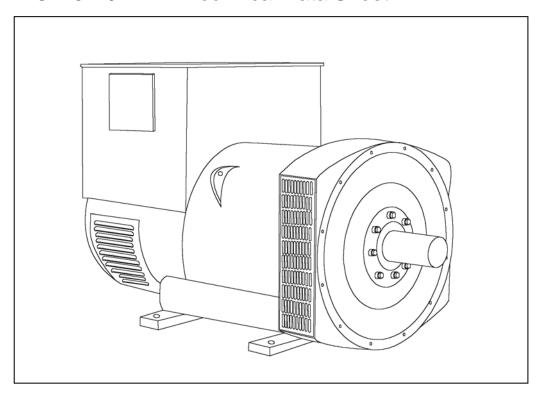
# STAMFORD

# HCI 434E/444E - Technical Data Sheet



#### STAMFORD

## HCI434E/444E

#### **SPECIFICATIONS & OPTIONS**

#### **STANDARDS**

Newage 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**

#### **AS440 AVR - STANDARD**

With this self-excited system the main stator provides power via the Automatic Voltage Regulator (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.

If three-phase sensing is required with the PMG system the MX321 AVR must be used.

We recommend three-phase sensing for applications with greatly unbalanced or highly non-linear loads.

#### MX321 AVR

The most sophisticated of all our AVRs combines all the features of the MX341 with, additionally, three-phase rms sensing, for improved regulation and performance. 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 are 3-phase 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%.

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.



# HCI434E/444E

# **WINDING 311**

A.V.R. MX321 MX341  **20	CONTROL SYSTEM SEPARATELY EXCITED BY P.M.G.													
VOLTAGE REGULATION   ± 0.5 %   ± 1.0 %   With 4% ENGINE GOVERNING														
SUSTAINED SHORT CIRCUIT  CONTROL SYSTEM  AV.R.  AS440  VOLTAGE REQUIATION  \$1.0 %   With 4% ENGINE GOVERNING  SUSTAINED SHORT CIRCUIT  WILL NOT SUSTAIN A SHORT CIRCUIT  USUATATION SYSTEM  PROTECTION  RATED POWER FACTOR  3.8  STATOR WINDING  WINDING PITCH  WINDING PI														
SELF EXCITED														
A.V.R. AS440   ±1.0%   With 4% ENGINE GOVERNING   ±1.0%   With 4% ENGINE GOVERNING	SUSTAINED SHORT CIRCUIT REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)													
VOLTAGE REGULATION   ± 1.0 % With 4% ENGINE GOVERNING	CONTROL SYSTEM SELF EXCITED													
SUSTAINED SHORT CIRCUIT   WILL NOT SUSTAIN A SHORT CIRCUIT	A.V.R.	AS440												
NSULATION SYSTEM  RATED POWER FACTOR  STATOR WINDING  WINDING PITCH  WINDING PITCH  TWO THIRDS  STATOR WID, RESISTANCE  ROTOR WDG, RESISTANCE  EXCITER STATOR RESISTANCE  EXCITER ROTOR DISTORM NO. LOAD < 1.5% NON-DISTORTING BALLANCED LINEAR LOAD < 5.0%  MAXIMUM OVERSPEED  BEARING DRIVE END  BEARING NON-DRIVE BOOK NON-DRIVE BOO	VOLTAGE REGULATION	± 1.0 %	± 1.0 % With 4% ENGINE GOVERNING											
RATED POWER FACTOR  RATED POWER FACTOR  STATOR WINDING  DOUBLE LAYER LAP  TWO THIRDS  WINDING PITCH  TWO THIRDS  WINDING LEADS  TWO THIRDS  WINDING LEADS  TRYOR WIG, RESISTANCE  ROTOR WID, RESISTANCE  EXCITER STATOR RESISTANCE  EXCITER ROTOR RESISTANCE  EXCITER ROTOR RESISTANCE  EXCITER ROTOR RESISTANCE  BS EN 61000-62 & BS EN 61000-6-4, VIDE 0875G, VDE 0875N. refer to factory for others  WAVEFORM DISTORTION  MAXIMUM OVERSPEED  BEARING DRIVE END  BEARING NON-DRIVE END  BEARING STATOR  WEIGHT WOUND STATOR  WEIGHT WOUND ROTOR  WRY INERTIA  4.6331 kgm²  1.10 kg  PACKING CRATE SIZE  155 x 87 x 107(cm)  105 kg  110 kg  PACKING CRATE SIZE  155 x 87 x 107(cm)  155 x 87 x 107(cm)  155 x 87 x 107(cm)  TELEPHONE INTERFERENCE  THE-2%  THE-2%  THE-30  TO SOUTH THE STATE AND THE AND THE ARCHIVE THE AND TH	SUSTAINED SHORT CIRCUIT	WILL NOT	SUSTAIN A	SHORT CIF	RCUIT									
RATED POWER FACTOR   10.8   1.19 Ohms   1.2	INSULATION SYSTEM CLASS H													
RATED POWER FACTOR   DOUBLE LAYER LAP	PROTECTION													
STATOR WINDING   TWO THIRDS   THIRDS   TWO THIRDS   T														
WINDING PITCH														
### VINDING LEADS  STATOR WDG, RESISTANCE  ### O.009 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED  ### STATOR WDG, RESISTANCE  ### STATOR WDG, RESISTANCE  ### STATOR WDG, RESISTANCE  ### STATOR RESISTANCE														
STATOR WBG. RESISTANCE  ROTOR WBG. RESISTANCE  ROTOR WBG. RESISTANCE  EXCITER STATOR RESISTANCE  EXCITER ROTOR RESISTANCE  BS EN 61000-6-2 & BS EN 61000-6-4 (ND 60876), VBC 60876N, refer to factory for others  WAVEFORM DISTORTION  NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%  MAXIMUM OVERSPEED  EARING DRIVE END  BEARING NON-DRIVE END  BEARING NON-DRIVE END  1 BEARING  WEIGHT COMP. GENERATOR  WEIGHT WOUND STATOR  WEIGHT WOUND STATOR  WR 470 kg  WRICHT WOUND ROTOR  470 kg  WR 377 kg  WR WR 1030 kg  WR 1033 kgm²  470 kg  WR 1050 Hz  155 k87 x 107(cm)  FELEPHONE INTERFERENCE  THF<2%  COOLING AIR  0.8 m³ysc 1700 cm  VOLTAGE SERIES STAR  380/220 400/231 415/240 440/254 416/240 440/254 460/266 480/277  VOLTAGE SERIES DELTA  20/110 230/115 220/120 220/127 200/120 220/127 206/130 220/127 206/130 220/127  VOLTAGE SERIES DELTA  20/10 230/115 220/120 200/127 200/120 220/127 206/130 227/130  XV B DRIVE RONON  XV B DRIVE RONON  3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  XV DIR. AXIS SYNCHRONOUS  3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  XV DIR. AXIS SYNCHRONOUS  3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  XV DIR. AXIS SYNCHRONOUS  3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  XV DIR. AXIS SYNCHRONOUS  3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  XV DIR. AXIS SYNCHRONOUS  3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  XV DIR. AXIS SYNCHRONOUS  3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  XV DIR. AXIS SYNCHRONOUS  3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  XV DIR. AXIS SYNCHRONOUS  3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  XV DIR. AXIS TRANSIENT  0.20 0.18 0.17 0.15 0.21 0.00 0.19 0.17  XV DIR. AXIS SYNCHRONOUS  3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  XV DIR. AXIS TRANSIENT  0.20 0.18 0.17 0.15 0.21 0.00 0.19 0.19  0.71 0.00 0.00 0.00 0.00 0.00 0.00 0.00														
ROTOR WDG. RESISTANCE   1.19 Ohms at 22°C			0.000.01	DED 011	-		0745 001	NEOTED						
EXCITER STATOR RESISTANCE  EXCITER ROTOR RESISTANCE  EXCITER ROTOR RESISTANCE  BS EN 61000-6-2 & BS EN 61000-6-4, VPE 0875G, VPE 0875N. refer to factory for others  WAVEFORM DISTORTION  NO LOAD < 1.5% NON-DISTORTIND BALANCED LINEAR LOAD < 5.0%  WAVEFORM DISTORTION  NO LOAD < 1.5% NON-DISTORTIND BALANCED LINEAR LOAD < 5.0%  BEARING ORIVE END  BEALE 6317 (ISO)  BEARING NON-DRIVE END  BEALE 6314 (ISO)  BEARING NON-DRIVE END  BEARING STATOR  ##EIGHT WOUND STATOR  ##EIGHT WOUND ROTOR			0.009 On	IMS PER PH			STAR CON	NECTED						
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 BALANCED LINEAR LOAD < 5.0%  WAXIMUM OVERSPEED  BEARING DRIVE END  BEARING NON-DRIVE END  BEARING NON-DRIVE END  BEARING NON-DRIVE END  BEARING SERIES STAR  WEIGHT WOUND STATOR  WEIGHT WOUND ROTOR  ### 1095 kg ### 1100 kg  PACKING CRATE SIZE  ### 1097 kg  ### 1000 kg  ### 1100 kg  ### 110														
R.F.I. SUPPRESSION BS EN 61000-6-2 & BS EN 61000-6-2 N/DE 0875G, VDE 0875N. refer to factory for others WAVEFORM DISTORTION NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%  MAXIMUM OVERSPEED 22550 Rev/Min  BEARING DRIVE END BALL. 6317 (ISO)  BEARING DRIVE END BALL. 6317 (ISO)  BEARING NON-DRIVE END BALL. 6314 (ISO)  BEARING NON-DRIVE END 1024 kg 1030 kg  WEIGHT COMP, GENERATOR 1024 kg 1030 kg  WEIGHT WOUND STATOR 470 kg 470 kg 377 kg  WEIGHT WOUND ROTOR 400 kg 377 kg  WEIGHT WOUND ROTOR 1095 kg 1100 kg  PACKING CRATE SIZE 1055 x 87 x 107(cm) 155 x 87 x 107(cm)  TELEPHONE INTERFERENCE 155 x 87 x 107(cm) 155 x 87 x 107(cm)  TELEPHONE INTERFERENCE 150 N N N N Sec 1700 cm 1155 x 87 x 107(cm)  VOLTAGE SERIES STAR 380/220 400/231 415/240 440/254 416/240 440/254 460/266 80/277  VOLTAGE SERIES DELTA 220110 230/115 240/120 220/127 208/120 220/127 230/133 240/138  KVA BASE RATING FOR REACTANCE VALUES 350 350 350 350 400 420 440 440 440  AVE DIR. AXIS SYNCHRONOUS 3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  Xd DIR. AXIS SYNCHRONOUS 3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  Xd DIR. AXIS SYNCHRONOUS 3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  Xd DIR. AXIS SYNCHRONOUS 3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  Xd DIR. AXIS SYNCHRONOUS 3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  Xd DIR. AXIS SYNCHRONOUS 3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  Xd DIR. AXIS SYNCHRONOUS 3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  Xd DIR. AXIS SYNCHRONOUS 3.01 2.71 0.15 0.21 0.20 0.19 0.17  Xd DIR. AXIS SYNCHRONOUS 3.01 2.71 0.15 0.21 0.20 0.19 0.17  Xd DIR. AXIS SYNCHRONOUS 3.01 2.71 0.16 0.16 0.20 0.20 0.19 0.17  Xd DIR. AXIS SUBTRANSIENT 0.36 0.32 0.30 0.27 0.41 0.38 0.37 0.34  XL LEAKAGE REACTANCE 0.07 0.06 0.06 0.05 0.08 0.08 0.07 0.07  XA NEGATIVE SEQUENCE 0.04 0.09 0.08 0.07 0.01 0.09 0.09 0.09 0.09  REACTANCES ARE SATURATED VALUES ARE PER UNITA TRATING AND VOLTAGE INDICATED  TIT TRANSIENT TIME CONST. 1.75  Ta ARMATURE TIME CONST. 1.75	EXCITER STATOR RESISTANCE				18 Ohms	at 22°C								
WAVEFORM DISTORTION   NO LOAD < 1.5%   NON-DISTORTING BALANCED LINEAR LOAD < 5.0%	EXCITER ROTOR RESISTANCE	0.068 Ohms PER PHASE AT 22°C												
MAXIMUM OVERSPEED   SALL. 6317 (ISO)   SALL. 6317 (ISO)   SEARING NON-DRIVE END   SALL. 6317 (ISO)   SEARING NON-DRIVE END   SALL. 6314 (ISO)   SEARING   SALL. 6314 (ISO)   SEARING	R.F.I. SUPPRESSION	BS EN 61000-6-2 & BS EN 61000-6-4, VDE 0875G, VDE 0875N. refer to factory for others												
BEARING DRIVE END  BEARING NON-DRIVE END  BEARING  BEARING  BEARING  BEARING  BEALL 6314 (ISO)  BEARING  WEIGHT COMP. GENERATOR  ##FINALL 1030 kg  ##FINA	WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%												
BEARING NON-DRIVE END    1 BEARING   2 BEARING   1030 kg	MAXIMUM OVERSPEED	2250 Rev/Min												
The bank of the	BEARING DRIVE END	BALL. 6317 (ISO)												
WEIGHT COMP. GENERATOR	BEARING NON-DRIVE END													
WEIGHT WOUND STATOR				2 BEARING										
WEIGHT WOUND ROTOR         400 kg         377 kg           WR² INERTIA         4.6331 kgm²         4.4343 kgm²           SHIPPING WEIGHTS in a crate         1095 kg         1100 kg           PACKING CRATE SIZE         155 x 87 x 107(cm)         155 x 87 x 107(cm)           TELEPHONE INTERFERENCE         THF<2%	WEIGHT COMP. GENERATOR		102	4 kg		<u> </u>								
WR² INERTIA       4.6331 kgm²       4.4343 kgm²         SHIPPING WEIGHTS in a crate       1095 kg       1100 kg         PACKING CRATE SIZE       155 x 87 x 107(cm)       155 x 87 x 107(cm)         TELEPHONE INTERFERENCE       THF<2%       CODLING AIR         VOLTAGE SERIES STAR       380/220       400/231       416/240       440/254       440/254       460/266       480/277         VOLTAGE PARALLEL STAR       190/110       200/115       208/120       220/127       208/20       220/127       230/133       240/138         VOLTAGE SERIES DELTA       220/110       230/115       240/120       254/127       240/120       254/127       266/133       277/138         VOLTAGE SERIES DELTA       220/110       230/115       240/120       254/127       240/120       254/127       266/133       277/138         VOLTAGE SERIES DELTA       220/110       230/115       240/120       254/127       240/120       254/127       266/133       277/138         VAJ DIA AKIS SYNCHRONOUS       3.01       2.71       2.52       2.24       3.47       3.26       3.12       2.87         <	WEIGHT WOUND STATOR													
SHIPPING WEIGHTS in a crate       1095 kg       1100 kg         PACKING CRATE SIZE       155 x 87 x 107(cm)       60 Hz         TIH < 2%       TIH < 50       115 < 50 Hz         COOLING AIR       0.08 m/sec 1700 mm       0.99 m/sec 2100 cfm       COOLING AIR       0.09 m/sec 2100 cfm       COOLING AIR       460/0231 415/240 440/254 440/250 2090 mm/sec 2100 cfm       VOLTAGE SERIES STAR       1800/133 200133       240/133 201/125       208/120 200/127 208/120 2020/127 208/120 2020/127 208/120 2020/127 208/120 2020/127 208/120 2020/127 208/120 2020/127 208/120 2020/127 208/120 2020/127 208/120 2020/127 208/120 2020/127 208/120 2020/127 208/120 2020/127 208/120 2020/127 208/120 2020/127 208/120 2020/127 208/120 2020/127 208/120 2020/127 208/120 2020/127 208/120 2020/120 2020/120 2020/120 2020/127 208/120 2020/120 2020/120 2020/120 2020/120 2020/120 2020														
PACKING CRATE SIZE  155 x 87 x 107(cm)  50 Hz  60 Hz  TELEPHONE INTERFERENCE  COOLING AIR  0.8 m³/sec 1700 cfm  VOLTAGE SERIES 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 SERIES DELTA  220/110 230/115 240/120 254/127 240/120 254/127 266/133 277/138  KVA BASE RATING FOR  REACTANCE VALUES  350 350 350 350 400 420 440 440  KVA DIR. AXIS SYNCHRONOUS  3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  X'd DIR. AXIS SUBTRANSIENT  0.20 0.18 0.17 0.15 0.21 0.20 0.19 0.17  X'd DIR. AXIS SUBTRANSIENT  0.14 0.13 0.12 0.11 0.15 0.14 0.13 0.12  Xq QUAD. AXIS REACTANCE  2.58 2.33 2.16 1.92 2.92 2.74 2.63 2.41  X'q QUAD. AXIS SUBTRANSIENT  0.36 0.32 0.30 0.27 0.41 0.38 0.37 0.34  XL LEAKAGE REACTANCE  0.07 0.06 0.06 0.05 0.08 0.08 0.07 0.07  X2 NEGATIVE SEQUENCE  0.10 0.09 0.08 0.07 0.10 0.09 0.08  REACTANCE SATURATED  VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED  Tid TRANSIENT TIME CONST.  1.75  Ta ARMATURE TIME CONST.						<u> </u>								
TELEPHONE INTERFERENCE  THF<2%  TIF<50  COOLING AIR  0.8 m³/sec 1700 cfm  VOLTAGE SERIES 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 SERIES DELTA  220/110 230/115 240/120 254/127 240/120 254/127 266/133 277/138  KVA BASE RATING FOR REACTANCE VALUES  350 350 350 350 400 420 440 440  KVA DIR. AXIS SYNCHRONOUS  3.01 2.71 2.52 2.24 3.47 3.26 3.12 2.87  X'd DIR. AXIS SUBTRANSIENT  0.20 0.18 0.17 0.15 0.21 0.20 0.19 0.17  X''d DIR. AXIS SUBTRANSIENT  0.14 0.13 0.12 0.11 0.15 0.14 0.13 0.12  Xq QUAD. AXIS REACTANCE  2.58 2.33 2.16 1.92 2.92 2.74 2.63 2.41  X''q QUAD. AXIS SUBTRANSIENT  0.36 0.32 0.30 0.27 0.41 0.38 0.37 0.34  XL LEAKAGE REACTANCE  0.07 0.06 0.06 0.05 0.08 0.08 0.07 0.07  X2 NEGATIVE SEQUENCE  0.10 0.09 0.08 0.07 0.10 0.09 0.08  REACTANCE SATURATED  VALUES ARE PER UNITA TRATING AND VOLTAGE INDICATED  T'd TANNSIENT TIME CONST.  T'd SUB-TRANSTIME CONST.  T'd SUB-TRANSTIME CONST.  T'd ARMATURE TIME CONST.  T'A ARMATURE TIME CONST.  T'A ARMATURE TIME CONST.														
TELEPHONE INTERFERENCE	PACKING CRATE SIZE			, ,		` ,								
COOLING AIR         0.8 m³/sec         1700 cfm         0.99 m³/sec         2100 cfm           VOLTAGE SERIES STAR         380/220         400/231         415/240         440/254         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 SERIES DELTA         220/110         230/115         240/120         254/127         240/120         254/127         266/133         277/138           kVA BASE RATING FOR REACTANCE VALUES         350         350         350         400         420         440         440           Xd DIR. AXIS SYNCHRONOUS         3.01         2.71         2.52         2.24         3.47         3.26         3.12         2.87           X'd DIR. AXIS SYNCHRONOUS         3.01         2.71         2.52         2.24         3.47         3.26         3.12         2.87           X'd DIR. AXIS SYNCHRONOUS         3.01         2.71         2.52         2.24         3.47         3.26         3.12         2.87           X'd DIR. AXIS SUBTRANSIENT         0.20         0.18         0.17         0.15         0.21         0.20         0.19	TELEPHONE INTERFERENCE													
VOLTAGE PARALLEL STAR         190/110         200/115         208/120         220/127         208/120         220/127         230/133         240/138           VOLTAGE SERIES DELTA         220/110         230/115         240/120         254/127         240/120         254/127         266/133         277/138           KVA BASE RATING FOR REACTANCE VALUES         350         350         350         400         420         440         440           Xd DIR. AXIS SYNCHRONOUS         3.01         2.71         2.52         2.24         3.47         3.26         3.12         2.87           X'd DIR. AXIS TRANSIENT         0.20         0.18         0.17         0.15         0.21         0.20         0.19         0.17           X'd DIR. AXIS SUBTRANSIENT         0.14         0.13         0.12         0.11         0.15         0.14         0.13         0.12           X'q QUAD. AXIS REACTANCE         2.58         2.33         2.16         1.92         2.92         2.74         2.63         2.41           X''q QUAD. AXIS SUBTRANSIENT         0.36         0.32         0.30         0.27         0.41         0.38         0.37         0.34           XL LEAKAGE REACTANCE         0.07         0.06         0.06			0.8 m³/sec	: 1700 cfm										
VOLTAGE SERIES DELTA         220/110         230/115         240/120         254/127         240/120         254/127         266/133         277/138           kVA BASE RATING FOR REACTANCE VALUES         350         350         350         350         400         420         440         440           Xd DIR. AXIS SYNCHRONOUS         3.01         2.71         2.52         2.24         3.47         3.26         3.12         2.87           X'd DIR. AXIS TRANSIENT         0.20         0.18         0.17         0.15         0.21         0.20         0.19         0.17           X'd DIR. AXIS SUBTRANSIENT         0.14         0.13         0.12         0.11         0.15         0.14         0.13         0.12           X'q QUAD. AXIS REACTANCE         2.58         2.33         2.16         1.92         2.92         2.74         2.63         2.41           X"q QUAD. AXIS SUBTRANSIENT         0.36         0.32         0.30         0.27         0.41         0.38         0.37         0.34           X. LEAKAGE REACTANCE         0.07         0.06         0.06         0.05         0.08         0.08         0.07         0.07           Xo ZERO SEQUENCE         0.10         0.09         0.08         0.0	VOLTAGE SERIES STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277					
kVA BASE RATING FOR REACTANCE VALUES       350       350       350       350       400       420       440       440         Xd DIR. AXIS SYNCHRONOUS       3.01       2.71       2.52       2.24       3.47       3.26       3.12       2.87         X'd DIR. AXIS TRANSIENT       0.20       0.18       0.17       0.15       0.21       0.20       0.19       0.17         X"d DIR. AXIS SUBTRANSIENT       0.14       0.13       0.12       0.11       0.15       0.14       0.13       0.12         Xq QUAD. AXIS REACTANCE       2.58       2.33       2.16       1.92       2.92       2.74       2.63       2.41         X"q QUAD. AXIS SUBTRANSIENT       0.36       0.32       0.30       0.27       0.41       0.38       0.37       0.34         XL LEAKAGE REACTANCE       0.07       0.06       0.06       0.05       0.08       0.08       0.07       0.07         X2 NEGATIVE SEQUENCE       0.24       0.22       0.20       0.18       0.28       0.26       0.25       0.23         X0 ZERO SEQUENCE       0.10       0.09       0.08       0.07       0.10       0.09       0.08         T'd TRANSIENT TIME CONST.       T'd SUB-	VOLTAGE PARALLEL STAR	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138					
REACTANCE VALUES         350         350         350         350         400         420         440         440           Xd DIR. AXIS SYNCHRONOUS         3.01         2.71         2.52         2.24         3.47         3.26         3.12         2.87           X'd DIR. AXIS TRANSIENT         0.20         0.18         0.17         0.15         0.21         0.20         0.19         0.17           X"d DIR. AXIS SUBTRANSIENT         0.14         0.13         0.12         0.11         0.15         0.14         0.13         0.12           Xq QUAD. AXIS REACTANCE         2.58         2.33         2.16         1.92         2.92         2.74         2.63         2.41           X"q QUAD. AXIS SUBTRANSIENT         0.36         0.32         0.30         0.27         0.41         0.38         0.37         0.34           XL LEAKAGE REACTANCE         0.07         0.06         0.06         0.05         0.08         0.08         0.07         0.07           X2 NEGATIVE SEQUENCE         0.24         0.22         0.20         0.18         0.28         0.26         0.25         0.23           X0ZERO SEQUENCE         0.10         0.09         0.08         0.07         0.10         0.09<		220/110	230/115	240/120	254/127	240/120	254/127	266/133	277/138					
Xd DIR. AXIS SYNCHRONOUS       3.01       2.71       2.52       2.24       3.47       3.26       3.12       2.87         X'd DIR. AXIS TRANSIENT       0.20       0.18       0.17       0.15       0.21       0.20       0.19       0.17         X"d DIR. AXIS SUBTRANSIENT       0.14       0.13       0.12       0.11       0.15       0.14       0.13       0.12         Xq QUAD. AXIS REACTANCE       2.58       2.33       2.16       1.92       2.92       2.74       2.63       2.41         X"q QUAD. AXIS SUBTRANSIENT       0.36       0.32       0.30       0.27       0.41       0.38       0.37       0.34         XL LEAKAGE REACTANCE       0.07       0.06       0.06       0.05       0.08       0.08       0.07       0.07         X2 NEGATIVE SEQUENCE       0.24       0.22       0.20       0.18       0.28       0.26       0.25       0.23         X0 ZERO SEQUENCE       0.10       0.09       0.08       0.07       0.10       0.09       0.08         T'd TRANSIENT TIME CONST.       0.08s         T'd SUB-TRANSTIME CONST.       0.019s         T'do O.C. FIELD TIME CONST.       1.7s		350	350	350	350	400	420	440	440					
X"d DIR. AXIS SUBTRANSIENT       0.14       0.13       0.12       0.11       0.15       0.14       0.13       0.12         Xq QUAD. AXIS REACTANCE       2.58       2.33       2.16       1.92       2.92       2.74       2.63       2.41         X"q QUAD. AXIS SUBTRANSIENT       0.36       0.32       0.30       0.27       0.41       0.38       0.37       0.34         XL LEAKAGE REACTANCE       0.07       0.06       0.06       0.05       0.08       0.08       0.07       0.07         X2 NEGATIVE SEQUENCE       0.24       0.22       0.20       0.18       0.28       0.26       0.25       0.23         X0ZERO SEQUENCE       0.10       0.09       0.08       0.07       0.10       0.09       0.09       0.08         REACTANCES ARE SATURATED       VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED         T'd TRANSIENT TIME CONST.       0.08s         T'd SUB-TRANSTIME CONST.       0.019s         T'do O.C. FIELD TIME CONST.       1.7s         Talanta ARMATURE TIME CONST.       0.018s		3.01	2.71	2.52	2.24	3.47	3.26	3.12	2.87					
X"d DIR. AXIS SUBTRANSIENT       0.14       0.13       0.12       0.11       0.15       0.14       0.13       0.12         Xq QUAD. AXIS REACTANCE       2.58       2.33       2.16       1.92       2.92       2.74       2.63       2.41         X"q QUAD. AXIS SUBTRANSIENT       0.36       0.32       0.30       0.27       0.41       0.38       0.37       0.34         XL LEAKAGE REACTANCE       0.07       0.06       0.06       0.05       0.08       0.08       0.07       0.07         X2 NEGATIVE SEQUENCE       0.24       0.22       0.20       0.18       0.28       0.26       0.25       0.23         X0ZERO SEQUENCE       0.10       0.09       0.08       0.07       0.10       0.09       0.09       0.08         REACTANCES ARE SATURATED       VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED         T'd TRANSIENT TIME CONST.       0.08s         T'd SUB-TRANSTIME CONST.       0.019s         T'do O.C. FIELD TIME CONST.       1.7s         Talanta ARMATURE TIME CONST.       0.018s	X'd DIR. AXIS TRANSIENT													
Xq QUAD. AXIS REACTANCE         2.58         2.33         2.16         1.92         2.92         2.74         2.63         2.41           X"q QUAD. AXIS SUBTRANSIENT         0.36         0.32         0.30         0.27         0.41         0.38         0.37         0.34           XL LEAKAGE REACTANCE         0.07         0.06         0.06         0.05         0.08         0.08         0.07         0.07           X2 NEGATIVE SEQUENCE         0.24         0.22         0.20         0.18         0.28         0.26         0.25         0.23           X0 ZERO SEQUENCE         0.10         0.09         0.08         0.07         0.10         0.09         0.08           REACTANCES ARE SATURATED         VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED           T'd TRANSIENT TIME CONST.         0.08s           T'd SUB-TRANSTIME CONST.         0.019s           T'do O.C. FIELD TIME CONST.         1.7s           Ta ARMATURE TIME CONST.         0.018s	X"d DIR. AXIS SUBTRANSIENT		0.13		0.11		0.14		0.12					
XL LEAKAGE REACTANCE       0.07       0.06       0.06       0.05       0.08       0.08       0.07       0.07         X2 NEGATIVE SEQUENCE       0.24       0.22       0.20       0.18       0.28       0.26       0.25       0.23         X0 ZERO SEQUENCE       0.10       0.09       0.08       0.07       0.10       0.09       0.09       0.08         REACTANCES ARE SATURATED       VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED         T'd TRANSIENT TIME CONST.       0.08s         T'd SUB-TRANSTIME CONST.       0.019s         T'do O.C. FIELD TIME CONST.       1.7s         Ta ARMATURE TIME CONST.       0.018s	Xq QUAD. AXIS REACTANCE	2.58	2.33	2.16	1.92	2.92	2.74	2.63	2.41					
X2 NEGATIVE SEQUENCE         0.24         0.22         0.20         0.18         0.28         0.26         0.25         0.23           X0 ZERO SEQUENCE         0.10         0.09         0.08         0.07         0.10         0.09         0.09         0.08           REACTANCES ARE SATURATED         VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED           T'd TRANSIENT TIME CONST.         0.08s           T'd SUB-TRANSTIME CONST.         0.019s           T'do O.C. FIELD TIME CONST.         1.7s           Ta ARMATURE TIME CONST.         0.018s	X"q QUAD. AXIS SUBTRANSIENT	0.36	0.32	0.30	0.27	0.41	0.38	0.37	0.34					
X0 ZERO SEQUENCE         0.10         0.09         0.08         0.07         0.10         0.09         0.09         0.08           REACTANCES ARE SATURATED         VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED           T'd TRANSIENT TIME CONST.         0.08s           T'd SUB-TRANSTIME CONST.         0.019s           T'do O.C. FIELD TIME CONST.         1.7s           Ta ARMATURE TIME CONST.         0.018s	XL LEAKAGE REACTANCE	0.07	0.06	0.06	0.05	0.08	0.08	0.07	0.07					
REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED T'd TRANSIENT TIME CONST. 0.08s T"d SUB-TRANSTIME CONST. 0.019s T'do O.C. FIELD TIME CONST. 1.7s Ta ARMATURE TIME CONST. 0.018s	X2 NEGATIVE SEQUENCE	0.24	0.22	0.20	0.18	0.28	0.26	0.25	0.23					
T'd TRANSIENT TIME CONST.       0.08s         T"d SUB-TRANSTIME CONST.       0.019s         T'do O.C. FIELD TIME CONST.       1.7s         Ta ARMATURE TIME CONST.       0.018s	X <sub>0</sub> ZERO SEQUENCE	0.10 0.09 0.08 0.07 0.10 0.09 0.09 0.08												
T"d SUB-TRANSTIME CONST.         0.019s           T'do O.C. FIELD TIME CONST.         1.7s           Ta ARMATURE TIME CONST.         0.018s														
T'do O.C. FIELD TIME CONST. 1.7s  Ta ARMATURE TIME CONST. 0.018s														
Ta ARMATURE TIME CONST. 0.018s														
SHORT CIRCUIT RATIO 1/Xd														
	SHORT CIRCUIT RATIO				1/	Xd								

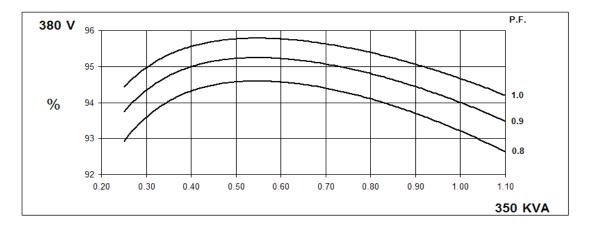
50 Hz

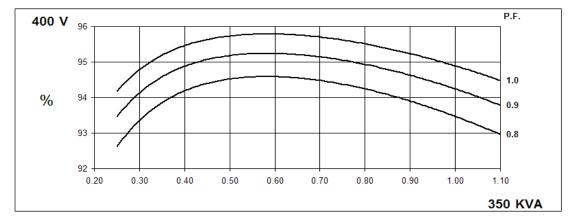
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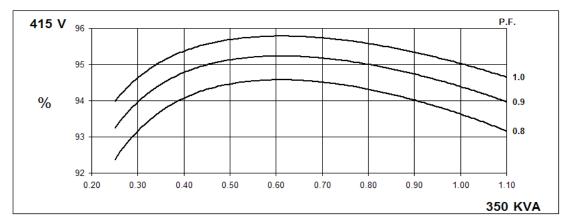
**STAMFORD** 

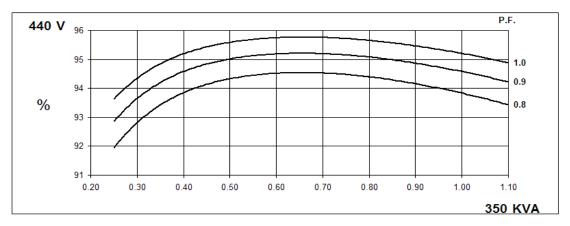
# Winding 311

#### THREE PHASE EFFICIENCY CURVES









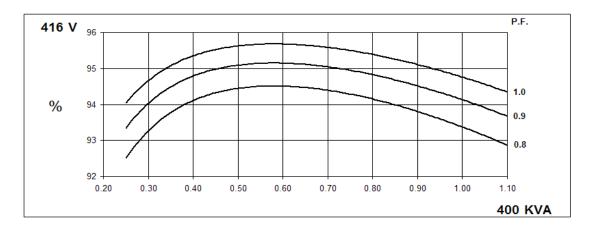
60 Hz

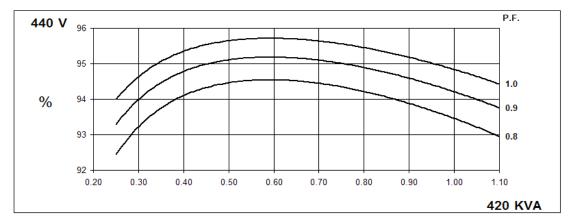
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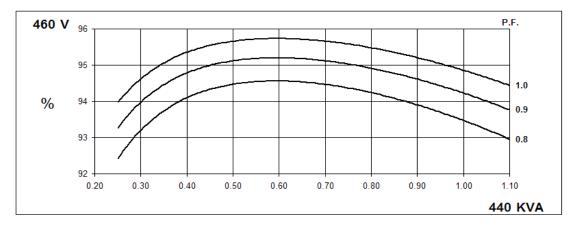
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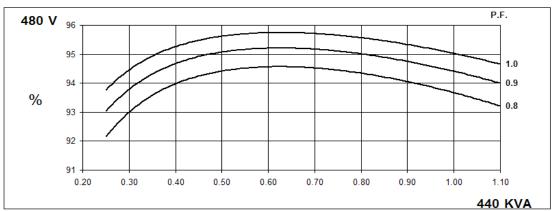
# Winding 311

#### THREE PHASE EFFICIENCY CURVES







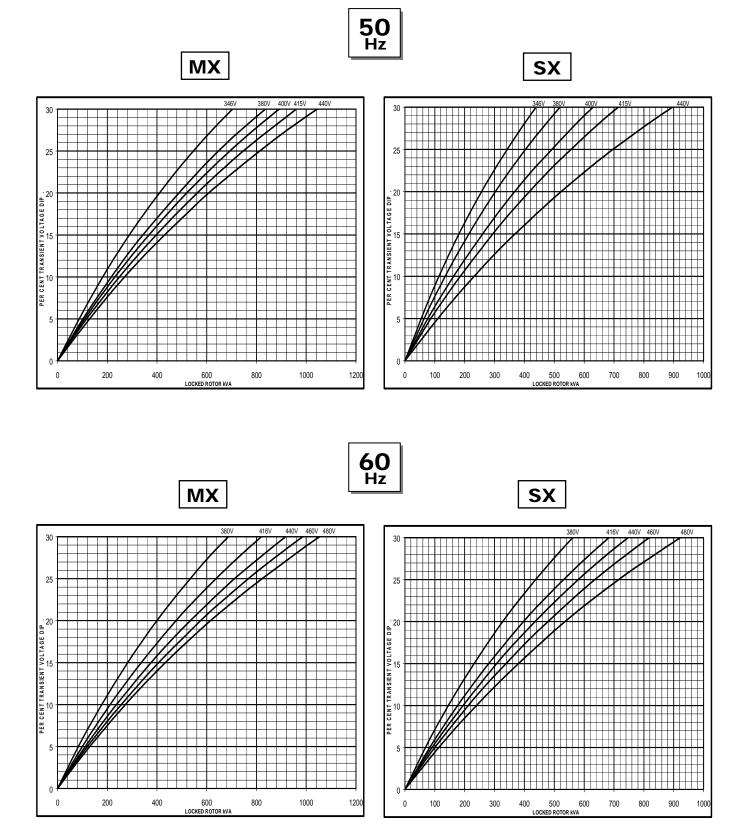




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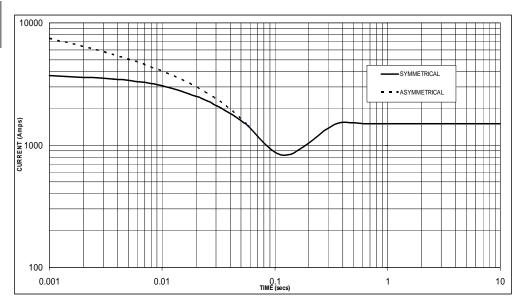
Winding 311

# **Locked Rotor Motor Starting Curve**



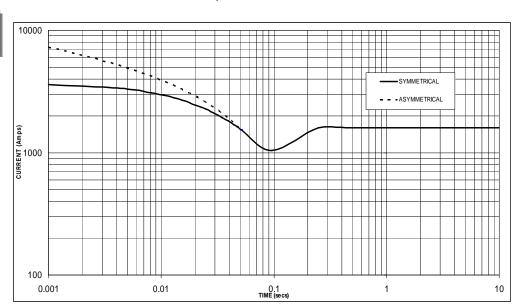
# Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on star (wye) connection.





Sustained Short Circuit = 1,500 Amps





Sustained Short Circuit = 1,600 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:

50	Hz	60Hz					
Voltage	Factor	Voltage	Factor				
380v	X 1.00	416v	X 1.00				
400v	X 1.05	440v	X 1.06				
415v	X 1.10	460v	X 1.10				
440v	X 1.16	480v	X 1.15				

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 other connection the following multipliers should be applied to current values as shown:

# **STAMFORD**

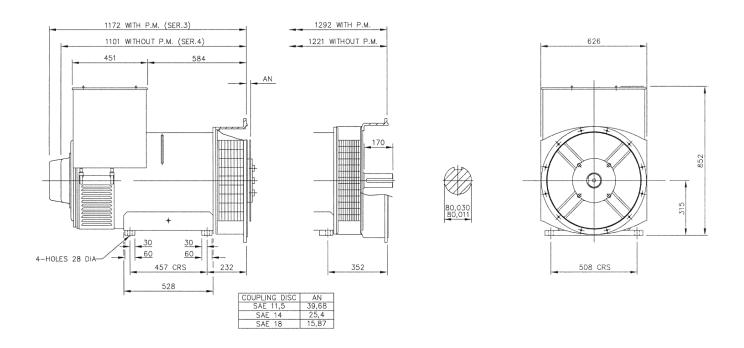
#### HCI434E/444E

# Winding 311 / 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					
50	Series Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	Parallel Star (V)	190	200	208	220	190	200	208	220	190	200	208	220	190	200	208	220
Hz	Series Delta (V)	220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
	kVA	320	320	320	320	350	350	350	350	370	370	370	370	380	400	380	380
	kW	256	256	256	256	280	280	280	280	296	296	296	296	304	320	304	304
	Efficiency (%)	93.6	93.8	94.0	94.1	93.2	93.5	93.6	93.8	92.9	93.2	93.4	93.6	92.7	92.7	93.2	93.5
	kW Input	274	273	272	272	300	299	299	299	319	318	317	316	328	345	326	325
										-							
60	Series Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
Hz	Parallel Star (V)	208	220	230	240	208	220	230	240	208	220	230	240	208	220	230	240
' '	Series Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
	kVA	365	385	400	400	400	420	440	440	420	445	460	460	435	455	475	475
	kW	292	308	320	320	320	336	352	352	336	356	368	368	348	364	380	380
	Efficiency (%)	93.8	93.8	93.9	94.0	93.4	93.5	93.5	93.7	93.1	93.2	93.2	93.5	92.9	93.0	93.1	93.3
	kW Input	311	328	341	340	343	359	376	376	361	382	395	394	375	391	408	407

#### **DIMENSIONS**



### **STAMFORD**

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