

SPECIFICATION FOR DUPLEX SWITCHBOARDS

1.0 SCOPE

This specification presents general guidelines, design criteria, and construction requirements for AVAIL ENCLOSURE SYSTEMS DUPLEX PANELS for providing control and protection of transmission lines, power transformers, and/or other electric equipment.

2.0 APPLICABLE STANDARDS

The design, material, manufacturing, testing, and performance of the AVAIL ENCLOSURE SYSTEMS DUPLEX PANEL shall meet the requirements of the applicable sections of the latest revisions of the standards listed below:

IEEE - Institute of Electrical and Electronic Engineers

NEMA - National Electrical Manufacturers Association

ANSI - American National Standards Institute

AISC - American Institute of Steel Construction

AISI - American Iron and Steel Institute

ICEA - Insulated Cable Engineers Association

ASTM - American Society for Testing and Materials

SSPC - Steel Structures Painting Council

AWS D1.1 - American Welding Society

3.0 GENERAL GUIDELINES

3.1 Design and construction techniques shall follow industry standards to support the manufacturing of the components and of the complete assembly of the switchboards. Tooling used for fabrication shall be designed for such use and maintained to guarantee performance.

3.2 The manufacturing, assembly, and testing of the AVAIL ENCLOSURE SYSTEMS DUPLEX PANEL shall be governed by a written Quality Control Manual outlining the procedures used to guarantee performance. When required, stage checks shall be administered throughout the design and manufacturing steps to verify compliance with the quality standards detailed in the manual. Copies of certificates of conformance shall be made available to the customer when required.

4.0 GENERAL DESCRIPTION

4.1 The AVAIL ENCLOSURE SYSTEMS DUPLEX PANEL shall be of the highest quality and all material shall be new, unused and free from defects affecting performance, serviceability, and appearance.

4.2 The AVAIL ENCLOSURE SYSTEMS DUPLEX PANEL is a factory manufactured metal assembly that is specifically designed to house low voltage electrical equipment. The following equipment may be included in a AVAIL ENCLOSURE SYSTEMS DUPLEX PANEL:

- Electro-mechanical relays
- Solid-state relays
- Transfer switches
- Test switches
- Control switches
- Analog meters
- Digital meters
- Transducers
- Programmable Logic Controllers
- Annunciation instruments
- Recording instruments
- Circuit breakers
- Indication lights
- Fuse blocks
- Terminal blocks
- Miscellaneous auxiliary equipment, ie. CT, PT, Auxiliary Relays, etc.

4.3 The completed AVAIL ENCLOSURE SYSTEMS DUPLEX PANEL shall be polyvinyl wrapped and crated for shipment to the job site or other designated locations. The crating shall be designed to protect the equipment during transportation and provide ease of installation site.

4.4 The AVAIL ENCLOSURE SYSTEMS DUPLEX PANEL shall be guaranteed against defects in material and workmanship for a period of twelve months from date of shipment.

5.0 DESIGN, CONSTRUCTION AND MATERIALS

5.1 GENERAL

5.1.1 The AVAIL ENCLOSURE SYSTEMS DUPLEX PANEL shall consist of an arrangement of 90 inch high back-to-back vertical panels positioned to form an internal isle way. Electrical devices shall be installed on the front panels with terminal blocks located on each side. Each panel shall be factory machined, welded, and assembled to conform to the engineered detail drawings.

5.1.2 The Duplex assembly shall have formed steel removable end trims with hinged full height door for access at either end. Three point catches and lockable handles shall be provided on all doors.

5.1.3. When the control cable entrance is from the bottom, a solid top cover shall be furnished.

5.1.4 When the control cable entrance is from the top, special top entry wire troughs shall be provided through the solid top cover.

5.1.5 The AVAIL ENCLOSURE SYSTEMS DUPLEX PANEL shall be a minimum of 60 inches wide and a maximum of 96 inches from front to rear.

5.1.6 The AVAIL ENCLOSURE SYSTEMS DUPLEX PANEL shall be designed for a non-corrosive indoor environment. Unless otherwise specified, the panels shall be of metal construction, and finished with a highly durable, wearable paint.

5.1.7 Engineering drawings shall be designed using the latest revision of AUTOCAD. Drawings for approval shall include front, plan, and section views of the panel(s). Each panel shall have a detailed Bill of Material and List of Nameplates. Wiring diagrams shall be provided with each panel when required.

5.1.8 The AVAIL ENCLOSURE SYSTEMS DUPLEX PANEL shall be designed for future expansion.

5.2 FRONT PANEL

5.2.1 All front panels shall be constructed from a minimum of 11 gauge pickled and oiled hot rolled steel, with three (3) inch flanges bent on 1/4 inch radius. The panel front shall be solid.

5.2.2 The front panel width shall range from a minimum of 28 inches to a maximum of 40 inches. The standard panel height shall be 90 inches from the base channel.

5.2.3 Flat surfaces on the face of the AVAIL ENCLOSURE SYSTEMS DUPLEX PANEL shall not deviate more than 1/16 inch from a true horizontal and vertical plane.

5.2.4 If equipment mounting cutouts weaken the front panel, stiffeners shall be used to reinforce the panel. Stiffeners shall be 1/4 X 1 cold rolled bar steel welded to the back of the panel(s).

5.2.5 All welds and burrs which may interfere with the workability, operation, and/or serviceability of the panels shall be ground smooth.

5.3 WING PANEL (Vertical Wire Grill)

5.3.1 The wing panel shall be constructed from a minimum of 16 gauge pickled and oiled hot rolled steel, with flanges bent on 1/8 inch radius. Two 90 degree flanges shall be provided to accommodate a removable cover.

5.3.2 Each wing panel shall have one (1) inch diameter grommet holes extending the entire length of the vertical wing panel on four (4) inch centers. Each grommet hole shall have a HEYCO grommet.

The AVAIL ENCLOSURE SYSTEMS DUPLEX PANEL shall have three (3) vertical rows of grommet holes as standard. Additional grommet holes can be provided if required.

5.3.3 Wing panel depth shall range from 12 inches minimum to 20 inches maximum. Each wing panel shall be 77 inches high, starting 9 inches above the channel base and ending into the top mounted lateral wireways.

5.3.4 Terminal blocks shall be located at the top or bottom or as required, and shall be mounted to accommodate an efficient wiring scheme.

5.3.5 A removable back cover plate shall be mounted on the back flange of each wing panel. When multiple panels are installed together, the wing panels and cover plates shall form a wireway.

5.3.6 To provide a finished end, a cover plate shall be provided on each unfinished side. This end cover plate shall form a wireway.

5.3.7 All welds and burrs which may interfere with the workability, operation, and/or serviceability of the wing panels shall be ground smooth.

5.4 CHANNEL BASE & GROUND

5.4.1 The support of the AVAIL ENCLOSURE SYSTEMS DUPLEX PANEL shall be provided by a structural steel ASTM A36 C4 channel, tied together at the ends with steel angles to form a complete frame. All front panels shall be bolted to this channel on 15 inch centers. Drilled and tapped holes, 3/8 inch -16, shall be provided in channel to accept bolt connection of panels.

5.4.2 The channel base structure shall have a minimum of one (1) hole per panel to fasten to floor. Hole shall be 5/8 inch diameter and shall be used by customer for attachment of structure to the floor.

5.4.3 Duplex assembly shall be furnished with two 1/4 inch by 1 inch copper bus bars located at the bottom of the panels. Each panel shall be solidly grounded to this bus through metal-to metal contact provided by clips welded to each panel. Ground bus shall be bolted to all panels.

5.5 LATERAL / LONGITUDINAL WIREWAYS

5.5.1 The lateral and longitudinal wireway shall be of 11 gauge pickled and oiled hot rolled steel formed into top accessible wireways. The formed edges of the wireways shall be ground smooth or covered with a moldable rubber grommet.

5.5.2 Both wireways shall be positioned in the same horizontal plane, and be mechanically connected at the intersection point. Provisions shall be made to the wireways to permit wiring access between each panel section.

5.5.3 The lateral wireway shall be 4 inches wide by 4 inches high. A structural partition shall divide the 4 inch wireway into two sections of equal area.

5.5.4 The longitudinal wireway shall be 10 inches wide by 3 inches high and enter into the lateral wireway 1 inch above the bottom of the lateral wireway.

5.5.5 The lateral / longitudinal wireway shall be located 84 inches above the finished floor.

5.6 PAINT

5.6.1 Each component to be assembled, such as the front panels, wing panels and other miscellaneous parts shall be painted prior to assembly.

5.6.2 Steel Structures Painting Council standards shall be followed in all preparation and application of primer and finish coatings. Surfaces to be painted shall be inspected for burrs and blemishes prior to paint application and corrected as required.

5.6.3 Surfaces to be painted shall be cleaned, rinsed, and etched with a rust inhibitive solution. Primer coats shall be applied and the surfaces sanded smooth and filled where necessary.

5.6.4 A minimum of two (2) coats of lacquer primer and two (2) final finish coats of air dry lacquer shall be applied. Color of finish to be ASA 61 light gray.

5.6.5 Paint manufacturer's recommendations shall be followed on application and drying times.

5.7 WIRING

5.7.1 Wiring shall consist of Type SIS, 600 volt, 90 degree C, gray stranded switchboard wire. Number 14 AWG shall be used as standard or as determined by product manufacture. Solid-state, communication, or other type of equipment may mandate the use of special wire.

5.7.2 All wiring connections shall be made on device terminals, and under no conditions shall any wire be spliced.

5.7.3 All wire ends shall be properly fitted with an insulated ring tongue terminal lug, and secured with aatchet type crimping tool designed for the specific lug being used.

5.7.4 Terminal blocks shall be GE Type EB25 or approved equal, with blank white marking stripes. Terminal blocks shall be four, six, or twelve point depending on the wiring requirements. Each terminal block shall be secured to the wing panel.

5.7.5 Each terminal point shall accommodate a maximum of two (2) number 10 AWG wires.

5.7.6 All devices installed on the front panel shall be mounted and wired such that standard hand tools can be used to service each wire or device without removing other devices.

5.7.7 Wiring outside of vertical and horizontal wire troughs shall be neatly bundled and tied using standard wire ties.

5.7.8 All terminal block spare points shall be securely seated.

5.7.9 All devices shall be identified on the rear of the panel with an adhesive backed marker affixed adjacent to or on each device per the panel wiring diagram.

5.8 NAMEPLATES

5.8.1 Nameplates shall be made of laminated lynply material, with white surfaces and black cores. Engraving shall generate a white plate with black letters and numbers. Standard 5/32 inch engraving size for all letters and numbers shall be used, and each line shall be centered on the nameplate.

5.8.2 AVAIL ENCLOSURE SYSTEMS DUPLEX PANEL nameplates shall be one (1) inch by three (3) inches. Nameplates shall be engraved in accordance with the nameplate list.

5.8.3 Colored mimic bus when required shall be 1/8 inch thick X 3/8 inch wide Plexiglas adhesive backing and as manufactured by the Rohm and Hass Co.

5.9 MISCELLANEOUS

6.0 TESTING AND CHECKOUTS

6.1 After fabrication, assembly, and wiring of the AVAIL ENCLOSURE SYSTEMS DUPLEX PANEL, the manufacturer shall perform the following test to conform with engineering drawings and specifications.

6.1.1 Physical inspection of panel and mounted equipment.

6.1.2 Physical inspection of wiring and verification of wire termination tightness.

6.1.3 Physical inspection of structural integrity.

6.1.4 Continuity checks of all wires installed by AVAIL ENCLOSURE SYSTEMS.

6.2 Optional functional test may be performed on the AVAIL ENCLOSURE SYSTEMS DUPLEX PANEL to indicate proper operation of all protection and control equipment. Optional functional test which may be required are as follows:

- Dielectric (HI-POT)
- Control Sequence
- Voltage Injection
- Current Injection