TERRA
BY TRIMBLE

TDF 100D

AUTOMATIC DIRECTION FINDER

OPERATION/INSTALLATION MANUAL

Trimble
2105 Donley
Austin, Texas 78758
(512) 432-0400

PRINTED IN U.S.A.

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TDF 100D AUTOMATIC DIRECTION FINDER
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SECTION I

1. INTRODUCTION

1.1 SCOPE

This manual provides installation and operation instructions for the Terra by Trimble TDF 100D Automatic Direction Finder system, composed of the following three components, as manufactured by Trimble of Austin, Texas.

1.1.1 Receiver/Control Unit - TDF 100D
(Part Number 0900-0406-00)

1.1.2 Antenna Assembly - TA 10
(Part Number 0900-0901-00)

1.1.3 Indicator/Power Supply - TDI 10
(Part Number 0900-0902-00)

1.2 DESCRIPTION

The Terra by Trimble TDF 100D ADF system is a navigational system designed primarily for use in finding relative bearing information to a non-directional beacon or AM broadcast station. The receiver, with the associated antenna assembly and indicator, functions by indicating the direction of the received signal source in relation to the aircraft heading. The TDF 100D Receiver and the TDI 10 Indicator are designed for panel mounting where the system can be controlled and the performance observed. The TA 10 Antenna Assembly may be installed in a top or bottom mount configuration. The TDF-100D ADF system is not capable of bootstraping to other navigation intruments.

1.2.1 TDF 100D RECEIVER

The receiver is a digitally tuned, solid state receiver capable of providing ADF information in the frequency range of 200 KHz to 1800 KHz and the Marine Distress Frequency assigned to 2182 KHz. The receiver may also be used as a conventional receiver by switching to the “ANT” mode to enable the pilot to identify stations or listen to commercial AM radio broadcasts. The front panel features include a gas discharge display, an ON/OFF/Volume knob, a function selector knob, a cursor tuning knob along with Active/Standby transfer and memory scan buttons.

The display indicates active frequency on the left and standby on the right. Also indicated on the display is the memory location when storing or recalling frequencies from any of the 10 user programmable memories. Quadratial Error adjustments are provided at the rceiver and antenna for system alignment to aircraft.

1.2 DESCRIPTION (CONTINUED)

1.2.1 TDF 100D RECEIVER

The 10 memories, along with the last used Active and Standby frequencies, are stored in a non-volatile electrically erasable memory (EEROM) for storage even when no power is applied to the unit. The tuning of the receiver is microprocessor controlled with a single reference frequency crystal. The display brightness is controlled by an automatic dimming control dependent on available ambient light.

The TDF 100D can be mounted in three different configurations, in a single tray, in a double tray or in a 3" ATI hole using the 3" adapter. With tray mounted units all power and control connections are made thru two 15 Pin “D” type connectors installed in the rear of the tray. A standard BNC male chassis connector is supplied on the tray for antenna connections. For the 3" face plate mounting option two locking, hooded, 15 Pin “D” type connectors and a standard BNC female connector are used respectively for power/control and antenna interfacing. The TDF 100D is secured, in tray installations, by means of a positive locking cam, accessible through the front panel. The 3" face plate mounting option is mounted with a minimum of three screws through the instrument panel.

Weighing only 1.44 lbs. (.653 Kg) the TDF 100D measures 11.450" long, 3.125" wide and 1.625" high (29.083 cm x 7.938 cm x 4.128 cm). Panel cutout is a mere 3.03" x 1.54" (7.70 cm x 3.91 cm) and the overall length of the unit is only 13.05" (33.147 cm) including mounting tray. Using only 13 watts of power the TDF 100D can be used in both 14 VDC and 28 VDC systems without a separate converter.

1.2.2 TDI 10 INDICATOR

The TDI 10 Indicator features a rotatable compass card which may be used to indicate the magnetic bearing to the received station. This is accomplished by manually rotating the compass card until the aircraft magnetic heading is positioned under the lubber line. The heading knob is located in the lower left hand corner of the indicator.

The TDI 10 contains driver circuitry for the indicator needle, and power supply circuitry to derive the required voltages for the remainder of the system.

Weighing 1.2 lbs. (.54 Kg) the TDI 10 is 5.57" long (14.15 cm) including knob and rear connector. The indicator can be front or rear mounted needing a maximum of 4.85" (12.32 cm) behind the front panel plus approximately 3" (7.62 cm) for connector space.

1.2 DESCRIPTION (CONTINUED)

1.2.3 TA 10 ANTENNA

The TA 10 contains the loop antenna assembly, the sense antenna and amplifier circuits for the individual antennas. Circuitry to process the amplified signals into the composite signal for the receiver is included in the antenna. Therefore antenna cable length is non-critical.

Weighing 1.7 lbs. (0.77 Kg) the TA 10 is 7.91" x 5.29" (20.09 cm x 13.44 cm) with the low profile design (1.1") (2.79 cm) reducing drag. Connection to the receiver is made through a 15 Pin “D” type connector.

1.3 SPECIFICATIONS

The following are pertinent specifications for the Terra by Trimble TDF 100D ADF System.

1.3.1 MECHANICAL

Mounting:

Receiver	Panel mounted using mounting tray supplied with unit or 3" adapter as provided.
Indicator	Front or rear panel mounted using either three screws (rear mount) or four screws and mooring plate (front mount).
Antenna	Belly or top mounted using 8 ea. 8-32 cap screws provided.

Overall Dimensions:

Receiver	13.05" long, 3.125" wide and 1.625" high (33.14 cm long, 7.9375 cm wide, 4.1275 cm high).
Indicator	5.57" long, 3.25" wide and 3.25" high (14.15 cm long, 8.26 cm wide and 8.26 cm high).
Antenna	7.91" long, 5.29" wide and 2.66" high (20.09 cm long, 13.44 cm wide and 6.76" high).

Mounting Dimensions:

Receiver	11.45" behind panel, 3.125" wide and 1.625" high (29.08 cm behind panel, 7.9375 cm wide and 4.1275 cm high).
Indicator	4.85" max. behind panel, 3.25" wide and 3.25" high (12.32 cm max. behind panel, 8.26 cm wide and 8.26 cm high).
Antenna	Internal to aircraft 1.36" long, 1.56" wide and 1.56" high (3.44 cm long, 3.96 cm wide and 3.96 cm high). External to aircraft 7.91" long, 5.29" wide and 1.1" high (20.09 cm long, 13.44 cm wide and 2.79 cm high).

1.3 SPECIFICATIONS

1.3.1 MECHANICAL

Panel Cutouts:

Receiver	3.03" x 1.54" (7.70 cm x 3.91 cm).
Indicator	3" ATI for rear mount, 3.22" x 3.22" with 3.94" diagonal (8.18 cm x 8.18 cm with 10.01 cm diagonal for front mount).
Antenna	3.44" x 2.00" (8.74 cm x 5.08 cm).
Wt (System)	5.35 lbs. with tray (2.43 Kg with tray).

Connectors:

Receiver	2 15 Pin “D” type - power and control, Female BNC-RF.
Indicator	1 15 Pin “D” type - power and control.
Antenna	1 15 Pin “D” type - power, control and RF.

1.3.2 POWER REQUIREMENTS

The Terra by Trimble TDF 100D ADF system requires 13.75 or 27.50 VDC +10-20% (945 mA at 13.75 V, 473 mA at 27.50 V) with power consumption at 13 watts.

1.3.3 ENVIRONMENTAL SPECIFICATIONS

Maximum Operating Conditions

Altitude:	To 50,000 ft (15,240 meters)
Temperature:	
Receiver	-20oC to +55oC (-4°F to 131°F)
Indicator	-20oC to +55oC (-4°F to 131°F
Antenna	-55oC to +70oC (-67°F to 158°F)

Minimum Storage Conditions

Temperature:	
Receiver	-40oC to +80oC (-40°F to +176°F)
Indicator	-40oC to +80oC (-40°F to +176°F)
Antenna	-55oC to +80oC (-67°F to 176°F)

1.3.4 ELECTRICAL SPECIFICATIONS

Receiver:

Freq Range	200 KHz to 1800 KHz in 1 KHz increments and 2182 KHz Marine Distress Frequency
Sensitivity	(S+N)/N = 6 dB ADF Mode: 150 uV/m, 30% mod, 400 or 1000 Hz (S+N)/N = 6 dB ANT Mode: 70 uV/m, 30% mod, 400 or 1000 Hz

1.3 SPECIFICATIONS (CONTINUED)

1.3.4 ELECTRICAL SPECIFCATIONS

Selectivity	6 dB bandwidth: ±7 KHz max from center frequency
Spurious	80 dB down ±12 KHz from center frequency min
Intermod/ Cross Mod	50 KHz to 550 KHz: 65 dB min 550 KHz to 1500 KHz: 72 dB min
Audio Output	100 mW across 500 ohms
Indicator: ADF Bearing Accuracy	±3o from 70 uV/m to 0.5 V/m RF input
ADF Ind Speed	175° sweep in 5 seconds maximum at 70µv/m to 0.5 v/m RF in.
Power Outputs	+10 VDC 100 mA +5 VDC 250 mA +12.5 VDC 260 mA

1.4 EQUIPMENT SUPPLIED

The equipment supplied will depend upon the "system" you have ordered. The part numbers and descriptions listed below indicate the equipment supplied with each "system".

0990-5303-00 TDF 100D Single System with 14' ADF Cable

1. 1 ea. ADF Receiver, Terra by Trimble TDF 100D
   P/N 0900-0406-00
2. 1 ea. ADF Antenna, Terra by Trimble TA 10
   P/N 0900-0901-00
3. 1 ea. ADF Indicator, Terra by Trimble TDI 10
   P/N 0900-0902-00
4. 1 ea. Mounting Tray
   P/N 1900-0357-20
5. 1 ea. Installation Kit
   P/N 1901-2671-20
6. 1 ea. Installation Kit ADF 14' Cable
   P/N 1901-5226-00
7. 1 ea. Installation Kit TDI 10
   P/N 1901-5225-00
8. 1 ea. Operation/Installation Manual
   TDF 100D, P/N 1910-0010-01
9. 3 ea. Warranty Card

1.4 EQUIPMENT SUPPLIED (Continued)

0990-5303-10 TDF 100D Single System with 28' ADF Cable

1.	1 ea.	ADF Receiver, Terra by Trimble TDF 100D P/N 0900-0406-00
2.	1 ea.	ADF Antenna, Terra by Trimble TA 10 P/N 0900-0901-00
3.	1 ea.	ADF Indicator, Terra by Trimble TDI 10 P/N 0900-0902-00
4.	1 ea.	Mounting Tray, Single P/N 1900-0357-20
5.	1 ea.	Installation Kit P/N 1901-2671-20
6.	1 ea.	Installation Kit, ADF 28' Cable P/N 1901-5226-10
7.	1 ea.	Installation Kit TDI 10 P/N 1901-5225-00
8.	1 ea.	Operation/Installation Manual TDF 100D, P/N 1910-0010-01
9.	3 ea.	Warranty Card

0990-5308-00 TX 760D/TDF 100D Dual System with 14' ADF Cable. This system consists of a TX 760D on the left and a TDF 100D on the right.

1.	1 ea.	Comm Transceiver, Terra by Trimble TX 760D P/N 0900-0405-00
2.	1 ea.	ADF Receiver, Terra by Trimble TDF 100D P/N 0900-0406-00
3.	1 ea.	ADF Antenna, Terra by Trimble TA 10 P/N 0900-0901-00
4.	1 ea.	ADF Indicator, Terra by Trimble TDI 10 P/N 0900-0902-00
5.	1 ea.	Mounting Tray, Dual P/N 1900-0373-14
6.	1 ea.	Installation Kit P/N 1901-2671-20
7.	1 ea.	Installation Kit, ADF 14' Cable P/N 1901-5226-00
8.	1 ea.	Installation Kit, TDI 10 P/N 1901-5225-00
9.	1 ea.	Operation/Installation Manual TX 760D, P/N 1910-0008-01
10.	1 ea.	Operation/Installation Manual TDF 100D, P/N 1910-0010-01
11.	4 ea.	Warranty Cards
12.	1 ea.	FCC Form 404
13.	1 ea.	FCC Form 406

1.4 EQUIPMENT SUPPLIED (CONTINUED)

0990-5308-10 TX 760D/TDF 100D Dual System with 28' ADF Cable.
This system consists of a TX 760D on the left and a TDF 100D on the right.

1. 1 ea. Comm Transceiver, Terra by Trimble TX 760D
P/N 0900-0405-00
2. 1 ea. ADF Receiver, Terra by Trimble TDF 100D
P/N 0900-0406-00
3. 1 ea. ADF Antenna, Terra by Trimble TA 10
P/N 0900-0901-00
4. 1 ea. ADF Indicator, Terra by Trimble TDI 10
P/N 0900-0902-00
5. 1 ea. Mounting Tray, Dual
P/N 1900-0373-14
6. 1 ea. Installation Kit
P/N 1901-2671-20
7. 1 ea. Installation Kit, ADF 28' Cable
P/N 1901-5226-10
8. 1 ea. Installation Kit, TDI 10
P/N 1901-5225-00
9. 1 ea. Operation/Installation Manual
TX 760D, P/N 1910-0008-01
10. 1 ea. Operation/Installation Manual
TDF 100D, P/N 1910-0010-01
11. 4 ea. Warranty Card
12. 1 ea. FCC Form 404
13. 1 ea. FCC Form 406

0990-5310-00 TDF 100D/TRT 250D, Dual System with 14' ADF Cable. This system consists of a TDF 100D on the left and a TRT 250D on the right.

1. 1 ea. Transponder, Terra by Trimble TRT 250D
P/N 0900-0250-30
2. 1 ea. ADF Receiver, Terra by Trimble TDF 100D
P/N 0900-0406-00
3. 1 ea. ADF Antenna, Terra by Trimble TA 10
P/N 0900-0901-00
4. 1 ea. ADF Indicator, Terra by Trimble TDI 10
P/N 0900-0902-00
5. 1 ea. Mounting Tray, Dual
P/N 1900-0376-14
6. 1 ea. Antenna Kit, TRT 250D
P/N 1901-0730-00
7. 1 ea. Installation Kit
P/N 1901-2671-20

1.4 EQUIPMENT SUPPLIED (CONTINUED)

8.	1 ea.	Installation Kit, ADF 14' Cable P/N 1901-5226-00
9.	1 ea.	Installation Kit, TDI 10 P/N 1901-5225-00
10.	1 ea.	Operation/Installation Manual TRT 250D, P/N 1910-0009-01
11.	1 ea.	Operation/Installation Manual TDF 100D, P/N 1910-0010-01
12.	4 ea.	Warranty Card
13.	1 ea.	FCC Form 404

0990-5310-10 TDF 100D/TRT 250D Dual System with 28' ADF Cable. This system consists of a TDF 100D on the left and a TRT 250D on the right.

1.	1 ea.	Transponder, Terra by Trimble TRT 250D P/N 0900-0250-30
2.	1 ea.	ADF Receiver, Terra by Trimble TDF 100D P/N 0900-0406-00
3.	1 ea.	ADF Antenna, Terra by Trimble TA 10 P/N 0900-0901-00
4.	1 ea.	ADF Indicator, Terra by Trimble TDI 10 P/N 0900-0902-00
5.	1 ea.	Mounting Tray, Dual P/N 1900-0376-14
6.	1 ea.	Antenna Kit, TRT 250D P/N 1901-0730-00
7.	1 ea.	Installation Kit P/N 1901-2671-20
8.	1 ea.	Installation Kit, 28' Cable P/N 1901-5226-10
9.	1 ea.	Installation Kit, TDI 10 P/N 1901-5225-00
10.	1 ea.	Operation/Installation Manual TRT 250D, P/N 1910-0009-01
11.	1 ea.	Operation/Installation Manual TDF 100D, P/N 1910-0010-01
12.	4 ea.	Warranty Card
13.	1 ea.	FCC Form 404

0990-5312-00 TRT 250D/TDF 100D Dual System with 14' ADF Cable. This system consists of a TRT 250D on the left and a TDF 100D on the right.

1.	1 ea.	Transponder, Terra by Trimble TRT 250D P/N 0900-0250-30
2.	1 ea.	ADF Receiver, Terra by Trimble TDF 100D P/N 0900-0406-00

1.4 EQUIPMENT SUPPLIED (CONTINUED)

3. 1 ea. ADF Antenna, Terra by Trimble TA 10
P/N 0900-0901-00
4. 1 ea. ADF Indicator, Terra by Trimble TDI 10
P/N 0900-0902-00
5. 1 ea. Mounting Tray, Dual
P/N 1900-0377-04
6. 1 ea. Antenna Kit, TRT 250D
P/N 1901-0730-00
7. 1 ea. Installation Kit
P/N 1901-2671-20
8. 1 ea. Installation Kit, ADF 14' Cable
P/N 1901-5226-00
9. 1 ea. Installation Kit, TDI 10
P/N 1901-5225-00
10. 1 ea. Operation/Installation Manual
TRT 250D, P/N 1910-0009-01
11. 1 ea. Operation/Installation Manual
TDF 100D, P/N 1910-0010-01
12. 4 ea. Warranty Card
13. 1 ea. FCC Form 404

0990-5312-10 TRT 250D/TDF 100D, Dual System with 28' ADF Cable. This system consists of a TRT 250D on the left and a TDF 100D on the right.

1. 1 ea. Transponder, Terra by Trimble TRT 250D
P/N 0900-0250-30
2. 1 ea. ADF Receiver, Terra by Trimble TDF 100D
P/N 0900-0406-00
3. 1 ea. ADF Antenna, Terra by Trimble TA 10
P/N 0900-0901-00
4. 1 ea. ADF Indicator, Terra by Trimble TDI 10
P/N 0900-0902-00
5. 1 ea. Mounting Tray Dual
P/N 1900-0377-04
6. 1 ea. Antenna Kit, TRT 250D
P/N 1901-0730-00
7. 1 ea. Installation Kit
P/N 1901-2671-20
8. 1 ea. Installation Kit, ADF, 28' Cable
P/N 1901-5226-10
9. 1 ea. Installation Kit, TDI 10
P/N 1901-5225-00
10. 1 ea. Operation/Installation Manual
TRT 250D, P/N 1910-0009-01
11. 1 ea. Operation/Installation Manual
TDF 100D, P/N 1910-0010-01
12. 4 ea. Warranty Card
13. 1 ea. FCC Form 404

1.4 EQUIPMENT SUPPLIED (CONTINUED)

0990-5313-00 TDF 100D/TDF 100D Dual System with 14' ADF Cable. This system consists of a TDF 100D on the left and right.

1. 2 ea. ADF Receiver, Terra by Trimble TDF 100D
   P/N 0900-0406-00
2. 2 ea. ADF Antenna, Terra by Trimble TA 10
   P/N 0900-0901-00
3. 2 ea. ADF Indicator, Terra by Trimble TDI 10
   P/N 0900-0902-00
4. 1 ea. Mounting Tray, Dual
   P/N 1900-0373-44
5. 1 ea. Installation Kit
   P/N 1901-2671-20
6. 2 ea. Installation Kit, ADF, 14' Cable
   P/N 1901-5226-00
7. 2 ea. Installation Kit, TDI 10
   P/N 1901-5225-00
8. 2 ea. Operation/Installation Manual
   TDF 100D, P/N 1910-0010-01
9. 6 ea. Warranty Card

0990-5313-10 TDF 100D/TDF 100D Dual System with 28' ADF Cable. This system consists of a TDF 100D on the left and right.

1. 2 ea. ADF Receiver, Terra by Trimble TDF 100D
   P/N 0900-0406-00
2. 2 ea. ADF Antenna, Terra by Trimble TA 10
   P/N 0900-0901-00
3. 2 ea. ADF Indicator, Terra by Trimble TDI 10
   P/N 0900-0902-00
4. 1 ea. Mounting Tray Dual
   P/N 1900-0373-44
5. 1 ea. Installation Kit
   P/N 1901-2671-20
6. 2 ea. Installation Kit, ADF, 28' Cable
   P/N 1901-5226-10
7. 2 ea. Installation Kit, TDI 10
   P/N 1901-5225-00
8. 2 ea. Operation/Installation Manual
   TDF 100D, P/N 1910-0010-01
9. 6 ea. Warranty Card

0990-5315-00 TDF 100D 3" System with 14' ADF Cable

1. 1 ea. ADF Receiver, Terra by Trimble TDF 100D
   P/N 0900-0406-00

1.4 EQUIPMENT SUPPLIED (CONTINUED)

2.	1 ea.	ADF Antenna, Terra by Trimble TA 10 P/N 0900-0901-00
3.	1 ea.	ADF Indicator, Terra by Trimble TDI 10 P/N 0900-0902-00
4.	1 ea.	3" Mod Kit for TDF 100D P/N 1901-5312-10
5.	1 ea.	Installation Kit, ADF, 14' Cable P/N 1901-5226-00
6.	1 ea.	Installation Kit, TDI 10 P/N 1901-5225-00
7.	1 ea.	Operation/Installation Manual TDF 100D, P/N 1910-0010-01
8.	3 ea.	Warranty Card

0990-5315-10 TDF 100D 3" System with 28' ADF Cable

1.	1 ea.	ADF Receiver, Terra by Trimble TDF 100D P/N 0900-0406-00
2.	1 ea.	ADF Antenna, Terra by Trimble TA 10 P/N 0900-0901-00
3.	1 ea.	ADF Indicator, Terra by Trimble TDI 10 P/N 0900-0902-00
4.	1 ea.	3" Mod Kit for TDF 100D P/N 1901-5312-10
5.	1 ea.	Installation Kit, ADF 28' Cable P/N 1901-5226-10
6.	1 ea.	Installation Kit, TDI 10 P/N 1901-5225-00
7.	1 ea.	Operation/Installation Manual TDF 100D, P/N 1910-0010-01
8.	3 ea.	Warranty Card

1.5 ADDITIONAL EQUIPMENT REQUIRED

The prewired ADF cable, available in 14 and 28 foot; connects the TA 10 antenna to the TDF 100D. This cable is prewired at the antenna end only to allow trimming for correct length.

Various lengths and gauges of MIL 22759 or equivalent MILSPEC wire to finish wiring of the receiver and indicator.

Circuit breaker rated at 2 amps.

1.6 LICENSE REQUIREMENTS

Not Applicable

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SECTION II

2. INSTALLATION

2.1 GENERAL

This section contains all necessary installation instructions and checkout procedures for the Terra by Trimble TDF 100D ADF System.

2.2 PREPARATION FOR USE

Every precaution has been taken to protect the TDF 100D, TA 10 and TDI 10 during shipment. Upon receipt of the equipment, perform the following inspection:

1. Remove the unit from the shipping container and visually inspect for damage.
2. Check controls and switches to determine if they may have been damaged.
3. Make sure that all hardware and connectors listed in Section I, under “Equipment Supplied, are present.

If the unit is damaged, a claim must be filed with the carrier. The carrier assumes title of the unit when it accepts it for shipment. Do not return it to Trimble or its representative.

It is suggested that the package be retained for inspection by the carrier in the case of damage or for future use should it be necessary to ship the unit for service or to transfer to another location.

2.3 INSTALLATION

2.3.1 TDF 100D AND TDI 10 INSTALLATION

Installation of any equipment in any certificated aircraft requires that the work be performed by a Certificated Radio Repair Station with appropriate ratings. The installing agency must complete an FAA Form 337 and compute a new weight and balance for the aircraft for insertion in the Aircraft Flight Manual.

Unless the mechanic is the designated inspector for a Certificated Radio Repair Station or holds an Inspection Authorization, the work is subject to inspection and approval of an FAA inspector.

The following items and suggestions should be considered prior to installation of the Terra by Trimble TDF 100D Receiver and TDI 10 Indicator.

1. Discuss the location of the receiver and indicator with your customer, preferably in a position that provides ease of operation for the receiver and for the indicator a position with good visibility.
2. Avoid installing the TDF 100D and TDI 10 near heat sources. If unavoidable, insure additional cooling is provided.
3. Insure that adequate clearance exists behind the panel for sleeve connectors and additional cooling if required. A minimum of 14" (35.56 cm) for the receiver and 6.5" (16.51 cm) for the indicator is recommended.

2.3 INSTALLATION (CONTINUED)

2.3.1 TDF 100D AND TDI 10 INSTALLATION

4. Refer to Terra by Trimble TDF 100D and TDI 10 outline drawings for panel cut-out details and mounting dimensions as well as pertinent notes.
5. Install the mounting tray assembly, for the receiver, in the instrument panel. Insure compliance with standards set forth in FAA Aircraft Inspection and Repair Document AC 43.13-2A.
   NOTE: INSURE THAT THE MOUNTING TRAY IS INSTALLED WITH THE LOCKING PAWL SLOT TOWARD THE BOTTOM.
6. The 15 Pin “D” Connector Assembly supplied with the Terra by Trimble TDF 100D and the 15 Pin “D” Connector supplied with the Terra by Trimble TDI 10 must be wired correctly to the aircraft avionics systems or severe damage may result to the TDF 100D, TDI 10, TA 10 or other systems. The antenna cable supplied is prewired to the antenna end and only needs to be trimmed to length and connected to the TDF 100D. The interconnecting wiring for the 15 Pin “D” connector is shown in Figure 3-6 (14V) and Figure 3-7 (28V). Comply with standards set forth in FAA Aircraft Inspection and Repair Document AC 43.13-1A Section 7 and other pertinent FAR’s as required. Insure MIL-SPEC wire is utilized for all interconnects.
7. The connector bracket is mounted from the front side of the mounting tray with two Phillips head screws and washers per bracket. Figure 3-1 shows a rear view of the sleeve with Pin 1 indicated.
8. Install the TDF 100D in the mounting tray assembly. Use caution as the rear connectors mate. After the float mounts are positioned correctly, (a little twisting at the front panel may be necessary), the unit will fully engage the connectors with light to medium pressure on the front panel. CAUTION: DO NOT PUSH UNIT INTO TRAY WITH THUMBS ON LENS AS DISPLAY DAMAGE MAY RESULT! Insert a 7/64" Allen wrench in the front panel hole and engage the locking screw. Turn clockwise until the cam has engaged itself in the tray and is moderately tightened. Use caution to prevent stripping the threads on the locking cam or screw. To remove the unit from the mounting tray, insert the 7/64" Allen wrench in the locking screw and turn counterclockwise. The cam will move the unit outward about 1/4" and disengage the connectors. The unit may now be pulled out of the mounting tray by hand. It is suggested that receiver wiring be dressed and secured with the TDF-100D receiver locked into its tray. This allows the tray connectors to "seat" into a position that allows ease of removal and installation of the receiver.

2.3 INSTALLATION (CONTINUED)

2.3.1 TDF 100D AND TDI 10 INSTALLATION

9. Installation of the TDI 10 is done in one of two different ways. If rear mounted, three screws through the instrument panel will secure the instrument. If front mounted, four screws through the instrument into a mooring plate or into captive nuts in the panel are required.

2.4 TA 10 INSTALLATION

The antenna installation will be one of the most important aspects of the installation to insure optimum performance for the TDF 100D ADF system. The TA 10 contains both the loop and sense antenna, and the following considerations should be taken into account before selecting a location for the antenna.

1. Mount the antenna on the centerline of the aircraft fuselage or parallel to it.
2. Keep the antenna a minimum of 4 feet away from DME or transponder antennas to minimize L-Band interference.
3. The antenna should be well removed from any projections such as the engines and propellers. Other possible projections include landing gear doors, access doors, or other openings which will break the antenna ground plane.
4. When top mounting the antenna, select a location where shadowing from wings, etc., is minimized.
5. If the antenna is to be mounted on an aircraft with floats the antenna should be top mounted.
6. When installing the antenna on a fabric covered aircraft, a metal ground plane as large as physically possible (but at least 3 feet in diameter) should be used.
7. The antenna should be mounted well clear of the aircraft alternator/generator. The antenna cables must not be routed with alternator cables, 400 Hz cables, or high level transmitting cables.
8. Insure that the routing of the antenna cable does not interfere with any aircraft control cables.
9. If skin mapping equipment is available, it is suggested that a map be done with engines and all electrical systems energized to insure and "electrically quiet" mounting location for the antenna.

2.4 TA 10 INSTALLATION (CONTINUED)

The following steps should be taken after you have decided on the proper location for the TA 10 Antenna. Figure 3-4, Pages 25-28 should be used in conjunction with these steps.

1. The nut plate furnished in the installation kit for the TA 10 antenna, may be used as a template for locating holes used in the installation of the TA 10 antenna.
2. Punch and drill the mounting holes.
3. Sand the area on the inside of the aircraft skin on which the doubler plate is to be mounted and on the outside where the antenna will be. All area of contact must be free of paint or insulating material.
4. Carefully following the directions supplied in the install kit, apply Alumiprep No. 33 to both the inside and the outside surface of the aircraft skin and the back of the doubler plate to cleanse the metal.
5. Apply Alodine No. 1001 to all three locations following the directions supplied in the install kit to insure good bonding and prevent oxidation.
6. Rivet the doubler plate in place, it is imperative that the doubler plate makes good R.F. contact with the ground plane.
7. Connect the antenna to the electrical cable and mount to the aircraft. (The antenna will be sealed to the aircraft after Quadrantal error correction is completed.)

NOTE: Alumiprep No. 33 and Alodine No. 1001 are supplied with the installation kit.

2.5 OPERATIONAL CHECKOUT

1. Rotate volume control (small inner left hand knob) clockwise to turn the TDF 100D receiver on.
2. Rotate “Tune” (right hand) knob to obtain desired frequency in the right hand window. Verify that the faster the knob is rotated, the more the frequency changes with each detent.
3. Press the “< >” (TRANSFER) button and verify that the two frequencies “swap” sides in the display.
4. Place the function selector knob (large outer left hand) in the “ADF” position. Without an operating station of sufficient signal strength the indicator needle will park at a 240° bearing relative to the nose of the aircraft.
5. Turn the function selector knob to the “ANT” position, the indicator needle will park at a 90° bearing relative to the nose of the aircraft.
6. Tune the radio to a known broadcast station in the right hand window and press the “< >” button. Adjust the volume to verify correct audio response.

2.6 ALIGNMENT OF TDF 100D SYSTEM TO AIRCRAFT

The system has been factory adjusted to compensate for the average amount of quadrantal error (QE) that exists due to the shape of the airframe. Therefore little or no QE adjustment should be required. System error should not exceed ±5°. In the event that QE adjustment is required, follow the procedure outlined below.

1. Tune the TDF 100D to a nearby broadcast station, NDB station or compass locator that gives a strong, clear signal free of fading. Position the aircraft on the ramp in an area that is clear of surrounding buildings, such that the nose of the aircraft is pointing directly at the beacon (i.e., the aircraft is heading toward the station.) Note the aircraft heading. If the TDI 10 indicator does not point to 0° ±5° adjust R312, with furnished adjustment tool P/N 9010-6717-01, through the small hole in the lower left hand side of the TDF 100D face plate,for a 0° reading on the indicator.
2. Using the aircraft directional gyro or compass, turn the aircraft to the left 45°. Note the indicator bearing error. Continue to turn the aircraft stopping at each 45° point and noting bearing error at each point. The errors at the 90°, 180° and 270° should be within ±5°. Average the errors at 45°, 135°, 225° and 315° to determine the amount of QE compensation required.
3. The QE compensation pot is located on the TA 10 antenna. To adjust R111, the antenna must be unfastened and pulled away from the aircraft far enough to remove the access hole screw and washer seal. The QE adjustment pot has a sensitivity of approximately 2° per turn. Turning the potentiometer counter-clockwise moves the pointer counterclockwise, and turning the pot clockwise moves the pointer clockwise. Use a small flat tip screwdriver and turn the pot in the direction required to correct bearing error.
4. Replace seal and screw and re-install antenna on aircraft. Repeat Step 2 to check that the indicator error does not exceed ±5°. If no further adjustments are required tighten all screws in antenna and seal junction area with approved sealant (Dow Corning Type 738 or equivalent RTV) to prevent moisture entrance between the antenna and skin of the aircraft.

2.7 FINAL INSPECTION

1. Insure that all wiring is properly routed and secure. Dress harnessing neatly and secure in place with cable ties. Check connector integrity and locking devices. Insure locking devices are functioning properly and are secured. Verify cabling is not “clotheslined” and provisions have been made for service loops. Pull yoke to its maximum travel. While slowly returning yoke to its normal position, rotate yoke left and right to insure all cabling is routed and tied up properly. Cycle rudder pedals and verify that they are free and cables are unobstructed. Install gust locks, perform complete checkout of all avionics including dimmers. Secure aircraft power and all master switches.
2. Have installation inspected by someone authorized under FAR Part 65.
3. Add the Terra by Trimble TDF 100D, TDI 10 and TA 10 to the aircraft equipment list, including the serial numbers. Complete FAA Form 337 if required, and make the required airframe logbook entries. A weight and balance change may be required depending on the type of aircraft.
4. Complete the warranty cards and return to Trimble.

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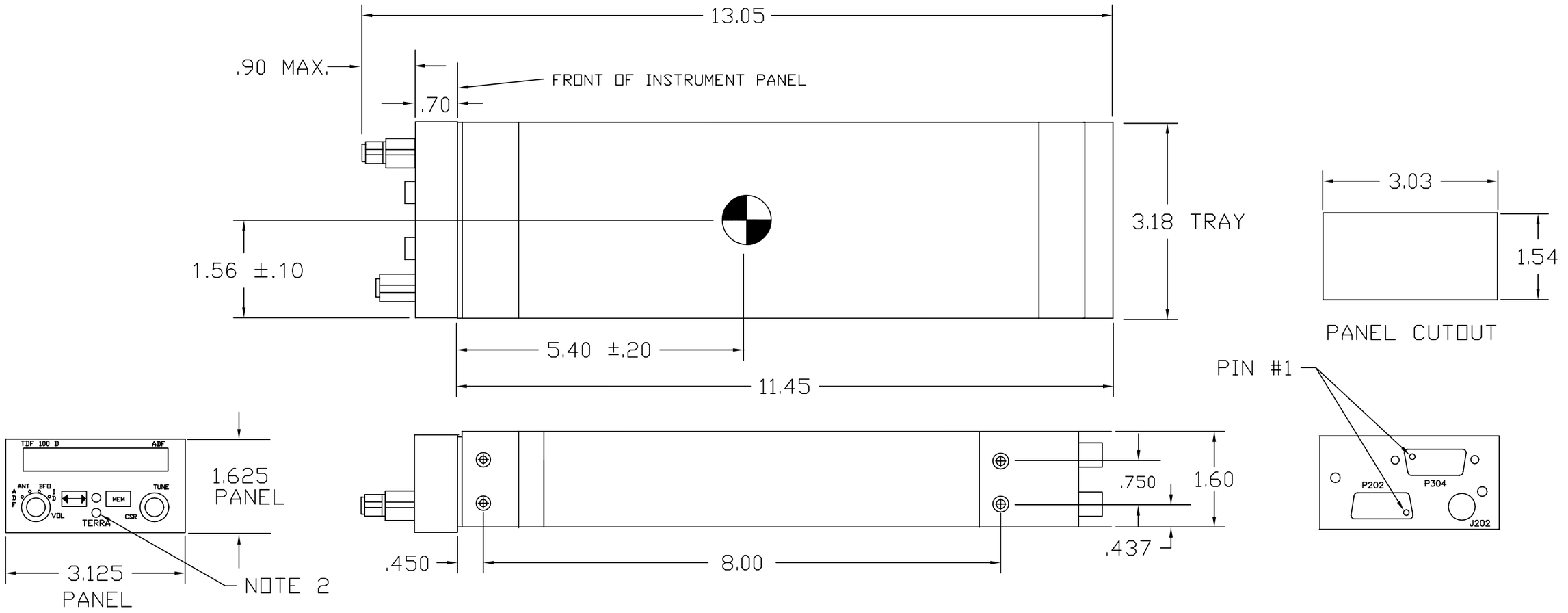


NOTE:
1.) WEIGHT WITH TRAY-2.45 LBS.
2.) LOCK SCREW USES 7/64" HEX KEY.

Figure 3-1
TDF Outline Dimensions

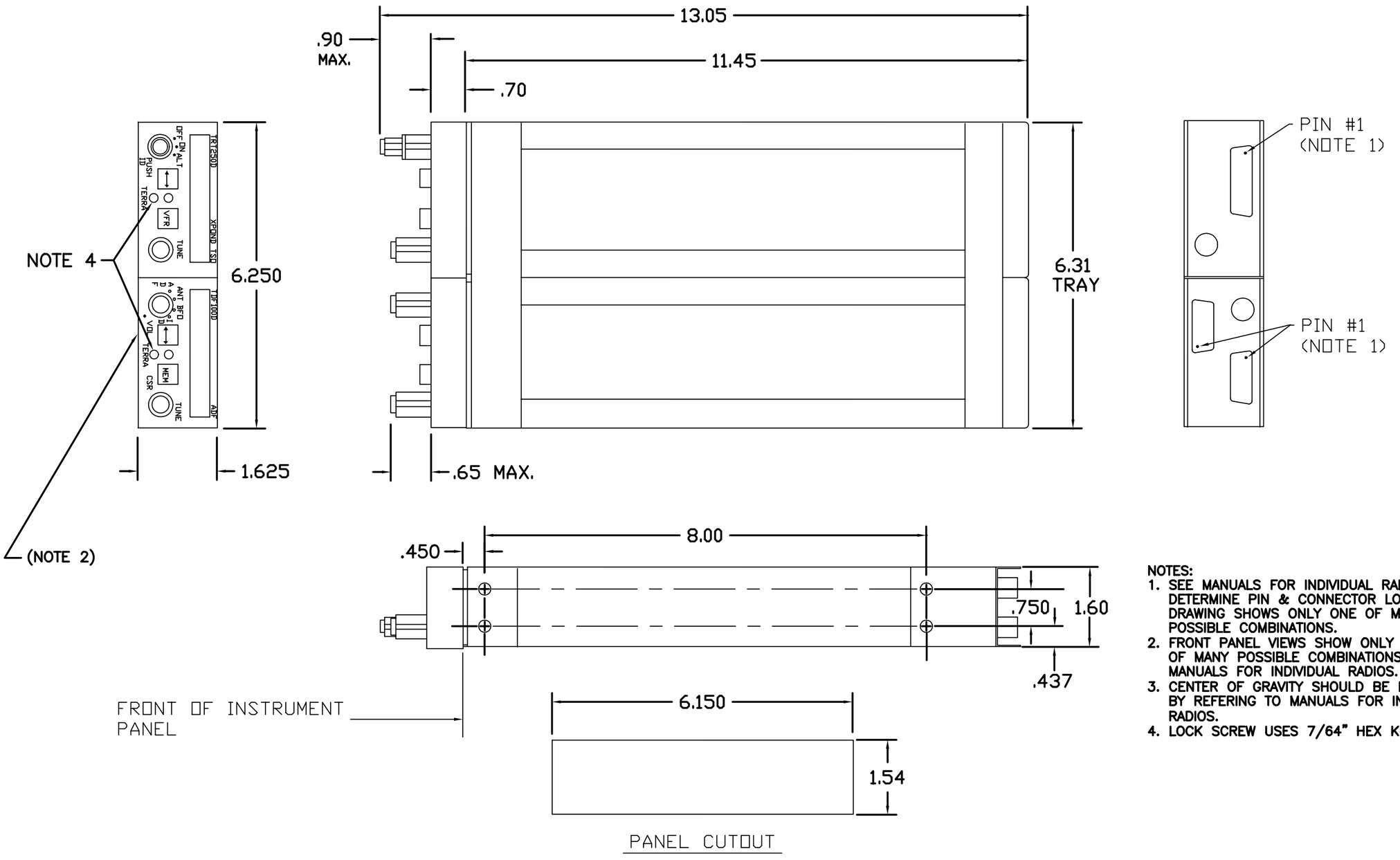
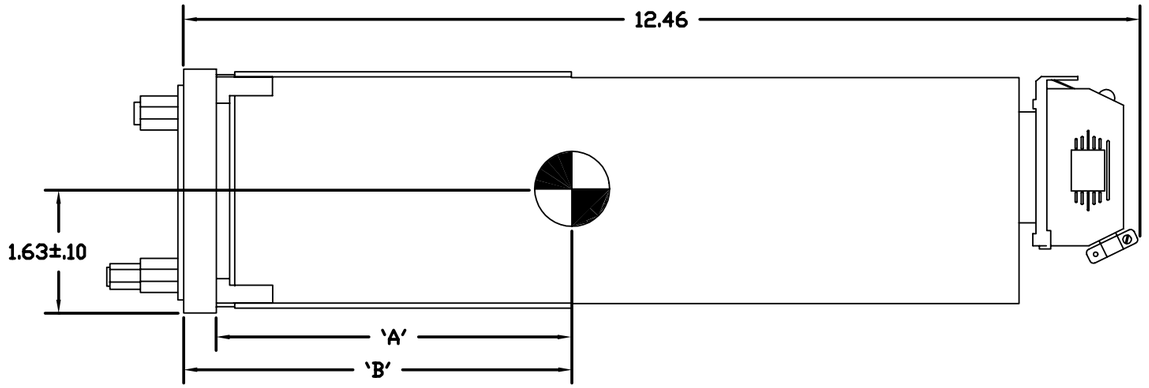
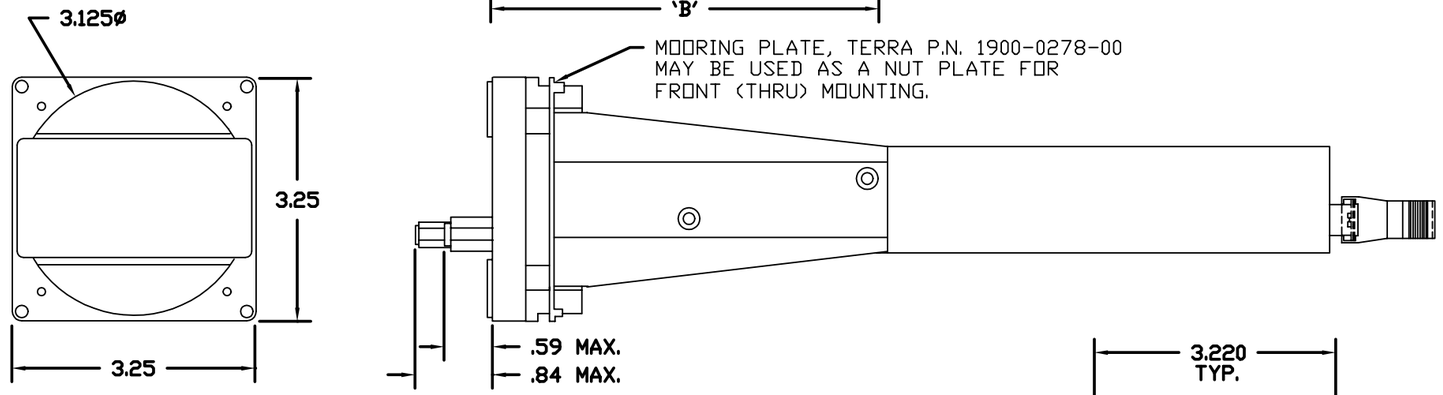
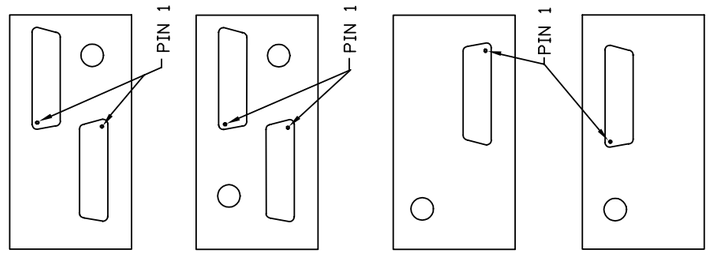


Figure 3-2
Typical Outline Drawing, Dual-Tray

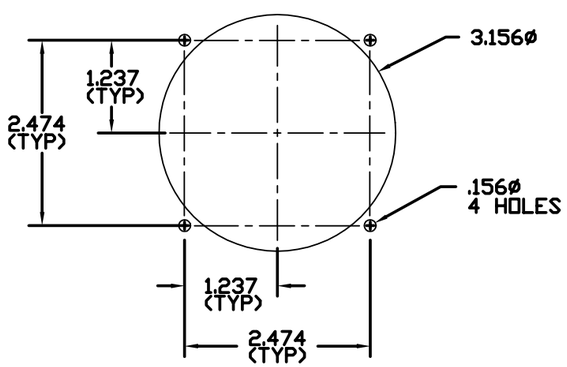




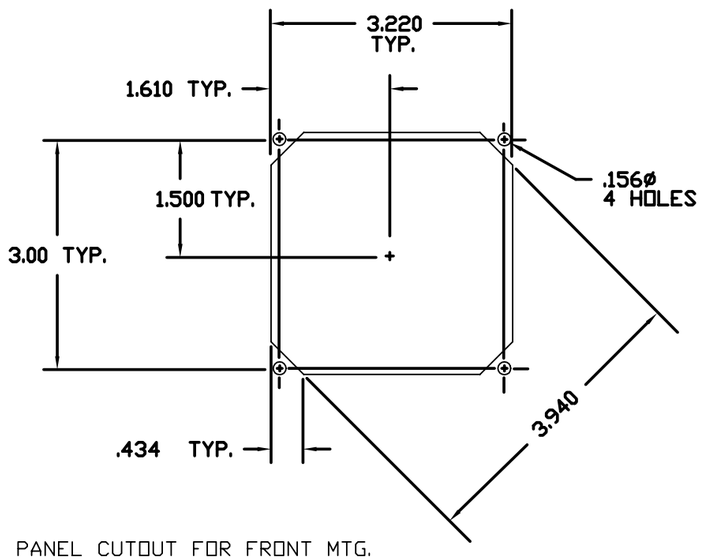


* WEIGHT / C.G. TABLE, 3" OPTION			
RADIO	WEIGHT (LBS)	'A' DIM ±.20	'B' DIM ±.20
TDF100D	1.86	4.48	4.90
TN200D W/GS	1.85	4.18	4.60
TN200D WO/GS	1.56	4.18	4.60
TRT250D	2.26	4.48	4.90
TX760D	1.92	4.18	4.60

* ALL C.G.'s MEASURED WITHOUT CABLES OR CONNECTORS ATTACHED.

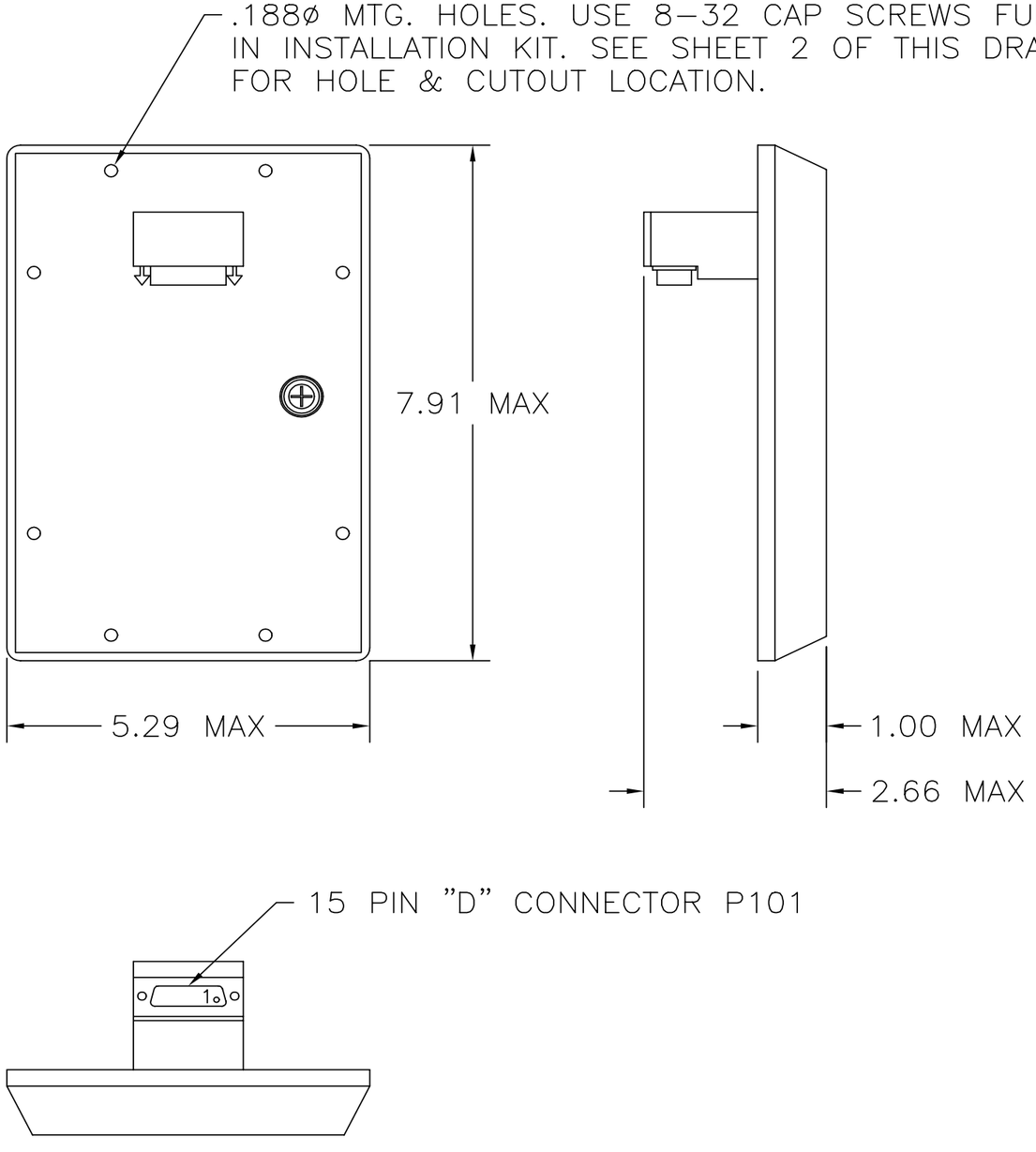


PANEL CUTOUT FOR REAR MTG.



PANEL CUTOUT FOR FRONT MTG.

Figure 3-3
Outline Drawing, 3" option



NOTES:

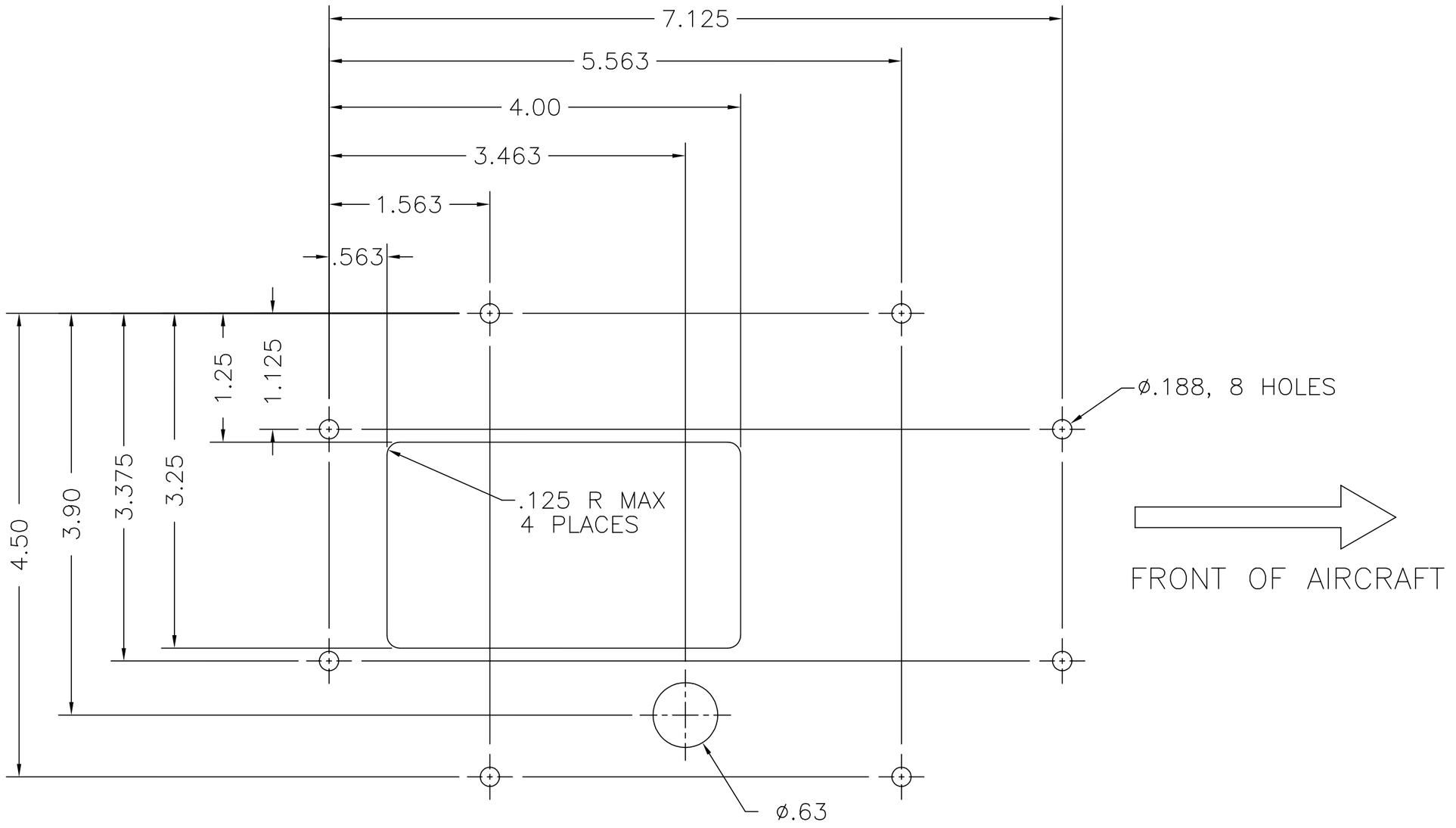
1.) SEE SHEET 2 OF THIS DRAWING FOR MOUNTING HOLE FOOT PRINT.

2.) TEMPLATE FURNISHED IN INSTALL KIT MAY BE USED AS A LOCATION TEMPLATE TO LOCATE HOLES FOR MOUNTING ANTENNA. DO NOT USE AS A NUT PLATE OR A DOUBLER PLATE.

3.) NOTCHES ON EACH END OF NUT PLATE SHALL BE USED TO LOCATE THE ANTENNA ALONG THE AIRCRAFT CENTER LINE.

4.) MOUNTING HARDWARE IS FURNISHED.

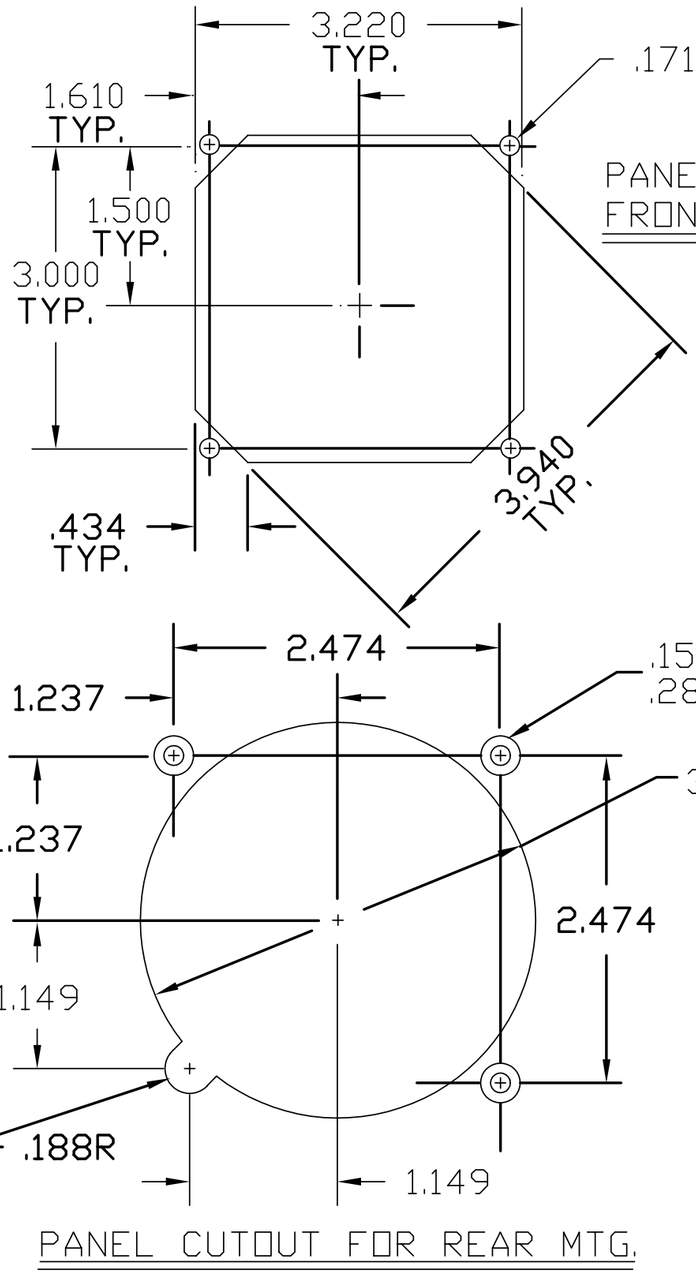
Figure 3-4 (Sheet 1 of 2)
TA-10 Outline and Installation Drawing

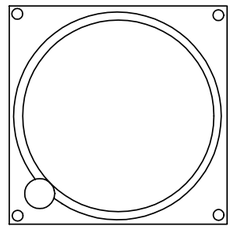


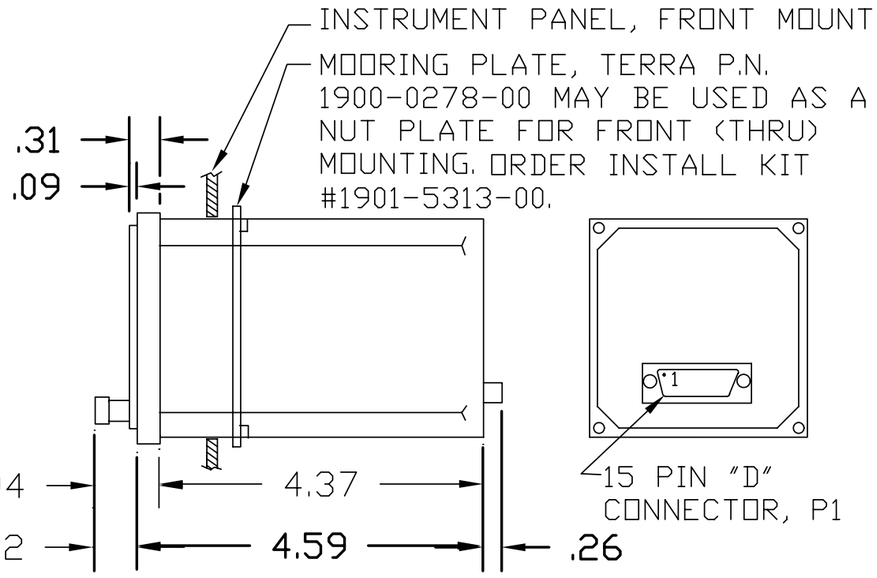
TA–10 INSTALLATION FOOT PRINT
(LOOKING AT AIRCRAFT)

DO NOT USE AS TEMPLATE

Figure 3-4 (Sheet 2 of 2)
TA-10 Outline and Installation Drawing



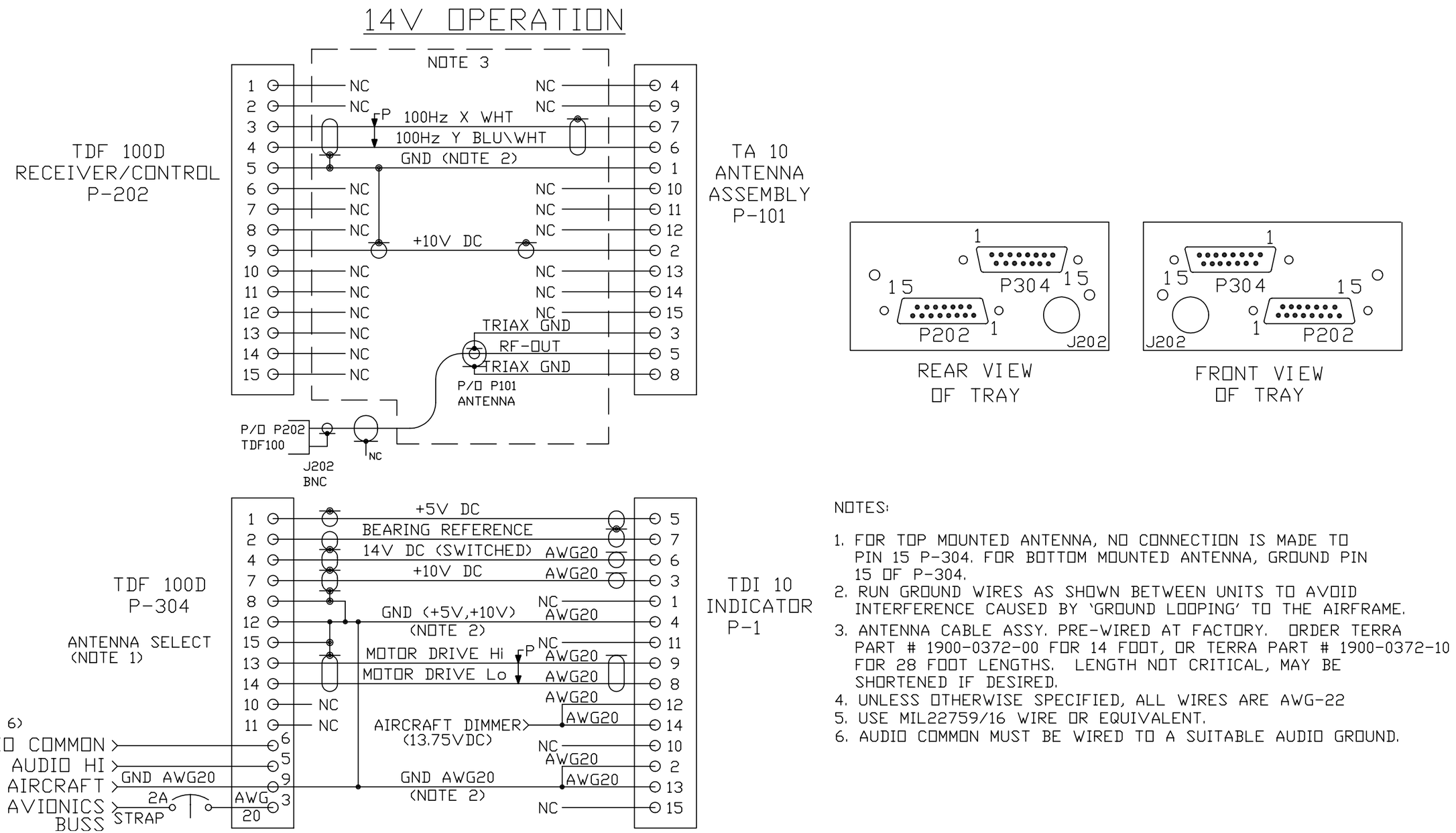




NOTES:

1. MOUNTING SCREWS ARE FURNISHED IN THE INSTALLATION KIT. MAXIMUM SCREW LENGTH WHEN MOUNTING FROM THE REAR SHALL BE 5/16.

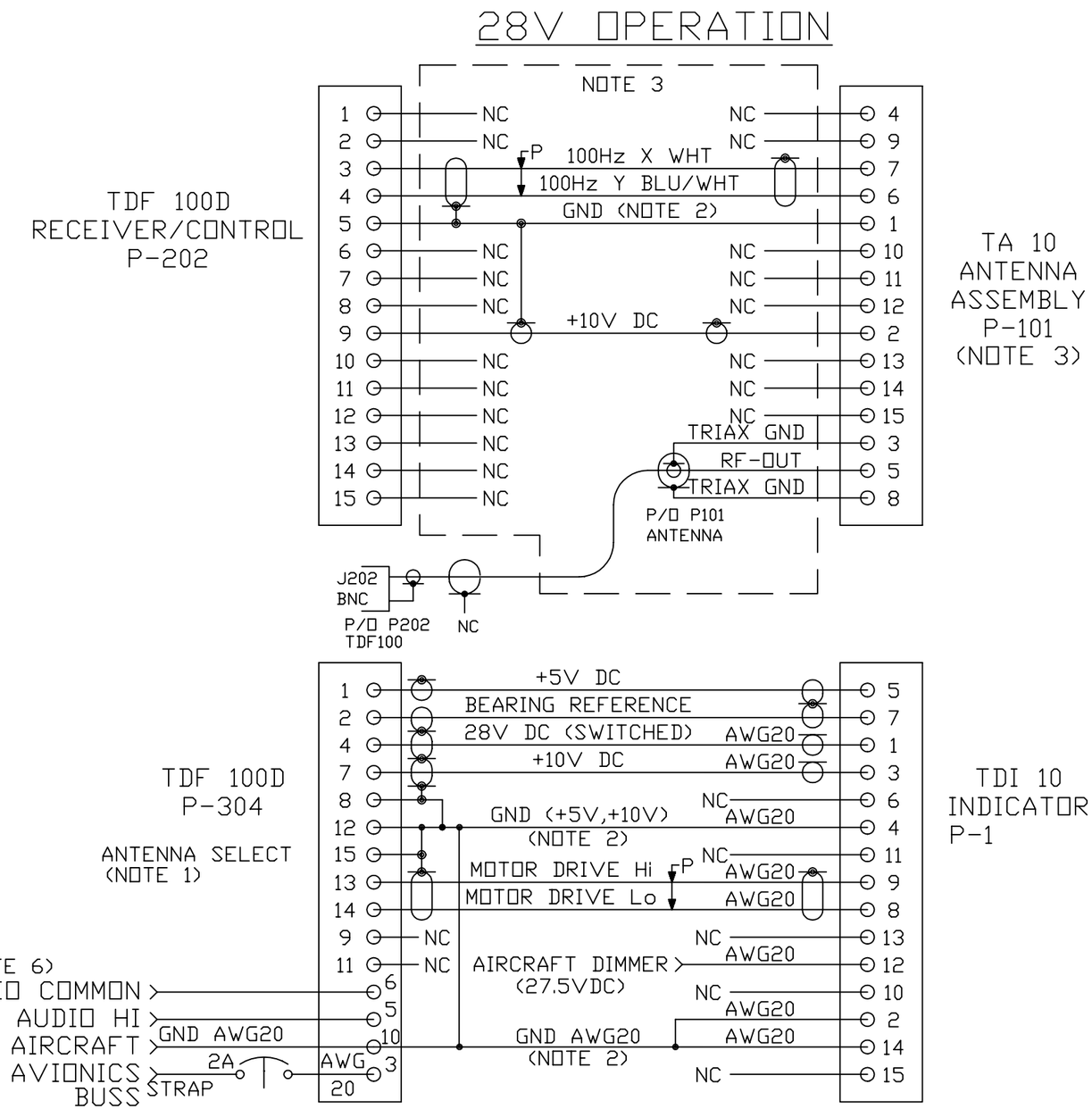
Figure3-5
TDI-10 Outline Dimension and Installation Drawing

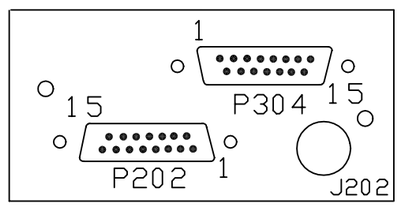


NOTES:

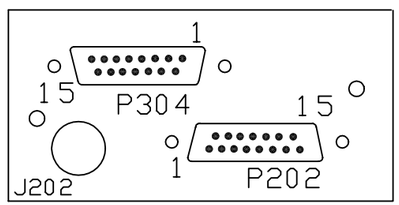
1. FOR TOP MOUNTED ANTENNA, NO CONNECTION IS MADE TO PIN 15 P-304. FOR BOTTOM MOUNTED ANTENNA, GROUND PIN 15 OF P-304.
2. RUN GROUND WIRES AS SHOWN BETWEEN UNITS TO AVOID INTERFERENCE CAUSED BY 'GROUND LOOPING' TO THE AIRFRAME.
3. ANTENNA CABLE ASSY. PRE-WIRED AT FACTORY. ORDER TERRA PART # 1900-0372-00 FOR 14 FOOT, OR TERRA PART # 1900-0372-10 FOR 28 FOOT LENGTHS. LENGTH NOT CRITICAL, MAY BE SHORTENED IF DESIRED.
4. UNLESS OTHERWISE SPECIFIED, ALL WIRES ARE AWG-22
5. USE MIL22759/16 WIRE OR EQUIVALENT.
6. AUDIO COMMON MUST BE WIRED TO A SUITABLE AUDIO GROUND.

Figure 3-6
TDF 100D System Interconnect Diagram, 14V





REAR VIEW
OF TRAY



FRONT VIEW
OF TRAY

NOTES:

1. FOR TOP MOUNTED ANTENNA, NO CONNECTION IS MADE TO PIN 15 P-304. FOR BOTTOM MOUNTED ANTENNA, GROUND PIN 15 OF P-304.
2. RUN GROUND WIRES AS SHOWN BETWEEN UNITS TO AVOID INTERFERENCE CAUSED BY 'GROUND LOOPING' TO THE AIRFRAME.
3. ANTENNA CABLE ASSY. PRE-WIRED AT FACTORY. ORDER TERRA PART # 1900-0372-00 FOR 14 FOOT, OR TERRA PART # 1900-0372-10 FOR 28 FOOT LENGTHS. LENGTH NOT CRITICAL, MAY BE SHORTENED IF DESIRED.
4. UNLESS OTHERWISE SPECIFIED, ALL WIRES ARE AWG-22.
5. USE MIL22759/16 WIRE OR EQUIVALENT.
6. AUDIO COMMON MUST BE WIRED TO A SUITABLE AUDIO GROUND.

Figure 3-7
TDF 100D System Interconnect Diagram, 28V

SECTION IV

4. OPERATION

4.1 SCOPE

This section is to instruct the owner/operator in the proper "care and feeding" of their new Terra by Trimble TDF 100D Automatic Direction Finder system.

4.2 OPERATION

See Figure 4-1 for locations and descriptions of the TDF 100D Front Panel Controls.

CAUTION!

Insure your new TDF 100D is turned off until after engine start-up procedures are completed. This simple precaution will greatly improve the lifetime of all of your avionics as well as your new TDF 100D.

4.3 ADF TUNING KNOB OPERATION

Pushing the tuning knob in for approximately one-third of a second will cause the first two digits (XXXX) of the frequency in the standby display to blink.

Rotating the knob will now tune the first two digits. Scrolling past the end of the frequency range (up or down) will cause the frequency to "wrap around" to the other end of the range (e.g., scrolling up past 21, wraps to 01).

Pushing the knob again for approximately one-third of a second will shift the cursor control from the first two digits to the third digit (XXXX) causing the first two digits to light steady and the third digit to blink.

Rotating the knob will now tune the third digit. Scrolling past the end of the frequency range (up or down) will cause the frequency to "wrap around" to the other end of the range (e.g., scrolling up past 9, wraps to 0).

Pushing the knob again for approximately one-third of a second will shift the cursor control from third digit to the last digit (XXXX) causing the third digit to light steady and the last digit to blink.

In the same manner as above, rotating the knob will now tune the last digit.

Pushing the knob again for approximately one-third of a second will cause all digits to display steady.

Notes:

1. Pushing the button at any time during the tuning sequence will cause the frequency in the standby display to switch to active and the active to standby as well as canceling the cursor tuning, if activated.
2. The software will let the user select an invalid frequency in the range from 1800 to 2181. However when that frequency is transferred into the active window the TA 10 needle will oscillate around 180°.
3. Tuning with the continuous mode is still available without utilizing the cursor.

4.4 NORMAL OPERATION

Rotate the Volume (small left-hand inner) knob clockwise until background noise is heard. Adjust the volume until this noise corresponds to a desired listening level.

4.5 FREQUENCY TRANSFER

As previously described, simply pressing this button will “swap” frequencies between active and standby windows.

Depressing this button also cancels the frequency memory display.

The transfer button must be used in order for the last frequencies used to be displayed after a power interruption. For example, say you are tuned to 208 in the active display and 332 in the standby display. Pressing the transfer button will insure that the unit will display “332 208” after any power interruption. Failure to do this transfer will cause the unit to come up with 208 in the active display and the last transferred frequency in the standby display.

4.6 MEMORY (MEM) OPERATION

Pressing the MEM button will call up the last used or programmed memory position.

Repeatedly pushing the MEM button will cycle upwards through the memory positions.

Alternately, holding the MEM button in will cause the unit to cycle through the memory positions at a rate of one position every one-third of a second.

4.7 TO PROGRAM FREQUENCIES IN MEMORY

Press MEM to select the desired memory position. The “M” will illuminate between active and standby frequencies.

Tune the new frequency using either the continuous or cursor programming method. As soon as the frequency value changes from the stored frequency, the “M” light goes out.

Press MEM again to store the new frequency. The “M” relights to confirm storage.

Use the button to move the new memory frequency to active side and repeat these steps to store additional frequencies in memory.

Notes:

1. If the button is pressed before storing the new frequency into memory; the radio will drop out of program mode and the new frequency will not be stored.
2. Frequency 2182 MHz is permanently programmed in Memory position 0.

4.8 ADF MODE

When the function selector knob (large left-hand outer) is in the ADF position and a station of sufficient signal strength is selected the indicator needle will indicate the direction to the station relative to the heading of the aircraft. If no station signal is received, the indicator needle will park at a 240° bearing relative to the nose of the aircraft.

4.9 ANT MODE

When the antenna mode “ANT” is selected, the switching frequency used to modulate the loop signals is inhibited. Consequently, when the ADF function is not required, the ANT function allows reception of the transmitted audio signal without the bearing signal in the background thus improving the audio fidelity. The ANT mode is also useful for identification of NDB stations. Since the direction finder circuits are inhibited, the indicator needle will park at a 90° bearing relative to the nose of the aircraft.

4.10 BFO MODE

The BFO mode is used when the received RF signal is unmodulated. When the BFO mode is selected a 1000 Hz signal is added to the received unmodulated signal to facilitate identification of the station. The indicator needle is parked at 90° when the BFO mode is selected.

4.11 ID MODE

The ID mode switches in a 1000 Hz filter. The filter enhances the signal-to-noise ratio of 1020 Hz identification signals and weak signals when the BFO mode is used.

4.12 DISPLAY BLANKING OPERATION (RECOMMENDED FOR GLIDERS AND BATTERY-POWERED A/C ONLY):

Press the tuning knob first and then the MEM button. Hold both in for approximately four seconds. The display will go into a blank condition.

If the display has blanked, moving the tuning control, pressing the button, or pressing the MEM button. Specifically, the first press of the button, the first “click,” or first push of the tuning knob will restore the display with no changes (e.g., the frequency will not transfer or change). Once the display has relit, the unit will function normally. However, pressing the MEM button will restore the display and recall the last Memory position to the standby display.

If no tuning control (button, MEM button, or tuning knob) is moved for a period of 15 - seconds, the frequency displays (both active and standby) will blank.

To cancel blanking operation, turn function knob to “off” then turn back on. The unit will operate in normal mode.

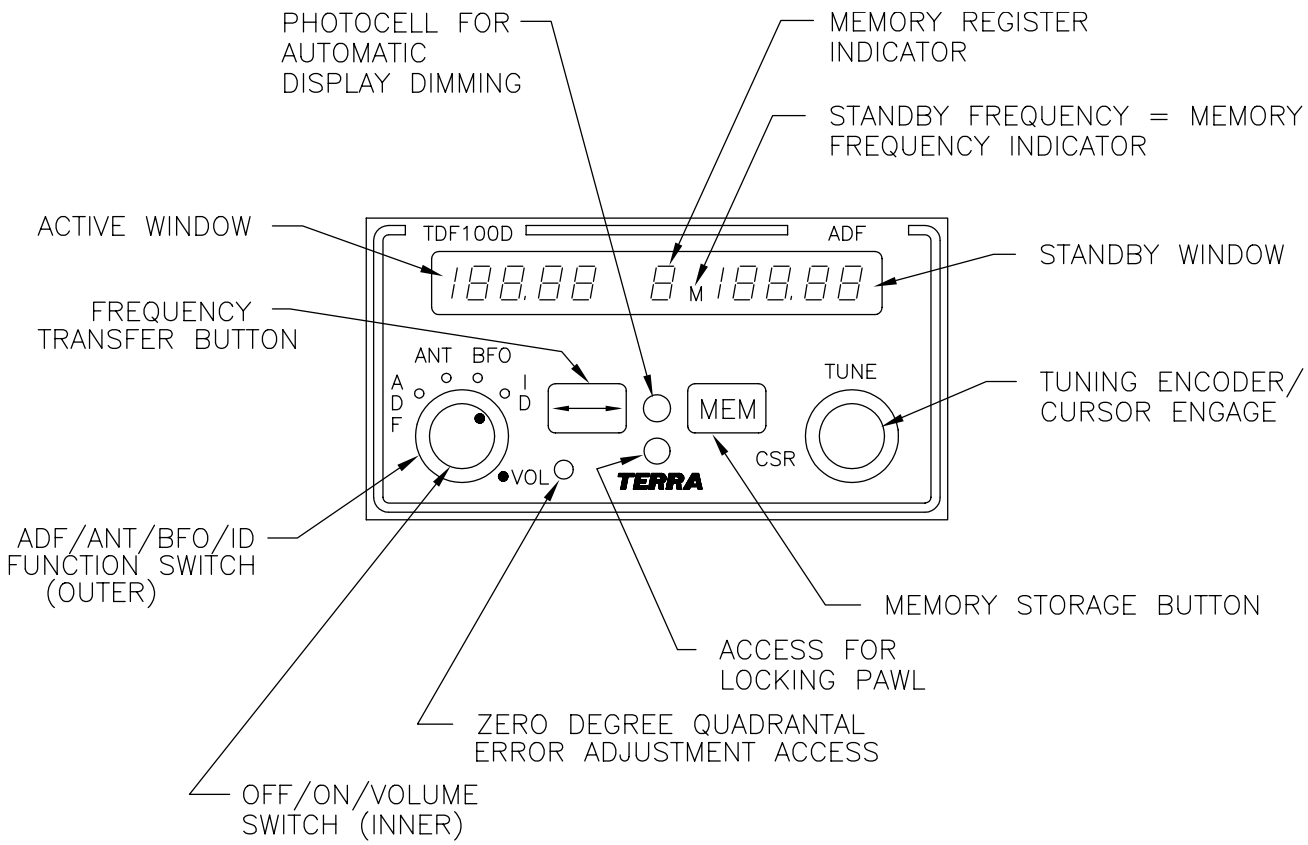


Figure 4-1
TDF 100D Front Panel Controls

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THREE YEAR UNLIMITED WARRANTY *TRIMBLE*

What does your warranty cover?

Any defect in materials or workmanship of Terra by Trimble equipment.
This warranty applies only to equipment sold after January 1, 1993.

How does your warranty become effective?

Your warranty does not become effective unless you mail your completed Warranty Registration card to us within 15 days after installation of your Terra by Trimble equipment.

For how long?

Three years from date of original installation of the equipment, but not more than four years from date of purchase.
If you receive repair or replacement of equipment under this warranty, the warranty remains in effect on the repaired or replaced equipment for the remainder of the original three-year term.

What will we do to correct problems?

Repair any equipment found to be defective in materials or workmanship.
If we choose, we may replace the equipment rather than repairing it.
We will be responsible for the cost of labor and materials for repair or replacement of any equipment found to be defective in materials or workmanship.

How do you make a warranty claim?

Contact your nearest Authorized Terra by Trimble dealer for repair or replacement of any equipment defective in materials or workmanship.
If directed by your Authorized Terra by Trimble dealer, or if you are unable to contact a Terra by Trimble dealer, send the equipment to our factory:
Properly pack your equipment; we recommend using the original container and packing materials.
Include in the package a copy of the sales receipt or other evidence of date of original purchase and installation. If the equipment was a gift, provide a statement specifying the date received and installed. Also note your name, address, daytime telephone number, and a description of the defect.
Ship the equipment UPS or equivalent. You must prepay the shipping charges. Ship to:

Trimble
2105 Donley Dr.
Austin, TX 78758
(512) 432-0400 Phone (512) 836-9413 FAX

We will pay surface shipping charges to return the equipment to you.

What does your warranty not cover

Terra by Trimble equipment purchased "As New" from other than an Authorized Terra by Trimble Dealer or Distributor.
Malfunctions or failures resulting from the way the equipment was installed or from installation not in accordance with factory instructions.
Certificated Aircraft: Installation by other than an FAA Repair Station (USA), approved installation facility (non-USA) and/or without

- — Appropriate air-worthiness approval(s) as required by governing aviation authority;
- — Form 337;
- — Logbook entry.

Experimental Category Aircraft: Installation without

- — Appropriate air-worthiness approval(s) as required by governing aviation authority;
- — Form, 8130-(x).
- — Logbook entry.

Fuses and batteries.
Use of equipment for purposes other than those for which is was designed.
Accidental or deliberate damage, alterations of any kind, inadequate storage or maintenance.
Warranty repair by anyone other than Trimble or Terra by Trimble Authorized Dealer with factory approval.

For conditions not covered by this warranty, you will receive an estimate of costs before the repair is initiated. Repairs will be billed to you at the normal repair rates of the facility that performs the repairs.

Are there any other limitations or exclusions?

Any implied warranties are in effect only as long as this warranty is in effect.
This warranty does not cover incidental or consequential damage such as damage to other equipment or to your aircraft that results from defects covered by this warranty.
Some states do not allow limitations on how long an implied warranty lasts, or allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

How does state law relate to this warranty?

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

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