CMT Air Impact Marker Air Preparation

Technical Data Sheet

COLUMBIA MARKING TOOLS

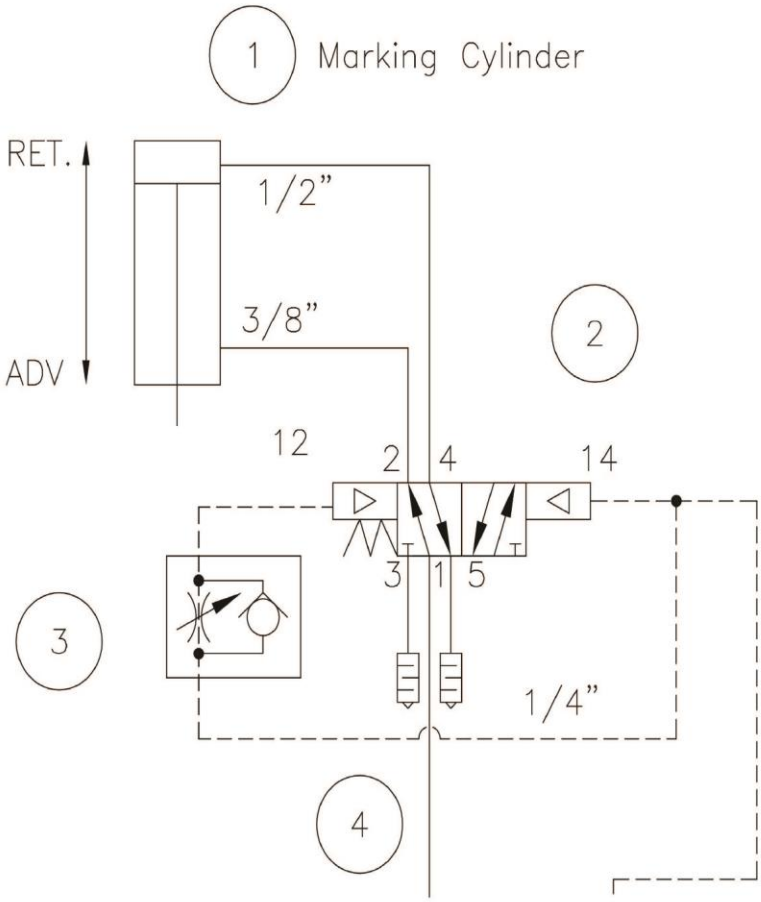
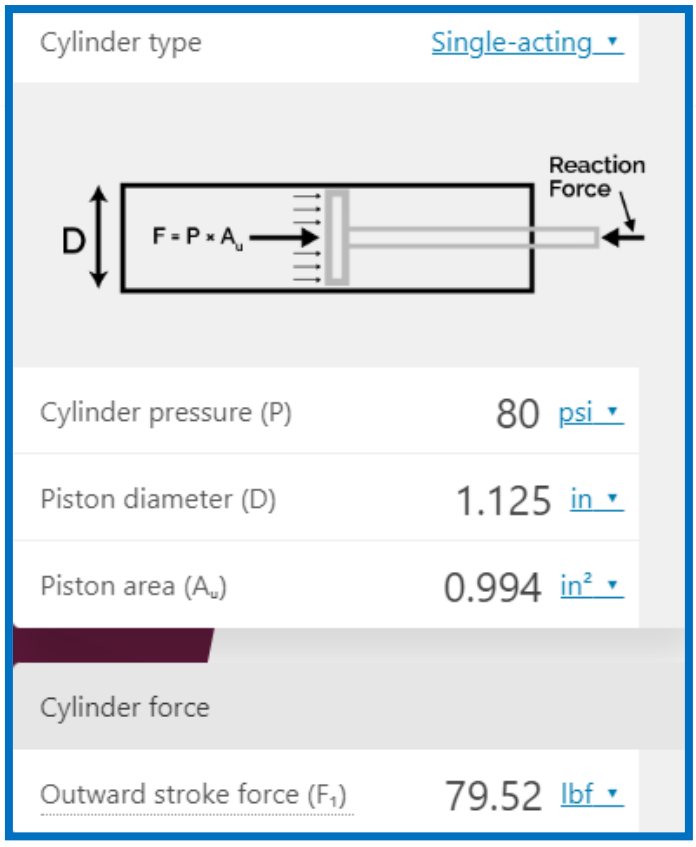


Table of Contents

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.



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 × A. The calculation of air cylinder “force” based on the model 88 parameters is 80 lbs (calculation shown in image)

On the other hand, an air impact marker, like the model 88, 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 6000 lbs by the Model 88 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 88

Bore Size: 1.25”

Air Cylinder Pressure: 80 lbs

Air Impact Pressure; 6,000 lbs

Air Requirements

A simple chart gives various information for Air Impact Models. The information includes the bore size, stroke length, and relative time to extend, CV, SCFM, and expected drop in pressure of the compressed air.

The Air Impact Marker is not generated solely dependent on the air flow. The force is a combination of the air pressure and speed at which the rod/hammer is moving.

Model	Bore	Stroke Length	Time To Extend	CV	SCFM
78	1.125”	15/16”	25ms	.62	8.3
78	1.125”	1 15/16	50ms	.68	10.3
88/288	1.125”	2.5	50ms	.83	11.7
288	1.125”	4	70ms	.95	12.7
288	1.125”	6	80ms	1.25	16.7
98/298	1.625”	2.5	60ms	1.45	19.3
298	1.625”	4	90ms	1.55	20.6
298	1.625”	6	130ms	1.61	21.4
451	7/8” Hammer	2.5	35ms	.69	9.2
451	1.5” cylinder	4	125ms	.60	7.9
751/851	1.5” hammer	2.5	70ms	1.38	18.4
751/851	3” cylinder	4	250ms	1.19	15.8

Columbia Marking Tools uses a standard valve with 1.7 cv for all our air impact markers.

IMPORTANT NOTE:

The drop in air pressure must not exceed 2 psi for any installation or the air impact marker will not provide the optimal designed force.

Suggested Pneumatic Diagrams

Air impact markers require a larger and more instantaneous air flow compared to standard air cylinders because they need to deliver a high force in a very short period. This rapid burst of air creates the impact necessary for marking applications, especially in industrial environments where precision and speed are critical. Unlike typical air cylinders, which operate more gradually and can sustain a consistent flow over time, air impact markers must compress and release air quickly to achieve the desired marking force, making efficient air flow management crucial for their performance.

Two Most Common mistakes when preparing an air circuit for an air impact marker:

1) Air starvation.
    a. Too small of valve
    b. Too small of an air-line
    c. Too long of an airline between marker and the valve
2) Cycle time too long
    a. If the timer on the valve is too long, customers make a mistake and believe that the marker is defective. This is because when the air impact marker is left in the forward position, air naturally leaks out. Please see the picture below with keyway that will leak air when marker is in the advanced position.

Model 78

Air Requirements:

The Model 78 is a double acting air cylinder. This system requires compressed air to both advance and retract the marking tool. CMT recommends 3/8" 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 1/4" NPT advance and 1/8" NPT retracting air-ports.

Adjustments:

Increased air pressure marks deeper, and decreased air pressure marks lighter. To regulate marking pressure, adjust the regulator on FRL (Filter/Regulator/Lubricator combo unit). The FRL is part of the Retro-Fit Valve Package.

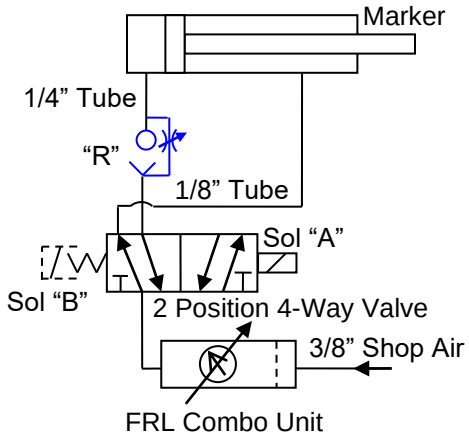
Electrical Sequence for Double Solenoid Valve:

To advance marker, energize solenoid "A". To return marker and reset, de-energize solenoid "A" and ENERGIZE solenoid "B".

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.

Suggested Pneumatic Control Diagram



Speed Control Adjustment:

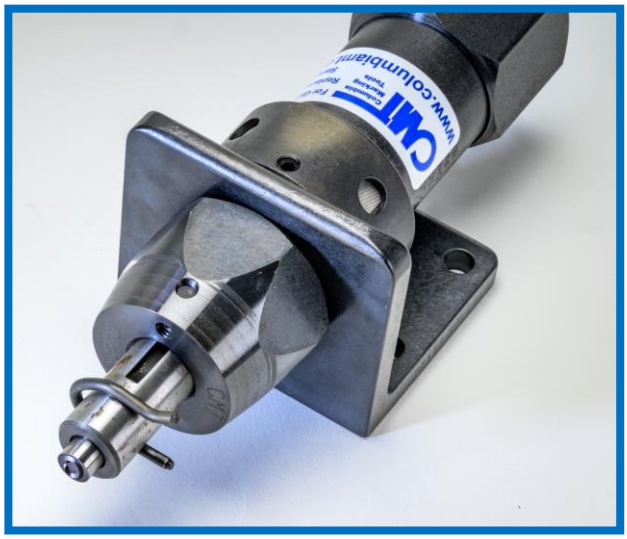
Adjust speed control "R" to control speed of retract motion. **DO NOT install speed control on the forward (rod) port of the marker.**

Note:

For the most efficient operation, electrical signal energizing solenoid "A" should be very short, approximately .06 to .10 seconds.

Model 88

Air requirements:



Model 88 is air powered for the forward motion, and the return motion is spring controlled. CMT recommends a 3/8” 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 3/8” NPT air-port.

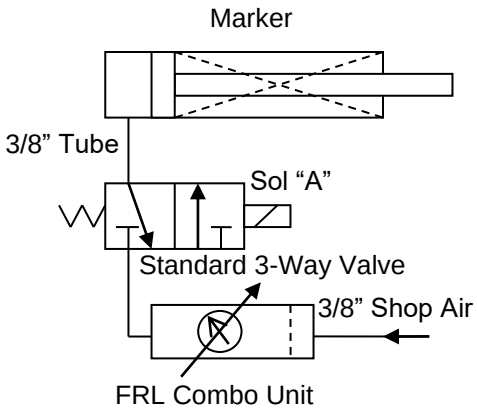
Adjustments:

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. The FRL is part of the Retro-Fit Valve Package.

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. The spring in the marker returns ram after pressure is exhausted.

Suggested Pneumatic Control Diagram

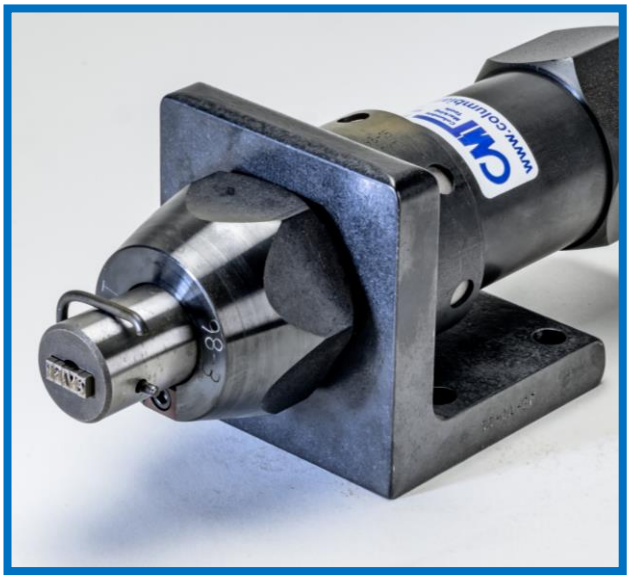


Note:

For most efficient operation, electrical signal energizing solenoid “A” should be very short, approximately .06 to .10 seconds.

Model 98

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.

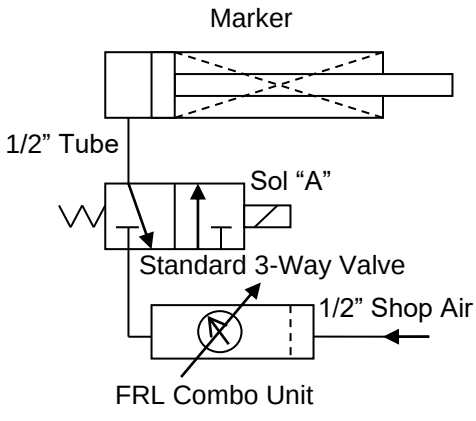
Adjustments:

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. The FRL is part of the Retro-Fit Valve Package.

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. The spring in the marker returns ram after pressure is exhausted.

<u>Suggested Pneumatic Control Diagram</u>



Note:

For most efficient operation, electrical signal energizing solenoid “A” should be very short, approximately .06 to .10 seconds.

Model 288

Air Requirements:

The Model 288 is a double acting air cylinder. This system requires compressed air to both advance and retract the marking tool. CMT recommends 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 3/8" NPT advance and retract air-ports.

Adjustments:

Increased air pressure marks deeper, and decreased air pressure marks lighter. To regulate marking pressure, adjust the regulator on FRL (Filter/Regulator/Lubricator combo unit). The FRL is part of the Retro-Fit Valve Package.

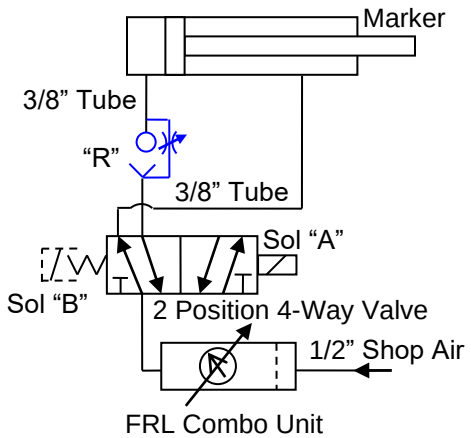
Electrical Sequence for Double Solenoid Valve:

To advance marker, energize solenoid "A". To return marker and reset, de-energize solenoid "A" and ENERGIZE solenoid "B".

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.

Suggested Pneumatic Control Diagram



Speed Control Adjustment:

Adjust speed control "R" to control speed of retract motion. **DO NOT install speed control on the forward (rod) port of the marker.**

Note:

For the most efficient operation, electrical signal energizing solenoid "A" should be very short, approximately .06 to .10 seconds.

Model 298

Air Requirements:

The Model 298 is a double acting air cylinder. This system requires compressed air to both advance and retract the marking tool. CMT recommends 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 1/2" NPT advance and 3/8" NPT retract air-ports.

Adjustments:

Increased air pressure marks deeper, and decreased air pressure marks lighter. To regulate marking pressure, adjust the regulator on FRL (Filter/Regulator/Lubricator combo unit). The FRL is part of the Retro-Fit Valve Package.

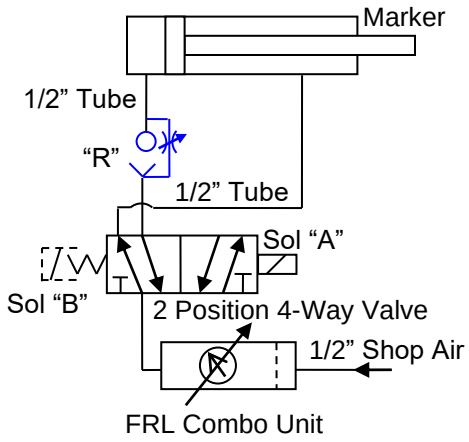
Electrical Sequence for Double Solenoid Valve:

To advance marker, energize solenoid "A". To return marker and reset, de-energize solenoid "A" and ENERGIZE solenoid "B".

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.

Suggested Pneumatic Control Diagram



Speed Control Adjustment:

Adjust speed control "R" to control speed of retract motion. **DO NOT install speed control on the forward (rod) port of the marker.**

Note:

For the most efficient operation, electrical signal energizing solenoid "A" should be very short, approximately .06 to .10 seconds.

Model 451

Air Requirements:

The Model 451 is a double acting air cylinder. This system requires compressed air to both advance and retract the marking tool. CMT recommends 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 3/8" NPT advance and 1/4" NPT retract air-ports.

Adjustments:

Increased air pressure marks deeper, and decreased air pressure marks lighter. To regulate marking pressure, adjust the regulator on FRL (Filter/Regulator/Lubricator combo unit). The FRL is part of the Retro-Fit Valve Package.

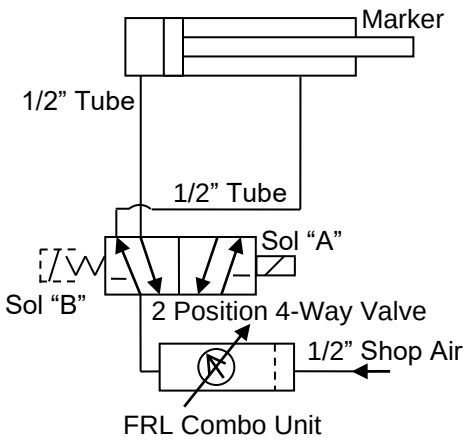
Electrical Sequence for Double Solenoid Valve:

To advance marker, energize solenoid "A". To return marker and reset, de-energize solenoid "A" and ENERGIZE solenoid "B".

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.

Suggested Pneumatic Control Diagram



Note:

For the most efficient operation, electrical signal energizing solenoid "A" should be very short, approximately .06 to .10 seconds.

Model 751/851

Air Requirements:

The Model 751/851 is a double acting air cylinder. This system requires compressed air to both advance and retract the marking tool. CMT recommends 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 3/8" NPT advance and retract air-ports.

Adjustments:

Increased air pressure marks deeper, and decreased air pressure marks lighter. To regulate marking pressure, adjust the regulator on FRL (Filter/Regulator/Lubricator combo unit). The FRL is part of the Retro-Fit Valve Package.

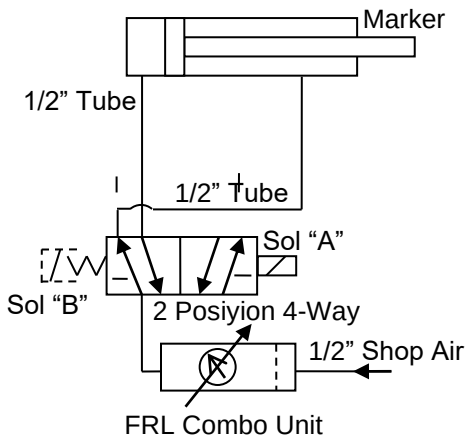
Electrical Sequence for Double Solenoid Valve:

To advance marker, energize solenoid "A". To return marker and reset, de-energize solenoid "A" and ENERGIZE solenoid "B".

Electrical Sequence for Spring Return Valve:

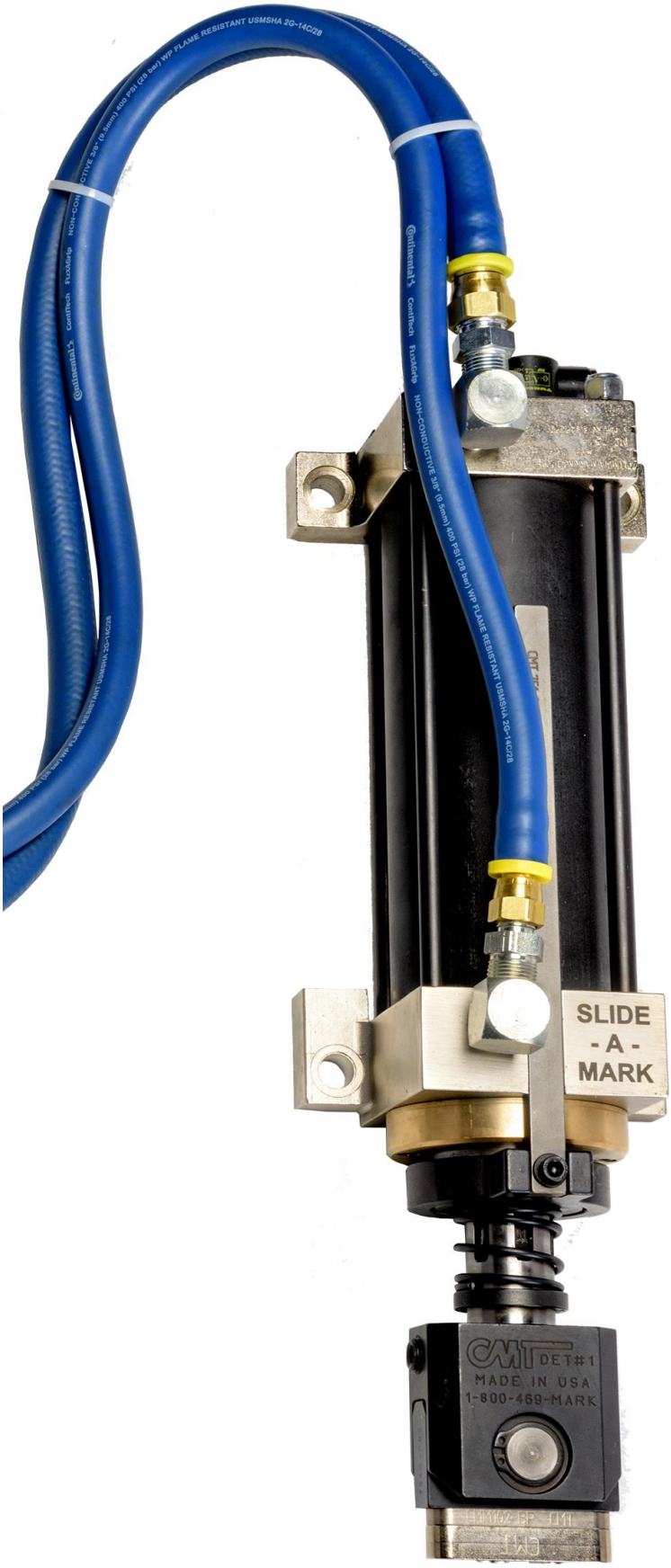
To advance marker, energize solenoid "A". To return marker and reset, de-energize solenoid "A" after part is marked.

Suggested Pneumatic Control Diagram



Note:

For the most efficient operation, electrical signal energizing solenoid "A" should be very short, approximately .06 to .10 seconds.



External Holders and Tooling

The Columbia SLIDE-A-MARK series of heavy-duty marking cylinders are engineered to deliver a patented soft-impact marking action with reduced noise levels, making them ideal for integration into existing automation systems. These markers function as telescoping cylinders, eliminating the need for additional approach slides when accessing parts or fixtures with clearance constraints. This design simplifies installation and enhances efficiency in various industrial marking applications.

The Slide-A-Mark series from Columbia Marking Tools is uniquely designed to accommodate external tooling and holders. This capability stems from its telescoping action, which allows the marker to extend and press into the part before the internal hammer fires.

The telescoping action is very quick as demonstrated in this video.

Retro-Fit Valve Pack – installation solution

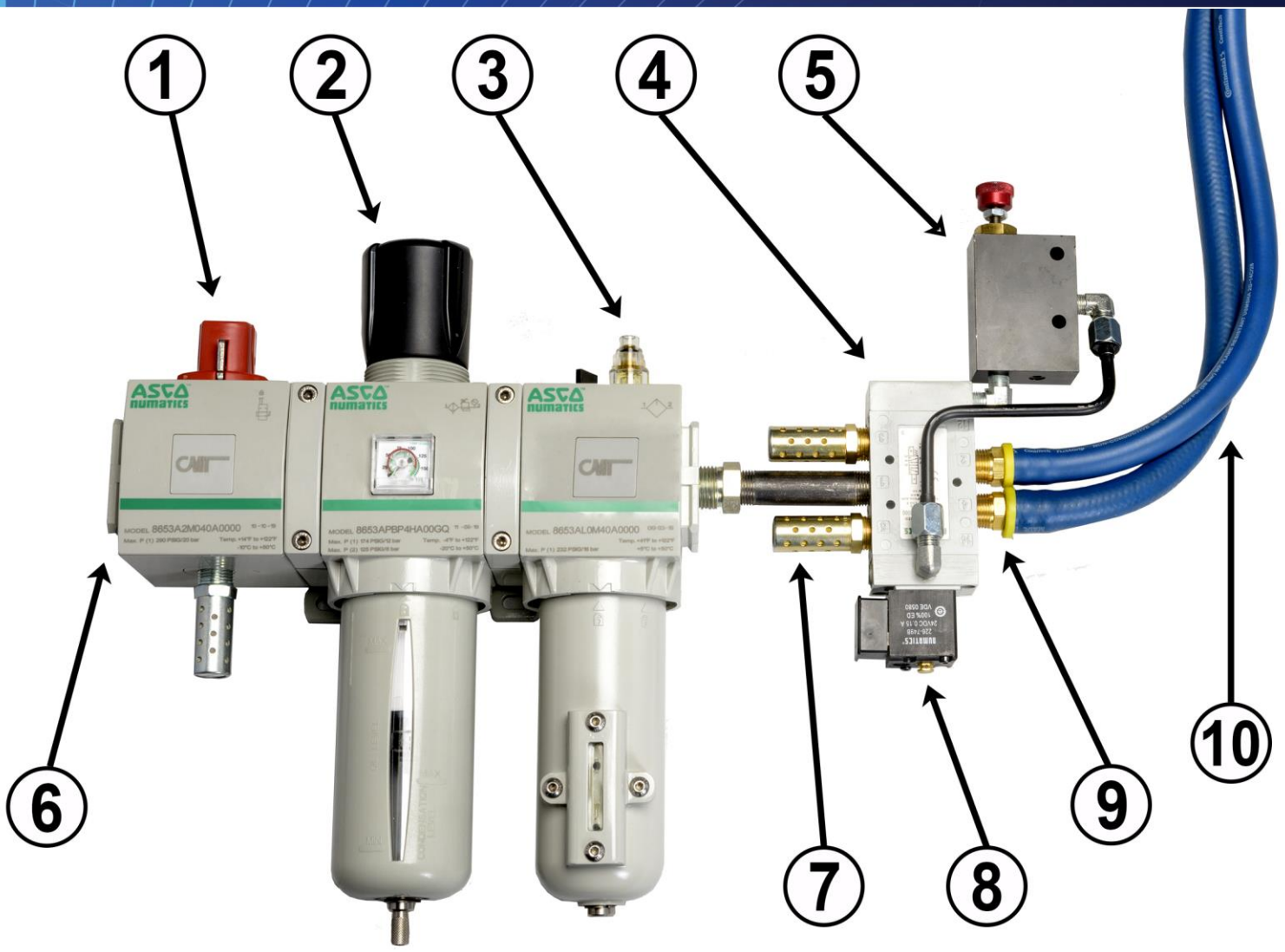
The easy-to-use valve pack from Columbia Marking Tools for the air impact markers includes

- Filter- Regulator to both clean the air supply and control the air pressure used during the air impact marker application.
- Lock out – safety lock out as required by OSHA for standard safety protocols during maintenance and repair.
- Lubricator – for the lubricated air supply
- Valve – either 3-way for the single acting air impact markers, or 4-way for the double acting air impact markers.
- Assembled and ready to mount

Item #	Single/Double Acting	DC/AC	Lubricated/Dry Air
RVPS	Single	AC	Lubricated
RVPSDC	Single	DC	Lubricated
RVPD	Double	AC	Lubricated
RVPDDC	Double	DC	Lubricated
RVPDNL	Double	AC	Dry
RVPDDCNL	Double	DC	Dry

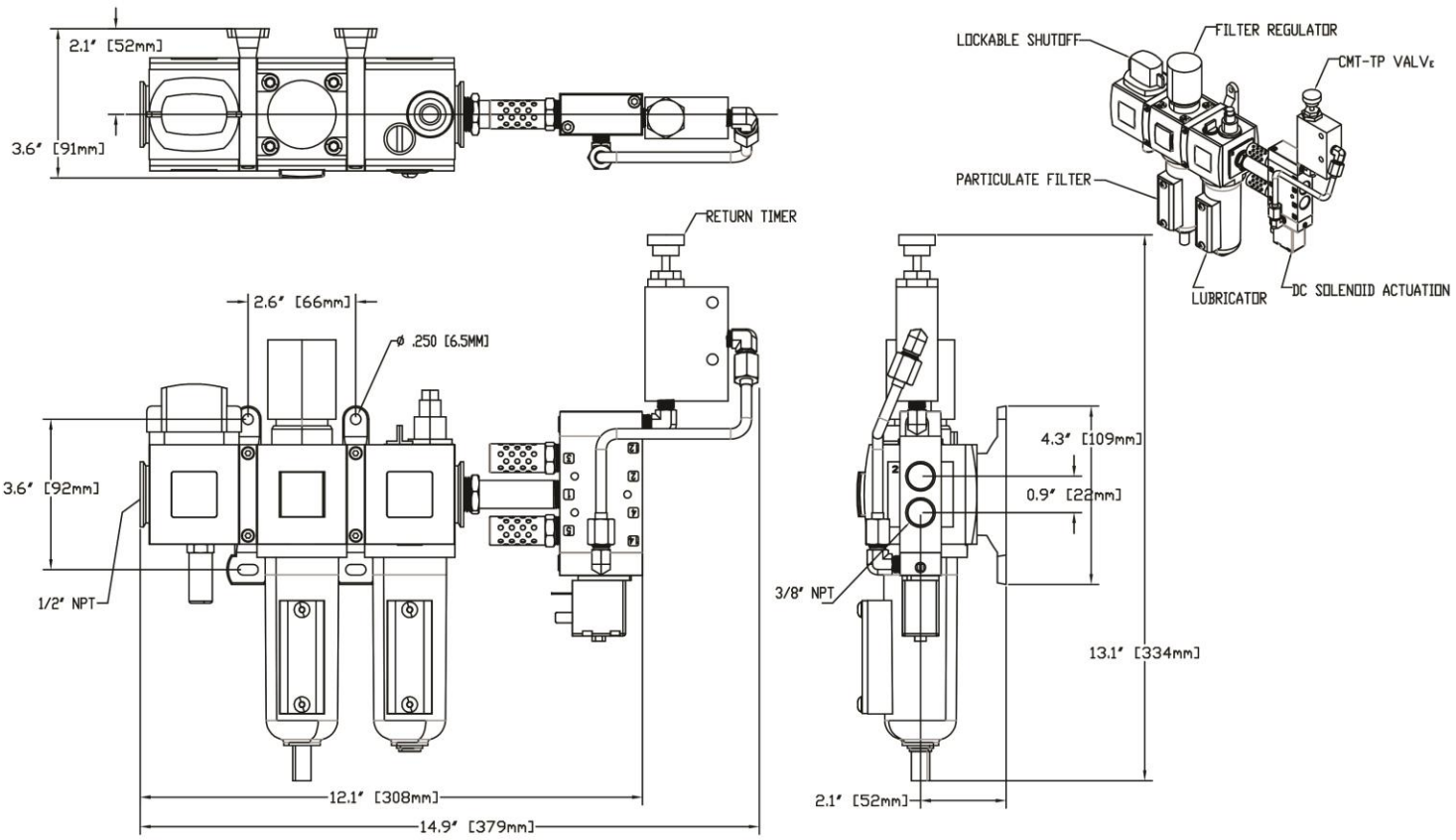
Select the valve pack required from the item chart. The three options include:

1) Single or double acting. The model 88 and 98 are the only single acting units.
2) Solenoid controls are available for DC or AC.
3) Filter/Lubricator is dependent on the type of shop air provided. Either Dry air or lubricated air.

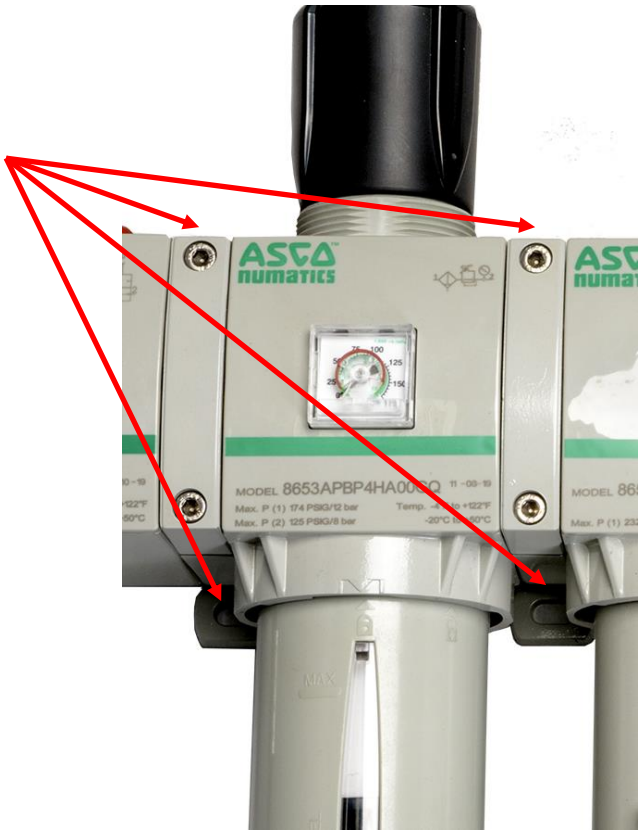


1- Safety Lockout – OSHA required
2- Filter/Regular
3- Lubricator, regular or coalescent for dry air supply
4- Valve, 3-way or 4-ay
5- Timer
6- 1/2” NPT connection for Shop Air
7- Muffler (2)
8- DC or AC solenoid for valve
9- Fitting for 3/8” NPT valve connection (1 or 2) - sold separately
10- Hose (1 or 2) to connect to impact marker - sold separately

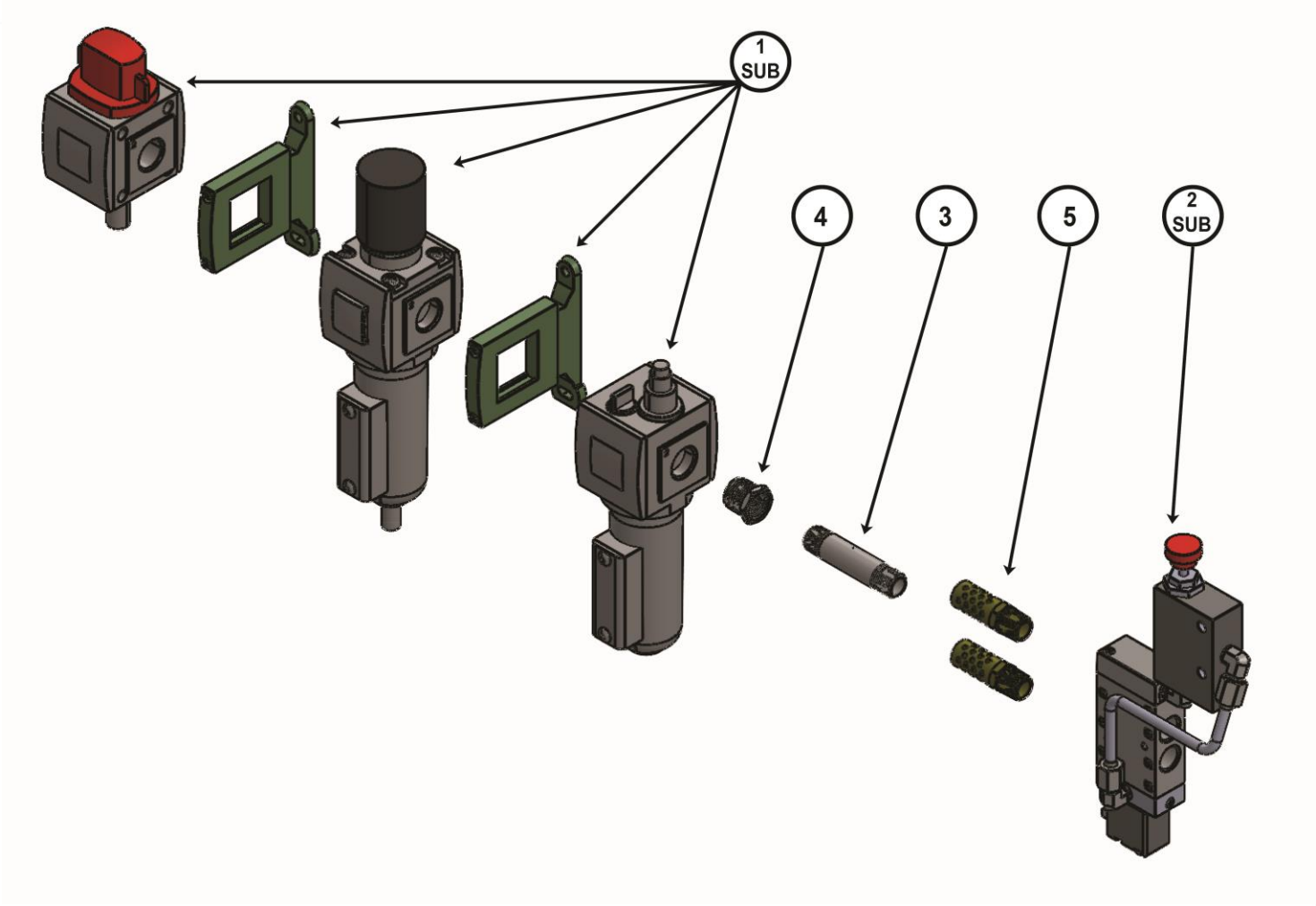
Dimensions



- CMT valve pack is easily mounted with four screws.
- Placement of the unit to be within 3' [91cm] of air impact marker.
- Valve pack works with CMT fittings bundle.



Parts



1- RVP Retro Fit Valve Pack Sub Assembly

2- Valve Timer Sub Assembly. Different configurations between single acting and double acting

3- Pipe nipple

4- Reducer

5- Muffler qty (2)

Fittings Kit

The CMT air impact marker fittings kit contains the recommended components to connect the CMT impact marker to the RVP valve pack.

Items Included:

- (1) or (2) pieces of pneumatic high-pressure hose. Cut to the maximum recommended length of 3 ft [91cm].
- 90° swivel fitting for the advance port on the air impact marker.
- 90° swivel fitting for the retract port on the air impact marker. Only for double acting cylinders.
- (1) or (2) fittings for the hose to connect to the valve.
- Flow control if recommended to be installed in the retract port for select models.

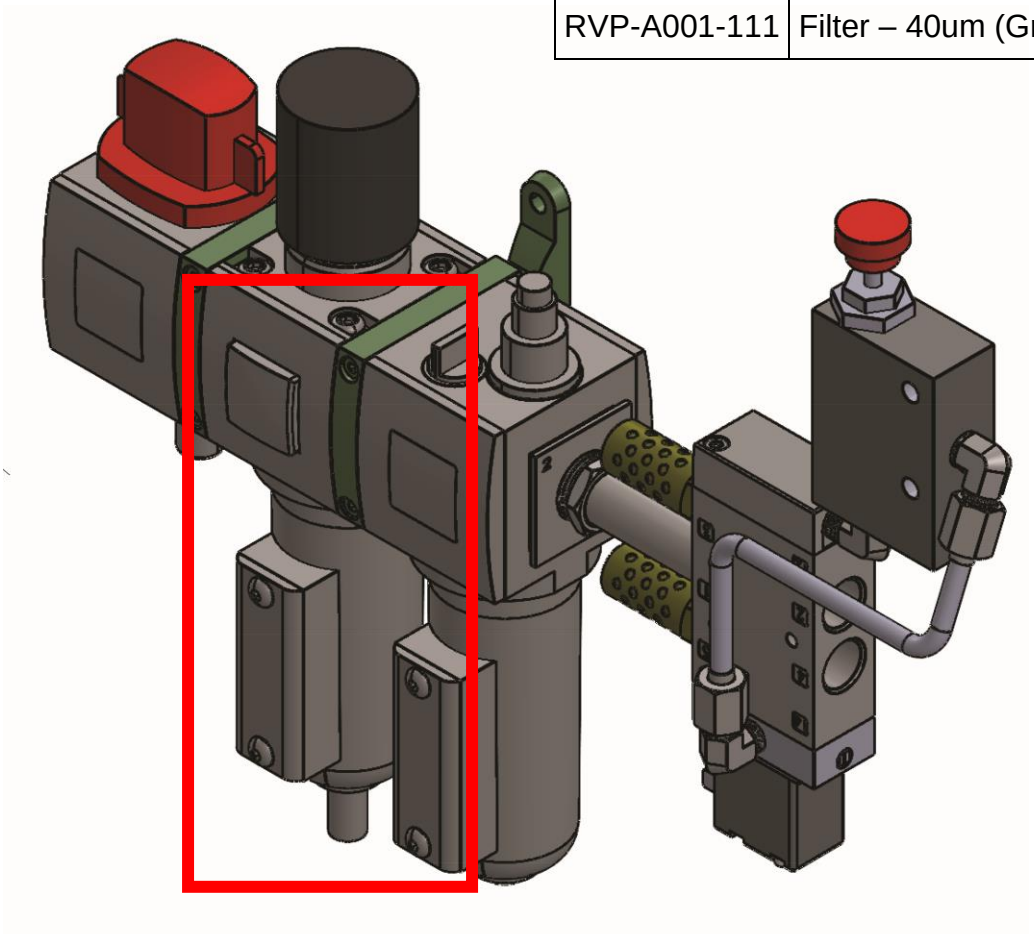
Model	Item #	Hose	Fitting Advance	Fitting Retract	Fitting Valve	Flow Control
78	078APIK	(2) pieces 3/8”	1/4" fitting 90°	1/8" fitting 90°	(2) 3/8" fittings	Yes
88	088APIK	(1) pieces 3/8”	3/8" fitting 90°		3/8" fitting	No
98	098APIK	(1) pieces 1/2”	1/2" fitting 90°		3/8" fitting	No
288	288APIK	(2) pieces 3/8”	3/8" fitting 90°	3/8" fitting 90°	(2) 3/8" fittings	Yes
298	298APIK	(2) pieces 1/2”	1/2" fitting 90°	3/8" fitting 90°	(2) 3/8" fittings	Yes
451	451APIK	(2) pieces 3/8”	3/8" fitting 90°	1/4" fitting 90°	(2) 3/8" fittings	No
751/851	751APIK	(2) pieces 1/2”	1/2" fitting 90°	3/8" fitting 90°	(2) 3/8" fittings	No

Example fittings kit shown for model 78

Spare parts

Designed for use with lubricated air supply systems, these replacement parts are provided with standard components included. Optional upgrades are available for purchase as spare parts to enhance performance. Maintenance schedules will vary based on the quality of the local air supply, ensuring optimal operation and longevity.

Item #	Spare Parts
RVP-A001-100	Filter Bowl – Polycarb with Guard
RVP-A001-101	Filter Bowl – Polycarb Semi Auto Drain
RVP-A001-102	Filter Bowl – Polycarb Auto Drain
RVP-A001-103	Filter Bowl – Metal Bowl
RVP-A001-104	Filter Bowl – Metal Bowl with Glass Site
RVP-A001-105	Drain – Plug Assembly
RVP-A001-106	Drain – Manual Drain
RVP-A001-107	Drain – Metal Manual Drain
RVP-A001-108	Drain – Automatic Drain
RVP-A001-109	Filter – 5um (White)
RVP-A001-110	Filter - 25um (Yellow)
RVP-A001-111	Filter – 40um (Green)



CMT provides additional product repair services including:

- Factory repair services
- Onsite repair, training, and installation
- Engineering and design services