



**Air Impact Marker
8 Ton Single Acting
Model 98**

Operation Manual

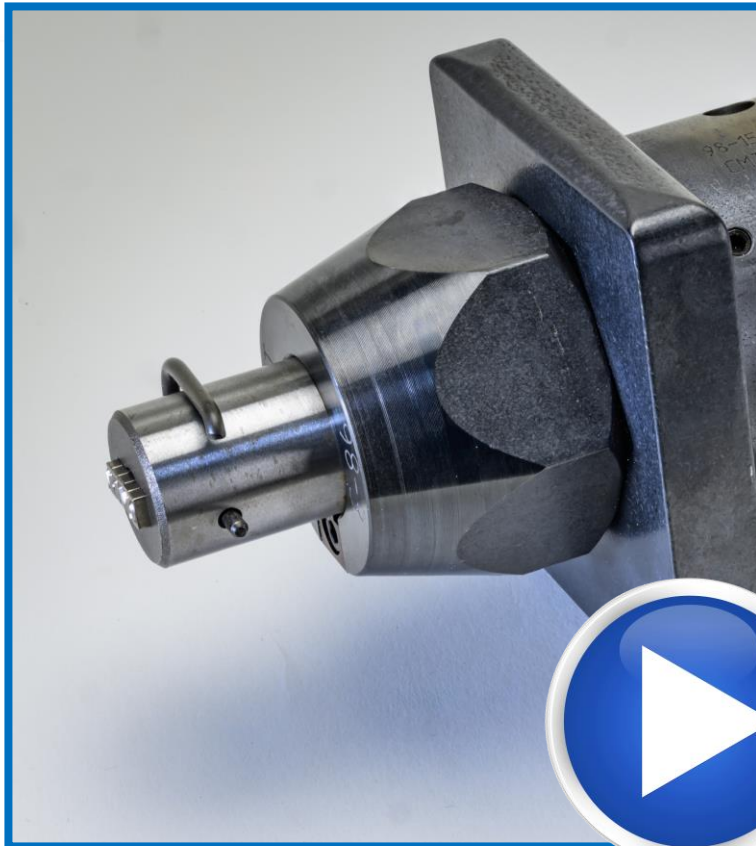
CMT COLUMBIA
MARKING
TOOLS

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What is an air impact marker?

An air impact marker is a type of industrial marking tool that utilizes compressed air to create high-impact forces, allowing for quick and durable marking on various materials. Here are some key features and advantages of CMT air impact markers:



1. **Simple Design:** Air impact markers typically have a straightforward and compact design, making them easy to use and integrate into different industrial settings. The simplicity of their design often translates to reliability and ease of maintenance.
2. **Durable Marking:** The high-impact forces generated by these markers result in durable and long-lasting markings on surfaces. This is particularly important in industrial applications where parts may undergo various stresses, including exposure to harsh environmental conditions.
3. **Speed and Efficiency:** Air impact markers are known for their speed and efficiency in marking parts. This is crucial in industrial production processes where rapid and accurate marking is essential for maintaining a smooth workflow and high productivity.
4. **Versatility:** These markers can be used on a wide range of materials, including metals, plastics, and composites. This versatility makes them suitable for diverse industrial applications.
5. **Integration with Automation:** The compact design of air impact markers allows for easy integration into both manual and automated production processes. This

adaptability is valuable for industries seeking efficient and automated solutions to streamline their production lines.

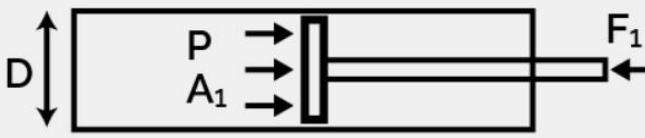
6. **Low Maintenance:** The robust and simple design of air impact markers often results in low maintenance requirements. This can contribute to cost savings and reduce downtime in industrial settings.
7. **Consistent Marking Quality:** Air impact markers provide consistent marking quality, ensuring uniformity in the marked information on parts. This is important for traceability, quality control, and compliance with industry standards.
8. **Adjustable Settings:** Many air impact markers come with adjustable settings, allowing users to control the force and depth of the marking. This flexibility is useful when working with different materials and applications.

Is an air impact marker an air cylinder?

No.

An air impact marker and an air cylinder serve different purposes, and their design and functionality vary.



Cylinder type	Single-acting ▾
	
Cylinder pressure (P)	80 psi ▾
Piston diameter/bore (D)	1.625 in ▾
Piston area (A ₁)	2.074 in² ▾
Cylinder force	
Outward stroke force (F ₁)	165.9 lbf ▾

An air cylinder is a pneumatic device that uses compressed air to generate linear motion. The force it produces is determined by the air pressure and the piston area, as described by the equation $F = P \times A$. The calculation of air cylinder “force” based on the model 98 parameters is 80 lbs (calculation shown in image)

On the other hand, an air impact marker, like the model 98, operates on the principle of force equals mass times acceleration ($F=MA$). In this case, the acceleration of the rod/stamp holder contributes to the

high force output, even though the air pressure may be relatively low. The impact force of 16,000 lbs by the Model 98 is generated by 80 psi.

In summary, an air impact marker is not the same as an air cylinder. The force calculation for an air impact marker involves the acceleration of the moving parts, leading to a high force output compared to what would be expected based solely on air pressure and piston area as in a traditional air cylinder.

Force Comparison

Model 98

Bore Size: 1.625"

Air Cylinder Pressure: 165 lbs

Air Impact Pressure; 16,000 lbs

Product Information

The Columbia Model 98 is an impact marking cylinder designed for robust and reliable performance. Here are the key features:

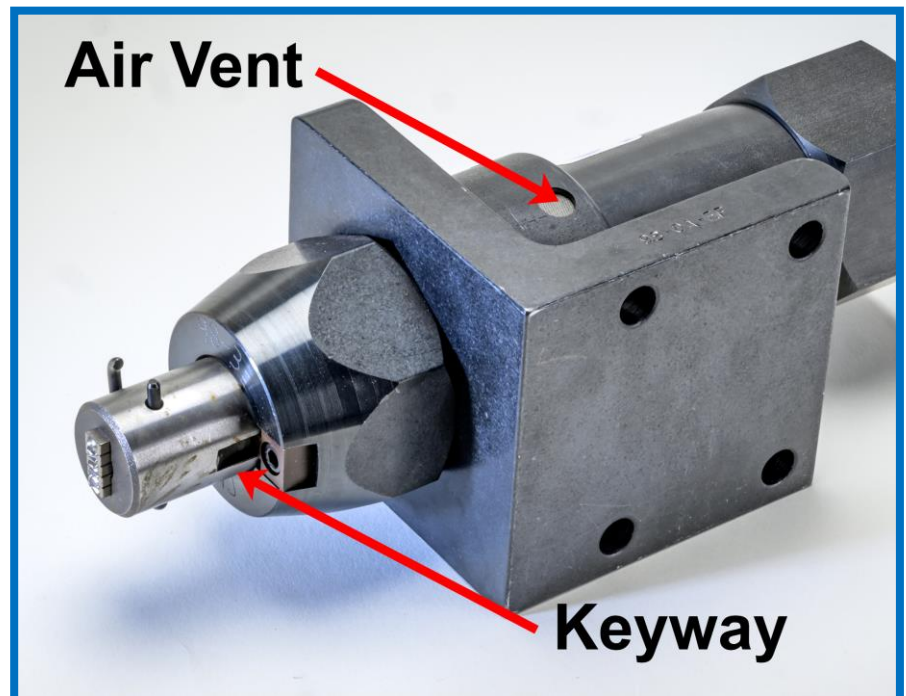
1. **Design:** The model is built as a rugged pneumatic tool with various pockets at the rod end for stamp character inserts, allowing it to deliver powerful impact blows.
2. **Impact Force:** Capable of delivering a substantial impact force of up to 8 tons at 80 psi (pounds per square inch). This makes it suitable for various industrial marking applications.
3. **Shock Absorption:** The cylinder is equipped with patented shock-absorbing bumpers at both ends of the stroke. This feature is designed to prevent damage to the marker during the forward stroke and reduce shock during the return stroke.
4. **Dependability:** The Model 98 is highlighted as a dependable marker, offering reliable performance while maintaining a low investment cost.
5. **Rod Action:** The rod features a spring return action, enhancing efficiency and contributing to a quick return stroke.

6. **Pressure Venting**

System: An efficient pressure venting system is incorporated, allowing for an instantaneous return stroke. This feature contributes to the overall efficiency of the marking process.

7. **Keyed Non-Rotating**

Rod: The rod is designed as keyed and non-rotating, ensuring precision and accuracy in



the marking process.

8. **Stroke Length:** The model offers 2.5 inches of stroke, providing versatility for different marking requirements.
9. **Lubricated Air Requirement:** The standard system still requires lubricated air for optimal performance. This ensures smooth operation and helps maintain the longevity of the components by reducing friction and wear.

Options:

1. Mounting Styles:

- Three mounting styles are available for flexibility:
 - Standard angle bracket
 - Reverse angle bracket
 - Straight sub-plate
- Special mountings are available upon request, allowing customization to meet specific application needs.

2. Rod Styles:

- Five standard rod styles are offered to hold stamps:
 - Multi-character OA for CMG Groove type
 - Multi-character OAS75 for CMG Groove type
 - Single character OB for CM9X round insert
 - Single character OY for CM9Y round insert

3. Air Port Locations:

- Two different air port locations are available to accommodate different installation constraints:
 - Standard end port
 - Side port for installations with restricted space
- This feature allows for flexibility in positioning the marking cylinder based on the available space in the industrial setup.

Marking Character Capacity

Stamp Capacities Rod Style "B"

(1) Pc CM9X round insert can mark up to a 3/8" character.

Stamp Capacities Rod Style "A"

(10) Pc's 1/16" Char. CMG06 Stamp Inserts

(5) Pc's 1/8" Char. CMG13 Stamp Inserts

Stamp Capacities Rod Style "AS75"

(12) Pc's 1/16" Char. CMG06 Stamp Inserts

(6) Pc's 1/8" Char. CMG13 Stamp Inserts

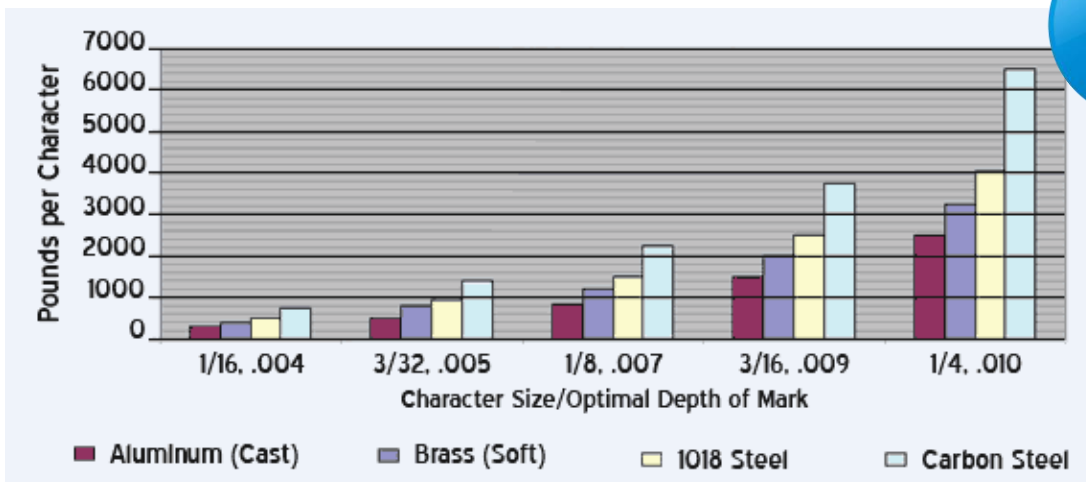
Stamp Capacities Rod Style "Y"

(1) Pc CM9Y round insert can mark larger character and longer marking legends. *



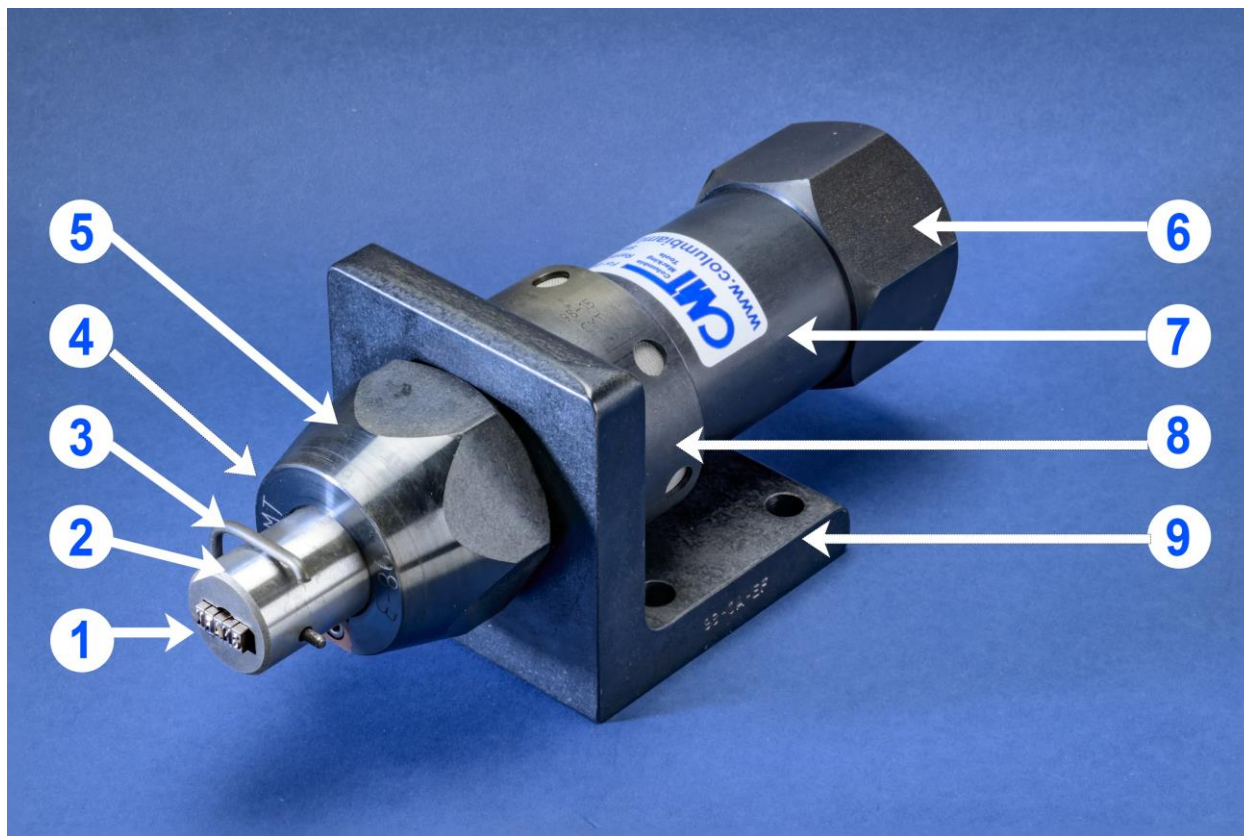
*Warning unit may not have force required to indent larger character and legends depending on the material being marked. Please review parameters with marking pressure chart

Marking Pressure Chart



Pressure chart and character size explained in detail.

Parts Breakdown



1. Stamp – wearable part
2. Rod/Stamp holder
3. Spring clip – retaining clip wearable part
4. Keyway – maintains orientation of stamp(s), At bas of unit.
5. Front nut – do not remove, will void warranty
6. Rear end cap – remove for seal replacement
7. Sleeve
8. Muffler assembly – protects system from particulate
9. Mounting bracket – do not remove, will void warranty

Model 98 How to Order Guide

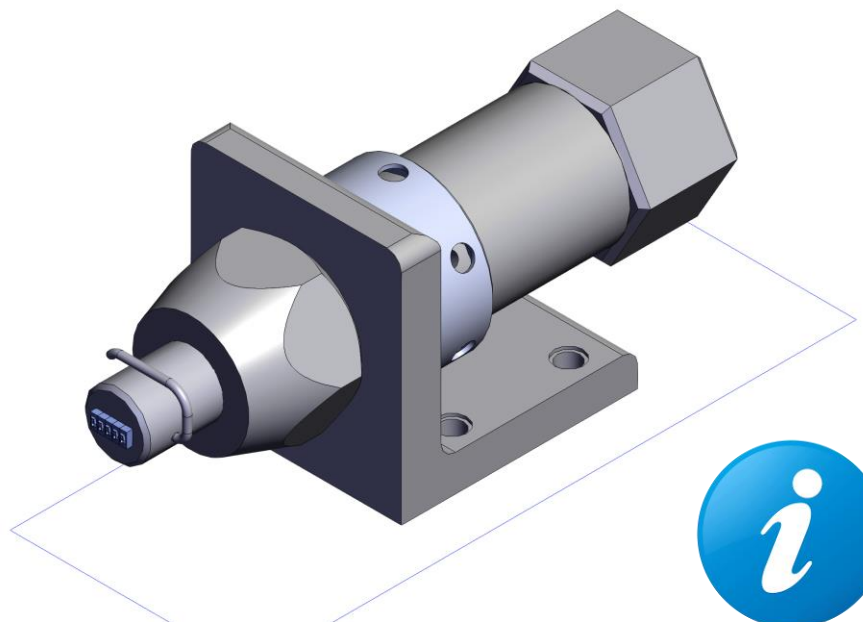
<i>Feature</i>	<i>Symbol</i>	<i>Example</i>
Mounting		98-OA-EF
<i>Standard angle bracket</i>	98	X
<i>Reverse angle bracket</i>	98R	
<i>Sub-plate</i>	98SP	
Rod/Type Holder		
<i>Round Pocket</i>	OB	
<i>Rectangular Pocket 1/4" x 3/8"</i>	OA	X
<i>Rectangular Pocket 1/4" x 15/32"</i>	OAS75	
<i>Machined Front Face for Anvil (larger characters)</i>	OY	
End configuration		
<i>Standard end port</i>	EF	X
<i>Side port</i>	SF	



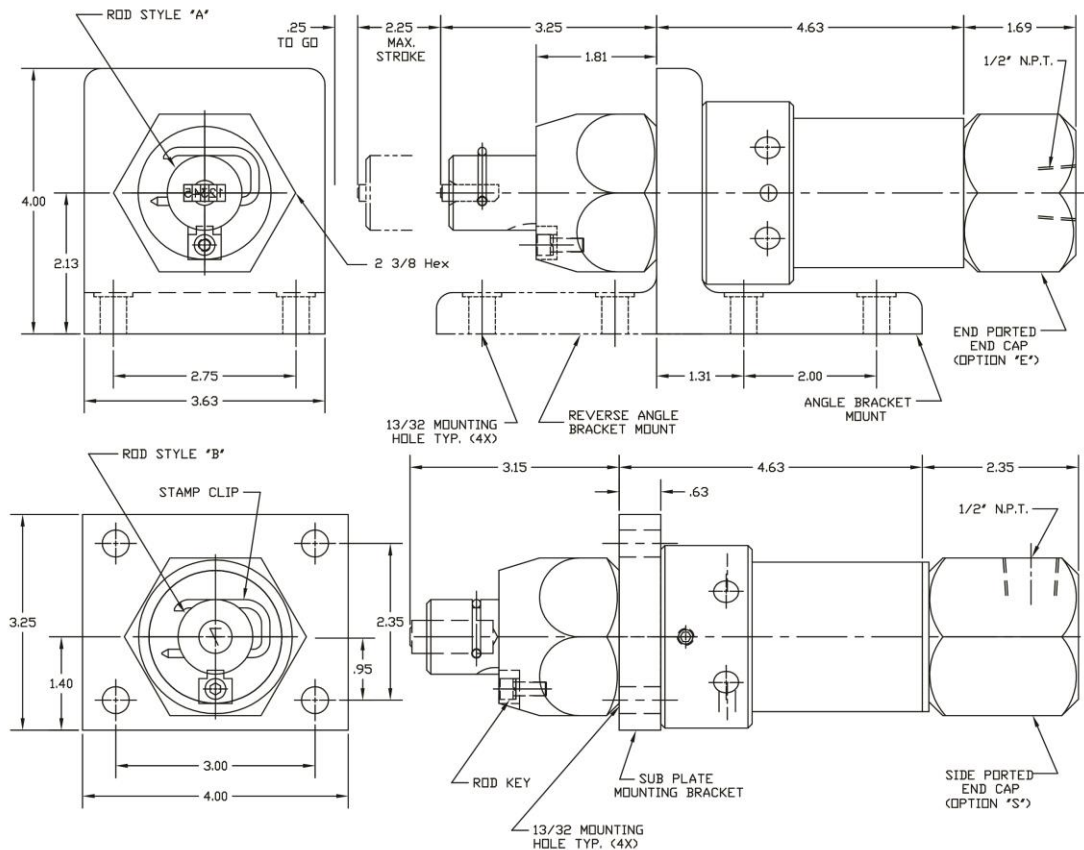
End port – shown above

Drawing Files

Drawings for all the models. CAD files formats of many different configurations.



Overall Dimensions



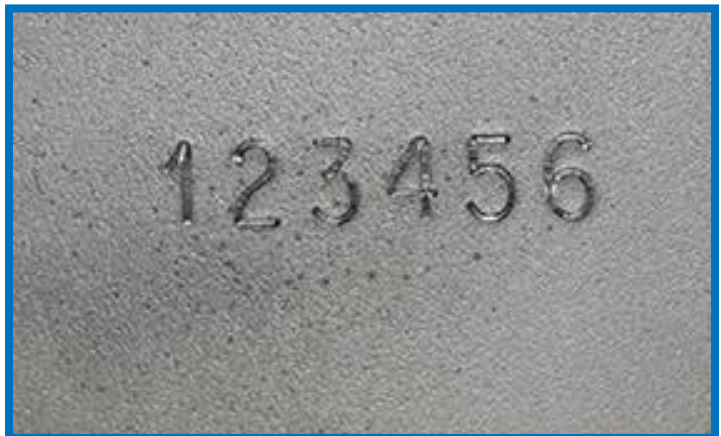
Technical Specifications

Recommended Air Hose: 1/2" ID Minimum

Recommended Air Valve: 1/2 3-way or 4-way solenoid valve

Operating Pressure: 20 to 80 psi

Maximum Marking Pressure: 16,000 lbs (at 80 psi)



Installation

Mounting:

Mounting holes are in the mounting bracket, and the use of 1/4-20 socket head cap screws with lock washers is required. The Model 98 markers require a sturdy, level platform for mounting. For optimum power, the marker should be mounted so that the stamp face is 2 1/8" to 2 3/8" away from the part to be marked for a 2 1/2" stroke model.

Best practice suggestion:

When designing the mount for the marker, include adjustability to change distance and ensure the marker is square with the part being marked.

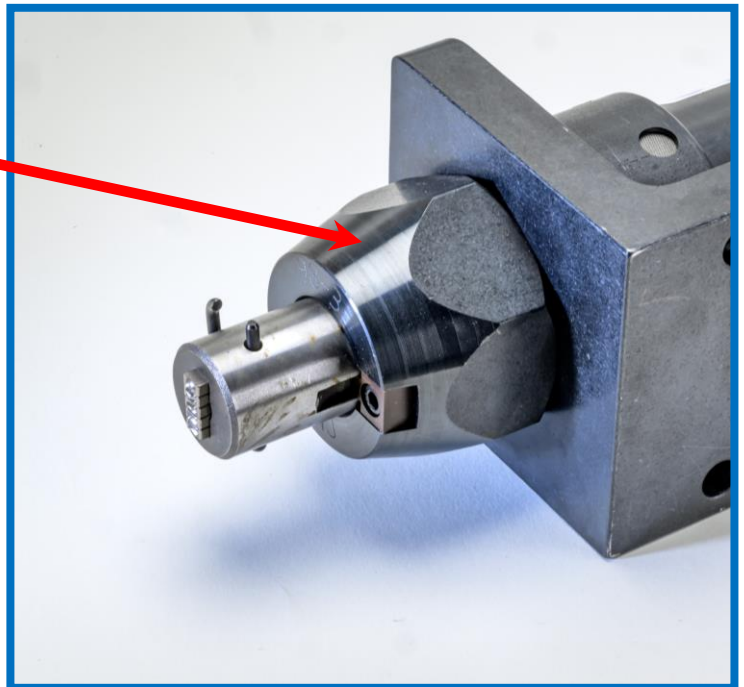
Warning:

Removing the front cap voids the warranty.

The mounting bracket, front nut, and the sleeve of the cylinder are assembled with such force that after assembly the cylinder is internally honed. To disassemble the part would require such pressure that the cylinder would be damaged.

CMT does provide custom assembly upon order placement. Please provide the complete model number and position of the ports or bracket required in clock position as looking at the front of the marker. For example, the standard position of the base of the characters is 6 o'clock, the base of the standard angle bracket is 6 o'clock, and the standard front port or side port position is noon or 12 o'clock.

Please note that if the mounting bracket is removed from the sleeve this voids the warranty.



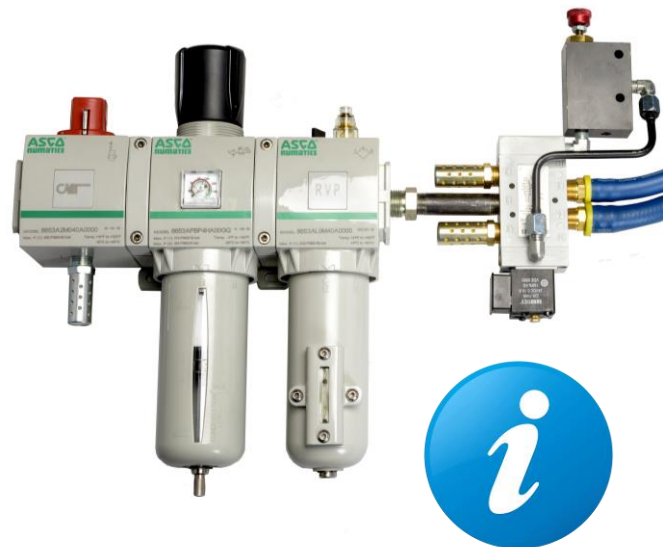
Pneumatic Controls

Air requirements:

Model 98 is air powered for the forward motion, and the return motion is spring controlled. CMT recommends a 1/2" minimum shop airline. Maximum operating pressure of 80 psi, minimum operating pressure of 20 psi. Please note that the airline length between the valve and marker should not exceed 3'. The marker has one 1/2" NPT air port.

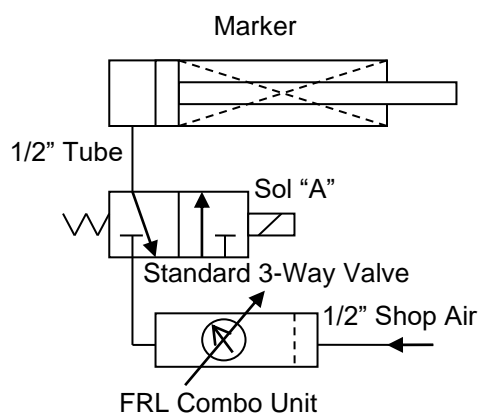
Adjustments:

Increase air pressure to mark deeper. Decrease air pressure to mark lighter. To regulate marking pressure, adjust FRL (Filter/Regulator/Lubricator unit). Sold separately with valve.



Electrical Sequence for Spring Return Valve:

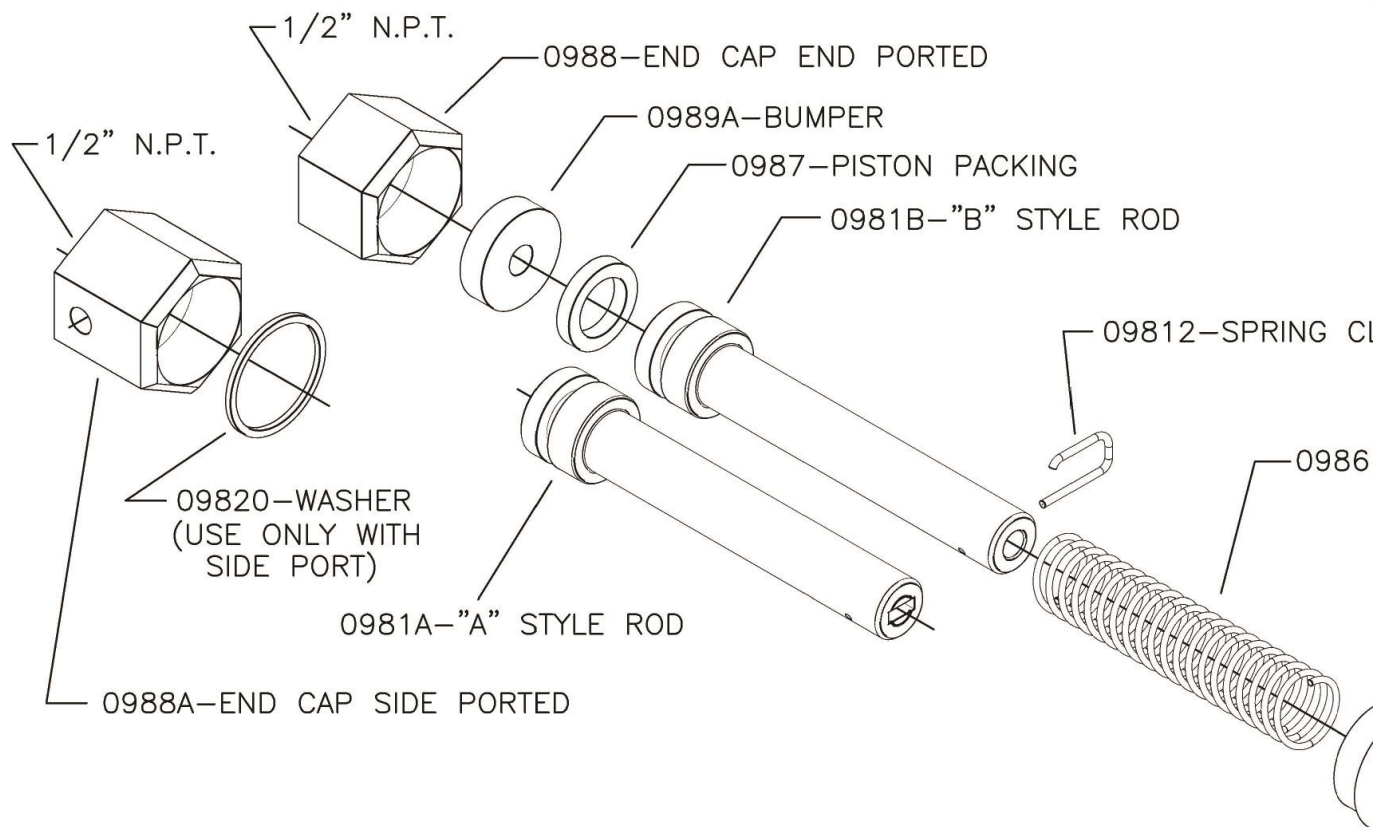
To advance marker, energize solenoid "A". To return marker and reset, de-energize solenoid "A" after part is marked. Spring in marker returns ram after pressure is exhausted.



Note:

For most efficient operation, electrical signal approximately .06 to .10 seconds.

Bill of Materials



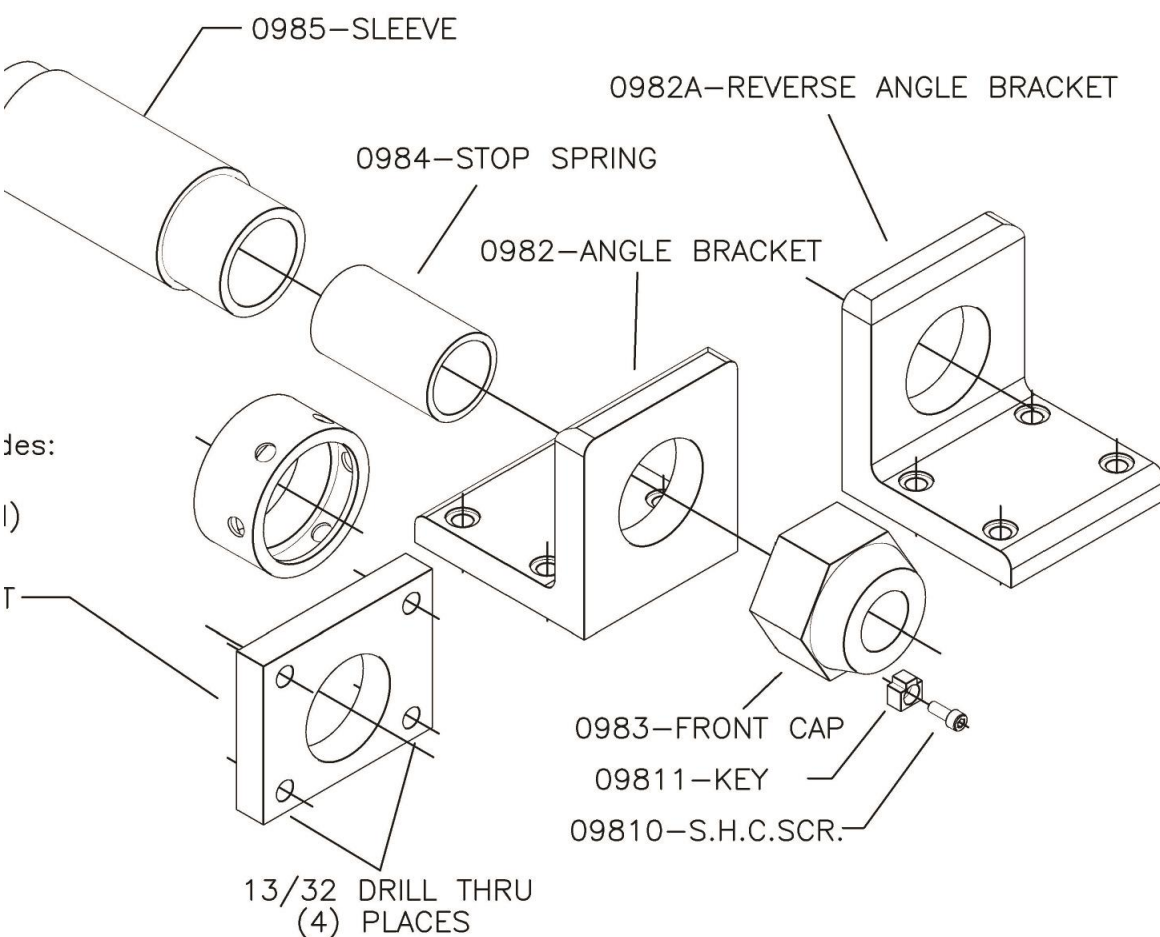
09815-MUFFLER Assembly Includes:
 98-15A Ring, 98-15B Screen
 98-15C Set Screw (2 required)

0982SP-SUB PLATE MOUNT

98-RKSN REPAIR KIT
INCLUDES:
98-12 SPRING CLIP
98-6 RETURN SPRING
98-9A BUMPER
98-11 KEY
98-10 S.H.C.SCR.
98-20 REAR CAP WASHER
98-7 PISTON PACKING

LIP

-RETURN SPRING



FAQ – Frequently Asked Questions

Q: How long for shipment/delivery of the Model 98?

A: 1 week or less for standard models. CMT has all the components in stock, and it is assembled and tested per customer order.

Please note - these units are not on the shelf ready to ship. Each unit is tested for both stamp configuration and pressure.

Q: How much for a Model 98?

A: The Model 98 is priced per the features/options selected. Please provide a complete part number for a quotation.

Q: How to get a quotation on the Model 98?

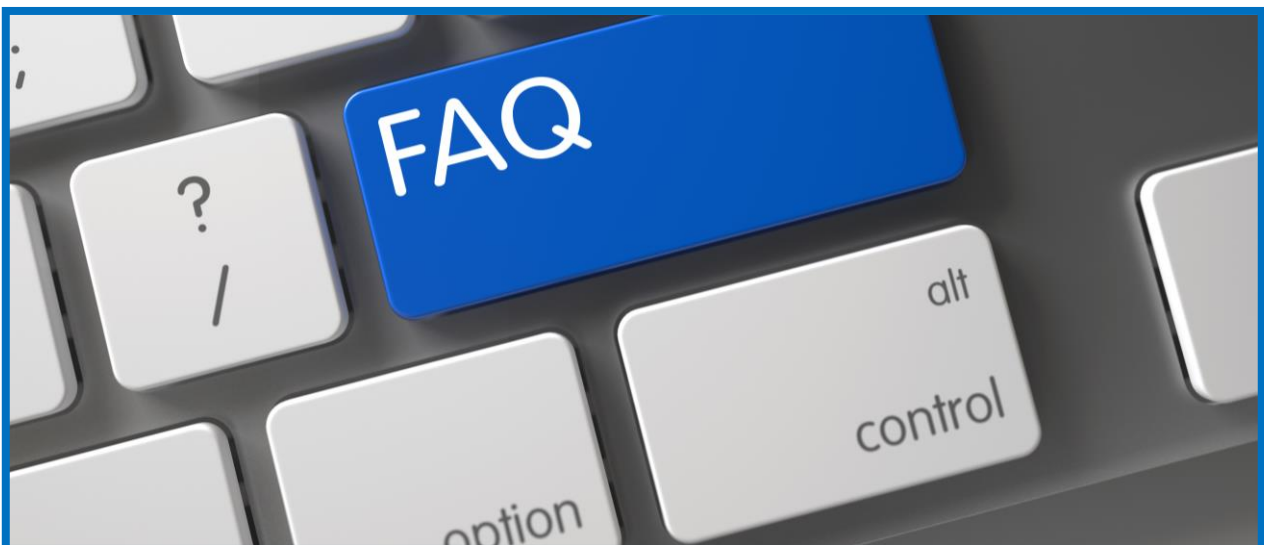
A: Use the easy [on-line form](#), or email to quotes@columbiamt.com. Remember to include the complete part number from the How-to-Order chart, and the address the quotation should be addressed to.

Q: What is the force of the Model 98?

A: The Model 98 has a maximum impact force of 16,000 lbs at 80 psi. There is a non-linear parabolic relationship between the incoming air pressure and resulting force.

Q: How far should the marker be mounted from the part?

A: For optimum power, the marker should be mounted so that the stamp face is 2 1/8" to 2 3/8" away from the part to be marked for a 2 1/2" stroke model. And for best practice the marker location should have some adjustment.

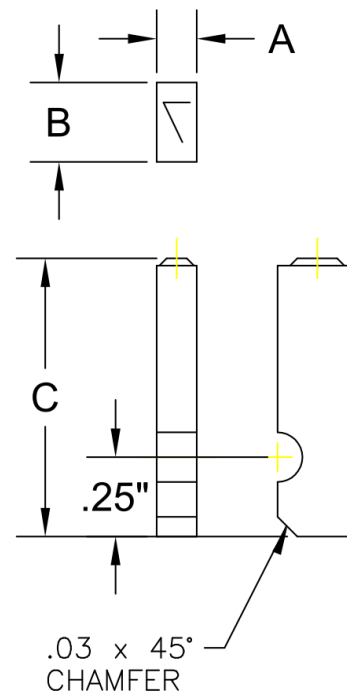


Spare Parts

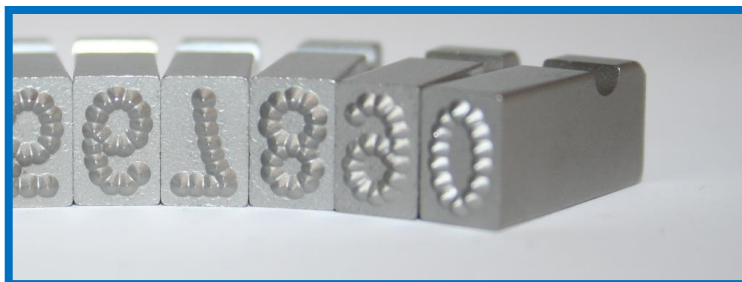
Stamps: Rectangular: CMG Groove Style

Style G Groove Type				
Char Size	A	B	C	Catalog No.
1/16"	1/16"	1/4"	7/8"	CMG06-
3/32"	3/32"			CMG09-
1/8"	1/8"			CMG13-

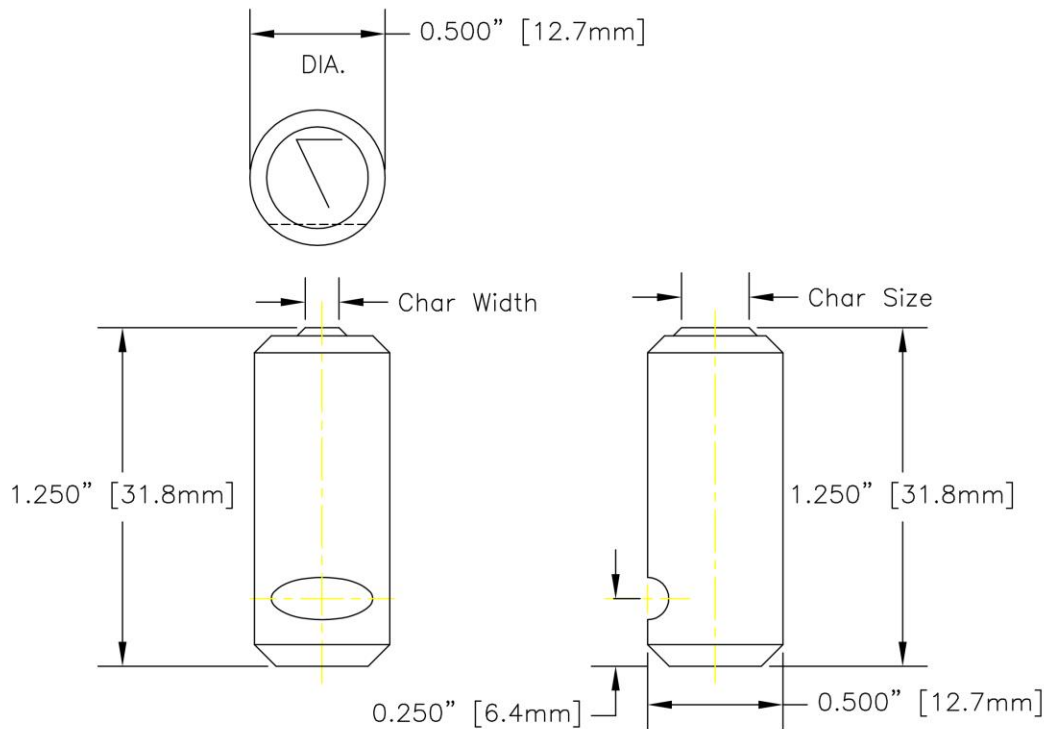
- When ordering please use the character required after the dash. Example "CMG13-A" would be for the 1/8" letter A.
- Symbols and punctuation are available – please see [on-line list for reference](#).
- Special length characters may be needed to mark in recess. Dimension "C" is available up to 3" long.
- Dot Style characters are a great solution for reducing the required force needed to mark a specific character size. For example – if the tool is not capable to mark a 1/8" character into the material you are marking, please try the CMG13DOT the dot style configuration reduces the force needed to mark the part.



Example of Dot Style Face



Stamps: Round CM9X one diameter

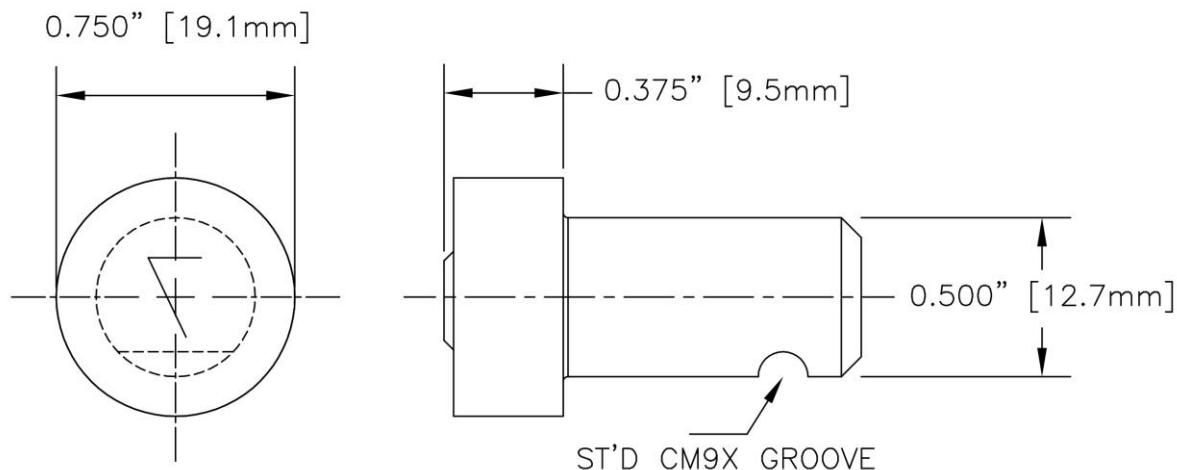


CM9X How to Order

Char. Size	Catalog Number	Engraving Depth
3/32" 2.4mm	CM9X09	.020" .5mm
1/8" 3.2mm	CM9X13	.023" .6mm
5/32" 4mm	CM9X16	.025" .6mm
3/16" 4.8mm	CM9X19	.025" .6mm
1/4" 6.3mm	CM9X25	.030" .8mm
3/8" 9.8mm	CM9X38	.035" .9mm

- When ordering please use the character required after the dash. Example "CM9X13-A" would be for the 1/8" letter A.
- Symbols and punctuation are available – please see [on-line list for reference](#).
- Special length characters may be needed to mark in recess. Lengths are available up to 3" long.
- Dot Style characters are a great solution for reducing the required force needed to mark a specific character size. For example – if the tool is not capable to mark a 3/16" character into the material you are marking, please try the CM9X19DOT the dot style configuration reduces the force needed to mark the part.

Stamps: Round CM9Y two diameters



- The CM9Y inserts are for use in the rod style “Y”.
- The model 98 has limited force and it is best to review the parameters for marking before purchasing a Custom CM9Y insert.
- The C98Y is a great insert for Tier style marking of small characters.
Example: 12 above 34 in 1/16” characters



CM8Y Round Insert		
Catalog No	Char Size	# of Char
CM9Y06C#-	1/16”	Up to (10)
CM9Y09C#-	3/32”	Up to (7)
CM9Y13C#-	1/8”	Up to (5)
CM9Y16C#-	5/32”	Up to (4)
CM9Y19C#-	3/16”	Up to (3)
CM9Y25C#-	1/4”	Up to (2)
CM9YLOGO	Custom Logo <5/8”	
CM9YCUST	Custom character layout to fit 5/8” circle	
CM9YANVIL	Blank hammer end, for use as anvil	

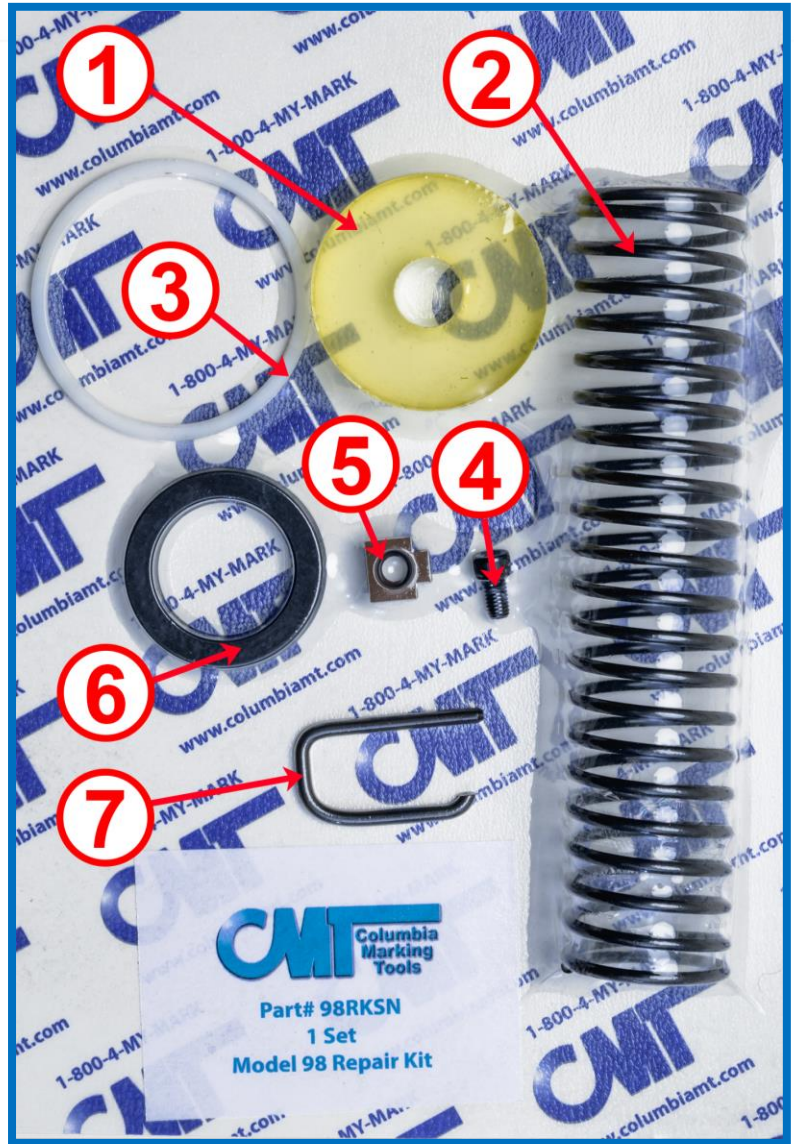
- The CM9Y can be purchased as an “Anvil”. The blunt force can be used for non-marking assembly operations, or to provide the force needed to mark characters sitting on the reverse side of the part from the marker.

Repair Kit

098RKSN contains all the wearable parts for the model 98:

1. 098-9A Bumper
2. 098-6 Return Spring
3. 098-20 Rear cap washer
4. 098-10 SHC Screw
5. 098-11 Key
6. 098-7 Piston Packing
7. 098-12 Spring Clip

The parts of the seal kit are sold separately. Two items that might be required more often than the rest of the kit include the 098-12 Spring clip and the 098-6 Return spring.



CMT provides repair services. Cylinder repairs get the benefit of 10% discount on parts, and CMT warranties the repair for 90 days.

Maintenance

Shut off all air and electrical power prior to performing any and all maintenance.

Stamp Replacement:

Not using worn stamps is key to keeping a great looking mark, and a functioning air impact marker. If worn stamps are used in the system, higher than normal air pressure must be used to indent the worn stamps to the depth of new stamps. The worn stamps will not provide the clear impression of the new stamps, and the higher-than-normal air pressure will age the seals, spring, and unit prematurely.

Stamps should be replaced when the engraving depth is worn by 50%.

Engraving Depth		
Char Size	Engraving Depth New	50% wear
1/16"	.018"	.009"
3/32"	.020"	.010"
1/8"	.023"	.012"
5/32"	.025"	.013"
3/16"	.025"	.013"
1/4"	.030"	.015"

Seal and wearable part Replacement:

All maintenance is done by the removable of the rear end cap. Replace all parts of the Repair kit.

Maintenance of FRL, Filter, Regulator, Lubricator

Lubrication:

To the lubricator, next to the regulator, add 10W "light" industrial hydraulic oil to lubricator bowl and adjust oil flow to approximately 1 drop for every 30-50 cycles.

Air Filter:

Also, in the Check and clean /change as required. The frequency of cleaning/changing is dependent on environment and plant air system. Do not allow excess water to fill filter bowl.



Troubleshooting table

Common Issue	Symptoms	How to Fix
Low air pressure	Shallow or incomplete marking.	Turn up air pressure. Check hose size, should be 1/2", and air connection.
High air pressure	Too deep or hard to control marking.	Turn down air pressure. Model 98 should not be connected directly into shop air, may need to install RVP (Retro Fit Valve Pack)
Set screw is too tight	The rod is frozen in place, preventing normal function	Untighten the set screw.
Set screw is not set in place	The rod is spinning freely	Align the slash in the rod with the position of the set screw and tighten.
Incomplete seal	The tool is leaking air when pressurized.	Disassemble the 98 from the rear fitting and check the O-ring for damage. Replace O-ring if damaged. If the O-ring is not damaged, clean unit and replace lock-tight.
Worn stamps	Shallow or incomplete mark, or having to use higher air pressure	Replace with new stamps.

Most common issues are due to insufficient air supply. CMT strongly recommends the purchase of the RVP to assure a regulated compressed air source.

More helpful hints can be found online.



Warranty

Limited One-Year Warranty

Columbia Marking Tools manufactures its hardware products from parts and components that are new or equivalent to new in accordance with industry-standard practices. Columbia warrants that the hardware products it manufactures will be free from defects in materials and workmanship. The warranty term is one year beginning on the date of invoice, as further described in the following text.

Damage due to shipping the products to you is covered under this warranty. Otherwise, this warranty does not cover damage due to external causes, including accident, abuse, misuse, problems with electrical power, servicing not authorized by Columbia Marking Tools, usage not in accordance with product instructions, failure to perform required preventive maintenance, and problems caused by use of parts and components not supplied by CMT.

This warranty does not cover any items that are in one or more of the following categories: software; external devices (except as specifically noted); accessories, parts or components added to a Columbia system after the system is shipped from CMT; accessories, parts or components that are not installed in the Columbia Marking Tools factory or associative companies; or accessories, parts or components that are sold with an expressed specific warranty in place of being covered under this warranty.

Columbia will repair or replace products covered under this limited warranty that are returned to Columbia's facility. To request warranty service, you must call Columbia's Return Material Authorization or Service Department within the warranty period. If warranty service is required, Columbia will issue a Return Material Authorization Number. You must ship the products back to Columbia in their original or equivalent packaging, prepay shipping charges, and insure the shipment or accept the risk of loss or damage during shipment. Columbia will ship the repaired or replacement products to you (freight prepaid) if you use an address in the continental U.S., where applicable. Shipments to other locations will be made freight collect. Columbia Marking Tools will not take responsibility for the cost of transportation required for the unit to be returned to the purchaser/owner.

NOTE: Before you ship the product(s) to Columbia, back up the data on the hard-disk drive(s) and any other storage device(s) in the product(s). Remove any removable media, such as diskettes, CDs, or PC Cards. CMT does not accept liability for lost data or software. ** CMT owns all parts removed from repaired products. Columbia Marking Tools will use new and reconditioned parts made by various manufacturers in performing warranty repairs and building replacement products. If Columbia repairs or replaces a product, its warranty term is not extended.

General Provisions

COLUMBIA MARKING TOOLS MAKES NO EXPRESS WARRANTIES OR CONDITIONS BEYOND THOSE STATED IN THIS WARRANTY STATEMENT. CMT DISCLAIMS ALL OTHER WARRANTIES AND CONDITIONS, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES AND CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE UNLESS AUTHORIZED BY CMT'S GENERAL MANAGEMENT. SOME STATES (OR JURISDICTIONS) DO NOT ALLOW LIMITATIONS ON IMPLIED WARRANTIES OR CONDITIONS, SO THIS LIMITATION MAY NOT APPLY TO YOU.

COLUMBIA MARKING TOOLS' RESPONSIBILITY FOR MALFUNCTIONS AND DEFECTS IN HARDWARE IS LIMITED TO REPAIR AND REPLACEMENT AS SET FORTH IN THIS WARRANTY

STATEMENT. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE (OR JURISDICTION TO JURISDICTION).

COLUMBIA MARKING TOOLS DOES NOT ACCEPT LIABILITY BEYOND THE REMEDIES SET FORTH IN THIS WARRANTY STATEMENT OR LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION ANY LIABILITY FOR PRODUCTS NOT BEING AVAILABLE FOR USE OR FOR LOST DATA OR SOFTWARE.

SOME STATES (OR JURISDICTIONS) DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE PRECEDING EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU.

These provisions apply to CMT's limited one-year warranty only. For provisions of any service contract covering your system, refer to your invoice or the separate service contract that you will receive.

In any instance in which Columbia issues a Return Materials Authorization Number, Columbia Marking Tools must receive the product(s) for repair prior to the expiration of the warranty period in order for the repair(s) to be covered by the warranty.