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ENSTROM F-28F/280F SERIES MAINTENANCE MANUAL

SUPPLEMENT 1 AVIONIC SYSTEMS

Revision 9 Changed Pages
May 26, 2020

Revision 9, dated Apr 30/2020, applies to the Enstrom F-28F/280F Series Maintenance Manual, Supplement 1 Avionics Systems.

Remove and insert the pages listed below. Avoid unintentional removal of pages by following this list carefully. Special instructions are denoted with asterisks where applicable.

Remove Pages	Insert Pages
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* Removal/Insertion of the Record of Revision page (page v) is unnecessary if Revision 9 date and issue information is recorded.

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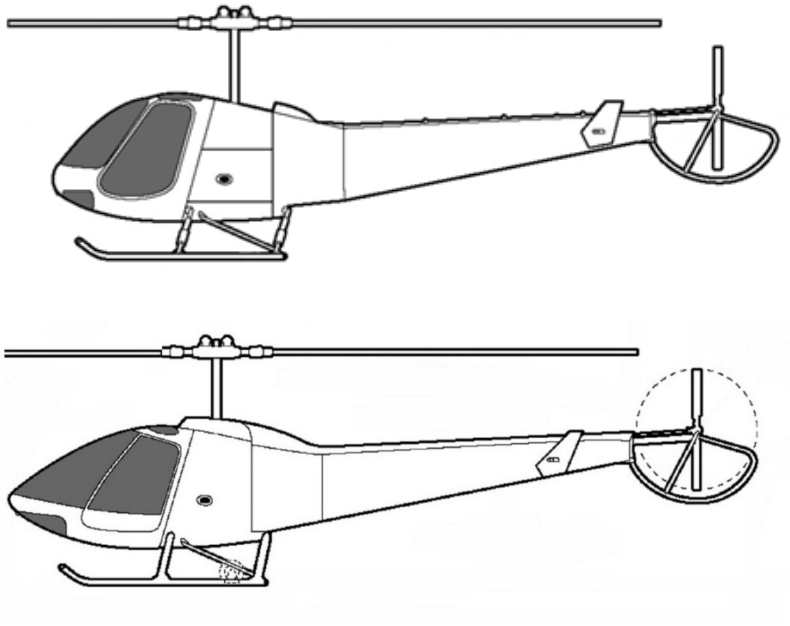
ENSTROM F-28F/280F SERIES MAINTENANCE MANUAL

SUPPLEMENT 1

AVIONIC SYSTEMS



For FAA approval, the Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

For EASA approval, the Airworthiness Limitations Section is approved and variations must also be approved.

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RECORD OF REVISIONS

REV NO.	ISSUE DATE	DATE INSERTED	BY	REV NO.	ISSUE DATE	DATE INSERTED	BY
1	Nov 21/08	Nov 21/08	JW				
2	Dec 8/08	Dec 8/08	JW				
3	Nov 11/11	Nov 11/11	JW				
4	Jan 9/14	Jan 9/14	JW				
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INTRODUCTION

Avionic System(s) Effectivity

A. The data presented in this supplement is applicable to the optional avionic systems listed in the following table:

Avionic System(s)

Avionic System	Enstrom Part Number
Attitude Indicator	28-22062-( )
Collective Control Installation (Dual Start)	28-16080-101
Directional Gyro	28-22062-( )
GDL 69/69A	28-22082-( )
GMA 350Hc	28-22048-5
GNC 255A	28-22063-5
GNS 430W	28-22037-( )
GNS 530W	28-22050-( )
GTN 650	28-22112-3
GTX 330	28-22028-1
GTX 345	28-22028-3
KX 165A COMM/NAV	28-22063-( )
MD200-306 VOR/LOC/GS Indicator	28-22095-1
MD200-706 VOR/LOC/GS Indicator	28-22095-3
SAE5-35 Altitude Data System	28-22090-( )
SL30	28-22069-1

Aircraft Effectivity

A. The data presented in this F-28F/280F Series Maintenance Manual Supplement is applicable to all Enstrom F-28F and 280F series model helicopters.

Supplemental Changes and Revisions

A. Subsequent to the publication of the initial issue of this supplement, changes in the avionics equipment, support concepts and procedures, as well as information developed by experience may affect the contents of this supplement. To ensure that coverage in the supplement continues to reflect such changes, revised information is released by one of the following methods:

1. Revision - A revision alters portions of the manual by replacement, addition, and/or removal of pages.

2. Reissue - A reissue of this supplement will occur when the amount of changes warrants complete reissue.

3. Service Directive Bulletins – Used to direct the owner/operator and/or maintenance personnel to make mandatory changes, improvements, or inspections to the aircraft applicable to the entire fleet or a segment of the fleet that are typically safety/airworthiness related. The information provided in the Service Directive Bulletins will be incorporated in the maintenance manual as needed at a later date. At the time of incorporation, the Service Directive Bulletin is superseded by the maintenance manual, and accomplishment or sign-off of the Service Directive Bulletin in the maintenance records book is no longer required. A detailed entry should be made in the maintenance records to indicate that the Service Directive Bulletin is superseded by the maintenance manual.

4. Service Information Letters – Used to transmit information, recommendations, and general service instructions to the aircraft owner/operator and/or maintenance personnel applicable to the entire fleet or a segment of the fleet. The information provided in the Service Information Letters will be incorporated into the maintenance manual as needed at a later date.

5. Service Instructions – Used to provide the owner/operator and/or maintenance personnel with information that is applicable to specific aircraft and does not meet the criteria of a Service Information Letter or Service Directive Bulletin. Service Instructions will not be distributed to the entire fleet.

Enstrom distributes maintenance manual supplement revisions and reissues in electronic form via the Enstrom Helicopter website: www.enstromhelicopter.com (follow the applicable link under the Technical Publications section of the Technical Support page). Revision update notices are sent via email to owners and operators who are registered with Enstrom. Registration to receive publication mailing notifications can be coordinated through the Enstrom Technical Publications Administrator. A complete manual hardcopy may be ordered through Enstrom Customer Service.

Service Information Letters and Service Directive Bulletins incorporated into the maintenance manual are logged in the Service Information Letter Index or the Service Directive Bulletin Index (as appropriate) located on the Enstrom Helicopter website: www.enstromhelicopter.com (follow the applicable link under the Technical Publications section of the Technical Support page). Each index numerically lists all Service Information Letters and Service Directive Bulletins, respectively, and identifies those which have been incorporated into the maintenance manual. All Service Information Letters and Service Directive Bulletins are also located under the Technical Publications section of the website.

Notice of recently released Service Information Letters and Service Directive Bulletins is provided via email notification. Registration to receive publication mailing notifications can be coordinated through the Enstrom Technical Publications Administrator.

CHAPTER 1

SL30 NAV COM

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The SL30 NAV/COM unit is a VHF Navigation/Communications Transceiver utilizing high performance Digital Signal Processing (DSP) filtering. It includes a 760-channel VHF Com transceiver and a 200-channel VOR/LOC/GS navigation receiver.

B. Functions and features of the SL30 include automatic decoding of the Morse code station identifier for VOR/LOC, memory storage for most-used frequency, built-in course deviation indicator, standby Com and Nav frequency monitoring, Nav receiving for both VOR and LOC navigation signals, and built in Glideslope receiver.

C. The components of the SL30 system include the panel mounted SL30 unit and nav and com antennas. The SL30 provides output to a VOR/LOC/GS Indicator and to either a VOX ICS or an audio panel.

D. Power to the SL30 unit is provided via the **COM** circuit breaker (CB27) (5 Amp) and the **NAV** circuit breaker (CB39) (2 Amp) located on the left side of the center pedestal.

E. Refer to the 280FX Rotorcraft Flight Manual Supplement and the current vendor operating manuals/instructions for operation of the SL30 system.

1-2. Vendor Publications

A. The SL30 is to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft. The applicable vendor manuals are listed in Table 1-1.

Table 1-1. Vendor Manuals

Component	Publication	Vendor
SL30	SL30 Nav Com Pilot's Guide	Garmin International 1200 E. 151st Street Olathe, KS 66062

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, the Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the SL30 system are “on condition”.

CHAPTER 2

SANDIA SAE5-35 ALTITUDE DATA SYSTEM

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The Sandia SAE5-35 is a solid state altitude data system (blind encoder) that converts pressure altitude into a digital output. The data output is referenced to 29.92 in Hg (1013 Millibars).

B. The Sandia SAE5-35 outputs altitude data via Gillham Grey Code or two independent RS232 digital outputs to Mode C transponders. The transponders utilized include the Bendix/King KT73, KT76A, and KT76C; and the Garmin GTX327 and GTX330.

C. Two configurations of the Sandia SAE5-35 system are available. They are part numbers 28-22090-1 and 28-22090-3. P/N 28-22090-1 is the standard system installation and P/N 28-22090-3 is the standard system with the “Altitude In-Flight Monitoring” function.

D. Power to the Sandia SAE5-35 encoder is provided via the **ENCDR** circuit breaker (CB) (2 Amp) located on the lower left side of the center pedestal.

E. Refer to the 280FX Rotorcraft Flight Manual Supplement and the current vendor operating manuals/instructions for operation of the Sandia SAE5-35 altitude data system.

1-2. Vendor Publications

A. The Sandia SAE5-35 is to be operated and maintained I/A/W the current vendor’s instructions to ensure the continued airworthiness of the aircraft. The applicable vendor manuals are listed in Table 2-1.

Table 2-1. Vendor Manuals

Component	Publication	Vendor
Sandia SAE5-35	1. SAE5-35 Pilot’s Guide, Document 305221 2. SAE5-35 Altitude Data System Installation Manual, Document 305186	Sandia Aerospace, Inc. 3700 Osuna Rd. NE, Suite 171 Albuquerque, NM 87109

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, the Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the Sandia SAE5-35 system are “on condition”.

CHAPTER 3

GNS 430W/530W GPS/WAAS NAVIGATOR

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The 430W/530W GPS/WAAS Navigator is a panel-mounted product that contains a GPS/WAAS receiver for GPS approved primary navigation under TSO C146a, and also VHF Com and VHF Nav radios in an integrated system unit with a moving map and color display. The graphical display is used to depict traffic, weather, or terrain data.

B. Four configurations of the 430W installation are available. They are part numbers 28-22037-5, 28-22037-7, 28-22037-9, and 28-22037-101. Four configurations of the 530W installation are available. They are part numbers 28-22050-5, 28-22050-7, 28-22050-103, and 28-22050-105. The dash numbers differentiate between installations with or without VOR/LOC/GS activation and between installations that are upper or lower panel mounted.

C. The 430W/530W provides optional output to a VOR/LOC/GS Indicator and to either a VOX ICS or an audio panel.

D. Power to the 430W/530W unit is provided via the **COMM/NAV GPS** (28-22037-5 or 28-22050-5) or the **COMM GPS** (28-22037-7 or 28-22050-7) circuit breaker (CB40) (5 Amp) and the **COMM TX** circuit breaker (CB41) (5 Amp) located on the left side of the lower panel.

E. Refer to the 280FX Rotorcraft Flight Manual Supplement and the current vendor operating manuals/instructions for operation of the 430W/530W.

1-2. Vendor Publications

A. The 430W/530W is to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft. The applicable vendor manuals are listed in Table 3-1.

Table 3-1. Vendor Manuals

Component	Publication	Vendor
GNS 430W	1. 400W Series Pilot's Guide and Reference 2. 400W Series Installation Manual	Garmin International 1200 E. 151st Street Olathe, KS 66062
GNS 530W	1. 500W Series Pilot's Guide and Reference 2. 500W Series Installation Manual	

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, the Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the GNS 430W/530W are “on condition”.

CHAPTER 4

GDL 69/69A XM SATELLITE WEATHER/RADIO

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The GDL 69/69A unit is a remote datalink receiver that delivers XM WX Satellite Weather™ to a Garmin navigation system such as the GNS 430W/530W.

B. Two configurations of the GDL 69/69A installation are available. They are part numbers 28-22082-5 and 28-22082-7. Part number 28-22082-5 provides continuous XM Weather coverage and also XM Satellite Radio for audio entertainment. Part number 28-22082-7 provides XM Weather only.

C. The GDL 69A interfaces with the cockpit audio panel control to provide XM Satellite Radio audio entertainment through the aircraft's audio system.

D. Power to the GDL 69/69A unit is provided via the **XM DL** circuit breaker (CB42) (5 Amp) located on the left side of the lower panel.

E. Refer to the 280FX Rotorcraft Flight Manual Supplement and the current vendor operating manuals/instructions for operation of the GDL 69/69A.

1-2. Vendor Publications

A. The GDL 69/69A is to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft. The applicable vendor manuals are listed in Table 4-1.

Table 4-1. Vendor Manuals

Component	Publication	Vendor
GDL 69/69A	400W/500W Series Pilot's Guide Addendum for Optional Displays GDL 69/69A Installation Manual	Garmin International 1200 E. 151st Street Olathe, KS 66062

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, the Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the GDL 69/69A are “on condition”.

CHAPTER 5

ATTITUDE INDICATOR AND DIRECTIONAL GYRO

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The Attitude Indicator Installation, P/N 28-22062-( ), provides an indication of the aircraft's attitude relative to the earth by means of an electrically powered gyroscope. The unit is mounted in the instrument panel. Power to the attitude indicator is provided via the **HRZN GYRO** circuit breaker (CB23) located on the left side of the center pedestal. This installation consists of several configurations depending on the manufacturer (refer to Figure 5-1).

B. The Directional Gyro Installation, P/N 28-22062-( ), provides a heading indication displayed on a rotating compass card by means of an electrically powered gyroscope. The unit is mounted in the instrument panel. Power to the directional gyro is provided via the **DIR GYRO** circuit breaker (CB24) located on the left side of the center pedestal. This installation consists of several configurations depending on the manufacturer (refer to Figure 5-1).

C. Each gyro contains internal lighting and a power monitor indication. The attitude indicator contains a slip indicator attached to the base of the display bezel.

1-2. Vendor Manuals

A. The following components listed in Table 5-1 are to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft.

Table 5-1. Vendor Manuals

Component	Publication	Vendor
Attitude Gyro RCA 26 Series	Installation/Operation Guide, Publication No. 1403	Kelly Manufacturing Company 555 South Topeka Wichita, KS 67202 www.kellymfg.com
Slip Indicator for Model 300-14E(L) Part Number 6648-1009-0901	Field Replacement or Installation of Inclinometer, 0050-1002, latest revision	Castleberry Instruments & Avionics, Austin, TX www.ciamfg.com

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

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B. For EASA approval, the Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the gyro systems are “on condition”.

CHAPTER 6

KX 165A NAV/COM

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The KX 165A is a VHF NAV/COM transceiver. The KX 165A NAV/COM installation, P/N 28-22063-( ), includes the KX 165A NAV/COM unit, COM and NAV antennas, and the wiring interface to a VOR/LOC/GS indicator and an audio panel or VOX ICS.

B. One of two configurations may be installed; P/N 28-22063-1 (760 channel COM, 25 kHz increments) and P/N 28-22063-3 (2280 channel COM; 8.33 kHz increments).

C. Power to the KX 165A NAV/COM installation is provided via the **COM1**/**NAV1** (or **COM2/NAV2**) circuit breaker (CB35, 7 ½ A) located on the upper left side of the center pedestal.

D. Refer to the Rotorcraft Flight Manual Supplement for operation of the KX 165A.

1-2. Vendor Manuals

A. The following component listed in Table 6-1 is to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft.

Table 6-1. Vendor Manuals

Component	Publication	Vendor
KX 165A NAV/COM	Installation Manual, Manual Number 006-10542-0003, Revision 3, or later approved revision	Bendix/King (by Honeywell) 9201-B San Mateo Blvd. NE Albuquerque, New Mexico 87112 Support US & Canada: 855-250-7027 Support International: 602-365-7027 techsupport@bendixking.com

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, the Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the KX 165A NAV/COM system are “on condition”.

CHAPTER 7

GTX 330 TRANSPONDER WITH ADS-B OUT

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The GTX 330 with ADS-B Out is installed as part number 28-22028-1. The components of the GTX 330 installation include the panel-mounted GTX 330 unit and a bottom-mounted antenna.

NOTE

When combined, the Garmin GTX 330 with Extended Squitter (ES) and the Garmin GTN 650 GPS/NAV/COM have been shown to fully comply with AC 20-165A and 14 CFR 91.227 when installed in accordance with Garmin's installation instructions. This configuration will be compliant with the 2020 ADS-B Out mandate defined in 14 CFR 91.225.

B. For ADS-B Out system functionality, the GTX 330 is configured with the extended squitter (ES) feature and is interfaced with the GTN 650 for position input and the A-30 altitude encoder for barometric altitude input. The GTX 330 performs the following ADS-B Out functions: Transmission of ADS-B Out data on 1090 extended squitter (1090ES) (1090 MHz), Integration of data from internal and external sources to transmit data as required per 14 CFR 91.227, and Pressure Altitude Broadcast Inhibit.

C. The GTX 330 may also be interfaced to other equipment such as an audio panel or VOX ICS and an OAT probe.

D. Power to the GTX 330 installation is provided via the **XPNDR** circuit breaker (CB33) (5 Amp) located on the left side of the center pedestal.

E. Refer to the F-28F/280FX Rotorcraft Flight Manual Supplement 28-AC-070 for GTX 330 with ADS-B Out limitations and basic operation instructions.

F. The following component listed in Table 7-1 is to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft.

Table 7-1. Vendor Manuals

Component	Publication	Vendor
GTX 330 Transponder	GTX 330 Installation Manual, Document No 190-00207-02, latest revision	Garmin International, Inc. 1200 East 151st Street Olathe, KS 66062 Tele: (913) 397-8200 Fax: (913) 397-8282 www.garmin.com
	GTX 330 Pilot's Guide, Document No. 190-00207-00, latest revision	
	GTX 330/D Maintenance Manual, Document No. 190-00207-05, latest revision	

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, the Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the GTX 330 with ADS-B Out system are “on condition.” No component-level overhaul is required for the GTX 330 with ADS-B Out installation.

ARINC 429 Configuration Page			Notes
	Speed	Data	
ARINC 429 In 1	- - -	OFF	
ARINC 429 In 2	- - -	OFF	
ARINC 429 Out 1	- - -	OFF	
ARINC 429 Out 2	- - -	OFF	
SDI		LNAV 1	No action taken

RS-232 Configuration Page			Notes
	Input	Output	
RS232 1	GTX Mode S+ #1	GTX Mode S+ #1	For Garmin GTX 345
	OFF	OFF	When not connected
RS232 2	Fuel Format 2	Aviation Output 1	For Shadin Miniflo
	OFF	OFF	When not connected
RS232 3	OFF	Aviation Output 1	For GTR/GNC
	OFF	OFF	When not connected
RS232 4	GMA Format 2	GMA Format 2	For GMA
	OFF	OFF	When not connected
More RS-232 Setup	Disable Forward ALT to GTX		For Garmin GTX 345
	No Action		When not connected

HSDB (Ethernet) Configuration Page		Notes
Ethernet Port 1	Not Connected	
Ethernet Port 2	Not Connected	
Ethernet Port 3	Connected	For Garmin GTX 345
	Not Connected	When not connected
Ethernet Port 4	Not Connected	

Interfaced Equipment Page			Notes
Unit	Present	Type	
Cross-Side Nav	Not Present	- - -	
GDL 69/69A	Not Present	- - -	
GDL 88	Not Present	- - -	
ADS-B In Source	Present	GTX #1	For Garmin GTX 345
	Not Present	- - -	When not connected
GDU #1	Not Present	- - -	
GDU #2	Not Present	- - -	
GDU #3	Not Present	- - -	
Transponder #1	Present	GTX Mode S+	For Garmin GTX 345
	Not Present	- - -	When not connected
Transponder #2	Not Present	- - -	
GSR 56	Not Present	- - -	

Main Indicator (Analog) Configuration page		Notes
Calibrate OBS Resolver	Calibrate	Calibrate for CDI/Slaved Compass System
CDI Key	Enabled	
Selected Course For GPS	Allowed	
Selected Course For VOR/LOC	Allowed	
V-Flag State	Normal	

Lighting Configuration Page		Notes
Display	Keys	
Source: Lighting Bus 1	Source: Photocell	
Minimum Level: 5.00%	Minimum Level: 5.00%	

Photocell Configuration Page			Notes
Response Time: 2sec	Slope: 50	Offset: 50	Adjust Offset to match/sync to other installed equipment
	Key Backlight Cutoff: 80%	Photocell Transition: 10%	

Lighting Bus Configuration Page			Notes
Lighting Bus 1: 28V DC			
Response Time: 0sec	Slope: 15	Offset: 15	Adjust Offset to match/sync to other installed equipment
Lighting Bus 2: 28V DC			
Response Time: 2sec	Slope: 50	Offset: 50	Lighting Bus 2 not applicable

Audio Configuration Page	Notes
Alert Volume: 50%	Adjust per customer requirement

Voice Command Configuration Page			Notes
Voice Commands			For GMA Voice Commands, otherwise disable all. Disable all for EASA specified configuraiton. (Delivery to Europe)
"Say..." Commands		Mute Tone	

Traffic Configuration Page		Notes
Traffic Intruder Symbol Color	White	
GTN Control of Traffic System	Yes	

Main System Configuration Page		Notes
Airframe Type	Rotorcraft	
Air/Ground Threshold	10KT	
Air/Ground Discrete	Active for Ground	
GPS Antenna Height Above Ground	5.5 feet	
Fuel Type	AV Gas	
GPS Select	Auto	
Heading Source Input	Not Connected	
Radio Altimeter Input	Not Connected	
Altitude Source Input	Connected	For Garmin GTX 345
	Not Connected	When not connected
Enhanced Lighting Mode	Disabled	
Crossfill Status Alert	Disabled	
System ID	GTN 1	
Database Sync	Pilot Control	
Airspace Labels	Enabled	
Checklist Page	Task List	
Blackout Mode	Disabled	

Figure 8-4. GTN 650 Configuration Set-Up (Ref. 28-19079-9 Rev. H)
(NOTE: Refer to Paragraph 4-1-4 for SW applicability) (Sheet 1 of 3) Rev. 9, Apr 30/2020

Com Configuration Page		Notes
Com Radio	Enabled	
Com Squelch Mode	Advanced	
Mic 1 Gain	+12db	Adjust per customer requirement
Sidetone Source	External	
Sidetone Volume	+60.0db	Adjust per customer requirement
Sidetone Pilot Control	Enabled	

Advanced Com Squelch		Notes
25kHz		
Low	80%	
Mid	80%	
High	80%	Adjust all per customer requirement
8.33kHz		
Low	80%	
Mid	80%	
High	80%	

Advanced Carrier Squelch		Notes
25kHz		
Low	55%	
Mid	55%	
High	55%	
8.33kHz		
Low	0%	
Mid	0%	
High	0%	

VOR/LOC/GS Configuration Page		Notes
Nav Radio	Enabled	
Selected Course	- - -	
Calibrate OBS Resolver		No action taken
ARINC 429 Speed RX	Low	
ARINC 429 Speed TX	Low	
SDI	VOR/ILS 1	
DME Mode		No action taken
DME Channel Mode		No action taken
LOC/GS Filtering	Disabled	

Discrete Configuration Page	Notes
N/A	No action taken/Default

Navigation Features Configuration Page		Notes
Mark on Target	Disabled	
RF Procedure Legs	Disabled	

Vertical Navigation Configuration Page			Notes
Vertical Navigation Type			
VCALC	VNAV		
Transition to Approach	Transition Altitude	VDI Scale	
	FL180	500 FT	

Ownship Configuration Page		Notes
Color Ownship		
 3-Blade Rotorcraft		**The following settings can be modified per customer requirements unless noted otherwise**

Terrain Configuration Page			Notes
Terrain Mode		**Alert Configuration**	
HTerrain Proximity	HTerrain Alerting	Audio Clips	
HTAWS		Alert Settings	
		Airport Criteria	
		Runway Surface **Any**	
		Minimum Length **0 FT**	

Com Transmit Power Configuration Page		Notes
Com Transmit Power		
Normal	16W	

Flight Simulator Configuration Page	Notes
N/A	Not applicable at this time

Search and Rescue Configuration Page	Notes
N/A	Not applicable at this time

External Systems - Audio Panel	Notes
Marker Beacon Display	For GMA Marker Beacon Display, otherwise disable

System - SBAS Providers	Notes
WAAS	WAAS provides SBAS serive for North America and most of Central America
EGNOS	Switch to EGNOS prior to shipment per customer requirement (Europe)
MSAS	Switch to MSAS prior to shipment per customer requirement (Japan)
GAGAN	Switch to GAGAN prior to shipment per customer requirement (India)

System -GTX 345 FIS-B Weather	Notes
Enabled	For Garmin GTX 345 FIS-B Weather, otherwise disable

System - Setup		Notes
CDI Scale	Auto	**The following settings can be modified per customer requirements unless noted otherwise**
ILS CDI Capture	Auto Switch	
Local Offset	Adjust to Local time	
Time Format	Local 12 hour	
Runway Surface	Any	
Runway Length	0 FT	
Include User Airports	Enabled	
Com Channel Spacing	25.0 kHz	Switch to 8.33 kHz prior to shipment per customer requirement (Europe/Asia)
Reverse Frequency Lookup	Toggled On	
Com Sidetone Control:		
Link to COM VOL	Toggled Off	
Offset	+0%	
Keyboard Format	ABC	
Crossfill	Disabled	

Figure 8-4. GTN 650 Configuration Set-Up (Ref. 28-19079-9 Rev. H)
(NOTE: Refer to Paragraph 4-1-4 for SW applicability) (Sheet 2 of 3) Rev. 9, Apr 30/2020

System - Alerts		Notes
Arival	Active	**The following settings can be modified per customer requirements unless noted otherwise**
Proximity	3.0 NM	
Airspace Alerts	All Active	
Altitude Buffer	200 FT	

System - Units		Notes
Altitude/Verticle Speed	Feet (FT/FPM)	**The following settings can be modified per customer requirements unless noted otherwise**
Distance /Speed	Nautical Miles	
Fuel	Gallons (GAL)	
Nav Angle	Magnetic (°)	
Magnetic Variation	N/A	
Position Format	LAT/LON	
Pressure	Inches of Mercury	
Temperature	Celsius (°)	

System - Audio		Notes
Click Volume	60%	**Setting can be modified per customer requirements unless noted otherwise**
HTAWS Alert Voice	N/A	Not applicable at this time
Voice Callout	N/A	Not applicable at this time

System - Backlight		Notes
Manual Offset	No Action	**Setting can be modified per customer requirements unless noted otherwise**

System - Connext Setup - GTX 345	Notes
Bluetooth	For Garmin GTX 345 Bluetooth, otherwise disable

System - Voice Commands	Notes
Voice Commands	For GMA Voice Commands, otherwise disable Disable for EASA specified configuration. (Delivery to Europe)

Figure 8-4. GTN 650 Configuration Set-Up (Ref. 28-19079-9 Rev. H)
(NOTE: Refer to Paragraph 4-1-4 for SW applicability)
(Sheet 3 of 3) Rev. 9, Apr 30/2020

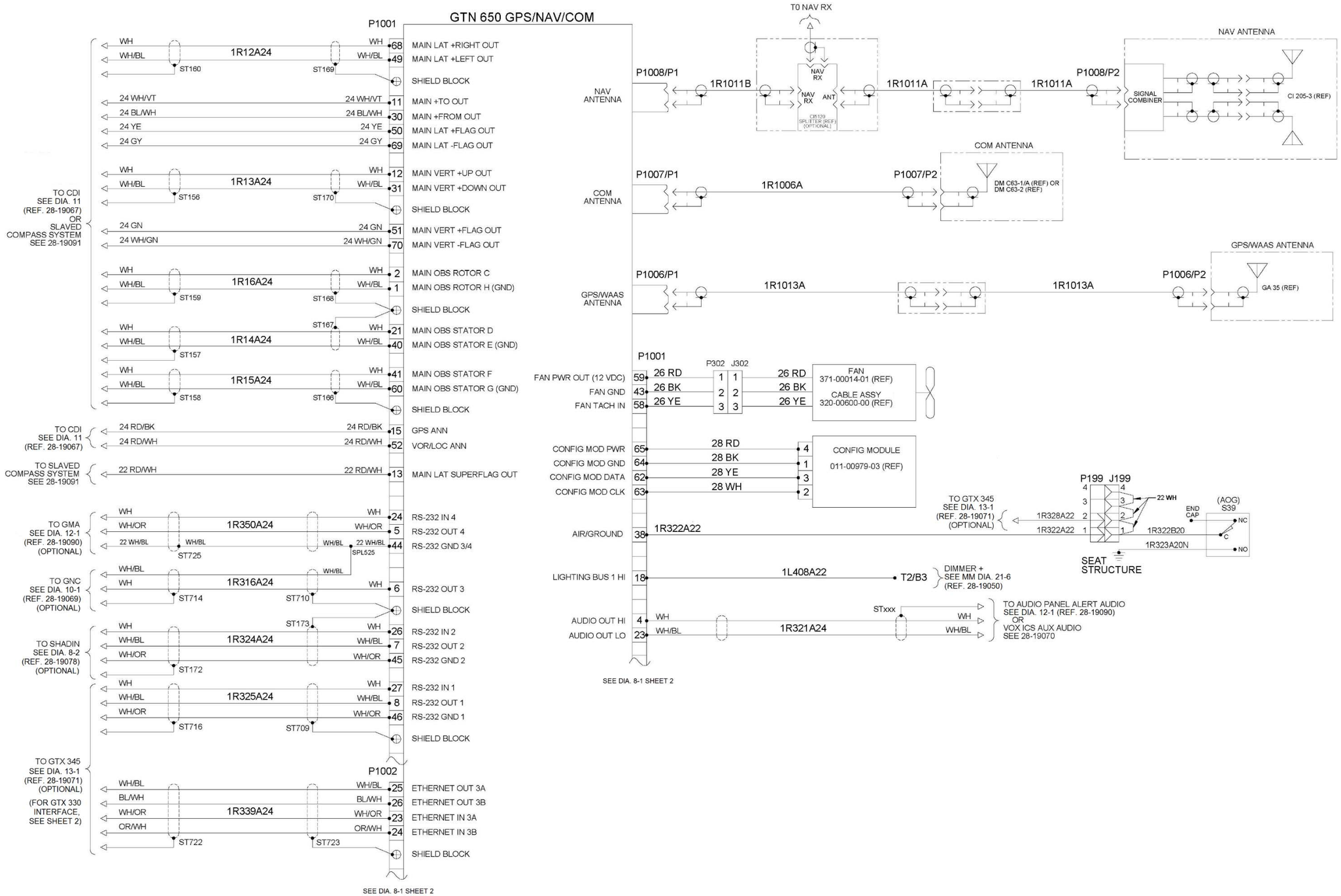


Diagram 8-1. GTN 650 Interface (Ref. 28-19079-9 Rev. H)
(Sheet 1 of 2) Rev. 9, Apr 30/2020
8-19/8-20 Blank

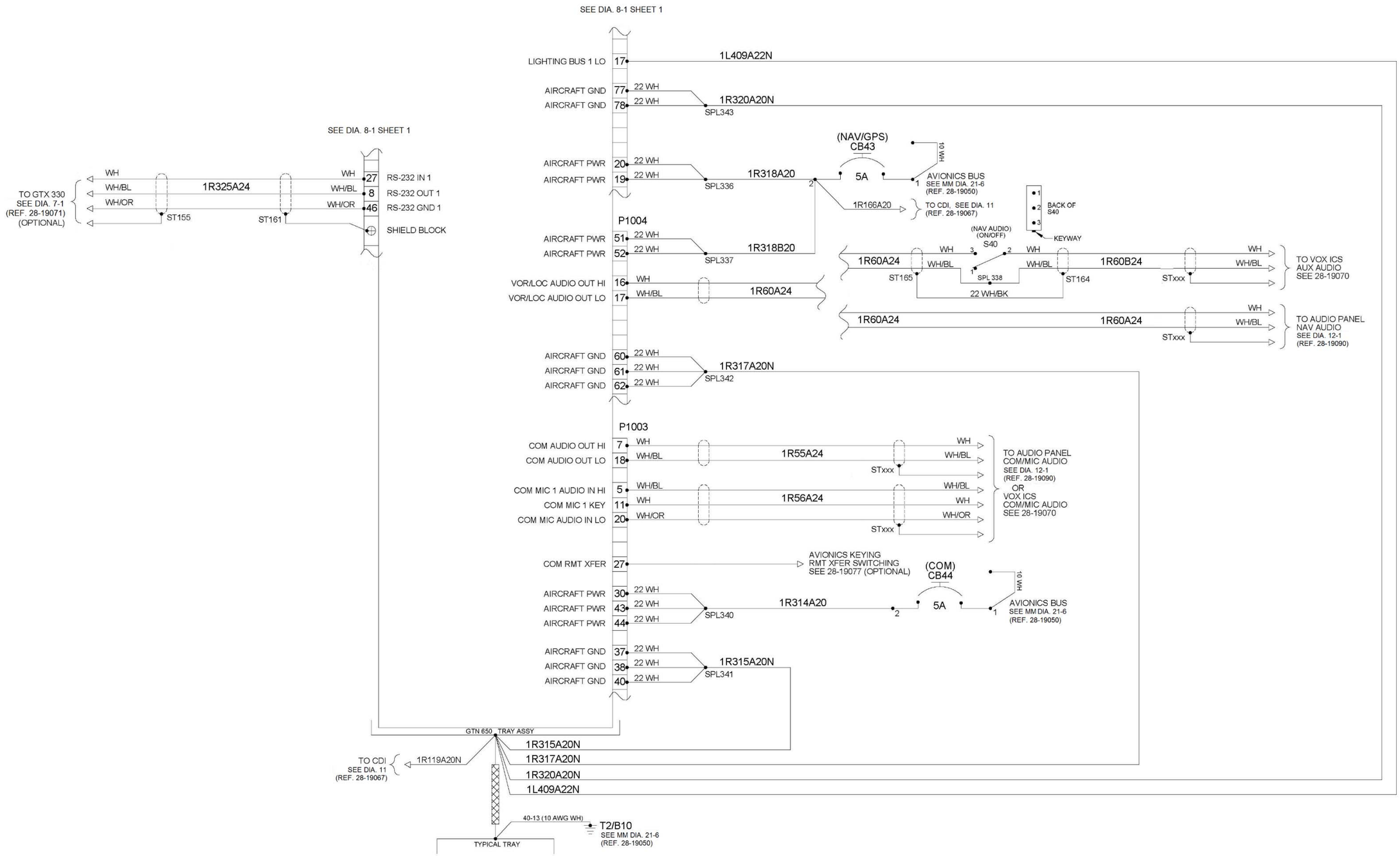


Diagram 8-1. GTN 650 Interface (Ref. 28-19079-9 Rev. H)
(Sheet 2 of 2) Rev. 9, Apr 30/2020

CHAPTER 9

DUAL START COLLECTIVE CONTROL INSTALLATION

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The collective control with dual start installation option is part number 28-16080-101.

B. The dual start feature allows the rotorcraft to be started from either the pilot or copilot positions. This is achieved with a momentary switch in the starboard-side collective stick. The switch is connected in parallel to the standard starting switch located in the port-side collective stick. The switch, when activated, closes the starter relay which then engages the starter motor.

C. When configured with the dual start collective control installation, the starboard-side collective stick is not equipped with a quick disconnect feature. Installation of both port- and starboard-side collective sticks is identical.

D. Refer to the applicable F-28F or 280FX Rotorcraft Flight Manual for limitations and basic operation instructions.

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, the Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the collective control with dual start installation are “on condition.”

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing, Troubleshooting, and Periodic Inspections

A. Refer to the F-28F/280F Series Maintenance Manual for servicing, troubleshooting, and periodic inspection procedures for the flight controls and electrical systems.

SECTION 4

SYSTEM MAINTENANCE

NOTE

Removal or installation of equipment will change the aircraft empty weight and empty weight c.g. These changes will be recorded on Form F-511-5, Basic Weight and Balance Record, as required (reference Enstrom F-28F/280F Series Maintenance Manual).

4-1. Dual Start – Starboard-Side Collective Control (Figure 9-1)

4-1-1. Removal

A. Remove the fiberglass seat deck.

B. Disconnect the starter button wires at the connector terminals.

C. Cut the safety wire and remove bolt (3) and washer (4) from the top of the collective stick socket (2).

D. Remove the collective stick (1) from the collective stick socket (2).

4-1-2. Installation

A. Install the collective stick (1) into the collective stick socket (2) and align holes.

B. Install washer (4) and bolt (3). Torque bolt (50 in-lbs/5.7 Nm) and safety wire with MS20995C32.

C. Connect the wire terminals for the starter button.

D. Cycle the collective stick up and down and rotate the throttle to check freedom of movement.

E. Install fiberglass seat deck.

4-2. Figures and Diagrams

A. The dual start collective control installation is shown in Figure 9-1.

B. The dual start collective control wiring interface is shown in Diagram 9-1.

CHAPTER 10

GNC 255A

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The GNC 255A is a VHF communications transceiver combined with 200-channel VOR, LOC, and GS navigation receivers. The com radio operates from 118.000 to 139.975 MHz in either 25 kHz or 8.33 kHz channel spacing. Transmitting power is 10W.

B. The GNC 255A installation part number is 28-22063-5.

C. The components of the GNC 255A include the panel mounted GNC 255A unit and Nav and Com antennas. The GNC 255A may be interfaced with a CDI, slaved compass system, EHSI, or an EFIS system and may also be interfaced to either a VOX ICS or an audio panel.

D. Power to the GNC 255A is provided via the **COM** circuit breaker (CB27) (5 Amp) and the **NAV** circuit breaker (CB39) (2 Amp) located on the left side of the lower instrument panel console. If equipped with a second transceiver unit (such as the GTN 650), power is provided via the **COM 1** or **COM 2** circuit breaker and **NAV 1** or **NAV 2** circuit breaker. The **NAV** circuit breaker may also provide power to the CDI.

E. Refer to F-28F/280FX Rotorcraft Flight Manual Supplement 28-AC-074 for GNC 255A limitations and basic operation instructions.

1-2. Vendor Manuals

A. The following components listed in Table 10-1 are to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft.

Table 10-1. Vendor Manuals

Component	Publication	Vendor
GNC 255A	GTR 255/GNC 255 Installation Manual, Document No. 190-01182-02, latest revision	Garmin International, Inc. 1200 East 151st Street Olathe, KS 66062 Tele: (913) 397-8200 Fax: (913) 397-8282 www.garmin.com
	GNC 255A/255B Pilot's Guide, Document No. 190-01182-01, latest revision	

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, the Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the GNC 255A installation are “on condition.”

SYSTEM CONFIGURATION GROUP		NOTES
◄► = NEXT	**SERIAL PORT** IO MODE .....AVN IN/MAPCOM NONE	FOR INTERFACE TO GTN 650/750 WHEN NOT CONNECTED
◄► = NEXT	**DST PRIORITY** DST.....GPS,DME	
◄► = NEXT	**INTERCOM ENABLE** CONTROL.....DISPLAY	DISABLE INTERCOM IN NORMAL MODE
◄► = NEXT	**BACKLIGHT** DISPLAY.....LIGHT BUS 1 BEZEL KEY.....PHOTOCELL DSP MIN.....1 KEY MIN.....1	
◄► = NEXT	**PHOTOCELL** TRNSN.....10 SLOPE.....50 KEY CO.....80 OFFSET.....50	ADJUST OFFSET TO MATCH/SYNC TO OTHER INSTALLED EQUIPMENT
◄► = NEXT	**LIGHTING BUS 1** INPUT.....28 VDC SLOPE.....25 OFFSET.....15	ADJUST OFFSET TO MATCH/SYNC TO OTHER INSTALLED EQUIPMENT

NAV CONFIGURATION GROUP		NOTES
◄► = NEXT	**CDI INDICATOR** TYPE .....RESOLVER	FOR INTERFACE TO CDI OR SLAVED COMPASS SYSTEM (OBS CALIBRATION REQUIRED)
◄► = NEXT	**ARINC 429** N/A	NO ACTION TAKEN
◄► = NEXT	**DME** N/A	NO ACTION TAKEN
◄► = NEXT	**FILTERED LOC/GS** ENABLED .....OFF	

COM CONFIGURATION PAGE		NOTES
◄► = NEXT	**MIC GAIN** MIC1 GAIN.....12 DB MIC2 GAIN.....12 DB	ADJUST PER CUSTOMER REQUIREMENT
◄► = NEXT	**COM CARRIER SQUELCH** MODE.....BASIC SPACING..... 25 kHz OR 8.33 kHz SQUELCH.....0	ADJUST PER CUSTOMER REQUIREMENT
◄► = NEXT	**COM RX SQUELCH** MODE.....BASIC SPACING..... 25 kHz OR 8.33 kHz SQUELCH.....80	ADJUST PER CUSTOMER REQUIREMENT

AUDIO CONFIGURATION PAGE		NOTES
◄► = NEXT	**COM SIDETONE** VOLUME .....90 MODE.....EXTERNAL PILOT CONTROL.....ENABLED	ADJUST VOLUME PER CUSTOMER REQUIREMENT
◄► = NEXT	**MIX NAV AUDIO** MIXED WITH COM.....OFF	
◄► = NEXT	**HI-FIDELITY AUDIO** ENABLED.....OFF	

ICS CONFIGURATION PAGE (NORMAL MODE)		NOTES
118.250 ENT=DONE CLR=UNDO	**INTERCOM ON/OFF** INTERCOM OFF	
118.250 ENT=DONE CLR=UNDO	**SPEAKER ON/OFF** SPEAKER OFF	
118.250 ENT=DONE CLR=UNDO	**AUX AUDIO** AUX OFF	

SYSTEM CONFIGURATION PAGE (NORMAL MODE)		NOTES
118.250 ENT=DONE CLR=UNDO	**COM SPACING** CHNL SPACE 25.0 kHz	SWITCH TO 8.33 KHZ PRIOR TO SHIPMENT PER CUSTOMER REQUIREMENT (TYPICAL FOR EUROPE/ASIA)
118.250 ENT=DONE CLR=UNDO	**COM SIDETONE** MODE: FIXED OFFSET: N/A	ADJUST PER CUSTOMER REQUIREMENT
118.250 ENT=DONE CLR=UNDO	**DISPLAY BRIGHTNESS** BRIGHTNESS OFFSET 0	ADJUST PER CUSTOMER REQUIREMENT
118.250 ENT=DONE CLR=UNDO	**DISPLAY CONTRAST** OFFSET 0	ADJUST PER CUSTOMER REQUIREMENT

Figure 10-2. GNC 255 Configuration Set-Up (Ref. 28-19069-103 Rev. D)

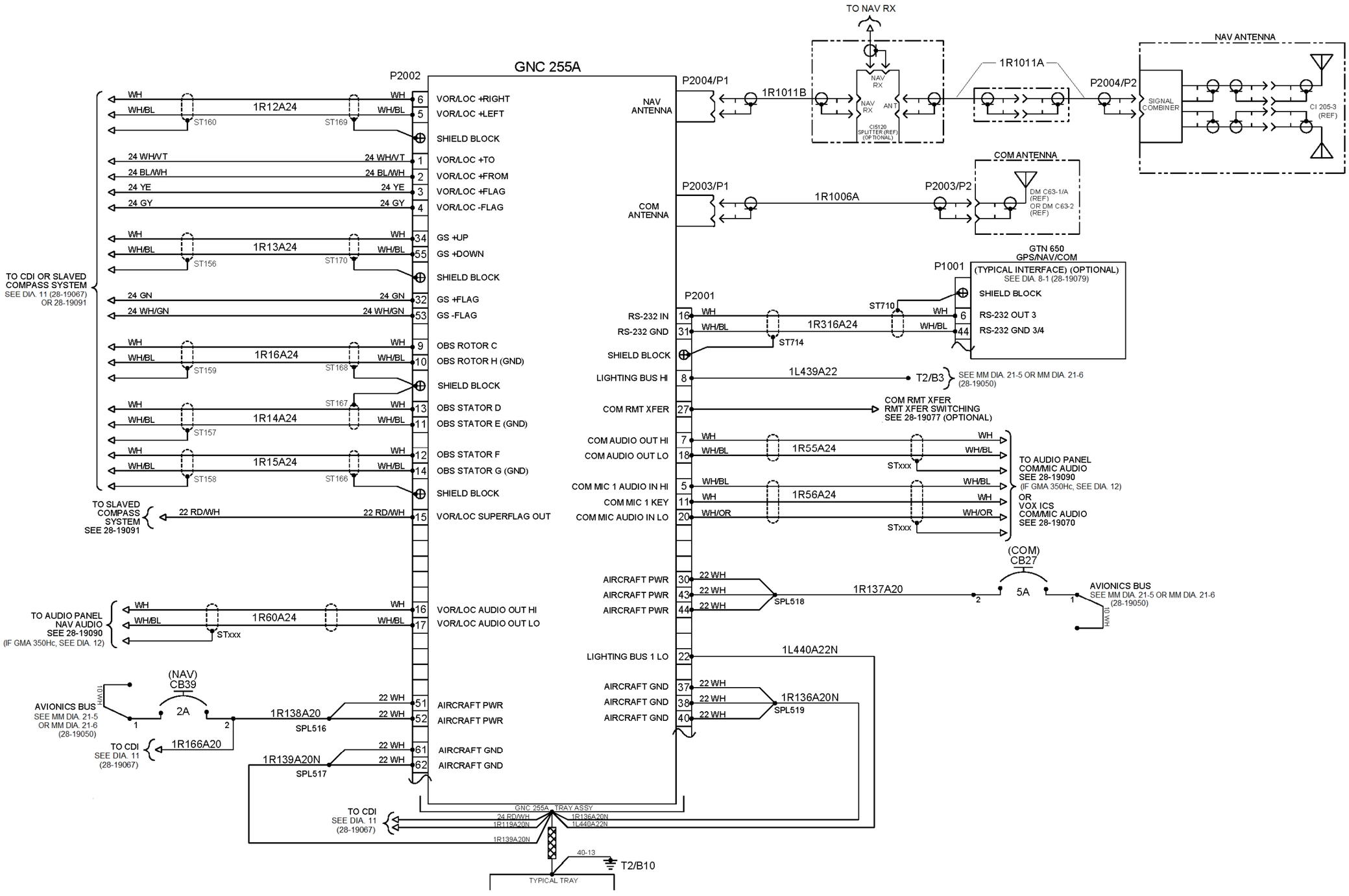


Diagram 10-1. GNC 255A (Ref. 28-19069-103 Rev. D)

CHAPTER 11

MD200 SERIES CDI

SECTION 1

SYSTEM DESCRIPTION

1-1. System Description

A. The Mid-Continent MD200-706 Course Deviation Indicator is designed to operate with VHF and GPS navigational equipment to provide OMNI (VOR), GPS, localizer (VLOC), and glideslope (GS) information.

B. The MD200 Series installation part number is 28-22095-( ).

C. Power to the MD200 CDI is provided via the **NAV** or **NAV/GPS** circuit breaker located on the left side of the lower instrument panel console.

D. Refer to F-28F/280FX Rotorcraft Flight Manual Supplement 28-AC-069 (GTN 650 interface) or 28-AC-074 (GNC 255A interface), as applicable, for system interface limitations and basic operation instructions.

1-2. Vendor Manuals

A. The following components listed in Table 11-1 are to be operated and maintained I/A/W the current vendor's instructions to ensure the continued airworthiness of the aircraft.

Table 11-1. Vendor Manuals

Component	Publication	Vendor
MD200-306	Installation Manual and Operating Instructions, Number 8017972, latest revision	Mid-Continent Inst. Co., Inc. 9400 E. 34th Street N. Wichita, KS 67226
MD200-706	Installation Manual and Operating Instructions, Model MD200-706/707, Number 9018582, latest revision	

SECTION 2

AIRWORTHINESS LIMITATIONS

2-1. Airworthiness Limitations

A. The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

B. For EASA approval, the Airworthiness Limitations Section is approved and variations must also be approved.

C. All components of the MD200 Series installation are "on condition."

SECTION 3

SERVICING, TROUBLESHOOTING, AND PERIODIC INSPECTIONS

3-1. Servicing

A. The MD200 Series CDI installation contains no user serviceable components or assemblies. Operations involving the removal of the MD200 Series CDI must be done by authorized maintenance technicians.

3-2. Troubleshooting

A. Refer to the electrical schematic in Diagram 11-1 when troubleshooting the MD200-306 interfaced to a GTN 650.

B. Refer to the electrical schematic in Diagram 11-2 when troubleshooting the MD200-706 interfaced to a GNC 255A.

C. Refer to the electrical schematic in Diagram 11-3 when troubleshooting the MD200-706 interfaced to a GTN 650.

D. Refer to the applicable electrical schematic when troubleshooting MD200 Series CDI interfaced to other equipment.

E. If the MD200 Series unit fails to operate after troubleshooting efforts, refer to paragraph 1-2 for the manufacturer contact information and additional assistance.

3-3. Periodic Inspections/Maintenance

A. The following inspection checklist is intended as a guide for 100 hour/annual inspections for aircraft operating under normal conditions. More frequent inspections may be required should adverse operating conditions be encountered.

Date	
Signature	
Aircraft Registration Number	
Aircraft Serial Number	
MD200 Series	
INITIAL EACH ITEM AFTER ACCOMPLISHMENT	
Inspect the following items every 100 hours or annually	**INITIAL**
1. Inspect the MD200 Series unit and mount for security, damage, and obvious defects.	

4-1-6. Post Installation Checkout – GMA 350Hc

A. Perform a post installation checkout in accordance with paragraph 3.8 of the GMA 350/350c/350H/350Hc Installation Manual (para. 1-2).

4-2. Software Update

A. Verify the software version number matches the approved software version listed in Enstrom Rotorcraft Flight Manual Supplement 28-AC-080. The software version information is available via the configuration tool (Table 12-2) or the GTN navigator system status page for interfaced equipment. If the replaced unit does not have the approved version of software installed, software can be downloaded from the Garmin Dealer Resource Center at www.flyGarmin.com.

4-3. Figures and Diagrams

A. GMA 350Hc installation parts list: Figure 12-1 and Figure 12-2.

B. GMA 350Hc installation configuration set-up: Figure 12-3.

D. GMA 350Hc audio panel wiring: Diagram 12-1.

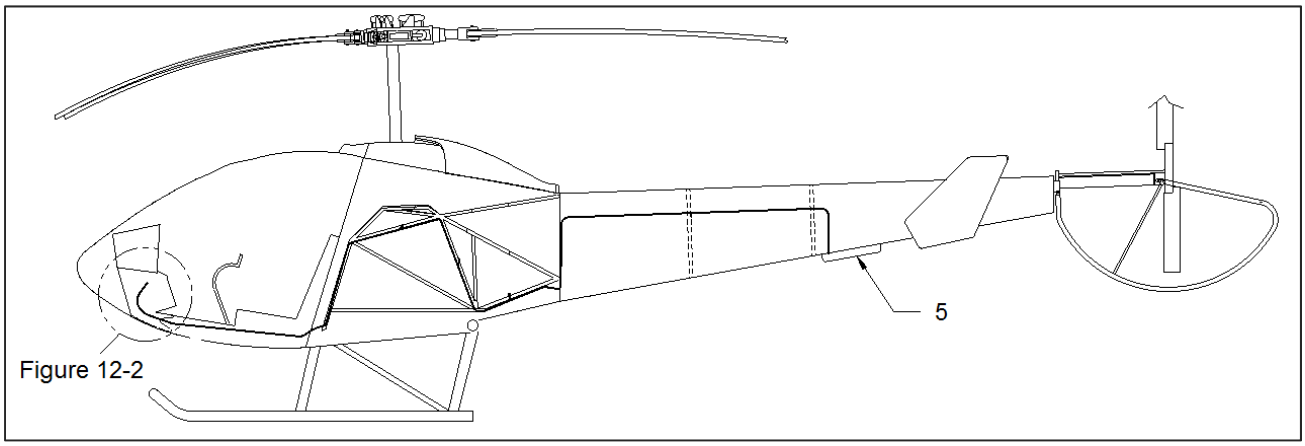
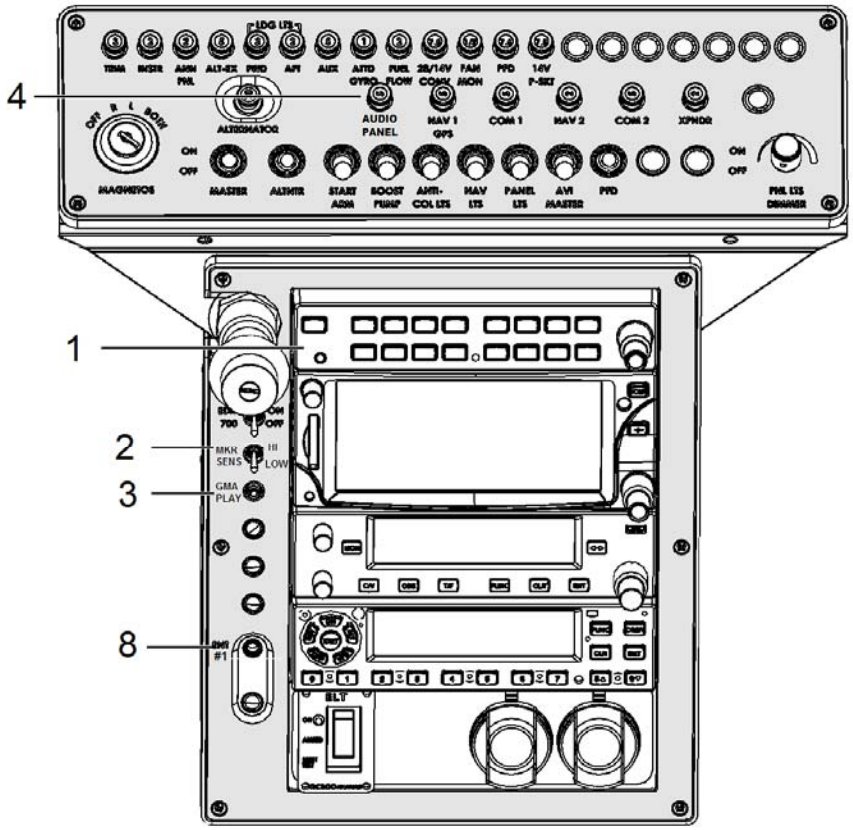


Figure 12-1. GMA 350Hc Installation



NOTE: PANEL LAYOUTS AND CONSOLE COMPONENTS MAY VARY DEPENDING ON CUSTOMER PREFERENCES.

Item	Part Number	Component	Quantity
-	28-22048-5	GMA 350Hc Audio Panel Installation with Marker Beacon Receiver	REF
1	011-02385-50	. GMA 350Hc	1
-	011-02302-00	. Connector Kit (Included with GMA 350Hc)	REF
2	7101SYZQE	. Switch (Used with 4220672-109)	1
3	8121SYZGE	. Push Button Switch	1
4	7277-5-5 (5 amp)	. Circuit Breaker	1
5	DMN43-1	. . Antenna	1
-6	AN960-8L	. . Washer	3
-7	AN365-832A	. . Nut	3
8	161-3402-E	. Entertainment Jack	1
-9*	28-19065-11	. Placard (VOICE COMMANDS DISABLED)	1

\- Item not illustrated

* EASA-specific configuration only

Figure 12-2. GMA 350Hc Installation