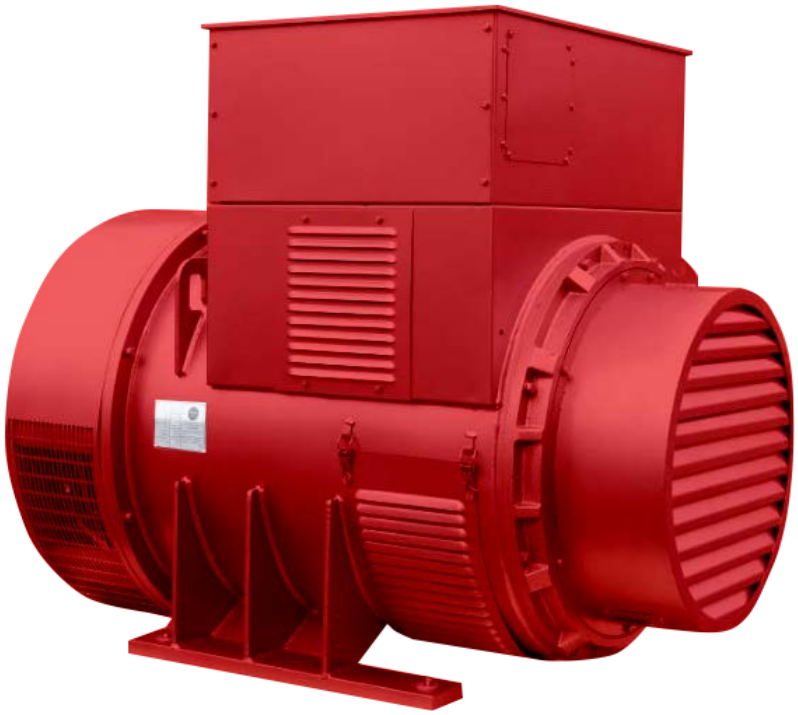
A.R.K7FS DATA SHEET



SPECIFICATIONS &OPTIONS

Standards

- A.R.K series alternator conforms to the major international standards and specifications, including:
  -IEC60034, GB755, BS5000, VDE0530, NEMA, MG1-22, C22.2-100, CSA, AS1359 standard, etc.
- A.R.K series alterantor is certified by ISO9001 quality system.
- A.R.K series alterantor can be used for the generator set of CE mark.
- Other standards and certification can be based on customer requirements.

Electrical characteristics

- Insualtion & Impregnating
  Class H insulation.
  All wound components are impregnated with meterial and processes designed specially to provide protection against harsh environments encountered in generator application. Resin based meterials are selected and developed to provide the high build required for static windings and the high mechanical strength required for rotating components.
- 3-phase reconnectable with12 ends brought out to the terminals.
- 2/3 pitch , can eliminates triple (3rd, 9th, 15th …) harmonics on the voltage waveform and is found to be the optimumdesign for trouble-free supply of non-linear loads.
- Telephone interference
  THF(as defined by IEC 60034-1) is less than 2%, TIF(as defined by NEMA MG1-32) is less than 50.
- Radio interference
  Brushless device and the high quality AVR ensure low levels of interference with radio transmissions.RFI suppression module may be installed if required.
- High efficiency and motor startup capability.

Mechanical properties

- Steel structure.
- Cast aluminum for front and rear cover.
- Rigid assembly, effectively reduces the vibration during running.
- All rotors are dynamically balanced to conform with BS6861.
- Half key dynamic balance is applied in double bearing structure.
- Non-maintenance sealed-for-life ball bearing.
- 120% overspeed ability.

Standard

Protection grade

- A.R.K series alternator protection level is IP23.
- Suitable for environment with 95% relative humidity.
- optional
  -Inlet and filter, power reduced by 5%.
  -Inlet and outlet filter, power reduced by 10% (IP44)
  -Anti-condensation heater.
  -Stator winding, bearing overheating protection.
  -Outlet line design of outlet box.
  -Center height can be customized according to requirements.

Excitation and voltage regulation system

MODEL	16 series	18 series	22 series	27 series	4 series	5 series	6 series	7 series
AVR								
SX460	Standard	Standard	Standard	Standard				
AS440(parallel optional)	Optional	Optional	Optional	Optional				
SX440(parallel optional)			Optional	Optional	Standard	Standard		
MX341(with PMG)			Optional	Optional	Optional	Optional		
MX321(with PMG)							Standard	Standard

With the self-excited system, the main stator provides power via the automatic voltage regulator(AVR) to the exciter stator. The high efficency AVR ensures the voltage maintaining at the rated level.
The exciter rotor output is fed to the main rotor through a three phase full wave bridge rectifier. The rectifier is protected by surge suppressor from voltage spikes of short circuit or phase mismatching.

Application

Prime power, rental, telecom, mobile power station, lighting tower, railway, refrigeration and standby power.

Quality assurance

A.R.K series alterantors are manufactured using production procedures having a quality assurance level to ISO 9001.

Note: Continuous development of our products entitles usto change specification details without notice, thereforethey must not be regarded as binding.

A.R.K7FS
Parameters (WINDING 311)

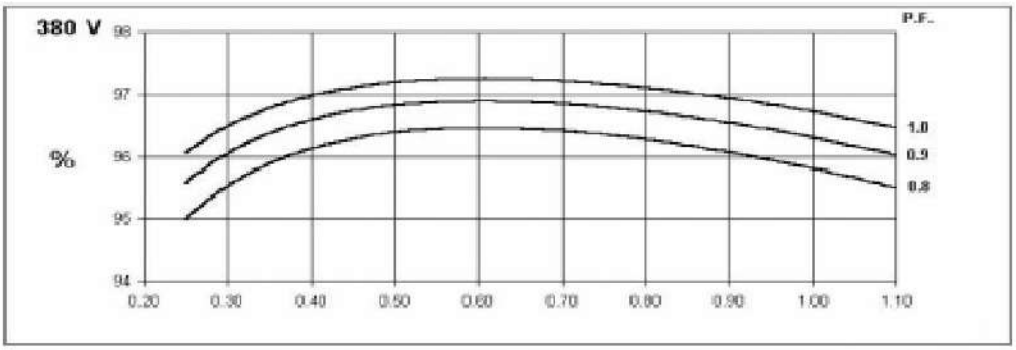
CONTROL SYSTEM	SELF EXCITED
A.V.R.	MX341 WITH PMG
VOLTAGE REGULATION	± 1.0 %
SUSTAINED SHORT CIRCUIT	>300% OF RATED CURRENT

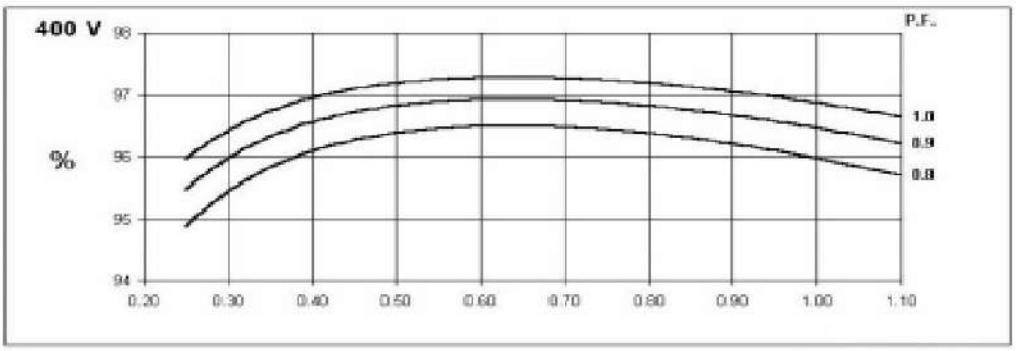
INSULATION SYSTEM	H							
RATED POWER FACTOR	0.8							
PROTECTION	IP23							
STATOR WINDING	DOUBLE LAYER							
ROTOR WINDING	WITH DAMPING CAGE							
WINDING LEADS	6							
STATOR WDG. RESISTANCE	0.00114 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED							
ROTOR WDG. RESISTANCE	1.98 Ohms at 22°C							
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	2250 Rev/Min							
BEARING DRIVE END	BALL. 6228 (ISO)							
BEARING NON-DRIVE END	BALL. 6319 (ISO)							
	1 BEARING				2 BEARING			
WEIGHT COMP. GENERATOR	3318 kg				3267 kg			
WEIGHT WOUND STATOR	1619 kg				1619 kg			
WEIGHT WOUND ROTOR	1383 kg				1321 kg			
WR² INERTIA	41.2206 kgm2				40.2197 kgm2			
SHIPPING WEIGHTS in a crate	3391 kg				3336 kg			
PACKING CRATE SIZE	216 x 105 x 154 (cm)				216 x 105 x 154 (cm)			
	50HZ				60HZ			
TELEPHONE INTERFERENCE	THF<2%				TIF<50			
COOLING AIR	2.69 m³/sec 5700 cfm				3.45 m³/sec 7300 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	1615	1650	1650	1620	1815	1935	1975	2015
Xd DIR. AXIS SYNCHRONOUS	3.12	2.88	2.67	2.33	3.75	3.57	3.33	3.12
X'd DIR. AXIS TRANSIENT	0.19	0.18	0.16	0.14	0.23	0.22	0.20	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	2.01	1.85	1.72	1.50	2.41	2.30	2.15	2.01
X"q QUAD. AXIS SUBTRANSIENT	0.28	0.26	0.24	0.21	0.34	0.32	0.30	0.28
X L LEAKAGE REACTANCE	0.04	0.03	0.03	0.03	0.04	0.04	0.04	0.04
X 2 NEGATIVE SEQUENCE	0.20	0.18	0.17	0.15	0.24	0.23	0.21	0.20
X 0 ZERO SEQUENCE	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.02
REACTANCES ARE SATURATED	VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED							
T'd TRANSIENT TIME CONST.	0.137s							
T"d SUB-TRANSTIME CONST.	0.01s							
T'do O.C. FIELD TIME CONST.	2.25s							
Ta ARMATURE TIME CONST.	0.02s							
SHORT CIRCUIT RATIO	1/Xd							

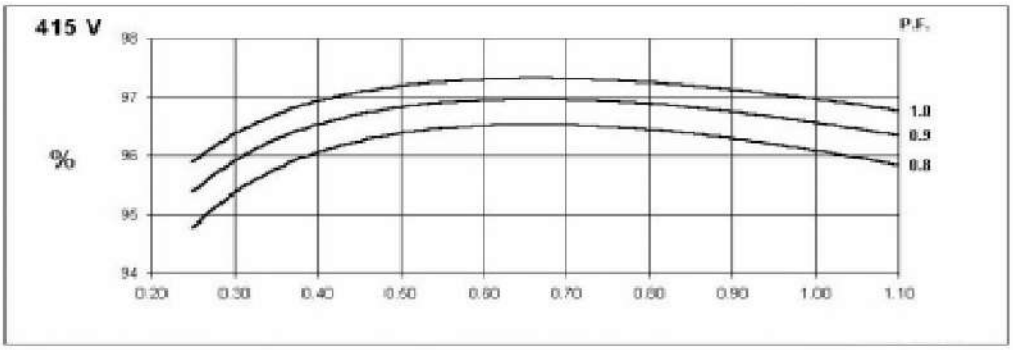
EXTATION SYSTEM	SX460	SX440	AS440	MX341	MX321
VOLTAGE REGULATION RATE	±1.5%	±1.0%	±1.0%	±1.0%	±0.5%
LOW SPEED VOLTAGE DROP PROTECTION	Standard	Standard	Standard	Standard	Standard
SHORT-CIRCUITED ELECTRIC ABILITY				300%:10S	300%:10S
PARALLEL OPERATION		Optional	Optional	Optional	Optional

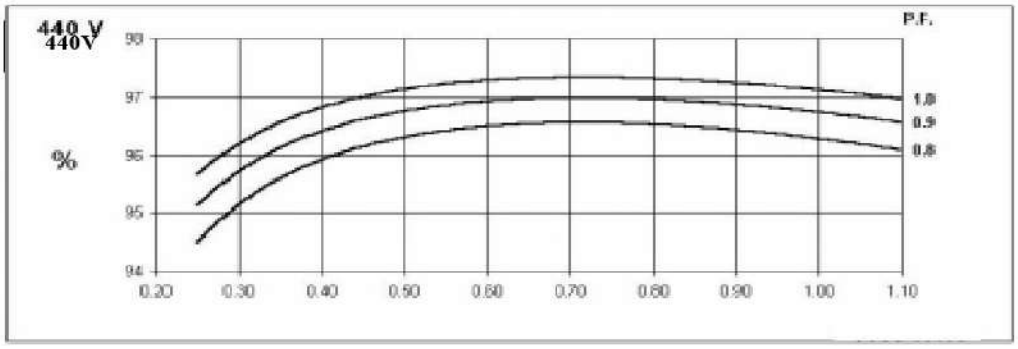
A.R.K7FS

Three Phase Efficiency Curves (WINDING 311) 50HZ



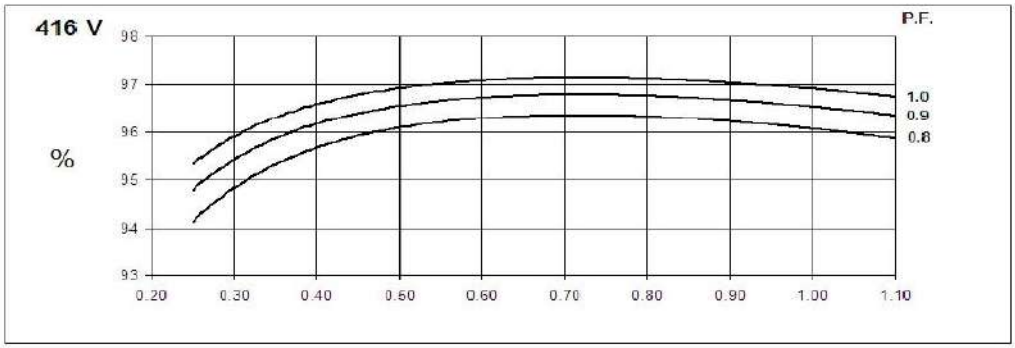


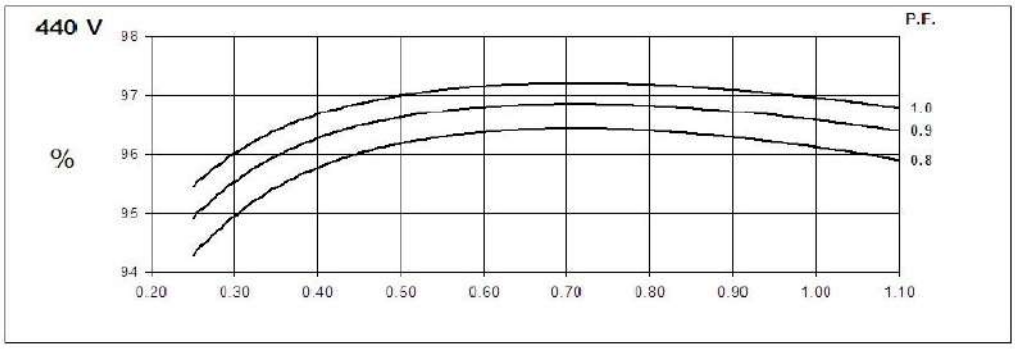


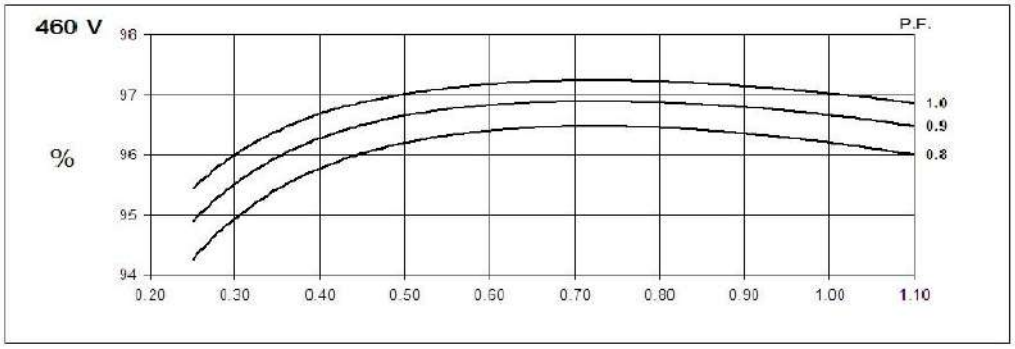


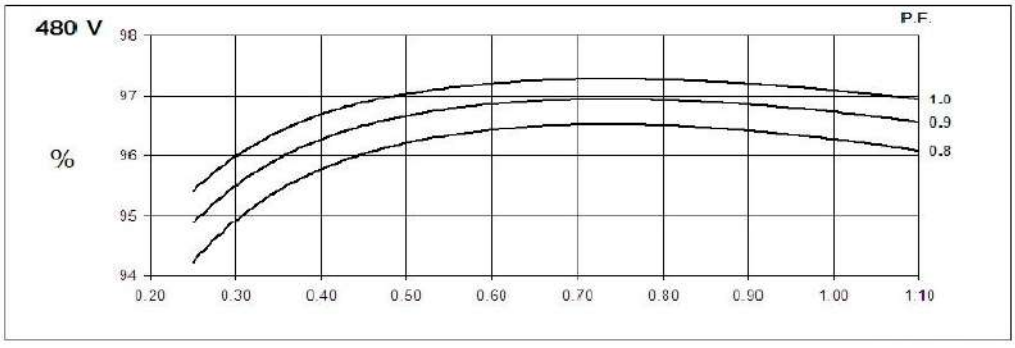
A.R.K7FS

Three Phase Efficiency Curves (WINDING 311) 60HZ



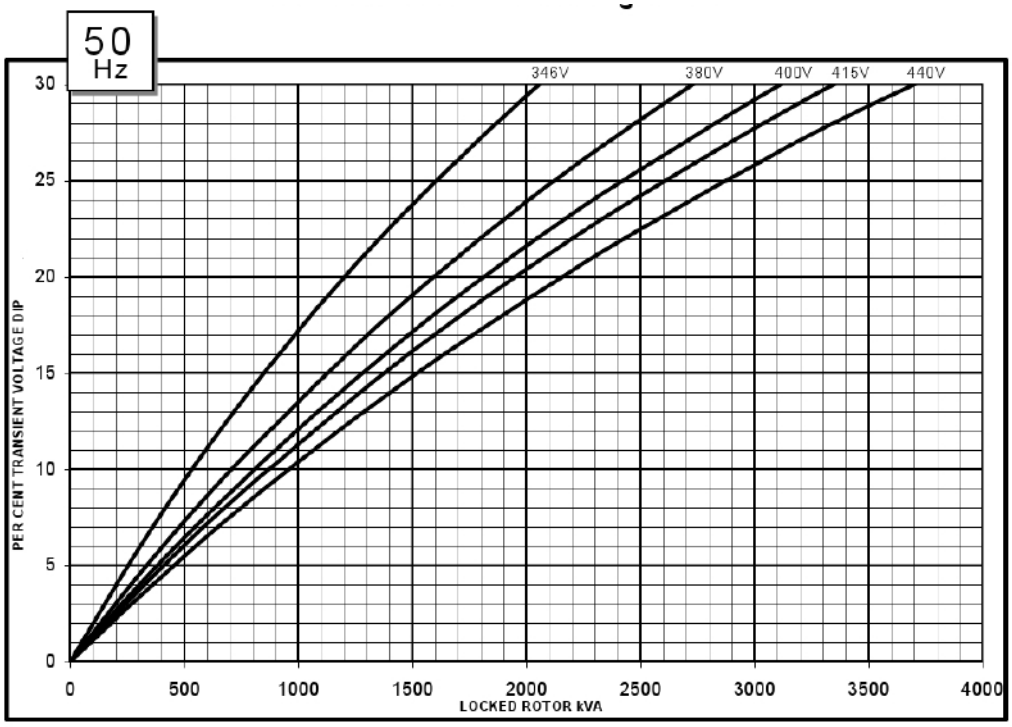


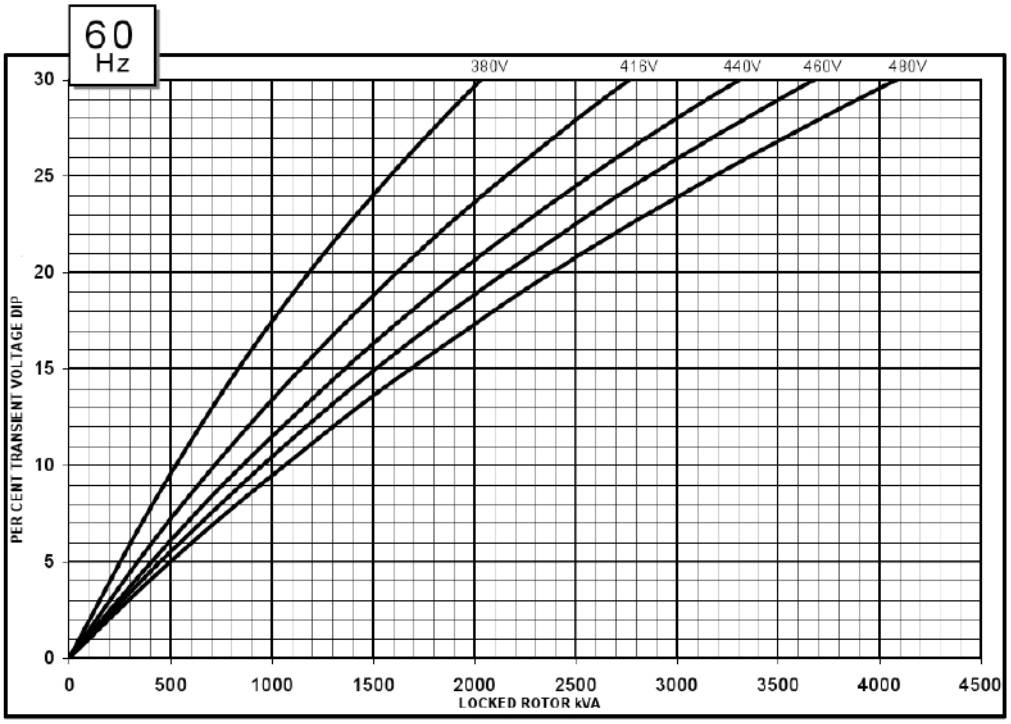




A.R.K7FS

Locked Rotor Motor Starting Curve (Winding 311)



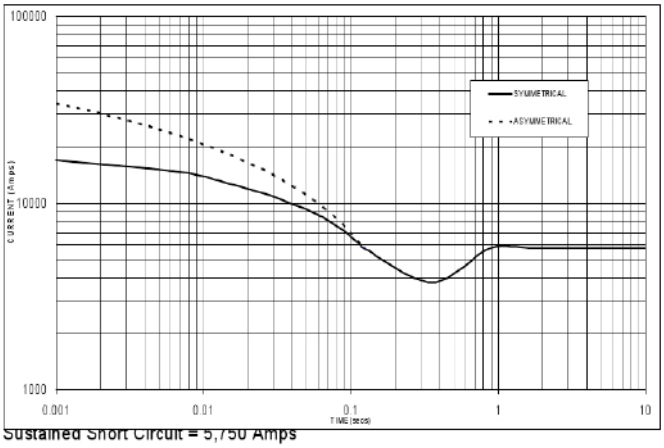


A.R.K7FS

Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed

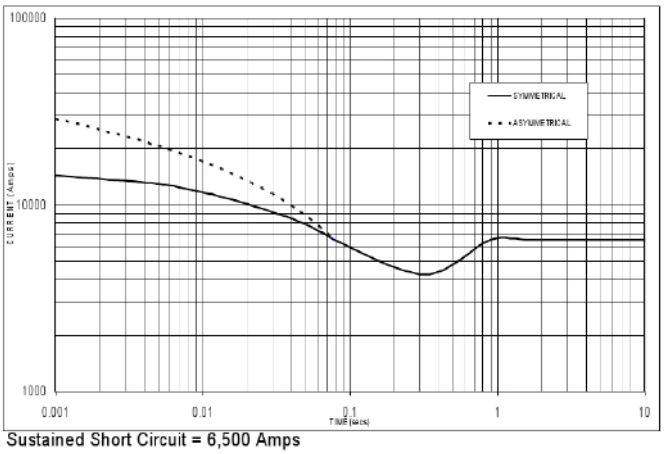
Based on star (wye) connection.

50 Hz



Sustained Short Circuit = 5,750 Amps

60 Hz



Sustained Short Circuit = 6,500 Amps

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

50HZ		60HZ	
Voltage	Factor	Voltage	Factor
380V	X 1.00	416V	X 1.00
400V	X 1.05	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

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

3.Curves are drawn for Star (Wye) connected machines.

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

Parallel Star = Curve current value X 2

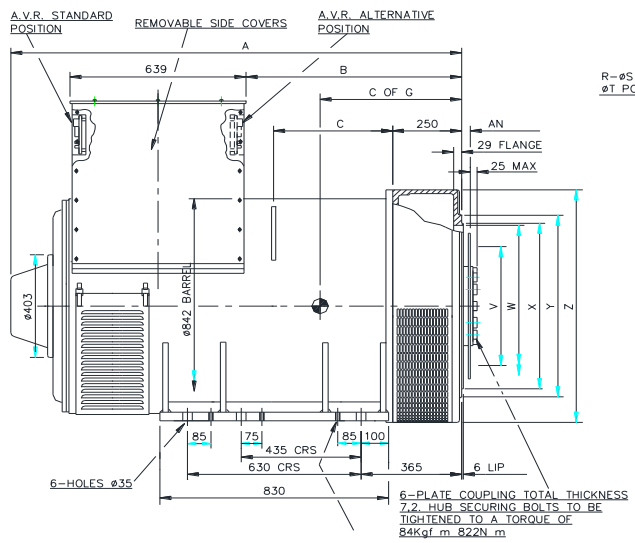
Series Delta = Curve current value X 1.732

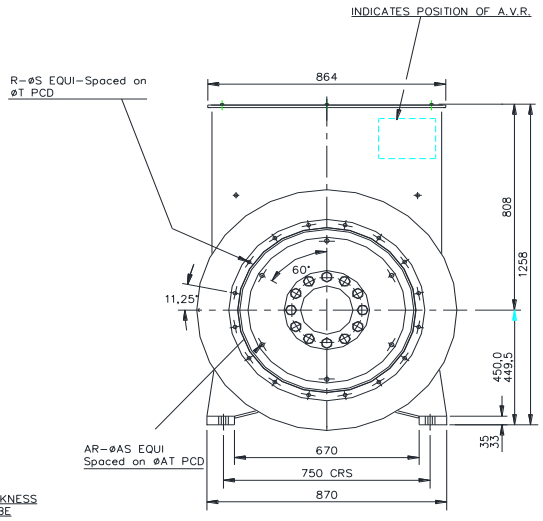
A.R.K7FS
Winding 311 / 0.8 Power Factor
RATINGS

Class - Temp Rise		Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C			
50HZ	Series Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	Parallel S tar (V)	190	200	208	220	190	200	208	220	190	200	208	220	190	200	208	220
		220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
	kVA	1500	1540	1540	1505	1615	1650	1650	1620	1675	1720	1720	1685	1715	1770	1770	1735
	kW	1200	1232	1232	1204	1292	1320	1320	1296	1340	1376	1376	1348	1372	1416	1416	1388
	Efficiency (%)	96.2	96.3	96.4	96.5	96.1	96.2	96.3	96.4	96	96.1	96.2	96.3	95.9	96	96.1	96.3

Class - Temp Rise		Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C			
60HZ	Series Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	Parallel S tar (V)	208	220	230	240	208	220	230	240	208	220	230	240	208	220	230	240
		240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
	kVA	1690	1800	1840	1875	1815	1935	1975	2015	1890	2015	2055	2100	1940	2070	2115	2160
	kW	1352	1440	1472	1500	1452	1548	1580	1612	1512	1612	1644	1680	1552	1656	1692	1728
	Efficiency (%)	96.2	96.2	96.3	96.4	96.1	96.1	96.2	96.3	96	96	96.1	96.2	95.9	96	96.1	96.1

DIMENSIONS





MODEL	A	B	C	C OF G
7E	1643	787	433	755
7F				755
7FS				770

ADAPTOR	X	Y	Z	N	R	S	T
SAE00	787.4	882	944	16	12	14	851
SAE0	647.7	711	944	16	16	14	679.5

COUPLING DISC	W	AN	AR	AS	AT
SAE24	733.3	0	12	20.7	692
SAE21	673.02	0	12	16.7	641.3
SAE18	571.42	15.87	6	16.7	543.0