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# Hot-Shot® Operating Instructions

Model 320  
(For use with Copper and Iron Pipe)



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Parts & Service**



Your Hot-Shot is designed to give you years of trouble-free, profitable service. However, no machine is better than its operator.

Read, understand and follow all safety warnings and instructions provided with the product. Failure to follow the warnings and instructions may result in electric shock and/or serious injury. Save all warnings and instructions for future reference.

**SAVE THESE INSTRUCTIONS!**

# **General PIPE CLEANERS**

## GENERAL SAFETY RULES



**WARNING**  
Read and understand operator's manual before using this machine. Failure to follow operating instructions could result in death or serious injury.

**WARNING! Read and understand all instructions.** Failure to follow all instructions listed below may result in electric shock, fire and/or serious personal injury. Replacement manuals are available upon request at no charge, or may be downloaded from our website, [www.drainbrain.com](http://www.drainbrain.com). Instructional videos are available for download on our website, and may be ordered. If you have any questions or problems, please call General's customer service department at 412-771-6300.

### SAVE THESE INSTRUCTIONS!

These instructions are intended to familiarize all personnel with the safe operation and maintenance procedures for the Hot-Shot.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

## DANGER

DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

## WARNING

WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

## CAUTION

CAUTION indicates a hazard with a low level of risk which, if not avoided, will result in minor or moderate injury.

## WARNING



Electric shock resulting in death can occur if you plug this machine into an improperly wired outlet. If the ground wire is electrified, you can be electrocuted by just touching the machine, even when the power switch is off. A ground fault circuit interrupter will not protect you in this situation. Use a UL approved tester to determine if the outlet is safe.



Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust. Power tools create sparks which may ignite the dust or fumes.



Always wear safety glasses and rubber soled, non-slip shoes. Use of this safety equipment may prevent serious injury.



Be very careful when thawing frozen pipes. Clamp tips and cable connections become hot during use. Avoid contact with skin as burns can result. Keep clamps away from combustible materials or articles that can be damaged by heat.

## GENERAL SAFETY RULES

### Work Area

1. **Keep work area clean and well lit.** Cluttered benches and dark areas invite accidents.
2. **Do not operate these tools in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust.** Power tools create sparks which may ignite the dust or fumes.
3. **Keep bystanders, children, and visitors away while operating a power tool.** Distractions can cause you to lose control.

### Electrical Safety

1. **Grounded tools must be plugged into an outlet, properly installed and grounded in accordance with all codes and ordinances. Never remove the grounding prong or modify the plug in any way. Do not use any adapter plugs. Check with a qualified electrician if you are in doubt as to whether the outlet is properly grounded.** If the tool should electrically malfunction or break down, grounding provides a low resistance path to carry electricity away from the user.
2. **Avoid body contact with grounded surfaces such as pipes, radiators, ranges and refrigerators.** There is an increased risk of electric shock if your body is grounded.
3. **Do not expose power tools to rain or wet conditions.** Water entering a power tool will increase the risk of electric shock.
4. **Do not abuse the cord. Never use the cord to carry the tools or pull the plug from an outlet. Keep cord away from heat, oil, sharp edges or moving parts. Replace damaged cords immediately.** Damaged cords increase the risk of electric shock.
5. **When operating a power tool outside use an outdoor extension cord marked "W-A" or "W".** These cords are rated for outdoor use and reduce the risk of electric shock.
6. **Use only three-wire extension cords which have three-prong grounding plugs, and three-pole receptacles which accept the tool's plug.** Use of other extension cords will not ground the tool and increases the risk of electrical shock.
7. **Use proper extension cords.** Insufficient conductor size will cause excessive voltage drop, loss of power, and overheating.
8. **Keep all electric connections dry and off the ground.** Reduces the risk of electric shock.
9. **Do not touch plugs or tools with wet hands.** Reduces the risk of electric shock.

### Personal Safety

1. **Stay alert, watch what you are doing and use common sense when operating a tool. Do not use tool while tired or under the influence of drugs, alcohol, or medication.** A moment of inattention while operating power tools may result in serious personal injury.
2. **Dress properly. Do not wear loose clothing or jewelry. Contain long hair. Keep your hair, clothing, and gloves away from moving parts.** Loose clothes, jewelry, or long hair can be caught in moving parts.
3. **Avoid accidental starting. Be sure switch is off before plugging in.** Plugging in tools that have the switch on invites accidents.
4. **Do not overreach. Keep proper footing and balance at all times.** Proper footing and balance enables better control of the tool in unexpected situations.

5. **Always wear safety glasses and rubber soled, non-slip shoes.** Dust mask, non-skid safety shoes, hard hat, or hearing protection must be used for appropriate conditions.

### Tool Use and Care

1. **Do not use tool if switch does not turn it on or off.** Any tool that cannot be controlled with the switch is dangerous and must be repaired.
2. **Disconnect the plug from the power source before making any adjustments, changing accessories, or storing the tool.** Such preventative safety measures reduce the risk of starting the tool accidentally.
3. **Store idle tools out of reach of children and other untrained persons.** Tools are dangerous in the hands of untrained users.
4. **Maintain tools with care.** Properly maintained tools are less likely to cause injury.
5. **Check for breakage of parts, and any other condition that may affect the tool's operation. If damaged, have the tool serviced before using.** Many accidents are caused by poorly maintained tools.
6. **Only use accessories that are recommended by the manufacturer for your model.** Accessories that may be suitable for one tool may become hazardous when used on another tool.
7. **Inspect tool and extension cords periodically and replace if damaged.** Damaged cords increase the risk of electrical shock.
8. **Keep handles dry and clean; free from oil and grease.** Allows for better control of the tool.

### Service

1. **Tool service must be performed only by qualified repair personnel.** Service or maintenance performed by unqualified repair personnel could result in injury.
2. **When servicing a tool, use only identical replacement parts. Follow instructions in the Maintenance section of this manual.** Use of unauthorized parts or failure to follow Maintenance Instructions may create a risk of electric shock or injury.
3. **Disconnect all power from the unit before servicing.** Eliminates the risk of electrical shock and accidental starting.

## SPECIFIC SAFETY RULES

1. **Be sure that the unit is plugged into a properly grounded receptacle.** If in doubt, check receptacle before plugging in machine. Check the power cord to see that there are no cuts or frays, and that the grounding prong on the plug is still in place.
2. **The Hot-Shot 320 requires a 120 volt AC grounded 15 amp circuit. The Hot-Shot 400 requires either a 15 amp 120 volt AC outlet when on the "low" setting, and a 20 amp outlet when on the "high" setting.** Using an inadequate power supply will cause the unit to underperform.
3. **If the power cord supplied with the machine is not long enough, be sure to use a 16 gauge heavy duty extension cord no more than 50 feet long and in good condition.** Using lighter cords can result in severe power loss and overheating.
4. **All grounds (i.e. electric service, telephone, and cable TV grounds) must be disconnected, both at the house being thawed and all houses on the same distribution transformer.** There is a possibility that the output current of the unit may be transferred into the electrical service, either at the house being thawed, or at a remote location.



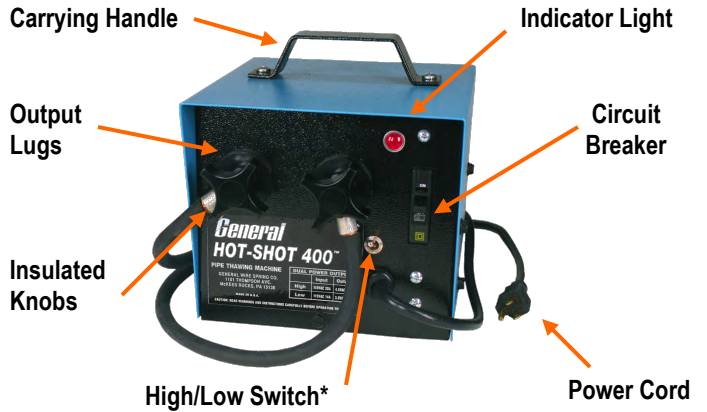
5. **Do not leave unit unattended while thawing.** It is dangerous to leave any tool unattended during operation.
6. **Do not touch the clamp tips or cable connections.** Reduces the risk of burns.
7. **Do not operate machine if operator or machine is standing in water.** Will increase risk of electrical shock.
8. **Do not operate unit with the housing removed.** Exposure to internal parts may result in injury.
9. **Wear safety glasses and rubber soled, non-slip shoes.** Use of this safety equipment may prevent serious injury.
10. **Use cable and clamps provided with unit.** Incorrect cables may result in overheating of the wires.
11. **Keep clamps away from combustible materials or articles that can be damaged by heat.** Clamp tips become hot during use.
12. **Tool is made to thaw frozen iron or copper pipes. Follow the instructions on proper use.** Other uses or may increase risk of injury.

## INTRODUCTION

A frozen water pipe can be thawed very quickly by passing low voltage high current electricity through the frozen pipe. **Plastic pipe will not conduct electricity so this method will not work on plastic pipe.** There must be unfrozen water under standard water pressure on one side of the frozen part of the pipe, and an open faucet on the other.

When thawing a frozen section of water pipe, heat the pipe only enough to melt a thin film of ice in the inside of the pipe. **A faucet must be opened** in the unfrozen part of the line down stream from the frozen section. The warmer water above the ice will seep through the melted film and very quickly melt the rest of the ice. The water will start to flow in about 10 minutes if the connections are properly made. Since copper pipe will not heat as fast as steel pipe, allow about a 30 percent longer thawing time. (See chart on page 7.)

## FEATURES



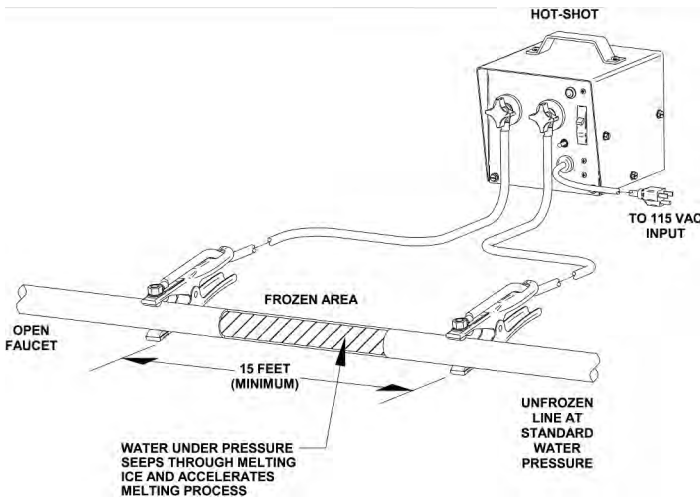
\*High/Low Switch is only on the Hot-Shot 400.

- The Hot-Shot 320 puts out 320 amps, yet pulls only 13 amps. It can clear 1/2" to 1-1/2" pipes up to 100 ft. long.
- The Hot-Shot 400 can clear 1/2" to 1-1/2" pipes up to 175 ft. long.
- The Hot-Shot 400 features a "High/Low" switch to allow the unit to be used on either a 15 amp or a 20 amp outlet. When the High/Low switch is in the **Low** position, the unit will draw 14 amps and supply 320 amps of thawing power. When in the **High** position, it will draw up to 20 amps and supply 400 amps of thawing power.
- Both units have a built-in thermal protector. If the internal temperature reaches a critical level, the Hot-Shot will automatically shut down.

## SPECIFICATIONS

	HS-320	HS-400
Input Voltage	120v	120v
Phase	Single	Single
Frequency	50/60 Hz	50/60 Hz
Input Current	13 amp	14 amp Low 20 amp High
Circuit Breaker	20 amp	20 amp
Output Voltage	3.5 volt	3.5 volt Low 4.3 volt High
Output Current	320 amp	320 amp Low 400 amp High
Thawing Capacity	1/2" - 1-1/2" x 100 ft. Max	1/2" - 1-1/2" x 175 ft. Max
Recommended Cables*	2 - 20 ft. #2 AWG 2 - 50 ft. #2/0 AWG	2 - 20 ft. #1 AWG 2 - 50 ft. #2/0 AWG
Height	8"	8"
Width	8"	8"
Depth	8"	8"
Weight	31 lbs.	31 lbs.

\*Note: Longer cables must also be larger in AWG size.



## ACCESSORIES

CAT. #	DESCRIPTION	WT.
20-2	20 Ft. #2 Cable w/Pipe Clamp & Lug	6 LBS.
50-2	50 Ft. #2 Cable w/Pipe Clamp & Lug	16 LBS.
20-1	20 Ft. #1 Cable w/Pipe Clamp & Lug	8 LBS.
20-2/0	20 Ft. #2/0 Cable w/Pipe Clamp & Lug	13 LBS.
50-2/0	50 Ft. #2/0 Cable w/Pipe Clamp & Lug	30 LBS.
100-2/0	100 Ft. #2/0 Cable w/Pipe Clamp & Lug	50 LBS.
50-4/0	50 Ft. #4/0 Cable w/Pipe Clamp & Lug	50 LBS.
100-4/0	100 Ft. #4/0 Cable w/Pipe Clamp & Lug	96 LBS.

## OPERATION

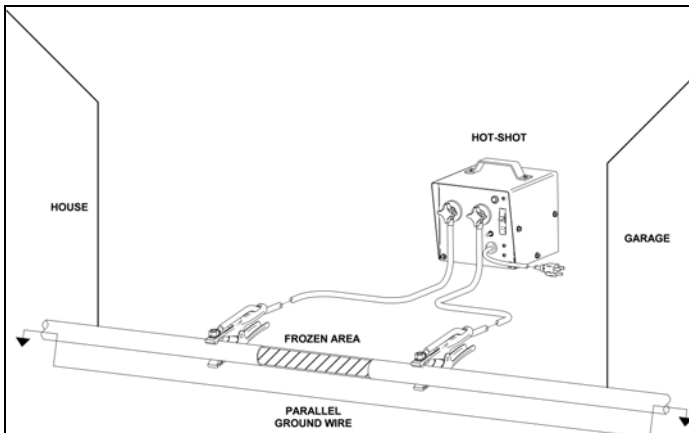


**MAKE SURE MACHINE IS DISCONNECTED FROM POWER SOURCE BEFORE CONNECTING CABLES!**

1. Isolate the frozen section of pipe. Inside a house, this is done by opening faucets and back tracking the pipes. The frozen section will usually be in the outside walls, near doors, windows, and in crawl spaces under floors. If all the water outlets in the house fail to operate, the line from the curb valve to the house is frozen.
2. House service pipes usually have to be thawed by connecting one cable to the exposed pipe in the kitchen or basement, and the other cable to the curb service. At the curb, make the connection to the valve at the bottom of the service riser, using the curb key. Do not connect the cable to the adjustable ground level cover, as it is a poor connection to the valve.
3. Connect the cables on either side of the frozen section so that they complete an electric circuit. The cable clamps must be at least 15 ft. apart. Keep clamps away from combustible materials or articles that can be damaged by heat. Cables and clamp tips become hot during use.



**CLAMPS AND CABLES GET HOT! KEEP CABLES CLEAR OF COMBUSTIBLE MATERIALS OR ARTICLES THAT CAN BE DAMAGED BY HEAT.**



All grounds (i.e. electric service, telephone, and cable TV grounds) must be disconnected, both at the house being thawed and all houses on the same distribution transformer. There is a possibility that the output current of the unit may be transferred into the electrical service, either at the house being thawed, or at a remote location.

4. Good connections are required. **Clean all pipes before connecting the cables.** Remove all material touching or near the pipe, including insulation, pipe heating tape, etc. Make both pipe connections before plugging unit into receptacle. Ensure all connections are tight to prevent arcing at the clamps. Loose connections also get hot and reduce current flow.



**REMOVE ALL MATERIAL TOUCHING OR NEAR PIPE, INCLUDING INSULATION, PIPE HEATING TAPE, ETC. BEFORE TURNING ON MACHINE AS THEY CAN BECOME A FIRE HAZARD!**

**Note:** Uncoil the cables. Do not leave any cable coiled up or placed on steel objects or the heating in the pipe will be reduced.

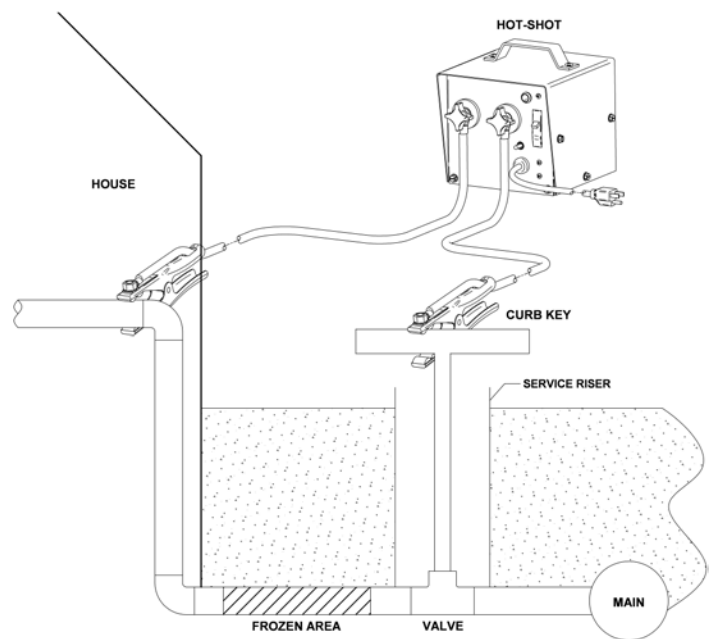
5. If a good connection is made, the pipe and cables will vibrate with a 60 cycle hum that you can feel with your hand. After all connections are made and the unit is plugged in, switch the circuit breaker on.
6. Monitor the equipment during pipe thawing operation. Use standard AC clamp-on Amprobe meter to check heating current. Current should be between 200 and 400 amps. If the current is less than 200 amps, a second Hot-Shot can be used to increase current. (See Thawing Pipes with two Hot-Shots.)



**MONITOR THE PIPE TEMPERATURE. SMALL, EMPTY PIPES WILL GET HOTTER BEFORE A LARGER PIPE WILL THAW, AND COULD MELT THE SOLDER IN THE COPPER FEEDER LINE.**

## THAWING A HOUSE SERVICE PIPE

1. Connect one cable to the exposed pipe in the kitchen or basement.
2. Connect the other cable to the curb service at the valve at the bottom of the service riser using a Curb Key.



**Note:** Make sure the Curb Key is clean and makes a tight connection to the pipe, otherwise the only result will be to heat the Curb Key.

## SPECIAL OPERATIONS

### THAWING HOT WATER HEATING SYSTEMS

#### (Winter/Summer Hook up)

The Hot-Shot is intended for use on a direct pipeline with an unfrozen high pressure area upstream of the blockage and an open faucet downstream. **USE OF THIS SYSTEM ON A HOT WATER HEATING SYSTEM MAY BE INEFFECTIVE.**

**NOTE:** Hot water heating systems use low pressure pumps. More heat will be required before the warm water can seep past the ice and continue the thawing process.

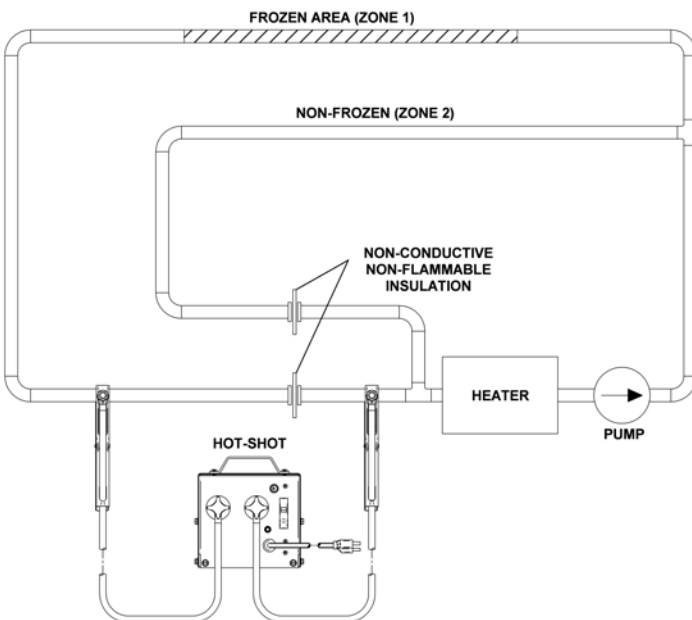
**NOTE:** Heat developed in the frozen section may only be 1/3 to 1/2 of the heat produced by the Hot-Shot and may not be sufficient to thaw the pipe. The current in the frozen section is reduced as the pipes in the hot water heating system are interconnected and offer alternative electrical paths, reducing the concentrated effect of the Hot-Shot.

**NOTE:** Systems using cast iron radiators, large iron pipes, and gravity circulation can not be thawed using the Hot-Shot.



**MAKE SURE MACHINE IS DISCONNECTED FROM POWER SOURCE BEFORE CONNECTING CABLES!**

1. Separate and cap all unfrozen zones.
2. Separate frozen zone of the system.
3. Put a non-conductive, non-flammable insulator between pipe ends.
4. Turn on heater, pump, and Hot-Shot (connected as shown below).
5. Collect thawing water in a container.
6. When thawed, shut of Hot-Shot, heater, and system pump.
7. Quickly reconnect all pipes.
8. Check heat in all zones.

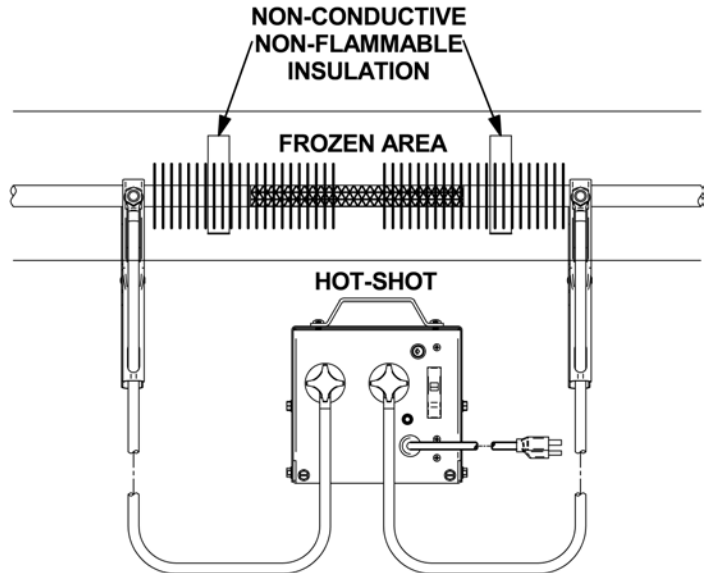


### THAWING COPPER BASEBOARD SYSTEMS



**MAKE SURE MACHINE IS DISCONNECTED FROM POWER SOURCE BEFORE CONNECTING CABLES!**

1. Lift or remove any sheet metal pipe covers so that they are not touching the pipe.
2. Make sure the copper pipe is separated from any metal hangers or supports by a non-conductive, non-flammable insulator.
3. Attach the Hot-Shot clamps directly to the copper pipe (see figure below).



### PREVENT REFREEZING OF PIPES

A pipe will freeze when it cools below 32 degrees F. Take the following steps to prevent freezing:

1. Insulate all cracks and openings.
2. Wrap pipes with thermostatically controlled heating tape.
3. Let water trickle through the pipe on cold nights. A flow of one gallon per hour is enough to prevent freezing.

### THAWING PIPES WITH TWO HOT-SHOTS

Whenever using the Hot-Shot it is important to monitor the equipment during the thawing operation. Use a standard AC clamp on Amprobe meter to check the heating current. Current should be between 200 and 400 amps. If the current is less than 200 amps, a second Hot-Shot can be used to increase the current.

Note: The second Hot-Shot will require a second 20 amp 120 volt AC power supply.

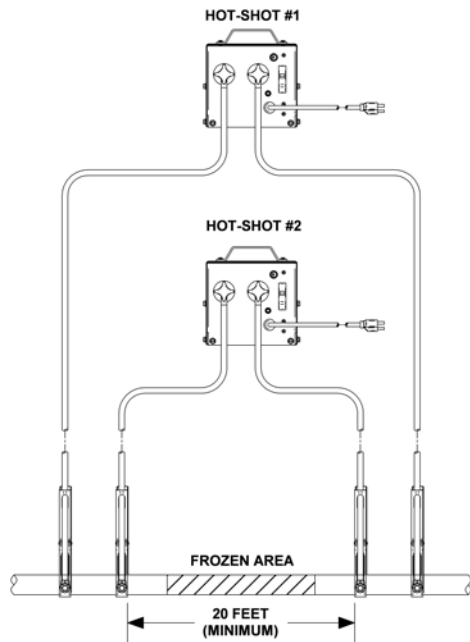
**MAKE SURE THAT THE POLARITY OF THE SECOND UNIT IS CORRECT AND HAS BEEN TESTED PRIOR TO USE.**



**REMOVE ALL FLAMMABLE MATERIALS, GASES, ETC. FROM THE IMMEDIATE AREA. WEAR HEAVY GLOVES AND EYE PROTECTION.**

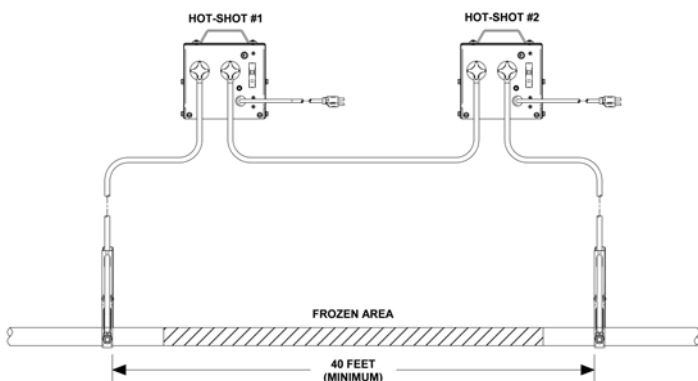
### SET-UP #1 (PARALLEL) - BEST FOR LARGE DIAMETER PIPES

1. Make the two pipe connections on one side of the pipe, and plug in both units.
2. Touch the other two clamps together for an instant. Observe the amount of spark.
  - A. None or weak spark - Polarity is correct.
  - B. Strong spark - Polarity is incorrect. To correct the polarity: Turn over one of the 115v plugs, **OR** interchange the cable leads on one of the Hot-Shot units.
3. Repeat the test until no spark is seen.
4. When polarity is determined to be correct, attach the clamps.



### SET-UP #2 (SERIES) - BEST FOR LONG LENGTHS OF PIPE

1. Make all connections EXCEPT leave the clamp on one end of the pipe free.
2. Touch the free clamp to the pipe for an instant. Observe the amount of spark.
  - A. Strong spark - Polarity is correct.
  - B. None or weak spark - Polarity is incorrect. To correct the polarity: Turn over one of the 115v plugs, **OR** interchange the cable leads on one of the Hot-Shot units.
4. Repeat the test until no spark is seen.
5. When polarity is determined to be correct, attach the clamps.



**NOTE:** Two correctly connected Hot-Shots will double the thawing action. If more heat is required, a larger Hot-Shot unit and qualified operator must be used.

## THAWING TIMES

The times in the charts below are approximate and under ideal conditions. Actual times will vary depending upon type of pipe, diameter, gauge, and length of cable, etc.

**Note:** Copper pipe will not heat up as fast as iron pipe, so allow about a 30 percent longer thawing time.

**Note:** Longer cables must also be a larger gauge. If smaller diameter cables are used, current will be reduced.

### 320 AMP OUTPUT

Pipe Length (in feet)	Thawing Time (in minutes)	
	Iron Pipe	Copper Pipe
20	9	12
40	12	16
50	14	19
60	17	23
80	24	32
100	30	40

Note: Pipe thawing times can vary significantly.

### 400 AMP OUTPUT

Pipe Length (in feet)	Thawing Time (in minutes)	
	Iron Pipe	Copper Pipe
20	8	11
40	10	13
50	12	17
60	15	20
80	20	27
100	25	33

Note: Pipe thawing times can vary significantly.

## MAINTENANCE



**DISCONNECT MACHINE FROM POWER SOURCE BEFORE PERFORMING MAINTENANCE ON MACHINE!**

1. Replace damaged, frayed, or worn cables.
2. Periodically clean terminal blocks, lugs, and clamps with steel wool and emery cloth.
3. Replace damaged, frayed, or worn power cord.
4. Store Hot-Shot indoors, in a dry location.



**DO'S AND DON'TS**

- **DO** - make sure there is water pressure at one side of the frozen section.
- **DO** - open faucets so moving water can help thaw the pipes.
- **DO** - disconnect all electrical grounds attached to the thawing area.
- **DO** - disconnect other appliances while using the Hot-Shot.
- **DO** - use only heavy-duty extension cords.
- **DO** - unwind the cables.
- **DO** - use short cables.
- **DO** - clean the pipe to ensure a good connection.
- **DO** - connect clamps to the pipe on either side of the frozen section.
- **DO** - attach the clamps to the pipe correctly.
- **DO** - make all connections to the pipe BEFORE plugging in the Hot-Shot.
- **DO** - watch for overheating and possible fires.
- **DO** - prevent refreezing.
- **DO NOT** - leave cables wound up.
- **DO NOT** - make quick connections to a dirty pipe.
- **DO NOT** - move the clamps while an electrical current is flowing.
- **DO NOT** - leave the Hot-Shot unattended.
- **DO NOT** - leave the Hot-Shot switched to the "ON" position overnight.

**TROUBLESHOOTING GUIDE**

Problem	Cause	Solution
Cables stay cold; pipe does not thaw.	No power	Plug unit into 120 volt, 20 amp AC outlet. (CHS-300 requires a 120 volt, 15 amp AC outlet.)
		Reset breaker on unit.
		Check if thermal protector has tripped.
	Poor connection to pipe	Clean pipes and clamps to ensure a good connection.
	Circuit not complete	Check to make sure both clamps are on the same pipe.
		Check to make sure there is no plastic pipe in the line.
		Check for a rubber coupling in the line.
Check to see if ice has pushed pipe connections apart.		
Cables get warm; pipe does not thaw.	Poor connection to pipe.	Clean pipes and clamps to ensure a good connection.
		Check to make sure clamp is on pipe, not curb cover.
	Undersize cables	Use shortest cables possible. Longer length cables must be heavier gauge wire.
	Long or undersize extension cord used.	Use either no extension cord or appropriate heavy duty cord.
Cables get hot; pipe does not thaw.	No water pressure in pipe.	There must be water pressure to thaw the ice. Open a faucet so the water can flow as it melts.
		Check to see if the source of water pressure is not frozen.
		Check to see if the source water pump is operating.
	Clamps improperly placed	Check to make sure the clamps cover the frozen area.
	Circuit bypassing through another pipe.	Check to make sure the circuit does not go more than one way from clamp to clamp.
	Cables coiled together	Stretch out cables. Do not operate with cables coiled.

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