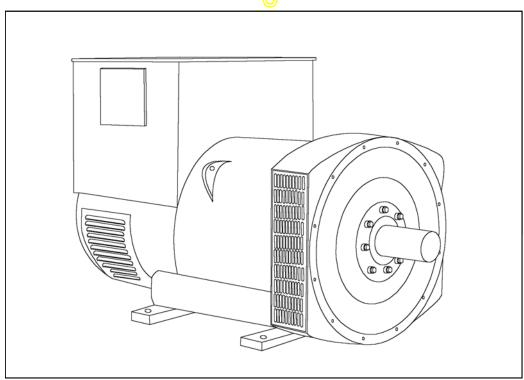
HCI534E/544E - Winding 311 Single Phase

Technical Data Sheet



HCI534E/544E

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

SX460 AVR - STANDARD

With this self excited control system the main stator supplies 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. This rectifier is protected by a surge suppressor against surges caused, for example, by short circuit.

AS440 AVR

With this self-excited system the main stator provides power via the AVR to the exciter stator. The high-efficiency semi-conductors 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 AS440 will support a range of electronic accessories, including a 'droop' Current Transformer (CT) to permit parallel operation with other ac generators.

MX341 AVR

This sophisticated AVR is incorporated into the Stamford Permanent Magnet Generator (PMG) control system.

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.

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, over voltage protection built-in and short circuit current level adjustments as 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 are reconnectable with 12 ends brought out to the terminals, which are mounted on a cover 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.

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.

HCI534E/544E

WINDING 311 Single Phase

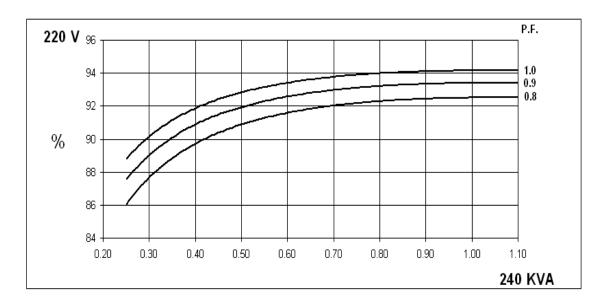
AV.R.	CONTROL SYSTEM SEPARATELY EXCITED BY P.M.G.										
A			i .								
SUSTAINED SHORT CIRCUIT REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)				With 49/ ENGINI	E COVERNING						
AV.R. AS440											
AV.R. AS440 # 1.0 % With 4% ENGINE GOVERNING # 1.0 % WITH 1	SUSTAINED SHORT CIRCUIT	REFER TO SHO	ORT CIRCUIT DE	CREMENT CURY	7ES (page 7)						
VOLTAGE REGULATION	CONTROL SYSTEM	SELF EXCITED									
SUSTAINED SHORT CIRCUIT WILL NOT SUSTAIN A SHORT CIRCUIT	A.V.R.	AS440									
NASULATION SYSTEM	VOLTAGE REGULATION	± 1.0 %									
RATED POWER FACTOR 0.8 STATOR WINDING DOUBLE LAYER LAP TWO THIRDS WINDING PITCH TWO THIRDS WINDING LEADS 12 STATOR WDG, RESISTANCE 0.003 Ohms AT 22°C DOUBLE DELTA CONNECTED ROTOR WDG, RESISTANCE 1.96 Ohms at 22°C EXCITER STATOR RESISTANCE 1.70 Ohms at 22°C EXCITER ROTOR RESISTANCE BS EN 61000-6-2 & 85 EN 61000-6-4, VDE 0875G, VDE 0875N, refer to factory for others WAVEFORM DISTORTION MAXIMUM OVERSPEED DEARING DISTORTION BALL. 6220 (ISO) BEARING DRIVE END BEARING DRIVE END BEARING ON-DRIVE END BEARING ON-DRIVE END 1 BEARING WEIGHT WOUND STATOR 722 kg WEIGHT WOUND STATOR WEIGHT WOUND ROTOR 617 kg 588 kg WRP INERTIA 8.9828 kgm³ 8.7049 kgm² SHIPPING WEIGHTS in a crate 1.95 OHz 165 x 87 x 124(cm) 1625 kg 165 x 87 x 124(cm) THF-50 COOLING AIR 1.035 m³/sec 2202 cfm 702 TIP-50 COOLING AIR 1.035 m³/sec 2202 cfm 703 TIP-50 COOLING AIR 1.035 m³/sec 2202 cfm 704 TIP-50 COOLING AIR 1.035 m³/sec 2202 cfm 705 TIP-50 COOLING AIR 705 TIP-50 COOLING AIR 706 TIP-50 COOLING AIR	SUSTAINED SHORT CIRCUIT	WILL NOT SUS	TAIN A SHORT C	IRCUIT							
RATED POWER FACTOR 0.8 STATOR WINDING DOUBLE LAYER LAP TWO THIRDS WINDING PITCH TWO THIRDS WINDING LEADS 12 STATOR WDG, RESISTANCE 0.003 Ohms AT 22°C DOUBLE DELTA CONNECTED ROTOR WDG, RESISTANCE 1.96 Ohms at 22°C EXCITER STATOR RESISTANCE 1.70 Ohms at 22°C EXCITER ROTOR RESISTANCE BS EN 61000-6-2 & 85 EN 61000-6-4, VDE 0875G, VDE 0875N, refer to factory for others WAVEFORM DISTORTION MAXIMUM OVERSPEED DEARING DISTORTION BALL. 6220 (ISO) BEARING DRIVE END BEARING DRIVE END BEARING ON-DRIVE END BEARING ON-DRIVE END 1 BEARING WEIGHT WOUND STATOR 722 kg WEIGHT WOUND STATOR WEIGHT WOUND ROTOR 617 kg 588 kg WRP INERTIA 8.9828 kgm³ 8.7049 kgm² SHIPPING WEIGHTS in a crate 1.95 OHz 165 x 87 x 124(cm) 1625 kg 165 x 87 x 124(cm) THF-50 COOLING AIR 1.035 m³/sec 2202 cfm 702 TIP-50 COOLING AIR 1.035 m³/sec 2202 cfm 703 TIP-50 COOLING AIR 1.035 m³/sec 2202 cfm 704 TIP-50 COOLING AIR 1.035 m³/sec 2202 cfm 705 TIP-50 COOLING AIR 705 TIP-50 COOLING AIR 706 TIP-50 COOLING AIR											
### STATOR WINDING ### DOUBLE LAYER LAP ### DOUBLE LAYER LAP ### TWO THIRDS ### STATOR WINDING ### DOUBLE LAYER LAP ### TWO THIRDS ### STATOR WINDING ### STATOR WINDING ### STATOR WINDING BEADS ### STATOR WDG, RESISTANCE ### 1.96 Ohms at 22°C ### STATOR WDG, RESISTANCE ### 1.96 Ohms at 22°C ### 1.96 Ohms at 22°C ### STATOR RESISTANCE ### 1.96 Ohms at 22°C ### 1.96 Ohms at											
DOUBLE LAYER LAP											
WINDING PITCH TWO THIRDS 12	RATED POWER FACTOR										
STATOR WDG. RESISTANCE	STATOR WINDING			DOUBLE L	AYER LAP						
STATOR WDG. RESISTANCE ROTOR WDG. RESISTANCE ROTOR WDG. RESISTANCE EXCITER STATOR RESISTANCE EXCITER ROTOR RESISTANCE EXCITER ROTOR RESISTANCE 1.96 Ohms at 22°C EXCITER ROTOR RESISTANCE EXCITER ROTOR RESISTANCE 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 MAXIMUM OVERSPEED EXERTING BALL. 6220 (ISO) BEARING DRIVE END BEARING NON-DRIVE END 1 BEARING 1 BEARING WEIGHT COMP. GENERATOR 1543 kg. 1535 kg WEIGHT WOUND STATOR 722 kg WEIGHT WOUND ROTOR 617 kg 588 kg WR? INERTIA 8.9828 kgm² 8.7049 kgm² 8.7049 kgm² 8.7049 kgm² FILEPHONE INTERFERENCE THE 200 cfm COOLING AIR 1.035 m²/se² 2202 cfm 1.312 m²/sec 2780 cfm VOLTAGE DOUBLE DELTA 220/110 230/115 240 240 240 240 240 250 261 273 Xd DIR. AXIS SYNCHRONOUS 1.87 1.71 1.57 2.30 2.20 2.11 Xg DIR. AXIS SUBTRANSIENT 0.10 0.09 0.15 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.05 0.08 s TO TIS BURDING AND VOLTAGE INDICATED VALUES ARE PER UNIT AR RATING AND VOLTAGE INDICATED TO THE STANSIENT 0.10 0.08 s TO THE CONST. TO SO.O FILED THINE AND VOLTAGE INDICATED TO THE STANSIENT 0.10 0.00 s 0.015 0.016 REACTANCES AND STANSIENT 0.10 0.09 0.15 0.016 0.08 s TO THE CONST. 1.000 S.E.	WINDING PITCH			TWOT	THIRDS						
1.96 Ohms at 22°C	WINDING LEADS			1	2						
EXCITER STATOR RESISTANCE EXCITER ROTOR RESISTANCE EXCITER ROTOR RESISTANCE EXCITER ROTOR RESISTANCE EXCITER ROTOR RESISTANCE D.0.92 Ohms PER PHASE AT 22°C R.F.I. SUPPRESSION BS EN 61000-6-2 & BS EN 61000-6-4, VDE 0875R, VDE 0875N. refer to factory for others WAVEFORM DISTORTION NO LOAD 1.5% NON-DISTORTING (INEAR LOAD < 5.0% MAXIMUM OVERSPEED EARLING 2250 Rev/Min BEARING ROW-DIVE END BALL. 6220 (ISO) BEARING NON-DRIVE END BALL. 6314 (ISO) 1 BEARING 2 BEARING WEIGHT COMP. GENERATOR 1543 Ag WEIGHT WOUND STATOR 722 kg 722 kg WEIGHT WOUND ROTOR 617 kg 8.9928 kgm² 8.7049 kgm² SHIPPING WEIGHTS in a crate 1635 kg 1625 kg PACKING CRATE SIZE 166 x 87 x 124(cm) 166 x 87 x 124(cm) 166 x 87 x 124(cm) 167 kg 187	STATOR WDG. RESISTANCE		0.0 <mark>03 O</mark> hr	ns AT 22°C DOL	JBLE DELTA COI	NNECTED					
EXCITER ROTOR RESISTANCE 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 LINEAR LOAD < 5.0% MAXIMUM OVERSPEED BEARING DRIVE END BEARING NON-DRIVE END BEARING 1543 kg 1535 kg WEIGHT COMP. GENERATOR 1543 kg 1535 kg WEIGHT WOUND ROTOR 617 kg 588 kg WR? INERTIA 8.9828 kgm² 8.7049 kgm² SHIPPING WEIGHTS in a crate 1635 kg 1625 kg PACKING CRATE SIZE 166 x87 x 124 (cm) 50 Hz 60 Hz TELEPHONE INTERFERENCE THF 2% 100 L320/110 230/115 240/120 VOLTAGE DOUBLE DELTA 200/110 230/115 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 VOLTAGE PARALLEL DELTA 101 0.09 0.08 0.11 0.11 0.10 X° JO IR. AXIS SYNCHRONOUS 1.87 1.71 1.57 2.30 2.20 2.11 X° JO IR. AXIS SYNCHRONOUS 1.87 1.71 1.57 2.30 2.20 2.11 X° JO IR. AXIS SYNCHRONOUS 1.87 1.71 1.57 2.30 2.20 2.11 X° JO IR. AXIS SYNCHRONOUS 1.87 1.71 1.57 2.30 2.20 2.11 X° JO IR. AXIS SYNCHRONOUS 1.87 1.71 1.57 2.30 2.20 2.11 X° JO IR. AXIS SYNCHRONOUS 1.87 1.71 1.57 2.30 2.20 2.11 X° JO IR. AXIS SYNCHRONOUS 1.88 1.39 1.22 1.84 1.76 1.69 X° QUAD. AXIS SRANSIENT 0.10 0.09 0.08 0.11 0.11 0.10 X° JO IR. AXIS SUBTRANSIENT 0.10 0.09 0.08 0.11 0.11 0.10 X° JO IR. AXIS SUBTRANSIENT 0.10 0.09 0.08 0.11 0.11 0.10 X° JO IR. AXIS SUBTRANSIENT 0.10 0.09 0.09 0.09 0.09 0.09 0.09 0.09	ROTOR WDG. RESISTANCE			1.96 Ohm	s 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 LINEAR LOAD < 5.0% MAXIMUM OVERSPEED BEARING DRIVE END BEARING NON-DRIVE END BEARING NON-DRIVE END BEARING OND-DRIVE END BEARING SEARCH STATE WEIGHT COMP. GENERATOR 1543 kg 1535 kg WEIGHT COMP. GENERATOR 1543 kg 1535 kg WEIGHT WOUND STATOR 722 kg WEIGHT WOUND ROTOR 617 kg 8.7049 kgm² SHIPPING WEIGHTS in a crate 1635 kg PACKING CRATE SIZE 166 x 87 x 124(cm) 166 x 87 x 124(cm) 160 x 87 x	EXCITER STATOR RESISTANCE			17 Ohms	at 22°C						
WAVEFORM DISTORTION MAXIMUM OVERSPEED 2250 Rev/Min BEARING DRIVE END BEARING NON-DRIVE END BEALL 6220 (ISO) BEALL 6220 (ISO) BEALL 6314 (ISO) BEALL 6314 (ISO) 1 BEARING WEIGHT COMP, GENERATOR 1535 kg WEIGHT WOUND STATOR 722 kg 722 kg WEIGHT WOUND ROTOR 617 kg 588 kg WEIGHT WOUND ROTOR 617 kg 589 588 kg WEIGHT WOUND ROTOR 617 kg 589 588 kg WEIGHT WOUND ROTOR 617 kg 618 589 1625 kg PACKING CRATE SIZE 166 x 87 x 724 km) 166 x 87 x 124 kcm) 167 b Hz 171F-50 COOLING AIR 1.035 m/sec 2202 cfm 1.312 m/sec 2780 cfm VOLTAGE DOUBLE DELTA 220/110 230/115 240/120 220/110 230/115 240/120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 VOLTAGE PARALLEL SELTA 110 115 120 110 115 120 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 VOLTAGE PARALLEL SELTA 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 100 100	EXCITER ROTOR RESISTANCE			0.092 Ohms PER	PHASE AT 22°C	;					
WAVEFORM DISTORTION MAXIMUM OVERSPEED 2250 Rev/Min BEARING DRIVE END BEARING NON-DRIVE END BEALL 6220 (ISO) BEALL 6220 (ISO) BEALL 6314 (ISO) BEALL 6314 (ISO) 1 BEARING WEIGHT COMP, GENERATOR 1535 kg WEIGHT WOUND STATOR 722 kg 722 kg WEIGHT WOUND ROTOR 617 kg 588 kg WEIGHT WOUND ROTOR 617 kg 589 588 kg WEIGHT WOUND ROTOR 617 kg 589 588 kg WEIGHT WOUND ROTOR 617 kg 618 589 1625 kg PACKING CRATE SIZE 166 x 87 x 724 km) 166 x 87 x 124 kcm) 167 b Hz 171F-50 COOLING AIR 1.035 m/sec 2202 cfm 1.312 m/sec 2780 cfm VOLTAGE DOUBLE DELTA 220/110 230/115 240/120 220/110 230/115 240/120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 VOLTAGE PARALLEL SELTA 110 115 120 110 115 120 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 VOLTAGE PARALLEL SELTA 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 100 100	R.F.I. SUPPRESSION	BS EN 61	000-6-2 & BS EN	61000-6-4,VDE ()875G, VDE 0875	N. refer to factor	y for others				
MAXIMUM OVERSPEED 2250 Rev/Min	WAVEFORM DISTORTION						,				
BEARING DRIVE END BEARING BEA			110 L97 []			20/12 (0.0/0					
BEARING NON-DRIVE END 1 BEARING 1 BEAR BEARING 1 BEA											
1 BEARING 2 BEARING 1535 kg 1535 kg 1535 kg 1535 kg 1535 kg 722 kg					. ,						
WEIGHT COMP. GENERATOR	BEARING NON-DRIVE END		4 DEADONO	BALL. 63	314 (ISO)	O DE ADIMO					
WEIGHT WOUND STATOR 722 kg 722 kg 722 kg WEIGHT WOUND ROTOR 617 kg 588 kg WR2 INERTIA 8.9828 kgm² 8.7049 kgm² SHIPPING WEIGHTS in a crate 1635 kg 1625 kg PACKING CRATE SIZE 166 x 87 x 124(cm) 167 x 124(cm) 166 x 124 x 124(cm) 166 x 124(cm) 166 x 124(cm) 167 x 124(cm)	WEIGHT COMP. CENEDATOR										
See											
WR2 INERTIA 8.9828 kgm² 8.7049 kgm²											
SHIPPING WEIGHTS in a crate											
PACKING CRATE SIZE 166 x 87 x 124(cm) 166 x 87 x 124(cm) 166 x 87 x 124(cm) 160 Hz 115 115 120 110 115 120 110 115 120 12	SHIPPING WEIGHTS in a crate										
TELEPHONE INTERFERENCE COOLING AIR 1.035 m³/sec 2202 cfm 1.312 m³/sec 2780 cfm VOLTAGE DOUBLE DELTA 220/110 230/115 240/120 220/110 230/115 240/120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 240 240 240 250 261 273 Xd DIR. AXIS SYNCHRONOUS 1.87 1.71 1.57 2.30 2.20 2.11 X'd DIR. AXIS TRANSIENT 0.10 0.09 0.08 0.11 0.11 0.10 X'd DIR. AXIS SUBTRANSIENT 0.07 0.07 0.07 0.06 0.08 0.07 0.07 Xq QUAD. AXIS REACTANCE 1.46 1.33 1.22 1.84 1.76 1.69 X'q QUAD. AXIS SUBTRANSIENT 0.16 0.14 0.13 0.22 0.21 0.20 XL LEAKAGE REACTANCE 0.04 0.03 0.03 0.04 0.04 0.04 X2 NEGATIVE SEQUENCE 0.05 0.05 0.05 0.05 0.04 0.08 s T'd SUB-TRANSIENT TIME CONST. 0.012 s T'd SUB-TRANSIME CONST. 1.020/110 230/115 240/120 240/120 240/120 240/120 240/120 240/120 240/120 240/120 240/120 240/120 240/120 240/120 240/120 240/120 240 250 261 273 2.30 2.20 2.11 0.10 0.10 0.11 0.10 0.09 0.08 0.07 0.07 0.07 0.07 0.06 0.08 0.07 0.07 0.07 0.06 0.08 0.07 0.04 0.04 0.04 0.04 0.04 0.05 0.06 0.08 0.07 0.06 0.08 s T'd SUB-TRANSTIME CONST. 0.08 s T'd SUB-TRANSTIME CONST. 1.00 2.5 s	PACKING CRATE SIZE		66 x 87 x 124(cm	;m)							
COOLING AIR 1.035 m³/sec 2202 cfm 1.312 m³/sec 2780 cfm VOLTAGE DOUBLE DELTA 220/110 230/115 240/120 220/110 230/115 240/120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 120 VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 VOLTAGE PARALLEL DELTA 110 115 120 120 120 VOLTAGE PARALLEL DELTA 110 115 120 120 120 VOLTAGE PARALLEL DELTA 110 115 120 120 VOLTAGE PARALLEL DELTA 110 115 120 VOLTAGE PARALLEL DELTA			50 Hz			60 Hz					
VOLTAGE DOUBLE DELTA	TELEPHONE INTERFERENCE	THF<2%									
VOLTAGE PARALLEL DELTA 110 115 120 110 115 120 kVA BASE RATING FOR REACTANCE VALUES 240 240 240 250 261 273 Xd DIR. AXIS SYNCHRONOUS 1.87 1.71 1.57 2.30 2.20 2.11 X'd DIR. AXIS TRANSIENT 0.10 0.09 0.08 0.11 0.11 0.10 X'd DIR. AXIS SUBTRANSIENT 0.07 0.07 0.06 0.08 0.07 0.07 X'q QUAD. AXIS REACTANCE 1.46 1.33 1.22 1.84 1.76 1.69 X''q QUAD. AXIS SUBTRANSIENT 0.16 0.14 0.13 0.22 0.21 0.20 XL LEAKAGE REACTANCE 0.04 0.03 0.03 0.04 0.04 0.04 X2 PEGATIVE SEQUENCE 0.11 0.10 0.09 0.15 0.14 0.14 X0 ZERO SEQUENCE 0.05 0.05 0.04 0.07 0.06 0.06 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED <td>COOLING AIR</td> <td>1.0</td> <td>)35 m³/sec 22<mark>0</mark>2</td> <td>-</td> <td>1.3</td> <td>12 m³/sec 2780</td> <td>cfm</td>	COOLING AIR	1.0)35 m³/sec 22 <mark>0</mark> 2	-	1.3	12 m³/sec 2780	cfm				
240 240 240 250 261 273 Xd DIR. AXIS SYNCHRONOUS 1.87 1.71 1.57 2.30 2.20 2.11 X'd DIR. AXIS TRANSIENT 0.10 0.09 0.08 0.11 0.11 0.10 X'd DIR. AXIS SUBTRANSIENT 0.07 0.07 0.06 0.08 0.07 0.07 Xq QUAD. AXIS REACTANCE 1.46 1.33 1.22 1.84 1.76 1.69 X''q QUAD. AXIS SUBTRANSIENT 0.16 0.14 0.13 0.22 0.21 0.20 XL LEAKAGE REACTANCE 0.04 0.03 0.03 0.04 0.04 0.04 X2 NEGATIVE SEQUENCE 0.11 0.10 0.09 0.15 0.14 0.14 X0 ZERO SEQUENCE 0.05 0.05 0.04 0.07 0.06 0.06 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED T'd TRANSIENT TIME CONST. 0.012 s T'd SUB-TRANSTIME CONST. 0.012 s T'd O.C. FIELD TIME CONST. 2.5 s	VOLTAGE DOUBLE DELTA	220/110		240/120	220/110		240/120				
VALUES 240 240 240 250 261 273 Xd DIR. AXIS SYNCHRONOUS 1.87 1.71 1.57 2.30 2.20 2.11 X'd DIR. AXIS TRANSIENT 0.10 0.09 0.08 0.11 0.11 0.10 X''d DIR. AXIS SUBTRANSIENT 0.07 0.07 0.06 0.08 0.07 0.07 Xq QUAD. AXIS REACTANCE 1.46 1.33 1.22 1.84 1.76 1.69 X''q QUAD. AXIS SUBTRANSIENT 0.16 0.14 0.13 0.22 0.21 0.20 XL LEAKAGE REACTANCE 0.04 0.03 0.03 0.04 0.04 0.04 X2 NEGATIVE SEQUENCE 0.11 0.10 0.09 0.15 0.14 0.14 X0 ZERO SEQUENCE 0.05 0.05 0.04 0.07 0.06 0.06 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED T'd TRANSIENT TIME CONST. 0.012 s 0.012 s 0.012 s 0.012 s 0.012 s 0.012 s <td></td> <td>110</td> <td>115</td> <td>120</td> <td>110</td> <td>115</td> <td>120</td>		110	115	120	110	115	120				
X'd DIR. AXIS TRANSIENT 0.10 0.09 0.08 0.11 0.11 0.10 X''d DIR. AXIS SUBTRANSIENT 0.07 0.07 0.06 0.08 0.07 0.07 X''q QUAD. AXIS REACTANCE 1.46 1.33 1.22 1.84 1.76 1.69 X''q QUAD. AXIS SUBTRANSIENT 0.16 0.14 0.13 0.22 0.21 0.20 XL LEAKAGE REACTANCE 0.04 0.03 0.03 0.04 0.04 0.04 X2 NEGATIVE SEQUENCE 0.11 0.10 0.09 0.15 0.14 0.14 X0 ZERO SEQUENCE 0.05 0.05 0.04 0.07 0.06 0.06 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED T'd TRANSIENT TIME CONST. 0.08 s T'd SUB-TRANSTIME CONST. 0.012 s T'do O.C. FIELD TIME CONST. 2.5 s	VALUES	240	240	240	250	261	273				
X"d DIR. AXIS SUBTRANSIENT 0.07 0.07 0.06 0.08 0.07 0.07 Xq QUAD. AXIS REACTANCE 1.46 1.33 1.22 1.84 1.76 1.69 X"q QUAD. AXIS SUBTRANSIENT 0.16 0.14 0.13 0.22 0.21 0.20 XL LEAKAGE REACTANCE 0.04 0.03 0.03 0.04 0.04 0.04 X2 NEGATIVE SEQUENCE 0.11 0.10 0.09 0.15 0.14 0.14 X0 ZERO SEQUENCE 0.05 0.05 0.04 0.07 0.06 0.06 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED T'd TRANSIENT TIME CONST. 0.08 s T'd SUB-TRANSTIME CONST. 0.012 s T'do O.C. FIELD TIME CONST. 2.5 s	Xd DIR. AXIS SYNCHRONOUS	1.87	1.71	1.57	2.30	2.20	2.11				
Xq QUAD. AXIS REACTANCE 1.46 1.33 1.22 1.84 1.76 1.69 X"q QUAD. AXIS SUBTRANSIENT 0.16 0.14 0.13 0.22 0.21 0.20 XL LEAKAGE REACTANCE 0.04 0.03 0.03 0.04 0.04 0.04 X2 NEGATIVE SEQUENCE 0.11 0.10 0.09 0.15 0.14 0.14 X0 ZERO SEQUENCE 0.05 0.05 0.04 0.07 0.06 0.06 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED T'd TRANSIENT TIME CONST. 0.08 s 0.012 s T'd SUB-TRANSTIME CONST. 0.012 s T'do O.C. FIELD TIME CONST. 2.5 s	X'd DIR. AXIS TRANSIENT	0.10	0.09	0.08	0.11	0.11	0.10				
X"q QUAD. AXIS SUBTRANSIENT 0.16 0.14 0.13 0.22 0.21 0.20 XL LEAKAGE REACTANCE 0.04 0.03 0.03 0.04 0.04 0.04 X2 NEGATIVE SEQUENCE 0.11 0.10 0.09 0.15 0.14 0.14 X0 ZERO SEQUENCE 0.05 0.05 0.04 0.07 0.06 0.06 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED T'd TRANSIENT TIME CONST. 0.08 s T"d SUB-TRANSTIME CONST. 0.012 s T'do O.C. FIELD TIME CONST. 2.5 s	X"d DIR. AXIS SUBTRANSIENT	0.07	0.07	0.06	0.08	0.07	0.07				
XL LEAKAGE REACTANCE 0.04 0.03 0.03 0.04 0.04 0.04 X2 NEGATIVE SEQUENCE 0.11 0.10 0.09 0.15 0.14 0.14 X0 ZERO SEQUENCE 0.05 0.05 0.04 0.07 0.06 0.06 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED T'd TRANSIENT TIME CONST. 0.08 s T'd SUB-TRANSTIME CONST. 0.012 s T'do O.C. FIELD TIME CONST. 2.5 s	Xq QUAD. AXIS REACTANCE	1.46	1.33	1.22	1.84	1.76	1.69				
X2 NEGATIVE SEQUENCE 0.11 0.10 0.09 0.15 0.14 0.14 X0 ZERO SEQUENCE 0.05 0.05 0.04 0.07 0.06 0.06 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED T'd TRANSIENT TIME CONST. 0.08 s T'd SUB-TRANSTIME CONST. 0.012 s T'do O.C. FIELD TIME CONST. 2.5 s	X"q QUAD. AXIS SUBTRANSIENT	0.16	0.14	0.13	0.22	0.21	0.20				
Xo ZERO SEQUENCE 0.05 0.05 0.04 0.07 0.06 0.06 REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED T'd TRANSIENT TIME CONST. 0.08 s T''d SUB-TRANSTIME CONST. 0.012 s T''do O.C. FIELD TIME CONST. 2.5 s	XL LEAKAGE REACTANCE	0.04	0.03	0.03	0.04	0.04	0.04				
REACTANCES ARE SATURATED T'd TRANSIENT TIME CONST. T'd SUB-TRANSTIME CONST. O.08 s T'd SUB-TRANSTIME CONST. 0.012 s T'do O.C. FIELD TIME CONST. 2.5 s	X2 NEGATIVE SEQUENCE	0.11	0.10	0.09	0.15	0.14	0.14				
T'd TRANSIENT TIME CONST. 0.08 s T"d SUB-TRANSTIME CONST. 0.012 s T'do O.C. FIELD TIME CONST. 2.5 s	X ₀ ZERO SEQUENCE										
T''d SUB-TRANSTIME CONST. 0.012 s T'do O.C. FIELD TIME CONST. 2.5 s		ATED	VALUE			D VOLTAGE IND	ICATED				
T'do O.C. FIELD TIME CONST. 2.5 s											
	Ta ARMATURE TIME CONST.										
	SHORT CIRCUIT RATIO	1/Xd									

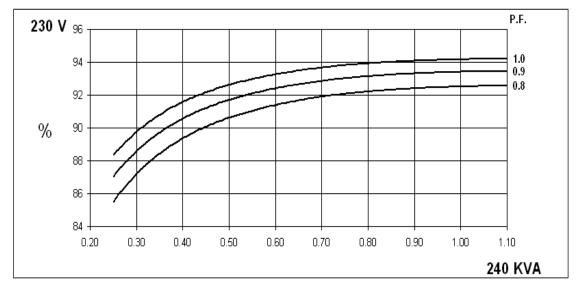


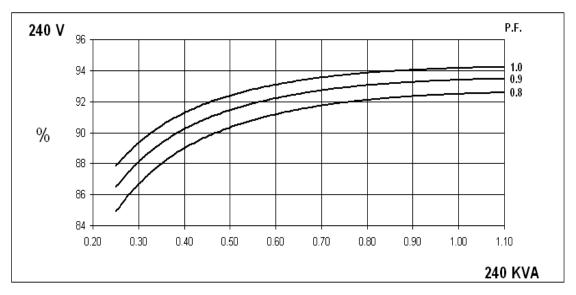
50 Hz

HCI534E/544EWinding 311 Single Phase

SINGLE PHASE EFFICIENCY CURVES





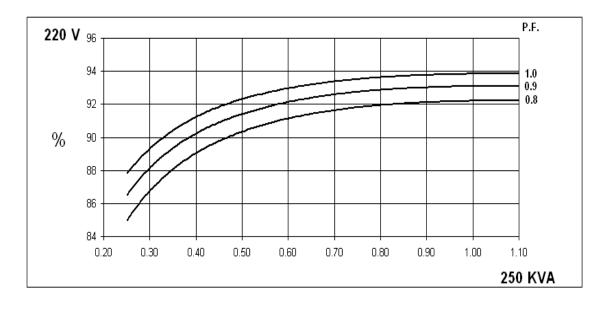


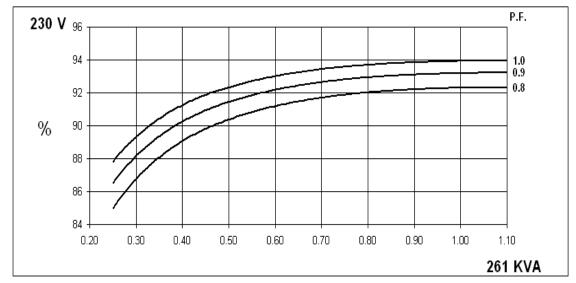


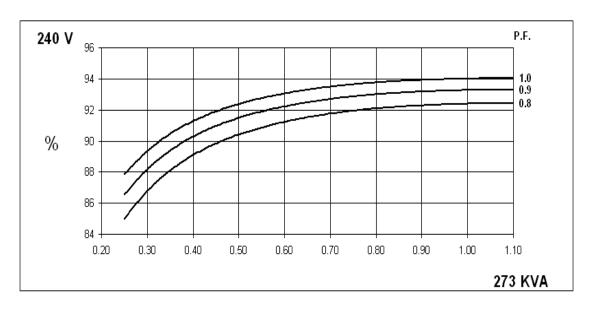
60 Hz

HCI534E/544EWinding 311 Single Phase

SINGLE PHASE EFFICIENCY CURVES





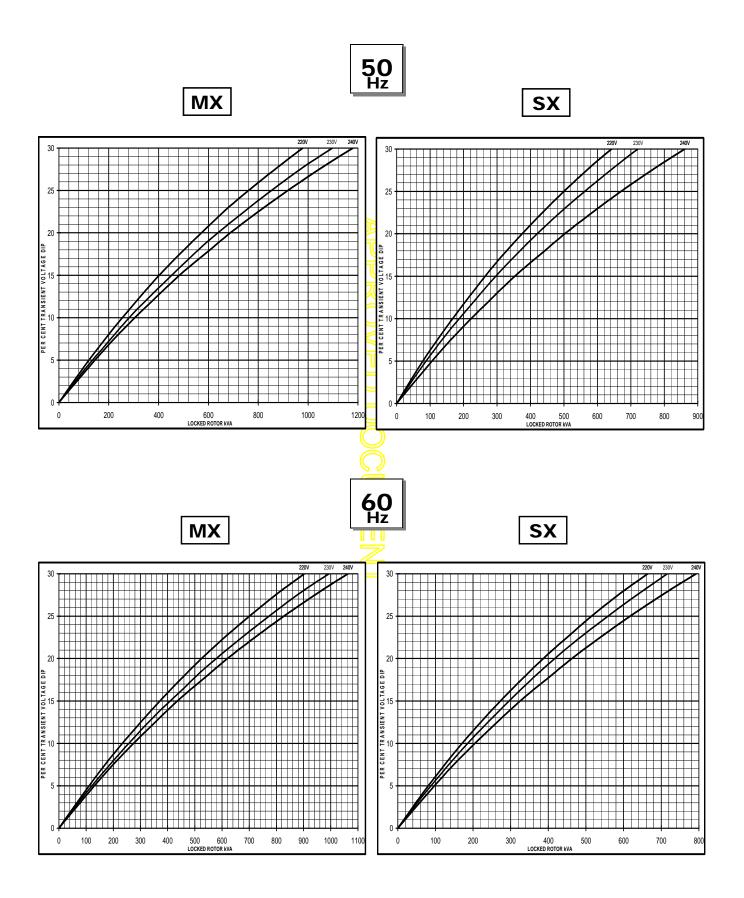




HCI534E/544E

Winding 311 Single Phase

Locked Rotor Motor Starting Curve



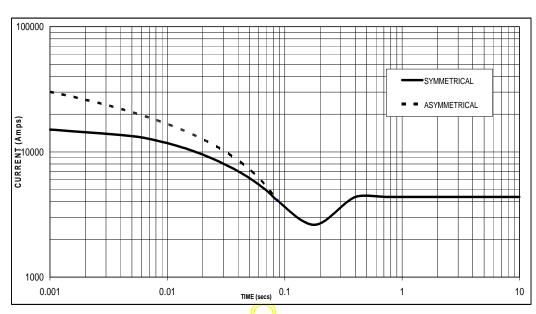
HCI534E

STAMFORD

Winding 311 Single Phase

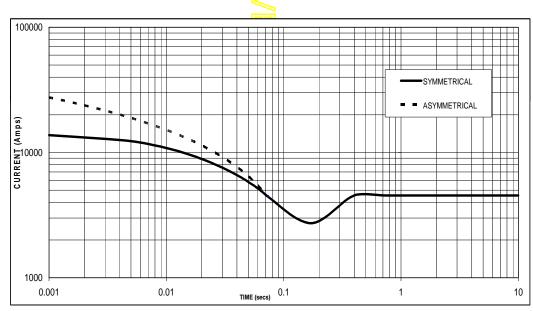
Single Phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on Double Delta connection.





Sustained Short Circuit = 4364 Amps





Sustained Short Circuit = 4545 Amps

Note

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 :

Voltage	Factor
220V	X 1.00
230V	X 1.05
240V	X 1.09

The sustained current value is constant irrespective of voltage level

HCI534E/544E

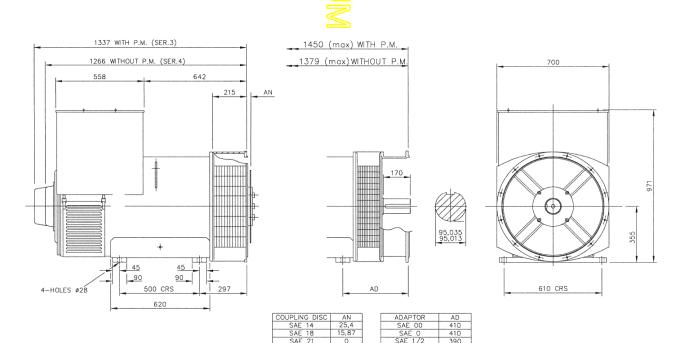
Winding 311 Single Phase

RATINGS

	Class - Temp Rise	Cont. F - 105/40°C			Cont.	Cont. H - 125/40°C			Cont. F - 105/40°C			Cont. H - 125/40°C		
	•		0.8pf			0.8pf			1.0pf			1.0pf		
50	Double Delta (V)	220	230	240	220	230	240	220	230	240	220	230	240	
	Parallel Delta (V)	110	115	120	110	115	120	110	115	120	110	115	120	
	kVA	220	220	220	240	240	240	220	220	220	240	240	240	
	kW	176	176	176	192	192	192	220	220	220	240	240	240	
	Efficiency (%)	92.4	92.4	92.4	92.5	92.5	92.5	94.1	94.1	94.1	94.2	94.2	94.2	
	kW Input	190	190	190	208	208	208	234	234	234	255	255	255	

	Class - Temp Rise	Cont. F - 105/40°C 0.8pf			Cont. H - 125	Cont. F - 105/40°C 1.0pf			Cont. H - 125/40°C 1.0pf			
60	Double Delta (V)	220	230	240	220 230	240	220	230	240	220	230	240
	Parallel Delta (V)	110	115	120	110 115	120	110	115	120	110	115	120
	kVA	228	238	250	250 <mark></mark> 261	273	228	238	250	250	261	273
	kW	182	190	200	200 209	218	228	238	250	250	261	273
	Efficiency (%)	92.1	92.2	92.3	92.2 92.3	92.4	93.8	93.9	93.9	93.8	93.9	94.0
	kW Input	198	206	217	217 226	236	243	253	266	267	278	290

DIMENSIONS



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

Copyright 2010, Cummins Generator Technologies Ltd, All Rights Reserved Stamford and AvK are registered trade marks of Cummins Generator Technologies Ltd Cummins and the Cummins logo are registered trade marks of Cummins Inc.