

FHWA REGION	STATE	PROJECT	
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LAKE COUNTY
LAK-306-6.15

GENERAL NOTES

9.1.2 MOLDED CASE CIRCUIT BREAKERS OF EITHER WESTINGHOUSE OR ITE MANUFACTURE, SHALL BE FURNISHED FOR COMBINATION STARTERS AND MAIN AND BRANCH CIRCUIT BREAKER UNITS. THEY SHALL BE RATED IN ACCORDANCE WITH THE MOTOR CONTROL CENTER UNIT REQUIREMENTS.

9.1.3 ALLEN-BRADLEY TYPE VISIBLE BLADE FUSIBLE DISCONNECT SWITCHES SHALL BE USED FOR COMBINATION STARTERS, NEMA SIZES 1, 2, 3, AND 4. FOR LARGER STARTERS WITH DISCONNECT AND MAIN OR BRANCH FEEDER UNITS, PROPERLY SIZED CIRCUIT INTERRUPTERS AND REQUIRED FUSE CLIPS SHALL BE PROVIDED.

10.0 MAGNETIC STARTERS

10.1 ALLEN-BRADLEY VERTICAL LIFT MAGNETIC STARTERS WITH DOUBLE BREAK CADMIUM OXIDE SILVER CONTACTS SHALL BE FURNISHED. EACH STARTER SHALL BE PROVIDED WITH THREE OVERLOAD RELAYS. NON-ADJUSTABLE OVERLOAD RELAYS SHALL BE MANUAL RESET - EUTECTIC SOLDER ALLOY TYPE. RELAYS SHALL NOT BE CONVERTIBLE FROM MANUAL TO AUTOMATIC.

11.0 NAMEPLATES

11.1 EACH UNIT SHALL HAVE ITS OWN IDENTIFICATION NAMEPLATE INDICATING EITHER A CATALOG NUMBER DESCRIPTION OR A SERIAL NUMBER DESCRIPTION, WHICH SHALL BE FASTENED TO THE INSERT NEAR THE UPPER RIGHT HAND CORNER.

11.2 EACH VERTICAL SECTION SHALL BE PROVIDED WITH AN IDENTIFICATION NAMEPLATE, INDICATING SERIAL NUMBER, BUS RATINGS AND VERTICAL SECTION REFERENCE NUMBERING. THE NAMEPLATE SHALL BE MOUNTED ON THE VERTICAL WIREWAY DOOR OF EACH SECTION.

11.3 EACH "OPERATOR" SHALL HAVE A LAMICOID NAMEPLATE, BLACK FACED WITH WHITE CORE, WITH MILLED DESCRIPTION OF LOAD SERVED. NAMEPLATES SHALL BE ATTACHED WITH SHEET METAL SCREWS.

12.0 WIRING

12.1 THE CONTROL CENTER SHALL BE WIRED IN ACCORDANCE WITH NEMA CLASS AND TYPE PREVIOUSLY SPECIFIED.

12.1.1 WHEN TYPE B WIRING IS SPECIFIED, TERMINAL BLOCKS SHALL BE MOUNTED WITHIN THE UNITS. PULL APART TERMINAL BLOCKS ARE AVAILABLE FOR BOTH POWER AND CONTROL WIRING. THE POWER PULL APART BLOCKS SHALL BE RATED 70 AMPERES AT 600 VOLTS AND BE APPLICABLE FOR SIZE 1 AND SIZE 2. SIZE 3 IS NON-PULL APART. THE CONTROL PULL APART TERMINAL BLOCK SHALL BE RATED 20 AMPERES AT 600 VOLTS. THE TERMINAL BLOCK SHALL CONSIST OF A MALE AND FEMALE COMPONENT, AND THE TOTAL ASSEMBLY HELD IN POSITION WITH CAPTIVE SCREWS. THE BLOCK ASSEMBLY SHALL BE DESIGNED TO WITHSTAND THE EFFECTS OF VIBRATION, YET ABLE TO BE PULLED APART WITHOUT DIFFICULTY. THE TERMINALS OF THE REMOVABLE PORTION OF THE PULL APART BLOCK SHALL BE RECESSED TO ISOLATE THEM FROM ACCIDENTAL CONTACT ONCE IT IS WITHDRAWN. TERMINAL MARKINGS SHALL BE PROVIDED FOR THE PURPOSE OF IDENTIFYING TERMINATIONS.

12.1.3 WHEN TYPE C WIRING IS SPECIFIED, TRACK MOUNTED NON-PULL APART TERMINALS SHALL BE FURNISHED IN A MASTER TERMINAL COMPARTMENT LOCATED BOTTOM OF EACH SECTION(S).

13.0 FINISH

13.1 ALL PAINTED PARTS SHALL UNDERGO A PHOSPHATIZING PREPAINTING TREATMENT. ALL PAINTING SHALL BE WITH ENAMEL WHICH SHALL BE BAKED FOR A DURABLE HARD FINISH. THE UNIT INSERT SHALL BE PAINTED WHITE FOR EASE OF VISIBILITY

WITHIN. ALL SURFACES OF THE CONTROL CENTER SHALL BE PAINTED ANSI NO. 49 MEDIUM LIGHT GRAY PER ANSI Z55.1, WITH THE EXCEPTION OF THE HORIZONTAL WIRE TROUGH COVER PLATES BOTH TOP AND BOTTOM, THE MOUNTING CHANNELS AND THE LIFTING ANGLE WHICH SHALL BE PAINTED A CONTRASTING ANSI NO. 24 CHARCOAL GRAY.

13.2 ALL UNPAINTED PARTS; UNIT SUPPORT PANS, HORIZONTAL WIREWAY BARRIERS, DOOR HARDWARE, UNIT LATCHES, AND ASSEMBLY HARDWARE, SHALL BE CHROMATE PLATED FOR RESISTANCE TO CORROSION.

14.0 DRAWINGS AND DRAWING SCHEDULES

14.1 CONTROL WIRING, CONTROL DEVICES, AND OTHER MOTOR CONTROL CENTER EQUIPMENT SHALL BE PROVIDED AS SHOWN ON THE DRAWINGS AND SCHEDULES THEREON. CHECK CUSTOM CONTROL PANEL DRAWINGS FOR COMPONENTS SUPPLIED MCC MANUFACTURER AND LOCATED IN THE MCC.

15.0 DOCUMENTATION

15.1 PROVIDE SIX (6) SETS OF SHOP DRAWINGS FOR OWNER'S APPROVAL.

15.2 PROVIDE SIX (6) SETS OF OPERATION, MAINTENANCE, SPARE PARTS, INSTALLATION INSTRUCTIONS, AND "AS BUILT" DRAWINGS FOR OWNER'S HANDBOOK TO OWNER.

16.0 ANCHORING

16.1 THE MOTOR CONTROL CENTER SHALL BE ANCHORED TO THE FLOOR/CURB BY EITHER THE IMBEDDED ANCHOR BOLT TECHNIQUE OR THE GROUTED MOUNTING CHANNEL TECHNIQUE. INSTALLATION SHALL BE IN STRICT COMPLIANCE WITH MANUFACTURERS PRINTED INSTRUCTIONS. ANCHOR BOLTS AND FASTENERS SHALL CONFORM TO THE GENERAL REQUIREMENTS FOR FASTENERS OF THIS SPECIFICATION.

28. CUSTOM PUMP CONTROL PANEL

A. SCOPE. CONTRACTOR SHALL PROVIDE, INSTALL AND TEST THE CUSTOM PUMP CONTROL PANEL DESCRIBED HEREIN. PANEL SHALL BE BUILT AND DOCUMENTED IN STRICT COMPLIANCE WITH JOINT INDUSTRY CONFERENCE (JIC) STANDARD EMP-1-1967 AND LATEST REVISION THERETO AND THE NATIONAL ELECTRIC CODE (NFPA CODE 70, 1978). SPECIFIC INSTRUCTIONS CONTRARY TO JIC STANDARDS IN THESE SPECIFICATIONS SHALL TAKE PRECEDENCE. NATIONAL ELECTRIC CODE RULES SHALL TAKE PRECEDENCE OVER JIC STANDARDS.

B. DRAWINGS AND DOCUMENTATION. SHOP DRAWINGS AND AS BUILT DRAWINGS SHALL BE DRAWN AND ANNOTATED IN ACCORDANCE WITH JIC STD. EMP-1-1967 AND SHALL INCLUDE AT MINIMUM THE FOLLOWING:

1. ENCLOSURE ASSEMBLY DRAWING(S)
2. ELECTRICAL SCHEMATIC DRAWING(S) (DETAILED)
3. COMPONENT MOUNTING PANEL(S) MECHANICAL AND ELECTRICAL COMPONENT LAYOUT (DIMENSIONED)
4. CONTROL DEVICE DOOR AND/OR PANEL LAYOUT (DIMENSIONED)
5. MATERIAL LIST FOR ALL COMPONENTS USED IN PANEL.

DRAWINGS SHALL SHOW BY NOTE OR CODE ALL TERMINAL BLOCKS (BOTH LOCAL AND REMOTE), AND ALL CONTROL DEVICES (BOTH LOCAL AND REMOTE) AND INTERCONNECTING WIRES. INTER-CONNECTING WIRES SHALL BE ASSIGNED CODE NUMBERS FOR FIELD ELECTRICIAN USE.

PREPARE AN "OWNER'S HANDBOOK" INCLUDING ITEMS (1) THROUGH (5) ABOVE, AND IN ADDITION, HANDBOOK SHALL CONTAIN MANUFACTURER'S DATA SHEETS ON ALL PURCHASED COMPONENTS. BIND IN STURDY COVERS WITH THREE BINDING POSTS (BOLT TYPE).

SUBMIT SIX (6) COPIES OF ITEMS (1) THROUGH (5) AS SHOP DRAWINGS FOR OWNER'S APPROVAL.

SUBMIT SIX (6) COPIES OF "OWNER'S HANDBOOK" AS RECORD COPIES. PROVIDE ONE SET OF REPRODUCIBLE DRAWINGS ALONG WITH OWNER'S HANDBOOK.

C. ENCLOSURE SHALL BE FREE STANDING NEMA TYPE 12, FRONT ACCESS, MADE FROM 12 GAUGE STEEL, CONTINUOUSLY WELDED SEAMS WITH NO HOLES OR KNOCKOUTS, EQUIPPED WITH LIFTING EYES, NEOPRENE DOOR GASKETS RETAINED WITH OIL RESISTANT ADHESIVE AND STEEL RETAINING STRIPS, 3 POINT LATCHING MECHANISM, OPERATED BY AN OIL-TIGHT KEY LOCKING HANDLE, ROLLER ENDS ON LATCH RODS, HEAVY-GAUGE CONTINUOUS DOOR HINGES, PRINT POCKET ON DOOR, HORIZONTAL MOUNTING CHANNELS WELDED TO INTERIOR BODY SIDES AT THE TOP, BOTTOM AND CENTER, FULL LENGTH SUB (INTERIOR) PANEL, WITH PANEL MOUNTING HARDWARE. ENCLOSURE SHALL BE UL LISTED, THE ENCLOSURE SHALL BE WHITE ENAMEL INSIDE AND TWO COATS OF ANSI NO. 49 MEDIUM LIGHT GRAY ENAMEL OUTSIDE OVER PHOSPHATIZED SURFACE. PANEL SHALL BE WHITE ENAMEL. PROVIDE ONE CAN OF GRAY TOUCH UP PAINT TO OWNER IN ADDITION TO THAT NEEDED BY CONTRACTOR TO LEAVE INSTALLED CONTROL PANEL FREE OF NICKS AND SCRATCHES.

ENCLOSURE SHALL BE SIZED BY CONTRACTOR TO ENCLOSE ALL REQUIRED EQUIPMENT BUT ENCLOSURE SHALL NOT BE SMALLER THAN 90 INCHES HIGH, 36 INCHES WIDE AND 24 INCHES DEEP.

PANEL SHALL BE BY HOFFMAN ELECTRICAL ENCLOSURES, CATALOG NUMBER A-903624FS WITH PANEL A-90P36F1 OR LARGER IF REQUIRED.

D. CONTROL RELAYS, CONTROL DEVICES. WHEN NOT SPECIFIED OTHERWISE, CONTROL RELAYS AND CONTROL DEVICES SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.

ALL DEVICES SHALL BE MANUFACTURED AND RATED IN CONFORMANCE WITH NEMA STANDARD ICS-1970 AND REVISIONS THERETO. ALL SYMBOLS AND ABBREVIATIONS USED HEREIN SHALL BE INTERPRETED AS DEFINED IN ICS-1970.

1. RELAYS SHALL USE SEALED IN GLASS CONTACT CARTRIDGES RATED NEMA B300, C600, P300 (TRIPLE RATED). CONTACTS SHALL BE TUNGSTEN TIPPED AND HERMETICALLY SEALED IN A CONTROLLED GAS ENVIRONMENT. RELAY SHALL NOT REQUIRE A MOVING ARMATURE. RELAYS SHALL BE UL LISTED FOR USE IN CLASS 1, DIVISION 2, GROUP A, B, C AND D LOCATIONS. CARTRIDGES SHALL BE COLOR CODED AND CLEARLY MARKED NORMALLY OPEN, OR NORMALLY CLOSED. UP TO EIGHT CARTRIDGES (N.O. OR N.C. TOTAL) SHALL MOUNT IN A RELAY BASE. CARTRIDGES SHALL HAVE SELF LIFTING CONTACT PLATES. ELECTRICALLY HELD AND LATCHING CARTRIDGES SHALL NOT BE INTERCHANGEABLE. COIL WINDINGS AND HYBRID RECTIFIER PACKAGES SHALL BE TOTALLY ENCAPSULATED IN A MOLDED ASSEMBLY. COIL CIRCUITS SHALL INCORPORATE AN INTERNAL VARISTOR. BASIC ELECTRICALLY HELD AND LATCHING RELAYS SHALL ENABLE THE ADDITION OF A SOLID STATE TIMING UNIT ACCESSORY. RELAYS SHALL BE ALLEN-BRADLEY BULLETIN 700, TYPE R ELECTRICALLY HELD AND TYPE RM LATCHING. PROVIDE MOUNTING TRACK FOR ALL RELAYS.

2. MOMENTARY PUSH BUTTONS SHALL BE EXTENDED HEAD TYPE WITH SEALED SWITCH CONTACT BLOCKS WHOSE CARTRIDGES ARE AS SPECIFIED IN 1. ABOVE. PROVIDE NAMEPLATE, OPERATOR AND BLOCKS. SWITCHES SHALL BE ALLEN-BRADLEY BULLETIN 800R, NEMA 4.

3. SELECTOR SWITCHES SHALL BE MAINTAINED TYPE IN ALL POSITIONS WITH SEALED SWITCH CONTACT BLOCKS WHOSE CARTRIDGES ARE AS SPECIFIED IN 1. ABOVE. PROVIDE NAMEPLATE, OPERATOR AND BLOCKS. SWITCHES SHALL BE ALLEN-BRADLEY BULLETIN 800R, NEMA 4, STANDARD KNOB.

4. PILOT LIGHTS SHALL BE TRANSFORMER TYPE, PUSH TO TEST, 120 VAC, NEMA TYPE 13, WITH NAMEPLATE, COLOR CODE LENS (CAP) IN ACCORDANCE WITH DRAWINGS, COMPLETE WITH BULBS. ALLEN-BRADLEY CAT. NO. SERIES 800T-PT16. PROVIDE TWENTY (20) SPARE BULBS IN CARTONS WITH PANEL TO OWNER. ALL BULBS SHALL BE #755 WITH RATED LIFE OF 50,000 HOURS.

E. TERMINAL STRIPS SHALL BE CHANNEL MOUNTED, INSULATED FOR 300V OR 600V AS REQUIRED TO OBTAIN SELECTION OF COMPONENTS DESIRED OR FOR OPERATING VOLTAGE. SECONDARY FUSING OF CONTROL CIRCUITS MAY BE ACCOMPLISHED BY TRACK MOUNTED FUSE CLIPS. PROVIDE END ANCHORS AND END INSULATORS AS REQUIRED. USE FACTORY PREFORMED JUMPERS WHERE FEASIBLE. STRICTLY OBSERVE MANUFACTURERS WIRE RANGE AND NUMBER OF WIRES PER TERMINAL RATING. PROVIDE STRIP TYPE TERMINAL IDENTIFICATION. EQUIP FUSES WITH FUSE PULLERS. BLOCKS SHALL BE TUBULAR SCREW TYPE WITH PRESSURE PAD. ALLEN-BRADLEY BULLETIN 1492, PROVIDE SPARES PER JIC SPEC.

NOTE: MOTOR POWER WIRING TERMINATIONS SPECIFIED ELSEWHERE. THIS SECTION APPLICABLE TO 120 VAC CONTROL WIRING ONLY.