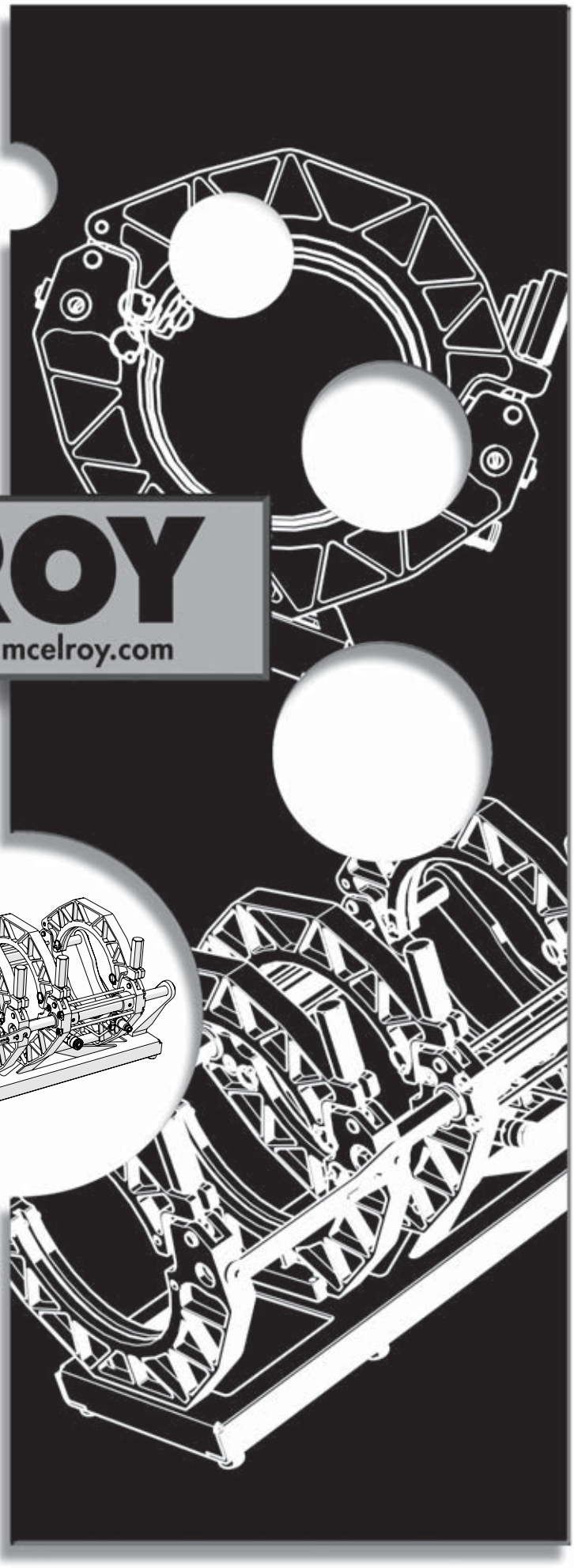
Operator's Manual



McELROY

www.mcelroy.com

Acrobat™ 160, 180, 250 and 315

Fusion Machines

Manual: 2501601 Revision: C 11/18

Original Language: English

WARNING Cancer and Reproductive Harm - www.P65warnings.ca.gov

8163361

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

Introduction

Thank you for choosing McElroy

The Acrobat™ fusion machines allows operators to butt fuse pipe in tight work spaces. With its small footprint and optimal weight, it is an easy machine to manipulate when performing overhead fusions in tight spaces as well as on the ground.

For even tighter spaces, the Acrobat machines can be configured from 4 jaws to 3 jaws without using tools.

When fusing thermoplastic pipe materials, refer to the pipe manufacturer's fusion procedures or appropriate joining standard.

The Acrobat 160 model fuses 63mm through 160mm (2" through 6") maximum pipe.

The Acrobat 180 model fuses 63mm through 180mm (2" through 7") maximum pipe.

The Acrobat 250 model fuses 63mm through 250mm (2" through 10") maximum pipe.

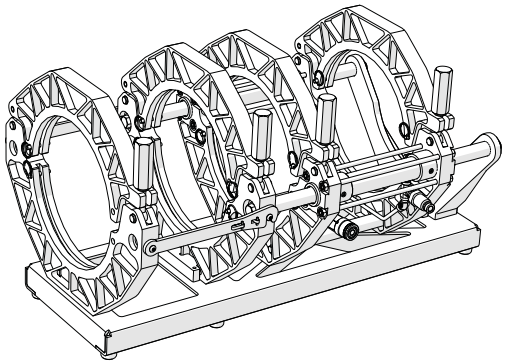
The Acrobat 315 model fuses 63mm through 315mm (2" through 12") maximum pipe.

TX04785-02-01-17

The Acrobat machines utilizes the Acrobat™ Hydraulic Power Unit (HPU) or the DynaMc® Electric Pump (EP) HPU to provide hydraulic power to the carriage.

With reasonable care and maintenance, this machine will give years of satisfactory service.

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



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McElroy University

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

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

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

TX04659-03-24-14

MU203-13-14

Warranty

LIMITED WARRANTY

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

RETURN OF GOODS

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

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

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

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

TX02486-11-4-13

DISCLAIMER OF LIABILITY

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

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

PRODUCT IMPROVEMENT

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

INFORMATION DISCLOSED

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

PROPRIETARY RIGHTS

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

LAW APPLICABLE

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

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

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

Model No. _____

Serial No. _____

Date Received _____

Distributor _____

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Safety

Safety Alerts

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

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

VR00051-11-30-92

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

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

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

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

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

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

TX00030-12-1-92

Read and Understand

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

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

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

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

VR00052-12-1-92

TX02946-4-15-09

Safety

General Safety

SAFE1ST-12-22-92

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.

TX00114-4-22-93

Wear Safety Equipment

WR00053-12-2-92

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.

TX00032-4-7-93

Heater Is Not Explosion Proof

WR00034-11-30-92

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

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

TX04467-03-24-14

Electric Motors are Not Explosion Proof

WR00080-4-12-93

⚠ 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.

Acrobat™ 315 facer cannot be used manually and must not be used in an explosive atmosphere.

TX05333-12-20-17

Safety

Overhead Loads

⚠WARNING The Acrobat fusion carriage is not designed to support overhead or overhung loads. Adequately support the pipe using appropriate support devices. If not supported, overhead loads could fall causing serious injury or death.

⚠WARNING Unclamping jaws in an overhead position could have jaws swing into the head resulting in serious injury or death. Support the carriage when attaching or removing the carriage to pipe.

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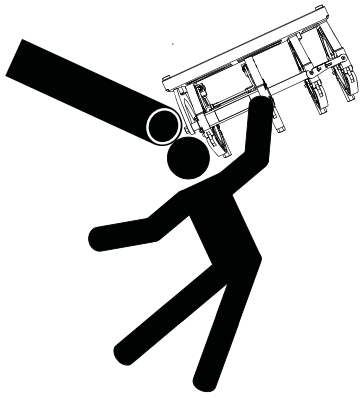

WR00102-03-25-14

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 pull on or 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 or required.

TX04787-02-16-17

WR00055-4-7-93

WR00025-11-30-92

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.

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

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

TX03007-04-18-16

WR00078-4-8-93

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.

TX03091-4-7-10

WR00012-12-4-92

Carriage Handling

⚠WARNING Disconnect carriage from HPU before attaching carriage to pipe. Carriage is operated remotely and remote operation could result in minor to moderate injury.

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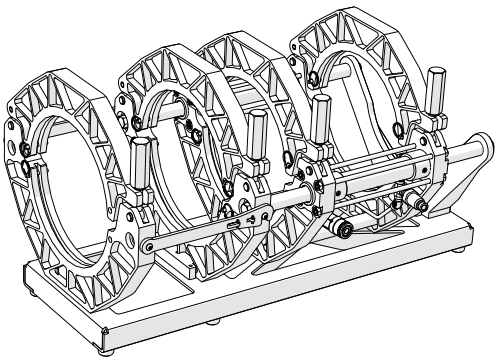

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Facer Blades Are Sharp

⚠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: Turn machine off, disconnect machine power, and remove the facer blades before attempting any maintenance or adjustment.

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

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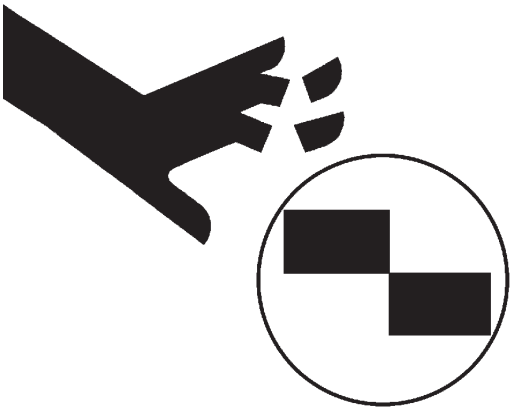

WR00073-4-6-93

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.

TX04244-11-18-15

WR00030-2-10-93

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.

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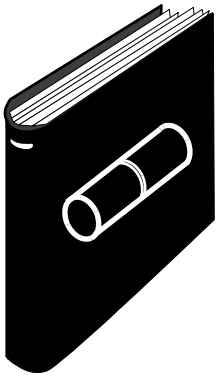

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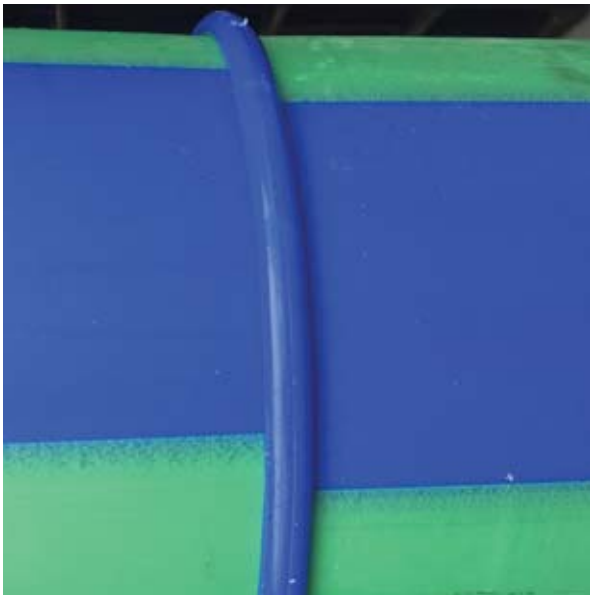
Overview

Theory of Heat 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.



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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.

TX04660-04-18-16

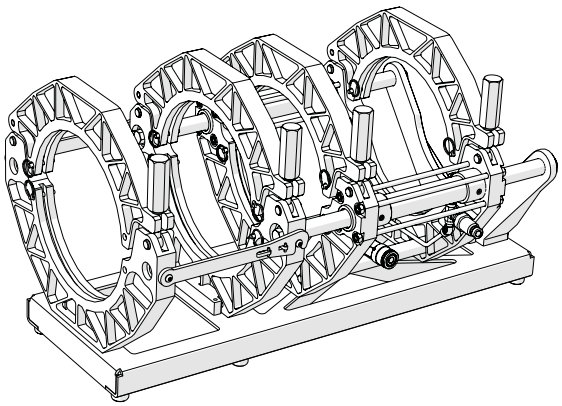
Carriage Assembly

The Acrobat carriage assembly is a 4-Jaw carriage but can be converted to a 3-Jaw carriage.

The carriage assembly consists of two fixed jaws and two hydraulically operated movable jaws bolted to a skid.

For more compact fusion, the 3-Jaw carriage can be separated from the 4-Jaw carriage without tools.

The carriage assembly connects to the HPU with quick disconnect (QD) fittings. Always relieve hydraulic pressure before connecting/disconnecting QD fittings.



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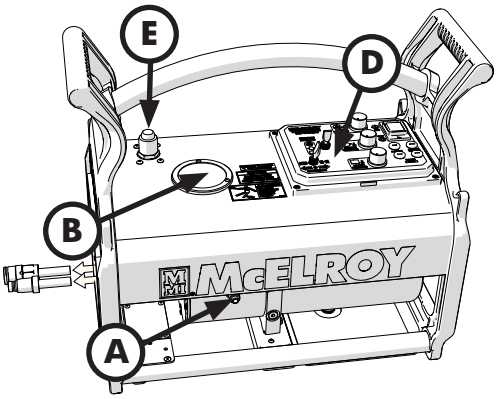
TX04791-05-05-16

Overview

Acrobat Hydraulic Power Unit (HPU)

The Acrobat HPU consists of three main hydraulic components:

1. Power pack - Consists of a capacitor start electric motor not submerged and gear pump that is submerged in the fluid reservoir to aid in cooling and reduce noise.
2. Hydraulic accumulator - Allows the power pack to cycle on and off to meet the demands of the hydraulic system, which reduces noise and power consumption.
3. Carriage control box - Includes all the McElroy standard carriage controls.



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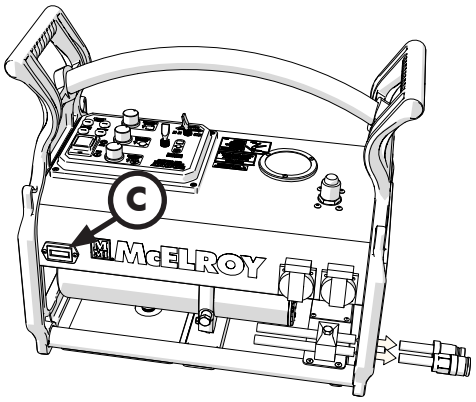

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- **A** DataLogger® port
- **B** Pressure gauge
- **C** Hour meter
- **D** Carriage Control Box
- **E** Filter Bypass Indicator

DANGER Electric motors are not explosion proof. Operation of these components in an explosive atmosphere will result in serious injury or death. Refer to Special Operation - Fusion in Explosive Atmosphere for safety precautions.

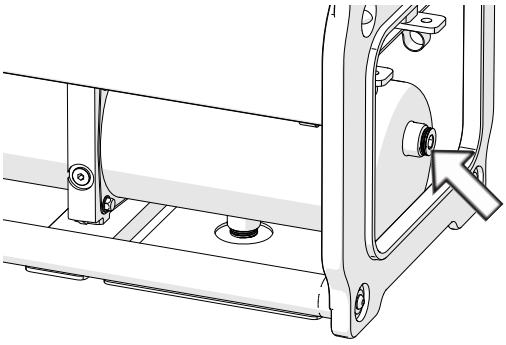
TX04792-05-05-16

Hydraulic Fluid Reservoir (Acrobat HPU)

The reservoir is incorporated in the HPU. The fluid level should be up to the fill plug on the end of the reservoir when the reservoir is on level ground.

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

Refer to the "Hydraulic Fluids" section of this manual for hydraulic fluid recommendations.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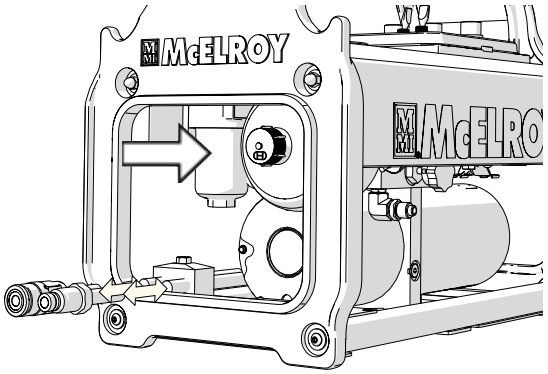
Filter (Acrobat HPU)

This HPU is equipped with a 3 micron pressure filter located under the top cover of the HPU below the filter bypass indicator.

If the filter bypass indicator is activated, the hydraulic fluid is bypassing the filter and the fluid and filter need to be changed.



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Carriage Control Box (Acrobat HPU)

Mounted on the top of the HPU is the carriage control box. The box has controls for the operation of the HPU.

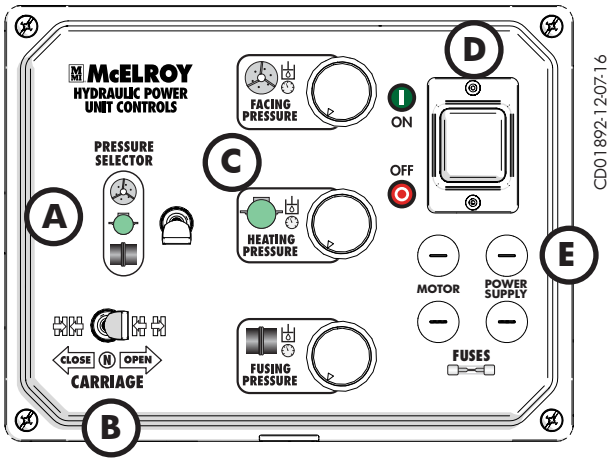
A) **Pressure Selector Control:** Selects one of the three pressure reducing knobs. The three selectable knobs are Facing, Heating and Fusing pressure.

B) **Carriage Directional Control:** Three position switch that closes and opens the carriage and has a neutral position.

C) **Pressure Reducing Knobs:** Use the pressure selector to select the pressure to use. Use the knob to adjust the selected pressure.

D) **Power Switch:** Powers the HPU on and off.

E) **Fuses:** Four fuses for machine electrical protection.



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TX04795-12-12-16

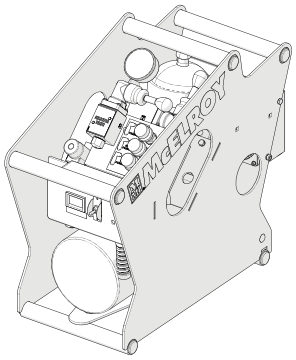
DynaMc EP Hydraulic Power Unit (HPU)

The DynaMc EP HPU consists of three main hydraulic components:

1. Power pack - Consists of a capacitor start electric motor and gear pump that are submerged in the fluid reservoir to aid in cooling and reduce noise.
2. Hydraulic accumulator - Allows the power pack to cycle on and off to meet the demands of the hydraulic system, which reduces noise and power consumption.
3. Carriage manifold assembly - Standard McElroy design for familiar operation and common service parts with other McElroy equipment.

There are two pressure gauges on the HPU. The carriage pressure gauge above the carriage directional control displays fusion pressure. The pressure gauge on the rear left side of the HPU displays main system pressure, which will fluctuate as the power pack cycles on and off.

The main power switch for the HPU is located on the front side of the electrical box. Next to the power switch is a digital volt meter that displays incoming voltage to the HPU. On the bottom side of the electrical box is a motor circuit breaker.



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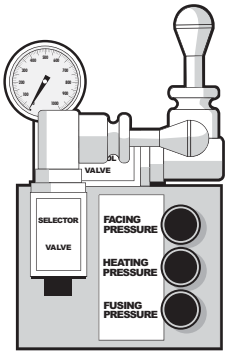

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DANGER Electric motors are not explosion proof. Operation of these components in an explosive atmosphere will result in serious injury or death. Refer to Special Operation - Fusion in Explosive Atmosphere for safety precautions.

TX04796-05-05-16

Hydraulic Fluid Reservoir (DynaMc EP HPU)

The reservoir is incorporated in the HPU. The fluid level is read from a dipstick and has a notch to indicate the proper fluid level.

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

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

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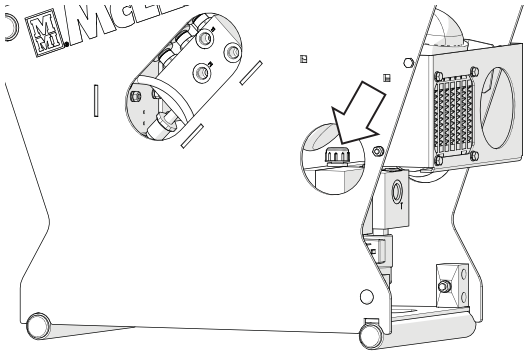

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Filter (DynaMc EP HPU)

This machine is equipped with a 10 Micron filter on the return line.

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PH04143-4-12-10

Hydraulic Manifold Block (DynaMc EP HPU)

Mounted on this block are a carriage directional control , a pressure selector control, three pressure reducing knobs, and a carriage pressure gauge.

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

B) A carriage pressure gauge is mounted on top of the manifold and shows pressure available to power carriage.

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

Each pressure reducing knob is labeled with a different function:

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

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

F) The bottom knob adjusts fusion pressure. The maximum fusion pressure may vary by model.

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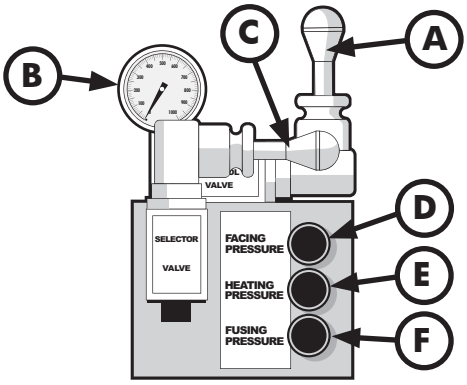

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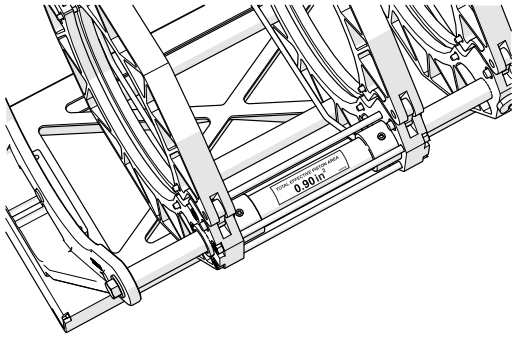
Hydraulic Cylinders

The hydraulic cylinders provide the fusion force which is dependent on the area of the cylinders.

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



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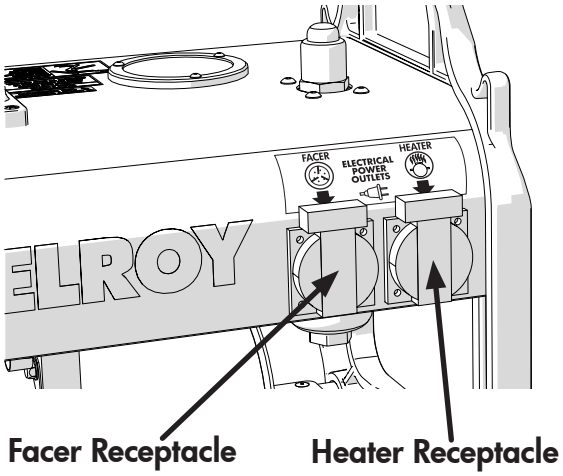
TX03094-4-7-10

Electrical Power Receptacles (Acrobat HPU)

Later models of the Acrobat HPU are equipped with electrical power receptacles that provide power to the facer and heater accessories. These are specific receptacles, one for the facer and the other for the heater.

Care must be taken to plug the correct accessory into its correct corresponding receptacle as indicated by the labeling. The HPU uses current sensing and logic to actively control the power to the heater receptacle. If the facer receptacle current sensor senses that the facer is on or if the HPU motor is running the heater receptacle will be disabled. Otherwise the heater receptacle will be enabled.

NOTICE: Always plug accessories into the correct receptacle. Plug the accessory into the specifically labeled receptacle. Do not plug anything other than the intended McElroy accessories into these receptacles or an over-current condition could occur.



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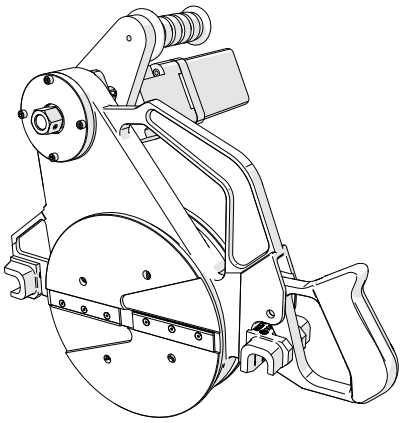
TX05210-02-16-17

Facer

Acrobat™ 160, 180 and 250 Facer:

The facer is a McElroy rotating planer block design. The blade holders each contain two cutter blades. The block rotates on ball bearings and is chain driven (enclosed in lubricant) by a heavy duty electric motor. When operating in an explosive atmosphere, operate the facer manually.



CD01370-10-1-15

⚠ DANGER Electric motors are not explosion proof. Operation of these components in an explosive atmosphere will result in serious injury or death. Refer to Special Operation - Fusion in Explosive Atmosphere for safety precautions.

The facer has a handle that latches into place on a guide rod. The handle must be pulled out to unlatch and remove facer.

The electric facer is symmetrical and can be inserted from either side.

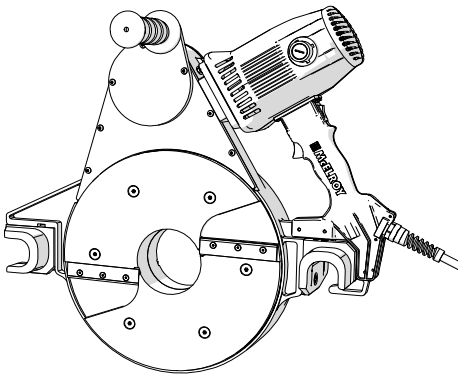
The facer should be stored in the stand when not in use to keep it clean and prevent damage.

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

Acrobat™ 315 Facer:

The facer is a McElroy rotating planer block design. The blade holders each contain two cutter blades. The block rotates on ball bearings and is chain driven with an electric motor mounted to a gearbox. The gearbox contains 80/90W gear oil.

This facer cannot be operated manually.



CD02319-06-20-18

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

The facer has a handle that latches into place on a guide rod. The handle trigger must be pulled to unlatch and remove the facer.

The electric facer is symmetrical and can be inserted from either side.

The facer should be stored in the stand when not in use to keep it clean and prevent damage.

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

TX04797-12-20-17

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. Refer to Special Operation - Fusion in Explosive Atmosphere for safety precautions.

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

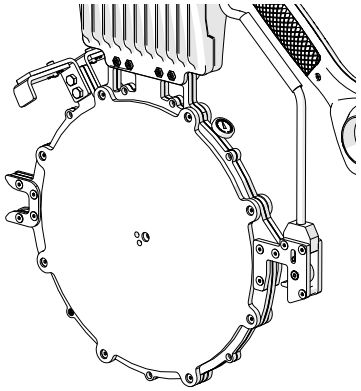
The heater temperature is controlled by a microprocessor. It has a red indicator light on the handle at the bottom of the temperature scale. When the heater is plugged in and preheating the light glows steadily until the set temperature is reached. The light then goes off and on slowly as the heater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

Heater plates are not shipped from McElroy installed. The heater body is not coated. Coated butt fusion heater plates are available for all butt fusion applications. Ensure the butt fusion heater plates are installed before operation.

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

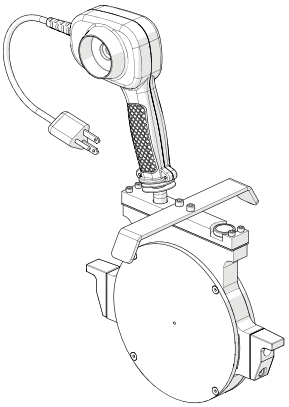
To prevent a build-up of plastic pipe residue from accumulating on the heater plates (loss of surface temperature and pipe sticking may result), the heater plates should be cleaned with a clean dry lint free non-synthetic cloth before every fusion joint.

Acrobat 250 and 315



CD01396-10-5-15

Acrobat 160 and 180



CD01157-03-06-14

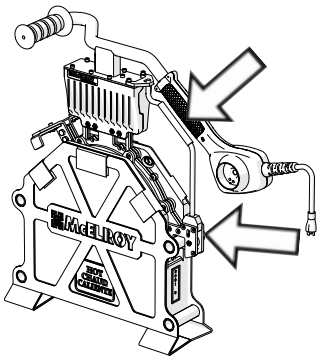
PH02314-4-24-02

TX04798-11-18-15

Heater Latch (Acrobat 250 and 315)

The heater has a latch that locks the heater to the carriage guide rod. The latch is actuated by pulling the latch handle into the heater handle. The latch locks onto the guide rod automatically when the heater is inserted.

TX04799-12-20-17



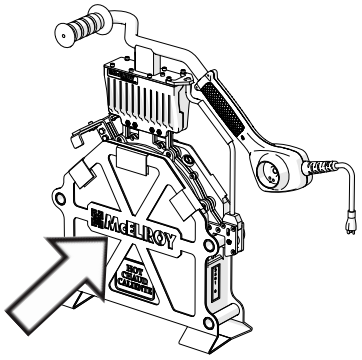
CD01383-10-5-15

Insulated Heater Stand

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

⚠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.

TX04664-03-24-14

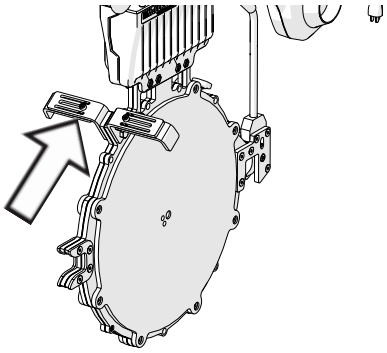


CD01383-10-5-15

Stripper Bar

The heater stripper bar can be attached to the heater to assist in separating the heater from the molten pipe. Refer to the instruction sheet packaged with the stripper bar for assembly instructions.

TX03095-4-7-10

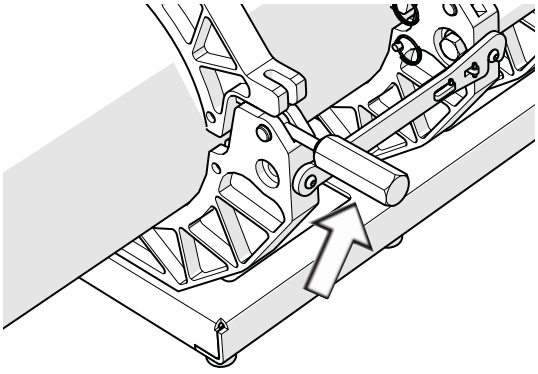


CD01403-10-5-15

Clamp Knobs

Clamp knobs are equipped with a thrust bearing, which permits the operator to develop high clamping forces with minimal effort.

TX03099-4-12-10



CD01330-10-1-15

Butt Fusion Procedure

Read Before Operating

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

When fusing thermoplastic pipe materials, refer to the pipe manufacturer's suggested procedures or appropriate joining standard.

TX04688-03-25-14

STOP-1222-92

Check Fluid Level

Acrobat HPU:

Before connecting to power and with the machine off, open the plug on the end of the reservoir. The fluid level should be up to opening when the HPU is on a level surface.

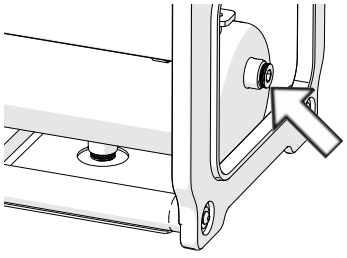
DynaMc EP HPU:

Before connecting to power and with the machine off, unscrew the dipstick and check the fluid level. The fluid level should be within ± 0.25" of the notch of the dipstick.

IMPORTANT: Ensure HPU is on a level surface. Unscrew the dipstick and wipe clean with a lint-free cloth. Screw dipstick in completely then remove to check fluid level.

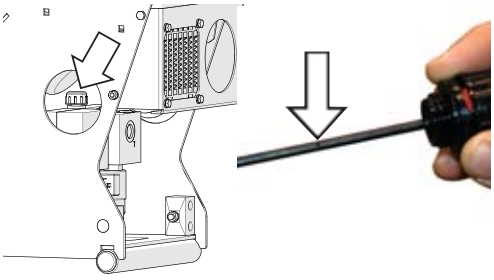
Refer to the "Hydraulic Fluids" section of this manual for hydraulic fluid recommendations.

TX04800-01-26-17



Acrobat HPU

CD01400-10-5-15



DynaMc EP HPU

CD01154-03-06-14 PH04145-4-12-10

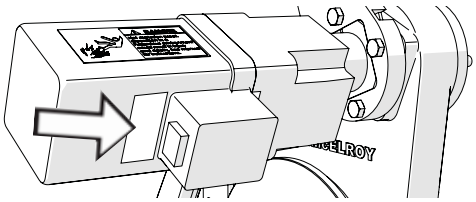
Connecting to Power

⚠ DANGER All electrical equipment and power sources must be located in a non-explosive atmosphere. Failure to do so will result in serious injury or death. Refer to Special Operation - Fusion in Explosive Atmosphere for safety precautions.

Each device must be connected to a source rated for each device's power requirements. Each device has a plate or label with the device's power requirements.

Consult generator sizing form in the back of this manual to determine the proper size generator to power all electrical equipment.

TX04801-11-18-15



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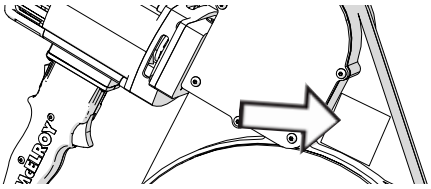
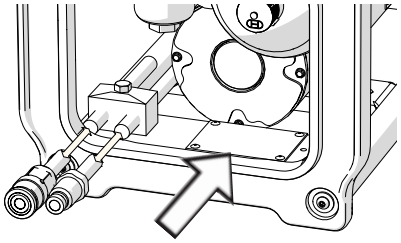


FACER

CD02132-12-21-17



Acrobat HPU

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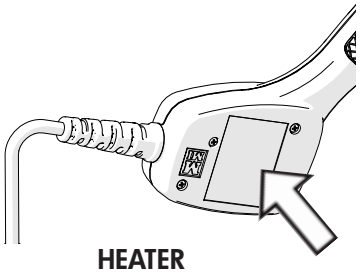
DynaMc HPU

PH04141-4-12-10



HEATER

CD01401-10-5-15

Butt Fusion Procedure

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. Refer to Special Operation - Fusion in Explosive Atmosphere for safety precautions.

Install butt fusion heater plates.

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

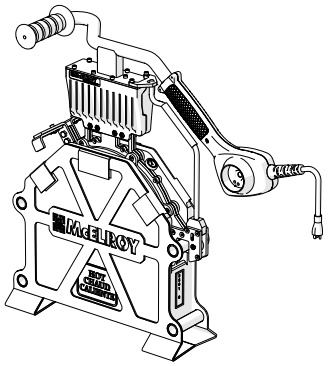
Place heater in insulated heater stand.

Plug heater into a proper power source. For Acrobat HPUs equipped with electrical power receptacles, the heater may be plugged into its proper accessory receptacle on the HPU.

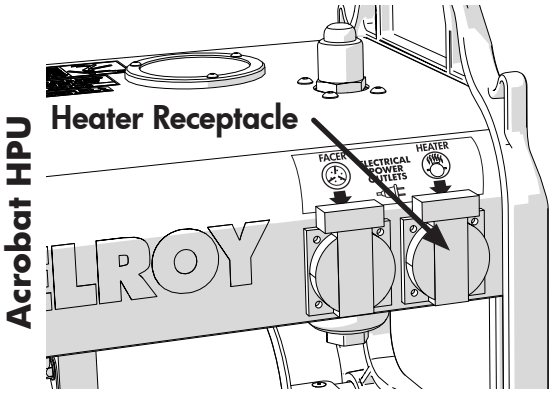
IMPORTANT: The HPU must be powered on for the heater receptacle to be enabled.

Allow heater to warm-up to operating temperature.

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



CD01383-10-5-15



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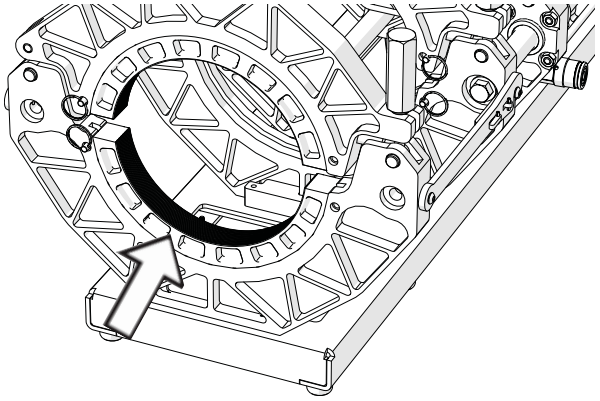
TX05211-02-16-17

Install Clamping Inserts

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



CD01395-10-5-15

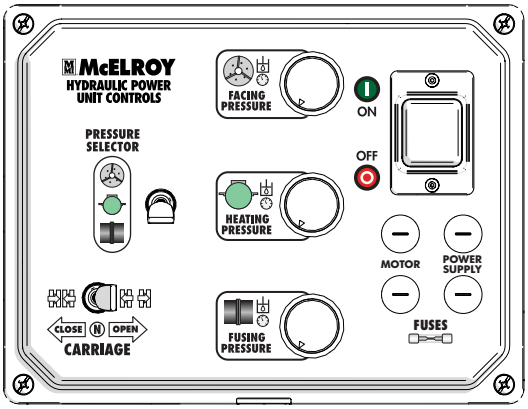
TX01310-4-1-97

Hydraulic Power Unit (HPU)

⚠ DANGER Electric motors are not explosion proof. Operation of these components in an explosive atmosphere will result in serious injury or death. Refer to Special Operation - Fusion in Explosive Atmosphere for safety precautions.

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

Turn on main power switch.



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TX04803-11-18-15

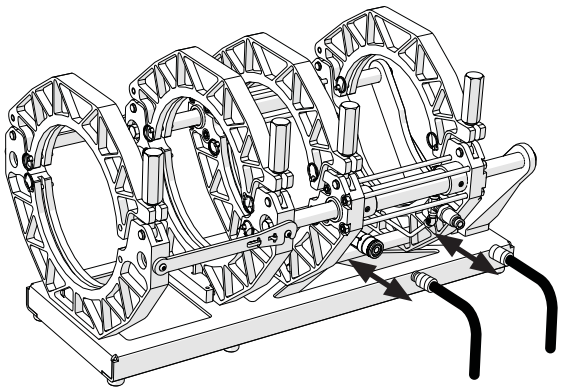
Connect HPU to Carriage Assembly

With HPU on, adjust carriage pressure to its minimum setting, then turn HPU off.

NOTICE: Always relieve hydraulic pressure before connecting/disconnecting quick disconnect (QD) fittings.

Connect QD fittings on HPU hoses to the carriage QD fittings.

Turn on main power switch.



CD01633-05-05-16

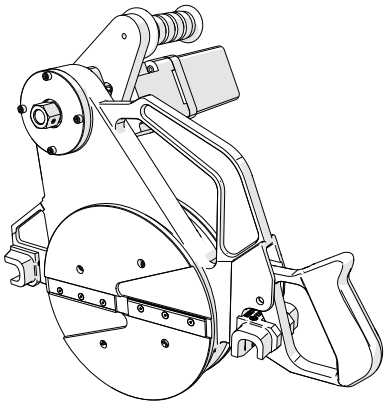
TX05042-05-05-16

Butt Fusion Procedure

Prepare Facer

⚠ 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. Refer to Special Operation - Fusion in Explosive Atmosphere for safety precautions.

Acrobat 315 facer cannot be used in an explosive atmosphere.

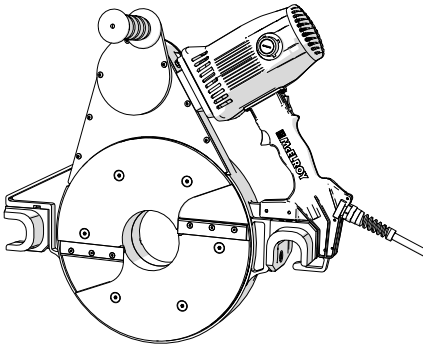


CD01370-10-5-15

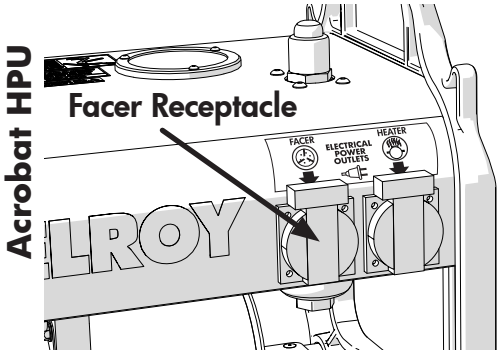
Ensure facer power switch is in the off position.

Plug facer to proper power source. For Acrobat HPUs equipped with electrical power receptacles, the facer may be plugged into its proper accessory receptacle on the HPU.

IMPORTANT: When the facer is on the heater receptacle will be disabled.



CD02125-12-13-17



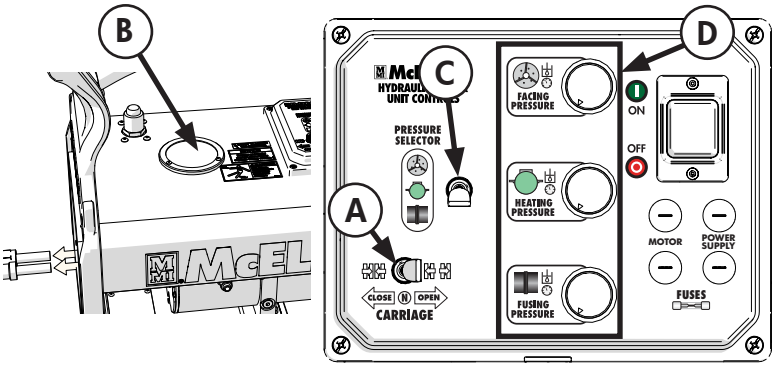
CD01943-02-07-17

TX05212-12-20-17

Hydraulic Pressure

The pressure gauge indicates the pressure at the carriage directional control. The pressure shown on the gauge is determined by the position of the pressure selector and the pressure setting of the selected pressure reducing knobs.

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



Acrobat HPU

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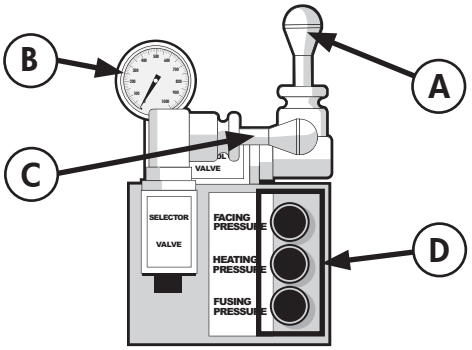


DynaMc EP HPU

CD01434-11-18-15

TX04805-05-05-16

Removing 3-Jaw Carriage (If Required)

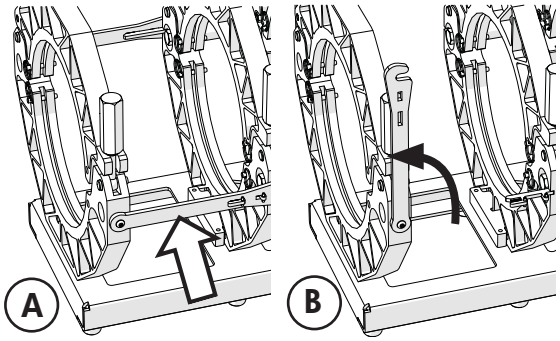
The 3-Jaw carriage can be removed from the base for close quarters fusion.

To remove the 3-Jaw carriage:

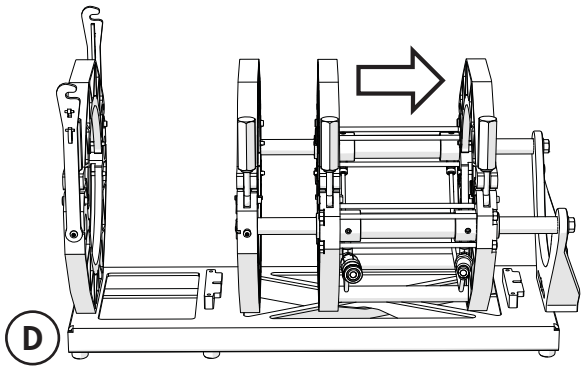
A) Actuate the release on the fixed jaw brace.

B) Rotate the fixed jaw brace away from the inner fixed jaw.

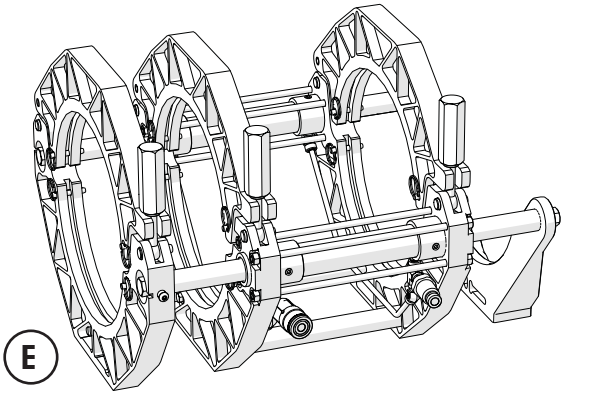
C) Repeat for the fixed jaw brace on the opposite side of the carriage.



D) Slide the 3-Jaw carriage away from the outer fixed jaw and away from the tabs holding the carriage.



E) The 3-Jaw carriage is ready to be used for fusion.

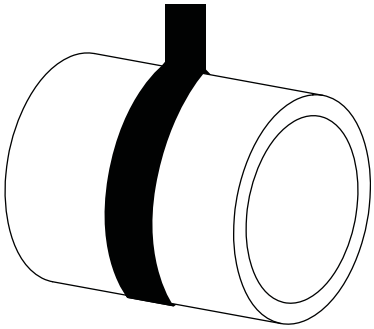


TX04689-05-05-16

Support Pipe

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

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



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TX04806-05-05-16

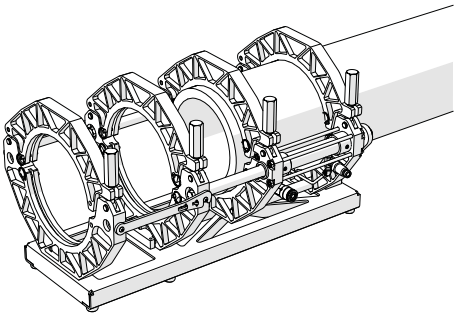
Loading Pipe Into Machine

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

Open the upper jaws and insert pipe in each pair of jaws with applicable inserts installed. Let the ends of the pipe protrude past the face of the jaws approximately 1" (25.4mm).

Insert the facer into place. With the carriage directional control, move the carriage toward the fixed jaws while watching the gap at each end of the facer stops. When the pipe is in contact with the facer, this gap indicates the amount of material that will be trimmed from the pipe end. Assure sufficient material will be removed for a complete face off.

NOTICE: Use a low pressure setting to avoid damaging the facer.



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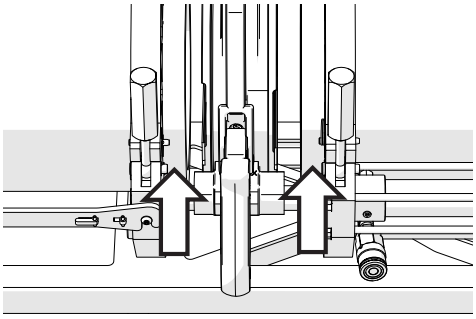


CD01376-10-5-15

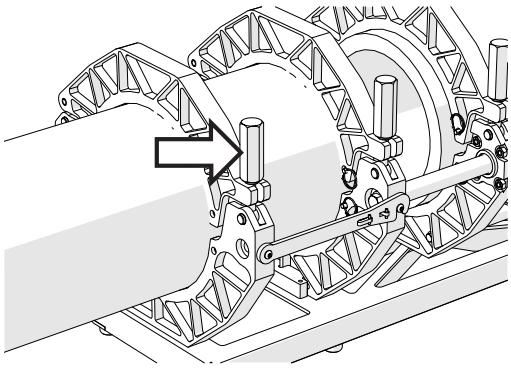
TX04807-05-05-16

Clamp the Pipe

Tighten the clamp knobs on the outside jaws to prevent pipe from slipping. Hand tighten the inside clamp knobs to allow for HI/LO adjustment.

The clamp knobs are equipped with a ball thrust bearing, which permit the operator to develop high clamp forces with minimal effort.

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



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TX04007-4-12-10

Butt Fusion Procedure

Begin Facing

Open the carriage and install the facer, ensuring the facer handle latches onto the carriage guide rod.

Turn on the facer.

Assure the pressure selector control is in the facing position.

Close the carriage.

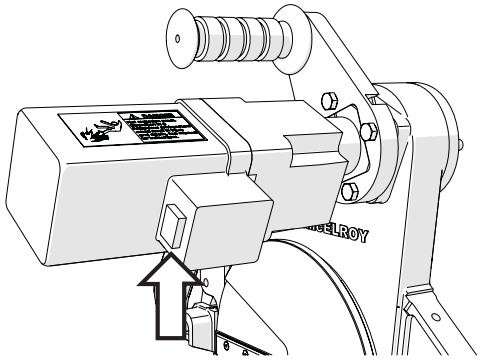
If the facer stalls, reduce the facing pressure so the facer continues to cut.

Continue facing until both jaws contact the facer stops on both sides.

Shift the carriage directional control to the neutral position.

Allow the facer to run for several revolutions to ensure that there are no chips hanging on the end of the pipe.

Turn facer off.



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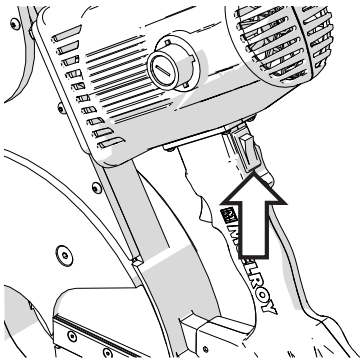

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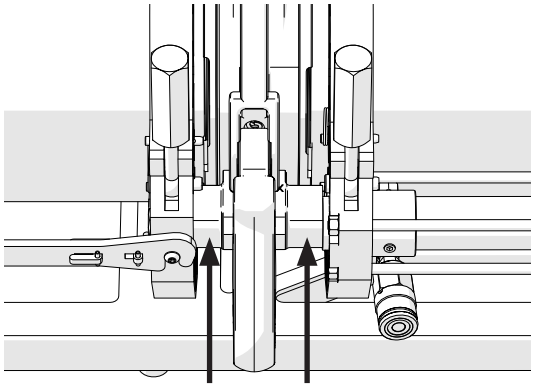


CD01378-10-5-15

Facer Stops

TX04808-05-05-16

After Facing

Ensure the facer has come to a complete stop.

Move the carriage directional control to the right to open the carriage.

Turn off the HPU.

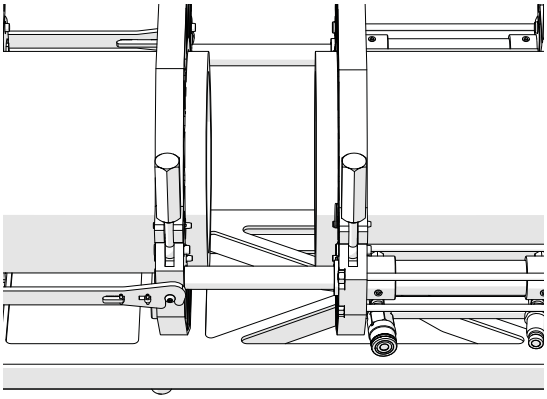
Release the handle lock, and lift the facer out.

Remove chips from pipe ends.

Do not touch faced pipe ends.

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

Turn on the HPU.



CD01338-10-5-15

TX04809-05-05-16

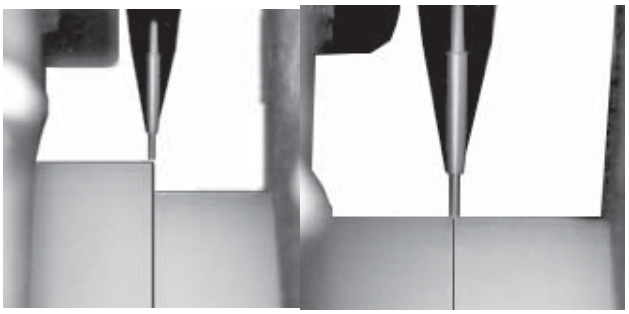
Butt Fusion Procedure

Check Alignment

Close the carriage until the ends of pipe butt together.

Check pipe joint for proper alignment.

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



PH00357-9-12-94 PH00366-9-12-94

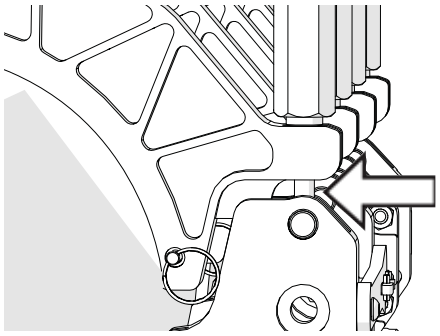
If pipe is not lined up, tighten the high side jaw to bring into alignment. Reinsert the facer and reface the pipe.

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

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

Ensure there is no unacceptable gap between the pipe ends. If there is an unacceptable gap, reinsert facer and reface.

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

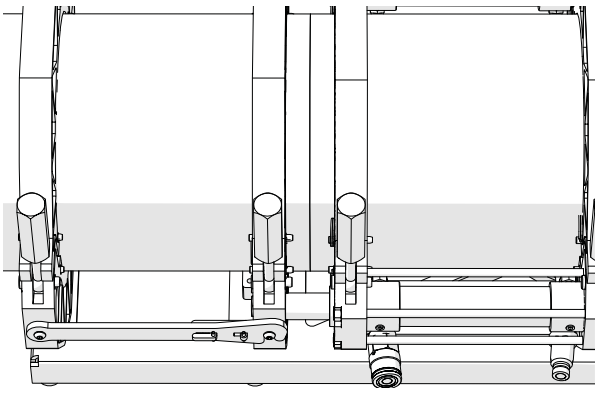


CD01339-10-5-15

TX04810-11-18-15

Check for Slippage

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



CD01340-10-5-15

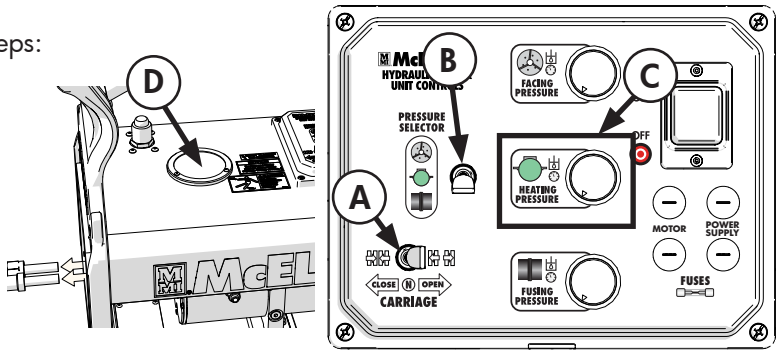
TX00971-5-31-96

Butt Fusion Procedure

Determine Drag Pressure

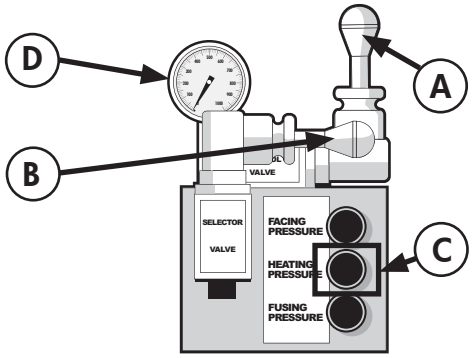
Determine drag pressure using the following steps:

1) Move the carriage so that the faced pipe ends are approximately 1" (25.4mm) apart.
2) Shift the carriage directional control to the middle (neutral) position (**A**).
3) Shift the pressure selector control (**B**) to the middle heating position, and adjust the heating pressure reducing knob (**C**) to its lowest pressure by turning the knob counterclockwise completely.



Acrobat HPU CD01889-02-01-17 CD01941-02-07-17

4) Shift the carriage directional control to the left (**A**).
5) Gradually increase the heating pressure by turning the knob clockwise slowly. Increase the pressure until the carriage just begins to move.
6) Quickly reduce the heating pressure knob counterclockwise until the carriage is just barely moving.
7) View pressure on carriage pressure gauge (**D**). Record this actual drag pressure.



DynaMc EP HPU CD1434-11-18-15

A - Carriage Directional Control
B - Pressure Selector Control
C - Heating Pressure Reducing Knob
D - Carriage Pressure Gauge

TX05040-05-05-16

Calculate 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.

PH04004-8-25-09

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.

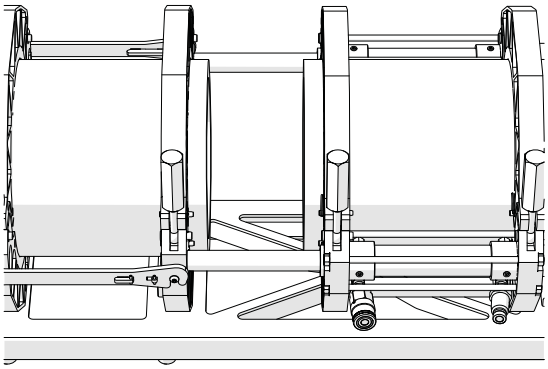
PH05505-04-18-16

TX04811-05-05-16

Position Carriage for Heater Insertion

Open the carriage until there is a gap large enough to insert the heater.

NOTICE: Do not open a gap too large as this could damage the heater stripper bar.



CD01338-10-5-15

TX04009-04-01-14

Check Heater Temperature

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

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

Check heater surface temperature with a pyrometer.

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

WR00077-4-16-93

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

The dial thermometer can be used as reference once the surface temperature has been verified and is never a substitute for actual surface temperature.

PH00420-11-1-94

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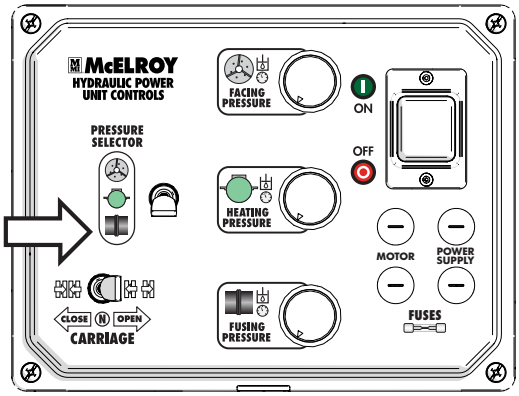
Select the Fusing Position

With the carriage directional control in the middle position, change the pressure selector to the fusing position.

Acrobat HPU



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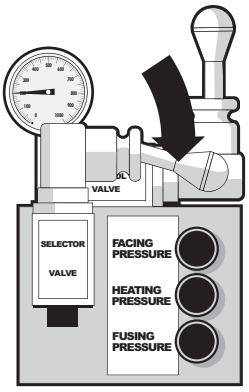
DynaMc EP HPU



CD01436-11-16-15

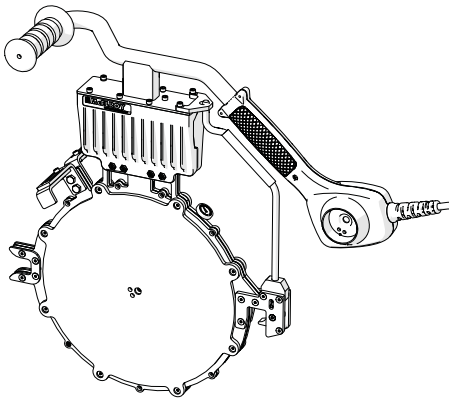
TX04812-05-05-16

Inserting Heater

DANGER The heater is not explosion proof. Operation of heater in an explosive atmosphere without necessary safety precautions will result in serious injury or death. Refer to Special Operation - Fusion in Explosive Atmosphere for safety precautions.

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

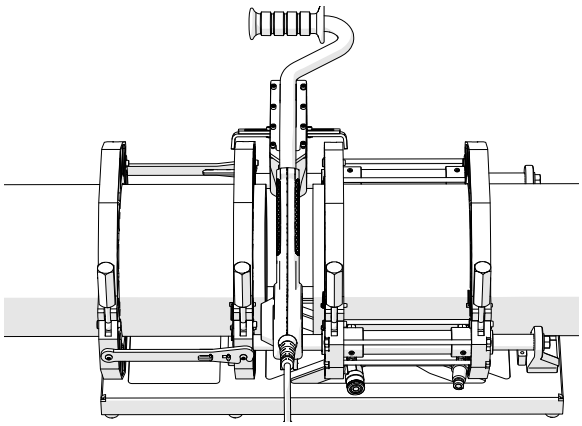
Insert heater between the pipe ends.



CD01379-10-5-15

Acrobat 250 and 315

Ensure the heater latch has locked onto the carriage guide rod.

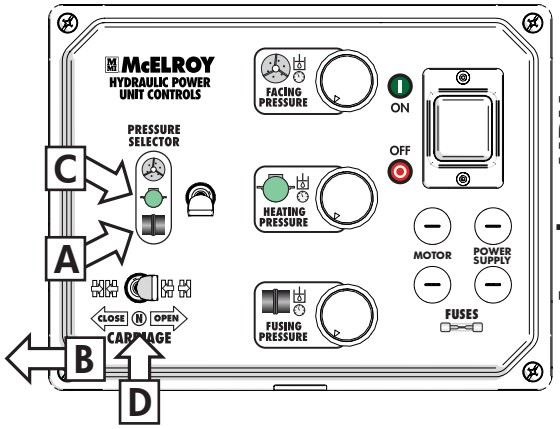


CD01381-10-5-15

TX04813-12-20-17

Heating the Pipe

1) Verify that the pressure selector control (**A**) is in the fusing position.
2) Close carriage (**B**) to bring pipe ends in contact with the heater.
3) Wait for manufacturer's recommended bead up.
4) After the proper bead-up, move pressure selector control to middle (heating mode) position (**C**) and wait for the gauge to drop to drag pressure.
5) If heating pressure is not required by pipe manufacturer's recommendation or appropriate joining standard, or opposing forces are not great enough to move the carriage away from the heater, shift the carriage directional control (**D**) to neutral.



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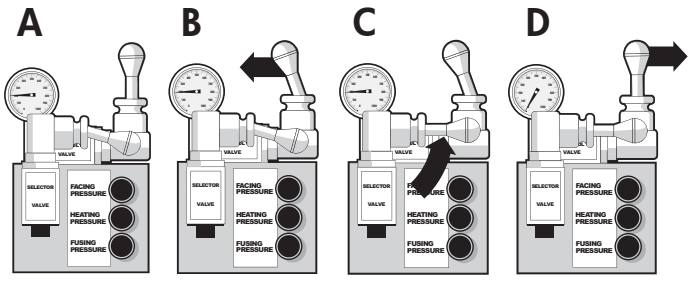


DynaMc EP HPU CD01435-11-16-15

TX04774-05-05-16

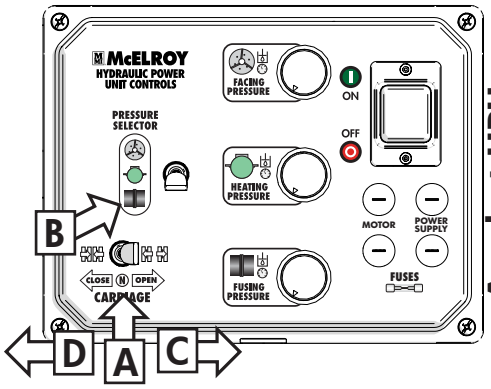
Fusing the Pipe

NOTICE: Failure to follow pipe manufacturer's fusion procedures may result in a questionable joint.

After following the pipe manufacturer's suggested heating procedure:

A) Shift carriage directional control to neutral position, if it is not already in that position.

B) Shift the pressure selector to fusing position.



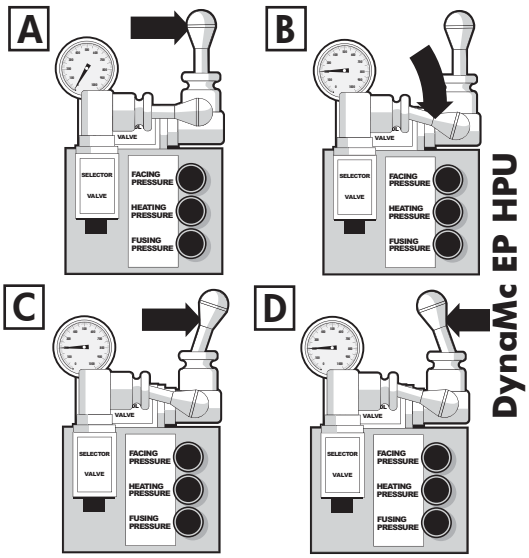
CD01892-12-07-16

C) Open the carriage just enough to remove the heater.

Quickly remove the heater. Inspect pipe ends for appropriate melt.

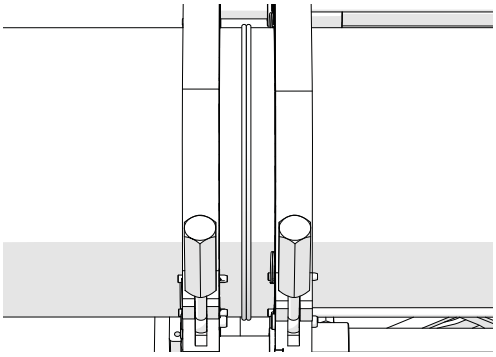
Acrobat 250 and 315: Quickly remove the heater by grabbing the heater latch and pulling it into the handle of the heater to release from the guide rod. Inspect pipe ends for appropriate melt.

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



CD01437-11-16-15

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



CD01341-10-5-15

TX04814-

Butt Fusion Procedure

Opening Jaws

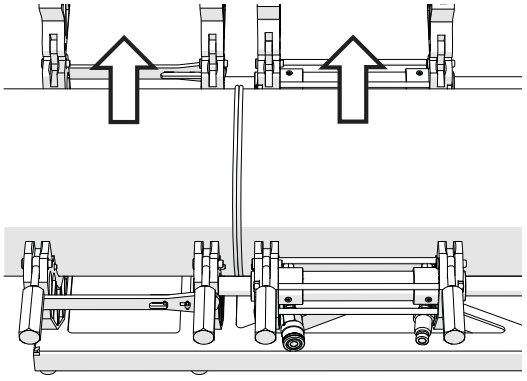
After the joint has cooled for the pipe manufacturer's recommended time or appropriate joining standard, shift the carriage directional control to the neutral position.

Turn off HPU.

Loosen all clamp knobs. Turn on HPU and open the carriage.

Open all of the jaws.

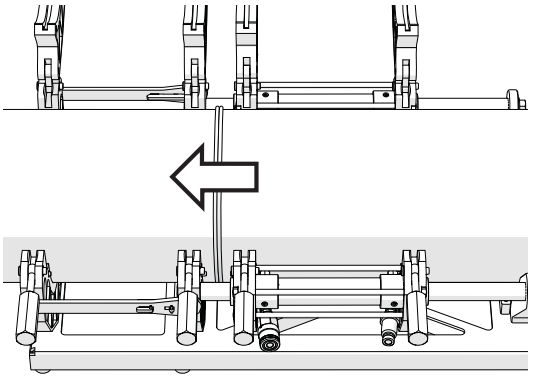
TX04815-05-05-16



Position Pipe for Next Joint

Move the fusion machine to end of pipe, or pull the pipe through the jaws until the end of the pipe is protruding approximately 1" (25.4mm) past the fixed jaw.

TX04816-12-01-15

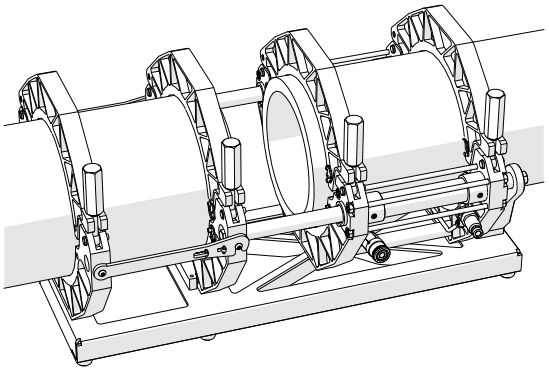


Install Next Piece of Pipe

Open the carriage completely.

Insert a new piece of pipe in movable jaws and repeat all previous steps in the procedures.

TX04817-11-18-15

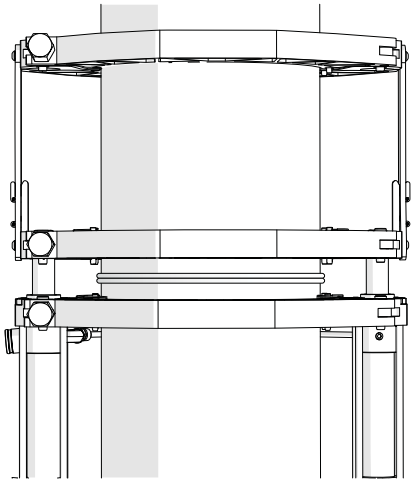


Special Operations - Vertical Fusion (Movable Pipe Below)

Vertical Fusion

The Acrobat fusion machines can be used to fuse pipes in a vertical position using the 4-Jaw or 3-Jaw carriage.

The vertical fusion with the movable pipe below is the recommended method for performing vertical fusions.



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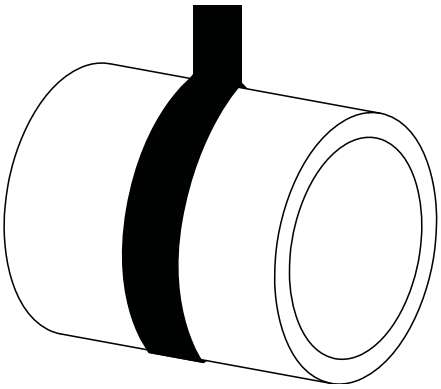
TX04818-05-05-16

Support Pipe

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

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



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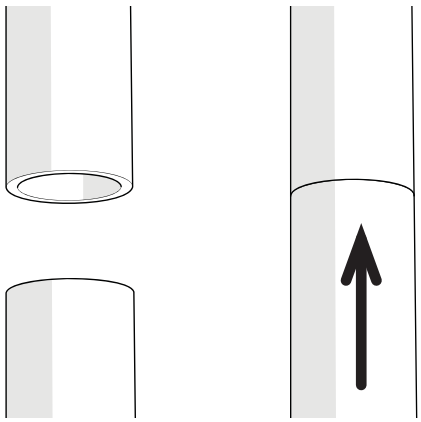
TX04819-05-05-16

Attach Carriage to Pipe

Position the pipe to be fused below the fixed pipe.

Relieve pressure in the system. Turn off HPU. Disconnect hoses from the carriage.

⚠WARNING Disconnect carriage from HPU before attaching carriage to pipe. Carriage is operated remotely and remote operation could result in minor to moderate injury.

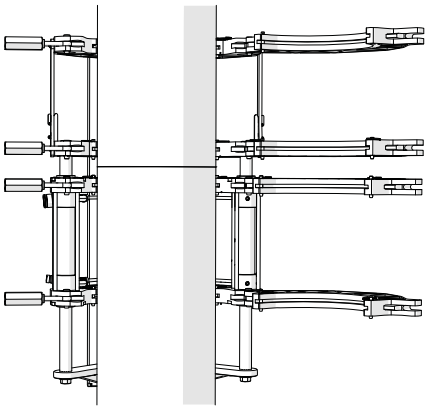


CD01182-03-12-14

CD01183-03-12-14

Position carriage assembly around the pipes with the fixed jaws positioned around the top pipe.

The top jaws of the carriage can be removed to help with positioning the carriage into position. Once the carriage is around the pipes, reinstall the top jaws to the carriage.



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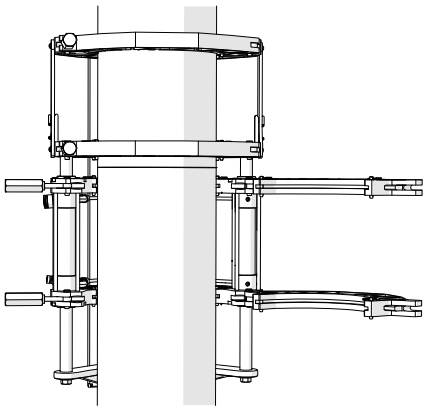
Close the fixed jaws on the pipe. Allow approximately 1" (25.4mm) of pipe to protrude from the fixed jaws for proper face off. Tighten the clamp knobs on the fixed jaws.

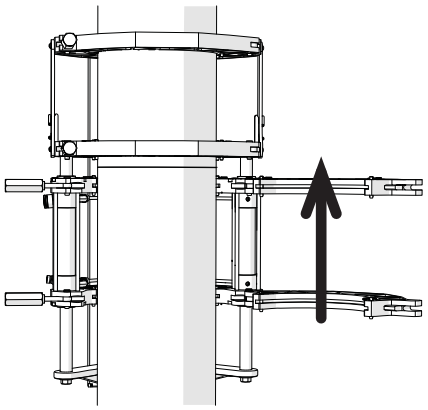


CD01348-10-5-15

With the HPU off, connect the hydraulic hoses to the carriage. Ensure the carriage control is in the neutral position.

Turn on the HPU.

Use the carriage directional control to slowly close the carriage. Allow the carriage to close until there is approximately 1" (25.4mm) of pipe protruding from the movable jaws.



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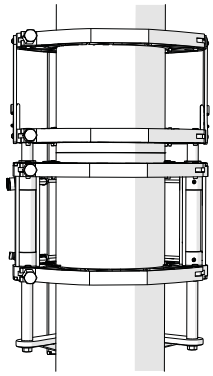
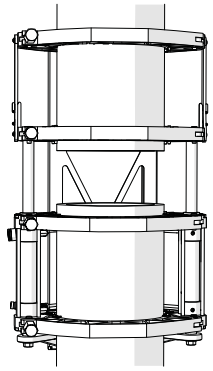
Attach Carriage to Pipe (continued)

Stop the carriage and close the movable jaws on the pipe. Tighten the clamp knobs on the movable jaws.



CD01349-10-5-15

Open the carriage.

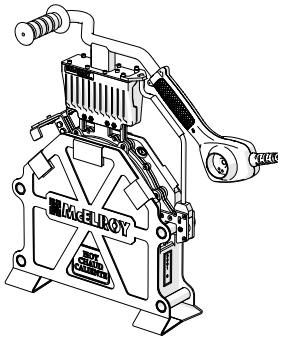


CD01350-10-5-15

TX04820-05-05-16

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. Refer to Special Operation - Fusion in Explosive Atmosphere for safety precautions.



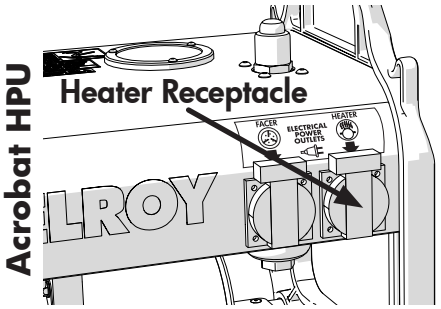
CD01383-10-5-15

Install butt fusion heater plates.

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

Place heater in insulated heater stand.

Plug heater into a proper power source. For Acrobat HPUs equipped with electrical power receptacles, the heater may be plugged into its proper accessory receptacle on the HPU.



CD01943-02-07-17

IMPORTANT: The HPU must be powered on for the heater receptacle to be enabled.

Allow heater to warm-up to operating temperature.

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

PH00420-11-1-94

TX05211-02-16-17

Special Operations - Vertical Fusion (Movable Pipe Below)

Begin Facing

Ensure the carriage is open.

Insert the facer, ensuring the facer handle latches onto the carriage guide rod.

Turn on the facer.

Assure the pressure selector control is in the facing position.

Move the carriage directional control to close the carriage.

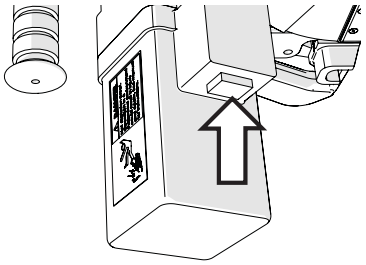
If the facer stalls, adjust the facing pressure so the facer continues to cut.

Continue facing until both jaws contact the facer stops on both sides.

Shift the carriage directional control to the neutral position.

Allow the facer to run for several revolutions to ensure that there are no chips hanging on the end of the pipe.

Turn facer off.



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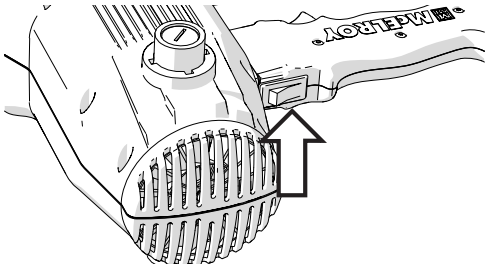

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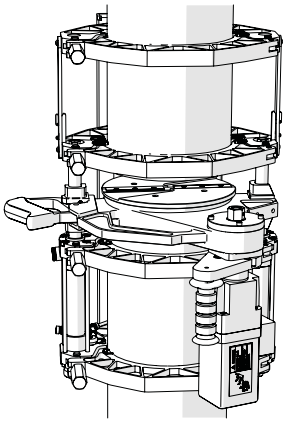

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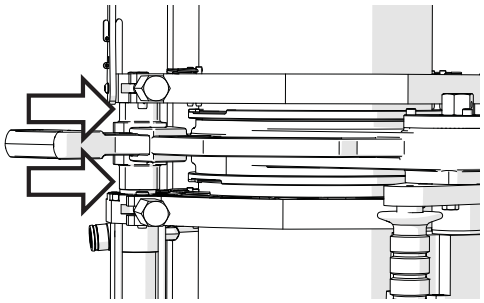


CD01352-10-5-15

TX04822-05-05-16

After Facing

Ensure facer has come to a complete stop.

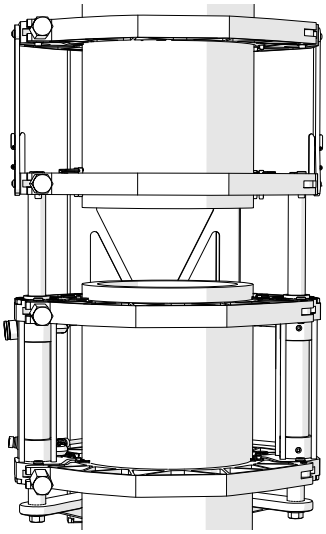
Open the carriage.

Release the handle latch, and lift the facer out.

Remove chips from pipe ends using a clean dry lint free non-synthetic cloth.

Do not touch faced pipe ends with hands.

Inspect both pipe ends for complete face off. If the face off is incomplete, return to **Attach Carriage to Pipe**.



CD01353-10-5-15

TX04823-11-18-15

Check Alignment

Move the carriage until ends of pipe butt together.

Check pipe joint for proper alignment.

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

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

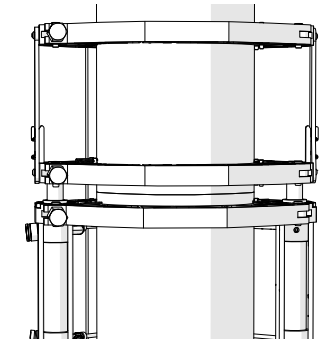
IMPORTANT: Always tighten the side that is higher, never loosen the low side.

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

Ensure there is no unacceptable gap between the pipe ends. If there is an unacceptable gap or if the clamp knobs were tighten, insert facer and reface.

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

TX04824-11-18-15



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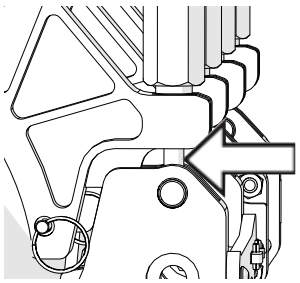


CD01339-10-5-15

Set Hydraulic Pressures

The weight of the bottom pipe will be pulling down on the carriage. This extra force must be taken into account when setting pressures for vertical fusion.

Set Heating (Drag) Pressure:

1) Open carriage so pipe ends are approximately 2" (50.8mm) apart.
2) Shift pressure selector to heating (drag) pressure.
3) Turn the heating pressure reducing knob to its lowest setting.
4) Move carriage directional control to the close position.
5) Turn the pressure reducing knob up until the carriage starts moving then back off until the carriage stops.
6) Repeat steps 1-5 to confirm heating (drag) pressure.

The heating pressure will represent the same as drag pressure on a horizontal fusion.

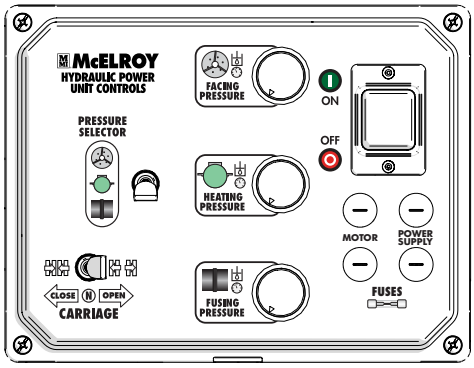
NOTICE: Setting the proper heating (drag) pressure will prevent the carriage from moving away or moving toward the fusion joint resulting in a improperly made fusion joint.

Set Fusing Pressure: To calculate the vertical fusion pressure, calculate the theoretical fusion pressure and add the heating pressure. The heating pressure must be added or the weight of the pipe will pull the carriage away from the fusion joint.

Vertical Fusion Pressure = Theoretical Fusion Pressure + Heating (Drag) Pressure.

TX04825-05-05-16

Acrobat HPU



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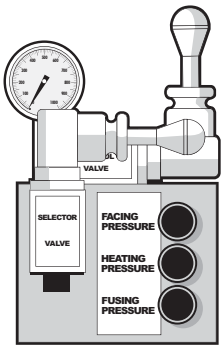
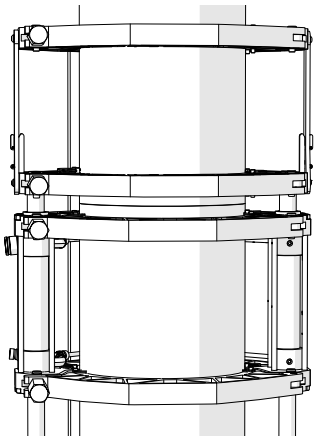
DynaMc EP HPU



CD01434-11-18-15

Check for Slippage

Bring the pipe ends together under fusion pressure to check for slippage. If slippage occurs, return to **Attach Carriage to Pipe**.



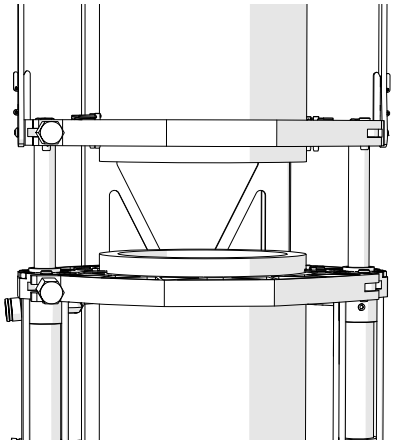
CD01354-10-5-15

TX00971-5-31-96

Position Carriage for Heater Insertion

Open the carriage until there is approximately a 2 1/2" (63.5mm) gap for inserting the heater.

NOTICE: Do not open a gap too large as this could damage the heater stripper bar.



CD01353-10-5-15

TX04833-11-18-15

Check Heater Temperature

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

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

Check heater surface temperature with a pyrometer.

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

WR00077-4-16-93

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

The dial thermometer can be used as reference once the surface temperature has been verified and is never a substitute for actual surface temperature.

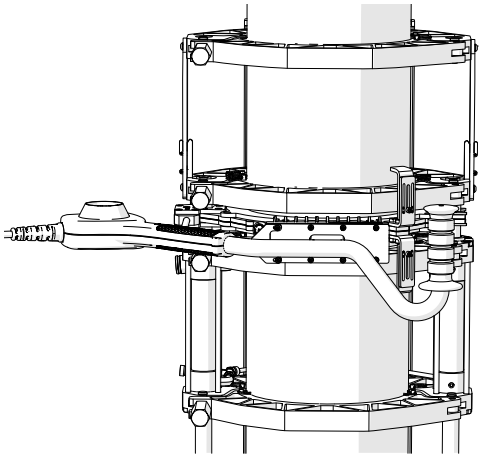
PH00420-11-1-94

TX04011-4-12-10

Inserting Heater

⚠ DANGER The heater is not explosion proof. Operation of heater in an explosive atmosphere without necessary safety precautions will result in serious injury or death. Refer to Special Operation - Fusion in Explosive Atmosphere for safety precautions.

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



CD01384-10-5-15

Place the heater between the two pipe ends.

Acrobat 250 and 315

Ensure the heater latch locks onto the carriage guide rod.

TX04826-12-21-17

Heating the Pipe

A) Verify that the pressure selector control is in the fusing position.

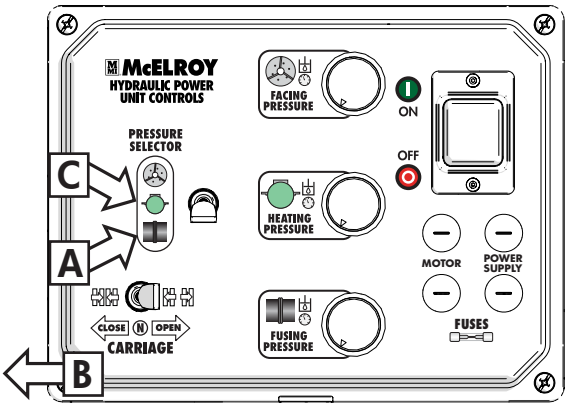
B) Close the carriage to bring pipe ends in contact with the heater. Allow for bead-up according to pipe manufacturer's or appropriate joining standard recommendations.

Ensure the heater stays perpendicular to the pipe by supporting the heater during the heating process.

C) After proper bead-up, move pressure selector control to middle (heating mode) position and leave the carriage directional control in the closed position.

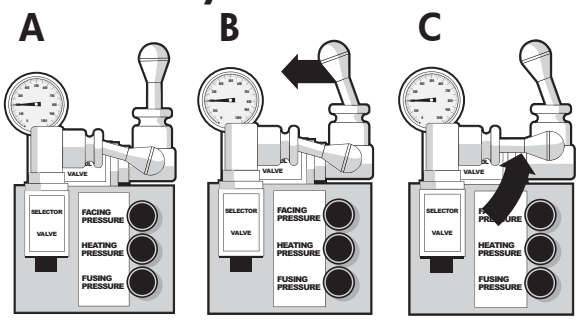
NOTICE: Ensure that the pipe remains in contact with heater throughout the entire process. If the pipe loses contact with the heater, abort the joint and go to "Attach Carriage to Pipe".

Acrobat HPU

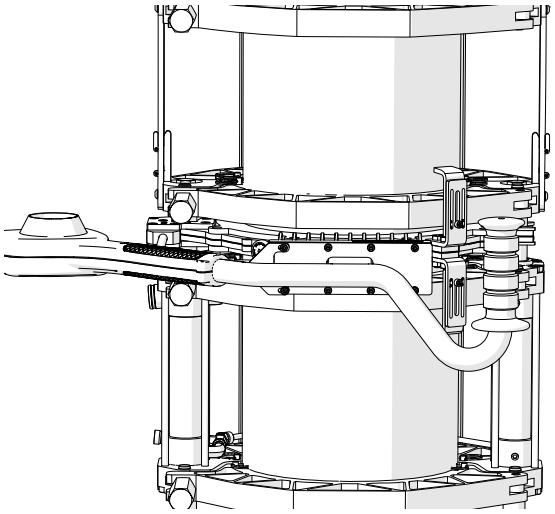


CD01892-1207-16

DynaMc EP HPU



CD01435-11-16-15



CD01384-10-5-15

TX04827-05-05-16

Fusing the Pipe

NOTICE: Failure to follow pipe manufacturer's fusion procedures may result in a questionable joint.

After following the pipe manufacturer's suggested heating procedure:

A) Shift the carriage directional control to the neutral position.

B) Shift the pressure selector to fusing position.

C) Open the carriage just enough to remove the heater.

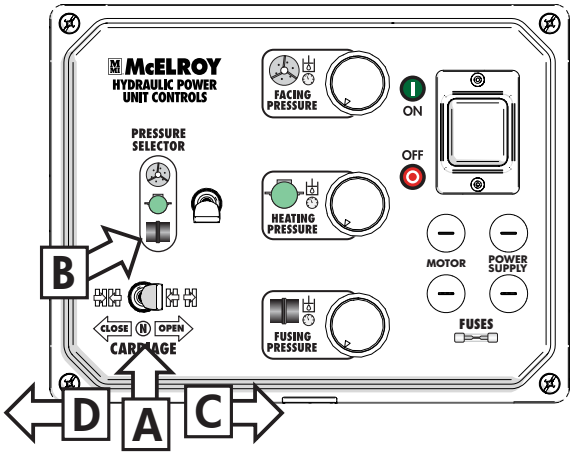
Quickly remove the heater. Inspect pipe ends for appropriate melt.

Acrobat 250 and 315: Quickly remove the heater by grabbing the heater latch and pulling it into the handle of the heater to release from the guide rod. Inspect pipe ends for appropriate melt.

D) Quickly close the carriage, bringing the pipe ends together under the vertical fusion pressure.

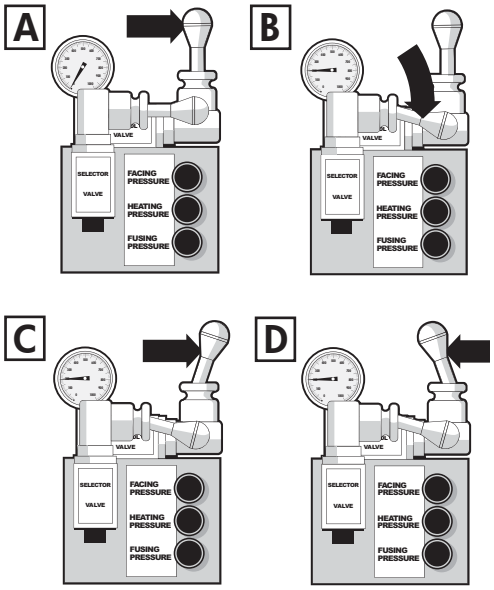
Allow joint to cool under pressure according to pipe manufacturer's or appropriate joining standard's recommendations.

Acrobat HPU

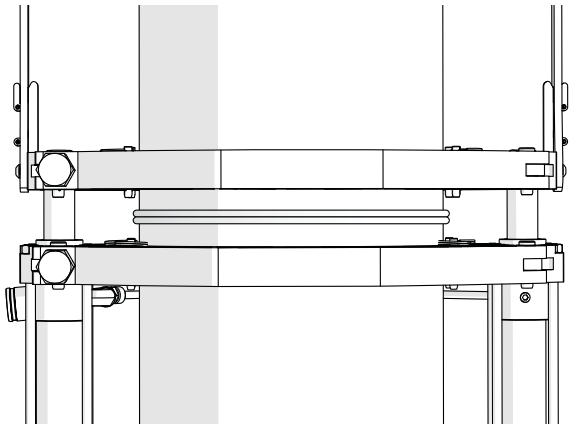


CD01892-12-07-16

DynaMc EP HPU



CD01436-11-16-15 CD01437-11-16-15



CD01382-10-5-15

TX04828-12-21-17

Opening Jaws

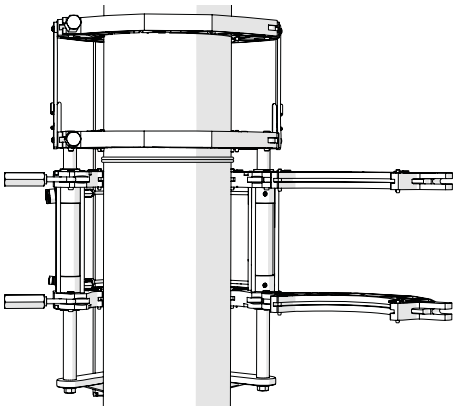
After the joint has cooled for the pipe manufacturer's or appropriate joining standard recommended time, shift the carriage directional control to the neutral position.

Relieve hydraulic pressure in the carriage by turning fusing pressure reducing knob to its minimum setting.

Turn off the HPU.

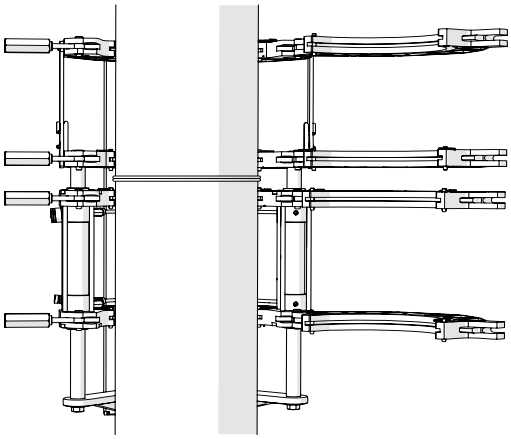
Disconnect the hydraulic hoses from the carriage.

Loosen the clamp knobs on movable jaws and open the jaws.



CD01385-10-5-15

Support the carriage and loosen the clamp knobs on the fixed jaws and open the jaws.



CD01386-10-5-15

Rotate the carriage out from around the pipe.

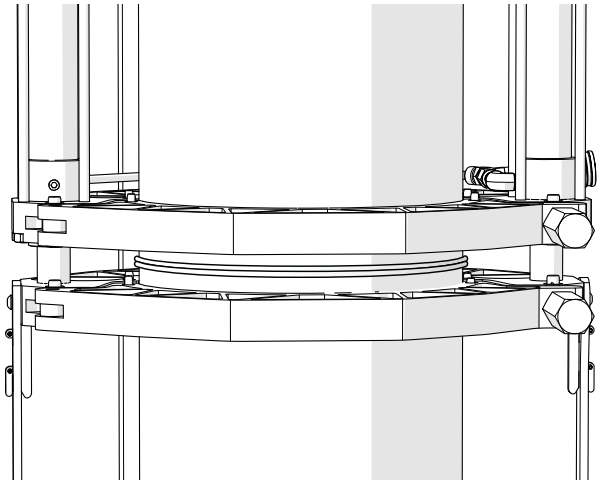
The upper jaws may need to be removed to remove the carriage from the pipe.

TX04829-05-05-16

Special Operations - Vertical Fusion (Movable Pipe Above)

Vertical Fusion

The Acrobat fusion machines can be used to fuse pipes in a vertical position using the 4-Jaw or 3-Jaw carriage.



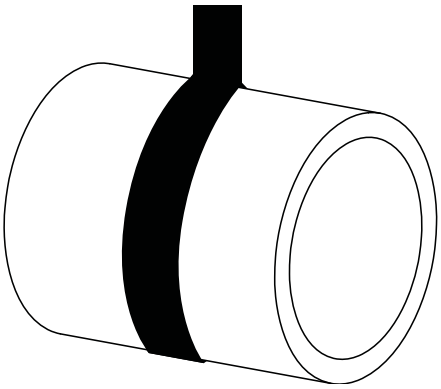
CD01387-10-5-15

TX04830-05-05-16

Support Pipe

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

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



CD01033-8-29-12

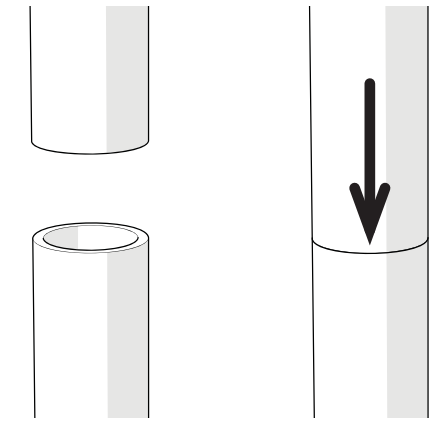
TX04819-05-05-16

Attach Carriage to Pipe

Position the pipe to be fused on top of the fixed pipe.

Relieve pressure in the system. Turn off HPU. Disconnect hoses from the carriage.

⚠WARNING Disconnect carriage from HPU before attaching carriage to pipe. Carriage is operated remotely and remote operation could result in minor to moderate injury could occur.

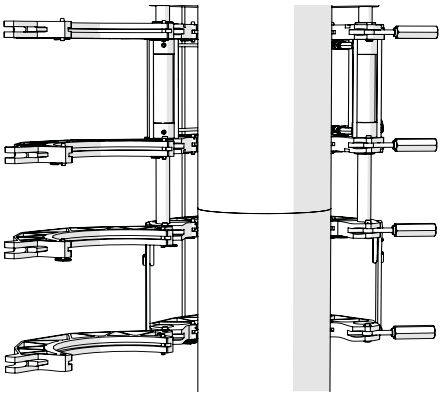


CD01182-03-12-14

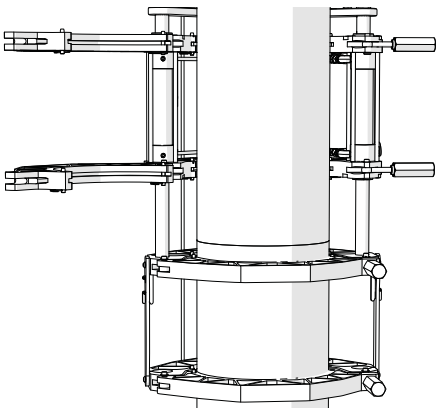
CD01183-03-12-14

Position carriage assembly around the pipes with the fixed jaws positioned around the bottom pipe.

The top jaws of the carriage can be removed to help with positioning the carriage into position. Once the carriage is around the pipes, reinstall the top jaws to the carriage.



CD01356-10-5-15



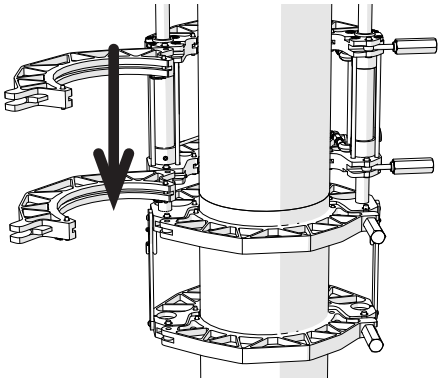
CD01357-10-5-15

Close the fixed jaws on the pipe. Allow approximately 1" (25.4mm) of pipe to protrude from the fixed jaws for proper face off. Tighten the clamp knobs on the fixed jaws.

With the HPU off, connect the hydraulic hoses to the carriage. Ensure the carriage directional control is the neutral position.

Turn on the HPU.

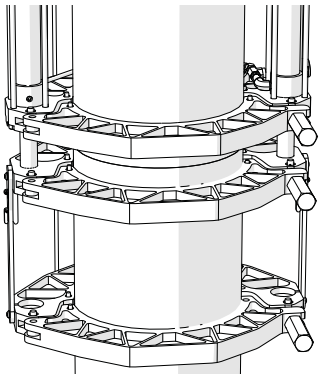
Use the carriage directional control to slowly close the carriage. Allow the carriage to lower until there is approximately 1" (25.4mm) of pipe protruding from the movable jaws.



CD01388-10-5-15

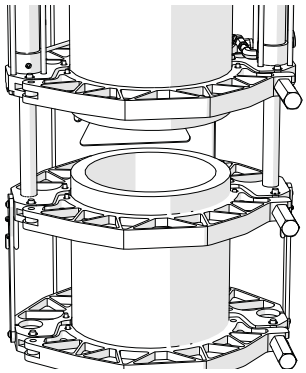
Attach Carriage to Pipe (continued)

Stop the carriage and close the movable jaws on the pipe. Tighten the clamp knobs on the movable jaws.



CD01358-10-5-15

Open the carriage.

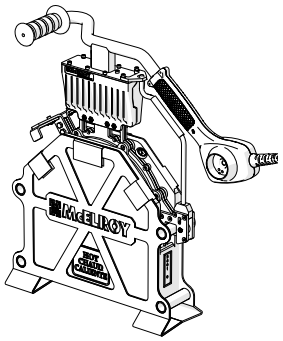


CD01359-10-5-15

TX04831-05-05-16

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. Refer to Special Operation - Fusion in Explosive Atmosphere for safety precautions.



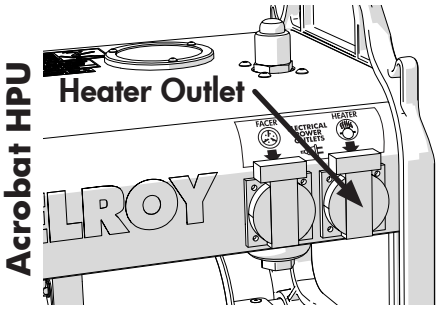
CD01383-10-5-15

Install butt fusion heater plates.

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

Place heater in insulated heater stand.

Plug heater into a proper power source. For Acrobat HPUs equipped with electrical power receptacles, the heater may be plugged into its proper accessory receptacle on the HPU.



CD01943-02-07-17

IMPORTANT: The HPU must be powered on for the heater receptacle to be enabled.

Allow heater to warm-up to operating temperature.

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

PH00420-11-1-94

TX05211-02-16-17

Special Operations - Vertical Fusion (Movable Pipe Above)

Begin Facing

Ensure the carriage is open.

Insert the facer, ensuring the facer handle latches onto the carriage guide rod.

Turn on the facer.

Assure the pressure selector control is in the facing position.

Move the carriage directional control to close the carriage.

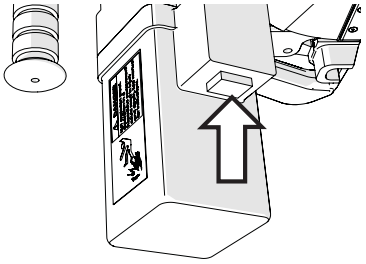
If the facer stalls, adjust the facing pressure so the facer continues to cut.

Continue facing until both jaws contact the facer stops on both sides.

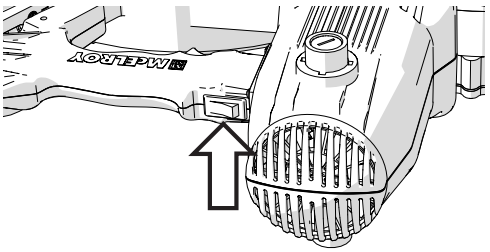
Shift the carriage directional control to the neutral position.

Allow the facer to run for several revolutions to ensure that there are no chips hanging on the end of the pipe.

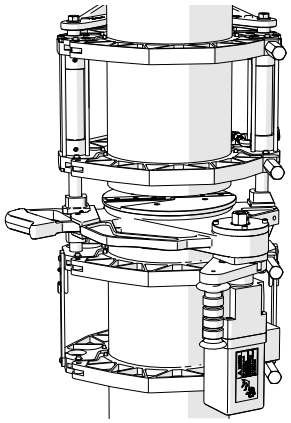
Turn facer off.



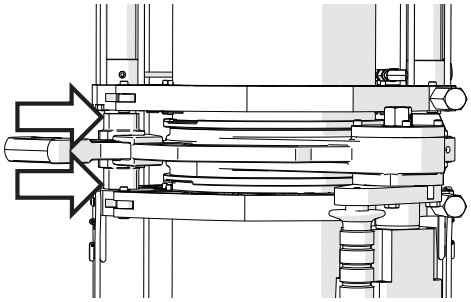
CD01372-10-5-15



CD02322-06-20-18



CD01389-10-5-15



CD01360-10-5-15

TX04822-05-05-16

After Facing

Ensure facer has come to a complete stop.

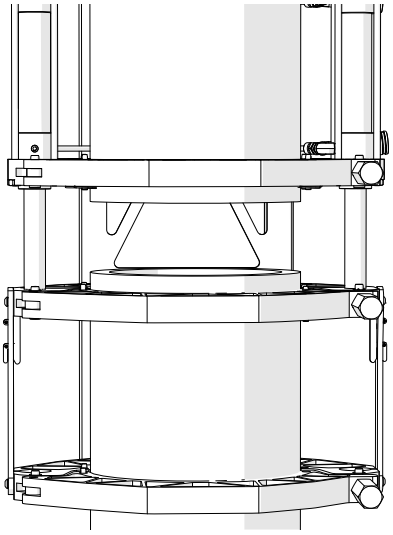
Open the carriage.

Release the handle latch, and lift the facer out.

Remove chips from pipe ends using a clean lint free non-synthetic cloth.

Do not touch faced pipe ends with hands.

Inspect both pipe ends for complete face off. If the face off is incomplete, return to **Attach Carriage to Pipe**.



CD01361-10-5-15

TX04823-11-18-15

Check Alignment

Move the carriage until ends of pipe butt together.

Check pipe joint for proper alignment.

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

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

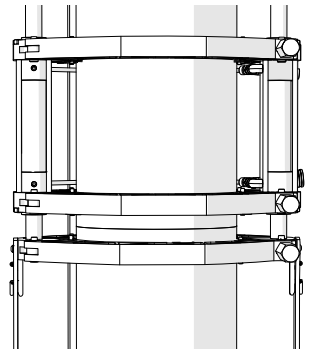
IMPORTANT: Always tighten the side that is higher, never loosen the low side.

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

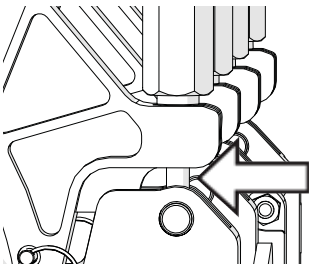
Ensure there is no unacceptable gap between the pipe ends. If there is an unacceptable gap or if the clamp knobs were tighten, insert facer and reface.

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

TX04824-11-18-15



CD01390-10-5-15



CD01339-10-5-15

Set Hydraulic Pressures

The weight of the top pipe will be pushing down on the carriage. This extra force must be taken into account when setting pressures for vertical fusion.

Set Heating (Drag) Pressure:

1) Close the carriage.
2) Shift pressure selector control to heating (drag) pressure.
3) Adjust the heating pressure reducing knob to its lowest setting.
4) Move the carriage directional control to open position.
5) Adjust the pressure reducing knob until the carriage moves up, then adjust down until the carriage stops. Then adjust the pressure reducing knob down until the carriage moves down, then adjust up until the carriage stops.
6) Repeat steps 1-5 to verify the heating (drag) pressure.

The heating pressure will represent the same as drag pressure on a horizontal fusion.

NOTICE: Setting the proper heating (drag) pressure will prevent the carriage from moving away or moving toward the fusion joint resulting in a improperly made fusion joint.

Set Facing Pressure: Turn the facing pressure reducing knob up until the carriage can lift the pipe quickly (facing pressure will be higher than heating pressure).

Set Fusing Pressure: To calculate the vertical fusion pressure, calculate the theoretical fusion pressure and subtract the heating pressure. The heating pressure must be subtracted or the weight of the pipe will apply too much force and squeeze out the melt.

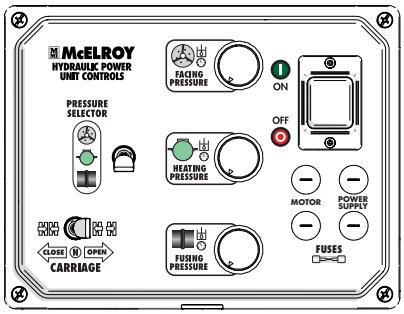
Set fusing pressure to the absolute value of the calculation.

Vertical Fusion Pressure = Theoretical Fusion Pressure - Heating (Drag) Pressure.

IMPORTANT: Follow the appropriate heating and fusing procedure based on either a positive or negative vertical fusion pressure calculation.

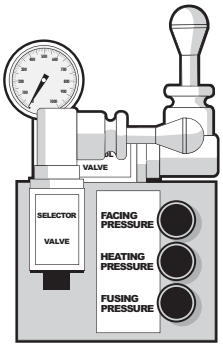
TX04832-05-05-16

Acrobat HPU



CD01892-12-07-16

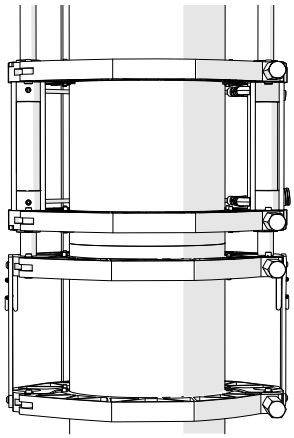
DynaMc EP HPU



CD01434-11-18-15

Check for Slippage

Bring the pipe ends together under fusion pressure to check for slippage. If slippage occurs, return to **Attach Carriage to Pipe**.



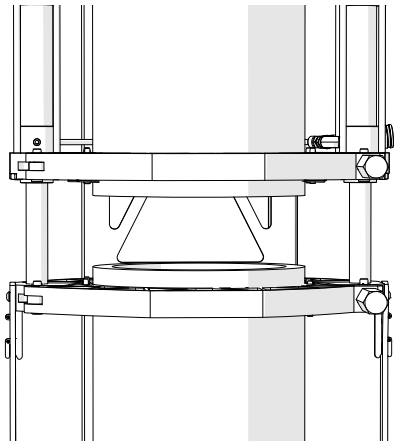
CD01390-10-5-15

TX00971-5-31-96

Position Carriage for Heater Insertion

Open the carriage until there is approximately a 2 1/2" (63.5mm) gap for inserting the heater.

NOTICE: Do not open a gap too large as this could damage the heater stripper bar.



CD01361-10-5-15

TX04833-11-18-15

Check Heater Temperature

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

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

Check heater surface temperature with a pyrometer.

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

WR00077-4-16-93

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

The dial thermometer can be used as reference once the surface temperature has been verified and is never a substitute for actual surface temperature.

PH00420-11-1-94

TX04011-4-12-10

Inserting Heater

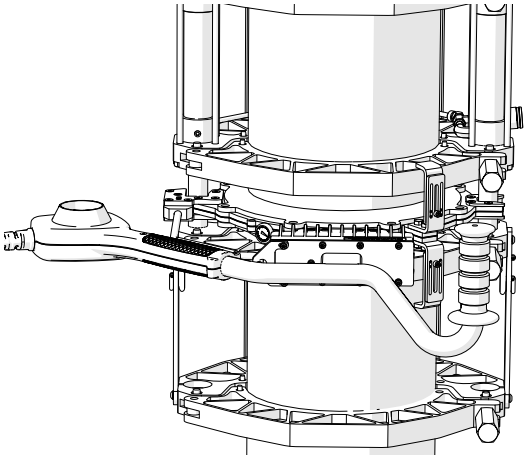
⚠ DANGER The heater is not explosion proof. Operation of heater in an explosive atmosphere without necessary safety precautions will result in serious injury or death. Refer to Special Operation - Fusion in Explosive Atmosphere for safety precautions.

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

Place the heater between the two pipe ends.

Acrobat 250 and 315

Ensure the heater latch locks onto the carriage guide rod.



CD01392-10-5-15

TX04826-12-21-17

Heating the Pipe (Positive Vertical Fusion Pressure)

A) Verify that the pressure selector control is in the fusing position.

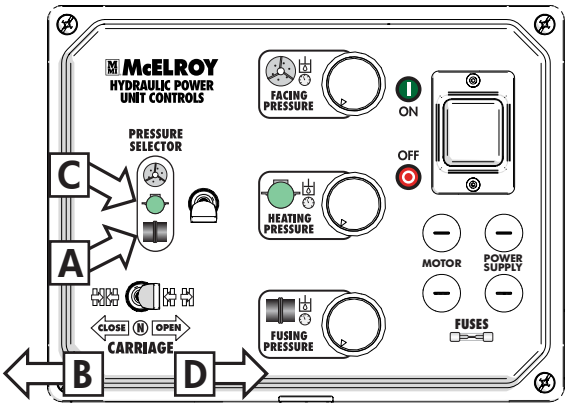
B) Close the carriage to bring pipe ends in contact with the heater. Allow for bead-up according to pipe manufacturer's or appropriate joining standard recommendation.

Ensure the heater stays perpendicular to the pipe by supporting the heater during the heating process.

C) After the proper bead-up, move pressure selector control to middle (heating mode) position and shift the carriage directional control to the open position (**D**).

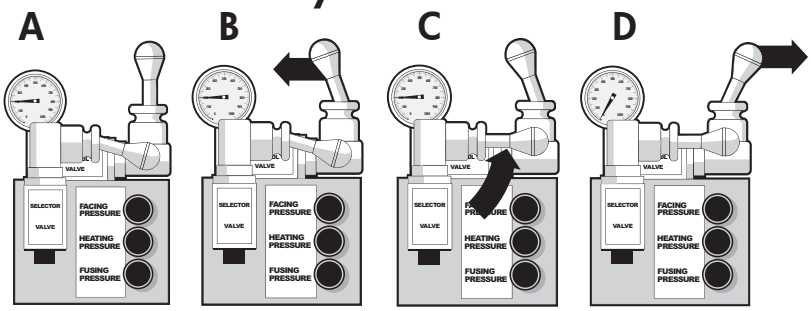
NOTICE: Ensure that the pipe remains in contact with heater throughout the entire process. If the pipe loses contact with the heater, abort the joint and go to "Attach Carriage to Pipe".

Acrobat HPU

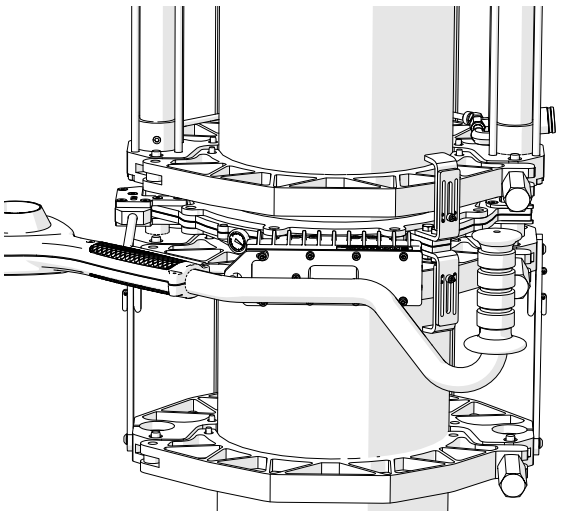


CD01892-12-07-16

DynaMc EP HPU



CD01635-05-11-16



CD01391-10-5-15

TX04834-05-05-16

Fusing the Pipe (Positive Vertical Fusion Pressure)

NOTICE: Failure to follow pipe manufacturer's fusion procedures may result in a questionable joint.

After following the pipe manufacturer's suggested heating procedure:

A) Shift the carriage directional control to neutral position.

B) Shift the pressure selector to the facing position.

C) Open the carriage just enough to remove the heater.

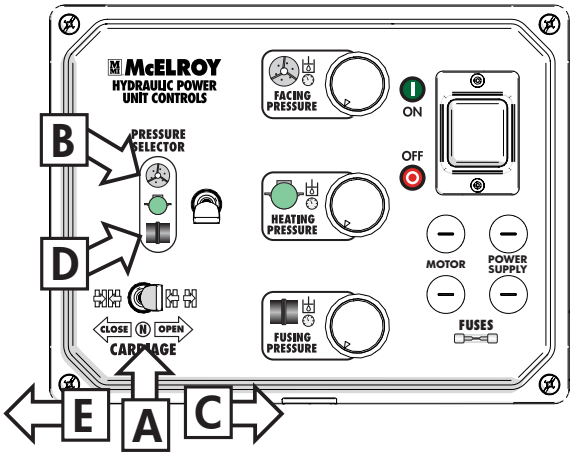
Quickly remove the heater. Inspect pipe ends for appropriate melt.

Acrobat 250 and 315: Quickly remove the heater by grabbing the heater latch and pulling it into the handle of the heater to release from the guide rod. Inspect pipe ends for appropriate melt.

D) Shift the pressure selector control to fusing pressure.

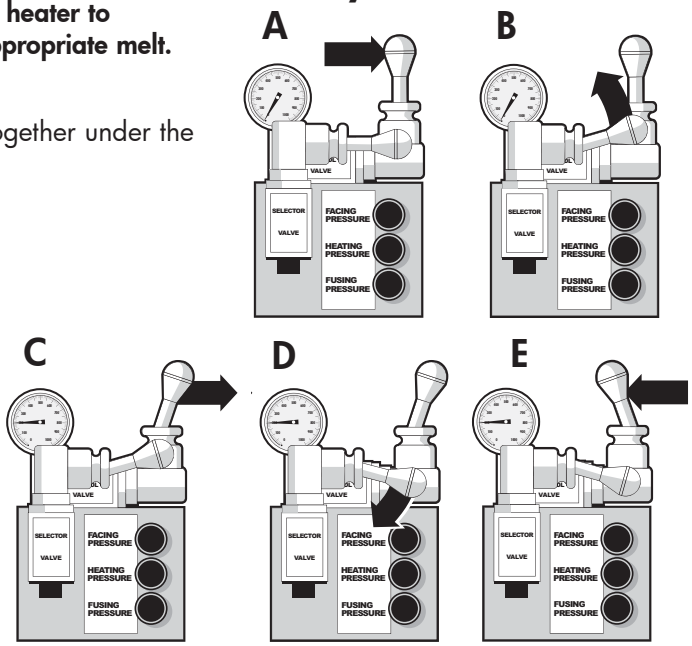
E) Quickly close the carriage, bringing the pipe ends together under the vertical fusion pressure.

Acrobat HPU



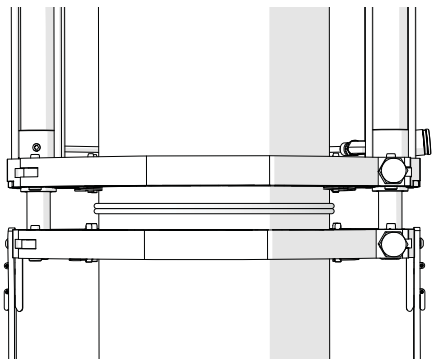
CD01892-12-07-16

DynaMc EP HPU



CD01438-11-18-15

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



CD01382-10-5-15

TX04835-12-21-17

Heating the Pipe (Negative Vertical Fusion Pressure)

A) Verify that the pressure selector control is in the fusing position.

B) Close the carriage to bring pipe ends in contact with the heater.

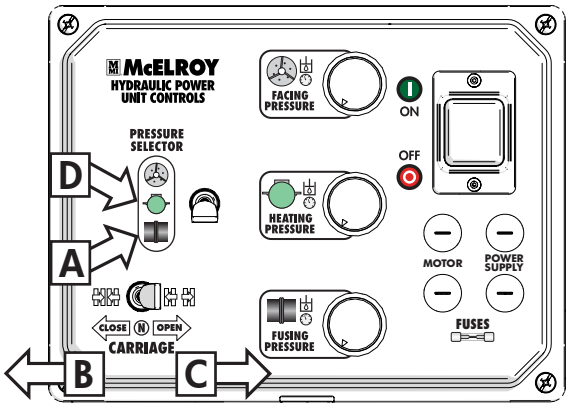
C) When pipe ends contact the heater, immediately shift the carriage directional control to the open position. Allow for bead-up according to pipe manufacturer's or appropriate joining standard's recommendations.

Ensure the heater stays perpendicular to the pipe by supporting the heater during the heating process.

D) After the proper bead-up, move pressure selector control to middle (heating mode) position.

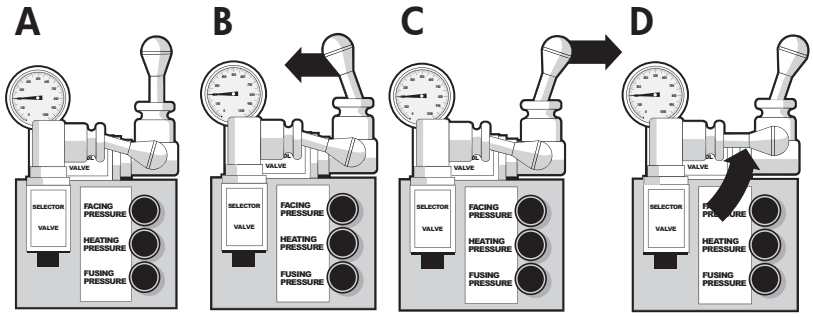
NOTICE: Ensure that the pipe remains in contact with heater throughout the entire process. If the pipe loses contact with the heater, abort the joint and go to "Attach Carriage to Pipe".

Acrobat HPU

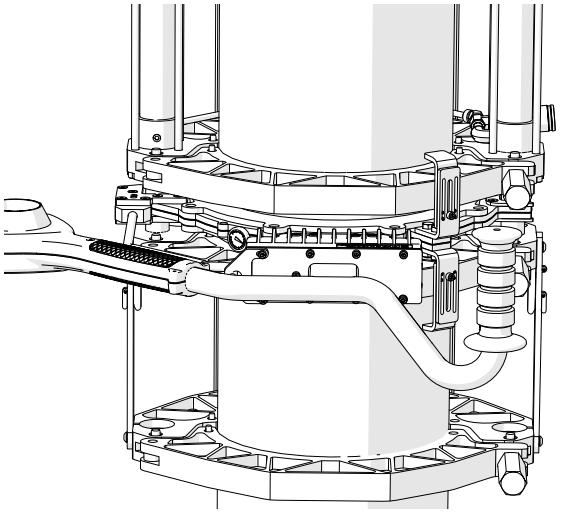


CD01892-12-07-16

DynaMc EP HPU



CD01634-05-05-16



CD01391-10-5-15

TX04836-05-05-16

Fusing the Pipe (Negative Vertical Fusion Pressure)

NOTICE: Failure to follow pipe manufacturer's fusion procedures may result in a questionable joint.

After following the pipe manufacturer's suggested heating procedure:

A) Shift the carriage directional control to neutral position.

B) Shift the pressure selector control to facing.

C) Open the carriage just enough to remove the heater.

Quickly remove the heater. Inspect pipe ends for appropriate melt.

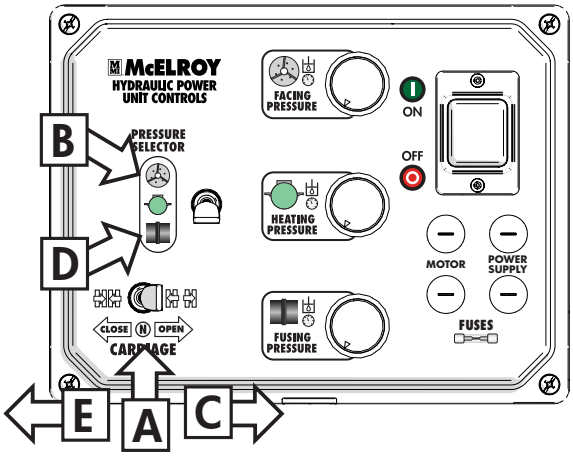
Acrobat 250 and 315: Quickly remove the heater by grabbing the heater latch and pulling it into the handle of the heater to release from the guide rod. Inspect pipe ends for appropriate melt.

D) Shift the pressure selector control to fusing pressure.

E) Quickly close the carriage (**1**), bringing the pipe ends close together then shift the carriage to the open position (**2**).

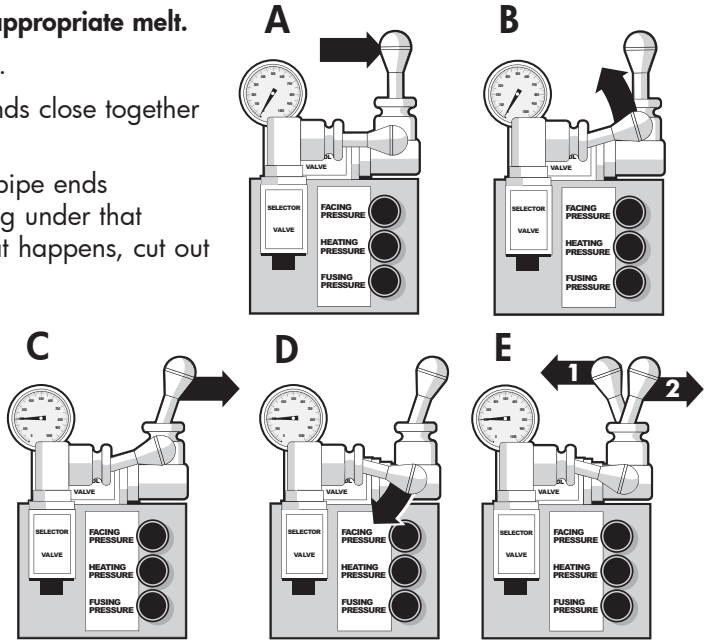
NOTICE: The carriage will move quickly so ensure the pipe ends do not make contact while closing the carriage. Closing under that pressure will push the melt out of the fusion area. If that happens, cut out the fusion joint and repeat the steps to fuse the pipe.

Acrobat HPU



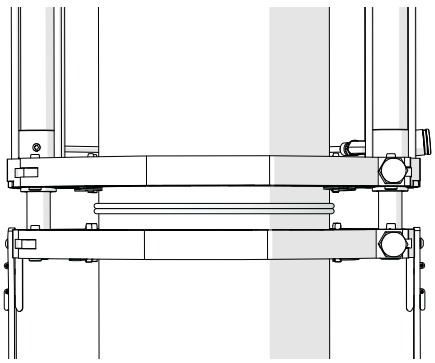
CD01892-12-07-16

DynaMc EP HPU



CD01439-11-18-15

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



CD01382-10-5-15

TX04837-12-21-17

Opening Jaws

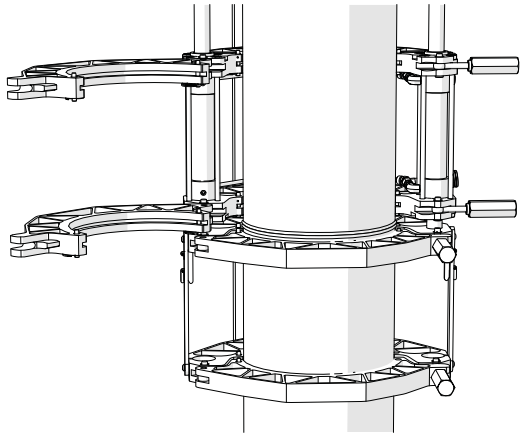
After the joint has cooled for the pipe manufacturer's or appropriate joining standard recommended time, shift the carriage directional control to the neutral position.

Relieve hydraulic pressure in the carriage by turning the fusing pressure reducing knob to its minimum setting.

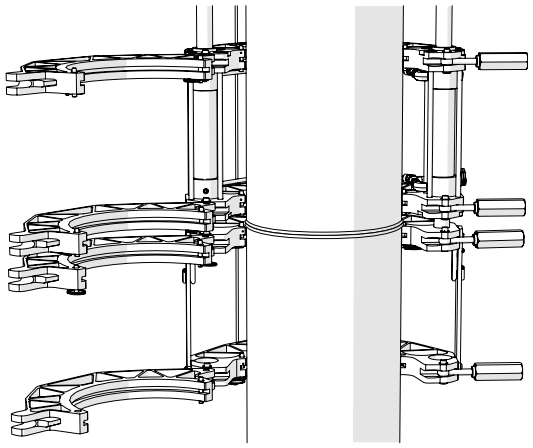
Turn off the HPU.

Disconnect the hydraulic hoses from the carriage.

Loosen the clamp knobs on movable jaws and open the jaws.



Support the carriage and loosen the clamp knobs on the fixed jaws and open the jaws.



Remove the carriage out from around the pipe.

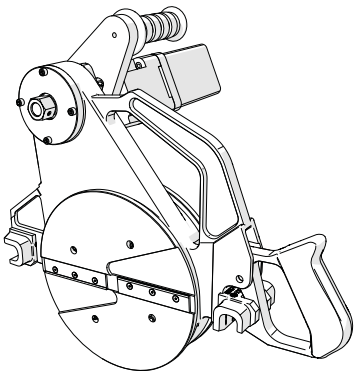
The upper jaws may need to be removed to remove the carriage from the pipe.

TX04829-05-05-16

Special Operations - Fusion in Explosive Atmosphere

Facer

⚠ 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.



CD01370-10-5-15

The brushes of the facer motor must be removed and the facer manually operated in an explosive atmosphere.

The Acrobat 315 facer cannot be operated manually and must not be operated in an explosive atmosphere.

Remove brushes on the Eibenstock facer motor:

The armature brushes must be removed from the electric motor when manually operating in an explosive atmosphere.

Remove the rear cover of the motor.

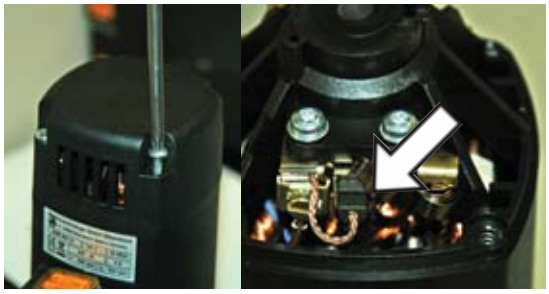
Slide the spring clip away from the brush and pull the brush out (A).

Loosen the brush ground wire (B) and pull the wire loose.

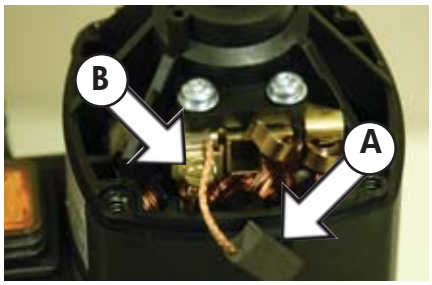
Repeat these steps on the wire on the opposite side.

Store the brushes in a safe location until needed.

A 7/8" hex shaft allows for manual operation in an explosive atmosphere.



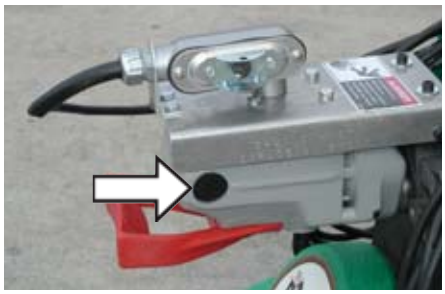
PH04129-4-12-10 PH04130-4-12-10



PH04130-4-12-10

Remove brushes on the Milwaukee facer motor:

The armature brushes must be removed from the electric motor when manually operating in explosive atmospheres. Unscrew the brushes from both sides of the motor. (Both brushes must be removed). A 7/8" hex shaft allows for manual operation in explosive atmospheres.

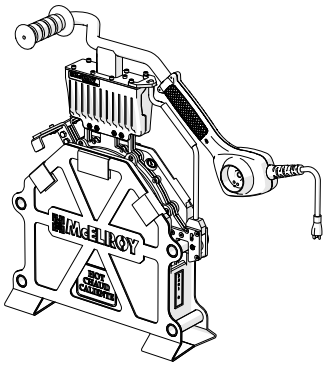


PH01847-7-25-00

TX04838-12-21-17

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. Refer to Special Operation - Fusion in Explosive Atmosphere for safety precautions.



CD01383-10-5-15

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

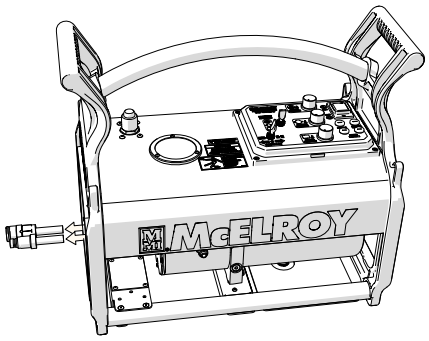
TX04839-11-18-15

Hydraulic Power Unit (HPU)

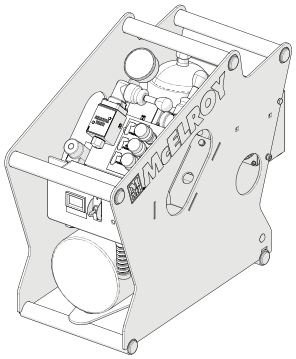
⚠ DANGER Electric motors are not explosion proof. Operation of these components in an explosive atmosphere will result in serious injury or death.

The HPU is not explosion proof and must be located outside of the explosive atmosphere.

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



CD01889-02-01-17



CD01153-03-06-14

TX04840-11-18-15

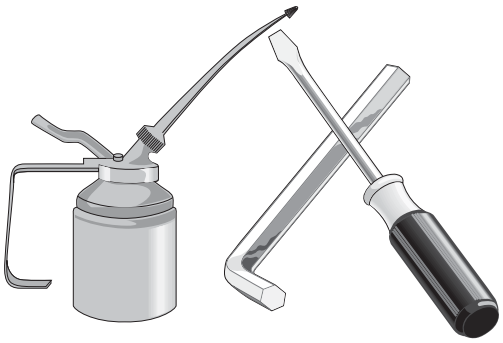
Maintenance

Preventative Maintenance

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

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

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



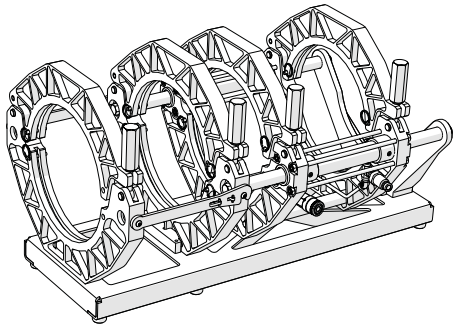
CD00142-11-2-94

TX00428-8-10-95

Washing the Machine

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

Do not pressure wash.



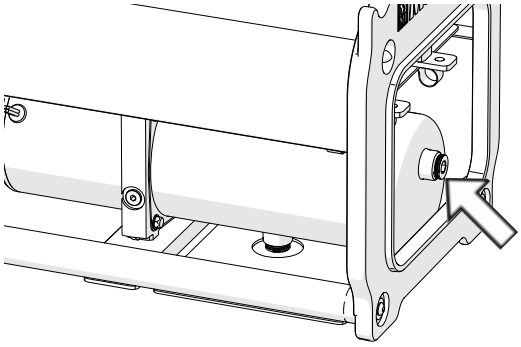
CD01327-11-18-15

TX00429-05-05-16

Check Hydraulic Fluid

Acrobat HPU:

Before connecting to power and with the machine off, open the plug on the end of the reservoir. The fluid level should be up to opening when the HPU is on a level surface. Refer to the "Hydraulic Fluids" section of this manual for hydraulic fluid recommendations.



Acrobat HPU

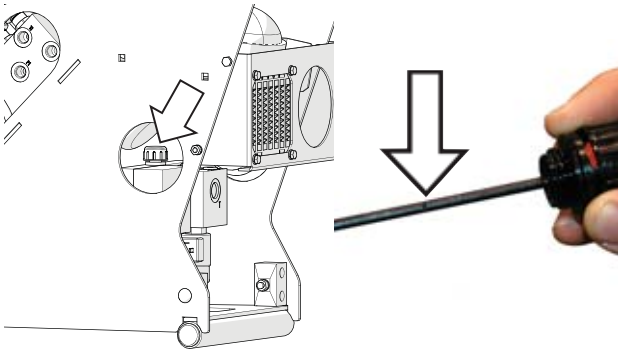
CD01400-10-5-15

DynaMc EP HPU:

Before connecting to power and with the machine off, unscrew the dipstick and check the fluid level. The fluid level should be within ± 0.25" (6.4mm) of the notch of the dipstick.

IMPORTANT: Ensure HPU is on a level surface. Unscrew the dipstick and wipe clean with a lint-free cloth. Screw dipstick in completely then remove to check fluid level.

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

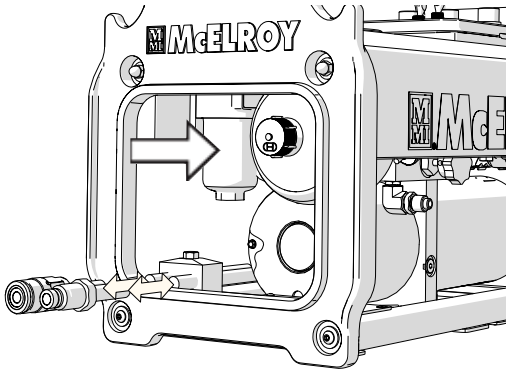


DynaMc EP HPU

CD01154-03-06-14 PH04145-11-18-15

TX04841-05-09-16

Change Hydraulic Fluid and Filter



CD01942-02-07-17

Acrobat HPU:

This HPU is equipped with a 3 micron pressure filter with a bypass indicator below the accumulator. If the indicator is activated, the filter needs to be changed otherwise the filter should be replaced every 500 hours.

Ensure the HPU is unplugged from the power source and use a wrench to remove the bowl from the filter housing. Remove the old filter cartridge and replace with a new filter cartridge. Install the bowl on the filter housing.

The hydraulic fluid should be replaced every year.

Fill the reservoir from a clean container. Refer to the "Hydraulic Fluids" section of this manual for hydraulic fluid recommendations.

PH04143-4-12-10

DynaMc EP HPU:

The hydraulic filter and fluid should be replaced every year.

Fill the reservoir from a clean container.

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

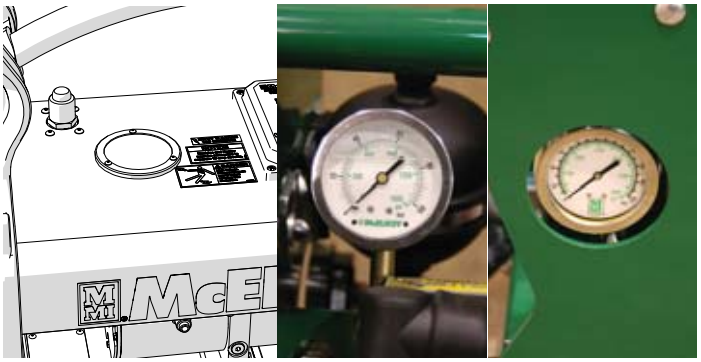
TX05204-02-01-17

Check Pressure Gauges

Pressure gauges should be checked daily.

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

Damaged gauges should be replaced.



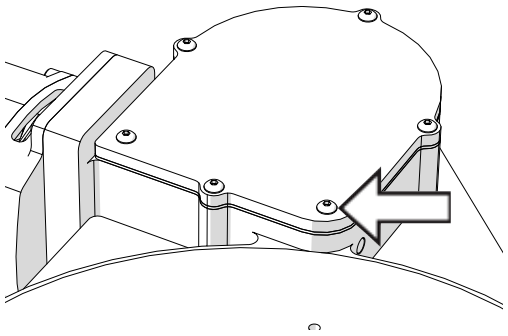
PH04138-4-12-10 PH04139-4-12-10 CD01941-02-07-17

TX04843-11-18-15

Change Gearbox Oil (Acrobat 315)

Unplug the facer from the power source.

Lay the facer in a horizontal position with the gearbox cover facing upward. Remove the 6 screws from the cover.

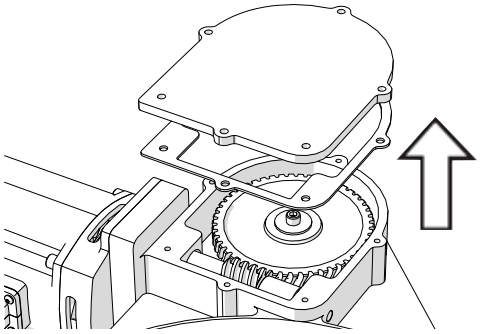

CD02129-12-14-17

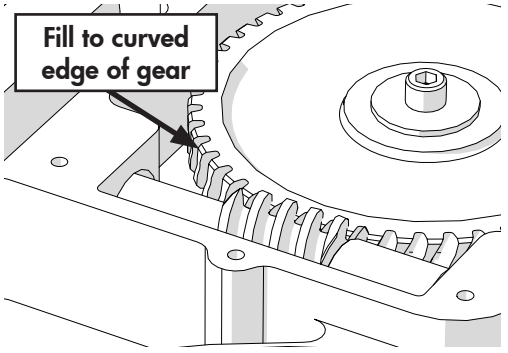
Remove with cover and carefully remove the gasket from the gearbox housing. Pour out the used oil from the gearbox housing and inspect for debris. Inspect the inside of the housing for excessive gear wear or damage. If there is excessive wear or damage to gears, replace the worn or damaged gears.

Fill the gearbox housing with 80W/90 gear oil from a clean container. Fill the housing until the oil level reaches the curved edge of the large gear.

Inspect the gasket for any damage, if damaged, replace the gasket. Place the gasket and cover on the gearbox housing and fasten with the 6 screws.

Inspect the housing to ensure there are no oil leaks.





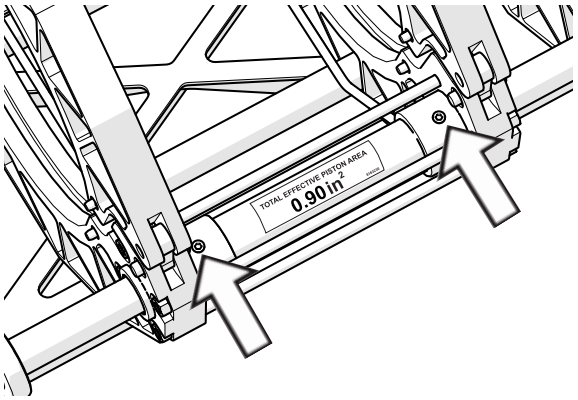
CD02130-12-14-17

CD02131-06-20-18

TX05336-02-15-18

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:



CD01329-11-18-15

The bleed screws are on the ends of the rod glands.

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

Move the carriage directional control to close carriage, and move the carriage to the fixed jaw end.

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

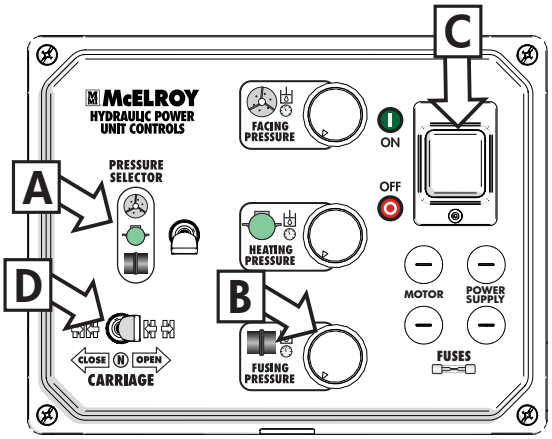
Hold pressure on the cylinder until no air is indicated and quickly tighten the plug.

Repeat this operation on the opposite cylinder.

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

TX04681-05-05-16

Bleeding Air From Acrobat HPU



CD01892-12-07-16

1) Fill hydraulic reservoir according to procedure "Check Hydraulic Fluid" in the Maintenance section of the manual.

2) Connect the quick disconnects together at the end of the hoses.

3) Move the pressure selector control (**A**) to fusing pressure.

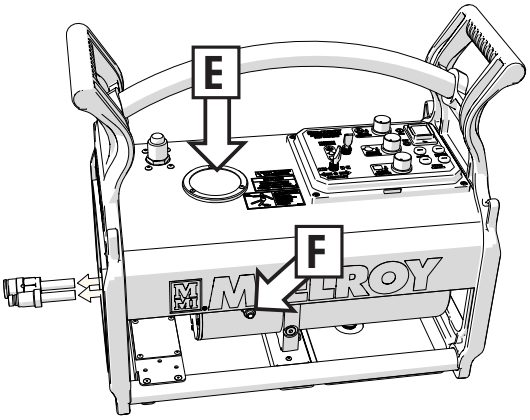
4) Set the fusing pressure reducing knob (**B**) to max setting by turning the knob clockwise.

5) Turn the Acrobat HPU on (**C**) and move the carriage directional control (**D**) to the open position. Allow fluid to circulate for 30 seconds.

6) Shift the carriage directional control (**D**) to the close position and circulate fluid for 30 seconds.

7) Reduce the fusing pressure completely by turning the knob (**B**) counter-clockwise. Ensure zero pressure is shown on the carriage pressure gauge (**E**).

8) Turn the Acrobat HPU off (**C**).



CD01941-02-07-17

9) Refill the hydraulic reservoir according to procedure "Check Hydraulic Fluid" in the Maintenance section of the manual.

10) Disconnect the quick disconnects at the end of the hoses.

11) Turn the Acrobat HPU on (**C**).

12) Move the carriage directional control (**D**) to the close position and set the fusing pressure between 30 and 40 PSI.

13) Attach a separate bleeder hose to the DataLogger Port (**F**) on the HPU. Allow fluid to trickle out until all signs of air are removed. Remove the bleeder hose from the DataLogger Port (**F**).

14) Increase/decrease pressure with the fusing pressure reducing knob (**B**) from 0-800 PSI for 10 cycles.

15) Turn the HPU off (**C**) and refill the hydraulic reservoir according to procedure "Check Hydraulic Fluid" in the Maintenance section of the manual.

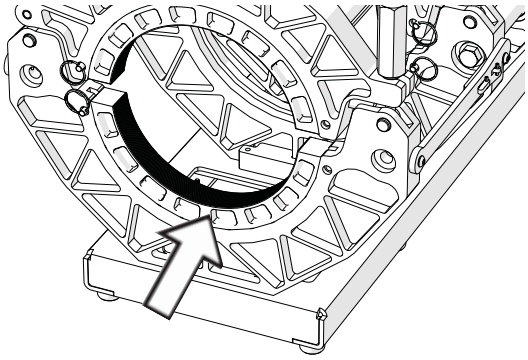
TX05041-01-25-17

Clean Jaws and Inserts

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

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

TX00433-9-15-94

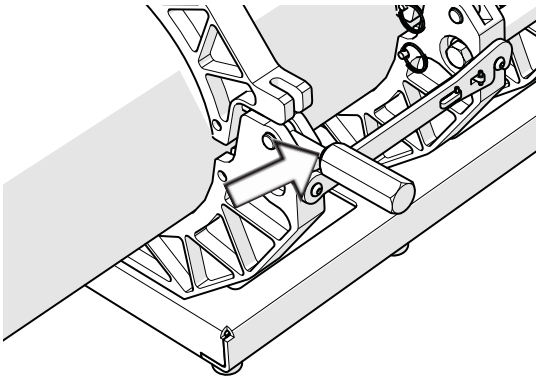


Clean Thrust Bearings

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

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

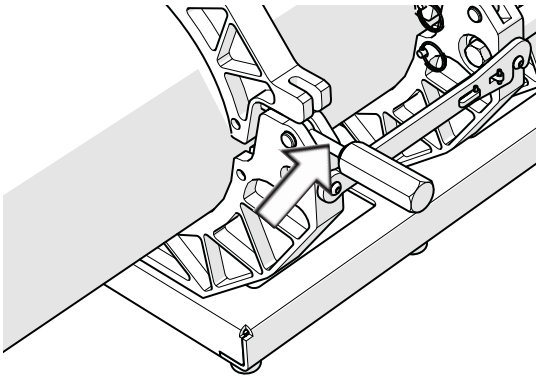
TX00434-9-13-94



Clean Eyebolt Threads

Keep the clamp knob eyebolt threads brushed clean.

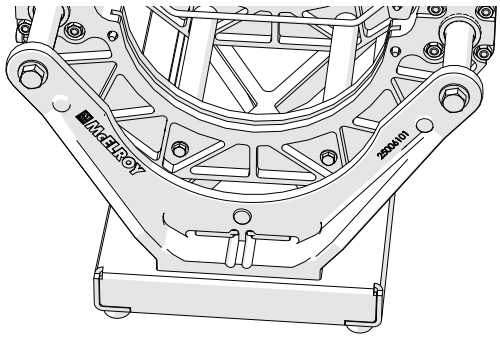
TX00435-9-13-94



Fasteners Must Be Tight

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

TX00437-9-13-94

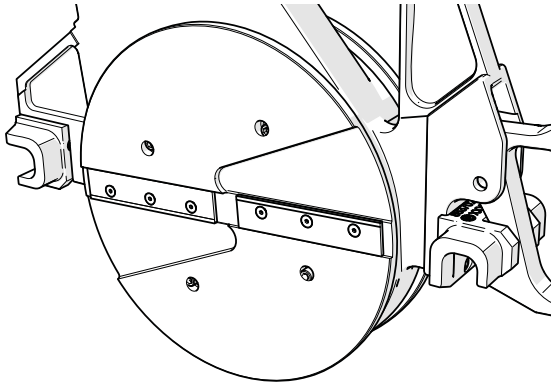


Facer Blades

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

Dull or chipped blades must be replaced.

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



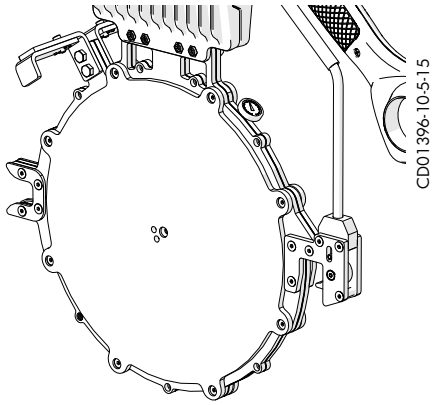
TX02475-3-29-05

Clean Heater Surfaces

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

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

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



TX04844-11-18-15

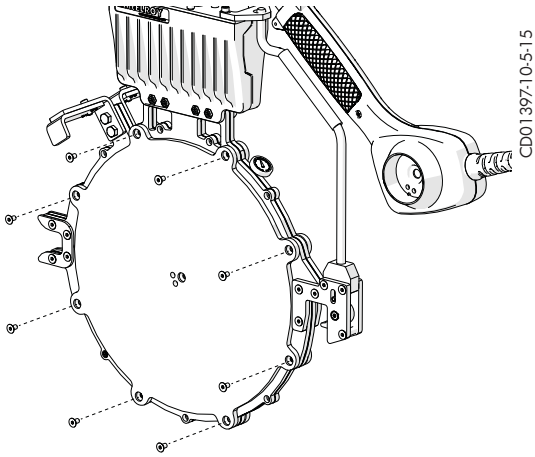
Installing Butt Fusion Heater Plates

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

Care should be taken to ensure 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.



TX04035-4-12-10

Adjusting Heater Temperature

Turn knob to desired temperature. Measure the heater surface temperature with a pyrometer. Any variance must be corrected to the pyrometer reading.

Loosen setscrew in the knob. Turn knob to point to the same temperature as the pyrometer. Tighten setscrew in the knob.

Turn knob to desired temperature. Allow heater to stabilize at the new temperature (5 to 10 minutes) after adjusting.

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

TX02009-3-13-02

PH02313-4-24-02

Heater Indicator Light

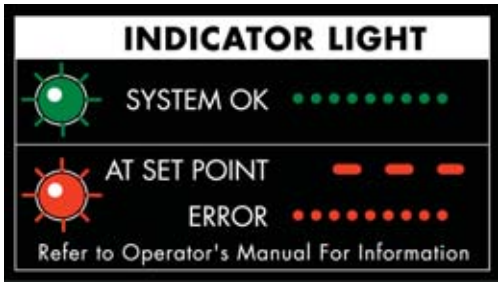
The heater has a green indicator light which will flash on and off. This indicates that the controller is operating normally. If the green indicator is not flashing then the controller may not be operating properly. If this occurs, disconnect power and have the heater repaired by an McElroy Authorized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

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

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

TX04036-4-12-10

PH02314-4-24-02



PH02571-09-16-03

Maintenance Checklist

Fusion Machine Checklist

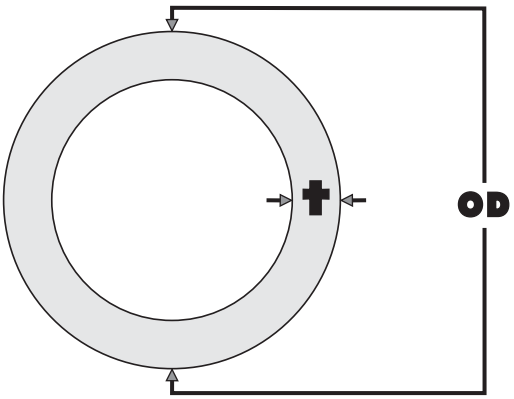
Item to Check	OK
UNIT	
Machine is clean	
All pins and snaprings are in place	
All nuts and bolts are tight	
All placards and handles are in place	
All clamp knobs turn freely	
Cords and plugs are in good condition	
Fluid reservoir is filled to correct level	
Machine is free of hydraulic leaks	
Hydraulic gauges read correctly	
Jaws are properly aligned	
Facer operates smoothly	
Face-off is square	
Inserts fit and pin properly	
Carriage and Selector controls operate smoothly	
Pressure Reducing Knobs operate in their range	
Electrical Power Receptacles function properly	
Heater surface is clean and in good condition	
Thermometer is in good working order	
Surface temperature checked with pyrometer	

TX04037-02-16-17

Determining Fusion Pressure

Variable Definitions

O.D. = Outside Diameter of Pipe (inch)
t = Wall Thickness of Pipe (inch)
$\prod$ = 3.14
SDR = Standard Dimensional Ratio of Pipe (unitless)
IFP = Interfacial Pressure of Pipe (PSI)
TEPA = Total Effective Piston Area of Carriage Cylinders (inch²)

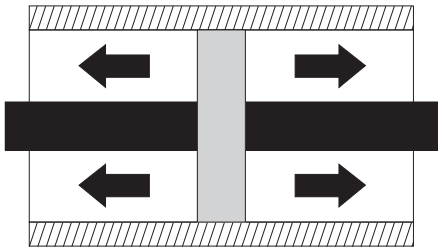


Formulas

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

PIPE AREA = (O.D. - t) x t x $\prod$
FUSION FORCE = AREA x IFP

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



Total Effective Piston Areas (in²)

Fusion Model	High Force	Medium	Low Force
A160/A180	-	-	0.90
A250	1.66	-	0.90
A315	3.14	-	1.47
28	4.71	3.24	1.66
250	4.71	3.24	1.66
412	11.78	6.01	3.14
618	11.78	6.01	3.14
500	-	6.01	3.14
824/T630	29.44	15.32	9.43
1236/T900	29.44	15.32	9.43
1648/T1200	31.42	14.14	-
2065	31.42	-	-
1600	31.42	14.14	-
2000	32.99	-	-

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

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

TEPA = 4.71 (From Table)

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

$$\text{GAUGE PRESSURE} = \frac{(8.625 - .784) \times .784 \times 3.14 \times 75}{4.71} + 30 \text{ PSI} = 338 \text{ PSI}$$

TX02893-04-18-16

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.

TX05044-05-13-16

Specifications

Fusion Machine Specifications: Acrobat™ 160

Dimensions	**4-Jaw**	**3-Jaw**
Length:	23.5" (597mm)	19" (483mm)
Width:	15" (381mm)	15" (381mm)
Height:	14" (356mm)	12" (305mm)
Weights		
Carriage Assembly:	40 lbs (18.1Kg)	29 lbs (13.2Kg)
Facer:	35 lbs. (15.9Kg)	
Heater:	14 lbs (6.4Kg)	
Acrobat HPU:	56 lbs (25.4Kg)	
DynaMc EP HPU:	115 lbs (52.1Kg)	

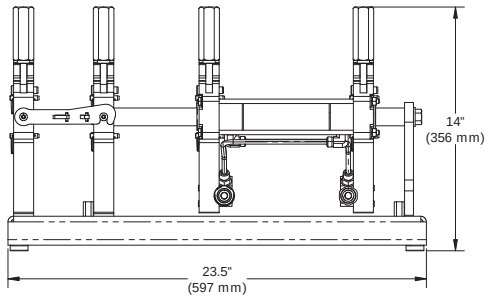
Power Requirements:

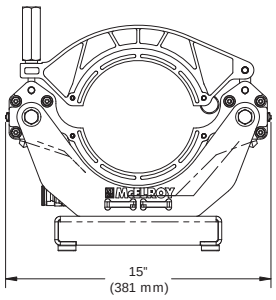
Facer:	0.9 kVA/0.7 kW (120V package), 1.2 kVA/1 kW (240V package)
Heater:	1.2 kW (120V and 240V package)
Acrobat HPU:	120V, 50/60Hz, 1Ph, 6.5A, 0.3HP (120V package not including receptacles), 208-240V, 50/60Hz, 1Ph, 4.5A, 0.3HP (240V package not including receptacles)
	Electrical Power Receptacles - 15A Max. each (non-protected)
DynaMc EP HPU:	1.6 kVA/1.25 kW (120V and 240V package)
Plug Type:	120V - NEMA 5-15, 240V - CEE 7/7

Hydraulic Pressure:

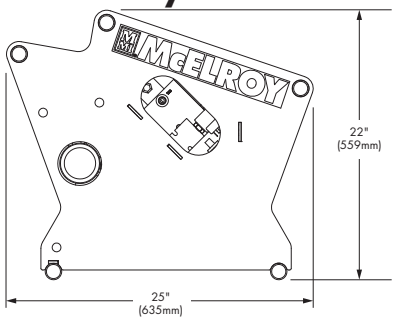
Acrobat HPU	800 psi max. (55.2 bar) fusion pressure (low pressure HPU)
DynaMc EP HPU	1500 psi max. (103.4 bar) fusion pressure (high pressure HPU)
Total effective piston area:	0.90 square inches
Reservoir Filling Capacity:	1 gal (3.78 liters) (DynaMc HPU)
	0.375 gal (1.41 liters) (Acrobat HPU)
Hydraulic Fluid:	Refer to Hydraulic Fluids Section

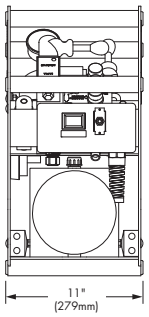
TX05213-02-08-18

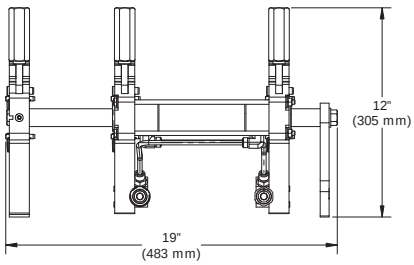


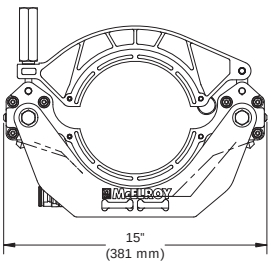


DynaMc EP HPU

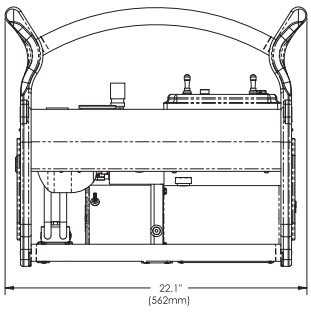


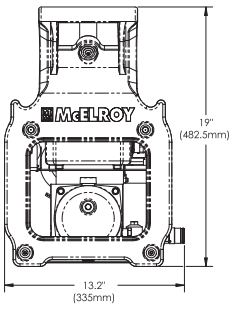






Acrobat HPU





Specifications

Fusion Machine Specifications: Acrobat™ 180

Dimensions	**4-Jaw**	**3-Jaw**
Length:	23.5" (597mm)	19" (483mm)
Width:	15" (381mm)	15" (381mm)
Height:	14" (356mm)	12" (305mm)
Weights		
Carriage Assembly:	40 lbs (18.1Kg)	29 lbs (13.2Kg)
Facer:	35 lbs. (15.9Kg)	
Heater:	14 lbs (6.4Kg)	
Acrobat HPU:	56 lbs (25.4Kg)	
DynaMc EP HPU:	115 lbs (52.1Kg)	

Power Requirements:

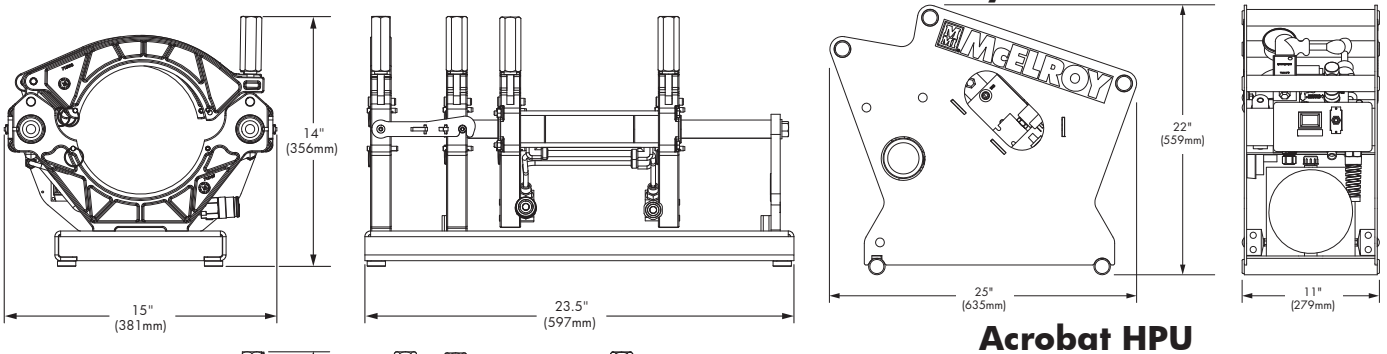
Facer:	0.9 kVA/0.7 kW (120V package), 1.2 kVA/1 kW (240V package)
Heater:	1.2 kW (120V and 240V package)
Acrobat HPU:	120V, 50/60Hz, 1Ph, 6.5A, 0.3HP (120V package not including receptacles), 208-240V, 50/60Hz, 1Ph, 4.5A, 0.3HP (240V package not including receptacles)
	Electrical Power Receptacles - 15A Max. each (non-protected)
DynaMc EP HPU:	1.6 kVA/1.25 kW (120V and 240V package)
Plug Type:	120V - NEMA 5-15, 240V - CEE 7/7

Hydraulic Pressure:

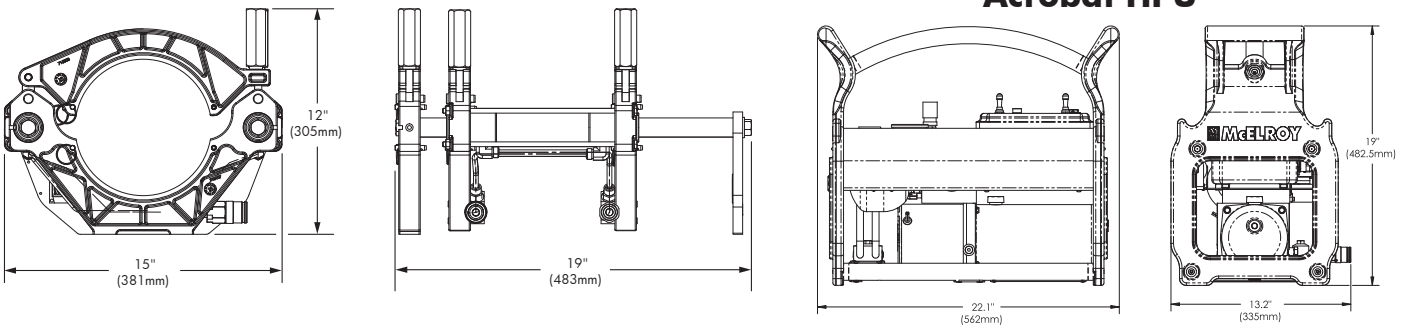
Acrobat HPU	800 psi max. (55.2 bar) fusion pressure (low pressure HPU)
DynaMc EP HPU	1500 psi max. (103.4 bar) fusion pressure (high pressure HPU)
Total effective piston area:	0.90 square inches
Reservoir Filling Capacity:	1 gal (3.78 liters) (DynaMc HPU)
	0.375 gal (1.41 liters) (Acrobat HPU)
Hydraulic Fluid:	Refer to Hydraulic Fluids Section

TX05214-02-08-18

DynaMc EP HPU



Acrobat HPU



Specifications

Fusion Machine Specifications: Acrobat™ 250

Dimensions	**4-Jaw**	**3-Jaw**
Length:	30.1" (765mm)	21.1" (536mm)
Width:	18.25" (464mm)	18" (457mm)
Height:	17" (432mm)	14.75" (375mm)

Weights

Carriage Assembly:	53.6 lbs (24.3Kg)	38.1 lbs (17.3Kg)
Facer:	39.8 lbs. (18.1Kg)	
Heater:	20 lbs (9.1Kg)	
Acrobat HPU:	56 lbs (25.4Kg)	
DynaMc EP HPU:	115 lbs (52.1Kg)	

Power Requirements:

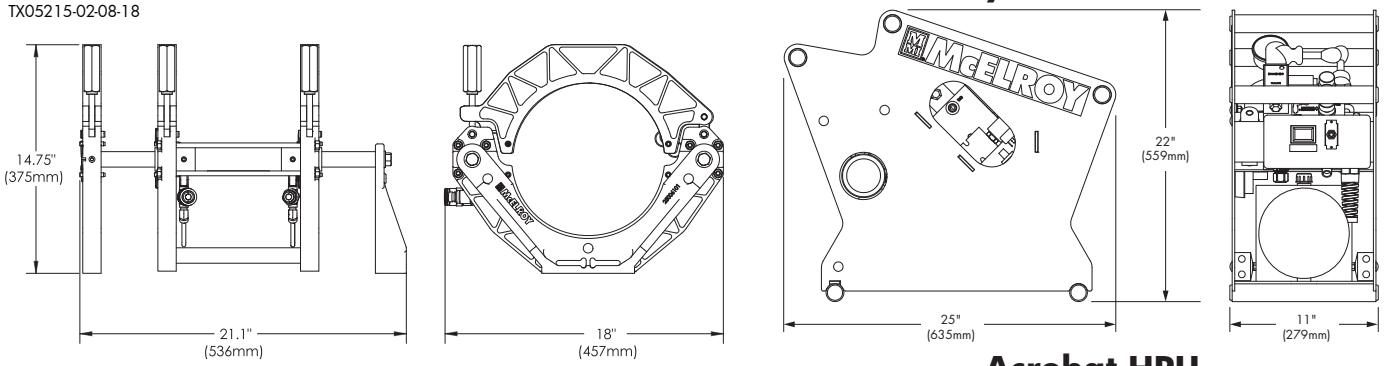
Facer:	1.6HP, 10 Amp @ 120 VAC / 5 Amp @ 240 VAC
Heater:	1750W (120V package), 3000W (240V package)
Acrobat HPU:	120V, 50/60Hz, 1Ph, 6.5A, 0.3HP (120V package not including receptacles), 208-240V, 50/60Hz, 1Ph, 4.5A, 0.3HP (240V package not including receptacles)
	Electrical Power Receptacles - 15A Max. each (non-protected)
DynaMc EP HPU:	1.6 kVA/1.25 kW (120V and 240V package)
Plug Type:	120V - NEMA 5-15, 240V - CEE 7/7

Hydraulic Pressure:

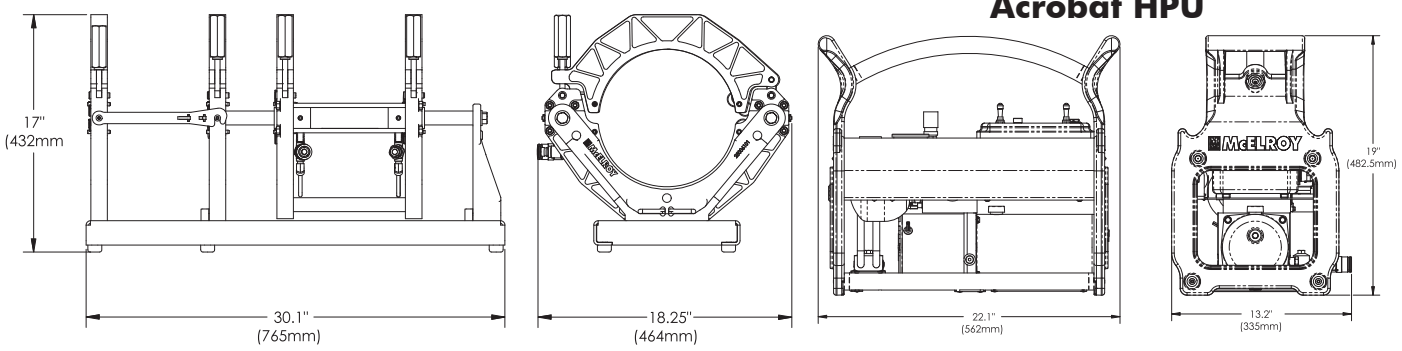
Acrobat HPU	800 psi max. (55.2 bar) fusion pressure (low pressure HPU)
DynaMc EP HPU	1500 psi max. (103.4 bar) fusion pressure (high pressure HPU)
Total effective piston area:	0.90 square inches (Low Force), 1.66 square inches (High Force)
Reservoir Filling Capacity:	1 gal (3.78 liters) (DynaMc HPU)
	0.375 gal (1.41 liters) (Acrobat HPU)
Hydraulic Fluid:	Refer to Hydraulic Fluids Section

TX05215-02-08-18

DynaMc EP HPU



Acrobat HPU



Specifications

Fusion Machine Specifications: Acrobat™ 315

Dimensions	**4-Jaw**	**3-Jaw**
Length:	30" (762mm)	23.9" (607mm)
Width:	25" (635mm)	24.25" (616mm)
Height:	21.2" (538mm)	18.7" (475mm)

Weights

Carriage Assembly:	97 lbs (44.0Kg)	72 lbs (32.7Kg)
Facer:	38 lbs. (17.2Kg)	
Heater:	22 lbs (10.0Kg)	
Acrobat HPU:	56 lbs (25.4Kg)	
DynaMc EP HPU:	115 lbs (52.1Kg)	

Power Requirements:

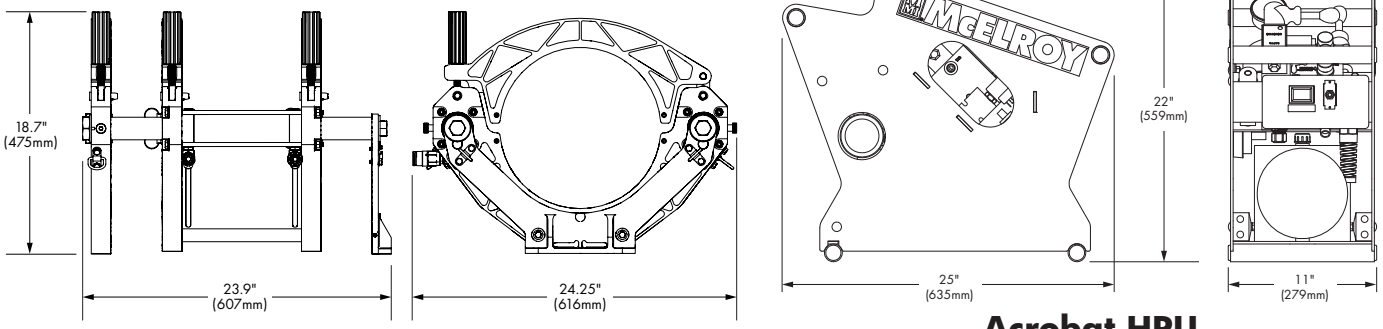
Facer:	2.3HP, 15 Amp Max. @ 120 VAC / 7.5 Amp Max. @ 240 VAC
Heater:	1850W (120V package), 3000W (240V package)
Acrobat HPU:	120V, 50/60Hz, 1Ph, 6.5A, 0.3HP (120V package not including receptacles), 208-240V, 50/60Hz, 1Ph, 4.5A, 0.3HP (240V package not including receptacles)
	Electrical Power Receptacles - 15A Max. each (non-protected)
DynaMc EP HPU:	1.6 kVA/1.25 kW (120V and 240V package)
Plug Type:	120V - NEMA 5-15, 240V - CEE 7/7

Hydraulic Pressure:

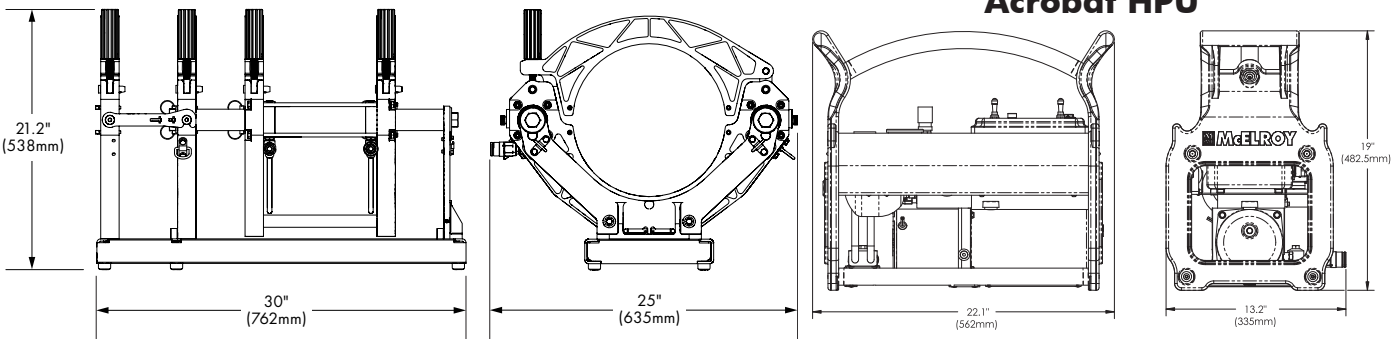
Acrobat HPU	800 psi max. (55.2 bar) fusion pressure (low pressure HPU)
DynaMc EP HPU	1500 psi max. (103.4 bar) fusion pressure (high pressure HPU)
Total effective piston area:	1.47 square inches (Low Force), 3.14 square inches (High Force)
Reservoir Filling Capacity:	1 gal (3.78 liters) (DynaMc HPU)
	0.375 gal (1.41 liters) (Acrobat HPU)
Hydraulic Fluid:	Refer to Hydraulic Fluids Section

TX05334-02-15-18

DynaMc EP HPU



Acrobat HPU



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: _____

Pump Motor Voltage: _____

Pump Motor Phases: ____

Pump Motor Frequency: _____ (50 or 60 Hz)

Facer Motor: _____

Facer Motor Voltage: _____

Facer Motor Phases: 1

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 pump motor, heater, and facer.

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:_____

_____

_____

_____

_____

_____

_____

_____

TX04682-03-25-14

Optional Accessories

DataLogger® 6

The need for better record keeping and increased accountability is growing among those who build and manage pipeline infrastructures. New standards, including ASTM F3124, have been implemented to govern the collection of data from plastic pipe fusions. The DataLogger® 6 from McElroy meets these requirements by capturing the most important information related to fusion operations. It is now easier than ever before to add improved traceability and a higher level of assurance that pipelines were fused properly before they go into service.

The DataLogger 6 features the tools necessary to properly capture the most important data from your jobsite. Scan the barcode on your pipe or fitting to automatically enter pipe material, size, manufacture date and lot. Add operator and machine information, along with GPS location of each joint and photos of the completed fusion and more.

Go to www.mcelroy.com for more information.

DataLogger 6 Specs

Model:	DL18001
Supported Standards:	ASTM F3124, ASTM F2620-12, ISO 21307:2011-05, GIS/PL2-3-07, Profuse, DS/INF 70-2 PE:HD:1992-05, WIS 4-32-08:2002-04, DVS 2207-1 PE-HD:2005-09, DVS 2207-11 PP:2008-08, DS/INF 70-2 PP:1992-05
Weight:	1.77 lbs (0.8 Kg)
Dimensions:	8.58" x 5.6" x 1.06"
Screen:	1280 X 720 HD, capacitive touchscreen
Operating System:	Android 5.1
Memory:	2 GB
Microprocessor:	Texas Instruments® OMAP 4430 Dual Core 1 GHz
Storage:	32 GB NAND Flash
Connectivity:	802.11 abgn, BT4.0
Camera:	2 Megapixel front / 8 megapixels back
Power Requirements:	100-240 V, 24 Watt, 12V, 2 Amp, 50/60 Hz
Battery:	Lithium-Polymer 7600 mAh
Inclusions:	Tablet, transducer, A/C adapter, machine mount, stylus, carrying case

TX05335-12-21-17

About this manual . . .

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

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

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

TX001660-8-19-99

McELROY

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www.mcelroy.com