

ELECTRICAL SPECIFICATION

ELECTRICAL GENERAL PROVISIONS

1. GENERAL
 1. PROVIDE ALL MATERIALS, LABOUR, PLANT AND EQUIPMENT NECESSARY TO MAKE A COMPLETE INSTALLATION AS DESCRIBED AND SHOWN. THIS INSTALLATION SHALL BE LEFT COMPLETE AND READY FOR OPERATION.
 2. THE ENTIRE INSTALLATION SHALL BE GUARANTEED FOR ONE YEAR FROM DATE OF FINAL ACCEPTANCE BY THE CITY. REPLACE AT NO ADDITIONAL COST ANY WORK OR MATERIAL WHICH MAY FAIL OR PROVE DEFECTIVE DURING THE GUARANTEE PERIOD.
 3. THE INSTALLATION SHALL CONFORM IN EVERY RESPECT TO THE RULES AND REGULATIONS OF THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE AND ALL LOCAL CODES. ALL WORK SHALL BE UNIFORM AND HIGH QUALITY. ALL EQUIPMENT SUPPLIED UNDER THIS CONTRACT SHALL BE NEW AND BUILT IN ACCORDANCE WITH NEMA, ANSI IEEE STANDARDS. SHALL BE CSA CERTIFIED OR CERTIFIED BY AN EQUIVALENT RECOGNIZED CERTIFYING AGENCY TO MEET CANADIAN STANDARDS AND LOCALLY APPROVED. ELECTRICAL EQUIPMENT CONSISTING OF INDIVIDUAL CERTIFIED COMPONENTS MUST ALSO HAVE A CSA OR EQUIVALENT CERTIFICATION FOR THE ENTIRE ASSEMBLY. PROVIDE INSPECTION CERTIFICATE UPON COMPLETION OF THE WORK.
 4. CAREFULLY EXAMINE ALL PLANS AND SPECIFICATIONS PERTAINING TO THIS CONTRACT AND VISIT SITE TO DETERMINE ALL FACTORS AFFECTING COSTS AND INCLUDE SAME IN BID OPPORTUNITY. NOTIFY CONTRACT ADMINISTRATOR OF DISCREPANCIES OR CONFLICTS WITH ANY REGULATION BEFORE SUBMITTING PRICE. FAILING SUCH NOTIFICATION, THIS CONTRACTOR SHALL MEET ALL SUCH REQUIREMENTS WITHOUT EXTRA COST TO THE CITY.
 5. OBTAIN ALL NECESSARY PERMITS, PAY ALL NECESSARY FEES, GIVE ALL NECESSARY NOTICES AND OBTAIN APPROVAL OF THE ELECTRICAL AUTHORITIES HAVING JURISDICTION.
2. SHOP DRAWINGS
 1. SUBMIT ELECTRONIC COPIES OF SHOP DRAWINGS FOR ALL EQUIPMENT.
 2. FOR SHOP DRAWINGS SUBMITTED ELECTRONICALLY, INCLUDE PROJECT NAME IN SUBJECT LINE OF E-MAIL TO CONTRACTADMIN@SMSENG.COM.
 3. EQUIPMENT PROPOSED SHALL MEET THE SAME STANDARDS OF PERFORMANCE, QUALITY AND WORKMANSHIP AS THAT SPECIFIED.
 4. SHOP DRAWINGS TO BE REVIEWED AND STAMPED BY THE TRADE AND GENERAL CONTRACTOR.
 5. SHOP DRAWINGS AND RFPs FOR CONTRACT ADMINISTRATOR'S RESPONSE FOR EACH RFI. RFI'S RECEIVED BY CONTRACT ADMINISTRATOR TO REMAIN THEM FOR REVIEWING FOR AT LEAST TEN (10) WORKING DAYS.
3. REQUEST FOR INTERPRETATION (RFI)
 1. FOR RFI'S SUBMITTED ELECTRONICALLY, INCLUDE PROJECT NAME AND RFI NUMBER IN SUBJECT LINE OF E-MAIL. SEND RFI'S TO CONTRACTADMIN@SMSENG.COM.
 2. CONTENT OF THE RFI SHOULD INCLUDE A DETAILED DESCRIPTION OF THE ITEM NEEDING INTERPRETATION AND PROPOSED SOLUTION.
 3. CONTRACT ADMINISTRATOR WILL REVIEW EACH RFI, DETERMINE ACTION REQUIRED, AND RESPOND. ALLOW TEN (10) WORKING DAYS FOR CONTRACT ADMINISTRATOR'S RESPONSE FOR EACH RFI. RFI'S RECEIVED BY CONTRACT ADMINISTRATOR AFTER 1:00 P.M. WILL BE CONSIDERED AS RECEIVED THE FOLLOWING WORKING DAY.
4. RECORD DRAWINGS
 1. PROVIDE "AS-BUILT" DRAWINGS IN PDF AND AUTOCAD FORMAT COPIED TO USB STICK.
 2. PRODUCE AS-BUILT DRAWINGS IN AUTOCAD FORMAT DESCRIBING THE ENTIRE ELECTRICAL AS-BUILT CONDITION. DRAWING SHALL INDICATE, BUT SHALL NOT BE LIMITED TO:
 1. RECORD ALL CIRCUIT NUMBERS AND THE HORIZONTAL AND VERTICAL ROUTING OF ALL ELECTRICAL CABLES AND CONDUITS INSTALLED UNDER THIS CONTRACT. THIS INCLUDES THE ENTIRE ELECTRICAL DISTRIBUTION, AND ALL OTHER DIVISIONS ELECTRICAL SYSTEMS, AND LIGHTING.
 2. EACH DISCIPLINE SHALL BE RECORDED ON SEPARATE RECORD DRAWING SETS. DO NOT "CROWD" DRAWINGS WITH AS-BUILT RECORD INFORMATION. USE ADDITIONAL DRAWING PRINTS AS REQUIRED. IN ADDITION TO THE PLAN RECORD DRAWINGS, PROVIDE SUPPLEMENTAL RISER SCHEMATICS FOR CLARITY.
 3. RECORD THE LOCATION OF THE FOLLOWING: ALL POWER DISTRIBUTION EQUIPMENT, CABLES SPLICES, PULL BOXES, JUNCTION BOXES, ACCESS FITTINGS, POWER SUPPLIES AND SYSTEM CONTROL EQUIPMENT, ANNUNCIATORS, TERMINAL CABINETS, ETC.
 4. RECORD LOCATIONS OF OTHER DISCIPLINES EQUIPMENT SUPPLIED BY ELECTRIC POWER.
5. OPERATION AND MAINTENANCE MANUALS
 1. PROVIDE DATA FOR INCORPORATION INTO MAINTENANCE MANUAL. MANUAL SHALL INCLUDE INSTRUCTIONS FOR ALL EQUIPMENT SUPPLIED, COPY OF REVIEWED SHOP DRAWINGS AND TECHNICAL DATA SUCH AS PARTS LISTS, OPERATING INSTRUCTIONS, MAINTENANCE INSTRUCTIONS, ETC. THREE (3) HARD COVER COPIES OF MAINTENANCE MANUALS ARE TO BE SUBMITTED.
6. REMOVALS
 1. REMOVE ALL UNNECESSARY EXISTING ELECTRICAL EQUIPMENT, WIRING AND FIXTURES IN THOSE PORTIONS OF THE EXISTING BUILDING WHICH ARE BEING REMODELED OR DEMOLISHED. THE EQUIPMENT MAY BE REUSED ON THIS PROJECT IF, IN THE OPINION OF THE CONTRACT ADMINISTRATOR, SUCH EQUIPMENT IS IN SATISFACTORY CONDITION AND MEETS THE STANDARDS ESTABLISHED. THE CITY MAY SELECT FROM THE MATERIALS AND/OR EQUIPMENT REMAINING WHICH HE WISHES TO RETAIN AND THE REMAINDER SHALL BE REMOVED FROM THE SITE.
 2. ANY ELECTRICAL EQUIPMENT IN REMODELED SECTIONS OR IN STRUCTURES REMOVED OR ALTERED, ADJACENT TO NEW WORK, NECESSARY FOR THE OPERATION OF THE EXISTING BUILDING, SHALL BE RELOCATED AS NECESSARY.
 3. ALL EXISTING EQUIPMENT REUSED SHALL BE MADE GOOD AND GUARANTEED.
 4. POWER INTERRUPTIONS SHALL BE KEPT TO A MINIMUM AND SHALL BE A TIME SUITABLE TO THE BUILDING OCCUPANT(S).
7. WORK IN EXISTING BUILDING
 1. CO-ORDINATION
 1. THE BUILDING SHALL REMAIN OPEN AND IN NORMAL OPERATION DURING THE CONSTRUCTION PERIOD.
 2. WHERE EXISTING SERVICES SUCH AS ELECTRICAL POWER, FIRE ALARM SYSTEM, SOUND SYSTEM, ETC. ARE REQUIRED TO BE DISRUPTED AND/OR SHUT DOWN, CO-ORDINATE THE SHUTDOWNS WITH THE CITY AND CARRY OUT THE WORK AT A TIME AND IN A MANNER ACCEPTABLE TO THEM.
 3. CAREFULLY SCHEDULE ALL DISRUPTION AND/OR SHUT-DOWNS AND ENSURE THAT THE DURATION OF SAME IS KEPT TO THE ABSOLUTE MINIMUM. SUBMIT FOR APPROVAL A WRITTEN, CONCISE SCHEDULE OF EACH DISRUPTION AT LEAST 120 HOURS IN ADVANCE OF PERFORMING WORK AND OBTAIN THE CITY'S WRITTEN CONSENT PRIOR TO IMPLEMENTING.
 4. SHOULD ANY TEMPORARY CONNECTIONS BE REQUIRED TO MAINTAIN SERVICES DURING WORK IN THE EXISTING BUILDING, SUPPLY AND INSTALL ALL NECESSARY MATERIAL AND EQUIPMENT AND PROVIDE ALL LABOUR AT NO EXTRA COST. SHOULD ANY EXISTING SYSTEM BE DAMAGED, MAKE FULL REPAIRS WITHOUT EXTRA COST, AND TO THE SATISFACTION OF THE CITY AND CONTRACT ADMINISTRATOR.
 5. IF EXISTING EQUIPMENT SHOWN ON DRAWINGS IS DEFECTIVE IT SHOULD BE BROUGHT TO THE CONTRACT ADMINISTRATOR AND THE CITY'S ATTENTION PRIOR TO WORK COMPLETION.
 2. INSTALLATION
 1. INSTALL BOXES, CONDUIT AND WIRING THROUGH EXISTING AREAS AS REQUIRED FOR THE NEW INSTALLATION.
 2. ADD MODULES, SWITCHES, ETC. IN EXISTING CONTROL PANELS AND RE-PROGRAM AS REQUIRED, TO EXTEND EXISTING SYSTEMS TO NEW OR RENOVATED AREAS.
 3. PATCH AND REPAIR WALLS AND CEILINGS IN EXISTING AREAS THAT HAVE BEEN DAMAGED OR CUT OPEN DUE TO THE NEW ELECTRICAL INSTALLATION.
 4. WHERE NEW CABLES OR CONDUITS HAVE BEEN INSTALLED THROUGH EXISTING FIRE RATED WALLS, SEAL OPENING AROUND CABLES AND CONDUIT TO MAINTAIN FIRE RATING.
 5. ALL EXISTING EQUIPMENT REUSED SHALL BE MADE GOOD AND GUARANTEED.
 6. POWER INTERRUPTIONS SHALL BE KEPT TO A MINIMUM AND SHALL BE A TIME SUITABLE TO THE BUILDING OCCUPANT(S).
 7. WHERE SERVICES ARE CONCEALED WITHIN WALLS, FLOORS OR CEILING AND CANNOT BE VISUALLY IDENTIFIED, PROVIDE ELECTRONIC SCANNING DEVICES OR OTHER APPROVED MEANS TO LOCATE AND IDENTIFY CONCEALED SERVICES PRIOR TO WORK START. MAKE GOOD ANY DAMAGE TO EXISTING SERVICES AT NO COST TO THE CONTRACT. SCAN FOR AND DO NOT CUT REINFORCING STEEL IN CONCRETE SLABS.

ELECTRICAL MATERIALS AND INSTALLATION

1. WIRING METHOD
 1. FOR GENERAL PURPOSE WIRING: RW90 CONDUCTORS IN EMT CONDUIT. USE AC90 FOR FIXTURE DROPS (MAX 3 METERS LONG) AND IN METAL STUD WALLS.
 2. FOR OUTDOOR WIRING USE TECK TYPE CONDUCTORS.
 3. FOR CONNECTION TO MOTORS AND MISCELLANEOUS MECHANICAL EQUIPMENT USE RAIN TIGHT FLEXIBLE METAL CONDUIT.
 4. RUN ALL CONDUIT AND CABLE CONCEALED, PARALLEL AND PERPENDICULAR TO BUILDING LINES, STAPLED AND/OR CLIPPED IN A NEAT WORKMANLIKE MANNER.
 5. ALL CONDUCTORS SHALL BE COPPER. MINIMUM CONDUCTOR SIZE SHALL BE #12 AWG EXCEPT AS NOTED.
2. GROUNDING AND BONDING
 1. THE ENTIRE INSTALLATION SHALL BE GROUNDED/BONDED IN CONFORMANCE TO THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE.
 2. ALL CONDUIT TO HAVE A SEPARATE INSULATED BONDING CONDUCTOR.
3. BOXES
 1. OUTLET, JUNCTION AND SWITCH BOXES SHALL BE GALVANIZED STEEL AND SIZED ACCORDING TO THE ELECTRICAL CODE AND TO SUIT EACH APPLICATION.
 2. PROVIDE MOULDED BOX VAPOUR BARRIER, FACTORY MOULDED POLYETHYLENE BOX FOR USE WITH RECESSED ELECTRIC BOXES IN EXTERIOR WALLS.
 3. OUTLET BOXES SHOWN ON DRAWINGS AS BEING "BACK-TO-BACK" SHALL HAVE A MINIMUM OFFSET OF 200MM BETWEEN BOXES TO REDUCE SOUND TRANSMISSION.
 4. OUTLET BOX EXTENDERS SHALL NOT BE USED.
 5. OUTLET BOXES WITH MATCHING EXTENSION RING, ADJUSTABLE DEPTH RING AND PLASTER RINGS AS REQUIRED.
 6. WHERE STANDARD SIZE RAISED DEPTH RINGS CAN'T PROVIDE THE REQUIRED CLEARANCE, ADJUSTABLE

DEPTH RINGS SHALL PROVIDED.

4. WIRING DEVICES
 1. PROVIDE WIRING DEVICES FOR ALL OUTLETS AS REQUIRED AND INDICATED. COLOUR AND MOUNTING TO MATCH EXISTING.
 2. STANDARD OF ACCEPTANCE FOR DEVICES SHALL BE AS FOLLOWS:
 1. NEMA 5-15R: 15A 120VAC RECEPTACLES SHALL BE U-GROUND PARALLEL SLOT SIDE.

SPECIFICATION GRADE

1. EATON/COOPER WILU-1X (1 GANG), WILU-2X (2 GANG)
 2. HUBBELL: BR15, DR15, CR15 (15A) AND BR20, DR20, CR20 (20A)
 3. LEVITON: BR15 SERIES (15A) AND BR20 (20A)
 4. PASS & SEYMOUR: 5262 SERIES (15A) AND 5362 SERIES (20A)
3. COVERPLATES FOR DEVICES SHALL BE STAINLESS STEEL.
 4. RECEPTACLES OF CONFIGURATIONS 5-15R, 5-20R, 5-20RA, 6-15K AND 6-20RA WHERE EXPOSED TO WEATHER, SHALL BE PROVIDED WITH COVERPLATES SUITABLE FOR WET LOCATIONS WHETHER OR NOT A PLUS IS INSERTED INTO RECEPTACLE.
 1. APPROVED MANUFACTURERS:
 1. APPLETON WCD1U1 (1 GANG), WCDIU2 (2 GANG)
 2. HUBBELL MM20 (1 GANG), MM2420 (2 GANG)
 3. LEVITON 5980-UCL1 (1 GANG), 5981-UCL2 (2 GANG)
 4. PASS & SEYMOUR WILUC10 (1 GANG), WILUC20 (2 GANG)
 5. WEATHERPROOF COVER FOR SWITCH WITH GASKETS AS INDICATED.
 6. RECEPTACLES THAT ARE TO CHANGE LOCATIONS AT NO EXTRA COST OR CREDIT, PROVIDED DISTANCE DOES NOT EXCEED 3000mm, AND INFORMATION IS GIVEN BEFORE INSTALLATION.

5. POWER DISTRIBUTION SYSTEM
 1. PROVIDE BREAKERS AS INDICATED ON THE DRAWINGS.
 2. ALL NEW BREAKERS SHALL MATCH PANEL VOLTAGE UNLESS INDICATED OTHERWISE.
 3. ALL DEVICES MUST BE FULLY RATED. SERIES RATED DEVICES ARE NOT ACCEPTABLE.
 4. COMPLETE CIRCUIT DIRECTORY WITH TYPEWRITTEN LEGEND SHOWING LOCATION AND LOAD OF EACH CIRCUIT.
 5. ACCEPTABLE MANUFACTURERS: TO MATCH EXISTING.
 6. INTERRUPTING RATING OF NEW BREAKERS IN EXISTING PANELS SHALL MATCH EXISTING.
 7. WIRING IN PANELBOARDS SHALL BE NEAT AND SET AS IF LACED. ALL NEUTRAL CONDUCTORS SHALL BE IDENTIFIED IN THE PANEL WITH THEIR ASSOCIATED CIRCUIT NUMBERS BY MEANS OF BRADY MARKERS.

6. MOUNTING HEIGHTS
 1. MOUNTING HEIGHT OF EQUIPMENT IS FROM FINISHED FLOOR TO CENTRE LINE OF EQUIPMENT UNLESS SPECIFIED OR INDICATED OTHERWISE.
 2. REVIEW ALL OTHER DISCIPLINES DRAWINGS.
 3. IF MOUNTING HEIGHT OF EQUIPMENT IS NOT SPECIFIED OR INDICATED, VERIFY WITH THE CITY BEFORE PROCEEDING WITH INSTALLATION.
 4. INSTALL ELECTRICAL EQUIPMENT ON WALL AT FOLLOWING HEIGHTS UNLESS INDICATED OTHERWISE.
 1. CONFIRM MOUNTING HEIGHTS WITH THE CITY PRIOR TO ROUGH IN.
 2. MANUAL STARTERS: 1200mm.
 3. IN CONFORMANCE WITH ARCHITECTURAL ELEVATIONS.
 4. HEIGHTS AS ABOVE OR AT BOTTOM OF NEAREST BLOCK OR BRICK COURSE EXCEPT WHERE REQUIRED TO COMPLY WITH MANITOBA BUILDING CODE, OTHER APPLICABLE CODES, AUTHORITIES HAVING JURISDICTION, ETC.
 5. HEIGHTS AND ORIENTATION TO MATCH EXISTING WHERE APPLICABLE EXCEPT WHERE REQUIRED TO COMPLY WITH MANITOBA BUILDING CODE, OTHER APPLICABLE CODES, AUTHORITIES HAVING JURISDICTION, ETC.
 6. WHERE MULTIPLE EXISTING DEVICES ARE PRESENT AND ARE INSTALLED AT DIFFERENT HEIGHTS OR ORIENTATIONS, CONFIRM MOUNTING HEIGHT AND ORIENTATION OF NEW DEVICES WITH CONTRACT ADMINISTRATOR PRIOR TO ROUGH-IN.
 7. ALL CONTROLS FOR THE OPERATION OF BUILDING SERVICES OR SAFETY DEVICES INCLUDING ELECTRICAL SWITCHES, DIMMERS, THERMOSTATS, INTERCOM SWITCHES, CARD ACCESS READERS, DOOR SECURITY REQUEST TO EXIT PUSHBUTTONS, FIRE ALARM PULL STATIONS, ETC. THAT ARE INTENDED TO BE OPERATED BY THE OCCUPANT, MUST BE MOUNTED BETWEEN 400mm AND 1200mm ABOVE THE FINISHED FLOOR (TO COMPLY WITH THE MANITOBA BUILDING CODE FOR ACCESSIBILITY TO A PERSON IN A WHEELCHAIR).
 8. NOTIFY CONTRACT ADMINISTRATOR FOR ANY DISCREPANCIES RELATED TO MOUNTING HEIGHTS AND ORIENTATIONS.

7. MECHANICAL EQUIPMENT CONNECTIONS
 1. REFER TO MECHANICAL DRAWINGS FOR THE EXACT LOCATION OF MOTOR CONTROL DEVICES, AND OTHER MECHANICAL EQUIPMENT REQUIRING AN ELECTRICAL CONNECTION.
 2. OBTAIN FULL INFORMATION FROM MECHANICAL/CONTROL CONTRACTOR, REGARDING WIRING, CONTROLS, OVERLOAD HEATERS, EQUIPMENT RATINGS AND OVERCURRENT PROTECTION. NOTIFY THE MECHANICAL/CONTROL CONTRACTOR SUBCONTRACTOR, AT ONCE, IF ANY INFORMATION PROVIDED IS INCORRECT OR UNSATISFACTORY.
 3. CO-ORDINATE CONTROL WIRING REQUIREMENTS WITH MECHANICAL/CONTROL CONTRACTOR AND PROVIDE ALL CONTROL WIRING AND CONNECTIONS AS REQUIRED TO MAKE THE CONTROL SYSTEMS OPERATE AS SPECIFIED.

8. CONDUITS AND CABLE
 1. DRAWINGS DO NOT INDICATE ALL CONDUIT AND CABLE RUNS. THOSE INDICATED ARE IN DIAGRAMMATIC FORM ONLY.
 2. MINIMUM CONDUIT SIZE SHALL BE 3/4" UNLESS INDICATED OTHERWISE.
 3. ALL CONDUITS SHALL HAVE A SEPARATE INSULATED GREEN GROUNDING CONDUCTOR.

9. WIRING IDENTIFICATION
 1. IDENTIFY WIRING WITH PERMANENT INDELIBLE IDENTIFYING MARKINGS ON BOTH ENDS OF PHASE CONDUCTORS OF FEEDERS (COLOURED PLASTIC TAPES) AND BRANCH CIRCUIT WIRING (NUMBERED WIRE MARKERS). CONDUCTOR MARKER IDENTIFYING SHALL CORRESPOND WITH PANEL OR TERMINAL BOARD DIRECTORY INFORMATION.
 2. MAINTAIN PHASE SEQUENCE AND COLOUR CODING THROUGHOUT.
 3. COLOUR CODING TO CSA C22.1.
 4. USE COLOUR CODED WIRES IN COMMUNICATION CABLES, MATCHED THROUGHOUT SYSTEM. COLOUR CODING USED SHALL BE DOCUMENTED BY INDIVIDUAL SYSTEMS IN MAINTENANCE MANUALS.
 5. INSULATED GROUNDING CONDUCTORS SHALL HAVE A GREEN FINISH AND SHALL BE USED ONLY AS A GROUNDING CONDUCTOR.

10. CONDUIT AND CABLE IDENTIFICATION
 1. CONFIRM IDENTIFICATION METHOD WITH THE CITY AND CONTRACT ADMINISTRATOR PRIOR TO START OF WORK.
 2. IDENTIFY CONDUIT AND CABLES AS FOLLOWS:
 1. AT ENTRY TO AND EXIT FROM EQUIPMENT, WITHIN 300mm FROM EQUIPMENT, INCLUDING PULL BOXES AND JUNCTION BOXES.
 2. AT PENETRATIONS THROUGH WALLS, CEILINGS, FLOORS, AT EACH SIDE, WITHIN 300mm FROM PENETRATION.
 3. AT EVERY 10M ALONG RUN.
 4. LABEL INDOOR AND OUTDOOR INSTALLATION.
 5. PROVIDE SELF ADHESIVE VINYL LABELS, UV RESISTANT, WITH THE FOLLOWING WORDING AS APPLICABLE:
 1. FOR NORMAL POWER: "NORMAL POWER, 120/208V", OR WITH AN APPROPRIATE VOLTAGE.
 2. CONTROLS
 3. OTHER SYSTEMS, LABEL AS REQUIRED.
 3. LABEL SIZES PER THE FOLLOWING TABLE:

OUTSIDE CONDUIT/CABLE DIAMETER	MINIMUM LENGTH LABEL	MINIMUM LETTER HEIGHT
INCHES	mm	INCHES
0.75 - 1.25	19 - 32	4
1.5 - 2	38 - 51	4
2.5 - 6	64 - 152	6
 4. PROVIDE LARGER LABEL TO SUIT WORDING AS REQUIRED.
 5. LABEL COLOURS:
 1. BLACK LETTERS ON ORANGE BACKGROUND, WORDING SHALL BE UPPER CASE.
 6. LABELS INSTALLED OUTDOORS SHALL BE RATED FOR OUTDOOR APPLICATIONS.
 7. LABELS SHALL BE MANUFACTURED IN ACCORDANCE TO ANSI Z535.4 PRODUCT SAFETY SIGNS AND LABELS.
 8. APPROVED MANUFACTURERS:
 1. GTS SIGN DESIGN
 2. ACCENT STRIPING AND LETTERING COMPANY
 9. BRANCH CIRCUIT JUNCTION BOX IDENTIFICATION
 10. SHOW CIRCUIT NUMBERS IN BLACK FELT MARKER ON INSIDE OF COVERS.

11. CONDUITS, FASTENINGS AND FITTINGS
 1. ONE HOLE STEEL STRAPS TO SECURE SURFACE CONDUITS 50MM AND SMALLER.
 2. FITTINGS FOR RACEWAYS: TO CSA C22.2 NO. 18
 3. FITTINGS MANUFACTURED FOR USE WITH CONDUIT SPECIFIED COATING SAME AS CONDUIT.
 4. FACTORY "ELLS" WHERE 90° BENDS ARE REQUIRED FOR 25MM AND LARGER CONDUITS.
 5. STEEL SET SCREW CONNECTORS AND COUPLINGS. INSULATED THROAT LINERS ON CONNECTORS.

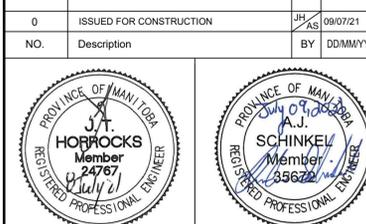
12. DISCONNECT SWITCHES
 1. HEAVY DUTY, FUSIBLE AND NON-FUSIBLE DISCONNECT SWITCH IN METAL ENCLOSURE, CSA RATED, NEMA 3R.
 2. PROVISION FOR PADLOCKING "ON-OFF" SWITCH POSITION BY THREE LOCKS.
 3. MECHANICAL INTERLOCKED DOOR TO PREVENT OPENING WHEN HANDLE IS IN "ON" POSITION.
 4. QUICK-MAKE, QUICK-BREAK ACTION.
 5. "ON-OFF" SWITCH POSITION INDICATION ON SWITCH ENCLOSURE COVER.
 6. DISCONNECT SWITCHES LOCATED AT MOTORS CONNECTED TO VARIABLE FREQUENCY DRIVES ARE TO BE PROVIDED WITH ONE FORM 'C' ELECTRICAL CONTACT TO INTERLOCK FROM THE DISCONNECT TO THE VFD.

13. FULL VOLTAGE MAGNETIC STARTERS
 1. MAGNETIC OF SIZE, TYPE, RATING AND ENCLOSURE TYPE AS INDICATED WITH COMPONENTS AS FOLLOWS:
 1. CONTACTOR SOLENOID OPERATED, RAPID ACTION TYPE.
 2. MOTOR OVERLOAD PROTECTIVE DEVICE IN EACH PHASE, MANUALLY RESET FROM OUTSIDE ENCLOSURE.
 3. POWER AND CONTROL TERMINALS.
 4. WIRING AND SCHEMATIC DIAGRAM INSIDE STARTER ENCLOSURE IN VISIBLE LOCATION.
 5. IDENTIFY EACH WIRE AND TERMINAL FOR EXTERNAL CONNECTIONS, WITHIN STARTER, WITH PERMANENT NUMBER MARKING IDENTICAL TO DIAGRAM.
 6. CONTROL TRANSFORMER.
 2. ACCESSORIES:
 1. PUSHBUTTONS AND SELECTOR SWITCHES: LABELED AS INDICATED.
 2. INDICATE TYPE AND COLOUR AS INDICATED.
 3. SINGLE PHASE, DRY TYPE, CONTROL TRANSFORMER WITH PRIMARY VOLTAGE AS INDICATED AND 120V SECONDARY, COMPLETE WITH SECONDARY FUSE, INSTALLED IN WITH STARTER AS INDICATED.
 4. SIZE CONTROL TRANSFORMER FOR CONTROL CIRCUIT LOAD PLUS 30% SPARE CAPACITY.
 3. ACCEPTABLE MANUFACTURERS: ALLEN BRADLEY CANADA LTD. "SYSTEM 89" SIEMENS ELECTRIC LIMITED SQUARE D.

14. EQUIPMENT IDENTIFICATION
 1. IDENTIFY ELECTRICAL EQUIPMENT WITH NAMEPLATES AND LABELS AS FOLLOWS:
 1. NAMEPLATES: LAMACOID 3MM THICK PLASTIC ENGRAVING SHEET, BLACK FACE WITH WHITE CORE (BLACK WITH WHITE LETTERS FOR NORMAL POWER AND LAMACOID 3MM THICK PLASTIC ENGRAVING SHEET, LETTERING ACCURATELY ALIGNED AND ENGRAVED INTO CORE MECHANICALLY ATTACHED WITH SELF TAPPING SCREWS. LETTERS TO BE MINIMUM 6MM HIGH.
 2. WORKING ON NAMEPLATES AND LABELS TO BE APPROVED BY CONTRACT ADMINISTRATOR PRIOR TO MANUFACTURE.
 3. ALLOW FOR MINIMUM OF TWENTY-FIVE (25) LETTERS PER NAMEPLATE AND LABEL.
 4. NAMEPLATES FOR TERMINAL CABINETS, STARTERS AND CONTACTORS. INDICATE EQUIPMENT BEING CONTROLLED AND VOLTAGE.
 5. TRANSFORMERS: INDICATE CAPACITY, PRIMARY AND SECONDARY VOLTAGES.
 6. ROOM NAMES AND NUMBERS USED SHALL BE ACTUAL ROOM NAMES AND NUMBERS THAT WILL BE USED ON THE PROJECT. COORDINATE AND CONFIRM WITH CONTRACTORS INVOLVED.
 7. COORDINATE NAMES OF EQUIPMENT AND SYSTEMS WITH MECHANICAL SECTION TO ENSURE THAT IDENTICAL NAMES ARE USED.
 8. NAMEPLATES FOR CONTROL DEVICES: INDICATE EQUIPMENT CONTROLLED.
 9. ADJACENT TO EACH BREAKER IN CDP TYPE PANELBOARDS, PROVIDE AND MOUNT LAMACOID NAMEPLATES IDENTIFYING THE RESPECTIVE LOAD AND LOCATION.
 10. TO MATCH EXISTING WHERE APPLICABLE.
 11. ALL RECEPTACLES SHALL HAVE A LAMACOID ON WHICH THE PANEL AND CIRCUIT NUMBER FROM WHICH IT IS FED, IS INDICATED. THE IDENTIFICATION SHALL BE MECHANICALLY SECURED TO THE COVERPLATE ON THE APPROPRIATE OUTLET. PRESSURE INDENTED ADHESIVE STRIP NAMEPLATES ARE NOT ACCEPTABLE AND SHALL NOT BE USED.

MOTOR SCHEDULE

MOTOR No.	NAME	LOCATION	H.P. (KVA)	VOLTS	STARTER & ACC.				CIRCUIT	STARTER LOCATION	FEEDER	TIME DELAY RELAY	FIRE ALARM SHUTDOWN	REMARKS
					MAN	MAG	PL	HOA						
EF-1	EXHAUST FAN	LOWER ROOF	7.5 HP 9FLA	600V 3Ø		✓	✓	✓	MCC-TT	MCC-TT	#312	N/A	N/A	ELECTRICAL CONTRA CTOR TO PROVIDE STARTER IN MCC AND WIRE BETWEEN MCC AND CONTROL PANEL. TERMINATIONS IN CONTROL PANEL BY MECHANICAL.



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Winnipeg Transit

Project Title

**TRANSIT HOIST 10-18
VEHICLE EXHAUST**

WINNIPEG MANITOBA

Drawing Title

**ELECTRICAL SPECIFICATION
AND SCHEDULE**

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Scale AS NOTED	Date JULY 2021	Project No. 21-083-01
Revision Number 0	Drawing Number ME4.1	Sheet Order 4 OF 5



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