INNOVATED STUDIOS

Operations and Maintenance Manual

ACCELEROMETER 2.0

PN: IS19210

Accelerometer 2.0

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1 Document Information

Title:	Operations and Maintenance Manual
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1.1 Release History

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1			
2			
3			
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6			
7			

1.2 Related Documents

Filename	Title

1.3 Abbreviations and Acronyms

Acronym	Meaning
MCU	Micro Controller Unit – STM32F1
PCB	Printed Circuit Board
ACC	Accelerometer 2.0

2 Overview

The Operations and Maintenance Manual provides comprehensive guidance and instructions for the effective operation and maintenance of the Accelerometer (Part Number:IS19210). This manual serves as a valuable resource for operators, technicians, and maintenance personnel, offering detailed information on equipment functionality, operating procedures, safety guidelines, and routine maintenance tasks. By following the instructions outlined in this manual, users will be able to maximize the performance, reliability, and longevity of the Accelerometer.

2.1 Purpose

This manual provides an overview of the Accelerometer units manufactured by Innovated Studios. It covers the hardware operation, maintenance, and interaction with the overall system.

The manual is intended for use by technicians and operators who are responsible for the maintenance and operation of the Accelerometer units. It is also a valuable resource for anyone who wants to learn more about these units.

The manual begins with an overview of the Accelerometer units, including their appearance, components, and operating principles. It then discusses the different maintenance tasks that need to be performed on the units, Finally, the manual provides a detailed explanation of how the Accelerometer interacts with the overall system.

2.2 Audience

This document is intended for the following audiences:

- Operators and technicians: This document provides detailed instructions on how to operate and maintain the Accelerometer. It is intended for use by team members who will be responsible for the day-to-day operation of the system.
- Engineers and managers: This document provides an overview of the Accelerometer system and how it interacts with the overall ecosystem. It is intended for use by team members who are responsible for the design, integration, and maintenance of the system.

The document uses the pronoun "you" to address the reader. When "you" refers to an operator or technician, it is understood that the reader is a member of the team responsible for operating and maintaining the Accelerometer system. When "you" refers to an engineer or manager, it is understood that the reader is a member of the team responsible for designing, integrating, and maintaining the Accelerometer system.

3 System Overview

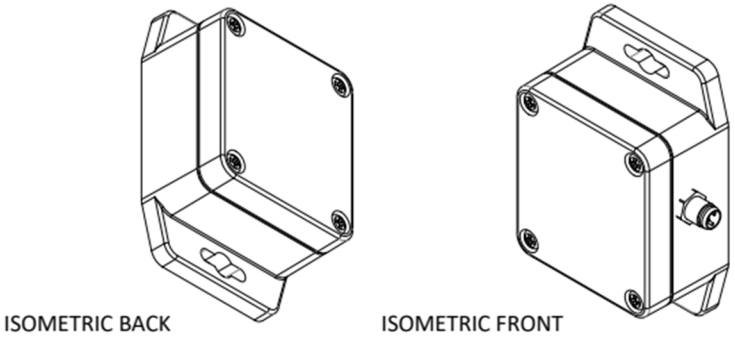

Figure 3.1 – Accelerometer 2.0 External

The Accelerometer 2.0 measures acceleration along its Z axis and is primarily used to detect vibrations or shocks resulting from impacts to its housing. When a "hit" is detected, the sensor outputs a signal to the connected system to trigger a corresponding response. This data can be utilized in various applications, including interactive gameplay and real-time event detection.

3.1 Hardware Components

The Accelerometer system is equipped with a single external 4-pin male M8 connector, which serves a dual purpose by providing both power and data connectivity. This connector plays a vital role in establishing a seamless connection between the Accelerometer device and the broader system infrastructure.

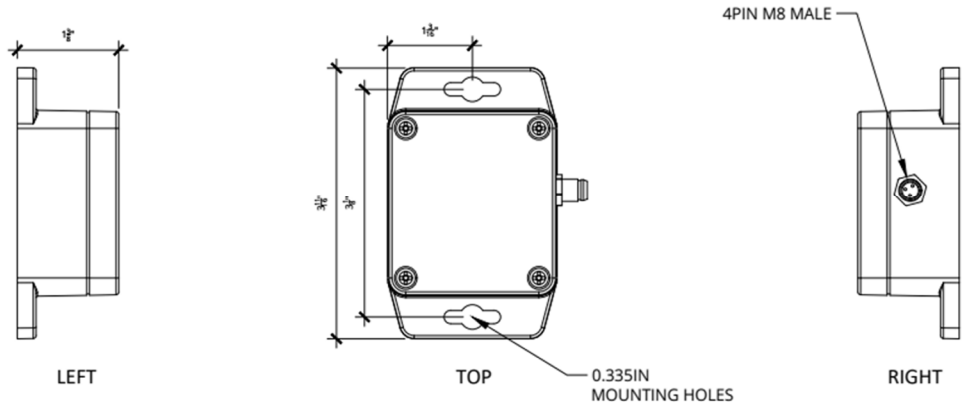

Figure 3.1.1 –Accelerometer External Connector

3.2 Enclosure

The WP-20F is a weatherproof and waterproof NEMA 4X enclosure made of high-impact polycarbonate. It is ideal for use in outdoor applications where it may be exposed to rain, snow, dust, and other harsh elements. The enclosure is also UL and cUL listed, making it safe for use in a variety of applications.

Figure 3.2.1 – Accelerometer enclosure

3.3 Custom PCB

The custom PCB (Printed Circuit Board) is the primary component of the Accelerometer system. Designed and developed by Innovated Studios, the custom PCB serves as the central hub for signal processing and data

acquisition. It integrates advanced circuitry and components to accurately detect and measure impacts on the accelerometer's enclosure. The PCB features precise and intricately laid-out traces that enable efficient signal transmission and noise reduction, ensuring optimal performance and reliable data capture. With its compact size and durable construction, the custom PCB is specifically tailored to meet the demanding requirements of the Accelerometer.

4 Network and Power

The Accelerometer 2.0 relies on its M8 connector for both serial communication and power supply, typically connected to a host device, such as a microcontroller or a PC. It interfaces with the host device via RS485 serial protocol that interprets the accelerometer signals to trigger appropriate responses. The Accelerometer 2.0 communicates with a PC via a USB-to-RS485 dongle.

There are two configurable parameters for the accelerometer to meet the application requirements:

Sensitivity: This is a Read/Write property that allows users to adjust how responsive the accelerometer is to motion or vibration. Higher sensitivity allows detection of smaller or more subtle accelerations, while lower sensitivity filters out minor movement to reduce false triggers.

Debounce: This is a Read/Write property that allows users to define a time threshold that must pass before a new signal is registered after an initial trigger. It prevents multiple signals from being falsely generated by a single event, such as a rapid series of small vibrations or mechanical noise.

5 Installation

The Accelerometer has 2 holes located on the enclosure body for mounting. These purpose-built mounting features guarantee proper alignment and stability of the accelerometer, allowing for precise detection of impacts and vibrations.

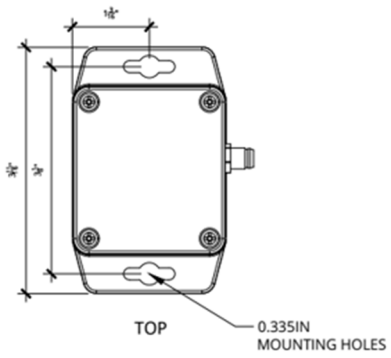

Figure 5.1 – ACC Mounting Location

Important Note: The proper installation orientation of the accelerometer is crucial for its correct functioning. It must be installed with the top side facing upward to ensure accurate detection and measurement of impacts and vibrations. Installing the accelerometer in any other orientation may lead to inaccurate readings and compromised performance. Therefore, it is essential to follow the recommended installation guidelines and ensure that the top side of the accelerometer is positioned upward during the installation process.

6 Maintenance

The maintenance of the Accelerometer is crucial to ensure its continued functionality and adherence to safety standards. This section provides guidelines and recommendations for maintaining and inspecting the Accelerometer.

1. Visual Inspection: Conduct regular visual inspections of the Accelerometer to identify any visible damage, such as cracks, corrosion, or signs of wear. If any issues are found, promptly address them to ensure the Accelerometer's proper functioning.

The maintenance requirements for the Accelerometer system are minimal. Routine inspections should be performed to ensure the device remains securely mounted and undamaged.

7 Contact and Support

The Accelerometer system is a delicate and precision-engineered device that is designed to operate under specific conditions and guidelines. Any tampering, modification, or unauthorized interference with the Accelerometer will result in the immediate voiding of the warranty. It is essential to understand that the warranty is in place to protect the device's integrity and ensure its proper functionality as intended by the manufacturer. Any attempts to alter or manipulate the Accelerometer may compromise its accuracy, reliability, and safety, thereby jeopardizing its performance and potentially causing harm. To maintain the warranty coverage and preserve the device's optimal operation, it is imperative to refrain from any unauthorized modifications or tampering with the Accelerometer system. The accelerometer does not have any serviceable components, if issues arise please contact Innovated Studios.

For technical support, please contact Innovated Studios:

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8 FCC Compliance Information

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.