

Exclusively from your Caterpillar® dealer



## STANDBY 17.5-25 kW 60 Hz

Model	Standby— kW (kVA)	
	LP	Natural
G20UH3	20.0 (25.0)	20.0 (25.0)
G25UH3	25.0 (31.3)	25.0 (31.3)
G17.5UH3S	17.5 (17.5)	17.5 (17.5)
G25UH3S	25.0 (25.0)	25.0 (25.0)

### FEATURES

#### GENERATING SET

- Complete system designed and built at ISO 9001 certified facilities
- Factory tested to design specifications at full load conditions

#### ENGINE

- Governor, Woodward electronic
- Electrical system, 12 VDC
- Cartridge type filters
- Natural gas fuel system, LP gas options available
- Gas shutoff valve, solenoid operated
- Gas pressure regulator
- Low oil pressure shutdown

#### GENERATOR

- Insulation system, class H
- Drip proof generator air intake (NEMA 2, IP23)
- Electrical design in accordance with BS5000 Part 99, IEC60034-1, EN61000-6, NEMA MG-1.33, UTE51100

#### AUTOMATIC VOLTAGE REGULATOR

- Voltage within  $\pm 0.5\%$  3 Phase and 1.0% Single Phase at steady state from no load to full load
- Provides fast recovery from transient load changes

#### COOLING SYSTEM

- Radiator and cooling fan complete with protective guards
- Standard ambient temperatures up to 110° F (43° C)
- High coolant temperature shutdown
- Low coolant level shutdown
- Low coolant temperature alarm

#### MOUNTING ARRANGEMENT

- Heavy-duty fabricated steel base with lifting points
- Anti-vibration pads to ensure vibration isolation
- Battery, rack, and cables
- Coolant and lube oil drains piped to edge of base
- Complete OSHA guarding

- Stub-up pipe ready for connection to silencer pipework
- Weather protective enclosures are available
- Fuel line terminated at base with NPT connections

#### CIRCUIT BREAKER

- 3-pole with solid neutral, UL/CSA listed
- NEMA 1 steel enclosure, vibration isolated
- Electrical stub-up area directly below circuit breaker

#### CONTROL SYSTEM

- EMCP3.1 control panel
- Vibration isolated NEMA 1 enclosure with hinged access door
- Engine and generator instrumentation
- Volts adjust potentiometer
- Safety shutdown and alarm indicators
- Audible alarm for all faults
- Volt-free contact for common alarm
- AC/DC wiring with multi-pin connectors for system flexibility

#### EQUIPMENT FINISH

- All electroplated hardware
- Anticorrosive protection prior to painting
- High gloss polyurethane paint for durability and scuff resistance

#### QUALITY STANDARDS

- BS4999, BS5000, BS5514, IEC60034, EN61000-6, NEMA MG1-33, ISO8528, NFPA 110 (with optional equipment)

#### DOCUMENTATION

- Operation and maintenance manuals provided
- Wiring diagrams included

#### WARRANTY

- All equipment carries full manufacturer's warranty

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**OPTIONAL EQUIPMENT\***

**ENCLOSURE**

- Weatherproof enclosure (includes internal silencer system)
- Sound attenuated enclosure (includes internal silencer system)

**SILENCER SYSTEM — OPEN UNIT**

- Level 1 silencer
- Level 2 silencer
- Level 3 silencer
- Mounting kit
- Through-wall installation kit

**ENGINE**

- Battery heater
- Lube oil sump heater, 110/120V

**SKIDBASE ACCESSORIES**

- Seismic vibration isolators (Zone 4)

**GENERATOR**

- Anti-condensation heater

**COOLING SYSTEM**

- Coolant heater, 110/120V
- Radiator transition flange

**CONTROL SYSTEM**

- EMCP3.2 control panel

**FUEL SYSTEM**

- LP gas (vapor)
- LP gas (liquid)

**MISCELLANEOUS ACCESSORIES**

- Circuit breaker auxiliary contacts, volt free
- Circuit breaker shunt trip (100 amp and above)
- Static battery charger
- UL listed static battery chargers
- Toolkit
- Additional operator's manual pack
- CSA certification
- French or Spanish Language labels

**EXTENDED SERVICE CONTRACTS**

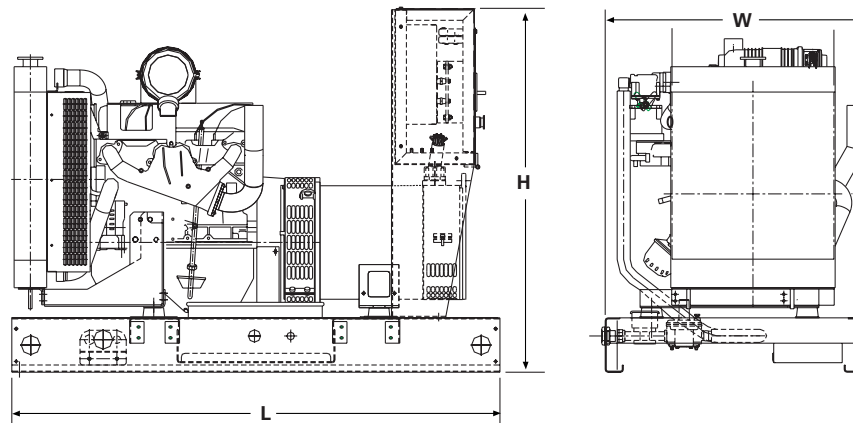
- Extended Service Coverage available

**TESTING**

- Special factory test available

\*Some options may not be available on all models. Not all options are listed.

**GENERATING SET DIMENSIONS AND WEIGHTS**



Model	Length in (mm)	Width in (mm)	Height in (mm)	Weight lbs (kg)**
G20UH3	53.1 (1350)	28.1 (715)	39.6 (1005)	849 (385)
G25UH3	53.1 (1350)	28.1 (715)	39.6 (1005)	893 (405)
G17.5UH3S	53.1 (1350)	28.1 (715)	39.6 (1005)	893 (405)
G25UH3S	53.1 (1350)	28.1 (715)	39.6 (1005)	893 (405)

**NOTE:** General configuration not to be used for installation. See specific dimensional drawings for detail.

\*\*Includes oil and coolant

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**SPECIFICATIONS**



**GENERATOR**

Voltage Regulation	±0.5% 3 Phase and ±1.0% 1 Phase at steady state from no load to full load
Frequency	±0.25% for constant load, no load to full load
Waveform Distortion	THD less than 4%
Radio Interference	EN61000-6
Telephone Influence Factor	TIF <50 per NEMA MG 1-32.11
Telephone Harmonic Factor	THF <2%
Stator Type	2/3 pitch Brushless, self excited, 12 reconnectable leads
Insulation	Class H per NEMA MG1-1.66
Temperature Rise	Within Class H limits
Overspeed Capability	125%
Available Voltages	1-Phase — 240/120, 220/110 3-Phase — 480/277, 240/120, 208/120
Deration	Please consult factory for available outputs
Ratings	At 77° F (25° C), 500 ft. (152.4 m), 60% humidity, 0.8 pf (3-Phase), 1.0 pf (1-Phase)



**ENGINE**

Manufacturer	HM Ltd.
Model	1.8L
Type	4-Cycle
Aspiration	Natural
Cylinder Configuration	In-line 4
Displacement — cu in (L)	109.8 (1.8)
Bore — in (mm)	3.3 (84.0)
Stroke — in (mm)	3.2 (82.0)
Compression Ratio	8.5:1
Governor	Type Electronic Class ISO 8528 G2
Piston Speed — ft/sec (m/sec)	16.1 (4.9)
Air Cleaner Type	Replaceable Element
<b>LP Gas</b>	
Engine Speed — rpm	3600
Max Power at Rated rpm — hp (kW)	
Standby	26.0 (19.5)
BMEP — psi (kPa)	
Standby	103.7 (715.0)
<b>Natural Gas</b>	
Engine Speed — rpm	3600
Max Power at Rated rpm — hp (kW)	
Standby	25.0 (19.0)
BMEP — psi (kPa)	
Standby	121.3 (836.0)



**CONTROL PANEL**

NEMA 1 steel enclosure with hinged access door  
 Vibration isolated mounted EMCP3.1 control panel  
 Single location customer connector point  
 Electrical stub-up area directly below control panel

**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 is peak rated (as defined in ISO8528-3).

# STANDBY 20 kW 60 Hz

# OLYMPIAN™

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## G20UH3 (3-Phase)

Materials and specifications are subject to change without notice.

Generating Set Technical Data - 3600 rpm/60 Hz		LP Gas		Natural Gas	
		Standby		Standby	
<b>Power Rating</b>	<b>kW (kVA)</b>	20.0 (25.0)		20.0 (25.0)	
<b>Lubricating System</b> Type: Full Pressure Oil Filter: Spin-On, Full Flow Oil Type Required: API CF4 15W-40 Total Oil Capacity Oil Pan	U.S. gal (L) U.S. gal (L)	1.2 (4.5) 1.1 (4.0)		1.2 (4.5) 1.1 (4.0)	
<b>Fuel System</b> Generating Set Fuel Consumption 100% Load 75% Load 50% Load	Cfh (m <sup>3</sup> /hr) Cfh (m <sup>3</sup> /hr) Cfh (m <sup>3</sup> /hr)	173.0 (4.9) 130.7 (3.7) 95.4 (2.7)		441.4 (12.5) 339.0 (9.6) 243.7 (6.9)	
<b>Engine Electrical System</b> Ignition System: Electronic, Distributorless Voltage/Ground: 12Vdc/Negative Battery Charging Generator Ampere Rating	Amps	45		45	
<b>Cooling System</b> Water Pump Type: Centrifugal Radiator System Capacity Incl. Engine Maximum Coolant Static Head Coolant Flow Rate Minimum Temperature to Engine Temperature Rise Across Engine Heat Rejected to Coolant at Rated Power Total Heat Radiated to Room at Rated Power Radiator Fan Load	U.S. gal (L) Ft H <sub>2</sub> O (m H <sub>2</sub> O) U.S. gal/min (L/min) °F (°C) °F (°C) Btu/min (kW) Btu/min (kW) Hp (kW)	1.6 (6.1) 31.5 (9.6) 1427.0 (90.0) 169.0 (76.0) 7.2 (4.0) 1763.0 (31.0) 887.0 (16.0) 3.75 (2.8)		1.6 (6.1) 31.5 (9.6) 1427.0 (90.0) 169.0 (76.0) 7.2 (4.0) 1763.0 (31.0) 887.0 (16.0) 3.75 (2.8)	
<b>Air Requirements</b> Combustion Air Flow Maximum Air Cleaner Restriction Radiator Cooling Air (zero restriction) Generator Cooling Air Allowable Air Flow Restriction (After radiator) Cooling Airflow (@ rated speed) Rate with restriction	Cfm (m <sup>3</sup> /min) In H <sub>2</sub> O (kPa) Cfm (m <sup>3</sup> /min) Cfm (m <sup>3</sup> /min) In H <sub>2</sub> O (kPa) Cfm (m <sup>3</sup> /min)	88.0 (2.5) 6.0 (1.5) 4386.0 (124.2) 551.0 (15.6) 0.99 (0.247) 4238.0 (120.0)		85.0 (2.4) 6.0 (1.5) 4386.0 (124.2) 551.0 (15.6) 0.99 (0.247) 4238.0 (120.0)	
<b>Exhaust System</b> Maximum Allowable Backpressure Exhaust Flow at Rated kW Exhaust Temperature at Rated kW — Dry Exhaust	In Hg (kPa) Cfm (m <sup>3</sup> /min) °F (°C)	- - -		5.1 (17.3) 290 (8.2) 1202.0 (650.0)	
<b>Generating Set Noise Rating*</b> (Without Attenuation) at 3.28 ft (1 m)	dBA	-		-	
<b>Mains Gas Pressure</b> with gas train	mBAR (in H <sub>2</sub> O)	<b>Min</b>	<b>Max</b>	<b>Min</b>	<b>Max</b>
		10 (4)	35 (14)	10 (4)	35 (14)

Generating Set Data	277/480V		240/120V 208/120V	
<b>Motor Starting Capability:</b> (kVA) Self Excited	41.0		32.0	
<b>Full Load Efficiencies:</b> Standby	84.0		83.4	
<b>Reactances (per unit):</b> X <sub>d</sub> X' <sub>d</sub> X'' <sub>d</sub> X <sub>q</sub> X'' <sub>q</sub> X <sub>2</sub> X <sub>0</sub>	3.70 0.11 0.057 1.85 0.086 0.072 0.004		4.92 0.15 0.076 2.46 0.114 0.095 0.006	
<b>Time Constants:</b>	t' <sub>d</sub> 40 ms	t'' <sub>d</sub> 4 ms	t' <sub>do</sub> 1221 ms	t <sub>a</sub> 6 ms

\* dB(A) levels are for guidance only

Consult your Olympian representative for more information.

# STANDBY 25 kW 60 Hz

# OLYMPIAN™

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## G25UH3 (3-Phase)

Materials and specifications are subject to change without notice.

Generating Set Technical Data - 3600 rpm/60 Hz		LP Gas		Natural Gas	
		Standby		Standby	
<b>Power Rating</b>	<b>kW (kVA)</b>	25.0 (31.3)		25.0 (31.3)	
<b>Lubricating System</b> Type: Full Pressure Oil Filter: Spin-On, Full Flow Oil Type Required: API CF4 15W-40 Total Oil Capacity Oil Pan	U.S. gal (L) U.S. gal (L)	1.2 (4.5) 1.1 (4.0)		1.2 (4.5) 1.1 (4.0)	
<b>Fuel System</b> Generating Set Fuel Consumption 100% Load 75% Load 50% Load	Cfh (m <sup>3</sup> /hr) Cfh (m <sup>3</sup> /hr) Cfh (m <sup>3</sup> /hr)	201.3 (5.7) 155.4 (4.4) 113.0 (3.2)		519.1 (14.7) 339.1 (11.3) 286.1 (8.1)	
<b>Engine Electrical System</b> Ignition System: Electronic, Distributorless Voltage/Ground: 12Vdc/Negative Battery Charging Generator Ampere Rating	Amps	45		45	
<b>Cooling System</b> Water Pump Type: Centrifugal Radiator System Capacity Incl. Engine Maximum Coolant Static Head Coolant Flow Rate Minimum Temperature to Engine Temperature Rise Across Engine Heat Rejected to Coolant at Rated Power Total Heat Radiated to Room at Rated Power Radiator Fan Load	U.S. gal (L) Ft H <sub>2</sub> O (m H <sub>2</sub> O) U.S. gal/min (L/min) °F (°C) °F (°C) Btu/min (kW) Btu/min (kW) Hp (kW)	1.6 (6.1) 31.5 (9.6) 1427.0 (90.0) 169.0 (76.0) 8.1 (4.5) 2155.0 (38.0) 1086.0 (19.0) 3.75 (2.8)		1.6 (6.1) 31.5 (9.6) 1427.0 (90.0) 169.0 (76.0) 8.1 (4.5) 2155.0 (38.0) 1086.0 (19.1) 3.75 (2.8)	
<b>Air Requirements</b> Combustion Air Flow Maximum Air Cleaner Restriction Radiator Cooling Air (zero restriction) Generator Cooling Air Allowable Air Flow Restriction (After radiator) Cooling Airflow (@ rated speed) Rate with restriction	Cfm (m <sup>3</sup> /min) In H <sub>2</sub> O (kPa) Cfm (m <sup>3</sup> /min) Cfm (m <sup>3</sup> /min) In H <sub>2</sub> O (kPa) Cfm (m <sup>3</sup> /min)	113.0 (3.2) 6.0 (1.5) 4386.0 (124.2) 551.0 (15.6) 0.99 (0.247) 4238.0 (120.0)		106.0 (3.0) 6.0 (1.5) 4386.0 (124.2) 551.0 (15.6) 0.99 (0.247) 4238.0 (120.0)	
<b>Exhaust System</b> Maximum Allowable Backpressure Exhaust Flow at Rated kW Exhaust Temperature at Rated kW — Dry Exhaust	In Hg (kPa) Cfm (m <sup>3</sup> /min) °F (°C)	- - -		5.1 (17.3) 367.0 (10.4) 1247.0 (675.0)	
<b>Generating Set Noise Rating*</b> (Without Attenuation) at 3.28 ft (1 m)	dBA	-		-	
<b>Mains Gas Pressure</b> with gas train	mBAR (in H <sub>2</sub> O)	<b>Min</b>	<b>Max</b>	<b>Min</b>	<b>Max</b>
		10 (4)	35 (14)	10 (4)	35 (14)

Generating Set Data	277/480V		240/120V 208/120V	
<b>Motor Starting Capability:</b> (kVA) Self Excited	67.0		53.0	
<b>Full Load Efficiencies:</b> Standby	87.0		86.2	
<b>Reactances (per unit):</b> X <sub>d</sub> X' <sub>d</sub> Reactances shown are applicable to the LPG standby rating X'' <sub>d</sub> X <sub>q</sub> X'' <sub>q</sub> X <sub>2</sub> X <sub>0</sub>	3.26 0.08 0.041 1.63 0.060 0.052 0.004		4.34 0.11 0.054 2.17 0.080 0.069 0.005	
<b>Time Constants:</b>	t' <sub>d</sub> 40 ms	t'' <sub>d</sub> 4 ms	t' <sub>do</sub> 1477 ms	t <sub>a</sub> 6 ms

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**G17.5UH3S (1-Phase)**

Generating Set Technical Data - 3600 rpm/60 Hz		LP Gas		Natural Gas	
		Standby		Standby	
<b>Power Rating</b>	<b>kW (kVA)</b>	17.5 (17.5)		17.5 (17.5)	
<b>Lubricating System</b> Type: Full Pressure Oil Filter: Spin-On, Full Flow Oil Type Required: API CF4 15W-40 Total Oil Capacity Oil Pan	U.S. gal (L) U.S. gal (L)	1.2 (4.5) 1.1 (4.0)		1.2 (4.5) 1.1 (4.0)	
<b>Fuel System</b> Generating Set Fuel Consumption 100% Load 75% Load 50% Load	Cfh (m <sup>3</sup> /hr) Cfh (m <sup>3</sup> /hr) Cfh (m <sup>3</sup> /hr)	151.9 (4.3) 116.5 (3.3) 84.8 (2.4)		388.5 (11.0) 300.2 (8.5) 215.4 (6.1)	
<b>Engine Electrical System</b> Ignition System: Electronic, Distributorless Voltage/Ground: 12Vdc/Negative Battery Charging Generator Ampere Rating	Amps	45		45	
<b>Cooling System</b> Water Pump Type: Centrifugal Radiator System Capacity Incl. Engine Maximum Coolant Static Head Coolant Flow Rate Minimum Temperature to Engine Temperature Rise Across Engine Heat Rejected to Coolant at Rated Power Total Heat Radiated to Room at Rated Power Radiator Fan Load	U.S. gal (L) Ft H <sub>2</sub> O (m H <sub>2</sub> O) U.S. gal/min (L/min) °F (°C) °F (°C) Btu/min (kW) Btu/min (kW) Hp (kW)	1.6 (6.1) 31.5 (9.6) 1427.0 (90.0) 169.0 (76.0) 7.2 (4.0) 1564.0 (28.0) 790.0 (14.0) 3.75 (2.8)		1.6 (6.1) 31.5 (9.6) 1427.0 (90.0) 169.0 (76.0) 7.2 (4.0) 1564.0 (28.0) 790.0 (13.9) 3.75 (2.8)	
<b>Air Requirements</b> Combustion Air Flow Maximum Air Cleaner Restriction Radiator Cooling Air (zero restriction) Generator Cooling Air Allowable Air Flow Restriction (After radiator) Cooling Airflow (@ rated speed) Rate with restriction	Cfm (m <sup>3</sup> /min) In H <sub>2</sub> O (kPa) Cfm (m <sup>3</sup> /min) Cfm (m <sup>3</sup> /min) In H <sub>2</sub> O (kPa) Cfm (m <sup>3</sup> /min)	78.0 (2.2) 6.0 (1.5) 4386.0 (124.2) 551.0 (15.6) 0.99 (0.247) 4238.0 (120.0)		74.0 (2.1) 6.0 (1.5) 4386.0 (124.2) 551.0 (15.6) 0.99 (0.247) 4238.0 (120.0)	
<b>Exhaust System</b> Maximum Allowable Backpressure Exhaust Flow at Rated kW Exhaust Temperature at Rated kW — Dry Exhaust	In Hg (kPa) Cfm (m <sup>3</sup> /min) °F (°C)	- - -		5.10 (17.3) 247.0 (7.0) 1180.0 (638.0)	
<b>Generating Set Noise Rating*</b> (Without Attenuation) at 3.28 ft (1 m)	dBA	-		-	
<b>Mains Gas Pressure</b> with gas train	mBAR (In H <sub>2</sub> O)	<b>Min</b>	<b>Max</b>	<b>Min</b>	<b>Max</b>
		10 (4)	35 (14)	10 (4)	35 (14)

Generating Set Data	120/240V		110/220V	
<b>Motor Starting Capability:</b> (kVA) Self Excited	21.0		19.0	
<b>Full Load Efficiencies:</b> Standby	82.6		81.1	
<b>Reactances (per unit):</b> X <sub>d</sub> X' <sub>d</sub> X'' <sub>d</sub> X <sub>q</sub> X'' <sub>q</sub>	3.45 0.23 0.113 1.73 0.161		4.11 0.27 0.134 2.05 0.192	
<b>Time Constants:</b>	t' <sub>d</sub> 40 ms	t'' <sub>d</sub> 5 ms	t' <sub>do</sub> 615 ms	t <sub>a</sub> 10 ms

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**G25UH3S (1-Phase)**

Materials and specifications are subject to change without notice.

Generating Set Technical Data - 3600 rpm/60 Hz		LPG Gas		Natural Gas	
		Standby		Standby	
<b>Power Rating</b>	<b>kW (kVA)</b>	25.0 (25.0)		25.0 (25.0)	
<b>Lubricating System</b> Type: Full Pressure Oil Filter: Spin-On, Full Flow Oil Type Required: API CF4 15W-40 Total Oil Capacity Oil Pan	U.S. gal (L) U.S. gal (L)	1.2 (4.5) 1.1 (4.0)		1.2 (4.5) 1.1 (4.0)	
<b>Fuel System</b> Generating Set Fuel Consumption 100% Load 75% Load 50% Load	Cfh (m <sup>3</sup> /hr) Cfh (m <sup>3</sup> /hr) Cfh (m <sup>3</sup> /hr)	201.3 (5.7) 155.4 (4.4) 109.5 (3.1)		515.6 (14.6) 399.1 (11.3) 279.0 (7.9)	
<b>Engine Electrical System</b> Ignition System: Electronic, Distributorless Voltage/Ground: 12Vdc/Negative Battery Charging Generator Ampere Rating	Amps	45		45	
<b>Cooling System</b> Water Pump Type: Centrifugal Radiator System Capacity Incl. Engine Maximum Coolant Static Head Coolant Flow Rate Minimum Temperature to Engine Temperature Rise Across Engine Heat Rejected to Coolant at Rated Power Total Heat Radiated to Room at Rated Power Radiator Fan Load	U.S. gal (L) Ft H <sub>2</sub> O (m H <sub>2</sub> O) U.S. gal/min (L/min) °F (°C) °F (°C) Btu/min (kW) Btu/min (kW) Hp (kW)	1.6 (6.1) 31.5 (9.6) 1427.0 (90.0) 169.0 (76.0) 8.1 (4.5) 2155.0 (38.0) 1085.0 (19.1) 3.75 (2.8)		1.6 (6.1) 31.5 (9.6) 1427.0 (90.0) 169.0 (76.0) 8.1 (4.5) 2155.0 (38.0) 1085.0 (19.1) 3.75 (2.8)	
<b>Air Requirements</b> Combustion Air Flow Maximum Air Cleaner Restriction Radiator Cooling Air (zero restriction) Generator Cooling Air Allowable Air Flow Restriction (After radiator) Cooling Airflow (@ rated speed) Rate with restriction	Cfm (m <sup>3</sup> /min) In H <sub>2</sub> O (kPa) Cfm (m <sup>3</sup> /min) Cfm (m <sup>3</sup> /min) In H <sub>2</sub> O (kPa) Cfm (m <sup>3</sup> /min)	113.0 (3.2) 6.0 (1.5) 4386 (124.2) 551.0 (15.6) 0.99 (0.247) 4238.0 (120.0)		106.0 (3.0) 6.0 (1.5) 4386 (124.2) 551.0 (15.6) 0.99 (0.247) 4238.0 (120.0)	
<b>Exhaust System</b> Maximum Allowable Backpressure Exhaust Flow at Rated kW Exhaust Temperature at Rated kW — Dry Exhaust	In Hg (kPa) Cfm (m <sup>3</sup> /min) °F (°C)	- - -		5.1 (17.3) 371.0 (10.5) 1247.0 (675.0)	
<b>Generating Set Noise Rating*</b> (Without Attenuation) at 3.28 ft (1 m)	dBA	-		-	
<b>Mains Gas Pressure</b> with gas train	mBAR (In H <sub>2</sub> O)	<b>Min</b>	<b>Max</b>	<b>Min</b>	<b>Max</b>
		10 (4)	35 (14)	10 (4)	35 (14)

Generating Set Data	120/240V		110/220V	
<b>Motor Starting Capability:</b> (kVA) Self Excited	34.0		31.0	
<b>Full Load Efficiencies:</b> Standby	85.6		84.2	
<b>Reactances (per unit):</b> X <sub>d</sub>	3.33		3.97	
X' <sub>d</sub>	0.17		0.20	
Reactances shown are applicable to the LPG standby rating	X'' <sub>d</sub>	0.083	X'' <sub>d</sub>	0.099
X <sub>q</sub>	1.67		1.98	
X'' <sub>q</sub>	0.130		0.155	
<b>Time Constants:</b>	t' <sub>d</sub> 40 ms	t'' <sub>d</sub> 5 ms	t' <sub>do</sub> 775 ms	t <sub>a</sub> 10 ms

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