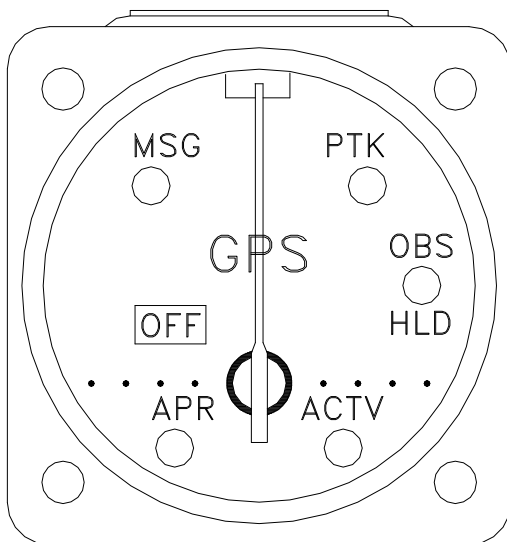


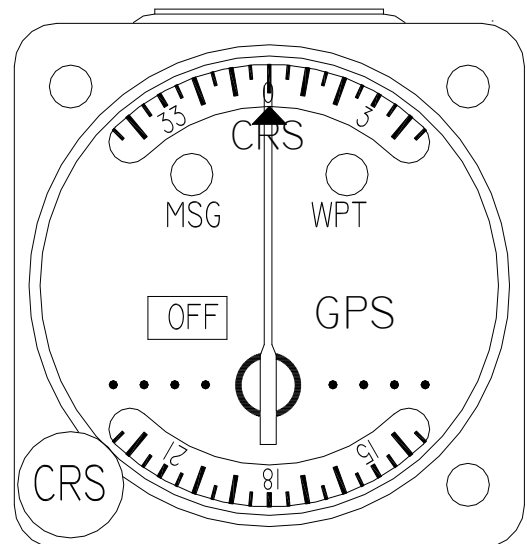


INSTALLATION MANUAL AND OPERATING INSTRUCTIONS

M40-() Series COURSE DEVIATION INDICATOR



(MD40-65L shown)



(MD40-232L shown)

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RECORD OF REVISIONS

Revision	Revision Date	Description	
N/R	03-28-87	Initial Release	
A	11-05-02	Changed Manual Format	
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1. GENERAL DESCRIPTION

1.1 INTRODUCTION

This manual describes the physical, mechanical and electrical characteristics and the installation requirements for the MD40-() series Course Deviation Indicator (CDI). The appropriate CDI top level drawing *must* be used in conjunction with this installation manual for electrical interconnect.

1.2 EQUIPMENT DESCRIPTION

The MD40 series Course Deviation Indicator is a compact, self-contained 2 1/4" indicator used to display output signals from various GPS and Loran receivers. The fully integrated display can provide annunciations, course error deviation, to-from-off indication and OBS resolver output. Because of the wide selection of GPS and Loran systems, Mid-Continent offers over 60 versions of the MD40 indicator. In *most* cases, the selected unit will include all the necessary functions required for FAA approval of the installed GPS or Loran system.

1.3 TECHNICAL SPECIFICATIONS

1.3.1 Physical Characteristics (without resolver)

Mounting	Panel, 2 1/4 inch round instrument hole
Width	2.39 inches
Height	2.45 inches (2.53 lighted)
Depth Behind Panel	2.13 inches (2.27 lighted)
Weight	0.50 lbs max

1.3.2 Physical Characteristics (with resolver)

Mounting	Panel, 2 1/4 inch round instrument hole
Width	2.39 inches
Height	2.45 inches (2.53 lighted)
Depth Behind Panel	4.72 inches (4.68 lighted)
Weight	1.0 lbs max

1.3.3 General Specifications

Regulatory Compliance	TSO C60a
Applicable Documents	RTCA/DO-194
Operating Temperature Range	-55°C to +70°C
Humidity	95% non-condensing
Altitude Range	0 to 55,000 ft
Operating Current	20 mA max
Lighting Current	90 mA max
Environmental Testing	RTCA/DO-160B

1.3.3 Electrical Specifications

OBS Resolver (when applicable)	Omni Range Zero: 300°, calibrated at 30 Hz
Deviation Input Impedance	1 K Ω \pm 15%
Deviation Deflection Sensitivity	150 mV \pm 15% for full scale deflection
Super Flag input (when applicable)	11-33 Vdc
TO-OFF-FROM Flag Input Impedance	200 Ω \pm 15%
TO-OFF-FROM Flag Sensitivity	\pm 40mV \pm 15% for TO or FROM fully in view

2. INSTALLATION

2.1 INTRODUCTION

Careful planning should be applied to achieve the desired performance and reliability from the MD40-() CDI.

2.2 EQUIPMENT LOCATION

The MD40-() CDI must be mounted as close to the pilot's field of view as possible. The unit depth, with connector attached, must also be taken into consideration.

2.3 COOLING AIR

No direct cooling is required. As with any electronic equipment, overall reliability may be increased if the MD40-() CDI is not located near any high heat source or crowded next to other equipment.

2.4 ROUTING OF CABLES

Care must be taken not to bundle the MD40-() CDI low level signal lines with any high energy sources. Examples of these sources include 400 HZ AC, Comm, DME, HF and transponder transmitter coax. Always use shielded wire when shown on the installation print.

Avoid sharp bends in cabling and routing near aircraft control cables.

2.5 EQUIPMENT LIMITATIONS

The MD40 series Course Deviation Indicators are limited for use with Loran or GPS systems providing the required outputs necessary to match the listed input characteristics of the applicable MD40 indicator.

For a fully TSO'd system the companion Loran or GPS system must also be certified to FAA TSO requirements.

3. INSTALLATION PROCEDURES

3.1 GENERAL INFORMATION

This section contains interconnect diagrams, mounting dimensions and other information pertaining to the installation of the MD40-() CDI. After installation of cabling and before installation of the equipment, ensure that power is applied only to the pins specified in the interconnect diagram.

For wiring, you *must* have the correct top level drawing that matches the indicator you are currently installing.

3.2 UNPACKING AND INSPECTING

When unpacking equipment, make a visual inspection for evidence of damage incurred during shipment. The following parts should be included:

Item	MCI Part Number	Drawing Number	QTY
MD40-() CDI	2010056-()		1
Installation Manual	2010085 Rev A or later		1
MD40-() Top level drawing		2010056-()	1
15 pin (sockets) connector kit	8018293		1
15 pin (pins) connector kit (required for MD40-2X2 indicators with resolver)	8018285		A/R

3.3 MOUNTING THE MD40-() INDICATOR

Avoid mounting close to heater vents or other high heat sources. Allow a clearance of at least 3 inches from back of unit for plug removal.

Make a panel cutout as shown in Figure 3.1 or 3.2. Secure the indicator in place with four 4-40 x 3/8 flat or round head screws with tinnerman nuts.

3.4 INSTALLATION LIMITATIONS

Wire the aircraft harness according to the appropriate top level drawing. Use at least 24 AWG wire for all connections. You **MUST** use shielded wire where shown by the receiver manufacture. Avoid sharp bends and routing cable near high-energy sources. Care must be taken to tie the harness away from aircraft controls and cables. Also see equipment limitations, section 2.5.

4 POST INSTALLATION CHECKOUT

4.1 PRE INSTALLATION TESTS

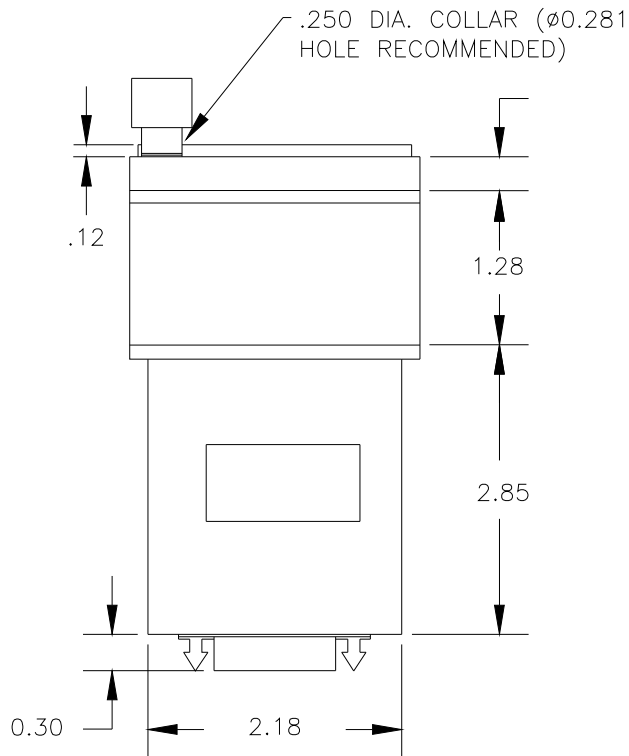
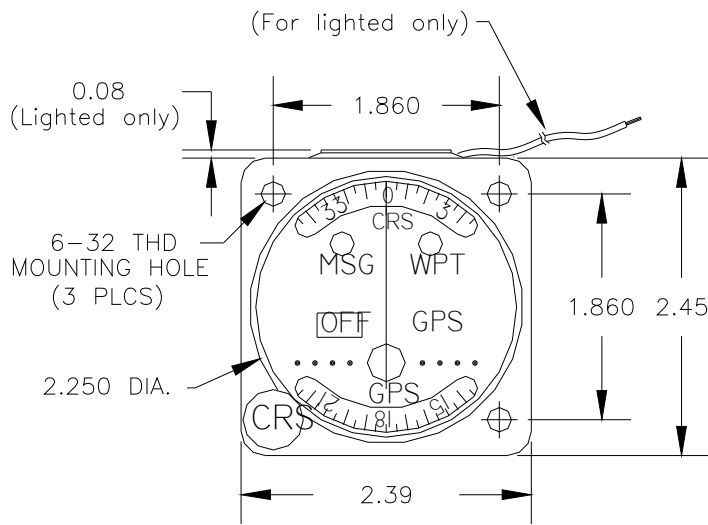
With the MD40-() disconnected, turn on the avionics master switch and verify that aircraft power is on the appropriate pins.

4.2 OPERATING INSTRUCTIONS

Operator should refer to the appropriate Loran or GPS Operating/Pilots Guide for explanations of various indications and annunciator functions. A complete ground test should be accomplished to determine proper annunciation and meter deflection.

4.3 AIRWORTHINESS STATEMENT

No periodic scheduled maintenance or calibration is necessary for continued airworthiness of the MD40-(). If unit fails to perform to specifications, the unit must be removed and serviced by a qualified service facility.



(MD40-232 shown)

Figure 3.1 Cutout Dimensions for MD40-() series Indicator With Resolver

APPENDIX A: MD40-() APPLICATION CHART

Manufacturer/Description	Part Number	Manufacturer/Description	Part Number
Mid-Continent for Arnav		Mid-Continent for Northstar	
<i>STAR5000GPS</i>		<i>60</i>	
STANDARD- VFR APR ALERT	MD40-27	STANDARD- PTK WRN WPT	MD40-43
LIGHTED- VFR APR ALERT	MD40-27L	LIGHTED- PTK WRN WPT	MD40-43L
Mid-Continent for Freeflight		<i>M2, 6</i>	
<i>TNL2000APR, 2101(ALL)</i>		STANDARD-ALERT WRN VFR PTK	
STANDARD-MSG WPT HLD APR	MD40-66	LIGHTED- ALERT WRN VFR PTK	MD40-29L
LIGHTED-MSG WPT HLD APR	MD40-66L	<i>M3</i>	
<i>TNL2000T/2100T</i>		STANDARD- ALERT WRN VFR PTK RAIM	
STANDARD-ADV WRN APT WPT	MD40-62	LIGHTED- ALERT WRN VFR PTK RAIM	MD40-41L
LIGHTED- ADV WRN APT WPT	MD40-62L	<i>M3APR</i>	
<i>TNL8100, HT9000</i>		STANDARD- APR PTK WPT MSG	
STANDARD- MSG HLD WPT APR	MD40-68	LIGHTED- APR PTK WPT MSG	MD40-64L
LIGHTED-MSG HLD WPT APR	MD40-68L	<i>M3IFR</i>	
Mid-Continent for Garmin		STANDARD- PTK WRN APR WPT	
<i>GNC-250/XL</i>		LIGHTED- PTK WRN APR WPT	
STANDARD- MSG WPT	MD40-42	Mid-Continent for Terra	
LIGHTED- MSG WPT	MD40-42L	<i>TGPS400D</i>	
<i>GPS100AVD</i>		STANDARD- WRN ADV	
STANDARD- MSG	MD40-22	LIGHTED- WRN ADV	MD40-38L
LIGHTED- MSG	MD40-22L	Mid-Continent for UPS Aviation	
<i>GPS150</i>		<i>APOLLO 360, GX55, GX65</i>	
STANDARD- MSG ARV	MD40-39	STANDARD- MSG PTK	MD40-44
LIGHTED- MSG ARV	MD40-39L	LIGHTED- MSG PTK	MD40-44L
<i>GPS155(XL)/165(XL), GNC300(XL)</i>		<i>GX50/60, 2001 GPS/TSO</i>	
STANDARD- MSG WPT	MD40-242	STANDARD- MSG PTK APR ACTV OBS HLD	
LIGHTED- MSG WPT	MD40-242L	LIGHTED- MSG PTK APR ACTV OBS HLD	
Mid-Continent for Honeywell		<i>SL50/60</i>	
<i>KLN-89A/90A</i>		STANDARD- MSG PTK OBS HLD	
STANDARD- MSG WPT	MD40-32	LIGHTED- MSG PTK OBS HLD	MD40-67L
LIGHTED- MSG WPT	MD40-32L	Mid-Continent for Various	
<i>KLN-89B/90B/94B</i>		<i>VARIOUS</i>	
STANDARD- MSG WPT	MD40-232	STANDARD- BASIC CDI	MD40-09
LIGHTED- MSG WPT	MD40-232L	LIGHTED- BASIC CDI	MD40-09L
<i>KLX-135/A</i>			
STANDARD- MSG WPT	MD40-42		
LIGHTED- MSG WPT	MD40-42L		
Mid-Continent for Magellan			
<i>SKYNAV 5000</i>			
STANDARD- NAV WPT GPS	MD40-31		
LIGHTED- NAV WPT GPS	MD40-31L		

APPENDIX B: ENVIRONMENTAL QUALIFICATION FORM RTCA /DO160B

NOMENCLATURE: MD40-() COURSE DEVIATION INDICATOR

MODEL NO: MD40-() **PART NUMBER:** 2010056-()

MANUFACTURER TEST SPECIFICATION: MPS 7015613

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

Conditions	Section	Description of Conducted Tests
Temperature and Altitude	4.0	Equipment tested to Categories B1 & F2 Category X: No test required Category X: No test required
Low Temperature	4.5.1	
High Temperature	4.5.3	
Altitude	4.6.1	
Decompression	4.6.2	
Overpressure	4.6.3	
Temperature Variation	5.0	Equipment tested to Category B
Humidity	6.0	Equipment tested to Category A
Shock	7.0	Equipment tested per DO-160B
Operational	7.2	Par. 7.2.1
Crash Safety	7.3	Category X: No test required
Vibration	8.0	Equipment tested without shock mounts to Categories P,K and S (Table 8-1)
Explosion	9.0	Category X: No test required
Waterproofness	10.0	Category X: No test required
Fluids Susceptibility	11.0	Category X: No test required
Sand and Dust	12.0	Category X: No test required
Fungus	13.0	Category X: No test required
Salt Spray	14.0	Category X: No test required
Magnetic Effect	15.0	Equipment tested to Class Z