Product catalog

QUANTIFIED
sensor technology

Product Catalog 2024-11

Software

Integration into InSight

Through the InSight platform developed by Quantified, you can visualize and/or download sensor data, create sensor groups, and set up push notifications. There are 3 subscription types: Green, Silver and API-only:

Q-Insight Green

- up to 100 FireFlies
- up to 10 users
- 9 months of data storage

Q-Insight Silver

- up to 500 FireFlies
- up to 25 users
- up to 500 alarm events or notifications per day
- 24 months of data storage (extension available upon request)

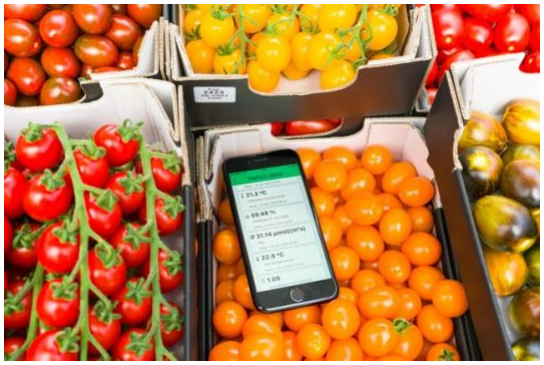
API-only

- up to 500 FireFlies
- 2 weeks of data storage (extension available upon request)

Quantified Mobile App

The Quantified App allows you to visualize sensor data on your phone or tablet. Using the links below, you can download the app for your Apple or Android device for free.

Download the Quantified app in the App Store (iPhone)
Download the Quantified app on Google Play (Android)



Integration into another platform

It is also possible to link your Quantified sensors to a data platform developed by one of our collaboration partners. To this end, you can use the Application Programming Interface (API). We can provide this connection for you: please feel free to contact us to discuss the possibilities.

Hardware

Starter kit	Article number
	FF02SK

The Starter kit includes a complete wireless sensor system, and is an inexpensive introduction to Quantified. The kit includes:

- 2 FireFly sensors with all options (FF02)
- 1 gateway with Ethernet and 4G
- 2 Smart Clips of your choice: FFSCang, FFSCMagnetic or FFSCMSC
- 1 USB charger (FFCh)
- 1 year access to Insight data platform (Incl. API link)
- 1 year data subscription for connectivity

You can add external sensors from the catalog to the starter kit as desired.

FireFly sensor node	Article number FF02

The FireFly sensor is a wireless sensor module with rechargeable battery in a rugged housing. The sensor configuration can be assembled as desired. A variety of external sensors and actuators can be connected via the connector.

FF02 sensor node

dimensions and weight	protection type	measuring interval
l x w x h = 35 x 40 x 110 mm^3 ; weight 127 g	IP67 connector with cap	5 minutes
LoRa frequencies		**battery charging interval**
868 MHz (EU, Africa) 915 MHz (Australia, America) 869.0 - 869.4 MHz (Morocco) 915MHz (South Korea)		>12 months (depending on measurement frequency, among other things)

FF02 selection options

air temperature	relative humidity	
operating range: -15..+65 °C	working range: 20..90% RH	accuracy: ±1.5% RH
accuracy: ±0.5 °C	working range: 90..100% RH	accuracy: ±2.5% RH
resolution: 0.01 °C	resolution: 0.01%	
GPS	**PAR light**	**barometric pressure**
accuracy: ±5 meters	±5% (calibrated for sunlight)	operating range: 0 ... 500 kPa
		accuracy: ±0.5 kPa
		resolution: 0.01 kPa

Infrared Thermometer linking to FireFly	**Article number** FFIRT



The infrared thermometer allows non-contact measurements of the surface temperature of, for example, plant leaves. The thermometer has a wide measuring range and a high accuracy of up to 0.3 °C. The device is used to detect plant stress.

FFIRT		
IR temperature		
accuracy	**object temperature**	**note**
±0.3 °C	+22 .. +40 °C	At operating temperature 0 ... +50 °C
±0.5 °C	0 .. +60 °C	
±2.0 °C	-70 .. +200 °C	
measuring range: -70 ... +200 °C		-
resolution: 0.02 °C		-
viewing angle: 35°		at 50% signal
distance per spot diameter: 1 : 1.59		
object emissivity: 1.00		-
spectral response: 550 ... 1400 nm		-
working temperature		
-15 .. +60 °C		
dimensions & weight	**protection type**	
l x D = 350 mm x 20 mm bending radius: ≥ 25 mm weight: 65 g	IP51	

Poseidon WET sensor linking to FireFly	**Article number** FFWETPos 1-, 2- or 3-gang

The Poseidon WET sensor measures permittivity* , electro-conductivity (EC), and temperature of soil or substrate. Single, dual, and triple versions are available. This makes it possible to monitor transport of water and nutrients through the soil. The (multi-) Poseidon should be connected to a FireFly.

*The relationship between permittivity and Volumetric Water Content (VWC) depends greatly on soil type. We recommend irrigation based on measured permittivity. If desired, the Poseidon can be calibrated for your substrate.

relative permittivity (-)	**EC**	**temperature**
operating range: 0..82	working range: 0..20 dS/m	operating range: -40..+80 °C
accuracy: < 3%	accuracy: ±3%	accuracy: ±0.5 °C
resolution: 1%	resolution: 10 dS/m	resolution: 0.1 °C
probe	**measuring principle**	**protection type**
Stainless steel; length: 7 cm; width: 2.5 cm	Time Domain Reflectometry (TDR), 50 MHz	IP67
A: gnaw protection cable		**cable length**
length 0.5 m, flexible and removable		2 m per probe

Smart Gutter linking to FireFly	**Article number** FFSG




The Smart Gutter is designed to optimize cultivation on substrate slabs. Through every five minutes to measure substrate weight, drain volume, drain EC and temperature, the grower gains insight into plant evaporation, root climate and thus optimal fertigation settings.

FFSG		
drain volume	**drain EC**	**drain temperature**
maximum flow rate: 1 ml/s	working range: 0..20 dS/m	operating range: -40..+80 °C
accuracy: ±5%	accuracy: ±3%	accuracy: ±0.5 °C
resolution: 5 ml	resolution: 10 dS/m	resolution: 0.1 °C
measuring range weight	**temperature range weight**	**standard dimensions and weight**
maximum load: 40 kg	accurate range: -10..+40 °C	inner gutter size: l x w x h: 1350 × 200 × 42 mm^3
accuracy: ±0.04% of max load + ±0.02% of max load per 10°C	operating range: -20..+60 °C	inner size foot brackets: 218 mm
resolution: 1 g		weight: 8 kg
		other sizes on request
	material	**protection type**
	Stainless steel and Polypropylene	IP 61

Drain/Dripper sensor linking to FireFly	**Article number** FFDS

The drain/dripper sensor is a tipping-bucket sensor for measuring drain volume. The sensor is connected to a FireFly.

FFDS		
drain / dripper volume	**dimensions**	**protection type**
max flow rate: 1 ml/s	l x w x h= 40 x 125 x 100 mm^3	IP61
accuracy: ±5%	weight: 110 g	
resolution: 5 ml		
connector cable		
length 0.5 m		
Optional		
drain / dripper EC	**drain / dripper temperature**	**dimensions**
drain / dripper EC	drain / dripper temperature	l x w x h = 40 x 125 x 120 mm^3
working range: 0..20 dS/m	operating range: -40..+80 °C	
accuracy: ±3%	accuracy: ±0.5 °C	weight: 200 g
resolution: 10 dS/m	resolution: 0.1 °C	

Carbon Dioxide (CO_2) Sensor linking to FireFly	**Article number** FFCO2



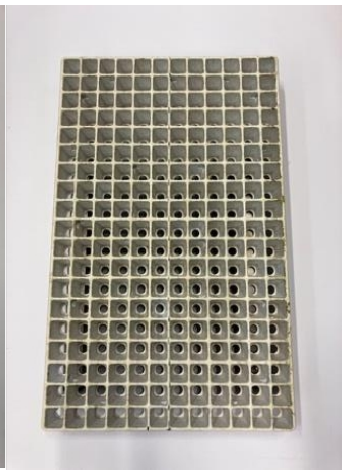
This sensor measures the concentration of CO_2 in the ambient air. The measured concentration is compensated for changes in temperature and air pressure. With a separately supplied calibration kit, the sensor can be easily calibrated by the user himself.

All CO_2 sensors expire over time and can begin to show very significant deviations. In addition, many CO_2 operate on a "self calibration" basis that assumes the lowest reading in a period is the CO_2 content of the outside air. The CO_2 content of the outside air varies from location to location, and in the greenhouse, CO_2 levels can vary greatly from the outside air. Therefore, a calibration kit is also available for a quick, easy self-executing calibration with a calibration gas.
This provides highly accurate CO_2 measurements.

$FFCO_2$ sensor		
dimensions and weight	**protection type**	
dimensions (ℓ x Ø): 63 mm x 20 mm weight: 40 g	IP44	
CO_2 concentration		
accuracy	**conditions**	**comments**
±50 ppm + 2.5%	400 .. 1000 ppm	-
±50 ppm + 3%	1001 .. 2000 ppm	-
±50 ppm + 5 %	2001 .. 5000 ppm	-
measuring range: 0 ... 5000 ppm		-
resolution: 1 ppm		-
repeatability: ±10 ppm		typical
time constant: 60 s		typical
working range		
operating temperature: -10 ... +60 °C		-
humidity: 0 ... 95 % RH		without condensation
air pressure: 700 . 1200 hPa		-

H-Frame scale (6, 8, 12, 24, 40, 80 kg) linking to FireFly	**Article number** FFHFS






The H-frame scale is a stainless steel scale developed to optimize watering in crops in trays and small to medium pots. The scale is available in various sizes and measuring ranges. The scale is connected to a FireFly and can be tared by
reset the FireFly wirelessly.

FFHFS		
measuring range	**temperature range weight**	**standard dimensions**
Options: 6, 8, 12, 24, 40 or 80 kg	accurate range: -10..+40 °C	l × w × h: 520 × 560 × 45 mm weight of the scale: +/- 4000 g
accuracy: ±0.04% of measuring range	operating range: -20..+60 °C	*Other sizes on request*
resolution: 1 g		
		protection type
		IP 65

Standing scale (9, 18, 30, 60, 90 kg) linking to FireFly	**Article number** FFSS 10..90

The upright scale can be used for weighing medium to large pots, to support irrigation and/or biomass determination. The scale comes in a square or round design, with a measurement range of 10, 20, 30, 60 or 90 kg. The scale
is connected to a FireFly and can be tared by resetting the FireFly wirelessly.

FFSS		
options measuring range	**working temperature**	**dimensions**
square: 10, 20 kg around: 30, 60, 90 kg	accurate range: -10..+40 °C Temperature dependence mass measurement within this range: 0.05% decrease per °C increase	<30kg: l × w × h: 250 × 250 × 50 mm^3 weight: 1400 g >30kg: h × d: 80 × 300 mm^2 weight: 2100 g
accuracy: ±0.04% of measuring range	operating range: -20..+60 °C	
resolution: 1 g		
connector cable		**protection type**
length 0.5 m		IP65

Macro Solar Chimney (ventilated measurement with FireFly)	**Article number** FFMSC



The Macro Solar Chimney is a passively ventilated housing for the FireFly. In environments with high irradiance (direct growth or sunlight), this housing provides a more accurate measurement of temperature and relative air humidity. When using the Macro Solar Chimney, the PAR measurement is not usable because the light sensor is shielded.

For mounting the FireFly in the Macro Solar Chimney, the Smart Clip (FFSCMSC) can be used.

FFMSC		
	dimensions and weight	**mounting**
	h × d: 500 x 125 mm; 250 g	tie-wrap

Solar Chimney (ventilated TrH sensor) linking to FireFly	**Article number** FFSC

The Solar Chimney TrV is designed for temperature and relative humidity measurements in the presence of high (solar) radiation. The radiation generates natural airflow through the chimney, allowing for ventilated air temperature and relative humidity. The FireFly platform sensor is connected via connector cable and provides data transmission. There are multiple mounting options to choose from. Use the Solar Chimney SubZero model for measurements below 0 °C (upon request).

FFSC		
air temperature	**relative humidity**	
operating range: 0..65 °C	working area: 20..90%	accuracy: ±1.5%
accuracy: ±0.4 °C	working area: 90..100%	accuracy: ±2.5%
resolution: 0.01°C	resolution: 0.01%	
connector cable	**dimensions and weight**	**protection type**
0.5 m	height 550 mm; diam. 80 mm; 225 g	IP61
mounting options		
FFSC A: string for hook mounting	FFSC B: block for pole mounting (40-75 mm)	FFSC C: clip for wire mounting (2 mm) or rod (5 -7 mm)

Hanging scale (5, 10, 30 or 50 kg) linking to FireFly	**Article number** FFSH 5..to..50

The hanging scale can be used for weighing hanging objects such as cultivation gutters or crop wires. The scale is available with various weight ranges. The scale connects to a FireFly and can be tared by resetting the FireFly wirelessly.

FFSH		
options measuring range	**working temperature**	**dimensions**
5, 10, 30, 50, 100 kg	accurate range: -10..+40 °C	height × diameter: 150 mm × 70 mm
accuracy: ±0.07% of measuring range	operating range: -20..+60 °C	
resolution: 1 g		
connector cable		**protection type**
0.15 m		IP65

Fluid pressure sensor (to be paired with the FireFly)	**Article number** FFPS

The liquid pressure sensor measures line pressure in, for example, water supply and irrigation systems. The pressure sensor is mounted with a (straight) G 1/2 inch male thread. The pressure sensor is connected to a FireFly.

print	**mechanical connection**	**dimensions**
measuring range: 0..10 bar	process connection: G ½ B	height: 68 mm
accuracy: ±2 %	material: stainless steel	diameter: 29 mm
overpressure limit: 20 bar		aperture: 3.5 mm
connector cable	**Temperature**	**protection type**
length 0.5 m	working range: 0..+80 °C (environment and fluid)	IP67

Drain/Dripper XXL sensor linking to FireFly	**Article number** FFDSXXL

The drain/dripper sensor is a tipping-bucket sensor for measuring large drain volumes. The sensor connects to a FireFly.

FFDS		
drain / dripper volume	**dimensions**	**protection type**
max flow rate: 25 l/min	L*w*h = 400 x 200 x 360mm^3	IP61
accuracy: 0.5 l/min : -2% 1 l/min: -6% 5 l/min: -10% 10 l/min: -14% 15 l/min: -18% 20 l/min: -20% 25 l/min: -22%	weight: 3100 g	
resolution: 1000 ml		
connector cable		
length +/- 3 m		

Weather Station	Article number
	FFWs

The weather station includes a wind gauge, pluviometer, air temperature and relative humidity. Optional features include a GPS module and a stainless steel pole.

air temperature	relative humidity	wind meter
see specifications FireFly (FF)	see specifications FireFly (FF)	wind speed up to 300km/hr wind direction in 8 quadrants
rain gauge	**dimensions**	**protection type**
see rain gauge specifications (FFPL)	Depending on pole length. Total diameter setup +/- 30cm	IP67

Pluviometer linking to FireFly	**Article number** FFPL

The pluviometer consists of a funnel with anti-bird stings mounted on a "tipping bucket" sensor. The pluviometer measures precipitation in mm, and can be connected to a FireFly.

precipitation	**dimensions**	
working range: 0..100 mm/hour	surface area: 200 mm^2	
accuracy: ±2%	height: 350 mm (including anti-bird spikes) diameter: 165 mm	
resolution: 0.2 mm	weight: 550 g	
connector cable		**protection type**
length 0.5 m		IP67

Sendot Photo efficiency sensor linking to FireFly	**Article number** FFSendotEff

The Sendot Photo Efficiency sensor can be linked to the FireFly. This allows the sensor data to be read digitally in the desired platform (including LetsGrow, Sendot and Ledgnd).

FFSendotEff

output	**dimensions**	**protection type**
photosynthesis efficiency; PAR; F_0 ; Fmax	L*w*h 250*60*20 mm	IP61

Poseidon City (rugged enclosure for underground/invisible use of Poseidon) linking to FireFly	**Article number** FFWETPosCity1, 2 or 3

Specially designed for use of Poseidon sensors in public green spaces is the Poseidon City sensor housing. This allows a FireFly with one or more Poseidons to be placed underground and therefore invisible. The housing also provides protection against mechanical and chemical weed control. The photos show a Poseidon Triple City; there is also a version with
a single or double Poseidon available.

Potato Guard 60 kg linking to FireFly	**Article number** FFPG

The Potato Guard measures real-time weight loss of seed potatoes during storage. This measurement helps you set climate and ventilation parameters, minimizing mass and quality loss during storage. The Potato Guard is buried at the level of the storage top. An optional lid can be used for deeper measurements.

Basic System

Weighing basket with potato protective cover (for ~60 kg sample weight) Battery charger for the sensors (item FFCh001)
FireFly for escaping ventilation air above storage (item FF02)

Options

Lid, air temperature and humidity for incoming ventilation and recirculated ventilation air.

sample weight	**material**	**dimensions and weight**
capacity: 60 kg	STAINLESS STEEL	h × d: 700 x 600 mm^2 ; 7.5 kg
accuracy: ±40 g (-10..+40 °C)		
FireFly (FF02)		
dimensions and weight	**protection type**	**measuring interval**
l x w x h = 35mm x 40mm x 110 mm weight: 127 g	IP67 (with connector cap)	5 minutes
LoRa frequencies	**working temperature**	**battery charging interval**
868 MHz (EU, Africa) 915 MHz (Australia, America) 869.0 - 869.4 MHz (Morocco) 915MHz (South Korea)	range: -10..+40 °C	~6 months at 5 min measurement interval ~9 months at 10 min. measuring interval

Gateway (4G, Ethernet)	Article number Gout

The outdoor 4G gateway receives LoRa messages from the FireFly sensors and sends the data over the Internet to the database. A single gateway is sufficient to process data coming from up to 100 FireFlies. Suitable for outdoor use, this Gout4G gateway connects via a 4G connection and/or an Ethernet cable.

frequency	distance	network options
868 MHz (EU, Africa) 915 MHz (Australia, America)	set-up inside: 0.4..1 km outside in built-up area: 1..3 km outside open field: 2..10 km	4G, Ethernet
working range temperature	**working range moisture**	**electrical power**
-40..+80 °C	IP67	230 V
network	**supplied accessories**	**protection type**
LTE cat. 4 (4G) and HSPA+ (3G)	LoRa antenna, adapter 230 V, pole mount materials	IP67

Gateway with solar panel and battery (4G, ethernet)	**Article number** GoutSolar

The outdoor 4G gateway receives LoRa messages from the FireFly sensors and sends the data over the Internet to the database. A single gateway is sufficient to process data coming from up to 100 FireFlies. Suitable for outdoor use, this GoutSolar gateway connects via a 4G connection and/or an Ethernet cable.
The Gateway can be connected to the power grid but also has a solar panel and battery to operate without a power connection.

The solar panel and battery provide enough energy to provide a season to year-round connection depending on the latitude at which the gateway is set up. Upon request, we can specify this time period for your location.

frequency	**distance**	**network options**
868 MHz (EU, Africa) 915 MHz (Australia, America)	set-up inside: 0.4..1 km outside in built-up area: 1..3 km outside open field: 2..10 km	4G, Ethernet
operating temperature range	**working range moisture**	**electrical power**
-20..+50 °C	IP67	230 V
network	**supplied accessories**	**protection type**
4G LTE (CAT 1)/GSM Nano SIM-4FF	LoRa antenna, adapter 230 V, pole mount materials	IP67
solar panel	**battery**	
45W	25000mAh	

Smart clip with integrated magnet	Article number FFScMagnetic

Smart clip for attaching the Firefly against steel or iron objects

Foot for fiberglass stick	Article number FFScMagnetic

Plastic base (15 x 10 cm) for vertical fixation of a fiberglass stick (6mm diameter. To be used in combination with FFSCang Smart clip. Options for stick position: center on foot or on end of foot.

Smart clip for wire or stick mounting

Article number

FFSCang

The clip can be used to mount the FireFly to a 2..3.5 mm diameter wire or a 6..7 mm diameter stick.

Smart clip for vertical hanging mounting

Article number

FFSCMSC

The clip allows the FireFly to be installed with a hook hanging vertically on a wire up to 6 mm in diameter. This clip is used for mounting in the Macro Solar Chimney.

Tripod with dragonfly for FireFly	Article number FFSTripod
	
To level the FireFly for more accurate derived PAR light measurements.	

Smart clip for wall mounting	Article number SCWm
	
This clip allows the FireFly to be attached to a vertical wall. Diameter screw hole 6 mm.	

FireFly USB charger

Article number
FFCh

The battery charger charges the FireFly battery in ~7 hours via a USB adapter.

work area temperature	charging current	protection type
+10..+30 °C	< 0.5 A	IP50

Reset magnet

Article number
RP

Magnet attached to a Quantified key cord for resetting the FireFly sensor.

Fiberglass cane white	Article number
	FGR75

Fiberglass stick to mount the FireFly sensor using a (FFSCang) Smart Clip. Length 0.75 m, diameter 6 mm.

Warranty and service

For the CE declaration, please visit our website. We are convinced of the quality and flawless operation of our products. Therefore, we offer 1.5 years warranty on the hardware, provided the products are handled carefully. See also our fair-use policy and manuals. In the event of a malfunction, we will support you in resolving any issues. If it is found that Quantified is liable for the faulty operation, no charge will be made and the product in question will be replaced free of charge within the warranty period. In all other cases, we charge for time spent based on hourly rates.

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