



MultiCube

DIN 96x96 Power Meters



4-20 mA

RS485

- * **One Meter Measures ALL your Values**

Economically replaces Ammeters, Voltmeters, Switches, PF & kW indicators, kWh meter, etc. Volts & Amp % Distortion and Import/Export measurements available

- * **East to See**

Clear backlit LCD Display with a very wide viewing angle

- * **Easy to Use**

Four keys select all parameters

- * **Safe to Use**

Fully isolated Current Inputs for complete user & installation safety

- * **Small in size yet great in performance**

Needs only 71mm behind the panel.
Measures every single cycle up to the 20th harmonic

- * **Simple to Install**

Software detection/correction of wiring errors

- * **Retro-fit Option Modules add extra features**

Fast MODBUS Communications or Quad Analogue Outputs can be added at anytime.
Alternative Factory-fit internal MODBUS Communications

The **MultiCube** provides Something for Everyone For the Consultant

Simplifies specification. The **MultiCube** will cover 99% of all LV panel requirements.

- 5 standard models for normal use
 - 4 Import/Export models for generator applications
- Standard instrument can be specified, and the system later expanded using option modules.

For the Engineer

Provides Peace of Mind. The **MultiCube** uses the latest technology - offering accurate high speed continuous measurement.

Simplifies panel design. The **MultiCube** combines all measurement functions and switches into a single attractive unit.

For the Buyer

Saves Time and Money. The **MultiCube** provides a single source of competitively priced instruments for all measurement and metering requirements, and is complemented by a full range of associated products.

For the Fitter

Speeds installation. The **MultiCube** has large rising cage terminals, accepting cables up to 4mm², and simple panel mount clips.

For the Commissioning Engineer

Tolerant of wiring errors. The **MultiCube** features 'Auto-commissioning', thus ensuring that a reverse CT connection will not cause reading errors (not Import/Export models). Per phase kW & PF measurements allow across-phase connection error to be quickly & easily detected.

Simplifies installation checking. The **MultiCube** can be tested at minimal loads - made possible by the full 4 digit resolution of single phase values, 5 digit resolution of 3Ø values and 7 digit energy registers.

For the End-User

Offers a high confidence level. The **MultiCube's** performance and accuracy is fully specified - no buts or maybes.

Offers maximum usability. The **MultiCube**, with it's custom backlit LCD display, is fully visible under all conditions and from all angles. Clear display legends ensure unambiguous readings with no multipliers required. Option Modules offer retro-fit system upgrades.

For System Expansion

High speed internal RS485 MODBUS® communications allow all readings to be read remotely.

Add-on Option Modules offer high speed MODBUS® communications (RS422 or RS485) or Quad Analogue Outputs (4-20mA or 0-5 Volt dc). Option Modules can be retro-fitted at any time.

MultiCube Models & Parameters

MultiCube Model	Standard					Import/Export			
	1	2	3	4	6	9.1	9.2	9.3	9.4
Phase Amps	✓	✓	✓	✓	✓	✓	✓	✓	✓
Peak Amps				✓	✓				✓
Ampere Demand	✓	✓	✓	✓	✓				✓
Peak Amp Demand	✓	✓	✓	✓	✓				✓
% THD Amps					✓				
Phase Volts	✓	✓	✓	✓	✓	✓	✓	✓	✓
Peak Phase Volts				✓	✓				✓
Line Volts	✓	✓	✓	✓	✓	✓	✓	✓	✓
Voltage Demand	✓	✓	✓	✓					
Peak Volt Demand	✓	✓	✓	✓					
% THD Volts					✓				
per phase PF	✓	✓	✓	✓	✓	✓	✓	✓	✓
per phase kW	✓	✓	✓	✓	✓	✓	✓	✓	✓
per phase kvar			✓	✓	✓			✓	✓
per phase kVA				✓	✓			✓	✓
3Ø PF	✓	✓	✓	✓	✓	✓	✓	✓	✓
3Ø kW	✓	✓	✓	✓	✓	✓	✓	✓	✓
3Ø kvar			✓	✓	✓		✓	✓	✓
3Ø kVA				✓	✓		✓	✓	✓
Frequency	✓	✓	✓	✓	✓	✓	✓	✓	✓
Import kWh		✓	✓	✓	✓	✓	✓	✓	✓
Export kWh						✓	✓	✓	✓
Import kVAh				✓	✓				
Capacitive kvarh			✓	✓	✓				
Inductive kvarh			✓	✓	✓				
Import kvarh						✓	✓	✓	✓
Export kvarh						✓	✓	✓	✓
Total kvarh			✓	✓	✓	✓	✓	✓	✓
kW Demand			✓	✓	✓				✓
Peak kW Demand			✓	✓	✓				✓
kVA Demand					✓				
Peak kVA Demand					✓				
kvar Demand					✓				
Peak kvar Demand					✓				
Neutral Current				✓	✓				✓
kWh Pulse (Import)		✓	✓	✓	✓	✓	✓	✓	✓
kWh Pulse (Export)						○	○	○	○
Total kvarh Pulse			✓	✓	✓	✓	✓	✓	✓
KVAh Pulse				○	○				

Notes: ✓ Fitted
 ○ Optional
 kVAh pulse replaces kvarh
 Export kWh pulse replaces kvarh

Option Modules - Retrofit

MODBUS Option Module

The MODBUS® Communications Options Module for the **MultiCube** adds multi-drop serial communications to any standard **MultiCube** meter. The device uses a high speed microprocessor to extract information from the meter and interface to an industry standard MODBUS® system.

Use of a dedicated communications processor ensures optimum efficiency, allowing fast access to data on systems with multiple meters. At 19,200 baud, it is possible to access and download the main instantaneous data tables (24 values) from typically 20 **MultiCube** Meters in one second.

The use of MODBUS® protocol ensures compatibility with existing systems and/or many readily available software packages.

The Options Module may be configured as RS485 or RS422 providing 2 or 4 wire communications over distances up to 1200 metres. Data rates of 4800, 9600 or 19200 may be selected to suit system requirements.

The Option Module features 1/4 unit load drivers, which allow 128 Meters on a single bus with no repeaters. Diagnostic LEDs are provided as a simple but effective commissioning tool, and 2-part screw terminals allow solderless connection.

The MODBUS Option Module is available in 2 formats:

- Standard Only parameters displayed on the **MultiCube** Meter can be accessed via MODBUS®.
- All Value The full set of **MultiCube** Type 4 parameters can be accessed via MODBUS® from any **MultiCube**.

Analogue Output Option Module

The Analogue Output Options Module for the **MultiCube** adds four programmable Analogue Outputs to any standard **MultiCube** meter. The device uses a high speed microprocessor to extract information from the meter and output selected parameters as 4-20mA or 0-5V dc signals.

Both single phase values and 3 phase totals can be selected by the user. For maximum convenience & resolution, frequency & voltage are also available as deviations from nominal - thus allowing maximum resolution and clarity for signals which normally do not deviate significantly from a nominal value.

To aid commissioning, a **Test Mode** is also available. This can be used to output known signals (4mA, 12mA or 20mA; or 0V, 2½V or 5V) for loop testing

An internal power supply is provided which is adequate for system testing and driving shorter loops; for normal applications, the data acquisition system loop supply can be used.

The Analogue Output Option Module is available in 2 formats:

- 4-20mA
- 0 - 5 volt dc

MultiCube Options

MODBUS® Communications

RS485 MODBUS® Communications can be factory-fitted within the **MultiCube** enclosure. Performance is identical to that of the MODBUS® **Option Module**, and both **Standard** and **All Value** versions are available; RS422 is not available. (Retro-fit **Option Modules** cannot be fitted if this option is specified).

Alternative Voltage Configurations

MultiCubes can be supplied for virtually all 3f voltage systems. Standard manufacture is for 230/400 Volt, but alternatives include 63/110 V, 120/240 V, 120/208 V, 277/480 V, etc.

Voltage Expander

The **Voltage Expander** is a small module that extends the voltage measurement range of the **MultiCube** up to a maximum of 750 Volt Line/line. It mounts on the existing voltage terminals of the meter and provides a new set of terminals for the high voltage connection. The module is an entirely passive device, containing high surge rated precision resistors and fitted with special high voltage terminals.

Brief Specification

Inputs		
System	3Ø 3 or 4 wire unbalanced load	
Voltage	230 / 400 Volt standard	
Optional	63/110, 120/208 or 277/480 Volt	
Measurement Range	20% to 120%	
Current	5 Amp from external CTs	
Optional	1 Amp	
	Fully isolated (2.5kV)	
Measurement Range	0.5% to 120%	
Operating Frequency		
Harmonics	up to 20th harmonic	
Input Loading		
Voltage	Less than 0.1VA per phase	
Current	Less than 0.1VA per phase	
Overload		
Voltage	x2 for 2 seconds max	
Current	x40 for 1 second max	
General		
Dimensions	96 x 96 mm x 80 mm deep	
MultiCube	(72mm behind panel)	
+ Option Module	96 x 96 mm x 138 mm deep	
	(130mm behind panel)	
Weight		
MultiCube	400 gms approx	
+ Option Module	600 gms approx	
Display	Custom backlit supertwist LCD	
	3 lines of 12mm digits	
	plus 3.8mm legends	
Environmental		
Temperature	-10°C to +65°C Operating	
Humidity	< 75% RH non-condensing	
Programming		
CT Primary	5 Amp to 6000 Amp	
VT Primary	60 V to 60,000 Volt	
Pulse Outputs		
Function	No 1	Wh
	No 2	Total varh (kVAh optional)
Pulse Length	100 ms	
Isolation	2500 Volt (50 V No 1 to No 2)	
Scaling	User programmable	
Terminals		
MultiCube	Rising Cage	
Option Module	4mm ² max cable	
	1.5mm ² solid, 1.0mm ² stranded	
Accuracy		
	per phase	3Ø
Current	±0.2% FS	N/A
5% to 120% FS	±1% Reading	
Voltage LN		
	±0.2% FS	N/A
20% to 120% FS	±1% Reading	
Voltage LL		
	±0.3% FS	N/A
20% to 120% FS	±1% Reading	
Watts		
	±0.4% FS	±0.6% FS
5% to 120% FS	±1% Reading	±1% Reading
VA		
	±0.6% FS	±1% FS
5% to 120% FS	±1.5% Reading	±1.5% Reading
var		
	±0.8% FS	±1.5% FS
5% to 120% FS	±2% Reading	±2% Reading
PF		
	±0.2∞	±0.2∞
-0.1 to 1 to 0.1		
Frequency		
	±0.05Hz	
45 - 90Hz		
Neutral Current		
	N/A	±0.6% FS
5% to 120% FS	±2% Reading	
Wh Register		
	N/A	Class 1 EN 61036
VAh Register		
	N/A	Class 2
varh Register		
	N/A	Class 2 IEC 1268

NOTE: All accuracies specified ±1 digit

Auxiliary Supply

Meter

Standard	230 V ±15% 45-65Hz 5VA max
Optional	115 V. Other values to order

Option Modules

3 VA Maximum
Automatic voltage selection (115/230 V) when inserted into MultiCube.

MODBUS® Serial Comms

Specification

Bus Type	RS485 2 Wires + 0V. 1/2 duplex
Option Module	1/4 Unit Load / Options Module
	Also RS422 4 Wire + 0v
RX Loading	Allows 128 units per bus
TX Drive	32 Unit Loads
Protocol	MODBUS® RTU with 16 bit CRC. (JBUS compatible)
Baud Rate	4800, 9600 or 19200 user programmable
Address	User Programmable 1-247
Latency	Reply within 100ms max
Max Data Packet	Any complete Table
Command Rate	New command within 5ms of previous one

Quad Analogue Output

Parameters

Single phase	Volt, Amp, PF (absolute or bipolar), kW & Voltage deviation
3 phase	PF (absolute or bipolar), KW, kW MD, kVA, kvar (absolute or bipolar), average Volts, average Amps, Hz deviation & Neutral Current

Outputs - General

Update Speed	Outputs updated every second (As MultiCube)
Resolution	10 Bit (1024 Levels including over-range)

Outputs - 4-20mA

Output	Quad 4-20mA DC Current Sink with common signal return
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Loop Supply

Nominal 24V DC
At Module, max 28V, min 5V DC

Internal Supply (Unregulated)

Unregulated 18V DC
Max 30V, Min 10V DC

Load Impedance

Ext. 24v dc Supply	Max 600W per channel
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Internal Supply	Max 250W per channel
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Over Range	Max output 21mA
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Output Accuracy	Test Range 4mA to 20mA
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lout < 5.6mA	±0.75% Rdg
lout ≥ 5.6mA	±0.5% Rdg

Output - 0-5 Volt dc

Output	Quad 0-5V DC with Common Ground (0V)
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Load Impedance	Min 150kW
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Over Range	Max output 5.05V
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Accuracy	Test Range 0V to 5.05V
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Vout > 0.25V ±0.5% Rdg

NOTE: Analogue Output errors are specified in addition to MultiCube Errors

