

# APS60 Rental Generator Set Specification

CSA Certified STANDBY 60 kW 60 Hz/PRIME 54 kW 60 Hz

## FEATURES

### EPA TIER 4 INTERIM AND CARB CERTIFIED FOR NON-ROAD MOBILE APPLICATIONS.

- An extremely rugged construction fully weather resistant enclosure incorporates an internally mounted exhaust silencer.
- Highly corrosion resistant construction.
  - Body made from sheet steel components pretreated with zinc phosphate prior to polyester powder coating at 200 °C (392 °F)
  - Black stainless steel pad lockable latches.
  - Zinc die cast hinges
  - Black powder coated grab handles
- Excellent access for maintenance.
  - Two large doors on each side. Two rear doors for distribution/control panel.
  - Front panel for air discharge box access.
  - Lube oil and cooling water drains piped to exterior of the enclosure with interior valves
- Security and safety.
  - Plexiglas control panel viewing window in a lockable access door.
  - Fuel fill and battery can only be reached through lockable access doors.

### ROBUST DESIGN FOR RENTAL ENVIRONMENT

- Packages designed to survive in a rugged environment.

### MULTI-VOLTAGE DISTRIBUTION PANEL

- Switchable 3-phase voltage output: 480/277volt WYE , 208/120volt WYE, 240/120volt DELTA (B phase high leg), 240/120volt single phase, Double DELTA

	Voltage	Standby kW (kVA)	Prime kW (kVA)
WYE	208/120V	60 (75)	54 (67.5)
WYE	480/277V	60 (75)	54 (67.5)
DELTA	240/120V 3-phase	60 (75)	54 (67.5)
Double Delta	240/120V 1-phase	42 (53)	37.8 (47.25)

\*Refer to distribution panel specifications for details

### REAR CUSTOMER ACCESS

- Separate control panel and distribution panel access doors.
- Hinged door over main bus connectors with safety switch
- External emergency stop on panel
- Remote start/stop contacts

### ENVIRONMENTALLY FRIENDLY DESIGN

- EPA Tier 4i off-highway compliant engine.
- Double walled fuel tank base with 24 hour minimum fuel supply. UL142/UN31A (TransCan) certified
- 110% Engine fluid spill containment
- Sound attenuated enclosure for low noise

### ELECTRONIC GOVERNING

- Isochronous.
- Fully Adjustable
- ADEM 5

### OPTIONS

- Tandem Axle Trailers with electric brakes
- Two gallon oil makeup system

## **STANDARD FEATURES**

### **1. ENGINE**

Heavy duty industrial EPA Tier 4I compliant diesel engine. Electronic governor, compliant with BS5514 Class G2.

### **2. COOLING RADIATOR**

Radiator and cooling fan complete with protection guards, designed to cool the engine in ambient temperatures up to 43 °C (110 °F) Jacket water heater with thermostat and isolation valves (1500w/120v).

### **3. ENGINE FILTRATION SYSTEM**

Cartridge type dry air filters with restriction indicator. Dry, 2-stage cyclonic paper element. Cartridge type fuel filters and full flow lube oil filters. All filters have replaceable elements.

### **4. EXHAUST SYSTEM**

Vertical Discharge critical silencer with flexible connector. All internal pipe work thermal blanketed

### **5. ELECTRICAL SYSTEM**

12 Volt Starter Motor system with 100 Amp charging alternator, 12V Cat brand maintenance free battery, battery rack, and cables. Package mounted 6 amp battery charger.

### **6. GENERATOR**

Screen protected and drip-proof, self-regulating brushless generator with fully interconnected damper windings, IC06 cooling system and sealed-for-life bearings. Switchable voltage output. Generator anti-condensation heaters. (125w/120v)

#### **6.1 Insulation System**

The insulation system is Class H. Windings are impregnated in triple dip thermo-setting moisture, oil and acid resisting polyester varnish.

Heavy Coat of anti-tracking varnish for additional protection against moisture or condensation.

#### **6.2 Electrical Characteristics**

Electrical design in accordance with BS5000 Part 99, IEC60034-1, EN61000-6, NEMA MG-1.22.

#### **6.3 Automatic Voltage Regulator (AVR)**

The EMCP integrated voltage regulator maintains the voltage within the limits of  $\pm 0.5\%$  at steady state from no load to full load. The control panel door incorporates a voltage adjustment potentiometer.

#### **6.3.1 Permanent Magnet Generator**

Providing 350% short circuit capabilities enhanced motor starting and non-linear loading performance.

#### **6.4 Waveform Distortion, THF and TIF Factors**

The total distortion of the voltage waveform with open circuit between phases or phase and neutral is in the order of 1.8. On a 3-phase balanced harmonic-free load the total distortion is <4%. Machines are designed to have a THF less than 2% and a TIF less than 50. A 2/3 optimal pitch factor is standard on all stator windings.

#### **6.5 Radio Interference**

Suppression is in line with the provisions of EN61000-6.

### **7. MOUNTING ARRANGEMENT**

#### **7.1 Base frame**

The complete generator set is mounted on a heavy duty fabricated steel base frame. The base frame includes a UL listed/TransCan certified dual wall closed top fuel tank and incorporates specially designed single point lift and engine fluid spill containment.

#### **7.2. Coupling**

The engine and generator are directly coupled by means of an SAE flange.

The engine flywheel is flexibly coupled to the generator rotor and a full torsional analysis has been carried out to guarantee no harmful vibration will occur in the assembly.

#### **7.3 Anti-Vibration Mounting Pads**

Captive anti-vibration pads affixed between engine/generator feet and the base frame ensuring complete vibration isolation of the rotating assemblies.

#### **7.4 Safety Guards**

The fan, fan drive, and optional battery charging alternator drive are fully guarded for personnel protection. Thermal wraps protect personnel from the exhaust pipe

### **8. FUEL SYSTEM**

Fuel feed and return lines to the engine are terminated at the base frame mounted 24 hour extended capacity fuel tank. 3-way valves allow connection of auxiliary fuel tank.

#### **8.1 Primary Fuel Filters**

Primary fuel filters in addition to cartridge type fuel filters.

### **9. CONTROL SYSTEM**

#### **9.1 Control Panel**

EMCP 4.2 in a NEMA 1 sheet steel enclosure with a hinged lockable door.

#### **FEATURES:**

- EMCP 4.2 display
- Panel light on/off switch
- Emergency stop pushbutton
- Lamp test/reset pushbutton
- Voltage adjust potentiometer
- Alarm and shutdown indicators
- Convenient service access for CAT Dealers (service tools not included)
- Frequency Adjust Potentiometer

#### **EMCP 4.2 ENGINE OPERATOR**

#### **INTERFACE**

- Controls

- Run/Auto/Stop
- Speed Adjust
- Voltage Adjust
- Emergency Stop
- Cycle crank
- Remote start/stop
- Engine Monitoring:
  - RPM
  - Operating hours
  - Coolant Temperature
  - Crank attempt and successful start counter
  - DC Volts
  - Oil pressure
  - Fuel Level
  - Intake Manifold Temperature
  - Fuel Temperature
  - Boost
  - Fuel Consumption
- Generator Monitoring:
  - L-L volts, L-N volts, Current (phase)
  - Average volts, Amps, Frequency
  - kW, kVA, kVAR, kW-hr
  - Power Factor (Average Phase)
  - kW-hr, kVA-hr (Total)
- Shutdowns with common indicating light for:
  - Low oil pressure
  - High Coolant Temp
  - Failure to Start (Over crank)
  - Emergency stop
  - Over speed
  - Low Coolant Level

**EMCP 4.2 GENERATOR PROTECTIVE RELAYING**

Generator protective features provided by EMCP 4.2

- Generator phase sequence
- Over/Under voltage (27/59)
- Over/Under frequency (81 O/U)
- Reverse Power (kW) (32)
- Reverse Reactive Power (kVAR) (32RV)

- Over current (50/51)

**9.2 DC and AC Wiring Harnesses**

DC and AC wiring harnesses utilizing industrial type multi-pin connectors to permit fast fault finding.

**10. DISTRIBUTION PANEL**

- Separate load and control sections
- Access using a hinged padlock-able door
- Main bus bar with hinged cover door, clear Plexiglas window and safety switch
- Customer convenience power receptacles protected by miniature circuit breaker
  - 1-Single phase-California Twist lock, 50 Amps @208 Volt phase, 120 Volt phase to neutral (adjustment to 240/139). Receptacles not for use with Delta configurations
  - 2-Single phase-GFCI Duplex receptacles, 15 Amps @120 Volts.
  - 1-Single phase NEMA locking receptacle, 20 Amps at 208/120V. (Adjustment to 240/139). Receptacles not for use with Delta configurations
  - Two wire remote start connection terminals
  - 2-30A, 125V single phase NEMA locking inlet receptacle.

**11. CIRCUIT BREAKER**

- Includes DC shunt trip coil activated on any monitored engine or electrical fault
- 25 KA-Interrupting capacity at 480 VAC

- Fixed type, 3 poles, package mounted
- 1-3 Pole 250 Amp MCCB with solid neutral (4 wire). UL/CSA listed with shunt trip. Integral trip unit for thermal and magnetic overload protection.

**12. CHANGE-OVER SWITCH**

- Switch provides voltage setting input to the EMCP 4.2 for automatic set point configuration
- Field disconnect safety switch

**13. DOCUMENTATION**

Operation and maintenance manuals, circuit wiring diagrams and instruction leaflets supplied

**14. SOUND ATTENUATED ENCLOSURES**

A noise reducing enclosure surrounds the entire generator set, combined with a critical engine silencer. This provides an overall noise reduction to 70dBa, at 23 feet through the range.

**15. FACTORY TESTS**

Every generator set is load tested. All protective devices, control functions are simulated. All generator and engine systems functions inspected, proven and documented for dispatch. Entire generator set package is CSA factory certified.

**16. STANDARDS**

The equipment meets the following standards: BS4999, BS5000, BS5514, IEC60034, EN61000-6 and NEMA MG-1.22.

**17. WARRANTY**

Full manufacturer's warranty.

# APS60

Generator Set Technical Data- 1800 rpm/60 HZ		Standby		Prime	
Power Rating	kW (kVA)	60	(75)	54	(68.8)
<b>Lubricating System</b>					
Type: full pressure					
Oil filter: spin-on, full flow					
Oil cooler: water cooled					
Oil type required: API CF-4					
Total oil capacity	L (U.S. gal)	8.4	(2.2)	8.4	(2.2)
Oil Pan	L (U.S. gal)	6.9	(1.8)	6.9	(1.8)
<b>Fuel System</b>					
Recommended fuel: #2 diesel					
Generator set fuel consumption					
100% load	L/hr (gal/hr)	19.5	(5.2)	18.7	(4.9)
75% load	L/hr (gal/hr)	16.9	(4.5)	16.0	(4.2)
50% load	L/hr (gal/hr)	13.1	(3.5)	12.4	(3.3)
Fuel tank capacity	L (U.S. gal)	655	(173)	655	(173)
Usable Fuel Capacity	L (U.S. gal)	574	(151)	574	(151)
<b>Running Time @ 75%</b>					
		Hours		34	
<b>Cooling System</b>					
Radiator system capacity including engine	L (U.S.gal)	13.0	(3.4)	13.0	(3.4)
<b>Air Requirements</b>					
Combustion air flow	m <sup>3</sup> /min (cfm)	5.9	(208)	5.9	(208)
Maximum air cleaner restriction	kPa (in H <sub>2</sub> O)	8.0	(32.1)	8.0	(32.1)
Radiator cooling air	m <sup>3</sup> /min (cfm)	101.4	(3,581)	101.4	(3,581)
Generator cooling air	m <sup>3</sup> /min (cfm)	19.2	(678)	19.2	(678)
<b>Exhaust System</b>					
Exhaust flow at rated kW	m <sup>3</sup> /min (cfm)	14.7	(519)	14.4	(509)
Exhaust temperature at rated kW-dry exhaust	°C (°F)	547	(1,017)	525	(977)
<b>Generator Set Noise Rating (Estimated)</b>					
[with enclosure at 7 meters (23 feet)]	<b>dba</b>	70		70	

In the spirit of innovation, specifications and features are subject to change without notice.

## SPECIFICATIONS

### GENERATOR

Voltage regulation ..... ± 0.5% at a steady state from no load to full load  
 Frequency ..... ± 0.25% for constant load from no load to full load  
 Waveform distortion ..... THD < 4%  
 Radio interference ..... Compliance with EN61000-6  
 Telephone interference ..... TIF < 50, THF < 2%  
 Over speed limit ..... 2250 rpm  
 Insulation ..... Class H  
 Temperature rise ..... Within Class B limits  
 Available voltages ..... 3-phase voltage output:  
 480/277 volt, 208/120 volt and  
 adjustable for 3-phase 240 volt output  
 Deration..... Consult factory for available outputs  
 Ratings..... At 30 °C (86 °F), 152.4m (500 ft) 60% humidity, 0.8 pf

### ENGINE

Manufacturer.....Caterpillar  
 Model.....C 4.4  
 Type.....4 cycle  
 Aspiration.....Turbocharged  
 Cylinder configuration.....In-line 4  
 Displacement –L (cu in).....4.4 (269)  
 Bore – mm (in).....105 (4.13)  
 Stroke – mm (in).....127.0 (5.0)  
 Compression ratio..... 18.3:1  
 Governor  
 Type.....Fully Electronic  
 Class.....ISO 8528-5 G2  
 Piston speed –m/sec (ft/sec)..... 7.62 (25.0)  
 Engine speed -rpm.....1800  
 Maximum power at rated rpm – kW  
 Standby.....60  
 Prime.....54

Model	Length mm (in)	Width mm (in)	Height mm (in)	Weight	
				With Lube Oil And Coolant kg (lb)	With Fuel, Lube Oil and Coolant kg (lb)
APS60	3404 (134)	1346 (53)	2108 (83)	2656 (5855)	3166 (6980)
APS60 with trailer	5232 (206)	2108 (83)	2540 (100)	3309 (7295)	3819 (8420)

**RATING DEFINITIONS**

**Standby-** Applicable for supplying continuous electrical power (at variable load) in the event of a utility power failure. No overload is permitted on these ratings. The generator on the generator set is peak prime rated (as defined in ISO8528-3) at 30° C (86° F).

**Prime-** Applicable for supplying continuous electrical power (at variable load) in lieu of commercially purchased power. There is no limitation to the annual hours of operation and the generator set can supply 10% overload power for 1 hour in 12 hours.