

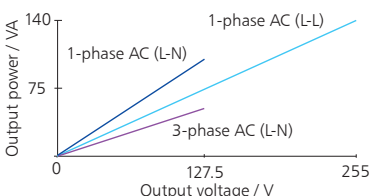
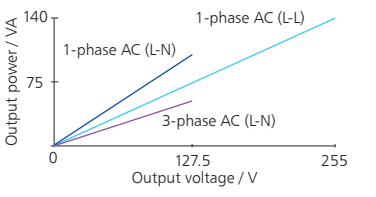
## CMC 156 EP

### CMC 156 EP: 3 Phase Voltage + 3 Phase Current Test Set



At only 9.8 kg / 22 lbs, the CMC 156 EP is the smallest and lightest solution for three-phase testing of numerical relays. Its high precision makes it also the perfect device (class 0.05 % Working Standard) for testing and calibrating meters, transducers and other measurement equipment.

#### Technical Data<sup>1</sup>

Voltage generators/-amplifiers		
Setting range	3-phase AC (L-N)	3 x 0 ... 127.5 V
	1-phase AC (L-L)	1 x 0 ... 255 V
	DC (L-N)	3 x 0 ... ±127.5 V
Power	3-phase AC (L-N)	3 x 50 VA at 127.5 V
	1-phase AC (L-N)	1 x 100 VA at 127.5 V
	1-phase AC (L-L)	1 x 140 VA at 255 V
	DC (L-N)	1 x 90 W at ±127.5 V
		
Accuracy <sup>2</sup>	error < 0.015 % rd. <sup>3</sup> + 0.005 % rg. <sup>3</sup> typ. at 0 ... 127.5 V error < 0.04 % rd. + 0.01 % rg. guar. at 0 ... 127.5 V	
Distortion (THD+N) <sup>4</sup>	< 0.015 % typ., < 0.05 % guar.	
Resolution	6 mV	
Connection	4 mm (0.16 in) banana sockets/comb. socket	
Current generators/-amplifiers		
Setting range	3-phase AC (L-N)	3 x 0 ... 12.5 A
	1-phase AC (3L-N)	1 x 0 ... 27 A
	DC (3L-N)	1 x 0 ... ±30 A
Power	3-phase AC (L-N)	3 x 40 VA at 12.5 A
	1-phase AC (3L-N)	1 x 75 VA at 27 A
	1-phase AC (L-L)	1 x 75 VA at 12.5 A
	DC (3L-N)	1 x 60 W at ±12.5 A
		
Accuracy <sup>5</sup>	error < 0.015 % rd. + 0.005 % rg. typ. at 0 ... 12.5 A error < 0.04 % rd. + 0.01 % rg. guar. at 0 ... 12.5 A	
Distortion (THD+N) <sup>4</sup>	< 0.025 % typ., < 0.05 % guar.	
Ranges	1.25 A / 12.5 A	
Resolution (for respective range)	50 µA / 500 µA	
Resolution	500 µA	
Max. compliance voltage (L-N)/(L-L)	4 VRMS, 6 Vpk / 8 VRMS, 12 Vpk	
Connection	4 mm (0.16 in) banana sockets/comb. socket	

Generators, general		
Frequency	range sine signals	10 ... 1000 Hz
	range transient signals	DC ... 3.1 kHz
	accuracy-drift	±0.5 ppm / ±1 ppm
Phase	resolution	5 µHz
	angle range	- 360° ... +360°
	resolution	0.001°
Bandwidth (-3dB)	error at 50/60 Hz	< 0.005° typ., < 0.02° guar.
	accuracy <sup>6</sup>	3.1 kHz
Simulated power S, P (calibration of energy meters)	error < 0.05 % rd. <sup>3</sup> typ., < 0.1 % rd. guar. at 10-63 Hz, 50 ... 127.5 V, and 0.1 ... 12.5 A	
	temperature drift	0.001 %/°C typ., < 0.05 %/°C guar.
Low level outputs		
Setting range	6 x 0 ... 5 VRMS	
Max. output current	2 mA	
Accuracy	error < 0.025 % typ., < 0.1 % guar.	
Resolution	250 µV	
Distortion (THD+N) <sup>4</sup>	< 0.015 % typ., < 0.05 % guar.	
Unconventional CT/VT simulation	linear	
Isolation	SELV	
Usability	completely independent from internal amplifier outputs	
Connection	16 pin combination socket (rear side)	
Binary Inputs		
Number	10	
Trigger criteria	Toggling of potential-free contacts or DC voltage compared to threshold voltage	
Input characteristics	0 ... +250 VDC threshold or potential-free	
Ranges (in RMS values)	250 VDC	
Resolution of threshold	1.5 V	
Sample rate	10 kHz (resolution 100 µs)	
Time stamping accuracy	±0.00015 % of rd. <sup>3</sup> ±70 µs	
Max. measuring time	infinite	
Counting function	< 3 kHz at pulse width > 150 µs	
Galvanic isolation	2 galvanically isolated groups (4 + 6)	
Max. input voltage	250 VDC	
Connection	4 mm (0.16 in) banana sockets or measurement combination socket	
Counter inputs 100 kHz		
Number	2	
Max. counting frequency	100 kHz	
Pulse width	> 3 µs	
Threshold voltage	6 V	
Voltage hysteresis	2 V	
Max. input voltage	±30 V	
Isolation	SELV	
Connection	16 pin combination socket (rear side)	

Binary outputs, relays	
Type	potential-free relay contacts, software controlled
Number	4
Break capacity AC	Vmax: 250 VAC / I <sub>max</sub> : 8 A / P <sub>max</sub> : 2000 VA
Break capacity DC	Vmax: 300 VDC / I <sub>max</sub> : 8 A / P <sub>max</sub> : 50 W
Connection	4 mm (0.16 in) banana sockets
Binary outputs, transistor	
Type	open collector transistor outputs
Number	4
Update rate	10 kHz
I <sub>max</sub>	5 mA
Connection	16 pin combination socket (rear side)
DC voltage measuring input	
Measuring range	0 ... ±10 V
Accuracy	error < 0.01 % rg. <sup>3</sup> typ., < 0.05 % rg. guar.
Input impedance	1 MΩ
Connection	4 mm (0.16 in) banana sockets or measurement combination socket
DC current measuring input	
Measuring range	0 ... ±20 mA
Accuracy	error < 0.01 % rg. <sup>3</sup> typ., < 0.05 % rg. guar.
Input impedance	15 Ω
Connection	4 mm (0.16 in) banana sockets or measurement combination socket
Power supply	
Nominal input voltage	110 – 240 VAC, 1-phase
Permissible input voltage	99 ... 264 VAC
Nominal frequency	50/60 Hz
Permissible frequency range	47 ... 63 Hz
Power consumption	< 600 VA
Rated current	6 A
Connection	Standard AC socket (IEC 60320)
Environmental conditions	
Operation temperature	0 ... +50 °C (+32 ... +122 °F)
Storage temperature	-25 ... +70 °C (-13 ... +158 °F)
Humidity range	Relative humidity 5 ... 95 %, non-condensing
Vibration	IEC 60068-2-6 (20 m/s <sup>2</sup> at 10 ... 150 Hz)
Shock	IEC 60068-2-27 (15 g/11 ms half-sine)

Safety Standards, Electromagnetic Compatibility		
EMC		
The product adheres to the electromagnetic compatibility (EMC) Directive 2004/108/EC (CE conform).		
Emission	Europe	EN 61326-1; EN 61000-6-4; EN 61000-3-2/3
	International	IEC 61326-1; IEC 61000-6-4; IEC 61000-3-2/3
	USA	FCC Subpart B of Part 15 Class A
Immunity	Europe	EN 61326-1; EN 61000-6-2; EN 61000-4-2/3/4/5/6/11
	International	IEC 61326-1; IEC 61000-6-2; IEC 61000-4-2/3/4/5/6/11
Safety		
The product adheres to the low voltage Directive 2006/95/EC (CE conform).		
Safety	Europe	EN 61010-1 Insulation of PC and SELV interfaces complies with EN 60950-1
	International	IEC 61010-1
	USA	UL 61010-1
	Canada	CAN/CSA-C22.2 No 61010-1-04
Miscellaneous		
Weight	9.8 kg (21.6 lbs)	
Dimensions (W x H x D, (without handle)	343 x 145 x 268 mm (13.5 x 5.7 x 10.6 in)	
PC connection <sup>7</sup>	parallel port (D-Sub 25 connector)	
Signal indication (LED)	> 42 V for voltage outputs	
Hardware diagnostics	Self diagnostics upon each start up	
Galvanic separated groups	The following groups are galvanically separated from each other: mains, voltage/current amplifier output, binary input	
Protection	All current and voltage outputs are fully overload and short circuit proof and protected against external high-voltage transient signals and over temperature	

## Ordering Information

CMC 156 EP with Test Universe Software	
VE001616	CMC 156 EP Basic
VE001617	CMC 156 EP Protection
VE001618	CMC 156 EP Advanced Protection
VE001619	CMC 156 EP Meter
VE001621	CMC 156 EP Measurement
VE001622	CMC 156 EP Universal

<sup>1</sup> Guaranteed values valid over one year within 23 °C ± 5 °C (73 °F ± 10 °F), in the frequency range of 10 ... 100 Hz at nominal value, analog measurement inputs at full-scale value. Specifications for three-phase systems under symmetrical conditions (0°, 120°, 240°)

<sup>2</sup> R<sub>load</sub>: 0 ... 0.5 Ω

<sup>3</sup> rd. = reading, rg. = range

<sup>4</sup> THD+N: Values at 50/60 Hz with 20 kHz bandwidth

<sup>5</sup> R<sub>load</sub>: > 250 Ω

<sup>6</sup> Data are valid for set value from 0.1 ... 12.5 A (current amplifier group A or B) at 50/60 Hz

Permissible load current outputs:

Range 1.25 A: 0 ... 1 Ω and max. 1 VA, cos φ = 0.5 ... 1

Range 12.5 A: 0 ... 0.5 Ω and max. 6 VA, cos φ = 0.5 ... 1

Permissible load voltage outputs:

max. 10 VA at 50 V ... full scale voltage, cos φ = 0.5 ... 1

<sup>7</sup> For the control of CMC 156 EP via the USB port of the PC, a CMUSB-P USB to Parallel Converter is included in delivery