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Rio Soldering Machine Instructions

The Rio Soldering machine produces intense, localized heat transfer using an electrical energy source. It's a great choice for soldering jobs where a torch flame is difficult to use without damaging fine or filigree pieces.

The machine is designed to operate on 115 volts, 60 cycle AC current. A 15-amp circuit is adequate providing the line is not overloaded with other equipment. After connecting the machine to a properly grounded wall outlet, step on the actuating foot control. A buzzing sound will indicate the machine is receiving current.

The Rio Soldering machine is shockproof. The voltage at the highest heat is very low, so if your hands touch the contacts, you will not receive a shock. The temperature, however, does get quite high; touching the carbon electrodes while soldering at high heat can result in a burn, so please use caution.

The heat for soldering is produced electrically, without flame, by touching the carbon electrode to your workpiece. The current passing through the electrode will heat the area in milliseconds.

Remove all packing materials prior to setup.

Suggested Uses for the Rio Soldering Machine

Soldering jobs that would be difficult or impossible to perform with flame soldering are easily and safely accomplished with the Rio soldering machine. For example, eyeglass frames with xylo pads can be soldered near the pad and quenched before the heat has traveled far enough to cause damage. Fine chains can be held in a pair of insulated tweezers with the contact clip attached to the tweezer. Sizing rings to a larger size can be done by using a length of ring-sizing material much longer than required and soldering on one side first, then shaping the material to size and soldering on the other side.

An emery cloth attached to the top of the bench is useful for removing flux from the piece and for cleaning the carbons.

If crystallized flux breaks the contact while soldering, move the work to another spot on the carbon or scrape the flux from the piece when it makes contact. **Please Note:** Do not increase the heat if the contact is broken, as this may damage your piece.

Safety Precautions

- Always wear proper eye protection.
- Never wear loose clothing or long chains/necklaces, and keep long hair pulled back.
- Exercise caution when placing hands and fingers near hot areas.
- Unplug the unit when not in use.

Tip—When first using this machine, it is a good idea to practice with old parts to get familiar with the machine and its operation before working on new parts.

Accessories

The **carbon holder stand** is for the large round carbons and is plugged into the end of the cord coming from the left of the machine. The large carbon holder can be adjusted to use carbons both horizontally and vertically, and is made low enough so that both hands can rest on the bench to steady them while soldering.

The **pencil carbons** also fit into the end of the cord coming from the left of the machine, and are generally used in large articles where it is difficult to bring the work to the carbons, and for soft soldering of joints, catches, etc.

Two sizes of **spring contact clips** are supplied, plug one or the other into the cord coming from the right side of the machine. These are used to hold the article to be soldered. Use the large clip when possible.

The **pointed brass rod** is used to make contact when the spring clips cannot grasp the article. The rod is grasped with the large clip and touched to the article to make contact.

The **indicator knob** controls the heat. The scale is in amps and the higher the number, the higher the heat that it will generate. The amount of heat required depends on the material to be soldered, the solder being used and the size of the article. Low heat is required for bismuth and lead/tin solders. Medium heat is required for gold and silver soldering applications. High heat is required for chrome metals. Larger parts will require higher heat settings. These settings will become more fine-tuned and familiar as the user develops more skill with the machine.

The **foot switch** turns the machine on and off, although it is advisable to unplug the unit when work is completed.

Soldering Procedures

1. Clean work by immersing in a pickling solution. Improperly cleaned work will not permit the proper flow of solder.
2. Arrange work so that the hands can be held steady. The principle is to provide a complete electrical circuit, with the carbon at the point where solder should flow.
3. Attach the contact clip to the article or larger piece of the two to be joined, as near as possible to the joint. If clips can not be used, use the pointed brass rod in the large contact clip to make contact. Adjust the carbon so that you can conveniently touch the joint to be soldered.
4. Place solder at the joint. Where two separate pieces are to be joined, it is usually preferable to place the solder between them or directly under the joint. In soldering ring shanks, the solder can be pressed into the joint and then soldered. Placing solder on top of the work usually results in the solder balling up and rolling away. It may sometimes be easier to tack the solder at low heat before proceeding with the actual soldering job.
5. Apply flux to the solder as well as to the joint to be soldered, but keep flux from the carbon as much as possible. Remember, solder flows to flux.
6. The heat control should be set as closely as possible to the correct setting. Remember that a small point of contact will create intense heat; therefore, the control should be set relatively low. The greater the area of contact , the less concentrated the heat, and the control should be set higher. After a little practice, you will be able to determine the exact settings for different applications.
7. Bring the joint to be soldered in contact with the carbon and hold steady. Avoid using undue pressure or flat spots or deforming may occur. Apply the heat by stepping on the foot switch.
8. If the solder flows immediately, realease the foot switch before removing the work from the carbon. If the solder does not flow immediately (within 3 seconds), the heat control may be set too low. Set control slightly higher and try again. If the heat control was initially set too high, the joint might burn. Although, it is possible for the quick intense heat to oxidize the joint, thereby, destroying the electrical contact. Examine the article carefully for discoloration caused by oxidation. If discolored, start over again. Cleaning the article and solder thoroughly.

General Information

Fluxes—Most metal oxidizes when heated, preventing the flow of solder. Flux dissolves the oxides. It also blocks the air from reaching the work, preventing oxidation. Oxides formed by hard metals differ from oxides fromed by soft metals. Fluxes are formulated to work with specific metals; therefore, the types of flux used will vary with most jobs. Flux must also withstand the soldering temperature.

Solders—The selected solder must melt at a lower temperature than the metal being joined, or the work will melt. They must bond with the metals being joined, generally, metals which can be alloyed with the work, should be present in the solder. In jewelry work, it is often important that the work is invisible, and the color of the solder should match the work.

Cleanliness—It is essential that the solders and the metals to be joined be clean before attempting to solder. The area to be soldered should be clean and bright. This can be achieved with a wire brush if necessary. A soak in a pickling bath will make surfaces chemically clean. Wiping with a damp rag from time to time and cleaning with coarse emery cloth will keep the electrical contact at it's best.