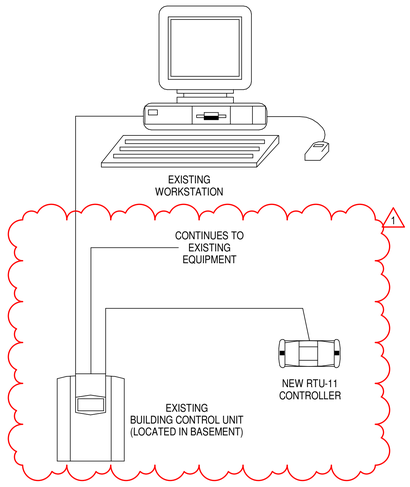
CONTROLS LEGEND

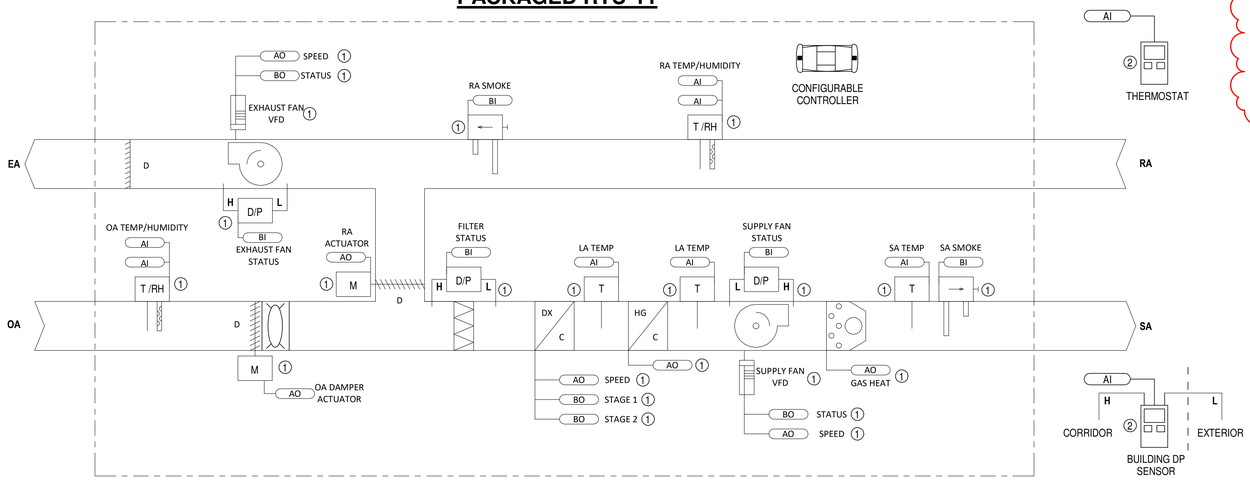
(DP)	DEWPOINT SENSOR	(AO)	ANALOG OUTPUT
BV	BYPASS VALVE	(AI)	ANALOG INPUT
[M]	MOTORIZED DAMPER ACTUATOR	(BO)	BINARY OUTPUT
(T)	THERMOSTAT OR SENSOR	(BI)	BINARY INPUT
— —	CONTROL LINE	(DO)	DIGITAL OUTPUT
[S MA]	MIXED AIR TEMPERATURE SENSOR	(DI)	DIGITAL INPUT
[S T]	TEMPERATURE SENSOR	(1)	FACTORY PROVIDED
[A]	ACTUATOR	(2)	ATC PROVIDED
[SD]	SMOKE DETECTOR		
(R)	RELAY		

SYSTEM RISER



1 SYSTEM RISER DIAGRAM
NOT TO SCALE

PACKAGED RTU-11



SEQUENCE OF OPERATIONS

BUILDING AUTOMATION SYSTEM INTERFACE:

The Building Automation System (BAS) shall send the controller Occupied / Unoccupied modes. If a BAS is not present, or communication is lost with the BAS the controller shall operate using default modes and setpoints. The unit shall operate with manufacturers operational sequences.

OCCUPIED MODE:

The unit shall remain in occupied mode at all times and shall only enter unoccupied mode upon an override command from the BAS.

During occupied periods, the supply fan shall run continuously and the outside air damper shall open to maintain ventilation requirements. The DX cooling shall stage and gas heat shall modulate to maintain the occupied space temperature setpoint. If economizing is enabled the outside air damper shall modulate to maintain the occupied space temperature setpoint.

COOLING MODE:

The unit controller shall use the discharge air temperature sensor and discharge air temperature cooling setpoint to determine when to initiate requests for cooling. Discharge air setpoint shall be maintained by modulating the economizer or staging the DX cooling as required.

HEATING MODE:

The unit controller shall monitor requests for heat. When the space temperature falls below the space temperature heating setpoint, the controller shall enable the gas heat to maintain the necessary rate to satisfy the space temperature setpoint. Once the space temperature rises above the setpoint, the heating cycle shall be disabled.

DEHUMIDIFICATION:

The unit shall be in dehumidification mode if the indoor humidity rises above the setpoint humidity setpoint and shall leave dehumidification mode when the indoor humidity falls below the humidity setpoint. The unit shall be capable of entering dehumidification mode during cooling mode and ventilation mode.

ECONOMIZER CONTROL / REFERENCE ENTHALPY:

The supply air sensor shall measure the dry bulb temperature of the air leaving the evaporator coil while economizing. When economizing is enabled and the unit is operating in the cooling mode, the economizer damper shall modulate between its minimum position and 100% to maintain the space temperature setpoint. Minimum position shall be calculated based on supply fan speed. If the supply air temperature starts to fall below supply air temperature setpoint, the outdoor damper shall be at minimum position. Compressors shall be delayed from operating until the economizer has opened to 100% for 5 minutes.

REFERENCE ENTHALPY:

Outside air enthalpy is compared with a reference enthalpy point. The enthalpy point - economizer is enabled when outdoor air enthalpy less than reference enthalpy point - 0.5 BTU/lb. The economizer is disabled when outdoor air enthalpy is greater than reference enthalpy point + 0.5 BTU/lb.

SUPPLY FAN MINIMUM:

The supply fan shall be enabled while in the occupied mode and cycled on during the unoccupied mode when the space temperature falls below the setpoint. When the space temperature falls below the setpoint in all cooling and heating modes. A differential pressure switch shall monitor the differential pressure across the fan. If the switch does not open within 40 seconds after a request for fan operation a fan failure alarm shall be annunciated, the unit shall stop, requiring a manual reset.

EXHAUST FAN OPERATION AND STATUS:

Whenever the building pressure rises above the Building Pressure Setpoint (dP = +0.025 in. W.C. (adj)) by the deadband amount, the exhaust fan relay will energize and the modulating signal will activate to control to the Building Pressure Setpoint. If the building pressure falls below the Building Pressure Setpoint by the deadband amount, the modulating signal will modulate towards 0% as it attempts to maintain the Building Pressure Setpoint. The exhaust fan relay is energized whenever the modulating signal is above 0%.

A differential pressure switch shall monitor the differential pressure across the fan. If the switch is detected to be open for 40 consecutive seconds after a request for exhaust fan operation a fan failure alarm shall be annunciated at the BAS and the exhaust fan shall stop. A manual reset shall be required.

SMOKE DETECTOR SHUTDOWNS:

The unit shall shut down in response to a signal from either smoke detector located in the return air duct or supply air duct. The smoke detectors shall be interlocked to the unit through the dry contacts of the smoke detectors. A manual reset of the smoke detectors shall be required to restart the unit.

FILTERS:

A differential pressure switch shall monitor the differential pressure across the filter section of the unit. If the switch closes for 2 minutes after a request for fan operation a dirty filter alarm shall be annunciated at the BAS.

OUTSIDE AIR CONTROLS:

Economizer Mode Maximum: 2,400 CFM

2 RTU-11 CONTROL DIAGRAM
NOT TO SCALE

GENERAL CONTROLS NOTES

1. BUILDING CONTROLS WILL BE UPGRADED CONCURRENTLY TO THE NEW CONTROLS WORK ASSOCIATED WITH THE REPLACEMENT OF RTU-11. CONTRACTOR TO COORDINATE WITH CONTROLS CONTRACTOR AS NEEDED.
2. THE NEW ROOFTOP AIR UNIT RTU-11 SHALL SEAMLESSLY INTERFACE WITH THE BUILDING AUTOMATION SYSTEM - CONTRACTOR TO VERIFY SYSTEM CONTROL ARCHITECTURE PRIOR TO FINAL ORDERING OF EQUIPMENT.
3. THE CONTROLS CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION OF NEW CONTROL WIRING CONNECTING THE NEW MED SURG SUITE DIFFERENTIAL PRESSURE MONITOR, THERMOSTAT/ZONE SENSOR, AND CONNECTING RTU-11 TO THE BUILDING JACE CONTROLLER LOCATED IN THE BUILDING BASEMENT.

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Design Phase
CONSTRUCTION DOCUMENTS

Revisions

No.	Date	Description
1	07-28-2025	ADD 001

Stamp

CERTIFICATE OF AUTHORIZATION — CROMWELL ARCHITECTS/ENGINEERS #5 — ARKANSAS ENGINEER

STATE OF ARKANSAS — REGISTERED PROFESSIONAL ENGINEER — No. 22271 — SHAWN B. SORNICK — 07-14-2025

Notes

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2. **THIS SHEET DESIGNED FOR COLOR PRINTING. CRITICAL INFORMATION MAY BE LOST WITH BLACK AND WHITE PRINTING.**

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Sheet Title
MECHANICAL CONTROLS

Sheet Number
M-701