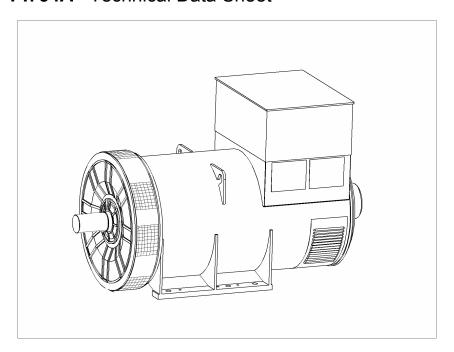


PI734A - Technical Data Sheet



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%.

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 is typical of the product range.



WINDING 312

CONTROL SYSTEM	SEPARATEL	EPARATELY EXCITED BY P.M.G.								
A.V.R.	MX341	IX341 MX321								
VOLTAGE REGULATION	± 1%	± 1% ± 0.5 % With 4% ENGINE GOVERNING								
SUSTAINED SHORT CIRCUIT	REFER TO S	EFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)								

INSULATION SYSTEM				CLAS	SS H							
PROTECTION				IP	23							
RATED POWER FACTOR				0.	8							
STATOR WINDING				DOUBLE L	AYER LAP							
WINDING PITCH		TWO THIRDS										
WINDING LEADS		6										
MAIN STATOR RESISTANCE		0.0016 Ohms PER PHASE AT 22°C STAR CONNECTED										
MAIN ROTOR RESISTANCE	1.67 Ohms at 22°C											
EXCITER STATOR RESISTANCE		17.5 Ohms at 22°C										
EXCITER ROTOR RESISTANCE		0.048 Ohms PER PHASE AT 22°C										
R.F.I. SUPPRESSION	BS EN	N 61000-6-2 8	& BS EN 610	00-6-4,VDE 0	875G, VDE 0	875N. refer to	o factory for o	others				
WAVEFORM DISTORTION		NO LOAD <	< 1.5% NON-	DISTORTING	G BALANCE	LINEAR LO	AD < 5.0%					
MAXIMUM OVERSPEED				2250 R	ev/Min							
BEARING DRIVE END				BALL. 6	228 C3							
BEARING NON-DRIVE END	BALL. 6319 C3											
		1 BEA	2 BEA	RING								
WEIGHT COMP. GENERATOR		276	60 kg			2710) kg					
WEIGHT WOUND STATOR		130	16 kg		1306 kg							
WEIGHT WOUND ROTOR		113	19 kg		1077 kg							
WR² INERTIA		32.749	98 kgm²		31.7489 kgm²							
SHIPPING WEIGHTS in a crate		283	33kg		2779kg							
PACKING CRATE SIZE		194 x 105	x 154(cm)			194 x 105	x 154(cm)					
		50	Hz			60	Hz					
TELEPHONE INTERFERENCE		THE	<2%			TIF	<50					
COOLING AIR		2.69 m³/se	c 5700 cfm		3.45 m³/sec 7300 cfm							
VOLTAGE STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277				
kVA BASE RATING FOR REACTANCE VALUES	1225	1260	1260	1235	1370	1500	1510	1525				
Xd DIR. AXIS SYNCHRONOUS	3.51	3.26	3.02	2.64	4.23	4.14	3.81	3.53				
X'd DIR. AXIS TRANSIENT	0.21	0.20	0.18	0.16	0.26	0.25	0.23	0.22				
X"d DIR. AXIS SUBTRANSIENT	0.16	0.15	0.14	0.12	0.19	0.19	0.17	0.16				
Xq QUAD. AXIS REACTANCE	2.26	2.10	1.95	1.70	2.73	2.67	2.46	2.28				
X"q QUAD. AXIS SUBTRANSIENT	0.32	0.29	0.27	0.24	0.38	0.37	0.34	0.32				
XL LEAKAGE REACTANCE	0.04	0.04	0.03	0.03	0.05	0.05	0.04	0.04				
X2 NEGATIVE SEQUENCE	0.22	0.21	0.19	0.17	0.27	0.26	0.24	0.23				
X ₀ ZERO SEQUENCE	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.03				
REACTANCES ARE SATURA	TED	V	ALUES ARE		T RATING A	ND VOLTAGE	E INDICATED)				
T'd TRANSIENT TIME CONST.	0.13s											
T''d SUB-TRANSTIME CONST.				0.0								
T'do O.C. FIELD TIME CONST.				2.1								
Ta ARMATURE TIME CONST. SHORT CIRCUIT RATIO				0.0								
55.tr 5ii (5511 10 (110	1/Xd											

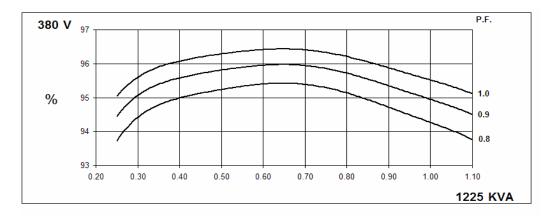
50 Hz

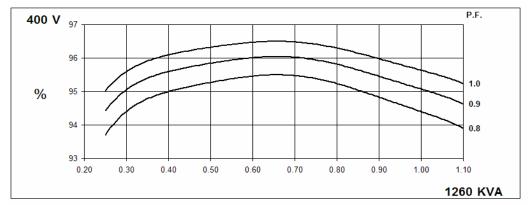
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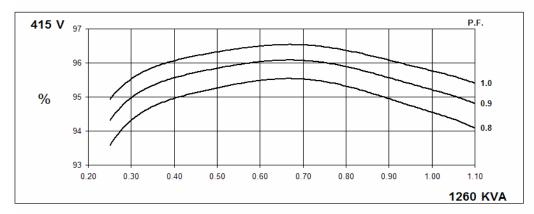
Winding 312

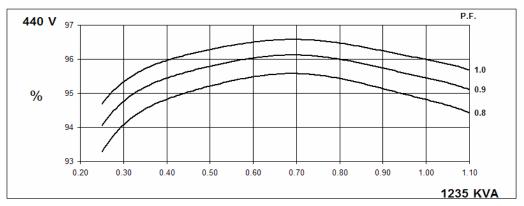


THREE PHASE EFFICIENCY CURVES







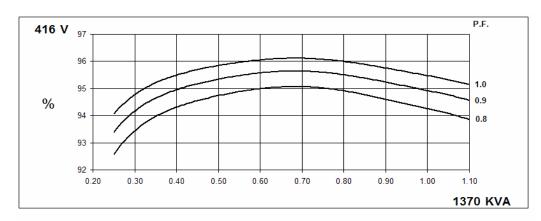


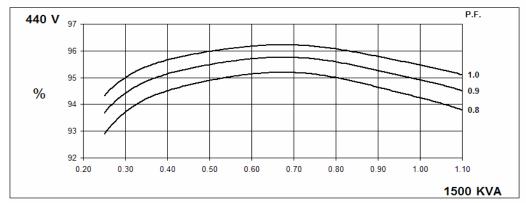


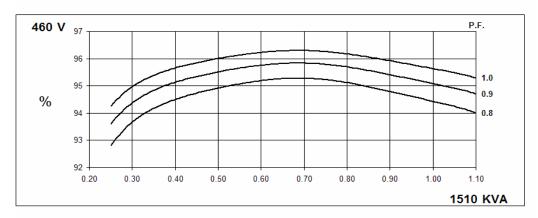
Winding 312

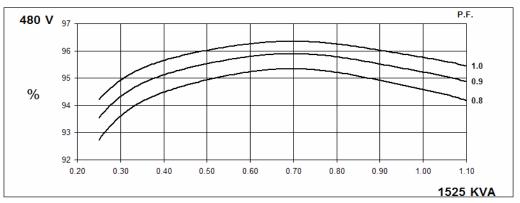
60 Hz

THREE PHASE EFFICIENCY CURVES







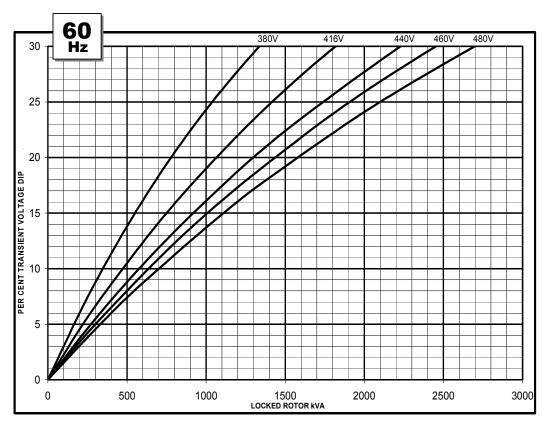








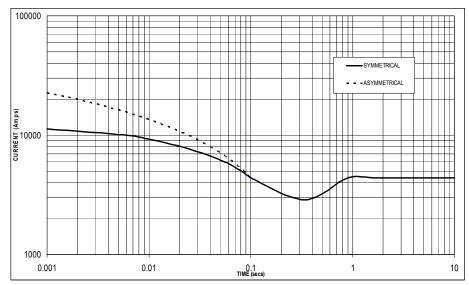






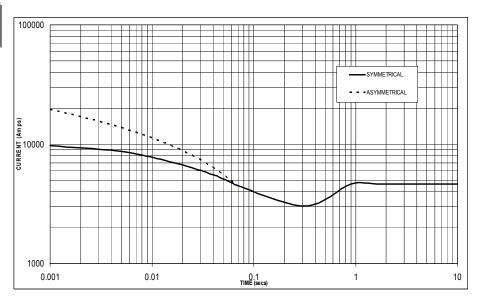
Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on star (wye) connection.





Sustained Short Circuit = 4,400 Amps





Sustained Short Circuit = 4,650 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 1.09	460v	x 1.10						
440v	x 1.16	480v	x 1.15						

The sustained current value is constant irrespective of voltage level

Note 2

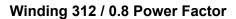
The following multiplication factor should be used to convert the values calculated in accordance with NOTE 1 to those applicable to the various types of short circuit:

	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.



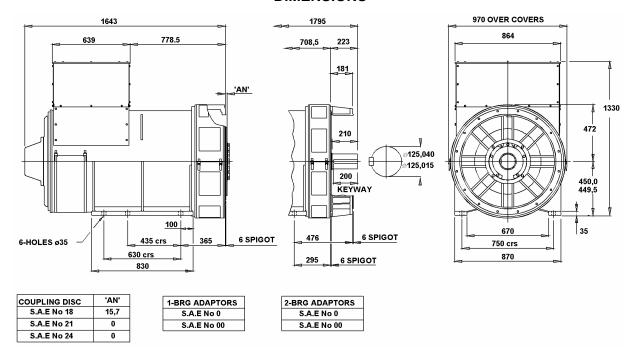


RATINGS

Class - Temp Rise	e Cont. F - 105/40°C				C	ont. H -	125/40	°C	St	andby -	150/40	°C	Standby - 163/27°C			
50 Hz Star (V)		400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
kVA	I	1175	1175	1150	1225	1260	1260	1235	1275	1315	1315	1290	1310	1350	1350	1325
kW	912	940	940	920	980	1008	1008	988	1020	1052	1052	1032	1048	1080	1080	1060
Efficiency (%)	94.5	94.6	94.8	95.0	94.3	94.4	94.6	94.8	94.1	94.2	94.4	94.7	94.0	94.1	94.3	94.6
kW Input	965	994	992	968	1039	1068	1066	1042	1084	1117	1114	1090	1115	1148	1145	1121
	<u> </u>															

60 Hz Star (V		440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
kVA		1395	1405	1415	1370	1500	1510	1525	1425	1560	1570	1585	1465	1605	1615	1630
kW	1020	1116	1124	1132	1096	1200	1208	1220	1140	1248	1256	1268	1172	1284	1292	1304
Efficiency (%	94.5	94.5	94.6	94.8	94.3	94.2	94.4	94.6	94.1	94.1	94.3	94.5	94.0	94.0	94.2	94.4
kW Inpu	1079	1181	1188	1194	1162	1274	1280	1290	1211	1326	1332	1342	1247	1366	1372	1381

DIMENSIONS





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