Schneider Electric

CM4000 Technical Datasheet

Life Is On Schneider Electric

Circuit Monitor Series 4000
Functions and characteristics

CM4000 + vacuum fluorescent display (VFD).

The PowerLogic CM4000T Circuit Monitor offers high-performance digital instrumentation, data acquisition and control capabilities. It can integrate easily in power monitoring and control systems due to its optional Ethernet connections and embedded web server. They are Transparent Ready.
These devices are designed for applications where power quality and availability are critical factors. They are generally used at service entrances and interconnection points or on circuits feeding sensitive equipment. Due to their very wide range of features, including transient detection, it is possible to rapidly solve problems related to poor power quality. EN 50160 compliance checking capability makes these products ideal to meet the needs related to market deregulation.
The Circuit Monitor CM4000T is available with detection of voltage sags and swells together with transient detection and flicker measurements.

Applications
- Panel instrumentation.
- Sub-billing / cost allocation.
- Remote monitoring of an electrical installation.
- Extensive power-quality monitoring.
- Contract and load curve optimisation.
- EN 50160 electrical supply compliance checking.
- Metering of other utilities.

Main characteristics

Disturbance direction detection
Indication of whether the source of a specific power quality event is upstream or downstream from the meter.

Power quality summary
Consolidation of all the power quality characteristics into a single trendable index.

Adaptive waveform capture
Capture of long-duration events.

Shift energy summary
Indication of energy usage per shift up to three shifts a day.

Detection and capture of voltage sags and swells
Fast identification of problems causing production shutdown.

Detection and capture of short transients less than 1 µs
Identification of problems due to short disturbances, e.g. switching of capacitors, etc.

Flicker evaluation based on IEC 61000-4-15 and IEEE 1453
Measurement of rapid voltage variations.

Electrical quality checking in compliance with EN 50160
Fast standardised check on the quality of the electricity supplied.

Detection of major waveform changes
Detection of phase switching phenomena (for example during the transfer of a high-speed static switch) not detected by classical threshold-based alarms.

Ultra-fast recording of electrical parameters every 100 ms or every cycle
Preventive maintenance: acquisition of a motor startup curve, etc.

Trend curves and short-term forecasting
Rapid trending and forecasting of upcoming values for better decision making.

Automatic alarm setting
Alarm setpoint learning feature for optimum threshold settings.

32 MB of memory
For archiving of data and waveforms.

Ethernet 10/100 Mbits/s card and server for HTML pages (with optional Ethernet card)
Rapid data transfers over an intranet or the internet, simply using a web browser.

Alarm notification via email
High-priority alarms sent directly to the user's PC.
Instant notification of power quality events by email.

Up to 25 inputs/outputs to monitor the electrical installation (with optional I/O cards)
Status of circuit breakers, as well as metering of other commodities, e.g. gas, water, etc.

IEC 62053-22 and ANSI C12.20 Class 0.2S for energy
Verification of consumption and load curves.

Circuit Monitor Series 4000
Functions and characteristics (cont.)

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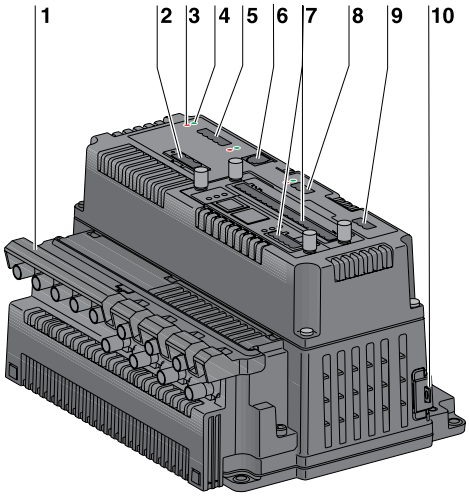

CM4000 series.

1 *Current/voltage module.*
2 *Control power-supply connector.*
3 *Maintenance LED indicator.*
4 *Power LED indicator.*
5 *RS 485 port with transmit and receive LED indicators.*
6 *Display communication port.*
7 *Slots for optional cards.*
8 *RS 232 port with transmit and receive LED indicators.*
9 *KYZ pulse output.*
10 *Sealable access door.*

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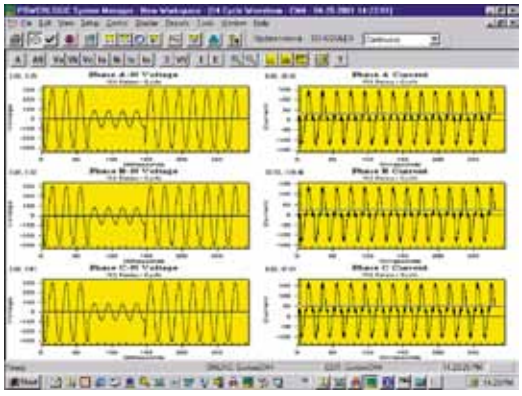

Disturbance waveform capture: detection of a voltage sag.

Commercial reference numbers

Circuit Monitor Series 4000	Commercial ref. no.
Circuit Monitor CM4000T	**CM4000T**

Selection guide		CM4000T
General		
Use on LV and HV systems		■
Current and voltage accuracy		0.07 %
Energy and power accuracy		0.2 %
Number of samples/cycle or sample frequency		5 MHz
Instantaneous rms values		
Current, voltage, frequency		■
Active, reactive, apparent power	Total and per phase	■
Power factor	Total and per phase	■
Energy values		
Active, reactive, apparent energy		■
Settable accumulation modes		■
Demand values		
Current	Present and max. values	■
Active, reactive, apparent power	Present and max. values	■
Predicted active, reactive, apparent power		■
Synchronisation of the measurement window		■
Setting of calculation mode	Block, sliding	■
Power quality measurements		
Interharmonics		-
Harmonic distortion	Current and voltage	■
Individual harmonics	Via monitor	63
	Via SMS	255
Waveform capture		■
Detection of voltage swells and sags		■
Adaptive waveform capture (up to 64 s)		■
Detection and capture of transients (< 1 µs)		■
Flicker		■
Fast acquisition of 100 ms or cycle by cycle data		■
EN 50160 compliance checking *		■
Programmable (logic and math functions)		■
Data recording		
Min/max of instantaneous values		■
Data logs		■
Event logs		■
Trending/forecasting		■
Alarms (optional automatic alarm setting)		■
Alarm notification via email		ECC21 option
SER (Sequence of Event Recording)		■
Time stamping		■
GPS synchronisation (1 ms)		IOC44 option
Memory expandable up to		32 MB
Display and I/O		
Display		CMDLC or CMDVF option
Multilingual: English, French, Spanish, German, Italian, Polish		■
Wiring self-test		■
Pulse output		■
Maximum number of I/Os		25
Input metering capability (number of channels)		10
Direct voltage connection		600 V
Communication		
RS-485 port		2/4 wires
RS-232 port		■
Modbus protocol		■
Ethernet card (Modbus/TCP/IP protocol)		ECC21 option
HTML-page web server		ECC21 option
Ethernet gateway for third-party products		ECC21 option

**Except for interharmonics, signalling voltages, flicker and transients.*

Circuit Monitor Series 4000
Functions and characteristics (cont.)

The Circuit Monitor has two optional display units, an LCD display and a vacuum fluorescent display (VFD). They may be used for local circuit-monitor setup and operation.

PE86143

CMDLC display

Back-lit LCD display with four lines and 20 characters per line. The display unit has four navigation buttons, a contrast button and a red alarm LED.
It connects to the Circuit Monitor via a CAB12 cable, 4.2 metres long, supplied with the display.

Commercial reference numbers

		Commercial ref. no.
LCD display supplied with the CAB12 cable		**CMDLC**
Connection cables: Circuit Monitor <-> display	1.25 m	**CAB4**
	3.65 m	**CAB12**
	9.14 m	**CAB30**

PE86142

CMDVF display

Vacuum fluorescent display (VFD) with four lines and 20 characters per line.
The display unit has four navigation buttons, a contrast button, a red alarm LED.
The display comes with a cable for connection to the Circuit Monitor (CAB12 cable, 4.2 m long).

Commercial reference numbers

		Commercial ref. no.
VFD supplied with the CAB12 cable		**CMDVF**
Connection cables: Circuit Monitor <-> display	1.25 m	**CAB4**
	3.65 m	**CAB12**
	9.14 m	**CAB30**

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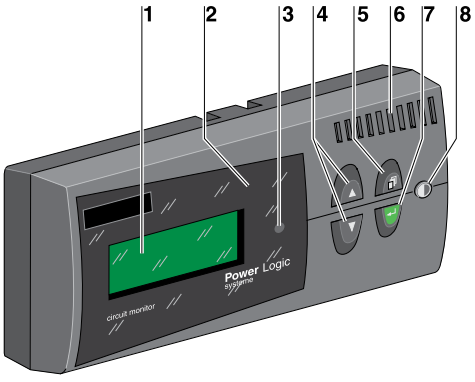


Display

1 *Display screen.*
2 *Alarm LED.*
3 *Arrow buttons.*
4 *Menu button.*
5 *Proximity sensor (VFD display only).*
6 *Enter button.*
7 *Contrast button.*

Circuit Monitor Series 4000
Functions and characteristics (cont.)

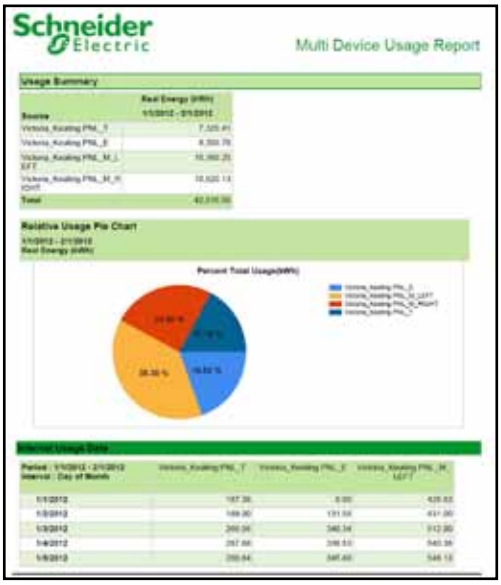
PE86141

CM4000 + options: ECC21, IOC44 and IOX2411.

Electrical characteristics		
Type of measurement		True rms up to the 255th harmonic On three-phase AC system (3P, 3P + N) Up to 512 samples per cycle Up to 5 MHz for transient events (CM4000T only)
Measurement accuracy	Current and voltage	±0.04 % of reading + ±0.025 % of full scale
	Power	±0.075 % of reading + ±0.025 % of full scale
	Frequency	±0.01 Hz from 45 to 67 Hz ±0.1 Hz from 350 to 450 Hz
	Power factor	±0.002 from 0.5 leading to 0.5 lagging
	Energy	IEC 62053-22 and ANSI C12.20 Class 0.2S
Data update rate		1 s in normal mode
Input-voltage characteristics	Measured voltage	0 to 600 V AC on CM4000T (direct) 0 to 1200 kV AC (with external VT)
	Measurement range	0 to 1.5 Un
	Impedance	> 2 M
	Frequency measurement range	45 Hz to 67 Hz and 350 Hz to 450 Hz
Input-current characteristics	CT ratings	Adjustable from 5 A to 30,000 A
	Measurement range	5 mA to 10 A
	Permissible overload	15 A continuous 50 A for 10 seconds per hour 500 A for 1 second per hour
	Impedance	< 0.1
	Load	< 0.15 VA
Power supply	AC	100 to 275 V AC (±10 %), 50 VA
	DC	125 to 250 V DC (±20 %), 30 W
	Ride-through time	100 ms at 120 V DC
Input/outputs	Pulse output	Static output (240 V AC max, 96 mA max)
	IOC44 card (optional)	4 digital inputs (20-138 V AC/DC), 3 relay outputs (5 A to 240 V AC) 1 static output (96 mA max to 240 V AC)
	IOX extender (optional)	Slots for 8 I/Os
	IOX08 (optional)	8 digital inputs 120 V AC
	IOX0404 (optional) ★	4 digital inputs 120 V AC, 4 analogue outputs 4-20 mA
	IOX2411 (optional) ★	2 digital outputs 120 V AC, 4 digital inputs 32 V DC, 1 analogue input 0-5 V, 1 analogue output 4-20 mA
Mechanical characteristics		
Weight		1.9 kg
IP degree of protection (IEC 60529)		IP52
Dimensions CM4250/ CM4000T	Without IOX accessory	235.5 x 165.6 x 133.1 mm
	With IOX accessory	235.5 x 216.3 x 133.1 mm
Environmental conditions		
Operating temperature	Circuit Monitor	-25 °C to 70 °C
	CMDLC display	-20 °C to 60 °C
	CMDVF display	-20 °C to 70 °C
Storage temperature	CM + displays	-40 °C to 85 °C
Humidity rating		5 % to 95 % RH at 40 °C
Pollution degree		2
Installation category	CVM42	IV
	CVMT	II
Dielectric withstand		As per EN 61010, UL508, CSA C22.2-2-4-M1987
Electromagnetic compatibility		
Electrostatic discharge		Level 3 (IEC 61000-4-2)
Immunity to radiated fields		Level 3 (IEC 61000-4-3)
Immunity to fast transients		Level 3 (IEC 61000-4-4)
Immunity to impulse waves		Level 4 (IEC 61000-4-5)
Conducted and radiated emissions		CE industrial envir./FCC part 15 class A
Safety		
USA and Canada		UL508 and CSA C22.2-2-4-M1987

★ *Operating limits: 0° C to +60 °C.*
Storage limits: -25 °C to +85 °C.

Circuit Monitor Series 4000
Functions and characteristics (cont.)



StruxureWare provides many different report templates to allow users to easily display and deliver the information they need .

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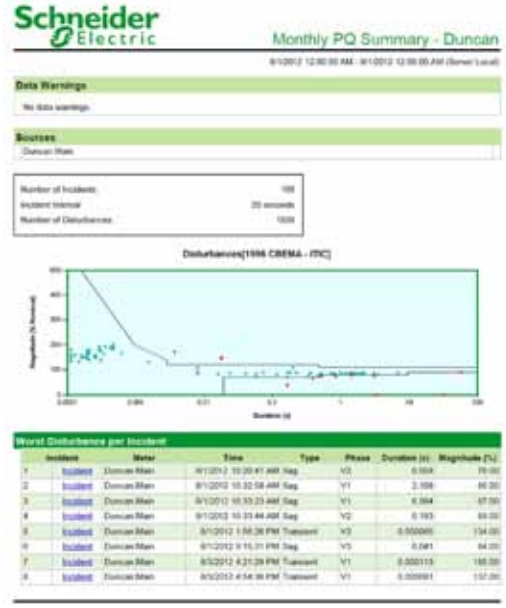

Power Quality Summary Report example

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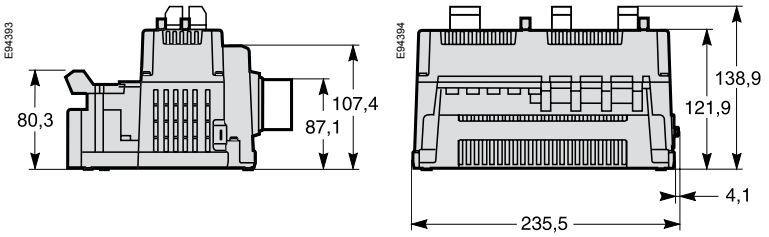
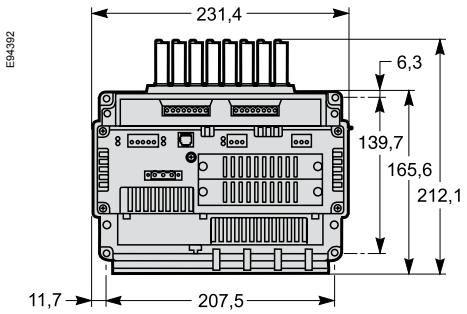
Example CM4250 HTML page showing instantaneous values.

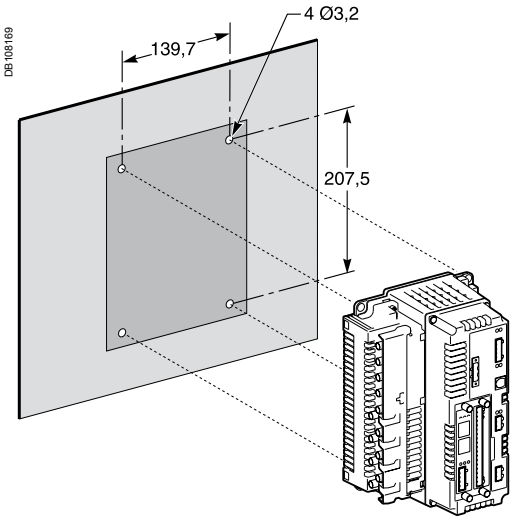
Circuit Monitor Series 4000
Dimensions and connection

CM4000T dimensions



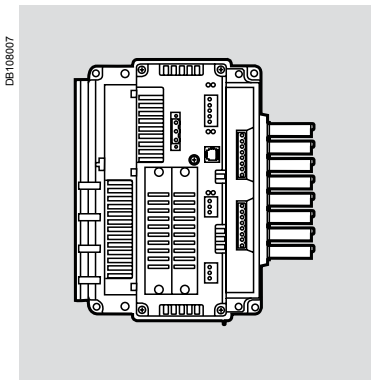


Mounting on a backplate

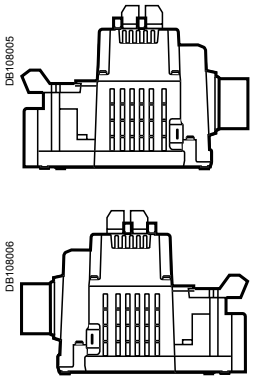


Circuit Monitor Series 4000
Dimensions and connection

Mounting possibilities

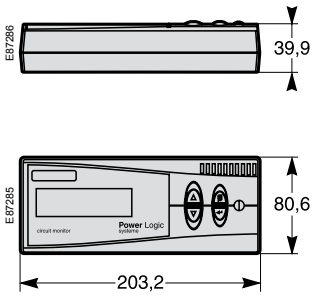


Vertical mounting.

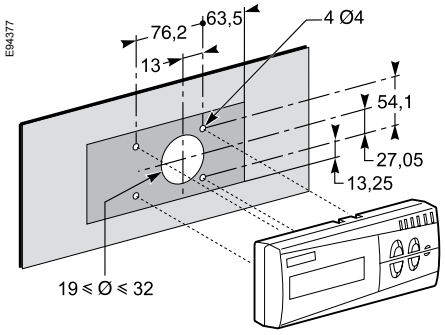


Horizontal mounting.

CMDLC/CMDVF dimensions



Mounting on a backplate



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