

## EMCP 3.3 GENERATOR SET CONTROLLER

### GENERAL DESCRIPTION

The Cat® EMCP 3.3 places fully featured power metering, protective relaying and engine and generator control and monitoring at your fingertips. Engine and generator controls, diagnostics, and operating information are accessible via the control panel keypads; diagnostics from the EMCP 3 optional modules can be viewed and reset through the EMCP 3.3. The EMCP 3.3 features a graphical display with a white backlight visible in all types of light as well as an advanced engine monitoring system. These features add to the sense of value and dependability that comes with your purchase of Caterpillar products.

### OPERATOR INTERFACE

- Graphical display with positive image, transfective LCD, adjustable white backlight/contrast
- Two LED status indicators (1 red, 1 amber)
- Three Engine Control Keys and Status Indicators (Run/Auto/Stop)
- Lamp Test Key
- Alarm Acknowledgement Key
- Display Navigation Keys
- Two Shortcut Keys: Engine Operating Parameters and Generator Operating Parameters

### FEATURES/BENEFITS

- A 64 x 240 pixel, 28 mm x 100 mm, white backlit graphical display denotes text alarm/event descriptions and is visible in all lighting conditions.
- Textual display with multiple language capability, including character languages such as Arabic, Chinese, and Japanese.
- Advanced engine monitoring is available on systems with an electronic engine control module.
- Integration with the CDVR provides enhanced system performance.
- Ability to view and reset diagnostics on EMCP 3 optional modules via the control panel removes the need for a separate service tool for troubleshooting.
- Fully featured power metering, protective relaying, engine and generator parameter viewing, and expanded AC metering are all integrated into this controller.
- Real-time clock allows for date and time stamping of diagnostics and events in the control's logs as well as service maintenance reminders based on engine operating hours or calendar days.
- Customer programmable protective relaying, available as alarm and shutdown, protects against undervoltage, overvoltage, underfrequency, overfrequency, overcurrent, and reverse power.
- Digital, 32-bit microprocessor-based system eliminates the need for multiple switches, meters, transducers, relays, and sending units, which translates to less wiring and fewer opportunities for mechanical failures.

## FEATURES/BENEFITS (CONT'D)

- Expanded remote customer communications are supported by MODBUS RTU (1/2 duplex) protocol using RS-485, which easily interfaces with existing plant systems and equipment.
- Simultaneous viewing of all AC L-L voltages, all AC L-N voltages, or all AC line currents.
- User-friendly, convenient, customer programmability directs the customer to logical parameter groups (Ex. AC metering, protective relaying, engine monitoring) for quick keypad access.
- Set points and software are stored in nonvolatile memory, preventing loss during a power outage.
- Compatibility with both mechanical and electronic engines makes it versatile.
- True RMS sensing ensures AC metering accuracy to within  $\pm 1\%$  of rated AC voltage (L-L and L-N) and current.
- kW and kVA metering to within  $\pm 5\%$  of rating
- Three levels of security allow for configurable operator privileges.
- Single, standard 70-pin connector

## COMMUNICATION

- J1939 (Primary Data Link)
- J1939 #2 (Accessory Data Link)
- MODBUS RTU (1/2 duplex); RS-485 (Customer Communication)

## ENVIRONMENTAL SPECIFICATIONS

- Environmentally sealed front face rated for IP56. Resistant to chemical splash, including: diesel fuel, engine oil and machine oil.
- Protection level IP22 for rear of controller
- Resistant to salt spray
- Vibration: withstands 4.3G @ 24-1000 Hz
- Shock: withstands 15G
- Monitoring Functionality and Controls Operational from  $-40^{\circ}\text{C}$  to  $70^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $158^{\circ}\text{F}$ )
- Display Operational from  $-20^{\circ}\text{C}$  to  $70^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$  to  $158^{\circ}\text{F}$ )
- Storable from  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $185^{\circ}\text{F}$ )
- 0 to 95% Humidity, non-condensing from  $30^{\circ}\text{C}$  to  $60^{\circ}\text{C}$  ( $86^{\circ}\text{F}$  to  $140^{\circ}\text{F}$ )

## STANDARDS

- UL 508 Listed
- CSA C22.2 No.100,14, 94
- Complies with all necessary standards for CE Certification
  - 98/37/EC Machinery Directive
    - BS EN 60204-1 Safety of Machinery
  - 89/336/EEC EMC Directive
    - BS EN 50081-1 Emissions Standard
    - BS EN 50082-2 Immunity Standard
  - 73/23/EEC Low Voltage Directive
    - EN 50178 LVD Standard
- ISO3046, ISO8528
- IEC529, IEC60034-5, IEC61131-3
- MIL STND 461

## STANDARD FEATURES

### CONTROLS

- Auto/Start/Stop
- Engine Cool-Down Timer
- Emergency Stop
- Engine Cycle Cranking
- Lamp Test
- Generator Voltage
- Engine Speed/Generator Frequency (Electronic Engines Only)

### DIGITAL (LCD) INDICATION

- Generator AC Voltage – 3 phase (L-L and L-N)
- Generator AC Current (per phase and average)
- Generator Power (kW) (total and per phase)
- Generator kVAR (total and per phase)
- Generator kVAR-hr (total)
- Generator % of rated power (total) (kW, kVA, kVAR)
- Generator kVA (total and per phase)
- Generator kW-hr (total)
- Generator Power Factor (PF) (average and per phase)
- Generator Frequency
- Engine RPM
- Battery Voltage
- Engine Hours
- Engine Successful Start Counter
- Engine Oil Pressure
- Engine Coolant Temperature
- Engine Crank Attempt Counter
- Service Maintenance Interval (Engine Operating Hours or Calendar Days)
- Real Time Clock
- Twenty (20) Event Fault Log

## STANDARD FEATURES (CONT'D)

Also available with Electronic Engines\*:

- Air Filter Differential Pressure
- Boost Pressure
- Engine Crankcase Pressure
- Engine Exhaust Temperature (L & R)
- Engine Intake Manifold Temperature
- Engine Oil Temperature
- Fuel Consumption (US/Imperial gal/hr or Liters/hr)
- Fuel Filter Differential Pressure
- Fuel Pressure
- Oil Filter Differential Pressure
- Oil Temperature
- Total Fuel Consumed

Notes:

1. Temperature indications are viewable in either °C or °F (operator selectable)
2. Pressure indications are viewable in psi, kPa, or bar
3. Fuel Consumption viewable in US/Imperial gal/hr or Liters/hr

### WARNING/SHUTDOWN INDICATION

- Overcrank
- Low Coolant Temperature Warning
- High Coolant Temperature Warning/Shutdown
- Loss of Coolant Warning/Shutdown
- Low Oil Pressure Warning/Shutdown
- Overspeed
- Control Switch Not In Auto
- High/Low Battery Voltage
- Emergency Stop Activated

Also available with Electronic Engines\*:

- Low Fuel Pressure Warning/Shutdown
- High Fuel Pressure Warning/Shutdown
- Fuel Filter Restriction Warning/Shutdown
- High Intake Manifold Air Temperature Warning/Shutdown
- High Oil Temperature Warning/Shutdown

Notes:

- Warning condition activates common alarm output signal and common flashing yellow indicating lamp.
- Shutdown condition activates common alarm output signal and common flashing red indicating lamp.
- Warning/Shutdown conditions result in text message on EMCP 3 display.

\* Engine information obtained from electronic engine controller over J1939 data link when available. Refer to Engine Installation Guide for specific engine application.

### DIGITAL INPUTS (8 TOTAL)

- Emergency Stop
- Remote Start
- 6 Programmable

Digital inputs can be programmed for various alarm, shutdown, and status conditions including:

- Low Fuel Level
- High Fuel Level
- Fuel Leak Detected
- High Exhaust Temperature
- Air Damper Closed
- Circuit Breaker Open/Closed
- Low Engine Oil Level
- Low Coolant Level
- Low Starting Air Pressure
- Low/High Ambient Air Temperature
- Spare Fault #1-6

Inputs can be programmed for either high or low activation using programmable Normally Open or Normally Closed contacts.

Note: The number of programmable Digital Inputs may vary based on specific package configuration. Refer to Engine Installation Guide for specific engine application.

### PROTECTIVE RELAYING

- Generator Over/Under Voltage
- Generator Over/Under Frequency
- Generator Reverse Power
- Generator Overcurrent

### RELAY OUTPUTS (8 TOTAL)

- Starter Motor
- Fuel Control
- 6 Programmable

Relay outputs can be programmed for various operating conditions including: Air Shut-off, or Pre-lube, Common Alarm, Common Shutdown, Common Warning, Engine Running, Crank Alert, and Idle/Rated.

Relays are rated for 2A @ 30 VDC and consist of 6 Form A (Normally Open) contacts. Two of the programmable outputs are Form C (Normally Open and Normally Closed) contacts.

Notes:

1. These are only rated for DC.
2. The number of programmable Relay Outputs may vary based on specific package configuration. Refer to Engine Installation Guide for specific engine application.

## STANDARD FEATURES (CONT'D)

### DISCRETE OUTPUTS (2 TOTAL)

- 2 Programmable

Discrete outputs can be programmed for various operating conditions including: Air Shut-off, Pre-lube, Common Alarm, Common Shutdown, Common Warning, Engine Running, Crank Alert, and Idle/Rated.

Discrete outputs can sink up to 300mA and are suitable for driving relay coils or incandescent lamps.

### SENSOR INPUTS

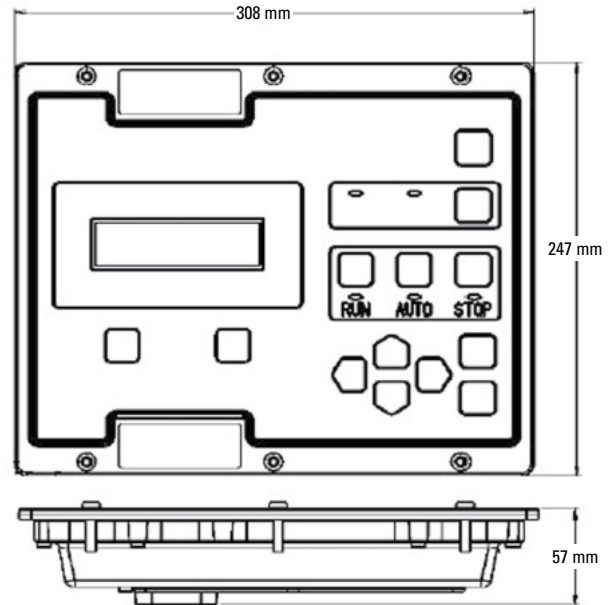
- Engine Speed (Magnetic Pick-up)
- Engine Oil Pressure (0-2 k  $\Omega$  resistive sender, 1 or 2-wire) – MUI Engines only
- Engine Coolant Temperature (0-2 k  $\Omega$  resistive sender, 1 or 2-wire) – MUI Engines only
- Configurable Input (0-2 k  $\Omega$  resistive sender) (for engine oil temperature, etc.)

## AVAILABLE LOCAL DISPLAY LANGUAGES

• Arabic	• Italian
• Chinese	• Japanese
• Czech	• Latvian
• Danish	• Lithuanian
• Dutch	• Norwegian
• Estonian	• Polish
• Finnish	• Portuguese
• French	• Russian
• German	• Spanish
• Greek	• Slovak
• Hungarian	• Slovene
• Icelandic	• Swedish
	• Turkish

*Note: Displays contain 2 languages  
(English and Local)*

## EMCP 3.3 GENSET CONTROLLER

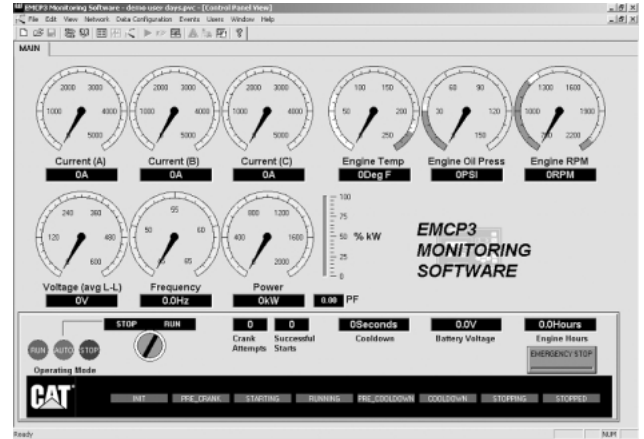


## OPTIONS



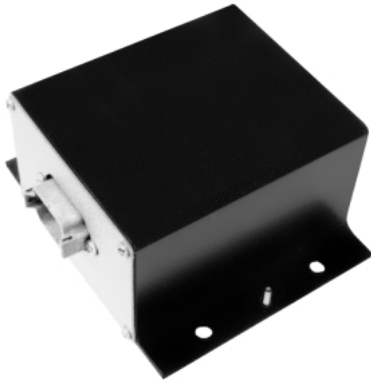
### ANNUNCIATOR

The EMCP 3 Annunciator serves to display Genset system alarm conditions and status indications. The Annunciator has been designed for use on the EMCP 3 Communication Network and may be used in either Local (package mounted) or Remote (up to 800 feet) application. A maximum of three (3) Annunciators may be used with a single EMCP 3.3.



### REMOTE MONITORING SOFTWARE

The EMCP 3 Remote Monitoring Software Package is a PC based program which allows the user to monitor and control a generator set, and is capable of running on a Windows based operating system. The Remote Monitoring software allows the user to configure data monitoring and data acquisition processes for monitoring, graphing, and logging of genset data.



**DISCRETE INPUT/OUTPUT MODULE**

The Discrete Input/Output (DI/O) module serves to provide expandable Input and Output capability of the EMCP 3 and is capable of reading 12 discrete inputs and setting 8 relay outputs. The DI/O Module has been designed for use on the J1939 Communication Network and may be used in either Local (package mounted) or Remote (up to 800 feet) application. A maximum of four (4) DI/O Modules may be used with a single EMCP 3.3.

**RTD MODULE**

The RTD module serves to provide expandable engine and generator temperature monitoring capability of the EMCP 3 and is capable of reading up to eight (8) type 2-wire, 3-wire and 4-wire RTD inputs. The RTD Module has been designed for use on the EMCP 3 Communication Network and may be used in either Local (package mounted) or Remote (up to 800 feet) application. A maximum of one (1) RTD Module may be used with a single EMCP 3.3.

**THERMOCOUPLE MODULE**

The Thermocouple module serves to provide expandable engine and generator temperature monitoring capability of the EMCP 3 and is capable of reading up to twenty (20) Type J or K Thermocouple inputs. The Thermocouple Module has been designed for use on the EMCP 3 Communication Network and may be used in either Local (package mounted) or Remote (up to 800 feet) application. A maximum of two (2) Thermocouple Modules may be used with a single EMCP 3.3.

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