EMCP 4

Image shown may not reflect actual package

EMCP 4.4 GENERATOR SET CONTROLLER

Caterpillar is leading the power generation market place with power solutions engineered to deliver unmatched performance, reliability, durability and cost-effectiveness.

FEATURES

GENERAL DESCRIPTION

The Cat® EMCP 4.4 offers fully featured power metering, protective relaying and engine and generator control and monitoring. Engine and generator controls, diagnostics, and operating information are accessible via the control panel keypads; diagnostics from the EMCP 4 optional modules can be viewed and reset through the EMCP 4.4.

FULL RANGE OF ATTACHMENTS

- Wide range of system expansion attachments, designed specifically to work with the EMCP 4.
- Flexible packaging options for easy and cost effective installation.

WORLD WIDE PRODUCT SUPPORT

- Cat dealers provide extensive pre and post sale support.
- Cat dealers have over 1,600 dealer branch stores operating in 200 countries

FEATURES

- A 480 x 320 pixel, 5.5 inch, white backlit graphical display denotes text alarm/event descriptions, set points, engine and generator monitoring, and is visible in all lighting conditions.
- Textual display with support for 28 languages, including character languages such as Arabic, Chinese, and Japanese.
- Paralleling functions, including automatic and manual synchronizing, dead bus arbitration, load sharing, and load sense/load demand.
- Advanced engine monitoring is available on systems with an ADEM™ controller.
- Integration with the CDVR provides enhanced system performance.
- 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.
- Up to 40 diagnostic events are stored in the non-volatile memory.
- Ability to view and reset diagnostics on EMCP 4 optional modules via the control panel removes the need for a separate service tool for troubleshooting.
- Set points and software stored in nonvolatile memory, preventing loss during a power outage.
- Reduced power mode offers a low power state to minimize battery power requirements.
- Three levels of security allow for configurable operator privileges.
- Selectable units
  - Temperature: °C or °F
  - Pressure: psi, kPa, bar
  - Fuel Consumption: Gal/hr or Liter/hr

STANDARD FEATURES

Generator Monitoring	• Voltage (L-L, L-N) • Current (Phase) • Average Volt, Amp, Frequency • kW, kVAr, kVA (Average, Phase, %) • Power Factor (Average, Phase) • kW-hr, kVAr-hr (total) • Excitation voltage and current (with CDVR) • Generator stator and bearing temp (with optional module)
Generator Protection	• Generator phase sequence • Over/Under voltage (27/59) • Over/Under frequency (81 O/U) • Reverse Power (kW) (32) • Reverse Reactive Power (kVAr) (32RV) • Overcurrent (50/51) • Current Balance (46)
Engine Monitoring	• Coolant temperature • Oil pressure • Engine speed (RPM) • Battery voltage • Run hours • Crank attempt and successful start counter • Enhanced engine monitoring (with electronic engines)
Engine Protection	• Control switch not in auto (alarm) • High coolant temp (alarm and shutdown) • Low coolant temp (alarm) • Low coolant level (alarm) • High engine oil temp (alarm and shutdown) • Low, high, and weak battery voltage • Overspeed • Overcrank
Control	• Run / Auto / Stop control • Speed and voltage adjust • Local and remote emergency stop • Remote start/stop • Cycle crank
Inputs & Outputs	• Two dedicated digital inputs • Twelve programmable digital inputs • Seventeen programmable digital outputs
Communications	• Primary and accessory CAN data links • RS-485 annunciator data link • Modbus TCP (10BT Ethernet) • Modbus RTU (RS-485 Half duplex)
Language Support	Arabic, Bulgarian, Chinese, Czech, Danish, Dutch, English, Estonian, Finnish, French, German, Greek, Hungarian, Icelandic, Italian, Latvian, Lithuanian, Japanese, Norwegian, Polish, Portuguese, Romanian, Russian, Slovak, Slovene, Spanish, Swedish, Turkish
Environmental	• Control module operating temperature: -40°C to 70°C • Display operating temperature: -20°C to 70°C • Humidity: 100% condensing 30°C to 60°C • Storage temperature: -40°C to 85°C • Vibration: Random profile, 24-1000 Hz, 6.0G rms

PARALLELING FUNCTIONS

DEAD BUS ARBITRATION
The EMCP 4.4 incorporates true dead bus arbitration to determine and select the primary generator set to close to a dead bus, allowing only one unit to close to the dead bus. The dead bus arbitration control minimizes the time for the first generator set to close to the dead bus.

SYNCHRONIZING
The EMCP 4.4 monitors all three phases of the generator and main bus. The proprietary synchronizing algorithms drive the generator output frequency, voltage, and phase to match another source, and close the generator circuit breaker when conditions have been met.

LOAD SHARING
The EMCP 4.4 actively monitors the real (kW) and reactive (kVAr) load requirement of all paralleled generator sets, and adjusts output of the generator set to maintain a balanced loading of all generator sets.

LOAD SHED/LOAD ADD
The EMCP 4 will provide a configurable load add signal as generator set capacity becomes available. In the event of generator capacity becoming unavailable during operation, a configurable load shed signal is provided.

LOAD SENSE/LOAD DEMAND
The EMCP 4.4 includes logic to sequence generator sets based on the total load requirement of the system. If the site load exceeds a minimum reserve kW threshold, additional generator sets will automatically start, synchronize, and close the generator breaker. If the site load falls below a reserve kW threshold, a generator set will automatically unload, open the generator circuit breaker, and shut down.

MODES OF OPERATION

AUTOMATIC PARALLELING
In the automatic paralleling mode, the EMCP 4.4 controller automatically adjusts the voltage and frequency of the generator set. When the generator output is synchronized with the second source, the EMCP 4.4 controller closes the generator circuit breaker.

MANUAL PARALLELING
In the manual paralleling mode, the operator will manually adjust the voltage and frequency of the generator set. When the generator set is synchronized with the second source, the operator will initiate a generator circuit breaker close command. A sync check function is also included to prevent out of phase paralleling.

SYNC CHECK MODE
In the sync check mode, the EMCP 4.4 controller automatically adjusts the voltage and frequency of the generator set without closing the generator circuit breaker. When the generator set is synchronized with the second source, the operator will initiate a generator circuit breaker close command. A sync check function is also included to prevent out of phase paralleling.

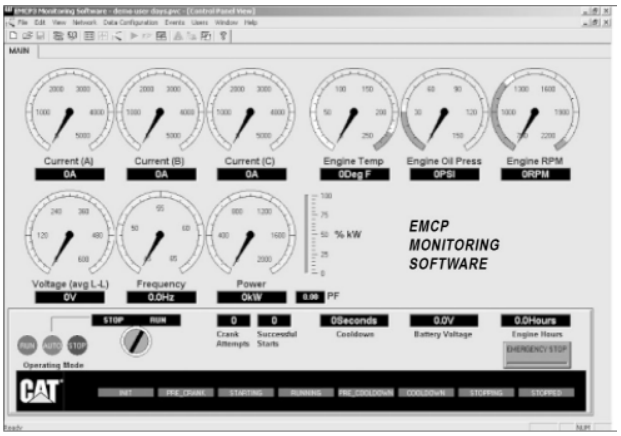
OPTIONAL MODULES

CAN ANNUNCIATOR

The EMCP 4 CAN Annunciator serves to display genset system alarm conditions and status indications. The annunciator has been designed for use on the accessory communication network and may be used in either local (package mounted) or remote (up to 800 feet) application. A maximum of four annunciators may be used with a single EMCP 4.3.

RS-485 ANNUNCIATOR

The EMCP 4 RS-485 Annunciator serves to display genset system alarm conditions and status indications. The annunciator has been designed for use on the long distance annunciator datalink and is used for remote (up to 4000 feet) application.



REMOTE MONITORING SOFTWARE

The EMCP 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.

OPTIONAL MODULES

DIGITAL INPUT/OUTPUT MODULE

The Digital Input/Output (DI/O) module serves to provide expandable Input and Output capability of the EMCP 4 and is capable of reading 12 digital inputs and setting 8 relay outputs. The DI/O module has been designed for use on the accessory Communication Network and may be used in either local (package mounted) or remote (up to 800 feet) application.

RTD MODULE

The RTD module serves to provide expandable generator temperature monitoring capability of the EMCP 4 and is capable of reading up to eight type 2-wire, 3-wire and 4-wire RTD inputs. The RTD Module has been designed for use on the Accessory Communication Network and may be used in either local (package mounted) or remote (up to 800 feet) application. A maximum of one RTD Module may be used with a single EMCP 4.3.

THERMOCOUPLE MODULE

The thermocouple module serves to provide expandable engine and generator temperature monitoring capability of the EMCP 4 and is capable of reading up to twenty Type J or K thermocouple inputs. The thermocouple module has been designed for use on the accessory communication Network and may be used in either local (package mounted) or remote (up to 800 feet) application. A maximum of one thermocouple modules may be used with a single EMCP 4.3 on each datalink.

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