EQUIPMENT INSTALLATION MANUAL

For the

GDC31 ROLL STEERING CONVERTER

P/N 1049-4000-XX-001( )

Rev Z
April 5, 2017

DAC International
6702 McNeil Drive
Austin, TX  78729

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RECORD OF REVISIONS

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<td>A</td>
<td>Correct P/N of mating connector</td>
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<td>CHANGED BREAKER TO 2 AMPS</td>
<td>E272-04</td>
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<td>C</td>
<td>Reduced 28V and 14V install kits into one universal kit and added instructions for configuration. Added wiring diagram for Bonanza A-36.</td>
<td>E306</td>
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<tr>
<td>D</td>
<td>Omit approval pending</td>
<td>E321</td>
<td>9/17/04</td>
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<tr>
<td>E</td>
<td>Add numerous wiring diagrams</td>
<td>E327</td>
<td>10/22/04</td>
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<td>F</td>
<td>Add additional wiring diagrams, correct table 4</td>
<td>E389</td>
<td>3/30/05</td>
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<tr>
<td>G</td>
<td>Add lighting bus circuit diagram to all wiring diagrams. Omit jumper on drawings Fig. 9 &amp; 11. Add note to installation section, page 16.</td>
<td>E415</td>
<td>5/20/05</td>
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<tr>
<td>H</td>
<td>Add Reference page for lighting connections and correct drawings. Add KLN-94 incompatibility stmt to Operation Overview and Appendix A. Correct pin references on ARINC HSI drawings. Remove Isolation Coupler from Fig. 10. Add –03 model &amp; update all applicable sections and drawings. Add Isolation Coupler to Figure 4 drawing. Add Follow-on Installation Data form and instructions.</td>
<td>E432</td>
<td>10/5/05</td>
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<tr>
<td>I</td>
<td>Add FD112 and AP107 drawing. Delete 1049-4200-10 kit information. Edit drawings to reflect –03 vs –01 differences</td>
<td>E461</td>
<td>11/16/05</td>
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<tr>
<td>J</td>
<td>Correct typo on Figure 3 ARINC HSI with Century IV drawing; Add Isolation Coupler requirement statement to “OPTIONAL EQUIPMENT” section;</td>
<td>E432</td>
<td>2/21/06</td>
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<tr>
<td>K</td>
<td>Add various drawings; minor changes on misc drawings; added Appendix D, GPS Receiver interconnect to RS232/ARINC 429; Added STC Permission Stmt</td>
<td>E645</td>
<td>12/12/06</td>
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<tr>
<td>L</td>
<td>Added various drawings; Added gain jumper flag note to various King autopilot drawings; Corrected pin-out on various STEC drawings; Add note to Appendix C. Add Note: “This A/P is not STC’d” on all relevant drwgs.</td>
<td>E645</td>
<td>6/8/07</td>
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- Fig 2: Add Note:
- Fig 4: Remove AP-Offset line
- Add jumper b/t pin 10 & 11 – GainSel 1
- Add pin 16 to J2 – 400hz Rtn
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<tr>
<td>M</td>
<td>Added various drawings; Revised website link on pg 26; Added KLN-89A to Operation Note Appendix A Note as non-compatible with the GDC31. Fig 7 - Revised wiring illustrations. Fig 13 - Add 5kHz flag note. Fig 20 - Remove Type Sel jumper &amp; added jumper to Phase Sel. Fig 31 - Add Type Sel jumper. Fig 32 – Add Phase Sel.</td>
<td>12/06/07</td>
<td>LW</td>
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<td>N</td>
<td>Added paragraph to PMA Section, pg 8. Removed Installation Manual from kit part list, pg 9. Added paragraph to Installation Section, pg 16. Added paragraph to Environmental Section, pg 29. Revised Figure 2, Pg 41, Relay Interconnect Diagram. Fig 17, Pg 60 - Add KC-295 computer for KFC200 autopilot &amp; ground shield at pin 6 &amp; 15 of GDC31. Fig 23, Pg 66 – Removed jumper from pins 11 &amp; 23. Removed non-STC’d drawings Added additional wiring diagrams (Fig 2, 14, 16, 18, 19, 25, 26, 29, 32, 33, &amp; 34).</td>
<td>08/01/11</td>
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<td>P</td>
<td>Added ARC800 with IG-895A / NSD-360 / NSD-1000 drawing &amp; Century 2000 drawings.</td>
<td>08/15/11</td>
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<tr>
<td>R</td>
<td>Added KAP150 with KI525A drawing</td>
<td>12/08/11</td>
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<td>S</td>
<td>Delete S-TEC 50/55/60/65 (DC) with S-TEC 6406. Revised S-TEC 50 (AC) with 6406 HSI drawing to include S-TEC 55/60/65 autopilots. Added STC Pending statement to ARC300/800, Century 2000 and KAP 140 drawings.</td>
<td>10/28/13</td>
<td>BH</td>
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<td>T</td>
<td>Corrected EXC pin reference on SN3500 P2 on Figure 13 drawing</td>
<td>12/16/13</td>
<td>BH</td>
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<tr>
<td>U</td>
<td>Revised Century II or III with 52D54 drawing to change pins D &amp; E at CD33 (Pigtail) from C &amp; F at CD33 (Fixed). Changed labels to DG Exc 5 KHz from Roll Exc 5 KHz. Reworded flag notes for clarity on all drawings. Added</td>
<td>05/22/15</td>
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<td></td>
<td>flag note to ground all shielded wiring on drawings in Fig 8-12, 28, 38, 39, 41 &amp; 42. Added drawing for KCS55 System with KG-102A &amp; SN3308 / SN3500. Removed ARC 300, ARC 800, Century 2000 &amp; KAP140 drawings. 001A software version not supported.</td>
<td>E1856</td>
<td></td>
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<td>V</td>
<td>Reworded “Required Equipment” header and first sentence on page 10. Reworded last sentence in “Optional Equipment” paragraph on page 11. Added ARC 300 (Fig 2-3), ARC 800 (Fig 7), Century 2000 (Fig 8-11) and KAP 140 (Fig 21-22) drawings</td>
<td>10/06/2015</td>
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<td>W</td>
<td>Edited jumper on drawing KING KAP 140 w/ KI-525A at GDC31 pin 11 to pin 21 and flag notes relative to change. Inserted Century II/III with NSD-360A / NSD-1000 to 1C388-2 Radio Coupler drawing. Renumbered pages. Edited various drawing notes.</td>
<td>03/10/16</td>
<td>BH</td>
</tr>
<tr>
<td>X</td>
<td>Remove page 29 (GDC31 STC permission statement) renumber pages</td>
<td>03/22/16</td>
<td>BH</td>
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<tr>
<td>Y</td>
<td>Add Collins AP-105 drawing</td>
<td>E1936-02</td>
<td>04/05/17</td>
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<td>Z</td>
<td>Update for 001C software</td>
<td>E1940-05</td>
<td>08/16/17</td>
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# Equipment Installation Manual

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INTRODUCTION:
This Installation Manual contains installation data, specifications and Instructions for Continued Airworthiness for the DAC International Model GDC31 Roll Steering Converter, Part Number 1049-4000-XX-001( ). Check the DAC International website www.dacint.com/gdc31 regularly for updates to this manual or for additional information.

DESCRIPTION:
The GDC31 Roll Steering Converter with software version 001A is designed to receive RS232 or RS422 serial data from a GPS Navigation System to produce both an analog Roll Sum Steering (RSS) signal and ARINC 429 labels bank angle command and ground speed.

The GDC31 Roll Steering Converter with software version 001B (or later) is designed to receive RS232 or RS422 serial data or ARINC 429 Label 121 from a GPS Navigation System to produce an analog Roll Sum Steering (RSS) signal.

The GDC31 output signal connects to the heading error input of the aircraft’s existing autopilot. The GDC31 mimics the heading error signal of the aircraft’s installed HSI or DG. The GDC31 does not reduce or otherwise alter any existing safety features of the autopilot, such as bank limiting, rate limiting and protection from a hard over. The GDC31 provides lateral (roll) data only (no pitch data is supplied by the GDC31).

The pilot simply selects between heading mode and GPS mode using the supplied switch / annunciator. In heading mode, the autopilot operates as always, tracking the heading bug of the HSI or DG. In GPS mode, the GDC31 RSS signal drives the autopilot’s heading channel. The GDC31 calculates the correct course intercept angle from the data supplied by the GPS, smoothly guiding the aircraft onto the course. The GDC31 then holds the aircraft on the selected course. If the GPS is programmed with Flight Plan data, the GDC31 will calculate the new intercept angle at each waypoint change, intercepting and holding the new course without pilot intervention.

The GDC31 is designed to operate with both rate based and position based autopilots.
PART NUMBERS:

The GDC31 Data Converter is available under the following part number:

<table>
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<th>Part Number</th>
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<td>1049-4000-03</td>
<td>GDC31 Roll Steering Converter, with RS232 and ARINC 429 Auto-Baud Detect Input (Recommended for all new installations)</td>
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Software part number, where ( ) contains the number zero for initial release, or any letter, A – Z to denote a minor change.

The following GDC31 version is no longer available and no longer supported.

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<th>Part Number</th>
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<td>1049-4000-01-001A</td>
<td>GDC31 Roll Steering Converter, with RS232 Input and ARINC 429 Low Speed Output</td>
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REGULATORY COMPLIANCE:

Software

The Model GDC31 software was developed in accordance with RTCA/DO-178B to criticality level C.

PMA

This manual contains FAA Approved installation instructions for installation of the DAC International model GDC31 unit under the GDC31 AML STC for use in those Part 23 Class I, II, and III aircraft (as defined in AC 23.1309-1C) listed on the GDC31 AML. Installation of the GDC31 into US-registered 14CFR Part 23 Class I, II or III aircraft not included in the AML, Part 23 Class IV aircraft, any part 25, 27, or 29 aircraft, or non-U.S. registered aircraft requires separate airworthiness approval.

Environmental

The Model GDC31 meets the DO-160D environmental categories listed later in this manual.

The performance and environmental limitations under which the GDC31 was granted PMA are described in this manual. It is the responsibility of the facility installing this article whether on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within the equipment limitations. The article may be installed only if performed under 14 CFR Part 43 or the applicable airworthiness requirements.
REQUIRED EQUIPMENT

Each Roll Steering System requires the following items:

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<th>Part Number</th>
<th>Description</th>
<th>Qty</th>
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<tr>
<td>1049-4000-03</td>
<td>GDC31 Roll Steering Converter, RS232 &amp; ARINC 429 Auto-Baud Detect Input</td>
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<tr>
<td>1049-4200-20</td>
<td>Connector Kit, GDC31 Data Converter</td>
<td>1</td>
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<tr>
<td>1049-4201-20</td>
<td>Annunciator Kit, GDC31 Data Converter 14V/28V</td>
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**NOTE:** The Annunciator / Switch, P10280, comes pre-configured for 28V operation. For 14V operation, see the section titled INSTALLATION - Wiring Considerations.

Complete installation kits are available under kit part numbers 1049-4200-20 and 1049-4201-20. Individual pieces are available under the part numbers shown. Contact DAC International sales to place orders.

<table>
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<tr>
<th>Part Number</th>
<th>Description</th>
<th>Qty</th>
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<td>1049-4200-20</td>
<td>Connector Kit, GDC31 Data Converter</td>
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<tr>
<td></td>
<td>M24308/2-3F Connector, Receptacle, 25 pin D-Sub</td>
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</tr>
<tr>
<td></td>
<td>M39029/63-368 Socket, Crimp Style, female</td>
<td>25</td>
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<td></td>
<td>P10219 Slide Latch Kit, shell size 3</td>
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<tr>
<td></td>
<td>P10220 Backshell, 25-Pin D-Sub</td>
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<tr>
<td>1049-4201-20</td>
<td>Annunciator Kit, GDC31 Data Converter</td>
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<tr>
<td></td>
<td>P10280 Mode Annunciator / Switch with 28V lamps</td>
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<td>P10301 Lamp, 14V</td>
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OPTIONAL EQUIPMENT

Certain installations require the use of an Isolation Coupler assembly. Isolation Coupler is used to transformer isolate the GDC31 reference input (excitation) and/or analog (heading error signal) output for installations where these signals are not referenced to airframe ground. Refer to the applicable installation drawings later in this manual for usage. This assembly is sold separately and requires a separate installation kit.

<table>
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<tr>
<th>Part Number</th>
<th>Description</th>
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<tr>
<td>1049-4801-01</td>
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<td>1049-4200-50</td>
<td>Installation Kit, Isolation Coupler</td>
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Complete installation kits are available separately under kit part number 1049-4200-50. Individual pieces are available under the part numbers shown. Contact DAC International sales to place orders.

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<th>Part Number</th>
<th>Description</th>
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<td>1049-4200-50</td>
<td>Installation Kit, Isolation Coupler</td>
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</tr>
<tr>
<td>M24308/2-2F</td>
<td>Connector, Receptacle, 15 pin D-Sub</td>
<td>1</td>
</tr>
<tr>
<td>M39029/63-368</td>
<td>Socket, Crimp Style, female</td>
<td>15</td>
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<tr>
<td>P10053</td>
<td>Slide Latch Kit</td>
<td>1</td>
</tr>
<tr>
<td>P10067</td>
<td>Backshell, 15-Pin D-Sub</td>
<td>1</td>
</tr>
</tbody>
</table>
SPECIFICATIONS:

Physical:
The GDC31 attaches to the airframe via four mounting holes. See the paragraph titled GDC31 Outline Drawing for further details.

RSC LRU

Height ................................................ 1.25”
Width ................................................. 5.22” (Includes mounting flange)
Depth.................................................. 3.54”
Weight................................................ 0.4 lb.

The Isolation Coupler (optional) attaches to the airframe via four mounting holes. See the paragraph titled Isolation Coupler Outline Drawing for further details.

Height ................................................ 1.25 in
Width ................................................. 4.5 in (Includes mounting flange)
Depth.................................................. 2.41 in”
Weight................................................ 0.2 lb.

Annunciator

Height ................................................ 0.753”
Width ................................................ 0.753” (Includes mounting flange)
Depth.................................................. 1.99”
Weight................................................ 0.05 lb.

Electrical:

Input Voltage ..................................... 14 / 28 VDC (10Vdc – 32Vdc operational)
Input Current ...................................... 0.1 Amp maximum at 28 VDC
Annunciator lamp current .................. 0.04 Amp at 28 VDC, 0.08 Amp at 14 VDC

Serial Data Input:

Format.................................................. RS232 or RS422 serial data in RNAV 0, RNAV 1, King 0 or King 1 format from a GPS navigation system

Baud Rate........................................... Selectable (4800, 9600)

ARINC 429 Input: (-03 Only)

Labels ................................................ Bank Angle Command, Label 121
Baud Rate ........................................... Auto-Baud Detect
Roll Sum Steering Output:

Description......................................... Analog bank angle command with program pin selectable scale factors to match most autopilot input levels. Program pin selection for position based or rate based output. Program pin selectable phasing.

Load .................................................. 1K

Reference Inputs:

General Description......................... AC or DC excitation used to excite the heading bug on the HSI or DG. The GDC31 uses the reference input to produce a steering signal with correct phase and amplitude characteristics. Two reference inputs are provided. Use only one, depending on the autopilot type. The unused input will be a no-connect. See typical interconnect diagrams later in this manual.

AP Ref 1 ............................................ Reference voltage input for use with gain settings found in Table 1.

  Maximum Input Level ............... 42 volts peak (30Vrms)
  Load: ............................................. 60K

AP Ref 2 ............................................ Reference voltage input for use with gain settings found in Table 2.

  Maximum Input Level ............... 15 volts peak (10.6Vrms)
  Load: ............................................. 30K
AP Offset Input:

Autopilot Offset ......................... For autopilots that use a signal common that is not airframe ground. Many use 5Vdc (relative to airframe) as the heading bug signal common. In these cases, connect the autopilot signal common to the GDC31 offset input pin, P1-19.

Maximum Input Level ................. 7 volts peak (5Vrms)
Load: .............................................. 10K

Annunciator Output:

GPS Coupled ............................... Normally Open relay contacts configured as a SPST switch intended to control an external GPS mode annunciator. The GDC31 closes the contacts when the steering output is valid. It cycles the contacts between open and closed at a 1 Hz rate if steering data is invalid. Closed contacts connect pins P1-24 and P1-12.

Max current: ............................... 250mA

Flag Input:

Description ............................... Valid input to the GDC31 at J1-25, supplied from a GPS receiver Super Flag output (14 or 28V).
Voltage: ....................................... Greater than 6V is valid, less than 3V is invalid.
Load ............................................. 200K ohms

Certification:

PMA
DO-178B ................................. Level C
DO-160D ................................. D1/BADSSXXXXXABBBAVB/A3E3/XXX

Reliability:

MTBF ........................................... Greater than 50,000 hours.
OPERATION:

Overview
The GDC31 Roll Steering Converter receives ARINC 429, Label 121 Bank Angle Command (BNR) (-03 model only), RS232 or RS422 serial data in RNAV 0, RNAV 1, King 0 or King 1 format from a GPS navigation system. It extracts Cross Track, Ground Speed and Track Angle Error information from the data stream to compute an appropriate bank angle command to return the aircraft to the Desired Track computed by the GPS navigation system.

NOTE: The Bendix/King KLN-89B and KLN-94 GPS Receivers are not compatible with the GDC31 Roll Steering Converter. See Appendix A, SIL GDC31-01.

Analog Output
The GDC31 produces an analog Roll Sum Steering (RSS) signal that drives the heading channel of the autopilot. Phasing and amplitude of the RSS signal is based on the reference input supplied to the GDC31 from the autopilot and the gain and phase settings established by the program pins (refer to Tables 1, 2 and 3). The GDC31 will accept either an AC or a DC reference input as well as reference inputs that contain an offset from airframe ground. The internal circuitry implements a multiplying Digital-to-Analog converter that uses the external reference input to produce the desired signal output amplitude and phase relative to the reference input. Certain installations (Century II and III, for example) will not accept a heading error signal referenced to ground, so require the Isolation Coupler in order to transformer isolate the GDC31 output signal.

Reference Inputs (Excitation)
The GDC31 contains two reference inputs to accommodate the wide range of reference voltages available. Input Ref 1 will accommodate excitation voltages up to a maximum input of 42 volts peak (30Vrms). Input Ref 2 will accommodate excitation voltages up to a maximum of 15 volts peak (15Vdc or 10.6Vrms). The determination of which reference to use will depend on the gain needed to match the autopilot scale factor as well as the maximum expected reference voltage. Certain installations (Century II and III, for example) produce a reference voltage that is floating relative to airframe ground. These installations require the Isolation Coupler in order to transformer isolate the GDC31 reference input signal.

ARINC 429 Input
The GDC31, (-03 model with software –001B or later) receives an ARINC 429 digital input containing label 121.

<table>
<thead>
<tr>
<th>429 Label (Octal)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>121</td>
<td>Bank Angle Command (BNR)</td>
</tr>
</tbody>
</table>

GPS Mode Annunciator Control
The GDC31 contains a Normally Open relay contact configured as a SPST switch to control the external GPS mode annunciator. This annunciator is further controlled by external switching and is active when the pilot selects GPS mode in place of heading mode with the external switch. Refer to the typical interconnect diagram.
later in this manual. If GDC31 output data is valid, the relay contacts are closed, allowing the mode annunciator to illuminate. If the data is invalid, the GDC31 will cause the mode annunciator to blink at a 1 Hz rate and command the steering output to zero degrees of bank (wings level).

The GPS mode annunciator blinks if either the super flag input is invalid or the serial data from the GPS is missing or not the correct format (see Appendix A).

Super Flag Input

The GDC31 reads the Super Flag (14 or 28Vdc) from the GPS receiver. If the flag is greater than 6Vdc, the flag shall be considered valid, if less than 3Vdc, the flag shall be considered as invalid. If the Super Flag indicates invalid, the GDC31 shall produce a steering signal of zero degrees, blink the GPS annunciator relay and invalidate the ARINC 429 label 121, bank command data, and label 312, ground speed data.
INSTALLATION

This Installation Manual is FAA Approved and contains detailed installation instructions for installing the GDC31 into specific aircraft as listed in the AML-STC. There are required FARs that must be complied with and followed to insure an airworthy installation. The Pre Modification Planning section will guide you through these requirements.

This section provides details for the installation of the GDC31 Roll Steering Converter, including configuration, wiring, mounting and checkout procedures. Follow the procedures and recommendations found in this section to assure a successful installation.

Read this entire section before beginning the installation.

Prior to installation, determine the required scale factor and phasing for use with the aircraft’s autopilot. Consider the location of the mode selector / annunciator switch; it should be installed within the pilot’s primary field of view and easily accessible by the pilot.

Complete an electrical load analysis in accordance with AC 43.13-1B, Chapter 11 prior to starting the aircraft modification to insure the aircraft has sufficient load capability.

Complete an aircraft weight and balance prior to aircraft modification to insure the aircraft has sufficient weight and CG margin.

Material Not Supplied

The following items are required for the installation but not supplied:
- Wire: MIL-W-22759/16 or equivalent
- Shielded Wire: MIL-C-27500 or equivalent
- Mounting screws: MS35206 6-32, 4 each
- Circuit Breaker: Klixon 7277-2-2 or equivalent
- Tie straps or lacing cord
- Ring terminals (for grounding)
- Splices

Special Tools

Use the following crimp tool to ensure reliable crimp contact connections to connector J1 and Annunciator.
- Crimp tool M22520/2-01
- Positioner M22520/2-08 (J1 crimp contacts)
Mounting Considerations

The GDC31 Roll Steering Converter can mount in the avionics bay, shelf or other suitable structure. It can be mounted in any orientation.

The optional Isolation Coupler can mount in the avionics bay, shelf or other suitable structure. It can be mounted in any orientation.

Attach the GDC31 and Isolation Coupler to suitable structure using the following hardware.

- Screw, 8-32 X 1/2”  MS35206-245
- Flat Washer, #8  AN960-8L
- Lock Washer, #8  MS35338-42
- Nut, 8-32   MS35649-282

AN or MS self-locking nut plates may be used in place of the nut and lock washer specified above.

Mount the GPS/HDG mode annunciator / switch as near as practical to the autopilot mode controller. If there is insufficient space there, mount the mode annunciator within the pilot’s primary field of view, near the HSI or CDI.

Wiring Considerations

Wiring should be done in accordance with AC 43.13-1B, Chapter 11. Refer to the typical interconnect diagram later in this manual for specifics. Use 22 to 24 AWG wire for all connections.

Fabricate wiring harness; refer to the interconnect diagrams and pin description. Test all the wiring for continuity and for shorts. Insure aircraft power is on the correct pins of J1; refer to Table 6. Install slide latch assembly onto J1 using instructions found later in this manual.

The mode annunciator/switch, P10280, comes pre-configured for 28V operation. For 14V operation, perform the following steps:

1. Pull firmly on the edges of the lens to disengage the lamp assembly from the body. The lamp assembly will hinge out and away from the body.
2. Remove and discard the four existing lamps, and replace with the four 14V lamps, P10301, contained in the kit.
3. Push the lens firmly back into the body.
Pre Modification Planning

Annunciator/Switch
The GPS/ HDG annunciator switch should be located near the HSI/ DG or alternately, near the existing autopilot mode annunciators.

Power Requirements
A suitable location will need to be determined for the RSS circuit breaker. It is recommended that power to the GDC31 be supplied from the same source and the autopilot, typically the avionics buss.

Equipment Interfaces

GPS
The GDC31 provides steering command through the HDG Datum of the autopilot based on GPS input. The GPS must be capable of providing either ARINC 429 label 121 or RS232 data in “Aviation Format” described in section appendix A and appendix B-ARINC 429 input of the manual.

Autopilot
The GDC31 is compatible with the autopilot models listed in the Limitations Section of the GDC 31 STC. During installation, the GDC31 is configured to emulate the Heading Datum output of the existing HSI or DG. Refer to the wiring diagrams in Section appendix E of this manual.

No modifications to the autopilot wiring are necessary. The GDC31 will use the same Heading Datum reference feeding the HSI or DG. As part of this modification, the HSI or DG Heading Datum error signal is re-wired through the supplied GPS / HDG annunciator switch, enabling either the current Heading Datum error signal of the GDC31 steering signal to feed the autopilot heading datum input.

Installation Summary

Mechanical Summary
__Panel layout is evaluated for the best placement of the GPS/HDG annunciator.
__Based on an evaluation of the DO-160 limitations found in this manual, a suitable location is found for the GDC31 computer.
__Weight and balance is performed.

Electrical Summary
__Electrical Load Analysis is performed.
__A dedicated circuit breaker in location is determined.
__Power and ground lines are installed.
__An applicable wiring diagram is selected from those available in this manual.
__Reference and heading datum interconnects are installed per the selected diagram.

Ground Checkout Summary
__Wiring is verified.
__Basic operation is verified with the ground test.

Functional Flight Test Summary
__Autopilot HDG Datum performance is evaluated.
__GDC31 RSS performance is evaluated.
NOTE:
The following setup procedures are for diagnosing interfacing problems.

Steering Output Scale Factor Determination

The GDC31 is designed to mimic the heading error signal produced by the existing HSI or DG, so it can operate with the wide variety of autopilots in current use. These various autopilots employ a wide range of reference voltages and scale factors to interface with the array of HSI and DG control heads. Reference voltage, or excitation, is the autopilot signal used to excite the Heading Select bug in the HSI or CDI. As used in this manual, scale factor refers to the autopilot’s response to the heading error input signal, expressed in volts per degree of bank. Examples are 200mv/deg and 60mv/deg. Examples of excitation voltage are 26Vac and 15Vdc. The GDC31 first computes the bank angle using data from the GPS. It then uses the reference voltage along with the scale factor setting (gain setting) to produce a signal that feeds into the autopilot’s heading error input to produce the desired bank angle.

The GDC31 has ten (10) choices for scale factor, selected with a combination of program pins (3 each) and reference inputs (2 each). Tables 1 and 2 describe the program pin combinations for the various scale factors. To determine the appropriate setting for a given autopilot, first determine the autopilot excitation amplitude in volts (AC or DC). Next, determine the autopilot scale factor from the autopilot maintenance data. The scale factor needs to be expressed as volts/degree of bank. Divide the scale factor by the excitation (scale factor / excitation voltage). Then look in Tables 1 and 2 for the nearest Scaling value to the one just computed.

If the gain is set too high, the commanded course intercept will be overly aggressive. For 90-degree course changes, too much gain will often cause the aircraft to turn inside the new course then S-turn back to capture the track.

If the gain is set too low, the commanded course intercept will be sluggish. For a 90-degree course change, too little gain will often cause the aircraft to overshoot the desired course then S-turn back to capture the track. Some autopilots limit the maximum bank angle to less than the 30 degrees, 22 degrees for example. In these cases, the aircraft will exhibit the symptoms of too little gain because the aircraft cannot turn sharp enough to capture the track without overshooting. Examine the attitude indicator during a 90-degree course change to verify that the aircraft banks to 30 degrees, or in the case of rate based autopilots, to a standard rate turn.
Configuration Pins

The GDC31 produces one of five (5) different RSS output levels for each reference input. This scaling selection is accomplished with program pins J1-10, J1-21 (-03 model only) and J1-22. Tables 1 and 2 define the scale factors available for each of the reference inputs, Ref 1 and Ref 2.

Gain Settings Using Ref 1 input J1-18

(Excitation: Maximum input of 42 volts peak, (30 Vrms)

<table>
<thead>
<tr>
<th>Scaling</th>
<th>J1-10</th>
<th>J1-21 (1)</th>
<th>J1-22</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.030276</td>
<td>Open</td>
<td>Ground</td>
<td>Open</td>
</tr>
<tr>
<td>0.015138</td>
<td>Open</td>
<td>Open</td>
<td>Open</td>
</tr>
<tr>
<td>0.011590</td>
<td>Open</td>
<td>Open</td>
<td>Ground</td>
</tr>
<tr>
<td>0.007687</td>
<td>Ground</td>
<td>Open</td>
<td>Open</td>
</tr>
<tr>
<td>0.003844</td>
<td>Ground</td>
<td>Open</td>
<td>Ground</td>
</tr>
</tbody>
</table>

Table 1

RSS Output Scaling Selection for Ref 1 input

(1) Applicable to software -001B or later.

Gain Settings Using Ref 2 input J1-6

(Excitation: Maximum input of 15 volts peak, (15 Vdc or 10.6 Vrms)

<table>
<thead>
<tr>
<th>Scaling</th>
<th>J1-10</th>
<th>J1-21 (1)</th>
<th>J1-22</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.066888</td>
<td>Open</td>
<td>Ground</td>
<td>Open</td>
</tr>
<tr>
<td>0.033444</td>
<td>Open</td>
<td>Open</td>
<td>Open</td>
</tr>
<tr>
<td>0.025606</td>
<td>Open</td>
<td>Open</td>
<td>Ground</td>
</tr>
<tr>
<td>0.016983</td>
<td>Ground</td>
<td>Open</td>
<td>Open</td>
</tr>
<tr>
<td>0.008492</td>
<td>Ground</td>
<td>Open</td>
<td>Ground</td>
</tr>
</tbody>
</table>

Table 2

RSS Output Scaling Selection for Ref 2 input

(1) Applicable to software -001B or later.
Phase Selection

The GDC31 will accommodate steering signals that are in phase with the reference or out of phase with the reference. For DC heading error signals, in-phase means a positive error signal produces a right turn, a negative error signal produces a left turn. Determine the correct phasing from the autopilot maintenance data then wire P1-13 accordingly.

If the phasing is incorrectly wired, the autopilot will turn the opposite direction when coupled to the GDC31 Roll Steering Converter.

<table>
<thead>
<tr>
<th>Phase</th>
<th>P1-13</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN Phase with Reference</td>
<td>Open</td>
</tr>
<tr>
<td>OUT of Phase with Reference</td>
<td>Ground</td>
</tr>
</tbody>
</table>

Table 3
Phase Selection

Position/Rate Selection

The GDC31 is designed to operate with both position based and rate based autopilots. Configuration is set by program pin P1-23.

<table>
<thead>
<tr>
<th>Scaling</th>
<th>J1-23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position Based</td>
<td>Open</td>
</tr>
<tr>
<td>Rate Based</td>
<td>Ground</td>
</tr>
</tbody>
</table>

Table 4
Position / Rate Selection

Position based autopilots require attitude information from the attitude indicator or vertical gyro. Rate based autopilots require turn rate information from the turn coordinator rate gyro. Determine the autopilot type, if it is rate based then connect J1-23 to program pin common, J1-11.
Baud Rate Selection

Table 5 removed in revision U.

The GDC31 Roll Steering Converter, P/N 1049-4000-03, with software -001B or later, will accept two (2) baud rates for GPS data configured using program pin P1-9.

<table>
<thead>
<tr>
<th>Baud Rate</th>
<th>P1-9</th>
</tr>
</thead>
<tbody>
<tr>
<td>9600</td>
<td>Open</td>
</tr>
<tr>
<td>4800</td>
<td>Ground</td>
</tr>
</tbody>
</table>

Table 6

Serial Baud Rate Selection

Note: Use Program Pin Common, J1-11, as ground for all program pin connections.

GPS Receiver Setup

Refer to the manufacturer's instructions for the GPS interfaced to the GDC31 RSC. Configure the GPS to output the RS232 Aviation Format data described in Appendix A.
REMOVAL AND REPLACEMENT

Removal, GDC31
1. Open the circuit breaker powering the GDC31.
2. Remove the connector by disengaging the slide latch then pulling the connector free.
3. Remove four (4) screws securing the unit to the airframe.

Replacement, GDC31
1. Open the circuit breaker powering the GDC31.
2. Attach the unit to the airframe with four (4) screws.
3. Seat the connector then engage the slide latch to secure.
5. Perform ground functional test found under Equipment Checkout in this manual.

Removal, Mode Annunciator
1. Open the circuit breaker powering the GDC31.
2. Pull firmly on the edges of the lens to disengage the lamp assembly from the body. The lamp assembly will hinge out and away from the body.
3. Release the two (2) pawls by unscrewing the flat-head screws located inside the body.
4. Unplug the lamp module from the sleeve.

Replacement, Mode Annunciator
1. Open the circuit breaker powering the GDC31.
2. Plug the lamp module into the sleeve.
3. Secure by engaging the two (2) pawls to the sleeve.
4. Plug the lamp module into the body - it will snap into place.
5. Close the circuit breaker.
6. Perform ground functional test found under Equipment Checkout in this manual.
EQUIPMENT CHECKOUT

The GDC31 provides conversion of RS232 serial data or ARINC 429 digital data (1049-4000-03 with software –001B or later) from a GPS receiver into a steering signal connected to the autopilot heading channel through switching controlled by the HDG/GPS mode selector switch. There are no other operator controls associated with the GDC31 unit.

The GPS receiver and the Autopilot must both be operational in order to perform this functional checkout.

Ground Functional Test

1. Insure that all control surfaces are clear and that the control wheel is centered in roll.
2. Apply power to the GPS Receiver and Autopilot.
3. Set the HDG/GPS Mode selector to HDG.
4. On the HSI, center the heading bug.
5. Engage the autopilot in Heading Mode.
6. Operate the heading bug; observe that the control wheel turns left and right in response to the heading bug operation.
7. Center the control wheel using the heading bug.
8. Create and activate a flight plan in the GPS unit according to existing maintenance and / or flight manual instructions.
9. Place the HDG/GPS Mode selector in the GPS position. With RS232 interface, observe GPS illuminates and is not blinking. With ARINC429 interface, Label 121 may not validate with less than 30 knots ground speed. If GPS receiver has test page mode, set receiver to test page to test for steady GPS indication. Refer to applicable GPS receiver documentation for state of Label 121 valids. If receiver does not provide valid ground speed for testing then it will be necessary to taxi aircraft in excess of 30 knots ground speed or fly to test for valid.
10. Remove power from the GPS receiver.
11. Observe that the GPS mode annunciator begins to blink within 15 seconds.
12. Verify that the control wheel centers once the GPS mode annunciator blinks.
13. Disengage the autopilot.

Flight Functional Test

1. Set the HDG/GPS Mode selector to HDG.
2. On the HSI, center the heading bug.
3. Engage the autopilot in Heading Mode.
4. Operate the heading bug; observe that the control wheel turns left and right in response to the heading bug operation.
5. Center the heading bug.
6. Create and activate a flight plan in the GPS unit according to existing maintenance and/or flight manual instructions. Manually fly the aircraft until the cross track error is between 1 and 3 miles.

7. Place the HDG/GPS Mode selector in the GPS position. Observe that GPS illuminates and is not blinking.

8. Observe that the aircraft turns to intercept the course selected in Step 6. Note: The GDC31 limits the intercept angle to 45° maximum. (Intercept angle = difference between Desired Track and Track.)

9. Observe that the aircraft captures the course without overshoot or undershoot.

10. Operate the heading bug; observe that the heading bug has no effect.

11. Select HDG on the HDG/GPS Mode selector.

12. Observe that the aircraft follows the heading bug.

CONTINUED AIRWORTHINESS:

This section provides data intended to assist the installer with establishing Instructions for Continued Airworthiness as required by FARs 23.1529, 25.1529, 27.1529 and 29.1529.

INSTRUCTIONS TO COMPLETE FOLLOW-ON INSTALLATION DATA FORM:

For follow-on installations, complete the data sheet found on the following page. Also include a wiring diagram specific to the installation.

On the data sheet, complete the aircraft make and model, registration number and serial number sections. Then describe the location of the GDC31 converter in sufficient detail, using station location numbers or other common reference points. For example, “GDC31 located under the instrument panel, right outboard side.” Use of sketches is recommended. Likewise, describe the location of the annunciator / switch. Describe or sketch the wire bundle routing.

Produce a wiring diagram specific to the aircraft installation. Use of wiring diagrams extracted from the installation manual, 1049-2510-01, or sketches are also acceptable. Also a copy can be obtained from the ICA.

Include a copy of the Instructions for Continued Airworthiness (ICA) (1049-2170-02) along with the data sheet and wiring diagram with the aircraft records.

A copy of the Instructions for Continued Airworthiness (1049-2170-02) may be obtained from the DAC International web site at http://www.dacint.com/products or by contacting DAC International at 1-800-527-2531.
FOLLOW-ON INSTALLATION DATA FORM

| AIRCRAFT MAKE AND MODEL: ________________________________________________ |
| AIRCRAFT TAIL NUMBER: ________________________________________________ |
| AIRCRAFT SERIAL NUMBER: ______________________________________________ |

| LOCATION DESCRIPTION of GDC31 ROLL STEERING CONVERTER:                  |
|_______________________________________________________________________|
|_______________________________________________________________________|
|_______________________________________________________________________|
|_______________________________________________________________________|
|_______________________________________________________________________|
|_______________________________________________________________________|

| LOCATION DESCRIPTION of MODE/ANNUNCIATOR switch:                         |
|_______________________________________________________________________|
|_______________________________________________________________________|
|_______________________________________________________________________|
|_______________________________________________________________________|
|_______________________________________________________________________|

| WIRE ROUTING:                                                             |
|_______________________________________________________________________|
|_______________________________________________________________________|
|_______________________________________________________________________|
|_______________________________________________________________________|
|_______________________________________________________________________|
|_______________________________________________________________________|
The GDC31 meets the environmental test categories detailed below in accordance with RTCA/DO-160D, Environmental Conditions and Test Procedures for Airborne Equipment.

**NOMENCLATURE:**  
Model GDC31 Roll Steering Converter

**PART NO:**  
1049-4000-XX-XXXX

**MANUFACTURER:**  
DAC International

**ADDRESS:**  
6702 McNeil Drive, Austin, TX 78729

<table>
<thead>
<tr>
<th>Section</th>
<th>Category</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0 Temperature and Altitude</td>
<td>D1</td>
<td>50,000 Ft Temperature controlled</td>
</tr>
<tr>
<td>5.0 Temperature Variation</td>
<td>B</td>
<td>Partially controlled temperature</td>
</tr>
<tr>
<td>6.0 Humidity</td>
<td>A</td>
<td>Standard Humidity</td>
</tr>
<tr>
<td>7.0 Operational Shock and Crash Safety</td>
<td>D</td>
<td>Fixed wing</td>
</tr>
<tr>
<td>8.0 Vibration</td>
<td>S</td>
<td>Curves L, M and C. Fixed Wing – Turbojet, Turbofan, Turboprop and reciprocating Instrument Panel or Fuselage</td>
</tr>
<tr>
<td>9.0 Explosion Proofness</td>
<td>X</td>
<td>Not Tested</td>
</tr>
<tr>
<td>10.0 Waterproofness</td>
<td>X</td>
<td>Not Tested</td>
</tr>
<tr>
<td>11.0 Fluids Susceptibility</td>
<td>X</td>
<td>Not Tested</td>
</tr>
<tr>
<td>12.0 Sand and Dust</td>
<td>X</td>
<td>Not Tested</td>
</tr>
<tr>
<td>13.0 Fungus Resistance</td>
<td>X</td>
<td>Not Tested</td>
</tr>
<tr>
<td>14.0 Salt Spray</td>
<td>X</td>
<td>Not Tested</td>
</tr>
<tr>
<td>15.0 Magnetic Effect</td>
<td>A</td>
<td>0.3 meter to 1.0 meter</td>
</tr>
<tr>
<td>16.0 Power Input</td>
<td>B</td>
<td>Alternator / Rectifiers</td>
</tr>
<tr>
<td>17.0 Voltage Spike</td>
<td>B</td>
<td>56 volts</td>
</tr>
<tr>
<td>18.0 AF Conducted Susceptibility – Power Inputs</td>
<td>B</td>
<td>Alternator / Rectifiers</td>
</tr>
<tr>
<td>19.0 Induced Signal Susceptibility</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>20.0 Radio Frequency Susceptibility (Radiated and Conducted)</td>
<td>V</td>
<td>50 volts/meter</td>
</tr>
<tr>
<td>21.0 Emission of Radio Frequency Energy</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>22.0 Lightning Induced Transient Susceptibility</td>
<td>A3E3</td>
<td></td>
</tr>
<tr>
<td>23.0 Lightning Direct Effects</td>
<td>X</td>
<td>Not Tested</td>
</tr>
<tr>
<td>24.0 Icing</td>
<td>X</td>
<td>Not Tested</td>
</tr>
<tr>
<td>25.0 ESD</td>
<td>X</td>
<td>Not Tested</td>
</tr>
</tbody>
</table>
Table 7 removed in revision U.

CONNECTOR PIN OUT: (1049-4000-03)

The GDC31 Roll Steering Converter, P/N 1049-4000-03, with software -001B or later, contains a single 25-pin male connector, J1, per MIL-C-24308. The mating connector, P1, is described previously under the section “Equipment Supplied”.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A+</td>
<td>28 Vdc Primary Power</td>
</tr>
<tr>
<td>2</td>
<td>Serial Out</td>
<td>RS232 Output</td>
</tr>
<tr>
<td>3</td>
<td>Serial In</td>
<td>RS232 Input</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Reserved (VPP)</td>
</tr>
<tr>
<td>5</td>
<td>AP-OUT</td>
<td>Autopilot Output</td>
</tr>
<tr>
<td>6</td>
<td>AP-REF2</td>
<td>Autopilot Reference, 10.6Vac max (1)</td>
</tr>
<tr>
<td>7</td>
<td>RX-A</td>
<td>ARINC 429 Receive A</td>
</tr>
<tr>
<td>8</td>
<td>RX-B</td>
<td>ARINC 429 Receive B</td>
</tr>
<tr>
<td>9</td>
<td>BAUDSEL1</td>
<td>Serial Baud Rate Select 1</td>
</tr>
<tr>
<td>10</td>
<td>GAINSEL1</td>
<td>Autopilot Gain Select 1</td>
</tr>
<tr>
<td>11</td>
<td>Prog Pin Common</td>
<td>Program Pin Common</td>
</tr>
<tr>
<td>12</td>
<td>GPS Lamp A</td>
<td>GPS Mode Annun Relay Armature</td>
</tr>
<tr>
<td>13</td>
<td>Phase Select</td>
<td>Phase select program pin</td>
</tr>
<tr>
<td>14</td>
<td>Power Common</td>
<td>28 Vdc Return</td>
</tr>
<tr>
<td>15</td>
<td>AP-COM</td>
<td>Autopilot Common (ground)</td>
</tr>
<tr>
<td>16</td>
<td>Serial Common</td>
<td>RS232 Common</td>
</tr>
<tr>
<td>17</td>
<td></td>
<td>Reserved (/PGM Enable)</td>
</tr>
<tr>
<td>18</td>
<td>AP-REF1</td>
<td>Autopilot Reference, 30Vac max (1)</td>
</tr>
<tr>
<td>19</td>
<td>AP-OFFSET</td>
<td>Autopilot Offset Input (A/P Common) +6Vdc max</td>
</tr>
<tr>
<td>20</td>
<td>429 Shield</td>
<td>ARINC 429 Shield Common</td>
</tr>
<tr>
<td>21</td>
<td>GAINSEL2</td>
<td>Autopilot Gain Select 2 (2)</td>
</tr>
<tr>
<td>22</td>
<td>GAINSEL0</td>
<td>Autopilot Gain Select 0</td>
</tr>
<tr>
<td>23</td>
<td>TYPESEL0</td>
<td>Rate Based Select</td>
</tr>
<tr>
<td>24</td>
<td>GPS Lamp B</td>
<td>GPS Mode Annun Relay N.O. Contact</td>
</tr>
<tr>
<td>25</td>
<td>Super Flag In</td>
<td>14 / 28 Vdc valid flag from GPS</td>
</tr>
</tbody>
</table>

Table 8

J1 Pin Description

NOTES: Do not use pins labeled Reserved. These are for factory test and In-Circuit-Programming
(1) Connect only one reference. Refer to “Reference Inputs” section.
(2) Does not apply to software versions prior to 001B.
OUTLINE DRAWINGS

GDC31 Outline

Note: Dimensions are in inches.
Switch / Annunciator Outline

Outline for part number P10280

Note: Dimensions are in inches.
Isolation Coupler Outline
SLIDE LATCH ASSEMBLY

Assemble the slide latch mechanism, part number P10219 or P10053, onto the mating connector as pictured using the hardware supplied with the slide latch.
APPENDIX A – RS232 AVIATION FORMAT

The GDC31 accepts data in the RS232 Aviation Format produced by most GPS panel mount receivers. Various manufacturers refer to this data as RNAV, KING or MAPCOM. The following table contains the minimum data set required by the GDC31. The GDC31 is designed to disregard additional data records transmitted from the GPS.

NOTE: The Bendix/King KLN-89A and KLN-94 GPS Receiver update rate of track is too slow to maintain aircraft on course. If connected to a KLN-89A or KLN-94, expect a 3-degree track angle error left and right of course over a 1 – 2 minute period.

GPS Receivers that supply the following minimum data set and any of the previously mentioned baud rates should be compatible with the GDC31. Insure the GDC31 is configured for the correct baud rate (refer to "Serial Baud Rate Selection" located earlier in this manual).

<table>
<thead>
<tr>
<th>Aviation Data Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;STX&gt;</td>
<td>ASCII Start of Transmission character</td>
</tr>
<tr>
<td>…</td>
<td>other data</td>
</tr>
<tr>
<td>C284&lt;cr&gt;</td>
<td>track; in degrees magnetic (ex: 284º)</td>
</tr>
<tr>
<td>D162&lt;cr&gt;</td>
<td>ground speed; in knots (ex: 162 kt)</td>
</tr>
<tr>
<td>GR0050&lt;cr&gt;</td>
<td>crosstrack; L (left) or R (right) in hundredths of nautical miles (ex: Right 0.5nm)</td>
</tr>
<tr>
<td>I2855&lt;cr&gt;</td>
<td>desired track; in tenths of degrees (ex: 285.5º)</td>
</tr>
<tr>
<td>…</td>
<td>other data</td>
</tr>
<tr>
<td>&lt;ETX&gt;</td>
<td>ASCII End of Transmission character</td>
</tr>
</tbody>
</table>

1. Each data field ends in a <cr> or <cr> <lf>
2. <cr> - ASCII carriage return character (0D hex)
3. <lf> - ASCII line feed character (0A hex)
The GDC31 Roll Steering Converter, P/N 1049-4000-03, with software -001B or later, will accept 4800 or 9600 baud. Software –001B (or later) accepts the following data in RS232 Aviation Format. GPS Receivers that supply the following minimum data set (excluding Horizontal Command Signal) and any of the previously mentioned baud rates should be compatible with the GDC31. Ensure the GDC31 is configured for the correct baud rate (refer to "Serial Baud Rate Selection" located earlier in this manual).

<table>
<thead>
<tr>
<th>Aviation Data Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;STX&gt;</td>
<td>ASCII Start of Transmission character</td>
</tr>
<tr>
<td>…</td>
<td>other data</td>
</tr>
<tr>
<td>C284&lt;CR&gt;</td>
<td>track; in degrees magnetic (ex: 284º)</td>
</tr>
<tr>
<td>D162&lt;CR&gt;</td>
<td>ground speed; in knots (ex: 162 kt)</td>
</tr>
<tr>
<td>GR0050&lt;CR&gt;</td>
<td>crosstrack; L (left) or R (right) in hundredths of nautical miles (ex: Right 0.5nm)</td>
</tr>
<tr>
<td>I2855&lt;CR&gt;</td>
<td>desired track; in tenths of degrees (ex: 285.5º)</td>
</tr>
<tr>
<td>hR150&lt;CR&gt;</td>
<td>Horizontal Command Signal; L (left) or R (right) in tenths of degrees (ex: Right 15.0 degrees)</td>
</tr>
<tr>
<td>…</td>
<td>other data</td>
</tr>
<tr>
<td>&lt;ETX&gt;</td>
<td>ASCII End of Transmission character</td>
</tr>
</tbody>
</table>

1. Each data field ends in a <CR> or <CR> <LF>
2. <CR> - ASCII carriage return character (0D hex)
3. <LF> - ASCII line feed character (0A hex)
APPENDIX B – ARINC 429 INPUT

The GDC31 Roll Steering Converter, P/N 1049-4000-03, with software –001B (or later) accepts input of ARINC 429 Label 121 – Bank Angle Command in the following format:

Label 121 - Bank Angle Command

Label 121 shall be formatted as follows:

<table>
<thead>
<tr>
<th>P</th>
<th>SSM</th>
<th>S</th>
<th>Roll Angle (two’s compliment if negative)</th>
<th>PAD</th>
<th>SDI</th>
<th>Label 121</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>0</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>0</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>P = odd parity</td>
<td>PAD =</td>
<td>SDI =</td>
<td>Label 121</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SSM = sign status matrix
   00 = fail/warning
   11 = normal

S = sign bit, 0=positive roll angle

SDI = source/destination identifier (always zero)

Data Range: ±180°

Resolution: 0.01°
APPENDIX C – GPS RECEIVER INTERCONNECT

Connect the GDC31 to a single GPS source only. The following diagrams are the recommended interconnections for each source. Refer to Figure 1 for RS232 interconnect. Refer to Figure 2 for ARINC 429 interconnect.

NOTE: For Procedure Turns and Holding Patterns capabilities provided by some GPS Receivers interface to the ARINC 429 output of the receiver shown in Figure 2.

![Figure 1 RS232 Interconnect Diagram](image1)

![Figure 2 ARINC 429 Interconnect Diagram](image2)
APPENDIX D - OPTIONAL LIGHTING CONTROLS

Figure 1  Day / Night Switch Interconnect Diagram

Figure 2  Relay Interconnect Diagram
APPENDIX E - TYPICAL INTERCONNECT

All wiring, wire gauge and wire type shall be according to the INSTALLATION section of this manual.

Mounting shall use the hardware called out in this manual or AN / MS equivalent fasteners.

NOTE:

THESE SCHEMATICS ARE FOR REFERENCE ONLY. For configurations not illustrated by drawing refer to the Installation section earlier in this manual for configuration, wiring, mounting and checkout procedures. Many autopilot units provide both an AC and a DC excitation signal. Verify the HSI or DG is connected to the autopilot signal and reference as shown in that diagram. Refer to the HSI or DG manufacturer’s data and the autopilot manufacturer’s data for additional information.

Visit our website: www.dacint.com/GDC31 for additional information.
Figure 1 - TYPICAL INTERCONNECT
IF AIRCRAFT TURNS AWAY FROM TRACK LINE, REMOVE PHASE JUMPER AND RETEST

CONNECT PARALLEL TO EXISTING WIRING

ENSURE ROLL CENTERING KNOB IS CENTERED

GROUND BOTH ENDS OF ALL SHIELDING

FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

1 ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
2 ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN1049-4000-01 WITH SOFTWARE -001A
3 ENSURE ROLL CENTERING KNOB IS CENTERED
4 CONNECT PARALLEL TO EXISTING WIRING
5 DASHED LINES REPRESENT EXISTING WIRING
6 GROUND BOTH ENDS OF ALL SHIELDING
7 IF AIRCRAFT TURNS AWAY FROM TRACK LINE, REMOVE PHASE JUMPER AND RETEST

Figure 2 - ARC 300A with G502A
Figure 3 - ARC 300A (DC) with NSD-360
IF AIRCRAFT TURNS AWAY FROM TRACK LINE, REMOVE PHASE JUMPER AND RETEST
GROUND BOTH ENDS OF ALL SHIELDING
CONNECT PARALLEL TO EXISTING WIRING

FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
CONNECT PARALLEL TO EXISTING WIRING

DASHED LINES REPRESENT EXISTING WIRING
GROUND BOTH ENDS OF ALL SHIELDING
IF AIRCRAFT TURNS AWAY FROM TRACK LINE, REMOVE PHASE JUMPER AND RETEST

Figure 4 - ARC 400/S530A with PN 101
FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

2 ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
3 ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
4 ENSURE ROLL CENTERING KNOB IS CENTERED
5 DASHED LINES BETWEEN HSI AND AUTOPILOT REPRESENT EXISTING WIRING - DO NOT REMOVE

Figure 5 - ARC 400A/CA-530A/FD (10VAC) with G502A
FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

2 ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
3 ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
4 ENSURE ROLL CENTERING KNOB IS CENTERED
5 CONNECT PARALLEL TO EXISTING WIRING
6 DASHED LINES REPRESENT EXISTING WIRING
7 IF AIRCRAFT TURNS AWAY FROM TRACK LINE, REMOVE JUMPER AND RETEST

Figure 6 - ARC 400B/CA-550A/ FD (10VAC) with G502A
Figure 7 - ARC 400B/CA-550A/FD (DC) with NSD-360
ENSURE ROLL CENTERING KNOB IS CENTERED

ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A

ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER

FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

CONNECT PARALLEL TO EXISTING WIRING

DASHED LINES REPRESENT EXISTING WIRING

Figure 8 - ARC 800B/CA-550A/FD with IG-895A / NSD-360 / NSD-1000
Figure 9 - CENTURY 2000 with 52D254
FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

1. ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
2. ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A

CONNECT PARALLEL TO EXISTING WIRING

DASHED LINES REPRESENT EXISTING WIRING

Figure 10 - CENTURY 2000 with FD112V
FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

1. ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE 2.001B OR LATER
2. ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE 2.01A
3. CONNECT PARALLEL TO EXISTING WIRING
4. DASHED LINES REPRESENT EXISTING WIRING
5. MEASURE HDG DC EXC (REF VOLTAGE). WHILE MEASURING OUTPUT AT PIN 5 WITH GPS RECEIVER
   POWERED OFF, ADJUST POT TO 1/2 OF HDG DC EXC (REF VOLTAGE).

Figure 11 - CENTURY 2000 with IG-832A / NSD-360 / NSD-1000
ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
CONNECT PARALLEL TO EXISTING WIRING
DASHED LINES REPRESENT EXISTING WIRING

FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

Figure 12 - CENTURY 2000 with KI-525A
FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

CONNECT PARALLEL TO EXISTING WIRING (DASHED LINES REPRESENT EXISTING WIRING)

ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER

GROUND BOTH ENDS OF ALL SHIELDING

1. THIS GAIN STRAPPING AND CONFIGURATION OF THE ISOLATION COUPLER WIRING EFFECTIVELY SETS SCALING TO APPROXIMATELY .0026 (THIS VALUE IS NOT REFERENCED IN THE GAIN TABLES IN THE INSTALLATION SECTION OF THIS MANUAL)
2. IF AIRCRAFT TURNS AWAY FROM TRACK LINE, REMOVE PHASE JUMPER AND RETEST
3. FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT
4. CONNECT PARALLEL TO EXISTING WIRING (DASHED LINES REPRESENT EXISTING WIRING)
5. ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
6. ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
7. GROUND BOTH ENDS OF ALL SHIELDING

Figure 13 - CENTURY II or III with 52D54 to 1C388/M/P Radio Coupler
CONNECT PARALLEL TO EXISTING WIRING (DASHED LINES REPRESENT EXISTING WIRING)

ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A

ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER

GROUND BOTH ENDS OF ALL SHIELDING

IF AIRCRAFT TURNS AWAY FROM TRACK LINE, REMOVE PHASE JUMPER AND RETEST

IN THE INSTALLATION SECTION OF THIS MANUAL

THIS GAIN STRAPPING AND CONFIGURATION OF THE ISOLATION COUPLER WIRING EFFECTIVELY SETS SCALING TO APPROXIMATELY .0026 (THIS VALUE IS NOT REFERENCED IN THE GAIN TABLES IN THE INSTALLATION SECTION OF THIS MANUAL)

CONNECT PARALLEL TO EXISTING WIRING (DASHED LINES REPRESENT EXISTING WIRING)

NOTES:

\[\text{NOTES:}\]

\[\text{FIGURE 14} - \text{CENTURY II / III with 4000C DG / 52D54 to 1C385 / 1D395 Console / Amp}\]
DASHED LINES REPRESENT EXISTING WIRING

IF AIRCRAFT TURNS AWAY FROM TRACK LINE, REMOVE PHASE JUMPER AND RETEST

FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

1. ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
2. ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A

CONNECT PARALLEL TO EXISTING WIRING
5. DASHED LINES REPRESENT EXISTING WIRING

GROUND BOTH ENDS OF ALL SHIELING

IF AIRCRAFT TURNS AWAY FROM TRACK LINE, REMOVE PHASE JUMPER AND RETEST

Figure 15 - CENTURY II / III with ARINC HSI to 1C385 / 1D395 Console/Amp
DASHED LINES REPRESENT EXISTING WIRING

IF AIRCRAFT TURNS AWAY FROM TRACK LINE, REMOVE PHASE JUMPER AND RETEST
GROUND BOTH ENDS OF ALL SHIELDING

ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
CONNECT PARALLEL TO EXISTING WIRING

FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

14 OR 28VDC

Figure 16 - CENTURY II / HI with IN-831A HSI to 1C385 / 1D395 CONSOLE/AMP
Figure 17 - CENTURY II / III with NSD-360A / NSD-1000 to 1C388-2 Radio Coupler

- FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT
- ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001B OR LATER
- ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
- DASHED LINES BETWEEN HSI AND AUTOPilot REPRESENT EXISTING WIRING
- CONNECT PARALLEL TO EXISTING WIRING
- IF AIRCRAFT TURNS AWAY FROM TRACK LINE, REMOVE PHASE JUMPER THEN RETEST
- GROUND BOTH ENDS OF ALL SHIELDING
1. **FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT**
2. **ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A OR LATER**
3. **ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER**
4. **CONNECT PARALLEL TO EXISTING WIRING**
5. **DASHED LINES REPRESENT EXISTING WIRING**
6. **GROUND BOTH ENDS OF ALL SHIELDING**
7. **IF AIRCRAFT TURNS AWAY FROM TRACK LINE, REMOVE PHASE JUMPER AND RETEST**

---

**Figure 18 - CENTURY II / III with NSD-360A / NSD-1000 to 1C385 / 1D395 CONSOLE/AMP**
3 CONNECT TO SINGLE SOURCE ONLY - RS232 OR ARINC 429

2 CONNECT PARALLEL TO EXISTING WIRING

DASHED LINES REPRESENT EXISTING WIRING

IF AIRCRAFT TURNS AWAY FROM TRACK LINE, REMOVE PHASE JUMPER AND RETEST

FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

Figure 19 - CENTURY III with SN3308 / SN3500 to IC388-2 Radio Coupler
SWITCH / ANNUN
P10280

RSS CONVERTER
GDC31

CENTURY IV
ID496 COMPUTER

5KHz EXCITATION
SIG COM

AC HDG ERR IN

NOTE: ID496 COMPUTER MUST BE ARINC TYPE ID496-X1XX2

Figure 20 - CENTURY IV with ARINC HSI
IF AIRCRAFT TURNS AWAY FROM TRACK LINE, REMOVE PHASE JUMPER AND RETEST.

FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

1. ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
2. ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
3. CONNECT PARALLEL TO EXISTING WIRING
4. DASHED LINES REPRESENT EXISTING WIRING
5. IF AIRCRAFT TURNS AWAY FROM TRACK LINE, REMOVE PHASE JUMPER AND RETEST

**Figure 21** - CENTURY IV with IG-832A / NSD-360 / NSD-1000
NEW WIRES FROM ANN SWITCH AND ISO COUPLER TO HSI429 SHIELD

DISCONNECT END AT HSI AND CONNECT AT ANN SWITCH AND ISO COUPLER THEN RUN DASHED LINES AT AUTOPILOT REPRESENT EXISTING WIRING WHICH ORIGINALLY RUN TO HSI

FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER

ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A

DASHED LINES AT AUTOPILOT REPRESENT EXISTING WIRING WHICH ORIGINALLY RUN TO HSI DISCONNECT END AT HSI AND CONNECT AT ANN SWITCH AND ISO COUPLER THEN RUN NEW WIRES FROM ANN SWITCH AND ISO COUPLER TO HSI

Figure 22 - COLLINS AP105 with 331A-6R
ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
IF AIRCRAFT TURNS AWAY FROM TRACK LINE, REMOVE PHASE JUMPER AND RETEST
FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT
1  CONNECT PARALLEL TO EXISTING WIRING
5  DASHED LINES REPRESENT EXISTING WIRING
4  IF AIRCRAFT TURNS AWAY FROM TRACK LINE, REMOVE PHASE JUMPER AND RETEST

Figure 23 - COLLINS AP106 with FD112C/V
For GPS input see Appendix C - GPS Receiver Interconnect

1. ARINC 429 input available on pins 7 & 8 on PN 1049-4000-03 with software -01B or later
2. ARINC 429 output available on pins 7 & 8 on PN 1049-4000-01 with software -001A
3. Connect parallel to existing wiring
4. Dashed lines represent existing wiring

**Figure 24 - KING KAP 140 with 4000C-15 DG**
IF TURNS ARE SLUGGISH, INSTALL THIS JUMPER

USE THIS JUMPER ONLY ON -03 MODEL WITH SOFTWARE -001B OR LATER

FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER

ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A

CONNECT PARALLEL TO EXISTING WIRING

DASHED LINES REPRESENT EXISTING WIRING
Figure 26 - KING KCS55 SYSTEM with KI-525 / 525A and KA-52 / KA-57
NOTE: THIS DRAWING SHOULD BE USED FOR SYSTEMS INCORPORATING BENDIX/KING KCS55 SYSTEMS WITH KA62 OR KA77 AUTOPILOT ADAPTERS

NOTE: IF TURNS ARE SLUGGISH, INSTALL THIS JUMPER USE THIS JUMPER ONLY ON 03 MODEL WITH SOFTWARE .0018 OR LATER
FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE .0018 OR LATER
ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE .001A
DASHED LINES BETWEEN KA-92 AND HSI AND DG REPRESENT EXISTING WIRING - DO NOT REMOVE

NOTE: THIS DRAWING SHOULD BE USED FOR SYSTEMS INCORPORATING BENDIX/KING KCS55 SYSTEMS WITH KA62 OR KA77 AUTOPILOT ADAPTERS

Figure 27 - KING KCS55 SYSTEM with KG-102A & SN3308 / SN3500 HSI
Figure 28 - KING KFC 150 with EFIS 50
If turns are sluggish, install this jumper. Use this jumper only on -03 model with software -001B or later.

For GPS input, see Appendix C - GPS Receiver Interconnect.

3. ARINC 429 input available on pins 7 & 8 on PN 1049-4000-03 with software -001B or later.

4. ARINC 429 output available on pins 7 & 8 on PN 1049-4000-01 with software -001A.

Connect parallel to existing wiring.

6. Dashed lines represent existing wiring.

Figure 29 - KING KFC 150 with KI-525A
USE THIS JUMPER ONLY ON -03 MODEL WITH SOFTWARE -001B OR LATER

IF TURNS ARE SLUGGISH, INSTALL THIS JUMPER

FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER

ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A

CONNECT PARALLEL TO EXISTING WIRING (EXISTING WIRING NOT ILLUSTRATED FROM DG)

DASHED LINES REPRESENT EXISTING WIRING

CONNECT PARALLEL TO EXISTING WIRING (EXISTING WIRING NOT ILLUSTRATED FROM DG)

DASHED LINES REPRESENT EXISTING WIRING

Figure 30 - KING KFC 150 with SN3308 / SN3500 & KG-102A
USE THIS JUMPER ONLY ON -03 MODEL WITH SOFTWARE -001B OR LATER

IF TURNS ARE SLUGGHISH, INSTALL THIS JUMPER

FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT

ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER

ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A

CONNECT PARALLEL TO EXISTING WIRING

DASHED LINES REPRESENT EXISTING WIRING

Figure 31 - KING KFC 200 / 300 Series with KI-525A
Figure 32 - KING KFC 200 with KA-118 & KPI-550A
USE THIS JUMPER ONLY ON -03 MODEL WITH SOFTWARE -001B OR LATER
IF TURNS ARE SLUGGISH, INSTALL THIS JUMPER
FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT
ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
CONNECT PARALLEL TO EXISTING WIRING (EXISTING WIRING NOT ILLUSTRATED FROM DG)
DASHED LINES REPRESENT EXISTING WIRING
CONNECT PARALLEL TO EXISTING WIRING (EXISTING WIRING NOT ILLUSTRATED FROM DG)

Figure 33 - KING KFC 200 with KI-825 HSI
Figure 34 - KING KFC 200 / 300 Series with KPI-552
Figure 35 - KING KFC 200 Series with SN3308 / SN3500 & KG-102A
Figure 36 - KING KFC 200 Series with SN3308 / SN3500 – without DG
For GPS input see Appendix C - GPS Receiver Interconnect

1. For GPS input see Appendix C - GPS Receiver Interconnect
2. ARINC 429 input available on PINS 7 & 8 on PN 1049-4000-03 with Software -001B or later
3. ARINC 429 output available on PINS 7 & 8 on PN 1049-4000-01 with Software -001A
4. Connect parallel to existing wiring
5. Dashed lines represent existing wiring

Figure 37 - KING KFC 325 with EFIS 50
Figure 38 - S-TEC 50/55/60/65 (DC) with NSD-360A / NSD-1000
Figure 39 - S-TEC 50/55/55X/60/65 (AC) with 6406 HSI

NOTES:
1. FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT
2. ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
3. ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
4. CONNECT PARALLEL TO EXISTING WIRING
5. DASHED LINES REPRESENT EXISTING WIRING
FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT
1 ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
2 ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
3 CONNECT PARALLEL TO EXISTING WIRING
4 DASHED LINES REPRESENT EXISTING WIRING

**Figure 40** - S-TEC 50/55/60 with KI-525A
DASHED LINES REPRESENT EXISTING WIRING
CONNECT PARALLEL TO EXISTING WIRING

+5 vdc OFFSET PROVIDED THROUGH ISOLATION TRANSFORMER, PIN 6
FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT
ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
CONNECT PARALLEL TO EXISTING WIRING
DASHED LINES REPRESENT EXISTING WIRING

Figure 41 - S-TEC 50/55/60/65 with ARINC HSI
CONNECT COUPLER PINS 1, 2 & 13 PARALLEL TO EXISTING WIRING
GROUND BOTH ENDS OF ALL SHIELDING

ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A

FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT
SETS SCALING TO APPROXIMATELY .0026 (THIS VALUE IS NOT REFERENCED IN THE GAIN TABLES IN THE INSTALLATION SECTION OF THIS MANUAL)

NOTES:
THIS GAIN STRAPPING AND CONFIGURATION OF THE ISOLATION COUPLER WIRING EFFECTIVELY SETS SCALING TO APPROXIMATELY .0026. (THIS VALUE IS NOT REFERENCED IN THE GAIN TABLES IN THE INSTALLATION SECTION OF THIS MANUAL)
FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT
ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
CONNECT COUPLER PINS 1, 2 & 13 PARALLEL TO EXISTING WIRING
DASHED LINES REPRESENT EXISTING WIRING
GROUND BOTH ENDS OF ALL SHIELDING

Figure 42 - S-TEC 50/60/65 (AC) with 1U262-006-45 DG
ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER

ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
CONNECT PARALLEL TO EXISTING WIRING

GROUND BOTH ENDS OF ALL SHIELDING

NOTES:
1. THIS GAIN STRAPPING AND CONFIGURATION OF THE ISOLATION COUPLER WIRING EFFECTIVELY SETS SCALING TO APPROXIMATELY .0026 (THIS VALUE IS NOT REFERENCED IN THE GAIN TABLES IN THE INSTALLATION SECTION OF THIS MANUAL)
2. FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT
3. ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
4. ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
5. CONNECT PARALLEL TO EXISTING WIRING
6. DASHED LINES REPRESENT EXISTING WIRING
7. GROUND BOTH ENDS OF ALL SHIELDING

Figure 43 - S-TEC 50/60/65 (AC) with 52D54 DG
Figure 44 - S-TEC 55 (DC) with 52D54DG
3 ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A

429 RX-B
GROUND BOTH ENDS OF ALL SHIELDING

DASHED LINES REPRESENT EXISTING WIRING
CONNECT PARALLEL TO EXISTING WIRING

5 ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER

NOTES:
1. FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT
2. ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
3. ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
4. CONNECT PARALLEL TO EXISTING WIRING
5. DASHED LINES REPRESENT EXISTING WIRING
6. GROUND BOTH ENDS OF ALL SHIELDING

Figure 45 - S-TEC 55/65 (AC) with 6443 HSI
ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A3

GROUND BOTH ENDS OF ALL SHIELDING

CONNECT PARALLEL TO EXISTING WIRING

ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER

NOTES:
1. FOR GPS INPUT SEE APPENDIX C - GPS RECEIVER INTERCONNECT
2. ARINC 429 INPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-03 WITH SOFTWARE -001B OR LATER
3. ARINC 429 OUTPUT AVAILABLE ON PINS 7 & 8 ON PN 1049-4000-01 WITH SOFTWARE -001A
4. CONNECT PARALLEL TO EXISTING WIRING
5. DASHED LINES REPRESENT EXISTING WIRING
6. GROUND BOTH ENDS OF ALL SHIELDING

Figure 46 - S-TEC 60 with G502A HSI