

- 6 CONTROLS
- 1 REFER TO CONTROLS SECTION
 - 2 BOILER CONTROLS SHALL FEATURE THE FOLLOWING STANDARD FEATURES:
 - 1 8" LCD SCREEN DISPLAY DISPLAYING STATUS, MODULATION PERCENTAGE, SETPOINTS, AND SENSOR DATA AT A MINIMUM ON THE HOME SCREEN. ADDITIONAL INFORMATION SUCH AS HISTORY AND PARAMETERS CAN BE ACCESSED VIA THE TOUCHSCREEN DISPLAY WITHOUT THE NEED FOR NAVIGATION BUTTONS. A SCREEN SAVER MODE SHALL BE AVAILABLE WITH THE DISPLAY.
 - 2 PASSWORD SECURITY: BOILER SHALL HAVE A DIFFERENT PASSWORD SECURITY CODE FOR THE USER AND THE INSTALLER TO ACCESS ADJUSTABLE PARAMETERS.
 - 3 OUTDOOR AIR RESET: BOILER SHALL CALCULATE THE SET POINT USING A FIELD INSTALLED, FACTORY SUPPLIED OUTDOOR SENSOR AND AN ADJUSTABLE RESET CURVE.
 - 4 PUMP EXERCISE: BOILER SHALL ENERGIZE ANY CERTAIN SET POINTS FOR AN ADJUSTABLE TIME IF THE ASSOCIATED PUMP HAS BEEN OFF FOR A TIME PERIOD OF 24 HOURS.
 - 5 RAMP DELAY: BOILER MAY BE PROGRAMMED TO LIMIT THE FIRING RATE BASED ON SIX LIMITS STEPS AND SIX TIME INTERVALS.
 - 6 BOOST FUNCTION: BOILER MAY BE PROGRAMMED TO AUTOMATICALLY INCREASE THE SET POINT A FIXED NUMBER OF DEGREES (ADJUSTABLE BY INSTALLER) IF THE SETPOINT HAS BEEN CONTINUOUSLY ACTIVE FOR A SET PERIOD OF TIME (TIME ADJUSTABLE BY INSTALLER). THIS PROCESS WILL CONTINUE UNTIL THE SPACE HEATING DEMAND ENDS.
 - 7 PC PORT CONNECTION: BOILER SHALL HAVE A PC PORT ALLOWING THE CONNECTION OF PC BOILER SOFTWARE.
 - 8 TIME CLOCK: BOILER SHALL HAVE AN INTERNAL TIME CLOCK WITH THE ABILITY TO TIME AND DATE STAMP LOCK-OUT CODES AND MAINTAIN RECORDS OF RUNTIME.
 - 9 SERVICE REMINDER: BOILER SHALL HAVE THE ABILITY TO DISPLAY A YELLOW COLORED SERVICE NOTIFICATION SCREEN BASED UPON MONTHS OF INSTALLATION, HOURS OF OPERATION, AND NUMBER OF BOILER CYCLES. ALL NOTIFICATIONS ARE ADJUSTABLE BY THE INSTALLER.
 - 10 ANTI-CYCLING CONTROL: BOILER SHALL HAVE THE ABILITY TO SET A TIME DELAY AFTER A HEATING DEMAND IS SATISFIED ALLOWING THE BOILER TO BLOCK A NEW CALL FOR HEAT. THE BOILER WILL DISPLAY AN ANTI-CYCLING BLOCKING ON THE SCREEN UNTIL THE TIME HAS ELAPSED OR THE WATER TEMPERATURE DROPS BELOW THE ANTI-CYCLING DIFFERENTIAL PARAMETER. THE ANTI-CYCLING CONTROL PARAMETER IS ADJUSTABLE BY THE INSTALLER.
 - 11 NIGHT SETBACK: BOILER MAY BE PROGRAMMED TO REDUCE THE SPACE HEATING TEMPERATURE SET POINT DURING A CERTAIN TIME OF THE DAY.
 - 12 FREEZE PROTECTION: BOILER SHALL TURN ON THE BOILER AND SYSTEM PUMPS WHEN THE BOILER WATER TEMPERATURE FALLS BELOW 45 DEGREES. WHEN THE BOILER WATER TEMPERATURE FALLS BELOW 37 DEGREES THE BOILER WILL AUTOMATICALLY TURN ON. BOILER AND PUMPS WILL TURN OFF WHEN THE BOILER WATER TEMPERATURE RISES ABOVE 43 DEGREES.
 - 13 ISOLATION VALVE CONTROL: BOILER SHALL HAVE THE ABILITY TO CONTROL A 2-WAY MOTORIZED CONTROL VALVE. BOILER SHALL ALSO BE ABLE TO FORCE A FIXED NUMBER OF VALVES TO ALWAYS BE ENERGIZED REGARDLESS OF THE NUMBER OF BOILERS THAT ARE FIRING.
 - 14 BMS INTEGRATION WITH 0-10V DC INPUT: THE CONTROL SHALL ALLOW AN OPTION TO ENABLE AND CONTROL SET POINT TEMPERATURE OR CONTROL FIRING RATE BY SENDING THE BOILER A 0-10V INPUT SIGNAL.
 - 15 DATA LOGGING: BOILER SHALL HAVE NON-VOLATILE DATA LOGGING MEMORY INCLUDING LAST 10 LOCKOUTS, HOURS RUNNING AND IGNITION ATTEMPTS AND SHOULD BE ABLE TO VIEW ON BOILER SCREEN.
 - 3 BOILER OPERATING CONTROLS SHALL INCLUDE THE FOLLOWING DEVICES AND FEATURES:
 - 1 SET POINT ADJUST: SET POINTS SHALL BE ADJUSTABLE.
 - 2 OPERATING PRESSURE CONTROL: FACTORY WIRED AND MOUNTED TO CYCLE BURNER.
 - 3 SEQUENCE OF OPERATION: FACTORY INSTALLED CONTROLLER TO MODULATE BURNER FIRING RATE TO MAINTAIN SYSTEM WATER TEMPERATURE IN RESPONSE TO CALL FOR HEAT.
 - 4 SEQUENCE OF OPERATION: ELECTRIC, FACTORY-FABRICATED AND FACTORY-INSTALLED PANEL TO CONTROL BURNER FIRING RATE TO RESET SUPPLY-WATER TEMPERATURE INVERSELY WITH OUTSIDE-AIR TEMPERATURE. AT 10 DEG F OUTSIDE-AIR TEMPERATURE, SET SUPPLY-WATER TEMPERATURE AT 180 DEG F. AT 60 DEG F OUTSIDE-AIR TEMPERATURE, SET SUPPLY-WATER TEMPERATURE AT 140 DEG F.
 - 5 BURNER OPERATING CONTROLS: TO MAINTAIN SAFE OPERATING CONDITIONS, BURNER SAFETY CONTROLS LIMIT BURNER OPERATION.
 - 1 HIGH TEMPERATURE LIMIT: AUTOMATIC AND MANUAL RESET STOPS BURNER IF OPERATING CONDITIONS RISE ABOVE MAXIMUM BOILER DESIGN TEMPERATURE. LIMIT SWITCH TO BE MANUALLY RESET ON THE CONTROL INTERFACE.
 - 2 LOW-WATER CUTOFF SWITCH: ELECTRONIC PROBE SHALL PREVENT BURNER OPERATION ON LOW WATER. CUTOFF SWITCH SHALL BE MANUALLY RESET ON THE CONTROL INTERFACE.
 - 3 BLOCKED INLET SAFETY SWITCH: MANUAL-RESET PRESSURE SWITCH FIELD MOUNTED ON BOILER COMBUSTION-AIR INLET.
 - 4 HIGH AND LOW GAS PRESSURE SWITCHES: PRESSURE SWITCHES SHALL PREVENT BURNER OPERATION ON LOW OR HIGH GAS PRESSURE. PRESSURE SWITCHES TO BE MANUALLY RESET ON THE CONTROL INTERFACE.
 - 5 BLOCKED DRAIN SWITCH: BLOCKED DRAIN SWITCH SHALL PREVENT BURNER OPERATION WHEN TRIPPED. SWITCH TO BE MANUALLY RESET ON THE CONTROL INTERFACE.
 - 6 LOW AIR PRESSURE SWITCH: PRESSURE SWITCHES SHALL PREVENT BURNER OPERATION ON LOW AIR PRESSURE. SWITCH TO BE MANUALLY RESET ON THE CONTROL INTERFACE.
 - 7 AUDIBLE ALARM: FACTORY MOUNTED ON CONTROL PANEL WITH SILENCE SWITCH; SHALL SOUND ALARM FOR ANY LOCKOUT CONDITIONS.
 - 6 BUILDING AUTOMATION SYSTEM INTERFACE: FACTORY INSTALLED MODBUS AND BACNET MSTP GATEWAY INTERFACE TO ENABLE BUILDING AUTOMATION SYSTEM TO MONITOR, CONTROL, AND DISPLAY BOILER STATUS AND ALARMS.
 - 7 SOFTWARE UPDATE: THE CONTROL SHALL HAVE THE ABILITY TO RECEIVE UPDATES IN THE FIELD WITHOUT HARDWARE COMPONENT REPLACEMENT. THIS UPDATE CAN BE PERFORMED VIA USB FLASH DRIVE, INTERNET CONNECTION, OR VIA WIRELESS CONNECTION. THIS SERVICE SHALL BE PROVIDED AT NO ADDITIONAL AND/OR ANNUAL COST TO THE CITY.
 - 7 ELECTRICAL POWER
 - 1 CONTROLLERS, ELECTRICAL DEVICES, AND WIRING: ELECTRICAL DEVICES AND CONNECTIONS ARE SPECIFIED IN ELECTRICAL DRAWINGS.
 - 2 SINGLE-POINT FIELD POWER CONNECTION: FACTORY-INSTALLED AND FACTORY-WIRED SWITCHES, MOTOR CONTROLLERS, TRANSFORMERS, AND OTHER ELECTRICAL DEVICES NECESSARY SHALL PROVIDE A SINGLE-POINT FIELD POWER CONNECTION TO BOILER.
 - 8 VENTING
 - 1 AL29-46 VENTING SHALL BE PROVIDED.
 - 2 BOILER SHALL COME STANDARD WITH A FLUE SENSOR TO MONITOR AND DISPLAY FLUE GAS TEMPERATURE ON FACTORY PROVIDED LCD DISPLAY.
 - 9 SOURCE QUALITY CONTROL
 - 1 BURNER AND HYDROSTATIC TEST: FACTORY ADJUST BURNER TO ELIMINATE EXCESS OXYGEN, CARBON DIOXIDE, OXIDES OF NITROGEN EMISSIONS, AND CARBON MONOXIDE IN FLUE GAS AND TO ACHIEVE COMBUSTION EFFICIENCY; PERFORM HYDROSTATIC TEST.
 - 2 TEST AND INSPECT FACTORY-ASSEMBLED BOILERS, BEFORE SHIPPING, ACCORDING TO ASME BOILER AND PRESSURE VESSEL CODE.
 - 3 ALLOW THE CITY ACCESS TO SOURCE QUALITY-CONTROL TESTING OF BOILERS.
 - 10 EXECUTION
 - 1 EXAMINATION
 - 1 BEFORE BOILER INSTALLATION, EXAMINE ROUGHING-IN FOR CONCRETE EQUIPMENT BASES, ANCHOR-BOLT SIZES AND LOCATIONS, AND PIPING AND ELECTRICAL CONNECTIONS TO VERIFY ACTUAL LOCATIONS, SIZES, AND OTHER CONDITIONS AFFECTING BOILER PERFORMANCE, MAINTENANCE, AND OPERATIONS.
 - 1 FINAL BOILER LOCATIONS INDICATED ON DRAWINGS ARE APPROXIMATE. DETERMINE EXACT LOCATIONS BEFORE ROUGHING-IN OF PIPING AND ELECTRICAL CONNECTIONS.
 - 2 EXAMINE MECHANICAL SPACES FOR SUITABLE CONDITIONS WHERE BOILERS WILL BE INSTALLED.

- 3 PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
- 2 BOILER INSTALLATION
 - 1 INSTALL EQUIPMENT ON EXISTING CONCRETE HOUSEKEEPING PAD.
 - 2 INSTALL GAS-FIRED BOILERS ACCORDING TO NFPA 54.
 - 3 ASSEMBLE AND INSTALL BOILER TRIM.
 - 4 INSTALL ELECTRICAL DEVICES FURNISHED WITH BOILER BUT NOT SPECIFIED TO BE FACTORY MOUNTED.
 - 5 INSTALL CONTROL WIRING TO FIELD-MOUNTED ELECTRICAL DEVICES.
- 3 CONNECTIONS
 - 1 INSTALL PIPING ADJACENT TO BOILER TO ALLOW SERVICE AND MAINTENANCE.
 - 2 INSTALL PIPING FROM EQUIPMENT DRAIN CONNECTION TO NEAREST FLOOR DRAIN. PIPING SHALL BE AT LEAST FULL SIZE OF CONNECTION. PROVIDE AN ISOLATION VALVE IF REQUIRED.
 - 3 CONNECT GAS PIPING TO BOILER GAS-TRAIN INLET WITH UNION. PIPING SHALL BE AT LEAST FULL SIZE OF EQUIPMENT CONNECTION. PROVIDE A REDUCER IF REQUIRED.
 - 4 CONNECT HOT GLYCOL PIPING TO SUPPLY AND RETURN BOILER TAPPINGS WITH SHUTOFF VALVE AND UNION OR FLANGE AT EACH CONNECTION.
 - 5 INSTALL PIPING FROM SAFETY RELIEF VALVES TO GLYCOL FILL TANK.
 - 6 BOILER VENTING
 - 1 INSTALL FLUE VENTING KIT AND COMBUSTION-AIR INTAKE.
- 4 FIELD QUALITY CONTROL
 - 1 PERFORM TESTS AND INSPECTIONS AND PREPARE TEST REPORTS.
 - 1 MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS, AND TO ASSIST IN TESTING.
 - 2 TESTS AND INSPECTIONS:
 - 1 PERFORM INSTALLATION AND STARTUP CHECKS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS. COMPLETE STARTUP FORM INCLUDED WITH BOILER AND RETURN TO MANUFACTURER AS DESCRIBED IN THE INSTRUCTIONS.
 - 2 LEAK TEST: HYDROSTATIC TEST. REPAIR LEAKS AND RETEST UNTIL NO LEAKS EXIST.
 - 3 OPERATIONAL TEST: START UNITS TO CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATION. ADJUST AIR-FUEL RATIO AND COMBUSTION.
 - 4 TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.
 - 1 CHECK AND ADJUST INITIAL OPERATING SET POINTS AND HIGH- AND LOW-LIMIT SAFETY SET POINTS OF FUEL SUPPLY, WATER LEVEL AND WATER TEMPERATURE.
 - 2 SET FIELD-ADJUSTABLE SWITCHES AND CIRCUIT-BREAKER TRIP RANGES AS INDICATED.
 - 3 OCCUPANCY ADJUSTMENTS: WHEN REQUESTED WITHIN 12 MONTHS OF DATE OF SUBSTANTIAL COMPLETION, PROVIDE ON-SITE ASSISTANCE IN ADJUSTING SYSTEM TO SUIT ACTUAL OCCUPIED CONDITIONS. PROVIDE UP TO TWO VISITS TO PROJECT DURING OTHER THAN NORMAL OCCUPANCY HOURS FOR THIS PURPOSE.
 - 4 PERFORMANCE TESTS:
 - 1 ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT COMPONENT ASSEMBLIES AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS, AND TO CONDUCT PERFORMANCE TESTING.
 - 2 BOILERS SHALL COMPLY WITH PERFORMANCE REQUIREMENTS INDICATED, AS DETERMINED BY FIELD PERFORMANCE TESTS. ADJUST, MODIFY, OR REPLACE EQUIPMENT TO COMPLY.
 - 3 PERFORM FIELD PERFORMANCE TESTS TO DETERMINE CAPACITY AND EFFICIENCY OF BOILERS.
 - 4 REPEAT TESTS UNTIL RESULTS COMPLY WITH REQUIREMENTS INDICATED.
 - 5 PROVIDE ANALYSIS EQUIPMENT REQUIRED TO DETERMINE PERFORMANCE.
 - 6 PROVIDE TEMPORARY EQUIPMENT AND SYSTEM MODIFICATIONS NECESSARY TO DISSIPATE THE HEAT PRODUCED DURING TESTS IF BUILDING SYSTEMS ARE NOT ADEQUATE.
 - 7 NOTIFY CONTRACT ADMINISTRATOR IN ADVANCE OF TEST DATES.
 - 8 PERFORM A COMBUSTION ANALYSIS AFTER INSTALLATION AND ADJUST GAS VALVE PER THE INSTALLATION AND OPERATIONS MANUAL AND NOTE IN STARTUP REPORT.
 - 9 DOCUMENT TEST RESULTS IN A REPORT AND SUBMIT TO CONTRACT ADMINISTRATOR.
 - 5 DEMONSTRATION
 - 1 ENGAGE A FACTORY REPRESENTATIVE OR A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE FOR BOILER STARTUP AND TO TRAIN THE CITY'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN BOILERS. REFER TO DIVISION 01 SECTION 'DEMONSTRATION AND TRAINING'.

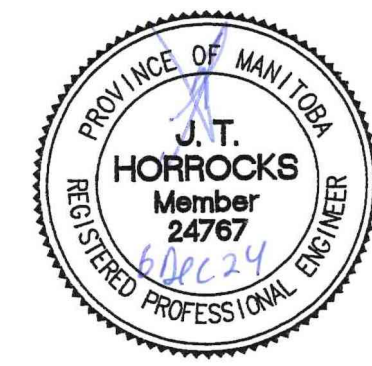
- 2 PUMP, BIP-2
 - 1 BASIS-OF-DESIGN PRODUCT: PROVIDE TACO COMFORT SOLUTIONS, INC.; KV SERIES MODEL 2007D.
 - 2 DESCRIPTION: FACTORY-ASSEMBLED AND TESTED, CENTRIFUGAL, OVERHUNG-IMPELLER, CLOSE-COUPLED, IN-LINE PUMP, DESIGNED FOR INSTALLATION WITH PUMP AND MOTOR SHAFTS MOUNTED HORIZONTALLY OR VERTICALLY.
 - 3 PUMP CONSTRUCTION:
 - 1 CASING: RADIIALLY SPLIT, CAST IRON AND COMPANION-FLANGE CONNECTIONS.
 - 2 IMPELLER: ASTM B564, CAST BRONZE; STATICALLY AND DYNAMICALLY BALANCED, KEYS TO SHAFT, AND SECURED WITH A STAINLESS STEEL LOCKING CAP SCREW. TRIM IMPELLER TO MATCH SPECIFIED PERFORMANCE.
 - 3 PUMP SHAFT SLEEVE: BRONZE.
 - 4 PUMP STUB SHAFT: TYPE 304 STAINLESS STEEL.
 - 5 SEAL: MECHANICAL SEAL CONSISTING OF CERAMIC/EPT RUBBER BELLOW AND GASKET. INCLUDE WATER SLINGER ON SHAFT BETWEEN MOTOR AND SEAL.
 - 6 SEAL FLUSHING: FLUSH, COOL, AND LUBRICATE PUMP SEAL BY DIRECTING PUMP DISCHARGE WATER TO FLOW OVER THE SEAL.
 - 4 MOTOR: COMPLY WITH NEMA DESIGNATION, TEMPERATURE RATING, SERVICE FACTOR, AND EFFICIENCY REQUIREMENTS FOR MOTORS.
 - 1 ENCLOSURE: OPEN, DRIP PROOF.
 - 2 NEMA PREMIUM EFFICIENT MOTORS AS DEFINED IN NEMA MG 1.
 - 3 MOTOR SIZES: LARGE ENOUGH SO DRIVEN LOAD WILL NOT REQUIRE MOTOR TO OPERATE IN SERVICE FACTOR RANGE ABOVE 1.0.
 - 4 CONTROLLERS, ELECTRICAL DEVICES, AND WIRING: COMPLY WITH REQUIREMENTS FOR ELECTRICAL DEVICES AND CONNECTIONS SPECIFIED IN ELECTRICAL SECTIONS.
 - 5 TACO KV SERIES MODEL 2007D IN-LINE CIRCULATOR, 140 GPM @ 45' H.D. WITH 50% PROPYLENE GLYCOL, 3 HP, 7.15" IMPELLER DIAMETER, 1760 RPM.

- 5.0 TESTING AND BALANCING
 - 1 HYDRONIC SYSTEMS SHALL BE BALANCED AND TESTED BY AN INDEPENDENT BALANCING AGENCY (AABC) TO PROVIDE QUANTITIES AS SHOWN. PROVIDE BALANCE REPORT FOR REVIEW BY THE CONTRACT ADMINISTRATOR. SUBMIT TWO COPIES FOR REVIEW UPON COMPLETION.
 - 2 INCORPORATE COMMENTS OR CHANGES REQUESTED BY CONTRACT ADMINISTRATOR AND PROVIDE SUFFICIENT NUMBER OF COPIES OF FINAL REPORT TO MECHANICAL CONTRACTOR FOR INCLUSION IN OPERATING & MAINTENANCE MANUALS.
- 6.0 CONTROLS
 - 1 PROVIDE ONE .PDF SOFT COPY AND THREE HARD COVER COPIES OF INFORMATION PERTAINING TO TEMPERATURE CONTROL SYSTEM FOR THE CITY'S PERMANENT RECORD. INCLUDE SCHEMATIC DRAWINGS AND CONTROL SEQUENCE WRITE-UPS OF ALL CONTROL SYSTEMS TO MECHANICAL SUBCONTRACTOR FOR INCLUSION IN OPERATIONS AND MAINTENANCE MANUALS.
 - 2 PROVIDE ALL LABOUR, MATERIAL, PLANT, TOOLS, EQUIPMENT, AND SERVICES NECESSARY AND REASONABLY INCIDENTAL TO COMPLETION OF TEMPERATURE CONTROLS SYSTEMS AS NOTED HEREIN AND/OR SHOWN ON DRAWINGS.

- 3 THE CITY OF WINNIPEG HAS AN EXISTING CENTRAL MONITORING SYSTEM IN PLACE. DDC POINTS ARE CENTRALLY MONITORED POINTS AND THE CONTROLS CONTRACTOR SHALL PROVIDE AND INSTALL REQUIRED HARDWARE AND SOFTWARE TO INTERFACE TO THE CITY'S JOHNSON CONTROLS METASYS EA SERVERS AND WORKSTATIONS. THESE ARE LOCATED AT THE CENTRAL CONTROL OFFICES, 510 MAIN STREET, WINNIPEG, MANITOBA (IE CITY HALL).
- 4 CONTROLS CONTRACTOR TO SUPPLY ALL DRAWINGS/GRAPHICS/SEQUENCE OF OPERATIONS IN BOTH A HARD AND SOFT COPY. DRAWINGS AND GRAPHICS TO BE ABLE TO BE READ AND MODIFIED BY CITY OF WINNIPEG STAFF. USER INTERFACE GRAPHICS TO BE COMPLETED USING GRAPHIC GENERATION TOOL. SOFTWARE GRAPHICS MUST USE CITY OF WINNIPEG GRAPHIC TEMPLATES. CONTRACTOR TO SUPPLY AS-BUILT DRAWINGS IN AN EDITABLE FORMAT, ABLE TO BE EASILY EDITED BY CITY OF WINNIPEG STAFF. CONTRACTOR SHALL USE METRIC UNITS; IMPERIAL UNITS WILL NOT BE ACCEPTED.
- 5 ALL NEW WORK RELATED TO NEW AND EXISTING CONTROLS SHALL BE PERFORMED BY JOHNSON CONTROLS WINNIPEG DIVISION.
- 6 PROVIDE COMPLETE SYSTEM OF AUTOMATIC CONTROLS FOR SYSTEMS INDICATED.
- 7 PROVIDE ALL NECESSARY DAMPERS, DAMPER OPERATORS, THERMOSTATS, VALVES, VALVE OPERATORS, CONTROL LERS, INDICATION, RELAYS, CUMULATORS, POSITIONERS, PNEUMATIC ELECTRIC SWITCHES, SOLENOID VALVES, SWITCHES, CLOCKS, TRANSFORMERS, ETC., TO MAKE COMPLETE AND OPERABLE SYSTEM.
- 8 MECHANICAL CONTRACTOR TO DISTRIBUTE AND MOUNT ALL PIPE CONNECTED EQUIPMENT.
- 9 ELECTRICAL CONTRACTOR 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.
- 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 AND SPECIFICATIONS INCLUDED WITHIN THIS PROJECT.
- 11 SEQUENCE OF OPERATION
 - 1 SYSTEM ENABLE:
 - 1 THE HEATING SYSTEM WILL AUTOMATICALLY START WHEN THE OUTSIDE AIR TEMPERATURE (OA-T) FALLS BELOW THE SYSTEM ENABLE SETPOINT (HTGOAT/LOCKOUT-SP) WHILE THE SYSTEM ENABLE (SYSTEM-EN) IS 'ON'. WHEN THE OUTSIDE AIR TEMPERATURE (OA-T) RISES ABOVE THIS SETPOINT (HTGOAT/LOCKOUT-SP) OR THE SYSTEM ENABLE (SYSTEM-EN) IS 'OFF', THE HEATING SYSTEM WILL BE DISABLED.
 - 2 BOILER CONTROL:
 - 1 THIS SYSTEM CONSIST OF ONE BOILER (BLR2-EN). THE BURNERS SHALL BE CONTROLLED VIA THEIR OWN INTERNAL CONTROLS.
 - 3 HOT WATER PUMP CONTROL:
 - 1 WHEN ENABLED, THE PUMP (BP2-C) ASSOCIATED WITH THE BOILER WILL BE STARTED. IF THE PUMP STATUS (BP2-S) DOES NOT MATCH THE COMMAND (BP2-C), AN ALARM WILL BE GENERATED AND THE BOILER WILL BE STOPPED. UPON LOSS OF STATUS (BP2-S), THE PUMP (BP2-C) WILL RESTART AFTER THE SYSTEM IS MANUALLY RESET (SYS-RESET). AFTER THE BOILER IS COMMANDED OFF, THE PUMP (BP2-C) WILL CONTINUE TO RUN FOR A SHORT TIME TO DISSIPATE THE HEAT.
 - 4 ADDITIONAL POINTS MONITORED BY THE FMS:
 - 1 BOILER 2 STATUS (BLR2-S)
 - 2 BOILER 2 ALARM (BLR2-A)
 - 3 PRIMARY HW SUPPLY TEMPERATURE (PHWS-T)
 - 4 PRIMARY HW RETURN TEMPERATURE (PHWR-T)
 - 5 OUTDOOR AIR TEMPERATURE (OA-T)

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Project Title
WINNIPEG TRANSIT BRANDON GARAGE BOILER #2 REPLACEMENT

Project Location
WINNIPEG MANITOBA

Drawing Title
MECHANICAL SPECIFICATION

Drawn By: AP
 Checked By: JH
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 Scale: AS NOTED
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 Project No: 24-214-01

Revision Number: **0**
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 Sheet Order: 2 OF 5