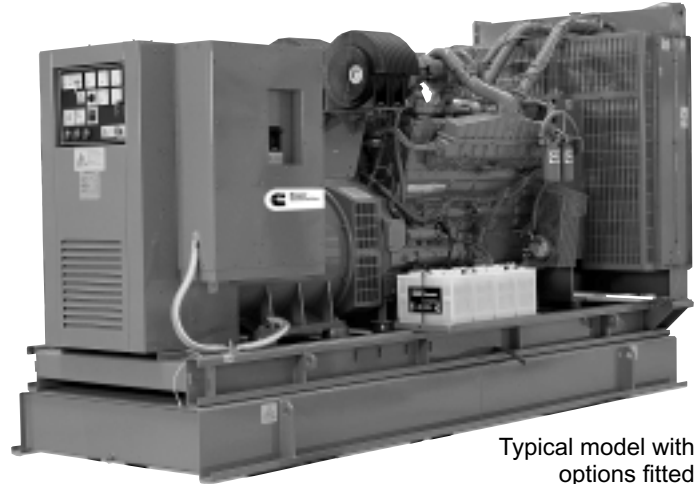


## Diesel Powered Generating Sets 458 kW - 565 kW 50 Hz VTA28 Series Engines



Typical model with options fitted

### Standard Genset Features

#### Single Source Responsibility

- Design, manufacturer and test of all components and accessories are made by Cummins Power Generation and Cummins companies

#### International Integrity

- Assurance and strength of a worldwide, world class corporation

#### Global Backing

- 24-hour spares and service support – in 72 countries

#### Single Source Warranty

- Complete genset covered by Cummins Power Generation comprehensive warranty

#### Packaged Self-Contained Units

- Units with built in antivibration systems with provision for base fuel tank and other accessories

#### Cummins Engine

- Heavy duty 4 cycle water cooled engine
- Electronic governor control

#### Cooling System

- 40°C cooling package (50°C option)

#### Ready Filled

- Every set comes filled with lube oil and anti-freeze

#### Alternator

- Brushless Group made machine
- Close voltage regulation
- Rotor and exciter impregnated with oil and acid resisting resin
- 12 lead reconnectable
- Exceptional short circuit capability
- Low waveform distortion with non linear loads

#### Ratings

All kW Power ratings based on a 40°C ambient temperature reference.

#### Chassis

- Built-in anti-vibration system
- Bonded rubber units fitted as standard eliminates need for rubber mats or spring mountings

#### PCL 'Power Control' System

- CE compliant
- Full AC instrumentation
- Emergency stop button
- Safety shutdowns
- Key or Remote starting

#### Alternative PCC PowerCommand Control System

- Microprocessor control
- Integrates governor and voltage regulation systems
- Superior alternator and genset protection system
- Accurate battery monitoring system
- Totally reliable and proven system




**Quality Assurance**  
Registered Firm Certificate Number FM509 in accordance with:  
BS EN ISO 9001  
Quality Assurance Schedule 3420/1



Cummins Power Generation, Cummins Engines and Newage Alternators are all part of the same group

| 50 Hz Ratings |                |               |                  |              |
|---------------|----------------|---------------|------------------|--------------|
| Model Prime   | Prime kW (kVA) | Model Standby | Standby kW (kVA) | Engine Model |
| 460 DFGA      | 460 (575)      | 509 DFGA      | 509 (636)        | VTA28G5      |
| 512 DFGB      | 512 (640)      | 565 DFGB      | 565 (706)        | VTA28G5      |

## A Single Source for *all* Power System Solutions

# Specifications

## Generator Set Performance

### Voltage Regulation

Maintains voltage output to within  $\pm 1.0\%$ .  
At any power factor between 0.8 lagging and unity.  
At any variations from No load to Full load.  
At any variations from Cold to Hot.  
At speed droop variations up to 4.5%.

### Frequency Regulation

Isochronous under varying loads from no load to 100% full load when electronic governor is fitted.

### Random Frequency Variation

Will not exceed  $\pm 0.25\%$  of its mean value for constant loads – no load to full load.

### Waveform

Total harmonic distortion open circuit voltage waveform in the order of 1.5%. Three-phase balanced load in the order of 5.0%.

### Telephone Influence Factor (TIF)

TIF better than 50.  
THF to BS4999 Part 40 better than 2%.

### Alternator Temperature Rise

Class H insulation. Temperature rise up to 125°C permitted.

### Radio Interference

In compliance with BS800 and VDE levels G and N.

## Engine

Cummins VTA28G5 direct injection engines. 12-cylinder VT range.

### Type

Water cooled, four cycle, turbo charged and aftercooled.

### Construction

Four valves per cylinder, forged steel crankshaft and connecting rods, cast iron block, replaceable wet liners.

### Starting

24 volt negative earth. Battery charging 35 amp alternator. Cranking current 1280 amps at 0°C.

### Fuel System

24 volt fail safe fuel actuator. Dual spin-on paper element fuel filters. Cummins PT fuel injection system with integral electronic governor. Dual flexible fuel lines and connectors. Fuel water separator.

### Filters

Dry element air filters with restriction indicator and spin-on full flow paper element and by pass lube oil filters fitted. Corrosion resistor filter.

### Cooling

40°C radiator as standard with 50°C ambient as option. Oil cooler.

## Alternator

### Type

Brushless, single bearing, revolving field, pole, drip proof, screen protected.  
Class H insulation.  
Enclosed to IP22 (NEMA 1) standard.  
IC 01 cooling system.  
Fully interconnected damper winding.  
AC exciter and rotating rectifier unit.  
Epoxy coated stator winding.  
Rotor and exciter impregnated with tropical grade insulating oil and acid resisting polyester resin. Dynamically balanced rotor to BS5625 grade 2.5.  
Sealed for life bearings.  
Layer wound mechanically wedged rotor.

### Exciter

Triple dipped in moisture, oil and acid resisting polyester varnish and coated with anti-tracking varnish.  
Sealed solid state automatic voltage regulator – self-exciting, self-regulating.  
Output windings with 2/3 pitch for improved harmonics and paralleling ability.  
Close coupled engine/alternator for perfect alignment.

## Compliance Standards

To BS4999/5000 pt 99,  
VDE 0530, UTE5100,  
NEMA MG1-22, CEMA,  
IEC 34, CSA A22.2,  
AS1359, BS5514,  
ISO 3046 and ISO 8528

## Chassis

Fabricated and welded steel chassis.  
Built-in anti-vibration mountings.  
Optional sub-base fuel tank with eight hour capacity, dual flexible fuel lines, dial type fuel gauge and drain bung.

### Finish

Etch undercoated and finished in high gloss durable green.

### General

Complete set of operating and instruction manuals.

## Generator Set Options

### Engine

- Heavy duty air cleaner
- Coolant heater and thermostat
- Lead acid batteries, cable and fitted tray
- NiCad batteries
- Sump drain pump
- Oil and water drain taps
- CE Compliance (guarding)
- Exhaust temperature monitoring (PCC only)
- Tool kit
- Compliance to TA Luft

### Cooling

- 50°C ambient radiator
- Remote radiator cooling (built to order)
- Oil temperature indication

### Alternator

- Anti-Condensation heater
- Thermistors
- PMG Exciter and MX321 AVR

### Exhaust System

- Industrial type silencer
- Residential type silencer
- Length of flexible exhaust and bellows

### Fuel System

- Sub-base tanks
- Hand fuel transfer pump
- Automatic fuel transfer pump
- Free-standing 450, 900 and 1350 litre fuel tanks with stand
- Fuel tank level switch
- High fuel level warning
- Low fuel level warning
- Low fuel level shutdown

### Generator Set

- Weather protective enclosures
- Silenced enclosures

### Control Panel

- See separate list on Control Panel page
- 3 or 4 pole circuit breaker
- Battery charger 5 amp or 10 amp
- CE Compliance PCL and PCC systems
- Cable entrance box

# Power Control System (PCL)

## PCL – Power Control System

- Choice of manual/key start or remote/automatic system
- Set mounted control panel on anti-vibration mounts
- Integrated circuit breaker (optional)

## Standard Specification

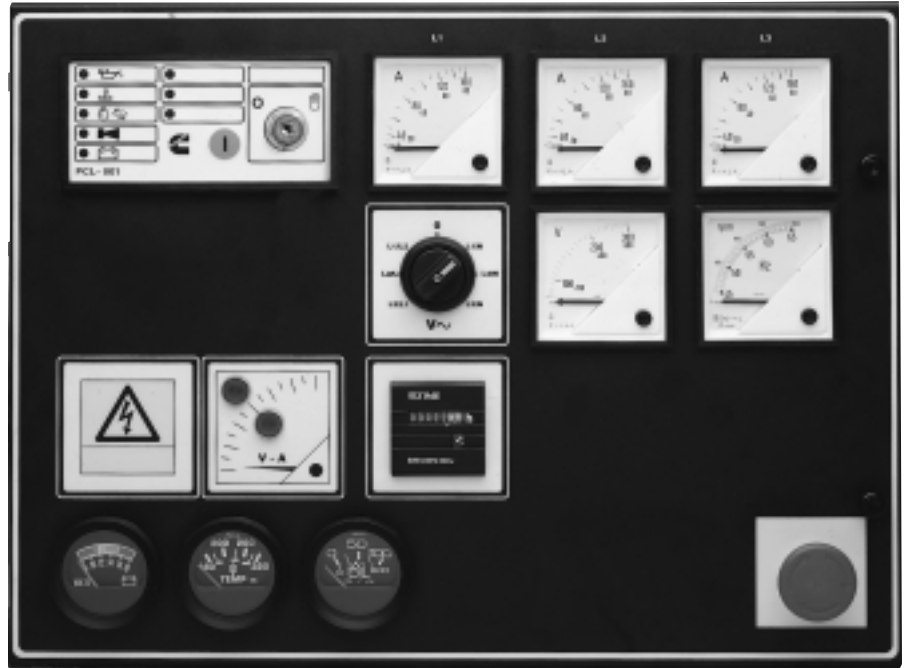
- Three ammeters 72 mm scale
- Voltmeter and selector switch
- Frequency (Hz) and RPM meter
- Hours run meter
- Oil pressure gauge
- Engine temperature gauge
- Battery condition meter
- Emergency stop shutdown pushbutton
- Dual scale indication
- Starting module (Manual or Remote)
- High engine temperature protection shutdown
- Low oil pressure protection shutdown
- Loss of coolant alarm and shutdown
- Overspeed/over frequency alarm and shutdown
- Underspeed/under frequency alarm and shutdown
- Status and fault conditions display by LED illumination
- Remote emergency stop connections

### Manual System PCL-001

- Key switch off/manual start positions
- Manual start pushbutton

### Remote/Auto Start System PCL-002 (option)

- Key switch off/auto and manual position
- Manual start pushbutton
- Fail to start LED indication
- Run on timer
- 3 attempts to start (adjustable) in auto mode
- Set will automatically start in event of receiving an external signal



PCL/Power Control – standard configuration PCL-001

## Circuit Breaker

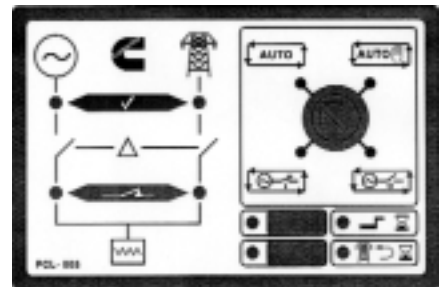
- Either 3 or 4 pole optional moulded case circuit breakers can be fitted. Located adjacent to the control panel the breaker is complete with magnetic and thermal trips for plant protection against overload and short circuit conditions. Removable gland plate covers provide top or bottom cable entry and a removable door over the circuit breaker provides accessibility to load terminals. Extended load connections off the circuit breaker can be provided either as pads for lugged cables or cable connectors for bare (unlugged) cables up to 1250 ampere capacity

## Optional Features to either Manual or Remote PCL System

- 5 or 10 Amp wall mounted battery chargers
- Audible alarm - fitted or loose
- Volts adjustment control
- Low fuel level alarm and/or shutdown
- Overload current protection
- Common fault contact
- Annunciator units - 5 or 10 warnings
- Under/Over volts shutdown
- CE compliance
- Low battery volts alarm
- Earth fault
- kW meter
- PF meter
- Oil temperature gauge
- 2 stage low oil pressure warning
- 2 stage high temperature warning
- High oil temperature warning or shutdown
- Remote Only:
  - Ready to accept load indicator
  - System energised indicator
  - Selector switch not-in-auto position indicator

## Automatic – Mains Failure System PCL-005

- Module supplied loose or fitted in wall mounting cubicle
- Works in conjunction with System PCL-002
- Adjustable voltage sensing on all three phases
- Provides signal to generator to start
- Provides signal to changeover switchgear
- Key control switch. Auto ON (2) RUN (2)
- Test positions permit RUN ON or off load
- LED indication for mains/power status
- Timers for mains fail, return time, warming time



System PCL-005

# Alternative PowerCommand Control System (PCC)

## PowerCommand® Control with AmpSentry™ Protection

- Integrated automatic voltage regulator and engine speed governor
- AmpSentry Protection guards the electrical integrity of the alternator and power system from the effects of overcurrent, over/under voltage, under frequency and overload conditions
- Control components designed to withstand the vibration levels typical in generator sets

## Standard Control Description

- Analogue % of current meter (amps)
- Analogue AC frequency meter
- Analogue AC voltage meter
- Analogue % of load meter (kW)
- Cycle cranking control
- Digital display panel
- Emergency stop switch
- Idle mode control
- Menu switch
- Panel backlighting
- Remote starting
- Reset switch
- Run-Off-Auto switch
- Sealed front panel, gasketed door
- Self diagnostics
- Separate customer interconnection box
- Voltmeter/Ammeter phase selector switch

## Standard Performance Data

### AC Alternator Data

- Current by Phase
- Kilowatts
- Kilowatt Hours
- Power Factor
- Voltage Line to Line
- Voltage Line to Neutral

### Engine Data

- Battery Voltage
- Coolant Temperature
- Engine Running Hours
- Engine Starts counter
- Oil Pressure
- RPM
- Oil Temperature

## EMC Compliance

The PCC control system meets EMC Shield Regulations.



PCC PowerCommand Control – standard configuration with optional contactor buttons shown

## Standard Protection Functions

### Warnings

- High Coolant Temperature
- High DC Voltage
- Low Coolant Temperature
- Low DC Voltage
- Low Fuel – Day Tank
- Low Oil Pressure
- Over Current
- Oil Pressure Sender Fault
- Temperature Sender Fault
- Overload Load Shed Contacts
- Temperature Sender Fault
- Up to four Customer Fault Inputs
- Weak Battery

### Shutdowns

- Emergency Stop
- Fail to Crank
- Low Coolant Level (option for alarm only)
- Low Oil Pressure
- Magnetic Pickup Failure
- Overcrank
- Overcurrent
- Overspeed
- Short Circuit
- Under-frequency
- High/Low AC Voltage

## Disconnecter Switch

The addition of a circuit breaker is considered unnecessary when PowerCommand with Amp Sentry protection is fitted. For isolation purposes a switch disconnecter can be supplied and mounted in the normal circuit breaker position on either side of the control panel.

## Voltage Regulation

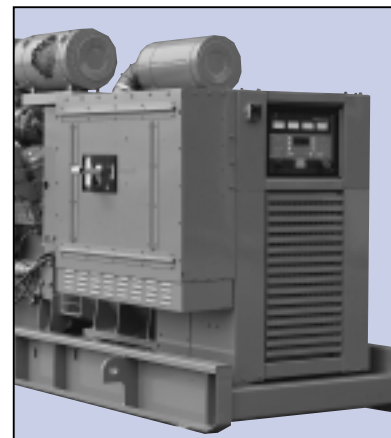
±0.5% with PowerCommand fitted.

## Options

### Control panel PowerCommand options

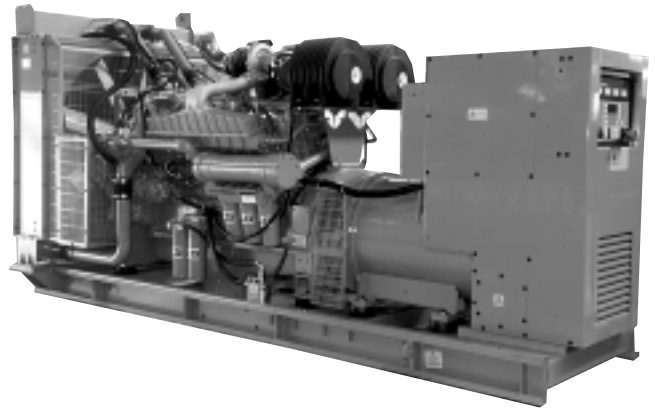
- Audible alarm and shutdown
- Key switch-operating mode
- Shutdown alarm-relay
- Running relays 4 pole D.T.
- Warning low fuel/high fuel

- Shut down – low fuel level
  - Earth fault shutdown
  - High alternator temperature alarm/shutdown
  - PowerCommand Digital Paralleling
- ### Cummins Optional Network Communications
- Echelon LonWorks multidrop communication. Communication network up to 5000 feet (1523 m) in length
  - Allows for local and remote communications with PowerCommand network products
  - Power system monitoring and control using PowerCommand software
  - Flexible for interface with other manufacturers' control and monitoring systems
- Other PowerCommand Control options are available



Circuit breaker can be fitted either side of generator set but supplied on R.H. side as standard.

# Technical Data



## Generating Sets – 50 Hz

|  |                           |                           |
|--|---------------------------|---------------------------|
| Set output                             | 380-440 V 50 Hz           | 380-440 V 50 Hz           |
| Prime at 40°C ambient                  | 460 kWe 575 kVA           | 512 kWe 640 kVA           |
| Model (Prime)                          | 460 DFGA                  | 512 DFGB                  |
| Standby at 40°C ambient                | 509 kWe 636 kVA           | 565 kWe 706 kVA           |
| Model (Standby)                        | 509 DFGA                  | 565 DFGB                  |
| Engine Make                            | Cummins                   | Cummins                   |
| Model                                  | VTA28G5                   | VTA28G5                   |
| Cylinders                              | Twelve                    | Twelve                    |
| Engine build                           | Vee                       | Vee                       |
| Governor / Class                       | Electronic / A1           | Electronic / A1           |
| Aspiration and cooling                 | Turbo Aftercooled         | Turbo Aftercooled         |
| Bore and stroke                        | 140 mm x 152 mm           | 140 mm x 152 mm           |
| Compression ratio                      | 13.0:1                    | 13.0:1                    |
| Cubic capacity                         | 28 Litres                 | 28 Litres                 |
| Starting / Min °C                      | Unaided / 4°C             | Unaided / 4°C             |
| Battery capacity                       | 254 A/hr                  | 254 A/hr                  |
| Nett Engine output – Prime             | 548 kWm                   | 548 kWm                   |
| Nett Engine output – Standby           | 604 kWm                   | 604 kWm                   |
| Maximum load acceptance – single step  | 340 kWe                   | 340 kWe                   |
| Speed                                  | 1500 rpm                  | 1500 rpm                  |
| Alternator voltage regulation          | ±1.0%                     | ±1.0%                     |
| Alternator insulation class            | H                         | H                         |
| Single load step to NFPA 110           | 100%                      | 100%                      |
| Fuel consumption (Prime) 100% load     | 124 l/hr                  | 140 l/hr                  |
| Fuel consumption (Standby) 100% load   | 137 l/hr                  | 154 l/hr                  |
| Lubrication oil capacity               | 83 Litres                 | 83 Litres                 |
| Base fuel tank capacity – open set     | 1200 Litres               | 1200 Litres               |
| Coolant capacity – radiator and engine | 166 Litres                | 166 Litres                |
| Exhaust temp – full load prime         | 493°C                     | 493°C                     |
| Exhaust gas flow – full load prime     | 7153 m³/hr                | 7153.2 m³/hr              |
| Exhaust gas back pressure max          | 76 mm Hg                  | 76 mm Hg                  |
| Air flow – radiator (40°C ambient)     | *13.7 m³/s                | *13.7 m³/s                |
| Pusher fan head (duct allowance) 40°C  | *19 mm Wg                 | *19 mm Wg                 |
| Air intake – engine                    | 2976.6 m³/hr              | 2976.6 m³/hr              |
| Air flow – radiator (50°C)             | *13.1 m³/s                | *13.1 m³/s                |
| Pusher fan head (duct allowance) 50°C  | *19 mm Wg                 | *19 mm Wg                 |
| Total heat radiated to ambient         | 112 kW                    | 114 kW                    |
| Engine derating – altitude             | 4% per 300 m above 1220 m | 4% per 300 m above 1220 m |
| Engine derating – temperature          | 2% per 11°C above 40°C    | 2% per 11°C above 40°C    |

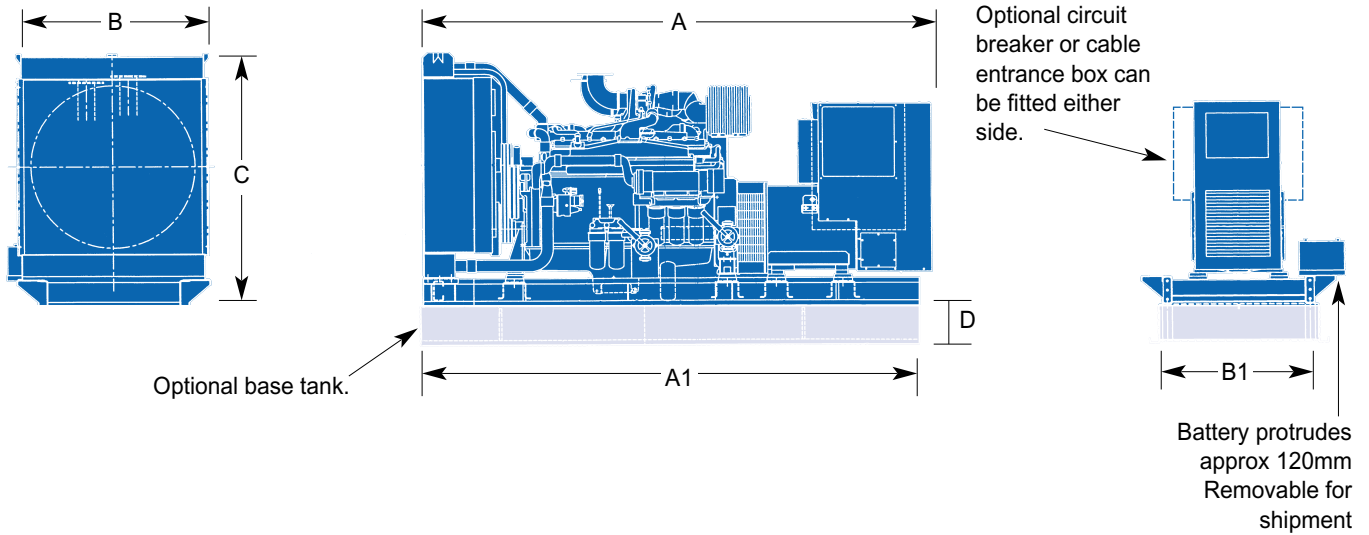
In accordance with ISO 8528, BS5514.

Prime: Continuous running at variable load for unlimited periods with 10% overload available for 1 hour in any 12 hour period.

Standby: Continuous running at variable load for duration of an emergency.

\*Subject to factory verification. Engine production tolerance ±5%.

# Dimensions and Weights – 50 Hz



| Model    | Engine  | Dimensions and Weights (mm/kg) |      |      |      |      |     | Set Weight<br>kg Dry | Set Weight<br>kg Wet | Tank Weight<br>kg (dry) | Tank Weight<br>kg (wet) |
|----------|---------|--------------------------------|------|------|------|------|-----|----------------------|----------------------|-------------------------|-------------------------|
|          |         | A                              | A1   | B1   | B    | C    | D   |                      |                      |                         |                         |
| 460 DFGA | VTA28G5 | 3825                           | 3875 | 1350 | 1423 | 1942 | 300 | 5355                 | 5665                 | 580                     | 1580                    |
| 512 DFGB | VTA28G5 | 3900                           | 3875 | 1350 | 1423 | 1942 | 300 | 5730                 | 6040                 | 580                     | 1580                    |

Set weights are **without** sub-base tank.

Dimensions and weights are for **guidance** only. Do not use for installation design. Ask for certified drawings on your specific application. Specifications may change without notice.



See your distributor for more information.

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Standard and custom made generating sets from 30 kVA to 2500 kVA

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