



DieMark® Vacuum Priming Tool

For 3 mil and 5 mil Small Dot Ink Cartridges

Overview

The purpose of priming the cartridge with the priming tool is to expedite the priming process for the small dot filament ink cartridges. The vacuum priming tool ensures that the lower ink reservoir and ink flow channels below the bottom O-ring are completely filled with ink. This will ensure even, continuous ink flow to the filament and shorten overall priming time. The priming tool has only been tested and factory certified for use with DieMark 3 mil and 5 mil cartridges.

Priming Tool Setup

1. Connect the *input vacuum valve* on the Priming Tool to vacuum source at -85 kPa +/-5kPa (-25.1 InHg) nominal. The *input valve connection port* will accept either ¼ OD or 6mm OD tubing.

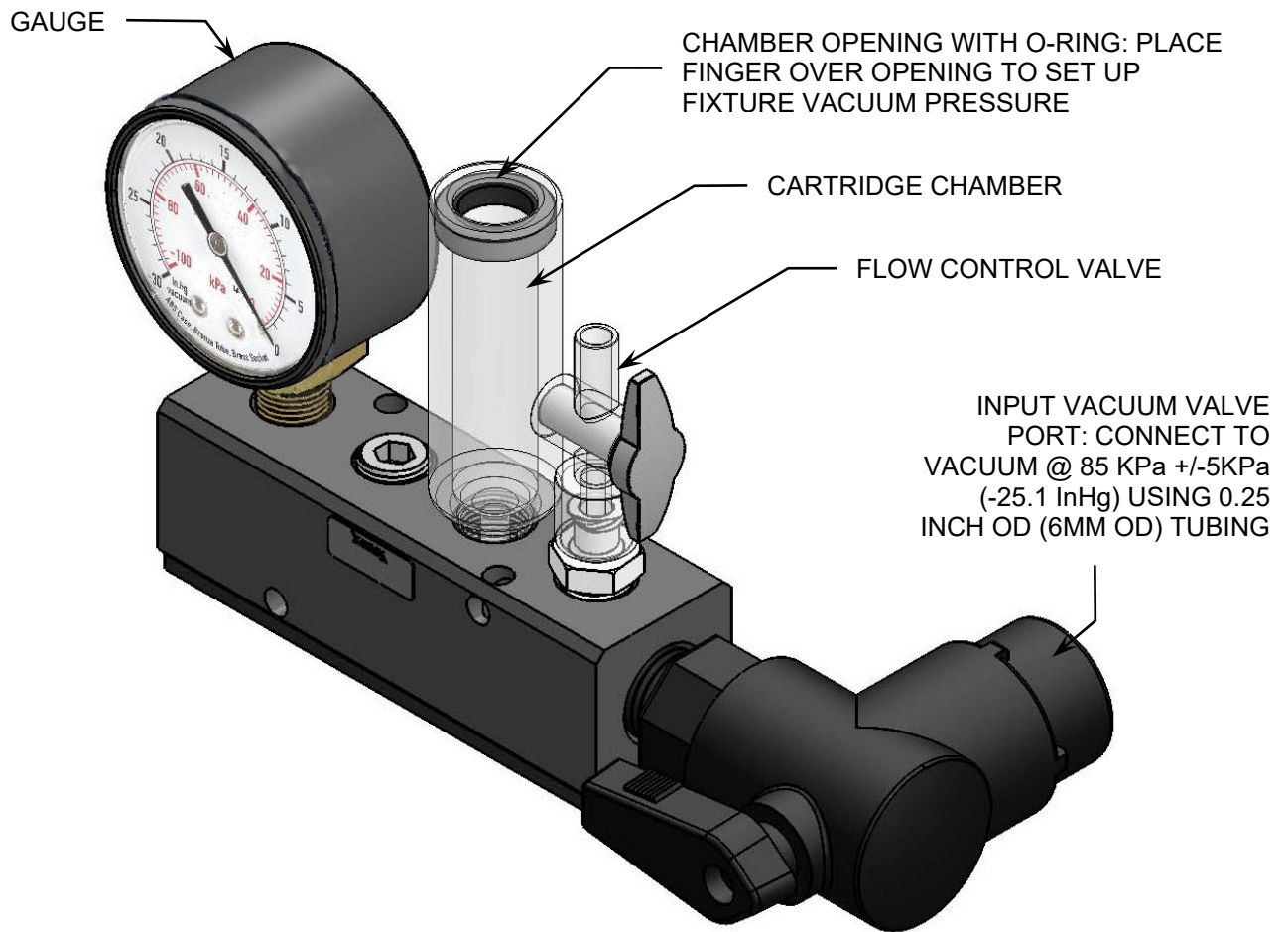
Note: There are two Priming Tool values that change dependent on cartridge filament size (3 mil or 5 mil) and the cartridge ink type. First is the Vacuum Control Setting, second is the Vacuum Time. See values in Table 1 to locate the Vacuum Control Setting and Vacuum Time for your ink cartridge's filament size and ink type before proceeding.

2. With the *input vacuum valve* OPEN and *flow control valve* CLOSED: place your finger on the *cartridge chamber opening*, eliminating air flow through the *cartridge chamber*. Vacuum on the *gauge* should now read -85 kPa ± 5kPa / -25.1 inHg ± 3 Hg, nominal. Adjust vacuum by slowly opening the *flow control valve* until the value listed in Table 1 for Vacuum Control Setting matches what is listed for your Cartridge type (either -34 kPa /-10 inHg for 3 mil OR -17 kPa /-5 inHg for 5 mil) is achieved on the priming fixture *gauge*, then close the *input vacuum valve*. The tool is now set up for use.

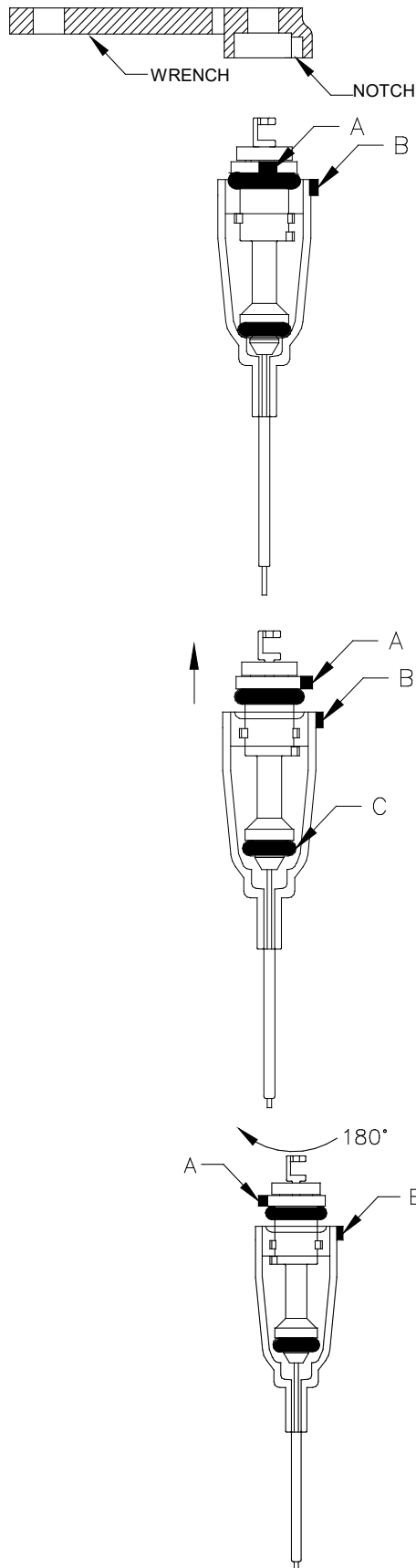
Table 1. Vacuum Priming Flow Control Setting and Vacuum Time Values

Cartridge Filament Size	Ink Type	Vacuum Control Setting (Value on Gauge in inHg ± 3 inHg)	Vacuum Time (In seconds ± 3 seconds)
3 mil	8103 Black	-10" inHg	25
3 mil	6993 Black 6997 Black 6990 Black	-10" inHg	15
3 mil	7824 Black	-10" inHg	15
5 mil	8103 Black	-5" inHg	20
5 mil	6993 Black 6997 Black 6990 Black	-5" inHg	10
5 mil	7824 Black	-5" inHg	10

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Opening the Cartridge

A plastic wrench is used to open and prime a cartridge. The wrench fits very tightly and has a shallow cup with a notch to fit over the top of the main shaft. The notch location is indicated by an alignment "bump" on the end of the wrench.

1. Two reference points on the ink cartridge are used in opening and priming the cartridge.

- An alignment "bump" at the top of main shaft called the "*main shaft indicator*" (A).
- An alignment "bump" on the cartridge body near the top called the "*body indicator*" (B).

2. Align the "*main shaft indicator*" (A) with the notch in the wrench and fit the wrench over the top of the *main shaft*.

3. Turn the "*main shaft indicator*" (A) towards the "*body indicator*" (B) on the cartridge until they are aligned.

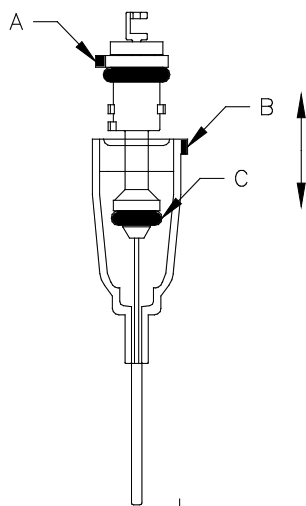
4. Hold the wrench at the cup section, between thumb and index finger, and pull up the *main shaft* with the wrench until it stops. The *bottom O-ring* (C) should be lifted from its sealed position, opening the *ink flow channels*. Visually inspect the *bottom O-ring* (C) and verify that it has lifted and the ink is flowing into the channels.

5. If the *bottom O-ring* is not lifted, close the cartridge by using the wrench to re-align the "*main shaft indicator*" and "*body indicator*". Push the *main shaft* down to re-seat it. Repeat this procedure if necessary, until the *bottom O-ring* is lifted.

6. After the *main shaft* and the *bottom O-ring* are lifted, turn the *main shaft* with the wrench until the *indicators* (A & B) are positioned exactly at opposite sides of the cartridge (at 180° with respect to each other). There is a small hole at the top of the wrench through which the "*body indicator*" (B) can be seen when it is at 180° from the "*main shaft indicator*" (A). Turn the wrench slowly while looking through this hole for the "*body indicator*" (B).

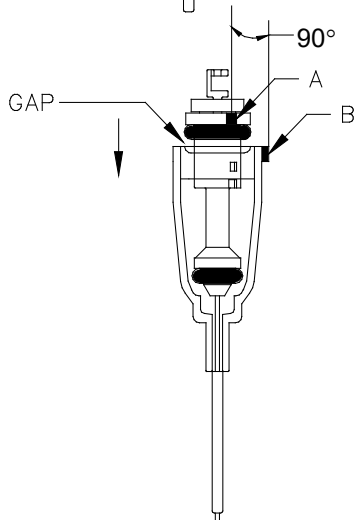
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Prepare Cartridge for Vacuum Priming



The purpose of priming the cartridge is to ensure that the lower reservoir and the *ink flow channels* below the *bottom O-ring* are completely filled with ink. This will ensure even, continuous ink flow. To prepare the cartridge for priming, follow the steps below.

1. Hold the cartridge steady in one hand and the wrench at the cup area (top of the *main shaft*) with the other.
2. Keeping the indicators at 180° from each other, pull up very gradually and lift the *main shaft* while wiggling the wrench slightly from side to side.
3. Stop lifting the *main shaft* when it is ½ way out of the reservoir.



4. Lower the *main shaft* back to its original position while gently stirring the ink. Take care not to bend the filament.

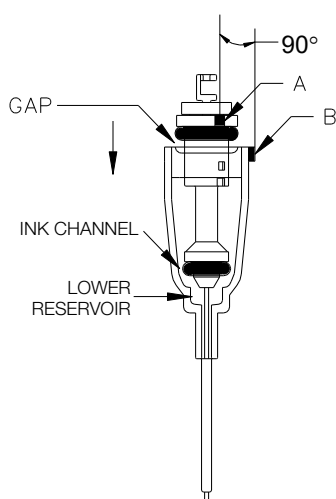
5. Repeat steps 1-4 a few times until ink is beginning to flow into the space below the *bottom O-ring*

6. Lower the *main shaft* the final time, as far down as it will go (until it stops). The *indicators* should still be 180° from each other and the *main shaft* back down to the pre-prime position.

7. Turn the *main shaft* 1/4 turn in either direction. This locks the *main shaft* in position so that it cannot be moved up or down. There should be a gap between the *top O-ring* and the *cartridge body*. Push the *filament holder* down and remove the wrench. The cartridge is now prepared for the priming tool.

Cartridge Inspection

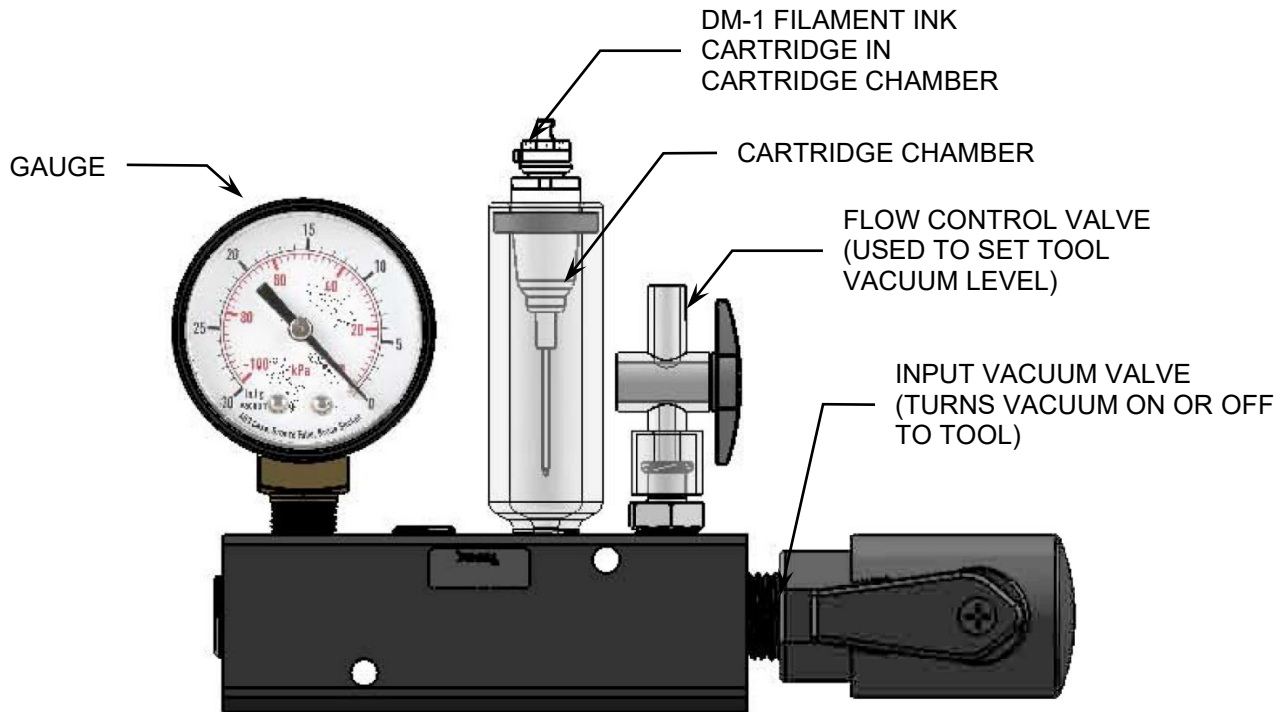
Visually inspect the cartridge before installing it in the priming tool and verify that the following conditions exist;



- The *bottom O-ring* is lifted and the *ink flow channels* under the bottom O-ring are open to allow ink flow.
- The cartridge *alignment indicators* (A & B) are 1/4 turn from each other. This way the *main shaft* cannot be pushed up or down.
- There is a *gap* between the *top O-ring* and the *cartridge body* indicating that the cartridge has not been inadvertently closed.

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Priming the Cartridge with the Vacuum Priming Tool

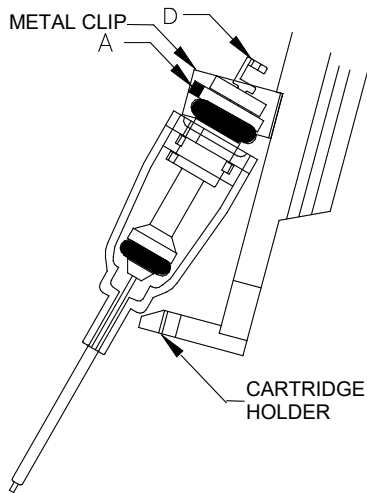


Cartridge Priming with Priming Tool

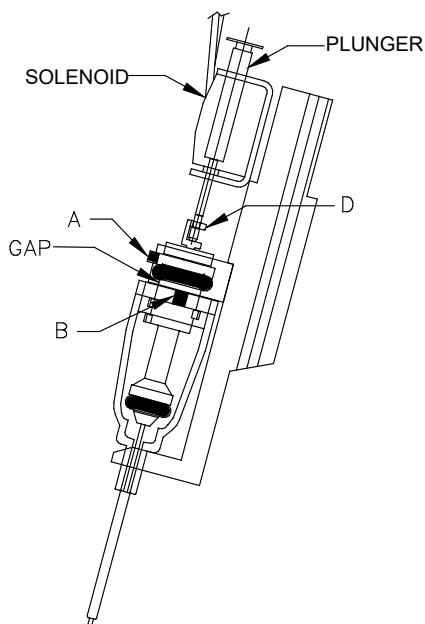
1. Place the *ink cartridge* in the *cartridge chamber* as shown. Ensure a good seal is present between the cartridge body and the O-ring (listen for hiss and adjust cartridge for good seal). Take care not to bend/damage the cartridge filament.
2. Open the *input vacuum valve* for the amount of time listed in Table 1 for your cartridge ink type under Vacuum Time (10-25 seconds \pm 3 seconds), and then close the valve and remove the cartridge, taking care not to bend the filament.
3. Inspect the cartridge and proceed as noted:
 - If the ink channels and lower reservoir are not full of ink, use the cartridge priming tool again but apply vacuum in 10 second intervals, until the ink channels and lower reservoir are full of ink.
 - If the ink channel and lower reservoir are full of ink, and there is no ink at the end of the filament tip, proceed to Cartridge Installation and perform Manual Priming step.
 - If the ink channel and lower reservoir are full of ink, and there is an ink drop / ball of ink at the end of the filament tip, the cartridge is primed. Carefully remove the excess ink from the cartridge tip with clean, lint free swab or cloth and proceed to Cartridge Installation step. Since ink has already reached the needle tip, Manual Priming step can be skipped.

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Cartridge Installation



1. Verify that the *filament holder* (D) has been pushed down.
2. Push the *main shaft* section into the *metal clip* on the *cartridge holder*. Make sure the “*main shaft indicator*” (A) is pointing outwards. Press the *cartridge body* until it snaps into place. Verify that the *gap* has not closed and the *indicators* are still 1/4 turn from each other. If these conditions are NOT satisfactory, remove the cartridge from the clip and review the priming procedure.



3. Align the *solenoid plunger* with the *filament holder* (D) and push the *plunger* until it snaps into the *filament holder*. In this position the *plunger* should move up and down freely. Manually depress the *plunger* a number of times to verify operation, occasionally rotating the *plunger* to ensure free movement.

Manual Cartridge Priming

If there is not a drop / ball of ink on the cartridge filament tip but the ink channels and lower reservoir are full of ink, perform this additional step until the cartridge is primed.

Note: For clarity, the images shown here do not show the Plunger Stop Assembly that is required for 3mil and 5 mil cartridges. Do not perform step 4 without the Plunger Stop assembly installed and initially adjusted.

4. Exercise the *plunger* manually or electrically until ink flow is established in the *stainless steel needle* and the *filament* is coated with ink. A DM-1 cartridge may require 20-40 *plunger* strokes to properly establish ink flow to the needle tip. When the *filament* is completely coated with ink, check the *needle tip* for excess ink and wipe with a clean, lint free cloth if necessary.