GRT SPORT

Installation Manual

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FORWARD

Welcome to Grand Rapids Technologies' GRT Sport! We are pleased that you have chosen our product to meet your flying needs.

Visit the Grand Rapids Technologies (GRT) website (**www.grtavionics.com**) for the latest updates and supplemental information concerning the operation of this and other GRT products.

This manual describes the installation of GRT Sport EFIS using the software version shown in the Record of Revisions. Some differences may be observed when comparing the information in this manual to other software versions. Every effort has been made to ensure that the information in this manual is accurate and complete. GRT is not responsible for unintentional errors or omissions in the manual or their consequences.

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RECORD OF REVISIONS

Rev	Date	SW Rev	Change(s)
A	5-1-07		Initial Release
B	4-1-08	3f	Extensive

LIST OF EFFECTIVE PAGES

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6-1….B	7-1….B	7-2….B	8-1….B	8-2….B	8-3….B	8-4….B	8-5….B
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Chapter 1 GENERAL DESCRIPTION

Introduction

This document provides the physical, mechanical and electrical characteristics and installation requirements for the GRT Sport EFIS.

This document, the Sport Connector Definitions document, the Sport Set Up Guide and the Sport Users Guide make up the set of installation documents.

Description

The GRT Sport EFIS consists of panel mounted Display Unit(s) and a separately mounted magnetometer. The Display Units are available in panel mount or radio rack configurations. The Display Units are also available with standard resolution or high resolution displays. The vertical dimensions of the two displays are different; the high resolution Display Unit being taller than the standard resolution. Dimensional drawings are provided in the rear of this manual.

The display faces are coated with a special anti reflective coating which is very sensitive to skin oils, waxes and abrasive cleaners. It is very import to clean the display with an eyeglass lens cleaner which is specified as safe for anti reflective coatings and a clean lint free cloth.

Certification

The GRT Sport EFIS is not certified for installation in FAA Type Certificated Aircraft. It is designed and intended for installation in aircraft licensed as Experimental.

Chapter 2 MECHANICAL INSTALLATION

Display Unit Installation

Mount the display unit(s) in the desired location in the instrument panel. The main consideration in choosing a location is simply the ability to view the display unit. Since the display is fully sunlight-readable, no consideration for shielding the display unit from sunlight is required.

1. For panel mount style display units, the use of nut plates behind the instrument panel greatly simplifies the task of installing and removing the 4 screws used to retain the display unit in the panel. #6 socket cap stainless steel screws are recommended.
2. For radio rack style display units, the #6 screws on the side of the unit (2 per side) should be used to attach the display unit to the radio rack.

Magnetometer Installation

Determining the location of the magnetometer requires considerable care because of the magnetometer's sensitivity to magnetic disturbances generated by the airplane. No periodic maintenance is required for the magnetometer, although it is desirable to mount it in a location that allows access to it if necessary. The most important consideration when mounting the magnetometer is choosing a location in the airplane that is away from magnetic disturbances. It is quite amazing how sensitive the magnetometer is to these disturbances, and how much error this can cause in the magnetic heading reported by the AHRS.

Keep the magnetometer at least 12 inches away from any current carrying wires (such as navigation or landing light wires), and more than 18 inches from ferrous metal, such as the steel mass balance tube that is typically used in the leading edge of ailerons. Use non ferrous hardware (or even double sticky tape) for mounting the magnetometer.

You can test your proposed magnetometer location prior to mounting the magnetometer itself by placing an ordinary compass at the spot. Then,

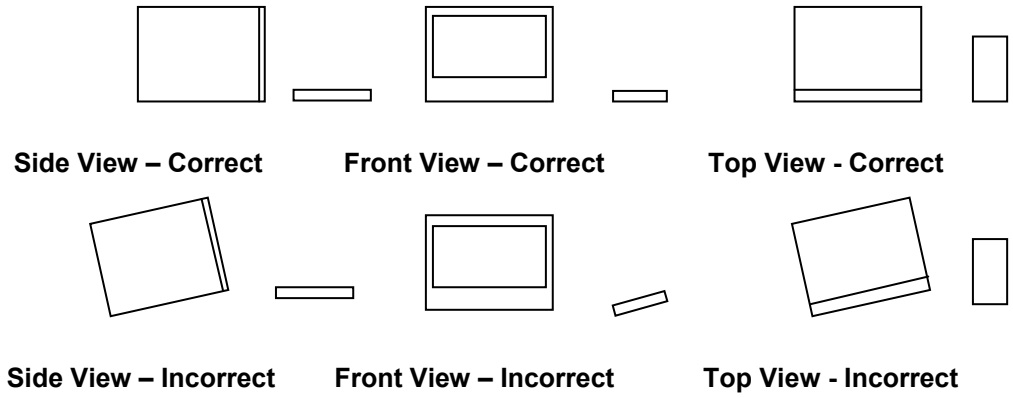
1. Turn on and off any electrical equipment whose wiring passes within 2 feet of the magnetometer.
2. Move the flight controls from limit to limit.
3. If the magnetometer is located within 2 feet of retractable landing gear, operate the landing gear.

Observe the compass while doing each of the above. The goal is no movement, or compass movement of less than 5 degrees. If you observe greater movement, try another location. After the installation and wiring of the

magnetometer and display unit(s) is complete, a more sensitive check for magnetic disturbances will be conducted.

The magnetometer and the AHRS in the Primary Flight Display unit work together. For this reason, they must be oriented in the same directions, that is, the pitch, roll and yaw axes of the magnetometer and the PFD display unit which contains the AHRS need to be parallel. A standard level can be used to orient the magnetometer and display unit such that they are equal in roll, and in pitch. For yaw, the orientation of these devices should be parallel to the fuselage centerline. In cases where the magnetometer is mounted in the wing, it may be possible to orient the magnetometer parallel to a wing rib, if these ribs are oriented in the wing such that they are parallel to the fuselage centerline. This is quite practical in airplanes such as Van's RV's. The following sketch shows this.

NOTE: Magnetometer and Display Unit with AHRS must be mounted in same attitude relative to each other.



Be sure to mount the magnetometer with the connector toward the rear of the airplane. Observe the label on the magnetometer to insure it is oriented correctly. Refer to the Magnetometer Installation page at the rear of this manual for additional installation instructions.

Chapter 3 COOLING CONSIDERATIONS

The GRT Sport EFIS does not require external cooling. However, as with all electronic equipment, lower operating temperatures extend equipment life. Units in an avionics stack heat each other through radiation, convection and sometimes by direct conduction. Even a stand- alone unit operates at a higher temperature in still air than in moving air. Fans or some other means of moving air around electronic equipment are usually worthwhile. Be certain that cooling air does not contain water – a problem often encountered when using external forced air cooling air.

Chapter 4 PITOT STATIC CONNECTIONS

The PFD display unit also contains the Air Data Computer. The ADC requires connection to the aircraft pitot static system. Connections on the display unit take a 1/8 – 27 NPT male fitting. To facilitate installation and removal of the display unit, quick disconnect fittings may be helpful. Connections and the entire pitot static system must be leak tight. Refer to AC 43.13.1B for approved methods to achieve this.

Chapter 5 WIRING CONSIDERATIONS

General

The cable assembly supplied with the EFIS includes wires that are certain to be used pre-installed in the connectors. Other connections to the EFIS, which may or may not be used, are not installed in the d-sub connectors. Colored tefzel wires with d-sub connector contacts pre-installed are included for these connections. The cable description diagram includes recommended wire colors for each connection to the EFIS components.

When routing the wiring, the following guidelines should be considered.

- Good practices for physical installation of the wiring should be followed, such as grommets where wires pass through sheet metal, considering for chaffing and interference with moving mechanisms, etc.
- Cable lengths should include enough extra length to allow for servicing the equipment. For example, the cables which plug into the display unit should be long enough to allow them to be connected to display unit with the display unit not installed in the instrument panel.
- In general, routing of the wiring is not critical, as the EFIS is designed to be tolerant of the electrical noise and other emissions typically found in aircraft. Some consideration should be given to avoid routing wires near antennas, or other locations that could impart high levels of electromagnetic signals on the wiring.
- The checkout procedures should be completed to verify the EFIS is not affected by radio transmissions on any frequency.

Power Connections

The display units each include 2 isolated power input connections. This allows redundant power sources, such as a main and secondary bus. The display units consume approximately 1 amp, making even a small 3 Amp-Hour gel cell a suitable emergency source.

The configuration of the power supplied to the display unit(s) is left to the installer. Considerations such as the number of power buses, the desire or not to supply one piece of equipment with power from redundant buses (which in theory allows the possibility of one device affecting both buses), the configuration of the electrical system with respect to backup equipment, and so on, may dictate the best configuration for a particular airplane.

No provision is included within the display units for a power switch. If a power switch is desired for the EFIS, the +12V power should be controlled with the switch (not ground).

The display units include internal thermally-activated fuses. This protects the equipment from internal electrical faults. Power supplied to the EFIS must pass through a fuse or circuit breaker. It should be sized to allow at least 1.5 amps per display unit, with a maximum rating of 5 amps.

The AHRS and display units monitor all of their power inputs, and alarms are available to annunciate the loss of any power source that was provided and is expected to be working according to the “General Setup” menu.

The majority of the current flow into the display unit will occur on the bus with the highest voltage.

It is desirable to have the display units and AHRS off during the engine start if all of the buses which power them are used for supplying power to the engine starter. This maximizes the current available for the starter, and may extend the life of the CCFL backlight in the display unit.

Ground Connections

The cable assembly provided includes 20 or 22 gauge wire for the ground return of the display units. This will result in a voltage drop of about 0.015 V/foot, which is acceptable for wire lengths up to 10 feet.

Magnetometer Wiring

Typically, the magnetometer cable supplied with the EFIS will not have a d-sub connector installed on magnetometer cable end. This makes it easier to route this cable through the airplane. After the cable has been routed, the wires can be cut to length if desired, although new d-sub pins would need to be installed. If the wires are not cut, inspect the d-sub connector pins to verify they have not been damaged. Insert the indicated wire color into the appropriate d-sub connector housing hole according to the cable description diagram. If desired, the crimp-type d-sub connector can be replaced with a solder-type connector.

All magnetometer connections are made directly to the mating display unit with internal AHRS. This wiring includes the power connections necessary for the magnetometer to operate. Each AHRS and magnetometer pair is calibrated together for optimal accuracy, and thus this paring should be maintained.

Specific Equipment Interconnect Details

Detail instructions and wiring information for connecting to specific other avionics equipment is provided in the rear of this manual. Pin out information for the GRT Sport EFIS is also provided.

Other Wiring Considerations

Autopilot Source Switch

Depending on the other equipment installed in the airplane, switches may be necessary or desirable for the following functions:

- A switch to allow the autopilot to be controlled by the EFIS, or directly from the GPS. The benefit of this switch is to allow the GPS to control the autopilot in the event the display unit which normally commands the autopilot, is not functioning.

Warning Light Output

A warning output is provided on connector to drive an external warning light. This output provides a path to ground when active, thus the indicator should be wired with one of its terminals to aircraft power, and the other to this output. The maximum current that can be controlled by this output is 0.2 amps.

Clock Power

Clock power is not required or available. The clock will set once a GPS signal is valid.

Inter-Display Unit Communication

Display units communicate between themselves so that most entries made during flight can be made from any display unit, and will be applied to all. This communication is accomplished by connecting the serial output to serial input such that the two display units are in this loop.

Audio Output

An audio output is provided. Future growth is planned to allow this output to provide a warning tone, or possibly other type of audio output. This output may be connected to a spare input on the aircraft's intercom system. Volume level will be controlled by menu settings within the display unit.

Chapter 6 CHECK OUT

Display Unit Check Out

1. Apply Power to the display unit. The LCD may flicker, and within 10 seconds, the display should show the first page.
2. If multiple power buses connect to the display unit, turn off the display unit, and apply power from each bus individually.

AHRS/Air Data Computer and Magnetometer Checkout Procedure

1. Apply power to display unit with internal AHRS.
2. Proper operation of the AHRS and magnetometer is indicated as follows:
    a. The display unit shows altitude and airspeed tapes.
    b. Attitude and heading data appears on the screen at the completion of the alignment period (typically less than 2 minutes).
    c. No "ATTITUDE FAIL" message is shown on the PFD screen.
    d. No failure messages are listed in the status page (accessible from the "Status" softkey on the PFD screen).
3. Select the “Set Menu” from the softkeys, and select the “AHRS Maintenance” page.
4. Verify AHRS communications status is valid, and AHRS status is OK. Verify the AHRS is receiving serial communications from the display unit by observing that no data fields are grayed out.
5. Scroll down this screen to the “Magnetic Heading” field. This is the raw magnetic heading sensed by the magnetometer.
6. To verify the magnetic heading is reasonable, the following conditions must be met.
    a. The roll and pitch attitude data must be accurate.
    b. The magnetometer must be in the same attitude as the AHRS.
    c. The magnetometer must have been electrically connected to the Display Unit when the Display Unit was turned on.
    d. The magnetic heading should be accurate within 30 degrees for any direction in which the airplane is pointed. This can be verified by observing the “Magnetic Heading” data while positioning the airplane in different directions. If this accuracy is not achieved, it is likely due to a wiring error of the magnetometer connector, or magnetic disturbances in the vicinity of the magnetometer.
7. The magnetometer location validation should be performed. Complete calibration must also be performed prior to flight. Refer to the GRT Sport Users Guide for complete magnetometer calibration instructions.

Chapter 7 Magnetometer Location Validation

Select “Set Menu”, “AHRS Maintenance”, and locate the Magnetic Heading field on this screen. This shows the magnetic heading data provided by the magnetometer. (The heading data shown on the normal display screens is the gyro slaved heading, which responds slowly to magnetic heading changes.) Observe this reading and verify it does not change by more than +/- 2 degrees while doing the following:

- Turn on and off any equipment whose wiring passes within 2 feet of the magnetometer.
- Move the flight controls.
- If the magnetometer is located near retractable landing gear, operate the landing gear.

Before performing the magnetometer calibration procedure, the approximate accuracy of the uncorrected magnetic heading data must be checked. While the calibration procedure can remove errors as large as 125 degrees, accuracy is improved if the location chosen for the magnetometer requires corrections of less than 30 degrees. To check the accuracy of the uncorrected magnetic heading, select the magnetometer calibration page from the AHRS maintenance page by changing the selection next to "Magnetometer Calibration". While on this page, rotate the airplane 360 degrees. A red graph will appear on this page showing the errors showing the calculated errors.

If errors of greater than 30 degrees are observed, this may be caused by magnetic disturbances near the magnetometers, such a ferrous metal, magnetic fields from electric motors, or if the magnetometer orientation is not the same as the AHRS. (For every 1 degree of misalignment between the magnetometer and the AHRS, approximately 3 degrees of heading error can be expected.)

Location Problems

The most common cause is simply magnetic disturbances near the magnetometer. This can be caused by ferrous metal (any metal that a magnet will stick to), control cables, or cable carrying electrical currents, such as navigation or landing lights, being too close to the magnetometer. If there is any doubt about a location, try moving the magnetometer to another location. Use tape or other temporary means to hold it in place, roughly aligned with the orientation of the AHRS, and repeat the test.

Wiring Problems

1. Some wiring problems will be detected by the AHRS built-in-test functions. The will result in an AHRS Attitude Fail Message, and an "AHRS: Magnetometer X, Y or Z-Axis Failed" message on the status page that is accessed by the STATUS

button from any page. If this message is present, the wiring to the magnetometer should be checked.

2. It is also possible that no built-in-test failure is reported, but the wiring is still incorrect. This can occur if the magnetometer X, Y, Z inputs are swapped. To check for this, point the airplane at various directions listed in the table below, ***with the magnetometer in an approximately level position*** (it may need to be removed from the airplane and held by hand). Use the AHRS Maintenance page to observe the "Magnetometer X, Y, Z Raw Data". The following should be observed.

Direction	X Raw Data*	Y Raw Data*	Z Raw Data*
Magnetic North	Positive Value above 1000	Between -500 and +500	Greater than positive 1500**
Magnetic East	Between -500 and +500	Positive Value above 1000	Greater than positive 1500**
Magnetic South	Negative Value less than -1000	Between -500 and +500	Greater than positive 1500**
Magnetic West	Between -500 and +500	Negative Value less than -1000	Greater than positive 1500**

* The raw data readings will appear to shift left and right on the screen once per second, as the sign change for a brief moment. This is normal, and the brief sign changes should be ignored when using this table of the expected readings.

** The Z Raw data will be greatly influenced by where on the earth the test is performed. Positive values will be observed in the northern hemisphere and negative values in the southern hemisphere.

Chapter 8 EQUIPMENT INTERCONNECT DETAILS

Serial Ports

The serial ports assigned below are general suggestions. You may use any serial port with baud rates compatible with the equipment connected to it. The only exception is serial port 4 which must be used for GRT XM weather.

Altitude Encoder Wiring

Gray code outputs are provided for transponders that require this format.

GTX327 Transponder

The EFIS can provide altitude encoding data to this transponder. The data must be provided via a serial data output, as the gray code input to these transponders is not compatible with the gray code output provided by the EFIS.

Display Unit Connector A Connections to the Garmin GTX327

Mating Connector: 37-pin Female D-sub (Instrument has 37-pin male D-sub)

EFIS Display Unit Pin	Function	GTX327 Connector 3271 Pin Number	Notes
35	Serial Output 2	19	Provides Altitude Encoding Data to Transponder.

Configuring the GTX327

Refer to the GTX327 installation manual, and configure serial input 1 for the FADC w/ALT format.

Setting	**Value**
RS232 Input - Channel 1	FADC w/ALT

Configuring the Display Unit

Use the "Settings Menu", "General Setup", to select the following:

Setting	**Value**
Serial Port 2 Output	Fuel/Air Data (Z Format)
Serial Port 2 Rate	9600

GTX330 Transponder

The EFIS can provide altitude encoding data to this transponder. The data must be provided via a serial data output, as the gray code input to these transponders is not compatible with the gray code output provided by the EFIS.

Display Unit Connector A Connections to the Garmin GTX330

Mating Connector: 37-pin Female D-sub (Instrument has 37-pin male D-sub)

EFIS Display Unit Pin	Function	GTX330 Connector 3271 Pin Number	Notes
35	Serial Output 2	24	Provides Altitude Encoding Data to Transponder.
33	Serial Input 4	25	Receives TIS data from Transponder.

Configuring the GTX330

Refer to the GTX330/330D installation manual, and configure it as follows:

Setting	**Value**
RS232 Input - Channel 2	FADC w/ALT
RS232 Output - Channel 2	Remote + TIS

Configuring the Display Unit

Use the "Settings Menu", "General Setup", to select the following:

Setting	**Value**
Serial Port 4	Garmin TIS
Serial Port 2 Output	Fuel/Air Data (Z Format)
Serial Port 2 Rate	9600

Other GPS (GNS430, GNS530, GPSMAP496 etc)

The EFIS can accept and display GPS data including flight plans.

Display Unit Connector A Connections to other GPS

EFIS Display Unit Pin	Function	Other GPS Connection	Notes
30	Serial Port 1 IN	Varies RS232 Serial Data OUT	Use RS232 Serial Out from Other GPS

Configuring Other GPS

Configure the Other GPS for Serial Out GPS data.

Configuring the Display Unit

Use the "Settings Menu", "General Setup", to select the following:

Setting	Value
Serial Port 1 Input	GPS1 Aviation /MapCom
Serial Port 1 Rate	9600
GPS1 Flight Plan Source	External

SL30/SL40 Nav/Com or Com

Display of Navigation Data from the SL30

The EFIS provides an HSI and other functions that display and use the VOR bearing data provided by the SL30 Nav/Com radio. Localizer and glide slope deviation data is also displayed on the EFIS from this radio. This data is transmitted to the EFIS display unit via an RS-232 output from the nav radio.

Radio Tuning and Loading of Pre-Sets in the SL30/SL40

The EFIS has the ability to load the SL30 and SL40 with frequency pre-sets to allow convenient selection of these frequencies from the front panel controls of the radio. For the SL30, the EFIS can also tune the navigation radio. This data is transmitted to the radio via an RS-232 output from the EFIS display unit.

Multi-Display Unit Considerations

Although the data from the SL30 is communicated to other display units via the inter-display unit serial data connections, allowing this data to appear on all display units, it is preferable to connect the serial data output from the SL30 to 2 display units. Connecting the serial output from the SL30 to multiple display units allows its data to be displayed in the event one display unit is not functional.

The serial ports within the display unit provide minimal loading of the serial data signals, allowing the one serial data output from the SL30 to be connected to multiple display units.

Only one serial data output to the SL30/SL40 may be provided. If the display unit which provides this (tuning) data to the SL30/SL40 was not operational, the SL30/SL40 would be tuned by its front panel controls.

Display Unit Connector A Connections

Mating Connector: 37-pin Female D-sub (Instrument has 37-pin male D-sub)

EFIS Display Unit Pin	Function	SL30/SL40	Notes
37	Serial Output 4 from Display Unit to SL30/SL40	Pin 4 of 37-pin connector-SL30 Pin 10 of 15-pin connector-SL40	Only 1 display unit may provide this connection.
33	Serial Input 4 from SL30	Pin 5 of 37-pin connector	This output from the SL30 may be connected to multiple display units.

Configuring the Display Unit

Using the general setup menu, set the display unit to which the above connections are made to 9600 baud. For the serial data output, select “SL30/SL40 Output”. For the serial input, select “SL30/SL40 Input”.

TruTrak Autopilot

EFIS Display Unit Pin	**Function**	**Autopilot Connection**	**Notes**
34	Serial Output 1 - Autopilot	GPS Serial Data Input	Output from the EFIS emulates NMEA0183B serial data to control the autopilot.

Optional Dual Serial Inputs to the Autopilot

To allow coupling the autopilot to the GPS in the event the display unit that normally controls the autopilot is not functional, a switch may be installed. This switch is wired so that it selects between the EFIS autopilot output, or the GPS serial data output. This switch should remain in the "EFIS" position, unless the display unit that provides the autopilot output is not functional. When the switch is in the "GPS" position, the autopilot will follow the GPS flight plan only, and will not respond to EFIS autopilots mode selections, such as HDG or others.

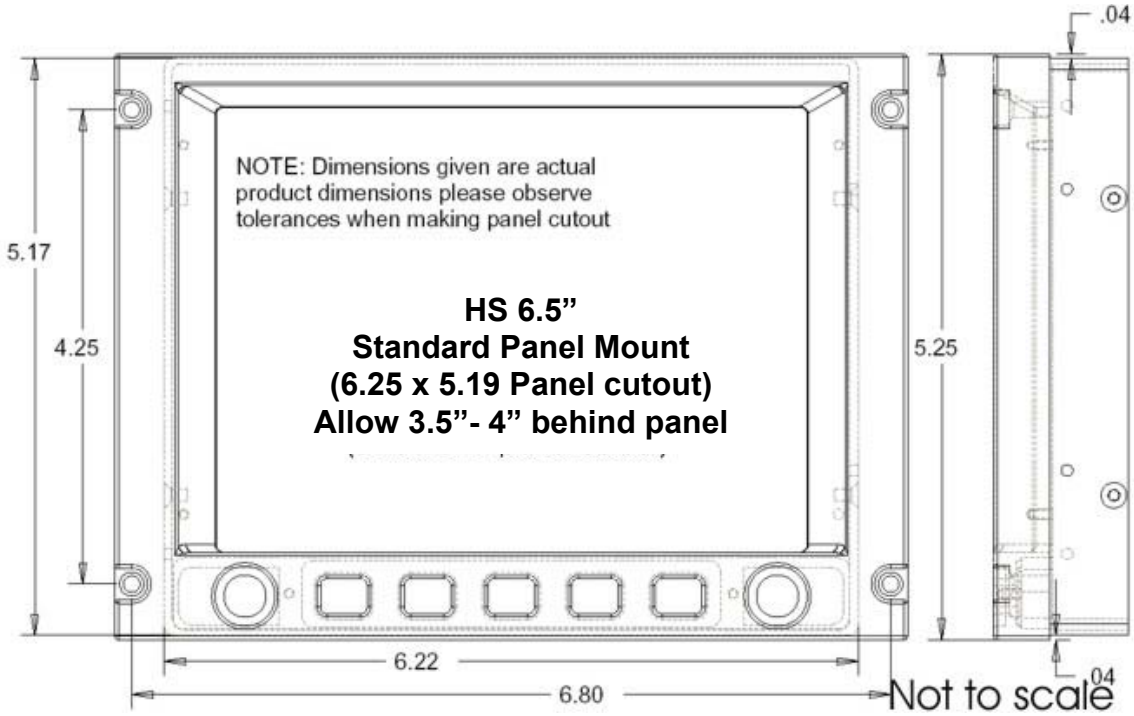
Configuring the Autopilot

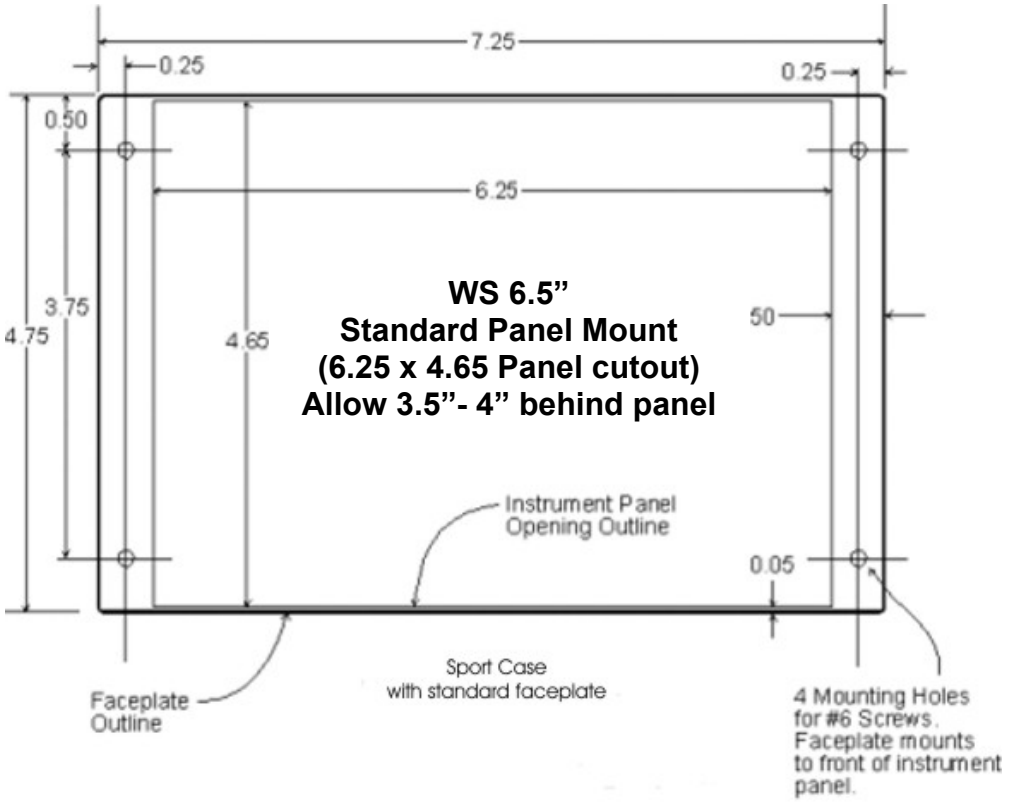
Make the following setting on the autopilot. Refer to the autopilot installation manual for additional information.

Setting	**Value**
RS232 Serial Input Baud Rate	4800 or as necessary to match EFIS autopilot serial port baud rate.

Chapter 9 APPENDIX A: MOUNTING DIAGRAMS

The following diagrams show the size and mounting holes for the GRT Sport HS/WS and magnetometer. NOT TO SCALE, dimensions in inches.





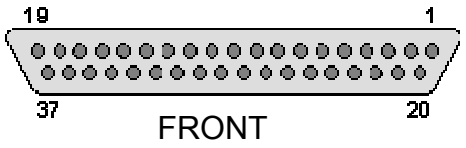
Chapter 10 Appendix B: Connector Description

Connector A- Master Unit

Mating Connector: 37-pin Female D-sub (Instrument has 37-pin Male D-sub)

Pin	Function	Wire Color	Pin	Function	Wire Color
1⇨	Primary Power Input	RED	20	Tone (Future use)	
2▽	Secondary Power Input	RED/BLU	21▽	Clock Power 12V @ <1 ma	RED/WHT
3⇨	GND	BLK	22	AP1 (Future use)	
4⇨	MAG_GND	BLK	23	AP2 (Future use)	
5⇨	MAG_X	WHT/GRN	24	AP3 (Future use)	
6⇨	MAG_Y	WHT/BRN	25	AP4 (Future use)	
7⇨	MAG_Z	WHT	26	TORQUE (Future use)	
8⇨	MAG_CNTRL	WHT/BLU	27	NAVAID (Future use)	
9⇨	MAG_PWR	WHT/RED	28	Warning Light (Future use)	
10▼	D4 Alt Encoder Output		29▽	OAT Sensor	GRY
11▼	C4 Alt Encoder Output		30	RX1 GPS Serial Input	
12▼	C2 Alt Encoder Output		31▽	RX2 EIS Serial Input	GRN/BLK
13▼	C1 Alt Encoder Output		32⇨	RX3 Inter-Display Link	ORANGE
14▼	B4 Alt Encoder Output		33	RX4 (Future use)	
15▼	B2 Alt Encoder Output		34▽	TX1 Autopilot Serial Output	BLUE
16▼	B1 Alt Encoder Output		35	TX2 Encoder Serial Output	
17▼	A4 Alt Encoder Output		36⇨	TX3 Inter-Display Link	VIOLET
18▼	A2 Alt Encoder Output		37	TX4 (Future use)	
19▼	A1 Alt Encoder Output				

⇨ Connected in wiring harness.
▽ Supplied as loose pinned wires.
▼ Optional wiring



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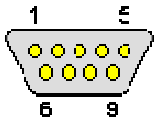
Connector B Description (Remote Magnetometer)

Mating Connector: 9-pin Male D-sub (Magnetometer has 9-pin Female D-sub)

Pin	Function	Wire Color	Pin	Function	Wire Color
1◢	MAG_Y	WHT/BRN	6◢	MAG_CNTRL	WHT/BLU
2◢	MAG_Z	WHT	7	No connection	
3◢	MAG_X	WHT/GRN	8	No Connection	
4◢	MAG_PWR	WHT/RED	9	No Connection	
5◢	MAG_GND	BLK			

◢ Customer inserts pins into connector after the wires are pulled through the airframe.



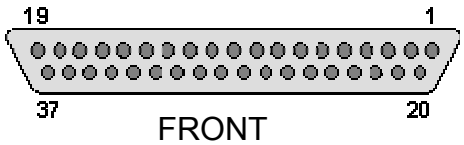
FRONT

Connector A Description- Slave Unit

Mating Connector: 37-pin Female D-sub (Instrument has 37-pin Male D-sub)

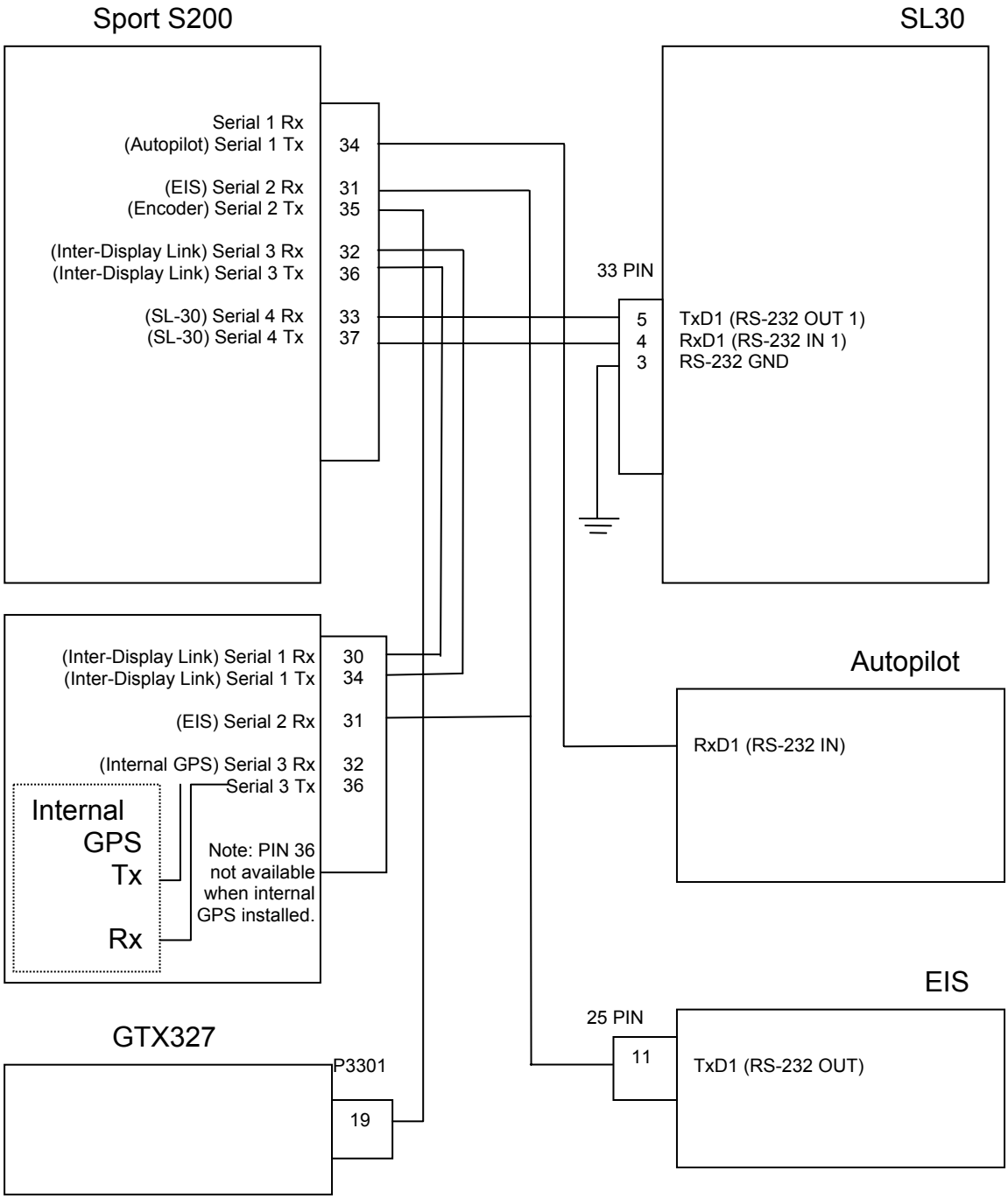
Pin	Function	Wire Color	Pin	Function	Wire Color
1⇨	Primary Power Input	RED	20	Tone (Future use)	
2▽	Secondary Power Input	RED/BLU	21▽	Clock Power 12V @ <1 ma	RED/WHT
3⇨	GND	BLK	22	AP1 (Future use)	
4	Not used		23	AP2 (Future use)	
5	Not used		24	AP3 (Future use)	
6	Not used		25	AP4 (Future use)	
7	Not used		26	TORQUE (Future use)	
8	Not used		27	NAVAID (Future use)	
9	Not used		28	Warning Light (Future use)	
10	Not used		29	OAT Sensor	
11	Not used		30⇨	RX1 Inter-Display Link	VIOLET
12	Not used		31▽	RX2 EIS Serial Input	GRN/BLK
13	Not used		32	RX3 Internal GPS (Actually Tx)	
14	Not used		33	RX4 (Future use)	
15	Not used		34⇨	TX1 Inter-Display Link	ORANGE
16	Not used		35	TX2 (Future use)	
17	Not used		36	TX3 Internal GPS (Not avail.)	-----
18	Not used		37	TX4 (Future use)	
19	Not used				

⇨ Connected in wiring harness.
▽ Supplied as loose pinned wires.
▼ Optional wiring

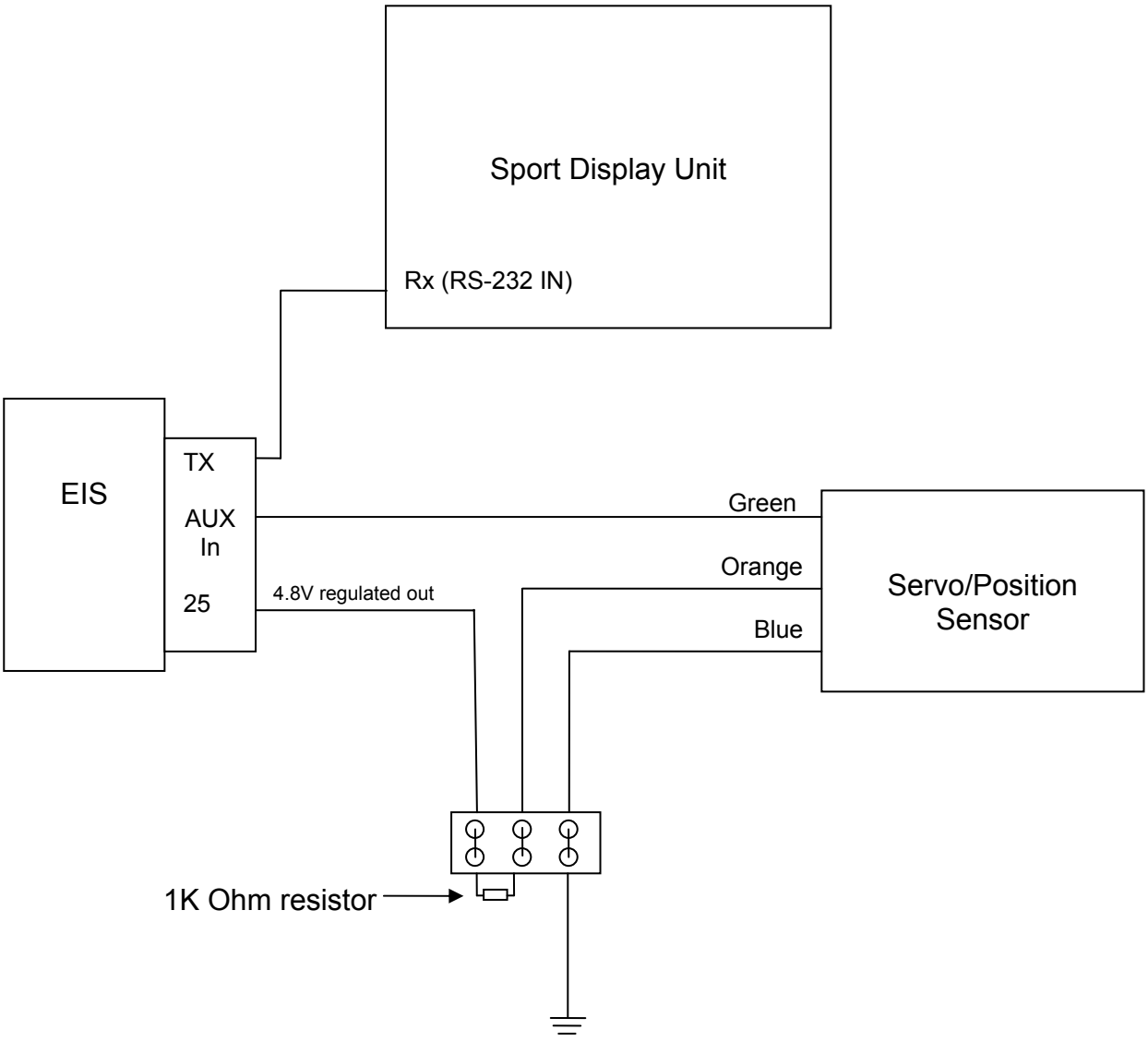


FRONT

Chapter 11 Appendix C: Interconnect Diagram



Chapter 12 Appendix D: Trim/Flap Position Install



Servo/Position Sensor
Installation