



TECHNISONIC INDUSTRIES LIMITED	
MULTI-BAND P25 TDFM-7000 & RC-7000, AND TDFM-7300 & RC-7300, AND SINGLE-BAND ANALOG / P25 TDFM-136A AIRBORNE SYSTEMS	
INSTRUCTIONS for CONTINUED AIRWORTHINESS	
<u>ICA06045-1</u>	
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R E L E A S E D

LOG OF PAGE REVISIONS

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CHAPTER 1.0 - INTRODUCTION

A. General

The Technisonic Industries Limited Multi-band P25 Airborne TDFM-7000, TDFM-7300, or TDFM-136A system installation is defined by Transport Canada STC SA97-129. The following equipment are installed:

CHAPTER	MAKE	MODEL / UNIT	P/N	LOCATION
23-10-00	Technisonic	TDFM-7000 Series Multi-band Digital FM Transceiver	TDFM-7000	DZUS rail-mounted in the cockpit or cabin of the aircraft; refer to Aircraft Weight & Balance and Aircraft Log for specific location of transceiver.
		or	or	
		TDFM-7300 Series Multi-band Digital / Analog FM Transceiver	TDFM-7300	
		or	or	
	TDFM-136A Series Digital / Analog FM Transceiver	TDFM-136A		
	RC-7000 Remote Control Head (Optional)	RC-7000	DZUS rail-mounted in the cockpit or cabin of the aircraft; refer to Aircraft Weight & Balance and Aircraft Log for specific location of transceiver.	
		or		or
	RC-7300 Remote Control Head (Optional)	RC-7300	DZUS rail-mounted in the cockpit or cabin of the aircraft; refer to Aircraft Weight & Balance and Aircraft Log for specific location of transceiver.	
		or		or
	Flowtronics or Sensor Systems	VHFLO Antenna (TDFM-7300 only)	FLX-3050B	Refer to Aircraft Weight & Balance and Aircraft Log for specific location of antenna as applicable for transceiver model.
or		or		
Comant	VHF Antenna 136 - 176 MHz (As required)	CI-292		
	UHFLO Antenna 403 - 470 MHz (As required)	CI-275		
	UHFHI Antenna 450 - 512 MHz (As required)	CI-275		
	UHFHI (II) 450 - 520 MHz (As Required)	CI-285		
	800 Antenna 806 - 870 MHz (As required)	CI-306		
	S65-8282-34			

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CHAPTER	MAKE	MODEL / UNIT	P/N	LOCATION
		800/700 (II) Antenna 700 - 870 MHz (As required)	CI-285	
	Technisonic	High-Pass Filter (If installed)	133956-1	Refer to Aircraft Log for specific location of filter as applicable for TDFM-136()tranceiver.

The inspection and maintenance practices described herein relate to the Multi-band P25 Airborne TDFM-7000 & RC-7300, or TDFM-7300 & RC-7300, or TDFM-136A system installation as described above. Component part numbers and wiring diagrams are included in the applicable Technisonic Installation and Operating Instructions, included in Appendix A.

The following are reference documents required to supplement the information in this manual concerning the removal, installation and inspection of the above components.

DOCUMENT	DOCUMENT NO.	TITLE
INSTALLATION AND OPERATING INSTRUCTIONS	05RE375	MULTIBAND P25 AIRBORNE TRANSCEIVER MODEL TDFM-7000 INSTALLATION AND OPERATING INSTRUCTIONS
INSTALLATION AND OPERATING INSTRUCTIONS	06RE377	MULTIBAND P25 AIRBORNE TRANSCEIVER REMOTE CONTROL RC-7000 INSTALLATION AND OPERATING INSTRUCTIONS
INSTALLATION AND OPERATING INSTRUCTIONS	08RE389	MULTIBAND P25 AIRBORNE TRANSCEIVER MODEL TDFM-7300 INSTALLATION AND OPERATING INSTRUCTIONS
INSTALLATION AND OPERATING INSTRUCTIONS	08RE400	MULTIBAND P25 AIRBORNE TRANSCEIVER REMOTE CONTROL RC-7300 INSTALLATION AND OPERATING INSTRUCTIONS
INSTALLATION AND OPERATING INSTRUCTIONS	09RE404	VHF/FM DIGITAL AIRBORNE TRANSCEIVER MODEL TDFM-136A INSTALLATION AND OPERATING INSTRUCTIONS

B. ICA Distribution

This document, and any revisions thereto, shall be distributed to authorized users of the applicable STC data. They will be distributed by courier, in electronic format or paper format.

R E F E R E N C E D

C. Aircraft Applicability

The Technisonic Industries Limited Multi-band P25 Airborne TDFM-7000 & RC-7300, or TDFM-7300 & RC-7300, or TDFM-136A system installation is applicable to the following aircraft:

MODEL	MANUFACTURER
172, 172A/B/C/D/E/F/G/H/I/K/L/M/N/P/Q, 172R	CESSNA
180, 180A/B/C/D/E/F/G/H/J/K	CESSNA
182, 182A/B/C/D/E/F/G/H/J/K/L/M/N/P/Q/R, 182S, T182, TR182, R182	CESSNA
185, 185A/B/C/D/E, A185E/F	CESSNA
206, P206, P206A/B/C/D/E, TP206A/B/C/D/E, U206, U206A/B/C/D/E/F/G, TU206A/B/C/D/E/F/G	CESSNA
208, 208A/B	CESSNA
PA-32-260/300/301/301T, PA-32R-300/301(SP)/301(HP)/301T, PA-32S-300, PA-32RT-300/300T	PIPER
PA-28-140/150/151/160/161/180/181/201T/235/236, PA-28R-180/200/201/201T, PA-28RT-201/201T, PA-28S-160/180	PIPER
500, 500-A/B/U/S, 520, 560, 560-A/E	TWIN COMMANDER
560-F, 680, 680E/F/FL/FL(P)/T/V/W, 681, 685, 690, 690A/B/C/D, 695, 695A/B, 720	TWIN COMMANDER
PC-6, PC-6-H1, PC-6-H2, PC-6/350, PC-6/350-H1, PC-6/350-H2, PC-6/A, PC-6/A-H1, PC-6/A-H2, PC-6/B-H2, PC-6/B1-H2, PC-6/B2-H2	PILATUS

D. Acronyms

- VHFLO Very High Frequency Low
- VHF Very High Frequency
- FM Frequency Modulation
- UHF Ultra High Frequency
- UHFHI Ultra High Frequency High
- UHFLO Ultra High Frequency Low
- MHz Mega Hertz
- RX Receive
- TX Transmit
- RF Radio Frequency
- STC Supplemental Type Certificate
- FAA Federal Aviation Administration
- ATA Airline Transport Association

E. Supplement Identities: Chapter, Page, Paragraph Numbers

The supplement format follows the general requirements of iSpec ATA-2200 with respect to Chapter and Title. However, since the extent of the supplemental information is relatively small in scope, the page numbering for each chapter is consecutive. Reference can be made to the following Chapter/Subject Listing:

<u>Subject</u>	<u>Page Number</u>
Title page	0
Table of Contents, Index, Page Listing	i, ii, iii, etc.
Content page(s)	1, 2, 3, etc.

Paragraph or component titles are listed via A. B. C. D. etc.

Sub-paragraphs are listed according to:

<u>Subject</u>	<u>Sub-Para. Number</u>
Description / Operation	1.0
Troubleshooting	101
(Reserved)	201
Servicing	301
Removal / Installation	401
Adjustment / Test	501
Inspection / Check	601
Cleaning / Painting	701
Approved Repairs	801
Storage	901

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CHAPTER 4.0 - AIRWORTHINESS LIMITATIONS

A. General

No airworthiness limitations associated with this type design change.

B. FAA Approval

The following is for installations requiring FAA STC Approval:

The Airworthiness Limitations section is FAA-approved and specifies maintenance required under 43.16 and 91.403 of the Federal Aviation Regulation, unless an alternative program has been FAA approved.

| "The airworthiness limitations are FAA approved per Article III of the Bilateral Aviation
| Safety Agreement (BASA 2000) and Section III, Para. 3.2.2 of the Implementation
| Procedures, 2008."

R E L E A S E D

CHAPTER 5.0 - TIME LIMITS/MAINTENANCE CHECKS
5-20-00: SCHEDULED CHECKS

A. General

Perform the following General Visual Inspections, annually. The inspections are to be performed referencing the applicable wiring diagrams in the Installation & Operating Instructions, included in Appendix A. Follow standard maintenance practices of individual Aircraft Maintenance Manual.

Description	Inspection	Inspection Details
Antenna Installation;	Annually	Remove antenna in accordance with Chapter 23-10-00 Section 401 Item C. Perform visual inspection of external skin around periphery of connector cutouts and all rivet locations. Check for damage such as fastener deterioration, skin cracks, corrosion, paint exfoliation and other signs of structural deterioration of the skin structure. Any flaw indication is cause for rejection.
TDFM-7000 Transceiver; RC-7000 Remote Control Head (if installed); Wiring; or TDFM-7300 Transceiver; RC-7300 Remote Control Head (if installed); Wiring; or TDFM-136A Transceiver; Wiring;		Visually examine all external surfaces for possible damage. Check external connectors for dust, corrosion, or damage. Check external parts for loose or damaged hardware. Make visual check of wiring and connectors for damage.

B. Component Overhaul Schedule

No component overhaul required for this type design change.

R E L E A S E D

CHAPTER 23.0 - COMMUNICATIONS

23-10-00: TDFM-7000 TRANSCEIVERS

1.0 Description / Operation

The TDFM-7000 and TDFM-7300 are airborne multi-band radios capable of operation in conventional analog and P25 digital FM systems, SmartNet/SMART ZONE trunking systems and P25 9600 trunking systems. Type I RF modules are available in VHF, UHFLO, UHFHI and 800 MHz bands. Type II RF modules support additional optional features not available in type I modules and are currently available in VHF, UHFLO, UHFHI and 700/800 MHz. The TDFM-7300 supports VHFLO operation.

The optional RC-7000 and RC-7300 remote controllers are designed to be a secondary control point for the TDFM-7000 and TDFM-7300 transceivers respectively and each remote controller operates the same as the corresponding transceiver.

A 5-line display for the TDFM-7000 (6-line display for the TDFM-7300) and a keypad and a rotary knob provide the operator control of up to 4 RF bands for the TDFM-7000 (5 bands for the TDFM-7300). The display shows activity of all bands as well as the menu of the active band, selected by pressing the BAND key. The knob has multiple functions including volume, and channel. The microphone, key line and headphone audio can be configured separately for each of the bands therefore switching from band to band is performed at an audio panel such as the Technisonic A71X series. This allows for separate and simultaneous operation on each of the bands just like having multiple radios. The transceiver can also be configured so that all bands are available on one output. In this configuration, the BAND key on the transceiver must perform switching between bands and the user can only transmit on one band at a time.

The TDFM-136A transceiver is a frequency agile, fully synthesized airborne transceiver capable of operating in the 136MHz to 174MHz frequency range in 2.5kHz increments with either 25kHz analog, 12.5kHz analog channel spacing and P25, 12.5kHz digital modulation on a channel by channel basis. The transceiver can operate on any split frequency pair in the band and also incorporates a two channel synthesized guard receiver. Channel operating parameters, including frequency and other related data, are presented on a 48-character, two-line LED matrix display. Data entry and function control takes place via a 12-button keypad. An optional 136MHz high-pass filter is installed on the antenna co-axial between the TFM-136 () transceiver and it's antenna.

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101. Troubleshooting

NOTE:

Prepare aircraft in accordance with standard aircraft maintenance manual procedures.

Condition	Action
No power.	Ensure connectors are properly affixed. Pull and reset applicable circuit breakers.
Not operating correctly.	<p>TDFM-7000 or TDFM-7300 or TDFM-136A:</p> <p>Inspect wiring and ring out harness in accordance with Figure 3-2 of Technisonic Industries Ltd. Installation and Operating Instructions document no. 05RE375 (TDFM-7000) or 08RE389 (TDFM-7300), or 09RE404 (TDFM-136A) and correct irregularities as required.</p> <p>RC-7000 or RC-7300:</p> <p>Inspect wiring and ring out harness in accordance with Figure 3-2 of Technisonic Industries Ltd. Installation and Operating Instructions document no. 06RE377 (RC-7000) or 08RE400 (RC-7300), and correct irregularities as required.</p>
Not operating correctly after above action completed.	<p>TDFM-7000 or TDFM-7300 or TDFM-136A:</p> <p>Remove in accordance with Section 401. A of this chapter and return to Technisonic Industries Ltd. for evaluation and repair.</p> <p>RC-7000 or RC-7300:</p> <p>Remove in accordance with Section 401. B of this chapter and return to Technisonic Industries Ltd. for evaluation and repair.</p>

201. Reserved

Not Applicable

301. Servicing

There are no servicing procedures associated with the components of this chapter.

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401. Removal / Installation

NOTES:

1. Prepare aircraft in accordance with standard aircraft maintenance manual procedures.
2. Gain access to the components of this chapter, in accordance with the aircraft maintenance manual.

A. TDFM-7000 / TDFM-7300 / TDFM-136A Transceivers

Removal

- a) Pull and collar applicable TDFM-7000 or TDFM-7300 or TDFM-136A circuit breaker.
- b) Remove four Dzus fasteners from front of transceiver.
- c) Slide transceiver forward of the panel cutout.
- d) Disconnect electrical connector and antenna connector(s) from the rear of the transceiver.
- e) Remove transceiver from the panel cutout.

Installation

- a) Connect electrical connector and antenna connector(s) to the rear of the transceiver.
- b) Slide transceiver into the panel cutout.
- c) Secure four Dzus fasteners on the front of transceiver.
- d) Remove applicable TDFM-7000 or TDFM-7300 or TDFM-136A circuit breaker collar and reset.
- e) Perform the Function Test in accordance with Sections 501.A, of this chapter.

B. RC-7000 / RC-7300 Remote Control Head (optional)

Removal

- a) Pull and collar applicable RC-7000 or RC-7300 circuit breaker.
- b) Unlock four Dzus fasteners from front of RC-7000 or RC-7300.
- c) Slide RC-7000 or RC-7300 forward of the panel cutout.
- d) Disconnect electrical connector from the rear of the RC-7000 or RC-7300.
- e) Remove RC-7000 from the panel cutout.

Installation

- a) Connect electrical connector to the rear of the RC-7000 or RC-7300.
- b) Slide RC-7000 into the panel cutout.
- c) Secure four Dzus fasteners on the front of RC-7000 or RC-7300.
- d) Remove applicable RC-7000 or RC-7300 circuit breaker collar and reset.
- e) Perform the Function Test in accordance with Sections 501.A, of this chapter.

R E L E A S E D

C. Antenna(s)

Removal

- a) Gain access to antenna.
- b) Remove electrical connectors from the antenna.
- c) Remove the sealant from periphery of antenna base.
- d) Remove screws and washers securing the antenna to the mounting surface.
- e) Remove the antenna from the aircraft.

Installation

- a) Perform visual inspection of antenna provisions in accordance with Chapter 5-20-00 prior to installation of antenna.
- b) Connect coaxial cable to antenna coax connector.
- c) Secure fastening screws used to attach antenna to fuselage.
- d) Seal around periphery of antenna with PRC-DeSoto PR-1422B2, or equivalent.
- e) Perform the Function Test in accordance with Sections 501.A, of this chapter.

D. High-Pass Filter (If installed)

Removal

- a) Pull and collar the TDFM-136A circuit breaker.
- b) Gain access to filter.
- c) Disconnect BNC connectors from mating connectors of filter.
- d) Remove and retain screws securing filter to mounting surface.
- e) Remove filter from mounting surface.

Installation

- a) Secure filter to mounting surface with screws retained from removal.
- b) Re-connect BNC connectors to mating connectors of filter.
- c) Remove circuit breaker collar and reset.
- d) Perform the Function Test in accordance with Sections 501.A, of this chapter.

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501. Adjustment / Test

A. Function Test

NOTE:

If only the transceiver is installed, perform the following function test using the front panel of the TDFM-7000 or TDFM-7300 or TDFM-136A. If the transceiver and the remote controller are installed (Applicable to TDFM-7000 or TDFM-7300 only), perform the following function test from the front panel of the RC-7000 or RC-7300.

- a) Power up the Aircraft's avionics systems. Turn on the transceiver and remote controller (as applicable).
- b) Adjust the volume levels as required.
- c) Press the squelch defeat button to open receiver.
- d) Ensure receiver is operational, the RX status indicator light is on and channels are open.
- e) Tune an operating frequency and carry out a transmit / receive. Ensure the TX status indicator lights when receiver is transmitting and RX status indicator lights when receiver is receiving.
- f) Check the operation of all front panel controls.

R E L E A S E D

601. Inspection / Check

Inspections for this chapters components are to be performed in accordance with Chapter 5-20-00, paragraph A, of these Instructions for Continued Airworthiness.

701. Cleaning / Painting

There are no additional cleaning or painting procedures to be added to the Aircraft Maintenance Manual for the components of this chapter.

801. Approved Repairs

A. TDFM-7000 or TDFM-7300 or TDFM-136A Transceiver / RC-7000 or RC-7300 Remote Controller / High-Pass Filter

There are no approved field repairs for these components. Failed units caused by defective parts or workmanship, should be returned to:

Technisonic Industries Limited
240 Traders Blvd. E
Mississauga, ON
L4Z 1W7
[905] 890-2113

B. Antennas

The antennas associated with this system are non-repairable. If they are determined to be faulty they must be removed and replaced.

901. Storage

There are no storage procedures associated with the components of this chapter.

APPENDIX A		
ITEM	TITLE	REV *
1	05RE375 MULTIBAND P25 AIRBORNE TRANSCEIVER MODEL TDFM-7000 INSTALLATION AND OPERATING INSTRUCTIONS	N/C
2	06RE377 MULTIBAND P25 AIRBORNE TRANSCEIVER REMOTE CONTROL RC-7000 INSTALLATION AND OPERATING INSTRUCTIONS	N/C
3	08RE389 MULTIBAND P25 AIRBORNE TRANSCEIVER MODEL TDFM-7300 INSTALLATION AND OPERATING INSTRUCTIONS	A
4	08RE400 MULTIBAND P25 AIRBORNE TRANSCEIVER REMOTE CONTROL RC-7300 INSTALLATION AND OPERATING INSTRUCTIONS	N/C
5	09RE404 VHF / FM DIGITAL AIRBORNE TRANSCEIVER MODEL TDFM-136A INSTALLATION INSTRUCTIONS	C

| * Or later Transport Canada approved revision.

R E L E A S E D