



GILLETTE GENERATORS

LIQUID COOLED NAT. GAS ENGINE GENERATOR SET

60 HZ MODEL

SP-8000

Model	STANDBY 130°C RISE		
	HZ	LPG	N.G.
SP-8000-60 HERTZ	60	475	800



All generator sets are USA prototype built and thoroughly tested. Production models are USA factory built and 100% load tested.



UL1446, UL508, UL142, UL498



NFPA 110, 99, 70, 37

All generator sets meet NFPA-110 Level 1, when equipped with the necessary accessories and installed per NFPA standards.



NEC 700, 701, 702, 708



NEMA ICS10, MG1, ICS6, AB1



ANSI C62.41, 27, 59, 32, 480, 40Q, 81U, 360-05

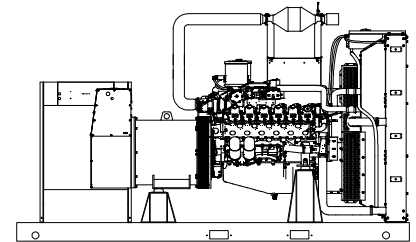


ASCE 7-05 & 7-10

All generator sets meet 180 MPH rating.

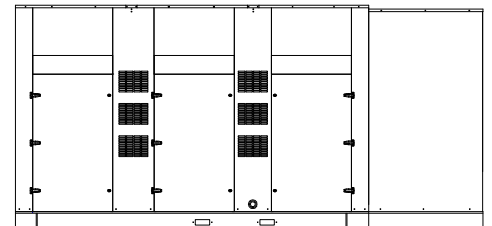


EPA 40CFR Part 60, 1048, 1054, 1065, 1068



“OPEN” GEN-SET

There is no enclosure, so gen-set must be placed within a weather protected area, un-inhabited by humans or animals, with proper ventilation. Silencer not supplied, as installation requirements are not known. However, this item is available as optional equipment.



“LEVEL 2” HOUSED GEN-SET

Full aluminum weather protection and superior sound attenuation for specific low noise applications. Critical grade muffler is standard.

GENERATOR RATINGS

GENERATOR MODEL	VOLTAGE		PH	HZ	LIQUID PROPANE GAS FUEL		NATURAL GAS FUEL	
	L-N	L-L			130°C RISE STANDBY RATING		130°C RISE STANDBY RATING	
					KW/KVA	AMP	KW/KVA	AMP
SP-8000-3-2	120	208	3	60	475/594	1650	800/1000	2779
SP-8000-3-3	120	240	3	60	475/594	1430	800/1000	2408
SP-8000-3-4	277	480	3	60	475/594	715	800/1000	1204
SP-8000-3-5	127	220	3	60	475/594	1560	800/1000	2627
SP-8000-3-16	346	600	3	60	475/594	572	800/1000	963

RATINGS: All three phase gen-sets are 12 lead windings, rated at .8 power factor. 130°C “STANDBY RATINGS” are strictly for gen-sets that are used for back-up emergency power to a failed normal utility power source. This standby rating allows varying loads, with no overload capability, for the entire duration of utility power outage. All gen-set power ratings are based on temperature rise measured by resistance method as defined by MIL-STD 705C and IEEE STD 115, METHOD 6.4.4. All generators have class H (180°C) insulation system on both rotor and stator windings. All factory tests and KW/KVA charts shown above are based on 130°C (standby) R/R winding temperature, within a maximum 40°C ambient condition. Generators operated at standby power ratings must not exceed the temperature rise limitation for class H insulation system, as specified in NEMA MG1-22.40. Specifications & ratings are subject to change without prior notice.

APPLICATION AND ENGINEERING DATA FOR MODEL SP-8000-60 HZ

GENERATOR SPECIFICATIONS

Manufacturer.....Stamford Electric Generators
 Model & Type..... HCI634H.311, 4 Pole, 12 Lead, Three Phase
 HCI634G.311, 4 Pole, 12 Lead, 480V, Three Phase
 HCI634G.07, 4 Pole, 6 Lead, 600V, Three Phase
 Exciter.....Brushless, shunt excited
 Voltage Regulator.....Solid State, HZ/Volts
 Voltage Regulation.....½%, No load to full load
 Frequency.....Field convertible, 60 HZ to 50 HZ
 Frequency Regulation.....½% (½ cycle, no load to full load)
 Unbalanced Load Capability.....100% of standby amps
 Total Stator and Load Insulation.....Class H, 180°C
 Temperature Rise.....130°C R/R, standby rating @ 40°C amb.
 3 Ø Motor Starting @ 30% Voltage Dip (208-240V)...2150 kVA
 3 Ø Motor Starting @ 30% Voltage Dip (480V-600V) 2350 kVA
 Bearing.....1, Pre-lubed and sealed
 Coupling.....Direct flexible disc
 Total Harmonic Distortion.....Max 3½% (MIL-STD705B)
 Telephone Interference Factor.....Max 50 (NEMA MG1-22)
 Deviation Factor.....Max 5% (MIL-STD 405B)
 Ltd. Warranty Period.....24 Months from date of start-up or
1000 hours use, first to occur.

GENERATOR FEATURES

- World Renown Stamford Electric Generator having UL-1446 certification on full amortisseur windings.
- Full generator protection with **Deep Sea 7420** controller, having UL-508 certification.
- Automatic voltage regulator with over-excitation, under-frequency compensation, under-speed protection, and EMI filtering. Entire solid-state board is encapsulated for moisture protection.
- Generator power ratings are based on temperature rise, measured by resistance method, as defined in MIL-STD 705C and IEEE STD 115, Method 6.4.4.
- Power ratings will not exceed temperature rise limitation for class H insulation as per NEMA MG1-22.40.
- Insulation resistance to ground, exceeds 1.5 meg-ohm.
- Stator receives 2000 V. hi-potential test on main windings, and rotor windings receive a 1500 V. hi-potential test, as per MIL-STD 705B.
- Complete engine-generator torsional acceptance, confirmed during initial prototype testing.
- Full load testing on all engine-generator sets, before shipping.
- Self ventilating and drip-proof & revolving field design

ENGINE SPECIFICATIONS AND APPLICATIONS DATA

ENGINE

Manufacturer.....Power Solutions Inc. (PSI)
 Model and Type.....Heavy Duty, 40.0LTCAC, 4 cycle
 Aspiration.....Turbocharged & Charge Air Cooled
 Cylinder Arrangement.....12 Cylinders, Vee
 Displacement Cu. In. (Liters).....2392 (39.2)
 Bore & Stroke In. (Cm.).....5.91 x 7.28 (15.0 x 18.5)
 Compression Ratio.....10.5:1
 Main Bearings & Style.....14, Precision Half-Shell
 Cylinder Head.....Cast Iron
 Pistons.....Cast Aluminum
 Crankshaft.....Forged Steel
 Exhaust Valve.....Inconel, A193
 Governor.....Electronic
 Frequency Reg. (no load-full load).....Isochronous
 Frequency Reg. (steady state).....± 1/4%
 Air Cleaner.....Dry, Replaceable Cartridge
 Engine Speed.....1800
 Piston Speed, ft/min (m./min)......2185 (665)
 Max Power, bhp (kwm) Standby/LPG.....783 (584)
 Max Power, bhp (kwm) Standby/NG.....1234 (921)
 Ltd. Warranty Period.....12 Months or 2000 hrs., first to occur

FUEL SYSTEM

Type.....LPG or NAT. GAS, Vapor Withdrawal
 Fuel Pressure (kpa), in. H₂O*.....(2.74), 11”
 Secondary Fuel Regulator.....NG or LPG Vapor System
 Auto Fuel Lock-Off Solenoid.....Standard on all sets
 Fuel Supply Inlet Line.....(2) 3” NPTF

FUEL CONSUMPTION

LP GAS: FT ³ /HR (M ³ /HR)	STANDBY
100% LOAD	2490 (70.5)
75% LOAD	1917 (54.3)
50% LOAD	1788 (50.6)
LPG = 2500 BTU X FT³/HR = Total BTU/HR LPG Conversion: 8.50 FT³ = 1 LB. : 36.4 FT³ = 1 GAL.	

NAT. GAS: FT ³ /HR (M ³ /HR)	STANDBY
100% LOAD	9048 (256)
75% LOAD	6901 (195)
50% LOAD	5279 (149)
NG = 1000 BTU X FT³/HR = Total BTU/HR	

OIL SYSTEM

Type.....Full Pressure
 Oil Pan Capacity qt. (L).....117 (110)
 Oil Pan Cap. W/ filter qt. (L).....154 (146)
 Oil Filter.....6, Replaceable Spin-On

ELECTRICAL SYSTEM

Ignition System.....Electronic
 Eng. Alternator/Starter: 24 VDC, negative ground, 55 amp/hr.

Recommended battery to -18°C (0° F):(2) 12 VDC, BCI# 31,
 Max. Dimensions: 14”lg x 6 ¾” wi x 10” hi, with standard
 round posts. Min output 1400 CCA. Battery tray (max. dim. at
 15”lg x 7”wi). This model has (2) battery trays, (2) hold down
 straps, (2) sets of battery cables, and (1) battery charger.
 Installation of (2) 12VDC starting batteries connected in series
 for 24VDC output is required, with possible higher AMP/HR
 rating, as described above, if the normal environment
 temperature averages -13° F (-25°C) or cooler.

APPLICATION AND ENGINEERING DATA FOR MODEL SP-8000-60 HZ

COOLING SYSTEM

Type of System Pressurized, closed recovery
 Coolant Pump Pre-lubricated, self-sealing
 Cooling Fan Type (no. of blades) Pusher (10)
 Fan Diameter inches (mm)..... 68" (1727)
 Ambient Capacity of Radiator °F (°C)..... 122 (50.0)
 Engine Jacket Coolant Capacity Gal (L)..... 23.3 (88.1)
 Radiator Coolant Capacity Gal. (L) 43 (164)
 Maximum Restriction of Cooling Air Intake
 and discharge side of radiator in. H₂O (kpa)..... 0.5 (.125)
 Water Pump Flow gpm (L/min)..... 458 (1734)
 Heat Reject Coolant: Btu/min (kw) 43,684 (764)
 Low Radiator Coolant Level Shutdown..... Standard
 Note: Coolant temp. shut-down switch setting at 230°F (110°C) with 50/50
 (water/antifreeze) mix.

AIR REQUIREMENTS

Combustion Air, cfm (m³/min) 1591 (45)
 Radiator Air Flow cfm (m³/min)..... 67,300 (1905)
 Heat Rejected to Ambient:
 Engine: kw (btu/min) 205 (11669)
 Alternator: kw (btu/min)..... 65 (3696)

EXHAUST SYSTEM

Exhaust Outlet Size..... (2) 6"
 Max. Back Pressure, in. hg (KPA)..... 3.8 (13)
 Exhaust Flow, at rated kw: cfm (m³/min) 7316 (207)
 Exhaust Temp., at rated kw: °F (°C) 1283 (670)
 Engines are EPA certified for Natural Gas.

SOUND LEVELS MEASURED IN dB(A)

	Open Set	Level 2 Encl.
Level 2, Critical Silencer	98	88
Level 3, Hospital Silencer	93	82

Note: Open sets (no enclosure) has (2) optional silencer system choices due to unknown job-site applications. Level 2 enclosure has installed critical silencer with upgrade to hospital silencer. Sound tests are averaged from several test points and taken at 23 ft. (7 m) from source of noise at normal operation.

DERATE GENERATOR FOR ALTITUDE

3% per 1000 ft. (305m) above 3000 ft. (914m) from sea level

DERATE GENERATOR FOR TEMPERATURE

2% per 10°F(5.6°C) above 104°F (40°C)

DIMENSIONS AND WEIGHTS

	Open Set	Level 2 Enclosure
Length in (cm).....	186 (472)	246 (625)
Width in (cm).....	92 (234)	92 (234)
Height in (cm).....	98 (249)	118 (300)
3 Ø Net Weight lbs (kg).....	16350 (7416)	16840 (7638)
3 Ø Ship Weight lbs (kg).....	16740 (7593)	17240 (8727)

DEEP SEA 7420 DIGITAL MICROPROCESSOR CONTROLLER



DEEP SEA 7420

The 7420 controller is an auto start mains (utility) failure module for single gen-set applications. This controller includes a backlit LCD display which continuously displays the status of the engine and generator at all times.

The 7420 controller will also monitor speed, frequency, voltage, current, oil pressure, coolant temp., and fuel levels. These modules have been designed to display warning and shut down status. It also includes: (11) configurable inputs • (8) configurable outputs • voltage monitoring • mains (utility) failure detection • (250) event logs • configurable timers • automatic shutdown or warning during fault detection • remote start (on load) • engine preheat • advanced metering capability • hour meter • text LCD displays • protected solid state outputs • test buttons for: stop/reset • manual mode • auto mode • lamp test • start button • power monitoring (kWh, kVAr, kVAh, kVArh)

This controller includes expansion features including RS232, RS484 (using MODBUS-RTU/TCP), direct USB connection with PC, expansion optioned using DSEnet for remote annunciation and remote relay interfacing for a distance of up to 3300FT. The controller software is freely downloadable from the internet and allows monitoring with direct USB cable, LAN, or by internet via the built in web interface.



Further expansion is available by adding the optional "WebNet" gateway interface module. This device will allow comprehensive monitoring of the generator via the cloud including identification, location, and status. Some advantages of this module include: reduced site visits and maintenance costs • remote fuel management • fault analysis • asset tracking • automatic system alerts • maximized system up-time.

STANDARD FEATURES FOR MODEL SP-8000-60 HZ

STANDARD FEATURES

CONTROL PANEL:

Deep Sea 7420 digital microprocessor with logic allows programming in the field. Controller has:

- STOP-MANUAL-AUTO modes and automatic engine shutdowns, signaled by full text LCD indicators:
- Low oil pressure
- High engine temp
- Low Radiator Level
- Three auxiliary alarms
- Battery fail alarm
- Engine fail to start
- Engine over speed
- Engine under speed
- Over & under voltage

Also included is tamper-proof engine hour meter

ENGINE:

Full flow oil filter • Air filter • Oil pump • Solenoid type starter motor • Hi-temp radiator • Jacket water pump

- Thermostat • Pusher fan and guard • Exhaust manifold
- 24 VDC battery charging alternator • Flexible exhaust connector • "Isochronous" duty, electronic governor • Secondary dry fuel regulator • Dry fuel lock-off solenoid • Vibration isolators • Closed coolant recovery system with 50/50 water to anti-freeze mixture • flexible oil & radiator drain hose.

AC GENERATOR SYSTEM:

AC generator • Shunt excited • Brushless design • Circuit Breaker installed and wired to gen-set • Direct connection to engine with flex disc • Class H, 180°C insulation • Self ventilated • Drip proof construction • UL Certified

VOLTAGE REGULATOR:

½% Voltage regulation • EMI filter • Under-speed protection • Over-excitation protection • total encapsulation

DC ELECTRICAL SYSTEM:

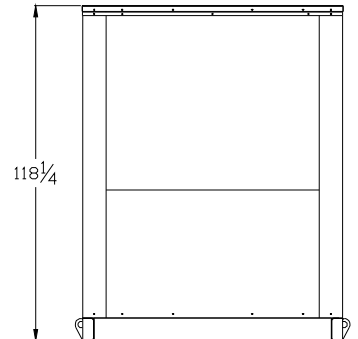
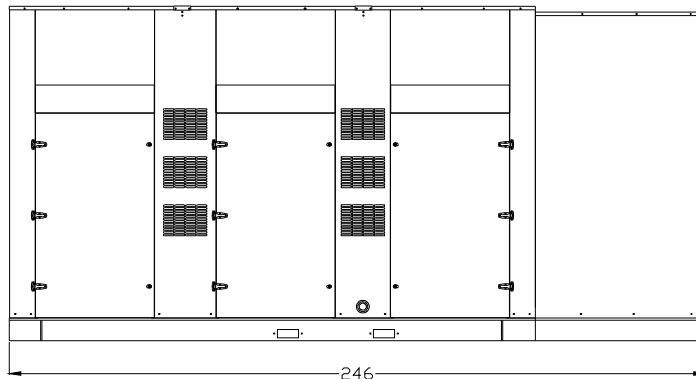
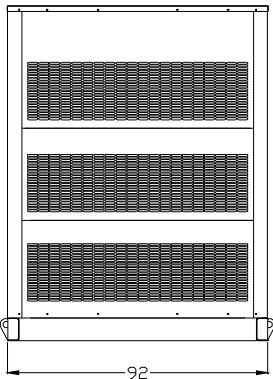
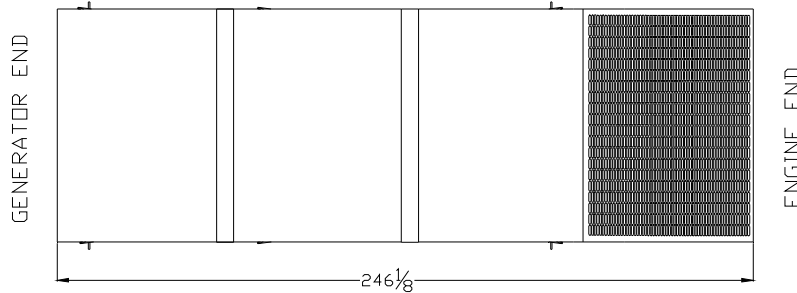
Battery tray • Battery cables • Battery hold down straps

- 2-stage battery float charger with maintaining & recharging automatic charge stages

WEATHER/SOUND PROOF ALUMINUM HOUSING CORROSION RESISTANT PROTECTION CONSISTING OF:

- 9 Heated and Agitated Wash Stages
- Zinc Phosphate Etching-coating Stage
- Final Baked On Enamel Powder Coat
- 18/8 Stainless Steel Hardware

Design & specifications subject to change without prior notice. Dimensions shown are approximate. Contact Gillette for certified drawings. DO NOT USE DIMENSIONS FOR INSTALLATION PURPOSES.



40L



ENERGY

[Stoic.]
56100026 Rev: 2

General Engine Data ⁵										
Type	V-Series				Flywheel housing			SAE No.0		
Number of cylinders	12				Flywheel			SAE No.18		
Aspiration	Charged Cooled Forced Induction				Dry Weight (Fan to Flywheel)		lb	kg	7432	3371
Firing Order	1 - 8 - 5 - 10 - 3 - 7 - 6 - 11 - 2 - 9 - 4 - 12				Wet Weight (Fan to Flywheel)		lb	kg	7894	3581
Rotation Viewed from Flywheel	Counter Clockwise				CG From Outer Flywheel Housing		in	mm	37.5	952
Bore	in	mm	5.906	150	CG Above Crank Centerline		in	mm	8	211
Stroke	in	mm	7.283	185	Oil Specification					SAE 15W-40 Low Ash Gas engine oil (.25-.5% by wt), API CD/CF or higher
Displacement	in ³	L	2392	39.2	Engine Oil Capacity ⁸					
Compression Ratio	10.5 : 1				Min		qts	L	127	120
Exhaust Manifold Type	Water Cooled				Max		qts	L	154	146
Turbo Exhaust Outlet Pipe Size	in	mm	3.5	89	ECU Oil Pressure Warning ⁶		psi	kPa	57	393
Catalyst Inlet Size	in	mm	5	124	ECU Oil Pressure Shut Down ⁶		psi	kPa	47	324
Catalyst Dp	in-H ₂ O	kPa	33.4	8.3	Oil Pressure at 1000 rpm (Idle)					
Maximum Allowable Exhaust Back Pressure	in-Hg	kPa	3.8	13	Min		psi	kPa	60	414
Maximum Fuel System Pressure	psi	kPag	29.0	200.0	Max		psi	kPa	82	565
Maximum Operating pressure to MFG	in-H ₂ O	kPa	11.0	2.7	Max Allowable Oil Temperature		°F	°C	250	121
Minimum Operating pressure to MFG	in-H ₂ O	kPa	7.0	1.7	Coolant Capacity (Engine only)		gal	L	20.1	76.0
Minimum Gas Supply Pipe Size ⁵	in	mm	3	76	Coolant Capacity (Radiator only)		gal	L	23.3	88.1
Maximum Pressure Drop Across CAC	psi	kPa	2.2	15.0	Standard Thermostat Range					
Max Allowable Intake Restriction					Normal Operation Temperature ⁹		°F	°C	176	80
Clean Air Filter	in-H ₂ O	kPa	5.2	1.3	Full Open Temperature ⁹		°F	°C	198	92
Dirty Air Filter	in-H ₂ O	kPa	15.0	3.7	ECU Coolant Temp Warning		°F	°C	220	104
Spark Plug Part Number	Denso GK3-5				ECU Coolant Temp Shutdown		°F	°C	230	110
Standard Spark Plug Gap ¹⁰	in	mm	0.012	0.3	50°C Ambient Capable ¹¹					Pass
Spark Plug Coil - Primary Resistance	Ohms		0.59Ω ± 10%		Max External Coolant Friction Head		psi	kPa	8.70	60
Battery Voltage	Volts		24		CAC Rise Above Ambient Specified		F	C	27	15
Starter Motor Power	HP	kW	13.4	10.0						

Performance Data 60Hz ^{3,5}										
Nominal Engine Speed	RPM		1800		Water Pump Speed		RPM		3499	
Mean Piston Speed	ft/min	m/s	2185	11.1	Engine Coolant Flow		gal/min	L/min	458	1736
RPM Range (Min-Max) ISO 8528-5 G1	RPM		1778 - 1823		Cooling Fan Power ¹¹		HP	kW	53.6	40
Charging Alternator Voltage	Volts		28		Cooling Fan Speed		RPM		1206	
Charging Alternator Current	Amps		55		Cooling Fan Air Flow ¹¹		SCFM	m ³ /min	52000	1472

NG 60Hz Standby Load	Load		100%		75%		50%		25%	
	HP	kWm	1234	920	925	690	617	460	310	231
Power Rating ^{1,2,3,4} Per ISO 3046	psi	bar	227	15.6	170	11.7	113	7.8	57	3.9
MEP (@ rated Load on NG)	lb/hr	kg/hr	452	205	336	152	242	110	156	71
Fuel Consumption ^{3,4,7}	lb/(hp-hr)	g/(kW-hr)	0.367	223	0.363	221	0.393	239	0.502	305
BSFC	°F	°C	1238	670	1185	640	1131	611	1078	581
Turbine Outlet Temperature	lb/hr	kg/hr	7755	3518	5916	2684	4203	1907	2608	1183
Exhaust Mass Flow (entire engine)	ACFM	m ³ /min	4920	139	3586	102	2457	70	1537	44
Exhaust Flow at Turbine Outlet Conditions										

Air Induction System ⁵										
Combustion Air required (entire engine)	lb/hr	kg/hr	7302	3312	5580	2531	3961	1797	2452	1112
Combustion Air Volume Required (entire engine)	ACFM	m ³ /min	1591	45	1216	34	863	24	534	15
Compressor Outlet Temperature ²	°F	°C	277	136	247	119	225	107	154	68

Thermal Balance ⁵										
Total Fuel	BTU/min	kW	154098	2710	115643	2034	82411	1449	54546	959
Mechanical Power	BTU/min	kW	52319	920	39240	690	26160	460	13155	231
Heat Rejected to Cooling Water at Rated Load	BTU/min	kW	43684	768	36018	633	28352	499	20730	365
Heat Rejection CAC at Rated Power	BTU/min	kW	5977	105	3992	70	2242	39	736	13
Heat Rejection to Exhaust (LHV to 150C)	BTU/min	kW	42017	739	29184	513	19192	337	12074	212
Engine Radiated Heat	BTU/min	kW	10101	178	7210	127	6465	114	7851	138

¹ Standby and overload ratings based on ISO 3046 gross flywheel power.

² Technical data based on ISO 3046-1 standards of 77°F(25°C), absolute pressure 14.5Psia(100kPa) and 30% relative humidity.

³ Production tolerances in engines and installed components can account for power variations of ± 5%. Altitude, temperature and excessive exhaust and intake restrictions should be applied to power calculations.

⁴ All fuel and thermal calculations unless otherwise noted are done at ISO 3046 rated load using LHV for NG of 48.17 MJ/kg.

⁵ All values in the following section are provided for informational purpose only and are non-binding.

⁶ >1400RPM.

⁷ See PSI Energy Technical Spec. 56300019 - Fuel Standard.

⁸ Standard Sump Capacity.

⁹ ± 2 degrees Celsius.

¹⁰ ± 0.002" or 0.05mm.

¹¹ At 0.5 in-H₂O of Package Restriction at STP.

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ENERGY

[Stoic.]
56100026 Rev: 2

General Engine Data ⁵										
Type	V-Series				Flywheel housing			SAE No.0		
Number of cylinders	12				Flywheel			SAE No.18		
Aspiration	Charged Cooled Forced Induction				Dry Weight (Fan to Flywheel)		lb	kg	7432	3371
Firing Order	1 - 8 - 5 - 10 - 3 - 7 - 6 - 11 - 2 - 9 - 4 - 12				Wet Weight (Fan to Flywheel)		lb	kg	7894	3581
Rotation Viewed from Flywheel	Counter Clockwise				CG From Outer Flywheel Housing		in	mm	37.5	952
Bore	in	mm	5.906	150	CG Above Crank Centerline		in	mm	8	211
Stroke	in	mm	7.283	185	Oil Specification					
Displacement	in ³	L	2392	39.2	SAE 15W-40 Low Ash Gas engine oil (.25-.5% by wt), API CD/CF or higher					
Compression Ratio	10.5 : 1				Engine Oil Capacity ⁸					
Exhaust Manifold Type	Water Cooled				Min		qts	L	127	120
Turbo Exhaust Outlet Pipe Size	in	mm	3.5	89	Max		qts	L	154	146
Catalyst Inlet Size	in	mm	5	124	ECU Oil Pressure Warning ⁶		psi	kPa	57	393
Catalyst Dp	in-H ₂ O	kPa	33.4	8.3	ECU Oil Pressure Shut Down ⁶		psi	kPa	47	324
Maximum Allowable Exhaust Back Pressure	in-Hg	kPa	3.8	13	Oil Pressure at 1000 rpm (Idle)					
Maximum Fuel System Pressure	psi	kPag	29.0	200.0	Min		psi	kPa	60	414
Maximum Operating pressure to MFG	in-H ₂ O	kPa	11.0	2.7	Max		psi	kPa	82	565
Minimum Operating pressure to MFG	in-H ₂ O	kPa	7.0	1.7	Max Allowable Oil Temperature		°F	°C	250	121
Minimum Gas Supply Pipe Size ⁵	in	mm	3	76	Coolant Capacity (Engine only)		gal	L	20.1	76.0
Maximum Pressure Drop Across CAC	psi	kPa	2.2	15.0	Coolant Capacity (Radiator only)		gal	L	23.3	88.1
Max Allowable Intake Restriction					Standard Thermostat Range					
Clean Air Filter	in-H ₂ O	kPa	5.2	1.3	Normal Operation Temperature ⁹		°F	°C	176	80
Dirty Air Filter	in-H ₂ O	kPa	15.0	3.7	Full Open Temperature ⁹		°F	°C	198	92
Spark Plug Part Number	Denso GK3-5				ECU Coolant Temp Warning		°F	°C	220	104
Standard Spark Plug Gap ¹⁰	in	mm	0.012	0.3	ECU Coolant Temp Shutdown		°F	°C	230	110
Spark Plug Coil - Primary Resistance	Ohms		0.59Ω ± 10%		50°C Ambient Capable ¹¹					
Battery Voltage	Volts		24		Max External Coolant Friction Head		psi	kPa	8.70	60
Starter Motor Power	HP	kW	13.4	10.0	CAC Rise Above Ambient Specified		F	C	27	15

Performance Data 50Hz ^{3,5}										
Nominal Engine Speed	RPM		1500		Water Pump Speed		RPM		2916	
Mean Piston Speed	ft/min	m/s	1821	9.3	Engine Coolant Flow		gal/min	L/min	379	1436
RPM Range (Min-Max) ISO 8528-5 G1	RPM		1477 - 1519		Cooling Fan Power ¹¹		HP	kW	31.0	23
Charging Alternator Voltage	Volts		28		Cooling Fan Speed		RPM		1005	
Charging Alternator Current	Amps		53		Cooling Fan Air Flow ¹¹		SCFM	m ³ /min	43100	1220

NG 50hz Standby Load	Load		100%		75%		50%		25%	
	HP	kWm	992	740	744	555	496	370	250	186
Power Rating ^{1,2,3,4} Per ISO 3046	psi	bar	219	15.1	164	11.3	110	7.6	55	3.8
MEP (@ rated Load on NG)	lb/hr	kg/hr	347	158	262	119	192	87	122	55
Fuel Consumption ^{3,4,7}	lb/(hp-hr)	g/(kW-hr)	0.350	213	0.352	214	0.388	236	0.487	296
BSFC	°F	°C	1183	639	1106	597	1082	583	1065	574
Turbine Outlet Temperature	lb/hr	kg/hr	6043	2741	4630	2100	3320	1506	2103	954
Exhaust Mass Flow (entire engine)	ACFM	m ³ /min	3675	104	2732	77	1901	54	1320	37
Exhaust Flow at Turbine Outlet Conditions										

Air Induction System ⁵										
Combustion Air required (entire engine)	lb/hr	kg/hr	5695	2583	4368	1981	3128	1419	1982	899
Combustion Air Volume Required (entire engine)	ACFM	m ³ /min	1241	35	952	27	682	19	432	12
Compressor Outlet Temperature ²	°F	°C	250	121	242	117	182	83	127	53

Thermal Balance ⁵										
Total Fuel	BTU/min	kW	118722	2088	90439	1590	64622	1136	41397	728
Mechanical Power	BTU/min	kW	42083	740	31562	555	21042	370	10581	186
Heat Rejected to Cooling Water at Rated Load	BTU/min	kW	35132	618	28966	509	22799	401	16669	293
Heat Rejection CAC at Rated Power	BTU/min	kW	4054	71	2866	50	1388	24	332	6
Heat Rejection to Exhaust (LHV to 150C)	BTU/min	kW	30027	528	21583	380	14515	255	8853	156
Engine Radiated Heat	BTU/min	kW	7426	131	5462	96	4877	86	4961	87

¹ Standby and overload ratings based on ISO 3046 gross flywheel power.

² Technical data based on ISO 3046-1 standards of 77°F(25°C), absolute pressure 14.5Psia(100kPa) and 30% relative humidity.

³ Production tolerances in engines and installed components can account for power variations of ± 5%. Altitude, temperature and excessive exhaust and intake restrictions should be applied to power calculations.

⁴ All fuel and thermal calculations unless otherwise noted are done at ISO 3046 rated load using LHV for NG of 48.17 MJ/kg.

⁵ All values in the following section are provided for informational purpose only and are non-binding.

⁶ >1400RPM.

⁷ See PSI Energy Technical Spec. 56300019 - Fuel Standard.

⁸ Standard Sump Capacity.

⁹ ± 2 degrees Celsius.

¹⁰ ± 0.002" or 0.05mm.

¹¹ At 0.5 in-H₂O of Package Restriction at STP.

40L



ENERGY

[Stoic.]
56100026 Rev: 2

General Engine Data ⁵											
Type	V-Series				Flywheel housing				SAE No.0		
Number of cylinders	12				Flywheel				SAE No.18		
Aspiration	Charged Cooled Forced Induction				Dry Weight (Fan to Flywheel)		lb	kg	7432	3371	
Firing Order	1 - 8 - 5 - 10 - 3 - 7 - 6 - 11 - 2 - 9 - 4 - 12				Wet Weight (Fan to Flywheel)		lb	kg	7894	3581	
Rotation Viewed from Flywheel	Counter Clockwise				CG From Outer Flywheel Housing		in	mm	37.5	952	
Bore	in	mm	5.906	150	CG Above Crank Centerline		in	mm	8	211	
Stroke	in	mm	7.283	185	Oil Specification		SAE 15W-40 Low Ash Gas engine oil (.25-.5% by wt), API CD/CF or higher				
Displacement	in ³	L	2392	39.2	Engine Oil Capacity ⁸						
Compression Ratio	10.5 : 1				Min		qts	L	127	120	
Exhaust Manifold Type	Water Cooled				Max		qts	L	154	146	
Turbo Exhaust Outlet Pipe Size	in	mm	3.5	89	ECU Oil Pressure Warning ⁶		psi	kPa	57	393	
Catalyst Inlet Size	in	mm	5	124	ECU Oil Pressure Shut Down ⁶		psi	kPa	47	324	
Catalyst Dp	in-H ₂ O	kPa	33.4	8.3	Oil Pressure at 1000 rpm (Idle)						
Maximum Allowable Exhaust Back Pressure	in-Hg	kPa	3.8	13	Min		psi	kPa	60	414	
Maximum Fuel System Pressure	psi	kPag	29.0	200.0	Max		psi	kPa	82	565	
Maximum Operating pressure to MFG	in-H ₂ O	kPa	11.0	2.7	Max Allowable Oil Temperature		°F	°C	250	121	
Minimum Operating pressure to MFG	in-H ₂ O	kPa	7.0	1.7	Coolant Capacity (Engine only)		gal	L	20.1	76.0	
Minimum Gas Supply Pipe Size ⁵	in	mm	3	76	Coolant Capacity (Radiator only)		gal	L	23.3	88.1	
Maximum Pressure Drop Across CAC	psi	kPa	2.2	15.0	Standard Thermostat Range						
Max Allowable Intake Restriction					Normal Operation Temperature ⁹		°F	°C	176	80	
Clean Air Filter	in-H ₂ O	kPa	5.2	1.3	Full Open Temperature ⁹		°F	°C	198	92	
Dirty Air Filter	in-H ₂ O	kPa	15.0	3.7	ECU Coolant Temp Warning		°F	°C	220	104	
Spark Plug Part Number	Denso GK3-5				ECU Coolant Temp Shutdown		°F	°C	230	110	
Standard Spark Plug Gap ¹⁰	in	mm	0.012	0.3	50°C Ambient Capable ¹¹		Pass				
Spark Plug Coil - Primary Resistance	Ohms		0.59Ω ± 10%		Max External Coolant Friction Head		psi	kPa	8.70	60	
Battery Voltage	Volts				CAC Rise Above Ambient Specified		F	C	27	15	
Starter Motor Power	HP	kW	13.4	10.0							
Performance Data 60Hz ^{3,5}											
Nominal Engine Speed	RPM		1800		Water Pump Speed		RPM		3499		
Mean Piston Speed	ft/min	m/s	2185	11.1	Engine Coolant Flow		gal/min	L/min	458	1736	
RPM Range (Min-Max) ISO 8528-5 G1	RPM		1778 - 1823		Cooling Fan Power ¹¹		HP	kW	53.6	40	
Charging Alternator Voltage	Volts		28		Cooling Fan Speed		RPM		1206		
Charging Alternator Current	Amps		55		Cooling Fan Air Flow ¹¹		SCFM	m ³ /min	52000	1472	
LPG 60hz Standby Load		Load		100%		75%		50%		25%	
Power Rating ^{1,2,3,4} Per ISO 3046	HP	kWm	783	584	587	438	392	292	197	147	
MEP (@ rated Load on NG)	psi	bar	144	9.9	108	7.4	72	5.0	36	2.5	
Fuel Consumption ^{3,4,7}	lb/hr	kg/hr	352	160	266	121	185	84	123	56	
BSFC	lb/(hp-hr)	g/(kW-hr)	0.449	273	0.453	275	0.473	288	0.625	380	
Turbine Outlet Temperature	°F	°C	1292	700	1199	648	1118	603	1050	565	
Exhaust Mass Flow (entire engine)	lb/hr	kg/hr	5786	2625	4363	1979	3112	1412	2051	930	
Exhaust Flow at Turbine Outlet Conditions	ACFM	m ³ /min	3762	107	2694	76	1824	52	1154	33	
Air Induction System ⁵											
Combustion Air required (entire engine)	lb/hr	kg/hr	5434	2465	4098	1859	2927	1328	1928	875	
Combustion Air Volume Required (entire engine)	ACFM	m ³ /min	1184	34	893	25	638	18	420	12	
Compressor Outlet Temperature ²	°F	°C	255	124	243	117	174	79	124	51	
Thermal Balance ⁵											
Total Fuel	BTU/min	kW	119825	2107	89725	1578	63603	1118	41574	731	
Mechanical Power	BTU/min	kW	33211	584	24909	438	16606	292	8351	147	
Heat Rejected to Cooling Water at Rated Load	BTU/min	kW	27735	488	22869	402	18002	317	13164	231	
Heat Rejection CAC at Rated Power	BTU/min	kW	4076	72	2700	47	1450	26	334	6	
Heat Rejection to Exhaust (LHV to 150C)	BTU/min	kW	32842	578	22321	392	14238	250	8618	152	
Engine Radiated Heat	BTU/min	kW	21960	386	16927	298	13307	234	11107	195	

¹ Standby and overload ratings based on ISO 3046 gross flywheel power.

² Technical data based on ISO 3046-1 standards of 77°F(25°C), absolute pressure 14.5Psia(100kPa) and 30% relative humidity.

³ Production tolerances in engines and installed components can account for power variations of ± 5%. Altitude, temperature and excessive exhaust and intake restrictions should be applied to power calculations.

⁴ All fuel and thermal calculations unless otherwise noted are done at ISO 3046 rated load using LHV for LPG 46.38 MJ/kg.

⁵ All values in the following section are provided for informational purpose only and are non-binding.

⁶ >1400RPM.

⁷ See PSI Energy Technical Spec. 56300019 - Fuel Standard.

⁸ Standard Sump Capacity.

⁹ ± 2 degrees Celsius.

¹⁰ ± 0.002" or 0.05mm.

¹¹ At 0.5 in-H₂O of Package Restriction at STP.

40L



ENERGY

[Stoic.]
56100026 Rev: 2

General Engine Data ⁵											
Type	V-Series				Flywheel housing				SAE No.0		
Number of cylinders	12				Flywheel				SAE No.18		
Aspiration	Charged Cooled Forced Induction				Dry Weight (Fan to Flywheel)		lb	kg	7432	3371	
Firing Order	1 - 8 - 5 - 10 - 3 - 7 - 6 - 11 - 2 - 9 - 4 - 12				Wet Weight (Fan to Flywheel)		lb	kg	7894	3581	
Rotation Viewed from Flywheel	Counter Clockwise				CG From Outer Flywheel Housing		in	mm	37.5	952	
Bore	in	mm	5.906	150	CG Above Crank Centerline		in	mm	8	211	
Stroke	in	mm	7.283	185	Oil Specification				SAE 15W-40 Low Ash Gas engine oil (.25-.5% by wt), API CD/CF or higher		
Displacement	in ³	L	2392	39.2	Engine Oil Capacity ⁸						
Compression Ratio	10.5 : 1				Min		qts	L	127	120	
Exhaust Manifold Type	Water Cooled				Max		qts	L	154	146	
Turbo Exhaust Outlet Pipe Size	in	mm	3.5	89	ECU Oil Pressure Warning ⁶		psi	kPa	57	393	
Catalyst Inlet Size	in	mm	5	124	ECU Oil Pressure Shut Down ⁶		psi	kPa	47	324	
Catalyst Dp	in-H ₂ O	kPa	33.4	8.3	Oil Pressure at 1000 rpm (Idle)						
Maximum Allowable Exhaust Back Pressure	in-Hg	kPa	3.8	13	Min		psi	kPa	60	414	
Maximum Fuel System Pressure	psi	kPag	29.0	200.0	Max		psi	kPa	82	565	
Maximum Operating pressure to MFG	in-H ₂ O	kPa	11.0	2.7	Max Allowable Oil Temperature		°F	°C	250	121	
Minimum Operating pressure to MFG	in-H ₂ O	kPa	7.0	1.7	Coolant Capacity (Engine only)		gal	L	20.1	76.0	
Minimum Gas Supply Pipe Size ⁵	in	mm	3	76	Coolant Capacity (Radiator only)		gal	L	23.3	88.1	
Maximum Pressure Drop Across CAC	psi	kPa	2.2	15.0	Standard Thermostat Range						
Max Allowable Intake Restriction					Normal Operation Temperature ⁹		°F	°C	176	80	
Clean Air Filter	in-H ₂ O	kPa	5.2	1.3	Full Open Temperature ⁹		°F	°C	198	92	
Dirty Air Filter	in-H ₂ O	kPa	15.0	3.7	ECU Coolant Temp Warning		°F	°C	220	104	
Spark Plug Part Number	Denso GK3-5				ECU Coolant Temp Shutdown		°F	°C	230	110	
Standard Spark Plug Gap ¹⁰	in	mm	0.012	0.3	50°C Ambient Capable ¹¹				Pass		
Spark Plug Coil - Primary Resistance	Ohms		0.59Ω ± 10%		Max External Coolant Friction Head		psi	kPa	8.70	60	
Battery Voltage	Volts				CAC Rise Above Ambient Specified		F	C	27	15	
Starter Motor Power	HP	kW	13.4	10.0							
Performance Data 50Hz ^{3,5}											
Nominal Engine Speed	RPM		1500		Water Pump Speed		RPM		2916		
Mean Piston Speed	ft/min	m/s	1821	9.3	Engine Coolant Flow		gal/min	L/min	379	1436	
RPM Range (Min-Max) ISO 8528-5 G1	RPM		1477 - 1519		Cooling Fan Power ¹¹		HP	kW	31.0	23	
Charging Alternator Voltage	Volts		28		Cooling Fan Speed		RPM		1005		
Charging Alternator Current	Amps		53		Cooling Fan Air Flow ¹¹		SCFM	m ³ /min	43100	1220	
LPG 50hz Standby Load		Load		100%		75%		50%		25%	
Power Rating ^{1,2,3,4} Per ISO 3046	HP	kWm	653	487	490	365	327	244	164	122	
MEP (@ rated Load on NG)	psi	bar	144	9.9	108	7.5	72	5.0	36	2.5	
Fuel Consumption ^{3,4,7}	lb/hr	kg/hr	265	120	203	92	147	67	98	44	
BSFC	lb/(hp-hr)	g/(kW-hr)	0.405	246	0.415	252	0.450	274	0.595	362	
Turbine Outlet Temperature	°F	°C	1172	633	1134	612	1080	582	1009	543	
Exhaust Mass Flow (entire engine)	lb/hr	kg/hr	4366	1980	3374	1531	2459	1115	1625	737	
Exhaust Flow at Turbine Outlet Conditions	ACFM	m ³ /min	2650	75	2000	57	1411	40	888	25	
Air Induction System ⁵											
Combustion Air required (entire engine)	lb/hr	kg/hr	4102	1860	3171	1438	2312	1049	1527	693	
Combustion Air Volume Required (entire engine)	ACFM	m ³ /min	894	25	691	20	504	14	333	9	
Compressor Outlet Temperature ²	°F	°C	240	115	190	88	142	61	109	43	
Thermal Balance ⁵											
Total Fuel	BTU/min	kW	89959	1582	69000	1213	50048	880	33194	584	
Mechanical Power	BTU/min	kW	27695	487	20771	365	13848	244	6964	122	
Heat Rejected to Cooling Water at Rated Load	BTU/min	kW	23125	407	19068	335	15010	264	10975	193	
Heat Rejection CAC at Rated Power	BTU/min	kW	2796	49	1510	27	651	11	219	4	
Heat Rejection to Exhaust (LHV to 150C)	BTU/min	kW	21662	381	16762	295	11755	207	6673	117	
Engine Radiated Heat	BTU/min	kW	14681	258	10889	191	8785	154	8364	147	

¹ Standby and overload ratings based on ISO 3046 gross flywheel power.

² Technical data based on ISO 3046-1 standards of 77°F(25°C), absolute pressure 14.5Psia(100kPa) and 30% relative humidity.

³ Production tolerances in engines and installed components can account for power variations of ± 5%. Altitude, temperature and excessive exhaust and intake restrictions should be applied to power calculations.

⁴ All fuel and thermal calculations unless otherwise noted are done at ISO 3046 rated load using LHV for LPG 46.38 MJ/kg.

⁵ All values in the following section are provided for informational purpose only and are non-binding.

⁶ >1400RPM.

⁷ See PSI Energy Technical Spec. 56300019 - Fuel Standard.

⁸ Standard Sump Capacity.

⁹ ± 2 degrees Celsius.

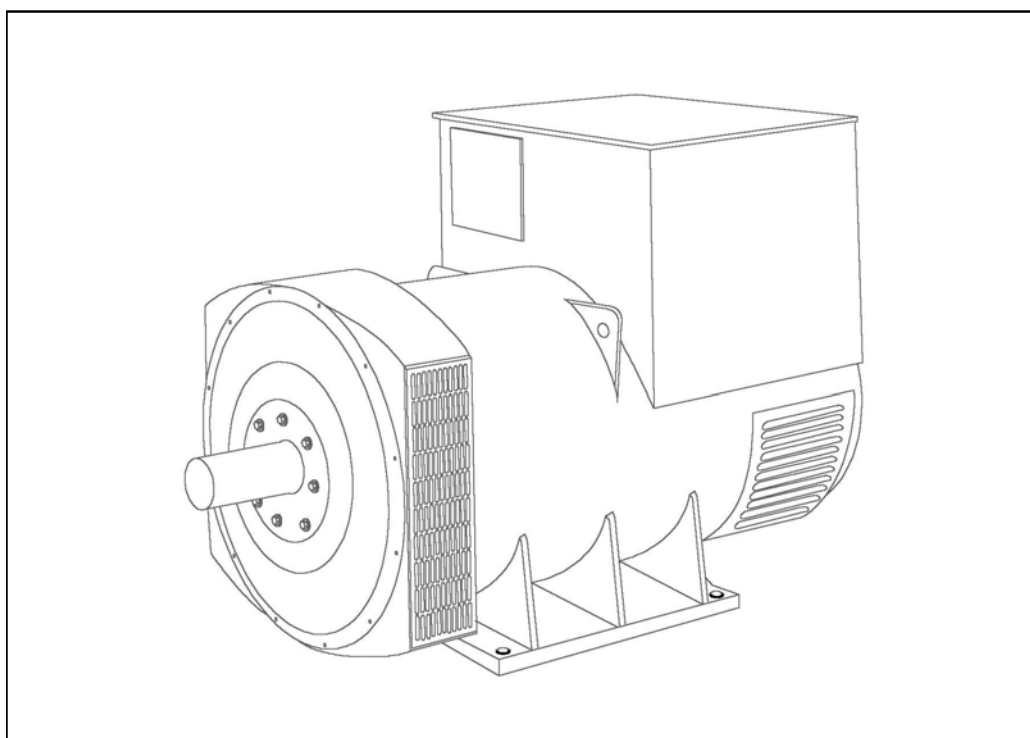
¹⁰ ± 0.002" or 0.05mm.

¹¹ At 0.5 in-H₂O of Package Restriction at STP.

STAMFORD®

HCI634H - Winding 311 and 312

Technical Data Sheet



HCI634H

SPECIFICATIONS & OPTIONS

WINDING 311 and 312

STAMFORD

STANDARDS

Stamford industrial generators meet the requirements of BS EN 60034 and the relevant section of other international standards such as BS5000, VDE 0530, NEMA MG1-32, IEC34, CSA C22.2-100, AS1359.

Other standards and certifications can be considered on request.

VOLTAGE REGULATORS

MX321 AVR - STANDARD

This sophisticated Automatic Voltage Regulator (AVR) is incorporated into the Stamford Permanent Magnet Generator (PMG) system and is fitted as standard to generators of this type.

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 in-built protection against sustained over-excitation, caused by internal or external faults. This de-excites the machine after a minimum of 5 seconds.

Over voltage protection is built-in and short circuit current level adjustments is an optional facility.

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 the 2/3 pitch and carefully selected pole and tooth designs, ensures very low waveform distortion.

TERMINALS & TERMINAL BOX

Standard generators feature a main stator with either 6 ends (Winding 312) or 12 ends (Winding 311) brought out to the terminals, which are mounted on the frame at the non-drive end of the generator. A sheet steel terminal box contains the AVR and provides ample space for the customers' wiring and gland arrangements. It has removable panels for easy access.

SHAFT & KEYS

All generator rotors are dynamically balanced to better than BS6861:Part 1 Grade 2.5 for minimum vibration in operation. Two bearing generators are balanced with a half key.

INSULATION/IMPREGNATION

The insulation system is class 'H'.

All wound components are impregnated with materials and processes designed specifically to provide the high build required for static windings and the high mechanical strength required for rotating components.

QUALITY ASSURANCE

Generators are manufactured using production procedures having a quality assurance level to BS EN ISO 9001.

The stated voltage regulation may not be maintained in the presence of certain radio transmitted signals. Any change in performance will fall within the limits of Criteria 'B' of EN 61000-6-2:2001. At no time will the steady-state voltage regulation exceed 2%.

DE RATES

All values tabulated on page 8 are subject to the following reductions

5% when air inlet filters are fitted.

10% when IP44 Filters are fitted.

3% for every 500 metres by which the operating altitude exceeds 1000 metres above mean sea level.

3% for every 5 C by which the operational ambient temperature exceeds 40 C.

Note: Requirement for operating in an ambient exceeding 60 C must be referred to the factory.

NB Continuous development of our products entitles us to change specification details without notice, therefore they must not be regarded as binding.

Front cover drawing typical of product range.

HCI634H



WINDING 311 and 312

CONTROL SYSTEM	SEPARATELY EXCITED BY P.M.G.	
A.V.R.	MX321	
VOLTAGE REGULATION	± 0.5 %	With 4% ENGINE GOVERNING
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)	

INSULATION SYSTEM	CLASS H
PROTECTION	IP23
RATED POWER FACTOR	0.8
STATOR WINDING	DOUBLE LAYER LAP
WINDING PITCH	TWO THIRDS
WINDING LEADS	6 (Wdg 312) or 12 (Wdg 311)
STATOR WDG. RESISTANCE	0.003 Ohms PER PHASE AT 22°C STAR CONNECTED
ROTOR WDG. RESISTANCE	1.88 Ohms at 22°C
EXCITER STATOR RESISTANCE	17 Ohms at 22°C
EXCITER ROTOR RESISTANCE	0.079 Ohms PER PHASE AT 22°C
R.F.I. SUPPRESSION	BS EN 61000-6-2 & BS EN 61000-6-4, VDE 0875G, VDE 0875N. refer to factory for others
WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%
MAXIMUM OVERSPEED	2250 Rev/Min
BEARING DRIVE END	BALL. 6224 (ISO)
BEARING NON-DRIVE END	BALL. 6317 (ISO)

	1 BEARING				2 BEARING			
WEIGHT COMP. GENERATOR	2117 kg				2145 kg			
WEIGHT WOUND STATOR	1010 kg				1010 kg			
WEIGHT WOUND ROTOR	866 kg				821 kg			
WR ² INERTIA	20.0438 kgm ²				19.4965 kgm ²			
SHIPPING WEIGHTS in a crate	2173kg				2180kg			
PACKING CRATE SIZE	183 x 92 x 140(cm)				183 x 92 x 140(cm)			
	50 Hz				60 Hz			
TELEPHONE INTERFERENCE	THF<2%				TIF<50			
COOLING AIR	1.614 m ³ /sec 3420 cfm				1.961 m ³ /sec 4156 cfm			
VOLTAGE STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
VOLTAGE PARALLEL STAR (*)	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138
VOLTAGE DELTA	220	230	240	254	240	254	266	277
kVA BASE RATING FOR REACTANCE VALUES	910	940	910	875	1025	1063	1075	1125
X _d DIR. AXIS SYNCHRONOUS	2.99	2.80	2.51	2.15	3.37	3.13	2.89	2.78
X' _d DIR. AXIS TRANSIENT	0.25	0.24	0.21	0.18	0.29	0.27	0.25	0.24
X'' _d DIR. AXIS SUBTRANSIENT	0.18	0.17	0.15	0.13	0.19	0.18	0.17	0.16
X _q QUAD. AXIS REACTANCE	1.77	1.65	1.49	1.27	2.00	1.86	1.72	1.65
X' _q QUAD. AXIS SUBTRANSIENT	0.19	0.18	0.16	0.14	0.22	0.20	0.19	0.18
X _L LEAKAGE REACTANCE	0.09	0.09	0.07	0.06	0.10	0.09	0.08	0.08
X ₂ NEGATIVE SEQUENCE	0.20	0.19	0.17	0.14	0.23	0.21	0.20	0.19
X ₀ ZERO SEQUENCE	0.03	0.02	0.02	0.02	0.03	0.03	0.02	0.02

REACTANCES ARE SATURATED

VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED

T' _d TRANSIENT TIME CONST.	0.185
T'' _d SUB-TRANSTIME CONST.	0.025
T' _{do} O.C. FIELD TIME CONST.	2.44
T _a ARMATURE TIME CONST.	0.04
SHORT CIRCUIT RATIO	1/X _d

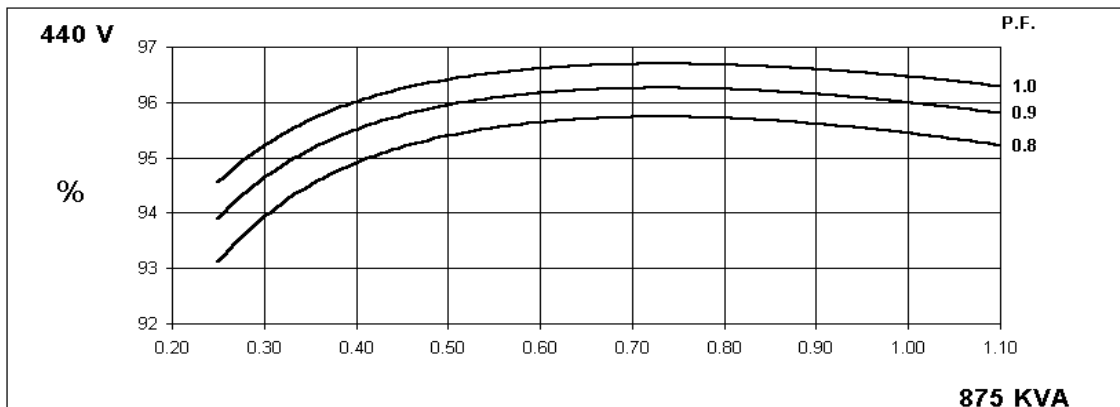
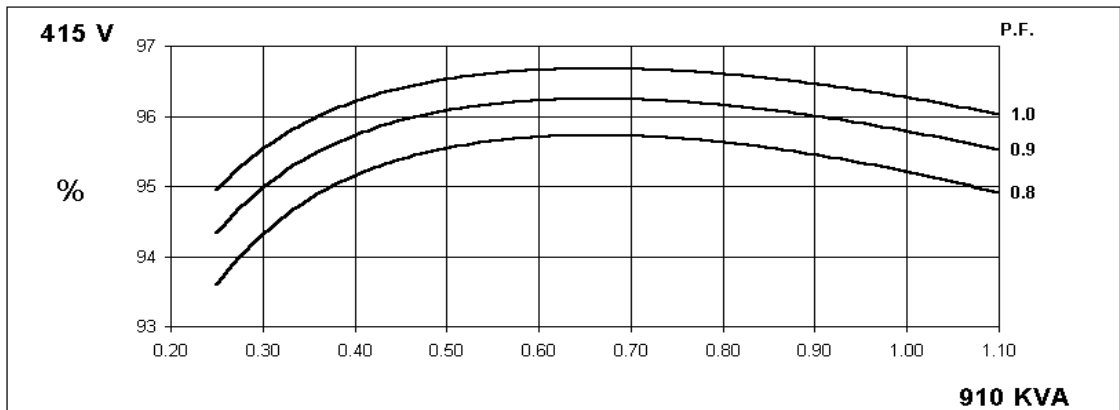
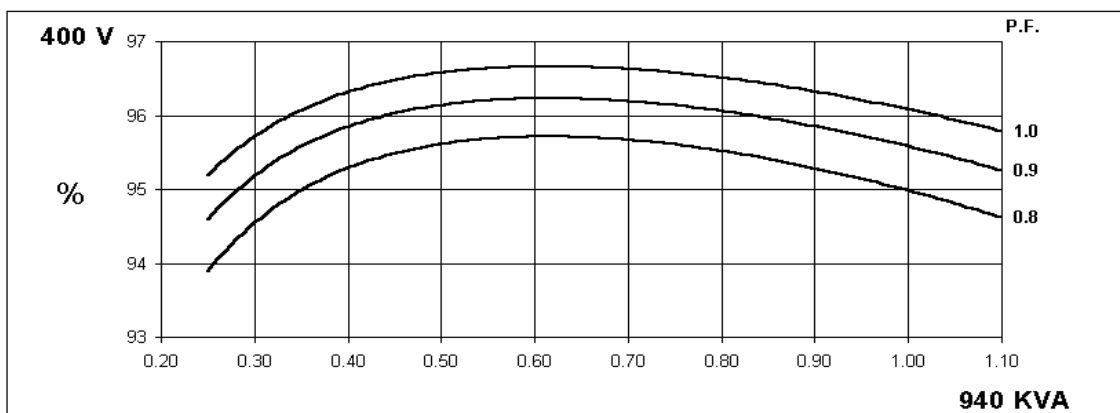
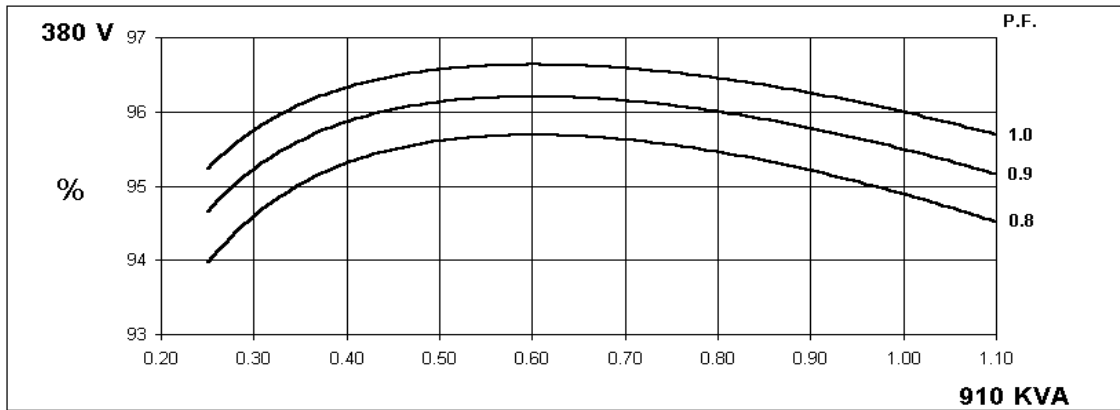
(*) Parallel Star connection only available with Wdg 311

50
Hz

STAMFORD

HCI634H
WINDING 311 and 312

THREE PHASE EFFICIENCY CURVES

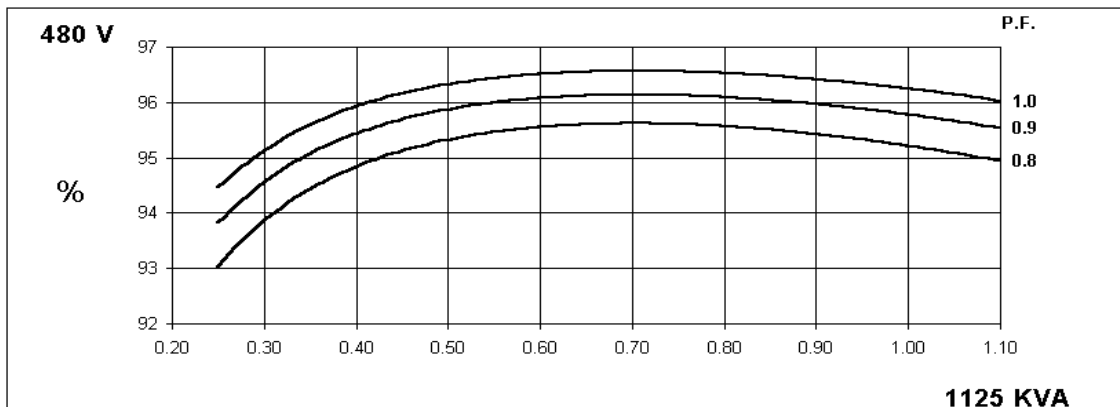
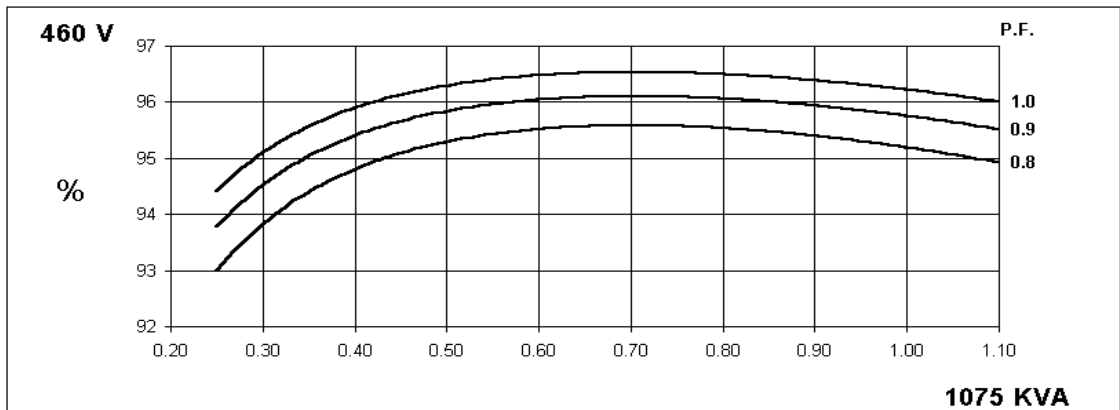
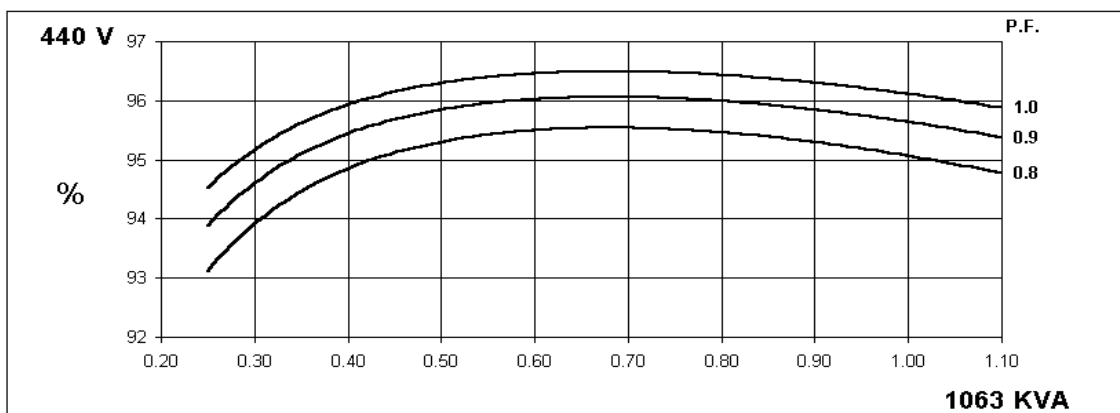
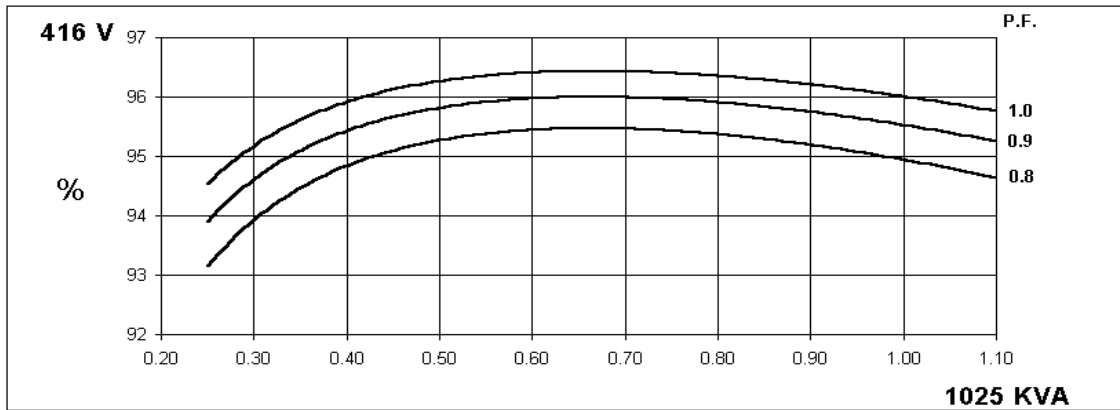


60
Hz

STAMFORD

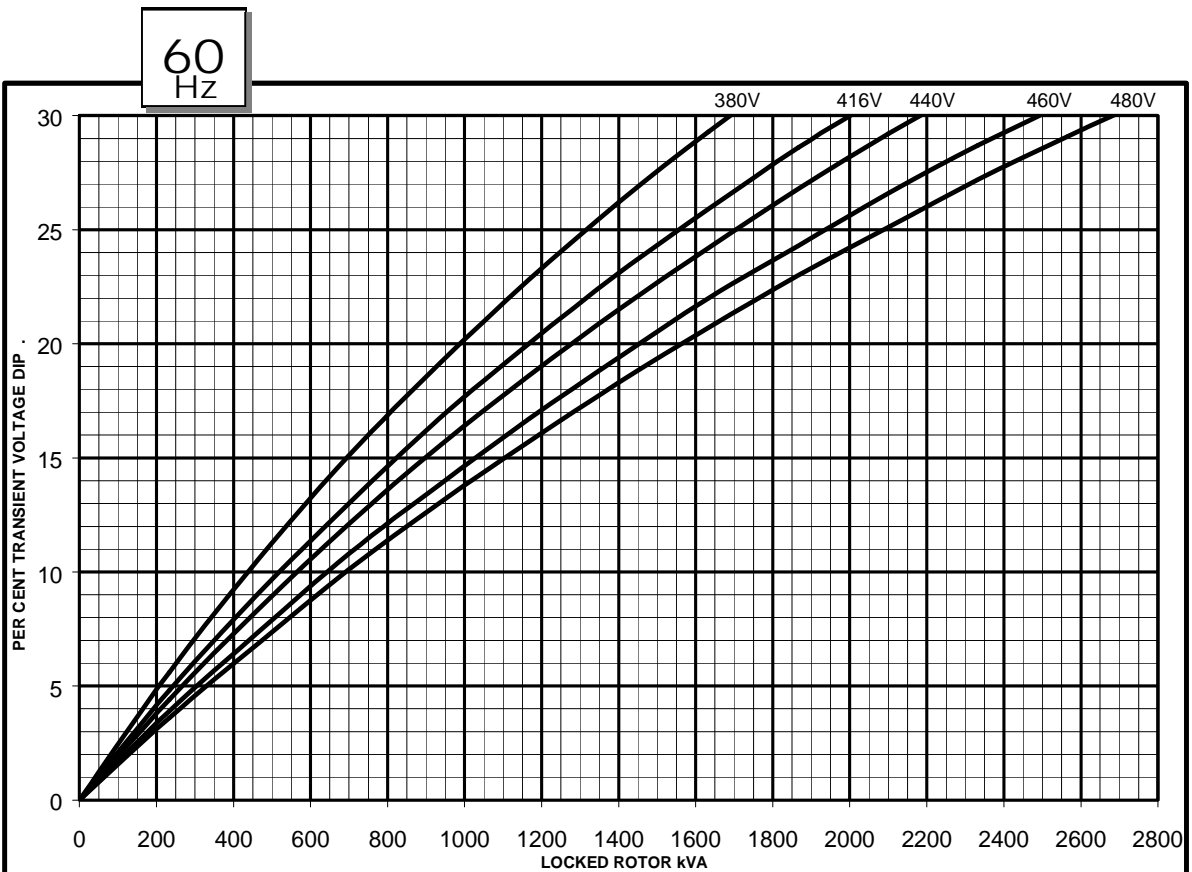
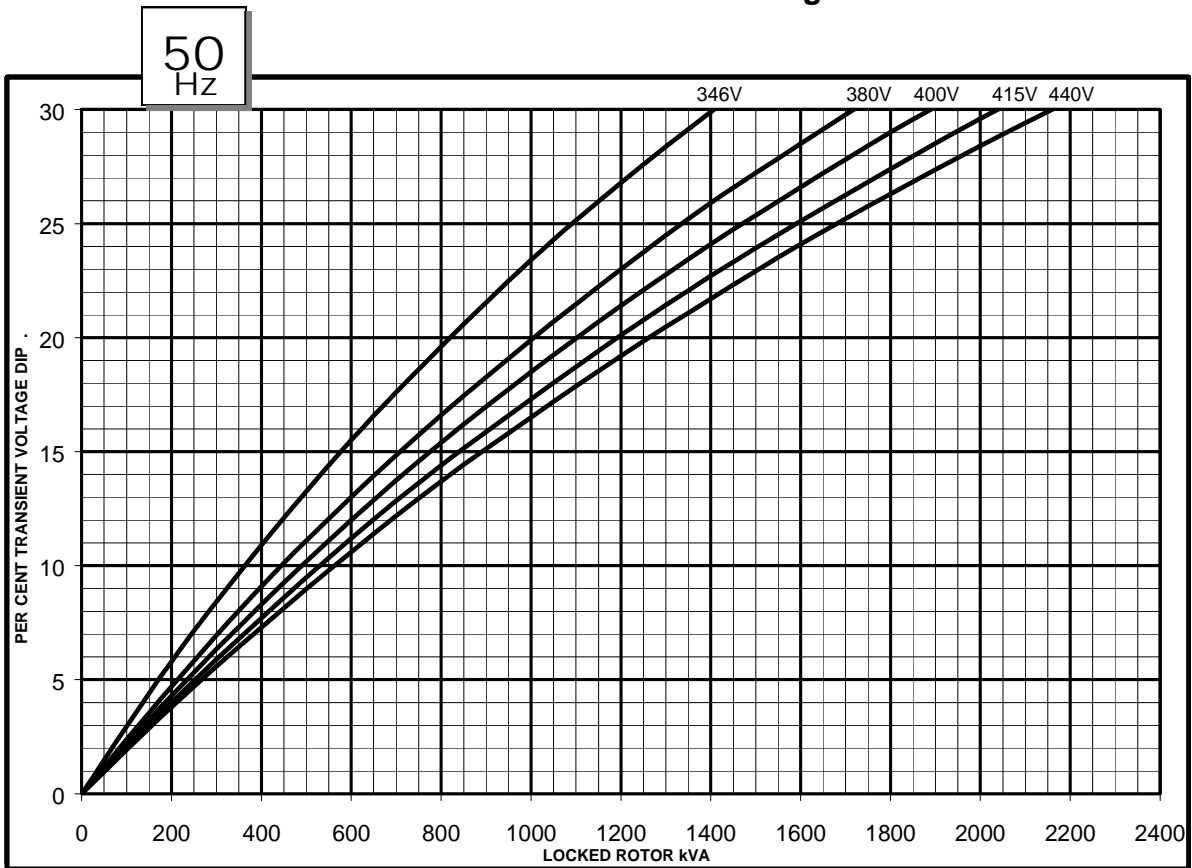
HCI634H
WINDING 311 and 312

THREE PHASE EFFICIENCY CURVES



HCI634H
WINDING 311 and 312

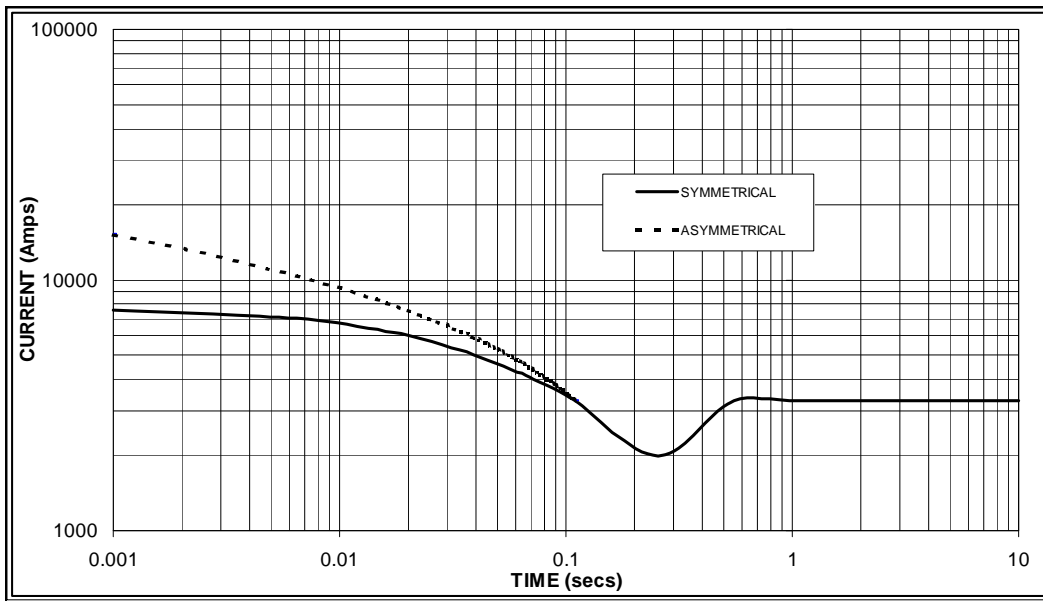
Locked Rotor Motor Starting Curve



WINDING 311 and 312

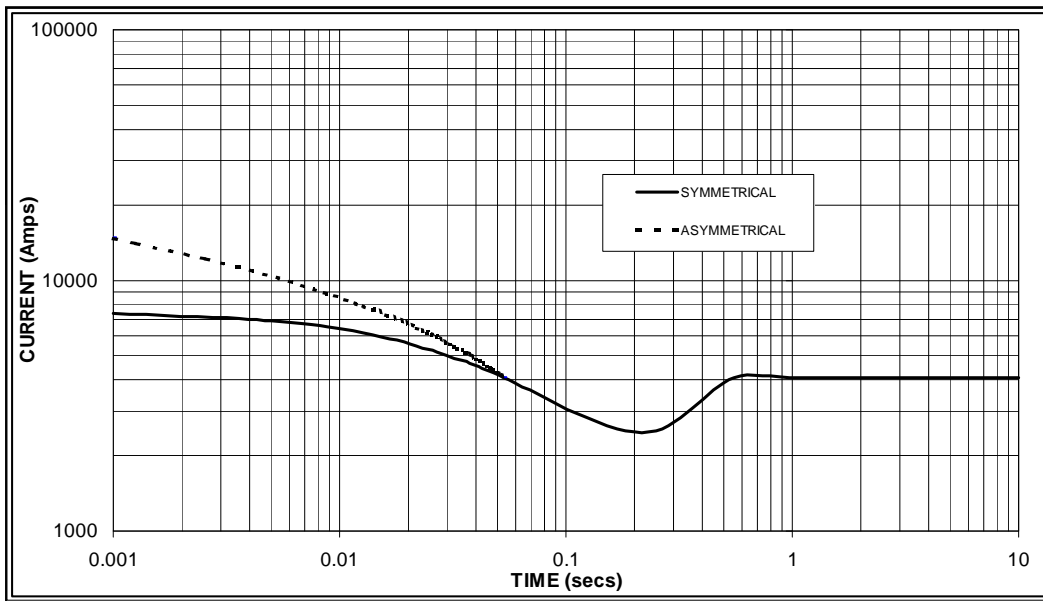
**Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed
Based on star (wye) connection.**

50
Hz



Sustained Short Circuit = 3,300 Amps

60
Hz



Sustained Short Circuit = 4,000 Amps

Note 1

The following multiplication factors should be used to adjust the values from curve between time 0.001 seconds and the minimum current point in respect of nominal operating voltage :

50Hz		60Hz	
Voltage	Factor	Voltage	Factor
380v	X 1.00	416v	x 1.00
400v	X 1.07	440v	x 1.06
415v	X 1.12	460v	x 1.12
440v	X 1.18	480v	x 1.17

The sustained current value is constant irrespective of voltage level

Note 2

The following multiplication factor should be used to convert the values calculated in accordance with NOTE 1 to those applicable to the various types of short circuit :

	3-phase	2-phase L-L	1-phase L-N
Instantaneous	x 1.00	x 0.87	x 1.30
Minimum	x 1.00	x 1.80	x 3.20
Sustained	x 1.00	x 1.50	x 2.50
Max. sustained duration	10 sec.	5 sec.	2 sec.

All other times are unchanged

Note 3

Curves are drawn for Star (Wye) connected machines.
For Delta connection multiply the Curve current value by 1.732

HCI634H

Winding 311 and 312 0.8 Power Factor

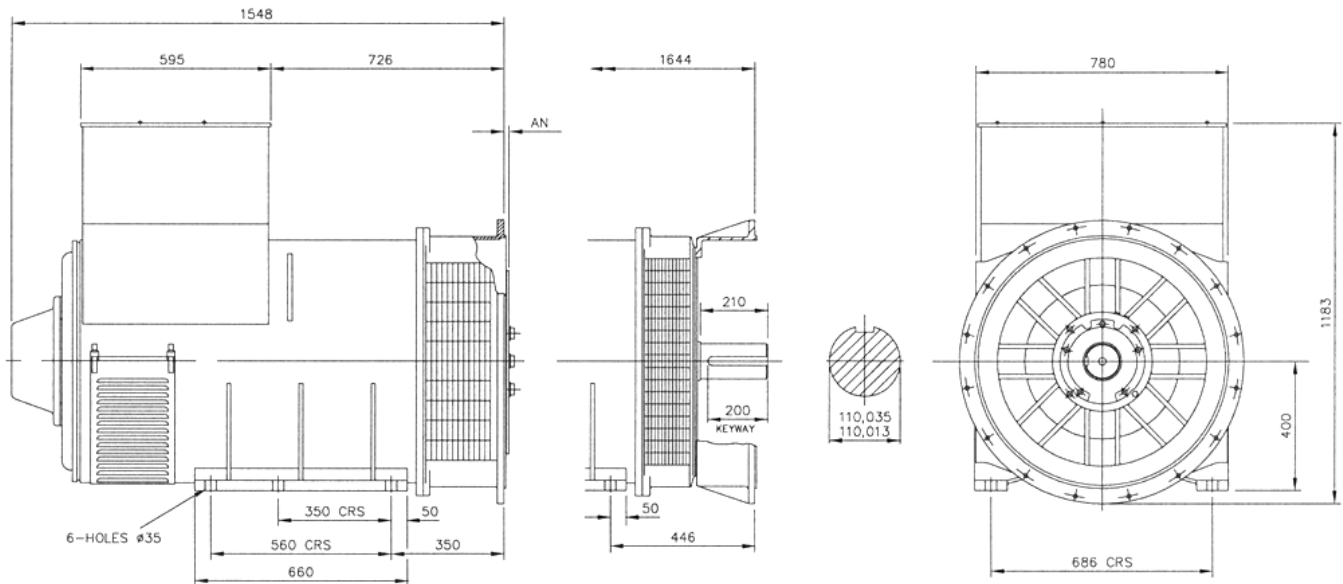
RATINGS

Class - Temp Rise	Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C				
50Hz	Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	Parallel Star (V) *	180	200	208	220	180	200	208	220	180	200	208	220	180	200	208	220
	Delta (V)	220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
kVA	830	860	830	800	910	940	910	875	960	980	960	920	1000	1010	1000	960	
kW	664	688	664	640	728	752	728	700	768	784	768	736	800	808	800	768	
Efficiency (%)	95.2	95.3	95.4	95.6	94.9	95.0	95.2	95.4	94.7	94.8	95.1	95.3	94.5	94.7	94.9	95.2	
kW Input	697	722	696	669	767	792	765	734	811	827	808	772	847	853	843	807	

60Hz	Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	Parallel Star (V) *	208	220	230	240	208	220	230	240	208	220	230	240	208	220	230	240
	Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
kVA	913	963	1000	1025	1025	1063	1075	1125	1088	1125	1138	1188	1125	1163	1175	1219	
kW	730	770	800	820	820	850	860	900	870	900	910	950	900	930	940	975	
Efficiency (%)	95.2	95.3	95.3	95.4	94.9	95.1	95.2	95.2	94.8	94.9	95.0	95.1	94.6	94.8	94.9	95.0	
kW Input	767	808	839	860	864	894	903	945	918	948	958	999	951	981	991	1027	

* Parallel Star only available with Wdg 311

DIMENSIONS



SAE	14	18	21	24
AN	25.4	15.87	0	0

STAMFORD

Head Office Address:
Barnack Road, Stamford
Lincolnshire, PE9 2NB
United Kingdom
Tel: +44 (0) 1780 484000
Fax: +44 (0) 1780 484100

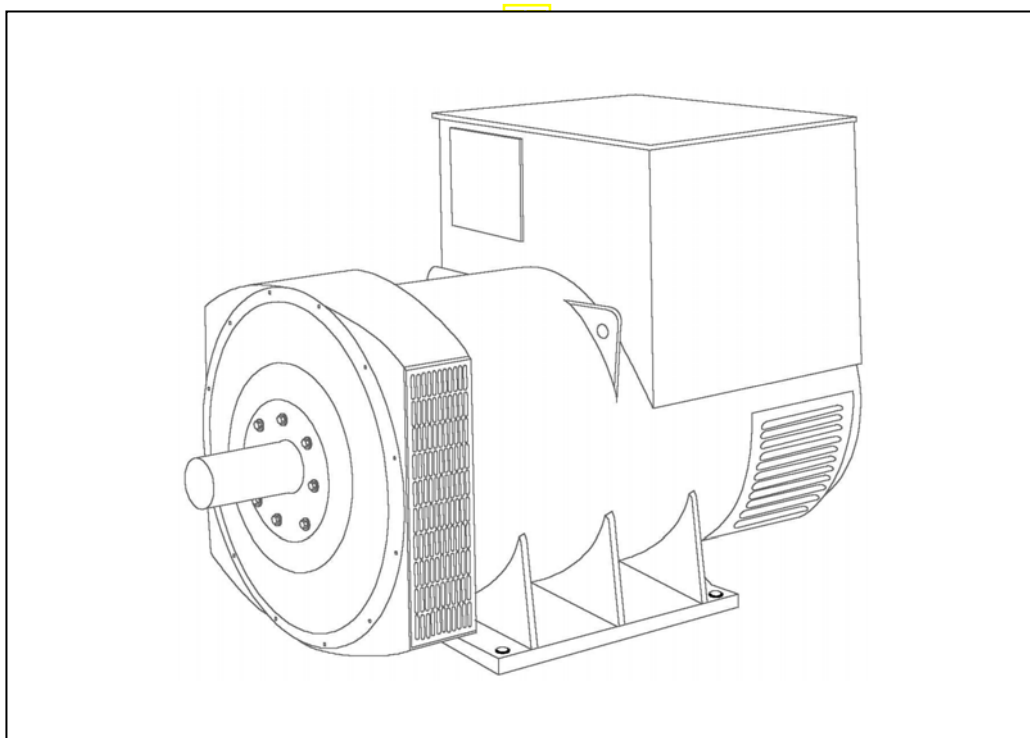
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HCI634G - Winding 311 and 312

Technical  Data Sheet



HCI634G

SPECIFICATIONS & OPTIONS

WINDING 311 and 312

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STANDARDS

Stamford industrial generators meet the requirements of BS EN 60034 and the relevant section of other international standards such as BS5000, VDE 0530, NEMA MG1-32, IEC34, CSA C22.2-100, AS1359. Other standards and certifications can be considered on request.

VOLTAGE REGULATORS

MX321 AVR - STANDARD

This sophisticated Automatic Voltage Regulator (AVR) is incorporated into the Stamford Permanent Magnet Generator (PMG) system and is fitted as standard to generators of this type.

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 in-built protection against sustained over-excitation, caused by internal or external faults. This de-excites the machine after a minimum of 5 seconds.

Over voltage protection is built-in and short circuit current level adjustments is an optional facility.

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 the 2/3 pitch and carefully selected pole and tooth designs, ensures very low waveform distortion.

TERMINALS & TERMINAL BOX

Standard generators feature a main stator with either 6 ends (Winding 312) or 12 ends (Winding 311) brought out to the terminals, which are mounted on the frame at the non-drive end of the generator. A sheet steel terminal box contains the AVR and provides ample space for the customers' wiring and gland arrangements. It has removable panels for easy access.

SHAFT & KEYS

All generator rotors are dynamically balanced to better than BS6861:Part 1 Grade 2.5 for minimum vibration in operation. Two bearing generators are balanced with a half key.

INSULATION/IMPREGNATION

The insulation system is class 'H'.

All wound components are impregnated with materials and processes designed specifically to provide the high build required for static windings and the high mechanical strength required for rotating components.

QUALITY ASSURANCE

Generators are manufactured using production procedures having a quality assurance level to BS EN ISO 9001.

The stated voltage regulation may not be maintained in the presence of certain radio transmitted signals. Any change in performance will fall within the limits of Criteria 'B' of EN 61000-6-2:2001. At no time will the steady-state voltage regulation exceed 2%.

DE RATES

All values tabulated on page 8 are subject to the following reductions

5% when air inlet filters are fitted.

10% when IP44 Filters are fitted.

3% for every 500 metres by which the operating altitude exceeds 1000 metres above mean sea level.

3% for every 5°C by which the operational ambient temperature exceeds 40°C.

Note: Requirement for operating in an ambient exceeding 60°C must be referred to the factory.

NB Continuous development of our products entitles us to change specification details without notice, therefore they must not be regarded as binding.

Front cover drawing typical of product range.

APPROVED DOCUMENT

WINDING 311 and 312

CONTROL SYSTEM	SEPARATELY EXCITED BY P.M.G.	
A.V.R.	MX321	
VOLTAGE REGULATION	± 0.5 %	With 4% ENGINE GOVERNING
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)	

INSULATION SYSTEM	CLASS H
PROTECTION	IP23
RATED POWER FACTOR	0.8
STATOR WINDING	DOUBLE LAYER LAP
WINDING PITCH	TWO THIRDS
WINDING LEADS	6 (Wdg 312) or 12 (Wdg 311)
STATOR WDG. RESISTANCE	0.003 Ohms PER PHASE AT 22°C STAR CONNECTED
ROTOR WDG. RESISTANCE	1.75 Ohms at 22°C
EXCITER STATOR RESISTANCE	17 Ohms at 22°C
EXCITER ROTOR RESISTANCE	0.079 Ohms PER PHASE AT 22°C
R.F.I. SUPPRESSION	BS EN 61000-6-2 & BS EN 61000-6-4, VDE 0875G, VDE 0875N. refer to factory for others
WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%
MAXIMUM OVERSPEED	2250 Rev/Min
BEARING DRIVE END	BALL. 6224 (ISO)
BEARING NON-DRIVE END	BALL. 6317 (ISO)

	1 BEARING				2 BEARING			
WEIGHT COMP. GENERATOR	1965 kg				1989 kg			
WEIGHT WOUND STATOR	934 kg				934 kg			
WEIGHT WOUND ROTOR	814 kg				766 kg			
WR ² INERTIA	18.3482 kgm ²				17.8009 kgm ²			
SHIPPING WEIGHTS in a crate	2023kg				2029kg			
PACKING CRATE SIZE	183 x 92 x 140(cm)				183 x 92 x 140(cm)			
	50 Hz				60 Hz			
TELEPHONE INTERFERENCE	THF<2%				TIF<50			
COOLING AIR	1.614 m ³ /sec 3420 cfm				1.961 m ³ /sec 4156 cfm			
VOLTAGE STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
VOLTAGE PARALLEL STAR (*)	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138
VOLTAGE DELTA	220	230	240	254	240	254	266	277
KVA BASE RATING FOR REACTANCE VALUES	800	800	800	800	875	925	963	1000
X _d DIR. AXIS SYNCHRONOUS	3.14	2.83	2.63	2.34	3.53	3.34	3.18	3.03
X' _d DIR. AXIS TRANSIENT	0.25	0.23	0.21	0.19	0.28	0.26	0.25	0.24
X'' _d DIR. AXIS SUBTRANSIENT	0.18	0.16	0.15	0.13	0.21	0.20	0.19	0.18
X _q QUAD. AXIS REACTANCE	1.88	1.70	1.58	1.40	2.10	1.98	1.89	1.80
X'' _q QUAD. AXIS SUBTRANSIENT	0.21	0.19	0.18	0.16	0.24	0.23	0.22	0.21
X _L LEAKAGE REACTANCE	0.10	0.09	0.08	0.07	0.12	0.11	0.10	0.10
X ₂ NEGATIVE SEQUENCE	0.22	0.20	0.19	0.17	0.24	0.23	0.22	0.21
X ₀ ZERO SEQUENCE	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03

REACTANCES ARE SATURATED

VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED

T' _d TRANSIENT TIME CONST.	0.185
T'' _d SUB-TRANSTIME CONST.	0.025
T' _{do} O.C. FIELD TIME CONST.	2.35
T _a ARMATURE TIME CONST.	0.04
SHORT CIRCUIT RATIO	1/X _d

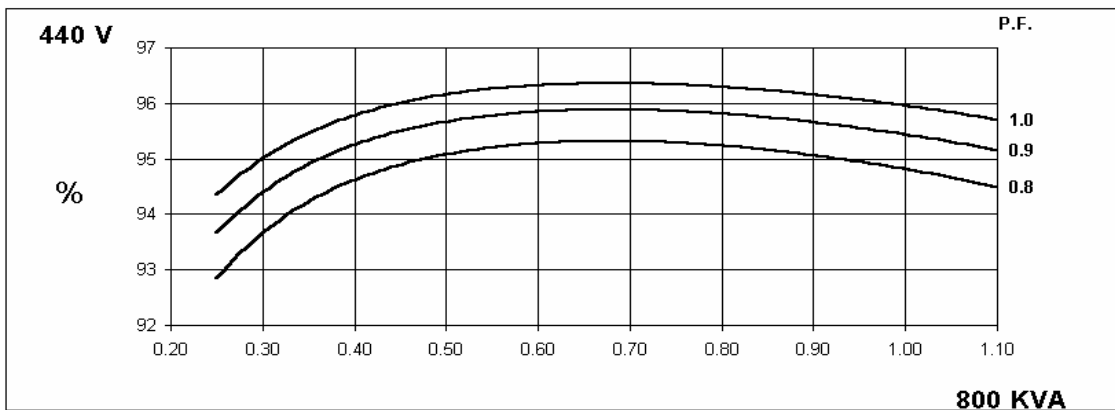
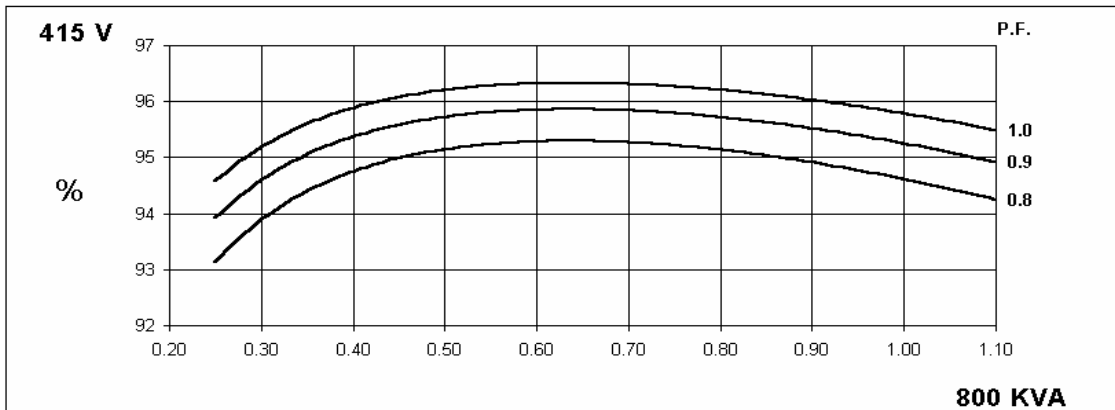
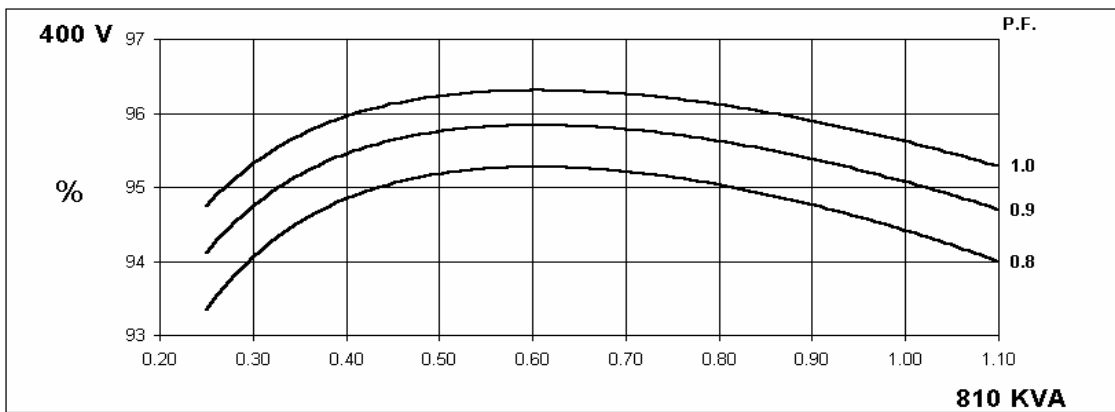
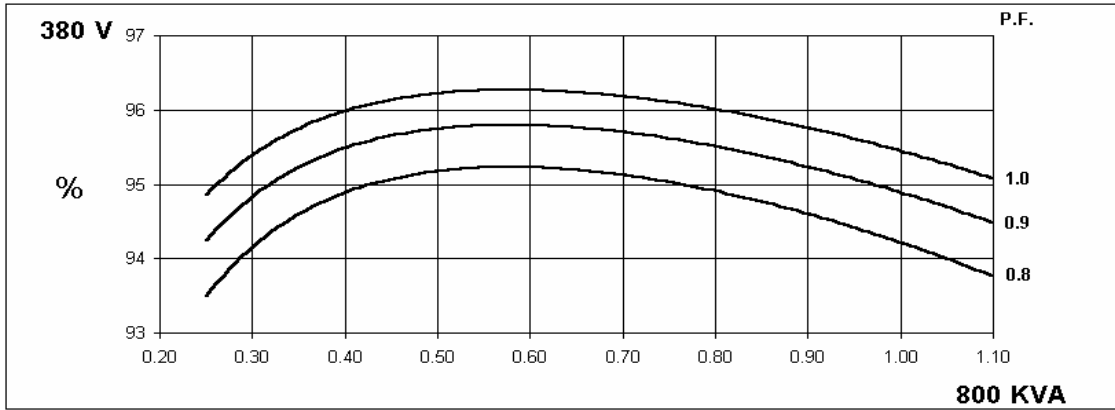
(*) Parallel Star connection only available with Wdg 311

50
Hz

STAMFORD

HCI634G
WINDING 311 and 312

THREE PHASE EFFICIENCY CURVES

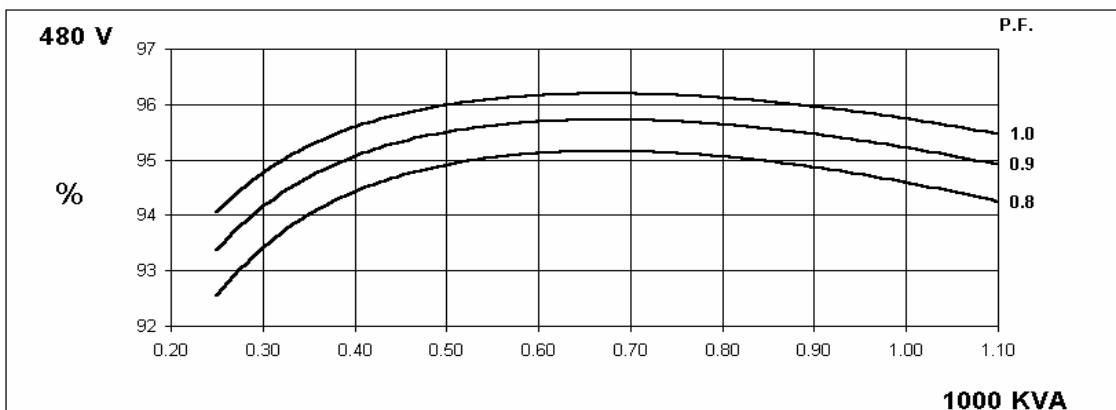
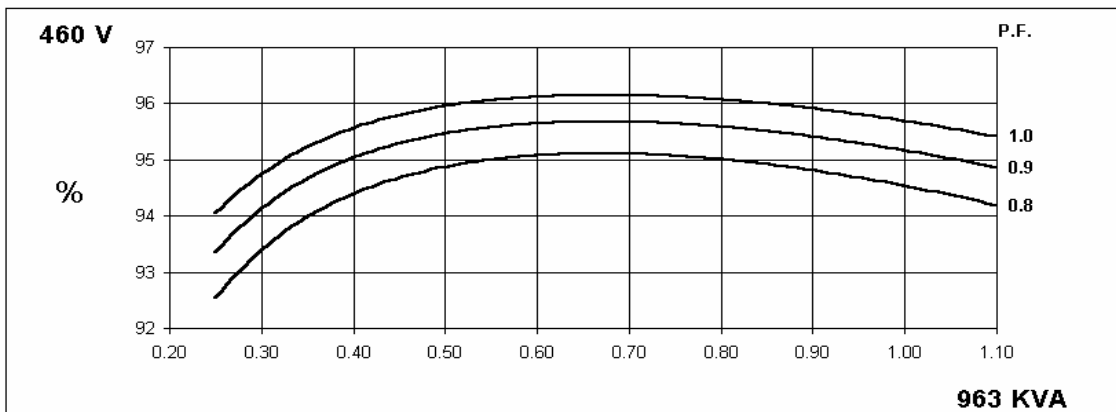
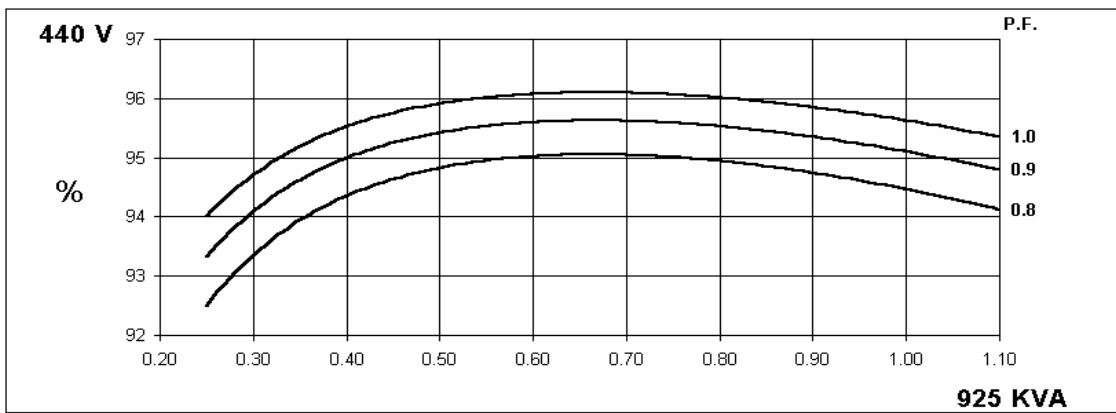
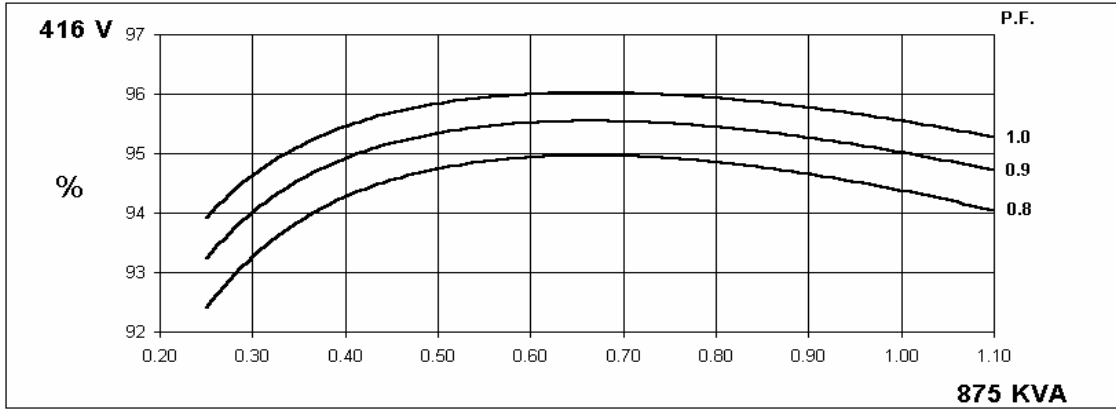


60
Hz

HCI634G
WINDING 311 and 312

STAMFORD

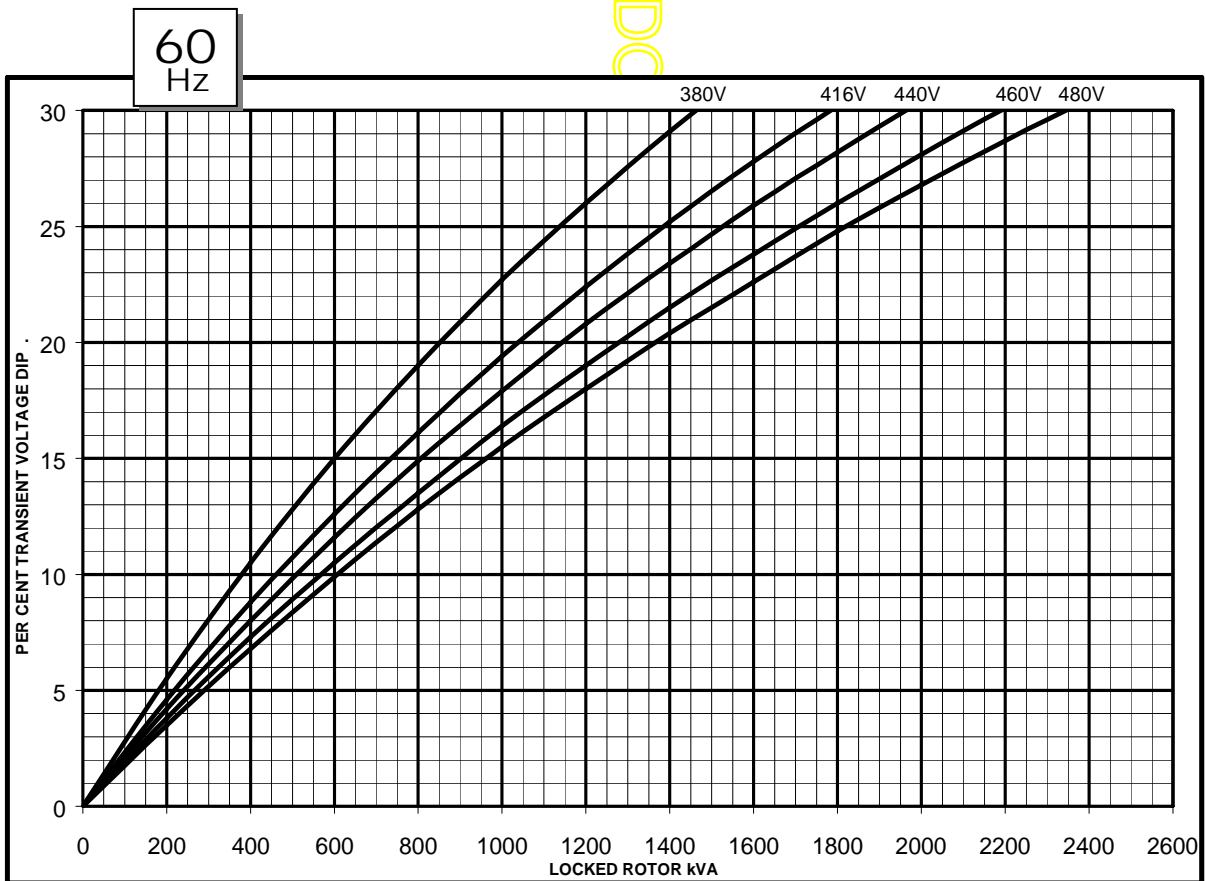
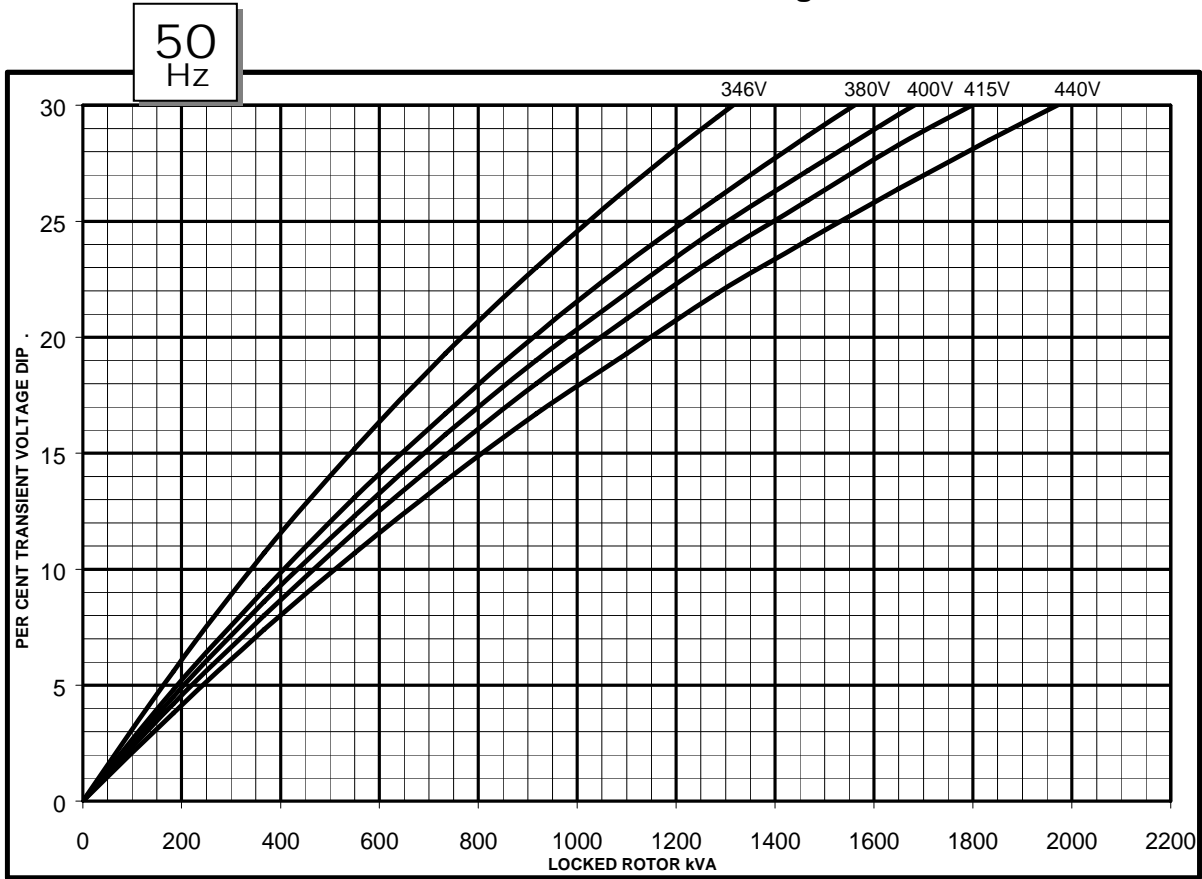
THREE PHASE EFFICIENCY CURVES



HCI634G
WINDING 311 and 312

STAMFORD

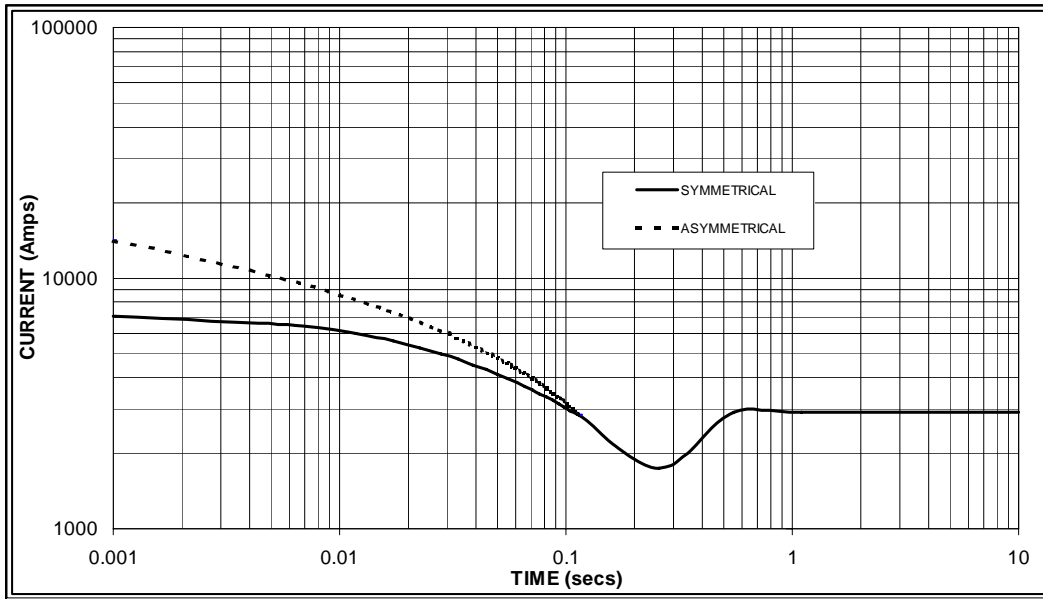
Locked Rotor Motor Starting Curve



WINDING 311 and 312

**Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed
Based on star (wye) connection.**

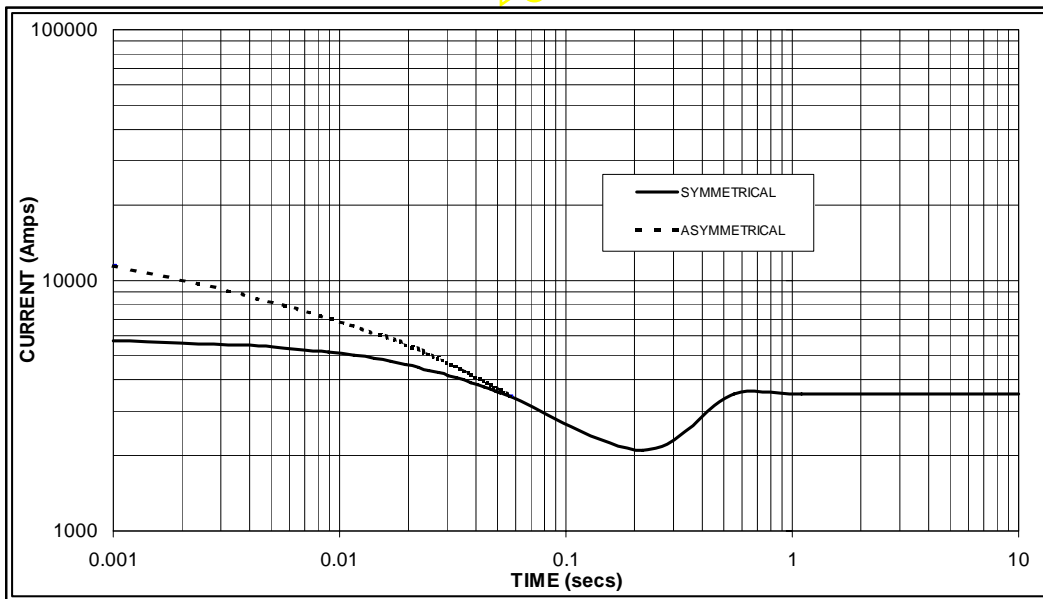
50
Hz



Sustained Short Circuit = 2,900 Amps



60
Hz



Sustained Short Circuit = 3,500 Amps

Note 1

The following multiplication factors should be used to adjust the values from curve between time 0.001 seconds and the minimum current point in respect of nominal operating voltage :

50Hz		60Hz	
Voltage	Factor	Voltage	Factor
380v	X 1.00	416v	x 1.00
400v	X 1.07	440v	x 1.06
415v	X 1.12	460v	x 1.12
440v	X 1.18	480v	x 1.17

The sustained current value is constant irrespective of voltage level

Note 2

The following multiplication factor should be used to convert the values calculated in accordance with NOTE 1 to those applicable to the various types of short circuit :

	3-phase	2-phase L-L	1-phase L-N
Instantaneous	x 1.00	x 0.87	x 1.30
Minimum	x 1.00	x 1.80	x 3.20
Sustained	x 1.00	x 1.50	x 2.50
Max. sustained duration	10 sec.	5 sec.	2 sec.

All other times are unchanged

Note 3

Curves are drawn for Star (Wye) connected machines. For Delta connection multiply the Curve current value by 1.732

HCI634G

Winding 311 and 312 0.8 Power Factor

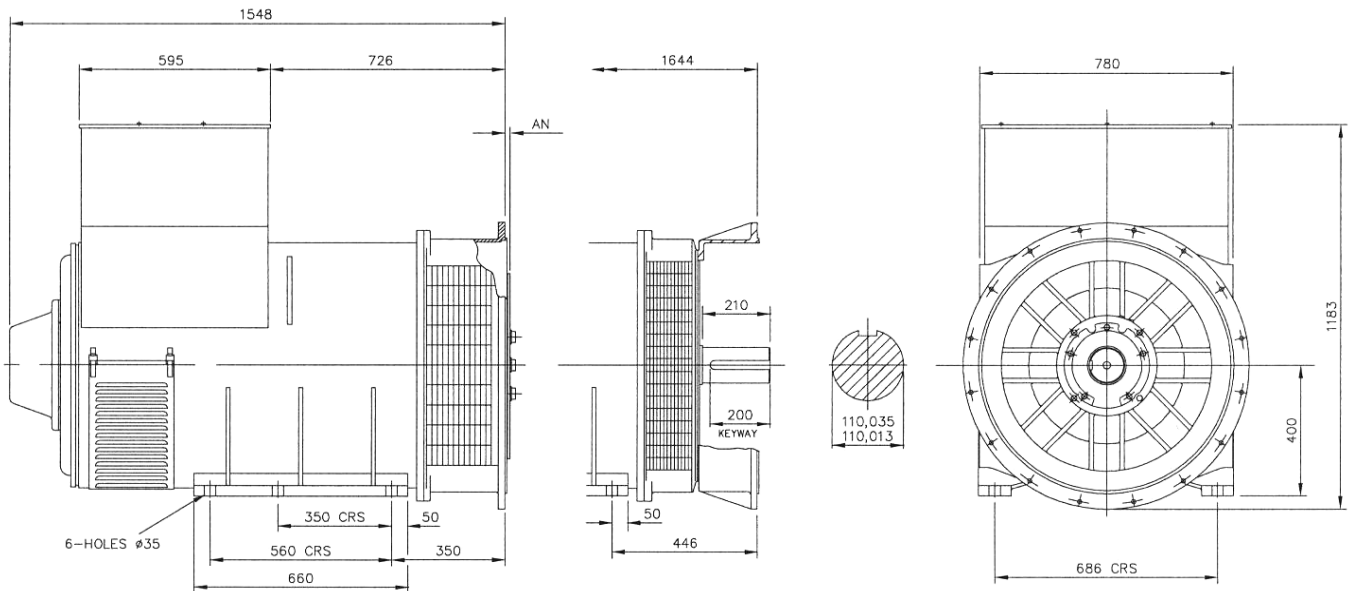
RATINGS

Class - Temp Rise	Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C				
50Hz	Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	Parallel Star (V) *	180	200	208	220	180	200	208	220	180	200	208	220	180	200	208	220
	Delta (V)	220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
	kVA	750	760	750	750	800	810	800	800	825	830	825	820	850	860	850	850
	kW	600	608	600	600	640	648	640	640	660	664	660	656	680	688	680	680
	Efficiency (%)	94.5	94.6	94.8	95.0	94.2	94.4	94.6	94.8	94.1	94.3	94.5	94.7	93.9	94.2	94.4	94.6
	kW Input	635	643	633	632	679	686	677	675	702	704	698	693	724	730	720	719

60Hz	Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	Parallel Star (V) *	208	220	230	240	208	220	230	240	208	220	230	240	208	220	230	240
	Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
	kVA	813	844	888	913	875	925	963	1000	913	969	1008	1046	950	1000	1044	1088
	kW	650	675	710	730	700	740	770	800	730	775	806	837	760	800	835	870
	Efficiency (%)	94.6	94.7	94.8	94.8	94.4	94.5	94.5	94.6	94.2	94.3	94.4	94.4	94.1	94.2	94.3	94.3
	kW Input	688	713	749	770	742	783	815	846	775	822	854	886	808	849	886	923

* Parallel Star only available with Wdg 311

DIMENSIONS



SAE	14	18	21	24
AN	25.4	15.87	0	0

APPROVED DOCUMENT

STAMFORD

Head Office Address:
Barnack Road, Stamford
Lincolnshire, PE9 2NB
United Kingdom
Tel: +44 (0) 1780 484000
Fax: +44 (0) 1780 484100

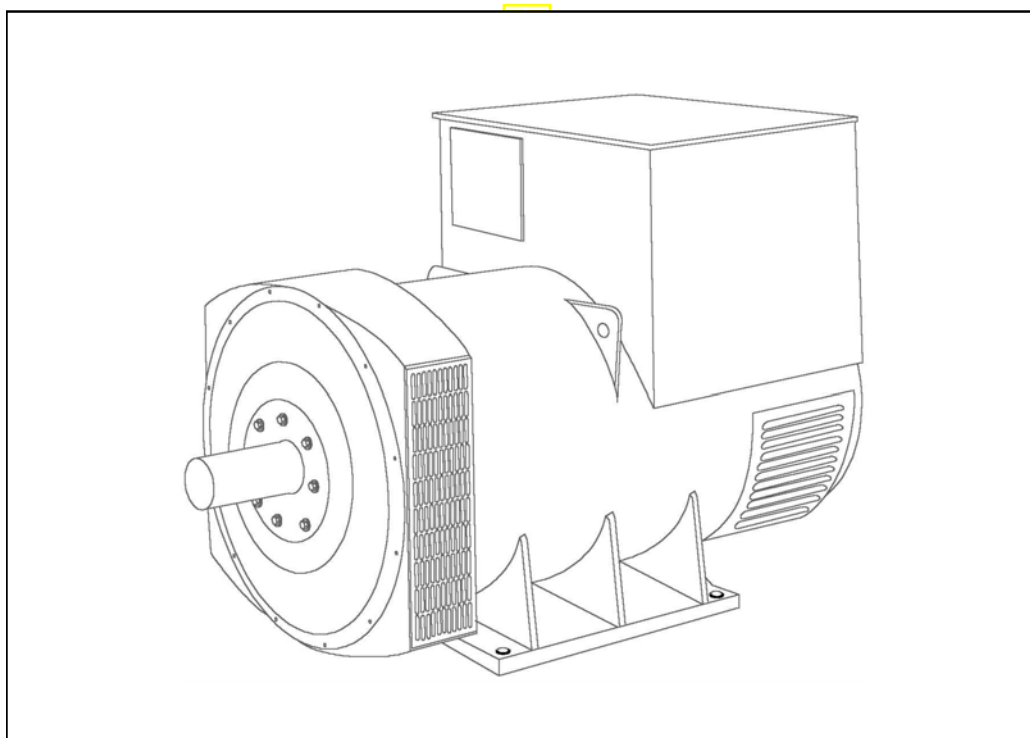
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STAMFORD[®]

HCI634G - Winding 07

Technical  Data Sheet



HCI634G

SPECIFICATIONS & OPTIONS

STANDARDS

Stamford industrial generators meet the requirements of BS EN 60034 and the relevant section of other international standards such as BS5000, VDE 0530, NEMA MG1-32, IEC34, CSA C22.2-100, AS1359. Other standards and certifications can be considered on request.

VOLTAGE REGULATORS**MX321 AVR - STANDARD**

This sophisticated Automatic Voltage Regulator (AVR) is incorporated into the Stamford Permanent Magnet Generator (PMG) system and is fitted as standard to generators of this type.

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 in-built protection against sustained over-excitation, caused by internal or external faults. This de-excites the machine after a minimum of 5 seconds. Over voltage protection is built-in and short circuit current level adjustments is an optional facility.

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 the 2/3 pitch and carefully selected pole and tooth designs, ensures very low waveform distortion.

TERMINALS & TERMINAL BOX

Standard generators feature a main stator with 6 ends brought out to the terminals, which are mounted on the frame at the non-drive end of the generator. A sheet steel terminal box contains the AVR and provides ample space for the customers' wiring and gland arrangements. It has removable panels for easy access.

SHAFT & KEYS

All generator rotors are dynamically balanced to better than BS6861:Part 1 Grade 2.5 for minimum vibration in operation. Two bearing generators are balanced with a half key.

INSULATION/IMPREGNATION

The insulation system is class 'H'. All wound components are impregnated with materials and processes designed specifically to provide the high build required for static windings and the high mechanical strength required for rotating components.

QUALITY ASSURANCE

Generators are manufactured using production procedures having a quality assurance level to BS EN ISO 9001.

The stated voltage regulation may not be maintained in the presence of certain radio transmitted signals. Any change in performance will fall within the limits of Criteria 'B' of EN 61000-6-2:2001. At no time will the steady-state voltage regulation exceed 2%.

DE RATES

All values tabulated on page 6 are subject to the following reductions

- 5% when air inlet filters are fitted.
- 10% when IP44 filters are fitted.
- 3% for every 500 metres by which the operating altitude exceeds 1000 metres above mean sea level.
- 3% for every 5 C by which the operational ambient temperature exceeds 40 C.

Note: Requirement for operating in an ambient exceeding 60 C must be referred to the factory.

NB Continuous development of our products entitles us to change specification details without notice, therefore they must not be regarded as binding.

Front cover drawing typical of product range.

APPROVED DOCUMENT

HCI634G



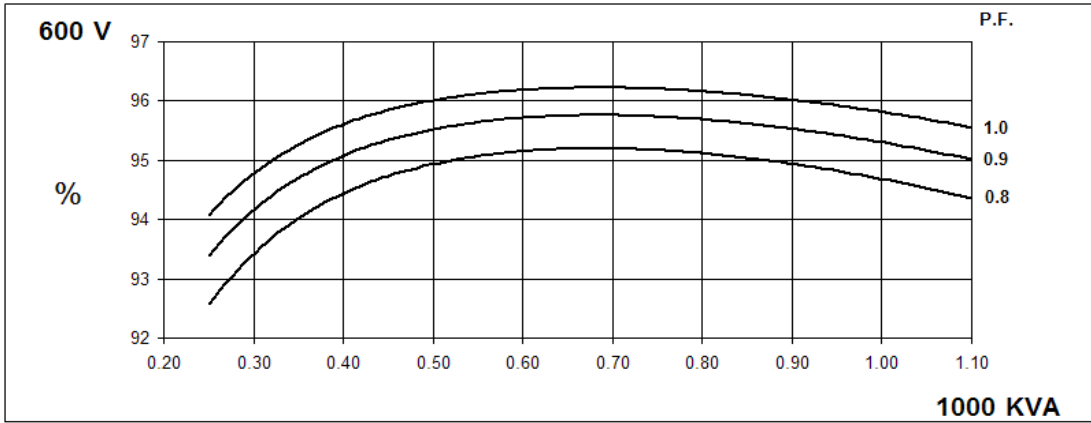
WINDING 07

CONTROL SYSTEM	SEPARATELY EXCITED BY P.M.G.	
A.V.R.	MX321	
VOLTAGE REGULATION	± 0.5 %	With 4% ENGINE GOVERNING
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 5)	
INSULATION SYSTEM	CLASS H	
PROTECTION	IP23	
RATED POWER FACTOR	0.8	
STATOR WINDING	DOUBLE LAYER LAP	
WINDING PITCH	TWO THIRDS	
WINDING LEADS	6	
STATOR WDG. RESISTANCE	0.0055 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED	
ROTOR WDG. RESISTANCE	1.75 Ohms at 22°C	
EXCITER STATOR RESISTANCE	17 Ohms at 22°C	
EXCITER ROTOR RESISTANCE	0.079 Ohms PER PHASE AT 22°C	
R.F.I. SUPPRESSION	BS EN 61000-6-2 & BS EN 61000-6-4, VDE 0875G, VDE 0875N. refer to factory for others	
WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%	
MAXIMUM OVERSPEED	2250 Rev/Min	
BEARING DRIVE END	BALL. 6224 (ISO)	
BEARING NON-DRIVE END	BALL. 6317 (ISO)	
	1 BEARING	2 BEARING
WEIGHT COMP. GENERATOR	1965 kg	1989 kg
WEIGHT WOUND STATOR	934 kg	934 kg
WEIGHT WOUND ROTOR	814 kg	766 kg
WR ² INERTIA	18.3482 kgm ²	17.8009 kgm ²
SHIPPING WEIGHTS in a crate	2023 kg	2029 kg
PACKING CRATE SIZE	183 x 92 x 140(cm)	183 x 92 x 140(cm)
TELEPHONE INTERFERENCE	THF <2%	TIF <50
COOLING AIR	1.961 m ³ /sec 4156 cfm	
VOLTAGE STAR	600V	
VOLTAGE DELTA	346V	
kVA BASE RATING FOR REACTANCE VALUES	1000	
X _d DIR. AXIS SYNCHRONOUS	2.96	
X' _d DIR. AXIS TRANSIENT	0.22	
X'' _d DIR. AXIS SUBTRANSIENT	0.16	
X _q QUAD. AXIS REACTANCE	1.74	
X'' _q QUAD. AXIS SUBTRANSIENT	0.19	
X _L LEAKAGE REACTANCE	0.08	
X ₂ NEGATIVE SEQUENCE	0.20	
X ₀ ZERO SEQUENCE	0.03	
REACTANCES ARE SATURATED		
VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED		
T' _d TRANSIENT TIME CONST.	0.185s	
T'' _d SUB-TRANSTIME CONST.	0.025s	
T' _{do} O.C. FIELD TIME CONST.	2.35s	
T _a ARMATURE TIME CONST.	0.04s	
SHORT CIRCUIT RATIO	1/X _d	

HCI634G
Winding 07

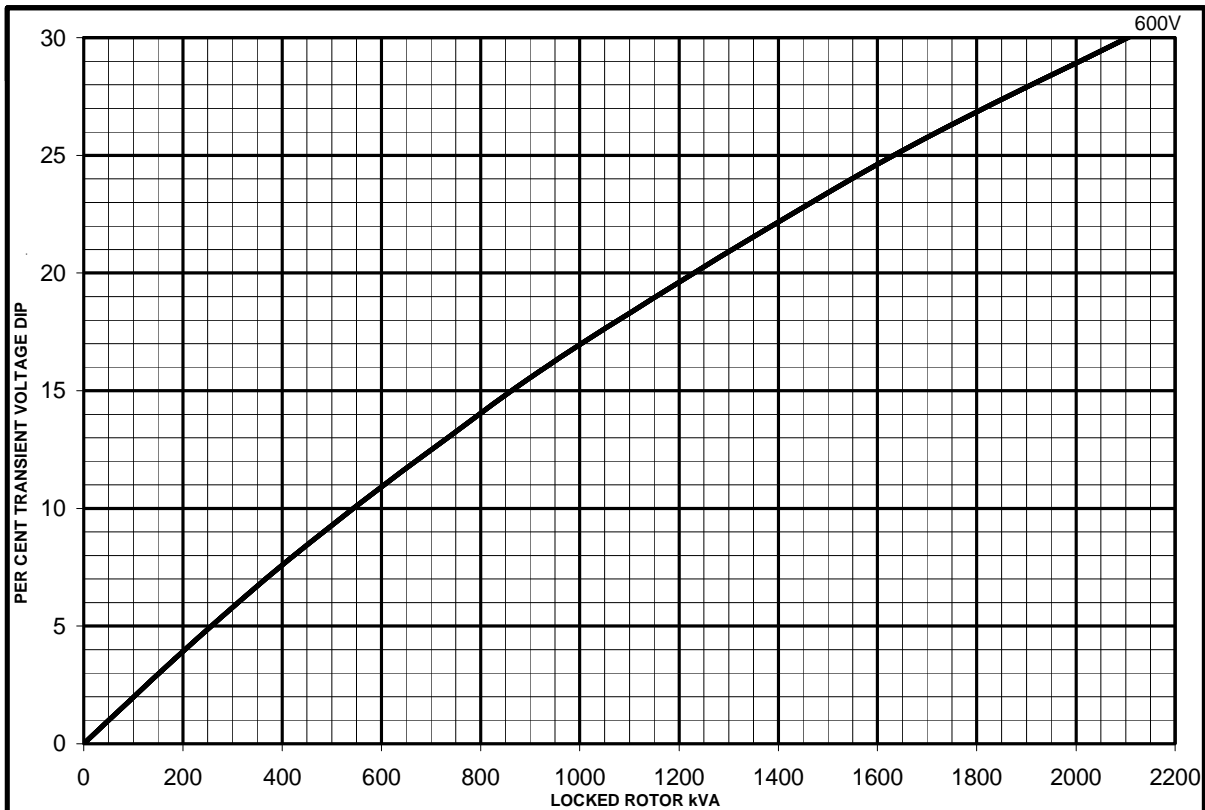
STAMFORD

THREE PHASE EFFICIENCY CURVES

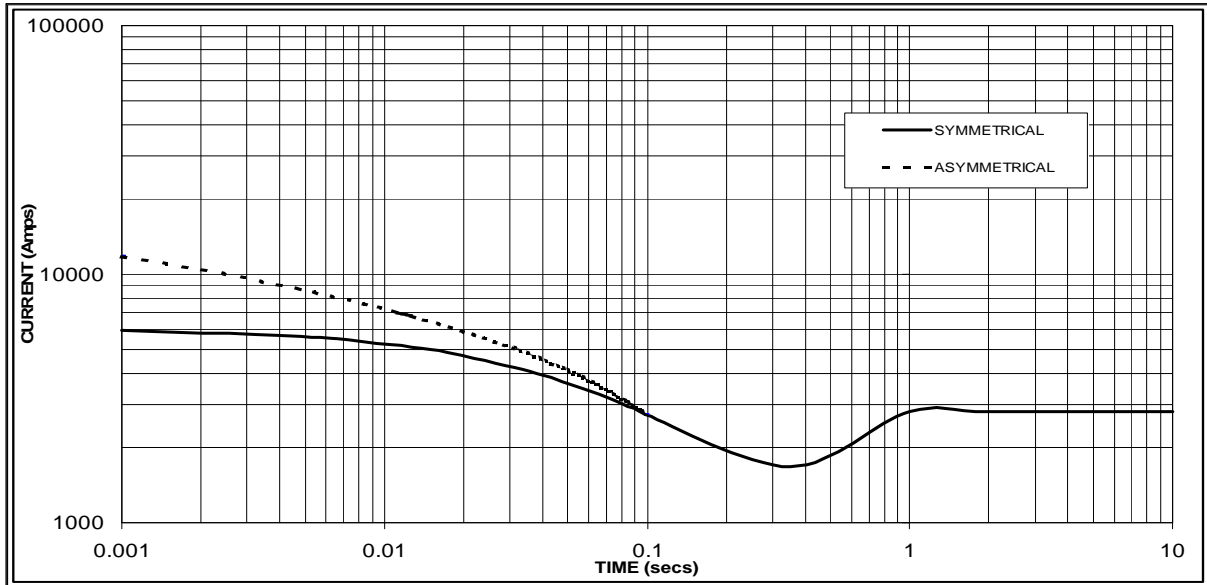


PROVIDED

Locked Rotor Motor Starting Curve



**Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed
Based on star (wye) connection.**



Sustained Short Circuit = 2800 Amps

Note

The following multiplication factor should be used to convert the values from curve for the various types of short circuit :

	3-phase	2-phase L-L	1-phase L-N
Instantaneous	x 1.00	x 0.87	x 1.30
Minimum	x 1.00	x 1.80	x 3.20
Sustained	x 1.00	x 1.50	x 2.50
Max. sustained duration	10 sec.	5 sec.	2 sec.

All other times are unchanged

HCI634G

STAMFORD

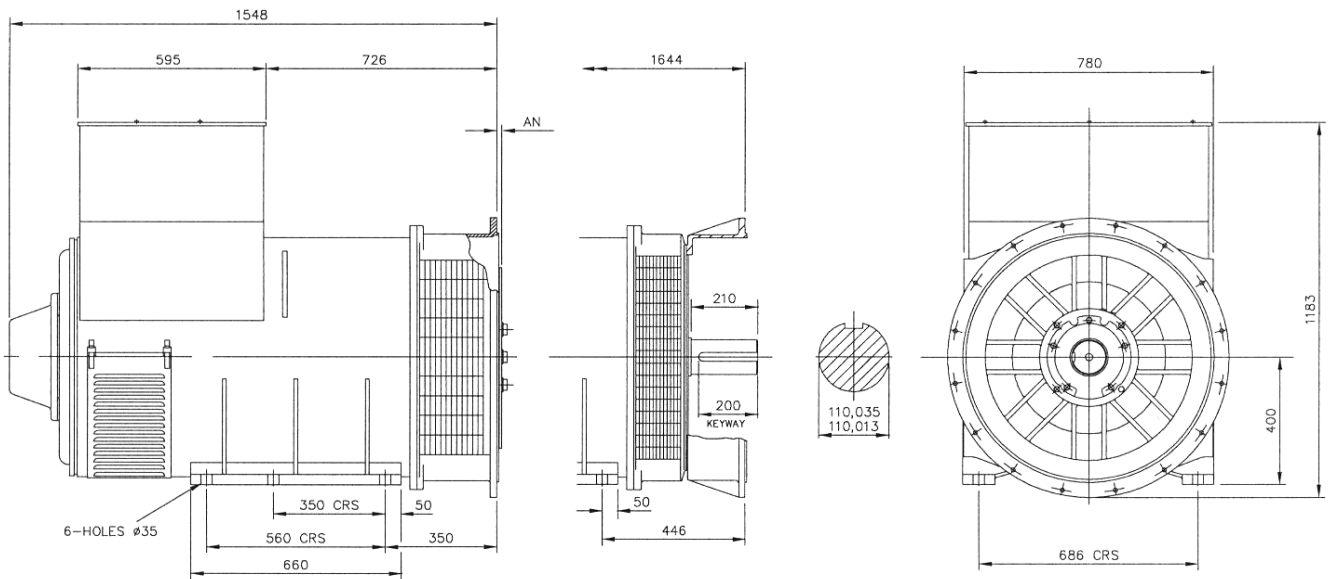
Winding 07 / 0.8 Power Factor

60Hz

RATINGS

Class - Temp Rise	Cont. F - 105/40°C	Cont. H - 125/40°C	Standby - 150/40°C	Standby - 163/27°C
Star (V)	600	600	600	600
Delta (V)	346	346	346	346
kVA	913	1000	1046	1088
kW	730	800	837	870
Efficiency (%)	94.9	94.7	94.5	94.4
kW Input	769	845	886	922

APPROVED
DIMENSIONS



SAE	14	18	21	24
AN	25.4	15.87	0	0

APPROVED DOCUMENT

STAMFORD

Head Office Address:
Barnack Road, Stamford
Lincolnshire, PE9 2NB
United Kingdom
Tel: +44 (0) 1780 484000
Fax: +44 (0) 1780 484100

www.cumminsgeneratortechnologies.com

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DSE7410/20

AUTO START & AUTO MAINS FAILURE MODULES

FEATURES

The DSE7410 is an Auto Start Control Module and the **DSE7420** is an Auto Mains (Utility) Failure Control Module suitable for a wide variety of single, diesel or gas, gen-set applications.

A sophisticated module monitoring an extensive number of engine parameters, the DSE74xx will announce warnings, shutdown and engine status information on the back-lit LCD screen, illuminated LED, remote PC, audible alarm and via SMS text alerts. The module includes RS232, RS485 & Ethernet ports as well as dedicated terminals for system expansion.

The DSE7400 Series modules are compatible with electronic (CAN) and non-electronic (magnetic pick-up/alternator sensing) engines and offer a comprehensive number of flexible inputs, outputs and extensive engine protections so the system can be easily adapted to meet the most demanding industry paralleling requirements.

The modules can be easily configured using the DSE Configuration Suite Software. Selected front panel editing is also available.

ENVIRONMENTAL TESTING STANDARDS

ELECTRO-MAGNETIC COMPATIBILITY

BS EN 61000-6-2
EMC Generic Immunity Standard for the Industrial Environment
BS EN 61000-6-4
EMC Generic Emission Standard for the Industrial Environment

ELECTRICAL SAFETY

BS EN 60950
Safety of Information Technology Equipment, including Electrical Business Equipment

TEMPERATURE

BS EN 60068-2-1
Ab/Ae Cold Test -30 °C
BS EN 60068-2-2
Bb/Be Dry Heat +70 °C

VIBRATION

BS EN 60068-2-6
Ten sweeps in each of three major axes
5 Hz to 8 Hz @ +/-7.5 mm,
8 Hz to 500 Hz @ 2 gn

HUMIDITY

BS EN 60068-2-30
Db Damp Heat Cyclic 20/55 °C @ 95% RH 48 Hours
BS EN 60068-2-78
Cab Damp Heat Static 40 °C @ 93% RH 48 Hours

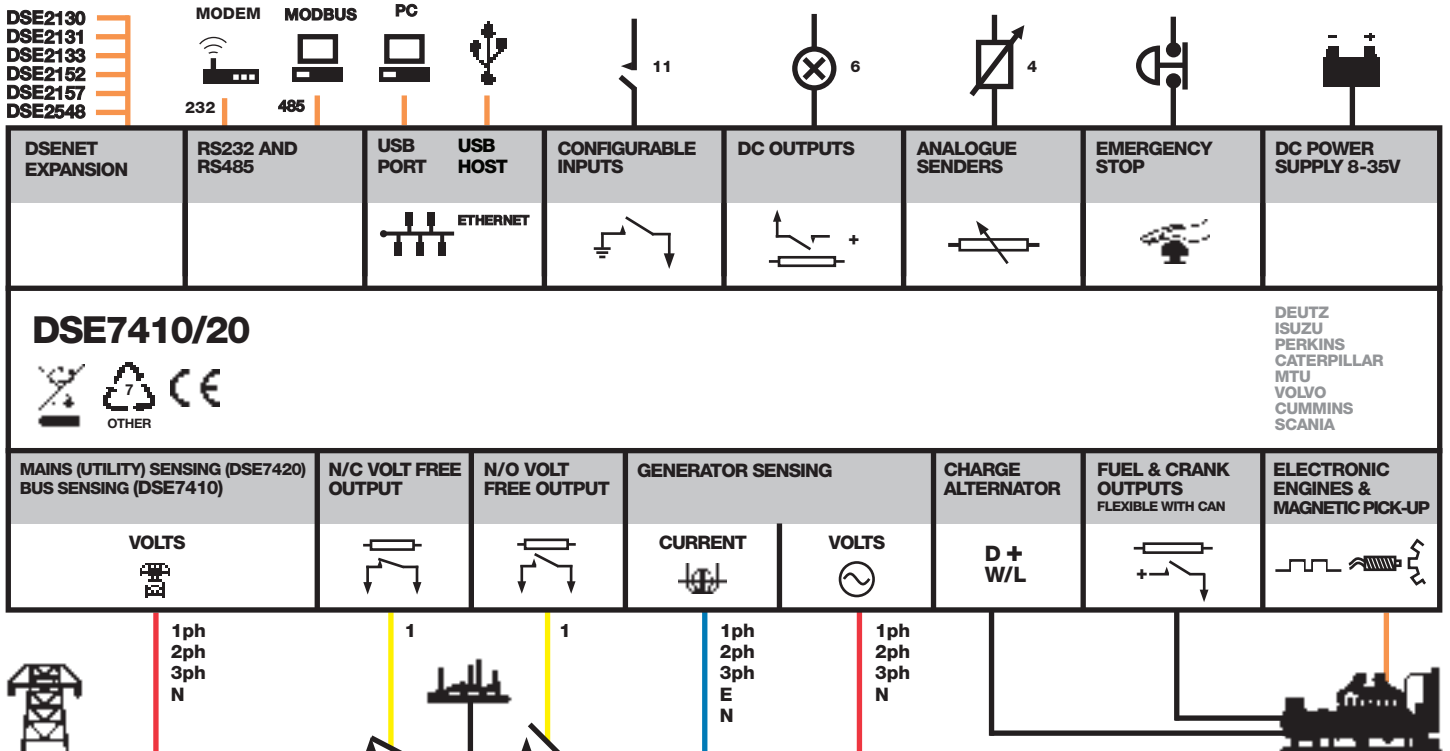
SHOCK

BS EN 60068-2-27
Three shocks in each of three major axes
15 gn in 11 ms

DEGREES OF PROTECTION PROVIDED BY ENCLOSURES

BS EN 60529
IP65 - Front of module when installed into the control panel with the supplied sealing gasket.

COMPREHENSIVE FEATURE LIST TO SUIT A WIDE VARIETY OF GEN-SET APPLICATIONS



DSE7410/20

AUTO START & AUTO MAINS FAILURE MODULES

FEATURES



DSE7420

DSE7410



KEY FEATURES

- Configurable inputs (11)
- Configurable outputs (8)
- Voltage measurement
- Mains (utility) failure detection
- Dedicated load test button
- kW overload alarms
- Comprehensive electrical protection
- RS232, RS485 & Ethernet remote communications
- Modbus RTU/TCP
- PLC functionality
- Multi event exercise timer
- Back-lit LCD 4-line text display
- Multiple display languages
- Automatic start/Manual start
- Audible alarm
- Fixed and flexible LED indicators
- Event log (250)
- Engine protection
- Fault condition notification to a designated PC
- Front panel mounting
- Protected front panel programming
- Configurable alarms and timers
- Configurable start and stop timers

- Five key menu navigation
- Front panel editing with PIN protection
- 3 configurable maintenance alarms
- CAN and magnetic pick-up/Alt. sensing
- Fuel usage monitor and low fuel alarms
- Charge alternator failure alarm
- Manual speed control (on compatible CAN engines)
- Manual fuel pump control
- "Protections disabled" feature
- Reverse power protection
- Power monitoring (kW h, kV Ar, kV A h, kV Ar h)
- Load switching (load shedding and dummy load outputs)
- Automatic load transfer (DSE7420)
- Unbalanced load protection
- Independent earth fault trip
- Fully configurable via DSE Configuration Suite PC software
- Configurable display languages
- Remote SCADA monitoring via DSE Configuration Suite PC software

- Advanced SMS messaging (additional external modem required)
- Start & stop capability via SMS messaging
- Additional display screens to help with modem diagnostics
- DSENet® expansion
- Integral PLC editor

KEY BENEFITS

- RS232, RS485 & Ethernet can be used at the same time
- DSENet® connection for system expansion
- PLC functionality
- Five step dummy load support
- Five step load shedding support
- High number of inputs and outputs
- Worldwide language support
- Direct USB connection to PC
- Ethernet monitoring
- USB host
- Data logging & trending

RELATED MATERIALS

TITLE

DSE7410 Installation Instructions
DSE7420 Installation Instructions
 DSE74xx Quick Start Guide
 DSE74xx Operator Manual
 DSE74xx PC Configuration Suite Manual

PART NO'S

053-085
 053-088
 057-162
 057-161
 057-160

SPECIFICATION

DC SUPPLY

CONTINUOUS VOLTAGE RATING
 8 V to 35 V Continuous

CRANKING DROPOUTS

Able to survive 0 V for 50 mS, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries

MAXIMUM OPERATING CURRENT

260 mA at 12 V, 130 mA at 24 V

MAXIMUM STANDBY CURRENT

120 mA at 12 V, 65 mA at 24 V

CHARGE FAIL/EXCITATION RANGE

0 V to 35 V

OUTPUTS

OUTPUT A (FUEL)

15 A DC at supply voltage

OUTPUT B (START)

15 A DC at supply voltage

OUTPUTS C & D

8 A AC at 250 V AC (Volt free)

AUXILIARY OUTPUTS E,F,G,H,I & J

2 A DC at supply voltage

GENERATOR

VOLTAGE RANGE

15 V to 333 V AC (L-N)

FREQUENCY RANGE

3.5 Hz to 75 Hz

MAINS (UTILITY) (DSE7420)

VOLTAGE RANGE

15 V to 333 V AC (L-N)

FREQUENCY RANGE

3.5 Hz to 75 Hz

BUS (DSE7410)

VOLTAGE RANGE

15 V to 333 V AC (L-N)

FREQUENCY RANGE

3.5 Hz to 75 Hz

MAGNETIC PICK UP

VOLTAGE RANGE

+/- 0.5 V to 70 V

FREQUENCY RANGE

10,000 Hz (max)

DIMENSIONS

OVERALL

240 mm x 172 mm x 57 mm
 9.4" x 6.8" x 2.2"

PANEL CUTOUT

220 mm x 160 mm
 8.7" x 6.3"

MAXIMUM PANEL THICKNESS

8 mm
 0.3"

STORAGE TEMPERATURE RANGE

-40 °C to +85 °C

DEEP SEA ELECTRONICS PLC UK

Highfield House, Hunmanby Industrial Estate, Hunmanby YO14 0PH
TELEPHONE +44 (0) 1723 890099 **FACSIMILE** +44 (0) 1723 893303
EMAIL sales@deepseapl.com **WEBSITE** www.deepseapl.com

DEEP SEA ELECTRONICS INC USA

3230 Williams Avenue, Rockford, IL 61101-2668 USA
TELEPHONE +1 (815) 316 8706 **FACSIMILE** +1 (815) 316 8708
EMAIL sales@deepseausa.com **WEBSITE** www.deepseausa.com

Tmax-Molded Case Circuit Breakers

T7 1200A Frame

AC Circuit Breakers and Switches

3 and 4 Pole

Motor Circuit Protectors

Higher Performances in Less Space

Field Installable Accessories and Trip Units



Dimensions 3P Fixed Version 10.55H x 8.26W x 6.06D

Weight 21.4 (lbs)

Compliance with Standards

UL 489

CSA C22.2 No.5.1

IEC 60947-2

Standards

EC directive:

– “Low Voltage Directives” (LVD) no. 73/23 EEC

– “Electromagnetic Compatibility Directive” (EMC) no.89/336 EEC

The ABB Quality System complies with the international ISO 9001 - 2000 Standard (model for quality assurance in design, development, construction, and installation and service) and with the equivalent European EN ISO 9001 and Italian UNI EN ISO 9001 Standards

Interrupting ratings (RMS sym. kAmps)		T7		
Continuous Current Rating		1200		
Number of Poles		3-4		
		S	H	L
AC				
	240V	65	100	150
	480V	50	65	100
	600V	25	50	65



Company Quality Systems and Environmental Systems

The new Tmax series has a hologram on the front, obtained using special anti-imitation techniques, which guarantees the quality and that the circuit breaker is an original ABB product.

Attention to protection of the environment and to health and safety in the work place is another priority commitment for ABB and, as confirmation of this, the company environmental management system has been certified by RINA in 1997, in conformity with the international ISO 14001 Standard. This certification has been integrated in 1999 with the Management System for Health and Safety in the workplace, according to OHSAS 18001 (British Standards), obtaining one of the first certification of integrated management System, QES (Quality, Environment,

Safety) issued by RINA. ABB - the first industry in the electro-mechanical section in Italy to obtain this recognition - thanks to a revision of the production process with an eye to ecology has been able to reduce the consumption of raw materials and waste from processing by 20%. ABB's commitment to safeguarding the environment is also shown in a concrete way by the Life Cycle Assessments of its products carried out directly by the ABB Research and Development in collaboration with the ABB Research Center. Selection of materials, processes and packing materials is made optimizing the true environmental impact of the product, also foreseeing the possibility of its being recycled.

Mounting

Fixed
Drawout

Connections

Busbar connection or compression lugs
Pressure-type terminals for bare cables
Rear connections

Trip Unit

PR231/P, PR232/P, PR331DS, and PR332DS/P electronic trip unit

Auxiliary Devices for Indication and Control

- Auxiliary contacts - AUX
- Undervoltage release - UVR
- Shunt trip - SOR
- Terminal covers
- Padlock provision - PLL
- Direct rotary handle - RHD
- Key lock - KLF
- Early auxiliary contact - AUE
- Transmitted rotary handle - RHE
- Front extended terminal - EF
- Front terminal for copper-aluminum - FC CuAl
- Front extended spread terminal - ES
- Rear orientated terminal - R
- Phase separators
- Residual current relay (IEC Only)



ABB Inc.

1206 Hatton Road
Wichita Falls, TX 76302
For more information and
the location of your local
field office please go to
www.abb-control.com

Annex to the
technical catalog



Tmax T8

Low voltage molded case
circuit breaker up to 3000 A

UL 489 and CSA C22.2 Standard



1SDC210026D0201 – 2008 Edition



ABB

Main characteristics

The Tmax family, conforming to the UL 489 and CSA C22.2 No. 5.1 Standards, is enriched with the Tmax T8 size, which allows 3000 A to be reached. Also available in the 1600 A, 2000 A and 2500 A frames, Tmax T8 is equipped with the same electronic trip units as Tmax T7, thereby guaranteeing extremely high performances able to satisfy all installation requirements. Adequately sized for the performances offered (W=16.8 / D=11.2 / H=15.0 in). Tmax T8 is able to interrupt the following short-circuit currents: 125 kA@480 V and 100 kA@600 V.



Main characteristics

General characteristics

The Tmax T8 size has both circuit breakers and molded case switches (MCS). The following tables show the main characteristics of these ranges.

Circuit breakers for power distribution

			Tmax T8
Frame size	[A]		1600/2000/2500/3000
Number of poles	[No]		3/4
Rated voltage	(AC) 50-60 Hz	[V]	600
	(DC)	[V]	–
Test voltage (1 min) 50-60 Hz		[V]	3000
Interrupting ratings		[kA rms]	V
	240 V AC	[kA rms]	125
	480 V AC	[kA rms]	125
	600 V AC	[kA rms]	100
Trip units	Electronic	PR232/P-T8	■
		PR331/P	■
		PR332/P	■
Dimensions fixed version (3p)	H	[in-mm]	15.0 - 382
	W	[in-mm]	16.8 - 427
	D	[in-mm]	11.2 - 282
Mechanical life		[operations]	15000
Weight (fixed 3p)	1600/2000/2500 A	[lbs]	161
	3000 A	[lbs]	236

Molded case switches (MCS)

The Tmax T8 MCS are derived from the corresponding circuit breakers, of which they keep the overall dimensions, the versions, the fixing systems and the possibility of mounting accessories unchanged. This version only differs from the circuit breakers in the absence of the protection trip units. All molded case switches comply with the UL 489 and CSA C22.2 Standards and are self-protected.

			Tmax T8V-D
Rating	[A]		2000/2500/3000
Poles	[No]		3/4
Magnetic override		[A]	40000
Rated voltage	AC (50-60 Hz)	[V]	600
	DC	[V]	–

Digital Linear Chargers

Specifications (cont.)

- New 4-color package design

minnkotamotors.com

MINN-KOTA

ON-BOARD MARINE BATTERY CHARGER

DIGITALLY CONTROLLED 2X FASTER CHARGING PROTECTS BATTERIES

Digital CONTROL

MK210D

MK 210D
 2 CHARGING BANKS
 5 AMPS PER BANK
 10 AMPS TOTAL OUTPUT

UL LISTED FC 10AMPS

CHARGING TECHNOLOGY

CHARGING TECHNOLOGY

DIGITALLY CONTROLLED.
 Microprocessor design protects your batteries so you can stay on the water longer. It monitors temperature and state of charge to create a faster, regulated, more precise charge. Also includes automatic shut-off when charging is complete to extend battery life.

DIGITALLY CONTROLLED.
 Microprocessor design protects your batteries so you can stay on the water longer. It monitors temperature and state of charge to create a faster, regulated, more precise charge. Also includes automatic shut-off when charging is complete to extend battery life.

ENHANCED STATUS CODES.
 Provides comprehensive feedback on charge stage, maintenance mode status, error notification and full charge.

ENHANCED STATUS CODES.
 Provides comprehensive feedback on charge stage, maintenance mode status, error notification and full charge.

Digital CONTROL

MULTI-STAGE CHARGING
 BULK ABSORPTION MAINTENANCE
 AMPS & VOLTS
 TIME (THREE STAGE CHARGER)
 VOLTS
 AMPS

BATTERY CHARGER TEMPERATURE COMPENSATION
 BATTERY VOLTAGE
 absorption voltage (output voltage)
 BATTERY TEMPERATURE (degrees F)

MULTI-STAGE CHARGING.
 Delivers a fast, precise charge profile by automatically controlling current and voltage without overcharging your batteries.

MULTI-STAGE CHARGING.
 Delivers a fast, precise charge profile by automatically controlling current and voltage without overcharging your batteries.

AUTOMATIC TEMPERATURE COMPENSATION.
 Adjusts output voltage based on ambient temperature to ensure a full charge and protect your batteries.

AUTOMATIC TEMPERATURE COMPENSATION.
 Adjusts output voltage based on ambient temperature to ensure a full charge and protect your batteries.

2010



Digital Linear Chargers

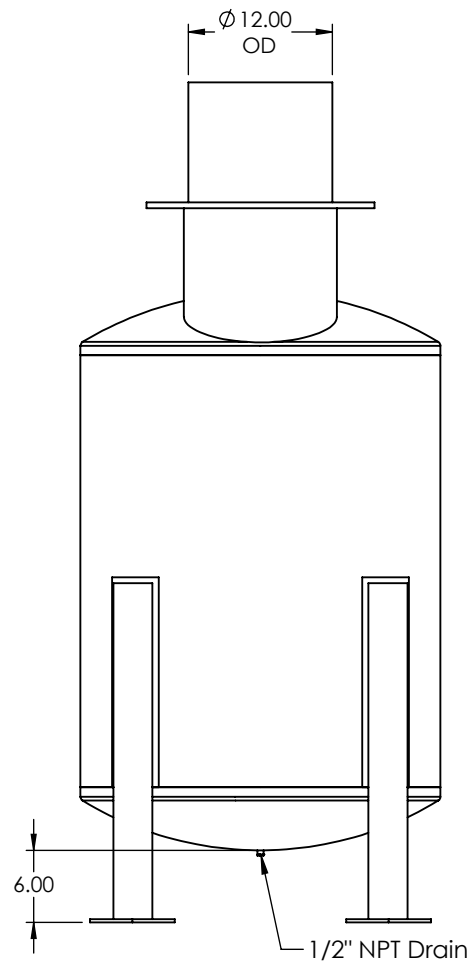
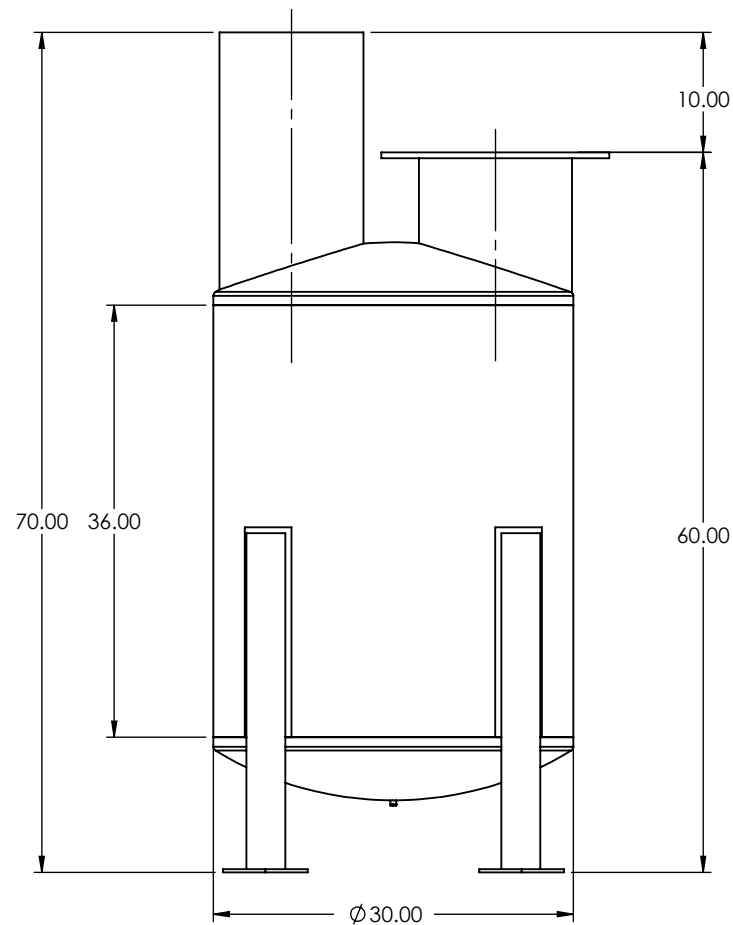
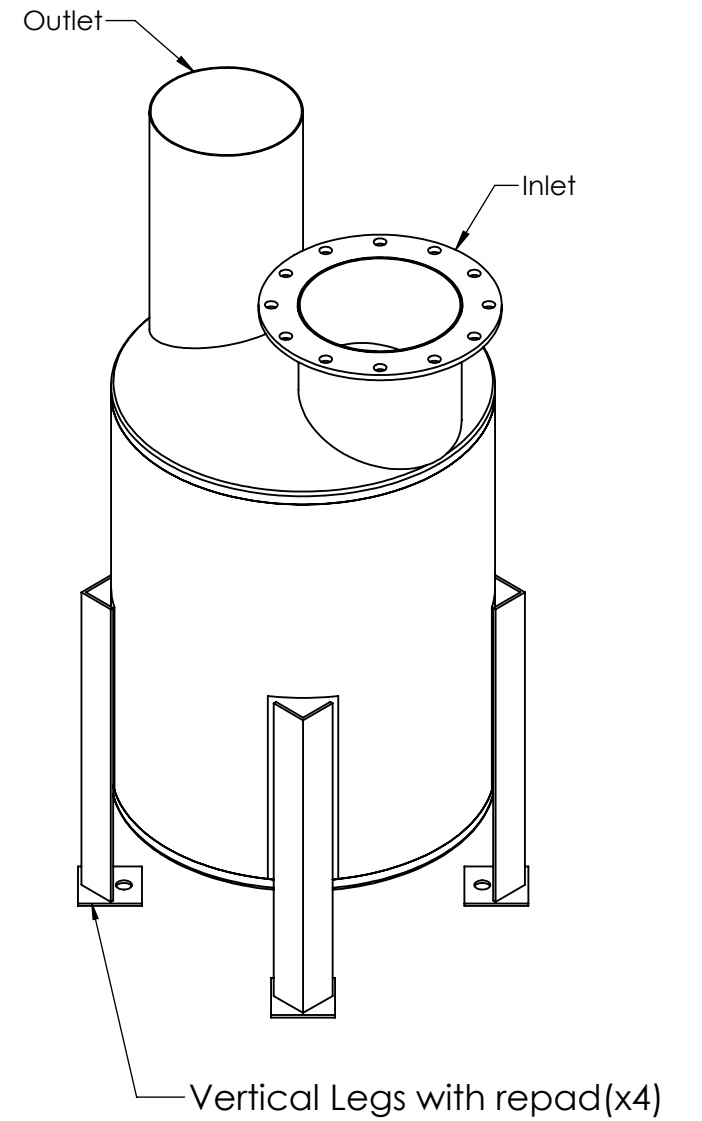
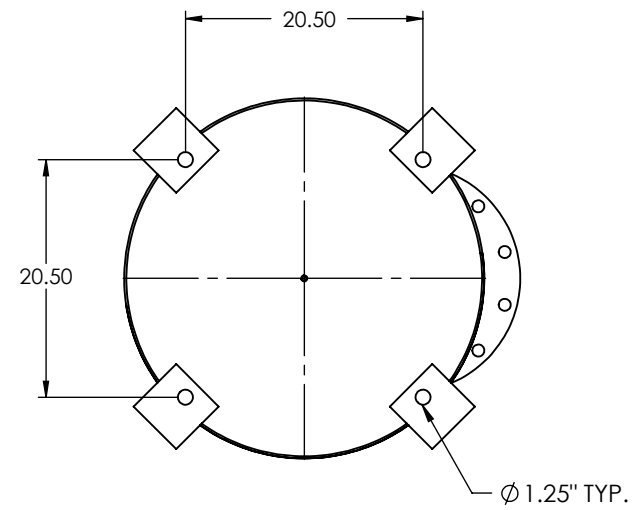
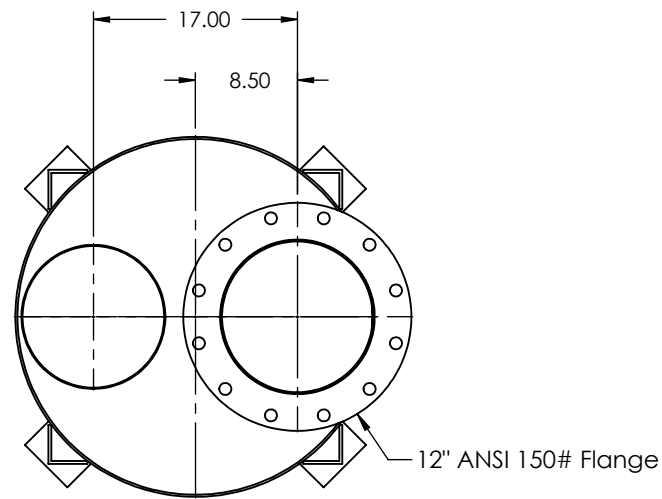
Specifications

- Waterproof, shock-and vibration-resistant aluminum construction
- Saltwater tested and fully corrosion-resistant
- Short circuit, reverse polarity, and ignition protected
- For use with 12V/6 cell batteries that are flooded/wet cell, maintenance free or starved electrolyte (AGM) only
- FCC compliant
- UL listed to marine standard 1236
- 3 year warranty
- Replaces all existing current on-board chargers (excluding portables)
- No Price Increase
- Availability: November 2010



DIGITAL LINEAR ON-BOARD CHARGERS

PRODUCT CODE	PRODUCT DESCRIPTION
1821065	MK 106D (1 bank x 6 amps)
1821105	MK-110D (1 bank x 10 amps)
1822105	MK-210D (2 bank x 5 amps)
1823155	MK-315D (3 bank x 5 amps)
1822205	MK-220D (2 bank x 10 amps)
1823305	MK-330D (3 bank x 10 amps)
1824405	MK-440D (4 bank x 10 amps)
1822305	MK-230D (2 bank x 15 amps)
1823455	MK-345D (3 bank x 15 amps)
1824605	MK-460D (4 bank x 15 amps)



Notes:
 All Dimensions are in Inches
 Material: Carbon Steel
 High Heat Black Paint
 Weight: Approx. 465 lbs

REV	DESCRIPTION	DATE (MM/DD/YY)	DRAWN BY	CHECKED BY
1	3 Vertical Legs to 4	09/10/19	FH	BN
2	Legs Hole Center Distance to 20.5"	09/21/19	FH	BN

UNLESS OTHERWISE NOTED
 1. REMOVE ALL BURRS AND SHARP EDGES
 2. DIMENSIONS ARE IN INCHES
 TOLERANCES
 0.X ± 0.2
 0.XX ± 0.12
 0.XXX ± 0.063

E. I. WILLIAMS INDUSTRIES INC.
 Building Sound Solutions

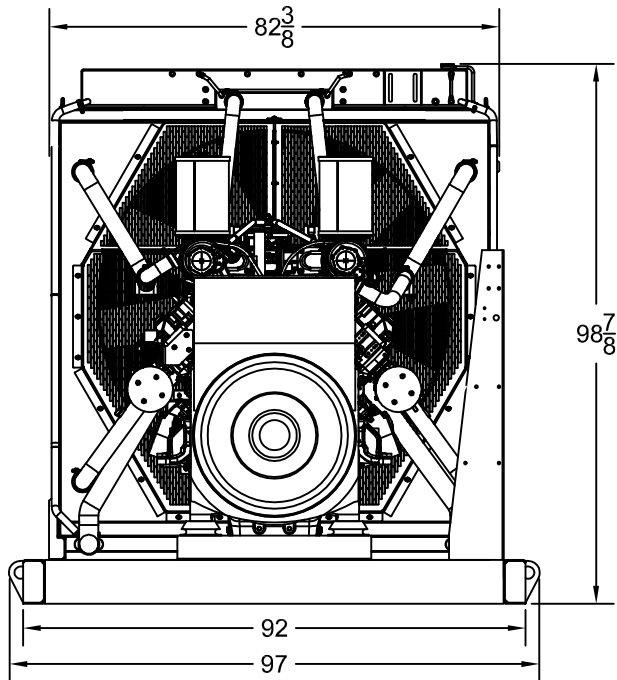
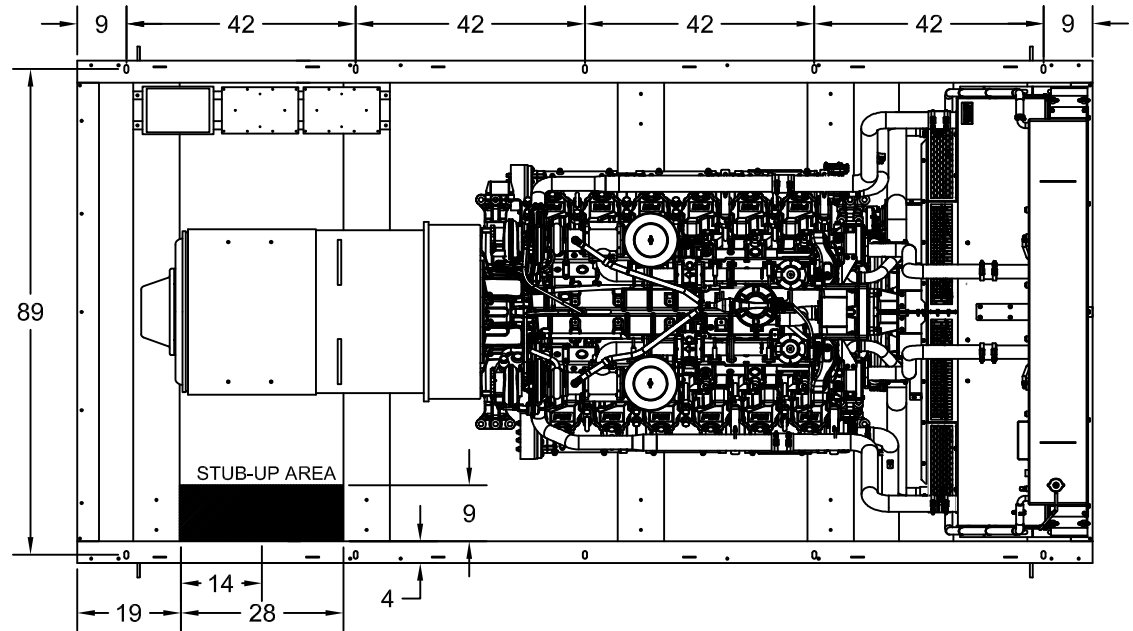
264 FAIRALL STREET, AJAX, ONTARIO, CANADA L1S 1R6
 T: 905-428-0950
 F: 905-428-8343
 WWW.EIWILLIAMS.COM

SILENCERS

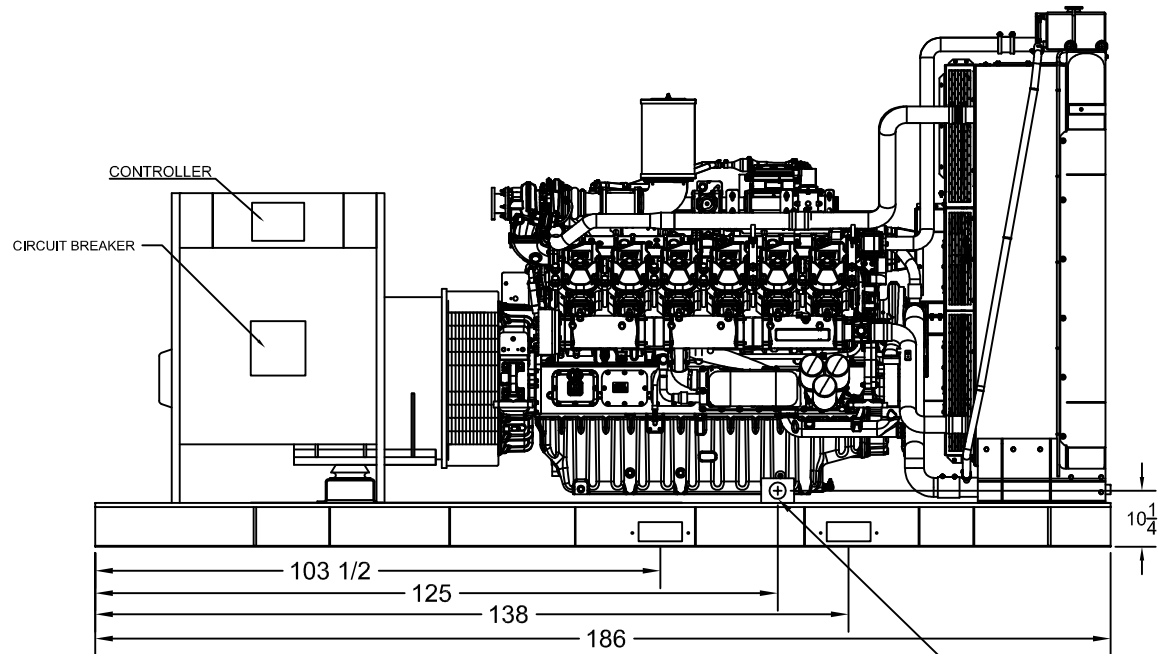
TITLE 12" CRITICAL GRADE COMPACT SILENCER		CUSTOMER GILLETTE GENERATORS	
APPLICATION	PROJECT 32L PSI	DWG NO.	DRAWN BY Fairuz H
DATE 04/22/19	SCALE	FILE NAME GE5-12-SP-R2	REV 2

SP-8000 OPEN DIMENSIONAL OVERVIEW

TOP VIEW



GEN END VIEW

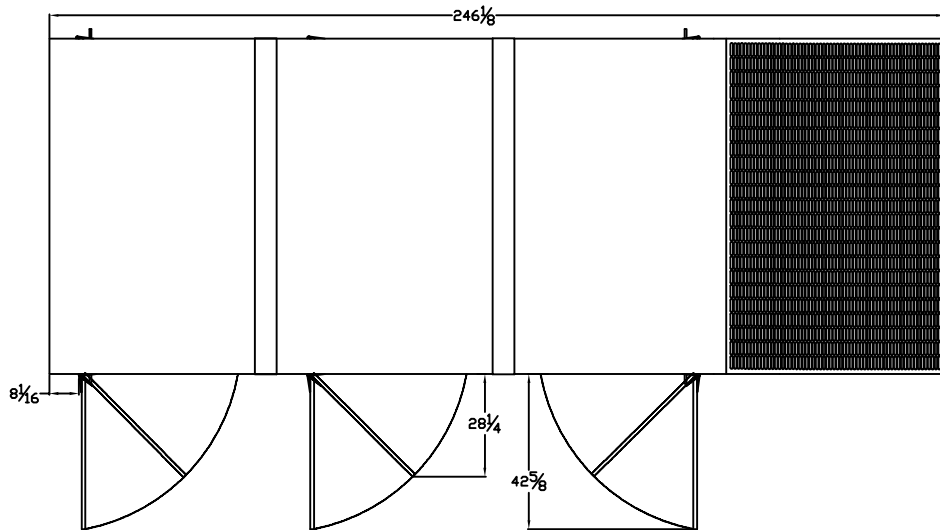


SIDE VIEW

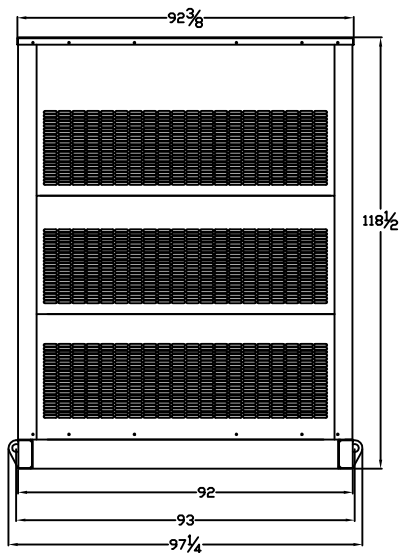
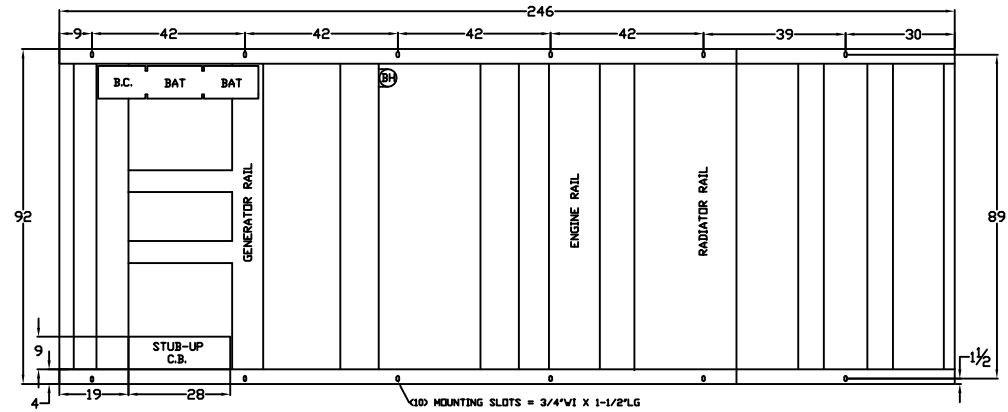
LEVEL 2 & 3 ENCLOSURE OUTLINE DIMENSIONS FOR SP-6500 & SP-8000

TOP VIEW

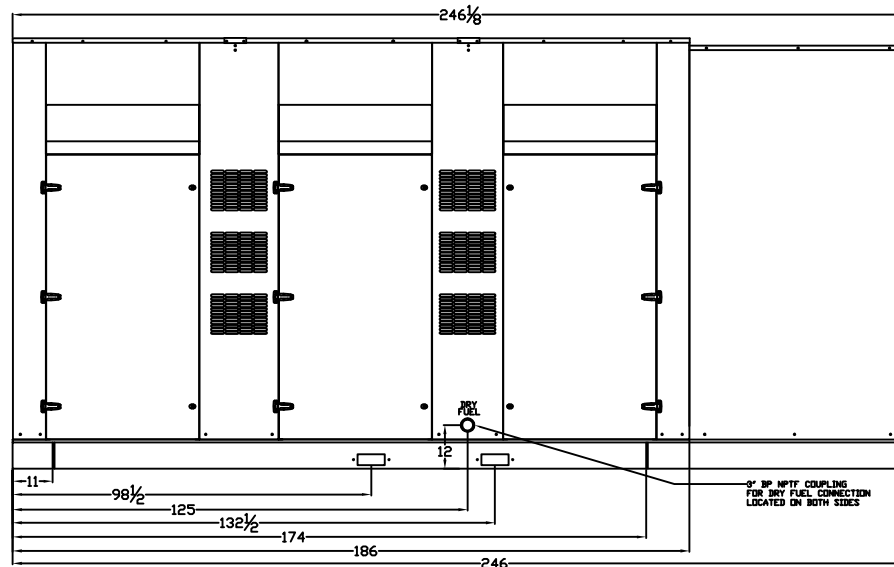
(GEN-SET HAS (6) DOORS, (3) SHOWN OPEN ARE TYPICAL FOR BOTH SIDES)



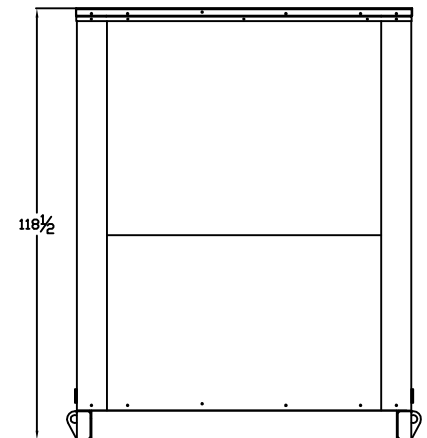
FRAME VIEW



GENERATOR END VIEW



SIDE VIEW



RADIATOR END VIEW