

# 31.8L



# ENERGY

|                 |
|-----------------|
| [Stoic.]        |
| 56100023 Rev: 2 |

| General Engine Data <sup>5</sup>          |  |     |       |      |   |     |      |      |  |      |      |       |                                    |     |     |    |    |     |    |
|---|--|-----|-------|------|---|-----|------|------|--|------|------|-------|------------------------------------|-----|-----|----|----|-----|----|
| Type                                      | V-Series   |     |       |      | Flywheel housing                        |     |      |      | SAE No.0   |      |      |       |                                    |     |     |    |    |     |    |
| Number of cylinders                       | 12   |     |       |      | Flywheel                                |     |      |      | SAE No.18  |      |      |       |                                    |     |     |    |    |     |    |
| Aspiration                                | Charged Cooled Forced Induction                  |     |       |      | Dry Weight (Fan to Flywheel)            |     |      |      | lb   | kg   | 6888 | 3124  |                                    |     |     |    |    |     |    |
| Firing Order                              | 1 - 8 - 5 - 10 - 3 - 7 - 6 - 11 - 2 - 9 - 4 - 12 |     |       |      | Wet Weight (Fan to Flywheel)            |     |      |      | lb   | kg   | 7384 | 3349  |                                    |     |     |    |    |     |    |
| Rotation Viewed from Flywheel             | Counter Clockwise                                |     |       |      | CG From Rear Face of Block              |     |      |      | in   | mm   | 37.0 | 941   |                                    |     |     |    |    |     |    |
| Bore                                      | in   | mm  | 5.906 | 150  | CG Above Crank Centerline               |     |      |      | in   | mm   | 0    | 0     |                                    |     |     |    |    |     |    |
| Stroke                                    | in   | mm  | 5.906 | 150  | Oil Specification                       |     |      |      | SAE 15W-40 Low Ash Gas engine oil (.25-.5% by wt), API CD/CF or higher |      |      |       |                                    |     |     |    |    |     |    |
| Displacement                              | in <sup>3</sup>                                  | L   | 1941  | 31.8 | Engine Oil Capacity <sup>8</sup>        |     |      |      | Min  | qts  | L    | 95    | 90                                 |     |     |    |    |     |    |
| Compression Ratio                         | 10.5 : 1   |     |       |      | Max                                     |     |      |      | qts  | L    | 129  | 122   |                                    |     |     |    |    |     |    |
| Exhaust Manifold Type                     | Water Cooled                                     |     |       |      | ECU Oil Pressure Warning <sup>6</sup>   |     |      |      | psi  | kPa  | 57   | 393   |                                    |     |     |    |    |     |    |
| Turbo Exhaust Outlet Pipe Size            | in   | mm  | 3.5   | 89   | ECU Oil Pressure Shut Down <sup>6</sup> |     |      |      | psi  | kPa  | 47   | 324   |                                    |     |     |    |    |     |    |
| Catalyst Inlet Size                       | in   | mm  | 5     | 127  | Oil Pressure at 1000 rpm (Idle)         |     |      |      | Min  | psi  | kPa  | 74    | 510                                |     |     |    |    |     |    |
| Catalyst Dp                               | in-H <sub>2</sub> O                              | kPa | 20.5  | 5.1  | Max                                     |     |      |      | psi  | kPa  | 82   | 565   |                                    |     |     |    |    |     |    |
| Maximum Allowable Exhaust Back Pressure   | in-Hg  | kPa | 3.0   | 10.2 | Max Allowable Oil Temperature           |     |      |      | °F   | °C   | 250  | 121   |                                    |     |     |    |    |     |    |
| Maximum EPR Rated Pressure                | psi  | kPa | 1.0   | 6.9  | Coolant Capacity (Engine only)          |     |      |      | gal  | L    | 29.1 | 110.0 |                                    |     |     |    |    |     |    |
| Maximum Operating pressure to EPR         | in-H <sub>2</sub> O                              | kPa | 11.0  | 2.7  | Coolant Capacity (Radiator only)        |     |      |      | gal  | L    | 39.0 | 147.6 |                                    |     |     |    |    |     |    |
| Minimum Operating pressure to EPR         | in-H <sub>2</sub> O                              | kPa | 7.0   | 1.7  | Radiator Weight (Dry)                   |     |      |      | lb   | kg   | 1275 | 578   |                                    |     |     |    |    |     |    |
| Minimum Gas Supply Pipe Size <sup>5</sup> | in   | mm  | 3     | 76   | Standard Thermostat Range               |     |      |      | Normal Operation Temperature <sup>9</sup>                              |      |      | °F    | °C                                 | 176 | 80  |    |    |     |    |
| Maximum Pressure Drop Across CAC          | psi  | kPa | 1     | 6.9  | Clean Air Filter                        |     |      |      | in-H <sub>2</sub> O  | kPa  | 5    | 1.24  | Full Open Temperature <sup>9</sup> |     |     | °F | °C | 198 | 92 |
| Max Allowable Intake Restriction          | Dirty Air Filter                                 |     |       |      | in-H <sub>2</sub> O                     | kPa | 15   | 3.73 | ECU Coolant Temp Warning   |      |      |       | °F                                 | °C  | 203 | 95 |    |     |    |
| Spark Plug Part Number                    | Denso GK3-5                                      |     |       |      | Spark Plug Coil - Primary Resistance    |     |      |      | Ohms   |      |      |       | 0.59Ω ± 10%                        |     |     |    |    |     |    |
| Standard Spark Plug Gap <sup>10</sup>     | in   | mm  | 0.012 | 0.3  | Battery Voltage                         |     |      |      | Volts  |      |      |       | 24                                 |     |     |    |    |     |    |
| Battery Voltage                           | Starter Motor Power                              |     |       |      | HP                                      | kW  | 15.7 | 11.7 | 50°C Ambient Capable <sup>11</sup>                                     |      |      |       | Pass                               |     |     |    |    |     |    |
| Starter Motor Power                       | CAC Rise Above Ambient Specified                 |     |       |      | psi                                     |     |      |      | kPa  | 7.25 | 50   |       |                                    |     |     |    |    |     |    |

| Performance Data 60Hz <sup>3,5</sup> |        |     |      |     |                     |  |  |  |                                    |       |     |      |      |                     |       |      |
|--------------------------------------|--------|-----|------|-----|---------------------|--|--|--|------------------------------------|-------|-----|------|------|---------------------|-------|------|
| Nominal Engine Speed                 | RPM    |     |      |     | 1800                |  |  |  | Water Pump Speed                   |       |     |      | RPM  |                     | 3705  |      |
| Mean Piston Speed                    | ft/min | m/s | 1772 | 9.0 | Engine Coolant Flow |  |  |  | gal/min                            | L/min | 361 | 1368 |      |                     |       |      |
| RPM Range (Min-Max) ISO 8528-5 G1    | RPM    |     |      |     | 1778 - 1823         |  |  |  | Cooling Fan Power <sup>11</sup>    |       |     |      | HP   | kW                  | 62.8  | 47   |
| Charging Alternator Voltage          | Volts  |     |      |     | 28                  |  |  |  | Cooling Fan Speed                  |       |     |      | RPM  |                     | 1050  |      |
| Charging Alternator Current          | Amps   |     |      |     | 55                  |  |  |  | Cooling Fan Air Flow <sup>11</sup> |       |     |      | SCFM | m <sup>3</sup> /min | 65100 | 1843 |

| NG 60hz Prime Load                           | Load       |                     | 100%  |      | 75%   |      | 50%   |      | 25%   |     |
|--|------------|---------------------|-------|------|-------|------|-------|------|-------|-----|
|  | HP         | kWm                 | 821   | 612  | 616   | 459  | 410   | 306  | 206   | 154 |
| Power Rating <sup>1,2,3,4</sup> Per ISO 3046 | psi        | bar                 | 186   | 12.8 | 140   | 9.6  | 93    | 6.4  | 47    | 3.2 |
| MEP (@ rated Load on NG)                     | lb/hr      | kg/hr               | 310   | 141  | 242   | 110  | 178   | 81   | 109   | 50  |
| Fuel Consumption <sup>3,4,7</sup>            | lb/(hp-hr) | g/(kW-hr)           | 0.378 | 230  | 0.393 | 239  | 0.435 | 265  | 0.530 | 323 |
| BSFC   | °F         | °C                  | 1138  | 615  | 1084  | 585  | 1040  | 560  | 999   | 537 |
| Turbine Outlet Temperature                   | lb/hr      | kg/hr               | 5472  | 2482 | 4323  | 1961 | 3175  | 1440 | 2030  | 921 |
| Exhaust Mass Flow (entire engine)            | ACFM       | m <sup>3</sup> /min | 3220  | 91   | 2409  | 68   | 1683  | 48   | 1046  | 30  |
| Exhaust Flow at Turbine Outlet Conditions    |            |                     |       |      |       |      |       |      |       |     |

| Air Induction System <sup>5</sup>              |       |                     |      |      |      |      |      |      |      |     |
|--|-------|---------------------|------|------|------|------|------|------|------|-----|
| Combustion Air required (entire engine)        | lb/hr | kg/hr               | 5162 | 2341 | 4082 | 1851 | 2997 | 1359 | 1920 | 871 |
| Combustion Air Volume Required (entire engine) | ACFM  | m <sup>3</sup> /min | 1125 | 32   | 890  | 25   | 653  | 18   | 419  | 12  |
| Compressor Outlet Temperature <sup>2</sup>     | °F    | °C                  | 260  | 127  | 236  | 113  | 187  | 86   | 132  | 55  |

| Thermal Balance <sup>5</sup>                 |         |    |        |      |       |      |       |      |       |     |
|--|---------|----|--------|------|-------|------|-------|------|-------|-----|
| Total Fuel                                   | BTU/min | kW | 106753 | 1877 | 83790 | 1473 | 61277 | 1078 | 39049 | 687 |
| Mechanical Power                             | BTU/min | kW | 34804  | 612  | 26103 | 459  | 17402 | 306  | 8751  | 154 |
| Heat Rejected to Cooling Water at Rated Load | BTU/min | kW | 29142  | 512  | 24385 | 429  | 19593 | 345  | 14160 | 249 |
| Heat Rejection CAC at Rated Power            | BTU/min | kW | 3229   | 57   | 2075  | 36   | 1120  | 20   | 352   | 6   |
| Heat Rejection to Exhaust (LHV to 150C)      | BTU/min | kW | 22577  | 397  | 16594 | 292  | 11314 | 199  | 6578  | 116 |
| Engine Radiated Heat                         | BTU/min | kW | 17001  | 299  | 14634 | 257  | 11849 | 208  | 9207  | 162 |

<sup>1</sup> Standby and overload ratings based on ISO 3046 gross flywheel power.

<sup>2</sup> Technical data based on ISO 3046-1 standards of 77°F(25°C), absolute pressure 14.5Psi(100kPa) and 30% relative humidity.

<sup>3</sup> Production tolerances in engines and installed components can account for power variations of ± 5%. Altitude, temperature and excessive exhaust and intake restrictions should be applied to power calculations.

<sup>4</sup> All fuel and thermal calculations unless otherwise noted are done at ISO 3046 rated load using LHV for NG of 48.17 MJ/kg.

<sup>5</sup> All values in the following section are provided for informational purpose only and are non-binding.

<sup>6</sup> >1400RPM.

<sup>7</sup> See PSI Energy Technical Spec. 56300019 - Fuel Standard.

<sup>8</sup> Standard Sump Capacity.

<sup>9</sup> ± 2 degrees Celsius.

<sup>10</sup> ± 0.002" or 0.05mm.

<sup>11</sup> At 0.5 in-H<sub>2</sub>O of Package Restriction at STP.

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| General Engine Data <sup>5</sup>          |  |     |       |      |   |     |    |      |  |     |      |             |                                    |     |                                    |    |     |      |      |     |    |
|---|--|-----|-------|------|---|-----|----|------|--|-----|------|-------------|------------------------------------|-----|------------------------------------|----|-----|------|------|-----|----|
| Type                                      | V-Series   |     |       |      | Flywheel housing                        |     |    |      | SAE No.0   |     |      |             |                                    |     |                                    |    |     |      |      |     |    |
| Number of cylinders                       | 12   |     |       |      | Flywheel                                |     |    |      | SAE No.18  |     |      |             |                                    |     |                                    |    |     |      |      |     |    |
| Aspiration                                | Charged Cooled Forced Induction                  |     |       |      | Dry Weight (Fan to Flywheel)            |     |    |      | lb   | kg  | 6888 | 3124        |                                    |     |                                    |    |     |      |      |     |    |
| Firing Order                              | 1 - 8 - 5 - 10 - 3 - 7 - 6 - 11 - 2 - 9 - 4 - 12 |     |       |      | Wet Weight (Fan to Flywheel)            |     |    |      | lb   | kg  | 7384 | 3349        |                                    |     |                                    |    |     |      |      |     |    |
| Rotation Viewed from Flywheel             | Counter Clockwise                                |     |       |      | CG From Rear Face of Block              |     |    |      | in   | mm  | 37.0 | 941         |                                    |     |                                    |    |     |      |      |     |    |
| Bore                                      | in   | mm  | 5.906 | 150  | CG Above Crank Centerline               |     |    |      | in   | mm  | 0    | 0           |                                    |     |                                    |    |     |      |      |     |    |
| Stroke                                    | in   | mm  | 5.906 | 150  | Oil Specification                       |     |    |      | SAE 15W-40 Low Ash Gas engine oil (.25-.5% by wt), API CD/CF or higher |     |      |             |                                    |     |                                    |    |     |      |      |     |    |
| Displacement                              | in <sup>3</sup>                                  | L   | 1941  | 31.8 | Engine Oil Capacity <sup>8</sup>        |     |    |      | Min  | qts | L    | 95          | 90                                 |     |                                    |    |     |      |      |     |    |
| Compression Ratio                         | 10.5 : 1   |     |       |      | Max                                     |     |    |      | qts  | L   | 129  | 122         |                                    |     |                                    |    |     |      |      |     |    |
| Exhaust Manifold Type                     | Water Cooled                                     |     |       |      | ECU Oil Pressure Warning <sup>6</sup>   |     |    |      | psi  | kPa | 57   | 393         |                                    |     |                                    |    |     |      |      |     |    |
| Turbo Exhaust Outlet Pipe Size            | in   | mm  | 3.5   | 89   | ECU Oil Pressure Shut Down <sup>6</sup> |     |    |      | psi  | kPa | 47   | 324         |                                    |     |                                    |    |     |      |      |     |    |
| Catalyst Inlet Size                       | in   | mm  | 5     | 127  | Oil Pressure at 1000 rpm (Idle)         |     |    |      | Min  | psi | kPa  | 74          | 510                                |     |                                    |    |     |      |      |     |    |
| Catalyst Dp                               | in-H <sub>2</sub> O                              | kPa | 20.5  | 5.1  | Max                                     |     |    |      | psi  | kPa | 82   | 565         |                                    |     |                                    |    |     |      |      |     |    |
| Maximum Allowable Exhaust Back Pressure   | in-Hg  | kPa | 3.0   | 10.2 | Max Allowable Oil Temperature           |     |    |      | °F   | °C  | 250  | 121         |                                    |     |                                    |    |     |      |      |     |    |
| Maximum EPR Rated Pressure                | psi  | kPa | 1.0   | 6.9  | Coolant Capacity (Engine only)          |     |    |      | gal  | L   | 29.1 | 110.0       |                                    |     |                                    |    |     |      |      |     |    |
| Maximum Operating pressure to EPR         | in-H <sub>2</sub> O                              | kPa | 11.0  | 2.7  | Coolant Capacity (Radiator only)        |     |    |      | gal  | L   | 39.0 | 147.6       |                                    |     |                                    |    |     |      |      |     |    |
| Minimum Operating pressure to EPR         | in-H <sub>2</sub> O                              | kPa | 7.0   | 1.7  | Radiator Weight (Dry)                   |     |    |      | lb   | kg  | 1275 | 578         |                                    |     |                                    |    |     |      |      |     |    |
| Minimum Gas Supply Pipe Size <sup>5</sup> | in   | mm  | 3     | 76   | Standard Thermostat Range               |     |    |      | Normal Operation Temperature <sup>9</sup>                              |     |      | °F          | °C                                 | 176 | 80                                 |    |     |      |      |     |    |
| Maximum Pressure Drop Across CAC          | psi  | kPa | 1     | 6.9  | Clean Air Filter                        |     |    |      | in-H <sub>2</sub> O  | kPa | 5    | 1.24        | Full Open Temperature <sup>9</sup> |     |                                    | °F | °C  | 198  | 92   |     |    |
| Max Allowable Intake Restriction          | Dirty Air Filter                                 |     |       |      | in-H <sub>2</sub> O                     | kPa | 15 | 3.73 | ECU Coolant Temp Warning   |     |      |             | °F                                 | °C  | 203                                | 95 |     |      |      |     |    |
| Spark Plug Part Number                    | Denso GK3-5                                      |     |       |      | Spark Plug Coil - Primary Resistance    |     |    |      | Ohms   |     |      | 0.59Ω ± 10% |                                    |     | ECU Coolant Temp Shutdown          |    |     | °F   | °C   | 208 | 98 |
| Standard Spark Plug Gap <sup>10</sup>     | in   | mm  | 0.012 | 0.3  | Battery Voltage                         |     |    |      | Volts  |     |      | 24          |                                    |     | 50°C Ambient Capable <sup>11</sup> |    |     | Pass |      |     |    |
| Battery Voltage                           | 24   |     |       |      | Starter Motor Power                     |     |    |      | HP   | kW  | 15.7 | 11.7        | Max External Coolant Friction Head |     |                                    |    | psi | kPa  | 7.25 | 50  |    |
| Starter Motor Power                       | HP   | kW  | 15.7  | 11.7 | CAC Rise Above Ambient Specified        |     |    |      | F  | C   | 15   | 9           |                                    |     |                                    |    |     |      |      |     |    |

| Performance Data 50Hz <sup>3,5</sup> |        |     |      |     |                     |  |  |  |                                    |       |     |      |      |                     |       |      |
|--------------------------------------|--------|-----|------|-----|---------------------|--|--|--|------------------------------------|-------|-----|------|------|---------------------|-------|------|
| Nominal Engine Speed                 | RPM    |     |      |     | 1500                |  |  |  | Water Pump Speed                   |       | RPM |      | 3088 |                     |       |      |
| Mean Piston Speed                    | ft/min | m/s | 1476 | 7.5 | Engine Coolant Flow |  |  |  | gal/min                            | L/min | 297 | 1126 |      |                     |       |      |
| RPM Range (Min-Max) ISO 8528-5 G1    | RPM    |     |      |     | 1477 - 1519         |  |  |  | Cooling Fan Power <sup>11</sup>    |       |     |      | HP   | kW                  | 36.4  | 27   |
| Charging Alternator Voltage          | Volts  |     |      |     | 28                  |  |  |  | Cooling Fan Speed                  |       |     |      | RPM  |                     | 875   |      |
| Charging Alternator Current          | Amps   |     |      |     | 53                  |  |  |  | Cooling Fan Air Flow <sup>11</sup> |       |     |      | SCFM | m <sup>3</sup> /min | 54200 | 1535 |

| NG 50hz Prime Load                           | Load       |                     | 100%  |      | 75%   |      | 50%   |      | 25%   |     |
|--|------------|---------------------|-------|------|-------|------|-------|------|-------|-----|
|  | HP         | kWm                 | 684   | 510  | 513   | 383  | 342   | 255  | 172   | 128 |
| Power Rating <sup>1,2,3,4</sup> Per ISO 3046 | psi        | bar                 | 186   | 12.8 | 140   | 9.6  | 93    | 6.4  | 47    | 3.2 |
| MEP (@ rated Load on NG)                     | lb/hr      | kg/hr               | 252   | 114  | 197   | 89   | 147   | 67   | 90    | 41  |
| Fuel Consumption <sup>3,4,7</sup>            | lb/(hp-hr) | g/(kW-hr)           | 0.369 | 224  | 0.383 | 233  | 0.429 | 261  | 0.523 | 318 |
| BSFC   | °F         | °C                  | 1048  | 564  | 1015  | 546  | 972   | 522  | 899   | 481 |
| Turbine Outlet Temperature                   | lb/hr      | kg/hr               | 4234  | 1921 | 3344  | 1517 | 2459  | 1116 | 1573  | 713 |
| Exhaust Mass Flow (entire engine)            | ACFM       | m <sup>3</sup> /min | 2432  | 69   | 1865  | 53   | 1330  | 38   | 830   | 23  |
| Exhaust Flow at Turbine Outlet Conditions    |            |                     |       |      |       |      |       |      |       |     |

| Air Induction System <sup>5</sup>              |       |                     |      |      |      |      |      |      |      |     |
|--|-------|---------------------|------|------|------|------|------|------|------|-----|
| Combustion Air required (entire engine)        | lb/hr | kg/hr               | 3982 | 1806 | 3147 | 1428 | 2313 | 1049 | 1483 | 673 |
| Combustion Air Volume Required (entire engine) | ACFM  | m <sup>3</sup> /min | 868  | 25   | 686  | 19   | 504  | 14   | 323  | 9   |
| Compressor Outlet Temperature <sup>2</sup>     | °F    | °C                  | 239  | 115  | 201  | 94   | 156  | 69   | 119  | 48  |

| Thermal Balance <sup>5</sup>                 |         |    |       |      |       |      |       |     |       |     |
|--|---------|----|-------|------|-------|------|-------|-----|-------|-----|
| Total Fuel                                   | BTU/min | kW | 86712 | 1525 | 68302 | 1201 | 49891 | 877 | 31587 | 555 |
| Mechanical Power                             | BTU/min | kW | 29003 | 510  | 21752 | 383  | 14502 | 255 | 7293  | 128 |
| Heat Rejected to Cooling Water at Rated Load | BTU/min | kW | 24848 | 437  | 21229 | 373  | 17150 | 302 | 12640 | 222 |
| Heat Rejection CAC at Rated Power            | BTU/min | kW | 2517  | 44   | 1502  | 26   | 631   | 11  | 220   | 4   |
| Heat Rejection to Exhaust (LHV to 150C)      | BTU/min | kW | 15628 | 275  | 11716 | 206  | 7959  | 140 | 4527  | 80  |
| Engine Radiated Heat                         | BTU/min | kW | 14715 | 259  | 12104 | 213  | 9650  | 170 | 6908  | 121 |

<sup>1</sup> Standby and overload ratings based on ISO 3046 gross flywheel power.

<sup>2</sup> Technical data based on ISO 3046-1 standards of 77°F(25°C), absolute pressure 14.5Psi(100kPa) and 30% relative humidity.

<sup>3</sup> Production tolerances in engines and installed components can account for power variations of ± 5%. Altitude, temperature and excessive exhaust and intake restrictions should be applied to power calculations.

<sup>4</sup> All fuel and thermal calculations unless otherwise noted are done at ISO 3046 rated load using LHV for NG of 48.17 MJ/kg.

<sup>5</sup> All values in the following section are provided for informational purpose only and are non-binding.

<sup>6</sup> >1400RPM.

<sup>7</sup> See PSI Energy Technical Spec. 56300019 - Fuel Standard.

<sup>8</sup> Standard Sump Capacity.

<sup>9</sup> ± 2 degrees Celsius.

<sup>10</sup> ± 0.002" or 0.05mm.

<sup>11</sup> At 0.5 in-H<sub>2</sub>O of Package Restriction at STP.

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| General Engine Data <sup>5</sup>          |  |     |       |      |   |     |    |      |  |     |      |       |     |     |     |    |
|---|--|-----|-------|------|---|-----|----|------|--|-----|------|-------|-----|-----|-----|----|
| Type                                      | V-Series   |     |       |      | Flywheel housing                        |     |    |      | SAE No.0   |     |      |       |     |     |     |    |
| Number of cylinders                       | 12   |     |       |      | Flywheel                                |     |    |      | SAE No.18  |     |      |       |     |     |     |    |
| Aspiration                                | Charged Cooled Forced Induction                  |     |       |      | Dry Weight (Fan to Flywheel)            |     |    |      | lb   | kg  | 6888 | 3124  |     |     |     |    |
| Firing Order                              | 1 - 8 - 5 - 10 - 3 - 7 - 6 - 11 - 2 - 9 - 4 - 12 |     |       |      | Wet Weight (Fan to Flywheel)            |     |    |      | lb   | kg  | 7384 | 3349  |     |     |     |    |
| Rotation Viewed from Flywheel             | Counter Clockwise                                |     |       |      | CG From Rear Face of Block              |     |    |      | in   | mm  | 37.0 | 941   |     |     |     |    |
| Bore                                      | in   | mm  | 5.906 | 150  | CG Above Crank Centerline               |     |    |      | in   | mm  | 0    | 0     |     |     |     |    |
| Stroke                                    | in   | mm  | 5.906 | 150  | Oil Specification                       |     |    |      | SAE 15W-40 Low Ash Gas engine oil (.25-.5% by wt), API CD/CF or higher |     |      |       |     |     |     |    |
| Displacement                              | in <sup>3</sup>                                  | L   | 1941  | 31.8 | Engine Oil Capacity <sup>8</sup>        |     |    |      | Min  | qts | L    | 95    | 90  |     |     |    |
| Compression Ratio                         | 10.5 : 1   |     |       |      | Max                                     |     |    |      | qts  | L   | 129  | 122   |     |     |     |    |
| Exhaust Manifold Type                     | Water Cooled                                     |     |       |      | ECU Oil Pressure Warning <sup>6</sup>   |     |    |      | psi  | kPa | 57   | 393   |     |     |     |    |
| Turbo Exhaust Outlet Pipe Size            | in   | mm  | 3.5   | 89   | ECU Oil Pressure Shut Down <sup>6</sup> |     |    |      | psi  | kPa | 47   | 324   |     |     |     |    |
| Catalyst Inlet Size                       | in   | mm  | 5     | 127  | Oil Pressure at 1000 rpm (Idle)         |     |    |      | Min  | psi | kPa  | 74    | 510 |     |     |    |
| Catalyst Dp                               | in-H <sub>2</sub> O                              | kPa | 20.5  | 5.1  | Max                                     |     |    |      | psi  | kPa | 82   | 565   |     |     |     |    |
| Maximum Allowable Exhaust Back Pressure   | in-Hg  | kPa | 3.0   | 10.2 | Max Allowable Oil Temperature           |     |    |      | °F   | °C  | 250  | 121   |     |     |     |    |
| Maximum EPR Rated Pressure                | psi  | kPa | 1.0   | 6.9  | Coolant Capacity (Engine only)          |     |    |      | gal  | L   | 29.1 | 110.0 |     |     |     |    |
| Maximum Operating pressure to EPR         | in-H <sub>2</sub> O                              | kPa | 11.0  | 2.7  | Coolant Capacity (Radiator only)        |     |    |      | gal  | L   | 39.0 | 147.6 |     |     |     |    |
| Minimum Operating pressure to EPR         | in-H <sub>2</sub> O                              | kPa | 7.0   | 1.7  | Radiator Weight (Dry)                   |     |    |      | lb   | kg  | 1275 | 578   |     |     |     |    |
| Minimum Gas Supply Pipe Size <sup>5</sup> | in   | mm  | 3     | 76   | Standard Thermostat Range               |     |    |      | Normal Operation Temperature <sup>9</sup>                              |     |      | °F    | °C  | 176 | 80  |    |
| Maximum Pressure Drop Across CAC          | psi  | kPa | 1     | 6.9  | 50°C Ambient Capable <sup>11</sup>      |     |    |      | Pass   |     |      |       |     |     |     |    |
| Max Allowable Intake Restriction          | Clean Air Filter                                 |     |       |      | in-H <sub>2</sub> O                     | kPa | 5  | 1.24 | Full Open Temperature <sup>9</sup>                                     |     |      |       | °F  | °C  | 198 | 92 |
|   | Dirty Air Filter                                 |     |       |      | in-H <sub>2</sub> O                     | kPa | 15 | 3.73 | ECU Coolant Temp Warning   |     |      |       | °F  | °C  | 203 | 95 |
| Spark Plug Part Number                    | Denso GK3-5                                      |     |       |      | ECU Coolant Temp Shutdown               |     |    |      | °F   | °C  | 208  | 98    |     |     |     |    |
| Standard Spark Plug Gap <sup>10</sup>     | in   | mm  | 0.012 | 0.3  | Max External Coolant Friction Head      |     |    |      | psi  | kPa | 7.25 | 50    |     |     |     |    |
| Spark Plug Coil - Primary Resistance      | Ohms   |     |       |      | CAC Rise Above Ambient Specified        |     |    |      | F  | C   | 15   | 9     |     |     |     |    |
| Battery Voltage                           | Volts  |     |       |      | 24                                      |     |    |      |  |     |      |       |     |     |     |    |
| Starter Motor Power                       | HP   | kW  | 15.7  | 11.7 |   |     |    |      |  |     |      |       |     |     |     |    |

| Performance Data 60Hz <sup>3,5</sup> |        |     |      |     |                     |  |  |  |                                    |       |     |      |      |                     |       |      |
|--------------------------------------|--------|-----|------|-----|---------------------|--|--|--|------------------------------------|-------|-----|------|------|---------------------|-------|------|
| Nominal Engine Speed                 | RPM    |     |      |     | 1800                |  |  |  | Water Pump Speed                   |       | RPM |      | 3705 |                     |       |      |
| Mean Piston Speed                    | ft/min | m/s | 1772 | 9.0 | Engine Coolant Flow |  |  |  | gal/min                            | L/min | 361 | 1368 |      |                     |       |      |
| RPM Range (Min-Max) ISO 8528-5 G1    | RPM    |     |      |     | 1778 - 1823         |  |  |  | Cooling Fan Power <sup>11</sup>    |       |     |      | HP   | kW                  | 62.8  | 47   |
| Charging Alternator Voltage          | Volts  |     |      |     | 28                  |  |  |  | Cooling Fan Speed                  |       |     |      | RPM  |                     | 1050  |      |
| Charging Alternator Current          | Amps   |     |      |     | 55                  |  |  |  | Cooling Fan Air Flow <sup>11</sup> |       |     |      | SCFM | m <sup>3</sup> /min | 65100 | 1843 |

| LPG 60hz Prime Load                          | Load       |                     | 100%  |        | 75%   |      | 50%   |      | 25%   |     |
|--|------------|---------------------|-------|--------|-------|------|-------|------|-------|-----|
|  | HP         | kWm                 | 541   | 403.75 | 406   | 303  | 271   | 202  | 136   | 102 |
| Power Rating <sup>1,2,3,4</sup> Per ISO 3046 | psi        | bar                 | 123   | 8.5    | 92    | 6.3  | 61    | 4.2  | 31    | 2.1 |
| MEP (@ rated Load on NG)                     | lb/hr      | kg/hr               | 237   | 107    | 197   | 89   | 131   | 59   | 106   | 48  |
| Fuel Consumption <sup>3,4,7</sup>            | lb/(hp-hr) | g/(kW-hr)           | 0.437 | 266    | 0.485 | 295  | 0.482 | 293  | 0.777 | 473 |
| BSFC   | °F         | °C                  | 1147  | 619    | 1089  | 587  | 1036  | 558  | 955   | 513 |
| Turbine Outlet Temperature                   | lb/hr      | kg/hr               | 4061  | 1842   | 3113  | 1412 | 2280  | 1034 | 1636  | 742 |
| Exhaust Mass Flow (entire engine)            | ACFM       | m <sup>3</sup> /min | 2508  | 71     | 1843  | 52   | 1287  | 36   | 843   | 24  |
| Exhaust Flow at Turbine Outlet Conditions    |            |                     |       |        |       |      |       |      |       |     |

| Air Induction System <sup>5</sup>              |       |                     |      |      |      |      |      |     |      |     |
|--|-------|---------------------|------|------|------|------|------|-----|------|-----|
| Combustion Air required (entire engine)        | lb/hr | kg/hr               | 3824 | 1735 | 2916 | 1323 | 2150 | 975 | 1530 | 694 |
| Combustion Air Volume Required (entire engine) | ACFM  | m <sup>3</sup> /min | 833  | 24   | 635  | 18   | 469  | 13  | 333  | 9   |
| Compressor Outlet Temperature <sup>2</sup>     | °F    | °C                  | 239  | 115  | 194  | 90   | 149  | 65  | 119  | 48  |

| Thermal Balance <sup>5</sup>                 |         |    |       |      |       |      |       |     |       |     |
|--|---------|----|-------|------|-------|------|-------|-----|-------|-----|
| Total Fuel                                   | BTU/min | kW | 81653 | 1436 | 62332 | 1096 | 45795 | 805 | 32844 | 578 |
| Mechanical Power                             | BTU/min | kW | 22961 | 404  | 17221 | 303  | 11480 | 202 | 5773  | 102 |
| Heat Rejected to Cooling Water at Rated Load | BTU/min | kW | 27785 | 489  | 23401 | 411  | 18526 | 326 | 13540 | 238 |
| Heat Rejection CAC at Rated Power            | BTU/min | kW | 2398  | 42   | 1314  | 23   | 551   | 10  | 199   | 4   |
| Heat Rejection to Exhaust (LHV to 150C)      | BTU/min | kW | 17220 | 303  | 12166 | 214  | 8387  | 147 | 5011  | 88  |
| Engine Radiated Heat                         | BTU/min | kW | 11290 | 199  | 8230  | 145  | 6850  | 120 | 8321  | 146 |

<sup>1</sup> Standby and overload ratings based on ISO 3046 gross flywheel power.  
<sup>2</sup> Technical data based on ISO 3046-1 standards of 77°F(25°C), absolute pressure 14.5Psi(100kPa) and 30% relative humidity.  
<sup>3</sup> Production tolerances in engines and installed components can account for power variations of ± 5%. Altitude, temperature and excessive exhaust and intake restrictions should be applied to power calculations.  
<sup>4</sup> All fuel and thermal calculations unless otherwise noted are done at ISO 3046 rated load using LHV for LPG 46.38 MJ/kg.  
<sup>5</sup> All values in the following section are provided for informational purpose only and are non-binding.  
<sup>6</sup> >1400RPM.  
<sup>7</sup> See PSI Energy Technical Spec. 56300019 - Fuel Standard.  
<sup>8</sup> Standard Sump Capacity.  
<sup>9</sup> ± 2 degrees Celsius.  
<sup>10</sup> ± 0.002" or 0.05mm.  
<sup>11</sup> At 0.5 in-H<sub>2</sub>O of Package Restriction at STP.

# 31.8L



# ENERGY

|                 |
|-----------------|
| [Stoic.]        |
| 56100023 Rev: 2 |

| General Engine Data <sup>5</sup>          |  |     |       |      |   |  |  |  |     |            |        |
|---|--|-----|-------|------|---|--|--|--|-----|------------|--------|
| Type                                      | V-Series   |     |       |      | Flywheel housing                        |  |  | SAE No.0   |     |            |        |
| Number of cylinders                       | 12   |     |       |      | Flywheel                                |  |  | SAE No.18  |     |            |        |
| Aspiration                                | Charged Cooled Forced Induction                  |     |       |      | Dry Weight (Fan to Flywheel)            |  |  | lb   | kg  | 6888 3124  |        |
| Firing Order                              | 1 - 8 - 5 - 10 - 3 - 7 - 6 - 11 - 2 - 9 - 4 - 12 |     |       |      | Wet Weight (Fan to Flywheel)            |  |  | lb   | kg  | 7384 3349  |        |
| Rotation Viewed from Flywheel             | Counter Clockwise                                |     |       |      | CG From Rear Face of Block              |  |  | in   | mm  | 37.0 941   |        |
| Bore                                      | in   | mm  | 5.906 | 150  | CG Above Crank Centerline               |  |  | in   | mm  | 0 0        |        |
| Stroke                                    | in   | mm  | 5.906 | 150  | Oil Specification                       |  |  | SAE 15W-40 Low Ash Gas engine oil (.25-.5% by wt), API CD/CF or higher |     |            |        |
| Displacement                              | in <sup>3</sup>                                  | L   | 1941  | 31.8 | Engine Oil Capacity <sup>8</sup>        |  |  | Min  | qts | L          | 95 90  |
| Compression Ratio                         | 10.5 : 1   |     |       |      | Max                                     |  |  | qts  | L   | 129 122    |        |
| Exhaust Manifold Type                     | Water Cooled                                     |     |       |      | ECU Oil Pressure Warning <sup>6</sup>   |  |  | psi  | kPa | 57 393     |        |
| Turbo Exhaust Outlet Pipe Size            | in   | mm  | 3.5   | 89   | ECU Oil Pressure Shut Down <sup>6</sup> |  |  | psi  | kPa | 47 324     |        |
| Catalyst Inlet Size                       | in   | mm  | 5     | 127  | Oil Pressure at 1000 rpm (Idle)         |  |  | Min  | psi | kPa        | 74 510 |
| Catalyst Dp                               | in-H <sub>2</sub> O                              | kPa | 20.5  | 5.1  | Max                                     |  |  | psi  | kPa | 82 565     |        |
| Maximum Allowable Exhaust Back Pressure   | in-Hg  | kPa | 3.0   | 10.2 | Max Allowable Oil Temperature           |  |  | °F   | °C  | 250 121    |        |
| Maximum EPR Rated Pressure                | psi  | kPa | 1.0   | 6.9  | Coolant Capacity (Engine only)          |  |  | gal  | L   | 29.1 110.0 |        |
| Maximum Operating pressure to EPR         | in-H <sub>2</sub> O                              | kPa | 11.0  | 2.7  | Coolant Capacity (Radiator only)        |  |  | gal  | L   | 39.0 147.6 |        |
| Minimum Operating pressure to EPR         | in-H <sub>2</sub> O                              | kPa | 7.0   | 1.7  | Radiator Weight (Dry)                   |  |  | lb   | kg  | 1275 578   |        |
| Minimum Gas Supply Pipe Size <sup>5</sup> | in   | mm  | 3     | 76   | Standard Thermostat Range               |  |  | Normal Operation Temperature <sup>9</sup>                              |     |            |        |
| Maximum Pressure Drop Across CAC          | psi  | kPa | 1     | 6.9  | 50°C Ambient Capable <sup>11</sup>      |  |  | Pass   |     |            |        |
| Max Allowable Intake Restriction          |  |     |       |      | Max External Coolant Friction Head      |  |  | psi  | kPa | 7.25 50    |        |
| Clean Air Filter                          | in-H <sub>2</sub> O                              | kPa | 5     | 1.24 | CAC Rise Above Ambient Specified        |  |  | F  | C   | 15 9       |        |
| Dirty Air Filter                          | in-H <sub>2</sub> O                              | kPa | 15    | 3.73 |   |  |  |  |     |            |        |
| Spark Plug Part Number                    | Denso GK3-5                                      |     |       |      |   |  |  |  |     |            |        |
| Standard Spark Plug Gap <sup>10</sup>     | in   | mm  | 0.012 | 0.3  |   |  |  |  |     |            |        |
| Spark Plug Coil - Primary Resistance      | Ohms 0.59Ω ± 10%                                 |     |       |      |   |  |  |  |     |            |        |
| Battery Voltage                           | Volts 24   |     |       |      |   |  |  |  |     |            |        |
| Starter Motor Power                       | HP   | kW  | 15.7  | 11.7 |   |  |  |  |     |            |        |

| Performance Data 50Hz <sup>3,5</sup> |                 |     |      |     |                                    |  |  |          |                     |            |
|--------------------------------------|-----------------|-----|------|-----|------------------------------------|--|--|----------|---------------------|------------|
| Nominal Engine Speed                 | RPM 1500        |     |      |     | Water Pump Speed                   |  |  | RPM 3088 |                     |            |
| Mean Piston Speed                    | ft/min          | m/s | 1476 | 7.5 | Engine Coolant Flow                |  |  | gal/min  | L/min               | 297 1126   |
| RPM Range (Min-Max) ISO 8528-5 G1    | RPM 1477 - 1519 |     |      |     | Cooling Fan Power <sup>11</sup>    |  |  | HP       | kW                  | 36.4 27    |
| Charging Alternator Voltage          | Volts 28        |     |      |     | Cooling Fan Speed                  |  |  | RPM 875  |                     |            |
| Charging Alternator Current          | Amps 53         |     |      |     | Cooling Fan Air Flow <sup>11</sup> |  |  | SCFM     | m <sup>3</sup> /min | 54200 1535 |

|  | Load       |                     | 100%  |        | 75%   |      | 50%   |     | 25%   |     |
|--|------------|---------------------|-------|--------|-------|------|-------|-----|-------|-----|
|  | HP         | kWm                 |       |        |       |      |       |     |       |     |
| Power Rating <sup>1,2,3,4</sup> Per ISO 3046 |            |                     | 462   | 344.25 | 346   | 258  | 231   | 172 | 116   | 87  |
| MEP (@ rated Load on NG)                     | psi        | bar                 | 126   | 8.7    | 94    | 6.5  | 63    | 4.3 | 32    | 2.2 |
| Fuel Consumption <sup>3,4,7</sup>            | lb/hr      | kg/hr               | 195   | 88     | 159   | 72   | 113   | 51  | 83    | 38  |
| BSFC   | lb/(hp-hr) | g/(kW-hr)           | 0.422 | 256    | 0.459 | 279  | 0.489 | 298 | 0.714 | 435 |
| Turbine Outlet Temperature                   | °F         | °C                  | 1106  | 597    | 1052  | 566  | 1004  | 540 | 930   | 499 |
| Exhaust Mass Flow (entire engine)            | lb/hr      | kg/hr               | 3292  | 1493   | 2509  | 1138 | 1892  | 858 | 1340  | 608 |
| Exhaust Flow at Turbine Outlet Conditions    | ACFM       | m <sup>3</sup> /min | 2005  | 57     | 1463  | 41   | 1018  | 29  | 671   | 19  |

| Air Induction System <sup>5</sup>              |       |                     |      |      |      |      |      |     |      |     |
|--|-------|---------------------|------|------|------|------|------|-----|------|-----|
| Combustion Air required (entire engine)        | lb/hr | kg/hr               | 3098 | 1405 | 2350 | 1066 | 1779 | 807 | 1257 | 570 |
| Combustion Air Volume Required (entire engine) | ACFM  | m <sup>3</sup> /min | 675  | 19   | 512  | 15   | 388  | 11  | 274  | 8   |
| Compressor Outlet Temperature <sup>2</sup>     | °F    | °C                  | 206  | 97   | 166  | 74   | 134  | 57  | 110  | 43  |

| Thermal Balance <sup>5</sup>                 |         |    |       |      |       |     |       |     |       |     |
|--|---------|----|-------|------|-------|-----|-------|-----|-------|-----|
| Total Fuel                                   | BTU/min | kW | 66171 | 1164 | 50331 | 885 | 38014 | 668 | 26709 | 470 |
| Mechanical Power                             | BTU/min | kW | 19577 | 344  | 14683 | 258 | 9789  | 172 | 4923  | 87  |
| Heat Rejected to Cooling Water at Rated Load | BTU/min | kW | 22124 | 389  | 18727 | 329 | 15525 | 273 | 11914 | 209 |
| Heat Rejection CAC at Rated Power            | BTU/min | kW | 1533  | 27   | 779   | 14  | 361   | 6   | 113   | 2   |
| Heat Rejection to Exhaust (LHV to 150C)      | BTU/min | kW | 13111 | 231  | 9339  | 164 | 6593  | 116 | 3971  | 70  |
| Engine Radiated Heat                         | BTU/min | kW | 9827  | 173  | 6803  | 120 | 5746  | 101 | 5788  | 102 |

<sup>1</sup> Standby and overload ratings based on ISO 3046 gross flywheel power.  
<sup>2</sup> Technical data based on ISO 3046-1 standards of 77°F(25°C), absolute pressure 14.5Psi(100kPa) and 30% relative humidity.  
<sup>3</sup> Production tolerances in engines and installed components can account for power variations of ± 5%. Altitude, temperature and excessive exhaust and intake restrictions should be applied to power calculations.  
<sup>4</sup> All fuel and thermal calculations unless otherwise noted are done at ISO 3046 rated load using LHV for LPG 46.38 MJ/kg.  
<sup>5</sup> All values in the following section are provided for informational purpose only and are non-binding.  
<sup>6</sup> >1400RPM.  
<sup>7</sup> See PSI Energy Technical Spec. 56300019 - Fuel Standard.  
<sup>8</sup> Standard Sump Capacity.  
<sup>9</sup> ± 2 degrees Celsius.  
<sup>10</sup> ± 0.002" or 0.05mm.  
<sup>11</sup> At 0.5 in-H<sub>2</sub>O of Package Restriction at STP.