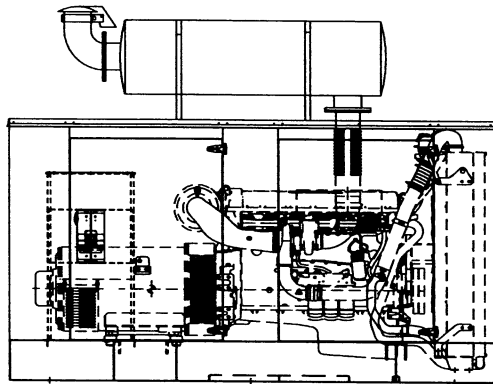


# TAYLOR®

## POWER SYSTEMS

Model: **DS450M2**

Ratings Range:



DRAWING DEPICTS UNIT WITH OPTIONAL EQUIPMENT

### Features

- **Single source responsibility for the generator set and accessories.**
- **Prototype and production tested to insure one step load acceptance per NFPA 110.**
- **Two year limited warranty on generator sets and accessories.**
- **Unit conforms to CSA, NEMA, EGSA, ANSI and other standards.**
- **Microprocessor based control system providing digital metering and monitoring.**
- **Heavy duty 4 cycle industrial engine for reliability and fuel efficiency.**
- **Brushless rotating field generator with class H insulation.**
- **Heavy duty steel base with integral vibration isolators.**
- **Electronic Isochronous Governor**
- **EPA Tier 2 Certified Engine**

		50Hz	60Hz
<b>Standby:</b>	<b>kw</b>	<b>360</b>	<b>384 - 450</b>
	<b>kva</b>	<b>450</b>	<b>480 - 563</b>
<b>Prime:</b>	<b>kw</b>	<b>320 - 324</b>	<b>350 - 405</b>
	<b>kva</b>	<b>400 - 405</b>	<b>438 - 506</b>

Generator	Voltage	PH	Hz	125°C Rise		105°C Rise		
				Standby	Rating	Prime	Rating	
				kw/kVA	Amps	kw/kVA	Amps	
HCI544C311	277/480	3	60	450/563	677	405/506	609	
	139/240	3	60	450/563	1354	405/506	1217	
	254/440	3	60	440/550	722	400/500	656	
	127/220	3	60	440/550	1443	400/500	1312	
	240/416	3	60	420/525	729	385/481	668	
	120/208	3	60	420/525	1457	385/481	1335	
	120/240	3	60	420/525	1263	385/481	1157	
	219/380	3	60	384/480	729	350/438	665	
	120/240	1	60	210/210	875	190/190	792	
	254/440	3	50	360/450	590	320/400	525	
	127/220	3	50	360/450	1181	320/400	1050	
	120/208	3	50	360/450	1249	320/400	1110	
	240/415	3	50	360/450	626	320/400	556	
	219/380	3	50	360/450	684	320/400	608	
	110/190	3	50	360/450	367	320/400	1216	
	110/220	1	50	180/180	818	160/160	727	
	HCI544D311	277/480	3	60	450/563	677	405/506	609
		139/240	3	60	450/563	1354	405/506	1217
254/440		3	60	450/563	739	405/506	664	
127/220		3	60	450/563	1478	405/506	1328	
240/416		3	60	450/563	781	405/506	702	
120/208		3	60	450/563	1562	405/506	1405	
120/240		3	60	450/563	1354	405/506	1217	
219/380		3	60	420/525	798	376/470	714	
120/240		1	60	230/230	958	208/208	867	
254/440		3	50	360/450	590	324/405	531	
127/220		3	50	360/450	1181	324/405	1063	
120/208		3	50	360/450	1249	324/405	1124	
240/415		3	50	360/450	626	324/405	563	
219/380		3	50	360/450	684	324/405	615	
110/190		3	50	360/450	1367	324/405	1231	
110/220		1	50	200/200	909	180/180	818	

RATINGS: All three-phase units are rated at 0.8 power factor. All single-phase units are rated at 1.0 power factor.

STANDBY RATINGS: Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. Ratings are in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271.

PRIME POWER RATINGS: Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings in accordance with ISO-8528/1, overload power in accordance with ISO-3046/1, BS5514, AS2789, and DIN 6271. For limited running time and base load ratings consult the factory. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever.

GENERAL GUIDELINES FOR DERATION: Altitude: Derate 0.5% per 100m (328 ft.) elevation above 1000m (3279 ft.)  
Temperature: Derate 1.0% per 10°C (18°F) temperature above 40°C (104°F).

# APPLICATION & ENGINEERING DATA

## ENGINE

Engine Specifications	60 Hz	50 Hz
Manufacturer	VOLVO	
Engine, model, type	TAD1640GE 4 cycle	
Cylinder arrangement	6 vertical, in-line	
Displacement, cu. in. (L)	983.7 (16.12)	
Bore and stroke, in. (mm)	5.67 (144) x 6.50 (165)	
Compression ratio	17.5:1	
Piston speed, ft/sec. (m/sec)	32.6 (9.9)	27.1 (8.3)
Rated rpm	1800	1500
Max. power at rated rpm, hp (kw)	651 (479)	586 (431)
Torque lb ft	1933	2066
Max. Combustion Pressure psi	2495	2335
Unsilenced Exhaust Noise dB (A)	119	115
Firing Order	1-5-3-6-2-4	
Air cleaner type, all models	Dry paper element	
Air Consumption, cfm (m <sup>3</sup> /min.)	1504 (42.6)	1278 (32.6)
Max. Allowable Air Intake Restriction, in. wc (kPa)	20.1 (5)	20.1 (5)

## EXHAUST

Exhaust System	60 Hz	50 Hz
Exhaust flow at rated kW, cfm (m <sup>3</sup> /min.)	3461 (98)	3016 (85.4)
Exhaust Gas temperature after Turbine, °F (°C)	831 (444)	853 (456)
Maximum allowable back pressure, in. wc (kPa)	40.2 in. wc. (10 KPA)	
Exhaust outlet size at hookup, in. (mm)	7 (178)	

## ENGINE ELECTRICAL

Engine Electrical System	60 Hz	50 Hz
Battery charging alternator: Ground (negative/positive).....	Negative	
Volts (DC).....	24	
Ampere rating.....	80	
Starter motor	7.0 kW (24Volts)	
Recommended battery cold cranking amps (CCA) rating for 0°F (-18°C)	1000	
Quantity of batteries	2	
Battery voltage (DC)	24	

## CONTROL PANEL

DGC-500 Digital Genset Controller utilizes microprocessor based technology to provide a versatile system for genset control, protection and monitoring. This microprocessor design allows customization of the controller's functions to fit virtually every application's needs. DGC-500 accepts conventional engine sender inputs. These can be customized via the BESTCOMS PC software to allow virtually any sender to be used.

### TOTAL MONITORED PARAMETERS

#### ● GENERATOR

- Voltage (A & B phases and A & B phases to neutral)
- Current (A & B phases)
- kVA total and per phase
- Frequency

#### ● ENGINE

- Oil pressure
- Coolant temperature
- Fuel Level
- Battery voltage
- Hours to next service
- Total run time
- Engine RPM

#### ● TIMERS

- Eng. cooldown: 0 to 60 minutes
- Eng. maint.: 0 to 5000 hours
- Pre-Alarm time delays:
  - Weak batt. & low batt. volt: 1-10 seconds
- Alarm time delays:
  - Overspeed: 0-500ms
  - Sender failure: 0-10 seconds
- Arming delays after crank disconnect:
  - Low oil pressure: 5-15 seconds
  - High coolant temp.: 50-150 seconds
- Pre-crank delay: 0-30 seconds

## FUEL

Fuel System	60 Hz	50 Hz
System Supply Flow gph (Lph)	48 (180)	44 (165)
System Return Flow gph (Lph)	6.6 (25)	
Fuel Supply Line Max. Restriction	1.5 psi (10 kPa)	
Max. Allowable Inlet Fuel Temp.	140° F	
Governor type/make, std.	Volvo / EMS2	
Injection Pump type/make	Delphi E1	
Recommended fuel	#1 AND #2 diesel	

## FUEL CONSUMPTION

Fuel Consumption	60 Hz	50 Hz
<b>Diesel, gph at % of load</b>		
100%	30.62	29.98
75%	22.4	21.93
50%	15.3	14.94

## COOLING

Cooling System	60 Hz	50 Hz
Max. Top Tank Temperature °F (°C)	217 (103)	
Radiator system capacity, including engine, gal. (L)	15.85 (60)	
Coolant Flow W/Std. Sys., gpm (Lps)	2.03 (7.7)	1.69 (6.4)
Heat rejected to coolant kW (Btu/min.)	188 (10691)	166 (9440)
Heat rejection radiation from engine, kW (Btu/min.)	22 (1251)	20 (1137)
Fan diameter, including blades, in. (mm)	35 (890)	
Fan Power Consumption hp (kW)	20 (15)	12 (9)

## LUBRICATION

Lubricating System	60 Hz	50 Hz
Oil Press. at Rated Speed psi	44 - 94	
Oil system capacity including filters US gal. (L)	12.7 (48)	
Oil filters	1 FULL FLOW SPIN ON 1 BY-PASS SPIN ON	
Oil Filter Micron Size mm	.04	

#### ● GENERATOR SET PROTECTION

##### ALARMS:

- Low oil pressure
- Overspeed
- Overcrank
- Emerg. Stop button input
- High coolant temp.
- Sender failure
- Low coolant level
- Low fuel level

##### PRE-ALARMS:

- Low oil pressure
- Low battery voltage
- Maintenance interval timer
- High coolant temp.
- Low coolant temp.
- High battery voltage
- Fuel leak
- Weak battery
- Low fuel level
- Battery charger failure

# GENERATOR SPECIFICATIONS

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## STANDARDS

HC4 and HC5 industrial generators meet the requirements of BS5000, VDE0530, UTE5100, NEMA MG1-22, CEMA, IEC34, CSA22.2 AND AS1359.

## EXCITATION SYSTEMS

### **SX440 AVR**

With this self-excited system the main stator provides power via the automatic voltage regulator (AVR) to the exciter stator. The high efficiency semiconductors of the (AVR) ensure positive build up from initial low levels of residual voltage.

The exciter rotor output is fed to the main rotor through a three phase full wave bridge rectifier. The rectifier is protected by a surge suppressor against surges caused, for example, by short circuit or out of phase paralleling. The SX440 will support a range of electronic accessories, including a 'droop' Current Transformer (CT) to permit parallel operation with other ac generators.

### **SX440 AVR**

This sophisticated AVR is incorporated into the permanent magnet generator (PMG) system, and is fitted as an option on industrial generators.

The PMG provides power via the AVR to the main exciter, giving a source of constant excitation power independent of generator output. The main exciter output is then fed to the main rotor, through a full wave bridge, protected by a surge suppressor. The AVR has built-in protection against sustained over-excitation, caused by internal or external faults. This de-excites the machine after a minimum of 5 seconds.

The two phase average voltage sensed MX341 provides voltage regulation of  $\pm 1.0\%$ . If three phase sensing is required with the PMG system the MX321 AVR must be used. We recommend three phase sensing for applications with greatly unbalanced or highly non-linear loads. An engine relief load acceptance feature can enable full load to be applied to the generator in a single step.

### **MX321 AVR**

The most sophisticated of all our AVRs combines all the features of the MX341 with, additionally, three phase rms sensing, for improved regulation (0.5%) and performance. Over voltage protection is built-in and short circuit current level adjustment is an optional facility.

## INSULATION / IMPREGNATION

The insulation system is Class 'H'.

All wound components are impregnated with materials and processes designed specifically to provide protection against the harsh environments encountered in generator applications. Varnishes and resins are selected and developed to provide the high build required for static windings and the high mechanical strength required for rotating components.

## WINDINGS & ELECTRICAL PERFORMANCE

All generator stators are wound to 2/3 pitch. This eliminates triplen (3rd, 9th, 15th...) harmonics on the voltage waveform and is found to be the optimum design for trouble-free supply of non linear loads. The 2/3 pitch design avoids excessive neutral currents, sometimes seen with higher winding pitches, when in parallel with the mains.

A fully connected damper winding reduces oscillations during paralleling. This winding, with 2/3 pitch and carefully selected pole and tooth designs, ensures very low waveform distortion.

## TELEPHONE INTERFERENCE

THF (as defined by BS4999 Part 40) is better than 2%. TIF (as defined by ASA C50.12) is better than 50.

## RADIO INTERFERENCE

The absence of brushgear and the high quality AVR ensure low levels of interference with radio transmissions.

Additional RFI suppression may be supplied if required.

## ENCLOSURE

IP22 (NEMA 1) is standard for all industrial generators. Protection to IP23 (60 degrees from vertical) is available as an option at reduced ratings (5% derate).

Inlet air filters are available as an option on all generators, at reduced ratings (5% derate).

## SHAFT

All generator rotors are dynamically balanced to better than BS6862: Part 1 Grade 2.5 for minimum vibration in operation.

## QUALITY ASSURANCE

Generators are manufactured using production procedures having a quality assurance level to BS5750 Part 2 (ISO9002).