TURNING INFORMATION INTO PROFITS

Product Portfolio

Technical Catalogue

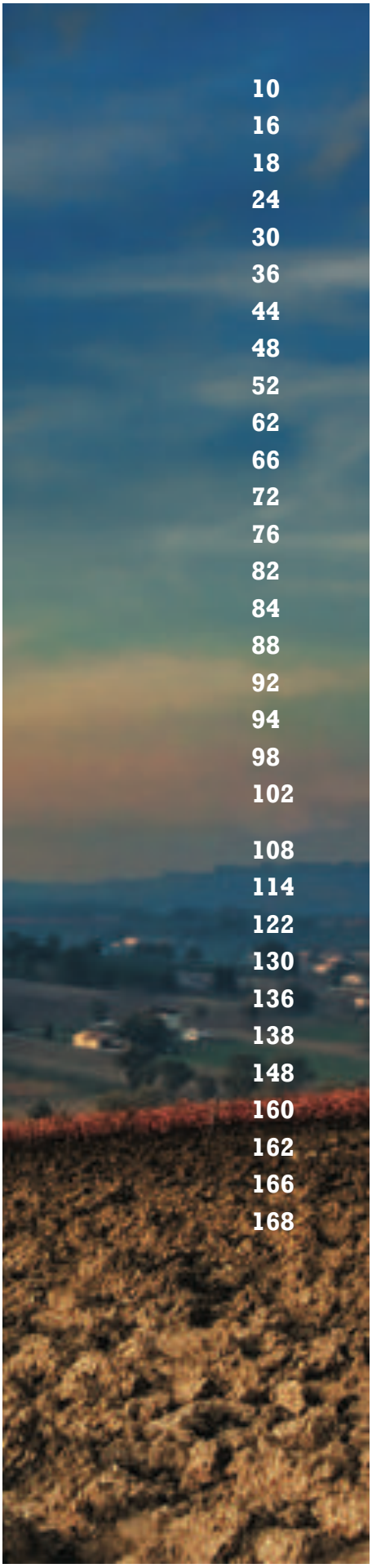
2022 JANUARY EDITION

January 2022

Pessl INSTRUMENTS

METOS® BY PESSL INSTRUMENTS


Stations & Dataloggers
Sensors

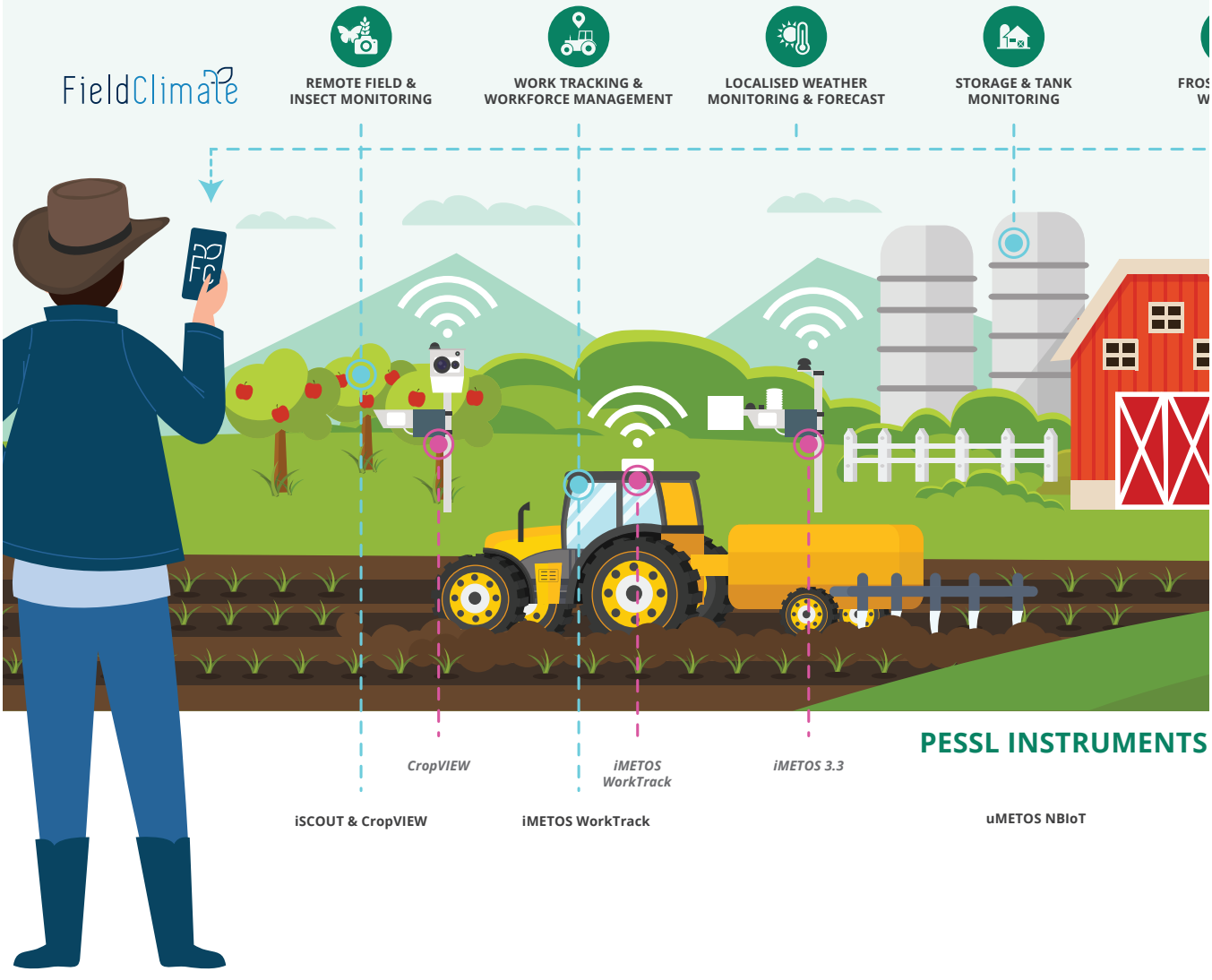


INTRODUCTION

Nested Approach to IoT Agriculture

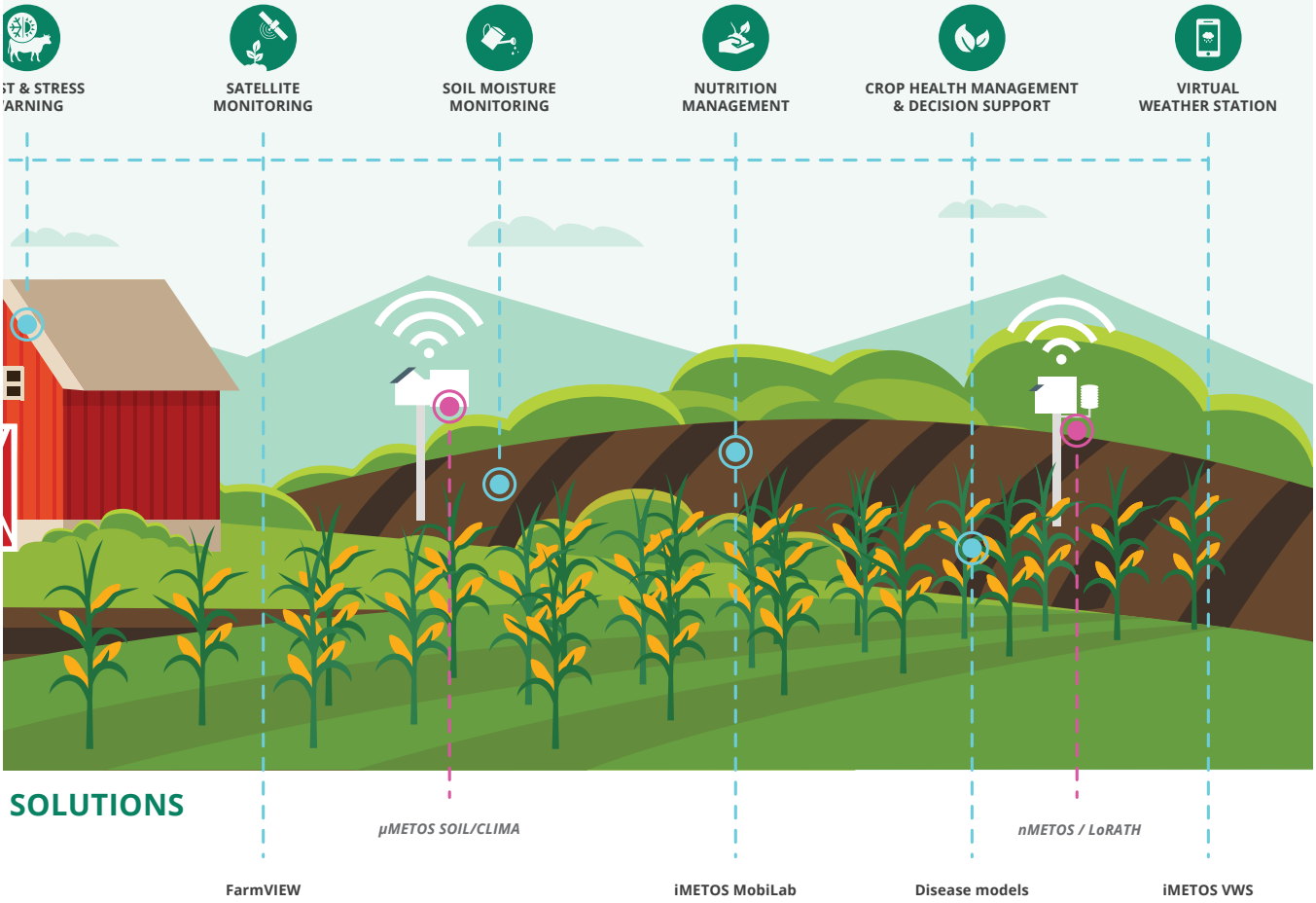
Agriculture has changed dramatically in the last two decades and fast developing technologies will continue to have a tremendous influence on the farming practices in the years to come. IoT in agriculture is gaining importance since it helps monitor multiple on-farm assets all at once. But how does it work?

The Nested or Holistic approach means connecting many different devices/ solutions that are strategically placed in fields. Pessl Instruments connects all the dots, makes it easier to control your farm and fields, so you don't have to worry



about important management decisions being overlooked. This way you avoid unnecessary trips to the field, know exactly what the conditions at any given time are, make timely decision about irrigation, fertilizing, pesticide application, harvesting, and more 24/7 all year round.

For the nested approach to work, you need multiple devices to monitor multiple issues in your field and around your farm; having just one weather station cannot provide enough data to respond to everything your farm needs.



METOS® by Pessl Instruments -

The Revolution of Decision Making for Your Farm

No matter which crop, soil, or part of the world is in question, digital IoT agriculture solutions will reduce guess work and enable data driven decisions for:

- **improved quality of your yield**
- **enhanced productivity of your team and**
- **increased profit of your farm.**

At the same time they will help:

- **optimize input use (water, energy, fertilizers, chemicals, and workforce),**
- **reduce the overall impact on the environment.**

Pessl Instruments has been serving growers, researchers and managers in 85 countries for more than 37 years. Customizable digital IoT agriculture hardware and software solutions cover all needs, pain points and challenges that boots on the ground face in their everyday work and we are proud to make the burden of decision making a bit lighter.

METOS IS APPLICABLE IN MULTIPLE SECTORS

AGRICULTURE | HYDROPONICS AND GREENHOUSES | LANDSCAPE (GOLF AND TURF) | SMART CITY | ANIMAL WELFARE | RESEARCH | HYDROLOGY AND FLOOD WARNING | METEOROLOGY

PESSL INSTRUMENTS IN NUMBERS & FACTS

A global ecosystem with headquarters in Austria

OVER 120 EXPERTS

AI specialists, Satellite experts, Plant Pathologist, Entomologists, Modelers, Hardware and Software developers, Researchers

16 SUBSIDIARIES

Global brand with local support

In-house development and manufacturing

80.000+

Stations deployed worldwide

1 MIO +

Sensors connected

INTERFACE PARTNERS

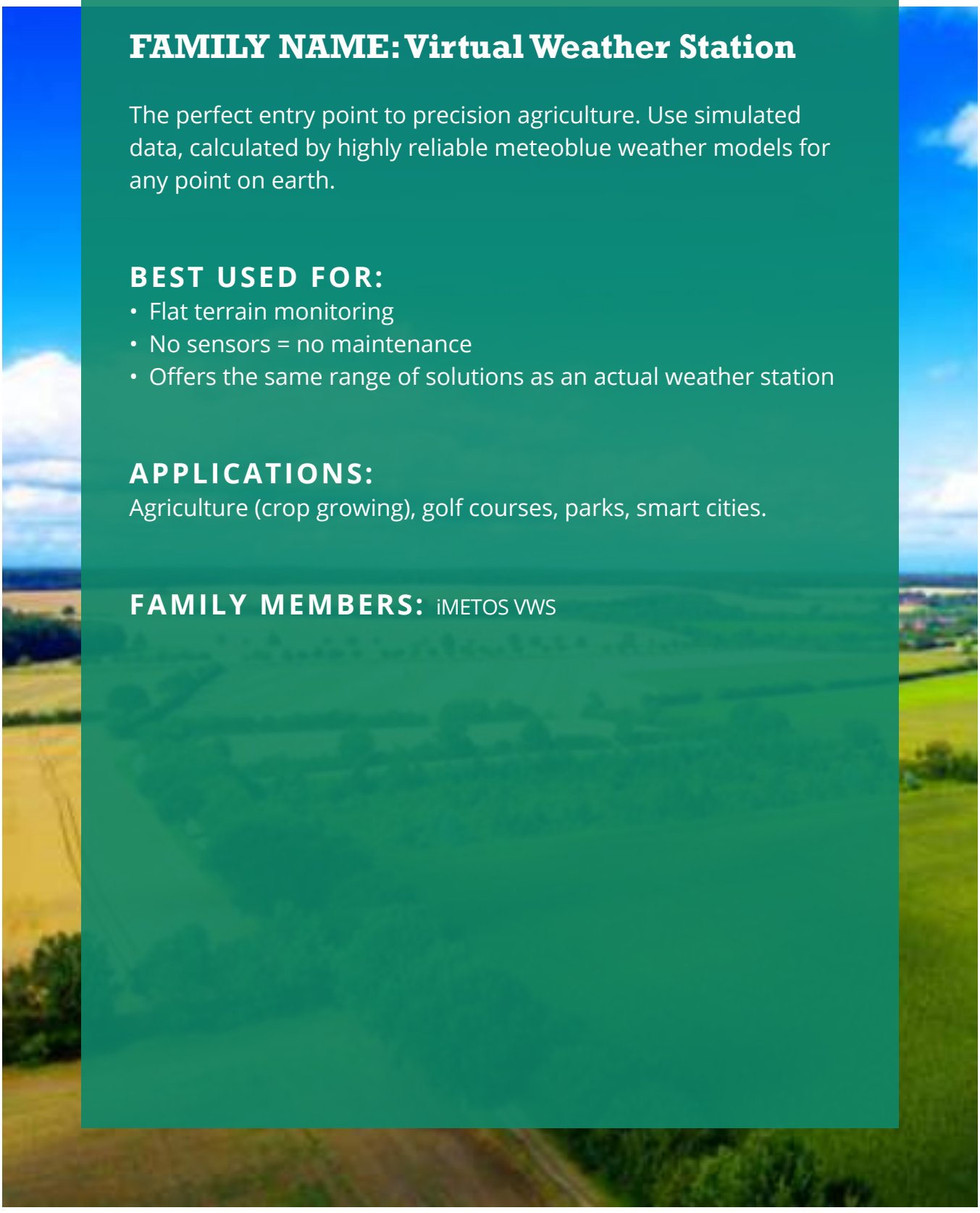
TELECOMMUNICATION PARTNERS

SENSOR PARTNERS

INPUT INDUSTRY PARTNERS

Stations & Dataloggers

iMETOS VWS - Virtual Weather Station
MiniMETOS SOIL
nMETOS
µMETOS NB-IoT
µMETOS SOIL LoRa
µMETOS CLIMA LoRa
LoRATH
LoRAIN
iMETOS 3.3
iMETOS ICA10 NB-IoT
iSCOUT®
CropVIEW®
iMETOS WorkTrack
iMETOS Beacon
iMETOS MobiLab
Dualex
iMETOS SoilGuard
SolAntenna
METOS® AOS



FAMILY NAME: Virtual Weather Station

The perfect entry point to precision agriculture. Use simulated data, calculated by highly reliable meteoblue weather models for any point on earth.

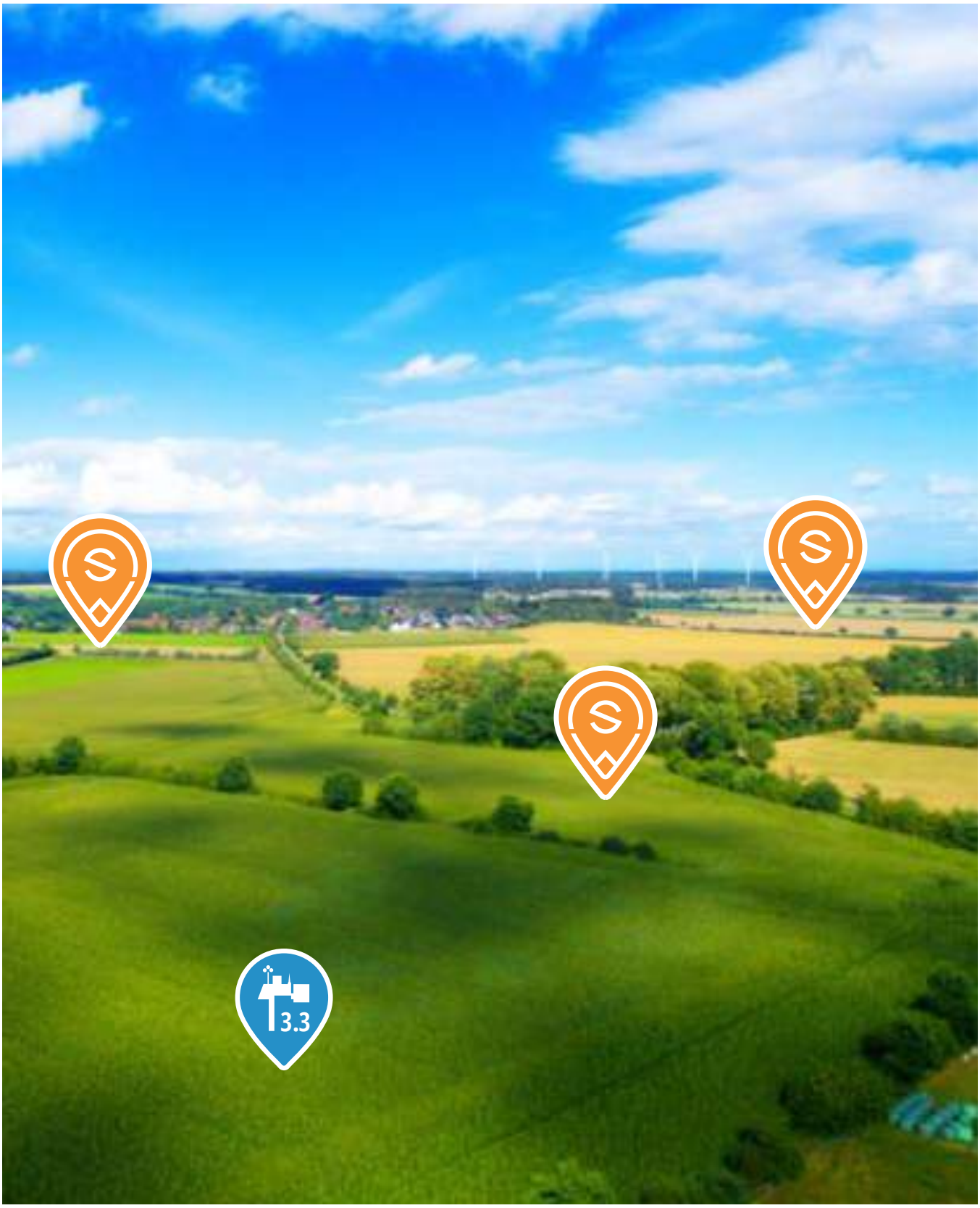
BEST USED FOR:

- Flat terrain monitoring
- No sensors = no maintenance
- Offers the same range of solutions as an actual weather station

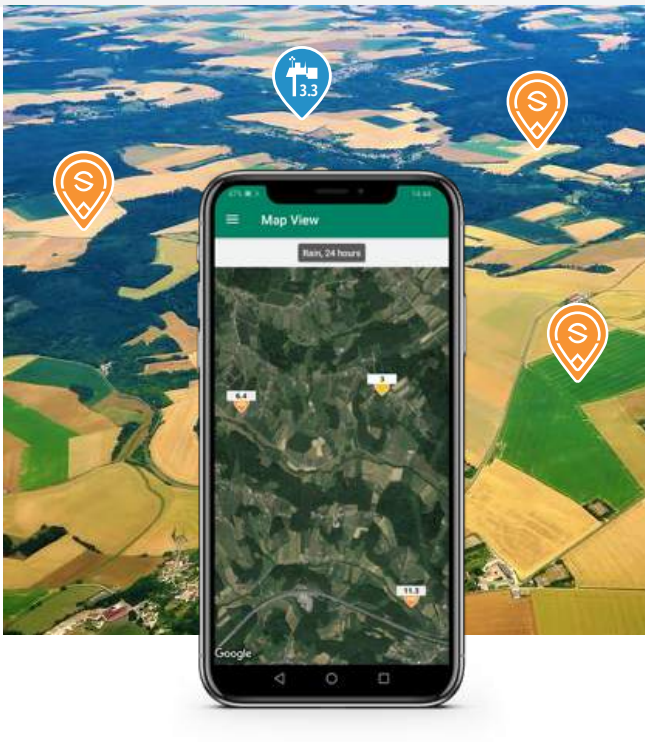
APPLICATIONS:

Agriculture (crop growing), golf courses, parks, smart cities.

FAMILY MEMBERS: iMETOS VWS


3.3

iMETOS VWS - Virtual Weather Station



Virtual Stations exist for any point on the earth, for which meteoblue can derive weather data. The data is not the result from an actual METOS® station measurement, but consists of simulated data, calculated by highly reliable meteoblue weather models.

In some terrains, such as flatlands, the calculated data is highly accurate with minimal discrepancies to actual values, such as temperature or precipitation. These are the regions where virtual stations prove to be a great asset.

In cases where terrain is more complex or the discrepancies to actual values are not acceptable because the risk is too high, an METOS® station needs to be installed.

iMETOS VWS vs iMETOS IoT STATION

	Virtual station	iMETOS IoT Stations
Variables	Same parameters as iMETOS IMT300 + soil temperature	Based on sensor set
Precision	Limited	High
Availability	Anywhere in the world	Only where the station is installed
Terrain	Not complex terrain	Any terrain
Maintenance	No maintenance	Regular hardware maintenance necessary
Suitability for high value decisions (frost, water management etc.)	Limited	High

Order number: 800005

DATA QUALITY

Air temperature	👍
Relative humidity	👍
Solar radiation	👍
Wind speed	👍
Precipitation	👎
Leaf wetness	👎
Soil temperature	👎

With actual case studies, iMETOS VWS is under continuous improvements.

VIEW RESULTS ON OUR WEBSITE:

MAIN FEATURES

Calculated sensor variables equal to iMETOS IMT300 sensor set: wind speed, solar radiation, soil temperature, air temperature, precipitation, relative humidity and leaf wetness, along with calculated values of ET0, vapor-pressure deficit (VPD) and Delta T. All data and decision support services are accessible online through FieldClimate platform.

THE ADVANTAGES

A perfect entry into precision agriculture with no maintenance cost

Offers the same range of solutions as an actual weather station

Very cost effective, simple to use and activated with just a few clicks on the computer or phone

Works as a complete decision support service - provides weather forecast, offers disease models and helps with work planning

FAMILY NAME: Entry Level IOTs

Compact, cost effective, small, quick to install, and designed for large-scale deployment everywhere intelligent IOTs are needed.

BEST USED FOR:

- Field operations planning (workforce allocation, spray and irrigation planning)
- Improving plant protection with disease models
- Reducing the risk for animal health problems

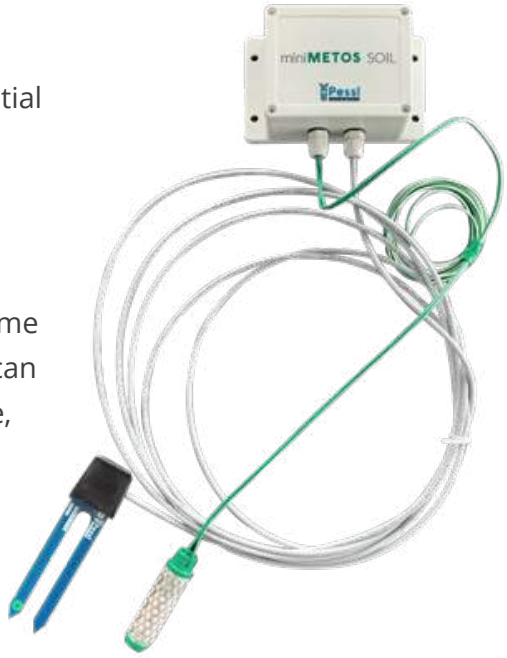
APPLICATIONS:

Agriculture (crop growing, animal production), golf courses, parks, smart cities, indoor monitoring, Country-wide Rainfall Networks.

FAMILY MEMBERS: MiniMETOS, nMETOS variations


LORAIN

MiniMETOS SOIL



MiniMETOS SOIL is a combination of most essential sensors for irrigation and stress management. It permanently measures soil temperature & volumetric water content (VWC) with Pessl Instruments Soil Moisture Sensor PI54-D and Watermark (soil moisture suction) in near real-time wherever you want. The installation of a logger can be completely underground (invisible); therefore, it is a perfect installation for golf courses, parks, home & garden, as well as in agriculture where vandalism and theft could be a problem. The device is battery powered with a lifespan between 6 to 12 months, and provides actionable data, such as the exact amount of soil moisture and the soil temperature in each inch/cm of the measurement area, to help you plan the irrigation event and to warn you about possible stress points in a timely fashion.

TECHNICAL SPECIFICATIONS

Housing	UV resistant polycarbonate plastic (Protection class IP67)
Dimensions	14.8 cm L x 11.8 cm W x 9.3 cm H
Weight	0.25 kg
Connectivity	**NB-IoT/CatM1:** Category: Cat-M1/NB1 Frequency Band: B1, B2, B3, B4, B5, B8, B9, B10, B12, B13, B14, B17, B18, B19, B20, B25, B26, B27, B28, B66
Power supply	3.6V primary battery cell
Measuring interval	15 minutes
Logging interval	15 minutes
Communication interval	60 minutes
SENSORS	
PI54-D	see page 116
Watermark	see page 122

Order number: 7000047 (HL7800), 7000048 (HL7802)

With MiniMETOS SOIL all the potential issues and stress events can be identified before they occur or become visible.

KEY FEATURES:

- Permanent measurement of the soil moisture and soil temperature at any of your locations
- Invisible, so it doesn't affect the workers and the aesthetic of location (golf course, park etc.)
- No solar panel needed as long life battery powered based on the latest power harvesting technology
- 6 to 12 months of battery life and quick installation
- Cost-effective and durable
- Prevents possible vandalism

INSTALLATION ON GOLF COURSE

Laying the cable - inserting the sensors in the main turf root zone.

Preparation of the irrigation box for the data logger.

Re-installing the lawn tiles to cover the sensors. 14 days later - "invisible".

nMETOS
100, 180, 180SM, 200

nMETOS is the latest generations of weather stations that operates on NB-IoT network and can be connected to any existing NB-IOT/CAT-M/GPRS network. nMETOS can measure rainfall, air and soil temperature, relative humidity, leaf wetness, and soil moisture. All the data is synchronized within FieldClimate.

TECHNICAL SPECIFICATIONS

Housing	UV resistant polycarbonate plastic (Protection class IP65)	
Dimensions	22.5 cm L x 17 cm W x 18 cm H	
Weight	1,10 kg	
	NB-IOT/CAT-M/GPRS:	
Connectivity	Category: Cat-M1/NB1 Frequency Band: B1, B2, B3, B4, B5, B8, B9, B10, B12, B13, B14, B17, B18, B19, B20, B25, B26, B27, B28, B66	NB-IoT is a default connectivity with nMETOS.
Power supply	3.6V primary battery cell	
Measuring interval	15 minutes	
Logging interval	15 minutes	
Communication interval	60 minutes	
SENSORS		
Rain Gauge	**Sensitivity:** 1 tip per 0.2 mm	
Air Temperature	**Operating temperature range:** -40 °C to +125 °C **Thermometer error -10 °C to +85 °C:** +/- 0.3 °C	
Relative humidity	**Precision 0 - 80 %:** +/- 2 %; **Precision 80 - 100 %:** +/- 3 %	

nMETOS
100, 180, 180SM, 200

Order number:
700220 (HL7800)
700221 (HL7802)

nMETOS 100

Rain gauge.

Order number:
700222 (HL7800)
700223 (HL7802)

nMETOS 180

Rain gauge, air temperature, air humidity and calculated sensors: leaf wetness, dew point, VPD and Delta T.

Order number:
700224 (HL7800)
700225 (HL7802)

nMETOS 180SM

Rain gauge, air temperature, air humidity, soil moisture and calculated sensors: leaf wetness, dew point, VPD and Delta T.

Order number:
700228 (HL7800)
700229 (HL7802)

nMETOS 200

Rain gauge, air temperature, air humidity, leaf wetness sensor and calculated sensors: dew point, VPD and Delta T.

By using proprietary intelligent sensor handling, nMETOS provides additional calculated sensor of:

- Leaf wetness for disease forecast,
- VPD and Delta T for defining best weather for spraying (plant protection window),
- Dew point for frost prediction.

nMETOS
80, 80SM, 90D

nMETOS is a new generation of a battery powered IoT data logger that operates on NB-IOT/CAT-M/GPRS networks. It can be connected to any existing NB-IoT network. nMETOS measures air temperature, relative humidity, leaf wetness and soil moisture. All the data is synchronized within FieldClimate. The unit is prepared to be mounted inside (tunnels, greenhouses, indoor applications) or outside in open fields (IP65).

TECHNICAL SPECIFICATIONS

Housing	UV resistant polycarbonate plastic (Protection class IP65)
Dimensions	14.8 cm L x 11.8 cm W x 9.3 cm H
Weight	0.25 kg
	NB-IOT/CAT-M/GPRS:
Connectivity	Category: Cat-M1/NB1 Frequency Band: B1, B2, B3, B4, B5, B8, B9, B10, B12, B13, B14, B17, B18, B19, B20, B25, B26, B27, B28, B66
Power supply	3.6V primary battery cell
Measuring interval	15 minutes
Logging interval	15 minutes
Communication interval	60 minutes
SENSORS	
Air Temperature	**Operating temperature range:** -40 °C to +125 °C **Thermometer error -10 °C to +85 °C:** +/- 0.3 °C
Relative humidity	**Precision 0 - 80 %:** +/- 2 %; **Precision 80 - 100 %:** +/- 3 %

nMETOS
80, 80SM, 90D

Order number:
700216 (HL7800)
700217 (HL7802)

Order number:
700218 (HL7800)
700219 (HL7802)

nMETOS 80

Air temperature, air humidity and calculated sensors: dew point, VPD and Delta T.

nMETOS 80SM

Air temperature, air humidity, soil moisture and calculated sensors: dew point, VPD and Delta T.

nMETOS 90D

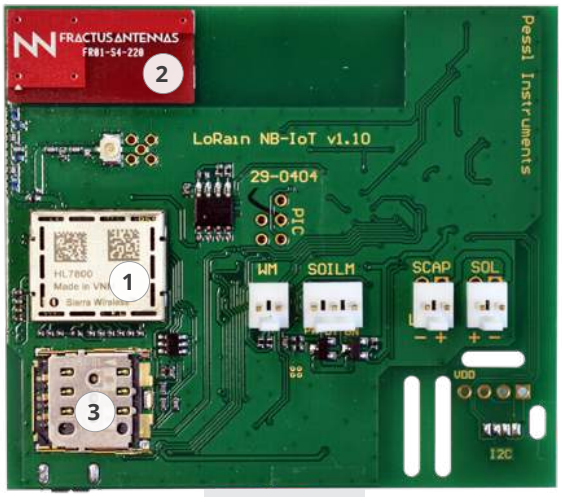
Air Temperature, air humidity, leaf wetness sensor, and calculated sensors: dew point, VPD and DELTA T.

By using proprietary intelligent sensor handling, nMETOS provides additional calculated sensors of:

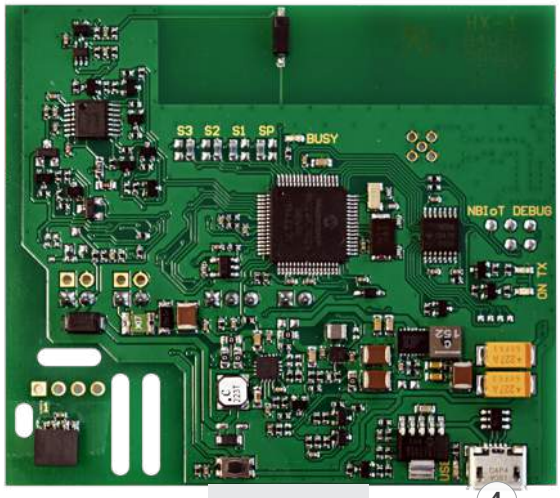
- VPD and Delta T for defining best weather for spraying (plant protection window),
- Dew point for frost prediction.

nMETOS Motherboards

nMETOS NB-IoT gen 3 (29-0404)

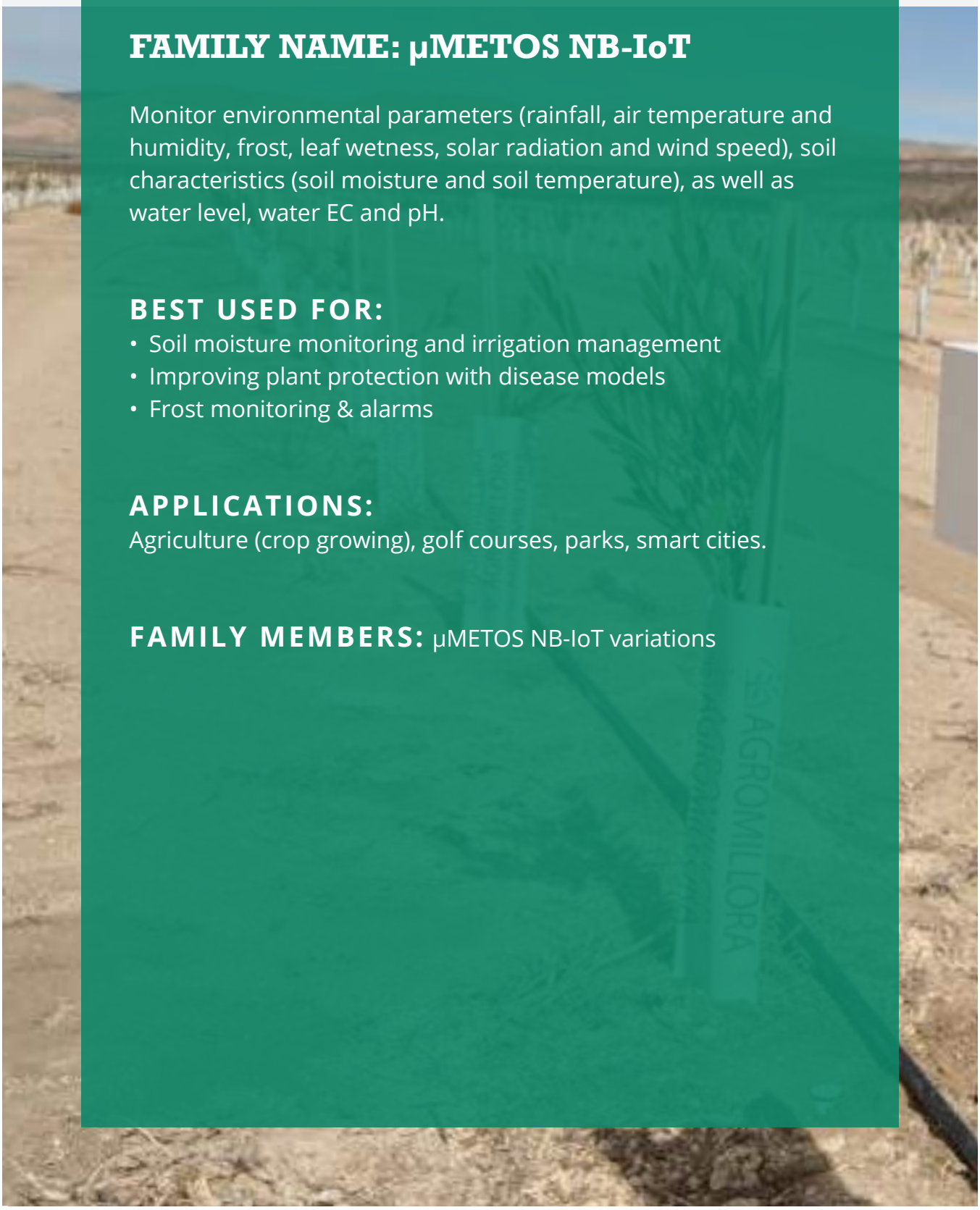


front



back

1 NB-IoT module **2** Antenna **3** SIM card holder **4** USB micro B



FAMILY NAME: µMETOS NB-IoT

Monitor environmental parameters (rainfall, air temperature and humidity, frost, leaf wetness, solar radiation and wind speed), soil characteristics (soil moisture and soil temperature), as well as water level, water EC and pH.

BEST USED FOR:

- Soil moisture monitoring and irrigation management
- Improving plant protection with disease models
- Frost monitoring & alarms

APPLICATIONS:

Agriculture (crop growing), golf courses, parks, smart cities.

FAMILY MEMBERS: µMETOS NB-IoT variations

µMETOS NB-IoT

µMETOS NB-IoT is a LPWAN weather station that supports LTE-M (LTE Cat M1) and NB-IoT (LTE Cat NB1) mobile network connectivity, designed to monitor climate parameters (rain and temperature), soil characteristics (soil moisture, soil temperature and electrical conductivity), water pressure, multisensor sdi12 probes etc. Providing everything what the standard user needs with possibility for further expansion. Low cost, low power consumption, long range connectivity.

Data is consistently measured in 15-minute intervals and sent every 60 minutes to the server - and this can be changed to fit the specific monitoring needs. For mitigating mobile network connectivity issues, the station stores data of last few days internally and resends the measured values to the cloud when the mobile network is back online. All the data is synchronized and stored on FieldClimate platform, integrated with all additional services from PI and available for further integrations via PI API.
It supports an external antenna option and it has a build in GPS sensor.

TECHNICAL SPECIFICATIONS

Housing	UV resistant polycarbonate plastic (Protection class IP65)
Dimensions	30 cm L x 16 cm W x 19 cm H
Weight	1.6 kg
Connectivity	**NB-IoT/CatM1:** Category: Cat-M1/NB1 Frequency Band: B1, B2, B3, B4, B5, B8, B9, B10, B12, B13, B14, B17, B18, B19, B20, B25, B26, B27, B28, B66
Battery	6V charging battery with solar panel
Solar panel	Dimensions: 13.5 x 13.5 cm, 2 Watt solar panel
Measuring interval	15 minutes
Logging interval	15 minutes
Communication interval	60 minutes

Product Variations

µMETOS BASE

A basic µMETOS NB-IoT station with no physical sensors.

Order number: 700035

µMETOS FROST

Wet & Dry bulb temperature.

Order number: 700036

µMETOS DISEASE

Rain gauge, air temperature, air humidity and leaf wetness.

Order number: 700037

µMETOS ET_0

Rain gauge, air temperature, air humidity, global radiation, wind speed.

Order number: 700039

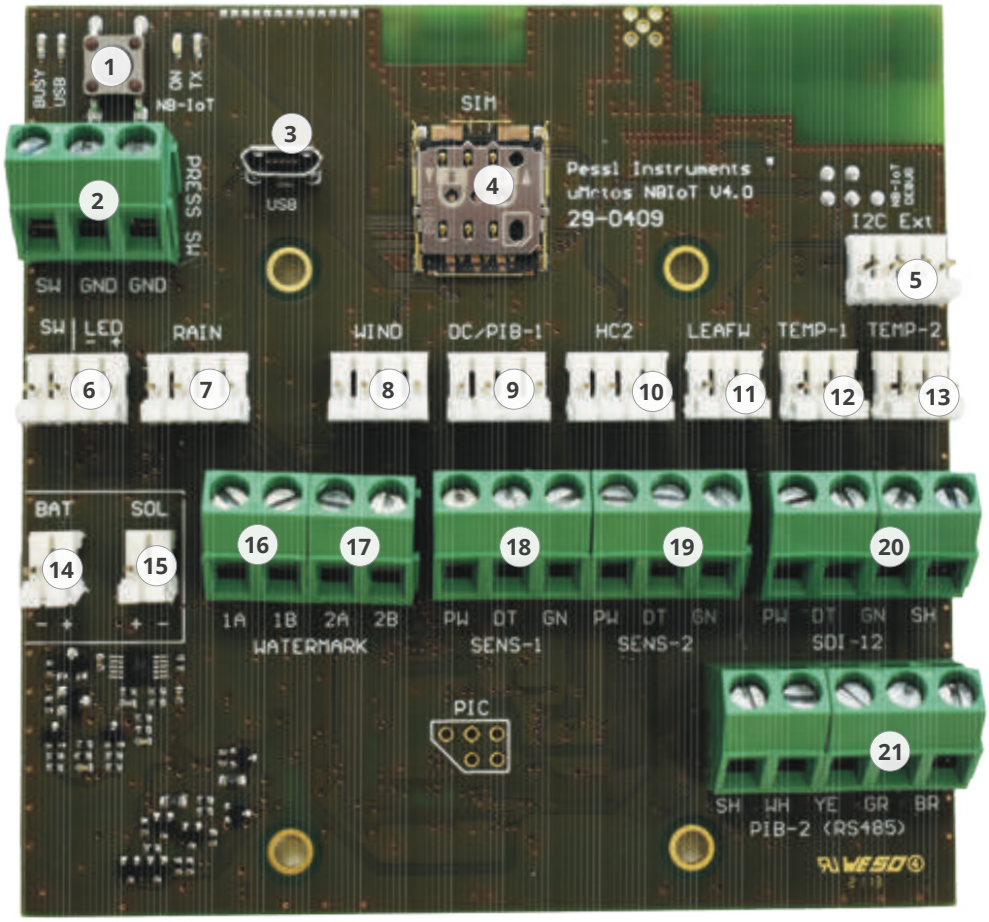
µMETOS ET_0 DISEASE

Rain gauge, air temperature and humidity, leaf wetness, global radiation, wind speed and direction ultrasonic.

Order number: 700041

*Optional: you can add soil temperature sensors (Aquacheck, Sentek, Watermark, PI54-D). Note that there are limitations how many sensors can be connected. For more details contact your local METOS® branch or your dealer.

µMETOS NB-IoT Motherboard



Gen. 4

1. Internal connectivity test button
2. Pressure switch input
3. USB port
4. SIM card slot
5. I2C input
6. External button with status LED
7. Rain gauge or Water meter input
8. Anemometer or Counter input
9. DC (Duty cycle) for Pyranometer or PI-Bus input
10. HC2 sensor input
11. Leaf Wetness input
12. Temp-1 (DS18B20) - dedicated soil temperature input
13. Temp-2 (DS18B20) - dedicated air temperature input
14. 6V Battery connector
15. Solar panel connector
16. Watermark input
17. Watermark input
18. PI-Bus input
19. PI-Bus input
20. SDI12 input
21. General PI-Bus input


µMETOS NB-IoT

FAMILY NAME: µMETOS SOIL LoRa

Monitor basic climate parameters (rain and temperature), soil characteristics (soil moisture, soil temperature and electrical conductivity), as well as water pressure.

BEST USED FOR:

- Soil moisture monitoring and irrigation management
- Improving plant protection with disease models
- Water level monitoring

APPLICATIONS:

Agriculture (crop growing), golf courses, parks, smart cities.

FAMILY MEMBERS: µMETOS SOIL LoRa variations

µMETOS SOIL LoRa

µMETOS SOIL LoRa is a LPWAN weather station that operates on LoRaWAN® network. It is designed to monitor basic climate parameters (rain and temperature), soil characteristics (soil moisture, soil temperature and electrical conductivity), as well as water pressure. Data is consistently measured in 5-minute intervals and sent every 15 minutes to the server. All the data is synchronized within FieldClimate.

MEMBER OF LoRa® Alliance

TECHNICAL SPECIFICATIONS

Housing	UV resistant polycarbonate plastic (Protection class IP65)
Dimensions	30 cm L x 16 cm W x 19 cm H
Weight	1.6 kg
Connectivity	**LoRaWAN™:** EU863-870, RU864-870, US902-928, AU915-928 and AS920-925
Battery	6V charging battery with solar panel
Solar panel	Dimensions: 13.5 x 13.5 cm, 2 Watt solar panel
Measuring interval	5 minutes
Logging and transmission interval	15 minutes

Product Variations

µMETOS SOIL BASE LoRa

A basic µMETOS SOIL LoRa station with no physical sensors.

Order number:
700106 (EU 863-870)
700107 (US 902-928)
700108 (AU 915-928)
700109 (RU 864-870)
700110 (AS 920-925)

µMETOS SOIL RAIN LoRa

Rain gauge and soil temperature.

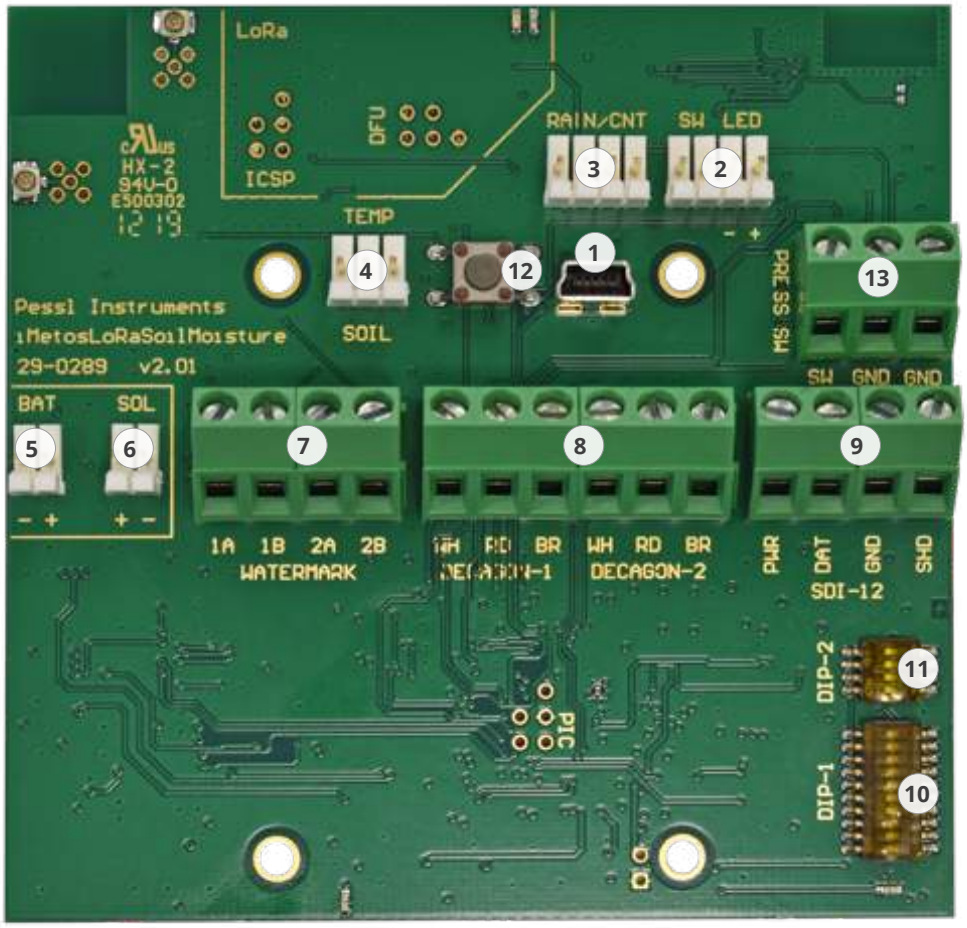
Order number:
700111 (EU 863-870)
700112 (US 902-928)
700113 (AU 915-928)
700114 (RU 864-870)
700115 (AS 920-925)

OPTIONAL SENSORS*

Pessl Instruments PI 54-A and PI 54-D Sensor
Watermark Sensor
Sentek D&D Profile Sensor Probe (10 / 30 / 60 / 90 / 120 cm)
Sentek D&D Triscan Profile Sensor Probe (10 / 30 / 60 / 90 / 120 cm)
Aquacheck Sub-Surface Probe (60 / 80 / 120 cm)
Pessl Instruments EC Sensor Module
Pessl Instruments pH Sensor Module
Pressure Switch 1 Bar
Flow Meter Internal Interface Directly Connectable to Rain Sensor Input
Water level

* The number of connected sensors to a single station is limited. For specific sensor set consult with your dealer.

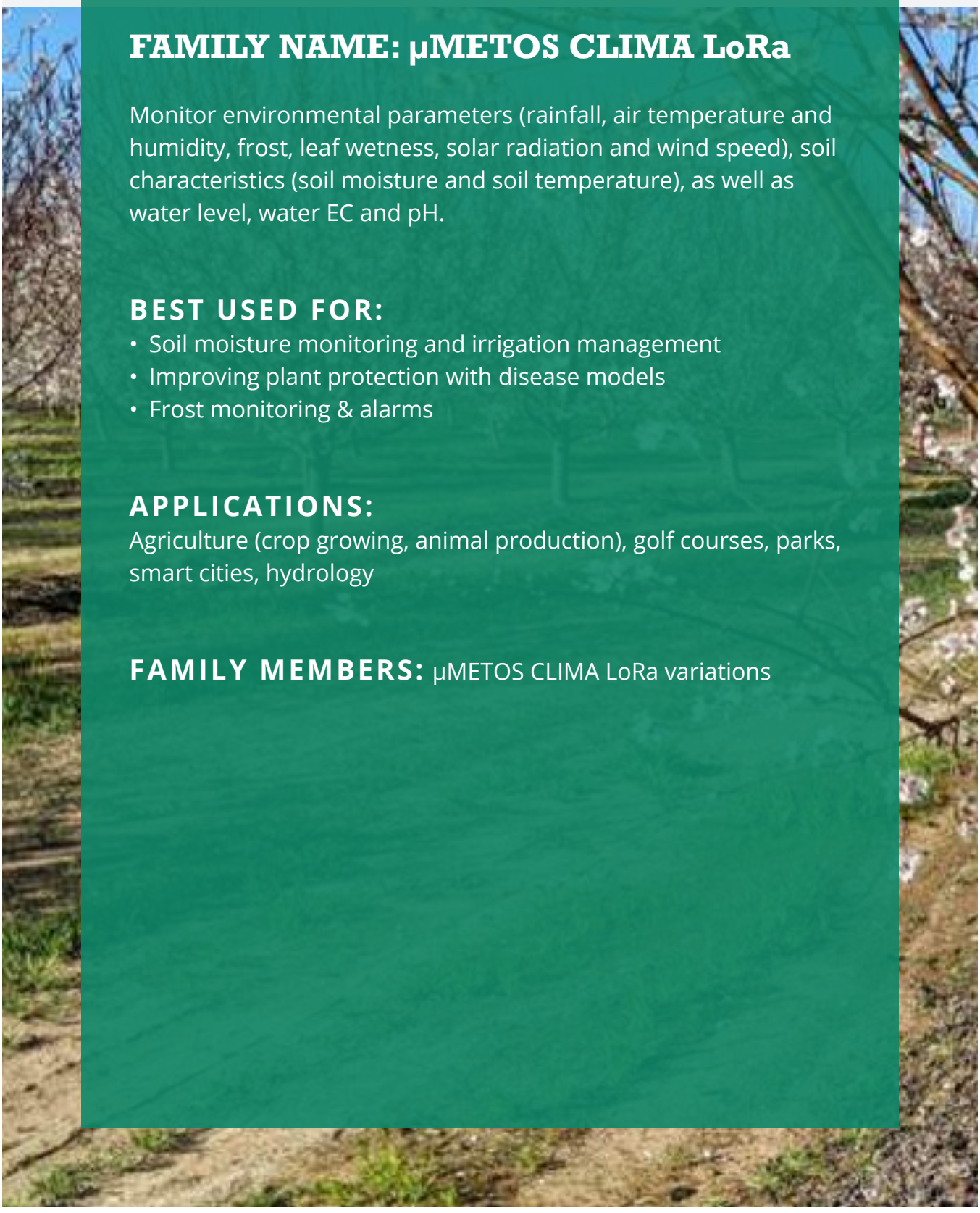
µMETOS SOIL LoRa Motherboard



Gen. 2 (29-0289)

1. USB mini A
2. External communication button with blue LED
3. Rain gauge
4. Soil temperature
5. Battery
6. Solar panel
7. Connector for 2 Watermark sensors
8. Connector for 2 PI54-D sensors
9. SDI12 input
10. DIP-1
11. DIP-2
12. Connect button
13. Pressure switch input

µMETOS SOIL LoRa



FAMILY NAME: µMETOS CLIMA LoRa

Monitor environmental parameters (rainfall, air temperature and humidity, frost, leaf wetness, solar radiation and wind speed), soil characteristics (soil moisture and soil temperature), as well as water level, water EC and pH.

BEST USED FOR:

- Soil moisture monitoring and irrigation management
- Improving plant protection with disease models
- Frost monitoring & alarms

APPLICATIONS:

Agriculture (crop growing, animal production), golf courses, parks, smart cities, hydrology

FAMILY MEMBERS: µMETOS CLIMA LoRa variations

µMETOS CLIMA LoRa

µMETOS CLIMA is a LPWAN weather station that operates on LoRaWAN® network.
It is designed to monitor basic climate parameters (rain and temperature, humidity, frost, leaf wetness, solar radiation, wind speed), soil characteristics (soil moisture and soil temperature), as well as water level, water EC and pH. Data is permanently measured in 5-minute intervals and sent every 15 minutes to the server. All the data is synchronized with FieldClimate.

MEMBER OF LoRa Alliance

TECHNICAL SPECIFICATIONS

Housing	UV resistant polycarbonate plastic (Protection class IP65)
Dimensions	30 cm L x 16 cm W x 19 cm H
Weight	1.6 kg
Connectivity	**LoRaWAN™:** EU863-870, RU864-870, US902-928, AU915-928 and AS920-925
Battery	6V charging battery with solar panel
Solar panel	Dimensions: 13.5 x 13.5 cm, 2 Watt solar panel
Measuring interval	5 minutes
Logging and transmission interval	15 minutes

Product Variations

µMETOS CLIMA BASE

A basic µMETOS CLIMA LoRa station with no physical sensors.

Order number:
700051 (EU 863-870)
700052 (US 902-928)
700053 (AU 915-928)
700054 (RU 864-870)
700055 (AS 920-925)

µMETOS CLIMA FROST

Wet & Dry bulb temperature.

Order number:
700056 (EU 863-870)
700057 (US 902-928)
700058 (AU 915-928)
700059 (RU 864-870)
700060 (AS 920-925)

µMETOS CLIMA DISEASE

Rain gauge, air temperature, air humidity and leaf wetness.

Order number:
700061 (EU 863-870)
700062 (US 902-928)
700063 (AU 915-928)
700064 (RU 864-870)
700065 (AS 920-925)

µMETOS CLIMA ET_0

Rain gauge, air temperature, air humidity, global radiation, wind speed.

Order number:
700071 (EU 863-870)
700072 (US 902-928)
700073 (AU 915-928)
700074 (RU 864-870)
700075 (AS 920-925)

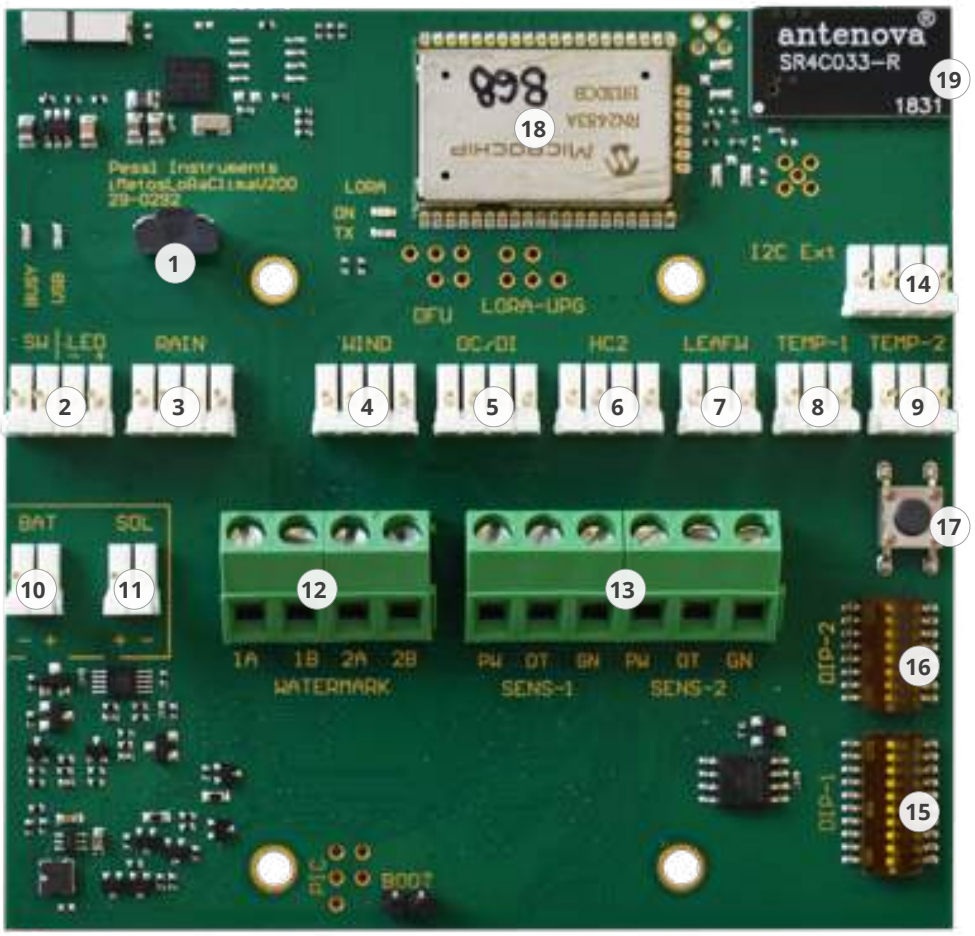
µMETOS CLIMA ET_0 DISEASE

Rain gauge, air temperature and humidity, leaf wetness, global radiation, ultrasonic wind speed and wind direction.

Order number:

700081 (EU 863-870)
700082 (US 902-928)
700083 (AU 915-928)
700084 (RU 864-870)
700085 (AS 920-925)

µMETOS CLIMA LoRa Motherboard



Gen. 1

1. USB micro B
2. External communication button with blue LED
3. Rain gauge
4. Wind speed
5. Duty cycle sensor or digital input
6. Temperature & relative humidity (Hygroclip)
7. Leaf wetness or pressure switch
8. Extra temperature input
9. Extra temperature input
10. Battery
11. Solar panel
12. Connector for 2 Watermark sensors
13. Connector for 2 PI54-D sensors
14. I2C External connector
15. DIP-1
16. DIP-2
17. Connect button
18. LoRaWAN™ module
19. On-board LoRaWAN™ antenna

µMETOS CLIMA LoRa

FAMILY NAME: Weather stations that operate on LoRa™ network

Compact, cost effective, small, quick to install, and designed for large-scale deployment everywhere intelligent IOTs are needed.

BEST USED FOR:

- Field operations planning (workforce allocation, spray and irrigation planning)
- Improving plant protection with disease models
- Reducing the risk for animal health problems

APPLICATIONS:

Agriculture (crop growing, animal production), golf courses, parks, smart cities, indoor monitoring, Country-wide Rainfall Networks.

FAMILY MEMBERS: LoRATH & LoRAIN

LoRATH

LoRATH is a new generation of a battery powered IoT data logger that operates on LoRAWAN network. It can be connected to any existing LoRAWAN® network. LoRATH measures air temperature, relative humidity, leaf wetness and soil moisture. All the data is synchronized within FieldClimate. The unit is prepared to be mounted inside (tunnels, greenhouses, indoor applications) or outside in open fields (IP65).

TECHNICAL SPECIFICATIONS

Housing	UV resistant polycarbonate plastic (Protection class IP65)
Dimensions	14.8 cm L x 11.8 cm W x 9.3 cm H
Weight	0.25 kg
	LoRaWAN™
Connectivity	EU863-870, RU864-870, US902-928, AU915-928 and AS920-925
Power supply	Super capacitor charged with the solar pane
Measuring interval	5 minutes
Logging interval	15 minutes
Communication interval	15 minutes
SENSORS	
Air Temperature	**Operating temperature range:** -40 °C to +125 °C **Thermometer error -10 °C to +85 °C:** +/- 0.3 °C
Relative humidity	**Precision 0 - 80 %:** +/- 2 %; **Precision 80 - 100 %:** +/- 3 %

LoRATH - LoRa connectivity

Order number:
700021 (EU 863-870)
700022 (US 902-928)
700023 (AU 915-928)
700024 (RU 864-870)
700025 (AS 920-925))

LoRATH

Air temperature, air humidity and calculated sensors: dew point, VPD and Delta T.

Order number:
700026 (EU 863-870)
700027 (US 902-928)
700028 (AU 915-928)
700029 (RU 864-870)
700030 (AS 920-925)

LoRATH SOIL

Air temperature, air humidity, soil moisture and calculated sensors: dew point, VPD and Delta T.

LoRATH

By using the proprietary intelligent sensor handling, LoRATH provides additional calculated sensor values of:

- VPD and Delta T for defining best weather for spraying (plant protection window),
- Dew point for frost prediction.

LoRATH

LoRAIN

LoRAIN is a new generations of weather stations that operate on LoRaWAN® network. LoRAIN devices measures rainfall, air and soil temperature, relative humidity, leaf wetness, and soil moisture. All the data is synchronized within FieldClimate.

TECHNICAL SPECIFICATIONS

Housing	UV resistant polycarbonate plastic (Protection class IP65)	
Dimensions	22.5 cm L x 17 cm W x 18 cm H	
Weight	1,10 kg	
	LoRaWAN™	
Connectivity	EU863-870, RU864-870, US902-928, AU915-928 and AS920-925	LoRAIN works on LoRAWAN® network. Keep in mind that the NB-IoT and LoRAWAN options are not interchangeable.
Power supply	Super capacitor charged with the solar panel	
Measuring interval	5 minutes	
Logging interval	15 minutes	
Communication interval	15 minutes	
SENSORS		
Rain Gauge	**Sensitivity:** 1 tip per 0.2 mm	
Air Temperature	**Operating temperature range:** -40 °C to +125 °C **Thermometer error -10 °C to +85 °C:** +/- 0.3 °C	
Relative humidity	**Precision 0 - 80 %:** +/- 2 %; **Precision 80 - 100 %:** +/- 3 %	

LoRAIN

Order number:
700000 (EU 863-870)
700001 (US 902-928)
700002 (AU 915-928)
700003 (RU 864-870)
700004 (AS 920-925)

LoRAIN Rain only

Rain gauge.

Order number:
700005 (EU 863-870)
700006 (US 902-928)
700007 (AU 915-928)
700008 (RU 864-870)
700009 (AS 920-925)

LoRAIN TRH

Rain gauge, air temperature, air humidity and calculated sensors: leaf wetness, dew point, VPD and Delta T.

Order number:
700010 (EU 863-870)
700011 (US 902-928)
700012 (AU 915-928)
700013 (RU 864-870)
700014 (AS 920-925)

LoRAIN SOIL

Rain gauge, air temperature, air humidity, soil moisture and calculated sensors: leaf wetness, dew point, VPD and Delta T.

Order number:
700235 (EU 863-870)
700236 (US 902-928)
700237 (AU 915-928)
700238 (RU 864-870)
700239 (AS 920-925)

LoRAIN DISEASE

Rain gauge, air temperature, air humidity, leaf wetness sensor and calculated sensors: leaf wetness, dew point, VPD and Delta T.

By using the proprietary intelligent sensor handling, LoRAIN provides additional calculated sensor values of:

- Leaf wetness for disease forecast,
- VPD and Delta T for defining best weather for spraying (plant protection window),
- Dew point for frost prediction.

LoRATH & LoRAIN Use

THIS IS WHAT YOU CAN DO:

- Plan the work week based on a localized weather forecast for your operations
- Plan your work day based on the actual rain, temperature data and the daily weather forecast for your field
- Plan your spray program based on disease models and check the quality of spray work online
- Plan your irrigation based on ET-crop and predicted plant water use
- Pass data directly into your management software and Operations Center via automatic interface

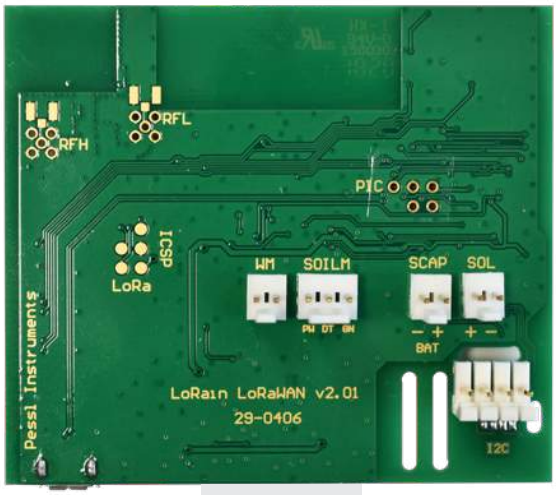
Precipitation shown in FieldClimate

24-hour rain map

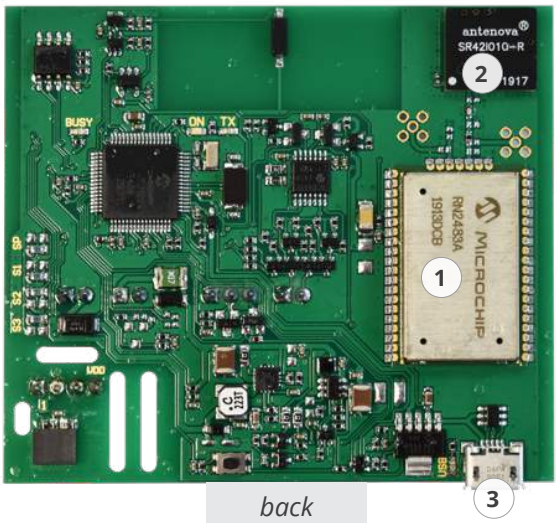
7-day rain map

LoRATH & LoRAIN Motherboards

LoRAIN and LoRATH LoRa gen 3 (29-0406)



front



back

1 LoRaWAN™ module **2** Antenna **3** USB micro B

FAMILY NAME: iMETOS 3.3

A powerful, durable and flexible data logger for all climatic and meteorological conditions. They offer a complete solution for environmental monitoring, disease models, water management and more. Versatile, with the possibility to configure and connect many different sensors - over 600 sensors to choose from.

BEST USED FOR:

- Improving plant protection with disease models
- Soil moisture monitoring and irrigation management
- Frost monitoring and alarms

APPLICATIONS:

Agriculture (crop growing, animal production), golf courses, parks, smart city, research, meteorology, hydrology

FAMILY MEMBERS: IMT variations

iMETOS 3.3

A powerful, durable and flexible data logger for all climatic and meteorological conditions. They offer a complete solution for environmental monitoring, disease models, water management and more. Versatile, with the possibility to configure and connect many different sensors – over 600 sensors to choose from.

Additionally, you can connect Pessl Instruments proprietary radio network (*for technical information see page 60*) and up to 16 wireless sensor nodes within a farm, research block, golf course, park, ...

TECHNICAL SPECIFICATIONS

Sensors layout	1 wind speed, 1 leaf wetness, 1 rain gauge, 1 water-meter (reed), 2 hygroclips (air temperature and relative humidity)
	5 digital inputs: automatic sensor recognition, supporting sensor chains (max. 600 sensors)
Extension connector	Radio access point or Sentek Drill & Drop or ultrasonic wind sensor or two extra chain connectors – Pessl Instruments bus cable nodes
Memory	8 MB flash memory
Internet connectivity	2G, 3G, 4G (LTE class 1, LTE class M)
Alert	SMS, user configurable via website
Dimensions without sensors	41 cm L x 13 cm W x 7 cm H
Weight without sensors	2.2 kg
Measuring interval	5 minutes (by default)
Logging interval	10-120 minutes (user selectable)
Transmission frequency	User selectable
Battery	6V, 4.5AH, Operating range: -35 °C to 80 °C
Solar panel	Dimensions: 13.5 x 13.5 cm, 2 Watt solar panel
	iMETOS 3.3 base unit (no sensors included), internet based logger, battery 4.5Ah, solar panel, UMTS based, logger, mounting brackets

Main Sensor Variations

iMETOS IMT200

Air Temperature and Relative Humidity sensor, Rain Gauge, Leaf Wetness sensor and Sensors for Disease models.

Order number:
700135 (EU LTE HL7692)
700136 (CA LTE HL7688)
700137 (US LTE HL7618RD)
700138 (HL8548)
700139 (HL7802)

iMETOS IMT280-USW

Rain Gauge and all the sensors for Evapotranspiration calculation: Air Temperature and Relative Humidity, Global Radiation and Ultrasonic Wind.

Order number:
700145 (EU LTE HL7692)
700146 (CA LTE HL7688)
700147 (US LTE HL7618RD)
700148 (HL8548)
700149 (HL7802)

iMETOS IMT300-USW

Sensors for Evapotranspiration and Disease Models calculation: Air Temperature and Relative Humidity, Rain Gauge, Global Radiation, Ultrasonic Wind and Leaf Wetness.

Order number:
700155 (EU LTE HL7692)
700156 (CA LTE HL7688)
700157 (US LTE HL7618RD)
700158 (HL8548)
700159 (HL7802)

iMETOS 3.3

iMETOS RadioNode Interface

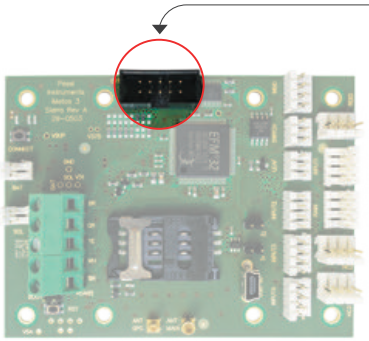
iMETOS RadioNode is a small, wireless, battery powered datalogger for in-field measurement of soil moisture, temperatures, rain, flow rate, leaf wetness, relative humidity and other parameters. iMETOS RadioNode sends all sensor readings in real time through an interactive star topology network back to our base station. From the base station, the data is uploaded to the web via cellular network (GPRS, UMTS, WiFi). All data is available within the FieldClimate platform. To connect iMETOS RadioNode to the iMETOS 3.3, RF Access Point is needed.

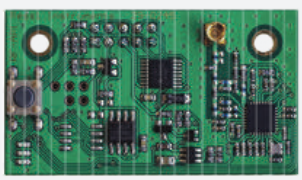
TECHNICAL SPECIFICATIONS

Housing	UV resistant polycarbonate plastic (Protection class IP67)
Dimensions without sensors	30 cm L x 16 cm W x 19 cm H
Weight without sensors	1.6 kg
Model/Type	Texas Instruments RF CC1120 module with integrated ultra low power sub-GHz; transceiver module; integrated crystal, internal voltage regulator, built in antenna global; using free ISM bands, ISM Band 915 MHz: USA, Canada, Australia, Israel etc.; ISM Band 868 MHz: Europe; ISM Band 433 MHz: Asia
Expected range	300 to 400 meter (1200 to 1400 ft.) at +10 dBm, broad line of sight, when mounted on level ground at least 3 m (10 ft.) high and above crops, grass, bushes or foliage

CONNECTION TO MOTHERBOARDS

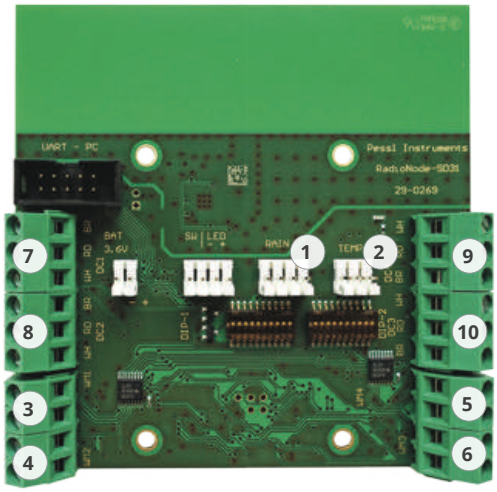
iMETOS 3.3/µMETOS NB-IoT/µMETOS CLIMA LoRA / µMETOS SOIL





Internal wireless access point allows you to connect up to 16 RadioNodes to the main station.

Remote Sensor Node Variations



SD31 iMETOS RadioNode Watermark/ METER with inputs for:

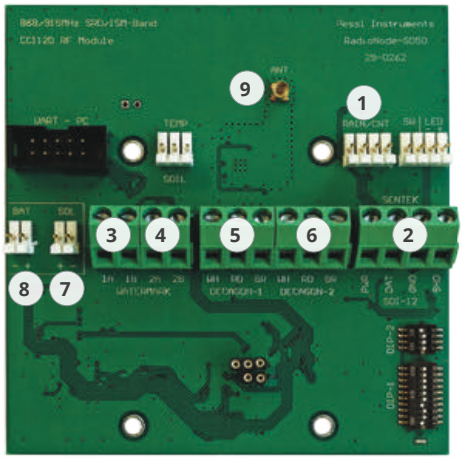
1. Rain gauge 0.2 mm (0.01 inch) / Water meter
2. Temperature sensor (WMTEMP)
3.-6. Watermark sensor
7.-10. PI54-D

Power Supply: One 3.6V Li-Ion primary cell with 19.000mAh (7 years operation)

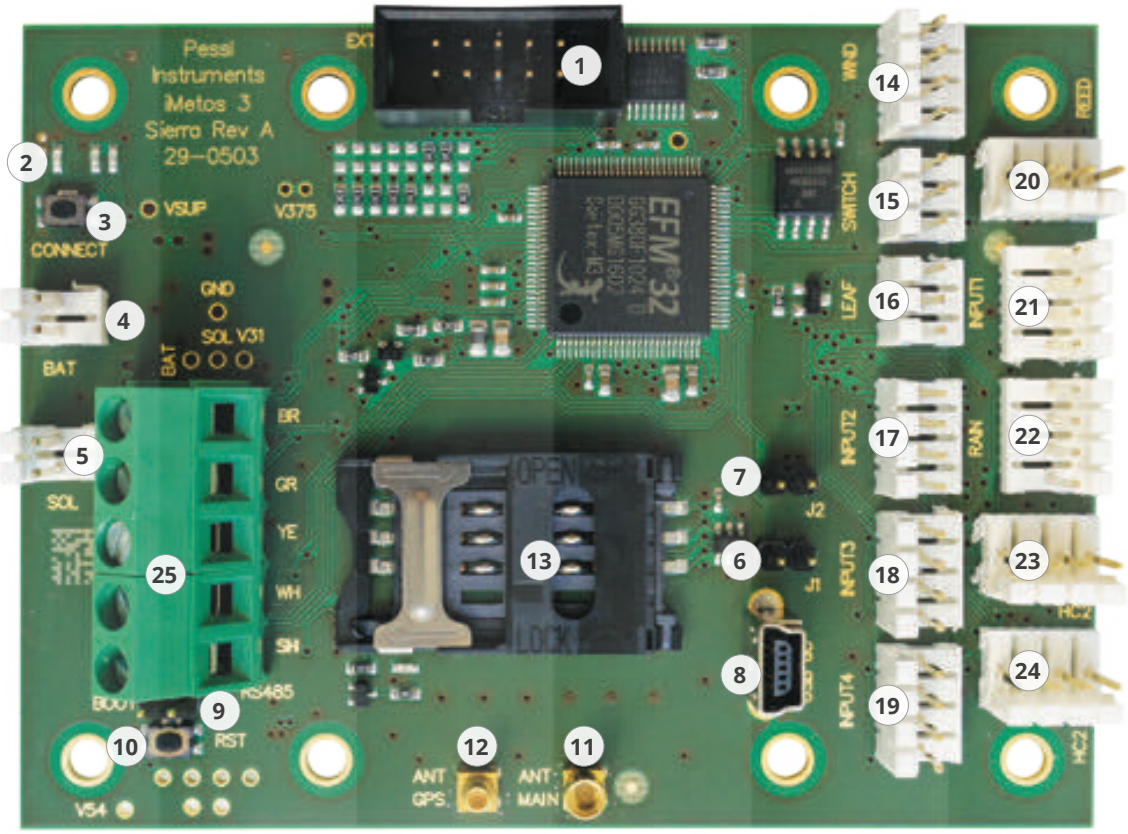
SD51 iMETOS RadioNode Drill & Drop with inputs for:

1. Rain gauge 0.2 mm (0.01 inch) / Water meter
2. Sentek Drill & Drop probe
3.-4. Watermark sensor
5.-6. PI54-D
7. Solar panel
8. 6V, 4.5Ah battery connector
9. External antenna

Power Supply: Solar panel and 6V Pb 4.5Ah battery



iMETOS 3.3 Motherboard



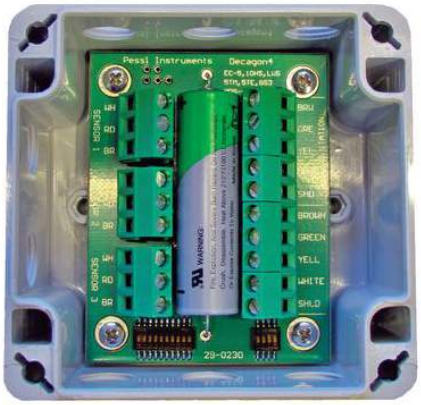
1. Extension board (Radio node)
2. LED indicators
3. Connect button
4. Battery
5. Solar panel
6. Jumper J1
7. Jumper J2
8. USB
9. Boot jumper
10. Reset button
11. GSM antenna
12. GPS antenna
13. SIM card holder
14. Wind speed
15. Switch
16. Leaf wetness
17. Input 2
18. Input 3
19. Input 4
20. Reed
21. Input 1
22. Rain gauge
23. Temperature & relative humidity (Hygroclip)
24. Temperature & relative humidity (Hygroclip)
25. Dedicated chain input

iMETOS 3.3

Chain Node Interface for 3 Pessl Instruments Sensors

Order number: 600069 / 900052 / 900173

This Interface enables the connection of up to 3 Pessl Instruments soil sensors to a METOS® weather station.
The Interface can be an External box for iMETOS 3.3 (ECH870EXT).



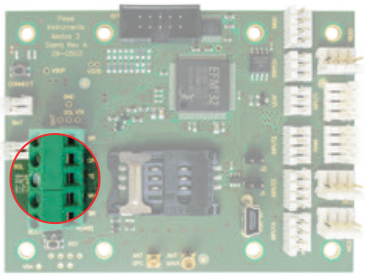
YOU CAN CONNECT:

The following Pessl Instruments sensors:

- Vacuum Tensiometer
- Water Level Sensor
- Pipe Water Pressure Sensor
- PI54-D

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



Chain Node Interface for 2 Pessl Instruments Sensors & 2 Watermark Sensors & 1 Soil Temperature Sensor

Order number: 600068 / 900051 / 900174

This Interface enables the connection of up to 5 soil sensors to a METOS® weather station.
It is possible to connect 2 Pessl Instruments sensors, 2 Watermark sensors and 1 soil temperature sensor.
The Interface can be an External box for iMETOS 3.3 (ECH871EXT).

YOU CAN CONNECT:

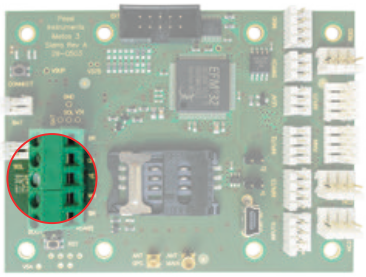
Two pieces of the following sensor:
- Watermark sensor

One piece of the following sensor:
- Soil Temperature (WMTEMP)

Two pieces of the following Pessl Instruments sensors:
- Vacuum Tensiometer
- Water Level Sensor
- Pipe Water Pressure Sensor
- PI54-D

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



Chain Node Interface for 1 Pessl Instruments Sensor & 4 Watermark Sensors & 1 Soil Temperature Sensor

Order number: 600167 / 900057 / 900175

This Interface enables the connection of up to 6 soil sensors to a METOS® weather station. It is possible to connect 1 Pessl Instruments sensor, 4 Watermark sensors and 1 soil temperature sensor. The Interface can be an External box for iMETOS 3.3 (ECH874EXT).

YOU CAN CONNECT:

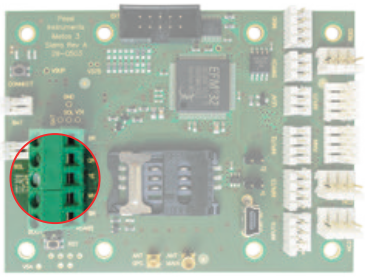
Four pieces of the following sensor:
- Watermark sensor

One piece of the following sensor:
- Single Soil Temperature

One piece of the following Pessl Instruments sensors:
- Vacuum Tensiometer
- Water Level Sensor
- Pipe Water Pressure Sensor
- PI54-D

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



SDI12 Chain Node Interfaces with 2 iMETOS AC/Sentek Connectors

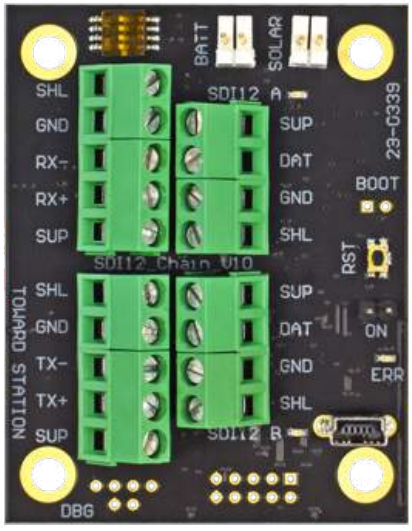
Order number: 600150 / 900105

These Interfaces enable the connection of up to 2 iMETOS AC or 2 Drill & Drop probes. The Interface can be an External box for iMETOS 3.3 (SDI12_Chain).

YOU CAN CONNECT:

Two pieces of the following probe:

- iMETOS AC different types
- Sentek Drill & Drop different types

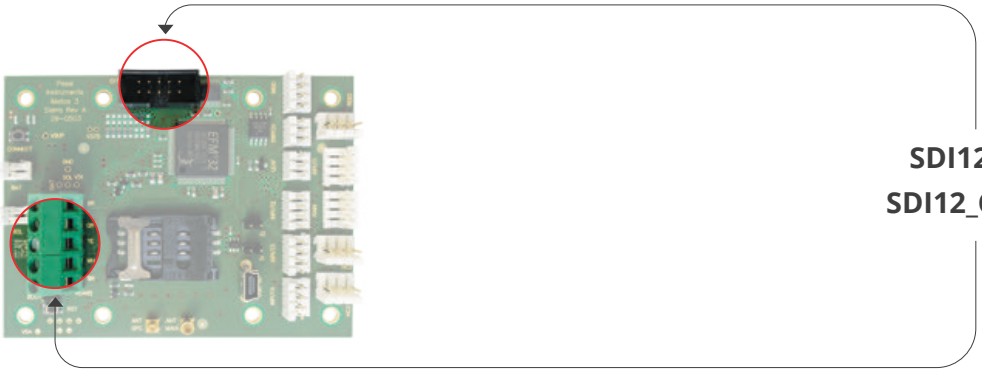


SDI12_Chain
External Chain Interface

SDI12_X2 Internal Interface
for 2 Soil Moisture Probes

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



SDI12_X2
SDI12_Chain

FAMILY NAME: iMETOS ICA10 NB-IoT

A smart system which uses the data from a pressure switch to monitor and to operate irrigation systems.

BEST USED FOR:

- Optimisation of irrigation cycles
- Optimisation of fertigation cycles
- Monitoring and operating the irrigation system

APPLICATIONS:

Agriculture (crop growing), hydrology

FAMILY MEMBERS: iMETOS ICA10 NB-IoT

iMETOS ICA10 NB-IoT

iMETOS ICA10 NB-IoT is a smart system which uses the data from a flow sensor switch to monitor and operate irrigation system.
With the help of partner platform Spherag, sensors for soil moisture, temperature, relative humidity, wind, rain, water counter, pressure transducers etc. can be used to automatically switch on and off the solenoids. iMETOS ICA10 NB-IoT works with most common solenoids from Baccara, TORO, Rainbird, Netafim etc. to make irrigation/fertigation cycles more intelligent, based on real-time data and real plant requirements.

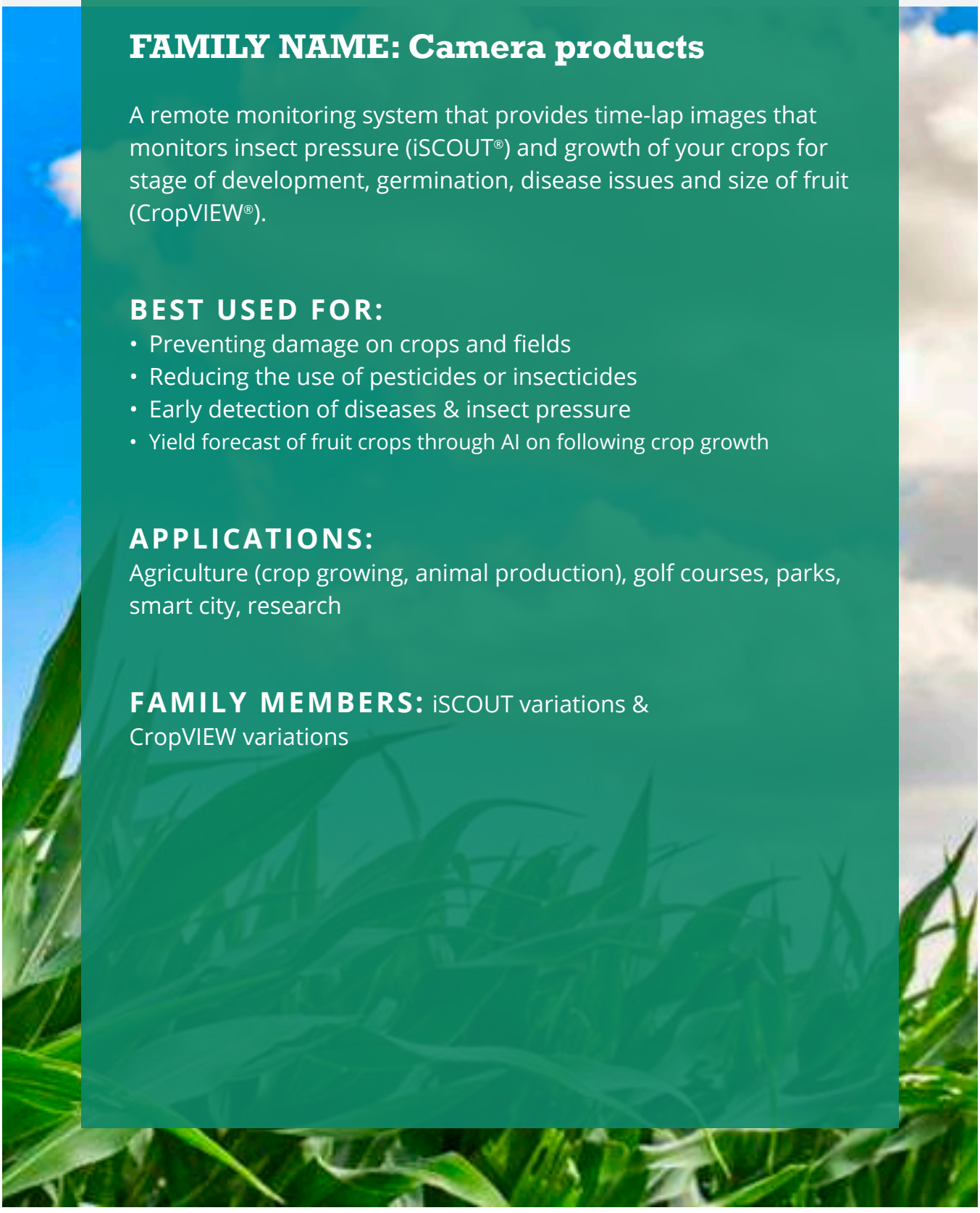
TECHNICAL SPECIFICATIONS

Sensors Layout	Automatic ON/OFF switch, Pressure detector
Memory	Microprocessor
Internet connectivity	NB-IoT
Alert	Notification, user configurable via website Remotely operated
Weight without sensors	246.5 g
Measuring interval	Real time
Logging interval	Real time
Internet contact	Real time
Battery	3,7V, 3AH, Operating range: -15° C to 60° C
Solar panel	Dimensions: 45 x 70 cm, 0,4 Watt solar panel
Outputs	1 bi-directional Latch valves (DC) . Outcome 14V

Order number: 100424

iMETOS ICA10 NB-IoT applications

Data in Spherag platform



FAMILY NAME: Camera products

A remote monitoring system that provides time-lap images that monitors insect pressure (iSCOUT®) and growth of your crops for stage of development, germination, disease issues and size of fruit (CropVIEW®).

BEST USED FOR:

- Preventing damage on crops and fields
- Reducing the use of pesticides or insecticides
- Early detection of diseases & insect pressure
- Yield forecast of fruit crops through AI on following crop growth

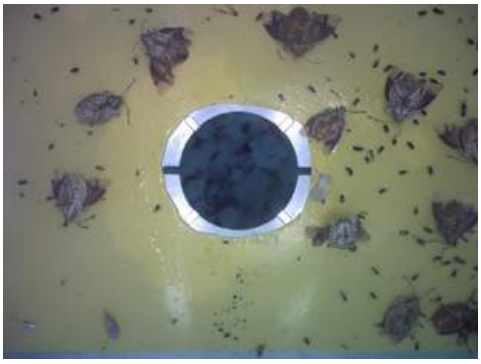
APPLICATIONS:

Agriculture (crop growing, animal production), golf courses, parks, smart city, research

FAMILY MEMBERS: iSCOUT variations & CropVIEW variations

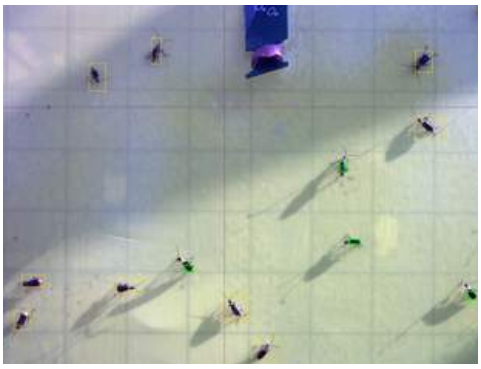
iSCOUT® - AI-Based Insect Scouting

iSCOUT® is a combination of hardware and software solutions for remote monitoring of different pest insects. The iSCOUT® is an insect trap with integrated electronics and a sticky plate. Due to its low weight, it can be hung anyhwere in the field. The device is self-sufficient, as it is powered by a solar panel and a battery. 10 MP camera takes high-resolution pictures of the sticky plate within the iSCOUT® trap. Images are sent via LTE communications to an online platform where they are analyzed and counted by automatic pest detection framework, using AI and self-learning algorithms. All data from camera system and AI software is displayed online, within the FieldClimate platform. Two camera devices (iSCOUT® or CropVIEW®) can be connected on one control unit. Every power unit can also connect the following environmental sensors: rain, temperature and relative humidity (Hygroclip) and leaf wetness.



iSCOUT® Bug

iSCOUT® uses automatic recognition algorithm for recognizing pests.

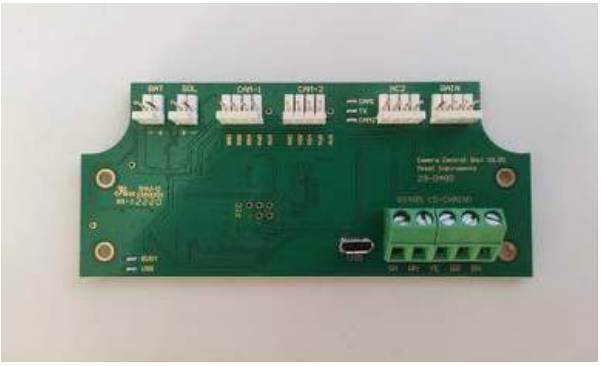


iSCOUT® Color Trap

TECHNICAL SPECIFICATIONS

Memory	1 GB
Internet connectivity	LTE class 1
GPS receiver	Yes
Dimensions of trap housing without control unit	20 cm L x 15.5 cm W x 17 cm H
Weight without control unit	0.93 kg
Transmission interval	Max. 3 times per day (usually once per day)
Battery type	Rechargeable Lead acid battery 6V, 12 Ah
Solar panel dimensions	17.5 x 17.5 cm, 7.2 Volt, 333 mA
Camera	10 megapixel camera
	Internet based monitoring device, solar panel, rechargeable battery, GPRS Logger, GPS sensor

Camera Control unit base with interface for up to 2 camera devices with opportunity to connect environmental sensors (not included). Following sensors can be connected: Rain gauge, temperature, relative humidity and leaf wetness.



Control Unit Board

iSCOUT® Variations

iSCOUT® PHEROMONE

Designed and developed to catch insects with insect specific pheromone lure (**codling moth, european grape berry moth, tomato leafminer and many other species**). It includes a metal plate on which sticky paper and a pheromone lure can be applied.

Order number:
700160 (EU LTE HL7692)
700161 (CA LTE HL7688)
700162 (US LTE HL7618RD)
700163 (HL8548)

iSCOUT® BUG

Designed and developed to catch bugs (**marmorated stink bug and others**). It includes a metal bottom plate with black pyramid wings and has closed side entries. Once the bug enters the trap from the bottom, it is fixed on the plate.

Order number:
700164 (EU LTE HL7692)
700165 (CA LTE HL7688)
700166 (US LTE HL7618RD)
700167 (HL8548)

iSCOUT® FRUIT FLY

Designed and developed to catch fruit flies (**spotted wing drosophila, olive fruit fly, mediterranean fruit fly and many other species**). It includes 3 mm nettings on entries, so that bigger flies (house flies) cannot enter the trap. Tank system for lure and metal plate on which sticky paper is applied are included. To catch and monitor bigger flies, nettings can be removed.

Order number:
700172 (EU LTE HL7692)
700173 (CA LTE HL7688)
700174 (US LTE HL7618RD)
700175 (HL8548)

iSCOUT® COLOR TRAP

Designed and developed to monitor sticky traps of different colors. The device comes with high resolution camera and a holder for a sticky plate.

Catching various insects depends on the color of the plate used:

- blue: ***frankliniella occidentalis, thrips tabaci, ...***
- yellow: **white flies, leafminers, sciarid flies, ...**
- white: **apple sawfly, plum sawfly, plum fruit sawfly, raspberry beetle, ...**

Order number:
700168 (EU LTE HL7692)
700169 (CA LTE HL7688)
700170 (US LTE HL7618RD)
700171 (HL8548)

CropVIEW® - AI-Based Crop & Growth Monitoring Solution

CropVIEW® is an agricultural information system, which periodically takes high resolution photos of farmland, research plots, crop canopies, orchards etc. Photos are automatically uploaded to FieldClimate platform, thus allowing a constant crop quality and yield control. The high resolution pictures enable checking seeds for germination, monitoring the effect of fertilizers and pesticides on crop development, and help decide whether a disease or pest already threatens profitability. High-resolution images can be viewed and analyzed daily over time without any additional effort. The system operates with rechargeable battery and a solar panel all year round in most climatic zones. Two camera devices (iSCOUT® or CropVIEW®) can be connected on one control unit. Every power unit can also host the following environmental sensors: rain, temperature, and relative humidity (Hygroclip) and leaf wetness.

TECHNICAL SPECIFICATIONS

Housing	Power supply and sensor support box: 41 cm L x 13 cm W x 7 cm H
Weight without sensors	2.2 kg
Camera module	Stainless steel base with IP65 box 27 cm L x 17 cm W x 9 cm H, weight: 1.5 kg
Power supply	6 V lead acid 12Ah battery with solar panel
Model/Type	Cortex M4 processor module with integrated Communication model for UMTS/LTE operation
Camera and optics	MT9J003 10 Mega Pixel 2/3“ CMOS sensors - Optics DSL377A-650-F2.8 2/3“ Lens with 2.5 mm Focal length and DSL901J-650-F3.0 2/3“ Lens with12 mm Focal Length
Control Unit	Camera Control Unit Base with interface for up to 2 camera device with opportunity of connect sensors (not inlcuded). Following sensors can be conneted: Rain gauge, temperature, relative humidity and leaf wetness.

CropVIEW VARIATIONS:

CropVIEW® Panorama

One 10 MP Wide Angle Lens

Order number:
700176 (EU LTE HL7692)
700177 (CA LTE HL7688)
700178 (US LTE HL7618RD)
700179 (HL8548)

CropVIEW® Tele

One 10 MP Tele Lens

Order number:
700180 (EU LTE HL7692)
700181 (CA LTE HL7688)
700182 (US LTE HL7618RD)
700183 (HL8548)

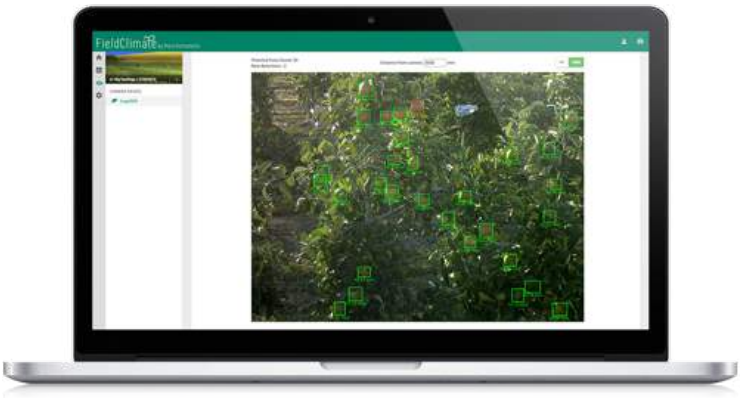
CropVIEW® Dual

Two 10 MP Lenses - Wide Angle and Tele

Order number:
700184 (EU LTE HL7692)
700185 (CA LTE HL7688)
700186 (US LTE HL7618RD)
700187 (HL8548)

Images, taken by CropVIEW®.

A tool in FieldClimate enables you to select specific fruits on pictures taken in your orchard or field by a zoom lense in CropVIEW®. If you know the precise distance between the camera and crop, you will get a reliable measurement of fruit diameter in mm.



APPLE ORCHARD USE CASE

Tele lens focusing on a tree and detecting the apples automatically (CropVIEW automatic detection).

Marking apples by hand and following their growth during the season.

The minimum, maximum and average diameter (in mm) of all selected fruits is shown on a graph, and the exact values in a table (which can be downloaded as an Excel file for further analysis).

VITICULTURE USE CASE

Following the growth of shoots and developing leaves.

Inflorescence of grapes is clearly seen on the photos.

SERIES OF PICTURES IN MAIZE/WHEAT USE CASE

Germination and emergence of wheat.

Different BBCH stages of wheat, for example tillering stages.

Following the uniform emergence and growth of maize daily.

With CropVIEW® you receive a time lapse of your crop growth. Check the time lapse of maize growth here:

https://youtu.be/V_ZXBSD_7XQ

FAMILY NAME: iMETOS WorkTrack

A battery-powered versatile tracking device that is easily mounted on any asset (sprayer, mower, utility vehicles, tractors, carts, ...).

BEST USED FOR:

- Detailed activity report about where, when, and how much an asset has been operational
- Optimisation and enhancement of work and workforce planning
- Knowing current position of all active machines

APPLICATIONS:

Agriculture (crop growing, animal production), golf courses, parks, smart city

FAMILY MEMBERS: iMETOS WorkTrack, iMETOS Beacon

iMETOS WorkTrack

With iMETOS WorkTrack you have your fleet always under full control - you know exactly when your drivers are coming and going.

The iMETOS WorkTrack agriculture GPS tracking unit combined with the Beacons feature allows you the capability of both fleet tracking and asset tracking, to manage your entire farm from equipment to employees.

On our FieldClimate platform, you see your vehicles and implements and have all data stored about where and which operations you have running. Together with your connected METOS® weather station, you can see the application of wet or dry fertilizer or chemical as well as any farm delivery, grain transport, over-the-road trucking, seed delivery, and equipment rental on the mobile phone/iPad or desktop. iMETOS WorkTrack connects all farming equipment automatically and swiftly. Companies that have implemented the iMETOS WorkTrack have improved their efficiency by 25-30% while decreasing fuel consumption by 15%. Most companies have seen these benefits within their first 30 days of activation.

TECHNICAL SPECIFICATIONS

Connectivity	LTE & 2G module for multi-regional use; Cat M1/NB1 deployed bands: 2, 3, 4, 5, 8, 12, 13, 20, 26*, 28*; EGPRS quad-band, 850/900/1800/1900 MHz (* roaming bands) with internal high gain antenna
GNSS	GPS, GLONASS, GALILEO, BEIDOU, accuracy < 3m, internal high gain GNSS antenna
Housing	UV resistant polycarbonate plastic (Protection class IP67)
Power	(+6...+30) V DC via car power plug or with internal capacitor with solar panel
Communication	It uses UDP protocol for data delivery to FieldClimate platform
Dimensions	72,5 x 73 x 27 mm

Order number: 700212

WorkTrack:

- Records a GPS position and speed every 5 seconds and transfers the data every 30 seconds to FieldClimate.
- It is activated with vibration and movement and records the first position when the super capacitor is sufficiently charged.
- The super capacitor can hold charge when connected to a permanent power source (tractor battery).
- In sleep mode the current uptake is below 100µAmp. It can empty a fully charged 75Ah battery within 750 000 hours. When it is connected to a switched-on power source the super capacitor will discharge within 24 hours after being disconnected from power.

This is what you get with iMETOS WorkTrack:

- A detailed activity report about where, when, and how much the machine has been running.
- Current positions of all active machines.
- Enhanced work planning.
- Automatic theft control of assets by geo-fence.

iMETOS WorkTrack used on a golf cart.

iMETOS Beacon

The new iMETOS Beacon is a low-cost yet fast and easy to use device that connects your machines - to save time, resources, improve productivity and profitability. With iMETOS Beacon together with iMETOS WorkTrack all your machines will be connected to the FieldClimate. You can track all your tractors, support vehicles and machines all in one place.

iMETOS Beacon comes with real-time views that include:

- GPS Location
- Hours & Mileage
- Location History
- Heading, Speed and more

Together with FieldClimate, we made it easy to monitor all your machines (tractors, support vehicles, fuel trucks, sprayers, and others). By attaching an iMETOS Beacon to whichever machine you like you'll be able to track:

- Maintenance of the device
- Work scheduling
- Fuel Logs and Automated Reporting
- Dispatching
- Movement and prevent theft

Order number: 100423

HOW DO iMETOS WORKTRACK AND iMETOS BEACON WORK TOGETHER?

The connection between the two is fast and they work together

- to maximise the efficiency of the workforce
- completely transparent fleet tracking

You can connect up to 20 iMETOS Beacons to one iMETOS WorkTrack without worrying about running out of data storage in FieldClimate.
You mount the iMETOS WorkTrack on your tractor and each iMETOS Beacon to the device, vehicle or any other machine you want tracking.

FAMILY NAME: iMETOS MobiLab & Accessories

Indispensable tool for sap and soil-analysis.

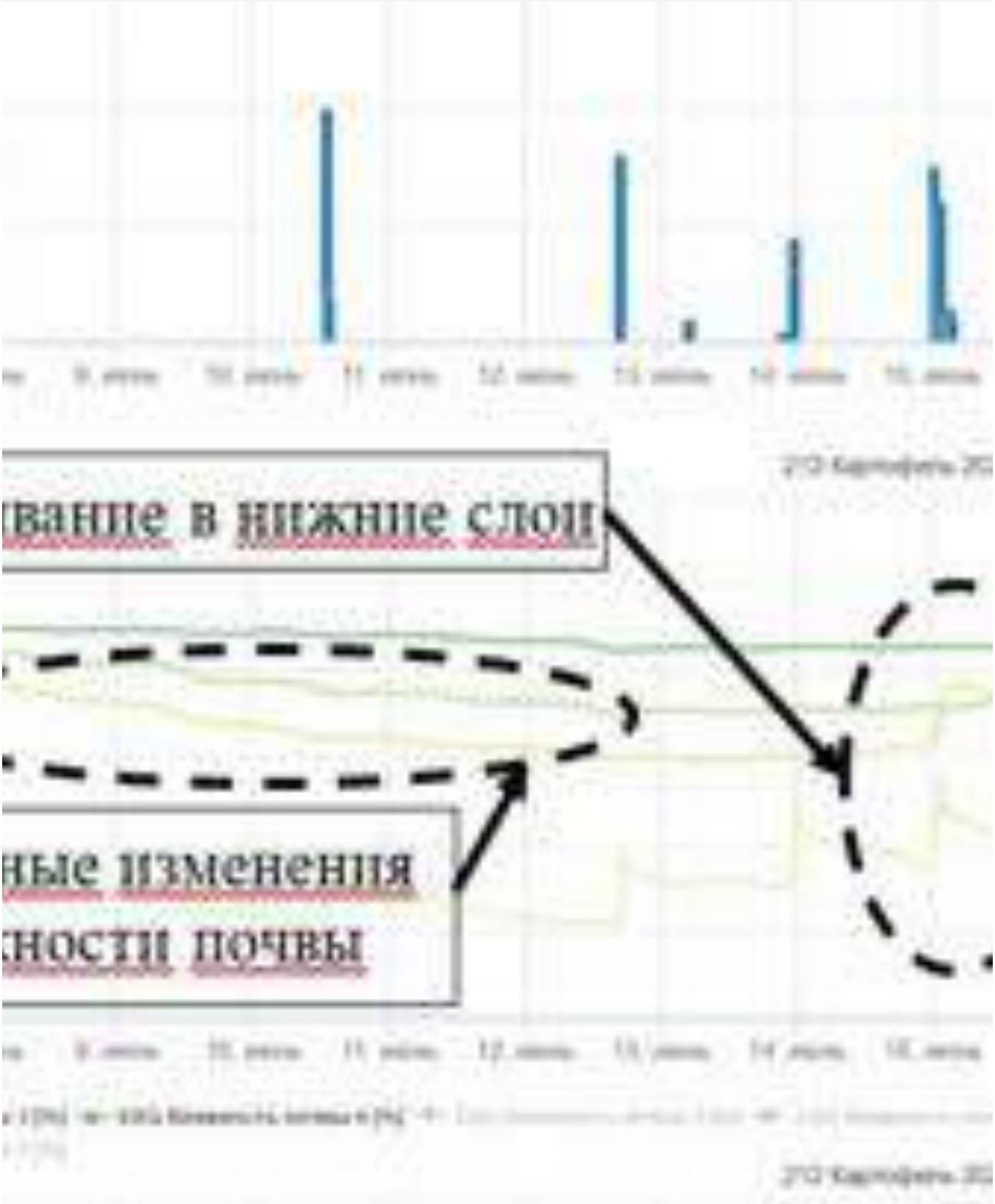
BEST USED FOR:

- Precise NO_3 and NH_4 soil analysis
- Precise NO_3, NH_4, Na, Cl, SO_4, K, Ca and Mg analysis from plant sap
- Defining usage of fertilizers and pesticides
- Lowering the impact on the environment (water, biodiversity, soil, ...)

APPLICATIONS:

Agriculture (crop growing), golf course, parks, smart city, research

FAMILY MEMBERS: iMETOS MobiLab variations & Dualex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ные изменения
кности почвы

iMETOS MobiLab – Soil, Water and Plant Sap Analytics

Successful crop growing needs an optimized use of fertilizers. At Pessl Instruments we have developed a product line to support horticulture and agriculture in this field.

REMOTE PLANT SENSING

The new FarmView services integrate Sentinel-2 Earth observations. This helps to determine homogeneous and inhomogeneous zones inside the fields. From this data, we can retrieve a useful soil sampling pattern.

SAMPLING AND MEASUREMENT

The **iMETOS Soil Sampler app** records the position of the sample and the sampling time. It assigns a unique identifier (UI) to each soil and plant sap sample. After saving the UI, sampling time and position are stored in FieldClimate and an optimized workflow is suggested. Data can be synced with the LOAC Software (Windows 7 or newer). The MobiLab LabOnAChip® measures soil samples via capillary electrophoresis (CE) on small microfluidic chip in an automated manner. An internal standard (ISTD) needs to be added to the sample before measuring.

PLANT SAP AND WATER

The **iMETOS MobiLab Lab-on-a-Chip SAP** contains everything needed for measuring plant sap. With a simple garlic press and some plastic gear one can easily take samples from leaves. The iMETOS MobiLab Lab-on-a-Chip WATER can be used to monitor irrigation water.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the grant agreement No. 765262.

SOIL

The **MobiLab Soil Extraction** set contains the hardware to take a soil sample and prepare an extract for further measurement. The set contains a sieve and a bowl to homogenize the solid soil sample. A tube inside a tailor-made balance takes the sieved sample up. Distilled water is then added. The balance records the actual share of the sample and the water; thus error tolerant working becomes possible. Afterwards, the tube is placed on a shaker and left there for 30 minutes to extract the nitrogen compounds. Balance and shaker communicate with the MobiLab software via a USB-hub.

The **iMETOS Mobilab Lab-on-a-Chip SOIL** supplies the Lab-on-a-Chip and the necessary plastic ware to undertake the subsequent soil measurements.

iMETOS MobiLab Lab-on-a-Chip® (soil, water or plant sap)

Sample volume	50 -100 µl
Measurment range	3-1000 ppm; 0.01-0.5 g/kg
Resolution	0.5 ppm; 1 mg/kg
Accuracy	For measurements of liquid concentrations (ppm): ±3 % For measurements of soil concentrations (mg/kg): ±15 %
Chip lifetime	Approximately 300-500 tests
Battery life	2 hours of measuring time

CONSUMABLES

Chemical solutions, plastic ware, filters and microfluidic chips will need to be replaced after every 300 measurements. **iMETOS MobiLab SOIL Consumables, iMETOS MobiLab WATER Consumables** and **iMETOS MobiLab SAP Consumables** deliver everything needed for the next 300 measurements. If one wants to change from soil measurement to plant sap and vice versa it will be enough to equip your system with the necessary tools and consumables.

iMETOS MobiLab SOIL EXTRACTION®

Power supply	12 V adaptor for wall outlet
Battery	2 h working time

SINGLE NUTRIENT MEASUREMENT

The **iMETOS NO_3 Electrode** is an ion selective electrode (ISE) capable of measuring nitrate. After a two point calibration the Electrode is immersed in the soil extract and returns the concentration of nitrate immediately. This value can be entered into the iMETOS MobiLab Software.

Waterproof	IP67
Concentration range	7 x 10^{-6} to 1 M (0.1 - 14,000 ppm as N)
pH range	2.5 to 11 pH
Temperature range	0 to 50°C
Electrode resistance	1 to 4 megohms
Reproducibility	+/- 4%
Minimum sample size	3 mL in a 50 mL beaker
Size	Electrode length - 155 mm
	Body diameter - 12 mm
	Cap diameter - 16 mm
	Cable length - 100 cm

Dualex - Instant non-destructive Nitrate and Clorophyl Measurement

Dualex is a leafclip sensor which measures chlorophyll and polyphenols content of plant leaves. Thanks to a patented technology, this optical sensor allows simple, fast, and non-destructive measurement of chlorophyll, flavanols and anthocyanins in leaves.

ACCURATE MEASUREMENT OF CHLOROPHYLL

Chlorophyll plays a vital role in photosynthesis and plant development. Dualex measures the chlorophyll by analyzing the light transmitted through the leaf. Thanks to a chemical calibration made by FORCE-A, the chlorophyll is given in µg/cm² in the range of 5-80 µg/cm².

UNIQUE LEAFCLIP SENSOR TO MEASURE FLAVONOLS AND ANTHOCYANINS CONTENT IN LEAVES

Flavanols are mainly synthetized after light exposure. As a consequence, they are a good indicator of plant-light interaction history. Dualex measures flavonols and anthocyanins by analyzing the screening effect of flavonols and anthocyanins on chlorophyll fluorescence. Flavonols and anthocyanins content are given in relative absorbance units from 0 to 3 for flavonols and 0 to 1.5 for anthocyanins.

NBI®: NITROGEN BALANCED INDEX

Chlorophyll is often used as an indicator of plant nitrogen status. Several years of research and experimentation showed that polyphenols, specifically flavonols, are also good indicators of nitrogen status of plants.
NBI® (Nitrogen Balance Index) combines chlorophyll and flavonols (related to nitrogen/Carbon allocation). It's a nitrogen plant status indicator directly correlated with massic nitrogen content. The NBI® is less sensitive to the variations of environmental conditions than the chlorophyll (leaf age, leaf thickness...).

TECHNICAL SPECIFICATIONS

Measuring material	Plant leaves
Measuring system	Transmittance and screening effect on chlorophyll fluorescence
Index measured	Chlorophyll (CHL), Flavonols (FLAV), anthocyanins (ANTH), NBI
Accuracy	5%
Reproducibility	4,5% for CHL, 3,5% for FLAV and ANTH
Repeatability	1,3% for CHL, 2% for FLAV and ANTH
Area measured	19,6 mm²
Leaf thickness	1.5 mm maximum
Measurement time	< 1 s
User interface	LCD screen, Sound warning
Positioning	Internal GPS
Relative accuracy	< 2,5 m (CEP, 50%, 24 h static)
Storage capacity	10 000 multiparametric data
Data output	.csv file
Data transfer	USB
Operating temperature	From 5 to 45 °C
Battery	Li-ion rechargeable
Autonomy	6 hours
Total weight	220 g
Size	205 x 65 x55 mm

FAMILY NAME: iMETOS SoilGuard

A perfect portable tool for measuring soil moisture and temperature.

BEST USED FOR:

- Work planning & water management
- Complete field's moisture profile
- Complete field's heat map based on temperature readings
- Accurate measurements

APPLICATIONS:

Agriculture (crop growing), golf courses, parks, smart city

FAMILY MEMBERS: iMETOS SoilGuard

iMETOS SoilGuard

The new iMETOS SoilGuard solution is the perfect mobile tool for measuring soil moisture and temperature in turf grass, wherever you want/need and combine it with permanent readings and your own good feelings. Due to its portability and simplicity of use it enhances the efficiency and helps to optimize work planning and water management. Once in place, it measures soil moisture right in the root zone. The readings are stored on the device and whenever needed. The mobile app sends point data to Fieldclimate and within a few seconds data is visible for any other stakeholder. Together with the permanent readings and the mobile application and the spot readings from iMETOS SoilGuard you will get a complete picture of the golf course's moisture profile, the temperature readings on the various points of the green in a form of a heat map for easier understanding and further decision-making.

KEY FEATURES:

- easy to use, mobile and rapid measurements
- easy-readable backlit display to see the values immediately
- provides up to 50,000 measurements, all with their specific GPS coordinates
- has an ergonomic design with a telescoping tubular frame
- comes with integrated Bluetooth and internal GPS therefore no additional connectivity components are necessary
- **it provides accurate measurements of:**
  - soil moisture (Volumetric Water Content %)
  - electrical conductivity (salts)
  - turf grass surface temperature

Order number: 100270

Using iMETOS SoilGuard

For improved performance and accurate measurements, you can choose between multiple lengths of measuring probes - 3.8 cm, 7.5 cm, 12 cm and 20 cm.

Order number: 100356

Order number: 100355

Order number: 100354

Order number: 100353

FAMILY NAME: SolAntenna

A wireless and easy to use device for measuring temperature, humidity and CO2 levels in the storage of vegetables and fruits.

BEST USED FOR:

- Preventing damage/rotting of crop before it occurs
- Management of your storage
- Fine tuning of the environmental conditions inside the storage
- Mitigating the problems with chemicals

APPLICATIONS:

Agriculture (monitoring storage conditions, detecting bad seed,)

FAMILY MEMBERS: SolAntenna

SolAntenna

SolAntenna is a wireless multipurpose electronic device providing automated real-time information. It was designed to collect, analyze and help with understanding storage conditions.. It measures the most critical parameters: with CO2, temperature and relative humidity in real time and where it is needed the most – in the middle of the storage.

Thanks to Solantenna, you'll always know the conditions in the storage which will help prevent damage/rotting before it occurs. Solantenna gives you 24/7 information about your storage conditions which leads to fine tuning the environmental conditions inside the storage units. Hot spots are easily detected
so you won't have to use as many chemicals to mitigate the issue.

KEY FEATURES:

- Preventing crop and money losses
- Suitable for any type of storage (bulk or box)
- Precise and specific measurements for quick actions
- Completely wireless
- Easy to use and setup – start tomorrow
- Flexible solution for every grower, especially potato

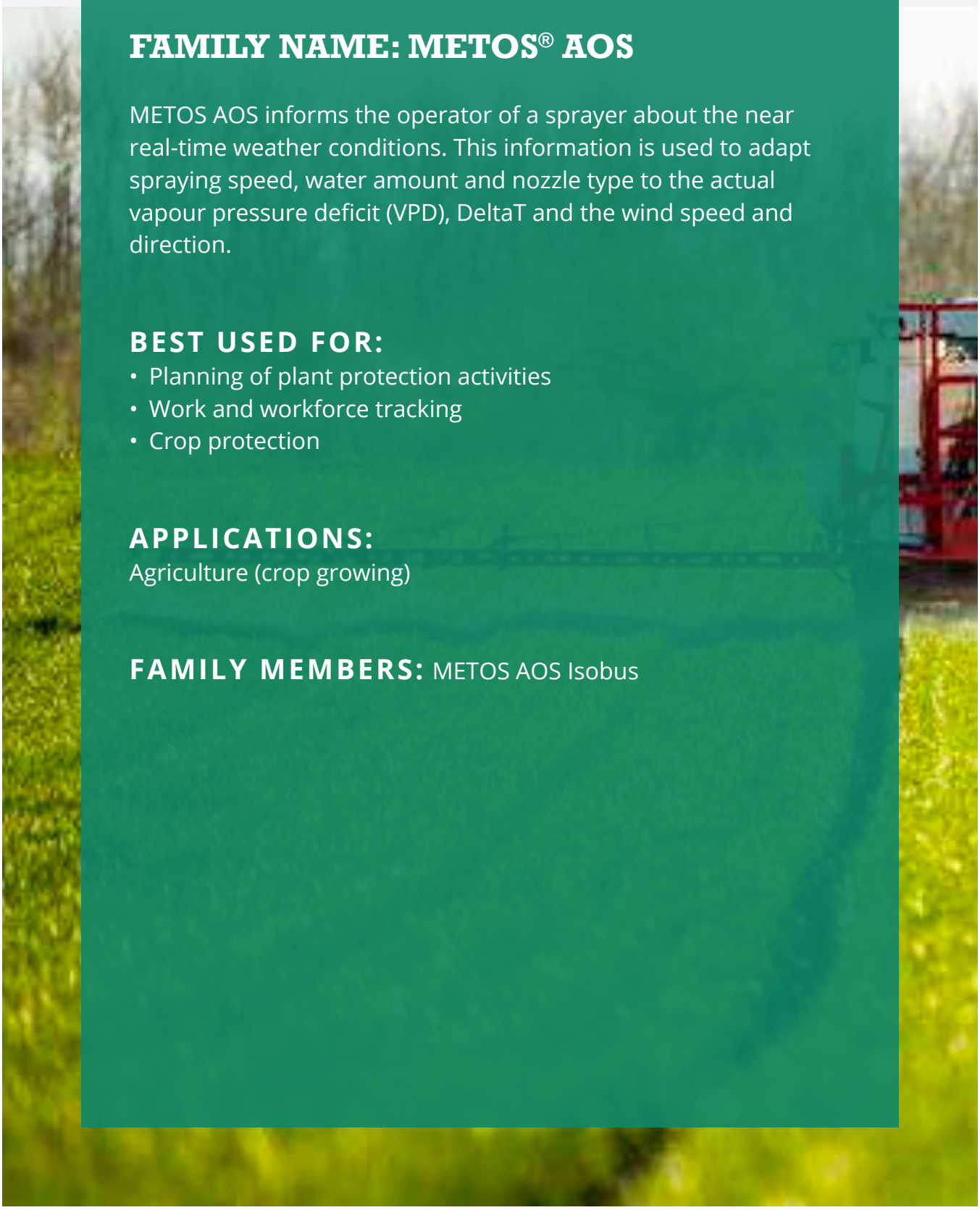
TECHNICAL SPECIFICATIONS

VERSION 3.0 EC

Measuring range (MR)	CO2: 0 – 40.000 ppm
Temperature (MR)	-5°C – +60°C
Humidity (MR)	0% – 99% RH
Measuring accuracy (MA)	CO2 ± 40 ppm +5% of the measured value
Temperature (MA)	± 0,5°C
Humidity (MA)	0% – 90%, ±1.8% RH, 90% – 95%, ± 2.3% RH 95% – 100%, accuracy ± 3% RH
Sensors Types	SCD41 0-40000ppm HYT-221 – temperature sensor TWLM1001 – humidity sensor

*Important Note: Solantenna needs to be connected to LoRaWAN® network to work. You can either connect it to any existing LoRaWAN® network (that is in range) or you can order LoRaWAN® gateway at Pessl Instruments.

LoRaWAN gateway



FAMILY NAME: METOS® AOS

METOS AOS informs the operator of a sprayer about the near real-time weather conditions. This information is used to adapt spraying speed, water amount and nozzle type to the actual vapour pressure deficit (VPD), DeltaT and the wind speed and direction.

BEST USED FOR:

- Planning of plant protection activities
- Work and workforce tracking
- Crop protection

APPLICATIONS:

Agriculture (crop growing)

FAMILY MEMBERS: METOS AOS Isobus

SolAntenna

METOS AOS Isobus

The METOS® AOS device is intended to support the farmer or contractor in his plant protection work, in real time. The METOS®AOS ISOBUS (Application Optimization System) is a lightweight unit that can be either mounted on the tractor or sprayer and connects with the ISOBUS terminal and mobile phone inside the cab. Once activated, METOS® AOS ISOBUS monitors the spraying weather conditions and logs real-time weather data: temperature, relative humidity, wind speed and direction on the ISOBUS terminal.

1 Connects Ultrasonic wind speed sensor to ISOBus terminal

2 ISOBus terminal - communicates with mobile phone via Bluetooth

TECHNICAL SPECIFICATIONS

Temperature	-20°C - +60°C	Precision:	+- 0.5°C
Relative Humidity	15% - 98%	Precision:	+- 3%
Wind Speed	0.4m/s - 40 m/s	Precision:	+- 0.2m/s
Wind direction	0° - 360°reading	Precision:	+- 5°
Measurement and communication interval	1 sec		
Communication	ISOBus, CAN-Bus, BLE (Bluetooth Low Energy)		

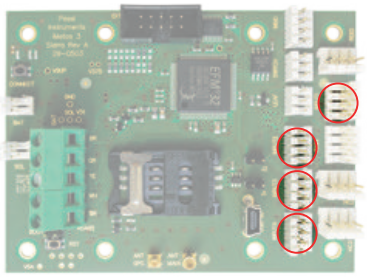
Sensors

Pessl Instruments Ultrasonic Wind Sensor

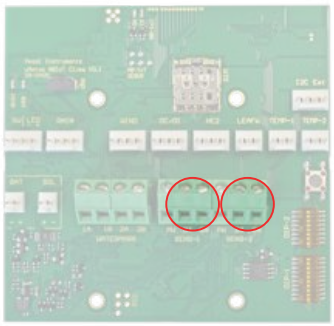
Pessl Instruments ultrasonic wind speed sensor is a two-dimensional sonic wind sensor, built specifically for agricultural, forestry, and environmental research applications. It calculates average and maximum (gust) wind speed and direction over 5 minutes interval.

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



µMETOS NB-IoT / µMETOS CLIMA LoRa



Order number: "600023 / 900028 (µMetos), 600064 / 900047 (IMT)"

TECHNICAL SPECIFICATIONS

Output data format	PI-bus
Information transmitted	Vectorial average wind speed, gust and direction
Output rate	1-10 min
Wind module sensitivity	0.12 m/s
Wind module resolution	0.05 m/s
Wind module dynamic	0.5 to 40 m/s
Direction sensitivity	+/-1.5°
Direction resolution	1°
Power supply	3.7V to 6V with supercap
Electrical consumption	0.5 mA Avg. 12 V
Operating temperature without icing	-15° C to +55° C
Cable	2.5 m / LIYCY
Connection	4 wires
Weight of the head	N/A
Weight of unit assembly	200 g with mounting part
Mounting	Pessl Instruments clamp

*weather station measurement interval needs to be set to 5 minute value

Pessl Instruments Wind Speed

Order number: 600034 / 900040

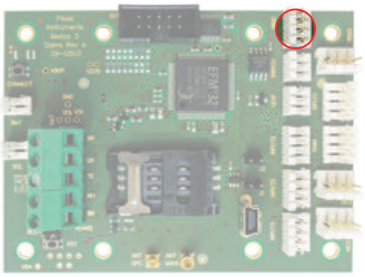
IM512CD is a cup type anemometer for low cost and long term, accurate wind measurements for all kinds of use. It calculates average wind speed in the specific time period.

TECHNICAL SPECIFICATIONS

Range	0 to 50 m/s, gust survival 60 m/s
Sensor	12 cm diameter cup wheel assembly, 40 mm diameter hemispherical cups
Turning factor	75 cm
Distance constant (63 % recovery)	2.3 m
Threshold	1.1 m/s
Transducer	Stationary Coil
Transducer output	AC sine wave signal induced by rotating magnet on cup wheel shaft. 100 mVpp at 60 rpm. 6 Vpp at 3600 rpm
Output frequency	1 cycle per cup wheel revolution. 0.75 m/s per Hz

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



Pessl Instruments Wind Direction

Order number: 600065 + 600166

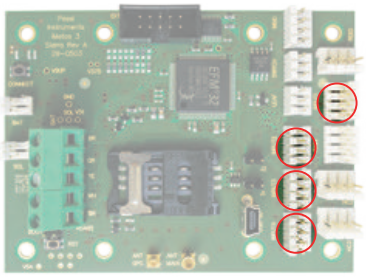
IM511CDI is a vane type digital wind direction sensor for accurate measurements in all weather conditions. It calculates average wind direction in the specific time period.

TECHNICAL SPECIFICATIONS

Range	360° mechanical, 352° electrical (8° open)
Sensor	Balanced vane, 16 cm turning radius
Damping ratio	0.2
Delay distance	0.5 m
Threshold	1.3 m/s at 10° displacement; 1.9 m/s at 5° displacement
Transducer	Precision conductive plastic potentiometer, 10 kOhm ±20 % resistance 1.0 % linearity, life expectancy 50 million revolutions Rated 1 watt at 40 °C, 0 watt at 125 °C
Transducer excitation requirement	Embedded micro controller
Output	RS 485

CONNECTION TO MOTHERBOARDS

iMETOS 3.3

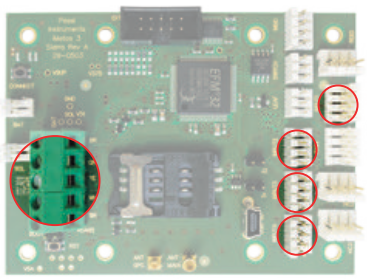


RM Young Wind Monitor

The wind monitor combines wind speed and wind direction. It is constructed of a four-blade helicoid propeller for highly accurate wind speed measurement with integrated wind direction sensor. It measures peak values.

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



Order number: 600129 / 900064

TECHNICAL SPECIFICATIONS

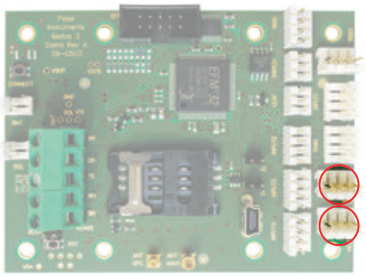
Range	0-100 m/s (224 mph), 0- 360°
Accuracy	**Wind Speed:** ±0.3 m/s (0.6 mph) or 1% of reading
	Wind Direction: ±3 °
Operating temperature range	-50 to 50 °C
Threshold	**Propeller:** 1.0 m/s (2.2 mph)
	Vane: 1.1 m/s (2.4 mph)
Signal output	**Wind speed:** magnetically induced AC voltage, 3 pulses per revolution. 1800 rpm (90 Hz) = 8.8 m/s (19.7 mph)
	Wind direction: DC voltage from conductive plastic potentiometer − resistance 10K Ω, linearity 0.25%, life expectancy − 50 million revolutions
Power Requirement	Potentiometer excitation: 15 VDC maximum
Dimensions	37 cm (14.6 in) H x 55 cm (21.7 in) L, Propeller: 18 cm (7 in) dia. Mounting: 34 mm (1.34 in) dia. (standard 1 inch pipe)
Weight	1.0 kg

Hygroclip (Air temperature & Relative Humidity)

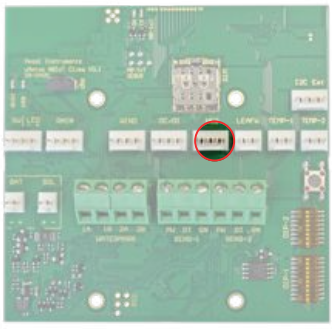
Measures relative humidity and temperature with outstanding accuracy and repeatability. It has an integrated data acquisition and calibration history. Dew point , VPD and delta T calculations available.

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



µMETOS NB-IoT / µMETOS CLIMA LoRa



Order number: 600149 / 900074 (IMT), 600148 / 900073 (µMetos; EcoD3)

TECHNICAL SPECIFICATIONS

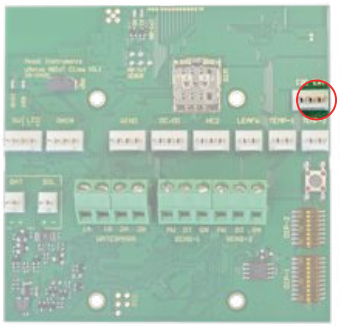
Temperature sensor	PT1000 1/3 Class B
Humidity sensor	ROTRONIC Hygromer® IN-1
Accuracy with standard adjustment profile	at 23 °C and 10, 35, 80 % rh ±0.8 % rh / ±0.1 °C
Accuracy with high precision adjustment profile	at 23 °C and 10, 20, 30, 40, 50, 60, 70, 80, 90 % rh ±0.5 % rh / 0.1 °C
Resolution, AirChip3000	Typically 0.02 % rh, 0.01 °C
Long-term stability	< 1 % rh, 0.1 °C / year
Humidity response time t 63	3 seconds
Measurement range	0...100 % rh, -100...200 °C
Electronics operating range	-50-100 °C and 0-100 % rh
Output signals	Serial port RS485
Audit trail & electronic records	FDA 21CFR Part 11 and GAMP compliant
Power supply & consumption	3.2 V / 4 mA
Housing/probe material	Polycarbonate
Filter	Polyethylene insert, polycarbonate cage
Standards	CE-compliant 2007/108/EG

Pessl Instrument Air Temperature & Relative Humidity Sensor

Measures air temperature and relative humidity and is used for low power consuming applications on µMETOS CLIMA (LoRaWAN®, NB-IoT).
I2C Bus Considerations: I2C Bus is sensitive to the electromagnetic waves and can be distorted under certain conditions. On the contrary, Hygroclip is less sensitive. Recommended cable length: no longer than 1 m.

CONNECTION TO MOTHERBOARDS

µMETOS NB-IoT / µMETOS CLIMA LoRa



Order number: 600019 / 900026 (µMetos), 600009 / 900021 (LoRain)

TECHNICAL SPECIFICATIONS

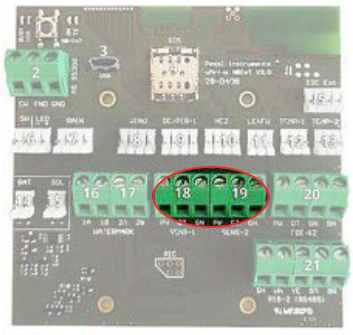
Sensor	HYT221
Operating temperature range	-40°C to +125°C
Humidity range	0% to 100% RH
Accuracy	±0.2°C (0°C to +60°C) ±2 % RH at +23 °C (0% to 90% RH)
Operating voltage	2.7V to 5.5V
Digital interface	I²C, address 0x28 or alternative address
Operating voltage (limit data)	0.3 V to +6 V
Storage conditions	-20 °C to +50 °C

Pessl Instrument Air Temperature & Relative Humidity Sensor with a longer (5 m) cable

Measures air temperature and relative humidity with additional calculation of virtual sensors like dew point, VPD and delta T. The sensor is used for low power consuming applications on µMETOS CLIMA (LoRaWAN®, NB-IoT).
Application: when long distances up to 15 m from the main station are required i.e. in greenhouses in/out, when two or more sensors are needed.

CONNECTION TO MOTHERBOARDS

µMETOS NB-IoT / µMETOS CLIMA LoRa



Order number: 600019 / 900026 (µMetos), 600009 / 900021 (LoRAIN)

TECHNICAL SPECIFICATIONS

Sensor	HYT221
Cable lenght	5 m
Operating temperature range	-40°C to +60°C
Humidity range	0% to 100% RH
Accuracy	±0.2°C (0°C to +60°C) ±2 % RH at +23 °C (0% to 90% RH)
Operating voltage	2.7V to 5.5V
Digital interface	RS485 with PI-Bus, insertable in a chain
Operating voltage (limit data)	0.3 V to +6 V
Storage conditions	-20 °C to +50 °C

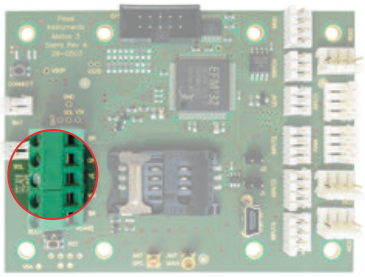
Pessl Instruments Wet and Dry Bulb Temperature

Two highly reliable and tested PT1000 are built in a waterproof housing. One of them is covered with cotton tissue and wetted with water.

CONNECTION TO MOTHERBOARDS

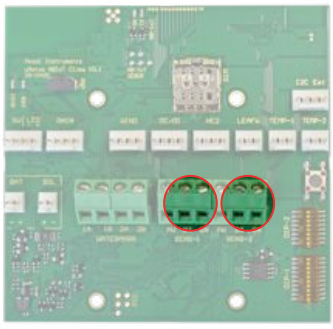
Order number: 600165 / 900134

iMETOS 3.3



Order number: 600164 / 900132

µMETOS NB-IoT / µMETOS CLIMA LoRa



Order number: 600165 / 900134 (iMETOS 3.3), 600164 / 900132 (µMETOS)

TECHNICAL SPECIFICATIONS

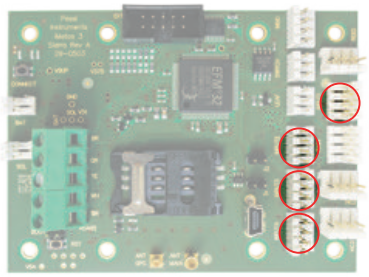
Sensor	PT1000
Supply voltage	4.57-7 V for chain version
Supply current	max. 200 µA
Short circuit protection	Infinite (within supply voltage range)
Short circuit supply current	max. 40 mA
Operating temperature range	-30 °C to +60 °C
Accuracy	0.1 °C
Cable length	5 m

Pessl Instruments Soil Temperature

The Soil Temperature Sensor is a PT1000 in a waterproof stainless-steel housing. The sensor output is a duty-cycle signal.

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



Order number: 600159 / 900124 (iMETOS 3.3), 600020 / 900027 (µMETOS, ECHO)

TECHNICAL SPECIFICATIONS

Sensor SMT172	**Operating temperature range:** -30 °C to +75 °C
	Accuracy: ±0.5 °C (-30 °C to +75 °C)
Sensor PT1000	**Operating temperature range:** -30 °C to +75 °C
	Accuracy: ±0.1 °C (-30 °C to +75 °C)
Supply voltage	4.57-7 V
Supply current	max. 200 µA
Short circuit protection	infinite (within supply voltage range)
Short circuit supply current	max. 40 mA
Calibration error	max. 0.25 °C (23 °C)
Nonlinearity error	max. 0.2 °C
Supply voltage sensitivity	max. 0. 1 °C/V
Repeatability	max. 0.2 °C
Long term drift	max. 0.1 °C
Output frequency	1 to 4 kHz
Evaluation	Duty cycle
Cable length	5 m

Pessl Instruments Multiple Soil Temperature

Order number: 600079 / 900058

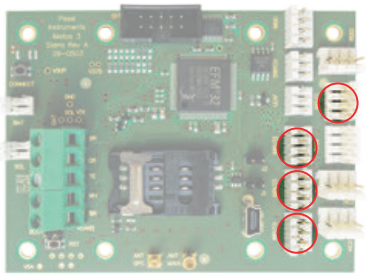
SAR19/SAR19M provides soil temperature measurement from several centimeters to 15-meter deep by using the Pessl Instruments sensor BUS. The distance between the sensors can be chosen according to the application, but only up to 10 sensors can be attached to one sensor chain.

TECHNICAL SPECIFICATIONS

Temperature sensor	DS18B20
Operating temperature range	-55 °C to +125 °C
Supply DC voltage (range)	3-5.5 V
Thermometer error -10 °C to +85 °C	±0.3 °C
Drift	±0.2 °C
Data transmission	Rs 485 Digital signal (temperature data sent on demand of iMETOS main board)

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



Pessl Instruments Single Soil Temperature

Order number: 600020

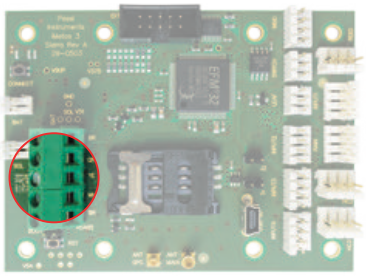
WMTEMP is a soil temperature sensor usually used with Watermark sensors on iMETOS ECO D3.

TECHNICAL SPECIFICATIONS

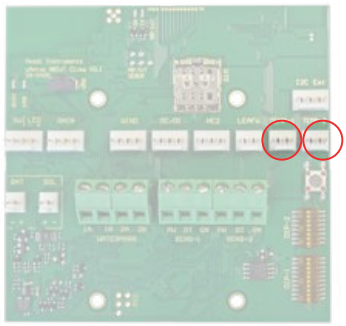
Temperature sensor	DS18B20
Operating temperature range	-55 °C to +125 °C
Supply DC voltage (range)	3-5.5 V
Thermometer error -10 °C to +85 °C	±0.3 °C
Drift	±0.2 °C
Data transmission	Rs 485 Digital signal (temperature data sent on demand of iMETOS main board)

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



µMETOS NB-IoT / µMETOS CLIMA / µMETOS SOIL



INTERFACE

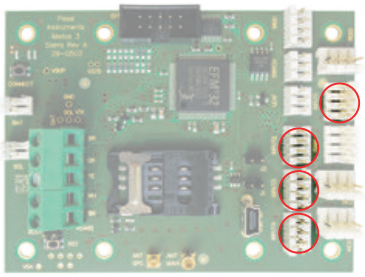
Necessary Interface to connect this sensor with iMETOS:
ECH871EXT, ECH874EXT or ECH871INT, ECH874INT or RFRN09, RFRN12 or WM-BUS

Pessl Instruments Heavy Duty Multiple-temperature Probe

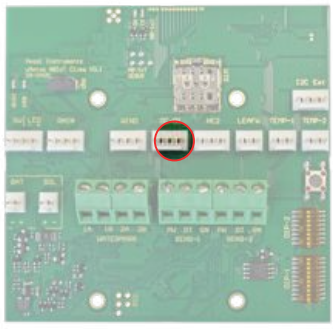
Multiple-temperature probe is a thermometer, designed to make measurements in extremely harsh conditions like temperature of waste on disposal sites, and chipped wood in storage rooms.

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



µMETOS NB-IoT / µMETOS CLIMA LoRa

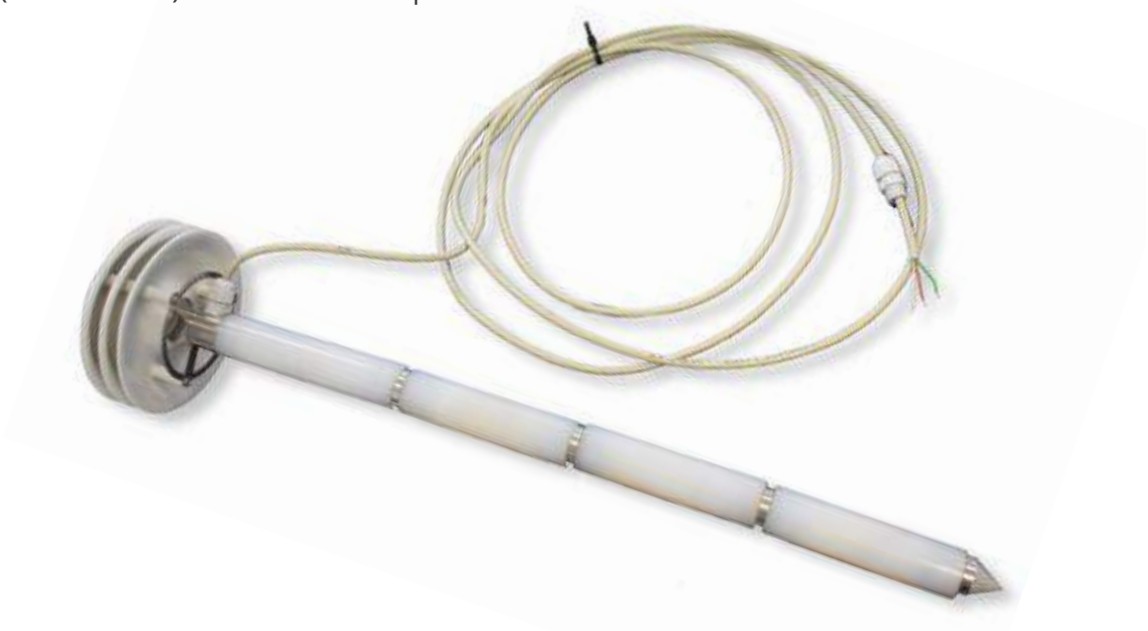


TECHNICAL SPECIFICATIONS

Operating temperature range	-55 °C to +125 °C
Supply DC Voltage (range)	3-5.5 V
Thermometer error -10 °C to +85 °C	±0.3 °C
Drift	±0.2 °C
Data transmission	Rs 485 Digital signal (temperature data sent on demand of iMETOS main board) iMETOS checks all sensors every 5 minutes

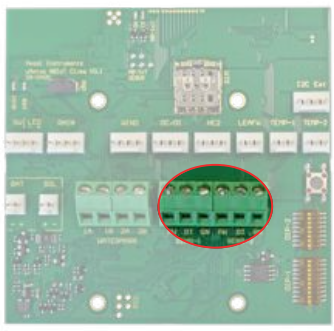
PI Asparagus multi temperature probe

That specific multiple sensor measures air temperature at the surface and soil temperatures at different soil depths (10 cm, 20 cm, 30 cm and 40 cm) in a soil profile with high accuracy.
The growth model for asparagus is implemented in FieldClimate (Section: Accumulation Tool) and calculates different stages/parameters of the plant growth, for example vernalization, harvesting conditions, quality, and critical damage (hollow stem) based on data input.

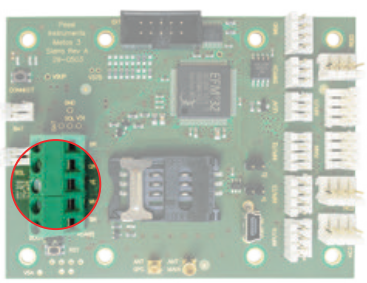


CONNECTION TO MOTHERBOARDS

µMETOS NB-IoT / µMETOS CLIMA LoRa



iMETOS 3.3



Order number: 600158 / 900203

TECHNICAL SPECIFICATIONS

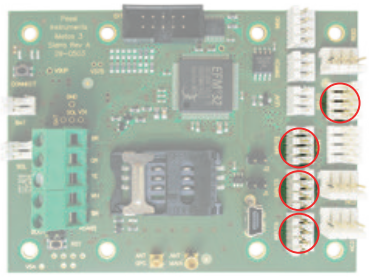
Temperature sensor	DS18B20
Operating temperature range	-55 °C to +125 °C
Supply DC voltage (range)	3-5.5 V
Thermometer error -10 °C to +85 °C	±0.3 °C
Drift	±0.2 °C
Data transmission	Rs 485 Digital signal (temperature data sent on demand of iMETOS main board)

Pessl Instruments Leaf Temperature

IM522CD is a highly accurate leaf temperature sensor. It measures the radiated temperature around the surface of a leaf or a canopy.

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



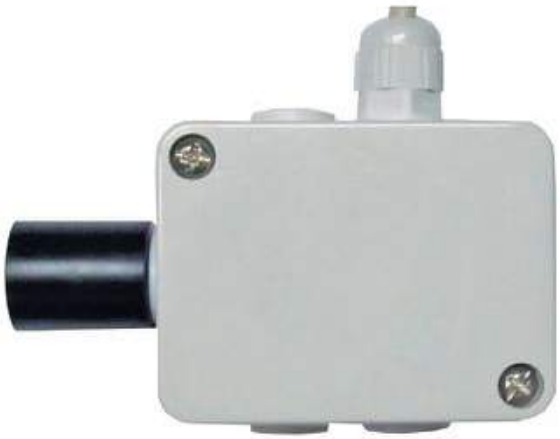
Order number: 600127 / 900169 (IMT), 600126 / 900171 (µMetos)

TECHNICAL SPECIFICATIONS

Sensor	PT1000
Accuracy	min. 0.1 °C (-30 °C to +99 °C)
Supply current	max. 200 µA
Short circuit protection	Infinite (within supply voltage range)
Short circuit supply current	max. 40 mA
Operating temperature range	-30 °C to +99 °C
Nonlinearity error	max. 0.2 °C
Supply voltage sensitivity	max. 0.1 °C/V
Repeatability	max. 0.2 °C
Long term drift	max. 0.1 °C
Output frequency	1 to 4 kHz
Duty cycle	0.320 (0 °C), 0.00470 °C
Evaluation	Analog
Cable length	5 m

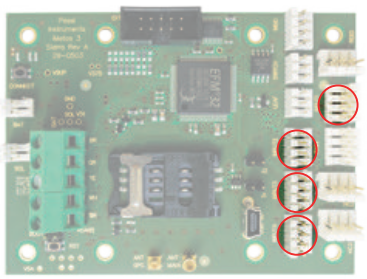
Pessl Instruments IR Temperature

The infrared temperature sensor infers the temperature from a portion of thermal radiation (blackbody radiation) emitted by the object being measured. It is a non-contact temperature sensor. By measuring the amount of infrared energy emitted by the object and its emissivity, the object 's temperature can be determined. Main use: canopy or leaf temperature measurements.



CONNECTION TO MOTHERBOARDS

iMETOS 3.3



Order number: 600131 / 900066

TECHNICAL SPECIFICATIONS

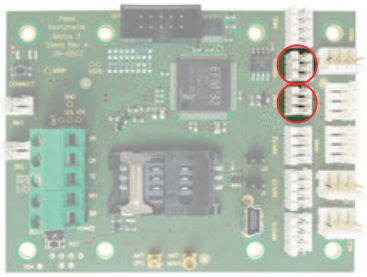
Sensor	Melexis MLX90614-BCC
Resolution	0.1 °C
Interface	RS 485 PI Sensor Bus
Size	20 mm (dia) x 24 mm
Sensor housing	Weather resistant PAS
Range	-40 °C to +85 °C

Pessl Instruments Leaf Wetness

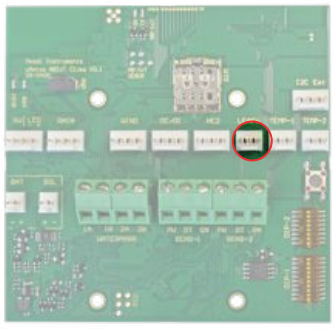
The leaf wetness sensor works by measuring the conductivity on a filter paper, which is held between two stainless steel electrodes in a transparent holder. The use of transparent Lucite plastic as a holder reduces the warming up of the sensor when it is exposed to direct sunlight.

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



µMETOS NB-IoT / µMETOS CLIMA LoRa



Order number: 600015 / 900025

TECHNICAL SPECIFICATIONS

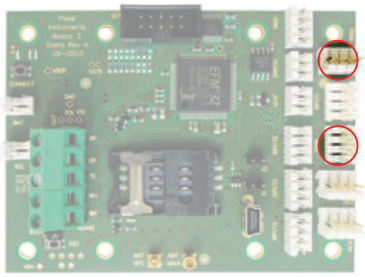
Supply voltage	4.75-5.25 V
Supply current	max. 1500 µA
Short circuit protection	Infinite (within supply voltage range)
Dry / Wet threshold	220-390 kOhm
Output	Dry: max. 0.4 VDC Wet: min. VCC-0.4 VDC
Electronic	Totally plastic encapsulated – SMD
Dimensions	42 mm x 78 mm x 15 mm
Cable length	5 m

Pessl Instruments Rain Gauge

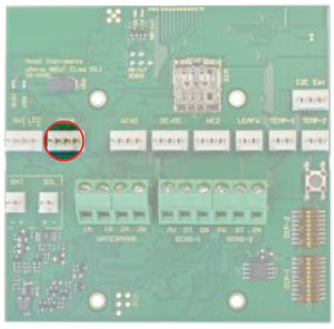
The mechanic consists of a magnet, which moves past a reed switch and opens or closes the circuit. The double spoon tips left or right and does not lose any water due to a very fast switching mechanics. The resolution with a surface of 200 cm^2 is 0.2 mm, while the resolution with the 80 cm^2 is 0.5 mm. Heating for rain gauge can also be included.

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



µMETOS NB-IoT / µMETOS CLIMA LoRa / µMETOS SOIL



Order number: 600157 / 900163

TECHNICAL SPECIFICATIONS

Sensor type	Double tipping bucket rain gauge
Output	Switch signal
Switch	Reed contact, solid state
Sensitivity	1 tip per 0.2 mm or 1 tip per 0.5 mm
Collector surface	200 cm^2
Evaluation	Digital
Maximum rain	12 mm/minute
Dimensions	185 mm diameter x 250 mm H
Accuracy	±5 %

Protect your rain gauge from birds - add bird protection crown. Very easy to install and dismantle.

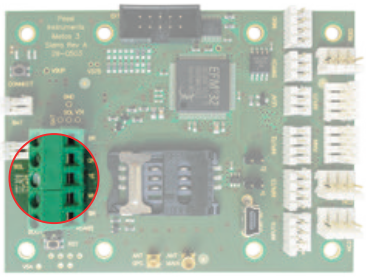
Order number: 900191

Pessl Instruments Soil Moisture & Soil Temperature Sensor PI54-D

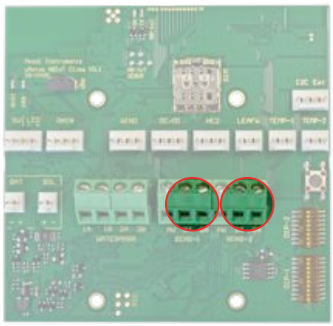
The PI54-D soil moisture and soil temperature sensor has a larger volume of influence. It determines volumetric water content (VWC) by measuring the dielectric constant of the soil using capacitance technology and soil temperature. It is 10 cm long and thus measures 1 Liter of soil, while high frequency minimizes salinity and textural effects which makes PI54-D accurate in most soils.

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



µMETOS NB-IoT / µMETOS CLIMA LoRa / µMETOS SOIL



Order number: 600118 / 900012

TECHNICAL SPECIFICATIONS

Volumetric water content (VWC)	**Range:** 0–0.57 m^3/m^3 (0%–57% VWC)
	Resolution: 0.0008 m^3/m^3 (0.08% VWC) in mineral soils from 0–0.50 m^3/m^3 (0%–50% VWC)
	Accuracy: With standard calibration equation, 0.03 m^3/m^3 (3% VWC) typical in mineral soils that have solution electrical conductivity <10 dS/m NOTE: With soil-specific calibration, ±0.02 m^3/m^3 (±2% VWC) is typical in any soil.
Dimensions	16.0 cm (6.3 in) length; 3.3 cm (1.3 in) width; 0.8 cm (0.3 in) height
Prong length	10 cm (3.94 in)
Operating temperature range	-40 to 50 °C
Cable length	5 m
Supply voltage (VIN to GND)	Minimum: 3.6 VDC at 12 mA Maximum: 15 VDC at 20 mA
Measurement duration	Maximum 10 ms
Temperature accuracy - PI54-D	±0.3
Output	Digital

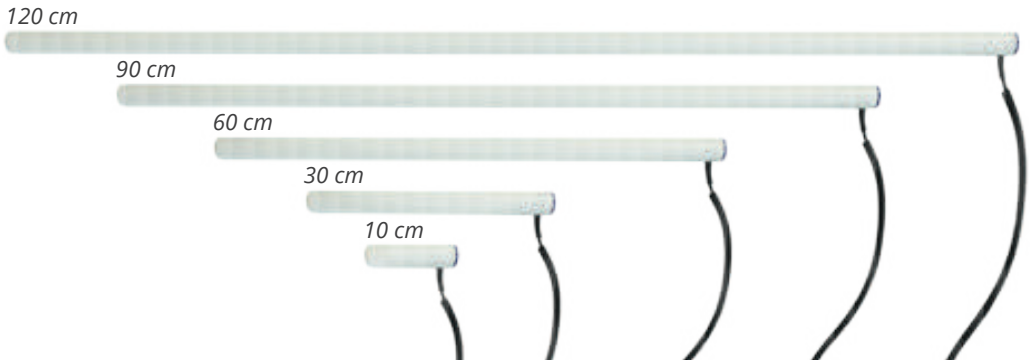
miniMETOS SOIL, LoRATH soil, LoRAIN soil

INTERFACE

Necessary Interface to connect this sensor with iMETOS:
600069 / 900052, 600068 / 900051, 600167 / 900057 or 900173, 900174, 900175

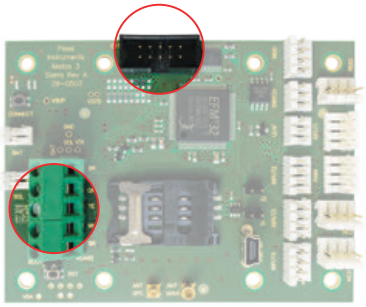
Sentek Drill & Drop and TriSCAN Probe

Sentek Drill & Drop probe provides the user with great flexibility for precision monitoring of temperature, water, and salinity (Triscan) at multiple depths in a soil profile. Available in five lengths: 10 cm, 30 cm, 60 cm, 90 cm and 120 cm with sensors fixed at every 10 cm increment.

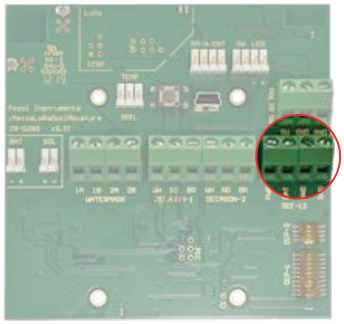


CONNECTION TO MOTHERBOARDS

iMETOS 3.3



µMETOS NB-IoT / µMETOS SOIL



Order number: 600098 / 900104, 600099 / 900106, 600100 / 900107, 600101 / 900108, 600102 / 900109, 600103 / 900110, 600104 / 900111, 600105 / 900112, 600106 / 900113, 600107 / 900114

TECHNICAL SPECIFICATIONS

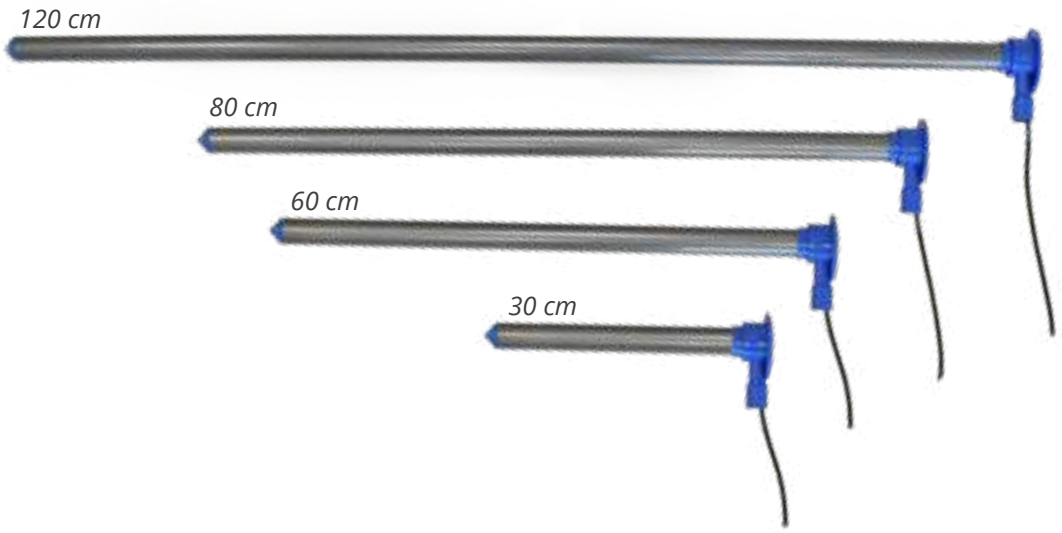
Probe lengths	10 cm (4") / 30 cm (12") / 60 cm (24") / 90 cm (36") / 120 cm (48")
Number of sensors	1 / 3 / 6 / 9 / 12
Outer probe diameter (top-bottom)	24-24.5 mm / 28-29.5 mm / 27-29.5 mm / 26-30 mm / 24.5-29.5 mm
Moisture (VWC) range	Oven dry to saturation
Method	Capacitance based technology
Resolution	**Moisture (VWC):** 1:10000 **Salinity (Triscan) (VIC, Volumetric Ion Content):** 1:6000 **Temperature:** 0.3 °C
Moisture precision	±0.03 % vol.
Temperature accuracy	±2 °C at 25 °C
Operating temperature range	-20 °C to 60 °C

INTERFACE

Necessary Interface to connect this sensor with iMETOS:
600150/900105

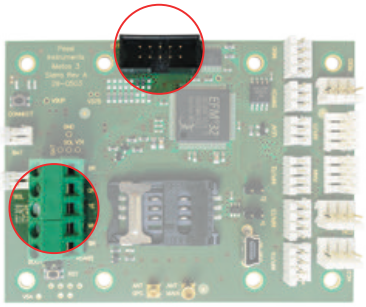
iMETOS AC Probe
Aquacheck Sub-Surface Probe

The Aquacheck sub-surface soil moisture probe offers capacitance-based soil moisture and temperature measurements along the vertical soil profile. Different configurations are available with 6, 8 or 12 sensors for a probe length variable from 60 to 120 cm.

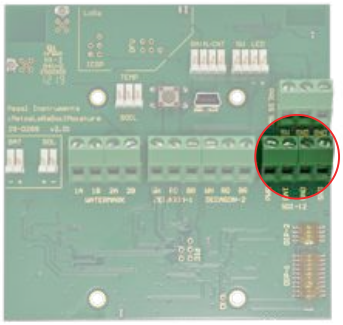


CONNECTION TO MOTHERBOARDS

iMETOS 3.3



µMETOS NB-IoT / µMETOS SOIL



Order number: 600123 / 900115, 600141 / 900116, 600142 / 900117, 600143 / 900118

TECHNICAL SPECIFICATIONS

Probe lengths	from 60 to 120 cm
Number of sensors	6 / 8 / 12 sensors depending on the configuration
Shaft Diameter	32 mm
Moisture (VWC) range	Oven dry to saturation
Method	Capacitance based technology
Temperature range	0 °C to 51 °C
Temperature resolution	0.2 °C
Cable length	5 m

INTERFACE

Necessary Interface to connect this sensor with iMETOS:
600150/900105

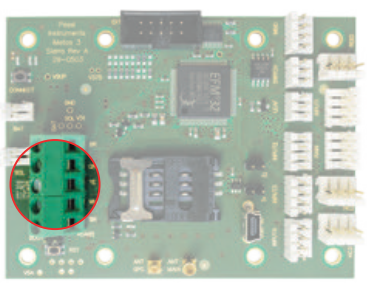
Irrometer Watermark Soil Moisture Sensor

The Watermark Sensor consists of two concentric electrodes buried in a special reference matrix material that is held in place by a synthetic membrane. The matrix material has been selected to reflect the maximum change of electrical resistance over the growth range of crop production, as well as to neutralize the effect of soil salinity. In operation, soil moisture is constantly being absorbed or released and the electrical resistance between the electrode's changes. This resistance is read and logged by the weather station.

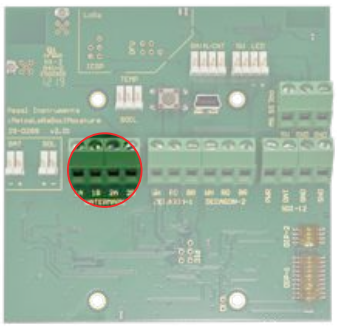
The sensor is manufactured from non-corrosive materials and lasts up to three years.

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



µMETOS NB-IoT / µMETOS SOIL



Order number: 600120 / 900010

TECHNICAL SPECIFICATIONS

Size	2.2 cm diameter x 5 cm length
Measuring principle	Soil water tension correlated with electrical resistance in granular matrix
Working range	0 to 200 kPa
Precision	5 %
Evaluation	Analog
Cable length	3.5m / 10m

INTERFACE

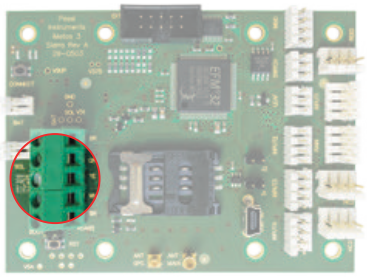
Necessary Interface to connect this sensor with iMETOS:
600068 / 900051, 600167 / 900057, 900174, 900175

Irrometer Tensiometer

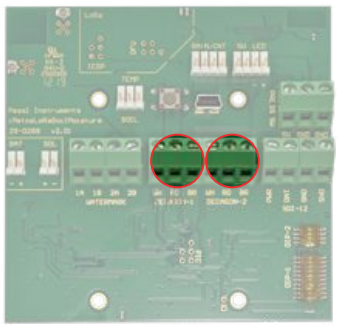
The instrument measures soil water tension (or suction). This value represents the energy a plant's root system uses to draw water from the soil. Understanding soil moisture dynamics helps the user make informed irrigation scheduling decisions, resulting in improved yield quantity and quality while reducing water, fertilizer, labor, and energy costs. Available in different lengths: 15 cm, 30 cm, 45 cm, 60 cm and 90 cm.

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



µMETOS NB-IoT/SOIL



Order number: TNS101

TECHNICAL SPECIFICATIONS

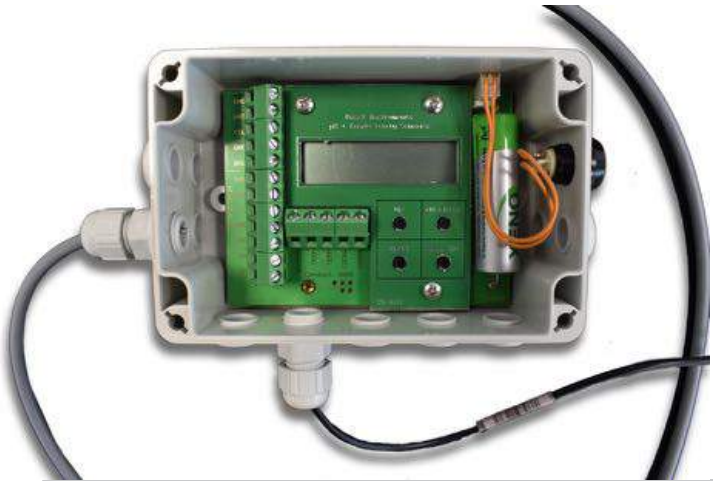
Instrument body materials	Butyrate body, ceramic tip, neoprene stopper
Weight	30 cm weights 0.439 kg. It increases 0.114 kg per 30 cm
Ceramic tip	White tip – used for most soil types
Operating suction	0-90 kPa
Operating temperature range	0 °C to 50 °C
Reservoir dimensions	Height: 120-130 mm including cap; Diameter: 51-55 mm including cap
Body tube dimensions	Length: ranges from 15 to 90 cm; Diameter: 22 mm

INTERFACE

Necessary Interface to connect this sensor with iMETOS:
600069 / 900052, 600068 / 900051, 600167 / 900057 or 900173, 900174, 900175

EC & pH Interface Box with Display in IP65 Box

The EC500PH EC & pH Interface box is a measuring device with display in IP65 Box to be integrated into any iMETOS sensor chain interface for continuous EC & pH measurements in water. It is compatible with most industry standard EC & pH sensors. The actual reading can be seen on the display. With the built-in calibration mode, all sensor readings can be calibrated and checked from time to time.

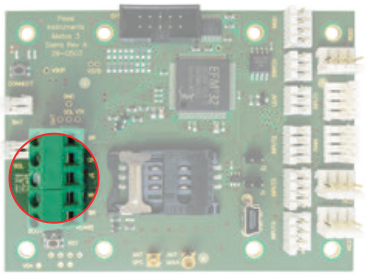


Connection Possibilities

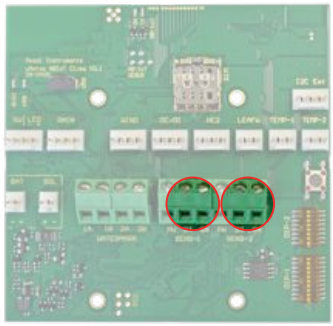
- 1 EC Sensor (Part.no. EC501)
- 1 pH Sensor (Part.no. PH501)

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



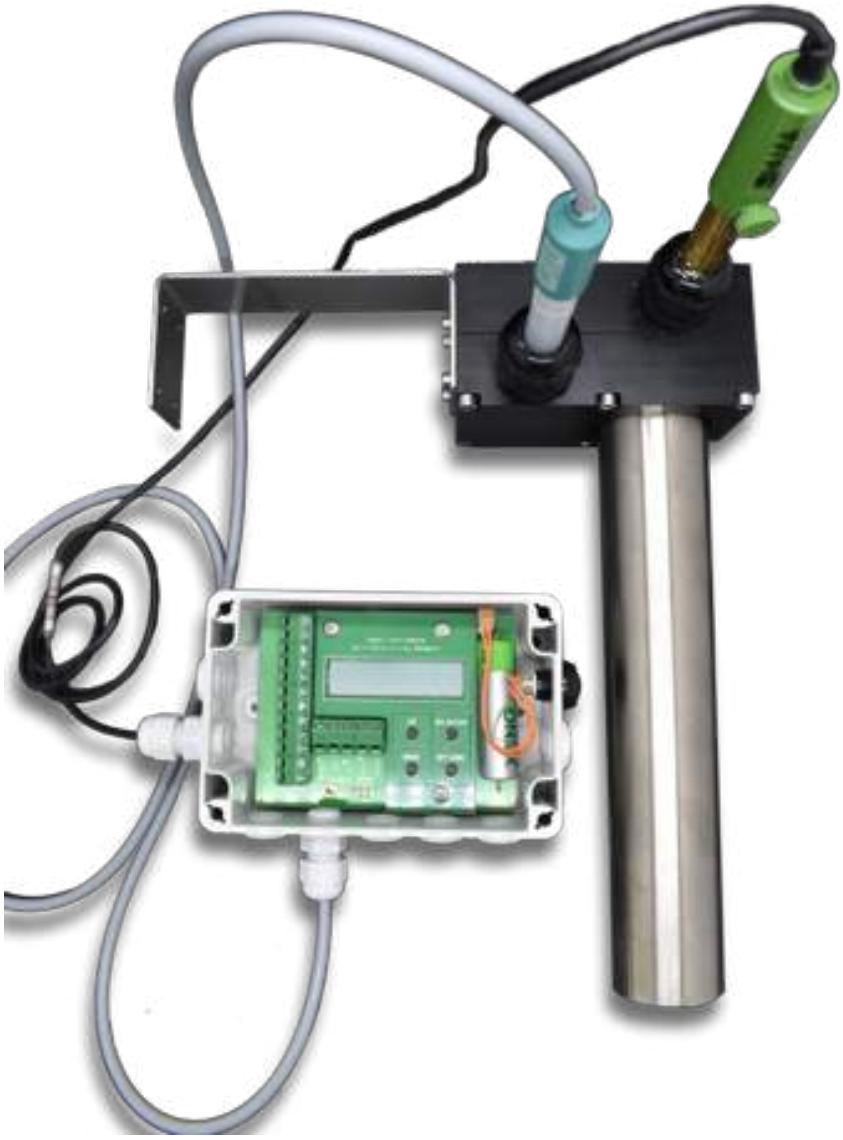
µMETOS NB-IoT/CLIMA



Order number: 600025 / 900029

TECHNICAL SPECIFICATIONS

General information	Display shows actual data by pressing the button. It works with iMETOS 3.3.
Cable length	5 m standard, custom cable lengths available upon request



Pessl Instruments Electrical Conductivity

Order number: 600145 / 900032

The conductivity sensor provides a complete self contained measurement. The sensor utilizes a reliable and robust sensor for conductivity measurement and a thermistor for temperature measurement. The sensor is ideal for hydrographical and environmental water monitoring, in agriculture and industrial applications. The durable design ensures suitability for the harshest environment applications.

TECHNICAL SPECIFICATIONS

Range	0.1 µS/m - 1000 mS/cm
Resolution	0.1 µS/cm
Temperature compensation	Automatic
Probe material	PP
Probe diameter	12 mm
Min. immersion	40 mm

INTERFACE

Necessary Interface to connect this sensor with iMETOS:
600025 / 900029 Interface box with display

Pessl Instruments pH Sensor

Order number: 600144 / 900030

The pH sensor is a reliable and cost-effective sensor for measuring the pH value of various aqueous solutions. The pH scale covers values between 0 and 14.

Acids have pH values between 0 and 6; caustic solutions have pH values between 8 and 14. Value 7 is neutral.

TECHNICAL SPECIFICATIONS

Range	pH 0.00 to 14.00
Resolution	0.001 pH
Accuracy	±2 % F.S.
Temperature deviation	3 % (range 5 °C to 30 °C)
pH probe	Standard up to 0.1 bar (other types on request), 3 m cable, 2-ring-flow-through (please specify type of application)
pH calibration	2-point with automatic buffer (recognition pH 4.0 and pH 7.0)
Probe material	Glass
Probe diameter	12 mm
Min. immersion	35 mm
Operating temperature range	15 °C to 60 °C
Response time	≤ 90 s

INTERFACE

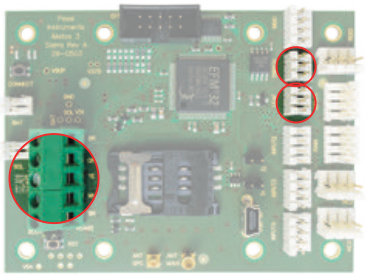
Necessary Interface to connect this sensor with iMETOS:
600025 / 900029 Interface box with display

Pessl Instruments Pressure Switch

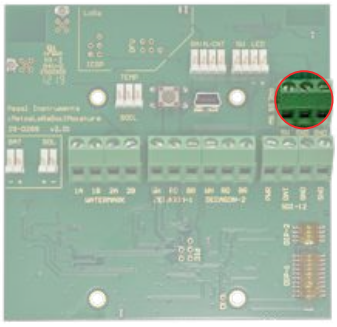
Simple and robust design makes pressure switch suitable for use with compressed air, hydraulic oil, oil emulsions and water. Detection threshold is 0.5 bar (7.25 psi) and switch off is at 0.25 bar (3.62 psi) (other values on demand). The main purpose of this sensor is to control/check the performance of the irrigation system in different types of applications (resistance to high pressure makes it usable also for frost protection system).

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



µMETOS NB-IoT/SOIL



Order number: 600168 / 900198

TECHNICAL SPECIFICATIONS

Material	Zinc-plated steel (G 1/4")
Switching function	Open contact, closed contact, changeover
Media	Water, compressed air, hydraulic oil, oil emulsion
Maximum medium temperature	+85 °C
Adjustment ranges	1 to 10 bar (1.4-14 psi), 0-1 bar
Switching frequency	max. 200 /min
Switching pressure difference	10 to 15 %
Switching voltage	Open contact/closed contact 42V max. 2A; Changeover 250 V max. 2A

Pessl Instruments Water Counter Interfaces

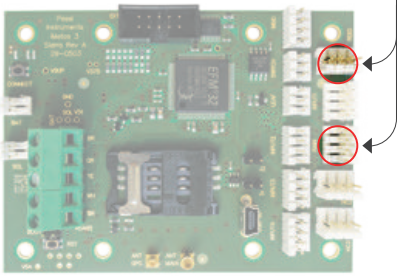
Order number: 600155

These interfaces support most of the water meters used in irrigation with a pulse output.

Applications: Irrigation management, irrigation consulting, smart irrigation, irrigation tractability and bookkeeping, alarms, and supervision. Used widely in open field crops, hydroponics, and green house.

SW1000 pulse counter (Reed/Rain input)

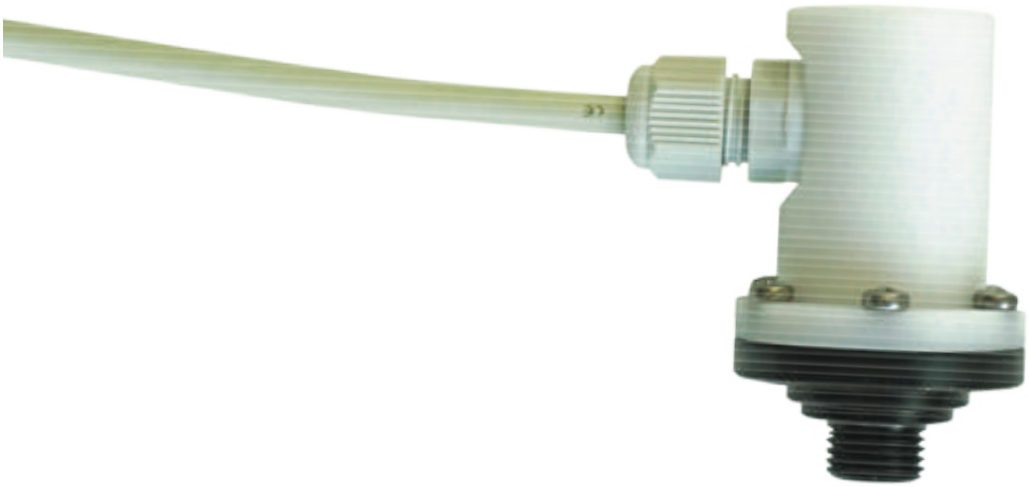
iMETOS 3.3



Pessl Instruments Pipe Pressure (WPS)

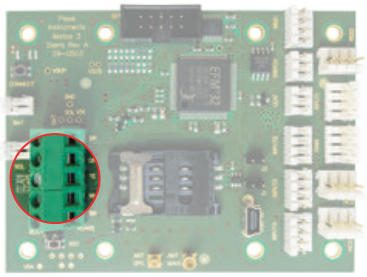
This sensor enables continuous monitoring of the pressure in irrigation pipes (main pipe or sector pipes) and it measures up to 50 bar, so it can be used in all types of irrigation systems (drip irrigation, sprinkler, hydroponics ...).
Technical specification of the full scale and resolution can be changed in the benefit of the user.

Applications: Irrigation monitoring and supervision, identification of pressure loss in the installation.

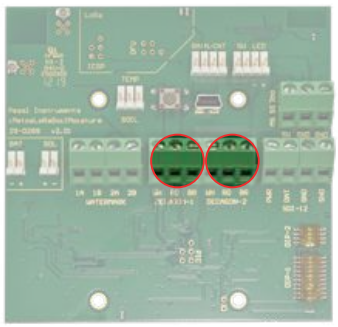


CONNECTION TO MOTHERBOARDS

iMETOS 3.3



µMETOS NB-IoT / µMETOS SOIL



Order number: 600154

TECHNICAL SPECIFICATIONS

Range	0 to 500 m of water column
Resolution	10 mbar
Accuracy	0.3 %
Operating temperature range	0 °C to 50 °C
Storage temperature range	-20 °C to 80 °C
Weight	300 g (including cable)
Housing	POM
Diaphragm	Ceramic
Cable sheath	Shielded PVC
Output signal	Serial (RS485)
Support	PI-bus only at the end of the chain
Dimensions gauge shaft	90 x 20 mm (height x diameter)

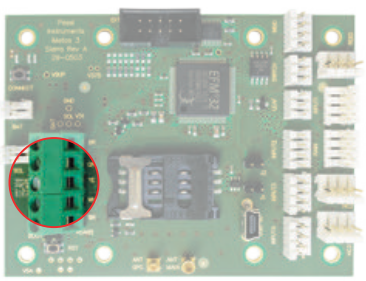
Pessl Instruments Water Level Sensor

The Water level sensor is an accurate and cost effective submersible water level sensor that can be connected to METOS® stations with the precision of 3 mm within the measurement ranges. Sensor has an integrated barometric sensor module to increase precision. Pressure (Measuring) ranges: 0 mWC up to 5 mWC (other distances on request). Special cable is also available.

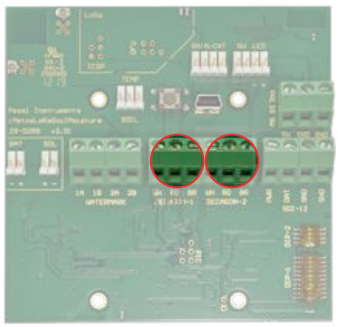
Applications: Depth or level measurement in wells and open waters (rivers and lakes) and ground water level measurement.

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



µMETOS NB-IoT / µMETOS SOIL



Order number: 600026 / 900201, 600153

TECHNICAL SPECIFICATIONS

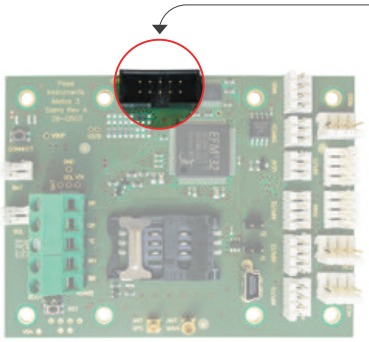
Accuracy according to IEC 60770	Limit point adjustment (nonlinearity, hysteresis and repeatability) within ±3 % within the measurement ranges
Response time	~ 5 ms
Range	0 to 20 m of water column (other on request)
Resolution	1 mm
Accuracy	0.5 % of maximum water level
Operating temperature range	0 °C to 50 °C
Storage temperature range	-20 °C to 80 °C
Weight	1.1 kg (including cable)
Housing	Stainless steel 1.4301
Diaphragm	Ceramic
Seals	FKM
Cable sheath	Shielded PVC
Output signal	Serial (RS485)
Support	PI-bus only at the end of the chain
Dimensions gauge shaft	90 x 20 mm (height x diameter)

Pessl Instruments Ultrasonic Snow Height or Water Depth Sensor

Ultrasonic snow depth sensor is used for non-contact measurements of snow depth and river levels in extreme weather conditions. The sensor is characterized by its high level of operating reliability, low energy consumption, fast installation and ease of use in the field.

CONNECTION TO MOTHERBOARDS

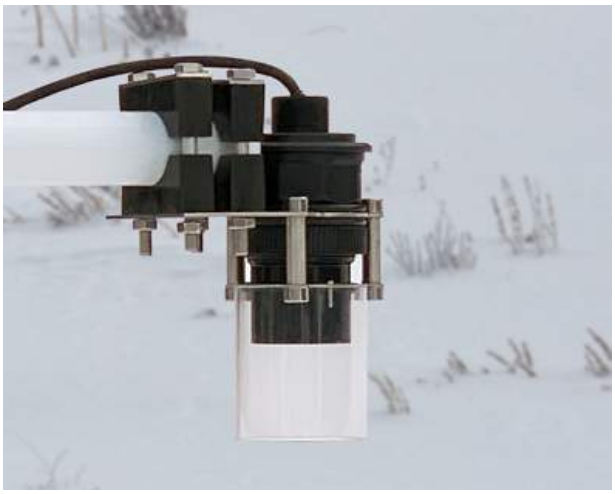
iMETOS 3.3

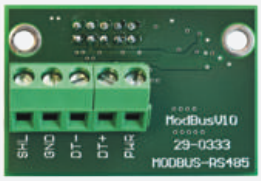


Order number: 600173 / 900209

TECHNICAL SPECIFICATIONS

Range	0 to 10 m
Resolution	10 mm
Accuracy	0.5 % (FS)
Measurement principle	Ultrasonic
Temperature measurement range	-40 °C to +60 °C
Digital RS-232 interface	Serial port protocol, distance or snow depth
Power supply	From the input of the iMETOS, in areas with limited sun extended battery is needed (ord. no. USH8-BATT-EXT).
Ingress protection	IP 66

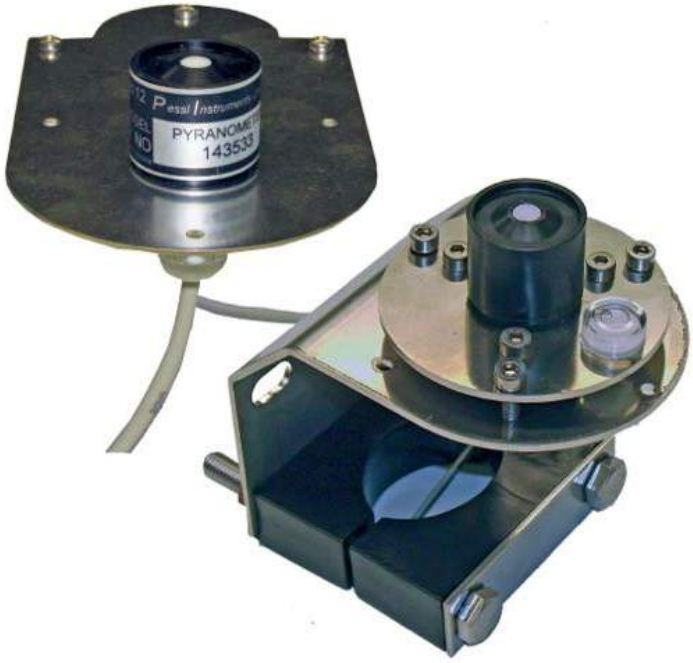




To connect Snow Depth Sensor to the motherboard, you will need **MOD BUS** interface.

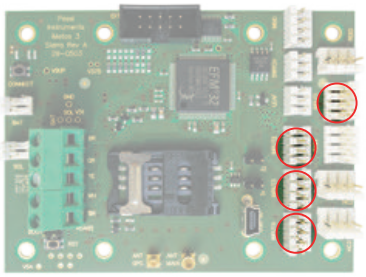
Pessl Instruments Pyranometer

The IM506D Pyranometer is designed for field measurements of global solar radiation in agricultural, meteorological, and solar energy studies. In clear, unobstructed daylight, the Pessl Instruments pyranometer has favorable results compared to the first class thermopile-type pyranometers, but is priced at just a fraction of the cost.

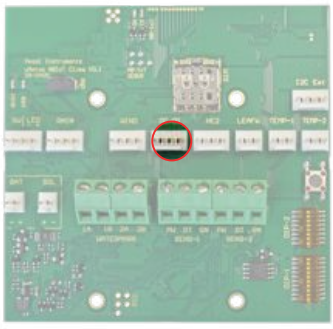


CONNECTION TO MOTHERBOARDS

iMETOS 3.3



µMETOS NB-IoT / µMETOS CLIMA LoRa



Order number: 600021 / 900002 (µMetos), 600035 / 900000 (IMT)

TECHNICAL SPECIFICATIONS

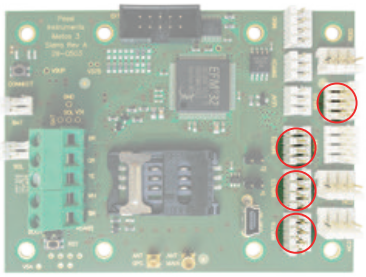
Sensor	LI-200SZ
Calibration	Calibration against Kipp & Zonen CMP3 under daylight. Absolute error max. 5 %, typically 3 %
Stability	2 % drift on 2-year use
Time to measure	10 µs
Temperature dependency	0.15 % per °C
Cosines correction	Sensor corrects up to 80° degrees
Azimuth	1 % error over 360 degree at 45 degree elevation
Operating temperature range	-20 °C to 65 °C
Operating relative humidity range	0 to 100 %
Sensor	Photodiode
Housing	Weatherproof PAS case with acrylic diffuser, stainless steel hardware
Size	35 mm diameter, 45 mm height
Weight	114 g
Evaluation	Pulse Wide Modulation 0-80 % = 0-2000 W/m^2
Spectral range	300-1100 nm

Pessl Instruments PAR Quantum

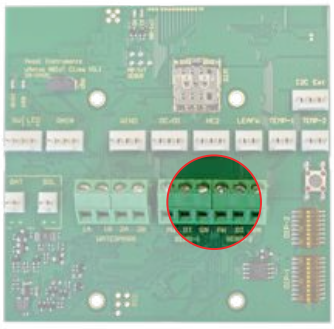
Photosynthetically Active Radiation (PAR) is typically measured as Photosynthetic Photon Flux Density (PPFD), which has units of quanta (photons) per unit of time per unit of surface. The units most often used are micromoles of quanta per second per square meter (µmol s-1 m-2). Plant scientists, horticulturists, ecologists, and other environmental scientists use MD507D Quantum Sensors to accurately measure this variable.

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



µMETOS NB-IoT / µMETOS CLIMA LoRa



Order number: 600078 / 900005

TECHNICAL SPECIFICATIONS

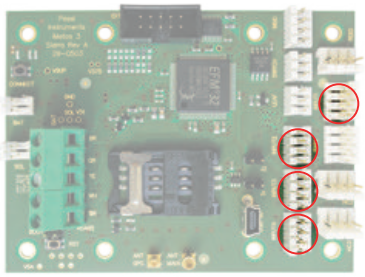
Sensor	EG&G VACTEC VTB1012B
Calibration	Calibration against LI-190SZ under daylight. Absolute difference max. 5 %, typical 3 %
Linearity	Maximum deviation of 1 % up to 3000 W/m²
Stability	2 % change over a 1-year period
Response time	150 ms
Temperature dependency	0.15 % per °C
Cosines correction	Sensor corrects up to 80° degrees
Azimuth	1 % error over 360 degrees at 45 degree elevation
Operating temperature range	-20 °C to 65 °C
Operating relative humidity range	0 to 100 %
Sensor	Photodiode
Housing	Weatherproof PAS case with acrylic diffuser, stainless steel hardware
Size	35 mm diameter, 45 mm height
Weight	114 g
Evaluation	PWM: 0-80 % duty cycle = 0-20 kJ/m²

Pessl Instruments Barometer

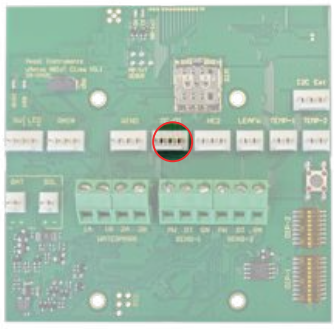
The Pessl Instruments barometric sensor measures the “absolute air pressure” of the atmosphere on site. It is designed for application of environmental protection, where high accuracy, quick response, long term stability and reliability are required. The instrument is suitable for indoor and outdoor use. A tempered piezoceramic sensor for absolute pressure is used, characterized by its thermal and mechanical stability.

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



µMETOS NB-IoT/CLIMA



Order number: 600157 / 900163

TECHNICAL SPECIFICATIONS

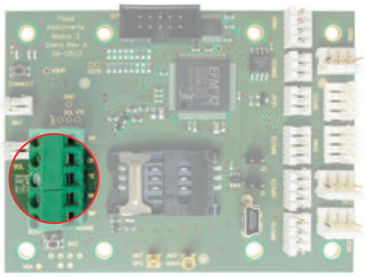
Working range	0-1150 mbar
Weight	ca. 50 g
Power supply	5.0 VDC (6 VDC maximum)
Zero offset	0.50 ±0.09 VDC
Power uptake	max. 20 mA
Precision	0.1 % max. Thrift
Temperature range	-40 °C to 125 °C
Measuring type	Serial (RS 485)

Pessl Instruments Dendrometer

Dendrometers are sensors for continuous measurement of plant growth (changes of the plant diameter). The dendrometer allows us to record the plant parameters using the same time interval as environmental parameters. The data allows the direct assignment of plant responses and stress to environmental influences. Dendrometers are a cost-effective and useful tool for Eco physiological studies.

CONNECTION TO MOTHERBOARDS

iMETOS 3.3



Order number: 100358, 100359, 100361, 100360

TECHNICAL SPECIFICATIONS

To specify plant size range	Diameter 3-30 cm
Range of the sensor	11 mm
Accuracy	±1.5 µm ±0.12 % (CR1000 Logger)
Resolution	0.2-2.6 µm (dependent on used data logger)
Linearity	1 %
Thermal expansion coefficient of the sensor	<0.1 µm/K
Operating temperature range	-25 to 70 °C
Operating relative humidity range	0 to 100 %

INTERFACE

Necessary Interface to connect this sensor with iMETOS:
600170 / 900205

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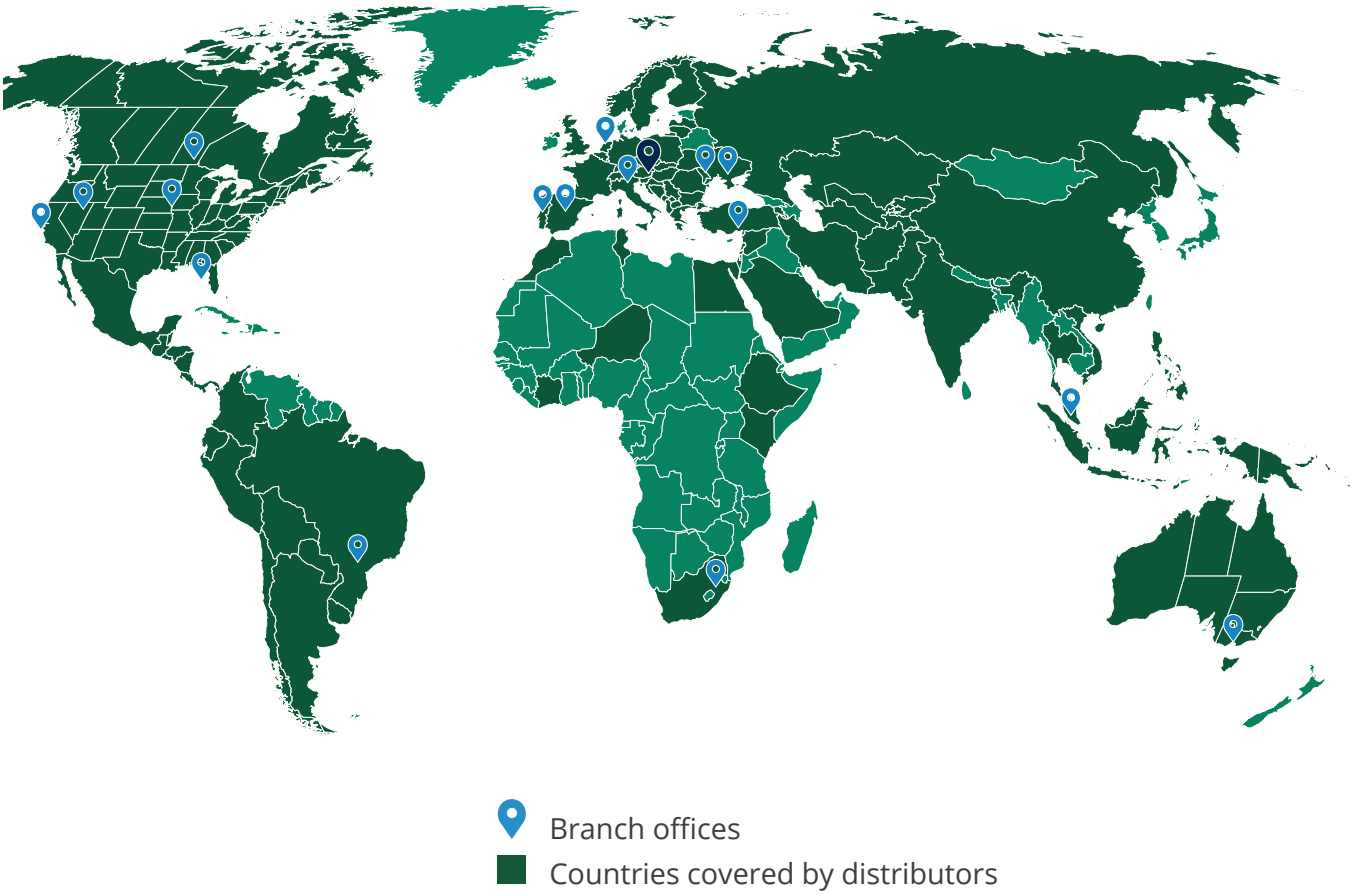

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