



VARIABLE REFRIGERANT FLOW SEQUENCE OF OPERATIONS

- ## A. GENERAL
1. THIS CONTROL SEQUENCE APPLIES TO THE FOLLOWING VARIABLE REFRIGERANT FLOW SPLIT SYSTEM(S):
513-HP1, 513-HP2, 513-FCU-1x, 513-FCU-2x
 2. THE VARIABLE FLOW REFRIGERANT SYSTEM SHALL OPERATE UNDER ITS OWN CONTROLS. CONTROLS ARE SHOWN FOR A SINGLE INDOOR UNIT, REQUIRED FOR ALL. SEE PLANS / SCHEDULES FOR QUANTITIES.
 3. UNIT SAFETIES SHALL BE FACTORY PRE-WIRED AND SHALL INCLUDE: COMPRESSOR CONTACTORS, COIL, LOCK-OUT RELAY, ANTI-SHORT CYCLE DELAY, REFRIGERANT PRESSURE SENSORS / SAFETIES.
 4. PROVIDE ADEQUATE DEAD-BANDS TO PREVENT SHORT-CYCLING OF UNIT.
 5. THE BCS SHALL MONITOR SPACE TEMPERATURE VIA SPACE TEMPERATURE SENSORS.
- ## B. FAN CONTROL AND STARTUP
1. THE SUPPLY FAN(S) SHALL BE ENABLED DURING THE OCCUPIED MODE AND SHALL RUN CONTINUOUSLY.
 2. DURING UNOCCUPIED MODE, THE SUPPLY FAN SHALL BE ENABLED UPON A CALL FOR HEATING OR COOLING, AS DESCRIBED UNDER "UNOCCUPIED SPACE CONDITIONS CONTROL".
- ## C. DISCHARGE CONDITIONS CONTROL
1. HEATING - UPON A DECREASE IN TEMPERATURE BELOW 70°F (ADJUSTABLE) AS SENSED BY THE SPACE TEMPERATURE SENSOR THE UNIT SHALL BE INDEXED INTO HEAT PUMP MODE.
 2. COOLING - UPON AN INCREASE IN TEMPERATURE ABOVE 75°F (ADJUSTABLE) AS SENSED BY THE SPACE TEMPERATURE SENSOR, THE UNIT SHALL BE INDEXED INTO COOLING MODE.
- ## D. UNOCCUPIED SPACE CONDITIONS CONTROL
1. DURING THE UNOCCUPIED PERIOD (ADJUSTABLE), THE BCS SHALL OPERATE THE UNIT AS ABOVE TO MAINTAIN THE UNOCCUPIED SPACE TEMPERATURE SETPOINTS OF 55°F AND 85°F. THE FAN SHALL CYCLE WITH HEATING AND COOLING LOADS.
- ## E. SAFETIES
1. THE FOLLOWING SAFETIES SHALL SHUT DOWN ITS RESPECTIVE UNIT, AND INITIATE AN ALARM THROUGH THE BCS AFTER APPROPRIATE TIME DELAYS WHERE SPECIFIED:
 - a. (1) UNIT CONTROLLER OR INTERNAL SAFETIES INDICATE A 'FAULT' - DELAY: NONE. UNIT SHALL SHUT DOWN AND REPORT THROUGH THE BCS.
- ## F. ALARMS
1. THE CONTROL SYSTEM SHALL INITIATE AN ALARM DESCRIBING THE ALARM IF ANY OF THE FOLLOWING CONDITIONS ARE MET:
 - a. (1) SPACE TEMPERATURE IS OFF SETPOINT (-3°F), DELAY: 5 MINUTES.

VRF INDOOR UNIT POINT SCHEDULE		
POINT	DESCRIPTION	TYPE
FLTH-OP	FILTER DIFF. PRESS. STATUS	DIGITAL INPUT (BY MANUF.)
FCU1-EN	INDOOR UNIT ENABLE	DIGITAL OUTPUT (BY MANUF.)
FCU1-S	INDOOR UNIT STATUS	DIGITAL INPUT (BY MANUF.)
FCU1-FS	INDOOR UNIT FAN SPEED	ANALOG INPUT (BY MANUF.)
FCU1-T	ROOM SETPOINT	ANALOG OUTPUT (BY MANUF.)
SP1-T	SPACE TEMPERATURE	ANALOG INPUT (BY MANUF.)
FCU1-CY	CURRENT/ENERGY	ANALOG INPUT (BY MANUF.)
FLTH-OP	FILTER DIFF. PRESS. STATUS	DIGITAL INPUT (BY MANUF.)
FCU#-EN	INDOOR UNIT ENABLE	DIGITAL OUTPUT (BY MANUF.)
FCU#-S	INDOOR UNIT STATUS	DIGITAL INPUT (BY MANUF.)
FCU#-FS	INDOOR UNIT FAN SPEED	ANALOG INPUT (BY MANUF.)
FCU#-T	ROOM SETPOINT	ANALOG OUTPUT (BY MANUF.)
SP#-T	SPACE TEMPERATURE	ANALOG INPUT (BY MANUF.)
FCU#-CY	CURRENT/ENERGY	ANALOG INPUT (BY MANUF.)

POINT	DESCRIPTION	TYPE
COMP1-0	COMPRESSOR 1 RUN	DIGITAL OUTPUT (BY MANUF.)
COMP2-0	COMPRESSOR 2 RUN	DIGITAL OUTPUT (BY MANUF.)
RV1-0	REVERSING VALVE 1 POSITION	DIGITAL OUTPUT (BY MANUF.)
RV2-0	REVERSING VALVE 2 POSITION	DIGITAL OUTPUT (BY MANUF.)
FLT1-1	FAULT 1	ANALOG INPUT (BY MANUF.)
FLT2-1	FAULT 2	ANALOG INPUT (BY MANUF.)
HRP1-1	HIGH REFRIGERANT PRESSURE ALARM	DIGITAL INPUT (BY MANUF.)
HRP2-1	HIGH REFRIGERANT PRESSURE ALARM 2	DIGITAL INPUT (BY MANUF.)
LRP1-1	LOW REFRIGERANT PRESSURE ALARM 1	DIGITAL INPUT (BY MANUF.)
LRP2-1	LOW REFRIGERANT PRESSURE ALARM 2	DIGITAL INPUT (BY MANUF.)

No.	Description	Date
	FINAL SUBMISSION	9/24/2013
Revisions:		Date

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Drawing Title

MECHANICAL CONTROL
DIAGRAMS

Approved: Project Director

Project Title	VA Erie Parking Structure
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	Location Erie, PA
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Date
9/24/2013

Checked	SCC
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Drawn
C. J. W.

Project Number
11159.00

Building Number

	Drawing Number
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M602

**Office of
Construction
and Facilities
Management**



FINAL SUBMISSION

Scale: