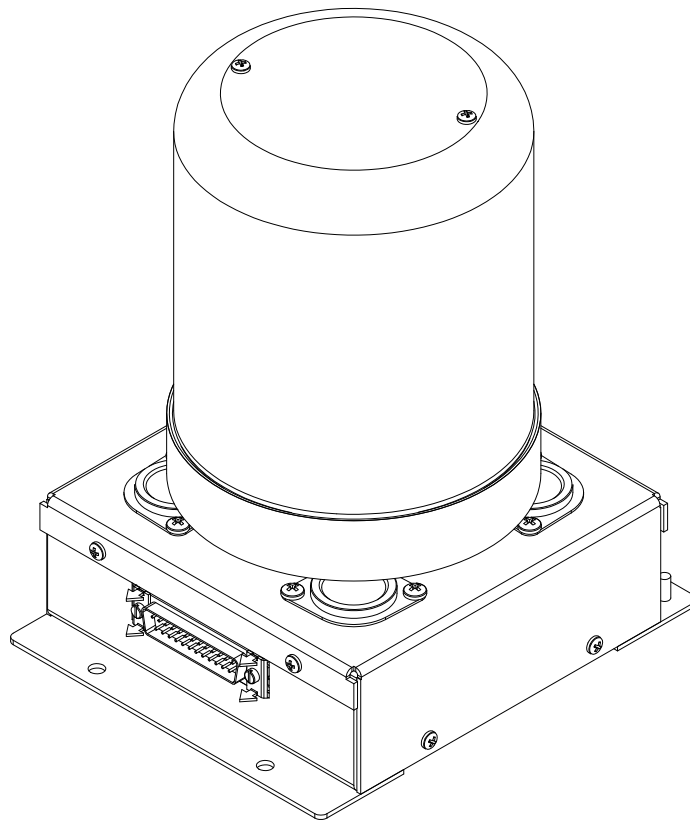




## **INSTALLATION MANUAL AND OPERATING INSTRUCTIONS FOR**

**4305-150 Remote Directional Gyro  
(14/28 Selectable Voltage Input)**



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**Revision Detail**

<b>Rev.</b>	<b>Date</b>	<b>Detail</b>
N/R	05/02/01	Complete issue
A	08/10/01	Upgrade to TSO C5e and AS8021.
B	6/4/02	Minor correction to functional diagram, add P2-4 to J1-3 connection in Sandel interconnect diagram.
C	6/14/05	Added Sandel SN3500 EHSI
D	10/05/05	Added Honeywell KMT 112
E	1/11/06	Pg 8, added optional KMT 112 Flux Detector Pg A1, corrected Sandel typo, added Honeywell p/n for KMT 112 Flux Detector

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**SECTION 1 GENERAL DESCRIPTION**

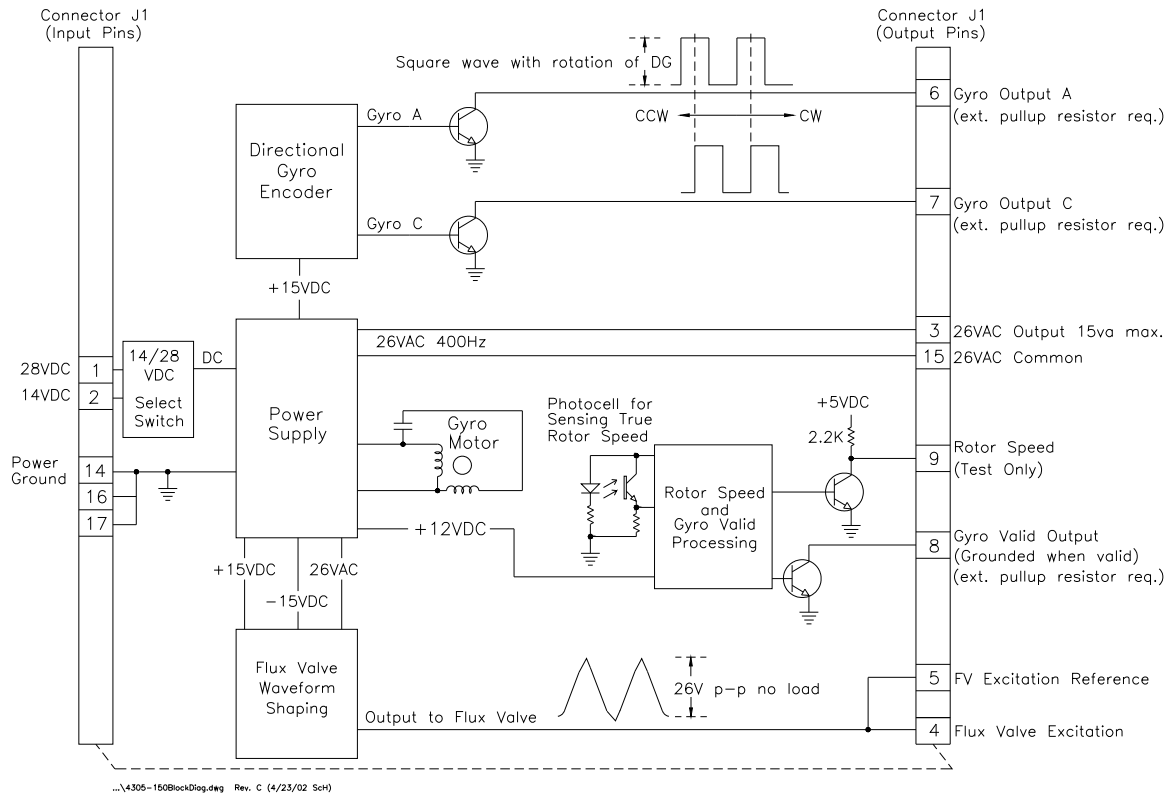
**1.1 INTRODUCTION**

Produced under the General Design product line, the Remote Directional Gyro (RDG) is a self-contained unit that provides a gyro-stabilized heading reference for electronic HSI indicators. The RDG provides a 512 PPR encoded output that allows better than 0.2-degree resolution. Additional features include internal generation of 10vac, 400Hz for flux valve excitation and 26vac, 15va, 400 Hz for synchro excitation, plus switch selectable 14 or 28V input.

Reliability has been designed in by utilizing an oversized rotor running at half the normal rotor speed, which can double the bearing life. The RDG also incorporates high quality precision bearings and electronics that have been tested and proven over the years. Estimated MTBF is 8,000 hours. See Fig. 1-1 for a functional block diagram.

**Fig. 1-1 Functional Block Diagram**

Mid-Continent Instruments  
4305-150 Remote Directional Gyro  
Functional Block Diagram



## 1.2 TECHNICAL SPECIFICATIONS

### 1.2.1 PHYSICAL CHARACTERISTICS

Mounting:	Remote
Width:	5.13 inches
Height:	7.51 inches
Depth:	6.20 inches
Weight:	4.3 pounds

### 1.2.2 ENVIRONMENTAL CHARACTERISTICS

TSO Compliance:	TSO C5e
Applicable Documents:	AS 8021, RTCA/DO-160D
Operating Temperature Range:	-55°C to +70°C
Operating Humidity Range:	0 to 95% Non-Condensing
Operating Altitude Range:	-1000 to 55,000 ft
Mounting Surface Vibration:	5g Max.

Note: Also see Appendix B for RTCA/DO-160D Environmental Qualification Form.

### 1.2.3 ELECTRICAL SPECIFICATIONS & INTERFACE

28VDC Aircraft Power J1 Pin 1	1.2 Amps. Max. (Voltage selection switch must be set to 28V)
14VDC Aircraft Power J1 Pin 2	1.8 Amps. Max. (Voltage selection switch must be set to 14V)
Ground DC Input J1 Pin 14, 16, 17	DC Power Ground and Flux Valve ground reference
Flux Valve Excitation J1 Pin 4	10 vac 400 Hz flux valve excitation to flux valve
FV Excitation Reference J1 Pin 5	10 vac 400 Hz flux valve excitation to electronic HSI for reference.
Gyro A Output J1 Pin 6	Provides square wave output with 512 pulses per revolution (PPR) 0° phase. (Open Collector output)
Gyro C Output J1 Pin 7	Provides square wave output with 512 pulses per revolution (PPR) 90° phase. (Open Collector output)
Gyro Valid Output J1 Pin 8	Provides a logic low when valid. (Open Collector output)
Rotor Speed Output J1 Pin 9	Square wave output in which the frequency is directly proportional to the rotor speed. (For test only)
26vac Output J1 Pin 3	26vac 400 Hz square wave output providing up to 15va (500ma) for synchro excitation.
26vac Common J1 Pin 15	Floating 26vac Common (Not internally grounded)

#### 1.2.4 EQUIPMENT LIMITATIONS

The Gyro provides heading output throughout the 360-degree range in azimuth. During dives, climbs or banks up to 55 degrees displacement from level flight the instrument will remain functional. Heading error involved through the gimbal system need not be corrected.

#### 1.2.5 MAJOR COMPONENTS

TSO C5e compliance applies to one major component, the 4305-( ) Remote Directional Gyro.

### SECTION 2 INSTALLATION CONSIDERATIONS

#### 2.1 COOLING

No direct cooling is required. As with any electronic equipment, overall reliability may be improved if the gyro is not located near any high heat source or crowded next to other equipment. Some means of providing a gentle airflow will be a plus.

#### 2.2 EQUIPMENT LOCATION

The Remote Directional Gyro may be mounted in any convenient location. The mounting surface should be such that when the aircraft is in level flight the mounting surface of the RDG will be level  $\pm 2$  degrees in any direction. The upper gyro assembly must be oriented in a location free of any obstructions such that the shock mounting provisions of the gyro assembly are not interfered with.

#### 2.3 ROUTING OF CABLES

Care must be taken not to bundle the RDG interface cable with any high-energy sources. Examples of these sources include 400 HZ AC, Comm, DME, HF and transponder transmitter coax. Always use shielded wire where shown on the installation diagram. Avoid sharp bends in RDG interface cable. Avoid routing near aircraft control cables.

### SECTION 3 INSTALLATION PROCEDURES

#### 3.1 GENERAL INFORMATION

This section contains voltage selection, wiring guidelines and other information pertaining to the installation of the RDG. After installation of cabling and before installation of the equipment, ensure that power is applied only to the pins specified in the interconnection diagram. Refer to the Appendix for application-specific interconnect and installation information.

#### 3.2 UNPACKING AND INSPECTING EQUIPMENT

When unpacking equipment, make a visual inspection for evidence of damage incurred during shipment.

#### 3.3 VOLTAGE SELECTION

The RDG is shipped from the factory configured for 28VDC input, but may be changed to accept 14VDC. Voltage input configuration may be verified by noting the decal visible beside the switch cover secured by 2 screws on the side of the base (see Fig. 3-2).

If it is desired to change the input voltage, simply remove the switch cover, flip the toggle switch toward the desired voltage and replace the cover. Note that the switch cover must then be flipped end

for end before re-installation, covering the voltage decal, which is not used. Note also that the appropriate power input pin must be connected at the DB-25 connector (see Fig. 3-1). E.g. If the selector switch is set for 14V operation, input power must be supplied on pin 2 or the gyro will not run. If the selector switch is set for 28V operation, input power must be supplied on pin 1.

### 3.4 MOUNTING THE RDG

Avoid mounting close to heater vents or other high heat sources. Allow clearance of at least 3 inches on the connector side for plug removal.

The unit should be secured using four #8 screws through the corners of the base plate. See Fig. 3-2 for the hole pattern.

### 3.5 INSTALLATION LIMITATIONS

Use at least 24 AWG wire for individual wires in the RDG interface cable. Avoid sharp bends in the interface cable and avoid routing near high-energy sources. Care must be taken to tie the interface cable away from aircraft control rods and cables. Also see equipment limitations, section 1.2.4.

## SECTION 4 POST-INSTALLATION CHECKOUT

### 4.1 CABLE WIRING TESTS

With the RDG disconnected, turn on the avionics master switch and verify that aircraft power is on pin 1 of the cable for 28 volt operation or pin 2 of the cable for 14 volt operation. Using an ohmmeter, verify that pin 14 is aircraft ground. Also verify that pin 3 of the cable (26vac output) is NOT connected to aircraft ground (see Fig. 3-1).

### 4.2 OPERATING INSTRUCTIONS

When power is applied to the RDG, the heading flag on the HSI will remain in view until the gyro rotor has reached at least 80% of normal speed.

The electronic HSI compass calibration procedure should now be performed to verify proper operation of the remote directional gyro.

### 4.3 AIRWORTHINESS STATEMENT

No periodic scheduled maintenance or calibration is necessary for continued airworthiness of the Remote Directional Gyro 4305-150. If the unit fails to perform to specifications, it must be removed and serviced by a qualified service facility.

## SECTION 5 INCLUDED PARTS LISTS

### 5.1 PARTS SUPPLIED WITH 4305-150 RDG

The 4305-150 RDG ships with the following items:

- 1 ea. 4305-150 14/28 VDC Remote Directional Gyro
- 1 ea. 7014517 Mating connector kit
- 1 ea. 9013376 Installation manual for 4305-150 RDG

### 5.2 PARTS SUPPLIED IN THE RDG 500 PACKAGE

The RDG 500 Package is designed to interface with the Sandel SN3308 or SN 3500 display.

The package consists of:

- 1ea 4305-150 14/28VDC Remote Directional Gyro
- 1 ea. 7014517 Mating connector kit
- 1 ea. 9013376 Installation manual for 4305-150 RDG

- 1ea FD01-0301-1 Flux Detector

Note: Mating connector is included in 9012394 install kit listed below.

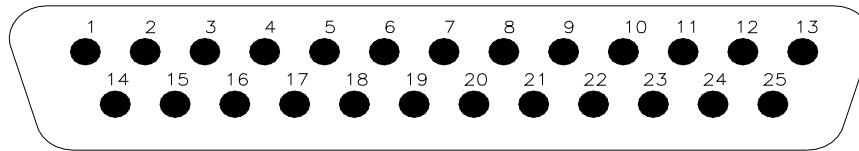
OR

071-01052-0000, KMT 112 Flux Detector  
050-01361-0000 Connector Kit

- 1ea 9012394 Flux Detector install kit consisting of the following:

- 1 ea. 9013384 Installation manual for Flux Detector
- 1ea. 9010887 Mounting Bracket 90°
- 1ea. 9010885 Mounting Plate
- 10ea. 9010893 Screw, 6-32X5/16 PH Brass
- 4ea. 9010901 Washer, #6 Flat, Brass
- 1ea. 9011875 Connector, 9 Pin
- 1ea. 9011883 Clamp, Cable
- 5ea. 9011891 Socket, Crimp 24-20 ga.



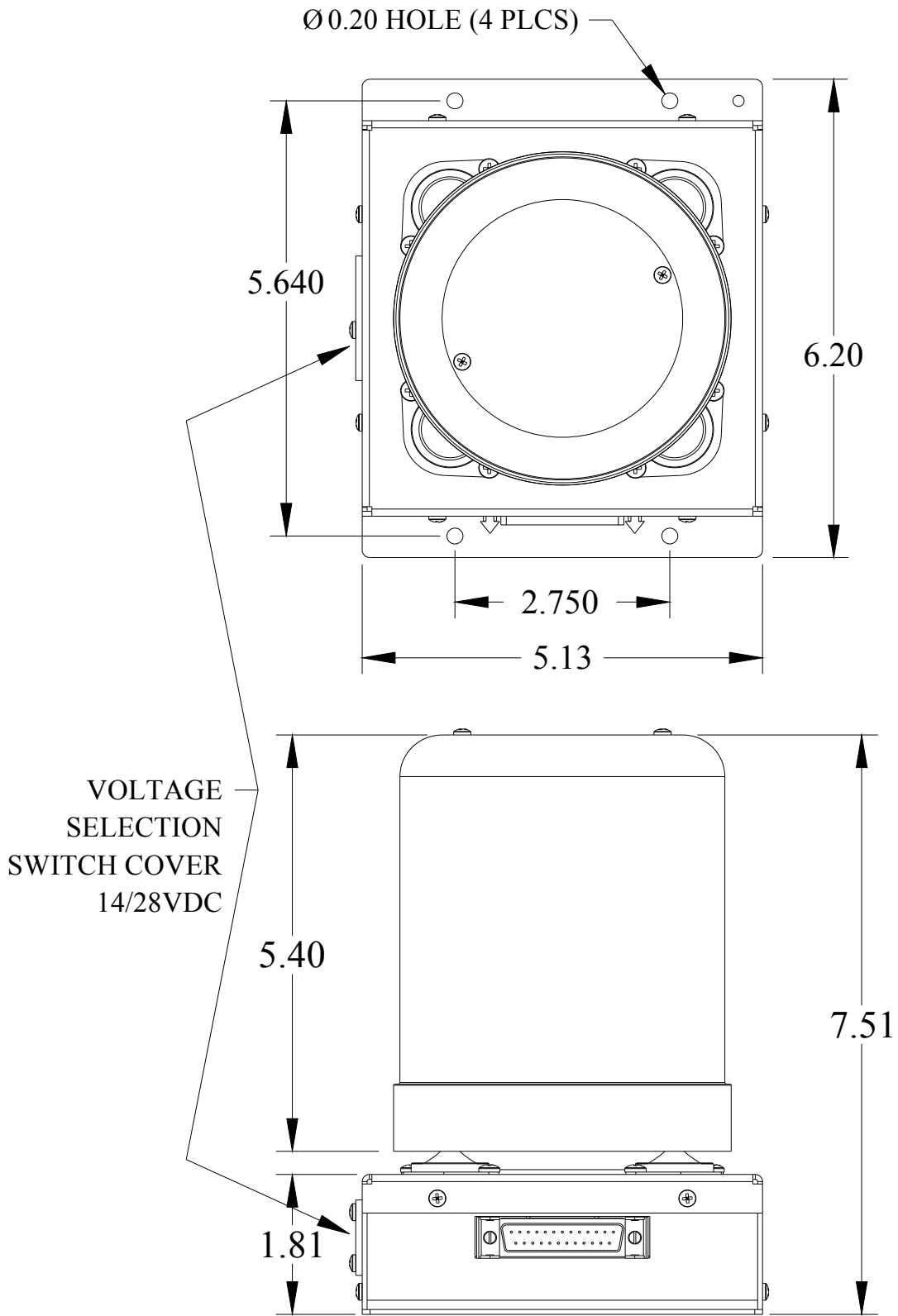


**J1 CONNECTOR**  
(View facing connector on RDG)

J1  
PIN NO.

- 1 ----- 28VDC Aircraft Power (Active only when voltage selection switch is set to 28V)
- 2 ----- 14VDC Aircraft Power (Active only when voltage selection switch is set to 14V)
- 3 ----- 26vac Output, 500 ma Max. For synchro excitation
- 4 ----- Flux Valve Excitation, 10vac, 400 Hz Modified Square Wave, To FV
- 5 ----- FV Excitation Reference 10vac, 400 Hz Modified Square Wave, To HSI
- 6 ----- Gyro A Output, Open Collector, Square Wave, 512 PPR
- 7 ----- Gyro C Output, Open Collector, Square Wave, 512 PPR
- 8 ----- Gyro Valid Output, Open Collector, Provides logic low when valid
- 9 ----- Rotor Speed Output, Square Wave, Frequency equals rotor speed (for testing only)
- 10 ----- Spare
- 11 ----- Spare
- 12 ----- Spare
- 13 ----- Spare
- 14 ----- Power Ground/Flux Valve Ground Reference
- 15 ----- 26vac Common
- 16 ----- Power Ground/Flux Valve Ground Reference
- 17 ----- Power Ground/Flux Valve Ground Reference
- 18 ----- Spare
- 19 ----- Spare
- 20 ----- Spare
- 21 ----- Spare
- 22 ----- Spare
- 23 ----- Spare
- 24 ----- Spare
- 25 ----- Spare

**FIGURE 3-1 CONNECTOR J1 PINOUT, 25 PIN D-SUB**

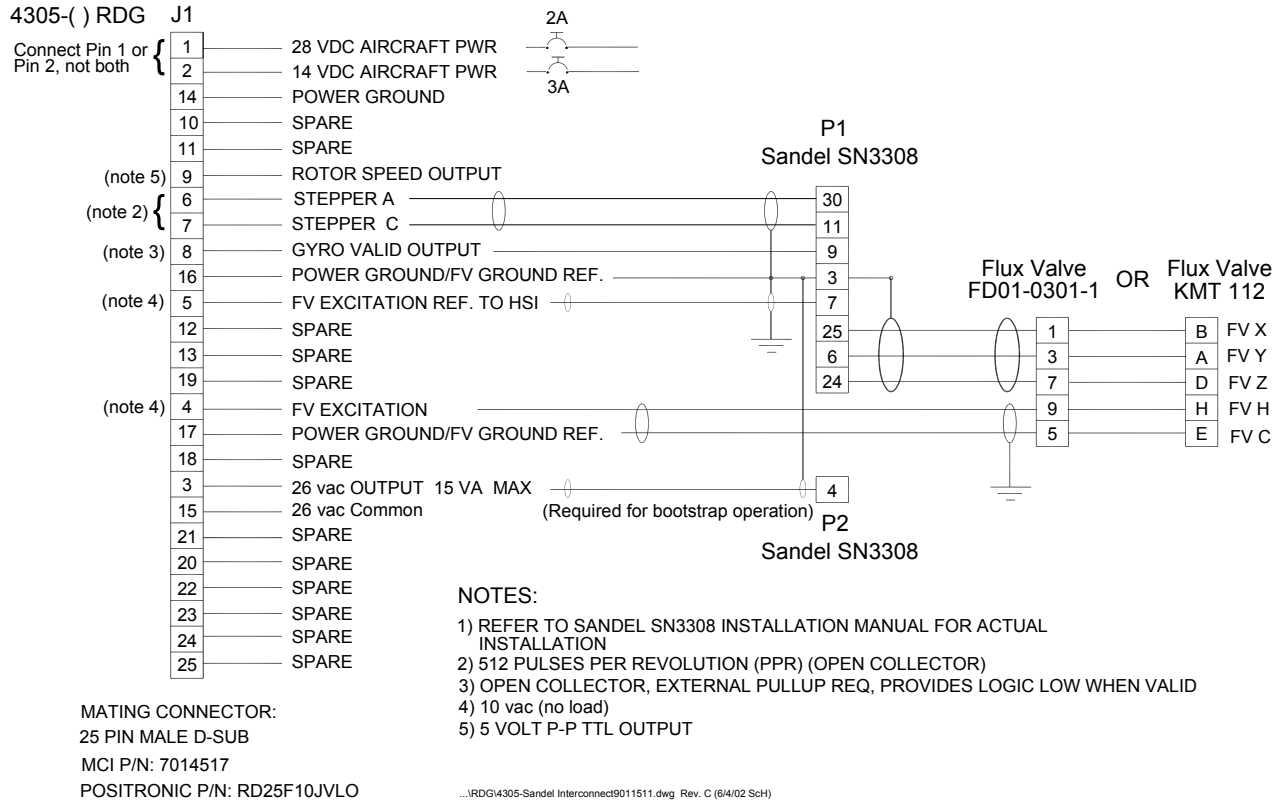


See FIGURE 3-1 for Connector Pinout  
Note: Use four #8 Screws for RDG Mounting

**FIGURE 3-2 OUTLINE DRAWING**

**APPENDIX A**

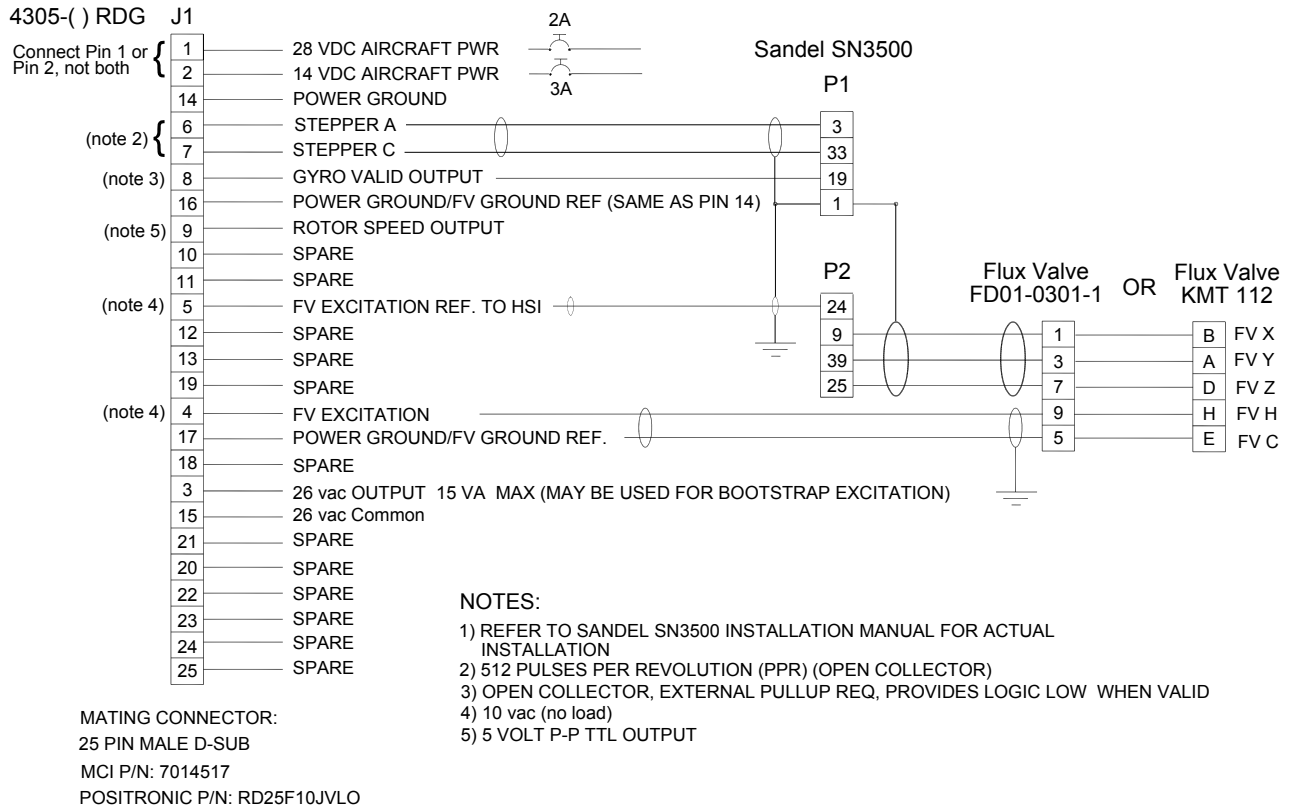
**Connection of 4305-150 RDG with Sandel SN3308 Display, Humphrey FD01-0301-1 or Honeywell KMT 112 Flux Detector**



**FIGURE 3-3 WIRING DIAGRAM, Connection of 4305-150 With Sandel SN3308**

**APPENDIX A**

**Connection of 4305-150 RDG with  
Sandel SN3500 Display, Humphrey FD01-0301-1  
or Honeywell KMT 112 Flux Detector**



**FIGURE 3-4 WIRING DIAGRAM, Connection of 4305-150  
with Sandel SN3500**

**APPENDIX B**

**ENVIRONMENTAL QUALIFICATION FORM**

NOMENCLATURE: REMOTE DIRECTIONAL GYRO

MODEL NO: 4305-( ) TSO NO: C5e

MANUFACTURER TEST SPECIFICATION: TDS190

MANUFACTURER: Mid-Continent Instruments and Avionics  
 9400 E 34th Street N.  
 WICHITA, KS 67226 PHONE (316) 630-0101

**Revision & Issue Date of RTCA/DO-160: D, July 29,1997      Date Tested: March-June, 2001**

Conditions	DO-160D Section	Description of equipment tests to be conducted
Temperature & Altitude	4.0	Category D2
Low Temperature	4.5.1	-55°C operating, -55°C survival
High Temperature	4.5.2 & 4.5.3	+70°C operating, +85°C survival
In-flight Loss of Cooling	4.5.4	Not applicable
Altitude	4.6.1	-1000 ft. to +55,000 ft. operating
Overpressure	4.6.3	-15,000 ft. operating
Temperature Variation	5.0	Category B
Humidity	6.0	Category B
Operational shock & Crash Safety	7.0	Category B
Vibration	8.0	Aircraft zone 2. Aircraft type 1 tested to Category U, Vibration level (F,F1). Aircraft type 2 through 6 tested to Category S, Vibration level B & M.
Explosion	9.0	Category X, no test performed
Waterproofness	10.0	Category X, no test performed
Fluids Susceptibility	11.0	Category X, no test performed
Sand and Dust	12.0	Category X, no test performed
Fungus Resistance	13.0	Category X, no test performed
Salt Spray	14.0	Category X, no test performed
Magnetic Effect	15.0	Equipment is Class Z
Power Input	16.0	Category B
Voltage Spike	17.0	Category A
Audio Freq. Susceptibility	18.0	Category A
Induced Signal Susceptibility	19.0	Category A
Radio Freq. Susceptibility	20.0	Category T
Radio Freq. Emission	21.0	Category L
Lightning Induced Transient Susc.	22.0	Category XXXX, no test performed
Lightning Direct Effects	23.0	Category X, no test performed
Icing	24.0	Category X, no test performed
Electrostatic Discharge	25.0	Category X, no test performed