

Smappee Infinity Technical Guide

Introducing the next evolution in smart building energy management technology.



Smappee Infinity

Smarter energy management



Smappee Infinity is an all-in-one building energy management system (BEMS) that offers detailed real-time and historical energy data, as well as IoT-enabled control and dynamic load balancing. It provides intelligent automation that enhances security, comfort and energy savings. The system is future-proof, and can adapt to any scenario, allowing over-the-air updates and the addition of extra modules for added functionality at any time.

A modular solution for every energy need

The strength of the Smappee Infinity system lies in its modularity, allowing the mix and match of components according to the level of energy control required. This allows the provision of Infinity features and services needed to deliver a level of energy management aligned to the buildings electrical infrastructure.

Smappee Infinity will gather real time energy data, from electrical circuits and provide that information to the user in the form of a digital dashboard. This energy data can also be used to control equipment such as lighting, aircon, solar PV, EV charging and general plant etc to maximise efficiencies with the building operations.

Smappee Infinity can easily pair with IoT products and platforms such as Amazon Alexa, Google Assistant, Siri and Home Assistant, along with different communication protocols for even more integrations.

Transparent energy use and costs

Smappee offers users insights into energy consumption and costs, down to the appliance level. This control avoids surprise energy bills. Infinity provides full control over high-power equipment, such as EV charges and AC units. The buildings electrical systems can be automated, or dynamically controlled based on time, load demand, sensors and many other specific control scenarios,

Dynamic load balancing

Smappee dynamically manages energy demands in the most efficient way by real time monitoring of circuits with CTs sampling thousands of times per second.

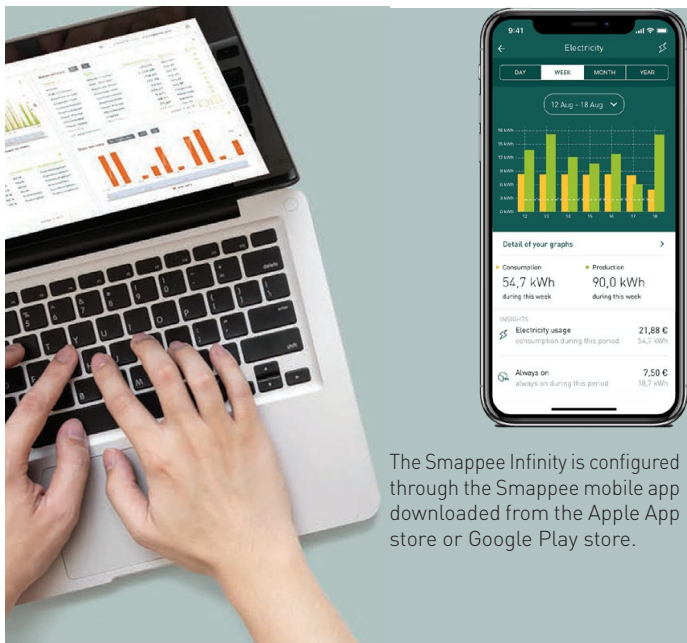
Overload protection

Smappee prevents electrical installation power overloading and potential power outages by managing power consumption on selected loads e.g, heating systems, EV chargers etc by dynamically managing electrical loads.

Smart energy control for EV's and Solar PV

Smappee allows for an easy and secure charging of your electric vehicle(s) while cleverly managing your building's energy loads.

Where solar power is installed, Smappee's dynamic load balancing technology ensures that 100% of the generated solar power is used by directing it to equipment, thus maximising the benefit of the generated electricity.



The Smappee Infinity is configured through the Smappee mobile app downloaded from the Apple App store or Google Play store.

Smappee collects real-time production and consumption data down to the appliance level. This provides a large amount of highly valuable, actionable data, which is managed on a flexible professional dashboard for in-depth analyses and control.

Once the hardware components are installed and operational, and the Genius is connected to the Internet, then all system configurations are undertaken via the Smappee App.

Data gathering

The Smappee CT Hub gathers energy data by measuring different currents from up to 28 CT's or Rogowski Coils. Use the Smappee Solid Core 3-phase CT as a simple and cost-efficient alternative. Add a Smappee Input module to count pulses or monitor input status with up to 4 digital inputs or Smappee Gas & Water for detailed data on gas and water consumption.

Communication

The Smappee Genius is the gateway between the Smappee modules and the Smappee Cloud. It ensures secure data storage. It also interacts with Smappee's controlling modules and 3rd party components.

Control

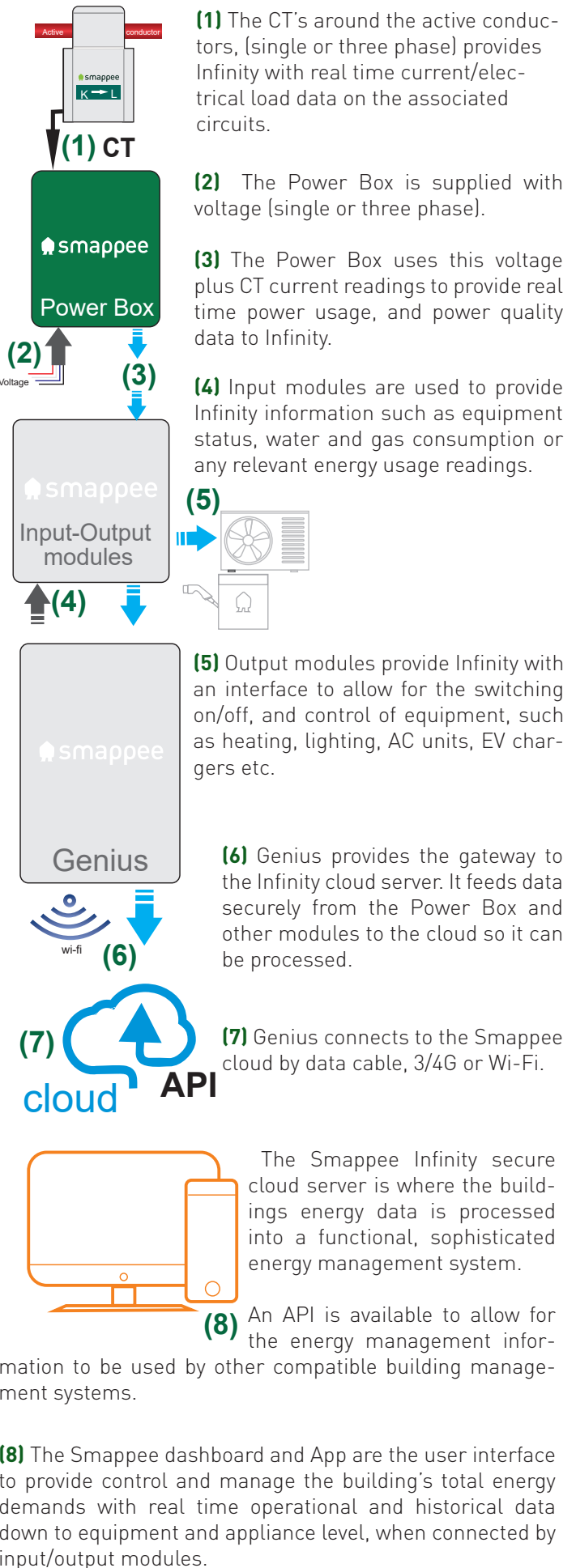
Control the buildings electrical equipment with the Smappee Input and Output Modules. The Output module can be configured to switch on any type of electrical equipment with a range of control parameters.

Smappee Switch is an optional small device used to control plug-in type appliances up to 16 Amps.

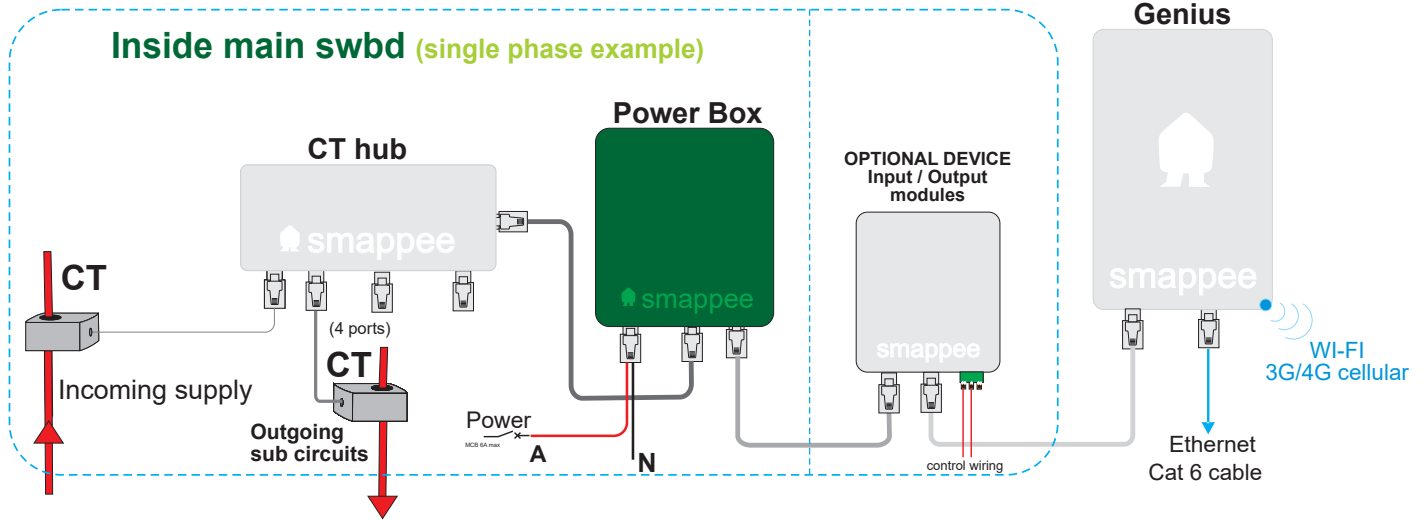
Power supply

The Smappee Power Box measures the line voltage of the connected phases, collects the currents from the CT's and calculates power, active, reactive and other energy and power quality data.

How Smappee Infinity Works



The Modular Smappee Infinity System



Smappee Infinity - Key Components



CT Current Transformers

CTs are a device used to measure currents flowing in a conductor/circuit to a very small amount. This current data is critical to identifying the demand on the cable and circuit, so that the Infinity system can manage the current through switching control.

Several CT options are available, single or three phase and with the Rogowski coil CT measurements up to 10kA.



CT Hub MOD-IAC-1

The CT Hub gathers energy data measured by up to 28 CTs. from a single Infinity system.” Daisy chain several CT Hubs to measure different installations up to a distance of 100 meters. Current is measured up to 4000 times/second.



LED status Indication

Power Box (MOD-VAC-1)

The Power Box provides power to all components and measures the line voltage of the connected phases. It also collects the currents from the CTs and calculates power, active, reactive and other energy and power quality data.



LED status Indication

Output Module: MOD-OUT-1

The Output Module controls (a group of) appliances remotely, and can be used as a control signal for smart devices from the distribution panel. The two separate power relay outputs can control devices that are directly powered (max. 5 A switching capability) or large currents via a contactor.

Add up to 10 Output Modules per Smappee Genius. You can set up rules to automate equipment connected to an Output Module with the Smappee automations.



LED status Indication

Genius: MOD-GW-1

The Genius is the gateway between the Power Box and the Smappee Cloud and ensures secure data storage. It also interacts with Smappee’s control modules and 3rd party components, allowing smart control and dynamic load balancing. Data is transferred via Ethernet, Wi-Fi or 3G/4G.

The Smappee logo illuminates to show “Power On”. Fault status is shown in different colours and flash/pulse rate on the LED.

Smappee Infinity Installation Process

Prior to the installation of the Smappee Infinity system an electrical site audit should be undertaken.

The site audit should establish:

- The overall objectives of Infinity installation, and what it is expected to deliver in terms of energy management and cost reductions.
- Is the electrical system single or three phase?
- The age, condition and suitability of the main switchboard for Infinity component Installation.
- The size and type of the supply conductors, so the correct selection of CT's can be determined.
- What parts of the electrical infrastructure will be measured with CT's, and monitored with Infinity
- What equipment will be measured with input or output modules.
- Solar PV (if installed) then consideration as to the monitoring and management of this incoming supply from inverters needs to be considered i.e. CT's on the incoming phase/ phases from the inverter.
- How is infinity going to connect to the Internet" wired Cat6, Wi-Fi, cellular?

Hardware Installation

The installation consists of the physical installation of CT's, CT hub and Power Box components within the buildings main switchboard enclosure.

The Genius can also be installed in the switchboard if space permits. Often the use of a separate enclosure external but close by the main switchboard provides a suitable solution. It can be installed at a suitable position and connected to the Power Box with using the (longest) supplied Smappee bus cable or a custom twisted-pair RJ10 cable.

The special Smappee split CT's can be installed around the incoming supply conductors without the need to disconnect the conductors from switches or protective device terminals.



Split-core CT's for easy installation



Rogowski coils split to wrap around large conductors

Wiring diagrams on Page 5 show the configuration for hardware installation.

Following hardware installation and energising the Power Box, configuration via the installation wizard in the Smappee app completes the electrical installation.

Smappee Installation App

The first step of the Smappee Infinity installation is creating a location and defining the measured loads and their properties. The location defines where the Smappee will be installed (e.g. house, store, or site address). This procedure is done with the Smappee mobile app.

The Smappee app will guide you through the various steps to fill in all the required information.

Steps:

Log in to the Smappee app with the corresponding Smappee username or create a new account.

- Create a new location.
- Follow the steps shown in the mobile app.

As an installer additional locations can be created under the same user account.

Scanning the QR code on the Genius will link product to Smappee cloud.

All configurations of the system including configuring the CT's, setting up Input and Output modules are undertaken with the Smappee mobile app.

The Smappee app is available for IOS or Android devices.

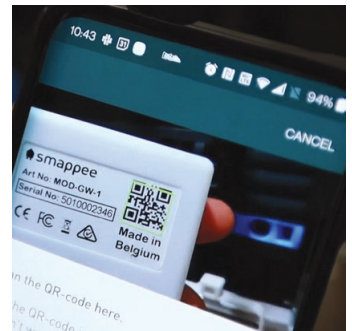
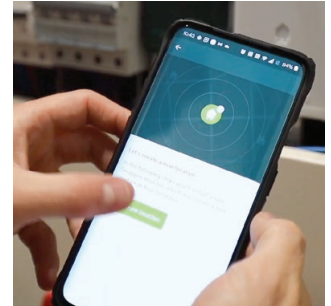
The Smappee Infinity instruction manual provides additional information for using the Smappee app.

Smappee Infinity for Solar PV

The Infinity system is designed to provide home or institutions who have solar PV infrastructure with a high level of control to maximise the electricity created.

Smappee's dynamic load-balancing technology ensures that 100% of the generated solar power is used instead of returning excess energy to the grid. Smappee can steer the energy flows within the building in the most optimal way taking into account your solar energy generation, batteries storage capacity, connected smart appliances, electric vehicles, and other smart energy management platforms.

Smappee automations allows users to automate the energy flows within their buildings or facilities.



Wiring and Wiring Schematics

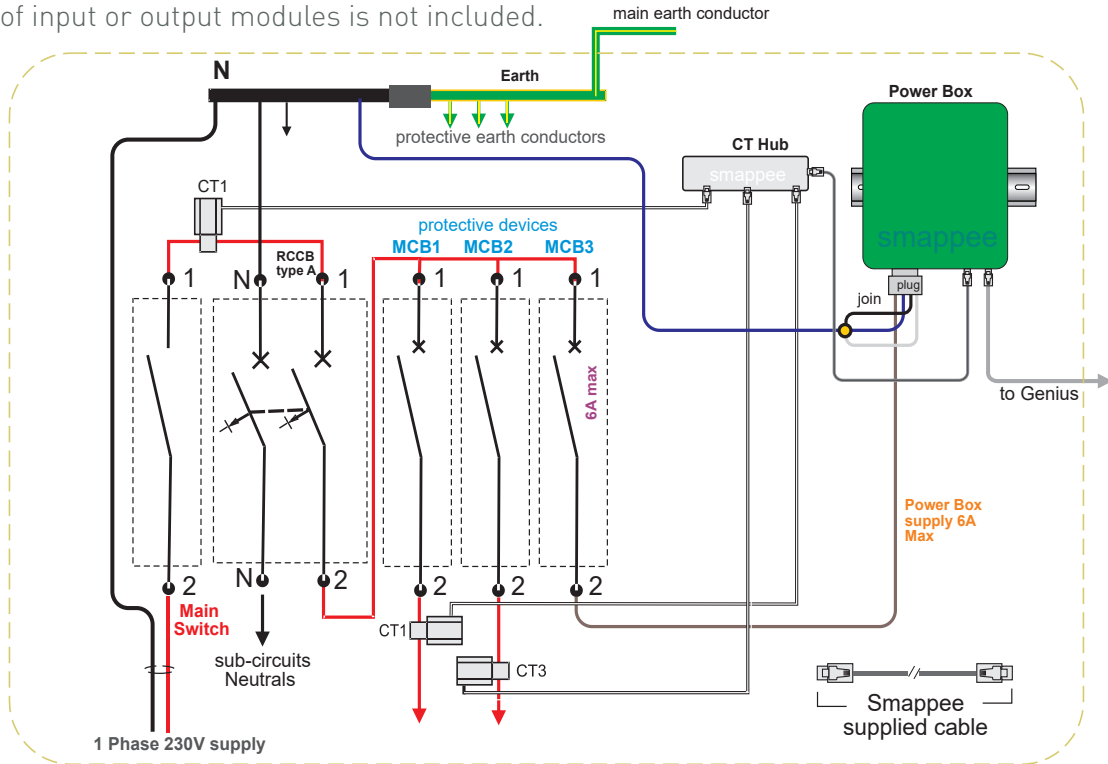
Installation of infinity must be undertaken by a qualified electrician holding a current NZ practicing license.

Electrical Installations must be undertaken in accordance with AS/NZS3000:2007 (the AUS /NZ wiring rules)

Termination of any flexible cable within the switchboard shall be done using bootlace ferrules.

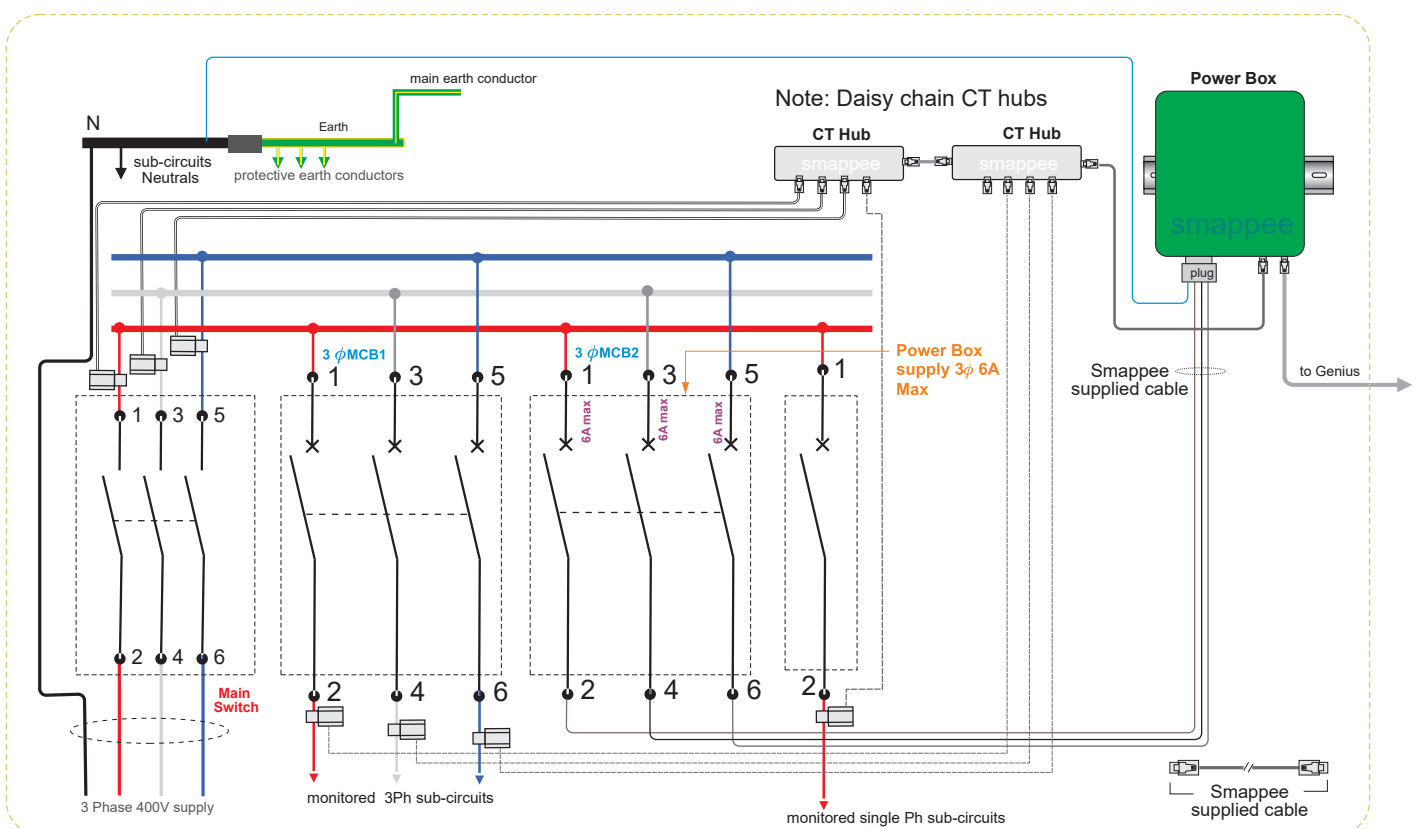
Single Phase 230V ac switchboard (indicative only)

Note; wiring of input or output modules is not included.



3 Phase 400V ac switchboard (indicative only)

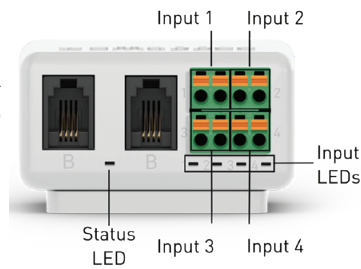
Note; wiring of input or output modules is not included.



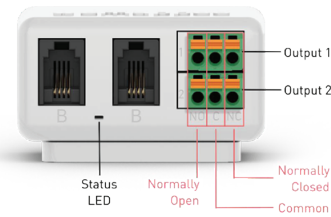
Connecting Input/Output modules

The **Input module** has 4 digital inputs to count pulses or monitor input status (low/high).

The inputs are indicated on the bottom of the module. One input has two horizontal wire connections next to each other.



The **Output module** has two relay outputs. Each output has NO (Normally Open), C (Common) and NC (Normally Closed). These three contacts are mounted horizontally from left to right for each output.



The output module is rated at 5A switching capacity.

It is normally used with a single or three phase contactor to control motors, AC units etc.

Technical Support

Smappee Infinity is supported by the technical team at Active Electrical Suppliers.

The Smappee mobile phone app guides the installer through the installation requirements, and Smappee's website (Smappee.com) provides extensive content, including user / installation manuals and a pathway to become a certified Smappee installer.

Additionally, YouTube has several videos on Smappee Infinity installation and setup.

Smappee Dashboard

<https://www.youtube.com/watch?v=u02GY-kwxBU>

Smappee provides a large amount of valuable, actionable energy data that can be accessed in multiple ways. There's an API for integration with EMS/BMS systems, a user-friendly app for consumers and a comprehensive professional dashboard for in-depth analysis.

Smappee Dashboard is the primary energy data gathering tool. Export energy data as an Excel or CSV file and analyse it in the program of choice, or save it for future reference on a hard drive, USB, or in the cloud, etc.



Smappee license

Smappee provide the license to use the Infinity cloud free of charge for the standard mobile and PC dashboard package.

Smappee assigns a non-exclusive, non-transmittable right of use, which you accept by installing the application. The right of use is limited to the normal execution of the application. The right of use is assigned by installing the application. Only one right of use is assigned.

Smappee offers a full BEMS dedicated license which provides an expanded function set including power quality data. This license is based on a yearly subscription fee. Power quality: Live harmonics, Total harmonic distortion and historical harmonic charts.

Smappee Infinity Component Codes			
Product type	Model code	Dimensions	Specification
Split Core single CT up to 16mm ²	AC-CT-100A	32 × 44.5 × 31	Up to 100A
Split Core single CT up to 25mm ²	AC-CT-200A	50.5 × 66.5 × 41	Up to 200A
Smappee Solid Core 3-Phase CT	MOD-IAC-2	59 × 35 × 23 mm	3 X 50A cable dia 6.7mm Smappee Bus cable 40 cm
Smappee CT Hub	MOD-IAC-1	70 × 31 × 23 mm	4 split core CT inputs / hub, 40cm bus cable incl
Smappee Power Box	MOD-VAC-1	55 × 55 × 26.6 mm	Voltage 90-264 - Din mount power 8W
Smappee Genius	MOD-GW-1	108 × 69 × 25 mm	Wall mount plate 150cm bus cable incl
Smappee Connect	MOD-GW-3	55 × 55 × 26.6 mm	Wall mount plate, bus cable incl
Smappee Input module	MOD-INP-1	55 × 55 × 26.6 mm	4 inputs/module Din mount
Smappee Output module	MOD-OUT-1	55 × 55 × 26.6 mm	2 relay outputs (NO/NC/Common) 5A max Din mount
Smappee Switch (appliance control)	S1-AUS -1	Length 600mm	230 V, 16A max (up to 20 Switch/Genius)
Rogowski Coil 0-1600A	AC-RSCT-12CM	145mm Dia	Cable length 1.8 Mtrs
Rogowski Coil 0-,4000 Amps	AC-RSCT-19CM	210mm Dia	Cable length 1.8 Mtrs
Rogowski Coil 0-,10,000 Amps	C-RSCT-30CM	300mm dia	Cable length 1.8 Mtrs

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