

Packaged Rooftop HVAC Units: General, Fan, Outside Air, Exhaust

MARK INFORMATION		GENERAL INFORMATION							FAN INFO/PERFORMANCE									OUTSIDE AIR, ECONOMIZER, EXHAUST INFO/PERFORMANCE								
QTY	MARK	MODEL	NOMINAL TONS	ELECTRICAL SERVICE	ELECTRICAL MOCP	FLA	EER/IEER	WEIGHT LBS	TYPE	WHEEL DIA.	TSP/ESP (IN WG)	AIRFLOW CFM	FAN BHP	FAN MOTOR HP	MOTOR EFF	DRIVE	RPM	OSA CFM	ECON RANGE	ECON TYPE	EXH FAN TYPE	EXH FAN NUMBER	EXH FAN CFM	EF SP (in WG)	EXH FAN CONTROL	FILTER EFF
1	RTU-1	MPS040	40	460/3/60	125	100	10.3/13.5	5291	AF SWSI	30	3.00/2.00	15000	10.5	15	93%	BELT	1296	1700	0 -100%	ENTHALPY	EXISTING	1	13000	0.50	MODULATING	MERV 8

Packaged Rooftop HVAC Units continued: Cooling, Heating, Options

MARK INFORMATION		GENERAL INFORMATION		COOLING INFO/PERFORMANCE										HEATING INFO/PERFORMANCE										NOTES, OPTIONS, ACCESSORIES
QTY	MARK	MODEL	NOMINAL TONS	REFRIG	COMPR TYPE	NUMBER OF COMPR	COIL ROWS/FPI	FACE VELOCITY	ENT DB/WB	LVG DB/WB	COND DB	CAPACITY TOT/SENS (kBTUs)	AIR PD (in WG)	HTG TYPE	COIL ROWS/FPI	ENT DB/ LVG DB	CAPACITY (kBTUs)	AIR PD (in WG)	HW PD (FT)	HW FLOW (GPM)	EWI/ LWT	HW CONTROL	(SEE NOTES BELOW)	
1	RTU-1	MPS040	40	R410A	SCROLL	4	6 R/12 FPI	420	80/67	56.6/56.1	95	504/367	0.65	HOT WATER	EXISTING	N/A	N/A	N/A	N/A	N/A	N/A	MODULATING	1, 2, 3, 4, 5, 6, 7, 8	

NOTES, OPTIONS, ACCESSORIES:

1. ASHRAE 90.1 2013 AND AHRI 340/360 COMPLIANT.

2. WARRANTY: 1 YEAR ALL PARTS, 5 YEAR COMPRESSORS.

3. DOUBLE WALL CONSTRUCTION, R VALUE 4.0, STAINLESS STEEL DRAIN PAN, SINGLE POINT ELECTRICAL CONNECTION.

4. INVERTER ON LEAD COMPRESSOR TO MODULATE FOR LOW LOAD CONTROL SUPPLY AIR TEMPERATURE CONTROL.

5. FACTORY DDC RTU CONTROLS WITH BACNET MSTP COMMUNICATIONS (REFER TO SEQUENCES OF OPERATION FOR ADDITIONAL CONTROL REQUIREMENTS.
6. PROVIDE AND INSTALL INSULATED ADAPTER CURB WITH VIBRATION ISOLATION TO CONNECT TO EXISTING DUCTS.

7. EXISTING EXTERNAL HEATING COIL (SUPPLY DUCT) TO BE RE-USED (REFER TO SEQUENCE OF OPERATION).

8. EXISTING RETURN FAN, EXISTING EBTRON SUPPLY AIRFLOW MEASURING STATION, AND EXISTING EBTRON RETURN AIRFLOW MEASURING STATION TO BE RE-USED.

RTU-1 SEQUENCES OF OPERATION

COMMUNICATIONS/INTEGRATION:
THE FACTORY DDC CONTROLLER SHALL BE NETWORKED TO THE EXISTING ALERTON BACNET SYSTEM (MSTP).

GRAPHICAL USER INTERFACE MODIFICATIONS:
THE EXISTING FRONT END WORKSTATIONS (B-29, B-10, AND B-7) SHALL BE UPDATED TO REFLECT THE CONFIGURATION OF RTU-1 AND THE SEQUENCES OF OPERATION (WITH DATA POINTS, SETPOINTS AND ALARMS AS DESCRIBED HEREIN).

SCHEDULING:
THE RTU SHALL BE COMMANDED TO OCCUPIED/UNOCCUPIED MODE BASED ON USER DEFINED REGULAR/HOLIDAY/EVENT SCHEDULES. THE RTU SHALL BE ENABLED IN UNOCCUPIED PERIODS BASED ON UNOCCUPIED ZONE TEMPERATURE SETPOINTS (78F COOLING AND 62F HEATING ADJUSTABLE). ALL ZONES SHALLED BE POLLED, WITH A MINIMUM 2 ZONES MEETING SETPOINT TO TRIGGER OCCUPANCY.

SUPPLY FAN SPEED CONTROL:
THE SUPPLY FAN SHALL BE MODULATED TO MEET THE DUCT STATIC PRESSURE SETPOINT (1.5" ADJUSTABLE).

SUPPLY AIR TEMPERATURE CONTROL - STANDARD DX COOLING MODE:
THE COMPRESSORS SHALL BE STAGED AND LEAD (INVERTER DRIVEN) COMPRESSOR SPEED MODULATED TO MEET THE LEAVING AIR SETPOINT (57F ADJUSTABLE).

SUPPLY AIR TEMPERATURE CONTROL - ECONOMIZER MODE:
THE ECONOMIZER CONTROL SHALL BE CAPABLE OF SINGLE POINT ENTHALPY CONTROL OR OSA DRY BULB TEMPERATURE CONTROL (SELECTABLE AT GRAPHICAL USER INTERFACE). THE ECONOMIZER SHALL BE SET UP FOR OSA DRY BULB CHANGEOVER AT 57F OSA TEMPERATURE (AS SENSED LOCALLY AT RTU). DURING ECONOMIZER MODE THE OUTSIDE AIR AND RETURN AIR DAMPERS SHALL BE MODULATED TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT. IF THE SUPPLY AIR TEMPERATURE FALLS 3F BELOW SETPOINT DURING ECONOMIZER MODE, THE HEATING WATER COIL SHALL BE ENABLED AND MODULATED TO MAINTAIN SUPPLY AIR SETPOINT.



SUPPLY AIR TEMPERATURE CONTROL - MORNING WARMUP MODE:
MORNING WARMUP SHALL BE ENABLED/DISABLED AT THE GRAPHICAL USER INTERFACE AND SHALL BE AUTOMATICALLY EXECUTED BASED ON RETURN AIR TEMPERATURE (64F ADJUSTABLE). WHEN MORNING WARMUP IS ENABLED AND THE RTU IS SHIFTED TO OCCUPIED MODE, THE OUTSIDE AIR DAMPER SHALL BE CLOSED AND THE HEATING VALVE SHALL BE MODULATED TO MEET THE MORNING WARMUP SUPPLY AIR TEMPERATURE SETPOINT (90F ADJUSTABLE). MORNING WARMUP IS CANCELED ON RETURN AIR TEMPERATURE (CANCEL SETPOINT 68F ADJUSTABLE).

RETURN FAN CONTROL:
THE EXISTING RETURN FAN SHALL BE MODULATED TO MAINTAIN THE SUPPLY AIRFLOW AND RETURN AIRFLOW DIFFERENTIAL SETPOINT (RETURN FAN TO TRACK SUPPLY FAN). THE AIRFLOW OFFSET SHALL BE EQUAL TO THE CURRENT VENTILATION AIRFLOW SETPOINT (1500 CFM ADJUSTABLE - NOTE THIS SETPOINT CAN BE RESET UP TO MAX VENTILATION SETPOINT BASED ON RETURN AIR CO2 AS DESCRIBED IN NEXT PARAGRAPH). EXISTING AIRFLOW MEASURING STATIONS IN THE SUPPLY AND RETURN DUCTS ARE TO BE CALIBRATED (TAB) AND RE-USED.

OUTSIDE AIR/VENTILATION:
OUTSIDE AIR DAMPER SHALL BE MODULATED TO MAINTAIN VENTILATION AIR SETPOINT (1500 CFM ADJUSTABLE). RETURN AIR CO2 SENSOR SHALL MONITOR CO2 LEVEL. WHEN RETURN AIR CO2 REACHES 800 PPM (ADJUSTABLE), THE VENTILATION AIR SETPOINT SHALL BE RESET TO 1700 CFM (ADJUSTABLE).

FAULT DETECTION, PROTECTIONS, AND ALARMS:
FREEZE PROTECTION - FACTORY FREEZE STAT SHALL INITIATE ALARM AT USER INTERFACE AND AUTOMATICALLY EXECUTE FREEZE PROTECTION SEQUENCE AS FOLLOWS. OUTSIDE AIR DAMPER SHALL CLOSE AND HOT WATER COIL SHALL BE OPENED TO 100%. IF 3 MINUTES AFTER FREEZE STAT TRIP, THE SUPPLY AIR IS BELOW 45F, THE SUPPLY AIR FAN SHALL ALSO BE COMMANDED OFF.
DUCT STATIC PROTECTION - IF THE RTU DUCT STATIC EXCEEDS THE DUCT STATIC PRESSURE LIMIT PRESSURE SETPOINT (3.5"), THE RTU SUPPLY FAN SHALL BE SHUTDOWN (DIRECT INTERLOCK TO SUPPLY FAN VFD). THE HIGH STATIC PRESSURE CONDITION SHALL ALARM AT THE GRAPHICAL USER INTERFACE.
SUPPLY AIR TEMPERATURE ALARM COOLING MODE - WHEN IN STANDARD COOLING MODE, IF THE SUPPLY AIR TEMPERATURE EXCEEDS 62F (ADJUSTABLE) A HIGH SUPPLY AIR TEMPERATURE ALARM SHALL BE INITIATED AT THE GRAPHICAL USER INTERFACE.
LOW RETURN AIR TEMPERATURE ALARM - ANY TIME DURING OCCUPIED MODE (EXCLUDING MORNING WARMUP) THAT THE RETURN AIR TEMPERATURE FALLS BELOW 64F A LOW RETURN AIR TEMPERATURE ALARM SHALL BE INITIATED AT THE GRAPHICAL USER INTERFACE.

DATA TRENDS:
TRENDLOGS SHALL BE SETUP TO TREND THE FOLLOWING DATA POINTS ON 5 MINUTE INTERVALS: SUPPLY AIR TEMP, RETURN AIR TEMP, OUTSIDE AIR TEMP, SUPPLY FAN SPEED, SUPPLY DUCT STATIC PRESSURE, COOLING COIL CONTROL VALVE SIGNAL, HEATING COIL CONTROL VALVE SIGNAL, OUTSIDE AIR DAMPER POSITION.

		Approved: Medical Center Facility Manager	Project Title REPLACE RTU-1 B-44	Drawing Title SCHEDULES, SEQUENCES	Project Number 564-17-133	<div>Engineering Service</div> <div></div> <div>Department of Veterans Affairs</div>
					Building Number 44	
		Approved: Engineering Service Chief	Measures one inch or not to scale! 	Location VAMC - Fayetteville, AR	Drawing Number M-2	
Notes and/or Revisions:	Date		Scale: NTS	Checked ENG	Drawn ENG	
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