

# 2500 Series 2506C-E15TAG1 Diesel Engine – Electropak

435 kWm at 1500 rpm  
490 kWm at 1800 rpm

The 2500 Series engine has been developed using the latest engineering techniques and builds on the strengths of the already very successful 2000 Series family and addresses today's uncompromising demands within the power generation industry. Developed from a proven heavy-duty industrial base, these products offer superior performance and reliability.

The 2506C-E15TAG1 is a turbocharged and air-to-air charge-cooled, 6 cylinder diesel engine. Its premium features provide economic and durable standby duty, exceptional power-to-weight ratio resulting in exceptional fuel consumption and low gaseous emissions and advanced overall performance and reliability making this the prime choice for today's power generation industry.

## Economic power

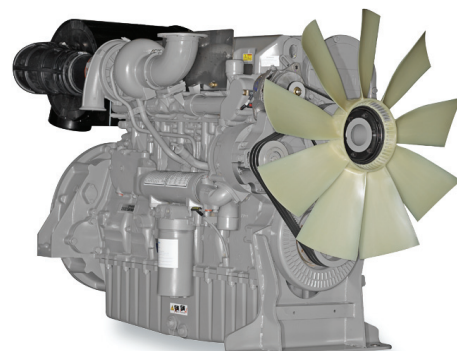
- Mechanically operated unit fuel injectors with advanced electronic control, combined with carefully matched turbocharging, give excellent fuel atomisation which leads to exceptional low fuel consumption

## Reliable power

- Developed and tested using the latest engineering techniques and finite element analysis for high reliability
- Low oil usage and low wear rates
- High compression ratio ensures clean rapid starting in all conditions
- Perkins global product support is designed to enhance the customer experience of owning a Perkins powered machine. We deliver this through the quality of our distribution network, extensive global coverage and a range of Perkins supported OEM partnership options. So whether you are an end-user or an equipment manufacturer our engine expertise is essential to your success

## Compact, clean and efficient power

- Exceptional power to weight ratio and compact size gives optimum power density for ease of installation and more cost effective transportation
- Designed to provide excellent service access for ease of maintenance



## Product support

- Perkins actively pursues product support excellence by ensuring our distribution network invest in their territory – strengthening relationships and providing more value to you, our customer
- Through an experienced global network of distributors and dealers, fully trained engine experts deliver total service support around the clock, 365 days a year. They have a comprehensive suite of web based tools at their fingertips covering technical information, parts identification and ordering systems, all dedicated to maximising the productivity of your engine
- Throughout the entire life of a Perkins engine, we provide access to genuine OE specification parts and service. We give 100% reassurance that you receive the very best in terms of quality for lowest possible cost .. wherever your Perkins powered machine is operating in the world

*Certified against the requirements of EU 2007 legislation for non-road mobile machinery, powered by constant speed engines (EU 97/68/EC Stage II)*

| Engine Speed<br>(rev/min) | Type of<br>Operation | Typical Generator<br>Output (Net) |     | Engine Power |     |     |     |
|---------------------------|----------------------|-----------------------------------|-----|--------------|-----|-----|-----|
|                           |                      |                                   |     | Gross        |     | Net |     |
|                           |                      | kVA                               | kWe | kWm          | bhp | kWm | bhp |
| 1500                      | Prime Power          | 455                               | 364 | 412          | 552 | 396 | 531 |
|                           | Standby Power        | 500                               | 400 | 451          | 605 | 435 | 583 |
| 1800                      | Prime Power          | 500                               | 400 | 458          | 615 | 435 | 583 |
|                           | Standby Power        | 563                               | 450 | 514          | 689 | 490 | 657 |

The above ratings represent the engine performance capabilities to conditions specified in ISO 8528/1, ISO 3046/1:1986, BS 5514/1. Derating may be required for conditions outside these; consult Perkins Engines Company Limited.

Generator powers are typical and are based on an average alternator efficiency and a power factor (cos.  $\theta$ ) of 0.8. Fuel specification: BS 2869: Part 2 1998 Class A2 or ASTM D975 D2. Lubricating oil: 15W40 to API C14.

### Rating Definitions

**Prime Power:** Power available at variable load with a load factor not exceeding 80% of the prime power rating. Overload of 10% is permitted for 1 hour in every 12 hours' operation.

**Standby Power:** Power available in the event of a main power network failure up to a maximum of 500 hours per year of which up to 300 hours may be run continuously. Load factor may be up to 100% of standby power. No overload is permitted.

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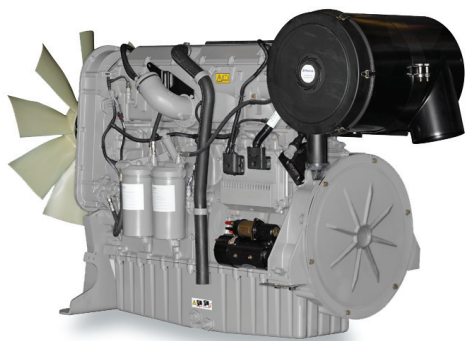
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THE HEART OF EVERY GREAT MACHINE

# 2500 Series 2506C-E15TAG1 Diesel Engine – Electropak

435 kWm at 1500 rpm

490 kWm at 1800 rpm



## Standard Electropak specification

### Air inlet

- Mounted air filter

### Fuel system

- Mechanically actuated electronically controlled unit fuel injectors with full authority electronic control
- Governing to ISO 8528-5 class G3 with isochronous capability
- Replaceable 'Ecoplus' fuel filter elements with primary filter/water separator
- Fuel cooler

### Lubrication system

- Wet sump with filler and dipstick
- Full-flow replaceable 'Ecoplus' filter
- Oil cooler integral with filter header

### Cooling system

- Gear-driven circulating pump
- Mounted belt-driven fan
- Radiator supplied loose incorporating air-to-air charge cooler
- System designed for ambients up to 50°C

### Electrical equipment

- 24 volt starter motor and 24 volt 70 amp alternator with DC output
- ECM mounted on engine with wiring looms and sensors
- 3 level engine protection system

### Flywheel and housing

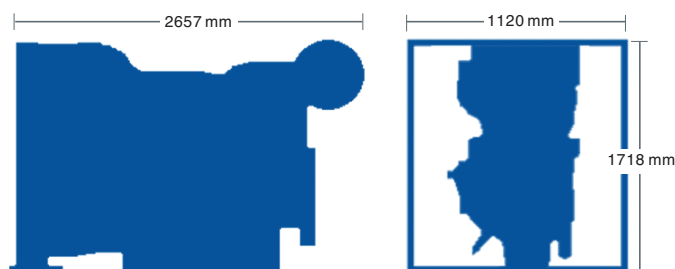
- High inertia flywheel to SAE J620 size 14
- SAE ½ flywheel housing

### Mountings

- Front engine mounting bracket

## Optional equipment

- 110 volt/240 volt immersion heater
- Additional speed sensor
- Temperature and pressure sensors for gauges
- Air filter rain hood
- Twin starters/facility for second starter
- Tool kit
- Additional manuals
- Closed circuit crankcase ventilation system



| Fuel Consumption   |              |      |              |      |
|--------------------|--------------|------|--------------|------|
| Engine Speed       | 1500 rev/min |      | 1800 rev/min |      |
|                    | g/kWh        | l/hr | g/kWh        | l/hr |
| Standby            | 217          | 109  | 201          | 114  |
| Prime Power        | 216          | 99   | 199          | 100  |
| 75% of Prime Power | 212          | 73   | 204          | 77   |
| 50% of Prime Power | 222          | 51   | 217          | 57   |

## General data

|                                         |                                           |
|-----------------------------------------|-------------------------------------------|
| Number of cylinders .....               | 6                                         |
| Cylinder arrangement .....              | Vertical in-line                          |
| Cycle .....                             | 4 stroke                                  |
| Induction system .....                  | Turbocharged and air-to-air charge cooled |
| Combustion system .....                 | Direct injection                          |
| Cooling system .....                    | Water-cooled                              |
| Bore and stroke .....                   | 137 mm x 171 mm                           |
| Displacement .....                      | 15 litres                                 |
| Compression ratio .....                 | 16:1                                      |
| Direction of rotation .....             | Anti-clockwise, viewed on flywheel        |
| Total lubrication system capacity ..... | 62 litres                                 |
| Total coolant capacity .....            | 58 litres                                 |
| Dimensions – Length .....               | 2657 mm                                   |
| Width .....                             | 1120 mm                                   |
| Height .....                            | 1718 mm                                   |
| Dry weight (Electropak) .....           | 1,633 kg                                  |

Final weight and dimensions will depend on completed specification

Photographs are for illustrative purposes only and may not reflect final specification.

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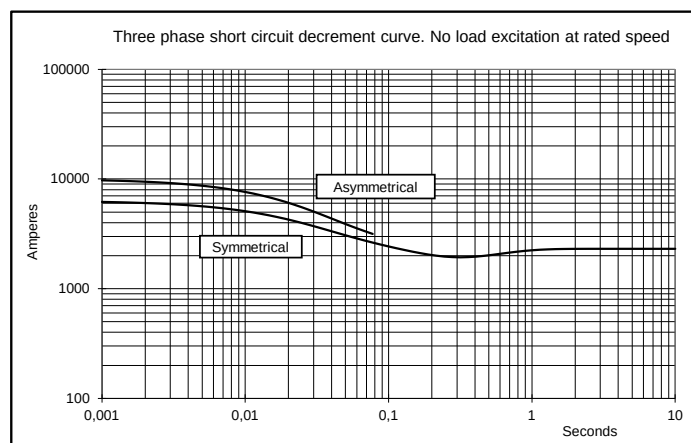
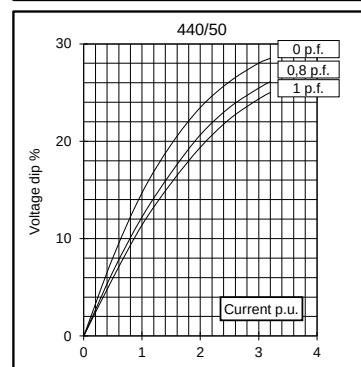
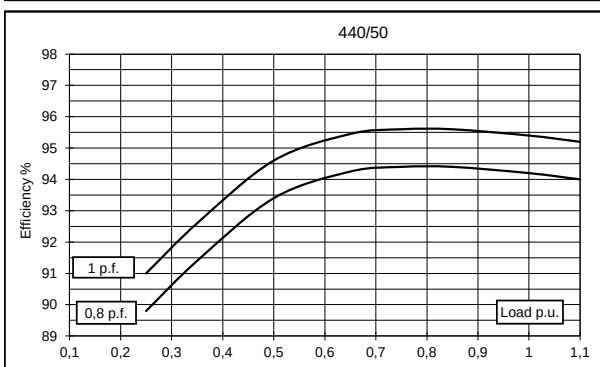
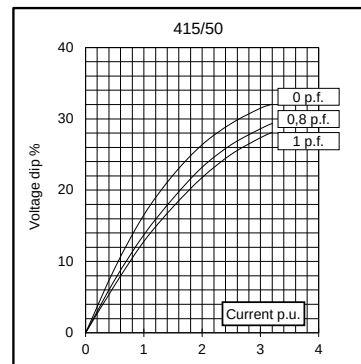
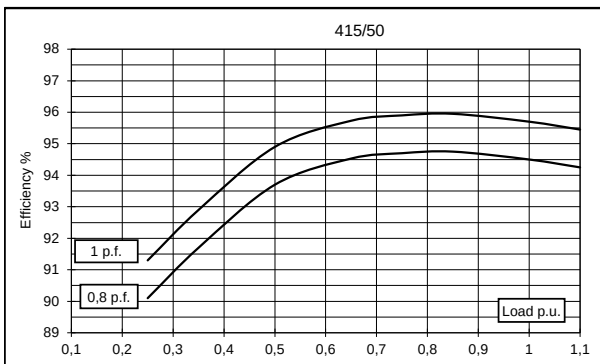
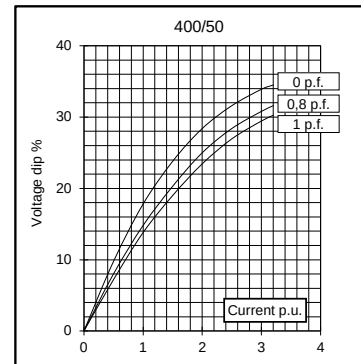
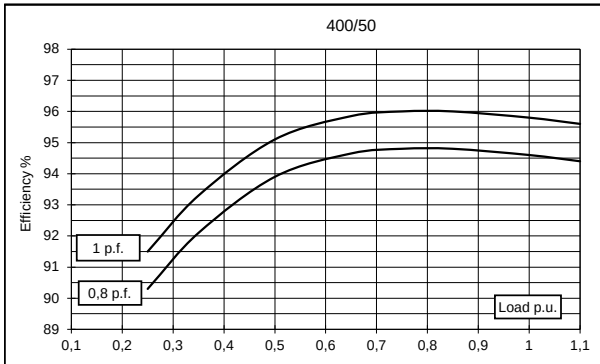
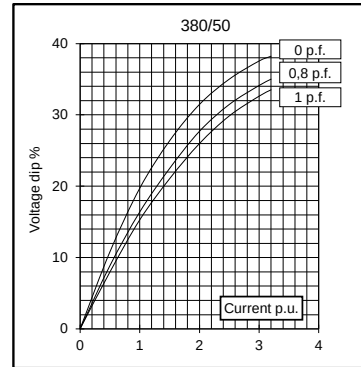
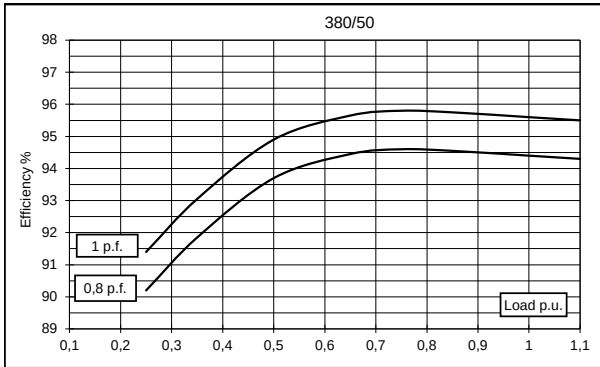
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| Electrical Characteristics           |                |        |                                                                         |       |       |       |               |       |       |       |
|--------------------------------------|----------------|--------|-------------------------------------------------------------------------|-------|-------|-------|---------------|-------|-------|-------|
| Frequency                            |                | Hz     | 50                                                                      |       |       |       | 60            |       |       |       |
| Voltage (parallel star)              |                | V      | 380                                                                     | 400   | 415   | 440   | 415           | 440   | 460   | 480   |
| Rated power class H                  |                | kVA    | 500                                                                     | 500   | 500   | 460   | 540           | 580   | 600   | 600   |
|                                      |                | kW     | 400                                                                     | 400   | 400   | 368   | 432           | 464   | 480   | 480   |
| Rated power class F                  |                | kVA    | 450                                                                     | 450   | 450   | 414   | 484           | 520   | 540   | 540   |
|                                      |                | kW     | 360                                                                     | 360   | 360   | 331   | 387           | 416   | 432   | 432   |
| Regulation with                      |                | DER1   | ±1% with any power factor and speed variations between -5% +30%         |       |       |       |               |       |       |       |
| Insulation class                     |                |        | H                                                                       |       |       |       |               |       |       |       |
| Execution                            |                |        | Brushless                                                               |       |       |       |               |       |       |       |
| Stator winding                       |                |        | 12 ends (nameplate data : 800V-50Hz Series Star, 960V-60Hz Series Star) |       |       |       |               |       |       |       |
| Rotor                                |                |        | with damping cage                                                       |       |       |       |               |       |       |       |
| Efficiencies class H                 | 4/4            | %      | 94,4                                                                    | 94,6  | 94,5  | 94,2  | 95            | 95,3  | 95,5  | 95,6  |
| (see graph. for details)             | 3/4            | %      | 94,6                                                                    | 94,8  | 94,7  | 94,4  | 95,2          | 95,5  | 95,7  | 95,8  |
|                                      | 2/4            | %      | 93,7                                                                    | 93,9  | 93,7  | 93,4  | 93,9          | 94,5  | 94,7  | 94,9  |
|                                      | 1/4            | %      | 90,2                                                                    | 90,3  | 90,1  | 89,8  | 90,5          | 90,7  | 90,9  | 91,1  |
|                                      |                |        |                                                                         |       |       |       |               |       |       |       |
| Reactances (f. l.cl. F)              | Xd             | %      | 322                                                                     | 250   | 167   | 105   | 430           | 370   | 322   | 250   |
|                                      | Xd'            | %      | 21,8                                                                    | 21    | 19,4  | 18,4  | 23,5          | 22,9  | 21,8  | 21    |
|                                      | Xd''           | %      | 12,1                                                                    | 11,4  | 10,2  | 9,7   | 14,1          | 13,4  | 12,1  | 11,4  |
|                                      | Xq             | %      | 122                                                                     | 108   | 102   | 92    | 145           | 136   | 122   | 108   |
|                                      | Xq'            | %      | 122                                                                     | 108   | 102   | 92    | 145           | 136   | 122   | 108   |
|                                      | Xq''           | %      | 27,7                                                                    | 26,4  | 25,8  | 24,3  | 29,5          | 28,6  | 27,7  | 26,4  |
|                                      | X <sub>2</sub> | %      | 18,4                                                                    | 16,7  | 15,7  | 13,8  | 20,2          | 19,4  | 18,4  | 16,7  |
|                                      | X <sub>0</sub> | %      | 3,2                                                                     | 3     | 2,7   | 2,5   | 3,8           | 3,6   | 3,2   | 3     |
| Short Circuit Ratio                  | Kcc            |        | 0,31                                                                    | 0,40  | 0,60  | 0,96  | 0,23          | 0,27  | 0,31  | 0,40  |
| Time Constants                       | Td'            | sec.   | 0,14                                                                    |       |       |       |               |       |       |       |
|                                      | Td''           | sec.   | 0,021                                                                   |       |       |       |               |       |       |       |
|                                      | Tdo'           | sec.   | 2,80                                                                    |       |       |       |               |       |       |       |
|                                      | Tα             | sec.   | 0,031                                                                   |       |       |       |               |       |       |       |
| Short Circuit Current Capacity       |                | %      | >300                                                                    |       |       |       | >350          |       |       |       |
| Excitation at no load                |                | Amp.   | 0,6                                                                     | 0,7   | 1     | 1,2   | 0,4           | 0,5   | 0,6   | 0,7   |
| Excitation at full load              |                | Amp.   | 3,6                                                                     | 3,5   | 3,9   | 4     | 3             | 3,1   | 3,2   | 3,4   |
| Overload (long-term)                 |                | %      | 1 hour in a 6 hours period 110% rated load                              |       |       |       |               |       |       |       |
| Overload per 20 sec.                 |                | %      | 300                                                                     |       |       |       |               |       |       |       |
| Stator Winding Resistance (20°C)     |                | Ω      | 0,0106                                                                  |       |       |       |               |       |       |       |
| Rotor Winding Resistance (20°C)      |                | Ω      | 5,176                                                                   |       |       |       |               |       |       |       |
| Exciter Resistance (20 °C)           |                | Ω      | Rotor : 0,317                                                           |       |       |       | Stator : 8,85 |       |       |       |
| Heat dissipation at f.l.cl.H         |                | W      | 23729                                                                   | 22833 | 23280 | 22658 | 22737         | 22884 | 22618 | 22092 |
| Telephone Interference               |                |        | THF < 2%                                                                |       |       |       | TIF < 40      |       |       |       |
| Radio interference                   |                |        | EN61000-6-3, EN61000-6-2. For others standards apply to factory         |       |       |       |               |       |       |       |
| Waveform Distors.(THD) at f. load    | LL/LN          | %      | 2,4 / 2,5                                                               |       |       |       |               |       |       |       |
| Waveform Distors.(THD) at no load    | LL/LN          | %      | 2,6 / 2,5                                                               |       |       |       |               |       |       |       |
| Mechanical characteristics           |                |        |                                                                         |       |       |       |               |       |       |       |
| Protection                           |                |        | IP 21 (other protection on request )                                    |       |       |       |               |       |       |       |
| DE bearing                           |                |        | 6322                                                                    |       |       |       |               |       |       |       |
| NDE bearing                          |                |        | 6318.2RS                                                                |       |       |       |               |       |       |       |
| Weight of wound stator assembly      |                | kg     | 428                                                                     |       |       |       |               |       |       |       |
| Weight of wound rotor assembly       |                | kg     | 274,6                                                                   |       |       |       |               |       |       |       |
| Weight of complete generator         |                | kg     | 1171                                                                    |       |       |       |               |       |       |       |
| Maximun overspeed                    |                | rpm    | 2250                                                                    |       |       |       |               |       |       |       |
| Unbalanced magnetic pull at f.l.cl.F |                | kN/mm  | 6,5                                                                     |       |       |       |               |       |       |       |
| Cooling air requirement              |                | m³/min | 54                                                                      |       |       |       | 64,8          |       |       |       |
| Inertia Constant (H)                 |                | sec.   | 0,175                                                                   |       |       |       | 0,210         |       |       |       |
| Noise level at 1m/7m                 |                | dB(A)  | 94 / 82                                                                 |       |       |       | 98 / 88       |       |       |       |

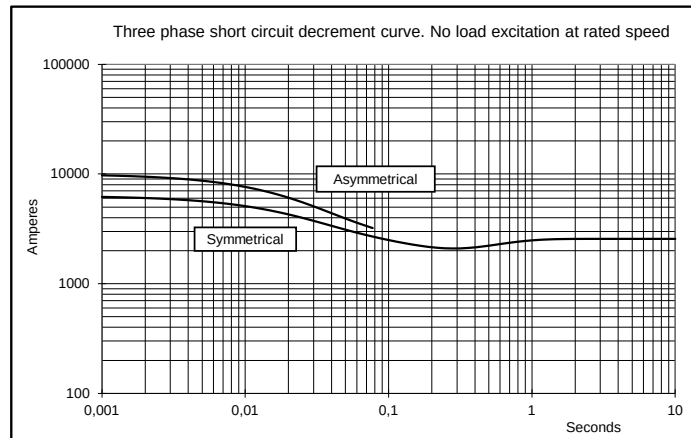
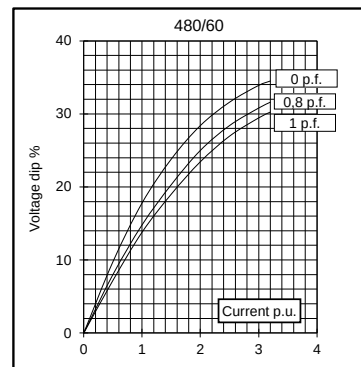
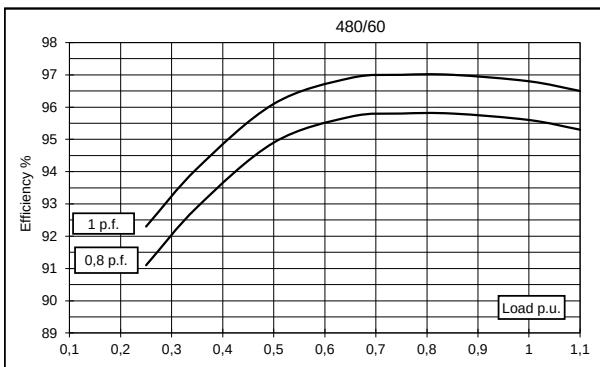
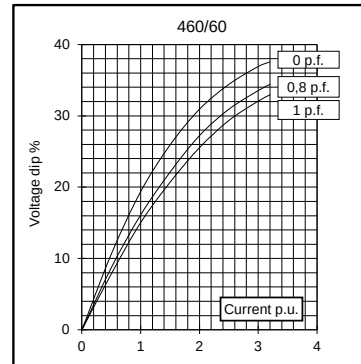
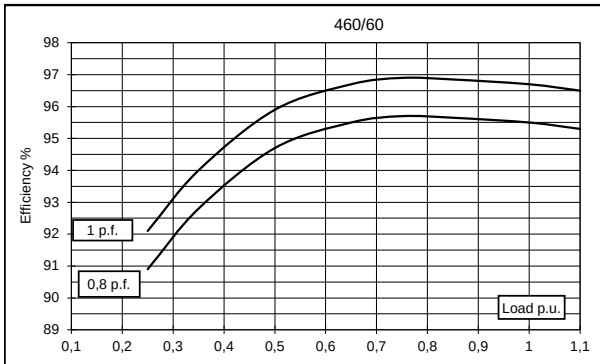
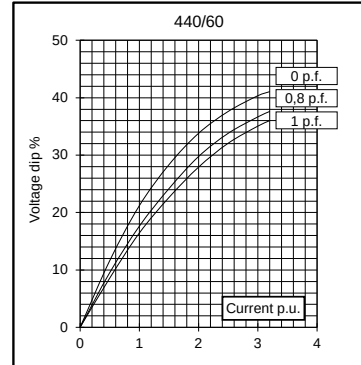
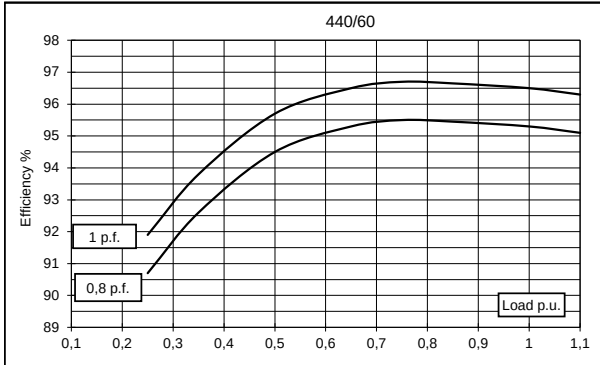
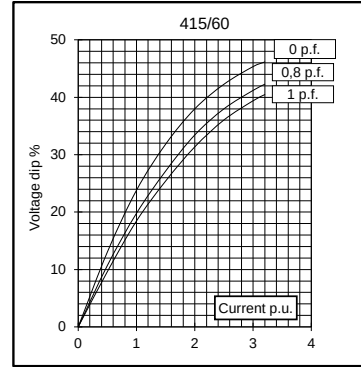
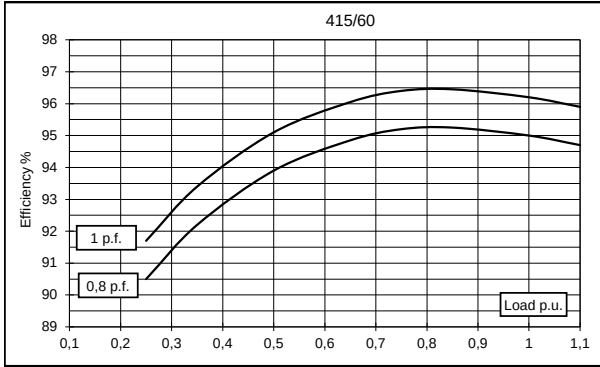
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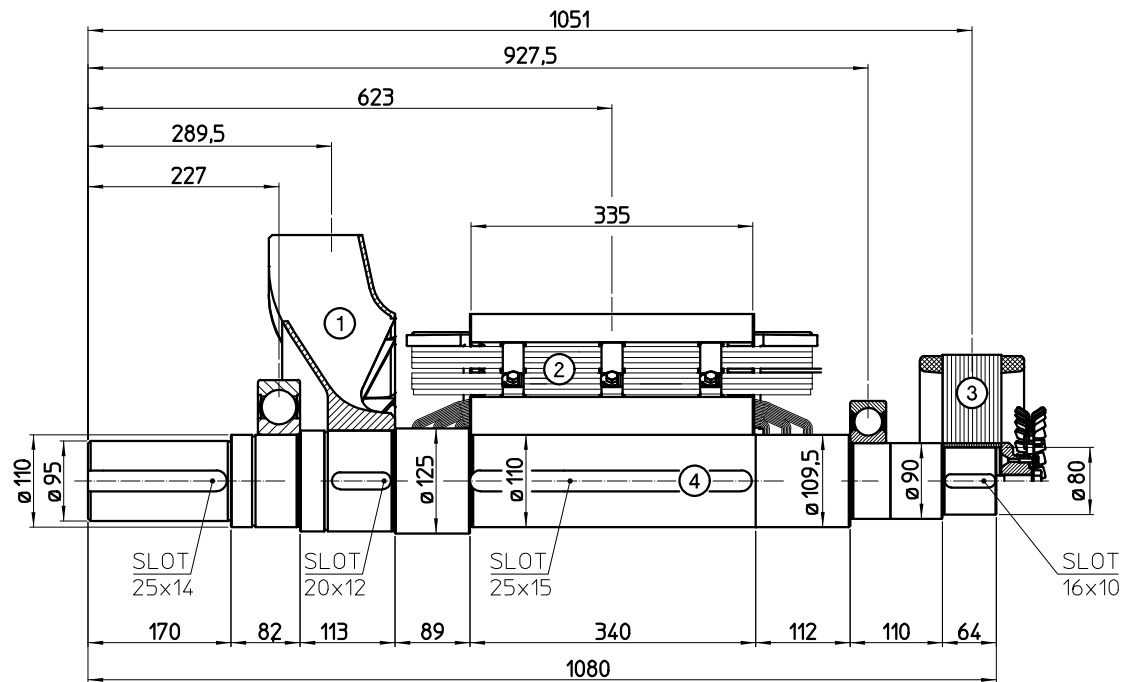
## 50 Hz



60 Hz

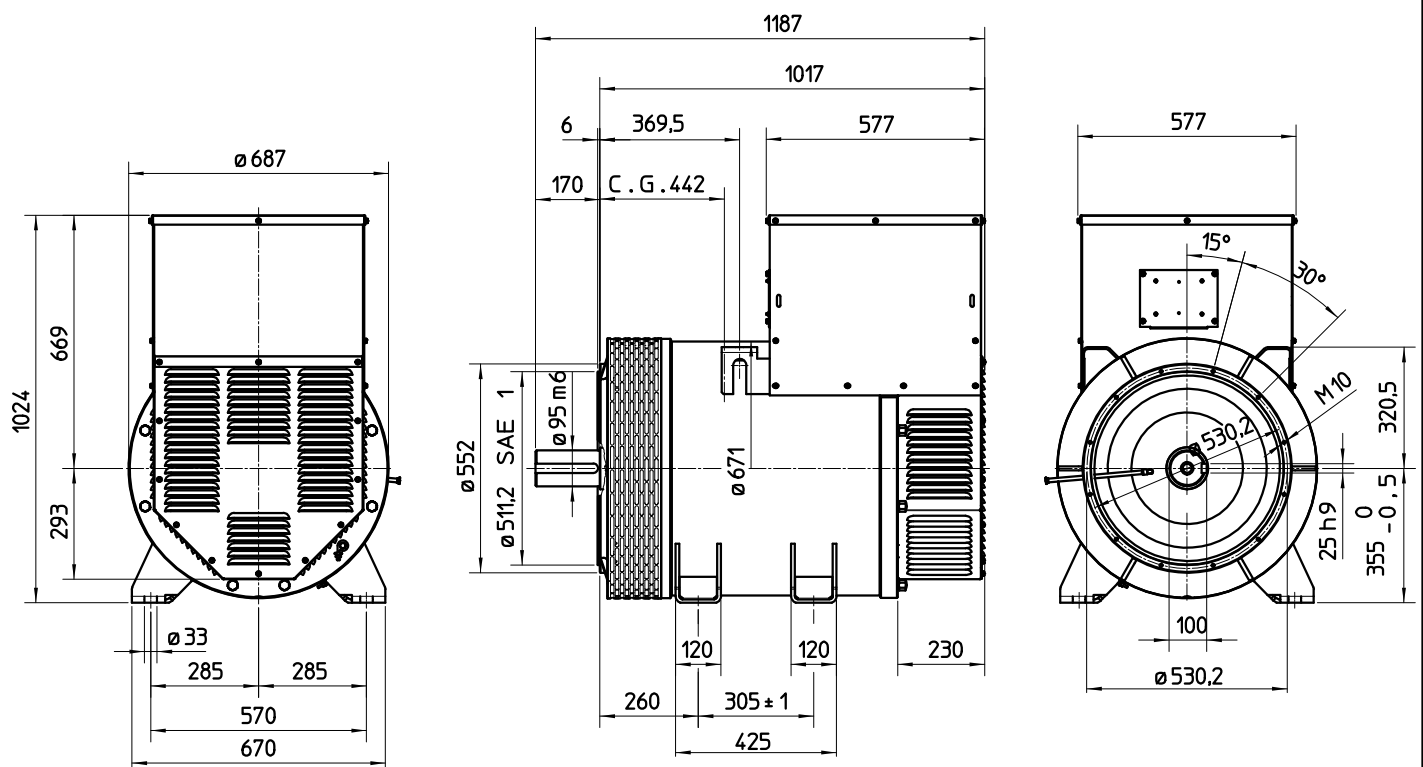


## TWO BEARING MOMENTS OF INERTIA



|   | COMPONENT  | WEIGHT kg | J kgm <sup>2</sup> |
|---|------------|-----------|--------------------|
| 1 | FAN        | 10,2      | 0,335              |
| 2 | MAIN ROTOR | 274,6     | 5.846              |
| 3 | EX. ROTOR  | 35        | 0,562              |
| 4 | SHAFT      | 73,6      | 0.109              |
|   | TOTAL      | 393,4     | 6.852              |

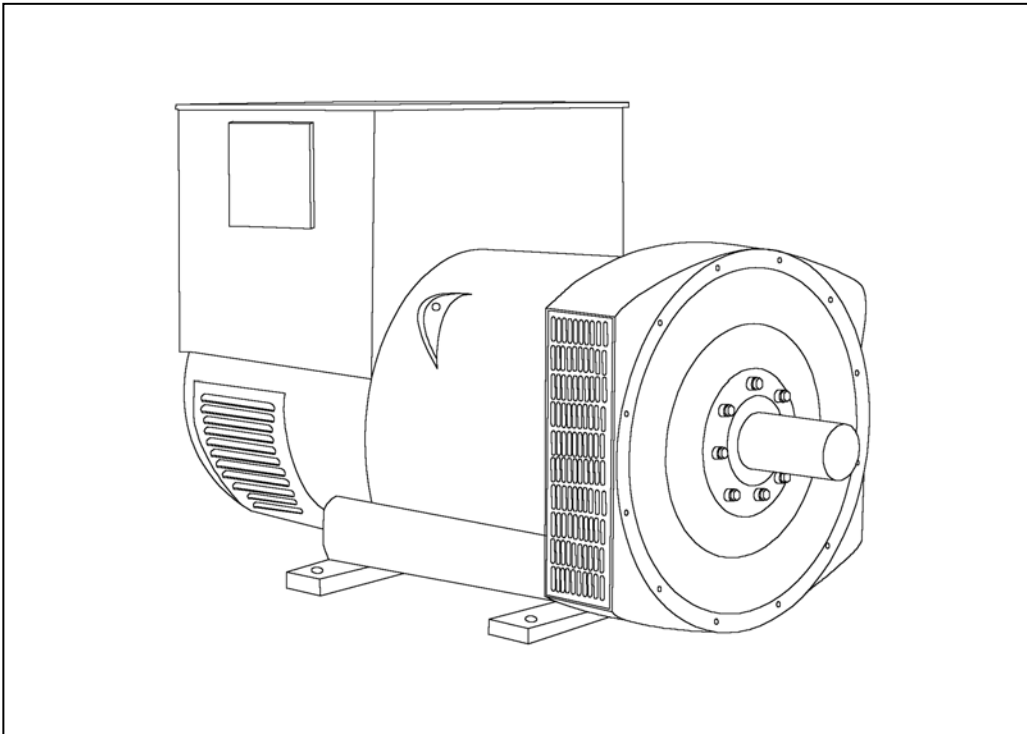
## TWO BEARING DIMENSIONS



C.G.= GRAVITY CENTER

C.G.= GRAVITY CENTER

## HCI 534C/544C - Technical Data Sheet





# HCI534C/544C

## SPECIFICATIONS & OPTIONS



### STANDARDS

Newage Stamford industrial generators meet the requirements of BS EN 60034 and the relevant section of other international standards such as BS5000, VDE 0530, NEMA MG1-32, IEC34, CSA C22.2-100, AS1359. Other standards and certifications can be considered on request.

### VOLTAGE REGULATORS

#### SX440 AVR - STANDARD

With this self-excited system the main stator provides power via the Automatic Voltage Regulator (AVR) to the exciter stator. The high efficiency semi-conductors of the AVR ensure positive build-up from initial low levels of residual voltage.

The exciter rotor output is fed to the main rotor through a three-phase full-wave bridge rectifier. The rectifier is protected by a surge suppressor against surges caused, for example, by short circuit or out-of-phase paralleling.

The SX440 will support a range of electronic accessories, including a 'droop' Current Transformer (CT) to permit parallel operation with other ac generators.

If 3-phase sensing is required with the self-excited system, the SX421 AVR must be used.

#### SX421 AVR

This AVR also operates in a self-excited system. It combines all the features of the SX440 with, additionally, three-phase rms sensing for improved regulation and performance. Over voltage protection is provided via a separate circuit breaker. An engine relief load acceptance feature is built in as standard.

#### MX341 AVR

This sophisticated AVR is incorporated into the Stamford Permanent Magnet Generator (PMG) control system.

The PMG provides power via the AVR to the main exciter, giving a source of constant excitation power independent of generator output. The main exciter output is then fed to the main rotor, through a full wave bridge, protected by a surge suppressor. The AVR has in-built protection against sustained over-excitation, caused by internal or external faults. This de-excites the machine after a minimum of 5 seconds.

An engine relief load acceptance feature can enable full load to be applied to the generator in a single step.

If three-phase sensing is required with the PMG system the MX321 AVR must be used.

We recommend three-phase sensing for applications with greatly unbalanced or highly non-linear loads.

#### MX321 AVR

The most sophisticated of all our AVRs combines all the features of the MX341 with, additionally, three-phase rms sensing, for improved regulation and performance.

Over voltage protection is built-in and short circuit current level adjustments is an optional facility.

### 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, when in parallel with the mains. 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 waveform distortion.

### TERMINALS & TERMINAL BOX

Standard generators are 3-phase reconnectable with 12 ends brought out to the terminals, which are mounted on a cover 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'.

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.

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 typical of product range.*

# **HCI534C/544C**

## **WINDING 311**

|                         |                                                  |         |                          |  |  |  |  |  |
|-------------------------|--------------------------------------------------|---------|--------------------------|--|--|--|--|--|
| CONTROL SYSTEM          | SEPARATELY EXCITED BY P.M.G.                     |         |                          |  |  |  |  |  |
| A.V.R.                  | MX321                                            | MX341   |                          |  |  |  |  |  |
| VOLTAGE REGULATION      | ± 0.5 %                                          | ± 1.0 % | With 4% ENGINE GOVERNING |  |  |  |  |  |
| SUSTAINED SHORT CIRCUIT | REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7) |         |                          |  |  |  |  |  |

|                         |                                                           |         |                          |  |  |  |  |  |
|-------------------------|-----------------------------------------------------------|---------|--------------------------|--|--|--|--|--|
| CONTROL SYSTEM          | SELF EXCITED                                              |         |                          |  |  |  |  |  |
| A.V.R.                  | SX440                                                     | SX421   |                          |  |  |  |  |  |
| VOLTAGE REGULATION      | ± 1.0 %                                                   | ± 0.5 % | With 4% ENGINE GOVERNING |  |  |  |  |  |
| SUSTAINED SHORT CIRCUIT | SERIES 4 CONTROL DOES NOT SUSTAIN A SHORT CIRCUIT CURRENT |         |                          |  |  |  |  |  |

|                                      |                                                                                     |         |         |         |                       |         |         |         |
|--------------------------------------|-------------------------------------------------------------------------------------|---------|---------|---------|-----------------------|---------|---------|---------|
| INSULATION SYSTEM                    | CLASS H                                                                             |         |         |         |                       |         |         |         |
| PROTECTION                           | IP23                                                                                |         |         |         |                       |         |         |         |
| RATED POWER FACTOR                   | 0.8                                                                                 |         |         |         |                       |         |         |         |
| STATOR WINDING                       | DOUBLE LAYER LAP                                                                    |         |         |         |                       |         |         |         |
| WINDING PITCH                        | TWO THIRDS                                                                          |         |         |         |                       |         |         |         |
| WINDING LEADS                        | 12                                                                                  |         |         |         |                       |         |         |         |
| STATOR WDG. RESISTANCE               | 0.0065 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED                                 |         |         |         |                       |         |         |         |
| ROTOR WDG. RESISTANCE                | 1.55 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. 6220 (ISO)                                                                    |         |         |         |                       |         |         |         |
| BEARING NON-DRIVE END                | BALL. 6314 (ISO)                                                                    |         |         |         |                       |         |         |         |
|                                      | 1 BEARING                                                                           |         |         |         | 2 BEARING             |         |         |         |
| WEIGHT COMP. GENERATOR               | 1263 kg                                                                             |         |         |         | 1275 kg               |         |         |         |
| WEIGHT WOUND STATOR                  | 584 kg                                                                              |         |         |         | 584 kg                |         |         |         |
| WEIGHT WOUND ROTOR                   | 502 kg                                                                              |         |         |         | 473 kg                |         |         |         |
| WR² INERTIA                          | 6.8928 kgm²                                                                         |         |         |         | 6.6149 kgm²           |         |         |         |
| SHIPPING WEIGHTS in a crate          | 1355 kg                                                                             |         |         |         | 1395 kg               |         |         |         |
| PACKING CRATE SIZE                   | 166 x 87 x 124(cm)                                                                  |         |         |         | 166 x 87 x 124(cm)    |         |         |         |
|                                      | 50 Hz                                                                               |         |         |         | 60 Hz                 |         |         |         |
| TELEPHONE INTERFERENCE               | THF<2%                                                                              |         |         |         | TIF<50                |         |         |         |
| COOLING AIR                          | 1.035 m³/sec 2202 cfm                                                               |         |         |         | 1.312 m³/sec 2780 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 | 450                                                                                 | 450     | 450     | 450     | 525                   | 550     | 581     | 594     |
| Xd DIR. AXIS SYNCHRONOUS             | 3.27                                                                                | 2.95    | 2.74    | 2.44    | 3.94                  | 3.69    | 3.57    | 3.35    |
| X'd DIR. AXIS TRANSIENT              | 0.18                                                                                | 0.16    | 0.15    | 0.13    | 0.18                  | 0.17    | 0.16    | 0.15    |
| X''d DIR. AXIS SUBTRANSIENT          | 0.13                                                                                | 0.12    | 0.11    | 0.10    | 0.13                  | 0.12    | 0.12    | 0.11    |
| Xq QUAD. AXIS REACTANCE              | 2.66                                                                                | 2.40    | 2.23    | 1.98    | 3.12                  | 2.92    | 2.82    | 2.65    |
| X''q QUAD. AXIS SUBTRANSIENT         | 0.26                                                                                | 0.24    | 0.22    | 0.20    | 0.34                  | 0.32    | 0.31    | 0.29    |
| Xl LEAKAGE REACTANCE                 | 0.07                                                                                | 0.06    | 0.06    | 0.05    | 0.08                  | 0.07    | 0.07    | 0.07    |
| X2 NEGATIVE SEQUENCE                 | 0.19                                                                                | 0.17    | 0.16    | 0.14    | 0.23                  | 0.22    | 0.21    | 0.20    |
| Xo ZERO SEQUENCE                     | 0.11                                                                                | 0.10    | 0.09    | 0.08    | 0.11                  | 0.10    | 0.10    | 0.09    |

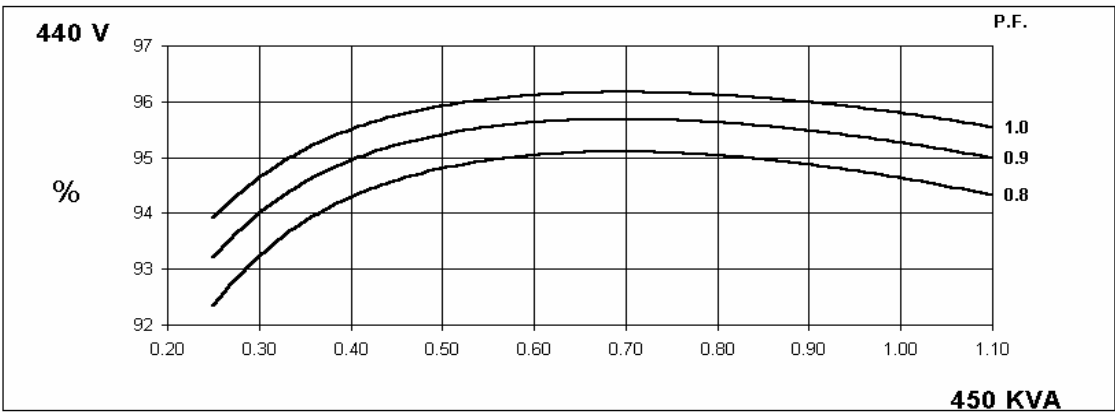
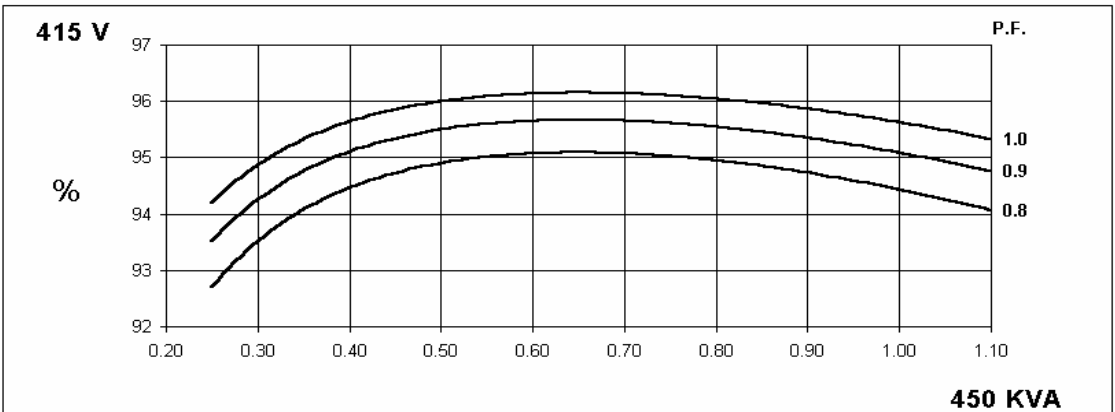
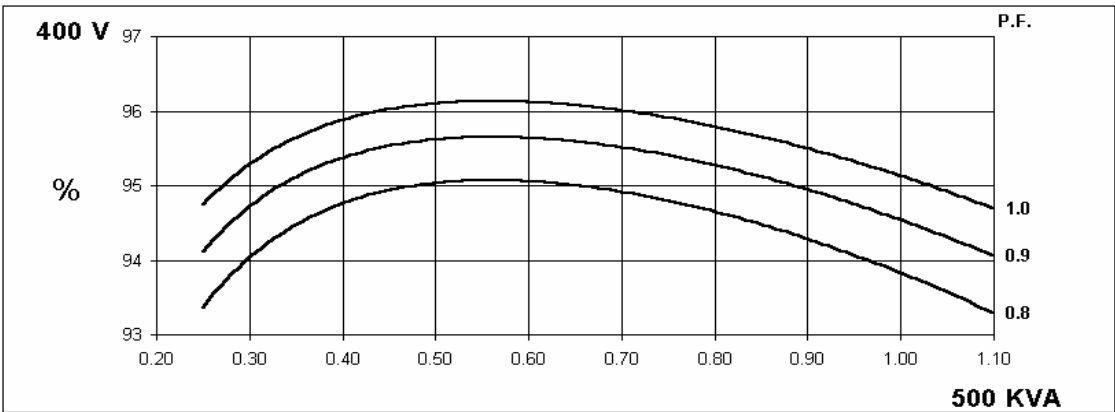
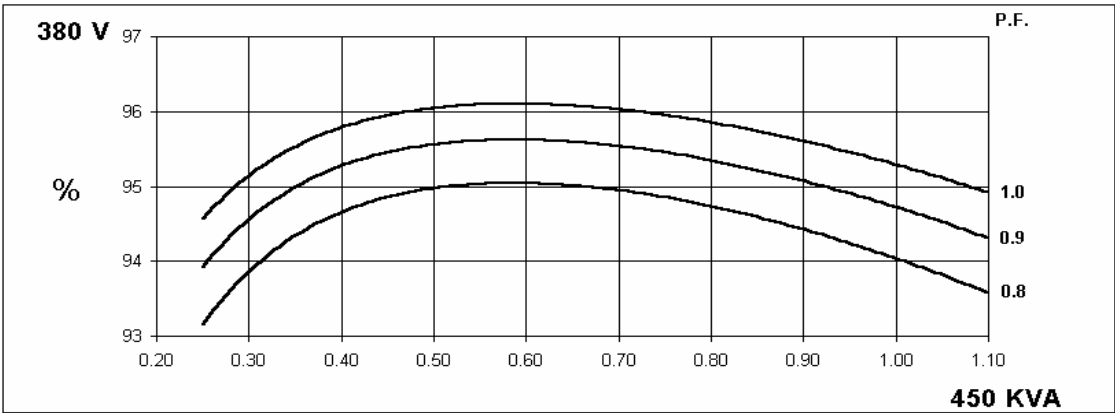
|                             |        |  |                                                     |  |  |  |  |  |
|-----------------------------|--------|--|-----------------------------------------------------|--|--|--|--|--|
| REACTANCES ARE SATURATED    |        |  | VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED |  |  |  |  |  |
| T'd TRANSIENT TIME CONST.   | 0.08s  |  |                                                     |  |  |  |  |  |
| T''d SUB-TRANSTIME CONST.   | 0.012s |  |                                                     |  |  |  |  |  |
| T'do O.C. FIELD TIME CONST. | 2s     |  |                                                     |  |  |  |  |  |
| Ta ARMATURE TIME CONST.     | 0.017s |  |                                                     |  |  |  |  |  |
| SHORT CIRCUIT RATIO         | 1/Xd   |  |                                                     |  |  |  |  |  |

**50  
Hz**

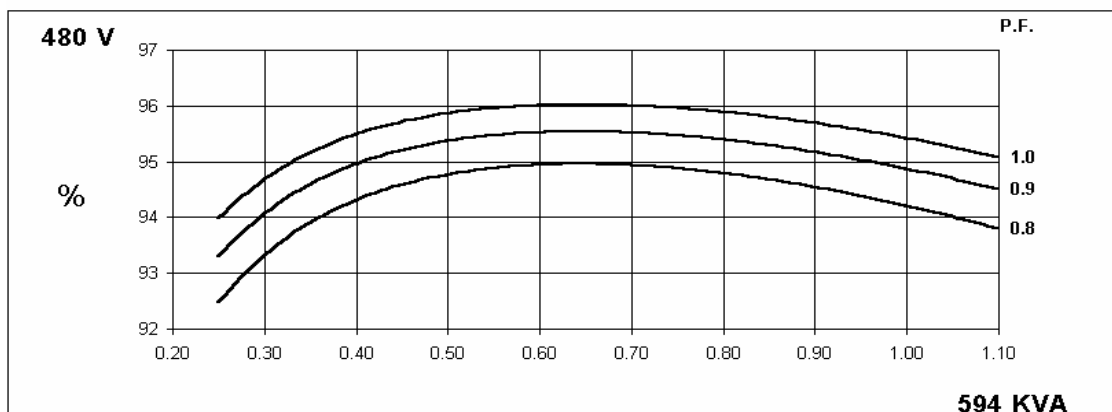
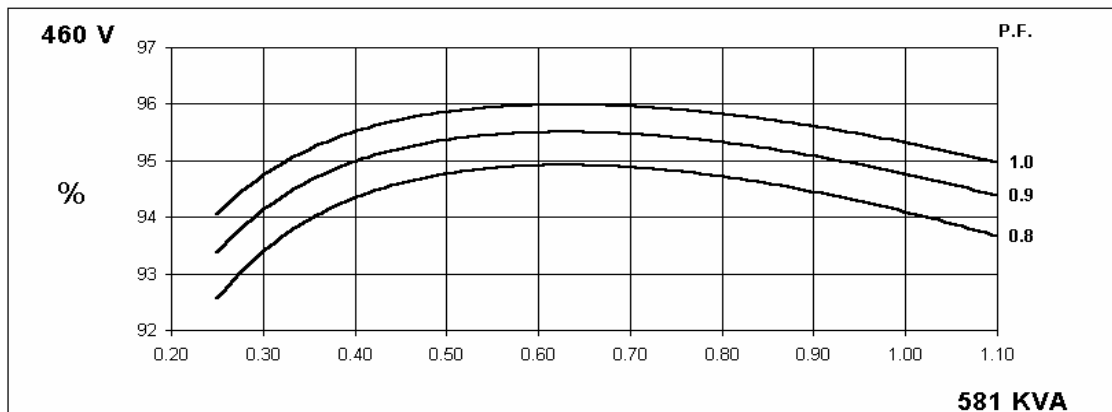
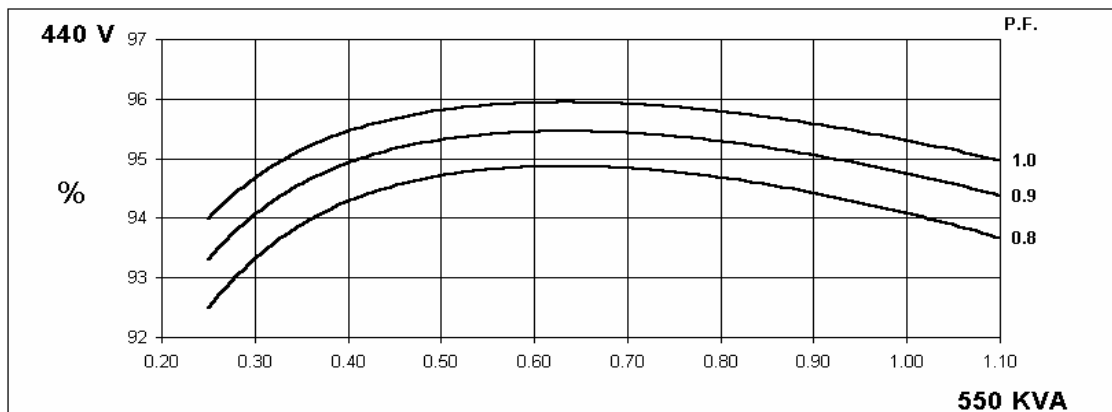
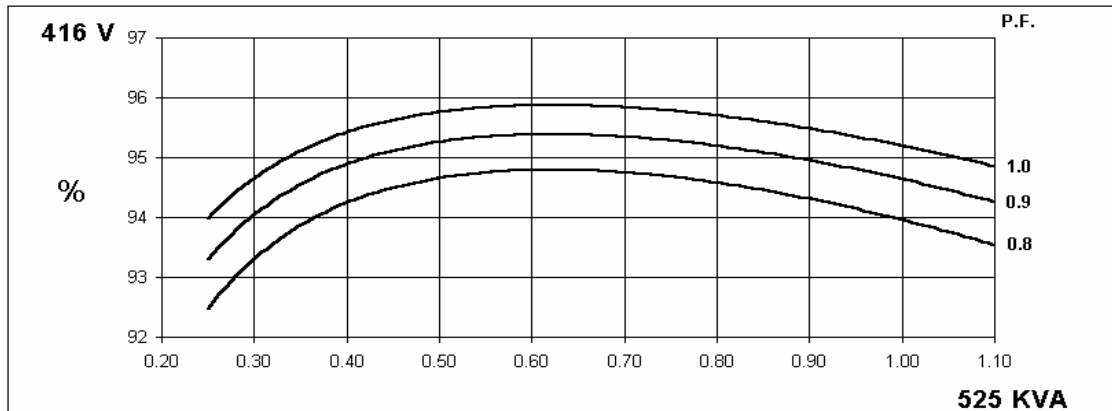
**HCI534C/544C**  
Winding 311



**THREE PHASE EFFICIENCY CURVES**



**THREE PHASE EFFICIENCY CURVES**



# HCI534C/544C

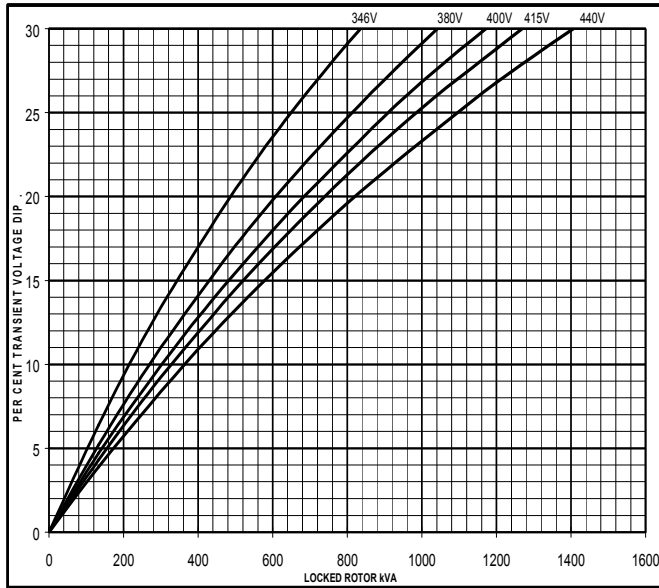
Winding 311



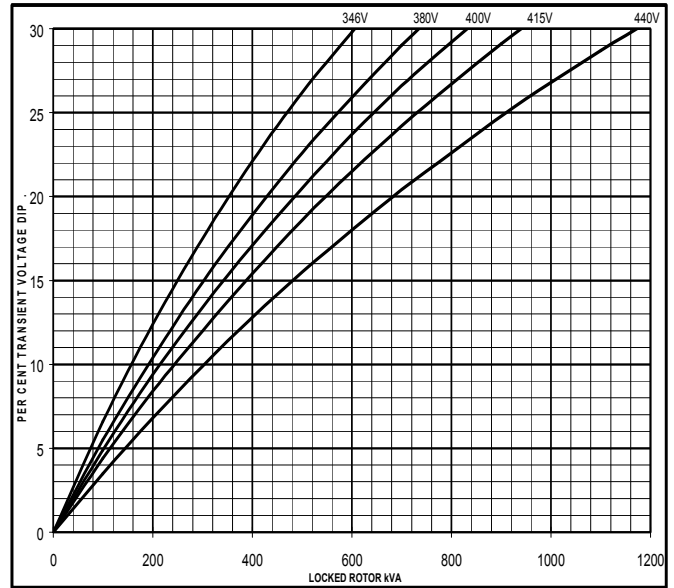
## Locked Rotor Motor Starting Curve

**50  
Hz**

**MX**

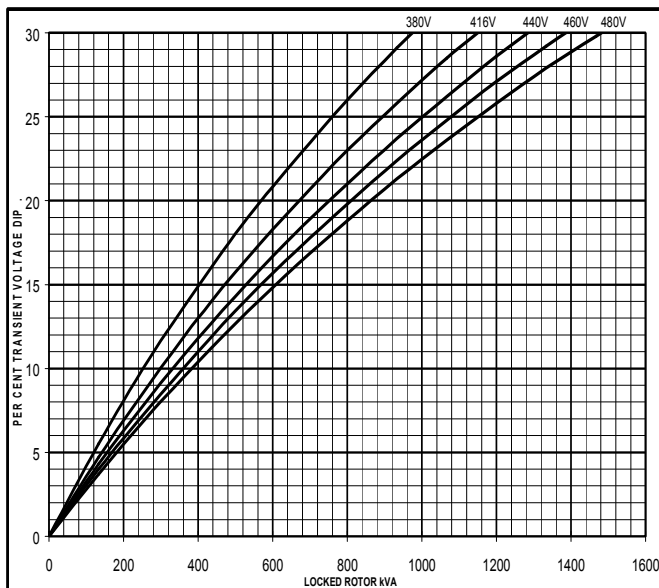


**SX**

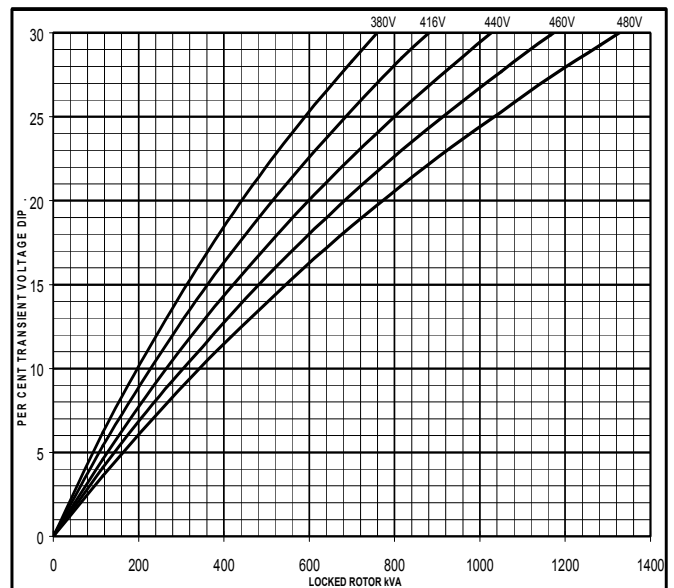


**60  
Hz**

**MX**

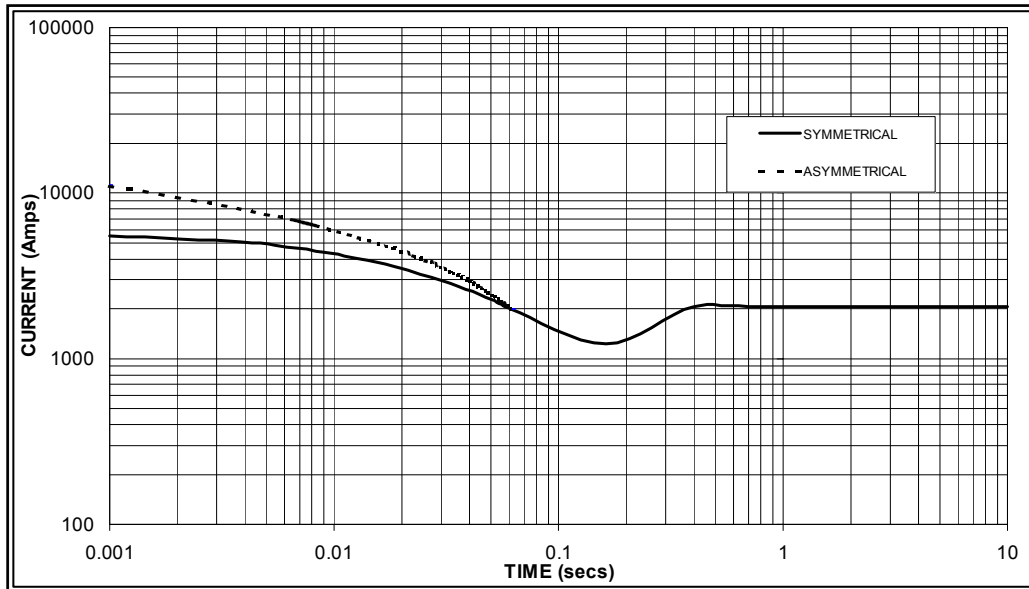


**SX**



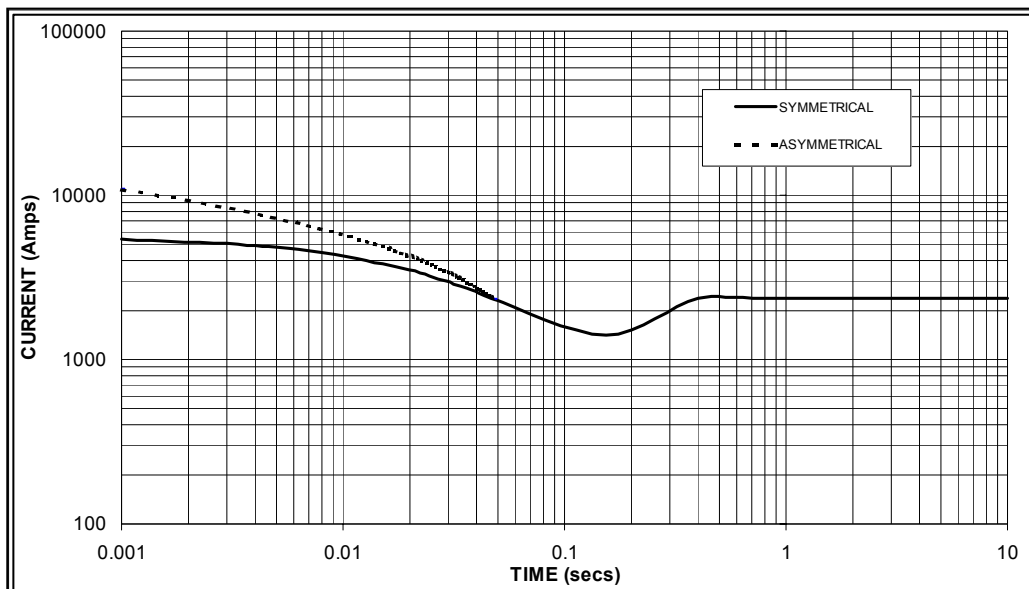
**Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed  
Based on star (wye) connection.**

**50  
Hz**



Sustained Short Circuit = 2,050 Amps

**60  
Hz**



Sustained Short Circuit = 2,350 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 1.03 | 440v    | X 1.06 |
| 415v    | X 1.05 | 460v    | X 1.12 |
| 440v    | X 1.07 | 480v    | X 1.20 |

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 :

Parallel Star = Curve current value X 2

Series Delta = Curve current value X 1.732

# HCI534C/544C

## Winding 311      0.8 Power Factor

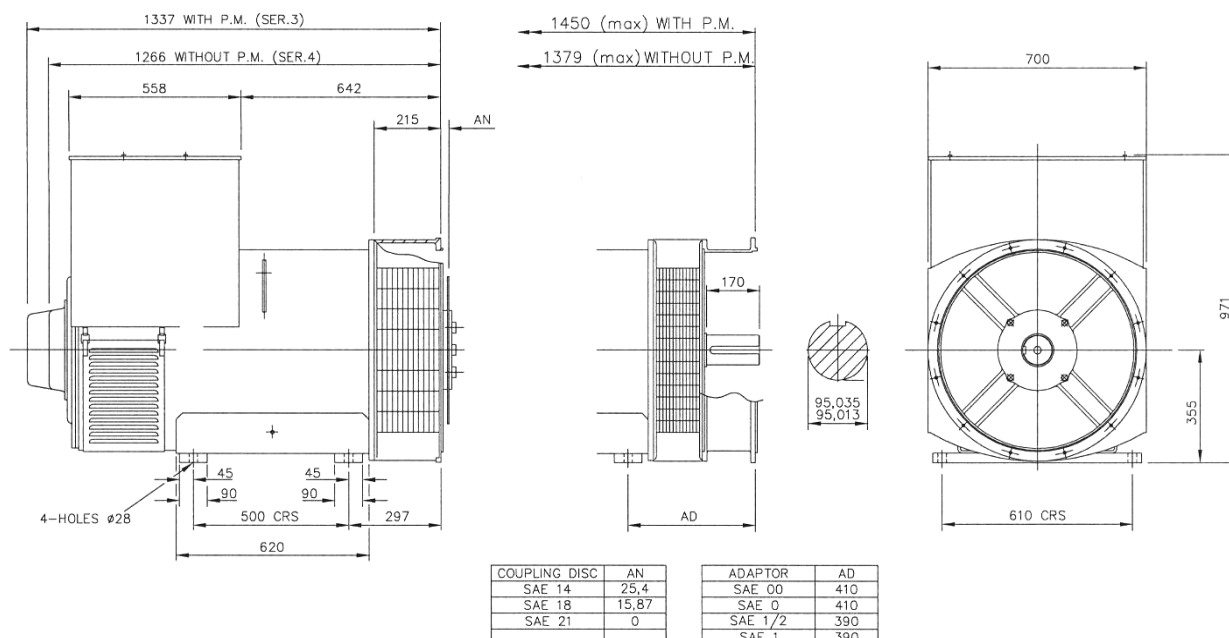


### RATINGS

| 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               | 400                | 445  | 400  | 400  | 450                | 500  | 450  | 450  | 478                | 512  | 478  | 478  | 495                | 520  | 495  | 495  |
|                   | kW                | 320                | 356  | 320  | 320  | 360                | 400  | 360  | 360  | 382                | 410  | 382  | 382  | 396                | 416  | 396  | 396  |
|                   | Efficiency (%)    | 94.5               | 94.3 | 94.8 | 94.9 | 94.0               | 93.8 | 94.4 | 94.6 | 93.8               | 93.7 | 94.2 | 94.4 | 93.6               | 93.6 | 94.1 | 94.3 |
|                   | kW Input          | 339                | 378  | 338  | 337  | 383                | 426  | 381  | 381  | 408                | 437  | 406  | 405  | 423                | 444  | 421  | 420  |

|              |                   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------|-------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>60 Hz</b> | 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  |
|              | Delta (V)         | 240  | 254  | 266  | 277  | 240  | 254  | 266  | 277  | 240  | 254  | 266  | 277  | 240  | 254  | 266  | 277  |
|              | kVA               | 481  | 500  | 531  | 538  | 525  | 550  | 581  | 594  | 550  | 581  | 613  | 625  | 569  | 600  | 631  | 644  |
|              | kW                | 385  | 400  | 425  | 430  | 420  | 440  | 465  | 475  | 440  | 465  | 490  | 500  | 455  | 480  | 505  | 515  |
|              | Efficiency (%)    | 94.3 | 94.4 | 94.4 | 94.5 | 94.0 | 94.1 | 94.1 | 94.2 | 93.8 | 93.9 | 93.9 | 94.0 | 93.6 | 93.7 | 93.7 | 93.9 |
|              | kW Input          | 408  | 424  | 450  | 455  | 447  | 468  | 494  | 504  | 469  | 495  | 522  | 532  | 486  | 512  | 539  | 549  |

### DIMENSIONS



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