

**ELECTRICAL SPECIFICATION**

**PART 1 ELECTRICAL GENERAL CONDITIONS**

- 1.1 GENERAL**
- A. The specification covering the General Conditions of the Contract, General Specifications, Instructions to Bidders and all associated sections form an integral part of this specification and shall be read in conjunction herewith.
- 1.2 SCOPE**
- A. Provide all materials, labour, plant and equipment required for a complete and working installation as herein specified and as shown on the drawings.
- B. The electrical installation shall be in accordance with the current edition of the Canadian Electrical Code, Provincial and Municipal codes and regulations.
- C. Obtain all permits, approvals and pay all related fees required for this installation.
- D. All equipment supplied under this Contract shall be new and be C.S.A. approved.
- E. Coordinate all telephone conduit runs with MTS before installation begins.
- F. Arrange for, and coordinate, rough-in and final inspections with City of Winnipeg, Consultant and Building Engineer.
- 1.3 EXAMINATION**
- A. Examine the architectural, interior design, structural and mechanical drawings to ensure that the work under this Contract can be satisfactorily carried out. Report any discrepancies to the Consultant prior to submission of tender.
- B. Examine the site, local conditions and all existing apparatus if any to be re-used and verify that the condition of this equipment is suitable for its intended use in the new construction.
- 1.4 SUPERVISION**
- A. Supervise the work at all times through responsible and competent supervisor.
- B. Full cooperation shall be shown with other trades to facilitate installations and to avoid delays in carrying out the work.
- 1.5 ACCURACY OF DATA**
- A. Drawings are schematic; exact locations, distances, levels and other dimensions shall be governed by the building as constructed.
- B. Outlets or equipment shall be moved to any point within a 10' radius when relocation is requested by the Consultant before the work has been substantially completed, without additional cost.
- C. Branch circuit wiring shall be installed with circuits arranged exactly as shown on the drawings. Conduit and cable runs may be modified to suit the installation.
- 1.6 APPROVAL OF MATERIAL**
- A. Request for approval of material as equals or alternates to that specified shall be submitted to the Consultant with a stamped self-addressed envelope and performance specifications (three (3) working days prior to the tender submission). Samples shall be provided on request.
- 1.7 SHOP DRAWINGS**
- A. Submit shop drawings of electrical equipment to the Architect or Interior Designer for review. Fabrication of equipment shall not commence until shop drawings of such equipment have been reviewed by the Consultant. Two sets shall be submitted with local Inspection Department approval where required.
- 1.8 "AS-BUILT" DRAWINGS**
- A. Keep a record set of drawings on the site at all times recording any changes that may occur. Submit these drawings to the Consultant upon completion of the work. As-builts shall include reworking of new and existing equipment to remain. Transfer changes to electronic disc AutoCAD file. Submit disc and hard copy for final review and submission to Owners.
- B. Submit a Certificate of Inspection from the local Inspection Authority upon completion of work and include with as-builts.
- C. The Consultant reserves the right to recommend that a portion of the Contract funds be withheld pending submission of acceptable As-built drawings.
- 1.9 TEST**
- A. The electrical installation shall be completely tested demonstrating that the equipment and systems installed perform in the manner intended.
- 1.10 GUARANTEE**
- A. The satisfactory operation of all work shall be guaranteed for a period of 12 calendar months after final acceptance of the building.
- 1.11 REQUEST FOR CHANGE**
- A. All quotations in response to request for change shall be submitted complete with an itemized cost breakdown of all materials and labour required in the change.
- 1.12 GROUNDING**
- A. The entire installation shall be grounded in accordance with the Canadian Electrical Code.
- B. Isolated ground conductors for panels shall be minimum #6 (green insulation) and be in one continuous, separate run, to the building water main (unless noted otherwise). Where required, panels shall be equipped with a separate isolated ground bus connected to the aforementioned ground conductor.

- 1.13 WORKMANSHIP**
- A. Install equipment, conduit and cables in a workmanlike manner to present a neat appearance to the satisfaction of the Consultant. Install conduit and cable runs parallel and perpendicular to chases, behind framing or above ceilings. In areas where systems are to be exposed (chemical rooms only), install neatly and group to present a tidy appearance.
- B. Install equipment and apparatus requiring maintenance, adjustment or eventual replacement with adequate clearances and accessibility for same.
- C. Include, in the work, all requirements shown on the shop drawings or manufacturer's installation instructions.
- D. Replace work unsatisfactory to the Consultant without extra cost.
- E. All conduit shall be clipped to structural concrete by means of anchors or supported by Unistrut hangers as close to U.S. as possible. Tie wraps and tie wire for wire and conduit support and fastening is not acceptable. Perfected strapping is also unacceptable.
- F. All supports for all luminaires, outlet boxes, junction boxes, etc. in a non-combustible building shall be of non-combustible material.
- 1.14 WORK IN EXISTING BUILDING**
- A. The building shall remain open and in normal operation during the construction period of this Contract.
- B. Where existing services such as electrical power, fire alarm system, television system, are required to be dropped and or shut-down, coordinate the shut-down with the Owner and carry out the work as a time and a manner acceptable to them. Carefully schedule all disruptions and or shut-downs and ensure that the duration of same is kept to a minimum. Submit for approval, a written schedule of each disruption at least 72 hours in advance of performing work and obtain Owner's written consent prior to implementing.
- C. Should any connections be required to maintain services during work in the existing building, supply and install all necessary material and equipment and labour at no extra cost. Should any existing system be damaged, make full repairs without extra cost, and to the satisfaction of the Owner.
- D. The drawings indicate major items of equipment to be deleted or relocated but may not indicate every item of equipment or conduit to be deleted or relocated. Be responsible for determining which existing equipment is to be deleted or relocated by examining the site and Construction Documents.
- E. Where existing devices (receptacles, switches) mounted on a wall which will be covered with a new finish, provide an extension ring, coverplate, etc. as required to mount the device to the new wall.
- F. Existing junction boxes shall remain accessible.
- G. Refer to General Conditions for phasing and staging of work and adhere to that program. Comply with instructions regarding working hours necessary to maintain the building in operation.
- H. It shall be the responsibility of the Electrical Contractor to ensure that any cutting of holes through the deck will not penetrate existing conduits, cables or mechanical equipment to be under the floor slab. He shall be responsible to take any and all actions as deemed necessary by the Building Engineer to correct any such penetrations at his cost. No cutting shall be undertaken unless permission is given by the Building Engineer.

**PART 2 MATERIALS AND INSTALLATION**

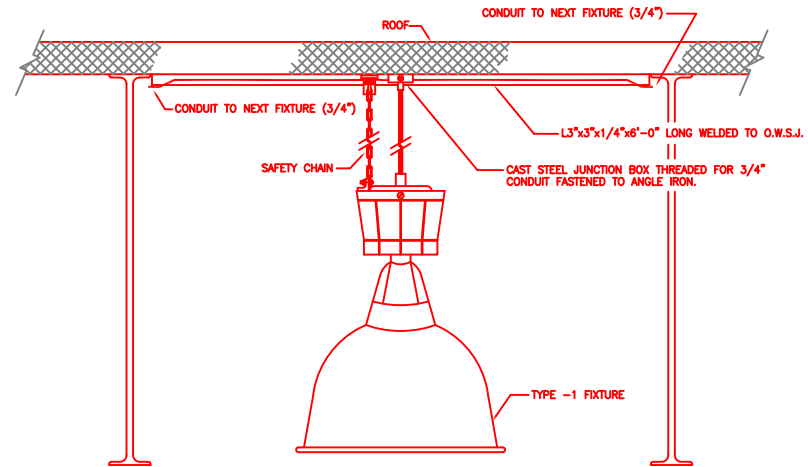
- 2.1 OUTLET BOXES**
- A. Outlet, junction and switch boxes shall be galvanized pressed steel of size and type to suit each individual application. Outlet boxes shall be located anywhere on the outside curtain wall. Outlet boxes shall be mounted on the nearest dividing wall 2' from outside wall, or nearest framed out column.
- 2.2 WIRING METHODS**
- A. Unless otherwise shown on the drawings, all wire shall be copper, minimum #12 AWG with 90 degree Celsius x-hk insulation. Wiring to be installed in conduit.
- B. Wiring in concrete or masonry construction shall be installed in steel electrical metallic tubing (EMT). Provide a separate grounding conductor in EMT conduit runs embedded in concrete slabs. Conduits installed in areas exposed to moisture shall have watertight fittings.
- C. All wiring in finished areas shall be concealed. Conduits shall be run at right angles to the building lines.
- D. Conduit and wiring shall be grouped where possible and clipped in a neat and workmanlike manner.
- E. AC-90 cable shall be used for drops from conduit systems to recessed lighting fixtures in accessible ceilings or outlet boxes in steel decks only. Home runs shall be in conduit. Maximum run of AC-90 in accessible ceiling space shall be 5'-0".
- F. Existing AC-90 runs to have building panels shall be removed and replaced with conduit and wire within the Contract. All unused communication and power wiring in ceiling space shall also be removed.
- G. Each circuit for computer equipment shall have a separate neutral conductor.
- H. Conduit runs shall be installed and inspected before AC-90 runs are installed to ensure conformance with Item E. herein.
- 2.3 IDENTIFICATION OF EQUIPMENT**
- A. All equipment, including receptacles, shall be identified with engraved lamacoid nameplates either screwed or riveted in place, or DYN AMO 6000 identification strip.
- 2.4 MECHANICAL EQUIPMENT WIRING**
- A. Provide starters and wiring for all heating, ventilating and plumbing equipment unless specified otherwise.
- B. Power and control wiring for the mechanical equipment shall be performed by the Electrical Contractor. Obtain a wiring diagram from the Mechanical Subcontractor.
- C. Refer to the mechanical drawings for the exact location of mechanical equipment requiring an electrical connection.
- 2.5 LUMINAIRES**
- A. Supply and install all luminaires complete with lamps.
- B. Install luminaires supplied by the Owner, as indicated.
- C. Re-hoop all fixtures to be recessed.
- D. Any unused fixtures above the ceiling shall be removed and circuits terminated. Turn fixtures over to building Owner.

**MOTOR SCHEDULE**

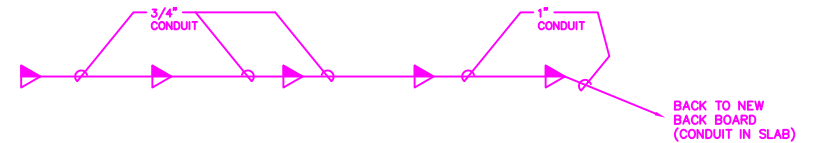
NO.	DESCRIPTION	LOCATION	KW/HP	VOLTS	PACK UNIT	STARTER				CONDUCTOR	COND. SIZE	BRKR	CIRCUIT	F/A SHUT DOWN	CONTR. BY DIV.	NOTES
						TYPE	FUNK.	FL.	PH.							
AH-1	AIR HANDLING UNIT	MEZZ.	15HP	600/3		MAG	FVNR	.	.	3#10 RW90	3/4"	40A/3P	MAIN DIST.	.	15	
AH-2	AIR HANDLING UNIT	MEZZ.	10HP	600/3		MAG	FVNR	.	.	3#12 RW90	3/4"	30A/3P	MAIN DIST.	.	15	1
CU-1	CONDENSING UNIT	EXIST.G. ROOF	37.6FLA	600/3	.					3#6 RW90	1"	30A/3P	MAIN DIST.		15	
CU-2	CONDENSING UNIT	EXIST.G. ROOF	20.6FLA	600/3	.					3#10 RW90	3/4"	30A/3P	MAIN DIST.		15	1
F-1	CLG. FAN	HALL	FRAC	120/1						2#12 RW90	3/8"	15A/1P	HF-41		15	2
F-2	CLG. FAN	HALL	FRAC	120/1						2#12 RW90	3/8"	15A/1P	HF-41		15	2
F-3	CLG. FAN	HALL	FRAC	120/1						2#12 RW90	3/8"	15A/1P	HF-41		15	2

- NOTES:**
- SEPARATE PRICE
  - WIRE & CONNECT CONTROLS SUPPLIED BY DIV. 15.

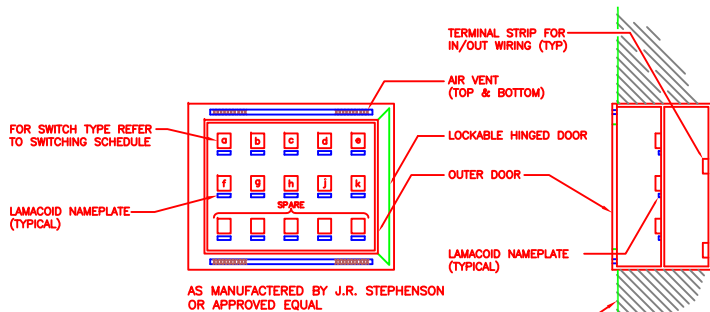
- 2.6 PANELBOARDS**
- A. New panelboards shall match the existing. Load centers are not acceptable. Panels shall be complete with panel from having concealed lugs and run remaining wires, locking door with flush catch. Provide two keys for each panel.
- B. Circuit breakers shall be built on moulded case with thermal breakers rated at 10,000A symmetrical.
- C. Affix typewritten directory to the inside of the panelboard indicating loads controlled by each circuit.
- D. Panelboards shall be surface or recessed mounted as indicated.
- E. Revise the directory in existing panels to suit revised circuiting (typewritten). Place existing directory behind new directory for verification by Consultant.
- 2.7 CUTTING AND PATCHING**
- A. Arrange one pay for all cutting and patching as required for the electrical installation.
- 2.8 DISTRIBUTION**
- A. General arrangement and size of components shall be as shown on the drawings.
- 2.9 DEVICES**
- A. Colors of receptacles, switches, outlets and coverplates shall be confirmed with Architect, Interior Designer or Consultant.
- B. Switches shall be Pass & Seymour 15AC) or 20AC) series, 15 Amps or 20 Amps, 125 VAC or indicated. Mount on inches 48" A.F.F. unless otherwise noted.
- C. Receptacles shall be Pass & Seymour 15MC) 15 Amps, 125 VAC. Isolated ground receptacles to be Pass & Seymour 16G20), orange face. Mount receptacles 18" A.F.F. unless otherwise noted.
- D. Incandescent lighting dimmer controls shall be Lutron Nova 1" rated at 1500, 1000 or 600 Watts as indicated on drawing. Color of dimmer switches cover to be as selected by Architect, Interior Designer, or as indicated on the drawing. Mount dimmers 48" A.F.F. unless otherwise noted.
- E. Provide stainless steel coverplates for recessed devices.
- 2.10 EMERGENCY LIGHTING**
- A. Emergency battery banks shall be 12 volt sealed lead acid long life, complete with all necessary mounting hardware. Minimum capacity for 45 minutes.
- B. Emergency lighting shall be 9 watt reflectorized halogen lamp mounted in polycarbonate square fixture. Fixture to be similar to Energy-lite E1-20 or E1-20D series.
- C. Emergency lighting shall be as per code and be connected to lighting circuits in area.
- D. Wiring shall be minimum #12 in EMT unless noted otherwise.
- 2.11 EXIT LIGHTING**
- A. Provide exit lighting to conform to code requirements.
- B. Exit lights shall be equal to Energy-lite Model Number LE-EX30 series.
- C. Exit lighting shall be wired minimum #12 AWG conductors in an independent conduit system unless noted otherwise.
- 2.12 OWNER SUPPLIED EQUIPMENT**
- A. Wire and connect all Owner supplied equipment as shown on the drawings. Verify nomenclature ratings with power provisions. Any discrepancies shall be reported to the Consultant.
- B. All owner supplied equipment, with the exception of plug-in types, shall be hard-wired at locations shown on the drawings.
- 2.13 TELEPHONE CONDUIT**
- A. Telephone conduit shall be completely independent from other conduit. Installation shall be made in strict accordance with the local telephone system regulations with regard to pullboxes, bends. Minimum conduit size to be 1.5".
- B. Empty conduit shall be provided with a nylon pull cord.
- C. Conduits shall be provided from each telephone outlet to accessible ceiling space.
- D. Where outlets are shown pedestal mounted, one 1/2" from each pedestal shall be run to the ceiling edge of the floor containing the pedestal.
- 2.14 FIRE ALARM SYSTEM**
- A. The Electrical Subcontractor shall install new devices or relocate existing as indicated on the drawings. All audible, alarm or supervisory zones which have been shown or added to shall be recorded by an agent acceptable to the Consultant. The cost of this verification shall be included in the Contract price.
- B. The Verification Report shall accompany the as-built drawings.
- C. All new fire alarm devices shall match existing.
- D. Where fire alarm devices are deleted, provide red coverplate and ensure continued accessibility. Patch coverplates of all fire alarm junction boxes, fire over-run.
- E. All new and/or relocated fire alarm devices shall be listed and locations shown on a separate drawing to be issued to building Owner.



**1 LUMINAIRE MOUNTING DETAIL**  
E-3 SCALE: NTS

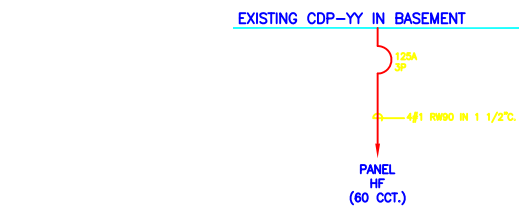


**3 TYPICAL COMMUNICATIONS EMPTY CONDUIT SIZING**  
E-3 SCALE: NTS



SWITCH	SWITCH	CIRCUIT
a	20A/2P	HF-1,2
b	20A/2P	HF-3,4
c	20A/2P	HF-5,6
d	20A/2P	HF-7,8
e	20A/2P	HF-9,10
f	20A/2P	HF-11,12
g	20A/2P	HF-13
h	15A/1P	HF-17
j	20A/1P	HF-23
k	20A/1P	HF-15

**2 SWITCHING CONTROL PANEL DETAIL**  
E-3 SCALE: NTS



**4 SINGEL LINE DISTRIBUTION SCHEMATIC**  
E-3 SCALE: NTS

PANEL HE				(120/208V/3Ø/4W/225A MAINS)					
L.TG.	920	1	34	REC.			4R		
L.TG.	920	2	35	REC.			4R		
L.TG.	920	3	36	REC.			4R		
L.TG.	920	4	37	SPARE					
L.TG.	920	5	38	REC.			3R		
L.TG.	920	6	39	REC.			2R		
L.TG.	920	7	40	EXIT LTG.					
L.TG.	920	8	41	CLG. FANS F-1,2,3			1200		
L.TG.	920	9	42	WHEEL CHAIR LIFT					
L.TG.	920	10	43	HANDICAP DOORS					
L.TG.	920	11	44						
L.TG.	920	12	45						
L.TG.	920	13	46						
L.TG.	920	14	47						
L.TG.	675	15	48						
SPARE		16	49						
L.TG.	720	17	50						
L.TG.	640	18	51						
L.TG.	900	19	52	NORTH VEST F.F. HEAT					
EXTERIOR LTG.	1000	20	53	2P30					
EXTERIOR LTG.	1000	21	54	SOUTH VEST F.F. HEAT					
EXTERIOR LTG.	1000	22	55	2P30					
L.TG.	1400	23	56						
SPARE		24	57						
SPARE		25	58	ELECTRIC IN FLOOR HEAT			6kW		
SPARE		26	59	2P40					
SPACE		27	60						
SPACE		28	61						
		29	62						
		30	63						
REC.	4R	31	64						
REC.	4R	32	65						
REC.	4R	33	66						
HTG.	6.0KW	LTG.	21.2KW	MTR.	1.2KW	MISC.	7.4KW	TOTAL	35.8KW

"AS-CONSTRUCTED" JULY 7, 1999

Revisions	By	Date
Seal		

**Ralph W. Schilling**  
ARCHITECT

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Project Title  
**AQUATIC HALL OF FAME AND MUSEUM OF CANADA INC.**  
Pan-Am Pool West Podium  
Winnipeg, Manitoba

Drawing Title  
**ELECTRICAL SPECIFICATIONS/PANELBOARD**

Scale: N.T.S. Date: JAN. 20/99 Drawn By: JR

Drawing No. AE-3 File No. 98129