



Cx Plus Monitor



The **Cx Plus Monitor®** is a power quality monitor adapted specifically for the needs of a commissioning agent.

The monitor gathers all of the voltage and current data required for all of the commissioning tests as well as provides a means for gathering wireless T/H and DC voltage data for one hundred (100) locations! The Cx Plus Monitor® is equipped to simultaneously monitor in real time, voltage on ten (10) separate channels and current on five (5) separate channels. This is ideal for documenting the testing of generators, UPS's and transfer switches.

General Specifications:

- Clock: Leap Year, 24-Hour, with time zone info
- Real-time Clock Accuracy: +/- 1 sec / day max
- Synchronize time between Cx Plus Monitors +/- 10 mSec / day
- Internal Memory: Minimum 64 Gbytes high speed NAND Flash
- Wireless 802.11gn Integration
- Two 10/100/1000Mbit Ethernet; SFTP, SMTP, HTTP, HTTPS, SSL, SSH, NTP
- Two USB Mass storage class supports
- Max number of events: Only limited by internal memory
- Power Requirements: 100V-240V ACrms +/-10% 47-63 Hz 10Watts 24Vdc 0.5Arms Center positive barrel
- UPS standby time: Programmable (Max time 20 Minutes)
- Dimensions: 11.5 x 10.25 x 4 Inches
(Height x Width x Depth)
- Weight: 5.55lb

Environmental & Safety

- Operating environment: Indoors
- Storage Temperature: -20°C to 50°C (-4F-122F)
- Operating Temperature: 0°C to 40°C (32F-104F)
- Max Changes per hour temp: 30°C
- Operating Humidity: 80% Max Non-Condensing
- Conforms to IEC61010 CAT III 600V

Synchronization & Sampling:

- Low Frequency:
- Sampling Frequency: 1,024 samples/cycle
 - A/D Resolution: 18 bit oversampled voltage 2X ; current 2X
 - Auto 50/60 Hz ; or locked to input
 - Voltage & Current RMS triggers ; Cross triggering
 - Adaptable trigger thresholds
- High Frequency:
- 1.666Msample/sec per channel
 - A/D Resolution: 14 bit

Voltage and Current Measurement:

- Low Frequency
- Voltage Measurement Range: 0-600Vrms
 - Voltage multiplier ready for PT integration
 - Voltage input impedance: 1Mohm
- High Frequency
- Voltage Measurement Range: 0-2,500V
 - Measurement type: AC coupled digital threshold trigger 500 sample buffer per channel
 - Voltage input impedance: 1Mohm
 - Current Measurement Range (Probe dependent)
 - Current input type: AC/DC +/- 6Vdc Input impedance 120K, 1M to gnd





Cx Plus Monitor

Log Types & Rates:

RMS Voltage / Current:

- 1 Second to 30 Minutes
- 10 Voltage Channels Ph-Ph, Ph-G, Ph-N & N-G
- 5 Current Channels { L1, L2, L3, N & G }
- 1 Residual Current { L1+L2+L3+N }
- RMS Voltage Imbalance

Frequency:

- 10 Seconds to 30 Minutes
- 3 Voltage { L1-G, L2-G, L3-G }

Peripherals:

- 4 Seconds to 30 Minutes
- Up to 100 Probes
- Wireless DC Voltage +/- 0-600V AutoRanging
- Wireless DCx Voltage { 10Ch - 60dc }
- Wireless DC Current { 2,000A, 4,000A }
- Wireless Temperature / Humidity
- Wired Temperature / Humidity
- DCw { V, I, % Ripple, AC & DC }

Power:

- 10 Seconds to 30 Minutes

3 Phase Delta

{Min/Max/Average} Apparent Power(KVA), Real power (KW), Reactive (KVAR), Power Factor (PF), Total KVA, Total KW, Total KVAR, Total PF, Total KVAH, Total KWH, Total KVARH, Total Demand (KVA) and Total Demand (KW)

3 Phase Wye - Split Phase - Single Pole Single Phase

{Min/Max/Average} Apparent Power (KVA), Real power (KW), Reactive (KVAR), Power Factor (PF), Total KVA, Total KW, Total KVAR, Total PF, Total KVAH, Total KWH, Total KVARH, Total Demand (KVA) and Total Demand (KW)

Single Phase (2 Pole)

{Min/Max/Average} Apparent Power (KVA), Real power (KW), Reactive (KVAR), Power Factor (PF), Total KVA, Total KW, Total KVAR, Total PF, Total KVAH, Total KWH, Total KVARH, Total Demand (KVA) and Total Demand (KW)

Harmonics:

- 10 Seconds to 30 Minutes
- 3 Ph-Ph, 3 Ph-G & 3 Current channels to the 31st.

THD:

- 10 Seconds to 30 Minutes
- 3 Ph-Ph, 3 Ph-G & 3 Current { Odd, Even, Total & Max }

Phase Angle:

- 10 Seconds to 30 Minutes
- 3 Ph-Ph, 3 Ph-G

Symmetrical Components:

- 10 Seconds to 30 Minutes
- Voltage & Current : Magnitude, Angle & Imbalance

Voltage Current & Time Accuracy:

V/I Calibrated at 72° f. TC = 0.003%/°F

Low Frequency

- A/D Measurement type: True RMS calculated every half cycle
- A/D Measurement Uncertainty: AC +/- 0.1% reading +/- 0.1% full scale above 50Vrms
- DC +/- 0.1% reading +/- 0.1% full scale above 50V dc Offset Error: AC/DC: 0.05Vrms

High Frequency

- A/D Measurement type: Sampled Threshold cross 500 sample buffer per channel
- A/D Measurement Uncertainty: AC +/- 5% reading Offset Error: AC: 5V

Current:

- A/D Measurement type: True RMS calculated every cycle
- A/D Measurement Uncertainty System:
- AC +/- 0.1% reading +/- 0.1% full scale above 50Arms
- DC +/- 0.1% reading +/- 0.1% full scale above 50Adc
- Offset Error: AC/DC: 1Arms

Time:

- 10mSec/day calibrated at 72° f. TC = 100ppb/°F

Additional Links:

Cx Plus User Manual:

https://filemanager.rxms.com/downloads/instructions/CxPlus_User_Manual.pdf

AC Current Probes:

http://www.rxms.com/files/downloads/spec_sheets//Spec_AC_Current.pdf

Wireless Spec Sheet:

http://www.rxms.com/files/downloads/spec_sheets//Wireless_battery_Specsheet.pdf





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General Specifications:

- Clock: Leap Year, 24-Hour, with time zone info
- Real-time Clock Accuracy: +/- 1 sec / day max
- Synchronize time between Cx Monitors +/- 10 mSec / day
- Internal Memory: Minimum 512Mbytes high speed NAND Flash
- Wireless 802.11gn Integration
- 10/100Mbit Ethernet; FTP, SMTP, HTTP, HTTPS, SSL, SSH, NTP
- USB Mass storage class support
- Remote access through secure remote Ethernet tunneling
- Max number of events: Only limited by internal memory
- Power Requirements: 100V-240V ACrms +/-10% 47-63 Hz 10Watts 24Vdc 0.5Arms Center positive barrel
- UPS standby time: Programmable (Max time 10 Minutes)
- Dimensions: 11.5 x 10.25 x 4 Inches (Height x Width x Depth)
- Weight: 5.55lb

Environmental & Safety

- Operating environment: Indoors
- Storage Temperature: -20°C to 50°C (-4F-122F)
- Operating Temperature: 0°C to 40°C (32F-104F)
- Max Changes per hour temp: 30°C
- Operating Humidity: 80% Max Non-Condensing
- Conforms to IEC61010 CAT III 600V

Synchronization & Sampling:

- Low Frequency:
- Sampling Frequency: 256 samples/cycle
 - A/D Resolution: 16 bit oversampled voltage 2X ; current 4X
 - Auto 50/60 Hz ; or locked to input
 - Voltage & Current RMS triggers ; Cross triggering
 - Adaptable trigger thresholds
- High Frequency:
- 1.666Msample/sec per channel
 - A/D Resolution: 12 bit

Voltage and Current Measurement:

- Low Frequency
- Voltage Measurement Range: 0-600Vrms
 - Voltage multiplier ready for PT integration
 - Voltage input impedance: 1.2Mohm
- High Frequency
- Voltage Measurement Range: 0-2,500V
 - Measurement type: AC coupled digital threshold trigger 500 sample buffer per channel
 - Voltage input impedance: 1.2Mohm
- Current Measurement Range (Probe dependent)
- Current input type: AC/DC +/- 6Vdc Input impedance 120K, 1M to gnd





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- 1 Residual Current { L1+L2+L3+N }
- RMS Voltage Imbalance

Frequency:

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Peripherals:

- 4 Seconds to 30 Minutes
- Up to 100 Probes
- Wireless DC Voltage +/- 0-600V AutoRanging
- Wireless DCx Voltage { 10Ch - 60dc }
- Wireless DC Current { 2,000A, 4,000A }
- Wireless Temperature / Humidity
- Wired Temperature / Humidity
- DCw { V, I, % Ripple, AC & DC }

Power:

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3 Phase Delta

- { Min/Max/Average } Apparent Power (KVA), Real power (KW), Reactive (KVAR), Power Factor (PF), Total KVA, Total KW, Total KVAR, Total PF, Total KVAH, Total KWH, Total KVARH, Total Demand (KVA) and Total Demand (KW)

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THD:

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- 3 Ph-Ph, 3 Ph-G & 3 Current { Odd, Even, Total & Max }

Phase Angle:

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- 3 Ph-Ph, 3 Ph-G

Symmetrical Components:

- 10 Seconds to 30 Minutes
- Voltage & Current : Magnitude, Angle & Imbalance

Voltage Current & Time Accuracy:

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- DC +/- 0.1% reading +/- 0.1% full scale above 50V dc Offset Error: AC/DC: 0.05Vrms

High Frequency

- A/D Measurement type: Sampled Threshold cross 500 sample buffer per channel
- A/D Measurement Uncertainty: AC +/- 5% reading Offset Error: AC: 5V

Current:

- A/D Measurement type: True RMS calculated every cycle
- A/D Measurement Uncertainty System:
- AC +/- 0.1% reading +/- 0.1% full scale above 50Arms
- DC +/- 0.1% reading +/- 0.1% full scale above 50Adc
- Offset Error: AC/DC: 1Arms

Time:

- 10mSec/day calibrated at 72° f. TC = 100ppb/°F

Additional Links:

- Cx User Manual: http://rxms.com/files/downloads/instructions//Cx_Monitor_User_Manual.pdf
- AC Current Probes: http://rxms.com/files/downloads/spec_sheets//Spec_AC_Current.pdf
- Wireless Spec Sheet: http://rxms.com/files/downloads/spec_sheets//Wireless_battery_Specsheet.pdf





AC Current Probes

10A Clamp-On 0.75" Diameter



Clamp-On 10 Arms medium

-Wire Length 12ft

- Measuring range: 0.01A- 12Arms AC
- Max Working Voltage: 600Vrms
- Basic probe accuracy: Of reading

0.1A-0.5A:	2.5%
0.5A-1A:	2.5%
1A-12A:	1.0%
12A-24A:	4.0%

- Linearity: 0.1% + accuracy
- Conductor sensitivity: none
- Frequency Response 40Hz – 10 kHz
- Phase Shift:

0.1A-0.5A:	< 5.0 degrees
0.5A-1A:	< 3.0 degrees
1A-12A:	< 2.5 degrees
12A-24A:	< 5.0 degrees

- Total System Accuracy: +/- 2.6% rms with offset errors of +/- 0.05Apk
- System Gain: 0.002A/Count (16bit a2d)
- Output voltage: 100mV/Amp
- Total Range: +/- 30Apk

200A Clamp-On 0.75" Diameter



Clamp-On 200 Arms medium

-Wire Length 12ft

- Measuring range: 0.5A- 240Arms AC
- Max Working Voltage: 600Vrms
- Basic probe accuracy: Of reading

0.5A-10A:	3.0%
10A-40A:	2.5%
40A-100A:	2.0%
100A-240A:	1.0%
240A-350A:	8.0%

- Linearity: 1% + accuracy
- Conductor sensitivity: none
- Frequency Response 40Hz – 10 kHz
- Phase Shift:

0.5A-10A:	Not Specified
10A-40A:	<5.0 degrees
40A-100A:	<3.0 degrees
100A-240A:	<2.5 degrees
240A-350A:	<5.0 degrees

- Total System Accuracy: +/- 4% rms with offset errors of +/- 0.5Apk
- System Gain: 0.02A/Count (16bit a2d)
- Output voltage: 10mV/Amp
- Total Range: +/- 600Apk





AC Current Probes

3,000A Rope 24" & 36" Lengths



3,000A Rope:

-Wire Length 8ft

- Measuring range: 5A- 3,200Arms AC
- Max Working Voltage: 600Vrms
- Basic probe accuracy: $\pm 1\%$ of reading $\pm 1A$
- Linearity: $\pm 0.2\%$ of reading
- Conductor position sensitivity: $\pm 1\%$ of reading
- Frequency Response: 10Hz to 10 kHz (-1dB)
- Phase Shift: < 1 degrees
- Total System Accuracy: $\pm 2\%$ RMS with offset errors of $\pm 2.5A$ pk
- System Gain: 0.2A/Count (16bit a2d)
- Output voltage: 1mV/Amp
- Total Range: $\pm 6,000A$ pk probe limited to 4,500Apk
- DC offset on startup can be significant for approximately 10 sec.

Powered from power monitor or 2xAA

10,000A Gen2 Rope 36", 48" & 60" Lengths



10,000A Gen2 Rope:

-Wire Length 12ft

- Measuring range: 20A- 10,000Arms AC
- Max Working Voltage: 600Vrms
- Basic probe accuracy: $\pm 1\%$ of reading $\pm 20A$
- Linearity: $\pm 0.2\%$ of reading
- Conductor position sensitivity: $\pm 1\%$ of reading
- Frequency Response: 40Hz to 7 kHz (-1dB)
- Phase Shift: < 1 degrees
- Total System Accuracy: $\pm 2\%$ RMS with offset errors of $\pm 20A$ pk
- System Gain: Frequency dependant
- Output: 0.122mV/ARMS @ 60Hz
- Total Range: $\pm 50,000A$ pk at 60Hz to $\pm 60,000A$ pk at 50Hz
- DC offset on startup can be significant for approximately 2 sec.

Self-powered no external source needed





Wireless DCx 10 Channel Probe

The **RxMS** Wireless system is a data logging tool that is utilized to monitor single 600V DC, 10 Channel 60V DC, DC Current as well as Temperature & Humidity.

All on one power monitor

100 Channels of wireless probe support per power monitor has the ability to monitor up to 250 batteries, as well as DC data points(600V) and temperature & humidity.



DC Current Probe Specifications:

- 10 Channel
- +/- 60 Vdc
- Accuracy: $\pm 0.1\%$
- Noise: $\pm 2\text{mV}$
- TC = $1.63\text{ppm}/^\circ\text{F}$
- 1 Sample per second min
- 4 Readings per log entry {Min, Max, Avg}
- Operating Temperature: 0°C to 40°C (32°F - 104°F)
- Operating Humidity: 80% Max - Non-Condensing
 - Conforms to CAT II 150V

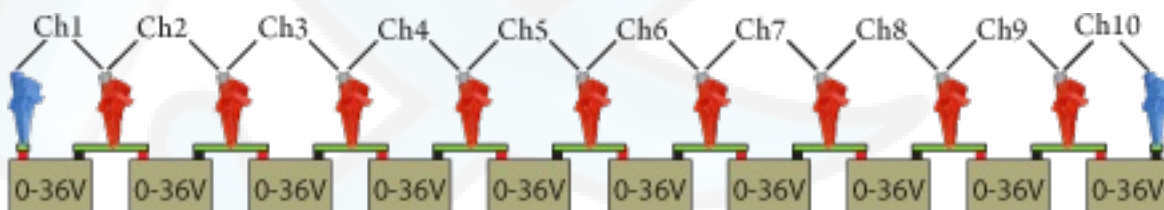
Dual Power Source

- Powered from 2x AA batteries or 12V wall supply



- AA Batteries last from 14 days (4 Second log rate) to 50 days (5 Minute log rate)

Only 11 Connections for 10 Batteries!



Additional Product Information:

- Individual log file created for each probe
- Programmable log rate of 4 seconds to 30 minutes
- Over 100 probes per monitor, mix and match probe types
- Range: Indoor up to 100 ft
- Line of Sight up to 1 mile
- External power supply for permanent install
- Backing for easy placement
- "Notes Feature" ideal for identifying and tracking of probes location. (Faster reporting of data)
- Dimensions: 10.5" x 5.5" x 2.5" (L/H/W)



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DCw



The DCw is a voltage and current monitoring device designed with commissioning agents requirements.

The device continuously streams wired or wireless, these values include

DC Voltage
DC Current
AC Voltage
AC Current
Watts
Voltage and Current Ripple%

General Specifications:

- True RMS sampling @ 4kHz input frequency
- On Board LED to give connection status
- Wired (ethernet) or Wireless stream to Cx Monitor
- Temperature compensated gain increases accuracy across large temperature variations
- CAT III 600V
- Power Requirements: 24V DC 3W

Additional Product Information:

- Individual log file created for each probe & channel
- Log rate of 4 Second to 30 minutes (1 second sample rate)
- Over 100 probes per monitor, mix and match probe types
- Range: Wireless Indoor up to 100 ft
- Line of Sight up to 1 mile
- Hanging kit for easy placement
- "Notes Feature" ideal for identifying and tracking of probes location. (Faster reporting of data)
- Re-calibrated on 6 month interval to ensure low drift
- Dimensions: 8" x 3" x 1.5" (L/H/W)

Readings:

DC Voltage 1-600Vdc:

Accuracy: 0.01% (+/- 5mV)

DC Current @ 2000A:

Accuracy: 0.01% (+/- 100mA)

DC Current @ 4000A:

Accuracy: 0.01% (+/- 200mA)

AC Voltage 1-480Vrms @ 60hz:

Accuracy: 0.1% (+/- 10mV)

AC Current 2000A @ 60hz:

Accuracy: 0.1% (+/- 100mA)

AC Current 4000A @ 60hz:

Accuracy: 0.1% (+/- 200mA)

Watt:

Accuracy: 0.1% (+/- 1W)

Accuracy stated @ 72°F : Temp error compensated and not to exceed stated accuracy from 50°F - 120°F ambient

