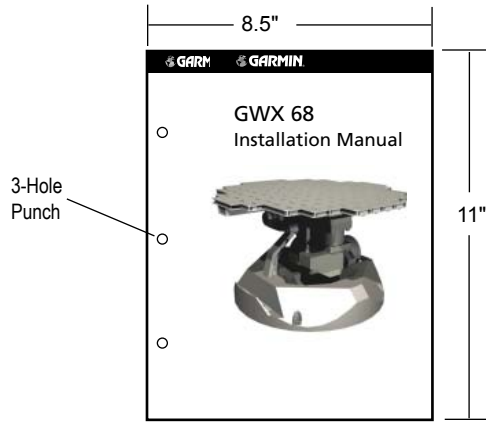


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Preliminary

GWX 68

Installation Manual



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This manual reflects the operation of software version TBD. Some differences in operation may be observed when comparing the information in this manual to earlier or later software versions.

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WARNING

This product, its packaging, and its components contain chemicals known to the State of California to cause cancer, birth defects, or reproductive harm. This Notice is being provided in accordance with California's Proposition 65. If you have any questions or would like additional information, please refer to our web site at www.garmin.com/prop65.



The image shows a yellow rectangular warning label. In the top left corner, there is a black triangular warning symbol containing a radar antenna icon with three curved lines representing radiation waves. To the right of the symbol, the words "MICROWAVE RADIATION" are printed in large, bold, purple capital letters. Below this, a white rectangular box with a yellow border contains the following text: "WARNING" in red, followed by "This radar device produces microwave radiation." in black. Below that, "DO NOT OPERATE THIS DEVICE UNTIL ALL SAFETY PRECAUTIONS AND INSTRUCTIONS IN THE OPERATING AND INSTALL MANUALS HAVE BEEN READ." is printed in black. Then, "IMPROPER USE OR EXPOSURE MAY RESULT IN BODILY INJURY." is printed in black. Next, "CAUTION" is printed in black. Finally, "All personnel should remain the prescribed 'safe distance' from this radar." and "Never expose any part of the body to an unterminated waveguide." are printed in black.

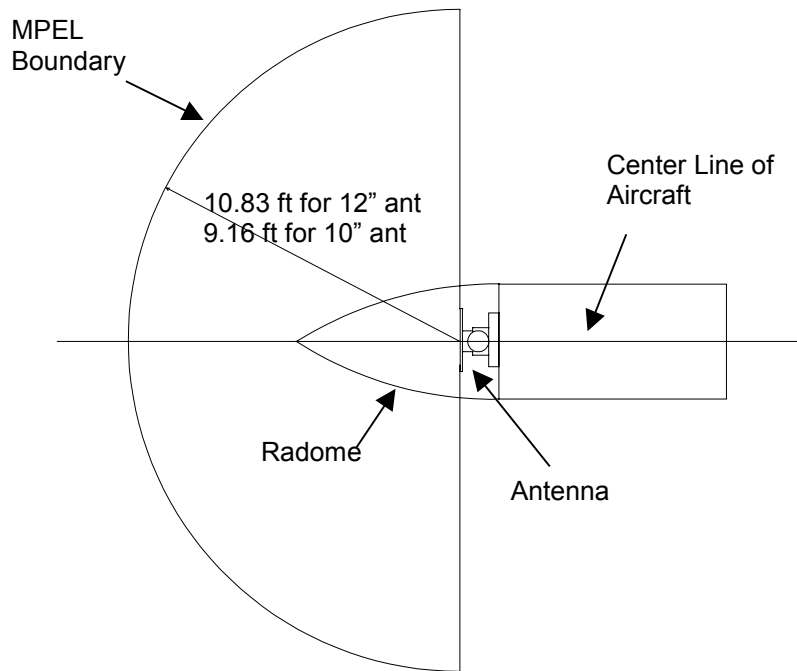
SAFE DISTANCE DETERMINATION

The following information establishes a minimum safe distance from the antenna for personnel near an operating airborne weather radar. The minimum safe distance is based upon the FCC's exposure limit at 9.3 to 9.5 GHz for general population/uncontrolled environments which is 1 mW/cm². See AC 20-68B for more information on safe distance determination.

| Antenna Size | Safe Distance |
|--------------|---------------|
| 10" | 9.16 ft |
| 12" | 10.8 ft |

MAXIMUM PERMISSIBLE EXPOSURE LEVEL (MPEL)

The zone in which the radiation level exceeds the US Government standard of 1 mW/cm², is the semi-circular area of at least 9.16 ft from the 10" antenna and 10.83 ft from the 12" antenna as indicated in the illustration below. All personnel must remain outside of this zone. The distance to the MPEL boundary is calculated upon the basis of each antenna available with the GWX 68 system, rated output power of the transmitter, and in the non-rotating or boresight position of the antenna (see example calculations above). With a scanning or rotating beam, the averaged power density at the MPEL boundary is significantly reduced.



GENERAL PRECAUTIONS

Airborne weather radar should be operated on the ground only by qualified personnel.

Installed airborne radar should not be operated while the aircraft is in a hanger or other enclosure unless the radar transmitter is not operating, or the energy is directed toward an absorption shield which dissipates the radio frequency energy. Otherwise, radiation within the enclosure can be reflected throughout the area.

BODY DAMAGE

To prevent possible human body damage, the following precautions should be taken:

1. Personnel should never stand nearby and in front of a radar antenna which is transmitting. When the antenna is not scanning, the danger increases.
2. The recommended safe distance which is established above should be followed. The distance from any person to the radar should be greater than that distance.
3. Personnel should be advised to avoid the end of an open waveguide unless the radar is turned off.
4. Personnel should be advised to avoid looking into a waveguide, or into the open end of a coaxial connector or line connector to a radar transmitter output, as severe eye damage may result.
5. Personnel should be advised that when high power radar transmitters are operated out of their protective cases, X-rays may be emitted. Stray X-rays may emanate from the glass envelope type pulser, oscillator, clipper, or rectifier tubes, as well as magnetrons.

COMBUSTIBLE MATERIALS

To prevent possible fuel ignition, an installed airborne weather radar should not be operated while an aircraft is being refueled or defueled.

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GWX 68 HARDWARE MOD LEVEL HISTORY

The following table identifies hardware modification (Mod) Levels for the GWX 68. 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.

| 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 GWX 68 Airborne Weather Radar.

NOTE

The ability of a weather radar system to accurately display weather returns is highly dependent upon the quality of the radome and its Transmission Efficiency. The specified performance of the GWX 68 Airborne Weather Radar can be achieved when installed behind a DO-213 Class A Radome within the RF window defined as ± 45 degrees from dead ahead in azimuth and ± 15 degrees from dead ahead in elevation. Refer to RTCA document DO-213 Class A for minimum operational performance standards for nose mounted radomes.

1.2 Equipment Description

The GWX 68 Airborne Weather Radar is a microprocessor-based Line Replaceable Unit (LRU) that outputs weather radar data to an external MFD. The GWX 68 communicates with other LRUs via ARINC 429/453 and/or Ethernet high speed data bus (HSDB).

CAUTION

The operation of ground-based cellular telephones or other ground-based cellular devices aboard aircraft while airborne is prohibited by FCC rules. Due to the potential for interference with onboard systems, the operation of ground-based cellular communication devices while onboard an aircraft that is on the ground is subject to FAA regulations 14 CFR 91.21.

FCC regulation 47 CFR 22.925 prohibits airborne operation of ground-based cellular telephones installed in or carried aboard aircraft. Ground-based cellular telephones must not be operated aboard any aircraft while the aircraft is off the ground. When any aircraft leaves the ground, all ground-based cellular telephones on board that aircraft must be turned off.

Ground-based cellular telephones that are on, even in a monitoring state, can disrupt GPS performance.

1.3 Interface Summary

The GWX 68 is designed as an open architecture system that uses typical ARINC 429, ARINC 453, and Ethernet communications interfaces.

1.4 Technical Specifications

1.4.1 Environmental Qualification Form

It is the responsibility of the installing agency to obtain the latest revision of the GWX 68 Environmental Qualification Form. This form is available directly from Garmin under the following part number:

GWX 68 Environmental Qualification Form, Garmin part number 005-00171-00

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

1.4.2 Physical Characteristics

| Characteristics | Specifications |
|-----------------|--|
| Unit Size | See Figure A-1. GWX 68 Outline Drawing |
| Unit weight | 10" – 9.0 lbs (4.08 kg) 12" – 9.1 lbs (4.13 kg) |

1.4.3 General Specifications

The table below contains general environmental specifications. For detailed specifications, see the Environmental Qualification Form (005-00171-00).

| Characteristics | Specifications |
|-----------------------------|--|
| Operating Temperature Range | -55°C to +70°C. For more details see Environmental Qualification Form. |
| Humidity | 95% non-condensing |
| Altitude Range | -1,500 ft to 50,000 ft |

1.4.4 Performance Specifications

| Characteristics | Specifications |
|-------------------------|--|
| Display Colors | 4 Colors |
| Selectable Ranges | 2.5, 5, 10, 20, 40, 80, 160, 320nm |
| Weather Avoidance Range | 305nm w/ 12" Ant. 270nm w/ 10" Ant. |
| Performance Index | 213dB w/ 12" Ant. 210dB w/ 10" Ant. |
| Rx Sensitivity | -110 dBm MDS |
| Manual Gain | +12 to -64dB |
| Antenna Beamwidth | 7.8° w/ 12" Ant. 9.0° w/ 10" Ant. |
| Magnetron Power | 6.5kW nominal 5kW minimum |
| Pulse Width | 1 or 4 μ S |
| Scan Angle | Pilot adjustable – 20, 40, 60 or 90° |
| Scan Centerline | Pilot adjustable |
| Scan Rate | 12 looks/minute |
| Manual Tilt | $\pm 15^\circ$ |
| Stabilization | $\pm 30^\circ$ combined pitch and roll |
| Altitude | 50k Ft unpressurized |
| STC | Effective to 80nm |
| Extended STC | 80nm to 320nm |
| Interface | Garmin HSDB/ARINC 429/ARINC 453 |

1.4.5 Power Requirements

| Characteristics | Specifications |
|---------------------|---|
| Input Voltage Range | 14/28 Vdc See the Environmental Qualification Form for details on surge ratings and minimum/maximum operating voltages. |
| Input Current | 2A @ 28V, maximum |

1.5 License Requirements

The Telecommunications Act of 1996, effective February 8, 1996, provides the FCC discretion to eliminate radio station license requirements for aircraft and ships. The GWX 68 installation must comply with current transmitter licensing requirements. To find out the specific details on whether a particular installation is exempt from licensing, please visit the FCC web site <http://wireless.fcc.gov/aviation>.

If an aircraft license is required, make application for a license on FCC form 404, Application for Aircraft Radio Station License. The FCC also has a fax-on-demand service to provide forms by fax. The GWX 68 owner accepts all responsibility for obtaining the proper licensing before using the transponder.

| |
|----------------|
| CAUTION |
|----------------|

The transmitter in this equipment is guaranteed to meet Federal Communications Commission acceptance over the specified operating temperature range. Modifications to Garmin equipment not expressly approved by Garmin could invalidate the license and make it unlawful to operate the equipment.

1.6 Certification

The conditions and tests required for 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 for installation in an aircraft. The article may be installed only if performed under 14 CFR part 43 or the applicable airworthiness requirements. At the time of publication, installations of this TSO approved article are only approved when installed in an aircraft as part of a Garmin G1000 system.

1.6.1 TSO/ETSO Compliance

TSO-C63c Class 7

1.7 Reference Documents

The following publications are sources of additional information for installing the GWX 68. Before installing the GWX 68, the technician should read all referenced materials along with this manual.

| Part Number | Document |
|--------------------|---|
| 190-00303-00 | G1000 System Installation Manual |
| 560-1025-09 | MX20 Multi-Function Display Installation Manual |

1.8 Limited Warranty

This Garmin product is warranted to be free from defects in materials or workmanship for two years from the date of purchase. Within this 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 cover failures due to abuse, misuse, accident or unauthorized alteration or repairs.

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Garmin retains the exclusive right to repair or replace the unit or software or offer a full refund of the purchase price at its sole discretion. SUCH REMEDY SHALL BE YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY.

To obtain warranty service, contact your local Garmin Authorized Service Center. For assistance in locating a Service Center near you, call Garmin Customer Service at one of the numbers shown below.

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2 INSTALLATION OVERVIEW

2.1 Introduction

This section provides hardware equipment information for installing the GWX 68, related hardware, and antennas. Installation of the GWX 68 should follow the aircraft TC or STC requirements. Cabling is fabricated by the installing agency to fit each particular aircraft. The final installation must meet the requirements of FAA AC 43.13-1B and AC 43.13-2A.

2.2 Installation Materials

The GWX 68 is available under the following part number:

| Item | Catalog P/N |
|-----------------------------------|--------------|
| GWX 68 Unit Only, (011-00883-00) | 010-00299-00 |
| GWX 68 Standard, (011-00883-00) * | 010-00300-00 |

*Includes installation kit (011-01114-00).

2.3 Installation Considerations

Fabrication of a wiring harness is required. Sound mechanical and electrical methods and practices are required for installation of the GWX 68.

2.3.1 Antenna Considerations

Antenna installations on pressurized cabin aircraft require FAA approved installation design and engineering substantiation data whenever such antenna installations incorporate alteration (penetration) of the cabin pressure vessel by connector holes and/or mounting arrangements. For needed engineering support pertaining to the design and approval of such pressurized aircraft antenna installations, it is recommended that the installer proceed according to any of the following listed alternatives:

1. Obtain approved antenna installation design data from the aircraft manufacturer.
2. Obtain an FAA approved STC, pertaining to, and valid for the antenna installation.
3. Contact the FAA Aircraft Certification Office in the appropriate Region and request identification of FAA Designated Engineering Representatives (DERs) who are authorized to prepare and approve the required antenna installation engineering data.
4. Obtain FAA Advisory Circular AC-183C and identify a DER from the roster of individuals in it.
5. Contact an aviation industry organization such as the Aircraft Electronics Association for assistance.

2.4 Cabling & 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 up to AWG #22 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 these cases, a larger gauge wire such as AWG #18 or #16 may be needed for power connections. The provided connector kit supplies extended barrel contacts for AWG #16 and #18 wire, if required. Special thin-wall heat shrink tubing is also provided to insulate the extended barrels inside the backshell. If using AWG #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, RF or 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 Requirements

The GWX 68 does not have provisions for attaching cooling air and does not generate an excessive amount of heat during typical operations, however thermal characteristics of the installation should always be assessed. An undesirable thermal condition could be created due to the unit's own internal power dissipation combined with restricted ventilation, or due to heat generated by adjacent equipment. Limiting thermal build up, by means of fan or natural convection is always good practice and recommended to increase the product life.

2.6 Mounting Requirements

The GWX 68 mounting surface must be capable of providing structural support and electrical bond to the aircraft to minimize radiated EMI and provide protection from High-Intensity Radiation Fields (HIRF).

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 of the item within the container.

3.2 Wiring Harness Installation

Allow adequate space for installation of cables, connectors, and strain relief as necessary. The installer shall supply and fabricate all of the cables. All wiring must be in accordance with FAA AC 43.13-1B. All electrical connections are made through a 44-pin D subminiature connector. Section 4 defines the electrical characteristics of all input and output signals. Required connectors and associated hardware are supplied with the connector kit.

See Appendix C for examples of interconnect wiring diagrams. Construct the actual harnesses in accordance with aircraft manufacturer authorized interconnect standards.

Table 3-1. Pin Contact Part Numbers

| Manufacturer | 44 pin D-Subminiature connector (P400) | | | |
|--------------|--|------------------------|--------------|---------------|
| | 16 AWG (Power Only) | 18 AWG (Power Only) | 20 AWG | 22-28 AWG |
| Garmin P/N | 336-00044-01 | 336-00044-00 | 336-00044-02 | 336-00021-00 |
| Military P/N | N/A | N/A | N/A | M39029/58-360 |
| AMP | N/A | N/A | N/A | 204370-2 |
| Positronic | N/A | N/A | N/A | MC8522D |
| ITT Cannon | N/A | N/A | N/A | 030-2042-000 |

Table 3-2. Recommended Crimp Tools

| Manufacturer | Hand Crimping Tool | 16, 18 & 20 AWG | | 22-28 AWG | |
|--------------|--------------------|-----------------|--|--------------|----------------------------------|
| | | Positioner | Insertion/ Extraction Tool (note 2) | Positioner | Insertion/ Extraction Tool |
| Military P/N | M22520/2-01 | N/A | M81969/1-04 | M22520/2-09 | M81969/1-04 |
| Positronic | 9507 | 9502-11 | M81969/1-04 | 9502-3 | M81969/1-04 |
| ITT Cannon | 995-0001-584 | N/A | N/A | 995-0001-739 | N/A |
| 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 |

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.

3.3 Backshell Assembly and D-Subminiature Connectors

The GWX 68 connector kit (011-01114-00) includes one Garmin backshell assembly. Garmin's backshell connectors give the installer the ability to quickly and easily terminate shield grounds at the backshell housing using the Shield Block ground kit. The term 'D-Sub' (D-Subminiature) connectors have a letter "D" physical shape. D-Sub refers only to the polarized shell that holds the contacts (pins or sockets) in place. Table 3-3 lists Garmin part numbers for the GWX 68 D-Sub Connectors and the Backshell Assembly.

Table 3-3. Backshell Assembly

| Figure Ref | Description | Garmin P/N |
|------------|--|---|
| 1 | Cast Housing (From Garmin Backshell kit.) | 125-00085-00 |
| 2 | Shield block | 117-00147-xx |
| 3 | Screw, 4-40 x.250, FLHP100°, SS/P, Nylon. | 211-63234-08 |
| 4 | Multiple Conductor Shielded Cable (See Interconnect Diagrams, Appendix C) | As Required |
| 5 | Shield Termination | As Required |
| 6 | Braid, Flat (19 – 20 AWG equivalent, tinned plated copper strands 36 AWG, Circular Mil Area 1000 – 1300) | As Required |
| 7 | Shrink Tubing | As Required |
| 8 | Pins | 336-00021-00 |
| 9 | Ring terminal, #8, insulated, 18-22 AWG, 14-16 AWG, 10-12 AWG | MS25036-149, MS25036-153, MS25036-156 |
| 10 | Screw, PHP, 8-32x.312", Stainless or Cad Plated Steel | MS51957-42, MS35206-242 |
| 11 | Split Washer, #8, (.045" compressed thickness) Stainless or Cad-plated steel | MS35338-137, MS35338-42 |
| 12 | Flat Washer, #8, .032" thick, .174"ID, .375" OD, Stainless or Cad Plated Steel | NAS1149CN832R, NAS1149FN832P |
| 13 | Silicon Fusion Tape | 249-00114-00 |
| 14 | Strain Relief | 115-00499-xx |
| 15 | Screw, 4-40x.375, PHP, SS/P, w/Nylon | 211-60234-10 |
| 16 | Lid | 115-00500-xx |
| 17 | Screw, 4-40x.187, FLHP100, SS/P, w/Nylon | 211-63234-06 |

3.3.1 Shield Block Assembly Procedure

The parts for the connector and backshell assembly, GWX68 installations, are listed in Table 3-3 and shown in Figure 3-1.

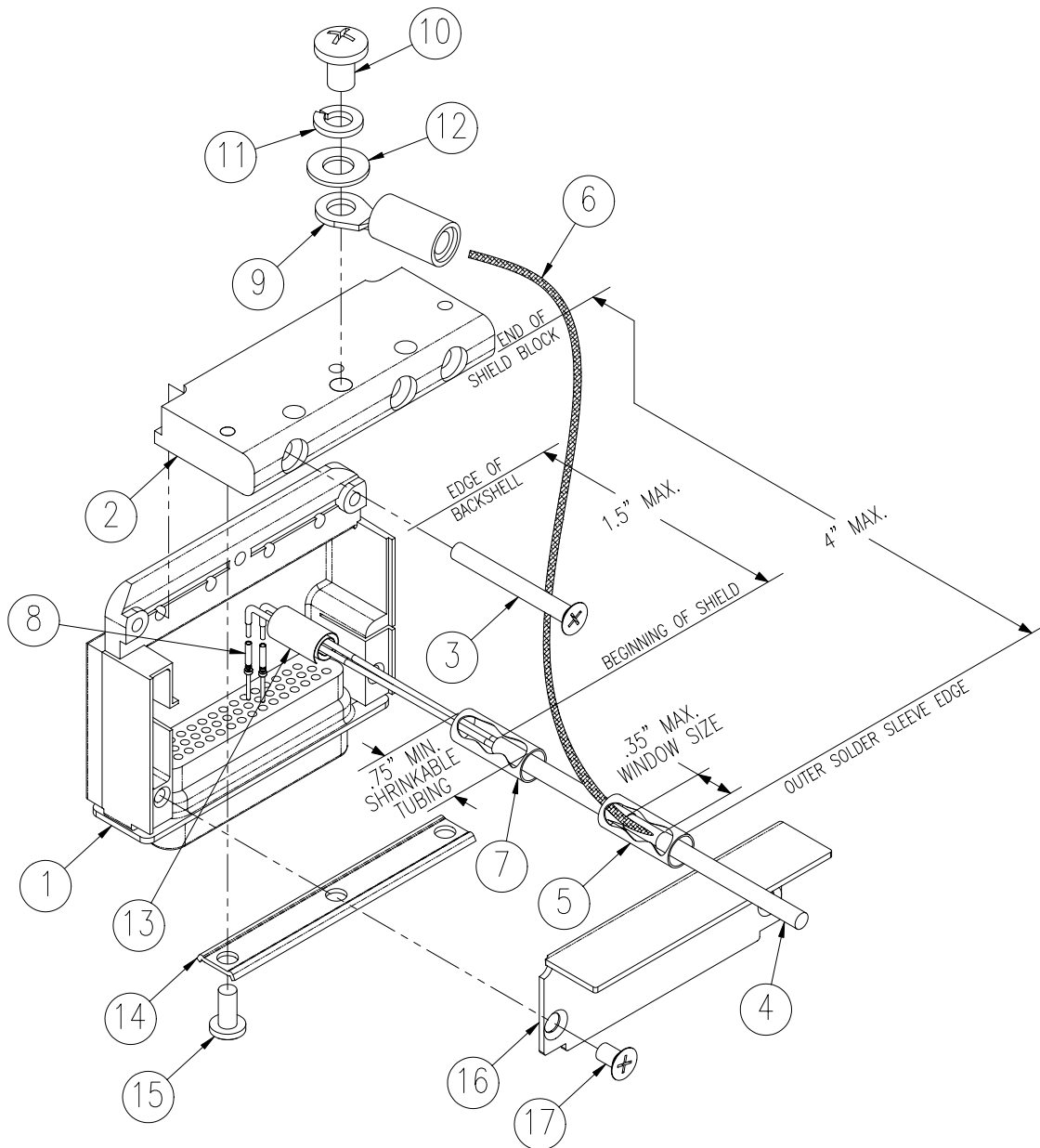


Figure 3-1. Shield Block Install onto Backshell Connector Assembly

Table 3-4. Shield Block Components

| Backshell Assembly Garmin P/N | Shield Block Garmin P/N |
|--|------------------------------------|
| 011-00950-12 (25/44 Pin High Density) | 011-01169-01 |

1. Attach the Shield Block(s) (2) to the backshell (1) by inserting the flathead screws (3) through the holes on the Shield Block and threading into the tapped holes on the backshell (1). (See Figure 3-1). The appropriate number of Shield Block kits is included in the GWX 68 connector kit.

Table 3-5. Shielded Cable Preparation

| Float Min | Float Max | Ideal Float | Window Min | Window Max | Ideal Window |
|------------------|------------------|--------------------|-------------------|-------------------|---------------------|
| 1.5" | 2.5" | 2.0" | 3.0" | 5.5" | 4.5" |

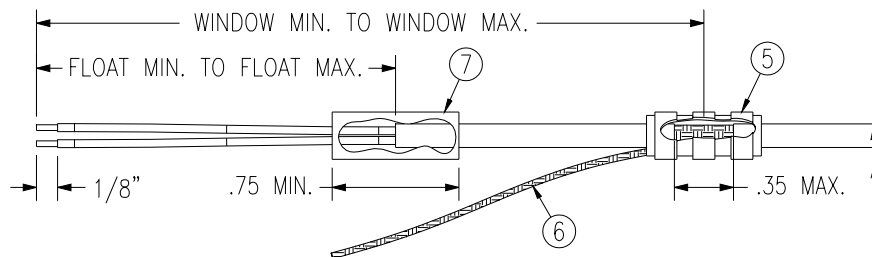


Figure 3-2. Shielded Cable Preparation

2. At one end of a shielded cable (4) measure back a distance between “Window Min” to “Window Max” (Table 3-5) and cut a window (max size 0.35”) in the jacket to expose the shield. (See Figure 3-2). Use caution when cutting the jacket to avoid damaging the individual braids of the shield. When dealing with a densely populated connector with many cables it may prove beneficial to stagger the windows throughout the “Window Min” to “Window Max” range. If staggering is not needed the “Ideal Window” length is recommended.

Tools needed to Accomplish the Window Cut:

- Coaxial Cable Stripper
- Thermal Stripper
- Sharp Razor Blade

3. Connect a Flat Braid (6) to the shield exposed through the window of the prepared cable assembly (4). The Flat Braid goes out the front of the termination towards the connector. Do not allow wires to exit the rear of the termination and loop back towards the connector. (See Figure 3-2). Make this connection using an approved shield termination technique. Refer to FAA Advisory Circular AC 43.13 as a reference for termination techniques.

Preferred Method, Solder Sleeves:

Slide a solder sleeve (5) onto the prepared cable assembly (4) and connect the Flat Braid (6) to the shield using a heat gun approved for use with solder sleeves. It may be easier to use a solder sleeve with a pre-installed Flat Braid versus having to cut a length of Flat Braid to be used. The chosen size of solder sleeve must accommodate both the number of conductors present in the cable and the Flat Braid (6) to be attached.

| |
|-------------|
| NOTE |
|-------------|

Solder Sleeves with pre-installed Flat Braid: A preferred solder sleeve is the Raychem S03 Series with the thermochromic temperature indicator. These solder sleeves come with a pre-installed braid and effectively take the place of items 5 and 6. For detailed instructions on product use, refer to Raychem installation procedure RCPS 100-70.

Raychem Recommended Heating Tools:

- HL1802E
- AA-400 Super Heater
- CV-1981
- MiniRay
- IR-1759

Individual Solder Sleeves and Flat Braid

Solder Sleeves:

Reference the following MIL-Specs for general solder sleeves:
(M83519/1-1, M83519/1-2, M83519/1-3, M83519/1-4, M83519/1-5).

Flat Braid:

If the preferred Raychem sleeves are not being used, the individual flat braid selected should conform to ASTM B33 for tinned copper and be made up of 36 AWG strands to form an approximately 19-20 AWG equivalent flat braid. A circular mil area range of 1000 to 1300 is required. The number of individual strands in each braid bundle is not specified.

| |
|-------------|
| NOTE |
|-------------|

Flat Braid as opposed to insulated wire is specified in order to insure continuing airworthiness by allowing for visual inspection of the conductor.

Secondary Method, Heat Shrink instead of Solder Sleeves:

Solder a Flat Braid (6) to the shield exposed through the window of the prepared cable assembly (4). Ensure a solid electrical connection through the use of acceptable soldering practices. Use care to avoid applying excessive heat that burns through the insulation of the center conductors and shorts the shield to the signal wire. Slide a minimum 0.75" of Teflon heat shrinkable tubing (5) onto the prepared wire assembly and shrink using a heat gun. The chosen size of heat shrinkage tubing must accommodate both the number of conductors present in the cable and the Flat Braid (6) to be attached.

4. At the same end of the shielded cable (4) and ahead of the previous shield termination, strip back "Float Min" to "Float Max" (Table 3-5) length of jacket and shield to expose the insulated center conductors. (See Figure 3-2). It may be best to build the "Ideal Float" length optimally.

Preferred Method:

The jacket and shield should be cut off at the same point so no shield is exposed. Slide 0.75" minimum of Teflon heat shrinkable tubing (7) onto the cable and use a heat gun to shrink the tubing. The chosen size of heat shrinkage tubing must accommodate the number of conductors present in the cable

Secondary Method:

Leave a max 0.35" of shield extending past the jacket. Fold this 0.35" of shield back over the jacket. Slide a solder sleeve (7) over the end of the cable and use a heat gun approved for solder sleeves to secure the connection. The chosen size of solder sleeve must accommodate the number of conductors present in the cable.

5. Strip back 1/8" of insulation and crimp a pin (8) to each of the conductors in the shielded cable.
6. Insert newly crimped pins and wires into the appropriate connector housing location as specified by the installation wiring diagrams.
7. Cut the Flat Braid (6) to a length with the addition of a ring terminal that will reach one of the tapped holes of the Shield Block (2). (See Figure 3-1). An appropriate amount of excess length without looping should be given to the Flat Braid (6) to allow it to move freely with the wire bundle. Note that the maximum distance from the backshell allowed for the window splice should keep the Flat Braid (6) to a worst case length of approximately 4".

8. Guidelines for terminating the newly cutoff Flat Braid(s) (item 6) with insulated ring terminals (9):

- Each tapped hole on the Shield Block (2) may accommodate only two ring terminals (9).
- It is preferred that only two Flat Braids (6) be terminated per ring terminal. Two Flat Braids per ring terminal will necessitate the use of a Ring terminal, #8, insulated, 14-16 AWG (MS25036-153).
- If only a single Flat Braid is left or if only a single Flat Braid is need for this connector, a Ring terminal, #8, insulated, 18-22 AWG (MS25036-149) can accommodate this single Flat Braid.
- If more braids exist for this connector than two per ring terminal, it is permissible to terminate three braids per ring terminal. This will necessitate the use of a Ring terminal, #8, insulated, 10-12 AWG (MS25036-156).
- In rare situations where more braids need to be terminated for this connector than three per ring terminal it is allowable to daisy chain a maximum of two shields together before coming to the ring terminal. (See Figure 3-3).

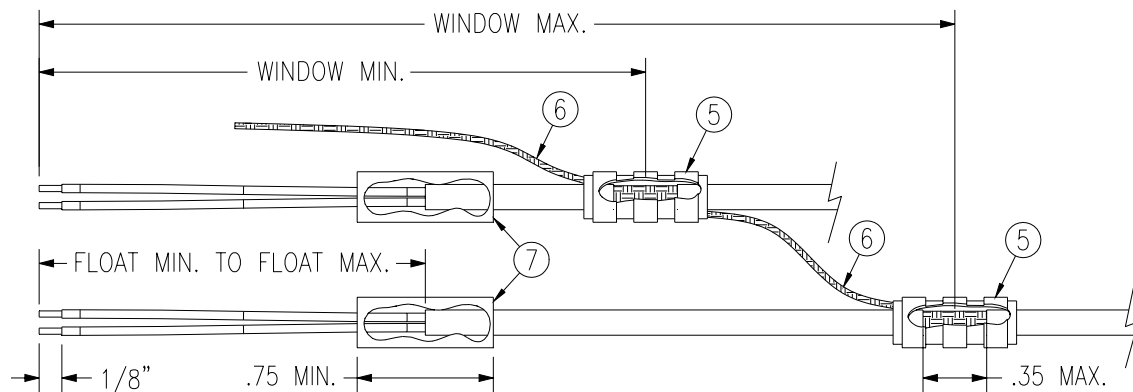


Figure 3-3: Daisy Chain Method for Shield Termination

9. Repeat steps 2 through 8 as needed for the remaining shielded cables.
10. Terminate the ring terminals to the Shield Block (2) by placing items on the Pan Head Screw (10) in the following order: Split Washer (11), Flat Washer (12), first Ring Terminal, second Ring Terminal if needed, before finally inserting the screw into the tapped holes on the Shield Block. Do not violate the guidelines presented in Step 8 regarding ring terminals.
11. It is recommended to wrap the cable bundle with Silicone Fusion Tape (13) (GPN: 249-00114-00 or a similar version) at the point where the backshell strain relief and cast housing will contact the cable bundle. Note: Choosing to use this tape is at the discretion of the installer.
12. Place the smooth side of the backshell strain relief (14) across the cable bundle and secure using the three screws (15). Warning: Placing the grooved side of the strain relief across the cable bundle may risk damage to wires.
13. Attach the cover (16) to the backshell (1) using two screws (17).

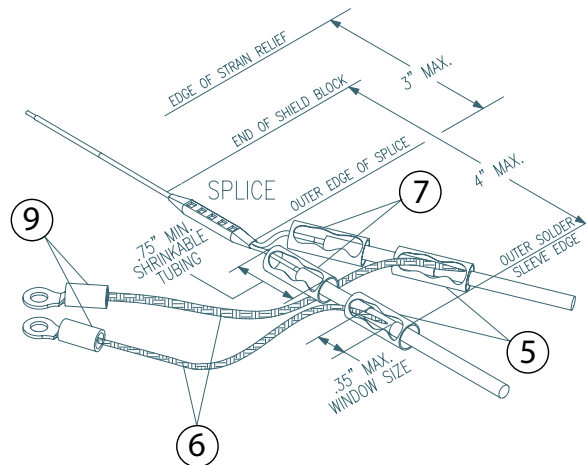


Figure 3-4: Parallel Shield Termination

3.3.2 Configuration Module Installation (MX20 only)

Table 3-6 lists part numbers for the Configuration Module Kit.

Table 3-6. Configuration Module Kit – 011-00979-00

| Item | Description | Garmin P/N |
|----------------------|-----------------------------|--------------|
| Configuration Module | PCB Board Assembly w/EEPROM | 012-00605-00 |
| Cable | 4-Conductor Harness | 325-00122-00 |
| Crimp Pins | #22 AWG (HD) | 336-00021-00 |
| Spacer | Spacer, Config Module | 213-00043-00 |

3.3.3 Configuration Module Assembly Procedure (MX20 only)

Table 3-7. Configuration Module Wire Color Reference Chart

| Color | Function | J400 Pin |
|--------|----------|----------|
| Black | Ground | 1 |
| Red | Vcc | 17 |
| Yellow | Data | 16 |
| White | Clock | 31 |

1. Crimp pins (4) onto each wire of the four-conductor wire harness (3). Strip 1/8" of insulation from each wire prior to crimping.
2. Insert newly crimped pins and wires (3, 4) into the appropriate connector housing (5) location shown in the figure below.
3. Apply the spacer (2) by wrapping it around the PCB Board (1) making sure to insert the plastic connector mounted on the board into the hole provided in the spacer.
4. Plug the four-conductor wire harness (3) into the connector on the PCB Board (1).
5. Insert into the backshell (6) recess, PCB Board (1) with pad (2) in position.
6. Attach cover (7) to backshell (6) using screws (8).

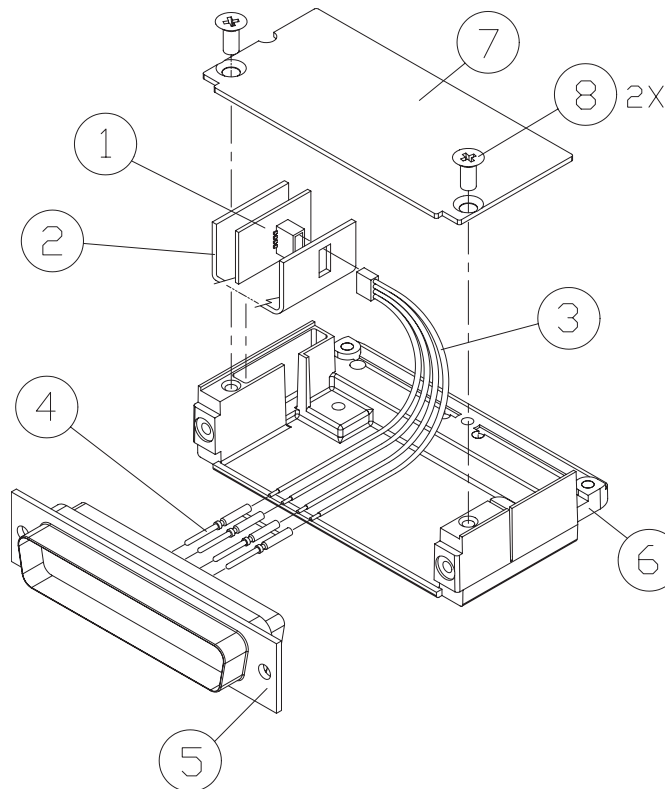


Figure 3-5. Configuration Module Installation

3.4 Unit Installation

The GWX 68 is designed to be rigidly mounted in the nose section of the aircraft. If the nose section is not accessible, pod mounting is possible. The bulk head or antenna mounting plate must be very close to perpendicular to the aircraft center line. The selected location must have adequate clearance for the full antenna sweep and tilt range. See Appendix A for outline and installation drawings. The nose section does not need to be pressurized.

NOTE

It is crucial to the performance of the GWX 68 weather radar system that care be taken in alignment of the GWX 68 unit with respect to the aircraft.

1. Refer to Figure A-1 mount the GWX 68 using the hardware provided.
2. Assemble the GWX 68 connector kit, see Section 3.3.
3. Check unit for clearance in all extreme positions.
4. Ensure wiring harness is routed in such a way that it can not be struck by or interfere with the unit movement through the full sweep and tilt range.

3.5 Post Installation Configuration & Checkout

NOTE

The GWX 68 does not provide valid outputs until the aircraft post installation configuration procedures are completed.

When installed as part of the G1000 integrated cockpit system, the GWX 68 must have FAA approved configuration data. Configuration data is loaded to the GWX 68 from an aircraft-specific G1000 Software Loader Card. Settings are predetermined for a specific aircraft and are typically contained within the file named 'TBD'.

The GDU 1040 PFD serves as the graphics user interface to the installer configuring the system. For basic configuration information, refer to the G1000 Line Maintenance and Configuration Manual, Garmin part number 190-00303-04. For actual aircraft installation/checkout, use only aircraft manufacturer approved checkout procedures.

For GWX 68 installations operating with a Garmin MX20, refer to MX20 Installation Manual, 560-1025-09.

3.6 Continued Airworthiness

For sample Instructions for Continued Airworthiness (ICA) for the GWX 68 installed as part of the G1000 integrated cockpit system, see the G1000 ICA Sample, Garmin part number 190-00303-07.

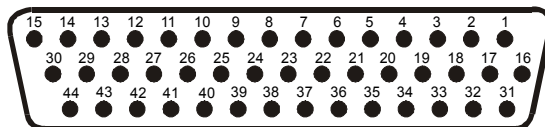
Other than for regulatory periodic functional checks, maintenance on the GWX 68 is "on condition" only. Refer to the G1000 Line Maintenance and Configuration Manual, Garmin part number 190-00303-04.

4 SYSTEM INTERCONNECTS

4.1 Pin Function List

4.1.1 P400

View of J400 connector from back of unit



| Pin | Pin Name | I/O |
|-----|----------------------|-----|
| 1 | CONFIG MODULE GROUND | -- |
| 2 | RESERVED | -- |
| 3 | RESERVED | -- |
| 4 | ARINC 453 OUT A | Out |
| 5 | ARINC 453 OUT B | Out |
| 6 | RESERVED | -- |
| 7 | AIRCRAFT POWER 1 | In |
| 8 | RESERVED | -- |
| 9 | AIRCRAFT POWER 1 | In |
| 10 | AIRCRAFT POWER 2 | In |
| 11 | RESERVED | -- |
| 12 | AIRCRAFT POWER 2 | In |
| 13 | POWER GROUND | -- |
| 14 | RESERVED | -- |
| 15 | POWER GROUND | -- |
| 16 | CONFIG MODULE DATA | I/O |
| 17 | CONFIG MODULE POWER | Out |
| 18 | ROLL ATTITUDE HI | In |
| 19 | ROLL ATTITUDE LO | In |
| 20 | 26 VAC GYRO REF LO | In |
| 21 | 26 VAC GYRO REF HI | In |
| 22 | ARINC 429 IN 2 A | In |
| 23 | ARINC 429 IN 2 B | In |
| 24 | RESERVED | -- |
| 25 | RESERVED | -- |
| 26 | RESERVED | -- |
| 27 | RESERVED | -- |
| 28 | RESERVED | -- |
| 29 | RESERVED | -- |
| 30 | RESERVED | -- |
| 31 | CONFIG MODULE CLOCK | Out |
| 32 | PITCH ATTITUDE HI | In |
| 33 | PITCH ATTITUDE LO | In |
| 34 | ETHERNET IN A | In |
| 35 | ETHERNET IN B | In |

| Connector P400, continued | | |
|---------------------------|------------------------|-----|
| Pin | Pin Name | I/O |
| 36 | ETHERNET OUT A | Out |
| 37 | ETHERNET OUT B | Out |
| 38 | ARINC 429 IN 1 A | In |
| 39 | ARINC 429 IN 1 B | In |
| 40 | RESERVED | -- |
| 41 | RESERVED | -- |
| 42 | RESERVED | -- |
| 43 | RESERVED | -- |
| 44 | RADAR REMOTE POWER OFF | In |

4.2 Power

4.2.1 Power Functions

This section covers the power input requirements.

4.2.1.1 Aircraft Power

| Pin Name | Connector | Pin | I/O |
|------------------|-----------|-----|-----|
| AIRCRAFT POWER 1 | P400 | 7 | In |
| AIRCRAFT POWER 1 | P400 | 9 | In |
| AIRCRAFT POWER 2 | P400 | 10 | In |
| AIRCRAFT POWER 2 | P400 | 12 | In |
| POWER GROUND | P400 | 13 | -- |
| POWER GROUND | P400 | 15 | -- |

Pins 7 and 9 of P400 are internally connected to form AIRCRAFT POWER 1. Pins 10 and 12 of P400 are internally connected to form AIRCRAFT POWER 2. AIRCRAFT POWER 1 and AIRCRAFT POWER 2 are “diode ORed” to provide power redundancy.

4.2.1.2 Remote On/Off

| Pin Name | Connector | Pin | I/O |
|------------------------|-----------|-----|-----|
| RADAR REMOTE POWER OFF | P400 | 44 | In |

For G1000 installations RADAR REMOTE POWER OFF must be grounded to pin 15 of P400 (POWER GROUND).

4.3 Serial Data

4.3.1 Serial Data Electrical Characteristics

4.3.1.1 ARINC 429/453

| Pin Name | Connector | Pin | I/O |
|------------------|-----------|-----|-----|
| ARINC 453 OUT A | P400 | 4 | Out |
| ARINC 453 OUT B | P400 | 5 | Out |
| ARINC 429 IN 1 A | P400 | 38 | In |
| ARINC 429 IN 1 B | P400 | 39 | In |
| ARINC 429 IN 2 A | P400 | 22 | In |
| ARINC 429 IN 2 B | P400 | 23 | In |

4.3.1.2 Ethernet HSDB

| Pin Name | Connector | Pin | I/O |
|----------------|-----------|-----|-----|
| ETHERNET IN A | P400 | 34 | In |
| ETHERNET IN B | P400 | 35 | In |
| ETHERNET OUT A | P400 | 36 | Out |
| ETHERNET OUT B | P400 | 37 | Out |

The Ethernet high speed data bus (HSDB) meets the hardware aspects of IEEE standard 802.3 for 10 base T Ethernet communications.

4.4 Configuration

4.4.1 Configuration Module

| Pin Name | Connector | Pin | I/O |
|----------------------|-----------|-----|-----|
| CONFIG MODULE GROUND | P400 | 1 | -- |
| CONFIG MODULE DATA | P400 | 16 | I/O |
| CONFIG MODULE POWER | P400 | 17 | Out |
| CONFIG MODULE CLOCK | P400 | 31 | Out |

4.5 Auto Pilot

4.5.1 Flight Instruments

| Pin Name | Connector | Pin | I/O |
|-------------------|-----------|-----|-----|
| ROLL ATTITUDE HI | P400 | 18 | In |
| ROLL ATTITUDE LO | P400 | 19 | In |
| PITCH ATTITUDE HI | P400 | 32 | In |
| PITCH ATTITUDE LO | P400 | 33 | In |

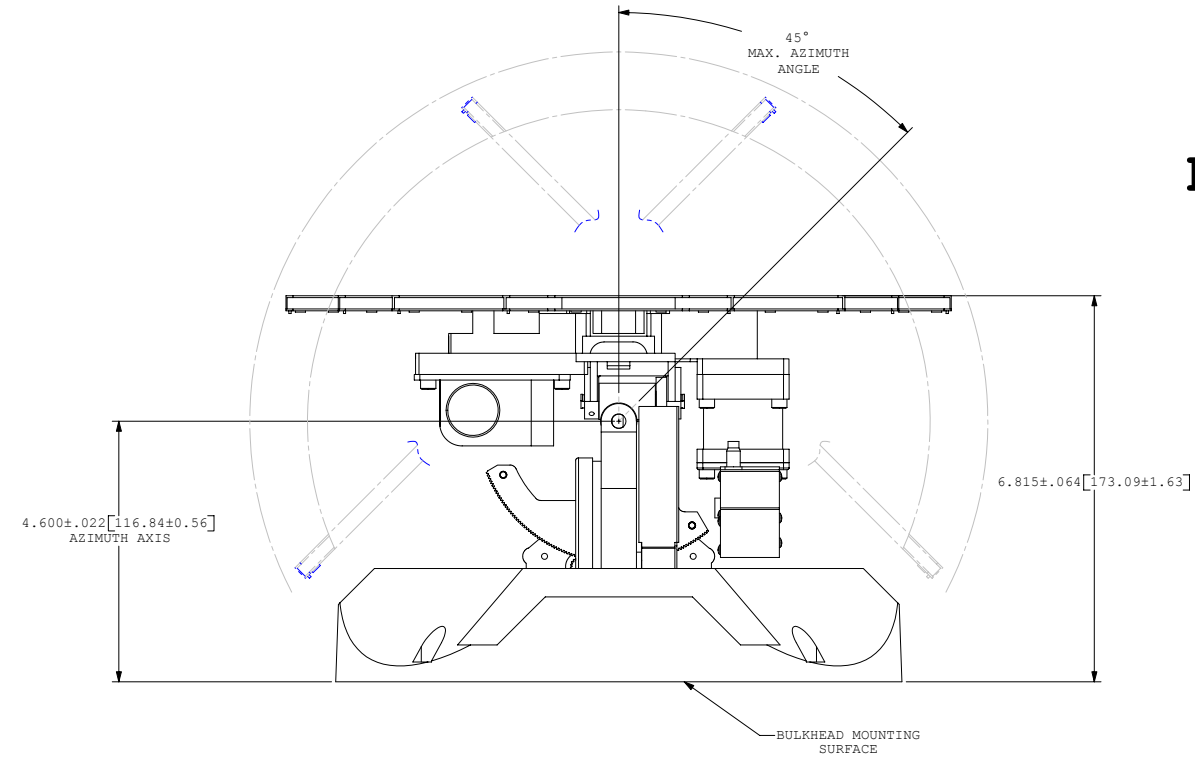
Inputs pitch and roll attitude information from AFCS. Expected nominal input voltage is 50mV/degree.

4.5.2 26 Volt AC Reference

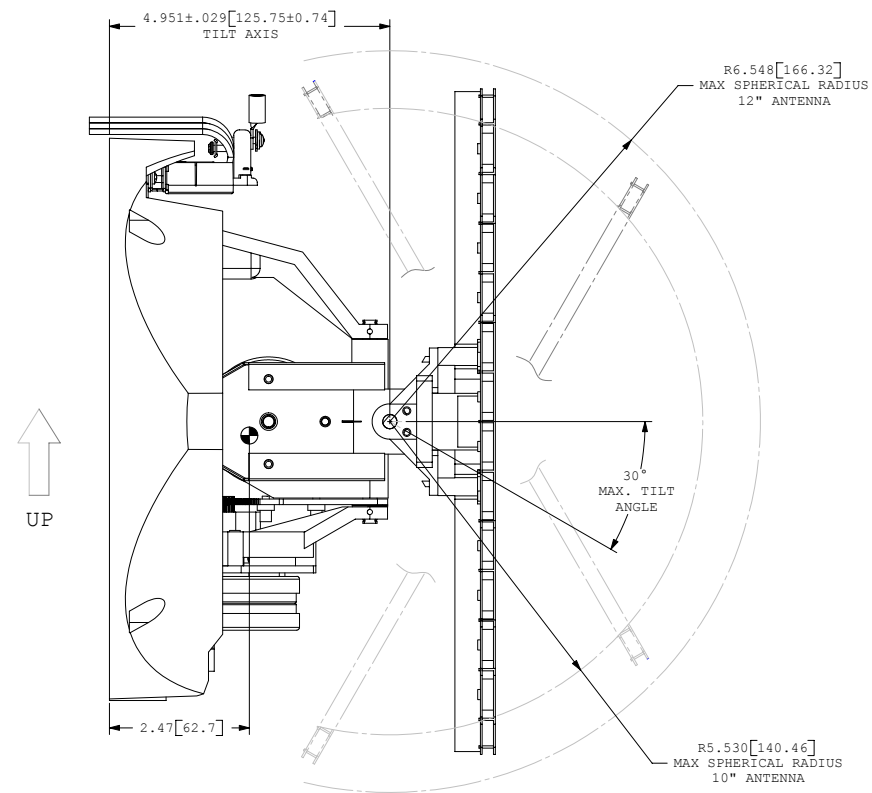
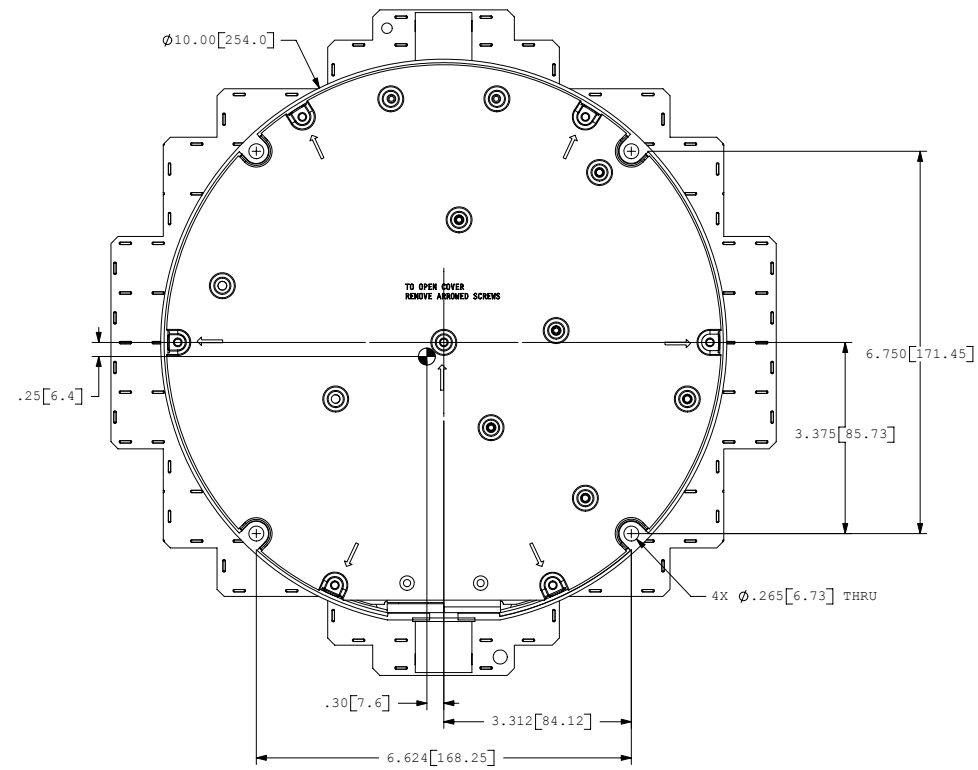
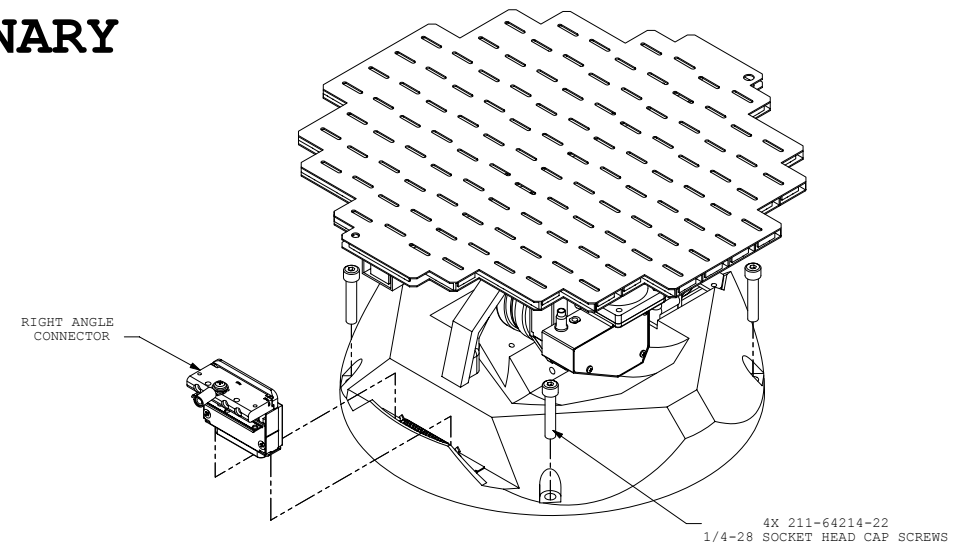
| Pin Name | Connector | Pin | I/O |
|--------------------|-----------|-----|-----|
| 26 VAC GYRO REF LO | P400 | 20 | In |
| 26 VAC GYRO REF HI | P400 | 21 | In |

Expected nominal input voltage is 400 Hz, 26V_{RMS}.

APPENDIX A OUTLINE & INSTALLATION DRAWINGS



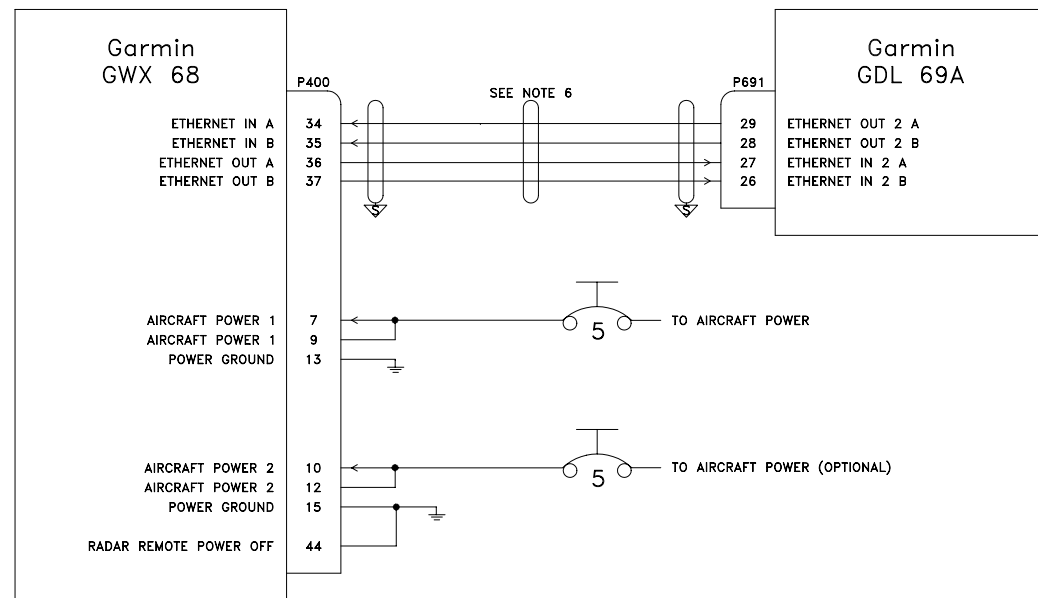
PRELIMINARY



NOTES:
1. DIMENSIONS: INCHES [mm]
2. 12" ANTENNA SHOWN

Figure A-1. GWX 68 Outline Drawing

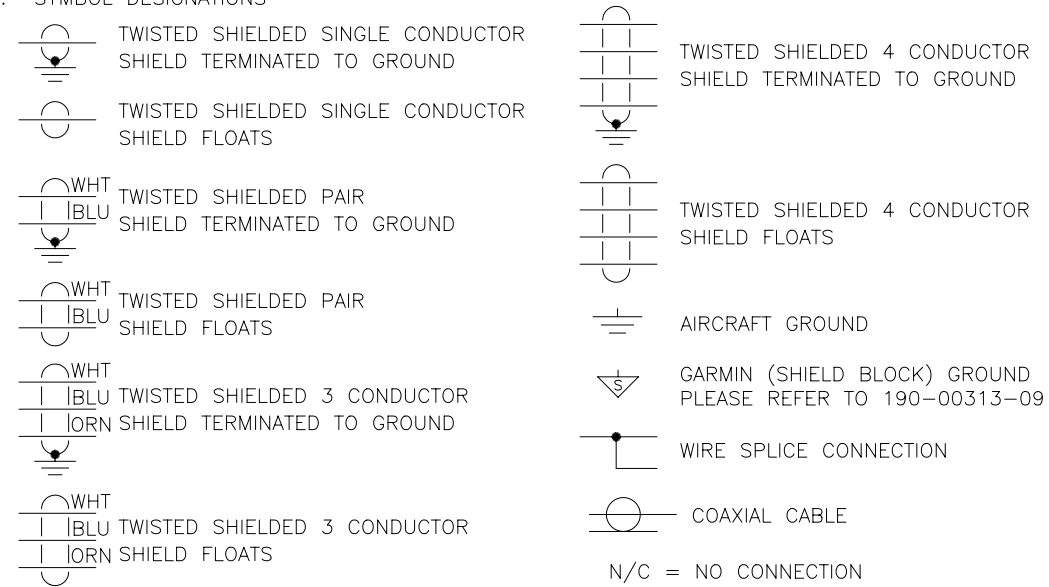
APPENDIX B INTERCONNECT DRAWINGS



NOTES:

1. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE MUST CONFORM TO MIL-W-22759/16 OR EQUIVALENT
2. UNLESS OTHERWISE NOTED, ALL SHIELDED WIRE MUST CONFORM TO MIL-C-27500 OR EQUIVALENT
3. UNLESS OTHERWISE NOTED, ALL WIRES ARE 24 GAUGE MINIMUM.

4. SYMBOL DESIGNATIONS



5. UNLESS OTHERWISE NOTED, ALL SHIELD GROUNDS MUST BE MADE TO THE RESPECTIVE UNIT BACKSHELLS. ALL OTHER GROUNDS SHOULD BE TERMINATED TO AIRCRAFT GROUND AS CLOSE TO THE RESPECTIVE UNIT AS POSSIBLE.

6. USE AIRCRAFT GRADE CATEGORY 5 ETHERNET CABLE. THESE INCLUDE ELECTRONIC CABLE SPECIALIST P/N 392404.

| MANUFACTURER | P/N |
|-----------------------------|-------------------|
| PIC WIRE AND CABLE | E10422 (22 GAUGE) |
| PIC WIRE AND CABLE | E10424 (24 GAUGE) |
| ELECTRONIC CABLE SPECIALIST | 392404 (24 GAUGE) |

7. FOR A COMPLETE LIST OF ALL PINS USED ON EACH CONNECTOR SEE THE SHEET(S) WITH THAT UNIT'S MODEL NUMBER ABOVE THE TITLE BLOCK. CONNECTORS TO UNITS WHOSE COMPLETE LIST IS ON LOWER NUMBERED PAGES ARE SHOWN AS "REF SHEET X". CONNECTORS TO UNITS WHOSE COMPLETE LIST IS ON HIGHER NUMBERED SHEETS ARE EXPLICITLY SHOWN. THE ONLY EXCEPTIONS TO THIS RULE ARE POWER, GARMIN CONFIGURATION PINS, AND ANTENNA CONNECTORS WHICH ARE SPECIFIED ON "POWER/ANTENNA" SHEETS AND REFERENCED FROM LOWER PAGE NUMBERED SHEETS.

8. THIS INTERCONNECT DOES NOT INCLUDE ANY INTERMEDIATE CONNECTORS.

9. THIS IS A SAMPLE INTERCONNECT. FOR ACTUAL INTERCONNECTS REFER TO:
 190-00295-XX UNIT INTERCONNECT SUMMARY.
 190-00295-XX UNIT POWER.
 190-00295-XX INTERCONNECT.

10. FOR GROUNDING PROCEDURES, REFER TO THE G1000 SYSTEM INSTALLATION MANUAL.

Figure B-1. GWX 68 Typical G1000 Interconnect Wiring Diagram



Figure B-2. GWX 68 Typical MX20 Interconnect Wiring Diagram

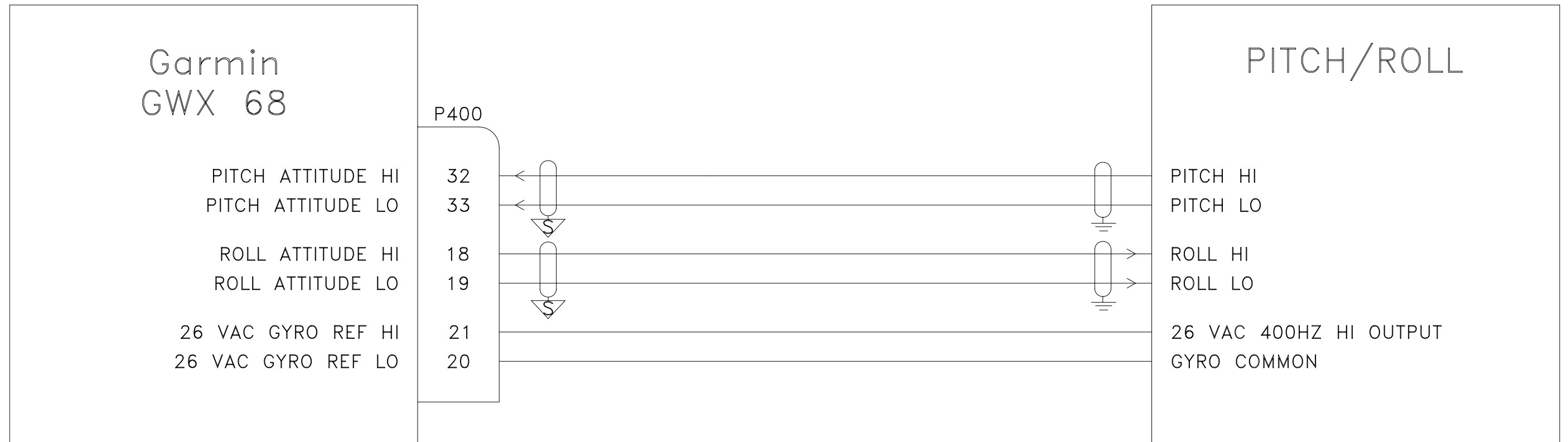


Figure B-3. GWX 68 Analog Stabilization Interconnect Wiring Diagram



Figure B-4. GWX 68 AHRS Stabilization Interconnect Wiring Diagram