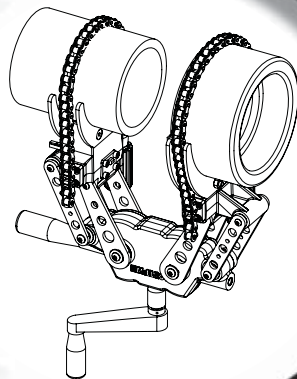


Operator's Manual



McELROY

www.mcelroy.com

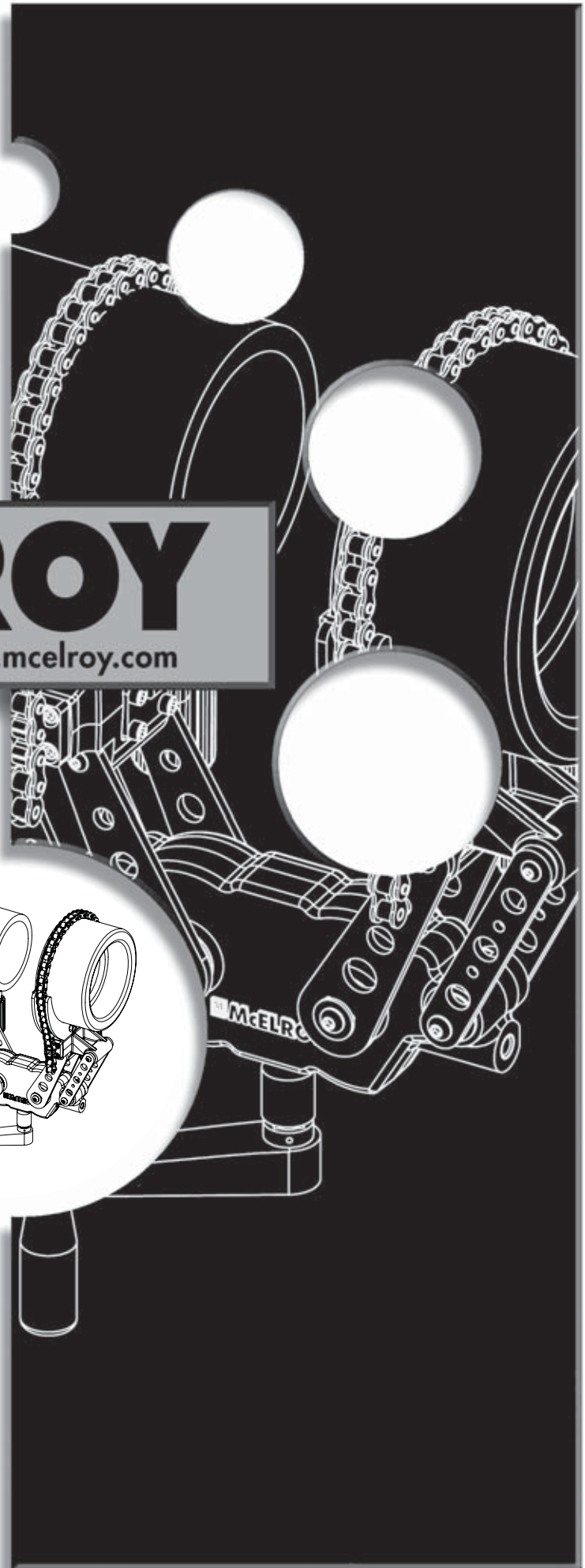


Polypropylene Socket Fusion Tooling System including Spider™ 125 Chain Clamping

Patent Pending

Original Language: English

Manual: SW20901 Revision: F 08/15



**California
Proposition 65 Warning**

This product could expose you to chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

This product and other products could be protected by patents or have patents pending. All the latest patent information is available at patent.mcelroy.com



Introduction



Thank You for purchasing this McElroy product

The McElroy Polypropylene Socket Fusion Tooling System is designed for socket fusion on 16mm to 125mm pipe.

With reasonable care and maintenance, these tools will give years of satisfactory service.

Before operating these tools, please read this manual thoroughly, and keep a copy with the tools for future reference. This manual is to be considered part of your Socket Fusion Tooling System.

TX04420-02-10-15

McElroy University

For more than 30 years, McElroy has been the only pipe fusion machine manufacturer to continuously offer advanced training. Course offerings are meant to enhance your efficiency, productivity and safety in the proper use of McElroy machines. McElroy University classes are structured so that the skills learned and the machines used in each class closely match the machines found on pipelining jobsites. We offer training at our facility or yours. Our uniquely qualified McElroy University course instructors offer years of industry experience.

Tuition for each course includes lunches, course materials and a certificate of completion. Online registration, as well as up-to-date course offerings and dates, is available at www.mcelroy.com/university

This manual is intended as a guide only and does not take the place of proper training by qualified instructors. The information in this manual is not all inclusive and can not encompass all possible situations that can be encountered during various operations.

TX04659-03-21-14



MU203-13-14



Warranty



LIMITED WARRANTY

McElroy Manufacturing, Inc. (McElroy) warrants all products manufactured, sold and repaired by it to be free from defects in materials and workmanship, its obligation under this warranty being limited to repairing or replacing at its factory and new products, within **5 years** after shipment, with the exception of purchased items (such as electronic devices, pumps, switches, etc.), in which case that manufacturer's warranty applies. Warranty applies when returned freight is prepaid and which, upon examination, shall disclose to have been defective. This warranty does not apply to any product or component which has been repaired or altered by anyone other than McElroy or has become damaged due to misuse, negligence or casualty, or has not been operated or maintained according to McElroy's printed instructions and warnings. This warranty is expressly in lieu of all other warranties expressed or implied. The remedies of the Buyer are the exclusive and sole remedies available and Buyer shall not be entitled to receive any incidental or consequential damages. Buyer waives the benefit of any rule that disclaimer of warranty shall be construed against McElroy and agrees that such disclaimers herein shall be construed liberally in favor of McElroy.

RETURN OF GOODS

Buyer agrees not to return goods for any reason except upon the written consent of McElroy obtained in advance of such return, which consent, if given, shall specify the terms and conditions and charges upon which any such return may be made. Materials returned to McElroy, for warranty work, repair, etc., **must have a Return Material Authorization (RMA) number**, and be so noted on the package at time of shipment. For assistance, inquiry shall be directed to:

McElroy Manufacturing, Inc.
P.O. Box 580550
833 North Fulton Street Tulsa, Oklahoma 74158-0550
PHONE: (918) 836-8611, FAX: (918) 831-9285.
EMAIL: fusion@McElroy.com

Note: Certain repairs, warranty work, and inquiries may be directed, at McElroy's discretion, to an authorized service center or distributor.

DISCLAIMER OF LIABILITY

McElroy accepts no responsibility of liability for fusion joints. Operation and maintenance of the product is the responsibility of others. We recommend qualified joining procedures be followed when using McElroy fusion equipment.

McElroy makes no other warranty of any kind whatever, express or implied; and all implied warranties of merchantability and fitness for a particular purpose which exceed the aforestated obligation are hereby disclaimed by McElroy.

PRODUCT IMPROVEMENT

McElroy reserves the right to make any changes in or improvements on its products without incurring any liability or obligation to update or change previously sold machines and/or the accessories thereto.

INFORMATION DISCLOSED

No information of knowledge heretofore or hereafter disclosed to McElroy in the performance of or in connection with the terms hereof, shall be deemed to be confidential or proprietary, unless otherwise expressly agreed to in writing by McElroy and any such information or knowledge shall be free from restrictions, other than a claim for patent infringement, is part of the consideration hereof.

PROPRIETARY RIGHTS

All proprietary rights pertaining to the equipment or the components of the equipment to be delivered by McElroy hereunder, and all patent rights therein, arising prior to, or in the course of, or as a result of the design or fabrication of the said product, are exclusively the property of McElroy.

LAW APPLICABLE

All sales shall be governed by the Uniform Commercial Code of Oklahoma, U.S.A.

Register your product online to activate your warranty:
www.McElroy.com/fusion

(Copy information listed on the machine nameplate here for your records).

Model No. _____

Serial No. _____

Date Received _____

Distributor _____



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Tulsa, Oklahoma, USA

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TX04406-2-26-13



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Fusion Equipment Safety



Safety Alerts



This hazard alert sign appears in this manual. When you see this sign, carefully read what it says. YOUR SAFETY IS AT STAKE.

You will see the hazard alert sign with these words: DANGER, WARNING, and CAUTION.



Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.

In this manual you should look for two other words: **NOTICE** and **IMPORTANT**.

NOTICE: can keep you from doing something that might damage the machine or someone's property. It may also be used to alert against unsafe practices.

IMPORTANT: can help you do a better job or make your job easier in some way.



WR00051-1-30-92

TX00030-12-1-92

Read and Understand

Do not operate this equipment until you have carefully read, and understand all the sections of this manual, and all other equipment manuals that will be used with it.

Your safety and the safety of others depends upon care and judgment in the operation of this equipment.

Follow all applicable federal, state, local, and industry specific regulations.

McElroy Manufacturing, Inc. cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this manual and on the machine are therefore not all inclusive. You must satisfy yourself that a procedure, tool, work method, or operating technique is safe for you and others. You should also ensure that the machine will not be damaged or made unsafe by the method of operation or maintenance you choose.



WR00052-12-1-92

TX02946-4-15-09



Fusion Equipment Safety



General Safety

Safety is important. Report anything unusual that you notice during set up or operation.

LISTEN for thumps, bumps, rattles, squeals, air leaks, or unusual sounds.

SMELL odors like burning insulation, hot metal, burning rubber, hot oil, or natural gas.

FEEL any changes in the way the equipment operates.

SEE problems with wiring and cables, hydraulic connections, or other equipment.

REPORT anything you see, feel, smell, or hear that is different from what you expect, or that you think may be unsafe.



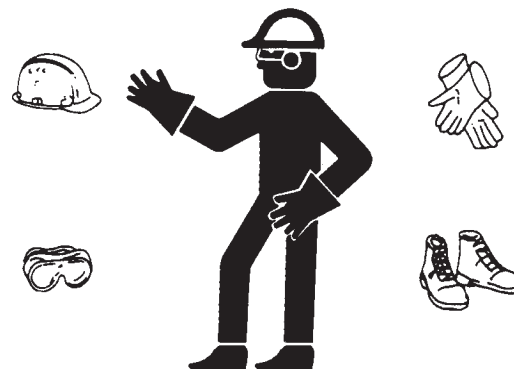
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Wear Safety Equipment

Wear a hard hat, safety shoes, safety glasses, and other applicable personal protective equipment.

Remove jewelry and rings, and do not wear loose-fitting clothing or long hair that could catch on controls or moving machinery.



WR00053-122-92

TX00032-4-7-93

Heater Is Not Explosion Proof



This heater is not explosion proof. Operation of heater in an explosive atmosphere without necessary safety precautions will result in serious injury or death.

If operating in an explosive atmosphere, the heater should be brought up to temperature in a safe environment, then **unplugged before entering** the explosive atmosphere for fusion.



WR00034-11-30-92

TX04378-8-4-14



Fusion Equipment Safety



Electrical Safety



WARNING Always ensure power cords are properly grounded. It is important to remember that you are working in a wet environment with electrical devices. Proper ground connections help to minimize the chances of an electric shock.

Frequently inspect electrical cords and unit for damage. Have damaged components replaced and service performed by a qualified electrician.

Do not carry electrical devices by the cord.



WR00055-4-7-93



WR00025-11-30-92

TX02947-4-15-09

Overhead Loads



WARNING The Spider™ 125 is not designed to support overhead or overhung loads. Adequately support the pipe using appropriate support devices. If not supported, overhead loads could fall causing serious injury or death.



WR00095-9-25-12

TX04455-2-26-13

Heater is Hot



CAUTION The heater is hot and will burn clothing and skin. Keep the heater in its insulated heater sling when not in use, and use care when heating the pipe.

NOTICE: Use only a clean non-synthetic cloth such as a cotton cloth to clean the heater plates.



WR000302-10-93

TX00104-8-12-94



Fusion Equipment Safety



Fusion Procedures

Obtain a copy of the pipe manufacturer's procedures or appropriate joining standard for the pipe being fused. Follow the procedure carefully, and adhere to all specified parameters.

NOTICE: Failure to follow pipe manufacturer's procedure could result in a bad joint. Always follow pipe manufacturer's procedures.

TX02984-5-22-12



WR00079-1-24-96



Overview



Theory of Heat Fusion

The principle of heat fusion is to heat two surfaces to a designated temperature, and then fuse them together by application of force. This pressure causes flow of the melted materials, which causes mixing and thus fusion. When the thermoplastic material is heated, the molecular structure is transformed from a crystalline state into an amorphous condition. When fusion pressure is applied, the molecules from each thermoplastic part mix. As the joint cools, the molecules return to their crystalline form, the original interfaces are gone, and the fitting and pipe have become one homogeneous unit. A strong, fully leak tight connection is the result.



PH01194-6-24-97

The principal operations include:

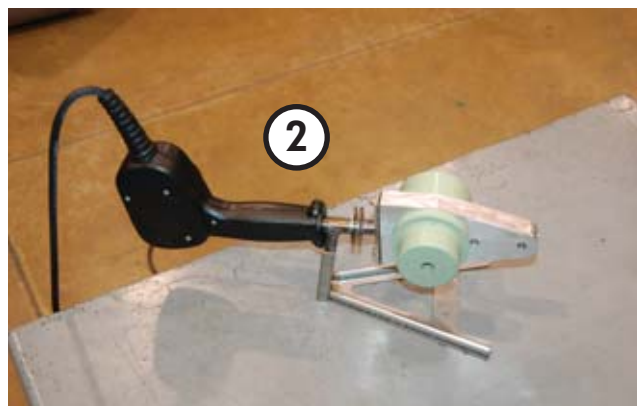
- Clamping** The pipe pieces held axially to allow all subsequent operations to take place.
- Facing** The pipe ends must be faced to establish clean, parallel mating surfaces perpendicular to the centerline of the pipes.
- Aligning** The pipe ends must be aligned with each other to minimize mismatch or high-low of the pipe walls.
- Heating** A melt pattern that penetrates into the pipe must be formed around both pipe ends.
- Joining** The melt patterns must be joined with a specified force. The force must be constant around the interface area.
- Holding** The molten joint must be held immobile with a specified force until adequately cooled.
- Inspecting** Visually examine the entire circumference of the joint for compliance with standards established by your company, customer, industry, federal, state, or local regulations.

Nomenclature

- ① **Heater Sling** - Sling used to hold the heater that protects and insulates the heater.
- ② **Heater and Heater Stand** - Used with heater adapters in order to heat the pipe and fitting so that they can be fused.
- ③ **Heater Adapters** - Used with the heater and should be installed to match the fitting and pipe being fused.
- ④ **Pipe Cutters** - Used to cut the pipe to remove any damaged or misshaped material.
- ⑤ **Socket Fusion Toolbox** - Holds the heater, heater adapters, pipe cutters, heater stand, and has a fusion chart attached.



PH042126-14-10



③



④





Operation - 16-63mm



Prepare Pipe End

Cut off damaged or oval ends of pipe squarely with a pipe cutter. Remove shavings and burrs inside pipe end.

TX04408-5-22-12



PH04675-5-15-12

Mark Insertion Depth

Place the depth gauge on the end of the pipe. Use a marking instrument and fill in the circle appropriate for the pipe size that is being fused. This mark is the insertion depth used when fusing the pipe and fitting.

TX04409-9-25-12



PH04676-5-15-12

Clean Fitting and Pipe

Fitting and pipe must be clean and dry. Use a clean cloth to wipe the mating surfaces.

NOTICE: Do not touch fusion area with hands.

TX04462-9-25-12



PH04671-5-15-12



PH04672-5-15-12



Operation - 16-63mm



Heater Is Not Explosion Proof



This heater is not explosion proof. Operation of heater in an explosive atmosphere without necessary safety precautions will result in serious injury or death.

If operating in an explosive atmosphere, the heater should be brought up to temperature in a safe environment, then unplugged before entering the explosive atmosphere for fusion.

Use a clean nonsynthetic lint free cloth to clean the heater adapter surfaces.

TX04410-04-10-14



PH04673-5-15-12

Heater Temperature

The socket faces of the heater must be at the temperature $500^{\circ}\text{F} \pm 18^{\circ}$ ($260^{\circ}\text{C} \pm 8^{\circ}$) per DVS standard.

Use a pyrometer to check the temperature on the socket faces.

If the temperature needs to be adjusted, refer to "Adjusting Heater Temperature" in the Maintenance section of this manual.

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Heating The Pipe and Fitting

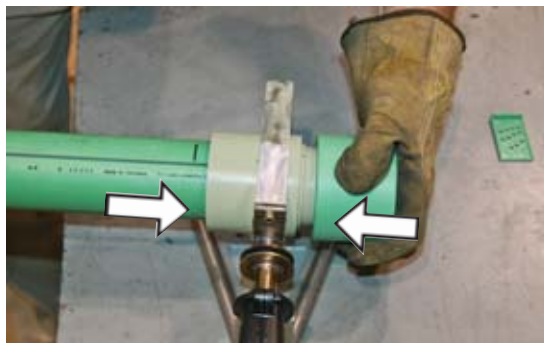
Firmly seat the socket fitting on the male adapter of the heater.

Simultaneously place the female adapter of the heater over the end of the pipe, up to the marked insertion depth.

Heating time starts when the heater is inserted to the proper insertion depth.

Heat fitting and pipe for the time specified by the chart on the toolbox.

NOTICE: Do not twist fitting, pipe or heater



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Operation - 16-63mm

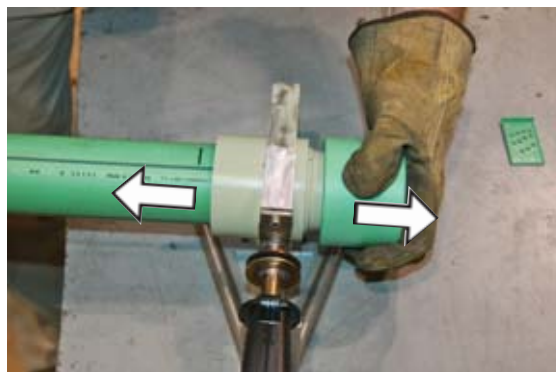


Remove Heater

Remove the pipe and the fitting from the heater.

NOTICE: Do not twist fitting, pipe or heater.

TX04458-9-25-12



PH046775-15-12

Inspect Melt

Quickly inspect the heated parts to make sure all surfaces have been melted properly.

If melt is not complete, cut off melted pipe end. Use a new fitting and repeat preparation and heating process.

TX01408-6-20-97

Fusion and Cooling

Within the welding time, after the heater has been removed, firmly push the melted fitting squarely onto the pipe to the marked insertion depth.

NOTICE: Do not twist or rotate the fitting.

Hold the fitting firmly in place for the total cooling time specified by chart on the toolbox.



PH046795-15-12

TX04412-02-10-15



Operation - 16-63mm



Inspecting Fusion Joint

After completing the specified cooling time, inspect the joint. A good joint will have a uniform melt ring.

There should be no gaps or voids between the fitting and the pipe.

If the joint is not acceptable, cut off the joint and re-fuse the joint.



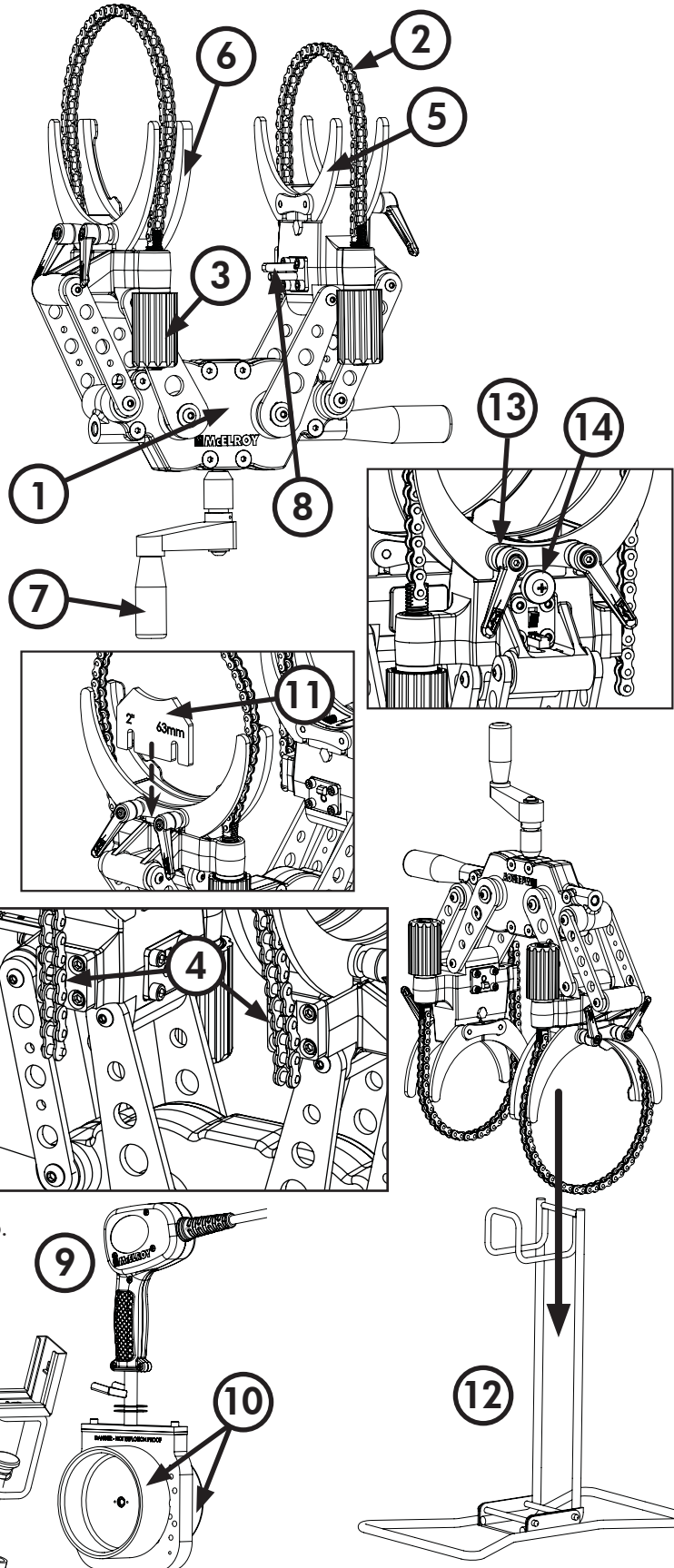
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TX04413-9-19-12



Nomenclature

- ① **Spider™ 125 with Chain Clamping** - Is an assembly tool that has two jaw blocks with inserts attached and can move the inserts toward or away from each other.
- ② **Clamp Chains** - Wrap around the pipe and fitting to secure them to the assembly tool.
- ③ **Clamp Chain Clamp Knobs** - Used to tighten the clamp chains to the assembly tool.
- ④ **Clamp Chain Attachment Hooks** - Hooks that fit between the chain links to secure the chains to the assembly tool.
- ⑤ **Pipe Insert** - Insert used to hold the pipe in the assembly tool. The correct size insert must be matched with the size pipe used.
- ⑥ **Fitting Insert** - Insert used to hold the fitting in the assembly tool. The correct size insert must be matched with the size fitting used.
- ⑦ **Crank Handle** - Handle used to move the inserts toward or away from each other.
- ⑧ **Stab Depth Gauge** - Set the desired stab depth determined by the size pipe and fitting to be fused.
- ⑨ **Heater and Heater Stand** - Used with heater adapters in order to heat the pipe and fitting so that they can be fused.
- ⑩ **Heater Adapters** - The correct size adapters should be installed to match the size pipe and fitting used.
- ⑪ **Narrow Insert** - Can be used when the gripping area is too short for a standard fitting. This insert is used outside the standard fitting insert.
- ⑫ **Assembly Tool Stand** - Holds the assembly tool when it is not in use.
- ⑬ **Quick Release Insert Clamp** - Secures the inserts to the tool base and does not require any additional tools to tighten or loosen the clamp.
- ⑭ **Alignment Cam** - A five position cam that adjusts the vertical alignment of the pipe so it matches the fitting.



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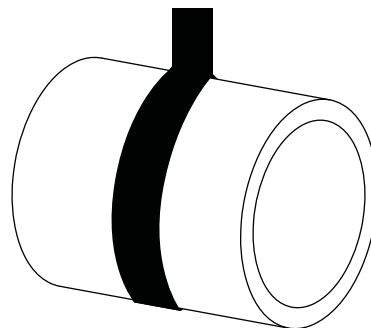
Operation - Spider™ 125 with Chain Clamping (63-125mm)



Support Pipe

Ensure the pipe is properly supported before attaching the assembly tool to the pipe. Ensure there is enough travel in the pipe to complete the fusion.

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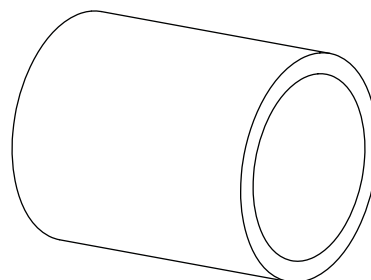


CD01033-8-29-12

Prepare Pipe End

Cut off damaged or oval ends of pipe squarely with a pipe cutter. Remove shavings and burrs inside pipe end.

TX04408-5-22-12

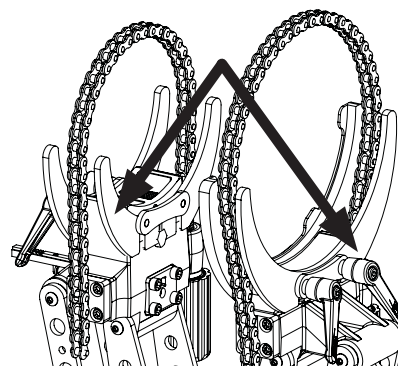


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Inserts

Select the appropriate fitting and pipe inserts and attach them to the jaw blocks of the assembly tool using the quick release insert clamps.

TX04460-2-26-13



CD01100-2-26-13

Heater Adapters

Select the appropriate heater adapters for the size of fitting and pipe being fused together.

The heater body of this assembly is not coated. Coated heater adapters are available for all fusion applications.

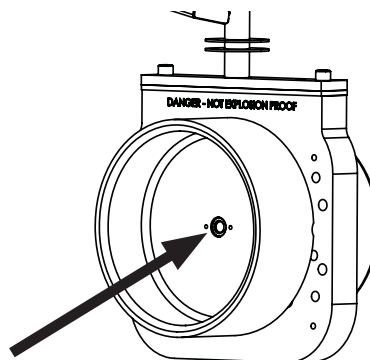
Heater adapters are installed with stainless steel cap screws.

Care should be taken to assure that the heater adapters are seated on the heater body, and that there is no foreign matter trapped between these surfaces.

IMPORTANT: Do not over-tighten the bolts.

The surface of the heater adapters are coated with an anti-stick coating.

TX04461-9-25-12



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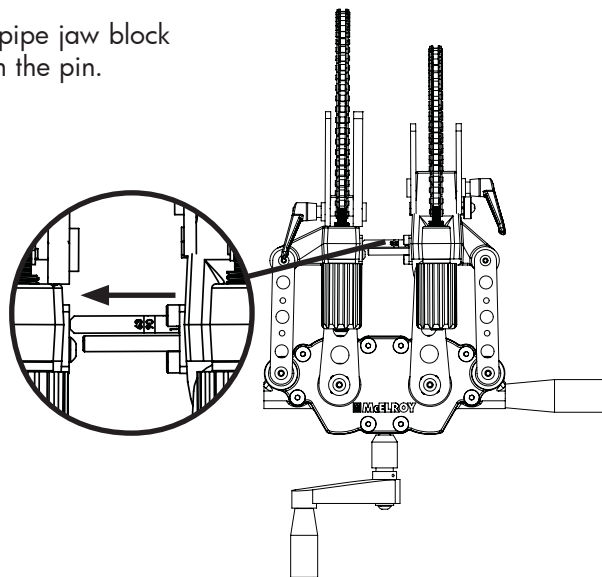


Operation - Spider™ 125 with Chain Clamping (63-125mm)



Set Insertion Depth

Push in the stab depth gauge, located in the jaw block of the pipe jaw block to the desired depth which is denoted by the pipe diameter on the pin.



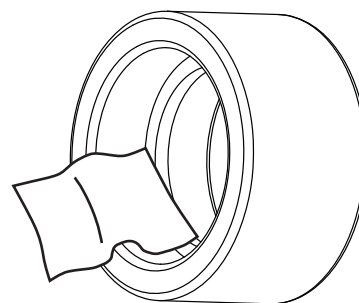
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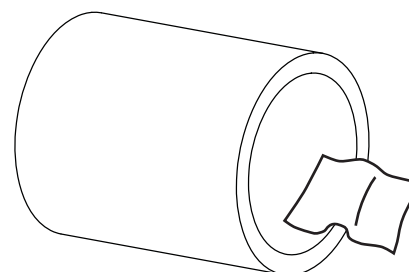
Clean Fitting and Pipe

Fitting and pipe must be clean and dry. Use a clean cloth to wipe the mating surfaces.

NOTICE: Do not touch fusion area with hands.



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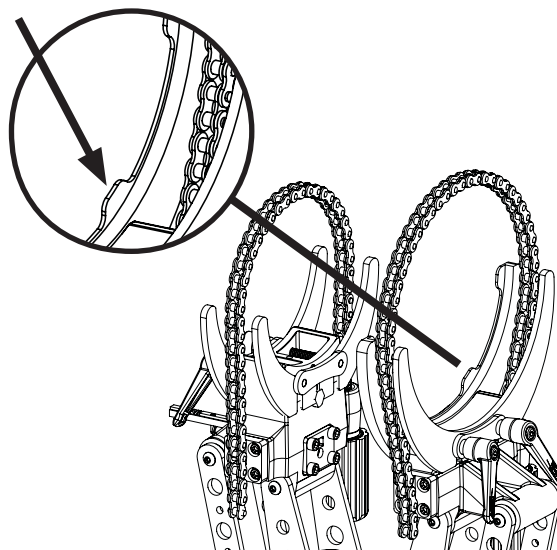
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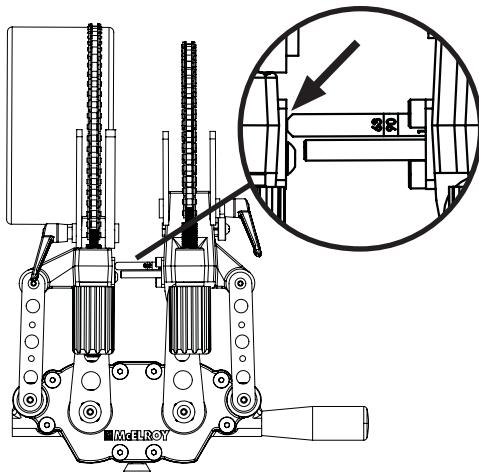
Attach Spider 125 to Fitting and Pipe

Insert the fitting into the fitting insert ensuring that the fitting is square to the stop tabs. Wrap chain over the fitting and secure chain to the attachment hooks. Tighten the chain with the clamp knob.

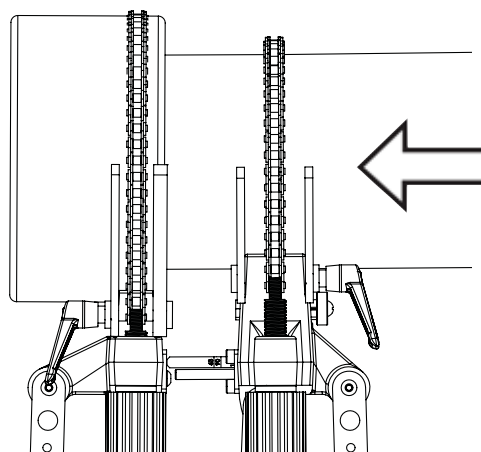


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Bring the jaws together until the stab gauge that was set earlier is making contact with the stop plate on the fitting jaw block.

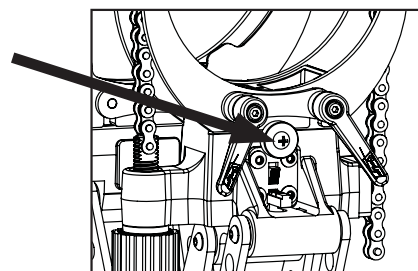


Insert pipe into the pipe insert, butting the end of the pipe against the fitting. Wrap chain over the pipe and secure chain to the attachment hooks. Tighten the chain with the clamp knob.



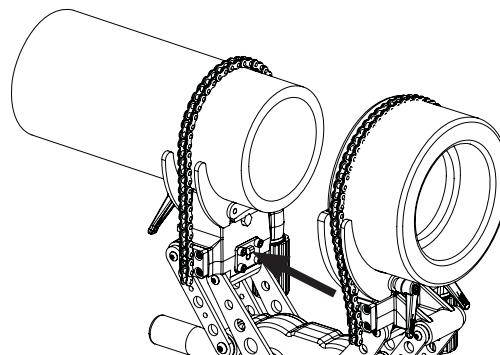
CD01103226-13

Check the vertical alignment of the pipe to the fitting and adjust the 5 position adjustment cam to move the pipe in the desired direction.



CD01101226-13

Open the jaws and release the stab depth gauge by sliding the latching mechanism up, allowing the pin to retract.



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Operation - Spider™ 125 with Chain Clamping (63-125mm)



Heater Is Not Explosion Proof

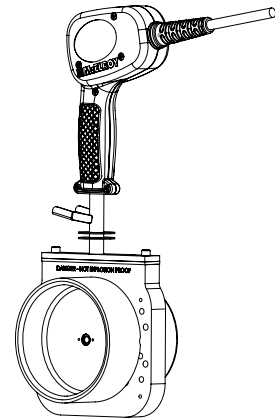


This heater is not explosion proof. Operation of heater in an explosive atmosphere without necessary safety precautions will result in serious injury or death.

If operating in an explosive atmosphere, the heater should be brought up to temperature in a safe environment, then unplugged before entering the explosive atmosphere for fusion.

Use a clean nonsynthetic lint free cloth to clean the heater adapter surfaces.

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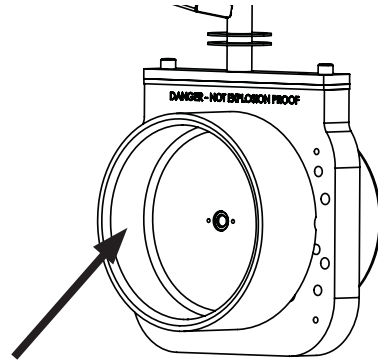
Heater Temperature

The socket faces of the heater must be at the temperature $500^{\circ}\text{F} \pm 18^{\circ}$ ($260^{\circ}\text{C} \pm 8^{\circ}$) per DVS standard.

Use a pyrometer to check the temperature on the socket faces.

If the temperature needs to be adjusted, refer to "Adjusting Heater Temperature" in the Maintenance section of this manual.

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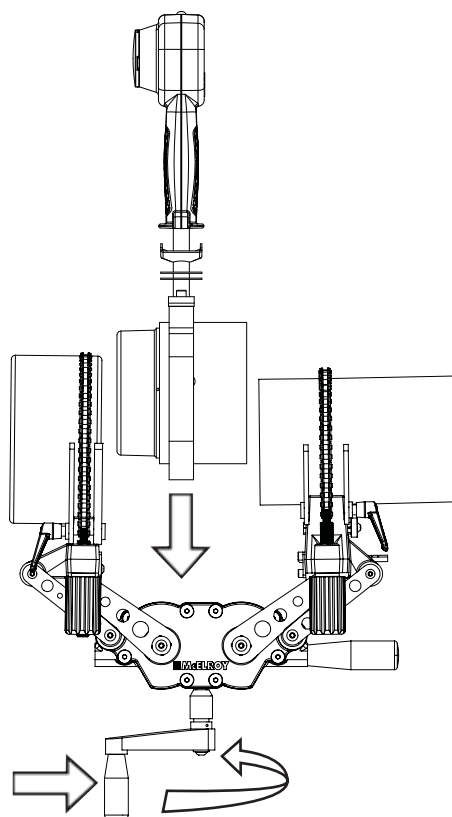
Heating The Pipe and Fitting

Insert the heater in between the pipe end and fitting. Rotate the crank handle moving the pipe and fitting onto the heater. Move the jaws onto the heater to the proper welding depths.

IMPORTANT: Do not force the pipe and fitting onto the heater. Allow the pipe and fitting to melt onto the heater. Forcing the pipe and fitting onto the heater will damage the assembly tool.

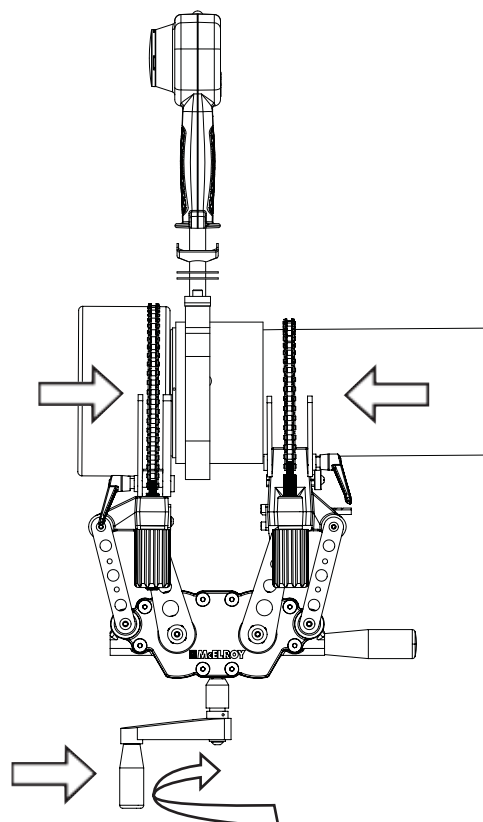
Heating time starts when the pipe and fitting are fully inserted onto the heater adapters.

Heat fitting and pipe for the pipe manufacturer's specified period of time or according to the chart on the toolbox.



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Operation - Spider™ 125 with Chain Clamping (63-125mm)

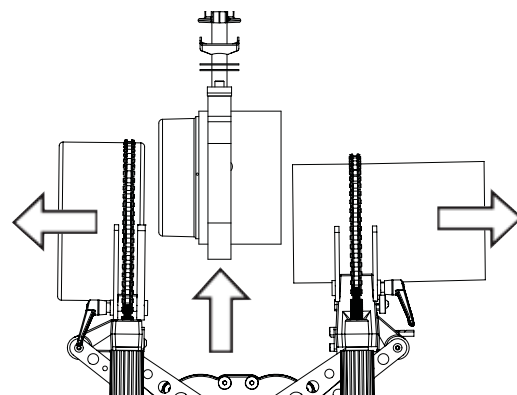


Remove Heater

Rotate the crank handle and open the jaws until there is enough room to remove the heater. Quickly remove the heater from the pipe and fitting.

IMPORTANT: An optional auxiliary heater handle is available to assist with removing the heater.

TX04417-9-25-12



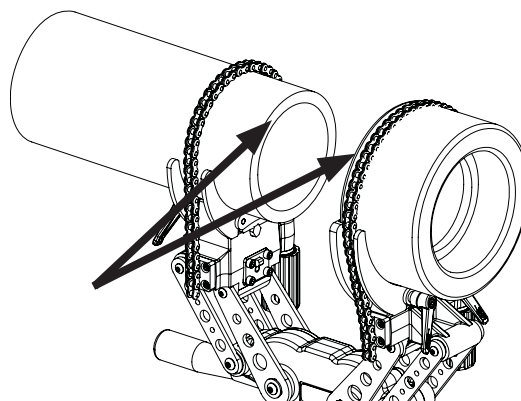
CD01108-226-13

Inspect Melt

Quickly inspect the heated parts to make sure all surfaces have been melted properly.

If melt is not complete, cut off melted pipe end. Use a new fitting and repeat preparation and heating process.

TX01408-6-20-97



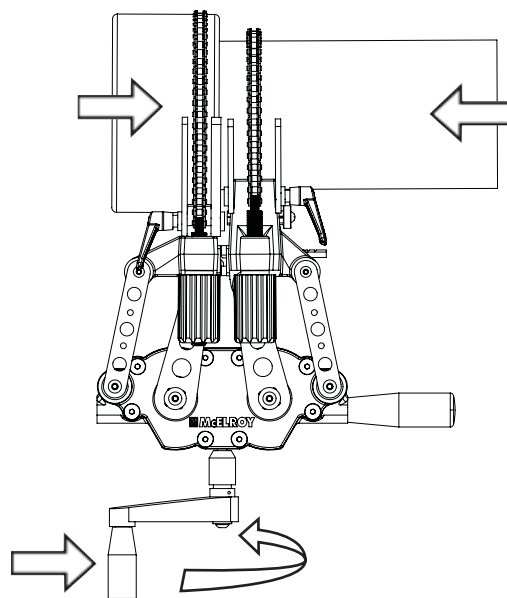
CD01110-226-13

Fusion and Cooling

Within the welding time, after the heater has been removed, rotate the crank handle and close the jaws completely together.

Allow the jaws to stay in place for the total cooling time specified by the chart on the toolbox.

TX04418-02-10-15



CD01107-226-13

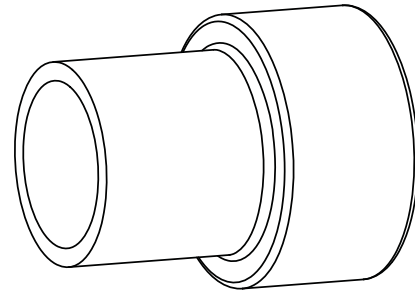
PH04726-9-18-12



Inspecting Fusion Joint

After completing the pipe manufacturer's specified cooling time, remove the fused pipe and fitting from the assembly tool. Inspect the fused pipe and fitting. A good joint will have a uniform melt ring.

There should be no gaps or voids between the fitting and the pipe.



CD00996-5-22:12

TX04419-0226-13



Maintenance



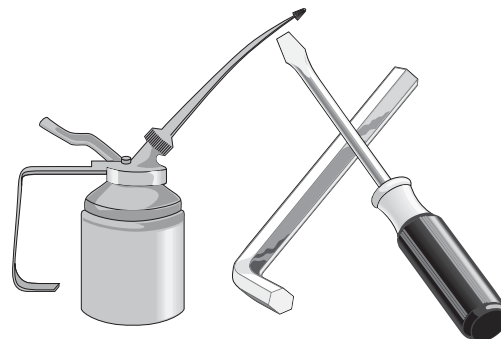
Preventative Maintenance

To insure optimum performance, the machine must be kept clean and well maintained.

With reasonable care, this machine will give years of service. Therefore, it is important that a regular schedule of preventive maintenance be kept.

Store machine inside, out of the weather, whenever possible.

TX00428-8-10-95



CD00142112-94

Cleaning the Machine

Clean the machine with a soap and water wash as needed. Remove the heater from the spray area before cleaning.

TX04463-9-25-12



CD00178-5-3-96

Lubrication

The assembly tool is sealed and does not require any lubrication.

Do not lubricate the clamp chains.

TX04464-2-26-13



Installing Socket Fusion Heater Adapters

The heater body of this assembly is not coated. Coated heater adapters are available for all fusion applications.

Heater adapters are installed with stainless steel cap screws.

Care should be taken to assure that the heater adapters are seated on the heater body, and that there is no foreign matter trapped between these surfaces.

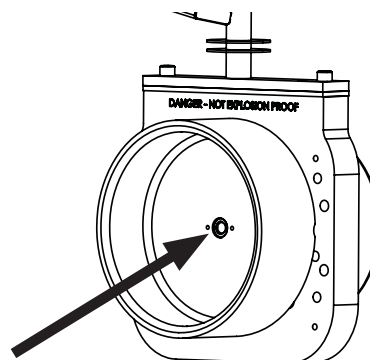
IMPORTANT: Do not over-tighten the bolts.

The surface of the heater adapters are coated with an anti-stick coating.

NOTICE: Only install heater adapters when the heater is cool.



PH04669-5-15-12



CD01001-5-22-12

TX01413-6-17-10

Adjusting Heater Temperature

The heater is pre set to 500°F at 70° ambient temperature. Before using the heater it should be allowed to reach operating temperature (10 minutes).

Once the heater has reached operating temperature, check the adapters with a pyrometer. If the temperature needs adjustment, remove the clear cap and change the temperature in less than 10° increments and allow 5 minutes for the heater temperature to stabilize. Check for proper operating temperature again using the pyrometer. If needed, repeat the adjustment of the temperature until the operating temperature of 500°F. is reached. Replace the clear cap.



PH04681-5-15-12

TX04452-9-19-12



Heater Indicator Light

The heater has a green indicator light which will flash on and off. This indicates that the controller is operating normally. If the green indicator is not flashing then the controller may not be operating properly. If this occurs, disconnect power and have the heater repaired by an McElroy Authorized Service Center.

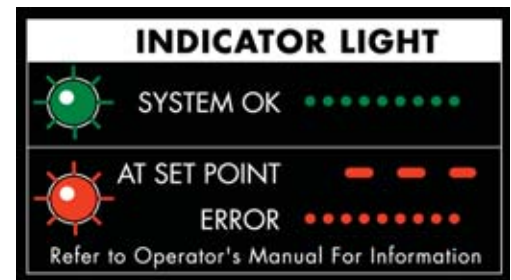
The heater has a red indicator light on the handle at the bottom of the temperature scale. When the heater is plugged in and preheating the red light glows steadily until the set temperature is reached. The red light then goes off and on as the heater maintains temperature.

If the heater is not operating properly, the control will attempt to turn the heater off and the red indicator light will flash rapidly. If this occurs, disconnect the power and take it to a McElroy Authorized Service Center for repair.

TX04036-4-12-10



PH04682-5-15-12



PH02571-09-16-03



Specifications



Specifications

The McElroy Polypropylene Socket Fusion Tooling System is designed for socket fusion of 16mm to 125mm pipe.

Heaters:

16mm - 63mm Socket Heater Power - 100V - 120V, 50/60Hz, 700 Watt, 1Ph

Large Socket Heater Power - 100V - 120V, 50/60Hz, 1600 Watt, 1Ph

Weight:

16mm - 63mm Socket Heater: 3.5 lbs. (1.6 Kg)

Larger Socket Heater: 5.5 lbs. (2.5 Kg)

Toolbox Dimensions:

Length: 24" (609.6mm)

Width: 10" (254mm)

Height: 9.5" (241.3mm)

Spider™ 125 with Chain Clamping

Weight: 13 lbs. (5.90 Kg)

Dimensions:

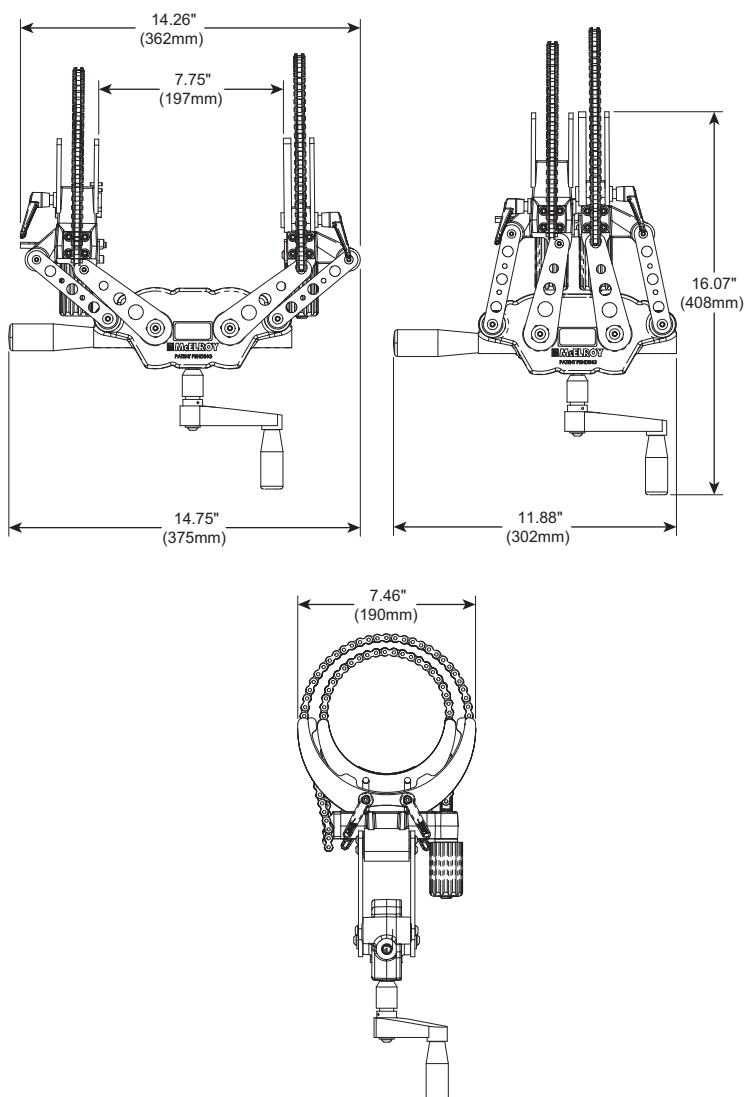
Length: 14.75" (375mm)

Width: 7.46" (190mm)

Height: 16.07" (408mm)

Maximum Stroke: 7.6" (193mm)

Mechanical Advantage: 20 to 1



About this manual . . .

McElroy Manufacturing continually strives to give customers the best quality products available. This manual is printed with materials made for durable applications and harsh environments.

This manual is waterproof, tear resistant, grease resistant, abrasion resistant and the bonding quality of the printing ensures a readable, durable product.

The material does not contain any cellulose based materials and does not contribute to the harvesting of our forests, or ozone-depleting constituents. This manual can be safely disposed of in a landfill and will not leach into ground water.

TX001660-8-19-99



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