

**Service Information System**

Shutdown SIS

[Previous Screen](#)

◀ Product: MARINE ENGINE  
Model: C280-16 MARINE ENGINE TDX  
Configuration: C280-16 MARINE TDX00001-UP

## Testing and Adjusting Marine Monitoring System II

Media Number -REN2490-06

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i01505402

## Signal Listing

### SMCS - 7490

The following tables contain information about the signals of the control panel. The data in the tables is available from the 2 Modbus ports. The ports are located in the control panel on the top slot of the PLC back plane.

Refer to the Systems Operation, "Marine Monitoring System Configuration" for information about the setup of communications.

**Reference:** "Gould Inc. Publication PI-MBUS 300 REV B"

The data link is configured for the following settings:

- 8 data bits
- 1 stop bit
- No parity

The node address and the baud rate can be configured by the user.

## Interfacing With a Shipyard

Provide table 3, table 4, table 7, table 8, and table 9.

Provide the following list of information about the configuration:

- The MMS protocol for output is Modbus.
- Ports for hardware are available. The ports have 9 pins. The RS-485 has one connection with 2 wires and two connections with 4 wires. The RS-232C has one handshaking connection and two connections without handshaking.

- Provide the list of baud rates.
- The network addresses can be a number between 1 and 247.
- The system uses a serial cable that has 9 pins. The cable has shielding.

## Control System Inputs to PLC Redundant Relay Logic

Table 1

| PLC I/O Address             | Sensor Description                            | PLC Alarm Address | Signal Type | Alarm | Shut Down | Setpoint Trip | Comments                         |
|-----------------------------|---|-------------------|-------------|-------|-----------|---------------|----------------------------------|
| <b>Pressure Contactors</b>  |   |                   |             |       |           |               |                                  |
| I:2.0/1<br>(I:2.0/0)        | Engine Low Oil Pressure:<br>144-0102          | B16:105/2         | DIGITAL     |       | X         | Close Contact | Low Speed                        |
| I:2.0/3<br>(I:2.0/2)        | Engine Low Oil Pressure:<br>144-0102          | B16:113/2         | DIGITAL     |       | X         | Close Contact | High Speed                       |
| I:2.0/4<br>(I:2.0/5)        | Engine High Crankcase Pressure:<br>117-1864   | B16:81/2          | DIGITAL     |       | X         | Close Contact |                                  |
| I:3.0/1                     | Low Air Starting Pressure:<br>117-1864        | B12:145/2         | DIGITAL     | X     |           | Open Contact  | Removed if Transducer is Ordered |
| I:3.0/6                     | Raw Water Low Pressure                        | B12:105/2         | DIGITAL     | X     |           | Open Contact  | Removed if Transducer is Ordered |
| I:3.0/2                     | Low Jacket Water Pressure:<br>144-0102        | B12:81/2          | DIGITAL     | X     |           | Open Contact  | Removed if Transducer is Ordered |
| I:3.0/3                     | Low AC/OC Circuit Water Pressure:<br>144-0102 | B12:97/2          | DIGITAL     | X     |           | Open Contact  | Removed if Transducer is Ordered |
| <b>Switch/Misc Contacts</b> |   |                   |             |       |           |               |                                  |
|                             |   |                   |             |       |           |               |                                  |

|                     |   |           |         |   |   |                    |                                      |
|---------------------|---|-----------|---------|---|---|--------------------|--------------------------------------|
| I:3.0/12            | Low Battery Voltage: 7C-3508                    | B13:233/2 | DIGITAL | X |   | Open Contact       | Alarm picks up at <~22 VDC           |
| I:3.0/13            | Jacket Water Detection: 125-4340                | B13:225/2 | DIGITAL | X |   | Open Contact       |                                      |
| I:2.0/14<br>I:4.0/0 | Emergency Stop (Local)                          | B16:145/2 | DIGITAL |   | X | Close Contact      | Redundant Contacts                   |
| I:2.0/8             | Engine Speed Switch Crank Terminate: 100-5675   | B13:145/2 | DIGITAL | X |   | > 170 RPM + 2 Sec  | Determines Engine Running            |
| I:2.0/9             | Engine Speed Switch Alarm Time Delay: 100-5675  | B13:153/2 | DIGITAL | X |   | 9 Sec After SS-001 | Low Speed Condition Pressure Alarms  |
| I:2.0/10            | Engine Speed Switch Oil Pressure Step: 100-5675 | B13:161/2 | DIGITAL | X |   | 75% Rated Speed    | High Speed Condition Pressure Alarms |
| I:3.0/0             | Engine Oil Level Low                            | B13:177/2 | DIGITAL | X |   | Open Contact       |                                      |
| I:2.070             | Starting Oil Sensor Auxiliary Relay: 3N-1400    |           | DIGITAL |   |   |                    | Engine Auto Start Interlock          |
| I:3.0/14            | Oil Mist Detection (System Status Ready)        |           | DIGITAL |   |   |                    | Close Contact Ready                  |
| I:3.0/15            | Oil Mist Detection (Alarm)                      | B16:89/2  | DIGITAL |   | X | Open Contact       |                                      |
| I:3.0/5             | Water Level Low Switch                          | B13:217/2 | DIGITAL | X |   | Open Contact       |                                      |
|                     |   |           |         |   |   |                    |                                      |

|          |  |           |         |   |   |                        |                                  |
|----------|--|-----------|---------|---|---|------------------------|----------------------------------|
| I:2.0/11 | Engine Overspeed (Engine Speed Switch): 100-5675 | B16:73/2  | DIGITAL |   | X | Close Contact from ESS |                                  |
| I:4.0/1  | Fuel Control Switch                              |           | DIGITAL |   |   |                        | Relay Based System               |
|          | Prelube/Start Switch - Start Signal              |           | DIGITAL |   |   |                        | Relay Based System               |
|          | Prelube/Start Switch - Prelube Signal            |           | DIGITAL |   |   |                        | Relay Based System               |
| I:4.0/7  | Engine Control Switch - Off/Reset                |           | DIGITAL |   |   | Close Contact          | Lock Out Engine and Reset System |
| I:4.0/8  | Horn Silence                                     |           | DIGITAL |   |   | Close Contact          | Indicates ACK Alarms             |
| I:3.0/4  | Metal Particle Detector                          | B13:193/2 | DIGITAL | X | X | Close Contact          |                                  |
| I:2.0/6  | Customer Shutdown                                | B13:137/2 | DIGITAL |   | X | Close Contact          | Customer Supplied                |
| I:2.0/12 | Relay Power Not Available                        | B13:241/2 | DIGITAL | X |   |                        |                                  |
| I:2.0/13 | Summary Shutdown Relay                           |           | DIGITAL |   |   |                        |                                  |
| I:2.0/15 | Air Door   |           | DIGITAL |   |   | Close Contact          |                                  |
| I:4.0/3  | Engine Control Switch - Remote                   |           | DIGITAL |   |   | Close Contact          |                                  |

|  |   |           |         |   |   |                   |                              |
|--|---|-----------|---------|---|---|-------------------|------------------------------|
|  | Position                                    |           |         |   |   |                   |                              |
| I:4.0/9                                      | Lamp Test                                   |           | DIGITAL |   |   | Close Contact     |                              |
| I:4.0/11I:4.0/10                             | Ball Head Backup Mode                       | B13:137/2 | DIGITAL | X |   | Close Contact     |                              |
| I:4.0/12                                     | Cylinder Arrangement:<br>0=Vee,<br>1=Inline |           | DIGITAL |   |   |                   | Engine Configuration Jumpers |
| I:4.0/13                                     | Cylinders Per Bank:<br>0=Eight,<br>1=Six    |           | DIGITAL |   |   |                   | Engine Configuration Jumpers |
| I:4.0/14                                     | Engine Packaging:<br>0=GMS, 1-MMS           |           | DIGITAL |   |   |                   | Engine Configuration Jumpers |
| I:4.0/15                                     | Optional Transducer Module Installed        |           | DIGITAL |   |   |                   | Engine Configuration Jumpers |
| <b>Analog Speed and Pressure Transducers</b> |   |           |         |   |   |                   |                              |
|  | Mag Pick-up (Engine Speed Switch): 8L-4171  |           | FREQ    |   | X | 113 % Rated Speed | Speed Switch Control Sensor  |
| I:6.1  | Mag Pick-up (PLC Engine Speed): 8L-4171     | F56:53    | FREQ    |   | X | 113 % Rated Speed | 0-1200 RPM                   |
| I:6.3  | Mag Pick-up (PLC Turbine Speed Left)        | F56:51    | FREQ    | X |   |                   |                              |
| I:6.4  | Mag Pick-up (PLC Turbine Speed Right)       | F56:52    | FREQ    | X |   |                   |                              |

|                              |   |        |         |   |   |  |  |
|------------------------------|---|--------|---------|---|---|--|--|
| Rack 0 Module<br>7 Channel 4 | Lube Oil<br>Pressure to<br>Filter: 141-<br>9880 | F56:3  | 4-20 mA |   |   |  | 0 -<br>1000 kPa<br>(145.0 psi)<br>Used to<br>Calculate Oil<br>Filter Doff<br>Press |
| Rack 0 Module<br>7 Channel 0 | Lube Oil<br>Pressure to<br>Engine: 141-<br>9880 | F56:2  | 4-20 mA | X | X | <<br>320 kPa<br>(46.4<br>psi) & <<br><br>120 kPa<br>(17.4<br>psi)<br><<br>260 kPa<br>(37.7<br>psi) & <<br><br>105 kPa<br>(15.2<br>psi) | Crank<br>Terminate for<br>Low Speed,<br>Oil Step for<br>High Speed                 |
| Rack 0 Module<br>7 Channel 4 | Fuel Pressure<br>to Filter: 141-<br>9880        | F56:8  | 4-20 mA |   |   |  | 0 -<br>1000 kPa<br>(145.0 psi)<br>Used for Diff<br>Alarm                           |
| Rack 0 Module<br>7 Channel 2 | Fuel Pressure<br>to Engine:<br>141-9880         | F56:7  | 4-20 mA | X |   | <<br>260 kPa<br>(37.7<br>psi)  | 0 -<br>1000 kPa<br>(145.0 psi)   |
| Rack 0 Module<br>3 Channel 3 | Engine Jacket<br>Water<br>Pressure:<br>141-9880 | F56:11 | 4-20 mA | X |   | <<br>20 kPa<br>(2.9 psi)<br>(Low<br>RPM)<br><<br>35 kPa<br>(5.1 psi)<br>(High<br>RPM)  | 0 -<br>1000 kPa<br>(145.0 psi)<br>Optional   |
| Rack 0 Module<br>3 Channel 1 | AC/OC<br>Circuit Water<br>Pressure:<br>141-9880 | F56:13 | 4-20 mA | X |   | <<br>35 kPa<br>(5.1 psi)   | 0 -<br>1000 kPa<br>(145.0 psi)<br>Optional   |

|                           |  |        |         |   |  |                       |                                   |
|---------------------------|--|--------|---------|---|--|-----------------------|-----------------------------------|
| Rack 0 Module 3 Channel 0 | Raw Water Pressure: 141-9880           | F56:14 | 4-20 mA | X |  | < 35 kPa (5.1 psi)    | 0 - 1000 kPa (145.0 psi) Optional |
| Rack 0 Module 3 Channel 2 | Engine Starting Air Pressure: 144-4003 | F56:19 | 4-20 mA | X |  | < 750 kPa (108.8 psi) | 0 - 4000 kPa (580.2 psi) Optional |
| Rack 0 Module 7 Channel 4 | Fuel Rack Position                     | F56:0  | 4-20 mA |   |  |                       | 0-110%                            |

## Control System Inputs to PLC and Redundant Relay Logic

Table 2

| PLC I/O Address                    | Sensor Description                                     | PLC Reg Assign | Signal Type | Alarm | Shut Down | Setpoint Trip                          | Comments                          |
|------------------------------------|--|----------------|-------------|-------|-----------|--|-----------------------------------|
| <b>Analog RTD and Thermocouple</b> |  |                |             |       |           |  |                                   |
| Rack 0 Module 6 Channel 0          | Engine Lube Oil Temperature: 141-6820                  | F56:1          | RTD         | X     |           | > 92 °C (198 °F)                       | PT100 - 385                       |
| Rack 0 Module 6 Channel 1          | Inlet Air Manifold Temperature: 141-6820               | F56:4          | RTD         | X     |           | > 92 °C (198 °F)                       | PT100 - 385                       |
| Rack 0 Module 6 Channel 4          | Engine AC/OC Circuit Inlet Water Temperature: 141-6820 | F56:12         | RTD         | X     |           | > 60 °C (140 °F)                       | PT100 - 385                       |
| Rack 0 Module 6 Channel 3          | Engine Jacket Water Outlet Temperature: 141-6820       | F56:9          | RTD         | X     | X         | > 103 °C (217 °F)<br>> 109 °C (228 °F) | PT100 - 385                       |
| Rack 0 Module 6 Channel 5          | Engine Jacket Water Outlet Temperature: 141-6820       | F56:10         | RTD         |       | X         | > 109 °C (228 °F)                      | PT100 - 385<br>2ND RTD per Marine |

|                                 |   |        |    |   |  |                          |  |
|---------------------------------|---|--------|----|---|--|--------------------------|--|
|                                 |   |        |    |   |  |                          | Society                                  |
| Rack 0<br>Module 0<br>Channel 0 | Exhaust Manifold<br>Temperature (Left):<br>124-4598   | F56:25 | TC | X |  | ><br>630 °C<br>(1166 °F) | Type K                                   |
| Rack 0<br>Module 1<br>Channel 6 | Exhaust Manifold<br>Temperature (Right):<br>124-4598  | F56:26 | TC | X |  | ><br>630 °C<br>(1166 °F) | Type K - 12<br>& 16 CYL<br>Engine Only   |
| Rack 0<br>Module 0<br>Channel 1 | Exhaust Stack<br>TurboTemperature<br>(Left): 124-4598 | F56:27 | TC | X |  | ><br>550 °C<br>(1022 °F) | Type K                                   |
| Rack 0<br>Module 0<br>Channel 2 | Cylinder Temperature<br>(1): F56:29 124-4596          | N7:31  | TC | X |  | ><br>550 °C<br>(1022 °F) | Type K                                   |
| Rack 0<br>Module 0<br>Channel 3 | Cylinder Temperature<br>(2): 124-4596                 | F56:30 | TC | X |  | ><br>550 °C<br>(1022 °F) | Type K                                   |
| Rack 0<br>Module 0<br>Channel 4 | Cylinder Temperature<br>(3): 124-4596                 | F56:31 | TC | X |  | ><br>550 °C<br>(1022 °F) | Type K                                   |
| Rack 0<br>Module 0<br>Channel 5 | Cylinder Temperature<br>(4): 124-4596                 | F56:32 | TC | X |  | ><br>550 °C<br>(1022 °F) | Type K                                   |
| Rack 0<br>Module 0<br>Channel 6 | Cylinder Temperature<br>(5): 124-4596                 | F56:33 | TC | X |  | ><br>550 °C<br>(1022 °F) | Type K                                   |
| Rack 0<br>Module 0<br>Channel 7 | Cylinder Temperature<br>(6): 124-4596                 | F56:34 | TC | X |  | ><br>550 °C<br>(1022 °F) | Type K                                   |
| Rack 0<br>Module 1<br>Channel 0 | Cylinder Temperature<br>(7): 124-4596                 | F56:35 | TC | X |  | ><br>550 °C<br>(1022 °F) | Type K - 8,12<br>& 16 CYL<br>Engine Only |
|                                 |   |        |    |   |  |                          |  |



|                                 |  |        |    |   |  |                          |   |
|---------------------------------|--|--------|----|---|--|--------------------------|---|
| Rack 0<br>Module 1<br>Channel 1 | Cylinder Temperature<br>(8): 124-4596  | F56:36 | TC | X |  | ><br>550 °C<br>(1022 °F) | Type K - 8,<br>12 & 16 CYL<br>Engine Only     |
| Rack 0<br>Module 1<br>Channel 2 | Cylinder Temperature<br>(9): 124-4596  | F56:37 | TC | X |  | ><br>550 °C<br>(1022 °F) | Type K - 8,<br>12 & 16 CYL<br>Engine Only     |
| Rack 0<br>Module 1<br>Channel 3 | Cylinder Temperature<br>(10): 124-4596 | F56:38 | TC | X |  | ><br>550 °C<br>(1022 °F) | Type K - 8,<br>12 & 16 CYL<br>Engine Only     |
| Rack 0<br>Module 1<br>Channel 4 | Cylinder Temperature<br>(11): 124-4596 | F56:39 | TC | X |  | ><br>550 °C<br>(1022 °F) | Type K - 8,<br>12 & 16 CYL<br>Engine Only     |
| Rack 0<br>Module 1<br>Channel 5 | Cylinder Temperature<br>(12): 124-4596 | F56:40 | TC | X |  | ><br>550 °C<br>(1022 °F) | Type K - 8,<br>12 & 16 CYL<br>Engine Only     |
| Rack 0<br>Module 2<br>Channel 0 | Cylinder Temperature<br>(13): 124-4596 | F56:41 | TC | X |  | ><br>550 °C<br>(1022 °F) | Type K - 8,<br>12, & 16<br>CYL Engine<br>Only |
| Rack 0<br>Module 2<br>Channel 1 | Cylinder Temperature<br>(14): 124-4596 | F56:42 | TC | X |  | ><br>550 °C<br>(1022 °F) | Type K - 8,<br>12, & 16<br>CYL Engine<br>Only |
| Rack 0<br>Module 2<br>Channel 2 | Cylinder Temperature<br>(15): 124-4596 | F56:43 | TC | X |  | ><br>550 °C<br>(1022 °F) | Type K - 8,<br>12, & 16<br>CYL Engine<br>Only |
| Rack 0<br>Module 2<br>Channel 3 | Cylinder Temperature<br>(16): 124-4596 | F56:44 | TC | X |  | ><br>550 °C<br>(1022 °F) | Type K - 8,<br>12, & 16<br>CYL Engine<br>Only |

## Control System Inputs to PLC and Redundant Relay Logic

Table 3

| PLC I/O | Sensor | PLC Reg | Signal | Alarm | Shut | Setpoint | Comments |
|---------|--------|---------|--------|-------|------|----------|----------|
|---------|--------|---------|--------|-------|------|----------|----------|

| Address                               | Description     | Assign    | Type    |   | Down | Trip                |   |
|---------------------------------------|-----------------|-----------|---------|---|------|---------------------|---|
| <b>Analog Inputs (Analog and RTD)</b> |                 |           |         |   |      |                     |   |
| Rack 0<br>Module 6<br>Channel 6       | Aux RTD 1       | F56:15    | RTD     | X | X    | Customer configured | 0 °C (32 °F)-<br>150 °C (302 °F) Customer Supplied<br>PT100 - 385 |
| Rack 0<br>Module 6<br>Channel 7       | Aux RTD 2       | F56:16    | RTD     | X | X    | Customer configured | 0 °C (32 °F)-<br>150 °C (302 °F) Customer Supplied<br>PT100 - 385 |
| Rack 0<br>Module 7<br>Channel 6       | Aux 4-20 mA #1  | F56:17    | 4-20mA  | X | X    | Customer configured | 0 °C (32 °F)-<br>150 °C (302 °F) Customer Supplied<br>PT100 - 385 |
| Rack 0<br>Module 7<br>Channel 7       | Aux 4-20 mA #2  | F56:18    | 4-20mA  | X | X    | Customer configured | 0 °C (32 °F)-<br>150 °C (302 °F) Customer Supplied<br>PT100 - 385 |
| <b>Auxiliary Inputs (Switches)</b>    |                 |           |         |   |      |                     |   |
| I:3.0/7                               | Aux Alarm #1    | B13:249/2 | DIGITAL | X |      | Close Contact       |   |
| I:3.0/8                               | Aux Alarm #1    | B14:1/2   | DIGITAL | X |      | Close Contact       |   |
| I:3.0/10                              | Aux Shutdown #1 | B16:121/2 | DIGITAL |   | X    | Close Contact       |   |
| I:3.0/11                              | Aux Shutdown #1 | B16:129/2 | DIGITAL |   | X    | Close Contact       |   |

| Remote Input (Customer) |  |          |         |   |  |               |                           |
|-------------------------|--|----------|---------|---|--|---------------|---------------------------|
| I:4.0/5                 | Remote Pre-lube/Start Switch - Start Signal    |          | DIGITAL |   |  |               |                           |
| I:4.0/6                 | Remote Stop Switch                             |          | DIGITAL |   |  | Close Contact | Customer Supplied Contact |
| I:4.0/2                 | Engine Shutdown Override                       | B14:49/2 | DIGITAL | X |  | Close Contact | Customer Supplied Contact |
| I:4.0/4                 | Remote Pre-lube/Start Switch - Pre-lube Signal |          | DIGITAL |   |  | Close Contact | Customer Supplied Contact |

## Control System Outputs on Modbus (Status/Alarm/Shutdown)

Table 4

| PLC I/O Address           | Output Description             | Modbus Address | Data Type | Alarm | Shut Down | Setpoint Trip                                      | Comments                  |
|---------------------------|--------------------------------|----------------|-----------|-------|-----------|--|---------------------------|
| Pressure Alarms/Shutdowns |                                |                |           |       |           |  |                           |
| I:2.0/1<br>(I:2.0/0)      | Engine Low Oil Pressure        | 40271.05       | BIT       |       | X         | 105 kPa<br>(15.2 psi)                              | Low Speed Shutdown        |
| I:2.0/3<br>(I:2.0/2)      | Engine Low Oil Pressure        | 40271.07       | BIT       |       | X         | 260 kPa<br>(37.7 psi)                              | High Speed Shutdown       |
|                           | Engine Low Oil Pressure        | 40257.11       | BIT       | X     |           | 120 kPa<br>(17.4 psi) to<br>320 kPa<br>(46.4 psi)  | Low Speed /<br>High Speed |
| I:2.0/4<br>(I:2.0/5)      | Engine High Crankcase Pressure | 40270.15       | BIT       |       | X         | ><br>1 kPa<br>(4.0186 inch<br>of H <sub>2</sub> O) |                           |
| I:3.0/1                   | Low Air Starting               | 40259.09       | BIT       | X     |           | <  |                           |

|                                     |   |          |     |   |   |  |                        |
|-------------------------------------|---|----------|-----|---|---|--|------------------------|
|                                     | Pressure  |          |     |   |   | 750 kPa<br>(108.8 psi)   |                        |
| I:3.0/6                             | Low Sea Water Pressure                          | 40258.15 | BIT | X |   | <<br>35 kPa (5.1 psi)  |                        |
| I:3.0/2                             | Low Jacket Water Pressure                       | 40258.09 | BIT | X |   | <<br>20 kPa (2.9 psi)<br>(Low RPM)<br><<br>35 kPa (5.1 psi) (High RPM) |                        |
| I:3.0/3                             | Low AC/OC Circuit Water Pressure                | 40258.13 | BIT | X |   | <<br>35 kPa (5.1 psi)  |                        |
|                                     | Engine Oil Filter Pressure Differential (High)  | 40266.15 | BIT | X |   | ><br>70 kPa (10.2 psi)   | Calc (PT-009 - PT-010) |
| Rack 0<br>Module 7<br>Channel 2     | Engine Low Fuel Pressure Alarm                  | 40258.05 | BIT | X |   | <<br>260 kPa (37.7 psi)  |                        |
|                                     | Engine Fuel Filter Pressure Differential (High) | 40266.13 | BIT | X |   | ><br>75 kPa (10.9 psi)   | Calc (PT-011 - PT-012) |
| Rack 0<br>Module 0<br>Channel 0     | Engine Inlet Air Manifold Pressure- Left        | 40258.01 | BIT | X |   | ><br>230 kPa (33.4 psi)  |                        |
| <b>Temperature (Alarm/Shutdown)</b> |   |          |     |   |   |  |                        |
| Rack 0<br>Module 6<br>Channel 3     | Engine High Jacket Water                        | 40258.07 | BIT |   | X | ><br>109 °C (228 °F)   |                        |
| Rack 0<br>Module 6<br>Channel 5     | Engine High Jacket Water                        | 40258.07 | BIT | X |   | ><br>103 °C (217 °F)   |                        |

|                                 |  |          |     |   |  |                          |                            |
|---------------------------------|--|----------|-----|---|--|--------------------------|----------------------------|
| Rack 0<br>Module 6<br>Channel 4 | Engine High<br>AC/OC Circuit<br>Water<br>Temperature | 40258.11 | BIT | X |  | ><br>60 °C (140 °<br>F)  |                            |
| Rack 0<br>Module 6<br>Channel 0 | Engine Lube Oil<br>Temperature                       | 40257.09 | BIT | X |  | ><br>92 °C (198 °<br>F)  |                            |
| Rack 0<br>Module 6<br>Channel 1 | High Inlet Air<br>Manifold<br>Temperature            | 40257.15 | BIT | X |  | ><br>92 °C (198 °<br>F)  |                            |
| Rack 0<br>Module 0<br>Channel 0 | Exhaust to Turbo<br>Temperature<br>(Left)            | 40260.05 | BIT | X |  | ><br>630 °C<br>(1166 °F) |                            |
| Rack 0<br>Module 1<br>Channel 6 | Exhaust to Turbo<br>Temperature<br>(Right)           | 40260.07 | BIT | X |  | ><br>630 °C<br>(1166 °F) | 12 & 16 Cyl<br>Engine Only |
| Rack 0<br>Module 0<br>Channel 1 | Exhaust from<br>Turbo<br>Temperature<br>(Left)       | 40260.09 | BIT | X |  | ><br>550 °C<br>(1022 °F) |                            |
| Rack 0<br>Module 0<br>Channel 2 | Exhaust from<br>Turbo<br>Temperature<br>(right)      | 40260.11 | BIT | X |  | ><br>550 °C<br>(1022 °F) | 12 & 16 Cyl<br>Engine Only |
| Rack 0<br>Module 0<br>Channel 2 | Cylinder<br>Temperature (1)                          | 40260.13 | BIT | X |  | ><br>550 °C<br>(1022 °F) |                            |
| Rack 0<br>Module 0<br>Channel 3 | Cylinder<br>Temperature (2)                          | 40260.15 | BIT | X |  | ><br>550 °C<br>(1022 °F) |                            |
| Rack 0<br>Module 0<br>Channel 4 | Cylinder<br>Temperature (3)                          | 40261.01 | BIT | X |  | ><br>550 °C<br>(1022 °F) |                            |
| Rack 0<br>Module 0              | Cylinder<br>Temperature (4)                          | 40261.03 | BIT | X |  | >                        |                            |

|                                 |                              |          |     |   |  |                          |                                  |
|---------------------------------|------------------------------|----------|-----|---|--|--------------------------|----------------------------------|
| Channel 5                       |                              |          |     |   |  | 550 °C<br>(1022 °F)      |                                  |
| Rack 0<br>Module 0<br>Channel 6 | Cylinder<br>Temperature (5)  | 40261.05 | BIT | X |  | ><br>550 °C<br>(1022 °F) |                                  |
| Rack 0<br>Module 0<br>Channel 7 | Cylinder<br>Temperature (6)  | 40261.07 | BIT | X |  | ><br>550 °C<br>(1022 °F) |                                  |
| Rack 0<br>Module 1<br>Channel 0 | Cylinder<br>Temperature (7)  | 40261.09 | BIT | X |  | ><br>550 °C<br>(1022 °F) | 8, 12 & 16<br>Cyl Engine<br>Only |
| Rack 0<br>Module 1<br>Channel 1 | Cylinder<br>Temperature (8)  | 40261.11 | BIT | X |  | ><br>550 °C<br>(1022 °F) | 8, 12 & 16<br>Cyl Engine<br>Only |
| Rack 0<br>Module 1<br>Channel 2 | Cylinder<br>Temperature (9)  | 40261.13 | BIT | X |  | ><br>550 °C<br>(1022 °F) | 12 & 16 Cyl<br>Engine Only       |
| Rack 0<br>Module 1<br>Channel 3 | Cylinder<br>Temperature (10) | 40261.15 | BIT | X |  | ><br>550 °C<br>(1022 °F) | 12 & 16 Cyl<br>Engine Only       |
| Rack 0<br>Module 1<br>Channel 4 | Cylinder<br>Temperature (11) | 40262.01 | BIT | X |  | ><br>550 °C<br>(1022 °F) | 12 & 16 Cyl<br>Engine Only       |
| Rack 0<br>Module 1<br>Channel 5 | Cylinder<br>Temperature (12) | 40262.03 | BIT | X |  | ><br>550 °C<br>(1022 °F) | 12 & 16 Cyl<br>Engine Only       |
| Rack 0<br>Module 2<br>Channel 0 | Cylinder<br>Temperature (13) | 40262.05 | BIT | X |  | ><br>550 °C<br>(1022 °F) | 16 Cyl<br>Engine Only            |
| Rack 0<br>Module 2<br>Channel 1 | Cylinder<br>Temperature (14) | 40262.07 | BIT | X |  | ><br>550 °C<br>(1022 °F) | 16 Cyl<br>Engine Only            |

|                                 |  |          |     |   |  |                          |                                  |
|---------------------------------|--|----------|-----|---|--|--------------------------|----------------------------------|
| Rack 0<br>Module 2<br>Channel 2 | Cylinder<br>Temperature (15)                             | 40262.09 | BIT | X |  | ><br>550 °C<br>(1022 °F) | 16 Cyl<br>Engine Only            |
| Rack 0<br>Module 2<br>Channel 3 | Cylinder<br>Temperature (16)                             | 40262.11 | BIT | X |  | ><br>550 °C<br>(1022 °F) | 16 Cyl<br>Engine Only            |
| <b>Switches/Misc Status</b>     |  |          |     |   |  |                          |                                  |
|                                 | Cylinder (1)<br>Temperature<br>Deviation from<br>Average | 40264.13 | BIT | X |  | ><br>50 °C (122 °<br>F)  |                                  |
|                                 | Cylinder (2)<br>Temperature<br>Deviation from<br>Average | 40264.15 | BIT | X |  | ><br>50 °C (122 °<br>F)  |                                  |
|                                 | Cylinder (3)<br>Temperature<br>Deviation from<br>Average | 40265.01 | BIT | X |  | ><br>50 °C (122 °<br>F)  |                                  |
|                                 | Cylinder (4)<br>Temperature<br>Deviation from<br>Average | 40265.03 | BIT | X |  | ><br>50 °C (122 °<br>F)  |                                  |
|                                 | Cylinder (5)<br>Temperature<br>Deviation from<br>Average | 40265.05 | BIT | X |  | ><br>50 °C (122 °<br>F)  |                                  |
|                                 | Cylinder (6)<br>Temperature<br>Deviation from<br>Average | 40265.07 | BIT | X |  | ><br>50 °C (122 °<br>F)  |                                  |
|                                 | Cylinder (7)<br>Temperature<br>Deviation from<br>Average | 40265.09 | BIT | X |  | ><br>50 °C (122 °<br>F)  | 8, 12 & 16<br>Cyl Engine<br>Only |
|                                 | Cylinder (8)<br>Temperature<br>Deviation from<br>Average | 40265.11 | BIT | X |  | ><br>50 °C (122 °<br>F)  | 8, 12 & 16<br>Cyl Engine<br>Only |
|                                 |  |          |     |   |  |                          |                                  |

|          |   |          |     |   |   |                         |                                    |
|----------|---|----------|-----|---|---|-------------------------|------------------------------------|
|          | Cylinder (9)<br>Temperature<br>Deviation from<br>Average  | 40265.13 | BIT | X |   | ><br>50 °C (122 °<br>F) | 12 & 16 Cyl<br>Engine Only         |
|          | Cylinder (10)<br>Temperature<br>Deviation from<br>Average | 40265.15 | BIT | X |   | ><br>50 °C (122 °<br>F) | 12 & 16 Cyl<br>Engine Only         |
|          | Cylinder (11)<br>Temperature<br>Deviation from<br>Average | 40266.01 | BIT | X |   | ><br>50 °C (122 °<br>F) | 12 & 16 Cyl<br>Engine Only         |
|          | Cylinder (12)<br>Temperature<br>Deviation from<br>Average | 40266.03 | BIT | X |   | ><br>50 °C (122 °<br>F) | 12 & 16 Cyl<br>Engine Only         |
|          | Cylinder (13)<br>Temperature<br>Deviation from<br>Average | 40266.05 | BIT | X |   | ><br>50 °C (122 °<br>F) | 16 Cyl<br>Engine Only              |
|          | Cylinder (14)<br>Temperature<br>Deviation from<br>Average | 40266.07 | BIT | X |   | ><br>50 °C (122 °<br>F) | 16 Cyl<br>Engine Only              |
|          | Cylinder (15)<br>Temperature<br>Deviation from<br>Average | 40266.09 | BIT | X |   | ><br>50 °C (122 °<br>F) | 16 Cyl<br>Engine Only              |
|          | Cylinder (16)<br>Temperature<br>Deviation from<br>Average | 40266.11 | BIT | X |   | ><br>50 °C (122 °<br>F) | 16 Cyl<br>Engine Only              |
| I:3.0/12 | Low Battery<br>Voltage - System                           | 40264.01 | BIT | X |   | < 22 VDC                |                                    |
|          | Low PLC<br>Memory Battery<br>Voltage                      | 40267.01 | BIT | X |   |                         | Red Battery<br>Light on<br>PLC CPU |
| I:3.0/13 | Jacket Water<br>Detection                                 | 40263.15 | BIT | X |   | Contact<br>Close        |                                    |
| I:2.0/14 | Emergency Stop  | 40271.15 | BIT |   | X | Contact                 |                                    |



|          |   |          |     |   |   |                       |                                 |
|----------|---|----------|-----|---|---|-----------------------|---------------------------------|
| I:4.0/0  |   |          |     |   |   | Close                 |                                 |
| I:2.0/8  | Engine Speed Switch Crank Terminate   | 40263.03 | BIT | X |   | > 170 RPM & 0 + 2 Sec |                                 |
| I:3.0/0  | Low Engine Oil Sump level   | 40263.09 | BIT | X |   | Mechanical Position   |                                 |
| I:3.0/15 | Oil Mist Detection (Alarm)  | 40271.01 | BIT | X |   | Contact Close         |                                 |
|          | Low Expansion Tank Level Switch   |          | BIT | X |   | Customer Defined      | Customer Supplied Contact       |
| I:2.0/11 | Engine Overspeed  | 40270.13 | BIT |   | X | 113% Rated Speed      | Provided by Speed Switch or PLC |
|          | Reduce Engine Load  |          | BIT | X |   |                       | Manual Decrease Load            |
| I:6.1    | Magnetic Pick-up (Engine Speed Switch)                                      |          | BIT | X |   | ST-008 and not SE-004 | Speed Switch Pick up            |
| I:4.0/7  | Engine Control Switch - Off Cylinder (1) Temperature Deviation from Average |          | BIT |   |   | Contact Close         |                                 |

## Control System Outputs on Modbus (Sensor Failures)

Table 5

| PLC I/O Address                 | Output Description          | Modbus Address | Data Type | Alarm | Shut Down | Setpoint Trip  | Comments |
|---------------------------------|-----------------------------|----------------|-----------|-------|-----------|----------------|----------|
| <b>Sensor Failures</b>          |                             |                |           |       |           |                |          |
| Rack 0<br>Module 6<br>Channel 0 | Engine Lube Oil Temperature | 40251.01       | BIT       | X     |           | < -50 OR > 150 |          |
|                                 |                             |                |           |       |           |                |          |

|                                 |   |          |     |   |  |                |                         |
|---------------------------------|---|----------|-----|---|--|----------------|-------------------------|
|                                 | Inlet Air Manifold Temperature                    | 40251.07 | BIT | X |  | < -50 OR > 150 |                         |
|                                 | Engine AC/OC Circuit Outlet Water Temperature     | 40252.07 | BIT | X |  | < -50 OR > 150 |                         |
| Rack 0<br>Module 6<br>Channel 5 | Engine Jacket Water Outlet Temperature (Shutdown) | 40252.01 | BIT | X |  | < -50 OR > 150 |                         |
| Rack 0<br>Module 6<br>Channel 3 | Engine Jacket Water Outlet Temperature (Alarm)    | 40252.03 | BIT | X |  | < -50 OR > 150 |                         |
| Rack 0<br>Module 0<br>Channel 0 | Exhaust to Turbo Temperature (Left)               | 40254.01 | BIT | X |  | < -50 OR > 700 |                         |
| Rack 0<br>Module 1<br>Channel 6 | Exhaust to Turbo Temperature (Right)              | 40254.03 | BIT | X |  | < -50 OR > 700 | 12 & 16 Cyl Engine Only |
| Rack 0<br>Module 0<br>Channel 1 | Exhaust from Turbo Temperature (Left)             | 40254.05 | BIT | X |  | < -50 OR > 700 |                         |
| Rack 0<br>Module 0<br>Channel 1 | Exhaust from Turbo Temperature (Right)            | 40254.07 | BIT | X |  | < -50 OR > 700 | 12 & 16 Cyl Engine Only |
| Rack 0<br>Module 0<br>Channel 2 | Cylinder Temperature (1)                          | 40254.09 | BIT | X |  | < -50 OR > 700 |                         |
| Rack 0<br>Module 0<br>Channel 3 | Cylinder Temperature (2)                          | 40254.11 | BIT | X |  | < -50 OR > 700 |                         |
| Rack 0<br>Module 0<br>Channel 4 | Cylinder Temperature (3)                          | 40254.13 | BIT | X |  | < -50 OR > 700 |                         |

|                                 |                              |          |     |   |  |                   |                                  |
|---------------------------------|------------------------------|----------|-----|---|--|-------------------|----------------------------------|
|                                 |                              |          |     |   |  |                   |                                  |
| Rack 0<br>Module 0<br>Channel 5 | Cylinder<br>Temperature (4)  | 40254.15 |     | X |  | < -50 OR ><br>700 |                                  |
| Rack 0<br>Module 0<br>Channel 6 | Cylinder<br>Temperature (5)  | 40255.01 | BIT | X |  | < -50 OR ><br>700 |                                  |
| Rack 0<br>Module 0<br>Channel 7 | Cylinder<br>Temperature (6)  | 40255.03 |     | X |  | < -50 OR ><br>700 |                                  |
| Rack 0<br>Module 1<br>Channel 0 | Cylinder<br>Temperature (7)  | 40255.05 | BIT | X |  | < -50 OR ><br>700 | 8, 12 & 16<br>Cyl Engine<br>Only |
| Rack 0<br>Module 1<br>Channel 1 | Cylinder<br>Temperature (8)  | 40255.07 | BIT | X |  | < -50 OR ><br>700 | 8, 12 & 16<br>Cyl Engine<br>Only |
| Rack 0<br>Module 1<br>Channel 2 | Cylinder<br>Temperature (9)  | 40255.09 | BIT | X |  | < -50 OR ><br>700 | 12 & 16 Cyl<br>Engine Only       |
| Rack 0<br>Module 1<br>Channel 3 | Cylinder<br>Temperature (10) | 40255.11 | BIT | X |  | < -50 OR ><br>700 | 12 & 16 Cyl<br>Engine Only       |
| Rack 0<br>Module 1<br>Channel 4 | Cylinder<br>Temperature (11) | 40255.13 | BIT | X |  | < -50 OR ><br>700 | 12 & 16 Cyl<br>Engine Only       |
| Rack 0<br>Module 1<br>Channel 5 | Cylinder<br>Temperature (12) | 40255.15 | BIT | X |  | < -50 OR ><br>700 | 12 & 16 Cyl<br>Engine Only       |
| Rack 0<br>Module 2<br>Channel 0 | Cylinder<br>Temperature (13) | 40256.01 | BIT | X |  | < -50 OR ><br>700 | 16 Cyl<br>Engine Only            |
|                                 |                              |          |     |   |  |                   |                                  |

|                                 |                                 |          |     |   |  |                               |                       |
|---------------------------------|---------------------------------|----------|-----|---|--|-------------------------------|-----------------------|
| Rack 0<br>Module 2<br>Channel 1 | Cylinder<br>Temperature (14)    | 40256.03 | BIT | X |  | < -50 OR ><br>700             | 16 Cyl<br>Engine Only |
| Rack 0<br>Module 2<br>Channel 2 | Cylinder<br>Temperature (15)    | 40256.05 | BIT | X |  | < -50 OR ><br>700             | 16 Cyl<br>Engine Only |
| Rack 0<br>Module 2<br>Channel 3 | Cylinder<br>Temperature (16)    | 40256.07 | BIT | X |  | < -50 OR ><br>700             | 16 Cyl<br>Engine Only |
|                                 | Engine Speed<br>Transducer      | 40256.13 | BIT | X |  | < 3.85 mA<br>OR ><br>20.15 mA |                       |
| Rack 0<br>Module 7<br>Channel 4 | Lube Oil Pressure<br>to Filter  | 40251.05 | BIT | X |  | < 3.85 mA<br>OR ><br>20.15 mA |                       |
| Rack 0<br>Module 7<br>Channel 0 | Lube Oil Pressure<br>to Engine  | 40251.03 | BIT | X |  | < 3.85 mA<br>OR ><br>20.15 mA |                       |
| Rack 0<br>Module 7<br>Channel 4 | Fuel Pressure to<br>Filter      | 40251.15 | BIT | X |  | < 3.85 mA<br>OR ><br>20.15 mA | Use for Diff<br>Alarm |
| Rack 0<br>Module 7<br>Channel 2 | Fuel Pressure to<br>Engine      | 40251.13 | BIT | X |  | < 3.85 mA<br>OR ><br>20.15 mA |                       |
| Rack 0<br>Module 3<br>Channel 3 | Engine Jacket<br>Water Pressure | 40252.05 | BIT | X |  | < 3.85 mA<br>OR ><br>20.15 mA | Optional              |
| Rack 0<br>Module 3<br>Channel 1 | AC/OC Circuit<br>Water Pressure | 40252.09 | BIT | X |  | < 3.85 mA<br>OR ><br>20.15 mA | Optional              |
| Rack 0<br>Module 3              | Sea Water<br>Pressure           | 40252.11 | BIT | X |  | < 3.85 mA<br>OR >             | Optional              |

|                                 |   |          |     |   |  |                                 |            |
|---------------------------------|---|----------|-----|---|--|---------------------------------|------------|
| Channel 0                       |   |          |     |   |  | 20.15 mA                        |            |
| Rack 0<br>Module 3<br>Channel 2 | Engine Starting<br>Air Pressure                   | 40253.05 | BIT | X |  | < 3.85 mA<br>OR ><br>20.15 mA   | Optional   |
|                                 | Engine Inlet Air<br>Manifold<br>Pressure          | 40251.09 | BIT | X |  | < 3.85 mA<br>OR ><br>20.15 mA   |            |
| I:2.0/1<br>(I:2.0/0)            | Engine Low Oil<br>Pressure<br>Contactor           | 40257.05 | BIT | X |  | No Signal -<br>N.O. and<br>N.C. | Low Speed  |
| I:2.0/3<br>(I:2.0/2)            | Engine Low Oil<br>Pressure<br>Contactor           | 40257.07 | BIT | X |  | No Signal -<br>N.O. and<br>N.C. | High Speed |
| I:2.0/4<br>(I:2.0/5)            | Engine High<br>Crankcase<br>Pressure<br>Contactor | 40257.01 | BIT | X |  | No Signal -<br>N.O. and<br>N.C. |            |

## Controls System Outputs on Modbus (Analog Pressure/Temperature/Speed)

Table 6

| PLC I/O<br>Address              | Output<br>Description          | Modbus<br>Address<br>(Metric /<br>English) | Data<br>Type | Alarm | Shut<br>Down | Setpoint<br>Trip       | Comments   |
|---------------------------------|--------------------------------|--|--------------|-------|--------------|------------------------|--|
| <b>Pressure/Engine Speed</b>    |                                |  |              |       |              |                        |  |
|                                 | Fuel Rack<br>Position          | 40001<br>40101                             |              |       |              |                        |  |
|                                 | Engine Speed<br>Transducer     | 40052                                      | WORD         |       | X            | 113%<br>Rated<br>Speed | 0-1200 RPM   |
| Rack 0<br>Module 7<br>Channel 4 | Lube Oil<br>Pressure to Filter | 40004<br>40103                             | WORD         |       |              |                        | 0 -<br>1000 kPa<br>(145.0 psi)<br>Used for Diff<br>Alarm |

|                                 |                                   |                |      |   |   |  |   |
|---------------------------------|-----------------------------------|----------------|------|---|---|--|---|
| Rack 0<br>Module 7<br>Channel 0 | Lube Oil<br>Pressure to<br>Engine | 40003<br>40102 | WORD | X | X | <<br>120 kPa<br>(17.4 psi)<br>& <<br>320 kPa<br>(46.4 psi)<br><<br>105 kPa<br>(15.2 psi)<br>& <<br>260 kPa<br>(37.7 psi) | 0 -<br>1000 kPa<br>(145.0 psi)<br>Low Speed<br>& High<br>Speed<br>Setpoints |
| Rack 0<br>Module 7<br>Channel 4 | Fuel Pressure to<br>Filter        | 40009<br>40108 | WORD | X |   |  | 0 -<br>1000 kPa<br>(145.0 psi)<br>Used for Diff<br>Alarm                    |
| Rack 0<br>Module 7<br>Channel 2 | Fuel Pressure to<br>Engine        | 40008<br>40107 | WORD | X |   | <<br>260 kPa<br>(37.7 psi)   | 0 -<br>1000 kPa<br>(145.0 psi)  |
| Rack 0<br>Module 3<br>Channel 3 | Engine Jacket<br>Water Pressure   | 40012<br>40111 | WORD | X |   | <<br>20 kPa<br>(2.9 psi)<br>(Low<br>RPM)<br><<br>35 kPa<br>(5.1 psi)<br>(High<br>RPM)                                    | 0 -<br>1000 kPa<br>(145.0 psi)<br>Optional                                  |
| Rack 0<br>Module 3<br>Channel 1 | AC/OC Circuit<br>Water Pressure   | 40014<br>40113 | WORD | X |   | <<br>35 kPa<br>(5.1 psi)   | 0 -<br>1000 kPa<br>(145.0 psi)<br>Optional                                  |
| Rack 0<br>Module 3<br>Channel 0 | Sea Water<br>Pressure             | 40015<br>40114 | WORD | X |   | <<br>35 kPa<br>(5.1 psi)   | 0 -<br>1000 kPa<br>(145.0 psi)<br>Optional                                  |
| Rack 0<br>Module 3<br>Channel 2 | Engine Starting<br>Air Pressure   | 40020<br>40119 | WORD | X |   | <<br>750 kPa<br>(108.8<br>psi)   | 0 -<br>4000 kPa<br>(580.2 psi)<br>Optional                                  |
|                                 |                                   |                |      |   |   |  |   |

|                                 |   |                |      |   |   |                            |   |
|---------------------------------|---|----------------|------|---|---|----------------------------|---|
|                                 | Engine Inlet Air<br>Manifold<br>Pressure              | 40006<br>40105 | WORD | X |   | ><br>230 kPa<br>(33.4 psi) | 0 -<br>1000 kPa<br>(145.0 psi)                |
| <b>RTD and Thermocouple</b>     |   |                |      |   |   |                            |   |
| Rack 0<br>Module 6<br>Channel 0 | Engine Lube Oil<br>Temperature                        | 40002<br>40101 | WORD | X |   | ><br>92 °C<br>(198 °F)     | 0 °C (32 °F)<br>to<br><br>150 °C (302<br>°F)  |
| Rack 0<br>Module 6<br>Channel 1 | Inlet Air<br>Manifold<br>Temperature                  | 40005<br>40104 | WORD | X |   | ><br>92 °C<br>(198 °F)     | 0 °C (32 °F)<br>to<br><br>150 °C (302<br>°F)  |
| Rack 0<br>Module 6<br>Channel 4 | Engine AC/OC<br>Circuit Inlet<br>Water<br>Temperature | 40013<br>40112 | WORD | X |   | ><br>65 °C<br>(149 °F)     | 0 °C (32 °F)<br>to<br><br>150 °C (302<br>°F)  |
| Rack 0<br>Module 6<br>Channel 3 | Engine Jacket<br>Water<br>Temperature<br>(Shutdown)   | 40010<br>40109 | WORD |   | X | ><br>109 °C<br>(228 °F)    | 0 °C (32 °F)<br>to<br><br>150 °C (302<br>°F)  |
| Rack 0<br>Module 6<br>Channel 5 | Engine Jacket<br>Water<br>Temperature<br>(Alarm)      | 40010<br>40110 | WORD | X |   | ><br>103 °C<br>(217 °F)    | 0 °C (32 °F)<br>to<br><br>150 °C (302<br>°F)  |
| Rack 0<br>Module 0<br>Channel 0 | Engine to Turbo<br>Temperature<br>(Left)              | 40026<br>40125 | WORD | X |   | ><br>630 °C<br>(1166 °F)   | 0 °C (32 °F)<br>to<br><br>700 °C (1292<br>°F) |
| Rack 0<br>Module 1<br>Channel 6 | Engine to Turbo<br>Temperature<br>(Right)             | 40027<br>40126 | WORD | X |   | ><br>630 °C<br>(1166 °F)   | 0 °C (32 °F)<br>to                            |

|                                 |  |                |      |   |  |                          |  |
|---------------------------------|--|----------------|------|---|--|--------------------------|--|
|                                 |  |                |      |   |  |                          | 700 °C (1292 °F)<br>12 & 16 Cyl<br>Engine Only                           |
| Rack 0<br>Module 0<br>Channel 1 | Engine from<br>Turbo<br>Temperature<br>(Left)  | 40028<br>40127 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292 °F)                               |
| Rack 0<br>Module 6<br>Channel 1 | Engine from<br>Turbo<br>Temperature<br>(Right) | 40029<br>40128 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292 °F)<br>12 & 16 Cyl<br>Engine Only |
| Rack 0<br>Module 0<br>Channel 2 | Cylinder<br>Temperature (1)                    | 40030<br>40129 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292 °F)                               |
| Rack 0<br>Module 0<br>Channel 3 | Cylinder<br>Temperature (2)                    | 40031<br>40130 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292 °F)                               |
| Rack 0<br>Module 0<br>Channel 4 | Cylinder<br>Temperature (3)                    | 40032<br>40131 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292 °F)                               |
| Rack 0<br>Module 0<br>Channel 5 | Cylinder<br>Temperature (4)                    | 40033<br>40132 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292 °F)                               |



|                                 |                                 |                |      |   |  |                          |   |
|---------------------------------|---------------------------------|----------------|------|---|--|--------------------------|---|
| Rack 0<br>Module 0<br>Channel 6 | Cylinder<br>Temperature (5)     | 40034<br>40133 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292<br>°F)                                     |
| Rack 0<br>Module 0<br>Channel 7 | Cylinder<br>Temperature (6)     | 40035<br>40134 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292<br>°F)                                     |
| Rack 0<br>Module 1<br>Channel 0 | Cylinder<br>Temperature (7)     | 40036<br>40135 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292<br>°F)<br>8, 12 & 16<br>Cyl Engine<br>Only |
| Rack 0<br>Module 1<br>Channel 1 | Cylinder<br>Temperature (8)     | 40037<br>40136 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292<br>°F)<br>8, 12 & 16<br>Cyl Engine<br>Only |
| Rack 0<br>Module 1<br>Channel 2 | Cylinder<br>Temperature (9)     | 40038<br>40137 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292<br>°F)<br>12 & 16 Cyl<br>Engine Only       |
| Rack 0<br>Module 1<br>Channel 3 | Cylinder<br>Temperature<br>(10) | 40039<br>40138 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292<br>°F)<br>12 & 16 Cyl                      |

|                                 |                                 |                |      |   |  |                          |   |
|---------------------------------|---------------------------------|----------------|------|---|--|--------------------------|---|
|                                 |                                 |                |      |   |  |                          | Engine Only   |
| Rack 0<br>Module 1<br>Channel 4 | Cylinder<br>Temperature<br>(11) | 40040<br>40139 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292<br>°F)<br>12 & 16 Cyl<br>Engine Only |
| Rack 0<br>Module 1<br>Channel 5 | Cylinder<br>Temperature<br>(12) | 40041<br>40140 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292<br>°F)<br>12 & 16 Cyl<br>Engine Only |
| Rack 0<br>Module 2<br>Channel 0 | Cylinder<br>Temperature<br>(13) | 40042<br>40141 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292<br>°F)<br>16 Cyl<br>Engine Only      |
| Rack 0<br>Module 2<br>Channel 1 | Cylinder<br>Temperature<br>(14) | 40043<br>40142 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292<br>°F)<br>16 Cyl<br>Engine Only      |
| Rack 0<br>Module 2<br>Channel 2 | Cylinder<br>Temperature<br>(15) | 40044<br>40143 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292<br>°F)<br>16 Cyl<br>Engine Only      |

|                                 |   |                |      |   |  |                          |  |
|---------------------------------|---|----------------|------|---|--|--------------------------|--|
|                                 |   |                |      |   |  |                          |  |
| Rack 0<br>Module 2<br>Channel 3 | Cylinder<br>Temperature<br>(16)   | 40045<br>40144 | WORD | X |  | ><br>550 °C<br>(1022 °F) | 0 °C (32 °F)<br>to<br><br>700 °C (1292<br>°F)<br>16 Cyl<br>Engine Only |
|                                 | Average of<br>Cylinder Exhaust<br>Port<br>Temperature for<br>Deviation Calc |                | WORD | X |  |                          | 0 °C (32 °F)<br>to<br><br>700 °C (1292<br>°F)                          |

## MMSII - PLC Register List

Table 7

| Register List |   |
|---------------|---|
| Register      | Description                                     |
| 40001         | Fuel Rack Position                              |
| 40002         | Lube Oil to Engine Temperature (° C)            |
| 40003         | Lube Oil to Engine Pressure (kPa)               |
| 40004         | Lube Oil to Filter Pressure (kPa)               |
| 40005         | Inlet Air Manifold Temperature (° C)            |
| 40006         | Inlet Air Manifold Pressure (kPa)               |
| 40007         | Fuel to Engine Temperature (° C)                |
| 40008         | Fuel to Engine Pressure (kPa)                   |
| 40009         | Fuel to Filter Pressure (kPa)                   |
| 40010         | Jacket Water Outlet Temperature (° C)           |
| 40011         | Redundant Jacket Water Outlet Temperature (° C) |
| 40012         | Jacket Water Pressure (kPa)                     |
|               |   |

|       |  |
|-------|--|
| 40013 | AC/OC Water Inlet Temperature (° C)          |
| 40014 | AC/OC Pump Pressure (kPa)                    |
| 40015 | Raw Water Pressure (kPa)                     |
| 40016 | Auxiliary #1 Temperature (° C)               |
| 40017 | Auxiliary #2 Temperature (° C)               |
| 40018 | Auxiliary #1 4-20mA                          |
| 40019 | Auxiliary #2 4-20mA                          |
| 40020 | Air Start Pressure (kPa)                     |
| 40021 | Non-Drive Bearing Temperature (° C)          |
| 40022 | Drive Bearing Temperature (° C)              |
| 40026 | Turbine Inlet Left/Inline Temperature (° C)  |
| 40027 | Turbine Inlet Right Temperature (° C)        |
| 40028 | Turbine Outlet Left/Inline Temperature (° C) |
| 40029 | Turbine Outlet Right Temperature (° C)       |
| 40030 | Exhaust Port #1 Temperature (° C)            |
| 40031 | Exhaust Port #2 Temperature (° C)            |
| 40032 | Exhaust Port #3 Temperature (° C)            |
| 40033 | Exhaust Port #4 Temperature (° C)            |
| 40034 | Exhaust Port #5 Temperature (° C)            |
| 40035 | Exhaust Port #6 Temperature (° C)            |
| 40036 | Exhaust Port #7 Temperature (° C)            |
| 40037 | Exhaust Port #8 Temperature (° C)            |
| 40038 | Exhaust Port #9 Temperature (° C)            |
| 40039 | Exhaust Port #10 Temperature (° C)           |
| 40040 | Exhaust Port #11 Temperature (° C)           |
| 40041 | Exhaust Port #12 Temperature (° C)           |
| 40042 | Exhaust Port #13 Temperature (° C)           |
| 40043 | Exhaust Port #14 Temperature (° C)           |
|       |  |

|       |  |
|-------|--|
| 40044 | Exhaust Port #15 Temperature (° C)           |
| 40045 | Exhaust Port #16 Temperature (° C)           |
| 40046 | Write Spare                                  |
| 40047 | Write Spare                                  |
| 40048 | Write Spare                                  |
| 40049 | Write Spare                                  |
| 40050 | Turbine Left/Inline Speed (RPM)              |
| 40051 | Turbine Right Speed (RPM)                    |
| 40052 | Engine Speed (RPM)                           |
| 40053 | Exhaust Port #1 Temperature Deviation (° C)  |
| 40054 | Exhaust Port #2 Temperature Deviation (° C)  |
| 40055 | Exhaust Port #3 Temperature Deviation (° C)  |
| 40056 | Exhaust Port #4 Temperature Deviation (° C)  |
| 40057 | Exhaust Port #5 Temperature Deviation (° C)  |
| 40058 | Exhaust Port #6 Temperature Deviation (° C)  |
| 40059 | Exhaust Port #7 Temperature Deviation (° C)  |
| 40060 | Exhaust Port #8 Temperature Deviation (° C)  |
| 40061 | Exhaust Port #9 Temperature Deviation (° C)  |
| 40062 | Exhaust Port #10 Temperature Deviation (° C) |
| 40063 | Exhaust Port #11 Temperature Deviation (° C) |
| 40064 | Exhaust Port #12 Temperature Deviation (° C) |
| 40065 | Exhaust Port #13 Temperature Deviation (° C) |
| 40066 | Exhaust Port #14 Temperature Deviation (° C) |
| 40067 | Exhaust Port #15 Temperature Deviation (° C) |
| 40068 | Exhaust Port #16 Temperature Deviation (° C) |
| 40069 | Write Spare                                  |
| 40070 | Write Spare                                  |
| 40071 | Write Spare                                  |
|       |  |

|       |  |
|-------|--|
| 40072 | Write Spare                                    |
| 40073 | Fuel Filter Pressure Differential (kPa)        |
| 40074 | Lube Oil to Filter Pressure Differential (kPa) |
| 40075 | Write Spare                                    |
| 40076 | Write Spare                                    |
| 40077 | Write Spare                                    |
| 40078 | Write Spare                                    |
| 40079 | Write Spare                                    |
| 40080 | Write Spare                                    |
| 40081 | Write Spare                                    |
| 40082 | Write Spare                                    |
| 40083 | Write Spare                                    |
| 40084 | Write Spare                                    |
| 40085 | Write Spare                                    |
| 40086 | Write Spare                                    |
| 40087 | Write Spare                                    |
| 40088 | Write Spare                                    |
| 40089 | Write Spare                                    |
| 40090 | Write Spare                                    |
| 40091 | Write Spare                                    |
| 40092 | Write Spare                                    |
| 40093 | Write Spare                                    |
| 40094 | Write Spare                                    |
| 40095 | Write Spare                                    |
| 40096 | Write Spare                                    |
| 40097 | Write Spare                                    |
| 40098 | Write Spare                                    |
| 40099 | Write Spare                                    |
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|       |   |
|-------|---|
| 40100 | Write Spare                                     |
| 40101 | Lube Oil to Engine Temperature (° F)            |
| 40102 | Lube Oil to Engine Pressure (psi)               |
| 40103 | Lube Oil to Filter Pressure (psi)               |
| 40104 | Inlet Air Manifold Temperature (° F)            |
| 40105 | Inlet Air Manifold Pressure (psi)               |
| 40106 | Fuel to Engine Temperature (° F)                |
| 40107 | Fuel to Engine Pressure (psi)                   |
| 40108 | Fuel to Filter Pressure (psi)                   |
| 40109 | Jacket Water Outlet Temperature (° F)           |
| 40110 | Redundant Jacket Water Outlet Temperature (° F) |
| 40111 | Jacket Water Pressure (psi)                     |
| 40112 | AC/OC Water Inlet Temperature (° F)             |
| 40113 | AC/OC Pump Pressure (psi)                       |
| 40114 | Raw Water Pressure (psi)                        |
| 40115 | Auxiliary #1 Temperature (° F)                  |
| 40116 | Auxiliary #2 Temperature (° F)                  |
| 40117 | Auxiliary #1 4-20mA                             |
| 40118 | Auxiliary #2 4-20mA                             |
| 40119 | Air Start Pressure (psi)                        |
| 40120 | Non-Drive Bearing Temperature (° F)             |
| 40121 | Drive Bearing Temperature (° F)                 |
| 40125 | Turbine Inlet Left/Inline Temperature (° F)     |
| 40126 | Turbine Inlet Right Temperature (° F)           |
| 40127 | Turbine Outlet Left/Inline Temperature (° F)    |
| 40128 | Turbine Outlet Right Temperature (° F)          |
| 40129 | Exhaust Port #1 Temperature (° F)               |
| 40130 | Exhaust Port #2 Temperature (° F)               |
|       |   |

|       |  |
|-------|--|
| 40131 | Exhaust Port #3 Temperature (° F)            |
| 40132 | Exhaust Port #4 Temperature (° F)            |
| 40133 | Exhaust Port #5 Temperature (° F)            |
| 40134 | Exhaust Port #6 Temperature (° F)            |
| 40135 | Exhaust Port #7 Temperature (° F)            |
| 40136 | Exhaust Port #8 Temperature (° F)            |
| 40137 | Exhaust Port #9 Temperature (° F)            |
| 40138 | Exhaust Port #10 Temperature (° F)           |
| 40139 | Exhaust Port #11 Temperature (° F)           |
| 40140 | Exhaust Port #12 Temperature (° F)           |
| 40141 | Exhaust Port #13 Temperature (° F)           |
| 40142 | Exhaust Port #14 Temperature (° F)           |
| 40143 | Exhaust Port #15 Temperature (° F)           |
| 40144 | Exhaust Port #16 Temperature (° F)           |
| 40145 | Write Spare                                  |
| 40146 | Write Spare                                  |
| 40147 | Write Spare                                  |
| 40148 | Write Spare                                  |
| 40149 | Exhaust Port #1 Temperature Deviation (° F)  |
| 40150 | Exhaust Port #2 Temperature Deviation (° F)  |
| 40151 | Exhaust Port #3 Temperature Deviation (° F)  |
| 40152 | Exhaust Port #4 Temperature Deviation (° F)  |
| 40153 | Exhaust Port #5 Temperature Deviation (° F)  |
| 40154 | Exhaust Port #6 Temperature Deviation (° F)  |
| 40155 | Exhaust Port #7 Temperature Deviation (° F)  |
| 40156 | Exhaust Port #8 Temperature Deviation (° F)  |
| 40157 | Exhaust Port #9 Temperature Deviation (° F)  |
| 40158 | Exhaust Port #10 Temperature Deviation (° F) |
|       |  |



|          |  |
|----------|--|
| 40159    | Exhaust Port #11 Temperature Deviation (° F)                     |
| 40160    | Exhaust Port #12 Temperature Deviation (° F)                     |
| 40161    | Exhaust Port #13 Temperature Deviation (° F)                     |
| 40162    | Exhaust Port #14 Temperature Deviation (° F)                     |
| 40163    | Exhaust Port #15 Temperature Deviation (° F)                     |
| 40164    | Exhaust Port #16 Temperature Deviation (° F)                     |
| 40165    | Write Spare  |
| 40166    | Write Spare  |
| 40167    | Write Spare  |
| 40168    | Write Spare  |
| 40169    | Fuel Filter Pressure Differential (psi)                          |
| 40170    | Lube Oil to Filter Pressure Differential (psi)                   |
| 40251.01 | Lube Oil to Engine Temperature Sensor Failure Alarm              |
| 40251.02 | Lube Oil to Engine Temperature Sensor Failure Alarm Acknowledged |
| 40251.03 | Lube Oil to Engine Pressure Sensor Failure Alarm                 |
| 40251.04 | Lube Oil to Engine Pressure Sensor Failure Alarm Acknowledged    |
| 40251.05 | Lube Oil to Filter Pressure Sensor Failure Alarm                 |
| 40251.06 | Lube Oil to Filter Pressure Sensor Failure Alarm Acknowledged    |
| 40251.07 | Inlet Air Manifold Temperature Sensor Failure Alarm              |
| 40251.08 | Inlet Air Manifold Temperature Sensor Failure Alarm Acknowledged |
| 40251.09 | Inlet Air Manifold Pressure Sensor Failure Alarm                 |
| 40251.10 | Inlet Air Manifold Pressure Sensor Failure Alarm Acknowledged    |
| 40251.11 |  |

|          |   |
|----------|---|
|          | Fuel to Engine Temperature Sensor Failure Alarm                             |
| 40251.12 | Fuel to Engine Temperature Sensor Failure Alarm Acknowledged                |
| 40251.13 | Fuel to Engine Pressure Sensor Failure Alarm                                |
| 40251.14 | Fuel to Engine Pressure Sensor Failure Alarm Acknowledged                   |
| 40251.15 | Fuel to Filter Pressure Sensor Failure Alarm                                |
| 40251.16 | Fuel to Filter Pressure Sensor Failure Alarm Acknowledged                   |
| 40252.01 | Jacket Water Outlet Temperature Sensor Failure Alarm                        |
| 40252.02 | Jacket Water Outlet Temperature Sensor Failure Alarm Acknowledged           |
| 40252.03 | Redundant Jacket Water Outlet Temperature Sensor Failure Alarm              |
| 40252.04 | Redundant Jacket Water Outlet Temperature Sensor Failure Alarm Acknowledged |
| 40252.05 | Jacket Water Pressure Sensor Failure Alarm                                  |
| 40252.06 | Jacket Water Pressure Sensor Failure Alarm Acknowledged                     |
| 40252.07 | AC/OC Water Inlet Temperature Sensor Failure Alarm                          |
| 40252.08 | AC/OC Water Inlet Temperature Sensor Failure Alarm Acknowledged             |
| 40252.09 | AC/OC Water Inlet Temperature Sensor Failure Alarm Acknowledged             |
| 40252.10 | AC/OC Pump Pressure Sensor Failure Alarm Acknowledged                       |
| 40252.11 | RAW WATER PRESSURE SENSOR FAILURE ALARM                                     |
| 40252.12 | RAW WATER PRESSURE SENSOR FAILURE ALARM ACKNOWLEDGED                        |
| 40252.13 |   |

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|          | AUXILIARY #1 TEMPERATURE SENSOR FAILURE ALARM                              |
| 40252.14 | AUXILIARY #1 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED              |
| 40252.15 | AUXILIARY #2 TEMPERATURE SENSOR FAILURE ALARM                              |
| 40252.16 | AUXILIARY #2 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED              |
| 40253.01 | AUXILIARY #1 4-20mA SENSOR FAILURE ALARM                                   |
| 40253.02 | AUXILIARY #1 4-20mA SENSOR FAILURE ALARM ACKNOWLEDGED                      |
| 40253.03 | AUXILIARY #2 4-20mA SENSOR FAILURE ALARM                                   |
| 40253.04 | AUXILIARY #2 4-20mA SENSOR FAILURE ALARM ACKNOWLEDGED                      |
| 40253.05 | AIR START PRESSURE SENSOR FAILURE ALARM                                    |
| 40253.06 | AIR START PRESSURE SENSOR FAILURE ALARM ACKNOWLEDGED                       |
| 40253.07 | NON-DRIVE BEARING TEMPERATURE SENSOR FAILURE ALARM                         |
| 40253.08 | NON-DRIVE BEARING TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED         |
| 40253.09 | DRIVE BEARING TEMPERATURE SENSOR FAILURE ALARM                             |
| 40253.10 | DRIVE BEARING TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED             |
| 40254.01 | TURBINE INLET LEFT/INLINE TEMPERATURE SENSOR FAILURE ALARM                 |
| 40254.02 | TURBINE INLET LEFT/INLINE TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED |
| 40254.03 | TURBINE INLET RIGHT TEMPERATURE SENSOR FAILURE ALARM                       |
| 40254.04 | TURBINE INLET RIGHT TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED       |
| 40254.05 | TURBINE OUTLET LEFT/INLINE TEMPERATURE SENSOR FAILURE ALARM                |

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|          |   |
| 40254.06 | TURBINE OUTLET LEFT/INLINE TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED |
| 40254.07 | TURBINE OUTLET RIGHT TEMPERATURE SENSOR FAILURE ALARM                       |
| 40254.08 | TURBINE OUTLET RIGHT TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED       |
| 40254.09 | EXHAUST PORT #1 TEMPERATURE SENSOR FAILURE ALARM                            |
| 40254.10 | EXHAUST PORT #1 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED            |
| 40254.11 | EXHAUST PORT #2 TEMPERATURE SENSOR FAILURE ALARM                            |
| 40254.12 | EXHAUST PORT #2 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED            |
| 40254.13 | EXHAUST PORT #3 TEMPERATURE SENSOR FAILURE ALARM                            |
| 40254.14 | EXHAUST PORT #3 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED            |
| 40254.15 | EXHAUST PORT #4 TEMPERATURE SENSOR FAILURE ALARM                            |
| 40254.16 | EXHAUST PORT #4 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED            |
| 40255.01 | EXHAUST PORT #5 TEMPERATURE SENSOR FAILURE ALARM                            |
| 40255.02 | EXHAUST PORT #5 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED            |
| 40255.03 | EXHAUST PORT #6 TEMPERATURE SENSOR FAILURE ALARM                            |
| 40255.04 | EXHAUST PORT #6 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED            |
| 40255.05 | EXHAUST PORT #7 TEMPERATURE SENSOR FAILURE ALARM                            |
| 40255.06 | EXHAUST PORT #7 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED            |
| 40255.07 |   |

|          |   |
|----------|---|
|          | EXHAUST PORT #8 TEMPERATURE SENSOR FAILURE ALARM                  |
| 40255.08 | EXHAUST PORT #8 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED  |
| 40255.09 | EXHAUST PORT #9 TEMPERATURE SENSOR FAILURE ALARM                  |
| 40255.10 | EXHAUST PORT #9 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED  |
| 40255.11 | EXHAUST PORT #10 TEMPERATURE SENSOR FAILURE ALARM                 |
| 40255.12 | EXHAUST PORT #10 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED |
| 40255.13 | EXHAUST PORT #11 TEMPERATURE SENSOR FAILURE ALARM                 |
| 40255.14 | EXHAUST PORT #11 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED |
| 40255.15 | EXHAUST PORT #12 TEMPERATURE SENSOR FAILURE ALARM                 |
| 40255.16 | EXHAUST PORT #12 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED |
| 40256.01 | EXHAUST PORT #13 TEMPERATURE SENSOR FAILURE ALARM                 |
| 40256.02 | EXHAUST PORT #13 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED |
| 40256.03 | EXHAUST PORT #14 TEMPERATURE SENSOR FAILURE ALARM                 |
| 40256.04 | EXHAUST PORT #14 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED |
| 40256.05 | EXHAUST PORT #15 TEMPERATURE SENSOR FAILURE ALARM                 |
| 40256.06 | EXHAUST PORT #15 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED |
| 40256.07 | EXHAUST PORT #16 TEMPERATURE SENSOR FAILURE ALARM                 |
| 40256.08 | EXHAUST PORT #16 TEMPERATURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED |
| 40256.09 |   |

|          |   |
|----------|---|
|          | TURBINE LEFT/INLINE SPEED SENSOR FAILURE ALARM                    |
| 40256.10 | TURBINE LEFT/INLINE SPEED SENSOR FAILURE ALARM ACKNOWLEDGED       |
| 40256.11 | TURBINE RIGHT SPEED SENSOR FAILURE ALARM                          |
| 40256.12 | TURBINE RIGHT SPEED SENSOR FAILURE ALARM ACKNOWLEDGED             |
| 40256.13 | ENGINE SPEED SENSOR FAILURE ALARM                                 |
| 40256.14 | ENGINE SPEED SENSOR FAILURE ALARM ACKNOWLEDGED                    |
| 40256.15 | BALL HEAD BACKUP MODE SENSOR FAILURE ALARM                        |
| 40256.16 | BALL HEAD BACKUP MODE SENSOR FAILURE ALARM ACKNOWLEDGED           |
| 40257.01 | CRANKCASE PRESSURE SENSOR FAILURE ALARM                           |
| 40257.02 | CRANKCASE PRESSURE SENSOR FAILURE ALARM ACKNOWLEDGED              |
| 40257.03 | OIL MIST DETECTOR SENSOR FAILURE ALARM                            |
| 40257.04 | OIL MIST DETECTOR SENSOR FAILURE ALARM ACKNOWLEDGED               |
| 40257.05 | LOW SPEED LOW OIL PRESSURE SENSOR FAILURE ALARM                   |
| 40257.06 | LOW SPEED LOW OIL PRESSURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED   |
| 40257.07 | HIGH SPEED LOW OIL PRESSURE SENSOR FAILURE ALARM                  |
| 40257.08 | HIGH SPEED LOW OIL PRESSURE SENSOR FAILURE ALARM<br>ACKNOWLEDGED  |
| 40257.09 | <del>LUBE OIL TO ENGINE TEMPERATURE HIGH ALARM</del>              |
| 40257.10 | <del>LUBE OIL TO ENGINE TEMPERATURE HIGH ALARM ACKNOWLEDGED</del> |
| 40257.11 |   |

|          |  |
|----------|--|
|          | <del>LUBE OIL TO ENGINE PRESSURE LOW ALARM</del>                   |
| 40257.12 | <del>LUBE OIL TO ENGINE PRESSURE LOW ALARM ACKNOWLEDGED</del>      |
| 40257.13 | <del>LUBE OIL TO FILTER PRESSURE HIGH ALARM</del>                  |
| 40257.14 | <del>LUBE OIL TO FILTER PRESSURE HIGH ALARM ACKNOWLEDGED</del>     |
| 40257.15 | <del>INLET AIR MANIFOLD TEMPERATURE HIGH ALARM</del>               |
| 40257.16 | <del>INLET AIR MANIFOLD TEMPERATURE HIGH ALARM ACKNOWLEDGED</del>  |
| 40258.01 | <del>INLET AIR MANIFOLD PRESSURE HIGH ALARM</del>                  |
| 40258.02 | <del>INLET AIR MANIFOLD PRESSURE HIGH ALARM ACKNOWLEDGED</del>     |
| 40258.03 | <del>FUEL TO ENGINE TEMPERATURE HIGH ALARM</del>                   |
| 40258.04 | <del>FUEL TO ENGINE TEMPERATURE HIGH ALARM ACKNOWLEDGED</del>      |
| 40258.05 | <del>FUEL TO ENGINE PRESSURE LOW ALARM</del>                       |
| 40258.06 | <del>FUEL TO ENGINE PRESSURE LOW ALARM ACKNOWLEDGED</del>          |
| 40258.07 | <del>JACKET WATER OUTLET TEMPERATURE HIGH ALARM</del>              |
| 40258.08 | <del>JACKET WATER OUTLET TEMPERATURE HIGH ALARM ACKNOWLEDGED</del> |
| 40258.09 | <del>JACKET WATER PRESSURE LOW ALARM</del>                         |
| 40258.10 | <del>JACKET WATER PRESSURE LOW ALARM ACKNOWLEDGED</del>            |
| 40258.11 | <del>AC/OC WATER INLET TEMPERATURE HIGH ALARM</del>                |
| 40258.12 | <del>AC/OC WATER INLET TEMPERATURE HIGH ALARM ACKNOWLEDGED</del>   |
| 40258.13 |  |

|          |  |
|----------|--|
|          | <del>AC/OC PUMP PRESSURE LOW ALARM</del>                         |
| 40258.14 | <del>AC/OC PUMP PRESSURE LOW ALARM ACKNOWLEDGED</del>            |
| 40258.15 | <del>RAW WATER PRESSURE LOW ALARM</del>                          |
| 40258.16 | <del>RAW WATER PRESSURE LOW ALARM ACKNOWLEDGED</del>             |
| 40259.01 | AUXILIARY #1 TEMPERATURE ALARM                                   |
| 40259.02 | AUXILIARY #1 TEMPERATURE ALARM ACKNOWLEDGED                      |
| 40259.03 | AUXILIARY #2 TEMPERATURE ALARM                                   |
| 40259.04 | AUXILIARY #2 TEMPERATURE ALARM ACKNOWLEDGED                      |
| 40259.05 | AUXILIARY #1 4-20mA ALARM  |
| 40259.06 | AUXILIARY #1 4-20mA ALARM ACKNOWLEDGED                           |
| 40259.07 | AUXILIARY #2 4-20mA ALARM  |
| 40259.08 | AUXILIARY #2 4-20mA ALARM ACKNOWLEDGED                           |
| 40259.09 | <del>AIR START PRESSURE LOW ALARM</del>                          |
| 40259.10 | <del>AIR START PRESSURE LOW ALARM ACKNOWLEDGED</del>             |
| 40259.11 | <del>NON-DRIVE BEARING TEMPERATURE HIGH ALARM</del>              |
| 40259.12 | <del>NON-DRIVE BEARING TEMPERATURE HIGH ALARM ACKNOWLEDGED</del> |
| 40259.13 | <del>DRIVE BEARING TEMPERATURE HIGH ALARM</del>                  |
| 40259.14 | <del>DRIVE BEARING TEMPERATURE HIGH ALARM ACKNOWLEDGED</del>     |
| 40259.15 |  |



|          |   |
|----------|---|
|          | STATOR A TEMPERATURE HIGH ALARM   |
| 40259.16 | STATOR A TEMPERATURE HIGH ALARM ACKNOWLEDGED                                  |
| 40260.01 | STATOR B TEMPERATURE HIGH ALARM   |
| 40260.02 | STATOR B TEMPERATURE HIGH ALARM ACKNOWLEDGED                                  |
| 40260.03 | STATOR C TEMPERATURE HIGH ALARM   |
| 40260.04 | STATOR C TEMPERATURE HIGH ALARM ACKNOWLEDGED                                  |
| 40260.05 | <del>TURBINE INLET LEFT/INLINE TEMPERATURE HIGH ALARM</del>                   |
| 40260.06 | <del>TURBINE INLET LEFT/INLINE TEMPERATURE HIGH ALARM<br/>ACKNOWLEDGED</del>  |
| 40260.07 | <del>TURBINE INLET RIGHT TEMPERATURE HIGH ALARM</del>                         |
| 40260.08 | <del>TURBINE INLET RIGHT TEMPERATURE HIGH ALARM ACKNOWLEDGED</del>            |
| 40260.09 | <del>TURBINE OUTLET LEFT/INLINE TEMPERATURE HIGH ALARM</del>                  |
| 40260.10 | <del>TURBINE OUTLET LEFT/INLINE TEMPERATURE HIGH ALARM<br/>ACKNOWLEDGED</del> |
| 40260.11 | <del>TURBINE OUTLET RIGHT TEMPERATURE HIGH ALARM</del>                        |
| 40260.12 | <del>TURBINE OUTLET RIGHT TEMPERATURE HIGH ALARM ACKNOWLEDGED</del>           |
| 40260.13 | EXHAUST PORT #1 TEMPERATURE HIGH ALARM  |
| 40260.14 | EXHAUST PORT #1 TEMPERATURE HIGH ALARM ACKNOWLEDGED                           |
| 40260.15 | EXHAUST PORT #2 TEMPERATURE HIGH ALARM  |
| 40260.16 | EXHAUST PORT #2 TEMPERATURE HIGH ALARM ACKNOWLEDGED                           |
| 40261.01 |   |

|          |  |
|----------|--|
|          | EXHAUST PORT #3 TEMPERATURE HIGH ALARM               |
| 40261.02 | EXHAUST PORT #3 TEMPERATURE HIGH ALARM ACKNOWLEDGED  |
| 40261.03 | EXHAUST PORT #4 TEMPERATURE HIGH ALARM               |
| 40261.04 | EXHAUST PORT #4 TEMPERATURE HIGH ALARM ACKNOWLEDGED  |
| 40261.05 | EXHAUST PORT #5 TEMPERATURE HIGH ALARM               |
| 40261.06 | EXHAUST PORT #5 TEMPERATURE HIGH ALARM ACKNOWLEDGED  |
| 40261.07 | EXHAUST PORT #6 TEMPERATURE HIGH ALARM               |
| 40261.08 | EXHAUST PORT #6 TEMPERATURE HIGH ALARM ACKNOWLEDGED  |
| 40261.09 | EXHAUST PORT #7 TEMPERATURE HIGH ALARM               |
| 40261.10 | EXHAUST PORT #7 TEMPERATURE HIGH ALARM ACKNOWLEDGED  |
| 40261.11 | EXHAUST PORT #8 TEMPERATURE HIGH ALARM               |
| 40261.12 | EXHAUST PORT #8 TEMPERATURE HIGH ALARM ACKNOWLEDGED  |
| 40261.13 | EXHAUST PORT #9 TEMPERATURE HIGH ALARM               |
| 40261.14 | EXHAUST PORT #9 TEMPERATURE HIGH ALARM               |
| 40261.15 | EXHAUST PORT #10 TEMPERATURE HIGH ALARM              |
| 40261.16 | EXHAUST PORT #10 TEMPERATURE HIGH ALARM ACKNOWLEDGED |
| 40262.01 | EXHAUST PORT #11 TEMPERATURE HIGH ALARM              |
| 40262.02 | EXHAUST PORT #11 TEMPERATURE HIGH ALARM ACKNOWLEDGED |
| 40262.03 |  |

|          |   |
|----------|---|
|          | EXHAUST PORT #12 TEMPERATURE HIGH ALARM                     |
| 40262.04 | EXHAUST PORT #12 TEMPERATURE HIGH ALARM ACKNOWLEDGED        |
| 40262.05 | EXHAUST PORT #13 TEMPERATURE HIGH ALARM                     |
| 40262.06 | EXHAUST PORT #13 TEMPERATURE HIGH ALARM ACKNOWLEDGED        |
| 40262.07 | EXHAUST PORT #14 TEMPERATURE HIGH ALARM                     |
| 40262.08 | EXHAUST PORT #14 TEMPERATURE HIGH ALARM ACKNOWLEDGED        |
| 40262.09 | EXHAUST PORT #15 TEMPERATURE HIGH ALARM                     |
| 40262.10 | EXHAUST PORT #15 TEMPERATURE HIGH ALARM ACKNOWLEDGED        |
| 40262.11 | EXHAUST PORT #16 TEMPERATURE HIGH ALARM                     |
| 40262.12 | EXHAUST PORT #16 TEMPERATURE HIGH ALARM ACKNOWLEDGED        |
| 40262.13 | <del>TURBINE LEFT/INLINE OVERSPEED ALARM</del>              |
| 40262.14 | <del>TURBINE LEFT/INLINE OVERSPEED ALARM ACKNOWLEDGED</del> |
| 40262.15 | <del>TURBINE RIGHT OVERSPEED ALARM</del>                    |
| 40262.16 | <del>TURBINE RIGHT OVERSPEED ALARM ACKNOWLEDGED</del>       |
| 40263.01 | <del>BALL HEAD BACKUP MODE ALARM</del>                      |
| 40263.02 | <del>BALL HEAD BACKUP MODE ALARM ACKNOWLEDGED</del>         |
| 40263.03 | <del>ENGINE CRANK TERMINATE ALARM</del>                     |
| 40263.04 | <del>ENGINE CRANK TERMINATE ALARM ACKNOWLEDGED</del>        |
| 40263.05 |   |

|          |   |
|----------|---|
|          | <del>ENGINE CRANK TERMINATE TIME DELAY ALARM</del>              |
| 40263.06 | <del>ENGINE CRANK TERMINATE TIME DELAY ALARM ACKNOWLEDGED</del> |
| 40263.07 | <del>ENGINE OIL STEP ALARM</del>                                |
| 40263.08 | <del>ENGINE OIL STEP ALARM ACKNOWLEDGED</del>                   |
| 40263.09 | <del>OIL LEVEL LOW ALARM</del>                                  |
| 40263.10 | <del>OIL LEVEL LOW ALARM ACKNOWLEDGED</del>                     |
| 40263.11 | <del>PARTICLE DETECTOR ALARM</del>                              |
| 40263.12 | <del>PARTICLE DETECTOR ALARM ACKNOWLEDGED</del>                 |
| 40263.13 | <del>WATER LEVEL LOW ALARM</del>                                |
| 40263.14 | <del>WATER LEVEL LOW ALARM ACKNOWLEDGED</del>                   |
| 40263.15 | <del>JACKET WATER DETECTOR ALARM</del>                          |
| 40263.16 | <del>JACKET WATER DETECTOR ALARM ACKNOWLEDGED</del>             |
| 40264.01 | <del>LOW BATTERY VOLTAGE ALARM</del>                            |
| 40264.02 | <del>LOW BATTERY VOLTAGE ALARM ACKNOWLEDGED</del>               |
| 40264.03 | RELAY POWER NOT AVAILABLE ALARM                                 |
| 40264.04 | RELAY POWER NOT AVAILABLE ALARM ACKNOWLEDGED                    |
| 40264.05 | AUXILIARY #1 ALARM  |
| 40264.06 | AUXILIARY #1 ALARM ACKNOWLEDGED                                 |
| 40264.07 |   |

|          |  |
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|          | <del>AUXILIARY #2 ALARM</del>                            |
| 40264.08 | <del>AUXILIARY #2 ALARM ACKNOWLEDGED</del>               |
| 40264.09 | <del>AUXILIARY #3 ALARM</del>                            |
| 40264.10 | <del>AUXILIARY #3 ALARM ACKNOWLEDGED</del>               |
| 40264.11 | <del>SHUTDOWN OVERRIDE ALARM</del>                       |
| 40264.12 | <del>SHUTDOWN OVERRIDE ALARM ACKNOWLEDGED</del>          |
| 40264.13 | EXHAUST PORT #1 TEMPERATURE DEVIATION ALARM              |
| 40264.14 | EXHAUST PORT #1 TEMPERATURE DEVIATION ALARM ACKNOWLEDGED |
| 40264.15 | EXHAUST PORT #2 TEMPERATURE DEVIATION ALARM              |
| 40264.16 | EXHAUST PORT #2 TEMPERATURE DEVIATION ALARM ACKNOWLEDGED |
| 40265.01 | EXHAUST PORT #3 TEMPERATURE DEVIATION ALARM              |
| 40265.02 | EXHAUST PORT #3 TEMPERATURE DEVIATION ALARM ACKNOWLEDGED |
| 40265.03 | EXHAUST PORT #4 TEMPERATURE DEVIATION ALARM              |
| 40265.04 | EXHAUST PORT #4 TEMPERATURE DEVIATION ALARM ACKNOWLEDGED |
| 40265.05 | EXHAUST PORT #5 TEMPERATURE DEVIATION ALARM              |
| 40265.06 | EXHAUST PORT #5 TEMPERATURE DEVIATION ALARM ACKNOWLEDGED |
| 40265.07 | EXHAUST PORT #6 TEMPERATURE DEVIATION ALARM              |
| 40265.08 | EXHAUST PORT #6 TEMPERATURE DEVIATION ALARM ACKNOWLEDGED |
| 40265.09 |  |

|          |   |
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|          | EXHAUST PORT #7 TEMPERATURE DEVIATION ALARM               |
| 40265.10 | EXHAUST PORT #7 TEMPERATURE DEVIATION ALARM ACKNOWLEDGED  |
| 40265.11 | EXHAUST PORT #8 TEMPERATURE DEVIATION ALARM               |
| 40265.12 | EXHAUST PORT #8 TEMPERATURE DEVIATION ALARM ACKNOWLEDGED  |
| 40265.13 | EXHAUST PORT #9 TEMPERATURE DEVIATION ALARM               |
| 40265.14 | EXHAUST PORT #9 TEMPERATURE DEVIATION ALARM ACKNOWLEDGED  |
| 40265.15 | EXHAUST PORT #10 TEMPERATURE DEVIATION ALARM              |
| 40265.16 | EXHAUST PORT #10 TEMPERATURE DEVIATION ALARM ACKNOWLEDGED |
| 40266.01 | EXHAUST PORT #11 TEMPERATURE DEVIATION ALARM              |
| 40266.02 | EXHAUST PORT #11 TEMPERATURE DEVIATION ALARM ACKNOWLEDGED |
| 40266.03 | EXHAUST PORT #12 TEMPERATURE DEVIATION ALARM              |
| 40266.04 | EXHAUST PORT #12 TEMPERATURE DEVIATION ALARM ACKNOWLEDGED |
| 40266.05 | EXHAUST PORT #13 TEMPERATURE DEVIATION ALARM              |
| 40266.06 | EXHAUST PORT #13 TEMPERATURE DEVIATION ALARM ACKNOWLEDGED |
| 40266.07 | EXHAUST PORT #14 TEMPERATURE DEVIATION ALARM              |
| 40266.08 | EXHAUST PORT #14 TEMPERATURE DEVIATION ALARM ACKNOWLEDGED |
| 40266.09 | EXHAUST PORT #15 TEMPERATURE DEVIATION ALARM              |
| 40266.10 | EXHAUST PORT #15 TEMPERATURE DEVIATION ALARM ACKNOWLEDGED |
| 40266.11 |   |

|          |   |
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|          | EXHAUST PORT #16 TEMPERATURE DEVIATION ALARM                        |
| 40266.12 | EXHAUST PORT #16 TEMPERATURE DEVIATION ALARM ACKNOWLEDGED           |
| 40266.13 | <del>FUEL FILTER PRESSURE DIFFERENTIAL ALARM</del>                  |
| 40266.14 | <del>FUEL FILTER PRESSURE DIFFERENTIAL ALARM ACKNOWLEDGED</del>     |
| 40266.15 | <del>LUBE OIL FILTER PRESSURE DIFFERENTIAL ALARM</del>              |
| 40266.16 | <del>LUBE OIL FILTER PRESSURE DIFFERENTIAL ALARM ACKNOWLEDGED</del> |
| 40267.01 | PLC MEMORY BATTERY LOW ALARM  |
| 40267.02 | PLC MEMORY BATTERY LOW ALARM ACKNOWLEDGED                           |
| 40267.03 | SLOT 1 FAULT ALARM  |
| 40267.04 | SLOT 1 FAULT ALARM ACKNOWLEDGED                                     |
| 40267.05 | SLOT 2 FAULT ALARM  |
| 40267.06 | SLOT 2 FAULT ALARM ACKNOWLEDGED                                     |
| 40267.07 | SLOT 3 FAULT ALARM  |
| 40267.08 | SLOT 3 FAULT ALARM ACKNOWLEDGED                                     |
| 40267.09 | SLOT 4 FAULT ALARM  |
| 40267.10 | SLOT 4 FAULT ALARM ACKNOWLEDGED                                     |
| 40267.11 | SLOT 5 FAULT ALARM  |
| 40267.12 | SLOT 5 FAULT ALARM ACKNOWLEDGED                                     |
| 40267.13 |   |

|          |   |
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|          | SLOT 6 FAULT ALARM                      |
| 40267.14 | SLOT 6 FAULT ALARM ACKNOWLEDGED         |
| 40267.15 | SLOT 7 FAULT ALARM                      |
| 40267.16 | SLOT 7 FAULT ALARM ACKNOWLEDGED         |
| 40268.01 | SLOT 8 FAULT ALARM                      |
| 40268.02 | SLOT 8 FAULT ALARM ACKNOWLEDGED         |
| 40268.03 | SLOT 9 FAULT ALARM                      |
| 40268.04 | SLOT 9 FAULT ALARM ACKNOWLEDGED         |
| 40268.05 | RACK 0 GROUP 0 FAULT ALARM              |
| 40268.06 | RACK 0 GROUP 0 FAULT ALARM ACKNOWLEDGED |
| 40268.07 | RACK 0 GROUP 1 FAULT ALARM              |
| 40268.08 | RACK 0 GROUP 1 FAULT ALARM ACKNOWLEDGED |
| 40268.09 | RACK 0 GROUP 2 FAULT ALARM              |
| 40268.10 | RACK 0 GROUP 2 FAULT ALARM ACKNOWLEDGED |
| 40268.11 | RACK 0 GROUP 3 FAULT ALARM              |
| 40268.12 | RACK 0 GROUP 3 FAULT ALARM ACKNOWLEDGED |
| 40268.13 | RACK 0 GROUP 4 FAULT ALARM              |
| 40268.14 | RACK 0 GROUP 4 FAULT ALARM ACKNOWLEDGED |
| 40268.15 |   |



|          |   |
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|          | RACK 0 GROUP 5 FAULT ALARM  |
| 40268.16 | RACK 0 GROUP 5 FAULT ALARM ACKNOWLEDGED                                   |
| 40269.01 | RACK 0 GROUP 6 FAULT ALARM  |
| 40269.02 | RACK 0 GROUP 6 FAULT ALARM ACKNOWLEDGED                                   |
| 40269.03 | RACK 0 GROUP 7 FAULT ALARM  |
| 40269.04 | RACK 0 GROUP 7 FAULT ALARM ACKNOWLEDGED                                   |
| 40269.05 | RACK 1 GROUP 0 FAULT ALARM  |
| 40269.06 | RACK 1 GROUP 0 FAULT ALARM ACKNOWLEDGED                                   |
| 40269.07 | RACK 1 GROUP 4 FAULT ALARM  |
| 40269.08 | RACK 1 GROUP 4 FAULT ALARM ACKNOWLEDGED                                   |
| 40269.09 | RACK 1 GROUP 6 FAULT ALARM  |
| 40269.10 | RACK 1 GROUP 6 FAULT ALARM ACKNOWLEDGED                                   |
| 40269.11 | <del>LUBE OIL TO ENGINE PRESSURE LOW SHUTDOWN</del>                       |
| 40269.12 | <del>LUBE OIL TO ENGINE PRESSURE LOW SHUTDOWN ACKNOWLEDGED</del>          |
| 40269.13 | <del>JACKET WATER OUTLET TEMPERATURE HIGH SHUTDOWN</del>                  |
| 40269.14 | <del>JACKET WATER OUTLET TEMPERATURE HIGH SHUTDOWN<br/>ACKNOWLEDGED</del> |
| 40269.15 | REDUNDANT JACKET WATER OUTLET TEMPERATURE HIGH SHUTDOWN                   |
| 40269.16 | REDUNDANT JACKET WATER OUTLET TEMPERATURE HIGH SHUTDOWN<br>ACKNOWLEDGED   |
| 40270.01 |   |

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|          | AUXILIARY #1 TEMPERATURE SHUTDOWN                        |
| 40270.02 | AUXILIARY #1 TEMPERATURE SHUTDOWN ACKNOWLEDGED           |
| 40270.03 | AUXILIARY #2 TEMPERATURE SHUTDOWN                        |
| 40270.04 | AUXILIARY #2 TEMPERATURE SHUTDOWN ACKNOWLEDGED           |
| 40270.05 | AUXILIARY #1 4-20 mA SHUTDOWN                            |
| 40270.06 | AUXILIARY #1 4-20 mA SHUTDOWN ACKNOWLEDGED               |
| 40270.07 | AUXILIARY #2 4-20 mA SHUTDOWN                            |
| 40270.08 | AUXILIARY #2 4-20 mA SHUTDOWN ACKNOWLEDGED               |
| 40270.09 | NON-DRIVE BEARING TEMPERATURE HIGH SHUTDOWN              |
| 40270.10 | NON-DRIVE BEARING TEMPERATURE HIGH SHUTDOWN ACKNOWLEDGED |
| 40270.11 | DRIVE BEARING TEMPERATURE HIGH SHUTDOWN                  |
| 40270.12 | DRIVE BEARING TEMPERATURE HIGH SHUTDOWN ACKNOWLEDGED     |
| 40270.13 | <del>ENGINE OVERSPEED SHUTDOWN</del>                     |
| 40270.14 | <del>ENGINE OVERSPEED SHUTDOWN ACKNOWLEDGED</del>        |
| 40270.15 | <del>CRANKCASE PRESSURE HIGH SHUTDOWN</del>              |
| 40270.16 | <del>CRANKCASE PRESSURE HIGH SHUTDOWN ACKNOWLEDGED</del> |
| 40271.01 | <del>OIL MIST DETECTOR SHUTDOWN</del>                    |
| 40271.02 | <del>OIL MIST DETECTOR SHUTDOWN ACKNOWLEDGED</del>       |
| 40271.03 |  |

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|          | <del>PARTICLE DETECTOR SHUTDOWN</del>                        |
| 40271.04 | <del>PARTICLE DETECTOR SHUTDOWN ACKNOWLEDGED</del>           |
| 40271.05 | <del>LOW SPEED LOW OIL PRESSURE SHUTDOWN</del>               |
| 40271.06 | <del>LOW SPEED LOW OIL PRESSURE SHUTDOWN ACKNOWLEDGED</del>  |
| 40271.07 | <del>HIGH SPEED LOW OIL PRESSURE SHUTDOWN</del>              |
| 40271.08 | <del>HIGH SPEED LOW OIL PRESSURE SHUTDOWN ACKNOWLEDGED</del> |
| 40271.09 | AUXILIARY #1 SHUTDOWN  |
| 40271.10 | AUXILIARY #1 SHUTDOWN ACKNOWLEDGED                           |
| 40271.11 | AUXILIARY #2 SHUTDOWN  |
| 40271.12 | AUXILIARY #2 SHUTDOWN ACKNOWLEDGED                           |
| 40271.13 | <del>CUSTOMER SHUTDOWN</del>                                 |
| 40271.14 | <del>CUSTOMER SHUTDOWN ACKNOWLEDGED</del>                    |
| 40271.15 | <del>EMERGENCY STOP SHUTDOWN</del>                           |
| 40271.16 | <del>EMERGENCY STOP SHUTDOWN ACKNOWLEDGED</del>              |
| 40272    | WRITE SPARE  |
| 40273    | WRITE SPARE  |
| 40274    | WRITE SPARE  |
| 40275    | WRITE SPARE  |
| 40276    | WRITE SPARE  |
| 40277    | WRITE SPARE  |
| 40278    | WRITE SPARE  |

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| 40278    | WRITE SPARE                              |
| 40279    | WRITE SPARE                              |
| 40280    | WRITE SPARE                              |
| 40281    | WRITE SPARE                              |
| 40282    | WRITE SPARE                              |
| 40283    | WRITE SPARE                              |
| 40284    | WRITE SPARE                              |
| 40285    | WRITE SPARE                              |
| 40286    | WRITE SPARE                              |
| 40287    | WRITE SPARE                              |
| 40288    | WRITE SPARE                              |
| 40289    | WRITE SPARE                              |
| 40290    | WRITE SPARE                              |
| 40291    | WRITE SPARE                              |
| 40292    | WRITE SPARE                              |
| 40293    | WRITE SPARE                              |
| 40294    | WRITE SPARE                              |
| 40295    | WRITE SPARE                              |
| 40296    | WRITE SPARE                              |
| 40297    | WRITE SPARE                              |
| 40298    | WRITE SPARE                              |
| 40299    | WRITE SPARE                              |
| 40300    | WRITE SPARE                              |
| 40310.01 | ACKNOWLEDGE ALL SIGNAL FROM MODBUS SCADA |
| 40310.02 | SPARE                                    |
| 40310.03 | SPARE                                    |
|          |  |

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|----------|------------|
| 40310.04 | SPARE      |
| 40310.05 | SPARE      |
| 40310.06 | SPARE      |
| 40310.07 | SPARE      |
| 40310.08 | SPARE      |
| 40310.09 | SPARE      |
| 40310.10 | SPARE      |
| 40310.11 | SPARE      |
| 40310.12 | SPARE      |
| 40310.13 | SPARE      |
| 40310.14 | SPARE      |
| 40310.15 | SPARE      |
| 40310.16 | SPARE      |
| 40302    | READ SPARE |
| 40303    | READ SPARE |
| 40304    | READ SPARE |
| 40305    | READ SPARE |
| 40306    | READ SPARE |
| 40307    | READ SPARE |
| 40308    | READ SPARE |
| 40309    | READ SPARE |
|          |            |

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| 40310 | READ SPARE |
| 40311 | READ SPARE |
| 40312 | READ SPARE |
| 40313 | READ SPARE |
| 40314 | READ SPARE |
| 40315 | READ SPARE |
| 40316 | READ SPARE |
| 40317 | READ SPARE |
| 40318 | READ SPARE |
| 40319 | READ SPARE |
| 40320 | READ SPARE |
| 40321 | READ SPARE |
| 40322 | READ SPARE |
| 40323 | READ SPARE |
| 40324 | READ SPARE |
| 40325 | READ SPARE |
| 40326 | READ SPARE |
| 40327 | READ SPARE |
| 40328 | READ SPARE |
| 40328 | READ SPARE |
| 40329 | READ SPARE |
| 40330 | READ SPARE |
| 40331 | READ SPARE |
| 40332 | READ SPARE |
| 40333 | READ SPARE |
| 40334 | READ SPARE |
| 40335 | READ SPARE |
| 40336 | READ SPARE |
|       |            |

|       |            |
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| 40337 | READ SPARE |
| 40338 | READ SPARE |
| 40339 | READ SPARE |
| 40340 | READ SPARE |
| 40341 | READ SPARE |
| 40342 | READ SPARE |
| 40343 | READ SPARE |
| 40344 | READ SPARE |
| 40345 | READ SPARE |
| 40346 | READ SPARE |
| 40347 | READ SPARE |
| 40348 | READ SPARE |
| 40349 | READ SPARE |
| 40350 | READ SPARE |

## Control System Analog PLC Outputs Hardwired (For Customer Use)

Table 8

| PLC I/O Address           | Output Description                | Signal | Signal Type | Comments   |
|---------------------------|-----------------------------------|--------|-------------|--|
| Rack 0 Module 4 Channel 0 | Customer Configured Analog Output | ANALOG | 4-20mA      | Engine Speed (Factory Default)                   |
| Rack 0 Module 4 Channel 1 | Customer Configured Analog Output | ANALOG | 4-20mA      | Jacket Water Outlet Temp (Factory Default)       |
| Rack 0 Module 4 Channel 2 | Customer Configured Analog Output | ANALOG | 4-20mA      | Turbine Inlet Left/Inline Temp (Factory Default) |
| Rack 0 Module 4 Channel 3 | Customer Configured Analog Output | ANALOG | 4-20mA      | Turbine Inlet Right Temp (Factory Default)       |

## Control System Hardwired Dry Contact & Analog Outputs (For Customer Use)

Table 9

| PLC I/O Address | Output Description               | Signal  | Signal Type | Alarm | Shut Down | Trip / Activation Condition | Comments    |
|-----------------|----------------------------------|---------|-------------|-------|-----------|-----------------------------|-------------|
|                 | High Crankcase Pressure Shutdown | CONTACT | N.C.        |       | X         | PSHH-003                    | RCPHS Relay |
|                 | Low Engine Oil Pressure Shutdown | CONTACT | N.C.        |       | X         | PSLL-001 OR PT-002          | ROPLS Relay |
|                 | Engine Overspeed Shutdown        | CONTACT | N.C.        |       | X         | SS-002                      | ROSR Relay  |
|                 | Fuel Control Relay               | CONTACT | N.O., N.C.  |       | X         | Switch or Fault             | RFCR Relay  |
| O:5.0/04        | Alarm Horn and Beacon            | CONTACT | N.O.        | X     | X         | Alarm or Shutdown           | RHB Relay   |
|                 | Summary Shutdown (Engine Fault)  | CONTACT | N.C.        |       | X         | Relay Shutdown              | REFR Relay  |
|                 | Engine Running (Crank Terminate) | CONTACT | N.O.        |       |           | Engine Speed > 170 RPM      | RCTR Relay  |
|                 | Prelube Engine                   | CONTACT | N.O.        |       |           | PS-008 > 9 kPa (1.3 psi)    | RPR Relay   |
| O:5.0/02        | Reduce Engine Load               | CONTACT | N.O., N.C.  |       |           |                             | REL Relay   |
| O:5.0/05        | Engine Alarm Summary             | CONTACT | N.O.        | X     |           | Any Active Alarm            | RSA Relay   |
| O:5.0/08        | Engine Shutdown Summary          | CONTACT | N.O.        |       | X         | Any Active Alarm            |             |
| O:5.0/09        | Programmable Speed Control #1    |         |             |       |           |                             |             |
| O:5.0/15        | Programmable Speed Control #1    |         |             |       |           |                             |             |



|          |                                |  |  |  |  |  |  |
|----------|--------------------------------|--|--|--|--|--|--|
| O:5.0/10 | PLC Crank Terminate Relay      |  |  |  |  |  |  |
| O:5.0/11 | PLC Crank Terminate Time Relay |  |  |  |  |  |  |
| O:5.0/12 | PLC Oil Step Relay             |  |  |  |  |  |  |

## Control System PLC Outputs Hardwired to Relay Logic (Not Available to Customer)

Table 10

| PLC I/O Address | Output Description                         | PLC Data Table Address | Signal Type | Alarm | Shut Down | Trip / Activation Condition | Comments                        |
|-----------------|--|------------------------|-------------|-------|-----------|-----------------------------|---------------------------------|
| O:5.0/03        | Air Start to Engine                        |                        | DIGITAL     |       |           |                             | Remote Start Only               |
| O:5.0/00        | Fuel Shutoff Signal to Engine              | N7:0/11                | DIGITAL     |       | X         | Shutdown or Fuel Off        | RFCR Relay                      |
| O:5.0/13        | Air Shutoff Signal to Engine               |                        | DIGITAL     |       |           | Overspeed and E-Stop        | ASOS Solenoid                   |
| O:5.0/01        | Engine Prelube Signal to Engine            |                        | DIGITAL     |       |           | > 9 kPa (1.3 psi)           | RPR Relay                       |
| O:4.0/02        | Engine Protection System Override Relay On |                        | DIGITAL     |       |           |                             | ROVR Relay - Override Shutdowns |
| O:3.0/13        | Jacket Water Detection Relay               | B13:225/2              | DIGITAL     | X     |           |                             | RJWDA Relay                     |

## Control System Lights and Meters

Table 11

| PLC I/O Address | Output description          | PLC Data Table Address | Signal type | Alarm | Shut down | Trip / activation condition | Comments                           |
|-----------------|-----------------------------|------------------------|-------------|-------|-----------|-----------------------------|------------------------------------|
|                 | Engine Speed Tachometer     |                        | FREQ        |       |           |                             | Mag Pickup Driven                  |
|                 | Engine Hour Meter           |                        | DIGITAL     |       |           |                             |                                    |
|                 | Starting Air Pressure Meter |                        | OHMS        |       |           |                             | Resistive Sensor                   |
| O:5.0/06        | Summary Alarm Light         |                        | DIGITAL     | X     |           | Any Alarm                   |                                    |
| O:5.0/07        | Summary Shutdown Light      |                        | DIGITAL     |       | X         | Protective Shutdown         |                                    |
| O:5.0/14        | PLC Failure                 | O:7.0/15               | DIGITAL     | X     |           | No Signal to RPLCFA         | RPLCFA De-energized on PLC Failure |
|                 | Engine Prelubed             |                        | DIGITAL     |       |           | > 9 kPa (1.3 psi)           |                                    |