

E01-SAA09FT06-030
SHEET 5 OF 16SAA09FT06-030
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Page 17 of 61**CRITICAL ITEM:** Environmental Control Unit, transporter mounted**Find Number:** None**System:** Environmental Control Subsystem
for the Payload Canister, Set 2**Failure Category:** 2**SAA No.:** 09FT06-030**NASA Part No.:** None**PMN/Name:** H70-1326**Mfr's** KECO
Part No.: Model F120-3**Drawing/**
Sheet No.: 79K22317**Function:** Provides filtered air with controlled temperature and humidity to the payload canister.**Critical Failure Mode:** Loss of temperature/humidity control (FMN 09FT06-030.001)**Cause:** Failure of any of the critical, active components listed in the attached table would result in this failure mode.**Failure Effect:** Failure to maintain specified temperature or humidity may result in payload damage.**ACCEPTANCE RATIONALE:****Design:**

- | | | |
|------------------------|-------------------------------|-------------------------------------|
| o Unit specifications: | <u>Rated</u> | <u>Actual</u> |
| Temperature (°F) | 40-100 (dry bulb) | 65-75 |
| Humidity | 32-51% RH | < 50% RH |
| Pressure | 0 - 8 inches H ₂ O | 0.3-0.5 inches H ₂ O max |
- o Flow rate: 75 to 150 lb/min
 - o Hydrocarbon content: 15 ppm of methane maximum (by weight)
 - o Failure of the unit is detectable by the I&CS.

Test:

File VI OMRSD requires verification of humidity/temperature control prior to each mission requiring ECS operation

Inspection:

Monthly, quarterly, and annual inspection of the ECU is described in OMI E6405, Transcan ECS Maintenance. After start-up of the ECU, the system is monitored for conformance to "ECS operation parameters" as described in the OMI. Also, the I&CS monitors the payload canister temperature and humidity.

Failure History:

PRACA data (from 1981 to present on Set 1, 1984 to present on Set 2) lists the following reported failures:

ECU on Canister Transporter, Set 2:

- o temperature controller is unstable -- currently used in manual mode
- ECU on Canister Transporter, Set 1:
- o temperature controller was unstable in high humidity and was replaced with a like unit.
 - o ECU shut down on high discharge pressure.
 - o ECU power breaker tripped during normal operation while at the VAB; attributed to power fluctuations caused by lightning in the area
 - o ECU main breaker tripped causing shutdown; caused by deteriorated wiring connection.

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- o unit extensively damaged due to Silicon Controlled Rectifier power controller commanding heater on without blower running. Problem addressed by installing magnetic contactors between circuit breaker and the SCR which prevents heater from being on without blower running.
- o compressor load control circuit was not functioning properly; attributed to controller being out of adjustment.

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Operational Use:

Actions to be taken will be addressed as a contingency plan for each mission.

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<u>Find No.</u>	<u>Component</u>
A147050	Temp. Transmitter
A147055	Blower
A147058	Controller, Loading Circuits
A145059	Heater, Elec.
A145060	Humidifier, Manifold
A147066	Press. Transmitter
A147063	Damper, Outside Air
A147084	Pump, 20gph, 60 PSI, 1.42A
A147088	Valve, Thermostatic Expansion
A147090	Valve, Solenoid, Liquid Line
A147075	Valve, Hot Gas Injection
A147096	Valve, Solenoid, Hot Gas
A147097	Accumulator, Suction
A147099	Valve, Relief
A147100	Receiver
A147105	Switch, Discharge High-Temp
A147110	Compressor, Refrigerant
A147119	Press. Switch, High Refrigerant
	Press. Outcut
A147120	Press. Switch, Compressor Low Oil
	Press. Outcut
A147080	Damper Actuator

Electrical

<u>Find No.</u>	<u>Component</u>
B1	Motor, Blower
B2	Motor, Compressor
B3	Motor, Condenser
K9, B1K, B2K	Relay, Starter
CB1, CB2, CB3, CB5, CB6, CB7, CB8	Circuit Breaker
HR1...HR37	Heater, Duct
K1	Starter, Blower
K2	Starter, Compressor
K3	Starter, Condenser
K4	Relay, Phase Reversal
K6, K6A, K6B, K6C, K7, K8, K10, K11	Relay
L1, L2	Solenoid Valve
L4, L5	Solenoid, Unloaders
L6	Solenoid, Valve Humidifier
R1, R2	Jump Sensing Element
GRA, GRB, GRC, GRD	Resistor 500 Ω
RC	Resistor 62.5 Ω
S7	Switch, Heater, Over-Temp.

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S10	Thermostat
S12	Switch, Over-Temp.
S13	Switch, Low Oil Pressure
S14	Switch, Low Refrigerant Pressure
S15	Switch, High Refrigerant Pressure
S16	Switch, Condenser Fan Pressure
S17, S18, S19	Switch, Thermal Overload
S20	Switch, Emergency Stop
T1	Transformer
Z2	Loading Circuit Controller
Z3	SCR Heater Controller
Z4	Electronic Indicating Controller
Z5	Resistance to Current Transmitter
Z6, Z8	Transducer
Z7	Pressure Transmitter
Z9, Z10	Staging Relay
KVR, KSR	Relay, 24VDC, 3PDT