SIMPLIFIED MINE INSTRUMENTS

INSTALLATION & SPECIFICATIONS
VERSION 1.0

MHR3
MHR-158-051015

MHR3
WITH ADAPTER
(Only included in MHR3 Adapter Kit)

BLUETOOTH
MODULE
(Only included in MHR3 Adapter Kit)

INTRODUCTION

Thank you for choosing the Miners Helpers 3 point extensometer (MHR3) system from Simplified Mine Instruments. This manual provides step-by-step instructions for installing the MHR3, MHR3 Adapter, and Bluetooth Data Logger. Please read this manual carefully before beginning installation to ensure proper setup and optimal performance.

For technical support, contact brankin@minershelpers.com or call customer service at 906-214-8175.

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SAFETY INFORMATION

Read all instructions before starting installation.

Ensure the installation area is clear of obstacles and hazards.

If you are unsure about any step, consult a professional or contact technical support.

TOOLS & MATERIALS REQUIRED

Crimping tool for rod sets	Smartphone or device with Bluetooth capability (for data logger setup)
¼” Allen wrench	Dead blow hammer (optional, for rod insertion)
5/6th Allen wrench	Dial gauge (sold separately, Optional: Used for local mechanical measurements)

PACKAGE CONTENTS

Ensure all components are included before starting:
MHR3 Monitoring Unit
MHR3 Rod Set (three rods at customer-specified lengths)
MHR3 Adapter **(Only included in MHR3 Adapter Kit)**
Bluetooth Data Logger **(Only included in MHR3 Adapter Kit)**
Extension data cables **(Only included in MHR3 Adapter Kit)**

INSTALLATION OVERVIEW

Estimated installation time: **15-25 minutes**
The installation process involves three main steps:

1. Mounting the MHR3 in the desired location with three measuring rods.
2. Attaching and configuring the MHR3 Adapter.
3. Installing and pairing the Bluetooth Data Logger for wireless data collection.

STEP-BY-STEP INSTALLATION INSTRUCTIONS

INSTALLING THE MHR3

1. Prepare Rods: Lay out the three rods on a flat surface and cut the fiberglass rods to the required customer-specified lengths if different from the ordered lengths.
2. Check Anchor Size: Ensure the flat anchor is ¼” longer than the drill hole diameter (e.g., a 1-5/8” diameter hole requires a 1-7/8” long flat anchor).
3. Assemble Rods: Crimp the three rods together and insert them in the borehole anchor first, Order of insertion: longest rod set (1) followed by middle length (2) followed by shortest length (3). Leave 1’ of each length rod outside of the borehole. Rod Lengths will be colored at the ends for ease of identification. Longest (1) rod set is Red, Middle length (2) rod set is white, Shortest (3) is Blue.
4. Collar: Insert the MHR3 collar unit into the borehole (minimum 1 5/8" diameter). Push until the thrust pins are inside the borehole and you can anchor them. The rod sets are should be sticking out of the 3 holes labeled 1, 2 and 3.
5. Extend Thrust Pins: Use a ¼” Allen wrench in the middle hole to turn clockwise and extend the thrust pins and secure the collar to the inside of the borehole.
6. Adjust rod sets: Gently tap the rods into the borehole until they are flush with the face of the collar.
7. Record Initial Reading: Take an initial base reading with the dial gauge (sold separately) or Bluetooth data logger and keep it in your records.

BEST PRACTICES

- Drill 1-2 feet past your desired monitoring distance to prevent clay packing or other issues.
- Anchor in solid rock. If anchoring in a clay seam or loose shale, contact SMI for solutions.
- If the monitoring rod is difficult to push, lightly tap the end with a dead blow hammer.

INSTALLING THE MHR3 ADAPTER

(Only included in MHR3 Adapter Kit)

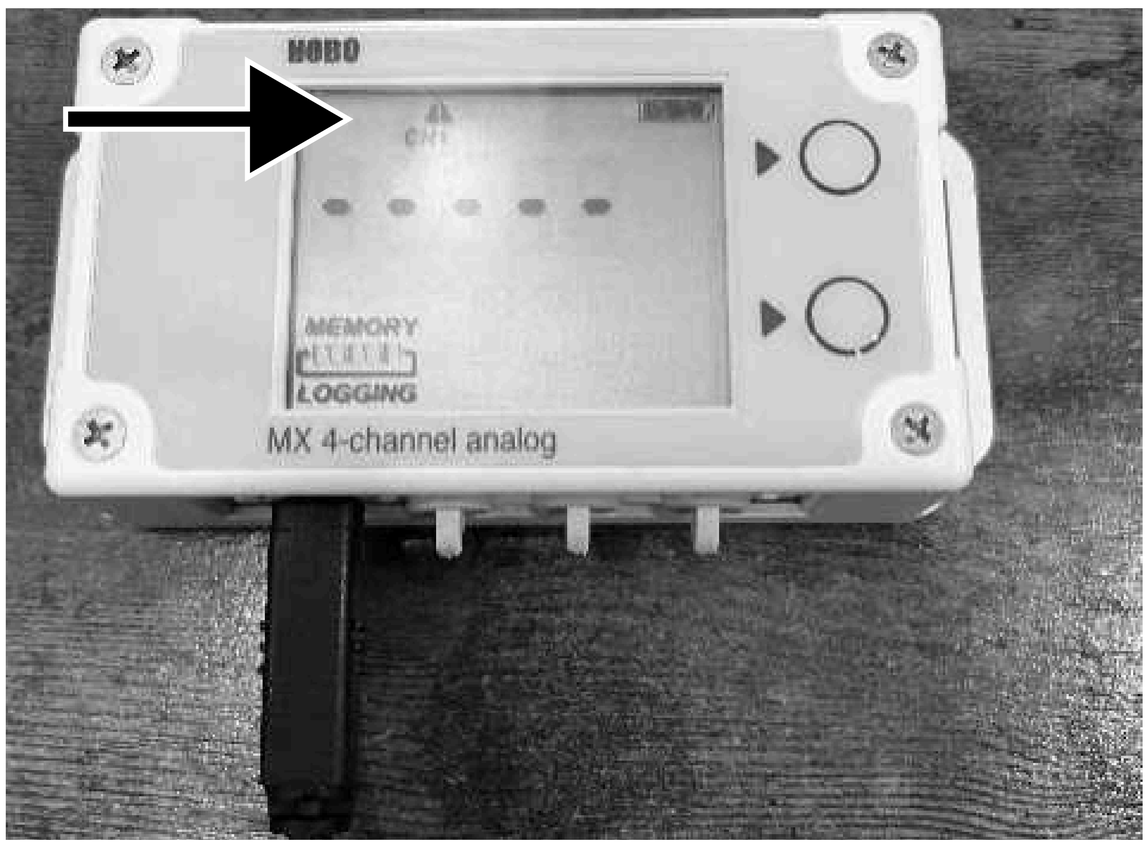
1. Align the MHR3 Adapter with the keyway on the collar.
2. Securely connect the adapter by tightening the 5/16th Allen head bolt in the center of the adapter onto the collar until snug.

STEP-BY-STEP INSTALLATION INSTRUCTIONS CONT.

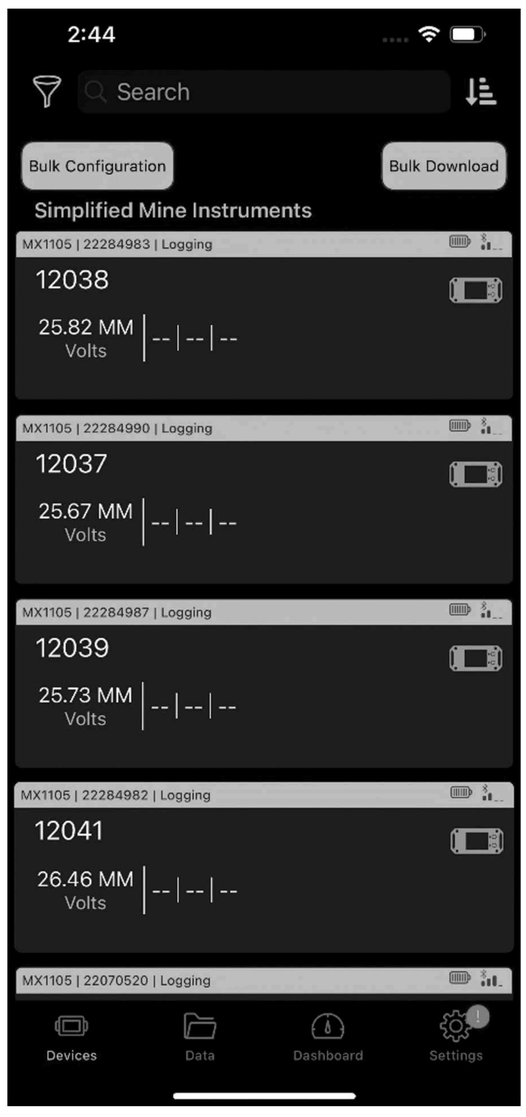
INSTALLING AND PAIRING THE BLUETOOTH MODULE

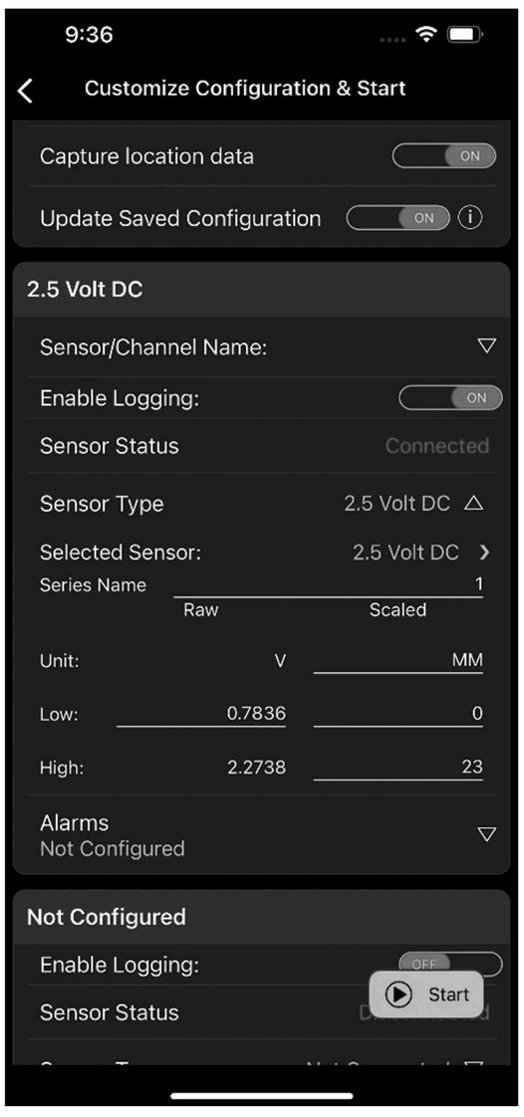
(Only included in MHR3 Adapter Kit)

1. Connect the three cables from the MHR3 Adapter to the Bluetooth Data Logger's channels (one cable per channel)
2. Download Hobo Data logger app from the App Store or Google Play.



3. Enable Bluetooth on your smartphone or device.
4. Open the app and look for the data logger (it will display an 8 digit number which is also on the box the data logger comes in or on the back of the physical data logger. Once paired it will display the SN on the parts bag this comes in. You can change the name from there.
5. The logging interval comes preset at 12 hours and the linear scaling is preset as well. Tested at SMI in Shop conditions.If readings deviate from the dial gauge (within 0.01"), rescale.
6. To rescale, set data logger to 1 second logging, change both the voltage and scaled sides to 2.5. Record reading with Record the reading with the dial gauge at 0 (no movement) for each rod, apply maximum movement (e.g., 38.1 mm) and record the reading for each rod. Do this for all 3 channels. Input the first reading in the top Voltage box in app. Input the second reading in the bottom Voltage box in app. Move to the right, label the scaled portion "mm." Enter 0 in the top right scaled box and 38.1 mm in the bottom right scaled box. Change logging interval back to previous value.
7. Test the connection by taking an initial reading by hitting the download data button on the data logger main screen. Export or save it locally to the phone or tablet being used.





For detailed information on the Hobo data logger see the installation manual here: **Hobo MX1104 & MX1105 Manual**

SPECIFICATIONS

MHR3

Made in the USA
3-point rock movement monitor
Thousandths of an inch measurements retrievable at the instrument with the use of a dial gauge or Bluetooth data logger (optional).
Non corrosive materials
Designed to install quickly and is easy to use by all.
1-5/8" diameter hole minimum.
Unlimited monitoring depth.
User set trips, Resettable and adjustable

DATA LOGGER

Resolution Accuracy	.001”
Operating Range	20° to 70°C (-4° to 158°F)
Operating Range	mW (0 dBm)
Radio Power 1	Approximately 30.5 m (100ft) line of-site
Transmission Range	Bluetooth Low Energy (Bluetooth Smart)
Wireless Data Standard	1 second to 18 hours
Logging Rate	Fixed interval (normal, statistics) or burst
Memory Modes	Wrap when full or stop when full
Start Modes	Immediate, push button, date & time, or next interval
Stop Modes	When Memory full, push button, date & time, or after a set of logging period
Time Accuracy	± minute per month at 25°C (77°F)
Battery Type	Two AAA 1.5 V alkaline batteries, user replacable
Battery Life	1 year, typical with logging interval of 1 minute and Bluetooth Always On enabled; 2 years, typical with logging interval of 1 minute and Bluetooth Always On disabled; and temperatures between 0° and 50°C (32" and 122°F). Faster logging intervals and statistics sampling intervals, burst logging, remaining connected with the app, excessive downloads, and paging may impact battery life. Memory 4 MB (1.9 million measurements, maximum)
Memory	4MB
Full Memory Down Time	Approximately 4 to 15 minutes depending on the mobile device; may take longer the further the device is

PART NUMBER EXPLANATIONS

Product Name	First 3 Characters	Next 3 Characters	Last 6 Characters
MHR3 **MHR-158-051015**	**MHR** = MHR unit	**158** = Hole Diameter = 1-5/8”	**051015** = Shortest to longest rod length. 2 digits per rod length

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Iron River, MI
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