# GARMIN.

# **GSR 56** Satellite Receiver Installation Manual



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#### **RECORD OF REVISIONS**

Revision	<b>Revision Date</b>	Description
A	04/09/09	Initial Release
В	07/06/09	Corrected interconnect drawing, added ETSO information
С	01/04/10	Added info for new 011-02268-00 unit
D	05/05/10	Added ETSO info for 011-02268-00 unit
E	07/27/10	Made correction to Section 4.2.1
F	08/17/10	Added activation info to Section 3.8

#### **DOCUMENT PAGINATION**

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#### **CURRENT REVISION DESCRIPTION**

Revision	Page Number(s)	Section Number	Description of Change
F	3-5	3.8	Added Flight Data Services activation info

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The following table identifies hardware modification (Mod) Levels for the GSR 56. Mod Levels are listed with the associated service bulletin number, service bulletin date, and the purpose of the modification. The table is current at the time of publication of this manual (see date on front cover) and is subject to change without notice. Authorized Garmin Sales and Service Centers are encouraged to access the most up-to-date bulletin and advisory information on the Garmin Dealer Resource web site at www.garmin.com using their Garmin-provided user name and password.

	GSR 56 (011-01706-00)	) HARDWARE MOD	<b>LEVEL HISTORY</b>
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MOD LEVEL	SERVICE BULLETIN NUMBER	SERVICE BULLETIN DATE	PURPOSE OF MODIFICATION

#### GSR 56 (011-02268-00) HARDWARE MOD LEVEL HISTORY

MOD LEVEL	SERVICE BULLETIN NUMBER	SERVICE BULLETIN DATE	PURPOSE OF MODIFICATION

## **1 GENERAL DESCRIPTION**

#### 1.1 Introduction

This manual presents mechanical and electrical installation requirements for installing the GSR 56 as part of the Garmin Integrated Flight Deck. The GSR 56 can be integrated into a variety of airframes under an appropriate TC or STC. Each installation may vary. Use only approved (type or supplemental type) data for specific installation instructions in a particular aircraft.



Figure 1-1. GSR 56 Unit View (in rack)

## 1.2 Equipment Description

The GSR 56 provides airborne low speed data link and voice communication capability to Garmin Integrated Flight Deck installations. The GSR 56 contains a transceiver that operates on the Iridium Satellite network.

#### 1.3 Interface Summary

The GSR 56 interfaces directly to a GDL 59 via an RS-232 interface in a Garmin Integrated Flight Deck installation. The GDL 59 unit interfaces to the Garmin Integrated Flight Deck using HSDB. The GDL 59 can interface with one, two, or zero GSR 56 units. Installation will vary between airframes.



Figure 1-2. GSR 56 Block Diagram

## 1.3.1 I/O

The GSR 56 supports the following I/O:

- Audio I/O: The GSR 56 provides one each differential audio output and input channels to carry Iridium telephone audio to and from the GSR 56 Iridium transceiver(s).
- **Heater Configuration Pins:** The GSR 56 contains an optional 30-W heater that must be configured for the particular system voltage of the installation. These pins provide a method to perform this strapping. Refer to Section 4 and Appendix B for additional details.
- **RS-232 I/O:** The GSR 56 has one RS-232 port, which is used to communicate with the GDL 59.

#### **1.4 Technical Specifications**

It is the responsibility of the installing agency to obtain the latest revision of the GSR 56 Environmental Qualification Form. This form is available directly from Garmin under the following part number:

GSR 56 (011-01706-00) Environmental Qualification Form, Garmin part number 005-00432-10

GSR 56 (011-02268-00) Environmental Qualification Form, Garmin part number 005-00554-10

To obtain a copy of this form, see the dealer/OEM portion of the Garmin web site (<u>www.garmin.com</u>).

#### 1.4.1 **Physical Characteristics (Unit with Remote Rack)**

#### Table 1-1. Physical Characteristics

Characteristic	Specification
Width	2.08 inches (5.28 cm)
Height	6.96 inches (17.68 cm)
Depth (Rack w/ Connectors)	12.96 inches (32.92 cm)
Unit Weight (GSR 56, 011-01706-00)	3.14 lb (1.42 kg)
Unit (GSR 56, 011-01706-00) and Remote Rack Weight	4.04 lb (1.83 kg)
Unit Weight (GSR 56, 011-02268-00)	2.45 lb (1.11 kg)
Unit (GSR 56, 011-02268-00) and Remote Rack Weight	3.35 lb (1.51 kg)

#### 1.4.2 **Power Requirements**

#### Table 1-2. Input Voltage

Characteristic	Specification
Input Voltage	14/28 Vdc - See the Environmental Qualification Form for details
	on surge ratings and minimum/maximum operating voltages.

Unit Status	Max Current @ 28 Vdc	Max Current @ 14 Vdc
Off*	0.100 A	0.100 A
On (No Heater)	0. 571 A	1. 14 A
On (With Heater)	1.78 A	3.58 A

\*REMOTE POWER ON\* in inactive state

## 1.4.3 General Specifications

Characteristics	Specifications
Operating Temperature Range (011-01706-00)	-15°C to +60°C. For more details see Environmental Qualification Form.
Operating Temperature Range (011-02268-00)	-15°C to +70°C. For more details see Environmental Qualification Form.
Humidity	95% non-condensing
Altitude Range	-1,500 ft to 55,000 ft
Software Compliance	RTCA/DO-178B Level E

 Table 1-4. General Specifications

#### 1.4.4 General Iridium Antenna Requirements

#### Table 1-5. Iridium Antenna Minimum Requirements

Characteristics	Specifications
Frequency Range	1616 to 1626.5 MHz
Gain (Typical)	3dBnc
Polarization	Right Hand Circular Polarization (RHCP)
Nominal Output Impedance	50 ohms
Operating Temperature Gain	-50 to +85°C*
Antenna Cable Loss (transmit and receive)	3.0dB Max

\*STC/Installation dependent

#### 1.5 Approved Antennas

Only antennas from a list of Iridium-approved antenna available from the Iridium website at <u>http://www.iridium.com</u> are approved for use with the GSR 56. This list currently includes:

- 1. Comant CI 490-1
- 2. Sensor System S67-1575-165
- 3. Antcom S3IR16RR
- 4. Dayton Granger L10-780
- 5. Dayton Granger L10-787

## 1.6 Certification

The conditions and tests required for the TSO approval of this article are minimum performance standards. It is the responsibility of those installing this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. TSO articles must have separate approval installation in an aircraft. The article may be installed only if performed under 14 CFR part 43 or the applicable airworthiness requirements.

The Appliance Project Identifier (API) for the GSR 56 is GMN-00641. The API has been used for project identification with the FAA and EASA. In addition, the alpha character appended to the API in the ETSO certificate has been added to supplement project identification by EASA. This alpha character does not represent a version number; see applicable hardware and software part numbers to identify appliance approvals.

The GSR 56 system is limited to communication to the cockpit and cabin for convenience only.

#### 1.6.1 TSO/ETSO Compliance

#### 1.6.1.1 GSR 56 (011-01706-00)

Function	TSO/ETSO	Category
Aircraft Audio Systems and Equipment	TSO-C139	
Audio Selector Panels and Amplifier	ETSO-C50c	
Airborne Systems for Non Required Telecommunication Services (In Non Aeronautical Frequency Bands)	ETSO-2C514	Class 2/Category 1

#### Table 1-6. TSO/ETSO Authorizations

#### 1.6.1.2 GSR 56 (011-02268-00)

Table 1-7. 1	<b>FSO/ETSO</b>	Authorizations
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Function	TSO	Category
Aircraft Audio Systems and Equipment	TSO-C139	
Audio Selector Panels and Amplifier	ETSO-C50c	
Airborne Systems for Non Required Telecommunication Services (In Non Aeronautical Frequency Bands)	ETSO-2C514	Class 2/Category 1

## 1.6.2 TSO/ETSO Deviations

## 1.6.2.1 GSR 56 (011-01706-00)

Table 1-8.	TSO/ETSO	<b>Deviations</b>
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TSO/ETSO	Deviation
T00.0400	1. Garmin was granted a deviation from TSO-C139 subpart 3b to consider failure of the intended function of the GSR56, defined in the stated paragraph of TSO-C139, as no safety effect.
	2. Garmin was granted a deviation from TSO-C139 to use the environmental qualification form as part of RTCA DO-160E instead of the form required as part of DO-160D.
130-0139	3. Garmin was granted a deviation from TSO-C139 subpart 7a which requires furnishing each person receiving a GSR 56 copy of the data listed in paragraph 5I of TSO-C139.
	4. Garmin was granted a deviation from TSO-C139 subpart 7b which requires furnishing each person receiving a GSR 56 a copy of the data in paragraphs 5I, 5m, and 5n of TSO-C139.
ETSO-C50c	1. Garmin was granted a deviation from ETSO-C50c § 3.1.2 to use EUROCAE ED-14E/ RTCA DO-160E instead of ED-14D/ RTCA DO-160D as the environmental test standard.
	2. Garmin was granted a deviation from ETSO-C50c § 3.1.1 to use RTCA DO-214 instead of EUROCAE ED-18/RTCA DO-170 as the Minimum Performance Standard.

## 1.6.2.2 GSR 56 (011-02268-00)

### Table 1-9. TSO/ETSO Deviations

TSO/ETSO	Deviation
T00.0400	1. Garmin was granted a deviation from TSO-C139 subpart 3b to consider failure of the intended function of the GSR56, defined in the stated paragraph of TSO-C139, as no safety effect.
	2. Garmin was granted a deviation from TSO-C139 to use the environmental qualification form as part of RTCA DO-160E instead of the form required as part of DO-160D.
130-0139	3. Garmin was granted a deviation from TSO-C139 subpart 7a which requires furnishing each person receiving a GSR 56 copy of the data listed in paragraph 5I of TSO-C139.
	4. Garmin was granted a deviation from TSO-C139 subpart 7b which requires furnishing each person receiving a GSR 56 a copy of the data in paragraphs 5I, 5m, and 5n of TSO-C139.
ETSO-C50c	1. Garmin was granted a deviation from ETSO-C50c § 3.1.2 to use EUROCAE ED-14E/ RTCA DO-160E instead of ED-14D/ RTCA DO-160D as the environmental test standard.
	2. Garmin was granted a deviation from ETSO-C50c § 3.1.1 to use RTCA DO-214 instead of EUROCAE ED-18/RTCA DO-170 as the Minimum Performance Standard.

#### 1.6.3 Non-TSO Functions

The non-TSO function listed in Table 1-10 was tested to RTCA/DO-160E environmental qualifications.

Function	Design Assurance
Iridium satellite radio transceiver	RTCA/DO-178B Level E

#### **1.7 Reference Documentation**

The publications listed in Table 1-11 are sources of additional information for installing the GSR 56. Before installing the GSR 56, the technician should read all referenced materials applicable to the installation along with this manual.

Part Number	Document
005-00432-10	GSR 56 (011-01706-00) Environmental Qualification Form
005-00554-10	GSR 56 (011-02268-00) Environmental Qualification Form
190-00303-00	G1000 System Installation Manual
190-00303-04	G1000 Line Maintenance and Configuration Manual

#### Table 1-11. Referenced Publications

### 1.8 Aviation Limited Warranty

All Garmin avionics products are warranted to be free from defects in materials or workmanship for: two years from the date of purchase for new Remote-Mount and Panel-Mount products; one year from the date of purchase for new portable products and any purchased newly-overhauled products; six months for newly-overhauled products exchanged through a Garmin Authorized Service Center; and 90 days for factory repaired or newly-overhauled products exchanged at Garmin in lieu of repair. Within the applicable period, Garmin will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts or labor, provided that the customer shall be responsible for any transportation cost. This warranty does not apply to: (i) cosmetic damage, such as scratches, nicks and dents; (ii) consumable parts, such as batteries, unless product damage has occurred due to a defect in materials or workmanship; (iii) damage caused by accident, abuse, misuse, water, flood, fire, or other acts of nature or external causes; (iv) damage to a product that has been modified or altered without the written permission of Garmin. In addition, Garmin reserves the right to refuse warranty claims against products or services that are obtained and/or used in contravention of the laws of any country.

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## 2 INSTALLATION

#### 2.1 Introduction

This section provides hardware equipment information for installing the GSR 56 and related hardware. Installation of the GSR 56 should follow the aircraft TC or STC requirements. Cabling is fabricated by the installing agency to fit each particular aircraft. The guidance of FAA advisory circulars AC 43.13-1B and AC 43.13-2A, where applicable, may be found useful for making retro-fit installations that comply with FAA regulations.

Refer to the G1000 System Installation Manual, Garmin part number 190-00303-00 for further details on the mechanical aspects.

#### 2.2 Installation Materials

The GSR 56 is available as a single unit under the part numbers listed in Table 2-1.

Item	Garmin Catalog Part Number
GSR 56 Unit (011-01706-00)	010-00641-00
GSR 56 Unit (011-02268-00)	010-00815-00

#### Table 2-1. Unit Part Numbers

#### 2.3 Equipment Available

Each of the accessories listed in Table 2-2 are available separately for the GSR 56.

#### Table 2-2. Accessories

Item	Garmin Catalog Part Number		
GSR 56 Unit Rack, Remote	115-01018-00		
GSR 56 Back Plate	011-01800-00		
GSR 56 Connector Kit	011-01732-00		

#### 2.4 Cabling and Wiring

Use AWG #24 or larger wire for all connections unless otherwise specified by the aircraft manufacturer or Garmin. The standard pin contacts supplied in the connector kit are compatible with 22, 24, 26, & 28 AWG wire. In cases where some installations have more than one unit sharing a common circuit breaker, sizing and wire gauge is based on aircraft circuit breaker layout, length of wiring, current draw of units, and internal unit protection characteristics. Do not attempt to combine more than one unit on the same circuit breaker unless it is specified on aircraft manufacturer approved drawings.

In some cases, a larger gauge wire such as 16 or 18 AWG may be needed for power connections. 16 & 18 AWG compatible pins are provided in the connector kit for these power and ground connections. Special thin-wall heat shrink tubing is also provided to insulate the extended barrels inside the backshell. If using #16 or #18 barrel contacts, ensure that no two contacts are mounted directly adjacent to each other. This minimizes the risk of contacts touching and shorting to adjacent pins and to ground.

Ensure that routing of the wiring does not come in contact with sources of heat or RF/EMI interference. Check that there is ample space for the cabling and mating connectors. Avoid sharp bends in cabling and routing near aircraft control cables.

## 2.5 Cooling Air

No cooling air is needed for the GSR 56.

#### 2.6 Mounting Requirements

The GSR 56 mounting surface should be capable of providing a sufficient electrical bond to the aircraft to minimize radiated EMI and provide protection from High-Intensity Radiation Fields (HIRF). The GSR 56 can be mounted using the GSR 56 remote rack shown in Figure 2-1.

Refer to the Figure A-1 GSR 56 Outline and Installation Drawing for details.



Figure 2-1. GSR 56 Remote Unit Rack

## 3 INSTALLATION PROCEDURE

#### 3.1 Unpacking Unit

Carefully unpack the equipment and make a visual inspection of the unit for evidence of damage incurred during shipment. If the unit is damaged, notify the carrier and file a claim. To justify a claim, save the original shipping container and all packing materials. Do not return the unit to Garmin until the carrier has authorized the claim.

Retain the original shipping containers for storage. If the original containers are not available, a separate cardboard container should be prepared that is large enough to accommodate sufficient packing material to prevent movement.

#### 3.2 Wiring Harness Installation

Allow adequate space for installation of cables and connectors. The installer shall supply and fabricate all of the cables. Electrical connections are made through a 44-pin D-Subminiature connector and a TNC coaxial connector.

Section 4 defines the electrical characteristics of all input and output signals. Required connectors and associated hardware are supplied with the connector kit (Refer to Section 2.3). See Appendix B for examples of interconnect wiring diagrams. Construct the actual harnesses in accordance with aircraft specific approved interconnect diagrams.

Manufaaturar	44 pin D-Subminiature connector (P561)			
Manufacturer	Manufacturer         16 AWG         18 AWG           (Power and Power         (Power and Power         Ground Only)           Ground Only)         Ground Only)		22-28 AWG	
Garmin P/N	336-00044-01	336-00044-00	336-00021-00	
Military P/N	N/A	N/A	M39029/58-360	
AMP	N/A	N/A	204370-2	
Positronic	N/A	N/A	MC8522D	
ITT Cannon	N/A	N/A	030-2042-000	

 Table 3-1. Pin Contact Part Numbers

Monufacturer	Hand Crimping	18-20 AWG		22-28 AWG	
Manufacturer	Tool	Positioner	Insertion/ Extraction Tool (note 2)	Insertion/ Positioner traction Tool (note 2)	
Military P/N	M22520/2-01	N/A	M81969/1-04	M22520/2-09	M81969/1-04
Positronic	9507	9502-11	M81969/1-04	9502-4	M81969/1-04
ITT Cannon	995-0001-584	N/A	N/A	M22520/2-09	274-7048-000
AMP	601966-1	N/A	91067-1	601966-6	91067-1
Daniels	AFM8	K774	M81969/1-04	K42	M81969/1-04
Astro	615717	N/A	M81969/1-04	615725	M81969/1-04

 Table 3-2.
 Recommended Crimp Tools

#### NOTES

- 1. Non-Garmin part numbers shown are not maintained by Garmin and consequently are subject to change without notice.
- 2. Extracting the #16, #18 and #20 contact requires that the expanded wire barrel be cut off from the contact. It may also be necessary to push the pin out from the face of the connector when using an extractor due to the absence of the wire. A new contact must be used when reassembling the connector.
- 3. For applications using 16 AWG wire, contact Garmin for information regarding connector crimp positioner tooling.

#### 3.3 Iridium Antenna Installation

For use with the GSR 56, Iridium antennas have an operating frequency range of 1616-1626.5 MHz. Minimum antenna requirements are listed in Section 1.4.4.



It is the installer's responsibility to ensure that their choice of antenna meets FAA certification standards according to the specific installation. This installation manual suggests the antenna specifications listed in Section 1.4.4. Other antennas may be acceptable but their installation is not covered by this manual.

There are several critical factors to take into consideration before installing an antenna for a satellite communications system, these factors are addressed in the following sections.

#### 3.3.1 Antenna Mounting

For installation mounting of the Iridium antenna, follow the manufacturer's instructions and the instructions in this Section (Section 3.3)

#### 3.3.2 Antenna Grounding



Improper grounding of the antenna can cause poor signal reception.

It is very important to have good conductivity between the coaxial shield and the ground plane. This is ensured when all the fasteners properly ground the antenna base to the skin of the aircraft. The resistance between the antenna and the skin of the aircraft should be less than 10 milliohms.

#### 3.3.3 Iridium Antenna Location

As with any antenna installation, keep the following points in mind:

- 1. The Iridium Satellite signal is a line-of-sight signal. Locating antennas too close to obstructions such as the vertical stabilizer will limit the reception of the satellite signal.
- 2. Maintain about three feet from heater, ignition, autopilot, and other control surface actuators and motors. Maintain about five feet from fluorescent lamps, related ballast, air conditioners, blowers, strobe lights and power supplies.
- 3. The minimum distances to be observed when selecting an antenna location are as follows:
  - 30 inches from any passive (receive only) antenna such as GPS.
  - 5 inches from a VHF active antenna such as COM or ACARS.
  - 5 inches from an active radar altimeter (4 GHz).
  - 30 inches from a UHF / Microwave transmitting antenna such as a transponder, DME, active TCAS, UAT, SATCOM, or Flitephone.
  - 34 inches between the Iridium Antenna for dual or multiple Iridium GSR 56 installations.
- 4. The Iridium antenna must be mounted on top of the aircraft for greatest satellite visibility (Figure 3-1). For best performance, select a location with an unobstructed view of the sky above the aircraft when in level flight. Location of communication antennas too close to the Iridium antenna may not only degrade the transmission through reflection, but can also absorb and re-radiate the transmission causing a condition similar to having two COM antennas located in close proximity to each other.



Figure 3-1. Antenna Installation Location

#### 3.4 Cable Installation

#### 3.4.1 Coaxial Cable Installation

1. Choose the correct coax: RG-400/U has good characteristics for loss, size, and flexibility. The maximum cable loss between the GSR 56 and the satellite antenna (transmit or receive) is 3.0 dB.



It is critical to the performance of the GSR 56 to keep the cable loss of the antenna cable to a minimum through the use of appropriate coax cable and proper connector installation. The total RF loss should not exceed 3.0 dB @ 1600 Mhz and the VSWR should be less than 1.4:1 when the cable is terminated in a 50 ohm load.

- 2. Trim the coaxial cable to the desired length and install TNC connectors at each end per the cabling instructions listed in Figure 3-2. For routing convenience, one end of the coaxial run can be terminated prior to installation.
- 3. With the GSR 56 receiver and antenna installed, route and clamp the coaxial cable in position. Secure cable in accordance with AC 43.13-1B, Chapter 11.



Figure 3-2. TNC Connector Installation

#### 3.5 Backshell Assembly and Installation

The GSR 56 connector kit includes a Garmin backshell assembly. Garmin's backshell also gives the installer the ability to easily terminate shield grounds at the backshell housing using the Shield Block method. To assemble the backshell refer to instructions provided in the G1000 System Installation Manual (190-00303-00) and Shield Block Installation Instructions (190-00313-09).

#### 3.6 Final Installation

For final installation and assembly, refer to the outline and installation drawings shown in Appendix A of this manual.

- 1. Assemble the connector backshell as described in Section 3.5.
- 2. Attach the connector to the rear plate using the (2) screws provided in the connector kit.
- 3. Mount the unit rack to a suitable mounting location using (4) #8 screws.
- 4. Assemble the rear plate into the GSR 56 unit rack using the (2) screws provided with the back plate.
- 5. Insert the GSR 56 into the rack, noting proper orientation as shown on the installation drawings in Appendix A.
- 6. Lock the GSR 56 in place using the ratcheting latch mechanism.

## CAUTION

Do not use excessive force when inserting the GSR 56 into the rack. This may cause damage to occur to the connectors, unit, and/or unit rack. If heavy resistance is felt during installation, stop! Remove the GSR 56 and identify the source of resistance.

#### 3.7 Post Installation Configuration and Checkout

For GSR 56 installations that interface directly with a GDL 59, refer to the GDL 59 Installation Manual, 190-00837-00.

For actual aircraft installation/checkout, use only aircraft manufacturer approved checkout procedures.

#### 3.8 Activation of Garmin Flight Data Services

In order to activate the GSR 56 for Garmin Flight Data Services, please contact Garmin Product Support at one of the following numbers (M-F, 7:00 a.m. to 7:00 p.m. Central Standard Time, - Central USA):

- 1.866.739.5687 (toll free in USA)
- +1.913.440.1135 (worldwide)

Please have the following information ready prior to calling:

- Name of aircraft owner and contact information
- Aircraft tail number, serial number, manufacturer, and model
- Serial number(s) of all GSR 56 units installed in aircraft
- System configuration (GSR 56 standalone installation, or GSR 56 with GDL 59 installation)
- G1000 system ID number
- Credit card information

## 3.9 Troubleshooting

Refer to the Table 3-3 to troubleshoot any faults

Table 3-3.	Troubleshooting
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Problem	Action
No communication with CCR 56	Check power wiring and pin out.
No communication with GSR 50	• Verify correct communication port setting on display/control device.
	<ul> <li>Ensure the Iridium antenna has an unobstructed view of satellite constellation.</li> </ul>
No or low-quality signal	Check the antenna cable and connectors.
	Verify antenna ground plane is adequate.
No audio autout	Check wiring from GSR 56 to audio panel or GDL 59
	Verify subscription with Garmin Iridium Services
	Verify subscription with Garmin Iridium Services
Unable to make a phone call	Verify signal quality is adequate
	<ul> <li>Verify communication between GSR 56 and the display/control device</li> </ul>

## 3.10 Continued Airworthiness

Maintenance of the GSR 56 is "on condition" only. For regulatory periodic functional checks, refer to approved aircraft maintenance manuals or manual supplements for actual aircraft maintenance requirements.

## 4 SYSTEM INTERCONNECTS

#### 4.1 Pin Function List

#### 4.1.1 P561 Connector

View of J561 connector looking at unit



Pin	Pin Name	I/O
1	AUDIO OUT HI	Out
2	AUDIO OUT LO	Out
3	POWER GROUND	
4	AUDIO IN HI	In
5	AUDIO IN LO	In
6	POWER GROUND	
7	RESERVED	
8	RESERVED	
9	RESERVED	
10	RESERVED	
11	SIGNAL GROUND	
12	RS-232 OUT	Out
13	RS-232 IN	In
14	SIGNAL GROUND	
15	RESERVED	
16	IRIDIUM REMOTE POWER ON*	In
17	POWER GROUND	
18	RESERVED	
19	POWER GROUND	
20	RESERVED	
21	HEATER POWER	In
22	HEATER 1 HI	
23	POWER GROUND	
24	SPARE	
25	RESERVED	
26	RESERVED	
27	RESERVED	
28	RESERVED	
29	RESERVED	
30	RESERVED	
31	STATUS DISCRETE* OUT	Out
32	AIRCRAFT POWER 1	In
33	AIRCRAFT POWER 1	In
34	AIRCRAFT POWER 2	In

\*Denotes Active Low (Ground to activate)

	Connector P561, continued		
Pin	Pin Name	I/O	
35	AIRCRAFT POWER 2	In	
36	HEATER POWER	In	
37	HEATER 2 HI		
38	HEATER 1 LO		
39	RESERVED		
40	RESERVED		
41	RESERVED		
42	RESERVED		
43	SIGNAL GROUND		
44	RESERVED		

\*Denotes Active Low (Ground to activate)

#### 4.2 **Power Functions**

#### 4.2.1 Aircraft Power

The GSR 56 has four inputs pins for the two Aircraft Power busses of 14/28VDC. For 28V systems, only one pin from each Aircraft Power input (pin 32 or 33 for Aircraft Power 1, and pin 34 or 35 for Aircraft Power 2) is required, plus the same number of Power Ground pins. For 14V systems, both pins from each Aircraft Power (1 & 2) input are required, plus the same number of Power Ground pins.

Pin Name	Connector	Pin	I/O
AIRCRAFT POWER 1	P561	32	In
AIRCRAFT POWER 1	P561	33	In
AIRCRAFT POWER 2	P561	34	In
AIRCRAFT POWER 2	P561	35	In
POWER GROUND	P561	3	
POWER GROUND	P561	6	
POWER GROUND	P561	17	
POWER GROUND	P561	19	

AIRCRAFT POWER 1 and AIRCRAFT POWER 2 are "diode ORed" to provide power redundancy.

#### 4.2.2 Heater Power

The Heater Power inputs use series/parallel circuitry internal to the GSR 56 to enable use of either a 14V or 28V supply. The low side of Heater 2 is always grounded internally to the GSR, thus a HEATER 2 LO connection is not needed/provided.

**14 V Heater Power Connections** – Connect the two HEATER POWER pins (pins 21 and 36) to the 14V Aircraft Power Bus. Connect HEATER 1 HI (pin 22) to HEATER 2 HI (pin 37), and connect HEATER 1 LO (pin 38) to power ground. These connections should be made within the connector backshell. This 14V input format uses the parallel heater circuitry.

**28 V Heater Power Connections** – Connect the two HEATER POWER pins (pins 21 and 36) to the 28V Aircraft Power Bus, connect HEATER 2 HI (pin 37) to HEATER 1 LO (pin 38), and leave HEATER 1 HI (pin 22) floating (unconnected). These connections should be made within the connector backshell. This 28V input format uses the series heater circuitry.

Pin Name	Connector	Pin	I/O
HEATER POWER	P561	21	In
HEATER POWER	P561	36	In
HEATER 1 HI	P561	22	
HEATER 1 LO	P561	38	
HEATER 2 HI	P561	37	

#### 4.2.3 Remote Power On

The GSR 56 requires remote power-on signal to power up. IRIDIUM REMOTE\_PWR\_ON is a non-configurable discrete input conforming to:

- a) Low: 0 VDC  $\leq$  Vin  $\leq$  3.5 VDC, OR Rin  $\geq$  100k ohms (active)
- b) High:  $8 \text{ VDC} \leq \text{Vin} \leq 36 \text{ VDC}$  (inactive)

Pin Name	Connector	Pin	I/O
IRIDIUM REMOTE POWER ON*	P561	16	In

\*Denotes Active Low (Ground to activate)

#### 4.3 Serial Data

#### 4.3.1 RS-232 Serial Input/Output

The RS-232 outputs conform to EIA/TIA-232C with an output voltage swing of at least  $\pm 5$  V when driving a standard RS-232 load.

Pin Name	Connector	Pin	I/O
RS232 Out	P561	12	Out
RS232 In	P561	13	In
SIGNAL GROUND	P561	11	

#### 4.4 Audio Connections

Pin Name	Connector	Pin	I/O
AUDIO OUT HI	P561	1	Out
AUDIO OUT LO	P561	2	Out
AUDIO IN HI	P561	4	In
AUDIO IN LO	P561	5	In

#### 4.5 Active Low Discrete Outputs

DISCRETE OUT\* pins: INACTIVE: Floating (can be pulled up to externally sourced Vout in the range  $0 \le \text{Vout} \le 33\text{VDC}$ ) Leakage current in the INACTIVE state is typically  $\le 10$  uA to ground ACTIVE: Vout  $\le 0.5$ VDC with  $\le 20$  mA sink current Sink current must be externally limited to 20 mA max

Pin Name	Connector	Pin	I/O
STATUS DISCRETE* OUT	P561	31	Out

\*Denotes Active Low (Ground to activate)

## 011-01706-00





NOTES: 1. DIMENSIONS: INCHES [mm] 2. DIMENSIONS ARE SHOWN FOR REFERENCE ONLY. 3. MOUNTING HOLE FOR #8 FASTENER (4 PLCS)

#### Figure A-1. GSR 56 (011-01706-00) Outline Drawing)

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## 011-02268-00





NOTES: 1. DIMENSIONS: INCHES [mm] 2. DIMENSIONS ARE SHOWN FOR REFERENCE ONLY. 3. MOUNTING HOLE FOR #8 FASTENER (4 PLCS)

#### Figure A-2. GSR 56 (011-02268-00) Outline Drawing)

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Figure A-3. GSR 56 011-01706-00 and 011-02268-00 Installation Drawing

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Figure B-1. GSR 56 Example Interconnect

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