

# Honeywell

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## APPLICABLE:



**MAINTENANCE  
& ENGINEERING**



**FLIGHT  
OPERATIONS**

FOR ALL AIRFRAME MANUFACTURERS USING  
GENERAL AVIATION, GENERAL PRODUCTS  
AND/OR AUXILIARY POWER UNITS,  
OWNER/OPERATORS, DISTRIBUTORS, SALES  
AND SERVICE ORGANIZATIONS, AND FIELD  
SERVICE REPRESENTATIVES.

**Applicable To:** Auxiliary Power Unit, RE220[GV]

**Subject:** Electronic Control Unit (ECU) "No Fault Found" Removals

**Purpose:** To assist field personnel in avoiding false removals of the RE220[GV] ECU

**Background:** Honeywell has observed that a significant number of the RE220[GV] ECU removals result in No Fault Found (NFF). That is, no functional failure of the unit can be determined during the Acceptance Test when returned to the supplier. The actual mechanical component failure rate has been approximately 9% of the units returned.

**Discussion:** Honeywell has surveyed the contents of the Non Volatile Memory (NVM) fault history of returned ECUs and has compiled a list of faults most commonly associated with NFF returns. The paragraphs that follow list these faults, the associated operational symptom, and the recommended action to be taken when these faults are encountered [(Note that on the G550 A/C, the CMC will show the faults in a "4922XXX format (where XXX is the three digit code)]:

**ARINC1\_RCV\_NO\_DATA (103) and ARINC2\_RCV\_NO\_DATA (106)** - These codes are common to virtually all A/C and occur when the ECU does not receive ARINC data from the aircraft, typically during initial power up. No action is required.

**DOOR\_FAILED\_OPEN (304) and DOOR\_POS\_VS\_CMD (321)** - Testing has shown that if the APU system is functioning normally (i.e. the APU Inlet Door can be observed to be opening and closing properly) these may be considered nuisance faults, particularly with the P/N 2118946-9 and prior ECUs. Actuator improvements, as well as software changes introduced with the P/N 2118946-10 ECU, have reduced the nuisance occurrences of both of these faults (Ref Service Bulletin 49-7863). Note that a failed in-flight start attempt may also result in a DOOR\_FAILED\_OPEN (304) fault. Under this circumstance, it is not an indication of an actuator problem and can be expected to clear when the APU Master switch is cycled. It may be appropriate to check door rigging. Refer to the Gulfstream Aircraft Maintenance Manual (AMM) for additional information on the door rigging procedure.

**IGN1\_FAULT (204), IGN2\_FAULT (205), and IGN\_UNIT (206)** - All P/N WE3876295-X ignition units are subject to these faults. Any of these faults occurring should *not* be considered a "nuisance." While experience suggests the ignition unit may still be capable of limited APU starts when the fault is first annunciated, to avoid operational impact it should be replaced at the first opportunity.

# Honeywell SERVICE INFORMATION LETTER

RE220[GV] APU

**MANUAL\_SD (142)** - This fault indicates the APU was shut down via the APU MASTER switch rather than the APU STOP switch. Using the APU MASTER switch results in a by-pass of the cool down mode and an immediate APU shut down. Stopping the APU in this manner is not recommended.

**NO\_FLAME (133)** - On some A/C this fault will be displayed as an ignition fault. The key is to look for the fault (133). If (133) is accompanied by (206), it is safe to assume the ignition unit is at fault. However, if (133) appears by itself, with no ignition related messages, lack of fuel is the most like cause of the no-start. Verifying proper fuel flow to the FCU is the first step is troubleshooting this concern. It is recommended to refer to the Gulfstream Aircraft Maintenance Manual (AMM) for additional information.

**STARTER\_VOLTS\_OPEN (112)** - This fault will occur if there is a high resistance between the ECU and the APU starter. Experience has shown that (assuming the sense circuit wiring is intact) the problem is starter brush wear/sticking. If fault (112) is given, measure the resistance across the starter terminals with an ohmmeter while manually rotating the starter with the HAND CRANK ACCESS. If resistance greater than 1000 ohms is found, the starter brushes should be cleaned or the starter replaced. Refer to SERVICE INFORMATION LETTER APU-137.

**FIRE\_SD (123)** - Normally this fault should not be seen except during system testing. However, experience has shown it can be induced by ground operation of the APU with the WOW C/B pulled, which puts the APU system in the AIR MODE. This in turn causes a partial closing of the APU inlet door which results in APU exhaust being drawn in to the APU compartment. APU compartment temperatures will quickly increase to the level where the fire loop will trigger an APU shutdown. Operation of the APU in the AIR MODE while on the ground is not recommended.

**UNDERSPEED (137) and/or FAILED\_RELIGHT\_SD (144)** - These are caused when the APU rolls back or flames out and the automatic relight attempt is unsuccessful. Experience shows these to be associated with combustion instability. **FAILED\_RELIGHT\_SD (144)** is most likely to occur when the APU is pneumatically unloaded, e.g., with the Packs off, during cool-down or in flight. Should this fault occur, an acetic acid combustor wash can be accomplished to clean the clogged effusion cooling holes and restore normal operation.

**RTS\_LMP\_SHORT\_LOAD (218) or RTS\_LMP\_OPEN\_LOAD (219)** – These faults relate to a perceived short or open in the READY light circuit, which can be caused by a wiring issue, burned out bulbs, or incorrect bulb PNs installed.

**WD\_TIMEOUT\_OCCURRED (76) and ECU\_FAILURE\_SD (120)** - Occurrence of these two fault codes together is a known nuisance issue, which will result in no READY light. It was more common with P/N 2118946-8 and prior ECUs. The P/N 2118946-9 and -10 ECUs are much less likely to be affected, although on rare occasions they may be seen. Cycling the circuit breakers that provide power to the ECU will clear the faults. Note that just cycling the APU Master switch will not clear these faults, UNLESS the ECU is allowed to power off by waiting five minutes after the APU Master switch is selected off. When the RPM and EGT indications in the overhead panel “dash out”, that indicates the ECU has been powered down. The APU Master switch can now be selected on and normal operation will resume. The ECU can be used normally after the occurrence of these faults with no limitations on operation.

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RE220[GV] APU

**LCV\_POS\_VS\_CMD (281)** - This fault is an indication that the load control valve (LCV) is not responding correctly to the ECU Commands. This can be due to a clogged filter or other LCV issue. For the 3291210-4 LCV , refer to SERVICE INFORMATION LETTER APU-109 for filter cleaning/replacement instructions. Refer to SERVICE BULLETIN RE220-49-7984 for information on upgrading to the improved 32912010-7 LCV.

**CLOSING REMARKS** - The RE220[GV] ECU has proven to be extremely reliable, and actual hardware failures are very rare. In addition, the ECU has extensive internal BIT capability, which means if the ECU does not report an internal system fault it should be considered serviceable. Replacement of the ECU for reasons other than specific internal faults is discouraged.

For further information on this subject, please contact your local Gulfstream or Honeywell Field Service Representative.