Energy Monitor

DIN CT3

Jan 2016

Features:

- Measures line voltage
- Measures up to three currents
- Calculates real and apparent power, power factor, and watt hour
- Relay output to control external device
- USB connectivity
- Optional RF connectivity (433MHz transceiver)

Description:

The Energy Monitor can be used to monitor the energy consumption of up to three electrical circuits, such as the mains, geyser and stove. Based on these measurements, the real (Watt) and apparent (VA) power is calculated. The power factor (PF) and watt hour (Wh) used is also calculated.

A relay output is provided which can be used to switch a circuit on or off, for instance when in peak usage time, the geyser can be switched off to help lower the peak requirements.

Specifications:

Model		NSB013	NSB013-RF[2]
Electrical	Nominal Voltage	230Vac	
	Voltage Measurement Range	180Vac to 265Vac	
	Current Measurement Range	0Aac to 60Aac per CT	
	Frequency	50Hz	
	Input/Output Connection	Screw Terminals	
Measurement Resolution	Voltage (Vrms)	0.33Vac	
	Current (Irms)	0.25Aac	
	Power (Watt)	1W	
	Power Factor	0.004	
	Energy (Watt Hour)	1Wh	
Wireless Connectivity	Frequency	-	433MHz
	Connector	-	Direct Solder
	Antenna	-	¼ Wave Wire
	Typical Range (Open Air)	-	> 100m
USB Connector	Connector	USB B	
	Baud-rate[1]	9600 baud	
	Data Bits, Parity, Stop Bits, Flow Ctr	8, None, 1, None	
Other	Relay Switch Capacity	16A @ 250Vac	
	Mounting	DIN 35	
	Dimensions (L*W*H)	90*36*58mm	
	Weight	0.5kg	
Notes	1. Configurable in software 2. See NSB011 RF - USB Master Unit to connect wirelessly to the monitor		

*Images for reference only

*Spesifications subject to change due to continuous improvements

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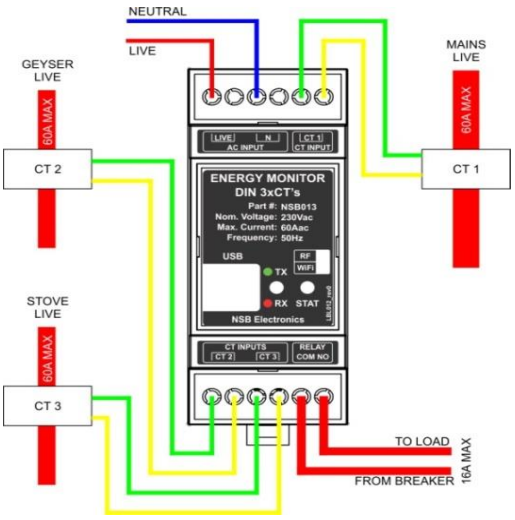
Connection:

1. Ensure power is turned off to the Distribution Board (DB) where the unit is to be installed
2. Unpack the unit from the packaging material
3. Install the unit inside the DB
4. Connect a Live and Neutral wire to the unit
5. Disconnect the Live cable to be monitored from its circuit breaker and slide a Current Transformer (CT) over the cable. Note the arrow on the CT must point away from the circuit breaker
6. Reconnect the Live cable to be monitored to its original position
7. Repeat steps above for more cables to be monitored
8. If a load is to be controlled by the unit, connect the Live feeding to the load to the COM connection and the cable to the load to the N/O connection
9. Turn power on to the DB where the unit has been installed and test that all circuits are working as before the installation



Current Transformer Polarity:

1. The CT is marked with a arrow to indicate the flow of current that is expected through the CT to give correct readings
2. Install the CT with the arrow facing away from the circuit breaker in the direction of the cable going to the load being measured
3. If the measurements are giving wrong values, check the direction of the CT. If it has been installed the wrong way around, the current will show high for small loads, and low for larger loads
4. In this case, turn the CT around to face the correct direction, or swop the wires connecting it to the monitor

Status LED:

The status LED will flash periodically to indicate the state of the monitor. Below a list of the flashes and their meaning:

ADD STATUS DESCRIPTIONS HERE

USB Connection:

The Energy Monitor can be connected to a pc using the USB B connection. The monitor outputs the measured parameters with comma seperation between data for logging purposes. See the table below for the data that is sent.

Notes: The Arduino Leonardo driver is required to be able to use the USB connection.

Data Value	Description	Units
Counter	Incremental number starting at 0 to 65535	N/A
Voltage	Line voltage measured	Vrms
CT1 Current	Current measured on CT1	Irms
CT1 Real Power	Real power measured on CT1	Watt
CT1 Power Factor	Power factor of CT1	N/A
CT1 Energy	Energy used on CT1	Watt Hour
CT2 Current	Current measured on CT2	Irms
CT2 Real Power	Real power measured on CT2	Watt
CT2 Power Factor	Power factor of CT2	N/A
CT2 Energy	Energy used on CT2	Watt Hour
CT3 Current	Current measured on CT3	Irms
CT3 Real Power	Real power measured on CT3	Watt
CT3 Power Factor	Power factor of CT3	N/A
CT3 Energy	Energy used on CT3	Watt Hour
Relay State	Whether relay is on or off, 0 - Off, 1 - On	Boolean

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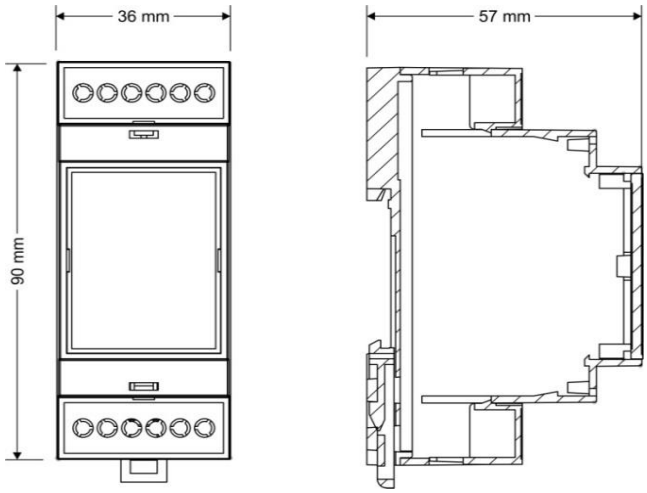
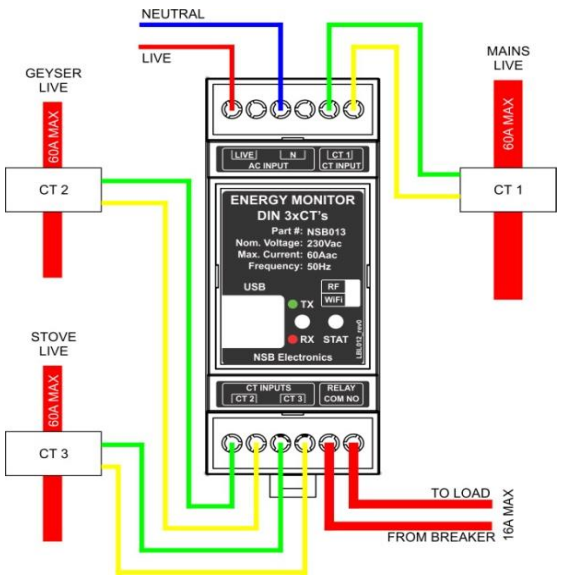
Dimensional Drawing:



Typical Connection:



Safety Instructions:

- This product must only be used for the purpose of measuring energy consumption on a ditributiion board.
- The product must be installed by a qualified electrician only.
- Read the manual and ensure you understand the operation and use of the product fully before proceeding to use the product.
- The product is designed to operate from the mains supply only and must be properly earthed.
- Keep the product out of reach of children as it is not a toy and can cause electrical shock if used incorrectly.
- Do not use the product in damp or wet conditions. It is intended for indoor use only.
- Do not use the product if there is any damage to the housing of the unit as this may result in electrical shock.

Guarantee:

The product comes with a 1 year manufacturer warranty. The warranty covers the product against defective materials and workmanship for the period of the warranty.

NSB Electronics reserves the right to repair, rework, or replace the product at its discretion.

The following will void the warranty:

- Alteration or repairs attempted to the product in any way
- Incorrect voltage connected
- Damage caused by incorrect connection
- Damage as a result of neglect or misuse

Liability:

NSB Electronics denies any liability for damages to property or persons caused by any of the following:

- Using the product for any purpose other than which it is intended for
- Incorrect installation, operation or use
- Neglect of the product

The customer shall have no claim against NSB Electronics, its directors, employees or resellers of whatsoever nature.

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