



Model MD23 Series
FLEX

User Guide
for
True Blue Power
TBX Battery Monitor
CID #1004

Rev	Date	Detail	Approved
3	11/09/2020	Initial release.	BAW

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 Mid-Continent Instruments and Avionics.

Mid-Continent Instruments and Avionics

User Guide UG1004
Revision 3

Mid-Continent Instrument Co., Inc.
dba Mid-Continent Instruments and Avionics
9400 E. 34th Street N.
Wichita, KS 67226 USA
ph (800) 821-1212
www mcico.com

1.1 INTRODUCTION

The model MD23 series FLEX Custom Function Display (“CFD”) is a standard 2-inch (2-¼”) panel-mounted instrument capable of displaying various inputs in a configurable graphical presentation. FLEX is an off-the-shelf solution that is FAA and EASA TSO-approved with Level A design assurance software certification. A Patent Pending software concept allows customization to your requirements by Mid-Continent Instruments and Avionics without additional certification at the unit level. With the ability to receive and send multiple types of inputs and outputs, allow user interface, and display custom designed graphics, FLEX is as flexible as it gets.

This User Guide is a supplement to the Installation Manual and Operating Instructions (IM), MCIA part number 9019161. The IM contains all information associated with the standard product, including installation procedures, product specifications, operating instructions, certification data, and maintenance requirements. This User Guide provides additional information associated with the customized version of the MD23 that is specific to your application and requested requirements. It addresses product identification, electrical pinout, initial configuration setup (if applicable), and in-flight user operation.

1.2 PRODUCT IDENTIFICATION

Each MD23 is comprised of certified hardware and certified software. Within the context of the certified software is a set of data items that can configure and customize the behavior of the unit. This set of data is referred to as a Custom Instrument Definition, or a CID file, and can be installed via a standard USB flash drive through the programming port on the rear of the unit.

A unique CID number has been assigned specifically to this application. The CID is identified by its four-digit number and a fifth alphabetic character representing the CID version, starting with “A”. A sixth numeric digit may be used to represent pre-released versions of the CID.

The identification of the hardware, software, and CID configurations are listed below. Both the software version and the CID can be viewed on the Introduction Screen during the first few seconds of applying power to the unit. This information can also be accessed on the Info page of the Options Menu during Flight Mode.

Unit Versions		
Hardware Part Number	Software Version	CID
6420023-1	1.0.0, or later	1004A, or later

1.3 PRODUCT FUNCTION

The CID identified within this User Guide is designed to function as a battery monitor for the True Blue Power TBX family of Advanced Lithium-ion Batteries. It uses ARINC 429 inputs from the battery to display multiple parameters such as voltage, current, state of charge, temperature and more. The unit can be configured upon installation to monitor one battery or two. Additional details can be found on a secondary status page including Remaining Life, Battery Capacity and detailed fault call-outs, when present. Variable thresholds and alerts, if programmed on the battery, will also be displayed. All ARINC data provided by the Battery 1 inputs will be re-broadcast on the ARINC output as well.

2.1 CONNECTOR PINOUT

For standard pre-installation and installation instructions, including location, cable harness assembly, pneumatic inputs (if applicable), mounting, and others, please refer to the IM.

Pinout identification specific to this CID is listed in the table below. A brief description is provided. Further definition of the inputs and outputs should be documented in the technical requirements and/or statement of work and are not provided within this User Guide.

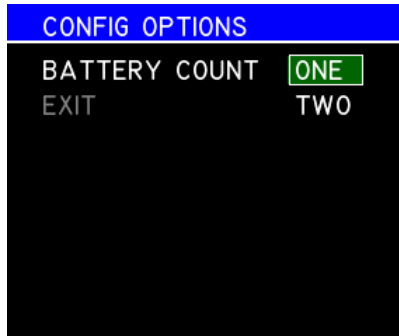
Connector Pinout		
Pin	Description	Function
1	Ground	Power return; connect to a/c gnd
2	ARINC Out (A)	Rebroadcast of ARINC In 1 data
3	ARINC Out (B)	(see pin 2)
4	Dimmer Input	5, 14, or 28VDC input (if used)
5	ARINC In 1(A)	ARINC In from Battery 1
6	ARINC In 2(A)	ARINC In from Battery 2 (if used)
7	Reserved	
8	Reserved	
9	Reserved	
10	Reserved	
11	Reserved	
12	Reserved	
13	Reserved	
14	ARINC In 1(B)	(see pin 5)
15	Reserved	
16	ARINC In 2(B)	(see pin 6)
17	Reserved	
18	Reserved	
19	Power Input	+10-32VDC
20	Reserved	
21	Reserved	
22	Reserved	
23	Reserved	
24	Reserved	
25	Reserved	
26	Reserved	

Table 1 Unit Connector Pin Identification

3.1 CONFIGURATION AND SETUP

Enter Configuration Mode by pressing and holding the Control Knob while applying power to the unit. For configuration and setup of standard unit functions, including dimming control options and dimming curve definition, please refer to the IM.

Configuration settings specific to this CID are found within the User Configuration menu option. The only user configuration item is for Battery Count. Select the number of batteries that will be connected to the MD23 TBX Battery monitor.



4.1 OPERATION

For operation of standard unit functions, including the Options Menu, manual brightness control, Info page, and others, please refer to the IM.

For details associated with the custom functions beyond those identified here, refer to the True Blue Power Install Manual and Operating Instructions for the specific battery associated with your application.

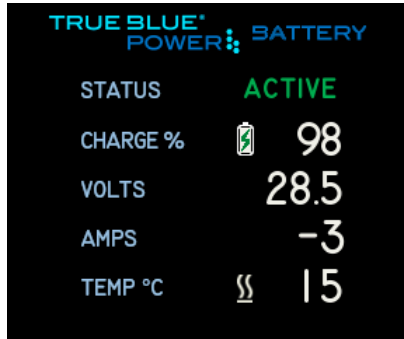
4.1.1. FLIGHT MODE

In Flight Mode, the display is presented as shown in the example figures below.

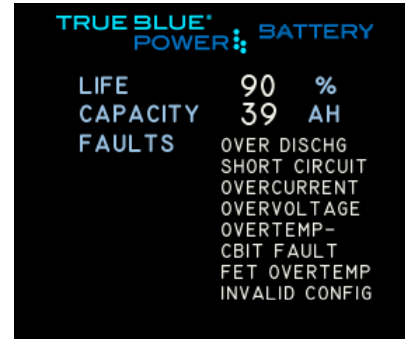
Turning the Control Knob right or left changes the display from Page 1 to Page 2.



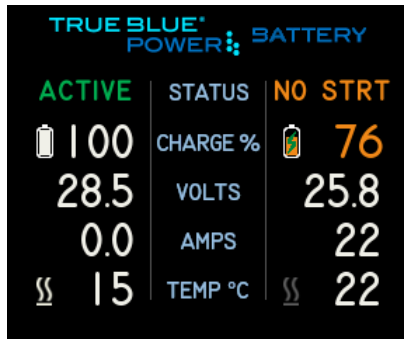
(power on screen)



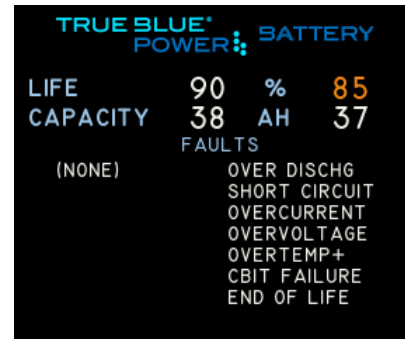
(page 1 – one battery)



(page 2 – one battery)



(page 1 – two batteries)



(page 2 – two batteries)

Individual elements are defined as follows:

- Page 1
 - Status: Displays battery status: Active, Fault, Service, Invalid, or No Start
 - Charge %: Displays current state of charge. 0-100%
 - Number is amber if state of charge is below battery-programmed minimum
 - Battery Icon represents state of charge and depletes in relation to charge %
 - Icon is amber if state of charge is below battery-programmed minimum
 - Icon contains green lightning bolt when battery is charging
 - Volts: Current voltage of the battery
 - Number turns amber when under-voltage or over-voltage
 - Amps: Discharge or charge current (discharge current denoted as negative (-))
 - Temp: Internal temperature of the battery, in degrees Celsius
 - Number is red if temperature exceeds the upper limit of the battery
 - Heater Icon represents the current state of the battery heater
 - Icon is a gray horizontal bar if heater is inactive/offline
 - Icon is a gray bar with squiggles if heater is active/available
 - Icon is a white bar with squiggles if heater is current on/heating
- Page 2
 - Life: Remaining percentage between original max and battery-programmed end of life capacity. 0-100%
 - Capacity: Current maximum capacity of the battery. Number is amber if capacity is below the battery-programmed end of life capacity.
 - Faults: Reported battery faults. “(None)”, if none.

4.1.2. USER OPTIONS

Pressing and holding the Control Knob for three (3) seconds will activate the Options Menu. The manual brightness adjustment and info page are described in the IM. The Options Menu or User Options items will close and return to the active display after five (5) seconds if no activity is recorded.

When highlighted and selected, the User Options item will open a new page and display the available options available to the pilot. The only User Option for this instrument is for Battery Info, which when selected will display the battery's current software version.

Highlight and select Exit to return to the Options Menu or simply wait five (5) seconds and the unit will return to the active Flight Mode display.



5.1 CONFORMANCE

For standard conformance items such as qualification levels and software updates, please refer to the IM.

5.1.1. INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

No periodic scheduled maintenance or calibration is necessary for continued airworthiness of the MD23 Custom Function Display, unless specified in the aircraft maintenance procedures.

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

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. Other than software version updates, there are no repairable parts or processes available to be performed in the field.