

# Test Set CMC 156

## Unique test sets from the technology leader

OMICRON's commitment to innovation is evident in the outstanding features and the absolute quality of its test sets. Making use of leading-edge technology in both development and quality assurance, OMICRON has set new standards for advanced three-phase testing equipment in terms of flexibility, accuracy, portability and reliability.

OMICRON's PC-controlled test sets generate the test signals digitally (DSP technology), resulting in highly accurate testing signals even at small amplitudes. The electronic design of the internal amplifiers and the use of switch-mode power supply units ensure a minimum of weight and volume is achieved. Independent channels with low-level signals are available at the back of the test sets, which can be used to control external amplifiers for applications requiring more signal channels or higher currents, voltages or power. The low-level signals can also be used for test objects which have a low-level input facility.

All generators are continuously and independently adjustable in amplitude, phase and frequency. No switching of ranges is necessary. All current and voltage outputs are fully overload and short-circuit proof and are protected against external high-voltage transient signals and overtemperature.

Every device is developed according to international IEC standards and verified by independent certification bodies including UL and TÜV.

## CMC 156 - 3 Phase Voltage/3 Phase Current Test Set

The compact solution for three-phase testing of relays, meters and transducers, weighing only 9.8 kg / 22 lb. Ideal for applications requiring a high degree of portability (routine testing, etc.).

**3 x 125 V outputs**

**3 x 12.5 A outputs**

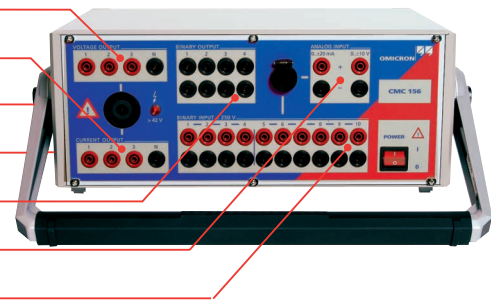
**6 x low level outputs (rear side)**

**2 x counter inputs (rear side)**

**4 x binary outputs**

**dc measuring inputs**

**10 x binary inputs**



## Option - EP (Extended Precision)

Equipped with the hardware option EP (Extended Precision), a CMC test set becomes an ideal instrument for the testing of energy meters. Due to the extremely high accuracy of the EP option, it is possible to test energy meters of up to class 0.2S according to IEC 62053 (formerly 60687) without an additional reference meter. This extremely high precision also makes a CMC 156 ideal for relay manufacturers for their development process, type testing, acceptance testing, device calibration, or product demonstration.

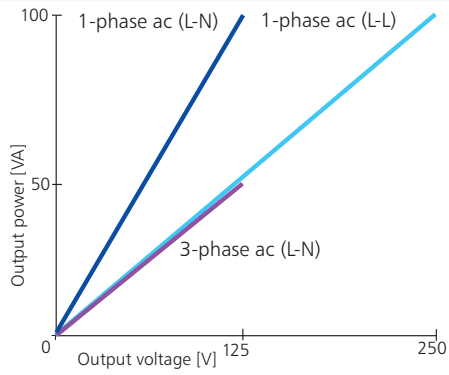
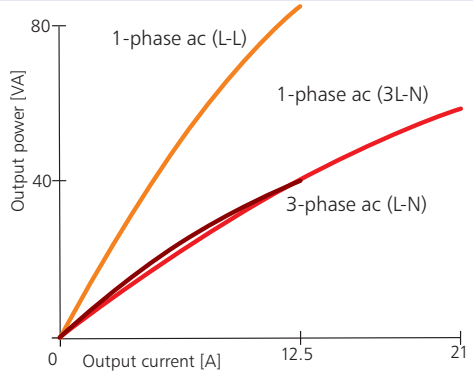
The technical data section on the following pages provides detailed information on where a EP version differs from a standard CMC.

The EP option can be ordered together with a new unit or an existing CMC 156 can be upgraded at any later stage.

## Ordering options

Ordering Number	Package/Option
VE001512	Basic Package
VE001412	Protection Package
VE001312	Advanced Protection Package
VE001612	Meter Package
VE001212	Measurement Package
VE001112	Universal Package
VEHO1001	Option EP if ordered with a new unit
VEHO0001	Option EP if ordered as an upgrade

## Technical Data

		CMC 156 Standard	with EP Option
<b>Voltage generators/-amplifiers</b>			
Setting range	3-phase ac (L-N)	3 x 0 ... 125 V	3 x 0 ... 127.5 V
	1-phase ac (L-L)	1 x 0 ... 250 V	1 x 0 ... 255 V
	dc (L-N)	3 x 0 ... ±125 V	3 x 0 ... ±127.5 V
Power	3-phase ac (L-N)	3 x 50 VA at 125 V	
	1-phase ac (L-N)	1 x 100 VA at 125 V	
	1-phase ac (L-L)	1 x 100 VA at 250 V	1 x 140 VA at 255 V
	dc (L-N)	1 x 90 W at ±125 V	
			
Accuracy		error < 0.025 % typ. (< 0.1 % guar.)	error < 0.02 % typ. (< 0.05 % guar.)
Distortion (THD+N) <sup>1</sup>		< 0.015 % typ. (< 0.05 % guar.)	
Ranges		125 V	127.5 V
Resolution		6 mV	
Connection		4mm banana sockets/amplifier combination socket	
<b>Current generators/-amplifiers</b>			
Setting range	3-phase ac (L-N)	3 x 0 ... 12.5 A	
	1-phase ac (3L-N)	1 x 0 ... 21 A	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 65 VA at 21 A	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		error < 0.02 % typ. (< 0.1 % guar.)	error < 0.02 % typ. (< 0.05 % guar.)
Distortion (THD+N)		< 0.03 % typ. (< 0.07 % guar.)	< 0.025 % typ. (< 0.05 % guar.)
Ranges		12.5 A	1.25 A / 12.5 A
Resolution (for respective range)		500 μA	50 μA / 500 μA
Max. compliance voltage (L-N)/(L-L)		4 Vrms, 6 Vpk / 8 Vrms, 12 Vpk	
Connection		4mm banana sockets/amplifier combination socket	

<sup>1</sup> THD+N: Values at 50/60 Hz with 20 kHz bandwidth

## Technical Data

		CMC 156 Standard	with EP Option
<b>Generators, general</b>			
Frequency	range sine signals	10 ... 1000 Hz	
	range transient signals	dc ... 3.1 kHz	
	accuracy/-drift	±0.5 ppm / ±1 ppm	
	resolution	5 µHz	
Phase	angle range	- 360° ... +360°	
	resolution	0.001°	
	error at 50/60 Hz	< 0.02° typ. (< 0.1° guar.)	< 0.005° typ. (< 0.02° guar.)
Bandwidth (-3dB)		3.1 kHz	
Output power	accuracy <sup>2</sup>	-	rel. error < 0.05 % typ. (< 0.1 % guar.) at 10-63 Hz, 50 ... 125 V, and 0.1 ... 12.5 A
	temperature drift	-	0.001 %/°C typ. (< 0.05 %/°C guar.)
<b>Low level outputs</b>			
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)		< 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)	
<b>Binary Inputs</b>			
Number		10	
Trigger criteria		Toggle 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	
Time resolution		100 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 banana sockets or measurement combination socket	
<b>Counter inputs 100 kHz</b>			
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)	
<b>Binary outputs, relays</b>			
Type		potential-free relay contacts, software controlled	
Number		4	
Break capacity ac		Vmax: 250 Vac / Imax: 8 A / Pmax: 2000 VA	
Break capacity dc		Vmax: 300 Vdc / Imax: 8 A / Pmax: 50 W	
Connection		4 mm banana sockets	

<sup>2</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 (CMC 156: 125V/CMC 256: 300V), cos φ = 0.5 ... 1.

## Technical Data

	CMC 156
<b>Binary outputs, transistor</b>	
Type	open collector transistor outputs
Number	4
Update rate	10 kHz
I <sub>max</sub>	5 mA
Connection	16 pin combination socket (rear side)
<b>dc voltage measuring input</b>	
Measuring range	0 ... ± 10 V
Accuracy	error < 0.01 % typ. (< 0.05% guar.)
Input impedance	1 MΩ
Connection	4 mm banana sockets or measurement combination socket
<b>dc current measuring input</b>	
Measuring range	0 ... ± 20 mA
Accuracy	error < 0.01 % typ. (< 0.05% guar.)
Input impedance	15 Ω
Connection	4 mm banana sockets or measurement combination socket
<b>Power supply</b>	
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)
<b>Environmental conditions</b>	
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 68-2-6 (20 m/s <sup>2</sup> at 10 ... 150 Hz)
Shock	IEC 68-2-27 (15g/11ms half-sine)
EMC	CE conform (89/336/EEC)
Emission	EN 50081-2, EN 61000-3-2/3, FCC Subpart B of Part 15 Class A
Immunity	EN 50082-2, IEC 61000-4-2/3/4/6
Safety	EN 61010-1, EN 60950+A1, IEC 61010-1, UL 3111-1, CAN/CSA-C22.2 No 1010.1
<b>Miscellaneous</b>	
Weight	9.8 kg (21.6 lb.)
Dimensions (W x H x D, without handle)	343 x 145 x 268 mm (13.5 x 5.7 x 10.6")
PC connection	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
	All voltage and current generators are continuously and independently adjustable in amplitude, phase and frequency. All current and voltage outputs are fully overload and short-circuit proof and protected against external high-voltage transient signals and overtemperature.
<b>Certifications</b>	
	TÜV-GS, UL, CUL

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°).