WT - RightAC

Automatic mains selection system (Module Solution)

Description:

The RightAC is a control module that accurately measures the mains input voltage and decides whether pass the voltage straight through or route it through an externally connected step-down transformer. The unit was designed to allow equipment manufactured for use in 100-120vac countries to be easily exported to countries where the mains voltage is 220-240vac without having to pre-configure the equipment prior to shipping. The cost savings in these instances can be considerable and the logistical hurdles involved in the configuration process and temporary storage are effectively removed. Further cost savings are realised by providing the opportunity for the manufacturer to source and fit their own transformer to allow a more professional presentation down-stream. Please note that this device MUST be fitted with the correct fuse for safety reasons.

Features:

- Completely automatic, install and forget.
- Will operate up to 1000 watts with NO additional components *
- Start-up over voltage and Brown-out protection (BPR).
- Non-stop sampling operation, input monitored at all times.
- Cycle by Cycle voltage monitoring, rising edge.
- Very small foot-print of about 50cm^2, is under 20mm high and weighs in at less than 60 grams.
- Low current draw during operation.
- Option for full time crowbar type output surge protection.**

Functions:

- Automatic output selection based on measured mains input voltage.
- Continuous voltage input level monitoring for surge protection.
- Output control through continuous input level assessment..

Operating Characteristics:

- Initial sampling time :
  - < 350 mS measured from power on to power out.
  - Minimum of ten mains input samples before switching.
- Switching levels :
  - Output valid bands from 95vac to 132vac and 195vac to 253vac.
  - No output during invalid voltage input range.
  - Mode indication via two range lights.
- Operating Voltage Range:
  - 65vac to 260vac (see specifications section*)
- Temperature Range:
  - Industrial: -10°C to +105°C
- Switching power <= 1000 watts, inductive or resistive load.

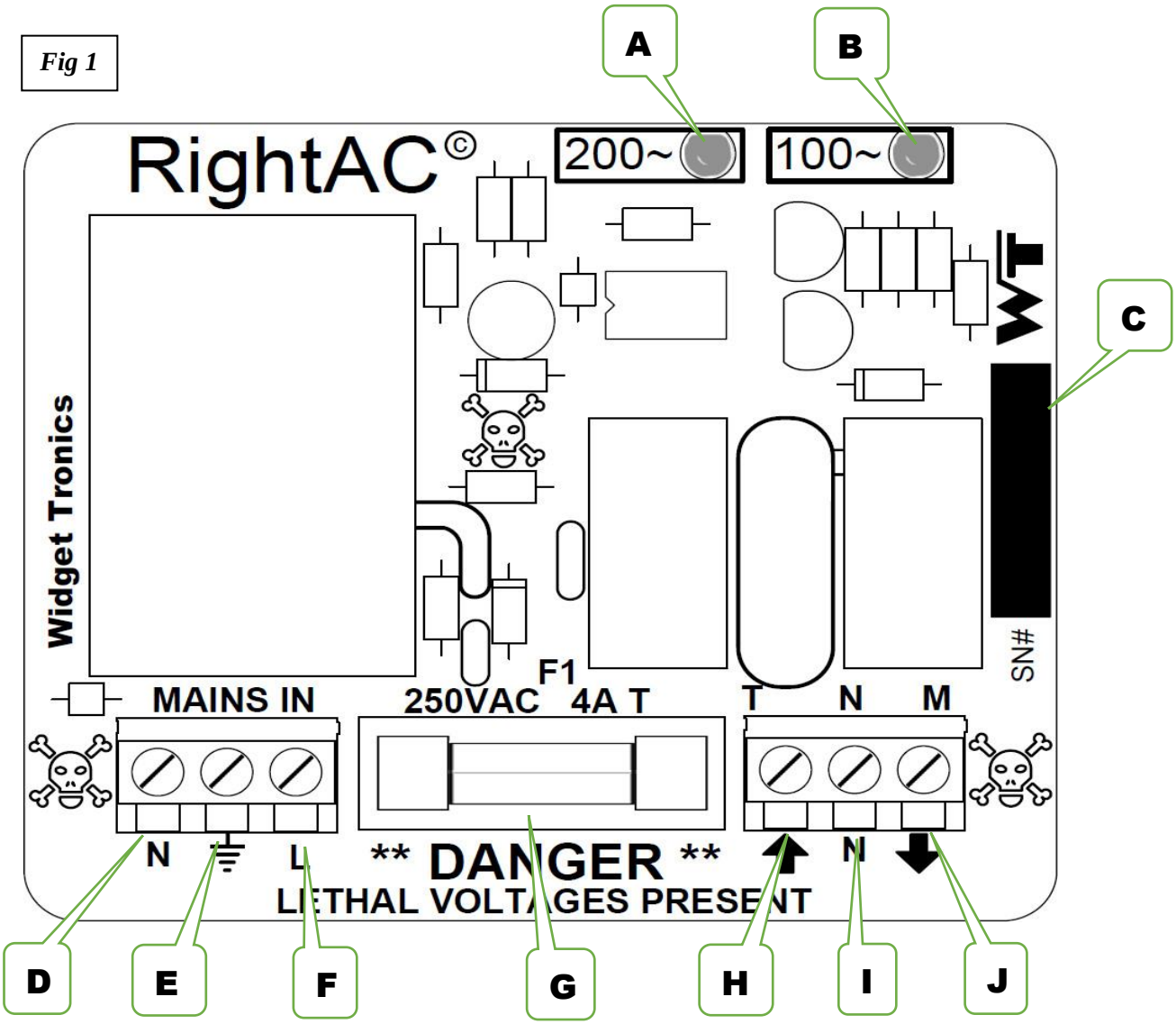
**User must supply a suitable transformer. The unit can be configured to switch relays allowing much larger transformers to be used. This device MUST be fitted with the correct fuse for safety reasons.*
*** User can select and fit as required.*

dangerous consequences of failures, (2) monitor failures and their consequences, and (3) lessen the likelihood of failures that might cause harm and take appropriate actions.

WIRING DIAGRAM

Module connections

Fig 1

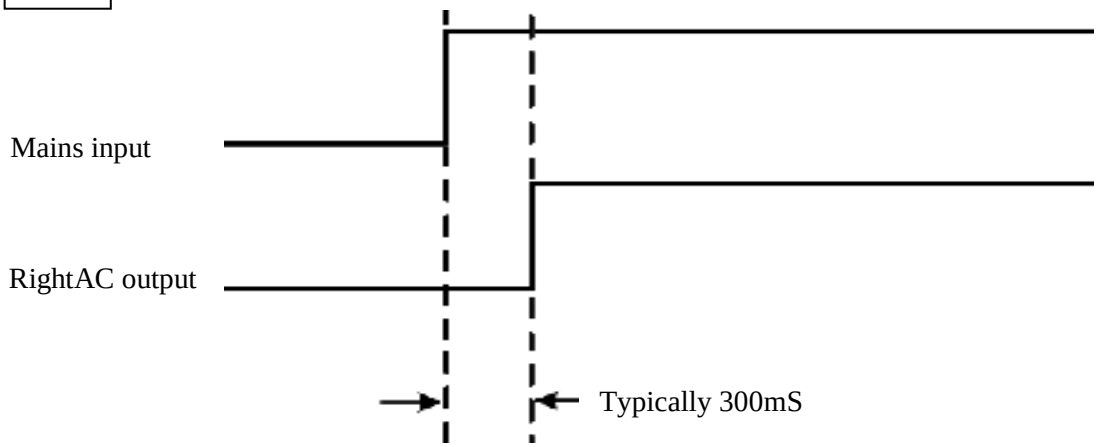


ID	Direction	NAME	FUNCTION
A	output	200+	Indicates input is in the 195 to 253 range
B	output	100+	Indicates input is in the 95 to 132 range
C	none	SN#	Serial number panel for customer use
D	input	N	Neutral AC input point
E	input		Earth input point
F	input	L	Live or HOT AC input point
G	none	Protection fuse	250vac time delay fuse rated at 5A
H	input	T	Input from 110vac transformer
I	input	N	Neutral AC output point
J	output	M	Protected Live or HOT AC output to equipment

Output voltage in relation to mains input

Figure 2 shows the input / output timing.

Fig 2



The RightAC utilises cycle by cycle continuous voltage monitoring. This means that it measure the AC cycle as it is happening and compares each new measurement with the previous measurement during the rising edge of the AC cycle, this means that the peak of each mains cycle is accurately measured. When the RightAC determines that the input voltage is stable it decides whether or not to route the mains through the transformer or not. Once it has 'locked' onto the voltage it continues it's cycle by cycle monitoring to ensure that the equipment it is protected. If there are more than 15 cycles out of range the unit will isolate the output to protect the equipment.

During the 'lock out' stage the RightAC will again use cycle by cycle monitoring but will store a sample every 200ms. After 15 successive 'good' samples it will then ascertain whether or not the mains input is safely within a valid band.

When power is first applied to the RightAC module a series of 10 measurements are taken in quick succession to ascertain the level of voltage present at it's input. The series takes about 100mS or one tenth of a second and ensures that at least 15 cycles (on a 50Hz supply) are sampled before it decides whether or not the AC should be allowed through, and if it should, whether or not it should select the feed from the step 110vac transformer. The whole process from power on to power out will typically complete in under 300mS (one third of a second)

The module will consider input voltages between 95 and 132vac to be a valid input for the 100+ range, and 195 to 253vac to be a valid input for the 200+ range. Any voltage ranges outside of these two bands will be considered to be "out of specification" and the RightAC module will keep the equipment isolated.

It should be noted that these valid voltage input range selections have been chosen to facilitate the easy integration of most popular makes of Uninterruptable Power Supplies if required.

Status indicator lights in relation to mains input

Figure 3 shows the behaviour of the indicator lights according to the mains input level.

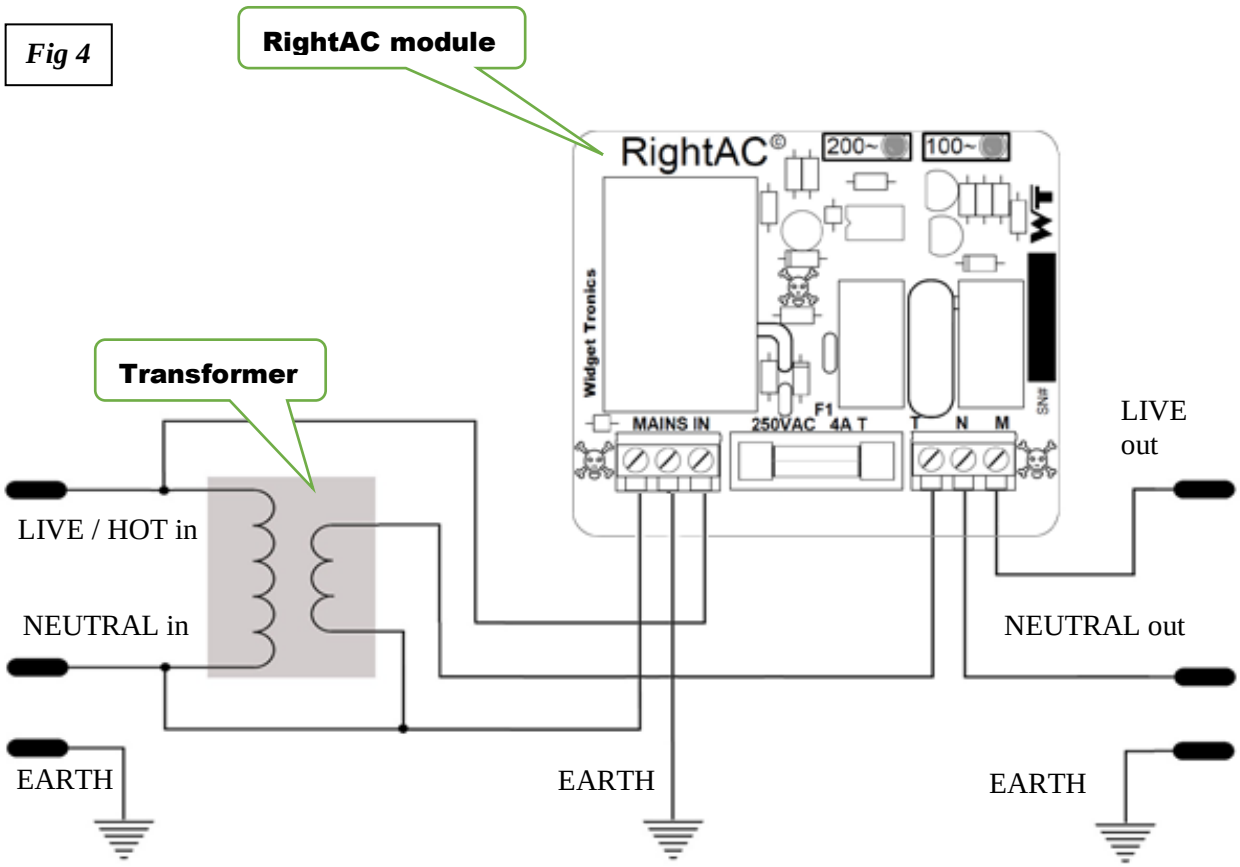
Fig 3

200~	100~	STATUS INDICATION
ON	OFF	VALID - Mains input is in the 195 to 253 range
OFF	ON	VALID - Mains input is in the 95 to 132 range
FLASHING	FLASHING	NOT VALID - Mains input is between 133 and 194
FLASHING	OFF	NOT VALID - Mains input is above 253
OFF	FLASHING	NOT VALID - Mains input is below 95

Typical application note

This device requires only the addition of an external mains transformer for normal use, figure 3 shows the standard configuration for use with loads that require 1000 watts or less.

Fig 4



Note that the input indicator lights operate independently of the load, they are ONLY for signalling the status of the mains input level after the RightAC module has completed the measurement sequence. Please refer to figure 3 on page 4 for an explanation of the information provided by these lights.

ELECTRICAL SPECIFICATIONS

Absolute Maximum Ratings (†)

Minimum and Maximum operating temperature.....-10°C to +85°C
Storage temperature ..... -65°C to +150°C
Maximum allowable input voltage..... 260VAC
Typical output voltage..... 95VAC to 253VAC
Maximum delay from power on to power out.....320mS
Recommended input frequency range.....45 to 65 Hertz
Maximum continuous output switch current (note 1).....5 Amps
Maximum output switch voltage (note 2).....400VAC
Protective clamp trigger voltage (note 3).....< 275VAC
Protective clamp current rating (note 4)..... > 5 Amps
Maximum operating current draw of module only @ 220vac in ……...…..50 mA

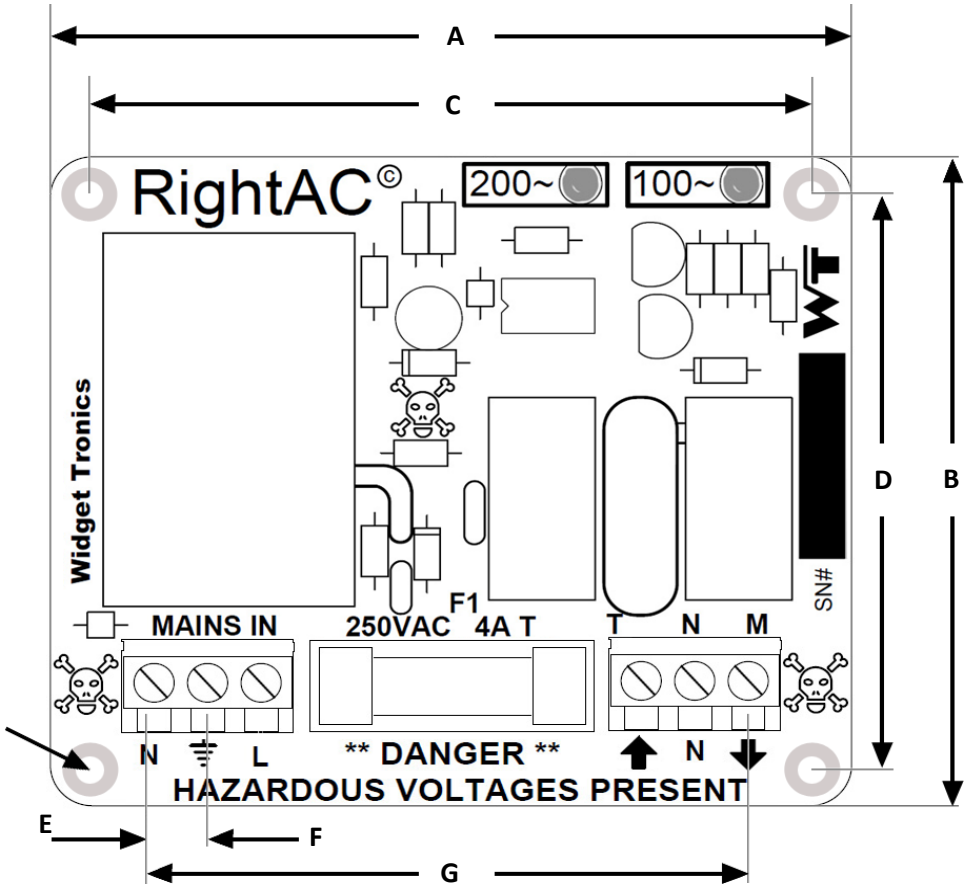
Note 1: Maximum current and voltage rating based on the relay manufacturers specifications.
Note 2: Manufacturer specifies 275VAC.
Note 3: Ensure that your chosen clamp can safely operate at the highest RMS operating voltage.
Note 4: Ensure that your chosen clamp device can safely clamp > 5 amps.

† IMPORTANT NOTICE: This device MUST be fitted with the correct fuse for safety reasons. All ratings are approximate, and measured from a module during operation. Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operation listings of this specification is not implied. Exposure above maximum rating conditions for extended periods will affect device reliability.

Document revision 1

Module dimension information

Open PCB assembly



Datum	Dimension specifics	millimeters		
Identifier		Min	Nom	Max
A	Overall Length	-	76	-
B	Overall Width	-	64	-
C	Distance between mounting holes (L)	-	68	-
D	Distance between mounting holes (W)	-	56	-
E	Mounting hole diameter	-	3	-
F	Connector pitch	-	5	-
G	Distance between outside connections	-	56.3	-

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