

6. Construction

6.1 General Requirements

6.1.1 Buses and Primary Connections.

Buses and primary connections shall be of copper or aluminum, or both. For bus ratings see Table 2.

6.1.1.1 Phase or Polarity Arrangements.

(1) The standard phase arrangement on three-phase assembled switchgear buses and primary connections shall be 1, 2, 3, from front to back, top to bottom, or left to right, as viewed from the main switching device operating mechanism side. Certain types of equipment may require other phasing arrangements and a neutral conductor. In these cases the phasing shall be suitably indicated.

(2) Panel mounting devices shall be mounted in the same arrangement as in (1) as viewed from the front of the panel.

6.1.1.2 Phase Sequence. The phase sequence on connection diagrams shall be such that, when considering voltage to neutral on a polyphase system with respect to the element of time, the voltage of Phase 1 will reach a maximum ahead of the voltage of Phase 2, Phase 3, etc. This sequence shall be designated as phase sequence in the order 1, 2, 3, etc, unless otherwise suitably indicated.

6.1.1.3 Cable Terminations. The MEI switchgear shall provide space for the devices used for making electric and mechanical connections to the incoming and outgoing cables. Each cable terminal connection point shall meet the bolt hole requirements of NEMA CCI-1975 [27], CCI-4.05.

6.1.1.4 Bushings, Potheads, or Other Terminators. Space for mounting these devices shall be provided in the MEI switchgear as required.

6.1.1.5 Main Bus Splices. When bolts, nuts, and washers are provided for connecting through buses to other sections, the length of the bolts shall be such that the dielectric integrity is not impaired.

6.1.2 Grounding. Ground bus shall be included that will electrically connect together the structures in MEI switchgear and provide for connection to station ground. A single unit shall be provided with a ground terminal or bus for connection to station ground.

At points of connection between the ground bus and the assembly, any nonconductive coat-

ings, such as paint, shall be removed or penetrated to ensure good electrical contact.

Circuit connections to the ground bus shall be made so that it is not necessary to open the ground bus to remove any connection made to the ground bus.

Ground connections shall be provided for removable elements to ensure that they are grounded until the primary circuit is disconnected and the removable element is moved a safe distance. See ANSI/IEEE C37.100-1981[7], test position.

When mounted on metal switchgear structures, cases of instruments, instrument transformers, meters, relays, and similar devices shall be considered as being adequately grounded when secured to these structures by metal mounting hardware with adequate provision for penetrating the paint film.

The ground bus shall be capable of carrying the rated short-time current of the MEI switchgear for 2 s.

6.1.3 Control and Secondary Circuits and Devices

6.1.3.1 General. All voltage circuits used for control, relaying, or metering shall be protected within the MEI switchgear as follows:

(1) All circuits supplied from external sources (ac or dc) shall have short-circuit protection. This may be provided by a single set of short-circuit protective devices within the control source incoming section.

(2) All circuits supplied from internal sources (ac and dc) shall have short-circuit protection within the same section as the supply source. If these circuits are supplied by a control power transformer, this protection may be in the primary circuit only.

Overcurrent protection of voltage circuits may be provided in addition to the required short-circuit protection.

Other circuits supplying loads, such as heaters, receptacles, or lights shall have overload and short-circuit protection.

Overcurrent protection of current transformer secondary circuits shall not be provided.

6.1.3.2 Voltage Transformer Fusing.

(1) Primary circuits of all voltage transformers shall include current-limiting fuses.

(2) Secondary circuits of all voltage transformers shall include fuses or their equivalent.

EXCEPTION: Fuses may be omitted from secondary circuits of voltage transformers if the secondary burden includes