

# Fuel Cell Monitor

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## **INTERFACE CONTROL DOCUMENT**

REVISION – Draft  
03 October, 2022

# INTERFACE CONTROL DOCUMENT FOR Fuel Cell Monitor

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## Change Record

Rev.	Date	Originator	Approvals	Description
-	[10/01/2022]	Fuel Cell Monitor System		Draft Release

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## 1. Overview

The following sections outline the physical, electrical, and communication characteristics of the fuel cell monitor System. Some of the fields outlined below are subject to change depending on availability of parts and part characteristics

## 2. References and Definitions

Provide any references (i.e., standards documents) and definitions. Examples are shown below.

### 2.1. References

Not Applicable at this time.

### 2.2. Definitions

ADC	Analog to digital converter
mA	Milliamp
mW	Milliwatt
MHz	Megahertz (1,000,000 Hz)
TBD	To Be Determined
TTL	Transistor-Transistor Logic
VME	VERSA-Module Europe

## 3. Physical Interface

### 3.1. Weight

The weight of the system is unknown at this time but is expected not to exceed 2lbs.

### 3.2. Dimensions

Dimensions are unknown at this time, but the volume is expected not to exceed 0.125 cubic feet. FSR will be updated when dimensions are known

### 3.3. Mounting Locations

Specific mounting options will not be considered for this system.

## **4. Electrical Interface**

### **4.1. Power**

#### **4.1.1 Primary Input Power**

Primary input power shall be from a standard wall outlet through a wall wart AC to DC converter which will bring down the voltage to 12 VDC.

#### **4.1.2 Internal Power**

Internal power shall be regulated through DC-DC converters and stepped down to voltages ranging from +2.7 to +5.5 VDC.

### **4.2. Signal Interfaces**

#### **4.2.1 Raw Data Signal Interface**

The voltages from the fuel cell will be passed to the monitor system via signal wire to PCB mounted terminal block.

#### **4.2.2 Internal Data Signal Interface**

The internal signal shall be transferred to the microcontroller via Op-amp filter, ADC, and opto-isolator.

### **4.3. User Control Interface**

#### **4.3.1 User Graphical Interface**

The android application shall display voltages for both the fuel cell stack and the individual fuel cells. The user shall receive alerts when errors occur with the fuel cells.

#### **4.3.2 User Control Interface**

The app shall allow the user to set both low and high point alarms.



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## **5. Communications / Device Interface Protocols**

### **5.1 *Wireless Communications (Wi-Fi)***

The microcontroller has a built-in Wi-Fi module using IEEE 802.11 b/g/n standards. This connection will be used to send a user android application for review.

### **5.2 *Device Peripheral Interface***

The MCU will connect to the ESP-32 microcontroller through a UART port. This allow to transfer the signal from the MCU to the ESP-32 microcontroller to send the signal to the application.