

# **BECKER**

AVIONIC SYSTEMS

**Converter and  
Indicator**

**ID 3502 - ( )**

## **Installation and Operation**

Manual DV 30650.03  
Issue 1 January 1993

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FIRST ISSUE AND CHANGES

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**Section 1 GENERAL INFORMATION**

**1.1 Introduction**

The following system manual describes the converter and indicator ID 3502 - ( ). The manual DV 30650.04 contains the following section :

	Section	DV 30650.04
1	General Information	X
2	Installation	X
3	Operation	X
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5	Maintenance and Repair	X
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**1.2 Purpose of equipment**

The converter and indicator ID 3502 - ( ) presents the bearing information relative to the centerline of the aircraft in which an RF-Signal is incident. The equipment has been designed to meet the requirements of JTSO-2C41d. For operational requirements under environmental conditions, EURO-CAE/RTCA ED-14C/DO-160C has been taken as a standard. In the certified Environmental Categories, there are practically no restrictions for use of the converter and indicator in the instrument panel of aircraft. In demonstration tests, all systems were shown to be functional at operating pressures equivalent to altitudes of up to 50.000 feet. The converter and indicator is located in the instrument panel. The converter and indicator is the converter circuit (decoder) for the indicator. A variable resistance control permits quadrantal error correction of approx. 20 degrees on the front panel without having to remove the indicator.

### 1.2.1 Variants survey

Type designation Part- No.:	Article-No.:	Panel illumination	Panel illumination	
		13.75 V / 27.5 V DC	5 V AC / DC	
ID 3502-(1)-(01)	0855.995-912	X		
ID 3502-(1)-(02)	0856.002-912		X	
ID 3502-(2)-(01)	0574.821-912	X		Master
ID 3502-(3)-01	0574.831-912	X		Slave

Table 1-1 list the available variants of the converter and Indicator ID 3502 - ( ) - ( )

### 1.3 General description

#### 1.3.1 Converter and Indicator ID 3502 - ( )

The mechanical design of the converter and indicator is robust and well-suited for installation in all types of aircraft. The converter and indicator was developed to meet the requirements of JTSO-2C41d/DO-179. In the environmental categories for which it is certified, there are no restrictions for use of the unit in instrument panels, operating consoles or direct rigid attachment to the airframe of all aircraft.

The converter and indicator was developed as a single-block unit. Its dimensions correspond to the ARINC standard for control equipment. It is held in place by means of four DZUS fasteners. All controls, indicators and displays are located on the front plate. The back side of the unit contains: the unit connector plug for connection to the aircraft wiring system.

### 1.4 Technical data

#### 1.4.1 General data

##### Power supply

ID 3502 - ( ) - ( ) + 27.5 V DC

##### Current consumption

ID 3502 - ( ) - ( ) < 200 mA

##### Illumination

Operating voltage AC or DC	14 V	28 V	5 V
Current consumption typ.	80mA	40mA	240mA

**1.5 System data**

Bearing accuracy  $\leq 3^\circ$  by 70  $\mu\text{V/m}$  (190 kHz - 850 kHz)  
 $\leq 8^\circ$  by 70  $\mu\text{V/m}$ ( | 850 kHz)

**1.5.1 Environmental data**

Operating temperature - 20° C . . . . . + 55° C shorttime + 70° C  
Storage temperature - 55° C . . . . . + 85° C  
EUROCAE/RTCA ED-14C/DO-160C Env.Cat. [A1D1]-BA(MN)XXXXXXZBA-  
BATZXXX

**1.5.2 Mechanical data**

Front panel 82.55 x 82.55  
Casing depth 135 mm  
Weight 0.5 Kg

**1.5.3 Certifications**

LBA no. 10.921/53JTSO  
BZT approval no. A107418D LB

**1.5.4 Design Specification**

JTSO-2C41d  
RTCA DO - 179 Category A  
EUROCAE/RTCA ED-14C/DO-160C  
EUROCAE/RTCA ED-12A/DO-178A

**1.5.5 Environmental Qualification**

The following performance standards under environmental test conditions have been established in accordance with the procedures set forth in EUROCAE/RTCA ED-14C/DO-160C Env. Cat. [A1D1] -BA(MN)XXXXXXZBABATZXXX.

Environmental condition	ED-14C/		
DO-160C	Category	Performan- ce	
Temperature	4.0	A1 D1	
Low operating temperature	4.5.1		- 20° C
Low ground survival (storage temperatur)			- 55° C
High short-time operating temperature	4.5.2		70° C
High operating temperature	4.5.3		+ 55° C
High ground survival (storage) temperature			85° C
Min. operating pressure (equivalent altitude)	4.6.1		50.000 ft.
Decompression	4.6.2		from 8000 ft. to 50.000 ft. altitude
Overpressure	4.6.3		- 15.000 ft.
Temperature variation	5.0	B	
Humidity	6.0	A	48 hrs at up to 50° C and 95%
relative humidity			
Shock :	7.0		
Operational shocks	7.2		11 ms at 6 G for all three dimensional axes
Crash safety shocks	7.3		11 ms at 15 G for all three dimensional axes
acceleration 12 G			
Vibration	8.0	MN	
Magnetic effect of < 30 cm	15.0	Z	Deflection of 1° of compass at a distance
Power input variation on a 20-volt emergency power supply	16.0	B	Test confirmed that the equipment functions
Resistance to voltage spikes on equipment power leads	17.0	A	
Audio-frequency conducted susceptibility	18.0	B	
Susceptibility to induced magne- tic and electric fields at 400 Hz	19.0	Z	
Radio-frequency interference susceptibility	20.0	T	
Spurious RF emissions	21.0	Z	



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## **Section 2 Installation**

### **2.1 General**

Installation of the Converter and Indicator components will depend on the aircraft type and equipment fitted, and thus only general instructions can be provided in this section.

Before installing the equipment in an aircraft, examine the equipment for signs of damage in transit.

### **2.2 Preinstallation Check**

Unpack the equipment and inspect all assemblies for evidence of damage. Try all the controls and check that they operate satisfactorily.

#### **2.2.1 Operational Check**

A functional check prior to installation is only reasonable when all system components (receiver, evaluation unit, and antenna, etc.) are installed. Therefore, such a functional check is described in the System Manual DV 30601.03.

### **2.3 Installing the Converter and Indicator ID 3502 - ( )**

The Converter and Indicator is manufactured to standard instrument dimensions, so that it can be installed in a standard cutout in the instrument panel. Installation should be located in the panel where the pilot is able to read the instrument with minimum parallax error.

The indicator can be mounted from behind or from the front of the instrument panel. The dimensions and drilling templates are shown in Fig. 2-1.

### **2.4 Installation Wiring**

#### **2.4.1 General**

For the installation wiring refer to system handbook DV 30601.03.

The types of cable to be used are indicated in the installation wiring diagram. It is mandatory that these instructions be complied with since they are vital to satisfactory operation of the system.

#### **2.4.2 Panel lighting**

The converter and indicator is equipped with a panel lighting. The panel lighting may be connected to 5 VAC or DC, to 14 VDC, or to 27.5 VDC supply voltage. If the panel lighting is connected to 14 V and 27.5 V respectively, the minus terminal of the lamps is internally grounded. For 5 V panel lighting both lamp terminals are run to the outside. Unless agreed otherwise, the units are set to 14V or 27.5 V panel lighting, respectively. Adaptation for 5 VAC or 5 VDC is described in the circuit diagrams. In addition, 5 V lamps must be used.

Pin assignment converter and indicator unit ID 3502 - ( ) (connector P1)

5 V DC	Pin 8 (+) Pin 15 (-)
5 V AC	Pin 15 ( ) Pin 8 ( )
14 V DC	Pin 8 (+) Pin 15 (-)
27.5 V DC	Pin 15 (+)

## **2.5 Post-installation Check**

A functional check after installation is only reasonable for all system components (receiver, RMI-converter, and antenna, etc.) together. Therefore, such a functional check is described in the System Manual DV 30601.03.

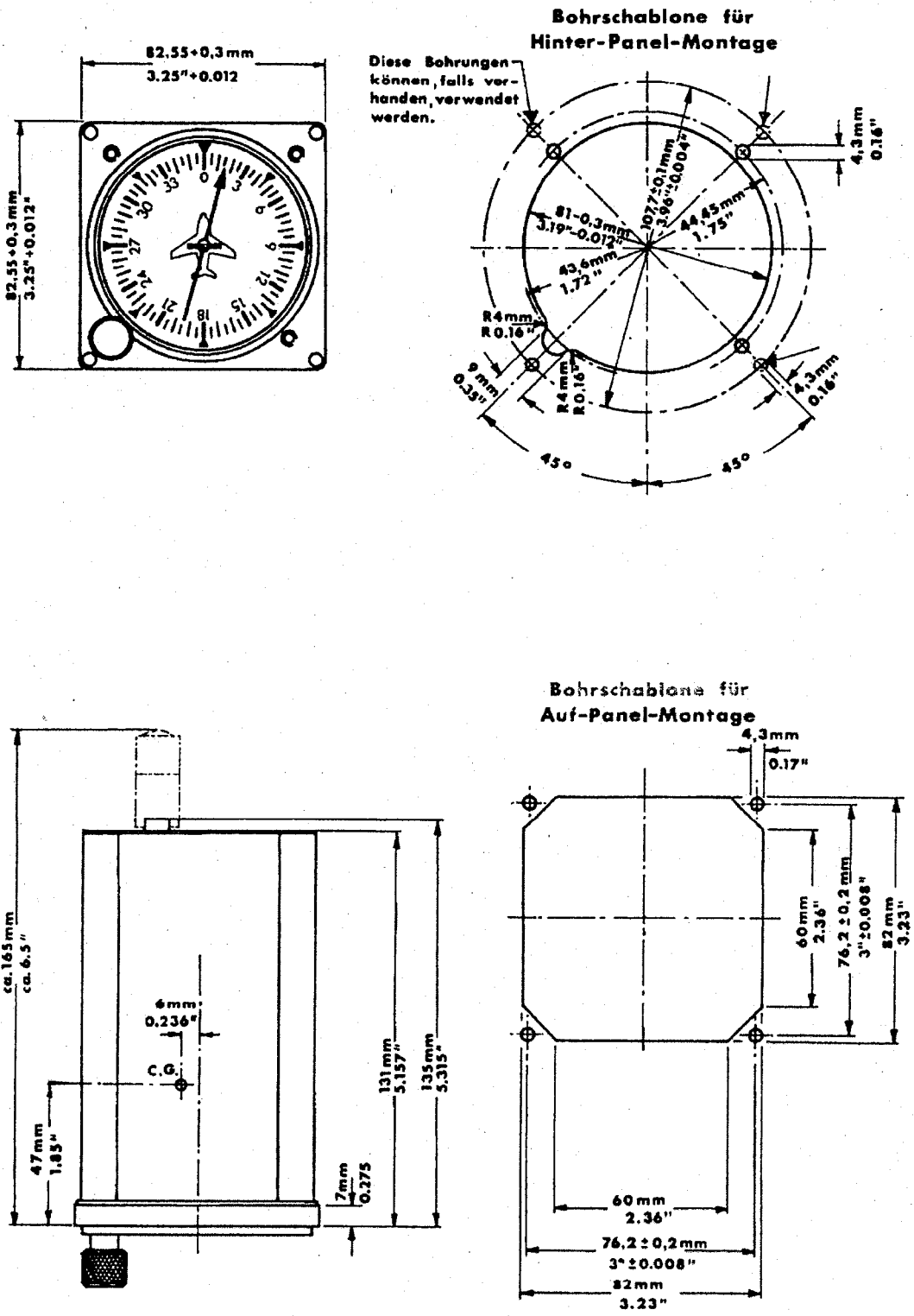


Abb. 2-1 Abmessungen ID 3502 - ( )

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**Section 3 Operation**

**3.1 Converter / Indicator ID 3502 Controls**

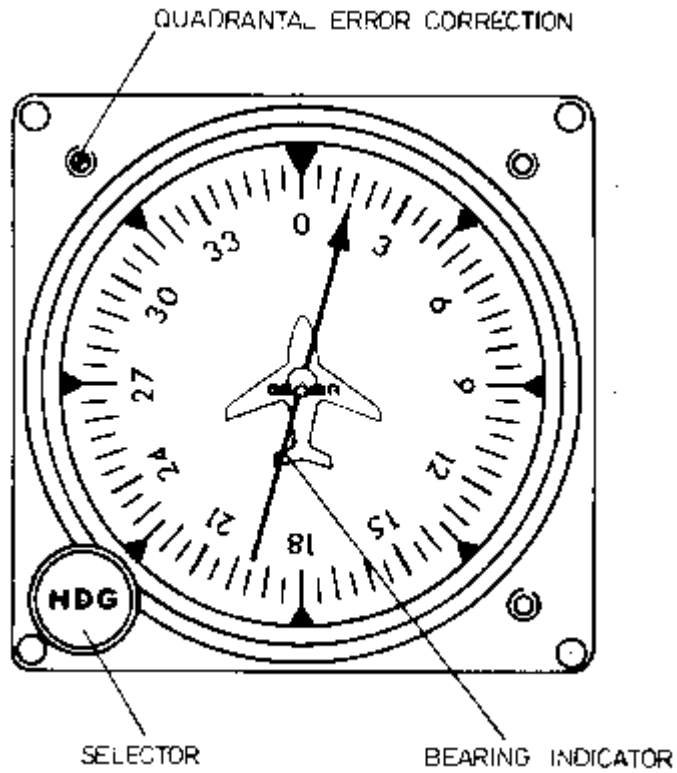


Fig. 3-1 Converter / Indicator ID 3502 controls

Controls and indicator	Description	Function
Heading selector	Knob for rotating 360° card	Serves to set relative heading
Bearing indicaton	Rotating pointer driven by DC repeater	Indicates direction of NDB relative to A/C heading

### **3.2 Operating instructions**

1. Rotate HDG setting so that its scale indicates 0° / 360°.
2. Switch receiver to REC / TEST mode and press test key.

#### **Test function**

The pointer of the indicator must go to three o'clock position (90°)!

3. Select NDB frequency by means of the frequency selector switches and compare station identification ( set Receiver to BFO-mode when NDB is transmitting on A1).
4. After checking station identification, return selector to ADF. The pointer leaves the 90° position and turns to the direction of the NDB.
5. Set heading using HDG selector depending on flight method.