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American Beauty®

Solutions for your Difficult Soldering Needs!

Industrial Quality Solder Pots

Models # 300 & 600

Information & Instruction Booklet

Table of Contents

Information & Instruction Manual for
American Beauty® General Purpose
Industrial Solder Pots

Proud Manufacturers of American
Beauty® Soldering Tools

9. Remove the heating elements by loosening the setscrews and gently tapping them out with a soft mallet.

If you have determined that one (or both) of the heating elements have expired, or become damaged, they can be replaced with new ones.

It is recommended that both heating elements be replaced whenever one (or both) of them has expired.

Remove the elements from the crucible by loosening the retaining screws in the crucible located at the middle of each element and tapping the elements out with a leather mallet and wooden dowel. Please note that it may take some added persuasion to free the elements due to the possibility of built up oxides. A wire brush may be used to remove any build up, or contamination from the inner walls before installing the new heating elements.

Install the new heating elements into the cavities with the wires located on the thermostat side of the crucible.
The steps for reassembling the solder pot are completed by simply reversing the steps used for disassembly.
The Heating Elements are wired in parallel for 120VAC, or in series for 220VAC.

With the electrical leads of the bi-metal thermostat disconnected you should perform a standard continuity test in order to determine the type of failure and the possible need for replacement that may exist.

There should be continuity when the shaft is turned fully clockwise. If no continuity exists there may be some type of contamination, or oxidation (this can be lightly abraded as a temporary resolution) on the surface of the electrical contacts or some type of obstruction interrupting current flow.

There should be no continuity when the shaft is turned fully counter clockwise. If continuity exists the electrical contacts may have arced causing them to weld together or a conductive material may be bridging the gap between the contacts.

10. Remove the thermostat assembly by first removing the retaining screw.

If you determine that the thermostat has expired, or become damaged, it should be replaced with a new one.

It is recommended that the bi-metal thermostat be replaced whenever excessive build-up or oxidation exists.

Remove the faulty thermostat from the crucible by removal of the retaining screw. A wire brush may then be used to remove any build up, or contamination that could hinder the attachment of the new thermostat.
The thermostat retaining screw should be snug to eliminate movement, however over tightening the screw can damage the thermostat by causing the ceramic insulators to crack. Make sure that the new thermostat is wired properly.

The steps for reassembling the solder pot are completed by simply reversing the steps used for disassembly.

We hope that the information covered in this manual has provided you with all of the necessary guidelines, recommendations, instructions and answers to assist in the proper care, maintenance and operation of your American Beauty® General Purpose Solder Pot. All of the information provided is accurate to the best of our knowledge and as more information becomes available to us we would be happy to include it in subsequent versions of this manual. If you have any questions that we have not covered within this manual please feel free to call us for the answers.
It is our desire to be able to provide you with ongoing customer service and product support for all of the American Beauty® Soldering Tools that we manufacture at Assembly Technologies International Inc.™

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7.0 Trouble Shooting

The solder pot is heating but it is no longer getting hot enough.
When this happens it generally means that one of the heating elements has expired. (Replace the Element)

It is recommended that both heating elements be replaced whenever one (or both) of them has expired.

The solder pot does not turn off.
When this happens it generally means that the thermostat's electrical contacts have become welded together, keeping the them from opening. (Replace the Thermostat)

The solder pot is overheating.
If the solder pot is overheating but you are still able to turn it off the thermostat's bi-metal plate may no longer be reacting to the rising temperature, or may be physically damaged. (Replace the Thermostat)

The solder pot is not heating.
Because of the variety of issues that may be the cause of the solder pot not heating it is a good idea to inspect and verify each of the components in a step-by-step manner until you find the direct cause of the problem.
Use the following steps as your guide to proper disassembly of the solder pot and performance of the necessary test and evaluation of each of the solder pot's components in the most direct and efficient manner.

1. Remove the base plate by first removing the three retaining screws. Mark all wires to avoid confusion.

This step makes the fuse holder and the run light accessible. Before continuing on to the next step a full visual analysis should be performed. Check for any broken wires, or loose connections that may be the source of the problem. If all of the wires are secure remove the fuse and perform a continuity test to determine its condition. If the fuse has expired, replace it with a 1-1/4" x 1/4" slow-blow fuse of the proper amperage rating. If the fuse is good you should perform a continuity test on the run light to determine its condition (replace if needed) and continue on to the next step.

2. Remove all of the wire- nuts from the electrical leads in order to remove the fuse holder and run light.

3. Remove the base from the crucible by first removing the center screw-and-spring assembly.

4. Remove the nut and bolt assembly to separate the ground wire terminal connection from the base.

5. Remove the aluminum foil shield and all of the high temperature ceramic insulation material.

6. Remove the control knob and then the dial nameplate.

7. Remove wrap-around casing.

This step will make the bi-metal thermostat and the heating elements accessible for your testing and evaluation. Before continuing on to the next step a full visual analysis should be performed. Check for any broken wires, or loose connections and for any obvious obstructions that may be the source of the problem.

8. Disconnect all of the electrical leads from the thermostat.

With the electrical leads of the heating elements disconnected you can perform a standard continuity test on each of the elements to check for failure before removing them. There should be continuity between both leads of the heating element and no continuity between either of the element leads and the element's casing.

Information & Instruction Manual for
American Beauty® General Purpose
Industrial Solder Pots

Proud Manufacturers of American
Beauty® Soldering Tools

1.0 Introduction

We would like to take this opportunity to thank you for choosing one of our General-Purpose Solder Pots in order to meet the requirements of your intended dip-soldering applications. All of our American Beauty® Solder Pots are manufactured by Assembly Technologies International Inc. We are confident that you will find the information that is being presented within this manual to be both helpful and informative, however if you have questions that are beyond the scope of what this manual covers, please feel free to give us a call.
American Beauty® Model 300 and Model 600 General-Purpose Solder Pots are always manufactured using the highest quality materials available and are assembled with care to consistently conform to our exacting quality specifications. We are confident that with the proper care and maintenance, your American Beauty® Solder Pot will provide you with a long and reliable service life.
This manual was developed to address specific questions and concerns as they relate to; General Operating Procedures, Care and Maintenance, Principles of Dip-Soldering and some very basic Safety Issues that may be associated with the use of these products.

1.1 Description

General-purpose solder pots provide a method of conduction soldering (simply referred to as dip-soldering) that may be utilized in a fairly wide variety of applications. The family of general-purpose solder pots that we manufacture are intended primarily for use in low volume industrial dip-soldering applications. They are designed to be able to melt the solder alloy that is being used in them and then maintain that solder's molten operating temperature for the duration of your dip-soldering application.
The Model 300 (1lb capacity) and the larger Model 600 (2.5 lb capacity) are general-purpose solder pots which feature; a fine-grain gray (chemically stable) grey cast iron crucible, with a wide lip for fixturing; a wide base to help prevent tipping and a removable dross skimmer assembly. The solder pot crucibles are always manufactured using grey cast iron because it has a natural resistance to solubility in tin (the primary component of many solder alloys) at temperatures below 800°F.
Both sizes of our general-purpose solder pots develop their heat by using two replaceable cartridge-heaters (160 watt, for the Model 300 and 300 watt for the Model 600) and they each have a bi-metal thermostat that controls their operating temperature. The glass wool (high-temperature ceramic) insulation being used in the solder pots helps to diminish the ambient heat loss that takes place during use, and a run-light lets you know that the units are continuing to cycle properly.
Both of these models have an operating temperature range of around 350-850°F (176-454°C) and operate on 110-120 volt AC, 50/60 Hz, supply voltage.(*220-240 volt models also available*) They also incorporate an in-line fuse for added safety and protection (the Model 300 uses a 5amp and the Model 600 uses a 7amp, 1/4" x 1-1/4" time-delay type fuse).
In dip-soldering applications, the solder pot serves as both the source of the required heat and as the supply of solder being used. The combined overall heat content of the crucible's mass and the solder that is contained within is generally large enough to offset any small amounts of heat losses that take place during the various dip-soldering applications.

1.2 General-purpose solder pot uses

General-purpose solder pots are usually used to dip-solder small boards and assemblies, and to pre-tin wire, cable conductors and electronic component leads. The pre-fluxed parts are simply dipped slowly and smoothly into the molten solder bath at the required rate of speed and then withdrawn in the same manner. The amount of solder that is required to adhere to the assembly or the conductor can be controlled to some extent by the operating temperature of the solder pot and is also affected by the force of gravity. A voltage regulator can be incorporated into your set-up, allowing you to adjust the supply voltage that is going into the solder pot, thus allowing you to better control the operating temperature and achieve a tighter tolerance. This gives you the ability to increase the use of your solder pot to include more thermally critical applications. *Call our customer service to ask about our line of voltage control units.*

2.0 Safety

American Beauty General-Purpose Solder Pots must be operated in complete compliance with any federal, state and local regulations that exist pertaining to the use of this type of device. Operators should be made aware of and fully understand all of the warnings that relate to the operation, or use of this device and also all of the warnings that relate to any materials used in, or around this device. Consult the manufacturers of the solders, fluxes, cleaning agents or other products that might be used in conjunction with this device to obtain their current MSDS's or other available documentation regarding each of their individual products.

Warnings (as stated above) should include any MSDS's, operations manuals, instruction sheets, stickers, labels, inserts, and other related material or documents that are currently (or that become) available.

2.1 Safety - Heat

Whenever they are in use, solder pots are usually going to be full of an extremely hot solder alloy that is in a molten liquid state. Therefore particular care should always be taken to protect the solder pot against any possibility of tipping, spilling, splashing or solder overflow. Your solder pot should always be located on a smooth level surface in the work area and this surface should be resistant to thermal and chemical damage that may be possible in case of spills, splashes or overflow of the materials that are being used.

Our general-purpose solder pots are designed with a very large thermal capacity so that they can reach and maintain relatively high operating temperatures. Because of this design they are able to remain at these high temperatures for a very long period of time, even after they are turned off and unplugged. Caution should be exercised whenever you are around any solder pot that has been recently used. This is because the surface of the solder may crust over as it is cooling and appear to be solid, while just below the surface it can still be dangerously hot, and may still remain in a molten liquid state.

Because of the relatively high temperatures required in many dip-soldering applications, there should never be any type of combustible, explosive or heat sensitive materials allowed in or near the intended work area.

All surfaces and components of the solder pot including the dross skimmer and the adjustment knob should be considered dangerously hot during use, and for a long period after being turned off or unplugged. Proper attire, including all required safety equipment or apparel, must be worn when working in, or around the areas where any of these general-purpose solder pots are in use.

2.2 Safety – Ventilation

The work area should always be properly ventilated whenever you are operating any type of solder pot or soldering related equipment. There are a wide variety of sizes, styles and types of exhaust and ventilation systems available that are specifically designed for the removal of any potentially harmful fumes, vapors or offensive odors that may be given off during any of your dip-soldering applications. At a minimum you must be aware of, and operate in complete compliance with all federal, state and local regulations that may pertain to the work area and to any of the materials and equipment that may be used in conjunction with the intended dip-soldering application.

The ventilation system that is being used, or the manner in which it is set up, may generate some unwanted air movement around and over the solders surface, which can contribute to a certain amount of additional cooling of the solder alloy. It may be necessary to alter the set up of the ventilation equipment, or make an adjustment to the solder pots set point, in order to off-set this type of cooling effect and maintain the proper operating temperature.

Be sure that you have obtained, read and fully understand all of the available documentation regarding the proper use, storage, safe handling and operations of any materials and equipment that you may be intending to use during your dip-soldering applications. This includes Material Safety Data Sheets and any other types of instructional materials or information that may be supplied by, offered by, or requested from, each of the individual manufacturers of the equipment, solders, fluxes, cleaning agents or other materials that you will be using directly, or indirectly with this general-purpose solder pot.

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Never work alone when performing any type of operation that has the potential to be hazardous in any way.

1. Prepare the work area to prevent damage in case of any over splash of molten solder while pouring it out.

2. Place the solder pot on the intended work surface. The surface must be smooth, level and unobstructed.

3. Place the discard receptacle near the solder pot, making sure that there are no obstructions between them.

4. Plug in the solder pot and heat to its normal operating temperature in order to melt the solder that is in it.

5. When the solder has completely melted remove the dross skimmer assembly and unplug the solder pot.

6. Pour the hot molten solder slowly and very carefully into the previously prepared discard receptacle.

7. Allow the solder in the discard receptacle to solidify and completely cool down before further handling.

8. Invert the now empty solder pot onto a sheet of aluminum foil over a non-combustible flat, level surface.

9. Plug the solder pot back in and turn the thermostat control knob clockwise to its maximum heat setting.

10. Allow the solder pot to heat for 15 to 20 minutes. Any remaining dross will cinder away to a fine ash.

11. Unplug the solder pot and allow it to completely cool down before moving on to the next step.

12. Using a natural bristle brush remove all of the ash. Take care not to disturb the surface of the crucible.

Solder that is removed from your solder pot using this process can be reused if it is not contaminated.

6.0 Helpful Solder Pot Information

Do not scrape, file or abrade the surface on the inner walls of your solder pot crucible.

When a new solder pot is first put into service the amount of dross production can be significant, especially during the initial start-up period. This is a temporary condition that occurs while the tin in the solder alloy is interacting with the grey cast iron, forming a tin/ferrite barrier on the surface of the crucible. The formation of this barrier improves the solder pot's efficiency, protects the crucible from the solution action of the tin and helps to retard dross production in the future. It takes about 72 hours of operation for the protective barrier to form, and the dross production to lessen. Once this barrier has formed on the walls of the crucible it will remain there unless it is disturbed or damaged with a scraper or a similar type of tool.

The effects of using lead free solder alloys in your American Beauty General-Purpose Solder Pot

The use of certain lead free solder alloys in the American Beauty® General Purpose Solder Pots should have no unfavorable effects that may be caused by using a higher percentage of tin in the solder alloy, as long as the required operating temperature being used does not exceed 800°F. You will find more information being discussed regarding the solution action of iron into tin and with some more specific details in Section **3.3**. Because of the 800°F temperature restriction, it is always important to consider the suggested operating temperature of 100-150°F above the liquid temperature of the solder alloy being used when making your determination as to which lead free solders should be used for the intended application.

Many of the lead free solders currently available may have a higher liquid temperature than the widely used "tin-lead" solders, but will still have a low enough liquid temperature to be used in your general purpose solder pot at or below the recommended maximum temperature of 800°F.

5.7 Evaluation and Replacement of the Bi-Metal Thermostat

Thermostat replacement sometimes becomes necessary when the bi-metal plate of the thermostat no longer responds to the rising temperature causing the solder pot to remain on and become over heated, or when the thermostat has become contaminated with flux vapor residue or oxidation that can obstruct the current flow between the two electrical contacts causing the solder pot not to be able to heat at all.

Begin by following the ***"Disassembly of the Solder Pot"*** steps from number one through number eight. When the electrical leads of the bi-metal thermostat have been disconnected you should perform a standard continuity test in order to determine the type of failure and the possible need for replacement that may exist. When you are testing the bi-metal thermostat for continuity you should first turn the adjustment shaft to the fully clockwise position to test for continuity (closed) and then to the fully counter clockwise position to test for no continuity (open).

Replacement of the bi-metal thermostat is recommended when either continuity test shows improper results.

Remove the faulty thermostat from the crucible by removal of the retaining screw. A wire brush may then be used to remove any build up, or contamination that could hinder the attachment of the new thermostat.
The thermostat retaining screw should be snug to eliminate movement, however over tightening the screw can damage the thermostat by causing the ceramic insulators to crack. Make sure that the new thermostat is wired properly.

The steps for reassembling the solder pot are completed by simply reversing the steps used for disassembly.

5.8 Purging the Solder Pot

There may be times when it will become necessary to remove the existing solder alloy from your solder pot crucible. When this situation arises it is very important for you to remember that you will be handling a very hot molten solder material and you should exercise extreme caution throughout the entire purging process.

Caution: Never attempt this process without using protective shielding devices and heat resistant attire.

You will need to have a discard receptacle for collecting the solder that is being removed from your solder pot. This can be a reservoir made from aluminum foil that is nested inside a larger container on a blanket of noncombustible material such as sand, vermiculite or clay based kitty litter. Make sure that the receptacle is of a sufficient size to accept all of the solder that is being removed from the solder pot.

The work area, solder pot and discard receptacle that are being used for this process should all have highly visible signs and posted markings warning personnel of the intense heat and the potential for severe burns that may exist. The work surface that you intend to use for this procedure should be smooth, level, and heat resistant. It is also a good idea to have the work surface covered with a protective sheet of noncombustible material in case there are any accidental spills or splashing of the hot molten solder.

In order to help prevent the possibility of any unnecessary accidents you should always limit the number of personnel that are allowed to be within the work area especially during this type of process. To help prevent tripping or restricted movements of your operators you should make sure that the work area is always kept clean, organized and uncluttered.

When you get to the solder pouring step of this process do not rush. The pot's grey cast iron crucible has a great capacity for holding heat and it should keep the hot solder molten long enough for you to safely empty your solder pot. You should however plan on dumping out the contents of the solder pot soon after unplugging it. If you have waited too long (and the solder's surface has begun to cool and skin over at all) do not attempt to empty the solder pot. The risk of splashing will become very high and the molten solder beneath the surface skin will be dangerously hot. It is better to plug the solder pot back in and reheat it until the solder has once again completely melted. The following steps will help to outline the specific procedures that should be followed in order to complete the purging process in a safe and efficient manner.

2.3 Safety - Electrical Current

This general purpose solder pot is an electrical heating device that has been designed primarily for its use in low volume industrial environments that require the completion of various types of general dip-soldering applications. It should always be operated in complete accordance with all of the applicable safe operating procedures, ordinances, and regulations that exist.

American Beauty® General-Purpose Solder Pots are available in 110-120 VAC and 220-240 VAC varieties. You should therefore make certain that your solder pot is securely plugged into the appropriate AC voltage receptacle to eliminate the possibility of electrical damage to the unit. The bi-metal thermostat that is being used to control the operating temperature of this solder pot does not incorporate what is commonly referred to as a positive off. Therefore a solder pot that is not being used should always be turned to the lowest setting and unplugged for an improved level of operator and workplace safety.

Removing the protective base-plate cover from the bottom of the solder pot can expose an individual to the possibility of electrical shock hazards. Only experienced, qualified personnel should attempt to perform any type of service or general maintenance that may become necessary.

Never leave any solder pot unattended unless it is unplugged and it has completely cooled down.

3.0 Set-up procedures

Your American Beauty® General-Purpose Solder Pots should be set-up to operate only in an appropriately ventilated and completely uncluttered work area. We recommend that all of your solder pots be set-up to operate along an inside wall (away from windows, fans or heating and air conditioning vents) in order to increase their level of heating efficiency.

A general-purpose solder pot will usually contain dangerously hot molten solder during its operation. Therefore it should always be set-up to operate on a heat resistant surface that is smooth, level and completely stable. Never allow any solder pots to be set-up or positioned on or near the edge of the work surface, or on any surface that does not offer a satisfactory level of accessibility and support.

For an improved level of operator safety your solder pots should be located in an area that has controlled or limited access and is away from high volumes of foot traffic. The solder pots cord should only be plugged into a properly wired (three-wire grounded) AC voltage receptacle and should be unplugged when not in use. The power cord should never be allowed to hang freely, but should be fastened in a safe and unobtrusive manner in order to help prevent the possibility of any accidental pulling on the cord, which can cause the solder pot to be tipped over and spilled.

Your general-purpose solder pot should have adequate shielding during start-up periods in case of any solder eruptions or degassing that may take place during the solder alloys transition from solid to liquid.

3.1 Charging the solder pot

Loading a solder pot with solder is commonly referred to as charging the pot. Whenever it is possible your general-purpose solder pots should be filled with ingots or bar solder that is the same alloy composition that will be used on the components during later operations. Whenever bar type solders are being used for filling or refilling solder pots of this size during use, we recommend that the solder bars be cut into approximately 1" pieces before placing them in the pot. These smaller pieces of solder are usually able to be more quickly assimilated into the hot molten solder, minimizing the temperature lowering effect of replenishing the used solder as you work. It is for this same reason that you should always keep the level of solder maintained by adding smaller portions more frequently. Be cautious and watch for splashing when introducing more solder into the pot. Never place any kind of flux (unless it is intended as a cover flux) directly into your solder pot. You should never use any types of rosin, or acid core solder alloys when you are charging your solder pot.

3.2 Determining the correct operating temperature

The operating temperature of the solder pot should be between 100-150°F (38-66°C) above the temperature that the solder alloy (check with the solder manufacturer or their supplied documentation) becomes liquid. The molten solder will then be less likely to drop below its liquid state due to sustained runs, excessive mass, heavy volumes, or other factors that lower the temperature of the solder pot. This is generally a good place to start your operating temperature evaluations for any new applications that are being performed.

Determining the correct operating set point of your solder pot for each application will be dependant upon several factors, such as; the liquid temperature of the solder; the geometry, size, overall mass and heat sinking properties of the parts; the amount of ambient-thermal loss due to air movement (currents, ventilation, etc.); the required recovery time needed and the speed and volume of the application that is being performed. For instance when performing dip-soldering applications on circuit boards that have closely populated components and leads, or when clusters of fine AWG wire leads are being pre-tinned it will be necessary to have the solder temperature high enough to resist bridging.

We suggest that you periodically review the operating temperature and the effectiveness of the solder pot's set point and then make any appropriate changes, according to those findings. There are some specific signs to watch for that will help you when determining whether the solder pot is being run at the most acceptable operating temperature for the application that is being performed. When the solder is properly heated it will be shiny in appearance and it will always produce a radiused fillet between the parts that are being joined together. Wires that are being tinned at the appropriate temperature will generally be evenly coated without losing their definition or having any clumps appear on the wire. The insulating jacket of the wires that are being tinned should never be melted or distorted from the heat (this problem can also be caused by allowing the wires to be held in the solder for too long, which causes a wicking action of the solder beneath the wires insulating jacket).

3.3 Setting the dial

The dial markings that are printed on the nameplate of our American Beauty® General-Purpose Solder Pots are there for reference information only. Whenever it becomes necessary for you to be able to determine the actual temperature of the solder while the pots are operating, an external temperature-sensing device will be required. The operating temperature range of the solder pot can be regulated by turning the adjustment knob (remember that the knob gets very hot during use) clockwise to raise it and counter-clockwise to lower it.

The dial markings and the knobs rotation continue beyond the solder pot's recommended operating range in a clockwise direction to the location that is marked maximum. If you are using any tin/lead solder alloy you should be aware that when operating the solder pot above 800° F the solvent action of the tin can begin to dissolve and erode away the inner wall of the grey cast iron crucible. The tin has no solvent effect on the grey cast iron until reaching temperatures above 800° F. This is one of the reasons why we incorporate grey cast iron crucibles in all of our American Beauty® General-Purpose Solder Pots.

It is important for you to understand that the idle range of the solder pot actually begins at the point where the bi-metal thermostat closes and the run light illuminates, which will vary depending upon the temperature of the ambient operating environment. The run light illuminates to indicate when the voltage is being supplied to the heating elements. This gives you the ability to monitor the actual cycling of the solder pot as it is being used. Bi-metal thermostats tend to function more accurately towards the middle of their operating range, rather than at either the upper or lower extremes.

To increase the operating life of the heating elements and eliminate excessive solder contamination do not operate your solder pots at a higher temperature than what is actually required for the specific dip-soldering application. You can expect higher operating temperatures to shorten the working life of the two elements that are being used to heat your solder pot because the higher the temperature is set, the longer the elements must be on to keep that temperature level maintained. The solution action that can cause contamination of the solder alloy (by materials being introduced into the solder) is also increased as the temperature is raised.

More detailed information is provided here regarding evaluation and replacement of various components.

5.4 Evaluation and Replacement of the Fuse

Follow the steps listed below to verify and replace a blown fuse.

1. Invert the solder pot and remove the base plate by first removing the three retaining screws.
2. Locate the in-line fuse holder within the solder pot base and open it.
3. Remove the fuse from the fuse holder and test it (this can be completed with a simple continuity tester).
4. Replace the blown fuse with the correct component. See the replacement parts list for the model number.
5. Close the in-line fuse holder and reassemble the base plate to the base using the three retaining screws.
6. Upright the solder pot and then plug it in to the appropriate receptacle for final verification.

If the fuse is not blown you should continue on with a test and evaluation of the other components in order to locate the true cause of your solder pot's failure. It may be a good idea to read over the troubleshooting section.

5.5 Evaluation and Replacement of the Run Light

Follow the steps below to verify and replace a burned out run light.

1. Invert the solder pot and remove the base plate by first removing the three retaining screws.
2. Locate the run light leads within the solder pot base and disconnect them.
3. Test the light to determine if it has burned out (this can be completed with a simple continuity tester).
4. If the light is burned out it should be replaced. See the replacement parts list for the model number.
5. Reconnect the new light's leads and reassemble the base plate to the base using the three retaining screws.
6. Upright the solder pot and then plug it in to the appropriate receptacle for final verification.

If the run light is good you should continue on with a test and evaluation of the other components in order to locate the true cause of your solder pots failure. It may be a good idea to read over the troubleshooting section.

5.6 Evaluation and Replacement of the Heating Elements

Begin by following the ***"Disassembly of the Solder Pot"*** steps from number one through number eight. With both of the electrical leads of the heating elements disconnected you can perform a standard continuity test on each of the elements in order to verify an element failure before you begin removing either of them. There should be continuity between both of the heating element's leads and no continuity between either of the element leads and the element's outer casing.

It is recommended that both heating elements be replaced whenever one (or both) of them has expired.

You can remove the elements from the crucible by loosening the retaining screws in the crucible located at approximately the middle of each element and tapping the elements out with a leather mallet and a wooden dowel. Please note that it may take some added persuasion to free the elements due to the possibility of built up oxides. A wire brush may be used to remove any build up, or contamination from the inner walls before installing the new heating elements.

Install new heating elements into the cavities with the wires located on the thermostat side of the crucible. The Heating Elements are wired in parallel for 120VAC, or in series for 220VAC.

The steps for reassembling the solder pot are completed by simply reversing the steps used for disassembly.

5.2 Disassembly of the Solder Pot

Use the following list of steps as your guide to the solder pot's disassembly when you are performing any required service, maintenance or trouble shooting of your American Beauty® General-Purpose Solder Pot.

1. Remove the base plate by first removing the three retaining screws. Mark all wires to avoid confusion.
2. Remove all of the wire- nuts from the electrical leads in order to remove the fuse holder and run light.
3. Remove the base from the crucible by first removing the center retaining (screw-and-spring) assembly.
4. Remove the nut and bolt assembly to separate the ground wire terminal connection from the base.
5. Remove the aluminum foil shield and high temperature ceramic insulation material (do not discard).
6. Remove the control knob from the bi-metal thermostat shank.
7. Remove the dial nameplate from the wrap around casing (solder pot ring).
8. Remove wrap-around casing (solder pot ring) by lifting at an angle to clear the thermostat assembly.
9. Disconnect all of the electrical leads from the thermostat assembly.
10. Remove the heating elements by loosening the setscrews and gently tapping them out with a soft mallet.
11. Remove the thermostat assembly by first removing the retaining screw.

Reverse the above steps for reassembling the solder pot after replacement of the faulty components.

If you replace the bi-metal thermostat be sure that you bend the new connecting terminals slightly inward (using the original thermostat for visual reference) to avoid the possibility of making any electrical contact with either the crucible or the wrap-around casing (solder pot ring).

- Make sure that the run-light connection is made on the element side of the thermostat.
- Make sure that all of the wire nut connections are tight and that absolutely no exposed wires exist.
- Make sure that all of the wire nut connections are located between the base and the base plate.

5.3 Wiring Information

Each of the American Beauty® General-Purpose Solder Pots contains two cartridge-style heating elements that are connected to a bi-metal thermostat assembly for temperature control. These elements are wired in parallel for the 120 volt solder pots and in series for the 220 volt solder pots. Before you attempt to replace either one of the heating elements or the bi-metal thermostat assembly you should test each of them in order to determine which one of the components has failed. This testing can be best accomplished by performing a simple continuity test using either a standard multi-meter or any basic type of continuity tester.

When you are performing the continuity testing on the elements be sure that both of the leads (on each of the heating elements) are completely disconnected from the circuit before you begin the testing process.

When you are testing the bi-metal thermostat for continuity you should first turn the adjustment shaft to the fully clockwise position to test for continuity (closed) and then to the fully counter clockwise position to test for no continuity (open). If either test fails the bi-metal thermostat should be replaced.

Information & Instruction Manual for
American Beauty® General Purpose
Industrial Solder Pots

Proud Manufacturers of American
Beauty® Soldering Tools

3.4 Measuring the solder pots actual temperature

When attempting to determine the specific operating temperature requirements for each of your dip soldering applications, we suggest you utilize a reliable temperature measurement system, in addition to the reference markings found on the solder pot itself. There are a number of reliable temperature measurement systems currently available that should be able to fulfill your specific requirements. Many of these systems contain a variety of thermocouple-probes in order to meet the specific requirements of several different temperature measurement applications and to provide you with the most accurate results.

The actual temperature of the molten solder alloy can vary significantly depending upon the exact location from where it is measured. In order to maintain some level of uniformity and consistency the temperature of the solder should always be measured from the same general area of the crucible and at approximately the same depth. The recommended depth and location should be documented when making the initial operating temperature determinations. This will insure consistency later when measuring for temperature verification.

The bottom of a properly designed solder pot should always maintain a higher level of heat than the sides, in order to cause a natural convection action to take place within the solder pot. This will keep the solder mildly agitated, which will help in maintaining a higher degree of uniformity throughout the molten solder. This type of heat requirement is easily accomplished by designing the solder pot with the heating elements located on the bottom, as we have done with the American Beauty® General-Purpose Solder Pots. With this type of design you will find that the highest temperature within the solder alloy is usually going to be within the middle one-third of the solder bath.

4.0 Usage Tips

It is important to establish the most appropriate operating temperature for each of the applications that you will be performing. Once you have established a solder pots operating temperature and it is properly set for an application, there are some specific practices that can be followed which may help improve your results.

- Utilize only quality solders with a high level of purity for your dip-soldering applications.
- Do not operate a solder pot at a higher temperature than what is required for the current application.
- Make sure that the components being soldered are clean and free of oxides and other contaminants.
- Avoid using any overly aggressive fluxes unless it is absolutely necessary for a specific application.
- Always dip and withdraw the components into the molten solder using a smooth and even motion.
- Allow an adequate amount of time for the molten solder to properly wet to the parts being dipped.
- Maintain a level of operator consistency after the soldering process has been properly established.
- Allow time for the excess flux to dissipate before immersing the component into the molten solder.
- Never introduce flux directly into the solder pot unless it is a recommended cover fluxing material.
- Use a flux that will not be adversely affected by the temperature required for the current application.
- Use flux materials sparingly. A small amount of the correct type of flux usually goes a long way.
- Skim the dross from the solders surface before dipping any components or parts into the solder.
- Do not clear the surface dross with unapproved materials that may ignite or contaminate the solder.
- Solder should be replenished frequently by adding small amounts of solder that can assimilate quickly.
- Do not wait until the solder level becomes detrimentally low before adding any replacement solder.
- To insure the highest level of efficiency every soldering process should be periodically reevaluated.

4.1 Dross

The term dross, as it relates to solder pots or dip-soldering applications, is a residue that develops at, or rises to the surface of, the molten solder alloy creating an isolative barrier to good solder adhesion. It is composed of oxidation residue, impurities and waste matter from the solder itself and from some of the other materials that are being used in the soldering process. This dross should be continuously removed by skimming it off from the surface of the solder pot with an approved (non-wettable) metal blade prior to dipping any components into the solder bath. The development of dross that is specifically due to surface oxidation may often be slowed down considerably or even stopped with the use of what is commonly referred to as cover fluxing.

All American Beauty® Solder Pots are supplied with a removable (non-wettable) dross skimmer blade assembly that pushes the dross off to the edge of the lip so it can cinder away as ash. When the dross skimmer is kept attached to the solder pot it remains at the same temperature as the molten solder so that it does not reduce the operating temperature of the solder bath during use. This also helps reduce the chances of spattering that sometimes occurs when you are introducing a cooler item into hot molten solder. All of the components of a solder pot are to be considered hot during and after use. This includes the dross skimmer and the adjustment knob, so make sure to wear the proper apparel and protective equipment that is necessary or required when you are working around, with or making adjustments to any solder pots.

4.2 Contamination

Maintaining the purity level of the solder alloy will contribute largely to the quality and uniformity of your finished solder joints. As a result of a solder alloys solvent action it may become contaminated even during normal use. This is because of the solder alloy's ability to absorb metals from the items that are being dipped into it. This form of contamination usually increases when the solder pot is operated at higher temperatures. There are certain metals such as zinc that are very quick to dissolve into the solder alloy, while other metals such as silver may do so much more slowly. When fixtures and clamps are being continuously inserted into the solder bath they may also help contribute to contamination of the solder alloy. There are several solder manufacturers who offer some type of analysis program for testing your solder alloys contamination level.

All solder alloys in use may become contaminated with foreign materials over time and at some point will probably need to be replaced. This replacement process is referred to as purging the solder pot. The solder alloy usually becomes noticeably ineffectual at wetting or tinning parts as its purity degrades until finally reaching the point where it becomes necessary to purge the solder pot and start over again with fresh solder.

You will find detailed instructions that relate to the process of purging the solder pot in the section of this manual that is titled "Purging the solder pot". Make sure you have read and fully understand the instructions before attempting the solder pot purging process.

4.3 Cover Fluxing

Cover fluxing (also referred to as top fluxing) is a practice that is sometimes used in order to help us slow down contamination of the solder alloy. A cover material (preferably a flux material designed for this type of application) is used as an insulating blanket on the surface of the molten solder alloy. The cover fluxing material acts as a protective barrier and will slow down contamination caused by the oxidation of the solder alloy that would otherwise occur from direct contact with the atmosphere. Cover fluxing does not address contamination by metals absorbed during the dip-soldering process. Therefore a continual monitoring of the solder alloys purity must still take place. Because the parts may pass through the cover material as they are removed from the solder, they may require a follow up cleaning to remove any unwanted residue.

Although it is a more expensive process, the surface of the solder alloy is sometimes covered with a blanket of inert gas such as nitrogen, to act as a barrier between the solder and the atmosphere. The primary advantage of this method is that the components being soldered can be brought through the gas, directly into the solder alloy and then removed without concern for unwanted residue adhering to the finished work.

Information & Instruction Manual for
American Beauty® General Purpose
Industrial Solder Pots

Proud Manufacturers of American
Beauty® Soldering Tools

4.4 Flux damage

Many fluxes, especially those containing chlorides, are highly activated and emit a rather caustic vapor at the temperatures required for dip-soldering applications. Solder pot failures can often be linked to damage that has been caused by this type of vapor. They usually collect around the base of the solder pot and are carried by convection into the solder pot assembly where they can attack the elements, the wiring connections and the electrical contacts of the bi-metal thermostat. Even the mildest fluxes (and the vapors that they emit) seek heat and will permeate into any of the accessible openings in the solder pot assembly, such as the dial plate area and the cord entry hole and can cause damage to the internal components of the solder pot if enough of their vapors are allowed in. Positioning the solder pot in a manner that will allow you to avoid taking parts in and out over these specific locations may be helpful in slowing down or even avoiding this particular type of damage.

Using clean components and quality materials will usually render the use of the more highly caustic fluxes unnecessary. Mildly activated organic based fluxes (such as rosin fluxes) will often suffice for most of your dip-soldering applications and they are much less damaging to the various components of the solder pot.

5.0 Maintenance and Service

As with all electrical and mechanical devices it might eventually become necessary to perform some type of repairs to your general purpose solder pot in order to help keep it in top working order. Some of the solder pot repairs that may eventually be required can include replacement of the fuse, run light, thermostat assembly, heating elements or the power cord and plug assembly.

You will be happy to know that the basic modular design of all of our American Beauty® Solder Pots makes servicing them a very uncomplicated process. The following information is presented in order to help assist you in accomplishing these simple repairs in a safe, efficient and orderly manner. Please be sure to read all of the instructions completely before attempting to service any part of your general-purpose solder pots.

Caution: To avoid the possibility of any accidents or personal injury only qualified maintenance personnel should perform any of the necessary repairs and they should never attempt any maintenance or service to the solder pot unless it is unplugged and has completely cooled. It is extremely important to remember that although the solder may appear to be solid on the surface while the pot is cooling down it may still remain extremely hot and even molten just below the surface.

5.1 Replacement Parts List.

Part Number	Description
29-2642	Fuse (5 amp Time-Delay) (for Model 300 only)
29-2650	Fuse (7 amp Time-Delay) (for Model 600 only)
29-1970	In-line Fuse Holder (both models)
9301	Heating Element (160 watt cartridge heaters, two required) (for Model 300 only)
9300	Heating Element (300 watt cartridge heaters, two required) (for Model 600 only)
8055	Bi-Metal Thermostat Assembly (both models)
302	Dross Skimmer Blade Assembly (for Model 300 only)
602	Dross Skimmer Blade Assembly (for Model 600 only)
874S3	Power Cord and Plug Assembly (both models)
29-1828	Run Light (both models)

The list above are those components that we have determined may eventually become necessary to replace. If you feel there is a need to replace a component that is not listed here you can obtain the appropriate part number from any one of our product support specialists.