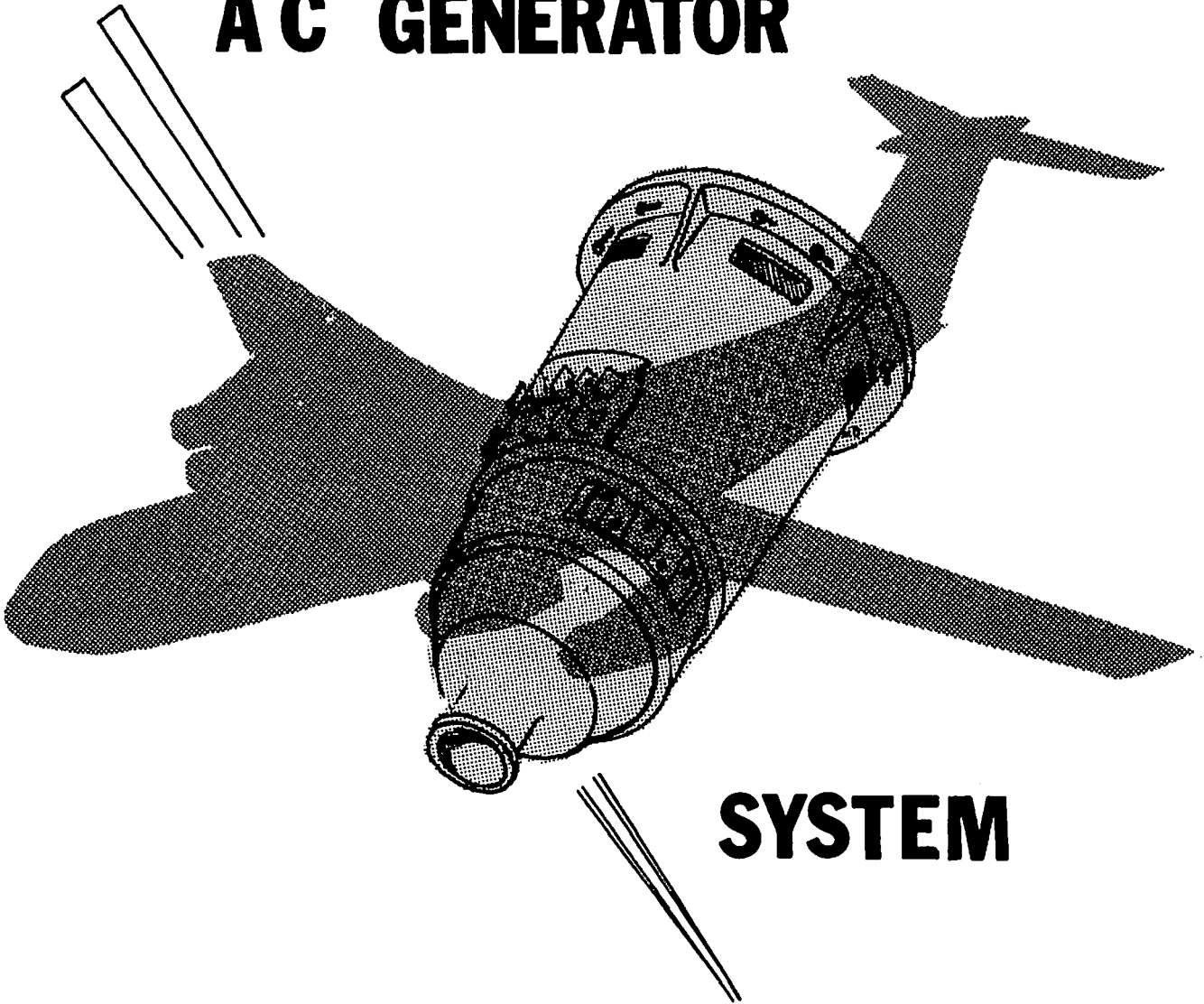


C141A



A C GENERATOR



SYSTEM

443d TECHNICAL TRAINING SQUADRON
443d MILITARY AIRLIFT WING, TNG (MAC)
ALTUS AIR FORCE BASE, OKLAHOMA

Revised 27 Jan 78 GPO 1200
Supersedes previous editions

FOR TRAINING PURPOSES ONLY

NOT NECESSARILY CURRENT AFTER DISTRIBUTION

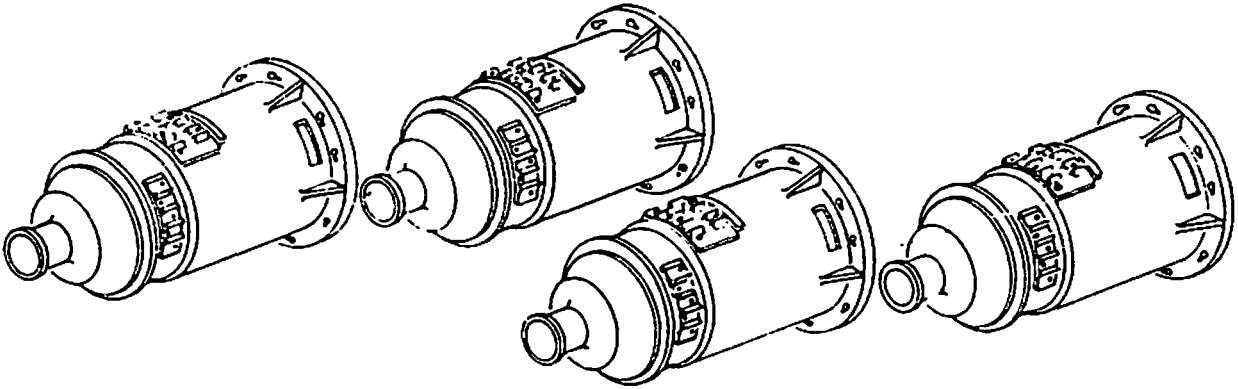
DISTRIBUTION

| | |
|------------------------|------------|
| 443d TCHTS, Altus | 1184 |
| 60th MAW/DOT, Travis | 9 |
| 63d MAW/DOT, Norton | 5 |
| 438th MAW/DOT, McGuire | 2 |
| TOTAL | <hr/> 1200 |

When you have finished this program you will be able to:

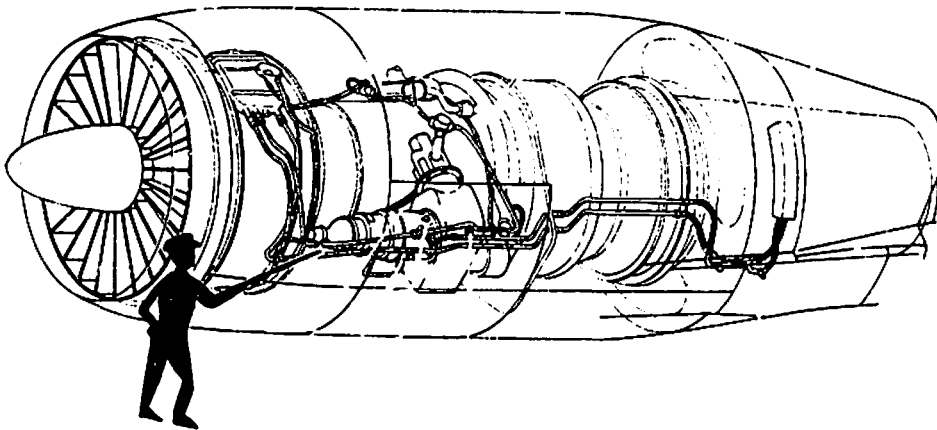
1. state the voltage and frequency output of the main generators.
2. state the location of the main generators.
3. state what components are energized when the generator control switch is in the "ON" position.
4. state what component is energized when the generator control switch is in the "TEST" position.
5. state the purpose of the voltage regulator.
6. state the location of the generator protection panels.
7. list two purposes of the generator protection panel.
8. state the type of trouble indicated by a "generator fail" light.
9. state the action to be taken when frequency is fluctuating and the generator fail light is on.
10. recognize a differential fault indication.
11. state the action to be taken with a differential fault indication.
12. state the type of trouble indicated by a "bus tie open" light.

The C-141 electrical system basic power source is 200/115 volt, 3 phase AC power supplied by four main engine driven generators.



Each main generator produces 3 phase 400 cycles per second (CPS) AC power. Each one of these phases produce 115 volts AC at a frequency of 400 cycles per second (CPS).

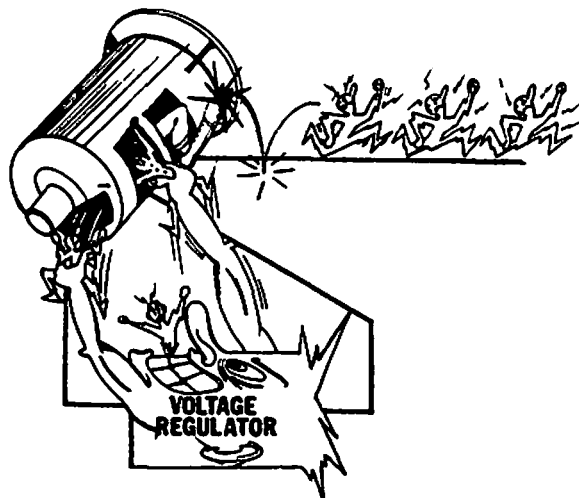
The main generators are driven by Constant Speed Drive (CSD) units, located at the 6 o'clock position of each engine. These CSDs drive the generators at a constant speed to maintain the generator frequency output at 400 CPS.



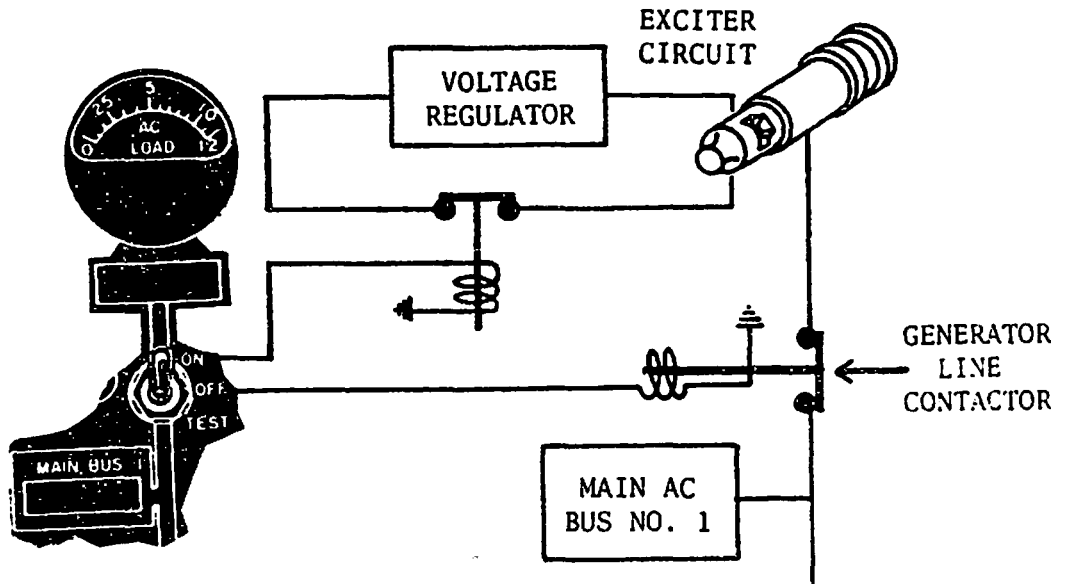
The voltage and frequency output of the main generator are 200/115 volts AC and 400 CPS.

ANSWER = 115 400

Each generator has a built in permanent magnet generator to excite the main generator. A voltage regulator regulates each generator's output to a constant voltage.



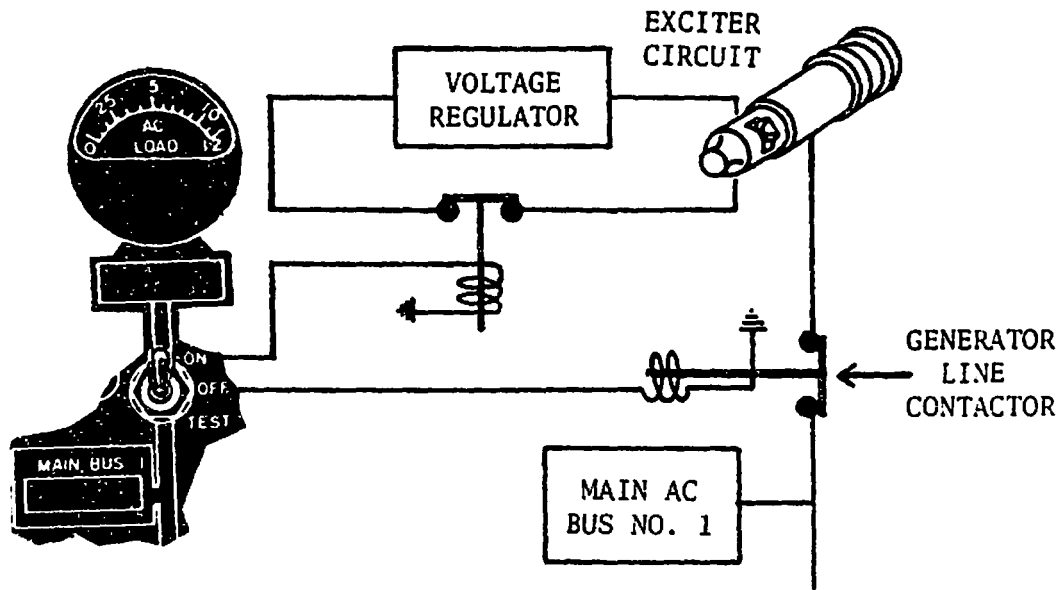
The excitation circuit is energized or de-energized by the Generator Control Switch. Placing the switch to the "ON" position *energizes* the generator and at the same time *closes* the Generator Line Contactor (GLC).



The Generator Control Switch has three positions OFF, ON and TEST.

When the Generator Control Switch is placed in the "ON" position, the generator is ENERGIZED and the GLC is CLOSED.

ANSWER = Energized closed

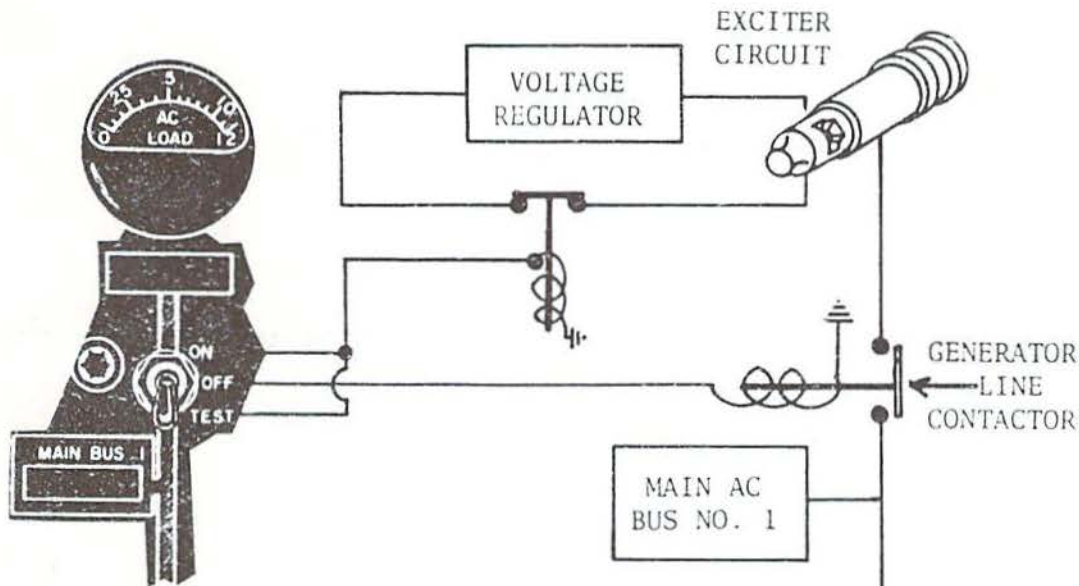


The Generator Line Contactor (GLC) is a Relay which connects the generator to the MAIN AC BUS and is controlled by the generator control switch.

When the generator control switch is in the "OFF" position the generator is DE-ENERGIZED and the GLC is OPEN.

The generator control switch must be held in the "TEST" position. It is spring loaded from "TEST" to "OFF".

When the generator control switch is in the "TEST" position the generator is energized but the GLC is OPEN.



You can check the voltage and frequency of a generator, without connecting it to the MAIN AC BUS, by holding the generator control switch in the TEST position.

ANSWER - TEST

The "TEST" position will *energize* the generator but will NOT *close* the GLC.

It's review time. Answer the following questions, then check your answers on Page 7.

1. What is the voltage and frequency output of the main generator?

115 / 400CPS

2. Where are the main generators located?

6 O'CLOCK

3. What components are energized when the generator switch is in the "ON" position?

GEN.
GLC closed

4. What component is energized when the generator control switch is in the "TEST" position?

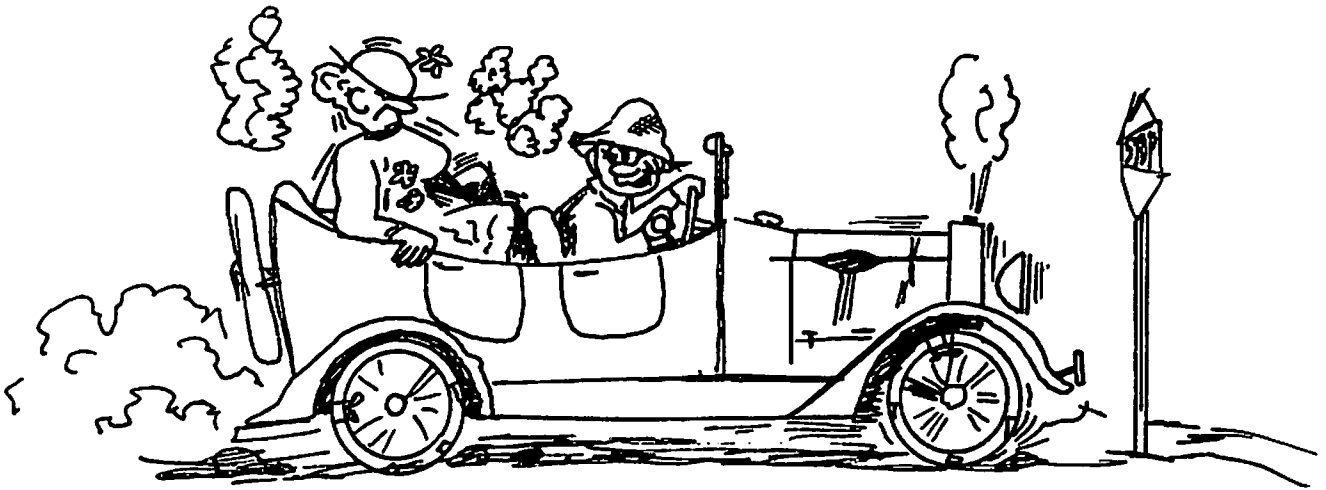
GEN.

5. What is the purpose of the voltage regulator?

MAINTAIN VOLTAGE OF 115

ANSWERS TO REVIEW QUESTIONS

1. 115 volts AC and 400 cycles per second (CPS).
2. 6 o'clock position of each engine.
3. generator and generator line contactor.
4. generator.
5. to maintain a constant voltage output.



Hang on Rosie, here we go again.

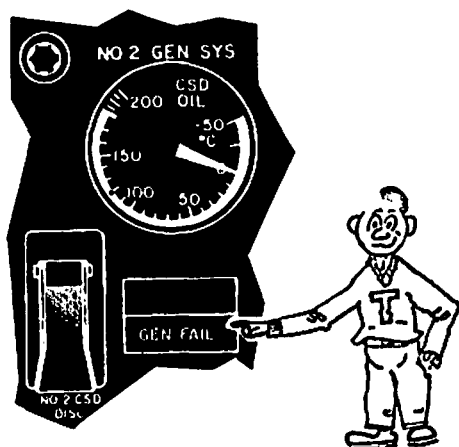
The generator system is protected from electrical malfunctions by four generator protection panels located in the right underdeck area. The protection panels serve two purposes:

- (1) *protect* the generators.
- (2) *control* the generators.

The generators are automatically Protected and Controlled by generator protection panels located in the Rt Underdeck area.

Two types of troubles the generator system could develop are mechanical and electrical.

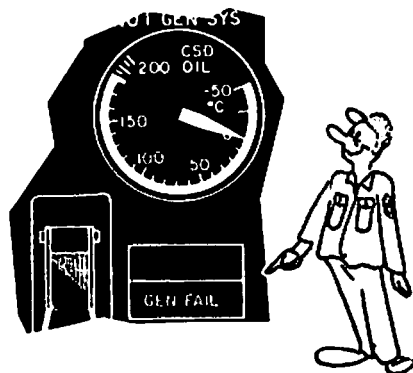
System indications will help you determine the type of trouble you have. For example, if a "GENERATOR FAIL" light illuminates you have a MECHANICAL failure.



If the "Generator Fail" light illuminates, the Flight Engineer should check the *voltage* and *frequency* of the generator. If NO fluctuation is observed, the generator can stay in operation. However, the output should be monitored closely.

If fluctuation in *voltage* or *frequency* is observed, the CSD must be disconnected immediately.

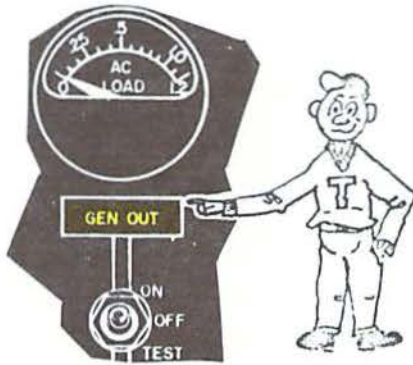
The light may illuminate only momentarily, then extinguish. But, if it extinguishes or remains illuminated the procedure is still the same.



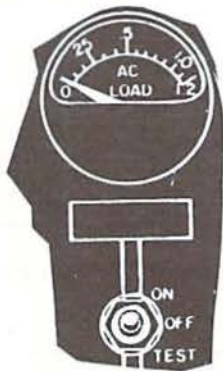
If this light illuminates, it indicates a MECH failure and the Flight Engineer should check the VOLTS and FREQS of the associated generator. If fluctuation of voltage or frequency is observed, DISC. the CSD immediately.

ANSWER = mechanical voltage frequency disconnect CSD

The generator can remain in operation with the "Generator Fail" light illuminated, if NO fluctuation is observed. However, if fluctuation in voltage OR frequency is observed, disconnect the CSD immediately.



If the "Generator Out" light illuminates, this is an indication of an ELECTRICAL trouble. The light should extinguish when the generator control switch is placed in the "OFF" position. If the light remains illuminated when the generator control switch is off, a DIFFERENTIAL FAULT (short in main power leads) has occurred and you would disconnect the CSD immediately.



If the "Generator Out" light extinguishes when the generator control switch is turned off, the Flight Engineer should test the generator.

The generator should be returned to the line if the light extinguishes when the switch is turned off and a test reveals that the *voltage* and *frequency* are within range.

However, if the generator trips off of the line again, the generator control switch should be placed in the OFF position. DO NOT make any further attempt to return the generator to operation.

If the generator *voltage* or *frequency* tests OUT-OF-LIMITS, turn the generator control switch off and DO NOT attempt to return it to operation.

1. If the "GENERATOR OUT" light stays ON when the generator control switch is turned OFF, a DIFFERENTIAL FAULT is indicated and you would

DISC, the CSD.

2. If the "GENERATOR OUT" light extinguishes when the generator control switch is turned off, and a test of that generator reveals that the voltage is NOT within limits, (DO) (DO NOT) attempt to return the generator to the line.

ANSWER #1 = DISCONNECT CSD

ANSWER #2 = DO NOT

Another indication of an ELECTRICAL trouble is the "BUS TIE OPEN" light.



When the "Bus Tie Open" light illuminates the Flight Engineer should check the *voltage* and *frequency* of that generator. If the voltage and frequency are within limits the Bus Tie should be reset. If the "Bus Tie Open" light illuminates again NO further attempt should be made to reset. If the voltage and frequency are NOT within limits, the Generator Control Switch should be turned OFF and the BUS TIE RESET.

NOTE:

The BUS TIE can be reset by placing the BUS TIE SWITCH to "OPEN" then to "NORMAL".

It's reveiw time again. Answer the following questions, then CHECK your answers on Page 15.

1. When the "Bus Tie Open" light illuminates and a test of that generator reveals the voltage and frequency are NOT within limits, the Flight Engineer should:

- a. Turn the generator control switch off and reset the bus tie.
- b. Disconnect the CSD

2. Where are the generator protection panels located?

RT. UNDERDECK

3. List two purposes of the generator protection panel.

- a. PROTECT
- b. CONTROL

4. If the "Generator Fail" light illuminates, what type of trouble does it indicate? MELT.

5. If the "Generator Fail" light illuminates and the frequency is fluctuating what action should be taken? DISC. CSD

6. This indication shows a DIFF FAULT.



7. What type of trouble does a "Bus Tie Open" light indicate?

ELECT. TROUBLE

ANSWERS TO REVIEW QUESTIONS

1. A
2. In the right Under Deck Area.
3. a. Protect the generator.
b. Control the generator.
4. Mechanical trouble
5. Disconnect the CSD.
6. Differential Fault.
7. Electrical trouble.

If any point is NOT clear to you, review the booklet.