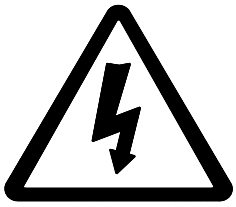
Cube400
Installation Guide
October 2008

1 Safety

This instruction sheet gives details of safe installation and operation of the ***Cube400*** 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

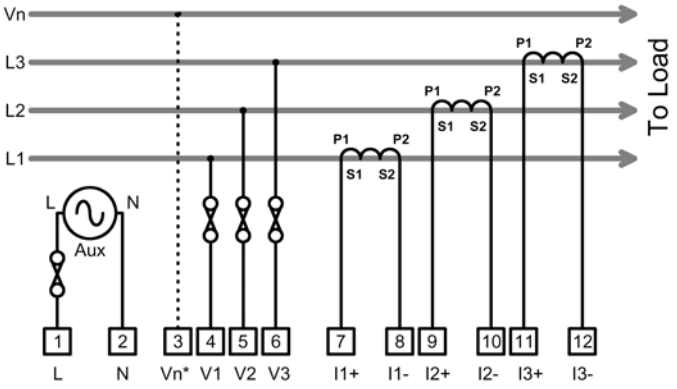
WARNING
The meter contains no user serviceable parts.
Installation and commissioning should only be carried out by qualified personnel

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

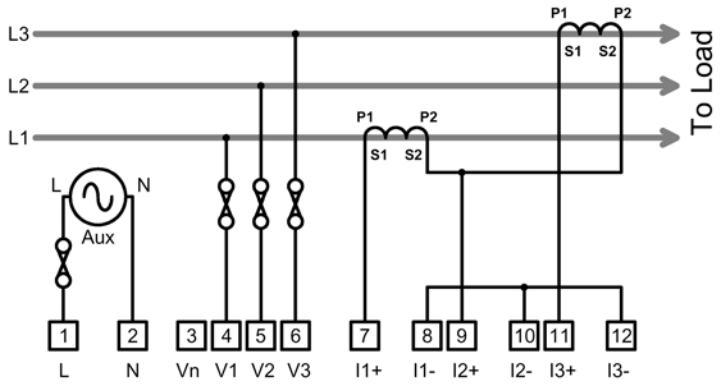
2 Mounting In a Panel

Panels should be 1mm to 4mm thick with a square cutout of 92mm (+0.8/-0.0mm). Insert the meter from the front of the panel, slide the panel clips from the rear of the case and push firmly against the panel ensuring even pressure on each clip.

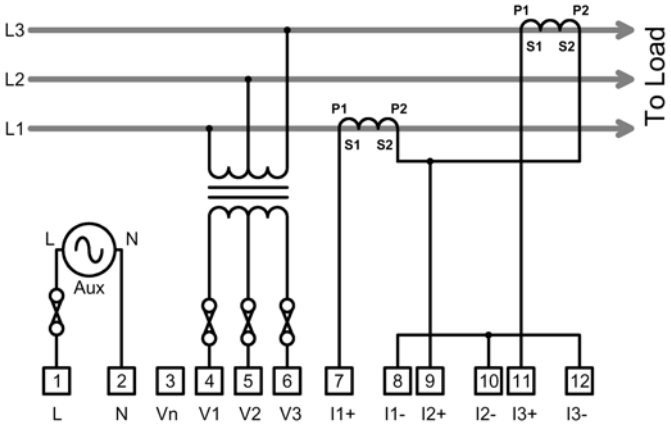
3 Standard Connections



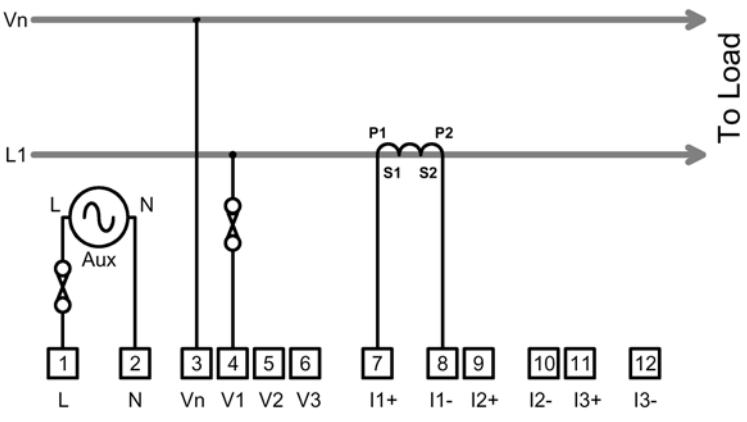
3-Phase 3 or 4-Wire (*Optional Neutral)



3-Phase 3-Wire (2 CTs)

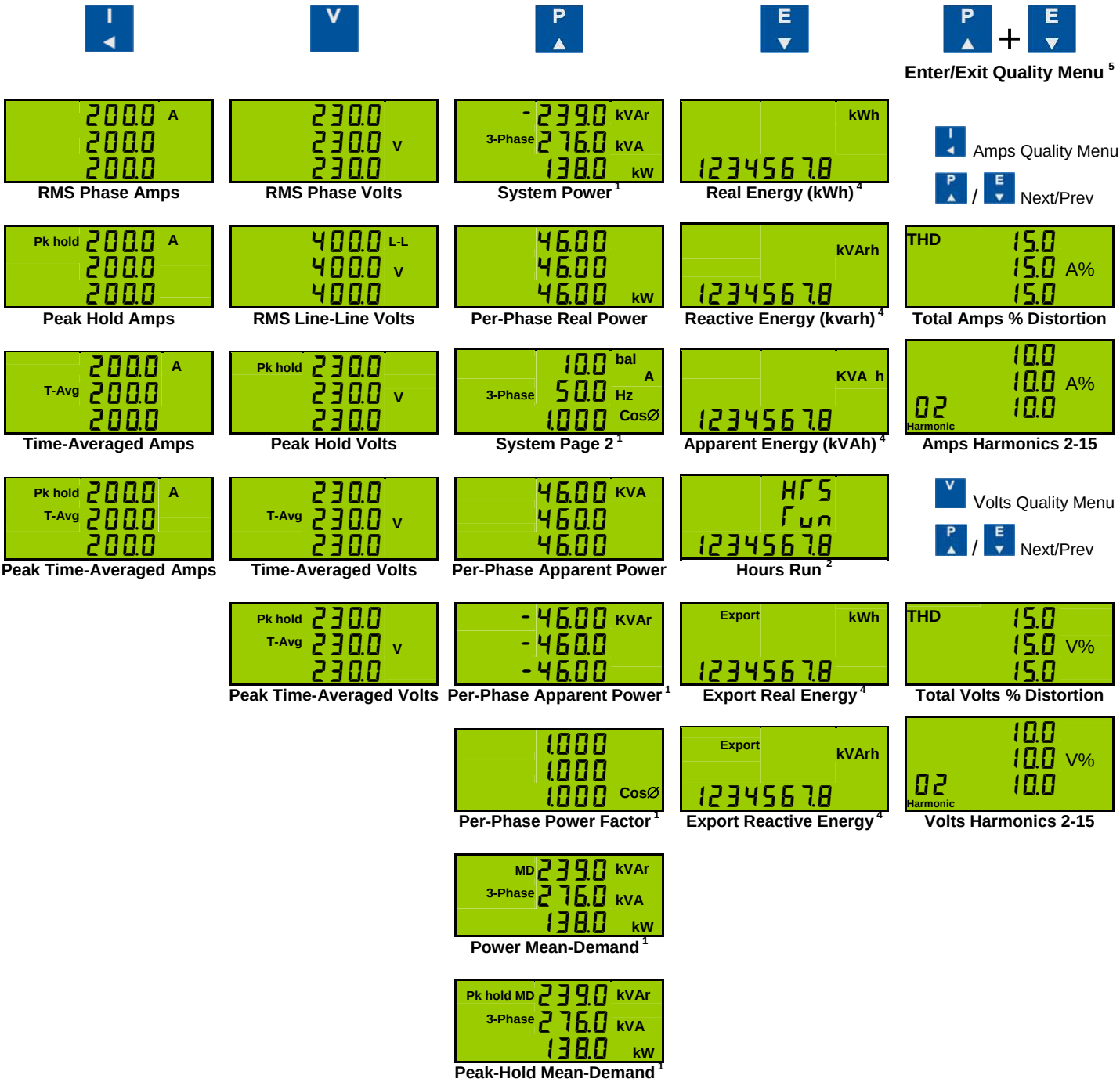


3-Phase High Voltage (HV)



Single Phase

4 Display Menus



Note 1: A display of ⊣⊢ after a value indicates a capacitive load.

Note 2: The Hours Run register accumulates the total time during which the real power (kW) exceeds a preset level. This is always displayed with a resolution of 0.1hour.

The percentage level of kW at which the Hours Run register accumulates is user programmable from 1% to 100% of full scale current.

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

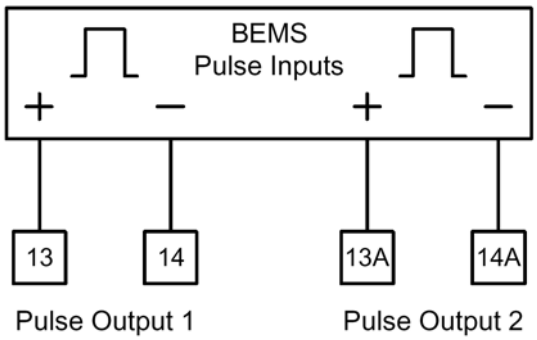
Note 4: Scaling of the energy registers is set by the nominal input currents and voltages and remains constant during operation of the meter. Energy registers will each accumulate from zero to 99,999,999 then restart from zero.

Note 5: Power quality menus are optional on some meters.

4.1 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 Л1 and Л2 remain ***ON*** during each associated output pulse.



5 Programming

[I] and [E] to enter programming.

[P] or [E] selects from the standard list of settings while L is displayed. (List Mode)

[P] or [E] increases or decreases the value while F is displayed. (Fine adjust)

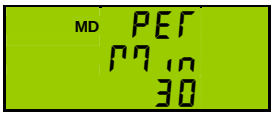
[I] and [P] together to toggle between L and F. [I] Accepts the set value.

Current Transformer Primary

Voltage Transformer Primary

Set the integration period in minutes used for the sliding time window MD calculation for kW and kvar.

[P] or [E] increments or decrements the value. [I] Accepts the set value.



Power MD Integration Time

Set the integration period in seconds used for the sliding time window calculation for voltage and current.

[P] or [E] increments or decrements the value. [I] Accepts the set value.

Current/Voltage Average Time

Set the instantaneous system kW level above which the Hours Run timer will accumulate. Below this level Hours Run will remain unchanged.

[P] or [E] increments or decrements the value. [I] Accepts the value.

Hours Run Trigger Point

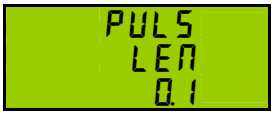
Set the amount of energy (kWh Pls1 kvarh pls2) required to trigger each Pulse Output.

[P] or [E] selects the next/previous Pulse Rate. [I] Accepts the value.

Pulse Rate (kWh per Pulse)

Set the contact closure time for both pulse outputs.

[P] or [E] selects the next/previous Pulse Length from a standard list. [I] Accepts the value.



Pulse On Period (Seconds)

Tests both pulse outputs and associated circuits without the need of a test load.

[P] or [E] starts/stops a test pulse stream. The display shows HLd (Hold) or RUN. The counter shows the total number of pulses during the test.

[I] and [V] reset the test counter to zero. [I] exits pulse test mode.

Pulse Test Mode

6 Specification

INPUTS		
System	3 Phase 3 or 4 Wire Unbalanced Load	
Voltage Un	400/230V. 3 Phase 3 or 4 Wire	
	110/63V & 208/120V optional. Others to order.	
Current In	5A from external CTs. 1A optional. Fully isolated	
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
Burden	Voltage	<0.1VA per phase
	Current	<0.1VA per phase
Overload	Voltage	x4 for 1 hour
	Current	x40 for 0.5 second max
DISPLAY		
Type	Custom, Supertwist, LCD	
Data Retention	10 years min. Stores all energy registers & Meter set-up	
Format	2 Rows x 4 Digits, 1 Row x 8 Digits + Legends	
Scaling	Direct reading. User programmable CT & VT	
	CT Primary programmable from 10A to 25kA	
	VT primary programmable from 11V to 440kV	
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	
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)	
PULSE OUTPUTS		
Function	1 Pulse per unit of energy	
Scaling	Settable between 1 & 1000 counts of kWh/kvarh registers	
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. 0.5W Max Load	
Isolation	2.5kV 50Hz 1 minute	
MODBUS® Serial Comms (option)		
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. 4mm2 (12 AWG) cable max.	
Enclosure	DIN 43700 96 x 96	
Material	Mablex® with fire protection to UL94-V-O. Self extinguishing	
Dimensions	96 x 96 mm x 83.5 mm (72 mm behind panel)	
Weight	~ 250 gms	
SAFETY		
Conforms to	EN 61010-1 Installation Category III	