
	PRINCETON PLASMA PHYSICS LABORATORY ES&H DIRECTIVES	
	ES&HD 5008 SECTION 2, CHAPTER 13 Specialty Switches	
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Chapter 13 SPECIALTY SWITCHES

13.1 DESCRIPTION

This section covers disconnecting and isolating switches, shorting and grounding switches, and other switches not specifically covered in the NEC or NESC. Examples include:

- A. Bolted bus-bar links.
- B. No-load disconnect switches, manually or automatically operated.
- C. Non-automatic circuit breakers.
- D. Safety-disconnect and grounding switches in coil-power supplies for experimental devices.

13.2 TYPES OF HAZARDS

- A. Reconfiguration of complex power supplies and their loads is often accomplished by reconnecting bus-bar links. Misapplication of power supplies and loads may result in equipment failures and personnel hazards such as arc flash, electrocution.
- B. Mechanical forces due to magnetic fields around conductors have occasionally resulted in damage to equipment and injury to personnel.
- C. All blades of multiblade disconnects do not always open and proper isolation may not be achieved.
- D. Non-automatic circuit breakers, used as disconnects in series with automatic circuit breakers, may not be rated for available short-circuit current and may be a personnel hazard if closed in on a fault.
- E. High contact resistance between finger-blades and main contacts may cause excessive heat, arcing, and fire.

13.3 DESIGN AND CONSTRUCTION CRITERIA

- A. No-load disconnects and non-automatic circuit breakers used as disconnects shall be sequenced with associated over-current protective devices (OCPDs) by the use of Kirk®-type locks and keys to assure that the OCPDs open first and close last.
- B. Switches shall be installed so that they are either clearly visible from their load locations or capable of being locked open.

- C. Automatically operated switches shall have a system of switch interlocks in the control circuit and Kirk®-type locks in the power circuit to positively disconnect normal power to the switch during testing or maintenance periods.
- D. Interlocks shall be provided to prevent parallel operation of loads, unless the power-circuit components are specifically designed for such operation.
- E. Suitable means shall be provided to make it possible to lock the switch in the desired position with a safety-padlock.
- F. Suitable visual indicators shall be provided to indicate the various switch positions (“Open,” “Closed,” etc.).
- G. Enclosures shall be provided so that it is not possible for personnel to contact live parts without first removing a protective cover or barrier.
- H. Install disconnects or grounding switches in circuits between the source and loads. Personnel shall not work on loads without first opening the safety disconnects.

13.4 OPERATING CRITERIA

- A. Suitable safety tools, such as hot-sticks and grounding-sticks, should be provided in the vicinity of the switch along with Class 2 high voltage gloves.
- B. Appropriate periodic maintenance to assure proper switch operation shall be provided.
- C. Switches that can be used to disconnect power during an emergency shall be clearly and uniquely marked.
- D. Switches shall be labeled to specify if they are “load break switches”. All unlabeled switches are to be considered to be non-load break switches.