AMS-QQ-A-250/11.
EXTERNAL SURFACES: BLACK SANDEX POWDER COAT OVER
CHEM-FILM PER MIL-DTL-5541 TYPE II. CLASS 3.

12. CONNECTORS FITTED WITH PROTECTIVE SHIPPING COVERS. REMOVE PRIOR TO TEST OR FINAL INSTALLATION.

ID-601426 E90401567-1-E

Figure 4-25. (Sheet 1 of 3) KANDU Outline and Installation Drawing (90401657, REV E)

TABLE 1: GXA Ka KANDU PART NUMBER

PART NUMBER	DESCRIPTION
90401566	GXA Ka KANDU

TABLE 2: GXA Ka KANDU EXTERNAL CONNECTORS IDENTIFICATION 9

REF. DES	PART NUMBER	MATES WITH	FUNCTION	REMARKS
J1	D38999/20FD19PN (AMPHENOL)	D38999/26FD19SN (AMPHENOL)	AIRCRAFT INTERFACE	19 PIN
J2	D38999/20FC4SN (AMPHENOL)	D38999/26FC4PN (AMPHENOL)	POWER OUTPUT	4 SOCKET
J3	D38999/20FG35PN (AMPHENOL)	D38999/26FG35SN (AMPHENOL)	CONTROL INTERFACE	79 PIN
J4	TVP00RGQF-21-75P (AMPHENOL)	TV06RQF-21-75S (AMPHENOL)	ETHERNET INTERFACE	4 PIN QUADRAX

TABLE 4: J2 POWER OUTPUT CONNECTOR RECEPTACLE PIN ASSIGNMENTS 9

PIN NUMBER	FUNCTION
A	OAE POWER
B	OAE POWER RETURN
C	IMU POWER
D	IMU POWER RETURN

TABLE 5: J3 CONTROL INTERFACE CONNECTOR RECEPTACLE PIN ASSIGNMENTS 9

CONTACT	FUNCTION	CONTACT	FUNCTION	CONTACT	FUNCTION
1	RS-422: KANDU TO SCM HI	28		55	
2	RS-422: KANDU TO SCM LO	29		56	
3	RS-422: KRFU TO KANDU HI	30		57	
4	RS-422: KRFU TO KANDU LO	31		58	RS-422: KANDU TO IMU HI
5	RS-422: KANDU TO KRFU HI	32	RS-422: KANDU TO OAE HI	59	RS-422: KANDU TO IMU LO
6	RS-422: KANDU TO KRFU LO	33	RS-422: KANDU TO OAE LO	60	
7	KRFU FILTER SELECT HI	34		61	
8	KRFU FILTER SELECT LO	35		62	SPARE
9	KRFU TX MUTE HI	36	RS-422: OAE TO KANDU HI	63	
10	KRFU TX MUTE LO	37	RS-422: OAE TO KANDU LO	64	
11	KRFU RESET HI	38		65	
12	KRFU RESET LO	39		66	
13	SPARE	40	FMA TX MUTE	67	RS-422: IMU TO KANDU LO
14	SPARE	41	FMA TX MUTE SIGNAL RETURN	68	RS-422: MAINTENANCE RX HI
15		42		69	RS-422: MAINTENANCE RX LO
16		43		70	
17		44		71	
18		45		72	
19		46		73	
20		47		74	SPARE
21		48		75	
22		49		76	RS-422: IMU TO KANDU HI
23		50	RS-422: SCM TO KANDU HI	77	
24		51	RS-422: SCM TO KANDU LO	78	
25		52	RS-422: MAINTENANCE TX HI	79	
26		53	RS-422: MAINTENANCE TX LO		
27		54			

TABLE 3: J1 AIRCRAFT INTERFACE CONNECTOR PIN ASSIGNMENTS 9

PIN NUMBER	FUNCTION
A	CHASSIS GROUND
B	SIGNAL GROUND
C	TX MUTE ARINC
D	TX CONTROL
E	FILTER SELECT HI
F	115 VAC RETURN
G	115 VAC POWER
H	/ RESET LO
J	IRS A429 HI
K	IRS A429 LO
L	SPARE
M	FILTER SELECT LO
N	TX MUTE HI
P	TX MUTE LO
R	AUX A429 HI
S	AUX A429 LO
T	/ RESET HI
U	SPARE
V	SPARE

TABLE 6: J4 ETHERNET INTERFACE CONNECTOR QUADRAX INSERT ASSIGNMENTS 9

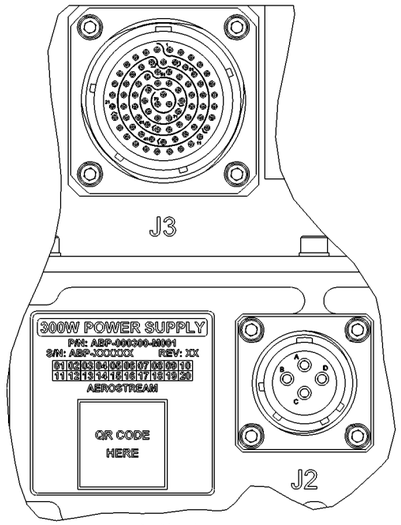
CONTACT	FUNCTION
A-1	EN3 TX+
A-3	EN3 TX-
A-2	EN3 RX+
A-4	EN3 RX-
A-S	EN3 SHIELD
B-1	EN1 TX+ (SPARE)
B-3	EN1 TX- (SPARE)
B-2	EN1 RX+ (SPARE)
B-4	EN1 RX- (SPARE)
B-S	(SPARE)
C-1	EN2 TX+
C-3	EN2 TX-
C-2	EN2 RX+
C-4	EN2 RX-
C-S	EN2 SHIELD
D-1	EN4 TX+
D-3	EN4 TX-
D-2	EN4 RX+
D-4	EN4 RX-
D-S	EN4 SHIELD

TABLE 7: GXA Ka KANDU ENVIRONMENTAL QUALIFICATION CHARACTERISTICS

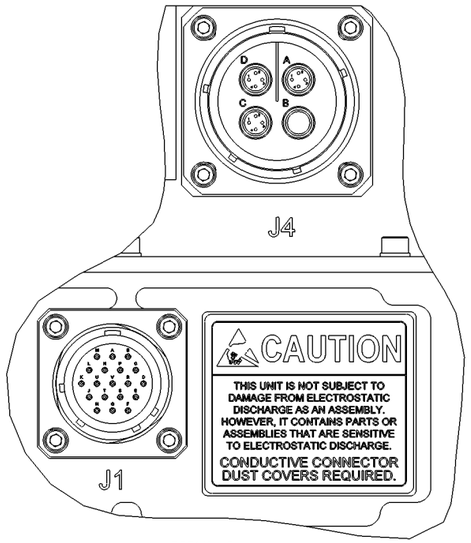
ENVIRONMENTAL CONDITIONS	LIMITS	RTCA/DO-160G SPECIFICATION
GROUND SURVIVAL LOW TEMPERATURE	-55°C	SECTION 4.5.1, CAT D2
OPERATING LOW TEMPERATURE	-55°C	SECTION 4.5.2, CAT D2
GROUND SURVIVAL HIGH TEMPERATURE	+85°C	SECTION 4.5.3, CAT D2
OPERATING HIGH TEMPERATURE	+70°C	SECTION 4.5.4, CAT D2
IN-FLIGHT LOSS OF COOLING	NOT APPLICABLE	SECTION 4.5.5, CAT Z
ALTITUDE	55000 FT	SECTION 4.6.1, CAT D2 EXTENDED TO 55000 FT FROM 51000 FT
DECOMPRESSION	6000 FT TO 55000 FT	SECTION 4.6.2, CAT A2 EXTENDED 6000 FT TO 55000 FT
OVER PRESSURE	199 KPA (-20000 FT)	SECTION 4.6.3, CAT A2 EXTENDED TO 199 KPA (-20000 FT) FROM 170 KPA (-15000 FT)
TEMPERATURE VARIATION	±10°C/MIN	SECTION 5, CAT A
HUMIDITY	85% RH @38°C 95% RH @65°C	SECTION 6, CAT B
OPERATIONAL SHOCK	3 SHOCK OF 6 G, 11 MS, 6 DIRECTIONS 3 SHOCK OF 6 G, 20 MS, 6 DIRECTIONS	SECTION 7, CAT B & E
CRASH SAFETY IMPULSE	1 SHOCK OF 20 G, 11 MS, 6 DIRECTIONS 1 SHOCK OF 20 G, 20 MS, 6 DIRECTIONS	SECTION 7, CAT B & E
CRASH SAFETY SUSTAINED	18 G, 3 SECS, 6 DIRECTIONS	SECTION 7, CAT B
VIBRATION	ROBUST RANDOM CURVE E & E1	SECTION 8, CAT R
EXPLOSIVE ATMOSPHERE	AIRCRAFT ZONE III	SECTION 9, CAT E
WATER PROOFNESS	CONDENSING AND SPRAYED	SECTION 10, CAT Y & R
FLUIDS SUSCEPTIBILITY	DE-ICING FLUID (ETHYLENE GLYCOL) HYDRAULIC FLUIDS (PHOSPHATE ESTER AS1241 TYPE IV & TYPE V)	SECTION 11, CAT F
SAND AND DUST	DUST	SECTION 12, CAT D
FUNGUS RESISTANCE	BY ANALYSIS	SECTION 13, CAT F
SALT FOG		SECTION 14, CAT S
ICING		SECTION 24, CAT A

ID-601427 E90401567-2-E

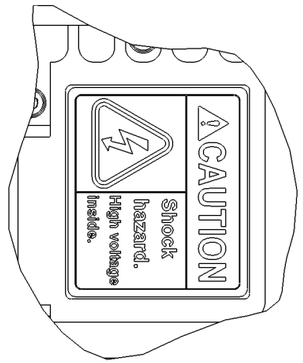
Figure 4-25. (Sheet 2 of 3) KANDU Outline and Installation Drawing (90401657, REV E)



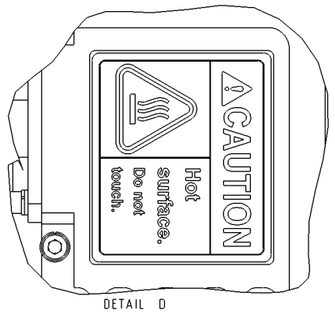
DETAIL A
SCALE 2/1



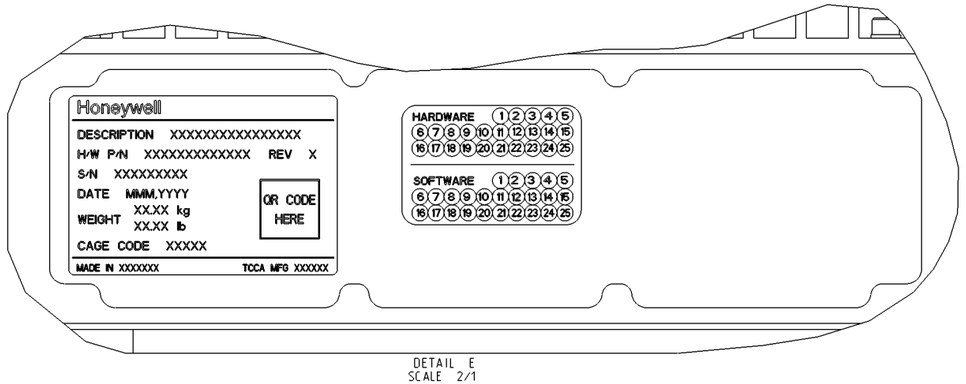
DETAIL B
SCALE 2/1



DETAIL C
SCALE 2/1



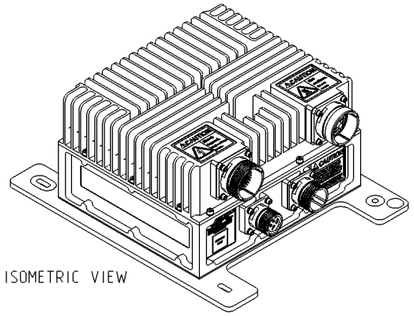
DETAIL D
SCALE 2/1

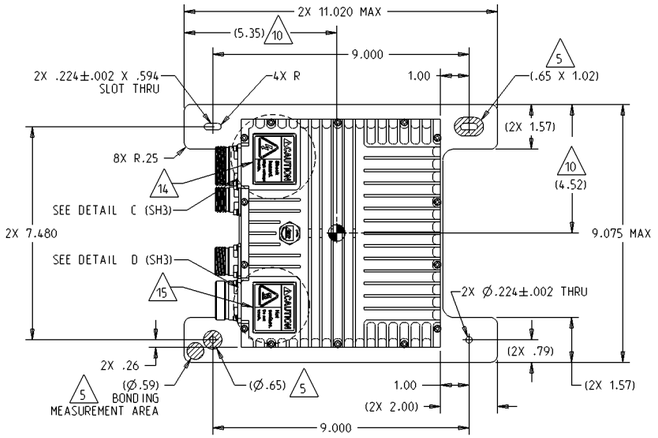


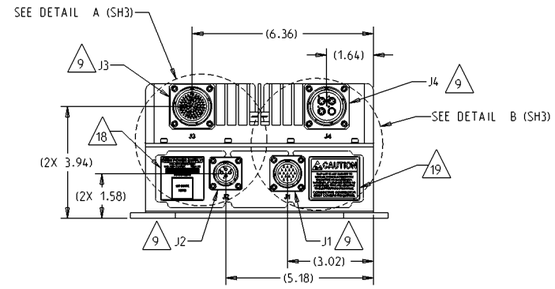
DETAIL E
SCALE 2/1

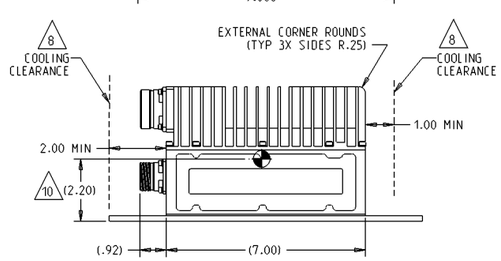
ID-601428 E90401567-3-E

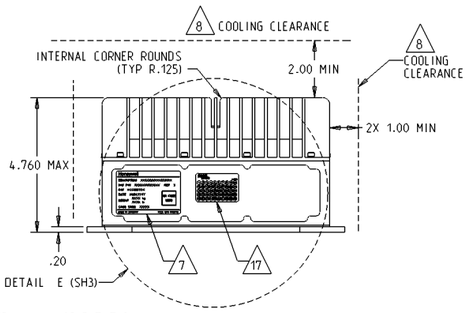
Figure 4-25. (Sheet 3 of 3) KANDU Outline and Installation Drawing (90401657, REV E)











11. ELECTROSTATIC DISCHARGE (ESD) SENSITIVE. HANDLE PER IPC-A-610.

10 ⊕ INDICATES CENTER OF GRAVITY.

9 J1, J2, J3 AND J4 CONNECTORS IDENTIFICATION AND CONTACTS ASSIGNMENT PER TABLE 2, 3, 4, 5 AND 6 ACCORDINGLY.

8 COOLING: NATURAL CONVECTION AND RADIATION ONLY. SEE COOLING CLEARANCE.

7 HONEYWELL IDENTIFICATION LABEL INCLUDES:
DESCRIPTION
H/W PART NUMBER AND REVISION
SERIAL NUMBER
DATE OF MANUFACTURE
WEIGHT
CAGE CODE
COUNTRY OF ORIGIN AND SITE TRANSPORT CANADA MFG CODE

6. POWER DISSIPATION AT 96-122VAC (320-800HZ): 50W MAX (CLASS A); 42W MAX (CLASS B).
POWER CONSUMPTION AT 96-122VAC (320-800HZ): 200W MAX (CLASS A); 115W MAX (CLASS B).
POWER FACTOR: GREATER THAN 0.98.
OAE POWER OUTPUT: 38.5 VDC AT 3.5 AMPS MAX.
IMU POWER Output: 24 VDC AT 0.46 AMPS MAX.
INPUT CURRENT DRAW: 2.1 AMPS MAX AT 96 VAC 800 HZ.

5 INDICATED SURFACE IS FOR ELECTRICAL BONDING VIA THE MOUNTING SCREWS. THE HATCHED AREAS ARE UNPAINTED BUT CHEM-FILM COATED PER NOTE 13. BONDING RESISTANCE FROM A POINT INSIDE THE INDICATED MEASUREMENT AREA TO THE SURFACE ON THE AIRCRAFT TO WHICH THE UNIT IS MOUNTED SHOULD BE LESS THAN 2.5 MILLIOHMS.

4. ASSOCIATED CAD DATA HAS BEEN MODELED TO NOMINAL DIMENSIONS. SPATIAL MODEL DEFINED BY 90401567_REVB.STP.

3. WEIGHT: 4.0 kg (8.7 lb) MAX.

2. DIMENSIONS SHOWN ARE FOR INSTALLATION PURPOSES ONLY.

1. DIMENSIONS AND TOLERANCES IN ACCORDANCE WITH ASME Y14.5M-1994.

NOTES. UNLESS OTHERWISE SPECIFIED:

21. UNIT SHALL BE INSTALLED USING ALL 4 MOUNTING HOLES AND MAY BE INSTALLED IN ANY ORIENTATION. RECOMMENDED FASTENERS TO BE .190-32 UNJF-3A. A286 CORROSION RESISTANT STEEL PER NAS1802.

20. DELETED.

19 CAUTION LABEL: ESD SENSITIVE.

18 WAVESTREAM IDENTIFICATION LABEL.

17 HONEYWELL MOD DOT LABEL.

16. ENVIRONMENTAL QUALIFICATION CHARACTERSTICS PER TABLE 7.

15 CAUTION LABEL: HOT SURFACE. DO NOT TOUCH.

14 CAUTION LABEL: SHOCK HAZARD. HIGH VOLTAGE INSIDE.

13. MATERIAL AND FINISH FOR CHASSIS:
AL ALLOY 6061-T6 IN ACCORDANCE WITH AMS-QQ-A-250/11.
EXTERNAL SURFACES: BLACK SANDEX POWDER COAT OVER
CHEM-FILM PER MIL-DTL-5541 TYPE II, CLASS 3.

12. CONNECTORS FITTED WITH PROTECTIVE SHIPPING COVERS. REMOVE PRIOR TO TEST OR FINAL INSTALLATION.

23. DELETED.

22. UNIT EXPORT CONTROL CLASSIFICATION NUMBER IS 7A994.

ID-6014429 E90405004-1-C

Figure 4-26. (Sheet 1 of 3) KANDU Variant 2 Outline and Installation Drawing (90405004, REV C)

TABLE 1: GXA BOEING KANDU PART NUMBER

PART NUMBER	DESCRIPTION
90404518	GXA BOEING KANDU

TABLE 2: GXA Ka KANDU EXTERNAL CONNECTORS IDENTIFICATION 9

REF. DES	PART NUMBER	MATES WITH	FUNCTION	REMARKS
J1	D38999/20FD19PN (AMPHENOL)	D38999/26FD19SN (AMPHENOL)	AIRCRAFT INTERFACE	19 PIN
J2	D38999/20FC4SN (AMPHENOL)	D38999/26FC4PN (AMPHENOL)	POWER OUTPUT	4 SOCKET
J3	D38999/20FG35PN (AMPHENOL)	D38999/26FG35SN (AMPHENOL)	CONTROL INTERFACE	79 PIN
J4	TVP00RGQF-21-75P (AMPHENOL)	TV06RQF-21-75S (AMPHENOL)	ETHERNET INTERFACE	4 PIN QUADRAX

TABLE 4: J2 POWER OUTPUT CONNECTOR RECEPTACLE PIN ASSIGNMENTS 9

PIN NUMBER	FUNCTION
A	OAE POWER (38.5 VDC)
B	OAE POWER RETURN
C	IMU POWER (24 VDC)
D	IMU POWER RETURN

TABLE 5: J3 CONTROL INTERFACE CONNECTOR RECEPTACLE PIN ASSIGNMENTS 9

CONTACT	FUNCTION	CONTACT	FUNCTION	CONTACT	FUNCTION
1	RS-422: KANDU TO SCM HI	28		55	
2	RS-422: KANDU TO SCM LO	29		56	
3	RS-422: KRFU TO KANDU HI	30		57	
4	RS-422: KRFU TO KANDU LO	31		58	RS-422: KANDU TO IMU HI
5	RS-422: KANDU TO KRFU HI	32	RS-422: KANDU TO OAE HI	59	RS-422: KANDU TO IMU LO
6	RS-422: KANDU TO KRFU LO	33	RS-422: KANDU TO OAE LO	60	
7	KRFU FILTER SELECT HI	34		61	
8	KRFU FILTER SELECT LO	35		62	SPARE
9	KRFU TX MUTE HI	36	RS-422: OAE TO KANDU HI	63	
10	KRFU TX MUTE LO	37	RS-422: OAE TO KANDU LO	64	
11	KRFU RESET HI	38		65	
12	KRFU RESET LO	39		66	
13	SPARE	40	FMA TX MUTE	67	RS-422: IMU TO KANDU LO
14	SPARE	41	FMA TX MUTE SIGNAL RETURN	68	RS-422: MAINTENANCE RX HI
15		42		69	RS-422: MAINTENANCE RX LO
16		43		70	
17		44		71	
18		45		72	
19		46		73	
20		47		74	SPARE
21		48		75	
22		49		76	RS-422: IMU TO KANDU HI
23		50	RS-422: SCM TO KANDU HI	77	
24		51	RS-422: SCM TO KANDU LO	78	
25		52	RS-422: MAINTENANCE TX HI	79	
26		53	RS-422: MAINTENANCE TX LO		
27		54			

TABLE 3: J1 AIRCRAFT INTERFACE CONNECTOR PIN ASSIGNMENTS 9

PIN NUMBER	FUNCTION
A	CHASSIS GROUND
B	SIGNAL GROUND
C	TX MUTE ARINC
D	TX CONTROL
E	FILTER SELECT HI
F	115 VAC RETURN
G	115 VAC POWER
H	/ RESET LO
J	IRS A429 HI
K	IRS A429 LO
L	SPARE
M	FILTER SELECT LO
N	TX MUTE HI
P	TX MUTE LO
R	AUX A429 HI
S	AUX A429 LO
T	/ RESET HI
U	SPARE
V	SPARE

TABLE 6: J4 ETHERNET INTERFACE CONNECTOR QUADRAX INSERT ASSIGNMENTS 9

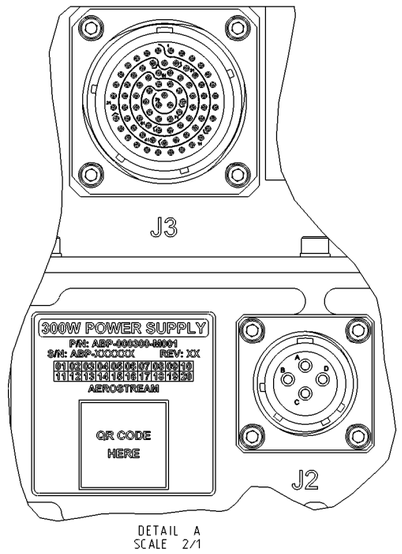
CONTACT	FUNCTION
A-1	EN3 TX+
A-3	EN3 TX-
A-2	EN3 RX+
A-4	EN3 RX-
A-S	EN3 SHIELD
B-1	EN1 TX+ (SPARE)
B-3	EN1 TX- (SPARE)
B-2	EN1 RX+ (SPARE)
B-4	EN1 RX- (SPARE)
B-S	(SPARE)
C-1	EN2 TX+
C-3	EN2 TX-
C-2	EN2 RX+
C-4	EN2 RX-
C-S	EN2 SHIELD
D-1	EN4 TX+
D-3	EN4 TX-
D-2	EN4 RX+
D-4	EN4 RX-
D-S	EN4 SHIELD

TABLE 7: GXA Ka KANDU ENVIRONMENTAL QUALIFICATION CHARACTERISTICS

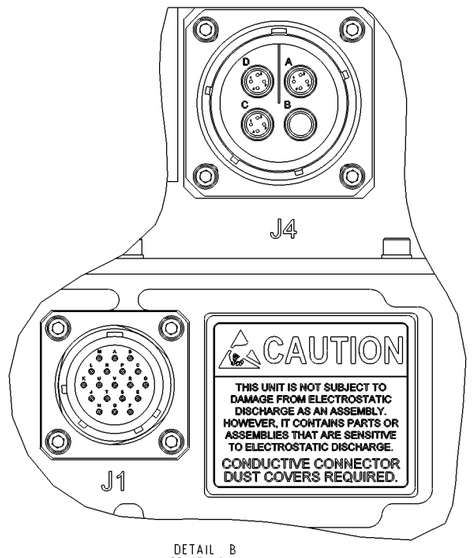
ENVIRONMENTAL CONDITIONS	LIMITS	RTCA/DO-160G SPECIFICATION
GROUND SURVIVAL LOW TEMPERATURE	-55°C	SECTION 4.5.1, CAT D2
OPERATING LOW TEMPERATURE	-55°C	SECTION 4.5.2, CAT D2
GROUND SURVIVAL HIGH TEMPERATURE	+85°C	SECTION 4.5.3, CAT D2
OPERATING HIGH TEMPERATURE	+70°C	SECTION 4.5.4, CAT D2
IN-FLIGHT LOSS OF COOLING	NOT APPLICABLE	SECTION 4.5.5, CAT Z
ALTITUDE	55000 FT	SECTION 4.6.1, CAT D2 EXTENDED TO 55000 FT FROM 51000 FT
DECOMPRESSION	6000 FT TO 55000 FT	SECTION 4.6.2, CAT A2 EXTENDED 6000 FT TO 55000 FT
OVER PRESSURE	199 KPA (-20000 FT)	SECTION 4.6.3, CAT A2 EXTENDED TO 199 KPA (-20000 FT) FROM 170 KPA (-15000 FT)
TEMPERATURE VARIATION	±10°C/MIN	SECTION 5, CAT A
HUMIDITY	85% RH @38°C 95% RH @65°C	SECTION 6, CAT B
OPERATIONAL SHOCK	3 SHOCK OF 6 G, 11 MS, 6 DIRECTIONS 3 SHOCK OF 6 G, 20 MS, 6 DIRECTIONS	SECTION 7, CAT B & E
CRASH SAFETY IMPULSE	1 SHOCK OF 20 G, 11 MS, 6 DIRECTIONS 1 SHOCK OF 20 G, 20 MS, 6 DIRECTIONS	SECTION 7, CAT B & E
CRASH SAFETY SUSTAINED	18 G, 3 SECS, 6 DIRECTIONS	SECTION 7, CAT B
VIBRATION	ROBUST RANDOM CURVE E & E1	SECTION 8, CAT R
EXPLOSIVE ATMOSPHERE	AIRCRAFT ZONE III	SECTION 9, CAT E
WATER PROOFNESS	CONDENSING AND SPRAYED	SECTION 10, CAT Y & R
FLUIDS SUSCEPTIBILITY	DE-ICING FLUID (ETHYLENE GLYCOL) HYDRAULIC FLUIDS (PHOSPHATE ESTER AS1241 TYPE IV & TYPE V)	SECTION 11, CAT F
SAND AND DUST	DUST	SECTION 12, CAT D
FUNGUS RESISTANCE	BY ANALYSIS	SECTION 13, CAT F
SALT FOG		SECTION 14, CAT S
ICING		SECTION 24, CAT A

ID-601430 E90405004-2-C

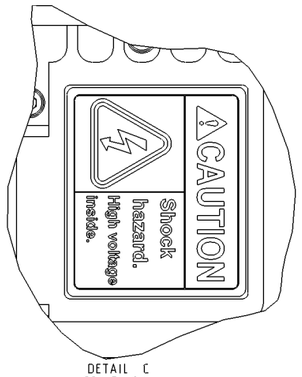
Figure 4-26. (Sheet 2 of 3) KANDU Variant 2 Outline and Installation Drawing (90405004, REV C)



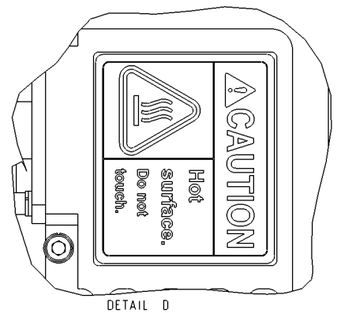
DETAIL A
SCALE 2/1



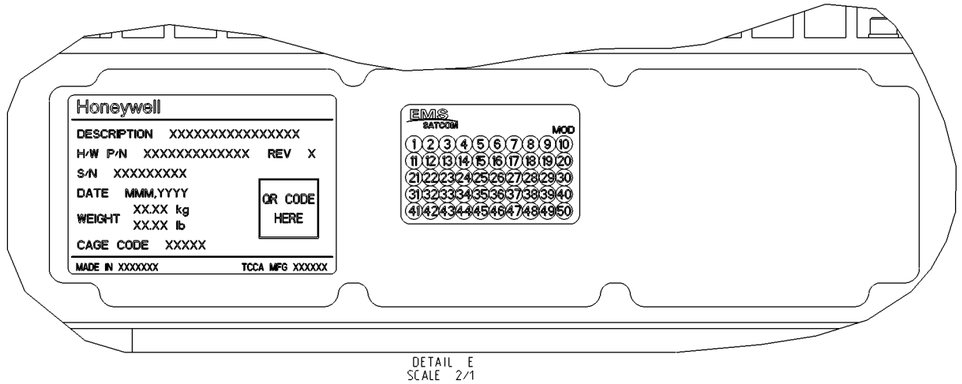
DETAIL B
SCALE 2/1



DETAIL C
SCALE 2/1



DETAIL D
SCALE 2/1



DETAIL E
SCALE 2/1

ID-601431 E90405004-3-C

Figure 4-26. (Sheet 3 of 3) KANDU Variant 2 Outline and Installation Drawing (90405004, REV C)

NOTES:

Unless otherwise specified

1. Dimensions and tolerances in accordance with ASME Y14.5M-1994.
2. Dimensions shown are for installation purposes only.
3. Weight: 5.44 kg (12.00 lbs) maximum for KRFU including SCD-90402388 thermal pad.
   KRFU 5.10 kg (11.25 lbs) nominal
   Thermal pad 0.34 kg (0.75 lbs) nominal
4. Associated CAD data has been modeled to nominal dimensions.
   Spatial model defined by 90401S73_REVF.STP.

5 (a) Indicated surface is intended for electrical bonding.
(b) Bonding resistance from bonding measurement point to electrical bonding surface: 0.0025 ohm max.
(c) Ground resistance from J1 Pin C to the bonding measurement point: 0.005 ohm max.
(d) The KRFU shall be bonded to the aircraft grounding structure.

6. (a) Power dissipation at 96-122 VAC (320-800 Hz):
   (i) 200W MAX at maximum operating power (MOP) for 100% duty cycle.
   (ii) 115W typical at MOP for 50% duty cycle when aircraft base plate is at 77˚F (25˚C).
   (iii) 55W typical with transmit mute.
   (b) Power consumption at 96-122 VAC (320-800Hz):
   (i) 300W max at transmit amplifier saturation (for installation design consideration only and only possible at cold temperatures that does not trigger the automatic mute function, see Note 8g).
   (ii) 220W max at maximum operating power (MOP) for 100% duty cycle.
   (iii) 127W typical at MOP for 50% duty cycle when aircraft base plate is at 77˚F (25˚C).
   (iv) 55W typical with transmit mute.
   (c) Current draw in amperes:
   (i) Maximum: 2.3A RMS at maximum nominal system transmit power.
   Power factor: greater than 0. 98.

7 Honeywell identification label includes:
Description
H/W Part Number and Revision
Serial Number
Date of Manufacture
Weight
Cage Code
Country of Origin and Site Transport Canada Mfg Code

8 Cooling:
(a) Conduction through the baseplate with thermal pad.
(b) No installation clearance is required for cooling purposes.
(c) Aircraft adapter plate surface that makes contact with the KRFU must have surface flatness of .010 inch max.
(d) During installation 85% of thermal pad is compressed by 25%, corresponding to 30 psi of pressure, to fill 0.045 in gap, 15% of thermal pad area located under the unit's 0.013 high thermal losses is compressed by 47%, corresponding to 77 psi.
(e) Thermal pad kit SCD-90402388 is shipped with the unit as a loose part. The pad must be handled with care and shall be attached to the unit in accordance with Note 28.
(f) Thermal pad material: T-Flex 560, 0.060 inch thick. Total surface area: 107.0 sq in.
(g) KRFU will mute the transmit RF signal if the hottest point on the aircraft adapter plate exceeds 185˚F (85˚C) to reduce heat dissipation. KRFU will automatically un-mute once KRFU cools below 167˚F (75˚C).

9 KRFU external connectors identification per Table 2.
J1 and J2 connectors contacts assignment per Table 3 and 4 accordingly.

10 ⌖ Indicates center of gravity.

11. Electrostatic discharge sensitive (ESD), handle per IPC-A-610.
12. Connectors fitted with protective shipping covers, remove prior to test or final installation.
13. Material and finish for chassis and mounting feet:
    Al alloy 6061-T6 in accordance with AMS-QQ-A-2S0/11.6
    External surfaces: Prism Powder Coatings Ltd, PB-134-LT, color black Sandtex, over chem-film per MIL-DTL-SS41 Type II, Class 3.

14 Caution label: shock hazard. High voltage inside.
15 Caution label: hot surface. Do not touch.
16 Warning label: hazardous RF energy.
Do not turn on without proper output termination.
Do not look into or touch output opening.

17. Deleted.
18. Environmental qualification characteristics per Table 5.

19 Honeywell mod dot label.
20 Wavestream identification label.
21 Caution label: ESD sensitive.
22 Material and finish for KRFU J3 and J4 waveguide flanges:
   (i) Material (J3 and J4): Al alloy 6061-T6 in accordance with AMS-QQ-A-2S0/11.
   (ii) J4 finish: nickel plated per QQ-N-290, Class 1, semi-bright, corrosion protection Grade F through G (0.0002 thick minimum) over nickel plated per MIL-C-26074, Class 4 (0.0005 thick minimum).
   (iii) J3 finish: nickel plated per MIL-C-26074, Class 4 (0.0005 thick minimum).

23 Indicated surfaces are chem-filmed only and are not powder coated.
24 FCC label.

25. Unit export control classification number is EAR99.
26. (a) Unit shall be installed using all 4 mounting holes and may be installed in any orientation.
    (b) Fasteners are recommended in accordance with ARINC 836: NAS1802-3 #10-32 screw, 1149C036R washer and MS35338-138 lock spring washer. Flat washer and lock spring washers should be used.
    (c) Fastener preload torque, to compress the T-Flex pad, shall be in the range of 34.0-38.0 in-lb.
    (d) Procedure for thermal pad installation is detailed in the last sheet of the O&I diagram as Note 28.
27. Deleted.

ID-631756 E90401573-1-F

Figure 4-27. (Sheet 1 of 9) KRFU, Conduction-Cooled 1, Outline and Installation Drawing (90401573, REV F)

TABLE I GXA Ka FRFU, CONDUCTION COOLED, PART NUMBER	
PART NO.	DESCRIPTION
90401203	GXA Ka KRFU

9

TABLE II GXA Ka KRFU EXTERNAL CONNECTORS IDENTIFICATION				
REF DES	PART NO.	MATES WITH	FUNCTION	REMARKS
J1	D38999/20FC4PN (AMPHENOL)	D38999/26FC4SN (AMPHENOL)	POWER INPUT	4 PIN
J2	D38999/20FC35PN (AMPHENOL)	D38999/26FC35SN (AMPHENOL)	CONTROL INTERFACE	22 PIN
J3	M3922/54-003	M3922/59-005 (THRU HOLE FLANGE)	RF TX INTERFACE	WR-28 WAVEGUIDE WITH FLANGE UG599/U PER MIL-DTL-3922/54, EXCEPT AS DEFINED IN THIS DRAWING
J4	M3922/54-001	M3922/59-003 (THRU HOLE FLANGE)	RF TX INTERFACE	WR-42 WAVEGUIDE WITH FLANGE UG595/U PER MIL-DTL-3922/54, EXCEPT AS DEFINED IN THIS DRAWING
J5	TNC FEMALE PER MIL-C-87104/2 (NEXTEK PTCTNFSAF20G)	TNC MALE PER MIL-C-87104/2 (AMPHENOL)	IF TX INTERFACE	LABELED BLUE
J6	TNC FEMALE PER MIL-C-87104/2 (NEXTEK PTCTNFSAF20G)	TNC MALE PER MIL-C-87104/2 (AMPHENOL)	IF RX INTERFACE	LABELED GREEN

22

9

TABLE III J1 POWER CONNECTOR CONTACT ASSIGNMENTS	
PIN NUMBER	SIGNAL NAME
A	115 VAC POWER
B	115 VAC RETURN
C	CHASSIS GROUND
D	NOT USED

9

TABLE IV J2 CONTROL CONNECTOR CONTACT ASSIGNMENTS	
CONTACT NUMBER	SIGNAL NAME
1	EN1: TX LOW (SPARE)
2	TP18-1 (SPARE)
3	KRFU FILTER SELECT HI
4	KRFU FILTER SELECT LO
5	KRFU TX MUTE HI
6	KRFU TX MUTE LO
7	REFU RESET HI
8	KRFU RESET LO
9	SPARE
10	SPARE
11	RS-422: KRFU TO KANDU HI
12	RS-422: KRFU TO KANDU LO
13	TP19-1 (SPARE)
14	EN1: RX HIGH (SPARE)
15	EN1: RX LOW (SPARE)
16	TP18-2 (SPARE)
17	RS-422: KANDU TO KRFU HI
18	RS-422: KANDU TO KRFU LO
19	TP17-1 (SPARE)
20	TP19-2 (SPARE)
21	EN1: TX HIGH (SPARE)
22	TP17-2 (SPARE)

ID-631757 E90401573-2-F

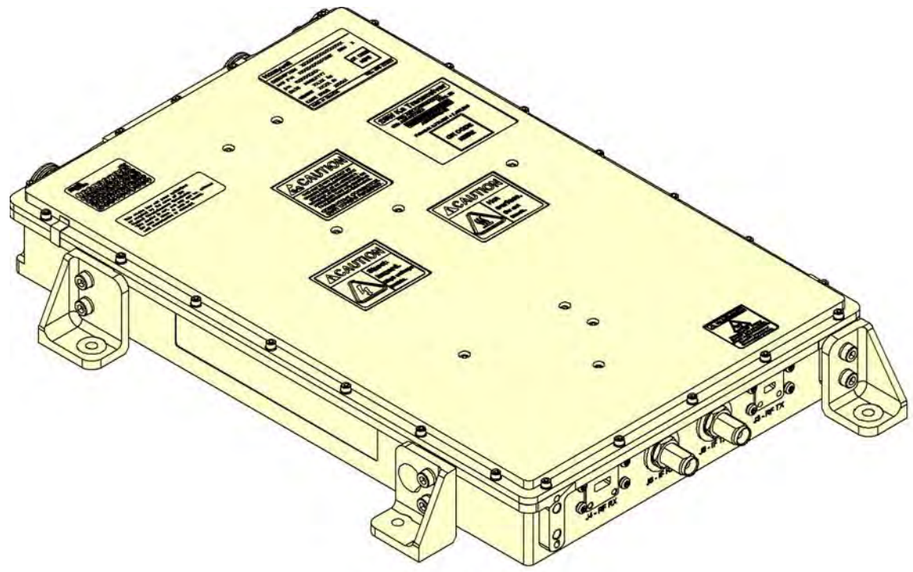
Figure 4-27. (Sheet 2 of 9) KRFU, Conduction-Cooled 1, Outline and Installation Drawing (90401573, REV F)

TABLE V
GXA Ka KRFU ENVIRONMENTAL QUALIFICATION CHARACTERISTICS

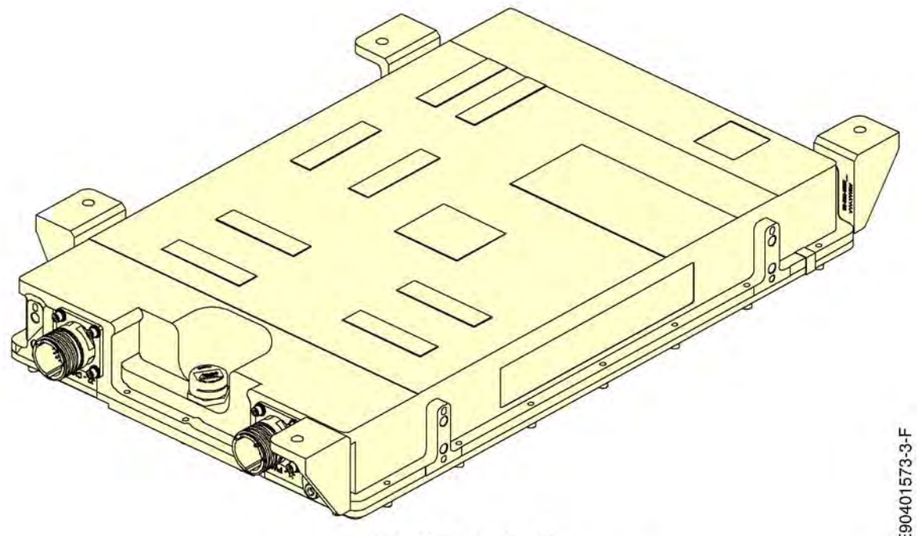
ENVIRONMENTAL CONDITIONS	LIMITS	RTCA/D0-160G SPECIFICATION
GROUND THERMAL CERTIFICATION	230°F (110°C)	NOT CAUSE A HAZARD OR UNSAFE CONDIITON
GROUND SURVIVAL LOW TEMPERATURE	-67°F (-55°C)	SECTION 4.5.1. CAT D2
OPERATING LOW TEMPERATURE	-67°F (-55°C)	SECTION 4.5.2. CAT D2
SHORT TERM OPERATING HIGH	185°F (85°C) (TX MUTE ALLOWED)	SECTION 4.5.3. CAT D2 EXTENDED TO 185°F (85°C) FROM 158°F (70°C)
GROUND SURVIVAL HIGH TEMPERATURE	194°F (90°C)	SECTION 4.5.3. CAT D2 EXTENDED TO 194°F (90°C) FROM 185°F (85°C)
OPERATING HIGH TEMPERATURE	158°F (70°C)	SECTION 4.5.4. CAT D2
IN-FLIGHT LOSS OF COOLING	NOT APPLICABLE	SECTION 4.5.5. CAT Z
ALTITUDE	55,000 FT (17 KM)	SECTION 4.6.1 CAT D2 EXTENDED TO 55,000 FT (17 KM) FROM 50,000 FT (15 KM)
TEMPERTURE VARIATION	±18°F/MIN (±10°C/MIN)	SECTION 5, CAT A
HUMIDITY	85% RH @100.4°F (38°C) 95% RH @149°F (65°C)	SECTION 6, CAT B
OPERATIONAL SHOCK	3 SHOCK OF 6 G, 11 MS, 6 DIRECTIONS 3 SHOCK OF 6 G, 20 MS, 6 DIRECTIONS	SECTION 7, CAT B & E
CRASH SAFETY IMPULSE	1 SHOCK OF 20 G, 11 MS, 6 DIRECTIONS 1 SHOCK OF 20 G, 20 MS, 6 DIRECTIONS ENCOMPASSED BY 28G CRASH SAFETY SUSTAINED	SECTION 7, CAT B & E
CRASH SAFETY SUSTAINED	28 G, 3 SECS, 6 DIRECTIONS BY ANALYSIS	D0-160, SECTION 7.3.3 CAT B EXTENDED TO 28G
VIBRATION	ROBUST RANDOM CURVE E & E1	SECTION 8, CAT R
EXPLOSIVE ATMOSPHERE	AIRCRAFT ZONE III	SECTION 9, CAT H
WATER PROOFNESS	CONDENSING AND SPRAYED	SECTION 10, CAT Y & R
FLUIDS SUSCEPTIBILITY	DE-ICING FLUIDS (SPRAY TEST ONLY)	SECTION 11, CAT F
SAND AND DUST		SECTION 12, CAT S
FUNGUS RESISTANCE	BY ANALYSIS	SECTION 13, CAT F
SALT FOG		SECTION 14, CAT S
ICING		SECTION 24, CAT A
FLAMMABILITY		SECTION 26, CAT C

ID-631758 E90401573-2-F

Figure 4-27. (Sheet 3 of 9) KRFU, Conduction-Cooled 1, Outline and Installation Drawing (90401573, REV F)



ISOMETRIC VIEW



ISOMETRIC VIEW
CONDUCTION COOLING SURFACE
THERMAL PADS NOT SHOWN
8

ID-631759 E90401573-3-F

Figure 4-27. (Sheet 4 of 9) KRFU, Conduction-Cooled 1, Outline and Installation Drawing (90401573, REV F)

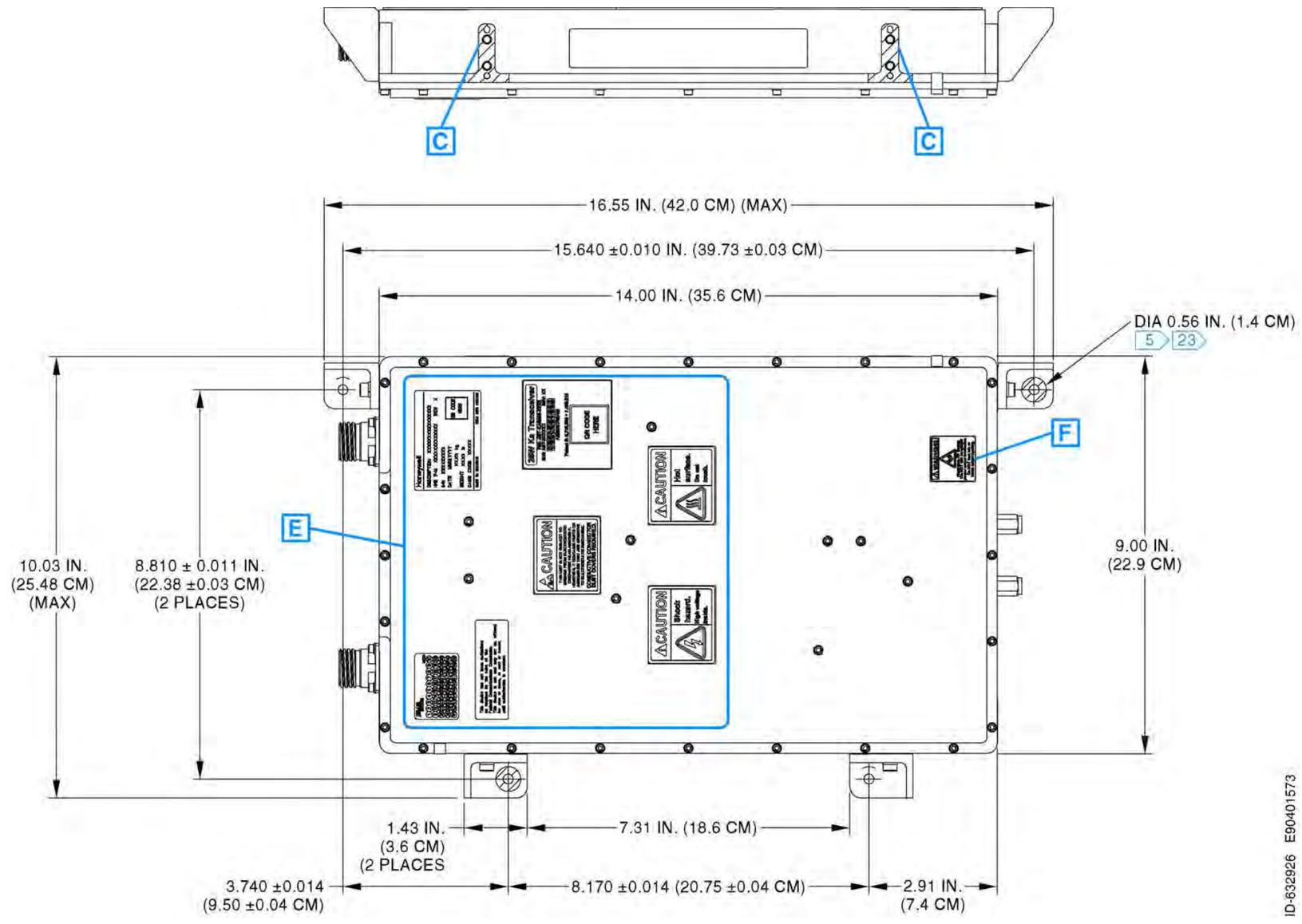


Figure 4-27. (Sheet 5 of 9) KRFU, Conduction-Cooled 1, Outline and Installation Drawing (90401573, REV F)

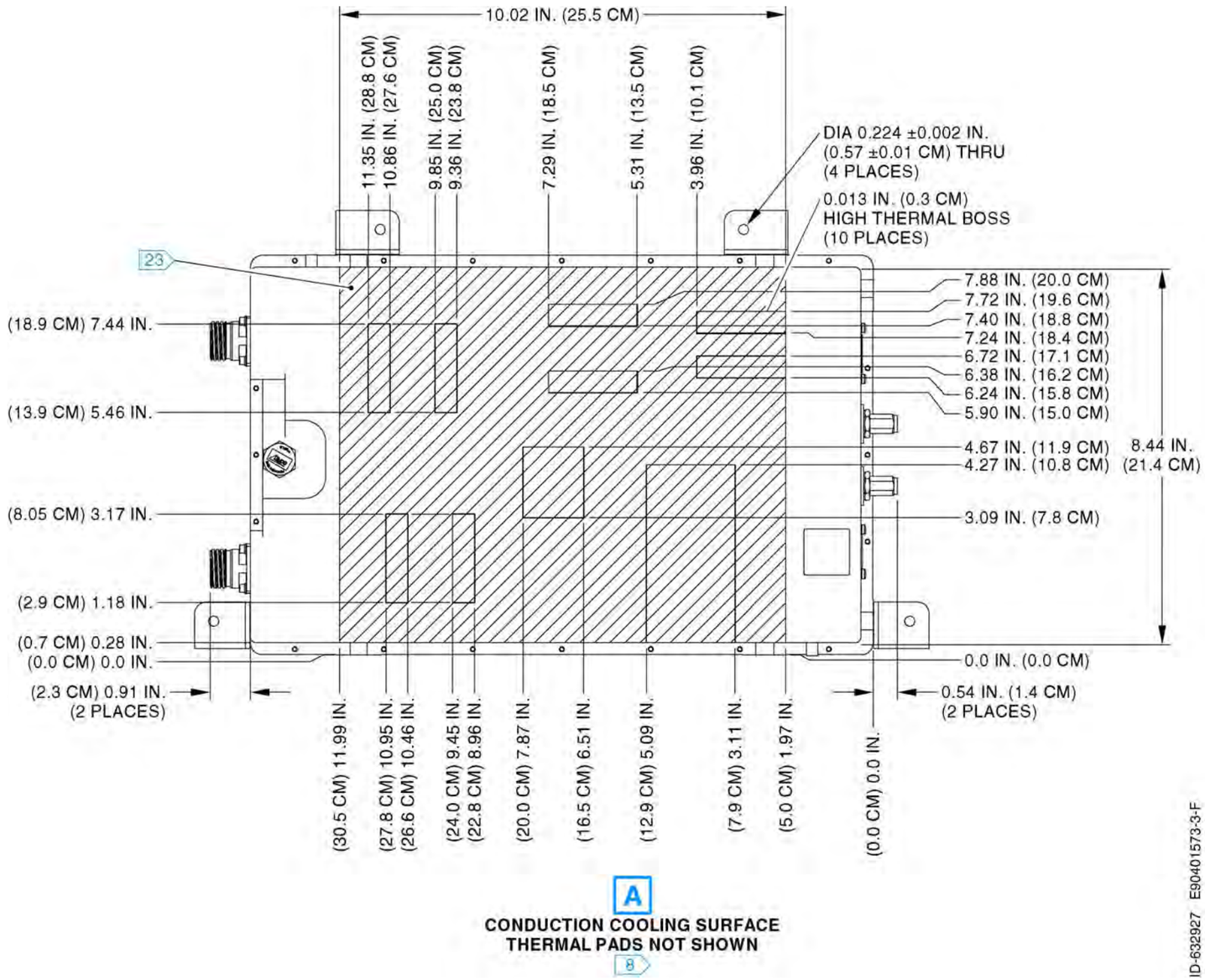


Figure 4-27. (Sheet 6 of 9) KRFU, Conduction-Cooled 1, Outline and Installation Drawing (90401573, REV F)

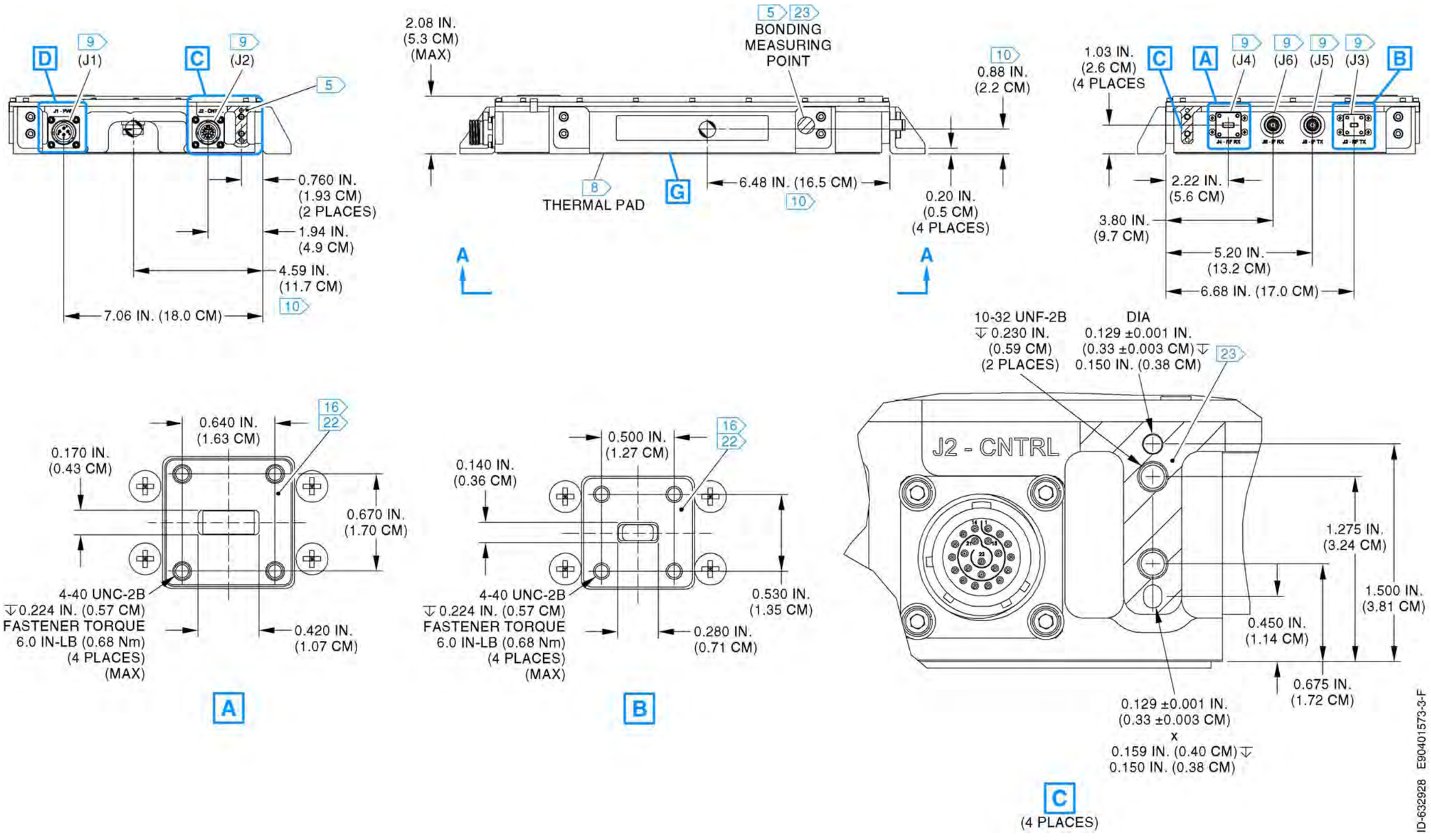


Figure 4-27. (Sheet 7 of 9) KRFU, Conduction-Cooled 1, Outline and Installation Drawing (90401573, REV F)

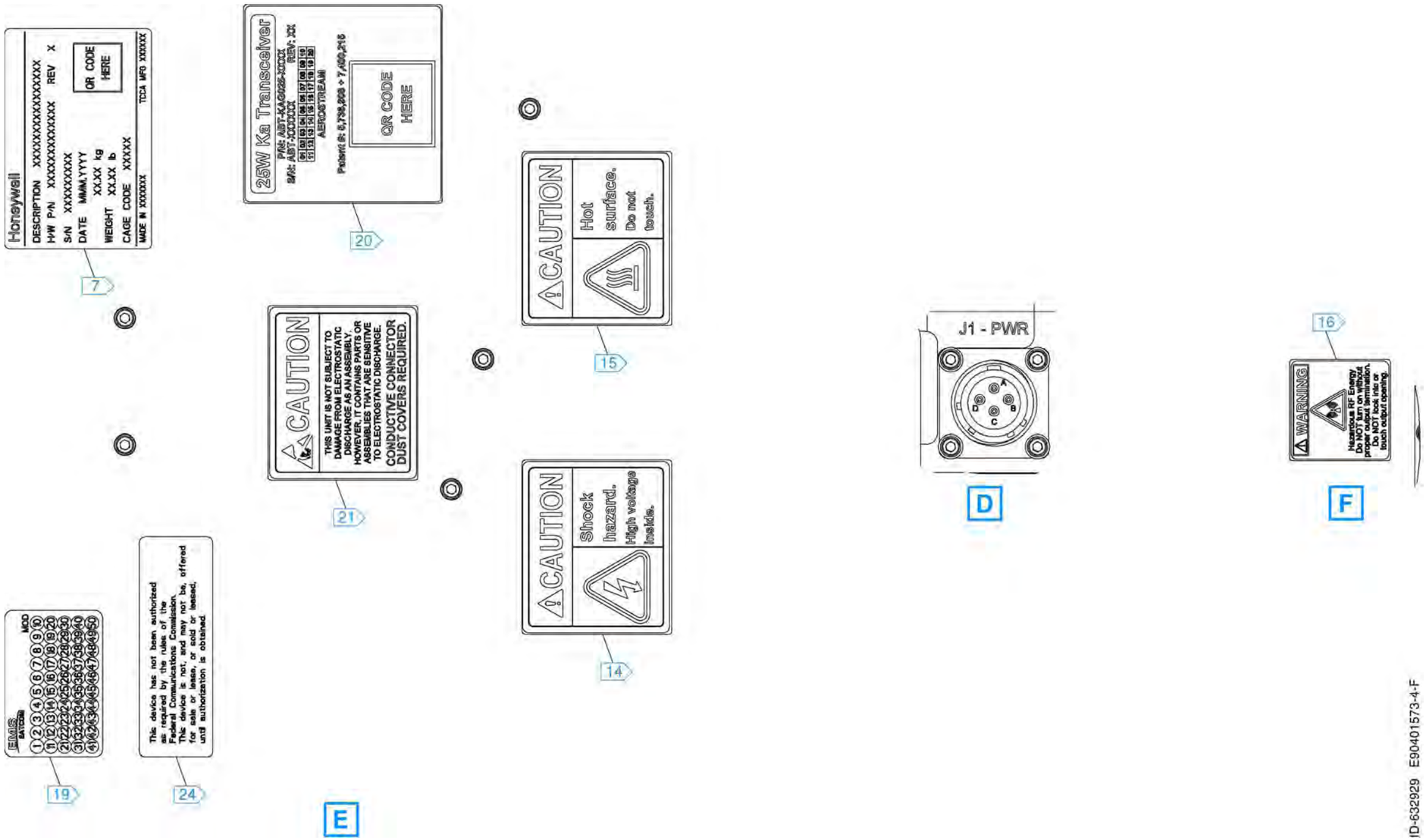


Figure 4-27. (Sheet 8 of 9) KRFU, Conduction-Cooled 1, Outline and Installation Drawing (90401573, REV F)

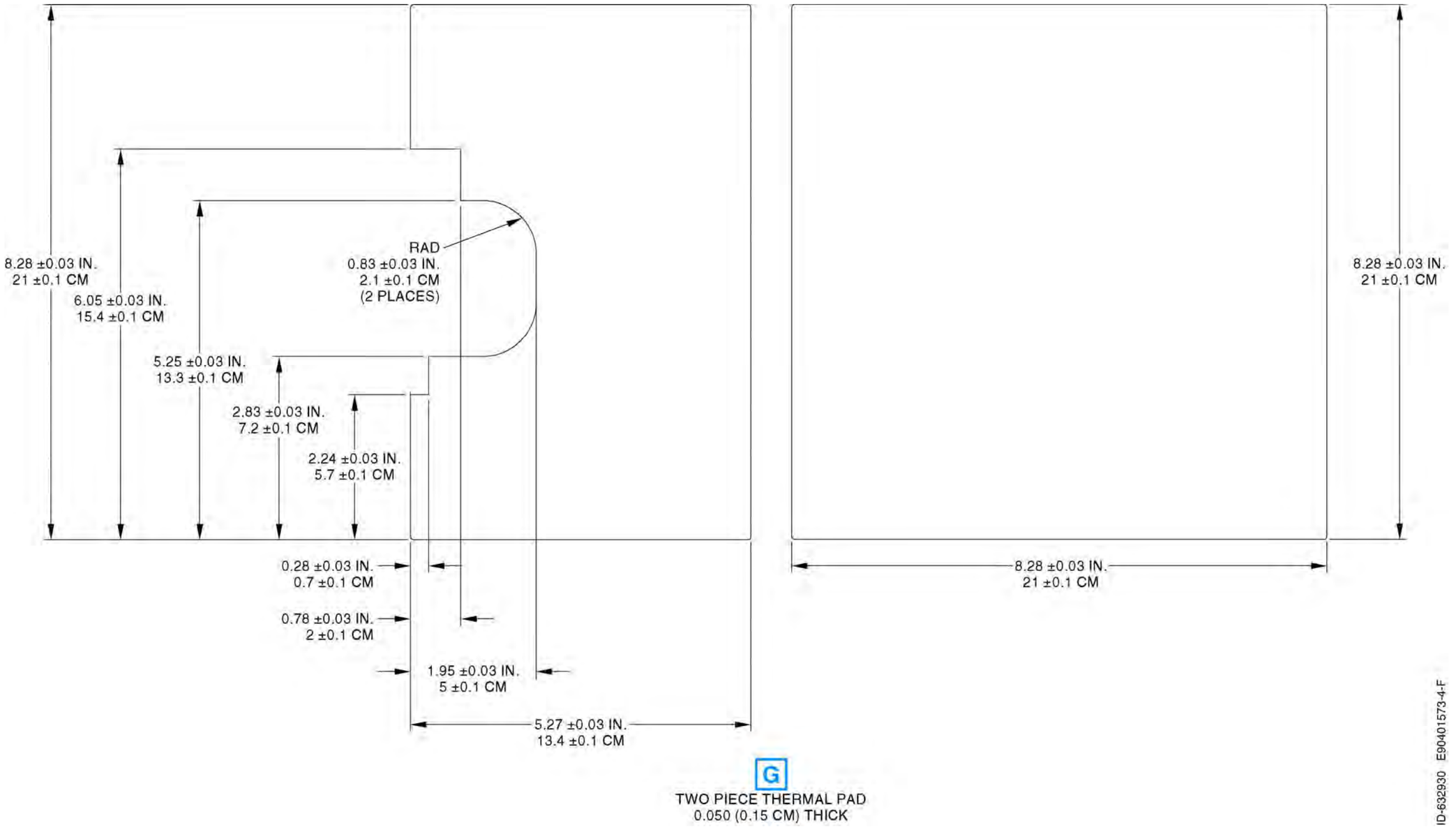


Figure 4-27. (Sheet 9 of 9) KRFU, Conduction-Cooled 1, Outline and Installation Drawing (90401573, REV F)

26. UNIT SHALL BE INSTALLED USING ALL 4 MOUNTING HOLES AND MAY BE INSTALLED IN ANY ORIENTATION. RECOMMEND FASTENERS TO BE .190-32 UNJF-3A CORROSION RESISTENT STEEL CRES-A286. RECOMMENDED MINIMUM TORQUE TO COMPRESS THERMAL PADS IS 22 INLB.

25. UNIT EXPORT CONTROL CLASSIFICATION NUMBER IS 7A994.

△24 FCC LABEL.

△23 INDICATED SURFACES ARE CHEM-FILMED ONLY AND ARE NOT POWDER COATED.

△22 MATERIAL AND FINISH FOR J3 AND J4 WAVEGUIDE FLANGES:
AL ALLOY 6061-T6 IN ACCORDANCE WITH AMS-QQ-A-250/11.
NI PLATE PER QQ-N-290, CLASS 1, SEMI-BRIGHT, CORROSION PROTECTION GRADE F THRU G (.0002 THICK MIN) OVER NI PLATE PER MIL-C-26074, CLASS 4, .0005 THICK MIN.

△21 CAUTION LABEL: ESD SENSITIVE.

△20 WAVESTREAM IDENTIFICATION LABEL.

△19 HONEYWELL MOD DOT LABEL.

18. ENVIRONMENTAL QUALIFICATION CHARACTERISTICS PER TABLE 5.

△16 WARNING LABEL: HAZARDOUS RF ENERGY.
DO NOT TURN ON WITHOUT PROPER OUTPUT TERMINATION.
DO NOT LOOK INTO OR TOUCH OUTPUT OPENING.

△15 CAUTION LABEL: HOT SURFACE. DO NOT TOUCH.

△14 CAUTION LABEL: SHOCK HAZARD. HIGH VOLTAGE INSIDE.

13. MATERIAL AND FINISH FOR CHASSIS AND MOUNTING FEET:
AL ALLOY 6061-T6 IN ACCORDANCE WITH AMS-QQ-A-250/11.
EXTERNAL SURFACES: BLACK SANDEX POWDER COAT OVER CHEM-FILM PER MIL-DTL-5541 TYPE II, CLASS 3.

12. CONNECTORS FITTED WITH PROTECTIVE SHIPPING COVERS. REMOVE PRIOR TO TEST OR FINAL INSTALLATION.

11. ELECTROSTATIC DISCHARGE SENSITIVE (ESD). HANDLE PER IPC-A-610.

△10 ⊕ INDICATES CENTER OF GRAVITY.

△9 KRFU EXTERNAL CONNECTORS IDENTIFICATION PER TABLE 2.
J1 AND J2 CONNECTORS CONTACTS ASSIGNMENT PER TABLE 3 AND 4 ACCORDINGLY.

△8 COOLING:
CONDUCTION THROUGH THE BASEPLATE WITH THERMAL PADS. AIRCRAFT ADAPTER PLATE SURFACE THAT MAKES CONTACT WITH THE KRFU MUST HAVE SURFACE FLATNESS OF .010 INCH MAX. THERMAL PAD MATERIAL: T-FLEX 560, .060 INCH THICK. TOTAL SURFACE AREA: 105.2 SQIN. DURING INSTALLATION THERMAL PAD IS COMPRESSED BY 25%, CORRESPONDING TO 30 PSI OF PRESSURE. TO FILL .045 INCH GAP. INSTALL THERMAL PAD KIT. SHIPPED WITH THE UNIT. IN ACCORDANCE WITH INSTALLATION INSTRUCTIONS SCD-90402388.

△7 HONEYWELL IDENTIFICATION LABEL INCLUDES:
DESCRIPTION
H/W PART NUMBER AND REVISION
SERIAL NUMBER
DATE OF MANUFACTURE
WEIGHT
CAGE CODE
COUNTRY OF ORIGIN AND SITE TRANSPORT CANADA MFG CODE

6. POWER DISSIPATION AT 96-122VAC (320-800Hz): 139.6 W MAX @ MAXIMUM OUTPUT POWER (MOP) WHEN BASE PLATE IS AT 25°C.
153.8 W MAX @ MOP WHEN BASE PLATE IS AT 85°C.
POWER CONSUMPTION AT 96-122VAC (320-800Hz): 157.6 W MAX @ MOP WHEN BASE PLATE IS AT 25°C.
171.8 W MAX @ MOP WHEN BASE PLATE IS AT 85°C.
CURRENT DRAW IN AMPERES: 2.7A RMS MAXIMUM. POWER FACTOR: GREATER THAN 0.98.

△5 INDICATED SURFACE IS INTENDED FOR ELECTRICAL BONDING. BONDING RESISTANCE FROM THE MEASUREMENT AREA TO SURFACE ON AIRCRAFT TO WHICH THE UNIT IS MOUNTED SHOULD BE LESS THAN 2.5 MILLIOHMS.

4. ASSOCIATED CAD DATA HAS BEEN MODELED TO NOMINAL DIMENSIONS.
SPATIAL MODEL DEFINED BY 90402347 REVF.STP.

3. WEIGHT: 5.1 KG (11.3 LB) MAX.

2. DIMENSIONS SHOWN ARE FOR INSTALLATION PURPOSES ONLY.

1. DIMENSIONS AND TOLERANCES IN ACCORDANCE WITH ASME Y14.5M-1994.

NOTES: UNLESS OTHERWISE SPECIFIED:

TABLE 1: GXA Ka KRFU, CONDUCTION 2 COOLED, PART NUMBER

PART NUMBER	DESCRIPTION
90402346	GXA Ka KRFU

TABLE 2: GXA Ka KRFU EXTERNAL CONNECTORS IDENTIFICATION △9

REF. DES	PART NUMBER	MATES WITH	FUNCTION	REMARKS
J1	D38999/20FC4PN (AMPHENOL)	D38999/26FC4SN (AMPHENOL)	POWER INPUT	4 PIN
J2	D38999/20FC35PN (AMPHENOL)	D38999/26FC35SN (AMPHENOL)	CONTROL INTERFACE	22 PIN
J3	M3922/54-003	M3922/59-005 (THRU HOLE FLANGE)	RF TX INTERFACE	WR-28 WAVEGUIDE WITH FLANGE UG599/U PER MIL-DTL-3922/54. EXCEPT AS DEFINED IN THIS DRAWING △22
J4	M3922/54-001	M3922/59-003 (THRU HOLE FLANGE)	RF RX INTERFACE	WR-42 WAVEGUIDE WITH FLANGE UG595/U PER MIL-DTL-3922/54. EXCEPT AS DEFINED IN THIS DRAWING △22
J5	TNC FEMALE PER MIL-C-87104/2 (NEXTEK PTCTNFSAF20G)	TNC MALE PER MIL-C-87104/2 (AMPHENOL)	IF TX INTERFACE	LABELED BLUE
J6	TNC FEMALE PER MIL-C-87104/2 (NEXTEK PTCTNFSAF20G)	TNC MALE PER MIL-C-87104/2 (AMPHENOL)	IF RX INTERFACE	LABELED GREEN

TABLE 3: J1 POWER CONNECTOR CONTACT ASSIGNMENTS △9

PIN NUMBER	SIGNAL NAME
A	115 VAC POWER
B	115 VAC RETURN
C	CHASSIS GROUND
D	SIGNAL GROUND

TABLE 4: J2 CONTROL CONNECTOR CONTACT ASSIGNMENTS △9

CONTACT NUMBER	SIGNAL NAME
1	EN1: TX LOW (SPARE)
2	TP18-1 (SPARE)
3	KRFU FILTER SELECT HI
4	KRFU FILTER SELECT LO
5	KRFU TX MUTE HI
6	KRFU TX MUTE LO
7	KRFU RESET HI
8	KRFU RESET LO
9	SPARE
10	SPARE
11	RS-422: KRFU TO KANDU HI
12	RS-422: KRFU TO KANDU LO
13	TP19-1 (SPARE)
14	EN1: RX HIGH (SPARE)
15	EN1: RX LOW (SPARE)
16	TP18-2 (SPARE)
17	RS-422: KANDU TO KRFU HI
18	RS-422: KANDU TO KRFU LO
19	TP17-1 (SPARE)
20	TP19-2 (SPARE)
21	EN1: TX HIGH (SPARE)
22	TP17-2 (SPARE)

TABLE 5: GXA Ka KRFU ENVIRONMENTAL QUALIFICATION CHARACTERISTICS

ENVIRONMENTAL CONDITIONS	LIMITS	RTCA/DO-160G SPECIFICATION
GROUND SURVIVAL LOW TEMPERATURE	-55°C	SECTION 4.5.1, CAT D2
OPERATING LOW TEMPERATURE	-55°C	SECTION 4.5.2, CAT D2
GROUND SURVIVAL HIGH TEMPERATURE	+90°C	SECTION 4.5.3, CAT D2 EXTENDED TO +90 °C FROM +85 °C
OPERATING HIGH TEMPERATURE	+70°C	SECTION 4.5.4, CAT D2
IN-FLIGHT LOSS OF COOLING	NOT APPLICABLE	SECTION 4.5.5, CAT Z
ALTITUDE	55000 FT	SECTION 4.6.1, CAT D2 EXTENDED TO 55000 FT FROM 51000 FT
DECOMPRESSION	6000 FT TO 55000 FT	SECTION 4.6.2, CAT A2 EXTENDED TO 6000 FT TO 55000 FT
OVER PRESSURE	199 KPA (20000 FT)	SECTION 4.6.3, CAT A2 EXTENDED TO 199 KPA (-20000 FT) FROM 170 KPA (-15000 FT)
TEMPERATURE VARIATION	±10°C/MIN.	SECTION 5, CAT A
HUMIDITY	85% RH @38°C 95% RH @65°C	SECTION 6, CAT B
OPERATIONAL SHOCK	3 SHOCK OF 6 G, 11 MS, 6 DIRECTIONS 3 SHOCK OF 6 G, 20 MS, 6 DIRECTIONS	SECTION 7, CAT B & E
CRASH SAFETY IMPULSE	1 SHOCK OF 20 G, 11 MS, 6 DIRECTIONS 1 SHOCK OF 20 G, 20 MS, 6 DIRECTIONS	SECTION 7, CAT B & E
CRASH SAFETY SUSTAINED	18 G, 3 SECS, 6 DIRECTIONS	SECTION 7, CAT B
VIBRATION	ROBUST RANDOM CURVE E & E1	SECTION 8, CAT R
EXPLOSIVE ATMOSPHERE	AIRCRAFT ZONE III	SECTION 9, CAT E
WATER PROOFNESS	CONDENSING AND SPRAYED	SECTION 10, CAT Y & R
FLUIDS SUSCEPTIBILITY	DE-ICING FLUID	SECTION 11, CAT F
SAND AND DUST	DUST	SECTION 12, CAT D
FUNGUS RESISTANCE	BY ANALYSIS	SECTION 13, CAT F
SALT FOG		SECTION 14, CAT S
ICING		SECTION 24, CAT A

ID-601435 E90402347-1-F

Figure 4-28. (Sheet 1 of 3) KRFU, Conduction-Cooled 2, Outline and Installation Drawing (90402347, REV F)

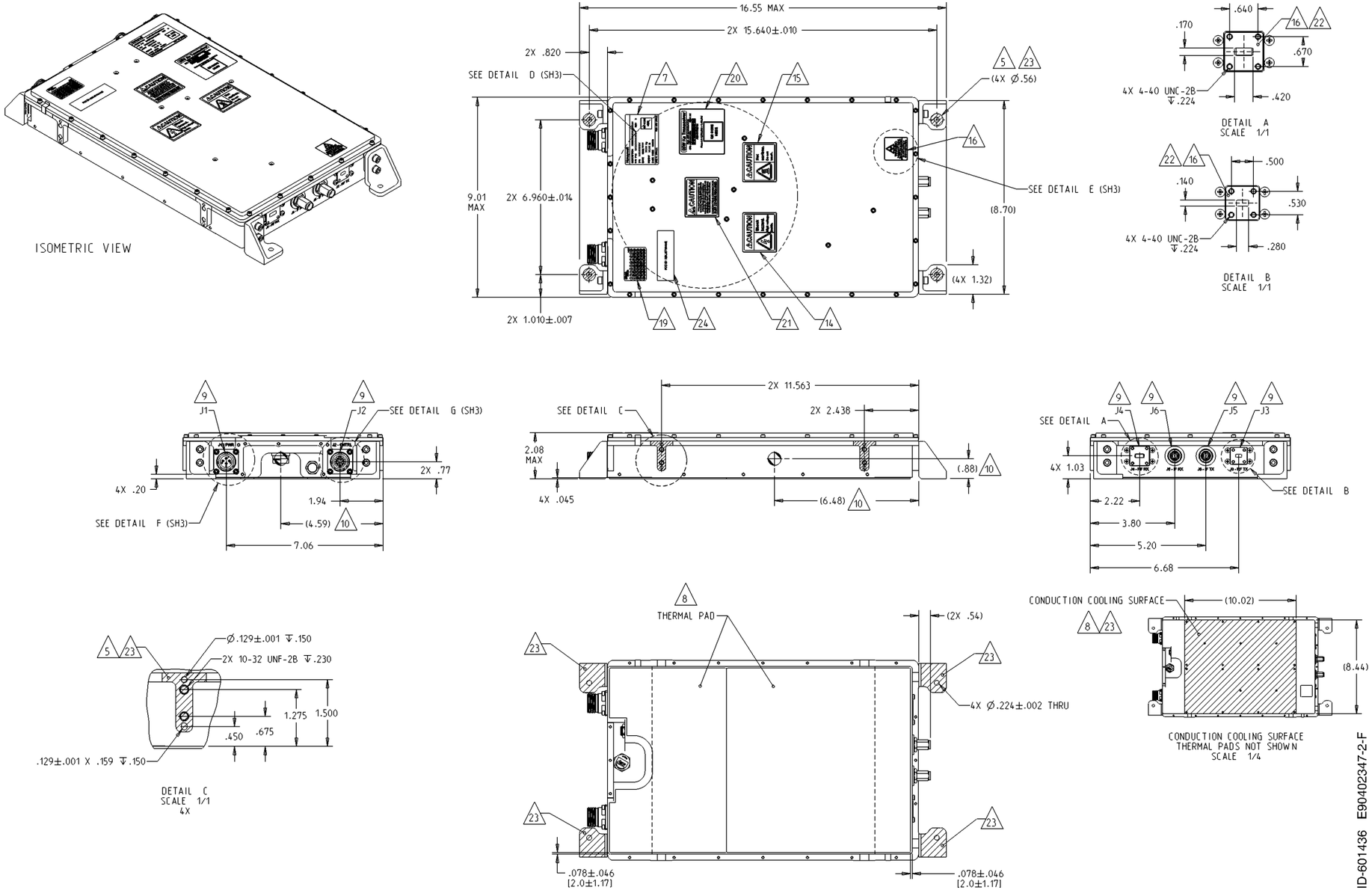
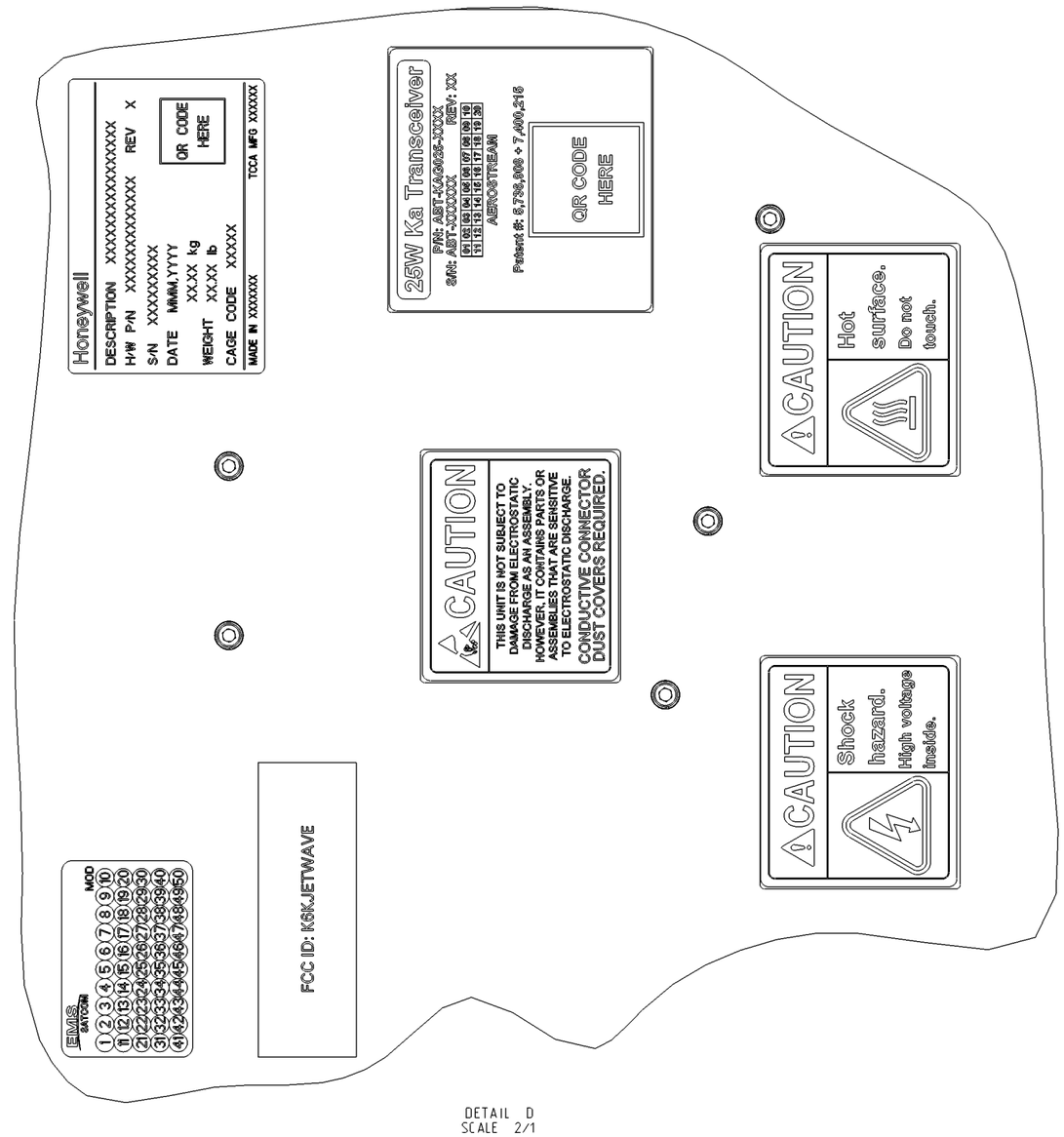
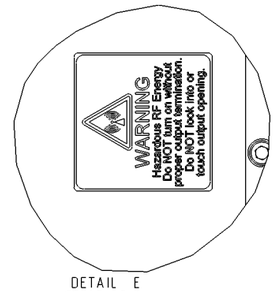


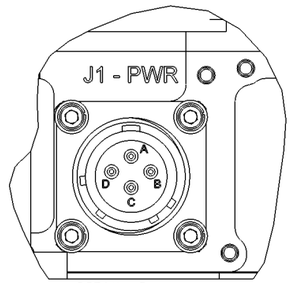
Figure 4-28. (Sheet 2 of 3) KRFU, Conduction-Cooled 2, Outline and Installation Drawing (90402347, REV F)



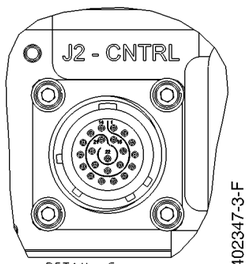
DETAIL D
SCALE 2/1



DETAIL E
SCALE 2/1



DETAIL F
SCALE 2/1



DETAIL G
SCALE 2/1

ID-601437 E90402347-3-F

Figure 4-28. (Sheet 3 of 3) KRFU, Conduction-Cooled 2, Outline and Installation Drawing (90402347, REV F)

TABLE 1: GXA Ka KRFU, AIRCRAFT AIR COOLED, PART NUMBER

PART NUMBER	DESCRIPTION
90401202	GXA Ka KRFU

TABLE 3: J1 POWER CONNECTOR CONTACT ASSIGNMENTS △9

PIN NUMBER	SIGNAL NAME
A	115 VAC POWER
B	115 VAC RETURN
C	CHASSIS GROUND
D	SIGNAL GROUND

△22 MATERIAL AND FINISH FOR J3 AND J4 WAVEGUIDE FLANGES:
AL ALLOY 6061-T6 IN ACCORDANCE WITH AMS-QQ-A-250/11.
NI PLATE PER QQ-N-290, CLASS 1, SEMI-BRIGHT, CORROSION PROTECTION GRADE F THRU G (.0002 THICK MIN) OVER NI PLATE PER MIL-C-26074, CLASS 4, .0005 THICK MIN.

△21 CAUTION LABEL: ESD SENSITIVE.

△20 WAVESTREAM IDENTIFICATION LABEL.

△19 HONEYWELL MOD DOT LABEL.

18. ENVIRONMENTAL QUALIFICATION CHARACTERISTICS PER TABLE 5.

△17 SPUD DESIGN PER AS5131B36.

△16 WARNING LABEL: HAZARDOUS RF ENERGY.
DO NOT TURN ON WITHOUT PROPER OUTPUT TERMINATION.
DO NOT LOOK INTO OR TOUCH OUTPUT OPENING.

△15 CAUTION LABEL: HOT SURFACE. DO NOT TOUCH.

△14 CAUTION LABEL: SHOCK HAZARD. HIGH VOLTAGE INSIDE.

13. MATERIAL AND FINISH FOR CHASSIS AND MOUNTING FEET:
AL ALLOY 6061-T6 IN ACCORDANCE WITH AMS-QQ-A-250/11.
EXTERNAL SURFACES: BLACK SANDEX POWDER COAT OVER CHEM-FILM PER MIL-DTL-5541 TYPE II, CLASS 3.

12. CONNECTORS FITTED WITH PROTECTIVE SHIPPING COVERS, REMOVE PRIOR TO TEST OR FINAL INSTALLATION.

11. ELECTROSTATIC DISCHARGE SENSITIVE (ESD), HANDLE PER IPC-A-610.

△10 ⌖ INDICATES CENTER OF GRAVITY.

△9 KRFU EXTERNAL CONNECTORS IDENTIFICATION PER TABLE 2.
J1 AND J2 CONNECTORS CONTACTS ASSIGNMENT PER TABLE 3 AND 4 ACCORDINGLY.

8. COOLING:
FORCED AIR BLOWN THROUGH COOLING SPUD PER ARINC 791.
STANDARD AIR FLOW: 77 KG/HR AT 40°C AT SEA LEVEL WITH PRESSURE DROP OF 250±50Pa.

△7 HONEYWELL IDENTIFICATION LABEL INCLUDES:
DESCRIPTION
H/W PART NUMBER AND REVISION
SERIAL NUMBER
DATE OF MANUFACTURE
WEIGHT
CAGE CODE
COUNTRY OF ORIGIN AND SITE TRANSPORT CANADA MFG CODE

6. POWER DISSIPATION AT 96-122VAC (320-800Hz): 132 W MAX @ MAXIMUM OUTPUT POWER (MOP).
POWER CONSUMPTION AT 96-122VAC (320-800Hz): 150 W MAX @ MOP.
CURRENT DRAW IN AMPERES: 2.7A RMS MAXIMUM. POWER FACTOR: GREATER THAN 0.98.

△5 INDICATED SURFACE IS INTENDED FOR ELECTRICAL BONDING.

4. ASSOCIATED CAD DATA HAS BEEN MODELED TO NOMINAL DIMENSIONS.
SPATIAL MODEL DEFINED BY 90401571_REVD.STP.

3. WEIGHT: 6.6 kg (14.6 lb) MAX.

2. DIMENSIONS SHOWN ARE FOR INSTALLATION PURPOSES ONLY.

1. DIMENSIONS AND TOLERANCES IN ACCORDANCE WITH ASME Y14.5M-1994.

NOTES: UNLESS OTHERWISE SPECIFIED:

TABLE 2: GXA Ka KRFU EXTERNAL CONNECTORS IDENTIFICATION △9

REF. DES	PART NUMBER	MATES WITH	FUNCTION	REMARKS
J1	D38999/20FC4PN (AMPHENOL)	D38999/26FC4SN (AMPHENOL)	POWER INPUT	4 PIN
J2	D38999/20FC35PN (AMPHENOL)	D38999/26FC35SN (AMPHENOL)	CONTROL INTERFACE	22 PIN
J3	M3922/54-003	M3922/59-005 (THRU HOLE FLANGE)	RF TX INTERFACE	WR-28 WAVEGUIDE WITH FLANGE UG599/U PER MIL-DTL-3922/54, EXCEPT AS DEFINED IN THIS DRAWING △22
J4	M3922/54-001	M3922/59-003 (THRU HOLE FLANGE)	RF RX INTERFACE	WR-42 WAVEGUIDE WITH FLANGE UG595/U PER MIL-DTL-3922/54, EXCEPT AS DEFINED IN THIS DRAWING △22
J5	TNC FEMALE PER MIL-C-87104/2 (NEXTEK PTCTNFSAF20G)	TNC MALE PER MIL-C-87104/2 (AMPHENOL)	IF TX INTERFACE	LABELED BLUE
J6	TNC FEMALE PER MIL-C-87104/2 (NEXTEK PTCTNFSAF20G)	TNC MALE PER MIL-C-87104/2 (AMPHENOL)	IF RX INTERFACE	LABELED GREEN

TABLE 4: J2 CONTROL CONNECTOR CONTACT ASSIGNMENTS △9

CONTACT NUMBER	SIGNAL NAME
1	EN1: TX LOW (SPARE)
2	TP18-1 (SPARE)
3	KRFU FILTER SELECT HI
4	KRFU FILTER SELECT LO
5	KRFU TX MUTE HI
6	KRFU TX MUTE LO
7	KRFU RESET HI
8	KRFU RESET LO
9	SPARE
10	SPARE
11	RS-422: KRFU TO KANDU HI
12	RS-422: KRFU TO KANDU LO
13	TP19-1 (SPARE)
14	EN1: RX HIGH (SPARE)
15	EN1: RX LOW (SPARE)
16	TP18-2 (SPARE)
17	RS-422: KANDU TO KRFU HI
18	RS-422: KANDU TO KRFU LO
19	TP17-1 (SPARE)
20	TP19-2 (SPARE)
21	EN1: TX HIGH (SPARE)
22	TP17-2 (SPARE)

TABLE 5: GXA Ka KRFU ENVIRONMENTAL QUALIFICATION CHARACTERISTICS

ENVIRONMENTAL CONDITIONS	LIMITS	RTCA/DO-160G SPECIFICATION
GROUND SURVIVAL LOW TEMPERATURE	-55°C	SECTION 4.5.1, CAT D2
OPERATING LOW TEMPERATURE	-55°C	SECTION 4.5.2, CAT D2
GROUND SURVIVAL HIGH TEMPERATURE	+90°C	SECTION 4.5.3, CAT D2 EXTENDED TO +90°C FROM +85°C
OPERATING HIGH TEMPERATURE	+70°C	SECTION 4.5.4, CAT D2
IN-FLIGHT LOSS OF COOLING	30 MIN., NO DAMAGE, OVER TEMPERATURE SHUTDOWN OF PA IS EXPECTED.	SECTION 4.5.5, CAT Z
ALTITUDE	55000 FT	SECTION 4.6.1, CAT D2 EXTENDED TO 55000 FT FROM 50000 FT
DECOMPRESSION	6000 FT TO 55000 FT	SECTION 4.6.2, CAT A2 EXTENDED 6000 FT TO 55000 FT
OVER PRESSURE	199 KPA (- 20000 FT)	SECTION 4.6.3, CAT A2 EXTENDED TO 199 KPA (-20000 FT) FROM 170 KPA (-15000 FT)
TEMPERATURE VARIATION	±10°C/MIN.	SECTION 5, CAT A
HUMIDITY	85% RH @38°C 95% RH @65°C	SECTION 6, CAT B
OPERATIONAL SHOCK	3 SHOCK OF 6 G, 11 MS, 6 DIRECTIONS 3 SHOCK OF 6 G, 20 MS, 6 DIRECTIONS	SECTION 7, CAT B & E
CRASH SAFETY IMPULSE	1 SHOCK OF 20 G, 11 MS, 6 DIRECTIONS 1 SHOCK OF 20 G, 20 MS, 6 DIRECTIONS	SECTION 7, CAT B & E
CRASH SAFETY SUSTAINED	18 G, 3 SECS, 6 DIRECTIONS	SECTION 7, CAT B
VIBRATION	ROBUST RANDOM CURVE E & E1	SECTION 8, CAT R
EXPLOSIVE ATMOSPHERE	AIRCRAFT ZONE III	SECTION 9, CAT E
WATER PROOFNESS	CONDENSING AND SPRAYED	SECTION 10, CAT Y & R
FLUIDS SUSCEPTIBILITY	DE-ICING FLUID	SECTION 11, CAT F
SAND AND DUST	DUST	SECTION 12, CAT D
FUNGUS RESISTANCE	BY ANALYSIS	SECTION 13, CAT F
SALT FOG		SECTION 14, CAT S
ICING		SECTION 24, CAT A

△26 INDICATED SURFACES ARE CHEM-FILMED ONLY AND ARE NOT POWDER COATED.

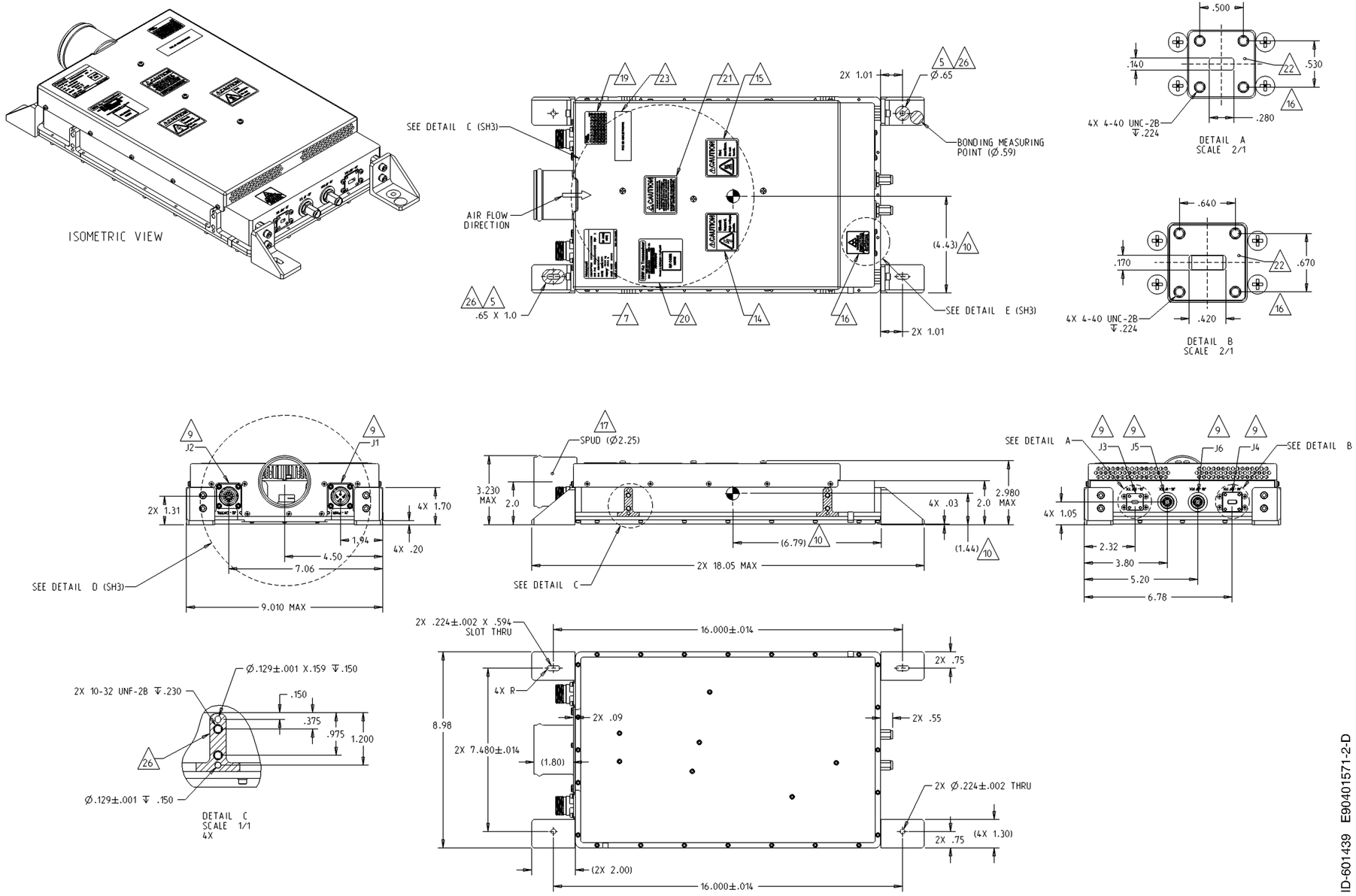
25. UNIT SHALL BE INSTALLED USING ALL 4 MOUNTING HOLES AND MAY BE INSTALLED IN ANY ORIENTATION. RECOMMEND FASTENERS TO BE .190-32 UNJF-3A CORROSION RESISTENT STEEL CRES-A286.

24. UNIT EXPORT CONTROL CLASSIFICATION NUMBER IS 7A994.

△23 FCC LABEL.

ID-601438 E90401571-1-D

Figure 4-29. (Sheet 1 of 3) KRFU, Forced Air Cooled, Outline and Installation Drawing (90401571, REV D)



ID-601439 E90401571-2-D

Figure 4-29. (Sheet 2 of 3) KRFU, Forced Air Cooled, Outline and Installation Drawing (90401571, REV D)

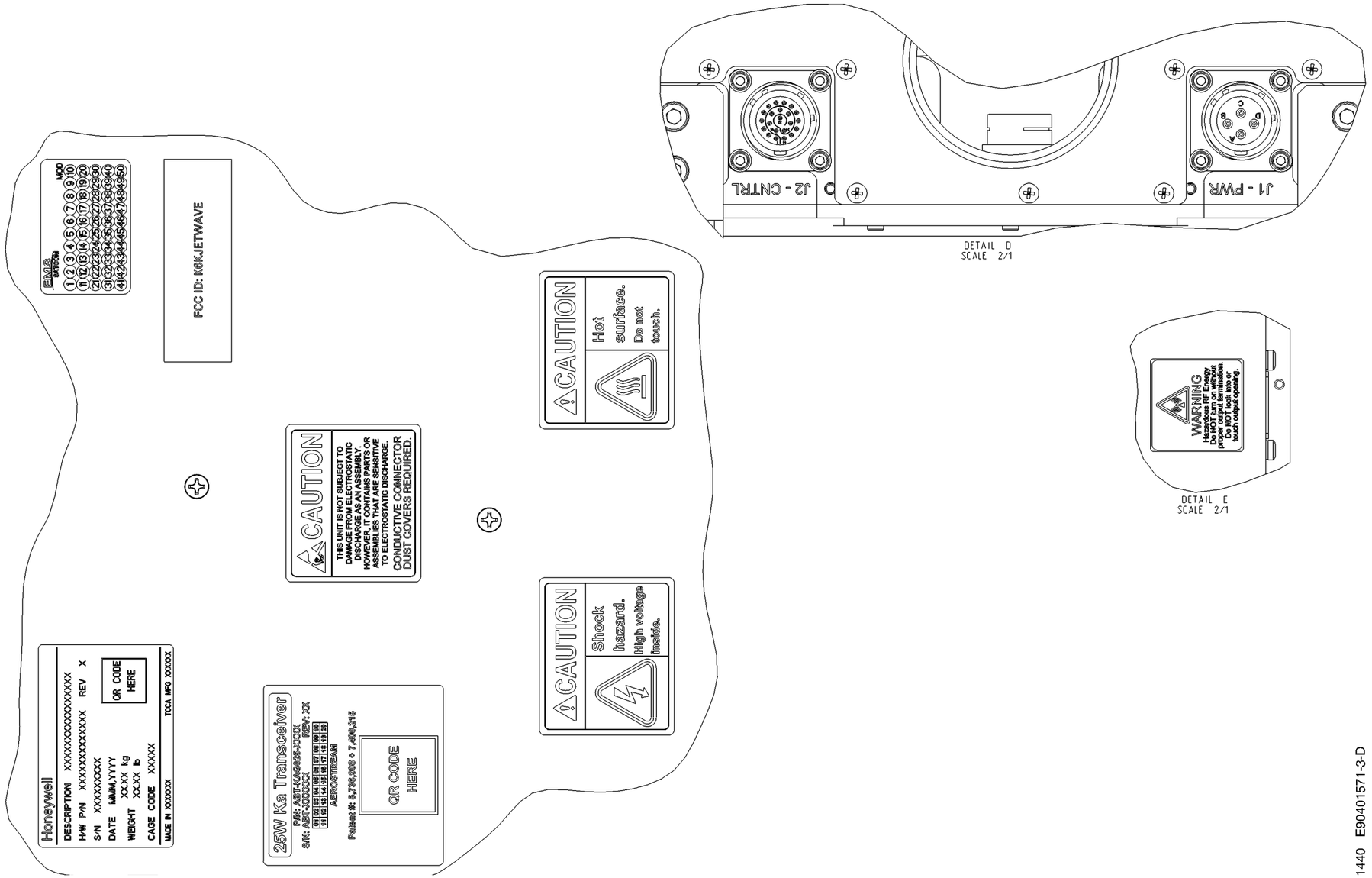


Figure 4-29. (Sheet 3 of 3) KRFU, Forced Air Cooled, Outline and Installation Drawing (90401571, REV D)

15. MS21209-C0610L INSERT. MAXIMUM SCREW PROTRUSION .20 INCHES.

14. MS21209F1-15L INSERT FOR OPTIONAL GROUNDING STRAP SURFACE ADJACENT TO INSERT IS INTENDED FOR ELECTRICAL BONDING. MAXIMUM SCREW INSERTION .30 INCHES.

13. MOUNTING HOLES IN BASE ARE ACCESSED BY ROTATING THE ANTENNA.

12. CAUTION THIS UNIT CONTAINS PARTS AND ASSEMBLIES SUSCEPTIBLE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD).

11. INDICATED MOUNTING SURFACES ARE ALUMINUM ALLOY 6061-T6 OR -T651 PER AMS-QQ-A-250/11. FINISH OF INDICATED SURFACES IS CHEMICAL CONVERSION COATING PER MIL-DTL-5541, TYPE II, CLASS 3.

10. ELECTROSTATIC DISCHARGE SENSETIVE (ESD) HANDLE PER IPC-A-610.

9. APPROXIMATE CENTER OF GRAVITY SHOWN BY ⊕ .

8. COOLING: NATURAL CONVECTION AND RADIATION ONLY.

7. UNIT ID NAMEPLATE, RF HAZARD, ESD CAUTION, HARDWARE/SOFTWARE MOD DOT, AND NO LIFT LABELS.
HONEYWELL DATA MATRIX NAMEPLATE INCLUDES:
HONEYWELL NAME
PRODUCT NAME: KA TMA
HARDWARE P/N: 90400013-0001
REVISION: (CURRENT REVISION)
SERIAL NUMBER: (SERIAL NUMBER)
WEIGHT: (WEIGHT IN kg AND lb)
DATE OF MFR: (CURRENT DATE MMM, YYYY)
CAGE CODE: 38473
COUNTRY OF ORIGIN: (MADE IN CANADA)
TCCA MFG CODE: 325-92

6. TMA EXTERNAL CONNECTORS J2, J3 AND J4 IDENTIFICATION PER TABLE 3. CONNECTOR CONTACT ASSIGNMENTS FOR J2 PER TABLE 2.

5. POWER CONSUMPTION
NOM: 35 W
MAX OP: 85 W

4. ASSOCIATED CAD DATA HAS BEEN MODELED TO NOMINAL DIMENSIONS. SPATIAL MODEL DEFINED BY 90401428_REVF.STP

3. WEIGHT: 4.55 Kg (10.0 lb) MAXIMUM.

2. DIMENSIONS SHOWN ARE FOR INSTALLATION PURPOSES ONLY.

1. DIMENSIONS AND TOLERANCES IAW ASME Y14.5M-1994.

NOTES: UNLESS OTHERWISE SPECIFIED

TABLE 1: GXA TMA PART NUMBERS

PART NUMBER	DESCRIPTION
90400013-0001	ASSEMBLY GXA TMA

TABLE 2: J2 (6)

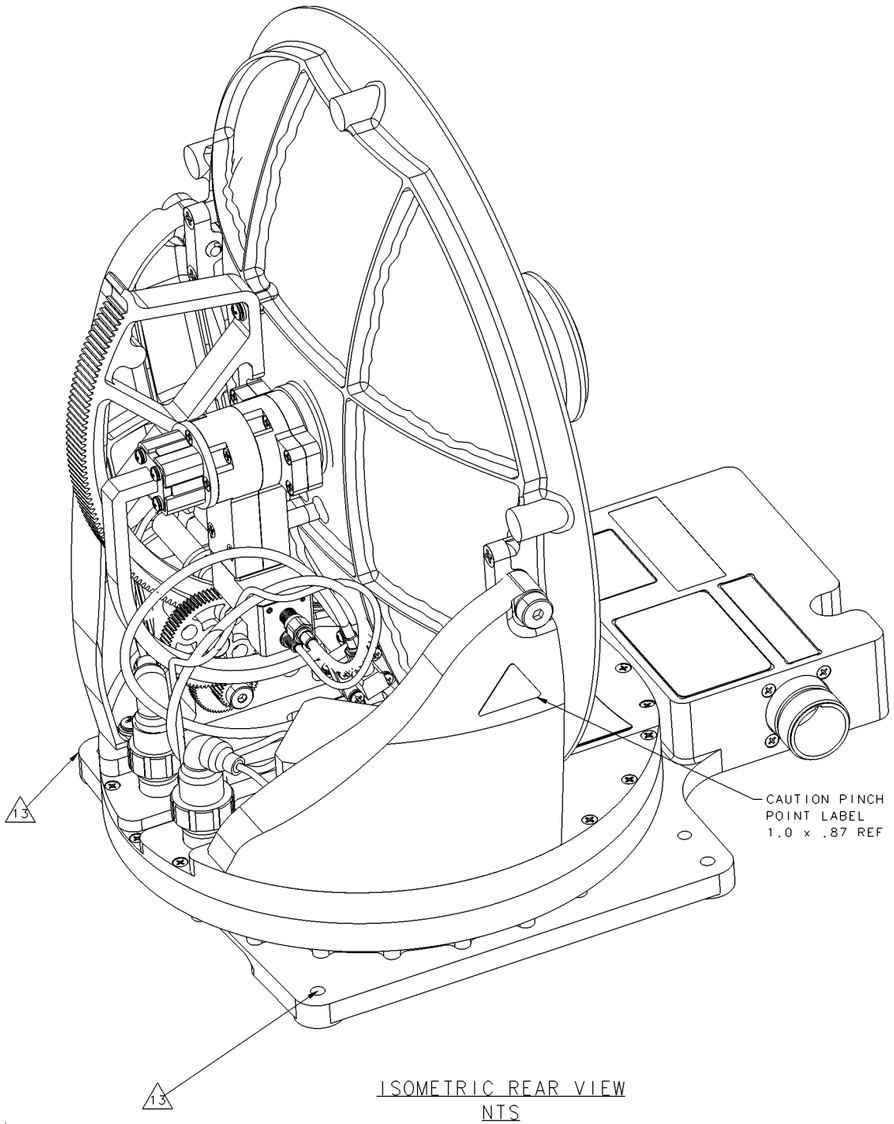
PIN	SIGNAL
A	RS-422: ASC TO TACM DATA HI
B	RS-422: ASC TO TACM DATA LO
C	GND
D	RS-422: TACM TO ASC DATA HI
E	RS-422: TACM TO ASC DATA LO
F	SPARE
G	TMA DC PWR 38.5V ±3%
H	TMA DC PWR RTN
J	RS422: IMU TO ASC DATA LOW
K	RS422: IMU TO ASC DATA HI
L	RS422: ASC TO IMU DATA LOW
M	RS422: ASC TO IMU DATA HI
N	SPARE
P	SPARE
R	SPARE
S	SPARE
T	SPARE
U	IMU DC PWR 24V +15%/-10%
V	IMU DC PWR RTN

TABLE 3 GXA TMA CONNECTOR IDENTIFICATION (6)

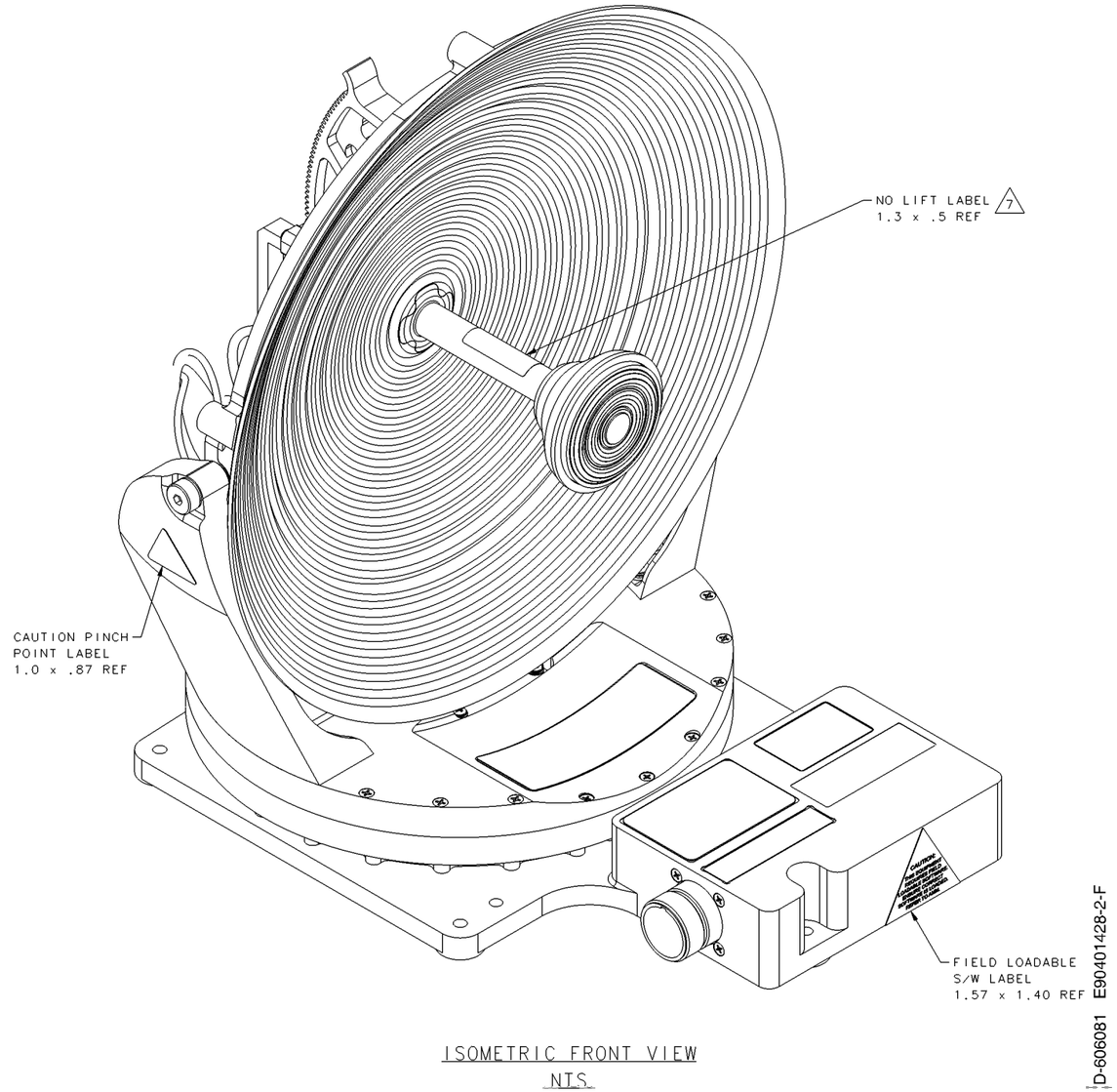
REF DES	PART NUMBER	MATING CONNECTOR	REMARKS
J2	D38999/20FD19PN	D38999/26FD19SN	SEE TABLE 2 FOR PINOUTS
J3	WAVEGUIDE FLANGE PER UG599/U WITH 4-40 THREADED INSERTS	WAVEGUIDE FLANGE PER UG599/U WITH THROUGH HOLES	FLANGE FACE IS ALUMINUM WITH CHEMICAL CONVERSION FINISH PER MIL-DTL-5541F TYPE II CLASS 3
J4	2.92mm COAX FEMALE	2.92mm COAX MALE	

ID-606080 E90401428-1-F

Figure 4-30. (Sheet 1 of 4) TMA Outline and Installation Drawing (90401428, REV F)



ISOMETRIC REAR VIEW
NTS



ISOMETRIC FRONT VIEW
NTS

D-606081 E90401428-2-F

Figure 4-30. (Sheet 2 of 4) TMA Outline and Installation Drawing (90401428, REV F)

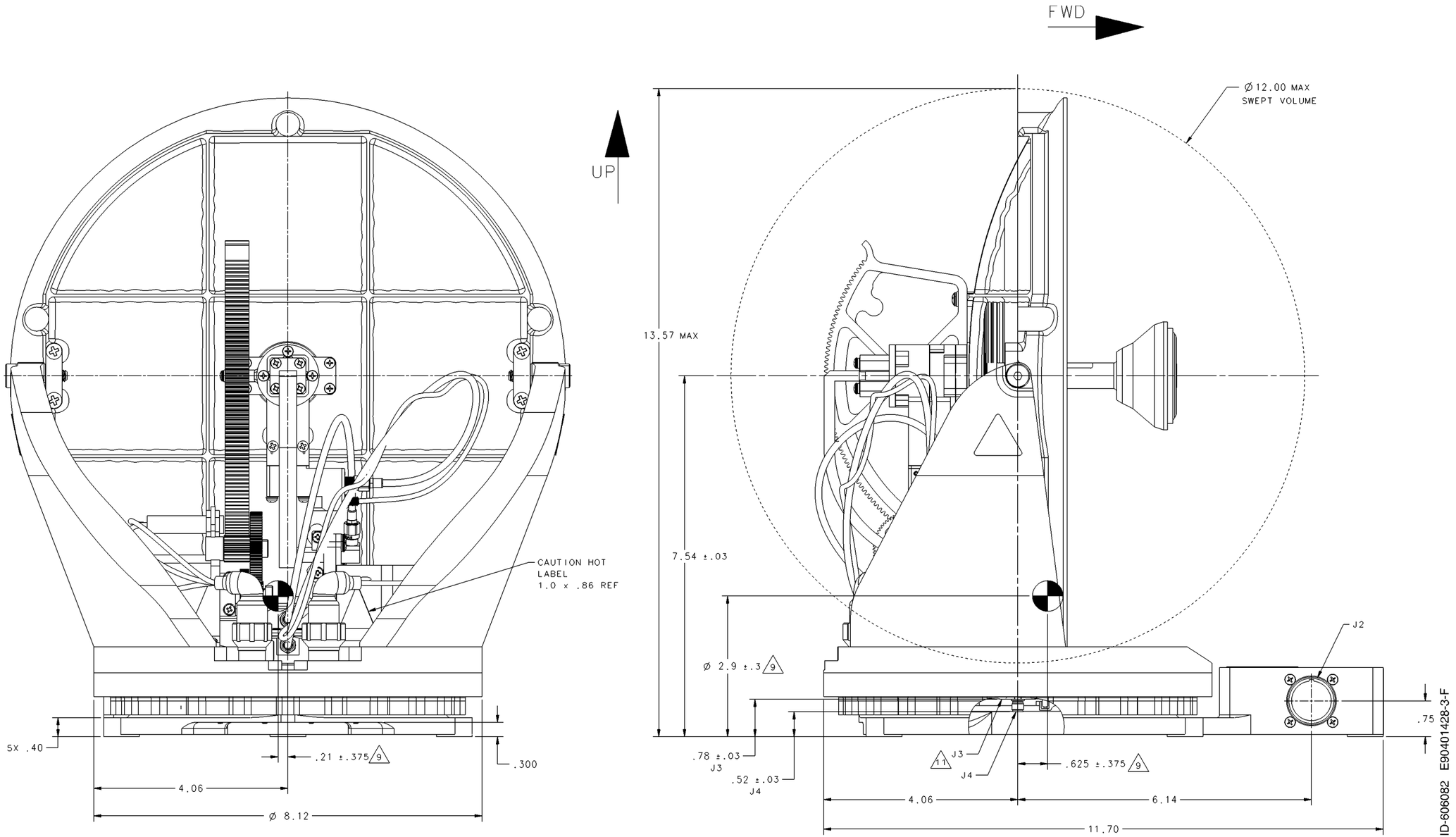
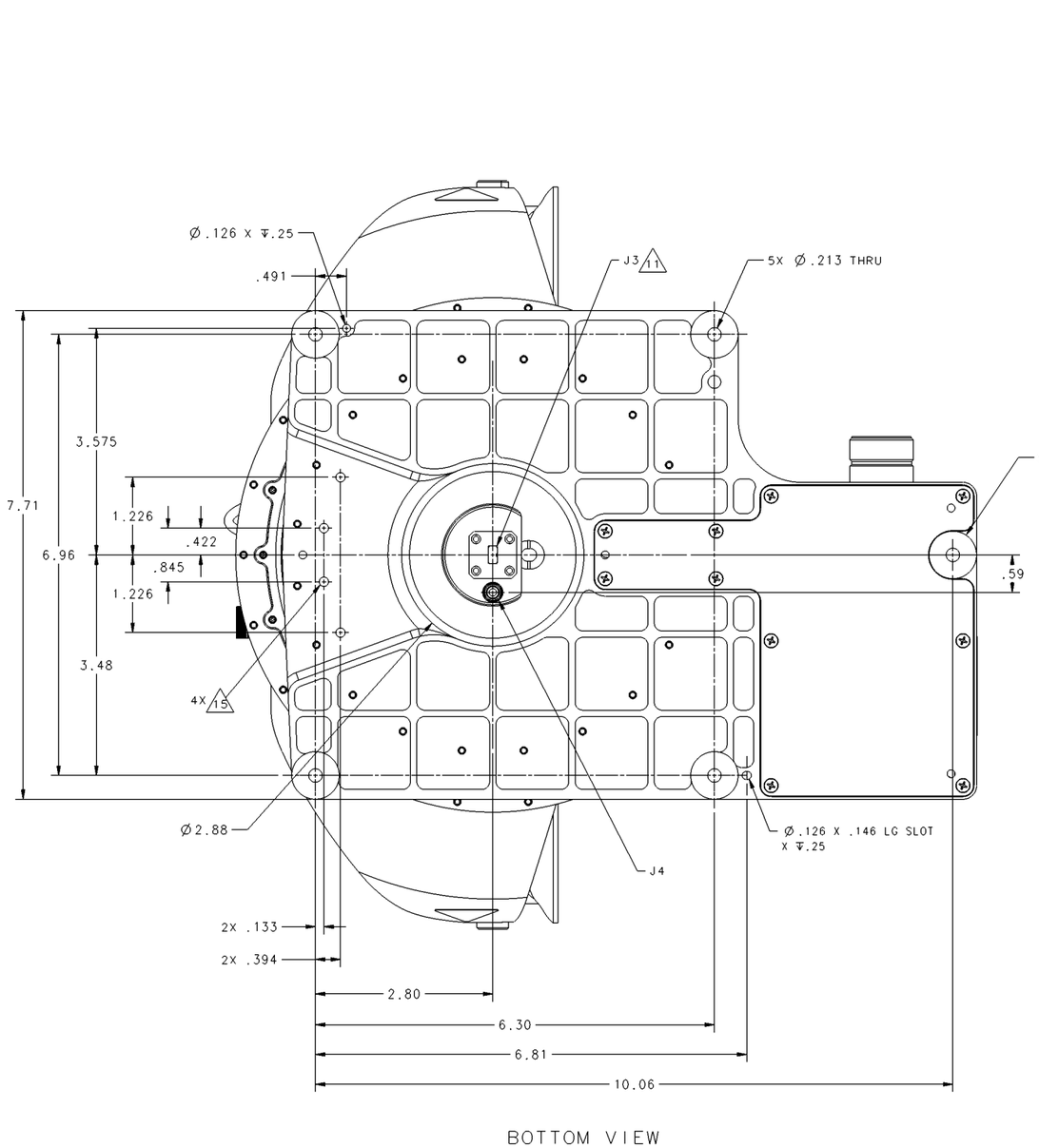
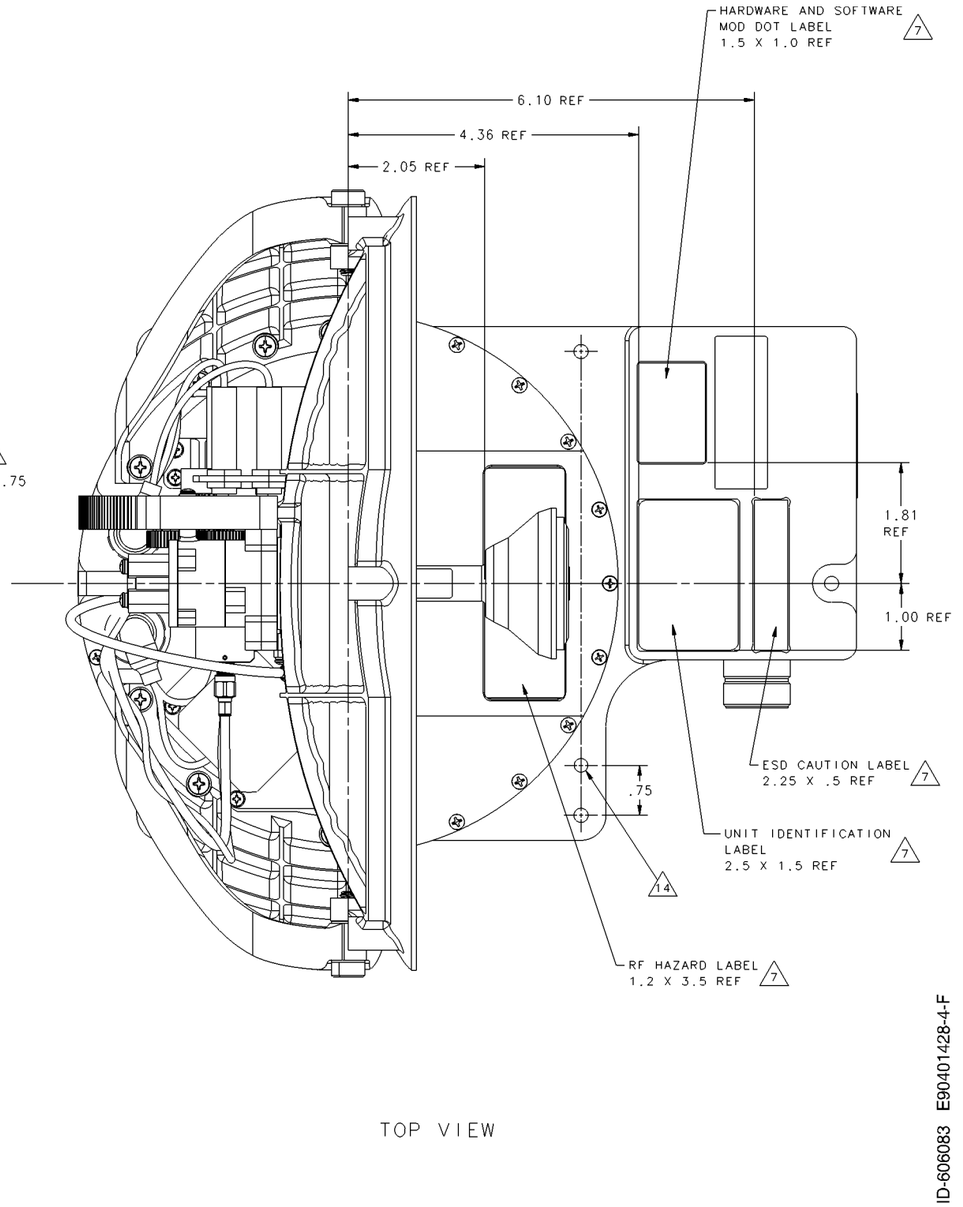


Figure 4-30. (Sheet 3 of 4) TMA Outline and Installation Drawing (90401428, REV F)

Draft as of 31 May 2017





ID-606083 E90401428-4-F

Figure 4-30. (Sheet 4 of 4) TMA Outline and Installation Drawing (90401428, REV F)

NOTES, UNLESS OTHERWISE SPECIFIED:

1. DIMENSIONS AND TOLERANCES IN ACCORDANCE WITH ASME Y14.SM-1994.
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.
TOLERANCES ON:
.XX +/- .03
.XXX +/-.010
∠ +/- 2°

2. DIMENSIONS SHOWN ARE FOR INSTALLATION PURPOSES ONLY.

3. WEIGHT:
3.1 FUSELAGE MOUNT ANTENNA, PART NUMBER 90000380-1: 83.0 LBS MAX.
3.2 IFTING FIXTURE, PART NUMBER 90000528-001: 5.50 LBS MAX. (SHEET 9)

4. ASSOCIATED CAD DATA HAS BEEN MODELED TO NOMINAL DIMENSIONS.

△5 INDICATED SURFACES ARES INTENDED FOR ELECTRICAL BONDING MEASUREMENT.
SEE SHEET 3 ZONE C4 AND SHEET 6 ZONE A6.
RESISTANCE FROM BONDING MEASUREMENT POINT INDICATED TO
BASE MOUNTING RING POINT SHALL BE 50.0 MILLIOHMS MAX.

6. POWER CONSUMPTION:
FMA REQUIREMENTS
-6A PEAK, 135W STEADY-STATE (@38VDC)
IMU REQUIREMENTS
-25W PEAK BELOW -20° C, 11W BETWEEN -20° C AND +10° C, 2.5W ABOVE +10° C.
(NOTE: APPROXIMATE INTERNAL IMU TEMPERATURES ARE REFERENCED)

△7 HONEYWELL DATA MATRIX LABEL INCLUDES:
HONEYWELL NAME
PRODUCT NAME: GXA FUSELAGE MOUNT ANTENNA
HARDWARE PART NUMBER
SERIAL NUMBER
WEIGHT
DATE OF MANUFACTURE
HARDWARE MOD STRIKE ARRAY
CAGE CODE
COUNTRY OF ORIGIN
QR CODE ENCODING CAGE CODE, SERIAL NUMBER, HARDWARE
PART NUMBER AND DATE OF MANUFACTURE.

8. COOLING: NATURAL CONVECTION AND RADIATION ONLY.
SEE SHEET 11 FOR COOLING SURFACES.

△9 FMA EXTERNAL CONNECTORS IDENTIFICATION PER TABLE 2
P1, P2 AND P3 CONNECTORS CONTACT ASSIGNMENTS
PER TABLES 3, 4 AND 5 ACCORDINGLY.
CABLES CONSISTS OF MULTIPLE STRANDED WIRES IN A SHIELDED AND
INSULATED JACKET. USE CUSHIONED CABLE CLAMPS TO SECURE CABLE
TO AIRCRAFT WHEN ROUTING TO THE MATING CONNECTOR. INSURE
CABLE ROUTING DOES NOT OBSTRUCT ANTENNA AZIMUTH OR ELEVATION
ROTATION DEFINED BY SWEPT VOLUME ON SHEET 7.

△10 ⊕ INDICATES CENTER OF GRAVITY SEE SHEET 3.

11. ELECTROSTATIC DISCHARGE SENSITIVE (ESD) HANDLE PER IPC-A-610

12. CONNECTORS FITTED WITH PROTECTIVE SHIPPING COVERS. REMOVE
PRIOR TO TEST OR FINAL INSTALLATION.

△13 INDICATED MOUNTING SURFACES ARE ALUMINUM ALLOY 6061-T651 PLATE
PER SAE-AMS4027. FINISH OF INDICATED SURFACES IS CHEMICAL
CONVERSION COATING PER MIL-DTL-5541, TYPE I OR II, CLASS 3,
WITH TWO COATS OF PRIMER PER MIL-PRF-85582, TYPE I, CLASS N.

△14 CAUTION LABEL: CONTAINS PARTS AND ASSEMBLIES SUSCEPTIBLE TO
DAMAGE BY ELECTROSTATIC DISCHARGE (ESD).

15. ENVIRONMENTAL QUALIFICATION CHARACTERISTICS PER TABLE 6.

△16 MOUNTING HOLES IN BASE ARE ACCESSED FROM THE TOP BETWEEN THE
ANTENNA AND TURNTABLE BY ROTATING THE ASSEMBLY IN AZIMUTH. FORCE
REQUIRED TO ROTATE THE UNIT SHALL BE LESS THAN 2.5 FOOT POUNDS.
MOUNTING HOLES LOCATIONS WILL ACCOMMODATE A 0.52 MAX DIAMETER FLAT
WASHERS AND SOCKET HEAD CAP SCREWS.

17. MATING CONNECTORS P1, P2 AND P3 MUST BE GROUNDED TO AIRCRAFT ADAPTERPLATE.
RESISTANCE FROM CONNECTOR SHELL SHALL BE 5 MILLIOHMS MAX.

△18 SWEPT VOLUME INCLUDES MANUFACTURING TOLERANCES, THERMAL DEFLECTION
AND DYNAMIC DEFLECTION DURING OPERATION.

NOTES, CONTINUATION:

19 EXPORT CONTROL CLASSIFICATION NUMBER: 7E994.

△20 INDICATED SURFACES ARES INTENDED FOR ELECTRICAL BONDING MEASUREMENT.
SEE SHEET 6 ZONE A6.
RESISTANCE FROM FMA BASE MOUNTING RING BONDING MEASUREMENT POINT TO
ADAPTER PLATE GROUNDING POINT MUST BE NO GREATER THAN 2.5 MILLIOHMS.
AFTER BONDING MEASUREMENT COAT WITH PRIMER PER MIL-PRF-85582, TYPE I, CLASS N.

21. TESTING: ACCEPTANCE TEST PER ATP90001104.

△22 TO ENSURE THE FMA CONNECTORS ARE FULLY MATED AT AIRCRAFT INSTALLATION. HAND
TIGHTEN THE PLUG CONNECTORS P1, P3, AND P3 (FMA) UNTIL THE RED BAND ON THE
RECEPTACLE CONNECTOR (AIRCRAFT) IS NOT VISIBLE.

△23 BONDING HOLES LOCATIONS WILL ACCOMMODATE A 0.59 MAX DIAMETER FLAT
WASHERS AND SOCKET HEAD CAP SCREWS.
BONDING CABLE MOUNTING POINT. RECOMMENDED THREAD ENGAGEMENT
0.250 MIN. 0.340 MAX INCHES. RECOMMENDED TORQUE 55-65 IN-LBS.
MAX ALLOWABLE TORQUE 150 IN-LBS. (6.22-7.35 NM. MAX ALLOWABLE TORQUE 16.95 NM.)
ONLY ONE BONDING POINT IS REQUIRED. EITHER BONDING POINT MAY BE USED, OR BOTH.

ID-627788 E90000380ICD-1-L

Figure 4-31. (Sheet 1 of 14) FMA Outline and Installation Drawing (90000380ICD, REV L)