

(2) *Step-up transformer.* A step-up transformer is a transformer that steps up the low or medium voltage to high voltage (See Figure 2 in this section) and must meet the following requirements:

- (i) The trailing cable supplying low or medium voltage to the step-up transformer must meet the applicable requirements of 30 CFR part 75;
- (ii) The high-voltage circuit output of the step-up transformer supplying power to the continuous mining machine must meet the applicable provisions of § 75.824;
- (iii) The step-up transformer enclosure must be—
 - (A) Securely mounted to minimize vibration on:
 - (1) The continuous mining machine; or

(2) A sled/cart that must be connected to the continuous mining machine by a tow-bar and be in close proximity to the mining machine.

- (B) Grounded as follows:
 - (1) Connected to the incoming ground conductor of the low- or medium-voltage trailing cable;
 - (2) Bonded by a No. 1/0 A.W.G. or larger external grounding conductor to the continuous mining machine frame; and
 - (3) Bonded by a No. 1/0 A.W.G. or larger external grounding conductor to the metallic shell of each cable coupler.
- (C) Equipped with:
 - (1) At least two interlock switches for each of the enclosure covers; and
 - (2) An external emergency stop switch to remove input power to the step-up transformer.

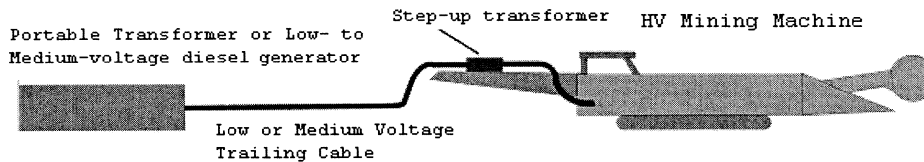


Figure 2 - Power source - 75.829(c) (2) 480 or 995 volts to a step-up transformer to 2300 volts for tramming

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§ 75.830 Splicing and repair of trailing cables.

- (a) *Splices and repairs.*
 - (1) Splicing means the mechanical joining of one or more severed conductors in a single length of a cable including the replacement of: Insulation, semi-conductive tape, metallic shielding, and the outer jacket(s).
 - (2) Repair means to fix damage to any component of the cable other than the conductor.
 - (3) Splices and repairs to high-voltage trailing cables must be made:
 - (i) Only by a qualified person trained in the proper methods of splicing and repairing high-voltage trailing cables;
 - (ii) In a workman-like manner;
 - (iii) In accordance with § 75.810; and

(iv) Using only MSHA-approved high-voltage kits that include instructions for outer-jacket repairs and splices.

- (b) *Splicing limitations.*
 - (1) Splicing of the high-voltage trailing cable within 35 feet of the continuous mining machine is prohibited.
 - (2) Only four (4) splices will be allowed at any one time for the portion of the trailing cable that extends from the continuous miner outby for a distance of 300 feet.

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§ 75.831 Electrical work; troubleshooting and testing.

- (a) *Trailing cable and continuous mining machine electrical work procedures.* Prior to performing electrical work, other than troubleshooting and testing, on the high-voltage trailing cable or the continuous mining machine, a

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qualified person must de-energize the power center and follow procedures specified in paragraph (1) or (2):

(1) If a trailing cable disconnecting switch is provided:

(i) Open and ground the power conductors, lock out and tag the disconnecting switch; and

(ii) Lock out and tag the plug to the power receptacle.

(2) If a trailing cable disconnecting switch is not provided and a cable coupler is used as a disconnecting device:

(i) Remove the plug from the power receptacle and connect it to the grounding receptacle;

(ii) Lock out and tag the plug to the grounding receptacle; and

(iii) Place a dust cover over the power receptacle.

(b) *Troubleshooting and testing the trailing cable.* During troubleshooting and testing, the de-energized high-voltage cable may be disconnected from the power center only for that period of time necessary to locate the defective condition. Prior to troubleshooting and testing trailing cables, a qualified person must perform the following:

(1) If a trailing cable disconnecting switch is provided:

(i) Open and ground power conductors and lock out and tag the disconnecting switch;

(ii) Disconnect the plug from the power receptacle;

(iii) Lock out and tag the plug; and

(iv) Place a dust cover over the power receptacle.

(2) If a trailing cable disconnecting switch is not provided and a cable coupler is used as a disconnecting device:

(i) Remove the plug from the power receptacle and connect it to the grounding receptacle to ground the power conductors;

(ii) Remove the plug from the grounding receptacle and install a lock and tag on the plug; and

(iii) Place a dust cover over the power receptacle.

(c) *Troubleshooting and testing limitations.* Troubleshooting and testing energized circuits must be performed only:

(1) On low- and medium-voltage circuits;

(2) When the purpose of troubleshooting and testing is to determine voltages and currents;

(3) By qualified persons; and

(4) When using protective gloves in accordance with the following table:

Circuit voltage	Type of glove required
Greater than 120 volts (nominal) (not intrinsically safe)	Rubber insulating gloves with leather protectors.
40 volts to 120 volts (nominal) (both intrinsically safe and non-intrinsically safe).	Either rubber insulating gloves with leather protectors or dry work gloves.
Greater than 120 volts (nominal) (intrinsically safe)	Either rubber insulating gloves with leather protectors or dry work gloves.

(d) *Power center electrical work procedures.* Before any work is performed inside any compartment of the power center, except for troubleshooting and testing energized circuits as specified in paragraph (c) of this section, a qualified person must:

(1) De-energize affected circuits;

(2) Open the corresponding disconnecting switch, lock it out, and tag it to assure the circuit is isolated;

(3) Visually verify that the contacts of the disconnecting switch are open and grounded; and

(4) Discharge all high-voltage capacitors and circuits.

(e) *Locking out and tagging responsibilities.*

(1) When more than one qualified person is performing electrical work, including troubleshooting and testing, each person must install an individual lock and tag. Each lock and tag must be removed only by the persons who installed them.

(2) If the person who installed the lock and tag is unavailable, the lock and tag may be removed by a person authorized by the operator, provided that:

(i) The authorized person is a qualified person; and

(ii) The mine operator assures that the person who installed the lock and

tag is aware that the lock and tag have been removed.

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§ 75.832 Frequency of examinations; recordkeeping.

(a) *Continuous mining machine examination.* At least once every 7 days, a qualified person must examine each high-voltage continuous mining machine to verify that electrical protection, equipment grounding, permissibility, cable insulation, and control devices are properly installed and maintained.

(b) *Ground-fault test circuit.* At least once every 7 days, and prior to tramping the high-voltage continuous mining machine, a qualified person must activate the ground-fault test circuit to verify that it will cause the corresponding circuit-interrupting device to open.

(c) *Ground-wire monitor test.* At least once every 7 days, and prior to tramping the high-voltage continuous mining machine, a qualified person must examine and test each high-voltage continuous mining machine ground-wire monitor circuit to verify that it will cause the corresponding circuit-interrupting device to open.

(d) *Trailing cable inspections.*

(1) Once each day during the shift that the continuous mining machine is first energized, a qualified person must de-energize and inspect the entire length of the high-voltage trailing cable from the power center to the continuous mining machine. The inspection must include examination of the outer jacket repairs and splices for damage, and assure guarding is provided where required.

(2) At the beginning of each shift that the continuous mining machine is energized, a person designated by the mine operator must de-energize and visually inspect the high-voltage trailing cable for damage to the outer jacket. This inspection must be conducted from the continuous mining machine to the following locations:

- (i) The last open crosscut;
- (ii) Within 150 feet of the working place during retreat or second mining; or

(iii) Up to 150 feet from the continuous mining machine when the machine is used in outby areas.

(e) *Grounded-phase detection test.* When a grounded-phase test circuit is provided on a high-voltage continuous mining machine, a person designated by the mine operator must activate the test circuit at the beginning of each production shift to assure that the detection circuit is functioning properly.

(f) *Corrective action.* When examinations or tests of equipment reveal a risk of fire, electrical shock, ignition, or operational hazard, the equipment must be immediately removed from service or repaired.

(g) *Record of tests.*

(1) At the completion of examinations and tests required under paragraphs (a), (b), and (c) of this section, the person conducting the examinations and tests must:

(i) Certify by signature and date that the examinations and tests have been conducted.

(ii) Make a record of any unsafe condition found.

(2) Any corrective action(s) must be recorded by the person taking the corrective action.

(3) The record must be countersigned by the mine foreman or equivalent mine official by the end of the mine foreman's or the equivalent mine official's next regularly scheduled working shift.

(4) Records must be maintained in a secure book that is not susceptible to alteration or electronically in a computer system so as to be secure and not susceptible to alteration.

(5) Certifications and records must be kept for at least 1 year and must be made available for inspection by authorized representatives of the Secretary and representatives of miners.

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§ 75.833 Handling high-voltage trailing cables.

(a) *Cable handling.*

(1) Miners must not handle energized trailing cables unless they are wearing high-voltage insulating gloves, which include the rubber gloves and leather outer protector gloves, or are using insulated cable handling tools that meet