



PowerView C3 CP Remote Monitoring Unit

Impressed Current CP Transformer/Rectifier Remote Controller

Model Number
C2398A

DATASHEET

- Remotely Monitor and Control of all your existing CP Transformer/Rectifiers
- Easily interfaces to most Impressed Current Transformer/Rectifiers
- Connect to SCADA and/or web based
- Continuously monitors your CP system and reports abnormal events by email, SMS or push notification.
- Perform Instant Off, Depolarisation, or Interference tests remotely.
- Perform Constant Potential Control.

Features

- Monitors T/R Voltage, Current and 1 Reference
- Tests structure/pipe On and Off potentials
- Monitors both AC & DC reference potentials
- Monitors AC power and reports failures

Overview

The **PowerView C3** is a module designed specifically for remote monitoring and control of traditional impressed current cathodic protection transformer/rectifiers.

Connect the C3 to any transformer/rectifier to monitor its performance, and optionally control, remotely.

Conduct CP testing such as Instant Off testing remotely. Operates in conjunction with PowerView C1 Test Post Monitors to automatically take instant off readings.

Remote T/R Monitoring

The PowerView C3 can directly monitor a T/R's output voltage (up to 100Vdc) and output current via an external current shunt (up to 300mV). In most installations, the T/R already has a current shunt installed for monitoring output current, and so no additional signal conditioning instruments are required to hook up the C3 to monitor the T/R output voltage and current.

A half-cell reference input on the C3 can monitor the AC and DC potential of the structure to ensure that the steel in the structure is not exposed to corrosion or excess potential voltage caused by stray currents or over protection.

Remote Adjustment

The PowerView C3 contains a solid-state potentiometer output that can be used to remotely adjust the T/R output. The potentiometer retains its setting even during power failures to ensure that settings are reliably retained under all conditions, just like the mechanical potentiometer pot it can replace.

Accurate Time Synchronisation

An internal GPS receiver in the PowerView C3 can keep the internal clock accurate to within milliseconds.

Remote Testing

An output relay change-over contact is provided to turn the T/R off and on again to perform CP testing such as Instance-



- GNSS Time Sync. for accurate Instant Off testing
- SD Card logging
- Can be used for remote adjustment
- 2 general alarm inputs e.g. intruder alarms etc.

Off, Interference and Depolarisation Testing (used on concrete structures).

Via the Data2Desktop web portal, this relay can be programmed to turn off the T/R at precise times to allow instant-off testing to be conducted on remote reference electrodes.

Alarm Inputs

Two general purpose alarm contact inputs are provided on the PowerView C3 to allow reporting of any abnormal events or faults in the TRU, such as loss of a phase in three phase supplies, or the enclosure door being opened.

AC Input Power Monitoring

The PowerView C3 provides a Modbus RTU serial output that can be used to monitor third party instruments such as an energy meter, to monitor the power consumption of the TRU.

This is useful for calculating green-house gas emissions or for electricity consumption cost allocation or billing.

SD Card Logging

The PowerView C3 has an SD card slot that can be configured to log various aspects of the operation of the T/R such as output voltage and current, temperature, on and off events, alarms etc.

This logging can be used where remote monitoring and control is not possible, as a backup for the remotely logged data, or when fast logging is required for stray current interference surveys.

AC and DC Reference Measurements

The PowerView C3 includes a high impedance reference input capable of monitoring both AC and DC voltages of the structure. This is useful for simultaneously monitoring dc potential to confirm corrosion protection and ac interference caused by electric power lines or passing trains.



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REMOTE MONITORING SPECIALISTS





Temperature etc. Measurement

The PowerView C3 has a **microLan** sensor bus input that can be used to monitor up to 6 low cost sensors in the TRU to monitor other conditions such as temperature and humidity, for example.

Two Modbus Serial Ports

The PowerView C3 is equipped with two Modbus serial ports that be used for a variety functions.

For example, the connection of a power meter is a common application as described above.

Another use case is the connection of the C3 to a local third party RTU for integration into a customer's existing SCADA network.

See the specifications for more details of the modes available on these serial ports.

Ethernet Port

The PowerView C3 is also provided with an Ethernet Port. This port can be used for a variety of applications such as connecting to a customer's local OT network for integration of remote monitoring of the TRU's.

Wireless Connectivity

The PowerView C3 can be fitted internally with one of a range of wireless modems. This allows the C3 to be remotely monitored over 3G, 4G or 5G (Cat-M1 or NB-IoT) mobile networks, whichever is available in the remote location.

In extremely remote locations, out of range of conventional LTE, satellite connectivity can be provided with an external low cost satellite interface.

Data2Desktop Integration

The PowerView C3 is supplied with Data2Desktop Web Portal integration preconfigured.

Data2Desktop is Omniflex's remote monitoring cloud based secure web portal built for hard real-time monitoring of remote assets and has full CP functionality built in as standard.

This allows the PowerView C3 to be easily monitored and controlled out of the box with a simple log-in to the Data2Desktop web portal. This allows fleets of TRU's to be monitored from a single location without needing any special network engineering.

Remote Pipeline Monitoring and Testing

By combining the C3 with PowerView C1 Remote Test Post Monitors on the Data2Desktop web portal, pipelines can be automatically monitored and testing at set intervals without

needing to leave the office. This can reduce operating costs and increase surveillance on remote assets such as pipelines.

USB Configuration Port

All configuration on the PowerView C3 is done through the USB port on the front of the module using the Omniset Configuration Software tool available as a free download from the Omniflex web site.

This allows a C3 to be configured with a laptop in under ten minutes. This can be done in the workshop before installation or on site once the C3 module is installed.

Monitoring Multiple Voltages, Currents or References

A C3 expansion module is available that provides 6 additional inputs for monitoring more voltages, currents or reference electrodes. Up to four of these expansion modules can be connected to a C3 to suit a wide range of applications.

For example, in many ICCP installations, a single T/R output is feeding multiple anode circuits. In these cases, it is common to want to monitor how the T/R output current is being split between the various anodes. By connecting the expansion modules to current shunts in each anode circuit, the individual anode currents can be monitored and alarms generated if any anode current exceeds set limits.

Local LCD Screen

The PowerView C3 has an integrated LCD screen which can be configured to display a range of operating variables such as T/R voltage and current, any alarm conditions and remote monitoring connection status.

IEC Standard DIN Rail Housing

The PowerView C3's compact design and standard IEC DIN rail mountable housing allow the unit to be easily retrofitted into space in an AC distribution board, or in any available space within the TRU.

AC or DC power supply

The PowerView C3 can be supplied with a direct 85-264Vac power supply input, or 9-30Vdc power input, to simplify the retrofitting of the C3 into existing TRU's.

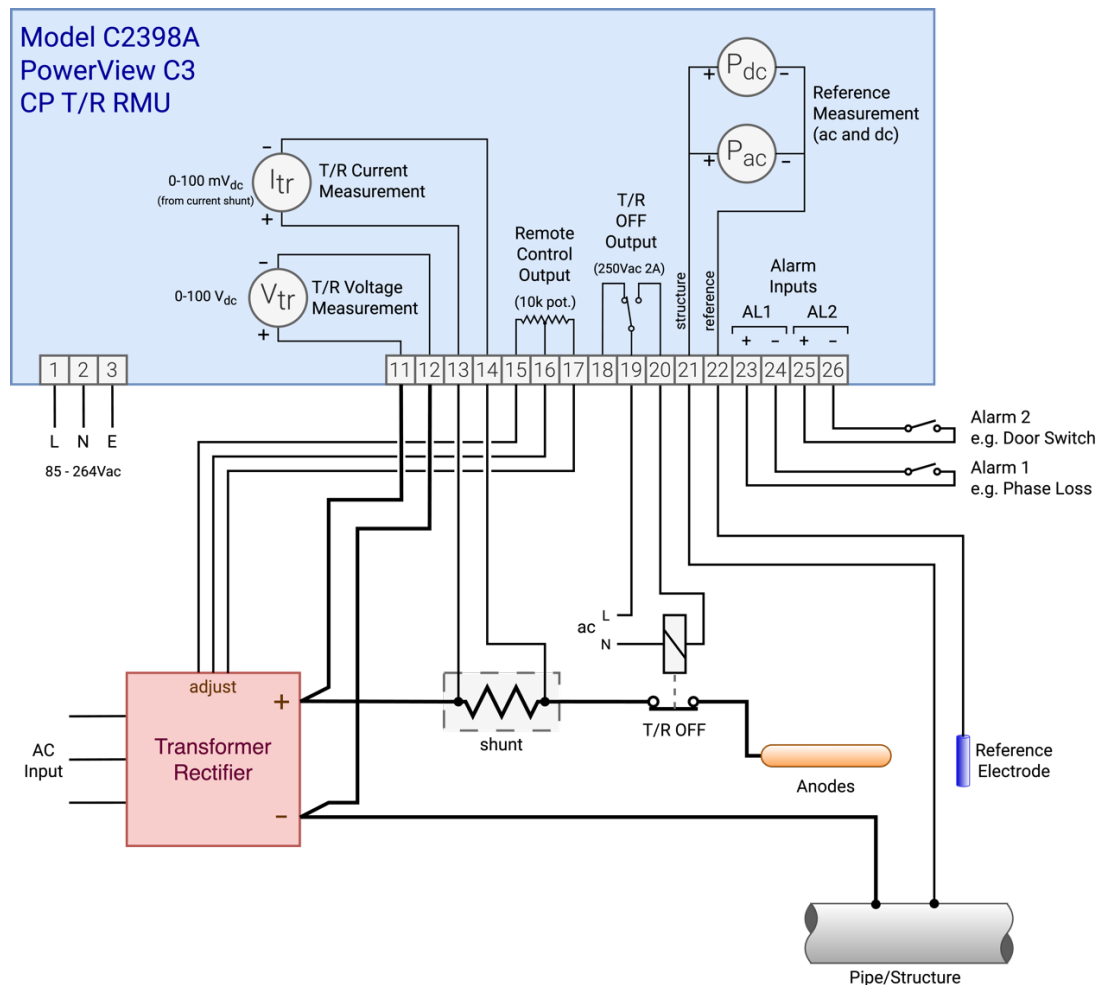
Internal Battery Backup

The PowerView C3 is has an internal backup battery which allow the C3 to continue operating communicating remotely for up 4 hours after an AC power failure to the TRU. This provides the ability for remote reporting of power failure events.

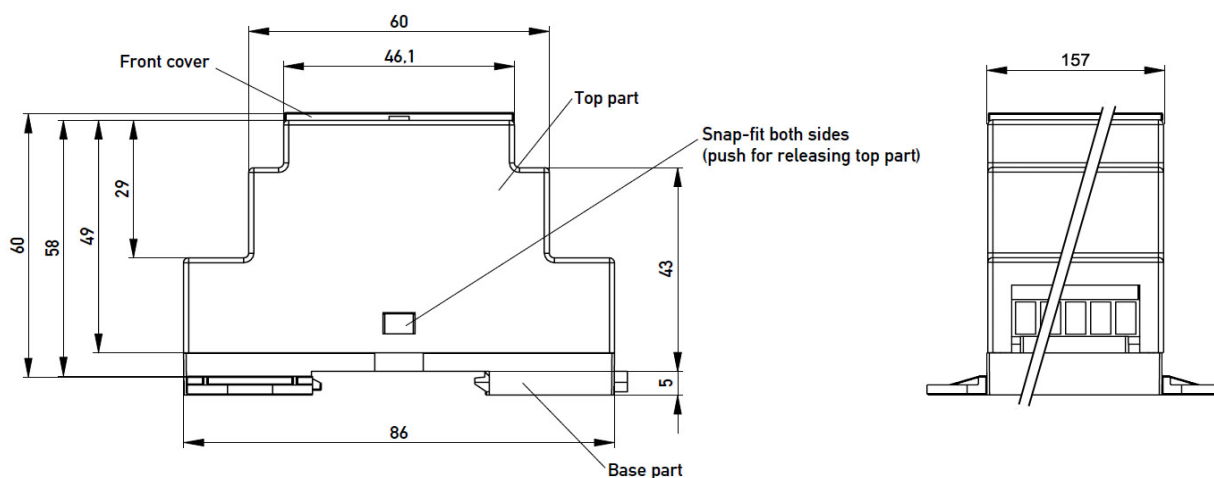




Typical Connection Diagram



Mechanical Dimensions





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Specifications

General

Power Requirements AC Version (C2398A-1-y)

AC input voltage range	85-264Vac
AC input frequency	47-63 Hz
Input current at full load	<0.1A rms
Switch-on inrush current	2A for <10ms (10A for < 1ms)
Surge withstand	2kV 1.2/50 us pulse (line to earth)

Power Requirements DC Version (C2395A-2-y)

DC input voltage range	9-30Vdc
Input current at full load	<0.33A

Battery Backup

Type	Internal Li-Ion battery
Lithium Content	0.6 grams
Behaviour	Keeps unit fully functional during power failures while battery lasts.
Operating time	4 hrs typical

Internal Real Time Clock (without GPS)

Resolution	10ms
Accuracy	1 min per month (without synchronisation)
Clock Backup Time	> 100h typical at 25 deg C
Clock Synchronisation	Via web portal (<1 second accuracy) Via GPS if installed (<10ms accuracy)

Plugin Memory Card

Type	microSD Memory Card (11mm x 15mm x 1mm)
Storage Capacity	SD Memory Card dependent: 2 to 32Gb supported
Card Format	PC Compatible FAT32 File Format
Data Format	CSV File Format compatible with Microsoft Excel etc.

Environmental Conditions

Storage Temperature	-25°C – 60 °C (-13°F – 140°F)
Operating Temperature	-10°C – 50 °C (+14°F – 122°F)

Compliance with Standards

Safety	EN 60950:2000
Emissions	EN 55011 Group I, Class A
Immunity – ESD	IEC 61000-4-2:2001, level 3
Immunity – RF Fields	IEC 61000-4-3:2003, level 3
Immunity – Fast Transients	IEC 61000-4-4:2004 1 kV – input/output lines

Weight

Unpacked	350g approx.
Packed	550g approx.

Inputs/Outputs

T/R Voltage Input (terminals 11 and 12)

Type	Voltage Input
Range	0-100Vdc
Accuracy	< 0.25% of reading +10mV
Resolution	10mV
Input Impedance	100kohm
Isolation	500Vdc i/p to i/p and i/p to ground.
Filtering	-60dB at 50Hz

T/R Current Input (terminals 13 and 14)

Type	Voltage Input from current shunt
Range	0-300mVdc
Accuracy	< 0.25% of reading +1mV
Resolution	8mV (12 bits)
Input Impedance	1Mohm
Isolation	500Vdc i/p to i/p and i/p to ground
Filtering	-60dB at 50Hz

Potentiometer Output (terminals 15, 16 and 17)

Type	Solid state Potentiometer
Range	10K resistor (RH to RL) with slider (RW)
Operating Voltage	4.5V min. to 15.5V max. RH(+) to RL (-)
Slider Resolution	128 steps (0.78%)

T/R OFF Output Relay (terminals 18, 19 and 20)

Coil Function	Relay Energises to turn OFF T/R
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Contact Output	Form C
Contact Rating	60W, 125VA maximum
Switching Voltage	220Vdc, 250Vac maximum
Switching Current	2A DC AC
Life Expectancy	5 x 10 ⁵ operations minimum

Reference Input (terminals 21, 22)

Quantity	1 channel
Isolation	300V input to earth
Input Range	-3V to +3V dc or 2Vac RMS;
Input Impedance	>100Mohms in default Hi-Z mode 10Mohms in Lo-Z (low impedance) mode
DC Input Resolution	0.01mV when input < 300mV 0.1mV when input > 300mV
DC Input Accuracy	0.25% of rdg. ± 1mV when input ≤ 300mV 0.25% of rdg. ± 3mV when input > 300mV
DC Input Filtering	-30dB 50Hz/60Hz rejection
AC Input Accuracy	1% of rdg. ± 10mV RMS measurement
Voltage protection	60Vdc maximum

Alarm Contact Inputs

Type	Volt-free contact input
Open circuit voltage	12Vdc approximately
Short circuit current	3mA approximately



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Communication Ports

Serial Ports (S1 and S2)

Type	2-wire RS485 or RS232 (Port 1) 2-wire RS485 (Port 2)
Baud Rate	300 – 38,400 baud.
Maximum Cable length	1200m (4000ft) in RS485 mode 15m (50ft) in RS232 mode (Port 1)
Connection	screw terminals
Protocols Supported	- Modbus ASCII (master or slave) - Modbus RTU (master or slave). - Modbus/TCP (master or slave). - Conet/s - Conet/m (PowerView compatible)

Ethernet Port

Type	10/100 UTP Ethernet (RJ45)
Network Protocols	UDP/IP, TCP/IP
IP Addressing	Fixed IP set during configuration
Data Protocols	Modbus/TCP Class 0 Conet/e HTTP Client for D2D server access

microLAN Network Port

Type	1-wire Dallas bus
Operating voltage	5V (with short circuit protection)
Output capacity	12 microLAN sensors max.
Connections	A,B,C see microLAN Installation Guide

Communication Ports – Internal GSM Modem (on D3G versions only)

4G/LTE Network Port EU (Model C2398A-X-141)

Region/Operator	EMEA/Thailand
Type	LTE Cat 1 mobile network
Network Bands	LTE-FDD: B1/B3/B7/B8/B20/B28A WCDMA: B1/B8 GSM/EDGE: B3/B8
Regulatory Approvals	Global: GCF Europe: CE Taiwan (China): NCC Australia/New Zealand: RCM
SIM Card	3Volt Standard SIM
Antenna	External via SMA connector.

4G/LTE Network Port AU (Model C2398A-X-142)

Region/Operator	Latin America/Australia/New Zealand
Type	LTE Cat 1 mobile network
Network Bands	LTE-FDD: B1/B2/B3/B4/B5/B7/B8/B28 LTE-TDD: B40 WCDMA: B1/B2/B5/B8 GSM/EDGE: B2/B3/B5/B8
Regulatory Approvals	North America: FCC Canada: IC Brazil: Anatel Taiwan (China): NCC Japan: JATE/TELEC Australia/New Zealand: RCM
SIM Card	3Volt Standard SIM
Antenna	External via SMA connector.

4G/LTE Network Port EU (Model C2398A-X-143)

Region/Operator	North America: AT&T/T-Mobile/ U.S. Cellular Canada: Rogers/Telus
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Type	LTE Cat 1 mobile network
Network Bands	LTE-FDD: B2/B4/B12 WCDMA: B2/B4/B5
Regulatory Approvals	North America: FCC/PTCRB Canada: IC
SIM Card	3Volt Standard SIM
Antenna	External via SMA connector.

4G/LTE Network Port EU (Model C2398A-X-144)

Region/Operator	North America: Verizon
Type	LTE Cat 1 mobile network
Network Bands	LTE-FDD: B4/B13
Regulatory Approvals	Global: GCF North America: FCC
SIM Card	3Volt Standard SIM
Antenna	External via SMA connector.

5G/LTE-M Network Port (Model C2398A-X-151)

Region/Operator	Multi-Region
Type	LTE Cat M1/NB2 mobile network
Network Bands	B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B28, B66, B71, B85
SIM Card	3Volt nano SIM
Approvals	FCC, ISSED, GCF, PTCRB, Verizon, AT&T, US Cell, T-Mobile, Telus, Rogers 3, RED, Vodafone 3, Deutsche Telekom 3, KCC 3, SKT 3, Giteki, Softbank 3, KDDI 3, RCM, Telstra, ICASA 3, NCC
Antenna	External via SMA connector.





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Ordering Information

ORDER CODE	PRODUCT NAME	DESCRIPTION
C2398A-1-0	PowerView C3	PowerView C3 Remote Monitoring Unit (85-264Vac) no wireless
C2398A-2-0	PowerView C3	PowerView C3 Remote Monitoring Unit (9-30Vdc) no wireless
C2398A-1-141	PowerView C3G41	PowerView C3 Remote Monitoring Unit (85-264Vac) with LTE (EMEA)
C2398A-2-142	PowerView C3G42	PowerView C3 Remote Monitoring Unit (9-30Vdc) with LTE (AU/NZ)
C2398A-1-151	PowerView C3G51	PowerView C3 Remote Monitoring Unit (85-264Vac) with LTE-M/NB2
C2398A-2-151	PowerView C3G51	PowerView C3 Remote Monitoring Unit (9-30Vdc) with LTE-M/NB2



Regional distributor:

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