KTA19-G4

Description

The KTA19-Series benefits from years of technical development and improvement to bring customers an innovative and future proof diesel engine that keeps pace with ever changing generator set requirements.

Recognised globally for its performance under even the most severe climatic conditions, the KTA19-Series is widely acknowledged as the most robust and cost-effective diesel engine in its power range for the generator set market.

This engine has been built to comply with CE certification.

This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Features

Turbocharger – Cummins Turbo technologies (CTT) exhaust gas driven turbocharger mounted at top of engine.


Aftercooler – Large capacity aftercooler results in cooler, denser intake air for more efficient combustion and reduced internal stresses for longer life.

Cylinder Block – Alloy cast iron with removable wet liners. Cross bolt support to main bearing cap provides extra strength and stability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

1500 rpm (50 Hz Ratings)

<table>
<thead>
<tr>
<th>Gross Engine Output</th>
<th>Net Engine Output</th>
<th>Typical Generator Set Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standby Prime Base</td>
<td>Standby Prime Base</td>
<td>Standby (ESP) Prime (PRP) Base (COP)</td>
</tr>
<tr>
<td>kWm/BHP</td>
<td>kWm/BHP</td>
<td>kW</td>
</tr>
<tr>
<td>504/675</td>
<td>488/600</td>
<td>355/475</td>
</tr>
</tbody>
</table>

1800 rpm (60 Hz Ratings)

<table>
<thead>
<tr>
<th>Gross Engine Output</th>
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<tr>
<td>kWm/BHP</td>
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<td>kW</td>
</tr>
<tr>
<td>563/755</td>
<td>507/680</td>
<td>429/575</td>
</tr>
</tbody>
</table>
### General Engine Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>4 cycle, in-line, Turbo Charged</td>
</tr>
<tr>
<td>Bore mm</td>
<td>159</td>
</tr>
<tr>
<td>Stroke mm</td>
<td>159</td>
</tr>
<tr>
<td>Displacement Litre</td>
<td>18.9 litre</td>
</tr>
<tr>
<td>Cylinder Block</td>
<td>Cast iron, 6 cylinder</td>
</tr>
<tr>
<td>Battery Charging</td>
<td>35A</td>
</tr>
<tr>
<td>Starting Voltage</td>
<td>24V</td>
</tr>
<tr>
<td>Fuel System</td>
<td>Direct injection</td>
</tr>
<tr>
<td>Fuel Filter</td>
<td>Spin-on fuel filters with water separator</td>
</tr>
<tr>
<td>Lube Oil Filter Type(s)</td>
<td>Spin-on full flow filter</td>
</tr>
<tr>
<td>Lube Oil Capacity (l)</td>
<td>50</td>
</tr>
<tr>
<td>Flywheel Dimensions</td>
<td>SAE 0</td>
</tr>
</tbody>
</table>

### Coolpac Performance Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling System Design</td>
<td>Jacket Water After Cooled</td>
</tr>
<tr>
<td>Coolant Ratio</td>
<td>50% ethylene glycol; 50% water</td>
</tr>
<tr>
<td>Coolant Capacity (l)</td>
<td>50</td>
</tr>
<tr>
<td>Limiting Ambient Temp (°C)**</td>
<td>Engine only – not applicable</td>
</tr>
<tr>
<td>Fan Power (kWm)</td>
<td></td>
</tr>
<tr>
<td>Cooling System Air Flow (m³/s)**</td>
<td>Engine only – not applicable</td>
</tr>
<tr>
<td>Air Cleaner Type</td>
<td>Dry replaceable element with restriction indicator</td>
</tr>
</tbody>
</table>

** @ 13 mm H²O

### Weight & Dimensions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length (mm)</td>
<td>1859</td>
</tr>
<tr>
<td>Width (mm)</td>
<td>868</td>
</tr>
<tr>
<td>Height (mm)</td>
<td>1728</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>1855</td>
</tr>
</tbody>
</table>

### Fuel Consumption 1500 rpm (50 Hz)

<table>
<thead>
<tr>
<th>Power</th>
<th>kWm</th>
<th>BHP</th>
<th>L/ph</th>
<th>US gal/ph</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standby Power</td>
<td>100</td>
<td>504</td>
<td>675</td>
<td>121</td>
</tr>
<tr>
<td>Prime Power</td>
<td>100</td>
<td>448</td>
<td>600</td>
<td>107</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>336</td>
<td>450</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>224</td>
<td>300</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>112</td>
<td>150</td>
<td>30</td>
</tr>
<tr>
<td>Continuous Power</td>
<td>100</td>
<td>355</td>
<td>475</td>
<td>86</td>
</tr>
</tbody>
</table>

### Fuel Consumption 1800 rpm (60 Hz)

<table>
<thead>
<tr>
<th>Power</th>
<th>kWm</th>
<th>BHP</th>
<th>L/ph</th>
<th>US gal/ph</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standby Power</td>
<td>100</td>
<td>563</td>
<td>755</td>
<td>136</td>
</tr>
<tr>
<td>Prime Power</td>
<td>100</td>
<td>507</td>
<td>680</td>
<td>122</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>380</td>
<td>510</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>254</td>
<td>340</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>127</td>
<td>170</td>
<td>36</td>
</tr>
<tr>
<td>Continuous Power</td>
<td>100</td>
<td>429</td>
<td>575</td>
<td>104</td>
</tr>
</tbody>
</table>

### Ratings Definitions

**Emergency Standby Power (ESP):** Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

**Limited-Time Running Power (LTP):** Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

**Prime Power (PRP):** Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

**Base Load (Continuous) Power (COP):** Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.
HCl 534D/544D - 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
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.
### 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:** 0.005 Ohms per phase at 22°C (series star connected)

### Rotor Wdg. Resistance
- 1.77 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

### Packing Crate Size
- 166 x 87 x 124 (cm)
- 166 x 87 x 124 (cm)

### 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
- 500 500 500 500 500 500 575 594 625 644

### Reactances
- 1/Xd
- X'd Dir. Axis Synchronous
- X'd Dir. Axis Transient
- X''d Dir. Axis Subtransient
- Xq Quad. Axis Reactance
- X''q Quad. Axis Subtransient
- Xl Leakage Reactance
- Xc Negative Sequence
- Xc Zero Sequence

### Reactances Are Saturated
- Values are per unit at rating and voltage indicated

### T'd Transient Time Const.
- 0.08s

### T'd Sub-Transilne Const.
- 0.012s

### T'do O.C. Field Time Const.
- 2.2s

### Ta Armature Time Const.
- 0.018s

### Short Circuit Ratio
- 1/Xd
THREE PHASE EFFICIENCY CURVES

**HCI534D/544D**

Winding 311

60 Hz

575 KVA

![Efficiency Curve 416 V](image)

![Efficiency Curve 440 V](image)

![Efficiency Curve 460 V](image)

![Efficiency Curve 480 V](image)

594 KVA

625 KVA

644 KVA
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**

<table>
<thead>
<tr>
<th>TIME (secs)</th>
<th>CURRENT (Amps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.001</td>
<td>10000</td>
</tr>
<tr>
<td>0.01</td>
<td>10000</td>
</tr>
<tr>
<td>0.1</td>
<td>10000</td>
</tr>
<tr>
<td>1</td>
<td>10000</td>
</tr>
<tr>
<td>10</td>
<td>10000</td>
</tr>
</tbody>
</table>

SYMERTICAL : -
ASYMERTICAL : -

Sustained Short Circuit = 2,400 Amps

**60 Hz**

<table>
<thead>
<tr>
<th>TIME (secs)</th>
<th>CURRENT (Amps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.001</td>
<td>10000</td>
</tr>
<tr>
<td>0.01</td>
<td>10000</td>
</tr>
<tr>
<td>0.1</td>
<td>10000</td>
</tr>
<tr>
<td>1</td>
<td>10000</td>
</tr>
<tr>
<td>10</td>
<td>10000</td>
</tr>
</tbody>
</table>

SYMIRMICAL : -
ASYMERMICAL : -

Sustained Short Circuit = 2,500 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:

<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 1.06</td>
<td>X 1.06</td>
</tr>
<tr>
<td>415v</td>
<td>X 1.09</td>
<td>X 1.12</td>
</tr>
<tr>
<td>440v</td>
<td>X 1.12</td>
<td>X 1.20</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>Type</th>
<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 0.87</td>
<td>x 1.30</td>
</tr>
<tr>
<td>Minimum</td>
<td>x 1.00</td>
<td>x 1.80</td>
<td>x 3.20</td>
</tr>
<tr>
<td>Sustained</td>
<td>x 1.00</td>
<td>x 1.50</td>
<td>x 2.50</td>
</tr>
<tr>
<td>Max. sustained duration</td>
<td>10 sec.</td>
<td>5 sec.</td>
<td>2 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
### RATINGS

<table>
<thead>
<tr>
<th>Class - Temp Rise</th>
<th>Cont. F - 105/40°C</th>
<th>Cont. H - 125/40°C</th>
<th>Standby - 150/40°C</th>
<th>Standby - 163/27°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 Hz Series Star (V)</td>
<td>380 400 415 440</td>
<td>380 400 415 440</td>
<td>380 400 415 440</td>
<td>380 400 415 440</td>
</tr>
<tr>
<td>Parallel Star (V)</td>
<td>190 200 208 220</td>
<td>190 200 208 220</td>
<td>190 200 208 220</td>
<td>190 200 208 220</td>
</tr>
<tr>
<td>Series Delta (V)</td>
<td>220 230 240 254</td>
<td>220 230 240 254</td>
<td>220 230 240 254</td>
<td>220 230 240 254</td>
</tr>
<tr>
<td>kVA</td>
<td>450 495 450 450</td>
<td>500 550 500 500</td>
<td>515 575 515 515</td>
<td>530 590 530 530</td>
</tr>
<tr>
<td>kW</td>
<td>360 396 360 360</td>
<td>400 440 400 400</td>
<td>412 460 412 412</td>
<td>424 472 424 424</td>
</tr>
<tr>
<td>Efficiency (%)</td>
<td>94.8 94.7 95.0 95.1</td>
<td>94.5 94.3 94.8 94.9</td>
<td>94.4 94.1 94.7 94.9</td>
<td>94.2 94.0 94.6 94.8</td>
</tr>
<tr>
<td>kW Input</td>
<td>380 418 379 379</td>
<td>423 467 422 421</td>
<td>436 489 435 434</td>
<td>450 502 448 447</td>
</tr>
</tbody>
</table>

| 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 |
| Delta (V) | 240 254 266 277 | 240 254 266 277 | 240 254 266 277 | 240 254 266 277 |
| kVA               | 519 538 563 588 | 575 594 625 644 | 588 625 655 675 | 606 644 673 694 |
| kW                | 415 430 450 470 | 460 475 500 515 | 470 500 524 540 | 485 515 538 555 |
| Efficiency (%)    | 94.7 94.8 94.9 94.9 | 94.5 94.6 94.6 94.7 | 94.4 94.4 94.5 94.5 | 94.3 94.3 94.4 94.4 |
| kW Input          | 438 454 475 496 | 487 502 529 544 | 498 530 554 571 | 514 546 570 588 |

### DIMENSIONS

![DIMENSIONS Diagram](image)

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