

# Operator's Manual



# McELROY

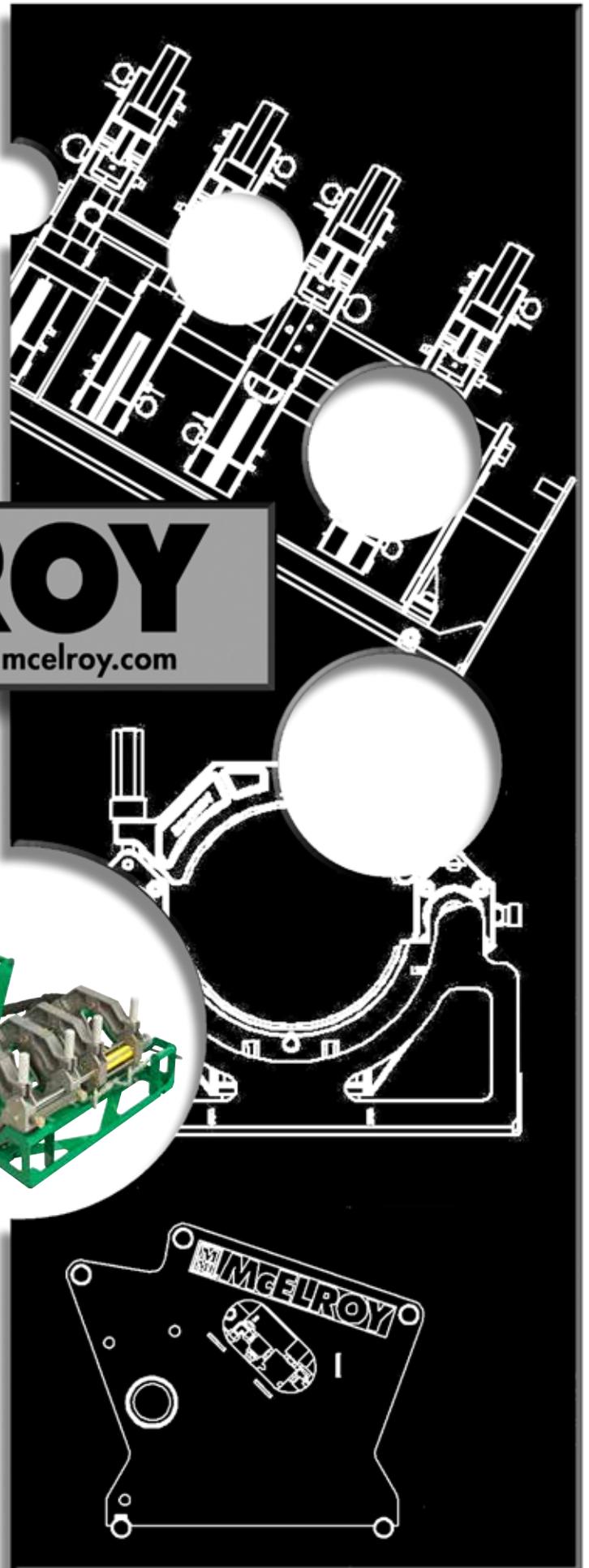
[www.mcelroy.com](http://www.mcelroy.com)

## **DynaMc**

28, 250, 412 and  
28 Sidewall Electric  
Pump (EP) Fusion  
Machines

Manual: 1272601 Revision: E 10/19

Original Language: English





**WARNING**

Cancer and Reproductive Harm -  
[www.P65warnings.ca.gov](http://www.P65warnings.ca.gov)

8165361

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](http://patent.mcelroy.com)

# Introduction

## Thank you for purchasing this McElroy product

The McElroy DynaMc® Electric Pump (EP) fusion machines are hydraulically operated fusion machines designed to fuse thermoplastic pipe.

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

The 28 model fuses 2" IPS (63mm) through 8" DIPS (225mm) maximum pipe.

The 250 model fuses 63mm (2" IPS) minimum to 250mm (8" DIPS) maximum pipe.

The 412 model fuses 4" IPS (110mm) minimum to 12" DIPS (340mm) maximum pipe.

The 28 Sidewall fuses branch saddles up to 8" DIPS outlet with up to 9 5/8" diameter base on any size main.

All models utilize the DynaMc® Hydraulic Power Unit (HPU) or the EP1500AD to provide hydraulic power to the machines.

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.

### DynaMc® HPU



TX04044-10-21-19

## 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](http://www.mcelroy.com/university)

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



MU2-03-13-14

TX04659-03-24-14

# Warranty

## LIMITED WARRANTY

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

## RETURN OF GOODS

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

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

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

## DISCLAIMER OF LIABILITY

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

McElroy makes no other warranty of any kind whatever, express or implied; and all implied warranties of merchantability and fitness for a particular purpose which exceed the aforesaid 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](http://www.McElroy.com/fusion)**

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

Model No. \_\_\_\_\_

Serial No. \_\_\_\_\_

Date Received \_\_\_\_\_

Distributor \_\_\_\_\_

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Tulsa, Oklahoma, USA

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# Fusion Equipment Safety

## Safety Alerts



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

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



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



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



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

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

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

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

TX00030-12-1-92

WR00051-11-30-92

## 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.



TX02946-4-15-09

WR00052-12-1-92

# Fusion Equipment Safety

## General Safety

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

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

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

**FEEL** any changes in the way the equipment operates.

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

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

TX00114-4-22-93



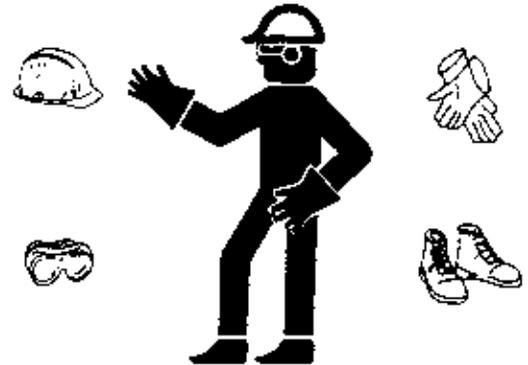
SAFE1ST-12-22-92

## Wear Safety Equipment

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

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

TX00032-4-7-93



WR00053-12-2-92

## Heater Is Not Explosion Proof



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

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

TX04467-03-24-14



WR00034-11-30-92

## Electric Motors are Not Explosion Proof



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.

See Section "Facer" in the Overview section for instructions on removing brushes from the facer motor.

TX02979-04-02-14



WR00080-4-12-93

# Fusion Equipment Safety

## 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.



WR00078-4-8-93

TX03007-04-18-16

## 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.



WR00055-4-7-93



WR00025-11-30-92

TX04787-02-16-17

# Fusion Equipment Safety

## 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.



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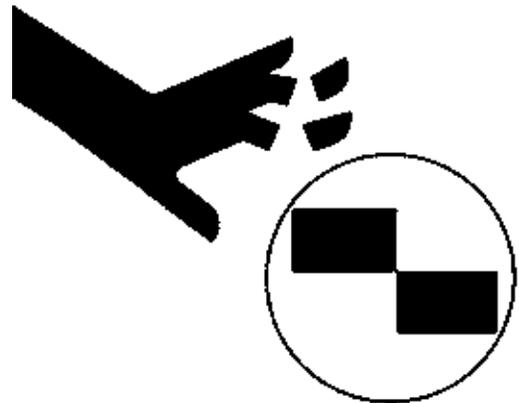
WR00012-12-4-92

## 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.



TX02378-04-18-16

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.

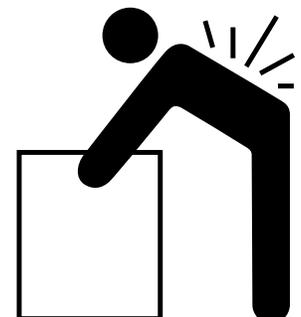


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WR00030-2-10-93

## Heavy Lifting

**⚠️ CAUTION** Components of the DynaMc® EP fusion machines may be heavy. Using one person to lift may result in injury. Two people are required to lift components.



TX04694-04-07-14

Heavy Lifting

# Fusion Equipment Safety

## 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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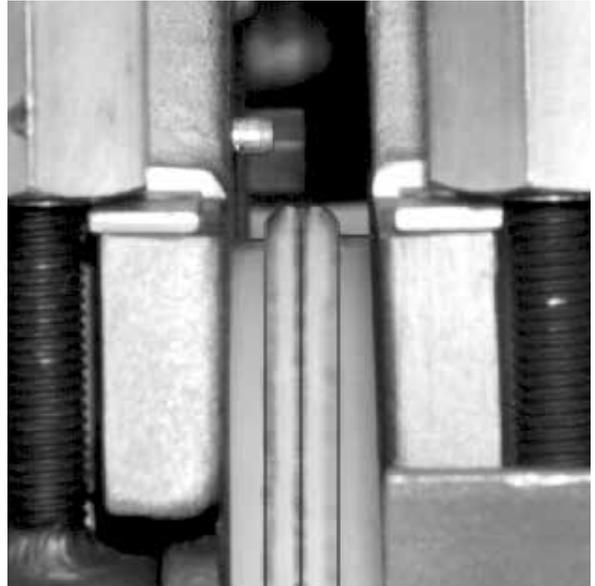
# Overview

## 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.

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.



PH0036B-1-4-96

# Overview

## Introduction to the Electric Pump (EP) Fusion Machines

The McElroy DynaMc® Electric Pump (EP) fusion machines are hydraulically operated fusion machines designed to fuse thermoplastic pipe.

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

The 28 model fuses 2" IPS (63mm) through 8" DIPS (225mm) maximum pipe.

The 412 model fuses 4" IPS (110mm) minimum to 12" DIPS (340mm) maximum pipe.

The 250 model fuses 63mm (2" IPS) minimum to 250mm (8" DIPS) maximum pipe.

The 28 Sidewall fuses branch saddles up to 8" DIPS outlet with up to 9 5/8" diameter base on any size main.

All models utilize the DynaMc® Hydraulic Power Unit (HPU) or the EP1500AD to provide hydraulic power to the machines.

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## Carriage Assembly

The DynaMc EP carriage assemblies are available in a 4-Jaw, 2-Jaw and sidewall models and are operated by a Hydraulic Power Unit (HPU).

The 4-Jaw EP carriage assembly consists of two fixed jaws and two hydraulically operated movable jaws bolted to a skid.

For fittings, the inner fixed jaw can be connected to the movable jaws on the carriage for a 3 movable 1 fixed jaw configuration.

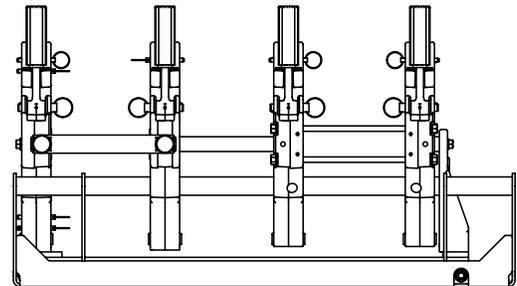
The 2-Jaw EP carriage assembly consists of one fixed jaw and one hydraulically operated movable jaw bolted to a skid.

The 28 Sidewall EP machine can also be used with the EP HPU.

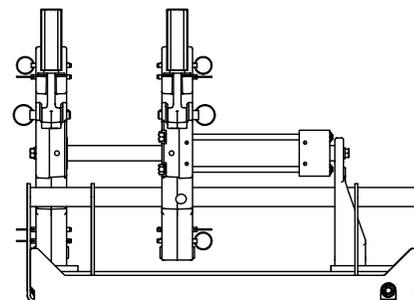
The 28 Sidewall EP has one movable jaw and a tailstock that attaches to the main. The carriage attaches to the main by the use of chain clamps.

All EP carriage assemblies use the DynaMc® Hydraulic Power Unit (HPU) or the EP1500AD to pressure the hydraulic cylinders to move the jaws.

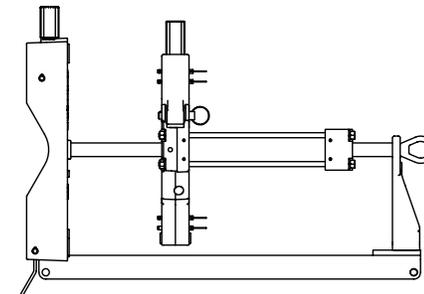
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CD00830-4-7-10



CD00828-4-7-10

# Overview

## 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 pressure gauge above the carriage directional valve displays fusion pressure. The pressure gauge on the rear left side of the HPU displays main system pressure, which will fluctuate between approximately 1600 psi - 2900 psi 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.

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

### Power Pack Manifold Block

The DynaMc EP HPU's power pack has three factory preset valve adjustments:

1. Valve "N" is adjusted completely in (clockwise).
2. Valve "DR" is adjusted completely out (counter-clockwise).
3. The non-labeled valve is the main system pressure relief valve that protects against over-pressurization.

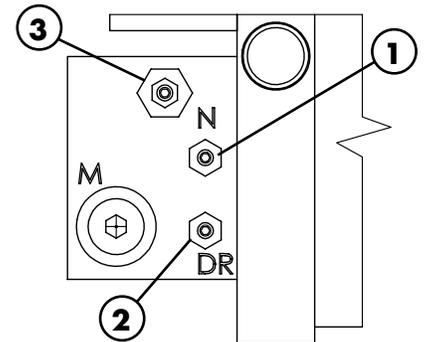
**NOTICE:** These valves are properly set at McElroy and should never be re-adjusted.



PH04146-4-12-10



PH04142-4-12-10



CD00831-10-5-15

# Overview

## EP1500AD Hydraulic Power Unit (HPU)

The EP1500AD HPU consists of two main hydraulic components:

1. Power pack - Consists of a capacitor start electric motor and a dual stage gear pump.
2. Carriage manifold assembly - Standard McElroy design for familiar operation and common service parts with other McElroy equipment.

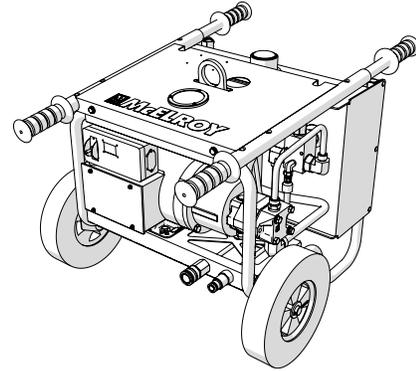
There are two pressure gauges on the HPU. The pressure gauge above the carriage directional valve displays fusion pressure. The pressure gauge on the top of the HPU displays main system pressure.

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.

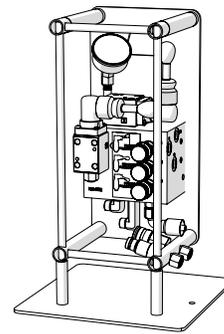


Electric motors are not explosion proof. Operation of these components in an explosive atmosphere will result in serious injury or death.

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CD002487-10-16-19



CD02489-10-17-19

## Hydraulic Fluid Reservoir

**DynaMc® 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.

**EP1500AD:** The reservoir is to the rear of the HPU. The fluid level is read from the sight gauge on the face of the reservoir.

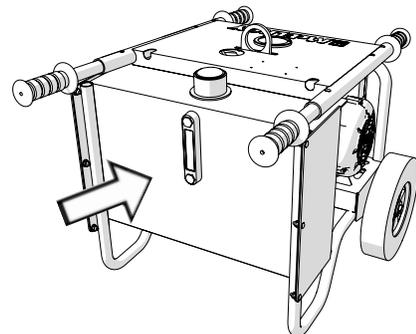
Never allow dirt or other foreign matter to enter the open tank.

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



**DynaMc® HPU**

PH04144-4-12-10



**EP1500AD**

CD002490-10-21-19

TX04662-10-21-19

# Overview

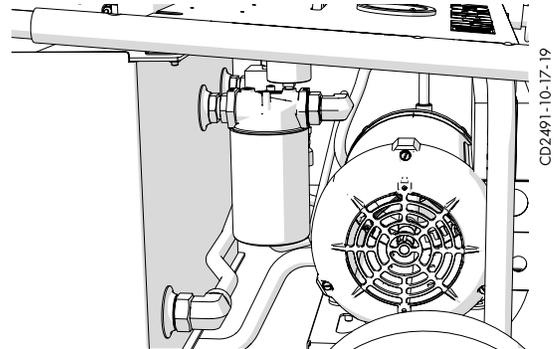
## Filter

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

DynaMc® HPU



PH04143-4-12-10



EP 1500AD

CD2491-10-17-19

TX02132-07-08-03

## Hydraulic Manifold Block

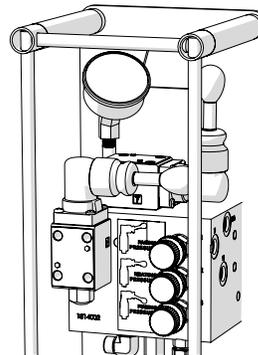
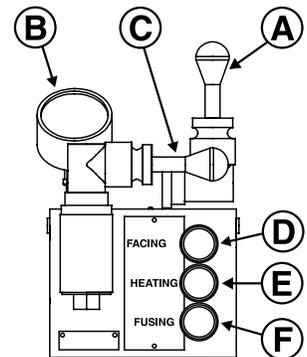
Mounted on this block are a carriage directional control valve, a pressure reducing selector valve, three pressure reducing valves, and a 1500 psi gauge.

- A) The carriage control valve, mounted on the top of the manifold, determines whether the carriage is moving left, right, or is in neutral.
- B) A 1500 psi gauge is mounted on top of the manifold.
- C) The selector valve, mounted on the front of the manifold, selects a reduced pressure from one of the pressure reducing valves.

Each pressure reducing valve is labeled with a different function:

- D) The top valve adjusts facing pressure to a maximum of 400 psi.
- E) The middle valve adjusts heating pressure to a maximum of 400 psi.
- F) The bottom valve adjusts fusion pressure to a maximum of 1500 psi.

TX02133-07-08-03



PH04142-4-12-10

CD02489-10-17-19

CD00138A-9-12-94

## 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.



PH03949-3-29-10

PH04126-4-7-10

TX03094-4-7-10

# Overview

## Facer

The facer is of the McElroy rotating planer-block design. The blade holders each contain multiple cutter blades. The block rotates on ball bearings and is chain driven (enclosed in lubricant) by an electric motor. The facer has a release mechanism for quick and easy removal from the machine. The facer can be inserted from either side of the carriage.

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



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

### 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 1-1/8" hex shaft allows for manual operation in explosive atmospheres.

### 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 1-1/8" hex shaft allows for manual operation in an explosive atmosphere.

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.

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



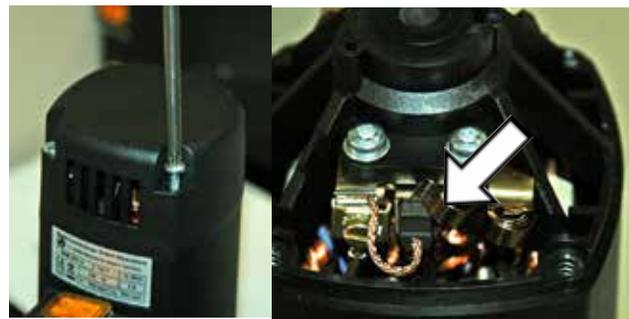
PH03873-3-29-10



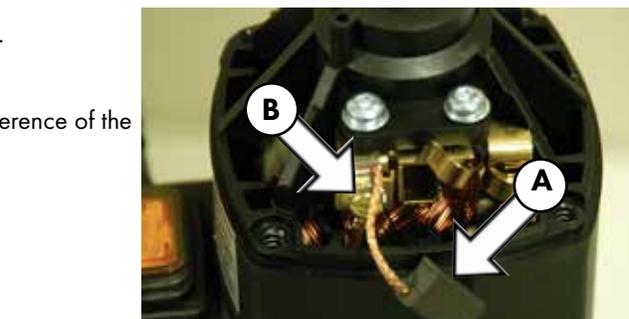
PH04099-3-29-10



PH01847-7-25-00



PH04130-4-12-10



PH04130-4-12-10

# Overview

## Heater

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

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

The heater 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.

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

**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 nonsynthetic cloth before every fusion joint.



PH03874-3-29-10



PH02314-4-24-02

TX02981-01-03-14

## 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.



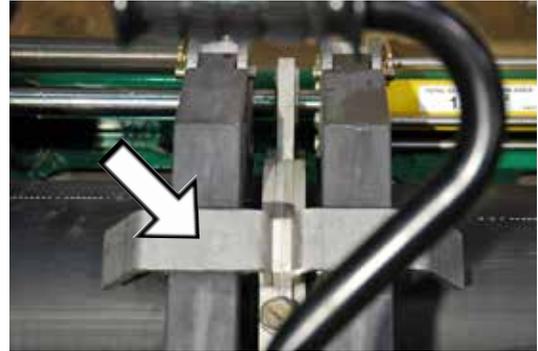
PH03874-3-29-10

TX04664-03-24-14

# Overview

## 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.

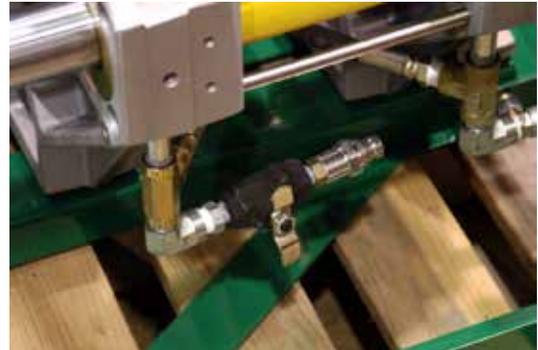
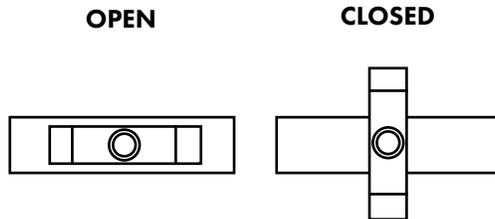


PH04127-4-12-10

TX03095-4-7-10

## Carriage Shut-off Valve

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

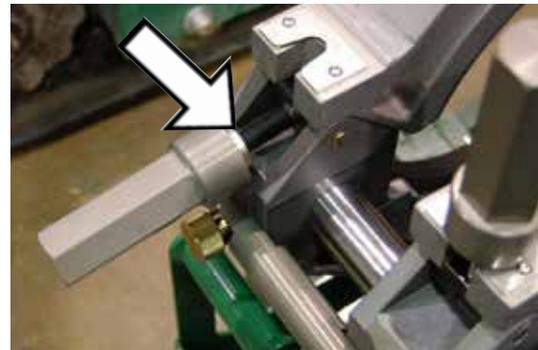


PH04133-4-12-10

TX04048-4-12-10

## Clamp Knobs

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



PH03895-3-29-10

TX03099-4-12-10

# 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-12-22-92

## Check Fluid Level

### DynaMc® HPU:

Before connecting to power and with the machine off, unscrew the dipstick and check the fluid level. The fluid level should be within  $\pm 0.25"$  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.

### EP1500AD:

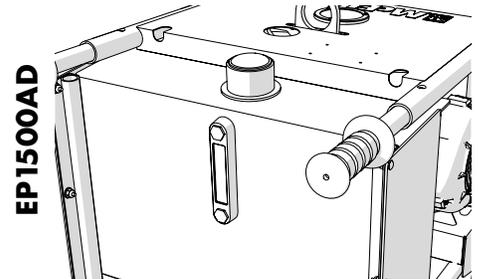
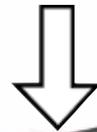
With the machine off and on a level surface, inspect the sight gauge on the reservoir for fluid at the high mark.

Add hydraulic fluid until the sight gauge reads fluid at the high mark.

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

TX04000-10-21-19

DynaMc® HPU



PH04145-4-12-10  
PH04136-4-12-10

## Connecting to Power



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.

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.

TX04001-03-24-14



FACER

PH04132-4-12-10



HPU

PH04141-4-12-10



HEATER

PH03874-4-12-10

# Butt Fusion Procedure

## Prepare Heater



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

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

Install butt fusion heater plates.

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

Place heater in insulated heater stand.

Plug heater into a proper power source.

Allow heater to warm-up to operating temperature.

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



PH03874-3-29-10



PH00420-11-1-94

TX02310-03-24-14

## Pipe Supports

Low profile rollers are recommended for proper pipe alignment with the jaws



PH03879-3-29-10

TX04002-4-12-10

## Install Clamping Inserts

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



PH00304-9-24-93

TX01310-4-1-97

# Butt Fusion Procedure

## Hydraulic Power Unit (HPU)



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

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

Turn on main power switch and note pressure at the system pressure gauge.

### EP1500AD:

System pressure is set to 1300 PSI at the factory but can be adjusted up to 1500 PSI Max.

To adjust the system pressure, loosen the locking ring under the adjustment knob. Turn the adjustment knob until the system pressure gauge on the top of the HPU reads the desired system pressure. Tighten the locking ring to secure the knob position.



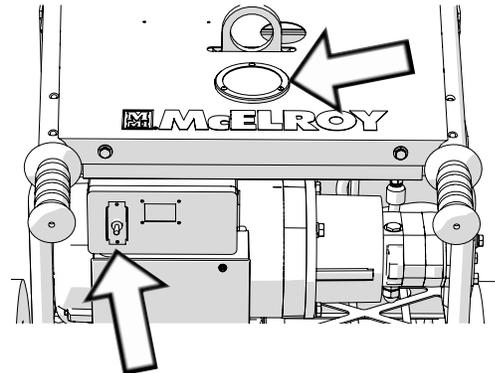
PH04140-4-12-10

DynaMc® HPU

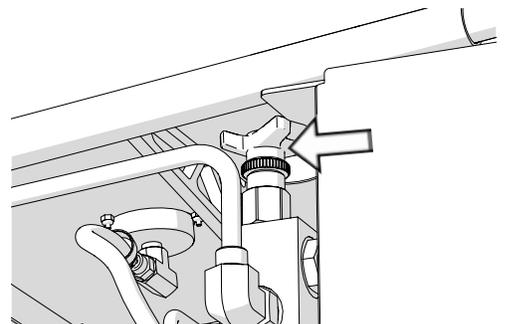


PH04138-4-12-10

EP1500AD



EP1500AD



# Butt Fusion Procedure

## Facer

### **⚠ DANGER**

Electric motors are not explosion proof. Operation of these components in a hazardous environment without necessary safety precautions will result in serious injury and death.

Ensure facer power switch is in the off position.

Connect facer to proper power source.

Don't turn on facer until ready to face.



PH04125-4-12-10

### **Remove brushes on the Milwaukee facer motor:**

The armature brushes must be removed from the electric motor when manually operating in a hazardous condition. Unscrew the brushes from both sides of the motor. (Both brushes must be removed). A 1-1/8" hex shaft allows for manual operation in hazardous conditions.



PH01847-7-25-00

### **Remove brushes on the Eibenstock facer motor:**

The armature brushes must be removed from the electric motor when manually operating in a hazardous condition.

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.

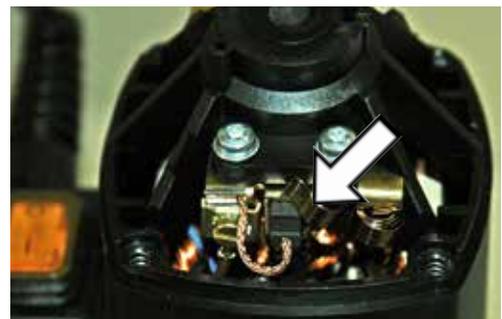
Repeat these steps on the wire on the opposite side.

Store the brushes in a safe location until needed.

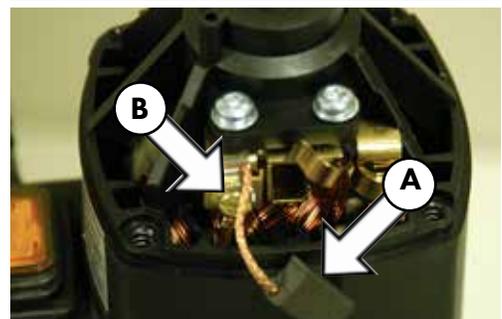
A 1-1/8" hex shaft allows for manual operation in hazardous conditions.



PH04129-4-12-10



PH04130-4-12-10

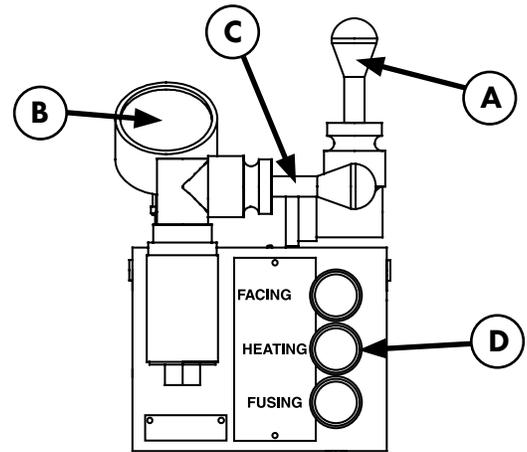


PH04130-4-12-10

# Butt Fusion Procedure

## Hydraulic Pressure

The pressure gauge above the manifold block indicates the pressure at the carriage control valve. The pressure shown on the gauge is determined by the position of the selector valve and the pressure setting of the selected pressure reducing valve.



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

# Butt Fusion Procedure

## Jaw Configuration

The DynaMc EP 4 jaw machines can be configured to a 2 movable/2 fixed jaw configuration or a 3 movable/1 fixed jaw configuration. This will allow work in close proximity to ells and tees without the removal of the outer jaw.

### To change to the 3 movable/1 fixed jaw configuration:

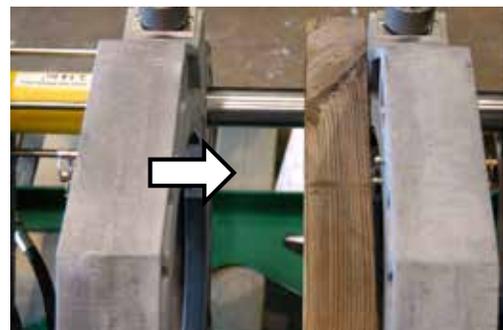
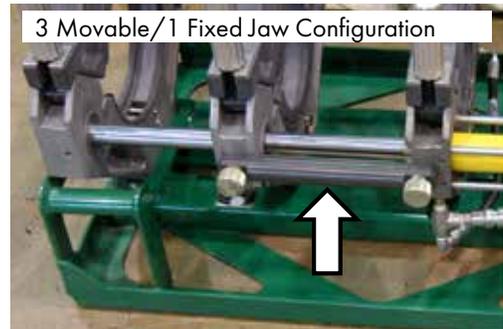
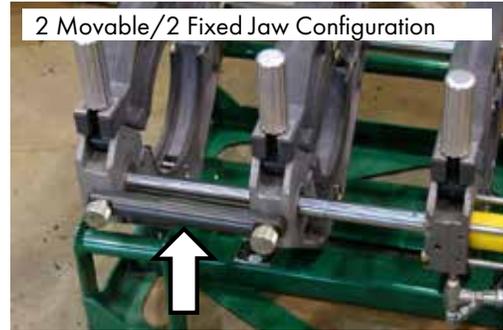
Unscrew the knobs on the jaw braces and remove the braces.

Align the brace between the middle 2 jaws. The carriage may have to be moved to align the brace. Attach the brace with the knobs to secure them in place.

### To change to the 2 movable/2 fixed jaw configuration:

Unscrew the knobs on the jaw braces and remove the braces.

Align the brace between the outer fixed jaw and adjacent jaw. The carriage may have to be moved to align the brace. A block of wood should be used on both sides across the guide rods to push the adjacent jaw with the movable jaws to align with the outer fixed jaw. Attach the brace with the knobs to secure them in place.



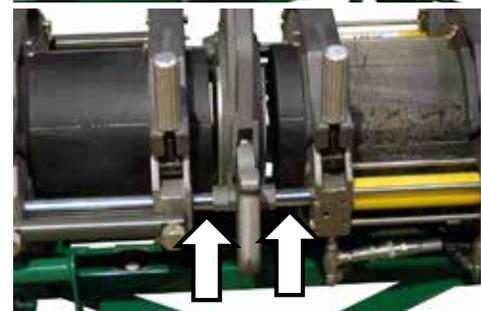
TX04006-4-12-10

## 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 .75" for model 28 and 1.25" for model 250/412.

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



TX04038-04-07-14

# Butt Fusion Procedure

## 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.

TX04007-4-12-10



PH04135-4-12-10

## Begin Facing

Move the carriage to the right.

Turn on the facer.

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

Move the carriage control valve to the left.

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

Let the carriage bottom out on facer stops.

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.

TX04008-4-12-10



PH04125-4-5-10



PH04107-3-29-10

# Butt Fusion Procedure

## After Facing

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

Release the handle lock, and lift the facer out.

Close carriage shut off valve.

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

Remove chips from pipe ends.

Do not touch faced pipe ends.

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

Open shut off valve.



PH04100-3-29-10

# Butt Fusion Procedure

## Determine Drag Pressure

Drag pressure should be determined using the following procedure:

Move the carriage so that the faced pipe ends are approximately 1" apart.

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

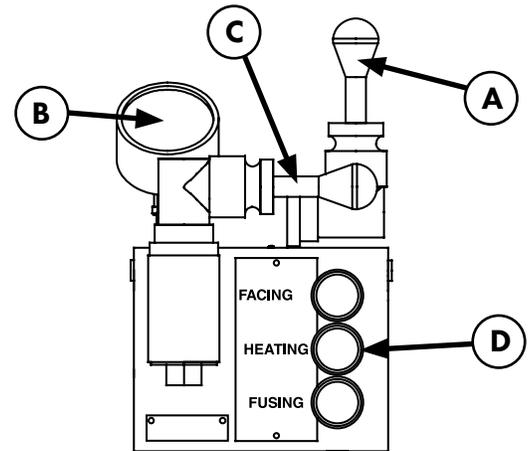
Select the heating mode, and adjust the middle pressure reducing valve to its lowest pressure by turning the valve completely counterclockwise.

Shift the carriage control valve to the left.

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

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

Record this actual drag pressure.



CD02492-10-18-19

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

TX03023-8-19-09

## Calculate Fusion Pressure

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

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

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

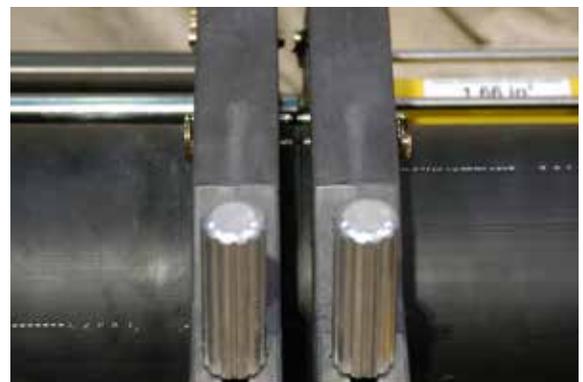


PH04004-8-25-09

TX03024-8-19-09

## Check for Slippage

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



PH04128-4-12-10

TX00971-5-31-96

# 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.

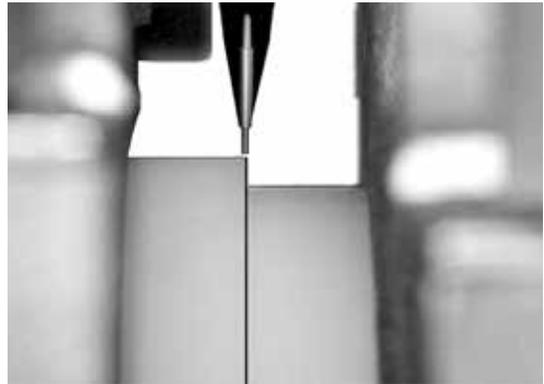
If pipe is not lined up, tighten the high side jaw to bring into alignment.

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

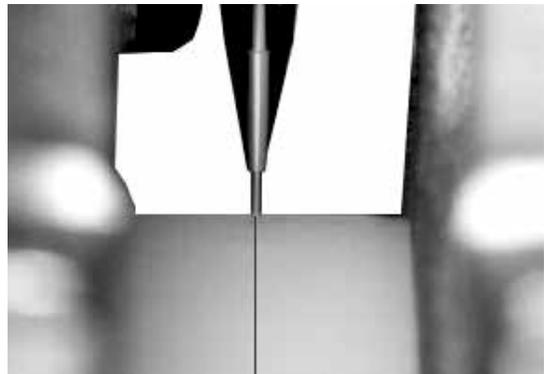
When the pipe is properly aligned tighten outside clamps to insure against slippage.

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

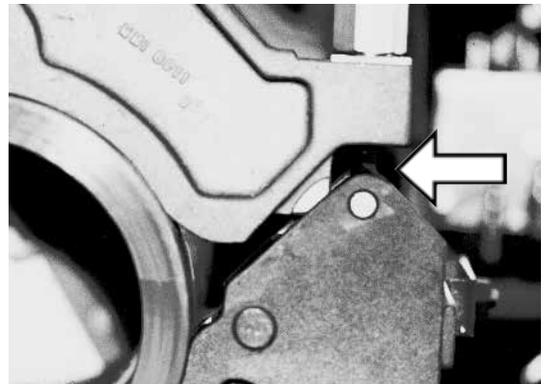
**NOTICE:** When clamping, do not over-tighten the clamp knobs because machine damage can result. Check to see if there is space between the upper and lower jaws. If the two jaws are touching, do not continue to tighten.



PH00366-9-12-94



PH00357-9-12-94



PH00323-9-25-93

TX04010-03-24-14

## Position Carriage for Heater Insertion

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

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



PH04100-3-29-10

TX04009-4-12-10

# Butt Fusion Procedure

## 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.

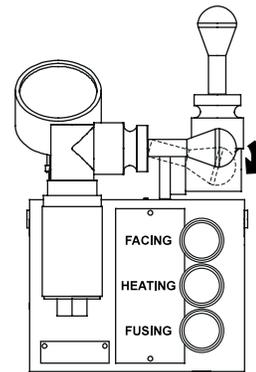


PH00420-11-1-94

TX04011-4-12-10

## Select the Fusion Position

Move selector valve handle down to the fusing position.



CD00138E-9-12-94

TX00376-9-15-94

# Butt Fusion Procedure

## 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.

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

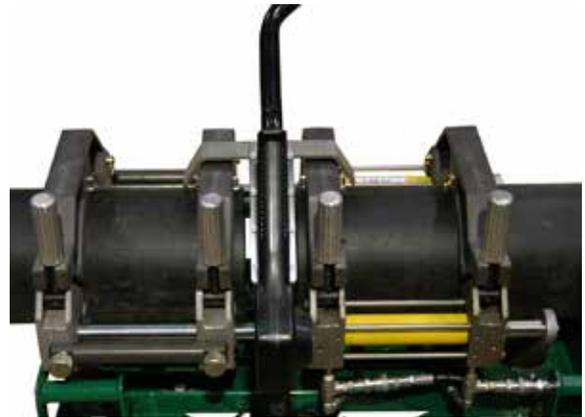
Use a clean non-synthetic cloth to clean the butt fusion heater adapter surfaces.

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

Insert heater between the pipe ends.



PH03875-3-29-10

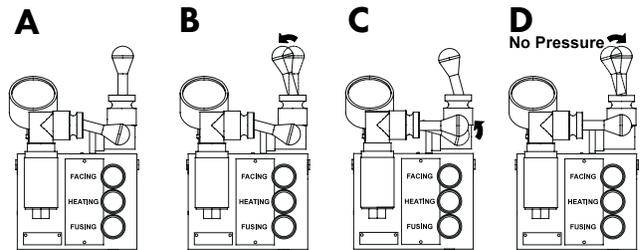


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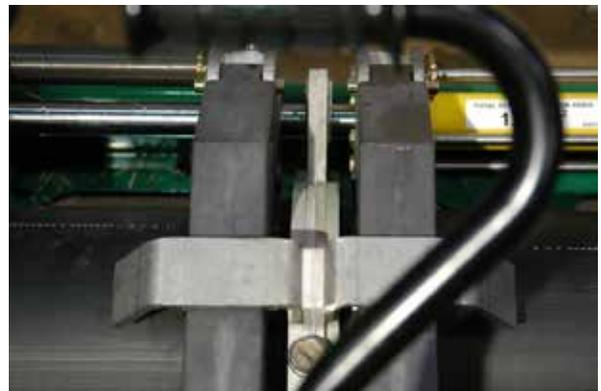
TX04050-03-24-14

## Heating the Pipe

- Verify that the selector valve is in the fusion position.
- Close carriage to bring pipe ends in contact with the heater.
- Move selector valve to middle (heating mode) position.
- 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 control valve to neutral.



CD00140-9-12-94



PH04102-3-29-10

TX04012-03-24-14

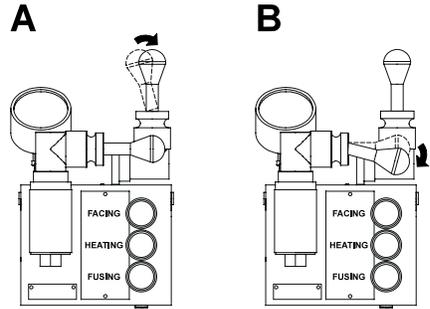
# Butt Fusion Procedure

## Fusing the Pipe

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

After following the pipe manufacturer's suggested heating procedure:

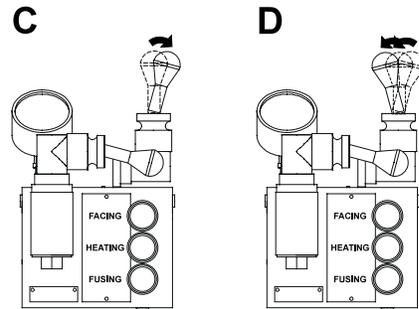
- A) Shift carriage control valve to neutral position, if it is not already in that position.
- B) Shift the selector valve down to fusion position.



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

**Quickly remove the heater and inspect pipe ends for appropriate melt.**

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



Allow joint to cool under pressure.

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



TX04013-03-24-14

CD00141A-9-12-94

CD00141B-9-12-94

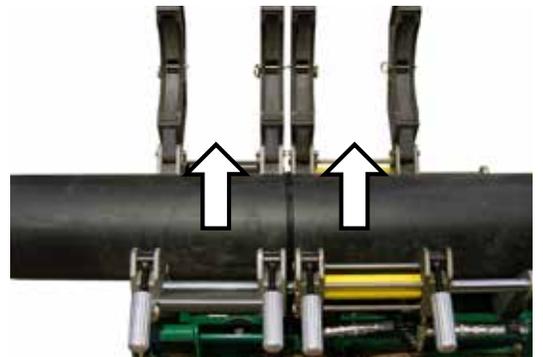
PH04103-3-29-10

## Opening Jaws

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

Loosen all clamp knobs, and open the carriage.

Open the all jaws



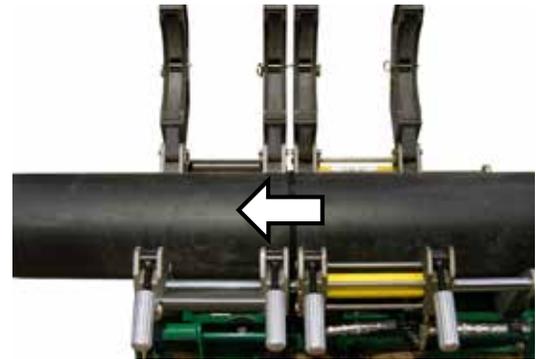
TX04014-4-12-10

PH04104-3-29-10

# Butt Fusion Procedure

## 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 .75" for 28 and 1.25" for 250/412 past the fixed jaw.



PH04104-3-29-10

TX04015-4-12-10

## Install Next Piece of Pipe

Move the carriage control valve and open the carriage completely. Insert a new piece of pipe in movable jaws and repeat all previous procedures.



PH04098-3-29-10

TX04016-4-12-10

# Special Operations - In Ditch

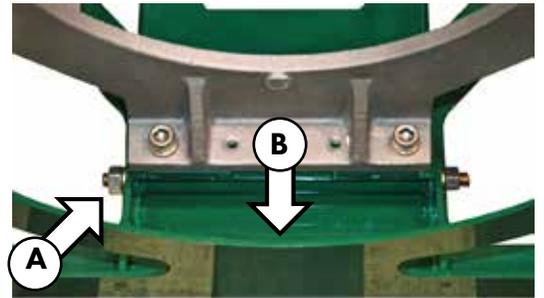
## Remove Carriage from Skid

The carriage can be removed from the base for close quarters in ditch fusion.

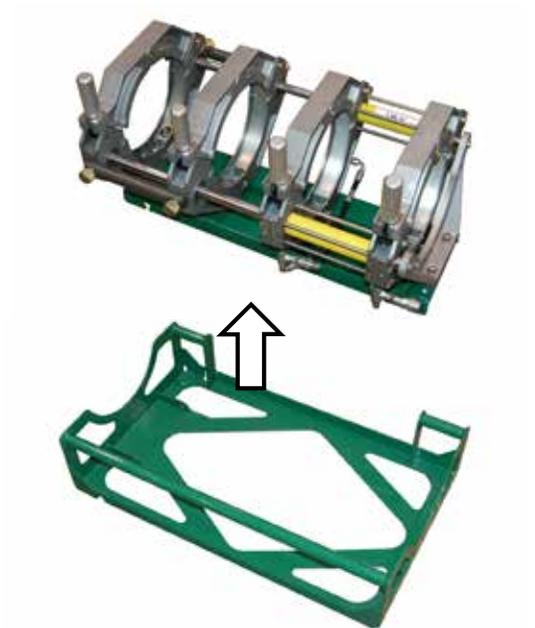
To remove the carriage:

- A) Remove the rod out of the carriage and through the opening on the base.
- B) Slide the carriage forward to release it from the back of the base.

Lift the carriage away from the base.



PH03900-4-15-09



PH04124-4-5-10

PH04123-4-5-10

TX02967-4-15-09

# Special Operations - In Ditch

## Lower the Carriage into Ditch

### Lowering carriage without the skid

Open the jaws.

Attach lifting strap (not included) to carriage base.

Lift carriage assembly and lower into ditch.

Lower carriage on top of the pipe and rotate the carriage underneath the pipe.



PH04121-4-5-10

### Lowering carriage with skid

Attach lifting strap to the carriage skid.

Lift carriage assembly and lower into the ditch.



PH04120-4-5-10



Components of the DynaMc® EP fusion machines may be heavy. Using one person to lift may result in injury. Two people are required to lift components.

### Lowering the carriage without skid manually

Open the jaws.

Rotate the carriage on its jaws.

Two person lift the carriage using the carriage base.

Lift carriage assembly and lower into the ditch.



PH04122-4-5-10

### Lowering the carriage with skid manually

Two person lift the carriage assembly using the handles on each end of the skid.

Lift carriage assembly and lower into the ditch.



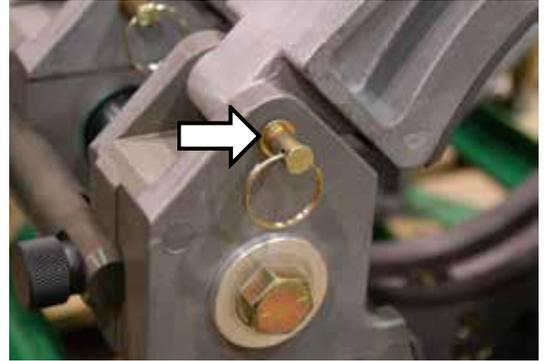
PH04122-4-5-10

# Special Operations - In Ditch

## Removing Top Jaws

If the carriage needs to be hoisted and slid underneath the pipe, the top jaws may need to be removed.

Loosen all clamp knobs. Take out the detent pins securing the top jaws and remove the jaws.

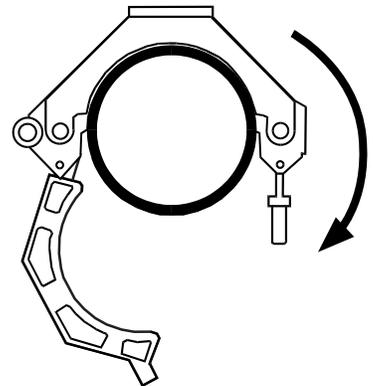


PH04137-4-12-10

TX04018-4-12-10

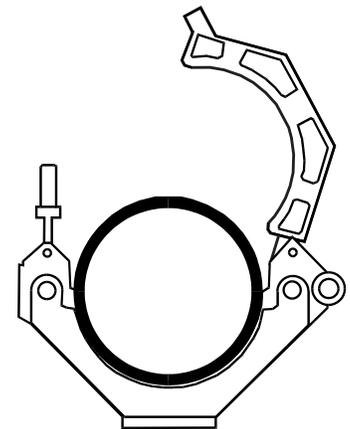
## Clamp Carriage Assembly to Pipe

Position carriage assembly on top of the pipe. Lift pipe and rotate carriage assembly under pipe.



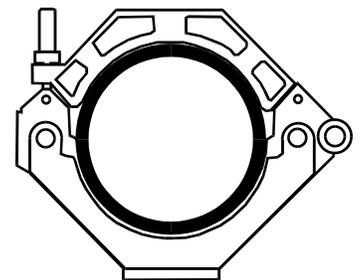
CD00194d-4-5-10

Rotate carriage assembly around to a normal upright position.



CD00194d-4-5-10

Attach the top jaws if removed and loosely clamp around pipe.



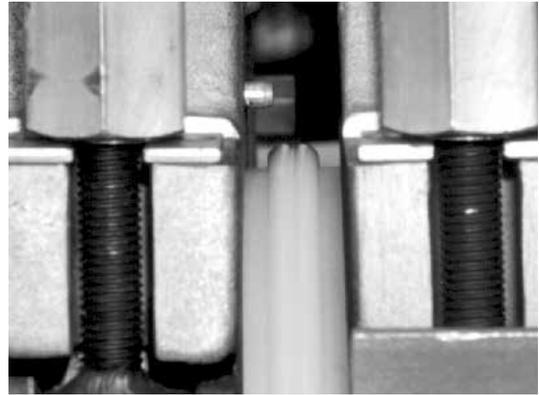
CD00195d-4-5-10

TX04019-4-12-10

# Special Operations - In Ditch

## Make Fusion Joint

Refer to the "Butt Fusion Procedure" for operating instructions.  
After facing operation, remove the facer from ditch.



PH00363-9-12-94

TX00450-9-16-94

## Remove Carriage Assembly from Ditch

Loosen clamp knobs and remove top jaws if needed.  
Rotate carriage assembly from under the pipe.  
Use one of the recommended lifting methods from "Lower the Carriage into Ditch" section of this manual to lift the carriage from the ditch.  
Lift carriage assembly from ditch.

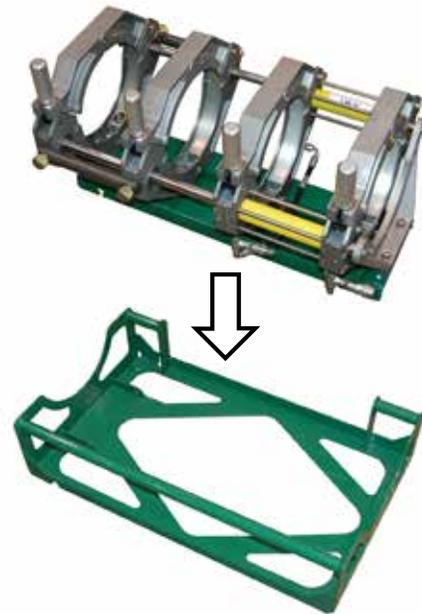


PH04121-4-5-10

TX04020-4-12-10

## Attach Carriage to Skid

Install carriage assembly to the skid. Refer to the "Remove Carriage from Base" section of this manual and follow instructions in reverse to attach carriage to skid.  
Replace top jaws if removed.



PH04124-4-5-10

PH04123-4-5-10

TX04021-4-12-10

# Special Operations - Saddle Fusion Procedure

## Saddle Fusion Procedure

The 28 Sidewall fuses branch saddles up to 8" DIPS outlet and up to a 9-5/8" diameter base on any size main.

**IMPORTANT:** Optional chain extension kit is available for larger main sizes.

TX04045-4-12-10



PH04108-3-30-10

## Install Heater Adapters

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

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

Select appropriate heater and sidewall fusion heater adapters. Clean heater surfaces and adapter surfaces. Attach the adapters to the heater.

Place heater in insulated heater blanket.

Plug heater into a proper power source.

TX00455-04-07-14



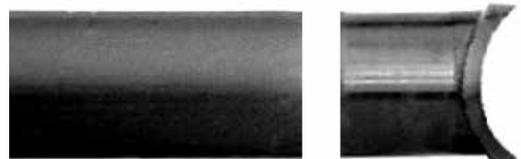
PH04117-4-5-10



PH04118-4-5-10

## Assure Saddle Will Fit

For branch saddles, a nipple long enough to extend through the movable jaw may need to be butt fused using a butt fusion machine and the butt fusion procedures.



PH00423-11-1-94

TX04022-4-12-10

# Special Operations - Saddle Fusion Procedure

## Install Clamping Inserts

Select and install appropriate clamping inserts in the movable jaw.



PH00304-9-23-93

TX04023-4-12-10

## Attach Carriage Assembly to Main

Place the machine on the main.

Place a line bolster on main opposite the carriage assembly if required.

Position the tailstock chains around the main and lock into the chain hooks.

Tighten the machine onto the main using the tailstock clamp knobs.



PH00387-9-21-94

TX04024-4-12-10

## Hydraulic Manifold Block

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

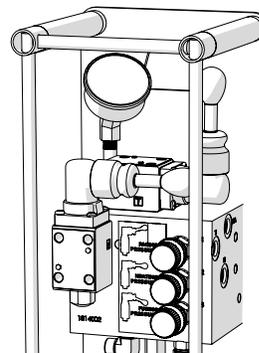
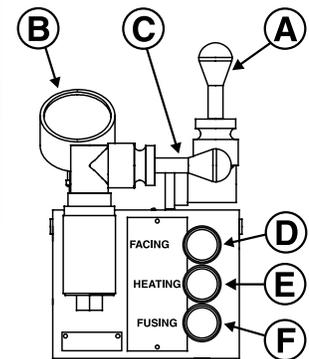
- A) The carriage control valve, mounted on the top of the manifold, determines whether the carriage is moving left, right, or is in neutral.
- B) A 1500 psi gauge is mounted on top of the manifold.
- C) The selector valve, mounted on the front of the manifold, selects a reduced pressure from one of the pressure reducing valves.



Each pressure reducing valve is labeled with a different function.

**IMPORTANT:** These functions are labeled for standard butt fusion. For saddle fusion the top valve is used for fusion pressure, the middle valve for heat/soak pressure and the bottom valve for initial heat (bead-up) pressure.

- D) The top valve adjusts pressure to a maximum of 400 psi.
- E) The middle valve adjusts pressure to a maximum of 400 psi.
- F) The bottom valve adjusts pressure to a maximum of 1500 psi.



PH04142-4-12-10

CD02489-10-17-19

CD00138A-9-12-94

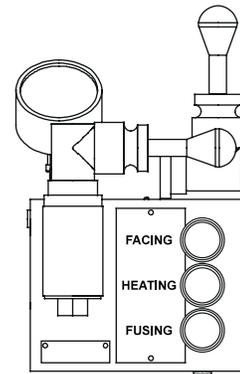
TX04051-4-12-10

# Special Operations - Saddle Fusion Procedure

## Set Hydraulic Pressure

Check hydraulic pressure. Shift the selector valve to the center position to set the pressure for heat/soak. With the selector valve in the down position, the initial heat (bead-up) pressure can be set. With the selector valve in the top position, the fusion pressure can be set.

Consult the pipe manufacturer's recommendations or appropriate joining standard for proper pressures.



TX04025-4-12-10

CD001388-9-12-94

## Clean Surfaces

Use 50 or 60 grit utility cloth or scraping tool to clean and rough the main to expose fresh material.

Rough the base of the fitting unless the manufacturer specifies otherwise.



TX04026-4-12-10

PH04110-3-30-10  
PH04111-3-30-10

## Clamp Fitting

Position the fitting, and bolster if required, loosely in the movable jaw. Close the carriage to properly position the fitting on the main. Tighten the clamp knob.

Be sure to allow enough travel for the melt pattern and fusion to occur (3/4" min.).



TX04027-4-12-10

PH00399-9-21-94

## Test for Slippage

Bring the fitting against the main under initial heat (bead-up) pressure to insure that no slippage or movement of the main or fitting occurs.

**IMPORTANT:** A piece of slightly larger pipe could be used as a spacer between the saddle base and the movable jaw to prevent slippage.



TX04028-4-12-10

PH00390-9-21-94

# Special Operations - Saddle Fusion Procedure

## Prepare Heater

**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.

**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.



PH04118-4-5-10



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.

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

Use a clean nonsynthetic cloth to clean the butt fusion heater adapter surfaces.

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

Place the heater on the main centered beneath the fitting base, and then place the Flexible Heat Shield between the heating tool and the fitting base. (This step usually requires an assistant to handle the Flexible Heat Shield).

**IMPORTANT:** A heat shield may not be required for fittings 3" and smaller.



PH04118-4-5-10

TX04041-04-07-14

# Special Operations - Saddle Fusion Procedure

## Heat Pipe and Fitting

Move selector valve to the bottom position.

Move the fitting against the Flexible Heat Shield under bead-up pressure, and observe melt bead formation on the main all around the heater faces. When a melt bead is first visible on the main all around the heating tool faces, in a quick continuous motion, open the carriage slightly and remove the Flexible Heat Shield.

Move the fitting against the heater face and start the heat time. When a melt bead is first visible all around the fitting base (usually about 3 to 5 seconds) immediately move the selector valve to the middle position to reduce pressure to the heat soak pressure (usually drag). Wait for the pressure to drop to drag pressure then shift the control valve to neutral. Maintain the heat soak pressure according to the pipe fitting manufacturer's recommendations or appropriate joining standard.



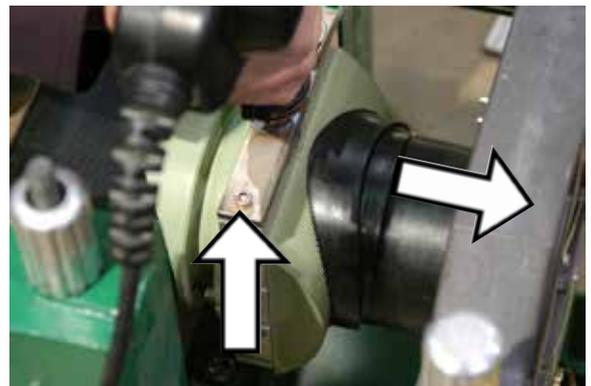
TX04042-4-12-10

## Remove Heater

Shift the carriage control valve to neutral and move the selector valve to the top position. Open the carriage just enough to remove the heater.

Remove the heater.

Quickly check for a complete and even melt pattern on the pipe main and fitting.



TX04029-4-12-10

## Fuse Fitting to Pipe

Quickly close the carriage bringing the fitting and main together under the pipe manufacturer's recommended pressure or appropriate joining standard.



TX04030-4-12-10

# Special Operations - Saddle Fusion Procedure

## Allow Joint to Cool

Allow the joint to cool under pressure as specified by the pipe manufacturer's recommendation or appropriate joining standard. To maintain fusion pressure during cooling, the carriage control valve must be positioned in the left hand direction.



PH04116-3-30-10

TX04043-4-12-10

# Special Operations - Lifting Fusion Machine

## Lifting Safety

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

### **⚠️ WARNING**

#### Safety warnings:

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



TX04047-04-07-14

SAFE18-12-14-92

WR00014-3-8-93

## Manual Lifting

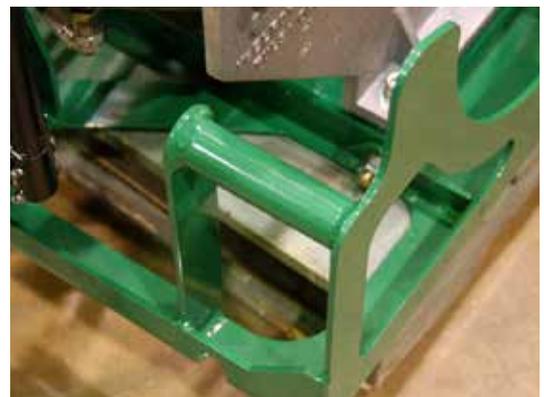
There are two hand holds on the operator side of the machine and a long hand hold along the opposite side of the machine.

The fusion carriages are a two person lift and should not be lifted alone.

The DynaMc® Hydraulic Power Unit (HPU) is a two person lift and should not be lifted alone.

### **⚠️ CAUTION**

Components of the DynaMc® EP fusion machines may be heavy. Using one person to lift may result in injury. Two people are required to lift components.



TX04031-04-07-14

PH02497-07-11-03

# Special Operations - Lifting Fusion Machine

## Powered Lifting

Powered lifting requires a hoist or lifting equipment of proper lifting capacity to lift the machine.

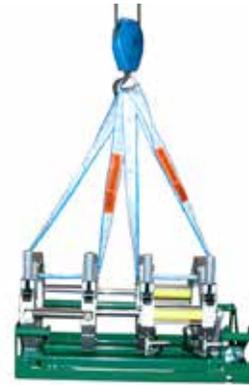
### Close jaws and tighten the jaw clamp knobs on each jaw.

Attach a properly rated lifting strap through the center of the movable jaws and a strap through the center of the fixed jaws.

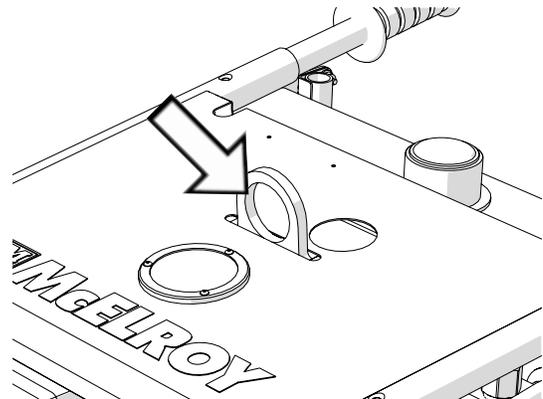
For 2 Jaw machines, attach a properly rated lifting strap through the center of each jaw.

Use proper overhead rigging and equipment of adequate load rating to lift the fusion unit.

**EP1500AD** - Use the lifting eye in the center of the top plate to lift the HPU.



PH04119-4-5-10



PH04119-4-5-10

TX04032-10-21-19

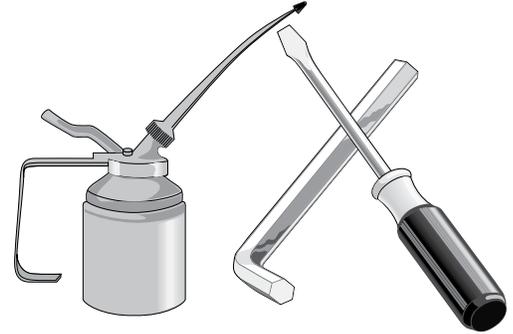
# Maintenance

## Preventative Maintenance

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

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

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



TX00428-8-10-95

CD00142-11-2-94

## Washing the Machine

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



TX00429-9-15-94

PH04096-3-29-10

## Check Hydraulic Fluid

### DynaMc® HPU:

Before connecting to power and with the machine off, unscrew the dipstick and check the fluid level. The fluid level should be within  $\pm 0.25$ " 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.

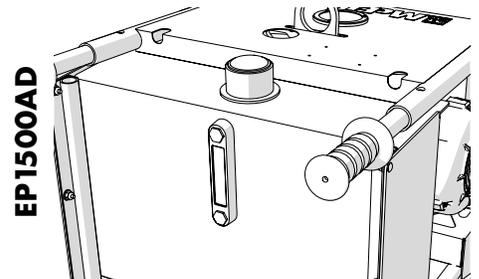
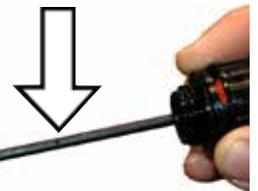
### EP1500AD:

With the machine off and on a level surface, inspect the sight gauge on the reservoir for fluid at the high mark.

Add hydraulic fluid until the sight gauge reads fluid at the high mark.

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

DynaMc® HPU



TX04000-10-21-19

PH04136-4-12-10

PH04145-4-12-10

# Maintenance

## Change Hydraulic Fluid and Filter

**DynaMc® HPU** - The hydraulic filter should be replaced every year.

The hydraulic fluid should be replaced every two years.

**EP1500AD** - The hydraulic fluid and filter should be replaced when the filter pressure gauge indicates "service filter" .

Fluid should also be changed as extreme weather conditions dictate.

Fill the reservoir from a clean container.

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

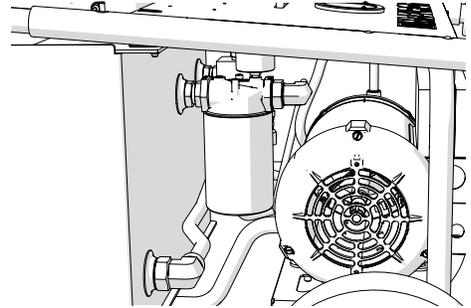
TX03075-10-21-19

DynaMc® HPU



PH04143-4-12-10

EP1500AD



CD2491-10-17-19

## Accumulator Charge (DynaMc HPU)

The precharge should be checked every 6 months.

The accumulator must be charged by a qualified hydraulic service facility to a nitrogen precharge of 500 psi.

An approximate amount of charge can be noted on the system pressure gauge when the HPU is turned on. When the HPU is turned on, the gauge will jump to a pressure before continuing to build pressure. The initial jump in pressure will indicate the approximate pressure of the precharge.

**NOTICE:** The precharge should be checked/maintained by a qualified hydraulics repair tech.

TX04695-10-21-19



PH05177-04-08-14

## Check Pressure Gauges

Both pressure gauges should be checked daily.

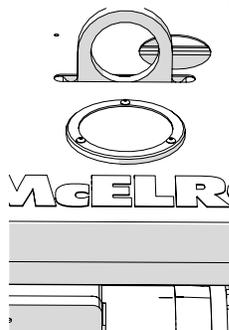
The gauges should read zero when the unit is not running.

Damaged gauges should be replaced.



PH04139-4-12-10

EP1500AD



DynaMc® HPU



PH04138-4-12-10

CD02488-10-18-19

TX04033-4-12-10

# Maintenance

## 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



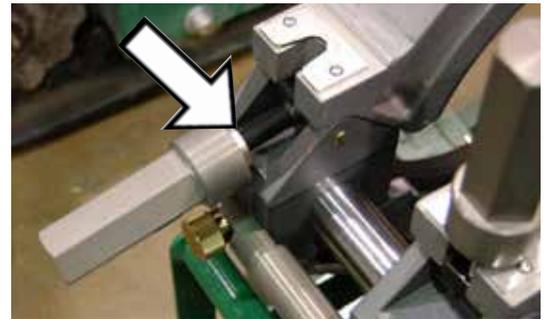
PH03894-3-29-10

## 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

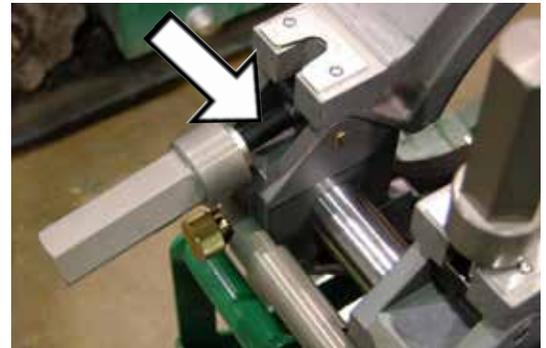


PH03895-3-29-10

## Clean Eyebolt Threads

Keep the clamp knob eyebolt threads brushed clean.

TX00435-9-13-94



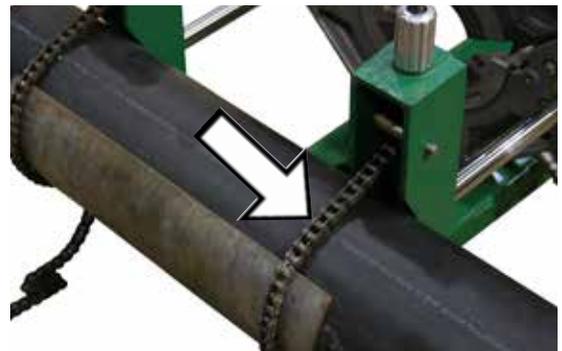
PH03895-3-29-10

## Clean the Clamping Chains

On the 28 sidewall unit, clean the tailstock chains as needed.

Clean using a stiff-bristled brush and oil generously. Wipe away any excess oil.

TX04034-4-12-10



PH04109-4-5-10

# Maintenance

## Fasteners Must Be Tight

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



PH00433-11-1-94

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.



PH03896-3-29-10

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, non-synthetic cloth.

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



PH03875-3-29-10

TX00440-8-14-08

# Maintenance

## Bleeding Air From Hydraulic System

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

### For the 28 and 250 machines:

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

### For the 412 machines:

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

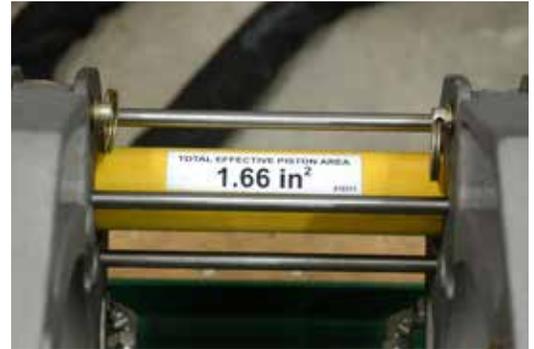
Loosen the bleed plug on one cylinder next to the fixed jaw.

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 the this end of the cylinders.



PH03949-3-29-10



PH04126-4-7-10

TX02975-04-08-14

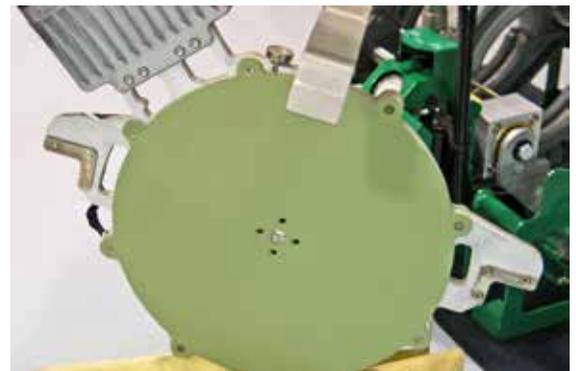
## Installing Butt Fusion Heater Plates

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.



PH03876-3-29-10

TX04035-4-12-10

# Maintenance

## 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.

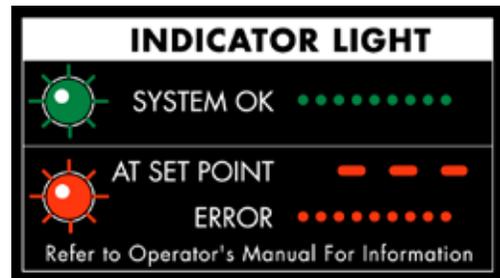
The heater has a red indicator light on the handle at the bottom of the temperature scale. When the heater is plugged in and preheating the red light glows steadily until the set temperature is reached. The red light then goes off and on as the heater maintains temperature.

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

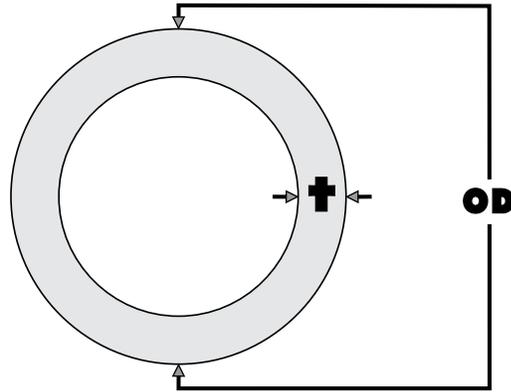
| Item to Check                                   | Satisfactory | Needs Repair | Repair Comments |
|---|--------------|--------------|-----------------|
| <b>UNIT</b>                                     |              |              |                 |
| Machine is clean                                |              |              |                 |
| 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           |              |              |                 |
| Oil 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 Valves operate smoothly   |              |              |                 |
| Pressure Reducing Valves operate in their range |              |              |                 |
| Heater surface is clean and in good condition   |              |              |                 |
| Thermometer is in good working order            |              |              |                 |
| Surface temperature checked with pyrometer      |              |              |                 |

TX04037-4-12-10

# Determining Fusion Pressure

## Variable Definitions

- O.D. = Outside Diameter of Pipe (inch)  
 t = Wall Thickness of Pipe (inch)  
 $\Pi$  = 3.14  
 SDR = Standard Dimensional Ratio of Pipe (unitless)  
 IFP = Interfacial Pressure of Pipe (PSI)  
 TEPA = Total Effective Piston Area of Carriage Cylinders (inch<sup>2</sup>)



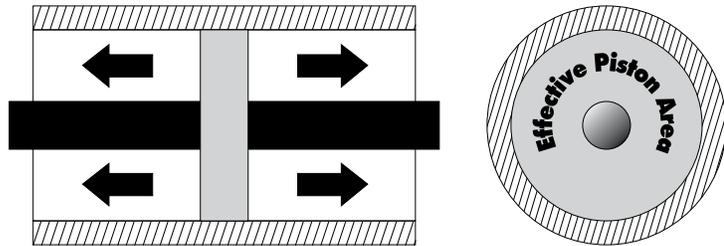
## Formulas

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

$$\text{PIPE AREA} = (\text{O.D.} - t) \times t \times \Pi$$

$$\text{FUSION FORCE} = \text{AREA} \times \text{IFP}$$

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



## 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

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

TEPA = 4.71 (From Table)

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

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

**Total Effective Piston Areas (in<sup>2</sup>)**

| Fusion Model | High Force | Medium | Low Force |
|--------------|------------|--------|-----------|
| A160/A250    | -          | -      | 0.90      |
| 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      | -      | -         |

# Determining Fusion Pressure - Sidewall

## Variable Definitions

- O.D. = Outside Diameter of Base (not branch)  
 t = Wall Thickness  
 $\Pi$  = 3.1416  
 SDR = Standard Dimensional Ratio  
 IFP = Manufacturer's Recommended Interfacial Pressure  
 TEPA = Total Effective Piston Area

## Formulas

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

$$\text{AREA} = (\text{O.D.} - t) \times t \times \Pi$$

$$\text{FORCE} = \text{AREA} \times \text{IFP}$$

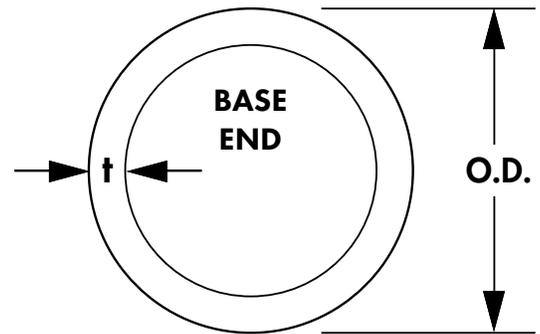
- IFP = 60 PSI for Bead-up  
 0 PSI for Heat/Soak  
 30 PSI for Saddle Fusion

### ROUND BASE

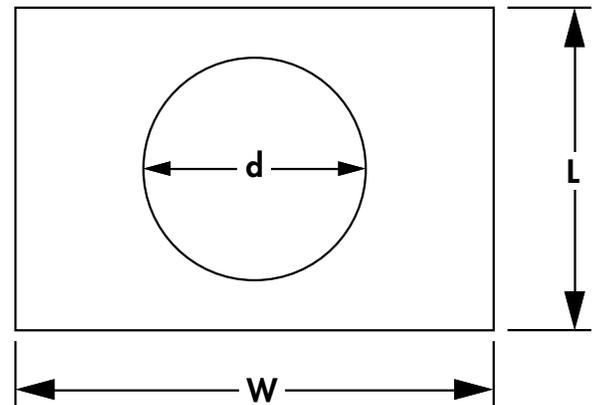
$$\frac{(\text{O.D.} - t) \times t \times \Pi \times \text{IFP}}{\text{TEPA}}$$

### RECTANGULAR BASE

$$\frac{[L \times W - (d \times d \times 0.7854)] \times \text{IFP}}{\text{TEPA}}$$



ROUND BASE



RECTANGULAR BASE

## Example

O.D. of Base = 7.36"

t = 1.10"

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

30 PSI for Saddle Fusion (must calculate for other IFP's also).

Using 28 Combination Unit and calculating the fusion pressure

$$\frac{(\text{O.D.} - t) \times t \times \Pi \times \text{IFP}}{\text{TEPA}} + \text{DRAG}$$

$$\frac{(7.36 - 1.10) \times 1.10 \times 3.14 \times 30}{4.71} + 30 \text{ PSI}$$

$$\frac{648.66}{4.71} + 30 \text{ PSI} = \mathbf{168 \text{ PSI Fusion Pressure}}$$

Using the same formula substitute the IFP with the IFP appropriate for the process and recalculate for each

Heat Soak Pressure for this example = **30 PSI**

Bead-up Pressure for this example = **306 PSI**

| Total Effective Piston Areas |                       |                              |                               |
|------------------------------|-----------------------|------------------------------|-------------------------------|
| Fusion Model                 | High Force (Standard) | Medium Force (High Velocity) | Low Force Extra High Velocity |
| Sidewinder                   | 1.00                  |                              |                               |
| 28 CU                        | 4.71                  | -                            | 1.66                          |
| 28 EP Sidewall               | -                     | -                            | 1.66                          |
| 18 Sidewall                  | 11.80                 | -                            | -                             |
| 36 Sidewall                  | 11.00                 | -                            | -                             |

# Hydraulic Fluids

## 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<br>100F | cSt<br>210F | V.I. | -20F | -10F | 0F | 10F | 30F | 50F | 70F | 90F | 110F | 130F | 150F | Range<br>°F | Range<br>°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.

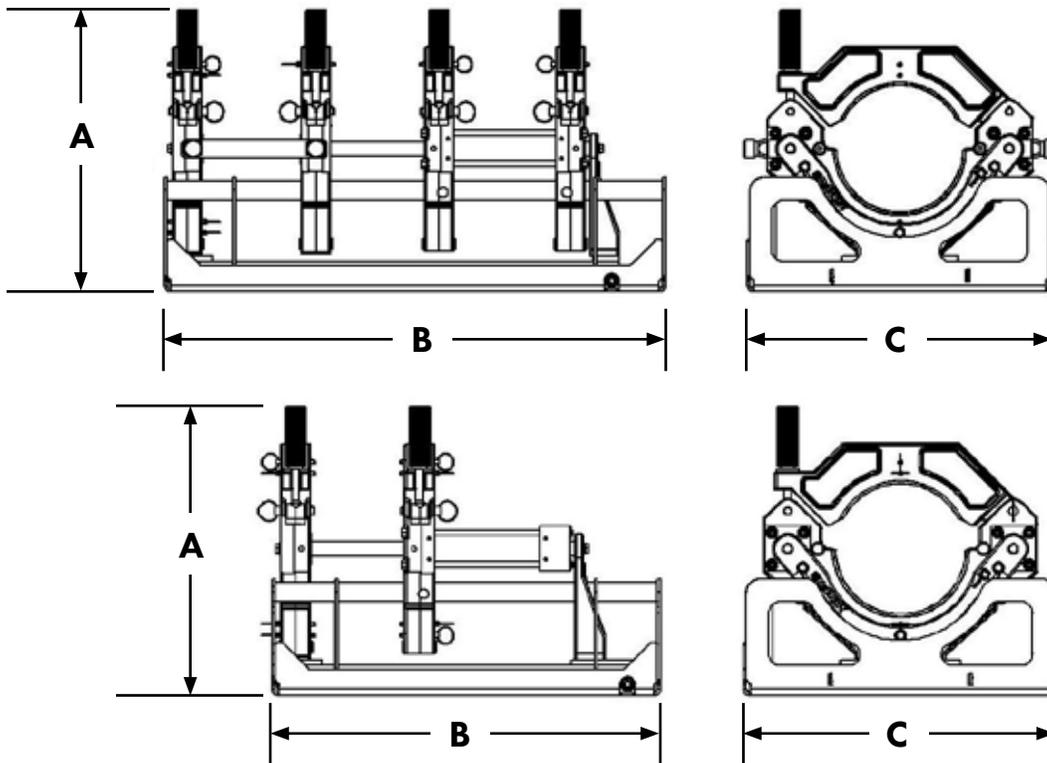
NOTE: Temperatures shown are fluid temperatures. – NOT ambient temperatures.

# Specifications

## Fusion Machine Specifications:

### 28, 250 and 412 EP Carriages

| Dimensions         | 28/250 - 2 Jaw    | 412 - 2 Jaw     | 28/250 - 4 Jaw    | 412 - 4 Jaw     |
|--------------------|-------------------|-----------------|-------------------|-----------------|
| Width: <b>C</b>    | 21" (533 mm)      | 27" (686 mm)    | 21" (533 mm)      | 27" (686 mm)    |
| Length: <b>B</b>   | 26" (660 mm)      | 27" (686 mm)    | 34" (864 mm)      | 34" (864 mm)    |
| Height: <b>A</b>   | 19" (483 mm)      | 24" (610 mm)    | 19" (483 mm)      | 24" (610 mm)    |
| <b>Weights</b>     |                   |                 |                   |                 |
| Carriage Assembly: | 78 lbs (36Kg)     | 170 lbs (77Kg)  | 125 lbs (57Kg)    | 263 lbs (120Kg) |
| Facer:             | 39 lbs. (17.7 kg) | 54 lbs (24.5Kg) | 39 lbs. (17.7 kg) | 54 lbs (24.5Kg) |
| Heater:            | 21 lbs (9.5 kg)   | 24 lbs (10.9Kg) | 21 lbs (9.5 kg)   | 24 lbs (10.9Kg) |



Facer Power: 1.6HP, 10 Amp @ 120 VAC / 5 Amp @ 240 VAC

Heater Power: 28 - 1750 Watts / 250 and 412 - 3000 Watts / 28 Sidewall - 2270 Watts

Design Pressure: 1500 psi max. fusion pressure

Reservoir Capacity: DynaMc HPU - 1 gallon filling volume

EP1500AD - 4.5 gallon filling volume

Hydraulic Fluid: Refer to Hydraulic Fluids Section

Total effective piston area: 1.66 square inches 28/250 and 3.14 square inches 412

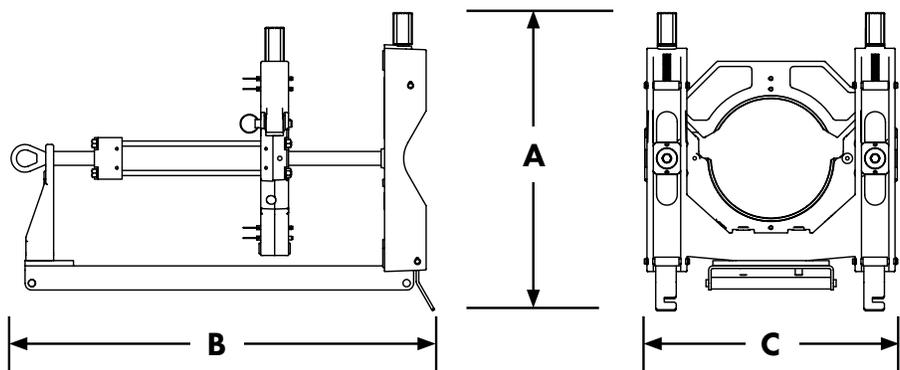
Designed for connecting the McElroy Datalogger® unit .

# Specifications

## Fusion Machine Specifications:

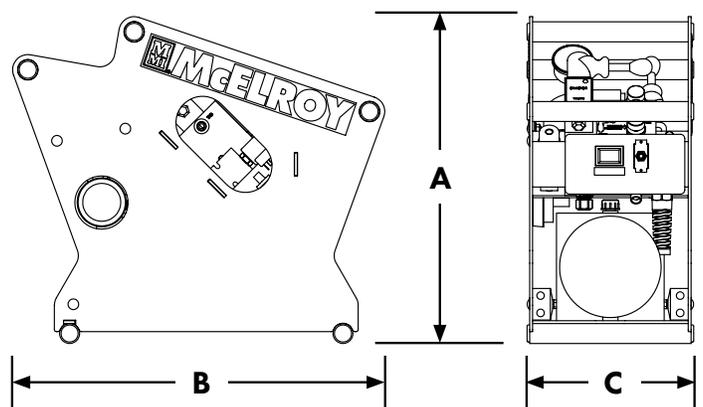
### 28 Sidewall EP Carriage

|                    |                    |
|--------------------|--------------------|
| <b>Dimensions</b>  | <b>28 Sidewall</b> |
| Width: <b>C</b>    | 18" (457 mm)       |
| Length: <b>B</b>   | 31" (787 mm)       |
| Height: <b>A</b>   | 22" (559 mm)       |
| <b>Weights</b>     |                    |
| Carriage Assembly: | 88 lbs (40Kg)      |



### DynaMc® Hydraulic Power Unit (HPU)

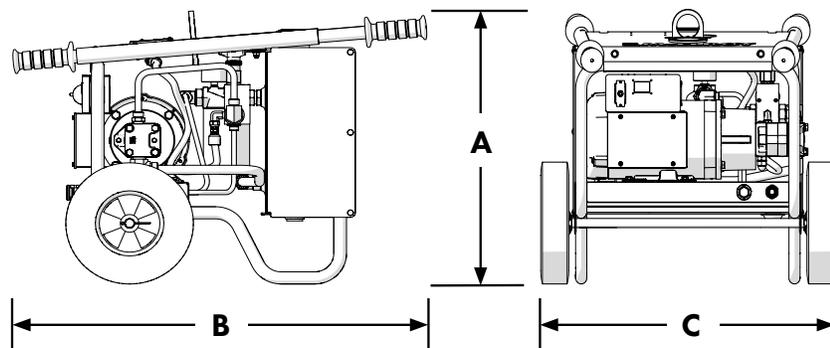
|                   |                |
|-------------------|----------------|
| <b>Dimensions</b> | <b>HPU</b>     |
| Width: <b>C</b>   | 11" (279 mm)   |
| Length: <b>B</b>  | 25" (635 mm)   |
| Height: <b>A</b>  | 22" (559 mm)   |
| <b>Weight</b>     |                |
| HPU:              | 110 lbs (50Kg) |



Fusion Pressure: 1500 PSI (103 BAR) Max.  
 Power: 2.2 HP, 14 Amp @ 120 VAC / 7 Amp @ 240 VAC

### EP1500AD (HPU)

|                   |                 |
|-------------------|-----------------|
| <b>Dimensions</b> | <b>HPU</b>      |
| Width: <b>C</b>   | 26.25" (667 mm) |
| Length: <b>B</b>  | 32.5" (826 mm)  |
| Height: <b>A</b>  | 22.5" (572 mm)  |
| <b>Weight</b>     |                 |
| HPU:              | 166 lbs (75Kg)  |



Fusion Pressure: 1500 PSI (103 BAR) Max. - Factory set to 1300 PSI (90 BAR)  
 Power: 1.5 HP, 15.2 Amp @ 120 VAC / 8.2 Amp @ 240 VAC

# Specifications

## Generator Sizing Form

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

Pump Motor: \_\_\_\_\_ Horsepower

Pump Motor Voltage: \_\_\_\_\_ (120 or 220 VAC)

Pump Motor Phases: 1

Pump Motor Frequency: \_\_\_\_\_ (50 or 60 Hz)

Facer Motor: 1.6 Horsepower

Facer Motor Voltage: \_\_\_\_\_ (120 or 220 VAC)

Facer Motor Phases: 1

Facer Motor Frequency: \_\_\_\_\_ (50 or 60 Hz)

Heater Wattage Rating: \_\_\_\_\_ Watts resistive

Heater Voltage: \_\_\_\_\_ (120 or 220 VAC)

Operational Altitude Range: \_\_\_\_\_ to \_\_\_\_\_

Ambient Temperature Range: \_\_\_\_\_ to \_\_\_\_\_

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

Allowable Voltage Dip: 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: \_\_\_\_\_

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# 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](http://www.mcelroy.com) for more information.



## DataLogger 6 Specs

|                             |   |
|-----------------------------|---|
| <b>Model:</b>               | DL18001   |
| <b>Supported Standards:</b> | 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 |
| <b>Weight:</b>              | 1.77 lbs (0.8 Kg)   |
| <b>Dimensions:</b>          | 8.58" x 5.6" x 1.06"  |
| <b>Screen:</b>              | 1280 X 720 HD, capacitive touchscreen   |
| <b>Operating System:</b>    | Android 5.1   |
| <b>Memory:</b>              | 2 GB  |
| <b>Microprocessor:</b>      | Texas Instruments® OMAP 4430 Dual Core 1 GHz  |
| <b>Storage:</b>             | 32 GB NAND Flash  |
| <b>Connectivity:</b>        | 802.11 abgn, BT4.0  |
| <b>Camera:</b>              | 2 Megapixel front / 8 megapixels back   |
| <b>Power Requirements:</b>  | 100-240 V, 24 Watt, 12V, 2 Amp, 50/60 Hz  |
| <b>Battery:</b>             | Lithium-Polymer 7600 mAh  |
| <b>Inclusions:</b>          | Tablet, transducer, A/C adapter, machine mount, stylus, carrying case   |

## **About this manual . . .**

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

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

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



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