

## A technical line drawing of a mechanical assembly. It features a rectangular housing with a sloped side panel. Attached to the front is a circular flange with a central hub and several mounting holes. To the left of the flange is a vertical plate with two rows of rectangular slots. The entire assembly is mounted on a base plate with four mounting holes.

## BCI184E

### 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

##### SX460 AVR - STANDARD

With this self excited control system the main stator supplies power via the Automatic Voltage Regulator (AVR) to the exciter stator. The high efficiency semiconductors 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. This rectifier is protected by a surge suppressor against surges caused, for example, by short circuit.

##### SA465 AVR

The SA465 shares all the features of the SX460, but additionally will support a range of electronic accessories, such as a 'droop' Current Transformer (CT) to permit parallel operation with other ac generators.

Voltage regulation is improved by use of this AVR.

##### SX421 AVR

When the SX421 AVR is supplied for use with a BC generator, it will be supplied loose for fitting in the set builder's control panel.

This AVR also operates in a self-excited system. It combines all the features of the SA465 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.

#### 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.*

# BCI184E

## WINDING 311

|                         |  |                |                        |
|-------------------------|--|----------------|------------------------|
| CONTROL SYSTEM          | SELF EXCITED   |                |                        |
| A.V.R.                  | STANDARD SX460   | OPTIONAL SA465 | SX421 (SUPPLIED LOOSE) |
| VOLTAGE REGULATION      | ± 1.5 %  | ± 1.0 %        | ± 0.5 %                |
| SUSTAINED SHORT CIRCUIT | SELF EXCITED MACHINES DO NOT SUSTAIN A SHORT CIRCUIT CURRENT |                |                        |

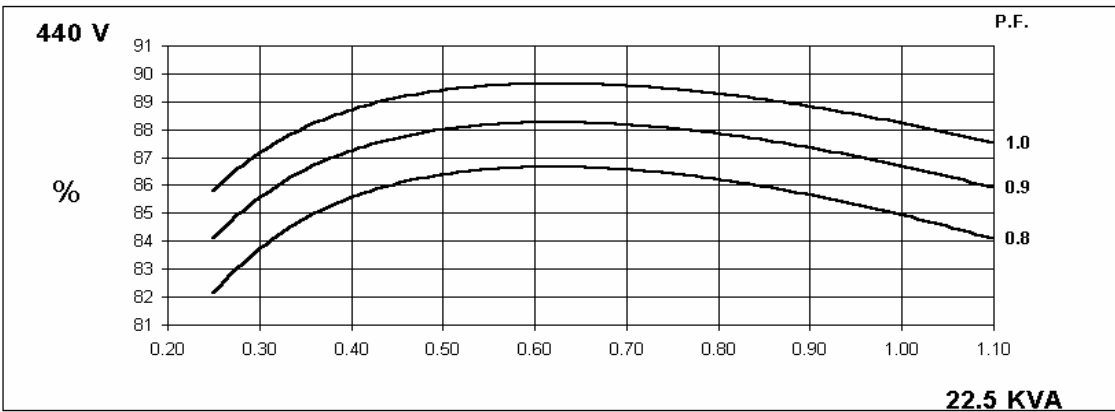
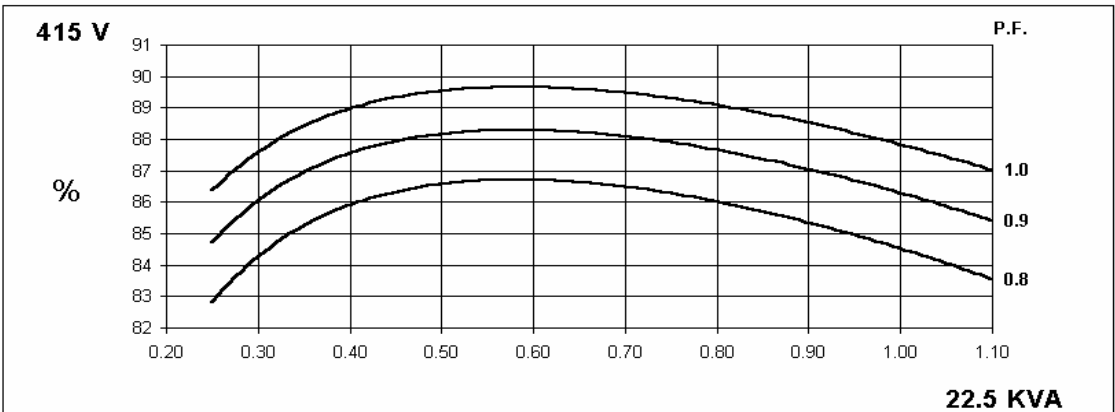
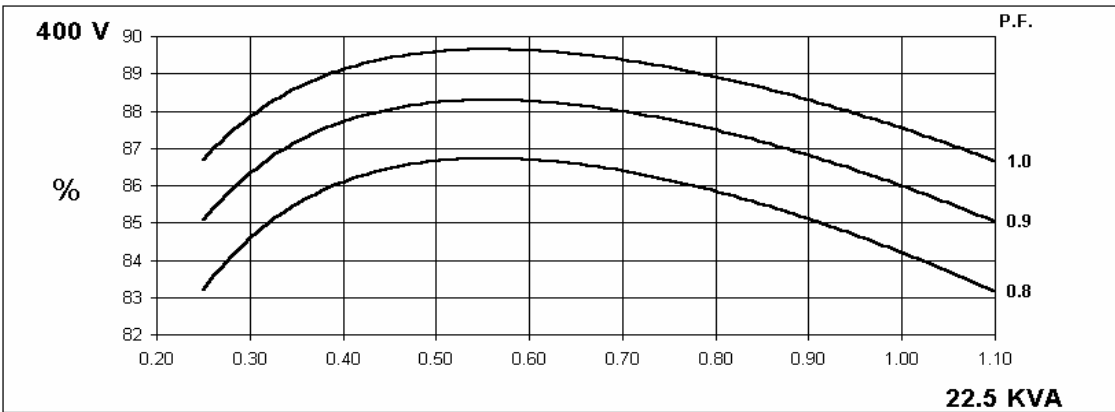
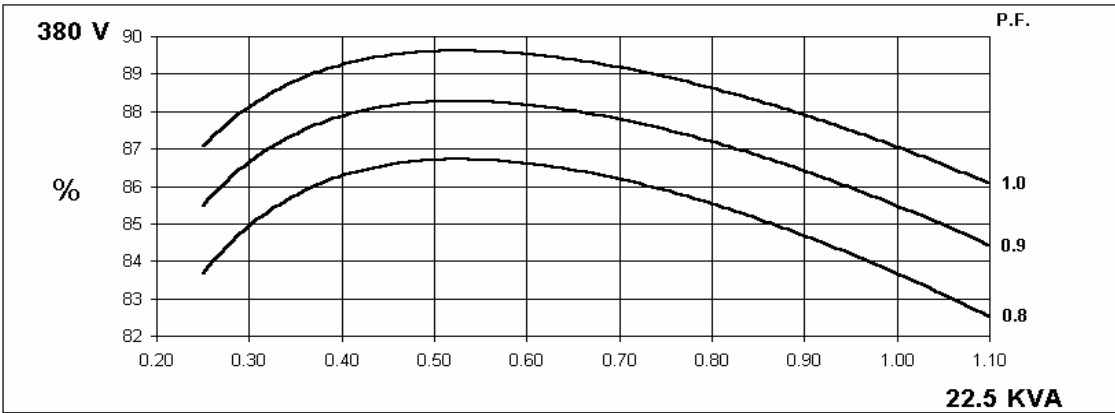
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|--|--|---------|---------|---------|-----------------------------------|---------|---------|---------|
| INSULATION SYSTEM  | CLASS H  |         |         |         |                                   |         |         |         |
| PROTECTION   | IP23   |         |         |         |                                   |         |         |         |
| RATED POWER FACTOR   | 0.8  |         |         |         |                                   |         |         |         |
| STATOR WINDING   | DOUBLE LAYER CONCENTRIC  |         |         |         |                                   |         |         |         |
| WINDING PITCH  | TWO THIRDS   |         |         |         |                                   |         |         |         |
| WINDING LEADS  | 12   |         |         |         |                                   |         |         |         |
| STATOR WDG. RESISTANCE   | 0.354 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED                                   |         |         |         |                                   |         |         |         |
| ROTOR WDG. RESISTANCE  | 0.64 Ohms at 22°C  |         |         |         |                                   |         |         |         |
| EXCITER STATOR RESISTANCE  | 20 Ohms at 22°C  |         |         |         |                                   |         |         |         |
| EXCITER ROTOR RESISTANCE   | 0.105 Ohms PER PHASE 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. 6309 - 2RS. (ISO)  |         |         |         |                                   |         |         |         |
| BEARING NON-DRIVE END  | BALL. 6306 - 2RS. (ISO)  |         |         |         |                                   |         |         |         |
|  | 1 BEARING  |         |         |         | 2 BEARING                         |         |         |         |
| WEIGHT COMP. GENERATOR   | 128 kg   |         |         |         | 131 kg                            |         |         |         |
| WEIGHT WOUND STATOR  | 43.6 kg  |         |         |         | 43.6 kg                           |         |         |         |
| WEIGHT WOUND ROTOR   | 40.69 kg   |         |         |         | 41.47 kg                          |         |         |         |
| WR <sup>2</sup> INERTIA  | 0.1568 kgm <sup>2</sup>  |         |         |         | 0.1568 kgm <sup>2</sup>           |         |         |         |
| SHIPPING WEIGHTS in a crate  | 133 kg   |         |         |         | 141 kg                            |         |         |         |
| PACKING CRATE SIZE   | 84 x 59 x 75 (cm)  |         |         |         | 84 x 59 x 75 (cm)                 |         |         |         |
|  | 50 Hz  |         |         |         | 60 Hz                             |         |         |         |
| TELEPHONE INTERFERENCE   | THF<2%   |         |         |         | TIF<50                            |         |         |         |
| COOLING AIR  | 0.095 m <sup>3</sup> /sec 200 cfm  |         |         |         | 0.119 m <sup>3</sup> /sec 250 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   | 22.5   | 22.5    | 22.5    | 17.5    | 27.5                              | 28.8    | 28.8    | 30      |
| Xd DIR. AXIS SYNCHRONOUS   | 1.873  | 1.690   | 1.570   | 1.796   | 2.294                             | 2.148   | 1.965   | 1.880   |
| X'd DIR. AXIS TRANSIENT  | 0.188  | 0.170   | 0.158   | 0.180   | 0.232                             | 0.217   | 0.199   | 0.190   |
| X''d DIR. AXIS SUBTRANSIENT  | 0.122  | 0.110   | 0.102   | 0.117   | 0.146                             | 0.137   | 0.125   | 0.120   |
| Xq QUAD. AXIS REACTANCE  | 0.931  | 0.840   | 0.780   | 0.892   | 1.135                             | 1.063   | 0.972   | 0.930   |
| X''q QUAD. AXIS SUBTRANSIENT   | 0.211  | 0.190   | 0.177   | 0.202   | 0.256                             | 0.240   | 0.220   | 0.210   |
| X <sub>L</sub> LEAKAGE REACTANCE   | 0.075  | 0.068   | 0.063   | 0.072   | 0.093                             | 0.087   | 0.079   | 0.076   |
| X <sub>2</sub> NEGATIVE SEQUENCE   | 0.177  | 0.160   | 0.149   | 0.170   | 0.207                             | 0.194   | 0.178   | 0.170   |
| X <sub>0</sub> ZERO SEQUENCE   | 0.081  | 0.073   | 0.068   | 0.077   | 0.099                             | 0.093   | 0.085   | 0.081   |
| REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED |  |         |         |         |                                   |         |         |         |
| T'd TRANSIENT TIME CONST.  | 0.02 s   |         |         |         |                                   |         |         |         |
| T''d SUB-TRANSTIME CONST.  | 0.005 s  |         |         |         |                                   |         |         |         |
| T'do O.C. FIELD TIME CONST.  | 0.4 s  |         |         |         |                                   |         |         |         |
| Ta ARMATURE TIME CONST.  | 0.006 s  |         |         |         |                                   |         |         |         |
| SHORT CIRCUIT RATIO  | 1/Xd   |         |         |         |                                   |         |         |         |

**50  
Hz**

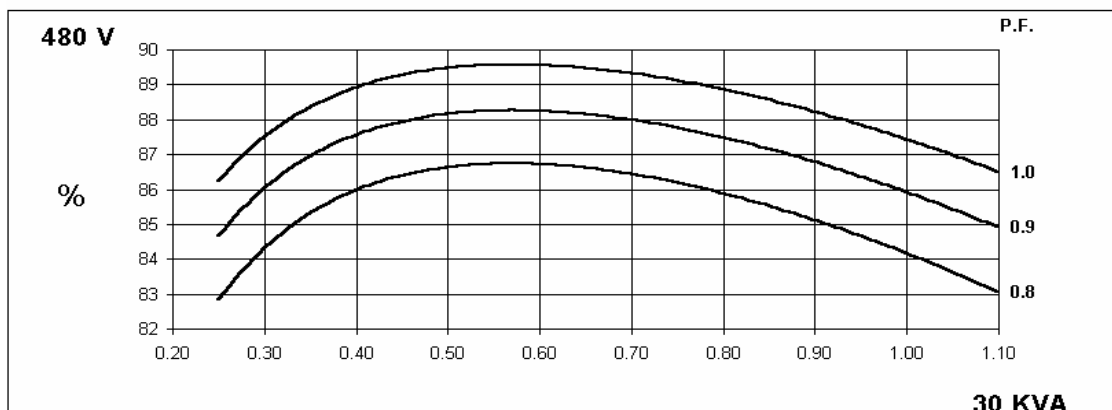
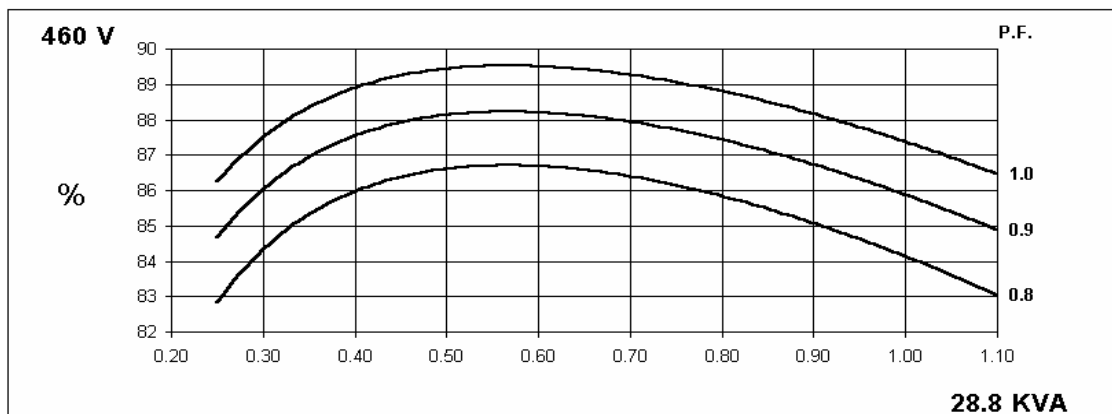
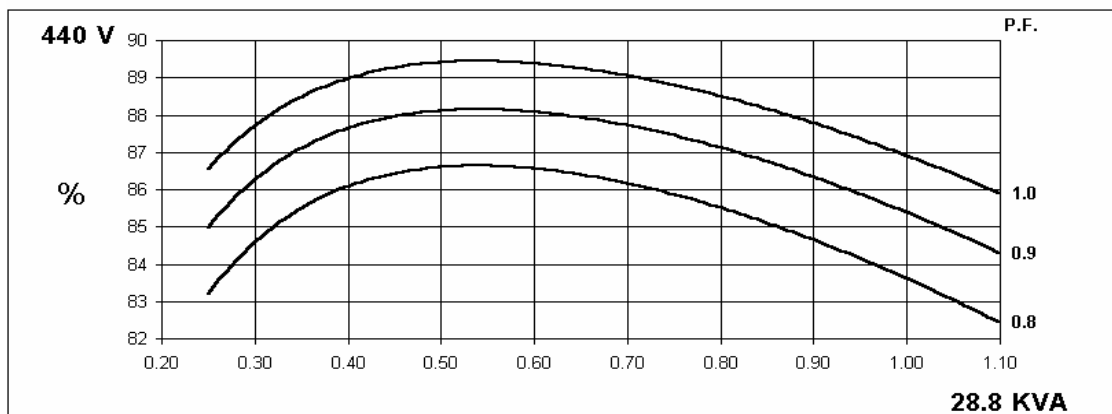
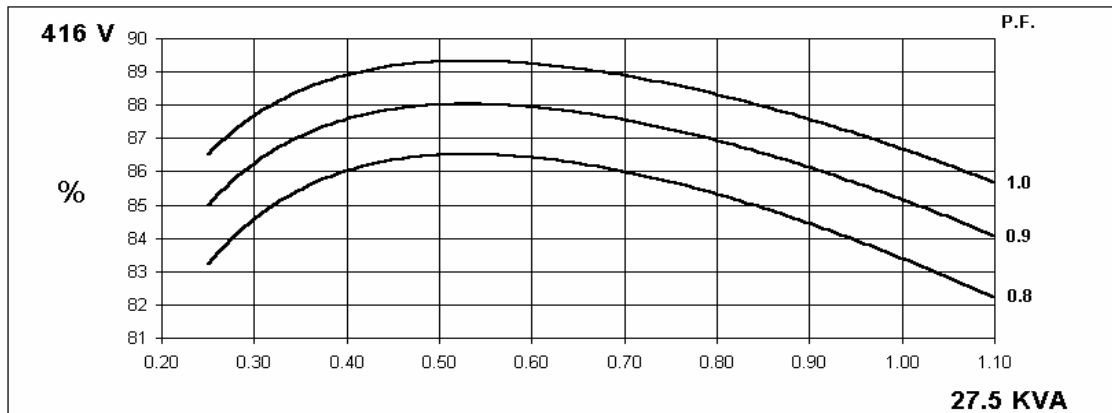
**BCI184E**  
Winding 311



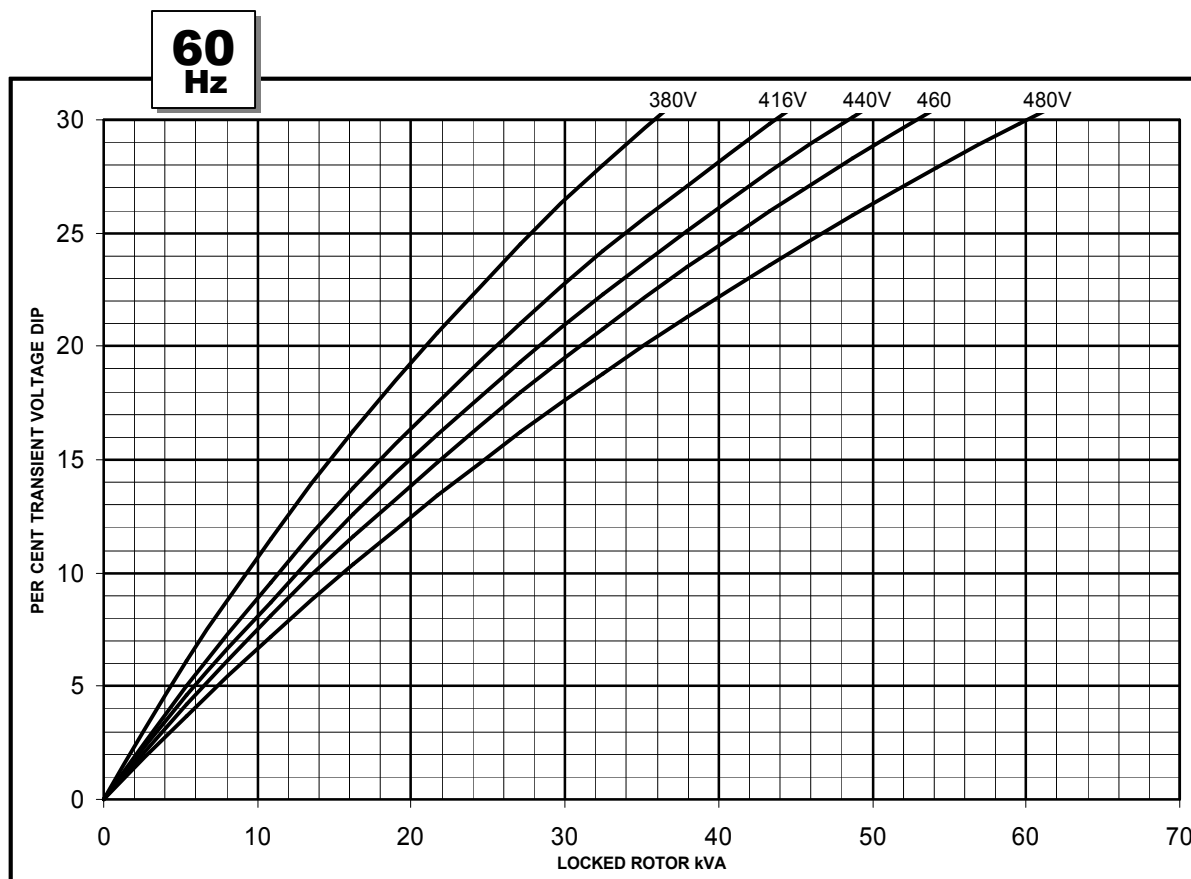
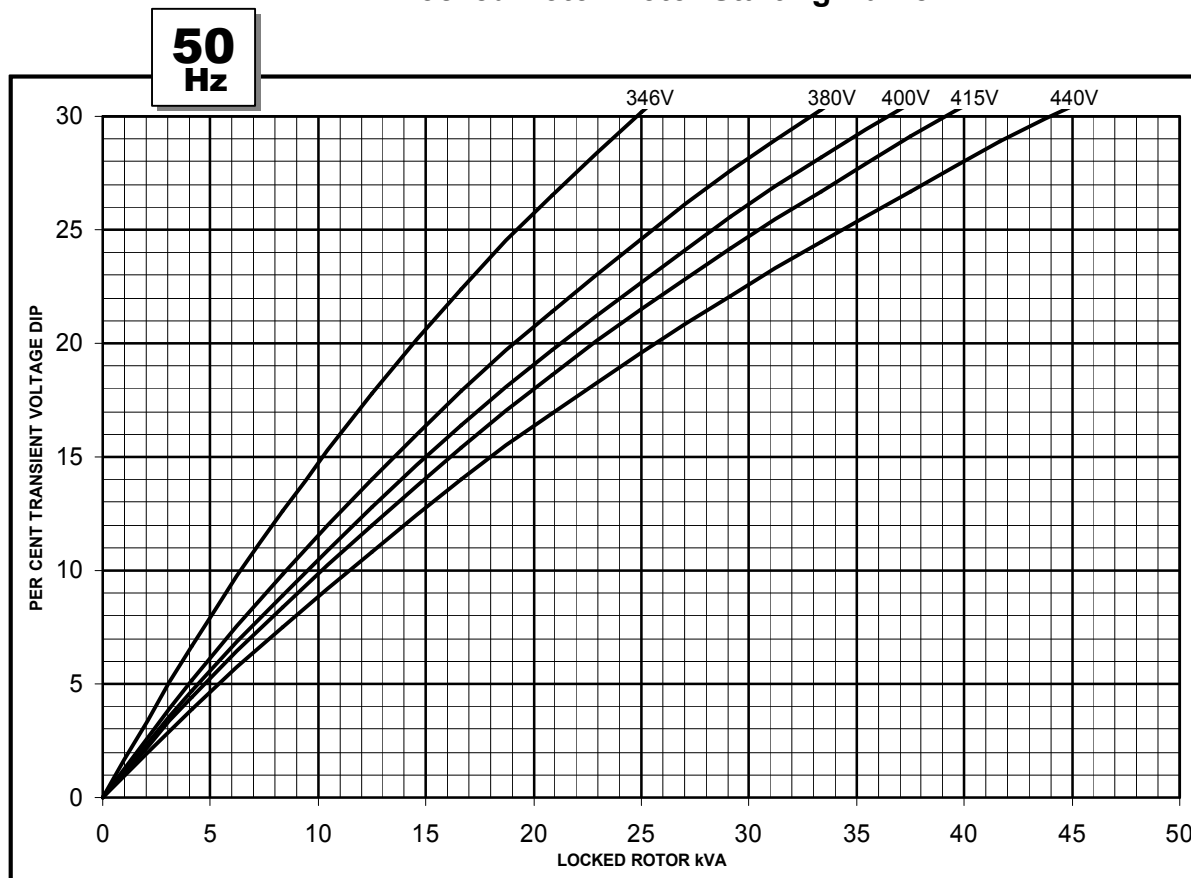
**THREE PHASE EFFICIENCY CURVES**



**THREE PHASE EFFICIENCY CURVES**



**Locked Rotor Motor Starting Curve**



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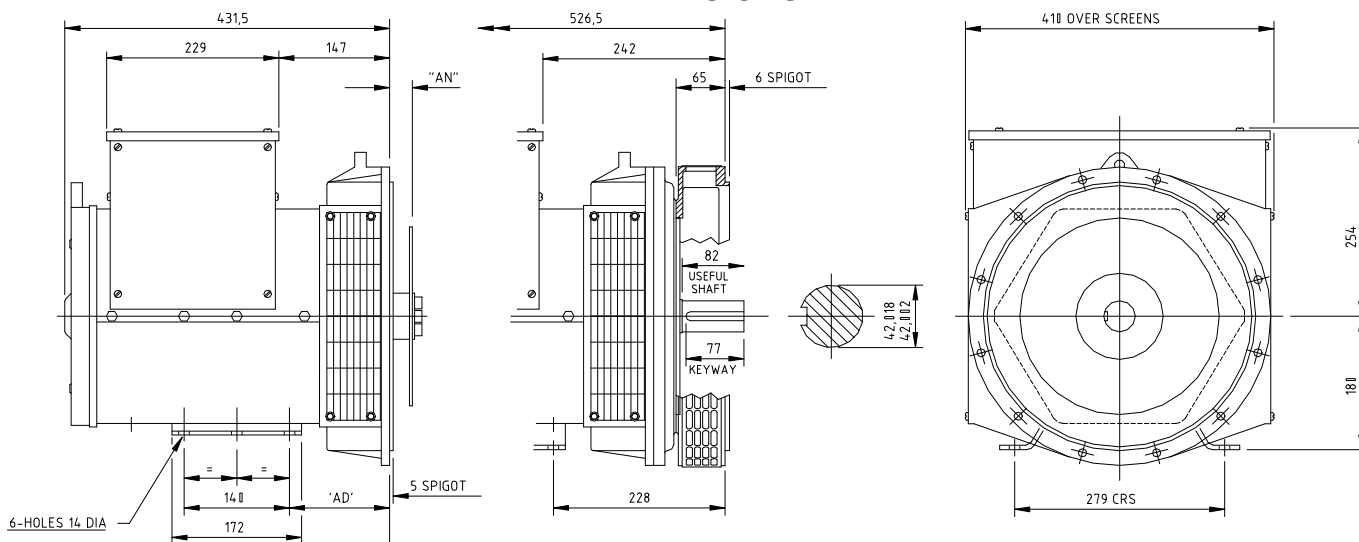
## Winding 311 / 0.8 Power Factor

### 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               |                   | 20.0               | 20.0 | 20.0 | 15.6 | 22.5               | 22.5 | 22.5 | 17.5 | N/A                |     |     |     | N/A                |     |     |     |
| kW                |                   | 16.0               | 16.0 | 16.0 | 12.5 | 18.0               | 18.0 | 18.0 | 14.0 |                    |     |     |     |                    |     |     |     |
| Efficiency (%)    |                   | 84.8               | 85.2 | 85.4 | 85.7 | 83.7               | 84.2 | 84.5 | 84.9 |                    |     |     |     |                    |     |     |     |
| kW Input          |                   | 18.9               | 18.8 | 18.7 | 18.7 | 21.5               | 21.4 | 21.3 | 21.2 |                    |     |     |     |                    |     |     |     |

|              |                   |      |      |      |      |      |      |      |      |     |     |     |     |     |     |     |     |
|--------------|-------------------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| <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 |
|              | Series Delta (V)  | 240  | 254  | 266  | 277  | 240  | 254  | 266  | 277  | 240 | 254 | 266 | 277 | 240 | 254 | 266 | 277 |
|              | kVA               | 25.0 | 26.3 | 26.3 | 28.1 | 27.5 | 28.8 | 28.8 | 30.0 | N/A |     |     |     | N/A |     |     |     |
|              | kW                | 20.0 | 21.0 | 21.0 | 22.5 | 22.0 | 23.0 | 23.0 | 24.0 |     |     |     |     |     |     |     |     |
|              | Efficiency (%)    | 84.4 | 84.5 | 85.0 | 84.8 | 83.4 | 83.6 | 84.1 | 84.2 |     |     |     |     |     |     |     |     |
|              | kW Input          | 23.7 | 24.9 | 24.8 | 26.5 | 26.4 | 27.6 | 27.4 | 28.5 |     |     |     |     |     |     |     |     |

### DIMENSIONS



| COUPLING DISC | "AN"  |
|---------------|-------|
| SAE 7,5       | 31,16 |
| SAE 8         | 61,9  |
| SAE 11        | 53,98 |

| ADAPTOR | "AD"  |
|---------|-------|
| SAE 2   | 172   |
| SAE 3   | 145   |
| SAE 4   | 133   |
| SAE 5   | 133   |
| SAE 6   | 164,7 |

8 HOLES SPACED AS 12

ACHIEVED WITH SPACER PLATE 31,7mm THICK