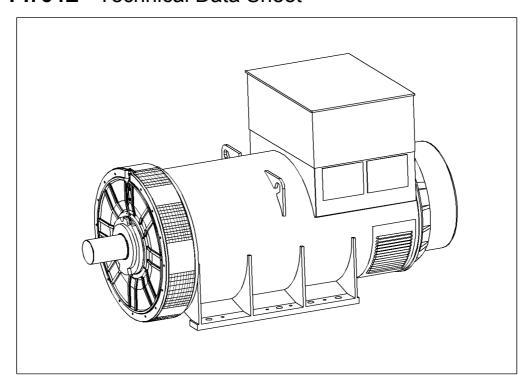


# PI734E - Technical Data Sheet



## **SPECIFICATIONS & OPTIONS**



### **STANDARDS**

Newage Stamford industrial generators meet the requirements of BS EN 60034 and the relevant sections of other national and international standards such as BS5000, VDE 0530, NEMA MG1-32, IEC60034, CSA C22.2-100. AS1359.

Other standards and certifications can be considered on request.

### **DESCRIPTION**

The STAMFORD PI range of synchronous ac generators are brushless with a rotating field. They are separately excited by the STAMFORD Permanent Magnet Generator (PMG). This is a shaft mounted, high frequency, pilot exciter which provides a constant supply of clean power via the Automatic Voltage Regulator (AVR) to the main exciter. The main exciter output is fed to the main rotor, through a full wave bridge rectifier, protected by surge suppression.

### **VOLTAGE REGULATORS**

The PI range generators, complete with a PMG, are available with one of two AVRs. Each AVR has soft start voltage build up and built in protection against sustained over-excitation, which will de-excite the generator after a minimum of 8 seconds.

Underspeed protection (UFRO) is also provided on both AVRs. The UFRO will reduce the generator output voltage proportional to the speed of the generator below a presettable level.

The MX341 AVR is two phase sensed with a voltage regulation of  $\pm$  1 %. (see the note on regulation).

The MX321 AVR is 3 phase rms sensed with a voltage regulation of 0.5% rms (see the note on regulation). The UFRO circuit has adjustable slope and dwell for controlled recovery from step loads. An over voltage protection circuit will shutdown the output device of the AVR, it can also trip an optional excitation circuit breaker if required. As an option, short circuit current limiting is available with the addition of current transformers.

Both the MX341 and the MX321 need a generator mounted current transformer to provide quadrature droop characteristics for load sharing during parallel operation. Provision is also made for the connection of the STAMFORD power factor controller, for embedded applications, and a remote voltage trimmer.

### 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. 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 levels of voltage 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', and meets the requirements of UL1446.

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.

### NOTE ON REGULATION

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%.

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

Front cover drawing is typical of the product range.



# **WINDING 312**

CONTROL SYSTEM	SEPARATEL	SEPARATELY EXCITED BY P.M.G.								
A.V.R.	MX341	MX321								
VOLTAGE REGULATION	± 1 %	± 1 % ± 0.5 % With 4% ENGINE GOVERNING								
SUSTAINED SHORT CIRCUIT	REFER TO S	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)								

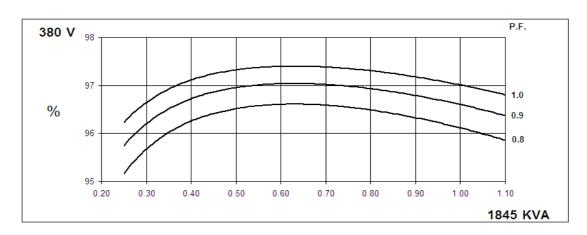
kVA BASE RATING FOR REACTANCE VALUES         1845         1900         1900         1865         2070         2210         2255         230           Xd DIR. AXIS SYNCHRONOUS         3.18         2.96         2.75         2.40         3.84         3.67         3.42         3.2           X'd DIR. AXIS TRANSIENT         0.19         0.18         0.17         0.15         0.23         0.22         0.21         0.19           X"d DIR. AXIS SUBTRANSIENT         0.14         0.13         0.12         0.11         0.17         0.16         0.15         0.14           Xq QUAD. AXIS REACTANCE         2.04         1.90         1.76         1.54         2.47         2.36         2.20         2.06           X"q QUAD. AXIS SUBTRANSIENT         0.29         0.27         0.25         0.22         0.35         0.33         0.31         0.29           XL LEAKAGE REACTANCE         0.04         0.03         0.03         0.03         0.03         0.04         0.04         0.04         0.04           X2 NEGATIVE SEQUENCE         0.20         0.19         0.17         0.15         0.24         0.23         0.22         0.20													
RATED POWER FACTOR  STATOR WINDING  DOUBLE LAYER LAP  WINDING PITCH  TWO THIRDS  6  MAIN STATOR RESISTANCE  EXCITER STATOR RESISTANCE  EXCITER STATOR RESISTANCE  EXCITER STATOR RESISTANCE  EXCITER ROTOR RESISTANCE  BEARING DISTORTION  NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%  EXCITER ROTOR RESISTANCE  BEARING DRIVE END  BALL. 6319 C3  EXEMPLY SEAL ROTOR RESISTANCE  BEARING DRIVE END  BALL. 6319 C3  EXEMPLY SEAL ROTOR RESISTANCE  BEARING DRIVE END  BEARING  1 BEARING  2 BEARING  3 556 kg  3 550 kg  3 550 kg  3 557 kg  EXCITER ROTOR ROTOR  1 444 4891 kgm²  444 4891 kgm²  444 4891 kgm²  SHIPPING WEIGHTS in a crate  3 3629kg  3 577 kg  WE' INERTIA  4 549 kgm²  444 4891 kgm²  444 4891 kgm²  50 Hz  FOLICIAN ROTOR  FIF-50  COOLING AIR  FIF-50  COOLING AIR  COOLING AIR  2.59 m'/sec 5700 cfm  3.45 m'/sec 7300 cfm  VOLTAGE STAR  380/220 400/231 415/240 440/254 416/240 440/254 460/266 480/2  XI DIR. AXIS SYNCHRONOUS  3.18 2.96 2.75 2.40 3.84 3.67 3.42 3.2  XI DIR. AXIS SYNCHRONOUS  3.18 2.96 2.75 2.40 3.84 3.67 3.42 3.2  XI DIR. AXIS SYNCHRONOUS  3.18 2.96 2.75 2.40 3.84 3.67 3.42 3.2  XI DIR. AXIS SYNCHRONOUS  3.18 2.96 2.75 2.40 3.84 3.67 3.42 3.2  XI DIR. AXIS SYNCHRONOUS  3.18 2.96 2.75 2.40 3.84 3.67 3.42 3.2  XI DIR. AXIS SYNCHRONOUS  3.18 2.96 2.75 2.40 3.84 3.67 3.42 3.2  XI DIR. AX	INSULATION SYSTEM				CLAS	SS H							
STATOR WINDING	PROTECTION				IP2	23							
WINDING PITCH         TWO THIRDS           WINDING LEADS         6           MAIN STATOR RESISTANCE         0.00093 Ohms PER PHASE AT 22°C STAR CONNECTED           MAIN ROTOR RESISTANCE         2.17 Ohms at 22°C           EXCITER STATOR RESISTANCE         17.5 Ohms at 22°C           EXCITER ROTOR RESISTANCE         0.048 Ohms PER PHASE AT 22°C           EXCITER ROTOR RESISTANCE         0.048 Ohms PER PHASE AT 22°C           EXCITER ROTOR RESISTANCE         0.048 Ohms PER PHASE AT 22°C           EXCITER ROTOR RESISTANCE         0.048 Ohms PER PHASE AT 22°C           EXCITER ROTOR RESISTANCE         0.048 Ohms PER PHASE AT 22°C           EXCITER ROTOR RESISTANCE         0.048 Ohms PER PHASE AT 22°C           EXCITER ROTOR RESISTANCE         0.048 Ohms PER PHASE AT 22°C           EXCITER ROTOR RESISTANCE         0.048 Ohms PER PHASE AT 22°C           WEIGHT WOUND STATOR         0.048 Ohms PER PHASE AT 22°C           WEIGHT WOUND STATOR         1 BEARING         2 BEARING           WEIGHT WOUND STATOR         1747 Ng         1747 Ng           WEIGHT WOUND ROTOR         1494 kg         1432 kg           WE'S INFERIOR         1549 kgm²         3575 kg           WE'S INFERIOR BY INFERIOR BY STATE AT 25 Kg         216 x 105 x 154 (cm)           SHIPPING WEIGHTS In a crate         3625 kg	RATED POWER FACTOR				0.	8							
WINDING LEADS   6	STATOR WINDING				DOUBLE L	AYER LAP							
MAIN STATOR RESISTANCE         0.00093 Ohms PER PHASE AT 22°C STAR CONNECTED           MAIN ROTOR RESISTANCE         2.17 Ohms at 22°C           EXCITER STATOR RESISTANCE         17.5 Ohms at 22°C           EXCITER ROTOR RESISTANCE         0.048 Ohms PER PHASE AT 22°C           EXCITER ROTOR RESISTANCE         0.048 Ohms PER PHASE AT 22°C           R.F.I. SUPPRESSION         BS EN 61000-6-2 & BS EN 61000-6-4 V/DE 0876G, 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. 6319 C3           BEARING NON-DRIVE END         BALL. 6319 C3           WEIGHT COMP. GENERATOR         3556 kg         3506 kg           WEIGHT WOUND STATOR         1747 kg         1747 kg           WEIGHT WOUND ROTOR         1494 kg         1432 kg           WR° INERTIA         45.49 kgm²         44.4891 kgm²           SHIPPING WEIGHTS in a crate         3629kg         3575kg           PACKING GRATE SIZE         216 x 105 x 154(cm)         216 x 105 x 154(cm)           FOHz         60 Hz         11F<50           TELEPHONE INTERFERENCE         THF<2%         TIF<50           COOLING AIR         2.69 m²/sec 5700 cfm         3.45 m²/sec 7300 cfm </td <td>WINDING PITCH</td> <td colspan="12">TWO THIRDS</td>	WINDING PITCH	TWO THIRDS											
MAIN ROTOR RESISTANCE EXCITER STATOR RESISTANCE EXCITER STATOR RESISTANCE EXCITER STATOR RESISTANCE EXCITER ROTOR RESISTANCE EXCITER ROTOR RESISTANCE  EXCITER ROTOR RESISTANCE  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  BEARING DRIVE END  BEARING DRIVE END  BEARING NON-DRIVE END  BEARING NON-DRIVE END  BEARING STATOR  WEIGHT WOUND STATOR  11747 kg  11747 kg  WEIGHT WOUND STATOR  11747 kg  WEIGHT WOUND ROTOR  1494 kg  1432 kg  WR² INERTIA  45.49 kgm²  44.4891 kgm²  SHIPPING WEIGHTS in a crate  3629kg  3575kg  PACKING CRATE SIZE  216 x 105 x 154(cm)  216 x 105 x 154(cm)  ELEPHONE INTERFERENCE  THF<2%  THF<2%  COOLING AIR  2.69 m³/sec 5700 cfm  3.45 m³/sec 7300 cfm  VOLTAGE STAR  380/220 400/231 415/240 440/254 416/240 440/254 460/266 480/2 VALUES  XI DIR. AXIS SYNCHRONOUS  3.18 2.96 2.75 2.40 3.84 3.67 3.42 3.2 XI DIR. AXIS SYNCHRONOUS  3.18 2.96 2.75 2.40 3.84 3.67 3.42 3.2 XI DIR. AXIS SYNCHRONOUS  3.18 2.96 2.75 2.40 3.84 3.67 3.42 3.2 XI DIR. AXIS SYNCHRONOUS  3.18 2.96 2.75 2.40 3.84 3.67 3.42 3.2 XI DIR. AXIS SYNCHRONOUS  3.18 2.96 2.75 2.40 3.84 3.67 3.42 3.2 XI DIR. AXIS SYNCHRONOUS  3.18 2.96 2.75 2.40 3.84 3.67 3.42 3.2 XI DIR. AXIS SYNCHRONOUS  3.18 2.96 2.75 2.40 3.84 3.67 3.42 3.2 XI DIR. AXIS SUBTRANSIENT  0.19 0.18 0.17 0.15 0.23 0.22 0.21 0.11 XI QUAD. AXIS REACTANCE  2.04 1.90 1.76 1.54 2.47 2.36 2.20 2.01 XI QUAD. AXIS SUBTRANSIENT  0.29 0.27 0.25 0.22 0.35 0.33 0.31 0.22 XI LEAKAGE REACTANCE  0.04 0.03 0.03 0.03 0.04 0.04 0.04 0.04  20 NEGATIVE SEQUENCE  0.04 0.05 0.01	WINDING LEADS				6								
EXCITER STATOR RESISTANCE 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  NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%  MAXIMUM OVERSPEED  BEARING ORIVE END  BEARING  WEIGHT WOUND STATOR  1747 kg  1747 kg  1747 kg  1747 kg  WEIGHT WOUND ROTOR  1494 kg  1432 kg  WR¹ INERTIA  45.49 kgm²  44.4891 kgm²  SHIPPING WEIGHTS in a crate  3629kg  3575kg  PACKING CRATE SIZE  216 x 105 x 154(cm)  50 Hz  60 Hz  TELEPHONE INTERFERENCE  THF<2%  TIF-50  COOLING AIR  2.69 m³/sec 5700 cfm  3.455 m³/sec 7300 cfm  VOLTAGE STAR  KVA BASE RATING FOR REACTANCE  VALUES  Xd DIR. AXIS SYNCHRONOUS  3.18  2.96  2.75  2.40  3.84  3.67  3.42  3.2  Xd DIR. AXIS SYNCHRONOUS  3.18  2.96  2.75  2.40  3.84  3.67  3.42  3.2  Xd DIR. AXIS SYNCHRONOUS  3.18  2.96  2.75  2.40  3.84  3.67  3.42  3.2  Xd DIR. AXIS SYNCHRONOUS  3.18  2.96  2.75  2.40  3.84  3.67  3.42  3.2  Xd DIR. AXIS SUBTRANSIENT  0.19  0.18  0.17  0.15  0.23  0.22  0.21  0.11  Xq QUAD. AXIS REACTANCE  2.04  1.90  1.76  1.54  2.47  2.36  2.20  2.01  XL LEAKAGE REACTANCE  0.04  0.03  0.03  0.03  0.04  0.05  0.06  0.06  0.07  0.07  0.07  0.07  0.07  0.07  0.07  0.07  0.07  0.07  0.07  0.07  0.07  0.07  0.07  0.07	MAIN STATOR RESISTANCE	0.00093 Ohms PER PHASE AT 22°C STAR CONNECTED											
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%  MAXIMUM OVERSPEED  BEARING DRIVE END  BEARING DRIVE END  BEARING NON-DRIVE END  BEARING ON-DRIVE END  BEARING ON-DRIVE END  BEARING ON-DRIVE END  BEARING  WEIGHT COMP. GENERATOR  3556 kg  3506 kg  WEIGHT WOUND STATOR  1747 kg  1747 kg  1747 kg  1747 kg  WEIGHT WOUND ROTOR  1494 kg  1432 kg  WR* INERTIA  45.49 kgm²  44.4891 kgm²  SHIPPING WEIGHTS in a crate  3629kg  3575kg  PACKING CRATE SIZE  216 x 105 x 154(cm)  50 Hz  TELEPHONE INTERFERENCE  TIF-50  COOLING AIR  2.69 m*/sec 5700 cfm  VOLTAGE STAR  380/220  400/231  415/240  440/254  416/240  440/254  460/266  480/2  Xd DIR. AXIS SYNCHRONOUS  3.18  2.96  2.75  2.40  3.84  3.67  3.42  3.2  Xd DIR. AXIS SYNCHRONOUS  3.18  2.96  2.75  2.40  3.84  3.67  3.42  3.2  Xd DIR. AXIS SYNCHRONOUS  3.18  2.96  2.75  2.40  3.84  3.67  3.42  3.2  Xd DIR. AXIS SYNCHRONOUS  3.18  2.96  2.75  2.40  3.84  3.67  3.42  3.2  Xd DIR. AXIS SUBTRANSIENT  0.19  0.18  0.17  0.15  0.23  0.22  0.21  0.11  XT*q QUAD. AXIS REACTANCE  2.04  1.90  1.76  1.54  2.47  2.36  2.20  2.01  XT*q QUAD. AXIS SUBTRANSIENT  0.29  0.27  0.25  0.22  0.35  0.33  0.31  0.22  XL LEAKAGE REACTANCE  0.04  0.03  0.03  0.03  0.04  0.04  0.04  0.04  2.06	MAIN ROTOR RESISTANCE	2.17 Ohms 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 BEARING DRIVE END BEARING DRIVE END BEARING NON-DRIVE END BEARING NON-DRIVE END BEARING ON-DRIVE END BEALL 6296 ON-DRIVE END BEAL	EXCITER STATOR RESISTANCE	17.5 Ohms at 22°C											
WAVEFORM DISTORTION         NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%           MAXIMUM OVERSPEED         2250 Rev/Min           BEARING DRIVE END         BALL. 6228 C3           BEARING NON-DRIVE END         BALL. 6319 C3           WEIGHT COMP. GENERATOR         3556 kg         3506 kg           WEIGHT WOUND STATOR         1747 kg         1747 kg           WEIGHT WOUND ROTOR         1494 kg         1432 kg           WR³ INERTIA         45.49 kgm²         44.4891 kgm²           SHIPPING WEIGHTS in a crate         3629kg         3575kg           PACKING CRATE SIZE         216 x 105 x 154(cm)         216 x 105 x 154(cm)           FELEPHONE INTERFERENCE         THF<2%         TIF<50           COOLING AIR         2.69 m³/sec 5700 cfm         3.45 m³/sec 7300 cfm           VOLTAGE STAR         380/220         400/231         415/240         440/254         460/266         480/26k           XIVA BASE RATING FOR REACTANCE VALUES         1845         1900         1900         1865         2070         2210         2255         230           Xid DIR. AXIS SYNCHRONOUS         3.18         2.96         2.75         2.40         3.84         3.67         3.42         3.2           X''d DIR. AXIS SUBTRANSIENT         0.14<	EXCITER ROTOR RESISTANCE	0.048 Ohms PER PHASE AT 22°C											
MAXIMUM OVERSPEED         2250 Rev/Min           BEARING DRIVE END         BALL. 6228 C3           BEARING NON-DRIVE END         BALL. 6319 C3           WEIGHT COMP. GENERATOR         3556 kg         3506 kg           WEIGHT WOUND STATOR         1747 kg         1747 kg           WEIGHT WOUND ROTOR         1494 kg         1432 kg           WR² INERTIA         45.49 kgm²         44.4891 kgm²           SHIPPING WEIGHTS in a crate         3629kg         3575kg           PACKING CRATE SIZE         216 x 105 x 154(cm)         216 x 105 x 154(cm)           TELEPHONE INTERFERENCE         THF<2%	R.F.I. SUPPRESSION	BS EI	N 61000-6-2 8	& BS EN 6100	00-6-4,VDE 0	875G, VDE 0	875N. refer to	o factory for o	thers				
BEARING DRIVE END BEARING NON-DRIVE END BEARING NON-DRIVE END BEARING BEARING BEARING BEARING BEARING BEARING BEARING BEARING  1 BEARING  2 BEARING WEIGHT COMP. GENERATOR 3556 kg 3506 kg WEIGHT WOUND STATOR 1747 kg 1747 kg 1747 kg 1747 kg 1747 kg WEIGHT WOUND ROTOR 1494 kg 1432 kg WR² INERTIA 45.49 kgm² 44.4891 kgm² SHIPPING WEIGHTS in a crate 3629kg 3575kg PACKING CRATE SIZE 216 x 105 x 154(cm) 216 x 105 x 154(cm)  50 Hz TELEPHONE INTERFERENCE THF<2% TIF<50 COOLING AIR 2.69 m³/sec 5700 cfm 3.45 m³/sec 7300 cfm VOLTAGE STAR 380/220 400/231 415/240 440/254 416/240 440/254 460/266 480/2 kVA BASE RATING FOR REACTANCE VALUES Xd DIR. AXIS SYNCHRONOUS 3.18 2.96 2.75 2.40 3.84 3.67 3.42 3.2 Xd DIR. AXIS TRANSIENT 0.19 0.18 0.17 0.15 0.23 0.22 0.21 0.11 X"d DIR. AXIS SUBTRANSIENT 0.14 0.13 0.12 0.11 0.17 0.16 0.15 0.14 Xq QUAD. AXIS REACTANCE 2.04 1.90 1.76 1.54 2.47 2.36 2.20 2.01 X"q QUAD. AXIS SUBTRANSIENT 0.29 0.27 0.25 0.22 0.35 0.33 0.31 0.24 XL LEAKAGE REACTANCE 0.04 0.03 0.03 0.03 0.04 0.04 0.04 0.04 X2 NEGATIVE SEQUENCE 0.20 0.19 0.17 0.15 0.24 0.23 0.22 0.21 C.21 0.22 C.22 0.24 C.24 0.25 0.25 0.24 0.25 0.24 0.25 0.24 0.26 C.25 0.26 0.26 0.29 0.29 0.29 0.29 C.26 0.26 0.29 0.29 0.29 0.29 0.29 0.29 0.29 0.29	WAVEFORM DISTORTION		NO LOAD <	< 1.5% NON-	DISTORTING	BALANCE	LINEAR LO	AD < 5.0%					
BEARING NON-DRIVE END  1 BEARING 2 BEARING WEIGHT COMP. GENERATOR 3556 kg 3506 kg WEIGHT WOUND STATOR 1747 kg 1747 kg 1747 kg WEIGHT WOUND ROTOR 1494 kg 1432 kg WR² INERTIA 45.49 kgm² 44.4891 kgm² SHIPPING WEIGHTS in a crate 3629kg 3575kg PACKING CRATE SIZE 216 x 105 x 154(cm) 216 x 105 x 154(cm)  50 Hz TELEPHONE INTERFERENCE THF<2% TIF<50 COOLING AIR 2.69 m²/sec 5700 cfm 3.45 m³/sec 7300 cfm VOLTAGE STAR 380/220 400/231 415/240 440/254 416/240 440/254 460/266 480/2 KVA BASE RATING FOR REACTANCE VALUES Xd DIR. AXIS SYNCHRONOUS 3.18 2.96 2.75 2.40 3.84 3.67 3.42 3.2 X'd DIR. AXIS TRANSIENT 0.19 0.18 0.17 0.15 0.23 0.22 0.21 0.15 X'q QUAD. AXIS REACTANCE 2.04 1.90 1.76 1.54 2.47 2.36 2.20 2.01 X'q QUAD. AXIS SUBTRANSIENT 0.29 0.27 0.25 0.22 0.21 0.15 XL LEAKAGE REACTANCE 0.04 0.03 0.03 0.03 0.04 0.04 0.04 0.04	MAXIMUM OVERSPEED				2250 R	ev/Min							
BEARING   2 BEARING   3506 kg   3506 kg   3506 kg   WEIGHT COMP. GENERATOR   3556 kg   3506 kg   3506 kg   WEIGHT WOUND STATOR   1747 kg   1747 kg   1747 kg   1432 kg   444891 kgm²   444.8891 kgm²   3575kg   3575kg   3575kg   3575kg   216 x 105 x 154(cm)   216 x	BEARING DRIVE END				BALL. 6	228 C3							
WEIGHT COMP. GENERATOR         3556 kg         3506 kg           WEIGHT WOUND STATOR         1747 kg         1747 kg           WEIGHT WOUND ROTOR         1494 kg         1432 kg           WR² INERTIA         45.49 kgm²         44.4891 kgm²           SHIPPING WEIGHTS in a crate         3629kg         3575kg           PACKING CRATE SIZE         216 x 105 x 154(cm)         216 x 105 x 154(cm)           TELEPHONE INTERFERENCE         THF<2%	BEARING NON-DRIVE END												
WEIGHT WOUND STATOR         1747 kg         1747 kg           WEIGHT WOUND ROTOR         1494 kg         1432 kg           WR² INERTIA         45.49 kgm²         44.4891 kgm²           SHIPPING WEIGHTS in a crate         3629kg         3575kg           PACKING CRATE SIZE         216 x 105 x 154(cm)         216 x 105 x 154(cm)           TELEPHONE INTERFERENCE         THF<2%													
WEIGHT WOUND ROTOR  1494 kg  1432 kg  WR² INERTIA  45.49 kgm²  44.4891 kgm²  SHIPPING WEIGHTS in a crate  3629kg  3575kg  PACKING CRATE SIZE  216 x 105 x 154(cm)  50 Hz  TELEPHONE INTERFERENCE  THF<2%  TIF<50  COOLING AIR  2.69 m³/sec 5700 cfm  VOLTAGE STAR  380/220  400/231  415/240  440/254  4416/240  440/254  440/254  440/254  440/254  440/254  440/254  440/254  440/254  440/254  440/254  440/254  440/254  440/254  440/254  440/254  440/254  45/240  440/254  460/266  480/2  8VA BASE RATING FOR REACTANCE  VALUES  Xd DIR. AXIS SYNCHRONOUS  3.18  2.96  2.75  2.40  3.84  3.67  3.42  3.2  X'd DIR. AXIS SYNCHRONOUS  3.18  0.19  0.18  0.17  0.15  0.23  0.22  0.21  0.15  X"d DIR. AXIS SUBTRANSIENT  0.14  0.13  0.12  0.11  0.17  0.16  0.15  0.14  Xq QUAD. AXIS REACTANCE  2.04  1.90  1.76  1.54  2.47  2.36  2.20  2.06  X"q QUAD. AXIS SUBTRANSIENT  0.29  0.27  0.25  0.22  0.35  0.33  0.31  0.25  XL LEAKAGE REACTANCE  0.04  0.03  0.03  0.03  0.04  0.04  0.04  0.04  0.04  2.06	WEIGHT COMP. GENERATOR		355	6 kg		-							
WR² INERTIA         45.49 kgm²         44.4891 kgm²           SHIPPING WEIGHTS in a crate         3629kg         3575kg           PACKING CRATE SIZE         216 x 105 x 154(cm)         216 x 105 x 154(cm)           50 Hz         60 Hz           TELEPHONE INTERFERENCE         THF<2%	WEIGHT WOUND STATOR		174	7 kg		1747 kg							
SHIPPING WEIGHTS in a crate 3629kg 3575kg  PACKING CRATE SIZE 216 x 105 x 154(cm) 216 x 105 x 154(cm)  50 Hz 60 Hz  TELEPHONE INTERFERENCE THF<2% TIF<50  COOLING AIR 2.69 m³/sec 5700 cfm 3.45 m³/sec 7300 cfm  VOLTAGE STAR 380/220 400/231 415/240 440/254 416/240 440/254 460/266 480/2  KVA BASE RATING FOR REACTANCE 1845 1900 1900 1865 2070 2210 2255 230  Xd DIR. AXIS SYNCHRONOUS 3.18 2.96 2.75 2.40 3.84 3.67 3.42 3.2  Xd DIR. AXIS TRANSIENT 0.19 0.18 0.17 0.15 0.23 0.22 0.21 0.19  X"d DIR. AXIS SUBTRANSIENT 0.14 0.13 0.12 0.11 0.17 0.16 0.15 0.14  Xq QUAD. AXIS REACTANCE 2.04 1.90 1.76 1.54 2.47 2.36 2.20 2.00  X"q QUAD. AXIS SUBTRANSIENT 0.29 0.27 0.25 0.22 0.35 0.33 0.31 0.25  XL LEAKAGE REACTANCE 0.04 0.03 0.03 0.03 0.04 0.04 0.04 0.04	WEIGHT WOUND ROTOR		149	4 kg		1432 kg							
PACKING CRATE SIZE  216 x 105 x 154(cm)  50 Hz  60 Hz  TELEPHONE INTERFERENCE  THF<2%  TIF<50  COOLING AIR  VOLTAGE STAR  380/220  400/231  415/240  440/254  416/240  440/254  460/266  480/2  230  240  2210  2255  230  X'd DIR. AXIS SYNCHRONOUS  3.18  2.96  2.75  2.40  3.84  3.67  3.42  3.2  X'd DIR. AXIS TRANSIENT  0.19  0.18  0.17  0.15  0.23  0.22  0.21  0.19  X''q QUAD. AXIS REACTANCE  2.04  1.90  1.76  1.54  2.47  2.36  2.20  2.06  X''q QUAD. AXIS SUBTRANSIENT  0.29  0.27  0.25  0.22  0.35  0.33  0.31  0.29  XL LEAKAGE REACTANCE  0.04  0.03  0.03  0.03  0.04  0.04  0.04  0.04  0.04  2.06  2.06  2.07  2.10  2.	WR² INERTIA		45.49	kgm <sup>2</sup>		44.4891 kgm <sup>2</sup>							
TELEPHONE INTERFERENCE  THF<2%  TIF<50  COOLING AIR  2.69 m³/sec 5700 cfm  3.45 m³/sec 7300 cfm  VOLTAGE STAR  VOLTAGE STAR  VABASE RATING FOR REACTANCE VALUES  Xd DIR. AXIS SYNCHRONOUS  3.18  2.96  2.75  2.40  3.84  3.67  3.42  3.2  X'd DIR. AXIS TRANSIENT  0.19  0.18  0.17  0.15  0.23  0.22  0.21  0.15  Xq QUAD. AXIS REACTANCE  2.04  1.90  1.76  1.54  2.47  2.36  2.20  2.04  XL LEAKAGE REACTANCE  0.04  0.03  0.03  0.03  0.04  0.04  0.04  0.04  2.06  TIF<50  TOLEPHONE INTERFERENCE  TIF<50  TOLEPHONE INTERFERENCE  TIF<50  TOLEPHONE INTERFERENCE  TIF<50  TIF<50  TOLEPHONE INTER<50  TOLEPHONE INTER TOLEPHON IN	SHIPPING WEIGHTS in a crate		362	.9kg		•							
TELEPHONE INTERFERENCE  THF<2%  TIF<50  COOLING AIR  2.69 m³/sec 5700 cfm  VOLTAGE STAR  380/220 400/231 415/240 440/254 416/240 440/254 460/266 480/2  kVA BASE RATING FOR REACTANCE VALUES  Xd DIR. AXIS SYNCHRONOUS  3.18 2.96 2.75 2.40 3.84 3.67 3.42 3.2  X'd DIR. AXIS TRANSIENT  0.19 0.18 0.17 0.15 0.23 0.22 0.21 0.19  X"d DIR. AXIS SUBTRANSIENT  0.14 0.13 0.12 0.11 0.17 0.16 0.15 0.14  Xq QUAD. AXIS REACTANCE  2.04 1.90 1.76 1.54 2.47 2.36 2.20 2.00  X'L LEAKAGE REACTANCE  0.04 0.03 0.03 0.03 0.04 0.04 0.04 0.04  X2 NEGATIVE SEQUENCE  0.20 0.20	PACKING CRATE SIZE		216 x 105	x 154(cm)		216 x 105 x 154(cm)							
COOLING AIR         2.69 m³/sec 5700 cfm         3.45 m³/sec 7300 cfm           VOLTAGE STAR         380/220         400/231         415/240         440/254         416/240         440/254         460/266         480/2           kVA BASE RATING FOR REACTANCE VALUES         1845         1900         1900         1865         2070         2210         2255         230           Xd DIR. AXIS SYNCHRONOUS         3.18         2.96         2.75         2.40         3.84         3.67         3.42         3.2           X'd DIR. AXIS TRANSIENT         0.19         0.18         0.17         0.15         0.23         0.22         0.21         0.11           X"d DIR. AXIS SUBTRANSIENT         0.14         0.13         0.12         0.11         0.17         0.16         0.15         0.14           Xq QUAD. AXIS REACTANCE         2.04         1.90         1.76         1.54         2.47         2.36         2.20         2.00           X"q QUAD. AXIS SUBTRANSIENT         0.29         0.27         0.25         0.22         0.35         0.33         0.31         0.24           XL LEAKAGE REACTANCE         0.04         0.03         0.03         0.03         0.03         0.04         0.04         0.04      <			50	Hz	60 Hz								
VOLTAGE STAR         380/220         400/231         415/240         440/254         416/240         440/254         460/266         480/2           kVA BASE RATING FOR REACTANCE VALUES         1845         1900         1900         1865         2070         2210         2255         230           Xd DIR. AXIS SYNCHRONOUS         3.18         2.96         2.75         2.40         3.84         3.67         3.42         3.2           X'd DIR. AXIS TRANSIENT         0.19         0.18         0.17         0.15         0.23         0.22         0.21         0.11           X''d DIR. AXIS SUBTRANSIENT         0.14         0.13         0.12         0.11         0.17         0.16         0.15         0.14           Xq QUAD. AXIS REACTANCE         2.04         1.90         1.76         1.54         2.47         2.36         2.20         2.00           X''q QUAD. AXIS SUBTRANSIENT         0.29         0.27         0.25         0.22         0.35         0.33         0.31         0.29           XL LEAKAGE REACTANCE         0.04         0.03         0.03         0.03         0.03         0.04         0.04         0.04         0.04           X2 NEGATIVE SEQUENCE         0.20         0.19         0.	TELEPHONE INTERFERENCE		THF	<2%			TIF<50						
kVA BASE RATING FOR REACTANCE VALUES         1845         1900         1900         1865         2070         2210         2255         230           Xd DIR. AXIS SYNCHRONOUS         3.18         2.96         2.75         2.40         3.84         3.67         3.42         3.2           X'd DIR. AXIS TRANSIENT         0.19         0.18         0.17         0.15         0.23         0.22         0.21         0.19           X''d DIR. AXIS SUBTRANSIENT         0.14         0.13         0.12         0.11         0.17         0.16         0.15         0.14           Xq QUAD. AXIS REACTANCE         2.04         1.90         1.76         1.54         2.47         2.36         2.20         2.06           X"'q QUAD. AXIS SUBTRANSIENT         0.29         0.27         0.25         0.22         0.35         0.33         0.31         0.29           XL LEAKAGE REACTANCE         0.04         0.03         0.03         0.03         0.04         0.04         0.04         0.04           X2 NEGATIVE SEQUENCE         0.20         0.19         0.17         0.15         0.24         0.23         0.22         0.26	COOLING AIR		2.69 m³/se	c 5700 cfm		3.45 m³/sec 7300 cfm							
VALUES         1845         1900         1900         1865         2070         2210         2255         230           Xd DIR. AXIS SYNCHRONOUS         3.18         2.96         2.75         2.40         3.84         3.67         3.42         3.2           X'd DIR. AXIS TRANSIENT         0.19         0.18         0.17         0.15         0.23         0.22         0.21         0.11           X''d DIR. AXIS SUBTRANSIENT         0.14         0.13         0.12         0.11         0.17         0.16         0.15         0.14           Xq QUAD. AXIS REACTANCE         2.04         1.90         1.76         1.54         2.47         2.36         2.20         2.00           X"q QUAD. AXIS SUBTRANSIENT         0.29         0.27         0.25         0.22         0.35         0.33         0.31         0.29           XL LEAKAGE REACTANCE         0.04         0.03         0.03         0.03         0.03         0.04         0.04         0.04           X2 NEGATIVE SEQUENCE         0.20         0.19         0.17         0.15         0.24         0.23         0.22         0.20	VOLTAGE STAR	380/220 400/231 415/240 440/254				416/240	440/254	460/266	480/277				
X'd DIR. AXIS TRANSIENT       0.19       0.18       0.17       0.15       0.23       0.22       0.21       0.19         X"d DIR. AXIS SUBTRANSIENT       0.14       0.13       0.12       0.11       0.17       0.16       0.15       0.14         Xq QUAD. AXIS REACTANCE       2.04       1.90       1.76       1.54       2.47       2.36       2.20       2.06         X"q QUAD. AXIS SUBTRANSIENT       0.29       0.27       0.25       0.22       0.35       0.33       0.31       0.29         XL LEAKAGE REACTANCE       0.04       0.03       0.03       0.03       0.04       0.04       0.04       0.04         X2 NEGATIVE SEQUENCE       0.20       0.19       0.17       0.15       0.24       0.23       0.22       0.20		1845	1900	1900	1865	2070	2210	2255	2300				
X"d DIR. AXIS SUBTRANSIENT       0.14       0.13       0.12       0.11       0.17       0.16       0.15       0.14         Xq QUAD. AXIS REACTANCE       2.04       1.90       1.76       1.54       2.47       2.36       2.20       2.00         X"q QUAD. AXIS SUBTRANSIENT       0.29       0.27       0.25       0.22       0.35       0.33       0.31       0.29         XL LEAKAGE REACTANCE       0.04       0.03       0.03       0.03       0.04       0.04       0.04       0.04         X2 NEGATIVE SEQUENCE       0.20       0.19       0.17       0.15       0.24       0.23       0.22       0.20	Xd DIR. AXIS SYNCHRONOUS	3.18	2.96	2.75	2.40	3.84	3.67	3.42	3.21				
Xq QUAD. AXIS REACTANCE       2.04       1.90       1.76       1.54       2.47       2.36       2.20       2.00         X"q QUAD. AXIS SUBTRANSIENT       0.29       0.27       0.25       0.22       0.35       0.33       0.31       0.29         XL LEAKAGE REACTANCE       0.04       0.03       0.03       0.03       0.04       0.04       0.04       0.04         X2 NEGATIVE SEQUENCE       0.20       0.19       0.17       0.15       0.24       0.23       0.22       0.20	X'd DIR. AXIS TRANSIENT	0.19	0.18	0.17	0.15	0.23	0.22	0.21	0.19				
X"q QUAD. AXIS SUBTRANSIENT 0.29 0.27 0.25 0.22 0.35 0.33 0.31 0.29  XL LEAKAGE REACTANCE 0.04 0.03 0.03 0.03 0.04 0.04 0.04 0.04	X"d DIR. AXIS SUBTRANSIENT	0.14	0.13	0.12	0.11	0.17	0.16	0.15	0.14				
XL LEAKAGE REACTANCE       0.04       0.03       0.03       0.03       0.04       0.04       0.04       0.04         X2 NEGATIVE SEQUENCE       0.20       0.19       0.17       0.15       0.24       0.23       0.22       0.20	Xq QUAD. AXIS REACTANCE	2.04	1.90	1.76	1.54	2.47	2.36	2.20	2.06				
X <sub>2</sub> NEGATIVE SEQUENCE 0.20 0.19 0.17 0.15 0.24 0.23 0.22 0.20	X"q QUAD. AXIS SUBTRANSIENT	0.29	0.27	0.25	0.22	0.35	0.33	0.31	0.29				
	XL LEAKAGE REACTANCE	0.04	0.03	0.03	0.03	0.04	0.04	0.04	0.04				
Vo ZEDO SEQUENCE 0.00 0.00 0.00 0.00 0.00 0.00 0.00	X2 NEGATIVE SEQUENCE	0.20	0.19	0.17	0.15	0.24	0.23	0.22	0.20				
NU ZERO SEQUENCE 0.02 0.02 0.03 0.03 0.03	X <sub>0</sub> ZERO SEQUENCE	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03				
REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED	REACTANCES ARE SATURAT	ΓED	V	ALUES ARE	PER UNIT A	T RATING AI	ND VOLTAGE	E INDICATED	)				
T'd TRANSIENT TIME CONST. 0.149s													
T''d SUB-TRANSTIME CONST. 0.02s T'do O.C. FIELD TIME CONST. 2.46s													
Ta ARMATURE TIME CONST. 0.02s													
SHORT CIRCUIT RATIO 1/Xd													

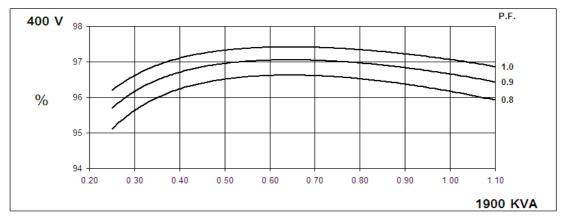
50 Hz

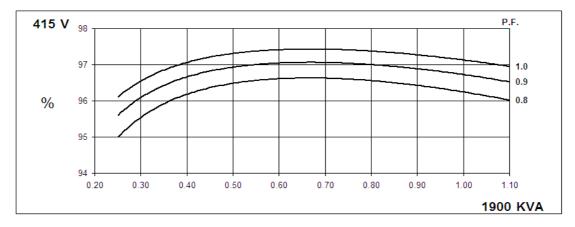
# **PI734E** Winding 312

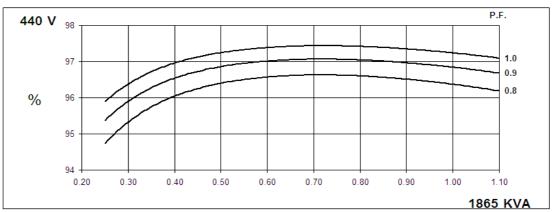


# THREE PHASE EFFICIENCY CURVES







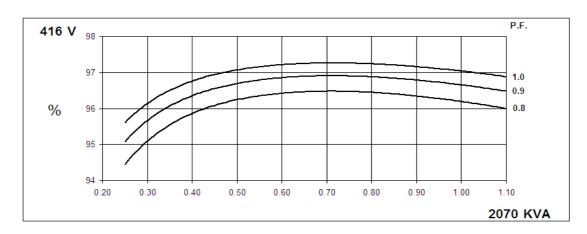


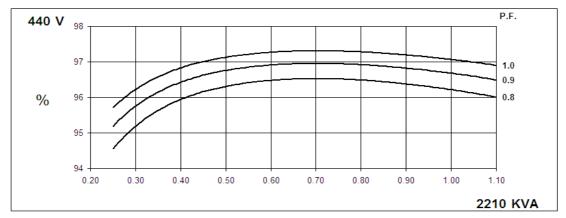


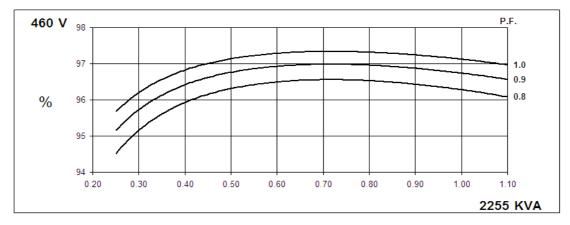
# Winding 312

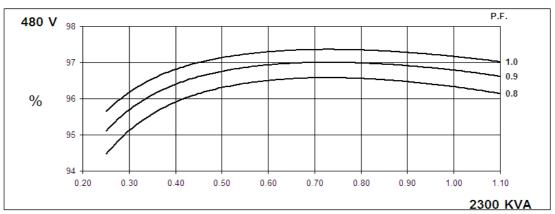
# 60 Hz

# THREE PHASE EFFICIENCY CURVES





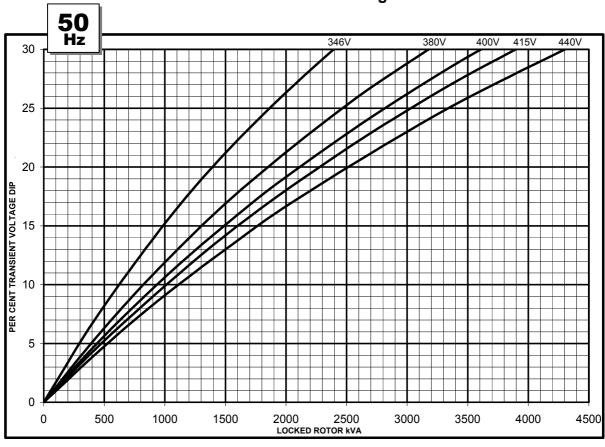


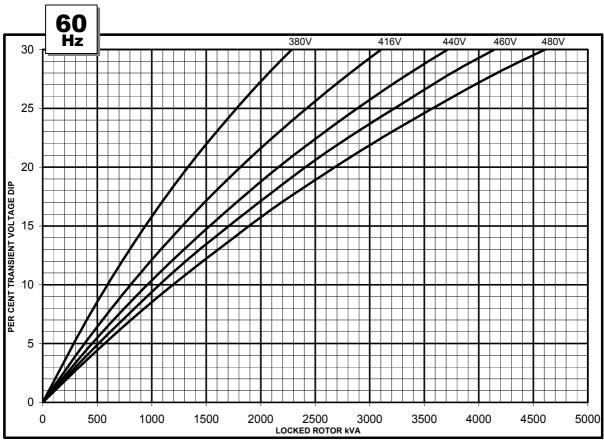


# **PI734E** Winding 312



# **Locked Rotor Motor Starting Curve**

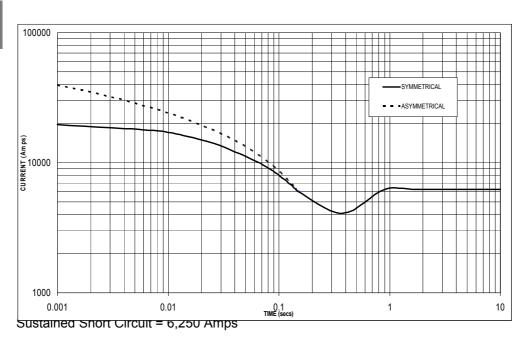




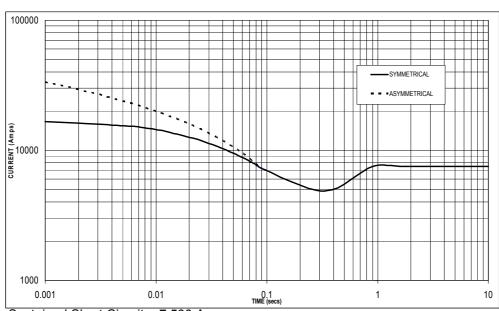


# Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on star (wye) connection.

50 Hz



60 Hz



Sustained Short Circuit = 7,500 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:

50	Hz	60	Hz
Voltage	Factor	Voltage	Factor
380v	x 1.00	416v	x 1.00
400v	x 1.05	440v	x 1.06
415v	x 1.09	460v	x 1.10
440v	x 1.16	480v	x 1.15

The sustained current value is constant irrespective of voltage level

### Note 2

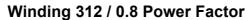
The following multiplication factor should be used to convert the values calculated in accordance with NOTE 1 to those applicable to the various types of short circuit :

	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.



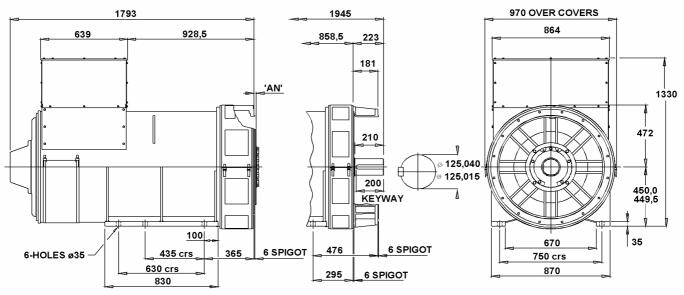


# **RATINGS**

Clas	s - Temp Rise	Cont. F - 105/40°C			Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C				
<b>50</b> Hz	Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	kVA	1715	1770	1770	1735	1845	1900	1900	1865	1920	1980	1980	1940	1975	2035	2035	1995
	kW	1372	1416	1416	1388	1476	1520	1520	1492	1536	1584	1584	1552	1580	1628	1628	1596
	Efficiency (%)	96.3	96.3	96.4	96.5	96.1	96.2	96.2	96.4	96.0	96.1	96.2	96.3	95.9	96.0	96.1	96.2
	kW Input	1425	1470	1469	1438	1536	1580	1580	1548	1600	1648	1647	1612	1648	1696	1694	1659

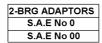
<b>60</b> Hz	Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	kVA	1935	2055	2100	2140	2070	2210	2255	2300	2155	2300	2345	2395	2215	2365	2415	2465
	kW	1548	1644	1680	1712	1656	1768	1804	1840	1724	1840	1876	1916	1772	1892	1932	1972
Effic	eiency (%)	96.3	96.3	96.4	96.4	96.2	96.2	96.3	96.3	96.1	96.1	96.2	96.3	96.1	96.1	96.1	96.2
	kW Input	1607	1707	1743	1776	1721	1838	1873	1911	1794	1915	1950	1990	1844	1969	2010	2050

## **DIMENSIONS**



COUPLING DISC	'AN'
S.A.E No 18	15,7
S.A.E No 21	0
S.A.E No 24	0

1-BRG ADAPTORS
S.A.E No 0
S.A.E No 00





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