



Installation Manual and Operating Instructions

MD41-1844
Annunciation Control Unit
for Lithium-ion Battery Systems



MD41-1844 28 VDC Horizontal Mount

Mid-Continent Instruments and Avionics®

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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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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 reference and the page number. Send your comments to:

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REVISION HISTORY

Rev.	Date	Detail
A	05/18/15	Production release.
B	10/13/20	Added text in Sec. 4.1.1 to document short press turn-off of 2 hr. timer & disable battery heater circuitry.

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SECTION 1 GENERAL DESCRIPTION

1.1 INTRODUCTION

The MD41-1844 product is compact, self-contained Annunciation and Control Unit (ACU). The fully integrated control unit provides annunciation for Mid-Continent Instruments and Avionics TB44 battery systems. It combines the necessary functions and annunciations required to interface with an approved system.

Highlighted features include long-life LEDs used for all lighting, internally backlit selection switch, dead-front inactive annunciations, and automatic dimming. An external annunciation dimming adjustment is provided for balancing low-level light conditions.

1.2 TECHNICAL SPECIFICATIONS

1.2.1 Model

MD41-1844	
Orientation	Horizontal
Power Input	28VDC
Lighting Input	28VDC

**Table 1
Model**

1.2.2 Physical Attributes

Characteristics:	
Weight:	0.26 pounds
Dimensions: (not including connector or mate)	3.2 inches long 2.75 inches wide 0.8 inches high
Mating Connector:	Positronic RD25S10JVL0 or equivalent (MCI P/N 7014517)
Instrument Panel Mounting:	Rear mount

**Table 2
Physical Attributes**

1.2.3 Performance

Specifications:	
Power Requirement:	0.20 A max

**Table 3
Performance**

SECTION 2 PRE-INSTALLATION CONSIDERATIONS

2.1 COOLING

No direct cooling is required. As with any electronic equipment, overall reliability may be increased if the unit is not located near a high heat source or crowded next to other equipment. Means of providing some airflow is considered beneficial.

2.2 EQUIPMENT LOCATION

The MD41-1844 ACU 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 when selecting an appropriate location. Allow at least 3 inches of space behind the unit for connector attachment and removal.

2.3 ROUTING OF CABLES

Care must be taken not to bundle the MD41-1844 ACU logic and low level signal lines with any high energy sources. Examples of these sources include 400 HZ AC, Comm, DME, HF and transponder transmitter coaxial cables. Always use shielded wire when shown on the installation print.

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 during flight and cause undesirable effects.

2.4 LIMITATIONS

Note that this product is part of an incomplete system. It is designed to be installed with other applicable equipment to provide functionality for main battery systems.

2.5 TECHNICAL SPECIFICATIONS

The MD41-1844 ACU complies with the manufacturers' specifications and has been verified and approved for use with the following systems:

Mid-Continent Instruments and Avionics Model Number(s):	Designed for use with Battery System:
MD41-1844	Manufacturer: True Blue Power Model: TB44

SECTION 3 INSTALLATION PROCEDURE

3.1 GENERAL INFORMATION

This section contains interconnect diagrams, mounting dimensions and other information pertaining to the installation of the MD41-1844 ACU. After installation of cabling and before installation of the equipment, ensure that power is applied only to the pins specified in the interconnect diagram.

3.2 UNPACKING AND INSPECTING EQUIPMENT

When unpacking this equipment, make a visual inspection for evidence of any damage that may have incurred during shipment.

3.2.1 Included Parts

- | | |
|------------------------|-----------------------|
| A. Main Battery ACU | MCI P/N MD41-1844-() |
| B. Installation Manual | MCI P/N 9018268 |

3.2.2 Available Parts

- | | |
|------------------------------|-----------------|
| A. J1 Connector Kit (25 pin) | MCI P/N 7014517 |
|------------------------------|-----------------|

3.3 CABLE HARNESS

The MD41-1844 ACU cable harness should be made using 24 AWG wire or larger for all connections. Construct the cable harness with regards to the instructions below and using the Connector Pinout of Figure 1, Schematic Pinout of Table 4, and Wiring Diagram of Figure 2.

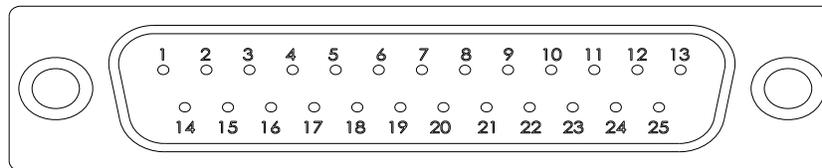


Figure 1
Rear View of 25 Pin D-Sub Connector (J1)

PIN#	MAIN BATTERY	PIN#	MAIN BATTERY
1	Pin1 of RTD1	14	Pin2 of RTD1
2	Pin2 of RTD2	15	Battery Maint High
3	Input from Pin2 of RTD2	16	Battery OK High
4	Battery Fail High	17	Battery OK Low
5	Output to Pin1 of RTD1	18	Battery Fail Low
6	Isolated Ground	19	Battery Maint Low
7	Heater Enable	20	Battery Enable
8	Overheat Warning Low	21	Reserved
9	Overheat Warning High	22	Reserved
10	External Switch (Battery/Heater)	23	Reserved
11	Reserved	24	Ground
12	Battery 28 VDC	25	Ground
13	Avionics Bus 28 VDC		

Table 4
25 Pin D-Sub Connector Pinout

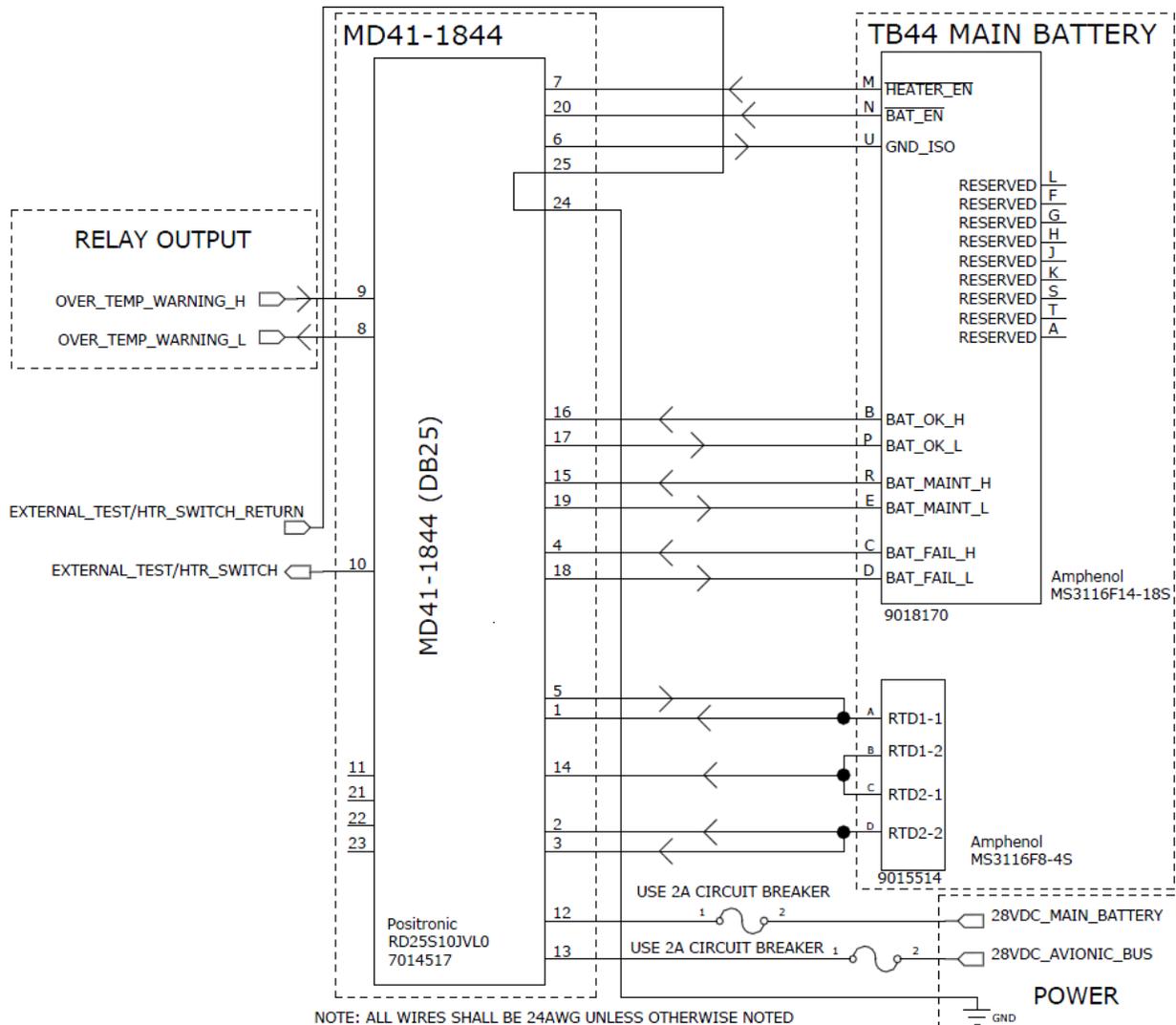


Figure 2
Wiring Diagram

Refer to Section 2: Pre-Installation Considerations in regards to routing precautions.

3.3.1 Lighting Control

Brightness will be automatically controlled by the internal photocell and the dimming circuit.

3.3.2 Power and Signals

Wire aircraft avionic bus power and aircraft ground according to the associated ACU pins in the Pinout Diagram. Annunciation signals should be wired from the appropriate system inputs and outputs to the associated ACU pins in the Pinout Diagram.

3.3.3 Harness Verification

With the MD41-1844 ACU disconnected, turn on the avionics master switch and use an ohmmeter to verify that aircraft avionic bus power is on the appropriate pin(s) with appropriate voltage. Also verify that aircraft ground is applied to the appropriate pins.

3.4 MOUNTING

Refer to Section 2: Pre-Installation Considerations in regards to equipment location.

The MD41-1844 ACU is designed for rear panel mounting only. A cutout should be made in the panel in accordance with Figure 3 for the unit bezel and two mounting holes. A cutout template is available from Mid-Continent Instruments and Avionics (reference p/n 8014474) upon request.

Prior to completing the mounting of the unit in the aircraft, make sure to set the Annunciator Dim Adjustment for the annunciators. Ideally this procedure is best performed in a dark cockpit to simulate low-light/night time conditions. Connect the unit to the cable harness and turn on master power to the instrument panel and lighting bus. Use a small flat-bladed screwdriver to access the adjustment screw inside the hole on the bottom of the unit. Adjust the screw to increase or decrease the annunciator lighting brightness to a level appropriate with the rest of the panel instrument lighting.

Secure the indicator to the panel with two #4-40 x 3/8 inch flat head Phillips screws.

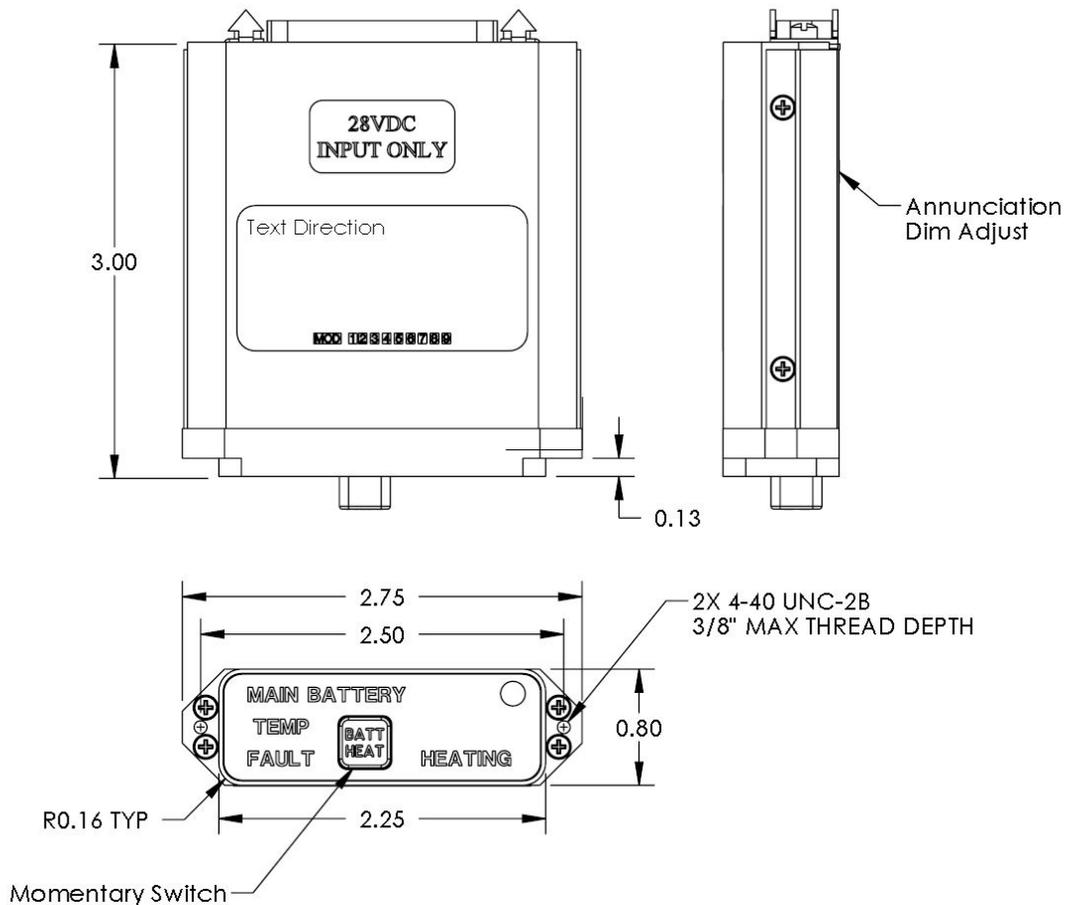


Figure 3
Outline Drawing MD41-1844

SECTION 4 OPERATION

4.1 FRONT PANEL CONTROLS AND ANNUNCIATIONS

4.1.1 Controls

BATT/HEAT

When avionics bus (power to Annunciator) is OFF:

- Short press of the BATT/HEAT momentary switch for less than two seconds lights all annunciators (as depicted in Figure 4) while the switch is pressed (lamp test).
- Long press of the BATT/HEAT momentary switch for two seconds or more enables the TB44 battery Central Monitoring System (CMS) and heater circuitry. It may take up to 15 seconds after releasing the switch until valid annunciators are displayed.
 - While the switch is pressed, all annunciators will be on (lamp test).
 - The CMS and heater circuitry will be active for two hours, enabling heaters to operate if the battery temperature is below -3°C .
 - During this two hour period, the BATT/HEAT light will be on.
 - After two hours have elapsed, the CMS and heater circuitry will be inactive and the BATT/HEAT light will turn off.
- Once the CMS and heater circuitry is enabled, short press of the BATT/HEAT momentary switch for less than two seconds cancels the two hour timer and disables the CMS and heater circuitry.
- Note: If Battery Heat has been enabled by the button on the side of the battery, the Annunciator cannot be used to cancel Battery Heat. It must be canceled at the battery. Likewise, if Battery Heat has been enabled by the Annunciator, it cannot be cancelled by the button on the battery.

When avionics bus (power to Annunciator) is ON:

- Battery Heat is enabled and the BATT/HEAT light will be on at the Annunciator.
- Pressing the BATT/HEAT momentary switch for any length of time lights all annunciators while the switch is pressed (lamp test).



Figure 4a
Front Panel

4.1.2 Annunciations

MAIN BATTERY	(WHITE)	Lit when any of the annunciations are ON.
TEMP	(RED)	Over temperature sensed on battery. Land as soon as practical and present the battery for maintenance evaluation.
FAULT	(AMBER)	Present battery for maintenance upon landing.
BATT/HEAT	(WHITE)	Lit when battery is enabled.
HEATING	(WHITE)	Battery heater is activated due to unit temperature below -3°C and battery is in active state. It is recommended that an engine start not occur until the HEATING annunciation turns off.



**Figure 4b
Front Panel**

4.1.3 ADDITIONAL INFORMATION

Refer to the installation manual and operating instructions of the TB44 for additional operational and functional interface details.

SECTION 5 CONFORMANCE

5.1 CONTINUED AIRWORTHINESS STATEMENT

No periodic scheduled maintenance or calibration is necessary for continued airworthiness of the MD41-1844 ACU. 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.

Appendix 1

DO-160 Environmental Qualification Form

MODEL NUMBER: MD41-() **PART NUMBER:** MD41-1844
NOMENCLATURE: MD41-() Battery Annunciation Control Unit
TSO APPROVALS: N/A
MANUFACTURER: Mid-Continent Instrument Co., Inc.
ADDRESS: 9400 E. 34th St. North, Wichita, KS 67226, USA.
MANUFACTURERS SPECIFICATIONS:
 Minimum Performance Specifications: TS553, TDS553
 Qualification Test Reports: QTR2104 – QTR2108; QTR2115 – QTR 2118
RTCA DO-160: Rev G, dtd 12/08/10 **DATES TESTED:** 4/2015-5/2015

CONDITIONS	SECTION	DESCRIPTION OF TEST
Temperature and Altitude	4	Category F2
Low Temperature	4.5.1	Survival and Short Operating Low Temp = -55C
High Temperature	4.5.2	Normal Operating Low Temp = -55C
High Temperature	4.5.3	Survival High Temp = +85C
Altitude	4.5.4	Short and Normal Operating High Temp = +70C
Altitude	4.6.1	Altitude = 55,000 ft
Temperature Variation	5	Category S2
Humidity	6	Category B
Operational Shock and Crash Safety	7	Category B
Vibration	8	Category R Curves B&B1, Category U Curve G
Explosion	9	Category X
Waterproofness	10	Category X
Fluids	11	Category X
Sand and Dust	12	Category X
Fungus	13	Category X
Salt Fog	14	Category X
Magnetic Effect	15	Category Y
Power Input	16	Category Z(XX)
Voltage Spike	17	Category A
Audio Freq Conducted Susceptibility	18	Category Z
Induced Signal Susceptibility	19	Category ZC(X)
Radio Frequency Susceptibility	20	Category T (conducted) Category T (radiated) [TT]
Emission of Radio Freq Energy	21	Category M
Lightning Induced Transient Susceptibility	22	Category A3 (pin injection) Category G3L3 (cable bundle) [A3G3L3]
Lightning Direct Effects	23	Category X
Icing	24	Category X
ESD	25	Category A
Fire, Flammability	26	Category X