



RELEASED

EQUIPMENT INSTALLATION MANUAL

for the

GDC65 ALTITUDE PRESELECT CONVERTER

P/N 1105-4000-01

Rev B1

DAC International
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Austin, TX 78729

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RECORD OF REVISIONS

REV	DESCRIPTION	DATE	APPROVED	
IR	INITIAL RELEASE	E1361	12/21/2011	SM
A	Update J1 pin out table	E1381	01/20/2012	BH
B	See ECO	E1641-05	02/20/2013	BH
B1	Update section 5.2.1	E1792	05/12/2014	BH



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1. INTRODUCTION:

This manual contains installation data, specifications and continued airworthiness information for the GDC65 Altitude PreSelect Converter (APSC), part number 1105-4000-01.

2. DESCRIPTION:

The Model GDC65 APSC produces ARINC 429 label 102 using data obtained from a modified Sperry AL-245 Altitude Alert Controller and an Air Data Computer. The GDC65 reads coarse selected altitude and fine altitude offset retrieved from a modified AL-245, and it reads fine aircraft altitude from the Air Data Computer (ACD). (It does not read ADC Coarse altitude.) The GDC65 uses this information to calculate the pilot selected altitude dialed into the modified AL-245, P/N 1105-4245-01.

3. PART NUMBER:

3.1. GDC65

The Model GDC65 ASPC is available under the following part number:

1105-4000-01-001() Altitude PreSelect Converter

|
Software part number, where () contains the number zero for initial release,
or any letter, A – Z to denote a minor change.

3.2. Modified AL-245

The Sperry model AL-245 Altitude Alert Converter must be modified to operate with the GDC65 converter by adding a signal to previously unused pin M. The modified part is identified as:

1105-4245-01 Altitude Alert Controller



4. REFERENCE DOCUMENTS

RTCA/DO-160E	Environmental Conditions and Test Procedures for Airborne Equipment
RTCA/DO-178B	Software Considerations in Airborne Systems and Equipment Certification
ARINC 429	Mark 33 Digital Information Transfer System

5. REGULATORY COMPLIANCE:

5.1. Software

The GDC65 software was developed in accordance with RTCA/DO-178B to criticality level D.

5.2. Hardware

5.2.1. GDC65

The GDC65 is approved via STC ST00090MC for installation on de Havilland Dash-7 aircraft.

5.2.2. AL-245 (Modified)

The modified AL-245, identified as P/N 1105-4245-01, is approved for installation under the STC. The modified AL-245 unit continues to perform its original function in addition to providing one new signal on connector pin M.



6. SUPPLIED EQUIPMENT

6.1. GDC65

Each unit is shipped with the following items:

Part Number	Description	Qty
1105-4000-01-001()	GDC65 Altitude Preselect Converter	1
0000-4200-62	Installation Kit	1

Complete installation kits are available under kit part number 0000-4200-62. Individual pieces are available under the part numbers shown. Contact DAC International sales to place orders.

Part Number	Description	Qty
0000-4200-62	Installation Kit	
M24308/2-14F	Connector, Receptacle, 62 pin D-Sub	1
P10891	Backshell, 62-Pin D-Sub	1

Additional sockets are available under DAC part number M39209/57-354, quantity as required (A/R).

M39209/57-354	Socket, Crimp Style, female	A/R
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6.2. AL-245

Model AL-245, Sperry P/N 4018285-904, provided to DAC International, will be modified for use with the GDC65 and re-identified as DAC International P/N 1105-4245-01. Modification shall be performed using approved type design data.



7. GDC65 SPECIFICATIONS:

7.1. Physical:

The GDC65 attaches to the airframe using four (4) #8 screws. See the paragraph titled Outline Drawing for additional details.

Height.....	1.25 inches
Width (including flanges)	5.00 inches
Depth.....	4.06 inches
Weight.....	.05 lb.

7.2. Electrical:

Input Voltage	28 VDC Nominal (10Vdc – 32Vdc operational)
Input Current.....	0.2 Amp nominal at 28 VDC

7.3. AL-245 Altitude Input:

The GDC65 uses both the coarse and fine altitude signals from the AL-245

7.3.1. Coarse Altitude Input

Reference Voltage.....	+15Vdc \pm 1Vdc
Signal	0 to +16dc
Gradient.....	5000 feet per Vdc (assuming Vref = +15Vdc)
Electrical Zero.....	Zero feet equals 2.55Vdc (assuming Vref = +15Vdc)

7.3.2. Fine Altitude Input

Reference Voltage.....	26Vac \pm 4Vac 400Hz \pm 20Hz
Signal	9 \pm 0.45 Vac Sine/Cosine
Gradient.....	13.89 feet per degree of rotation
Range	0 to 5000 feet offset from current aircraft altitude



7.4. Air Data Computer Fine Altitude Input:

The GDC65 uses only the fine altitude signal from the ADC

7.4.1. Fine Altitude Input

Reference Voltage.....	26Vac \pm 4Vac 400Hz \pm 20Hz
Signal	9 \pm 0.45 Vac Sine/Cosine
Gradient.....	13.89 feet per degree of rotation
Range	0 to 5000 feet

7.5. Reliability:

MTBF.....Greater than 40,000 hours.



8. OPERATION:

The GDC65 contains no operator controls. It accepts AC and DC input signals from both the modified AL-245 Altitude Alert Controller and the existing Air Data Computer then outputs digital Selected Altitude via ARINC label 102 on both a high speed and a low speed output port.



9. INSTALLATION:

This section contains considerations and recommendations for installation of the GDC65 LRU. The interconnect wiring harness and physical mounting must be considered to satisfy all applicable regulations. The environmental conditions and tests required for PMA of these articles are minimum performance standards. If this article is installed in a location that would place it in environmental conditions outside the limitations listed in the manual, it is the responsibility of that installing agency to determine if additional compliance data is required and to present such data to the administrator of the Federal Aviation Administration or other applicable certifying agency. Refer to the Environmental Qualification Forms found later in this document.

9.1. Aircraft Interconnect Wiring

The typical interconnect diagram and connector pin listings are provided to assist the installation agency in preparation of the interconnect wiring cables. Wiring shown as twisted/shielded must be installed as shown in order to maintain compliance with the Environmental categories. ARINC 429 outputs are connected using twisted shielded pairs (M27500-26SB2T23 or equivalent). Analog inputs are connected using triple twisted shielded pairs (M27500-26SB3T23 or equivalent). Power and ground return signals should be connected using M22759/32-24-9 or equivalent.

DESCRIPTION	PART NO.
24 AWG	M22759/32-24-9 or equivalent
TPL TWSTD SHIELDED	M27500-26SB3T23 or equivalent
DBL TWSTD SHIELDED	M27500-22SB2T23 or equivalent
SHIELD TERMINATION	M83519/2-13 or equivalent

9.2. Mounting

The GDC65 is intended to mount in the aircraft electronic equipment bay but may mount in either a pressurized or non-pressurized section of the aircraft so long as consideration is given to the appropriate environmental categories. It can be mounted in any orientation. The GDC65 is secured with installer provided hardware; four each 8-32 screws (length as appropriate for aircraft installation), four each #8 flat washers, and four each #8 lock washers are required for proper installation. See section 16 for the location dimensions of the mounting holes. It is recommended that at least 4 inches of clearance be provided on the connector side of the GDC65 to allow room for the mating connector and cable.



10. REMOVAL AND REPLACEMENT

10.1. Removal

1. Open the circuit breaker powering the GDC65.
2. Loosen the two jack screws on P1 and remove the connector.
3. Remove four (4) screws securing the unit to the airframe.

10.2. Replacement

1. Open the circuit breaker powering the GDC65.
2. Attach the unit to the airframe with four (4) screws.
3. Attach connector P1 to the GDC65. Thread the two jack screws on P1 in J1 then tighten.
4. Close circuit breaker.
5. Perform operational test of the GDC65 as prescribed in the aircraft maintenance manual.

11. EQUIPMENT CHECKOUT

The GDC65 provides ARINC 429 selected altitude to an APX-119 Mode-S transponder. There are no operator controls associated with the GDC65. The Air Data Computer, AL-245 and APX-119 must be installed and operational in order to perform this functional test.

1. Apply power to the GDC65, Air Data Computer, APX-119 transponder and Sperry flight director system.
2. Set the selected altitude on the AL-245 to 25,000 feet
3. Perform the functional test of Mode-S transponder according to existing, approved maintenance data.
4. Verify the Mode-S transponder reports a target altitude of $25,000 \pm 100$ feet



12. CONTINUED AIRWORTHINESS:

This section provides data intended to assist the installer with establishing Instructions for Continued Airworthiness as required by FAR 25.1529.

1. Maintenance Manual information for the GDC65, which includes system description, removal instructions, installation instructions and functional testing, is contained in DAC International Installation Manual, 1105-2510-01 (this document).
2. Line Replaceable Unit (LRU) part numbers and other parts contained in the installation data package should be placed in the aircraft operator's appropriate airplane Illustrated Parts Catalog (IPC).
3. Wiring diagram information contained in the installation data package should be placed in the aircraft operator's appropriate airplane Wiring Diagram Manual.
4. Scheduled Maintenance Program tasks are as follows:
 - a. Recommended Periodic Scheduled Servicing: None required
 - b. Recommended Periodic Scheduled Preventive Maintenance Tests..... None Required
 - c. Recommended Periodic Inspections: None Required
 - d. Recommended Periodic Overhaul Period None Required
 - e. Special Inspection Requirements None Required
5. Application of Protective Treatments None Required
6. Special Tools..... None Required
7. Electrical Loads for this article are as specified in the DAC International Installation Manual, 1105-2510-01 (this manual).
8. There are no Airworthiness limitations associated with the installation of this article.

13. ENVIRONMENTAL:

NOMENCLATURE: Model GDC65 Altitude Preselect Converter
 PART NO: 1105-4000-01-XXXX
 MANUFACTURER: DAC International
 ADDRESS: 6702 McNeil Drive, Austin, TX 78729
 RTCA/DO-160E Environmental Conditions and Test Procedures for Airborne Equipment

Section	Category	Remarks
4.0 Temperature and Altitude	D2	50,000 Ft
5.0 Temperature Variation	B	Partially controlled temperature
6.0 Humidity	A	Standard Humidity
7.0 Operational Shock and Crash Safety	B	Standard Operational Shock
8.0 Vibration	SBM	Curve B, A/C Type 2, Fixed Wing – Turbojet or Turbofan, Reciprocating & Turboprop Engines, Single and Multi Eng, Aircraft Zone 2. Curve M, A/C Type 5, Fixed Wing – Reciprocating & Turboprop, Multi Eng, Aircraft Zone 2.
9.0 Explosion Proofness	X	Not Tested
10.0 Waterproofness	X	Not Tested
11.0 Fluids Susceptibility	X	Not Tested
12.0 Sand and Dust	X	Not Tested
13.0 Fungus Resistance	X	Not Tested
14.0 Salt Spray	X	Not Tested
15.0 Magnetic Effect	Z	Less than 0.3 meter
16.0 Power Input	B	Alternator / Rectifiers with battery
17.0 Voltage Spike	A	E = 600 volts
18.0 AF Conducted Susceptibility – Power Inputs	B	Alternator / Rectifiers with battery
19.0 Induced Signal Susceptibility	AC	No interruption of operation
20.0 Radio Frequency Susceptibility (Radiated and Conducted)	QQ	50 volts/meter, 0.075 amps/meter
21.0 Emission of Radio Frequency Energy	M	At or below acceptable limit per DO-160E.
22.0 Lightning Induced Transient Susceptibility	A3XXX	Pin input test, interference controlled to tolerable levels.
23.0 Lightning Direct Effects	X	Not Tested
24.0 Icing	X	Not Tested
25.0 ESD	A	Aircraft mounted equipment

14. CONNECTOR PIN OUT:

The GDC65 contains a single 62-pin male connector, J1, DAC part number P10879. The part numbers for mating connector P1, along with crimp pins and backshell are described previously under the section “Equipment Supplied”.

Pin	Signal	Function
1	A+	28 Vdc Primary Power
2		
3		
4		
5	429TX2A	ARINC Transmitter 2A, Low Speed
6	429TX2B	ARINC Transmitter 2B, Low Speed
7		Reserved (COM 2 RX) Production Use Only
8		Reserved: ARINC Receiver 3A
9		Reserved: ARINC Transmitter 3A
10		Reserved (COM 1 RX)
11		
12		
13		
14	AL-245 Coarse	AL-245 Coarse Altitude dc signal
15		
16		
17	429TX1A	ARINC Transmitter 1A, High Speed
18	429TX1B	ARINC Transmitter 1B, High Speed
19		Reserved: ARINC Receiver 1A
20		Reserved: ARINC Receiver 1B
21	26Vac (L) Ref	400 Hz Reference for sin/cos resolver inputs
22	A+	28 Vdc Primary Power
23		
24		
25		
26		Reserved: ARINC Receiver 2A
27		Reserved: ARINC Receiver 2B
28		Reserved (COM 2 TX) Production Use Only
29		
30		Reserved (COM 1 TX)
31		
32		
33		

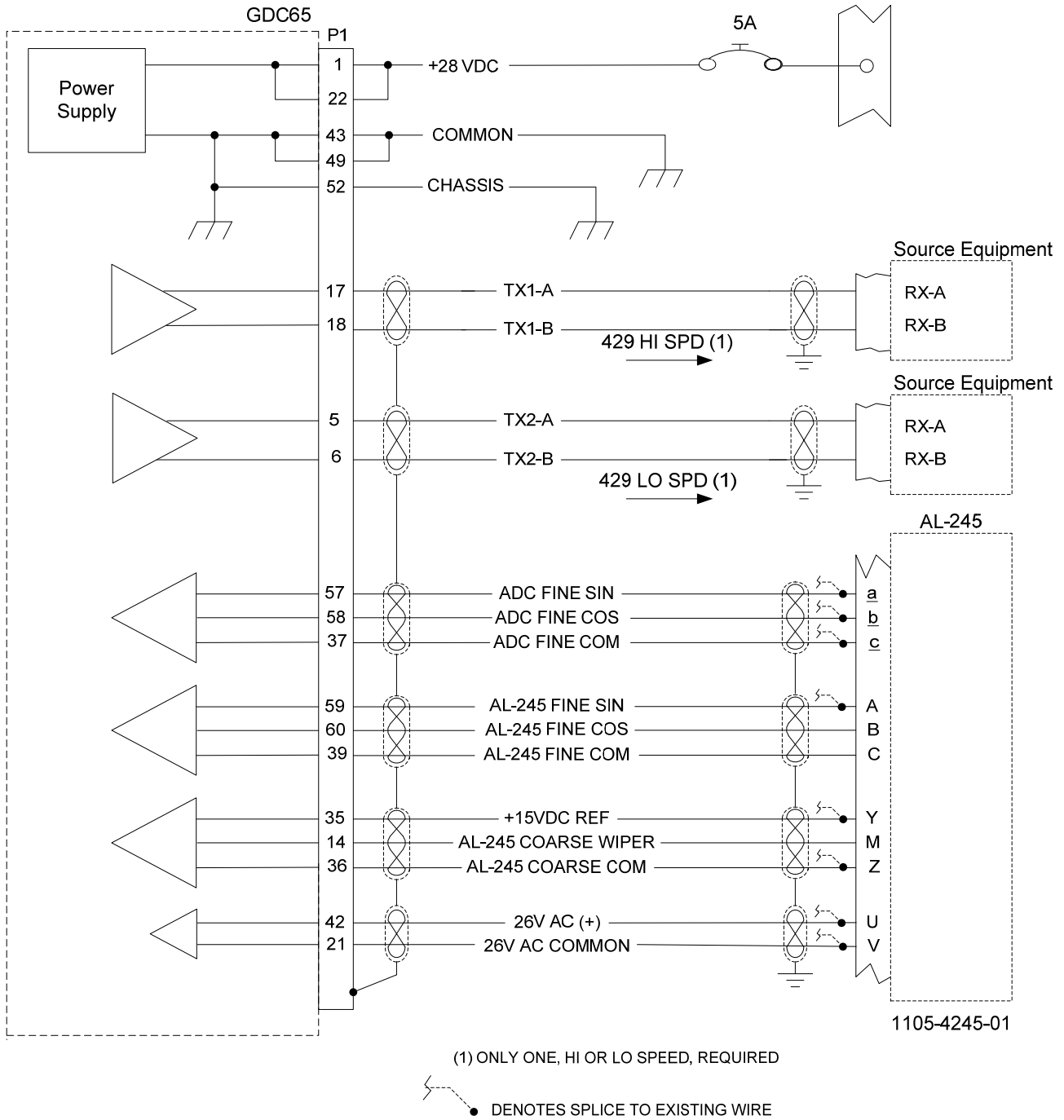


Pin	Signal	Function
34		
35	+15Vdc Reference	Coarse Reference Voltage from ADC
36	AL-245 Coarse Common	AL-245 Coarse Selected Altitude Common
37	ADC Fine Common	ADC Fine Altitude Common
38		Reserved
39	AL-245 Fine Common	AL-245 Fine Altitude Common
40		Reserved
41		Reserved
42	26Vac (H) Ref	400 Hz Reference for sin/cos resolver inputs
43	Power Com	
44		Reserved: SEL7
45		Reserved: SEL6
46		Reserved: SEL5
47		Reserved: SEL4
48		Reserved: SEL3
49	Power Com	
50		Reserved: SEL2
51		Reserved: SEL1
52	Chassis Gnd	
53		Reserved: SEL0
54	Signal Common	
55	Signal Common	
56	Signal Common	
57	ADC SIN	ADC Fine Altitude (sin)
58	ADC COS	ADC Fine Altitude (cos)
59	AL-245 SIN	AL-245 Fine Selected Altitude (sin)
60	AL-245 COS	AL-245 Fine Selected Altitude (cos)
62		Reserved

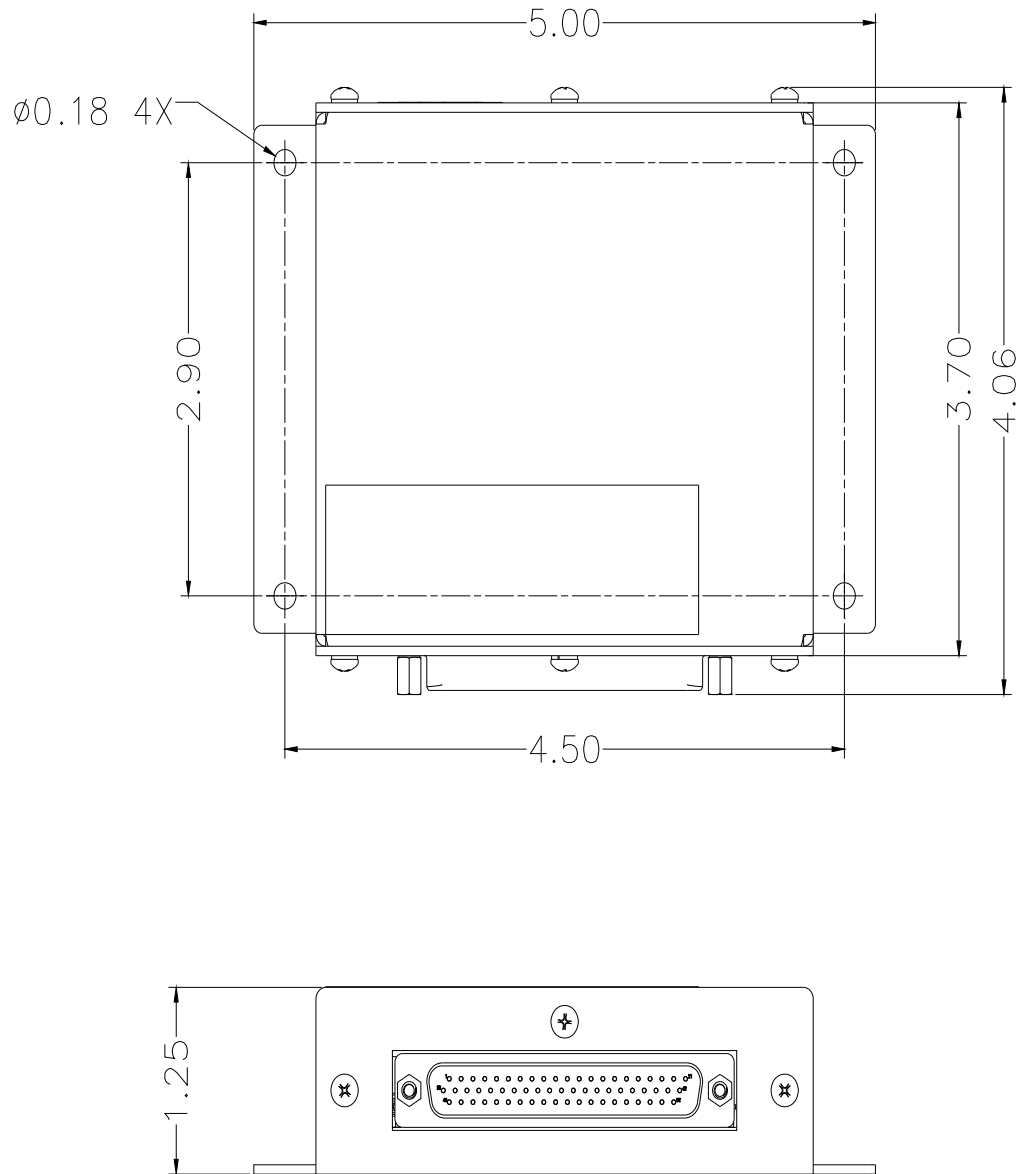
J1 Pin Description

NOTE: Do not use pins labeled Reserved.

15. TYPICAL INTERCONNECT



16. OUTLINE DRAWING



Note: Dimensions are in inches.