

1 GENERAL

1.01 SUMMARY

- .1 Section Includes:
 - .1 At minimum detailed narrative description of Sequence of Operation of each system including ramping periods and reset schedules.
 - .1 Control Description Logic (CDL) for each system.
 - .2 Input/Output Point Summary Tables for each system.
 - .3 System Diagrams consisting of the following; EMCS System architectural diagram, Control Design Schematic for each system (as viewed on OWS), System flow diagram for each system with electrical ladder diagram for MCC starter interface.

1.02 REFERENCES

- .1 Public Works and Government Services Canada (PWGSC) / Real Property Branch / Architectural and Engineering Services.
 - .1 MD13800-September 2000, Energy Management and Control Systems (EMCS) Design Manual. English: <ftp://ftp.pwgsc.gc.ca/rps/docentre/mechanical/me214-e.pdf>

1.03 SEQUENCING

- .1 Present sequencing of operations for system, in accordance with MD13800 - Energy Management and Control Systems (EMCS) Design Manual.
- .2 Sequencing of operations for system as follows:
 - .1 VRF Evap-1 to 5

All Variable Refrigerant Flow Evaporator Units shall operate on a time of day schedule. During the occupied period the evaporator shall operate continuously with the minimum outdoor air setting as indicated to maintain ventilation. During the unoccupied hours, the unit shall cycle on for a heating demand only (summer/shoulder seasons) and operate continuously during the heating season. Cooling will be disabled during the unoccupied period. Outdoor air dampers shall remain closed during the unoccupied period. Outdoor air provided by ERV-1 and ERV-2.

Upon system start, the ERV supply fans and EVAP return fans shall start followed by EVAP supply fans. Heating or cooling controls shall be enabled.

Supply air temperature shall be maintained at setpoint by modulating the linear expansion valve as required.

Individual zones are equipped with local control module. Display supply air flow.

Monitor supply with airflow proving switches and return fan status with current relays as indicated. Initiate local alarm Red Light upon supply or return fan failure.

On a call for cooling from zone temperature sensor initiate evaporator cooling mode. Modulate evaporator linear expansion valve open to satisfy cooling demand. When satisfied modulate to minimum airflow position.

On a call for heating from zone temperature sensor, modulate linear expansion valve until set point is achieved. On a further call for heat if set point is not achieved within 30 minutes, activate radiant heat relay.

.2 Hot Water Baseboard Radiation

On a call for first stage auxiliary heat from local module, activate radiant heat relay to open associated on/off temperature control valve.

.3 Heating Boiler

Boiler to be controlled from the EMCS and shall provide the functions described below.

Boiler shall be equipped with manual reset high limit aquastats for safety shutdown. Burners are equipped with alarm contacts for EMCS monitoring of alarm conditions. Burners will accept enable command from EMCS and modulating input signal for supply water reset.

Automatic Controls contractor shall wire electric antisiphon solenoid valves to burner. Valves to close upon burner shutdown. Antisiphon valves located at fuel oil storage tank.

Outdoor Air Reset: EMCS shall reset Heating Water Supply setpoint to facility based on outdoor air reset schedule. Outdoor air sensor by others. Heating Supply Water temperature shall be initially set as follows:

Initial Settings:

OAT	13°C	-18°C
Supply Temp	60°C	82°C

Minimum supply temp 60°C, maximum supply temp 82°C.

Boiler Setpoint Reset: EMCS shall reset Boiler Supply Water temperatures to maintain the Heating Water Supply setpoint.

Boiler Supply Range: 60°C to 100°C

Boiler Alarm Monitoring: EMCS shall monitor boiler general alarm fault via the alarm monitoring contacts in the burner control. Initiate local and remote alarms if boilers initiate alarm.

Main existing heating circulators (4) shall operate from the EMCS based on outdoor air temperature. Circulators for any particular zone to run during heating season on a call for perimeter heat from that zone.

2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

3 EXECUTION

3.01 NOT USED

- .1 Not Used.

END OF SECTION