



TEMPUS[®] AIR

PRECISION IRRIGATION **SOLUTIONS.**







Toro Tempus® Air is a centralized system to control hydraulic irrigation valves and monitor a wide set of field parameters for an even more precise and efficient irrigation scheduling.

Based on LoRa™ technology, Tempus® Air system allows to remotely control valves via smartphone, tablet or PC.

In the field, direct access to Gateway/Modules can be done via Bluetooth® for quick manual operations.

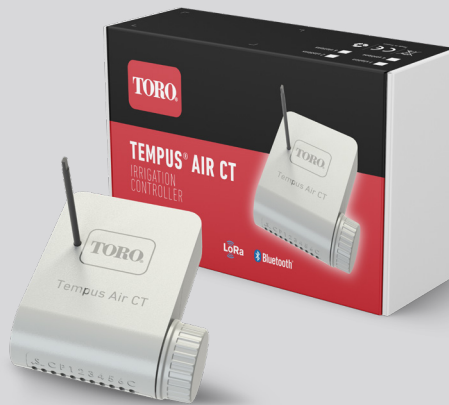


MAIN FEATURES

Scalable: add field modules to expand the number of irrigation sectors or for a more precise monitoring of field parameters.

Easy to install: all the modules are battery powered, no need for wiring.

Easy to use: user-friendly mobile App and web platform



Toro reserves the right to change the product specifications without prior notice and without incurring any penalties.

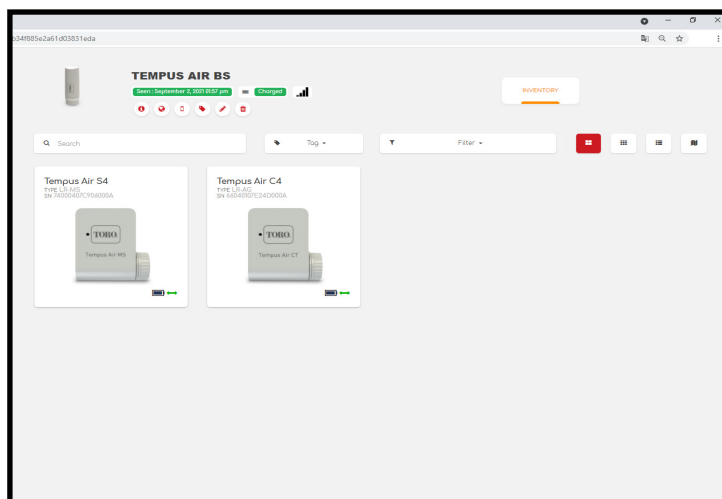
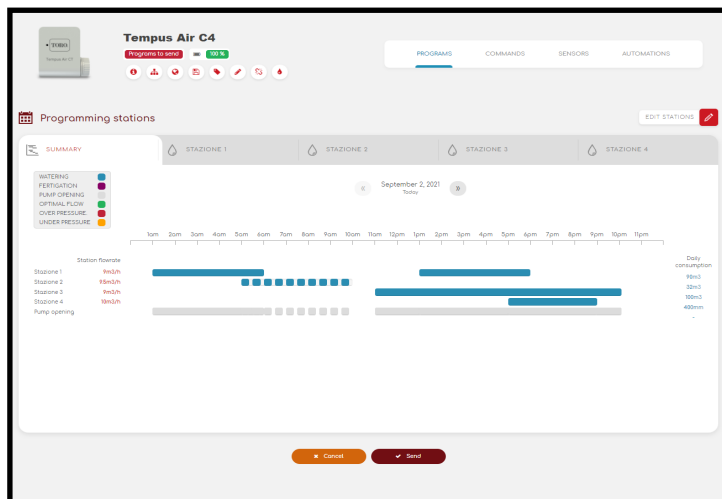


Manage your irrigation system via a very intuitive web platform. Connect to MyToroTempus.com and quickly start programming your system through a user-friendly graphic interface.

- Stations programming
 - by time
 - by volume
 - by rainfall
- Cyclic programming
- Up to 180 stations per gateway
- Real-time detection of field parameters through sensors:
 - Soil moisture sensor
 - Wind speed sensor
 - Pluviometer
 - Air humidity sensor
 - Temperature sensor
 - Rain sensor
- Automatic response depending on flowmeter and sensors inputs
- Real-time alerts
- Monitor trend of sensors through specific graphs
- Export sensor data in excel, CSV or JSON formats
- Daily irrigation summary chart
- Water consumption summary
- Automatic management of master valve
- Manual command by volume or time
- Water budget
- Geolocation and system visual management on digital maps
- Management of customer-defined groups of modules/gateways



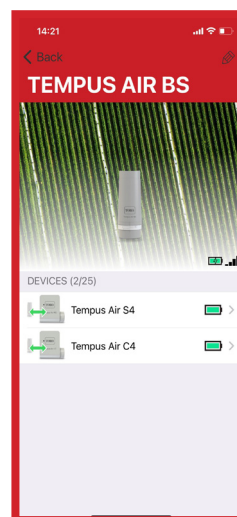
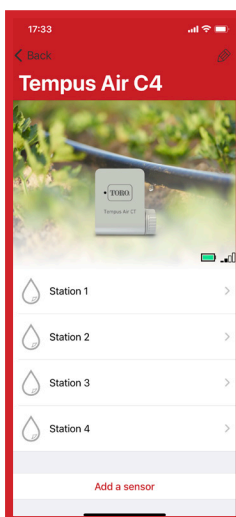
ACCESS YOUR DASHBOARD FROM HOME, OFFICE OR DIRECTLY IN THE FIELD AND SET YOUR IRRIGATION SCHEDULE BASED ON REAL-TIME INFORMATION



Discover MyToroTempus App
to monitor and control
your TEMPUS® AIR SYSTEM

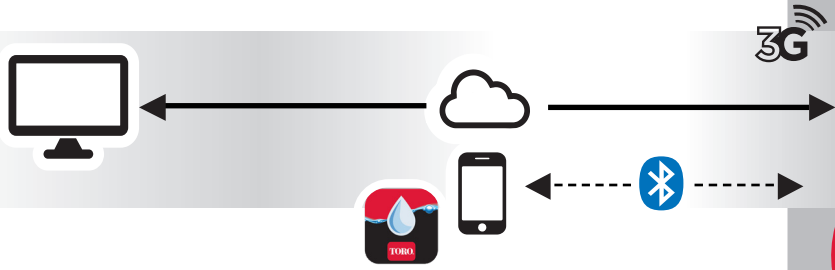


Free download at
App Store or Google Play

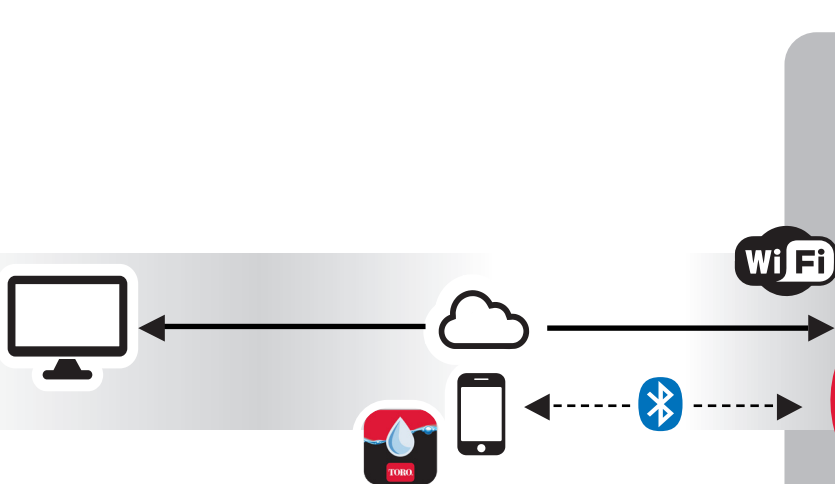


GENERAL SYSTEM OVERVIEW

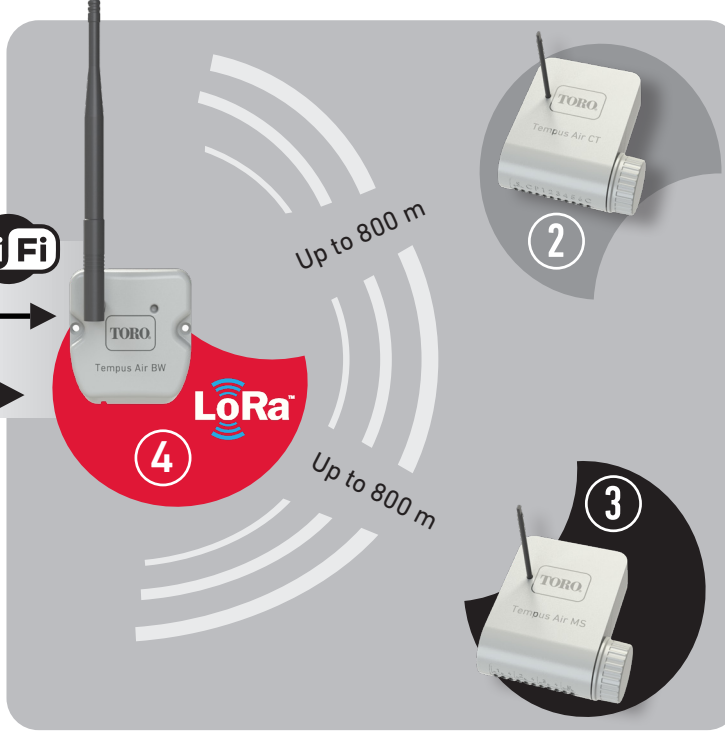
**ALL THE MODULES ARE
BATTERY POWERED
NO NEED FOR WIRING**



- 1 TEMPUS® AIR BS**
3G - LoRa™ Gateway to connect and control up to 25 field modules
- 2 TEMPUS® AIR CT**
LoRa™ controlled, IP68 battery operated controller to manage 1 to 6 DC latching hydraulic valves
- 3 TEMPUS® AIR MS**
LoRa™ controlled, IP68 battery operated single/multi sensors module to detect environment data from field sensors.



- 4 TEMPUS® AIR BW**
Wi-Fi LoRa™ Gateway to connect and control up to 30 field modules



TEMPUS[®] AIR BS

3G - LoRa[™] Gateway

3G - LoRa[™] Gateway allows you to remotely monitor and control the field modules via smartphone / tablet (with MyToroTempus App) or via PC utilizing MyToroTempus.com web platform.

3G - LoRa[™] Gateway allows direct connection from smartphone / tablet via Bluetooth[®]



3G - LoRa[™] Gateway to connect and control up to 25 field modules via LoRa[™].

DATA SUBSCRIPTION FEE INCLUDED FOR THE FIRST YEAR

SPECIFICATION AND FEATURES

- LoRa[™] radio connection [868-868.6] MHz, 25mW
- Manages up to 25 field modules simultaneously
- LoRa[™] range up to 800 m
- 3G Connection
- 12 connections per day
- Bluetooth[®] Smart 4.0 Low Energy
- 230VAC/24VDC power supply or solar panel (optional)
- 24 h autonomy
- Remote management via MyToroTempus App and MyToroTempus.com Web Platform
- Waterproof
- SIM Card included
- Data Subscription fee included for the first year*
SIM Card must be activated, ask your dealer to manage your activation.
- Power transformer 230VAC/24VDC included
- Possibility to be powered by a solar panel (not included)
- Installation Kit included (stainless steel band ties and clamp)
- Test to check the status of the connection between Tempus Air BS and the modules at any time
- Operating Temperature: -20°C / 60°C

Discover MyToroTempus App to monitor and control your TEMPUS[®] AIR SYSTEM



Free download at App Store or Google Play



** First year data subscription will expire end of February independently from the activation date. For the following years, data subscription renewals will be subject to annual fee.*

Codification

Code	Description
TEMP-AIR-BS	Tempus [®] Air BS - 3G - LoRa [™] Gateway

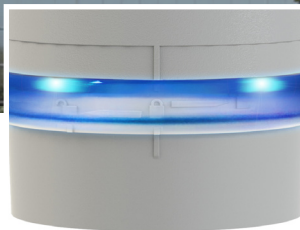


In remote areas where power supply is not available, Tempus® Air BS can be powered by solar panel.

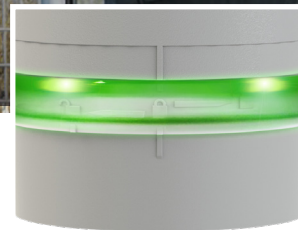
Colored LEDs to easy identify Gateway Status



Initialization



Network Connection



Ready



Power transformer
230VAC/24VDC included
(Electric plug not included)



Installation Kit included
(stainless steel band ties and clamp)

TEMPUS® AIR BW

Wi-Fi LoRa™ Gateway

Wi-Fi - LoRa™ Gateway allows you to remotely monitor and control the field modules via smartphone/tablet (with MyToroTempus App) or via PC utilizing MyToroTempus.com web platform.



SPECIFICATION AND FEATURES

- LoRa™ radio connection [868-868.6] MHz, 25mW
- Manages up to 30 field modules simultaneously
- LoRa™ range up to 800 m
- Wi-Fi Connection: 2.4GHz, 25mW
- Bluetooth® Smart 4.0 Low Energy
- Power supply with external 230VAC/12VDC transformer included
- Remote management via MyToroTempus App and MyToroTempus.com Web Platform
- Can be installed indoor or outdoor in a waterproof box
- Continuous connection with your Wi-Fi network.
- LoRa™ radio communication with modules every 3 minutes.
- Antenna wire extension up to 10 m optional
- Test to check the status of the connection between Tempus Air BW and the modules at any time
- Operating Temperature: 0°C / 50°C

Wi-Fi - LoRa™ Gateway to connect and control up to 30 field modules via LoRa™.

TEMPUS AIR BW CONNECTS THE IRRIGATION SYSTEM TO YOUR WI-FI NETWORK IN JUST ONE CLICK!

Discover MyToroTempus App to monitor and control your TEMPUS® AIR SYSTEM



Free download at App Store or Google Play



Codification

Code	Description
TEMP-AIR-BW	Tempus® Air BW - Wi-Fi - LoRa™ Gateway

Colored LEDs to easy identify Gateway Status



Initialization



Ready



*Power transformer
230VAC/12VDC included*



Swivel antenna



*10 m cable extension
(optional)*

TEMPUS® AIR CT

1-6 Stations Controller

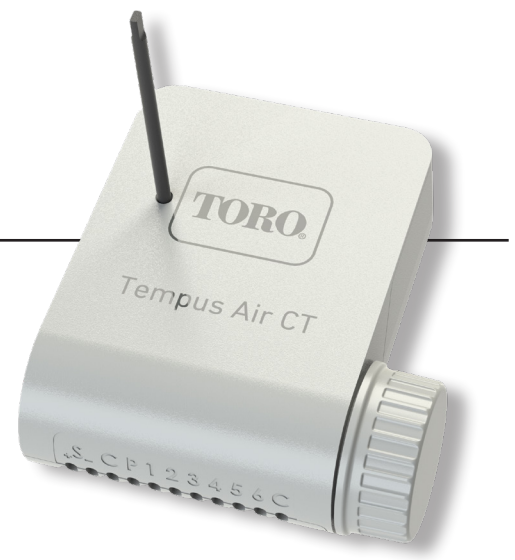
The module can control from 1 to 6 DC latching hydraulic valves. It can read one rain or flow meter sensor input.

The module communicates with Gateway (3G or Wi-Fi) receiving the irrigation programming and transmitting data detected by the sensor.

The module allows direct connection from smartphone / tablet via Bluetooth®.

SPECIFICATION AND FEATURES

- LoRa™ radio connection [868-868.6] MHz, 25mW
- 1,2,4 or 6 stations
- LoRa™ range up to 800 m
- Independent programming by station
- Watering schedule: daily, odd/even days, day interval, cyclic
- 4 irrigation windows per station
- Bluetooth® Smart 4.0 Low Energy
- Automatic and manual start from smartphone/tablet/pc
- Permanent memory
- Rain or flow meter sensor input
- Rain delay function from 1 to 15 days or permanent
- Remote management via MyToroTempus App and MyToroTempus.com Web Platform
- IP68 waterproof
- Power Supply 9V DC battery
- 9V Latching solenoid compatible
- Maximum wiring distance from CT module to solenoids: 300 m
- Operating Temperature: -20°C / 60°C



LoRa™ controlled, IP68 battery operated controller to manage from 1 to 6 hydraulic valves. It can read one rain or flow meter sensor input.

CONTROLLERS ARE BATTERY POWERED NO NEED FOR WIRING

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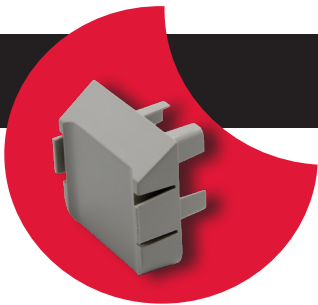
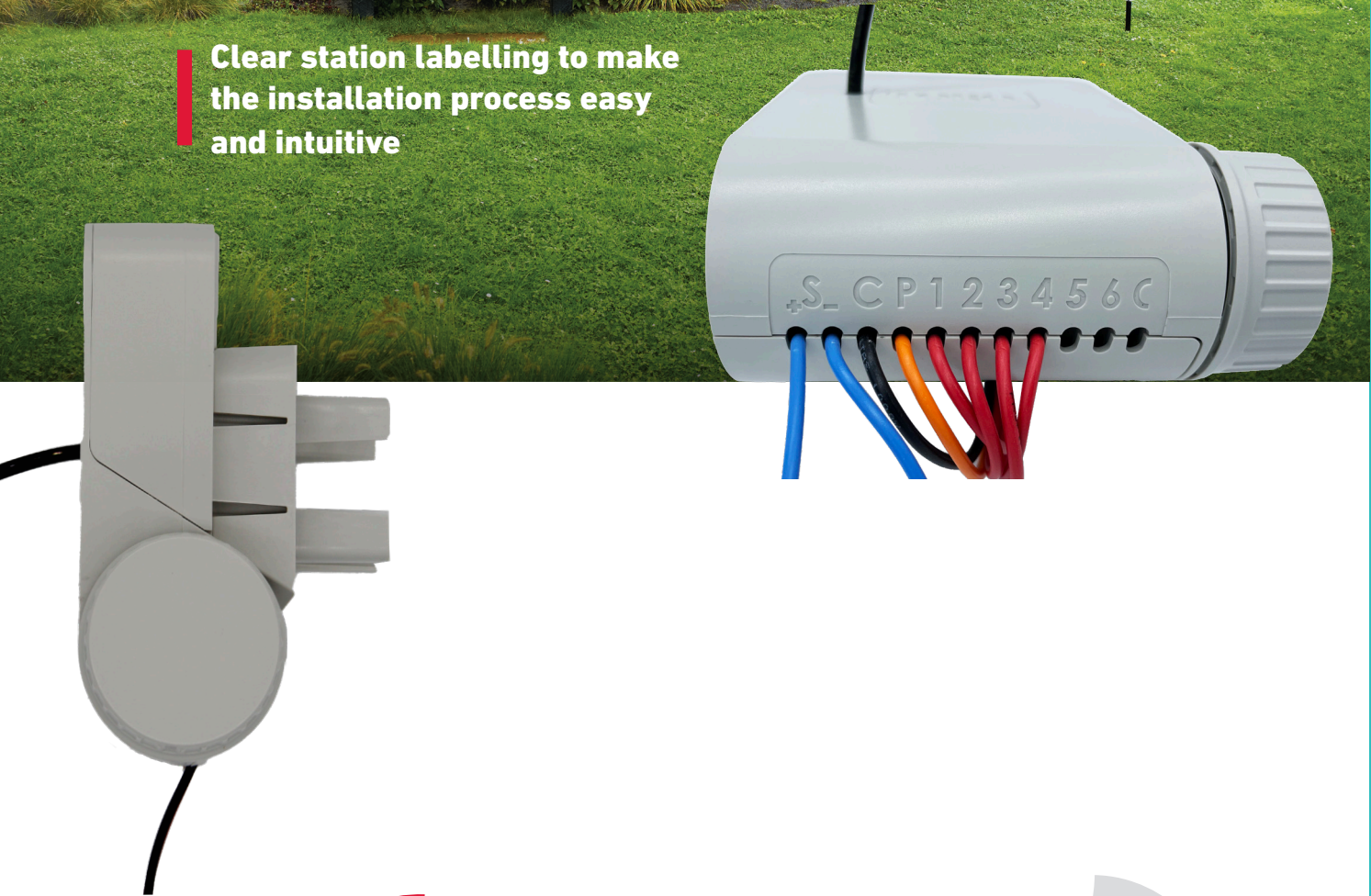


Codification

Code	Description
TEMP-AIR-C1	Tempus® Air CT - DC Controller 1 Station
TEMP-AIR-C2	Tempus® Air CT - DC Controller 2 Stations
TEMP-AIR-C3	Tempus® Air CT - DC Controller 4 Stations
TEMP-AIR-C6	Tempus® Air CT - DC Controller 6 Stations



Clear station labelling to make the installation process easy and intuitive



Bracket for installation on top of a solenoid included



Waterproof wire connectors included

Battery not included



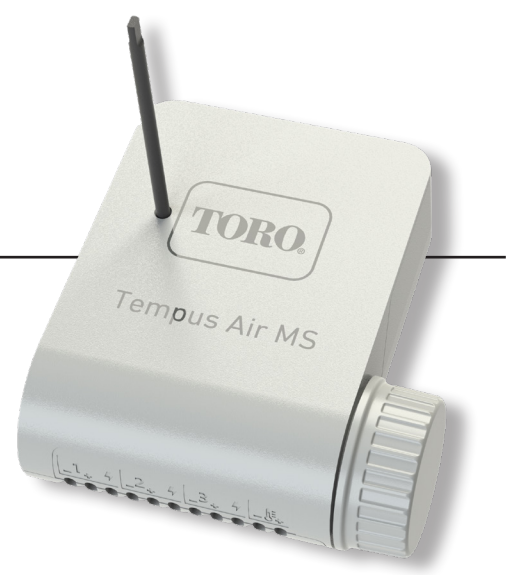
TEMPUS® AIR MS

Single/Multi Sensors Module

The module receives field data from 1-4 sensor inputs (among temperature, soil humidity, air humidity, wind and pluviometer).

The module communicates with Gateway (3G or Wi-Fi) transmitting detected field data.

The module allows direct connection from smartphone / tablet via Bluetooth®.



LoRa™ controlled, IP68 battery operated single/multi sensors module.

SPECIFICATION AND FEATURES

- LoRa™ radio connection [868-868.6] MHz, 25mW
- 1 or 4 sensor inputs (S1 or S4 respectively)
- LoRa™ range up to 800 m
- 1 temperature acquisition input (S4 model only)
- 1 or 3 configurable inputs (respectively for S1 and S4):
 - Dry contact (rain sensor, pluviometer...)
 - Pulse (flow meter, wind sensor)
 - Analog 0-3,5V (humidity sensor)
- Bluetooth® Smart 4.0 Low Energy
- Alert function based on daily thresholds
- Remote management via MyToroTempus App and MyToroTempus.com Web Platform
- IP68 waterproof
- Power Supply 9V DC battery
- Operating Temperature: -20°C / 60°C

**MODULES ARE BATTERY POWERED
NO NEED FOR WIRING**

Discover MyToroTempus App
to monitor and control
your TEMPUS® AIR SYSTEM



Free download at
App Store or Google Play



Codification

Code	Description
TEMP-AIR-S1	Tempus® Air MS - DC Single Sensor Module
TEMP-AIR-S4	Tempus® Air MS - DC Multi Sensors Module

Worry-free wiring process due to clearly visible input labelling



Multi Sensor Module can work with the following sensors



Soil Moisture sensor



Temperature sensor



Flow meter sensor*



Pluviometer sensor



Air humidity sensor



Wind Speed sensor



See next session for sensors details and specifications



Waterproof wire connectors included

*) it can work with any pulsing flow meter

Battery not included



VH400

Soil moisture sensor

VH400 sensor allows an accurate monitoring of soil moisture. It can be installed into the soil, close to the root zone, or directly into pots. Its small dimensions do not disturb plant's root system while providing precise moisture readings.

FEATURES

- Volumetric water (VWC) or Gravimetric Water (GWC) Content measurement
- Output voltage proportional to humidity level
- Low consumption (< 13 mA)
- Insensitive to salinity
- Quick response time
- Rugged design for long term use
- Probe resistant to corrosion
- Small dimensions
- Waterproof
- EN 50581:2012

SPECIFICATION

Accuracy	Soil Volumetric Water Content (VWC) 2% @ 25°C
Reading range	0% - 100%
Resolution	from 0 to 50 % VWC (from 0 to 2,2V)
Power supply	3,5V - 20 V DC, Consumption < 13 mA
Output signal	0 to 3V related to moisture content
Power on to Output stable	400 ms
Cable length	2 m (extensible up to 10 m)
Dimensions of detection area	9,3 cm x 0,7 cm
Operating temperature	-40°C to 85°C
Wiring & Connection to Tempus Air MS	Red: + VBAT (Power supply) to be connected with Tempus Air MS red wire Black: Output from 0 to 3V to be connected with Tempus Air MS yellow wire (+) Grey or nude cable: GND (Ground) to be connected with Tempus Air MS black wire (-)

Codification

Code	Description
IT-VH400	Soil moisture sensor (VH400)



Compatible with Tempus® Air MS Single/Multi Sensors Modules (S1 and S4)



INSTALLATION

*Place the sensor at root level.
For accurate readings place it horizontally*



SM100

Soil moisture sensor



Compatible with Tempus® Air MS Single/Multi Sensors Modules (S1 and S4)

Maintaining the correct soil moisture is essential for keeping plants healthy. SM100 sensor supports you in identifying the correct irrigation scheduling so to optimize plant growth while avoiding water stress. Place SM100 sensors at multiple depths to have an accurate detection of soil humidity.

FEATURES

- Volumetric Water (VWC) Content measurement
- Capacitance-type sensor responds immediately to changes in soil moisture content for better irrigation decisions
- Calibrated for mineral soils or soilless media
- Installs easily into 1.9 cm hole (3/4 in)
- Analog voltage proportional to excitation voltage
- Install permanently or use to take spot measurements
- Sturdy design
- Probe resistant to corrosion
- Small dimensions
- Waterproof

SPECIFICATION

Accuracy	Soil Volumetric Water Content (VWC) 3% @ EC < 8 ms/cm
Reading range	0% VWC up to saturation
Resolution	0,1% VWC
Power supply	3 to 5V @ 6 to 10 mA
Output signal	0,5 to 1,5V for a 3V excitation Analog voltage proportional to excitation voltage
Cable length	1,8 m (extendable up to 15 m)
Dimensions of detection area	6 cm x 2 cm
Operating temperature	0,5°C to 80°C
Wiring	Red: Output voltage humidity to be connected with Tempus Air MS yellow wire (+) White: V + Excitation (from 3 to 5V regulated) to be connected with Tempus Air MS red wire Black: GND (Ground) to be connected with Tempus Air MS black wire (-)



INSTALLATION

*It can be installed on the surface or buried.
For accurate readings place it vertically*

Codification

Code	Description
IT-SM100	Soil moisture sensor (IT-SM100)



PT100

Temperature sensor

PT100 probe is a Resistance Temperature Detector (RTD) that contains a 100 Ω platinum resistor that changes its resistance value as temperature changes. Together with several other parameters, temperature readings are essential to evaluate evapotranspiration and consequently to identify the optimal irrigation scheduling.

FEATURES

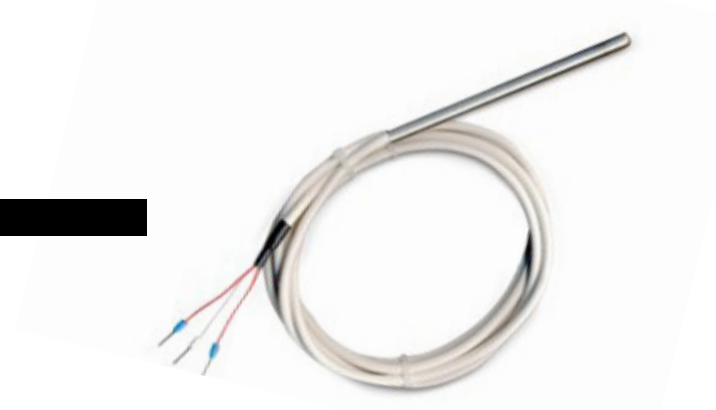
- Accurate temperature readings
- High precision
- Waterproof
- IEC 60751

SPECIFICATION

Probe type	PT100 class B - 3 wires
Accuracy	± 0,30°C @ 0°C
Protective sheath	INOX 316L
Cable	PVC / PVC
Cable length	3 m
Frame dimension	Ø 6 mm, length 100 mm
Operating temperature	-40°C to 105°C
Wiring & Connection to Tempus Air MS	White: to be connected with Tempus Air MS (S4) positive orange wire (+) Red (one of the two): to be connected with Tempus Air MS (S4) negative orange wire (-)

Codification

Code	Description
IT-PT100	Temperature sensor (IT-PT100)



Compatible with Tempus® Air MS Multi Sensors Modules (S4)



INSTALLATION

The PT100 cable must be laid linearly, without creating windings.



PLUVIO-01

Pluviometer sensor

PLUVIO-01 measures the amount of precipitation over a specified period of time. After each filling (0.2794 mm), the tipping bucket empties automatically so that it can be ready to fill again. Rainfall reporting is essential to optimize your irrigation schedule thus avoiding unnecessary waste of water.

FEATURES

- Compact rounded rain gauge (118/135 x 60 x 80 mm).
- After each filling, the bucket automatically empties so that it can be ready to be refilled again.

SPECIFICATION

Output signal	Dry contact
Cable length	75 cm
Dimensions	13,5 cm x 6 cm x 8 cm
Wiring & Connection to Tempus Air MS	Red: to be connected with Tempus Air MS yellow wire Green: to be connected with Tempus Air MS black wire



Compatible with Tempus® Air MS Single/Multi Sensors Modules (S1 and S4)



INSTALLATION

*Place the pluviometer in undisturbed position (so to have an optimum rain catch).
Suggestions: In open field strive to be twice as far from obstacles as they are high and at least 50 cm off the ground*

Codification

Code	Description
IT-PLUVIO-01	Pluviometer (LEXCA001)



HM1500LF

Air humidity sensor



*Compatible with Tempus® Air MS
Single/Multi Sensors Modules
(S1 and S4)*

HM1500LF is a humidity transducer designed for those applications where a reliable and accurate measurement is needed. HM1500LF measures air Relative Humidity (RH). There is a strong correlation between RH trace and daily evapotranspiration; HM1500LF supports you in identifying plant-watering needs.

FEATURES

- Accurate measurements within 10 to 95% RH
- High reliability and long-term stability
- Fast response time
- Not light sensitive
- Instantaneous de-saturation after long periods in saturation phase
- Protected against reversed polarity
- Not affected by water immersion
- Very low temperature dependence
- Patented solid polymer structure
- Small size
- Lead free / RoHS Compliant



SPECIFICATION

Humidity Measuring Range	0 to 100% RH
Relative Humidity Accuracy (10 to 95% RH)	± 3 to ±5% RH
Humidity resolution	0,4 %RH
Humidity Hysteresis	±1 %RH
Warm up time (electronic)	150 ms
Current consumption	1 to 2 mA
Operating temperature	-40°C to 60°C
Wiring & Connection to Tempus Air MS	Blue: to be connected with Tempus Air MS red wire Yellow: to be connected with Tempus Air MS yellow wire (+) White: to be connected with Tempus Air MS black wire (-)

INSTALLATION

Avoid installing the sensor near an area that could cause an inaccurate reading

Codification

Code	Description
IT-HM1500LF	Air humidity sensor (HM1500LF)



ANEMO 440 V3

Wind speed sensor

ANEMO 440 V3 is a anemometer sensor that can obtain wind speed records during time. Winds strongly affect evapotranspiration, and it is hence essential to detect and record wind speed to correctly adjust the irrigation scheduling.

FEATURES

- Wide range of measurement
- Sturdy construction, great mechanical resistance
- Stainless steel bearings
- Low power consumption
- IP65
- EN 61000-6-2:2001 & EN 55022:2001 Class B

SPECIFICATION

Reading range	Wind speed from 3 to 180 km/h
Maximum wind speed	200 km/h
Accuracy	1 km/h from 3 to 15 km/h 3% from 15 to 180 km /h
Output	Frequency (pulses)
Power Supply	3 to 24 VDC (24 mA max)
Cable Length	2,5 m
Dimensions	Ø 125 mm x 139 mm
Weight	130 g
Operating temperature	-20°C to 80°C
Wiring	Red: to be connected with Tempus Air MS yellow wire (+) Yellow: to be connected with Tempus Air MS black wire (-)

Codification

Code	Description
IT-4403VZ	Wind speed sensor (ANEMO440 V3)



Compatible with Tempus® Air MS Single/Multi Sensors Modules (S1 and S4)



INSTALLATION

The wind sensor must be fixed on a vertical position



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