

TEO2-GCU ANALYZER FOR GC07 TROUBLESHOOTING PROCEDURES



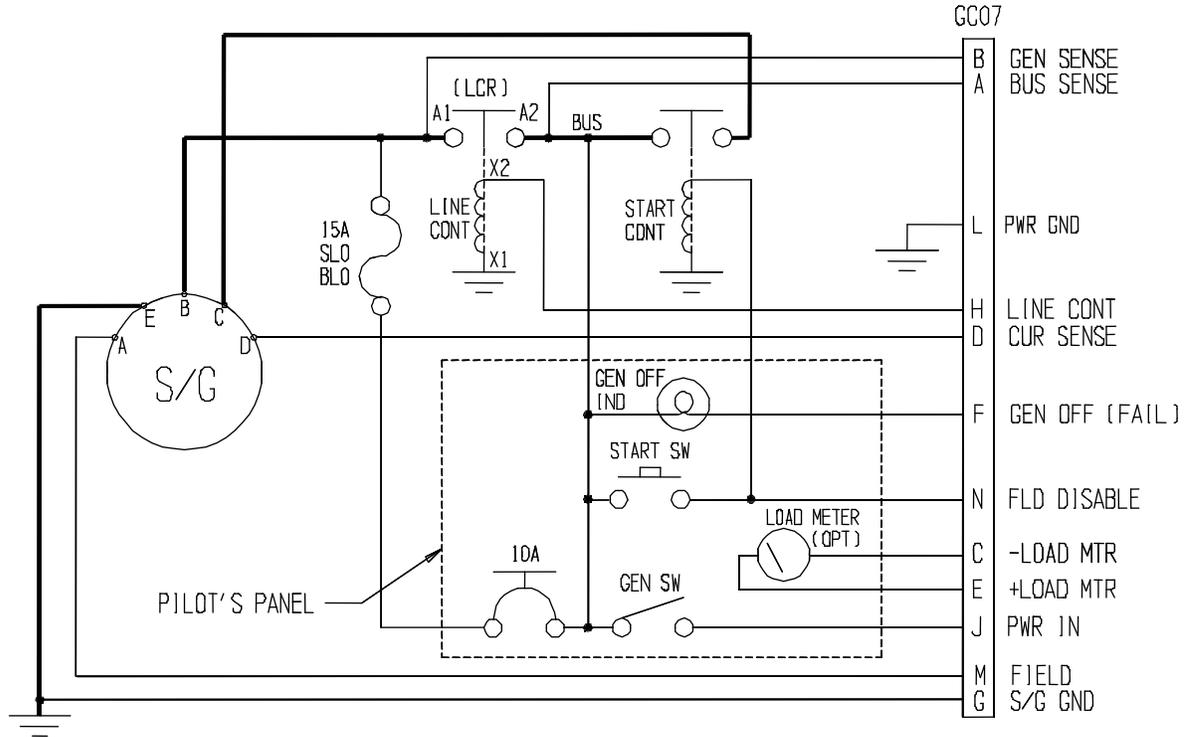
STATIC TEST Before going into specific Symptoms which will result in operational “squawks” it may be productive to perform a static test routine that is “quick and easy” and will result in localizing some problems without starting the engine. Set-up requirements; remove the aircraft connector from the GCU, plug the aircraft connector into the breakout harness but do not connect the breakout harness to the GCU. Check with the ohmmeter from designated test points on the TE02 to various other designated points in the aircraft. Bear in mind that the ohmmeter test leads will usually have a small resistance, say .1 to .4 ohms, so before starting, short the probes together and get this reading. Subtract this reading from all point to point readings.

INITIAL SETUP – NO POWER, master Switch OFF, Generator Switch ON.

TEO2-GCU ANALYZER FOR GC07 TROUBLESHOOTING PROCEDURES

From Term			To Term		Nominal Value (Ω)	Notes
TE02	J	PWR IN	S/G	B	0	If high. Check Start Switch, Generator Switch, C/B, Fuse and all associated wires and onnections.
TE02	L	PWR GND	S/G	E	0	If high, check wire and connections from L to ground.
TE02	G	S/G GND	S/G	E	0	If high, check wire and connections.
TE02	M	FIELD	S/G	A	0	If high, check wire and connections.
S/G	A	BUS SEN	S/G	E	2	If high, suspect S/G field is open. If low, suspect that S/G field is shorted or GCU M to S/G A wire shorted to Ground.
TE02	D	CUR SEN	S/G	D	0	If high, check wire and connections.
TE02	H	LINE CONT	LCR	X2	0	If high, check wire and connections.
LCR	X2		S/G	E	50	If high, suspect LCR Coil is open. If low, suspect LCR Coil is shorted or GCU H to LCR X2 wire is shorted to ground.
TE02	A	BUS SEN	LCR	A2	0	If high, check wire and connections.
TE02	B	GEN SEN	LCR	A1	0	If high, check wire and connections.

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TEO2-GCU ANALYZER FOR GC07 TROUBLESHOOTING PROCEDURES

SUGGESTED INSTALLATION SCHEMATIC FOR REFERENCE

Operational Tests –

Plug breakout harness into the GCU. This restores the system, but leaves the TEO2 connected in line.

In the following, the expression “GEN will not come on line” is evidenced by a low Lower Instrument Panel voltmeter reading (25V or lower) and the GEN off light staying on if so equipped.

Symptom - After engine start, GEN will not come on line unless the Start Switch is engaged momentarily after the Generator Switch is turned on.

Probable Cause - Field Flash function of GCU inoperative.

Fix - Repair or replace GCU.

Notes - The system can be operated as described without creating further detrimental effects until a convenient time to have the GCU replaced or repaired.

Symptom - During engine shutdown the starter “motors on” if the Generator Switch is left on.

Probable Cause - Reverse Current Protection function of GCU is defective.

Fix - Repair or replace GCU.

Notes - Turning the Generator Switch off prior to engine shutdown will correct this condition as a stopgap measure but the operator should be aware that if this precaution is overlooked damage to the starter generator could result.

Symptom -	After an engine start the Generator won't come on line (low VM reading and/or GEN off Light "ON") but normal generator output voltage exist (nominally 28V) at A1 of the LCR.
Probable Cause -	This symptom would indicate that the Generator has built up and is being regulated but the LCR is not connecting the Generator to the Bus. This can be caused by: a) Check the 120 Amp Bus Circuit Breaker. b) No output (nominally 28V) on pin H of the GCU (defective GCU). c) Output on pin H but no voltage on X2 of LCR (defective wiring). d) Normal voltage (nominally 28V) from X2 to X1 of LCR (defective LCR). e) Normal voltage (nominally 28V) from both X2 and X1 of LCR (open ground wire).
Fix -	a) Reset or replace Circuit Breaker. b) Replace or repair GCU c) Ring out and repair wiring as required. d) Replace LCR. e) Ring out and repair LCR gnd wire as required

Symptom -	The Generator won't come on line and the voltage on A1 of the LCR is low (9-16V).
Probable Cause -	The Voltage Regulator section of the GCU is defective.
Fix -	Repair or replace the GCU.

Symptom -	The Lower Instrument Panel Voltmeter indicates rapidly increasing bus voltage and then at about 32V suddenly drops to about 24V and then slowly decreases as the batteries discharge.
Probable Cause -	This is indicative of an overvoltage trip and may be accompanied by the 15A C/B tripping. In those cases where the C/B does not trip, the system can be restored to normal operation by momentarily turning the Generator Switch off and back on.
Fix -	If resetting the C/B or cycling the Generator Switch restores the system and the Generator stays on line, the GCU is suspect of an intermittent condition. If the symptoms repeat, the GCU is faulty and should be repaired or replaced.

DESCRIPTION & SPECIFICATION INCLUDED FOR YOUR CONVENIENCE

- 1.0 DESCRIPTION:** The GC07 Generator Control Unit (GCU) is designed for control and protection of MIL-G-6162 starter/generators in harsh environmental applications. The unit is housed in a die-cast aluminum enclosure which is water tight. It provides the following functions:
- 1.1 **VOLTAGE REGULATION:** The generated voltage is held constant independent of load, temperature and generator speed by a pulse width modulator (PWM) operating at the specified carrier frequency.
 - 1.2 **LINE CONTACTOR CONTROL:** Pull-in when pin "B" is more positive than pin "A" by the specified value the line contactor is energized. Drop-out when pin "D" is more positive than pin "G" by the specified value, line contactor is de-energized.
 - 1.3 **OVERVOLTAGE PROTECTION:** If the voltage on pin "B" exceeds the specified value, pin "J" will be shorted to pin "D" by a "crowbar" circuit which results in immediate removal of voltage from the generator shunt field and the line contactor and the field circuit breaker (C/B) will trip. To reset the unit the field C/B must be reset. The overvoltage (OV) trip is delayed by a specified time inversely proportional to the magnitude to prevent nuisance trips.
 - 1.4 **"GEN. OFF" WARNING:** If pin "H" is low or the line contactor fails to close the circuit between pins "A" & "B" the annunciator lamp will be energized.
 - 1.5 **LOAD METER DRIVE:** Provides a calibrated signal to standard 50mv full scale meters without the need for an external current shunt or fuses.

- 2.0 SPECIFICATIONS:**
- 2.1 Weight: 1.5lbs max.
 - 2.2 Operating temperature: -40°F to 160°F.
 - 2.3 Regulator set point: Externally adjustable from 27 to 30v minimum.
 - 2.4 Voltage regulation: +/- 0.7v, all conditions.
 - 2.5 Field switching rate: 800 +/-100hz.
 - 2.6 Generator build up: From a residual voltage of 0.5V, no battery required.
 - 2.7 Line contactor control:
 - 2.7.1 Pull in: Pin "B" 0.2 to 0.4v more positive than pin "A"
 - 2.7.2 Drop out: Pin "D" 0.06 to 0.4v more positive than pin "G".
 - 2.8 Overvoltage protection:
 - 2.8.1 Trip: 32.5 +/-0.5v
 - 2.8.2 Time delay: 0.1 to .15 seconds for a step change from 28 to 36 volts.

HARNES ASSEMBLY: P/N W53-0046, 9' LONG

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From Term		To Term		Nominal Value (Ω)	Notes

From Term		To Term		Nominal Value (Ω)	Notes

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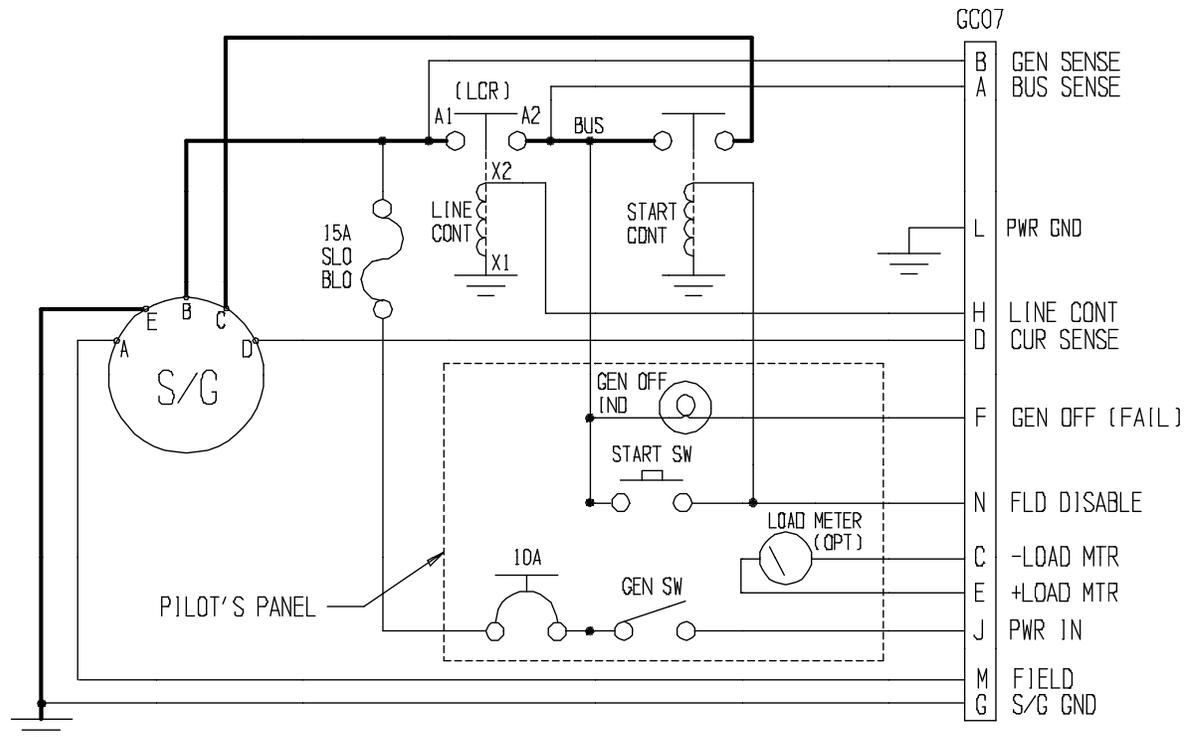
TEO2-GCU ANALYZER FOR GC07 TROUBLESHOOTING PROCEDURES

STATIC TEST Before going into specific Symptoms which will result in operational “squawks” it may be productive to perform a static test routine that is “quick and easy” and will result in localizing some problems without starting the engine. Set-up requirements; remove the aircraft connector from the GCU, plug the aircraft connector into the breakout harness but do not connect the breakout harness to the GCU. Check with the ohmmeter from designated test points on the TE02 to various other designated points in the aircraft. Bear in mind that the ohmmeter test leads will usually have a small resistance, say .1 to .4 ohms, so before starting, short the probes together and get this reading. Subtract this reading from all point to point readings.

INITIAL SETUP – NO POWER, master Switch OFF, Generator Switch ON.

From Term			To Term		Nominal Value (Ω)	Notes
TE02	J	PWR IN	S/G	B	0	If high. Check Start Switch, Generator Switch, C/B, Fuse and all associated wires and connections.
TE02	L	PWR GND	S/G	E	0	If high, check wire and connections from L to ground.
TE02	G	S/G GND	S/G	E	0	If high, check wire and connections.
TE02	M	FIELD	S/G	A	0	If high, check wire and connections.
S/G	A	BUS SEN	S/G	E	2	If high, suspect S/G field is open. If low, suspect that S/G field is shorted or GCU M to S/G A wire shorted to Ground.
TE02	D	CUR SEN	S/G	D	0	If high, check wire and connections.
TE02	H	LINE CONT	LCR	X2	0	If high, check wire and connections.
LCR	X2		S/G	E	50	If high, suspect LCR Coil is open. If low, suspect LCR Coil is shorted or GCU H to LCR X2 wire is shorted to ground.
TE02	A	BUS SEN	LCR	A2	0	If high, check wire and connections.
TE02	B	GEN SEN	LCR	A1	0	If high, check wire and connections.

TEO2-GCU ANALYZER FOR GC07 TROUBLESHOOTING PROCEDURES



SUGGESTED INSTALLATION SCHEMATIC FOR REFERENCE

Operational Tests -

Plug breakout harness into the GCU. This restores the system, but leaves the TEO2 connected in line.
In the following, the expression "GEN will not come on line" is evidenced by a low Lower Instrument Panel voltmeter reading (25V or lower) and the GEN off light staying on if so equipped.

Symptom - After engine start, GEN will not come on line unless the Start Switch is engaged momentarily after the Generator Switch is turned on.

Probable Cause - Field Flash function of GCU inoperative.

Fix - Repair or replace GCU.

Notes - The system can be operated as described without creating further detrimental effects until a convenient time to have the GCU replaced or repaired.

Symptom - During engine shutdown the starter "motors on" if the Generator Switch is left on.

Probable Cause - Reverse Current Protection function of GCU is defective.

Fix - Repair or replace GCU.

Notes - Turning the Generator Switch off prior to engine shutdown will correct this condition as a stopgap measure but the operator should be aware that if this precaution is overlooked damage to the starter generator could result.

Symptom - After an engine start the Generator won't come on line (low VM reading and/or GEN off Light "ON") but normal generator output voltage exist (nominally 28V) at A1 of the LCR.

Probable Cause - This symptom would indicate that the Generator has built up and is being regulated but the LCR is not connecting the Generator to the Bus. This can be caused by:

- Check the 120 Amp Bus Circuit Breaker.
- No output (nominally 28V) on pin H of the GCU (defective GCU).
- Output on pin H but no voltage on X2 of LCR (defective wiring).

- d) Normal voltage (nominally 28V) from X2 to X1 of LCR (defective LCR).
- e) Normal voltage (nominally 28V) from both X2 and X1 of LCR (open ground wire).

- Fix -**
- a) Reset or replace Circuit Breaker.
 - b) Replace or repair GCU
 - c) Ring out and repair wiring as required.
 - d) Replace LCR.
 - e) Ring out and repair LCR gnd wire as required

Symptom - The Generator won't come on line and the voltage on A1 of the LCR is low (9-16V).

Probable Cause - The Voltage Regulator section of the GCU is defective.

Fix - Repair or replace the GCU.

Symptom - The Lower Instrument Panel Voltmeter indicates rapidly increasing bus voltage and then at about 32V suddenly drops to about 24V and then slowly decreases as the batteries discharge.

Probable Cause - This is indicative of an overvoltage trip and may be accompanied by the 15A C/B tripping. In those cases where the C/B does not trip, the system can be restored to normal operation by momentarily turning the Generator Switch off and back on.

Fix - If resetting the C/B or cycling the Generator Switch restores the system and the Generator stays on line, the GCU is suspect of an intermittent condition. If the symptoms repeat, the GCU is faulty and should be repaired or replaced.

DESCRIPTION & SPECIFICATION INCLUDED FOR YOUR CONVENIENCE

1.0 DESCRIPTION: The GC07 Generator Control Unit (GCU) is designed for control and protection of MIL-G-6162 starter/generators in harsh environmental applications. The unit is housed in a die-cast aluminum enclosure which is water tight. It provides the following functions:

- 1.1 **VOLTAGE REGULATION:** The generated voltage is held constant independent of load, temperature and generator speed by a pulse width modulator (PWM) operating at the specified carrier frequency.
- 1.2 **LINE CONTACTOR CONTROL:** Pull-in when pin "B" is more positive than pin "A" by the specified value the line contactor is energized. Drop-out when pin "D" is more positive than pin "G" by the specified value, line contactor is de-energized.
- 1.3 **OVERVOLTAGE PROTECTION:** If the voltage on pin "B" exceeds the specified value, pin "J" will be shorted to pin "D" by a "crowbar" circuit which results in immediate removal of voltage from the generator shunt field and the line contactor and the field circuit breaker (C/B) will trip. To reset the unit the field C/B must be reset. The overvoltage (OV) trip is delayed by a specified time inversely proportional to the magnitude to prevent nuisance trips.
- 1.4 **"GEN. OFF" WARNING:** If pin "H" is low or the line contactor fails to close the circuit between pins "A" & "B" the annunciator lamp will be energized.
- 1.5 **LOAD METER DRIVE:** Provides a calibrated signal to standard 50mv full scale meters without the need for an external current shunt or fuses.

2.0 SPECIFICATIONS:

- 2.1 Weight: 1.5lbs max.
- 2.2 Operating temperature: -40°F to 160°F.
- 2.3 Regulator set point: Externally adjustable from 27 to 30v minimum.



TEO2-GCU ANALYZER FOR GC07 TROUBLESHOOTING PROCEDURES

- 2.4 Voltage regulation: +/- 0.7v, all conditions.
- 2.5 Field switching rate: 800 +/-100hz.
- 2.6 Generator build up: From a residual voltage of 0.5V, no battery required.
- 2.7 Line contactor control:
 - 2.7.1 Pull in: Pin "B" 0.2 to 0.4v more positive than pin "A"
 - 2.7.2 Drop out: Pin "D" 0.06 to 0.4v more positive than pin "G".
- 2.8 Overvoltage protection:
 - 2.8.1 Trip: 32.5 +/-0.5v
 - 2.8.2 Time delay: 0.1 to .15 seconds for a step change from 28 to 36 volts.

HARNESS ASSEMBLY: P/N W53-0046, 9' LONG

LEFT BLANK FOR ADDITIONAL TESTS

From Term		To Term		Nominal Value (Ω)	Notes

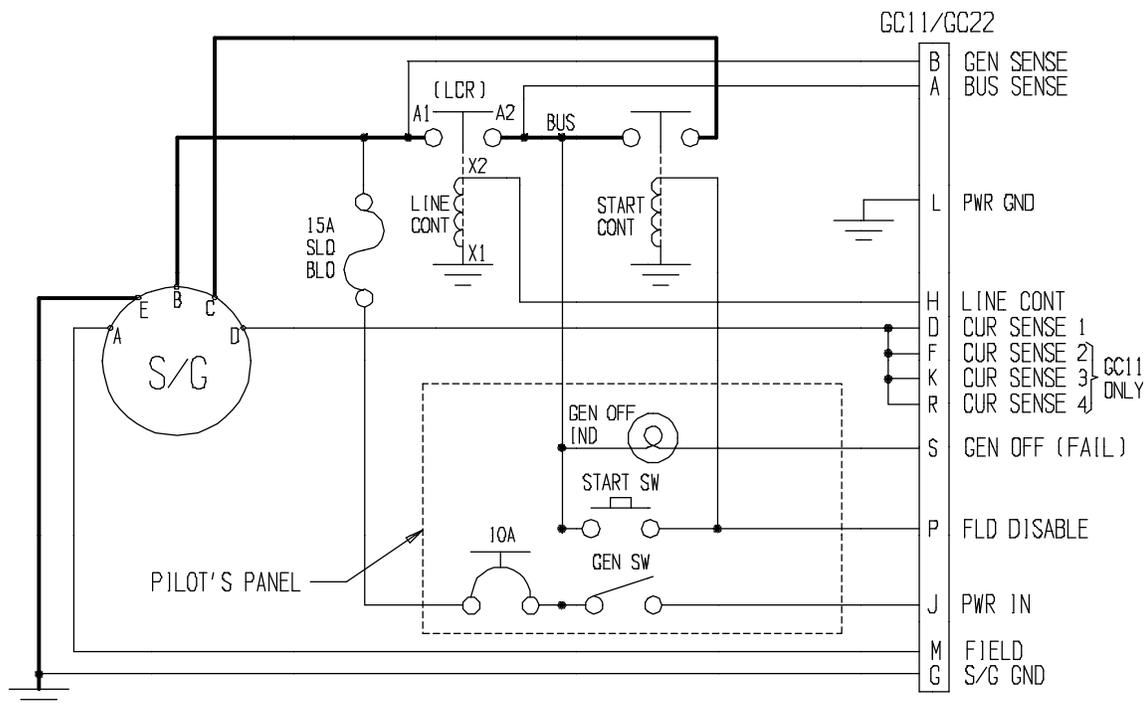
TEO2-GCU ANALYZER FOR GC07 TROUBLESHOOTING PROCEDURES

TE02-GCU ANALYZER FOR GC11 & GC22 TROUBLESHOOTING PROCEDURES

STATIC TEST Before going into specific Symptoms which will result in operational “squawks” it may be productive to perform a static test routine that is “quick and easy” and will result in localizing some problems without starting the engine. Set-up requirements; remove the aircraft connector from the GCU, plug the aircraft connector into the breakout harness but do not connect the breakout harness to the GCU. Check with the ohmmeter from designated test points on the TE02 to various other designated points in the aircraft. Bear in mind that the ohmmeter test leads will usually have a small resistance, say .1 to .4 ohms, so before starting, short the probes together and get this reading. Subtract this reading from all point to point readings.

INITIAL SETUP – NO POWER, master Switch OFF, Generator Switch ON.

From Term		To Term		Nominal Value (Ω)	Notes
TE02	J PWR IN	S/G	B	0	If high. Check Start Switch, Generator Switch, C/B, Fuse and all associated wires and onnections.
TE02	L PWR GND	S/G	E	0	If high, check wire and connections from L to ground.
TE02	G S/G GND	S/G	E	0	If high, check wire and connections.
TE02	M FIELD	S/G	A	0	If high, check wire and connections.
S/G	A BUS SEN	S/G	E	2	If high, suspect S/G field is open. If low, suspect that S/G field is shorted or GCU M to S/G A wire shorted to Ground.
TE02	D CUR SEN F, K, R - GC11 ONLY	S/G	D	0	If high, check wire and connections.
TE02	H LINE CONT	LCR	X2	0	If high, check wire and connections.
LCR	X2	S/G	E	50	If high, suspect LCR Coil is open. If low, suspect LCR Coil is shorted or GCU H to LCR X2 wire is shorted to ground.
TE02	A BUS SEN	LCR	A2	0	If high, check wire and connections.
TE02	B GEN SEN	LCR	A1	0	If high, check wire and connections.





TEO2-GCU ANALYZER FOR GC11 & GC22 TROUBLESHOOTING PROCEDURES

SUGGESTED INSTALLATION SCHEMATIC FOR REFERENCE

Operational Tests –

Plug breakout harness into the GCU. This restores the system, but leaves the TEO2 connected in line. In the following, the expression “GEN will not come on line” is evidenced by a low Lower Instrument Panel voltmeter reading (25V or lower) and the GEN off light staying on if so equipped.

Symptom - After engine start, GEN will not come on line unless the Start Switch is engaged momentarily after the Generator Switch is turned on.

Probable Cause - Field Flash function of GCU inoperative.

Fix - Repair or replace GCU.

Notes - The system can be operated as described without creating further detrimental effects until a convenient time to have the GCU replaced or repaired.

Symptom - During engine shutdown the starter “motors on” if the Generator Switch is left on.

Probable Cause - Reverse Current Protection function of GCU is defective.

Fix - Repair or replace GCU.

Notes - Turning the Generator Switch off prior to engine shutdown will correct this condition as a stopgap measure but the operator should be aware that if this precaution is overlooked damage to the starter generator could result.

Symptom - After an engine start the Generator won't come on line (low VM reading and/or GEN off Light “ON”) but normal generator output voltage exist (nominally 28V) at A1 of the LCR.

Probable Cause - This symptom would indicate that the Generator has built up and is being regulated but the LCR is not connecting the Generator to the Bus. This can be caused by:

- a) Check the 120 Amp Bus Circuit Breaker.
- b) No output (nominally 28V) on pin H of the GCU (defective GCU).
- c) Output on pin H but no voltage on X2 of LCR (defective wiring).
- d) Normal voltage (nominally 28V) from X2 to X1 of LCR (defective LCR).
- e) Normal voltage (nominally 28V) from both X2 and X1 of LCR (open ground wire).

- Fix -**
- a) Reset or replace Circuit Breaker.
 - b) Replace or repair GCU
 - c) Ring out and repair wiring as required.
 - d) Replace LCR.
 - e) Ring out and repair LCR gnd wire as required
-

Symptom - The Generator won't come on line and the voltage on A1 of the LCR is low (9-16V).

Probable Cause - The Voltage Regulator section of the GCU is defective.

Fix - Repair or replace the GCU.

Symptom - The Lower Instrument Panel Voltmeter indicates rapidly increasing bus voltage and then at about 32V suddenly drops to about 24V and then slowly decreases as the batteries discharge.

Probable Cause - This is indicative of an overvoltage trip and may be accompanied by the 15A C/B tripping. In those cases where the C/B does not trip, the system can be restored to normal operation by momentarily turning the Generator Switch off and back on.



TEO2-GCU ANALYZER FOR GC11 & GC22 TROUBLESHOOTING PROCEDURES

Fix - If resetting the C/B or cycling the Generator Switch restores the system and the Generator stays on line, the GCU is suspect of an intermittent condition. If the symptoms repeat, the GCU is faulty and should be repaired or replaced.

DESCRIPTION & SPECIFICATION INCLUDED FOR YOUR CONVENIENCE

1.0 DESCRIPTION: The GC11 or GC22 Generator Control Unit (GCU) is designed for control and protection of MIL-G-6162 starter/generators in harsh environmental applications. The unit is housed in a die-cast aluminum enclosure which is water tight. It provides the following functions:

- 1.1 **VOLTAGE REGULATION:** The generated voltage is held constant independent of load, temperature and generator speed by a pulse width modulator (PWM) operating at the specified carrier frequency.
- 1.2 **LINE CONTACTOR CONTROL:** Pull-in when pin "B" is more positive than pin "A" by the specified value the line contactor is energized. Drop-out when pin "D" is more positive than pin "G" by the specified value, line contactor is de-energized.
- 1.3 **OVERVOLTAGE PROTECTION:** If the voltage on pin "B" exceeds the specified value, pin "J" will be shorted to pin "D" by a "crowbar" circuit which results in immediate removal of voltage from the generator shunt field and the line contactor and the field circuit breaker (C/B) will trip. To reset the unit the field C/B must be reset. The overvoltage (OV) trip is delayed by a specified time inversely proportional to the magnitude to prevent nuisance trips.
- 1.4 **"GEN. OFF" WARNING:** If pin "H" is low or the line contactor fails to close the circuit between pins "A" & "B" the annunciator lamp will be energized.
- 1.5 **LOAD METER DRIVE:** Provides a calibrated signal to standard 50mv full scale meters without the need for an external current shunt or fuses.

2.0 SPECIFICATIONS:

- 2.1 Weight: 1.5lbs max.
- 2.2 Operating temperature: -40°F to 160°F.
- 2.3 Regulator set point: Externally adjustable from 27 to 30v minimum.
- 2.4 Voltage regulation: +/- 0.7v, all conditions.
- 2.5 Field switching rate: 800 +/-100hz.
- 2.6 Generator build up: From a residual voltage of 0.5V, no battery required.
- 2.7 Line contactor control:
 - 2.7.1 Pull in: Pin "B" 0.2 to 0.4v more positive than pin "A"
 - 2.7.2 Drop out: Pin "D" 0.06 to 0.4v more positive than pin "G".
- 2.8 Overvoltage protection:
 - 2.8.1 Trip: 32.5 +/-0.5v
 - 2.8.2 Time delay: 0.1 to .15 seconds for a step change from 28 to 36 volts.

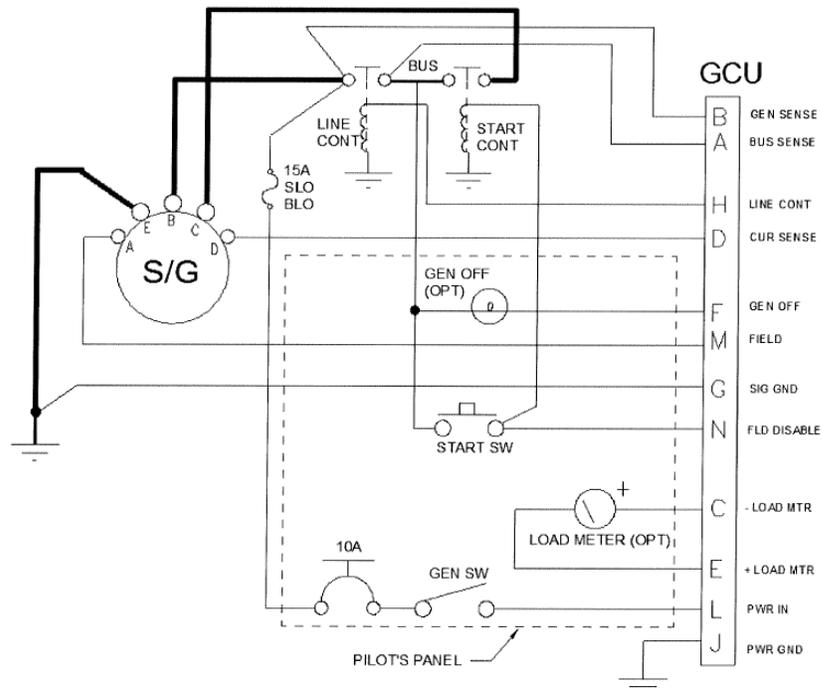
HARNESS ASSEMBLY: P/N W53-0056, 9' LONG

TE02-GCU ANALYZER FOR GC08 TROUBLESHOOTING PROCEDURES

STATIC TEST Before going into specific Symptoms which will result in operational “squawks” it may be productive to perform a static test routine that is “quick and easy” and will result in localizing some problems without starting the engine. Set-up requirements; remove the aircraft connector from the GCU, plug the aircraft connector into the breakout harness but do not connect the breakout harness to the GCU. Check with the ohmmeter from designated test points on the TE02 to various other designated points in the aircraft. Bear in mind that the ohmmeter test leads will usually have a small resistance, say .1 to .4 ohms, so before starting, short the probes together and get this reading. Subtract this reading from all point to point readings.

INITIAL SETUP – NO POWER, master Switch OFF, Generator Switch ON.

From Term			To Term		Nominal Value (Ω)	Notes
TE02	J	PWR GND	S/G	E		
TE02	L	PWR IN	S/G	B	0	If high. Check Start Switch, Generator Switch, C/B, Fuse and all associated wires and connections.
TE02	G	S/G GND	S/G	E	0	If high, check wire and connections.
TE02	M	FIELD	S/G	A	0	If high, check wire and connections.
S/G	A	FIELD	S/G	E	2	If high, suspect S/G field is open. If low, suspect S/G field or GCU pin M to S/G A wire is shorted to Ground.
TE02	D	CUR SEN	S/G	D	0	If high, check wire and connections.
TE02	H	LINE CONT	LCR	X2	0	If high, check wire and connections.
LCR	X2		S/G	E	50	If high, suspect LCR Coil is open. If low, suspect LCR Coil or GCU pin H to LCR X2 wire is shorted to ground.
TE02	A	BUS SEN	LCR	A2	0	If high, check wire and connections.
TE02	B	GEN SEN	LCR	A1	0	If high, check wire and connections.



SUGGESTED INSTALLATION SCHEMATIC FOR REFERENCE

Operational Tests –

Plug breakout harness into the GCU. This restores the system, but leaves the TE02 connected in line. In the following, the expression “GEN will not come on line” is evidenced by a low Lower Instrument Panel voltmeter reading (25V or lower) and the GEN off light staying on if so equipped.

Symptom - After engine start, GEN will not come on line unless the Start Switch is engaged momentarily after the Generator Switch is turned on.

Probable Cause - Field Flash function of GCU inoperative.

Fix - Repair or replace GCU.

Notes - The system can be operated as described without creating further detrimental effects until a convenient time to have the GCU replaced or repaired.

Symptom - During engine shutdown the starter “motors on” if the Generator Switch is left on.

Probable Cause - Reverse Current Protection function of GCU is defective.

Fix - Repair or replace GCU.

Notes - Turning the Generator Switch off prior to engine shutdown will correct this condition as a stopgap measure but the operator should be aware that if this precaution is overlooked damage to the starter generator could result.

Symptom - After an engine start the Generator won’t come on line (low VM reading and/or GEN off Light “ON”) but normal generator output voltage exist (nominally 28V) at A1 of the LCR.

Probable Cause - This symptom would indicate that the Generator has built up and is being regulated but the LCR is not connecting the Generator to the Bus. This can be caused by:

- a) Check the 120 Amp Bus Circuit Breaker.
- b) No output (nominally 28V) on pin H of the GCU (defective GCU).
- c) Output on pin H but no voltage on X2 of LCR (defective wiring).
- d) Normal voltage (nominally 28V) from X2 to X1 of LCR (defective LCR).
- e) Normal voltage (nominally 28V) from both X2 and X1 of LCR (open ground wire).

Fix -

- a) Reset or replace Circuit Breaker.
- b) Replace or repair GCU
- c) Ring out and repair wiring as required.
- d) Replace LCR.
- e) Ring out and repair LCR gnd wire as required

Symptom - The Generator won’t come on line and the voltage on A1 of the LCR is low (9-16V).

Probable Cause - The Voltage Regulator section of the GCU is defective.

Fix - Repair or replace the GCU.

Symptom - The Lower Instrument Panel Voltmeter indicates rapidly increasing bus voltage and then at about 32V suddenly drops to about 24V and then slowly decreases as the batteries discharge.

Probable Cause - This is indicative of an overvoltage trip and may be accompanied by the 15A C/B tripping. In those cases where the C/B does not trip, the system can be restored to normal operation by momentarily turning the Generator Switch off and back on.

Fix - If resetting the C/B or cycling the Generator Switch restores the system and the Generator stays on line, the GCU is suspect of an intermittent condition. If the symptoms repeat, the GCU is faulty and should be repaired or replaced.

DESCRIPTION & SPECIFICATION INCLUDED FOR YOUR CONVENIENCE

1.0 DESCRIPTION: The GC08 Generator Control Unit (GCU) is designed for control and protection of MIL-G-6162 starter/generators in harsh environmental applications. The unit is housed in a die-cast aluminum enclosure which is water tight. It provides the following functions:

- 1.1 **VOLTAGE REGULATION:** The generated voltage is held constant independent of load, temperature and generator speed by a pulse width modulator (PWM) operating at the specified carrier frequency.
- 1.2 **LINE CONTACTOR CONTROL:** Pull-in when pin "B" is more positive than pin "A" by the specified value the line contactor is energized. Drop-out when pin "D" is more positive than pin "G" by the specified value, line contactor is de-energized.
- 1.3 **OVERVOLTAGE PROTECTION:** If the voltage on pin "B" exceeds the specified value, pin "L" will be shorted to pin "D" by a "crowbar" circuit which results in immediate removal of voltage from the generator shunt field and the line contactor and the field circuit breaker (C/B) will trip. To reset the unit the field C/B must be reset. The overvoltage (OV) trip is delayed by a specified time inversely proportional to the magnitude to prevent nuisance trips.
- 1.4 **"GEN. OFF" WARNING:** If pin "H" is low or the line contactor fails to close the circuit between pins "A" & "B" the annunciator lamp will be energized.
- 1.5 **LOAD METER DRIVE:** Provides a calibrated signal to standard 50mV full scale meters without the need for an external current shunt or fuses.

2.0 SPECIFICATIONS:

- 2.1 Weight: 1.5lbs max.
- 2.2 Operating temperature: -40°F to 160°F.
- 2.3 Regulator set point: Externally adjustable from 27 to 30V minimum.
- 2.4 Voltage regulation: +/- 0.7V, all conditions.
- 2.5 Field switching rate: 800 +/-100hz.
- 2.6 Generator build up: From a residual voltage of 0.5V, no battery required.
- 2.7 Line contactor control:
 - 2.7.1 Pull in: Pin "B" 0.2V to 0.4V more positive than pin "A"
 - 2.7.2 Drop out: Pin "D" 0.06V to 0.4V more positive than pin "G".
- 2.8 Overvoltage protection:
 - 2.8.1 Trip: 32.5 +/-0.5V
 - 2.8.2 Time delay: 0.1 to .15 seconds for a step change from 28 to 36 volts.

HARNESS ASSEMBLY: P/N W53-0046, 9' LONG

