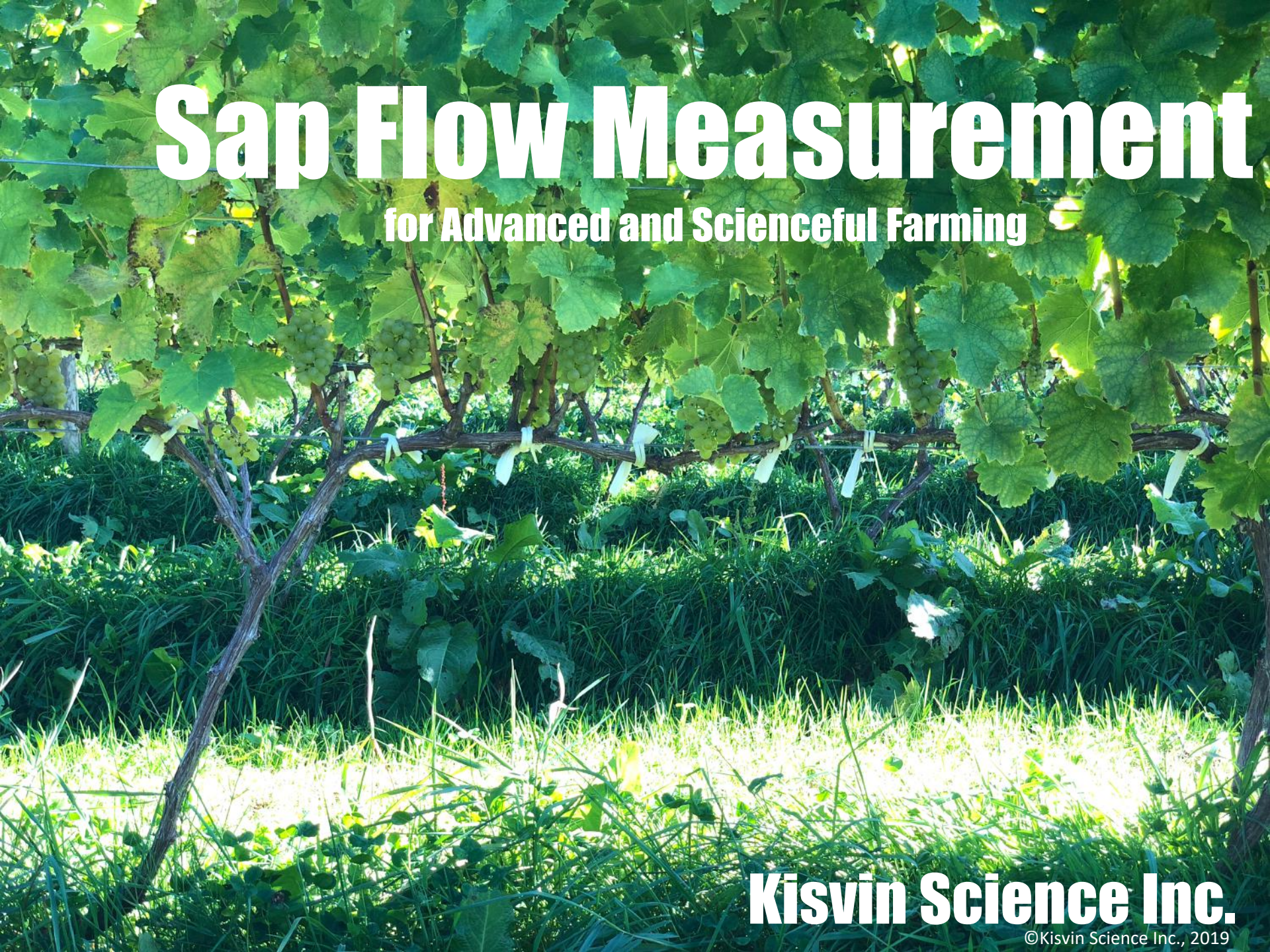


Kisvin Science

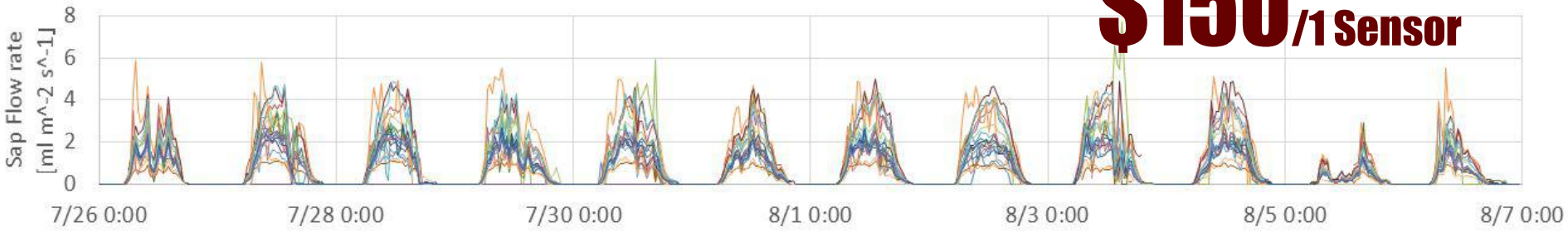
We are accepting reservations.

## The Most Intelligent Physiological Monitoring System

# KSap Flow Sensor

### For Your Scienceful & Sustainable Viticulture

Thermopile Type




**$150/1 Sensor**

## Professional Manufacturing Offers Easier Use and More Precise Readings.

- Well-known for their reliability due to its long history of achievements
- Non-destructive method (Stem Heat Balance Method)
- Over 90% accuracy without calibration
- Very Low Cost
- Made in Japan
- Easy set-up

Coming soon

To revolutionize plant science

# Film Sap Flow Sensor

Thermistor Type

We are accepting reservations.

## Disposable
## Low Cost
## Extensibility

## $30/1 Sensor

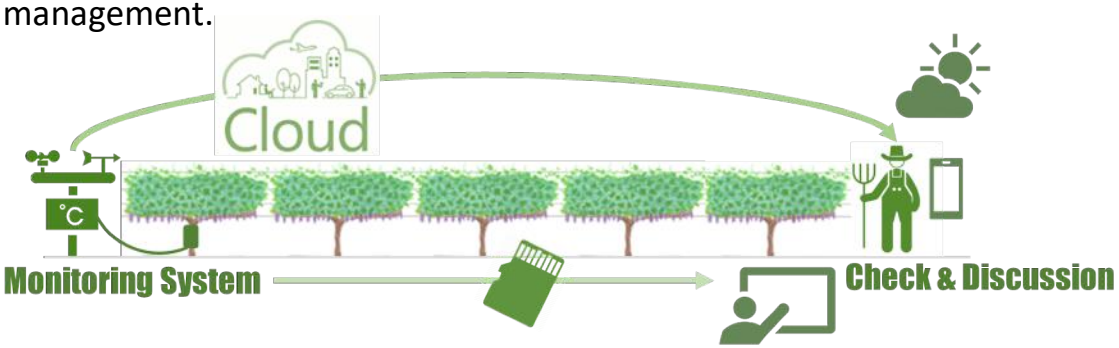
### Easy Connect to Tiny Micro-computer
### Size Variation On-demand

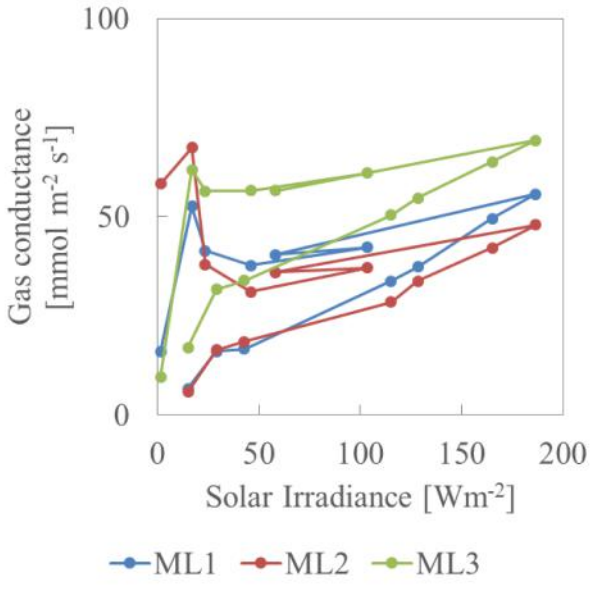
The SHB sensor has been reborn completely. The cost of the measurement system has been dramatically reduced. You can easily improve the granularity of measurement. This sensor can be used as a teaching material for educational purposes besides agriculture. By all means, please try out this brand new technology. Do not miss it!

※ This image is proto type.
Product version will be changed.

# Sap Flow & Gas-Exchange Monitoring

Measurement system for assessing gas-exchange of plants have been quite expensive. However, in addition to the water consumption by plants, our monitoring system is able to estimate the gas-exchange capacity by sap flow and vapor-pressure deficit sensing. It would be very helpful for your farming. By knowing the specific water consumption in case by case, you will not get lost in irrigation management.




# Installation point & Sensor size

The sensor size is single only (10mmϕ), because it's hard to measure the total leaf area to normalize the sap flow amount in thicker stem or shoot which come out more leaves. Please install KSap flow sensor on a stem or distal shoot of around 10mmϕ. Then, the sensor can detect the sap flow amount which reflects the structure and condition of stem or shoot and leaves on the tip side of the installation point.

# KS-Logger

## All in One

Because of the standard environmental sensor (temperature, humidity and solar radiation), so you don't have to dare implement additional weather station.

## Smart Technology

It can be equipped with a SigFox shield for telemetry. However, since the measurement values (voltage value, csv format) are backed up to the local micro SD card, the data is not lost even if the communication is lost. Open API for programing and integrating to third party systems. It is possible to mount an another communication module (LoRaWAN, NB-IoT, etc) in the future.

## High Flexibility

KS-Logger is based on the Arduino Pro mini. The code written at the shipment is made public, so users are free to rewrite the code any times. By rewriting the code, you can connect other commercial sensors and build your own measurement platform at low cost.

## Multipoint Measurement

The low cost of not only the sensor but also the logger makes it easier to measure more valuable data at multiple points by installing many KS-Loggers in the field.

# Coming soon

# KSLogger

## For Thermopile Type ver. 1


Note)The logger box is not included, so please order it additionally or make your own. We share how to make a low-cost, waterproof logger box.

**Electrical**
Operating voltage: 12V

**Control**
・SigFox Shield（option）
・HTTP web interface for simple management
・Arduino Pro mini base

**Physical**
Weight: undetermined
Dimensions: undetermined
Temperature:
Operating: 0-60℃
Storage: -10-70℃

**Accuracy**
in evaluation

**Local Reading Storage**
Depend on microSD card

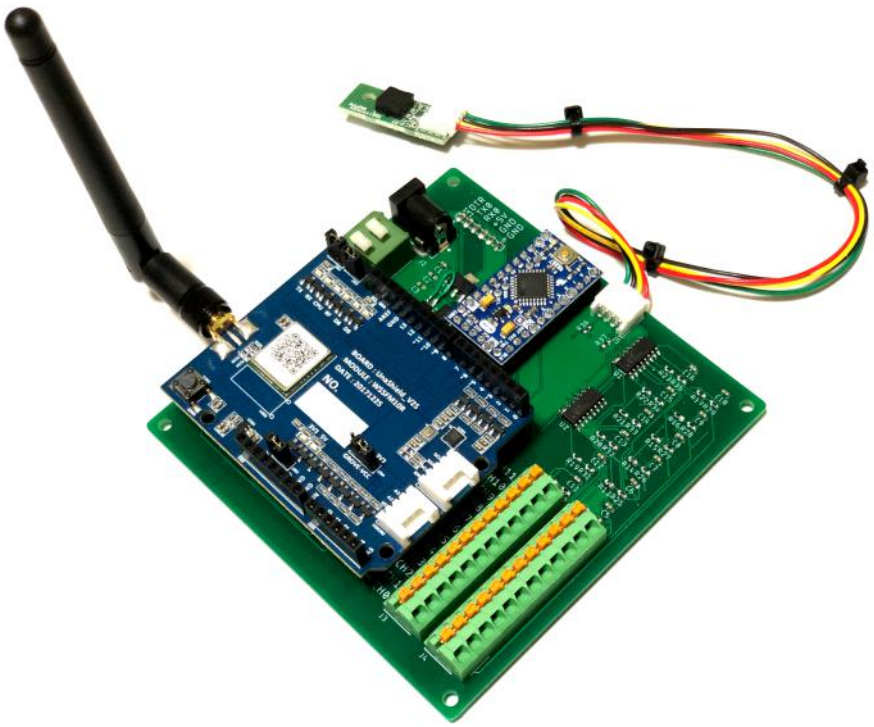
**Connection**
3 Sap Flow Sensors
Temperature sensor
Humidity sensor
Radiation sensor (to be scheduled for addition)

**Certifications and Compliance (in preparation)**
MET, CE, REACH compliant, RoHS compliant

# Coming soon

# KSLogger

## For Thin Film Thermmistor Type ver. 1



Note)The logger box is not included, so please order it additionally or make your own. We share how to make a low-cost, waterproof logger box.

**Electrical**
Operating voltage: 12V

**Control**
・SigFox Shield（option）
・HTTP web interface for simple management
・Arduino Pro mini base

**Physical**
Weight: undetermined
Dimensions: undetermined
Temperature:
Operating: 0-60℃
Storage: -10-70℃

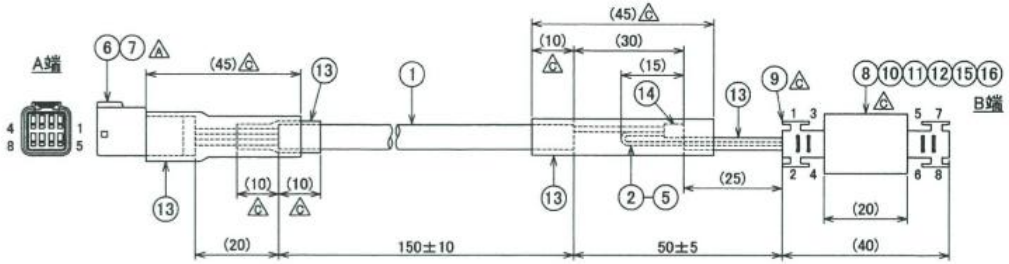
**Accuracy**
±0.6% (0.36℃)

**Local Reading Storage**
Depend on microSD card

**Connection**
3 Sap Flow Sensors
Temperature sensor
Humidity sensor
Radiation sensor (to be scheduled for addition)

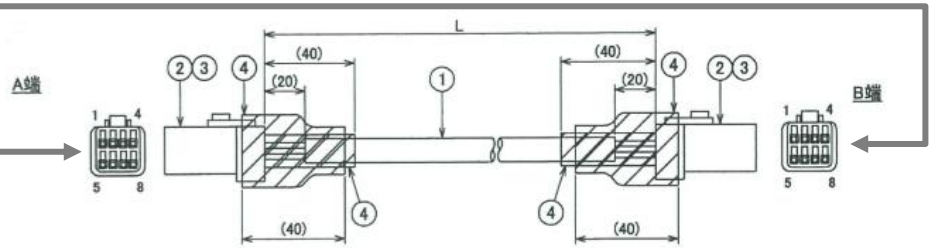
**Certifications and Compliance (in preparation)**
MET, CE, REACH compliant, RoHS compliant

# KSap Sensor Probe



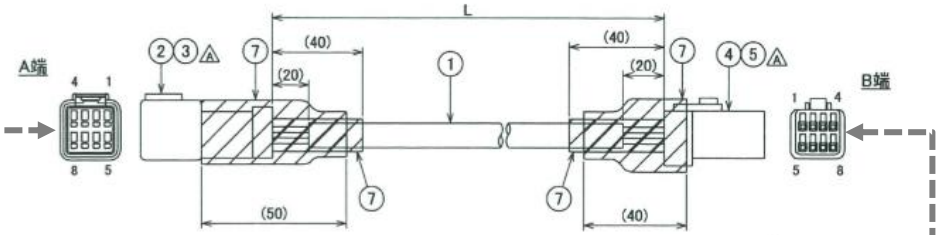

# Standard Cable

Type1 L=5000±150
Type2 L=10000±300

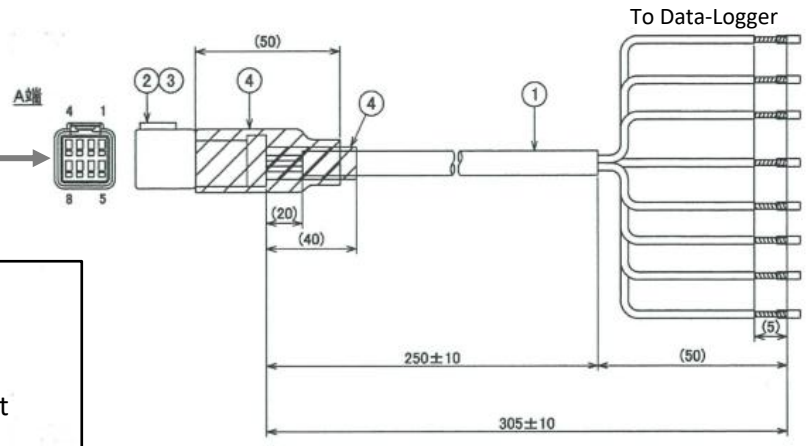



# Extension Cable

Type1 L=5000±150
Type2 L=10000±300




# Logger Cable




**Test Item**

1. Appearance
2. Structure and Dimension
3. Conduction and Arrangement
4. AC Voltage Proof: 750V/2s
5. Insulation resistance: 100MOhm<

**Design**: Kisvin Science Inc.
**Manufacturing**: Hitachi Metals, Ltd.

# Accessory

We adopt Aeroflex (AEROFLEX INTERNATIONAL CO., LTD.) as the insulation material. It‘s a high quality international brand(ISO14001).
In addition, aluminum deposition film is required as a radiation shield. Mount these accessories at the sensor installation position. Of course, you can use another maker's product if it is the goods of similar quality.


| | | Part Number | Unit Price USD | Minimum Quantity | Status | Remarks |
|---|---|---|---|---|---|---|
| **KSap Sensor** | Thermopile Type, 10mmϕ | KS01-10 | USD150 | 10 | Active | Manufacturing product, |
| **Film Sap Sensor** | Film Type, 10mmϕ | KS02-10 | USD30 | 10 | Coming soon (DEC 2019) | Disposable, Size available on demand |
| **Standard Cable** | L=5m | KS03-05 | USD50 | 10 | Active | Preferred length |
| | L=10m | KS03-10 | USD75 | 10 | Active | as necessary |
| **Extension Cable** | L=5m | KS04-05 | USD35 | 1 | Active | as necessary |
| | L=10m | KS04-10 | USD55 | 1 | Active | as necessary |
| **Logger Cable** | L=250mm | KS05 | USD10 | 10 | Active | Required for connection |
| **Accessory** | Insulation Form(2m) | KS06I | USD20 | 1 | Active | Required for installation |
| | Silver coated sheet | KS06S | USD15 | 1 | Active | Required for installation |
| | Repeat tie | KS06T | USD10 | 50 | Active | Required for installation |
| **KS Logger** | Thermopile Type | KS07-Pro | USD150 | 1 | Coming soon (DEC 2019) | for KS01-10 |
| | Thin Film Thermistor Type | KS07-Ez | USD100 | 1 | Coming soon (DEC 2019) | for KS02-10 |
| | SigFox Shield | KS07-Sh | USD150 | 1 | Active | Communication costs included for 3 years |
| **High-End Logger** | MIJ-01 in Case | KS08 | USD3,000 | 1 | Active | as necessary, max 12 KSap sensor<br>add a MUX for more 10 KSap sensor |
| **Battery System** | --- | --- | Contact Us | 1 | Active | as necessary |

| | | Part Number | Unit Price USD | Minimum Quantity | Status | Remarks |
|---|---|---|---|---|---|---|
| **Power Circuit** | Standard type | KS09-01 | USD 5 | 1 | Active | Self-made circuit |
| | Standard type | KS09-02 | USD 20 | 1 | Active | Implemented board |
| | Programable type | KS09-03 | USD 50 | 1 | In preparation | Implemented board |
| **Logger Box** | Woter proof for Thermopile type | KS10-01 | USD 150 | 1 | Active | |
| | Woter proof For Thin Film Thermistor type | KS10-02 | USD 150 | 1 | Active | |
| **Radiation Shield** | | KS11-01 | USD 100 | 1 | In preparation | For environment measurement with a fan. |

There are several ways to supply voltage to the heater of the sap flow sensor.

-Provide a constant voltage supply

-supply a variable voltage proportional to the solar radiation

-supply voltage to keep the constant temperature at the installation position above the air temperature

It is necessary to select the optimum voltage supply method according to the purpose and environment.

Please ask for details.

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