

# MD1000 - GEM

For Generac Modular Power System (MPS)

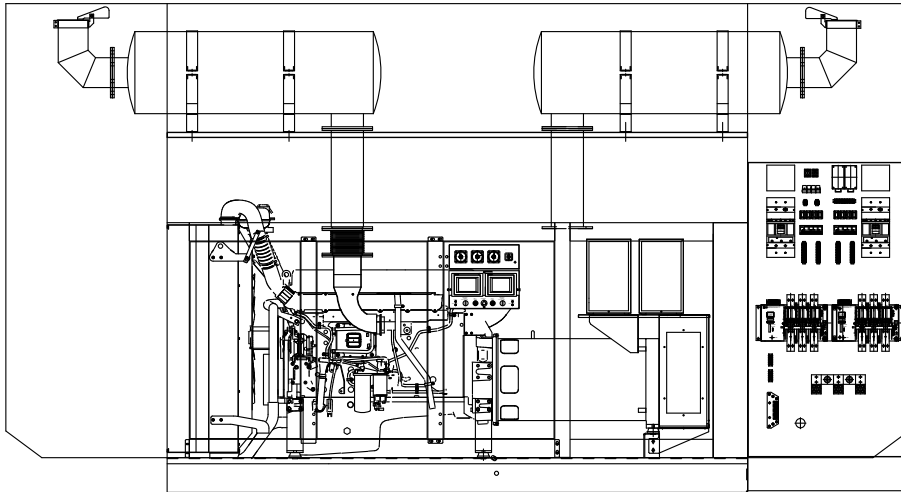
Standby Power Rating  
1000KW 60 Hz

Prime Power Rating  
880KW 60 Hz

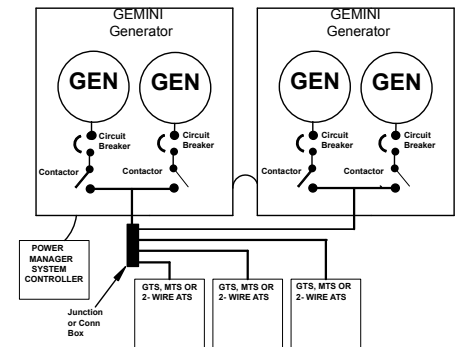
Power Matched

**VOLVO 16.0DTA ENGINES**

Turbocharged / Aftercooled  
EPA Tier II Compliant



PowerManager® Digital Control Platform



## FEATURES

### GEMINI DUAL POWER MODULES:

- Twin 16 liter diesel 6 cylinder engines coupled with two 500 kW alternators with permanent magnet excitation on a single base.
- The two units are connected to a common generator bus through a switching mechanism to parallel to each other for combined power output.
- **POWERMANAGER® DIGITAL CONTROL PLATFORM.** The PowerManager® Digital Control Platform (PM-DCP) is a powerful control system built around a 32 bit industrial microprocessor. Standard factory programming controls the entire engine generator system while allowing the PM-DCP, with its onboard PLC, to be customized to meet any application requirement. The system is available on single diesel installations as well as Modular Paralleling Systems (MPS) from 300 kW - 6000 kW.
- **SINGLE SOURCE SERVICE RESPONSE** from Generac's dealer network provides parts and service know-how for the entire unit, from the engine to the smallest electronic component. You are never on your own when you own a GENERAC POWER SYSTEM.
- **ECONOMICAL DIESEL POWER.** Low cost operation due to modern diesel engine technology. Better fuel utilization plus lower cost per gallon provide real savings.
- **LONGER ENGINE LIFE.** Generac heavy-duty diesels provide long and reliable operating life at 1800 RPM.
- **GENERAC TRANSFER SWITCHES, POWERMANAGER® AND ACCESSORIES.** Long life and reliability is synonymous with GENERAC POWER SYSTEMS. One reason for this confidence is that the GENERAC product line includes its own transfer systems, accessories, and PowerManager® controls for total system compatibility.
- **UL2200 LISTING**

# GENERAC®

# APPLICATION & ENGINEERING DATA

GEM1000

## GENERATOR SPECIFICATIONS (EACH GENERATOR)

TYPE .....	Four Pole Revolving Field
ROTOR INSULATION .....	Class H
STATOR INSULATION .....	Class H
ADDITIONAL INSULATION .....	Fungus Resistant Coating
TOTAL HARMONIC DISTORTION .....	<5%
TELEPHONE INTERFERENCE FACTOR.....	<50
BEARINGS .....	Prelubed and Sealed
COUPLING .....	Direct
LOAD CAPACITY (STANDBY) .....	100%
EXCITATION SYSTEM .....	Permanent Magnet with Wound Field
TEMPERATURE RISE .....	120°C
WINDING PITCH .....	2/3 (skewed)
ROTOR .....	Dynamically Balanced (2 planes)

## VOLTAGE REGULATOR

REGULATION .....	Digital ± 0.25%
SENSING .....	3 Phase
OPERATION .....	Digital
PARALLELING CAPABILITY .....	Yes

## CONTROL PANEL

PM-PC .....	PowerManager Generator Control
TOUCH SCREEN DISPLAY	
AC VOLTS .....	L/L L/N
AC AMPS .....	Per Line
FREQUENCY .....	10-99 Hertz
OIL PRESSURE .....	Digital LCD
COOLANT TEMPERATURE .....	Digital LCD
FUEL LEVEL .....	Digital LCD
DC BATTERY VOLTAGE .....	Digital LCD
RUN TIME HOURS .....	Digital LCD
ENGINE SPEED .....	Digital LCD
GENERATOR POWER (kW) .....	Digital LCD
POWER FACTOR .....	Digital LCD
PANEL POWER .....	LED
NOT IN AUTO .....	LED
COMMON ALARM .....	Flashing LED
GENERATOR ALARM .....	LED
CONTROLS	
Emergency Stop .....	Push Button
Auto-Off-Manual Switch .....	Keyed
ALARMS	
High/Low Voltage .....	Panel Display
High/Low Battery Voltage .....	Panel Display
High/Low Frequency .....	Panel Display
Low Oil Pressure & Prealarm .....	Panel Display
High Oil Water & Prealarm .....	Panel Display
High, Low & Critical Fuel Levels	
Overcrank	
Sensor Failure – Oil Pressure, Temperature, RPM Oil Temp.	
Transfer Switch Fault, Internal Comm Fault	
Communication	
Serial Communication RS232 and RS485	

## INTERNAL DUAL CONTACTOR

RATING .....	1000 Amp
INTERRUPT RATING .....	42,000 Amp
TYPE .....	Single
Mechanism is 3 pole, solenoid actuated with separate inputs from each generator to a single output.	
ACCESSIBILITY .....	Contacts are viewable without disassembly

## PARALLELING CONTROLLER (PM-DCP)

DEVICES REQUIRED (STD) .....	Generac PowerManager
PARALLELING TIME ....	Variable (Consult Factory for Specific Application)
PROTECTIVE DEVICES	
Over/Under Voltage	
Over/Under Frequency	
Reverse Current	
Unequal Load Share	

## ENGINE SPECIFICATIONS (EACH ENGINE)

MAKE .....	Volvo
MODEL .....	TAD1641GE
CYLINDERS .....	6 in-line
DISPLACEMENT - liter (cu. in.) .....	16.1 (984)
BORE - mm (in.) .....	144 (5.67)
STROKE - mm (in.) .....	165 (6.5)
ASPIRATION .....	Turbocharged and Aftercooled
COMPRESSION RATIO .....	16.5:1
VALVES 4/cyl .....	Stellite Faced Heat Resistant Steel
CRANKSHAFT .....	Case Hardened, Die Forged
CONNECTING RODS .....	Forged 4140
CYLINDER BLOCK .....	Cast Iron
CYLINDER HEAD .....	Overhead Valve, Cast Iron
STARTING MOTOR .....	24 Volt DC
BATTERY CHARGING ALTERNATOR .....	80 Amp 24 V
BATTERIES .....	(2) - 12V, 31F
GROUND POLARITY .....	Negative
FUEL .....	#2D (Min. Cetane #40)
FUEL SYSTEM .....	Electronic
GOVERNOR .....	Isochronous
AIR CLEANER .....	Dry
TYPE OF OIL PUMP .....	Gear
LUBE OIL CAPACITY .....	12.6 gallons
LUBE OIL FILTERS .....	full flow and bypass
COOLING SYSTEM .....	Pressurized, Closed Recovery
WATER PUMP .....	Pre-lubed, Self sealing
TYPE OF FAN .....	Pusher
FAN DIAMETER - mm (in.) .....	991 (39)
COOLANT HEATER .....	240 V, 2000 W x 2
EXHAUST SYSTEM .....	Single Muffler per engine
Muffler .....	Critical Grade
Inlet Diameter .....	8"
Exhaust Stack Diameter .....	8"

## GEM1000

### OPERATING DATA

		<b>STANDBY</b>	
<b>GEM1000</b>		<b>STANDBY (PRIME)</b>	
<b>GENERATOR OUTPUT VOLTAGE/KW—60Hz</b>		<b>kW</b>	<b>Rated AMP</b>
277/480V, 3-phase, 0.8 pf	NOTE: Consult your Generac dealer for additional voltages.	1000 (880)	1503 (1323)
600V, 3-phase, 0.8 pf		1000 (880)	1203 (1058)
<b>GENERATOR PARAMETERS</b>			
Subtransient Reactance		0.13 pu.	
Transient Reactance		0.17 pu.	
Synchronous Reactance		2.11 pu.	
<b>MOTOR STARTING TOTAL</b>			
Locked rotor kva at		<b>277/480</b>	
Instantaneous voltage dip 60 Hz		10%	380
		20%	925
		30%	1625
		35%	1900
<b>FUEL</b>			
Fuel consumption		<b>% Load Standby</b>	<b>gal./hr.</b>
		25	18
		50	31
		75	46
		100	62.5
Fuel pump lift	in.	40	
<b>COOLING TOTAL</b>			
Coolant capacity	System - gal.	44	
Coolant flow/min.	60 Hz - gal.	122	
Heat rejection to coolant	BTU/hr.	1,576,440 (1,387,300)	
Radiator air flow	60 Hz - cfm	40,000	
Max. operating air temp. onto radiator	°C (°F)	60 (140) *see note	
Max. operating ambient temp.	°C (°F)	50 (122) *see note	
Max. external pressure drop after radiator	in. H <sub>2</sub> O	0.5	
<b>COMBUSTION AIR REQUIREMENTS - Total</b>			
Flow at rated power	60 Hz - cfm	3230 (2900)	
<b>EXHAUST TOTAL</b>			
Exhaust flow at rated output	60 Hz - cfm	7800 (7100)	
Maximum recommended back pressure	"Hg	3	
Exhaust temperature at rated output	°C (°F)	479 (893)	
Exhaust outlet size		8"	
<b>ENGINE TOTAL</b>			
Rated RPM	60 Hz	1800	
HP at rated kW <sub>e</sub> (gross)	60 Hz	1514	
Piston speed	60 Hz - ft./min	1956	
BMEP	60 Hz - psi	297	
<b>POWER ADJUSTMENT FOR AMBIENT CONDITIONS</b>			
Temperature	-4.5% for every 10°C	40	
	-2.5% for every 10°F	104	
Altitude	-0.8% for every 100 m above - m	1066	
	-2.5% for every 1000 ft. above - ft.	3500	

\*Note: Values given are maximum temperatures to which power rating adjustments can be applied. Consult your Generac representative if operating conditions exceed these maximums. For individual engine parameters, refer to the SD500 Spec Sheet.

### SYSTEM DESCRIPTION

The Gemini system consists of twin 500 kW gensets mounted on a common baseframe within a single, patented sound-attenuated enclosure. The two generators are paralleled to a common generator bus through a unit-mounted switching mechanism to provide 1000 kW of total power output. The control system consists of the PowerManager™ System Controller (PM-SC) along with a PowerManager Paralleling Controller (PM-PC) for each 500 kW genset. The PM-SC is provided in a separate NEMA 1 wall-mount enclosure. It interfaces with the two generator controllers to provide start-stop commands based on utility power, proportional load sharing and safe paralleling of each unit to the common generator bus.

The PowerManager control system, including generator controllers, can be locally or remotely viewed and programmed via Generac GenLink® Communications Software. PowerManager also offers upstream digital communications via RS485/Modbus to other supervisory control systems.

### TYPICAL OPERATION

1. A transfer switch in the PM-DCP configuration detects a utility failure and issues a start command. The command goes to the PM-SC which then issues a start command to the PM-PC's.
2. Each generator will start on its own.
3. The first generator that attains rated frequency and voltage is connected to the common generator bus via the switching mechanism.
4. The second generator will synchronize and close into the bus via the switching mechanism.
5. When both gensets are paralleled to the bus, the PM-SC will signal the transfer switches to transfer to the load. If multiple transfer switches are installed, the PM-SC will connect these switches in 3 separate programmed steps.
6. If an NFPA requirement for 10 second start exists, the first unit connects to the bus. This causes the controller in a separate emergency transfer switch to immediately transfer to the NFPA load.
7. If a single generator fails, load shed contacts are available to disconnect selected non critical loads.
8. If load conditions are reduced (night time operation), one generator can be programmed off line (optional).
9. When utility supply returns, the PM-SC will issue commands to transfer loads back to the utility. It then issues commands to the individual PM-PC's to disconnect from the bus. Each PM-PC will operate its generator for the cool-down period and then issue a shutdown command.

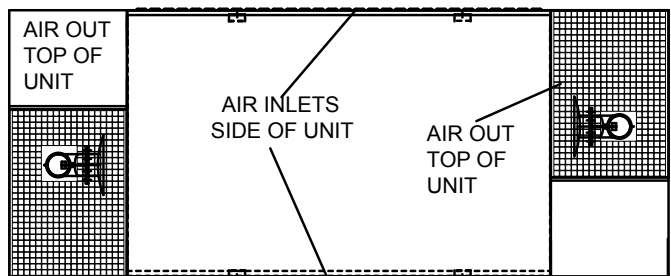
- 16 Liter 1800 RPM Diesel Engines
- 12 Lead 500 kW 60 Hz Generators
- Dual PM-PC Generator Controllers
- High Coolant Temperature Automatic Shutdown
- Low Coolant Level Automatic Shutdown
- Low Oil Pressure Automatic Shutdown
- Overspeed Automatic Shutdown
- Crank Limiter (Solid-state)
- Pre-alarms
- Emergency Stop Button
- Serial RS232 and RS485 Output
- Isochronous Governors
- 0.25% Digital Voltage Regulators
- Fuel Shut off Solenoid
- Primary Fuel Filters
- Factory Installed Cool-Flow Radiators
- 2000 Watt Coolant Heater Per Engine
- UV/Ozone Resistant Hoses
- Rubber-Booted Engine Electrical Connections
- Amp DC Engine Driven Alternator Per Engine
- Air Cleaners
- Dual Oil Filters
- Vibration Isolators
- Oil and Antifreeze
- Critical Mufflers
- 10 Amp Battery Charger Per Engine
- Batteries (2 – 700 CCA, 27F Per Engine)
- Stainless Steel Flex Exhaust Connections
- Flex Fuel Lines
- 3 Sets of Owner's Manuals
- Mainline Circuit Breaker (One at each Generator)
- Two Year Warranty
- Sound Attenuated Weather Protective Enclosure
- Critical Grade Muffler (2)
- GenLink® Communications Software
- UL2200 Listed

## POWERMANAGER® DIGITAL CONTROL PLATFORM

The PowerManager® Paralleling Controller (PM-PC) is a fully programmable, integrated digital generator control console, using a 32-bit industrial microprocessor to handle all the control, monitoring, input and output genset functions. The open architecture used allows customizing the control to meet any customer requirements, yet maintaining the simplicity of operating 'as is' with the factory default programming. (see Generac bulletin #0168840SBY)

The PowerManager® Paralleling Controller (PM-SC) is a separate 32 bit processor that over sees the generator system. It signals the connected gensets to start and stop on power failures, signals transfer switches to acquire load in a prioritized sequence and initiates prioritized load shed if conditions warrant. It also handles proportional load sharing and is the portal for remote communications.

## OPTIONS

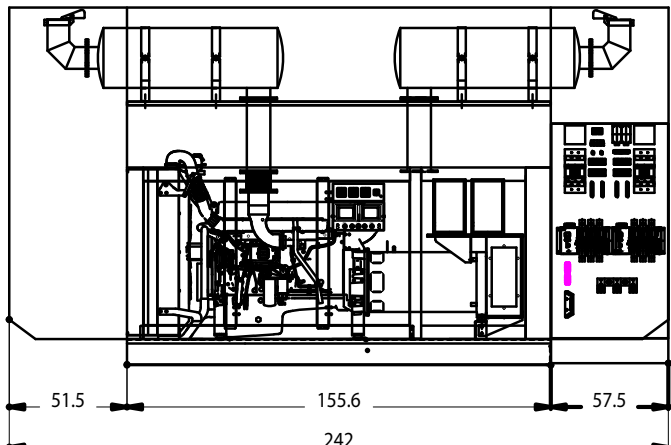


AIR OUT TOP OF UNIT

AIR INLETS SIDE OF UNIT

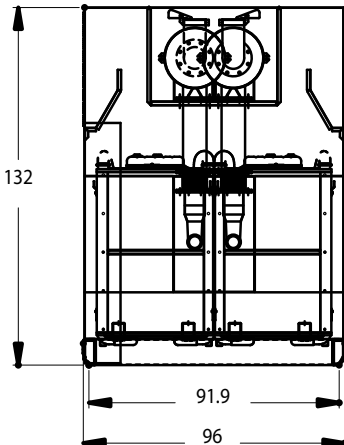
AIR OUT TOP OF UNIT

- **OPTIONAL FUEL ACCESSORIES**
  - Secondary Fuel Filters and Heaters
  - UL Listed Double Wall Base Tanks
  - Base Tank Emergency Vent
- **OPTIONAL ELECTRICAL ACCESSORIES**
  - Battery Warmer
- **OPTIONAL ALTERNATOR ACCESSORIES**
  - Alternator Tropicalization
- **ADDITIONAL OPTIONAL EQUIPMENT**
  - 20 Light Remote Annunciator
  - Remote Relay Panel
  - 2 and 5 Year Extended Warranties



51.5      155.6      57.5

242



132

91.9

96

mm [in.]

Design and specifications subject to change without notice. Dimensions shown are approximate. Contact your Generac dealer for certified drawings. DO NOT USE THESE DIMENSIONS FOR INSTALLATION PURPOSES.