INPUT/OUTPUT SUMMARY

SYSTEM, APPARATUS, OR AREA POINT DESCRIPTION	INPUTS: ANALOG MEASURED: TEMPERATURE	PH	AIR FLOW	WATER FLOW	HEATZ	VOLTZ	AMPZ	INPUTS: ANALOG CALC.: ENTHALPY	RUN TIME	EFFICIENCY	INPUTS: BINARY: STATUS	ALARM	SMOKE	AIR FLOW	FILTER	OVER-RIDE	OUTPUTS: DIGITAL: OFF-ON	OFF-HIGH-LOW	OPEN-CLOSE	OUTPUTS: ANALOG: VARI. FREQ.	VALVE POS.	DAMPER POS.	SETPOINT ADJ.	SYSTEM FEATURES: ALARMS: HI ANALOG	LO ANALOG	HI BINARY	PROOF	SYSTEM FEATURES: PROGRAMS: TIME SCHEDULING	DEMAND LIMITING	OPTIMUM START/STOP	SYSTEM LOCKOUT	SMOKE CNT	ALARM INSTRUCT	MAINT. MK. ORD.	GENERAL: COLOR GRAPHIC	SUPPLEMENTAL NOTES
RTUs																													X							X	
Supply Fan											X						X							X												
Power Exhaust Fan											X						X							X												RTU–L26 only
Compressor #1											X						X							X												
Compressor #2											X						X							X												RTU–L26 only
Gas Valve																				X																
Heating Coil Disch. Temp	X																																			
Cooling Coil Disch. Temp	X																																			
Return Damper			X																		X															
Supply Temp	X																																			
Return Temp	X																																			
Mixed Air Temp	X																																			
OA Damper			X																		X															
Smoke Detector													X																							RTU–L26 only
Filters Status												X												X												
Over-ride															X																					
Space Humidity		X																						X												Monitor Only
Condensate Flow Switch			X																					X												
Space Temp	X																							X												
DX Split System HPs																													X							
Supply Fan											X						X							X												
Compressor #1											X						X							X												
Compressor #2											X						X							X												
Supply Temp	X																																			
Return Temp	X																																			
Space RH		X																						X												Monitor Only
Filter Status												X												X												
Over-ride															X																					
Condensate Flow Switch			X																					X												
Space Temp	X																							X												
VAV Diffuser																													X							
Volume Damper																					X															
Space Temp	X																							X												
Fans																																				
Toilet Fans											X													X												
Misc. Points																																				FACP by Division 28
OA Temp	X							X																X												
Dew Point	X							X																												
Fire Alarm Status										X															X											
Ductless Split Systems	X																							X												

GENERAL NOTE:
INPUT/OUTPUT SUMMARY IS A GENERAL LIST OF CONTROL POINTS REQUIRED FOR THE OPERATION OF THE MECHANICAL SYSTEM. IN ADDITION TO CONTROL POINTS INDICATED, THE CONTROLS CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADDITIONAL POINTS AS REQUIRED FOR OPERATION OF THE MECHANICAL SYSTEM AS SPECIFIED AND OUTLINED IN THE SEQUENCE OF OPERATION AND TO COMPLY WITH THE SPECIFICATIONS.

CONTROLS AND SEQUENCE OF OPERATION

BAS INSTRUCTION

FULLY INTEGRATE NEW EQUIPMENT INTO EXISTING CAMPUS ALLERTON BAS. BAS GRAPHICS SHALL BE UPDATED TO INCLUDE ALL NEW EQUIPMENT AND EQUIPMENT LOCATIONS. ALL CONTROLS POINTS SHALL MATCH EXISTING SYSTEM SETUP.

CONSTANT VOLUME ROOFTOP UNIT

ROOFTOP UNITS SHALL BE STARTED AND STOPPED ON A PROGRAMMED BASIS BY THE DDC CONTROL SYSTEM. UNIT SHALL BE PROVIDED WITH A WALL MOUNTED DDC SENSOR (BY BAS VENDOR) FOR SPACE TEMPERATURE CONTROL. WHILE IN THE OCCUPIED MODE, THE SUPPLY FAN SHALL OPERATE CONTINUOUSLY TO PROVIDE VENTILATION AIR TO THE SPACE. DX COMPRESSORS SHALL CYCLE AS REQUIRED TO MAINTAIN SPACE TEMPERATURE. UPON A DROP IN SPACE TEMPERATURE, UNIT SHALL ACTIVATE 1ST STAGE OF GAS HEAT TO MAINTAIN SPACE SETPOINT. UPON A FURTHER DROP IN SPACE TEMPERATURE, THE 2ND STAGE OF GAS HEAT SHALL BE ENERGIZED.

WHILE IN THE UNOCCUPIED MODE, THE UNIT SUPPLY FAN, DX COOLING, AND HEATING SHALL CYCLE AS NOTED ABOVE TO MAINTAIN SETBACK TEMPERATURES. IF ACTIVATED DURING THE UNOCCUPIED MODE, THE UNIT SHALL RUN FOR A MINIMUM OF TEN MINUTES AND SHALL NOT BE ALLOWED TO RESTART FOR A MINIMUM OF TWENTY MINUTES FOLLOWING SHUT–DOWN.

ROOFTOP UNIT FACTORY MOUNTED CONTROLS SHALL PROVIDE ECONOMIZER OPERATION TO PROVIDE "FREE COOLING" WHEN OUTDOOR AIR CONDITIONS ALLOW. UPON BAS DETERMINATION THAT OUTSIDE AIR ENTHALPY IS BELOW RETURN AIR ENTHALPY IN COOLING MODE, THE OUTSIDE AIR AND RETURN AIR DAMPERS SHALL MODULATE TO MAINTAIN UNIT DISCHARGE AIR TEMPERATURE. IF "ECONOMIZER" CONTROL IS INSUFFICIENT TO MAINTAIN DISCHARGE AIR SPACE TEMPERATURE, THE UNIT COOLING CYCLE SHALL FUNCTION AS OUTLINED ABOVE. UPON A DROP IN DISCHARGE AIR TEMPERATURE BELOW SETPOINT, THE OUTSIDE AIR DAMPER SHALL MODULATE CLOSED UNTIL THE MINIMUM OUTSIDE AIR POSITION IS REACHED. WITH OUTSIDE AIR DAMPER AT MINIMUM POSITION AND A CONTINUED DROP IN UNIT SUPPLY AIR TEMPERATURE BELOW SETPOINT THE UNIT HEATING CYCLE SHALL FUNCTION AS OUTLINED ABOVE. POWER EXHAUST SHALL ACTIVATE AS REQUIRED TO MAINTAIN BUILDING PRESSURIZATION AS OUTSIDE AIR DAMPERS ARE OPENED FOR ECONOMIZER OPERATION.

PROVIDE EACH UNIT WITH A IONIZATION TYPE SMOKE DETECTOR, INSTALLED IN THE RETURN DUCT PRIOR TO SHUT DOWN THE UNIT UPON ACTIVATION. SMOKE DETECTOR SHALL BE SUPPLIED, WIRED FOR INTERFACE WITH FIRE ALARM SYSTEM AND UNIT SHUTDOWN BY THE ELECTRICAL CONTRACTOR. SMOKE DETECTOR SHALL BE INSTALLED IN THE RETURN DUCT BY THE MECHANICAL CONTRACTOR.

DX SPLIT SYSTEMS (CDU AND HP)

DX HANDLER UNITS SHALL BE STARTED AND STOPPED ON A PROGRAMMED BASIS BY THE DDC CONTROL SYSTEM. UNIT SHALL BE PROVIDED WITH A WALL MOUNTED DDC SENSOR (BY BAS VENDOR) FOR SPACE TEMPERATURE CONTROL. THE SUPPLY FAN SHALL OPERATE CONTINUOUSLY DURING OCCUPIED HOURS. UPON A RISE IN SPACE TEMPERATURE, UNIT COMPRESSOR AND CONDENSER FAN SHALL ACTIVATE TO SATISFY SPACE. UPON A DROP IN SPACE TEMPERATURE, UNIT COMPRESSOR SHALL ACTIVATE IN REVERSE CYCLE FOR HEATING. UPON A FURTHER DROP IN TEMPERATURE, UNIT ELECTRIC HEATING COIL SHALL ENGERGIZE TO MAINTAIN SETPOINT (IDU–3 ONLY). ALL TIME AND TEMPERATURE SETPOINTS SHALL BE VERIFIED BY THE OWNER PRIOR TO PROGRAMMING.

TOILET EXHAUST FANS
CENTRAL BAS SHALL OPERATE EXHAUST FANS ON A PROGRAMMED SCHEDULE.

IT / DATA ROOMS:

IT / DATA ROOM IS PROVIDED WITH A DUCTLESS SPLIT SYSTEM UNIT. DUCTLESS SPLIT SYSTEM UNIT SHALL BE PROVIDED WITH STAND ALONE CONTROLS, ELECTRONIC 7–DAY PROGRAMMABLE THERMOSTATS SEPARATE FROM THE CENTRAL DDC SYSTEM. HOWEVER, THE BAS SHALL STILL MONITOR SYSTEM STATUS AND SHALL ALSO MONITOR ROOM TEMPERATURE. THE DUCTLESS SPLIT UNIT SHALL PROVIDE COOLING ON A CONTINUOUS BASIS. SUPPLY FAN AND COOLING CYCLE SHALL CYCLE WITH A CALL FOR COOLING TO MAINTAIN ROOM TEMPERATURE SETPOINT OF 72° F. THE BAS SHALL ACTIVATE AN ALARM IF THE ROOM TEMPERATURE RISES ABOVE 78° F.

NOTES:
1. ALL CONTROL SETPOINTS SHALL BE ADJUSTABLE, INDICATED TEMPERATURE SETPOINTS SHOULD BE USED FOR ORIGINAL SYSTEM SET–UP. ANY CHANGES IN SETPOINT SETTINGS REQUIRED FOR INTENDED SYSTEM OPERATION SHALL BE NOTED ON AS–BUILT DRAWINGS.
2. IONIZATION TYPE DUCT SMOKE DETECTORS SHALL BE FURNISHED AND WIRED TO THE FIRE ALARM SYSTEM AND FOR UNIT SHUT–DOWN BY THE ELECTRICAL CONTRACTOR. MECHANICAL CONTRACTOR SHALL INSTALL DETECTOR IN THE RETURN DUCT PRIOR TO THE OUTSIDE AIR CONNECTION.
3. ELECTRICAL CONTRACTOR SHALL PROVIDE A DEDICATED 120V CIRCUIT IN A J–BOX FOR CONTROL POWER. CONTROLS CONTRACTOR SHALL EXTEND 120V POWER FROM J–BOX TO CONTROL PANELS, DAMPER ACTUATORS, TRANSFORMERS, ETC. AS REQUIRED FOR OPERATION OF CONTROL SYSTEM.

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BID DOCUMENTS

MECHANICAL CONTROL POINTS AND SEQUENCE OF OPERATIONS

DATE 4-5-2019
PROJECT NO 16063

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NO DATE DESCRIPTION:

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