maranello alternator

# M33

CONT 30 kVA

# THREE-PHASE SYNCHRONOUS GENERATOR

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

| | | | |
|---|---|---|---|
| Ambient Temperature | 40℃ | Method of Cooling | Air cooling |
| Temperature Rise | 125℃ | 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<3% | | |

| AVR MODEL AVR | Standard | Selection | | PMG | | |
|---|---|---|---|---|---|---|
| | SX460 | AS440 | KRS440 | | | |
| Voltage Regulation - in steady state condition | ±1.0 | ±1.0 | ±1.0 | | | |
| Short Circuit Current Capacity | Control does not sustain a short circuit current | | | | | |

## 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 ºC) temperature rise | kVA | 31.3 | 31.3 | 31.3 | 27.5 | 35 | 37.5 | 37.5 | 37.5 |
| | kW | 25.0 | 25.0 | 25.0 | 22.0 | 28.0 | 30.0 | 30.0 | 30.0 |
| Efficiency at Class H (P.F.=0.8) | 4/4% | 85.7 | 86 | 86.3 | 86.8 | 86.3 | 86.2 | 86.8 | 87 |
| | 3/4% | 87.6 | 87.9 | 88 | 88 | 88 | 88 | 88.1 | 88.1 |
| | 2/4% | 88.2 | 88.1 | 88 | 87.9 | 88.2 | 88.1 | 88.1 | 88 |
| Efficiency at Class H (P.F.=1.0) | 4/4% | 88.8 | 89.1 | 89.2 | 89.8 | 89.1 | 89.1 | 89.5 | 89.9 |
| | 3/4% | 90.3 | 90.5 | 90.7 | 90.8 | 90.4 | 90.5 | 90.8 | 90.9 |
| | 2/4% | 90.9 | 90.9 | 90.8 | 90.7 | 90.7 | 90.8 | 90.8 | 90.8 |
| Reactances (%) at Class H | | | | | | | | | |
| Direct axis synchronous reactance unsaturated | Xd | 1.729 | 1.56 | 1.449 | 1.467 | 1.938 | 1.857 | 1.699 | 1.56 |
| Direct axis transient reactance saturated | X'd | 0.166 | 0.15 | 0.139 | 0.141 | 0.199 | 0.19 | 0.174 | 0.16 |
| Direct axis subtransient reactance saturated | X"d | 0.122 | 0.11 | 0.102 | 0.104 | 0.124 | 0.119 | 0.109 | 0.1 |
| Quadrature axis synchronous reactance unsaturated | Xq | 0.864 | 0.78 | 0.725 | 0.734 | 0.957 | 0.916 | 0.838 | 0.77 |
| Quadrature axis subtransient reactance saturated | X"q | 0.188 | 0.17 | 0.158 | 0.159 | 0.211 | 0.202 | 0.185 | 0.17 |
| Leakage reactance | X1 | 0.07 | 0.063 | 0.059 | 0.059 | 0.078 | 0.075 | 0.069 | 0.063 |
| Negative sequence reactance saturated | X2 | 0.155 | 0.14 | 0.13 | 0.132 | 0.186 | 0.179 | 0.163 | 0.15 |
| Zero sequence reactance unsaturated | X0 | 0.074 | 0.067 | 0.062 | 0.063 | 0.083 | 0.08 | 0.073 | 0.067 |
| Short-circuit ratio | Kcc | 0.5784 | 0.6410 | 0.6901 | 0.6817 | 0.5160 | 0.5385 | 0.5886 | 0.6410 |

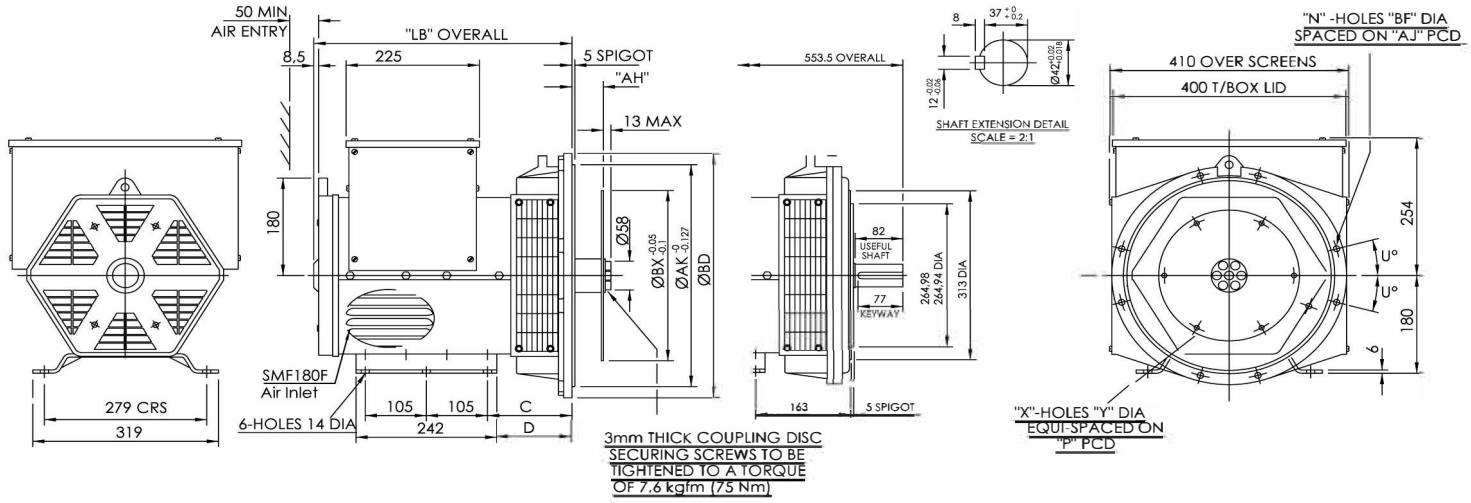
| | | |
|---|---|---|
| Short-circuit transient time constant (sec.) | T'd | 0.024 |
| Subtransient time constant (sec.) | T"d | 0.006 |
| Open circuit time constant (sec.) | T'do | 0.55 |
| Armature time constant (sec.) | Tα | 0.007 |
| Stator Winding Resistance (20℃) | ohm | 0.21 |
| Rotor Winding Resistance (20℃) | ohm | 0.83 |
| Exciter Stator Resistance (20℃) | ohm | 22 |
| Exciter Rotor Phase resistance | ohm | 0.12 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| No load excitation current | io (A) | 0.6 | 0.62 | 0.64 | 0.62 | 0.55 | 0.57 | 0.63 | 0.65 |
| Full load excitation current | ic(A) | 1.95 | 2 | 2 | 1.95 | 1.9 | 1.95 | 2 | 2 |
| Cooling air requirement | $m^3$/sec | 0.095m3/s 200cfm | | | | 0.119m3/s 250cfm | | | |

## Mechanical Characteristic

| | | |
|---|---|---|
| Configuration | Single Bearing | Double Bearing |
| Type of Construction | B2-SAE | IM B34 |
| Total Weight - kgs | 173 | 178 |
| Weight wound stator - kgs | 64 | 64 |
| Weight wound rotor - kgs | 56 | 56 |
| Inertia (J) [kgm2] | 0.22kgm2 | 0.22kgm3 |
| Drive end bearing / Lubrication | | BALL.6309-2RS(ISO) |
| Non-drive end bearing / Lubrication | BALL.6306-2RS(ISO) | BALL.6306-3RS(ISO) |
| Packing crate size（cm） | 63X49X58 | 70X49X57 |

# DIMENSIONS




| DIMENSIONS(mm) | | | WEIGHE |
|---|---|---|---|
| SAE | TYPE | LB | KG |
| SAE 2 | QYI 184G | 560.5 | 169 |
| SAE 3 | QYI 184G | 533 | 170 |
| SAE 4/5 | QYI 184G | 521 | 169 |

| COUPLING DISC | | | | | |
|---|---|---|---|---|---|
| SAE | BX | P | X | Y | AH |
| 11.5 | 352.42 | 333.38 | 8 | 11 | 39.6 |
| 10 | 314.32 | 295.28 | 8 | 11 | 53.8 |
| 8 | 263.52 | 244.48 | 6 | 11 | 62 |
| 7.5 | 241.3 | 222.25 | 8 | 9 | 30.2 |
| 6.5 | 215.9 | 200.02 | 6 | 9 | 30.2 |

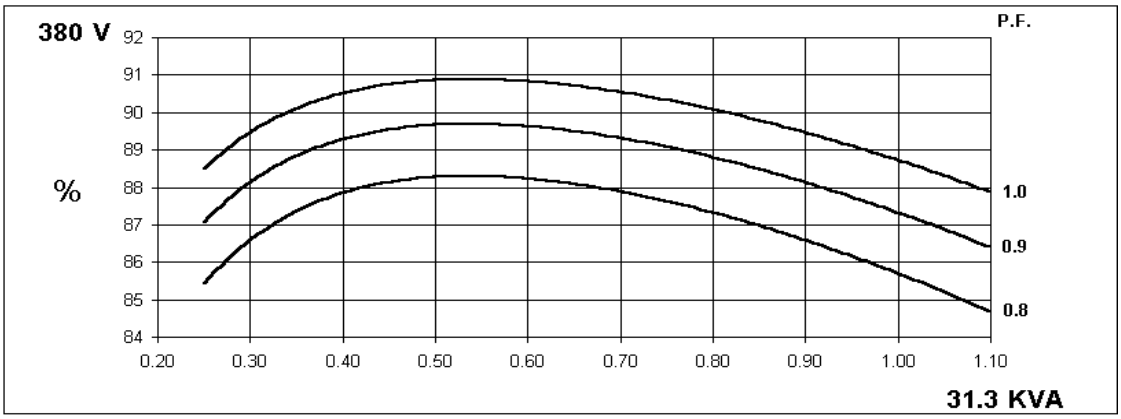
| FLANGE(mm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | BD | AK | AJ | U° | BF | n | C | D |
| SAE5 | 356 | 314.32 | 333.38 | 22.5 | 11 | 8 | 133 | 117 |
| SAE4 | 402 | 361.95 | 381 | 15 | 11 | 8 | 133 | 117 |
| SAE3 | 451 | 409.58 | 428.62 | 15 | 11 | 8 | 145 | 129 |
| SAE2 | 489 | 447.68 | 466.72 | 15 | 11 | 12 | 172 | 156 |

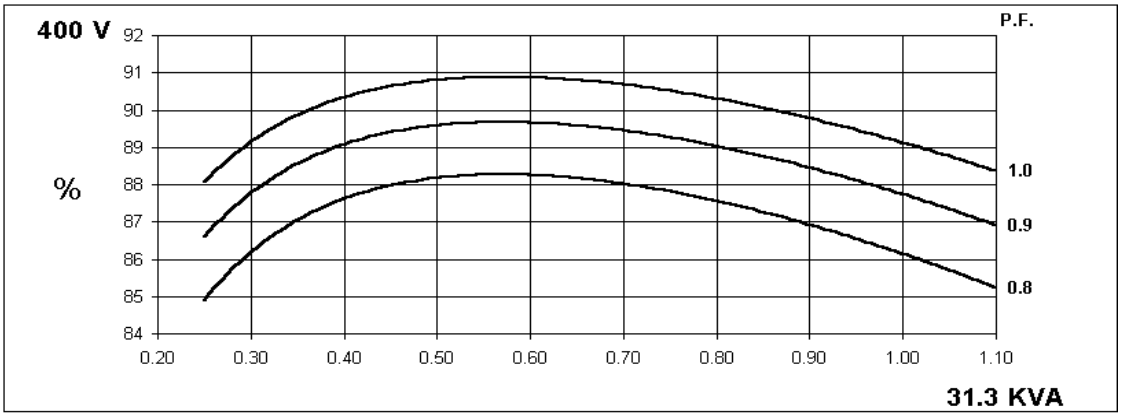
| | | | | |
|---|---|---|---|---|
| | | | | A2 |
| VER | MOD | DRW | Date | |
| Design | | APP | | |
| CHK | | Date | 2018.01 | mm |

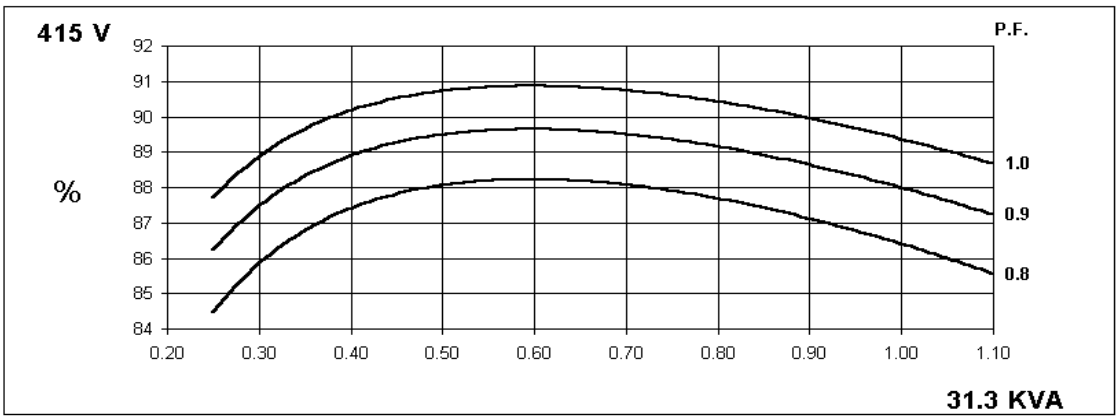
**50 Hz**

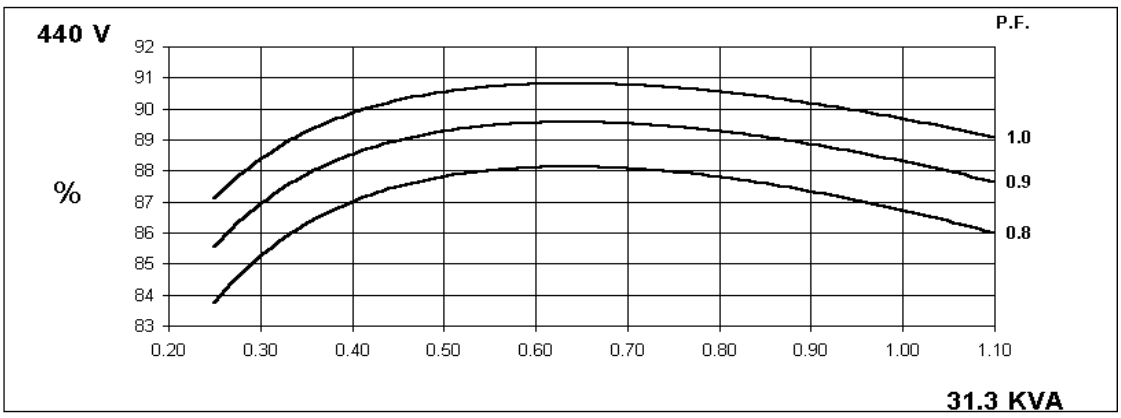
## Winding 311

## THREE PHASE EFFICIENCY CURVES



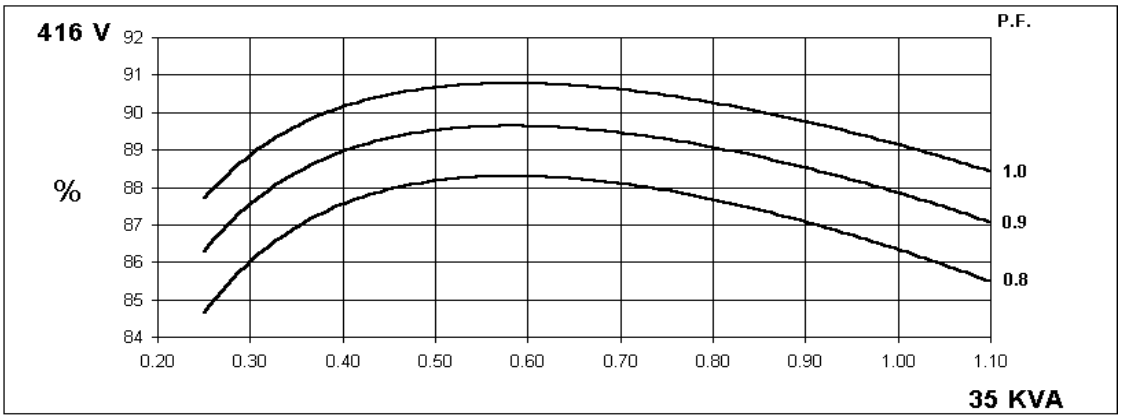



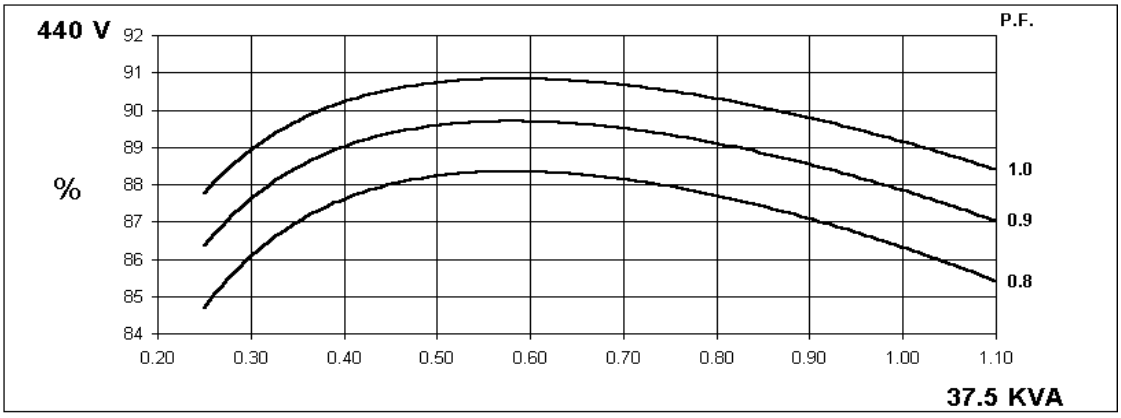



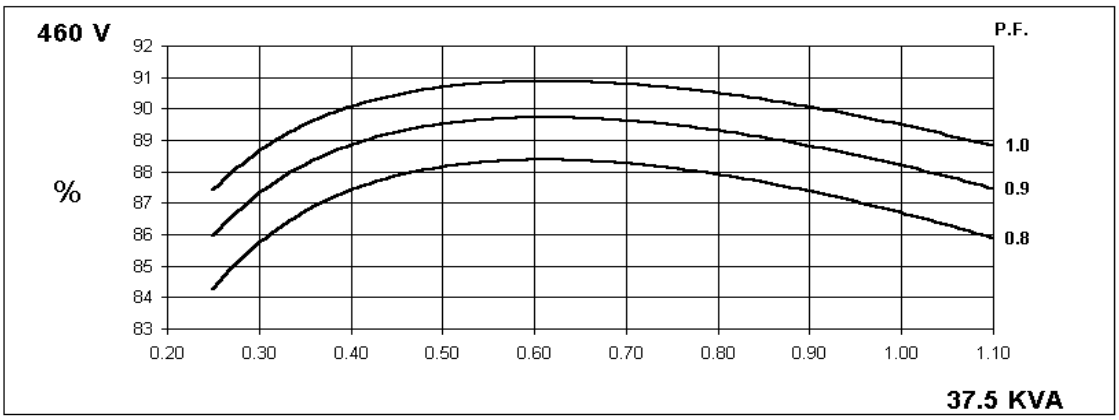
## Winding 311

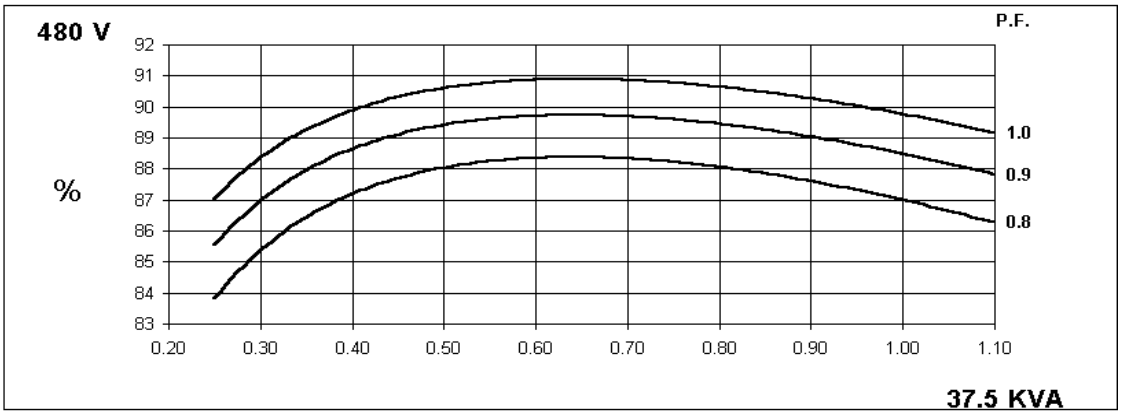
## THREE PHASE EFFICIENCY CURVES

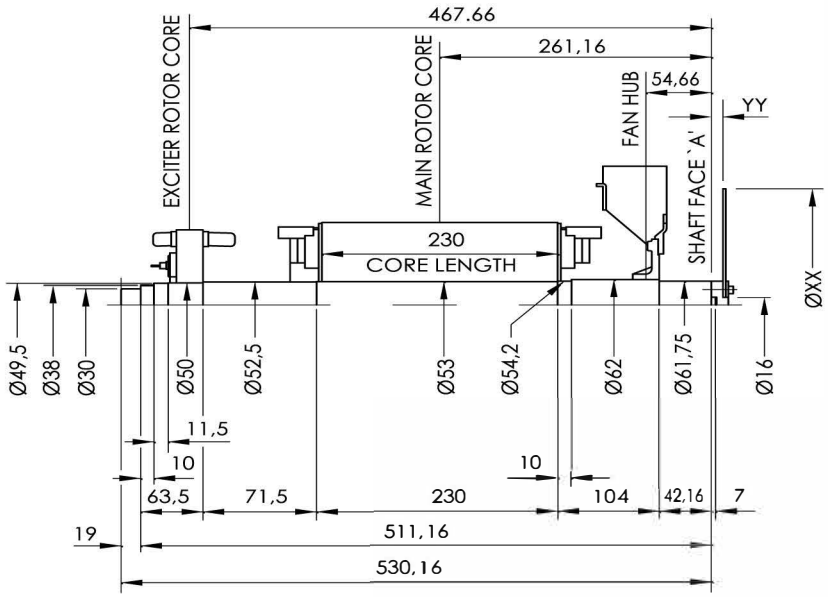
**60 Hz**



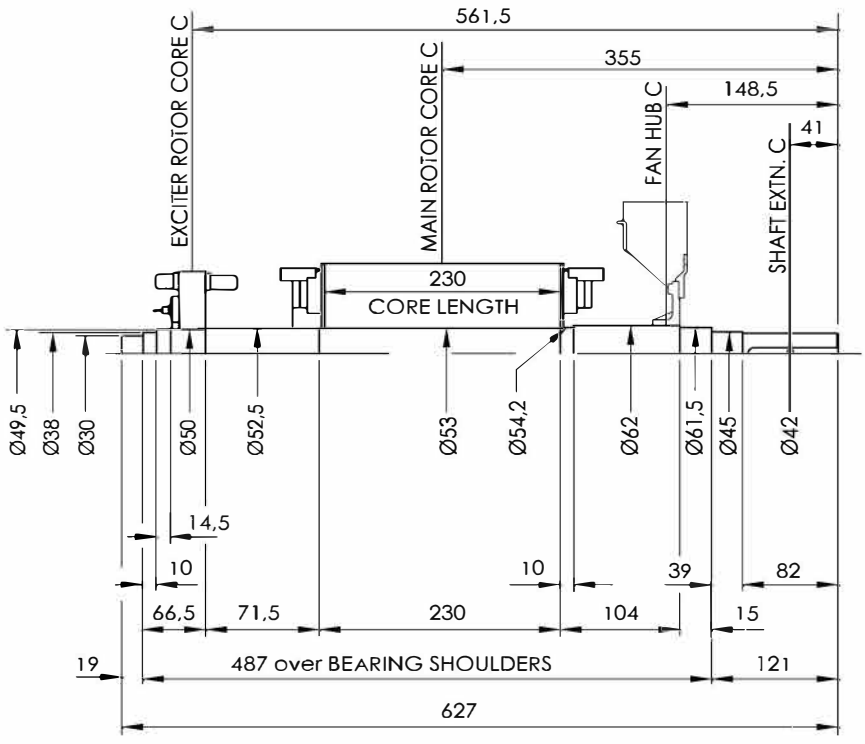






| COMPONENT | Wt kg | J kgm² |
|---|---|---|
| EX.ROTOR | 6,530 | 0,0253 |
| MAIN ROTOR | 39,090 | 0,1849 |
| FAN | 0,744 | 0,0061 |
| SHAFT | 9,614 | 0,0037 |
| TOTAL | 55,978 | 0,2200 |

| ADAPTOR SAE No. | COUPLING SAE No. | COUPLING DIMENSIONS XX | COUPLING DIMENSIONS YY | COUPLING ASSEMBLY WEIGHT kg | COUPLING DISC J kgm² |
|---|---|---|---|---|---|
| 6 | 7½ | 241,2 | 31,7 | 1,810 | 0,0078 |
| 4/5 | 7½ | 241,2 | 0 | 1,071 | 0,0078 |
| 4/5 | 8 | 263 | 31,7 | 2,018 | 0,0111 |
| 4 | 10 | 314 | 23,8 | 2,377 | 0,0225 |
| 3 | 10 | 314 | 35,8 | 2,657 | 0,0225 |
| 3 | 11½ | 352 | 21,5 | 2,793 | 0,0356 |

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




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




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