

TECH TIP # 40



One of a series of dealer contractor technical advisories prepared by HARDI wholesalers as a customer service.

ELECTRICAL SAFETY PRECAUTIONS

Tools

As a general precaution, be sure that all tools used conform to industry standards as to quality and type. Use each tool only for which it is intended. All tools should be maintained in good repair and all damaged or nonworking tools should be returned to the toolkeeper.

Care must be taken when selecting pliers, side cutters, or diagonal cutters. Pliers or cutters should never be used on nuts or pipe fittings. Always hold the pliers or cutters so that the fingers are not wrapped around the handle in such a way they can be pinched or jammed if the tool slips. When cutting short pieces, take care that parts of the work do not fly and cause injury. Never put extensions on tool handles to increase leverage.

When selecting a screwdriver for electrical work, be sure that it has a non-conducting handle. The screwdriver selected should be of the proper size to fit the screw and should never be used as a substitute for a punch or a chisel. The points of the screwdrivers can be kept in proper shape with a file or a grinding wheel.

Use wrenches only if they are right for the job and only if they are in good condition. An adjustable wrench should be faced so that the movable jaw is located forward in the direction in which the handle is to be turned.

PORTABLE POWER TOOLS

All portable tools should be inspected before use to see that they are clean, well oiled, and in the proper state of repair. The switches should operate normally and the cords should be clean and free of defects. The case of any electrically driven power tool should be well grounded; and sparking electric tools should never be used in places where flammable gases or liquids or exposed explosives are present.

Drills must be straight, undamaged, and properly sharpened. Tighten the drill securely in the chuck, using the key provided; never secure it with pliers or with a wrench. It is important that the drill be set straight and true in the chuck. The work should be firmly clamped and, if of metal, a center punch should be used to score the material before drilling is started.

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Be sure that power cords do not come in contact with sharp objects. The cords should not be allowed to kink, nor should they be allowed to come in contact with oil, grease, hot surfaces, or chemicals. When cords are damaged, they should be replaced instead of being patched with tape.

ELECTRICAL MAINTENANCE

Because of the possibility of injury to personnel, the danger of fire, and possible damage to material, all repair and maintenance work on electrical equipment should be performed only by qualified persons.

When any electrical equipment is to be overhauled or repaired, the main supply switches or cut-out switches in each circuit from which power could possibly be fed should be secured in the open position and tagged. The tag should read, "The circuit was ordered open for repairs and shall not be closed except by direct order of" After the work has been completed, the tag (or tags) should be removed by the same person.

The covers of fuse boxes and junction boxes should be kept securely closed except when work is being done. Safety devices such as interlocks, overload relays, and fuses should never be changed or modified in any way without specific authorization.

The interlock switch is ordinarily wired in series with the power-line leads to the appliance power supply unit, and is installed on the lid or door of the enclosure so as to break the circuit when the lid or door is opened. The true interlock switch is entirely automatic in action; it does not have to be manipulated by the operator. Multiple interlock switches, connected in series, may be used for increased safety. One switch may be installed on the access door of the device, and another on the cover or the power-supply section. Complex interlock systems are provided when several separate circuits must be opened for safety.

Because electrical equipment may have to be serviced without de-energizing the circuits, interlock switches are constructed so that they can be disabled by the technician. However, to minimize the danger of disabling them accidentally, they are generally located in such a manner that a certain amount of manipulation is necessary in order to operate them.

Fuses should be removed and replaced only after the circuit has been de-energized. When a fuse blows, it should be replaced only with a fuse of the same current and voltage ratings. When possible, the circuit should be carefully checked before making the replacement, since the burned out fuse is often the result of circuit fault.

HIGH VOLTAGE PRECAUTIONS

Personnel should never work alone near high voltage equipment. Tools and equipment containing metal parts, such as brushes and brooms, should not be used in any area within four feet of high voltage circuits or any electric wiring having exposed surfaces. The handles of all metal tools, such as pliers and cutters, should be covered with rubber insulating tape. It is also necessary to insulate the shanks of certain screwdrivers with insulating sheathes. Only 3/16 of an inch of the blade need be exposed. Where it is not practicable to tape or otherwise insulate a surface, electrician's insulating varnish may be used.

Before a worker touches a capacitor which is connected to a de-energized circuit, or which is disconnected entirely, he should discharge the capacitor using approved and safe work habits.

Do not work on any type of electrical apparatus with wet hands or while wearing wet clothing, and do not wear loose or flapping clothing. The use of thin soled shoes with metal plates or hobnails is prohibited. Safety shoes with non-conducting soles should be worn if available. Flammable articles should not be worn.

Before working on electrical apparatus, all rings, wrist watches, bracelets, and similar metal items should be removed. Care should be taken that the clothing does not contain exposed zippers, metal buttons, or any type of metal fasteners.

Warning signs and suitable guards should be provided to prevent personnel from coming into accidental contact with high voltages.

WORK ON ENERGIZED CIRCUITS

Insofar as is practicable, repair work on energized circuits should NOT be undertaken. When repairs on operating equipment must be made in order to make proper adjustments, every known safety precaution should be carefully observed. Ample light for good illumination should be provided; and the worker should, if possible, use only one hand in accomplishing the necessary repairs, keeping the other hand well away from the energized circuit. Helpers should be stationed near the main switch or the circuit breaker so that the equipment can be de-energized immediately in case of emergency.

TREATMENT FOR ELECTRICAL SHOCK

Electric shock is a jarring, shaking sensation resulting from contact with electric circuits or from the effects of lightning. The victim usually feels that he has received a sudden blow; and if the voltage is sufficiently high, he may become unconscious. Severe burns may appear on the skin at the place of contact; muscular spasm can occur, causing them to clasp the apparatus or wire which caused the shock and be unable to turn it loose. Electric shock can kill its victim by stopping the heart or by stopping breathing, or both. It may sometimes damage nerve tissue and result in a slow wasting away of muscles that may not become apparent until several weeks or months after the shock was received.

The following procedure is recommended for rescue and care of shock victims:

1. Remove the victim from electrical contact at once, but **DO NOT ENDANGER YOURSELF**. This can be done by: (1) Throwing the switch if it is nearby; (2) cutting the cable or wires to the apparatus, using an ax with a wooden handle while taking care to protect your eyes from the flash when the wires are severed; (3) use of a dry stick, rope, leather belt, coat, blanket, or any other non-conductor of electricity.
2. Determine whether the victim is breathing. If they are, keep them lying down in a comfortable position. Loosen the clothing about their neck, chest, and abdomen so that he can breathe freely. Protect them from exposure to cold, and watch them carefully.
3. Keep them from moving about. In this condition, the heart is very weak, and any sudden muscular effort or activity on the part of the patient may result in heart failure.

4. Do not give stimulants or opiates. Send for medical help at once and do not leave the patient until they have had adequate medical care.
5. If the victim is not breathing, it will be necessary to apply artificial respiration without delay; even though they may appear to be lifeless.

RESUSCITATION FROM THE EFFECTS OF ELECTRIC SHOCK

Artificial respiration is the process of promoting breathing by mechanical means. It is used to resuscitate persons whose breathing has stopped, not only as a result of electric shock, but also from causes such as drowning, asphyxiation, strangling, or the presence of a foreign body in the throat.

When a shock victim must be revived, begin artificial respiration as soon as possible. If there is any serious bleeding, stop it first, but do not waste time on anything else. Seconds count; and the longer you wait to begin, the less are the chances of saving the victim.