Product Catalog 2021-008

Hardware

Starter kit	Article number
	FF02SK

The starter kit is an ideal introduction to the functionalities of the Quantified basic sensoring 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 SCll 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)

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: -40 … + 65 °C	range: 20 … 90% RH	accuracy: ± 1,5% RH
accuracy: ± 0,5 °C	range: 90 … 100% RH	accuracy: ± 2,5% RH
GPS	**PAR**	
accuracy: +/- 5 meters	± 5% (Apogee SQ 500SS calibrated)	
	calibrated for the solar spectrum	

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 node also the measurements for air temperature (non-ventilated), relative humidity (non-ventilated), 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, direct mounting to a pole with tie wraps is also possible.

FFSC		
air temperature	**relative air humidity**	
range: 0 … + 65 °C	range: 20 … 90% RH	accuracy: ± 1,5% RH
accuracy: ± 0,5 °C	range: 90 … 100% RH	accuracy: ± 2,5% RH
resolution: 0,1°C		
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 sensornode also the measurements for air temperature (non-ventilated), relative humidity (non-ventilated), PAR-light or GPS can be added (for details: see FireFly FF02 specifications). For Volumetric Water Content representation, soil/substrate-specific calibration is needed.

Relative permittivity (dS/m)	EC	Temperature
Range: 0 … 50	Range: 0 … 10 000 µs/cm	Range: -40 … +80 °C
Accuracy: Up to 3%	Accuracy: ± 3%	Accuracy: ±0,5°C
Resolution: 1%	Resolution: 10 µs/cm	Resolution: 0,1°C
Probe pins	**Measuring principle**	**ingress protection**
Stainless steel, length: 7cm	Time domain Resonance (TDR)	IP 67
A: cable knibble protection		**Cable**
50cm (flexible and removable)		Length: 2 m (per probe)
		

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Poseidon City heavy duty housing option for underground / invisible usage (Soilmoisture, -Electro Conductivity (EC) and -temperature) (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 Posseidon sensors. All other specifications are equal to the FFWETPos (In the photo's above the Posseidon Triple in the city housing is shown, also the Poseidon double and - single can be fitted in this housing).

T- Probe (multi level temperature measurements) (to be connected to FireFly)	Article number FFT-P



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 sensornode also the measurements for air temperature (non-ventilated), relative humidity (non-ventilated), 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: ±0,25°C	Maximum depth 100cm	Outer diameter: 7mm
Resolution: 0,125°C		
probe material	**connector cable**	**ingress protection**
Carbon fiber	Length: 0,5 m	IP 67

Probe for high accuracy temperature and relative humidity measurements (to be connected to FireFly)	Article number FFPrTrH

The Probe TrH is designed for measuring temperature and humidity inside stacks of commodities (not to be used in fluids). The FireFly platform node is connected via the connector cable and takes care of the data transmission. On the connected FireFly platform sensornode also the measurements for air temperature (non-ventilated), relative humidity (non-ventilated), PAR-light or GPS can be added (for details: see FireFly FF02 specifications).

air temperature	relative air humidity	Dimensions
Range: -40 … +65 °C	Range: 0 … 100% RH	Length: 105mm, Diameter 25mm
Accuracy: ±0,1°C	Accuracy: ±1,5% RH	
Resolution: 0,1°C		
probe material	**connector cable**	**ingress protection**
Carbon fiber / metal	0,5 m	IP 60

Ultra-sonic level meter for fluids and solids (to be connected to FireFly)	Article number FFUS

The Lidar measures distance very accurately. The Lidar is connected to the FireFly platform node via the connector cable and takes care of the data transmission. On the connected FireFly platform sensornode also the measurements for air temperature (non-ventilated), relative humidity (non-ventilated), PAR-light or GPS can be added (for details: see FireFly FF02 specifications).

Distance		dimensions
Range: 0 .. 4 m		Standard: PVC 40mm diameter
Accuracy: ±0,001m		Custom housing (starting @ 30mm diameter)
Resolution: 0,001m		
	connector cable	ingress protection
	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 node also the measurements for air temperature (non-ventilated), relative humidity (non-ventilated), 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		
connector cable		**ingress Protection**
0,5 m		IP 67

Wind speed & wind direction sensor (to be connected to FireFly)	Article number FFPS

The wind sensor reports wind speed (m/s) as well as wind direction (degrees). The FireFly platform node is connected via the connector cable and takes care of the data transmission. On the connected FireFly platform sensornode also the measurements for air temperature (non-ventilated), relative humidity (non-ventilated), PAR-light or GPS can be added (for details: see FireFly FF02 specifications).

Wind speed	Wind direction	Dimensions
Range: 0 .... 30 m/sec	Range: 0 -180 degrees	Funnel surface: 50 mm^2
Accuracy: ±5%	Reported in 8 quadrants	Height: 100 mm
Resolution: 1 m/s		
Connector cable		**Ingress Protection**
0,5 m		IP 62

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 sensornode also the measurements for air temperature (non-ventilated), relative humidity (non-ventilated), PAR-light or GPS can be added (for details: see FireFly FF02 specifications).

Precipitation	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 (including 2 FireFly platformnodes)		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, PAR-light, barometric pressure and 2 (50cm and 250cm from ground) non-ventilated air temperature and non-ventilated air humidity. Optional are a GPS module and a stainless-steel anti-theft pole.

air temperature (ventilated)	**relative air humidity** (ventilated)	**PAR-light**
range: -40 … +65 °C	range: 0 … 100% RH	± 5% (Apogee SQ 500SS calibrated)
accuracy: ±0,1°C	accuracy: ±1,5% RH	Standard calibration: Sunlight
resolution: 0,1°C		Calibration other light sources on request
air temperature	**relative air humidity**	
range: -40 … + 70 °C	range: 0 … 100% RH	± 5% (Apogee SQ 500SS calibrated)
accuracy: ± 0,5 °C	accuracy: ± 3% RH	calibtated for sunlight
		calibration for artificial light available on request
barometric pressure	**GPS**	**ingress protection**
Range: 300 … 1100 hPa	Accuracy: 3 m	See components
Accuracy: ± 1 hPa		
sample rate	**charge interval battery**	**pole**
Variable: per 5 minutes or less	+/- 6 months @ 5min sample rate	Stainless steel pole (3 m)
	+/- 3 years @ 1hour sample rate	
precipitation	**dimensions**	**windspeed & direction**
Range: 0 …. 100 mm / hour	Funnel surface: 200 mm2	Range: 0 … 30 m/s
Accuracy: ±2%	Height: 350 mm (including bird spikes), Diameter: 165 mm	8 separate directions indicated
Resolution: 0.2 mm		

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 sensornode also the measurements for air temperature (non-ventilated), relative humidity (non-ventilated), PAR-light or GPS can be added (for details: see FireFly FF02 specifications).

weight	temperature	dimensions
Capacity: 5, 10, 30, 50, 100 kg	Accurate range: -10 … +40 °C	Height: 150mm, Diameter: 70mm
Accuracy: ±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

Standing scales can be taylor-made to fit custom requirements. A 90 kg scale with a diameter of 30 cm, and a 25x25 cm^2 platform with 6 kg full-scale can be delivered from stock. 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 sensornode also the measurements for air temperature (non-ventilated), relative humidity (non-ventilated), 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	>30kgs. height: 80mm, diameter: 300mm <30kgs. height: 50mm, 250x250mm
Accuracy: ±0.04% of capacity	Operating range: -20 … +60 °C	
Resolution: 1 gram		
connector cable		**ingress protection**
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 ~60cm at the top of the storage 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
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
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

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Lysimeter (60 -500 kg) (to be connected to FireFly)	Article number
	FFLM

The Lysimeter can be taylor-made to fit custom requirements. It includes measurements of sample mass and drain volume. The Lysimeter can be combined with the wheaterstation to include rainfall, ventilated relative air humidity and ventilated air temperature, as well as wind speed and wind direction. The Lysimeter is tared by resetting the FireFly platform node. The FireFly platform node is connected via the connector cable and takes care of the data transmission. PAR-light and/or GPS can be added.

sample weight	temperature	dimensions
Capacity: 30 - 500 kg	Accurate range: -10 … +40 °C	Depending on requirements (min. L60*W60*H150 cm)
Accuracy: ±0.04% of capacity	Operating range: -20 … +60 °C	
Resolution: 1-10 gram		
		ingress protection
		IP 67

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) 2…5 km (urban) 5…15 km (open field)	Ethernet, wifi
operating temperature	**operating moisture**	**power supply**
Range: - 40 … + 80 °C	Extended < 80% rH	Standard USB
	Peaks < 95% rH	
	accessories included	**ingress protection**
	USB-C power 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) 2…5 km (urban) 5…15 km (open field)	Ethernet, wifi
operating temperature	**operating moisture**	**power supply**
Range: - 40 … + 80 °C	Extended < 80% rH	Standard USB
	Peaks < 95% rH	
GSM	**accessories included**	**ingress protection**
LTE cat 4 (4G) en hspa+ (3G)	USB-C power cable	IP 30

Gateway (Outdoor, ethernet, wifi)	Article number Gout

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.

frequency	range	network connections
868 MHz (EU + Africa) 915 MHz (Americas and Australia)	0,4-1 km (indoor / obstacles) 2-5 km (urban) 5-15 km (open field)	Ethernet, wifi
Accuracy: +/- 0,5%	Accuracy: +/- 3%	
operating temperature	**operating moisture**	**power supply**
Range: - 40 … + 80 °C	Extended < 80% rH	230V
	Peaks < 95% rH	
	accessories included	**ingress protection**
	230V power adapter	IP 67

Gateway (Outdoor, ethernet, wifi, 4G)	Article number Gout4G

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 outdoor 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)	0,4-1 km (indoor / obstacles) 2-5 km (urban) 5-15 km (open field)	Ethernet, wifi, 4G
Accuracy: +/- 0,5%	Accuracy: +/- 3%	
operating temperature	**operating moisture**	**power supply**
Range: - 40 … + 80 Celsius	Extended < 80% rH	230 V
	Peaks < 95% rH	
GSM	**accessories included**	**ingress protection**
LTE cat 4 (4G) en hspa+ (3G)	230V Power adapter	IP 67
	Gateway mounting bracket	

Stainless steel auger pole (2m, 2,5m, 3m, 4m)	Article number Auger Pole

Stainless steel pole with auger. Length 1,65m..to ..3,5m. Diameter 40mm, wall thickness 4mm.

Smart clip (angled)	Article number FFSCang

The smart clip can be used to mount the FireFly:
- wire or rod with a diameter of 2..to..3,5 mm
- stick with a diameter of 6..to..7mm

Smart clip (Wall mount)	Article number SCWm

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

Smart clip (Leg less)	Article number Scll

The smart clip can be used to fix or mount all kinds of products to a rod or stick
- 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

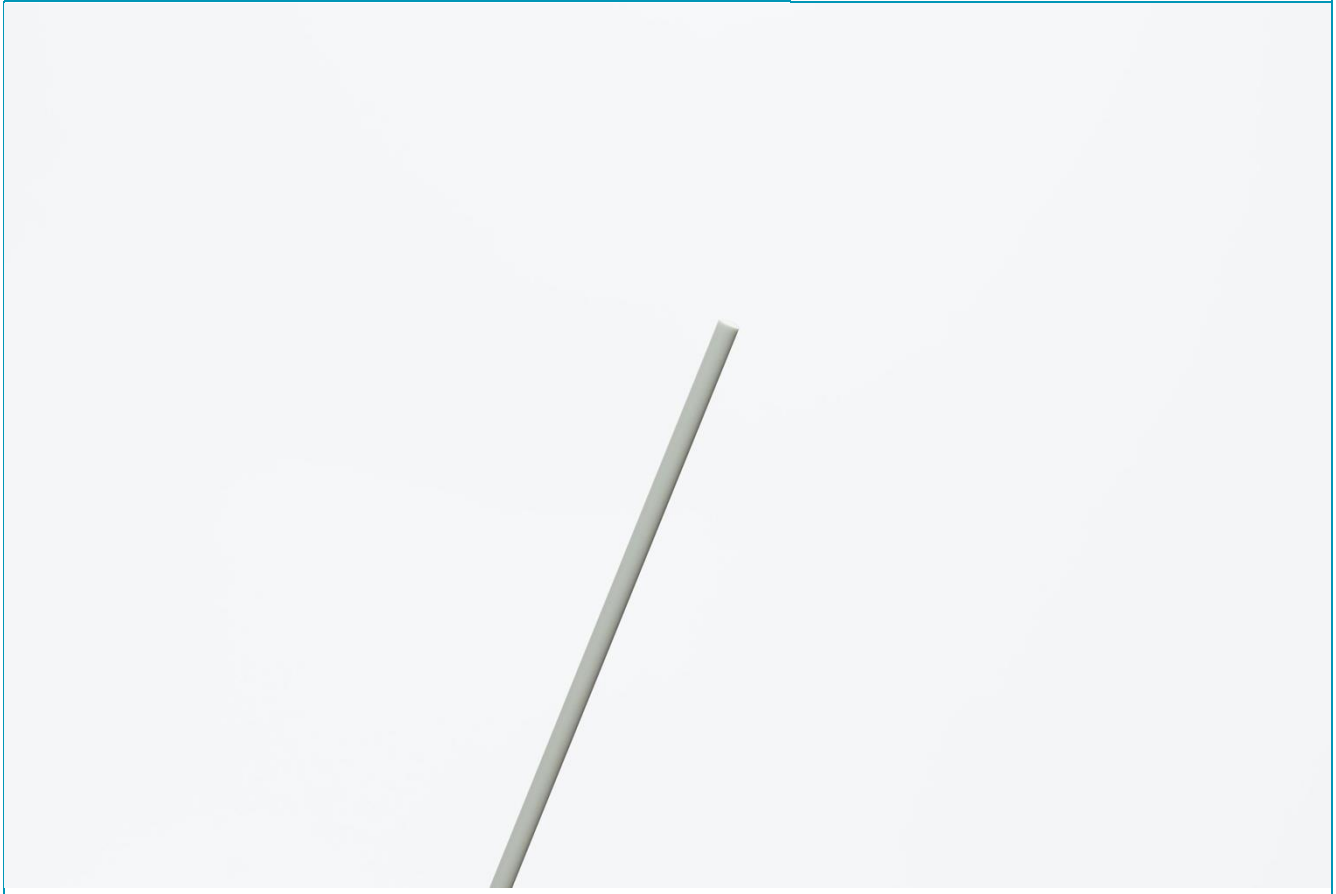
The FireFly has a battery life of around 6 months. The battery charger will charge the battery within 4-6 hours.

operating temperature	charge current	ingress protection
Range: - 5 … + 40 °C	0,5 A maximum	IP 50

Magnetic Reset pin	article number RP

The Magnetic Reset pin resets the sensor and tares any connected external scale device

Fiber glass rod (white, 75cm, 6mm diameter)	Article number FGR75



The fiber glass rod can be used to mount the FireFly sensor using the Smart Clip angled.

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 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.