

Special Instruction

i10964300

Procedure to Install and Operate Cat® GCCP 1.2/1.3 Control Panel on Certain Generator Sets

SMCS Code: 1609; 4490; 7451; 7490; 7566

Electric Power Generation

C13GENSET (S/N: T321-UP; R2H1-UP)
 C15 GEN SET (S/N: AR21-UP; T331-UP; R2F1-UP)
 C18 GEN SET (S/N: AR31-UP; T341-UP; T351-UP)
 C3.3 DE33E0 (S/N: EC31-UP)
 C3.3 DE33E3 (S/N: EC41-UP)
 C3.3 DE50E0/DE5 (S/N: EC51-UP)
 C3.3 DE50E2 (S/N: EC61-UP)
 C3.3 GEN SET (S/N: H371-UP; RFF1-UP; RFG1-UP)
 C4.4 DE110E2 (S/N: ECL1-UP)
 C4.4 DE55E2 (S/N: EC71-UP)
 C4.4 DE65E3 (S/N: EC81-UP)
 C4.4 DE88E0 (S/N: EC91-UP)
 C4.4 DE88E3/DE1 (S/N: ECK1-UP)
 C4.4 GEN SET (S/N: T921-UP; TX21-UP; CN31-UP; T931-UP; TX31-UP; CN41-UP; T941-UP; T951-UP; CN61-UP; T961-UP; H381-UP; RFJ1-UP; RFK1-UP; H3Z1-UP)
 C7.1 DE200E0/DE (S/N: ECW1-UP)
 C7.1 GEN SET (S/N: RD21-UP; WG21-UP; RD31-UP; WG31-UP; T971-UP; T991-UP; TX91-UP; TXR1-UP; RMT1-UP; T9T1-UP; T9W1-UP)
 C9 GEN SET (S/N: RZ91-UP; NTX1-UP)
 DE150E0 (S/N: GTY1-UP)
 DE18E3/DE22E3 (S/N: GBY1-UP)

DG150 (S/N: 3G31-UP; 2S81-UP) Engine

C3.3 (S/N: SM61-UP)
 C4.4 (S/N: HW41-UP; HW51-UP; TXB1-UP)

Generator Set

C1.1 DE9.5E3 (S/N: GB81-UP)
 C1.5 DE13.5E3 (S/N: GB91-UP)
 D1000 (S/N: GN71-UP)
 D1250 (S/N: GN91-UP)
 D20 (S/N: 2F21-UP)
 D25 (S/N: 2F31-UP)
 D250GC (S/N: RG31-UP)
 D30 (S/N: 2F41-UP)
 D300GC (S/N: RE31-UP)
 D350GC (S/N: RG41-UP; S341-UP)
 D400GC (S/N: RE41-UP; S441-UP)
 D450GC (S/N: RG51-UP; S351-UP)
 D500GC (S/N: RK51-UP; S651-UP)
 D550GC (S/N: S371-UP; R2K1-UP)
 D600 GC (S/N: S361-UP; R2N1-UP)
 D800 (S/N: GNF1-UP)
 DE1000S (S/N: GJS1-UP)
 DE1100 (S/N: GGF1-UP; GGM1-UP; GGR1-UP; GGS1-UP)
 DE1250 (S/N: GJT1-UP)
 DE1250S (S/N: GJZ1-UP)
 DE1400 (S/N: GJX1-UP)
 DE1500 (S/N: GJY1-UP)
 DE500 (S/N: H7R1-UP)
 DE630 (S/N: H7S1-UP)
 DE800S (S/N: GG61-UP; GGY1-UP)
 DG100 (S/N: 2K81-UP)
 DG125 (S/N: 3G51-UP; 3K81-UP; 2K91-UP)
 DG175 (S/N: 2Y41-UP)
 DG200 (S/N: 2Y31-UP)
 DG50 (S/N: 2R81-UP)
 DG60 (S/N: 2Y91-UP)

DG70 (S/N: 2Y71-UP)
DG80 (S/N: 2Y51-UP)
XQ20T4F (S/N: 4KZ1-UP)
XQP20 (S/N: XPZ1-UP)
Industrial Engine
C7.1 (S/N: HW61-UP; HW71-UP)

Revision History:

Table 1

Revision	Summary of Changes
18	Updated Section "ECU Alarms (CAN Fault Codes / Diagnostic Trouble Code (DTC))".
17	Updated the pin number of DSENet Expansion A in Table 35 .
16	Added 4KZ. Removed NSN.
15	Added serial number prefixes.
14	Added serial number prefix.

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Introduction

This Special Instruction contains the procedure to install and operate Cat ® GCCP 1.2/1.3 Control Panel on certain generator sets.

Cat GCCP 1.2/1.3 Control Panel provides different functionality across a common platform. The functionality provides greater flexibility in choosing the controls for the generator set.

Cat GCCP 1.2/1.3 Control Panel allows the operator to start and stop the generator set, and transfer load to the generator set either manually or automatically.

The user can view system operating parameters via the text Liquid Crystal Display (LCD). Cat GCCP 1.2/1.3 Control Panel monitors the engine and indicates the operational status and fault conditions. The control panel helps to shut down automatically the engine and displays the fault condition through LCD display.

The Advanced RISC Machines microprocessor (ARM microprocessor) in the module incorporates the following complex features:

- Text-based LCD display
- True Root Mean Square Voltage (RMS Voltage)
- Current and Power monitoring
- Universal Serial Bus (USB) and RS485 Communications
- Engine parameter monitoring
- Fully configurable inputs for use as alarms or a range of different functions
- Engine Electronic Control Module interface (ECU interface) to electronic engines including Tier 5 engines
- Integral Programmable Logic Controller (PLC) to help provide customization where required
- Fuel tank level monitoring to track fuel filling operations and detect fuel leak/theft
- Data Logging

Cat GCCP 1.2/1.3 Configuration Suite Software allows alteration of selected operational sequences, timers, and alarms. The integral front panel configuration editor of the module is used to adjust the values.

A security code can protect access to critical operational sequences and timers for use by qualified engineers.

The module is housed on a robust plastic case suitable for panel mounting. Connections to the module are via locking plug and sockets.

Safety Section

Do not perform any procedure in this Special Instruction until you have read this Special Instruction and you understand this information. Use only proper tools and observe all precautions that pertain to the use of those tools. Failure to follow these procedures can result in personal injury. **The following procedures should be observed.**

Work safely. Most accidents that involve product operation, maintenance, and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs.

A person must be alert to potential hazards. This person must also have the necessary training, skills, and tools to perform these functions properly.

Safety precautions and warnings are provided in this instruction and on the product. If these hazard warnings are not heeded, bodily injury or death could occur to you or to other persons. Caterpillar cannot anticipate every possible circumstance of a potential hazard.

Therefore, the warnings in this publication and the warnings that are on the product are not all inclusive. Avoid using a tool, a procedure, a work method, or operating technique that is not recommended by Caterpillar.

Ensure that the operation, lubrication, maintenance, or the repair procedures used will not create an unsafe condition or damage the product.

WARNING

Do not operate or work on this product unless you have read and understood the instructions and warnings in the relevant Operation and Maintenance Manuals and relevant service literature. Failure to follow the instructions or heed the warnings could result in injury or death. Proper care is your responsibility.

WARNING

When removing a major component or attachment, ensure that it is properly blocked or secured before removing mounting hardware. An assembly that is disconnected without proper blocking could shift or fall, resulting in serious injury or death of personnel or machine damage.

WARNING

Accidental engine starting can cause injury or death to personnel working on the equipment.

To avoid accidental engine starting and to bring the equipment to a zero energy state, disconnect all positive (+) and negative (-) battery cables. Install an appropriate battery cable lockout device and protect the battery posts to prevent accidental contact and shorting.

Place a Do Not Operate tag at the Start/Stop switch location to inform personnel that the equipment is being serviced.



Illustration 1

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WARNING

Never disconnect any charging unit circuit or battery circuit cable from the battery when the charging unit is operated. A spark can cause an explosion from the flammable vapor mixture of hydrogen and oxygen that is released from the electrolyte through the battery outlets. Injury to personnel can be the result.

Hazardous Voltage Information

DANGER

ELECTROCUTION HAZARD - The electrical system contains hazardous voltage levels.

DO NOT remove any covers that will expose energized hazardous-voltage electrical components without shutting down and discharging the electrical system.

DO NOT perform any maintenance on the electrical system until after the electrical system has been shut down and the voltage has been discharged by qualified personnel.

Read and understand the instructions and warnings found in the Operation and Maintenance Manual to properly shut down the electrical system and discharge hazardous-voltage electrical components.

Failure to follow these instructions will result in personal injury or death.

DANGER

ELECTROCUTION HAZARD - Ensure proper grounding.

Avoid a buildup of hazardous live voltages on exposed surfaces by ensuring that all grounding wires/straps are always properly connected.

Disconnected grounding wires, including grounding wires/straps for hazardous-voltage components and electrical enclosures, must be properly reconnected before connecting equipment to the power supply.

Failure to follow these instructions will result in personal injury or death.

WARNING

When service or maintenance must be performed in a hazardous-voltage component enclosure, always assume that a hazardous voltage level could be present.

Qualified personnel should manually check for hazardous voltage using electrical measuring tools that have the capacity to measure the hazardous-voltage components being checked.

The voltage level present must be confirmed to be below 50 Volts before any exposure to the hazardous-voltage components can take place.

Failure to follow these instructions could result in personal injury or death.

There may be government regulations, local regulations, or site-specific rules that govern the operation, service, and maintenance of high-voltage components and machines. Comply with applicable rules and regulations for the work place.

Appropriate high-voltage protective equipment should be worn as defined by local rules and regulations.

Only qualified service personnel should perform service on high-voltage systems.

DO NOT remove covers, or open enclosures, that will expose energized high-voltage electrical components.

DO NOT perform service or maintenance on energized high-voltage electrical components.

High voltage can cause electrocution resulting in personal injury or death.

High-voltage components and connections must be properly maintained.

Refer to the Maintenance Section in the Operation and Maintenance Manual for additional information.

Residual energy can remain in high-voltage components even after operation has stopped. Always assume that a hazardous level of voltage could be present.

Before performing any type of service, repair, or maintenance on high-voltage electrical components, perform the following:

- Disconnect the electrical power source
- Isolate electrical components
- Discharge residual energy
- Check components for voltage using electrical measuring tools.

Note: Use electrical measuring tools that have the capacity to measure the high-voltage components being checked. The level of voltage present must be confirmed to be below 50 Volts before any exposure to the high-voltage components can take place.

Read and understand the instructions and warnings found in Operation and Maintenance Manual, "Electrical Shutdown and Voltage Discharge", to shut down the electrical system and discharge high-voltage electrical components.

Specification

Storage Temperature

The storage temperature of the module is given in Table 2 :

Table 2

Module	Specification
Cat GCCP 1.2/1.3	-40 °C (-40.0 °F) to 85 °C (185.0 °F)

Operating Temperature

The operating temperature of the module is given in Table 3 :

Table 3

Module	Specification
Cat GCCP 1.2/1.3	-30 °C (-22.0 °F) to 70 °C (158.0 °F)

Requirements for UL

Note: UL is a trademark owned by UL LLC.

Note: If more than one live circuit exists, refer to Section "Cat GCCP 1.2 Three Phase Four Wire, and Cat".

Suggested installation specifications to meet UL compliance is given Table 4 :

Table 4

Description	Specification
Screw Terminal Tightening Torque	0.5 N·m (4.42 lb in)
Conductors	Terminals suitable for connection of conductor size AWG 20 (0.5 mm ²) to AWG 13 (2.5 mm ²). Conductor protection must be provided in accordance with NFPA 70, Article 240. Low voltage circuits (35 V or less) must be supplied from the engine starting battery or an isolated secondary circuit. Separate and secure the communication, sensor, and battery derived circuit conductors. Maintain a minimum of 6 mm (0.2 inch) distance from the generator and mains connected circuit conductors, unless all conductors are rated 600 V or greater.
Current Inputs	Inputs must be connected through UL listed or recognized isolating Current Transformers (CTs) with a maximum secondary rating of 5 A.
Communication Circuits	Circuits must be connected to communication circuits of UL listed equipment.
Output Pilot Duty	0.5 A
Mounting	Suitable for use in type-one enclosure type rating with a surrounding air temperature between -30 °C (-22.0 °F) to 70 °C (158.0 °F). Suitable for pollution degree three environments when voltage sensing inputs do not exceed 300 V. To maintain a "Pollution Degree 2" environment, install the device in an unventilated or filtered ventilation enclosure when used to monitor voltages over 300 V.
Operating Temperature	-30 °C (-22.0 °F) to 70 °C (158.0 °F)
Storage Temperature	-40 °C (-40.0 °F) to 80 °C (176.0 °F)

Terminal Specification

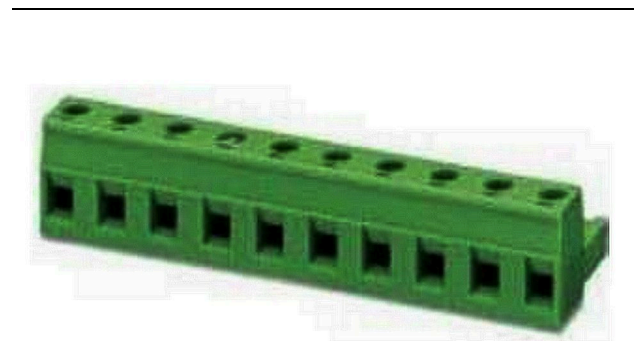


Illustration 2 g06763395
Cable Entry and Screw Terminals of a 10 Way Connector

Terminal specification of 10 Way Connector is given in Table 5 :

Table 5

Description	Specification
Connection Type	Two part connector Male part fitted to module. Female part supplied in module packing case - Screw terminal, rising clamp, no internal spring. ⁽¹⁾
Minimum Cable Size	AWG 20 (0.5 mm ²)
Maximum Cable Size	AWG 13 (2.5 mm ²)

(continued)

(Table 5, contd)

Description	Specification
Tightening Torque	0.5 N·m (4.42 lb in)
Wire Strip Length	7 mm (0.3 inch)

⁽¹⁾ Refer to Illustration 2 for cable entry and screw terminals of a 10 way connector.

Power Supply Requirements

The power supply requirement details are given in Table 6 :

Table 6

Description	Specification
Minimum Supply Voltage	8 V continuous, 5 V for up to 1 minute.
Cranking Dropouts	Survives 0 V for 100 ms when the supply is greater than 10 V before the dropout. Recovers to 5 V after sometime.
Maximum Supply Voltage	35 V continuous (60 V for 1 minute)
Reverse Polarity Protection	-35 V continuous
Maximum Operating Current	280 mA at 12 V 150 mA at 24 V
Maximum Standby Current	145 mA at 12 V 85 mA at 24 V

(continued)

(Table 6, contd)

Description	Specification
Maximum Current When In Sleep Mode	70 mA at 12 V 40 mA at 24 V
Typical Power (Controller ON, Heater OFF)	3.5 W
Typical Power (Controller ON, Heater ON)	6.5 W

Module Supply Instrumentation Display

The module supply instrumentation display specification is given in Table 7 :

Table 7

Description	Specification
Range	0 V to 70 V DC (maximum continuous operating voltage of 35 VDC)
Resolution	0.1 V
Accuracy	1% full scale (35 V)

Voltage and Frequency Sensing

The voltage and frequency sensing specification is given in Table 8 :

Table 8

Description	Specification
Measurement Type	True RMS conversion
Sample Rate	40 kHz
Harmonics	Up to 11 th grade or more.
Input Impedance	450 kilo ohm phase to neutral.
Phase to Neutral	15 V (minimum requirement for sensing frequency) to 415 V AC (absolute maximum) Suitable for 345 V AC nominal ($\pm 20\%$ for under/overvoltage detection)
Phase to Phase	25 V (minimum required for sensing frequency) to 720 V AC (absolute maximum) Suitable for 600 V AC nominal ($\pm 20\%$ for under/overvoltage detection)
Common Mode Offset from Earth	100 V AC (max)
Resolution	1 V AC phase to neutral 2 V AC phase to phase
Accuracy	$\pm 1\%$ full scale phase to neutral $\pm 1\%$ full scale phase to phase

(continued)

(Table 8, contd)

Description	Specification
Minimum Frequency	3.5 Hz
Maximum Frequency	75.0 Hz
Frequency Resolution	0.1 Hz
Frequency Accuracy	± 0.2 Hz

Current Sensing

The current sensing specification is given in Table 9 :

Table 9

Description	Specification
Measurement Type	True RMS conversion
Sample Rate	40 Hz
Harmonics	Up to 11 th harmonics or more
Nominal Current Transformer (CT) Secondary Rating	5 A
Maximum Continuous Current	
Overload Measurement	15 A
Absolute Maximum Overload	50 A for 1 second
Burden	0.5 VA (0.02 R burden resistors)
Common Mode Offset	± 1 V peak plant ground to Current Transformer (CT) common terminal
Resolution	25 mA
Accuracy	$\pm 1\%$ of nominal (excluding CT error)

VA (Volt-Ampere) Rating of the CTs

Note: Details for 4.0 mm² (0.15 inch) cables are given for reference only. Connectors on Cat GCCP 1.2/1.3 control panel are only suitable for cables up to 2.5 mm² (0.09 inch).

The VA burden of the module on the CTs is 0.5 VA. Depending upon the type and length of cable between the CT and the module, CTs with a greater VA rating than the module might be required.

Distance between CTs and the measuring module should be estimated and cross-referenced against the cable size chart to find the VA burden of the cable.

If the CTs are fitted within the alternator top box, connect the star point (common) of the CTs to system ground (Earth) closer to the CTs. Closer connections minimize the length of cable that is used to connect the CTs to Cat GCCP 1.2/1.3 control panel.

Example

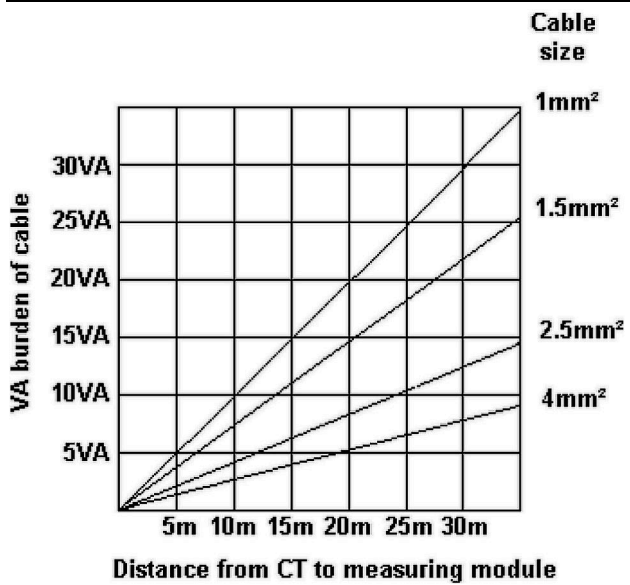


Illustration 3
Cable Size

If a 1.5 mm² (0.05 inch) cable is used and the distance between CT and measuring module is 20.0 m (65.62 ft), VA burden of the cable would approximately be 15 VA. As VA burden of Cat GCCP 1.2/1.3 controller is 0.5 VA, use a CT with rating of at least 15.5 VA (15 VA + 0.5 VA).

If 2.5 mm² (0.09 inch) cables are used over the same distance as the 1.5 mm² (0.05 inch), the VA burden of the cable on the CT would be approximately 7 VA. CTs required for this instance are at least 7.5 VA (7 VA + 0.5 VA).

A graphical representation of the distance between CT and the measuring module against VA burden of the cable, along with the cable size is shown in Illustration 3.

CT Polarity

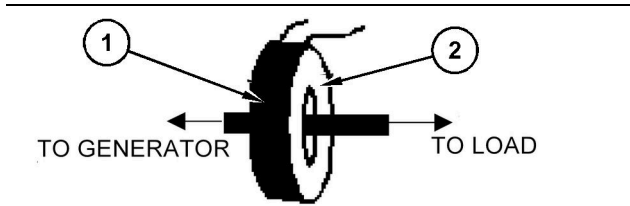


Illustration 4
Polarity of CT Primary

(1) Side facing Generator (Labeled as p1, k, or K)
(2) Side facing Load (Labeled as p2, l, or L)

Note: Ensure correct polarity of the CT primary.

Incorrect CT orientation would lead to negative kW readings when the set is supplying power. Use labeling in the casing as an indicator of orientation, if available.

To test the orientation, run the generator in parallel mode and load the generator to around 10% of the set rating. Do not run the generator in parallel with any other supply while testing the orientation. Ensure that Cat GCCP 1.2/1.3 control panel shows positive kW for all three individual phase readings. Illustration 4 shows the polarity of CT primary.

CT Phasing

Ensure that the CTs are connected to the correct phases. For example, CT on phase 1 should be connected to the terminal on Cat GCCP 1.2/1.3 control panel intended for the CT Phase 1 connection.

Ensure that voltage sensing for phase 1 is connected to generator phase 1. Incorrect connection of phases results in incorrect power factor measurements, which in turn results in incorrect kW measurements.

Use a single-phase load to check for incorrect connection. Place the load on each phase, run the generator, and ensure that the kW value appears in the correct phase. For example, if the load is connected to phase 3, ensure that the kW figure appears on phase 3 display. The kW figure must not appear on phase 1 or phase 2 display.

CT Class

Ensure that the correct CT type is chosen. For instance, if Cat GCCP 1.2/1.3 control panel provides overcurrent protection, ensure that the CT could measure the overload level required to protect against and accurately.

Fit a protection class CT (P15 type) to maintain high accuracy while the CT is measuring overload currents.

If Cat GCCP 1.2/1.3 control panel uses CT for instrumentation only (current protection disabled or not fitted to the controller), measurement class CTs can be used. Consider the level of accuracy that is required for your application. Cat GCCP 1.2/1.3 control panel is accurate to more than 1% of the full-scale current reading. To maintain the level of accuracy, a class 0.5 or class 1 CT must be used.

Inputs

Digital Inputs

The digital input specification is given in Table 10 :

Table 10

Description	Specification
Number	Eight configurable digital inputs (12 inputs in case if the "Analogue Inputs" are configured as digital inputs).
Arrangement	Contact between terminal and ground
Low-Level Threshold	2.1 V minimum
High-Level Threshold	6.6 V maximum
Maximum Input Voltage	+60 V DC for plant supply negative
Minimum Input Voltage	-24 V DC for plant supply negative
Contact Wetting Current	5 mA typical
Open Circuit Voltage	12 V typical

Emergency Stop

The emergency stop specification is given in Table 11 :

Table 11

Description	Specification
Arrangement	Contact between terminal and module supply positive
Closed Threshold	5 V minimum
Open Threshold	5 V maximum
Maximum Input Voltage	+35 V DC for plant supply negative (60 V protection for 1 minute)
Minimum Input Voltage	-24 V DC for plant supply negative
Open Circuit Voltage	0 V

Analogue Inputs

All Analogue inputs are flexible within Cat GCCP 1.2/ 1.3 modules.

Analogue Input A

Table 12

Description	Specification
Input Type	Flexible: Configured for Oil Sensor in Cat GCCP 1.2/1.3 default configuration Flexible Options: Not Used, Digital Input, Flexible Analogue Oil Sensor, and Temperature Sensor
Flexible Input Selection	Pressure Sensor, Percentage Sensor, or Temperature Sensor
Flexible Measured Quantity	Current, Resistive, or Voltage

The resistive configuration specification is given in Table 13 :

Table 13

Resistive Configuration	
Description	Specification
Measurement Type	Resistance measurement by measuring voltage across sensor with a fixed current applied.
Arrangement	Differential resistance measurement input
Measurement Current	15 ± 2 mA
Full Scale	240 ohm
Over Range / Fail	350 ohm
Resolution	±1% of full scale
Accuracy	±2% of full scale resistance (±9.6 ohm) excluding sensor error
Maximum Common Mode Voltage	±2 V
Display Range	Configurable by Personal Computer software (PC software)

Table 14

0 V to 10 V Configuration	
Description	Specification
Full Scale	0 V to 10 V
Over Range / Fail	11 V
Resolution	±1% of full scale
Accuracy	±2% of full scale voltage ±0.2 V excluding sensor error

(continued)

(Table 14, contd)

0 V to 10 V Configuration	
Description	Specification
Maximum Common Mode Voltage	± 2 V
Display Range	Configurable by PC software

Table 15

4 mA to 20 mA Configuration	
Description	Specification
Full Scale	0 mA to 20 mA
Over Range / Fail	22 mA
Resolution	$\pm 1\%$ of full scale
Accuracy	$\pm 2\%$ of full scale current ± 0.4 mA excluding sensor error
Maximum Common Mode Voltage	± 2 V
Display Range	Configurable by PC software

Analogue Input B and C

Table 16

Description	Specification
Analogue Input B Type	Flexible: Configured for Temperature Sensor in Cat GCCP 1.2/1.3 default configuration Not used, Digital Input, Flexible Analogue, Fuel Sensor, and Temperature Sensor
Analogue Input C Type	Flexible: Configured for Fuel Sensor in Cat GCCP 1.2/1.3 default configuration Flexible Options: Not used, Digital Input, Flexible Analogue, Fuel Sensor, and Temperature Sensor
Flexible Input Selection	Flexible Input Selection, Pressure Sensor, Percentage Sensor, or Temperature Sensor
Flexible Measured Quantity	Resistive only

Table 17

Resistive Configuration	
Description	Specification
Measurement Type	Resistance is measured by measuring voltage across the sensor with a fixed current applied.
Arrangement	Differential resistance measurement input
Measurement Current	13 ± 10 mA
Full Scale	3 kilo ohm
Over Range / Fail	5 kilo ohm
Resolution	$\pm 1\%$ of full scale
Accuracy	$\pm 2\%$ of full scale resistance excluding sensor error
Maximum Common Mode Voltage	± 2 V
Display Range	Configurable by PC software

Analogue Input D

Table 18

Description	Specification
Analogue Input D Type	Flexible: Configured for Temperature Sensor in Cat GCCP 1.2/1.3 default configuration Flexible Options: Not Used, Digital Input, Flexible Analogue, Fuel Sensor, and Temperature Sensor
Flexible Input Selection	Pressure Sensor, Percentage Sensor, or Temperature Sensor
Flexible Measured Quantity	Current, Resistive, or Voltage

Table 19

Resistive Configuration	
Description	Specification
Measurement Type	Resistance is measured by measuring voltage across sensor with a fixed current applied.
Arrangement	Differential resistance measurement input
Measurement Current	13 ± 2 mA
Full Scale	3 kilo ohm
Over Range / Fail	5 kilo ohm
Resolution	$\pm 1\%$ of full scale

(continued)

(Table 19, contd)

Resistive Configuration	
Description	Specification
Accuracy	$\pm 2\%$ of full scale resistance (± 9.6 ohm) excluding sensor error
Maximum Common Mode Voltage	± 2 V
Display Range	Configurable by PC software

Table 20

0 V to 10 V Configuration	
Description	Specification
Full Scale	0 V to 10 V
Over Range / Fail	11 V
Resolution	$\pm 1\%$ of full scale
Accuracy	$\pm 2\%$ of full scale voltage (± 0.2 V) excluding sensor error
Maximum Common Mode Voltage	± 2 V
Display Range	Configurable by PC software

Table 21

4 mA to 20 mA Configuration	
Description	Specification
Full Scale	0 mA to 20 mA
Over Range / Fail	22 mA
Resolution	1% of full scale
Accuracy	$\pm 2\%$ of full scale current (± 0.4 mA) excluding sensor error
Maximum Common Mode Voltage	± 2 V
Display Range	Configurable by PC software

Charge Fail Input

Charge Fail Input is a combined input and output. The terminal provides excitation current to charge the alternator field winding when the generator is required to run. Voltage of the terminal is close to the plant battery supply voltage when the charge alternator is correctly charging the battery.

In a failed charge situation, the voltage of the terminal drops down to low voltage. The drop in voltage triggers the "Charge Failure" alarm. The level at which the alarm operates and triggers a warning or shutdown alarm is configurable using Cat GCCP 1.2/ 1.3 Configuration Suite Software.

Table 22

Description	Specification
Minimum Voltage	0 V
Maximum Voltage	35 V
Resolution	0.2 V
Accuracy	$\pm 1\%$ of full scale
Excitation	Active circuit constant power output
Output Power	2.5 W nominal at 12 V and 24 V
Current at 12V	210 mA
Current at 24V	105 mA

Magnetic Pick-Up

Requirements for Magnetic Pickup devices (MPU devices) when used with Cat GCCP 1.2/1.3 control panel is given in Table 23 .

Table 23

Description	Specification
Type	Differential input
Minimum Voltage	0.5 V RMS
Maximum Voltage	60 V RMS
Max Common Mode Voltage	± 2 V peak
Minimum Frequency	5 Hz
Maximum Frequency	10,000 Hz
Resolution	6.25 rpm
Accuracy	± 25 rpm
Flywheel Teeth	10 to 500

Outputs

DC Outputs A and B (Fuel and Start)

Table 24

Description	Specification
Type	Normally used as Fuel and Start outputs. Fully configurable for other purposes if the module is configured to control an electronic engine, supplied from DC supply terminal 2.
Rating	10 A resistive for 10 seconds, 5 A resistance continuous at module supply

Configurable DC Inputs C, D, E, F, G, and H

Table 25

Description	Specification
Type	Fully configurable, supplied from DC supply terminal 2
Rating	2 A resistive at module supply

Communication Ports

Note: All communication ports can be used at the same time.

Table 26

Description	Specification
Universal Serial Bus port (USB port)	Type B USB 2.0 For connection to PC running Cat GCCP 1.2/1.3 Configuration Suite Software. Maximum distance is 5 m (16.4 ft)
RS485 Serial Ports	Isolated port Data connection 2 wire + common Half Duplex Data direction control for Transmit (by software protocol) Baud Rate 115.2 baud subject to configuration External termination required (120 ohm) Maximum common mode offset voltage is 56 V (on board protection transorb) Maximum distance 1.2 km (0.75 miles)
ECU Port	Engine Controller Area Network port (CAN port) standard implementation of slow mode up to 250 kbit/s Non-Isolated Internal termination enabled by software configuration provided that the (120 ohm) maximum distance is 40 m (131.2 ft).

(continued)

(Table 26, contd)

Description	Specification
Cat® (Expansion Comms) Port	Non-isolated Data connection 2 wire + common Half Duplex Data direction control for Transmit (by software protocol). Maximum Baud Rate of 115 kilo baud internal termination fitted (120 ohm) Max common mode offset ± 5 V maximum distance 1.2 km (0.75 miles)

Communication Port Usage

USB Slave Port (PC Configuration)

Note: DC supply must be connected to the module for PC configuration.

A USB port is provided to give a simple means of connection between a PC and the controller. The operator can perform the following actions using Cat GCCP 1.2/1.3 Configuration Suite Software:

- Control the module
- Start or stop the engine
- Select operating modes
- Activate various other functions

Various operating parameters such as coolant temperature and oil pressure, of the engine are available to be viewed or changed.



Illustration 5
Cat GCCP 1.2/1.3 Control Panel

g06528633



Illustration 6
Cat Configuration Suite PC Software



Illustration 7
USB Cable Type A to Type B

Items shown in Illustrations 5, 6, and 7 are required to connect the module to the PC using a USB. The cable shown in Illustration 7 is the same cable often used to connect a PC to a printer.

RS485 Port

Note: For a single module for PC connection and distances up to 6 m (19.7 ft), USB connection method is more suitable and lower-cost alternative to RS485. RS485 cable is more suited for longer distance connections.

RS485 port on the controller supports MODBUS Remote Terminal Unit protocol (RTU protocol) and connects to a single MODBUS master device only.

Cat GCCP 1.2/1.3 MODBUS register table for the controller is available upon request from the authorized Cat Dealer.

RS485 is used for point-to-point cable connection of more than one device (maximum 32 devices), and for connections to PCs, PLCs, and Building Management Systems.

The long-distance specification (1.2 km (0.75 miles)) of RS485 interface is an advantage when using BELDEN 9841 (or equivalent) cable. The long-distance specification allows large distance between the module and a PC running Cat GCCP 1.2/1.3 Configuration Suite software.

Note: BELDEN is a trademark owned by BELDEN INC.

The operator can control the module, starting, or stopping the engine, selecting operating modes, and so on. The various operating parameters such as coolant temperature and oil pressure of the remote engine can be viewed or changed.

Many PCs may not have an internal RS485 serial port. Caterpillar DOES NOT recommend the use of USB for RS485 converters but does recommend PC add-ons add an RS485 port to the computer.

Cable Specification

Note: Cat GCCP 1.2/1.3 utilizes BELDEN 9841 (or equivalent) cable for RS485 communication. The cable is rated to a maximum length of 1.2 km (0.75 miles).

Table 27

Description	Specification
Cable Type	Two core screened and shielded twisted pair
Cable Characteristics	120 ohm impedance Low capacitance
Recommended Cable	BELDEN 9841 BELDEN 9271
Maximum Cable Length	1.2 km (0.75 miles) when using BELDEN 9841 or direct equivalent 600 m (656.4 yd) when using BELDEN 9271 or direct equivalent
RS485 Topology	"Daisy Chain" bus with no stubs (spurs).
RS485 Termination	120 ohm Not fitted internally to module Must be fitted externally to the "first" and "last" device on RS485 link.

RS485 Used for MODBUS Engine Connection

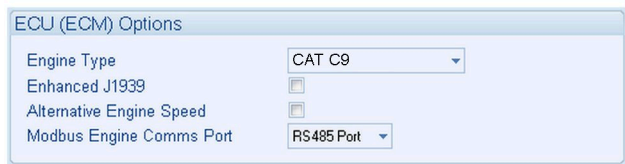


Illustration 8 g06528694
RS485

The RS485 port can be configured for connection to units that are equipped with MODBUS capable controllers. The connection leaves DSENet interface free for connection to expansion devices.

Note: DSENet is a trademark of Deep Sea Electronics Inc.

Note: RS485 interface is no longer an available connection for remote monitoring equipment (Building Management System, PLC, or PC RS232 port), or dual mutual system.

An example of configuring DSENet for connection to Genset using Cat GCCP 1.2/1.3 Configuration Suite Software is shown in Illustration 8.

Electronic Control Unit Port (ECU Port) (SAE J1939)

Note: A screened 120 ohm impedance cable specified for use with CAN must be used for CAN link. Cat GCCP 1.2/1.3 utilizes BELDEN 9841 (or equivalent) cable for RS485 communication. The cable is rated to a maximum length of 1.2 km (0.75 miles).

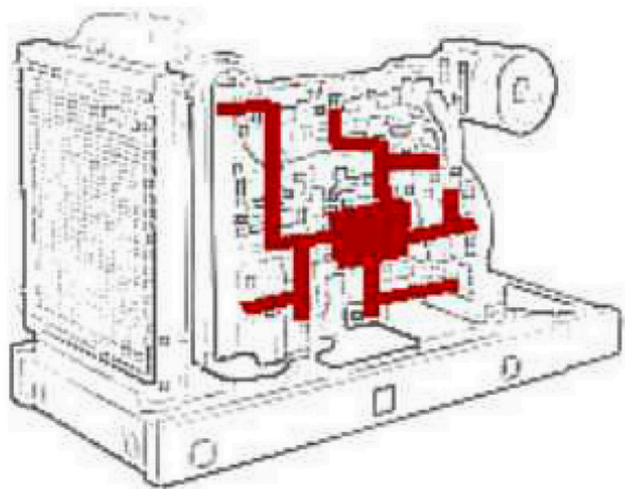


Illustration 9 g06528709
Engine

Modules are fitted with CAN interface as standard and receives engine data from engine ECU or Electronic Control Modules (ECMs) compliant with CAN SAE J1939 standard.

ECU or ECMs monitor operating parameters of engine such as speed, oil pressure, coolant temperature, to monitor closely and control the engine.

Industry standard communications interface (CAN) transports data gathered by ECU or ECM of the engine using SAE J1939 protocol. The data transport allows Cat GCCP 1.2/1.3 control panel to access the engine parameters without any physical connection to the sensor device.

The ECU port is used for point-to-point cable connection of more than one device and connections to CAN scanner, PLC, and CAN controllers and so on. The operator can now view the various operating parameters of the engine.

SAE J1939-75

Note: Refer to Section "CAN Interface Specification (SAE J1939-75)" for further details of CAN communication.

When SAE J1939-75 is enabled in the module configuration, the module AC measurements and alarms configuration are sent to the CAN bus using the ECU port. The AC measurements and alarms configuration are received through an external monitoring device.



Illustration 10 g06528716
SAE J1939-75

There are two check boxes to enable each of the two parts of the interface, AC measurement and AC-related alarms. Refer to Illustration 10 for the two options. The module AC alarms are translated into SAE J1939 Diagnostic Messages 1 (DM1). No additional display screens are visible on the module when the options are selected.

The default CAN source address for additional SAE J1939-75 messages is 44. The address can be changed by the generator supplier.

Cat[®] Expansion Modules

Note: Controller must be the first unit on the DSENet link as a termination resistor is internally fitted to the controller. The resistor must be fitted to the last unit on the DSENet link. Refer to Section “Typical Arrangement of DSENet, and DSENet” for connection details.

Note: Caterpillar recommends utilizing BELDEN 9841 (or equivalent) cable for DSENet communication. The cable is rated to a maximum length of 1.2 km (0.75 miles).

DSENet is the interconnection cable between the host controller and the expansion modules.

Do not connect interconnection cable to any device other than Cat equipment designed for connection to DSENet.

Table 28

Description	Specification
Cable Type	Two core screened and shielded twisted pair
Cable Characteristics	120 ohm impedance Low capacitance
Recommended Cable	BELDEN 9841 BELDEN 9271
Maximum Cable Length	1.2 km (0.75 miles) when using BELDEN 9841 or direct equivalent. 600 m (656.4 yd) when using BELDEN 9271 or direct equivalent.
DSENet Topology	“Daisy Chain” bus with no stubs (spurs).
DSENet Termination	120 ohm Fitted internally to the host controller. Must be fitted externally to the last expansion module.
Maximum Expansion Modules	Total 20 devices can make up the DSENet. Maximum 32 additional 0-10 V or 4-20 mA outputs Maximum 80 additional relay outputs Maximum 80 additional Light Emitting Diode indicators (LED indicators) Maximum 24 additional Resistance Temperature Device (RTD) or thermocouple inputs Maximum 4 Cat GCCP Battery Chargers

Note: Only supported Cat GCCP Intelligent Battery Chargers can be connected to DSENet. Contact the authorized Caterpillar Dealer for further information.

The following are the possibilities that are given by maximum expansion modules:

- 32 additional 0-10 V or 4-20 mA outputs
- 80 additional relay outputs

- 80 additional LED indicators
- 24 additional RTD or thermocouple inputs
- 4 Cat GCCP Battery Chargers

DSENet Used for MODBUS Engine Connection

The DSENet uses an RS485 hardware interface. This port can be configured for connection to units that are equipped with MODBUS capable controllers. The configuration leaves the RS485 interface free for connection to remote monitoring equipment (Building Management System, PLC, or PC RS485).

Note: The DSENet interface will not be available for connection to expansion devices, when the port is configured for connection for use with MODBUS capable controllers.

Illustration 11

g06529025

An example of configuring the DSENet for connection to a Genset using Cat GCCP 1.2/1.3 Configuration Suite Software is shown in Illustration 11.

Adding an External Sounder

Outputs (DC Supply Out)

	Source	Polarity
Output C	Close Gen Output ▼	Energise ▼
Output D	Close Mains Output ▼	De-Energise ▼
Output E	Common Warning ▼	Energise ▼
Output F	Common Electrical Trip ▼	Energise ▼
Output G	Common Shutdown ▼	Energise ▼
Output H	Audible Alarm ▼	Energise ▼

Illustration 12
Audible Alarm

g06529033

Digital Inputs A - C

Digital Input A

Function	Alarm Mute ▼
Polarity	Close to Activate ▼
Action	▼
Arming	▼
LCD Display	Digital Input A
Activation Delay 0s	0

Illustration 13
Alarm Mute

g06529034

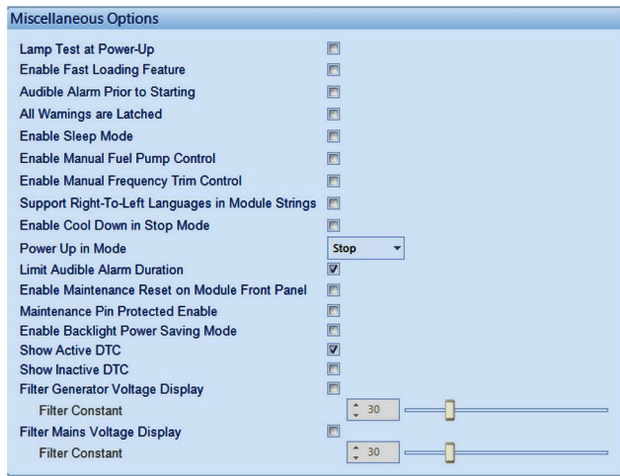


Illustration 14 g06538583
Miscellaneous Options

Cat GCCP 1.2/1.3 does not have an internal sounder. Hence an external alarm or indicator is required.

An external alarm or indicator can be utilized by the following means:

- Using Cat GCCP 1.2/1.3 Configuration Suite PC software to configure an auxiliary output for “Audible Alarm”
- Configuring an auxiliary input for “Alarm Mute”

The “Audible Alarm” output deactivates when the Alarm Mute input activates or after “Audible Alarm Duration” time ceases.

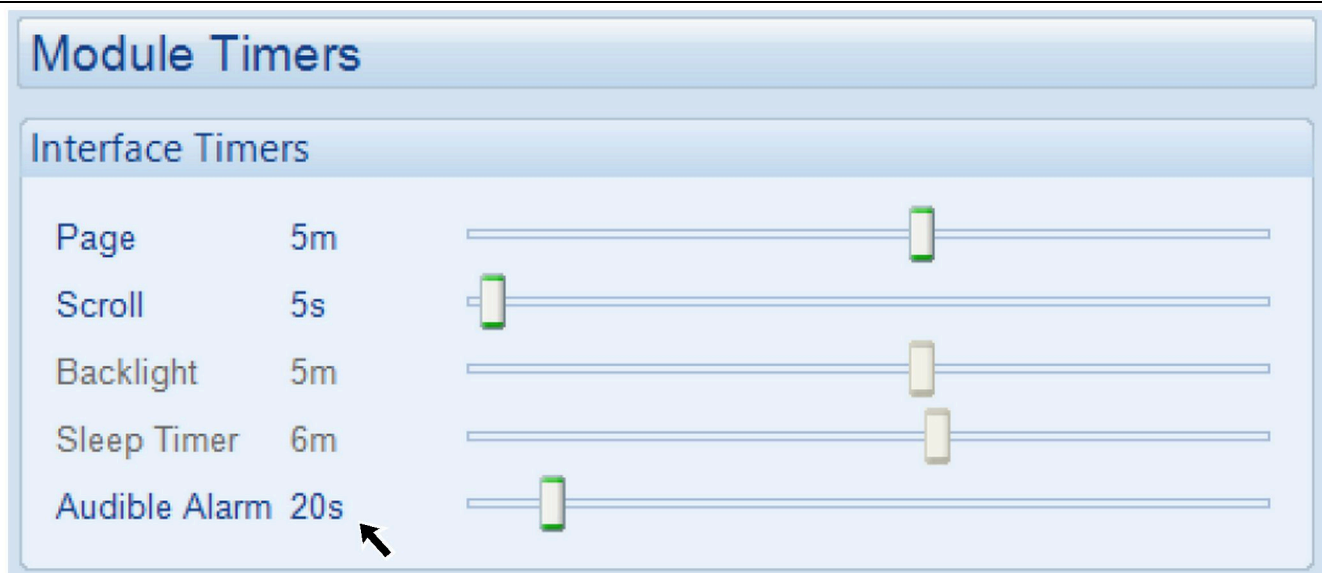


Illustration 15 g06529041
Module Timers

An example of configuration to achieve external sounder with external alarm mute/lamp test button or an automatic mute after 20 seconds is shown in Illustration 15.

Accumulated Instrumentation

Note: When an accumulated instrumentation value exceeds the maximum number, the value is reset and begins counting from zero again.

The amount of logged “Engine Hours” and “Number of Starts” can be set or reset using Cat GCCP 1.2/1.3 Configuration Suite PC Software.

The options may be locked with a PIN by Caterpillar depending upon the module configuration.

Table 29

Description	Specification
Engine Hours Run	Maximum 99999 hours 59 minutes (approximately 11 years 4 months)
Number of Starts	1000000 (1 Million)
Accumulated Power	999999 kWh / kVARh / kVAh

Dimensions and Mounting

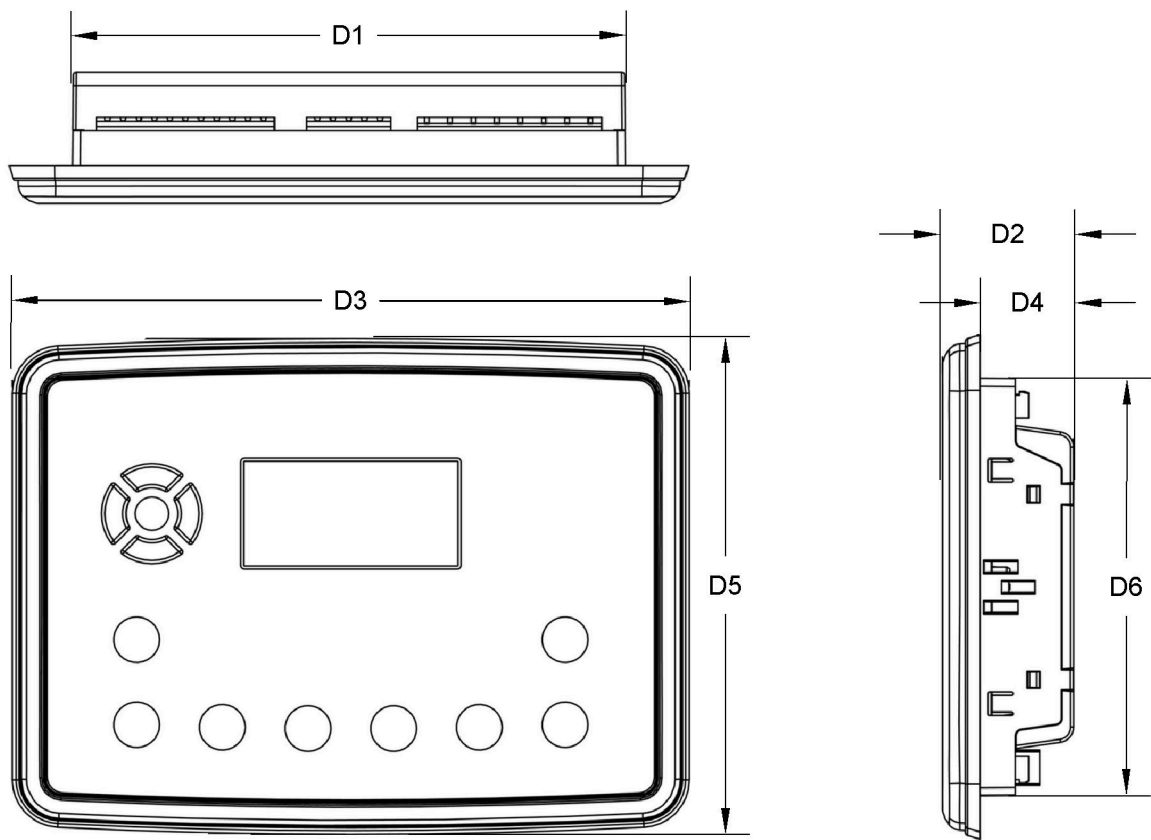


Illustration 16 g06529054

Dimensions of Module

(D1) 184 mm (7.2 inch)	(D3) 221 mm (8.7 inch)	(D5) 163 mm (6.4 inch)
(D2) 42.5 mm (1.67 inch)	(D4) 31 mm (1.2 inch)	(D6) 137 mm (5.4 inch)

Dimensions

The dimensions of the module are 245 mm (9.6 inch) x 184 mm (7.2 inch) x 51 mm (2.0 inch).

Panel Cutout

The dimensions of panel cutout of the module are 220 mm (8.7 inch) x 160 mm (6.3 inch).

Module Weight

The weight of the module is 0.98 kg (2.161 lb).

Fixing Clips

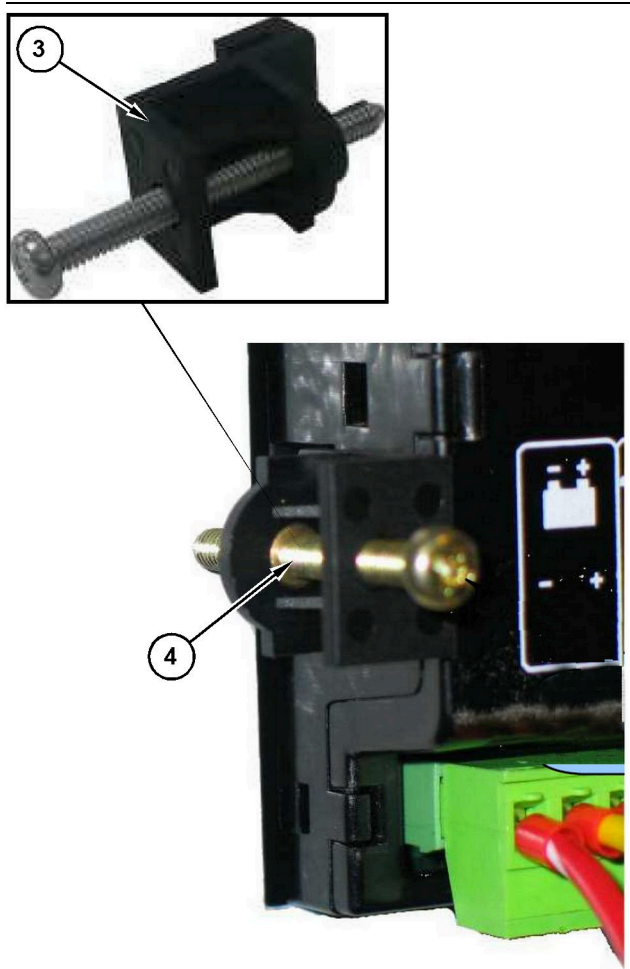


Illustration 17 g06529072

Location of Fixing Clips on the Module

- (3) Fixing Clip
- (4) Fixing Clip Screw

The module is held into the panel fascia using the supplied fixing clip (3). Follow the below procedure to fix the module:

1. Withdraw fixing clip screw (4) (turn counterclockwise) until only the pointed end protrudes from fixing clip (3).
2. Insert the three prongs of fixing clip (3) into the slots at the side of the module case.
3. Pull fixing clip (3) backwards (towards the back of the module) ensuring all the three prongs of the clip are inside the allotted slots.
4. Turn fixing clip screws (4) in clockwise direction until the screws reach the panel fascia.
5. Turn the screw a quarter of a turn to secure the module into the panel fascia.

Note: Do not overtighten fixing clip screws (4).

Cable Tie Fixing Points

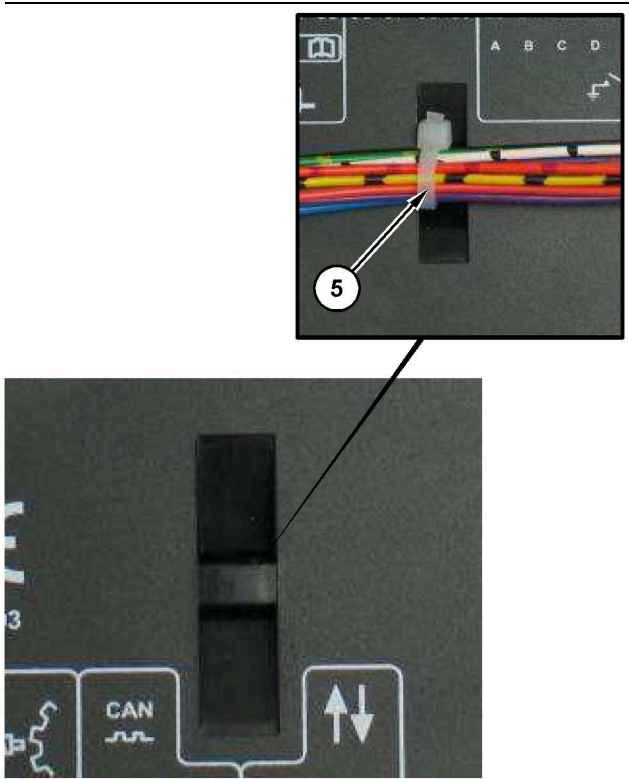


Illustration 18 g06763392

Location of Fixing Clips on the Module

- (5) Cable Tie

Cable tie (5) fixing points are included at the rear side of the module case to aid wiring.

Including the fixing points at the rear side relieves strain to the cable loom by removing the weight of the loom from the screw connectors. This action reduces the chance of future connection failures.

Do not overtighten cable tie (5) (for instance with cable tie tools). Overtightening might damage the module case.

Applicable Standards

Table 30

Standard	Description
BS EN 60068-2-1 (Minimum temperature)	-30° C (-22° F)
BS EN 60068-2-2 (Maximum temperature)	70° C (158° F)
BS EN 60068-2-6 (Vibration)	Ten sweeps in each of three major axes 5 Hz to 8 Hz at ± 7.5 mm (0.30 inch) 8 Hz to 500 Hz at g _n

(continued)

(Table 30, contd)

Standard	Description
BS EN 60068-2-27 (Shock)	Three shocks in each of three major axes 15 g _n in ms.
BS EN 60068-2-30 (Damp heat cyclic)	20° C (68° F) to 55° C (131° F) at 95% for 48 hours
BS EN 60068-2-78 (Damp heat static)	40° C (104° F) at 95% for 48 hours
BS EN 60950 (Electrical safety)	Safety of information technology equipment, including electrical business equipment.
BS EN 61000-6-2 (Electromagnetic Compatibility)	Electromagnetic Compatibility (EMC) Generic Immunity Standard (Industrial).
BS EN 61000-6-4 (Electromagnetic Compatibility)	EMC Generic Emission Standard (Industrial).
BS EN 60529 (Degrees of protection provided by enclosures)	IP42 (front of the module when installed into the control panel WITHOUT being sealed to the panel).

(continued)

(Table 30, contd)

Standard	Description
UL 508, National Electrical Manufacturers Association (NEMA) rating (approximate)	2 (front of the module when installed into the control panel WITHOUT being sealed to the panel).
IEEE C37.2 (Standard Electrical Power System Device Function Numbers and Contact Designations)	Under the scope of IEEE 37.2, function numbers can also be used to represent functions in microprocessor devices and software programs. Device number of the controller is 11L-8000 (multifunction device protecting Line (generator) - module). As the module is configurable for "IEEE C37.2" by the generator Original Equipment Manufacturer (OEM), functions covered by the module may vary. Depending on the module configuration, the device numbers included within the module could be as given below: 2- Time delay starting or closing relay 3- Checking or interlocking relay 5- Stopping device 8- Control power disconnecting device 10- Unit sequence switch 11- Multifunction device 12- Overspeed device 14- Underspeed device 49- Machine or transformer thermal relay 50- Instantaneous overcurrent relay 51- AC time overcurrent relay 52- AC circuit breaker 53- AC circuit breaker 54- Turning gear engaging relay 55- Power factor relay (using internal PLC editor) 59AC- AC overvoltage relay 59DC- DC overvoltage relay 62- Time delay stopping or opening relay 63- Pressure switch

(continued)

(Table 30, contd)

Standard	Description
	71- Level switch
	74- Alarm relay
	78- Phase angle measuring relay
	79- Reclosing relay (using internal PLC editor)
	81- Frequency relay
	83- Automatic selective control or transfer relay
	86- Lockout relay

Enclosure Classifications

IP Classifications

Module specification under BS EN 60529 degrees of protection provided by enclosures.

Note: IP42 (front of the module when module is installed into the control panel WITHOUT being sealed to the panel).

Table 31

First Digit	Second Digit
Protection Against Contact and Ingress of Solid Objects	Protection Against Ingress of Water
0 - No protection	0 - No protection
1 - Protection against ingress solid objects with a diameter of more than 50 mm (2.0 inch). No protection against deliberate access. For example, with a hand, but large surfaces of the body are prevented from approach.	1 - Protection against dripping water falling vertically. No harmful effect must be produced (vertically falling drops).
2 - Protection against penetration of solid objects with a diameter of more than 12 mm (0.5 inch). Fingers or similar objects prevented from approach.	2 - Protection against dripping water falling vertically. There must be no harmful effect when the equipment (enclosure) is tilted up to 15 degrees from the normal position (drops falling at an angle).
3 - Protection against ingress of solid objects with a diameter of more than 2.5 mm (0.10 inch). Tool wires and so on, with a thickness of more than 2.5 mm (0.10 inch) are prevented from approach.	3 - Protection against water falling at any angle up to 60 degrees from the vertical. There must be no harmful effect (spray water).
4 - Protection against ingress of solid objects with a diameter of more than 1.0 mm (0.04 inch). Tools, wires, and so on, with a thickness of more than 1.0 mm (0.04 inch) are prevented from approach.	4 - Protection against water splash against the equipment (enclosure) from any direction. There must be no harmful effect (splashing water).
5 - Protection against harmful dust deposits. Ingress of dust is not prevented completely, but the dust must not enter in sufficient quantity to interfere with satisfactory operation of the equipment. Complete protection against contact.	5 - Protection against water projected from a nozzle against the equipment (enclosure) from any direction. There must be no harmful effect (water jet).
6 - Protection against ingress of dust (dust-tight). Complete protection against contact.	6 - Protection against heavy seas or powerful water jets. Water must not enter the equipment (enclosure) in harmful quantities (splashing over).

NEMA Classification

Note: There is no direct equivalence between Internet Protocol (IP) / NEMA ratings (National Electrical Manufacturers Association ratings). IP figures shown are only approximate.

2 – Front of the module when module is installed into the control panel WITHOUT being sealed to the panel.

NEMA ratings are given the Table 32 :

Table 32

Rating	Description
1 IP30	Provides protection contact with the enclosure equipment and against dirt falling.
2 IP31	Provides protection against limited amounts of falling water and dirt.
3 IP64	Provides protection against windblown dust, rain, and sleet. Undamaged by the formation of ice on the enclosure.
3R IP32	Provides protection against rain and sleet. Undamaged by the formation of ice on the enclosure.
4 (X) IP66	Provides protection against splashing water, wind-blown dust, and rain, hose directed water. Undamaged by the formation of ice on the enclosure. (resist corrosion).
12/12K IP65	Provides protection against dust, falling dirt, and dripping non-corrosive liquids.
13 IP65	Provides protection against dust and spraying of water, oil, and non-corrosive coolants.

Installation Procedure

The module is mounted on the panel fascia. For dimensions and mounting details, refer to Section "Dimensions and Mounting".

User Connections

Note: Availability of some terminals depends upon the module version.

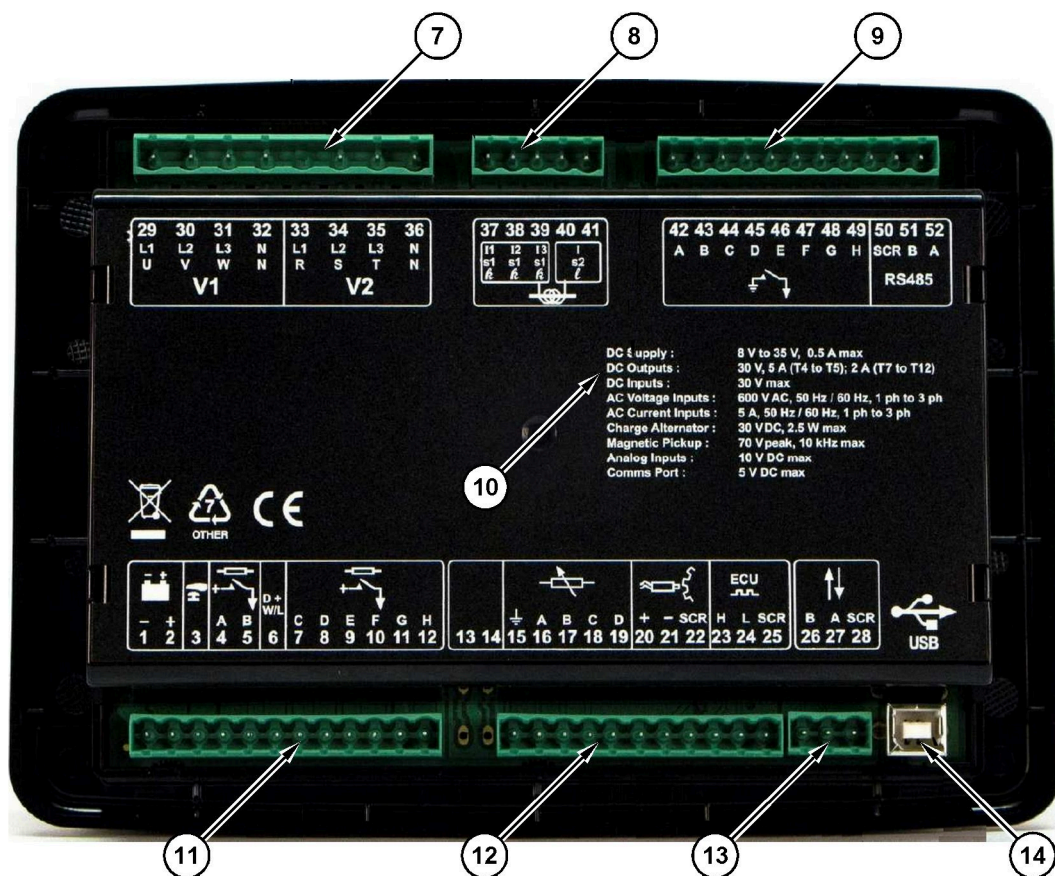


Illustration 19

g06529211

Icons on Rear Side of the Module

- (7) Terminals 29 to 36
- (8) Terminals 37 to 41
- (9) Terminals 50 to 52

- (10) UL Ratings
- (11) Terminals 1 to 12
- (12) Terminals 15 to 25

- (13) Terminals 26 to 28
- (14) USB Port

To aid user connection, icons are used on the rear of the module to help identify terminal functions. An example is shown in Illustration 19.

Connection Description

DC Supply, E-Stop Input, DC Outputs, and Charge Fail Input

Note: “Fuel” and “Start” output requirements may be different when the module is configured for operation with an electronic engine. Refer to the appropriate electrical schematic of the Engine.

Table 33

Pin	Description	Cable Size	Notes
1	DC Plant Supply Input (Negative)	AWG 13 (2.5 mm ² (0.09 inch))	Connect to ground where applicable.
2	DC Plant Supply Input (Positive)	AWG 13 (2.5 mm ² (0.09 inch))	Supplies the module and DC Outputs C, D, E, F, G & H
3	Emergency Stop Input	AWG 13 (2.5 mm ² (0.09 inch))	Plant Supply Positive. Supplies DC Outputs A & B.

(continued)

(Table 33, contd)

Pin	Description	Cable Size	Notes
4	DC Output A (FUEL)	AWG 13 (2.5 mm ² (0.09 inch))	Plant Supply Positive from terminal 3. 5 A DC rated Fixed as fuel relay if electronic engine is not configured.
5	DC Output B (START)	AWG 13 (2.5 mm ² (0.09 inch))	Plant Supply Positive from terminal 3. 5 A DC rated Fixed as start relay if electronic engine is not configured.
6	Charge Fail / Excite	AWG 13 (2.5 mm ² (0.09 inch))	Do not connect to ground (battery negative). If charge alternator is not fitted, leave this terminal disconnected.
7	DC Output C	AWG 18 (2.5 mm ² (0.09 inch))	Plant Supply Positive from terminal 2. 2 A DC rated.
8	DC Output D	AWG 18 (2.5 mm ² (0.09 inch))	Plant Supply Positive from terminal 2. 2 A DC rated.
9	DC Output E	AWG 18 (2.5 mm ² (0.09 inch))	Plant Supply Positive from terminal 2. 2 A DC rated.
10	DC Output F	AWG 18 (2.5 mm ² (0.09 inch))	Plant Supply Positive from terminal 2. 2 A DC rated.
11	DC Output G	AWG 18 (2.5 mm ² (0.09 inch))	Plant Supply Positive from terminal 2. 2 A DC rated.
12	DC Output H	AWG 18 (2.5 mm ² (0.09 inch))	Plant Supply Positive from terminal 2. 2 A DC rated.

Analogue Sensor Inputs, MPU, and ECU

Note: Terminal 15 (sensor common) MUST be connected to the Earth point on the “Engine Block” and not within the control panel. The terminal must provide an electrical connection to the sensor bodies. The connection MUST NOT be used to provide an Earth connection for other terminals or devices. Run a separate Earth connection from the system Earth star point to terminal 15 directly, to avoid using the Earthing point for other connections.

Note: Ensure not to insulate the entire thread while using PTFE insulating tape on the sensor thread when using Earth return sensors. Insulating the entire thread prevents the sensor body from being Earthed via the engine block.

Note: A screened 120 ohm impedance cable specified for use with CAN must be used for the CAN ECU links. Caterpillar recommends utilizing BELDEN 9841 (or equivalent) cable for RS485 communication. The cable must be rated to a maximum length of 1.2 km (0.75 miles).

Note: For further details on connection to electric engines, refer to the appropriate electrical schematic of the Engine.

Table 34

Pin	Description	Cable Size	Notes
15	Sensor Common Return	AWG 20 (0.5 mm ² (0.01 inch))	Ground Return Feed For Sensors
16	Analogue Sensor Input A	AWG 20 (0.5 mm ² (0.01 inch))	Connect To Oil Pressure Sensor
17	Analogue Sensor Input B	AWG 20 (0.5 mm ² (0.01 inch))	Connect To Coolant Temperature Sensor
18	Analogue Sensor Input C	AWG 20 (0.5 mm ² (0.01 inch))	Connect To Fuel Level Sensor
19	Analogue Sensor Input D	AWG 20 (0.5 mm ² (0.01 inch))	Connect To Extra Sensor (User Configurable)
20	Magnetic Pickup Positive	AWG 20 (0.5 mm ² (0.01 inch))	Connect To Magnetic Pickup Device
21	Magnetic Pickup Negative	AWG 20 (0.5 mm ² (0.01 inch))	Connect To Magnetic Pickup Device
22	Magnetic Pickup Screen	Shield	Connect To Ground At One End Only
23	CAN Port H	AWG 20 (0.5 mm ² (0.01 inch))	Use only 120 ohm CAN or RS485 approved cable
24	CAN Port L	AWG 20 (0.5 mm ² (0.01 inch))	Use only 120 ohm CAN or RS485 approved cable
25	CAN Port Screen	Shield	Use only 120 ohm CAN or RS485 approved cable

DSE Net

Note: The controller must be the first unit on the DSENet link, as a termination resistor is internally fitted to the controller. The termination **MUST** be fitted to the last unit on the DSENet link.

Table 35

Pin Number	Description	Cable Size	Notes
26	DSENet Expansion B	AWG 20 (0.5 mm ² (0.01 inch))	Use only 120 ohm CAN or RS485 approved cable
27	DSENet Expansion A	AWG 20 (0.5 mm ² (0.01 inch))	Use only 120 ohm CAN or RS485 approved cable
28	DSENet Expansion Screen	Shield	Use only 120 ohm CAN or RS485 approved cable

V1 (Generator), V2 (Mains) Voltage, and Frequency Sensing

Table 36

Pin No	Description	Cable Size	Notes
29	Generator L1 (U) Voltage Sensing	AWG 18 (1.0 mm ² (0.03 inch))	Connect to generator L1 (U) output (AC) (recommend 2 A fuse)
30	Generator L2 (V) Voltage Sensing	AWG 18 (1.0 mm ² (0.03 inch))	Connect to generator L2 (V) output (AC) (recommend 2 A fuse)
31	Generator L3 (W) Voltage Sensing	AWG 18 (1.0 mm ² (0.03 inch))	Connect to generator L3 (W) output (AC) (recommend 2 A fuse)
32	Generator Neutral (N) Input	AWG 18 (1.0 mm ² (0.03 inch))	Connect to generator Neutral terminal (AC)
33	Bus L1 (R) Voltage Sensing	AWG 18 (1.0 mm ² (0.03 inch))	Connect to Bus L1 (R) output (AC) (recommend 2 A fuse)
34	Bus L2 (S) Voltage Sensing	AWG 18 (1.0 mm ² (0.03 inch))	Connect to Bus L2 (S) output (AC) (recommend 2 A fuse)

(continued)

(Table 36, contd)

Pin No	Description	Cable Size	Notes
35	Bus L3 (T) Voltage Sensing	AWG 18 (1.0 mm ² (0.03 inch))	Connect to Bus L3 (T) output (AC) (recommend 2 A fuse)
36	Bus Neutral (N) Input	AWG 18 (1.0 mm ² (0.03 inch))	Connect to Bus Neutral terminal (AC)

Note: Connection to a three phase, four wire alternator is described in Table 36 .

Note: Terminals 33 to 36 (V2) are not fitted to Cat GCCP 1.2/1.3.

Current Transformers

Note: The module has a VA burden of 0.25 VA on the CT. Ensure that the CT is rated for the burden of the controller, the cable length being used, and any other equipment sharing the CT. Consult with the CT supplier for any queries.

Table 37

Pin No	Description	Cable Size	Notes
37	CT Secondary for L1	AWG 13 (2.5 mm ² (0.09843 inch))	Connect to s1 secondary of L1 monitoring CT
38	CT Secondary for L2	AWG 13 (2.5 mm ² (0.09843 inch))	Connect to s1 secondary of L2 monitoring CT
39	CT Secondary for L3	AWG 13 (2.5 mm ² (0.09843 inch))	Connect to s1 secondary of L3 monitoring CT
40	CT Common	AWG 13 (2.5 mm ² (0.09843 inch))	Connect to s2 secondary of L1, L2 & L3 monitoring CTs and ground

Note: Ensure correct polarity of the CT primary as shown in Table 37 . Consult with the CT supplier for doubts.

CT Connections

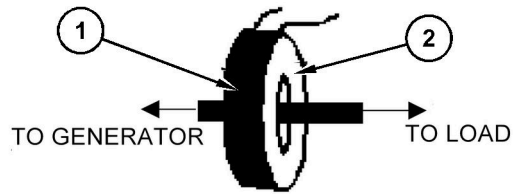


Illustration 20

g06528538

CT Connections

- (1) Side facing Generator (Labeled as p1, k, or K)
 (2) Side facing Load (Labeled as p2, l, or L)

Side facing Generator (labeled as p1, k, or K) (1) is the primary of the CT that points towards the Generator.

Side facing Load (labeled as p2, l, or L) (2) is the primary of the CT that points towards the Load.

s1 is the secondary of the CT that connects to the input for CT measuring of Cat GCCP 1.2/1.3 control panel.

s2 is the secondary of the CT that should be connected with s2 connections of all the other CTs. s2 is connected to the CT common terminal of the module.

Digital Inputs and RS485 Port

Table 38

Pin No	Description	Cable Size	Notes
42	Configurable Digital Input A	AWG 20 (0.5 mm ² (0.01 inch))	Switch To Negative
43	Configurable Digital Input B	AWG 20 (0.5 mm ² (0.01 inch))	Switch To Negative
44	Configurable Digital Input C	AWG 20 (0.5 mm ² (0.01 inch))	Switch To Negative
45	Configurable Digital Input D	AWG 20 (0.5 mm ² (0.01 inch))	Switch To Negative
46	Configurable Digital Input E	AWG 20 (0.5 mm ² (0.01 inch))	Switch To Negative
47	Configurable Digital Input F	AWG 20 (0.5 mm ² (0.01 inch))	Switch To Negative
48	Configurable Digital Input G	AWG 20 (0.5 mm ² (0.01 inch))	Switch To Negative

(continued)

(Table 38, contd)

Pin No	Description	Cable Size	Notes
49	Configurable Digital Input H	AWG 20 (0.5 mm ² (0.01 inch))	Switch To Negative
50	RS485 Port Screen	Shield	Use only 120 ohm CAN or RS485 approved cable
51	RS485 Port B (+)	AWG 20 (0.5 mm ² (0.01 inch))	Connect to RXD+ and TXD+ Use only 120 ohm CAN or RS485 approved cable
52	RS485 Port A (-)	AWG 20 (0.5 mm ² (0.01 inch))	Connect to RXD- and TXD- Use only 120 ohm CAN or RS485 approved cable

Note: Fit a 120 ohm termination resistor across terminals A and B if Cat GCCP 1.2/1.3 control panel is the first or last device on R485 link.

Note: Screened 120 ohm impedance cable specified for use with CAN must be used for CAN ECU link. Caterpillar recommends utilizing BELDEN 9841 (or equivalent) cable for RS485 communication. The cable is rated to a maximum length of 1.2 km (0.75 miles). Refer to Table 38 for cable sizes.

USB Slave (PC Configuration) Connector



Illustration 21

g06529177

Socket for Connection to PC with Cat GCCP 1.2/1.3 Configuration Software



Illustration 22

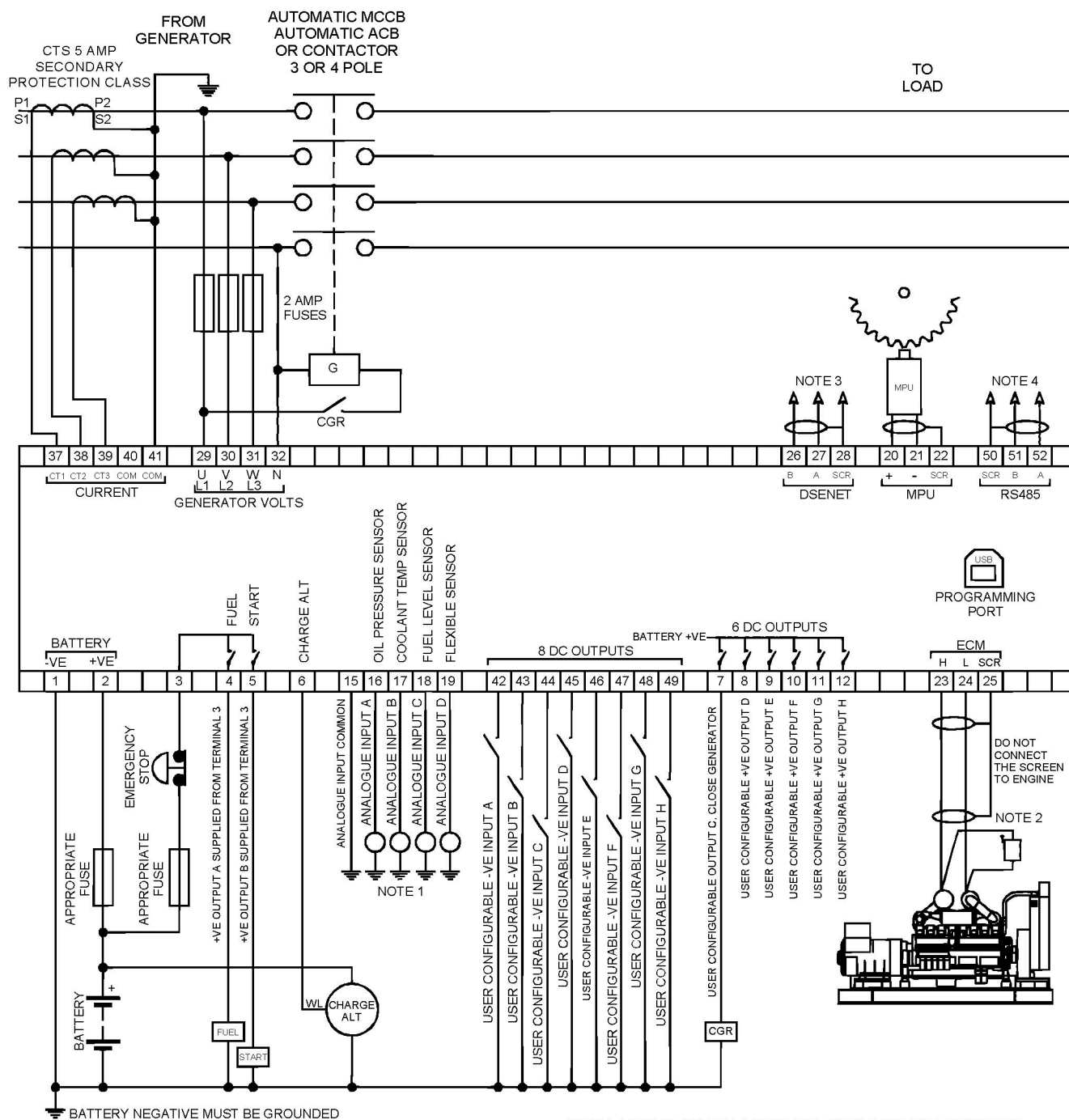
g06528634

USB Type A to Type B Connector

Note: USB connection cable between the PC and the module must not be extended beyond 5 m (16.4 ft). For distances over 5 m (16.4 ft), there is a possibility of using a third-party USB extender. The USB can be extended up to 50 m (164.0 ft).

Note: Do not overload the USB system of the PCs by connecting more than the recommended number of USB devices to the PC. Consult the PC supplier for further information.

Cat GCCP 1.2 Three Phase Four Wire



NOTE 1. THESE GROUND CONNECTIONS MUST BE ON THE ENGINE BLOCK, AND MUST BE TO THE SENSOR BODIES.

†NOTE 2. 120 Ω TERMINATING RESISTOR MAY BE REQUIRED EXTERNALLY, SEE ENGINE MANUFACTURERS LITERATURE.

NOTE 3. MUST BE FITTED AS FIRST OR LAST UNIT ON DSENET WITH NO TERMINATION RESISTOR. THE SUBSEQUENT FIRST OR LAST UNIT ON DSENET MUST BE FITTED WITH A 120 OHM TERMINATION RESISTOR ACROSS TERMINALS A AND B.

NOTE 4. IF THE MODULE IS FIRST OR LAST UNIT ON THE LINK, IT MUST BE FITTED WITH A 120 OHM TERMINATION RESISTOR ACROSS TERMINALS A AND B.

Illustration 23

q06548182

Typical Wiring Diagram of Cat GCCP 1.2 Three Phase, Four Wire

Note 1 – Ground connections must be on the engine block and must be to the sensor bodies.

Note 2 – 120 ohm terminating resistor may be required externally.

Note 3 – Must be fitted as the first or the last unit on DSENet with no termination resistor. The subsequent first or last unit on DSENet must be fitted with a 120 ohm termination resistor across terminals A and B.

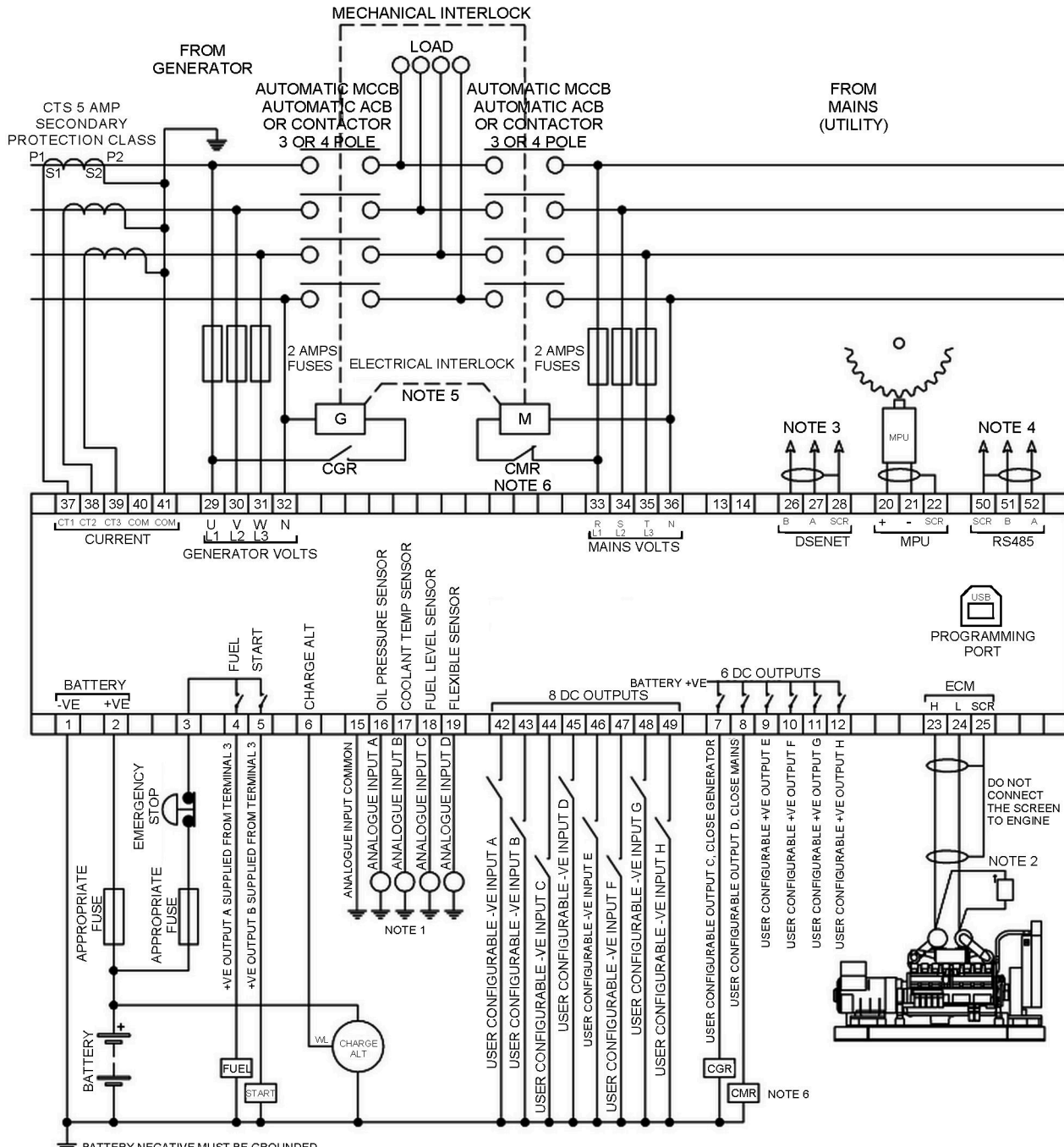
Note 4 – The module is first or last unit on the link. The module must be fitted with a 120 ohm termination resistor across terminals A and B.

A typical three phase four wire system is shown in Illustration 23. As every system has different requirements, the Illustration 23 does not intend to show a complete system. Contact the authorized Cat Dealer for further information.

Illustration 23 is applicable for the following AC topologies:

- Three Phase four Wire Star
- Three Phase four Wire Delta L1-N-L2
- Three Phase four Wire Delta L1-N-L3
- Three Phase four Wire Delta L2-N-L3

Cat GCCP 1.3 Three Phase Four Wire



BATTERY NEGATIVE MUST BE GROUNDED

NOTE 1. THESE GROUND CONNECTIONS MUST BE ON THE ENGINE BLOCK, AND MUST BE TO THE SENSOR BODIES.

NOTE 2. 120 R TERMINATING RESISTOR MAY BE REQUIRED EXTERNALLY, SEE ENGINE MANUFACTURERS LITERATURE.

NOTE 3. MUST BE FITTED AS FIRST OR LAST UNIT ON DSENET WITH NO TERMINATION RESISTOR. THE SUBSEQUENT FIRST OR LAST UNIT ON DSENET MUST BE FITTED WITH A 120 OHM TERMINATION RESISTOR ACROSS TERMINALS A AND B.

NOTE 4. IF THE MODULE IS FIRST OR LAST UNIT ON THE LINK, IT MUST BE FITTED WITH A 120 OHM TERMINATION RESISTOR ACROSS TERMINALS A AND B.

NOTE 5. IT IS RECOMMENDED THAT THE GENERATOR AND MAINS SWITCHGEAR ARE MECHANICALLY AND ELECTRICALLY INTERLOCKED.

NOTE 6. CLOSE MAINS OUTPUT SHOULD BE CONFIGURED FOR CLOSE MAINS WITH A POLARITY OF DE-ENERGISE, AND THE NORMALLY CLOSED CONTACTS OF MCCR USED TO DRIVE THE SWITCHGEAR.

Illustration 24

g06610176

Cat GCCP 1.3 Three Phase, Four Wire

Note 1 – Ground connections must be on the engine block and must be to the sensor bodies.

Note 2 – 120 ohm terminating resistor may be required externally.

Note 3 – Must be fitted as the first or the last unit on DSENet with no termination resistor. The subsequent first or last unit on DSENet must be fitted with a 120 ohm termination resistor across terminals A and B.

Note 4 – The module is first or last unit on the link. The module must be fitted with a 120 ohm termination resistor across terminals A and B.

Note 5 – Recommended to mechanically and electrically interlock generator and switchgear.

Note 6 – Close mains output should be configured for close mains of MBCR that is used to drive the switchgear.

Table 39

Device	Maximum Number Supported
Cat GCCP 1.2/1.3 Input Expansion	4
Cat GCCP 1.2/1.3 Output Expansion	10
Cat GCCP 1.2/1.3 Remote Annunciator	10
Cat GCCP 1.2/1.3 Battery Chargers	4

Negative Earth

Typical wiring diagram shown in Illustration 23 shows connections for a negative Earth system (battery negative connects to Earth).

Positive Earth

The following points must be followed when using a Cat GCCP 1.2/1.3 control panel with a Positive Earth System (battery positive connects to Earth):

- Follow the typical wiring diagram shown in Illustration 23 as common for all sections except for the Earth points.
- All points shown as Earth in the typical diagram shown in Illustration 23 should connect to the battery negative (not Earth).

Floating Earth

The following points must be followed when the battery positive and/or battery negative terminals are not connected to Earth:

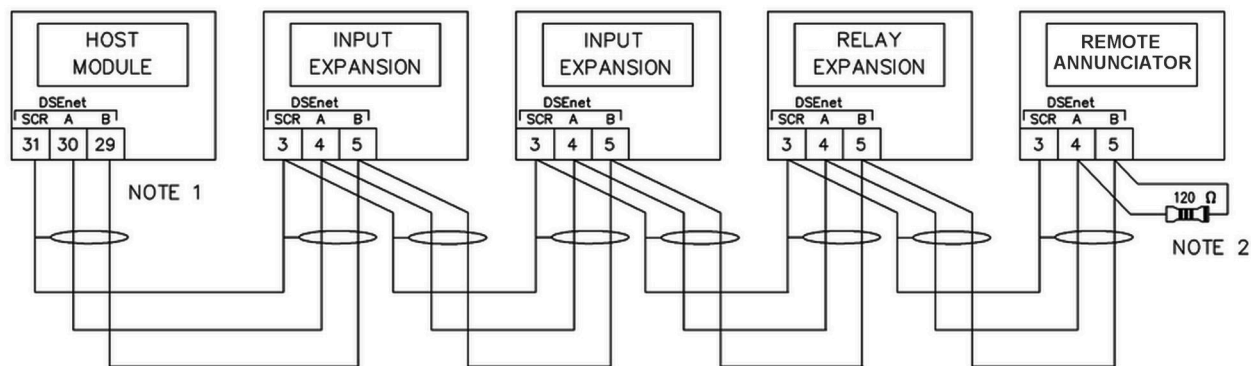
- Follow the typical wiring diagram as normal for all sections except the Earth points.
- All points shown as Earth in Illustration 23 should connect to the negative of the battery (not Earth).

Typical Arrangement of DSENet

Note: This feature is not available if Cat GCCP 1.2/1.3 control panel has been configured to use the DSENet port as an interface to ECU.

Note: Screened 120 ohm impedance cable specified for use with CAN must be used for the DSENet (RS485) connection.

20 devices can be connected to DSENet, made up of the devices listed in Table 39 :



NOTE 1
AS A TERMINATING RESISTOR IS INTERNALLY FITTED TO THE HOST CONTROLLER, THE HOST CONTROLLER MUST BE THE FIRST UNIT ON THE DSEnet

NOTE 2
A 120 OHM TERMINATION RESISTOR MUST BE FITTED TO THE LAST UNIT ON THE DSEnet

Illustration 25

g06529220

Typical Arrangement of DSEnet

Note 1 – The host controller must be the first unit on the DSEnet, as the terminating resistor is internally fitted to the host controller.

Note 2 – A 120 ohm termination resistor must be fitted to the last unit on DSEnet.

Description of Controls

Note: The module may instruct an engine start event due to external influences.

Note: Prior to performing any maintenance on the system, remove the battery and isolate the supplies, as the engine might start at any time without warning.

Note: The following description details the sequences that are followed by a module containing the standard factory configuration. Refer to the configuration source for the exact sequences and timers observed by any particular module in the field.

Module control is through the push buttons that are mounted on the front of the module "Stop/Reset Mode", "Manual Mode", "Auto Mode", "Alarm Mute and Lamp Test", and "Start" functions.

Only operate the above controls for a normal operation.

Cat GCCP 1.2 and Cat GCCP 1.3 Modules



Illustration 26

g06531405

Cat GCCP 1.2 Module

- (15) Menu Navigation Button
- (16) Module Display/Generator Display
- (17) Open Generator Button
- (18) Mains LED Button

- (19) Close Generator Button
(20) Stop/Reset Mode Button
(21) Selected Mode Indication LED
(22) Manual Mode Button

- (23) Auto Mode Button
(24) Alarm Mute and Lamp Test Button
(25) Start Button



Illustration 27

g06610245

Cat GCCP 1.3 Module

(15) Menu Navigation Button
 (16) Module Display/Generator Display
 (19) Close Generator Button
 (20) Stop/Reset Mode Button

(22) Manual Mode Button
 (23) Auto Mode Button
 (24) Alarm Mute and Lamp Test Button
 (25) Start Button

(26) Transfer to Mains
 (27) Test Mode

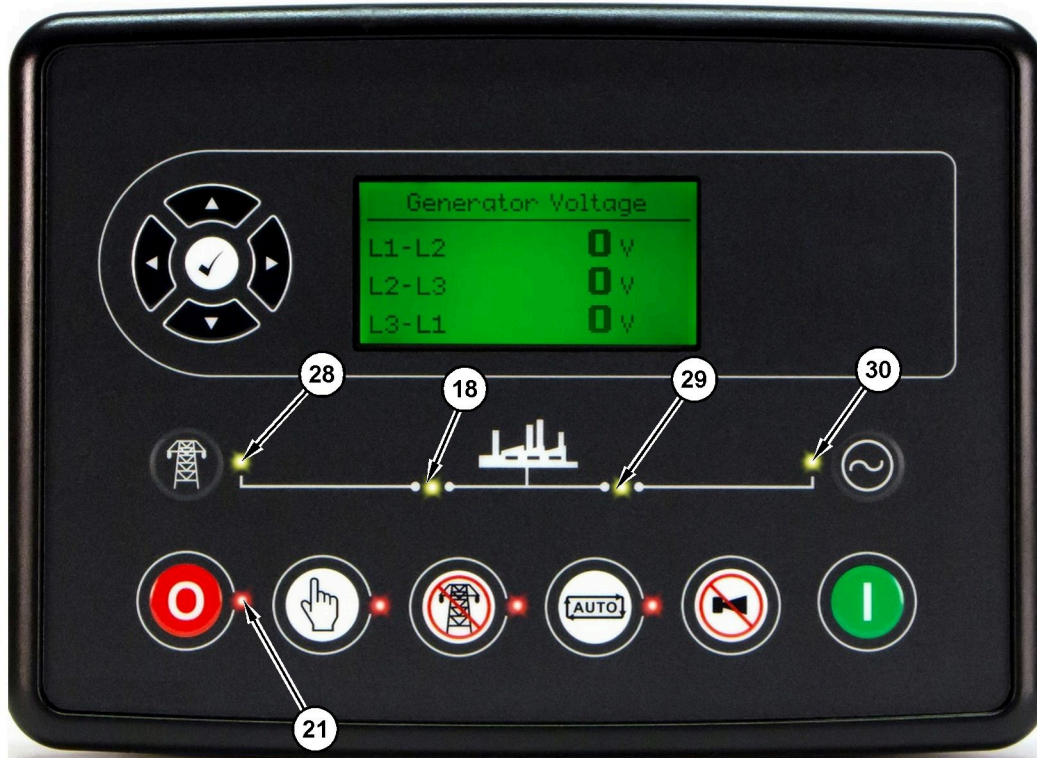


Illustration 28

g06610246

Cat GCCP 1.3 Module

(18) Mains LED Button
(21) Selected Mode Indication LED

(28) Mains available LED
(29) Generator Breaker LED

(30) Generator Available LED

Control Push Buttons

Note: For further details, refer to Section “Operation” in the document.

Stop/Reset Mode Button (20) – Pressing stop/reset mode button (20) puts the module in stop/reset mode. Pressing the button clears any alarm condition for which the triggering criteria has been activated. If the engine is running and the module is put into stop/reset mode, the module automatically instructs the generator off load (“Close Generator Output” becomes inactive if used).

The fuel supply de-energizes and the engine comes to a standstill. When in stop/reset mode, the generator remains at rest if any form of start signal is present.

Manual Mode Button (22) – Pressing manual mode button (22) puts the module in manual mode. When in manual mode, the module responds to start button (25) to start the generator and run off load.

To place the generator on load, use the transfer to generator button (19). The module automatically instructs the changeover device to take the mains off load (“Close Mains Output” becomes inactive) and place the generator on load.

Use open generator button (17) to place the generator off load. The module automatically instructs

the changeover device to take the generator off load and place the mains on load.

Additional digital inputs can be assigned to perform the functions.

If the engine is running off-load in manual mode and load signal becomes active, the module automatically instructs the changeover device to take mains off load. The generator is then placed on load.

Upon removal of the on load signal, the generator remains on load until either “Stop/Reset Mode” or “Auto Mode” is selected.

Auto Mode (23) – Pressing auto mode button (23) puts the module in auto mode. In auto mode, the module can control the function of the generator automatically.

The module monitors numerous start requests and when a start request is received, the set is automatically started. Once the generator is available, mains is taken off load and the generator is placed on load.

Upon removal of the starting signal, the module starts the return delay timer. Once the timer expires, the module takes the generator off load and place the mains on load.

The generator then continues to run during the cooling timer, until stopped. The module then waits for the next start event.

Alarm Mute/Lamp Test Button (24) – Alarm mute/lamp test button (24) puts the audible alarm in the controller in silent mode. The button de-activates the audible alarm output (if configured) and illuminates all the LEDs on the fascia module as a lamp test function.

Start Button (25) – Start button (25) is only active in the “Stop/Reset Mode”, “Manual Mode”, and “Test Mode”.

Pressing start button (25) in stop/reset mode, powers up the engine ECU but does not start the engine.

Pressing start button (25) in manual mode or test mode starts and runs the generator off load in manual mode or on load in test mode.

Menu Navigation Button (15) – Menu navigation button (15) is used for navigating the instrumentation, event log, and configuration screens.

Open Generator Button (17) – Open generator button (17) is active only in manual mode. Pressing the button when the generator is on load opens the generator load switch. Pressing the button further has no effect.

Viewing Instrument Pages

Scroll to view the different pages of information by repeatedly pressing the next and previous page buttons in the menu navigation button (15).

Note: A complete order and content of each information page are given in the following sections.

Once selected, the page remains on the Liquid Crystal Display (LCD) until the user selects a different page. The module reverts to the status display after certain period of inactivity (LCD page timer).

If no button is pressed upon entering an instrumentation page, the instruments displayed are automatically subjected to the setting of the LCD scroll timer. The LCD page and LCD scroll timers are configurable using Cat GCCP 1.2/1.3 Configuration Suite Software or by using the Front Panel Editor.

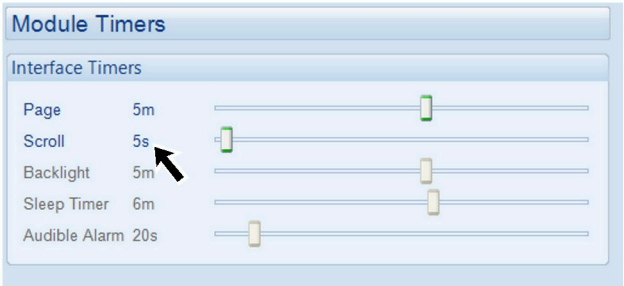


Illustration 29
Factory Settings for Timers

Factory settings for module timers are shown in Illustration 29. Press the instrumentation scroll button or menu navigation button (15) to scroll manually through all instruments on the currently selected page.

Note: Auto scroll is disabled. Scroll to the title of instrumentation page (i.e “Engine”) to re-enable “Auto scroll”

After a short time (the duration of LCD scroll timer), the instrumentation display begins to auto scroll. When scrolling manually, the display automatically returns to the “Status” page if no buttons are pressed during the configuration LCD page timer.

The display shows the alarms page to draw the attention of the operator to the alarm condition, if an alarm activates while viewing the status page.

Status

Note: Press menu navigation button (15) on the status page to view other configurable status screens, if configured.



Illustration 30
Factory Setting of Status Screen Showing Engine Stopped

“Home” page of the status page is shown in Illustration 30. The page is displayed when no other page has been selected. Status page is also automatically displayed after a certain period of inactivity (duration of LCD page timer) of the module control buttons.

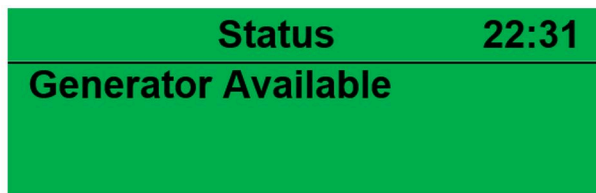


Illustration 31 g06529505
Engine Running

“Status” screen changes with the action of the controller. For example, when the Generator is running and available, the display shows that the Generator is available. Refer to Illustration 31.

Generator Locked Out

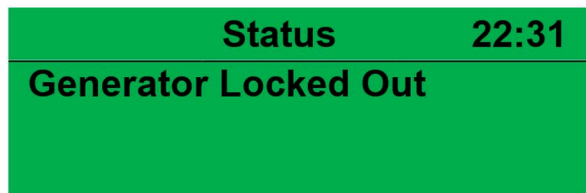


Illustration 32 g06529506
Generator Locked Out

“Generator Locked Out” message shown in Illustration 32 indicates that the generator cannot be started due to an active “Shutdown or Electric Trip Alarm” on the module. Press the next button or the previous page button to clear the alarm, if the alarm does not clear the fault.

Waiting for Generator

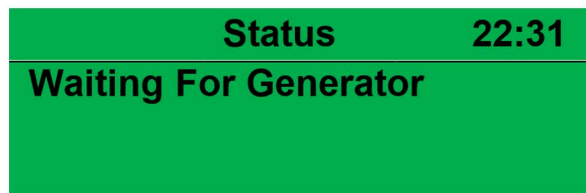


Illustration 33 g06529508
Generator Waiting

“Waiting for Generator” message shown in Illustration 33 indicates that the generator has started but not reached the required loading voltage and/or loading frequency as set in the module configuration. Press the next page or previous page button. Scroll to the “Generator” page to check if the generator voltage and frequency is higher than the configured voltage and loading frequency.

Configurable Status Screens



Illustration 34 g06529557
Configurable Status Screen

Note: Contents of “Home Page” are configurable and can be changed to display various information that is broadcasted on the CAN. An example of “Home Page” being changed to show engine CAN related information is shown in Illustration 34.

Engine

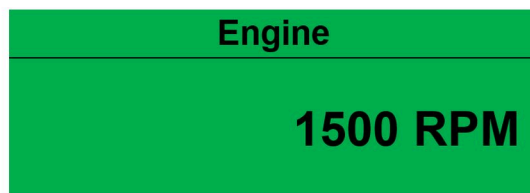


Illustration 35 g06529559
Engine Page

The “Engine” page contains information about the engine, measured or derived from the inputs of the module or obtained from the engine ECU.

* – Denotes CAN ECU-specific information

- Engine Speed
- Engine Oil Pressure
- Engine Coolant Temperature
- Engine Battery Voltage
- Engine Run Time
- Engine Fuel Level
- Engine Oil Temperature*
- Engine Inlet Temperature*
- Engine Turbo Pressure*
- Engine Percent Torque*

- Engine Demand Torque*
- Engine Percent Load*
- Non-Friction Torque*
- Engine Oil Level*
- Engine Coolant Level*
- Cooling Fan Speed Level*
- Electrical Potential
- DEF Tank Level*
- DEF Level Status*
- SCR-DEF Lamps*
- SCR Action Timer*
- Engine Link*
- ECU Regeneration*
- ECU Regeneration Icons*
- Engine Soot Levels*
- DEF Tank Temperature*
- DEF Reagent Cons*
- SCR After Treatment Status*
- CAN Bus Information*
- Instant Fuel Rate
- Coolant Pressure*
- Exhaust Temperature*
- Fuel Temperature*
- Fuel Pressure*
- Fuel Consumption*
- Fuel Used*
- Flexible Sensors
- Engine Maintenance Alarm 1
- Engine Maintenance Alarm 2
- Engine Maintenance Alarm 3
- After Treatment Fuel Used*
- After Treatment Exhaust Gas Temperature*
- Engine Crank Case Pressure*
- Engine Injector Rail Pressure*
- Engine Exhaust Temperature*
- Intercooler Temperature*

- Turbo Oil Pressure*
- Fan Speed*
- Water In Fuel*
- Air Inlet Pressure*
- ECU ECR DEF Icons*
- DEF Counter Minimum*
- DPTC Filter Status*
- Engine ECU Link*
- Tire 4 Engine Information*

Manual Fuel Pump Control

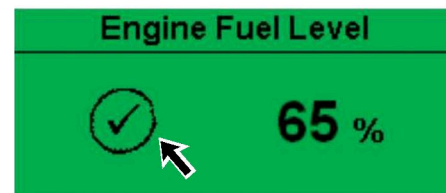


Illustration 36

g06529565

Engine Fuel Level Page

“Engine Fuel Level” page shown in Illustration 36 may have a tick icon depending upon the module configuration. The tick icon denotes that manual fuel pump control is available. Pressing and holding the Tick button allows manual fuel pump control.

DPF Regeneration Lamps

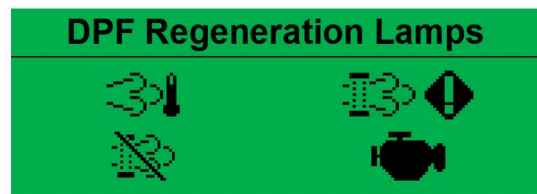


Illustration 37

g06529649

DPF Regeneration Lamps

Depending upon the engine type selected in the configuration of the module, “Engine” section may include “DPF Regeneration Lamps” page that is shown in Illustration 37. Icons on the page show the status of various ECU functions.

Some of the icons are applicable to Tier 4 engine requirements. The icons flash at different rates to show the status of the ECU function. The following are the faults that are displayed on the screen:



ECU Amber Alarm – Activates when the module receives an Amber fault condition from the engine ECU.



ECU Red Alarm – Activates when the module receives a Red fault condition from the engine ECU.



DPF Active – Activates when the module receives a fault indication from the engine ECU indicating that the Diesel Particulate Filter is active.



DPF Inhibited – Activates when the module receives a fault indication from the engine ECU indicating that the Diesel Particulate Filter has been inhibited.



DPF Stop – Activates when the module receives a fault indication from the engine ECU indicating that the Diesel Particulate Filter has been stopped.



DPF Warning – Activates when the module receives a fault condition from the engine ECU indicating that the Diesel Particulate Filter has a fault condition.



HEST Active – Activates when the module receives a fault indication from the engine ECU indicating that the High Exhaust System Temperature is active.



DEF Low Level – Activates when the module receives a fault condition from the engine ECU indicating that the Diesel Exhaust Fluid Low Level is active.



SCR Inducement – Activates when the module receives a fault indication from the engine ECU indicating that the Selective Catalytic Reduction Inducement is active.

Generator

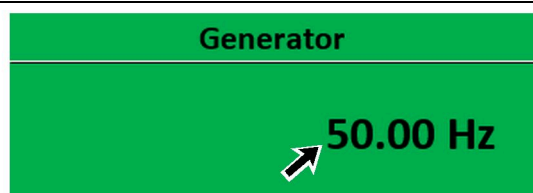


Illustration 38

g06533375

Generator Page

“Generator” page contains electrical values of the Generator, measured or derived from the voltage and current inputs of the module.

Press the menu navigation button to scroll through the “Generator” parameters listed below:

- Generator Voltage (Line to Neutral)
- Generator Voltage (Line to Line)
- Generator Frequency

- Generator Current (A)
- Generator Load Line to Neutral (kW)
- Generator Total Load (kW)
- Generator Load Line to Neutral (kVA)
- Generator Total Load (kVA)
- Generator Single Phase Power Factors
- Generator Power Factor Average
- Generator Load Line to Neutral (kvar)
- Generator Total Load (kvar)
- Generator Accumulated Load (kWh, kVAh, kVARh)
- Generator Phase Rotation
- Generator Active Configuration

Expansion

Note: Some display screens may be disabled depending upon the module configuration.

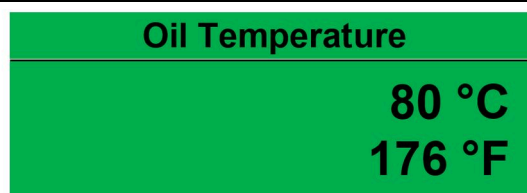


Illustration 39

g06529674

Oil Temperature

“Expansion” page contains measured values from various input expansion modules that are connected to Cat GCCP 1.2/1.3 module. Pressing the menu navigation button scrolls through the expansion parameters, if configured.

Note: Analogue inputs only appear if configured.

Charger ID

Note: Some display screens may be disabled depending upon the configuration of the module.

Press the menu navigation button and scroll through the charger ID parameters, if configured.

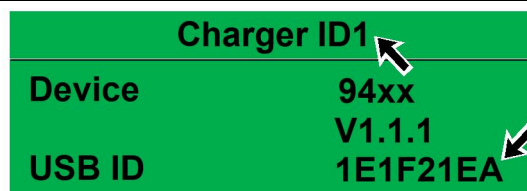


Illustration 40

g06529680

Charger ID1

ID number configured in the expansion module of Cat GCCP 1.2/1.3 control panel is shown in Illustration 40. The page contains information and instrumentation of Cat GCCP battery charger that are connected to Cat GCCP 1.2/1.3 controller.

Supply Voltage	
L1 - N	240V

Illustration 41 g06529687
Supply Instrumentation Screen

Charger ID1	
Temperature	32 °C 89 °F

Illustration 42 g06529683
Battery Charger Temperature Instrumentation Screen

Charger ID1	
Fan 1	100 rpm
Fan 2	0 rpm

Illustration 43 g06529690
Battery Charger Fan Speed (When Supported by the Charger)

Charger Output 1	
Charge Mode	Float

Illustration 44 g06529707
Output Instrumentation Screens Showing Output 1 of the Battery Charger

Charger Output 1	
Output	26.91V

Illustration 45 g06529692
Output Voltage

Charger Output 1	
Current	7.05A
Limit	10.00A
Power	189W

Illustration 46 g06529708
Output Current, Limit, and Power

Alarms

The “Common Alarm LED” illuminates (if configured) and an external “Audible Alarm” sounds when an alarm is active. Pressing alarm text/lamp test button (24) silences the audible alarm. Refer to Illustration 49 for alarm text/lamp test button (24).

The LCD changes from the “Information” page to display the “Alarm” Page. The LCD displays multiple alarms such as “Coolant Temperature High alarm”, “Emergency Stop alarm”, and “Low Coolant Warning alarm”.

The alarms automatically scroll in the order that the alarms occur or press the menu navigation button to scroll through the alarm manually. The LCD displays the appropriate text in the event of an alarm. If an additional alarm then occurs, the module displays the appropriate text.

1/2	Alarms
Oil Pressure Low	
Warning	

Illustration 47 g06529711
Alarm Mute/Lamp Test

The module indicates the following in the alarms page:

- One out of two alarms are active
- The cause of the alarm (Oil Pressure Low)
- The type of alarm (Warning)

1/2	Alarms
Low Oil Pressure	
Warning	

Illustration 48 g06533391
Example of Additional Alarms

2/2 Alarms

Coolant Temp High

Shutdown

Illustration 49

g06533394

Example of Additional Alarms

The module displays a message similar to Illustration 49 if there is an additional alarm.

ECU Alarms (CAN Fault Codes / Diagnostic Trouble Code (DTC))

Note: Refer to Cat engine ECU manual for appropriate DTC definitions and for details on the code/graphic meanings.

1/1 Alarms

ECU Amber

Warning

Illustration 50

g06529722

Type of Alarm

The controller displays alarm status messages from the ECU, in the alarms section of the display, when connected to a suitable CAN engine.

Press right menu navigation button (15) to access the list of current engine DTCs from the ECU. DTCs are DM1 messages.

1/2 ECU Current DTCs

Water Level Low

SPN=131166 , FMI=8, OC=127

Illustration 51

g06529725

DM1 DTC

The DM1 DTC is interpreted by the module and is shown on module display (16) as a text message. Refer to Illustration 51 for manufacturer DM1 DTC. Refer to Illustration 49 for module display (16).

Event Log

The module maintains a log of past alarms and selected status changes. The log size has been increased in the module over the past module updates and is always subjected to change.

The modules log stores the last 250 log entries, with the latest version/update.

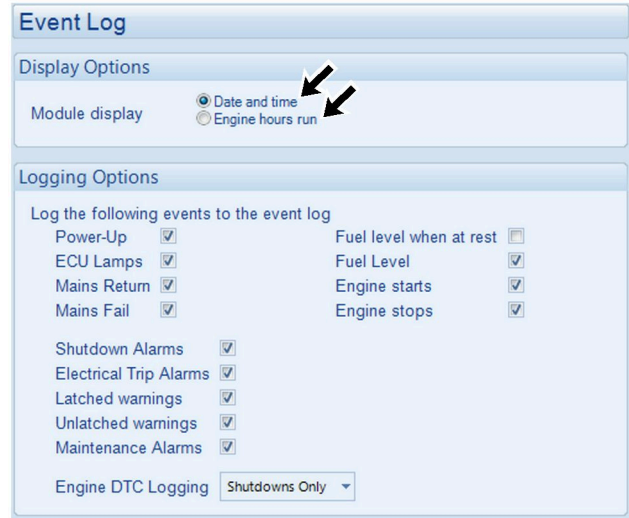


Illustration 52

g06529730

Event Log

Event log is configured to include all possible options under the default factory settings. Event log can only be configured by the technician using Cat GCCP 1.2/ 1.3 Configuration Suite software.

Any subsequent event overwrites the older entry when the event log is full. Hence, the event log always contains the most recent events. The module logs the event type, along with the date and time (or engine running hours, if configured).

1 Event Log

Oil Pressure Low

Warning

Illustration 53

g06529731

Event Log 1

To view the event log, repeatedly press menu navigation button (15) until the LCD screen displays the "Event Log" page. Press scroll down button to view the next most recent event. Continuing to press the scroll down button cycles through the past events. The display shows the most recent alarm and the cycle begins again.

Press right or left menu navigation button (15) to exit the event log and return to viewing the instruments.

Protections Disabled

Note: Refer to Section "Protections" for further details on protections disabled.

Disabling the protections prevents the shutdown and electrical alarms from stopping the generator. The operator is informed that the events were blocked under such conditions.



Illustration 54
Shutdown Blocked g06529737

Serial Port

RS485 Serial Port

The items displayed on the serial port page change depending upon the configuration of the module.

Note: Factory default setting for the RS485 port is to operate at 115200 baud, MODBUS slave address 10.

Connected to R485 MODBUS Master

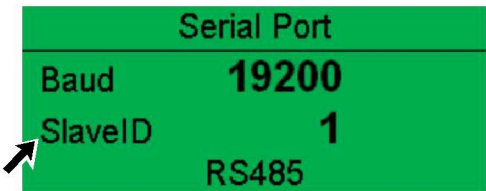


Illustration 55
Slave Device g06529749

The module operates as a MODBUS RTU slave device. There is only one Master (typically a PLC) Human Machine Interface system (HMI system), or PC SCADA system in a MODBUS system.

The master requests for information from the MODBUS slave (module) and may also send request to change the operating modes (in control systems), and so on. Unless the Master makes a request, the slave is quiet on the data link.

Note: Factory default settings are for the module to communicate at 115200 baud, MODBUS slave address 10.

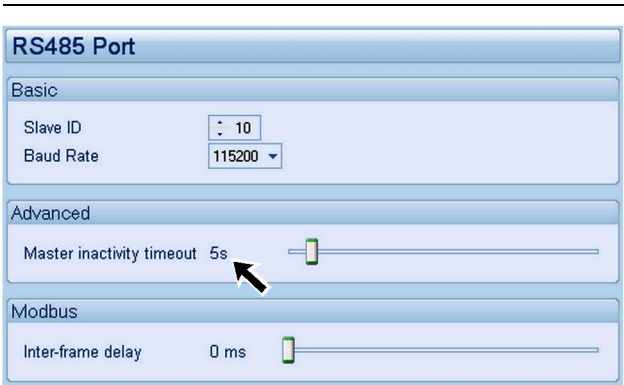


Illustration 56
Master Inactivity Timeout g06529751

“Master Inactivity Timeout” must be set to at least two times the value of the system scan time. For example, if a MODBUS master PLC requests data from the module once per second, timeout should be set to at least 2 seconds.

Note: Cat GCCP 1.2/1.3 MODBUS document containing register mappings inside Cat GCCP 1.2/ 1.3 control panel is available from PowerNet. Refer to the link below:

<https://engines.cat.com/en.html>

Configurable CAN

Note: Some display screens may be disabled depending upon the module configuration.

Configurable CAN instruments are intended to display CAN information from CAN devices such as fuel flow meters. The contents of the screens may vary depending upon the configuration done by the engine manufacturer.

Configurable CAN instruments are not viewable under default factory settings. The instruments are configurable by the technician using Cat GCCP 1.2/ 1.3 Configuration Suite software.

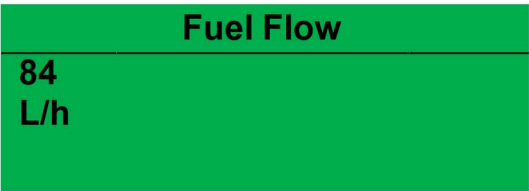


Illustration 57
Fuel Flow g06529755

Configurable CAN Instrument 1 to 30

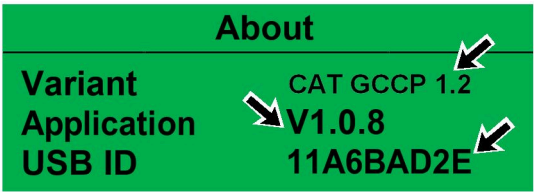


Illustration 58 g06529757
About

“About” page contains important information about the module and the firmware versions such as Variant, Application Version, and USB ID (unique identifier for PC USB connection).

Version of the module main firmware is updatable using Firmware Update Wizard in Cat GCCP 1.2/1.3 Configuration Suite Software. Press scroll down button to access more information about the module.



Illustration 59 g06529759
Bootloader and Analogue

Press the scroll down button to access more information about the module.

Bootloader – This line item is the bootstrap software version.

Analogue – This line item is the module micro firmware file version.

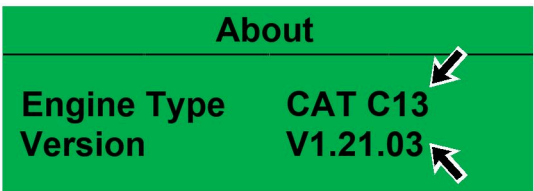


Illustration 60 g06529778
Engine Type and Version

Engine type and version of the engine file selected in the configuration is shown in Illustration 60.

Operation

Note: The following descriptions detail the sequences of a module with the standard factory configuration. Always refer to the configuration source for the exact sequences and timers observed by any particular module in the field.

Engine Starting



Illustration 61 g06529785
Starting Engine

Press manual mode button (22) followed by start button (25). Refer to Illustration 49 for manual mode button (22) and start button (25).

Note: Refer to Section “Operation” for further details on starting engine.

Engine Stopping



Illustration 62 g06529790
Engine Stopping

The generator will stop when the stop/reset mode is selected.

Stop/Reset Mode

Note: Changing the module modes is not possible if a digital input configured to “Panel Lock” is active. Viewing the instruments and event logs is not affected by “Panel Lock”.

Pressing stop/reset mode button (20) activates stop/reset mode. The LED above stop/reset mode button (20) illuminates to indicate stop/reset mode operation. Refer to Illustration 49 for stop/reset mode button (20).

In stop/reset mode, the module removes the generator from load before stopping the generator, if necessary. The “Fail to Stop” alarm activates if the generator does not stop when requested (subjected to the setting of the “Fail to Stop” timer). The following conditions must be satisfied to detect the engine at rest:

- Engine speed is zero as detected by the CAN ECU.
- Generator AC Voltage and Frequency must be zero.
- Engine Charge Alternator Voltage must be zero.
- Oil pressure sensor must indicate low oil pressure.

When the engine stops and the module is in stop/reset mode, the module configuration files from Cat GCCP Configuration Suite PC software can be installed. Also, front panel editor can be accessed to change the parameters.

Any latched alarms that have been cleared is at rest in the stop/reset mode. Engine does not start when in stop/reset mode. If start signals are received, input is ignored until auto mode is activated.



Illustration 63

g06529795

Power Save Mode

When the module is configured for “Power Save Mode”, leaving the module in stop/reset mode without any activity, will make the module enter power save mode. To wake the module, press any fascia control button.

ECU Override

Pressing start button (25) in stop/reset mode powers up the engine ECU, but does not start the engine. ECU override can be used to check the status of CAN communication and to prime the fuel system. Refer to Illustration 49 for start button (25).

Manual Mode

Note: If a digit input configured to panel lock is active, changing module modes is not possible. Viewing the instruments and event logs is not affected by panel lock.

Pressing manual mode button (22) activates manual mode. LED above manual mode button (22) illuminates to indicate manual mode operation. Generator does not start automatically in manual mode. Press start button (25) to begin the starting sequence. Refer to Illustration 49 for manual mode button (22) and start button (25).

Starting Sequence

Note: No “Start Delay” is present in the manual mode of operation.

Note: Compatible ECUs receive start command via CAN if the unit has been configured for CAN.

The fuel relay is energized and the engine is cranked. If the engine fails to fire during a cranking attempt, the starter motor is disengaged for the crank rest timer duration. The next start attempt is made after the crank rest timer. If the sequence continues beyond the set number of attempts, the start sequence is terminated and the display shows “Fail to Start”. The starter motor disengages when the engine fires.

Speed detection is factory configured to be derived from the AC alternator output frequency. Speed can also be measured from “Magnetic Pick-Up” that is mounted on the flywheel or from CAN bus link to the engine ECU, depending on the module configuration. Rising oil pressure can be used to disconnect the starter motor but cannot detect underspeed or overspeed.

Once starter motor is disengaged, the “Safety on Delay” timer activates allowing the following to stabilize without triggering the fault:

- Oil Pressure
- High Engine Temperature
- Under-speed
- Charge Fail
- Any delayed Auxiliary fault inputs

Engine Running

Note: Load transfer signal remains inactive until the generator is available. Inactivity prevents excessive wear on the engine and alternator.

When in manual mode, the load is transferred to the generator whenever a “Loading Request” is made. The possible sources for loading requests are limited depending on the state of the Manual Breaker Control function.

Manual Breaker Control Disabled

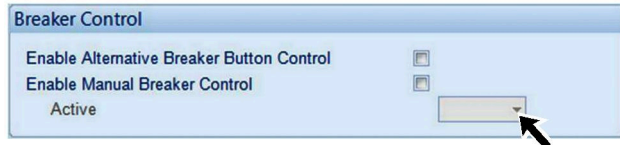


Illustration 64

g06530036

Manual Breaker Control Disabled

A loading request may come from any of the following sources:

- Pressing transfer to generator button (19). Refer to Illustration 49 for transfer to generator button (19).
- Activating an auxiliary input that has been configured to "Remote Start On Load" .
- Activating a built-in exercise scheduler if configured for "On Load" runs.
- Activating Dual Mutual Standby Balance Mode.

Once the generator is placed under load, the load will not be automatically removed. One of the following methods can be used to open the load switch manually depending on loading request state.

Follow the below procedure if the loading request has been removed:

1. Press open generator button (17). Refer to Illustration 49 for open generator button (17).
2. Activate auxiliary input that has been configured to Open Generator.
3. Press auto mode button (23) to return to auto mode. The set observes all auto mode start requests and stopping timers before beginning the auto mode stopping sequence. Refer to Illustration 49 for auto mode button (23).

Follow the below procedure if the loading request remains active:

1. Press stop/reset button (20) to remove the load and stop the generator. Refer to Illustration 49 for stop/reset button (20).
2. Activate an auxiliary input that has been configured to "Generator Load Inhibit" .

Manual Breaker Control Enabled

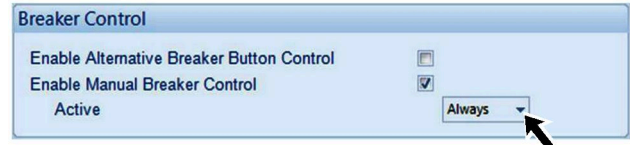


Illustration 65

g06530043

Manual Breaker Control Enabled

Loading request sources are limited to the following:

- Pressing transfer to generator button (19). Refer to Illustration 49 for transfer to generator button (19).
- Activating an auxiliary input that has been configured to Open Mains.

Once the generator is placed under load, the load will not be automatically removed. Use any of the following methods to open the load switch manually:

- Pressing open generator button (17).
- Activating an auxiliary input that has been configured to "Transfer To Generator" / "Open Generator" .
- Pressing auto mode button (23) to return to auto mode. The generator set observes all auto mode start requests and stopping timers before beginning the auto mode stopping sequence.
- Pressing stop/reset mode button (20) to remove load and stop the generator.
- Activating an auxiliary input that has been configured to "Generator Load Inhibit" .

Refer to Illustration 49 for open generator button (17), auto mode button (23), and stop/reset mode button (20).

Stopping Sequence

In test mode, the generator set continues to run until either of the following conditions occur:

Stop/Reset Mode Button (20) is pressed – Delayed load outputs are de-activated immediately and the generator set immediately stops.

Auto Mode Button (23) is pressed – Generator set observed all auto mode start requests and stopping timers before beginning "auto mode Stopping Sequence" .

Auto Mode

Note: Changing module modes is not possible if a digital input configured to external panel lock is active. Panel lock does not affect viewing instruments and event logs.

Pressing auto mode button (23) activates auto mode. Illumination of the LED above auto mode button (23) indicates auto mode operations. In auto mode, the generator can operate automatically, starting and stopping as required with no user intervention. Refer to Illustration 49 for auto mode button (23).

Waiting in Auto Mode

The starting sequence begins when a starting request is made. Starting requests can be from the following sources:

- Activation of an auxiliary input that has been configured to “Remote Start” .
- Activation of a built-in exercise scheduler.
- Instruction from external remote telemetry devices using the RS232 or RS485 interface.
- Activation of “Dual Mutual Standby Balance Mode” . Refer to Section “Operation” for more details.

Starting Sequence

Note: Compatible ECU receives start command via CAN and transmit the engine speed to Cat GCCP 1.2/ 1.3 controller if the unit has been configured for CAN.

The start delay timer begins to allow false start requests. The unit returns to a stand-by state if all start requests are removed during the “Start Delay” timer. Fuel relay energizes and engine cranks if a start request is still present at the end of the start delay timer.

If the engine fails to fire during cranking attempt, the starter motor is disengaged during crank rest timer. The next start attempt is made after the crank rest timer. If the sequence continues beyond the set number of attempts, the start sequence is terminated and the display shows “Fail to Start” . The starter motor is disengaged when the engine fires. Speed detection is factory configured to be derived from the AC alternator output frequency.

Speed can also be measured from a magnetic pick-up that is mounted on the flywheel or from the CAN link to the engine ECU depending on module.

Rising oil pressure can be used to disconnect the starter motor, but cannot detect underspeed or overspeed.

Once the starter motor has disengaged, the “Safety On Delay” timer activates, allowing the following parameters to stabilize without triggering a fault:

- Oil Pressure
- High Engine Temperature
- Under-speed
- Charge Fail
- Any delayed auxiliary fault inputs

Engine Running

Note: Load transfer signal remains inactive until the generator is available. Inactivity prevents excessive wear on the engine and alternator.

Generator is placed on load, if configured. Stopping sequence begins if all start requests are removed.

Scheduler

Controller contains a built-in exercise run scheduler, capable of automatically starting and stopping the set or inhibiting the set from starting. Up to 16 scheduled (in two banks of eight) start/stop/inhibiting start sequences can be configured to repeat on a seven day or 28-day cycle. Scheduled runs may be on load or off load depending upon the module configuration.

Bank 1

Schedule Period

Monthly

Week	Day	Run Mode	Start Time	Duration	
First	Monday	Off Load	09:00	05:00	Clear
First	Tuesday	On Load	13:30	00:30	Clear
First	Monday	Auto Start Inhibi	17:00	12:00	Clear
First	Monday	Off Load	00:00	00:00	Clear
First	Monday	Off Load	00:00	00:00	Clear
First	Monday	Off Load	00:00	00:00	Clear
First	Monday	Off Load	00:00	00:00	Clear
First	Monday	Off Load	00:00	00:00	Clear

Illustration 66

g06530433

Screen Capture of Cat GCCP 1.2/1.3 Configuration Suite Software

A screen capture of Cat GCCP 1.2/1.3 Configuration Suite Software showing the configuration of “Exercise Scheduler” is shown in Illustration 66. In the example, the set starts at 09:00 on Monday and runs for 5 hours off load. The next set starts at 13:30 on Tuesday and runs for 30 minutes on load. The set is inhibited from automatically starting on Monday from 17:00 for 12 hours.

Stop Mode

Scheduled runs do not occur when the module is in stop/reset mode.

Manual Mode

Scheduled runs do not occur when the module is in manual mode waiting for a start request. Activating a scheduled run “On Load” when the module is operating off load in manual mode forces the set to run on load.

Auto Mode

Scheduled runs operate only if the module is in auto mode with no “Shutdown or Electrical Trip” alarms active. If the module is in “Stop/Reset Mode” or “Manual Mode” when a scheduled run begins, engine will not be started. However, if the module is put into auto mode during a scheduled run, the engine will be started.

Depending upon the configuration by technician, an external input can be used to inhibit a scheduled run. If the engine runs off load in auto mode and a scheduled run configured to “On Load” begins, the set is placed “On Load” during the Schedule.

Alternative Configuration

The system may have selectable configurations (for example, to select between 50 Hz and 60 Hz) depending upon the system configuration by the generator supplier.

If alternative configuration has been enabled, the generator supplier will advise about activating the selection. Selection can be activated by operating an external selector switch or by selecting the required configuration file in the front panel configuration editor of the module.

Protections

Alarms

When an alarm is active, an internal audible alarm sounds and the common alarm output activate, if configured. Pressing alarm mute/lamp test button (24) silences the audible alarm. The LCD display moves from the information page to display alarm page. Refer to Illustration 49 for alarm mute/lamp test button (24).

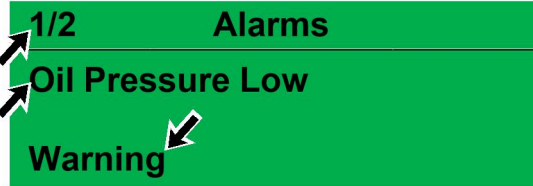


Illustration 67

g06529711

Protection Alarm

In Illustration 67 from the module, the following can be observed:

- One of two alarms is active
- The cause of the alarm (Oil Pressure Low)
- The type of alarm (Warning)

The LCD displays multiple alarms such as “Coolant Temperature High”, “Emergency Stop”, and “Low Coolant Warning”. The alarms automatically scroll in the order that occurred or press menu navigation button (15) to scroll through manually. In the event of an alarm, the LCD displays the appropriate text. If an additional alarm occurs, the module displays the appropriate text.

Protections Disabled

Configuration is possible to prevent “Shutdown and Electrical Trip” alarms from stopping the generator. Under such conditions, “Protections Disabled” appears on module display/generator display (16) to inform the operator. Refer to Illustration 49 for module display/generator display (16).



Illustration 68

g06530493

Protections Disabled

“Shutdown and Electrical Trip” alarms still appear. The operator is informed that the alarms are blocked. The feature is provided to assist the technician in meeting specifications for “Warning Only”, “Protections Disabled”, “Run to Destruction”, “War Mode”, or other similar wording.

When configuring the feature in the PC software, the technician would make the feature permanently active or only active upon operation of an external switch. The technician provides a key operated switch. The location of the switch varies depending upon the manufacturer. The switch prevents inadvertent activation.

Depending upon the configuration, a warning alarm may be generated when the switch is operated. The feature is configurable in the PC configuration software for the module. Configuring a controller that has “Protections Disabled” configured alerts the user with a warning message displayed on the PC screen. The alert helps the user to acknowledge the problem before the configuration of the controller is changed, preventing inadvertent activation of the feature.

Reset Electrical Trip

Configuring “Reset Electrical Trip” enables the operator to reset electrical trip alarm for a configurable number of times before the generator has stopped. Resetting the electrical trip alarm before the generator stops allows the generator to go back on load without having to perform a cooling run initially.

“Electrical Trip” alarm can be prevented from stopping the generator. Under such conditions, the “Electrical Trip Stop Inhibited Warning” alarm appears on module display (16) to inform the operator. “Electrical Trip” alarms still appear however, the operator is informed the generator is inhibited from stopping.

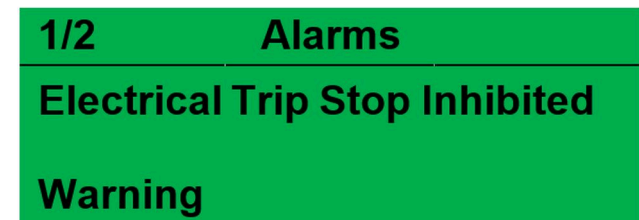


Illustration 69

g06530506

Electrical Trip

2/2 Alarms

Gen Over Current

Electrical Trip

Illustration 70

g06530507

Electrical Trip

The feature is provided to assist the technician in meeting specification requirements to ensure that the generator takes load again after the alarm has been reset. Depending upon the configuration, the generator may go into a cooling run or be inhibited from stopping after the “Electrical Trip” alarm activates.

When configuring the feature in the PC software, the technician chooses to make “Electrical Trip” alarms resettable using a switch connected to an input configured for “Reset Electrical Trip”. The “Electrical Trip” alarms can also be made resettable by pressing close generator button (19). Refer to Illustration 49 for close generator button (19).

The technician provides a key operated switch. The location of the switch varies depending upon manufacturer. The switch prevents inadvertent activation.

Press close generator (19) to place the generator on load on the following conditions:

- Cat GCCP 1.2/1.3 control panel is in manual mode
- No other on load request is active

Configuring the controller that has “Reset Electrical Trip” enabled, displays a warning message on the PC screen for the user to acknowledge before the controller configuration is changed. This action prevents inadvertent activation of the feature.

1/1 Alarms

ECU Warning

Warning

Illustration 71

g06530510

Type of Alarm

An example of Cat GCCP 1.2/1.3 showing the warning message is shown in Illustration 71. When connected to a suitable CAN engine, the controller displays alarm status messages from the ECU in the Alarms section of the display.

1/2 ECU Current DTCs

Water Level Low

SPN=131166 , FMI=8, OC=127

Illustration 72

g06530518

ECU Current DTC

Press right menu navigation button (15) to access the list of ECU Current DTCs from the ECU which are DM1 messages. The DM1 DTC is interpreted by the module and is shown on the display of the module as a text message. Manufacturer DTC is shown in Illustration 72.

1/10 ECU Prev. DTCs

Water Level Low

SPN=131166 , FMI=8, OC=127

Illustration 73

g06530519

ECU Previous DTC

Press right menu navigation button (15) to access the list of ECU current DTCs from the ECU which are Diagnostic Message 2 messages (DM2 messages). The DM2 DTC is interpreted by the module and is shown on module display/generator display (16) as a text message. Manufacturer DTC is shown in Illustration 73. Refer to Illustration 49 for module display/generator display (16).

Warning Alarms

Warnings are non-critical alarm conditions and do not affect the operation of the engine system. Warning alarms serve to draw the attention of the operators to an undesirable condition.

1/2 Alarms

Coolant Temp High

Warning

Illustration 74

g06530531

Warning Alarm

In the event of an alarm, the LCD moves to the alarms page and scrolls through all active alarms. Warning alarms are self-resetting by default, when the fault condition is removed.

Note: Enabling “All Warnings are Latched” causes warning alarms to latch until reset manually.

Warning alarms are enabled using Cat GCCP 1.2/1.3 Configuration Suite along with a compatible PC. “ECU Warning” is shown on the module display as a warning alarm if the module is configured for CAN and receives an error message from the ECU.

Table 40

Fault	Description
Cat GCCP 1.2/1.3 ID 0 to 3 Analogue Input (A to J High)	Module detected that an Analogue input value of a Cat GCCP 1.2/1.3 Input Module had risen above the “Flexible Sensor High Pre-Alarm Trip” level.
Cat GCCP 1.2/1.3 ID 0 to 3 Analogue Input (A to J Low)	Module detected that an Analogue input value of a Cat GCCP 1.2/1.3 had fallen below the “Flexible Sensor Low Pre-Alarm Trip” level.
Cat GCCP 1.2/1.3 ID 0 to 3 Digital Input (A to J)	Module detected that a digital input configured to create fault condition on Cat GCCP 1.2/1.3 expansion module became active. An appropriate message is displayed on the LCD.
Cat GCCP 1.2/1.3 ID 0 to 3 Common Warning	Module detected that a battery charger connected by DSENet had issued a “Common Warning Alarm” .
Analogue Input A to D (Digital)	Module detected that an Analogue input configured as a digital input created a fault condition became active and an appropriate message is displayed on the LCD.
Battery Detect Failure	Module detected that a battery charger connected by DSENet had issued a “Battery Detect Failure” alarm.
Battery Failure Detection Output 1	Module detected that a battery charger connected by DSENet had issued a “Battery Failure Detection” alarm on Output 1.
Battery Failure Detection Output 2	Module detected that a battery charger connected by DSENet had issued a “Battery Failure Detection” alarm on Output 2.
Battery High Current Output 1	Module detected that a battery charger connected by DSENet had issued a “Battery High Current” alarm on Output 1.
Battery High Current Output 2	Module detected that a battery charger connected by DSENet had issued a “Battery High Current” alarm on Output 2.
Battery High Temperature Output 1	Module detected that a battery charger connected by DSENet had issued a “Battery High Temperature” alarm on Output 1.

(continued)

(Table 40, contd)

Fault	Description
Battery High Temperature Output 2	Module detected that a battery charger connected by DSENet had issued a "Battery High Temperature" alarm on Output 2.
Battery High-Voltage Output 1	Module detected that a battery charger connected by DSENet had issued a "Battery High Voltage" alarm on Output 1.
Battery High-Voltage Output 2	Module detected that a battery charger connected by DSENet had issued a "Battery High Voltage" alarm on Output 2.
Battery Low Voltage Output 1	Module detected that a battery charger connected by DSENet had issued a "Battery Low Voltage" alarm on Output 1.
Battery Low Voltage Output 2	Module detected that a battery charger connected by DSENet had issued a "Battery Low Voltage" alarm on Output 2.
Battery Temperature Sensor Fail Output 1	Module detected that a battery charger connected by DSENet had issued a "Battery Temperature Fail" alarm on Output 1.
Battery Temperature Sensor Fail Output 2	Module detected that a battery charger connected by DSENet had issued a "Battery Temperature Fail" alarm on Output 2.
Calibration Fault	Module detected that the internal calibration has failed. Contact the authorized Cat Dealer for Product Support.
Charge Alternator Failure (IEEE 37.2 – 27 DC Undervoltage Relay)	Module detected that the output voltage of the charge alternator had fallen below the "Charge Alternator Warning Trip" level for the configured delay timer.
Charger Fan Locked	Module detected that a battery charger connected by DSENet had a "Failure" alarm.
Charger High Temperature	Module detected that a battery charger connected by DSENet had a "High Temperature" alarm.
Charger Mains High Current	Module detected that a battery charger connected by DSENet had a "Mains High Current" alarm.
Charger Mains High Voltage	Module detected that a battery charger connected by DSENet had a "Mains High Voltage" alarm.
Charger Mains Low Voltage	Module detected that a battery charger connected by DSENet had a "Mains Low Voltage" alarm.
Charger Voltage Drop Charging Cable Output 1	Module detected that a battery charger connected by DSENet had issued a "Voltage Drop Charging Cable" alarm on Output 1.
Charger Voltage Drop Charging Cable Output 2	Module detected that a battery charger connected by DSENet had issued a "Voltage Drop Charging Cable" alarm on Output 2.
Coolant Temp High (IEEE C37.2 – 26 Apparatus Thermal Device)	Module detected that the engine coolant temperature had risen above the "High Coolant Temperature Pre-Alarm Trip" level after the Safety On Delay timer had expired.
DC Battery High Voltage (IEEE 37.2 – 59 DC Overvoltage Relay)	Module detected that the DC supply voltage had risen above the "Plant Battery Overvolts Warning Trip" level for the configured delay timer.
DC Battery Low Voltage (IEEE 37.2 – 27 DC Undervoltage Relay)	Module detected that the DC supply voltage had fallen below the "Plant Battery Undervolts Warning Trip" level for the configured delay timer.
DC Battery High Voltage (IEEE 37.2 – 59 DC Overvoltage Relay)	Module detected that the DC supply voltage had risen above the "Plant Battery Overvolts Warning Trip" level for the configured delay timer.
DC Battery Low Voltage (IEEE 37.2 – 27 DC Undervoltage Relay)	Module detected that the DC supply voltage had fallen below the Plant Battery Undervolts Warning Trip level for the configured delay timer.
DEF Level Low	Module received a fault condition from the engine ECU alerting about the DEF level. Module detected that the "DEF Level" had fallen below the "DEF Level Low Pre-Alarm Trip" level for the configured delay timer.
Digital Input A to H	Module detected that a digital input configured to create a fault condition became active and the appropriate LCD message is displayed.

(continued)

(Table 40, contd)

Fault	Description
DPTC Filter	Module received a fault condition from the engine ECU alerting that the DPF/DPTC had activated.
ECU Amber	Module received an amber fault condition from the engine ECU.
ECU Data Fail	Module is configured for CAN operation but has not detected data being sent from the ECU engine.
ECU Malfunction	Module received a malfunction fault condition from the engine ECU.
ECU Protect	Module received a protect fault condition from the engine ECU.
ECU Red	Module received a red fault condition from the engine ECU.
Engine Over Speed (IEEE C37.2 - 12 Overspeed Device)	Module detected that the engine speed had risen above the "Over Speed Pre-Alarm Trip" level for the configured delay timer.
Engine Over Speed Delayed (IEEE C37.2 - 12 Overspeed Device)	Module detected that the engine speed had risen above the "Over Speed Trip" level but was below the "Over Speed Overshoot Trip" for the configured "Overshoot Delay" timer during starting.
Engine Under Speed (IEEE C37.2 - 14 Underspeed Device)	Module detected that the engine speed had fallen below the Under Speed Pre-Alarm Trip level for the configured delay timer after the "Safety On Delay" timer had expired.
Exp. Unit Failure	Module detected that communications to one of the DSENet expansion modules had been lost.
Flexible Sensor A to D High	Module detected that an Analogue input value had risen above the "Flexible Sensor High Pre-Alarm Trip" level.
Flexible Sensor A to D Low	Module detected that an Analogue input value had fallen below the "Flexible Sensor Low Pre-Alarm Trip" level.
Fuel Level High (IEEE C37.2 - 71 Liquid Level Switch)	Module detected that the engine fuel level rose above the "High Fuel Level Trip" level.
Fuel Level Low (IEEE C37.2 - 71 Liquid Level Switch)	Module detected that the engine fuel level had fallen below the "Low Fuel Level Trip" level.
Fuel Level Low Switch (IEEE C37.2 - 71 Liquid Level Switch)	Module detected that the engine low fuel level switch had activated.
Fuel Tank Bund Level High (IEEE C37.2 - 71 Liquid Level Switch)	Module detected that the fuel tank bund level switch had activated.
Fuel Usage (IEEE C37.2 - 80 Flow Switch)	Module detected that the fuel consumption was more than the configured "Running Rate" or "Stopped Rate" .
Generator Loading Frequency	Module detected that the generator output frequency had not risen above the "Generator Loading Frequency" setting after the warming up timer had expired.
Generator Loading Voltage	Module detected that the generator output voltage had not risen above the "Generator Loading Voltage" setting after the warming up timer had expired.
Generator Over Current (IEEE C37.2 - 50 Instantaneous Overcurrent Relay) (IEEE C37.2 - 51 IDMT Over-current Relay)	Module detected that the generator output current had risen above the "Generator Over Current Trip" .
Generator Over Frequency (IEEE C37.2 - 81 Frequency Relay)	Module detected that the generator output frequency had risen above the "Over Frequency Pre-Alarm Trip" level for the configured delay timer.

(continued)

(Table 40, contd)

Fault	Description
Generator Over Frequency Delayed (IEEE C37.2 – 81 Frequency Relay)	Module detected that the generator output frequency had risen above the “Over Frequency Trip” level but was below the “Over Frequency Overshoot Trip” for the configured “Overshoot Delay” timer during starting.
Generator Over Voltage (IEEE C37.2 – 59 AC Overvoltage Relay)	Module detected that the generator output voltage had risen above the “Over Voltage Pre-Alarm Trip” level for the configured delay timer.
Generator Reverse Power (IEEE C37.2 – 32 Directional Power Relay)	Module detected that the generator output kW had fallen below the “Reverse Power Trip” for the configured delay timer.
Generator Short Circuit (IEEE C37.2 – 51 IDMT Short Circuit Relay)	Module detected that the generator output current had risen above the “Short Circuit Trip” during the Inverse Definite Minimum Time function (IDMT function).
Generator Under Frequency (IEEE C37.2 – 81 Frequency Relay)	Module detected that the generator output frequency had fallen below the “Under Frequency Pre-Alarm Trip” level for the configured delay timer after the “Safety On Delay” timer had expired.
Generator Under Voltage (IEEE C37.2 – 27 AC Undervoltage Relay)	Module detected that the generator output voltage had fallen below the “Under Voltage Pre-Alarm Trip” level for the configured delay timer after the “Safety On Delay” timer had expired.
HEST Active	Module received a fault condition from the engine ECU alerting that the “HEST” had activated.
Inlet Temperature	Module detected that the engine ECU measurement of inlet temperature had risen above the “Inlet Temperature Alarm Pre-Alarm Trip” level.
kW Overload (IEEE C37.2 – 32 Directional Power Relay)	Module detected that the generator output kW had risen above the Overload Protection Trip for the configured delay timer.
Loss of Magnetic Pick Up	Module detected that the Magnetic Pick-Up was not producing a pulse output after the required “Crank Disconnect” criteria had been met.
Low Coolant Warning	Module detected that the engine coolant temperature had fallen below the “Low Coolant Temperature Pre-Alarm Trip” level.
Low Load (IEEE C37.2 – 37 Undercurrent to Underpower Relay)	Module detected that the load had fallen below the “Low Load Alarm Trip” level.
Maintenance Due	Module detected that one of the configured maintenance alarms is due as the configured maintenance interval has expired.
Negative kvar (IEEE C37.2 – 40 Field Under Excitation Relay)	Module detected that the generator output kvar had fallen below the “Negative var Pre-Alarm Trip” for the configured delay timer.
Negative Phase Sequence (IEEE C37.2 - 46 Phase-Balance Current Relay)	Module detected that there was an imbalance of current across the generator phases greater than the “Negative Phase Sequence Trip” Level percentage setting.
Oil Pressure Low (IEEE C37.2 - 63 Pressure Switch)	Module detected that the engine oil pressure had fallen below the “Low Oil Pressure Pre-Alarm Trip” level after the “Safety On Delay” timer had expired.
Positive kvar (IEEE C37.2 – 40 Field Over Excitation Relay)	Module detected that the generator output kvar had risen above the “Positive var Pre-Alarm Trip” for the configured delay timer.
Protections Disabled	Module detected that an input configured for “Protections Disable” became active.
SCR Inducement	Module received a fault condition from the engine ECU alerting about the SCR Inducement.
Water in Fuel	Module received a fault condition from the engine ECU alerting that water in the fuel had been detected.

Electrical Trip Alarm

Note: Fault condition must be resolved before the alarm is reset. Alarm cannot be reset if the fault condition is not resolved. The exception to this condition is the “Coolant Temp High” alarm and similar “Active From Safety On” alarms, as the coolant temperature could be high with the engine at rest.

Electrical trip alarms are latching and stop the generator but in a controlled manner. If an electrical trip occurs, the module deactivates the “Close Generator Output” to remove the load from the generator.

After removing the load from the generator, the module starts the cooling timer and allows the engine to cool off-load before shutting down the engine. Fault must be cleared and the alarm must be reset to restart the generator.

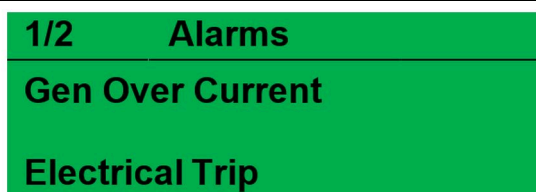


Illustration 75

g06530533

Electrical Trip Alarm

LCD moves to the alarms page and scrolls through all active alarms in the event of an alarm. Electrical Trip alarms are latching alarms. Press stop/reset mode button (20) on the module to remove the fault. Refer to Illustration 49 for stop/reset mode button (20).

Table 41

Fault	Description
Cat GCCP 1.2/1.3 Input Expansion Module ID 0 to 3 Analogue Input A to J High	Module detected that an Analogue input value of a Cat GCCP Input Expansion Module had risen above the “Flexible Sensor High Alarm Trip” level.
Cat GCCP 1.2/1.3 Input Expansion Module ID 0 to 3 Analogue Input A to J Low	Module detected that an Analogue input value of a Cat GCCP input expansion module had fallen below the “Flexible Sensor Low Alarm Trip” level.
Cat GCCP 1.2/1.3 Input Expansion Module Charger ID 0 to 3 Common Electrical Trip	Module detected that a battery charger connected by DSENet had issued a “Common Electrical Trip Alarm” .
Analogue Input A to D (Digital)	Module detected that an Analogue input configured as a digital input to create fault condition became active and an appropriate message is displayed on the LCD.
Auto Sense Fail	Module detected that the output voltage of the generator had risen above the “Over Voltage During Auto Sensing Trip” level during starting while attempting to detect an alternative configuration to use.
Calibration Fault	Module detected that the internal calibration has failed. The unit must be returned back for investigation and repair.
Coolant Temperature High (IEEE C37.2 – 26 Apparatus Thermal Device)	Module detected that the engine coolant temperature had risen above the “High Coolant Temperature Electrical Trip” level after the “Safety On Delay” timer had expired.

(continued)

(Table 41, contd)

Fault	Description
DEF Level Low	Module received a fault condition from the engine ECU alerting about the DEF level. Module detected that the "DEF Level" had fallen below the "DEF Level Low Alarm Trip" level for the configured delay timer.
Digital Input A to H	Module detected that a digital input configured to create a fault condition became active and an appropriate message is displayed on the LCD.
DPTC Filter	Module received a fault condition from the engine ECU alerting that the DPF/DPTC had activated.
ECU Amber	Module received an amber fault condition from the engine ECU.
ECU Data Fail	Module is configured for CAN operation but has not detected data being sent from the engine ECU.
ECU Malfunction	Module received a malfunction fault condition from the engine ECU.
ECU Protect	Module received a protect fault condition from the engine ECU.
ECU Red	Module received a red fault condition from the engine ECU.
Exp. Unit Failure	Module detected that communications to one of the DSENet expansion modules had been lost.
Flexible Sensor A to D Low	Module detected that an Analogue input value had fallen below the "Flexible Sensor Low Alarm Trip" level.
Fuel Level High (IEEE C37.2 - 71 Liquid Level Switch)	Module detected that the engine fuel level rose above the "High Fuel Level Trip" level.
Fuel Level Low (IEEE C37.2 - 71 Liquid Level Switch)	Module detected that the engine fuel level had fallen below the "Low Fuel Level Trip" level.
Fuel Level Low Switch (IEEE C37.2 - 71 Liquid Level Switch)	Module detected that the engine low fuel level switch had activated.
Fuel Tank Bund Level High (IEEE C37.2 - 71 Liquid Level Switch)	Module detected that the fuel tank bund level switch had activated.
Fuel Usage (IEEE C37.2 – 80 Flow Switch)	Module detected that the fuel consumption was more than the configured "Running Rate" or "Stopped Rate" .
Generator Loading Frequency	Module detected that the generator output frequency had not risen above the "Generator Loading Frequency setting" after the warming up timer had expired.
Generator Loading Voltage	Module detected that the generator output voltage had not risen above the "Generator Loading Voltage" setting after the warming up timer had expired.
Generator Over Current (IEEE C37.2 – 51 IDMT Over-current Relay)	Module detected that the generator output current had risen above the "Generator Over Current Trip" during the IDMT function.
Generator Phase Sequence Wrong (IEEE C37.2 – 47 Phase Sequence Relay)	Module detected that the phase rotation of the generator was different to the configured "Generator Phase Rotation Alarm" setting.
Generator Reverse Power (IEEE C37.2 – 32 Directional Power Relay)	Module detected that the generator output kW had fallen below the "Reverse Power Trip" for the configured delay timer.
Generator Short Circuit (IEEE C37.2 – 51 IDMT Short Circuit Relay)	Module detected that the generator output current had risen above the "Short Circuit Trip" during the IDMT function.
Inlet Temperature	Module detected that the engine ECU measurement of inlet temperature had risen above the "Inlet Temperature Alarm Trip" level.
kW Overload (IEEE C37.2 – 32 Directional Power Relay)	Module detected that the generator output kW had risen above the "Overload Protection Trip" for the configured delay timer.

(continued)

(Table 41, contd)

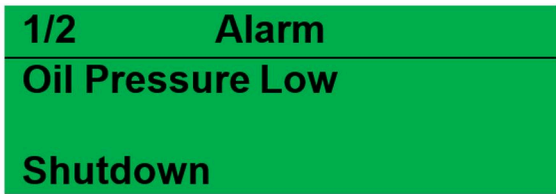
Fault	Description
Loss of Magnetic Pick Up	Module detected that the Magnetic Pick-Up was not producing a pulse output after the required "Crank Disconnect" criteria had been met.
Low Load (IEEE C37.2 – 37 Undercurrent to Underpower Relay)	Module detected that the load had fallen below the "Low Load Alarm Trip" level.
Maintenance Due	Module detected that one of the configured maintenance alarms is due as the configured maintenance interval has expired.
Negative kvar (IEEE C37.2 – 40 Field Under Excitation Relay)	Module detected that the generator output kvar had fallen below the "Negative var Alarm Trip" for the configured delay timer.
Negative Phase Sequence (IEEE C37.2 - 46 Phase-Balance Current Relay)	Module detected that there was an imbalance of current across the generator phases greater than the "Negative Phase Sequence Trip Level" percentage setting.
Positive kvar (IEEE C37.2 – 40 Field Over Excitation Relay)	Module detected that the generator output kvar had risen above the "Positive var Alarm Trip" for the configured delay timer.
SCR Inducement	Module received a fault condition from the engine ECU alerting about the SCR inducement.
Water in Fuel	Module received a fault condition from the engine ECU alerting that water in the fuel had been detected.

Shutdown Alarms

Note: Fault condition must be resolved before the alarm is reset. Alarm cannot be reset if the fault condition is not resolved. "Oil Pressure Low" alarm and similar "Active From Safety On" alarms are exceptions to this condition, as the coolant temperature could be high with the engine at rest.

Shutdown alarms are latching and immediately stop the generator. The module deactivates the "Close Gen Output" outputs on initiation of the electrical trip condition to remove the load from the generator.

The module starts the cooling timer and allows the engine to cool off-load before shutting down the engine once the outputs are deactivated. Fault must be cleared, and the alarm reset to restart the generator.



1/2 Alarm
Oil Pressure Low
Shutdown

Illustration 76

g06530539

Shutdown Alarm

LCD moves to the alarms page and scrolls through all active alarms in the event of an alarm.

"Shutdown Alarms" are latching alarms. Press stop/reset mode button (20) on the module to remove the fault. Refer to Illustration 49 for stop/reset mode button (20).

Table 42

Fault	Description
Cat GCCP 1.2/1.3 Input Expansion Module ID 0 to 3 Analogue Input A to J High	Module detected that an Analogue input value of a Cat GCCP Input Expansion Module had risen above the "Flexible Sensor High Alarm Trip" level.
Cat GCCP 1.2/1.3 Input Expansion Module ID 0 to 3 Analogue Input A to J Low	Module detected that an Analogue input value of a Cat GCCP Input Expansion Module had fallen below the "Flexible Sensor Low Alarm Trip" level.
Cat GCCP 1.2/1.3 Input Expansion Module ID 0 to 3 Analogue Input A to J	The module detected that a digital input configured to create fault condition on Cat GCCP Input Expansion Module became active. An appropriate message is displayed on the LCD.
Cat GCCP 1.2/1.3 ID 0 to 3 Common Shutdown	Module detected that a battery charger connected by DSENet had issued a "Common Shutdown Alarm" .
Analogue Input A to D (Digital)	Module detected that an Analogue input configured as a digital input to create a fault condition became active and an appropriate message displayed on the LCD.
Auto Sense Fail	Module detected that the output voltage of the generator had risen above the "Over Voltage During Auto Sensing Trip" level during starting whilst attempting to detect which alternative configuration to use.
Battery Temperature	Module detected that a battery charger connected by DSENet had issued a "Battery Temperature" alarm.
Calibration Fault	Module detected that the internal calibration has failed. The unit must be returned back for investigation and repair.
Charge Alternator Failure (IEEE C37.2 – 27DC Undervoltage Relay)	Module detected that the output voltage of the charge alternator had risen above the "Charge Alternator Shutdown Trip" level for the configured delay timer.
Charger Failure	Module detected that a battery charger connected by DSENet had a "Failure" alarm.
Charger Fan Locked	Module detected that a battery charger connected by DSENet had a "Failure" alarm.
Charger High Temperature	Module detected that a battery charger connected by DSENet had a "High Temperature" alarm.
Charger Input Fuse Fail	Module detected that a battery charger connected by DSENet had an "Input Fuse Fail" alarm.
Charger Mains High Current	Module detected that a battery charger connected by DSENet had a "Mains High Current" alarm.
Charger Mains High Voltage	Module detected that a battery charger connected by DSENet had a "Mains High Voltage" alarm.
Charger Mains Low Voltage	Module detected that a battery charger connected by DSENet had a "Mains Low Voltage" alarm.
Charger Reverse Polarity	Module detected that a battery charger connected by DSENet had a "Reverse Polarity" alarm.
Charger Short Circuit	Module detected that a battery charger connected by DSENet had a "Short Circuit" alarm.
Charger Short Circuit / Reverse Polarity	Module detected that a battery charger connected by DSENet had a combined "Short Circuit" and "Reverse Polarity" alarm.
Coolant Sender O/C	Module detected that circuit to the engine coolant temperature sensor had become open circuit.
Coolant Temp High (IEEE C37.2 – 26 Apparatus Thermal Device)	Module detected that the engine coolant temperature had risen above the "High Coolant Temperature Shutdown Trip" level after the "Safety On Delay" timer had expired.
Coolant Temp High Switch (IEEE C37.2 – 26 Apparatus Thermal Device)	Module detected that the high engine coolant temperature switch had activated after the "Safety On Delay" timer had expired.
DEF Level	Module received a fault condition from the engine ECU alerting about the DEF level. Module detected that the "DEF Level" had fallen below the "DEF Level Low Alarm Trip" level for the configured delay timer.
Digital Input A to D	Module detected that a digital input configured to create a fault condition became active and the appropriate LCD message is displayed.
DPTC Filter	Module received a fault condition from the engine ECU alerting that the DPF/DPTC had activated.
ECU Amber	Module received an amber fault condition from the engine ECU.

(continued)

(Table 42, contd)

Fault	Description
ECU Data Fail	Module is configured for CAN operation but has not detected data being sent from the engine ECU.
ECU Malfunction	Module received a malfunction fault condition from the engine ECU.
ECU Protect	Module received a protect fault condition from the engine ECU.
ECU Red	Module received a red fault condition from the engine ECU.
Emergency Stop (IEEE C37.2 - 5 Stopping Device)	Module detected that emergency stop button had been pressed removing a positive voltage supply from the emergency stop input terminal. This input is failsafe (normally closed to emergency stop), and immediately stops the generator when the signal is removed.
Engine Over Speed (IEEE C37.2 - 12 Overspeed Device)	Module detected that the engine speed had risen above the "Over Speed Alarm Trip" level for the configured delay timer.
Engine Over Speed Overshoot (IEEE C37.2 - 12 Overspeed Device)	Module detected that the engine speed had risen above the "Over Speed Overshoot Trip" during the configured "Overshoot Delay" timer whilst starting.
Engine Under Speed (IEEE C37.2 - 14 Underspeed Device)	Module detected that the engine speed had fallen below the "Under Speed Alarm Trip" level for the configured delay timer after the "Safety On Delay" timer had expired.
Exp. Unit Failure	Module detected that communications to one of the DSENet expansion modules had been lost.
Failed to Start (IEEE C37.2 - 48 Incomplete Sequence Relay)	Module detected that the generator failed to start as the generator did not meet the required Crank Disconnect criteria, during the configured number of Crank Attempts.
Failed to Stop (IEEE C37.2 - 48 Incomplete Sequence Relay)	Module detects a condition that indicates the generator is running when the module has instructed the generator to stop.
Flexible Sensor A to D Fault	Module detected that circuit to the flexible sensor had become open circuit.
Flexible Sensor A to D High	Module detected that an Analogue input value had risen above the "Flexible Sensor High Alarm Trip" level.
Flexible Sensor A to D Low	Module detected that an Analogue input value had fallen below the "Flexible Sensor Low Alarm Trip" level.
Flexible Sensor A to F Open Circuit	Module detected that circuit to the flexible sensor had become open circuit.
Fuel Level High (IEEE C37.2 - 71 Liquid Level Switch)	Module detected that the engine fuel level rose above the "High Fuel Level Trip" level.
Fuel Level Low (IEEE C37.2 - 71 Liquid Level Switch)	Module detected that the engine fuel level had fallen below the "Low Fuel Level Trip" level.
Fuel Level Low Switch (IEEE C37.2 - 71 Liquid Level Switch)	Module detected that the engine low fuel level switch had activated.
Fuel Sensor Fault	Module detected that circuit to the engine fuel level sensor had become open circuit.
Fuel Tank Bund Level High (IEEE C37.2 - 71 Liquid Level Switch)	Module detected that the fuel tank bund level switch had activated.
Fuel Usage (IEEE C37.2 - 80 Flow Switch)	Module detected that the fuel consumption was more than the configured Running Rate or Stopped Rate.
Generator Loading Frequency	Module detected that the generator output frequency had not risen above the "Generator Loading Frequency" setting after the warming up timer had expired.
Generator Loading Voltage	Module detected that the generator output voltage had not risen above the "Generator Loading Voltage" setting after the warming up timer had expired.

(continued)

(Table 42, contd)

Fault	Description
Generator Over Current (IEEE C37.2 – 51 IDMT Over-current Relay)	Module detected that the generator output current had risen above the “Generator Over Current Trip” during the IDMT function.
Generator Over Frequency (IEEE C37.2 – 81 Frequency Relay)	Module detected that the generator output frequency had risen above the “Over Frequency Alarm Trip” level for the configured delay timer.
Generator Over Frequency Overshoot (IEEE C37.2 – 81 Frequency Relay)	Module detected that the generator output frequency had risen above the “Over Frequency Overshoot Trip” during the configured “Overshoot Delay” timer whilst starting.
Generator Over Voltage (IEEE C37.2 – 59 AC Overvoltage Relay)	Module detected that the generator output voltage had risen above the “Over Voltage Alarm Trip” level for the configured delay timer.
Generator Phase Sequence Wrong (IEEE C37.2 – 47 Phase Sequence Relay)	Module detected that the phase rotation of the generator was different to the configured “Generator Phase Rotation Alarm” setting.
Generator Reverse Power (IEEE C37.2 – 32 Directional Power Relay)	Module detected that the generator output kW had fallen below the “Reverse Power Trip” for the configured delay timer.
Generator Short Circuit (IEEE C37.2 – 51 IDMT Short Circuit Relay)	Module detected that the generator output current had risen above the “Short Circuit Trip” during the IDMT function.
Generator Under Frequency (IEEE C37.2 – 81 Frequency Relay)	Module detected that the generator output frequency had fallen below the “Under Frequency Alarm Trip” level for the configured delay timer after the “Safety On Delay” timer had expired.
Generator Under Voltage (IEEE C37.2 – 27 AC Undervoltage Relay)	Module detected that the generator output voltage had fallen below the “Under Voltage Alarm Trip” level for the configured delay timer after the “Safety On Delay” timer had expired.
Inlet Temperature	Module detected that the engine ECU measurement of inlet temperature had risen above the “Inlet Temperature Alarm Trip” level.
kW Overload (IEEE C37.2 – 32 Directional Power Relay)	Module detected that the generator output kW had risen above the Overload Protection Trip for the configured delay timer.
Loss of Magnetic Pick Up	Module detected that the magnetic pickup was not producing a pulse output after the required Crank Disconnect criteria had been met.
Low Load (IEEE C37.2 – 37 Undercurrent to Underpower Relay)	Module detected that the load had fallen below the “Low Load Alarm Trip” level.
Magnetic Pick Up Fault	Module detected that the circuit to the magnetic pickup sensor had become open circuit.
Maintenance Due	Module detected that one of the configured maintenance alarms is due as the configured maintenance interval has expired.
Negative kvar (IEEE C37.2 – 40 Field Under Excitation Relay)	Module detected that the generator output kvar had fallen below the “Negative var Alarm Trip” for the configured delay timer.
Negative Phase Sequence (IEEE C37.2 – 46 Phase-Balance Current Relay)	Module detected that there was an imbalance of current across the generator phases greater than the “Negative Phase Sequence Trip Level” percentage setting.
Oil Pressure Sender Fault	Module detected that circuit to the engine oil pressure sensor had become open circuit.

(continued)

(Table 42, contd)

Fault	Description
Oil Pressure Low (IEEE C37.2 - 63 Pressure Switch)	Module detected that the engine oil pressure had fallen below the "Low Oil Pressure Shutdown Trip" level after the "Safety On Delay" timer had expired.
Oil Pressure Low Switch (IEEE C37.2 - 63 Pressure Switch)	Module detected that the low oil pressure switch had activated after the "Safety On Delay" timer had expired.
Over Frequency Runaway (IEEE C37.2 - 81 Frequency Relay)	Module detected that the generator output frequency had risen above the "Run Away Trip" level.
Over Speed Runaway (IEEE C37.2 - 12 Overspeed Device)	Module detected that the engine speed had risen above the "Run Away Trip" level.
Positive kvar (IEEE C37.2 - 40 Field Over Excitation Relay)	Module detected that the generator output kvar had risen above the "Positive var Alarm Trip" for the configured delay timer.
SCR Inducement	Module received a fault condition from the engine ECU alerting about the SCR Inducement.
Water in Fuel	Module received a fault condition from the engine ECU alerting that water in the fuel had been detected.

Maintenance Alarms

Depending upon the module configuration, one or more levels of engine maintenance alarm may occur based on the configured schedule.

The screenshot displays the 'Maintenance Alarm' configuration screen. It contains three sections, each for a different alarm:

- Maintenance Alarm 1:**
 - Enable: ☒
 - Description: Maintenance Alarm 1
 - Action: Warning
 - Engine run hours: 10 hrs
 - Enable alarm on due date: ☒
 - Maintenance interval: 1 months
- Maintenance Alarm 2:**
 - Enable: ☒
 - Description: Maintenance Alarm 2
 - Action: Warning
 - Engine run hours: 10 hrs
 - Enable alarm on due date: ☒
 - Maintenance interval: 1 months
- Maintenance Alarm 3:**
 - Enable: ☒
 - Description: Maintenance Alarm 3
 - Action: Warning
 - Engine run hours: 10 hrs
 - Enable alarm on due date: ☒
 - Maintenance interval: 1 months

Illustration 77

g06530541

Maintenance Alarm

A screen capture from Cat GCCP 1.2/1.3 Configuration Suite Software showing the configuration of "Maintenance Alarm" for 1, 2, and 3 is shown in Illustration 77. Maintenance alarm can be either a "warning" (set continues to run) or "shutdown" (running the set is not possible) when activated.

Site service engineer resets the maintenance alarm after performing the required maintenance. Follow any one of the following methods to reset the alarm:

- Activate an input that has been configured to "Maintenance Reset Alarm" for 1, 2, or 3.
- Press the maintenance reset button in Cat GCCP 1.2/1.3 Configuration Suite under "Maintenance" section.
- Press and hold stop/reset mode button (20) for 10 seconds on the desired "Maintenance Alarm" status page. The page may be protected with a PIN number. Refer to Illustration 49 for stop/reset mode button (20).

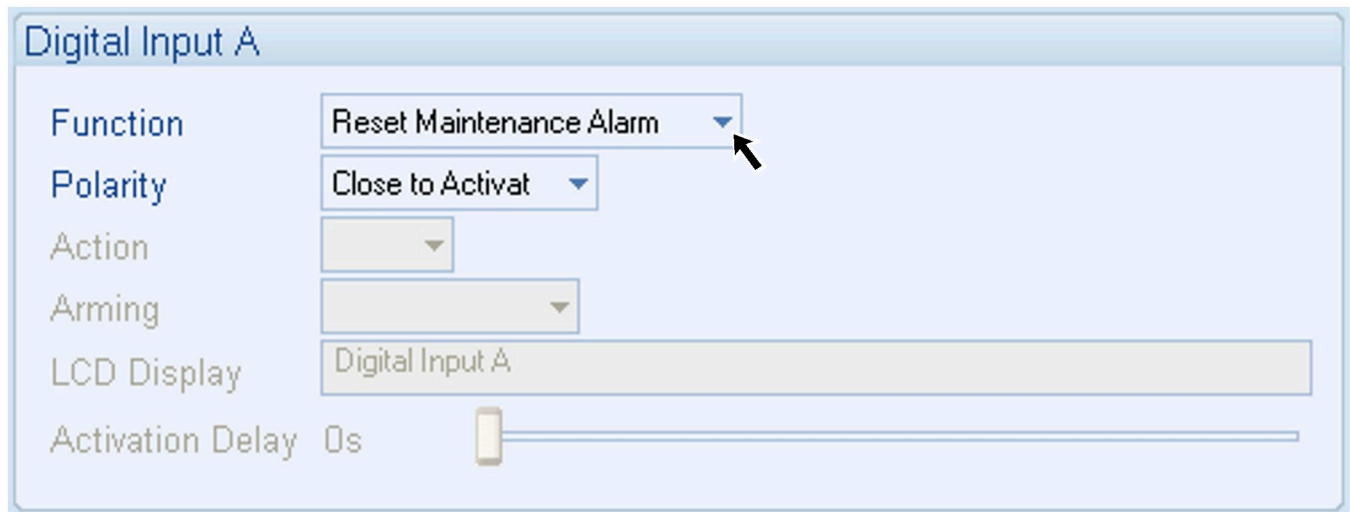


Illustration 78

g06530569

Resetting Maintenance Alarm

A screen capture from Cat GCCP 1.2/1.3 Configuration Suite Software showing the configuration of a digital input for reset maintenance alarm is shown in Illustration 78.

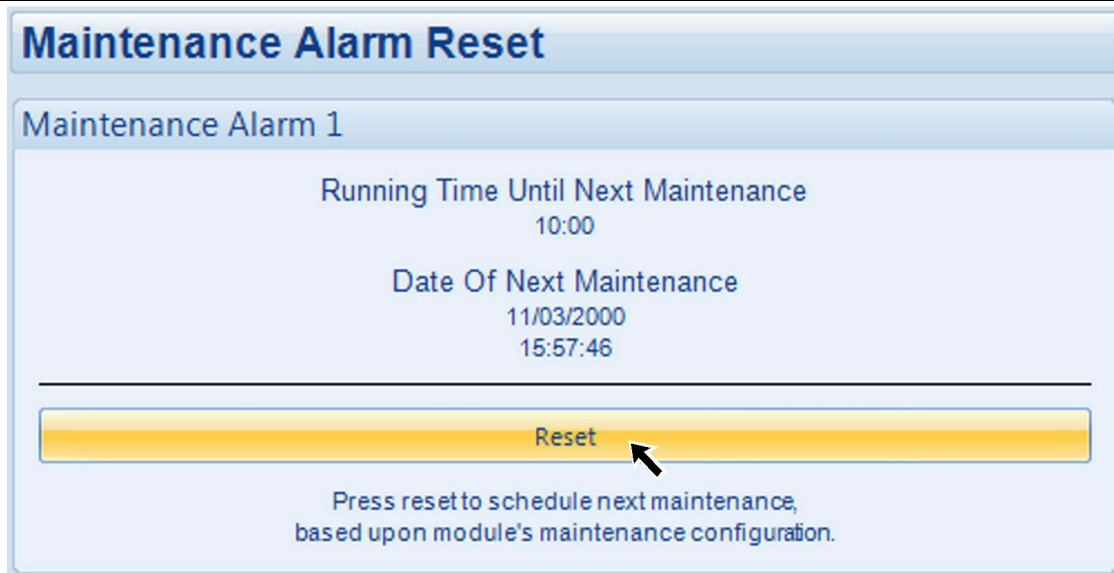


Illustration 79

g06530579

Maintenance Alarm Reset

A screen capture from Cat GCCP 1.2/1.3 Configuration Suite Software showing the maintenance alarm reset button in Cat GCCP 1.2/1.3 Configuration Suite SCADA/maintenance section.

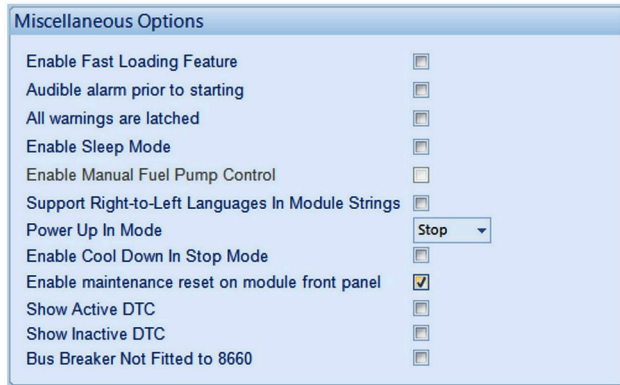


Illustration 80

g06530591

Resetting Maintenance Alarm

A screen capture from Cat GCCP 1.2/1.3 Configuration Suite Software showing the configuration holding stop/reset button (20) to reset the maintenance alarm is shown in Illustration 80.

Overcurrent Alarm

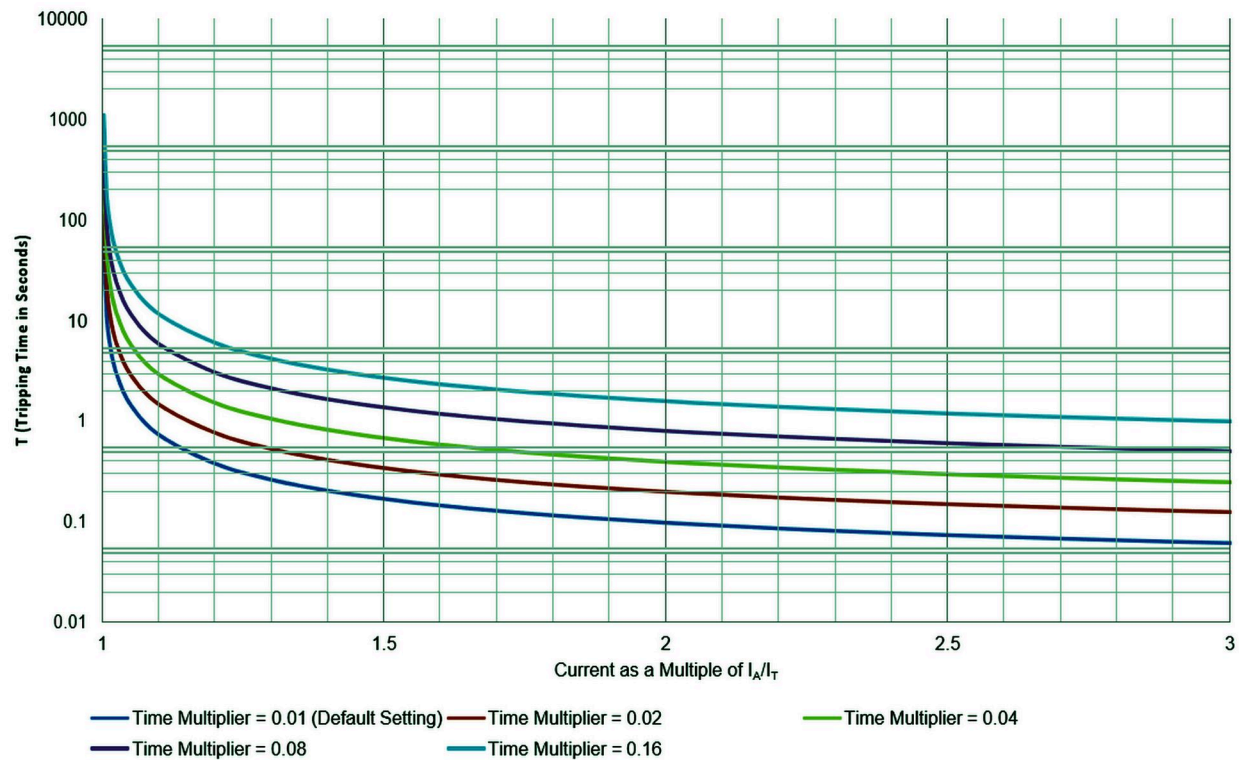


Illustration 81

g06531402

Short Circuit IDMT Alarm Curves

Overcurrent alarm combines a simple warning trip level with a fully functioning Inverse Definite Minimum Time curve (IDMT curve) for thermal protection.

Immediate Warning

If “Immediate Warning” is enabled, the controller generates a warning alarm when the trip level is reached. The alarm automatically resets once the generator loading current falls below the trip level, unless “All Warnings are Latched” is enabled.

Inverse Definite Minimum Time Alarm (IDMT Alarm)

The controller begins to follow IDMT curve when the current on any phase passes the “Trip” setting if the overcurrent IDMT alarm is enabled. IDMT alarm triggers shutdown or electrical trip as selected in action, if the trip is surpassed for an excess amount of time.

$$T = \frac{t}{\frac{I_A}{I_T} - 1}$$

Illustration 82

g06533872

Formula for Tripping Time

The larger the over circuit fault, the faster the trip. The speed of the trip depends upon the fixed formula that is shown in Illustration 82. The following are the parameters of the formula:

T – Tripping time (seconds)

I_A – Actual measured current of the most highly loaded line (L1, L2, or L3)

I_T – Delayed trip point setting in current

t – Time multiplier setting, and also represents the tripping time in seconds at twice full load (when I_A/I_T= 2).

Overcurrent Alarm

Immediate Warning

IDMT Alarm

Trip

Time Multiplier

Action

☒
☒

100

%

36

Electrical Trip

500

A

Illustration 83

g06530600

DSE Factory Settings

The settings shown in Illustration 83 are factory settings that are taken from Cat GCCP 1.2/1.3 Configuration Suite PC Software for a brushless alternator. The settings are for normal running of the generator up to 100% full load. If the load is surpassed, the “Immediate Warning” alarm is triggered, and the set continues to run.

Alternator windings begin to overheat when the generator is overloaded. The aim of the IDMT alarm is to prevent the windings from being overloaded (heated). The amount of time that the alternator can be safely overloaded is governed by high overload condition. The default settings as shown in Illustration 83 allows alternator to overload to the limit of a typical brushless alternator. A 110% overload is permitted for 1 hour or a 200% overload is permitted for 36 seconds.

The controller follows a cooling curve if the alternator load reduces. A second overload condition may trip soon after the first as the controller knows if the windings have not cooled sufficiently.

Creating Spreadsheet for Over Current IDMT Curve

The formula used to create a spreadsheet for overcurrent IDMT curve is shown in Illustration 82. The formula can be simplified for adding into a spreadsheet. The formula is useful for trying out different values of time multiplier setting “t” and viewing the results without testing on the generator.

A

B

C

	A	B	C	D	E	F
1		1.01	1.02	1.03	1.05	1.06
2	36	360000	90000	40000	14400	10000

Illustration 84

g06541841

Spreadsheet for Over Current IDMT Curve (typical example)

- (A) t (time multiplier setting)
- (B) T (tripping time in seconds)
- (C) I_A / I_T (multiple of the Trip setting from 1.01 to 3.0 in steps of 0.1)

f_x

=A2/POWER((B\$1-1),2)

Illustration 85

g06530863

Formula for Trip Time

The formula for tripping time cells is shown in Illustration 85.

Short Circuit IDMT Alarm

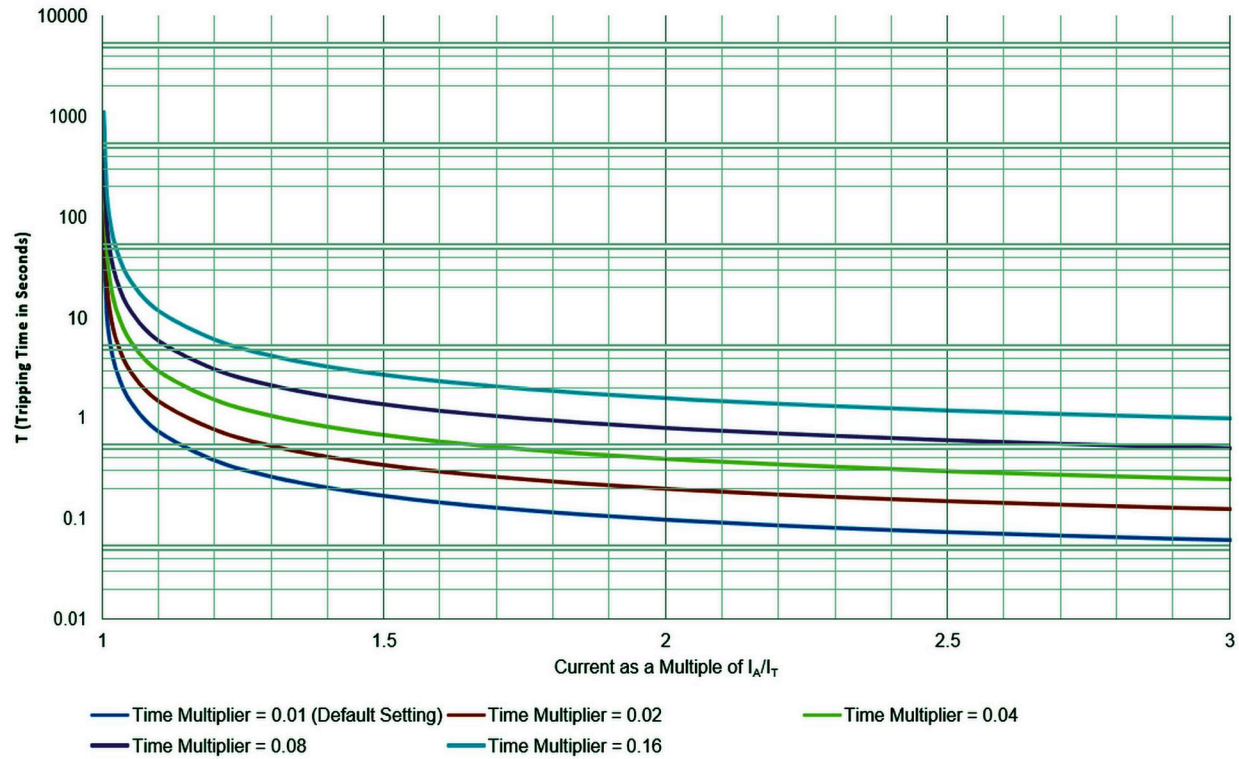


Illustration 86

g06531402

Short Circuit IDMT Alarm Curves

If Short Circuit alarm is enabled, the controller begins to follow the IDMT curve when the current on any phase passes the trip setting. The IDMT alarm triggers if the trip is surpassed for an excess amount of time.

t – Time multiplier setting

$$T = \frac{t \times 0.14}{\left(\left(\frac{I_A}{I_T} \right)^{0.02} - 1 \right)}$$

Illustration 87

g06533873

Formula for Tripping Time in Short Circuit Condition

The larger the short circuit fault, the faster the trip. The speed of the trip depends on the fixed formula, shown in Illustration 87.

The following are the parameter of the formula:

T – Tripping time in seconds (accurate to 5% or ± 50 ms (whichever is greater)).

I_A – Actual measured current

I_T – Trip point setting in current

Short Circuit

Enabled

☒

Action

Electrical Trip

Trip

200

%

1000

A

Time Multiplier

0.01

Illustration 88

g06531092

Factory Settings of DSE Configuration Suite Software

The settings shown in Illustration 88 are factory settings that are taken from Cat GCCP 1.2/1.3 Configuration Suite software.

Note: Due to large inrush currents from certain loads, such as motors or transformers, the default settings for short circuit alarm may need adjusting to compensate.

Alternator stator and rotor begin to overheat when the generator is overloaded. The aim of the IDMT alarm is to prevent the stator and rotor from being overloaded (heated). The amount of time for which the alternator can be safely overloaded is governed by high short circuit condition.

Creating Spreadsheet for Short Circuit IDMT Curve

The formula used to create spreadsheet for short circuit curve is the same as given in Illustration 87.

The formula can be simplified for addition into a spreadsheet. The formula is useful for trying out different values of timer multiplier setting "t", and viewing the results without testing on the generator.

	A	B	C	D	E	F
1		1.01	1.02	1.03	1.05	1.06
2	0.01	7.034242	25	11.11111	4	2.777778

Illustration 89

g06541843

Spreadsheet for Short Circuit IDMT Curve (typical example)

(A) t (time multiplier setting)

(B) T (tripping time in seconds)

(C) I_A / I_T (multiple of the Trip setting from 1.01 to 3.0 in steps of 0.1)

$$f_x = \frac{= (\$A2 * 0.14)}{(\text{POWER}((B\$1), 0.02) - 1)}$$

Illustration 90

g06531401

Tripping Time Cells Formula

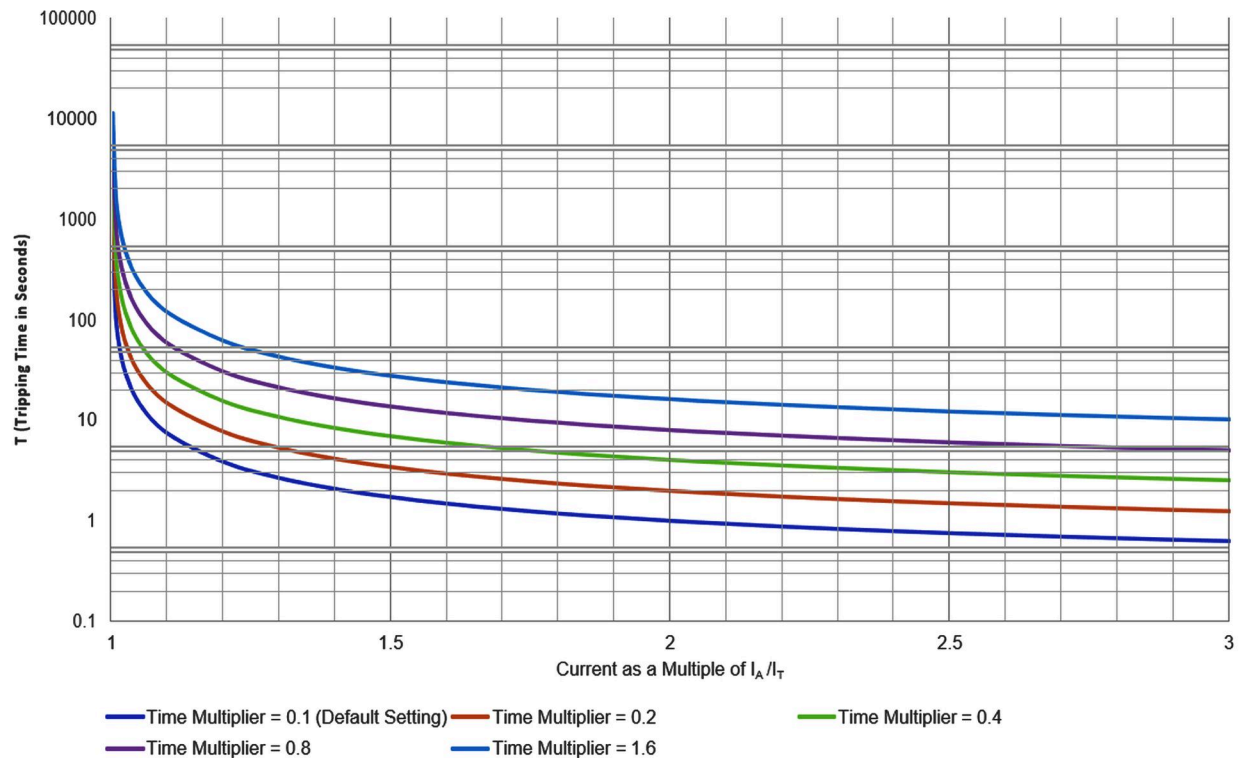


Illustration 91

g06531403

Earth Fault IDMT Alarm Curves

Default Current Protection Tripping Characteristics

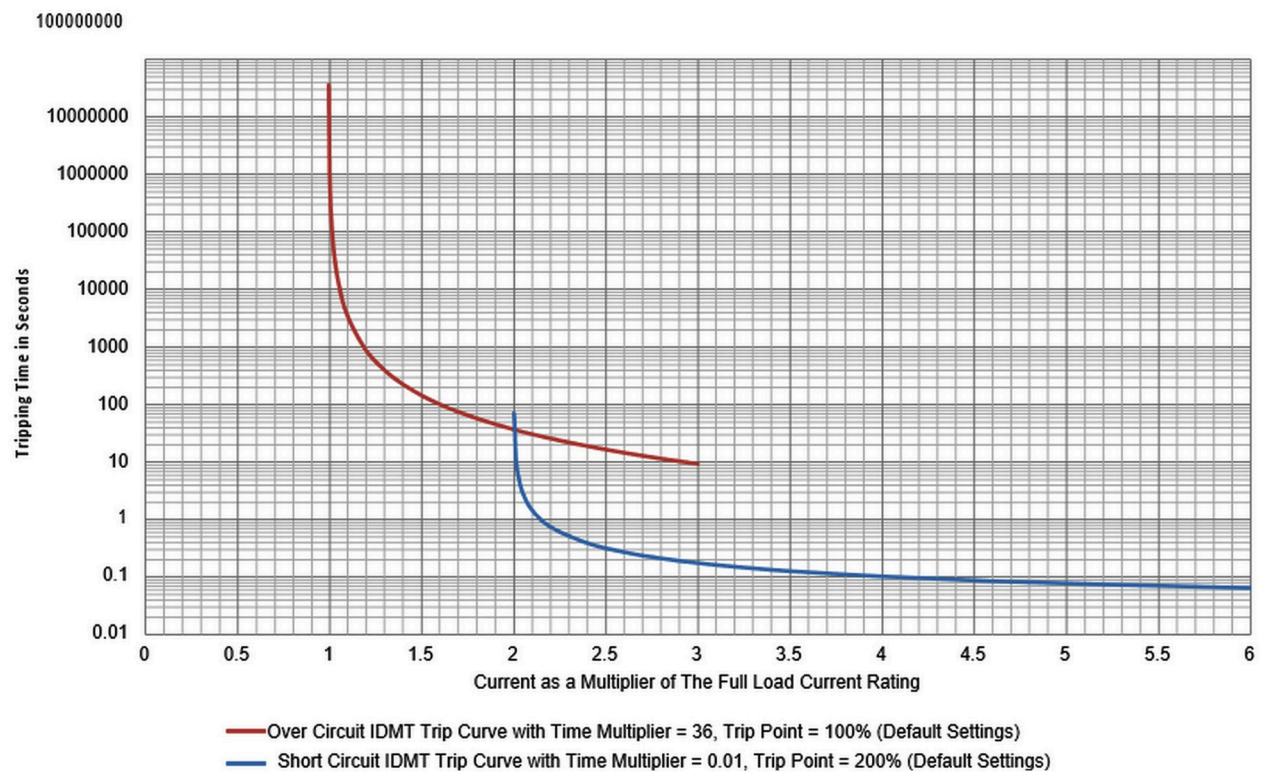


Illustration 92

g06531404

Cat GCCP 1.2/1.3 Default Configuration of Over Current, Short Circuit and, Earth Fault IDMT Alarm Curves

Cat GCCP 1.2/1.3 default settings for IDMT tripping curves for overcurrent, short circuit, and Earth fault protections are shown in Illustration 92. The default settings for overcurrent alarm allow the alternator to overload to the limit of a typical brushless alternator. The permitted overload is 110% for 1 hour or 200% for 36 seconds. The alternator begins to overheat in an overcurrent situation.

The aim of the overcurrent IDMT alarm is to prevent the windings from being overloaded (heated). The amount of time that the alternator can be safely overloaded is governed by high overload condition. The default settings for short circuit alarm allow an alternator to supply high current caused by a genuine short circuit or an inrush current of motor/transformer. The permitted overload is 300% for 0.17 seconds or 600% for 0.06 seconds.

The alternator begins to overheat to a point where the insulation breaks down, potentially causing a fire in a short circuit situation. The aim of the short circuit IDMT alarm is to prevent the insulation from melting due to excessive heat. The amount of time that the alternator can be safe in a short circuit condition is governed by the overload condition.

Front Panel Configuration

In front panel configuration mode, the operator can fully configure the module through the display without the use of Cat GCCP 1.2/1.3 Configuration Suite PC Software.



Illustration 93

g06531411

Fascia Buttons of Module
(15) Menu Navigation Button

Use the fascia buttons on the module shown in Illustration 93 to traverse the menu and make value changes to the parameters.

Main Configuration Editor

Accessing Main Configuration Editor

Note: More comprehension module configuration is possible via PC configuration software.

Press stop/reset mode button (20) to ensure that the engine is at rest and at the module. Press stop/reset mode button (20) and tick button together to enter the main configuration editor.

Entering Pin

Note: Entering PIN is not set by Caterpillar when the module leaves the factory. The module must be replaced if the code has been lost or forgotten.

If a module security PIN has been set, the PIN request is then shown.

Note: To ensure security, the PIN is automatically reset when the editor exits (manually or automatically) the security screen.

Follow the below steps to set or change the PIN number:

1. The first “#” changes to “0” . Press left or right menu navigation button (15) to adjust to the correct value.
2. Press right menu navigation button (15) when the first digit is correctly entered. The digit previously entered, now shows as “#” for security.
3. Repeat Step 1 and Step 2 for the other digits of the PIN number. Press left menu navigation button (15) to move back to adjust one of the previous digits.
4. The PIN is checked for validity when the center button in menu navigation button (15) is pressed after editing the final digit. If the number is incorrect, the PIN must be reentered.
5. The editor will display if the PIN has been successfully entered or if the module PIN was not enabled.

Editing Parameter

Note: Pressing and holding menu navigation button (15) provide the auto-repeat functionality. Values can be changed quickly by holding menu navigation buttons (15) for a prolonged period.

Follow the below procedure to edit a parameter:

1. Press left or right menu navigation button (15) to cycle the section to view/change.
2. Press up or down menu navigation button (15) to select the parameter to view/change within the current selected section.

3. Press center menu navigation button (15), to enter edit mode to edit the parameter. The parameter begins to flash to indicate editing.
4. Press left, right, up, or down menu navigation button (15) to change the parameter to the required value.
5. Press center menu navigation button (15) to save the value. The parameter ceases flashing to indicate that the parameter has been saved.

Exiting Main Configuration Editor

Note: To ensure security, the editor automatically exits after 5 minutes of inactivity.

- Press and hold stop/reset mode button (20) to exit the editor without saving the changes.
- Press and hold center menu navigation button (15) to exit the editor and save the changes.

Adjustable Parameters

Table 43

Section	Parameter as Shown on Display	Value
Module	Contrast	0%
	Language	English
	Current Date and Time	Month, Year, hh:mm
	Fast Loading	Active/Inactive
	Warnings Latched	
	Lamp Test At Start Up	
	Power Save Mode	
	Backlight Power Saving	Date and Time
	Event Log Display Format	
	Maintenance Pin Protect	
	Cool Down In Stop Mode	
	Hold Start Button To Crank	Active/Inactive
	Power Up In Mode	
	Audible Alarm Timer	Active/Inactive
	Suppress Instrument Generator Voltage	

(Table 43, contd)

Section	Parameter as Shown on Display	Value
	Suppress Instrument Generator	
	Frequency	
	Suppress Instrument Mains Voltage	
	Suppress Instrument Mains Frequency	
	Suppress Instrument Current	
	Suppress Instrument kW	
	Suppress Instrument kvar	
	Suppress Instrument kVA	
	Suppress Instrument Power Factor	
	Suppress Instrument kWh	
	Suppress Instrument kVARh	
	Suppress Instrument kVAh	
Engine Generator	Suppress Instrument Charge Alternator	3
	Start Attempts	
	Gas Engine Choke (Gas Engine Only)	0 h 0 m 0 s
	Gas Engine Delay (Gas Engine Only)	
	Ignition off Delay (Gas Engine Only)	
	Crank Disconnect Oil Pressure	
	Oil Pressure Check Prior to Starting	Active/Inactive
	Crank Disconnect Frequency	
	Crank Disconnect Engine Speed	Hz
	Crank Disconnect Oil Pressure	rpm
	Oil Pressure Low Shutdown	
		Bar/psi/kPa

(continued)

(continued)

(Table 43, contd)

Section	Parameter as Shown on Display	Value
	Oil Pressure Low Pre-Alarm	
	Coolant Temp Low Warning	0° C
	Coolant Temp High Pre-Alarm	
	Coolant Temp High Electrical Trip	
	Coolant Temp High Shutdown	
	Fuel Usage Running Rate	%
	Fuel Usage Stopped Rate	
	Specific Gravity	0.89
	Pre-Heat Temp	0° C
	Pre-Heat Timer	0 h 0 m 0 s
	Post-Heat Temp	0° C
	Post-Heat Timer	0 h 0 m 0 s
	Battery Under Voltage Warning [Enable]	Active/Inactive
	Battery Under Voltage Warning	V
	Battery Under Voltage Warning Return	
	Battery Under Voltage Warning Delay	0 h 0 m 0 s
	Battery Over Voltage Warning [Enable]	Active/Inactive
	Battery Over Voltage Warning Return	V
	Battery Over Voltage Warning	
	Battery Over Voltage Warning Delay	0 h 0 m 0 s
	Over Speed Shutdown [Trip]	0%
	Over Speed Delay	0.89
	Overspeed Overshoot	0° C
	Overspeed Overshoot [Delay]	0 h 0 m 0 s

(continued)

(Table 43, contd)

Section	Parameter as Shown on Display	Value
	Charge Alternator Failure Warning [Enable]	Active/Inactive
	Charge Alternator Failure Warning	V
	Charge Alternator Failure Warning Delay	0 h 0 m 0 s
	Charge Alternator Failure Shutdown [Enable]	Active/Inactive
	Charge Alternator Failure Shutdown	V
	Charge Alternator Failure Shut down Delay	0 h 0 m 0 s
	Low Battery Start [Enable]	Active/Inactive
	Low Battery Run On Load [Enable]	
	Low Battery Start Threshold	0 V
	Low Battery Start Delay	0 h 0 m 0 s
	Low Battery Run Time	
	Magnetic Pickup [Enable]	Active/Inactive
	AC System	Three Phase, Four Wire
	Alternator Fitted	Active/Inactive
	Alternator Poles	4
	Under Voltage Alarm [Enable]	Active/Inactive
	Under Voltage Alarm [Trip]	V
	Under Voltage Pre-Alarm [Enable]	Active/Inactive
	Under Voltage Pre-Alarm [Trip]	V
	Under Voltage Delay	0 s
	Loading Voltage	V
	Nominal Voltage	

(continued)

(Table 43, contd)

Section	Parameter as Shown on Display	Value
	Over Voltage Pre-Alarm [Enable]	Active / Inactive
	Over Voltage Pre-Alarm Return	V
	Over Voltage Pre-Alarm [Trip]	
	Over Voltage Shutdown [Trip]	
	Over Voltage Delay	0 s
	Under Frequency Alarm [Enable]	Active/Inactive
	Under Frequency Alarm [Trip]	Hz
	Under Frequency Pre-Alarm [Enable]	Active/Inactive
	Under Frequency Pre-Alarm [Trip]	Hz
	Under Frequency Delay	0 s
	Loading Frequency	Hz
	Nominal Frequency	
	Over Frequency Pre-Alarm [Enable]	Active/Inactive
	Over Frequency Pre-Alarm Return	Hz
	Over Frequency Pre-Alarm [Trip]	
	Over Frequency Shutdown [Trip]	
	Over Frequency Delay	0 s
	Frequency Over-shoot Shutdown	%
	Frequency Over-shoot Delay	0 h 0 m 0 s
	CT Location	Gen / Load
	CT Primary	A
	CT Location	Gen / Load
	CT Primary	A
	Full Load Rating	
	Immediate Over Current [Enable]	Active/Inactive

(continued)

(Table 43, contd)

Section	Parameter as Shown on Display	Value
	Delayed Over Current [Enable]	
	Delayed Over Current	%
	Full Load kW Rating	kW
	kW Overload Alarm [Enable]	Active/Inactive
	kW Overload Alarm Action	Indication/Warning/ Electrical Trip/ Shutdown
	kW Overload Alarm Trip	%
	kW Overload Alarm Delay	0 h 0 m 0 s
	Start Delay Off Load	0 h 0 m 0 s
	Start Delay On Load	
	Start Delay Mains Fail	
	Start Delay Telemetry	
Timers	Mains Transient Delay	0 m 0 s
	Crank Duration Timer	
	Crank Rest Timer	
	Smoke Limiting	
	Smoke Limiting Off	
	DPF Ramp	0 s
	Safety On Delay	0 m 0 s
	Warming	0 h 0 m 0 s
	ECU Override	0 m 0 s
	Mains Transfer Time	
	Breaker Close Pulse	0 s
	Breaker Trip Pulse	
	Return Delay	0 h 0 m 0 s
	Cooling	
	Cooling at Idle	
	ETS Solenoid Hold	0 m 0 s

(continued)

(Table 43, contd)

Section	Parameter as Shown on Display	Value
	Fail To Stop Delay	0 h 0 m 0 s
	LCD Page Timer	
	LCD Scroll Delay	
CAN ECU	Alternate Engine Speed	-
	ECU Data Fail	
	ECU Data Fail Action	
	ECU Data Fail Delay	
	Use Module Oil Pressure	
	Use Module Coolant Temp	
	Use Module Engine Hours	
	Use Module RPM	
Maintenance Alarms	Use Module Charge Alt	-
	Maintenance Alarm 1 [Enable]	Active/Inactive
	Maintenance Alarm 1 Action	Warning/Electrical Trip/Shutdown
	Maintenance Alarm 1 Engine Hours	Hours
	Maintenance Alarm 1 On Due Date	Active/Inactive
	Maintenance Alarm 1 Interval	MTH
	Maintenance Alarm 2 [Enable]	Active/Inactive
	Maintenance Alarm 2 Action	Warning/Electrical Trip/Shutdown
	Maintenance Alarm 2 Engine Hours	Hours
	Maintenance Alarm 2 On Due Date [Enable]	Active/Inactive
	Maintenance Alarm 2 Interval	MTH
	Maintenance Alarm 3 [Enable]	Active/Inactive
	Maintenance Alarm 3 Action	Warning/Electrical Trip/Shutdown

(continued)

(Table 43, contd)

Section	Parameter as Shown on Display	Value
	Maintenance Alarm 3 Engine Hours	Hours
	Maintenance Alarm 3 On Due Date [Enable]	Active/Inactive
	Maintenance Alarm 3 Interval	MTH
Outputs	Digital Output A Source	Refer to Section "Output Sources".
	Digital Output A Polarity	Energize/De-energize
	Digital Output B Source	Refer to Section "Output Sources".
	Digital Output B Polarity	Energize/De-energize
	Digital Output C Source	Refer to Section "Output Sources".
	Digital Output C Polarity	Energize/De-energize
	Digital Output D Source	Refer to Section "Output Sources".
	Digital Output D Polarity	Energize/De-energize
	Digital Output E Source	Refer to Section "Output Sources".
	Digital Output E Polarity	Energize/De-energize
	Digital Output F Source	Refer to Section "Output Sources".
	Digital Output F Polarity	Energize/De-energize
	Digital Output G Source	Refer to Section "Output Sources".
	Digital Output G Polarity	Energize/De-energize
	Digital Output H Source	Refer to Section "Output Sources".
	Digital Output H Polarity	Energize/De-energize
	LCD Indicator 1 Source	Refer to Section "Output Sources".
	LCD Indicator 1 Polarity	Liter/Unit
	LCD Indicator 2 Source	Refer to Section "Output Sources".

(continued)

(Table 43, contd)

Section	Parameter as Shown on Display	Value
	LCD Indicator 2 Polarity	Liter/Unit
	LCD Indicator 3 Source	Refer to Section "Output Sources".
	LCD Indicator 3 Polarity	Liter/Unit
Schedule	Schedule Enable	Active/Inactive
	Schedule Period Bank 1	Weekly/Monthly
	Bank 1 Schedule 1 to 8	Press the Tick button to begin editing then up or down when selecting the different parameters.
	Schedule Period Bank 2	Weekly/Monthly
	Bank 2 Schedule 1 to 8	Press the Tick button to begin editing then up or down when selecting the different parameters.

Output Sources

Table 44

Output Sources	
0	Not Used
1	Air Flap Relay
2	Alarm Mute
3	Alarm Reset
4	Alternator Config 1 Selected
5	Alternator Config 2 Selected
6	Alternator Config 3 Selected
7	Alternator Config 4 Selected
8	Alternator Config 5 Selected
9	Analogue Input A
10	Analogue Input B
11	Analogue Input C
12	Analogue Input D
13	Arm Safety On Alarms
14	Audible Alarm
15	Auto Restore Inhibit

(continued)

(Table 44, contd)

Output Sources	
16	Auto Start Inhibit
17	Auxiliary Mains Failure
18	Battery High Volts
19	Battery Low Volts
20	Call For Scheduled Run
21	Charge Alt Fail Shutdown
22	Charge Alt Fail wiring
23	Close Gen Output
24	Close Gen Pulse
25	Close Mains Output
26	Close Mains Pulse
27	Combined Mains Failure
28	Maintenance Alm 1, 2, 3
29	Common Low / High Frequency Alarm
30	Combined Low / High Frequency Warning
31	Combined Low / High Volt Alm
32	Combined Low / High Volt Wng
33	Common Alarm
34	Common E Trip
35	Common Shutdown
36	Common Warning
37	Config CAN 1 Active
38	Config CAN 10 Active
39	Config CAN 2 Active
40	Config CAN 3 Active
41	Config CAN 4 Active
42	Config CAN 5 Active
43	Config CAN 6 Active
44	Config CAN 7 Active
45	Config CAN 8 Active
46	Config CAN 9 Active
47	Coolant Cooler Control
48	Coolant Heater Control
49	Coolant Temp Switch
50	Cooling Down
51	Data Logging Active
52	DEF Level Low
53	DEF Level Low Alarm

(continued)

(Table 44, contd)

Output Sources	
54	Digital Input A
55	Digital Input B
56	Digital Input C
57	Digital Input D
58	Digital Input E
59	Digital Input F
60	Digital Input G
61	Digital Input H
62	HTR Fitted and ON
63	DPF Forced Regen Requested
64	DPF Non-Mission
65	DPF Regen Active
66	DPF Regen Interlock
67	DPTC Filter
68	Droop Enable
69	ECU (ECM) Data Fail
70	ECU (ECM) Power
71	ECU (ECM) Shutdown
72	ECU (ECM) Stop
73	ECU (ECM) Warning
74	ECU Pre-Heat
75	EJP 1
76	EJP 2
77	Emergency Stop
78	Energize to stop
79	External Panel Lock
80	Fail to Start
81	Fail to Stop
82	Fan Control
83	Flex Sensor A High Alarm
84	Flex Sensor A High Pre-Alm
85	Flex Sensor A Low Alarm
86	Flex Sensor A Low Pre-Alm
87	Flex Sensor A OC
88	Flex Sensor B High Alarm
89	Flex Sensor B High Pre-Alm
90	Flex Sensor B Low Alarm
91	Flex Sensor B Low Pre-Alm

(continued)

(Table 44, contd)

Output Sources	
92	Flex Sensor B OC
93	Flex Sensor C High Alarm
94	Flex Sensor C High Pre-Alm
95	Flex Sensor C Low Alarm
96	Flex Sensor C Low Pre-Alm
97	Flex Sensor C OC
98	Flex Sensor D High Alarm
99	Flex Sensor D High Pre-Alm
100	Flex Sensor D Low Alarm
101	Flex Sensor D Low Pre-Alm
102	Flex Sensor D OC
103	Fuel Level High Alarm
104	Fuel Level High Pre-Alm
105	Fuel Level Low Alarm
106	Fuel Level Low Pre-Alm
107	Fuel Pump Control
108	Fuel Relay
109	Fuel Sensor OC
110	Fuel Tank Bund Level High
111	Fuel Usage Alarm
112	Gas Choke ON
113	Gas Ignition
114	Gen Loading Freq Not Reached
115	Gen Loading Volts Not Reached
116	Gen Hi Freq Overshoot Alm
117	Gen Hi Freq Overshoot Wng
118	Gen Available
119	Gen Closed Aux
120	Gen Excite
121	Gen High Volts Alarm
122	Gen High Volts Warning
123	Gen High Volts Shutdown
124	Gen Load Inhibit
125	Gen Low Volts Alarm
126	Gen Low Volts Warning
127	Gen High Frequency Alarm
128	Gen High Frequency Delayed Alarm

(continued)

(Table 44, contd)

Output Sources	
129	Gen High Frequency Delayed Warning
130	Gen Ph Rotation Alarm
131	Gen Reverse Power
132	HEST Active
133	High Coolant Temp E Trip
134	High Coolant Temperature Shutdown
135	High Coolant Temperature Warning
136	High Inlet Temperature Shutdown
137	High Inlet Temperature Warning
138	Inhibit Schedule Run
139	kW Overload Alarm
140	Lamp Test
141	Load Freq Not Reached
142	Load Volts Not Reached
143	Loss of MPU Signal
144	Louvre Control
145	Low Coolant Temp
146	Low Load
147	Low Oil Pressure Sdn
148	Low Oil Pressure Wng
149	Main Configuration Selected
150	Mains Closed Aux
151	Mains Failure
152	Mains High Freq
153	Mains High Volts
154	Mains Load Inhibit
155	Mains Low Freq
156	Mains Low Volts
157	Mains Ph Rotation Alarm
158	Maintenance Alarm 1 Due
159	Maintenance Alarm 2 Due
160	Maintenance Alarm 3 Due
161	Manual Restore Contact
162	MPU Open Circuit
163	Negative Ph Sequence Alm
164	Oil Pressure Sensor OC
165	Oil Pressure Switch
166	Open Gen Output
167	Open Gen Pulse

(continued)

(Table 44, contd)

Output Sources	
168	Open Mains Output
169	Open Mains Pulse
170	Over Current IDMT Alarm
171	Over Current Imm Warning
172	Over Frequency Runaway
173	Over Frequency Warning
174	Over Speed Runaway
175	Over Speed Shutdown
176	Over Speed Warning
177	Overspeed Delayed Alarm
178	Overspeed Delayed Wng
179	Overspeed Overshoot Alarm
180	Overspeed Overshoot Wng
181	Preheat During Preheat Timer
182	Preheat Until Crank End
183	Preheat Until End Of Safety
184	Preheat Until End Of Warming
185	Protections Disabled
186	Remote Control 1
187	Remote Control 10
188	Remote Control 2
189	Remote Control 3
190	Remote Control 4
191	Remote Control 5
192	Remote Control 6
193	Remote Control 7
194	Remote Control 8
195	Remote Control 9
196	Remote Start Off Load
197	Remote Start On Load
198	Reset Maintenance 1
199	Reset Maintenance 2
200	Reset Maintenance 3
201	Scheduled Auto Start Inhibit
202	SCR Inducement
203	Screensaver Active
204	Shutdown Blocked
205	Simulate Auto Button

(continued)

(Table 44, contd)

Output Sources	
206	Simulate Close Gen
207	Simulate Lamp Test
208	Simulate Mains Available
209	Simulate Manual
210	Simulate Open Gen
211	Simulate Start
212	Simulate Stop
213	Simulate Test On Load
214	Smoke Limiting
215	Start Relay
216	Stop And Panel Lock
217	System In Auto Mode
218	System In Man Mode
219	System In Stop Mode
220	System In Test Mode
221	Telemetry Active
222	Telemetry Data Active
223	Temp Sensor OC
224	Low Frequency Alarm
225	Low Frequency Warning
226	Low Speed Alarm
227	Low Speed Warning
228	Wait For Man Restore
229	Water in Fuel

Running Configuration Editor

Accessing Running Configuration Editor

Running editor may be accessed during generator set operation. Press and hold center navigation button (15) to access the “Running Editor” .

Entering PIN

Note: Entering PIN is not set by Caterpillar when the module leaves the factory. If the code has been “lost” or “forgotten” , the module must be replaced.

Note: PIN is automatically reset when the editor is exited (manually or automatically) to ensure security.

The PIN is not requested while accessing the running editor even if a module security PIN has been set.

Editing Parameter

Note: Pressing and holding menu navigation button (15) provide auto-repeat functionality. Long press the buttons to change the values quickly.

Follow the below procedure to edit a parameter:

1. Select the configuration to be edited by pressing up or down menu navigation button (15).
2. Press left or right menu navigation button (15) to cycle to the section to view or change.
3. Press up or down menu navigation button (15) to select the parameter within the current selected section to view or change.
4. Press center menu navigation button (15) to enter edit mode. The parameter begins to flash to indicate editing.
5. Press up or down menu navigation button (15) to change the parameter to the required value.
6. Press center menu navigation button (15) to save the value. The parameter ceases flashing to indicate that the parameter has been saved.

Exiting Running Configuration Editor

Note: To ensure security, the editor automatically exits after 5 minutes of inactivity.

Press and hold center menu navigation button (15) to exit the editor, and save the changes.

Running Editor Parameters

Table 45

Section	Parameter	Values
Module	Contrast	%
	Language	English / Other
Engine	Manual Frequency Trim	0.0 Hz
	Speed Bias	0.0 Unit
	Governor Gain	0.0
	Frequency Adjust	0.0 Hz
	DPF Auto Regen Inhibit	Active / Inactive
	DPF Manual Regen Request	
	ECU Service Mode	

Commissioning

Basic Checks

Note: Link the input to DC positive if emergency stop feature is not required.

Perform the following checks before starting the system:

- The unit is adequately cooled and all the wiring to the module is of standard and rating compatibility with the system.
- All mechanical parts are correctly fitted and that all electrical connections (including Earths) are in good condition.
- The unit DC supply is fused and connected to battery and that the unit is of correct polarity.
- The emergency stop input is wired to an external “Normally closed” switch that is connected to the DC positive.

Note: To check the start cycle operation, prevent the engine from starting by disabling the operation of the fuel solenoid. Connect the battery supply after visual inspection. Press manual mode button (22) followed by the start button (25) until the start sequence commences.

The starter engages and operates for a pre-set crank period. After the starter motor has attempted to start the engine for a pre-set number of attempts, the LCD displays “Failed to Start”. Press stop/reset button (20) to reset the unit.

Restore the engine to operational status (reconnect the fuel solenoid). Press manual mode button (22) followed by start button (25). The engine should start and the starter motor should disengage automatically. The engine is fully operational and the fuel solenoid is operating if the engine does not start and the starter motor does not disengage automatically.

The engine should run at rated speed. If the engine does not run at the rated speed and an alarm is present, check if the alarm is valid and the check input wiring. The engine should continue to run for an indefinite period. The engine and alternator parameters can be viewed when the engine is running. Refer to Section “Description of Controls”. Press auto mode button (23). The engine runs for a pre-set cooling down period, then stops.

The generator should stay in the standby mode. If generator does not stay in the standby mode, check if the remote start input is not active. Initiate an automatic start by supplying a remote start signal, if configured. The start sequence should commence and the engine should run up to the rated speed.

Once the generator is available, the delayed load outputs activate and the generator should accept the load. If the generator does not accept the load, check the wiring to the delayed load output contactors. Verify that the warning timer has timed out.

Remove the remote start signal. The return sequence begins. Generator unloads after a pre-set time. The generator should run for a pre-set period and then shutdown into standby mode. Set the internal clock/ calendar of the modules to ensure correct operation of the scheduler and event logging functions. Refer to Section “Front Panel Configuration” for details of the procedure.

Note: Check the connections between the controller and the customer system. Contact Caterpillar Dealer Solution Network (DSN), if the unit does not function as stated previously, after checking.

CAN Interface Specification (SAE J1939-75)

Use ECU port for live operational communications between Cat GCCP 1.2/1.3 and other CAN enabled devices. The below specification details all broadcast messages which are transmitted when SAE J1939-75 is enabled and the relevant engine file is selected.

Table 46

Parameter	Description
Protocol	SAE J1939 with PGNs as listed in the following subsections.
Bit Rate	250 kb/s
Isolation	$\pm 2.5 \text{ kV}_{\text{rms}}$
Termination	120 ohm termination resistor, with the option for direct PCB installation.

Instrumentation and Control

Broadcast Messages SAE J1939-75

Note: All configurable broadcast CAN messages are priority 3 by default. Priority of the messages cannot be changed.

The parameter groups under Section “Instrumentation and Control” are broadcasted by Cat GCCP 1.2/1.3.

Note: SPNs that are not implemented in Cat GCCP 1.2/1.3 have all bits set to “1”.

Note: “PDU Format” and “PDU Specific” are shown in Hexadecimal.

Note: Values larger than 8 bits utilize “Little-Endian” format. A 16-bit value occupying 2 bytes have “Byte1” as the most significant byte and “Byte2” as the least significant byte.

ACS-AC Switching Device Status

PGN 64913

Table 47

Priority	Extension Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FD	91	8 bytes	250 ms

Table 48

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
ODD9	3545	Generator Breaker Status - Indicates measured state of the generator circuit breaker.	Byte 1 Bits 1 to 3	000: Open 001: Closed 010: Locked Out 011-101: Available for SAE assignment 110: Error 111: Not available	0	N/A
ODDA	3546	Utility Circuit Breaker - Indicates the measured state of the utility circuit breaker.	Byte 1 Bits 4 to 6	000: Open 001: Closed 010: Locked Out 011-101: Available for SAE assignment 110: Error 111: Not available	0	N/A

GC1 - Generator Control 1

PGN 64915

Table 49

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FD	93	8 bytes	100 ms

Table 50

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0DEF	3567	Generator Control Not in Automatic Start State - Indicates whether the generator set is in a condition to start-up automatically and provide power. The parameter remains in the active state if the generator does not automatically start up and power up.	Byte 1 Bits 4 to 5	00: Inactive (ready to start automatically) 01: Active (not ready to start automatically) 10: Error 11: Not available	0	N/A

GAAC - Generator Average Basic AC Quantities

PGN 65030

Table 51

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FE	6	8 bytes	100 ms

Table 52

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0988	2440	Generator Average L-L AC Voltage	Byte 1 to 2	1	0	V
098C	2444	Generator Average L-N AC Voltage	Byte 3 to 4	1	0	V
0984	2436	Generator Average AC Frequency	Byte 5 to 6	1/128 Hz/bit	0	Hz
0990	2448	Generator Average AC RMS Current	Byte 7 to 8	1	0	A

GPAAC - Generator Phase A Basic AC Quantities**PGN 65027**

Table 53

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FE	3	8 bytes	100 ms

Table 54

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0985	2437	Generator Phase A AC Frequency	Byte 5 to 6	128	0	V
0989	2441	Generator Phase A Line AC RMS Voltage	Byte 1 to 2	1	0	V
098D	2445	Generator Phase A Line Neutral AC RMS Voltage	Byte 3 to 4	1	0	A
0991	2449	Generator Phase A AC RMS Current	Byte 7 to 8	1	0	Hz

GPAACP - Generator Phase A AC Power**PGN 65026**

Table 55

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FE	2	8 bytes	100 ms

Table 56

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0993	2453	Generator Phase A Real Power	Byte 1 to 4	1	-2*10 ⁹	W
099D	2461	Generator Phase A Apparent Power	Byte 5 to 8			

GPAACR - Generator Phase A AC Reactive Power**PGN 65025**

Table 57

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FE	0	8 bytes	100 ms

Table 58

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0986	2438	Generator Phase B AC Frequency	Byte 5 to 6	0.078125	0	Hz
098A	2442	Generator Phase B Line AC RMS Voltage	Byte 1 to 2	1	0	V
098E	2446	Generator Phase B Line Neutral AC RMS Voltage	Byte 3 to 4	1	0	V
0992	2450	Generator Phase B AC RMS Current	Byte 7 to 8	1	0	A

GPBACP - Generator Phase B AC Power**PGN 65023**

Table 59

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FD	FF	8 bytes	100 ms

Table 60

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0996	2454	Generator Phase B Real Power	Byte 1 to 4	1	-2*10 ⁹	W
099E	2462	Generator Phase A Apparent Power	Byte 5 to 8			

GPBACR - Generator Phase B AC Reactive Power**PGN 65022**

Table 61

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FD	FE	8 bytes	100 ms

Table 62

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0996	2454	Generator Phase B Reactive Power	Byte 1 to 4	1	-2*10 ⁹	VAR

GPCAC - Generator Phase C Basic AC Quantities**PGN 65021**

Table 63

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FD	FD	8 bytes	100 ms

Table 64

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0987	2439	Generator Phase C AC Frequency	Byte 5 to 6	0.078125	0	Hz
098B	2443	Generator Phase B Line AC RMS Voltage	Byte 1 to 2	1	0	V
098F	2447	Generator Phase B Line Neutral AC RMS Voltage	Byte 3 to 4	1	0	V
0993	2451	Generator Phase B AC RMS Current	Byte 7 to 8	1	0	A

GPCACP - Generator Phase C AC Power**PGN 65020**

Table 65

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FD	FF	8 bytes	100 ms

Table 66

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0997	2455	Generator Phase C Real Power	Byte 1 to 4	1	-2*10 ⁹	W
099F	2463	Generator Phase C Apparent Power	Byte 5 to 8			

GPCACR- Generator Phase C AC Reactive Power**PGN 65019**

Table 67

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FD	FB	8 bytes	100 ms

Table 68

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
099B	2459	Generator Phase C Reactive Power	Byte 1 to 4	1	-2*10 ⁹	VAR

GTACPP- Generator Total AC Percent Power**PGN 64911**

Table 69

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FD	8F	8 bytes	250 ms

Table 70

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0E06	3590	Generator Total Percent kW as a percentage of rated power	Byte 1 to 2	0.0078125	-251	%

GTACE- Generator Total kW Hours Export**PGN 65018**

Table 71

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FD	FA	8 bytes	100 ms

Table 72

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0E06	3590	Generator Total kW Hours Export	Byte 1 to 4	1	0	kWh

GTACER- Generator Total AC Reactive Energy**PGN 64910**

Table 73

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FD	8E	8 bytes	250 ms

Table 74

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0E09	3593	Generator Total kVAr Hours Export	Byte 1 to 4	1	0	kVARh

GTACP- Generator Total AC Power**PGN 65029**

Table 75

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FE	5	8 bytes	100 ms

Table 76

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0994	2452	Generator Total Real Power	Byte 1 to 4	1	-2*10 ⁹	W
099C	2460	Generator Total Apparent Power	Byte 5 to 8			VA

GTACR- Generator Total AC Power**PGN 65028**

Table 77

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FE	4	8	100 ms

Table 78

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0988	2456	Generator Total Reactive Power	Byte 1 to 4	1	-2*10 ⁹	VAR
09A0	2464	Generator Overall Power Factor	Byte 5 to 6	-1	6.103515625E05	pF
09D6	2518	Generator Overall Power Factor Lagging	Byte 7 to 8	1	0	+/-

Broadcast Messages Engine Instrumentation

Note: Availability of the engine instrumentation PGNs depends upon the engine file that is selected within the configuration of Cat GCCP 1.2/1.3 control panel.

Dash Display (DD)

PGN 65276

Table 79

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FE	FC	8 bytes	1000 ms

Table 80

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
060	96	Ratio of volume of fuel to the total volume of fuel storage container	Byte 2	0.4	0	%

EC2- Engine Configuration 2

PGN 64895

Table 81

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FD	7F	8 bytes	Request

Table 82

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0E56	3670	Maximum Crank Attempts per Start Attempt	Byte 1	1	0	N/A

EEC1- Engine Speed

PGN 61444

Table 83

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	F0	4	8 bytes	100 ms

Table 84

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0BE	190	Engine Speed	Byte 4 to 5	0.125	0	RPM

EEC4- Crank Attempt Count on Present Start Attempt

PGN 65214

Table 85

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FE	FB	8 bytes	Request

Table 86

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0E57	3671	Crank Attempt Count on Present Start Attempt	Byte 6	1	0	N/A

EFL_P1 - Oil Pressure

PGN 65263

Table 87

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FE	EF	8 bytes	500 ms

Table 88

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
064	100	Oil Pressure	Byte 4	4	0	kPa

EOI - Emergency Stop

PGN 64914

Table 89

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FD	92	8 bytes	250 ms

Table 90

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0E17	3607	Emergency Stop 00: Off (No Shutdown Requested) 01: On (Shutdown Requested) 10: Reserved 11: Do not care / take no action	Byte 6 Byte 6 to 8	1	0	N/A

ET1 - Coolant Temperature

PGN 65262

Table 91

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FE	EE	8 bytes	1000 ms

Table 92

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
06E	110	Engine Coolant Temperature	Byte 1	1	-40	°C

Hours - Engine Hour Revolutions

PGN 65253

Table 93

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FE	E5	8 bytes	Request

Table 94

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0F7	247	Engine Total Hours of Operation	Byte 1 to 4	0.05	0	hr

VEP1 - Vehicle Electrical Power

PGN 65271

Table 95

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
3	0	0	FE	F7	8 bytes	1000 ms

Table 96

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
0A7	167	Charge Alternator Voltage	Byte 1 to 4	0.05	0	V
0A8	168	Plant Battery Voltage	Byte 5 to 6			

DM01 - Conditions Active Diagnostic Trouble Codes

Note: Availability of “Engine Alarm” SPN and FMI depends upon the engine file that is selected within the configuration of Cat GCCP 1.2/1.3 control panel.

Note: DM1 priority will remain as six if only one DM1 alarm is active. Priority will be seven if two or more DM1 alarms are active.

PGN65226

Table 97

Priority	Ext Data Page	Data Page	PDU Format	PDU Specific	Size	Rate
6/7	0	0	FE	CA	8 bytes	1000 ms

Table 98

SPN		Instrument	Byte / Bit	Scaling	Offset	Unit
Hex	Decimal					
04BE	1214	Suspect Parameter Number	Byte 3 Bits 1 to 19	1	0	N/A
04BF	1215	Failure Mode Identifier	Byte 5 Bits 1 to 5			
06AA	1706	SPN Conversion Method	Byte 6 Bit 7			

DM1 Conditions

Table 99

Key	Value
Low Fault- Least Severe	17
High Fault- Least Severe	15
Low Fault- Most Severe	1
High Fault- Most Severe	0
Erratic- Incorrect Data	2

Table 100

Generator Alarm Condition	SPN	Warning FMI	Shutdown FMI
Generator Average AC Frequency Under	2436	17	1
SPN Generator Average Line-Line AC RMS Voltage Over	2436	15	0
Generator Average Line-Line AC RMS Voltage Under	2440	17	1
Generator Average Line-Line AC RMS Voltage Over	2440	15	0
Generator Average Line-Neutral AC RMS Voltage Under	2444	17	1
Generator Average Line-Neutral AC RMS Voltage Over	2444	15	0
Generator Average AC RMS Current Over	2448	15	0

Table 101

Engine Alarm Condition	SPN	Warning FMI	Shutdown FMI
Fuel Level Low	96	17	1
Oil Pressure Low (Analogue Sensor)	100	17	1
Oil Pressure Low (Digital Input)	100	17	1
Oil Pressure Sensor Fault	100	2	2
Coolant Temperature High (Analogue Sensor)	110	15	0
Coolant Temperature High (Digital Input)	110	15	0

(continued)

(Table 101, contd)

Engine Alarm Condition	SPN	Warning FMI	Shutdown FMI
Coolant Temperature Sensor Fault	110	2	2
Charge Alternator Failed	167	17	1
Plant Battery Voltage High	168	15	0
Plant Battery Voltage Low	168	17	1
Overspeed	190	15	0
Underspeed	190	17	1

Fault Finding

Note: Fault finding is provided as a guide check-list only. As the module can be configured to provide a wide range of different features, always refer to the source of the module configuration.

Starting

Table 102

Symptom	Possible Remedy
Unit is inoperative Read/Write configuration does not operate	Check the battery and wiring to the unit. Check the DC supply. Check the DC fuse.
Unit shuts down	Ensure that the DC supply voltage is not above 35 V or below 9 V. Ensure that the operating temperature is not above 70° C (158° F). Check the DC fuse.
Fail to start is activated after preset number of attempts to start	Check the wiring of the fuel solenoid. Check fuel. Check the battery supply. Check if battery supply is present at the fuel output of the module. Check if speed-sensing signal is present at the inputs of the module.
Continuous starting of generator when in the Auto Mode	Ensure that no signal is present at the remote start input. Ensure that the configured polarity is correct.
Generator fails to start on receipt of "Remote Start" signal	Check if start delay timer has timed out. Check signal at the remote start input. Confirm that correct configuration of input is configured as remote start. Check if the oil pressure switch or sensor is indicating low oil pressure to the controller. Depending upon the configuration, the set does not start if oil pressure is not low.
Preheat inoperative	Check the wiring to the engine heater plugs. Check the battery supply. Check if the battery supply is present at the pre-heat output of the module. Check if pre-heat configuration is correct.
Starter motor inoperative	Check the wiring to the starter solenoid. Check the battery supply. Check if battery supply is present at the starter output of the module. Ensure that the oil pressure switch or sensor is indicating "Low Oil Pressure" state to the controller.

Loading

Table 103

Symptom	Possible Remedy
Engine runs but generator does not take load	Check if warmup timer has timed out. Ensure that the generator load inhibit signal is not present at the module inputs. Check connections to the switching device.
Incorrect reading in engine gauges ⁽¹⁾	Check is the engine is operating correctly.
Fail to stop alarm when engine is at rest	Check if sensor is compatible with the module and that the module configuration is suited to the sensor.

⁽¹⁾ Set does not take load in manual mode unless there is an active load signal.

Alarms

Table 104

Symptom	Possible Remedy
"Oil Pressure Low" fault operates after engine has fired	Check engine oil pressure. Check oil pressure switch/sensor and wiring. Check configured polarity (if applicable) is correct (Normally Open or Normally Closed) or that sensor is compatible with the module and is correctly configured.
"Coolant Temperature High" fault operates after engine has fired	Check engine temperature. Check switch/sensor and wiring. Check configured polarity (if applicable) is correct (Normally Open or Normally Closed) or that sensor is compatible with the module.
"Shutdown" fault operates	Check the relevant switch and wiring of the fault indicated on the LCD display. Check configuration of the input.
"Electrical Trip" fault operates	
Warning fault operates	
ECU Amber ECU Red	Indicates the fault condition that is detected by the engine ECU and transmitted to Cat GCCP 1.2/1.3 controller.
ECU Data Fail	Indicates failure of CAN data link to the engine ECU. Check all wiring and termination resistors, if required.
Incorrect reading on engine gauges	Check if the engine is correctly operating. Check if the sensor and wiring are paying particular attention to the wiring to terminal 14.
"Fail to Stop" alarm when engine is at rest	Check if the sensor is compatible with the module and that the module configuration is suited to the sensor.

Communications

Table 105

Symptom	Possible Remedy
ECU Data Fail	Indicates failure of CAN data link to the engine ECU. Check all wiring and termination resistors, if required.

Instruments

Table 106

Symptom	Possible Remedy
Inaccurate generator measurements on controller display	Check if CT primary, CT secondary, and VT ratio settings are correct for the application. Check if the CTs are wired correctly about the direction of current flow (p1 and p2, and s1 and s2). Also ensure that the CTs are connected to the correct phase. Error occurs if CT1 is connected to phase 2. Consider the power factor ($kW = kVA \times \text{power factor}$). The controller is true RMS measuring and gives more accurate value when compared with "averaging" meter such as an Analogue panel meter or lower specified digital multimeters. Accuracy of the controller is better than 1% of full scale. Generator voltage full scale is 415 V ph-N and accuracy is ± 4.15 V (1% of 415 V).

Glossary of Terms

Table 107

Term	Abbreviation	Description
Cat GCCP 1.2/1.3 Control Panel	-	-
CAN	Controller Area Network	Vehicle standard to allow digital devices communicate to one another.
CDMA	Code Division Multiple Access	Cell phone access used in some areas including part of USA and Australia.
CT	Current Transformer	An electrical device that takes a large Alternating Current (AC), and scales down AC to a smaller current by a fixed ratio.
BMS	Building Management System	A digital/computer based control system for the infrastructure of a building.
DEF	Diesel Exhaust Fluid	A consumable liquid used in Selective Catalytic Reduction process (SCR process) to lower nitric oxide, and nitrogen dioxide concentration in engine exhaust emissions.
DM1	Diagnostic Message 1	A DTC is active on the engine ECU.
DM2	Diagnostic Message 2	A DTC was previously active on the engine ECU and has been stored in the internal memory of the ECU.
DPF	Diesel Particulate Filter	A filter fitted to the exhaust of an engine to remove diesel particulate matter or soot from the exhaust gas.
DPTC	Diesel Particulate Temperature Controlled Filter	A filter fitted to the exhaust of an engine to remove diesel particulate matter or soot from the exhaust gas which is temperature controlled.
DTC	Diagnostic Trouble Codes	Fault code sent by an engine ECU.
ECU/ECM	Engine Control Unit/Engine Control Management	An electronic device that monitors engine parameters and regulates fueling.
FMI	Failure Mode Indicator	A part of DTC that indicates the type of failure. For example high, low, open circuit.
SAE J1939	Society of Automotive Engineers SAE J1939	Vehicle bus recommended practice for communication and diagnostics among vehicle components.

(continued)

(Table 107, contd)

Term	Abbreviation	Description
SAE J1939-75	-	Sub section of SAE J1939 standard. The parameters and parameter groups contained in this sub section are predominantly associated with generators and driven equipment in electric power generation and industrial applications.
GSM	Global System for Mobile communications	Cell phone technology used in most part of the World.
HEST	High Exhaust System Temperature	Initiates when DPF filter is full with an extra fuel injector in the exhaust system to burn off accumulated diesel particulate matter or soot.
HMI	Human Machine Interface	A device that provides a control and visualization interface between a human and a process or machine.
IDMT	Inverse Definite Minimum Time	-
MSC	Multi-Set Communication	-
OC	Occurrence Count	A part of DTC that indicates the number of times a failure has occurred.
PGN	Parameter Group Number	A CAN address for a set of parameters that relate to the same topic and share transmission rate.
PLC	Programmable Logic Controller	A programmable digital device used to create logic for a specific purpose.
SCADA	Supervisory Control And Data Acquisition	A system that operates with coded signals over communication channels to provide control and monitoring of remote equipment.
SCR	Selective Catalytic Reduction	A process that uses DEF with aid of a catalyst to convert nitric oxide and nitrogen dioxide into nitrogen and water to reduce engine exhaust emission.
SIM	Subscriber Identity Module	A small card supplied by the GSM/CDMA provider. This card is inserted into the cell phone, GSM modem, or DSE gateway device to give GSM/GPRS (General Packet Radio Service) connection.
SMS	Short Message Service	The text messaging service of mobile/cell phones.
SPN	Suspect Parameter Number	A part of DTC that indicates failure. Examples of failure are oil pressure, coolant temperature, turbo pressure, and so on.

■

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