

# SPECIFICATIONS FOR MANUAL TRANSFER SWITCH

## PART 1 – GENERAL REQUIREMENTS

### 1.01 **Scope:**

- A. Contractor shall furnish, deliver, install and test the manual transfer switches as specified herein and in accordance with the drawings.

### 1.02 **Quality Assurance:**

- A. Manual transfer switch shall be UL listed and labeled under the UL 1008 standard.
- B. Manual transfer switch shall be special seismic certified by OSHPD exclusively on the basis of approved shake table testing, and also certified to IBC 2015. Minimum IBC 2015 design parameters shall be as follows:  $I_p = 1.5$ ,  $S_{DS} = 2.0g$ ,  $z/h = 1.0$
- C. Manual transfer switch manufacturer shall provide a complete factory assembled, wired and tested manual transfer switch.
- D. Manual transfer switch manufacturer shall submit UL 1008 certification of authenticity.
- E. Manual transfer switch shall be factory Hi-pot tested for a period of not less than 60 seconds.
- F. Manual transfer switch installation shall meet all applicable NEC standards.

### 1.03 **Submittals:**

- A. Contractor shall submit manufacturer's drawings and data of manual transfer switches for Engineer's approval prior to start of fabrication. Drawings and data shall include, as a minimum, dimensioned general arrangement drawings and wiring diagrams, UL listing information including UL control or file number, OSHPD "OSP" certification number, short circuit rating or withstand rating, component data, mounting provisions, conduit entry locations and installation instructions.
- B. Upon installation of manual transfer switches Contractor shall submit manufacturer's Operating & Maintenance Manual which shall include as a minimum:
  - 1. Certified as-built General Arrangement drawings and Wiring Diagram.
  - 2. Materials / Component List including part numbers.
  - 3. Maintenance and service requirements.
  - 4. Certificate of Compliance and hi-pot test data.

### 1.04 **Warranty:**

- A. Manual transfer switches shall be covered by manufacturer's warranty for a minimum period of (1) one year after shipment from manufacturer.

## SECTION 2 - PRODUCTS

### 2.01 **General:**

- A. All equipment shall be new.
- B. Manual transfer switch manufacturer must have produced and sold UL 1008 Listed manual transfer switches as a standard product for a minimum of (3) years.
- C. Manual transfer switches shall be molded case circuit breaker type; knife switch or fused switches are not acceptable.
- D. Contractor shall be responsible for the equipment until it has been installed and is finally inspected, tested and accepted in accordance with the requirements of this Specification.
- E. Manual transfer switches shall be StormSwitch as manufactured by ESL Power Systems, Inc. or equal as approved by the Engineer.

### 2.02 **Manual Transfer Switches:**

- A. Manual transfer switch shall consist of (2) two mechanically-interlocked molded case circuit breakers; kirk-locks are not acceptable, cam-style male connectors, power distribution block and grounding terminals, all housed within a padlockable enclosure.
- B. Manual transfer switch enclosure shall be Type 3R, constructed of continuous seam-welded, powder coated galvanneal steel. The main access shall be through an interlocked, hinged door that extends the full height of the enclosure. Access for portable generator cables with female cam-style plugs shall be via a) drawn flange cable entry openings in the bottom of enclosure for wall mount units, or b) hinged lower door for pad mount units. A hinged flap door shall be provided to cover the cable openings when cables are not connected; the hinged flap door shall allow cable entry only after the main access door has been opened. Enclosure shall be powder coated after fabrication; color shall be wrinkle gray RAL 7035.
- C. Number of male input cams shall not exceed the number as shown on the drawings and must be rated for the specified amperage.
- D. Cam-style male connectors (inlets) shall be UL Listed single-pole separable type and rated 400 amps at 600VAC. Cam-style male connectors shall be color coded. Cam-

style male connectors shall be provided for each phase and for ground, and shall also be provided for neutral if required. Each of the phase cam-style male connectors within the enclosure shall be factory-wired to a molded case circuit breaker. The ground cam-style male connectors shall be bonded to the enclosure, and a ground lug shall be provided for connection of the facility ground conductor. The neutral cam-style male connectors, if required, shall be factory wired to a power distribution block. None of the cam-style male connectors shall be accessible unless both molded case circuit breakers are in the "OFF" position and the main access door is open.

- E. A power distribution block shall be provided for load-side field wiring. The power distribution block shall be factory wired to the molded case circuit breakers.
- F. Molded case circuit breakers shall be UL Listed and the short circuit interrupt rating shall be a minimum of 35kAIC at 480VAC. Trip rating of the molded case circuit breakers shall be as shown on the drawings. One molded case circuit breaker shall be fed from utility power; the other molded case circuit breaker shall be fed from the cam-style male connectors to supply power from a portable generator. Both molded case circuit breakers shall include UL Listed door-mounted operating mechanisms (with provisions for a locking device), preventing the opening of the main access door unless both breakers are in the "OFF" position. Both molded case circuit breakers shall be mounted behind a deadfront panel. The load-side of the molded case circuit breakers shall not be energizable unless the main access door is closed and one of the molded case circuit breakers is in the "ON" position. The (2) molded case circuit breakers shall be safety interlocked by mechanical means to ensure that only one breaker can be closed at any given time.
- G. Manual transfer switch shall be suitable for use as service equipment in the USA as defined by the NEC.
- H. Manual transfer switch shall include permanently affixed operation instructions.

## SECTION 3 - EXECUTION

### 3.01 Installation:

- A. Prior to installation of manual transfer switches, Contractor shall examine the areas and conditions under which the manual transfer switch is to be installed and notify the Engineer in writing if unsatisfactory conditions exist.
- B. Manual transfer switch shall be installed as shown on the drawings and per the manufacturer's written instructions. In addition, the installation shall meet the requirements of local codes, the National Electrical Code and National Electrical Contractors Association's "Standard of Installation".

- C. Conduit entry into the manual transfer switch shall be by Contractor; Contractor shall furnish and install UL listed watertight conduit hubs, as manufactured by MYERS, T&B or other for each conduit entry on the manual transfer switch. The incoming hub size shall match the conduit size for feeders and ground as shown on the drawings. The outgoing hub size shall match the conduit size for loads and ground as shown on the drawings.
- D. Any conduit penetrations that are above live parts must be properly sealed to prevent moisture intrusion from the conduit. A UL Listed or Classified expanding foam sealant (such as Rainbow Quick Seal 79547), or other sealing product meeting local codes and NEC requirements should be used to seal the interior of the conduit around the cables. The product selected must be able to permanently seal around all wires and the conduit (common "Duct Seal" is not acceptable for this application). The sealing shall be done at the entry into the enclosure so the seal can be verified and inspected from inside the enclosure. Failure to seal may allow water to drip on live parts and will void warranty. Hubs shall be properly installed and tightened to maintain Type 3R integrity of the manual transfer switch enclosure.
- E. Contractor shall terminate feeder conductors, load conductors and ground per the manufacturer's instructions. All field wiring terminations shall be torqued as required per the instructions on the manual transfer switch's power distribution block, circuit breaker & ground lug.

### 3.02 **Field Testing:**

- A. Prior to energizing manual transfer switch, the Contractor shall perform the following checks and tests as a minimum:
  - 1. Verify mounting and connections are complete and secure.
  - 2. Verify internal components and wiring are secure.
  - 3. Perform continuity check of all circuits.
  - 4. Perform 1,000 VDC megger test on feeder, load and ground cables.
  - 5. Verify deadfront is secure.
  - 6. With the manual transfer switch deadfront in place and the main access door closed and properly latched, actuate both Operator Mechanisms; verify only (1) breaker at a time can be turned to the "ON" position.
  - 7. Confirm operation of the manual transfer switch ground receptacle by attaching a plug to the manual transfer switch ground receptacle and then verify that the plug is grounded to the facility ground.
  - 8. Once utility power has been applied, confirm operation of manual transfer switch by following directions on main access door.

End of Section