

GENSET CONTROL MODULE OPERATION - A121/A241

A. GENERAL

The Genset control module is a microprocessor based module that monitors engine control and safety inputs and provides all the required START and STOP functions automatically.

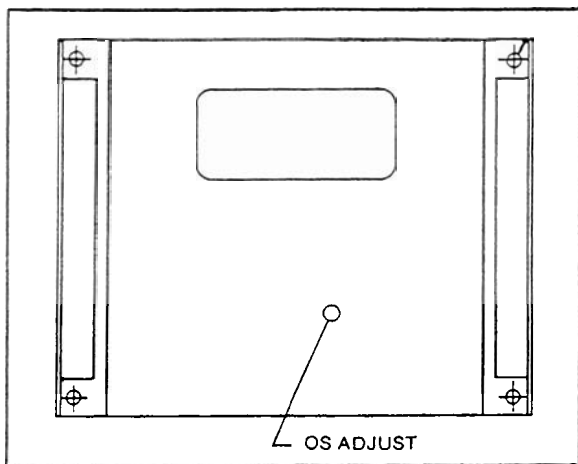


Figure 1

B. CONTROL SWITCH INPUTS:

The following front panel controls and instruments are wired into the microprocessor through the front-mounted terminal blocks.

1. Run-Off-Auto Switch

- a. "Run" - run position causes the engine to start and run immediately.
- b. "Auto" - auto position allows unit to be controlled via any remote single-pole "dry" contact (transfer switch, etc.). Contact closure causes the unit to start and run, while contact opening causes unit to shut down.

2. Lamp Test

Push button energizes all four alarm lights simultaneously. This feature is disabled with the run-stop-auto switch in the "stop" position, and has no other effect on unit operation.

C. RELAY FUNCTIONS

1. Master control relay - (FS) - operates fuel solenoid, etc.
2. Cranking control relay - (CS) - controls engine cranking.
3. Alarm relay - (AL) - provides isolated contact (2-amp maximum) for remote alarm indication, bell, etc.

D. SAFETY INPUTS

1. Low Oil Pressure Shutdown - (LPI)

Monitoring of oil pressure begins 12-seconds after unit starts and remains in effect until unit is shut down (except as noted in "loss of frequency input" below). The LPI signal is derived from an oil pressure sensor switch mounted on the engine.

2. High Water Temperature Shutdown - (HTI)

The engine coolant sensor temperature monitoring begins immediately with the start signal. However, if water temperature is excessive prior to start, (i.e., heat soak after shutdown), the unit is permitted to start. The high temperature condition is permitted to exist for up to 60 seconds after the unit is running before shutdown with alarm occurs. If the high temperature condition is corrected within that time period, the microprocessor circuit reverts to normal monitoring. The HTI signal is derived from a temperature sensor switch mounted on the engine.

3. Overspeed Adjustment - (OS)

Overspeed shutdown protection is provided by a frequency sensing network within the control module. The trip point of the frequency network is screw driver adjustable thru the opening in the face of the control module. (See Figure 1). Clockwise rotation increases the trip frequency and, thereby, raises the shutdown speed.

E. CRANKING CONTROL

1. Overcrank Protection - (OC). Two different cranking cycles are programmed into the microprocessor:

- a. Fixed single cycle - provides a single, non-adjustable, crank period of 48 seconds. Failure of the engine to start within that time results in a "overcrank" shutdown and alarm.
- b. Cycle cranking feature - the controller may be field-converted to the "cycle cranking" feature by grounding the "CCI" terminal on the control module. This feature provides a series of five cranking cycles, each 12 seconds long with a 12-second rest period between each. Failure of the engine to start by the end of the fifth crank period results in an "overcrank" shutdown and alarm indication.

2. Cranking Disconnect

The cranking termination speed is obtained from the frequency network within the control module. The microprocessor automatically sets the cranking termination speed at 30% of the selected overspeed trip value.

F. MICROPROCESSOR PROGRAM NOTES

Internal protection against loss of frequency input signal is programmed in after the unit has started normally. In the event the frequency goes to zero (engine runs out of fuel, frequency signal source fails, etc.), the Lo-oil pressure shutdown circuit is bypassed and a 12-second wait period is initiated. If frequency returns within this time period, Lo-oil pressure monitoring resumes and operation continues normally. If frequency has not returned at the end of this time period, the engine oil pressure status is observed to determine whether the engine is actually running or stopped. If the engine has stopped, the cranking cycle will begin in an effort to restart the engine. If the engine has **not** stopped (loss of input signal, etc.), the unit is shut down with an "overcrank" indication and alarm.

WARNING: "Overcrank" indication can mean a loss of frequency input signal during the previous run period. Attempting to restart the engine with no frequency input signal can destroy the starter motor, which can cause serious personal injury. The frequency signal source is a key component in this system and must be checked out thoroughly whenever an "overcrank" shutdown occurs, since the control module cannot provide protection against loss of signal during startup.

G. RESETTING A FAULT SHUTDOWN

A shutdown with alarm, due to any fault condition, will prevent any subsequent operation of the generator set. The run-stop-auto selector switch on the control panel must be momentarily placed in the "stop" position to reset these functions.

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