UCI224G - Technical Data Sheet
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.

SX440 AVR
With this self-excited system the main stator provides power via the 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.

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 is built in as standard.

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.
### 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.** SX460, SX440, SX421
- **VOLTAGE REGULATION** ± 1.5 %, ± 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

### WINDING PITCH
- **TWO THIRDS**
- **WINDING LEADS** 12

### ROTOR WDG. RESISTANCE
- **0.055 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED**
- **0.94 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
- **BALL. 6315-2RS (ISO)**

### SHIPPING WEIGHTS
- **126.75 kg**
- **0.7136 kgm²**
- **IP23**
- **0.8**
- **DOUBLE LAYER CONCENTRIC**
- **TWO THIRDS**

### PACKING CRATE SIZE
- **105 x 57 x 96(cm)**
- **105 x 57 x 96(cm)**

### TELEPHONE INTERFERENCE
- **THF<2%**
- **TIF<50**

### COOLING AIR
- **0.261 m³/sec 458 cfm**
- **0.281 m³/sec 595 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**

### RVA BASE RATING FOR REACTANCE VALUES
- **85 85 85 75 93.8 97.5 100 103.8**

### Xd DIR. AXIS SYNCHRONOUS
- **2.43 2.20 2.04 1.78 2.66 2.47 2.32 2.21**
- **X'd DIR. AXIS TRANSIENT**
- **0.19 0.17 0.16 0.14 0.20 0.19 0.17 0.17**
- **X''d DIR. AXIS SUBTRANSIENT**
- **0.13 0.12 0.11 0.09 0.14 0.13 0.12 0.12**
- **Xg QUAD. AXIS REACTANCE**
- **1.12 1.01 0.94 0.82 1.22 1.13 1.06 1.01**
- **X''g QUAD. AXIS SUBTRANSIENT**
- **0.17 0.15 0.14 0.13 0.15 0.14 0.13 0.12**
- **Xl LEAKAGE REACTANCE**
- **0.07 0.06 0.06 0.05 0.08 0.07 0.07 0.07**
- **Xo NEGATIVE SEQUENCE**
- **0.16 0.14 0.13 12.00 0.15 0.14 0.13 0.12**
- **Xo ZERO SEQUENCE**
- **0.11 0.10 0.09 0.07 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.
- **0.03 s**

### T'd SUB-TRANSTIME CONST.
- **0.008 s**

### T'do O.C. FIELD TIME CONST.
- **0.75 s**

### Ta ARMATURE TIME CONST.
- **0.007 s**

### SHORT CIRCUIT RATIO
- **1/Xd**
THREE PHASE EFFICIENCY CURVES

Winding 311

UCI224G

50 Hz

380 V

89 90 91 92 93 94

0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.10

85 KVA

400 V

89 90 91 92 93 94

0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.10

85 KVA

415 V

89 90 91 92 93 94

0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.10

85 KVA

440 V

89 90 91 92 93 94

0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.10

79 KVA
Locked Rotor Motor Starting Curve

UCI224G
Winding 311

50 Hz
MX

346V                  380V              400V     415V                  440V

380V            416V       440V          460V              480V

60 Hz
MX

346V               380V         400V     415V                440V

380V               416V         440V     460V                480V
Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on star (wye) connection.

**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:

<table>
<thead>
<tr>
<th>Voltage</th>
<th>50Hz Factor</th>
<th>60Hz Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>380v</td>
<td>X 1.00</td>
<td>X 1.00</td>
</tr>
<tr>
<td>400v</td>
<td>X 1.07</td>
<td>X 1.06</td>
</tr>
<tr>
<td>415v</td>
<td>X 1.12</td>
<td>X 1.12</td>
</tr>
<tr>
<td>440v</td>
<td>X 1.18</td>
<td>X 1.17</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>3-phase</th>
<th>2-phase L-L</th>
<th>1-phase L-N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instantaneous</td>
<td>x 1.00</td>
<td>x 1.00</td>
</tr>
<tr>
<td>Minimum</td>
<td>x 1.00</td>
<td>x 1.80</td>
</tr>
<tr>
<td>Sustained</td>
<td>x 1.00</td>
<td>x 1.50</td>
</tr>
<tr>
<td>Max. sustained duration</td>
<td>10 sec.</td>
<td>5 sec.</td>
</tr>
</tbody>
</table>

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
## UCI224G

### Winding 311 / 0.8 Power Factor

#### RATINGS

<table>
<thead>
<tr>
<th></th>
<th>50 Hz</th>
<th>60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class - Temp Rise</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Series Star (V)</td>
<td>380</td>
<td>416</td>
</tr>
<tr>
<td>Parallel Star (V)</td>
<td>190</td>
<td>208</td>
</tr>
<tr>
<td>Series Delta (V)</td>
<td>220</td>
<td>240</td>
</tr>
<tr>
<td><strong>Cont. F - 105/40°C</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>kVA</td>
<td>75.0</td>
<td>416</td>
</tr>
<tr>
<td>kW</td>
<td>60.0</td>
<td>70.0</td>
</tr>
<tr>
<td>Efficiency (%)</td>
<td>90.3</td>
<td>90.0</td>
</tr>
<tr>
<td>kW Input</td>
<td>66.4</td>
<td>77.1</td>
</tr>
<tr>
<td><strong>Cont. H - 125/40°C</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>kVA</td>
<td>85.0</td>
<td>440</td>
</tr>
<tr>
<td>kW</td>
<td>68.0</td>
<td>72.0</td>
</tr>
<tr>
<td>Efficiency (%)</td>
<td>90.7</td>
<td>91.0</td>
</tr>
<tr>
<td>kW Input</td>
<td>66.2</td>
<td>79.1</td>
</tr>
<tr>
<td><strong>Standby - 150/40°C</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>kVA</td>
<td>87.5</td>
<td>500</td>
</tr>
<tr>
<td>kW</td>
<td>70.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Efficiency (%)</td>
<td>90.8</td>
<td>90.5</td>
</tr>
<tr>
<td>kW Input</td>
<td>78.0</td>
<td>82.4</td>
</tr>
<tr>
<td><strong>Standby - 163/27°C</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>kVA</td>
<td>90.8</td>
<td>530</td>
</tr>
<tr>
<td>kW</td>
<td>81.0</td>
<td>53.0</td>
</tr>
<tr>
<td>Efficiency (%)</td>
<td>90.9</td>
<td>90.6</td>
</tr>
<tr>
<td>kW Input</td>
<td>89.8</td>
<td>94.1</td>
</tr>
</tbody>
</table>

#### DIMENSIONS

- **A (WITH P.M.C.)**
- **B (WITHOUT P.M.C.)**
- **C**
- **D**
- **E**
- **F**

### SINGLE BEARING ADAPTORS

<table>
<thead>
<tr>
<th>ADAPTOR</th>
<th>A (mm)</th>
<th>B (mm)</th>
<th>C (mm)</th>
<th>D (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAE 1</td>
<td>850.3</td>
<td>784.3</td>
<td>345.3</td>
<td>177.3</td>
</tr>
<tr>
<td>SAE 2</td>
<td>840.0</td>
<td>782.0</td>
<td>343.0</td>
<td>177.0</td>
</tr>
<tr>
<td>SAE 3</td>
<td>840.0</td>
<td>782.0</td>
<td>343.0</td>
<td>177.0</td>
</tr>
<tr>
<td>SAE 4</td>
<td>840.0</td>
<td>782.0</td>
<td>343.0</td>
<td>177.0</td>
</tr>
</tbody>
</table>

### COUPLING DISCS

<table>
<thead>
<tr>
<th>DISC</th>
<th>AN</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAE 1</td>
<td>81.0</td>
</tr>
<tr>
<td>SAE 2</td>
<td>81.0</td>
</tr>
<tr>
<td>SAE 3</td>
<td>84.0</td>
</tr>
<tr>
<td>SAE 4</td>
<td>85.6</td>
</tr>
</tbody>
</table>

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