

§ 18.48

30 CFR Ch. I (7-1-11 Edition)

(2) A continuously monitored, failsafe grounding system is provided that will maintain the frame of the equipment and the frames of all accessory equipment at ground potential. Also, the equipment, including its controls and portable (trailing) cable, will be deenergized automatically upon the occurrence of an incipient ground fault. The ground-fault-tripping current shall be limited by grounding resistor(s) to that necessary for dependable relaying. The maximum ground-fault-tripping current shall not exceed 25 amperes.

(3) All high voltage switch gear and control for equipment having a nameplate rating exceeding 1,000 volts are located remotely and operated by remote control at the main equipment. Potential for remote control shall not exceed 120 volts.

(4) Portable (trailing) cable for equipment with nameplate ratings from 661 volts through 1,000 volts shall include grounding conductors, a ground check conductor, and grounded metallic shields around each power conductor or a grounded metallic shield over the assembly; except that on machines employing cable reels, cables without shields may be used if the insulation is rated 2,000 volts or more.

(5) Portable (trailing) cable for equipment with nameplate ratings from 1,001 volts through 4,160 volts shall include grounding conductors, a ground check conductor, and grounded metallic shields around each power conductor.

(6) MSHA reserves the right to require additional safeguards for high-voltage equipment, or modify the requirements to recognize improved technology.

§ 18.48 Circuit-interrupting devices.

(a) Each machine shall be equipped with a circuit-interrupting device by means of which all power conductors can be deenergized at the machine. A manually operated controller will not be acceptable as a service switch.

(b) When impracticable to mount the main-circuit-interrupting device on a machine, a remote enclosure will be acceptable. When contacts are used as a main-circuit-interrupting device, a means for opening the circuit shall be

provided at the machine and at the remote contactors.

(c) Separate two-pole switches shall be provided to deenergize power conductors for headlights or floodlights.

(d) Each handheld tool shall be provided with a two-pole switch of the "dead-man-control" type that must be held closed by hand and will open when hand pressure is released.

(e) A machine designed to operate from both trolley wire and portable cable shall be provided with a transfer switch, or equivalent, which prevents energizing one from the other. Such a switch shall be designed to prevent electrical connection to the machine frame when the cable is energized.

(f) Belt conveyors shall be equipped with control switches to automatically stop the driving motor in the event the belt is stopped, or abnormally slowed down.

NOTE: Short transfer-type conveyors will be exempted from this requirement when attended.

§ 18.49 Connection boxes on machines.

Connection boxes used to facilitate replacement of cables or machine components shall be explosion-proof. Portable-cable terminals on cable reels need not be in explosion-proof enclosures provided that connections are well made, adequately insulated, protected from damage by location, and securely clamped to prevent mechanical strain on the connections.

§ 18.50 Protection against external arcs and sparks.

Provision shall be made for maintaining the frames of all off-track machines and the enclosures of related detached components at safe voltages by using one or a combination of the following:

(a) A separate conductor(s) in the portable cable in addition to the power conductors by which the machine frame can be connected to an acceptable grounding medium, and a separate conductor in all cables connecting related components not on a common chassis. The cross-sectional area of the additional conductor(s) shall not be less than 50 percent of that of one power conductor unless a ground-fault tripping relay is used, in which case

the minimum size may be No. 8 (AWG). Cables smaller than No. 6 (AWG) shall have an additional conductor(s) of the same size as one power conductor.

(b) A means of actuating a circuit-interrupting device, preferably at the outby end of the portable cable.

NOTE: The frame to ground potential shall not exceed 40 volts.

(c) A device(s) such as a diode(s) of adequate peak inverse voltage rating and current-carrying capacity to conduct possible fault current through the grounded power conductor. Diode installations shall include: (1) An overcurrent device in series with the diode, the contacts of which are in the machine's control circuit; and (2) a blocking diode in the control circuit to prevent operation of the machine with the polarity reversed.

§ 18.51 Electrical protection of circuits and equipment.

(a) An automatic circuit-interrupting device(s) shall be used to protect each ungrounded conductor of a branch circuit at the junction with the main circuit when the branch-circuit conductor(s) has a current carrying capacity less than 50 percent of the main circuit conductor(s), unless the protective device(s) in the main circuit will also provide adequate protection for the branch circuit. The setting of each device shall be specified. For headlight and control circuits, each conductor shall be protected by a fuse or equivalent. Any circuit that is entirely contained in an explosion-proof enclosure shall be exempt from these requirements.

(b) Each motor shall be protected by an automatic overcurrent device. One protective device will be acceptable when two motors of the same rating operate simultaneously and perform virtually the same duty.

(1) If the overcurrent-protective device in a direct-current circuit does not open both lines, particular attention shall be given to marking the polarity at the terminals or otherwise preventing the possibility of reversing connections which would result in changing the circuit interrupter to the grounded line.

(2) Three-phase alternating-current motors shall have an overcurrent-pro-

TECTIVE device in at least two phases such that actuation of a device in one phase will cause the opening of all three phases.

(c) Circuit-interrupting devices shall be so designed that they can be reset without opening the compartment in which they are enclosed.

(d) All magnetic circuit-interrupting devices shall be mounted in a manner to preclude the possibility of their closing by gravity.

§ 18.52 Renewal of fuses.

Enclosure covers that provide access to fuses, other than headlight, control-circuit, and handheld-tool fuses, shall be interlocked with a circuit-interrupting device. Fuses shall be inserted on the load side of the circuit interrupter.

§ 18.53 High-voltage longwall mining systems.

(a) In each high-voltage motor-starter enclosure, with the exception of a controller on a high-voltage shearer, the disconnect device compartment, control/communications compartment, and motor contactor compartment must be separated by barriers or partitions to prevent exposure of personnel to energized high-voltage conductors or parts. In each motor-starter enclosure on a high-voltage shearer, the high-voltage components must be separated from lower voltage components by barriers or partitions to prevent exposure of personnel to energized high-voltage conductors or parts. Barriers or partitions must be constructed of grounded metal or nonconductive insulating board.

(b) Each cover of a compartment in the high-voltage motor-starter enclosure containing high-voltage components must be equipped with at least two interlock switches arranged to automatically deenergize the high-voltage components within that compartment when the cover is removed.

(c) Circuit-interrupting devices must be designed and installed to prevent automatic reclosure.

(d) Transformers with high-voltage primary windings that supply control voltages must incorporate grounded electrostatic (Faraday) shielding between the primary and secondary