

Rail350V Installation Guide January 2010

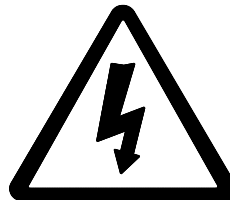


1 Safety

This instruction sheet gives details of safe installation and operation of the **Rail350V** 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.



Refer To User Manual



Risk of Electric Shock

WARNING

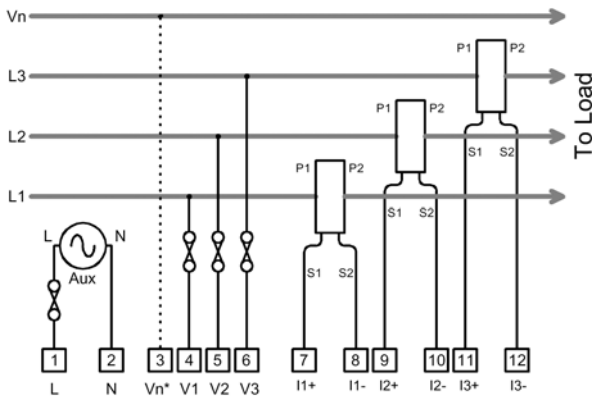
The meter contains no user serviceable parts.
Installation and commissioning should only be carried out by qualified personnel

Further information is available for download at <http://www.ndmeter.co.uk>.

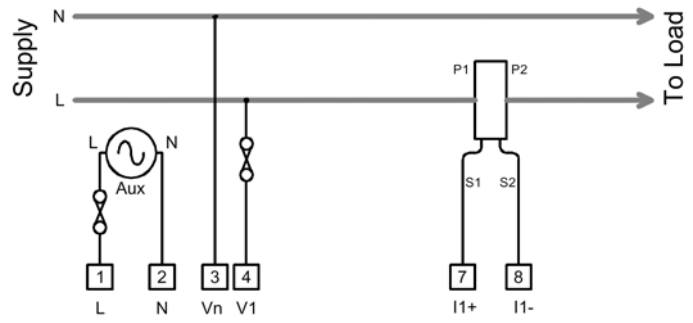
1.1 Mounting On A Rail

The **Rail350V** conforms to DIN 43880, 6-Module Wide. The unit is therefore compatible with a number of standard distribution systems with 45mm cut-outs. The meter should be mounted on a 35mm symmetrical ("Top-Hat") DIN rail of minimum length 106mm.

2 Standard Connections



3-Phase 3 or 4-Wire (*Optional Neutral)



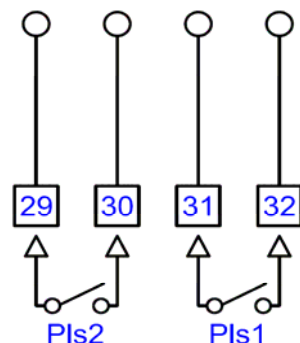
Single Phase

2.1 Pulse Output Connections

The pulse outputs take the form of isolated volt free normally open contact pairs. Pulse 1 is associated with active energy (kWh) and Pulse 2 with reactive energy (kvarh).

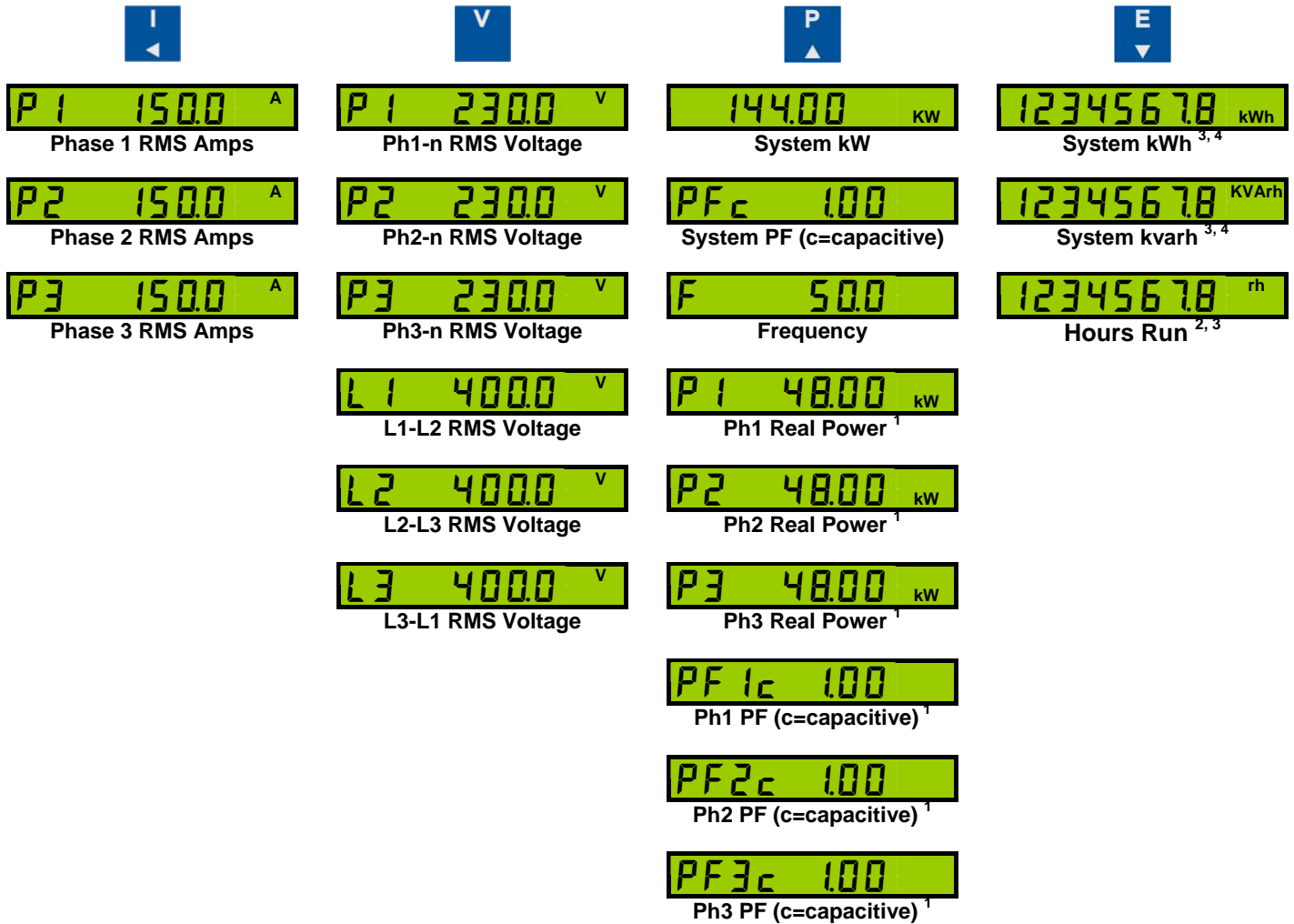
The contacts are isolated from all other circuits (2.5kV / 1 minute) and at 50V from pulse 1 to pulse 2.

Pulses can be used as input to remote counters, pulse loggers, building energy management system etc.



Light emitting diodes **Π1** and **Π2** remain **ON** during each associated output pulse.

3 Display Menus



Note 1: Display of some per phase values may not be available on all models.

Note 2: The Hours Run register accumulates the total time during which the average 3-phase load current exceeds a preset level. This is always displayed with a resolution of 0.1hour.

The percentage level of (I1+I2+I3) at which the Hours Run register accumulates is user programmable from 1% to 100% of full scale current.

Note 3: Press **P** and **E** together and hold for 2 seconds to reset the displayed value. This feature may be disabled before mounting in a panel.

Note 4: Scaling of the energy registers is set by the nominal input currents and voltages and remains constant during operation of the meter. Energy registers will each accumulate from zero to 99,999,999 then restart from zero.

4 Programming

To Change a Setting Value:

Press **P** **▲** or **E** **▼** until the required value is set.

To Move to The Next Setting:

Press **I** **◀** until the next page in the list is displayed. Parameters are set in the following order:

Fine Adjust Ct and Un Settings

CT Primary and Nominal Voltage settings are selected from a table of preferred values. This reduces the time to program these parameters to industry standard values.

Fine Adjust Mode allows values other than those provided by the default tables to be set. To enter/exit **Fine Adjust Mode**:

Hold **P** **▲** and **I** **◀** together for 2 Seconds while setting **CT** or **Un**.

Fine Adjust Mode is indicated by a decimal point immediately after the parameter type (ie. "CT." or "Un.")

Ct 150^A
Current Transformer Primary

Un 400^V
Voltage Transformer Primary

PLr 0.1 kWh
Pulse Output Rate (1 and 2)

PLt 0.1
Pulse On Time (Seconds)

Pto 9999
Pulse Test

Hr 20
Hours Run %Amps Trigger

tr UE 3Ph
Voltage Input Mode

Auto rot
CT Auto Rotation Mode

Storing
Store Setup to Memory

4.1 Pulse Output Test Pto 9999

This feature allows the pulse output hardware and external system connections to be commissioned without a measured load. The LCD shows **Pto** (off) and **Ptr** (run) and the number of test pulses. The test pulse rate is set automatically dependant on the programmed pulse length (maximum 0.5Hz).

Press **P** **▲** to start/stop the test pulses on both outputs.

Press **P** **▲** and **E** **▼** together to stop the test pulses and simultaneously reset the test counter.

5 Specification

| INPUTS | |
|------------------------|--|
| System | 3 Phase 3 or 4 Wire Unbalanced Load |
| Voltage Un | 400/230V, 3 Phase 3 or 4 Wire 110/63V, 120/240V & 208/120V optional. Others to order. |
| Current Sensors | |
| Output @ Nominal In | 0.333Vac |
| Accuracy | ±1% (0.1In – 1.2In) |
| ND SCL8-5 | In = 5A; Max Cable = 8mm Dia. Phase Error <2.5° at 0.5In |
| ND SCL16-50 | In = 50A; Max Cable = 16mm Dia. Phase Error <2.5° at 0.5In |
| ND SCL16-100 | In = 100A Max Cable = 16mm Dia. Phase Error <2° at 0.5In |
| ND SCT19-150 | In = 150A Max Cable = 19mm Dia. Phase Error <2° at 0.5In |
| ND SCT32-400 | In = 400A; Max Cable = 32mm Dia. Phase Error <2° at 0.5In |
| ND SCT51-800 | In = 800A; Max Cable = 51mm Dia. Phase Error <2° at 0.5In |
| Enclosures | UL94V-0 |
| Insulation | >300Vrms, CAT III |
| Environment | Indoor use only (Altitude < 2000m) |
| Measurement | Voltage 50% to 120% |
| Range | Current 0.2% to 120% |

| | |
|--|--|
| Frequency Range | Fundamental 45 to 65Hz Harmonics Up to 30th harmonic at 50Hz Individual to the 15th |
| Voltage Burden Overload | <0.1VA per phase Voltage x4 for 1 hour Current SCL x10 for 1min SCT19 200A Continuous SCT32 800A Continuous SCT51 2000A Continuous |
| DISPLAY | |
| Type | Custom, Supertwist, LCD with LED backlight |
| Data Retention | 10 years min. Stores kWh & Meter set-up |
| Format | 8 x 6.66mm high digits with DPs & 3.2mm legends |
| Scaling | Direct reading. User programmable CT & VT CT Primary programmable from 5A to 25kA VT primary programmable from 11V to 55kV |
| Legends | Wh, kWh, MWh etc. depending on user settings |
| AUXILIARY SUPPLY | |
| Standard | 230V 50/60 Hz ±15% |
| Options | 110V 50/60 Hz ±15% |
| Load | 2VA max. |
| Overload | x1.2 continuous |
| METER ACCURACY All errors ± 1 digit | |
| kWh | Better than Class 1 per EN 62053-21 & BS 8431 |
| Kvarh | Better than Class 2 per EN 62053-23 & BS 8431 |
| kW & kVA | Better than Class 0.25 IEC 60688 |
| kvar | Better than Class 0.5 IEC 60688 |
| Amps & Volts | Class 0.1 IEC 60688 (0.01In – 1.2In or 0.1Un – 1.2Un) |
| PF | ±0.2° (0.05In – 1.2In and 0.2Un – 1.2Un) |
| Neutral Current | Class 0.5 IEC 60688 (0.05In – 1.2In) |
| OVERALL METERING ACCURACY | |
| ND SCL8-5 | 5 Amp Better than Class 2 Meter with Class 1 CTs |
| ND SCL16-50 | 50 Amp Better than Class 1 Meter with Class 1 CTs |
| ND SCL16-100 | 100 Amp Better than Class 1 Meter with Class 1 CTs |
| ND SCT19-150 | 150 Amp Better than Class 1 Meter with Class 1 CTs |
| ND SCT32-400 | 400 Amp Better than Class 1 Meter with Class 1 CTs |
| ND SCT51-800 | 800 Amp Better than Class 1 Meter with Class 1 CTs |
| PULSE OUTPUTS | |
| Function | 1 Pulse per unit of energy |
| Scaling | Settable between 1 & 1000 counts of kWh register |
| Pulse Period | 0.1 sec. default; Settable between 0.1 and 20 sec |
| Rise & Fall Time | < 2.0ms |
| Type | N/O Volt free contact. Optically isolated BiFET |
| Contacts | 100mA ac/dc max., 100V ac/dc max. |
| Isolation | 2.5kV 50Hz 1 minute |
| MODBUS® Serial Comms | |
| Bus Type | RS485 2 wire + 0v. ½ Duplex, ¼ unit load |
| Protocol | MODBUS® RTU with 16 bit CRC |
| Baud Rate | 4800, 9600 or 19,200 User settable |
| Address | 1 – 247 User settable |
| Latency | Reply within 250ms max. |
| Command Rate | New command within 5ms of previous one |
| GENERAL | |
| Temperature | Operating -10°C to +65°C Storage -25°C to +70°C |
| Humidity | < 75% non-condensing |
| Environment | IP54 standard, IP65 optional |
| MECHANICAL | |
| Terminals | Rising Cage. 4mm ² (12 AWG) cable max. |
| Enclosure | DIN 43880, 6-Modules Wide |
| Material | Noryl® with fire protection to UL94-V-O. Self extinguishing |
| Dimensions | 106 x 90 x 58mm (Cut out 106 x 45mm) |
| Weight | ~ 250 gms |
| SAFETY | |
| Conforms to | EN 61010-1 Installation Category III & BS 8431 |