ICT INTERNATIONAL

IoT
Sensor – Node Integrated Packages (SNiPs)
2023

For Real-Time Continuous Monitoring of

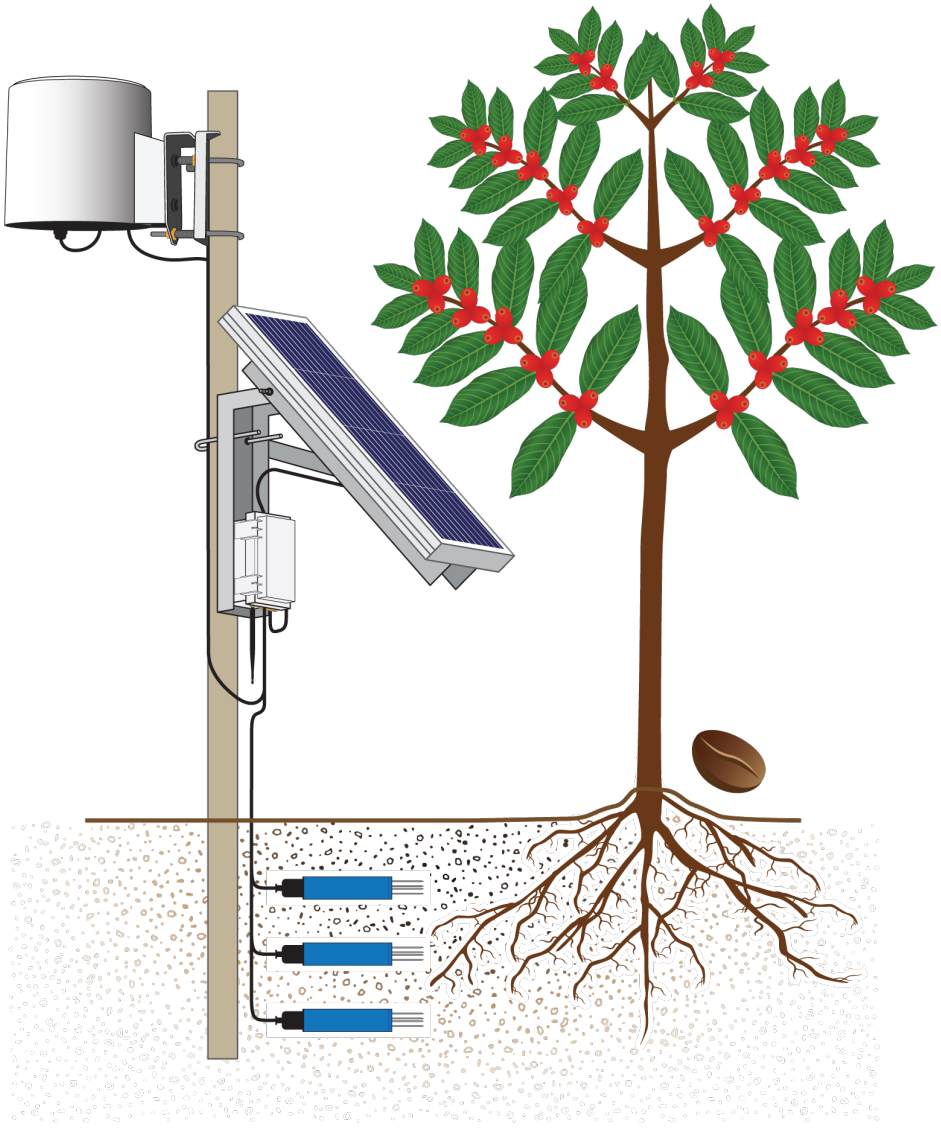
Natural, Built & Agricultural Environments

Partnering with:

Contents

Sensor-Node IoT Packages (SNiPs)

ICT International's integrated Sensor Node IoT Packages (SNiP) provide off-the-shelf pre-configured monitoring solutions. The range of SNiPs provided within this catalogue includes sensor(s), node, and power and mounting accessories. The SNiP can be expanded to incorporate multiple compatible sensors and accessories.



1x MFR-NODE...
1x MP406 Sensor

With Power & Frequency Calibrations

1x Solar Panel
+ Rechargable Li-ion Battery
1x Solar Panel/Node Mounting Frame

2x MP406 Sensors

1x Rain Gauge Sensor

ICT International's implementation of IoT is guided by over 40 years' experience in environmental sensing. ICT International SNiPs are designed specifically to measure key soil, plant and environmental parameters, and encapsulate all the important features in a sensing communication:

Flexible Connectivity - Current support for LoRaWAN and Cat-M1/NB-IoT. Satellite option coming in 2023.

Open Format Data - Data which is open-format and free from proprietary formatting or decoding.

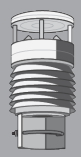
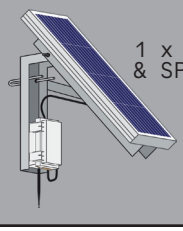
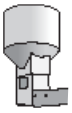
IP65 RATED

Environmentally Sealed - IP65 rated with demonstrated operation in extreme environmental conditions

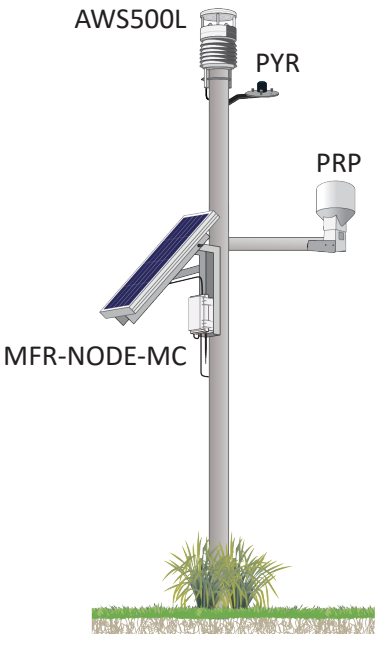
Adaptable Power System - rechargeable 6.5Ah or 13Ah Lithium-Ion batteries, options for external 12 - 24VDC supply.

ICT International Automatic Weather Station (SNiP-AWS5L)

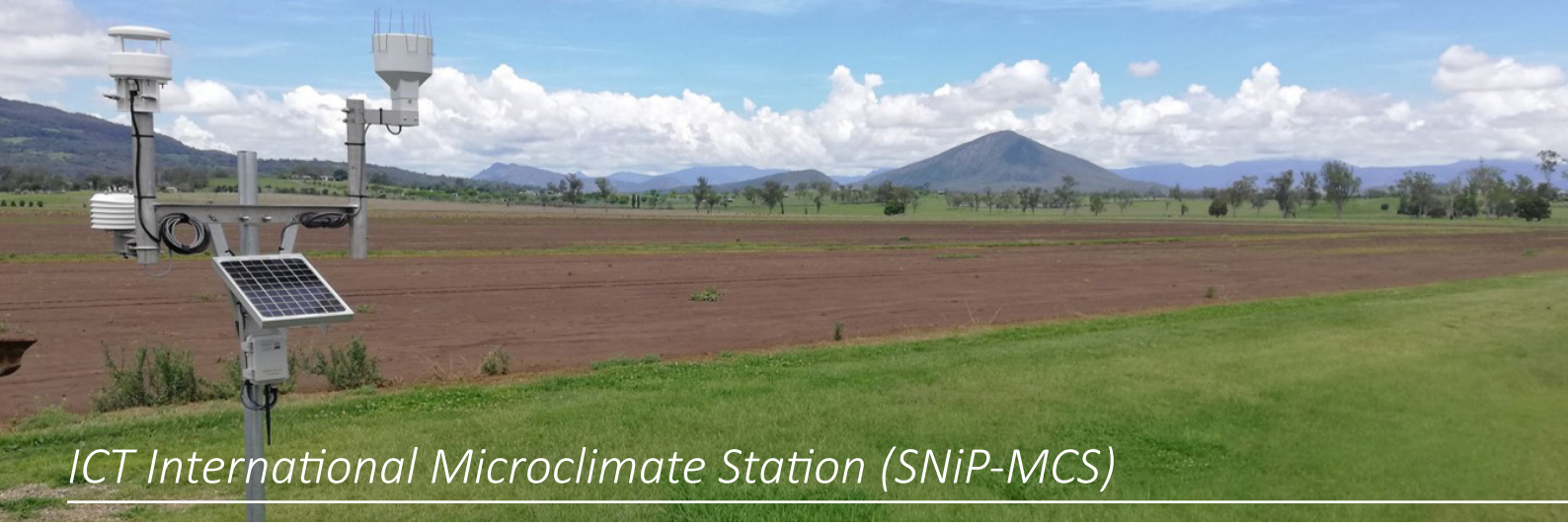
SNiP-AWS5L Ordering Information

SNiP-AWS5L-M	X	-XXX	-XXX
Base Package    1 x MFR-NODE 1 x AWS500L 1 x SP10 solar panel & SPLM7 mounting frame			
Communications LoRaWAN NB-IoT LTE-M	L C		
Extension Sensors 1 (Select up to 1)  PRP-02 with mounting and bird spikes  RIM-7499-STD		PRP RIM	
Extension Sensors 2 (Select up to 1)  Solar radiation  PAR  Leaf wetness  Frost  Soil moisture & temperature		PYR PAR LWS RFS SMT	
Accessories SNiP-AWS5L pole mount bracket to suit thread ended 40NB pipe — AWS5L-MB4025 Horizontal extension arm for PYR and PAR sensor mounting (requires AWS5L-MB4025) — AWS5L-ARM25 Rain gauge stand to suit RIM rain gauges — RIM-7499-STAND			

Example Package



SNiP-AWS5L-MC-PRP-PYR

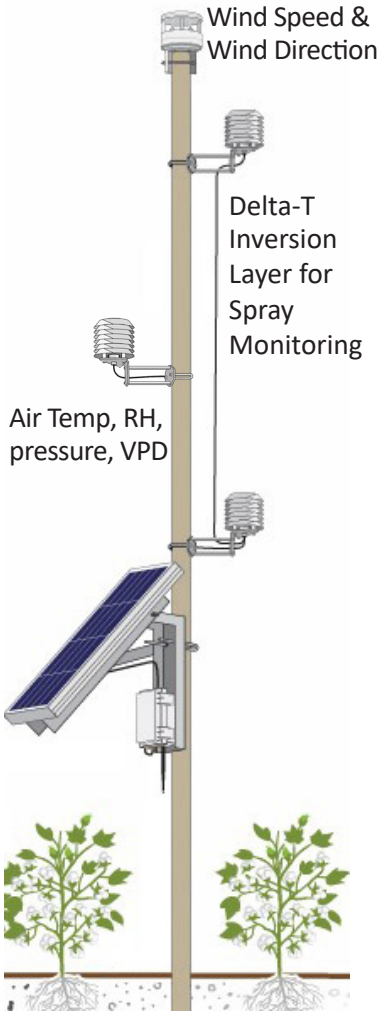


ICT International Microclimate Station (SNiP-MCS)

SNiP-MCS Ordering Information

	SNiP-MCS-M	X	-XXX-XXX-XXX	-XXX
Base Package	1 x MFR-NODE 1 x SP10 solar panel & SPLM7 mounting frame			
Communications	LoRaWAN	L		
	NB-IoT LTE-M	C		
SOI12 Sensors 1 (Select up to 3)	Wind Speed & Direction		AWS2	
	Wind Speed & Direction PM2.5/10 (smoke & dust sensor)		IMS2	
	Air Temp, Relative Humidity, pressure, VPD		VPD	
	Solar radiation		PYR	
	Frost		RFS	
	Canopy Surface Temperature		IRT	
	Delta-T		DT2T	
Digital Sensor (Select up to 1)	PRP-02 with mounting and bird spikes			PRP
	RIM-7499-STD			RIM
Accessories	MCS-pole mount bracket to suit thread-ended 40NB pipe		MCS-MB4040	
	Horizontal extension arm for PYR and PAR sensor mounting (requires MCS-MB4040)		MCS-ARM40	
	Rain gauge stand to suit RIM rain gauges		RIM-7499-STAND	

Example Package



SNiP-MCS-ML-AWS2-VPD-dT2T

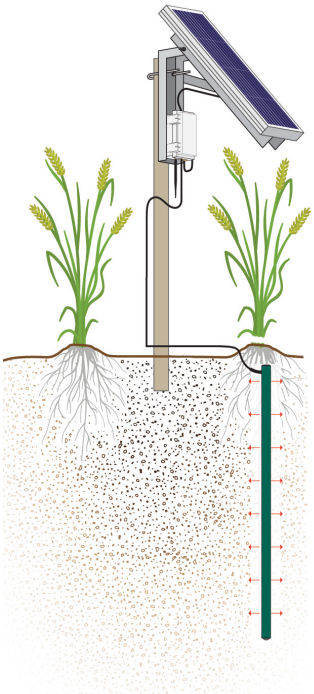
ICT International Fixed Multidepth Soil Moisture (SNiP-EP)

SNiP-EP Ordering Information

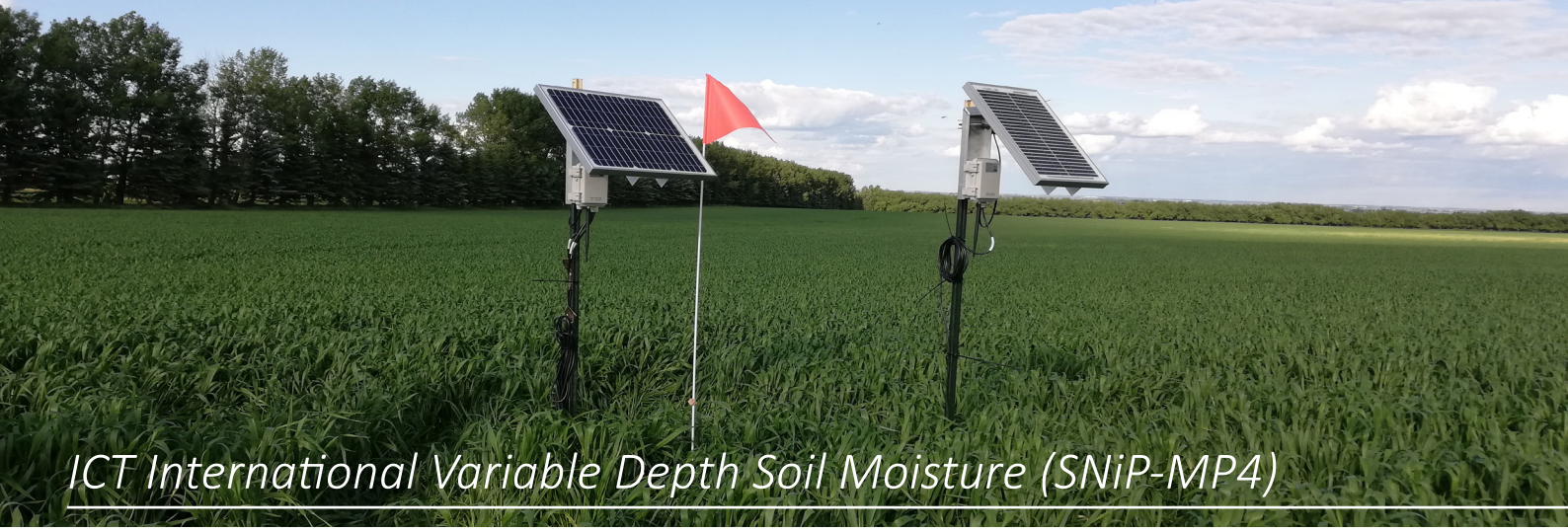
	SNiP-EP	X	-SX	-XXX
Base Package	1 x S-NODE 1 x SP10 solar panel & SPLM7 mounting frame			
Eviro Pro Probe Selection	40cm Soil Moisture & Temperature	4		
	80cm Soil Moisture & Temperature	8		
	120cm Soil Moisture & Temperature	12		
Communications	LoRaWAN		L	
	NB-IoT LTE-M		C	
Extension Sensors ^ (Select up to 1)	EP100GL-04 - 40cm Soil Moisture & Temperature			EP4
	EP100GL-08 - 80 cm Soil Moisture & Temperature			EP8
Electrical Conductivity Sensor Expansion	EC upgrade for 1 x 40cm Probe			EP4-EC
	EC upgrade for 1 x 80cm Probe			EP8-EC
Accessories	EnviroPro Installation auger [std]			EP4-INSTALL
	EnviroPro removal tool			EP4-RT

Extension Sensors ^ can only be added to SNiP-EP4 & SNiP-EP8 packages

Example Package

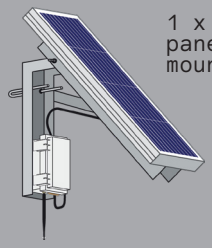
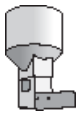


SNiP-EP8-SC

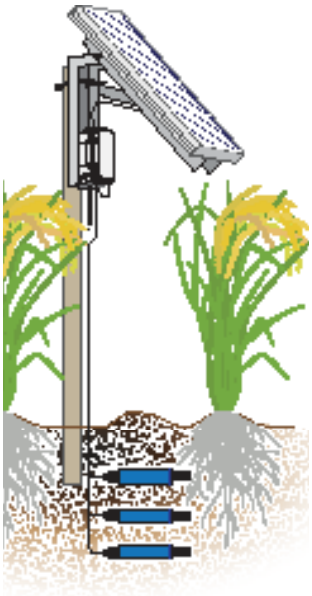


ICT International Variable Depth Soil Moisture (SNiP-MP4)

SNiP-MP4 Ordering Information

	SNiP-MP4-M	X	-XXX	-XXX
Base Package	 1 x MFR-NODE  1 x SP10 solar panel & SPLM7 mounting frame  1 x MP406			
Communications	LoRaWAN	L		
	NB-IoT LTE-M	C		
Extension Sensors 1	1 x MP406		MP1	
	2 x MP406		MP2	
Extension Sensors 2	 1 X PRP-02 with mounting and bird spikes			PRP
Accessories	300mm installation riser, for augured installation of MP406 at a depth to 200mm depth			MP4-AUG-3
	450mm installation riser, for augured installation of MP406 at a depth to 200mm-350mm			MP4-AUG-4
	600mm installation riser, for augured installation of MP406 at a depth to 350mm-500mm			MP4-AUG-6
	750mm installation riser, for augured installation of MP406 at a depth to 500mm-650mm			MP4-AUG-7
	900mm installation riser, for augured installation of MP406 at a depth to 650mm-800mm			MP4-AUG-9
	1200mm installation riser, for augured installation of MP406 at a depth to 800mm-1100mm			MP4-AUG-12

Example Package



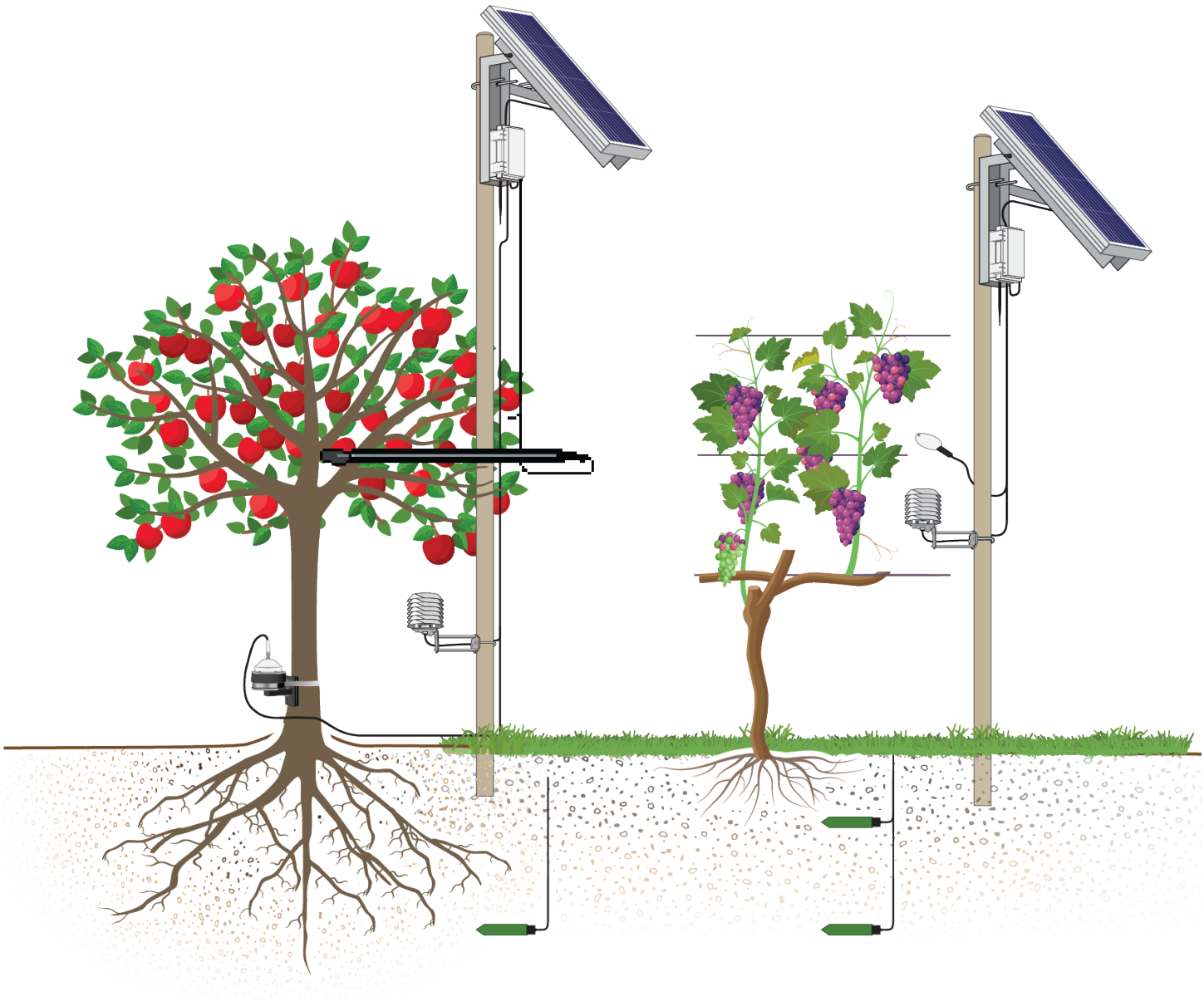
SNiP-MP4-ML-MP2

ICT International Plant Monitoring Station 1 (SNiP-PMS1)

SNiP-PMS1 Ordering Information

	SNiP-PMS1-S	X	-XXX-XXX-XXX-XXX
Base Package	1 x S-NODE 1 x SP10 solar panel & SPLM7 mounting frame		
Communications	LoRaWAN	L	
	NB-IoT LTE-M	C	
Extension Sensors (Select up to 4)	Band Dendrometer (Stems < 60mm)		DBS
	Pivot Dendrometer (Stems 5 -40mm)		DPS
	Soil Moisture & Temperature		SMT
	Air Temp, Relative Humidity, Pressure, VPD		VPD
	Leaf wetness		LWS
	Frost		RFS
	PAR		PAR
	Canopy Surface Temperature		IRT
	Soil Oxygen and Temperature		SO2
	NDVI		NDVI

Example SNiP-PMS1 Systems

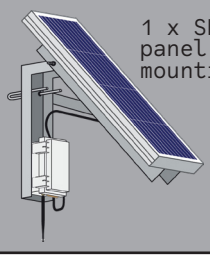


SNiP-PMS-SC-DBS-LBT-VPD-SMT

SNiP-PMS-SL-LWS-VPD-SMT-SMT

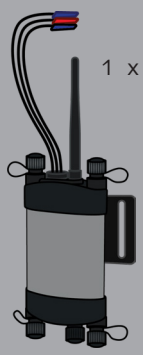
ICT International Plant Monitoring Station 2 (SNiP-PMS2)

SNiP-PMS2 Ordering Information

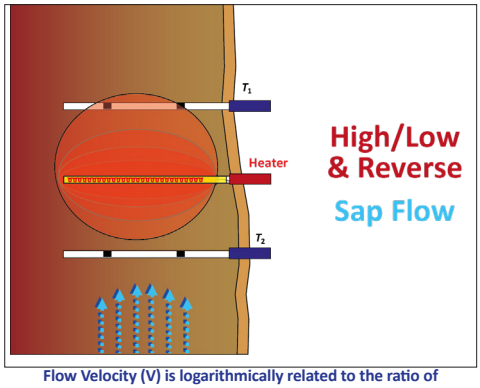
		SNiP-PMS2-M	X	-XXX-XXX	-XXX-XXX
Base Package	 	1 x MFR-NODE 1 x SP10 solar panel & SPLM7 mounting frame			
Communications	LoRaWAN		L		
	NB-IoT LTE-M		C		
Sensor Selection 1		Dendrometer for medium-/large-sized and fast-growing fruit, 10 - 130mm		DF4	
		Dendrometer for small-sized fruit 5 - 30mm		DF5	
		Dendrometer for small- to medium-sized, fast-growing fruit, 5 - 50mm		DF6	
Sensor Selection 2		Band Dendrometer			DBS
		Pivot Dendrometer (5 -40mm)			DPS
		Air Temp, Relative Humidity, Pressure, VPD			VPD
		Soil Moisture & Temperature			SMT

ICT International Sap Flow Meter (SFM1x)

Sap Flow Meter SFM1x Ordering Information

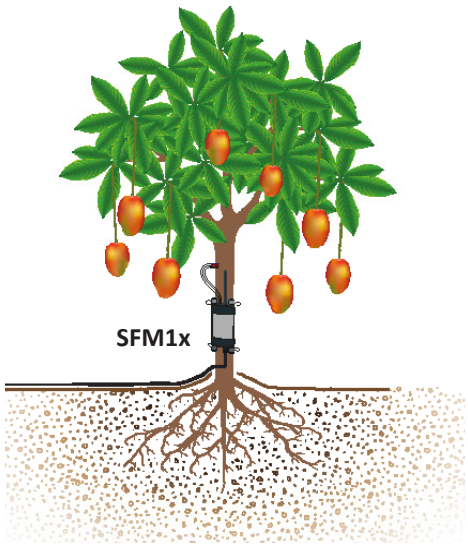
	SFM1x	-X
Base Package	 1 x SfM1x	
Communications	LoRaWAN	L
	NB-IoT LTE-M	C
Accessories	20 Watt solar panel with 4m cable	SP22
	Solar Panel Post Mount suits SP22 Solar Panels. For mounting solar panel upon a standard star picket	SPPM1
	SFM1 Drill bit and sleeve pack, includes: 3 x 1.3mm drill bits, 2 x 1.7mm drill bits and 3 x stainless steel sleeves	SFM1-DSP
	Heat Ratio Method small drill guide with 3 holes spaced 5mm distance	SFM-SDG
	Dremel Drill with 482 1/16" Collet	SFM-DR

Sap Flow Meter Uses Heat Ratio Method



Flow Velocity (V) is logarithmically related to the ratio of temperature increases up and downstream from a heater.

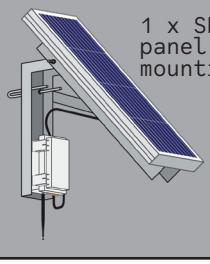
Example Package



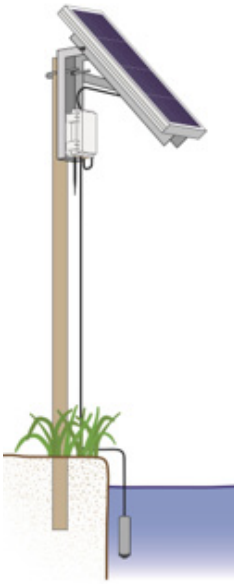
SFM1x-C

ICT International Water Quality Station Ordering Sheet (SNiP-WQS)

SNiP-WQS Ordering Information

	SNiP-WQS-S	-X	-XXX-XXX-XXX-XXX
Base Package	 1 x S-NODE  1 x SP10 solar panel & SPLM7 mounting frame		
Communications	LoRaWAN	L	
	NB-IoT LTE-M	C	
Sensor Selection 1 (Select up to 4)	 Dissolved Oxygen and Water Temperature	DOT	
	Electrical Conductivity, Salinity, TDS-KCI and Water Temperature 	C4E	
	 pH, Redox and Water Temperature	pHR	
	Turbidity and Water Temperature 	NTU	

Example Package



SNiP-WQS-SL-DOT

ICT International supplies IoT solutions to a global customer base, and as such works across multiple LoRaWAN frequency plans and LTE network providers. To streamline your order please provide the following supplementary information regarding your IoT network requirements.

LoRaWAN

Required LoRaWAN Frequency Plan from supported options:

- AU915-928, FSB1 - 8
- AS923 (AS1 / AS2)
- US902-920, FSB1 - 8
- EU863-870
- CN470-510

LoRaWAN payloads are sent as hexadecimal, ICT International (or local representative) supplies a payload decoder with each system variant.

LTE-M1/NB2

Supported Frequency Bands

- LTE-M1: B1/B2/B3/B4/B5/B8/ B12/B13/B18/B19/ B20/B25/B26/B27/ B28/B66/B85
- LTE-NB2: B1/B2/B3/B4/B5/B8/ B12/B13/B18/B19/ B20/B25/B28/B66/ B71/B85

ICT International and local representative offer SIM card plans, please identify your local network provider so that we can assess if support can be provided.

If you are unsure about the best communications technology for your monitoring project, please reach out to ICT International or your local representative for guided support.

Enabling better global research outcomes
in soil, plant & environmental monitoring

DOC-00044-03