



**SAG FLAG
SF-100-158-10**

**SAG FLAG
WITH ADAPTER**
(Only included in Sag Flag Adapter Kit)

**BLUETOOTH
MODULE**
(Only included in Sag Flag Adapter Kit)

INTRODUCTION

Thank you for choosing the Sag Flag system. This manual provides step-by-step instructions for installing the Sag Flag, Sag Flag Adapter, and Bluetooth Module. 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

Impact drill and 4" or longer 3/8" rock /cement bit	Hammer
Crimping tool for rod sets	Smartphone or device with Bluetooth capability (for Bluetooth Module setup)

PACKAGE CONTENTS

Ensure all components are included before starting:

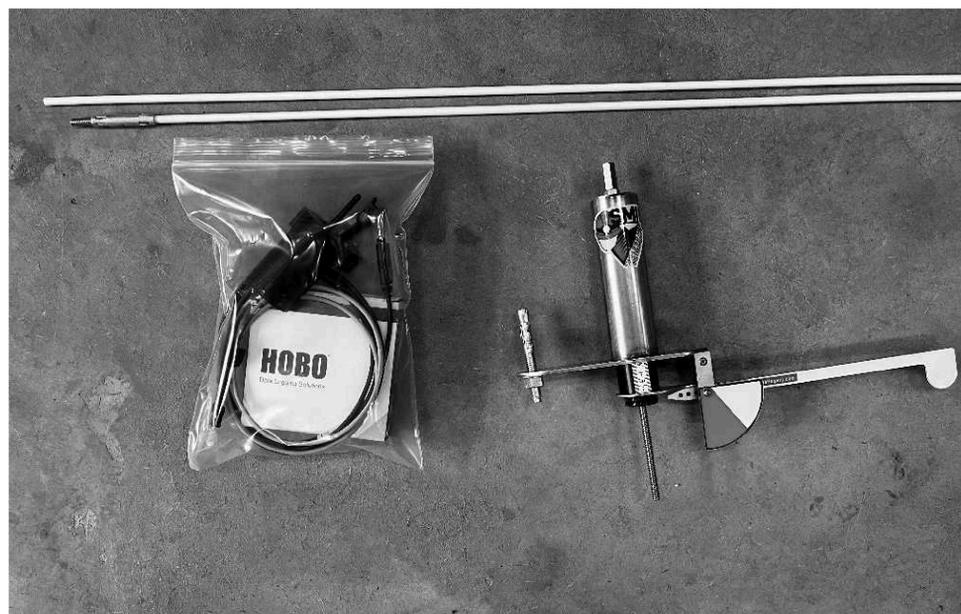
Sag Flag

Sag Flag Rod Set

Sag Flag Adapter (**Only included in Sag Flag Adapter Kit**)

Bluetooth Module (**Only included in Sag Flag Adapter Kit**)

Extension data cables (**Only included in Sag Flag Adapter Kit**)



INSTALLATION OVERVIEW

Estimated installation time: **10-20 minutes**

The installation process involves three main steps:

1. Mounting the Sag Flag in the desired location.
2. Attaching and configuring the Sag Flag Adapter.
3. Installing and pairing the Bluetooth Module for wireless control.

STEP-BY-STEP INSTALLATION INSTRUCTIONS

INSTALLING THE SAG FLAG

1. Determine the required depth from the mine roof to your anchor point.
2. Layout the sag flag collar device and the rods on a flat surface and cut the fiberglass rod to achieve the depth if different from the ordered length.
3. Make sure the length of the Flat anchor is 1/4" longer than the drill hole diameter. (For example... a 1- 5/8" diameter hole should have a 1-7/8" long flat anchor. Etc.)
4. Crimp the rods together and attach to the collar device.
5. Insert into the borehole anchor first. (Continue to push the unit up the hole until the collar device is against the roof.) **(note: If the borehole diameter is less than 1-5/8", bore out the hole to 1-5/8" for a minimum of 6" up the hole. This will allow the Sag Flag unit so seat properly. Example: 1 -3/8" borehole would require this procedure.)**
6. Rotate the collar device to the position you want it to be set at.
7. Mark where the rock needs to be drilled for the rock anchor and drill it about 2- 1/2" deep. (3/8" bit)
8. Install rock anchor
9. Install the collar device onto the rock anchor stud and tighten it down.
10. Adjust the flag to a horizontal position by turning the black nut on the threaded stud, up or down.
11. Pull on the all thread sticking down below the plunger to take any slack out of the fiberglass monitoring rod and to ensure it is anchored well. Approximately 15 pounds of force is all that is needed.
12. Video of installation: https://www.youtube.com/watch?v=BgCcEuA_Gfk

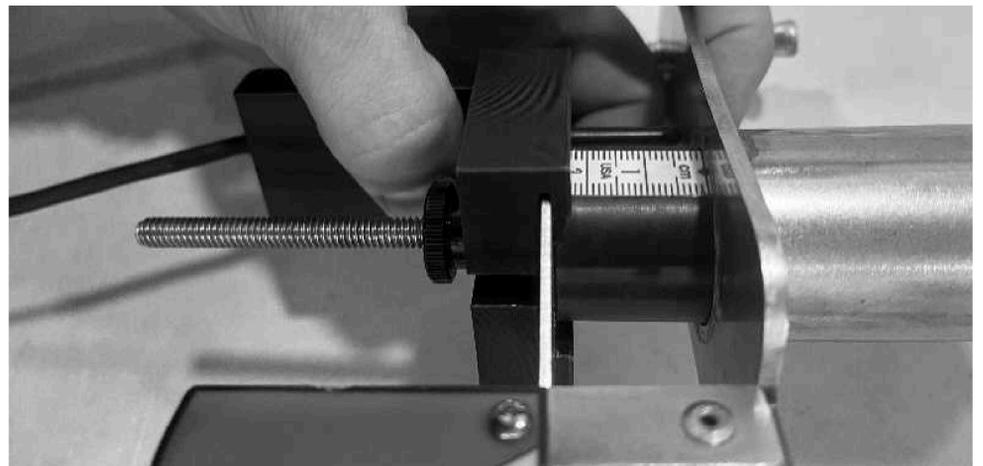
BEST PRACTICES

- **If Flag passes the red portion of the scale, the unit should be readjusted so the flag is horizontal again. When the flag reaches the red there is only 1/4" to go before the unit will be maxed out and stop reading movement. To adjust the unit, back off the thumb nut until the flag is horizontal again. Any readjustment should be noted so the lifetime movement of the instrument is recorded.**
- Drill 1 to 2 feet past your desired monitoring distance. This prevents clay packing or other possible issues from interfering with the monitoring rod insertion
- Make sure you are anchoring in solid Rock. If anchoring in a clay seam or loose shale, contact SMI for possible solutions
- If the monitoring rod becomes difficult to push up the borehole, lightly tap the end of the rod with a dead blow hammer or similar device.

INSTALLING THE SAG FLAG ADAPTER

(Only included in Sag Flag Adapter Kit)

1. Attach the Adapter by aligning the Sag Flag Adapter slot with the metal tab on the bottom of the Sag Flag plunger
2. Securely connect the Adapter by ensuring the connection is tight to prevent disconnection during operation.

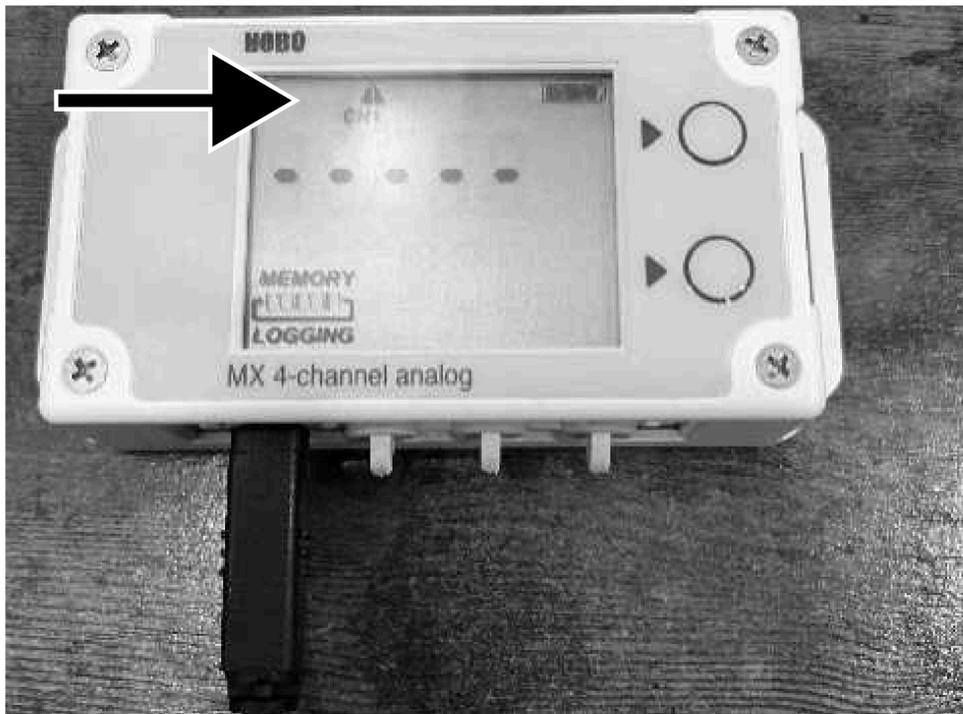


STEP-BY-STEP INSTALLATION INSTRUCTIONS CONT.

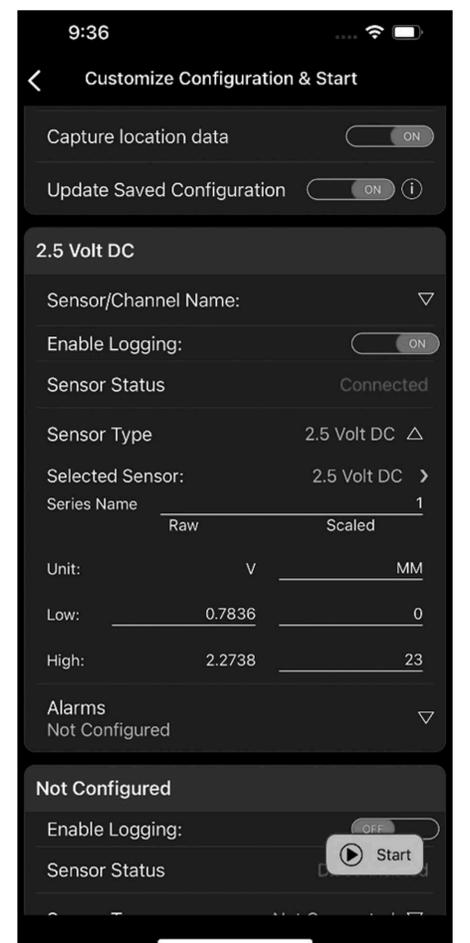
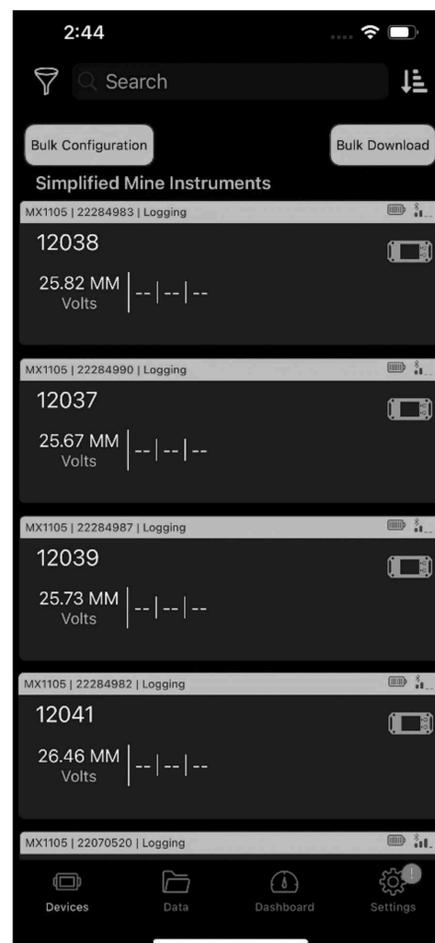
INSTALLING AND PAIRING THE BLUETOOTH MODULE

(Only included in Sag Flag Adapter Kit)

1. Plug the Sag Flag adapter into the Bluetooth data logger in position/channel 1
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 do not match what is shown on the physical linear scale (Within 0.5MM) on plunger, rescale.
6. To rescale, set data logger to 1 second logging, change both the voltage and scaled sides to 2.5. Record reading with plunger scale showing 0 movement, then push plunger up to its max position (23MM of movement), record that reading. 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 scaled portion MM. Input 0 in the top right scaled box, input 23 in the bottom right scaled box. Change logging interval back to previous value.
7. See Video: <https://www.youtube.com/watch?v=cW0SbOXJ3vk> for full overview.
8. 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

SAG FLAG

Made in the USA
Single-point rock movement monitor with a 9" flag that is visible from great distances.
.5mm measurements retrievable at the instrument.
Non corrosive materials
1-1/2" (38.1) diameter hole minimum.
Unlimited monitoring depth.
1" (25mm) of detectable movement at initial setup. Resettable.
.001" (.01mm) movement resolution when used with the Sag Flag adapter

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 replaceable
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 5 Characters	Next 3 Characters	Last 2 Characters
Sag Flag SF-100-158-10	SF-100 = Sag Flag Unit	158 = Hole Diameter = 1-5/8"	10 = Desired Monitoring Depth = 10'

SIMPLIFIED MINE INSTRUMENTS
 Iron River, MI
 minershelpers.com