Sap Flow Sensor

This kit monitors relative variations of sap flow rate in small shoots or petioles to reveal how plants respond to environmental factors like temperature and humidity. Ideal for greenhouses to track water transport dynamics and plant activity. This device, belonging to the PRO sensor series, includes Aranet Sub-GHz ISM band radio which wirelessly transmits sensor measurements to the Aranet PRO base station.

Product numbers

Product number	Radio band	To be used in
TDSKT102	EU868	European Union
TDSKT1U2	US920	United States of America, Canada, South America, Australia, New Zealand
TDSKT1U2	AS923	BRN, KHM, HKG, IDN, LAO, TWN, THA, VNM, MYS, SGP
TDSKT1J2	JP923	Japan
Not available	KR923	South Korea

- This product is a kit consisting of several separate devices. It combines Aranet devices with carefully selected solutions from other companies to provide a single, unified solution. Please consult the *Kit contains* table for a detailed list of included devices.

Kit contains

Product number	Manufacturer	Product name	Amount
TDSCT1*2	Aranet	4-20 mA Transmitter with 12 VDC PSU	1
SF-5Mi	Bio Instruments	Sap Flow Sensor	1
--	Bio Instruments	Sap Flow Sensor Signal Conditioner	1

- Aranet product number designations include the symbol "*" to signify multiple product numbers, which, depending on the region of use, have either 0, U or J in place of the asterisk. Refer to the relevant product datasheets for more information.

Specifications of kit components

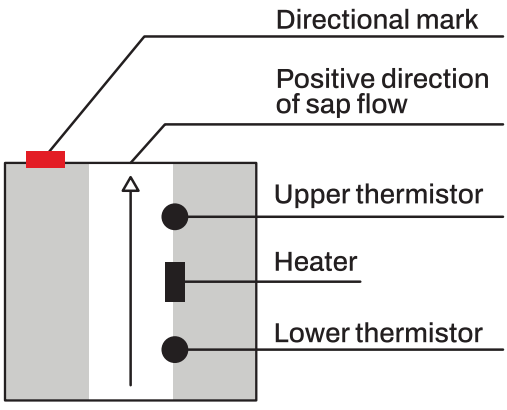
General

Ingress protection rating	IP64	
Operating temperature range	0–50 °C	-32–122 °F
Transmitter Dimensions	160×132×46 mm	6.3×5.2×1.8 in
Signal Conditioner dimensions	95×95×60 mm	3.7×3.7×2.4 in
Sensor Dimensions	30×30×40 mm	1.2×1.2×1.6 in
Total Weight	760 g	26.8 oz
Power cable length	1.8 m	6 ft
Signal cable length	3 m	9.8 ft
Probe cable length	1 m	3.3 ft
Packaging includes	1 pcs AA alkaline battery	

Sap Flow Sensor

Measurement Range	Not specified	
Accuracy	Not specified	
Suitable stem diameter range	4–10 mm	0.16–0.39 in
Warm up time	5 min	

- For detailed specifications of the transmitter parameters, please use the product code listed in the *Kit contains* table to locate the corresponding product data sheet.
- Approximate measurement range of 12 ml/h was determined on a stem simulator – a fiber-filled PVC hose with 5 mm in diameter.



- The sensor's probe is made as a hollow collapsible heat-insulating cylinder.
- A spring loaded heater and a pair of bead thermistors are located inside the cylinder.
- A red directional mark indicates positive direction of sap flow.
- A signal conditioner provides powering of the heater and conditioning of the output signal.

Aranet radio parameters

Line of sight range	3 km	1.9 mi
Transmitter power	14 dBm	25 mW
Data transmission interval	1, 2, 5 or 10 min	
Data protection	XXTEA encryption	

- Specifically for JP923 radio band, reduced transmitter power of 13 dBm (20 mW) is used.

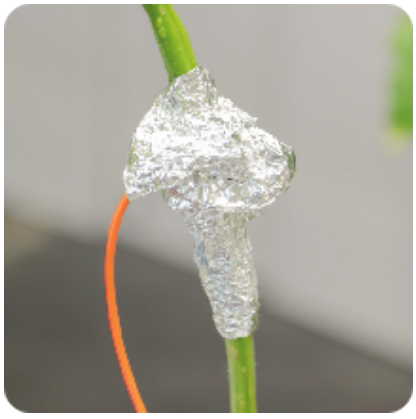
Installing and using the Sap Flow Sensor

- **Attach the Sap Flow Sensor.** Follow the instructions below to install the sap low sensor to monitor growth-related factors of the plant.

- Choose an appropriate part of stem for installing the sensor.
- Make sure that sap flow rate in the stem does not exceed 12 ml/h.
- The rough estimation may be done assuming the average transpiration rate equal to 1.5 ml/h per square decimeter of leaf surface.

- Open the sensor wide enough to place it on the stem.
- Make sure that the red directional mark corresponds to upward flow.

- Make sure that the sensor is firmly placed and cannot slide or twist with the application of gentle force.



- To securely position the sensor on stems with a diameter below 8 mm (approximately 0.31 inches), insert a foam-rubber bar into the internal cavity of the sensor, as shown above.
- To ensure more precise measurements and protect the sensor from external heat effects, it is advisable to carefully cover the sensor with two or three layers of aluminum foil, as shown above.
- **Pair the Aranet transmitter.** For more details on pairing process consult Aranet product TDSCT1*2 data sheet. After pairing 4–20 mA transmitters with 12 VDC PSU included in this kit, configure the conversion from analog 4–20 mA

to flow values. Open the sensor settings menu in the Aranet base station's web interface, update its name, and enable the conversion feature. Select Flow as a Metric and ml/h as Unit and define the minimum and maximum measurement values as detailed below.

Current value	Flow conversion value
4 mA	0 ml/h
20 mA	2 ml/h

- For detailed description of the usage of the Aranet base station, consult the Aranet PRO/PRO Plus base station User Guide.

Compliance information

CE Conformité Européenne

FC Federal Communications Commission (USA)

IC Innovation, Science and Economic Development Canada