



# Radius Roller Manual

Serial # \_\_\_\_\_

**800-446-4402**

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

474 E. 105th St. • Cleveland, OH 44108



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# Radius Roller

## Material Capacities

Solid Round	1.375"
Flat Bar - Easy Way	3" (.75")
Flat Bar - Hard Way	2.25" (.375")
Angle Iron	2" (.250")
Channel	2" (.250")

- 43"h x 45"w x 49"d, 950 lb
- Shaft diameter - 2.0"
- Shaft center distance - 14.12"
- Die sets are sold separately for tube and pipe



Designed for medium to heavy material, the Radius Roller powers through your job quickly and accurately. Roll rod, flat, angle and channel. The variable speed, hydraulic drive allows you to "dial in" the appropriate speed for various materials. Quickly change the orientation from vertical for smaller projects to horizontal for those larger, heavier jobs.



3 Dies and 16 Spacers Included!  
Designed for maximum versatility.  
Configured to accept a wide variety of metal sections.

## HYDRAULIC SPECIFICATIONS

### PORTA POWER

5 HP Hydraulic Power Unit



Motor	Specifications
Standard Electric Motor	5HP, 3 Phase, 208V/230V
Optional Electric Motor	5HP, 3 Phase, 460V 5HP, 1 Phase, 230V
Pump Size	3-1/2 gpm-single stage
Valve Pressure	3,000 psi
Reservoir	7 Gallons

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## ***Company Profile***

The Cleveland Steel Tool Company offers a full line of high quality, low maintenance hydraulic ironworking machines, associated tooling and accessories that are used in the steel fabrication industry. With proper operation, care, and maintenance, your Cleveland Steel Tool Radius Roller will provide years of safe, trouble-free service. Please take time to study this manual carefully to fully understand Radius Roller safety procedures, set-up, operation, care, maintenance, troubleshooting and warranty coverage prior to putting the machine into production. Any questions not answered within this manual can be directed to The Cleveland Steel Tool Company.



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## ***Machine Identification***

Your Cleveland Steel Tool Radius Roller has been serialized for quality control, product traceability and warranty enforcement. Please refer to the aluminum identification tag with the engraved serial number and electrical and power specifications when ordering parts or filing a warranty claim.

## ***Warranty***

*The Cleveland Steel Tool Company* will, within one (1) year of date of purchase, replace F.O.B. the factory, any goods, excluding punches, dies, and/or blades, which are defective in materials and workmanship provided that the buyer returns the defective goods, freight prepaid, to the seller, which shall be the buyer's sole and exclusive remedy for the defective goods. Hydraulic and electrical components are subject to their respective manufacturer's warranties.

*The Cleveland Steel Tool Company* will, within thirty (30) days of date of purchase, replace F.O.B. the factory any punches, dies, and/or blades that prove to be defective in material and workmanship.

(Proof of purchase date required)

This warranty does not apply to machines and/or components which have been altered, changed or modified in any way, or subjected to abusive and abnormal use, inadequate maintenance and lubrication, or subjected to use beyond seller recommended capacities and specifications. THIS WARRANTY IS VOID IF YOU ATTEMPT REPAIRS YOURSELF. In no event shall seller be liable for labor costs expended on such goods or consequential damages. Seller shall not be liable to the purchaser or any other person for loss, downtime, or damage directly or indirectly arising from the use of the goods or from any other cause. No officer, employee, or agent of seller is authorized to make any oral representations or warranty of fitness or to waive any of the foregoing terms of sale and none shall be binding on seller.

## Operator and Supervisor Information

This manual includes information on:

- Installation
- Safety
- Operation
- Maintenance

*READ ALL INSTRUCTIONS BEFORE OPERATING MACHINERY.* Operating machinery before reading and understanding the contents of this manual greatly increases the risk of injury.

This manual describes 'best practices' in handling, installing, operating and maintaining your machine. The contents are subject to change without notice due to improvements in the machinery or changes in National or International standards.

All rights reserved. Reproduction of this manual in any form, in whole or in part, is not permitted without the written consent of Cleveland Steel Tool.

Keep this manual close to the machine to allow for easy reference when necessary.

Provide operators with sufficient training and education in the basic functions of the machine prior to machine operation.

Do not allow for operation of the machine by unqualified personnel. Cleveland Steel Tool is not liable for accidents arising from unskilled, untrained operation.

Do not modify or change the machine without written authorization from Cleveland Steel Tool. Unauthorized modification to a machine may result in serious operator injury, machine damage and will void your machine warranty.

Never leave a powered machine unattended. Turn machinery OFF before walking away.

This machine is manufactured for use by able bodied and able minded operators only. Never operate machinery when tired or under the influence of drugs or alcohol.

Do not resell, relocate or export to a destination other than to the original point of sale. Cleveland Steel Tool has designed this machine to meet the standards of the original receiving country and is not liable for meeting any governing body or performance standards beyond those of the original receiving country.

## Signal Word Definition

 **DANGER**

Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

 **WARNING**

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

 **CAUTION**

Indicates a hazardous situation that, if not avoided, could result in mild or moderate injury.

 **NOTICE**

Indicates information considered important, but not hazard related.

## Signal Word Panel on Machine

 **DANGER**

Critical machine safety information is identified on signal word labels. Labels are attached adjacent to the potentially hazardous locations of the machine. Reference safety instructions for additional information regarding the potentially hazardous condition identified on the label.

Review ALL labels on the machinery, reference the operational precautions and safe operations sections within this manual before any operation activity is initiated.

Failure to read and understand the signal word labels affixed to the machinery may result in operator death or injury.

## Receiving Radius Roller

This manual provides installation requirements for the Cleveland Steel Tool Radius Roller.

All Cleveland Steel Tool hydraulic accessory tools are powered by a Cleveland Steel Tool Ironworker or a Cleveland Steel Tool Porta Power, portable hydraulic power unit.

Refer to the manual for the Cleveland Steel Tool Porta Power to operate your Cleveland Steel Tool hydraulic accessory tool. Provide operators with sufficient training and education in the basic functions of the machine prior to machine operation.

### Environmental Requirements at Work Station

#### NOTICE

The work station environment for your Cleveland Steel Tool Radius Roller must meet the following minimum requirements:

- **Ambient temperature:** 45°F - 110°F
- **Relative humidity:** No greater than 90% relative humidity.
- **Floor area:** Assure that the machinery work area provides for a stable, adequately sized and load rated floor area for material movement to and from the machinery work stations.
- **Shelter:** Protect your Ironworking machinery from water, salts and corrosive elements.
- **Lighting:** 60 Watts (500LUX or 50 footcandles) minimum.

#### WARNING

Cleveland Steel Tool Hydraulic Accessory Tools are fully assembled and are shipped either by palletized custom wooden crate or by shrink-wrapped wooden pallet for ease of transport and receiving. Inspect the packaging for damage and follow shipping/receiving instructions as listed on the packaging prior to receiving the tool into your facility. When receiving your Hydraulic Accessory Tool, be prepared to safely move your machinery with a forklift rated for the following equipment weights:

#### Minimum Machinery Weights

Radius Roller 950 lbs/430.91 kg

## Unpacking/Moving the Radius Roller

### Forklift

This machine is equipped with rated forklift movement points. Do not attempt to lift the machinery by any other means. Inappropriate movement of the machinery may result in serious operator injury, machine damage and will void machine warranty. Provide rated forklift and certified forklift operator to move machinery to appropriate location.



Handle material as close to the drive surface as possible with the widest spread and deepest penetration of forks effective to service the pallet. Forks should be adjusted and locked into the safety detent closest to the maximum available fork spread.

Your Cleveland Steel Tool Radius Roller includes surface and remotely mounted electrical cabling and hydraulic lines. Exercise caution when removing the factory supplied packaging. Do not cut electrical wires or hydraulic hoses.

1. Carefully remove packaging.
2. Carefully remove the lagbolts and washers attaching the Radius Roller to the shipping pallet.
3. Locate the fork-lift areas directly under the Radius Roller base assembly.
4. Carefully insert forks under the roller base assembly. Do not allow forks to hit roller assembly. Confirm that forks are in contact with both front and rear frame surfaces. Install clamps (not included) to forks so that the Radius Roller is stable while moving and lift the Radius Roller from the pallet.
5. Locate your Radius Roller directly adjacent to the Cleveland Steel Tool Ironworker or Porta Power. Ensure that power controls of the Ironworker or Porta Power are within arms-reach of the Radius Roller tool.

## Installing the Radius Roller

### **WARNING**

1. The Radius Roller is designed with a rolling base. The floor rating should be a minimum multiplier of 2.5 times the weight of the Roller plus the weight of any tooling being used within the Press.

**(Roller weight (950 lb) + Tooling weight + Material weight) x 2.5 = Dedicated, weight rated floor system**

2. **Safe Work Zone** Roll forming can fail the part being worked, fail a part adjacent to the work or fail the forming tool. Failed parts can become airborne projectiles with deadly force. Protect yourself with appropriate personal protective equipment when operating the press. Protect others by defining a safe work zone for Radius Roller use and limiting access to the operator. Identify a safe working zone from the working area of the roller equal to or greater than the finished diameter of the piece being rolled x 1.5 e.g. 5' finished diameter x 1.5 = 7.5'. Keep unauthorized individuals clear of the safe working zone when roll forming.

## Danger Panel

### **DANGER**

#### Electrical Hazard

High voltages present inside the enclosure of this product. ONLY qualified, authorized, maintenance, service or Certified Electricians should gain access to electrical panel. Do not operate this equipment from any power source that does not match the voltage rating stamped on the equipment. Refer to the Manufacturer's Identification Label for operational requirements.



#### Lockout Power

Danger circuits are live. Lockout/Tagout the upstream power source. Lockout/Tagout machinery according to Employer procedures.



## Warning Panel

### **WARNING**



#### Pinch/Shear/Crush Hazard

Moving parts can pinch and crush. Keep hands clear while operating. Lockout power before servicing.



#### Wear Personal Protective Equipment

To avoid physical hazard, always wear personal protective equipment. Wear protective eye-wear, clothing, gloves, footwear, head-gear and hearing protection while operating or servicing this machinery.



#### Fluid Injection Hazard

Hydraulic hoses and cylinders are under pressure. Pressurized fluid can pierce skin and cause severe injury. To avoid physical hazard, always wear personal protective equipment. Keep hands clear while operating. Lockout power before servicing. Immediately replace guards after adjustment, repair or service.



#### Do Not Operate With Guard Removed

Physical barriers and guards have been designed and installed to protect the operator from moving parts that can pinch, cut and crush. Keep hands clear while operating. Lockout power before servicing. Immediately replace guards after adjustment, repair or service moving parts.





## Notice Panel

### NOTICE



#### Safety, Installation, Operations and Maintenance

This manual contains critical instructions regarding proper procedures for your machinery. Understand the contents of all parts thoroughly. Failure to follow proper procedures may result in serious operator injury, machine damage and will void your machine warranty. Keep the manual close to the machine for easy reference.

## Caution Panel

### CAUTION



#### Tilting Operation

The head-frame of your Cleveland Steel Tool Radius Roller is mounted with a friction plate and pin stop mechanism in the roller base. This mounting configuration allows for the roller head-frame to be operated in either a horizontal or vertical orientation. Exercise care when changing the operating position of the roller and during operation of the roller.



#### Roll Speed Adjustment

Rotate the roll speed adjustment knob to change the speed at which the drive rollers spin.

## Maintenance Schedule

### CAUTION

Your CST Radius Roller will benefit from reasonable care and periodic maintenance. Reasonable care includes daily visual observation, as well as general maintenance procedures at daily intervals by operator/maintenance personnel. Perform inspections and maintenance of the electrical, hydraulic, and mechanical systems of the Cleveland Steel Tool hydraulic accessory connected to the Ironworker or Porta Power as follows:

## Daily/Shift Change Visual Observation

### Electrical System

Visually inspect controls and power cording to the Ironworker or Porta Power for signs of damage. Cut, abraded or crushed electrical cords may present an electrical hazard to the Operator and/or damage the machinery.

### Hydraulic System

Visually inspect exposed or surface mounted hydraulic hoses and fittings for signs of damage. Cut, abraded or crushed hydraulic hoses or leaking fittings may present a hydraulic fluid hazard to the Operator and/or damage the machinery.

## Daily/Shift Change Visual Observation

### Mechanical System

Visually moving parts. Guards and material hold-downs must remain on the machine for safe operation. Clear any material obstructions at the work station prior to visually inspecting moving parts of the machine. Cycle the machine. Machine should operate smoothly in hydraulic extend and retract mode.

**Failure of any element of the daily/shift change visual observation will require maintenance of the affected accessory componentry. Please follow the following maintenance procedures.**

## Daily Maintenance

### WARNING

#### Disconnect unit from power source.

Check wiring harness for loose connections or damaged control wiring.

Replace damaged control wiring as necessary. Order replacement control wiring assembly from Cleveland Steel Tool.

Check hydraulic fittings and hoses for wear or damage. Replace damaged or worn hydraulic hoses and fittings as necessary. Order replacement hydraulic components from Cleveland Steel Tool.

Check bolted connections and secure as necessary.

Check welded connections.

Check bearing surface quality.

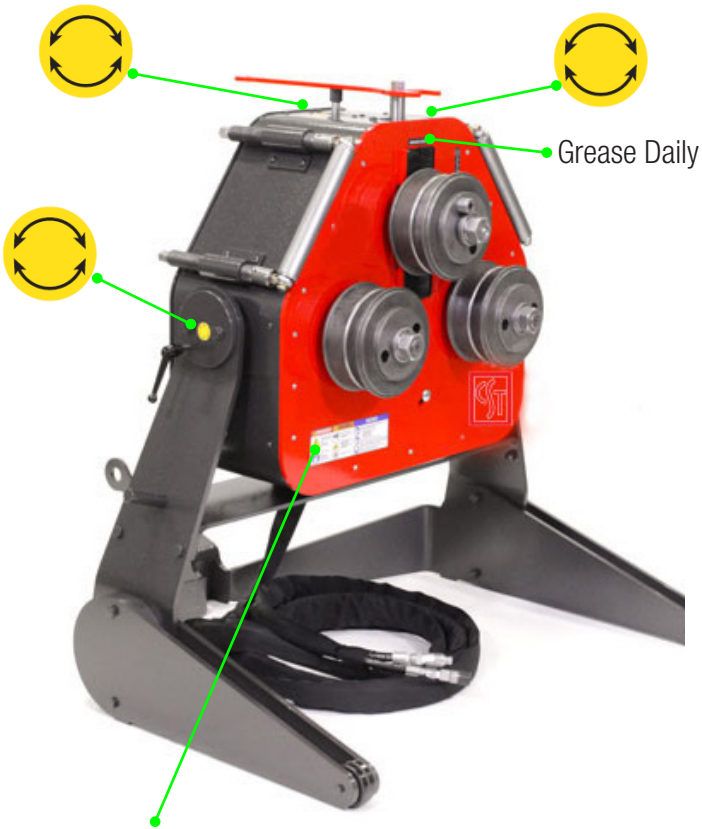
Visually inspect die surfaces for chips or galling in the bearing surface.










Verify tooling is secure. Cleveland Steel Tool tooling is manufactured from billet steel for enhanced strength and durability. These are wearing parts that will fail over time and will require replacement. Order additional tooling through Cleveland Steel Tool. Install replacement parts according to this manual.

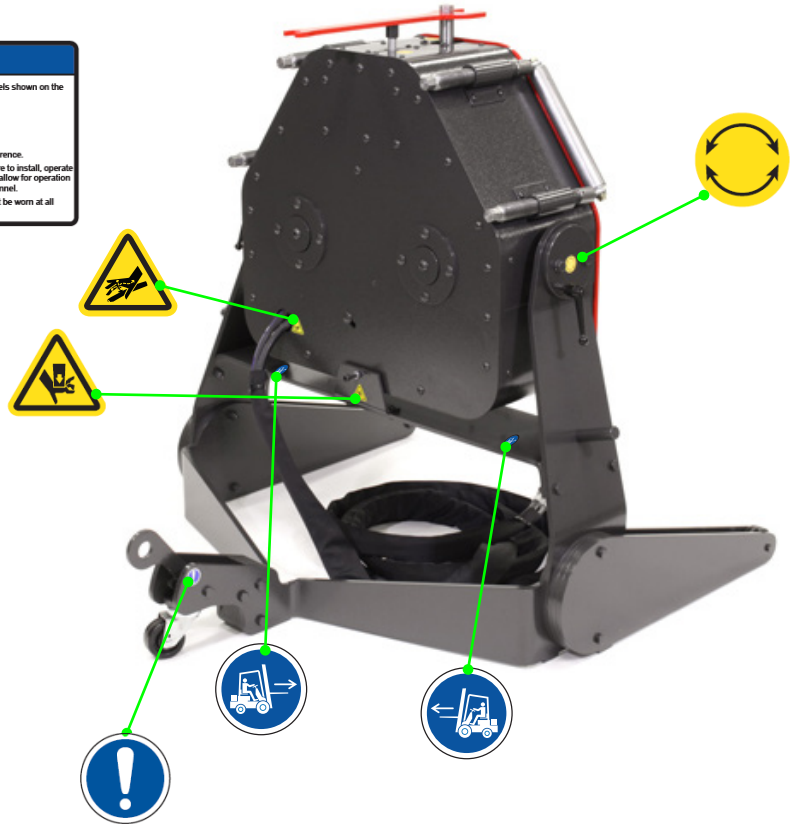
Clean your Radius Roller daily. Disconnect the unit from its power source first. Do not use liquid cleaners, aerosols, abrasive pads, scouring powders or solvents such as benzene or alcohol. Clean your machine with a compressed air nozzle and soft cloth lightly moistened with a mild, water-based detergent solution. Remove filings, dirt, dust and grime from working surfaces. Ensure the surfaces are fully dry before reconnecting power.

**Lubricate the pressure roller generously at every tooling / setup change by applying NLGI#2 Extreme Pressure Grease to the idler shaft and the idler shaft grease zerkl fitting. Visually confirm that grease is lubricating the full shaft and each of the components that comprise the pressure die.**

# Radius Roller • Signal Diagram



⚠ DANGER	⚠ WARNING	NOTICE
		
<p>Hydraulic accessory controls powered by Ironworker/ Porta-Power.</p>	<p>Pinch/Crush Hazard Moving parts can pinch and crush. Keep hands clear of moving parts.</p>	<p>Read, understand, and follow all labels shown on the machine and described in the:</p> <ul style="list-style-type: none"> <li>• Safety Instructions Manual</li> <li>• Installation Manual</li> <li>• Operations Manual</li> <li>• Maintenance Manual</li> </ul> <p>Keep all manuals close for easy reference.</p>
		
<p>Lockout power at Ironworker/ Porta-Power before servicing.</p>	<p>Fluid Injection Hazard Hydraulic fluid is under pressure. Hydraulic fluid powers moving parts.</p>	<p>Trained and authorized personnel are to install, operate and service this machinery. Do not allow for operation of the machine by unqualified personnel.</p>
		
	<p>Keep guards in place</p>	<p>Personal protective equipment must be worn at all times during machinery operation.</p>



# Hydraulic Power Sources



Hydraulic Accessory Tool Power/Controls



Your Cleveland Steel Tool Radius Roller is factory assembled and tested for optimum performance when powered by a Cleveland Steel Tool rated hydraulic power supply.

The Radius Roller is powered by either a Cleveland Steel Tool Ironworker factory installed Hydraulic Accessory Control Package or a Cleveland Steel Tool Porta Power, 5hp, 3000psi, portable power unit.

***Alternate power sources are not recommended and may compromise machine operation, machine hydraulic warranty and operator safety.***

Follow electrical connection installation instructions for power supply as set forth within this manual.

## Powering with a Cleveland Steel Tool Ironworker

Power selection controls are located adjacent to the starter box on the feed side of the machine. Hydraulic quick connections and accessory controls are located on the drop-off side or end cap of the machine.

With the Ironworker power off, install Radius Roller hoses, power and control:

- Install the Radius Roller male and female accessory hydraulic hoses to the ironworker male and female quick connect hydraulic fittings. Both fittings have a detent ball setting that must be aligned to couple and uncouple hoses.
- Attach the Radius Roller control OUT/IN, male M12 control cable to the female M12 accessory control port.



## Factory Installed Ironworker Hydraulic Accessory Pack

***With all Ironworker and Press stations clear of hands, tools, tooling, material or debris, power up the Ironworker by depressing the green button on the starter box.***

With the power on, your Ironworker machine will return to a neutral position.

Turn the 3-position switch on the front of the machine case to the **Accessory** position. This operation disables the Ironworker and switches control to the accessory hand control.

With all Radius Roller work stations clear of hands, tools, tooling, material or debris, test the Radius Roller operation by depressing the OUT control button. Once depressed, the hydraulic cylinder of the Radius Roller will extend to operate the accessory. Releasing pressure on the OUT control button will stop the machine mid-operation. Return the tool to its starting position by depressing the IN button.



## Porta Power

**Power up the Porta Power by depressing the green button on the starter box.**

With all Radius Roller stations clear of hands, tools, tooling, material or debris, test the accessory operation by depressing the OUT control button. Once depressed, the hydraulic cylinder of the Radius Roller will extend to operate the accessory. Releasing pressure on the OUT control button will stop the machine mid-operation. Return the Radius Roller to its starting position by depressing the IN button.

If the machine fails to cycle, power down the Porta Power by depressing the red button on the starterbox, and consult the trouble shooting section.

# Machine Operations

## DANGER

Cleveland Steel Tool Radius Roller is a quick-connect, hydraulic accessory tool capable of rolling flat, angle, pipe and tube sections to variable radiuses. This manual outlines the basic functions associated with typical rolling operations and is neither intended to create a comprehensive list of, nor describe every operation possible with a roller tool. **Roller operations are dangerous and require extreme care and caution in the preparation of the material being worked, the roller set-up and the rolling operation.** Please refer to the following setup, safe operation and roller operation sections of this manual for an understanding of the potential hazards present in any rolling operation.

Cleveland Steel Tool Radius Roller features robust design and construction and is designed for years of service when powered by an Cleveland Steel Tool Ironworker or Porta Power portable hydraulic unit. Please refer to Cleveland Steel Tool power source manual prior to operation of the machinery.

The Radius Roller is constructed of four basic assemblies. The rolling base holds the tilting head frame which houses the pyramid roller assembly and the control components. The un-powered top pressure roller descends with a hand crank to apply pressure to the material being worked. The bottom two, knurled, drive rollers are stationary and move the material clockwise and counterclockwise.

The following pages detail the proper operating procedures for setting up and safely operating the Cleveland Steel Tool Radius Roller.

## DANGER

### Safe Operation

Observe the following guidelines when performing roll forming operations with your Cleveland Steel Tool Radius Roller.

#### Operator Safety / Safe Work Zone

Roll forming parts can fail the part being worked, fail a part adjacent to the work or fail the forming tool. Failed parts can become airborne projectiles with deadly force. Protect yourself with appropriate personal protective equipment when operating the press. Protect others by defining a safe work zone for Radius Roller use and limiting access to the operator. Identify a safe working zone from the working area of the roller equal to or greater than the finished diameter of the piece being rolled  $\times 1.5$ . Example: 5' finished diameter  $\times 1.5 = 7.5'$ . Keep un-authorized individuals clear of the safe working zone when roll forming.

### Radius Roller Inspection

Roll forming operations may generate concussive failure to mechanical parts. Although Cleveland Steel Tool machinery is fabricated with both bolted and welded construction, concussive failure is a possibility over time or with extreme use. Prior to any roll forming operation, visually check all bolted and welded connections for failure. All bolts must be tight and welds intact. Failure to verify the structural integrity of the machinery may result in workpiece shift, part ejection, operator injury or machinery damage.

### Workpiece Inspection

Your Radius Roller is designed for forming A36 steel. Take time to thoroughly understand the workpiece. Never apply roll forming pressure to unstable sections, spring steel or any item with elastic, spring-back tendencies. Confirm the material properties of the workpiece will withstand the pressure to be exerted by the roller. Confirm that workpiece items are stripped down to their simplest form. Never double up material. Workpiece must be clean and free of substances that would allow the forming surfaces to slip under load.

### Workpiece Support

Workpiece failure may be a result of improper or inadequate workpiece support. Adequate support for the workpiece must be present through the entirety of the roll forming operation. Understand your workpiece and confirm that the workpiece support system you employ will withstand the pressure being exerted through the roll forming operation.

### Safe Use of Tooling

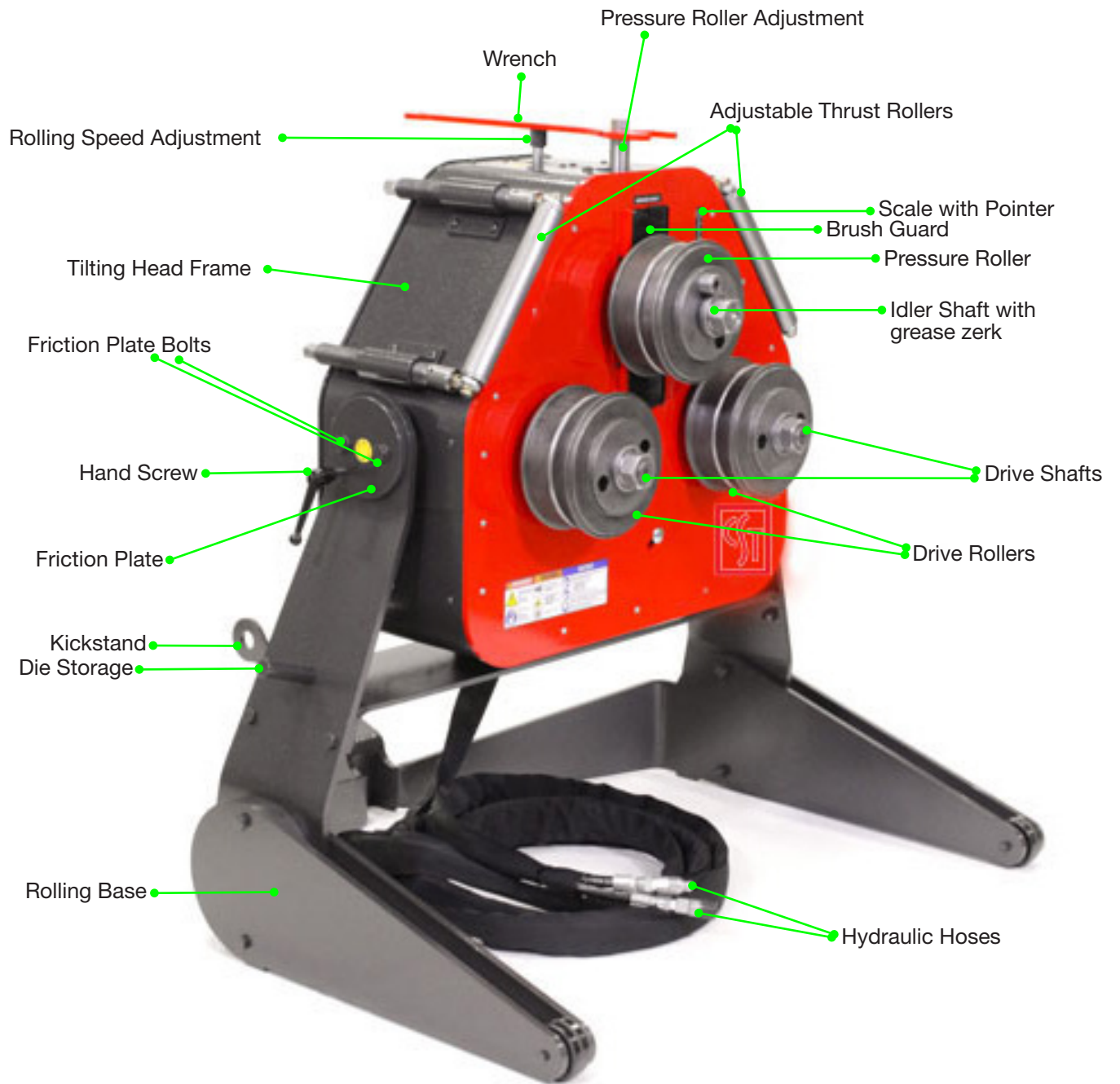
Your Radius Roller is equipped with a Universal, 15 piece roll forming die set. This roll form tooling is designed to provide for basic roll forming applications. These tools are not designed to provide for all roll forming applications. Custom tooling is available for your Radius Roller. Care must be taken when selecting roll form tooling.

Select tooling that is designed and rated for the specific application. To avoid undue stress upon the structural components of the Radius Roller select tooling with the shortest, most compact, tool depth available. Confirm that tooling and workpiece are aligned and follows a direct path. Misaligned loads may fail the tooling or workpiece and cause operator injury or damage to the machinery.

### Do Not Force Radius Roller

Consider the rating of the Radius Roller and the work at hand. Gradually build pressure being applied to the workpiece. Carefully observe the workpiece to avoid tooling misalignment or workpiece failure. Observe the roller as it reacts under load. Do not overload the roller. Under heavy rolling operation built up force may be released if the part breaks free of its die. This release of pressure can be sudden and can appear to shake the machinery. Take care to avoid parts falling from the workpiece.

# Operations Diagram



## Component Operations

**CAUTION**



Horizontal Operating Position



Vertical Operating Position

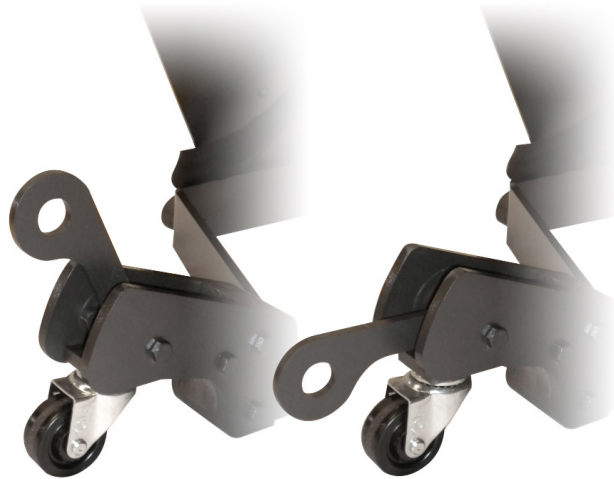
### Tilting Head-Frame Operation

The head-frame of your Cleveland Steel Tool Radius Roller is mounted with a yoke and pin to a sleeve and stop mechanism in the roller stand. This mounting configuration allows for the Roller enclosure to be operated in either a horizontal or vertical orientation. Positive stops at 0 and 90 degrees provide for a flexible and stable operation of the roller when working with light or heavy weight shapes or long setups.

**Rotate the tilting head frame with caution.** To rotate the head frame, release the hand screw on the sides of the rotational sleeves. Release the four friction plate bolts (do NOT remove).

Rotate the tilting head frame by lifting from the base of the roller. Once the roller is in its horizontal position, secure the hand screws on both yokes into their respective detent locations. For extra support of the enclosure, tighten the four 1/2" bolts on the friction plates. To return to vertical, repeat this sequence in reverse while supporting the head frame to its vertical resting place.

## Base Operations



Left: Kickstand up (disengaged) Right: Kickstand down (engaged)

### Base Operation

The heavy duty, 1/2" formed steel plate design is balanced like a tripod and rolls on 3 wheels. The "kickstand" at the rear of the Radius Roller base allows you to push the kickstand down with your foot to deploy the swiveling caster and easily roll the bender to your work station. When located in the ideal location, flip the kickstand up to disengage the swiveling caster and stabilize the Radius Roller on the floor.

# Die Set Operations

## **WARNING**

Your Cleveland Steel Tool Radius Roller will roll-form flat, angle, pipe and tube sections to variable radiuses when equipped with the proper, matched die sets and careful operation.

The Cleveland Steel Tool Radius Roller is shipped with one un-keyed, smooth, universal pressure die and spacer kit as well as two keyed, knurled, universal drive die and spacer kit. Die sets are designed to center the forming work within the pyramid roller assembly.



Die sets are wearing parts. Periodic cleaning and/or replacement of wearing surfaces is required to maintain the highest quality finished parts.

### DIE SET INSTALLATION

#### Drive Dies

With the head frame in its vertical position, carefully load the two, keyed, knurled, universal drive die and spacer kits (3 pieces) onto the lower, paired, keyed drive shafts. Dies must never touch the face of the enclosure and must have the same orientation to the face of the enclosure. Arrange the 3 pieces to accommodate the work at hand.

Always orient the mass of your section being formed towards the face of the enclosure. This orientation greatly reduces the cantilever forces being applied to the drive shafts and internal bearings.

Install shafting washers and nuts to hand tight.



#### Pressure Dies

With the pressure die adjustment towards its upper limit, carefully load the single, un-keyed, smooth, universal pressure die and spacer kit (3 pieces) onto the fully lubricated idler shaft. It is critical that the idler shaft be thoroughly lubricated with NLGI#2 extreme pressure grease

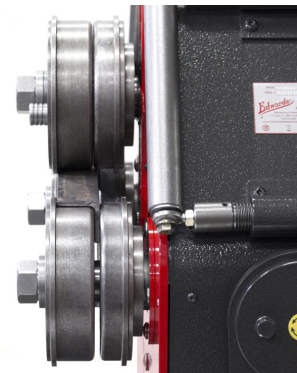
**Lubricate pressure die set with NLGI#2 extreme pressure grease. Failure to adequately lubricate the pressure dies and idler shaft may result in damage to the die set, damage to the idler shaft or both.**

Dies must never touch the face of the enclosure. Arrange the pressure dies to complement the drive roller orientation. If utilizing an eccentric section, ensure that the mass of the section being formed is placed towards the face of the enclosure. This orientation greatly reduces cantilever forces being applied to the idler shaft and internal screw.

Install shafting washers and nuts to hand tight.



- Arrange the 3 die sets to accommodate the work at hand.
- Note: Confirm complimentary alignment of upper and lower dies.



#### Alignment Pin

Coordinates inner and outer die surfaces of the pressure roller. Insert pin to outer die. Rotate die to engage inner die surface.



## Roll Forming

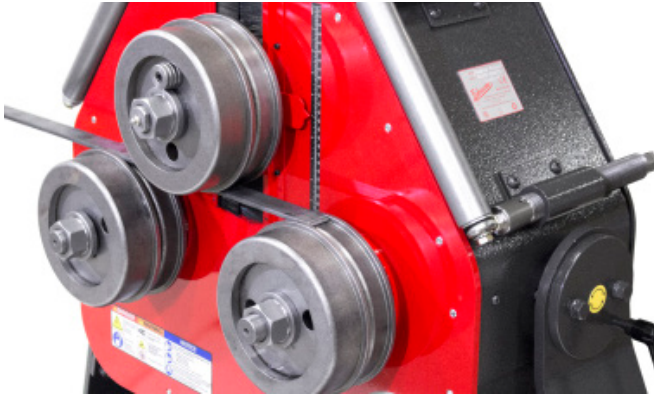
### **WARNING**

#### Loading Material

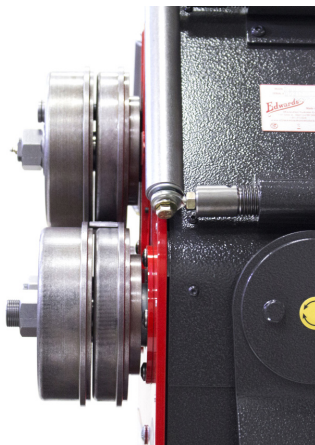
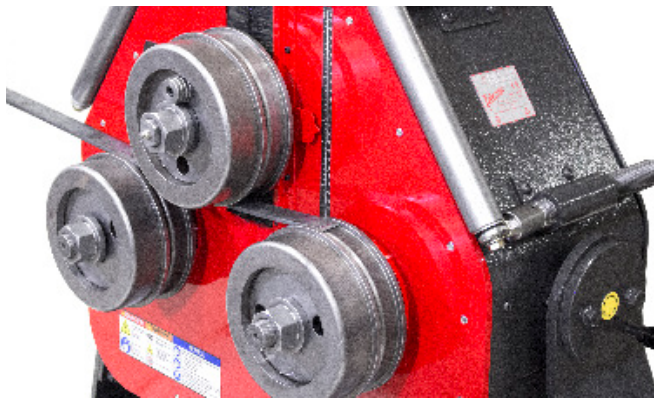
Prepare your work by cleaning the material and die surfaces.

Rotate and secure the roller head frame in either the vertical or horizontal working position. If working with long sections of material, be prepared to support your material with a material rest or roller stand (provided by user). Place the material to be formed on top of the two drive roll dies. Adjust dies to accommodate material size. Capture the material within the drive rolls by nesting the drive roll sets and spacers.

Bring the pressure roll down to meet the material being formed.



Adjust the pressure roll to capture the material being roll formed by nesting the roll set and spacer.



With the roller dies configured to the material, tighten the dies onto the drive and idler shafts with the wrench provided. **DO NOT OVERTIGHTEN SECURING NUTS TO SHAFTING.**

#### LUBRICATION

The dies and shafting on your Radius Roller are hardened to provide wearing surface durability. The hardened surfaces of dies where they meet shafting must be cleaned and lubricated prior to each tooling change. Hardened wearing surfaces will wear prematurely and fail if metal scale, shavings, dirt and grime are allowed to build up on these wearing surfaces.

Lubricate the pressure roller generously at every tooling / setup change by applying NLGI#2 Extreme Pressure Grease to the idler shaft and idler shaft grease zerk fitting. Visually confirm that grease is lubricating the full shaft and each of the components that comprise the pressure die.

**Do not lubricate the drive or pressure roller surfaces that contact the material being Roll Formed.**



#### ROLL FORMING

Provide adequate test material to support your successful project. Clean your material of all surface contaminants, grease, dirt and debris.

Lubricate pressure die set with NLGI#2 extreme pressure grease. Failure to adequately lubricate the pressure roller and idler shaft may result in damage to the die set, damage to the idler shaft or both.

Dies must never touch the face of the enclosure. Arrange the 3 pieces to complement the drive roller orientation. If utilizing an eccentric section, ensure that the mass of the section being formed is placed towards the face of the enclosure. This orientation greatly reduces cantilever forces being applied to the idler shaft and internal screw wear.

Install shafting washers and nuts to hand tight.



## Rolling Common Sections

### **WARNING**

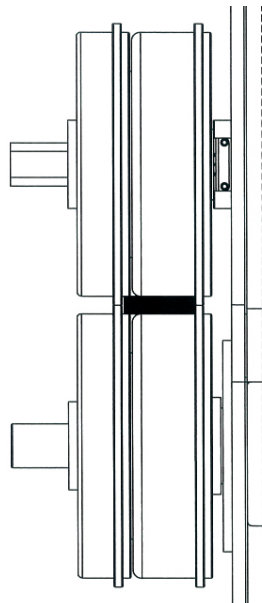
#### ROLL FORMING FLAT SECTIONS

Roll forming is a multi-pass process. Patience and test material are required to provide for a successful part.

Identify your target profile by creating a full scale template of the proposed radius. With your radius template or profile gauge available, lay your material over the coordinated drive dies. Lower the pressure roller to meet the surface of your section. Apply additional pressure to the section to gently prebend the material. Prebending the material will be seen as raising the tail stock of your section. **DO NOT OVER APPLY PRESSURE AT THE PREBENDING STAGE.**

With adequate pressure applied to the section, push the OUT button on the hand control and adjust the roller speed to slowly roll the material through the die set. Once your first pass is complete, compare your prebend outcome with your radius template and adjust the pressure roller accordingly. If additional radius is required, apply additional pressure to the material by lowering the pressure die set further onto the section. Push the IN button on the hand control to return the section to its original starting position. Compare the radius outcome with your template or radius gauge and adjust the pressure roller accordingly.

Repeat the aforementioned process until your desired radius is achieved.



#### ROLL FORMING ANGLE SECTIONS

Roll forming angle sections is a multi-pass process. Patience and test material are required to provide for a successful part.

Identify your target profile by creating a full scale template of the proposed radius. With your radius template or profile gauge available, lay your material over the coordinated drive dies. **CONFIRM THAT THE GREATEST CROSS SECTIONAL DIMENSION OF THE ANGLE IS ADJACENT TO THE MACHINE FACE.**

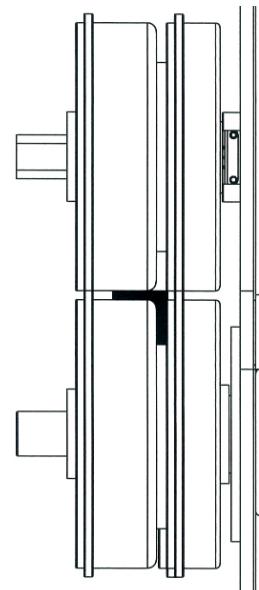
Lower the pressure roller to meet the surface of your section. Apply additional pressure to the section to gently prebend the material. Prebending the material will be seen as raising the tail stock of your section. **DO NOT OVER APPLY PRESSURE AT THE PREBENDING STAGE.**

With adequate pressure applied to the section, push the OUT button on the hand control and adjust the roller speed to slowly roll the material through the die set. Once your first pass is complete, compare your prebend outcome with your radius template and adjust the pressure roller accordingly. If additional radius is required, apply additional pressure to the material by lowering the pressure die set further onto the section. Push the IN button on the hand control to return the section to its original starting position. Compare the radius outcome with your template or radius gauge and adjust the pressure roller accordingly.

With increased pressure you may see your angle twist as a result of the roll forming process.

To attempt to limit this occurrence, utilize the thrust rollers at the lead in and lead out edges of the machine face. With your angle placed within the roller dies, extend the thrust rollers to meet the up or down leg of the material by extending the support screws of the thrust roller assembly. Roll your angle material through the die sets to observe the materials tendency to twist. Additional pressure may be required to control twist.

Repeat the aforementioned process until your desired radius is achieved.



## Roll Forming Round Sections

Roll forming solid round, pipe and tube sections is possible with the Universal Die Set. Custom die sets created specifically for the round pipe and tube sections are recommended for minimum distortion of the cross section and maintenance of the surface quality.

Roll forming round sections is a multi-pass process. Patience and test material are required to provide for a successful part.

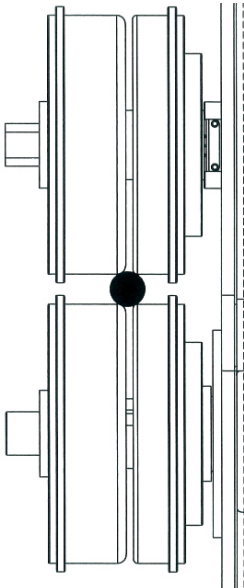
Identify your target profile by creating a full scale template of the proposed radius. With your radius template or profile gauge available, lay your material over the coordinated drive dies. **WHEN ROLL FORMING PIPE OR TUBE SECTIONS**

**ORIENT THE SEAM OF THE MATERIAL TO THE DIE CENTERLINE.**

Lower the pressure roller to meet the surface of your section. Apply additional pressure to the section to gently prebend the material. Prebending the material will be seen as raising the tail stock of your section. **DO NOT OVER APPLY PRESSURE AT THE PREBENDING STAGE.**

With adequate pressure applied to the section, push the OUT button on the hand control and adjust the roller speed to slowly roll the material through the die set. Once your first pass is complete, compare your prebend outcome with your radius template and adjust the pressure roller accordingly. If additional radius is required, apply additional pressure to the material by lowering the pressure die set further onto the section. Push the IN button on the hand control to return the section to its original starting position. Compare the radius outcome with your template or radius gauge and adjust the pressure roller accordingly.

Repeat the aforementioned process until your desired radius is achieved.



## Troubleshooting

### **WARNING**

Quality parts are dependent upon conscientious setup, operation and maintenance of your Radius Roller. Physically review your Radius Roller prior to any operation. Confirm all static components are tight in the assembly. Confirm all moving components are free of obstruction. Confirm all tooling and assemblies are properly seated within the assembly.

#### **Problem**

#### **Solution**

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Roller Inoperable

Check accessory control switch at Ironworker  
Check Roller mil. spec. control cable is connected to female mil. spec. port.

Check variable speed control. Check E-Stop button at Ironworker, Porta Power, or accessory hand control.

**Note:** Auto Cut port will NOT power the Radius Roller accessory.

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Rough Roller Operation

Check Hydraulic fluid level at power source.  
Check variable speed control



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