ORDER

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
GREAT LAKES REGION

GL-6970.17A

5/29/81

SUBJ: ENVIRONMENTAL CONTROL SYSTEMS

1. PURPOSE. The purpose of this Order is to improve the reliability of FAA communication and navigational facilities. The control system will provide a more stable and energy efficient environment within the building by preventing simultaneous operation of opposing environmental components such as heaters, vent fans and air conditioners.

2. DISTRIBUTION. This Order is distributed to Section Level and above in the Airway Facilities Division and to all Airway Facilities Field Offices.

3. CANCELLATION. Order GL6970.17,"Automatic Environmental System for ILS Shelters" is cancelled.

4. BACKGROUND. Air conditioners, heaters and vent fans have been installed in recent years at several FAA facilities such as ILS, VOR, RTR, RCAG and RML buildings, etc. At some of these facilities, the additions have been made without providing an adequate environmental control system to prevent simultaneous operation of opposing environmental components such as the air conditioner and ventilator and/or the air conditioner and heater. The resulting condition causes an unstable environment within the facility. At some facilities, no provision has been made for an economizer mode of operation of the air conditioner at temperatures where outside air could be utilized for cooling. At most facilities, excessive infiltration occurs due to poorly closing outside air dampers.

5. ACTION. The environmental control system described herein will be installed in all unmanned facilities that contain air conditioning, heating and ventilation equipment.

6. EXCEPTION: This Order does not apply to control systems configured per Drawing GL-D-328 which utilizes the "Honeywell T872" heating/cooling thermostat and Drawing GL-D-710-(1, 2 and 3).

7. REFRENCE DRAWING. Drawing No. GL-D-328-1.

8. MATERIALS REQUIRED.

a. Control Panel Enclosure similar to . . .
Oil Tight Jic Box Hoffman Cat. #A1614CH with Panel Cat. #A-16P14

Distribution: A-XAF-4, FAF-0 (Max.)

Initiated By: AGL-436

b. Heating/Cooling Thermostat similar to . . .
Accustat Model LMS-AH22 with 55°, 65°, 78° and 85° Sensors

c. Remote Bulb Thermostat similar to . . .
Honeywell Part #T675A1565 (0-100°)

d. Overtemperature Thermostat similar to . . .
Honeywell Part #631C1020 (70°-140°)

e. Override and Occupied Relay (3 ea.) similar to . . .
Honeywell Part #R8222D1014 (24V Coil, Dpdt. 3 Amp.)

f. A/C, Heater and Vent Fan Contractor (3-4 ea.) similar to . . .
Honeywell Part No. R8243B1005 (24V Coil, 20 Amp. N/O Contacts)

g. Transformer . . .
Dongan Part #33-100K (120/24V; 100 VA)

h. Timer . . .
60 Min. Manual Timer similar to . . . "Dayton" 6X546

i. Time Delay Relay . . .
Items 7a(1) & (2), AF P 6970.3 Chg. 19.

The following components, if to be newly installed or when replacement of existing components becomes necessary, shall be of the type given below. Size of components to be coordinated with AGL-436 engineers.

j. Air Conditioner . . .
5,000 - 30,000 BTUH room air conditioner with sleeve and front discharge for the condenser, 230V single phase, 60 cyc., similar to "Fedders" ASL and ASD Series or "Carrier" Series 51. Procure this item, if available, from GSA schedule.

k. Heater . . .
1,500 - 4,000 watts wall mounted forced air wall heater, 240V, single phase, 60 cyc., similar to "Emerson-Chromalox" AWH-4000 Series or "Markel" 770 Series.

l. Vent Fan . . .
560-2,735 CFM at 1/8 S.P. sidewall centrifugal exhauster, 115/230V, single phase, 60 cyc., similar to "Greenheck" SW Series or "Chelsea" WDC Series.

m. Dampers . . .
Intake and exhaust dampers, size to vent fan, similar to "Honeywell" D640 Series or "Air Conditioning Produces Co." Series 560.

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n. Damper Motor . . .
Spring-return 2-position motor similar to "Honeywell" M436

o. Intake Air Cap similar to . . .
ak"Greenheck" Model 6IH, size to dampers.

9. SOURCE OF MATERIAL. To be furnished by the Region if installed under an SMP/RMP project or purchased locally except for the air conditioner which is an equipment item.

10. SCHEDULE. Projects submitted to the Region on GL Form 6030-2 will be performed as scheduled by the Regional Office.

11. INSTALLATION PROCEDURE.

a. Mount thermostats on outside and relays on inside of control center panel and wire up to operate as shown in Figure 1 on Drawing GL-D-328-1.

(1) Relays should energize outlets if air conditioner, heater, or vent fan are equipped with conventional appliance cords and plugs. In this case, outlet shall be labeled, "for air conditioner, heater, etc. use only". If appliance is not equipped with a conventional cord and plug, it shall be hard wired from the controlling relay.

(2) Each air conditioner, heater and vent fan shall receive power from a separate, suitably sized circuit breaker.

(3) If air conditioner, heater or vent fan have integral, built-in thermostats, they shall be defeated so that control of the equipment is solely by the control center. NOTE: This applies to normal manual control devices only, and not to safety devices such as overtemperature thermostats etc.

b. Mount center of control panel approximately five feet above the floor in an area with good air circulation at average room temperature, but preferably not on the entrance door wall.

c. Complete wiring by connecting control circuit to the A/C, heater, and vent fan.

(1) Install EMT conduit on all runs over three feet.

(2) Use flexible steel conduit on runs less than three feet, and only when vibration is encountered.

(3) All conduit fittings shall be compression type fittings; set screw type are not to be used.

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(4) Anchor the EMT conduit securely at approximately every six feet and at ends where the connection is made with the flexible conduit.

(5) Terminate the flexible conduit into boxes.

(6) Install exposed conduit parallel to, or at right angles with the lines of the building. Field bends shall be avoided where possible and where necessary, are to be made with hickey or conduit-bending device. Radius of field bends are not to be less than ten times the inside diameter of the conduit.

(7) Use existing square duct where available if the total cross-sectional area of the existing and new conductors do not exceed 40% of the interior cross-sectional area of the duct. Use compression type fittings for all connections of square duct to conduit.

d. Install sensing bulb of remote bulb thermostat on outside of north wall near roof and provide sun shield.

e. Install A/C if replaced as shown in Figure 2 on Drawing GL-D-328-1.

f. Replace eixsting wall heater, if non-fan type, with one similar to type given in parts list.

g. Install sidewall centrifugal exhauster if required as shown in Figure 3 on Drawing GL-D-328-1.

h. Install motorized damper and hood if required inside wall as shown in Figure 4 on Drawing GL-D-328-1.

10. TEST AFTER INSTALLATION.

a. Cooling Cycle Checkout.

(1) Unoccupied.

(a) Jumper across the bands on Y2 sensor. If the outside temperature is above the remote bulb setting, the air conditioner should turn on. If the outside temperature is below the remote bulb setting, the vent fan should turn on.

(b) Adjust the remote bulb setting below the outside temperature and check to see that the air conditioner turns on.

(c) Adjust the remote bulb setting above the outside temperature and check to see that the vent fan turns on.

(2) Occupied. Energize timer and repeat procedure given under (a) for Sensor Y1.

b. Heating Cycle Checkout.

(1) Unoccupied. Jumper across the bands on W1 sensor and heater(s) should turn off. Remove sensor from thermostat and heater(s) should turn on.

(2) Occupied. Energize timer and repeat the above procedure for W2 sensor.

c. Overtemperature Checkout. Adjust the overtemperature thermostat to about 10°F. below room temperature and check to see that the vent fan turns on.

13. RESULTS AFTER INSTALLATION: The Environmental Control System is to maintain the temperature within the building per Table 3-1 (heating 65°F. db (occupied), 55°F. db (unoccupied); cooling 78°F. db (occupied), 85°F. db (unoccupied)), of Order 6970.3, "Maintenance of Environmental Systems", by the fully automatic selection of heater, vent fan or air conditioner.

14. CORRECTIONS TO INSTALLATION DRAWINGS. Update applicable local as-built drawings as required.

15. TOTAL PROJECT SCOPE PER THIS ORDER. As of the issue date of this Order, approximately 50% of the Great Lakes facilities have this system installed. There also exists several other facilities with variations of this system which were installed by Turn-Key, Sector initiated contracts, Sector personnel and F&E construction crews. Sector Managers shall review all their non-attended facilities and make a determination of which locations are not configured per this Order. GL Order 6030-2 forms are to be submitted for all facilities in non-compliance which require funding and accomplishment at the Regional level. See para. 6 for exempt facilities.

16. SURPLUS MATERIAL. Dispose of locally.

Stanley Rivers

STANLEY RIVERS
Acting Chief, Airway Facilities Division

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