

Product Catalog 2023-01

Hardware

Starter kit

Article number

FF02SK



The starter kit is an ideal introduction to the functionalities of the Quantified basic sensing solutions at a discount. The kit includes:

- 3 FireFly sensors with full options (FF02)
- 1 indoor Gateway wifi/internet (GW868i)
- 3 Smart Clips (SCAng or SCII or SCWm)
- 1 USB charger (FFCh001)
- 1 year access to our data platform "Insight"
- 1 year data subscription for the 3 sensors

If you would like to try additional external sensors, you can easily add those to the starter kit order. All external sensors are listed in this product catalog.

FireFly platform sensor node (multi-parameter sensor with GPS)

Article number

FF02



The FireFly sensor node is a wireless data-transmission platform in a rugged industrial-grade housing. The FireFly onboard sensors are customizable. Through the connector a range of external devices can be connected. The available options are listed in this product catalog.

The onboard temperature and humidity sensors are not suited for use in direct sunlight: use the Solar Chimney (FF02SC) for accurate readings in high radiation environments.

FF02 platform sensor node

dimensions & weight	Ingress Protection (IP)	sampling interval
l x w x h = 35 mm x 40mm x 110 mm weight: 127 g	IP 67 (with connector cap)	one measurement per 5 minutes longer intervals on request
Lora frequencies		battery charge interval
868 MHz (EU & Africa) 915 MHz (Australia & America's)		+/- 6 months @5 min. interval +/- 9 months @10 min. interval

FF02 options / add ons

air temperature	relative air humidity	
range: - 15 ... + 65 °C	range: 20 ... 90% RH	accuracy: ± 1,5% RH
accuracy: ± 0,5 °C	range: 90 ... 100% RH	accuracy: ± 2,5% RH
resolution: 0,01 °C	resolution: 0,01%	
GPS	PAR	Barometric pressure
accuracy: +/- 5 meters	± 5% (Apogee SQ 500SS calibrated)	
	calibrated for the solar spectrum	

Macro Solar Chimney (for ventilated temperature and relative humidity measurements with the Firefly)

Artikelnummer
FFMSC



The Macro Solar Chimney serves as a vented enclosure for the Firefly. If the Firefly is used in environments with high irradiance (eg direct growth or sunlight), this housing ensures an accurate temperature and relative humidity measurement under these conditions. The PAR measurement is not usable when using the Macro Solar Chimney.

To mount the Firefly in the Marco Solar Chimney, the “smart clip” SCFFMSC should be used.

FFMSC

	Dimensions and weight	Mounting
	hight 550mm, diam 125mm, 250gr	tie wrap

Solar Chimney TrH (ventilated high accuracy temperature and relative humidity measurements) (to be connected to FireFly)

Article number

FFSC



The Solar Chimney TrH is designed for extremely accurate temperature and relative humidity measurements in the presence of high (solar) radiation. The radiation generates a natural air flow through the chimney which makes reliable and accurate ventilated air temperature and relative air humidity measurements possible. The FireFly platform node is connected via the connector cable and takes care of the data transmission. On the connected FireFly platform sensor additional options like PAR-light or GPS can be added (for details: see FireFly FF02 specifications).

For use below 0°C use our Solar Chimney SubZero model (upon request). Multiple mounting options are available.

FFSC

air temperature		relative air humidity	
range: 0 ... + 65 °C	range: 20 ... 90% RH	accuracy: ± 1,5% RH	
accuracy: ± 0,3 °C	range: 90 ... 100% RH	accuracy: ± 2,5% RH	
resolution: 0,01 °C	resolution: 0,01%		
connector cable	dimensions	Ingress Protection	
0,5 m	height: 550mm, diameter 80mm	IP 61	
mounting options			
FFSC A: top rope (for hanging on a hook)	FFSC B: Pole mount (40-75mm)	FFSC C: Wire mount (2mm) and rod (5 -7mm)	
			

Poseidon multi depth WET sensor (Soil/substrate -moisture, -Electro Conductivity (EC) and -temperature) (to be connected to FireFly)

Article number
FFWETPos 1, 2 or 3 probes



The Poseidon WET sensor can be used in any soil and substrate type. The measurement principle is based on 15 MHz TDR capacitive sampling. The sensor has a flexible sensing depth up to 2 meters. The FireFly platform node should be connected via the connector cable and takes care of the data transmission. On the connected FireFly platform sensor additional options like PAR-light or GPS can be added (for details: see FireFly FF02 specifications).

For Volumetric Water Content (VWC) representation, soil/substrate-specific calibration is needed. We advise to trigger irrigation on permittivity and not to perform a VWC conversion.

relative permittivity (dS/m)	EC	temperature
range: 0 ... 50	range: 0 ... 10 000 $\mu\text{s/cm}$	range: -40 ... +80 °C
accuracy: Up to 3%	accuracy: $\pm 3\%$	accuracy: $\pm 0,5^\circ\text{C}$
resolution: 1%	resolution: 10 $\mu\text{s/cm}$	resolution: 0,1°C
probe pins	measuring principle	ingress protection
stainless steel, length: 7cm, width: 2,5cm	Time Domain Resonance (TDR) 50 MHz	IP 67
cable knibble protection		probe cables
50cm (flexible and removable)		length: 2 m (per probe)
		

Poseidon City heavy duty housing option for underground / invisible usage of Poseidon) (to be connected to FireFly)

Article number
FFWETPosCity1, 2 or 3



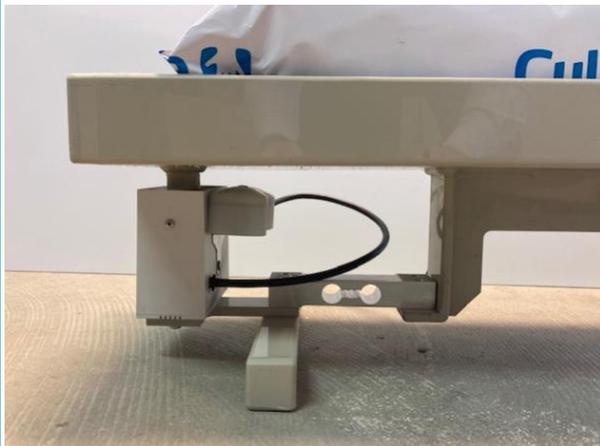
The Poseidon City sensor housing is designed for underground / invisible usage. The sensor housing is rugged, water proof and resistant to mechanical / chemical weed control. The housing is suited for the 1, 2 or 3 multi depth Poseidon sensors. All other specifications are equal to the FFWETPos (In the photos above the Poseidon Triple in the city housing is shown, also the Poseidon double and - single can be supplied in this housing).

Smart Gutter (real time weight)

Optional: substrate moisture, -EC, -temperature and drainvolume)
(To be connected to FireFly)

Article number

FFSG



The “Smart Gutter” is a multi-functional wireless sensor solution for optimizing watering strategies. The gutter is completely wireless and will measure substrate-weight, drain-volume, -temperature and -EC. Additionally substrate EC, temperature and moisture can be added using the Firefly-Poseidon sensor combination. Two length options are available: 135cm and 275cm.

Smart Gutter

drain volume	EC	temperature
Range: 0 100 ml/hour	range: 0 ... 10 000 $\mu\text{s}/\text{cm}$	range: -40 ... +80 °C
Accuracy: $\pm 5\%$	accuracy: $\pm 3\%$	accuracy: $\pm 0,5^\circ\text{C}$
Resolution: 1.0 ml	resolution: 10 $\mu\text{s}/\text{cm}$	resolution: 0,1°C
Weight range	weight temperature range	Dimensions and weight
Max. capacity: 22 kg or 44kg	accurate range: -10 ... +40 °C	L*w*h: 135cm*21cm*7cm L*w*h: 275cm*21cm*7cm
accuracy: $\pm 0.04\%$ of capacity	operating range: -20 ... +60 °C	+/- 2,5 kgs
resolution: 1 gram		
		ingress protection
		IP 67

T- Probe (multi level temperature measurements)
(To be connected to FireFly)

Article number
FFTP



The T-Probe is designed for measuring multi-level temperatures inside food-, feed stuffs, soil, substrate, and liquids. The FireFly platform node should be connected to the connector cable and takes care of the data transmission. On the connected FireFly platform sensor additional options like PAR-light or GPS can be added (for details: see FireFly FF02 specifications).

temperature	temperature level options	probe dimensions
range: -40 ... +125 °C	every 10 cm, maximum 8 in total	Upon request: 10 cm to 80 cm
accuracy: $\pm 0,25^{\circ}\text{C}$	maximum depth 100cm	Outer diameter: 7mm
resolution: 0,125°C		Weight: 200 - 550gr.
probe material	connector cable	ingress protection
carbon fiber	Length: 0,5 m	IP 67

Pluviometer (to be connected to FireFly)

Article number

FFPL



The Pluviometer reports precipitation in mm. The FireFly platform node is connected via the connector cable and takes care of the data transmission.

On the connected FireFly platform sensor additional options like PAR-light or GPS can be added (for details: see FireFly FF02 specifications).

precipitation	dimensions	
range: 0 ... 100mm / hour	funnel surface: 200 mm ²	
Accuracy: ±2%	height: 350 mm (including bird spikes), Diameter: 165 mm	
resolution: 0.2 mm	weight: 550 gr.	
connector cable		ingress Protection
0,5 m		IP 67

Drain sensor (to be connected to FireFly)

Article number

FFDS



The drain is reported in mm. The FireFly platform node is connected via the connector cable and takes care of the data transmission. On the connected FireFly platform sensor additional options like PAR-light or GPS can be added (for details: see FireFly FF02 specifications).

drain	dimensions	
range: 0 100 mm/hour	funnel surface: 50 mm ²	
accuracy: ±5%	height: 100 mm	
resolution: 1.0 mm		
connector cable		ingress protection
0,5 m		IP 67

Weather station

Article number

FFWS



The weather station combines a pluviometer, windspeed meter, wind direction meter, a high accuracy ventilated air temperature, and high accuracy ventilated relative air humidity and PAR-light. Optional are a GPS module and a stainless-steel anti-theft pole.

air temperature (ventilated)	relative air humidity (ventilated)	PAR-light
see specifications Solar Chimney (FFSC)	see specifications Solar Chimney (FFSC)	see specifications FF02
precipitation		
see specifications pluvio meter (FFPL)		

Hanging scale (5, 10, 30, 50 kg) (to be connected to FireFly)

Article number
FFSh5...to...50



The hanging scale is housed in a PVC tube, well protected for the use in harsh environments. The scale can be tared by resetting the FireFly platform node. Various weight ranges can be chosen depending the task at hand. The FireFly platform node is connected via the connector cable and takes care of the data transmission. On the connected FireFly platform sensor additional options like PAR-light or GPS can be added (for details: see FireFly FF02 specifications).

measuring range	operating temperature	dimensions
capacity: 5, 10, 30, 50, 100 kg	accurate range: -10 ... +40 °C	height: 150mm, diameter: 70mm
accuracy: $\pm 0.07\%$ of capacity	operating range: -20 ... +60 °C	
resolution: 1 gram		
connector cable		ingress protection
0,5 m		IP 67

Standing scale (9, 18, 30, 60, 90 kg) (to be connected to FireFly)

Article number

FFSs06...to...90



The scales are suitable for wet environments. The scale can be tared by resetting the FireFly platform node. The FireFly platform node is connected via the connector cable and takes care of the data transmission. On the connected FireFly platform sensor additional options like PAR-light or GPS can be added (for details: see FireFly FF02 specifications).

weight	temperature	Dimensions
capacity: 9, 18, 30, 60, 90 kg	accurate range: -10 ... +40 °C	PVC grey: 30, 60 or 90kgs. height: 80mm, diameter: 300mm. Trespa white: 10kgs. height: 50mm, 250x250mm.
accuracy: $\pm 0.04\%$ of capacity	operating range: -20 ... +60 °C	
resolution: 1 gram		
connector cable		ingress protection
0,5 m		IP 67

Pressure sensor (to be connected to FireFly)

Article number
FFPS



The pressure sensor measures the relative pressure in bar, relative to the environment. The value is passed in millibars. (The image above is an example)

On the connected FireFly platform sensor additional options like PAR-light or GPS can be added (for details: see FireFly FF02 specifications).

pressure	mechanical connection	dimensions
range: 0 10 bar	connection: G ½ B	Hoogte: 68mm
accuracy: ±2 %	material: RVS	Diameter: 29mm
pressure limit: 20 bar		Druk-opening 3,5mm
connector cable		ingress protection (IP)
0,5 m		IP 67

Potato Guard (75 kg) (to be connected to FireFly)

Article number

FFPG



The Potato Guard measures real-time weight loss and will also help you optimize the climate and ventilation settings to optimize quality during storage. The weighing basket is buried in the storage (level with the storage top or inside making use of the lid) for a representative measurement.

The basic system consists of:

- #1 potato guard weighing basket (for ~60 kg)
- #1 battery charger for the sensors (article FFCh001)
- #1 FF02 "FireFly" platform sensor node for outflowing ventilation air (on top of the storage)
(Air temperature, air humidity, light intensity)

Optional:

- indoor sensor for incoming/recirculated ventilation air
(Air temperature, air humidity, light intensity)
- (ventilated) outdoor sensors
(Air temperature, air humidity, light intensity, rain, wind-speed and -direction)
- temperature probe(s) for temperature measurement up to 100cm inside the storage

The complete set is sent by courier and is operational within 10 minutes (excluding placing/filling the weighing basket in the storage).

sample weight	material	
capacity: <75 kg	stainless steel	
accuracy: ±40g (-10 ... +40 °C)		
FF02 platform sensor node		
dimensions & weight	Ingress Protection (IP)	sampling interval
h x diam: 700 mm x 500mm weight: 7,5kgs	IP 67 (with connector cap)	one measurement per 5 minutes longer intervals on request
Lora frequencies	battery charge interval	
868 MHz (EU & Africa) 915 MHz (Australia & America's)	+/- 6 months @5 min. interval +/- 9 months @10 min. interval	
air temperature	relative air humidity	
range: -40 ... + 65 °C	range: 20 ... 90% RH	accuracy: ± 1,5% RH
accuracy: ± 0,5 °C	range: 90 ... 100% RH	accuracy: ± 2,5% RH

Gateway (Indoor, ethernet, wifi)

Article number

Gin



The gateway receives the Lora signals from the sensornodes and sends the data to the internet. This gateway has connection for ethernet and wifi. Each gateway can service +/- 100 sensornodes simultaneously.

frequency	range	network connections
868 MHz (EU + Africa) 915 MHz (Americas and Australia)	400m...1 km (indoor / obstacles) 1...3 km (urban)	ethernet, wifi
operating temperature	operating moisture	power supply
- 40 ... + 80 °C	extended < 80% rH peaks < 95% rH	standard USB-C
accessories included		ingress protection
Lora antenna, USB-C cable		IP 30

Gateway (Indoor, ethernet, wifi, 4G)	Article number Gin4G
	

The gateway receives the Lora signals from the sensornodes and sends the data to the internet. This gateway has connection for ethernet, wifi and 3G/4G and is suited for indoor use where wifi or internet is not (always) active. Each gateway can service +/- 100 sensornodes simultaneously.

frequency	range	network connections
868 MHz (EU + Africa) 915 MHz (Americas and Australia)	400m...1 km (indoor / obstacles) 1...3 km (urban)	ethernet, wifi
operating temperature	operating moisture	power supply
- 40 ... + 80 °C	extended < 80% rH peaks < 95% rH	230V
GSM	accessories included	ingress protection
LTE cat 4 (4G) ann hspa+ (3G)	antenna (GPS & Lora), 220V adapter	IP 30

Gateway (Outdoor, ethernet, wifi)		Article number Gout
		
<p>The gateway receives the Lora signals from the sensornodes and sends the data to the internet. This gateway has connection for ethernet and wifi and is suited for outdoor use. Each gateway can service +/- 100 sensornodes simultaneously.</p>		
frequency	range	network connections
868 MHz (EU + Africa) 915 MHz (Americas and Australia)	400m...1 km (indoor / obstacles) 1...3 km (urban) 2-10 km (open field)	ethernet, wifi
operating temperature	operating moisture	power supply
- 40 ... + 80 °C	100% rH	230V
	accessories included	ingress protection
	230V power adapter gateway mounting bracket	IP 67

Gateway (Outdoor, ethernet, wifi, 4G)

Article number

Gout4G



The gateway receives the Lora signals from the sensor nodes and sends the data to the internet. This gateway has connection for ethernet, wifi and 3G/4G and is suited for outdoor use where wifi or internet is not (always) active. Each gateway can service +/- 100 sensor nodes simultaneously.

frequency	range	network connections
868 MHz (EU + Africa) 915 MHz (Americas and Australia)	400m...1 km (indoor / obstacles) 1...3 km (urban) 2-10 km (open field)	ethernet, wifi, 4G
operating temperature	operating moisture	power supply
- 40 ... + 80 Celsius	100% rH	230 V
GSM	accessories included	ingress protection
LTE cat 4 (4G) ann hspa+ (3G)	230V Power adapter gateway mounting brackets	IP 67

Stainless steel auger pole (2m, 2,5m, 3m, 4m)	Article number Auger Pole
	
<p>Stainless steel pole with auger. Length 1,65m..to ...3,5m. Diameter 40mm, wall thickness 4mm.</p>	

Firefly Smart clip (wire / stick mount)	Article number FFSCang
	
<p>The smart clip can be used to mount the FireFly:</p> <ul style="list-style-type: none"> - wire or rod with a diameter of 2...to...3,5 mm - stick with a diameter of 6...to...7mm 	

Smart clip (Vertical / hanging installation)

Artikelnummer

FFSCMSC



With this clip, the FireFly can be installed hanging vertically with a hook (diameter wire / line maximum 6mm)
This clip is used for mounting in the Macro Solar Chimney

Firefly Smart clip (wall mount)

Article number

SCWm

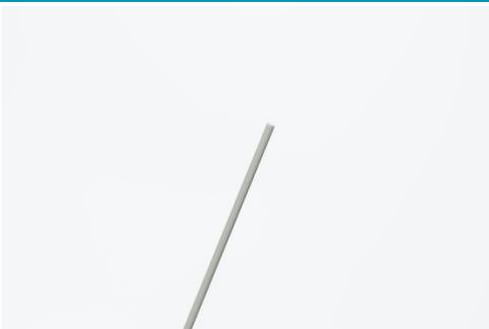


The smart clip can be used to mount the FireFly on a wall (maximum M6 screw)

Multifunctional Smart clip (Leg less wire / stick mount)	Article number ScLL
	
<p>The smart clip can be used to fix or mount all kinds of products to a wire, rod or stick</p> <ul style="list-style-type: none"> - wire or rod with a diameter of 2...to...3,5 mm - stick with a diameter of 6...to...7mm 	

FireFly USB charger	Article number FFCh001	
<div style="display: flex; align-items: center;"> <div data-bbox="161 1196 523 1337" style="border: 1px solid black; padding: 5px; margin-right: 20px;"> <p style="color: red; margin: 0;">Attention: do not charge batteries outside the operating range!</p> </div> <div data-bbox="464 1131 1086 1547" style="text-align: center;">  </div> </div>		
<p>The battery charger will charge the Firefly battery in 4-6 hours.</p>		
operating temperature	charge current	ingress protection
range: + 15 °C ... + 20 °C	0,5 A maximum	IP 50

Magnetic Reset pin	article number RP
	
<p>Magnetic reset pin to reset the Firefly sensor and to tare connected external devices</p>	

Fiber glass rod (white, 75cm, 6mm diameter)	Article number FGR75
	
<p>The fiber glass rod can be used to mount the FireFly sensor using the Smart Clip angled.</p>	

Warranty and service

For the CE declaration of conformity please go to our website. We are convinced of the quality and flawless operation of our products. Therefore, we offer a 1,5-year warranty on hardware provided products are handled with care. See also our fair-use policy and manuals. In case of faulty operation, we will support you in solving any issues. If it turns out that Quantified is liable for the faulty operation, no costs will be charged and the product in question will be replaced free of charge within the warranty period. In all other cases we will charge the time spend based on hourly rates.