

Cube 350

Multifunction Meter



- ***DIN 96x96 Standard Format***
- ***Phase Indicator Lights IEC 60439***
- ***True rms measurement to the 30th harmonic
Individual harmonics to the 15th via MODBUS***
- ***Installation Aids – ‘Right First Time’***
- ***Accuracy better than Class 1***
- ***Isolated Pulse Output***
- ***RS485 MODBUS[®] or TCP/IP Communications***
- ***IP54 Protection Category***
- ***Designed & Made in the UK with a 5 year Warranty***

Cube350 – a DIN 96x96 panel mounting Electronic Multifunction Meter, with Phase Indicator Lights for compliance with IEC 60439. Easy to install and convenient to use. Equally suitable for both 3 wire and 4 wire 3f unbalanced loads, these Meters have been designed to measure accurately irrespective of the type of load – ideal for a motor or heater, or for a modern electronically controlled load.

MultiParameter

Displayed	Phases	Additionally available via MODBUS	Phases
Volts, LN & LL	1, 2, 3	Pk Volts LN	1, 2, 3
Amps	1, 2, 3	Pk Amps	1, 2, 3
PF	1, 2, 3 & Σ	Neutral Current	Σ
kW	1, 2, 3 & Σ	kVA & kvar	1, 2, 3 & Σ
kWh & kvarh	Σ	kVAh	Σ
Frequency		kW, kVA & kvar Demand	Σ
Hours Run (on Load)	Σ	Pk kW, kVA & kvar Demand	Σ
True rms measurement of Volts & Amps – and true Power, Measurement – to the 30th harmonic at 50Hz.		Amp Demand & Peak	1, 2, 3
		%THD Volts & Amps	1, 2, 3
		V & I Harmonics 2 nd – 15 th	1, 2, 3

Safe to Use

With fully isolated current inputs, installation safety is assured. This allows the **Cube350** to be directly connected under certain conditions and provides versatility of connection. Installation in conjunction with other instrumentation can be carried out safely without affecting accuracy and CTs can be earthed if required.

Easy to Install

The **Cube350** is fitted with large Rising Cage terminals – allowing connection to a wide range of cables from 0.25mm² to 4.0mm²

Easy to Configure

Cube350 Meters are configured from the front panel to suit installations using Current and/or Voltage Transformers, with decimal point and legend being automatically set to provide optimum resolution.

Easy to Commission — Right First Time

Wiring: With kW & PF displayed at the touch of a button, installations can be quickly and simply tested – connections confirmed & the load measured.

Pulse Output: With a **Pulse Test** facility, pulses can be generated – without any load present – to test all downstream equipment.

Easy to Use

Complex menus structures are eliminated by limiting the displayed parameters to key values. Links allow the display to be further simplified by disabling the per-phase kW and/or PF readings. All system parameters are however available via MODBUS. With a bold custom LCD display, the **Cube350** can be read from any angle, with the necessary legends simplifying reading. The programmable isolated pulse outputs provide an interface to a data collection system or BEMs.

Fully Supported

Comprehensive operating instructions - supplied with every **Cube350** - include full information on installation. These include connection schematics and configuration details for virtually all CT ratios. Full technical support is readily available from your local Distributor or from Technical Sales at ND Metering Solutions.

Universality of Connections

For maximum convenience all **Cube350** Meters can be powered from the measurement voltage. Where supplies may be subject to unusually wide variations, the Meters may be powered from a separate auxiliary supply. Standard Meters are suitable for both 3 wire and 4 wire 3f unbalanced loads.

Accurate Real World Measurement

A precision measurement system maintains full accuracy up to the 30th harmonic (at 50Hz) in the presence of harmonics and randomly and/or periodically interrupted waveforms - as commonly found on modern electronically controlled loads.

Communications Options

Internal communications options makes Meter readings available remotely and provides the extra information required for system management. Options include RS485 MODBUS[®], MODBUS TCP[®] and TCP/IP standard Network connection.

OUTLINE SPECIFICATION

INPUTS	
System	3 Phase 3 or 4 Wire Unbalanced Load
Voltage U_n	400/230V. 3 Phase 3 or 4 Wire 110/63V & 208/120V optional. Others to order.
Current I_n	5A from external CTs. 1A optional. Fully isolated
Measurement	Voltage 50% to 120%
Range	Current 0.2% to 120%
Frequency	Fundamental 45 to 65Hz
Range	Harmonics Up to 30 th harmonic at 50Hz Individual to the 15 th
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 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 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 $\pm 15\%$
Options	110V 50/60 Hz $\pm 15\%$ 24Vdc, 48Vdc or 110Vdc
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 (0.01 I_n – 1.2 I_n or 0.1 U_n – 1.2 U_n)
PF	$\pm 0.2^\circ$ (0.05 I_n – 1.2 I_n and 0.2 U_n – 1.2 U_n)
Neutral Current	Class 0.5 IEC 60688 (0.05 I_n – 1.2 I_n)
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	
	Alternatively MODBUS TCP or TCP/IP
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 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

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www.ndmeter.co.uk

DRIVE

Current Transducers

Miniature Transducers for mounting on standard DIN rails



Small size

Just 22.5 mm wide

Simplified stocking

Dual 1 Amp and 5 Amp Inputs

Standard Output

Industry standard 4-20mA

DRIVE II Transducers – the simplest device possible for measuring current. For minimising stocking, each transducer may be connected for 5 Amp or 1 Amp input. Neat, slim and easy to use. Applications include:

- **Motor Control**
- **Failure Detection**, including
Heating Coils
Lighting circuits
- **Energy Management**
- **Control Systems**,

Where the application is for lower or higher currents, the **XD** range of transducers can directly measure currents from 5mA to 250 Amp.

Brief Specification

Input I_n	1 Amp & 5 Amp
Sensing	Mean
Frequency Range	45Hz - 65Hz Standard
Operating Range	0 - 120% nominal FS Amp
Overload for 10 seconds Continuous	$\times 15 I_n$ $\times 2 I_n$
Output	4 - 20 mA max 25mA
Response Time	Less than 1 sec
Accuracy-	Better than Class 1 EN 60688
Output Burden	250 Ω nominal, 600 Ω max
Aux Supply	Loop 24Vdc (16 - 36V)
Max Cable	4mm ²
Isolation Input to Output	4kV 50Hz 1 sec test
Environmental Operating Temp Range Storage Temp Range Humidity Protection Category	-10°C to + 65°C -40°C to + 85°C < 95% non-condensing IP20
Mounting	TS35 DIN Rail
Dimensions	35 x 38 mm x 22.5mm



Network enabled for easy connection

CubelP Meters are fitted with a standard RJ45 connector and use proven Network Protocols including Passive FTP & MODBUS TCP

Network Communications

Readings are automatically transmitted to a remote server at preset intervals using passive FTP or SNMP protocols

Readable with any Web Browser

With an integral web-site, a standard web browser is the only software necessary to access the Meter. 8 web pages, all customisable, provide Meter readings & graphs; further pages can be added

Embedded Software

Software needed for configuration & commissioning is built into the meter. With SVG graphics, graphs & screens can be scaled and panned at will

Real-time graphics

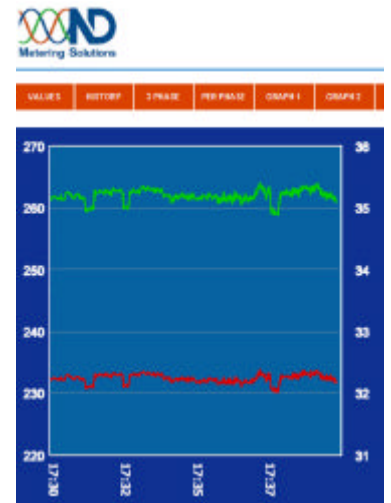
Using Java applets and SVG graphics, graph data can be easily scaled to any screen size and is constantly updated

Read Meters across the Internet

See www.cubeip.co.uk, where a **CubelP Meter** is measuring the energy consumption for part of our site. With the correct permissions set, any meter can be read from anywhere

Data Retention

Readings are stored within the meter at pre-set intervals. If network communications are lost, readings are retained locally for later transmission



Read Gas and Water Meters

Digital Inputs are available as an option. If connected to the pulse outputs of other meters, their readings are then available for transmission.

Multiple access to all meters

With **CubelP Meters**, multiple users can access the same Meter, reading different data at different rates

Local Alarms

Digital outputs, available as an option, can be programmed as alarms – for excessive Demand, high Neutral Current, ... ; any Meter parameter can be used. These outputs can also be used for local control. (2 outputs are available)

Secure Data Backup

Each Meter can regularly transmit selected parameters to a remote server. Parameters, transmission frequency and destination URL are all freely programmable. Standard FTP protocol is used, thus ensuring free passage through firewalls

Data Export

An 'Excel Web Query' page allows direct import of selected data into any standard desktop application - such as a spreadsheet or word processor. This data can be automatically updated if required.



Easy Installation

With metering and the network interface inside a standard meter, installation is simple:

- The electrician understands the electrical connection
- The IT specialist understands the RJ45 connector

System Integration

Readings can be *pushed* by the Meters – using passive FTP or SNMT protocols – or *pulled*, using MODBUS[®] TCP

Easy Retro-fit

CubelP Meters are available for interface with the special miniature split current sensors

Power Quality

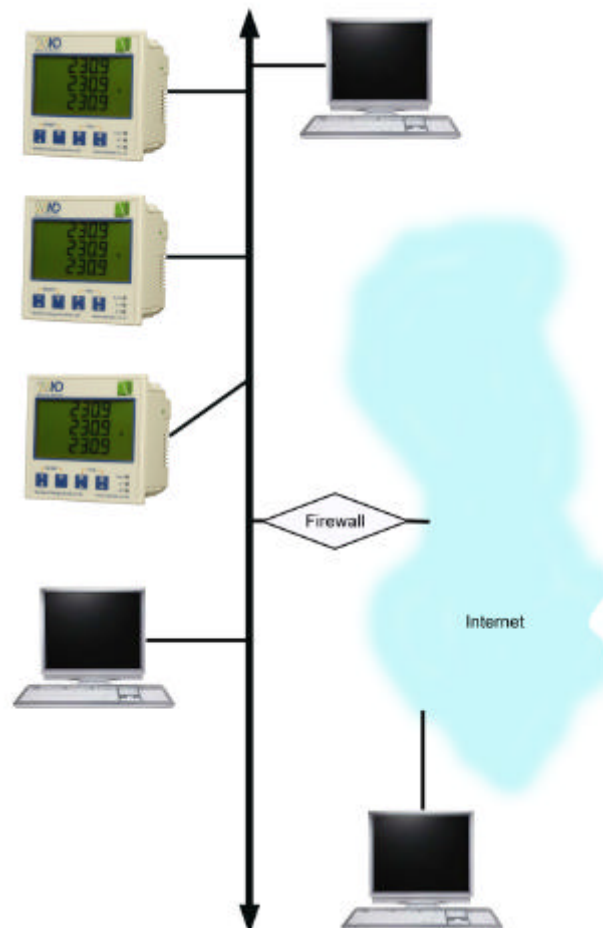
CubelP Meters are not just intended for Energy Management. THD & the individual voltage and current harmonic are also measured; as is Neutral Current, Current Demand, etc

SCADA and Process Control

With industry standard MODBUS[®] TCP protocol, **CubelP Meters** can be easily integrated into most Process Control Systems. Individual or multiple Registers can be accessed and read by the software - every second if necessary

Accurate Meter Reading & Billing

CubelP Meters make Meter Readings available to any PC - on the same network or anywhere over a link that can be as secure as necessary. Individual Energy Registers can be accessed and read by billing software - daily, weekly or monthly as required, The possibility of errors - as can occur where pulses are read and remotely counted - are eliminated.



Brief Specification

Network Interface

RJ45 Connector
10BaseT
Cat5 Cabling

IP Protocols

FTP, TFTP & SNTP
MODBUS[®] TCP
Fixed IP address (User configured)
DHCP & SNMP in development

Web Server

HTTP
HTML Format, SVG for dynamic graphics
8 split Direct Display Pages
Additional user-configured pages can be added
'Excel Web Query' Page
Network Configuration Page
Meter & FTP Data Transmission Configuration Page

Time

A software real time clock is integrated, synchronised to local or global time server using the SNTP protocol

CubelP Meters

CubelP 350 & CubelP 350V
CubelP 400 & CubelP 400V

In Production

Rail Ip 350 & Rail Ip 350V

In Development

Meter Inputs

Voltage	230/400v Standard 63/110, 120/208 & 277/480v Optional
Current	Standard Meter 5 Amp (or 1 Amp) Retro-fit Meter To suit Split Sensors
Frequency	Fundamental 45 - 65 Hz Harmonics To 30 th at 50Hz Individual To 15 th
Aux Supply	Standard 230V $\pm$ 15% 50/60Hz Optional 110Vac; 24, 48 or 110 Vdc

Meter Options

Digital Inputs & Outputs

2 digital Inputs for external pulsing devices or status
2 digital for Alarm or local control

Cube 400

Multifunction Meter



- ***DIN 96x96 Standard Format***
- ***True rms measurement to the 30th harmonic
Individual harmonics to the 15th***
- ***Accuracy better than Class 1***
- ***Isolated Pulse Outputs as standard***
- ***RS485 MODBUS[®]***
- ***IP54 Protection Category***
- ***Designed & Made in the UK with a 5 year Warranty***

Cube400 – a DIN 96x96 panel mounting Electronic Multifunction Meter, with a backlit 3 line display. Easy to install and convenient to use. Equally suitable for both 3 wire and 4 wire 3f unbalanced loads, these Meters have been designed to measure accurately irrespective of the type of load – ideal for a motor or heater, or for a modern electronically controlled load.

MultiParameter

	Phases		Phases
Volts, LN & LL	1, 2, 3	Pk Volts LN	1, 2, 3
Amps	1, 2, 3	Pk Amps	1, 2, 3
Amp Demand & Peak	1, 2, 3	Neutral Current	Σ
PF	1, 2, 3 & Σ	kW, kVA & kvar	1, 2, 3 & Σ
kW, kVA & kvar Demand	Σ	Pk kW, kVA & kvar Demand	Σ
kWh & kVAh	Σ	kvarh, Ind & Cap	Σ
Frequency		Export kWh, kVAh & kVAh	Σ
Hours Run (on Load)	Σ		
%THD Volts & Amps	1, 2, 3	V & I Harmonics 2 nd – 15 th	1, 2, 3
True rms measurement of Volts & Amps – and true Power Measurement – to the 30th harmonic at 50Hz			

Safe to Use

With fully isolated current inputs, installation safety is assured. This allows the **Cube400** to be directly connected under certain conditions and provides versatility of connection. Installation in conjunction with other instrumentation can be carried out safely without affecting accuracy and CTs can be earthed if required.

Easy to Install

The **Cube400** is fitted with large Rising Cage terminals – allowing connection to a wide range of cables from 0.25mm² to 4.0mm²

Easy to Configure

Cube400 Meters are configured from the front panel to suit installations using Current and/or Voltage Transformers, with decimal point and legend being automatically set to provide optimum resolution.

Easy to Commission — Right First Time

Wiring: With kW & PF displayed at the touch of a button, installations can be quickly and simply tested – connections confirmed & the load measured.

Pulse Outputs: With a **Pulse Test** facility, pulses can be generated – without any load present – to test all downstream equipment.

Easy to Use

With a bold backlit 3 line custom LCD display, the **Cube400** can be read from any angle, with the necessary legends simplifying reading.

Fully Supported

Comprehensive operating instructions - supplied with every **Cube400** - include full information on installation. These include connection schematics and configuration details for virtually all CT ratios. Full technical support is readily available from your local Distributor or from Technical Sales at ND Metering Solutions.

Universality of Connections

For maximum convenience all **Cube400** Meters can be powered from the measurement voltage. Where supplies may be subject to unusually wide variations, the Meters may be powered from a separate auxiliary supply. Standard Meters are suitable for both 3 wire and 4 wire 3f unbalanced loads.

Accurate Real World Measurement

A precision measurement system maintains full accuracy up to the 30th harmonic (at 50Hz) in the presence of harmonics and randomly and/or periodically interrupted waveforms - as commonly found on modern electronically controlled loads.

RS485 MODBUS® Communications

A high speed internal RS485 MODBUS® communications option allows readings to be read remotely. User assignable registers simplify communications.

OUTLINE SPECIFICATION

INPUTS	
System	3 Phase 3 or 4 Wire Unbalanced Load
Voltage U_n	400/230V. 3 Phase 3 or 4 Wire 110/63V & 208/120V optional. Others to order.
Current I_n	5A from external CTs. 1A optional. Fully isolated
Measurement	Voltage 50% to 120%
Range	Current 0.2% to 120%
Frequency	Fundamental 45 to 65Hz
Range	Harmonics Up to 30 th harmonic at 50Hz Individual to the 15 th
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 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 10A to 25kA VT primary programmable up to 440kV
Legends	Wh, kWh, MWh etc. depending on user settings
AUXILIARY SUPPLY	
Standard	230V 50/60 Hz $\pm 15\%$
Options	110V 50/60 Hz $\pm 15\%$
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 (0.01 I_n – 1.2 I_n or 0.1 U_n – 1.2 U_n)
PF	$\pm 0.2^\circ$ (0.05 I_n – 1.2 I_n and 0.2 U_n – 1.2 U_n)
Neutral Current	Class 0.5 IEC 60688 (0.05 I_n – 1.2 I_n)
PULSE OUTPUTS	
	kWh plus kvarh / kVAh
Function	1 Pulse per unit of energy
Scaling	Settable between 1 & 1000 counts of energy 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
Register	Fixed & User Assignable
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 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

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XD Current Transducers

The easiest and simplest devices for measuring current

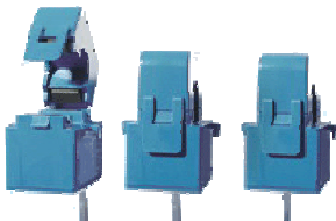


**XD
Ring Series**

- Safe & Simple Current Measurement
True rms or Mean Sensing
- Quick to Install
No external CTs required
- 5mA to 300 Amp
Without CTs
- 4 – 20mA or 0 – 5V_{dc} Outputs
Process Control
Circuit Monitoring
- Pulse Output
Energy Management Metering
- High Overload withstand



**SXD
Clip-on Series**



Retro-fit — just clip round the Cable. It could not be easier.

New Installation — no needs for CTs. Clip onto the rail, pass the cable through the hole

Current Measurement

4-20mA or 0-5V_{dc} Output. Mean Sensing or True rms

Energy Management

Pulse Output Meter replacement

Earth Leakage measurement

4-20mA True rms from 5mA (XD-R420-0)

Motor Control

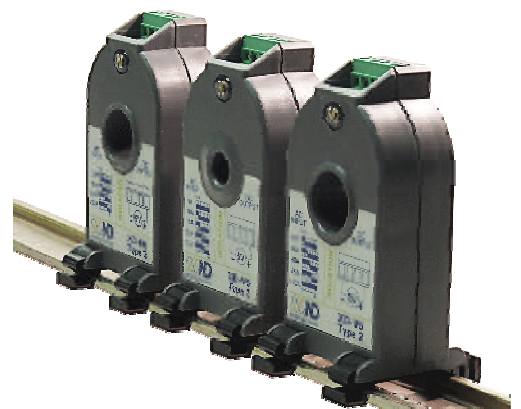
ON / OFF and failure sensing

Actuators

Operation / Failure

Lamp Failure

Multiple lamps can be monitored with a single XD Transducer



XD Transducers are the simplest devices possible for measuring current or monitoring consumption — just pass the cable through the hole; with the **SXD** ideal for retro-fit — just clip around the Cable.

For ultimate simplicity, the **XD-V5** & **SXD-V5** models are self powered.

For maximum flexibility, the **4-20mA** versions are available either Mean-Sensing or True-rms.

The **XD-R0** low current model can be used for simple current measurement or – if all the cores are passed through the aperture – as a core-balance **Earth Leakage** transducer.

Lower Currents can always be measured by passing two or more turns of the primary cable through the XD Transducer.

XD Models					
Current Range		100mA to 1 Amp	5 Amp to 25 Amp	30 Amp to 100 Amp	100 Amp to 300 Amp
Max Cable ϕ		19mm	10mm	19mm	19mm
Output	Measurement				
0 – 5 Vdc	Mean Sense		XD-V5-1	XD-V5-2	XD-V5-3
4 – 20mA	Mean Sense		XD-I420 - 1	XD-I420-2	XD-I420-3
4 – 20mA	True rms	XD-R420-0	XD-R420-1	XD-R420-2	XD-R420-3
Pulse Contact	True rms		XD-P-1	XD-P-2	

User Selectable Current Range & Supply Requirements					
Type	100mA to 1 Amp	5 Amp to 30 Amp	15 Amp to 100 Amp	50 Amp to 300 Amp	Aux Supply
XD-V XD-I	N / A	5, 10, 15, 20, 25 & 30 [*] A	15 [*] , 30, 45, 60, 75 & 100A	50 [*] , 100, 150, 200, 250 & 300 [*] A	None 24V Loop
XD-R	100, 200, 500, 600 & 1000 mA	5, 10, 15, 20, 25 & 30A	20, 40, 60, 80 & 100 A	50 [*] , 100, 150, 200, 250 & 300 [*] A	24V Loop
XD-P	N / A	7.5A, 15A, 22.5A & 30A	30A, 60A, 90A & 120A	N / A	24V dc 10mA
SXD-V	N / A	5, 10, 20, 40, 50 or 100A Factory Set			

Brief Specification

Input SXD		5, 10, 20, 40, 50 & 100 A
XD-V5-1	XD-I-420-1	5, 10, 15, 20, 25 or 30 [*] A
XD-V5-2	XD-I420-2	15 [*] , 30, 45, 60, 75 or 100A
XD-V5-3	XD-I420-3	50 [*] , 100, 150, 200, 250 or 300 [*] A
XD-R420-0		100, 200, 500, 600 or 1000mA
XD-R420-1		5, 10, 15, 20, 25 or 30 A
XD-R420-2		20, 40, 60, 80 or 100A
XD-R420-3		50, 100, 150, 200, 250 or 300A
XD-P-1		7.5, 15, 22.5 or 30A
XD-P-2		30, 60, 90 or 120 A
		[*] At reduced accuracy
Frequency Range Standard		45Hz – 65Hz Standard
Operating Range SXD-V, XD-V & XD-P XD-I and XD-R		0 – 120% nominal FS Amp 0 – 100% nominal FS Amp
Overload for 2 seconds Continuous		XD TBC SXD x 20 I _n min x 2 I _n min
Output SXD-V5 & XD-V5 XD-I420 XD-R420 XD-P		0 – 5V dc max ...V 4 – 20 mA max ...mA 4 – 20 mA max ...mA Volt -free contact
Response Time		Less than 1 sec
Accuracy -V, -I & -R Models -P Models		Better than Class 1 EN 60688 Equiv to Class 1 EN 60253-11 and BS DD 8431
Crest Factor XD-RXD Others		TBC YBC
Output Burden SXD-V5 & XD-V5 XD-I420 & XD-R420		100k Ω min 250 Ω nominal, 600 Ω max
Pulse Output XD-P Rating Calibration		Isolated from dc supply, 50V max 50V ac or dc and 100mA max 230V at PF=1 1f or 3f, user selectable 100 or 1000 pulses/kWh
Aux Supply SXD-V5 & XD-V5 XD-I420 & XD-R420 XD-P		None Loop 24Vdc (16 – 36V) 24Vdc (16 – 36V) at 10mA max
Max Cable Diameter XD-1 Models XD-0, -2 & -3 Models SXD Models		10mm 19mm 16mm
Isolation Input to Output		4kV 50Hz 1 sec test
XD Dimensions		95 x 52 x 32 mm 99 mm above & 52 mm along rail
SXD Dimensions		51 x 45 x 37 mm 16mm Cable Aperture
Environmental Operating Temp Range Storage Temp Range Humidity Protection Category		-10°C to + 65°C -40°C to + 85°C < 95% non-condensing IP50
XD Mounting Plate DIN Rail		35 x 38 mm Fixing Centres TS35 DIN Rail (Clips supplied)

Smart Metering

The CubelP Meter

The complete *aM&T* Energy Management System within a Meter



RJ45
Standard
CAT5

You install your *IPMeter*
You connect it to your IT Network

- The Meter Measures
- The Meter Logs
- You read the Meter with your web-browser

And ...

- For Data Security
The Meter transmits data to your Server

Energy Management at an affordable price

- **Totally Integrated** — Just one box to install
- **Retro-fit Option** — Available with split current sensors & a wall-mounted Enclosure
- **Expandable** — Use one or multiple Meters
- **No Special Software** — Uses you standard web browser
- **Prevent Excessive Demand** — Auto Alarm option available



The Meter Logs & Profiles your consumption
The Meter can warn you if limits are exceeded

And ...

Use the Meter to calculate your Energy Cost
And your CO₂ Emissions

Use the Meter to compare your consumption against
best practice

Use your Meter Data to compare energy suppliers

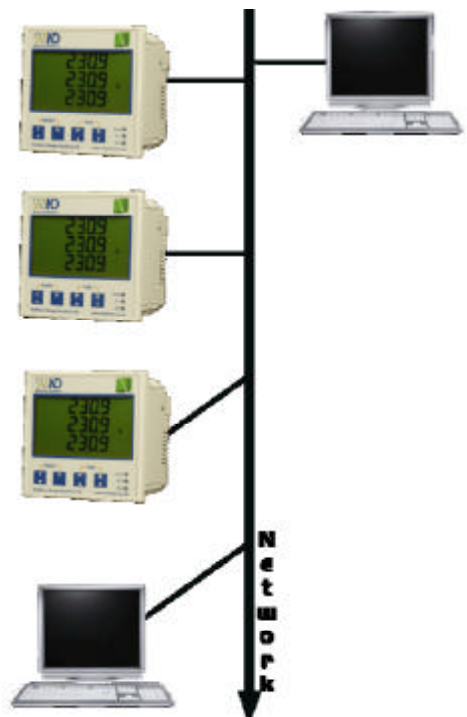
Use your Meter to control your Energy Consumption

And ...

Use your Meter to monitor your Gas & Water

Use your Meter to monitor Degree Days

Use your Meter to monitor production



The Truly Smart Meter

- It Measures your Electricity
- It Logs the readings (for 2 months every ½ hour)
- It includes all the software you need to Manage your Energy

The Meters

Network connectivity is currently available on the **Cube IP 400** Meter. Network versions of the **Rail 350** and other multifunction Meters are in development. With these Meters, all readings – not just the Energies – can be accessed.

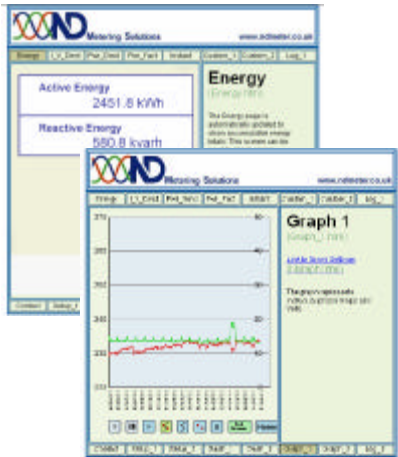
Available Network options include:

- **External Managed Web Servers**

Allow access to Meters from outside the organisation without endangering network security, and provide regular data backup

- **Custom Web Pages**

The integral web site can be customised to order. Options include displaying readings from several **Cube IP** Smart Meters



The Integral Web-Site

Accessed from any PC or PDA with the correct permissions. 16 screens available as standard; custom screens can be developed and uploaded. Every parameter measured by the meter is available for presentation.

Configuration screens, for the Meter, for the network interface and for Data Logging and FTP transfer are provided.

An 'Excel Web Query' page allows direct import of selected data into any standard desktop application – such as a spreadsheet or word processor. Such data can be automatically updated if required

kWh	kvarh	Amp Dem 1	Amp Dem 2	Amp Dem 3	kW Dem	Pk kW Dem	kVA Dem	Pk kVA Dem	kW	PF	kvar	I Neut
25077	5921	127	138	92	92	107.2	98	121	79.3	0.95	26	3

The Options

- **Retro Fit**

Cube IP Smart Meters can be supplied as retro-fit kits, complete with a set of split Current Sensors. Available ranges include 50 Amp, 100 Amp, 150 Amp, 400 Amp & 800 Amp

- **Easy Install Enclosure**

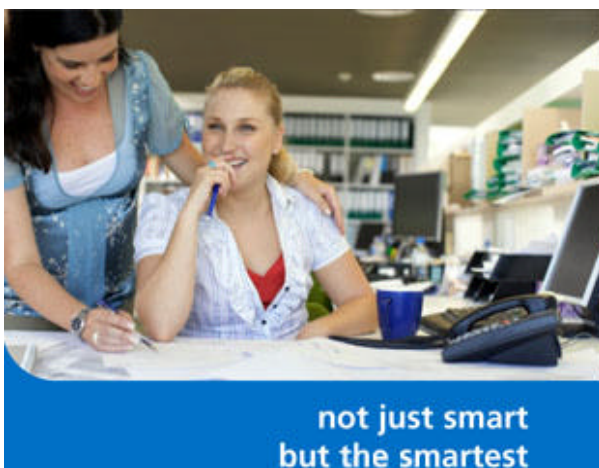
Cube IP Smart Meters can be supplied complete with a wall mount enclosure. Alternatively, they can be installed in a standard electrical panel – all that is needed is a standard DIN 96x96 aperture

- **Inputs and Outputs**

Cube IP Smart Meters can be supplied with Digital Inputs & Outputs

The two **Digital Inputs** are available to read Gas or Water Meters, or any other device that has a pulse output (Production Counter)

The two **Digital Outputs** can be programmed as Alarms or to remotely control the operation of an item of plant



Really Smart Meters

Easy to Install

By any professional Electrician

Easy to Connect

Fully network enabled. Just plug into the nearest network socket

For remote connection, use a standard WiFi access point or Mains Network Interface

Easy to Read

Use your favourite web browser

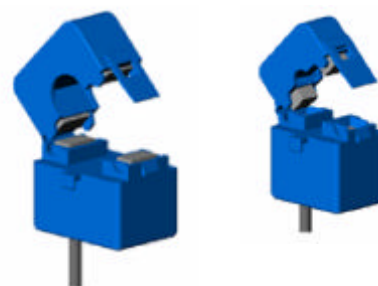
Data Access

All measurements taken by the Meter are available to you when you need them – even in real-time !

SCL Miniature Split-Core Current Transformers

The **ND SCL** series of retro-fit (split-core) current sensors are designed for fast and easy installation without the need to disconnect any loads. These high precision units are equally suitable for Current or Power measurement - ideal for Energy Management or any form of automation and control systems.

An internal protection device across the secondary winding of the CT limits the output to a safe low voltage - no more worries about open-circuiting CT secondary circuits.



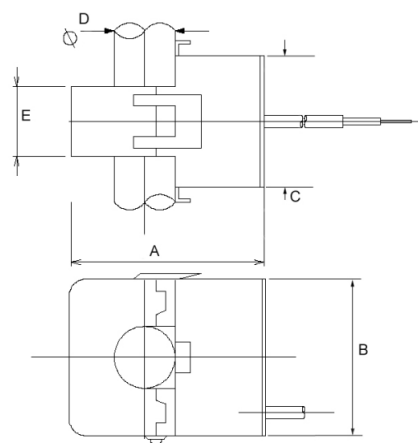
SCL16
100 Amp

SCL8
50 Amp

- Miniature Size
- Low Cost
- Safe, easy & simple to install

Brief Specification

Electrical	
Nominal Input Current I_n	
SCL8 - 50	50 Amp
SCL16 - 100	100 Amp
Maximum Input Current I_{max}	
SCL8 - 50	100 Amp (1kA 1 minute)
SCL16 - 100	300 Amp (4kA 1 minute)
Output at I_n	
SCL8 - 50	16.67 mA
SCL16 - 100	33.33 mA
Frequency Range	50-60 Hz
Accuracy ($0.1I_n - 1.3I_n$)	$\pm 1\%$
Phase Error	$1\frac{1}{2}^\circ \pm 1^\circ$
Temperature Coefficient	60 ppm / °C
Mechanical	
Enclosure	Plastic to UL94V-0
Insulation Voltage	300 V _{rms} CAT III
Environment	Indoor use only, altitude < 2000m
Operating Temperature	-25°C to +70 °C
Storage Temperature	-30°C to +90 °C
Humidity	Max 80% RH at 30°C Non-condensing
Output Connection	1m captive cable



Nominal Dimensions (mm)

Model	A	B	C	D	E
SCL8 - 50	43	37	32	8	13
SCL16 - 100	51	45	37	16	18

Also Available

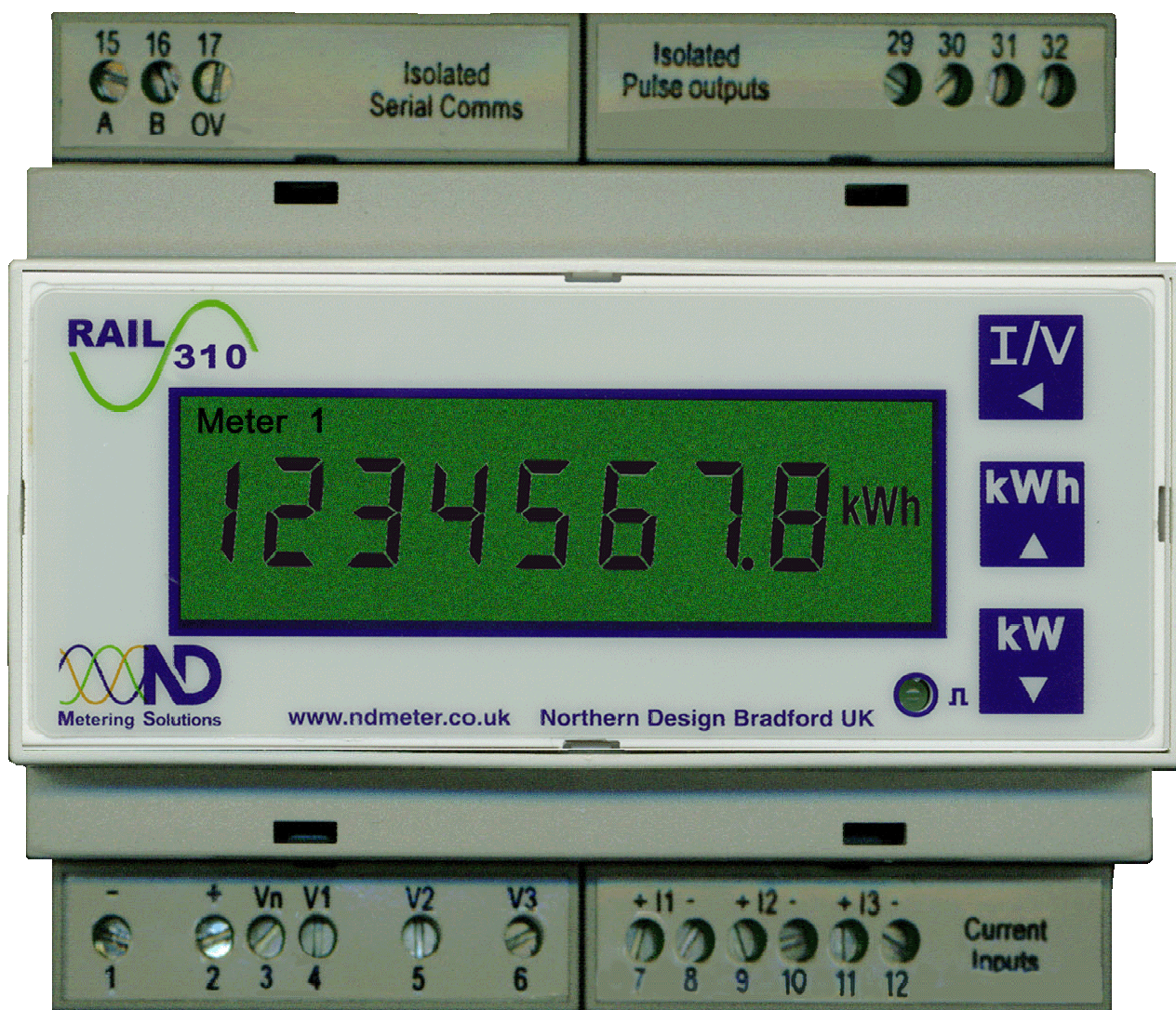
The **SCL16** is available with an integral transducer, providing a 0-5V_{dc} output proportional to the input current.

Available ranges:

0 - 5 Amp	0 - 10 Amp
0 - 20 Amp	0 - 40 Amp
0 - 50 Amp	0 - 100 Amp.

Rail 310

Triple 1 phase Meter



- ***3 Single Phase Meters in a Single Enclosure***
- ***Standard DIN Rail Format***
- ***Available as a Retro-fit Kit with Split CTs***
- ***Installation Aids – ‘Right First Time’***
- ***Accuracy better than Class 1***
- ***Isolated Pulse Output***
- ***RS485 MODBUS[®]***
- ***Designed & Made in the UK with a 5 year Warranty***

Rail 310 – 3 kWh Meters in a single DIN Rail mounting. Easy to install and convenient to use. These Meters have been designed to measure accurately irrespective of the type of load – ideal for modern electronically controlled loads.

Multi-Parameter

Displayed	Additionally available via MODBUS	
Meters		Meters
Volts, LN	1, 2, 3	PF
Amps	1, 2, 3	kvar
kW	1, 2, 3	Average Current
kWh	1, 2, 3	Average Volts
True rms measurement of Volts & Amps – and true Power Measurement – to the 30th harmonic at 50Hz.	Total kW	
	Total kWh	

Safe to Use

With fully isolated current inputs, installation safety is assured. This allows the **Rail 310** to be directly connected under certain conditions and provides versatility of connection. Installation in conjunction with other instrumentation can be carried out safely without affecting accuracy and CTs can be earthed if required. (Does NOT apply to retro-fit Meters.

Easy to Install

The **Rail 310** is fitted with large Rising Cage terminals – allowing connection to a wide range of cables from 0.25mm² to 4.0mm²

Easy to Configure

Rail 310 Meters are configured from the front panel to suit installations using Current Transformers, with decimal point and legend being automatically set to provide optimum resolution.

Easy to Commission — Right First Time

Wiring: With Volts, Amps & kW displayed at the touch of a button, installations can be quickly and simply tested – connections confirmed & the load measured.

Pulse Output: With a **Pulse Test** facility, pulses can be generated – without any load present – to test all downstream equipment.

Easy to Use

Complex menus structures are eliminated by limiting the displayed parameters to key values. All are however available via MODBUS. With a bold custom LCD display, the **Rail 310** can be read from any angle, with the necessary legends simplifying reading. The programmable isolated pulse outputs provide an interface to a data collection system or BEMs.

Fully Supported

Comprehensive operating instructions provide full information on installation. These include connection schematics and configuration details for virtually all CT ratios. Full technical support is readily available from your local Distributor or from Technical Sales at ND Metering Solutions.

Universality of Connections

For maximum convenience all these Meters can be powered from the measurement voltage. Where supplies may be subject to unusually wide variations, the Meters may be powered from a separate auxiliary supply.

Accurate Real World Measurement

A precision measurement system maintains full accuracy up to the 30th harmonic (at 50Hz) in the presence of harmonics and randomly and/or periodically interrupted waveforms - as commonly found on modern electronically controlled loads.

RS485 MODBUS® Communications

A high speed internal RS485 MODBUS® communications option allows readings to be read remotely and provides the extra information required for system management.

Retro-fit Option

The **Rail 310** is optionally available with the special current inputs that can be used with the ND range of openable current sensors — from 5 Amp to 800 Amp.

OUTLINE SPECIFICATION

INPUTS	
System	3 x Single Phase Load with common Neutral
Voltage U_n	3 x 230V. 3 x 110V optional. Others to order.
Current I_n	5A from external CTs. 1A optional. Fully isolated Option of 0.333mV (from External Sensors)
Measurement Range	Voltage 50% to 120% Current 0.2% to 120%
Frequency Range	Fundamental 45 to 65Hz Harmonics Up to 30 th harmonic at 50Hz
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 kWh & Meter set-up
Format	8 x 9mm high digits with DPs & 2.8mm legends
Scaling	Direct reading. User programmable CT
Legends	CT Primary programmable from 10A to 25kA Wh, kWh, MWh etc. depending on user settings
AUXILIARY SUPPLY	
Standard	230V 50/60 Hz $\pm 15\%$
Options	110V 50/60 Hz $\pm 15\%$ 24Vdc, 48Vdc or 110Vdc
Load	2VA max.
Overload	x1.2 continuous
ACCURACY	
All errors ± 1 digit	
kWh	Better than Class 1 per EN 62053-21 & BS 8431
kW	Better than Class 0.25 IEC 60688
Amps & Volts	Class 0.1 IEC 60688 ($0.01I_n - 1.2I_n$ or $0.1U_n - 1.2U_n$)
kvar (via MODBUS)	Better than Class 0.5 IEC 60688
PF (via MODBUS)	$\pm 0.2^\circ$ ($0.05I_n - 1.2I_n$ and $0.2U_n - 1.2U_n$)
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	
Optional	
Bus Type	RS485 2 wire + 0v. 1/2 Duplex, 1/4 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	IP20 standard
MECHANICAL	
Enclosure	DIN 42880 6 Modules
Material	Noryl with fire protection to UL94-V-O. Self extinguishing
Dimensions	106mm x 90mm x 58mm (6 modules wide)
Weight	~ 325 gms
Terminals	Rising Cage. 4mm ² (12 AWG) cable max.
SAFETY	
Conforms to	EN 61010-1 Installation Category III

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E-mail: sales@ndmeter.co.uk
www.ndmeter.co.uk

Rail 350

Multifunction Meter



- **Standard DIN Rail Format**
- **True rms measurement to the 30th harmonic**
Individual harmonics to the 15th via MODBUS
- **Available as a Retro-fit Kit with Split CTs**
- **Installation Aids – ‘Right First Time’**
- **Accuracy better than Class 1**
- **Isolated Pulse Output**
- **RS485 MODBUS[®]**
- **Designed & Made in the UK with a 5 year Warranty**

Rail 350 – a DIN Rail mounting Electronic Multifunction Meter. Easy to install and convenient to use. Equally suitable for both 3 wire and 4 wire 3 ϕ unbalanced loads, these Meters have been designed to measure accurately irrespective of the type of load – ideal for a motor or heater, or for a modern electronically controlled load.

Multi-Parameter

Displayed	Phases	Additionally available via MODBUS	Phases
Volts, LN & LL	1, 2, 3	Pk Volts LN	1, 2, 3
Amps	1, 2, 3	Pk Amps	1, 2, 3
PF	1, 2, 3 & Σ	Neutral Current	Σ
kW	1, 2, 3 & Σ	kVA & kvar	1, 2, 3 & Σ
kWh & kvarh	Σ	kVAh	Σ
Frequency		kW, kVA & kvar Demand	Σ
Hours Run (on Load)	Σ	Pk kW, kVA & kvar Demand	Σ
True rms measurement of			
Volts & Amps – and true			
Power Measurement – to			
the 30th harmonic at 50Hz.			
		Amp Demand & Peak	1, 2, 3
		%THD Volts & Amps	1, 2, 3
		V & I Harmonics 2 nd – 15 th	1, 2, 3

Safe to Use

With fully isolated current inputs, installation safety is assured. This allows the **Rail 350** to be directly connected under certain conditions and provides versatility of connection. Installation in conjunction with other instrumentation can be carried out safely without affecting accuracy and CTs can be earthed if required.

Easy to Install

The **Rail 350** is fitted with large Rising Cage terminals – allowing connection to a wide range of cables from 0.25mm² to 4.0mm²

Easy to Configure

Rail 350 Meters are configured from the front panel to suit installations using Current and/or Voltage Transformers, with decimal point and legend being automatically set to provide optimum resolution.

Easy to Commission — Right First Time

Wiring: With kW & PF displayed at the touch of a button, installations can be quickly and simply tested – connections confirmed & the load measured.

Pulse Output: With a **Pulse Test** facility, pulses can be generated – without any load present – to test all downstream equipment.

Easy to Use

Complex menus structures are eliminated by limiting the displayed parameters to key values. Links allow the display to be further simplified by disabling the per-phase kW and/or PF readings. All system parameters are however available via MODBUS. With a bold custom LCD display, the **Rail 350** can be read from any angle, with the necessary legends simplifying reading. The programmable isolated pulse outputs provide an interface to a data collection system or BEMs.

Fully Supported

Comprehensive operating instructions - supplied with every Meter – provide full information on installation. These include connection schematics and configuration details for virtually all CT ratios. Full technical support is readily available from your local Distributor or from Technical Sales at ND Metering Solutions.

Universality of Connections

For maximum convenience all these Meters can be powered from the measurement voltage. Where supplies may be subject to unusually wide variations, the Meters may be powered from a separate auxiliary supply. Standard Meters are suitable for both 3 wire and 4 wire 3 ϕ unbalanced loads.

Accurate Real World Measurement

A precision measurement system maintains full accuracy up to the 30th harmonic (at 50Hz) in the presence of harmonics and randomly and/or periodically interrupted waveforms - as commonly found on modern electronically controlled loads.

RS485 MODBUS[®] Communications

A high speed internal RS485 MODBUS[®] communications option allows readings to be read remotely and provides the extra information required for system management.

OUTLINE SPECIFICATION

INPUTS

System	3 Phase 3 or 4 Wire Unbalanced Load
Voltage U_n	400/230V. 3 Phase 3 or 4 Wire 110/63V & 208/120V optional. Others to order.
Current I_n	5A from external CTs. 1A optional. Fully isolated
Measurement	Voltage 50% to 120%
Range	Current 0.2% to 120%
Frequency	Fundamental 45 to 65Hz
Range	Harmonics Up to 30 th harmonic at 50Hz Individual to the 15 th
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 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 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 $\pm$ 15%
Options	110V 50/60 Hz $\pm$ 15% 24Vdc, 48Vdc or 110Vdc
Load	2VA max.
Overload	x1.2 continuous

ACCURACY

	All errors $\pm$ 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 (0.01I _n – 1.2I _n or 0.1U _n – 1.2U _n)
PF	$\pm$ 0.2° (0.05I _n – 1.2I _n and 0.2U _n – 1.2U _n)
Neutral Current	Class 0.5 IEC 60688 (0.05I _n – 1.2I _n)

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

Optional

Bus Type	RS485 2 wire + 0v. ½ Duplex, ¼ unit load
Protocol	MODBUS [®] RTU with 16 bit CRC
Baud Rate	4800, 9600 or 19,2000 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	IP22 standard

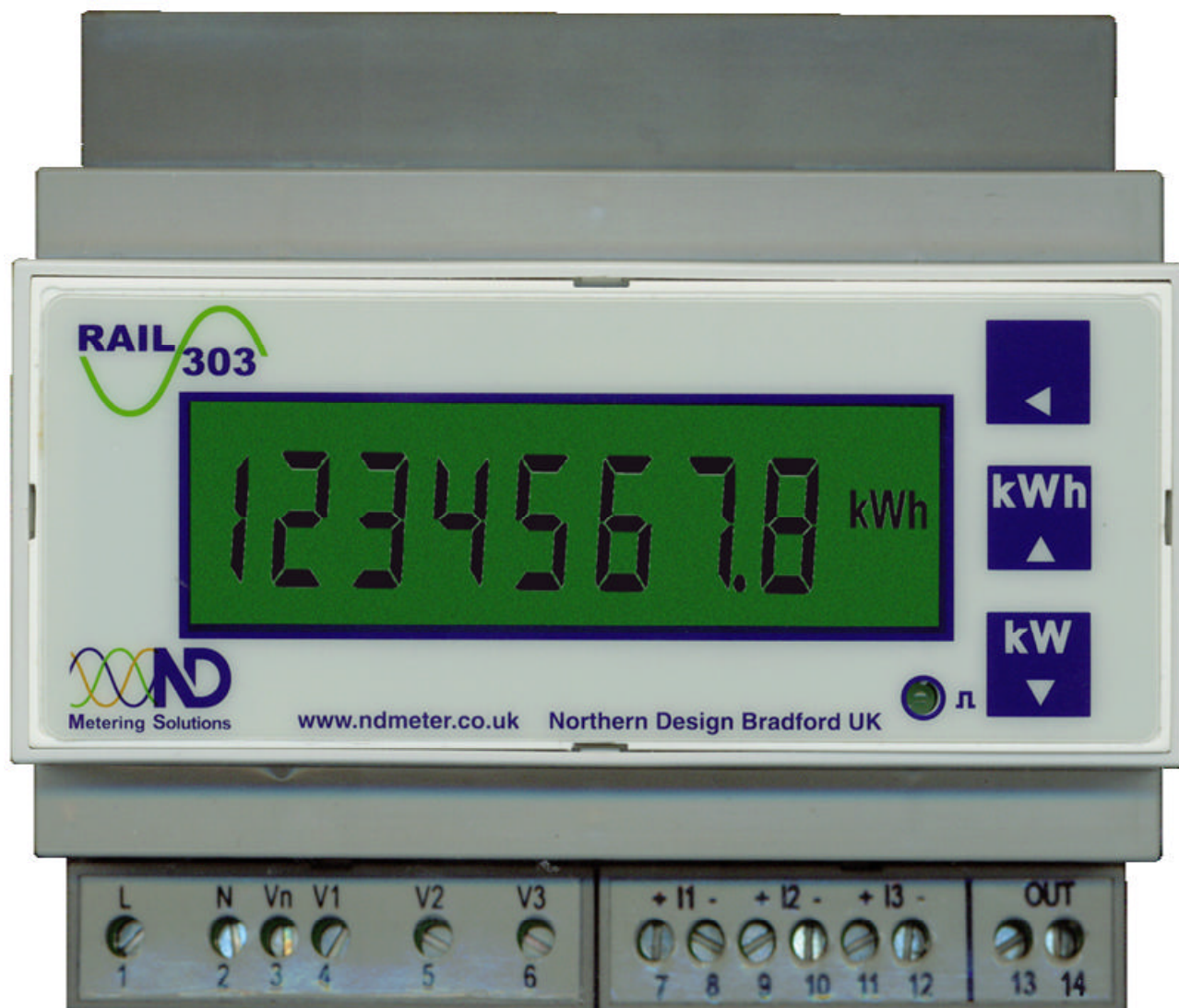
MECHANICAL

Enclosure	DIN 42880 6 Modules
Material	Noryl with fire protection to UL94-V-O. Self extinguishing
Dimensions	106mm x 90mm x 58mm (6 modules wide)
Weight	~ 325 gms
Terminals	Rising Cage. 4mm ² (12 AWG) cable max.

SAFETY

Conforms to	EN 61010-1 Installation Category III
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www.ndmeter.co.uk



- **Standard DIN Rail Format**
- **Installation Aids – ‘Right First Time’**
 - kW Display*
 - Configuration Display (CT, VT & Pulse setting)*
- **Accuracy better than Class 1**
- **Isolated Pulse Output**
- **RS485 MODBUS RTU[®], MD & Dual Tariff Options**
- **Designed & Made in the UK with a 5 year Warranty**
- **Large Clear Backlit Display**

PowerRail 303 - a DIN Rail mounting Electronic kWh Meter. Easy to install and convenient to use. Equally suitable for both 3 wire and 4 wire 3f unbalanced loads (optionally for single phase or balanced 3f systems), these Meters have been designed to measure accurately irrespective of the type of load - ideal for a motor, a heater, or a modern electronically controlled load.

Safe to Use

With fully isolated current inputs, installation safety is assured. Current input isolation allows these meters to be directly connected under certain conditions and provides versatility of connection. Installation in conjunction with other instrumentation can be carried out safely, without affecting accuracy.

Easy to Install

The **PowerRail 303** is fitted with large Rising Cage terminals - allowing connection to cables from 0.25mm² to 4.0mm²

Easy to Configure

PowerRail 303 Meters are configured from the front panel to suit installations using Current and/or Voltage Transformers, with decimal point and legend being automatically set to provide optimum resolution.

Easy to Commission — Right First Time

Configuration: CT, VT & Pulse configuration can be displayed at the touch of a button. Links at the rear of the meter can be removed to disable Configuration.

Wiring: With kW displayed at the push of a button, installations can be quickly and simply tested - connections confirmed & the load measured. To remove the possibility of reading errors, the display reverts to kWh after 60 seconds.

Pulse Output: With its **Pulse Test** facility, pulses can be generated - without any load - to test all downstream equipment.

Easy to Use

The **PowerRail 303** can be read from any angle. The bold LCD display overcomes small character size, poor visibility and short life associated with electromechanical counters and provides the necessary legends (Wh, kWh, MWh) to simplify reading. The programmable isolated pulse output provides an interface to a remote data collection system or BEMs.

Fully Supported

Comprehensive operating instructions - supplied with every **PowerRail 303** - include full information on installation. These include connection schematics and configuration details for virtually all CT ratios. Full technical support is readily available from your local Distributor or from Technical Sales at ND Metering Solutions.

Universality of Connections

For maximum convenience all **PowerRail 303** Meters can be powered from the measurement voltage. Where supplies may be subject to unusually wide variations, the Meters may be powered from a separate auxiliary supply. Standard Meters are suitable for both 3 wire and 4 wire 3f unbalanced loads, and can be used on single phase.

Accurate Real World Measurement

A precision measurement system maintains full accuracy in the presence of harmonics and randomly and/or periodically interrupted waveforms - as commonly found on modern electronically controlled loads.

Dual Tariff Option

The **PowerRail 303** is optionally available with 2 registers for Dual Tariff applications. Tariff changeover is effected by an external signal.

Maximum Demand Option

The **PowerRail 303** is optionally available with kW Maximum Demand measurement. Power is averaged over a user defined demand period, typically 15 or 30 minutes. The peak value of demand — Peak or Maximum Demand is retained in non-volatile memory.

RS485 MODBUS® Communications

A high speed internal RS485 MODBUS® communications option allows all readings to be read remotely.

OUTLINE SPECIFICATION

INPUTS

System	3 Phase 3 or 4 Wire Unbalanced Load 3 Phase Balanced & Single Phase to order
Voltage	400/230V. 3 Phase 3 or 4 Wire 110/63V & 208/120V optional. Others to order.
Current	5A from external CTs. 1A optional. Fully isolated
Measurement Range	Voltage 50% to 120% Current 0.2% to 120%
Frequency Range	Fundamental 45 to 65Hz Harmonics Up to 30th harmonic at 50Hz
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 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 10A 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

ACCURACY

kWh	Better than Class 1 per EN 61036 & EN 62053-21 Better than Class 1 per BS 8431
kW	Better than ±1% reading; Class 1 BS 8431

PULSE OUTPUT

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

Optional	
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

MAXIMUM DEMAND

Optional	
Measurement	Rolling Demand with 30 sub-periods
Demand Period	1 – 60 minutes, user settable
Display	Adds MD and Peak MD to the display pages
MD Reset	Front panel – may be disabled

GENERAL

Tariff Change	Normal $V_{in} < 35V$ ac or dc
Signal	Alternate $60V < V_{in} < 300V$ ac or dc
(Option)	Isolated at 2.5kV from all other inputs & outputs
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 42880 6 Modules
Material	Noryl with fire protection to UL94-V-O. Self extinguishing
Dimensions	106mm x 90mm x 58mm (6 modules wide)
Weight	~ 325 gms

SAFETY

Conforms to	EN 61010-1 Installation Category III
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A 3 phase AC current probe utilising the Rogowski principle. It is designed specifically for use with the PHS50 and PHS51 Power Harmonic Analysers and can be used to measure currents up to 3000 Amp. The flexible and lightweight measuring heads allows quick and easy installation in hard to reach areas.

Electrical Characteristics

Current Ranges

Output Sensitivity (AC coupled)

Load Impedance

Accuracy at +25°C

Linearity 10% to 100% of range

Noise

Frequency Range

Phase Error

Position Sensitivity

with cable > 25mm from the coupling

External field

with cable > 200mm from the head

Power Supply

Battery Life

Temperature Coefficient

Working Voltage (Head)

Working Voltage (Output to Earth)

300Amp and 3000Amp AC_{RMS}

3.33 mV or 0.33 mV per Amp

100 kOhm minimum

± 1% of range (45 – 65 Hz)

± 0.2% of reading

2 mV AC_{RMS}

10 Hz to 50 kHz (- 3 dB)

< ± 1° (45 – 65Hz) ± 10° (at 20 kHz)

± 2% of range

± 1% of range

2 x AA MN 1500 LR6 alkaline

1000 Hours. Low battery indicator

± 0.08% of reading per °C

600 V AC_{RMS} or DC

30 V AC_{RMS} or DC

General Characteristics

Head Cable length 610mm (24")

Head Cable Diameter 14.3 mm

Head Bend Radius 38.1 mm

Cable length 2 meters

Head to electronics

Output Connection 3 x 0.5 m cable.
D01 connector fitted

Temperature Range -20 to +90 °C

Head Storage -40 to +105 °C

Temperature Range -20 to +85 °C

Electronics Storage -20 to +85 °C

Humidity 15% to 85%

non condensing

Weight Head 540g

Electronics 190 g

Size Electronics 116 x 68.5 x 30 mm

