

EQUIPMENT LISTING			
TAG	DESCRIPTION	TYPE	NOTES
M621-F42	LAB & LOCKEROOM AIR HANDLING UNIT SUPPLY FAN	NEW	WITH INVERTER DUTY MOTOR
M621-XV1	AIR HANDLING UNIT O/A DAMPER C/W ACTUATOR	NEW	SUPPLIED WITH UNIT, INSULATED
M621-XV2	AIR HANDLING UNIT R/A DAMPER C/W ACTUATOR	NEW	SUPPLIED WITH UNIT
M621-VFD	F42 VARIABLE FREQUENCY DRIVE	NEW	USED FOR 2-SPEED FAN OPERATION
M621-HC1	AIR HANDLING UNIT HOT WATER (GLY) HEATING COIL	NEW	SUPPLIED WITH UNIT
M621-HC3	LAB HOT WATER (GLY) REHEAT COIL	NEW	
M621-HC2	LOCKEROOM HOT WATER (GLY) REHEAT COIL	EXIST	RE-USED
M621-CC1	DIRECT EXPANSION EVAPORATOR (AC) COIL	NEW	SUPPLIED WITH UNIT, PACKAGED CONTROLS
M621-CU1	SPLIT CONDENSING UNIT	NEW	REMOTE, PACKAGED CONTROLS
M622-F43	LOCKEROOM EXHAUST FAN	EXIST	RE-USED
M629-F46	LAB FUME HOOD EXHAUST FAN	NEW	
M630-F47	LAB CEILING PLENUM EXHAUST FAN	NEW	
M621-XV3	LAB AIR SUPPLY VAV TERMINAL UNIT	NEW	2-POSITION OPERATION INTERLOCKED TO M629-F46

DEVICE LISTING				
TAG	DESCRIPTION	TYPE	ACTION/SIGNAL	NOTES
M621-TT1	OUTSIDE AIR TEMPERATURE SENSOR		ANALOG	
M621-XV1	OUTSIDE AIR DAMPER ACTUATOR	PTO/SC	OCC/UNOCC	ELECTRIC, SET MINIMUM POSITION TO PROVIDED UNOCCUPIED AIR FLOW SHOWN
M621-XV2	RETURN AIR DAMPER ACTUATOR	PTC/SO	OCC/UNOCC	ELECTRIC
M621-ZS81	DAMPER LIMIT SWITCH		D	PROVE OPEN SWITCH
M621-ZSD1	DAMPER LIMIT SWITCH		D	PROVE CLOSED SWITCH
M621-TV1	AIR HANDLING UNIT TEMPERATURE CONTROL VALVE	3-WAY, MIXING, FTCS	MOD, A	ELECTRIC
M621-TV2	LOCKEROOM HOT WATER (GLY) REHEAT COIL TEMPERATURE CONTROL VALVE	3-WAY, MIXING, FTCS	MOD, A	ELECTRIC, REMOVE EXIST PNEU
M621-TV3	LAB HOT WATER (GLY) REHEAT COIL TEMPERATURE CONTROL VALVE	3-WAY, MIXING, FTCS	MOD, A	ELECTRIC, REMOVE EXIST PNEU
M621-TT2	INDUCT DISCHARGE TEMPERATURE SENSOR		ANALOG	ELECTRIC, DISCHARGE AIR TEMP CNTRL
M621-TSL	INDUCT DISCHARGE TEMPERATURE SENSOR -LOW LIMIT	AVERAGING	ON/OFF	ELECTRIC, INTERLOCK TO AHU M621
M621-XV3	LAB AIR SUPPLY VAV TERMINAL UNIT DAMPER	PTO/PTC	OCC/UNOCC	2-POSITION OPERATION
M621-VFD	SUPPLY FAN ADJUSTABLE FREQUENCY DRIVE		A, D	DISCRETE INPUT/OUTPUTS FOR OCC/UNOCC CONTROL, ANALOG OUTPUTS TO CONFIRM OPERATING STATUS
M621-ZSD2	VAV DAMPER LIMIT SWITCH		D	PROVE MINIMUM POSITION SWITCH
M621-ZS82	VAV DAMPER LIMIT SWITCH		D	PROVE OPEN SWITCH
M621-TT4	LAB SERVICES THERMOSTAT HEAT/COOL		A	ROOM THERMOSTAT USED FOR LAB REHEAT COIL CONTROL, AND AC COIL CONTROL
M621-TT3	LOCKEROOM THERMOSTAT		A	ROOM THERMOSTAT USED FOR LOCKEROOM REHEAT COIL CONTROL
M622-4S	CURRENT SENSING RELAY		D	CONFIRMS OPERATING STATUS OF FAN AND ABNORMAL OPERATION
M629-4S	CURRENT SENSING RELAY		D	CONFIRMS OPERATING STATUS OF FAN AND ABNORMAL OPERATION
M630-4S	CURRENT SENSING RELAY		D	CONFIRMS OPERATING STATUS OF FAN AND ABNORMAL OPERATION

ABBREVIATIONS:

PNEU - Pneumatic	FTCBP - Fail to coil bypass	D - Digital
PTO/SC - Power to open, spring closed	MOD - Modulating	A - Analog
PTC/SO - Power to close, spring open	O/A - Outside air	
NC - Normally closed	R/A - Return air	
NO - Normally open	S/A - Supply air	
FTCS - Fail to coil supply	MAT - Mixed air temperature	

SEQUENCE OF OPERATIONS

GENERAL:

NEW LABORATORY AND EXISTING LOCKEROOM HVAC CONTROLS OPERATE ON AN OCCUPIED/UNOCCUPIED TIME SCHEDULE; UNOCCUPIED MODE CAN BE OVERRIDEN THROUGH OPERATION OF NEW FUME HOOD EXHAUST FAN M629-F46.

NOTE: THE IMPLICATION OF THE OVERRIDE IS THAT IF THE FUME HOOD IS SWITCHED ON AND LEFT ON THE HVAC SYSTEM WILL NEVER SWITCH TO UNOCCUPIED MODE; PLEASE REVIEW AND CONFIRM IF THIS IS ACCEPTABLE, I.E. DO YOU ANTICIPATE NEEDING TO OPERATE THE FUME HOOD AFTER HOURS.

UNOCCUPIED MODE:

AIR HANDLING UNIT SUPPLY FAN M621-F42 OPERATES CONTINUOUSLY ON LOW SPEED (UNOCCUPIED) THROUGH M621-VFD VARIABLE FREQUENCY DRIVE

LAB FUME HOOD EXHAUST FAN M629-F46 IS DE-ENERGIZED TO OFF

LAB CEILING PLENUM EXHAUST FAN M630-F47 IS ENERGIZED TO OPERATE CONTINUOUSLY

EXISTING LOCKEROOM EXHAUST FAN M622-F43 IS DE-ENERGIZED TO OFF

AIR HANDLING UNIT OUTSIDE AIR DAMPERS M621-XV1 IS DE-ENERGIZED TO DRIVE O/A DAMPERS TO MINIMUM POSITION

AIR HANDLING UNIT RETURN AIR DAMPERS M621-XV2 IS DE-ENERGIZED TO DRIVE R/A DAMPERS TO FULL OPEN

LAB AIR SUPPLY VAV TERMINAL UNIT DAMPER ACTUATOR M621-XV3 IS DRIVEN TO ITS MINIMUM POSITION SETPOINT

HEATING MODE: HEATING MODE IS INITIATED AT OUTSIDE AIR TEMPERATURES BELOW 13 °C AS SENSED BY M621-TT1. PLC HMI SHALL ALSO INCLUDE A MANUAL OVERRIDE SWITCH THAT FORCES THE SYSTEM INTO SELECTABLE HEATING OR COOLING MODE

AIR HANDLING UNIT TEMPERATURE CONTROL VALVE M621-TV1 MODULATES TO MAINTAIN A DISCHARGE AIR TEMPERATURE OF 16 °C AS SENSED BY IN DUCT TEMPERATURE SENSOR M621-TT2

LAB AND LOCKEROOM REHEAT COIL TEMPERATURE CONTROL VALVES M621-TV2 AND M621-TV3 RESPECTIVELY MODULATE TO MAINTAIN A SPACE TEMPERATURE SETPOINT AS SENSED BY LAB AND LOCKEROOM SPACE THERMOSTATS M621-TT3 & TT4.

COOLING MODE: COOLING MODE IS INITIATED AT OUTSIDE AIR TEMPERATURES ABOVE 16 °C AS SENSED BY M621-TT2. PLC HMI SHALL ALSO INCLUDE A MANUAL OVERRIDE SWITCH THAT FORCES THE SYSTEM INTO SELECTABLE HEATING OR COOLING MODE

SPLIT CONDENSING UNIT M621-CU1 THROUGH ITS PACKAGED CONTROLS STAGES ON-OFF IN RESPONSE TO LAB SPACE THERMOSTAT SETPOINT IF THE SYSTEM IS IN COOLING MODE

OCCUPIED MODE:

AIR HANDLING UNIT SUPPLY FAN M621-F42 OPERATES CONTINUOUSLY ON HIGH SPEED (OCCUPIED) THROUGH M621-VFD VARIABLE FREQUENCY DRIVE

LAB CEILING PLENUM EXHAUST FAN M630-F47 IS DE-ENERGIZED OFF

EXISTING LOCKEROOM EXHAUST FAN M622-F43 IS ENERGIZED TO OPERATE CONTINUOUSLY

LAB FUME HOOD EXHAUST FAN M629-F46 IS ENERGIZED TO OPERATE CONTINUOUSLY

AIR HANDLING UNIT OUTSIDE AIR DAMPERS M621-XV1 IS ENERGIZED TO DRIVE O/A DAMPERS OPEN

AIR HANDLING UNIT RETURN AIR DAMPERS M621-XV2 IS ENERGIZED TO DRIVE R/A DAMPERS CLOSED

LAB AIR SUPPLY VAV TERMINAL UNIT DAMPER ACTUATOR M621-XV3 IS DRIVEN TO ITS MAXIMUM OPEN POSITION SETPOINT

HEATING MODE: HEATING MODE IS INITIATED AT OUTSIDE AIR TEMPERATURES BELOW 13 °C AS SENSED BY M621-TT1. PLC HMI SHALL ALSO INCLUDE A MANUAL OVERRIDE SWITCH THAT FORCES THE SYSTEM INTO SELECTABLE HEATING OR COOLING MODE

AIR HANDLING UNIT TEMPERATURE CONTROL VALVE M621-TV1 MODULATES TO MAINTAIN A DISCHARGE AIR TEMPERATURE OF 16 °C AS SENSED BY IN DUCT TEMPERATURE SENSOR M621-TT2

LAB AND LOCKEROOM REHEAT COIL TEMPERATURE CONTROL VALVES M621-TV2 AND M621-TV3 RESPECTIVELY MODULATE TO MAINTAIN A SPACE TEMPERATURE SETPOINT AS SENSED BY LAB AND LOCKEROOM SPACE THERMOSTATS M621-TT3 & TT4.

COOLING MODE: COOLING MODE IS INITIATED AT OUTSIDE AIR TEMPERATURES ABOVE 16 °C AS SENSED BY M621-TT2. PLC HMI SHALL ALSO INCLUDE A MANUAL OVERRIDE SWITCH THAT FORCES THE SYSTEM INTO SELECTABLE HEATING OR COOLING MODE

SPLIT CONDENSING UNIT M621-CU1 THROUGH ITS PACKAGED CONTROLS STAGES ON-OFF IN RESPONSE TO LAB SPACE THERMOSTAT SETPOINT IF THE SYSTEM IS IN COOLING MODE

OTHER:

SYSTEM STATUS MONITORING SHALL BE PROVIDED ON THE PLC-HMI AND AS A MINIMUM SHALL DISPLAY THE FOLLOWING SYSTEM, EQUIPMENT & DEVICE STATUS POINTS;

SYSTEM MODE: OCCUPIED OR UNOCCUPIED




FAN OPERATING STATUS - NORMAL OR ALARM; AS SENSED BY RESPECTIVE MOTOR CSR DEVICES FOR: M621-VFD, M622-F43, M629-F46, M630-F47

DEVICE OPERATING STATUS - NORMAL OR ALARM; AS SENSED BY RESPECTIVE DEVICES SWITCHES FOR: M621-ZS81, M621-ZSD1, M621-ZSD2, M621-ZS82

TEMPERATURE STATUS - ACTUAL AND ALARM; AS SENSED BY RESPECTIVE DEVICES FOR: M621-TT1, M621-TT2, M621-TS3, M621-TS4

SYSTEM SHUT-DOWN: UPON SENSING A LOW DISCHARGE AIR TEMPERATURE (5 °C) AS SENSED BY M621-TSL, AIR HANDLING UNIT FAN M621-F42 IS DENERGIZED AND THE AIR HANDLING UNIT O/A AND R/A DAMPERS REVERT TO THEIR UNOCCUPIED POSITIONS, GENERAL ALARM IS GENERATED ON THE PLC-HMI

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