

Environmental Measurement Japan

Dendrometer MIJ-02 Type II Rotary Manual



MIJ-02 Type II Rotary Setting Manual

How to Set: Basic Measurement of trunk circumference

Please Set MIJ-02 Rotary Dendrometer as below steps

Note:

When measuring growth of vertical direction or extremely bent tree, please make sure that pulley of MIJ-02 is not aim to upward but it aims to side or down.

*If the pulley aim to upward it will cause puddle of rain water at potentiometer bearing which leads failure.

Installation

1.



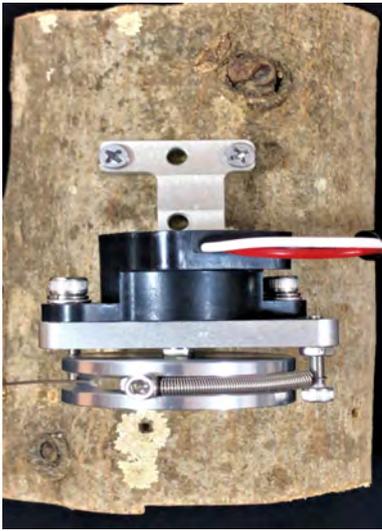
Please choose smooth bark to set MIJ-02 dendrometer.
Wire also need to be set at smooth bark.
For fixing the MIJ-02, use the fixing screw.
Two holes on the MIJ-02 arm, screw the fixing screw to the tree.
(Please use #2 Phillips screwdriver)

2.



Make sure it not wobble.
At this time, wrap the mesh tube around the trunk and cut it to an appropriate length.
Pass the wire through the cut mesh tube.

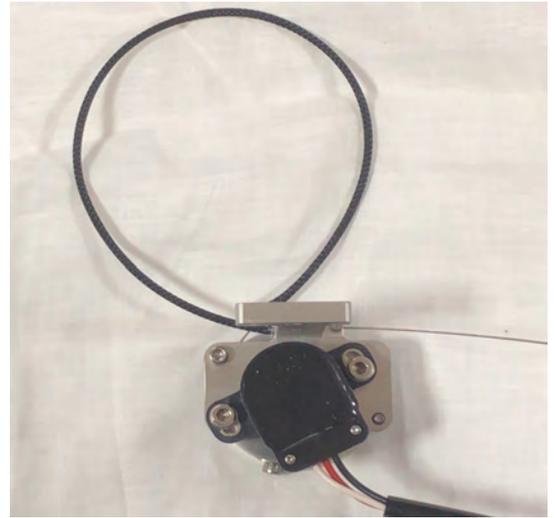
3. Some users struggle with how to wrap the wire but it is very simple so please wrap as follows.
Wrong setting shown next page.



MIJ-02 Rotary set to the trunkl



Wrap the wire counterclockwise. Route the wire along the groove between the pulley and the trunk. After passing it, wind the wire counterclockwise as it is.



View from above, it will be wrapped in this state

4.



Make a circle around the tree trunk clockwise, and pass the tip of the wire returning from the left through the hole of the wire stopper from the left side.
After the wire has passed, tighten the screw on the wire stopper while pulling the wire until the pulley rotates slightly. You don't have to overtighten it, just your fingertips will suffice. (Tool : Hex Socket 1.5mm)

5



Look at the whole, check the fixing of the dendrometer, the position of the wire, etc., and make corrections as necessary. Note: By this stage, measure the trunk circumference of the place where the wire is wound with a measuring tape (Necessary for analysis).

Bad example: The wire is down.
Please correct it to an appropriate state.

6.



When all steps are done, connect the dendrometer and logger. At this time, push it in until the claws click.

The logger hangs on the trunk and bundles the extra cables together.

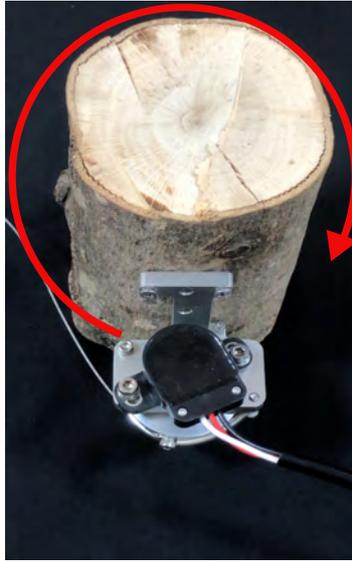
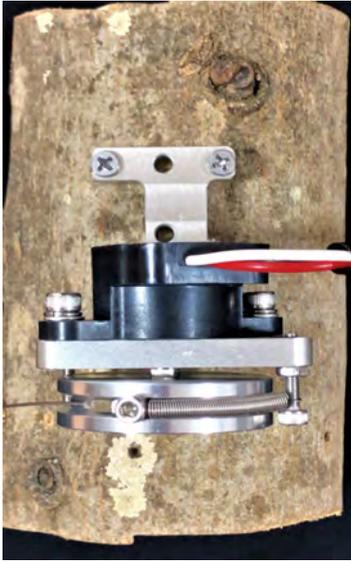
It will lead to the reduction of the following damages.

- Damage from wild animals
- Impact from human damage



Excess wire should be organized by using wire band. (Please use black wire band to avoid UV damage)

This is a winding method that users tend to do.
Please note that measurement is not possible with the following winding methods.



Winding the wire clockwise is not allowed.

The wire will not move as the trunk grows, it will not be possible to measure the trunk growth.

MIJ-02 Rotary Dendrometer Wiring

Connect the sensor to a data Logger.
Red goes to Power port of datalogger
Blak goes to Power Grounf of datalogger
White goes to Signal output+ of datalogger

Datalogger should be used as single-end. If your datalogger is differential only, connect signal ground and power ground.

Regression Equation (Output)

$$dL(\mu\text{m})=29059.7(\mu\text{m})\times V_{\text{out}}(\text{V})/V_{\text{pre}}(\text{V})$$

dL: displacement μm
Vout: voltage output
Vpre: preheat voltage

If the datalogger 5V power and the datalogger output is 1.2V then $dL(\mu\text{m})=29059.7(\mu\text{m})\times 1.2\text{V}/5\text{V}$
So the result will be 6974.328 micro meter

Specification

Range	< ϕ 40mm (wire can be extended as request so magerment range will be infinity)
Output	Ratiometric (eg: When preheat 5V then output full scale is also 5V)
Resolution	Depend on data logger (5.81194 $\mu\text{m}/\text{mV}$, Using MIJ-01 less than 0.1 μm , MIJ-12 less than 5.8 μm)
Power	5VDC (<1mA at 5VDC)
Withstand Voltage	<18VDC
Sliding Resistance	0.03-0.15Nm (Measured value range 0-29mm)
Spring Constant	Standard (for wood) 0.3N/mm, Medium (for plants without wood)0.1N/mm
Linearity	$\pm 1\%$
Thermal Characteristic	Thermal expansion coefficient $17.3\times 10^{-6}/\text{DEG}$ (SUS304)
Waterproof	IP65