



Digital controls

> PowerCommand® digital control technology

Our energy working for you.™



**Power
Generation**

Because they are designed by one manufacturer, all of the elements of the Power Command system are designed to work in harmony from the start.



The Power of One™

Digital controls for every application

For over a decade, Cummins Power Generation has been the industry leader in power system integrated designs. All major components of our systems—the engine, alternator, generator sets, transfer switches and control systems—are manufactured by Cummins. This integral approach—what we call the Power of One—gives you peace of mind for reliable, trouble-free standby power operation.

When you choose PowerCommand systems, you benefit from the advantages of a fully-integrated system:

- > Streamlined specifying
- > Easier installation
- > Higher reliability
- > Faster maintenance
- > 24/7 service and support
- > Seamless communication and operation



The Power of One in digital controls

Unlike other manufacturers, Cummins Power Generation designs power system controls as a single self-monitoring system, not as components in a larger system. PowerCommand controls simultaneously can operate the engine fuel system, directly control the alternator excitation system and monitor up to 150 other nodes.

The interaction of the controls on a generator set and the proper matching of control capabilities require a smart, systems approach to control design. Our experience in the design, production and application of engines and alternators provides an unmatched level of expertise in the proper design of power system control electronics.

From the engine sensors to a network interface model, PowerCommand controls are designed to optimize the reliability and performance of your power generation system—while keeping costs competitive and providing unique system capabilities.

Whatever your power needs...

Standby or prime, simple or complex, paralleling or non-paralleling, on the grid or off—Cummins Power Generation offers a complete range of controls to enhance your power system.

- > *Premium control system reliability.* Integrating multiple control components into a single control package reduces the number of controls, the number of components in the controls and the number of connections.
- > *Digital voltage regulation.* Fast, stable output voltage through varying environmental conditions. Flexible for specific application tailoring.
- > *Digital governing with smart starting.* Integrated fuel ramping limits black smoke and improves frequency stability on cold starts and optimizes cold-weather starting.
- > *Generator set monitoring.* Comprehensive monitoring of the engine, alternator and auxiliary equipment provides the critical information necessary to manage generator operation and maintain system reliability.
- > *Environmental protection.* Genset-mounted controls survive vibration, temperature extremes, electrical transients and other harsh conditions.
- > *Remote monitoring.* Easy, flexible remote monitoring and control.
- > *Advanced serviceability.* Operating panels include all critical information and set-up capability. InPower™, a PC-based service tool, allows fast problem diagnosis and more convenient testing and service.
- > *Certifications.* All controls are designed, manufactured, tested and certified to comply with relevant UL, NFPA, ISO, IEC, CSA and CE standards.
- > *Warranty and service.* PowerCommand controls are backed by a comprehensive warranty and worldwide distribution and service network.

For non-paralleling applications:



PCC1301

PowerCommand® 1301 and 2100 controls are your best choice for emergency, standby and prime power applications that do not require paralleling.

PowerCommand 1301 Reliable generator control

Simple design, robust construction — easy to integrate into generator applications

Superior protection from the environment — one fully-potted main circuit board controls all functions

Digital governing and voltage regulation — stable, responsive control

Optional operator panel — connects via high-speed link, so the display can easily be mounted anywhere on the generator



PCC2100

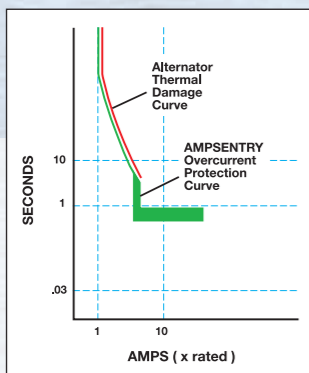
PowerCommand 2100 Premium performance with non-linear loads

Digital voltage regulation — 3-phase line-to-neutral sensing for accurate instrumentation and protection; pulse-width modulated (PWM) design and compatibility with external excitation sources (PMG)

Digital governing — smart starting for minimized emissions, temperature-compensated operation optimizes cold-weather starting and hot transient performance

Comprehensive AC metering — analog metering for quick visual verification of transients and stability; digital metering for accurate, convenient data recording

Configurable for many display languages



AmpSentry™ for monitoring and control

AmpSentry guards the electrical integrity of the alternator and power system, protecting against a wide range of fault conditions.

Single and 3-phase fault regulation give downstream protective devices reliable levels of fault current to clear faults quickly, without risking the life of the alternator or exposing loads to potentially damaging voltage levels.

AmpSentry is standard on PCC 2100, 3100 and 3200.

For demanding applications, PowerCommand 3100 and 3201 controls parallel with other generator sets or with the utility service.

PowerCommand 3100 Optimized performance and digital paralleling control

Digital paralleling control — active synchronizing; isochronous load sharing; import/export and var/pf control for real and reactive load control when utility paralleled; engine and alternator protection; advanced diagnostics and controls

Digital voltage regulation — 3-phase line-to-neutral sensing for accurate instrumentation and protection; reliable service to non-linear loads

Digital governing — optimizes cold-weather starting and hot transient performance

Comprehensive AC metering — analog metering for quick visual verification of transients and stability; digital metering for accurate, convenient data recording

Configurable for many display languages

PowerCommand 3201 Paralleling control for emission-approved engines

PCC3200 offers all the features of the 3100 series, plus:

Digital engine management — engine fuel rate and timing control, engine protection and diagnostics of Cummins engine

Digital power transfer control — single generator set and breaker pair control functions in applications that require open, fast-closed or soft-closed (ramped) transition or block loading

For non-paralleling and paralleling applications:



PCC3100



PCC3200

Transfer switch controls

Basic control:

Microprocessor controls for OTEC and GTEC automatic transfer switches monitor both power sources, signal generator set startup, automatically transfer power and return the load to the primary power source.

PowerCommand microprocessor controls, available in two levels, are fully-featured and field-programmable. All features, settings and adjustments are software-enabled for easy installation and operation.

Level 1 and Level 2 control:



OTEC, GTEC controls

OTEC / GTEC control

All the features you need for open- or delayed-transition transfer between a utility and a single generator set.

Control panel — LED lamps display source available and source connected; exercise and test mode

Field-configurable — for in-phase or delayed (programmed) transition

Voltage sensing — 3-phase for the utility; 1-phase for the generator set

Operating modes — Open transition with programmed transition (adjustable 0-10 seconds); open transition with in-phase monitor and delayed transition backup

Exerciser clock — Single-event programmable generator set exerciser with four pre-set cycle choices

Delayed transition — Controls the speed of operation of the transfer switch power contacts to allow load-generated voltages from inductive devices to decay prior to connecting a live source (adjustable 0-10 seconds)

Certification — UL, CSA and NEMA (OTEC); IEC and CE (GTEC)

Level 1 control

Flexible control options let you precisely match your system requirements

Continuously adjustable engine start — 0-15 seconds

Programmable generator set exerciser — One event or schedule, with or without load

Under- and over-voltage sensing — 3-phase for utility; 1-phase for generator set

Communications — Communicates with other transfer switches, accessories, SCADA networks or Cummins Power Generation generator sets

Certification — UL, NEMA, CSA

Level 2 control

For critical power and maintenance requirements, including hospitals and data centers

Continuously adjustable engine start — 0-120 seconds

Programmable generator set exerciser — Eight events or schedules, with or without load

Under- and over-voltage sensing — 3-phase for utility; 3-phase for generator set

Communications — Communicates with other transfer switches, accessories, SCADA networks or Cummins Power Generation generator sets

Certification — UL, NEMA, CSA

Bar-graph metering (Optional) — for “across-the-room” monitoring of normal and emergency voltages and frequencies, load currents, power factor, and kilowatts



OTPC control

- Open transition
- Closed transition
- Delayed transition

OHPC control

- Open transition
- Delayed transition



OTPC control

- Open transition
- Closed transition
- Delayed transition

OHPC control

- Open transition
- Delayed transition

CHPC control

- Closed transition
- Delayed transition

BTPC control

- Open transition
- Closed transition
- Delayed transition

Configurations

Basic control OTEC, GTEC

Level 1 control OTPC, OHPC

Level 2 control OTPC, CHPC, OHPC, BTPC

Configurations	Basic control OTEC, GTEC	Level 1 control OTPC, OHPC	Level 2 control OTPC, CHPC, OHPC, BTPC
Display Type	LED Indicators	Optional digital display	Standard digital display
Analog bar graph metering	Not Available	Optional	Standard
Programmable genset Exerciser	<ul style="list-style-type: none"> • Single event • Fixed period • Four cycle choices 	<ul style="list-style-type: none"> • Single event • Adjustable period • Adjustable cycle 	<ul style="list-style-type: none"> • Eight events • Adjustable period • Adjustable cycle
Under-voltage sensing	<ul style="list-style-type: none"> • 3-phase for utility • 1-phase - genset 	<ul style="list-style-type: none"> • 3-phase - utility • 1-phase - genset 	<ul style="list-style-type: none"> • 3-phase - utility • 3-phase - genset
Memory of settings if transfer switch loses	Not Available	Standard	Standard

Digital Master Control

For paralleling systems:

PowerCommand® Digital Master Controls are designed and manufactured around standardized control blocks—delivering increased reliability, flexibility and performance.

PowerCommand Digital Master Control is a state-of-the-art, microprocessor-based paralleling system used with PowerCommand paralleling generator sets and switchgear in low- and medium-voltage applications. All of the elements of the control package are designed to work together:

- > Digital Master Control automates load-add and load-shed, data logging and operator interface
- > Generator set performs all paralleling functions
- > Switchgear provides basic circuit protection and electrical switching functions

Combine these advantages with a smaller footprint, lower system costs and easy-to-use intuitive interfaces that share the same data throughout the system, and you have state-of-the-art performance. That's the Power of One.

Redefining reliability

Distributed logic design enables each individual system component to remain fully functional even if the Digital Master Controller fails—improving system reliability and reducing maintenance costs.

Digital Master Controls interface directly with the generator set and run continuously. They provide self-diagnostics and event reporting and detect failures even when the system is not in use.

Model 150

For isolated bus paralleling systems

For low- or medium-voltage isolated bus applications: Generator sets are switched to facility loads with transfer switches or interlocked breaker pairs, or provide all the power for site loads. A full range of standard control and digital display features include:

- Cost-effective and economical full-function Master Control*
- Full-function digital bus metering*
- Alpha-numeric operator panel*
- LED alarm annunciator*
- Automatic load adding and shedding (optional)*
- Automatic load demand system*
- PowerCommand network (optional)*

Model 200

For isolated bus paralleling systems

For low- or medium-voltage isolated bus (not utility-paralleled) applications. A wide range of standard control and digital display features gives you custom control configurations without the cost:

- Full-function Master Control for standby power systems*
- High-resolution touchscreen*
- Automatic load adding and shedding*
- PowerCommand network*
- Remote user interface (optional)*

Model 300

For infinite bus paralleling applications

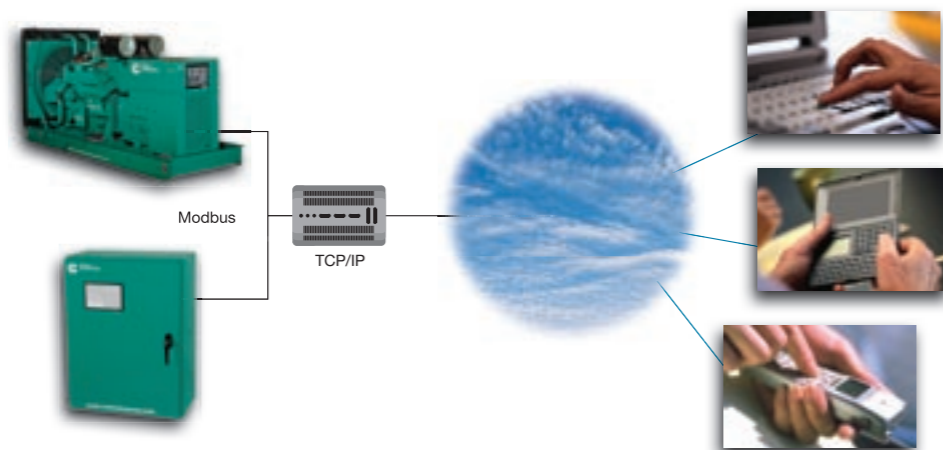
For low- or medium-voltage isolated bus (not utility-paralleled) and infinite bus (utility-paralleled) applications ranging from short-term soft power transfer to continuous paralleling. Standard control and display features include:

- Full-function Master Control for infinite bus paralleling systems*
- High-resolution touchscreen*
- Automatic load adding and shedding*
- PowerCommand network*
- Remote user interface (optional)*



Accessories: software and networking

PowerCommand® software and networking tools let you easily manage on-site and off-site power systems from one location.



Whether you're using a desktop computer, a laptop or a cell phone, PowerCommand iWatch™ and PowerCommand Pulse™ help you reduce power set-up time, operation and maintenance.

PowerCommand iWatch for reliable Web-based monitoring

PowerCommand iWatch lets you monitor generator set and transfer switch functions via the Internet. An Internet browser rather than dedicated software eliminates the need for monitoring software on your PC.

PowerCommand iWatch features let you:

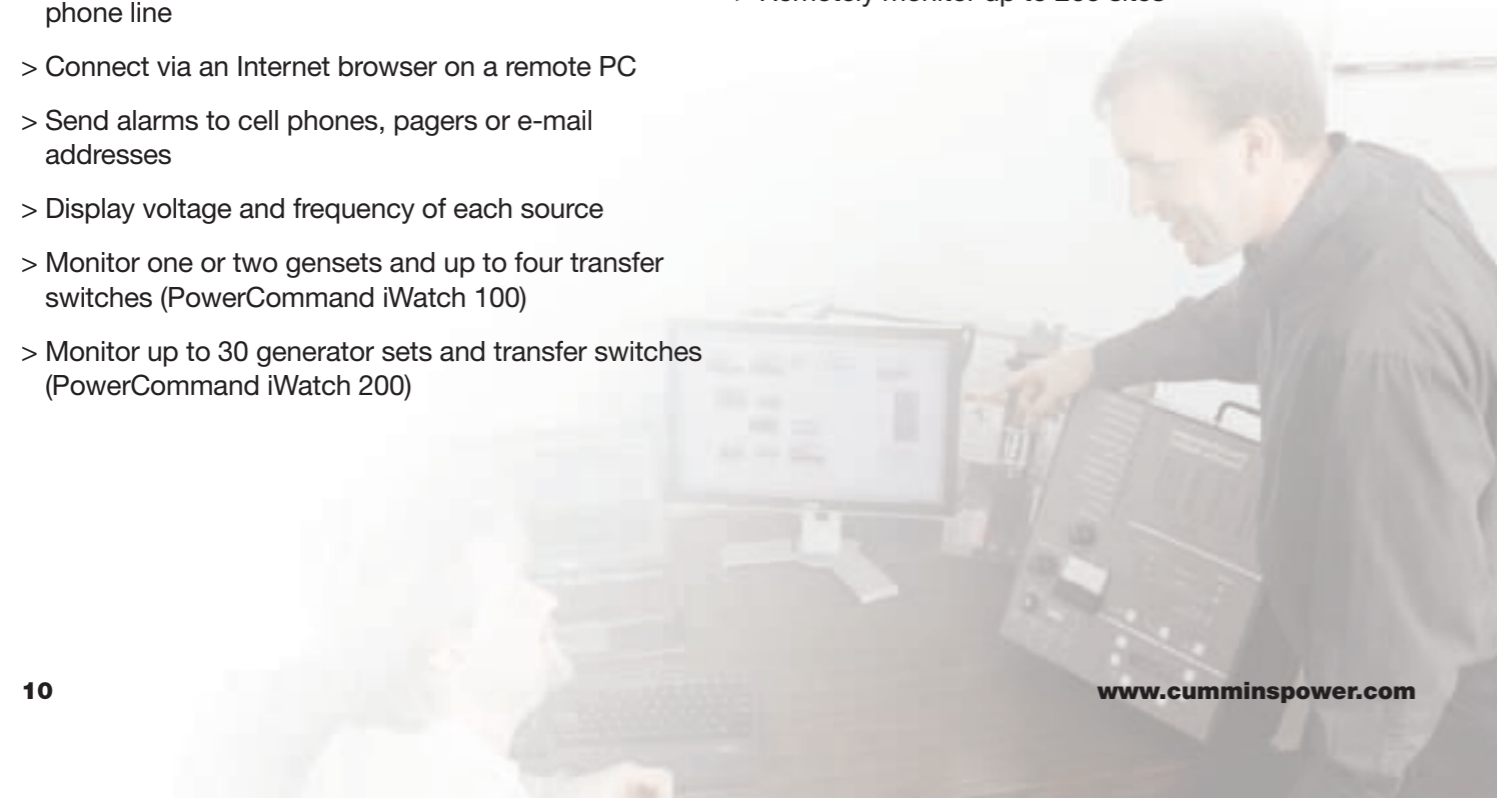
- > Communicate via an Ethernet connection or phone line
- > Connect via an Internet browser on a remote PC
- > Send alarms to cell phones, pagers or e-mail addresses
- > Display voltage and frequency of each source
- > Monitor one or two gensets and up to four transfer switches (PowerCommand iWatch 100)
- > Monitor up to 30 generator sets and transfer switches (PowerCommand iWatch 200)

PowerCommand Pulse for multiple power systems

PowerCommand Pulse is a full SCADA package. Its enhanced graphical user interface quickly and easily monitors multiple power systems.

PowerCommand features let you:

- > View displays of current alarms as well as alarm logs
- > Set three levels of system security
- > Fully customize the monitoring and control system
- > Monitor up to 60 devices at a site
- > Remotely monitor up to 200 sites



Our global operations:

- 26 Factories
- 16 Technical centers
- 15 Parts distribution centers
- 550 Distributors
- 5,587 Sales and service
- 160 Countries
- 33,500 Employees



For more information on transfer switches, visit www.cumminspower.com Or contact your local Cummins Power Generation distributor.



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