



gulplug ZBRTC1 Harmony Wireless Current Sensor User Manual

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Product

Product: Electric Energy Estimator

The ZBRTC1, ZBRTC2 and ZBRTC3 gulplug sensors are designed to estimate the consumption of electrical equipment. Wireless and battery-free, they communicate by ZigBee GreenPower radio with the Harmony Hub ZBRN1 / ZBRN2 product.

Contacts

Address : Schneider Electric SAS, 35 rue Joseph Monier
F-92506 Rueil Malmaison

Web : <https://www.se.com/>



Representative: Schneider Electric Limited Stafford Park 5
Telford, TF3 3BL, UK

To display, print or download the latest addition to the user manual, visit the website.

Safety instructions

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

DANGER

- Respect the measurement category and the voltage and current limits indicated in the product characteristics.
- Respect the type of cable on which the product must be installed.
- Do not put your finger inside the clamp during installation.

Failure to follow these instructions will result in death or serious injury.

EN : Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel.

ATTENTION

UNINTENDED EQUIPMENT OPERATION

- Always read the safety instructions before using this equipment.
- Read the instructions carefully.
- Only use this device for its intended purpose. Failure to do so could impair the protection provided by this device.
- Examine the product before installing and operating it, look for any cracks or defects.
- Check the insulation of the cable connecting the clamp and the box. If you detect any anomalies, do not install the product.
- Only use the product under environmental conditions for which it was designed.
- Comply with local and national safety standards.
- Only authorized persons may install the product.

- Use suitable PPE (personal protective equipment) when installing the product (mask, rubber gloves, regulatory clothing).
- Store the product according to the conditions indicated.
- Service the product according to the conditions indicated.
- Never open or dismantle the product.

Failure to follow these instructions can result in injury, or equipment damage.

Symbols

The table contains the list of symbols used on the product and throughout this manual.

Symbols	Description
	Complies with European Union directives.
	Warning, danger, refer to the manual.
	Alternating current (AC).
	The device should never be disposed of with household waste.
	Do not apply to or remove from conductors at dangerous voltages.
CAT III	Measurement category III applies to the test and measurement circuits connected to parts of the building's low-voltage network installation.

Installing the product

Since the product is a component, the installer must fit the electrical enclosure. The product must be installed in equipment provided with its own fire protection enclosure.

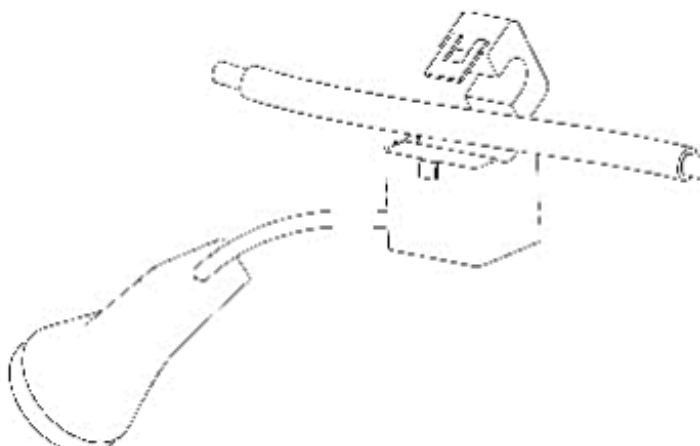
The product must be clamped on a cable respecting its characteristics and including at least one insulating sheath corresponding to a main insulation. The cable diameter and the currents must respect the values given below. Otherwise, do not install the product.

ZBRTC1	$\varnothing \leq 9,8 \text{ mm} / 0,38 \text{ in}$	0,5...35 A
ZBRTC2	$\varnothing \leq 24 \text{ mm} / 0,94 \text{ in}$	2,5...180 A
ZBRTC3	$\varnothing \leq 35 \text{ mm} / 1,38 \text{ in}$	7...500 A

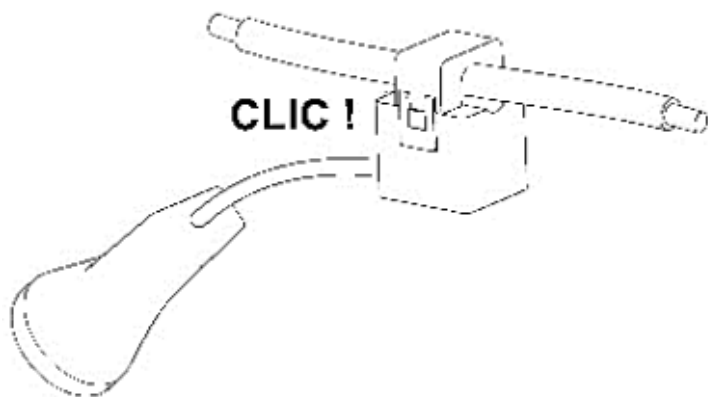
The current clamp must be closed

Installation

Move the opening clamp of the ZBRTC* sensor around the voltage phase to be measured.



Close the clamp until you hear a “click”. Check that the clamp is closed: lug clipped.



Pairing the product with the Harmony Hub

Use the knob to browse through the menus of the Harmony Hub ZBRN1 / ZBRN2. Turn the knob to select a value and press it to validate a selection. Return to the previous menu by pressing twice quickly.

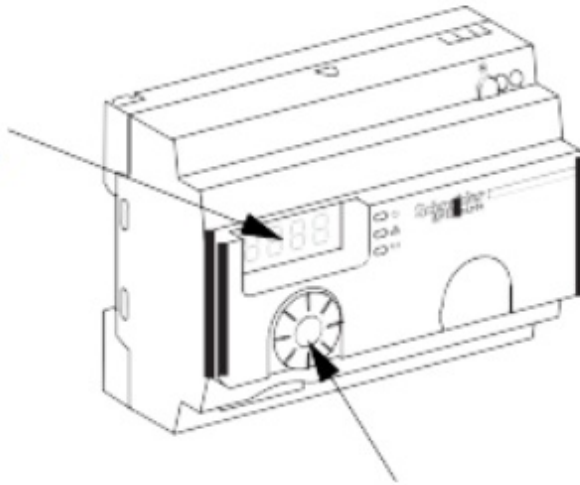
The statuses of the sensor locations are indicated as follows on the display (example for input No. 1)

The input is free (no sensor paired with it).

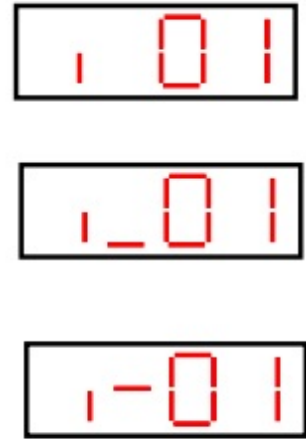
The input already contains a paired sensor.

The input contains a sensor but indicates that the Harmony HUB is expecting a communication from the sensor.

Display
Afficheur

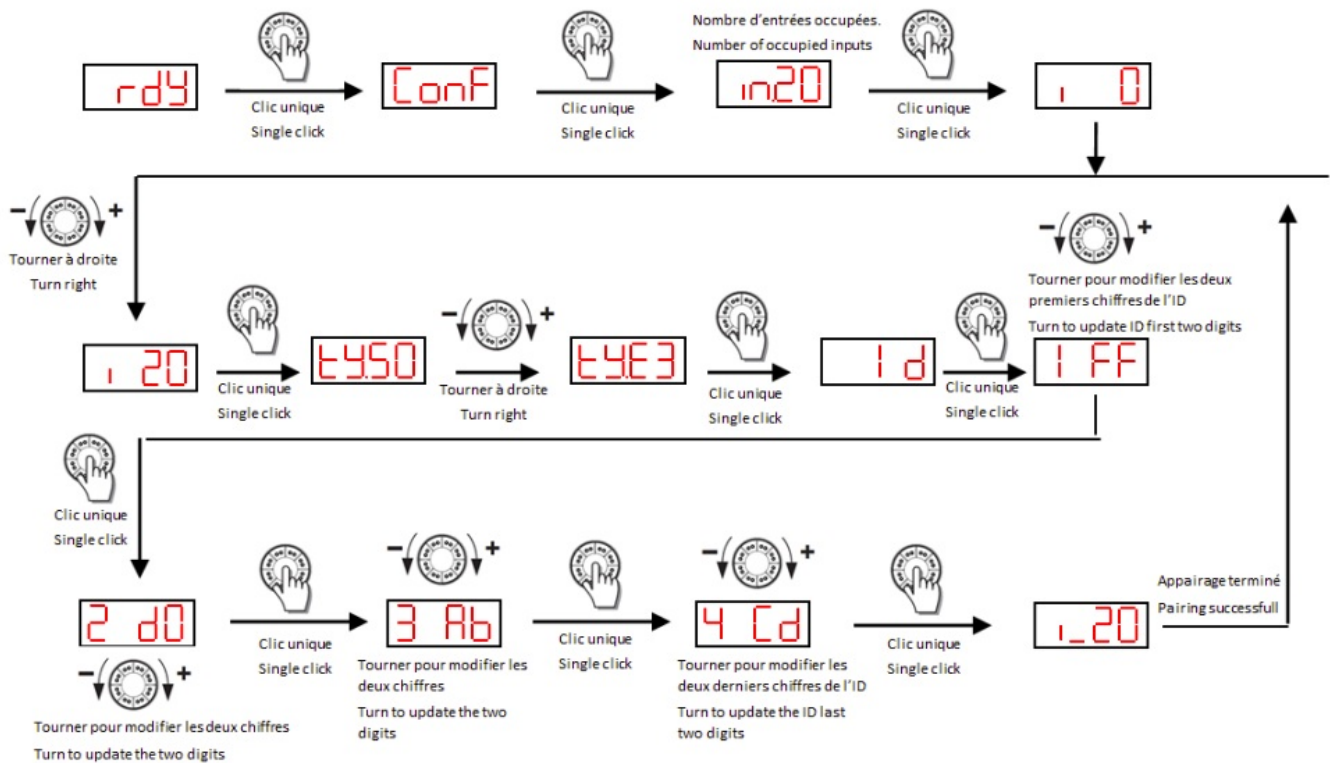


Knob
Bouton rotatif



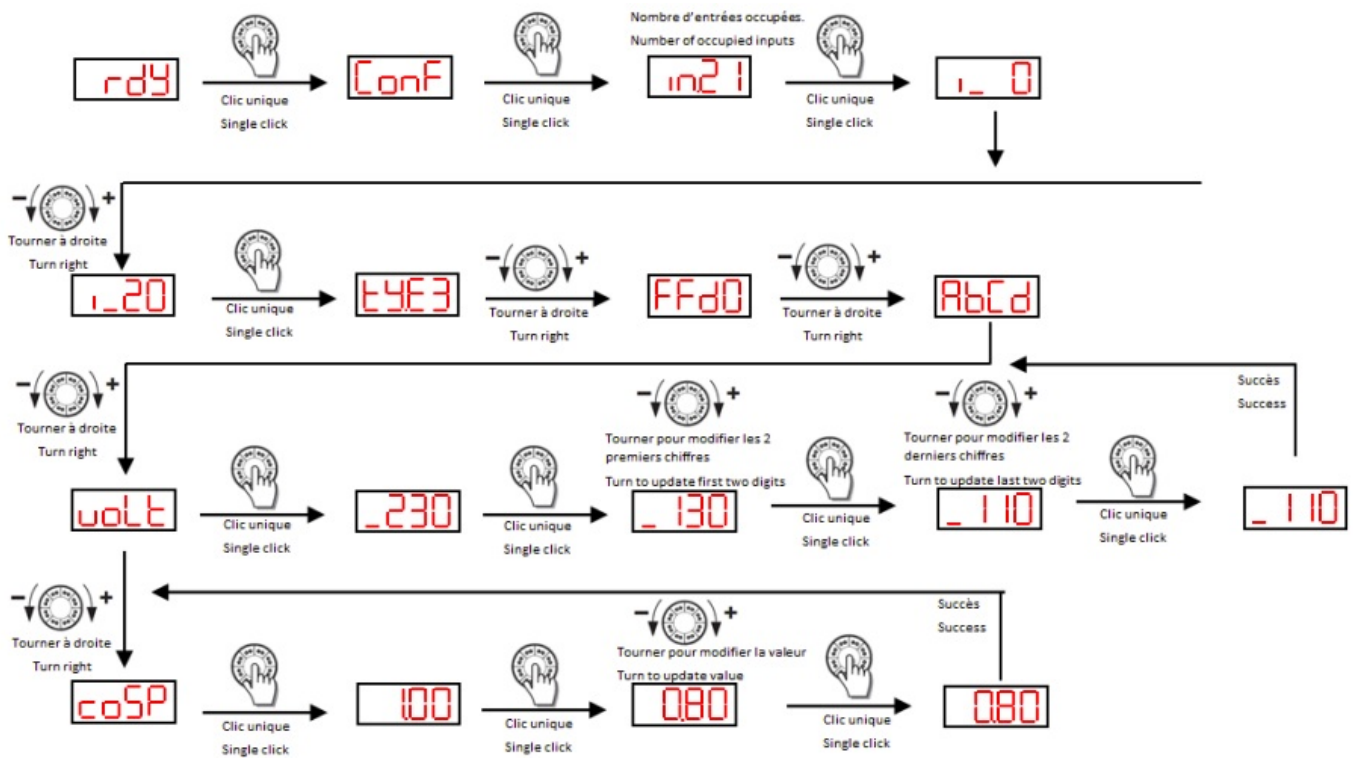
Pairing

Example of pairing a ZBRTC* (0xFFD0ABCD) on input No. 20 of the Harmony Hub ZBRN1 / ZBRN2



Modifying the ZBRTC* parameters

Example of modifying the voltage and power factor parameters of a ZBRTC* (0xFFD0ABCD) for which the voltage is changed from 230 V to 110 V and the power factor from 1.0 to 0.8.



Harmony Hub Modbus registers

The ZBRTC* is a Type 2 sensor in the Harmony Hub ZBRN1 / ZBRN2.

For sensor input N [0..59] of the Harmony Hub ZBRN1 / ZBRN2, the register address is $10 + 33 * N + \text{Offset}$.

Type 2 data in the Harmony Hub ZBRN1 / ZBRN2. The following table lists the registers of the ZBRTC* sensor (Type 2):

Offset	Nom	Accès	Channel status	Description	Unité
+0	Type Type		Bit 0..Bit 7 : transmitter type / Type de – 0 : none- [1..6] : transmitter type / Type de Bit 8..Bit 15 : Spare	Contains the transmitter type associated with the input le type de	
+1	Timeout RSSI	R	Bit 0..Bit 7 : Timeout- True : 0xFF (timeout expired / timeout)- False : 0x00Bit 8..Bit 15 : RSSI- (-127..127 dBm)- 128 : invalid value / invalie	Contains the RSSI timeout and value (radio signal power)le timeout et la du RSSI (puissance du signal radio)	
+2	Timestamp	R	Two registers (Most Significant Byte first) Deux registres (Most Significant Byte en premier)- 0xFFFF FFFF : invalid value / – 0x00FF 0000 : rolling value	Contains the timesta mp details Contient le détail du timestamp	µs/320
+3					
+4	Spare	–	–	–	
+5	Spare	–	–	–	
+6	Temperature	R	– 0x8000 : invalid value / valeur invalide	Contains the tempera ture	0.01 °C / 32°F
+7	CurrentCou rant	R		Contains the le coura nt	0.01 A
+8	Apparent power Puissance	R	Two registers (Most Significant Byte first) Deux – 0xFFFF : invalid value /	Contains the apparen t	0.01 VA
+9					
+10	Active power Puissance active	R	Two registers (Most Significant Byte first) Deux (Most Significant Byte premier)- 0xFFFF : invalid value / invalid	Contains the active p ower la puissance active(V *	0.01 W
+11					
+12	Sensor energy	R	Four registers (Most Significant Byte first)Quatre (Most Significant Byte en premier)- 0xFFFF FFFF : invalid value	Contains the sensor e nergy	0.01 VA.h
+13					
+14					
+15					
+16	Apparent energy	R	Four registers (Most Significant Byte first)Quatre (Most Significant – 0xFFFF FFFF : invalid value	Contains the apparen t	0.01 VA.h
+17					
+18					
+19					
+20	Active energy active	R	Four registers (Most Significant Byte first)Quatre (Most Significant Byte premier)- 0xFFFF FFFF invalid value	Contains the active	0.01 Wh
+21					
+22					
+23					
+24..32	Spare /	–		–	

Servicing and cleaning the device

No special servicing is required.

For cleaning, reinstall the product and clean with a dry or slightly damp cloth.

Specifications

The product requires no calibration throughout its lifetime. If the current estimations are incorrect, return the product to us. The product specifications are given below /

Operation

EnvironmentIndoor

Altitude / Altitude0...2000

m

Temperatures /

Températures.....-20...60

°C / -4...140 °F

Maximum relative humidity, no condensation / Humidité relative maximum, sans condensation.....90 %

...35 °C / 95 °F

75 %...40 °C / 104 °F

45 %...50 °C / 122 °F

Pollution degree / Degré de pollution

.....Poll 2

Network voltage fluctuation / Fluctuation de la tension sur réseau : +-10 % of the rated voltage / +-10% de la tension

Accepts the occurring on the power supply network / mentation

Storage

Altitude

.....0...2000

m

Temperatures /

Températures.....-30...90

°C / -22...194 °F

Maximum relative humidity, no condensation condensation.....90 %...35 °C / 95 °F

75 %...40 °C / 104 °F

45 %...50 °C / 122 °F

Dimensions / Dimensions (L×I×h)

.....16 × 4 × 4 cm / 0.63 x

0.16 x 0.16 in

Weight / Poids

ZBRTC1.....60 g

ZBRTC2.....240 g

ZBRTC3.....426 g

Measurement category /CAT III

Overvoltage category

surtension.....CAT III

Safety

General / Générale CEI

61010-1 : pollution degree 2

Measurement CEI 61010-2-032 :

CAT III

Electromagnetic compatibility (EMC) / (CEM)..... EN 61326-1

Weight ZBRTC1.....60 g

ZBRTC2.....240 g

ZBRTC3.....
426 g

Measurement category.....CAT III

Overvoltage category

surtension.....CAT III

General CEI 61010-1 : pollution
degree 2

Measurement / CEI 61010-2-032 : CAT III

Electromagnetic compatibility (EMC) EN 61326-1

Electrical characteristics

Measured current range / Plage de courant

ZBRTC1
..... 0,5

A...35 A

ZBRTC2
..... 2,5

A...180 A

ZBRTC3
..... 7 A...

500 A

Maximum voltage

ZBRTC1 300 Vac

ZBRTC2 600 Vac

ZBRTC3 600 Vac

Accuracy +/- 3% FSD (Full
Scale Deflection)

Estimated power range at 230 V

ZBRTC1
..... 115

W...8 050 W

ZBRTC2
..... 575

W...41 400 W

ZBRTC3 1
610 W...115 000 W

Estimated power range at 110 V

ZBRTC1
..... 55

W...3 050 W

ZBRTC2	275
W...19 800 W	
ZBRTC3	770
W...55 000 W	

Energy estimation unit kWh

Operating frequency 50 Hz et 60Hz

Temperature accuracy..... +/- 5% FSD (Full Scale Deflection)

Diameter of measured conductor

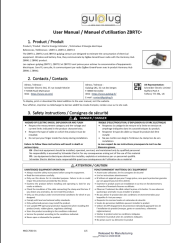
ZBRTC1	≤
9.8 mm / 0,38 inch	
ZBRTC2	≤ 24
mm / 0,94 inch	
ZBRTC3	≤
35 mm / 1,38 inch	

Calibration.....	Non
Radio protocol radio.....	ZigBee Green
Power	
Radio repeater radio.....	Non
Radio frequency	2,4 GHz
Radio power radio.....	+5 dBm

Radio transmission rate (Time interval between 2 radio transmissions)

ZBRTC1	
27s...0,5 A	
0,3s...35 A	
ZBRTC2	
27s...2,5 A	
0,3s...180 A	
ZBRTC3	27s...7
A	
0,3s...500 A	

Documents / Resources

	gulplug ZBRTC1 Harmony Wireless Current Sensor [pdf] User Manual ZBRTC1, ZBRTC2, ZBRTC3, ZBRTC1 Harmony Wireless Current Sensor, Harmony Wireless C urrent Sensor, Wireless Current Sensor, Current Sensor, Sensor
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References

-  [Gulplug : Branchement automatique des véhicules électriques](#)
-  [Schneider Electric Global | Global Specialist in Energy Management and Automation](#)
- [User Manual](#)

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