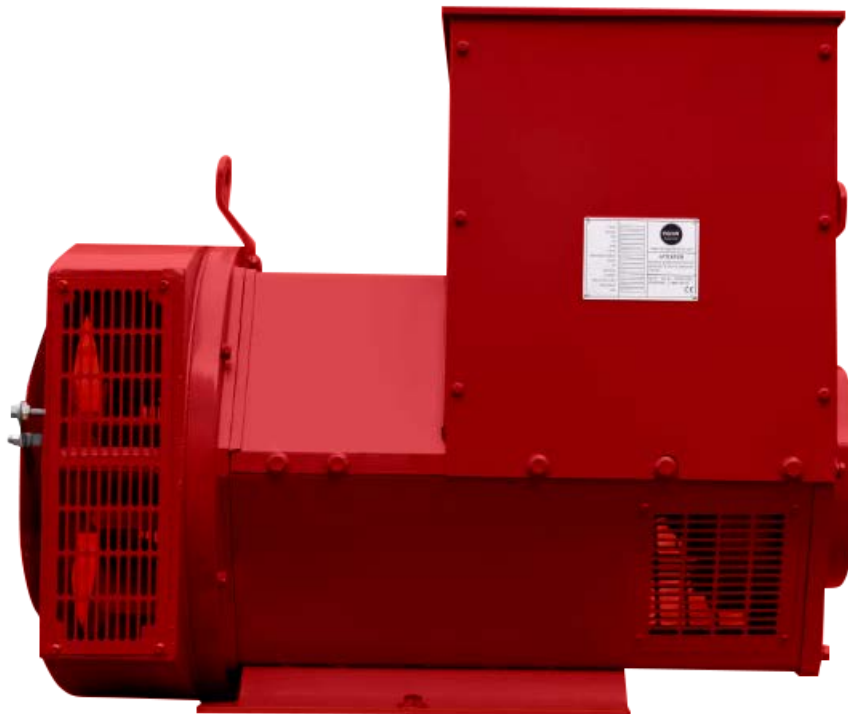




## A.R.K274F DATA SHEET



## 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 alternator is certified by ISO9001 quality system.
- A.R.K series alternator can be used for the generator set of CE mark.
- Other standards and certification can be based on customer requirements.

### Electrical characteristics

- Insulation & Impregnating
  - Class H insulation.
  - All wound components are impregnated with material and processes designed specially to provide protection against harsh environments encountered in generator application. Resin based materials 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 with 12 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 optimum design 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 efficiency 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 alternators are manufactured using production procedures having a quality assurance level to ISO 9001.

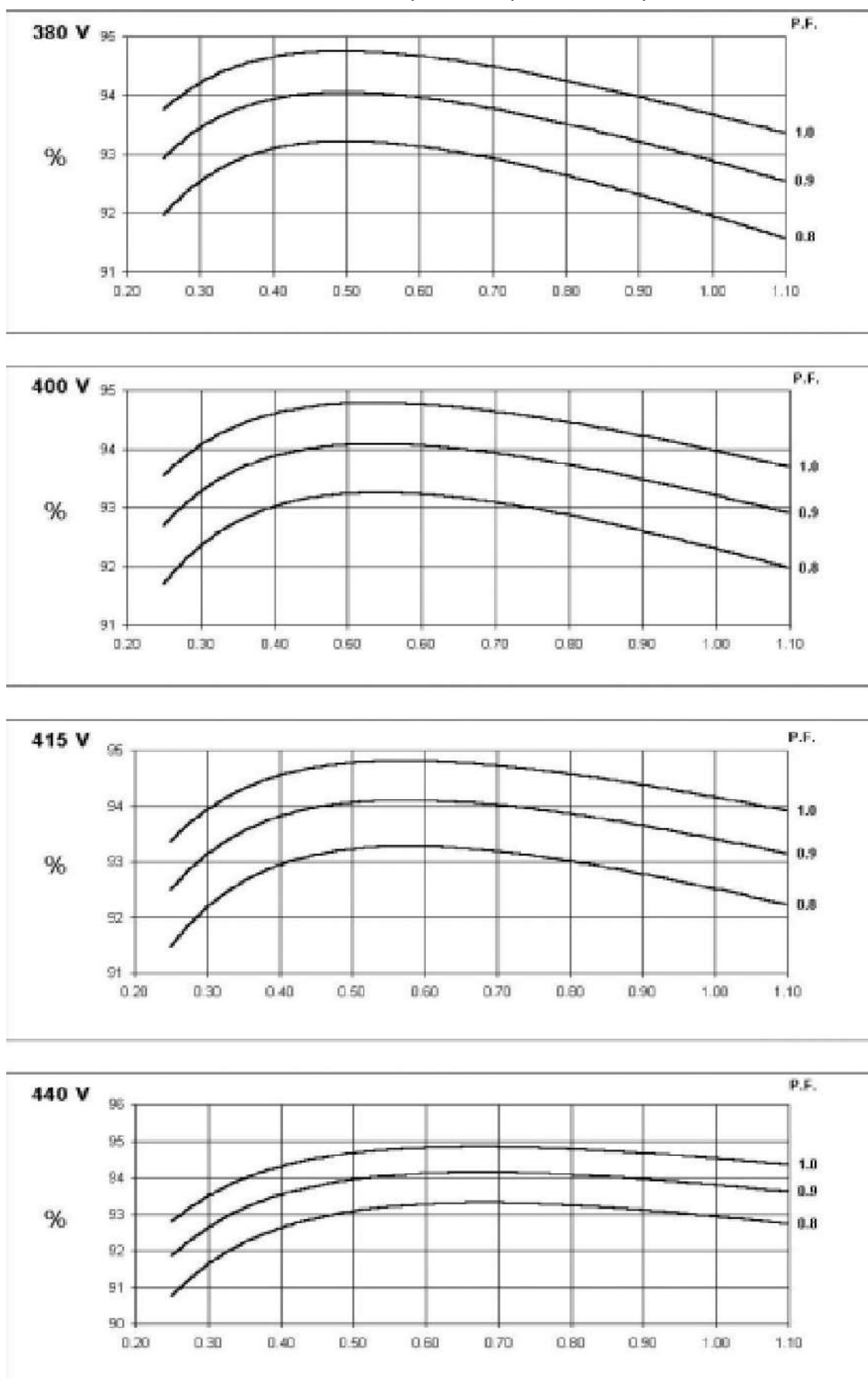
*Note: Continuous development of our products entitles us to change specification details without notice, therefore they must not be regarded as binding.*

**A.R.K274F**  
**Parameters (WINDING 311)**

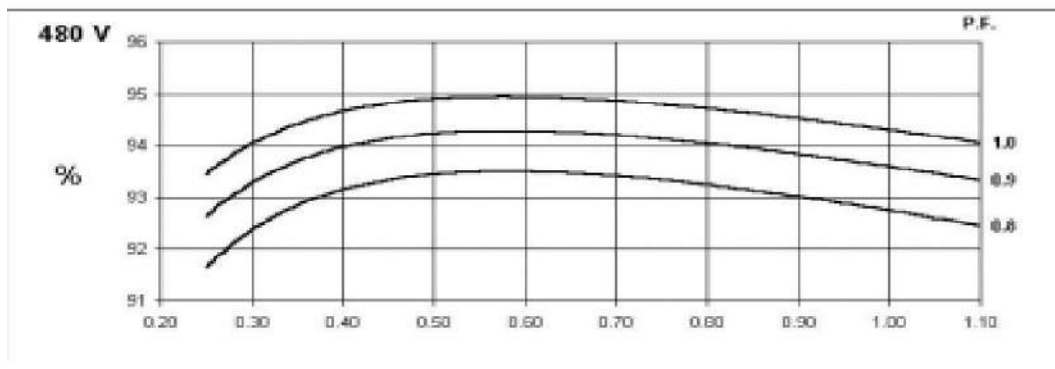
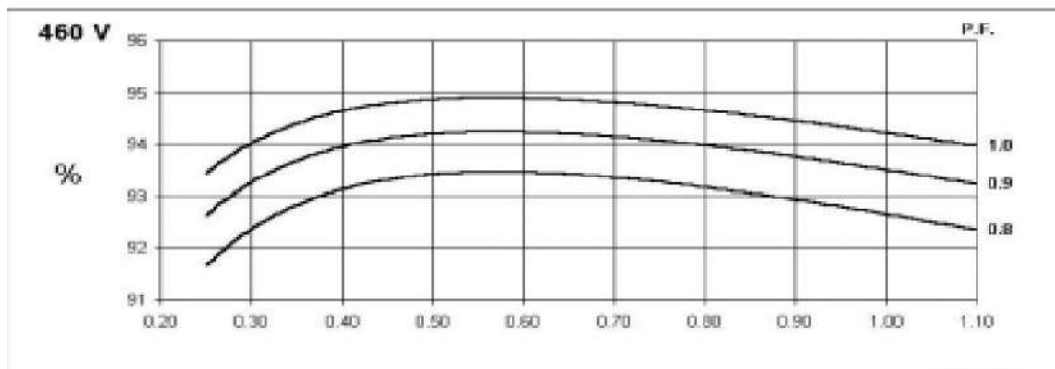
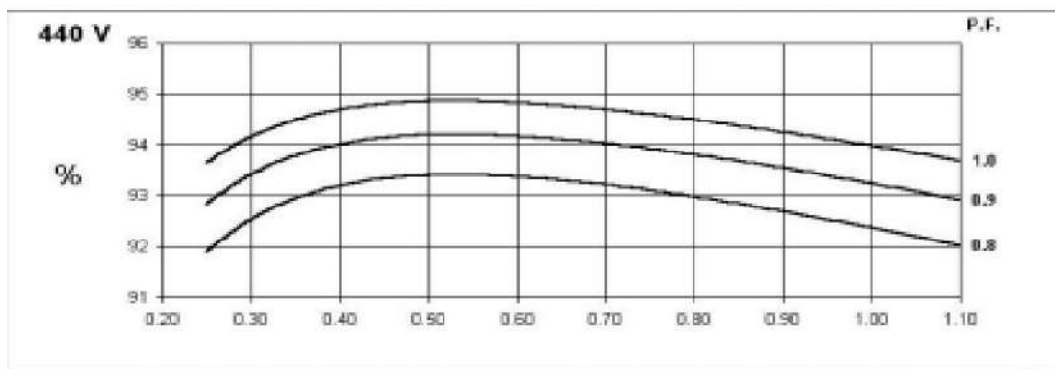
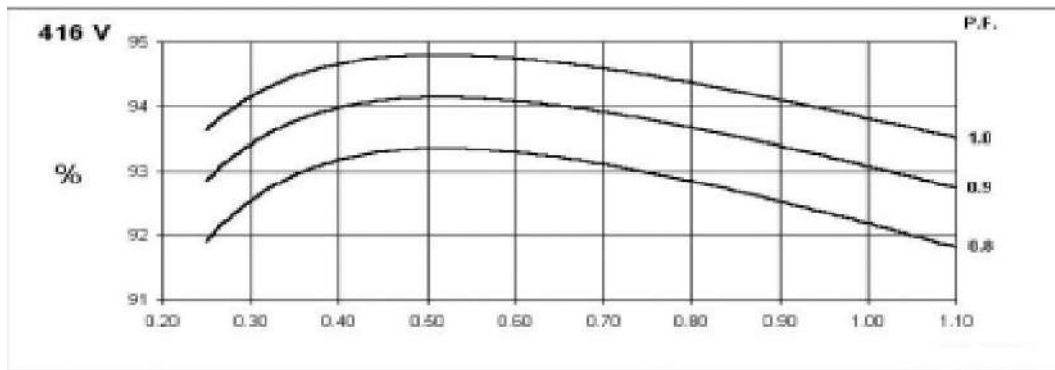
|                         |                        |
|-------------------------|------------------------|
| CONTROL SYSTEM          | SELF EXCITED           |
| A.V.R.                  | OPTIONAL SX440         |
| VOLTAGE REGULATION      | ± 1.0 %                |
| SUSTAINED SHORT CIRCUIT | >300% OF RATED CURRENT |

|                                      |                                                                                     |         |         |         |                                    |         |         |         |
|--------------------------------------|-------------------------------------------------------------------------------------|---------|---------|---------|------------------------------------|---------|---------|---------|
| INSULATION SYSTEM                    | H                                                                                   |         |         |         |                                    |         |         |         |
| RATED POWER FACTOR                   | 0.8                                                                                 |         |         |         |                                    |         |         |         |
| PROTECTION                           | IP23                                                                                |         |         |         |                                    |         |         |         |
| STATOR WINDING                       | DOUBLE LAYER WITH AUXILIARY WINDING                                                 |         |         |         |                                    |         |         |         |
| ROTOR WINDING                        | WITH DAMPING CAGE                                                                   |         |         |         |                                    |         |         |         |
| WINDING LEADS                        | 12                                                                                  |         |         |         |                                    |         |         |         |
| STATOR WDG. RESISTANCE               | 0.0199 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED                                 |         |         |         |                                    |         |         |         |
| ROTOR WDG. RESISTANCE                | 1.69 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. 6315 - 2RS. (ISO)                                                             |         |         |         |                                    |         |         |         |
| BEARING NON-DRIVE END                | BALL. 6310 - 2RS. (ISO)                                                             |         |         |         |                                    |         |         |         |
|                                      | 1 BEARING                                                                           |         |         |         | 2 BEARING                          |         |         |         |
| WEIGHT COMP. GENERATOR               | 580 kg                                                                              |         |         |         | 598 kg                             |         |         |         |
| WEIGHT WOUND STATOR                  | 225 kg                                                                              |         |         |         | 225 kg                             |         |         |         |
| WEIGHT WOUND ROTOR                   | 210.35 kg                                                                           |         |         |         | 199.39 kg                          |         |         |         |
| WR <sup>2</sup> INERTIA              | 1.7674 kgm <sup>2</sup>                                                             |         |         |         | 1.7169 kgm <sup>2</sup>            |         |         |         |
| SHIPPING WEIGHTS in a crate          | 613 kg                                                                              |         |         |         | 630 kg                             |         |         |         |
| PACKING CRATE SIZE                   | 123 x 67 x 103 (cm)                                                                 |         |         |         | 123 x 67 x 103 (cm)                |         |         |         |
|                                      | 50HZ                                                                                |         |         |         | 60HZ                               |         |         |         |
| TELEPHONE INTERFERENCE               | THF<2%                                                                              |         |         |         | TIF<50                             |         |         |         |
| COOLING AIR                          | 0.514 m <sup>3</sup> /sec 1090 cfm                                                  |         |         |         | 0.617 m <sup>3</sup> /sec 1308 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 | 180                                                                                 | 180     | 180     | N/A     | 205                                | 218     | 218     | 231     |
| Xd DIR. AXIS SYNCHRONOUS             | 2.24                                                                                | 2.02    | 1.88    | -       | 2.53                               | 2.37    | 2.17    | 2.16    |
| X'd DIR. AXIS TRANSIENT              | 0.19                                                                                | 0.17    | 0.16    | -       | 0.21                               | 0.20    | 0.18    | 0.18    |
| X'd DIR. AXIS TRANSIENT              | 0.13                                                                                | 0.12    | 0.11    | -       | 0.14                               | 0.13    | 0.12    | 0.12    |
| Xq QUAD. AXIS REACTANCE              | 1.38                                                                                | 1.25    | 1.16    | -       | 1.53                               | 1.43    | 1.31    | 1.31    |
| X'q QUAD. AXIS SUBTRANSIENT          | 0.17                                                                                | 0.15    | 0.14    | -       | 0.20                               | 0.19    | 0.17    | 0.17    |
| X L LEAKAGE REACTANCE                | 0.07                                                                                | 0.06    | 0.06    | -       | 0.09                               | 0.08    | 0.08    | 0.08    |
| X 2 NEGATIVE SEQUENCE                | 0.14                                                                                | 0.13    | 0.12    | -       | 0.16                               | 0.15    | 0.14    | 0.14    |
| X 0 ZERO SEQUENCE                    | 0.08                                                                                | 0.08    | 0.07    | -       | 0.10                               | 0.09    | 0.09    | 0.09    |
| REACTANCES ARE SATURATED             | VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED                                 |         |         |         |                                    |         |         |         |
| T'd TRANSIENT TIME CONST.            | 0.038 s                                                                             |         |         |         |                                    |         |         |         |
| T'd SUB-TRANSTIME CONST.             | 0.0012 s                                                                            |         |         |         |                                    |         |         |         |
| T'do O.C. FIELD TIME CONST.          | 1s                                                                                  |         |         |         |                                    |         |         |         |
| Ta ARMATURE TIME CONST.              | 0.01s                                                                               |         |         |         |                                    |         |         |         |
| SHORT CIRCUIT RATIO                  | 1/Xd                                                                                |         |         |         |                                    |         |         |         |

**A.R.K274F**  
**Three Phase Efficiency Curves (WINDING 311) 50HZ**



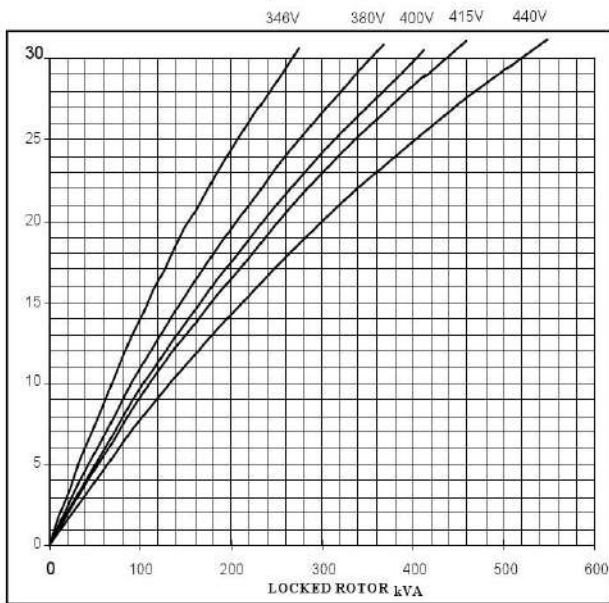
**A.R.K274F**  
**Three Phase Efficiency Curves (WINDING 311) 60HZ**



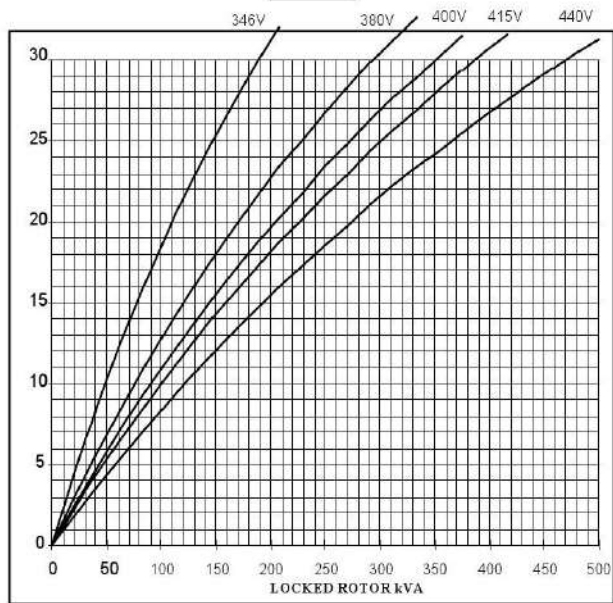
A.R.K274F  
Locked Rotor Motor Starting Curve (Winding 311)

50<sub>Hz</sub>

MX

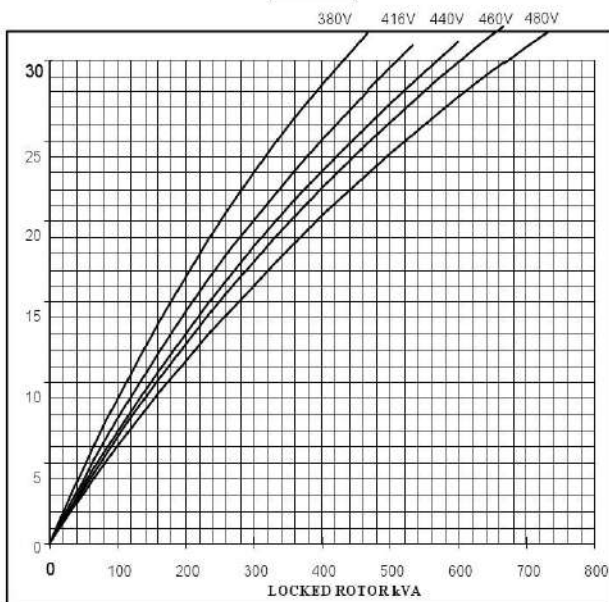


SX

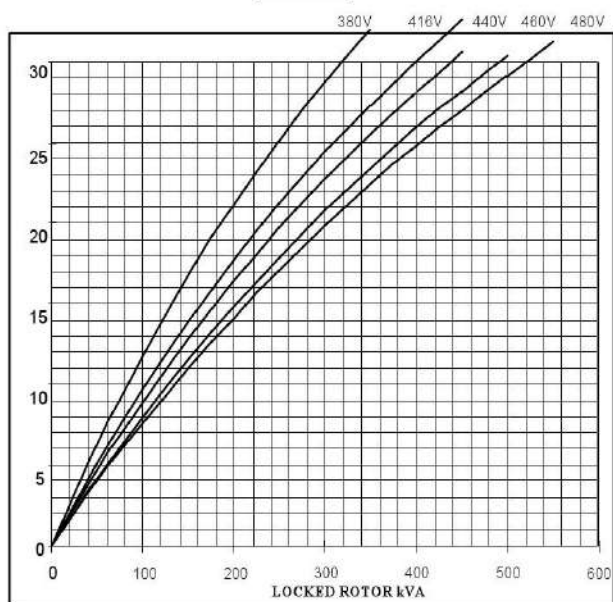


60<sub>Hz</sub>

MX



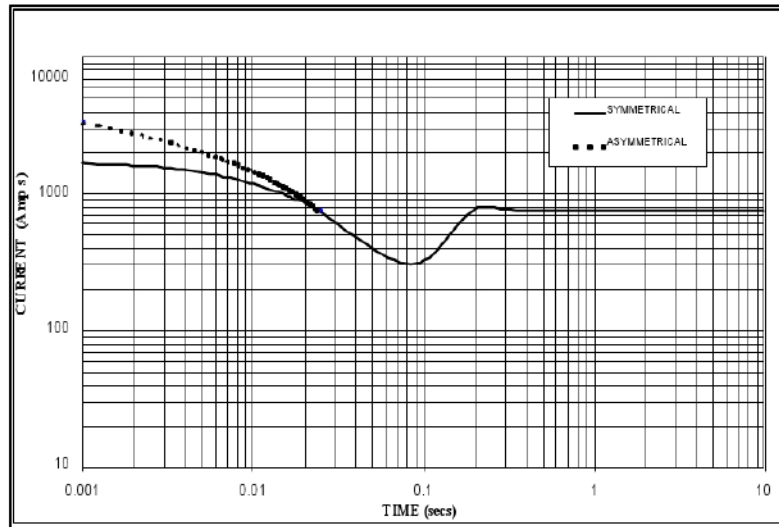
SX



## A.R.K274F

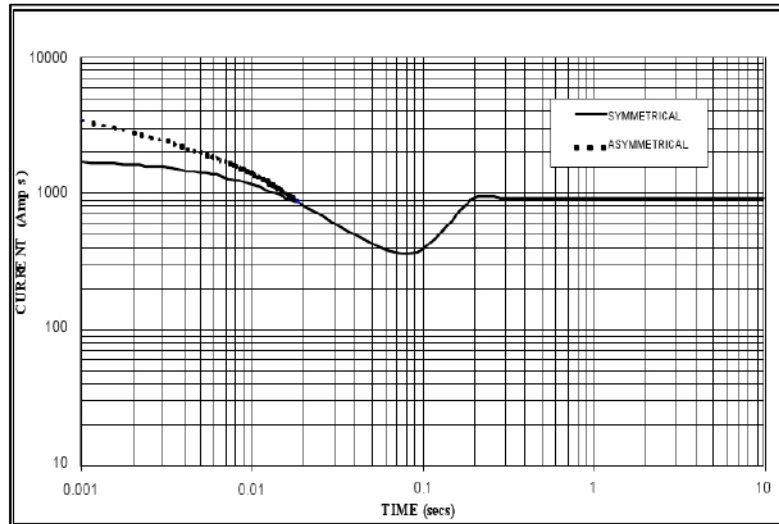
### Three-phase Short Circuit Decrement Curve.No-load Excitation at Rated Speed Based on srar(wye) connection.

50  
Hz



Sustained Short Circuit = 750 Amps

60  
Hz



Sustained Short Circuit = 920 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 1.07 | 440V    | X 1.06 |
| 415V    | X 1.12 | 460V    | X 1.12 |
| 440V    | X 1.18 | 480V    | X 1.17 |

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

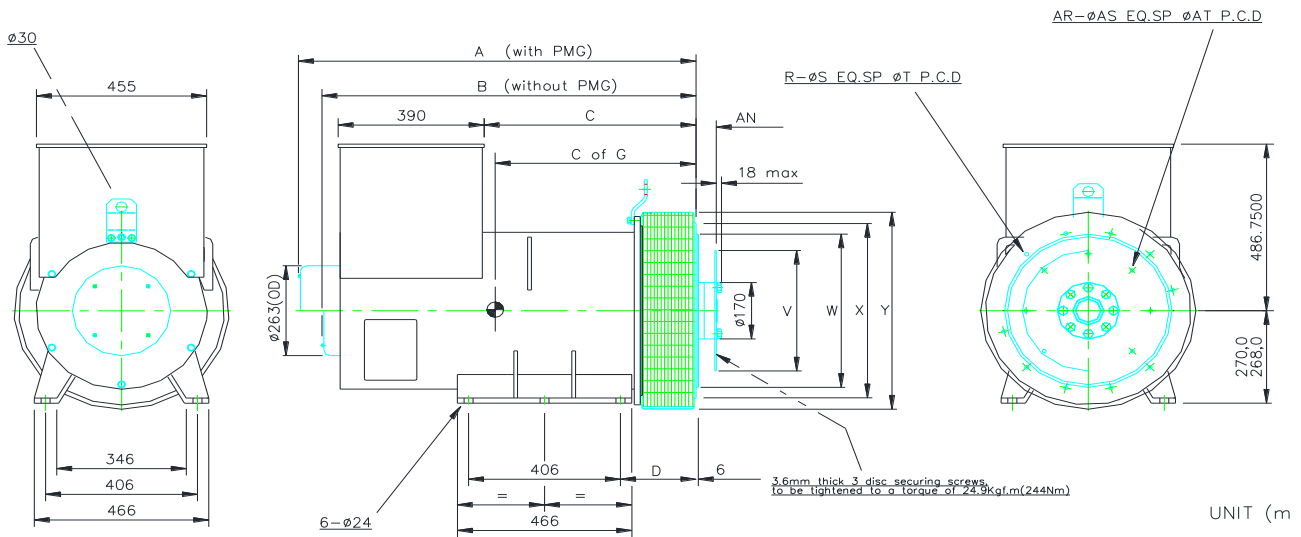
**A.R.K274F**  
**Winding 311 / 0.8 Power Factor**  
**RATINGS**

| 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 |
|                   | Series Delta (V)□  | 220                | 230   | 240   | 254 | S                  | 230   | 240   | 254 | 220                | 230   | 240   | 254 | 220                | 230   | 240   | 254 |
|                   | kVA                | 145.0              | 145.0 | 145.0 | N/A | 160.0              | 160.0 | 160.0 | N/A | 170.0              | 170.0 | 170.0 | N/A | 175.0              | 175.0 | 175.0 | N/A |
|                   | kW                 | 116.0              | 116.0 | 116.0 | N/A | 128.0              | 128.0 | 128.0 | N/A | 136.0              | 136.0 | 136.0 | N/A | 140.0              | 140.0 | 140.0 | N/A |
| Efficiency (%)    |                    | 92.3               | 92.6  | 92.8  | N/A | 92.0               | 92.3  | 92.5  | N/A | 91.7               | 92.1  | 92.3  | N/A | 91.6               | 92.0  | 92.2  | N/A |

| 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   |
|                   | Series Delta (V)□  | 240                | 254   | 266   | 277   | 240                | 254   | 266   | 277   | 240                | 254   | 266   | 277   | 240                | 254   | 266   | 277   |
|                   | kVA                | 162.5              | 172.5 | 172.5 | 187.5 | 181.3              | 190.0 | 190.0 | 206.3 | 187.5              | 200.0 | 200.0 | 212.5 | 192.5              | 206.3 | 206.3 | 218.8 |
|                   | kW                 | 130.0              | 138.0 | 138.0 | 150.0 | 145.0              | 152.0 | 152.0 | 165.0 | 150.0              | 160.0 | 160.0 | 170.0 | 154.0              | 165.0 | 165.0 | 175.0 |
| Efficiency (%)    |                    | 92.5               | 92.7  | 92.9  | 92.9  | 92.1               | 92.4  | 92.7  | 92.7  | 92.0               | 92.2  | 92.5  | 92.6  | 91.9               | 92.1  | 92.4  | 92.5  |

**DIMENSIONS**



| MODEL  |      | DIMENSION |       |       |     |        |
|--------|------|-----------|-------|-------|-----|--------|
|        |      | A         | B     | C     | E   | C of G |
| SAE1   | 274C | 813,3     | 750,3 | 318,3 | 554 | 365    |
|        | 274D | 813,3     | 750,3 | 318,3 | 554 | 375    |
|        | 274E | 928,3     | 865,3 | 433,3 | 554 | 390    |
|        | 274F | 928,3     | 865,3 | 433,3 | 554 | 415    |
|        | 274G | 978,3     | 915,3 | 483,3 | 554 | 435    |
|        | 274H | 1018,3    | 955,3 | 523,3 | 554 | 455    |
| SAE2&3 | 274C | 799       | 736   | 304   | 544 | 353    |
|        | 274D | 799       | 736   | 304   | 544 | 363    |
|        | 274E | 914       | 851   | 419   | 544 | 378    |
|        | 274F | 914       | 851   | 419   | 544 | 403    |
|        | 274G | 964       | 901   | 469   | 544 | 423    |
|        | 274H | 1004      | 941   | 509   | 544 | 443    |

| ADAPTOR   |       |    |      |       |       |     |     |
|-----------|-------|----|------|-------|-------|-----|-----|
| S.A.E No. | D     | R  | S    | T     | W     | X   | Y   |
| 1         | 216,3 | 12 | 12,7 | 530,2 | 511,1 | 553 | 580 |
| 2         | 202   | 12 | 11   | 466,7 | 447,6 | 490 | 530 |
| 3         | 202   | 12 | 11   | 428,6 | 409,5 | 451 | 530 |

| COUPLING DISC |       |    |      |       |       |
|---------------|-------|----|------|-------|-------|
| S.A.E No.     | AN    | AR | AS   | AT    | V     |
| 10            | 53,98 | 8  | 11   | 295,3 | 314,2 |
| 11,5          | 39,68 | 8  | 11   | 333,3 | 352,3 |
| 14            | 25,40 | 8  | 13,5 | 438,2 | 466,6 |