

7.4.4. EQUIPMENT SHALL OPERATE DOWN TO 50°F (10°C) AMBIENT TEMPERATURE FOR MIXED AIR AND 58°F (14.4°C) AMBIENT TEMPERATURE FOR MAKE-UP-AIR APPLICATIONS. WHERE APPLICABLE, MULTIPLE REFRIGERATION CIRCUITS SHALL BE SEPARATE FROM EACH OTHER. REFRIGERATION CIRCUITS SHALL BE COMPLETE WITH TX VALVES, SIGHT GLASS, LIQUID LINE FILTER-DRIERS, AND SERVICE PORTS FITTED WITH SCHRADER FITTINGS. EQUIPMENT SHALL HAVE CONDENSERS DESIGNED FOR 15°F (8°C) LIQUID SUB-COOLING. THE COMPLETE PIPING SYSTEM SHALL BE PURGED AND PRESSURE TESTED WITH DRY NITROGEN, THEN TESTED AGAIN UNDER VACUUM. EACH SYSTEM SHALL BE FACTORY RUN AND ADJUSTED PRIOR TO SHIPMENT.

7.4.5. PACKAGED UNITS SHALL BE SUPPLIED WITH R-454B REFRIGERANT.

7.4.6. CONTROLS FOR HERMETIC COMPRESSOR UNITS SHALL INCLUDE COMPRESSOR AND CONDENSER FAN MOTOR CONTACTORS, SUPPLY FAN CONTACTORS AND OVERLOAD PROTECTION, CONTROL CIRCUIT TRANSFORMER, COOLING RELAYS, AMBIENT COMPRESSOR LOCKOUT, ANTI SHORT CYCLE AND INTER STAGE TIMERS, AND AUTOMATIC RESET LOW PRESSURE CONTROLS. COMPRESSORS OVER 6 TONS (21 KW) SHALL BE COMPLETE WITH MANUAL RESET HIGH PRESSURE CONTROLS. HEAD PRESSURE ACTUATED FAN CYCLING CONTROL SHALL BE PROVIDED ON ALL MULTIPLE CONDENSER FAN UNITS.

7.4.7. PROVIDE HOT GAS BYPASS ON THE LEAD COMPRESSOR TO PROVIDE FREEZE PROTECTION IN THE EVENT OF LOW LOADS.

7.4.8. MODULATING CONDENSER REHEAT COIL WITH STEPPER VALVE INFINITE MODULATING CONTROL TO EITHER INDEPENDENT HEAT COIL OR AMBIENT CONDENSER. SYSTEM MUST INCLUDE RECEIVER(S), SUB-COOLING CONDENSER CIRCUIT(S), AND CHECK VALVES.

7.4.9. COMPRESSORS SHALL BE LOCATED ON THE SIDE OF THE UNIT IN A SERVICE ENCLOSURE COMPLETE WITH HINGED ACCESS DOORS C/W LEVER HANDLES FOR EASE OF SERVICE.

7.4.10. COMPRESSOR ENCLOSURE SHALL INCLUDE 1" (25 MM), 1 ½ LB./FT3 ACOUSTICAL COATED INSULATION.

7.4.11. MAKE-UP AIR AND VAV UNITS TO HAVE A MINIMUM OF THREE COMPRESSORS.

7.4.12. PROVIDE LOW AMBIENT OPERATION TO 58°F (14.4°C) OPERATION.

7.4.13. PROVIDE OPTIONAL COMPRESSOR SERVICE VALVES FOR PACKAGED UNITS.

7.5. COOLING CONTROL

7.5.1. THE CENCON C/W C-XM MODULE SHALL BE COMPLETE WITH PROPORTIONAL AND INTEGRAL CONTROL WITH A DISCHARGE AIR SENSOR TO MAINTAIN SET POINT TEMPERATURE AND PROVIDE RAPID RESPONSE TO INCREMENTAL CHANGES IN DISCHARGE AIR TEMPERATURE.

7.5.1.1. THE CONTROLLER SHALL PROVIDE 3 STAGES OF MECHANICAL COOLING.

7.5.1.1.1. MAXIMUM 6 STAGES FOR CENCON C/W C-XM MODULE.

7.5.2. THE CONTROLLER SHALL HAVE BUILT-IN MINIMUM RUN TIME AND ANTI-CYCLE TIMERS.

7.5.3. MECHANICAL COOLING SHALL BE DISABLED BELOW A FIXED LOW AMBIENT TEMPERATURE SETPOINT.

7.5.4. COOLING ENABLE/DISABLE SHALL BE THROUGH

1. CONTROLLER DEMAND.

2. CONTACT BY OTHERS.

3. BACNET MSTP COMMUNICATION

4. BACNET IP COMMUNICATION

7.5.5. WHEN CONTROLLER IS IN ECONOMIZER MODE, THE MECHANICAL COOLING SHALL BE DISABLED.

7.5.6. THE CONTROLLER SHALL PROVIDE A VERNIER CONTROLLED OUTPUT TO CONTROL MODULATING COMPRESSORS.

8. FACTORY SUPPLIED CABLESWIRING

8.1. PROVIDE A SYSTEM OF MOTOR CONTROL, INCLUDING ALL NECESSARY TERMINAL BLOCKS, MOTOR CONTACTORS, MOTOR OVERLOAD PROTECTION, GROUNDING LUGS, CONTROL TRANSFORMERS, AUXILIARY CONTACTORS, AND TERMINALS FOR THE CONNECTION OF EXTERNAL CONTROL DEVICES OR RELAYS.

8.2. GAS FIRED UNITS SHALL ALSO INCLUDE HIGH LIMIT AND COMBUSTION AIRFLOW SAFETIES.

8.3. ELECTRIC HEAT UNITS SHALL INCLUDE FAN ACCESS DOOR SWITCH (TO SHUT HEATER OFF WHEN DOOR IS OPENED), AUXILIARY HIGH LIMIT, AIRFLOW SWITCH, AND HEATING CONTACTORS.

8.4. FIRE ALARM CIRCUITS (WHERE REQUIRED) SHALL BE POWERED FROM A RELAY IN UNIT CIRCUITRY.

8.5. CONTROLS SHALL BE HOUSED IN A CONTROL PANEL MOUNTED IN OR ON THE UNIT THAT WILL MEET THE STANDARD OF THE SPECIFIC INSTALLATION.

8.6. REMOTE PANEL - PROVIDE FOR EACH AIR HANDLING UNIT A REMOTE MOUNTED CONTROL PANEL FOR THE PURPOSE OF SWITCHING AND VISUAL INDICATION OF OPERATIONS. EACH PANEL TO INCLUDE THE FOLLOWING ITEMS:

___ENGRAVED LAMICOID FACEPLATE

___SYSTEM ON-OFF SWITCH

___SYSTEM ON LIGHT

___HEAT ON-OFF SWITCH

___HEAT-AUTO-COOL SWITCH

___HEAT ON LIGHT

___COOL ON LIGHT

___CLOGGED FILTER LIGHT WITH UNIT MOUNTED FILTER AIR PRESSURE SWITCH

___SEVEN-DAY TIME-CLOCK

___OTHER (TO BE SPECIFIED)

8.7. PROVIDE A DISCHARGE AIR LOW LIMIT EQUIPPED WITH AN AUTOMATIC BY-PASS TIME DELAY TO ALLOW FOR COLD WEATHER START-UP. ON A HEATING SYSTEM FAILURE, THIS DEVICE WILL SHUT DOWN THE FAN AND CLOSE THE OUTDOOR AIR DAMPER.

8.8. CENCON

8.8.1. THE CONTROLLER SHALL BE ETL AND BTL CERTIFIED.

8.8.2. A GRAPHIC OLED DISPLAY MODULE SHALL PROVIDE TEMPERATURES AND STATUS OF THE EQUIPMENT.

8.8.3. THE CONTROLLER SHALL HAVE A 9-BUTTON KEYPAD FOR NAVIGATION OF SCREENS.

8.8.4. THE CONTROLLER SHALL HAVE A COMPUTER CONNECTION DIAGNOSTICS VIA ETHERNET COMPLETE WITH WEB BASED INTERFACE.

8.8.5. THE CONTROLLER SHALL HAVE 4 DISTINCT MODES (HEATING, ECONOMIZER, VENTILATION AND COOLING). EACH MODE CHANGE IS DETERMINED BY THE DEMAND OF THE SYSTEM.

8.8.6. MINIMUM OPERATING AMBIENT TEMPERATURE SHALL BE -40°F (-40°C).

8.8.7. THE CONTROLLER SHALL PROVIDE CONTINUOUS AMBIENT TEMPERATURE SENSING.

8.8.8. SELF-CHECK ON START-UP SHALL BE PROVIDED TO ENSURE AIR PROVING AND ALL SENSORS ARE OPERATING WITHIN DESIGN TOLERANCES.

8.8.9. BLOWER DELAY FUNCTIONALITY SHALL BE PROVIDED TO ENSURE DAMPER(S) ARE OPEN BEFORE BLOWER STARTS.

8.8.9.1. A DAMPER END SWITCH SHALL BE PROVIDED. CONTROLLER SHALL HAVE AN INPUT FOR EXTERNAL DAMPER END SWITCH CONTACT THAT ENABLES THE FAN TO START ONCE DAMPER CONTACT IS CLOSED (INTERNAL TIME DELAYS ARE BYPASSED)

8.8.10. THE CONTROLLER SHALL HAVE NON-RECYCLING AUTO BY-PASS LOW LIMIT WITH ALARM CONTACTS.

8.8.11. TEMPERATURE CONTROL SHALL BE

1. DISCHARGE AIR C/W INTERNAL SETPOINT ADJUSTMENT ON KEYPAD.

2. DISCHARGE AIR C/W REMOTE SETPOINT ADJUSTMENT (SHIPPED LOOSE).

3. DISCHARGE AIR C/W 0-10VDC RESET.

4. DISCHARGE AIR C/W ROOM OR RETURN AIR RESET.

5. DISCHARGE AIR C/W ADJUSTABLE SETPOINT VIA BACNET MS/TP

6. DISCHARGE AIR C/W ADJUSTABLE SETPOINT VIA BACNET IP.

8.8.12. THE NEXTGEN CENCON DIGITAL CONTROLLER AND ASSOCIATED MODULES SHALL BE FULLY INTEGRATE INTO THE EXISTING JOHNSON CONTROLS SNE SUPERVISORY CONTROLLER.

8.8.13. THE CENCON DIGITAL CONTROLLER SHALL BE CONFIGURED FOR EITHER BACNET MS/TP OR BACNET/IP COMMUNICATION.

8.8.14. NETWORK CAT 6 CABLE AND A 2216 COMMUNICATION CABLE SHALL BE RAN FROM THE NEXTGEN CENCON CONTROLLER TO THE EXISTING JOHNSON CONTROLS CABINET IN THE ELECTRICAL ROOM.

9. HRP(QDT) HEAT PIPES

9.1. HEAT EXCHANGER DESIGN

9.2. THE HEAT RECOVERY DEVICE SHALL BE AN AIR-TO-AIR HEAT PIPE HEAT EXCHANGER. THE BASIS OF DESIGN SHALL BE THE ENGINEERED AIR HRP (QDT) HEAT PIPE.

9.2.1. THE PRIMARY HEAT EXCHANGER CORE SHALL BE CONSTRUCTED OF 5/8" (16 MM) DIAMETER 0.035" (0.9 MM) THICK SEAMLESS ALUMINUM TUBES PERMANENTLY EXPANDED INTO FINS.

9.2.2. THE SECONDARY SURFACE SHALL BE CONTINUOUS PLATE ALUMINUM FINS OF CORRUGATED DESIGN TO PRODUCE MAXIMUM HEAT TRANSFER EFFICIENCY AND REDUCE THE FROST THRESHOLD OF THE UNIT.

9.2.3. TUBE CONSTRUCTION

9.2.3.1. EACH TUBE SHALL BE AN INDIVIDUALLY SEALED HEAT PIPE FILLED WITH A WORKING FLUID CONFORMING TO THE MECHANICAL REFRIGERATION CODE.

9.2.3.2. HEAT PIPE TUBES SHALL BE WICKED. THE CAPILLARY WICK OF EACH HEAT PIPE SHALL BE AN INTEGRAL PART OF THE INNER WALL OF THE TUBE TO PROVIDE A COMPLETELY WETTED SURFACE FOR MAXIMUM HEAT PIPE CAPACITY WITH MINIMUM HEAT TRANSFER RESISTANCE.

9.2.3.3. AIR STREAM PARTITION

9.2.3.3.1. A PARTITION SHALL BE PROVIDED TO ISOLATE THE EXHAUST AND SUPPLY AIR STREAMS FROM EACH OTHER TO PREVENT CROSS-CONTAMINATION. THE PARTITION SHALL BE TWO METAL TUBE SHEET DIVIDERS TO PROVIDE DOUBLE THE SEALING AREA.

9.2.4. TUBES SHALL BE EXPANDED INTO EACH DIVIDER TO FORM A POSITIVE SEAL AGAINST AIR LEAKAGE.

9.2.5. TEMPERATURE AND FROST CONTROL

9.2.5.1. THE CENCON C/W ER-XM MODULE SHALL BE COMPLETE WITH PROPORTIONAL AND INTEGRAL CONTROL AND DISCHARGE AIR SENSOR TO MAINTAIN SET POINT TEMPERATURE AND PROVIDE RAPID RESPONSE TO INCREMENTAL CHANGES IN THE DISCHARGE AIR TEMPERATURE.

9.2.5.2. THE CONTROLLER SHALL PROVIDE TEMPERATURE AND FROST CONTROL OPERATION C/W ACCURATE SUPPLY AIR TEMPERATURE CONTROL AND SUMMER/WINTER OPERATION.

9.2.5.3. THE ENERGY RECOVERY CONTROL FUNCTION SHALL BE INCORPORATED INTO THE CONTROL OF THE SYSTEM DISCHARGE AIR SETPOINT. THE CONTROLLER SHALL UTILIZE THE HEAT RECOVERY DEVICE TO ITS FULL ABILITY PRIOR TO ENABLING ADDITIONAL HEATING OR COOLING DEVICES.

9.2.5.4. CONTROLLER SHALL PROVIDE FROST PREVENTION.

9.2.5.4.1. WHEN THE EXHAUST AIR TEMPERATURE DROPS BELOW THE FROST THRESHOLD, THE CONTROLLER SETPOINT SHALL BE OVERRIDDEN TO MAINTAIN A SPECIFIC SETPOINT IN THE EXHAUST AIRSTREAM. THIS SETPOINT IS CALCULATED BASED ON THE DEWPOINT OF THE RETURN AIR TO ENSURE MAXIMUM HEAT RECOVERY IS MAINTAINED WHILE NOT ALLOWING FROST TO ACCUMULATE ON THE HEAT RECOVERY DEVICE.

9.2.5.5. ENHANCED RECOVERY

9.2.5.5.1. MAXIMUM HEAT RECOVERY IS OBTAINED BY FIRST ALLOWING FROST TO FORM ON THE EXHAUST SIDE OF THE COIL AND USING A PRESSURE DIFFERENTIAL SWITCH TO SENSE WHEN THIS FROST FORMS. JUST PRIOR TO THE FROST FORMING, MAXIMUM HEAT RECOVERY OCCURS. WHEN FROST IS DETECTED, THE FROST CONTROL SET POINT IS RESET UPWARDS, AND THE HEAT PIPE IS SENT TO DEFROST MODE. RECOVERY IS STILL ACHIEVED BUT AT A LOWER LEVEL UNTIL THE HEAT PIPE IS CLEAR OF FROST.

9.2.5.6. TILT MECHANISM

9.2.5.6.1. THE HRP (QDT) HEAT PIPE SHALL BE MOUNTED ON A CRADLE WITH ACCOMPANYING LINKAGE, FULCRUM, ACTUATOR, AND CONTROLS. FLEXIBLE CONNECTORS SHALL BE INSTALLED TO PERMIT THE NECESSARY TILTING MOVEMENT OF THE RECLAIM COIL. THE FLEXIBLE CONNECTORS SHALL BE A POLYESTER FIBER KNIT STYLE MEMBRANE WITH A PVC COATING.

10. UNIT SCHEDULE:

10.1. ROOF TOP UNIT RTU-2, ENG. A MODEL DJS40/O/HRP, SUPPLY AIR 4,200 CFM AT 1.2" ESP, 100% OUTDOOR AIR, INDIRECT GAS FIRED, 400 MBH INPUT, 324 MBH OUTPUT, 71.4 DEGREE F HEATING TEMPERATURE RISE, 5HP, 208/3/60 MOTOR, 150 BAE-DW BLOWER, 12.5 TON DX COOLING COIL, MERV 14 FILTER, HEAT PIPE HEAT RECOVERY, EFFICIENCY WINTER 72.8%, AND SUMMER 62.1%, EXHAUST AIR 4,420 CFM AT 1.2" ESP, 5HP, 208/3/60 MOTOR, 15/15 FC DIOW BLOWER, UNIT WEIGHT NOT TO EXCEED 5400 LBS.

10.2. CONDENSING UNIT CU-2, ENG. A MODEL CUE123/O 208/3/60, REFRIGERANT R454B, 12.5 TONS TOTAL COOLING, UNIT OPERATING WEIGHT 850 LBS. CONDENSING UNIT TO COME WITH CURRENT SENSORS ON COMPRESSORS TO BE WIRED INTO RTU BACNET CONTROL FOR FEEDBACK.

11. TESTING AND BALANCING:

11.1. AIR SYSTEMS SHALL BE BALANCED AND TESTED BY AN INDEPENDENT AIR BALANCE AGENCY (AABC) TO PROVIDE AIR QUANTITIES AS SHOWN. PROVIDE AIR BALANCE REPORT FOR REVIEW BY THE CONTRACT ADMINISTRATOR. SUBMIT TWO COPIES FOR REVIEW UPON COMPLETION. PROVIDE DAMPER STICKER UPON FINAL BALANCING COMPLETION.

12. CONTROLS

12.1. PROVIDE ALL LABOUR, MATERIAL, PLANT, TOOLS, EQUIPMENT, AND SERVICES NECESSARY AND REASONABLY INCIDENTAL TO COMPLETION OF CONTROLS SYSTEMS AS NOTED HEREIN AND/OR SHOWN ON DRAWINGS.

12.2. PROVIDE COMPLETE DDC SYSTEM OF JOHNSON CONTROLS METASYS FOR SYSTEMS INDICATED.

12.3. ALL NEW WORK RELATED TO NEW AND EXISTING CONTROLS SHALL BE PERFORMED BY A QUALIFIED CONTROLS SUBCONTRACTOR.

12.4. NEW THERMOSTAT AND HUMIDISTAT WILL BE PROVIDED AND INSTALLED BY CONTROL CONTRACTOR.

12.5. ALL NEW CONTROLS WILL COMMUNICATE USING MSTP AND ADHERE TO BACNET STANDARD PROTOCOL SSPC-135, CLAUSE 9. PROVIDE FIELD MSTP CONTROLLER AS REQUIRED AND CONNECT TO THE EXISTING METASYS MSTP SYSTEM.

12.6. PROVIDE ALL NECESSARY DAMPERS, DAMPER OPERATORS, VALVES, VALVE OPERATORS, CONTROLLERS, INDICATION, RELAYS, CUMULATORS, POSITIONERS, PNEUMATIC ELECTRIC SWITCHES, SOLENOID VALVES, SWITCHES, CLOCKS, TRANSFORMERS, ETC., TO MAKE COMPLETE AND OPERABLE SYSTEM.

12.7. MECHANICAL SUB-CONTRACTOR TO DISTRIBUTE AND MOUNT ALL PIPE AND DUCT CONNECTED TO EQUIPMENT.

12.8. MECHANICAL SUB-CONTRACTOR TO DISTRIBUTE AND MOUNT ALL MOTORIZED DAMPERS IN THEIR RESPECTIVE LOCATIONS.

12.9. ELECTRICAL TO SUPPLY AND INSTALL ALL CONDUIT, WIRE AND CONNECTIONS FROM DISTRIBUTION PANELS TO LINE SIDE OF MAGNETIC STARTERS AND THERMAL OVERLOAD SWITCHES, AND FROM LOAD SIDE OF STARTERS AND SWITCHES TO MOTORS.

12.10. CONTROL CONTRACTOR SHALL SUPPLY AND INSTALL ALL CONDUIT, WIRE, ELECTRIC RELAYS, CONNECTIONS AND OTHER DEVICES REQUIRED FOR CONTROL CIRCUIT WIRING FOR SYSTEMS AS SPECIFIED HEREIN WHETHER LINE OR LOW VOLTAGE. ELECTRICAL WIRING SHALL BE INSTALLED IN CONFORMANCE WITH CSA, ULC, MANITOBA BUILDING CODE AND DIVISION 26 ELECTRICAL REQUIREMENTS.

12.11. THE CITY OF WINNIPEG HAS AN EXISTING CENTRAL MONITORING SYSTEM IN PLACE, LOCATED AT THE CENTRAL CONTROL OFFICES, 510 MAIN STREET, WINNIPEG, MANITOBA. THE CONTROLS CONTRACTOR SHALL PROVIDE AND INSTALL REQUIRED HARDWARE AND SOFTWARE FOR THE MONITORING AND CONTROL OF OBJECTS TO BE VIEWED AND ADJUSTED THROUGH THE CITY OF WINNIPEG ADX SERVER. OBJECTS TO BE ADDED BOTH TO THE METASYS USERVIEW AND JOHNSON CONTROLS LATEST GRAPHIC PACKAGE.

12.12. ROOF TOP UNIT RTU-2 CONTROL SEQUENCES)

12.12.1. FAN SYSTEM CONTROLS-GENERAL

12.12.1.1. FOLLOWING CONTROL SEQUENCES SHALL APPLY TO ALL SUPPLY FAN SYSTEMS WHETHER SPECIFICALLY NOTED IN SEQUENCE OF OPERATION OR NOT.

12.12.1.2. WHERE FAN SYSTEMS HAVE OUTDOOR AND RETURN AIR DAMPERS MODULATED TO MAINTAIN MIXED AIR, OR SPACE TEMPERATURE, PROVIDE ADJUSTABLE (0- 1 MIN.) RESTRICTION FEATURE TO RETARD OPENING OF O.A. DAMPER ON SYSTEM START UP AND ENABLE HEATING SOURCE CONTROLS TO COME INTO CONTROL AND PREVENT NUISANCE TRIPPING OF LOW LIMIT PROTECTION CONTROLS.

12.12.1.3. PROVIDE INTERLOCKS TO ENSURE AUXILIARY EQUIPMENT SUCH AS OUTDOOR AIR DAMPERS, RELIEF AIR DAMPERS, ELECTRIC HUMIDIFIER ETC. ARE SHUT OFF AND/OR CLOSED WHEN SUPPLY FAN IS OFF.

12.12.1.4. PROVIDE ALL FAN SYSTEMS THAT INTRODUCE O.A. WITH LOW LIMIT CONTROL IN DISCHARGE AIR TO SHUT DOWN SUPPLY FAN AND ACTIVATE LOCAL ALARM WHEN DISCHARGE AIR TEMPERATURE DROPS BELOW 3 DEG.C(37 DEG.F). LOCATE LOW LIMIT IN MANNER THAT SHALL PROTECT HEATING AND COOLING COILS, AND AT SAME TIME NOT BE SUBJECT TO NUISANCE TRIPPING.

12.12.1.5. PROVIDE DIFFERENTIAL PRESSURE SWITCHES ACROSS EACH FILTER BANK TO INDICATE "FILTER DIRTY" NOTIFICATION.

12.12.2. ROOF TOP UNIT (RTU-2)

12.12.2.1. SYSTEM IS COMPRISED OF A CENTRAL SINGLE DUCT CONSTANT AIR VOLUME ROOF TOP AIR HANDLING UNIT, INCLUDING SUPPLY FAN, FILTER BANKS, CONTROL DAMPERS, GAS HEATING BURNER, DX COOLING COIL, HEAT PIPE HEAT RECOVERY AND ACCESS SECTION.

12.12.2.2. UNITS SHALL OPERATE ON CONTINUOUSLY.

12.12.2.3. IN THE EVENT OF FIRE, THE SMOKE DETECTOR IN THE RETURN DUCT WILL SHUT DOWN THE ROOF TOP UNIT.

12.12.2.4. THE FOLLOWING LISTS THE MINIMUM I/O POINTS TO BE SENSED/CONTROLLED BY THE CONTROLLER:

12.12.2.4.1. ANALOGUE INPUTS

1. DISCHARGE AIR TEMPERATURE

2. RETURN AIR TEMPERATURE

3. AIR TEMPERATURE AFTER HEAT RECOVERY

4. OUTSIDE AIR TEMPERATURE

5. FILTER DIFFERENTIAL PRESSURE

6. SPACE AIR TEMPERATURE

12.12.2.4.2. ANALOGUE OUTPUTS

1. OUTDOOR/RETURN DAMPERS

12.12.2.4.3. BINARY INPUTS

1. LOW TEMPERATURE LIMIT SWITCH

2. FILTER STATUS

3. SUPPLY FAN STATUS

4. RETURN FAN STATUS

12.12.2.4.4. BINARY OUTPUTS

1. SUPPLY FAN START/STOP

2. RETURN FAN START/STOP

3. HEATING STAGES START/STOP

4. DX COOLING START/STOP

5. PROVIDE AND INSTALL A BACNET/IP TO MSTP ROUTER IF REQUIRED TO CONVERT THE COMMUNICATION FOR PROPER WORKING ORDER.

13. ELECTRIC HUMIDIFIER HU-2

13.1. INTERLOCK HU-2 WITH RTU-2. IN THE EVENT THAT RTU-2 IS SHUT DOWN, HU-2 SHALL BE SHUT DOWN.

13.2. THE FOLLOWING LISTS THE MINIMUM I/O POINTS TO BE SENSED/CONTROLLED BY THE CONTROLLER:

13.2.1. ANALOGUE INPUTS

1. SPACE AIR HUMIDITY

2. RETURN AIR HUMIDITY

13.2.2. BINARY INPUTS

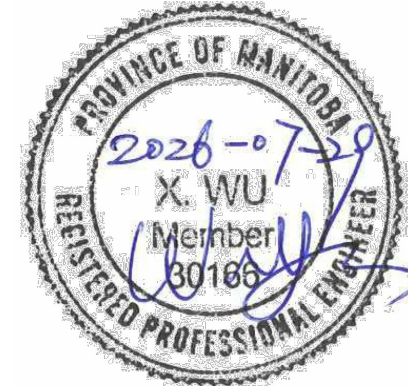
1. HUMIDIFIER STATUS

13.2.3. BINARY OUTPUTS

1. HUMIDIFIER START/STOP

0	ISSUED FOR CONSTRUCTION	XYW	07_28 2026
No.	REVISION DESCRIPTION	BY	DATE

SEAL



DATE	DESIGN	DRAWN	CHECKED	APPROVED
2026.07.28	BY: XYW	BY: HA	BY: XYW	BY: XYW

THE CITY OF WINNIPEG
ASSETS & PROJECT MANAGEMENT DEPARTMENT
MUNICIPAL ACCOMMODATIONS DIVISION
3-65 GARRY STREET, R3C 4K4

PROJECT
ANIMAL SERVICES
KENNEL ROOF TOP UNIT REPLACEMENT

1057 LOGAN AVENUE
SHEET TITLE
MECHANICAL SPECIFICATIONS

SCALE	PROJECT No:	SHEET No:
AS SHOWN	2025-005	M4