Roll Marking

Technical Data Sheet

CMT

Columbia
Marking
Tools

Contents

Roll Marking Definition

Roll marking involves "rolling" the mark onto the part. It is an economical solution for applications where high tonnage requirements make using a press too costly. This method is also practical for marking fragile parts that could be damaged by the stamping pressure of other methods. Roll marking can be performed using either a round part with a flat die or a round die with a flat part, making it suitable for a variety of shapes and surfaces.

Roll Marking marks characters one at a time. This allows for the use of less force, and a reduction in machinery costs.

Roll Marking Terms

Holder: Pocket tooling to position individual type in place when roll marking round parts.

Part Fixture: Work holding piece to hold part being marked firmly in place.

Ram Cylinder: Cylinder providing the force for the marking operation.

Roll Cradle: Two pieces of round rollers to move a round part during the marking operation.

Roll Carriage: Tooling to move the rotate the roll die or roll type holder during the marking of flat parts.

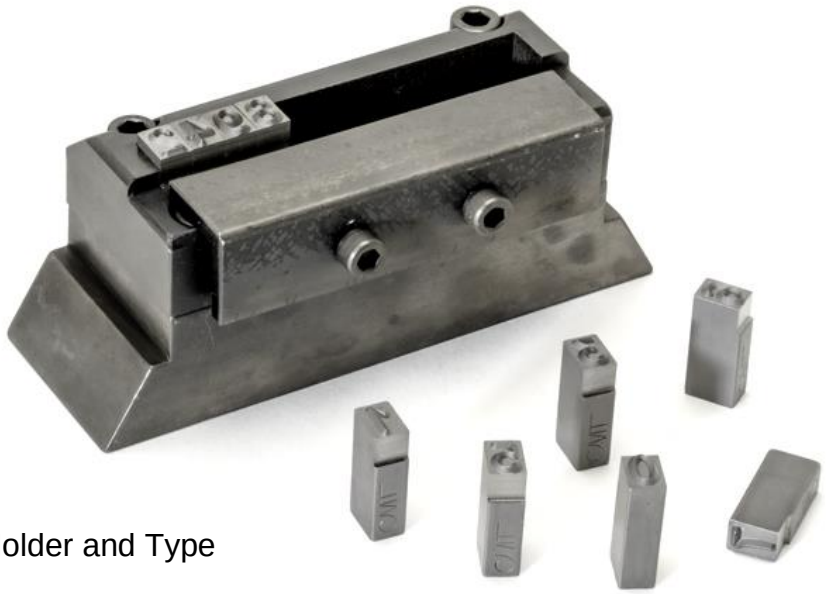
Roll Die: Solid roll die with marking details engraved to mark flat parts. The Roll die must be used with the roll carriage.

Roll Type Holder: Holder for inter-changeable wedge type used in roll marking flat parts. The roll type holder is used with the roll carriage.

Segment Type: Multi-character die. Offers time savings in tooling set-up and a reduction or errors in common part number numbers and names.

Slide Cylinder: Cylinder to move marking tooling across part. The length of travel or stroke of this cylinder is the length of the marking legend.

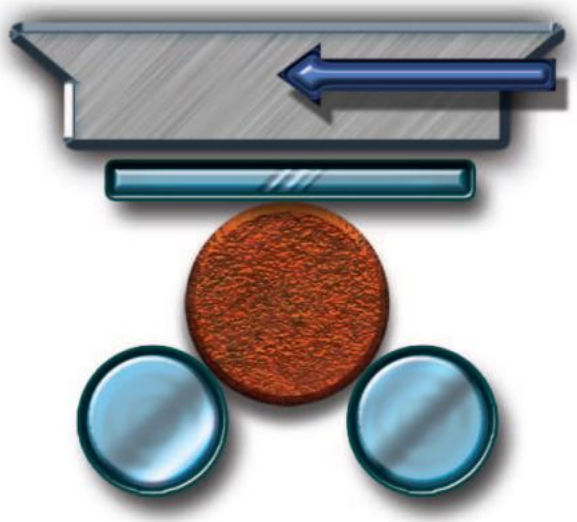
Type: Rectangular type to fit into holder for marking round parts during roll marking process.



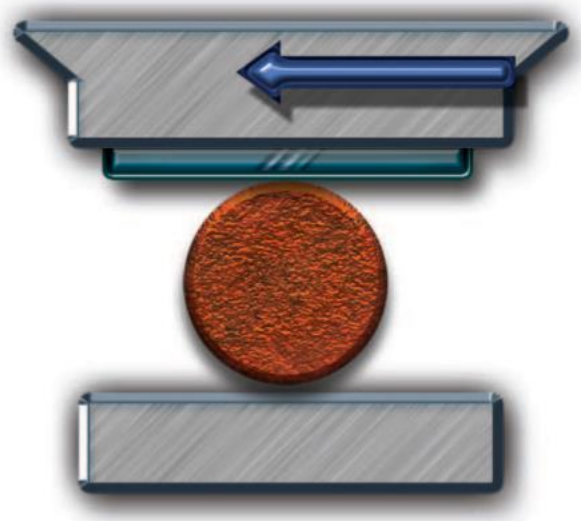
Holder and Type

Roll Marking Methods

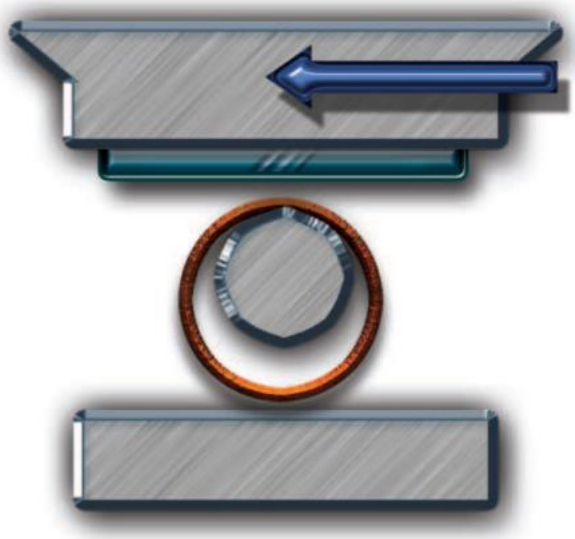
Method #1 – Round parts marked with a flat die. The round part rotates under the motion of the flat die via the use of roll These rollers are called a roll cradle.



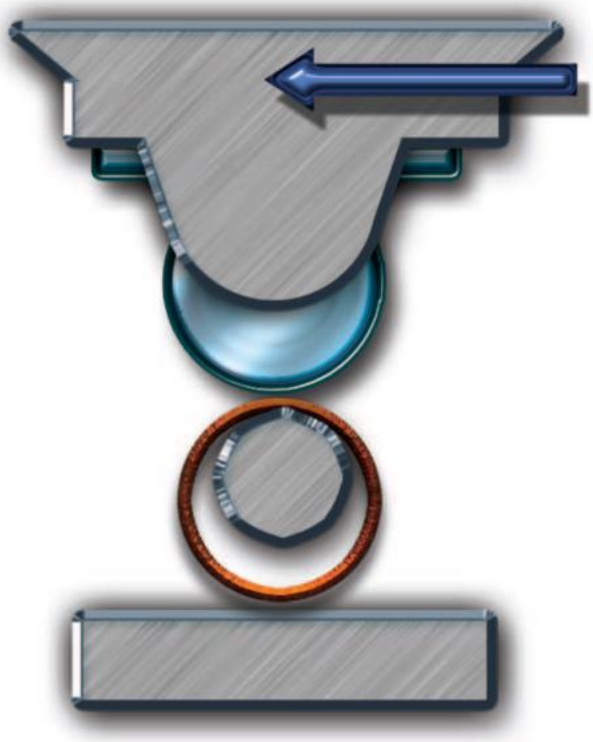
Method #1A – Round parts marked with a flat die. The round part rotates on a flat fixture backup. This method is uncommon.



Method #2 – Flat parts marked with a round die. The part is held firmly in place as a roll die or roll type holder rolls across the marking surface.



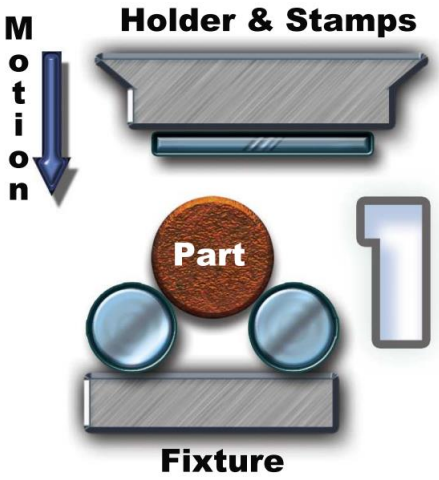
Method #3 – Round hollow parts marked with a flat die. This method uses a mandrel to support the hollow part during the marking process. The mandrel rotates with the part as the flat die moves across the surface.

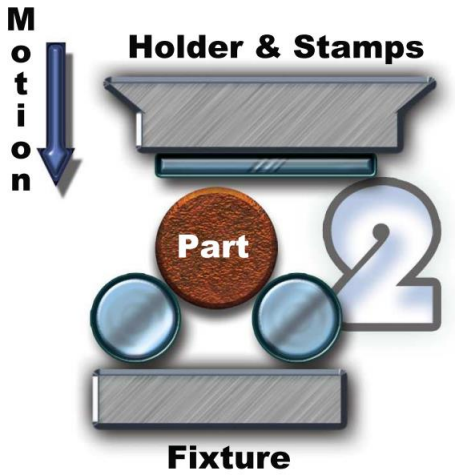


Method #4 – Round parts marked with a round die. The process of diameter-to-diameter marking is a CMT exclusive process. This roll marking method involves the les amount of surface area in contact between the die and the part and therefore requires the least amount of force for the maximum impression.

Roll Marking Process

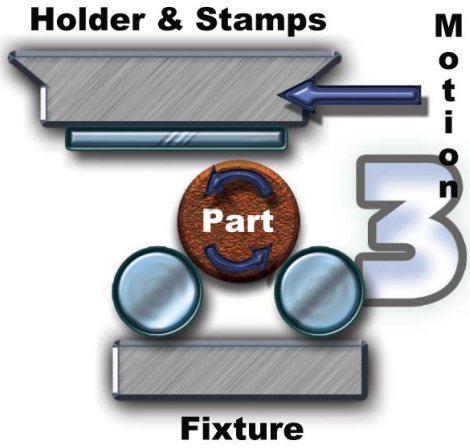
Step #1 – Part in position to be marked. May require part locating fixture or roll cradle as shown.

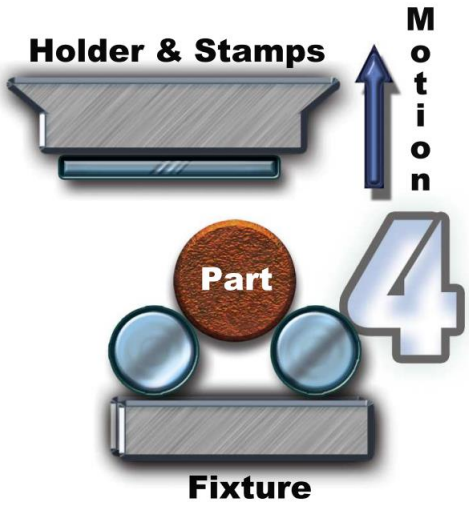




Step #2 – Marking die approaches and contact part. CMT “Seek & Find” pressure system always assures contact marking pressure on the part.

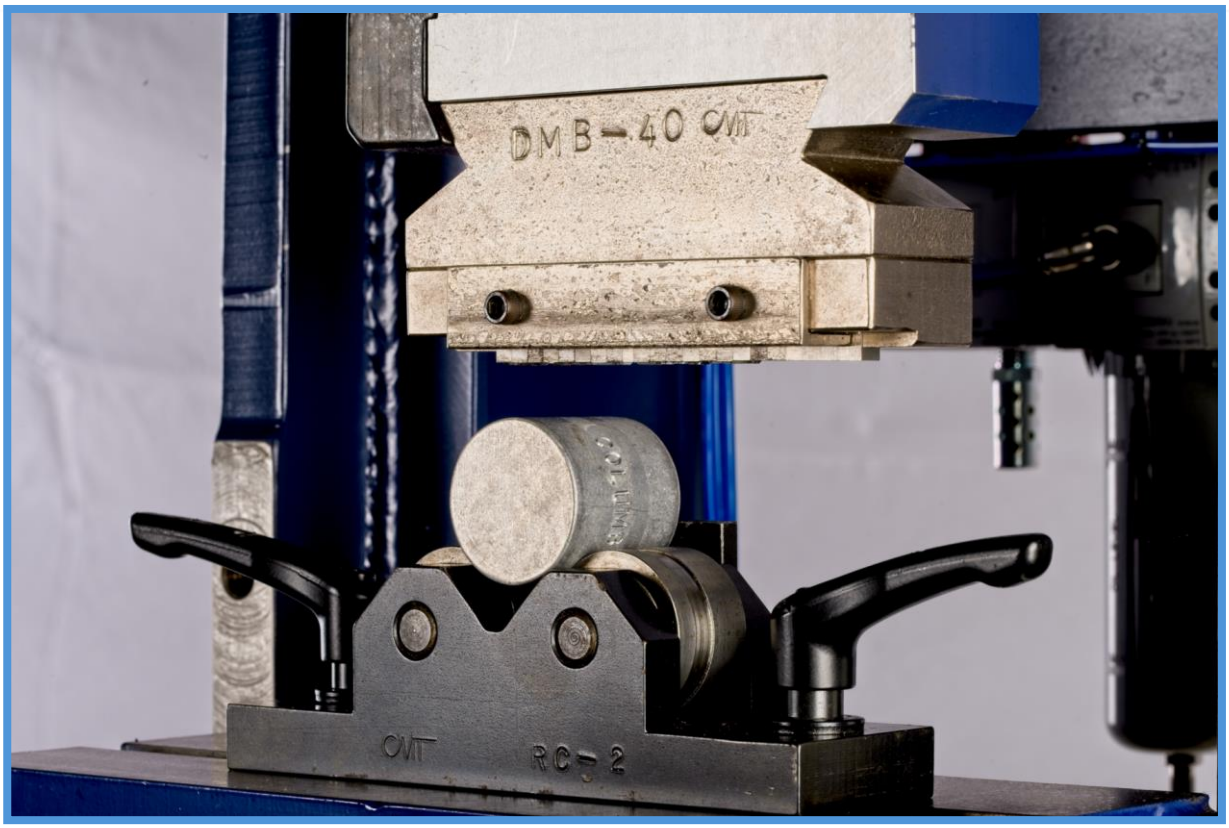
Step #3 – Marking die moves across part. Approximately 1 character in contact with the surface of the part always. Round parts shown rolling with die in roll cradle.



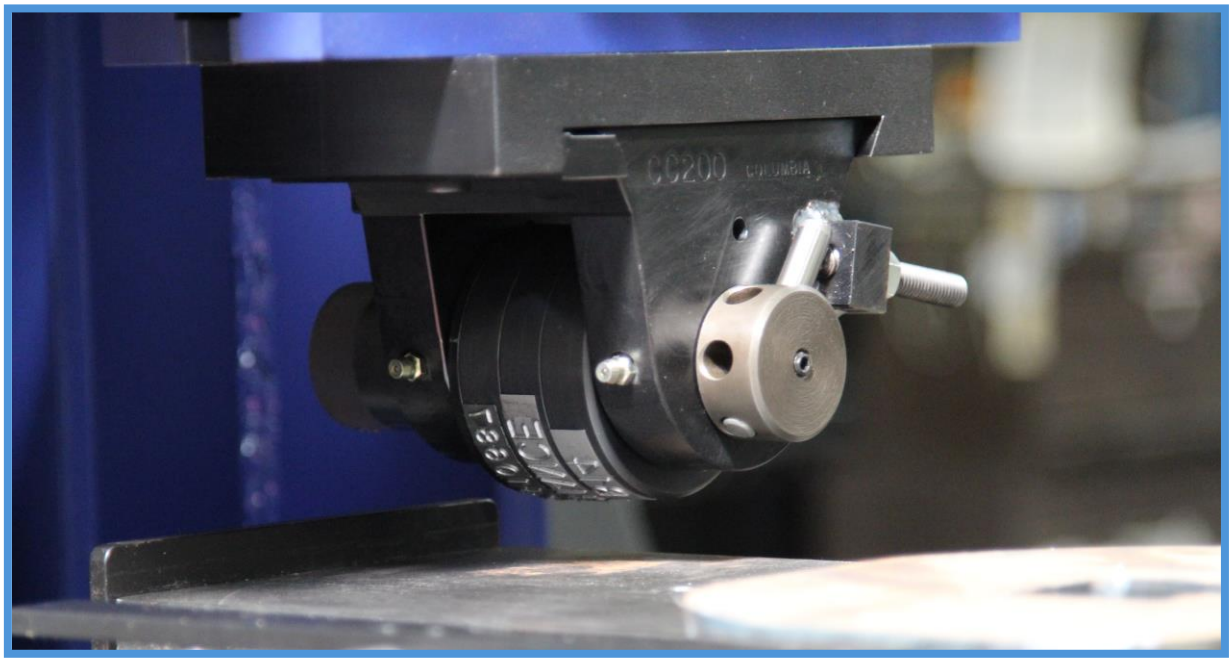


Step #4 – After moving the length of the slide stroke, the roll marking die retracts from the part.

Example of a flat die marking a round part. Holder with type is above the round part, and the (2) rollers of the roll cradle are below the part.

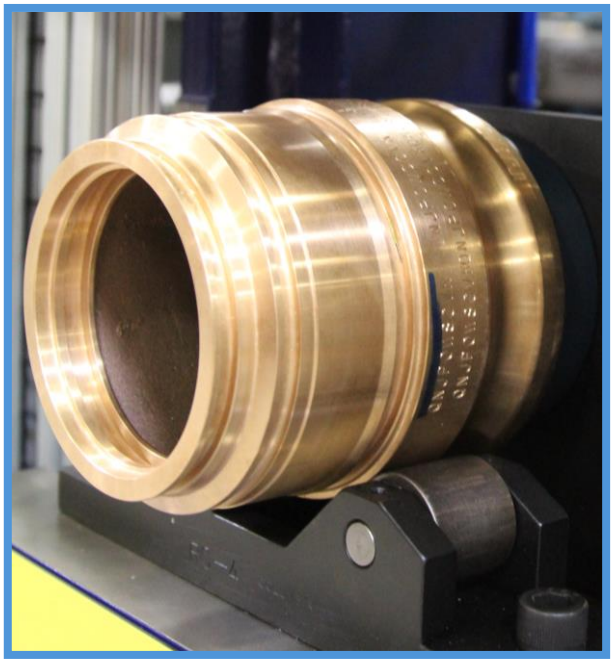


Example of a round roll type holder marking a flat part. The (3) lines of interchangeable wedge type are above the part.



Air Powered Roll Marking Machines – 260/860

Columbia Marking Tools' classic roll marking machine features a custom-designed and built ram cylinder that delivers the driving force for marking pressure. This innovative system employs a "Seek & Find" pressurization method to ensure consistent pressure throughout the marking operation. The all-air marking system is ideal for high-volume marking applications and is versatile enough to handle both round and flat parts efficiently.



Roll marking delivers a deep mark than any other method in a fraction of the cycle time. The high throughput of the roll marking system provides a reliable and economic solution for industrial part marking.

Components

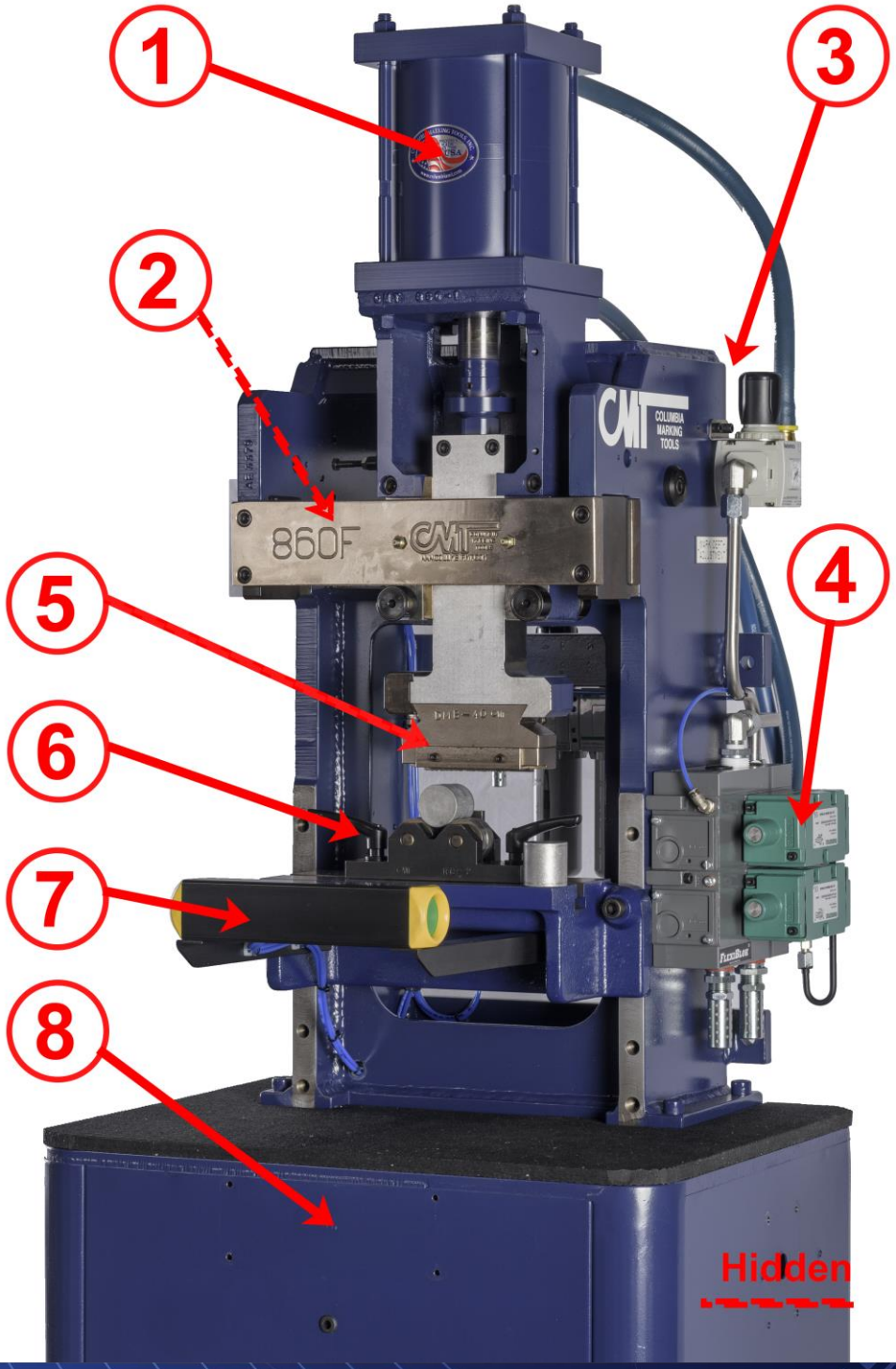
The 260/860 Roll Marking Machine is composed of the following key components:

- **Air-Powered Keyed Ram**: Provides the driving force for marking operations.
- **Slide Cylinder**: Provides the driving force for marking operations.
- **Controls**: Includes operator interfaces for starting and managing the marking cycle.
- **Stamp Holder and Stamps**: Designed to securely hold and position the marking stamps. Upgrades include numbering heads for serial numbering.

- **Fixture and Roll Cradles**: Design to hold or roll part during marking process.
- **Frame Options**: Mounted on either a bench frame (B) or a floor-style base (F), depending on application requirements.
- **Safety**: OSHA required palm buttons or guarding with a part present cycle start.

The sequence is initiated either by operator palm buttons or a part-present cycle switch, ensuring safety and precision in automated or semi-automated setups.

1. Air powered ram
2. Slide Cylinder
3. FRL – Filter Regulator Lock out (OSHA required)
4. 4-way valve and air controls
5. Holder (or numbering head)
6. Roll Cradle for round parts or part holding fixture
7. Operator palm buttons (mounting on optional machine base
8. Machine base with caster wheels for mobility



The flexibility of the 260/860 design allows for easy configuration to meet diverse application needs, including horizontal orientation, integration with automation field bus systems, extended throat sizes for accommodating larger parts, and much more.

Hydraulic Powered Roll Marking Machine - 410

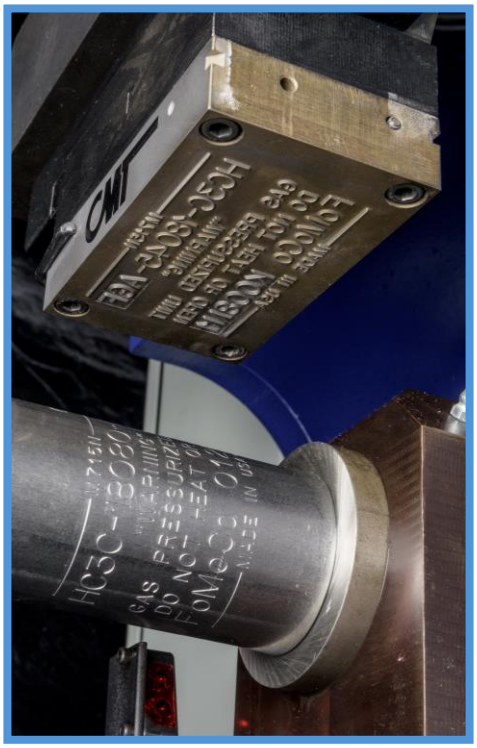
Columbia Marking Tools' 410 hydraulic roll marking machine features a custom-designed ram cylinder that delivers powerful marking pressure. This innovative design enables the deepest and fastest part marking available.

Hydraulic roll marking machines offer 9 to 18 tons of force and longer stroke lengths, making them ideal for demanding applications. The 410 machine can function as a standalone unit or be seamlessly integrated into a larger production system

Components

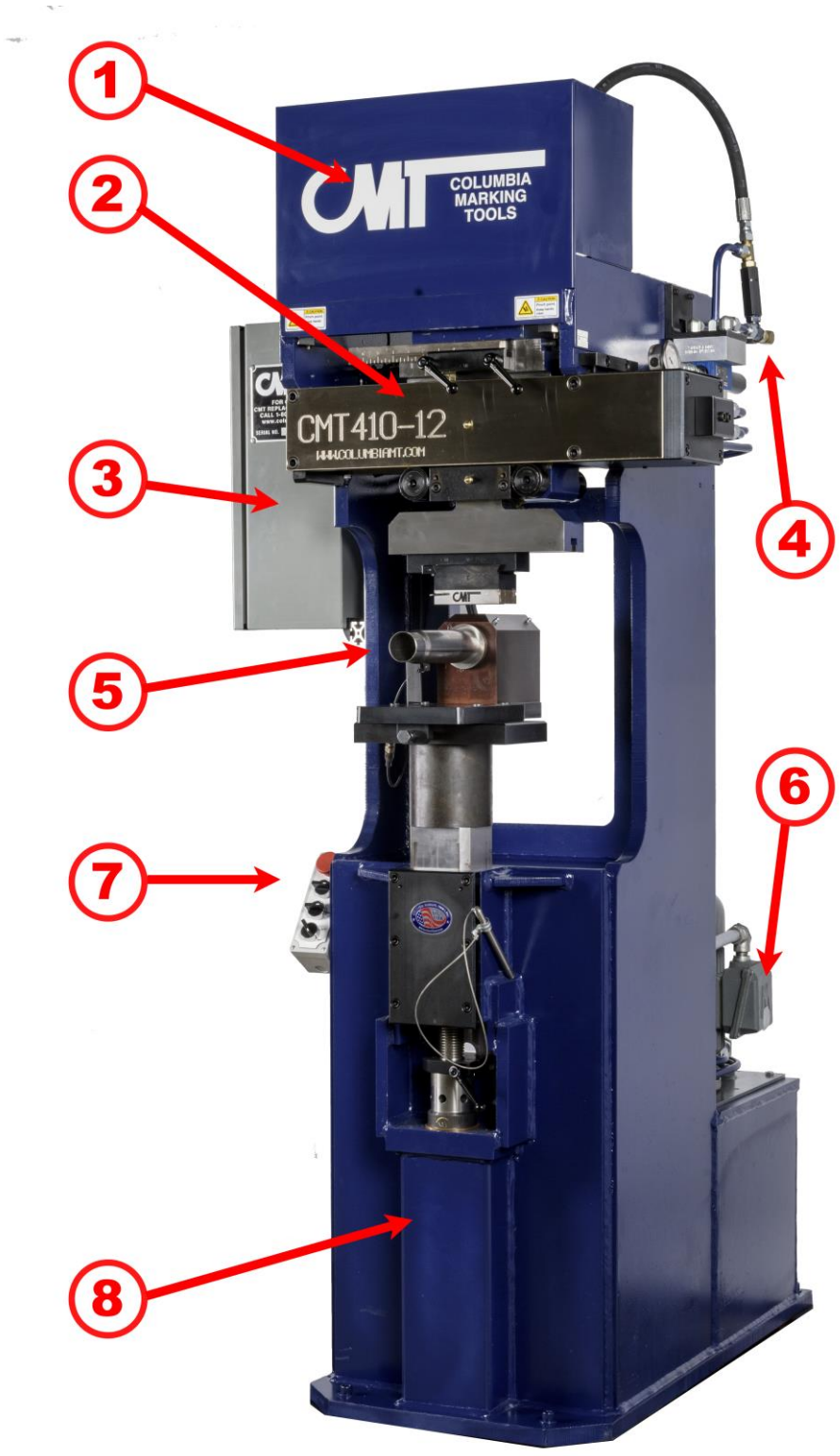
The 410 Hydraulic Roll Marking Machine composed of the following key components:

- **Air-Powered Keyed Ram**: Provides the driving force for marking operations.
- **Slide Cylinder**: Provides the driving force for marking operations.
- **Controls**: Includes operator interfaces for starting and managing the marking cycle.
- **Stamp Holder and Stamps**: Designed to securely hold and position the marking stamps. Upgrades include numbering heads for serial numbering.
- **Fixture and Roll Cradles**: Design to hold or roll part during marking process.
- **Frame**: Floor style industrial weldment to withstand high pressure operation and provide durability.
- **Safety**: OSHA required palm buttons or guarding with a part present cycle start.



The sequence is initiated either by operator palm buttons or a part-present cycle switch, ensuring safety and precision in automated or semi-automated setups.

1. Hydraulic powered ram
2. Slide Cylinder
3. Machine mounted control panel
4. Hydraulic control valves
5. Holder (or numbering head) and mandrel support for hollow round parts or part holding fixture
6. Emergency stop
7. Machine base with caster wheels for mobility



The 410-machine shown here is specifically designed for integration into a robotic automated production cell. The palm buttons for manual operation have been removed and replaced with a fieldbus interface, enabling seamless communication with the line PLC.

Retro-Fit Roll Marking Machines – 260R/860R

Columbia Marking Tools' offers a retro-fit roll marking unit for installation in automated production equipment. This CMT retro-fit system features a custom-designed and built ram cylinder that delivers the driving force for marking pressure. This innovative system employs a "Seek & Find" pressurization method to ensure consistent pressure throughout the marking operation. The all-air marking system is ideal for high-volume marking applications and is versatile enough to handle both round and flat parts efficiently.

Roll marking delivers a deep mark than any other method in a fraction of the cycle time. The high throughput of the roll marking system provides a reliable and economic solution for industrial part marking.

Components

The 260R/86R0 Roll Marking Machine is composed of the following key components:

- **Air-Powered Keyed Ram**: Provides the driving force for marking operations.
- **Slide Cylinder**: Provides the driving force for marking operations.
- **Controls- Air**: All required air-preparation and valves for control of the motion of the dual cylinder system.
- **Controls- Electric**: Includes Junction box with field bus for starting and managing the marking cycle.
- **Stamp Holder and Stamps**: Designed to securely hold and position the marking stamps. Upgrades include numbering heads for serial numbering.

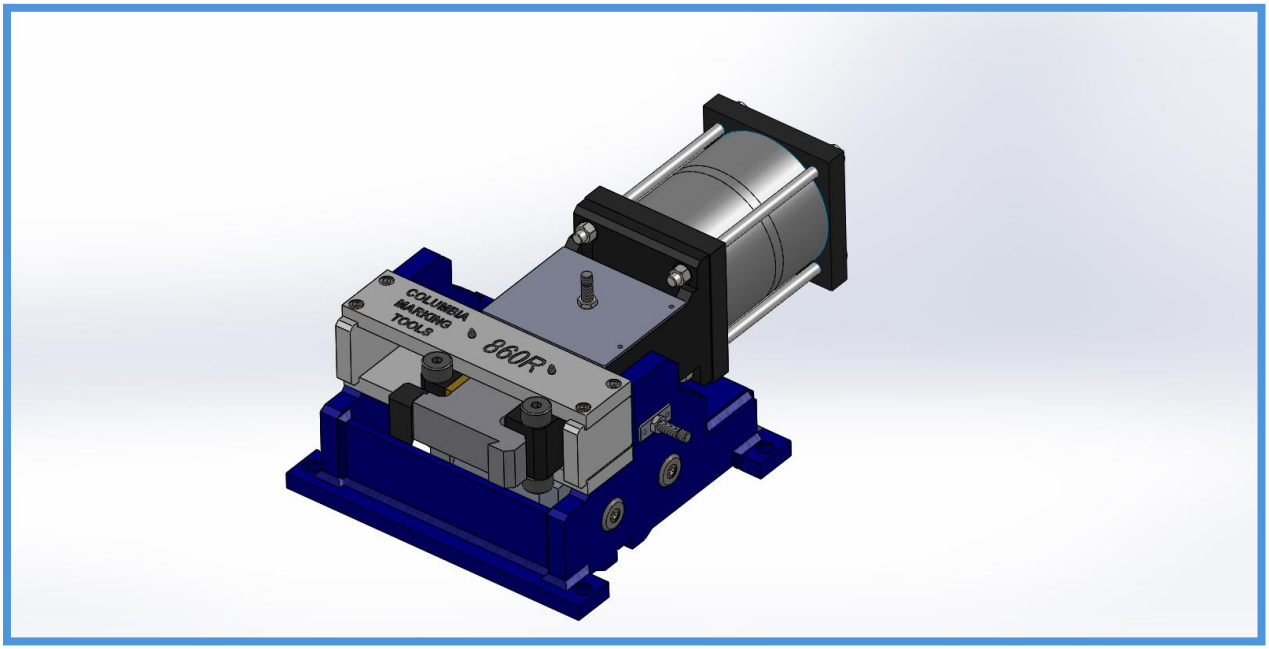
Example Sequence of events with serialization numbering head.

The flexibility of the 260R/860R design allows for easy integration info automated production. Custom configurations include marking legend length, force, approach stroke, sensors, electrical controls.

Sequence of Operation

KEY
"X" = ENERGIZED
"–" = DE–ENERGIZED

FUNCTION	SEC.	CYCLE TIME IN SECONDS 1 2 3 4 5 6	INPUTS X2 PRX	INPUTS X3 PRX	INPUTS X4 PRX	OUTPUTS Y0 SOL	OUTPUTS Y1 SOL	OUTPUTS Y2 SOL
AT START			X	–	X	–	–	–
ADVANCE RAM	1.5		–	–	X	X	–	–
DWELL	.5		–	–	X	X	–	–
ADVANCE SLIDE	1.5		–	X	–	X	X	–
RETRACT RAM	1.5		X	X	–	–	X	–
RETRACT SLIDE	1.5		X	–	X	–	–	–
ADV. NO. HD.	.5		X	–	X	–	–	X
RET. NO. HD.	.5		X	–	X	–	–	–
END OF CYCLE								

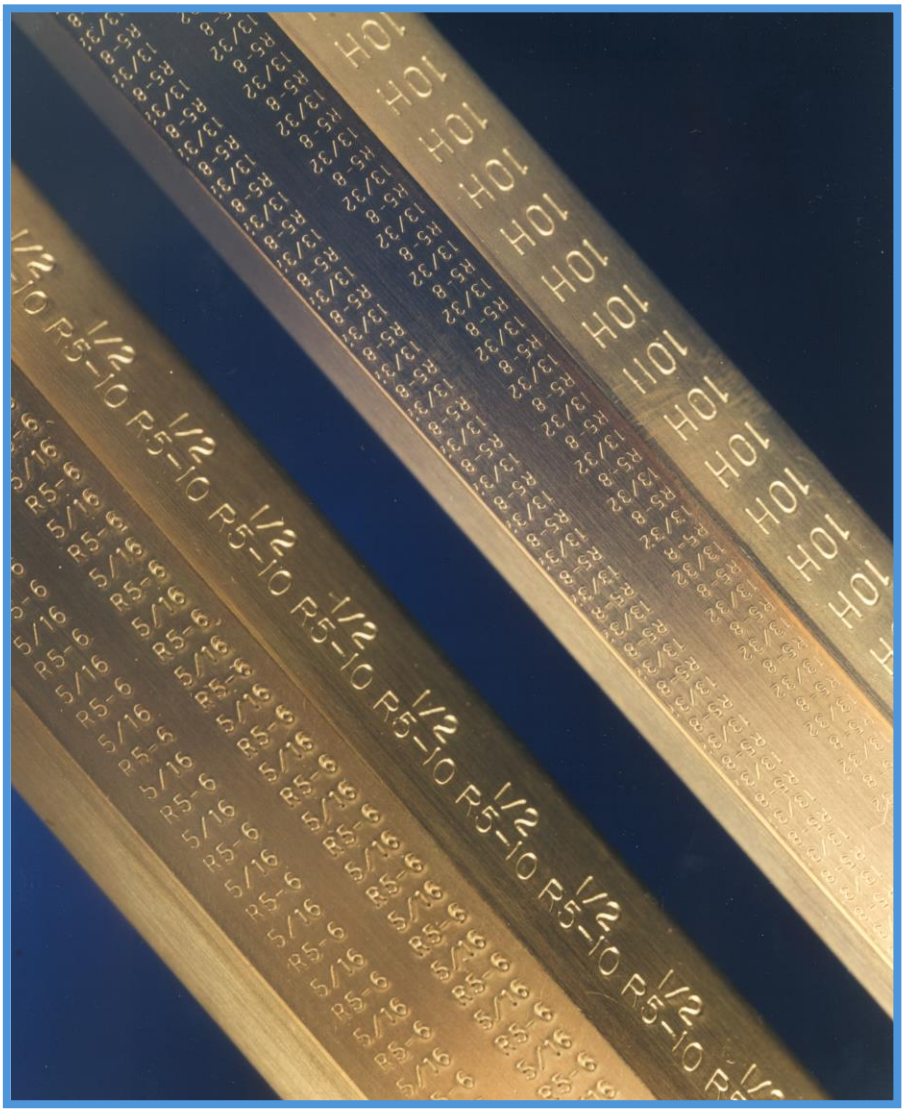


The basic roll marking system components:

1. Air powered ram
2. Slide Cylinder
3. FRL – Filter Regulator Lock out (OSHA required)
4. 4-way valve and air controls
5. Holder (or numbering head)
6. Mounting Holes
7. Electrical Connections

Barstock Marking Machines 2020/4040

Columbia Marking Tools' 2- and 4-sided bar stock marking machines are provide super-fast throughput for high volume fittings manufacturers.



This heavy-duty marking system is engineered for high-volume production, capable of marking up to four sides of bar stock with rapid cycle times.

Machine Specifications:

- Supports bar stock sizes from 3/8" to 2-1/2"
- Robust, floor-style machine base
- Expanded main machine frame with increased spacing for easier tool change and adjustment
- Heavy-duty Boston drive (10-250 FPM) for continuous operation
- Independent marking pressure rams with self-centering backup support
- Adjustable marking pressure rams with lock-in-place settings
- Forward/reverse variable speed control with "Jog" feature
- Heavy-duty Torrington bearings with cast iron housings
- Double-sized "Part Guide" rollers with lever locks
- Safety Features: OSHA-compliant safety guarding with a power disconnect switch

Components of the CMT Barstock marking machine:

1. Safety Guard – Shown open
2. Heavy Duty Frame and floor base
3. Machine mounted control panel
4. In-Feed
5. Adjustment Height – for bar sizes
6. Marking Dies (2) sets of (2)

Accessories include:

- Roll Dies
- Wafer Die holders and wafer dies
- Infeed loading station for 24/7 lights out operation

Diameter to Diameter D2D Roll Marking Machines

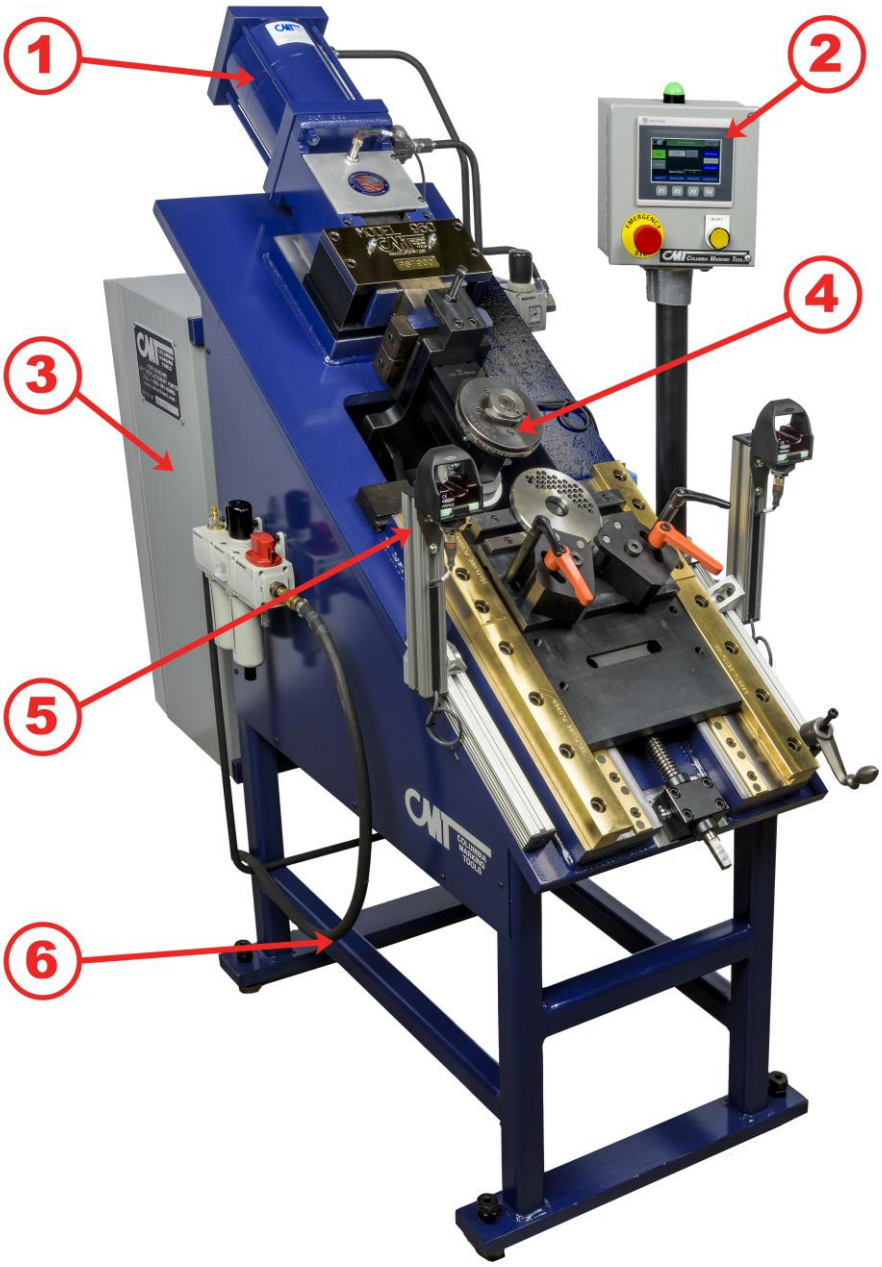
Diameter 2-diameter roll marking is a great solution for marking long legends on the outer diameter of large round parts. The reduced contact between the tooling and the parts requires less force to create the industrial mark, making the process more efficient. Additionally, this tooling style minimizes floor space requirements, leading to cost savings in both machinery and manufacturing footprint.

The 960-A43 is a custom floor-style, air-powered roll marking machine designed for precision and efficiency. Engineered for durability and ease of use, this machine delivers high-quality markings on small to large diameter parts while ensuring minimal stress on the material.

Key Features:

- Heavy-Duty Steel Frame: Provides stability and durability for long-term use.
- Ergonomic Tilt Design: Facilitates effortless part loading and accommodates various part sizes.
- Extended Marking Capability: Supports up to a 10" legend mark length for enhanced versatility.
- Low Pressure, Low Stress Marking: CMT’s exclusive Pressure Seek and Find Mark Depth Control ensures consistent, high-quality markings.
- Touchless Palm Buttons: Ergonomically designed with protective ring guards for enhanced safety and efficiency.

Components of the 960 D2D Diameter-to Diameter marking machine:



1. Ram
2. Machine Controls
3. Machine mounted control panel
4. Roll Type Holder
5. Master Fixture Plate – Roll cradle shown
6. OSHA required palm Buttons
7. Frame with industrial floor base

Accessories include:

- Roll type Holder
- Stamping type and segment dies
- Roll cradles for part rotation
- Guarding
- Fieldbus is available for full automation production

The Diameter-2-Diameter marking process is an exclusive CMT development. This type of process is used in many industries including high pressure cylinder/bottles.