

| Technical Sales Documentation                                         |                                                                                                                                                                                       | - ENGINE DATA - |                             |                                          | MTU Project No. |  |  |  |  |
|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------|------------------------------------------|-----------------|--|--|--|--|
| Printout: (y-m-d) 2007-07-25                                          |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| No.                                                                   |                                                                                                                                                                                       | Index           | Unit                        | 12V2000G65-TB                            |                 |  |  |  |  |
|                                                                       | Application Group<br>MTU data code<br>Intake air temperature<br>Charge-air coolant temperature<br>Barometric pressure<br>Site altitude above sea level<br>Raw-water inlet temperature |                 | °C<br>°C<br>mbar<br>m<br>°C | 3B<br>15<br>25<br>55<br>1000<br>100<br>- |                 |  |  |  |  |
| 0. DATA-RELEVANT ENGINE DESIGN CONFIGURATION                          |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 1                                                                     | Fuel-consumption optimized                                                                                                                                                            |                 |                             | x                                        |                 |  |  |  |  |
| 2                                                                     | Exhaust-emissions optimized<br>(limit values see Exhaust Emissions, Chapter 21)                                                                                                       |                 |                             | -                                        |                 |  |  |  |  |
| 16                                                                    | Complies with: "TA-Luft" (Edition 1986)<br>(German clean-air standard)                                                                                                                |                 |                             | -                                        |                 |  |  |  |  |
| 17                                                                    | Complies with:<br>Regulations for stationary power plants in France<br>(arrêté du 25 Juillet 1997)                                                                                    |                 |                             | -                                        |                 |  |  |  |  |
| 18                                                                    | Complies with:<br>US EPA, regulation for nonroad engines<br>(40 CFR 89 - Tier 1 -)                                                                                                    |                 |                             | -                                        |                 |  |  |  |  |
| 25                                                                    | Complies with:<br>US EPA, regulation for nonroad engines<br>(40 CFR 89 - Tier 2 -)                                                                                                    |                 |                             | -                                        |                 |  |  |  |  |
| 12                                                                    | Engine with sequential turbocharging<br>(turbochargers with cut-in/cut-out control)                                                                                                   |                 |                             | -                                        |                 |  |  |  |  |
| 13                                                                    | Engine without sequential turbocharging<br>(turbochargers without cut-in/cut-out control)                                                                                             |                 |                             | x                                        |                 |  |  |  |  |
| 31                                                                    | Engine with air-cooled charge air                                                                                                                                                     |                 |                             | -                                        |                 |  |  |  |  |
| 32                                                                    | Engine with water-cooled charge air (external)                                                                                                                                        |                 |                             | x                                        |                 |  |  |  |  |
| 1. POWER-RELATED DATA (power ratings are net brake power to ISO 3046) |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 1                                                                     | Engine rated speed                                                                                                                                                                    | A               | rpm                         | 1500                                     |                 |  |  |  |  |
| 3                                                                     | Mean piston speed                                                                                                                                                                     |                 | m/s                         | 7.5                                      |                 |  |  |  |  |
| 4                                                                     | Continuous power ISO 3046 (10% overload capability)<br>(design power DIN 6280, ISO 8528)                                                                                              | A               | kW                          | 695                                      |                 |  |  |  |  |
| 5                                                                     | Fuel stop power ISO 3046                                                                                                                                                              | A               | kW                          | 765                                      |                 |  |  |  |  |
| 8                                                                     | Mean effective pressure (MEP)<br>(Continuous power ISO 3046)                                                                                                                          |                 | bar                         | 23.3                                     |                 |  |  |  |  |
| 9                                                                     | Mean effective pressure (MEP)<br>(Fuel stop power ISO 3046)                                                                                                                           |                 | bar                         | 25.6                                     |                 |  |  |  |  |
| 2. GENERAL CONDITIONS (for maximum power)                             |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 1                                                                     | Intake air depression (new filter)                                                                                                                                                    | A               | mbar                        | 15                                       |                 |  |  |  |  |
| 2                                                                     | Intake air depression, max.                                                                                                                                                           | L               | mbar                        | 50                                       |                 |  |  |  |  |
| 3                                                                     | Exhaust back pressure                                                                                                                                                                 | A               | mbar                        | 30                                       |                 |  |  |  |  |
| 4                                                                     | Exhaust back pressure, max.                                                                                                                                                           | L               | mbar                        | 85                                       |                 |  |  |  |  |
| 5                                                                     | Fuel temperature at fuel feed connection                                                                                                                                              | R               | °C                          | 25                                       |                 |  |  |  |  |
| 6                                                                     | Fuel temperature at fuel feed connection, max.                                                                                                                                        | L               | °C                          | 60                                       |                 |  |  |  |  |
| 3. CONSUMPTION                                                        |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 17                                                                    | Specific fuel consumption (be) - 100 % CP<br>(+ 5 %; EN 590; 42.8 MJ/kg)                                                                                                              | G               | g/kWh                       | 202                                      |                 |  |  |  |  |
| 18                                                                    | Specific fuel consumption (be) - 75 % CP<br>(+ 5 %; EN 590; 42.8 MJ/kg)                                                                                                               | R               | g/kWh                       | 203                                      |                 |  |  |  |  |
| 19                                                                    | Specific fuel consumption (be) - 50 % CP<br>(+ 5 %; EN 590; 42.8 MJ/kg)                                                                                                               | R               | g/kWh                       | 210                                      |                 |  |  |  |  |
| 20                                                                    | Specific fuel consumption (be) - 25 % CP<br>(+ 5 %; EN 590; 42.8 MJ/kg)                                                                                                               | R               | g/kWh                       | 230                                      |                 |  |  |  |  |
| 21                                                                    | Specific fuel consumption (be) - FSP<br>(+ 5 %; EN 590; 42.8 MJ/kg)                                                                                                                   | R               | g/kWh                       | 204                                      |                 |  |  |  |  |
| 73                                                                    | No-load fuel consumption                                                                                                                                                              | R               | kg/h                        | 12                                       |                 |  |  |  |  |
| 61                                                                    | Lube oil consumption after 100 h of operation<br>(B = fuel consumption per hour)                                                                                                      | R               | % of B                      | 0.5                                      |                 |  |  |  |  |
| 62                                                                    | Lube oil consumption after 100 h of operation, max.<br>(B = fuel consumption per hour)                                                                                                | L               | % of B                      | 1.0                                      |                 |  |  |  |  |
| 4. MODEL-RELATED DATA (basic design)                                  |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 3                                                                     | Engine with exhaust turbocharger (ETC) and intercooler                                                                                                                                |                 |                             | x                                        |                 |  |  |  |  |
| 4                                                                     | Exhaust piping, non-cooled                                                                                                                                                            |                 |                             | x                                        |                 |  |  |  |  |
| 5                                                                     | Exhaust piping, liquid-cooled                                                                                                                                                         |                 |                             | -                                        |                 |  |  |  |  |

Explanation:

CP = Ref.value: Continuous power    FSP = Ref.value: Fuel stop power  
 A = Design value    G = Guaranteed value    L = Limit value, up to which the engine can be operated, without change (e.g. of power setting)    R = Guideline value  
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| Technical Sales Documentation                |                                                                                                                                                                                       | - ENGINE DATA - |                             |                                          | MTU Project No. |  |  |  |  |
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| No.                                          |                                                                                                                                                                                       | Index           | Unit                        | 12V2000G65-TB                            |                 |  |  |  |  |
|                                              | Application Group<br>MTU data code<br>Intake air temperature<br>Charge-air coolant temperature<br>Barometric pressure<br>Site altitude above sea level<br>Raw-water inlet temperature |                 | °C<br>°C<br>mbar<br>m<br>°C | 3B<br>15<br>25<br>55<br>1000<br>100<br>- |                 |  |  |  |  |
| 33                                           | Working method: four-cycle, diesel, single-acting                                                                                                                                     |                 |                             | x                                        |                 |  |  |  |  |
| 34                                           | Combustion method: direct injection                                                                                                                                                   |                 |                             | x                                        |                 |  |  |  |  |
| 36                                           | Cooling system: conditioned water                                                                                                                                                     |                 |                             | x                                        |                 |  |  |  |  |
| 37                                           | Direction of rotation: c.c.w. (facing driving end)                                                                                                                                    |                 |                             | x                                        |                 |  |  |  |  |
| 6                                            | Number of cylinders                                                                                                                                                                   |                 |                             | 12                                       |                 |  |  |  |  |
| 7                                            | Cylinder configuration: V angle                                                                                                                                                       |                 | degrees                     | 90                                       |                 |  |  |  |  |
| 10                                           | Bore                                                                                                                                                                                  |                 | mm                          | 130                                      |                 |  |  |  |  |
| 11                                           | Stroke                                                                                                                                                                                |                 | mm                          | 150                                      |                 |  |  |  |  |
| 12                                           | Displacement, cylinder                                                                                                                                                                |                 | liter                       | 1.99                                     |                 |  |  |  |  |
| 13                                           | Displacement, total                                                                                                                                                                   |                 | liter                       | 23.88                                    |                 |  |  |  |  |
| 14                                           | Compression ratio                                                                                                                                                                     |                 |                             | 16                                       |                 |  |  |  |  |
| 40                                           | Cylinder heads: single-cylinder                                                                                                                                                       |                 |                             | x                                        |                 |  |  |  |  |
| 41                                           | Cylinder liners: wet, replaceable                                                                                                                                                     |                 |                             | x                                        |                 |  |  |  |  |
| 24                                           | Number of inlet valves, per cylinder                                                                                                                                                  |                 |                             | 2                                        |                 |  |  |  |  |
| 25                                           | Number of exhaust valves, per cylinder                                                                                                                                                |                 |                             | 2                                        |                 |  |  |  |  |
| 15                                           | Number of turbochargers                                                                                                                                                               |                 |                             | 2                                        |                 |  |  |  |  |
| 18                                           | Number of intercoolers                                                                                                                                                                |                 |                             | 1                                        |                 |  |  |  |  |
| 28                                           | Standard flywheel housing flange (engine main PTO)                                                                                                                                    |                 | SAE                         | 0                                        |                 |  |  |  |  |
| 43                                           | Flywheel interface                                                                                                                                                                    |                 | DISC                        | 18"                                      |                 |  |  |  |  |
| 46                                           | Engine mass diagram, drawing No.                                                                                                                                                      |                 |                             | N                                        |                 |  |  |  |  |
| 47                                           | Engine mass diagram, drawing No. (cont.)                                                                                                                                              |                 |                             | N                                        |                 |  |  |  |  |
| 5. COMBUSTION AIR / EXHAUST GAS              |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 8                                            | Charge-air pressure before cylinder - CP                                                                                                                                              | R               | bar abs                     | 3.2                                      |                 |  |  |  |  |
| 27                                           | Charge-air pressure before cylinder - FSP                                                                                                                                             | R               | bar abs                     | 3.5                                      |                 |  |  |  |  |
| 9                                            | Combustion air volume flow - CP                                                                                                                                                       | R               | m³/s                        | 0.85                                     |                 |  |  |  |  |
| 10                                           | Combustion air volume flow - FSP                                                                                                                                                      | R               | m³/s                        | 0.9                                      |                 |  |  |  |  |
| 11                                           | Exhaust volume flow (at exhaust temperature) - CP                                                                                                                                     | R               | m³/s                        | 2.3                                      |                 |  |  |  |  |
| 12                                           | Exhaust volume flow (at exhaust temperature) - FSP                                                                                                                                    | R               | m³/s                        | 2.5                                      |                 |  |  |  |  |
| 15                                           | Exhaust temperature after turbocharger - CP                                                                                                                                           | R               | °C                          | 555                                      |                 |  |  |  |  |
| 16                                           | Exhaust temperature after turbocharger - FSP                                                                                                                                          | R               | °C                          | 565                                      |                 |  |  |  |  |
| 6. HEAT DISSIPATION                          |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 15                                           | Heat dissipated by engine coolant - CP<br>with oil heat, without charge-air heat                                                                                                      | R               | kW                          | 285                                      |                 |  |  |  |  |
| 16                                           | Heat dissipated by engine coolant - FSP<br>with oil heat, without charge-air heat                                                                                                     | R               | kW                          | N                                        |                 |  |  |  |  |
| 26                                           | Charge-air heat dissipation - CP                                                                                                                                                      | R               | kW                          | 160                                      |                 |  |  |  |  |
| 27                                           | Charge-air heat dissipation - FSP                                                                                                                                                     | R               | kW                          | N                                        |                 |  |  |  |  |
| 33                                           | Radiation and convection heat, engine - CP                                                                                                                                            | R               | kW                          | 40                                       |                 |  |  |  |  |
| 34                                           | Radiation and convection heat, engine - FSP                                                                                                                                           | R               | kW                          | N                                        |                 |  |  |  |  |
| 7. COOLANT SYSTEM (high-temperature circuit) |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 17                                           | Coolant temperature<br>(at engine outlet to cooling equipment)                                                                                                                        | A               | °C                          | 95                                       |                 |  |  |  |  |
| 20                                           | Coolant temperature after engine, alarm                                                                                                                                               | R               | °C                          | 97                                       |                 |  |  |  |  |
| 21                                           | Coolant temperature after engine, shutdown                                                                                                                                            | L               | °C                          | 102                                      |                 |  |  |  |  |
| 25                                           | Coolant antifreeze content, max.                                                                                                                                                      | L               | %                           | 50                                       |                 |  |  |  |  |
| 30                                           | Cooling equipment: coolant flow rate                                                                                                                                                  | A               | m³/h                        | 40                                       |                 |  |  |  |  |
| 35                                           | Coolant pump: inlet pressure, min.                                                                                                                                                    | L               | bar                         | 0.4                                      |                 |  |  |  |  |
| 36                                           | Coolant pump: inlet pressure, max.                                                                                                                                                    | L               | bar                         | 1.52                                     |                 |  |  |  |  |
| 41                                           | Pressure loss in off-engine cooling system, max.                                                                                                                                      | L               | bar                         | 0.7                                      |                 |  |  |  |  |
| 47                                           | Breather valve (expansion tank)<br>opening pressure (excess pressure)                                                                                                                 | R               | bar                         | N                                        |                 |  |  |  |  |

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|                                             | Application Group<br>MTU data code<br>Intake air temperature<br>Charge-air coolant temperature<br>Barometric pressure<br>Site altitude above sea level<br>Raw-water inlet temperature |                 | °C<br>°C<br>mbar<br>m<br>°C | 3B<br>15<br>25<br>55<br>1000<br>100<br>- |                 |  |  |  |  |
| 48                                          | Breather valve (expansion tank) opening pressure (depression)                                                                                                                         | R               | bar                         | N                                        |                 |  |  |  |  |
| 54                                          | Cooling equipment: height above engine, max.                                                                                                                                          | L               | m                           | 15.2                                     |                 |  |  |  |  |
| 53                                          | Cooling equipment: operating pressure                                                                                                                                                 | A               | bar                         | 2.2                                      |                 |  |  |  |  |
| 74                                          | Coolant level in expansion tank, below min. shutdown                                                                                                                                  | L               |                             | x                                        |                 |  |  |  |  |
| 8. COOLANT SYSTEM (low-temperature circuit) |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 9                                           | Coolant temperature before intercooler (at engine inlet from cooling equipment)                                                                                                       | A               | °C                          | 55                                       |                 |  |  |  |  |
| 13                                          | Coolant antifreeze content, max.                                                                                                                                                      | L               | %                           | 50                                       |                 |  |  |  |  |
| 17                                          | Charge-air temperature after intercooler, max.                                                                                                                                        | L               | °C                          | 75                                       |                 |  |  |  |  |
| 76                                          | Temperature differential between intake air and charge-air coolant before intercooler                                                                                                 | A               | K                           | N                                        |                 |  |  |  |  |
| 75                                          | Temperature differential between intake air and charge-air coolant before intercooler, max.                                                                                           | L               | K                           | N                                        |                 |  |  |  |  |
| 45                                          | Charge-air temperature after intercooler, max. for compliance with "TA-Luft" at CP                                                                                                    | L               | °C                          | -                                        |                 |  |  |  |  |
| 20                                          | Cooling equipment: coolant flow rate                                                                                                                                                  | A               | m³/h                        | 14                                       |                 |  |  |  |  |
| 24                                          | Coolant pump: inlet pressure, min.                                                                                                                                                    | L               | bar                         | 0.4                                      |                 |  |  |  |  |
| 25                                          | Coolant pump: inlet pressure, max.                                                                                                                                                    | L               | bar                         | 1.52                                     |                 |  |  |  |  |
| 29                                          | Pressure loss in off-engine cooling system, max.                                                                                                                                      | L               | bar                         | 0.7                                      |                 |  |  |  |  |
| 43                                          | Cooling equipment: height above engine, max.                                                                                                                                          | L               | m                           | 15.2                                     |                 |  |  |  |  |
| 36                                          | Breather valve (expansion tank) opening pressure (excess pressure)                                                                                                                    | R               | bar                         | N                                        |                 |  |  |  |  |
| 37                                          | Breather valve (expansion tank) opening pressure (depression)                                                                                                                         | R               | bar                         | N                                        |                 |  |  |  |  |
| 38                                          | Pressure in cooling system, max.                                                                                                                                                      | L               | bar                         | N                                        |                 |  |  |  |  |
| 42                                          | Cooling equipment: operating pressure                                                                                                                                                 | A               | bar                         | 2.2                                      |                 |  |  |  |  |
| 68                                          | Coolant level in expansion tank, below min. shutdown                                                                                                                                  | L               |                             | x                                        |                 |  |  |  |  |
| 10. LUBE OIL SYSTEM                         |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 1                                           | Lube oil operating temp. before engine, from                                                                                                                                          | R               | °C                          | 88                                       |                 |  |  |  |  |
| 2                                           | Lube oil operating temp. before engine, to                                                                                                                                            | R               | °C                          | 98                                       |                 |  |  |  |  |
| 5                                           | Lube oil temperature before engine, alarm                                                                                                                                             | R               | °C                          | 100                                      |                 |  |  |  |  |
| 6                                           | Lube oil temperature before engine, shutdown                                                                                                                                          | L               | °C                          | 105                                      |                 |  |  |  |  |
| 8                                           | Lube oil operating press. bef. engine, from                                                                                                                                           | R               | bar                         | 6.2                                      |                 |  |  |  |  |
| 9                                           | Lube oil operating press. bef. engine, to                                                                                                                                             | R               | bar                         | 7.5                                      |                 |  |  |  |  |
| 10                                          | Lube oil pressure before engine, alarm                                                                                                                                                | R               | bar                         | 4.4                                      |                 |  |  |  |  |
| 11                                          | Lube oil pressure before engine, shutdown                                                                                                                                             | L               | bar                         | 3.9                                      |                 |  |  |  |  |
| 19                                          | Lube oil fine filter (main circuit): number of units                                                                                                                                  |                 |                             | 1                                        |                 |  |  |  |  |
| 20                                          | Lube oil fine filter (main circuit): number of elements per unit                                                                                                                      |                 |                             | 2                                        |                 |  |  |  |  |
| 21                                          | Lube oil fine filter (main circuit): particle retention                                                                                                                               | R               | mm                          | 0.009                                    |                 |  |  |  |  |
| 32                                          | Lube oil fine filter (main circuit): pressure differential, max.                                                                                                                      | L               | bar                         | 0.8                                      |                 |  |  |  |  |
| 11. FUEL SYSTEM                             |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 1                                           | Fuel pressure at fuel feed connection, min. (when engine is starting)                                                                                                                 | L               | bar                         | -0.3                                     |                 |  |  |  |  |
| 2                                           | Fuel pressure at fuel feed connection, max. (when engine is starting)                                                                                                                 | L               | bar                         | +0.5                                     |                 |  |  |  |  |
| 37                                          | Fuel supply flow, max.                                                                                                                                                                | R               | liter/min                   | 8.0                                      |                 |  |  |  |  |
| 8                                           | Fuel return flow, max.                                                                                                                                                                | R               | liter/min                   | 3.5                                      |                 |  |  |  |  |
| 10                                          | Fuel pressure at return connection on engine, max.                                                                                                                                    | L               | bar                         | 0.5                                      |                 |  |  |  |  |
| 15                                          | Fuel prefilter: number of units                                                                                                                                                       | A               |                             | -                                        |                 |  |  |  |  |

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| 16                            | Fuel prefilter: number of elements per unit                                                                                                                                           | A               |                             | -                                        |                 |  |  |  |  |
| 17                            | Fuel prefilter: particle retention                                                                                                                                                    | A               | mm                          | -                                        |                 |  |  |  |  |
| 18                            | Fuel fine filter (main circuit): number of units                                                                                                                                      | A               |                             | 1                                        |                 |  |  |  |  |
| 19                            | Fuel fine filter (main circuit): number of elements per unit                                                                                                                          | A               |                             | 1                                        |                 |  |  |  |  |
| 20                            | Fuel fine filter (main circuit): particle retention                                                                                                                                   | A               | mm                          | 0.005                                    |                 |  |  |  |  |
| 21                            | Fuel fine filter (main circuit): pressure differential, max.                                                                                                                          | L               | bar                         | 1.0                                      |                 |  |  |  |  |
| 12. GENERAL OPERATING DATA    |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 1                             | Cold start capability: air temperature (w/o starting aid, w/o preheating) - (case A)                                                                                                  | R               | °C                          | 0**                                      |                 |  |  |  |  |
| 2                             | Additional condition (to case A): engine coolant temperature                                                                                                                          | R               | °C                          | N                                        |                 |  |  |  |  |
| 3                             | Additional condition (to case A): lube oil temperature                                                                                                                                | R               | °C                          | +10**                                    |                 |  |  |  |  |
| 4                             | Additional condition (to case A): lube oil viscosity                                                                                                                                  | R               | SAE                         | 30**                                     |                 |  |  |  |  |
| 9                             | Cold start capability: air temperature (w/o starting aid, w/ preheating) - (case C)                                                                                                   | R               | °C                          | -10**                                    |                 |  |  |  |  |
| 10                            | Additional condition (to case C): engine coolant temperature                                                                                                                          | R               | °C                          | +40**                                    |                 |  |  |  |  |
| 11                            | Additional condition (to case C): lube oil temperature                                                                                                                                | R               | °C                          | -5**                                     |                 |  |  |  |  |
| 12                            | Additional condition (to case C): lube oil viscosity                                                                                                                                  | R               | SAE                         | 10W30                                    |                 |  |  |  |  |
| 21                            | Coolant preheating, heater performance (standard)                                                                                                                                     | R               | kW                          | 3                                        |                 |  |  |  |  |
| 22                            | Coolant preheating, preheating temperature (min.)                                                                                                                                     | R               | °C                          | 32                                       |                 |  |  |  |  |
| 28                            | Breakaway torque (without driven machinery) coolant temperature +5°C                                                                                                                  | R               | Nm                          | 580                                      |                 |  |  |  |  |
| 30                            | Breakaway torque (without driven machinery) coolant temperature +40°C                                                                                                                 | R               | Nm                          | 330*                                     |                 |  |  |  |  |
| 29                            | Cranking torque at firing speed (without driven machinery) coolant temperature +5°C                                                                                                   | R               | Nm                          | 380*                                     |                 |  |  |  |  |
| 31                            | Cranking torque at firing speed (without driven machinery) coolant temperature +40°C                                                                                                  | R               | Nm                          | 305*                                     |                 |  |  |  |  |
| 96                            | Starting is blocked if the engine coolant temperature is below                                                                                                                        |                 | °C                          | N                                        |                 |  |  |  |  |
| 37                            | High idling speed, max. (static)                                                                                                                                                      | L               | rpm                         | 1660                                     |                 |  |  |  |  |
| 38                            | Limit speed for overspeed alarm / emergency shutdown                                                                                                                                  | L               | rpm                         | 1800                                     |                 |  |  |  |  |
| 42                            | Firing speed, from                                                                                                                                                                    | R               | rpm                         | 100                                      |                 |  |  |  |  |
| 43                            | Firing speed, to                                                                                                                                                                      | R               | rpm                         | 120                                      |                 |  |  |  |  |
| 44                            | Engine coolant temperature before starting full-load operation, recommended min. (for emergency/standby sets with coolant preheating: at least the preheating temperature)            | L               | °C                          | 40                                       |                 |  |  |  |  |
| 48                            | Minimum continuous load                                                                                                                                                               | R               | %                           | 20                                       |                 |  |  |  |  |
| 49                            | Extended low or no-load operation possible (consultation required)                                                                                                                    |                 |                             | x                                        |                 |  |  |  |  |
| 50                            | Engine mass moment of inertia (without flywheel)                                                                                                                                      | R               | kgm²                        | 1.12                                     |                 |  |  |  |  |
| 51                            | Engine mass moment of inertia (with standard flywheel)                                                                                                                                | R               | kgm²                        | 3.92                                     |                 |  |  |  |  |
| 52                            | Standard flywheel mass moment of inertia                                                                                                                                              | R               | kgm²                        | 2.80                                     |                 |  |  |  |  |
| 69                            | Speed droop (with electronic governor) adjustable, from                                                                                                                               | R               | %                           | 0                                        |                 |  |  |  |  |
| 70                            | Speed droop (with electronic governor) adjustable, to                                                                                                                                 | R               | %                           | 5                                        |                 |  |  |  |  |
| 95                            | Number of starter ring-gear teeth on engine flywheel                                                                                                                                  |                 |                             | 160                                      |                 |  |  |  |  |
| 13. STARTING (electric)       |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 12                            | Starter, rated power (make DELCO) (standard design)                                                                                                                                   | R               | kW                          | 9.0                                      |                 |  |  |  |  |
| 2                             | Starter, rated voltage (standard design)                                                                                                                                              | R               | V=                          | 24                                       |                 |  |  |  |  |
| 14                            | Starter, power requirement max. (make DELCO)                                                                                                                                          | R               | A                           | 1750                                     |                 |  |  |  |  |
| 15                            | Starter, power requirement at firing speed (make DELCO)                                                                                                                               | R               | A                           | 800                                      |                 |  |  |  |  |

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| Technical Sales Documentation                            |                                                                                                                                                                                       | - ENGINE DATA - |                             |                                          | MTU Project No. |  |  |  |  |
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|                                                          | Application Group<br>MTU data code<br>Intake air temperature<br>Charge-air coolant temperature<br>Barometric pressure<br>Site altitude above sea level<br>Raw-water inlet temperature |                 | °C<br>°C<br>mbar<br>m<br>°C | 3B<br>15<br>25<br>55<br>1000<br>100<br>- |                 |  |  |  |  |
| 16                                                       | Start attempt duration (engine preheated)                                                                                                                                             | R               | s                           | -                                        |                 |  |  |  |  |
| 17                                                       | Start attempt duration (engine not preheated)                                                                                                                                         | R               | s                           | -                                        |                 |  |  |  |  |
| 18                                                       | Start attempt duration, max.                                                                                                                                                          | L               | s                           | 6                                        |                 |  |  |  |  |
| 15. STARTING (pneumatic/oil pressure starter)            |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 5                                                        | Starting air pressure before starter motor, min.                                                                                                                                      | R               | bar                         | 17                                       |                 |  |  |  |  |
| 6                                                        | Starting air pressure before starter motor, max.                                                                                                                                      | R               | bar                         | N                                        |                 |  |  |  |  |
| 7                                                        | Starting air pressure before starter motor, min.                                                                                                                                      | L               | bar                         | N                                        |                 |  |  |  |  |
| 8                                                        | Starting air pressure before starter motor, max.                                                                                                                                      | L               | bar                         | N                                        |                 |  |  |  |  |
| 18                                                       | Start attempt duration (engine preheated)                                                                                                                                             | R               | s                           | N                                        |                 |  |  |  |  |
| 19                                                       | Start attempt duration (engine not preheated)                                                                                                                                         | R               | s                           | N                                        |                 |  |  |  |  |
| 20                                                       | Start attempt duration, max.                                                                                                                                                          | L               | s                           | N                                        |                 |  |  |  |  |
| 21                                                       | Air consumption / start attempt (engine preheated)                                                                                                                                    | R               | m <sup>3</sup> n            | 0.49                                     |                 |  |  |  |  |
| 23                                                       | Starting air tank for 3 start attempts (max. 40 bar) (engine preheated)                                                                                                               | R               | liter                       | N                                        |                 |  |  |  |  |
| 24                                                       | Starting air tank for 3 start attempts (max. 30 bar) (engine preheated)                                                                                                               | R               | liter                       | N                                        |                 |  |  |  |  |
| 25                                                       | Starting air tank for 6 start attempts (max. 40 bar) (engine preheated)                                                                                                               | R               | liter                       | N                                        |                 |  |  |  |  |
| 26                                                       | Starting air tank for 6 start attempts (max. 30 bar) (engine preheated)                                                                                                               | R               | liter                       | N                                        |                 |  |  |  |  |
| 27                                                       | Starting air tank for 10 start attempts (max. 40 bar) (engine preheated)                                                                                                              | R               | liter                       | N                                        |                 |  |  |  |  |
| 28                                                       | Starting air tank for 10 start attempts (max. 30 bar) (engine preheated)                                                                                                              | R               | liter                       | N                                        |                 |  |  |  |  |
| 16. INCLINATIONS - STANDARD OIL SYSTEM (ref.: waterline) |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 15                                                       | Longitudinal inclination, continuous max. driving end down (Option: max. operating inclinations)                                                                                      | L               | degrees                     | 5                                        |                 |  |  |  |  |
| 17                                                       | Longitudinal inclination, continuous max. driving end up (Option: max. operating inclinations)                                                                                        | L               | degrees                     | 5                                        |                 |  |  |  |  |
| 19                                                       | Transverse inclination, continuous max. (Option: max. operating inclinations)                                                                                                         | L               | degrees                     | 10                                       |                 |  |  |  |  |
| 18. CAPACITIES                                           |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 1                                                        | Engine coolant capacity (without cooling equipment)                                                                                                                                   | R               | liter                       | 110                                      |                 |  |  |  |  |
| 10                                                       | Intercooler coolant capacity                                                                                                                                                          | R               | liter                       | 20                                       |                 |  |  |  |  |
| 11                                                       | On-engine fuel capacity                                                                                                                                                               | R               | liter                       | 5                                        |                 |  |  |  |  |
| 14                                                       | Engine oil capacity, initial filling (standard oil system) (Option: max. operating inclinations)                                                                                      | R               | liter                       | 77                                       |                 |  |  |  |  |
| 20                                                       | Oil change quantity, max. (standard oil system) (Option: max. operating inclinations)                                                                                                 | R               | liter                       | 74                                       |                 |  |  |  |  |
| 28                                                       | Oil pan capacity, dipstick mark min. (standard oil system) (Option: max. operating inclinations)                                                                                      | L               | liter                       | 50                                       |                 |  |  |  |  |
| 29                                                       | Oil pan capacity, dipstick mark max. (standard oil system) (Option: max. operating inclinations)                                                                                      | L               | liter                       | 67                                       |                 |  |  |  |  |
| 19. WEIGHTS / DIMENSIONS                                 |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 9                                                        | Engine weight, dry (basic engine configuration acc. to scope of supply specification)                                                                                                 | R               | kg                          | 2570                                     |                 |  |  |  |  |
| 10                                                       | Engine weight, wet (basic engine configuration acc. to scope of supply specification)                                                                                                 | R               | kg                          | 2760                                     |                 |  |  |  |  |
| 20. FAN / FAN COOLER                                     |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 3                                                        | Fan, pusher-type                                                                                                                                                                      |                 |                             | x                                        |                 |  |  |  |  |
| 18                                                       | Fan arrangement: vertical above crankshaft                                                                                                                                            |                 |                             | x                                        |                 |  |  |  |  |

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|                               | Application Group<br>MTU data code<br>Intake air temperature<br>Charge-air coolant temperature<br>Barometric pressure<br>Site altitude above sea level<br>Raw-water inlet temperature |                 | °C<br>°C<br>mbar<br>m<br>°C | 3B<br>15<br>25<br>55<br>1000<br>100<br>- |                 |  |  |  |  |
| 9                             | Fan drive: mechanical via V-belt                                                                                                                                                      |                 |                             | x                                        |                 |  |  |  |  |
| 19                            | Standard fan cooler, supplied by MTU, design and specific data acc. to case A / B / C                                                                                                 |                 |                             | N                                        |                 |  |  |  |  |
| 21                            | (Case A) - fan cooler, designed for:<br>- ambient temperature                                                                                                                         | A               | °C                          | N                                        |                 |  |  |  |  |
| 54                            | (Case A) - fan cooler, designed for:<br>- site altitude, max.                                                                                                                         | A               | m                           | N                                        |                 |  |  |  |  |
| 22                            | (Case A) - fan cooler, designed for:<br>- coolant antifreeze content, max.                                                                                                            | A               | %                           | N                                        |                 |  |  |  |  |
| 56                            | (Case A) - fan: power consumption at 2 mbar / 200 Pa duct allowance (pressure and suction sides, total)                                                                               | R               | kW                          | N                                        |                 |  |  |  |  |
| 57                            | (Case A) - fan: power consumption at 3 mbar / 300 Pa duct allowance (pressure and suction sides, total)                                                                               | R               | kW                          | N                                        |                 |  |  |  |  |
| 27                            | (Case A) - cooling-air flow rate at 1 mbar / 100 Pa duct allowance (pressure and suction sides, total)                                                                                | R               | m³/s                        | N                                        |                 |  |  |  |  |
| 28                            | (Case A) - cooling-air flow rate at 2 mbar / 200 Pa duct allowance (pressure and suction sides, total)                                                                                | R               | m³/s                        | N                                        |                 |  |  |  |  |
| 29                            | (Case A) - cooling-air flow rate at 3 mbar / 300 Pa duct allowance (pressure and suction sides, total)                                                                                | R               | m³/s                        | N                                        |                 |  |  |  |  |
| 58                            | (Case A) - fan: weight                                                                                                                                                                | R               | kg                          | N                                        |                 |  |  |  |  |
| 59                            | (Case A) - fan cooler: weight, dry (incl. pipework)                                                                                                                                   | R               | kg                          | N                                        |                 |  |  |  |  |
| 31                            | (Case A) - fan cooler: coolant capacity                                                                                                                                               | R               | liter                       | N                                        |                 |  |  |  |  |
| 32                            | (Case B) - fan cooler, designed for:<br>- ambient temperature                                                                                                                         | A               | °C                          | N                                        |                 |  |  |  |  |
| 60                            | (Case B) - fan cooler, designed for:<br>- site altitude, max.                                                                                                                         | A               | m                           | N                                        |                 |  |  |  |  |
| 33                            | (Case B) - fan cooler, designed for:<br>- coolant antifreeze content, max.                                                                                                            | A               | %                           | N                                        |                 |  |  |  |  |
| 61                            | (Case B) - fan: power consumption at 1 mbar / 100 Pa duct allowance (pressure and suction sides, total)                                                                               | R               | kW                          | N                                        |                 |  |  |  |  |
| 62                            | (Case B) - fan: power consumption at 2 mbar / 200 Pa duct allowance (pressure and suction sides, total)                                                                               | R               | kW                          | N                                        |                 |  |  |  |  |
| 63                            | (Case B) - fan: power consumption at 3 mbar / 300 Pa duct allowance (pressure and suction sides, total)                                                                               | R               | kW                          | N                                        |                 |  |  |  |  |
| 38                            | (Case B) - cooling-air flow rate at 1 mbar / 100 Pa duct allowance (pressure and suction sides, total)                                                                                | R               | m³/s                        | N                                        |                 |  |  |  |  |
| 39                            | (Case B) - cooling-air flow rate at 2 mbar / 200 Pa duct allowance (pressure and suction sides, total)                                                                                | R               | m³/s                        | N                                        |                 |  |  |  |  |
| 40                            | (Case B) - cooling-air flow rate at 3 mbar / 300 Pa duct allowance (pressure and suction sides, total)                                                                                | R               | m³/s                        | N                                        |                 |  |  |  |  |
| 64                            | (Case B) - fan: weight                                                                                                                                                                | R               | kg                          | N                                        |                 |  |  |  |  |
| 65                            | (Case B) - fan cooler: weight, dry (incl. pipework)                                                                                                                                   | R               | kg                          | N                                        |                 |  |  |  |  |
| 42                            | (Case B) - fan cooler: coolant capacity                                                                                                                                               | R               | liter                       | N                                        |                 |  |  |  |  |
| 43                            | (Case C) - fan cooler, designed for:<br>- ambient temperature                                                                                                                         | A               | °C                          | N                                        |                 |  |  |  |  |
| 66                            | (Case C) - fan cooler, designed for:<br>- site altitude, max.                                                                                                                         | A               | m                           | N                                        |                 |  |  |  |  |
| 44                            | (Case C) - fan cooler, designed for:<br>- coolant antifreeze content, max.                                                                                                            | A               | %                           | N                                        |                 |  |  |  |  |
| 67                            | (Case C) - fan: power consumption at 1 mbar / 100 Pa duct allowance (pressure and suction sides, total)                                                                               | R               | kW                          | N                                        |                 |  |  |  |  |

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|                               | Application Group<br>MTU data code<br>Intake air temperature<br>Charge-air coolant temperature<br>Barometric pressure<br>Site altitude above sea level<br>Raw-water inlet temperature |                 | °C<br>°C<br>mbar<br>m<br>°C | 3B<br>15<br>25<br>55<br>1000<br>100<br>- |                 |  |  |  |  |
| 68                            | (Case C) - fan: power consumption at 2 mbar / 200 Pa duct allowance (pressure and suction sides, total)                                                                               | R               | kW                          | N                                        |                 |  |  |  |  |
| 69                            | (Case C) - fan: power consumption at 3 mbar / 300 Pa duct allowance (pressure and suction sides, total)                                                                               | R               | kW                          | N                                        |                 |  |  |  |  |
| 49                            | (Case C) - cooling-air flow rate at 1 mbar / 100 Pa duct allowance (pressure and suction sides, total)                                                                                | R               | m³/s                        | N                                        |                 |  |  |  |  |
| 50                            | (Case C) - cooling-air flow rate at 2 mbar / 200 Pa duct allowance (pressure and suction sides, total)                                                                                | R               | m³/s                        | N                                        |                 |  |  |  |  |
| 51                            | (Case C) - cooling-air flow rate at 3 mbar / 300 Pa duct allowance (pressure and suction sides, total)                                                                                | R               | m³/s                        | N                                        |                 |  |  |  |  |
| 70                            | (Case C) - fan: weight                                                                                                                                                                | R               | kg                          | N                                        |                 |  |  |  |  |
| 71                            | (Case C) - fan cooler: weight, dry (incl. pipework)                                                                                                                                   | R               | kg                          | N                                        |                 |  |  |  |  |
| 53                            | (Case C) - fan cooler: coolant capacity                                                                                                                                               | R               | liter                       | N                                        |                 |  |  |  |  |
| 21. EXHAUST EMISSIONS         |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 307                           | Regulation: "TA-Luft" (Edition 1986) - CP Nitric oxide (NOx) (5% O2)                                                                                                                  | G               | mg/m³n                      | -                                        |                 |  |  |  |  |
| 308                           | Regulation: "TA-Luft" (Edition 1986) - CP Carbon monoxide (CO) (5% O2)                                                                                                                | G               | mg/m³n                      | -                                        |                 |  |  |  |  |
| 309                           | Regulation: "TA-Luft" (Edition 1986) - CP Unburned hydrocarbons (HC)                                                                                                                  | G               | mg/m³n                      | -                                        |                 |  |  |  |  |
| 310                           | Regulation: "TA-Luft" (Edition 1986) - CP Dust (5% O2)                                                                                                                                | G               | mg/m³n                      | -                                        |                 |  |  |  |  |
| 366                           | Regulation: "TA-Luft" (Edition 1986) - CP Formaldehyde (5% O2)                                                                                                                        | G               | mg/m³n                      | -                                        |                 |  |  |  |  |
| 311                           | Regulation: stationary power plants in France - CP Nitric oxide (NOx) (5% O2)                                                                                                         | G               | mg/m³n                      | -                                        |                 |  |  |  |  |
| 312                           | Regulation: stationary power plants in France - CP Carbon monoxide (CO) (5% O2)                                                                                                       | G               | mg/m³n                      | -                                        |                 |  |  |  |  |
| 313                           | Regulation: stationary power plants in France - CP Unburned hydrocarbons (NMHC)                                                                                                       | G               | mg/m³n                      | -                                        |                 |  |  |  |  |
| 314                           | Regulation: stationary power plants in France - CP Dust / particulates (5% O2)                                                                                                        | G               | mg/m³n                      | -                                        |                 |  |  |  |  |
| 316                           | Regulation: US EPA "Nonroad" (40 CFR 89 - Tier 1 -) Nitric oxide (NOx)                                                                                                                | G               | g/kWh                       | -                                        |                 |  |  |  |  |
| 317                           | Regulation: US EPA "Nonroad" (40 CFR 89 - Tier 1 -) Carbon monoxide (CO)                                                                                                              | G               | g/kWh                       | -                                        |                 |  |  |  |  |
| 318                           | Regulation: US EPA "Nonroad" (40 CFR 89 - Tier 1 -) Unburned hydrocarbons (HC)                                                                                                        | G               | g/kWh                       | -                                        |                 |  |  |  |  |
| 319                           | Regulation: US EPA "Nonroad" (40 CFR 89 - Tier 1 -) Particulates                                                                                                                      | G               | g/kWh                       | -                                        |                 |  |  |  |  |
| 320                           | Regulation: US EPA "Nonroad" (40 CFR 89 - Tier 2 -) Nitric oxide (NOx) + unburned hydrocarbons (HC)                                                                                   | G               | g/kWh                       | -                                        |                 |  |  |  |  |
| 321                           | Regulation: US EPA "Nonroad" (40 CFR 89 - Tier 2 -) Carbon monoxide (CO)                                                                                                              | G               | g/kWh                       | -                                        |                 |  |  |  |  |
| 323                           | Regulation: US EPA "Nonroad" (40 CFR 89 - Tier 2 -) Particulates                                                                                                                      | G               | g/kWh                       | -                                        |                 |  |  |  |  |
| 141                           | Exhaust volume flow, dry - CP (standard conditions)                                                                                                                                   | R               | m³/h                        | N                                        |                 |  |  |  |  |
| 143                           | Exhaust mass flow - CP (reference conditions)                                                                                                                                         | R               | kg/h                        | N                                        |                 |  |  |  |  |

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|                                   | Application Group<br>MTU data code<br>Intake air temperature<br>Charge-air coolant temperature<br>Barometric pressure<br>Site altitude above sea level<br>Raw-water inlet temperature |                 | °C<br>°C<br>mbar<br>m<br>°C | 3B<br>15<br>25<br>55<br>1000<br>100<br>- |                 |  |  |  |  |
| 144                               | Residual oxygen content (O2) in dry exhaust - CP (standard conditions)                                                                                                                | R               | % (vol.)                    | N                                        |                 |  |  |  |  |
| 145                               | Total combustion calorific value - CP                                                                                                                                                 | R               | kW                          | N                                        |                 |  |  |  |  |
| 37                                | Smoke index, BOSCH - FSP                                                                                                                                                              | R               |                             | 0.3                                      |                 |  |  |  |  |
| 22. ACOUSTICS                     |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 101                               | Exhaust noise, unsilenced - CP (free-field sound-pressure level Lp, 1m distance, ISO 6798)                                                                                            | R               | dB(A)                       |                                          |                 |  |  |  |  |
| 201                               | Exhaust noise, unsilenced - CP (sound power level LW, ISO 6798)                                                                                                                       | R               | dB(A)                       |                                          |                 |  |  |  |  |
| 103                               | Exhaust noise, unsilenced - FSP (free-field sound-pressure level Lp, 1m distance, ISO 6798) Spectrum No.                                                                              |                 |                             |                                          |                 |  |  |  |  |
| 203                               | Exhaust noise,unsilenced - CP (sound power level LW, ISO 6798) Spectrum No.                                                                                                           |                 |                             | N                                        |                 |  |  |  |  |
| 109                               | Engine surface noise with attenuated intake noise (filter) - CP (free-field sound-pressure level Lp, 1m distance, ISO 6798)                                                           | R               | dB(A)                       |                                          |                 |  |  |  |  |
| 209                               | Engine surface noise with attenuated intake noise (filter) - CP (sound power level LW, ISO 6798)                                                                                      | R               | dB(A)                       |                                          |                 |  |  |  |  |
| 111                               | Engine surface noise with attenuated intake noise (filter) - CP (free-field sound-pressure level Lp, 1m distance, ISO 6798) Spectrum No.                                              |                 |                             |                                          |                 |  |  |  |  |
| 211                               | Engine surface noise with attenuated intake noise (filter) - CP (sound power level LW, ISO 6798) Spectrum No.                                                                         |                 |                             | N                                        |                 |  |  |  |  |
| 125                               | Structure borne noise at engine mounting brackets in vertical direction above resilient engine mounts - CP Spectrum No.                                                               |                 |                             |                                          |                 |  |  |  |  |
| 129                               | Test stand impedance spectrum, Diagram No.                                                                                                                                            |                 |                             | N                                        |                 |  |  |  |  |
| 130                               | Test stand impedance spectrum, Diagram No. (cont.)                                                                                                                                    |                 |                             | N                                        |                 |  |  |  |  |
| 23. TBO AND LOAD PROFILE (case A) |                                                                                                                                                                                       |                 |                             |                                          |                 |  |  |  |  |
| 15                                | Maintenance schedule No.                                                                                                                                                              |                 |                             | N                                        |                 |  |  |  |  |
| 16                                | Maintenance schedule No. (cont.)                                                                                                                                                      |                 |                             | N                                        |                 |  |  |  |  |

Explanation:  
 CP = Ref.value: Continuous power      FSP = Ref.value: Fuel stop power  
 A = Design value      G = Guaranteed value      L = Limit value, up to which the engine can be operated, without change (e.g. of power setting)      R = Guideline value  
 X = Applicable      - = Not applicable      N = Not yet defined value      Z = See notes provided after "ENGINE DATA"