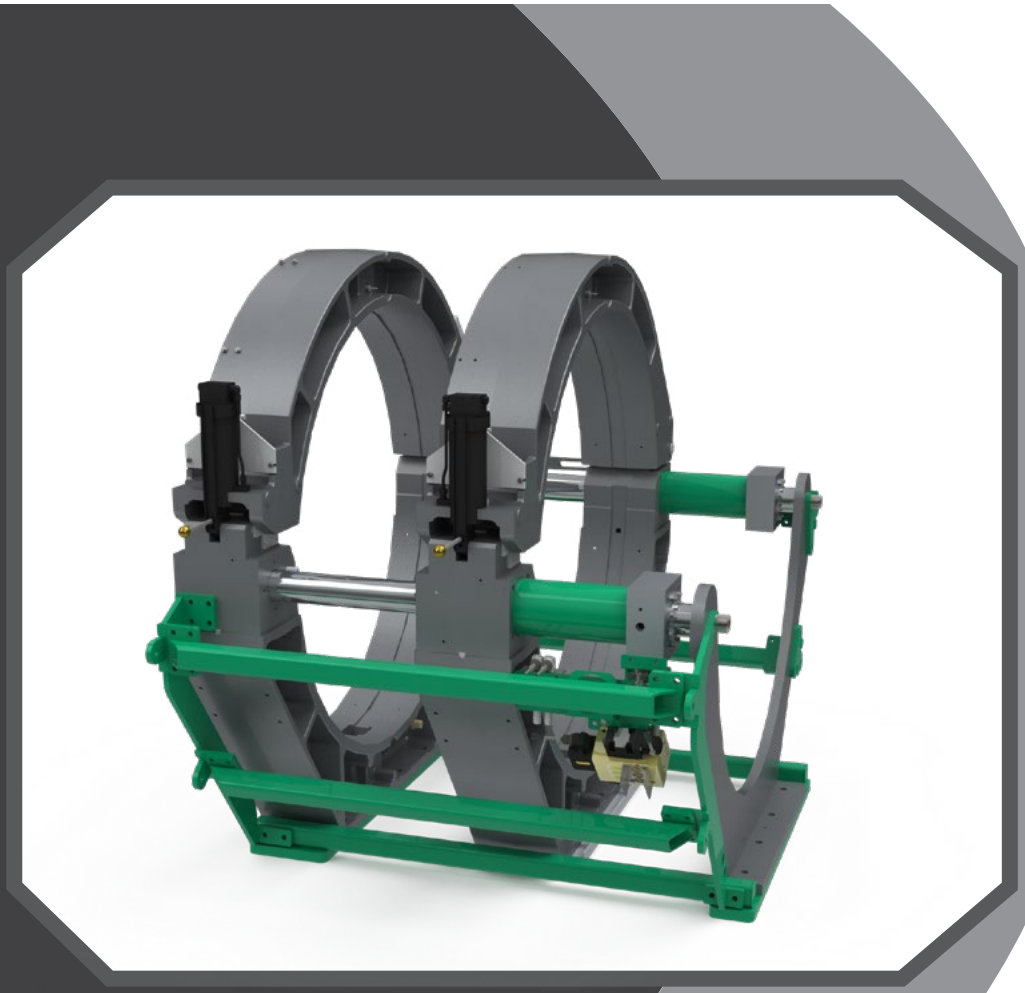
In Ditch 1600

Model: A6523501



McELROY

www.mcelroy.com

Operator's Manual

Manual: 6523401
Rev 12/18
Original Language: English

P.O. Box 580550
Tulsa, Oklahoma 74158-0550, USA

Important Safety Information

Most accidents that involve product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have necessary training, skills and tools to perform these functions properly.

Advanced training is offered through McElroy University. Course offerings are meant to enhance your efficiency, productivity and safety in the proper use of McElroy equipment.

Improper operation, maintenance or repair of this product can be dangerous and could result in injury or death.

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

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

The hazards are identified by the "Safety Alert Symbol" and followed by a "Signal Word" such as "DANGER", "WARNING" or "CAUTION". The Safety Alerts are shown below.

The meaning of these safety alert symbols are as follows:

⚠ 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.

Signal words "**NOTICE**" and "**IMPORTANT**" are used to bring attention to important information.

The meaning of these signal words are as follows:

"**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.

McElroy cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are, therefore, not all inclusive. If a tool, procedure, work method or operating technique that is not specifically recommended by McElroy is used, you must satisfy yourself that it is safe for you and for others. You should also ensure that the product will not be damaged or be made unsafe by the operation, maintenance or repair procedures that you choose.

The information, specifications, and illustrations in the publication are on the basis of information that was available at the time that the publication was written. The specifications, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service that is given to the product. Obtain the complete and most current information before you start any job. The most current information is available at our website **www.mcelroy.com**.

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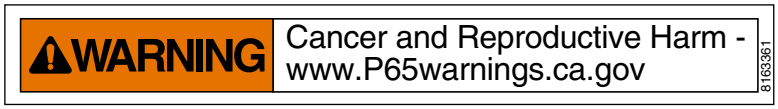

⚠WARNING

When replacement parts are required for this product McElroy recommends using McElroy replacement parts or parts with equivalent specifications including, but not limited to, physical dimensions, type, strength and material.

Failure to heed this warning can lead to premature failures, product damage, personal injury or death.

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SPECIFICATIONS

For Digital Copy: ***Press Alt + Left Arrow*** to return to the link that was clicked.

NOTES

GENERATOR SIZING FORM

FOREWORD

Literature Information

This manual should be stored in a protected location for future reference. Use the literature holder if provided with the product. Digital copy will contain hyperlinks. Press Alt + Left Arrow to return to the selected hyperlink.

This manual contains safety information, operation instructions, transportation information, lubrication information and maintenance information.

Some photographs or illustrations in this publication show details or equipment that can be different from your machine. Guards and covers might have been removed for illustrative purposes.

Continuing improvement and advancement of product design might have caused changes to your machine which are not included in this publication. Read, study and keep this manual with the machine.

Whenever a question arises regarding your machine, or this publication, please contact McElroy Technical Services at 918-831-9224 or techsupport@mcelroy.com

Safety

The safety section lists basic safety precautions. In addition, this section identifies the text and locations of warning signs and labels used on the machine.

Read and understand the basic precautions listed in the safety section before operating or performing maintenance and repair on this machine.

Operation

The operation section is a reference for the new operator and a refresher for the experienced operator. This section includes a discussion of gauges, switches, machine controls, accessories and transportation.

Photographs and illustrations guide the operator through correct procedures of setting up, checking and operating the machine. Machine orientation is established from the operator's controls position.

Operating techniques outlined in this publication are basic. Proficiency develops as the operator gains knowledge and experience with the machine and its capabilities.

Maintenance

The maintenance section is a guide to equipment care. The maintenance schedule lists the items to be maintained at a specific service interval. Items without specific intervals are listed under the “As Needed” service interval. The schedule lists the page for the step-by-step instructions required to accomplish the scheduled maintenance. Use the schedule as an index for all maintenance procedures.

Some maintenance procedures may be referenced in a manual pertaining to that component of the machine. For example, maintenance for an engine component would have its intervals and procedures in the engine operator’s manual.

Use the hour meter (if equipped) to determine servicing intervals. Calendar intervals will be used instead of hour meter intervals if no hour meter is equipped on a machine. Recommended service should always be performed at the interval that occurs first.

Under extremely severe, dusty or wet operating conditions, more frequent lubrication than is specified in the maintenance schedule might be necessary.

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.

Patent Information

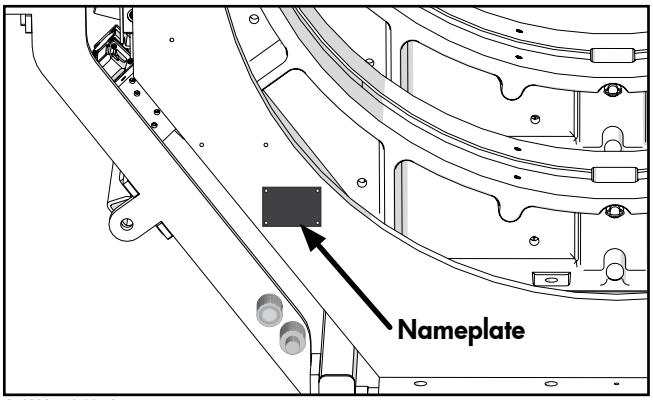
This product and other products could be protected by patents or have patents pending. All the latest patent information is available at patent.mcelroy.com

Replacement Literature

This product is shipped with a printed operator's manual. If the manual becomes lost or damaged, order a replacement manual or download and print a copy of the manual at www.mcelroy.com.

Nameplate Locations

Every machine has a name plate that includes the machine's model number, serial number, and power requirements. The model and serial numbers can be used to register the machine online and activate the warranty. Reference warranty card for information on registering your product.



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Replacement Parts

Refer to the McElroy parts finder at www.mcelroy.com to locate parts for purchase. Reference the model number on the nameplate of the machine when using the parts finder.

Contact your McElroy distributor to order replacement parts. Find your closest distributor on our website at www.mcelroy.com.

TX05380-12-18

Limited Warranty

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

Return of Goods

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

McElroy Manufacturing, Inc.
P.O. Box 580550
833 North Fulton Street Tulsa, Oklahoma 74158-0550

PHONE: (918) 836–8611, FAX: (918) 831–9285.
EMAIL: fusion@McElroy.com

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

Disclaimer of Liability

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

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

Product Improvement

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

Information Disclosed

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

Proprietary Rights

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

Law Applicable

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

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

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

Model No. _____

Serial No. _____

Date Received _____

Distributor _____

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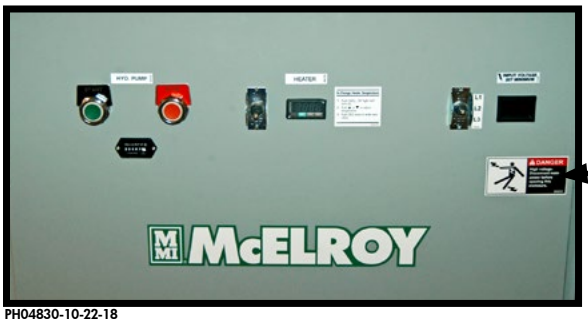
SAFETY



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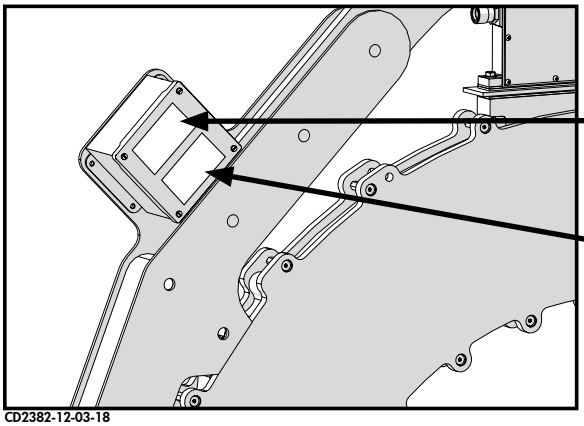

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829201

829201

410902

There can be several specific safety messages on this machine. The exact location of the hazards and the description of the hazards are reviewed in this section. Please become familiarized with all safety messages.

Make sure that all of the safety messages on the machine are legible. Clean the safety messages or replace the safety messages if you cannot read the words. Replace if the illustrations are not legible. When you clean the safety messages, use a cloth, water and soap. Do not use solvent, gasoline, or other harsh chemicals to clean the safety messages. Solvents, gasoline, or harsh chemicals could loosen the adhesive that secures the safety message or damage the print of the safety message.

Replace any safety message that are damaged, or missing. If a safety message is attached to a part that is replaced, install a safety message on the replacement part. New safety messages can be ordered from McElroy using the part number listed.

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-2-21-18

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. Remove any loose safety equipment during an operation that could be drawn into or caught in the machine.

Ensure proper fire prevention or other fire-fighting equipment is available and all personnel know how and when to use it.

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.

WR00080-2-21-18

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.

WR00080-2-21-18

Pipe Handling Safety

⚠ WARNING

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

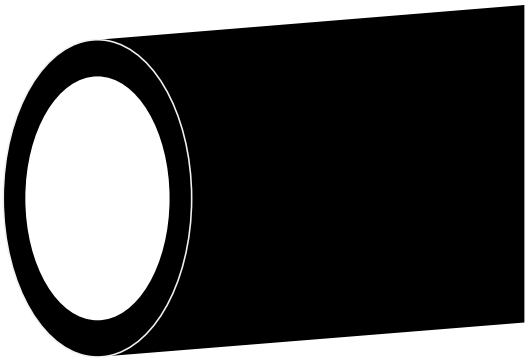
Pipe that is bent can store a great amount of energy. Do not bend and force the pipe into the machine. A bent pipe with stored energy could cause serious injury or death when that energy is released.

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

NOTICE: Do not leave machine unattended to unauthorized personnel. Operation of the machine by unauthorized personnel could damage the machine.

Keep persons that are not involved in handling pipe away from handling operations. Keep away from the pipe when the pipe and handling equipment are in motion. When 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.

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.



WR00097-4-17-13

Electrical Safety

⚠WARNING

Always ensure equipment is properly grounded. It is important to remember that if 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. Use GFCI electrical connections when available.

WR00055-6-14-18

Units With Hydraulics

It is important to remember that a sudden hydraulic oil leak can cause serious injury, or even be fatal if the pressure or oil temperature 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.

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.

WR00078-5-14-18

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.

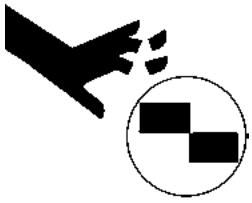
WR00012-5-14-18

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



WR00073-2-21-18

Stand Clear

⚠WARNING

Jaws 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.

WR00096-3-18-13

Lifting Safety

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

⚠WARNING

Safety warnings:

1. **Do not exceed rated load or lift loads greater than the rated load of the lifting device.**
2. **Do not operate a damaged or malfunctioning lifting 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 lifting device operator's manual before use.**
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.**

WR00014-5-21-18

Heater is Hot

⚠CAUTION

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

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

WR00030-2-21-18

Fusion Procedures

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

NOTICE: Failure to follow the pipe manufacturer's fusion procedures or appropriate joining standard could result in a bad fusion joint.

Do Not Modify Machine

Make no modifications to your equipment unless specifically recommended or requested by McElroy.

TX05339-06-18

Theory of Butt Fusion

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

The principal operations include:

Clamping The pipe pieces are held axially and radially to allow all subsequent operations to take place.

Facing The pipe ends are faced to establish clean, parallel mating surfaces perpendicular to the centerline of the pipes.

Aligning The pipe ends are aligned with each other to minimize mismatch of the pipe walls.

Heating A melt pattern that penetrates into the pipe is formed around both pipe ends.

Fusing The melt patterns are joined with a specified force, which is constant around the pipe interfacial area.

Cooling The fusion joint is held immobile with a specified force until adequately cooled.

Inspecting Visually examine the entire circumference of the joint for compliance with the standard or fusion procedure used.

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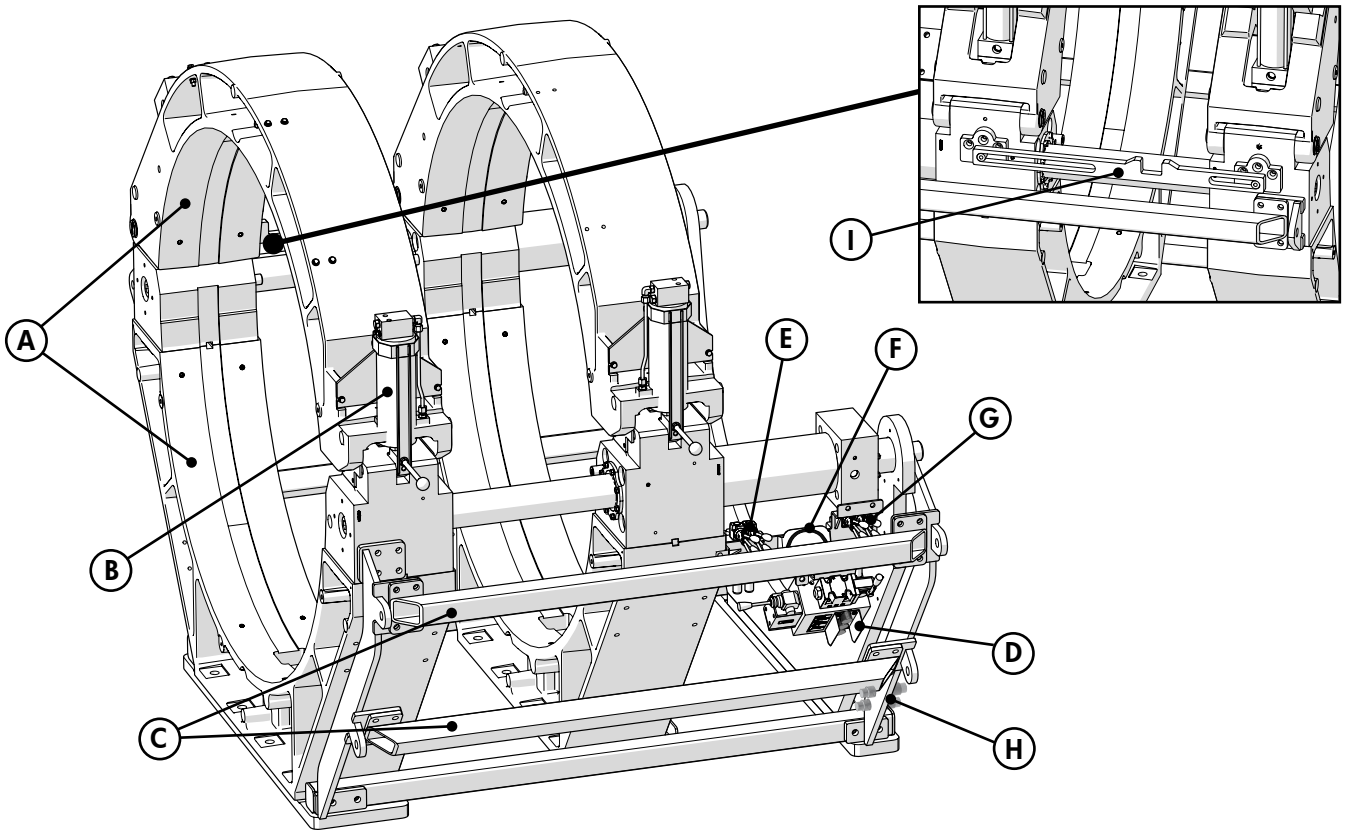

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Nomenclature

In Ditch 1600 Carriage Assembly

A - Jaw Assembly

Jaw that consists of a upper and lower jaw used to clamp to pipe.

B - Hydraulic Clamping Cylinder

Hydraulically clamps the upper jaw to the lower jaw to secure the pipe.

C - Carriage Side Roll Bars

Protects the carriage when moving in and out of the ditch.

D - Hydraulic Manifold Block

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

E - Fixed Jaw Controls

Has two levers, one for clamping and a second for opening/closing the fixed jaw.

F - Hydraulic Pressure Gauge

Displays hydraulic pressure for selected pressure setting on the manifold block.

G - Movable Jaw Controls

Has two levers, one for clamping and a second for opening/closing the movable jaw.

H - Carriage Hydraulic Quick Disconnects

The machine is equipped with self relieving quick disconnects. The hoses will not hold pressure after being disconnected. When the quick disconnects are not connected, use the dust caps to cover the fittings on the hoses and on the machine and Power Pack.

I - Heater Stripper

Strips the heater from the pipe ends when opening the carriage.

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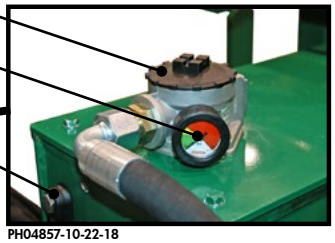

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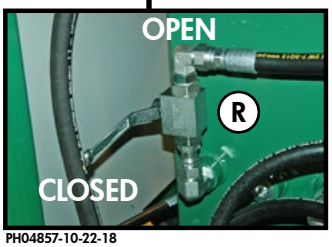

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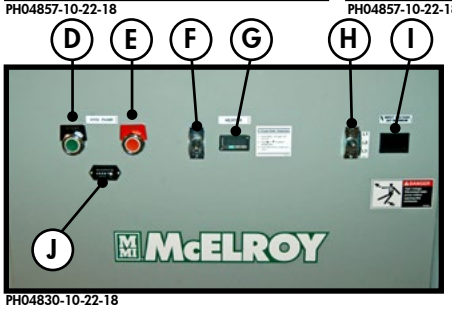

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Fusion Power Pack Assembly

A - Hydraulic Fluid Fill Access Cover

Remove cover to access hydraulic fill and filter.

B - Hydraulic Reservoir Filler Cap

Remove the cap and filter to fill the hydraulic reservoir. The cap has a breather hole on the top.

C - Filter Indicator Gauge

Change the filter when the indicator gauge is not in the green.

D - Start - Hydraulic Pump

Turns power on to the hydraulic pump.

E - Stop - Hydraulic Pump

Shuts off power to the hydraulic pump.

F - Heater On/Off

Turns electrical power on and off to heater.

G - Temperature Adjustment

Digital controller used to set heater temperature.

H - Volt Meter Selector Switch

Allows for selecting each incoming phase of a 3-phase electrical system.

I - Voltmeter

Displays incoming voltage from the selected phase of the power source.

J - Hour Meter

Registers total hours hydraulic pump has been used.

K - Heater Power Receptacle

Plug the heater extension cable into the receptacle and heater.

L - Hydraulic Connections

Hydraulic connections for facer and carriage.

M - Electric Motor

Turns hydraulic pump to supply hydraulic fluid to the facer and carriage.

N - Heater RTD Extension Cable

Cable used between Power Pack control box and heater

O - Heater Power Extension Cable

Cable used to supply power between the Power Pack and Heater.

P - Hydraulic Fluid Sight Gauge

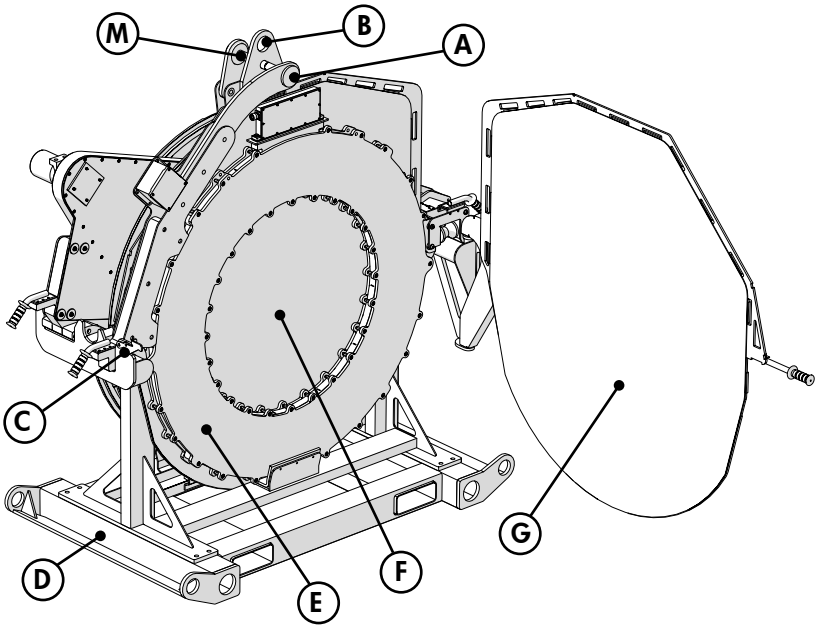
The fluid level sight gauge is located on the reservoir behind the electrical box. It includes a thermometer which indicates oil temperature.

Q - Reverse Phase Relay

Interrupts power and prevents pump from turning the wrong direction.

R - Pressure Relief Valve

Open and closes relief valve for carriage pressure.



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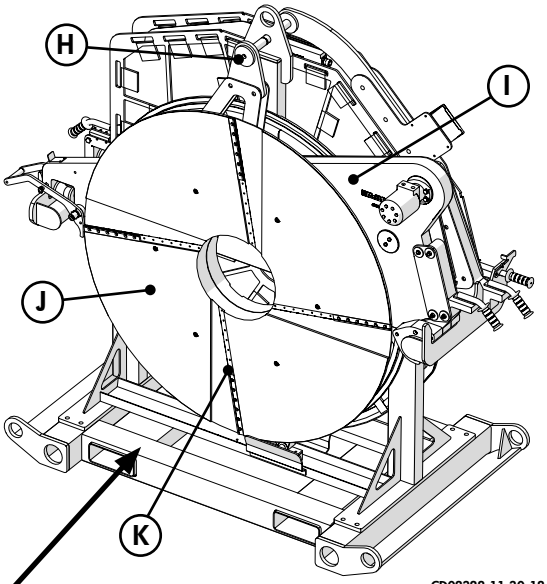

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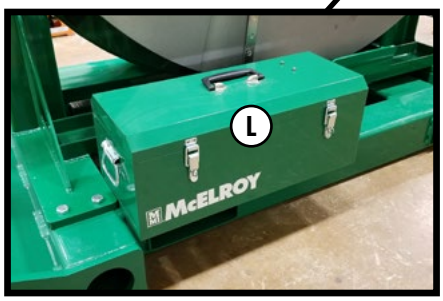

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Heater/Facer with Stand

A - Heater Lifting Point

Attachment point for lifting the heater.

B - Stand Lifting Point

Attachment point for lifting the heater/facer stand.

C - Heater Cover Lock

Locks the heater cover to prevent from opening.

D - Heater/Facer Stand

Stand for storing the heater and facer.

E - Heater

Has two coated heater plates which are heated to melt the ends of the pipe. Temperature is adjusted from the control panel on the power pack.

F - Insulated Heater Panel

Insulated panel that helps keep the heater to set temperature.

G - Insulated Heater Cover

Cover rotates open to allow the removal of the heater. The cover is insulated to help keep the heater to set temperature.

H - Facer Lifting Point

Attachment point for lifting the facer heater.

I - Facer

Hydraulically driven rotating blade holders with blades attached, which remove material from the pipe ends to square the ends of the pipe.

J - Facer Blade Holders

Two holders with four blades on each holder.

K - Facer Blades

Four blades on each holder which remove pipe material.

L - Storage Toolbox

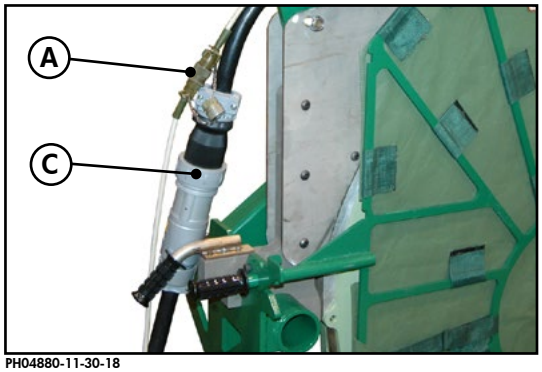
Used to store pins and other items removed from the machine.

M - Shipping Spacers

There are two shipping spacers used to secure the heater and facer to the stand for transport.

Connect Heater

1) Connect the RTD cable to the receptacle on the heater (**A**) and connect the other end to the receptacle on the power pack (**B**).



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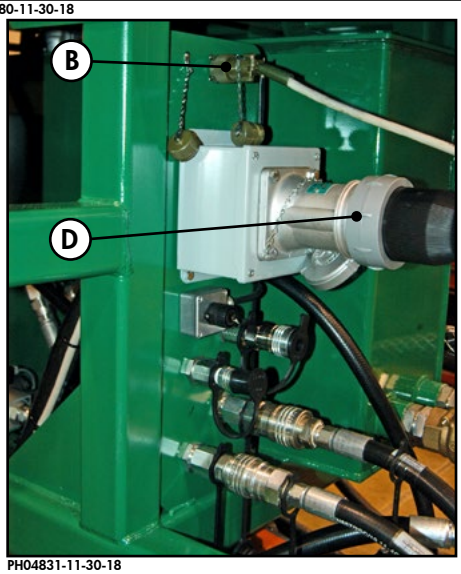


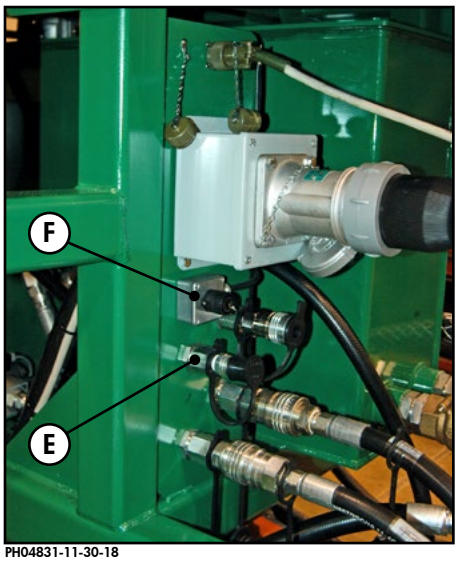
PH04831-11-30-18

2) Connect the power cable to the receptacle on the heater (**C**) and connect the other end to the receptacle on the power pack (**D**).

3) Ensure to tighten the coupling nuts after the cables are plugged in.

Connect Facer

1) Connect the hydraulic hoses to the quick disconnects on the facer and the quick disconnects on the power pack (**E**).

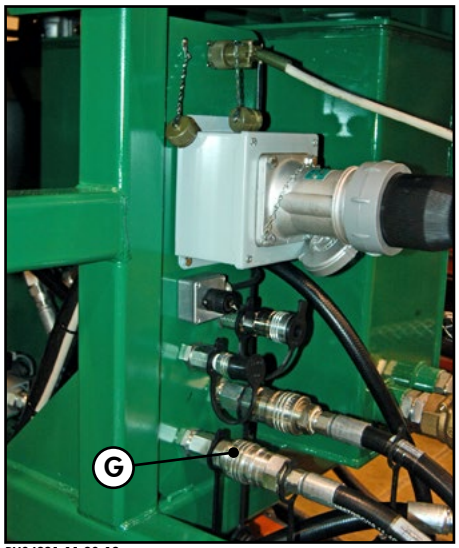


PH04831-11-30-18

2) Connect the cable bundled with the hydraulic hoses to the facer receptacle and the receptacle on the power pack (**F**).

Connect Fusion Carriage

1) Connect the hydraulic hoses to the quick disconnects on the power pack (**G**) and connect the other end to the quick disconnects on the fusion carriage (**H**).



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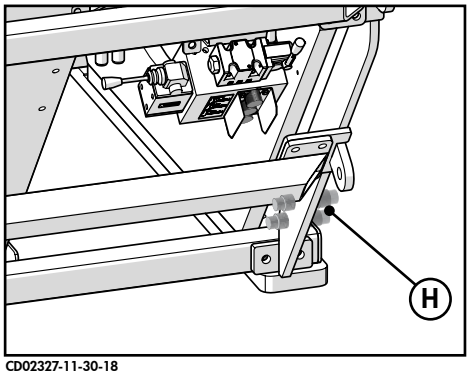

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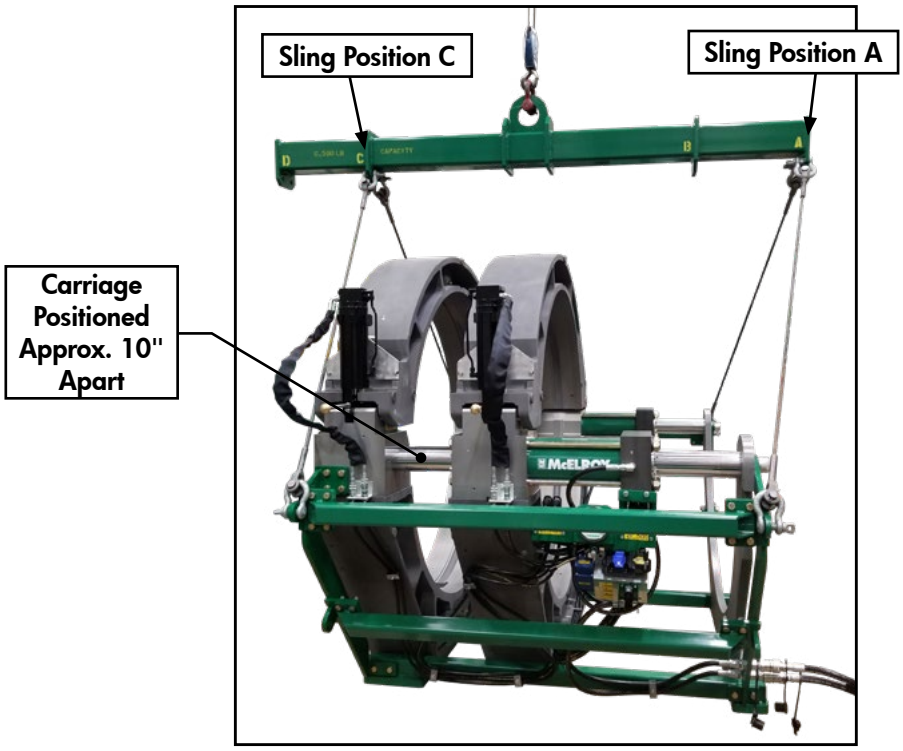


PH05702-12-06-18

Lift Equipment

Lift Fusion Carriage:

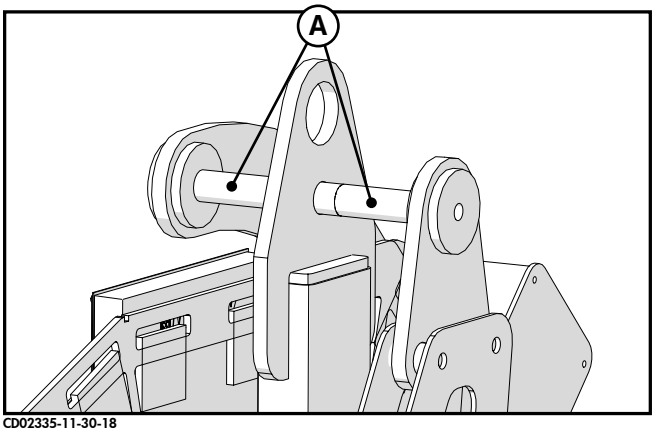
1) Attach the spreader bar to overhead lifting equipment and lift the spreader bar.
2) Ensure the slings of the spreader bar are in positions (**A** and **C**).
3) Position the movable jaw approximately 10 inches (254mm) from the fixed jaw.
4) Attach the slings in the **C** position of the spreader bar to the lift points on the fixed jaw side of the carriage.
5) Attach the slings in the **A** position of the spreader bar to the lift points on the movable jaw side of the carriage.

NOTICE: Use lift points for lifting carriage only. Do not use lifting points to lift carriage with pipe. Support the pipe by other means. Lifting other objects with carriage could cause lift points to fail, damaging carriage.

6) Ensure the carriage is disconnected from the HPU.
7) Lift fusion carriage.

Lift Facer:

1) Remove bolts securing shipping spacers. Remove spacers (**A**) from between the heater and stand and the facer and stand. Store spacers in the toolbox on the stand.



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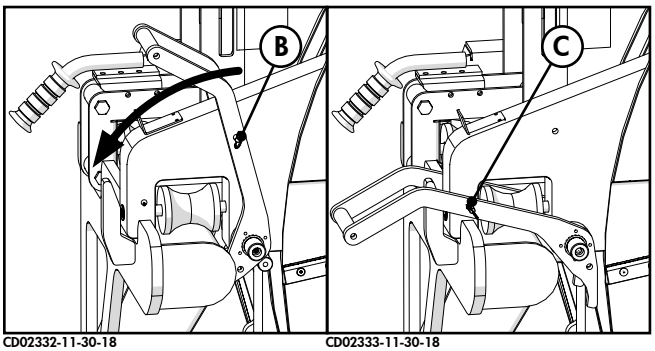
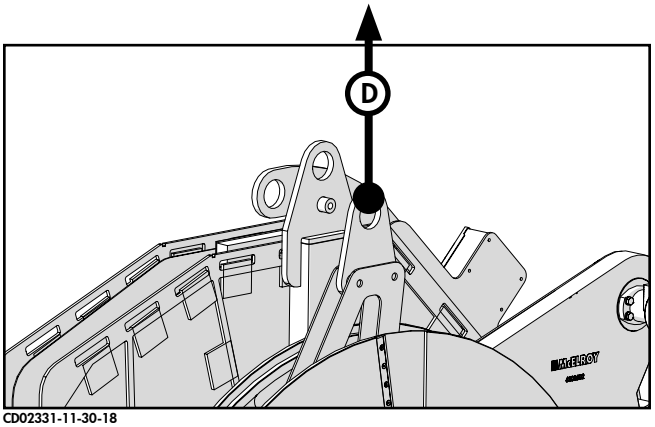
2) Remove the pin from the facer latch (**B**) and unlatch the facer from the heater/facer stand. Replace the pin to lock the latch in the open position (**C**).



CD02332-11-30-18 CD02333-11-30-18

3) Attach a lifting device of adequate rating to the lifting eye of the facer (**D**) [1250 lbs, 567 kg].



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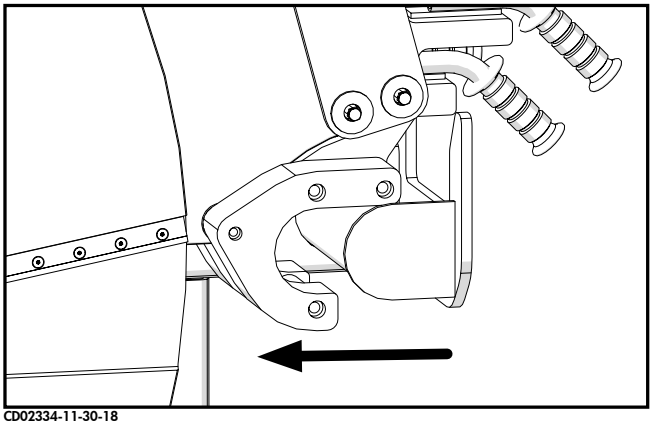
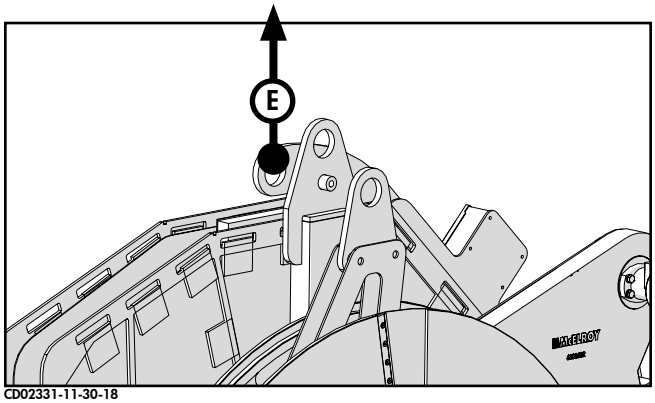
4) As the facer is lifted from the stand, slide the facer guide rod bracket from the stand until it is clear using the handle of the facer latch.



CD02334-11-30-18

Lift Heater:

1) Attach a lifting device of adequate rating to the lifting eye of the heater (**E**) [750 lbs, 340 kg]. Open the door (**F**) of the heater. Lift the heater up from the stand and then away from the heater/ facer stand.



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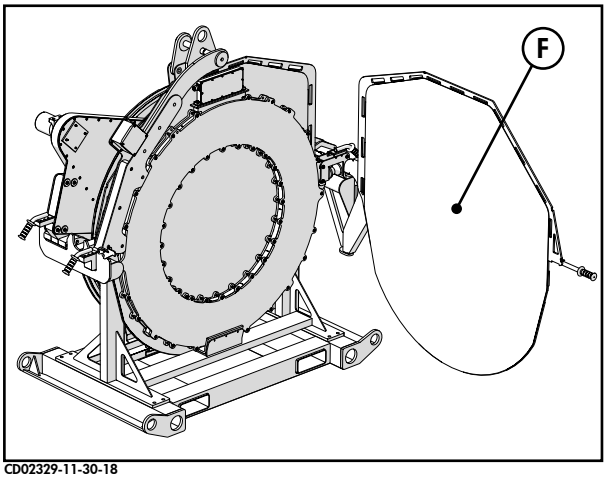


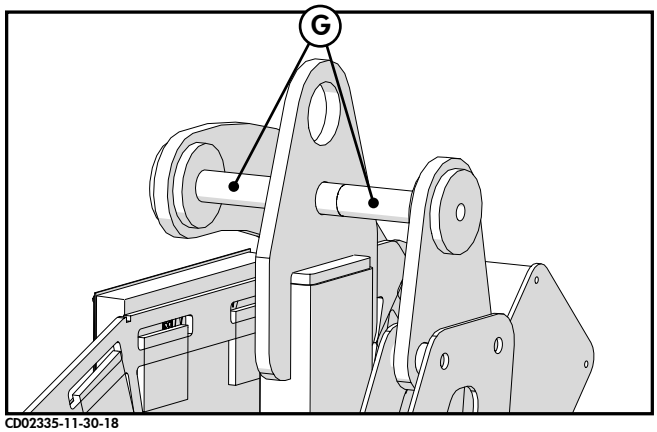
CD02329-11-30-18

Lift Heater/Facer Stand:

The heater/facer stand can be lifted using the lifting point on the stand between the facer and heater.

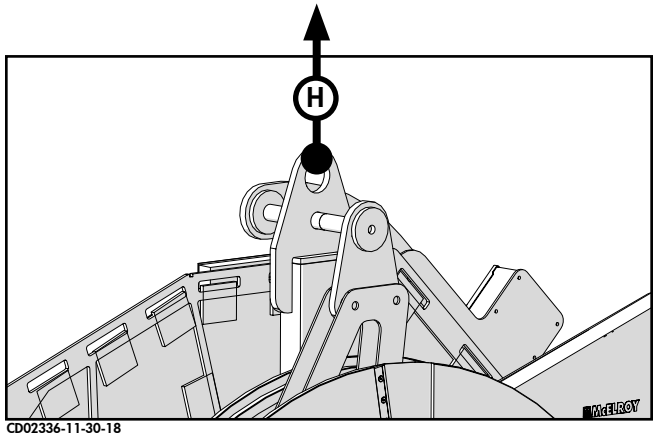
Before lifting the stand, the heater and facer need to be secured in the stand.

1) Attach heater/facer shipping spacers (**G**) between the heater and stand. Also attach between facer and stand. Use bolts to secure to stand.



CD02335-11-30-18

2) Attach an adequately rated lifting device to the lifting point of the stand (**H**) [3450 lbs, 1565 kg].



CD02336-11-30-18

NOTICE: Do not attempt to lift the stand using the lifting point of the heater or facer. Doing so will cause damage to the stand and its components.

The stand has forklift pockets on its skid if using a forklift is preferred.

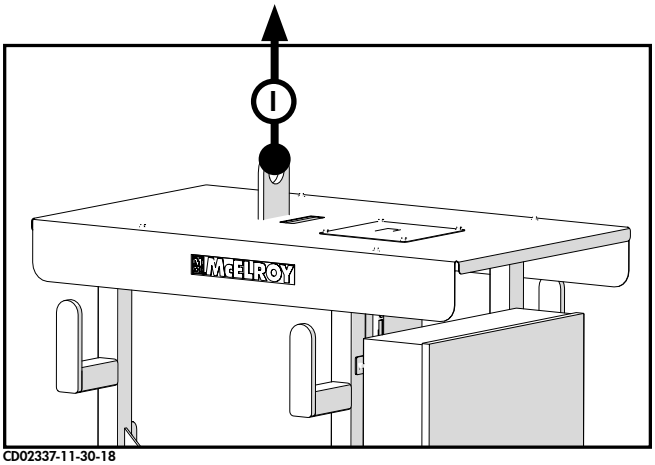
3) Lift the stand.

Lift Power Pack:

The Power Pack can be lifted using the lifting point on the top of the Power Pack in the middle of the top cover.

1) Before lifting the Power Pack, roll up and secure all the hoses and cables on the hooks of the Power Pack.

2) Attach an adequately rated lifting device to the lifting point of the Power Pack (**I**) [2780 lbs, 1261 kg].



CD02337-11-30-18

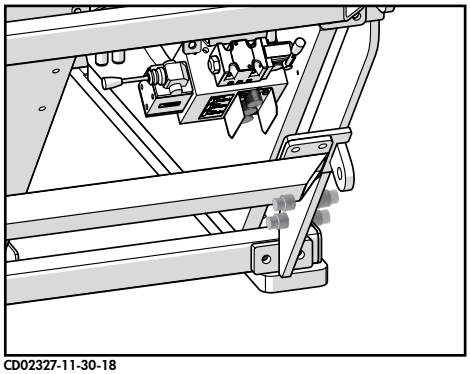
The Power Pack has forklift pockets on its skid if using a forklift is preferred.

3) Lift the Power Pack.

TX05382-12-18

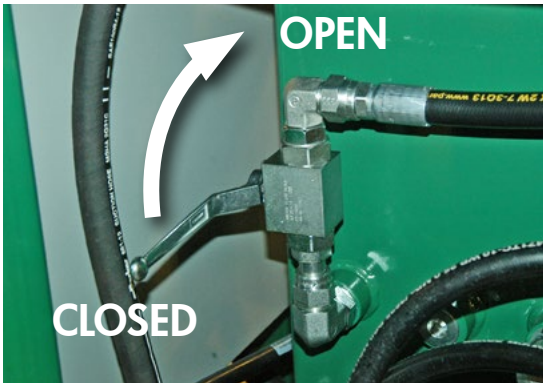
Before Starting

1) Connect the hydraulic hoses to the carriage and facer from the Power Pack.



CD02327-11-30-18

IMPORTANT: Open the pressure relief valve before connecting the hoses and starting the machine. This will allow for easier connection of hoses and easy start of the hydraulic pumps.



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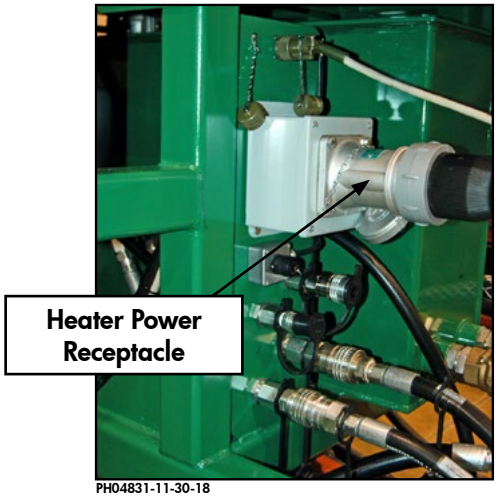
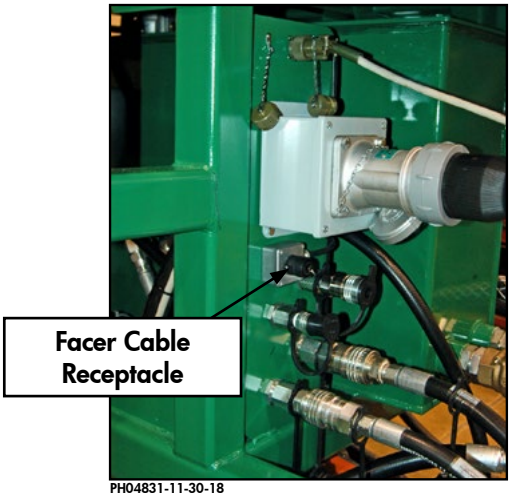
2) Connect the power cable for the heater first and then connect the RTD cable between the heater and the Power Pack.

PH04880-11-30-18



PH04831-11-30-18

3) Connect the electrical cables to the facer.



PH04831-11-30-18

NOTICE: Plug the facer cable last and remove first before connecting and disconnecting facer hoses. This will prevent damage to the cable from supporting the weight of the hoses.

4) Center the carriage directional control before starting machine. Ensure the heater and facer switches are in the OFF position.

5) Center clamp valves and jaw pivot valves should match the current position of the jaws.

This will prevent any unwanted movement upon starting of Power Pack.

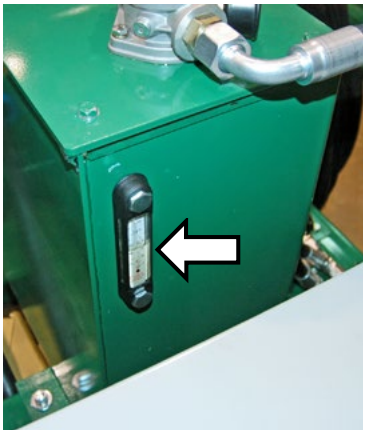
⚠WARNING

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

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.



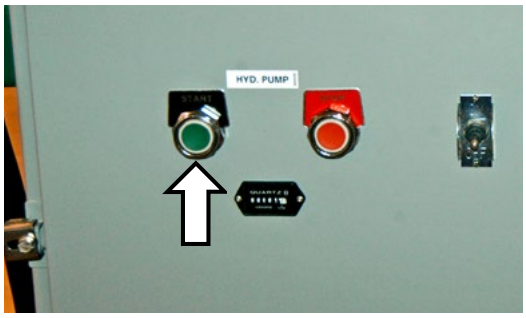
PH04856-3-13-13

Fill to the top of the sight gauge when the fluid is cool.

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

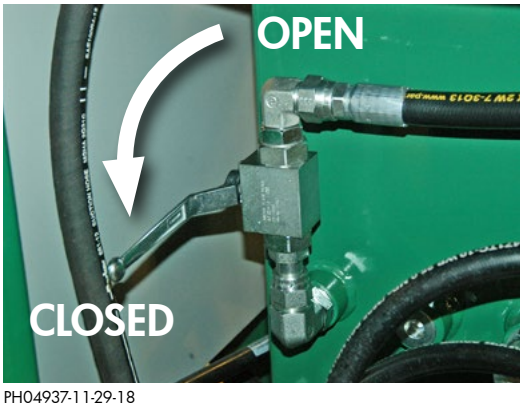
Hydraulic Pump

1) Turn on hydraulic pumps by pushing start button.



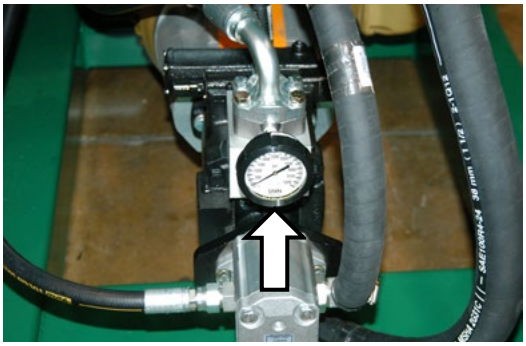
PH04830-11-29-18

2) Close the pressure relief valve or the system will not build pressure.



PH04937-11-29-18

3) System pressure gauge reading should be 3000 psi.



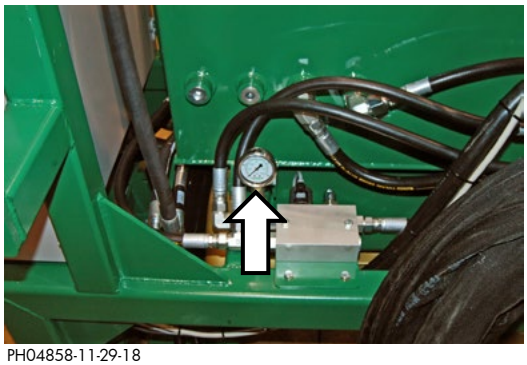
PH04878-3-11-13

The large pump is the main hydraulic pump for the machine. The second pump runs the facer and cooling circuit.

4) When shutting off the hydraulic pumps, open the pressure relief valve to relieve pressure in hydraulic hoses for easy disconnection.

NOTICE: Do not stop and quickly restart the Power Pack. Allow the system pressure gauge to go to zero before restarting the Power Pack. Quickly restarting with pressure in the Power Pack will damage the Power Pack.

The gauge for the facer pump is located to side of the hydraulic reservoir. The relief valve is factory set to 2700 PSI to prevent damage to the pump.



PH04858-11-29-18

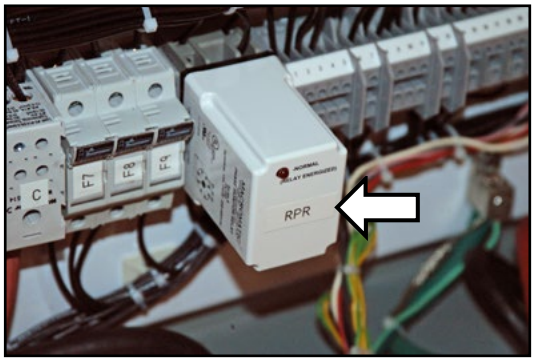
NOTICE: Do not adjust the relief valve. It could cause damage to the pump.

Electrical Power

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

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, call qualified service personnel for assistance.

The reverse phase relay ensures correct rotation of the pump motor so damage to the hydraulic system does not occur.



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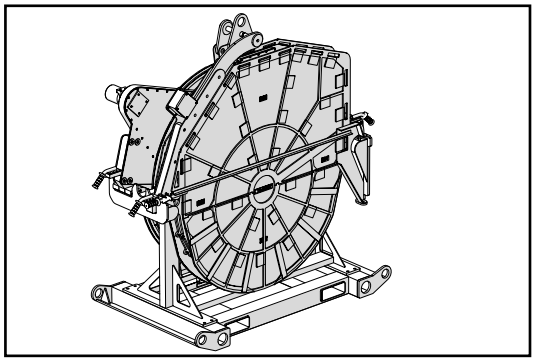
Prepare Heater

⚠ DANGER

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

Make sure butt fusion heater plates are properly installed.



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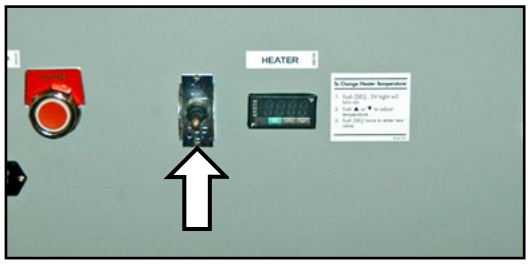
NOTICE: The heater should never be used without butt fusion heater plates installed. Refer to the "Changing Heater Plates/Adapters" section of this manual for installation procedure.

1) If the heater/facer stand is secured for transport, remove the shipping spacers from the heater and facer.

⚠ CAUTION

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

2) Switch heater on using the switch on the electrical box of the Power Pack. Adjust heater temperature to required setting.



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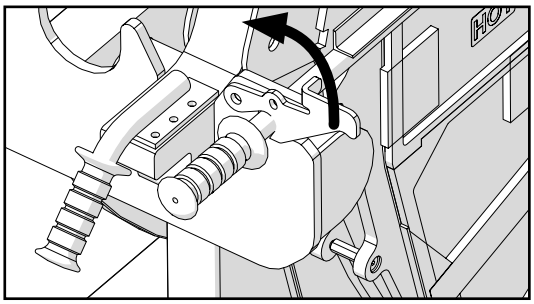
3) Allow heater to warm-up to operating temperature.

The heater cover can be opened to inspect and easily remove the heater. The cover is latched with a locking pin.

4) To open the cover, pull the pin locking the latch. Lift the latch and open the cover.



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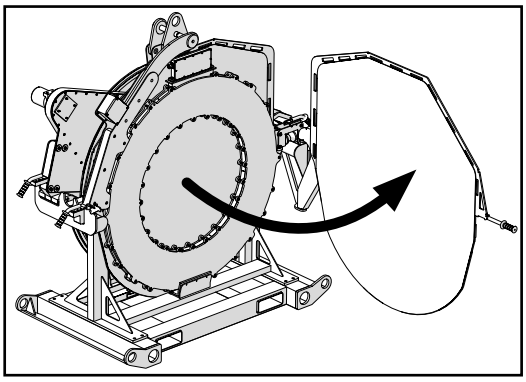

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Adjusting Heater Temperature:

5) The temperature controller and an on/off switch are located on the front of the electrical box.

Heater surface temperature should be checked periodically with a pyrometer and the necessary adjustment made to the temperature controller.

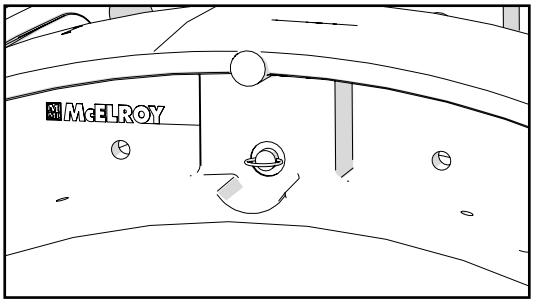
PH04830-11-30-18

To Adjust the Heater Temperature: Follow the instructions for using the "Fuji Temperature Controller".

6) Allow heater to warm-up to operating temperature.

Jaw Inserts

Install appropriate size jaw inserts for the pipe that is being fused. The inserts are held in place by detent pins or screws.



CD02355-11-27-18

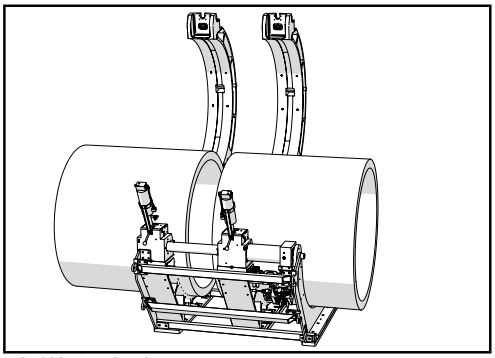
Loading Pipe into Machine

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

⚠WARNING

Plastic pipe is heavy. If loaded or lifted improperly, it could crush or kill. Handle load carefully with proper rigging and equipment of adequate load rating.

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.

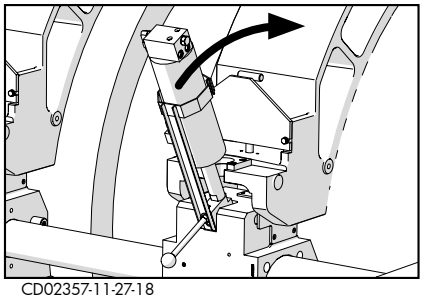


CD02356-11-27-18

Closing Jaws

1) Move the jaw valve control lever to Close position.

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

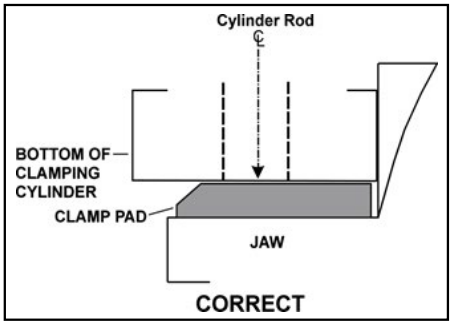


CD02357-11-27-18

NOTICE: The jaw clamping cylinders are designed to clamp when in the upright position, evenly applying pressure over the entire base of the cylinder. Always ensure the clamping cylinder is upright over the clamping pad of the jaw before clamping the jaw. Damage to the cylinder and jaw can occur if not clamped properly.

⚠WARNING

Hydraulic cylinder is heavy. If clamped improperly, it could break and fall which could crush or kill. Ensure to clamp correctly and use the handle to move the cylinder into place.



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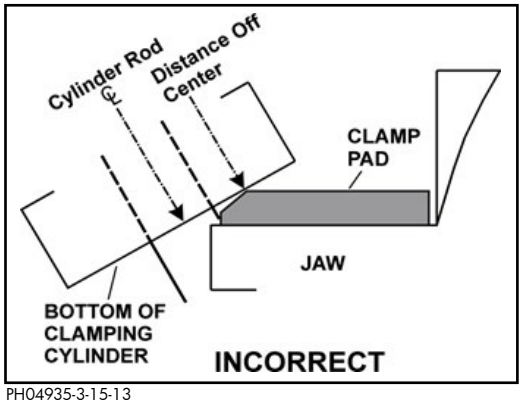
Clamp marks on the bottom of the cylinder are an indication that the cylinder was not in the proper position when clamped down.



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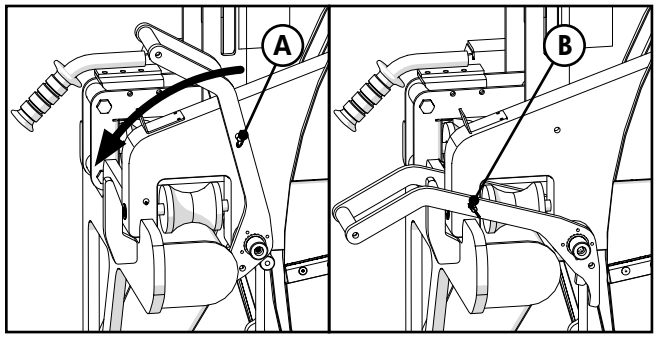
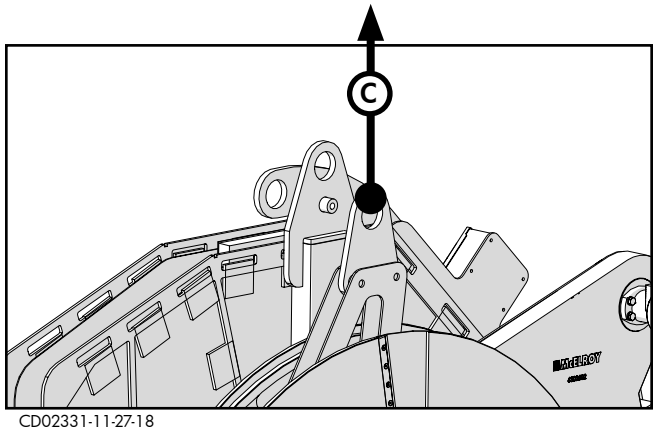
Positioning Facer

Remove the pin from the facer latch (**A**) and unlatch the facer from the heater/facer stand. Replace the pin to lock the latch in the open position (**B**).



CD02332-11-27-18 CD02333-11-27-18

Attach a lifting device of adequate rating to the lifting eye of the facer (**C**) [1250 lbs, 567 kg].



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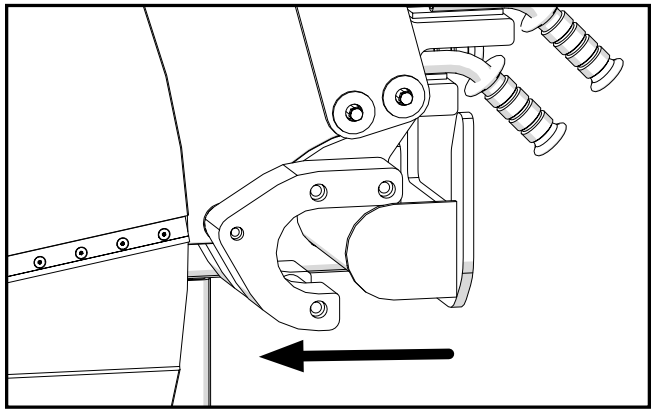
As the facer is lifted from the stand, slide the facer guide rod bracket from the stand until it is clear using the handle of the facer latch.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Move the facer into position over the carriage. Lower the facer between the pipe ends on the carriage. Once the facer reaches the guide rods of the carriage slide the guide bracket over the guide rod using the handles on the front or back of the facer and lower until the facer rests on the guide rods.

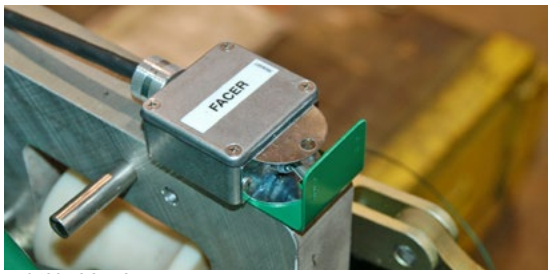
⚠CAUTION

Keep hands clear of the facer while moving into position. Use the handles provided on the facer. Failure to do so could result in minor injury.

Remove the pin from the facer latch and latch the facer to the guide rod. Replace the pin to lock the latch to the locked position.

Begin Facing

1) Turn facer on by using the switch near the facer latch.



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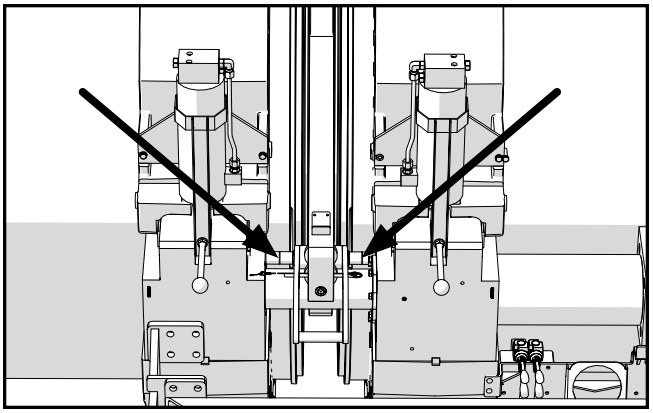
2) Move the selector valve on the hydraulic manifold block to the top (facing pressure) position.

The facing pressure should be set as low as possible while still facing pipe. Excessive facing pressure can damage the facer. It may be necessary to adjust the carriage pressure.

⚠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.

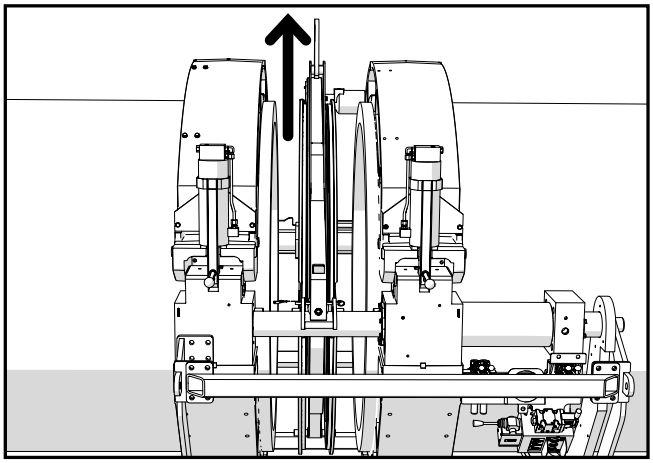
3) Activate the carriage control valve and move the carriage to the left to begin facing. Continue to face the pipe until the rest buttons on the jaws bottom out on the facer rest buttons.



IMPORTANT: Always face the pipe until the rest buttons are in contact with the rest buttons on the facer.

After Facing

1) Turn facer switch off.
2) Move carriage all the way to the right. Center the facer in between the pipe ends to avoid dragging facer stops on the pipe ends. Unlatch the facer latch and lock in the open position. Lift the facer out of the carriage. Move the facer back into the heater/facer stand.



⚠DANGER

Turn the Power Pack off if it is necessary to enter the unit for maintenance or chip removal. Death or serious injury could result if the hydraulics are activated while in the unit.

3) Clean shavings out of pipe ends and from between the jaws. Do not touch faced pipe ends.

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.

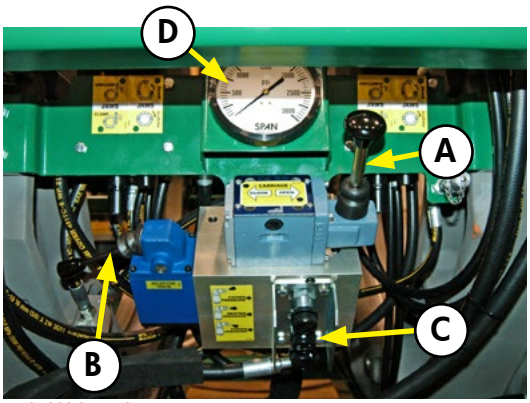
Select the heating mode, and adjust the middle pressure reducing valve to its lowest pressure by turning the valve counterclockwise.

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 as actual drag pressure.



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A - Carriage Directional Control
B - Pressure Selector Control
C - Pressure Reducing Knobs (3)
D - Carriage Pressure Gauge

Set Fusion Pressure

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

The theoretical fusion pressure can be calculated using the fusion pressure calculator supplied with the machine or by using the McCalc® app is available for iOS, Android, Windows Phone and PC devices.

Always add drag pressure to the theoretical fusion pressure.

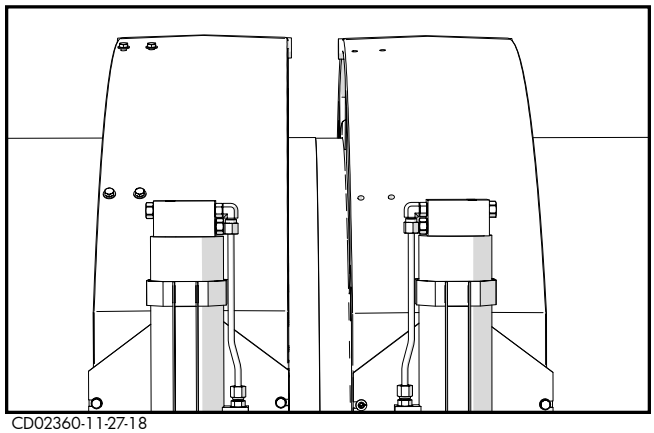
Gauge (Fusion) Pressure = Theoretical Fusion Pressure + Drag Pressure

The use of the DataLogger® will provide the ability to calculate fusion pressure as well as log fusion joints.

Check for Slippage

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

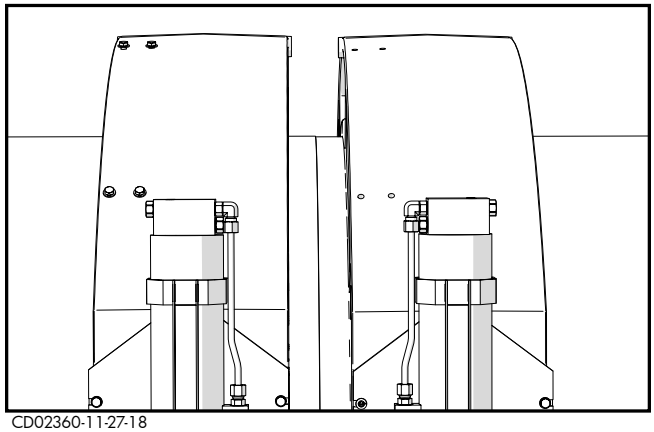
If slippage occurs, return to "Loading Pipe into Machine".



CD02360-11-27-18

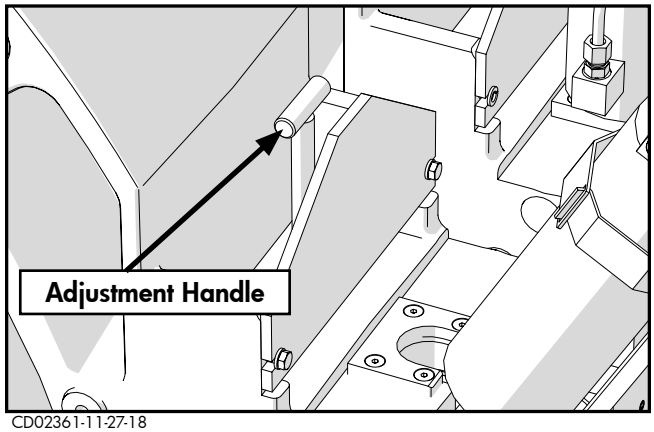
Check Alignment

1) Move carriage to the left at facing pressure, until pipe ends contact. Look across the top surface of pipe ends to check alignment. If there is a noticeable step across the pipe ends, adjustments must be made.



CD02360-11-27-18

2) Adjusting handles are located on top of both jaws. The jaws must be opened to perform the adjustment. To open the jaws enough to adjust the alignment, open the jaws. Unclamp the jaws, which will allow the jaws to open as they are unclamped. Turn the handle counter-clockwise on the high side jaw to improve alignment. Supporting the clamping cylinder, close the jaws and reclamp the jaws with the clamping cylinders.



CD02361-11-27-18

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

⚠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.

3) Insert the facer and reface the pipe ends.

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

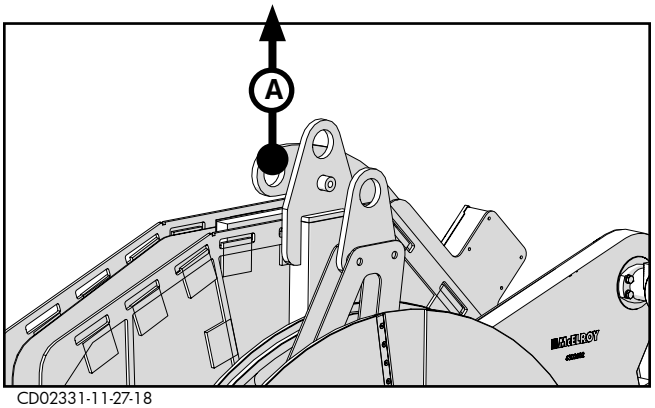
Remove Heater from Heater/Facer Stand

1) Attach a lifting device of adequate rating to the lifting eye of the heater **(A)** [750 lb, 340 kg]. Open the cover of the heater. Lift the heater up from the stand and then away from the heater/facer stand.

Cleaning Heater:

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

2) Position the heater over the carriage between the pipe ends.



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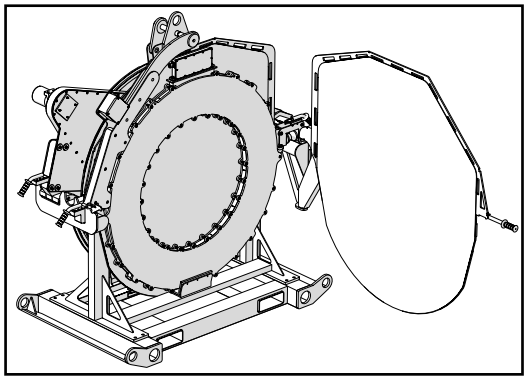

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Check Heater Temperature:

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

3) Check heater surface temperature.

Refer to the pipe manufacturer's recommendations or appropriate joining standard for proper heater temperature.

⚠CAUTION

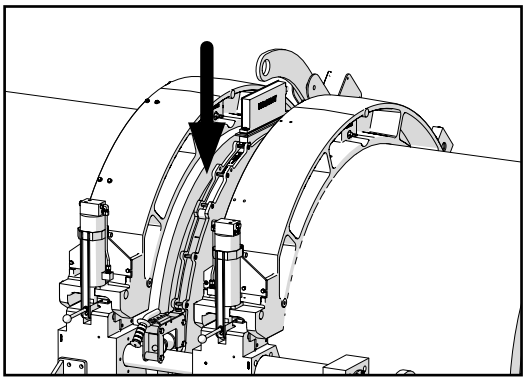
Keep hands clear of the heater while moving into position. Use the handles provided on the heater. Failure to do so could result in minor injury.

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.

Insert Heater

1) Move the carriage to the right.

2) Lower the heater between the pipe ends and ensure the rear of the heater is inserted in the notch of the heater stripper. Lower until the heater is completely in the notch and the heater roller rests on the guide rod.



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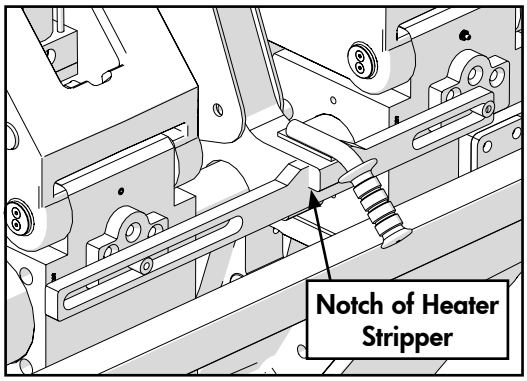

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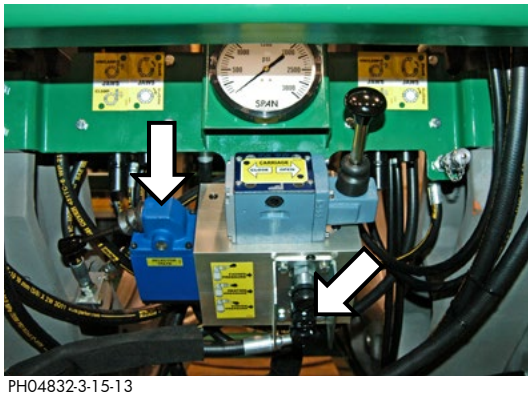
Heat Pipe

1) 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.



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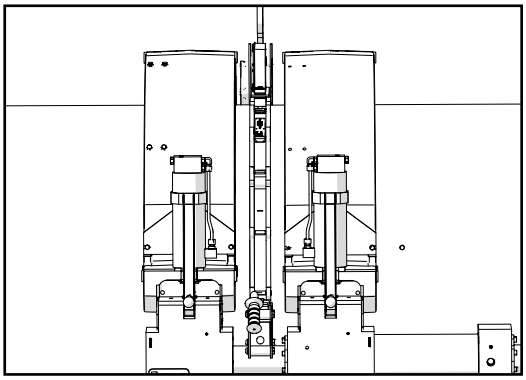
2) Shift the selector valve to the fusion position and move carriage to the left to bring pipe ends in contact with the heater. Move selector valve to middle (heating mode) position. If heater pressure is not required by pipe manufacturer or joining standard, or opposing forces are not great enough to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



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

Follow the pipe manufacturer's suggested heating and soaking procedure or joining standard.

Fusing the Pipe

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

1) After following the heating procedure, verify carriage control valve is in neutral and move selector valve down, to fusion position.

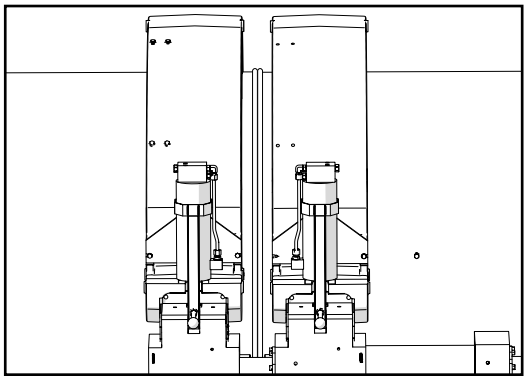
2) Move the carriage to the right and allow the heater to be stripped from the pipe ends.

IMPORTANT: The heater stripper will strip the back of the pipe, use the front handle of the heater to assist in stripping the front of the pipe.

3) **Quickly** lift the heater from between the pipe ends. Ensure the heater does not touch the pipe ends as it is removed.

4) **Quickly** inspect pipe ends for appropriate melt.

5) When heater is clear of the jaws, quickly move the carriage to the left and bring the pipe ends together using the pipe manufacturer's recommended pressure.



CD02365-11-27-18

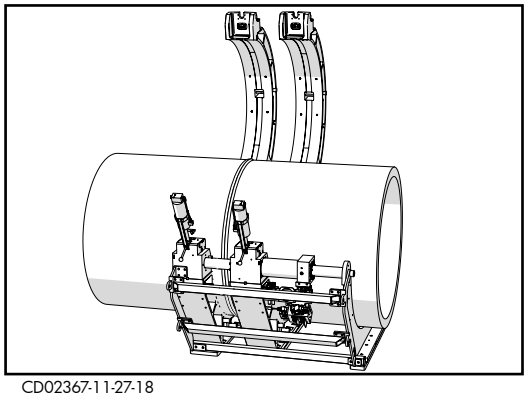
Allow joint to cool under pressure according to pipe manufacturer's recommendations or appropriate joining standard.

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

Open Jaws

1) Shift the carriage control valve to the neutral position before opening the jaws.

2) Unclamp jaws on carriage and open jaws.



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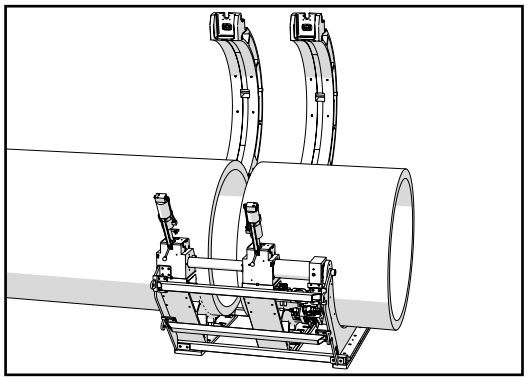
Position Pipe for Next Joint

1) Move the fusion machine to end of pipe, or pull the pipe through the jaws until the end of the pipe is protruding past the jaw face of the fixed jaw.

2) Insert a new piece of pipe in movable jaws and repeat all previous procedures.



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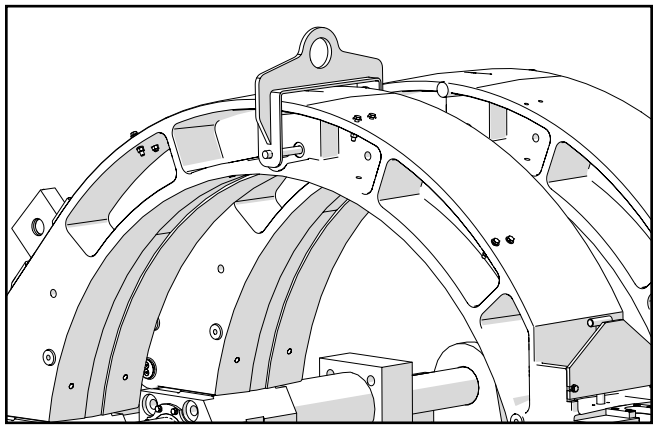
SPECIAL OPERATION - UPPER JAWS

Remove Upper Jaws

The upper jaws of the carriage can be removed so it is easier to maneuver the carriage under pipe in a close quarters in-ditch situation.

NOTICE: Use jaw lifter to lift upper jaws of the fusion carriage only.

1) Attach the jaw lifter to the jaw that is to be removed.



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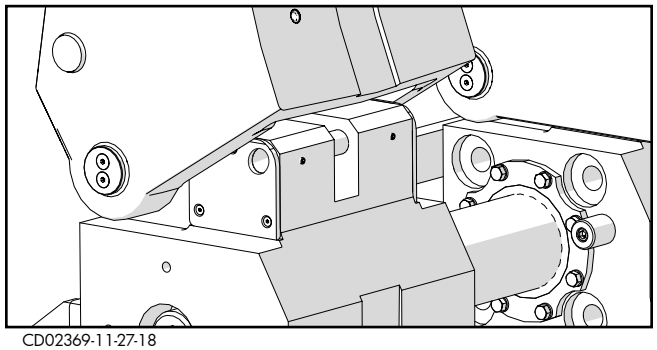
Ensure the retaining pin is secured with pins on both sides to prevent the pin from sliding out of the device.



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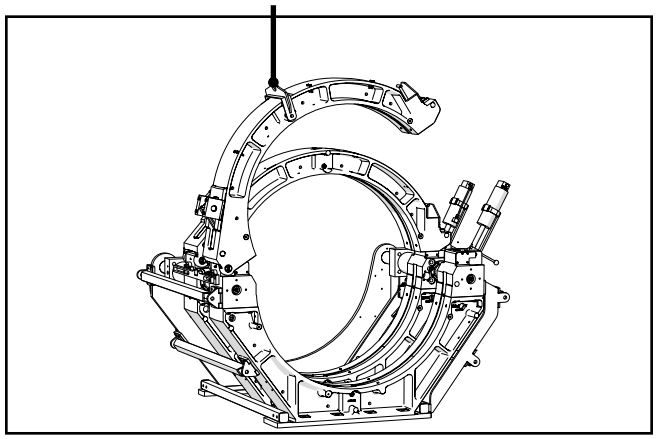
2) Open the jaw enough to expose the jaw cylinder pin.



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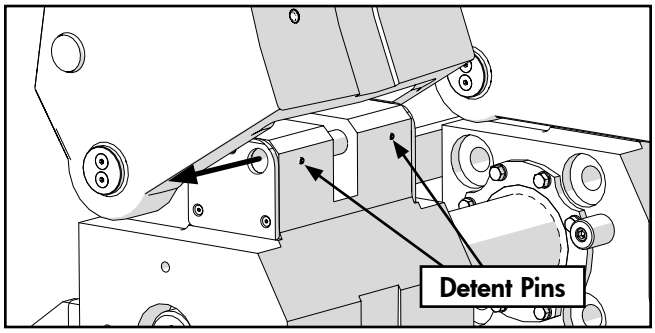
3) Use an overhead lifting device connected to the jaw lifter and lift until the open jaw is supported.



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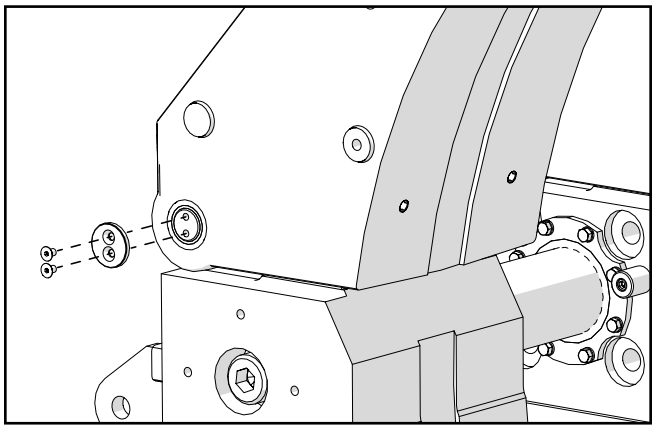
4) With a drift, drive the pin out completely past the detent pins and store in the toolbox.

5) Retract the hydraulic cylinder arm using the jaw controls to close the jaws.

6) Turn off the Power Pack. Move the jaw open/close valve to relieve pressure in the hydraulic hoses to the hydraulic cylinder. Disconnect the two quick disconnects going to the hydraulic cylinder.



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7) Use the lifting device to manually pivot the jaw and lower to the closed position.

8) Loosen and remove the screws on jaw pivot pin cap. Use a drift to drive the pin attaching the upper jaw to the lower jaw out. Once the pin is removed, the upper jaw can be lifted away from the carriage. The pin and cap should be stored in the toolbox.

IMPORTANT: The jaw may drop slightly when the pin is driven out.

9) To reattach the upper jaws, reverse the procedure. Ensure screws are tightened and hoses connected.

TX05384-12-18

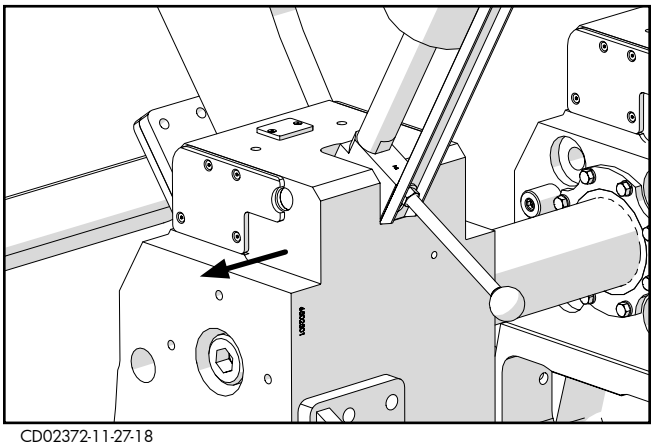
SPECIAL OPERATION - HYDRAULIC CLAMPING

Remove Hydraulic Clamping

The hydraulic clamping should be removed if the carriage is going to be rotated and slid under pipe to prevent damage to the hydraulic clamping cylinders.

1) Disconnect the hydraulic disconnects on the clamping cylinder.

2) Have a second person hold the clamp cylinder while the first person use the drift to drive the pin from the lower jaw. When the pin is removed, the second person can remove the clamp cylinder from the lower jaw.



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3) Repeat this procedure and remove the other clamping cylinder.

4) After the carriage has been moved into position for fusion, reverse the procedures to reinstall all of the hydraulic clamping cylinders.

IMPORTANT: When installing the pin, ensure the detent pin in the jaw is in the groove of the pin to prevent the pin from coming out.

TX05385-12-18

MAINTENANCE

Task	As Needed	Daily	Monthly	Yearly	500 hrs
Clean Machine	●				
Check Machine Operation		●			
Fasteners Are Tight			●		
Clean Jaws and Inserts	●				
Changing Heater Plates/Adapters	●				
Facer Blades	●				
Grease				●	
Change Hydraulic Fluid and Filter					●
Hydraulic Cylinder Cushion	●				
Adjusting System Pressure	●				
Bleeding Air from Hydraulic System	●				

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.

⚠WARNING

Disconnect electrical power whenever performing maintenance to avoid injury or damage to equipment.

Clean Machine

1) Clean the machine with soap and water as needed.

   Do not pressure wash.

Check Machine Operation

1) Operate carriage using controls on carriage. Select each of the three pressure settings and ensure they each build pressure. Rotate the respective knob to adjust pressure. Actuate the carriage direction control in all positions and ensure the carriage functions accordingly. Actuate jaw and clamp controls and ensure they function accordingly.
2) Open and close the carriage of the machine. Check for smooth opening and closing motion. If movement is erratic, the hydraulic system may need to be bled.
3) Close the carriage to the end of travel. Build pressure on the gauge, inspect gauge to ensure it is working properly.
4) Turn on facer and inspect for proper operation. Do not operate facer if it is not functioning properly.
5) Turn on heater and check for heater to reach set heater temperature. Allow several minutes for heater to reach set temperature. If heater doesn't reach set temperature, contact technical services for troubleshooting assistance.

Whenever a question arises regarding your machine, please contact McElroy Technical Services at 918-831-9224 or techsupport@mcelroy.com

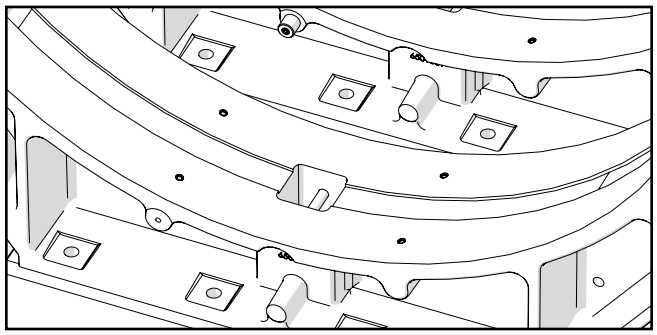
Fasteners Are Tight

1) Inspect all machine fasteners for tightness. Tighten any loose fasteners.

Clean Jaws and Inserts

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

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



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Changing Heater Plates/ Adapters

Coated butt fusion heater plates are available for all non-coated heaters.

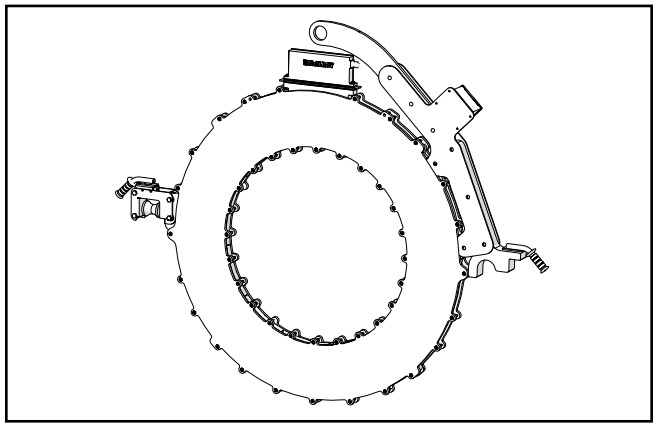
Butt fusion heater plates are installed with stainless steel cap screws.

Install butt fusion heater plates while the heater is cool.

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.



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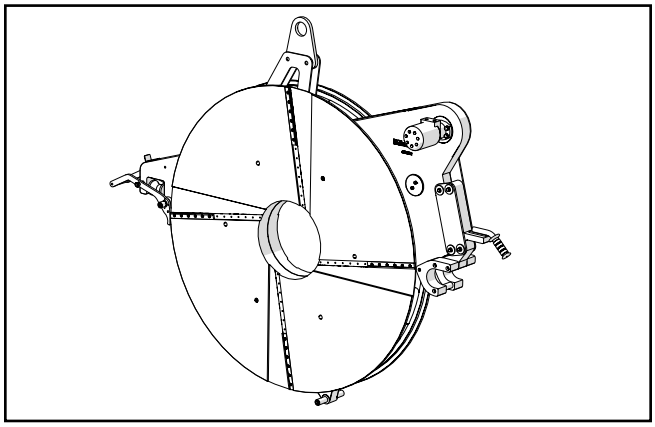
Facer Blades

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

1) Dull or chipped blades must be replaced.

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



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Grease

Keep moving parts well lubricated as needed with high temperature grease.

- Jaw pivot pin
- Hydraulic cylinder pivot pins
- Facer

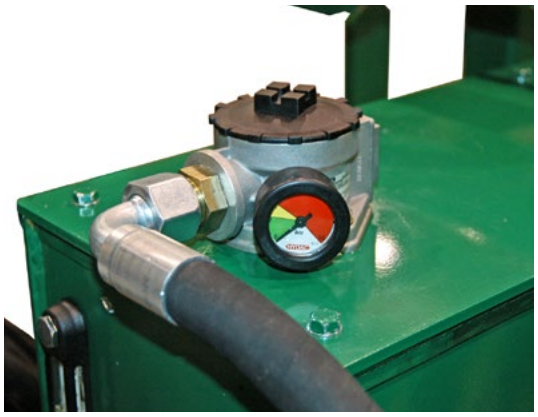
Change Hydraulic Fluid and Filter

The hydraulic fluid and filter should be replaced after every 500 hours or when the gauge is not green. The magnetic suction filters inside the reservoir should also be disassembled and cleaned.

1) Use compressed air to remove contamination from the magnetic elements.

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 oil recommendations.



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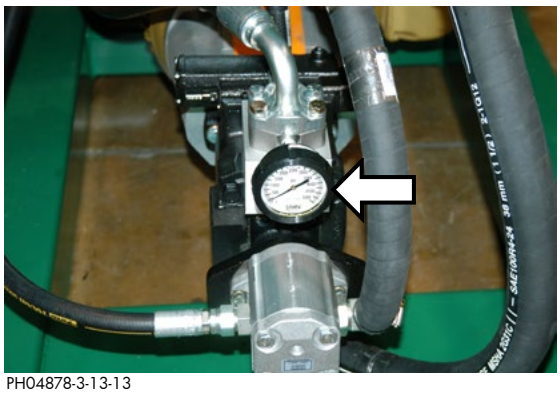
Adjusting System Pressure

The pumps are attached to the electric motor on the side opposite the electrical box of the Power Pack.

1) To adjust the pressure of the large pump, loosen the jam nut and turn the compensator clockwise to increase the pressure, or counter-clockwise to decrease pressure.



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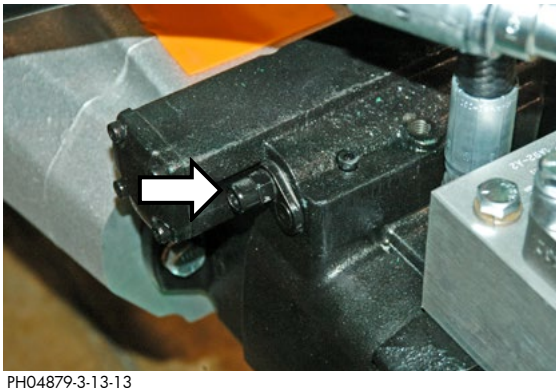
The system pressure should be at 3000 psi.

2) Re-tighten the jam nut.



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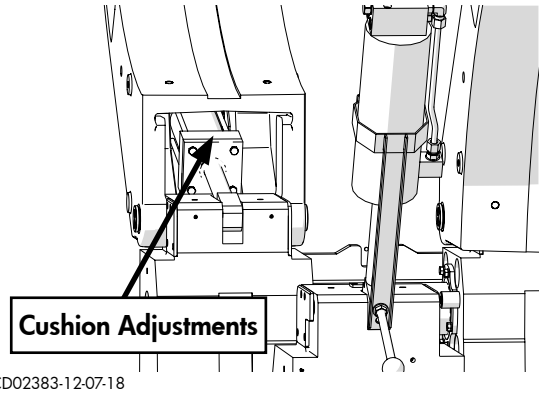
Hydraulic Cylinder Cushion

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. The rod end of the cylinder adjusts the opening cushion and the base end of the cylinder adjusts the closing cushion.

1) To adjust cylinder cushions, open the jaws completely. Turn off the Power Pack. Disconnect the quick disconnects on the pivot cylinder. Both adjustments will be visible through the open jaw. Turn the set screw making fine adjustments on the top and bottom of the cylinder until the cushion is correct.



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2) Reconnect the cylinder quick disconnects. Stand clear of the carriage. Turn on the Power Pack. Close the jaw and check the cushion closing and opening.

3) If the cushion is not correct, repeat the above steps until the cushion is correct.

Bleeding Air From Hydraulic System

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

To bleed the system, proceed as follows:

The bleed screws are on the movable jaw facing outward.

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

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

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

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

Repeat bleeding operation on the opposite cylinder.

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

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

7) Repeat the bleeding procedures for the remaining cylinder.

If Unit Fails to Start (Power Pack)

If Unit Fails to Start (Power Pack)

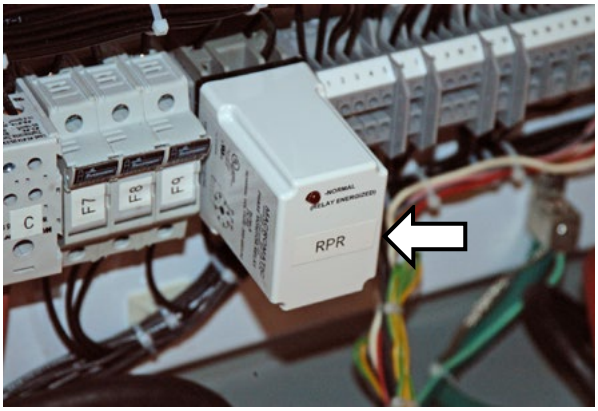
1) Check electrical source to make sure it is sufficient for your machine.

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.

⚠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.

2) 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, call qualified service personnel for assistance.



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3) Inspect fuses inside electrical box. Replace as required.

TX05372-08-18

Fuji Model PXR3 Temperature Controller Setup

PH04830-3-13-13

Setting the heater temperature

Turn the heater on and press the SEL key to display the SV (Setting Value). The SV indicator lamp will be illuminated. Press the ▲ (UP) or ▼ (DOWN) arrow keys until the desired setting is displayed. The new value will be registered in the SV after three seconds. Thereafter, the controller will operate using the new SV value.

Checking the heater with a pyrometer

Each day the operator should check the surface of the heater to see that the PV (Process Value) reading on the controller agrees with the actual surface temperature. When the heater has come up to operating temperature, use a hand-held pyrometer or DataLogger® to read the actual surface temperature. Be sure to allow enough time after the heater is turned on for the surface to stabilize. If a discrepancy is detected and the difference is consistent, the operator can modify the controller bias setting as described below.

Adjusting the Controller Bias Setting

Press and hold the SEL key for approximately 6 seconds until the *PvOF* (PVOF) parameter is displayed. Press the SEL key once to display current offset. Use the ▲ (UP) and ▼ (DOWN) arrow keys to adjust the setting to the desired offset value. To increase the heater surface temperature, the offset should be a negative (-) number. Press the SEL key once and *PvOF* (PVOF) will be displayed and the new offset value will be added or subtracted from the SV setting. Press the SEL key for two seconds, to return to the SV setting. After approximately thirty seconds the display will return to the PV reading.

Perform Auto-Tune

Auto-tuning determines the PID values (proportional band, intergral time and derivative time) for optimum heater performance. Press and hold the SEL key for approximately 3 seconds. *AT* (AT) will be displayed. Press the SEL key once. Use ▲ (UP) key to change *AT* (AT) to 1. Push SEL key once to accept the new *AT* (AT) value. The unit will begin auto-tuning. The lamp at the bottom right of the display will flash until auto-tuning is complete. *AT* (AT) value will automatically be reset to 0.

Removing masking

The factory setup hides most of the parameters. The first part of this procedure removes the masking so the parameters can be verified or changed. The final part of this procedure reinstalls the masking to prevent the parameters from being inadvertently changed.

1.	Hold SEL button until display shows	dSP 1	Push SEL to access value.
	Use △ ▽ to change value to	96	Push SEL to enter new value.
2.	Push ▽ until display shows	dSP2	Push SEL to access value.
	Use △ ▽ to change value to	252	Push SEL to enter new value.
3.	Push ▽ until display shows	dSP3	Push SEL to access value.
	Use △ ▽ to change value to	128	Push SEL to enter new value.
4.	Push ▽ until display shows	dSP4	Push SEL to access value.
	Use △ ▽ to change value to	13	Push SEL to enter new value.
5.	Push ▽ until display shows	dSP5	Push SEL to access value.
	Use △ ▽ to change value to	128	Push SEL to enter new value.
6.	Push ▽ until display shows	dSP6	Push SEL to access value.
	Use △ ▽ to change value to	1	Push SEL to enter new value.
7.	Push ▽ until display shows	dSP7	Push SEL to access value.
	Use △ ▽ to change value to	0	Push SEL to enter new value.
8.	Push ▽ until display shows	dSP8	Push SEL to access value.
	Use △ ▽ to change value to	0	Push SEL to enter new value.
9.	Push ▽ until display shows	dSP9	Push SEL to access value.
	Use △ ▽ to change value to	0	Push SEL to enter new value.
10.	Push ▽ until display shows	dP 10	Push SEL to access value.
	Use △ ▽ to change value to	111	Push SEL to enter new value.
11.	Push ▽ until display shows	dP 11	Push SEL to access value.
	Use △ ▽ to change value to	255	Push SEL to enter new value.
12.	Push ▽ until display shows	dP 12	Push SEL to access value.
	Use △ ▽ to change value to	255	Push SEL to enter new value.
13.	Push ▽ until display shows	dP 13	Push SEL to access value.
	Use △ ▽ to change value to	127	Push SEL to enter new value.
14.	Turn temperature controller off for a few seconds and turn it back on.		

Enter 1st Block Parameters

1.	Hold SEL until display shows	StbY	Push SEL to access value.
	Use △▽ to change value to	OFF	Push SEL to enter new value.
2.	Push ▽ until display shows	ProG	Push SEL to access value.
	Use △▽ to change value to	OFF	Push SEL to enter new value.
3.	Push ▽ until display shows	LACH	Push SEL to access value.
	Use △▽ to change value to	0	Push SEL to enter new value.
4.	Push ▽ until display shows	AR	Push SEL to access value.
	Use △▽ to change value to	0	Push SEL to enter new value.
5.	Push ▽ until display shows	rn-1	Push SEL to access value.
	Use △▽ to change value to	0	Push SEL to enter new value.
6.	Push ▽ until display shows	AL1	Push SEL to access value.
	Use △▽ to change value to	600	Push SEL to enter new value.
7.	Push ▽ until display shows	LoC	Push SEL to access value.
	Use △▽ to change value to	0	Push SEL to enter new value.
8.	Turn temperature controller off for a few seconds and turn it back on.		

Enter 2nd Block Parameters

1.	Hold SEL until display shows	P	Push SEL to access value.
	Use △▽ to change value to	5.0	Push SEL to enter new value.
2.	Push ▽ until display shows	c	Push SEL to access value.
	Use △▽ to change value to	240	Push SEL to enter new value.
3.	Push ▽ until display shows	d	Push SEL to access value.
	Use △▽ to change value to	60.0	Push SEL to enter new value.
4.	Push ▽ until display shows	HYS	Push SEL to access value.
	Use △▽ to change value to	1	Push SEL to enter new value.
5.	Push ▽ until display shows	CooL	Push SEL to access value.
	Use △▽ to change value to	1.0	Push SEL to enter new value.
6.	Push ▽ until display shows	db	Push SEL to access value.
	Use △▽ to change value to	0.0	Push SEL to enter new value.
7.	Push ▽ until display shows	CtrL	Push SEL to access value.
	Use △▽ to change value to	PID	Push SEL to enter new value.
8.	Push ▽ until display shows	rC	Push SEL to access value.
	Use △▽ to change value to	18	Push SEL to enter new value.
9.	Push ▽ until display shows	rC2	Push SEL to access value.
	Use △▽ to change value to	30	Push SEL to enter new value.
10.	Push ▽ until display shows	P-n2	Push SEL to access value.
	Use △▽ to change value to	1	Push SEL to enter new value.
11.	Push ▽ until display shows	P-SL	Push SEL to access value.
	Use △▽ to change value to	-200	Push SEL to enter new value.

Enter 2nd Block Parameters (continued)

12.	Hold SEL until display shows	P-SU	Push SEL to access value.
	Use △▽ to change value to	700	Push SEL to enter new value.
13.	Push ▽ until display shows	P-dP	Push SEL to access value.
	Use △▽ to change value to	0	Push SEL to enter new value.
14.	Push ▽ until display shows	P-F	Push SEL to access value.
	Use △▽ to change value to	°F	Push SEL to enter new value.
15.	Push ▽ until display shows	PUOF	Push SEL to access value.
	Use △▽ to change value to	0	Push SEL to enter new value.
16.	Push ▽ until display shows	SUOF	Push SEL to access value.
	Use △▽ to change value to	0	Push SEL to enter new value.
17.	Push ▽ until display shows	P-dF	Push SEL to access value.
	Use △▽ to change value to	5.0	Push SEL to enter new value.
18.	Push ▽ until display shows	ALN1	Push SEL to access value.
	Use △▽ to change value to	1	Push SEL to enter new value.
19.	Push ▽ until display shows	SrAr	Push SEL to access value.
	Use △▽ to change value to	OFF	Push SEL to enter new value.
20.	Push ▽ until display shows	Prn	Push SEL to access value.
	Use △▽ to change value to	1	Push SEL to enter new value.
21.	Push ▽ until display shows	SU-1	Push SEL to access value.
	Use △▽ to change value to	32	Push SEL to enter new value.
22.	Push ▽ until display shows	rN1r	Push SEL to access value.
	Use △▽ to change value to	0.00	Push SEL to enter new value.
23.	Push ▽ until display shows	rN1S	Push SEL to access value.
	Use △▽ to change value to	0.00	Push SEL to enter new value.
24.	Push ▽ until display shows	SU-2	Push SEL to access value.
	Use △▽ to change value to	32	Push SEL to enter new value.
25.	Push ▽ until display shows	rN2r	Push SEL to access value.
	Use △▽ to change value to	0.00	Push SEL to enter new value.
26.	Push ▽ until display shows	rN2S	Push SEL to access value.
	Use △▽ to change value to	0.00	Push SEL to enter new value.
27.	Push ▽ until display shows	SU-3	Push SEL to access value.
	Use △▽ to change value to	32	Push SEL to enter new value.
28.	Push ▽ until display shows	rN3r	Push SEL to access value.
	Use △▽ to change value to	0.00	Push SEL to enter new value.
29.	Push ▽ until display shows	rN3S	Push SEL to access value.
	Use △▽ to change value to	0.00	Push SEL to enter new value.
30.	Push ▽ until display shows	SU-4	Push SEL to access value.
	Use △▽ to change value to	32	Push SEL to enter new value.

Enter 2nd Block Parameters (continued)

31.	Hold SEL until display shows	rM4r	Push SEL to access value.
	Use △▽ to change value to	0.00	Push SEL to enter new value.
32.	Push ▽ until display shows	rM4S	Push SEL to access value.
	Use △▽ to change value to	0.00	Push SEL to enter new value.
33.	Push ▽ until display shows	SU-5	Push SEL to access value.
	Use △▽ to change value to	32	Push SEL to enter new value.
34.	Push ▽ until display shows	rM5r	Push SEL to access value.
	Use △▽ to change value to	0.00	Push SEL to enter new value.
35.	Push ▽ until display shows	rM5S	Push SEL to access value.
	Use △▽ to change value to	0.00	Push SEL to enter new value.
36.	Push ▽ until display shows	SU-6	Push SEL to access value.
	Use △▽ to change value to	32	Push SEL to enter new value.
37.	Push ▽ until display shows	rM6r	Push SEL to access value.
	Use △▽ to change value to	0.00	Push SEL to enter new value.
38.	Push ▽ until display shows	rM6S	Push SEL to access value.
	Use △▽ to change value to	0.00	Push SEL to enter new value.
39.	Push ▽ until display shows	SU-7	Push SEL to access value.
	Use △▽ to change value to	32	Push SEL to enter new value.
40.	Push ▽ until display shows	rM7r	Push SEL to access value.
	Use △▽ to change value to	0.00	Push SEL to enter new value.
41.	Push ▽ until display shows	rM7S	Push SEL to access value.
	Use △▽ to change value to	0.00	Push SEL to enter new value.
42.	Push ▽ until display shows	SU-8	Push SEL to access value.
	Use △▽ to change value to	32	Push SEL to enter new value.
43.	Push ▽ until display shows	rM8r	Push SEL to access value.
	Use △▽ to change value to	0.00	Push SEL to enter new value.
44.	Push ▽ until display shows	rM8S	Push SEL to access value.
	Use △▽ to change value to	0.00	Push SEL to enter new value.
45.	Push ▽ until display shows	Mod	Push SEL to access value.
	Use △▽ to change value to	0	Push SEL to enter new value.

46. Turn temperature controller off for a few seconds and turn it back on.

Enter 3rd Block Parameters

1.	Hold SEL until display shows	P-n1	Push SEL to access value.
	Use △▽ to change value to	4	Push SEL to enter new value.
2.	Push ▽ until display shows	SU-L	Push SEL to access value.
	Use △▽ to change value to	32	Push SEL to enter new value.
3.	Push ▽ until display shows	SU-H	Push SEL to access value.
	Use △▽ to change value to	550	Push SEL to enter new value.

Enter 3rd Block Parameters (continued)

4.	Push ▽ until display shows	dLY1	Push SEL to access value.
	Use △▽ to change value to	0	Push SEL to enter new value.
5.	Push ▽ until display shows	A1HY	Push SEL to access value.
	Use △▽ to change value to	1	Push SEL to enter new value.
6.	Push ▽ until display shows	A1oP	Push SEL to access value.
	Use △▽ to change value to	001	Push SEL to enter new value.
7.	Hold SEL until display shows	dSP1	Push SEL to access value.
	Use △▽ to change value to	247	Push SEL to enter new value.
8.	Push ▽ until display shows	dSP2	Push SEL to access value.
	Use △▽ to change value to	255	Push SEL to enter new value.
9.	Push ▽ until display shows	dSP3	Push SEL to access value.
	Use △▽ to change value to	255	Push SEL to enter new value.
10.	Hold SEL until display shows	dSP4	Push SEL to access value.
	Use △▽ to change value to	255	Push SEL to enter new value.
11.	Push ▽ until display shows	dSP5	Push SEL to access value.
	Use △▽ to change value to	247	Push SEL to enter new value.
12.	Push ▽ until display shows	dSP6	Push SEL to access value.
	Use △▽ to change value to	255	Push SEL to enter new value.
13.	Hold SEL until display shows	dSP7	Push SEL to access value.
	Use △▽ to change value to	255	Push SEL to enter new value.
14.	Push ▽ until display shows	dSP8	Push SEL to access value.
	Use △▽ to change value to	255	Push SEL to enter new value.
15.	Push ▽ until display shows	dSP9	Push SEL to access value.
	Use △▽ to change value to	255	Push SEL to enter new value.
16.	Hold SEL until display shows	dP10	Push SEL to access value.
	Use △▽ to change value to	255	Push SEL to enter new value.
17.	Push ▽ until display shows	dP11	Push SEL to access value.
	Use △▽ to change value to	255	Push SEL to enter new value.
18.	Push ▽ until display shows	dP12	Push SEL to access value.
	Use △▽ to change value to	255	Push SEL to enter new value.
19.	Push ▽ until display shows	dP13	Push SEL to access value.
	Use △▽ to change value to	31	Push SEL to enter new value.

A complete operations manual for the Fuji PXR3 controller may be downloaded in .pdf form from the following websites:

http://www.fujielectric.com

http://www.bectrol.com

http://www.instrumart.com

TX05386-12-18

Determine Fusion Pressure

Variable Definitions:

O.D. = Outside Diameter of Pipe (inch)

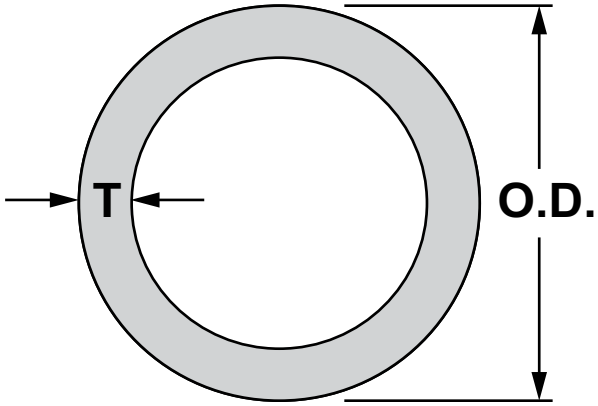
T = Wall Thickness of Pipe (inch)

π = 3.14

SDR = Standard Dimensional Ratio of Pipe (unitless)

IFP = Interfacial Pressure of Pipe (PSI)

TEPA = Total Effective Piston Area of Carriage Cylinders (inch²)



WR00119-6-14-18

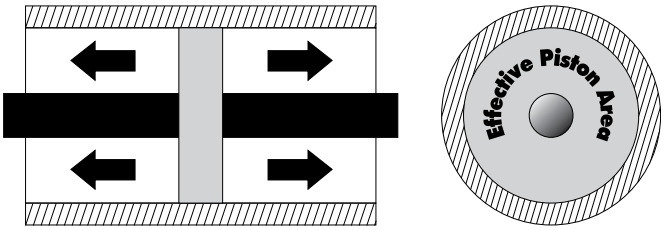
Formulas:

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

PIPE AREA = (O.D. - T) x T x **π**

FUSION FORCE = AREA x IFP

$$\text{GAUGE PRESSURE} = \frac{\text{FUSION FORCE}}{\text{TEPA}} + \text{DRAG}$$



PISTONAREA-6-14-18

Example:

Pipe Size = 8" IPS, SDR 11

O.D. = 8.625 inch

DRAG = as measured in PSI (for this example use 30 PSI)

Recommended IFP = 75 PSI

Using a Model 28 High Force Fusion Unit

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

In Ditch 1600 Total Effective Piston Area (in²)		
High Force	**Medium Force**	**Low Force**
31.42	14.14	

TEPA = 4.71 (From Table)

$$\text{GAUGE PRESSURE} = \frac{(O.D. - T) \times T \times \pi \times IFP}{TEPA} + \text{DRAG}$$

$$\text{GAUGE PRESSURE} = \frac{(8.625 - 0.784) \times 0.784 \times 3.14 \times 75}{4.71} + 30 \text{ PSI} = 338 \text{ PSI}$$

TX05373-06-18

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.

Standard 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	DTE 10 Excel 15	15.8	4.1	168	**********	-16 - 113	-27 - 45
	DTE 10 Excel 32	32.7	6.6	164	**********	12 - 154	-11 - 68
	DTE 10 Excel 46	45.6	8.5	164	**********	23-173	-5 - 78
	DTE 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

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

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

TX05374-06-18

SPECIFICATIONS

Specifications

Dimensions

Carriage

Length: 73.00" (1854mm)

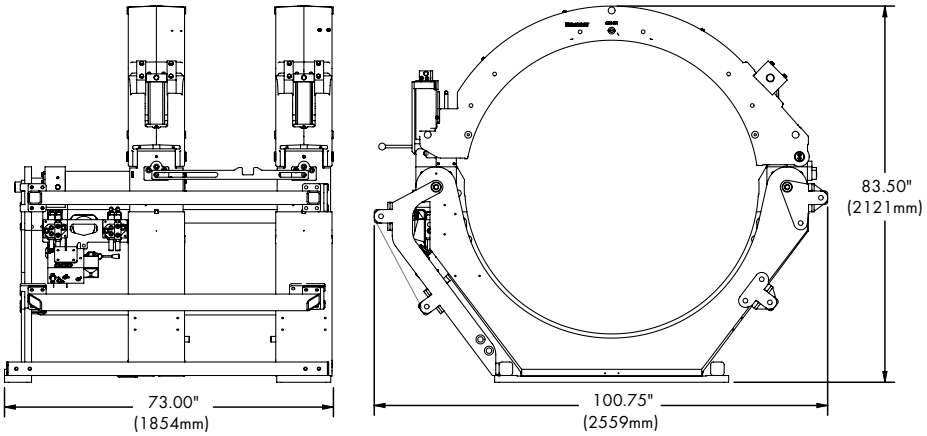
Width: 100.75" (2559mm)

Height: 83.50" (2121mm)

Centerline Height, Carriage: 43.50" (1105mm)

Centerline Width, Carriage: 52.75" (1340mm)

Bottom of Machine to Bottom of Pipe: 10.75" (273mm)



Fusion Machine Weights

Carriage: 4960 lbs (2250 kg)

Spreader Bar 380 lbs (172 kg)

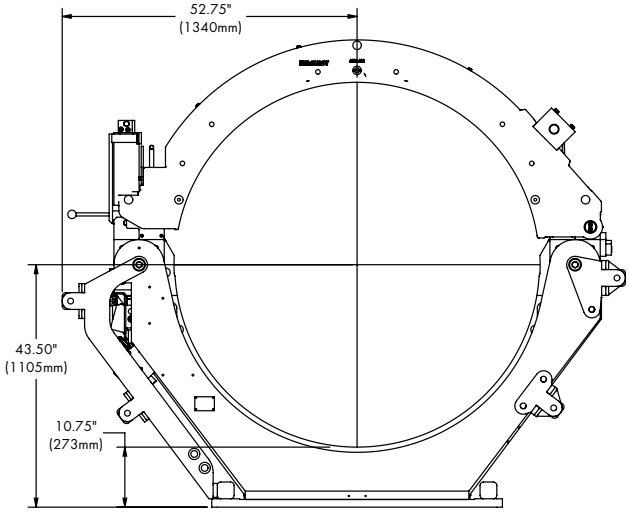
Carriage Specifications

Maximum Pipe Diameter: 65" OD (1600mm)

Minimum Pipe Diameter: 20" IPS (508mm)

High Force Effective Piston Area: 31.42 sq in (202.7 sq cm)

Maximum Force: 94,260 lbs (42756 kg)



Fusion Power Pack

Length: 81.5" (2070mm)

Width: 49.5" (1257mm)

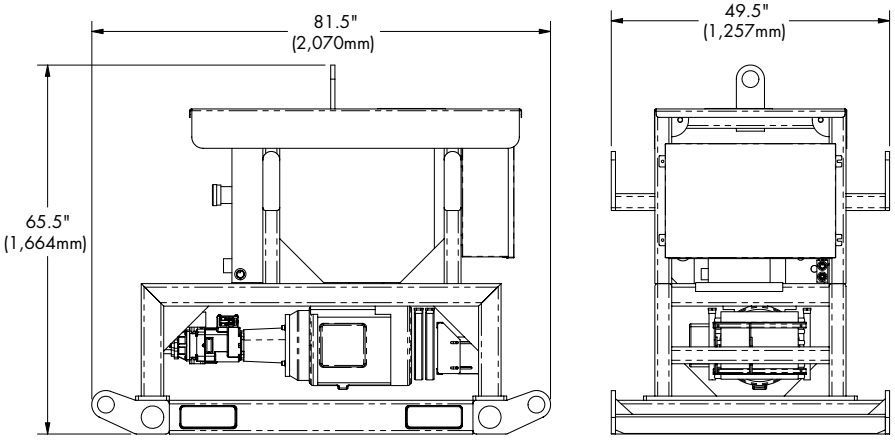
Height: 65.5" (1664mm)

Weight: 2780 lbs (1261 kg)

Motor: 25HP, 3 Phase, 240V, 60hz

35 gal (132.5 liters) Hydraulic Reservoir Capacity

3,000 PSI (206 bar) Operating System pressure



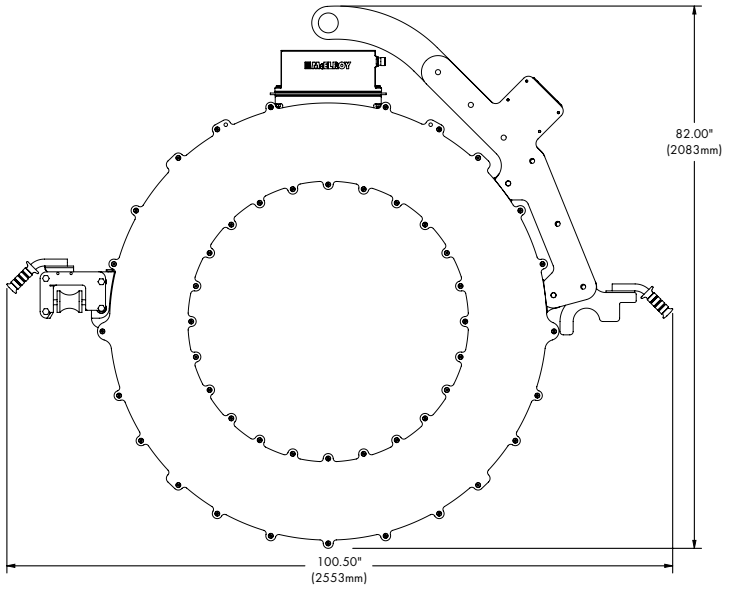
Heater

Length: 100.50" (2553mm)

Height: 82.00" (2083mm)

Weight: 750 lbs (340 kg)

Heater Power: 38,437 Watt



Power Requirements:

Minimum Power Requirement*: 220-240V, 50/60Hz, 3Ph, 170A - 71KVA / 65KW

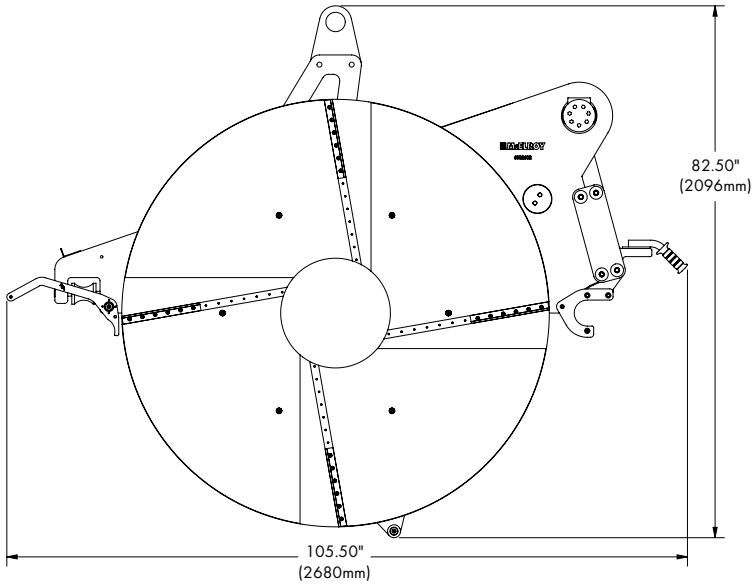
* minimum requirement at sea level

Facer

Length: 105.50" (2680mm)

Height: 82.50" (2096mm)

Weight: 1250 lbs (567 kg)



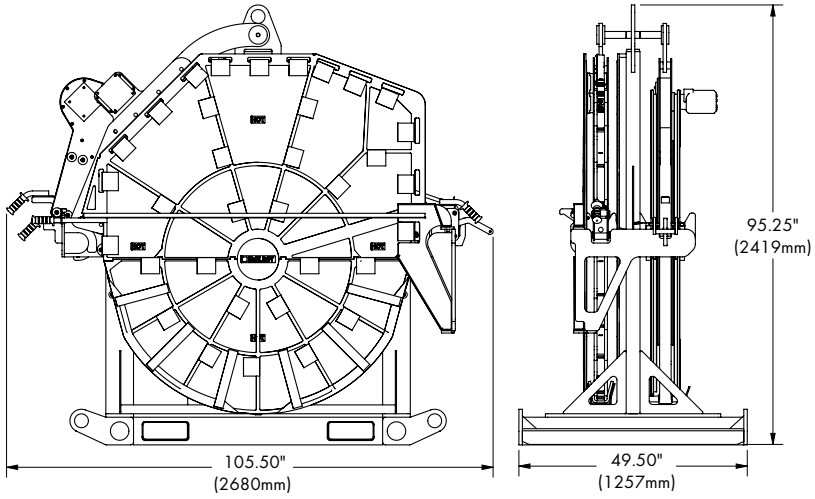
Heater/Facer Stand

Length: 105.50" (2680mm)

Width: 49.50" (1257mm)

Height: 95.25" (2419mm)

Weight: 3450 lbs (1565 kg) (with heater and facer)



TX05387-12-18

NOTES

Notes

GENERATOR SIZING FORM

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.

Pump Motor: _____ hp

Pump Motor Voltage: _____

Pump Motor Phases: _____

Pump Motor Frequency: _____ (50 or 60 Hz)

Facer Motor: _____

Facer Motor Voltage: _____

Facer Motor Phases: _____

Facer Motor Frequency: _____ (50 or 60 Hz)

Heater Wattage Rating: _____ Watts resistive

Heater Voltage: _____

Operational Altitude Range: _____ to _____

Ambient Temperature Range: _____ to _____

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

Allowable Voltage Dip: 15%

Allowable Frequency Dip: 5%

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

Running Load: Motor cycling on and off at varied intervals, heater cycling on and off at varied intervals, facer continuous.

Fuel:_____ (Gasoline or Diesel)

Special requirements for customer application:_____

_____

_____

_____

_____

_____

McELROY
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