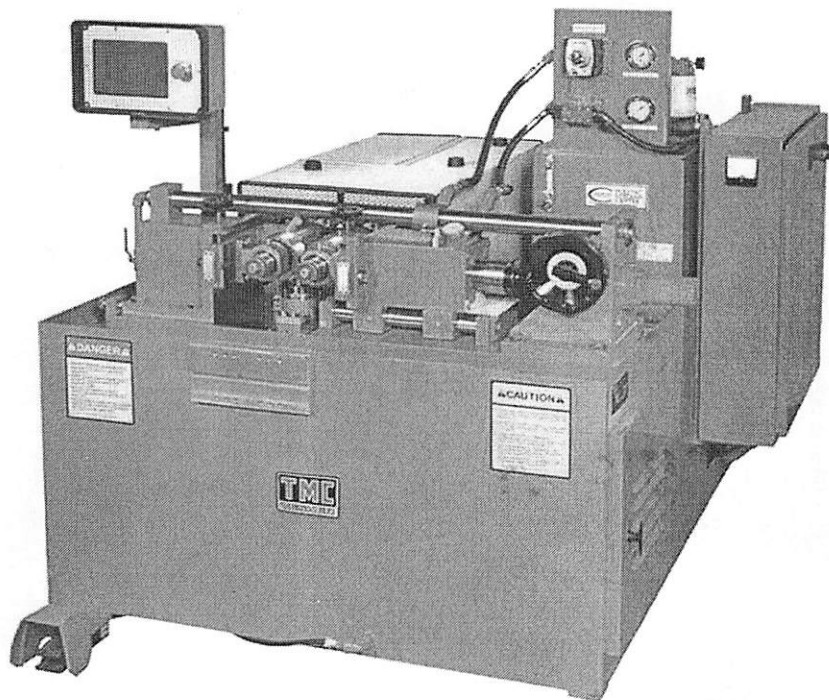


Model 200 Cylindrical-Die Thread Roller Manual



Rev 8/10



Manufactured with pride in the U.S.A.

Randy

Tesker Manufacturing Corporation
4343 Highway I
Saukville WI 53080
USA

Phone: (262) 675-6505
Toll Free: (800) 247-1855
Fax: (262) 675-6401

Email: tesker@tesker.com
Web: www.tesker.com



Warranty Certificate

Covering Tesker Manufacturing Corporation Thread Rolling Machines
Effective May 1, 2009

LIMITED WARRANTY COVERAGE

All new Tesker Thread Rolling Machines are warranted exclusively by the Tesker Manufacturing Corporation. Thread Rolling Machines limited warranty as follows:

Each Tesker Thread Rolling Machine ("Machine") and its components ("Components") (except those listed below under limits and exclusions) is warranted against defects in material and workmanship for a period of one (1) year from the date of shipment, which is the date that a machine leaves the manufacturing facility. For component parts not manufactured by Tesker Manufacturing Corporation, the original manufacturer's warranty will apply (example – electrical motor contactors). The foregoing is a limited warranty and it is the only warranty by manufacturer. Manufacturer disclaims all other warranties, express or implied, including but not limited to all warranties of merchantability and fitness for a particular purpose.

REPAIR OR REPLACEMENT ONLY: MANUFACTURER'S LIABILITY UNDER THIS AGREEMENT SHALL BE LIMITED TO REPAIRING OR REPLACING PARTS OR COMPONENTS AT THE DISCRETION OF MANUFACTURER.

LIMITS and EXCLUSIONS of WARRANTY

Except as provided above, buyer agrees that all warranties expressed or implied, as to any matter whatsoever, including but not limited to warranties of merchantability and fitness for a particular purpose are excluded. Components subject to wear during normal use and over time such as paint, bearings, seals, u-joints, rolling dies...etc., are excluded from this warranty. Factory-specified maintenance procedures must be adhered to and recorded in order to maintain this warranty. This warranty is void if the machine is subjected to mishandling, misuse, neglect, accident, improper installation, maintenance, operation or application, or if the machine was improperly repaired or serviced by the customer or by an unauthorized service technician. Warranty service or repair service is available from Tesker Manufacturing Corporation.

Without limiting the generality of any of the exclusions or limitations described in other paragraphs, manufacturer's warranty does not include any warranty that the machine or components will meet buyer's production specifications or other requirements or that operation of the machine and components will be uninterrupted or error-free. Manufacturer assumes no responsibility with respect to the use of the Machine and Components by Buyer, and manufacturer shall not incur any liability or Seller to Buyer for any failure in design, production, operation, performance or otherwise of the Machine or Components other than repair or replacement of same as set forth in the Limited Warranty above. Manufacturer is not responsible for any damage to parts, machines, business premises or other property of Buyer, or for any other incidental or consequential damages that may be caused by a malfunction of the machine or components.

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Buyer has accepted this restriction on its right to recover incidental or consequential damages as part of its bargain with Seller. Buyer realizes and acknowledges that the price of the equipment would be higher if Seller or Manufacturer were required to be responsible for incidental, consequential, or punitive damages.

This Warranty Certificate supersedes any and all other agreements, either oral or in this writing, between the parties hereto with respect to the warranties, limitations of liability and/or damages regarding the Machine or Components, and contains all of the covenants and agreements between the parties with respect to such warranties, liability limitations and/or damages. Each party to this Warranty Certificate acknowledges that no representations, inducements, promises, or agreements, orally or otherwise, have been made by any party, or anyone acting on behalf of any party, which are not embodied herein regarding such warranties, liability limitations and/or damages, and that no other agreement, statement, or promise not contained in this Warranty Certificate shall be valid or binding regarding such warranties, liability limitations and damages.

TRANSFERABILITY

This warranty is not transferable if the machine is sold via private sale before the end of the warranty period.

Tesker Manufacturing Corporation 4343 Hwy I, Saukville, WI 53080 Phone: (800) 247-1855 FAX: (262) 675-6401



The information in this manual is subject to updates. Contact Tesker Manufacturing Corporation for replacement copies, or visit our website (www.tesker.com) for other helpful information.

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Tesker Model 200 Safety Manual

Safety Introduction

Thread rolling machines present many dangers to shop employees including extreme forces, high speed operation, crush hazards, rotating workpieces, belts and pulleys, high voltage and high temperatures. The safety portion of this manual is split into the following sections:

Safety Introduction	p. 1
Operator Safety	p. 6
Operator Safety Checklist	p. 9
Setup Safety	p. 11
Maintenance Safety	p. 13

Workers should read and understand each section according to their duties. **It is the shop owner's responsibility to make sure that everyone involved in the installation, servicing, setup and operation of this machine has read and understood the contents of this manual before they perform any actual work.** Additional information on workplace safety can be found on the Occupational Safety and Health Act (OSHA) website at (www.osha.gov) – refer to the General Industry Standard, Part 1910.

Declarations of Warnings, Cautions and Notes

Throughout this manual, important information is contained in the following symbols/formats; Warnings, Cautions and Notes:



Warnings are used when there is an extreme danger to the operator and/or to the machine. Take all steps necessary to heed the warning given. Do not continue if you cannot follow the warning instructions. An example of a warning is:

- **Never place hands between the work piece and the rolling die**



Cautions are used when there is the potential for minor personal injury or mechanical damage. An example of a caution is:

- **Remove the spindle nut wrench immediately after use.**

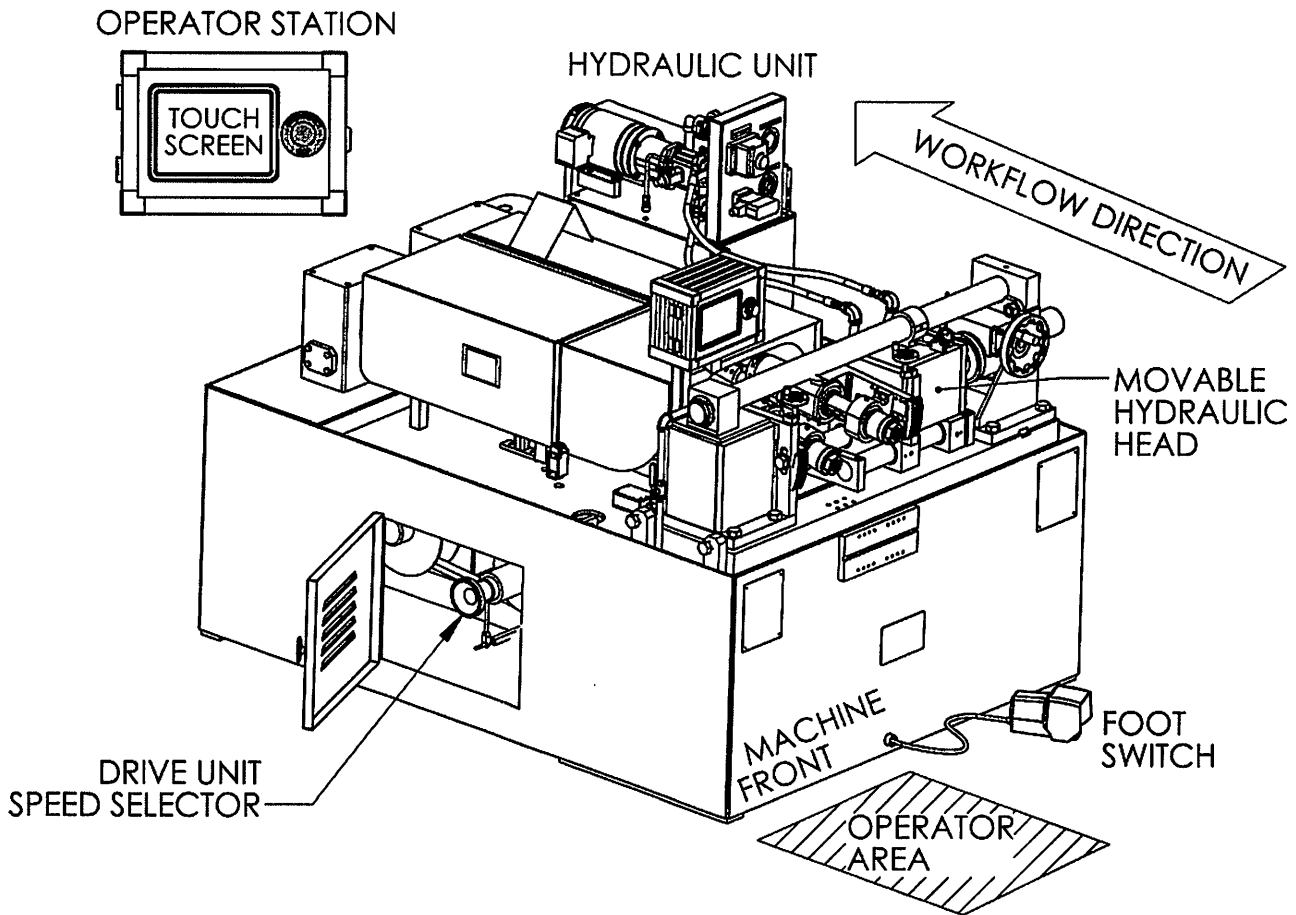
Notes are used to give additional information to the operator about a particular step or procedure. This information should be taken into consideration by the operator as he/she performs the step or procedure to ensure there is no confusion. An example of a note is:

Note: Numbered die sets must be installed in correct orientation.

Tesker Model 200 Safety Manual

Machine Definitions and Areas

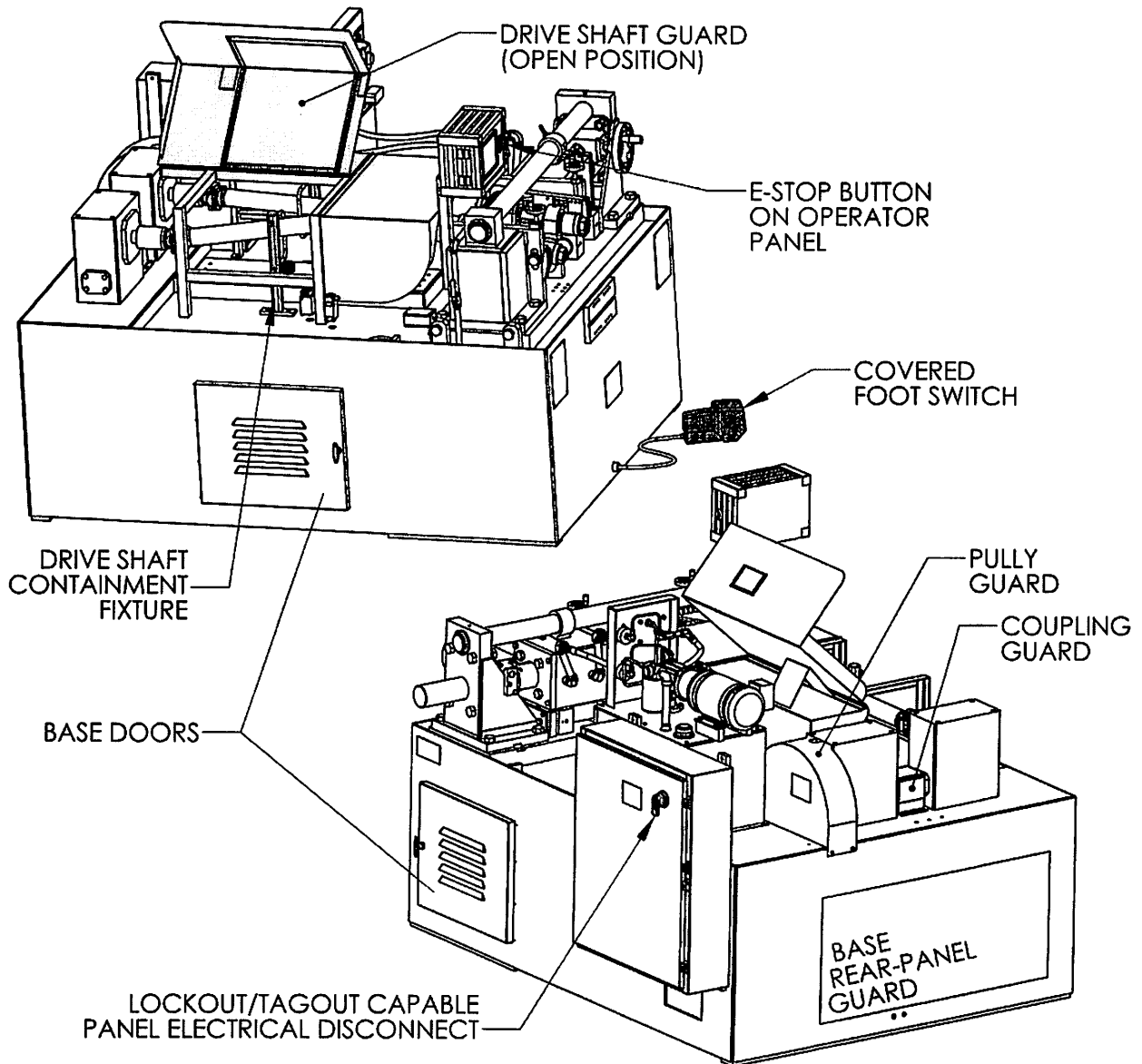
This is a representation of a Model 200 Thread Rolling machine. Typically additional fixturing will be installed with the machine at the front to feed raw product into the rolling area and at the rear to collect finished product. It is the setup person's responsibility to ensure that guarding and shielding adequately protect the operator and the machine from injury and damage. Tesker Manufacturing Corporation is only responsible for ensuring the safety of fixturing produced or designed by Tesker Manufacturing Corporation.



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Standard Guard and Safety Features

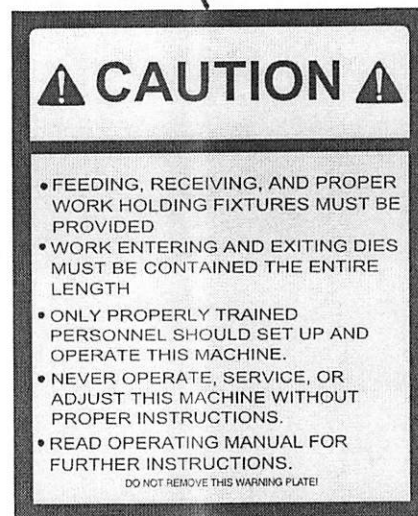
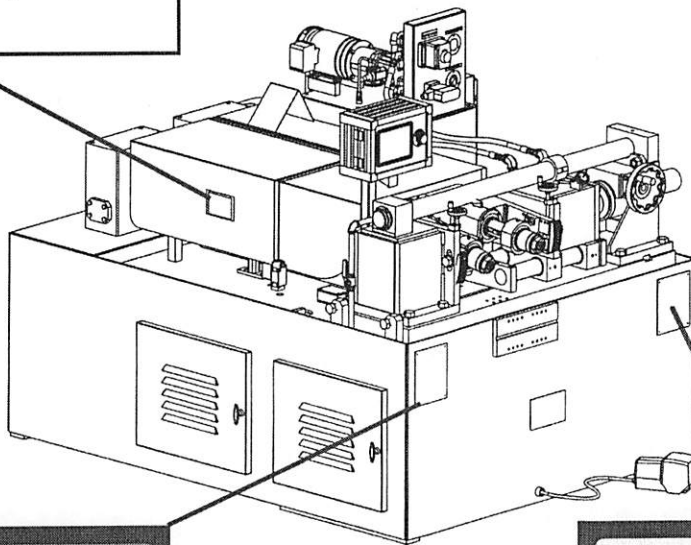
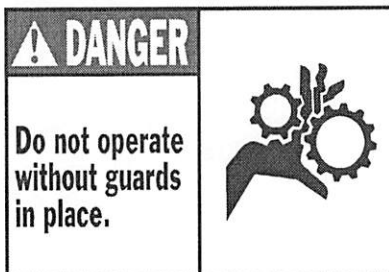
Thread Rolling Machines can produce a wide variety of parts. Given this characteristic, standard guards and safety features may not sufficiently protect the operator - **The machine owner is ultimately responsible to ensure machine and workplace safety.** The Job Setup Safety portion of this manual provides information about expected safeguarding. Additionally, the Operator Safety section provides a checklist to ensure that the standard guards and safety features are present and functional. The following diagrams detail these components.



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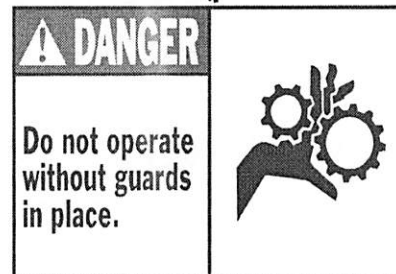
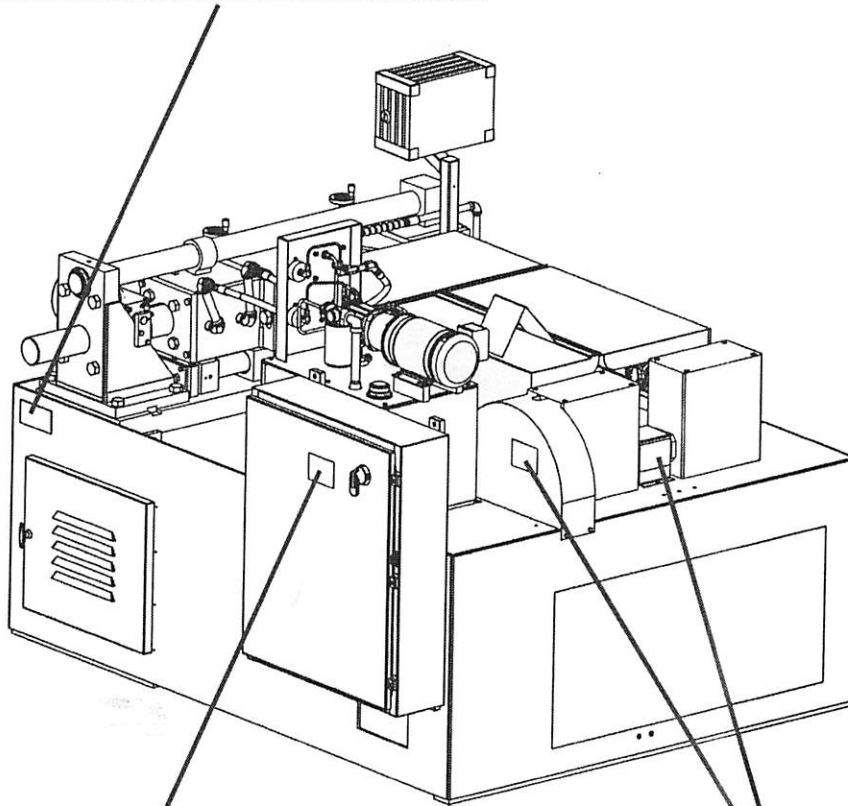
Safety Signs

Safety signs are placed on the machine to remind workers of the dangers inherent in a thread rolling machine. All safety signs should be present, and kept in a clean and readable state. Replacements will be provided for a nominal charge by contacting Tesker Manufacturing Corporation. The following diagrams show the contents and location of the standard safety signs. Sign locations and contents may vary depending on factory customizations.



Tesker Model 200 Safety Manual

TMC		TESKER THREAD ROLLER	
TESKER			
Model	Serial No.		
Max. H.P.	Spindle Amp.		
Voltage	Date Mfg.		
Maximum Rolling Pressure			
MANUFACTURED BY TESKER MFG. CORP, SAUKVILLE, WI USA - (262) 676-6505			



Tasker Model 200 Safety Manual

Operator Safety

In this manual, the role of the operator refers to a worker that produces parts on a machine that is already setup and configured for a particular job. Duties of this individual include material handling, machine operation and possibly quality control. **The operator should read and understand the Safety Introduction, Operator Safety and Machine Operation sections of this manual.**

The following operator safety guidelines should be followed:

- Only authorized, trained personnel should operate this machine. Untrained personnel present a hazard to themselves and the machine, and improper operation will void the warranty.
- New operators should be trained under the close supervision of an experienced machine operator, or setup person.
- Before beginning each job, the machine operator should complete the safety checklist provided on page 9.
- Use appropriate eye and ear protection while operating the machine. ANSI-approved impact safety goggles and OSHA-approved ear protection are recommended to reduce the risks of sight damage and hearing loss.
- Do not attempt to adjust or repair machine unless authorized to do so. If authorized, read and understand the Setup Safety and Maintenance Safety sections of this manual.
- Do not begin rolling until authorized by setup person. Verify that machine is not locked out or tagged out by maintenance staff.
- Keep hands, long hair, clothing, shop rags, etc... from all moving and rotating components. Long hair and long beards should be contained with a cap or a hairnet.
- Gloves must never be worn by anyone operating this machine.
- Do not touch or reach over moving or rotating machine parts or workpiece.
- Be aware of pinch points created by actuating hydraulic system on machine.
- Keep machine and area around machine clean. Clean up liquid spills around machine immediately to prevent slip hazard. Do not set loose tools or parts on machine or fixturing. Report any machine leaks to supervisor immediately.
- The workpiece, dies, and other machine components may be hot as a result of rolling.
- Workpiece coolant and swarf (metal flakes and residue produced by thread rolling) may be irritating to skin. Refer to Material Safety Data Sheet (MSDS) for details about your particular coolant.
- Prolonged skin exposure to oil and grease common on many workpieces and components of this machine could be hazardous.
- Roll only straight parts. A bent part may jump out of fixturing and injure operator or damage the machine
- Beware of burrs on workpiece – remove if possible.
- Never check workpiece dimension while spindles are turning.
- Never attempt to slow rotation or brake spindles, dies, or workpiece.
- Do not attempt to remove workpiece from machine unless hydraulic head is "OPEN"

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- Machine and fixtures may be automatically controlled – as a result they may begin operating or cycle without any user interaction.
- Electrical cabinet should be closed and locked. Only authorized maintenance electricians should enter cabinet. Cabinet contains lethal high-voltage.
- Do not place any body part in path of moving parts
- Do not rest or sit any part of body on machine.
- Do not run machine unattended.
- Report accidents to supervisor – no matter how small.
- Stop all motors and switch off disconnect at electrical panel when leaving machine unattended.
- During the course of production, be aware of changes in the machine due to fixture wear and drifting adjustments. Contact the setup person to make adjustments to machine as necessary. **DO NOT ADJUST MACHINE UNLESS AUTHORIZED TO DO SO.**
- Be aware of changes in rolling conditions – changes in sounds, heat, vibrations etc. may indicate failure of a machine component. Stop the job immediately and seek help.
- If you are unsure about safety of your task, contact supervisor before beginning job.

General Shop safety procedures

- Use common sense.
- Lift heavy work pieces with appropriate lifting devices.

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Operator Safety Checkoff

Before beginning a job, the following checklist should be completed by the operator.

- All guards are secured in place.
- Drive shaft containment fixture is secured in place.
- All spindle hardware including die clamp nut and support block hardware is tight.
- Fixturing and work blades are aligned and secured.
- Machine area and fixture are free of loose parts (tools, dies, etc..)
- Loose clothing and long hair is secured
- Rings and loose jewelry and watches removed
- Approval to proceed from setup person

With no work piece in work area, start spindles in run mode, with hydraulic head in "OPEN" position.

- Verify function of hydraulic system by cycling head – MAKE SURE WORK AREA IS CLEAR OF OBSTRUCTIONS AND WORK PIECE!
- Verify function of E-STOP button: Pressing button should latch down, spindle drive motor and hydraulic motor will turn off. Hydraulic head will release slightly.

Reset E-stop by twisting knob, and re-start spindle motor.

- Carefully verify function of drive shaft guard door interlocks by lifting door slightly off interlock switches. Spindle motor should stop when door is opened.
- Verify function of coolant pump by turning pump on and opening shutoff valve. Coolant should come out of coolant nozzles.
- Check all safety functions on fixtures and workholding devices. These devices must operate according to design.
- Note direction of spindle rotation.

OK to begin work!

Job Name

Operator Name

Date & Time

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Tesker Model 200 Safety Manual

Setup Safety

In this manual, the role of the setup refers to a worker that configures and proves out a job. Duties of this individual include machine adjustment and configuration, safety assessment, producing trial pieces and quality control. The setup person should read and understand this entire manual. They should be an experienced operator that can apply mechanical common sense to configure the machine and fixturing.



Job setup on a Thread Rolling Machine requires in-close inspection and adjustment of various machine controls and devices. Extreme precautions should be taken to ensure safety.

An important duty of the setup person is to provide a safety assessment of each particular setup. **IT IS THE DUTY OF THE SETUP PERSON TO EVALUATE IF THE GUARDING AND SAFETY SYSTEMS ON MACHINE AND FIXTURING ADEQUATELY PROTECT THE MACHINE OPERATOR.** If this assessment finds that more guarding or safety systems are required, **DO NOT AUTHORIZE OPERATOR TO BEGIN PRODUCTION.** The safety assessment should occur during the course of setup.

The Safety Assessment should include (but may not be limited to) the following items:

- Machine is of the correct type and size to handle job.
- Machine is in good working order – if not, refer matter to maintenance department.
- Work feed or holding fixtures and exit fixtures are appropriate for job.
- Work feed and exit fixtures and feed and exit tubes are aligned properly.
- The exit tube is the correct size for the enlarged – as rolled – work piece.
- The spinning work piece is completely contained and guarded except where it immediately enters and exits the rolling dies.
- All bolts and nuts are tightened after setup or making adjustments.
- The machine is cleared of all wrenches, tools, etc..
- Part material is correct and of adequate quality (size and straightness) to roll safely.
- Test roll several pieces and insure smooth operation before handing over job to operator.
- Ensure that the operator is adequately trained to run machine and knows what to do if the machine does not perform normally.

Tesker Model 200 Safety Manual

Refer to the Occupational Safety and Health Act (OSHA) General Industry Standard, Part 1910, Sub Part O, 1910.212 Machine Guarding for more information about end user expectations for safeguarding machines. In order to prevent operators from reaching into a hazardous area, physical guards are preferred due to their simplicity, but the following devices, or combination of devices may also meet these minimum requirements:

- Two hand controls
- Pullback devices
- Restraint device
- Light curtain presence sensing device

The following general "Setup Safety" guidelines should be observed:

- Follow all of the guidelines and rules set forth in the "Operator Safety" section.
- Complete "Safety Assessment" before beginning production work.
- Interchangeable machine components (dies, driveshafts etc...) are heavy. Use the correct lifting method to accomplish job without strain.
- Wrenches and tools should not be left on machine while test rolling. - Remove spindle nut wrench immediately after use.
- Avoid climbing on machine for setup.
- Always wait for spindles to come to a complete stop before adjusting any portion of machine or reversing the rotation of the spindles.
- While making adjustments, depress E-Stop button to prevent accidental starting by others.
- Use the proper tool for the job.
- Never reach near or around a rotating work piece to make a machine adjustment. Always stop the spindles and allow them to come to rest.
- Use extreme caution when "hand feeding" short blanks for setup. Make sure workpiece is smooth and cannot get caught on your hands or clothing as it begins to roll. Remove hands immediately as hydraulic head contacts workpiece. Use caution to avoid crush hazard as hydraulic head closes on workpiece.
- Gloves must never be worn by anyone using this machine.
- If "hand feeding" blanks during setup, be sure work piece is correct length and supported by proper fixturing. If blanks are too short, hands may be placed unnecessarily close to hazard area. If too long the free workpiece end may begin to whip uncontrollably.

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Maintenance Safety

In this manual, the role of the maintenance person refers to a worker that repairs the machine. Duties of this individual include machine service, machine component replacement, and electrical and mechanical troubleshooting. If the maintenance staff is expected to operate the machinery, even for a test, they should read and understand this entire manual.

Thread rolling machines have many inherent dangers that maintenance staff may encounter. These include but are not limited to :

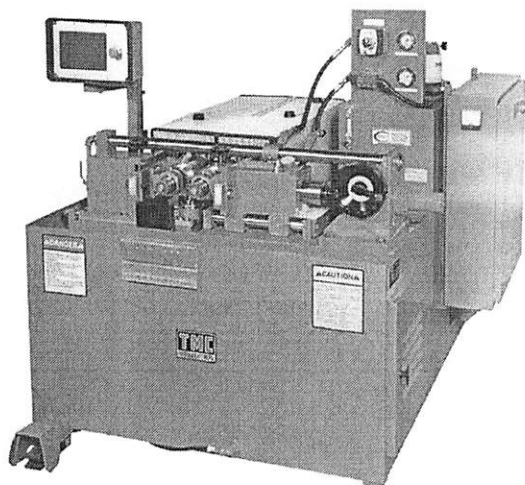
- High voltage electrical hazards
- High pressure hydraulic systems
- High temperatures
- Heavy components
- High torque drive systems
- Rotating parts with pinch points

The following "Maintenance Safety" guidelines should be observed by maintenance personnel while working on this machine:

- Follow lock-out/tag-out rules for machines under maintenance.
- Disconnect electrical power from machine before servicing.
- Some energy may be stored in high pressure hydraulic system after shut-down.
- Hydraulic head may move during disconnection or servicing of hydraulic system.

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Machine Specifications



Model 200

Machine Capacity	
Rolling Capacity	0" to Ø2"
Rolling Pressure	up to 24,000 lbs.
Spindle Drive	15 HP
Spindle Size	Ø1 1/2"
Max Die Diameter	Ø6"
Max Die Width	3 1/2"

Spindle Speeds	
(No data provided)	

Hydraulic System	
Hydraulic Motor	2HP
Hydraulic Oil	Mobil DTE 26
Hydraulic Cap.	30 Gallon
Max. System Pressure	2000 PSI

Floor Dimensions	
Width	56"
Length	66"
Height	62"
Weight	3,000 lbs.

Flood Coolant System	
Coolant Motor	¼ HP
Coolant Type	Oil or Water Based
Coolant Cap.	50 Gallon

Electrical Requirements	
Voltage	240/480 VAC
Service	38/19 AMPS
Phase	3

* Figures shown are for standard machine. Factory options may change these figures

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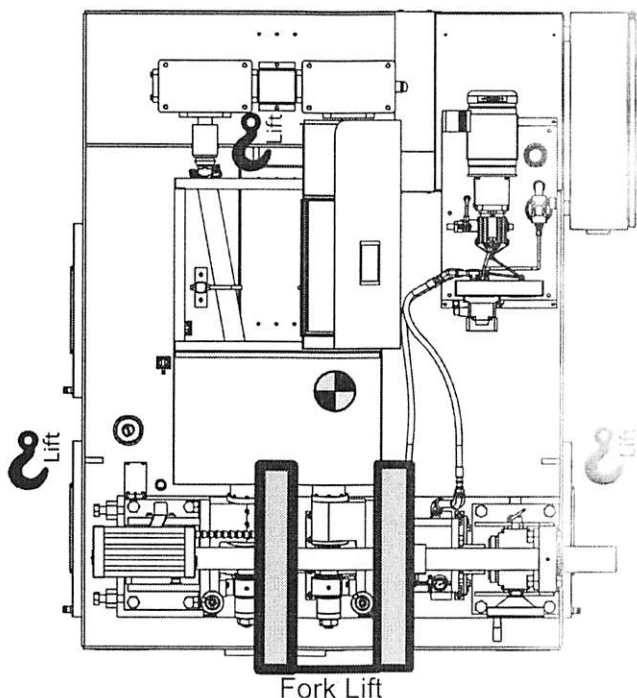
Machine Installation

In this manual, the role of installer refers to a worker that commissions the machine for operation in the customer's shop. Duties of this individual include rigging, machine placement and anchoring, and electrical hookup.

Rigging

The overall dimensions and weight for a standard machine are listed in the specifications section of this manual. Options and accessories will change these figures. It is recommended that the end customer hire a rigging and installation contractor to ensure that offloading and positioning is done in a safe manner.

The thread rolling machine can either be fork lifted from the machine front or sides, or hoisted by using all three lifting hole that are welded directly to the machine base walls. If lifting, the rigging will pass through the driveshaft guard door opening.



Machine Front



If using overhead lifting, make sure to use the appropriate spreaders and lifting fixtures to ensure sling legs or lifting chains do not touch machine components (motor, guards etc..)

Machine Placement and Anchoring

The machine should be placed with product workflow in mind. Leave extra room for external hydraulic unit, coolant tank (if equipped), and any fixturing needed. An electronic floor plan drawing is available from Tesker Manufacturing Corporation to assist in shop layout. Generally speaking, an electrical drop to the machine electrical panel is the only necessary utility, however most shops will also use compressed air to clean parts around the operator station. The machine should be installed level. Check for level on the flat machined surface located in the center of the base. If necessary, the machine can be anchored to the concrete slab through holes located inside base.

Electrical Installation

Contact Tesker Manufacturing Corporation for specific wiring details about your machine. A tag located in the electrical panel indicates the correct mains voltage. The electrical connections and grounding must follow all local and national electrical codes. If shop outlets are provided near machine (for small electrical hand tools etc..) use a GFCI (ground fault circuit interrupter) outlet to ensure employee safety around the wet environment created by machine coolant.



When creating knockout service hole in electrical cabinet, do not allow any metal shavings to fall into electrical components.



Before powering up machine, understand the operation and operational safety section of this manual.

It is recommended on machines controlled by a PLC (Programmable Logic Controller) that an additional grounding rod located near machine be bonded to the cabinet ground terminal.

Start Machine

Remove all shipping materials from machine. To protect bare metal parts during transit, surfaces are coated with a wax type metal protectant spray. This can be removed with a mild solvent.

Note: Check oil level in all gearboxes before starting spindles for the first time



Hydraulic Unit is shipped empty.

Fill to site-guage with Mobil DTE-26 or equivalent before powering machine

Verify correct rotation of spindles. Using the Operator Interface Terminal (OIT - touch screen), start the spindles in the "RIGHT" rotation. The following diagram shows the proper rotation when the "spindle rotation" switch is set to "RIGHT":

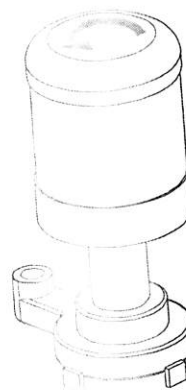
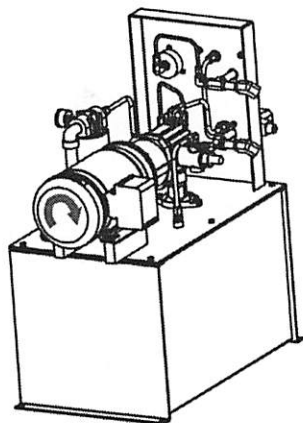


*End view of spindles
while standing in
front of machine*

If necessary switch two of the mains service phases to reverse motor rotation.

Start the hydraulic motor from the OIT. If the "Pump Pressure" guage does not rise quickly, stop the hydraulic motor. Spinning the motor backwards or with an empty tank will damage hydraulic unit pump.

If hydraulic pressure or coolant flow is unavailable, verify rotation of motors.



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Machine Operation

In this manual, the role of the operator refers to a worker that produces parts on a machine that is already setup and configured for a particular job. Duties of this individual include material handling, machine operation and possibly quality control. The operator should read and understand the Safety Introduction, Operator Safety section and Machine Operation sections of this manual. **The operator should not make any adjustments to the machine – contact the setup person.**



Before beginning work, it is recommended that the Operator Safety Checkoff be completed (found on page 9).

You should only begin work when authorized to do so by setup person.

Thread Rolling

Once set up, a two-die thread rolling machine can produce quality parts for a long time with few adjustments. Operators should note changing rolling and machine conditions and alert the setup person or foreman.



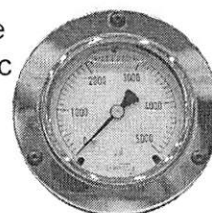
If you feel your job, or a particular setup is not safe, contact the setup person or foreman.

Operator Controls and Indicators

The diagram on the following page describes the functions of the operator controls and indicators. Gauges and indicators should be monitored during operation. Changes in gauge readings may indicate a problem – contact the setup person or foreman.

This machine is equipped with a touch-screen Operator Interface Terminal (O.I.T.).

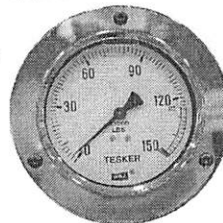
PUMP PRESSURE: Shows the current pressure of the hydraulic system.



PUMP PRESSURE

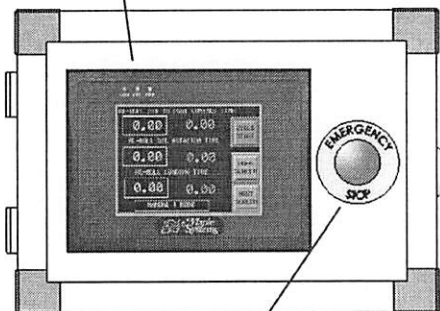
Operator Interface Terminal: (O.I.T.) Touch panel screen to control machine functions

ROLLING PRESSURE: This gauge shows the current rolling force of the machine in thousands of pounds.

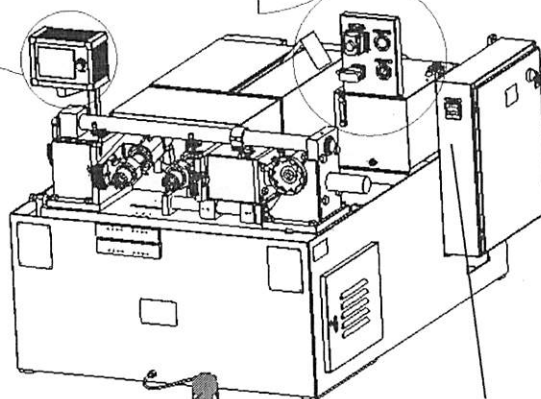


ROLLING PRESSURE

Level and Temperature Indicator: Shows temperature and level of hydraulic oil in reservoir. Oil level should be visible in glass.

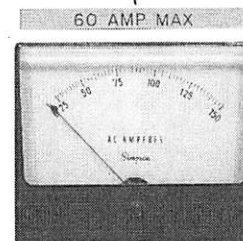


EMERGENCY-STOP: This latching red mushroom switch removes all power from motors on the machine. If wired to do so, the switch may also interlock with accessories or fixture functions. Pressing the Emergency Stop button will cause the hydraulic head to slightly open or release if the head was closed. An alarm message will appear on the O.I.T.. To reset the E-Stop, rotate the red button to the left.



Floor Foot Switch: Starts machine cycles

AC AMPERES: This gauge shows the current draw of the spindle motor. Do not exceed level indicated on yellow sign above meter.



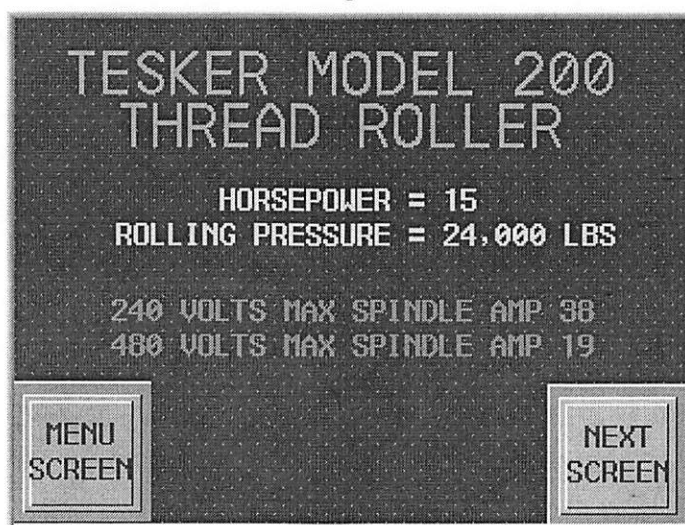
Operator Interface Terminal

There are several rolling modes and options available within the O.I.T.. The setup person should select the applicable mode and have the machine fully configured for the operator.

The operator must know how to start and stop the machine, and cycle the different modes for rolling production.

O.I.T. Navigation: The O.I.T. is laid out in different screens. A screen contains information regarding machine status as well as push-buttons that directly control machine functions. Also, each screen contains navigational buttons that can flip to other control screens.

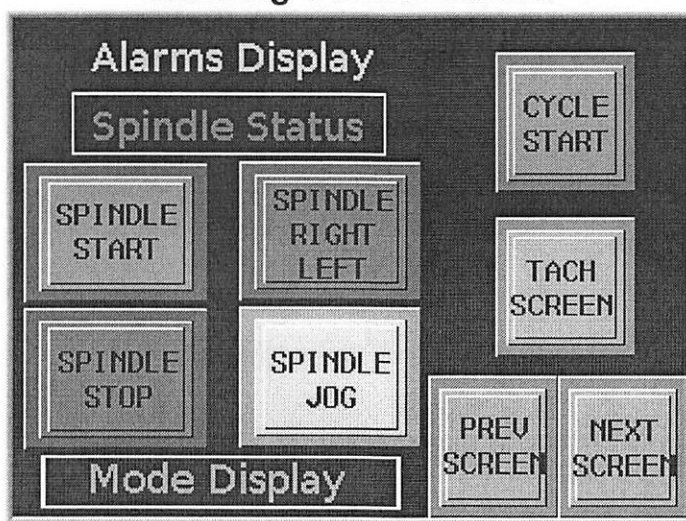
Heading Screen



Upon powering the machine the "Heading" screen will be displayed. This screen displays the model number along with other machine information.

Press the "NEXT SCREEN" button to display four screens that contain important safety information. These screens are restatements of the most important items in the safety portion of this manual.

Maching Control Screen



This is the main control page for the O.I.T.. The following diagram describes these buttons and display functions:

Alarms display: Displays the current machine “ALARM” status. More details about alarms can be found on the “ALARM SCREEN”

Spindle Status: Displays the current direction and status of the spindles.

SPINDLE START: This green button starts the spindle rotation. This button does not function when machine is in “Re-roll” mode.

SPINDLE STOP: This red button stops the spindle rotation.

SPINDLE RIGHT/LEFT: This blue button controls the direction of spindle rotation. When the spindles are started or jogged, the rotation direction will appear in the “spindle status” display. For thrufeed rolling, a right hand rotation will make the part feed through the machine (see setup section for more details). Most often, the rotation is set to “Right”.



Allow the spindle drivetrain to stop before restarting spindles after a direction change - machine damage can occur.

SPINDLE JOG: Pressing this button will momentarily cause the spindle motor to start. Releasing the button turns the spindle motors off. This button is commonly used during setup to test machine adjustments.

Mode Display: Displays the current rolling mode. (See Rolling Modes” for more details)

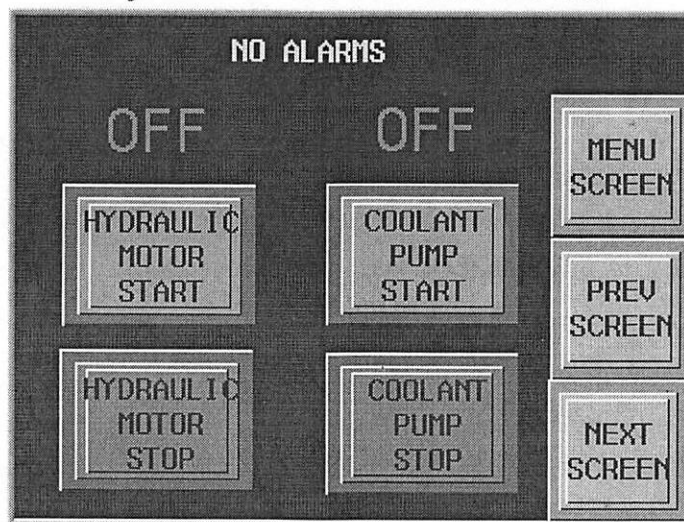
CYCLE START: This button behaves differently depending on which “Mode” the machine is set to. (See "Rolling Modes” for more details.) The floor foot switch also triggers this button, and acts exactly the same as pressing the button on the screen.

TACH SCREEN: This button jumps to the tachometer page to display current spindle speed.

PREV SCREEN: This button jumps back to the safety information page.

NEXT SCREEN: This button jumps forward to the Hydraulic and Coolant Screen.

Hydraulic and Coolant Screen



This screen follows the Machine Control Screen, and displays the status of the hydraulic and coolant motors. The hydraulic motor must be running to perform rolling production.

HYDRAULIC MOTOR START: Turns on the machine hydraulic system.

HYDRAULIC MOTOR STOP: Turns off the machine hydraulic system.

COOLANT PUMP START: Turns on the flood coolant pump.

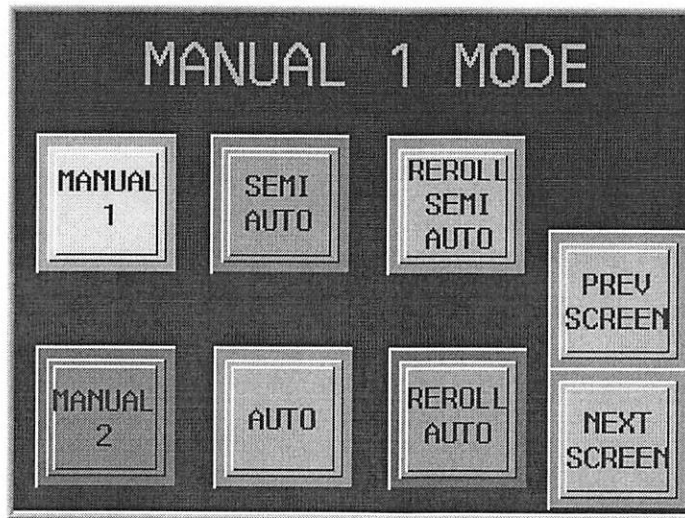
COOLANT PUMP STOP: Turns off the flood coolant pump.

MENU SCREEN: This button jumps to the “Help Menu” screen.

PREV SCREEN: This button jumps back to the Machine Control Screen.

NEXT SCREEN: This button jumps forward to the Rolling Mode Screen.

Rolling Mode Screen



This screen sets the different rolling modes of the machine by affecting how the “CYCLE START” button and floor foot switch operate.

Pressing each button switches the current mode - which is displayed across the top of the screen.

PREV SCREEN: This button jumps back to the Hydraulic and Coolant Screen.

NEXT SCREEN: This button jumps forward to the Timer Screen.

MANUAL 1: MANUAL 1 is used in both infeed setup and thrufeed rolling. Pressing and holding the “CYCLE START” button or foot switch closes and holds the hydraulic head. When the button or foot switch is released, the head reopens.

MANUAL 2: MANUAL 2 is used in both infeed setup and thrufeed rolling. Pressing and releasing the “CYCLE START” button or foot switch closes and holds the head. Pressing the button or foot switch again returns the head to the open position.

SEMI AUTO: SEMI AUTO is used for production to automatically time how long a part is rolled for. It can be used in infeed rolling, or in thrufeeding to roll a certain length thread on a part. The “ROLLING TIME” must be set from the Timer Screen. Pressing the “CYCLE START” button or foot switch closes the head and starts the timer. When the timer reaches zero, the head automatically reopens. A new part is placed for rolling and the button or foot switch is pressed again to repeat the cycle.



The machine operates automatically from timers during any of the “AUTO” modes. Do not place hands or parts where they can be crushed by the moving head.

AUTO: AUTO mode is used for production to fully automate the machine functions. It can be used for both infeed and thrufeed processes. Both the “ROLLING TIME” and “LOADING TIME” need to be entered on the Timer Screen. In this mode, pressing the “CYCLE START” button or foot switch closes the head and starts the “ROLLING TIME” timer. When this timer counts down to zero, the head opens to accept a new part and the “LOADING TIME” timer begins counting down to zero. When the timer reaches zero, the cycle starts over by closing the head. The machine will continue to cycle automatically until the “CYCLE START” button or foot switch is again depressed to interrupt the cycle.



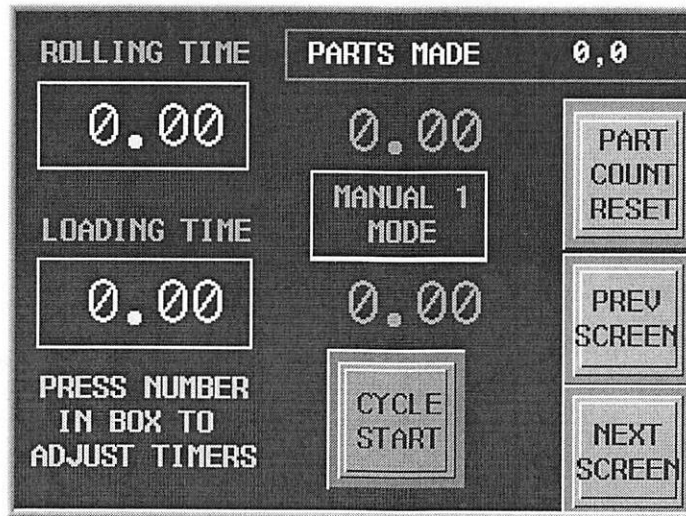
After pressing the “CYCLE START” button or foot switch to *stop* any of the “AUTO” modes, the machine will continue on and finish the current rolling cycle. To stop the cycle immediately, press the E-STOP button.

REROLL SEMI AUTO: The rerolling process is used to “repair” nicked or damaged rolled threads using infeed dies. This cycle is controlled by the timer entries on the Reroll Timer Screen. In the beginning of this process, the machine spindles are stopped. The operator places a part in the work area and engages the preformed thread on the part into the thread-form on the non-rotating stationary die. Pressing the “CYCLE START” button or foot switch starts the “RE-ROLL DIE TO PART CONTACT TIME” timer and closes the head. When this timer reaches zero, the “RE-ROLL DIE ROTATION TIME” begins, and the spindles start rotating. After this timed interval, the head reopens and the spindle rotation stops. The finished part is removed and the cycle is ready to be repeated.

REROLL AUTO: The REROLL AUTO cycle begins the same way as the REROLL SEMI AUTO cycle; except after RE-ROLL DIE ROTATION TIME zeros out, the spindles stop, the head opens and the RE-ROLL LOADING TIME begins to count. When this timer zeros out, the cycle automatically begins anew. This process will continue until either the “CYCLE START” button or the foot switch is pressed.

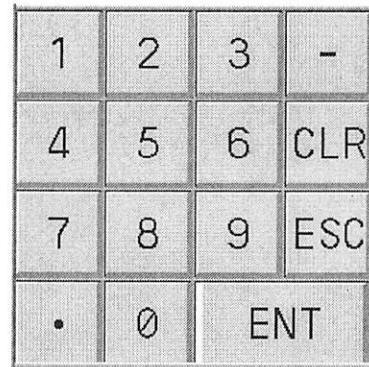
Note: While in either RE-ROLL mode, the SPINDLE START button on the Machine Control Screen will not function.

Timer Screen



This screen controls the timers and part counter for SEMI AUTO and AUTO mode.

Touching the screen inside the “ROLLING TIME” or “LOADING TIME” box opens up a numeric keypad where a time can be entered with precision of 0.01 seconds. To exit the keypad pop-up, press “ENT”.



CYCLE START: This button operates the same as the floor foot switch. Pressing this button will start the machine operating according to which machine MODE is currently selected.

PART COUNTER: The control counts how many parts are made when using any of the AUTO modes. This count can be reset by pressing the “PART COUNT RESET” button. Also, the count is reset when the power to the machine is cycled.

PREV SCREEN: This button jumps back to the Rolling Mode Screen.

NEXT SCREEN: This button jumps forward to the Reroll Timer Screen.

This screen controls the timers and part counter for REROLL SEMI AUTO and REROLL AUTO mode.

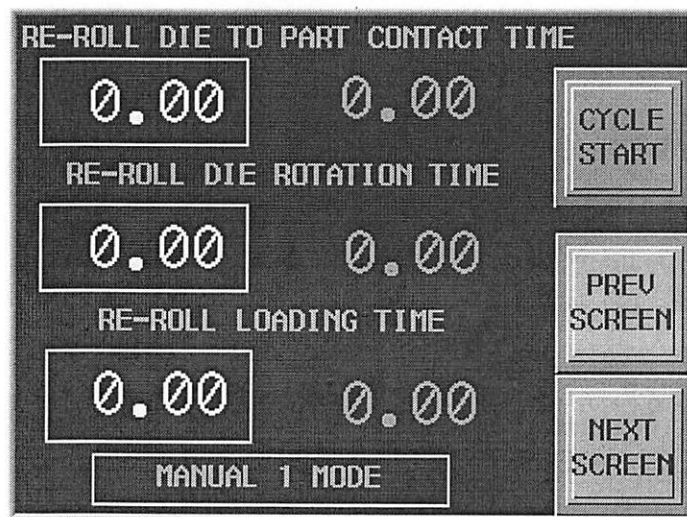
Touching the screen inside any of the timer boxes opens a numeric keypad where a time can be entered with precision of 0.01 seconds. To exit the keypad pop-up, press "ENT".

CYCLE START: This button operates the same as the floor foot switch. Pressing this button will start the machine operating according to which machine MODE is currently selected.

PREV SCREEN: This button jumps back to the Timer Screen

NEXT SCREEN: This button jumps forward to the Tachometer Screen.

Reroll Timer Screen



This screen displays the current spindle RPM (if equipped).

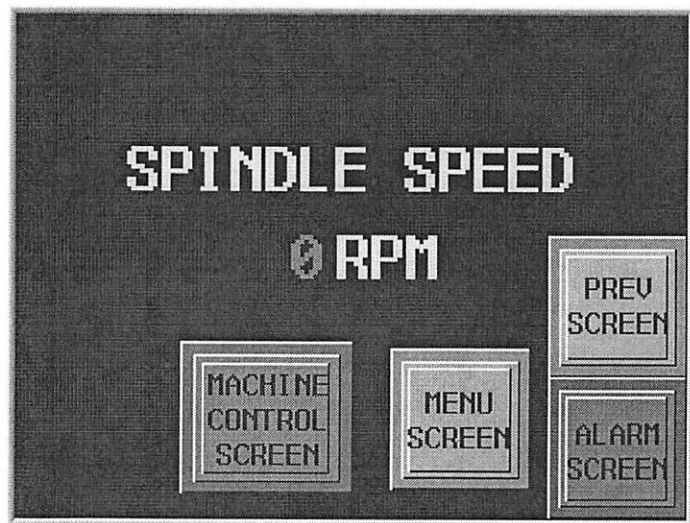
MACHINE CONTROL SCREEN: This button jumps to the MACHINE CONTROL SCREEN.

MENU SCREEN: This button jumps to MENU SCREEN or setup instructions screen.

PREV SCREEN: This button jumps back to the Reroll Timer Screen.

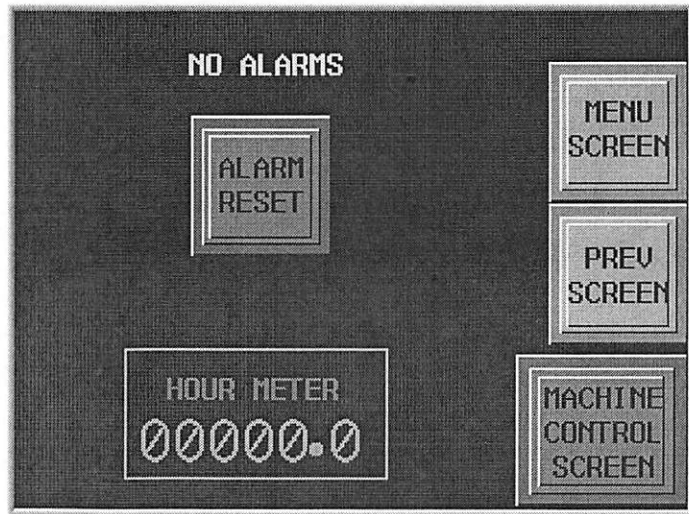
ALARM SCREEN: This button jumps forward to the Alarm Screen.

Tachometer Screen



This screen displays the current alarm status. Pressing the ALARM RESET button will clear all system alarms, and allow the spindles to restart. The operator should refer all alarms to the setup person, or the maintenance department. This page also displays the machine hour meter.

Alarm Screen

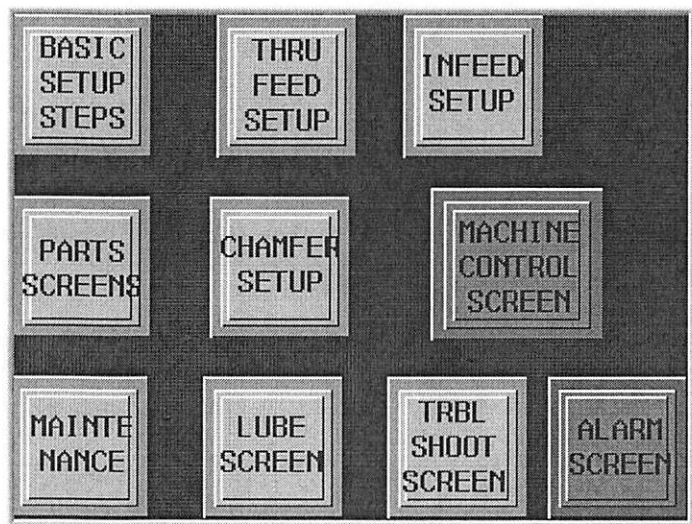


MACHINE CONTROL SCREEN: This button jumps to the MACHINE CONTROL SCREEN.

MENU SCREEN: This button jumps to MENU SCREEN or setup instructions screen.

PREV SCREEN: This button jumps back to the Tachometer Screen.

Menu Screen



This page contains summaries of setup procedures used by the setup person.

Machine Setup

In this manual, the role of the setup refers to a worker that configures and proves out a job. Duties of this individual include machine adjustment and configuration, safety assessment, producing trial pieces and quality control. The setup person should read and understand this entire manual. They should be an experienced operator that can apply mechanical common sense to configure the machine and fixturing.



Job setup on a Thread Rolling Machine requires in-close inspection and adjustment of various machine controls and devices. Extreme precautions should be taken to ensure safety.



It is the responsibility of the setup person to ensure the safety of each job. Comply with all recommendations in the Setup Safety portion of this manual.

Thread Rolling Introduction

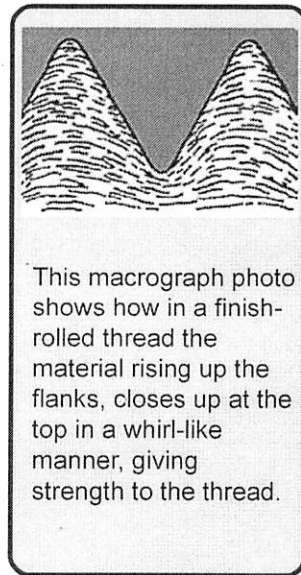
Tesker Thread Rolling Machines use high pressure to create various thread forms and sizes in a variety of materials. Properly configuring a thread rolling machine relies on both knowledge contained in this manual and experience. Training and setup assistance are offered through the factory.

Rolled threads have many advantages to offer: strength, accuracy, fine surface finish, high rates of production, less material cost and no chips. Cold forming is perhaps the best description of the thread rolling process. A cylindrical blank having an outside diameter between the major and minor diameters of the finished thread is rotated between hardened steel dies bearing the reverse thread form. The die threads penetrate the blank surface to form the thread roots and displace material radially outward to form the crests. Unlike other threading processes, metal is neither removed nor wasted, but displaced.

The cold forming that threads receive during the rolling process strengthens them in three ways: tension, shear, and fatigue resistance. Static tensile tests have reported increases in the ultimate strength of the parts of approximately 30%.

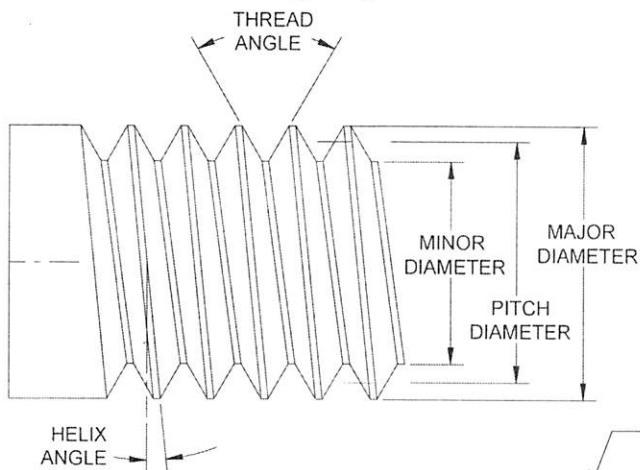
Thread grain structure is not severed, it is instead reformed in continuous unbroken lines following the thread contours. Rolled threads have increased resistance to stripping because such failures are compelled to take place across, rather than with, the grain flow.

Fatigue resistance is improved in several ways. Threads are produced with burnished roots and flanks, free from surface imperfections that can be starting points for fatigue failure. Surface layers of the thread, particularly those in the roots, are stressed in compression. These compressive stresses must be overcome before the tensile stresses that cause fatigue failure can be built up. Fatigue strength is improved by up to 75%.

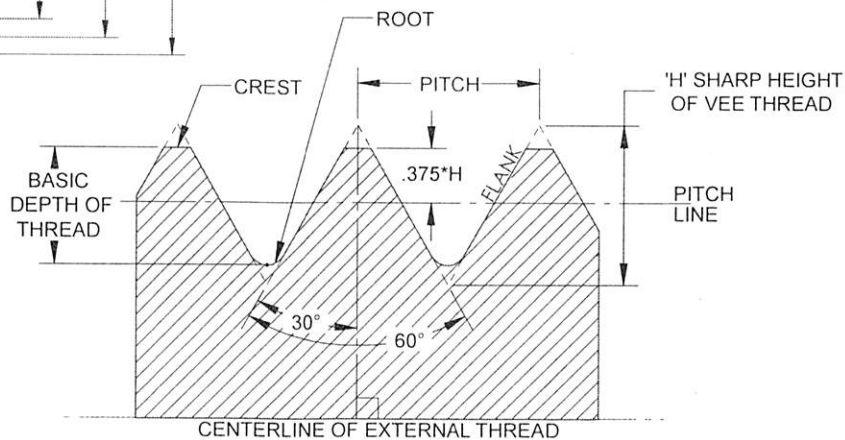


Threads

The *Tesker Thread Book*, which is bound with this manual, shows several common thread forms that can be rolled on this machine. Common terminology for many thread forms is shown in the following diagrams:



The *Tesker Thread Chart Book* will provide basic information for common thread forms and series. The most useful information will be the pitch diameter, major diameter and the helix angle. For additional thread forms, or sizes not listed in the book, contact Tesker Manufacturing for assistance.



Two Die Thread Rollers

Two die thread rollers: 2-Die machines are the most versatile type of cylindrical die thread rollers. They can roll very short to very long continuous thread lengths. And unlike 3-Die machines, they can theoretically roll any diameter from zero to the maximum listed in the specifications section.

The work piece will not automatically stay positioned between the dies during rolling, so it must be contained or held by a work support. In addition to this work support, extra fixturing is most often used to setup the machine for manual loading or automatic feeding operations.

Thrufeed VS. Infeed Rolling

Rolling jobs on a cylindrical die machine can be classified by the following two categories:

Thrufeed: In thrufeeding, a blank is fed into a closed set of dies. The part will rotate as the threads are being formed. A helix angle set on the machine's spindles drives the part axially through the machine. This type of rolling is commonly used to make a long, continuously threaded part.

Infeed: Infeed or plunge rolling is when the rotating dies are closed in upon a part blank. The part will rotate while the threads are being formed. The machine spindle helix angles are set to zero, so the part does not move axially – all of the necessary thread helix is ground into the dies. This method can only form a thread that is as long as the dies are wide. It is used when only a portion of the part is to be threaded, or the thread is to be created up to a shoulder.

Thread Rolling Dies

Cylindrical rolling dies are made from precision ground heat treated tool steel. The dies are ground with a reverse profile of the desired thread form (60°, acme, ball screw, etc..) and a certain pitch (11 or 14 tpi, etc..). Thread forms ground into the die are called rills. The number of rills, and their helix angle on the die determine how the machine is set up to produce a certain thread form.

A common type of die used is called a “**Thrufeed Die**”. One type of thrufeed die, the “**Annular Ring**” die, has rills with a helix angle of zero – that is the rills form continuous rings around the die. The helix angle required to produce a thread is set only on the machine spindles. Due to ease of grinding, these dies are also the most economical to manufacture.

“**Thrufeed dies**” can also be ground with helix angle in the rills, and require a helix angle to be set on the spindles as well. When these dies are used, it allows the axial speed (in or out of machine) to be controlled.

Using a “**Speed-up**” type die will create a faster axial feed rate (feed per minute of rod traveling through machine) for a given spindle speed. This is commonly used on small diameter threaded rod to increase production rates.

Using a “**Slow-feed**” combination die will slow the axial feed rate for a given spindle speed. This allows a lower capacity machine time to completely form the thread profile.

Infeed Die: An infeed die has the required helix ground into the die. Since the part does not move axially during rolling, infeed dies can have extra “features” such as: straightening rolls, burnishing rolls, and knurling areas.

Ground tapers: Cylindrical thread rolling dies have special tapers on the beginning and sometimes the end to strengthen these areas and help grab on to a part. Tapers can also effect the thread lead on the beginning and end of a part.

Diameter and length: Generally it is most economical to use the largest diameter and the longest dies possible that will fit on the machine. If in-feeding, the die width is equal to the desired thread length on the part. When dies wear out, most can be reground at the factory for as little as 1/3 the cost of new dies.

Die material: Tesker dies are available in various materials depending on specific job needs.

Die lineup: Since there are two dies forming the part, the pattern of each die must be properly oriented so they both create one thread form. That is, the thread created by one die matches up with the thread's created by the other die. All Tesker spindles are able to be axially adjusted in and out for this die lineup step. For infeed rolling, an optional accessory allows angular adjustment on a drive shaft to create lineup.

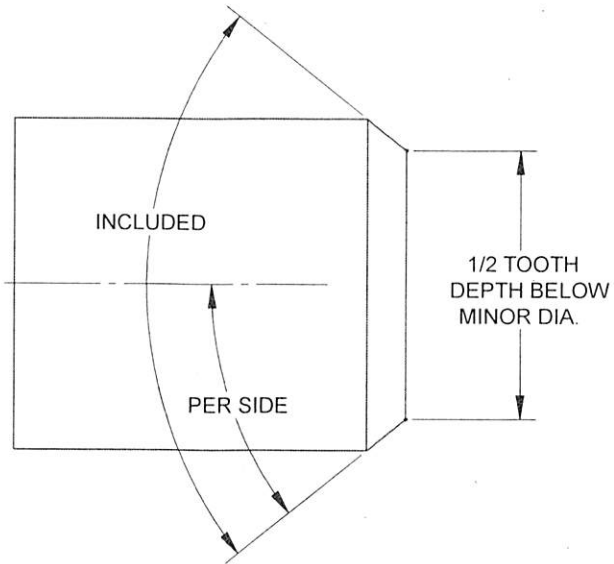
Many die options and combinations are available. Tesker Manufacturing Corporation has over 40 years of experience in thread rolling and will gladly help you select the die set that suits your needs.

Part Considerations

Part blank: Part blanks generally are sized slightly below the finished desired pitch diameter. Blank diameter variations will affect the size of a finished part. Average fits can usually be obtained by cold-rolled or drawn stock, however for tight toleranced threads, ground diameters are commonly used. Thread rolling tends to amplify waviness in long bars.

Chamfers: Chamfers at the beginning and end of a threaded section are important for die life, especially on harder material. The following table has suggestions for common materials:

	CHAMFERS IN DEGREES	
	PER SIDE	INCLUDED
MILD STEEL	30°	60°
STEEL BETWEEN 25-32 Hrc	20°	40°
STEEL BETWEEN 33-40 Hrc	15°	30°
STEEL ABOVE 40 Hrc	10°	20°
ANNEALED STAINLESS	30°	60°
NON-FERROUS	30°	60°
ALL ACME	15°	30°



Coolant Selection

Coolant is required during thread rolling for the following reasons:

- Coolant removes heat created by the forming process from the dies and the workpiece
- Acts as high pressure lubrication to allow the metal to flow easier along the part/die contact surface
- Flushes away scale and metal sliver contaminates created during rolling

Clean coolant prolongs die and machine component life and produces a better surface finish. Coolant tanks contain baffles that allow particles to precipitate out, so the tank must occasionally be drained and cleaned. Machines can also be fitted with membrane or magnetic style coolant filters to extend the clean-out interval. Extended high-speed production or precision rolled parts can benefit from a coolant chiller which maintains a constant coolant temperature.

There are two types of coolants used:

Water based: Water based fluids are less expensive and are most commonly used for “commodity” type rolling. They are very effective at removing heat from the rolling area and can easily be blown off of the finished part for very little coolant loss. These coolants are referred to as “Soluble Oils” and are mixed with water to their specified concentrations by volume. Concentrations can be monitored using a refractometer. Water based coolants tend to wash grease and oil out of bearings and machine components. It is recommended that the machine be lubricated more often when using these coolants.



Refractometer

Oil based: Oil based coolants are most often used for heavy form rolling because of their lubricity and high pressure additives. Oil based coolant will leave a cosmetically better, burnished thread. However, oil is not as effective at removing heat as water based coolants. Also oil is more expensive and tends to be carried away on the finished part, requiring more frequent tank refills, and possibly secondary cleaning operations on the finished part.



This is a short list of recommended coolants and their suppliers:

Ultrasol 5720 Universal Soluble Oil – General purpose water based coolant mixed at 7%-10% concentration.

Coolant Control Inc.
5353 Spring Grove Ave
Cincinnati, Ohio 45217
800-535-3885

Shell Adrana D 208 Water extendible metalworking fluid – general purposed water based coolant mixed at 5% - 8% concentration.

Shell Lubricants
800-237-8645

Picocool 5255 HD Sythetic soluble oil – general purpose water based coolant.

Pico Chemical Corporation
400 E. 16th Street
Chicago Heights, IL 60411
708-757-4910

Piedmont Threadroll 444 – Heavy duty thread rolling oil

Piedmont Chemical Company.
PO 12680
Pittsburgh, PA 15241
937-428-6640

Benzoil 141 Threading Compound – Thread rolling oil used on work-hardening alloys including stainless steel.

Benz Oil
2424 West Hampton Avenue
Milwaukee, WI 53209
414-442-2900

Lightweight Hydraulic Oil (ISO 32 or less) – Oil containing high pressure additives, hydraulic oil can be used for non-demanding rolling operations.

Machine Setup

Once job parameters such as rolling method and type of die are known, you can begin to set up the machine. To assist documenting each job, a "Thread Rolling Procedure" sheet is included at the end of this manual. Generally, the following setup procedure is used:

1. Set 0° helix angle on the spindles
2. Set initial spindle RPM
3. Set work support height
4. Position work support
5. Install the dies and the outboard supports
6. Match die faces
7. Set helix angle on spindles (thrufeed only)
8. Bring heads in to contact part
9. Setup fixturing
10. Adjust die lineup and match
11. Adjust toe-in
12. Adjust rolling pressure and die penetration rate
13. Calculate and set thread depth
14. Test roll sample pieces
15. Set Timers
16. Perform production safety evaluation