



M380

CONT 350 kVA



THREE-PHASE SYNCHRONOUS GENERATOR

Datasheet for 4 poles -50Hz @ 1500rpm/ 60Hz @ 1800rpm

| | | | |
|--|--|----------------------------------|-------------------|
| Ambient Temperature | 40 °C | Method of Cooling | Air cooling |
| Temperature Rise | 125 °C | Direction of Rotation | Clockwise |
| Insulation Class | H | Maximum Over-speed | 2250r/min |
| Power Factor | 0.8 | Degree of Protection / Enclosure | IP23 |
| Excitation | Brushless | Altitude | 1000m |
| Winding Pitch | 2/3 | Stator winding | DLL |
| Pole | 4 | Number of Terminal | 12 |
| Duty | S1- Continuous | Rotor | With damping cage |
| Waveform | TIF<50 | | THF<2% |
| Waveform distortion | BS EN 61000-6-2&BS EN 61000-6-4,VDE 0875G,VDE0874N | | |
| Radio interference | Noload<1.5%,Non-distorting balanced linear load<5% | | |
| AVR MODEL AVR | Standard | Selection | |
| | AS440 | KRS440 | PMG |
| Voltage Regulation - in steady state condition | ±1.0 | ±1.0 | ±0.5 ±0.5 |
| Short Circuit Current Capacity | Control does not sustain a short circuit current | | 1500A |

Electrical Characteristic

| Frequency | Hz | 50 | | | | 60 | | | |
|--|------|---------|---------|---------|---------|---------|---------|---------|---------|
| | | | | | | | | | |
| Voltage (series star) Y | V | 380/220 | 400/231 | 415/240 | 440/254 | 416/240 | 440/254 | 460/266 | 480/277 |
| Voltage (parallel star) YY | V | 190/110 | 200/115 | 208/120 | 220/127 | 208/120 | 220/127 | 230/133 | 240/138 |
| Voltage (series delta) Δ | V | 220 | 230 | 240 | 254 | 240 | 254 | 266 | 277 |
| Rated power at Class H (125 °C) temperature rise | kVA | 350 | 350 | 350 | 350 | 400 | 420 | 440 | 440 |
| | kW | 280.0 | 280.0 | 280.0 | 280.0 | 320.0 | 336.0 | 352.0 | 352.0 |
| Efficiency at Class H (P.F.=0.8) | 4/4% | 93.2 | 93.4 | 93.6 | 93.8 | 93.3 | 93.4 | 93.4 | 93.7 |
| | 3/4% | 94.2 | 94.3 | 94.3 | 94.3 | 94.3 | 94.3 | 94.4 | 94.4 |
| | 2/4% | 94.3 | 94.5 | 94.4 | 94.2 | 94.4 | 94.4 | 94.4 | 0.3 |
| Efficiency at Class H (P.F.=1.0) | 4/4% | 94.6 | 94.8 | 95 | 95.1 | 94.8 | 94.8 | 94.9 | 95 |
| | 3/4% | 95.5 | 95.7 | 95.6 | 95.7 | 95.5 | 95.6 | 95.6 | 95.7 |
| | 2/4% | 95.6 | 95.8 | 95.7 | 95.6 | 95.7 | 95.7 | 95.7 | 95.7 |

Reactances (%) at Class H

| | | | | | | | | | |
|---|------|--------|--------|--------|--------|--------|--------|--------|--------|
| Direct axis synchronous reactance unsaturated | Xd | 3.01 | 2.71 | 2.52 | 2.24 | 3.47 | 3.26 | 3.12 | 2.87 |
| Direct axis transient reactance saturated | X'd | 0.2 | 0.18 | 0.17 | 0.15 | 0.21 | 0.2 | 0.19 | 0.17 |
| Direct axis subtransient reactance saturated | X''d | 0.14 | 0.13 | 0.12 | 0.11 | 0.15 | 0.14 | 0.13 | 0.12 |
| Quadrature axis synchronous reactance unsaturated | Xq | 2.58 | 2.33 | 2.16 | 1.92 | 2.92 | 2.74 | 2.63 | 2.41 |
| Quadrature axis subtransient reactance saturated | X''q | 0.36 | 0.32 | 0.3 | 0.27 | 0.41 | 0.38 | 0.37 | 0.34 |
| Leakage reactance | X1 | 0.07 | 0.06 | 0.06 | 0.05 | 0.08 | 0.08 | 0.07 | 0.07 |
| Negative sequence reactance saturated | X2 | 0.24 | 0.22 | 0.2 | 0.18 | 0.28 | 0.26 | 0.25 | 0.23 |
| Zero sequence reactance unsaturated | X0 | 0.1 | 0.09 | 0.08 | 0.07 | 0.1 | 0.09 | 0.09 | 0.08 |
| Short-circuit ratio | Kcc | 0.3322 | 0.3690 | 0.3968 | 0.4464 | 0.2882 | 0.3067 | 0.3205 | 0.3484 |

| | | | | | | | | | |
|--|---------------------|------------------------------|------|-----|-----|-------------------------------|------|-----|-----|
| Short-circuit transient time constant (sec.) | T'd | 0.08 | | | | | | | |
| Subtransient time constant (sec.) | T''d | 0.019 | | | | | | | |
| Open circuit time constant (sec.) | T'do | 1.7 | | | | | | | |
| Armature time constant (sec.) | Ta | 0.018 | | | | | | | |
| Stator Winding Resistance (20°C) | ohm | 0.009 | | | | | | | |
| Rotor Winding Resistance (20°C) | ohm | 1.17 | | | | | | | |
| Exciter Stator Resistance (20°C) | ohm | 18 | | | | | | | |
| Exciter Rotor Phase resistance | ohm | 0.068 | | | | | | | |
| No load excitation current | io (A) | 0.5 | 0.52 | 0.6 | 0.6 | 0.5 | 0.51 | 0.6 | 0.6 |
| Full load excitation current | ic(A) | 2.1 | 2.1 | 2.2 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 |
| Cooling air requirement | m ³ /sec | 0.8m ³ /s 1700cfm | | | | 0.99m ³ /s 2100cfm | | | |

Mechanical Characteristic

| Configuration | Single Bearing | Double Bearing |
|-------------------------------------|------------------------|------------------------|
| Type of Construction | B2-SAE | IM B34 |
| Total Weight - kgs | 970 | 956 |
| Weight wound stator - kgs | 455 | 455 |
| Weight wound rotor - kgs | 387 | 365 |
| Inertia (J) [kgm ²] | 4.6331kgm ² | 4.4343kgm ² |
| Drive end bearing / Lubrication | | BALL.6317-2RS(ISO) |
| Non-drive end bearing / Lubrication | BALL.6314-2RS(ISO) | BALL.6314-2RS(ISO) |
| Packing crate size (cm) | 122X70X104 | 133X70X104 |

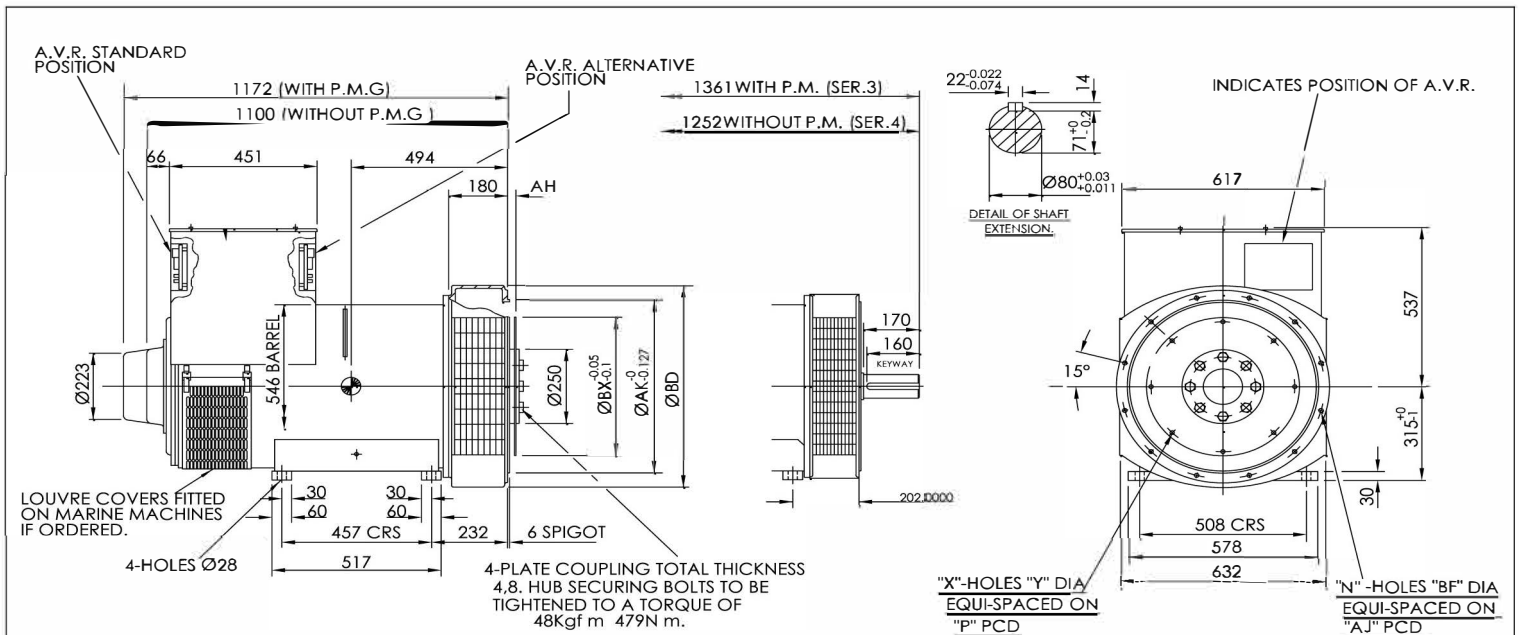
Winding 311 / 0.8 Power Factor

RATINGS

| Class - Temp Rise | | Cont. F - 105/40°C | | | | Cont. H - 125/40°C | | | | Standby - 150/40°C | | | | Standby - 163/27°C | | | |
|-------------------|-------------------|--------------------|------|------|------|--------------------|------|------|------|--------------------|------|------|------|--------------------|------|------|------|
| 50 Hz | 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 |
| | 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 Hz | Series Star (V) | 416 | 440 | 460 | 480 | 416 | 440 | 460 | 480 | 416 | 440 | 460 | 480 | 416 | 440 | 460 | 480 |
| | 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



| COUPLING DISC | | | | | | |
|---------------|--------|--------|---|------|------|--|
| SAE | BX | P | X | Y | AH | |
| 18 | 571.50 | 542.92 | 6 | 16.7 | 15.7 | |
| 14 | 466.72 | 438.15 | 8 | 13.5 | 25.4 | |
| 11.5 | 352.42 | 333.38 | 8 | 11 | 39.6 | |

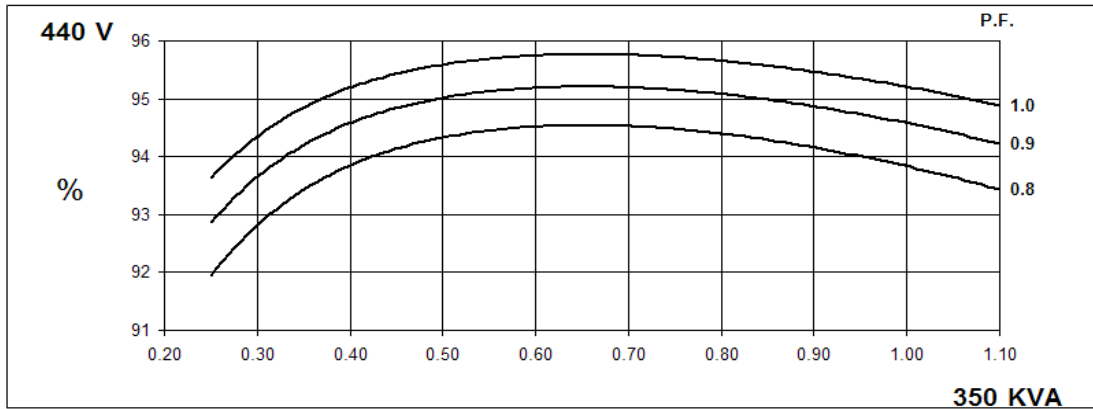
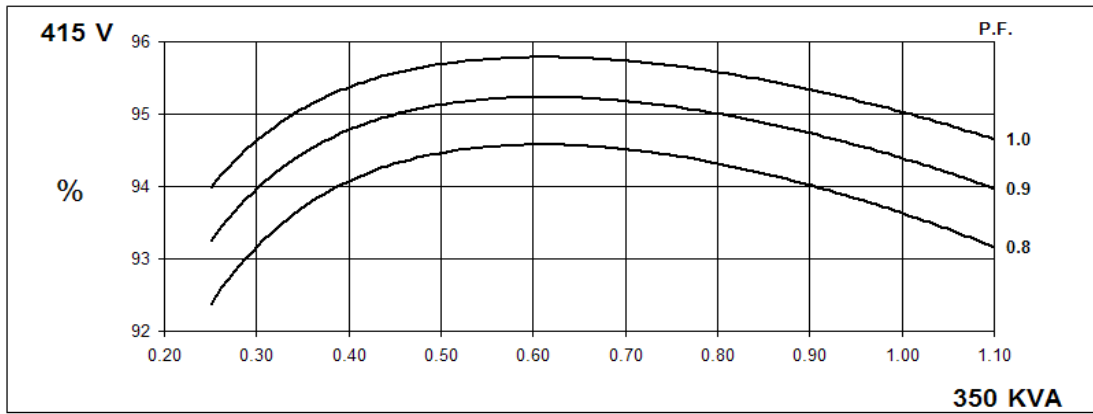
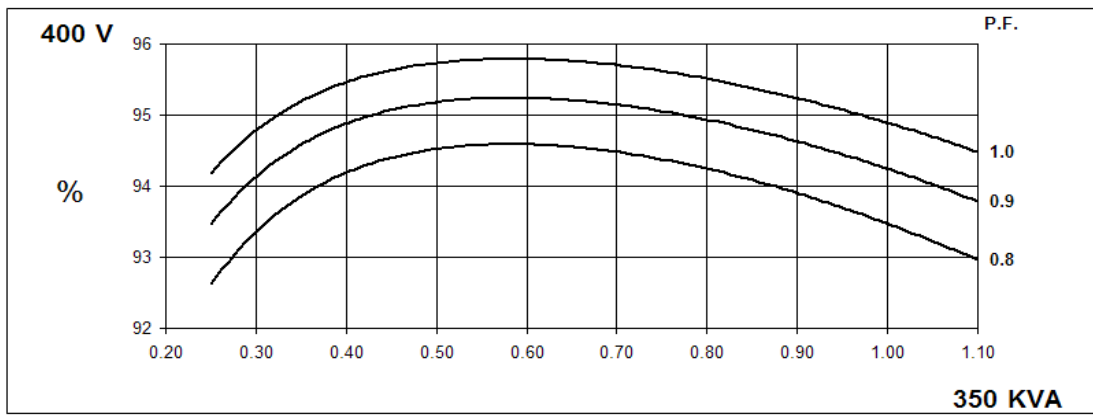
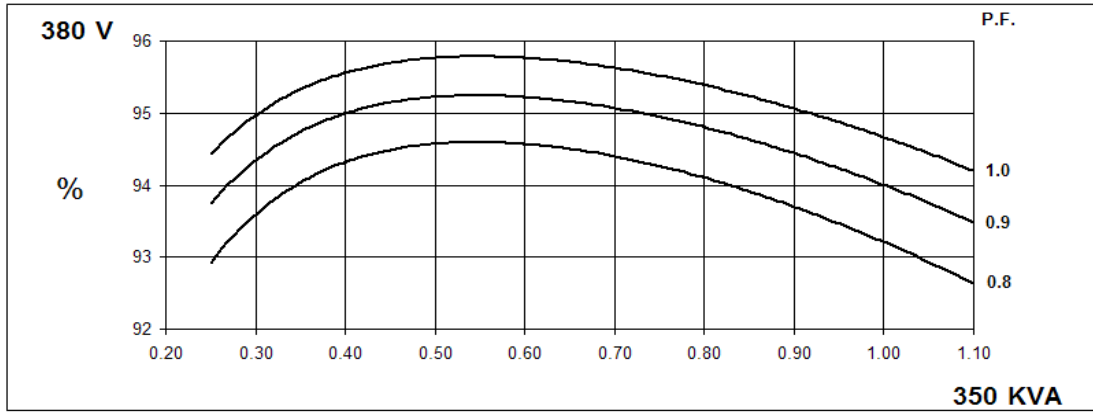
| FLANGE (mm) | | | | | | |
|-------------|-----|--------|--------|----------------|------|----|
| SAE | BD | AK | AJ | U ^o | BF | n |
| SAE3 | 617 | 409.58 | 428.62 | 15 | 11 | 12 |
| SAE2 | 617 | 447.68 | 466.72 | 15 | 11 | 12 |
| SAE1 | 617 | 511.18 | 530.22 | 15 | 12.7 | 12 |
| SAE1/2 | 680 | 584.20 | 619.12 | 15 | 14 | 12 |
| SAE0 | 711 | 647.70 | 679.45 | 11.25 | 14 | 16 |

| | | | | |
|--------|------|---------|------|-----|
| VER | MOD | DRW | Date | 1:1 |
| Design | APP | | | A2 |
| CHK | Date | 2018.01 | | mm |

50
Hz

Winding 311

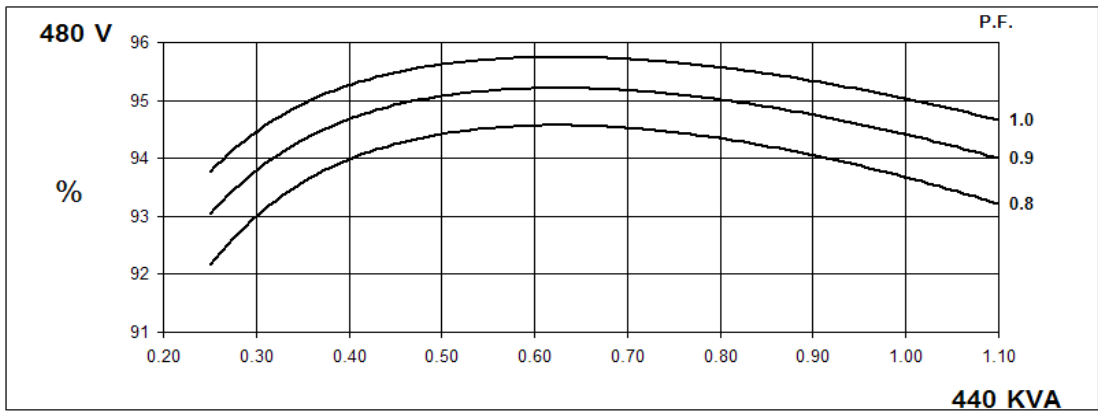
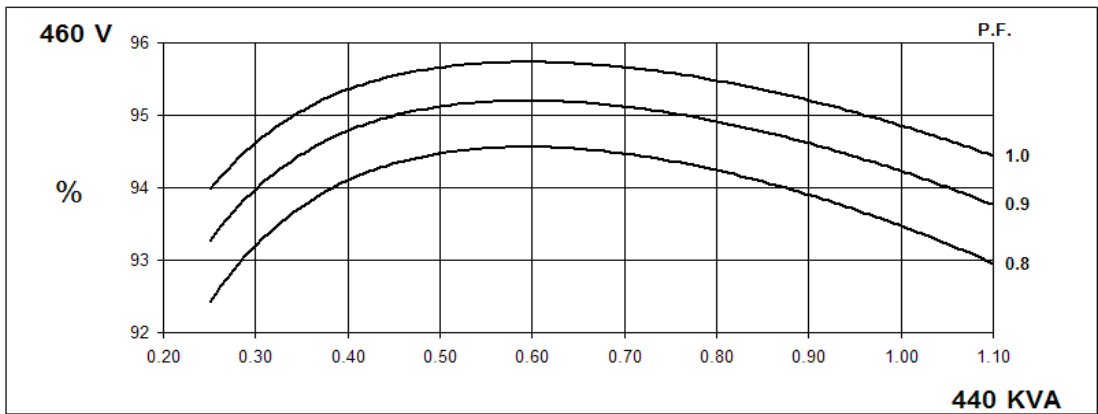
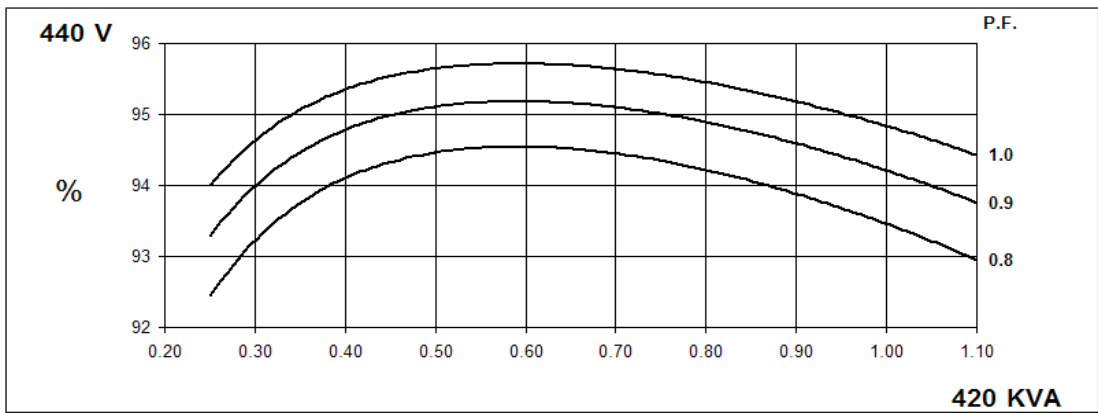
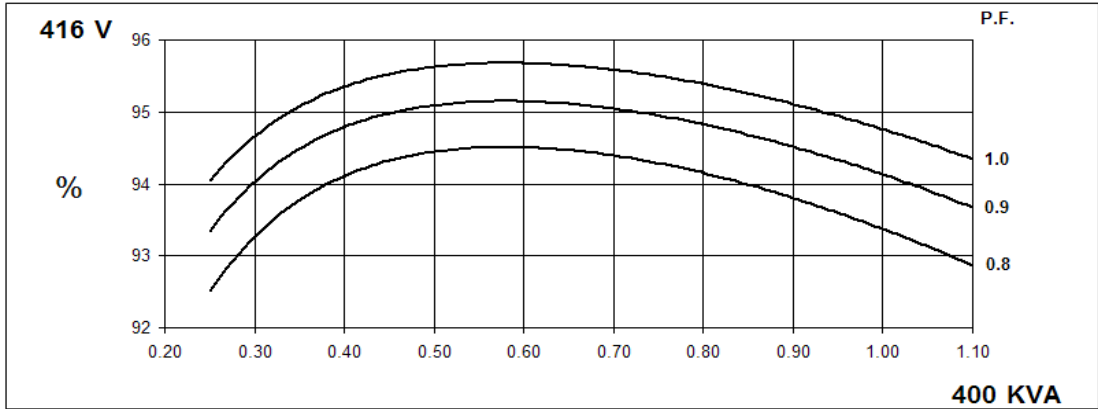
THREE PHASE EFFICIENCY CURVES



60
Hz

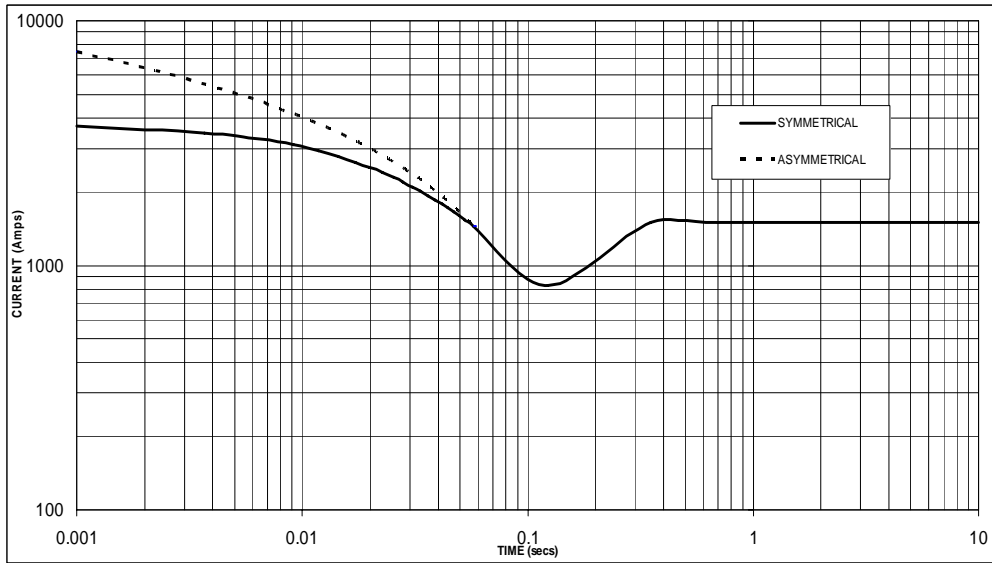
Winding 311

THREE PHASE EFFICIENCY CURVES



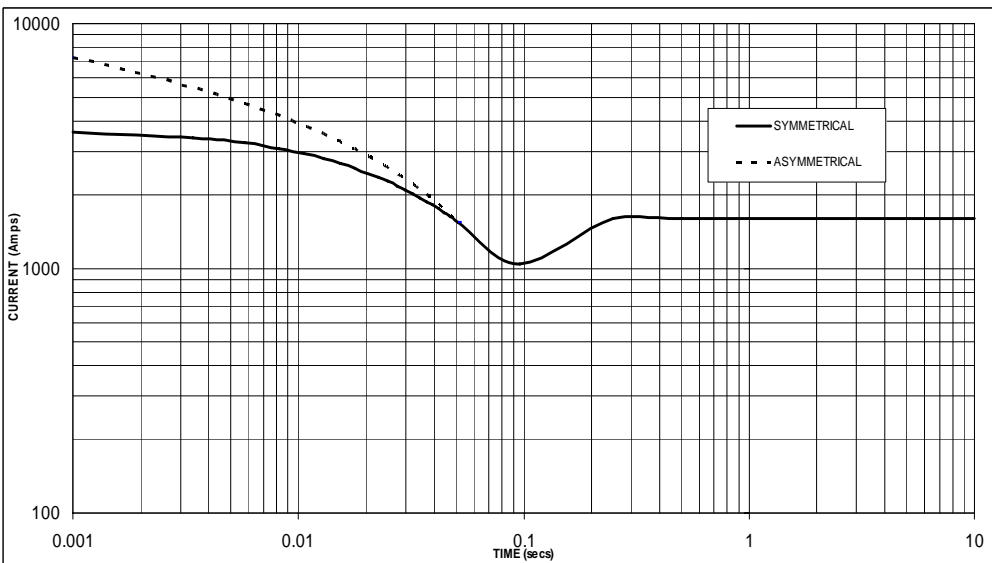
**Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed
Based on star (wye) connection.**

**50
Hz**



Sustained Short Circuit = 1,500 Amps

**60
Hz**



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 :

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

The sustained current value is constant irrespective of voltage level

Note 2

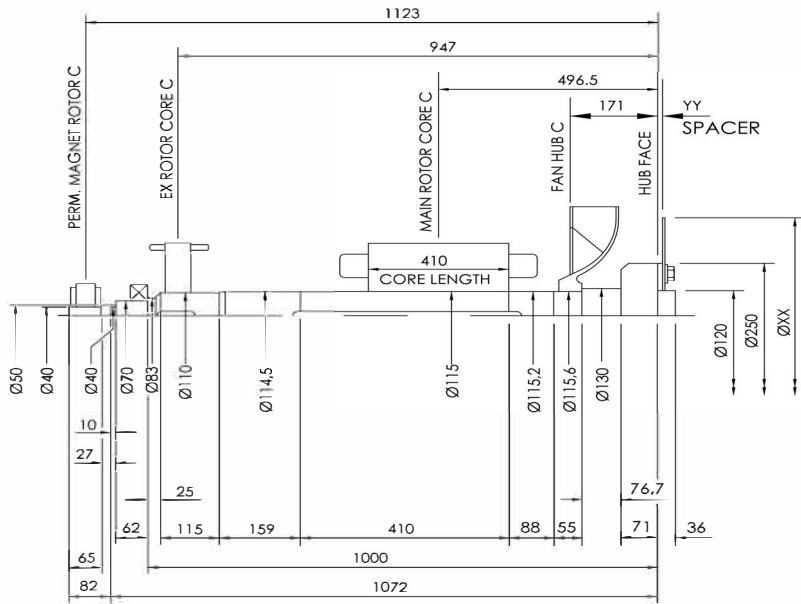
The following multiplication factor should be used to convert the values calculated in accordance with NOTE 1 to those applicable to the various types of short circuit :

| | 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 :



| COMPONENT | Wt kg | J kgm ² |
|------------|---------|--------------------|
| EX. ROTOR | 31,290 | 0,5100 |
| MAIN ROTOR | 248.15 | 3.525 |
| FAN | 9.910 | 0,2630 |
| SHAFT | 87,191 | 0,1450 |
| HUB | 18,507 | 0,1779 |
| TOTAL | 395.048 | 4.6209 |
| PERM. MAG. | 5.215 | 0,0122 |
| TOTAL | 400.263 | 4.6331 |

| COUPLING SAE No | COUPLING DIMEN's | | COUPLING ASSEMBLY WEIGHT kg | COUPLING DISC J kgm ² |
|-----------------|------------------|------|-----------------------------|----------------------------------|
| | XX | YY | | |
| 11,5 | 352 | 23,8 | 12,08 | 0,055 |
| 14 | 467 | 9,5 | 11,66 | 0,172 |
| 18 | 572 | 0,0 | 12,07 | 0,386 |

| | | | | | |
|--------|-----|------|---------|--|-----|
| | | | | | 1:1 |
| | | | | | |
| | | | | | |
| | | | | | |
| VER | MOD | DRW | Date | | |
| Design | | APP | | | |
| CHK | | Date | 2018.01 | | mm |

