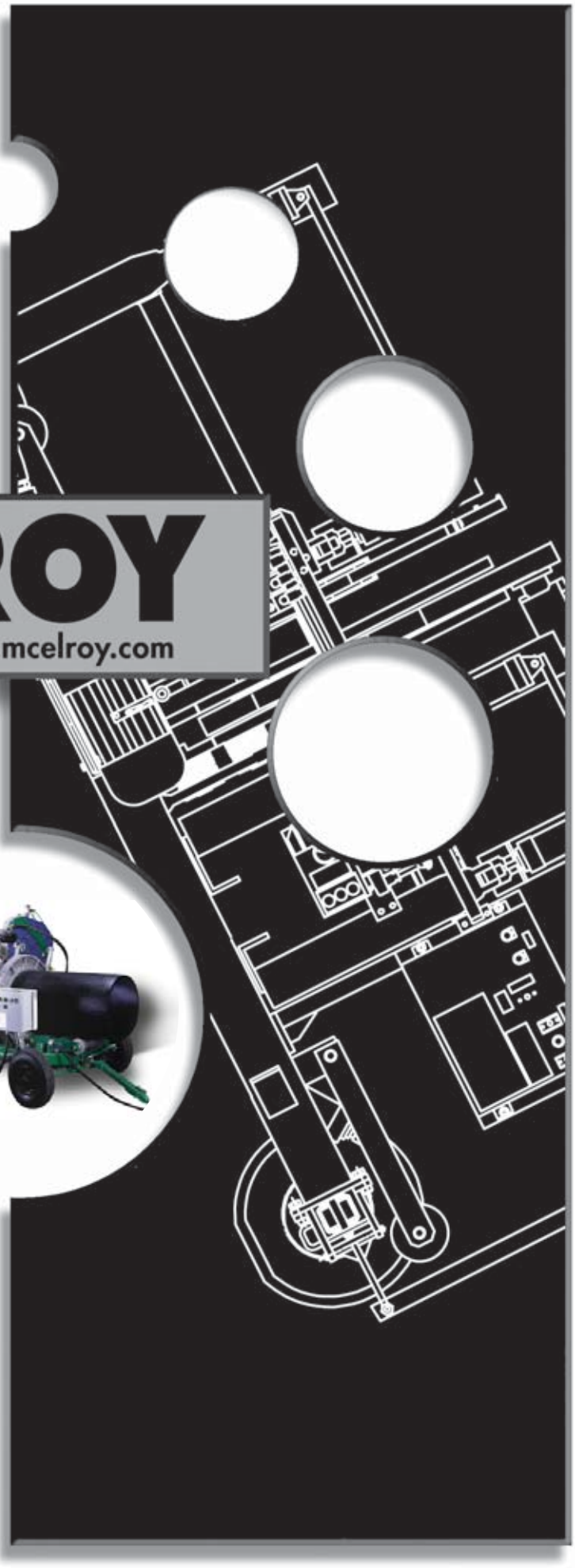
Operator's Manual



McELROY

www.mcelroy.com

Fusion Machine Model 1648

Original Language: English

Manual: 4803801 Revision: D 05/14

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 MegaMc® 1648 fusion machine is designed to butt fuse polyethylene pipe.

The machine also allows for butt 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.

This manual was written to assist in the training of personnel in the procedures and operating functions of this fusion machine. Only trained and qualified personnel should operate this machine.

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PH00475-12-11-95

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.

SINCE 1981
McELROY
UNIVERSITY℠

MU2-03-13-14

TX04659-03-24-14

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 _____

TX02486-11-4-13

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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.

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.

WR00051-11-30-92

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

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.

SAFE1ST-12-22-92

TX00114-4-22-93

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.

WR00053-12-2-92

TX00032-4-7-93

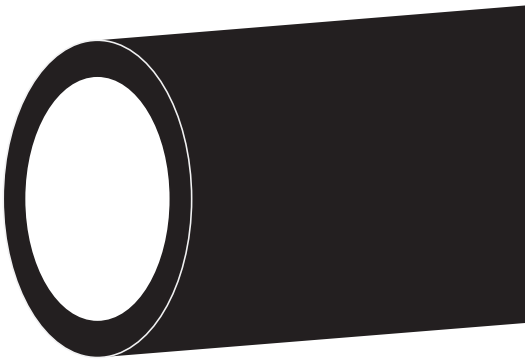
Do Not Operate This Machine in a Hazardous Environment

⚠ DANGER Electric motors and heaters are not explosion proof. Operation of these components in an explosive atmosphere will result in serious injury or death.

WR00080-4-12-93

TX00796-04-11-14

Pipe Handling Safety


WR00097-4-17-13

⚠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.

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.

Keep persons that are not involved in handling pipe away from handling operations. 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.

TX04586-4-17-13

Units With Hydraulics


WR00078-4-8-93

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.

⚠WARNING Unwanted movement of the machine could result in serious injury or damage to machine. Unwanted movement of the machine may take place if switches do not match machine state when the machine power is turned on.

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

TX03007-10-12-10

Fusion Safety Equipment

Electrical Safety

⚠WARNING Always ensure equipment is 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.

WR00055-4-7-93

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

NOTICE: Always connect units to the proper power source as listed on the unit, or in the owner's manual.

NOTICE: Disconnect the machine from the power source before attempting any maintenance or adjustment.

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

WR00025-11-30-92

TX03003-3-30-11

Crush Points

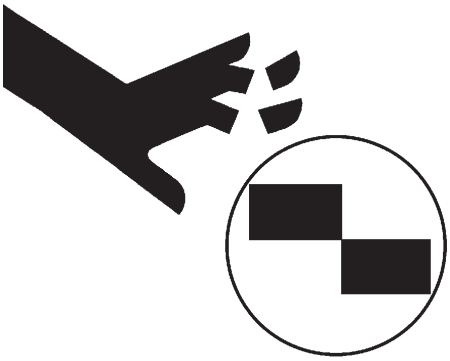
⚠WARNING Hydraulically operated equipment is operated under pressure. Anything caught in the machine will be crushed. Keep fingers, feet, arms, legs, and head out of the machine while operated.

WR00012-12-4-92

TX03004-8-11-09

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.



WR00073-4-6-93

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.

TX02378-1-24-05

Fusion Safety Equipment

Stand Clear

⚠WARNING Jaws, heater and facer pivot rapidly and can cause severe bodily injury if someone is standing too close. All personnel must stand clear of machine when operating.

Be aware of yourself and others when operating this machine and when sections of pipe are being moved.

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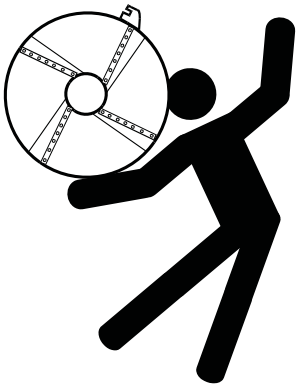
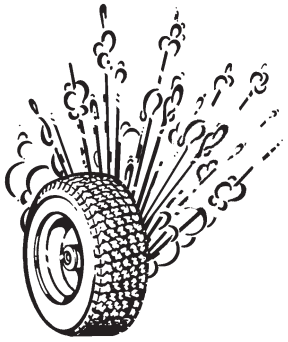


WR00091-3-4-96

Have Tires Properly Serviced

⚠WARNING Failure to follow proper procedures when mounting a tire on a wheel or rim can produce an explosion which may result in serious injury or death. Have tires mounted by someone that is experienced, and has the proper equipment to perform the job safely.

TX00118-4-22-93



WR00083-4-22-93

Do Not Tow Fusion Machine At Speeds Greater Than 5 MPH

⚠WARNING The chassis is not designed for over-road towing. Towing at speeds greater than five miles per hour can result in machine damage as well as injury. Always transport the machine by flat bed truck or similar means, and make sure that unit is properly secured.

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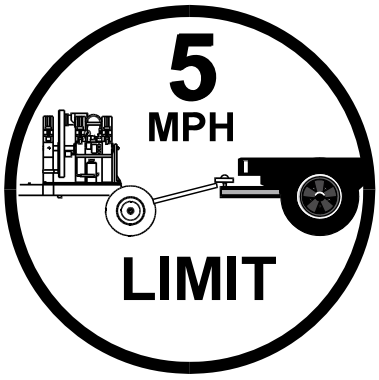

CD00189-1-24-96

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.

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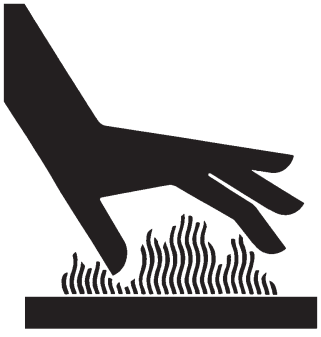
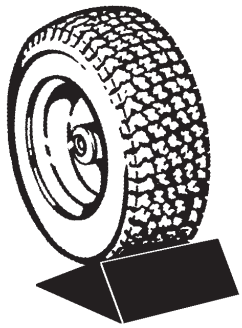


WR00030-2-10-93

Fusion Safety Equipment

Positioning Fusion Machine

Place fusion machine on as level ground as possible, and set the brake on the rear wheel. If it is necessary to operate machine on unlevel grade, chock the wheels and block the unit to make it as stable as possible.



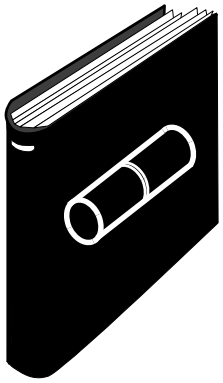
WR00076-4-7-93

TX00112-9-15-94

Fusion Procedures

Obtain a copy of the pipe manufacturer's procedures 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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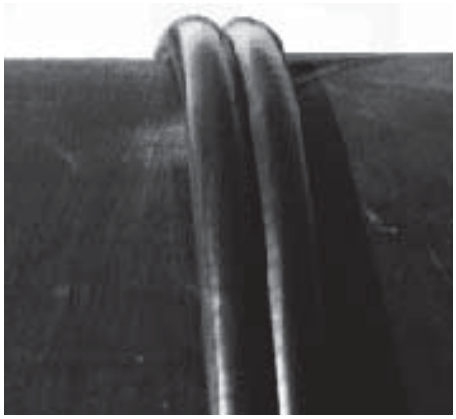
TX02984-5-22-12

Theory of Heat Fusion



PH00524-18-95

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.

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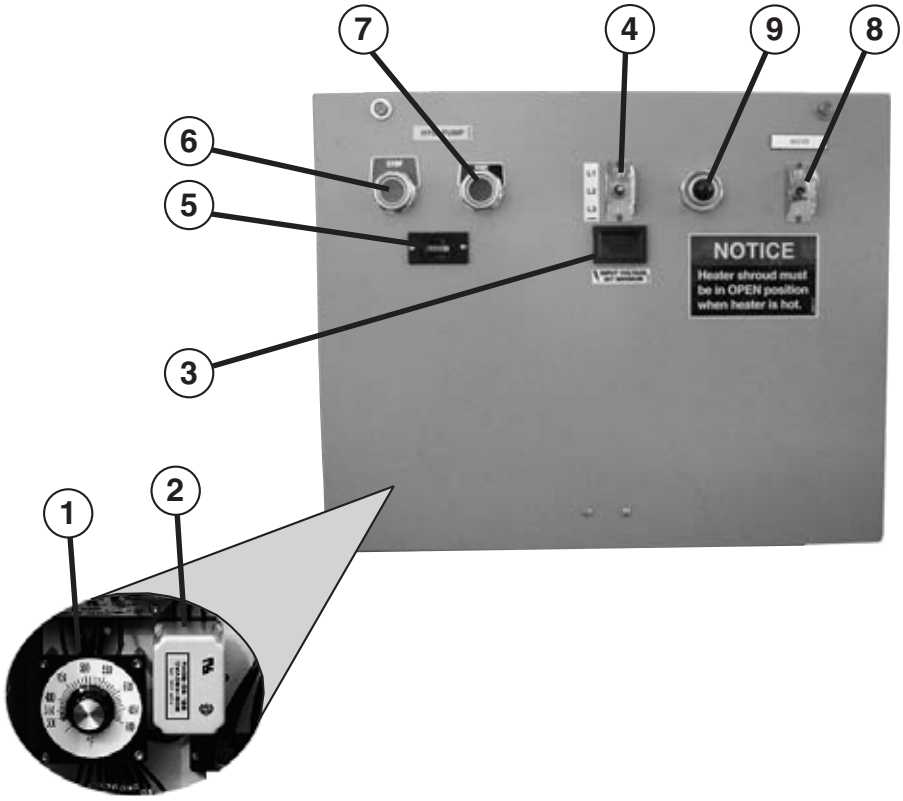


CD00192D-3-8-96

Control Panel

1. **Temperature Adjustment.** Dials in temperature requirement for heater.
2. **Reverse Phase Relay.** Interrupts power and prevents pump from turning the wrong direction.
3. **Volt Meter.** Displays incoming volts of electricity from the power source.
4. **Volt Meter Selector Switch.** Allows for selecting each incoming phase of a 3-phase electrical system.
5. **Hour Meter.** Registers total hours hydraulic pump has been used.
6. **Stop - Hydraulic Pump.** Shuts off power to the hydraulic pump.
7. **Start - Hydraulic Pump.** Turns power on to the hydraulic pump.
8. **Heater On/Off.** Turns electrical power on and off to heater.
9. **Heater Indicator Light.** Light comes on when heater is heating up to predetermined temperature and goes off when that temperature is reached.

TX00884-3-6-96

Fixed Jaws and Lift Controls

Nomenclature and arrows on valves indicate direction of control lever movement for operation required.

PH03055-7-28-05

TX00885-3-7-96

Movable Jaws, Heater and Facer Controls

Nomenclature and arrows on valves indicate direction of control lever movement for operation required.

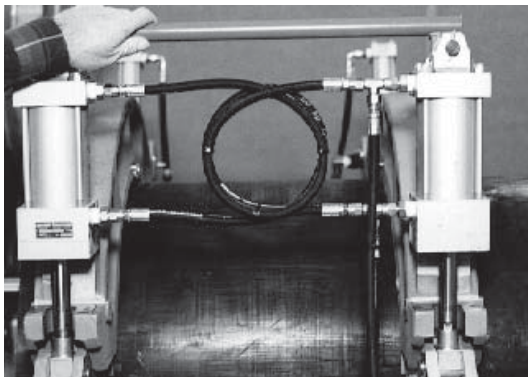
PH03056-7-28-05

TX00886-3-7-96

Jaw Clamps

Jaw clamps are hydraulically operated for clamping and unclamping the upper jaws.

There is a handle connecting both clamping cylinders that is used for lowering the clamps away from the jaws.



PH00613-3-7-96

TX00887-3-7-96

Index Cylinder Lock

The index cylinder lock valve should be in the closed position for transporting.

Move the control lever to the open position before operating.

PH03062-7-28-05

TX00888-3-7-96

Hydraulic Manifold Block

Mounted on this block are a carriage directional control valve, a pressure reducing selector valve, three pressure reducing valves, and a 1500 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 1500 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.

G) DataLogger port

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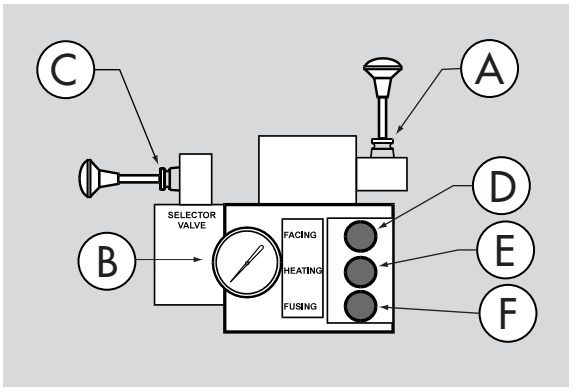

CD00182-11-1-95

Indexing Valve

The Indexing valve moves the facer or heater into position before lowering between the jaws.

Arrows indicate the direction to move the control lever.

TX00889-3-7-96

PH03061-7-28-05

Electrical Power

⚠ DANGER All electrical equipment and power sources must be located outside an explosive atmosphere. Failure to do so will result in serious injury or death.

See SPECIFICATIONS section of this manual for power requirements.

Ensure proper ground for the electrical system.

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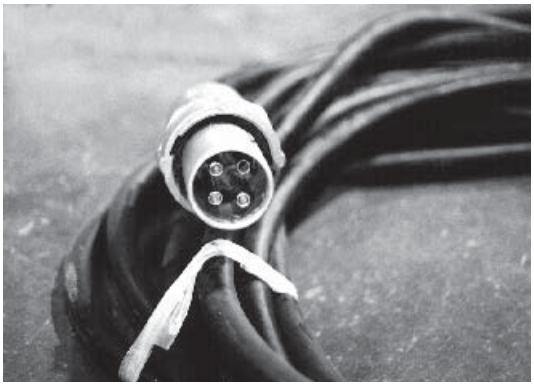

PH00741-3-12-96

Electric Motor

The pump motor is a totally enclosed fan cooled motor.

DANGER Electric motors are not explosion proof. Operation of these components in an explosive atmosphere will result in serious injury or death.

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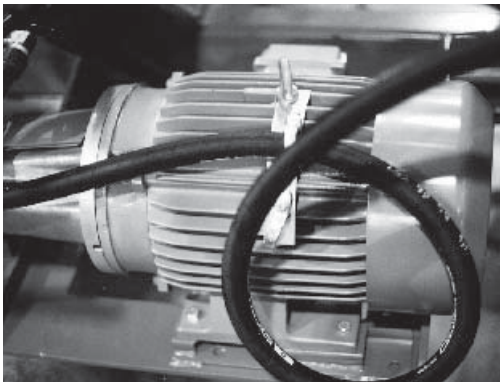


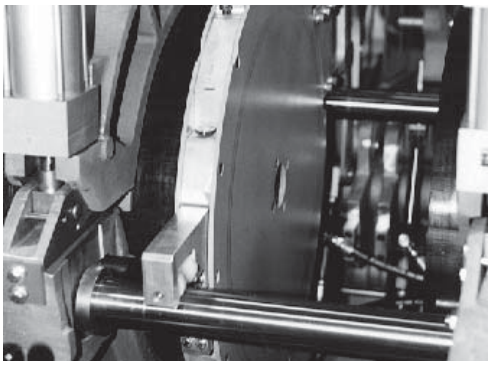
PH0738-3-12-96

Heater

The heater is equipped with butt fusion heater adapters, coated with an antistick coating.

DANGER This heater is not explosion proof. Operation of heater in an explosive atmosphere will result in serious injury or death.

TX00719-04-11-14



PH00612-1-10-95

Facer

The facer is of the McElroy rotating planer-block design. The blade holders each contain three cutter blades. The block rotates on plain bearings and is chain driven (enclosed in lubricant) by a hydraulic motor.

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

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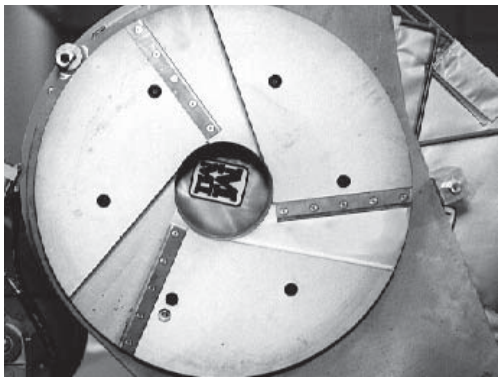


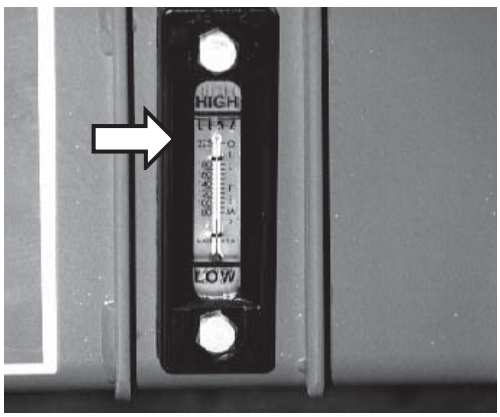
PH00621-12-11-95

Hydraulic Fluid

Check fluid level in reservoir at rear of machine. Proper level is indicated on the sight gauge. If level drops below this point, fill reservoir to the HIGH level on the sight gauge. Refer to the "Hydraulic Fluids" section of this manual for hydraulic fluid recommendations.

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

TX00715-04-11-14



PH00567-10-27-95

Filter

This machine is equipped with a 10 Micron filter in the return line to the reservoir.

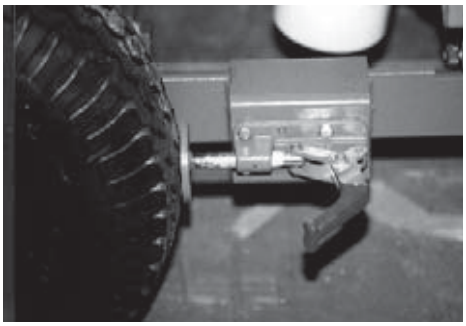
Change filter after every 500 hours of operation.

PH00568-11-1-95

TX00716-11-2-95

Setting Unit

Position unit on fairly level ground and set brakes on rear wheels. If it is necessary to operate the unit on unlevel grade, chock the wheels and block the unit to make it as level and stable as possible.

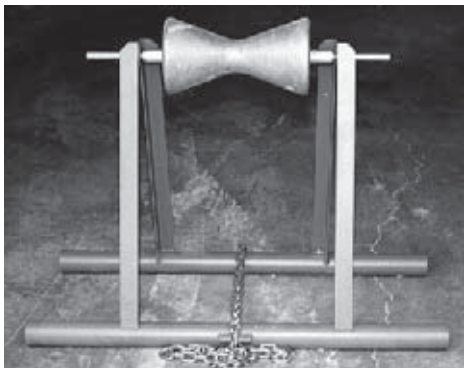


PH00585-11-2-95

TX00713-11-2-95

Position Pipe Support Stands

Always use pipe support stands to help support and align the pipe. Position pipe support stands approximately 20 feet from each end of the unit.



PH00626-12-12-95

TX00794-11-28-95

Periodically Check Temperature

NOTICE: Incorrect heating temperature can result in bad fusion joints. Check heater plate surface temperature periodically with a properly calibrated pyrometer, and make necessary adjustments.

The digital thermometer on the control panel indicates internal temperature and should be used as a reference only.

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

WR00077-4-16-93

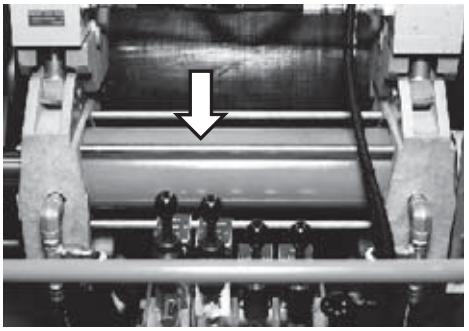
TX00807-12-12-95

Standard and High Velocity Cylinders

HIGH FORCE hydraulic carriage cylinders are painted green. Standard cylinders are used when higher interfacial pressures are required, when handling heavy wall pipe, or when large drag factors need to be overcome.

MEDIUM FORCE cylinders are painted orange and have approximately half the total effective piston area as standard cylinders. The cylinders move faster and are normally used for medium density pipe and when lower interfacial pressures are used.

TX00808-12-12-95



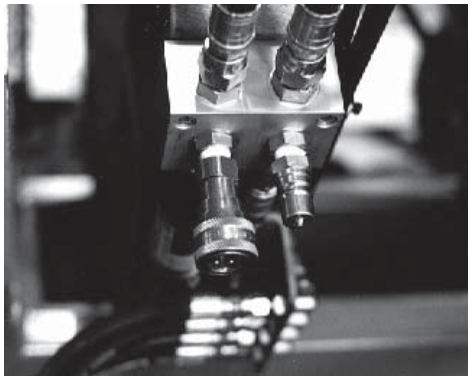
PH00625-12-12-95

Auxiliary Hydraulic Equipment

There are quick disconnects located on the back of the machine that can be used to power hydraulic equipment.

The facer ball valve behind the manifold must be on, and the valve located near the facer motor must be off.

TX00972-6-4-96



PH00866-7-3-96

Operation

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

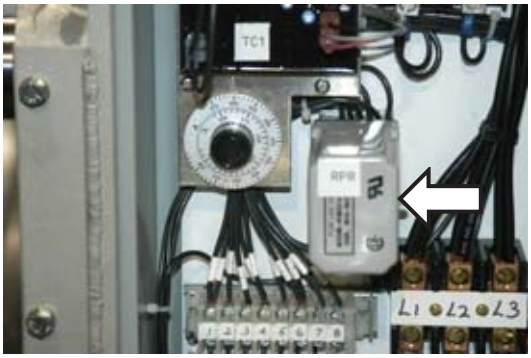
STOP-112-28-95

Electrical Power

NOTICE: Low voltage will damage unit. Connect unit to adequate electrical power source. Ensure proper ground for electrical system.

If unit fails to start, check to see if the light on the reverse phase relay is on. If not, disconnect the power source and switch any two incoming power leads and try again. If the unit still doesn't start and the light is on, call McElroy personnel for assistance. The reverse phase relay ensures correct rotation of the pump motor so damage to the hydraulic system does not occur.

TX00722-11-3-95



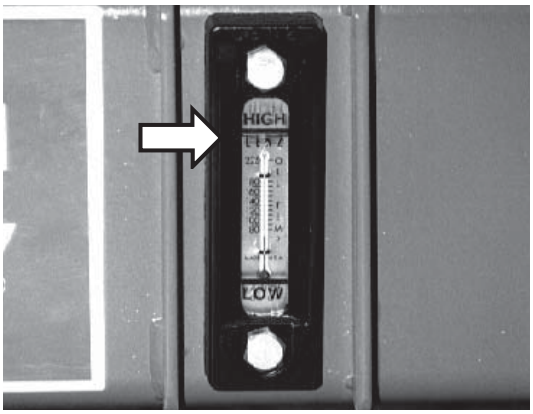
PH03059-7-28-05

Check Hydraulic Fluid

Check fluid level in reservoir at rear of machine. Proper level is indicated on the sight gauge. If level drops below this point, fill reservoir to the HIGH level on the sight gauge. Refer to the "Hydraulic Fluids" section of this manual for hydraulic fluid recommendations.

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

TX00715-04-11-14

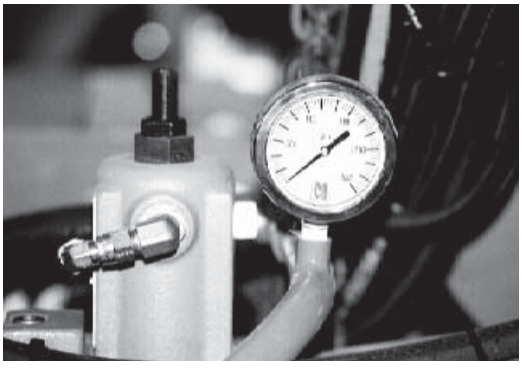


PH00567-11-2-95

Hydraulic pump

Turn on hydraulic pump by pushing start button. Pump pressure gauge reading should be 1200 or 1300 psi.

TX00724-11-3-95



PH00586-11-2-95

Move Heater and Facer Out

Move carriage to the right.

Manually move heater bag and frame out of unit.

Swing facer and heater out by moving levers on valves labeled **Facer Out** and **Heater Out**.

TX00891-3-12-96

PH02003-2-22-01

Heater

Clean the heater surfaces. Refer to the Maintenance Section of this manual.

Turn heater switch on.

NOTICE: Damage to wiring may result if heater and shroud are left in the unit for an extended period of time while the heater is hot.

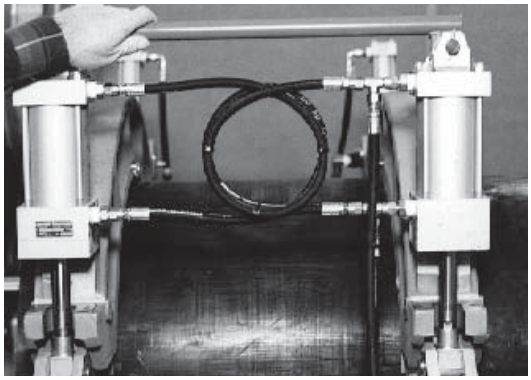
TX00725-7-28-05

PH02002-2-22-01

Jaws

Move clamp valve lever to unclamp position and swing the clamp cylinders toward you. Move jaw valve lever to open position and open jaws.

TX00726-11-3-95

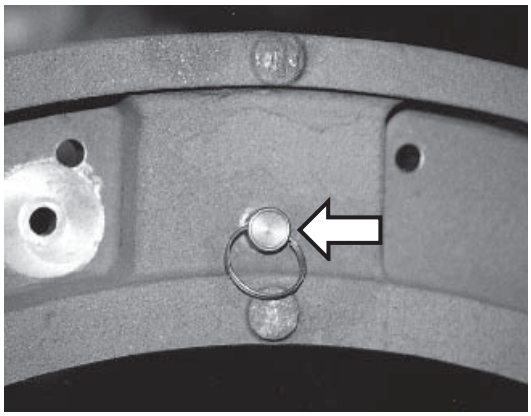


PH00613-12-11-95

Jaw Inserts

Install proper size jaw inserts if required. The inserts are held in place by detent pins.

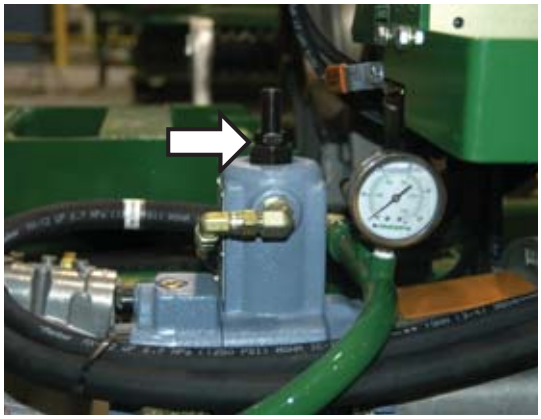
TX00890-3-11-96



PH00737-3-11-96

Adjusting System Pressure

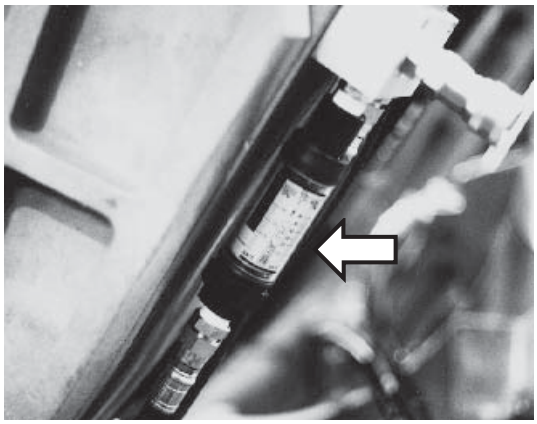
The hydraulic pump is factory set at 1200 or 1300 psi. If additional pressure is required, start the pump running and the system deadheading with no motion occurring. Loosen the locknut on the pressure adjusting screw and turn it clockwise to increase the pressure. Watch the pressure gauge by the pump and retighten the locknut on the adjusting screw when the desired pressure is reached. Readjust the lower pressure reducing valve to the required fusion pressure.



PH03058-7-28-05

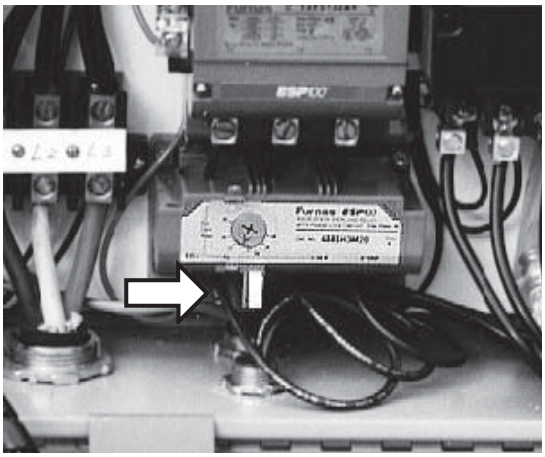
NOTICE: The electric motor can be overloaded and trip the overload switch if the pressure is set too high. If the overload switch trips and turns off power to the motor, the flow rate must be decreased.

The volume adjusting screw is on the bottom of the pump and can be adjusted to decrease the flow rate. The screw has a locknut to loosen before adjusting and retighten after adjusting. A flow meter is installed in the system behind the movable jaws. Observe the flow meter to determine the adjustment made.



PH00742-11-2-95

The overload switch is located inside the control box. Push the reset button on the overload switch after making adjustments.



PH00739-3-12-96

TX00728-11-3-95

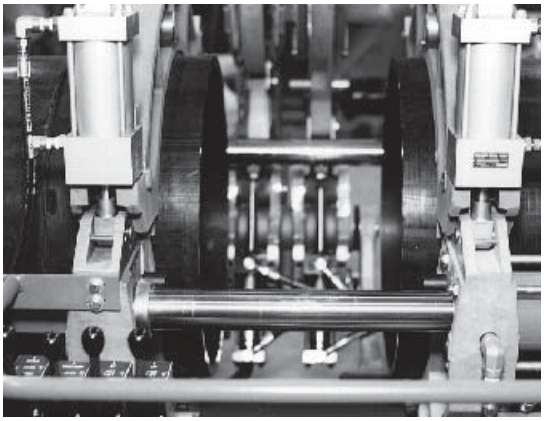
Place Pipe in Jaws

Position pipe support stands approximately 20 feet from each end of the machine to help support and align the pipe.

Position pipe with enough material protruding past the jaw faces to allow for facing of the pipe end.

Move the jaw valve control lever to **Close** position.

Move the clamp cylinders into the vertical position and then move the jaw clamp control valve lever to the **Clamp** position.



PH00614-12-11-95

TX00729-11-3-95

Using Lifting Roller to Help Load

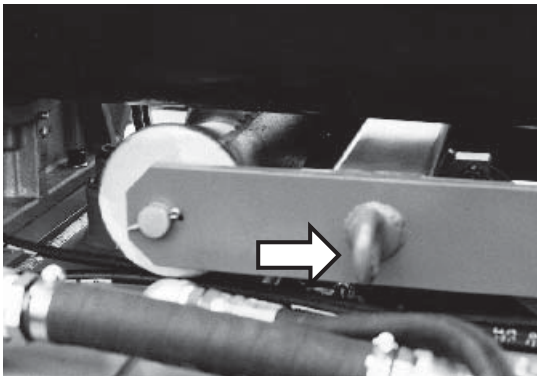
A section of pipe can be bent or out of round, preventing the jaw clamping cylinders from moving completely into position on top of the jaws. The hydraulics on the lifting roller can help straighten the pipe long enough to get it clamped in the jaws.

Position the pipe in the jaws and move the jaws control to the **close** position to apply pressure on the pipe.

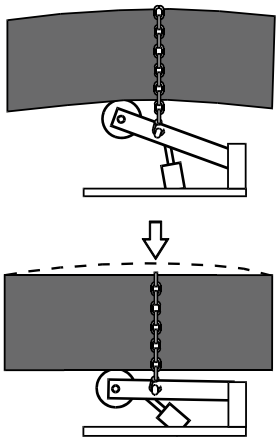
Raise the lifting roller up until it just starts lifting the pipe. Put a chain of adequate strength around the pipe and secure to the lifting eyes on either side of the lifting roller platform. Tighten the chain as much as possible.

NOTICE: For the 1648, use a chain with a working load that is rated for 15,000 pounds or greater.

Lower the lifting roller to put downward pressure on the pipe until the jaws can be closed and secured. The process may have to be repeated, tightening the chain as much as possible each time.



PH00605-6-3-96



CD00309-6-3-96

TX00973-04-30-14

Determine Drag Pressure

Drag pressure should be determined using the following procedure:

Move the carriage so that the faced 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.

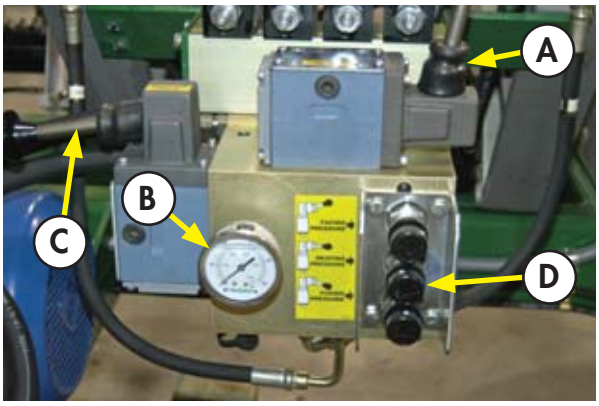
Shift the carriage control valve to the left.

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.

TX03023-8-19-09



PH03057-7-28-05

A - Carriage Control Valve
B - Pressure Gauge
C - Pressure Selector Valve
D - Pressure Reducing Valves (3)

Set Fusion Pressure

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

The theoretical fusion pressure can be calculated using the enclosed fusion pressure calculator. Always add drag pressure to the theoretical fusion pressure.

Gauge (Fusion) Pressure = Theoretical Fusion Pressure + Drag Pressure

TX03024-10-19-10

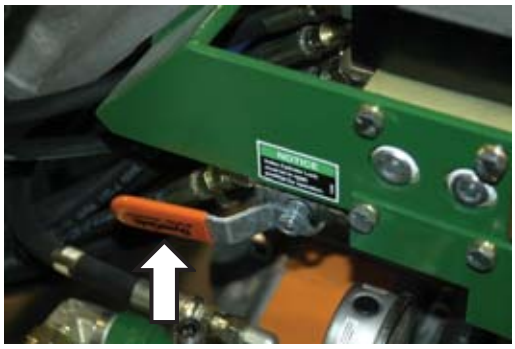
PH04004-8-25-09

Position Facer

Make sure the index cylinder lock valve is in the open position and move the heater/facer index valve lever to position the facer between the pipe ends.

Move the facer into position by activating the facer valve to in position.

TX00730-11-3-95



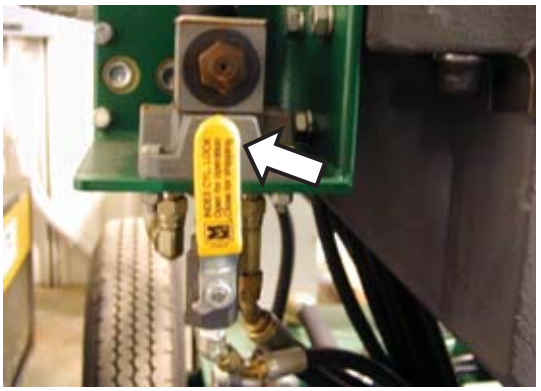
PH03062-7-28-05

Begin Facing

Turn facer motor on by opening ball valve under the hydraulic manifold block. Make sure the service valve by the facer motor is in the open position.

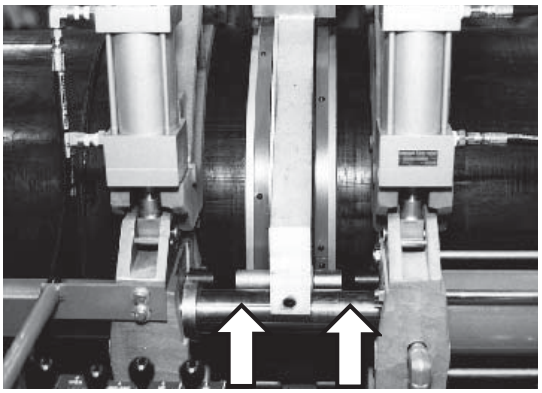
Place the selector valve on the hydraulic manifold block in the up (facing pressure) position.

Activate the carriage control valve and move the carriage to the left to begin facing.



PH00740-3-12-96

Continue to face the pipe until the rest buttons on the jaws bottom out on the facer rest buttons.



PH00615-12-11-95

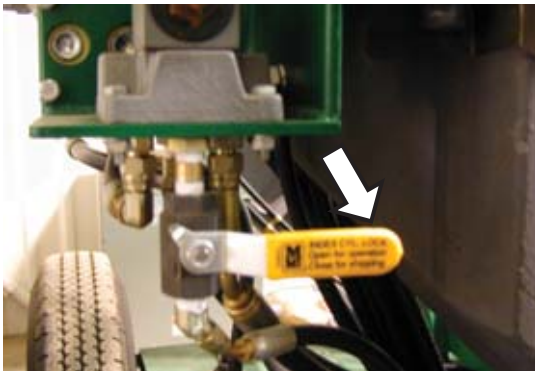
TX00731-11-3-95

After Facing

Turn facer motor off.

Move carriage all the way to the right.

Swing facer out and clean shavings out of pipe ends and from between jaws.



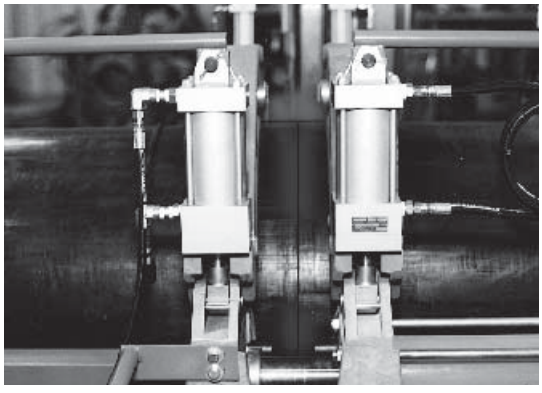
PH02004-2-22-01

TX00732-11-3-95

Check for Slippage

Bring the two sections of pipe together under fusion pressure to make sure they don't slip in the jaws.

If slippage occurs, the pipe will have to be reloaded in the jaws and the facing procedure repeated.



PH00616-12-11-95

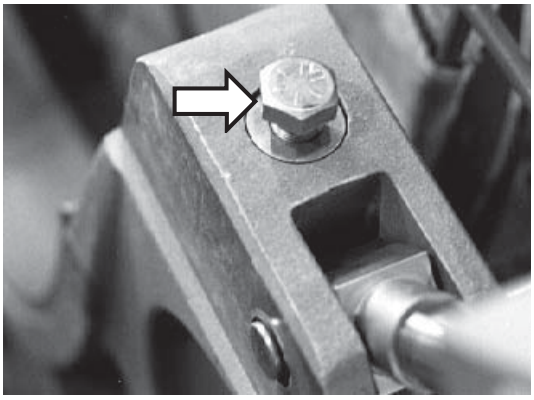
TX00971-5-31-96

Check Alignment

Move carriage to the left until pipe ends contact. Look across the top surface of pipe ends to check alignment. If there is a noticeable step across the joint, adjustments must be made. Adjusting screws are located on top of both inner jaws. The jaws must be opened to perform the adjustment. Tighten the bolt on the high side jaw to improve alignment.

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

TX00733-11-3-95



PH00884-7-3-96

Position Heater

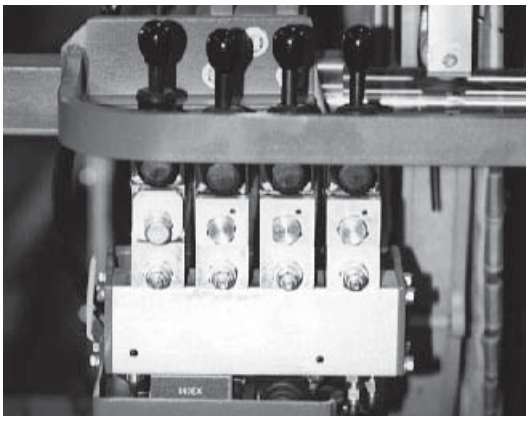
Move the carriage to the right, leaving about a 5" gap between pipe ends.

Activate the heater/facer index valve and move the heater to center on gap.

Move heater valve lever to **IN** position and swing heater into position. Ensure that heater temperature is correct.

Use the indexing valve to move the heater left until it contacts pipe.

TX00734-11-3-95



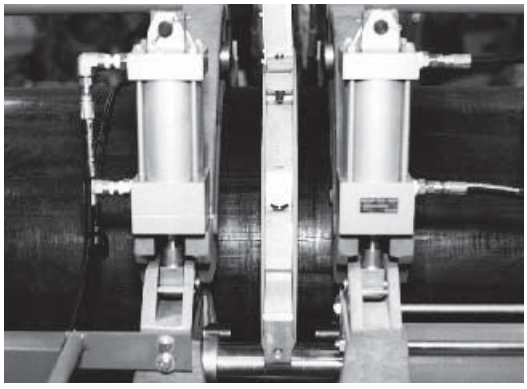
PH00589-11-2-95

Heat Pipe

Move carriage to the left to bring pipe ends in contact with the heater. Move selector valve to middle (heating mode) position. If heater pressure is not required by pipe manufacturer, or opposing forces are not great enough to move the carriage away from the heater, shift the carriage control valve to neutral.

IMPORTANT: Always shift into the heating mode **before** returning carriage valve to neutral.

TX00735-11-3-95



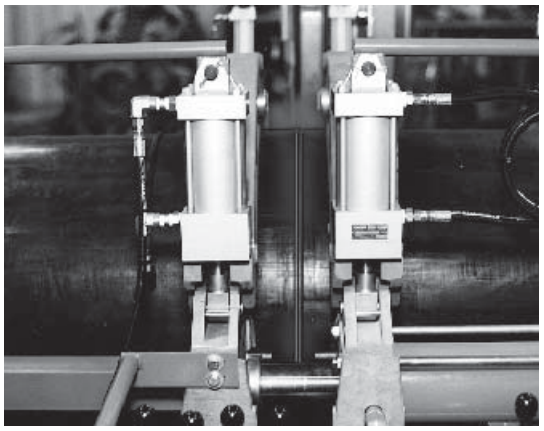
PH00617-12-11-95

Fusing the Pipe

After following the pipe manufacturer's suggested heating procedure, position carriage control valve in neutral and move selector valve down to fusion position.

Move the carriage to the right just enough to remove the heater. Index the heater to the right to clear the pipe ends. Move the heater valve to **OUT** position and quickly swing heater out. When heater is clear of the jaw, quickly move the carriage to the left and bring the pipe ends together using the pipe manufacturer's recommended pressure.

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

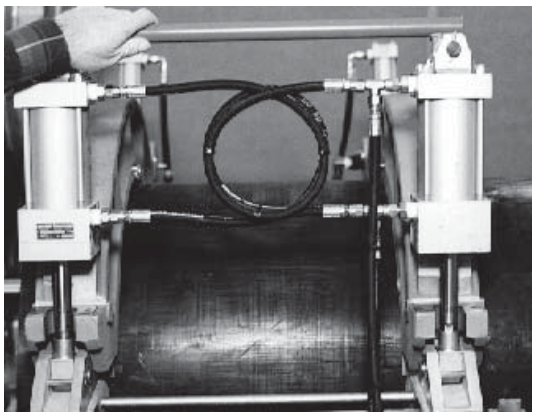


PH00623-12-11-95

TX00736-11-3-95

Opening Movable Jaws

Unclamp jaws on carriage and open jaws until they bottom out on the clamp cylinders, releasing grip on pipe.

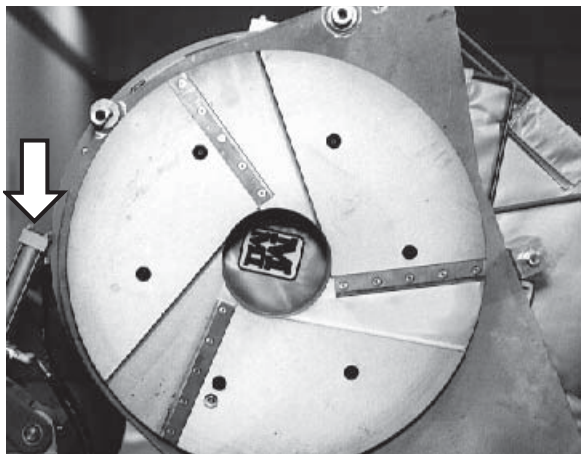


PH00613-12-11-95

Move heater and facer completely to the right.

NOTICE: Watch facer to make sure it clears the upper end of the cylinder that opens the inner movable jaw.

Move carriage all the way to the right. Jaws should slip on pipe. Close the carriage jaws and swing clamping cylinders out, then open carriage jaws.



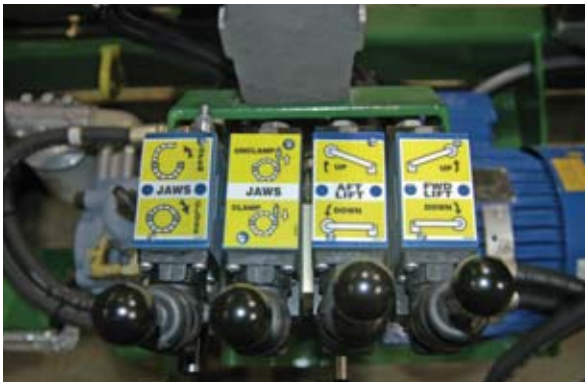
PH00621-12-11-95

TX00737-11-3-95

Opening Fixed Jaws

Unclamp and open fixed jaws.

TX00738-11-3-95

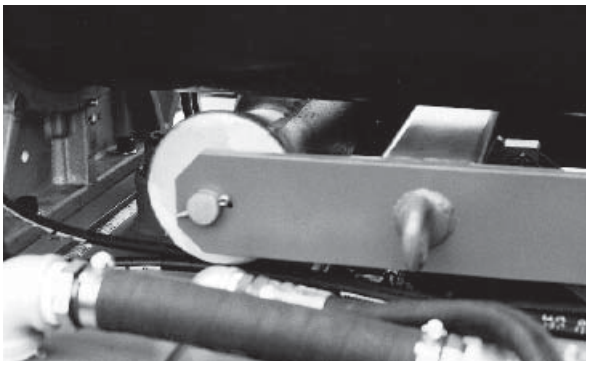


PH03055-7-28-05

Raise Pipe

Activate hydraulic lift controls and raise pipe lifts until the pipe raises up from the lower jaws enough to clear the fusion bead.

TX00739-11-3-95



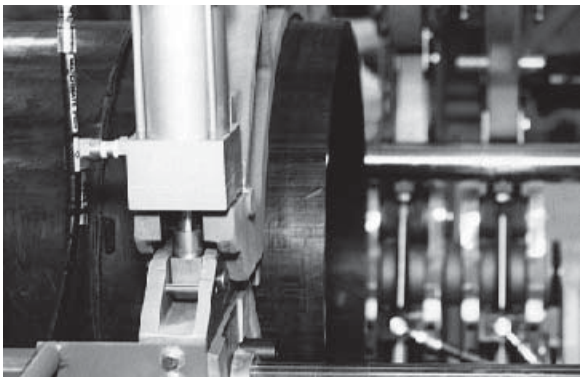
PH00605-3-12-96

Position Pipe for Next Joint

Pull the pipe through the machine until the end of the pipe protrudes to the right of the inner fixed jaw face with enough material to allow for face-off.

Close fixed jaws and clamp.

TX00740-11-3-95



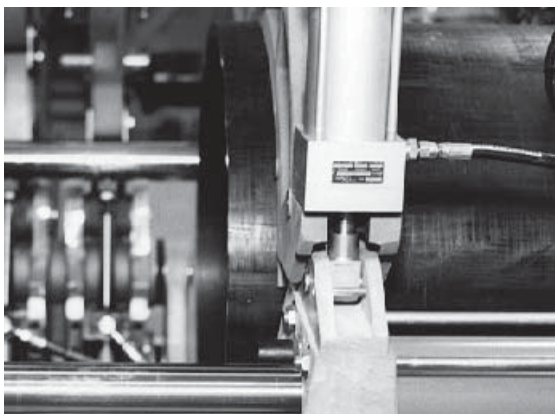
PH00618-12-11-95

Install Next Piece of Pipe

Position new piece of pipe in movable jaws, leaving enough material protruding to the left of the inner movable jaw to allow for face-off. Close movable jaws and clamp.

Repeat operating procedures.

TX00741-11-3-95



PH00619-12-11-95

Lifting Safety

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

SAFE1st 12-14-92

WR000143-8-93

⚠WARNING

Safety warnings:

1. Do not exceed rated load or lift loads greater than the rated load rating of the lifting device.
2. Do not operate a damaged or malfunctioning device.
3. Do not lift persons.
4. Do not lift a suspended load over persons.
5. Do not leave a suspended load unattended.
6. Do not remove or obscure warning labels.
7. Read and understand the operator's manual before using the device.
8. Stay clear of the suspended load.
9. Lift loads only as high as necessary.
10. Do not alter or modify the lifting device.
11. Employ generally accepted safe lifting practices.
12. Do not shock or impact load the lifting device.
13. Inspect all lifting pins for damage.

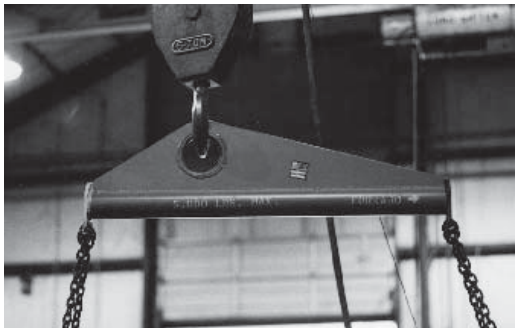
TX04268-02-27-14

Lifting Fusion Machine

Spreader Bar

The special spreader bar shipped with the machine has color coded ends that correspond with the colors of the lifting eyes on the machine. The spreader bar also has an arrow that must point forward, to the tow bar end of the machine when positioned correctly.

TX00845-1-15-96

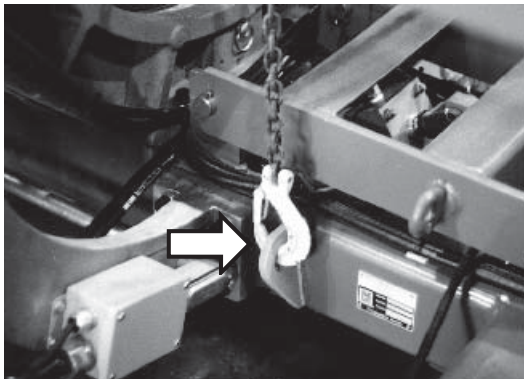


PH00667-1-15-96

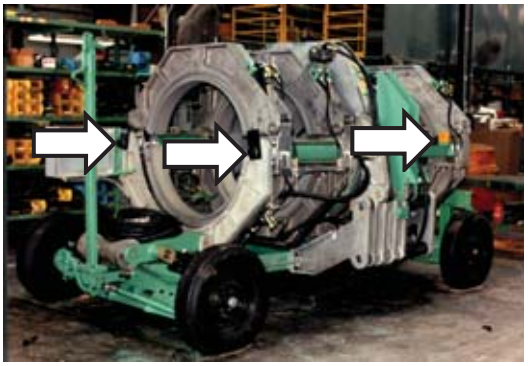
Attach to Lifting Eyes

The chains from the spreader bar have color coded hooks. Attach the yellow hooks to the yellow lifting eyes on the machine. Attach the black hooks to the black lifting eyes on the machine.

TX00846-1-15-96



PH00668-1-15-96



PH02001-2-22-01

Lift Machine

Using proper overhead rigging and equipment of adequate load rating, lift the fusion machine.

Model 1648 weighs 8800 lbs.*

*approximately

TX00917-4-18-96

CD00193-7-28-05

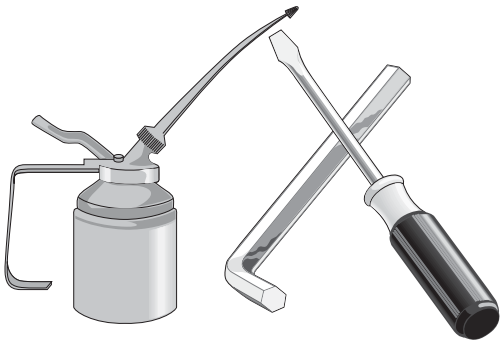
Maintenance

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.



CD00142-11-2-94

TX00428-8-10-95

Disconnect Electrical Power

⚠WARNING Always disconnect unit from electrical power source before beginning any maintenance to avoid the risk of electric shock

Cover plug and electrical control box before washing.

WR00055-4-7-93

TX00742-11-3-95

Washing the Machine

An important factor in the service life of this machine is cleanliness. The machine should be cleaned with soap and water as needed.

Do not pressure wash.

When exposed to dust and mud in a field location the machine should be washed at the end of each work day.

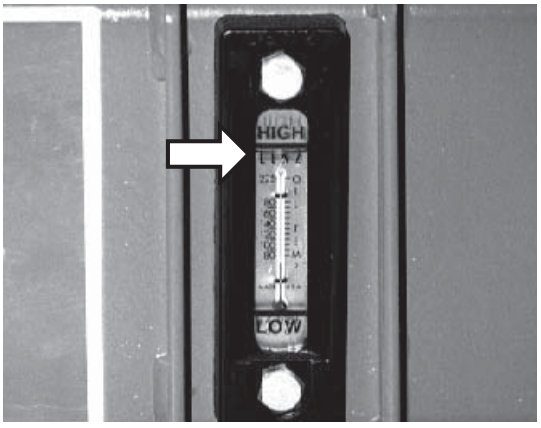
CD00178-9-15-95

TX00743-04-30-14

Check Hydraulic Fluid

Check fluid level in reservoir at rear of machine. Proper level is indicated on the sight gauge. If level drops below this point, fill reservoir to the HIGH level on the sight gauge. Refer to the "Hydraulic Fluids" section of this manual for hydraulic fluid recommendations.

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



PH00567-11-2-95

TX00715-04-11-14

Hydraulic Fluid and Filter

The hydraulic fluid and filter should be replaced after every 500 hours or 3 months of operation.

Fluid should also be changed as extreme weather conditions dictate. There is a drain plug on the hydraulic reservoir.

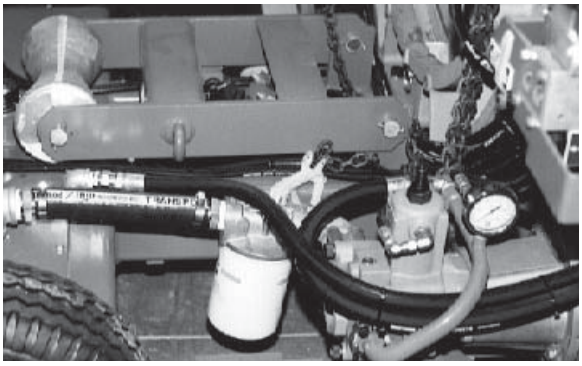
Refer to the "Hydraulic Fluids" section of this manual for hydraulic fluid recommendations.

PH00568-11-6-95

TX00744-04-30-14

Hydraulic hoses

Inspect all hoses and replace those that show wear.



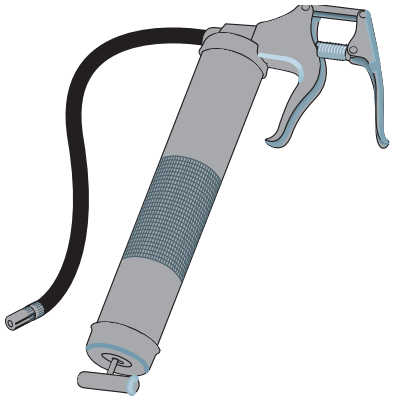
PH00591-11-6-95

TX00745-11-3-95

Grease

Keep moving parts well lubricated daily with high temperature grease.

- Front axle pivot shaft and spindles
- Jaw pivot pin
- Tie rods and steering arms
- Lifting arm rollers (front and rear)
- Facer pivot bushings
- Heater pivot bushings
- Facer

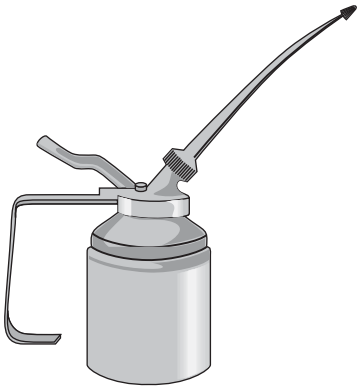


CD00183-11-6-95

TX00746-11-3-95

Oil

On a daily basis, oil all hydraulic cylinder pivot pins and the brake rod,with SAE 10W-40 weight oil.



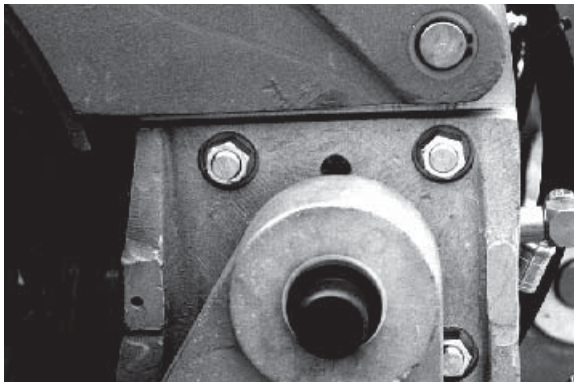
CD00184-11-6-95

TX00747-11-3-95

Fasteners Must Be Tight

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

TX00437-9-13-94



PH00606-12-8-95

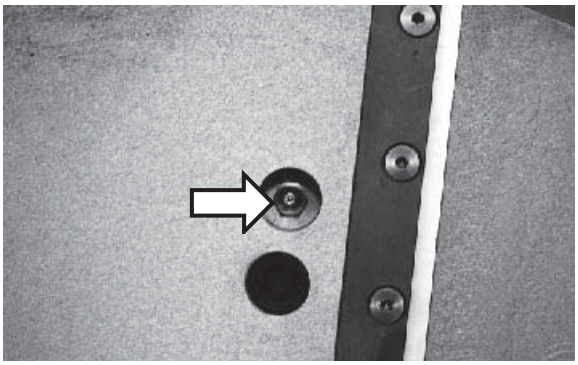
Facer

The facer should be lubricated weekly with high temperature grease.

The model 1648 has two fittings in the center hole of the facer.

Always clean any grease off the facer after lubricating.

TX00799-04-30-14



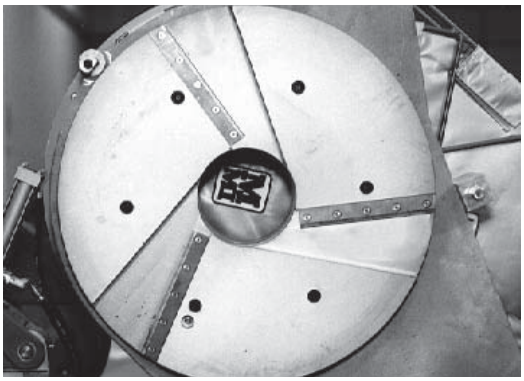
PH00620-12-11-95

Facer Blades

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

Dull or chipped blades must be replaced.

TX00439-9-13-94



PH00621-12-11-95

Tire Pressure

Air pressure in tires should be maintained at psi rating on tire.

TX00748-11-3-95

PH00624-12-11-95

Clean Heater Surfaces

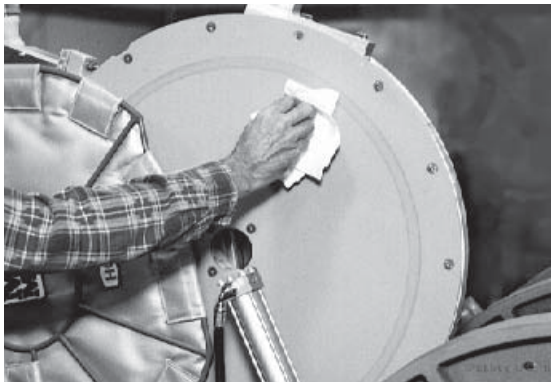
The heater faces must be kept clean and free of any plastic build up or contamination.

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.

⚠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.

TX00440-3-30-11



PH00622-12-11-95

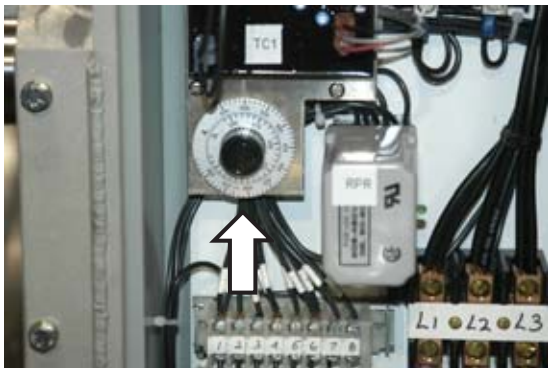
Heater Temperature Adjustment

The thermometer may not read actual surface temperature and should be used only as a general indicator.

NOTICE: To adjust the temperature of the heater, disconnect electrical power and remove the two screws securing the electrical control box cover.

Open box cover and adjust temperature controller to desired setting. Secure box cover when adjustment is completed. Restore electrical power.

TX00749-11-3-95



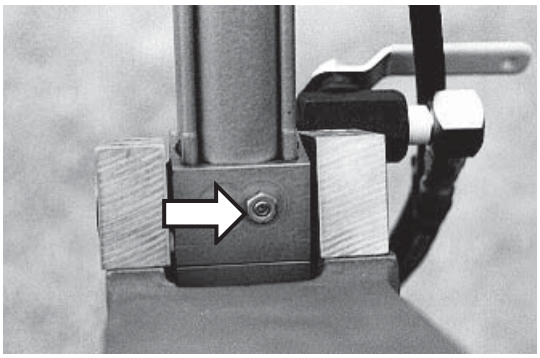
PH03059-7-28-05

Hydraulic Cylinder Cushion

Most hydraulic cylinders are equipped with a cushion which slows the motion of the cylinder near the end of the stroke. There is a set screw near either end of the cylinder to adjust this cushion.

To adjust, loosen lock nut, turn small set screw in center, then retighten the lock nut.

TX00750-11-3-95



PH00608-12-8-95

To Bleed Hydraulic Carriage

Tilt unit 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.

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

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

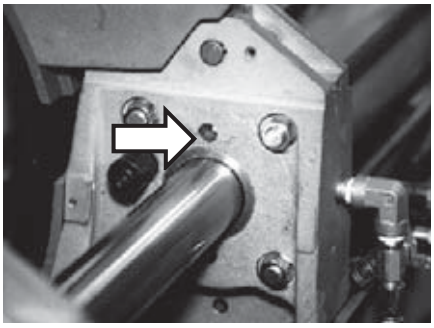
Repeat bleeding operation on the opposite cylinder.

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

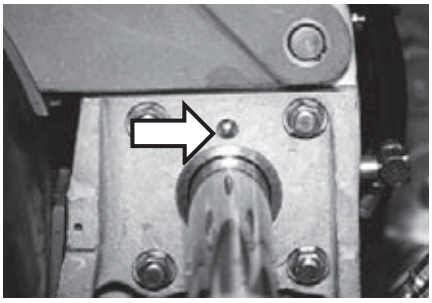
Move the carriage to the end opposite the fixed jaw end.

Repeat the bleeding procedures for the remaining cylinders.

TX00761-11-14-95



PH00627-12-13-95



PH00628-12-13-95

If Unit Fails to Start

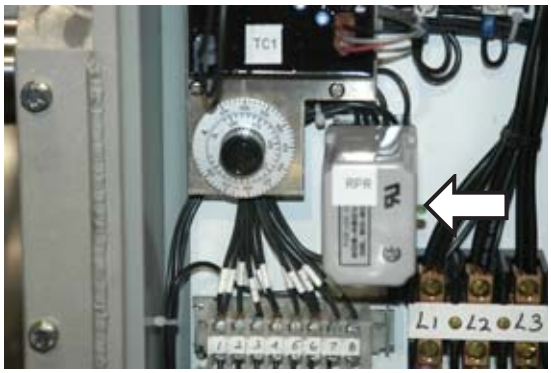
Check electrical source to make sure it is sufficient for your machine.

NOTICE: Low voltage will damage unit. Using the phase selector switch and observing the volt meter on the control panel, check voltage at each of the three phases.

NOTICE: If unit fails to start, check to see if the light on the reverse phase relay is on. If not, disconnect the power source and switch any two incoming power leads and try again. If the unit still doesn't start and the light is on, call McElroy personnel for assistance. The reverse phase relay ensures correct rotation of the pump motor so damage to the hydraulic system does not occur.

Inspect fuses inside electrical box. Replace as required.

TX00810-12-13-95



PH03059-7-28-05

Clean Jaws

To prevent slippage and ensure proper alignment, remove any dirt and residual build-up from the jaw and insert serrations using a stiff bristle brush.

TX00809-12-13-95

PH00666-1-15-96

Maintenance Checklist

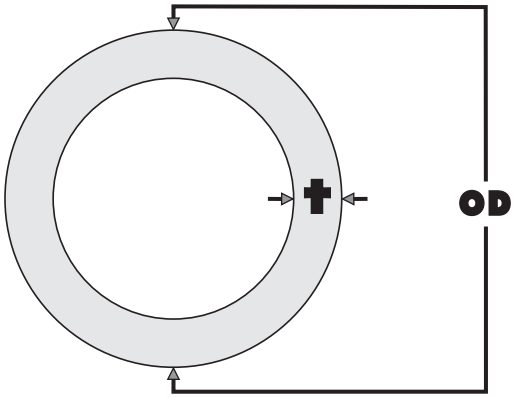
Fusion Machine Checklist

Item to Check	Satisfactory	Needs Repair	Repair Comments
Machine is clean			
Hydraulic reservoir is filled to correct level			
Hydraulic gauges read correctly			
Hydraulic cylinders are free of leaks			
All pivot points lubricated (jaws – front axle)			
All hydraulic cylinders are adjusted: • Cushion • Speed • Travel distance			
All hydraulic hoses free of leaks and in good condition			
Heater and facer secured to support arms and in alignment with jaws			
Heater and facer hydraulic cylinder travel adjusted correctly			
All hardware is with unit (inserts and pins, etc.)			
Tow bar is in good condition			
Tire pressure correct			
Inserts fit and pin properly			
All rest buttons are on facer			
Rest buttons are on inner movable and inner fixed jaw			
Pipe lift and roller lubricated and in good condition			
Brake functions properly			
Jaws are aligned properly			
Pump pressure and flow are set correctly: • 1648 1300 psig, 14 gpm			
Power cord and plug in good condition			
Spare fuses in electric control panel			
All hydraulic valves and pressure reducing valves function well			
All nuts and bolts are tight			
Generator in good condition and voltage output correct 240 Volts, 3 Phase 60Hz (824=20 KVA, 1236=30 KVA, 1648=50 KVA)			
All wiring in good condition and functions properly			
Heater surface is clean and in good condition			
Thermometer is in good condition • Test heater and compare with pyrometer (daily) • Test temp controller by allowing heater to cycle 4 times			

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

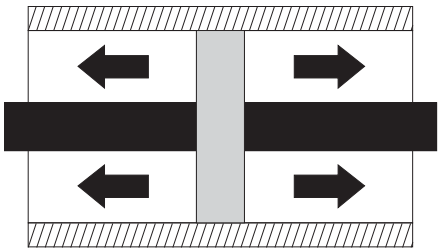


Formulas

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

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

$$FORCE = AREA \times IFP$$



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

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	4.710	-	1.66
412	11.775	6.013	3.142
618	11.775	6.013	3.142
824	29.44	15.32	9.425
1236	29.44	15.32	9.425
1648	31.42	14.14	-
2065	31.42	-	-
1600mm	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

Models	Pipe Size Range		Dimensions			Weight	Power Requirements
	Minimum Inches/mm	Maximum Inches/mm	Length Inches/mm	Width Inches/mm	Height Inches/mm	Pounds/Kg 3-Fases (*)	240 VCA, 60Hz 3-Phase (*)
1648	16.0/406.4	48.0/1219.2	151.0/383.5	95.0/241.3	86.0/218.4	8800/3991.7	50 KW/50 KVA

Specification

Design pressure — 1500 psi max-capable of more with modification
Reservoir capacity — 33 gallons for MODEL 1648
Hydraulic Fluid — Use Sunvis 2105 or equivalent hydraulic oil
Designed for connecting the McElroy Datalogger unit
Tires — MODEL 1648 – 7.00-15, 60 psi max.

Other Features

Centerline guidance
Pipe lift located on front and back
Three mode manifold block
Heater with bolt on butt fusion heater adapters
Quick change inserts for various pipe sizes
Locking wheel brake

(*) Average Values at Sea Level

TX00753-04-30-14

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: _____ ,10 Horsepower for Model 1648

Motor Code Letter: __H__ (from motor nameplate)

Motor Voltage: ___240 VAC___

Motor Phases: 3 Delta

Motor Frequency: _____ (50 or 60 Hz)

Heater Wattage Rating: _____ Watts resistive 35,000 for Model 1648

Heater Voltage: _240 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: _____

_____

_____

_____

_____

_____

_____

_____

TX00574-04-30-14

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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