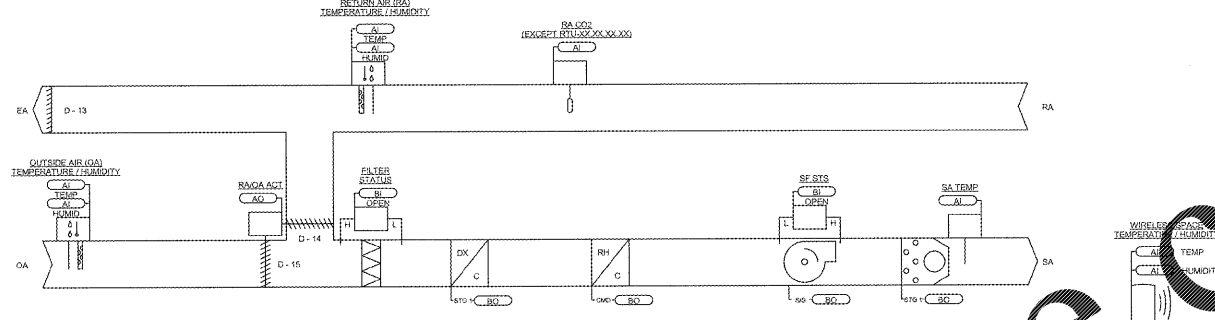


PROJECTOR EXHAUST SCHEMATIC
NOT TO SCALE



CONSTANT VOLUME ROOFTOP UNIT CONTROL DIAGRAM
NOT TO SCALE

AMC CONSTANT VOLUME RTU

SEQUENCE OF OPERATIONS

BUILDING AUTOMATION SYSTEM INTERFACE:

THE BUILDING AUTOMATION SYSTEM (BAS) SHALL SEND THE CONTROL SIGNALS FOR WARM-UP / PRE-COOL, OCCUPIED / UNOCCUPIED AND HEAT / COOL MODES. IF A BAS IS NOT INSTALLED, COMMUNICATION IS LOST WITH THE BAS THE CONTROLLER SHALL OPERATE USING FAULT MODES AND SETPOINTS.

OCCUPIED MODE:

DURING OCCUPIED PERIODS, THE SUPPLY FAN SHALL RUN CONTINUOUSLY AND THE OUTSIDE AIR DAMPER SHALL OPEN TO MAINTAIN MINIMUM VENTILATION REQUIREMENTS. THE DX COOLING AND GAS HEAT SHALL STAGE TO MAINTAIN THE OCCUPIED SPACE TEMPERATURE SETPOINT. ECONOMIZING IS ENABLED THE OUTSIDE AIR DAMPER SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

UNOCCUPIED MODE:

WHEN THE SPACE TEMPERATURE IS BELOW THE UNOCCUPIED HEATING SETPOINT OF 80.0 DEG. F (ADJ.) THE SUPPLY FAN SHALL STOP. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED UNLESS GAS HEAT SHALL STAGE TO MAINTAIN THE UNOCCUPIED SPACE TEMPERATURE SETPOINT. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED HEATING SETPOINT PLUS THE UNOCCUPIED OFFSET (DEG. F (ADJ.)) THE SUPPLY FAN SHALL STOP AND THE GAS HEAT SHALL BE DISABLED.

PRE-COOL MODE:

WHEN THE SPACE TEMPERATURE IS ABOVE THE UNOCCUPIED HEATING SETPOINT OF 85.0 DEG. F (ADJ.) THE SUPPLY FAN SHALL STAGE TO MAINTAIN THE UNOCCUPIED HEATING SETPOINT. THE OUTSIDE AIR DAMPER SHALL OPEN IF ECONOMIZING IS DISABLED. WHEN THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED HEATING SETPOINT PLUS THE UNOCCUPIED OFFSET (DEG. F (ADJ.)) THE SUPPLY FAN SHALL STOP. THE DX COOLING SHALL BE DISABLED AND THE OUTSIDE AIR DAMPER SHALL CLOSE.

OPTIMAL START:

THE UNIT SHALL MONITOR THE SCHEDULED UNOCCUPIED TIME, OCCUPIED SPACE SETPOINTS AND SPACE TEMPERATURE TO CALCULATE WHEN THE OPTIMAL START OCCURS.

MORNING WARM-UP MODE:

DURING OPTIMAL START, IF THE SPACE TEMPERATURE IS BELOW THE OCCUPIED HEATING SETPOINT A MORNING WARM-UP SHALL BE ACTIVATED. WHEN MORNING WARM-UP IS INITIATED THE UNIT SHALL ENABLE THE HEATING AND SUPPLY FAN. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED. WHEN THE SPACE TEMPERATURE REACHES THE OCCUPIED HEATING SETPOINT (ADJ.) THE UNIT SHALL TRANSITION TO THE OCCUPIED MODE.

PRE-COOL MODE:

WHEN THE SPACE TEMPERATURE IS ABOVE THE OCCUPIED COOLING SETPOINT, PRE-COOL MODE SHALL BE ACTIVATED. WHEN PRE-COOL IS INITIATED THE UNIT SHALL ENABLE THE FAN AND COOLING ECONOMIZER. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED. THE ECONOMIZER SHALL STAGE TO MAINTAIN THE UNOCCUPIED HEATING SETPOINT (ADJ.) THE UNIT SHALL TRANSITION TO THE OCCUPIED MODE.

OPTIMAL STOP:

THE UNIT SHALL MONITOR THE SCHEDULED UNOCCUPIED TIME, OCCUPIED SPACE SETPOINTS AND SPACE TEMPERATURE TO CALCULATE WHEN THE OPTIMAL STOP OCCURS. WHEN THE OPTIMAL STOP MODE IS ACTIVE THE UNIT CONTROLLER SHALL MAINTAIN THE SPACE TEMPERATURE TO THE SPACE TEMPERATURE OFFSET SETPOINT.

COOLING MODE:

THE UNIT CONTROLLER SHALL USE SPACE TEMPERATURE AND SPACE TEMPERATURE SETPOINT TO DETERMINE WHEN TO INITIATE REQUESTS FOR COOLING. WHEN THE SPACE TEMPERATURE RISES ABOVE THE SETPOINT, THE UNIT CONTROLLER SHALL MODULATE THE ECONOMIZER OR STAGE THE DX COOLING AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT. THE FIRST COMPRESSOR SHALL ENERGIZE AFTER ITS MINIMUM 3-MINUTE OFF TIME HAS EXPIRED. IF ADDITIONAL COOLING CAPACITY IS REQUIRED, THE SECOND STAGE OF COOLING SHALL BE ENABLED. ONCE THE SPACE TEMPERATURE FALLS BELOW THE SETPOINT, THE COMPRESSORS SHALL BE DEACTIVATED AND THE ECONOMIZER SHALL RETURN TO MINIMUM POSITION.

HEATING MODE:

THE UNIT CONTROLLER SHALL USE THE SPACE TEMPERATURE AND SPACE TEMPERATURE SETPOINT TO DETERMINE WHEN TO INITIATE REQUESTS FOR HEAT. WHEN THE SPACE TEMPERATURE DROPS BELOW THE SETPOINT, THE UNIT CONTROLLER SHALL ENABLE GAS HEATING STAGES TO MAINTAIN THE SPACE TEMPERATURE SETPOINT. ONCE THE SPACE TEMPERATURE RISES ABOVE THE SETPOINT THE GAS HEATING STAGES SHALL BE DISABLED.

DEHUMIDIFICATION:

FACTORY INSTALLED HOT GAS REHEAT SHALL ALLOW APPLICATION OF DEHUMIDIFICATION. DEHUMIDIFICATION SHALL BE ALLOWED ONLY WHEN THE OUTSIDE AIR TEMPERATURE IS ABOVE 40.0 DEG. F AND BELOW 100.0 DEG. F. THE ECONOMIZER OUTSIDE AIR DAMPER SHALL DRIVE TO MINIMUM POSITION DURING DEHUMIDIFICATION.

SINGLE COMPRESSOR UNITS:

ON A CALL FOR DEHUMIDIFICATION, THE REHEAT VALVE SHALL ENERGIZE AND THE COMPRESSOR SHALL ENABLE. WHEN THE HUMIDITY CONTROL SETPOINT IS SATISFIED, THE VALVE SHALL BE DE-ENERGIZED AND THE COMPRESSOR SHALL BE DISABLED. IF THERE IS A CALL FOR COOLING FROM THE SPACE TEMPERATURE CONTROLLER, WHILE IN REHEAT, THE REHEAT VALVE SHALL BE DE-ENERGIZED AND THE COMPRESSOR CONTINUES TO RUN.

DUAL COMPRESSOR UNITS:

ON A CALL FOR DEHUMIDIFICATION, THE REHEAT VALVE SHALL ENERGIZE AND BOTH COMPRESSORS SHALL ENABLE. WHEN THE HUMIDITY CONTROL SETPOINT IS SATISFIED, THE VALVE SHALL BE DE-ENERGIZED AND BOTH COMPRESSORS SHALL BE DISABLED. IF THERE IS A CALL FOR 1ST STAGE COOLING WHILE IN THE DEHUMIDIFICATION MODE, NO ACTION SHALL TAKE PLACE. IF THERE IS A CALL FOR 2ND STAGE COOLING, THE REHEAT VALVE SHALL BE DE-ENERGIZED, AND THE UNIT SHALL REVERT TO THE COOLING MODE. IF 2ND STAGE COOLING IS SATISFIED AND THERE IS STILL A CALL FOR DEHUMIDIFICATION, THE REHEAT VALVE SHALL ONCE AGAIN BE ENERGIZED.

ECONOMIZER:

OUTSIDE AIR (OA) ENTHALPY SHALL BE COMPARED WITH RETURN AIR (RA) ENTHALPY POINT. THE ECONOMIZER SHALL ENABLE WHEN OA ENTHALPY IS LESS THAN RA ENTHALPY - 0.9 BTU/LB. THE ECONOMIZER SHALL DISABLE WHEN OA ENTHALPY IS GREATER THAN RA ENTHALPY.

DEMAND CONTROL VENTILATION (DCV):

IF THE RETURN CO2 LEVEL IS GREATER THAN OR EQUAL TO THE DESIGN MINIMUM CO2 SETPOINT, THE OUTDOOR AIR DAMPER SHALL OPEN TO THE DESIGN MINIMUM OUTDOOR AIR DAMPER SETPOINT. IF THERE IS A CALL FOR ECONOMIZER COOLING, THE DAMPER MAY BE OPENED FURTHER TO SATISFY THE COOLING REQUEST.

IF THE RETURN CO2 LEVEL IS LESS THAN OR EQUAL TO THE DCV MINIMUM CO2 SETPOINT AND LESS THAN THE DESIGN MINIMUM CO2 SETPOINT, THE OUTDOOR AIR DAMPER POSITION SHALL BE MODULATED PROPORTIONALLY TO THE SPACE CO2 LEVEL RELATIVE TO A TARGET POSITION BETWEEN THE DCV MINIMUM CO2 SETPOINT AND THE DESIGN MINIMUM CO2 SETPOINT. IF THERE IS A CALL FOR ECONOMIZER COOLING, THE DAMPER MAY BE OPENED FURTHER TO SATISFY THE COOLING REQUEST.

FAN FAILURE:

THE SUPPLY FAN SHALL BE ENABLED WHILE IN THE OCCUPIED MODE AND CYCLED ON DURING THE UNOCCUPIED MODE. A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FAN. IF THE SWITCH DOES NOT OPEN WITHIN 60 SECONDS AFTER A REQUEST FOR FAN OPERATION A FAN FAILURE ALARM SHALL BE ANNUNCIATED AT THE BAS. THE UNIT SHALL STOP, REQUIRING A MANUAL RESET.

BUILDING PRESSURE CONTROL:

THE BAROMETRIC RELIEF DAMPERS SHALL OPEN WITH INCREASED BUILDING PRESSURE. AS THE BUILDING PRESSURE INCREASES, THE PRESSURE IN THE UNIT RETURN SECTION ALSO INCREASES, OPENING THE DAMPERS AND RELIEVING AIR.

FILTER STATUS:

A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FILTER WHEN THE FAN IS RUNNING. IF THE SWITCH CLOSSES FOR 2 MINUTES AFTER A REQUEST FOR FAN OPERATION A DIRTY FILTER ALARM SHALL BE ANNUNCIATED AT THE BAS.



DATE: 7/21/88
SHEET: 08

ENGINEERING
Cibbets, Drake, Scott, Inc.
9501 E. 6th Street, Suite 100
Buckner, Missouri 64617
Phone: (816) 358-1790
Fax: (816) 358-1147
www.cibbets.com
GEORGIA LIC. #13843

SHEET LEGEND

0000	GENERAL INFORMATION
1000	SCHEMATIC
2000	GENERAL NOTES
3000	MECHANICAL
4000	ELECTRICAL
5000	PLUMBING
6000	MECHANICAL
7000	ELECTRICAL
8000	PLUMBING
9000	MECHANICAL

MADISON YARDS 8
AMC NEW BUILD
905 MEMORIAL DRIVE SE
ATLANTA, GA 30316



No.	Date	Description

Project Issue Date:

KEY PLAN:
CONTROL DIAGRAM

SHEET TITLE:
CONTROL DIAGRAM
SHEET NUMBER:
M002

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