

Manual Number
9020079
Revision A
October 25, 2024



1394T100-() SERIES

Turn Coordinator



FOREWORD

This manual provides information intended for use by persons who, in accordance with current regulatory requirements, are qualified to install this equipment. If further information is required, please contact:

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Wichita, KS 67226 USA
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www.mcico.com

We welcome your comments concerning this manual. Although every effort has been made to keep it free of errors, some may occur. When reporting a specific problem, please describe it briefly and include the manual part number, the paragraph/figure/table number, and the page number. Send your comments to:

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REVISION HISTORY

Rev	Date	Detail	Approved
A	10/25/2024	Initial release.	CAS



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SECTION 1 GENERAL DESCRIPTION

1.1 INTRODUCTION

The 1394T100 series Turn Coordinator is a panel-mounted instrument designed to display the combined rate of turn and rate of roll information as a rotating aircraft symbol, which aids in performing a standard-rate turn of 360 degrees in two minutes and aircraft control in partial panel instrument conditions. The instrument also includes an inclinometer which indicates slip or skid when not in a coordinated turn.

The Turn Coordinator is a vital resource for Part 23 and Part 25 aircraft operating in IMC conditions. The ability of crew to execute a clean, coordinated maneuver is essential to optimizing passenger comfort, as well as maintaining efficient flight conditions.

Installation and operation are simple and straightforward. There is no crew interaction required. In addition to the aircraft symbol, a red flag will indicate whether the instrument is “OFF” (essentially INOP). When “OFF” is not shown, the display is available for use.

Optionally (for units with the 5-pin connector), the following additional features are provided:

- "Autopilot Out" analog output with a voltage proportional to the sensed turn rate
- "Tach" output signal indicating system status

1.2 TECHNICAL SPECIFICATIONS

Electrical Attributes	
Input Voltage	11-32 VDC
Input Power	1 watt (0.04A @ 28VDC)
Lighting Input	5, 14, or 28VDC

Table 1.1

Available Features by Unit Version*	-3B	-7B	-14RB
Autopilot Output			✓
Tach Output			✓
Lighting	✓		✓

Table 1.2

Physical Attributes	
Weight	13 ounces (369 g) for -3B 11 ounces (312 g) for -7B 14 ounces (397 g) for -14RB
Dimensions	3.40" x 3.27" x 5.10" (HxWxD)
Mating Connectors	5-pin MCIA p/n MS3106A14S-5S, 3-pin MCIA p/n MS3106A10SL-3S
Mounting	Rear Panel Mount with (4) #6-32 screws; Ø3.25 inch round bezel

Table 1.3



Qualifications	
Certifications	FAA/EASA TSO-C3e
Environmental Qualification	RTCA DO-160G (details listed in Section 5.2)
Software Qualification	RTCA DO-178C, Design Assurance Level A

Table 1.4



SECTION 2 PRE-INSTALLATION CONSIDERATIONS

2.1 COOLING

No external cooling is required. The unit will generate some heat as a function of normal operation. Installation in an area that is exposed to extreme heat or restricted airflow can reduce the expected life of the product.

2.2 EQUIPMENT LOCATION

The 1394T100 is designed primarily to be installed in the instrument panel of the aircraft. When selecting a panel location for the 1394T100, be sure to consider appropriate field-of-view with regard to pilot and/or co-pilot visibility and accessibility. Other locations may be acceptable if the environmental qualifications are considered with respect to the installation approval.

Additionally, consider what equipment is behind the panel that could impede the installation. Clearance for the unit as well as its electrical connections and routing must be allowed.

2.3 ROUTING OF CABLES

Be aware of routing cables near other electronics or with other wire bundles that may be susceptible to high energy flow. Avoid sharp bends in cabling and routing near aircraft control cables. Also avoid proximity and contact with aircraft structures, avionics equipment, or other obstructions that could chafe wires or hoses during flight and cause undesirable effects.

2.4 LIMITATIONS

The 1394T100 Turn Coordinator is certified to FAA TSO C3e with the following limitations identified:

Deviations have been granted for the use of RTCA/DO-160G and RTCA/DO-178C rather than the environmental and software standards specified in the TSOs.

Applicable TSOs:

Technical Standard Order Authorization to FAA TSO C3e applies to all versions of the 1394T100. Specific STC limitations or ACO coordination is not required for product or installation qualification.

The conditions and tests for TSO approvals of this article are minimum performance standards. Those installing this article, on or in a specific type or class of aircraft, must determine that the aircraft installation conditions are within the TSO standards, specification of the article, and deviations as listed above. TSO articles must have separate approval for installation in an aircraft. The article may be installed only according to 14 CFR part 43 or the applicable airworthiness requirements.

2.5 MODIFICATION

This product has a nameplate that identifies the manufacturer, part number, description, certification(s) and technical specifications of the unit. It also includes the “MOD” or modification number representing notable changes in the hardware design of the unit.



Modification (MOD) 0 is the initial release of the product and is identified on the nameplate by the lack of marking on the MOD numbers 1 through 9 (i.e. 1-9 are visible). All subsequent modifications are identified on the nameplate by the marking/blacking out of that particular MOD number (i.e. for MOD 1, the number 1 is not visible and 2-9 are visible - see Figure 2.1 for examples). MODs do not have to be sequentially inclusive and may be applied independent of each other.

For additional details regarding specific changes associated with each MOD status refer to the product published Service Bulletins at www.mcico.com.

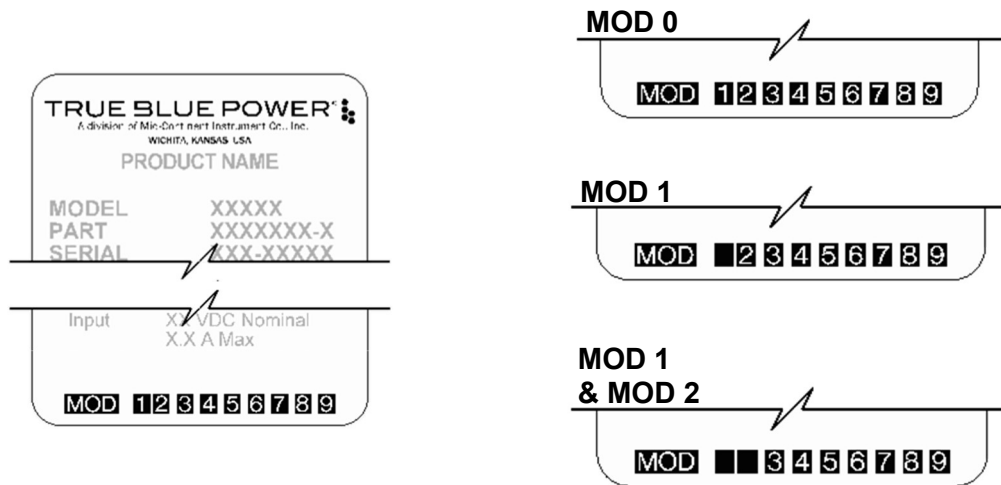


Figure 2.1 Nameplate and MOD Status Example



SECTION 3 INSTALLATION PROCEDURES

3.1 GENERAL INFORMATION

IMPORTANT: READ THIS ENTIRE SECTION PRIOR TO STARTING INSTALLATION!

This section contains interconnect diagrams, mounting dimensions and other information pertaining to the installation of the 1394T100 Turn Coordinator.

3.2 PARTS LIST

When unpacking this equipment, make a visual inspection and notify the sender if there is any evidence that damage may have incurred during shipment. The following parts are included:

<u>Item Description</u>	<u>MCIA Part Number</u>
a. 1394T100 Turn Coordinator	1394T100-()
b. Installation Manual	9020079

Optional Equipment Available

a. Light Tray Options:

<u>P/N (bulbs)</u>	<u>P/N (LED)</u>	<u>VOLTAGE</u>	<u>Color</u>
6018634-3	MD31-6	5V	White
6015010-3	MD31-4	14V	White
6015358-3	MD31	28V	White

3.3 CABLE HARNESS

Construct the cable harness in accordance with the instructions below, including the Connector Pinout shown in Figure 3.1 and Table 3.1 or Figure 2.2 and Table 3.2. Installers should follow industry-accepted practices regarding aircraft wiring and applicable regulatory requirements and guidance. The instructions for constructing the cable harness as listed within this manual were also used to construct the harness during environmental and electrical testing. Alterations may invalidate environmental qualification and/or performance results.

Refer to Section 2.2 and 2.3 for planning unit location and cable routing guidelines.

3.3.1 WIRE GAUGE SELECTION

Wire gauge should be 22 AWG. Use of PTFE, ETFE, TFE, Teflon, or Tefzel insulated wire is recommended for aircraft use per MIL-DTL-16878 or equivalent.

3.3.2 CONNECTOR PINOUT

The supplied connector is required for proper installation and operation of the unit. The functions associated with the 5-pin or 3-pin MIL-DTL-5051 connector are identified in Figure 3.1 and Table 3.1 or Figure 2.2 and Table 3.2 below.

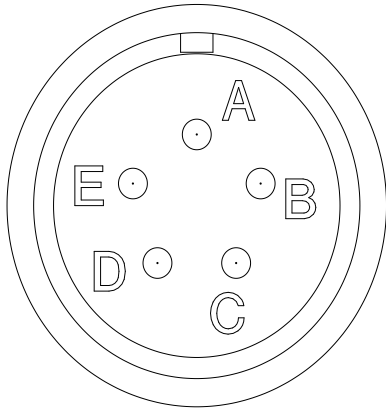


Figure 3.1
View from Rear of Mating
Connector (-14RB)

Connector Pinout (-14RB)	
Pin	Description
A	Power In
B	Power Return
C	Autopilot Out Reference
D	Autopilot Out
E	Tach Output

Table 3.1 Unit Connector Pin
Identification (-14RB)

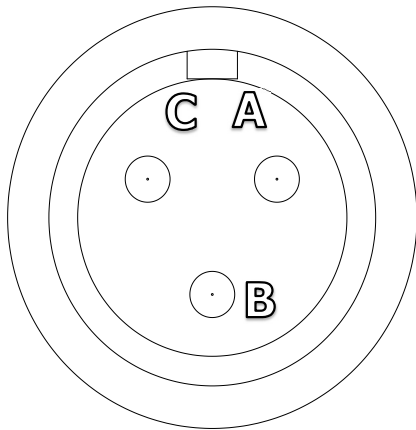


Figure 2.2
View from Rear of Mating
Connector (-3B, -7B)

Connector Pinout (-3B, -7B)	
Pin	Description
A	Power In
B	Power Return
C	Reserved

Table 3.2 Unit Connector Pin
Identification (-3B, -7B)



3.4 MOUNTING

The 1394T100 Turn Coordinator is designed primarily to be rear mounted in an aircraft instrument panel. Refer to Section 2.2 for Equipment Location information. To install the unit in the instrument panel, follow the instructions below and refer to Figure 3.3 and Figure 3.4.

Notes:

If using flat-head screws, minimum panel thickness is 0.050 inches (1.3mm). Thinner panels require a pan-head screw, or a spacer/washer between the unit and the rear surface of the panel to properly secure the unit.

If using screws other than those provided, ensure that they do not protrude more than 1/2-inch into the unit.

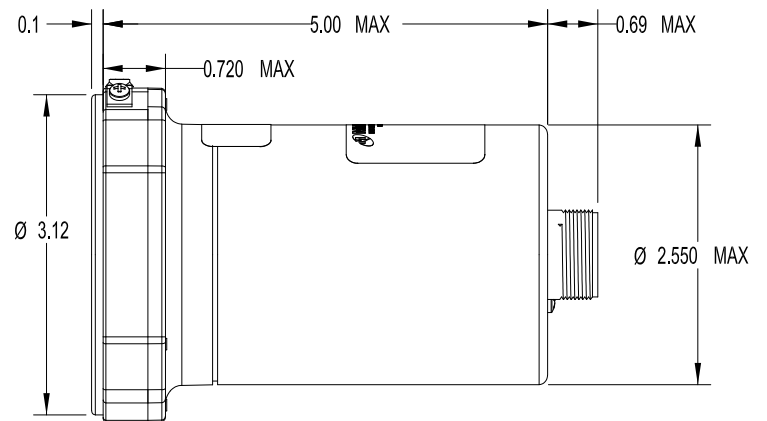
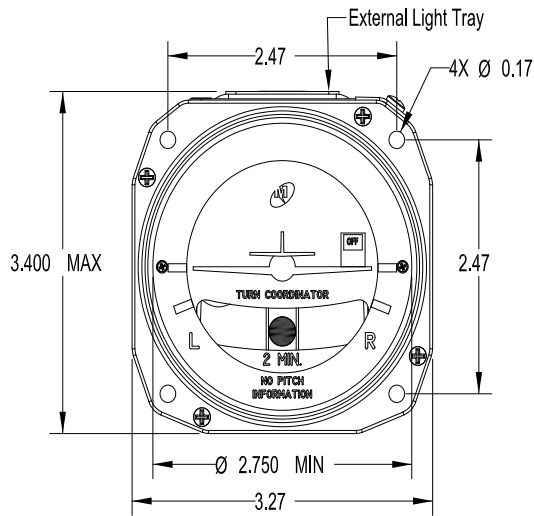
Remove burrs around the cutout and holes to allow the unit to mount flush with the panel. Electrical bonding between the aircraft and the unit chassis is NOT required.

1. Once a location is selected, cut the panel per the dimensions in Figure 3.4.
Either through-holes for pan-head or cap screws, or countersink holes for flat-head screws can be used. The installation kit includes flat-head screws.
2. Route the prepared cable harness and pneumatic tubing (if applicable) behind the panel and to the panel cutout.
3. **VERIFY THAT AIRCRAFT POWER IS TURNED OFF.**
4. Connect the cable harness to the rear of the unit.
5. Insert the unit into the panel cutout and secure with four (4) #6-32 screws (provided).

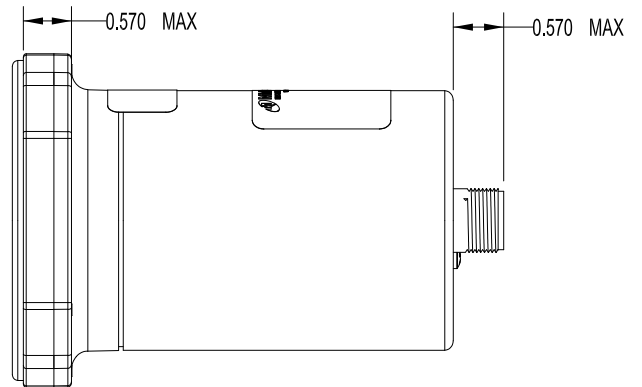
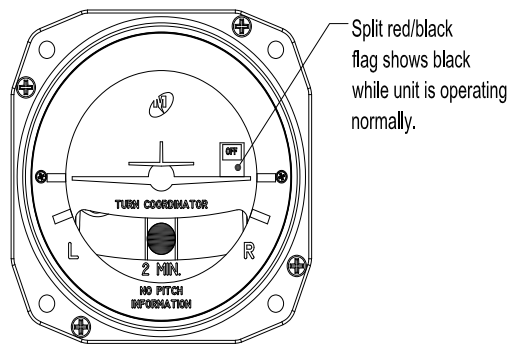
3.5 INSTALLATION COMPLETION

After installation of cabling and before installation of the equipment, ensure that power is applied only to the pins specified in the interconnect diagram.

Prior to operating the unit in the aircraft, verify the basic operation of the unit.



Unit with Autopilot Output and Light Tray.



Unit without Autopilot Output or Light Tray.

Figure 3.3 1394T100 Outline Drawing

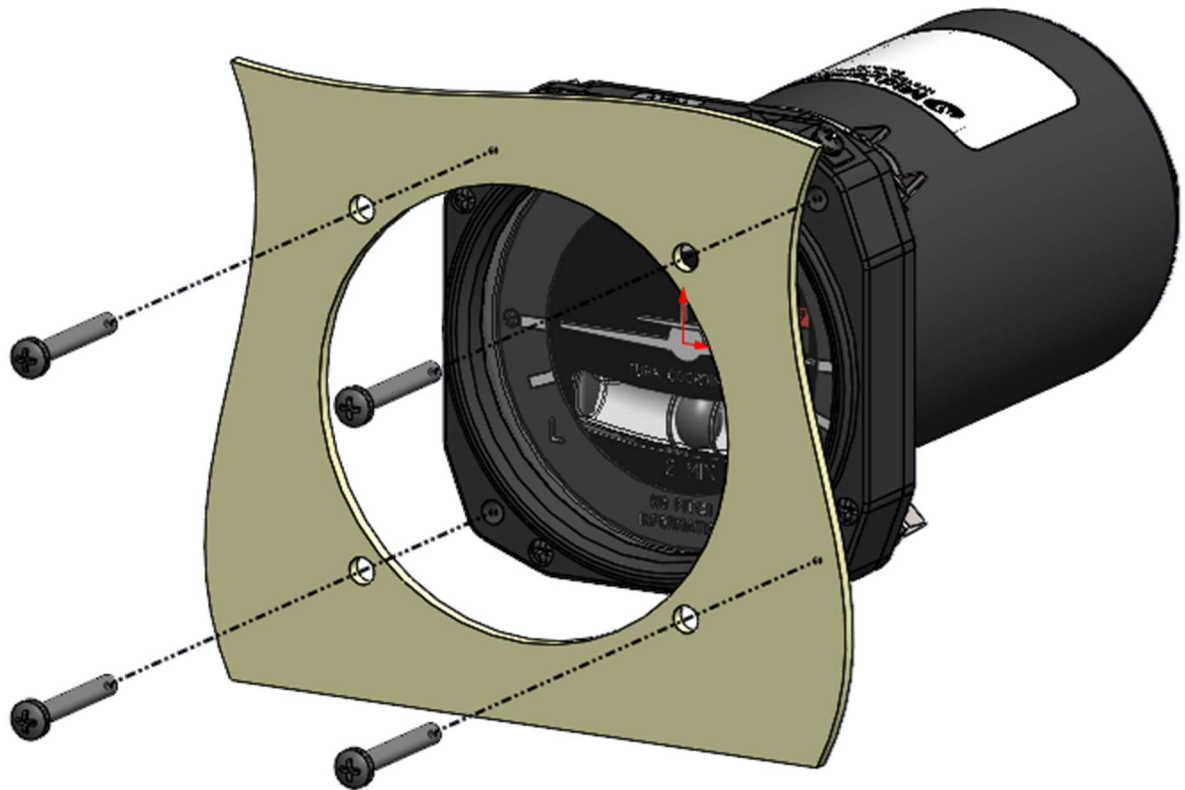
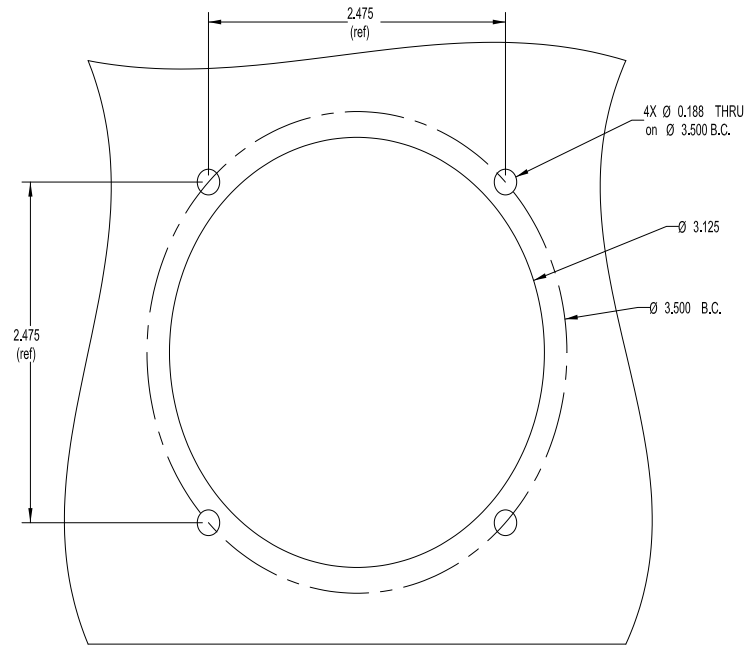


Figure 3.4 Panel Cutout



SECTION 4 OPERATION

IMPORTANT: READ THIS ENTIRE SECTION PRIOR TO OPERATING THE UNIT IN FLIGHT!

4.1 GENERAL FUNCTION

The airplane symbol indicates the rate of turn. When a two-minute turn rate is achieved, the airplane wingtip will align with the left (L) or right (R) hash mark on the dial face. If the turn rate is greater than a two-minute turn rate, the airplane wingtip will go beyond the hash mark.

Slip or Skid information is provided by means of a fluid-damped "ball-in-tube" inclinometer. A turning maneuver is considered to be coordinated only when the ball is centered between the lines.

For units with the 5-pin connector, the Autopilot Output can be connected to an autopilot, allowing the 1394T100 Turn Coordinator to function as a sensor for wing-leveling control. The Autopilot Output voltage is proportional to the sensed turn rate with an output voltage of ± 1.0 VDC representing a two-minute turn (± 180 deg/sec turn rate). Positive voltage corresponds to a right turn.

For units with the 5-pin connector, the Tach Output can be connected to an indicator lamp or other means of displaying instrument status. The Tach Output will be approximately 9 VDC when the unit is powered on and operating normally.

SECTION 5 CONFORMANCE

5.1 INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

No periodic scheduled maintenance or calibration is necessary for continued airworthiness of the 1394T100 Turn Coordinator. If the unit fails to perform to specifications, the unit must be removed and serviced by Mid-Continent Instruments and Avionics or their authorized designee. There are no repairable parts or processes available to be performed in the field

5.1.1 COMPONENT MAINTENANCE AND REPAIR

The unit glass and bezel can be cleaned using a lint-free cloth moistened with water. No chemicals should be used to clean the glass and bezel.



5.2 ENVIRONMENTAL QUALIFICATION STATEMENT

MODEL NUMBER: 1394T100 Series **PART NUMBER:** 1394T100-()
DESCRIPTION: Turn Coordinator
CERTIFICATION: FAA TSO C3e
MANUFACTURER: Mid-Continent Instrument Co., Inc.
ADDRESS: 9400 E. 34th St. North, Wichita, KS 67226, USA
SPECIFICATION: Test Specification (TS) 316 Test Data Sheet (TDS) 316
STANDARD: RTCA DO-160, Rev G, dated 12/08/10

CONDITIONS	SECTION	DESCRIPTION OF TEST
Temperature and Altitude	4	Category B2
Temperature Variation	5	Category S2
Humidity	6	Category A
Operational Shock and Crash Safety	7	Category X
Vibration	8	Category R, Curves C, C1
Explosion	9	Category X
Waterproofness	10	Category X
Fluids	11	Category X
Sand and Dust	12	Category X
Fungus	13	Category F
Salt Spray	14	Category X
Magnetic Effect	15	Category Z
Power Input	16	Category Z
Voltage Spike	17	Category B
Audio Frequency Conducted Susceptibility	18	Category Z
Induced Signal Susceptibility	19	Category ZCE
Radio Frequency Susceptibility	20	Category RR
Emission of Radio Freq Energy	21	Category X
Lightning Induced Transient Susceptibility	22	Category B3H3L3
Lightning Direct Effects	23	Category X
Icing	24	Category X
ESD	25	Category A
Fire, Flammability	26	Category X

REMARKS:
Section 13: Category F by analysis.