



THERMO KING

Product specification

Product: SGCO-4000

Revision: D

Date: 19-11-2015

SGCO-4000™



CLIP-ON TWO SPEED GENERATOR SET
With SG+ Controller



GeneratorJoe®

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GENERAL DESCRIPTION

Manufacturer	Thermo King Corporation
Construction	<ol style="list-style-type: none"> 1. The generator set is designed for mounting to the upper front structure of an ISO container. 2. The design incorporates a quick connection to the upper container corner castings and/or steel pin-mounting clamps for mounting to container top. 3. Additional attaching points on the container vertical structural members provide a secure mounting arrangement. 4. These lower mounting bolts are retained by a steel plate, stainless steel hinge, and positive ¼ turn latch. 5. A bolt storage tube is welded to the frame to secure the bolt between trips. 6. The rotor washer clip to prevent spinning off during normal use positively retains the lower mounting bolt/plate washer assembly. Provision tube for mounting bolt when not in use. 7. The genset envelope considered the need to access the refrigeration unit control box while mounted on all common refrigeration units from Thermo King, Carrier, StarCool, Daikin, Klinge for either standard or high-cube containers. 8. The genset subcomponents (filters, hoses, wire harness, etc.) are installed and securely fastened to ensure dependable, long-term operation and ease of serviceability. 9. All wires, hoses, tubes etc. are fastened properly to protect integrity and prevent wire chafing. 10. Ring terminals are used on all high voltage connections.
Structural Design	<ol style="list-style-type: none"> 1. The genset is designed to withstand & operate satisfactorily in over-the-road trucking, railway operations & aboard ships. 2. The genset is rated to withstand shock levels of a minimum 3 g's acceleration force in the transversal and vertical directions & 5 g's acceleration force in the longitudinal direction according to IEC 6137.
Structural Frame	<ol style="list-style-type: none"> 1. Structural steel frame is cleaned through a 2-stage mechanical pretreatment (sandblast) and 6-stage chemical pretreatment with a multi-metal iron phosphate passivation, and coated with black polyester TGIC powder (2.5 – 4.0) mils. 2. All steel is commercial quality hot or cold rolled.
Panels and Doors	<ol style="list-style-type: none"> 1. Panels and doors are chemically cleaned through a 6-stage pretreatment line with a multi-metal iron phosphate passivation and top coated with white polyester TGIC powder (2.5 - 4.0) mils. 2. Door material: aluminum, 0.100" (2.5mm) thick. 3. Panel material: aluminum, 0.063" (1.60 mm) thick.
Hardware	<ol style="list-style-type: none"> 1. All hardware (screws, washers, nuts & clamps) are stainless steel for maximum protection from salt-water corrosion. 2. This excludes hardware supplied by original equipment manufacturer suppliers.
Nameplate Instructions	English and Spanish language operating instructions.
Ambient Temperature Range	<p>Structure: -40°C to 50°C (-40°F to 122°F)</p> <p>Operation and starting: -29°C to 50°C (-20°F to 122°F)</p> <p>Running: -40°C to 50°C (-40°F to 122°F)</p>
Alternator Power Rating	15kW. Designed to supply operating power for container refrigeration units complying with ISO 1496-2



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Sound Pressure Level	70 dBA. 5 point average at 7m.
CE Compliance	Compliant with the Machinery Directive 89/392/EEC amending Directive 91/368/EEC, Electro Magnetic Compatibility Directive 89/336/EEC and Low Voltage Directives 73/23/EEC and 93/68/EEC.
Dimensions	Width: 2321 mm (91.3 in) Height: 1173 mm (47.2 in) Depth: 708 mm (27.9 in)
Weight	791.4kg (1,744 lbs) – Total Weight with 125 gallon tank, including genset oil, coolant and battery. Genset to be provided with decal indicating max weight inclusive of fuel.

ENGINE

Type	TK DV6	Protection	Oil temperature, Oil pressure, Coolant level
Cylinders	4 cylinders	Serviceability	Fuel pump, Oil filter, Fuel filter, Starter motor, Air Cyclonic Filter mounted on front side of engine
Fuel injection	Turbocharged direct injection Can Bus communication system		
Displacement	1.56 liter (95 in ³)		
Horsepower	29.2HP (21.8kW) @ 1800 rpm	Oil Capacity	Dry fill: 13.2 liters (14 quart) Wet fill: 12 liters (12.7 quart)
Turbocharger	Fixed Geometry Turbo (TGF)	Coolant Capacity	6.7 liters (7.08 quarts)
Torque	135Nm @ 1800rpm	Emission	Compliant with EPA and CARB Final Tier IV regulations

ENGINE LUBRICATION SYSTEM

Oil Type	API CJ4 grade or better Use straight or multi-weight oils appropriate for the ambient temperature (delivered with 10W30 oil)	Oil Change Interval	Consult applicable service manual
		Oil Filter	Thermo King Part #119959

HOSES

Intake Air Hose	High temperature structural EPDM
Coolant Hoses	High temperature structural EPDM
Intercooler Hoses	VAMAC - Ethylene acrylic elastomers (AEM)

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FUEL SYSTEM

Fuel	Diesel fuel Ultra Low Sulfur (ULSD) CFR 1065.703; max. 15ppm sulfur; ASTM D 975 No 2 diesel. Biodiesel B11 (same maintenance interval) or B20 (specific maintenance intervals, please consult service manual)	Fuel Tank	125 gallon STANDARD fuel tank.
		Fuel Tank Mounting	Bottom-integrated, integral to genset chassis and fork pockets.
Fuel Cap	Held with 200 lb tension chain.	Anti-Siphon	Rated at 30GPM.
Fuel Filters	Integrated water separator fuel filter Thermo King Part #131301	Fuel Tank Drainage	Supplied with a drain plug in the bottom of the tank for purging contaminants.

GENERATOR

Type	Synchronous type generator consisting of a 4-pole alternator wound field design with brushless exciter	Insulation	Class H per NEMA Standard MG-1-1.65
Maximum Temperature Rise	105°C in accordance with NEMA Standard MG 1-22.40	Method of Cooling	Drive disc radial fan
Varnish Treatment – Generator Stator & Exciter Stator	Double Vacuum Pressure Impregnated with polyester resin, top coated with EG43 grey varnish. Exposed windings brushed with black poly-butylene	Varnish Treatment - Rotor	Double Vacuum Pressure Impregnated with polyester resin, top coated with EG43 grey varnish.
Rear Bearing	Single bearing, 6307 Double contact sealed, including a medium fill of Mobil 28 grease.	Engine Flywheel Housing	Cast steel housing. Cast surfaces are machined for the mounting bolts.
Output Power	15 kW @ 60Hz	Voltage	3P 460VAC @60Hz
Power Factor	0.8	RPM	1800

ELECTRICAL POWER RECEPTACLE

Type	ESL 1911-01	Voltage	460V
Current Limit	32 Amps	Protection	Spring loaded protection cover

DOC

Type	Diesel Oxidation Catalyst Exhaust System
Max Exhaust gas flow	137 kg/h at 1800rpm
Muffler	Catalyst acting as muffler, stainless steel terminal



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RADIATOR

Protection	E-coat coating for corrosion resistance or equivalent.	Tube Material	Aluminum
Structure	26 Micro Channel tubes; 52 fins/dm	Fin Material	Aluminum
Core Surface Area	0,099 m ² (1.0656ft ²)	Configuration	Vertical
Core Dimensions	300 mm x 330 mm x 60 mm	Coolant	Chevron ELC or equivalent PH and Reserve Alkalinity specification

INTERCOOLER

Protection	E-coat coating for corrosion resistance or equivalent.	Tube Material	Aluminum
Core Surface Area	0,048 m ² (0.51667ft ²)	Fin Material	Aluminum
Core Dimensions	300 mm x 160 mm x 60 mm	Configuration	Vertical
		Structure	10 Micro Channel tubes; 52 fins/dm

FAN

Type	Electric motor driven Six blades plastic fan	Fan Diameter	355mm
Motor	3 phases, 400V +/-10% Y 1.4 A, PF 0.92 at 50Hz 3 phases, 460V +/-10% Y 1.5 A, PF 0.92 at 60Hz	Lubrication	Ball bearings with low temperature grease
Speed	3390 RPM @ 460 VAC 60Hz 2832 RPM @ 400 VAC 50 Hz	Pitch	30°
Protection	<ul style="list-style-type: none"> - Cast iron end bells and aluminum housing with iron phosphate pretreatment with cathodic epoxy prime coat - Steel terminal box with zinc phosphate pretreatment with cathodic epoxy prime coat and polyester powder painting and bake - Bushing and retaining plate zintek treatment 		

BATTERY

Type	Maintenance free 12 VDC	Cold Cranking Amps	925A at -18°C (0°F)
Recharging	Solid-state battery charging 26A output integrated into SG+ controller.	Terminal Posts	Post terminals and standard battery cable connections are provided.
		Dimensions	330 x 173 x 238 mm (13 x 6.8 x 9.4 in)



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SG+ MICROPROCESSOR CONTROLLER

The SG+ Microprocessor Controller is a one-piece self contained microprocessor for diesel generator sets. This system automatically controls the generator set operation by providing:

- ◆ CAN bus communication
- ◆ Ability to operate at variable speeds for enhanced fuel consumption
- ◆ Automatic unit pre-heat and engine start-up during initial start-up or unattended restart
- ◆ Variable glow plug preheat time
- ◆ Automatic pre-trip capability
- ◆ Provides unit shutdown protection due to high engine coolant temperature, low engine oil pressure, low engine oil level, fuel relay feedback failure or 230/460V alternator overload
- ◆ Automatic unit restart attempt 20 minutes after:
 - High engine water temperature
 - Engine failure to start
 - Check fuel alarm
 - 230/460V alternator overload
 - Fuel relay feedback failure
 - Low engine oil pressure
- ◆ Exterior Deutsch downloading port with protective cap provided.
- ◆ Delayed alternator excitation for 2 minutes
- ◆ Internal self-checking and diagnostic capability
- ◆ Hour meter
- ◆ Multi language menu capability

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SG+ CONTROLLER INTERFACE

The SG+ controller interface contains the following features and components:

A. LCD Digital Display

B. Alarm LED

C. Power LED

D. Six keypad keys:

1. "Escape" use escape a new setting or jump to the parent menu
2. "Up" use to scroll up through the menu display, or increase the value of a setting
3. "Down" use to scroll down through the menu display, or decrease the value of a setting
4. "Enter" use to enter or execute controller menu tasks or commands
5. "Alarm" use to go directly to the alarm list menu and view the alarm information in the display
6. "Language" use to change the display language. English and Spanish are currently available.

E. Unit On/Off switch



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SG+ CONTROLLER INPUTS/OUTPUTS/MENUS

Data Inputs/Outputs		
ENGINE	WATER TEMP.	Water temperature.
	LOAD	Engine load at current speed.
	RPM	Current engine RPM.
	RPM REQUESTED	Requested engine RPM.
	FUEL RATE	Current fuel consumption.
	IGNITION RELAY	Ignition signal to ECU.
	RUN RELAY	Run signal to ECU.
ENGINE LAMPS	AMBER LAMP	On for defects that may lead to speed limitation mode (1500 RPM only).
	STOP LAMP	On for defects that may lead to engine stop.
	WAIT TO START	On when air heater is on, so don't start the engine.
GENERATOR	VOLTAGE MEAS	Current output voltage.
	RUNNING FREQ	Current output frequency (50Hz / 60Hz).
	QUARD CLOSED	On when generator controller (DSR) is turned on.
	BAT. VOLTAGE	Main battery voltage.
	BAT. CHARGER	Main battery charger enabled or disabled.
UNIT	FUEL LEV. MEAN	Fuel level average.
	LOW COOLANT LEVEL	Coolant level switch.
	FUEL PUMP	Fuel pump on or off.

Display Menus

1. Data Menu
 - ◆ Engine
 - ◆ Engine lamps
 - ◆ Generator
 - ◆ Unit
2. Alarm list Menu
3. Message list Menu
4. Commands Menu
 - ◆ PTI
 - ◆ Manual function test
 - ◆ ECU service
 - ◆ Oil priming
 - ◆ System setup
5. Misc Functions Menu
6. Configuration Menu
7. Event log Menu

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SG+ ALARMS/MESSAGES/OPERATING INSTRUCTIONS

Alarms/Messages/Operating instructions

See Thermo King SGCO Maintenance Manual.



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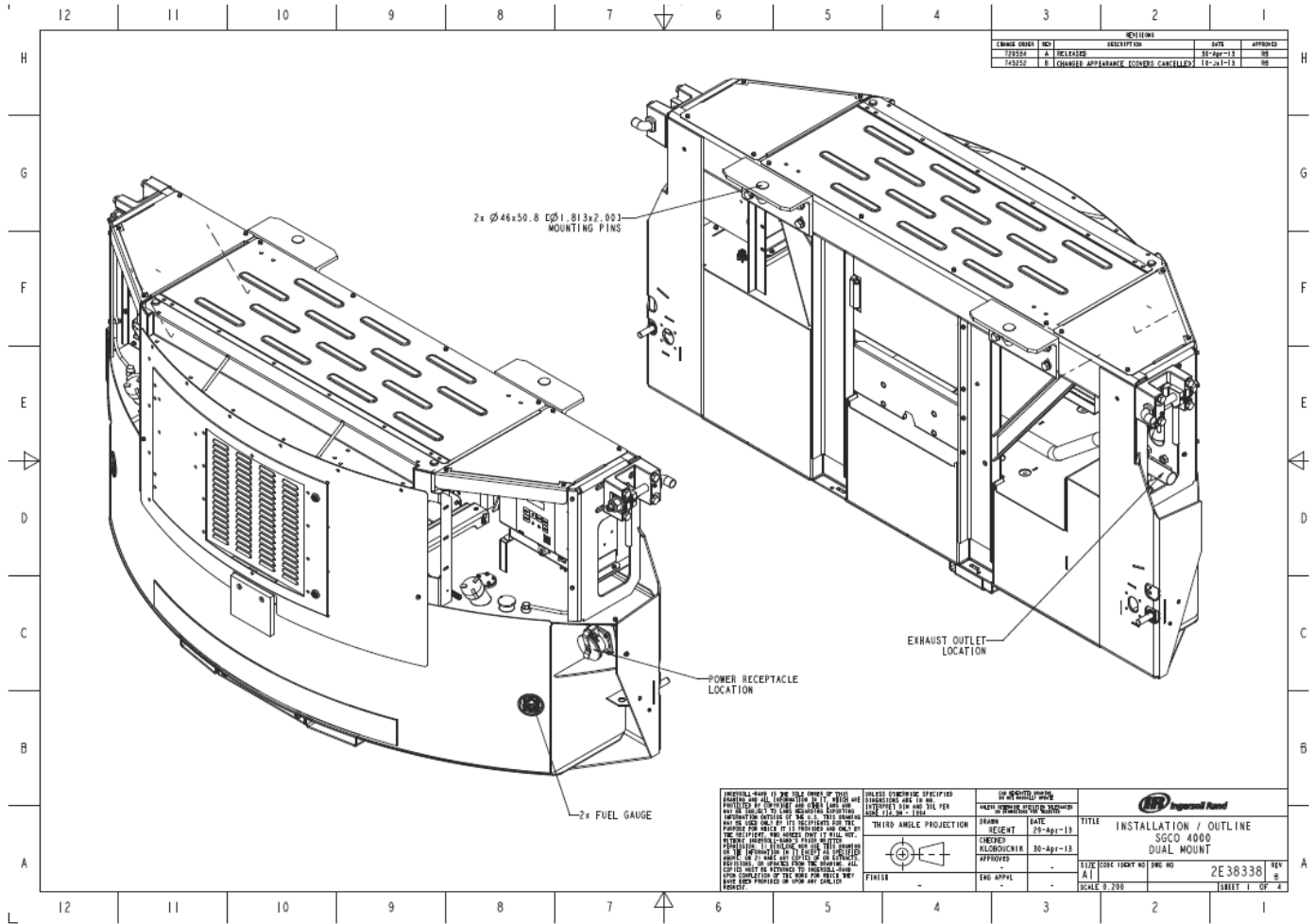
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INSTALLATION DIAGRAM



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Revisions

A	January 13, 2014	Original release
B	February 2, 2015	Construction updated
C	August 27, 2015	Weight specifications Fan motor specifications
D	November 19, 2015	Weight specifications



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