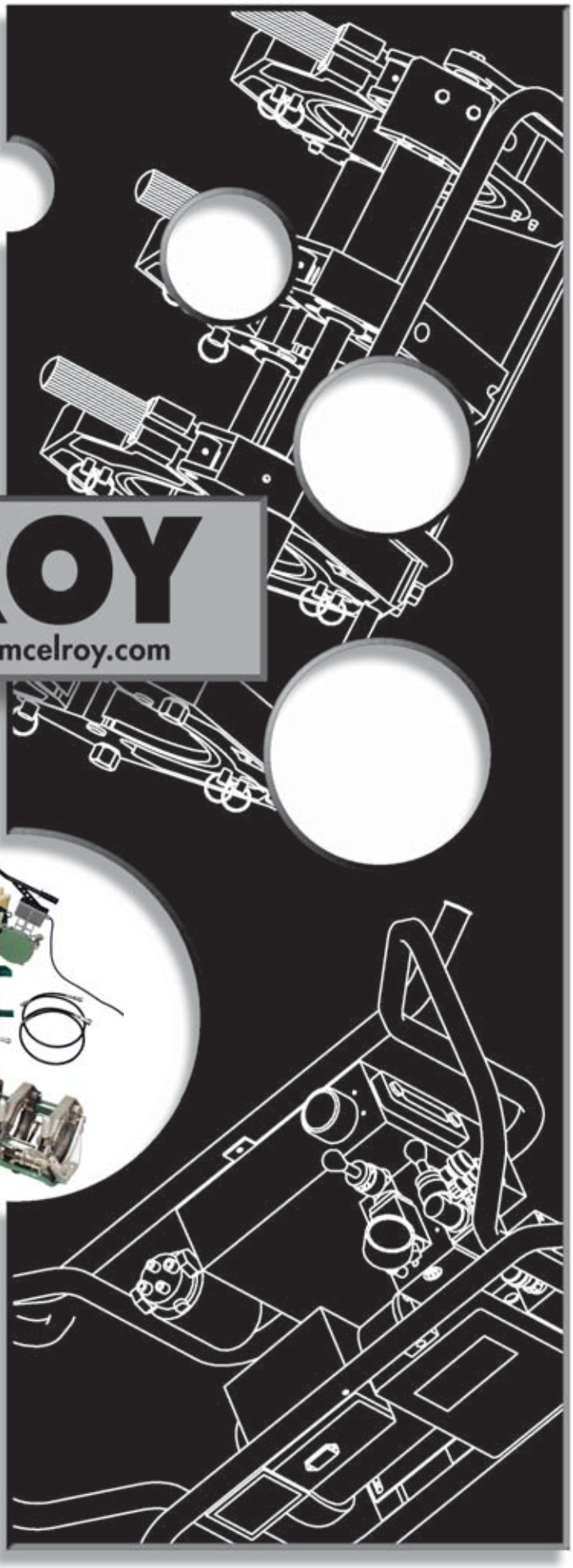
Operator's Manual



McELROY

www.mcelroy.com

Mc28 Pit Bull® DIPS

FUSION MACHINE

Manual: 850901 Revision: B 05/17

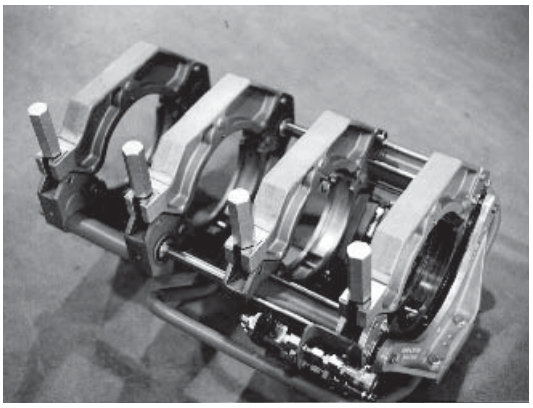
This product and other products could be protected by patents or have patents pending. All the latest patent information is available at patent.mcelroy.com

Introduction

Thank you for purchasing this McElroy product.

The McElroy 28 close quarter hydraulically operated fusion machine is designed to be used in-ditch or out in the open and is easily moved by two operators. The machine will butt fuse all pipe sizes from 2" IPS through 8" DIPS (63 mm – 200 mm). The machine also allows for fusion of most fittings without special holders or removal of outer jaws. Mitered inserts are also available for fabricating ells in the shop or in the field. With reasonable care and maintenance, this machine will give years of satisfactory service.

Before operating this machine, please read this manual thoroughly, and keep a copy with the machine for future reference. This manual is to be considered part of your machine.



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TX01312-

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.

MU2-03-13-14

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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.

TX02486-11-4-13

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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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.

WR00051-11-30-92

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

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

CAUTION 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.

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

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.

TX0114--4-22-93

SAFE1ST-12-22-92

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.

TX0032-4-7-93

WR00053-12-22-92

Heater is Not Explosion Proof

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

When 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.

TX04467-03-24-14

WR00034-11-30-92

Electric Motors are Not Explosion Proof

⚠ DANGER Electric motors are not explosion proof. Operation of these components in an explosive atmosphere without necessary safety precautions will result in serious injury or death.

When operating in an explosive atmosphere, keep pump motor and chassis in a safe area by using hydraulic extension hoses.

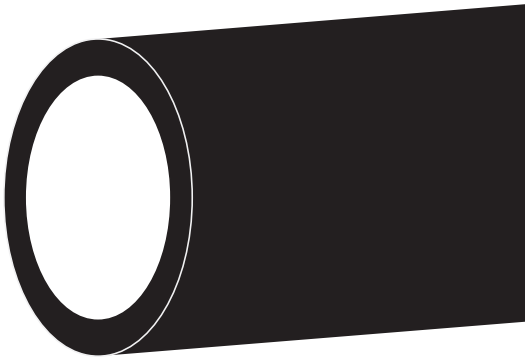
TX00424-04-28-14

WR00080-4-12-93

Pipe Handling Safety

⚠WARNING Do not position yourself under supported or raised pipe. Pipe is heavy and could result in serious injury or death.

⚠WARNING Pipe that is bent can store a great amount of energy. Do not bend and force the pipe into the machine. A bent pipe with stored energy could cause serious injury or death when that energy is released.


WR00097-4-17-13

It is recommended that the pipe is always be held securely by either being clamped securely in the fusion machine jaws or attached to the lifting device.

Ensure all portions of the pipe and fittings are clear before lifting the pipe from the machine. If the pipe becomes bound in the machine, do not continue to lift the pipe. Lower the pipe into the machine and ensure the pipe is clear before lifting again.

Keep persons that are not involved in handling pipe away from handling operations. Persons that are involved with handling operations keep away from the pipe when the pipe and handling equipment are in motion. When the pipe and handling equipment are in motion, all persons involved in handling pipe should be able to see all other persons at all times. If any handling person is not in sight, immediately stop moving equipment and pipe and locate that person. Do not continue until all persons are accounted for and in sight.

NOTICE: Do not leave machine unattended while the Power Pack is running. When not operating the machine, turn off the Power Pack. This will prevent accidental or unintentional movement of the machine.

Never push, roll, dump or drop pipe lengths, bundles or coils off the truck, off handling equipment or into a trench. Always use appropriate equipment to lift, move and lower the pipe.

TX04586-07-24-14

Units With Hydraulics

For hydraulically operated equipment, it is important to remember that a sudden hydraulic oil leak can cause serious injury, or even be fatal if the pressure is high enough.

⚠WARNING Escaping fluid under pressure can penetrate the skin causing serious injury. Keep hands and body away from pinholes which eject fluid under pressure. Use a piece of cardboard or paper to search for leaks. If any fluid is injected into the skin, it must be immediately removed by a doctor familiar with this type of injury.


WR00078-4-8-93

NOTICE: wear safety glasses, and keep face clear of area when bleeding air from hydraulic system to avoid spraying oil into eyes.

TX03077-2-16-10

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.

NOTICE: Always connect units to the proper power source as listed on the unit, or in the owner's manual. On units with two power cords, plug each cord into separate power circuits. Do not plug into both outlets of one duplex receptacle.

⚠WARNING Disconnect the machine from the power source before attempting to service the control panel. Failure to disconnect the power could result in electric shock. Refer service to a qualified technician.

VR00055-4-7-93

VR00025-11-30-92

TX00105-5-6-13

Crush Points

⚠WARNING Hydraulically operated jaws are operated under pressure Anything caught in the jaws will be crushed. Keep all body parts out of the jaw area. Always check pipe alignment with a pencil or similar object.

VR00012-12-4-92

TX03091-4-7-10

Two Operators

⚠WARNING Jaws are operated hydraulically by a remote operator. Anything caught in the jaws will be crushed. Always communicate clearly with the second operator and use the carriage shut off valve to lock out jaw motion.

VR00012-12-4-92

TX00543-10-23-96

Facer Blades Are Sharp

⚠WARNING Facer blades are sharp and can cut. Never attempt to remove shavings while the facer is running, or is in the facing position between the jaws. Use care when operating the facer, and when handling the unit.

NOTICE: Disconnect power from the facer, and remove the facer blades before attempting any maintenance or adjustment.

NOTICE: Never extend the blade beyond the inner or outer circumference of the facer.

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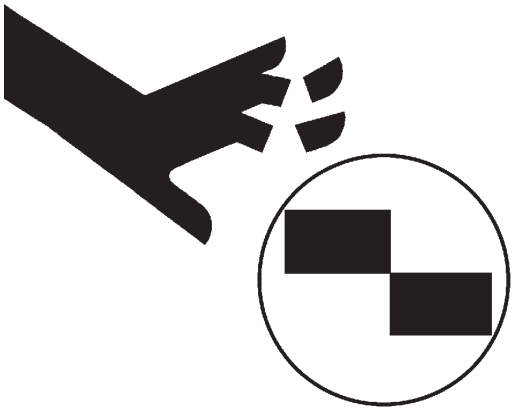

VR00073-4-6-93

Heater Is Hot

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

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

TX04244-10-12-10

VR00030-2-10-93

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.

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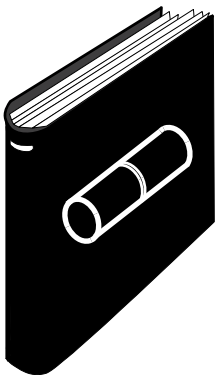

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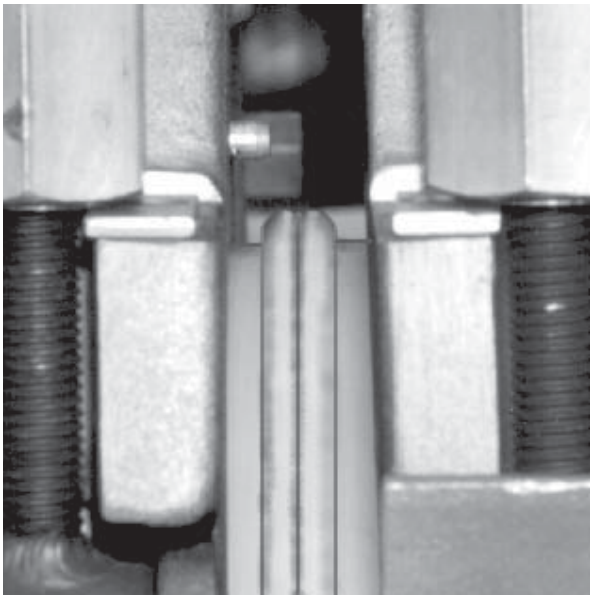
Theory of Heat Fusion



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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 polyethylene 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 polyethylene 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.

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.

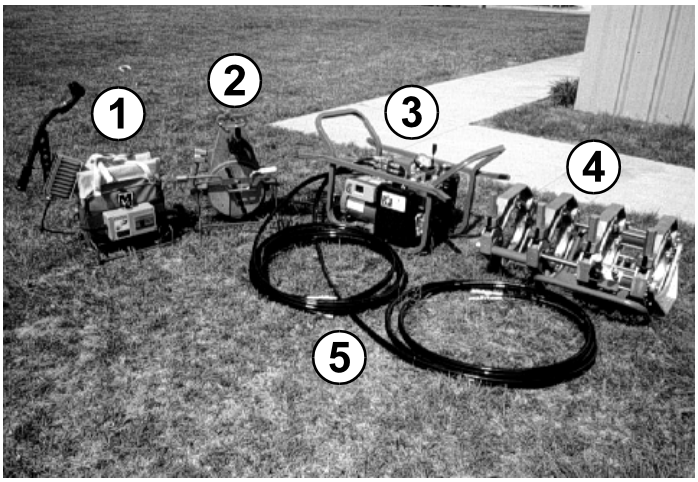
Holding The molten joint must be held immobile with a specified force until adequately cooled.

Inspecting Visually examine the entire circumference of the joint for compliance with standards established by your company, customer, industry, federal, state, or local regulations.

TX02476-04-28-14

Introduction to the Mc28 Pit Bull® Fusion Machine

The McElroy Mc28 Pit Bull® is a hydraulically operated fusion machine that will butt fuse all pipe sizes from 2" IPS through 8" DIPS (63 mm – 200 mm). The machine also allows for butt fusion of most fittings without special holders.



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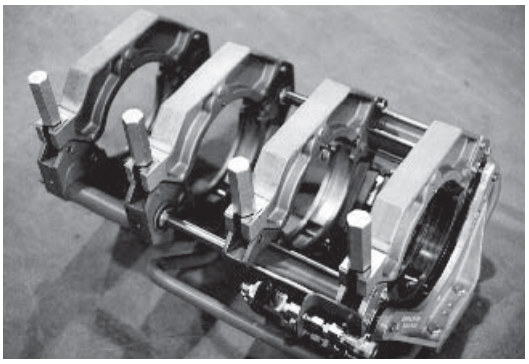
The Fusion Machine consists of:

① Heater
② Facer
③ Hydraulic Power Unit
④ Carriage Assembly
⑤ Hydraulic Hoses

TX01313-4-1-97

Carriage Assembly

The carriage assembly consists of two fixed jaws and two hydraulically operated movable jaws.



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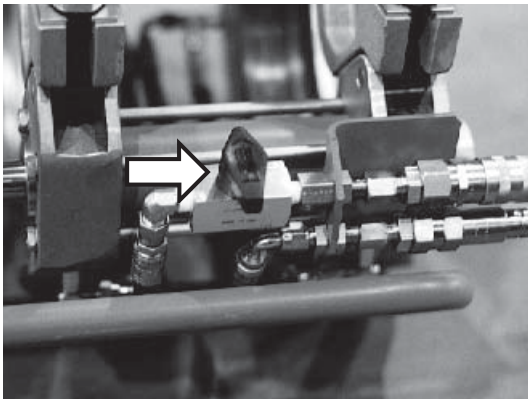
TX01542-5-6-98

Carriage Shut-off Valve

A shut-off valve is installed on the carriage. When it is closed, the operator at the power unit can not move the carriage.



PH00989-10-24-96

TX001138-10-24-96

Oil Reservoir

The reservoir is incorporated in the hydraulic power unit.

The oil level should remain visible in the sight gauge in the side of the reservoir.

Never allow dirt or other foreign matter to enter the open tank.

Refer to the "Hydraulic Fluids" section of this manual for hydraulic fluid recommendations.

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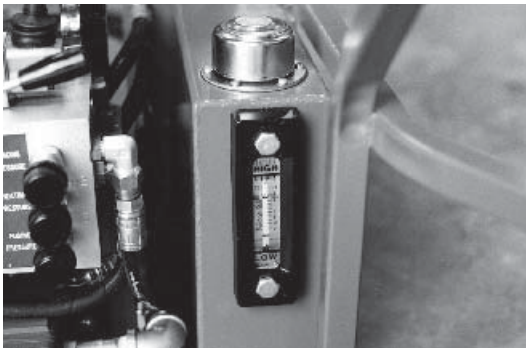


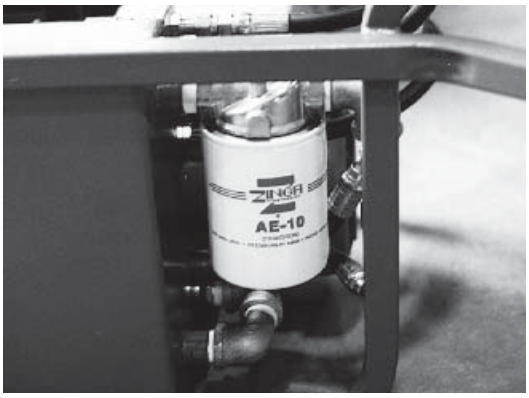
PH00793-4-96

Filter

This machine is equipped with a 10 Micron filter on the return side of the pump.

Change filter every 400 hours.

TX00545-7-12-95



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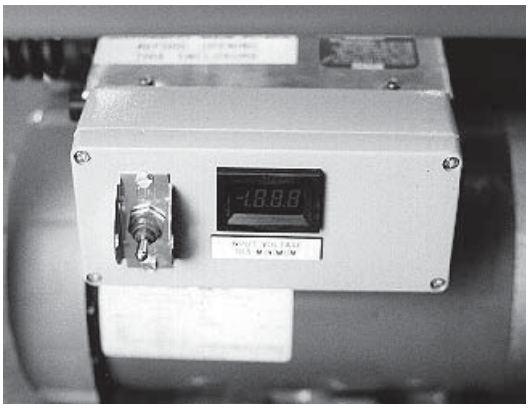
Motor and Pump

The pump is powered by a TEFC capacitor start motor. The pump is a high/low gear pump and is set to give maximum flow up to 300 psi. At this pressure, an internal sequence valve shifts to a lower flow and reduces the load on the motor.



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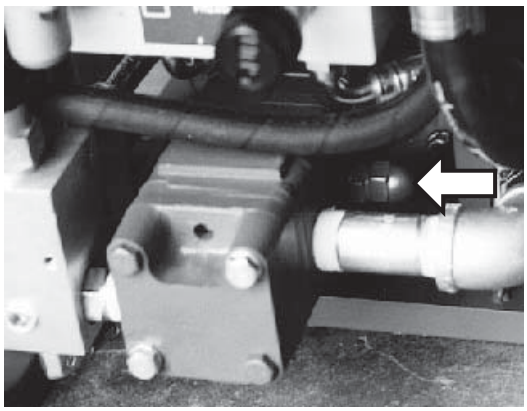
NOTICE: Do not adjust the sequence valve higher on the pump. This will overload the motor.



PH00795-4-9-96

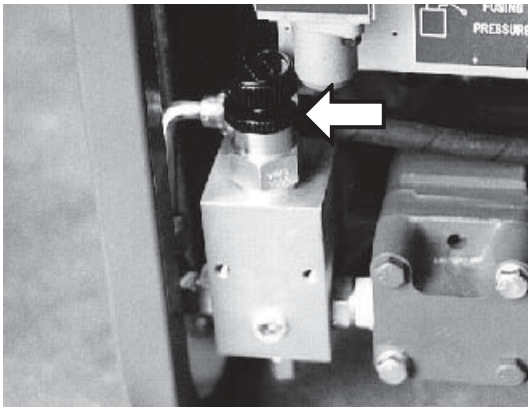
TX00669-05-11-17

Relief Valve

The overall system pressure is set with the relief valve mounted off the pump. This pressure is set at 800 psi and is sufficient for most pipe.

When working with heavy wall pipe, it may be necessary to increase the pressure to 1000 psi for the facing operation. Reduce the pressure to 800 psi when facing is completed.

NOTICE: Prolonged operation at increased pressure can over-heat the oil and overload the motor.



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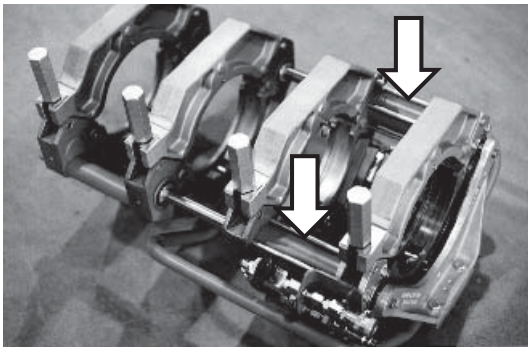
TX0670-10-12-95

Hydraulic Cylinders

The two carriage cylinders have air bleed screws and must be bled if the system ever runs low on oil or leaks air on inlet side of pump. Air in the system is indicated when carriage movement becomes jerky and erratic.

Consult the "Maintenance" section of this manual for procedure to follow when bleeding air from system.



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TX01137-10-23-96

Hydraulic Manifold Block

Mounted on this block are a carriage directional control valve, pressure reducing selector valve, three pressure reducing valves, and a 1000 psi gauge.

A) The carriage control valve, mounted on the top of the manifold, determines whether the carriage is moving left, right, or is in neutral.

B) A 1000 psi gauge is mounted on top of the manifold.

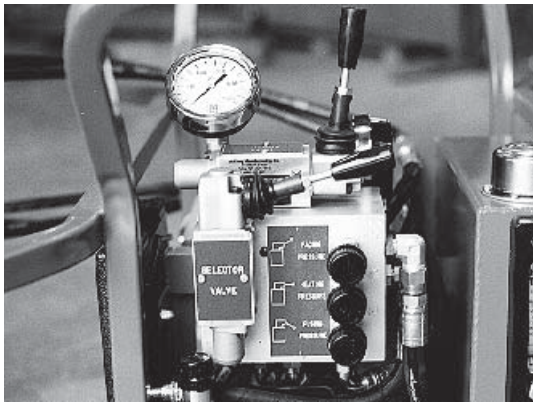
C) The selector valve, mounted on the front of the manifold, selects a reduced pressure from one of the pressure reducing valves.

Each pressure reducing valve is labeled with a different function:

D) The top valve adjusts facing pressure to a maximum of 400 psi.

E) The middle valve adjusts heating pressure to a maximum of 400 psi.

F) The bottom valve adjusts fusion pressure to a maximum of 1500 psi.



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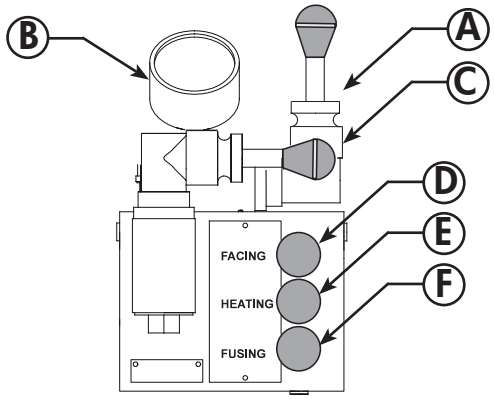

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TX00357-11-3-94

Facer

The facer is of the McElroy Rotating Planer-Block Design. The blade holders each contain two cutter blades. The block rotates on ball bearings and is chain driven (enclosed in lubricant) by a hydraulic motor. The facer weighs approximately 40 pounds. The facer has a release mechanism on the operator's side for quick and easy removal from the machine.

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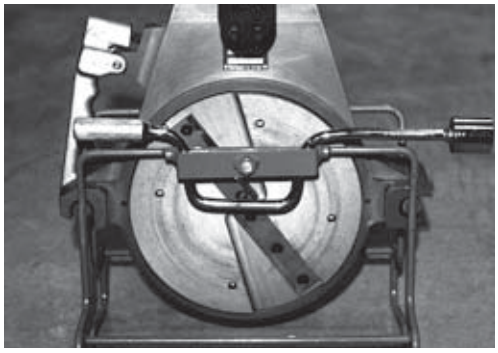

PH00519-9-21-95

Facer Stand

The facer stand is provided to allow easy access to the facer, protect the facer blades from damage and protect the operator from the facer blades. It also serves as a receptacle for the jaw speed wrench.

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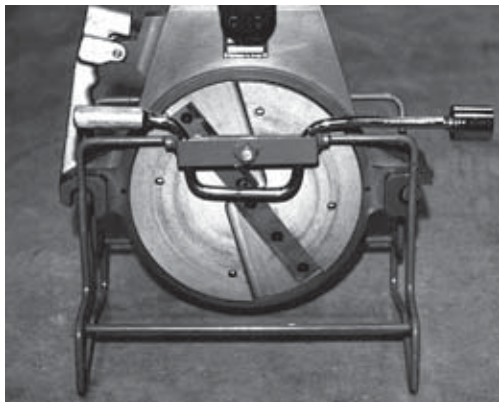

PH00519-9-21-95

Heater

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

The heater is thermostatically controlled. The heater body is not coated. Coated butt fusion heater adapters are available for all butt fusion applications.

NOTICE: The heater should never be used without butt fusion heater adapters installed.

To prevent a build-up of plastic pipe residue from accumulating on the heater plates (loss of surface temperature and pipe sticking may result), the heater plates should be cleaned with a non-synthetic cloth before and after every fusion joint.

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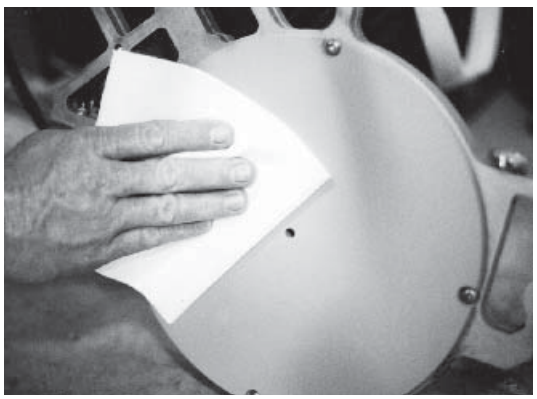

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Installing Butt Fusion Heater Adapters

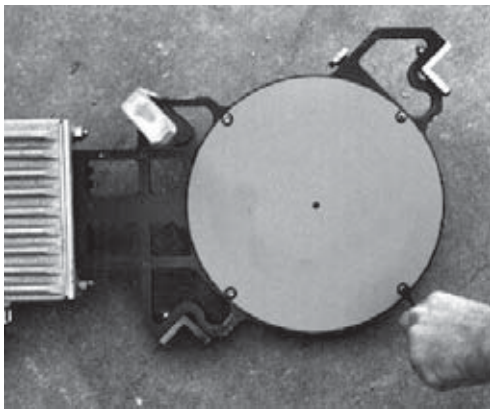
The heater body of this assembly is not coated. Coated butt fusion heater plates are available for all butt fusion applications.

Butt fusion heater adapters are installed with eight stainless steel cap screws.

Care should be taken to assure that the butt fusion 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 butt fusion heater adapters are coated with an anti-stick coating.



PH00483-9-7-95

TX00443-9-22-94

Insulated Heater Stand

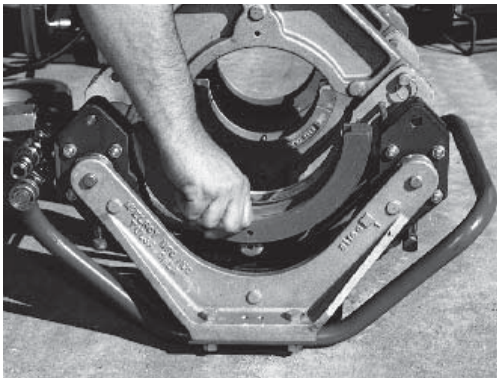
The heater should always be stored in the insulated heater stand or blanket for protection of the operator and to minimize heat loss and risk of mechanical damage.

PH00480-4-10-96

TX00363-9-15-94

Inserted Outer Movable Jaw

When clamping a molded fitting in the movable side of the carriage, it is necessary to remove the 8" IPS insert in the outer movable jaw. Pull the detent pin and lift the insert out. The upper jaw is not used and may be removed.



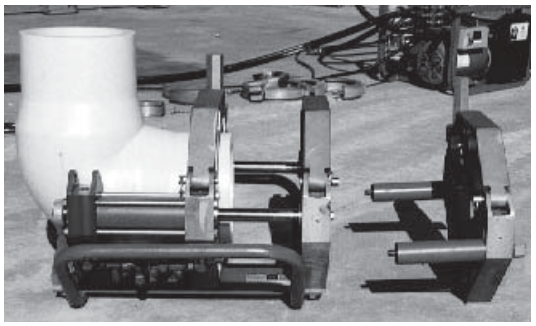
PH00983-10-24-96

TX01140-10-24-96

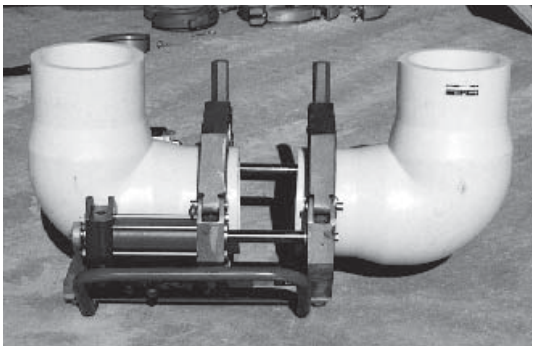
Removable Outer Fixed Jaw

The outer fixed jaw can easily be removed to facilitate fusing tees or ells to the line.

Two tie bolts hold the jaw on the carriage and can be removed with the speed wrench provided.



PH00984-10-24-96

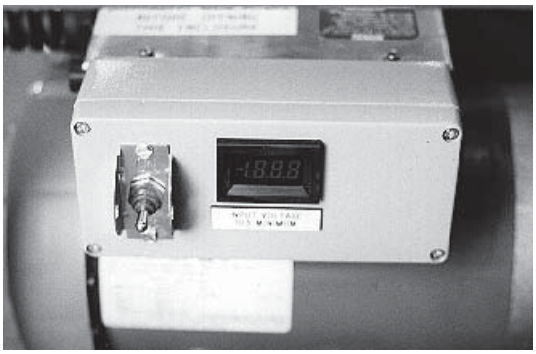


PH00984-10-24-96

TX01141-10-24-96

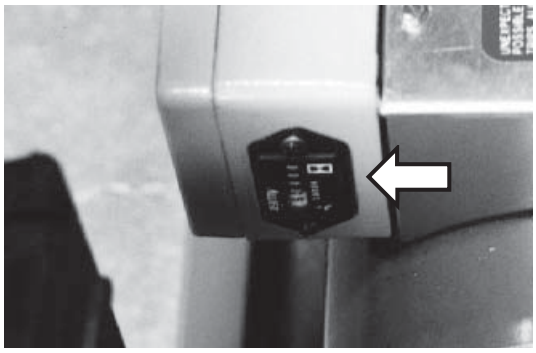
Electrical Box

The main power switch is located on the top of the motor. Next to the power switch is a digital volt meter. This meter shows the incoming voltage to the unit. Minimum voltage is listed under the volt meter.



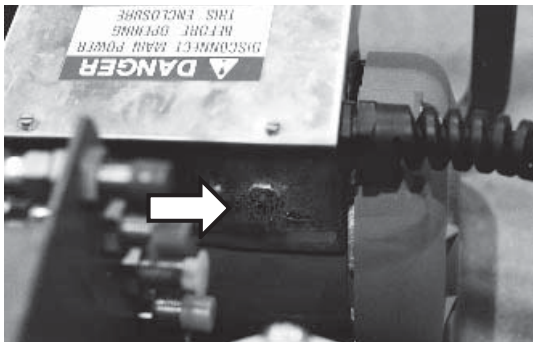
PH00798-4-10-96

Located on the side of the electrical box is an hour meter that indicates how many hours the unit has been in operation.



PH00799-4-10-96

A circuit breaker is located on the motor. In case of an overload it can be pushed to reset.



PH00982-10-24-96

TX00672-10-12-95

Butt Fusion Procedure

Read Before Operating

Before operating this machine, please read this manual thoroughly, and keep a copy with the machine for future reference.

Return manual to the protective storage box when not in use. This manual is to be considered part of your machine.

TX00401-9-15-94

STOP-9-22-95

Two Operators

⚠WARNING Jaws are operated hydraulically by a remote operator. Anything caught in the jaws will be crushed. Always communicate clearly with the second operator and use the carriage shut off valve to lock out jaw motion.

TX00543-10-23-96

WR00012-12-4-92

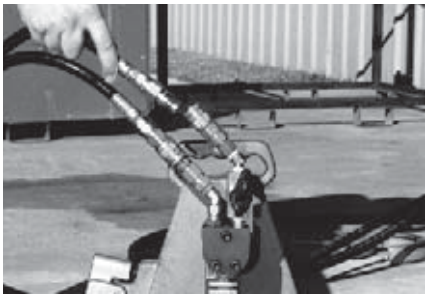
Setup

There are four hydraulic hoses that connect the facer and the carriage to the hydraulic power unit. The unit must be off to connect or disconnect the hoses.

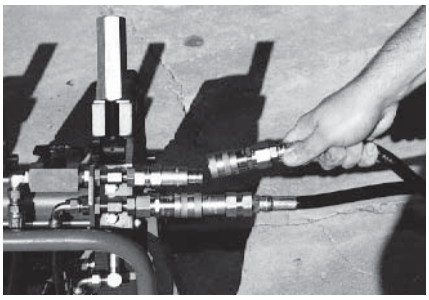
Connect the 1/4" quick disconnects on the hydraulic power unit to the facer and the 3/8" quick disconnects to the carriage.

IMPORTANT: Always open the carriage shut-off valve before connecting or disconnecting the hoses. Pressure can build up in the lines with this valve shut, making it difficult to reconnect the hoses.

TX00544-7-11-95



PH00987-10-24-96



PH00987-10-24-96

Check Fluid Level

Check fluid level in sight gauge on reservoir and add oil if necessary.

Refer to the "Hydraulic Fluids" section of this manual for hydraulic fluid recommendations.

TX00547-04-28-14

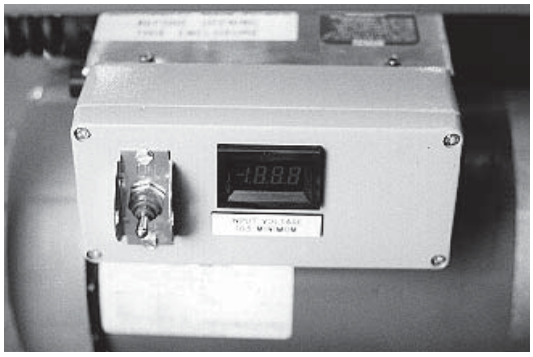
PH00793-4-10-96

Connecting machine to Power

⚠ DANGER All electrical equipment and power sources must be located in a non-hazardous location. Failure to do so will result in serious injury or death.

Plug machine's electrical cord into a proper power source. The voltage should drop no more than indicated on the voltmeter label.

TX00907-4-10-96



PH00798-4-10-96

Prepare Heater

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

Install butt fusion heater plates.

NOTICE: The heater should never be used without butt fusion heater plates installed. Refer to the "Maintenance" section of this manual for installation procedure.

Place heater in insulated heater stand.

Plug heater into a proper power source.

Allow heater to warm-up to operating temperature.

Refer to the "Maintenance" section of this manual for instructions on how to adjust heater temperature.

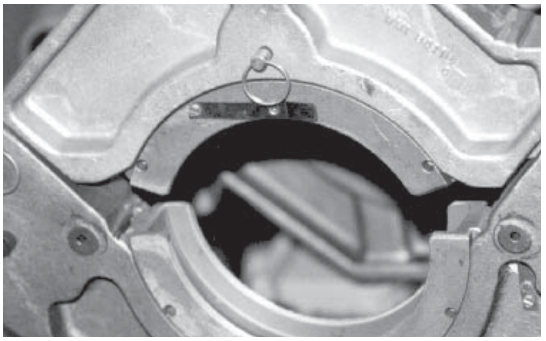
PH00303-9-24-93

PH00420-11-1-94

TX00366-04-16-14

Install Clamping Inserts

Select and install appropriate clamping inserts for the pipe that is being fused.



PH00304-9-24-93

TX01310-4-1-97

Pump Motor

DANGER Pump motor is not explosion proof. Operation of pump motor in an explosive atmosphere without necessary safety precautions will result in serious injury or death.

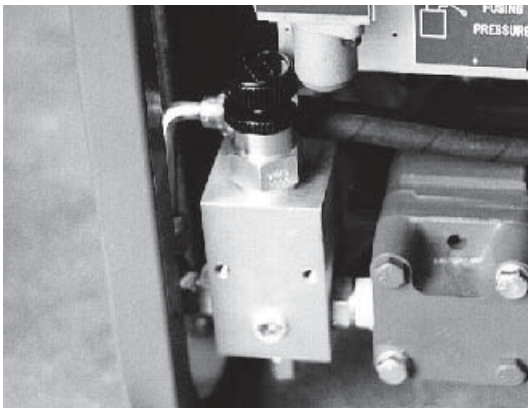
WR00080-4-12-93

Locate pump motor in a safe environment. Plug the electrical cord into a proper power source.

Turn on hydraulic pump motor and note pressure at the relief valve.

Set the system pressure to 800 psi for most pipe sizes and SDR's. When facing heavy wall pipe, it may necessary to increase the pressure to 1000 psi. Reduce the pressure to 800 psi when facing is completed. Prolonged operation at increased pressure can over-heat the oil.

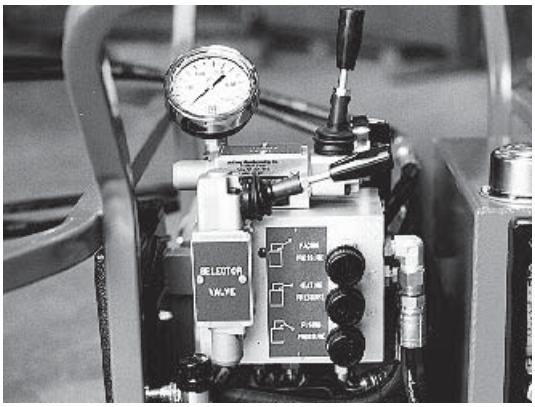
IMPORTANT: Unplug heater when starting pump motor. This will reduce the load on the power supply.



PH00796-4-10-96

TX00673-05-11-17

Check Hydraulic Pressure



PH00797-4-10-96

The pressure gauge on the manifold block indicates the pressure at the carriage valve. How much pressure depends on the position of the selector valve and the pressure set on the specific pressure reducing valve. With the selector valve up, the facing pressure can be set. It may be necessary to adjust the carriage speed, while facing, with the top pressure reducing valve to control facing speed.

Shift the selector valve to the center position, and set the heating pressure (if required). If heating pressure is not required, set the pressure reducing valve at its lowest setting, or the drag pressure, whichever is higher.

With the selector valve in the down position, the fusion pressure can be set.

The heating and fusion pressures can be calculated using the enclosed nomogram. A 30 psi drag factor is included in the nomogram pressure. This is to compensate for seal, and pipe drag with one joint of pipe on a pipe stand. If additional lengths of pipe are being moved by the movable jaws, the actual drag pressure should be determined using the following procedure:

After facing the pipe, move the carriage so that the pipe ends are approximately 2" apart.

Shift the carriage control valve to the middle (neutral) position.

Select the heating mode, and adjust the middle pressure reducing valve to its lowest pressure by turning the valve counterclockwise.

Shift the carriage control valve to the left.

Gradually increase the pressure by turning the valve clockwise. Increase the pressure until the carriage moves.

Quickly reduce the heating pressure valve counterclockwise until the carriage is just barely moving.

Record this actual drag pressure.

Take the pressure, determined from the nomogram, and subtract the 30 psi included drag factor. Then add the actual measured drag pressure back. This will be the actual fusion pressure to set with the bottom pressure reducing valve.

TX00370-9-22-94

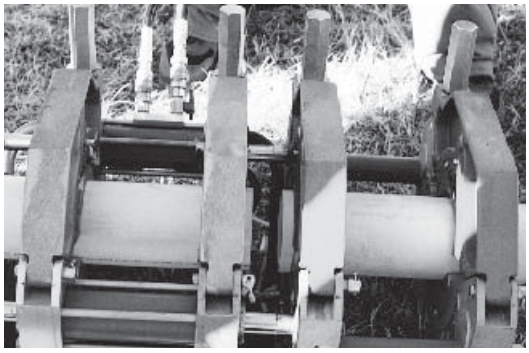
Butt Fusion Procedure

Loading Pipe Into Machine

Clean the inside and outside of pipe ends that are to be fused.

Open the upper jaws and insert pipe in each pair of jaws with applicable inserts installed. Let the ends of the pipe protrude about 1" past the face of the jaws.

TX0371-9-15-94

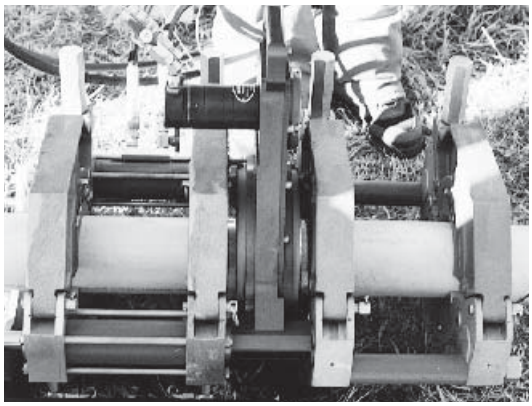


PH00807-4-10-96

Positioning Pipe In Machine

Set the facer into place. With the carriage control valve lever, move the carriage toward the fixed jaws, while watching the gap at each end of the facer stops. When the pipe is in contact with the facer, this gap indicates the amount of material that will be trimmed from the pipe end. Assure sufficient material will be removed for a complete face off. Tighten the clamp knobs on the outside jaws. Hand tighten the inside clamp knobs.

TX01545-5-7-98



PH00806-4-10-96

Facing the Pipe

Move the carriage to the right.

Open the ball valve on the facer motor.

Assure the selector valve handle is up in the facing position.

Move the carriage control valve to the left.

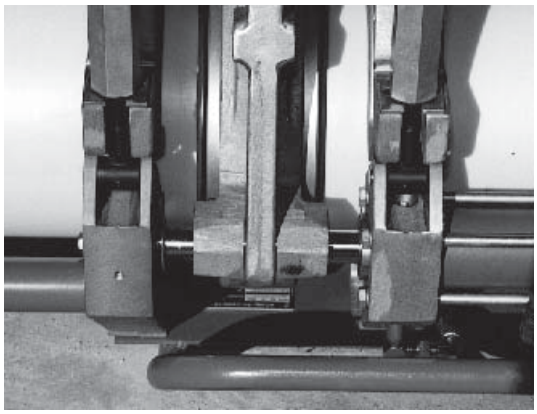
If the facer stalls, adjust the facing pressure so the facer continues to cut.

IMPORTANT: When facing heavy wall pipe, it may be necessary to increase the system pressure to 1000 psi.

IMPORTANT: When drag pressure exceeds 300 psi it is necessary to move the carriage to the left bringing the pipe ends into contact with the facer before opening the facer valve.

Let the carriage bottom out on facer stops.

Turn facer off. Move the carriage to the right so the facer can be removed.



PH00988-10-24-96

TX00403-8-26-96

Remove Facer

Release the latch handle, and lift the facer out and place it in the facer stand.

Close carriage shut off valve.

⚠WARNING Jaws are operated hydraulically by a remote operator. Anything caught in the jaws will be crushed. Always communicate clearly with the second operator and use the carriage shut off valve to lock out jaw motion.

Remove chips from pipe ends.

Do not touch faced pipe ends.

Inspect both pipe ends for complete face off. If the face off is incomplete, return **Loading Pipe Into Machine**.

Open shut off valve.

Move the carriage to the left until ends of pipe butt together.

Check pipe joint for proper alignment.

⚠WARNING Do not use finger to check for hi/lo (misalignment). The unit is under pressure, and slippage could result in crushed fingers. Always keep hands clear of the jaw area.

If pipe is not lined up, tighten the high side jaw to bring into alignment.

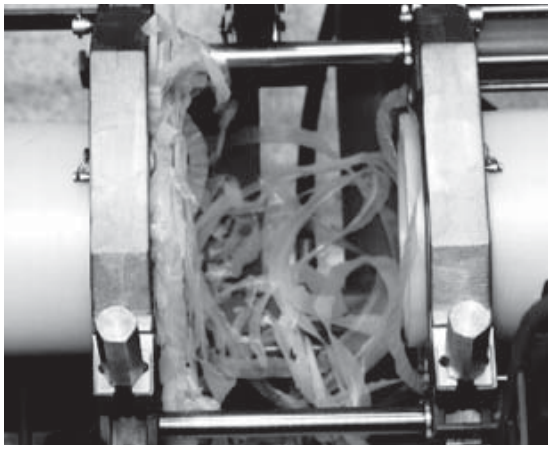
IMPORTANT: Always tighten the side that is higher, never loosen the low side.

When the pipe is properly aligned tighten outside clamps to insure against slippage.

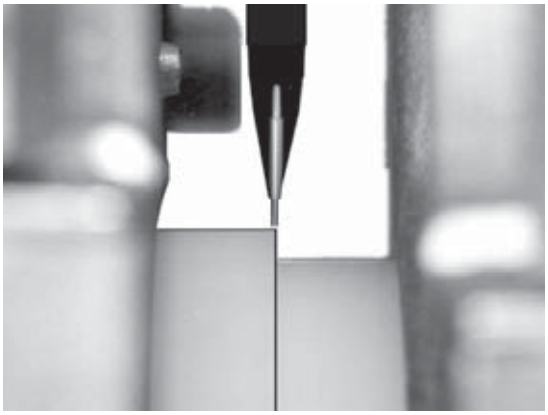
Ensure there is no unacceptable gap between the pipe ends. If there is an unacceptable gap, return to **Loading Pipe Into Machine**.

NOTICE: When clamping, do not over tighten the clamp knobs because machine damage can result. Check to see if there is space between the upper and lower jaws. If the two jaws are touching, do not continue to tighten.

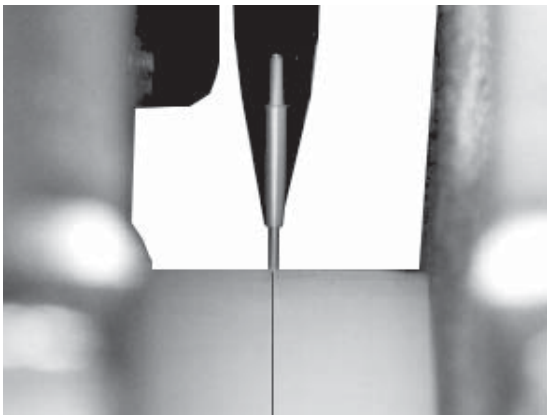
Bring the pipe ends together under fusion pressure to check for slippage. If slippage occurs, return to **Loading Pipe Into Machine**.



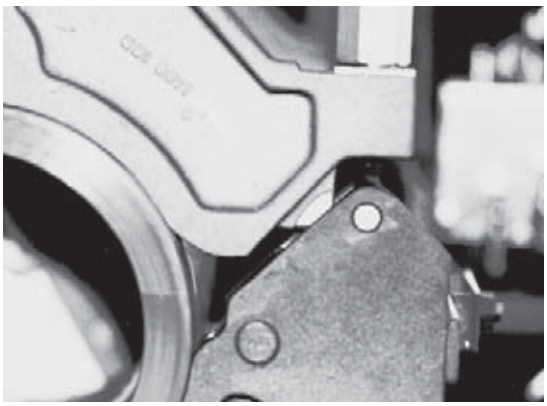
PH00362-9-14-94



PH00366-9-12-94



PH00357-9-12-94

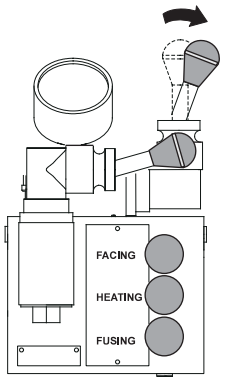


PH00323-9-25-93

TX00549-7-13-95

Position Carriage for Heater Insertion

Move carriage to the right to open a gap large enough to insert the heater.



CD00172-9-15-95

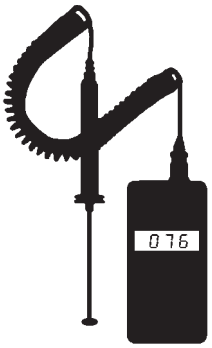
TX00374-9-15-94

Check Heater Temperature

NOTICE: Incorrect heating temperature can result in questionable fusion joints. Check heater plates periodically with a pyrometer and make necessary adjustments.

Check heater surface temperature.

Refer to the pipe manufacturer's recommendations for proper heater temperature.



WR00077-4-16-93

IMPORTANT: The dial thermometer on the heater indicates internal temperature which varies from the actual surface temperature.

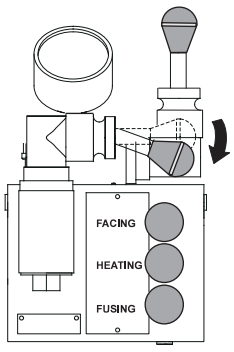
The dial thermometer can be used as reference once the surface temperature has been verified.

PH00420-11-1-94

TX00375-11-1-94

Select the Fusion Position

Move selector valve handle down to the fusing position.



CD00172B-9-15-95

TX00376-9-15-94

Butt Fusion Procedure

Inserting Heater

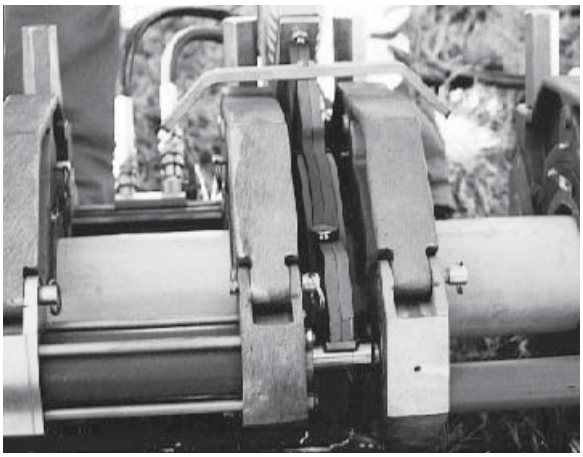
⚠ DANGER Heater Is Not Explosion Proof. This unit is not explosion proof. Operation of heater in an explosive atmosphere without necessary safety precautions will result in serious injury or death.

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

Use a clean non-synthetic cloth to clean the butt fusion heater adapter surfaces.

Verify heater temperature by noting the reading on the dial thermometer.

Insert heater between the pipe ends.



PH00596-12-4-95

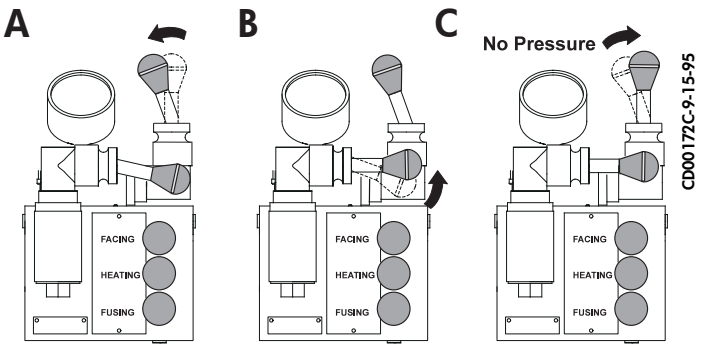
TX00377-9-15-94

Heating the Pipe

A) Move the carriage to the left, bringing the heater into contact with both pipe ends.

B) Move selector valve to center position.

C) If heating pressure is not required, allow the pressure to stabilize at the lowest setting and return carriage control valve to neutral position.



CD00172C-9-15-95

TX00378-9-15-94

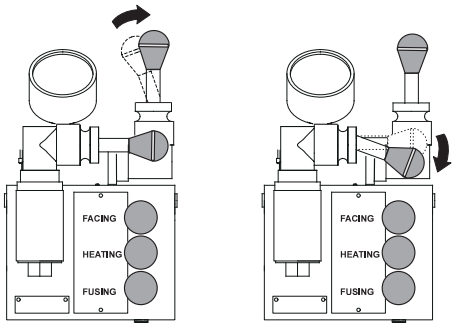
Fusing the Pipe

NOTICE: Failure to follow pipe manufacturer's heating time, pressure, and cooling time may result in a bad joint.

After following the pipe manufacturer's suggested heating procedure:

A) Shift carriage control valve to neutral position.

B) Shift the selector valve down to fusion position.

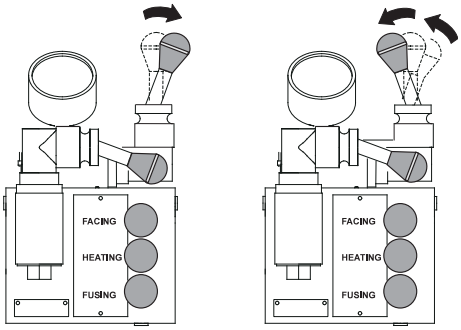


CD00172D-9-15-95

C) Move the carriage to the right just enough to remove the heater.

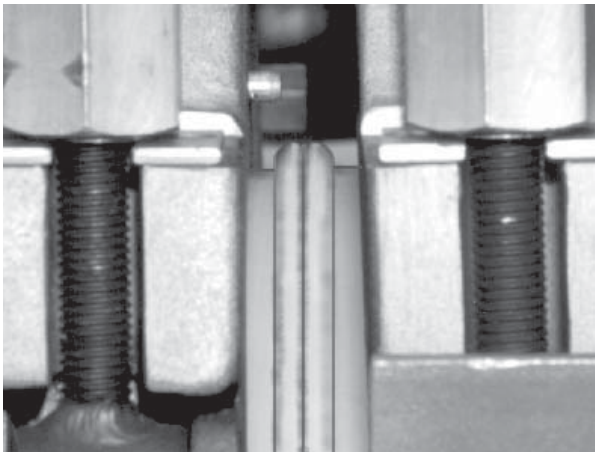
Quickly remove the heater.

D) Quickly move the carriage to the left, bringing the pipe ends together under the pipe manufacturer's recommended pressure.



CDJ172E-9-15-95

Allow joint to cool under pressure according to pipe manufacturer's recommendation.



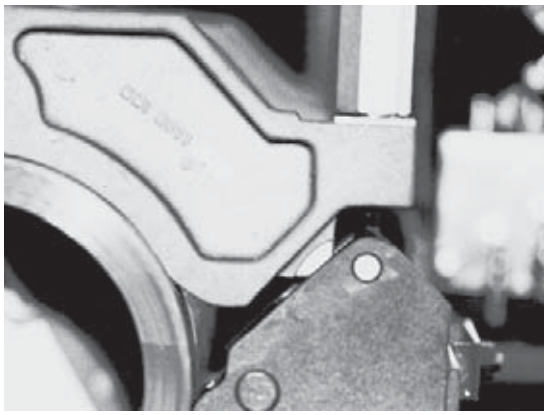
PH00363B-9-21-95

TX00379-9-13-94

Opening Movable Jaws

After the joint has cooled for the pipe manufacturer's recommended time, shift the carriage control valve to the neutral position.

Loosen all clamp knobs, and open the movable jaws.



PH00323-9-25-93

TX00674-10-12-95

Maintenance

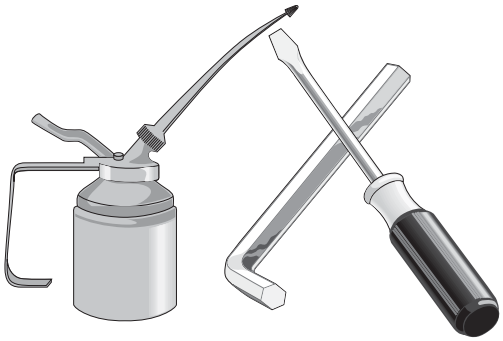
Preventative Maintenance

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



CD00142-11-2-94

Washing the Machine

The machine should be cleaned, as needed with a soap and water wash.

TX00429-9-15-94

CD00178-9-15-95

Check Hydraulic Fluid

The hydraulic fluid level should be checked daily.

If hydraulic fluid is not visible in the sight gauge, fluid must be added.

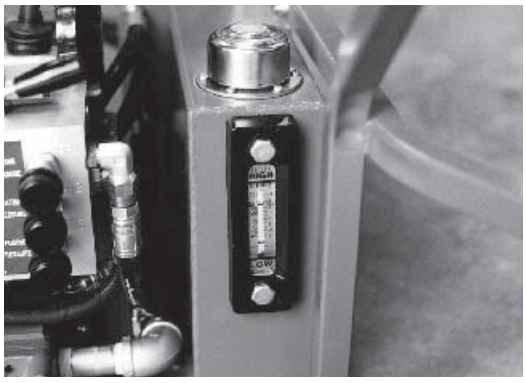
Refer to the "Hydraulic Fluids" section of this manual for hydraulic fluid recommendations.

If fluid is not visible in the sight gauge, fill reservoir until fluid is visible in the sight gauge. Do not overfill reservoir as the fluid will expand as it heats up.

Never allow dirt, water or other foreign matter to enter the tank.

Use only clean fluid from an unopened container.

TX00430-04-28-14



PH00793-4-10-96

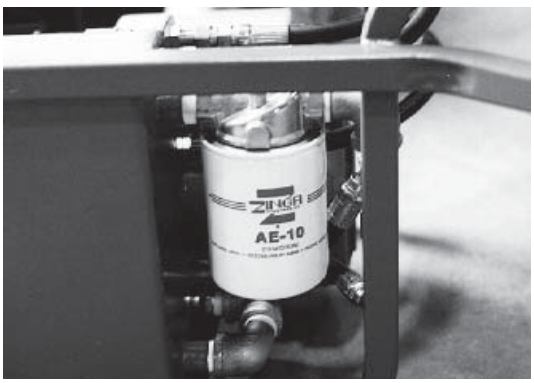
Change Hydraulic Fluid and Filter

The hydraulic fluid and filter should be replaced after every 400 hours of operation.

Fluid should also be changed as extreme weather conditions dictate.

Refer to the "Hydraulic Fluids" section of this manual for hydraulic fluid recommendations.

TX05295-05-11-17



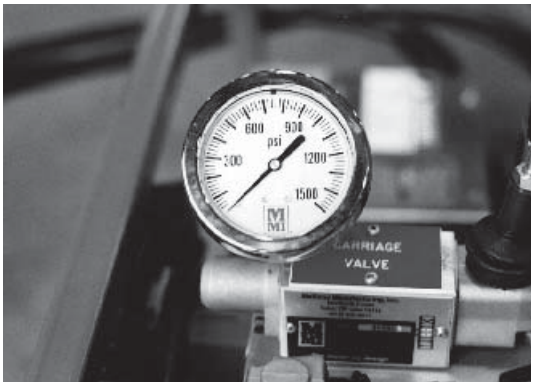
PH00794-4-10-96

Check Gauge Calibration

Gauge calibration should be checked daily.

The gauge should read zero when the unit is not running.

TX00432-9-13-94



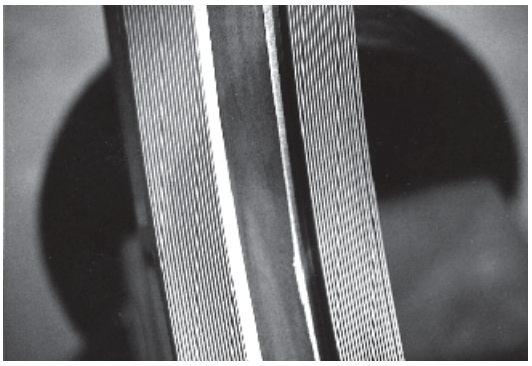
PH00803-4-10-96

Clean Jaws and Inserts

To prevent slippage and insure proper alignment, the jaws and inserts must be clean.

Clean the jaws and inserts of any dirt or residual material using a stiff-bristled brush.

TX00433-9-15-94



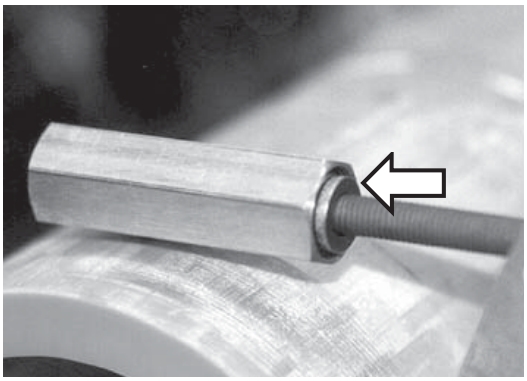
PH00927-8-20-96

Clean Thrust Bearings

The thrust bearings located in the clamp knobs must turn freely.

Wash the clamp knob bearing assembly with a solvent, and then lubricate with 30W or lighter oil.

TX00434-9-13-94

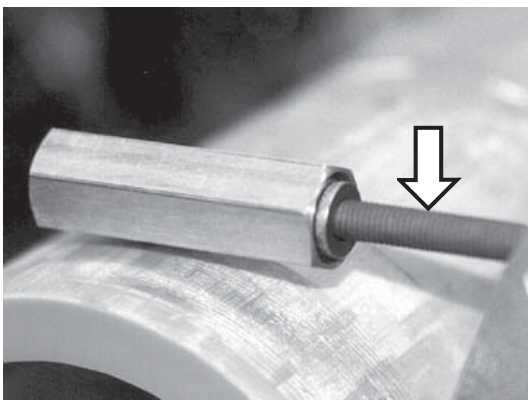


PH00377-9-14-94

Clean Eyebolt Threads

Keep the clamp knob eyebolt threads brushed clean.

TX00435-9-13-94

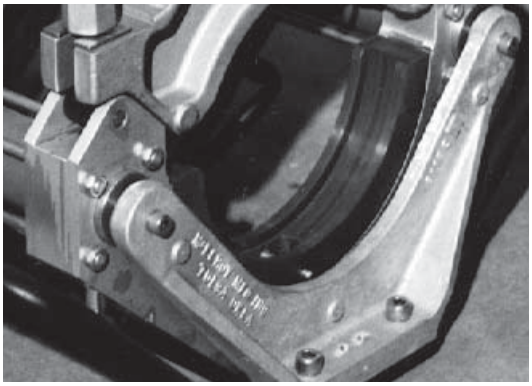


PH00377-9-14-94

Fasteners Must Be Tight

Check all nuts, bolts, and snap rings to make certain they are secure and in place.

TX00437-9-13-94

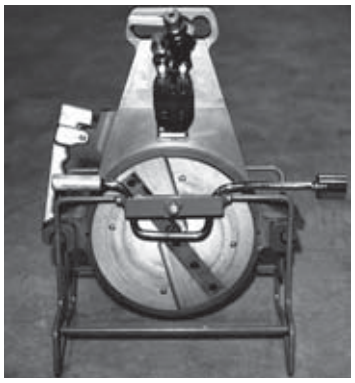


PH00805-4-10-96

Facer

The facer should be lubricated annually.

TX00438-9-15-94



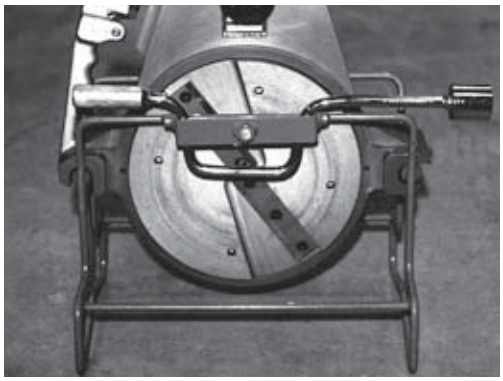
PH00519-9-21-95

Blades bolt directly to the blade holder and should be inspected for damage and sharpness.

Dull or chipped blades must be replaced.

NOTICE: Never extend the blade beyond the inner or outer circumference of the facer.

TX02475-3-29-05



PH00519-9-21-95

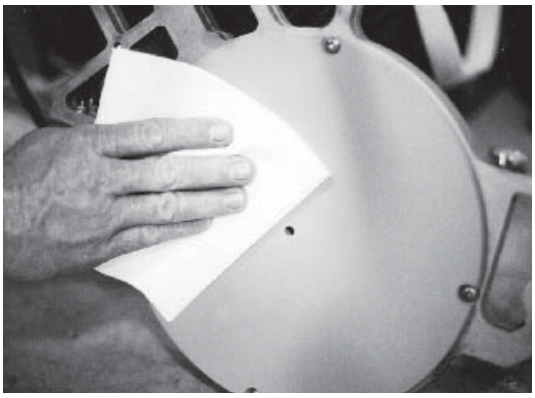
Clean Heater Surfaces

The heater faces must be kept clean and free of any plastic build up or contamination.

Before each fusion joint the heater surfaces must be wiped with a clean, non-synthetic cloth.

NOTICE: Do not use an abrasive pad or steel wool. Use a non-synthetic cloth that won't damage surfaces.

TX00440-8-14-08



PH00804-4-10-96

Bleeding Air From Hydraulic System

The two carriage cylinders have air bleed screws and must be bled if the system ever runs low on oil or leaks air on inlet side of pump. Air in the system is indicated when carriage movement becomes jerky and erratic. To bleed the system, proceed as follows:

Remove upper jaws & clamping eye bolts from the two movable clamp jaws to expose the bleed plugs recessed in top of the lower jaws.

Tilt machine so the fixed jaw end is higher than the opposite end.

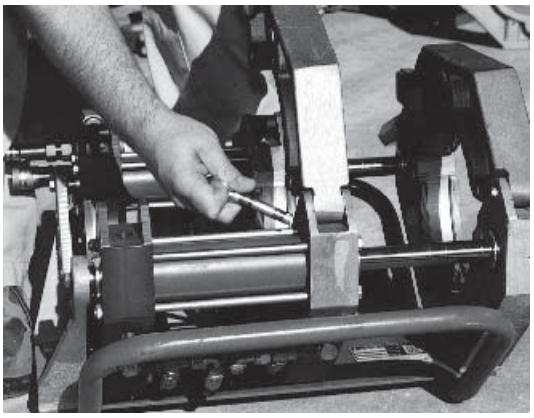
Shift the directional control and move the carriage to the fixed jaw end. Adjust the pressure to approximately 50-100 psi before proceeding.

Loosen the bleed plug on one cylinder next to the fixed jaw.

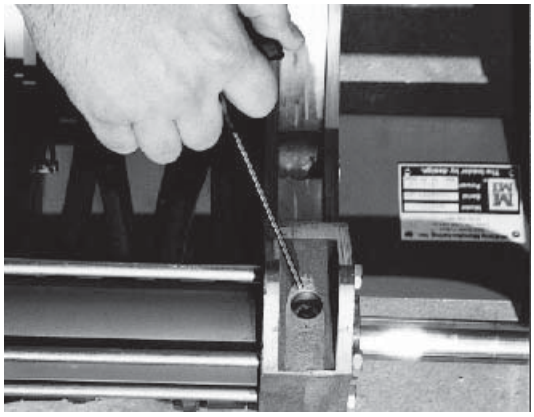
Hold pressure on the cylinder until no air is indicated and quickly tighten the plug.

Repeat this operation on the opposite cylinder.

Tilt the machine so the opposite end is higher than the fixed jaw end. Move the carriage to the end opposite the fixed jaw and repeat the above procedure on the this end of the cylinders.



PH00990-10-24-96



PH00991-10-24-96

TX00427-9-15-94

Installing Butt Fusion Heater Adapters

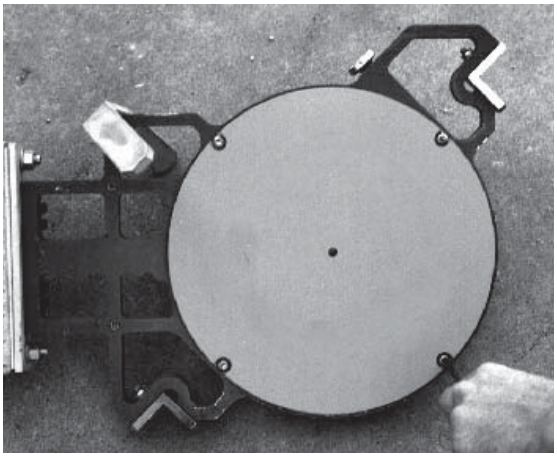
The heater body of this assembly is not coated. Coated butt fusion heater plates are available for all butt fusion applications.

Butt fusion heater plates are installed with stainless steel cap screws.

Care should be taken to assure that the butt fusion heater plates 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 butt fusion heater plates are coated with an antistick coating.



PH00483--9-7-995

TX02311-07-30-04

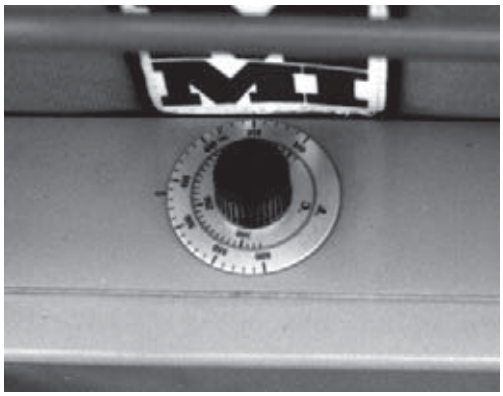
Adjusting Heater Temperature

Set dial to desired temperature. Check the heater surface with a pyrometer. Any variance must be corrected to the pyrometer reading.

Loosen the set screw in the knob. Turn the dial to read the same temperature as the pyrometer. Tighten the set screw in the knob.

Allow heater to stabilize at the new temperature (5 to 10 minutes) after each adjustment.

The heater thermometer indicates internal temperature and should be used as a reference only.



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TX00892-3-13-96

Maintenance Checklist

Fusion Machine Checklist

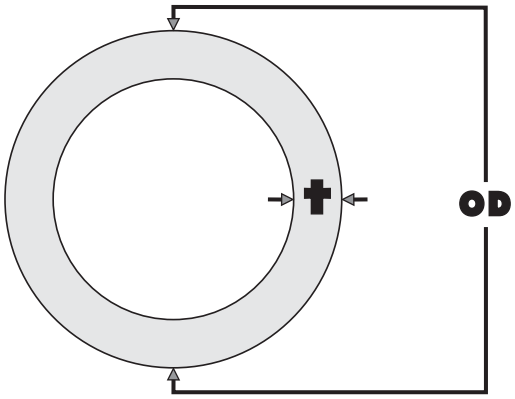
Item to Check	Satisfactory	Needs Repair	Repair Comments
Machine is clean			
All pins and snap rings are in place			
All nuts and bolts are tight			
All placards and handles are in place			
All clamp knobs turn freely			
Cords and plugs are in good condition			
All hardware is on the basic machine			
Oil Reservoir is filled to correct level			
Machine is free of hydraulic leaks			
Hydraulic gauge reads correctly			
Jaws are properly aligned			
Facer operates smoothly			
Face-off is square			
Inserts fit and pin properly			
Primary pump pressure can be adjusted from 500 psi to 1000 psi			
Correct Input Voltage to Machine			
Carriage and Selector Valves operate smoothly			
Pressure Reducing Valves operate in their range			
Heater			
Cord and plug are in good condition			
Heater surface is clean and in good condition			
Thermometer is in good working order			
Surface temperature checked with pyrometer			

TX00566-7-13-95

Determining Fusion Pressure

Variable Definitions

O.D. = Outside Diameter
t = Wall Thickness
$\prod$ = 3.1416
SDR = Standard Dimensional Ratio
IFP = Manufacturer's Recommended Interfacial Pressure
TEPA = Total Effective Piston Area

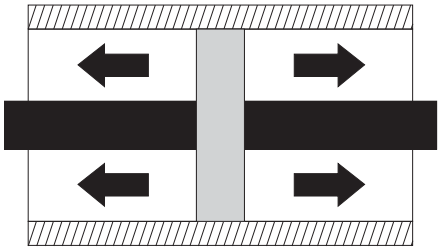


Formulas

$$t = \frac{O.D.}{SDR}$$

$$AREA = (O.D. - t) \times t \times \prod$$

$$FORCE = AREA \times IFP$$



$$GAUGE\ PRESSURE = \frac{(O.D. - t) \times t \times \prod \times IFP}{TEPA} + DRAG$$

Example

Pipe Size = 8" IPS
O.D. of Pipe = 8.625
DRAG = as measured in PSI (for this example use 30 PSI)
SDR of Pipe = 11
Recommended Interfacial Pressure = 75 PSI
Using a Model 28 Fusion Unit

$$t = \frac{O.D.}{SDR} = \frac{8.625}{11} = 0.784$$

TEPA = 4.710 (From Table)

$$GAUGE\ PRESSURE = \frac{(O.D. - t) \times t \times \prod \times IFP}{TEPA} + DRAG$$

$$GAUGE\ PRESSURE = \frac{(8.625. - .784) \times .784 \times 3.1416 \times 75}{4.710} + 30\ PSI = 338\ PSI$$

Total Effective Piston Areas

Fusion Model	High Force (Standard)	Medium Force (High Velocity)	Low Force (Extra High Velocity)
28/250	4.71	-	1.66
412	11.78	6.01	3.14
618	11.78	6.01	3.14
824	29.44	15.32	9.45
1236	29.44	15.32	9.45
1648	31.42	14.14	-
2065	31.42	-	-
1600	31.42	14.14	-

TX02893-10-12-10

Hydraulic Fluids

The use of proper hydraulic fluid is mandatory to achieve maximum performance and machine life. Use a clean, high quality, anti-wear hydraulic fluid with a viscosity index (VI) of 135 minimum. It should have a maximum viscosity of 500 cSt (2000 SSU) at startup (ambient temperature) and a minimum viscosity of 13 cSt (65 SSU) at the maximum fluid temperature (generally 80°F above ambient). Using hydraulic fluids that do not meet these criteria may cause poor operation and/or damage to the hydraulic components.

The following table specifies the fluid temperature at various viscosities. Temperature rise of the hydraulic fluid can vary from 30° F to about 80° F over the ambient temperature depending on the pressure setting, age of the pump, wind, etc. Mobil Univis N46 hydraulic fluid is installed at our factory. The advantage of this fluid is a wider temperature range, however, this fluid should not be used for continuous operation below 24°F.

NOTE: The Mobil DTE 10 Excel series replaced the DTE 10M Series. The Exxon Univis N series are now Mobil Univis N.

Hydraulic Fluids Characteristics

Manufacturer	Fluid Name	cSt 100F	cSt 210F	V.I.	-20F	-10F	0F	10F	30F	50F	70F	90F	110F	130F	150F	Range °F	Range °C
Mobil	10 Excel 15	15.8	4.1	168		**********	**********	**********	**********	**********	**********	**********				-16 - 113	-27 - 45
	10 Excel 32	32.7	6.6	164					**********	**********	**********	**********	**********	**********	**********	12 - 154	-11 - 68
	10 Excel 46	45.6	8.5	164					**********	**********	**********	**********	**********	**********	**********	23-173	-5 - 78
	10 Excel 68	68.4	11.2	156						**********	**********	**********	**********	**********	**********	37-196	3 - 91
	Univis N-32	34.9	6.9	164					**********	**********	**********	**********	**********	**********	**********	12-150	-11 - 66
	Univis N-46	46	8.5	163					**********	**********	**********	**********	**********	**********	**********	24-166	-4 - 74
	Univis N-68	73.8	12.1	160						**********	**********	**********	**********	**********	**********	39-193	4 - 89

TX03082-2-26-14

NOTE: This chart is based on pump manufacturer recommendations of 13 to 500 cSt.

NOTE: Temperatures shown are fluid temperatures. – NOT ambient temperatures.

Specifications

Fusion Machine Dimensions

Hydraulic Power Unit – 37" long (94 cm) x 22" high (56 cm) x 24" wide (61 cm)
Carriage assembly – 31" long (79 cm) x 15-1/2" high (39 cm) x 22" wide (56 cm)

Fusion Machine Weights

Hydraulic Power Unit – 158 lbs. (72 kg)
Carriage assembly – 4 jaw configuration - 95 lbs. (43 kg)
– 3 jaw configuration - 75 lbs. (34 kg)
Facer – 37 lbs. (17 kg)
Facer with stand – 45 lbs. (20.5 kg)
Heater – 17 lbs. (7.7 kg)
Heater with stand and control box – 38 lbs. (17.2 kg)

Power Requirements

Total input power required – 3500 W (See machine nameplate for specific voltage)
Pump motor – 1-1/2 hp
Heater – 1750 W

Specification

Designed for 2" IPS through 8" DIPS pipe (63 mm - 200 mm)
Design pressure – 1000 psi max-capable of more with modification
Reservoir capacity – 2 gallons
Hydraulic Fluid – Use Mobil DTE 15M or equivalent hydraulic oil
Total effective piston area – 4.71 square inches
Designed for connecting the McElroy Datalogger unit
Hydraulic facer for hazardous environments and reduced maintenance

Other Features

Forth jaw easily removed with speed wrench
Centerline guidance
Thrust bearing clamp knobs
Three mode manifold block
Flush face quick disconnects
Heater with bolt on butt fusion heater adapters
Quick change inserts for various pipe sizes
Compact carriage for in-ditch tie-ins

TX00908-4-11-96

Specifications

Generator Sizing Form

Complete this form and provide a copy to your generator supplier. This information will enable your generator supplier to correctly size a generator for your application.

Motor: 1-1/2 Horsepower

Motor Code Letter: _____ (from motor nameplate should be J or K)

Motor Voltage: _____ (120 or 220 VAC)

Motor Phases: 1

Motor Frequency: _____ (50 or 60 Hz)

Heater Wattage Rating: _____ Watts resistive

Heater Voltage: _____ (120 or 220 VAC)

Operational Altitude Range: _____ to _____

Ambient Temperature Range: _____ to _____

Duty Cycle: Standby (Not continuous 24 hours/day)

Allowable Voltage Dip: 20%

Allowable Frequency Dip: 5%

Starting Load Application: Simultaneous turn-on of both motor and heater.

Running Load: Motor continuous, heater cycling on and off at approximately 5 minute intervals.

Fuel: _____ (Gasoline or Diesel)

Special requirements for customer application: _____

_____

_____

_____

_____

TX00473-9-17-94

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.

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