PowerRail 303-V

(3-Range Split-Core Current Transducer Kit)

OPERATING INSTRUCTIONS
February 2002

1 Safety

This instruction sheet gives details of safe installation and operation of the ***PowerRail 303-V*** electricity meter. Safety may be impaired if the instructions are not followed. Labels on each meter give details of equipment ratings for safe operation. Take time to examine all labels before commencing installation. Safety symbols on the meter have specific meanings.

CAUTION
Refer to Operating Instructions

WARNING
Risk of electric shock

2 Cleaning

The front panel of the ***PowerRail 303-V*** may be cleaned by wiping lightly with a soft, clean cloth. No solvents or cleaning agents should be used.

3 Mounting the Unit

The ***PowerRail 303-V*** enclosure conforms to DIN 43880, 6 Modules wide. The unit is therefore compatible with a number of standard DIN distribution systems with 45mm cut-outs. The unit may be mounted by itself or alongside other standard units such as timers, circuit breakers etc. The ***PowerRail 303-V*** should be mounted on a 35mm, symmetric DIN rail of minimum length 106mm.

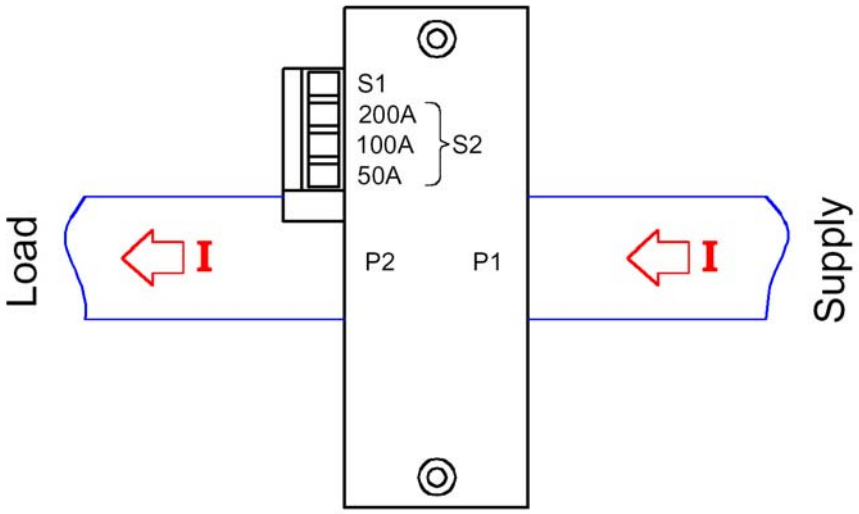
The ***PowerRail 303-V*** may be surface mounted by housing the unit in a standard MCB enclosure designed for a minimum of 6 modules.

4 Current Inputs

The ***PowerRail 303-V*** is designed for use with special split-core current transducers with three input ranges and a full-scale output of 1V ac. These may be installed on primary conductors with a minimum insulation rating of 250V.

4.1 Fitting The Transducers

- Isolate the supply to the primary cables.
- Remove the two screws holding the transducer halves together.
- Open each unit and place over a primary cable as shown in the diagram below. Take care not to put undue strain on the wires connecting each part.
- Replace the screws holding the halves together taking care not to over tighten them.
- Connect the secondary terminals of each transducer to the meter according to the relevant schematic in Section 9. **Connect only one S2 terminal** for each transducer dependant on the required input current range. **Use the same range for each transducer.**



WARNING

The current transducer secondaries MUST NOT BE EARTHED.

WARNING

If standard Current Transformers are connected to the PowerRail 303-V dangerous voltages may be generated due to open circuit secondaries. Damage to the CTs and/or the meter may also occur.

Note: Cables between the transducer and the meter should be rated at 250V minimum and kept as short as possible. Cables longer than 1m may be susceptible to noise pickup.

5 Auxiliary Mains Supply (L & N)

The ***PowerRail 303-V*** is supplied from an auxiliary mains input, isolated from the voltage measurement inputs. This may be connected separately or in parallel with the measurement inputs. Ensure the ratings detailed on the instrument label are not exceeded. The auxiliary mains supply is internally fused at 250V, 100mA type T. External fusing is required if the auxiliary supply voltage exceeds 250V. The meter ratings are detailed on the instrument label.

6 Voltage Inputs

Cables used for the voltage measurement circuit should have minimum ratings of 600V, 250mA AC. The maximum conductor size is 4.0mm^2. External protection fuses are recommended for the voltage measurement inputs. These should be rated at 160mA max, Type F, with a voltage rating to suit the maximum inputs to the meter.

7 Display Scaling

Display of kWh is scaled to provide optimum resolution for the primary current measured. When used with the 3-range transducers, assuming a value of ***Sca***=1.0, the kWh display will have a resolution of 0.1kWh.

8 Pulse Output (optional)

An isolated pulse output may be provided as an option on the ***PowerRail 303-V***. The pulse output provides a volt free contact pair closure for a programmable number of increments (1, 10, 100 or 1000) of the energy display. (e.g. 10 increments = 1 pulse per 1.0 kWh). The signal provided is designed to interface to building management systems, data collectors, remote counters etc.

On completion of the programmed number of counts the Pulse Output terminals momentarily appear short circuit (100ms). At all other times the pins appear open circuit.

The Pulse Output terminals are isolated (@ 2.5kV) from all other parts of the instrument providing safe connection to external systems.

Each pulse output is indicated on the front panel of the ***PowerRail 303-V*** by a single flash of the ***Pulse*** LED.

9 Meter Connections

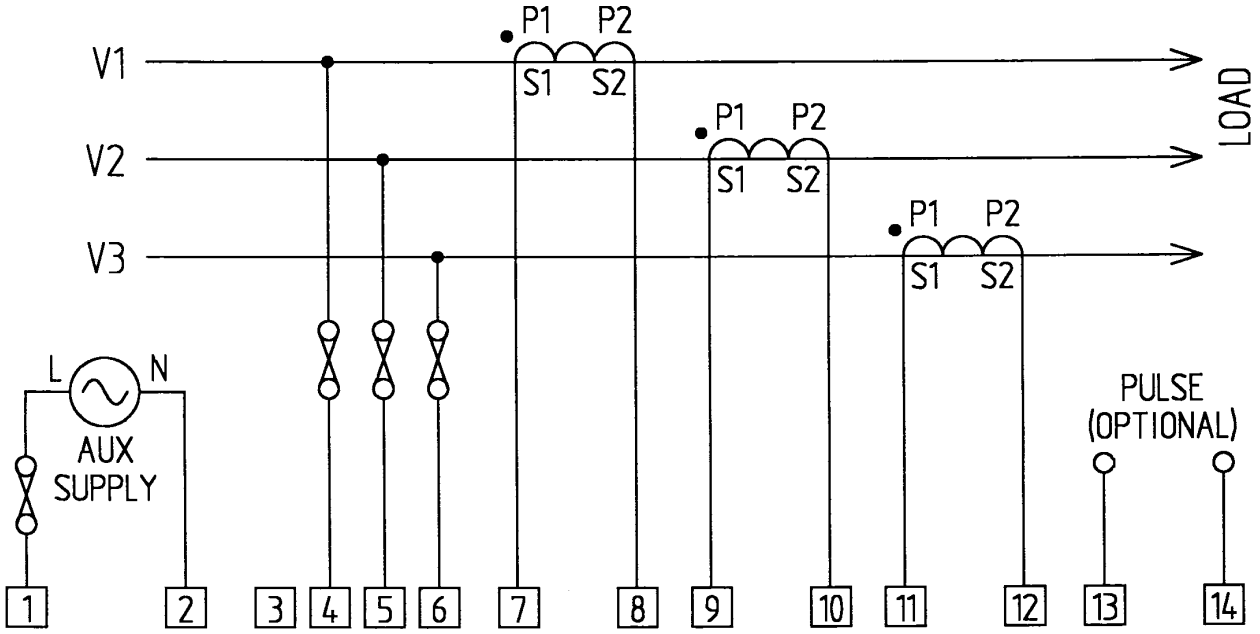


Figure 1 3-Phase 3-Wire

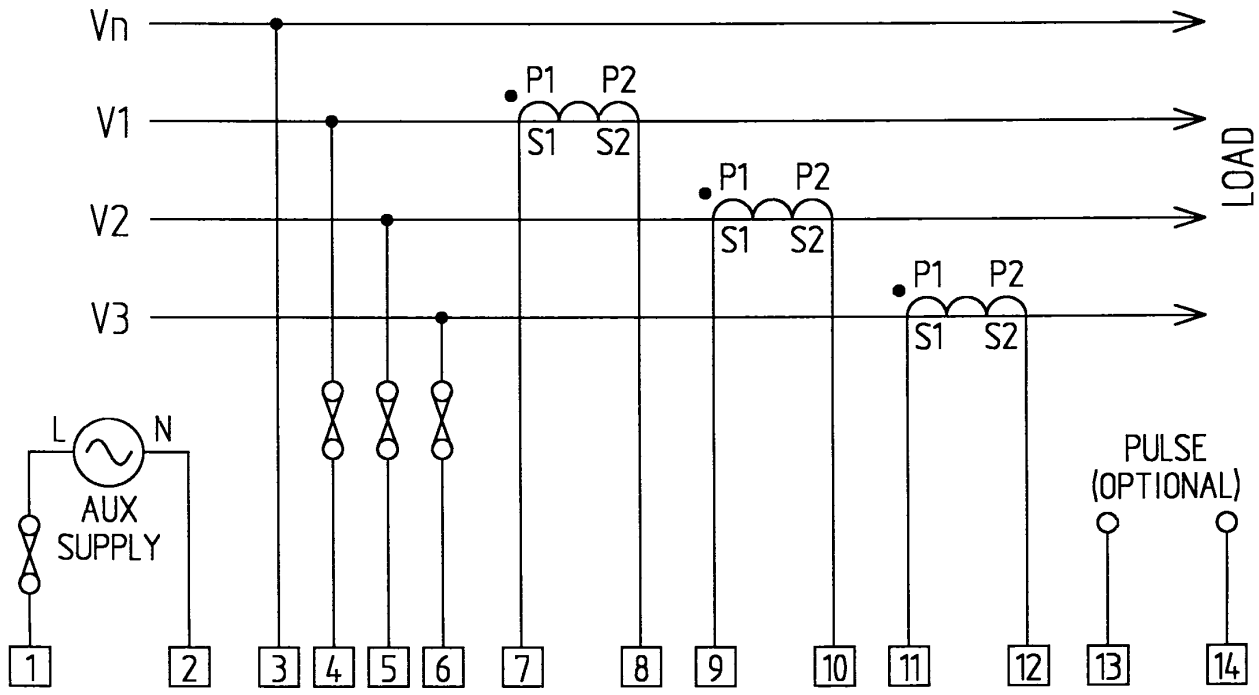


Figure 2 3-Phase 4-Wire

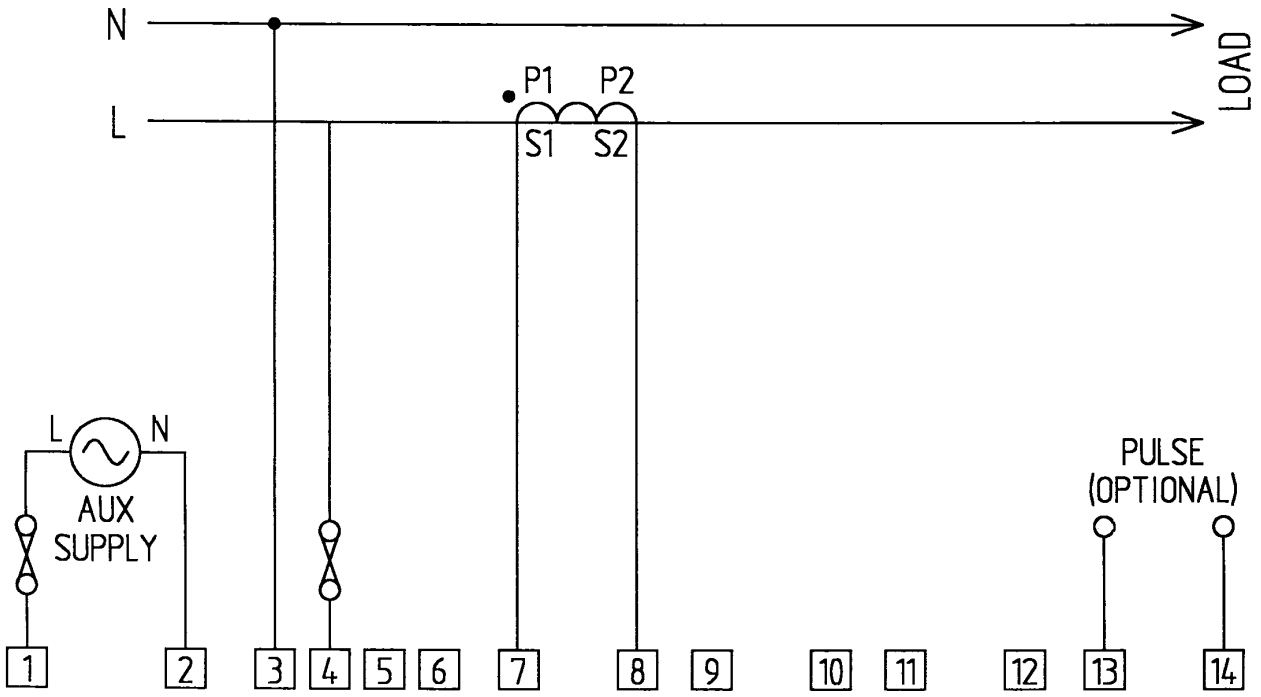


Figure 3 Single Phase

10 Commissioning

Three front panel keys are used during commissioning to set the meter scaling and test the instantaneous measured load. The key functions are shown below.

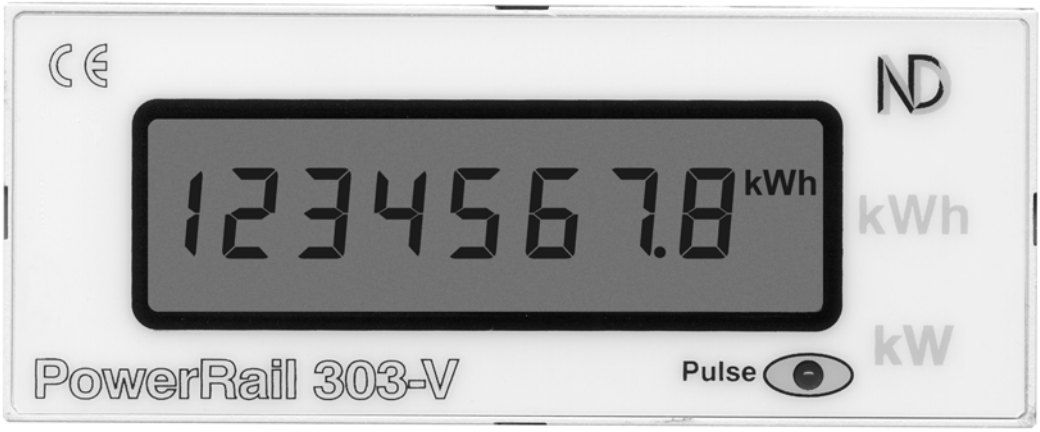


Figure 4 Front Panel Keys

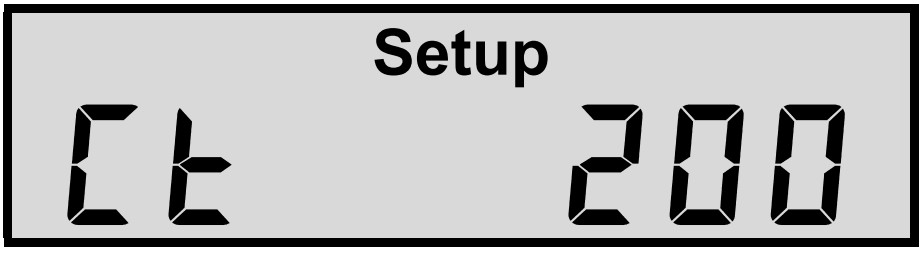
10.1 kW Display

A display of instantaneous primary kW is available by pressing the ***kW*** key. This display remains visible for 1 minute before the unit reverts to normal kWh mode. The ***kWh*** key may be used to return to kWh mode before the minute has elapsed.

10.2 Programming CT Primary Current

The ***PowerRail 303-V*** display requires scaling to suit the primary current range selected on the 3-range transducers. This is carried out in programming mode.

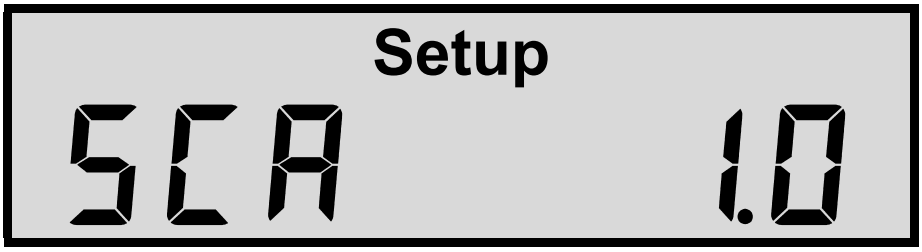
To enter programming mode Press the top key indicated by the ***ND*** logo and **hold** for 5 seconds. The unit shows the current transducer primary Setup screen.



Press ***kWh*** to increase the selected primary current in steps of 10A or ***kW*** to decrease the value. When a value of 50A, 100A or 200A is selected to match the wiring of the current transducers (Refer to Section 4) press ***ND*** to confirm the selection.

10.3 Programming PT Scaling Factor

The ***PowerRail 303-V*** display may be scaled by an additional multiplying factor '***Sca***'. This is used in systems fitted with potential transformers (PTs). The meters overall scaling is determined by ***Ct x Sca***.
For the majority of applications using the Split Core Current Transducers ***Sca*** should be set to 1.0.



Press the ***kWh*** or ***kW*** keys until the desired Scaling Factor is displayed. Press ***ND*** when the selection is complete.

10.4 Programming Pulse Output Rate

The ***PowerRail 303-V*** may optionally provide output pulses in proportion to accumulated energy as described in Section 8.

The pulse output rate may be set to provide 1 pulse after each 1, 10, 100 or 1000 increments of the LCD register. Press the ***kWh*** or ***kW*** keys until the desired Pulse Rate is displayed. Press ***ND*** when the selection is complete. If no pulse output is fitted to the meter this programmed setting has no effect on meter operation.
The meter automatically reverts to a display of kWh on completion of programming.

10.5 Reverse Connections

If the ***PowerRail 303-V*** detects negative power at it's input terminals the **'REV Ct'** message is displayed and the kWh register is frozen.
This condition is most commonly caused by wiring errors. The most common of these errors is incorrect orientation of current transducer primaries (P1/P2) or secondaries (S1/S2).

11 SPECIFICATION

AUX MAINS	Nominal 230V, ±15%, 45-65Hz		
	Optional 110V		
	Other voltages available to special order		
	Burden 4W max		
VOLTAGE	Nominal Un = 400V L-L, 230V L-N		
	Optional Un = 110V L-L, 63.5V L-N		
	Other voltages to special order		
	AC 45-65Hz fundamental		
	Range = Un ± 20%		
	Burden 0.1W per phase		
	Overload 2 x Un for 2 Seconds		
CURRENT	Nominal Ib = 50A, 100A, 200A selectable		
	Range = 0.005 Ib to 1.2 Ib		
	Overload 250A continuous (500A for 10s)		
	Secondary Output = 1V ac rms at Ib		
	Meter Input Impedance = 10kΩ per phase.		
DISPLAY	Liquid Crystal (LCD). 8 x 9mm Digits + Legends		
	Backlight green LED		
	Memory 10 Years in the event of power fail.		
PULSE	Normally Open Volt Free Contacts.		
	Contact Rating 100V & 100mA AC/DC max.		
	100mS Closure per display increment.		
	Switching Time (t_r, t_f) 2mS max		
	Contact Bounce 0.5mS max.		
STANDARDS	Accuracy	EN 61036	Class 1 (kWh)
	Safety	EN 61010-1	(Installation Category 3)
	EMC	EN 50081-1	(Commercial Emmissions)
		EN 50082-2	(Industrial Immunity)
CASE	DIN 43880, 6-Modules wide		
	106mm x 90mm x 58mm		
	Cut-Out 45mm x 106mm		
	NORYL. ULV94 V-O self extinguishing		
DIN RAIL	DIN EN 50022 106mm (min) x 35mm		
TERMINALS	Rising Cage 0.25mm^2 to 4mm^2		
OPERATION	-10°C to 55°C. <75% RH non condensing		
STORAGE	-25°C to 70°C. < 85% RH non condensing		