# QB78 $CO_2$ Pellet Rifle

## Maintenance Instructions

**Text and photos by George Fox Lang**


The Chinese QB78 pellet rifle is one of the nicest and most popular $CO_2$ rifles ever produced. Here are the long-wanted details on how to take it apart, lubricate it, adjust it and reassemble it.



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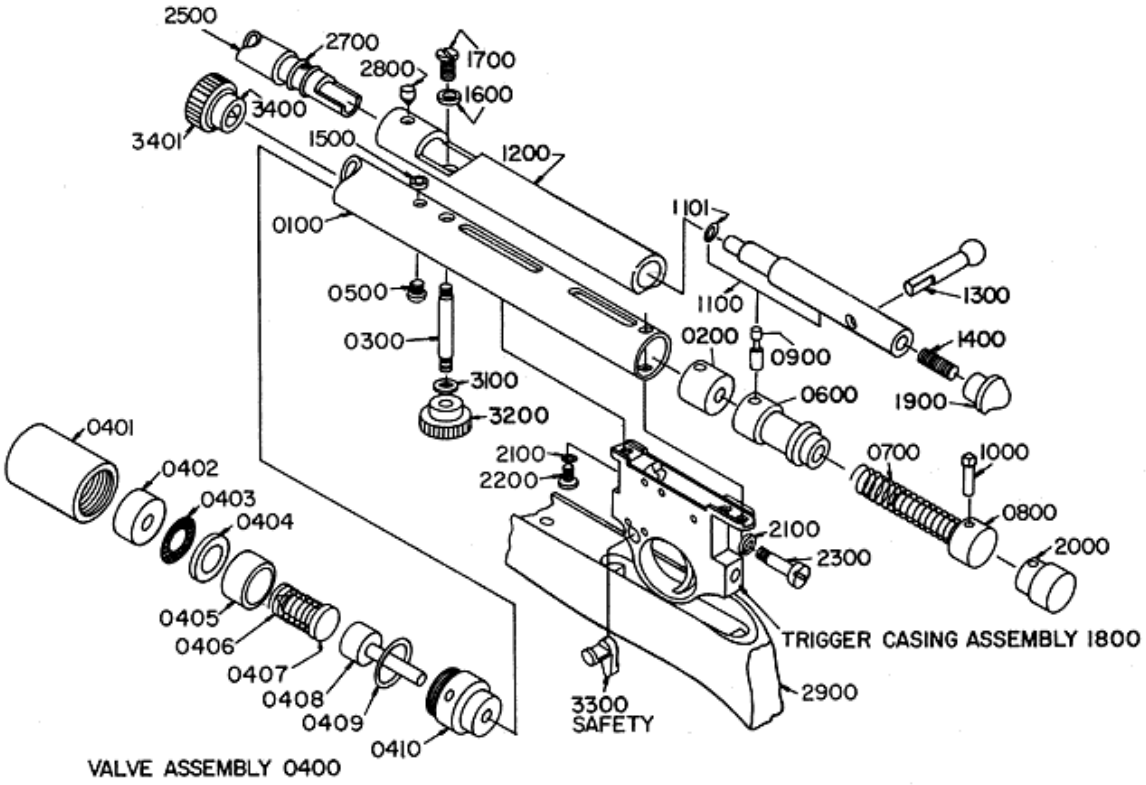



# How to Disassemble the Basic QB78 Rifle

## Tools Required

1/8” flat-bladed screwdriver
1/4” flat-bladed screwdriver
#2 Phillips head screwdriver
0.1” (2.5 mm) Allen wrench
6” open-end adjustable wrench
small mallet or hammer
$^{1}/_{8}$”x ¾” x 8” steel bar
¼”x 6” hardwood dowel
¾”” x 18” hardwood dowel

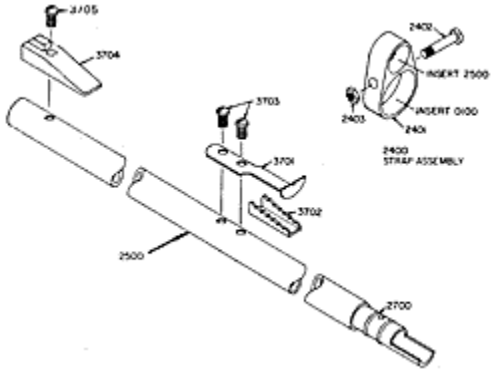
## Remove the Action from the Stock

Place the **Safety** (3300) in the Safe position. Lay the rifle on its right side and use a ¼” wooden dowel and a mallet to drive the **Safety** out of the **Trigger Casing Assembly** (1800).

Loosen and remove the **Locating Screw Nut** (3200) and (if present) the **Plain Washer** (3100). Remove the action from the **Hardwood Stock** (2900).

**Warning**: perform further disassemble of your rifle at your own risk.

## Separate the Barrel from the Breech



Unscrew and remove the **Tube Cap Assembly** (3400). Remove **Rear Sight** (3701) and the **Rear Sight Ramp** (3702) by undoing the two **Rear Sight Screws** (3703). Unscrew **Front Sight Screw** (3705) and remove the **Front Sight** (3704).

Loosen the barrel-band **Strap Assembly** 2400) by loosening the **Strap Screw** (2402). Slide the **Strap** (2401) forward on the **Barrel Assembly** (2500) and off of the **Tube** (0100).

Use a 0.1" (2.5 mm) Allen wrench to remove the **Barrel Set Screw** (2800). Twist the **Barrel Assembly** (2500) back and forth and gently pull it straight out of the **Breech** (1200).

Slide the **Strap Assembly** (2400) off of the **Barrel Assembly** (2500).

## Remove the Trigger Casing Assembly

Unscrew and remove the **Front Casing Screw** (2200), the **Rear Casing Screw** (2300) and their **Casing Lock Washers** (2100). Separate the **Trigger Casing assembly** (1800) from the action.

## Remove the Bolt Handle

Remove the **Breech Plug** (1900) from the **Breech** (1200) tube. Insert the long end of the 0.1 Allen wrench into the breech tube and into the head of the **Breech Bolt Set Screw** (1400). Remove this Allen head screw and pull the **Bolt Knob**(1300) out to the right, freeing it from the **Breech Bolt assembly** (1100).

## Separate the Breech from the Tube

Push the **Breech Bolt Assembly** (1100) fully to the rear. Use a ¼" flat-bladed screwdriver to loosen and remove the **Hold Dow Screw** (1700) and its **Lock Washer** (1600).

Lift the **Breech** (1200) off of the **Tube** (0100). Remove the **Breech Gasket** (1500) from the gas tube.

Remove the (round-headed, forward) **Hammer Pin** (0900) and the (square-headed, aft) **Cocking Pin** (1000) protruding through slots in the tube from the **Hammer** (0600) and the **Cocking Block** (0800), respectively.

## Remove the Bolt and Hammer Parts

Slide the **Breech Bolt Assembly** (1100) out of the **Breech** (1200) to the rear.

Pull the **Tube Plug** (2000) from the rear of the **Tube** (0100). Tip the tube and slide the **Cocking Block** (0800), **Hammer Spring** (0700) and the **Hammer** (0600) out of the tube.

## Remove the Valve Assembly

Lay the **Tube** (0100) on its right side. Use the $^{1}/_{8}$"x ¾" x 8" steel bar as a screwdriver to loosen the **Valve Assemble** (0400). Place this tool into the forward end of the tube and engage the slot(s) in the **Piercing Body** (0401). Using the 6" wrench if required, turn the piercing body one-half turn counter-clockwise. This will release pressure on the 19mm **O Ring** (0409), relieving compression against the tube.

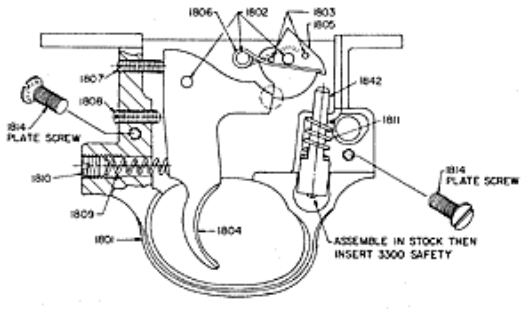
Remove the **Valve Seat Screw** (0500). This frees the **Valve Assembly** (0400) to slide in the **Tube** (0100). Remove the **Locating Screw** (0300). This frees the **Inside Plug** (0200) to slide in the tube.

Use the 3/4" x 18" dowel to push the **Valve Assembly** (0400) and the **Inside Plug** (0200) out of the **Tube** (0200) from the rear to the front.

## Disassemble the Valve

Unscrew the **Piercing Body** (0401) from the **Exhaust Valve Body** (0410). Separate these to free the **Valve Stem Assembly** (0408), the **Piercing Pin** (0407), the **Check Valve Spring** (0406), the **Spacer** (0405), **Washer** (0404), **Screen** (0403) and **Filter** (0402).

## Trigger Casing Assembly Breakdown



1800 TRIGGER CASING ASSEMBLY

Use a #2 Phillips-head screwdriver to remove the two **Casing Plate Screws** (1814). Lift off the **Casing Plate** (1813) to expose the trigger mechanism.

Using a 1/8" flat-blade screwdriver, remove the **Bottom Screw** (1810) and the **Trigger Spring** (1809). The **Trigger** (1804), **Sear** (1805) and **Sear Spring** (1806) may now be lifted out of the **Trigger Casing Assembly** (1800).

| Part # | Description | Quan | Size | Material | Note | McMaster-Carr # |
|---|---|---|---|---|---|---|
| 409 | Valve O-Ring | 1 | 113 | Silicon | | 9396K26 |
| 1101 | Bolt O-Ring | 1 | 003 | Buna-N | .177 cal | 9452K11 |
| 1101 | Bolt O-Ring | 1 | 006 | Buna-N | .22 cal | 9452K14 |
| 1500 | Breech Gasket | 1 | 1/8" | Polyethylene | .25 OD, .17 ID tubing | 5181K39 |
| 2700 | Barrel O-Ring | 3 | 012 | Buna-N | | 9452K21 |
| 3401 | Tube Cap O-Ring | 1 | 113 | Viton | | 9464K26 |

# Reassembly and Lubrication of the QB78 Rifle

## General

Plan to replace all five of the seals as a matter of course whenever the rifle is disassembled. The table above provides a cross reference to typical industrial parts. Wipe old lubricants off, clean the parts using WD-40 and wipe them dry. Apply new lubricants during reassembly.

## Assemble the Trigger Components

Apply a drop of oil to each of the three **Pivot Pins** (1802). Reassemble the trigger mechanism. Apply a coat of light grease to the contact areas of the **Trigger** (1804) and **Sear** (1805). Close the assembly by reinstalling the **Casing Plate** (1813) and securing it with the two **Casing Plate Screws** (1814).

## Assemble the Valve

Stack the **Spacer** (0405), **Washer** (0404), **Screen** (0403) and **Filter** (0402) on a Phillips head screwdriver. Insert the screwdriver into the threaded end of the **Piercing Body** (0401) and slide the stacked parts into it. Put the **Check Valve Spring** (0406) on the **Piercing Pin** (0407) and drop these parts into the **Piercing Body** (0401).

Put the **Valve Stem Assembly** (0408) into the threaded end of the **Exhaust Valve Body** (0410) and fit the **O-Ring** (0409) over the threads. Screw the **Exhaust Valve Body** (0408) into the **Piercing Body** (0401), but leave the joint parts so that the **O-Ring** (0409) is not compressed.

## Assemble the Tube

Smear a small amount of light grease on the valve **O-ring** (0409) and slide the brass end of the assembled **Valve** (0400) into the front (threaded) end of the **Tube** (0100). Make sure that the exhaust hole is facing 'up' to align with the slots in the **Tube** (0100). Use the ¾" x 18" dowel to push the valve into the tube, stopping when the exhaust hole appears in the first hole (the transfer port) of the tube. If necessary, use a rod or screwdriver to center the valve's exhaust port in the tube's transfer port. Reinstall the **Valve Set Screw** (0500).

Warning: pushing the valve assembly beyond the transfer port may tear the **O-Ring** (0409).

Slide the **Inside Plug** (0200) into the rear (unthreaded) end of the tube with its holes first and the larger threaded hole 'down'. Screw the **Locating Screw** (0300) into this threaded hole through the second hole in the **Tube** (0100).

Use the $^{1}/_{8}$"x ¾" x 8" steel bar to tighten the valve's **Piercing Body** (0401) on the **Exhaust Valve Body** (0410), squeezing the **O-Ring** (0409) out against the **Tube** (0100).

Put a drop of light oil on both raised diameters of the **Hammer** (0600) and slide it into the rear of the **Tube** (0100) with the pin hole 'up' and forward. Apply a drop of light oil to the (round-headed) **Hammer Pin** (0900) and seat it fully into the **Hammer** (0600) through the forward slot in the **Tube** (0100).

Coat the **Hammer Spring** (0700) with heavy grease and fit it on the **Cocking Block** (0800). Smear grease on the **Cocking Block** (0800) and slide the assembly into the rear of the **Tube** (0100) with the pin hole 'up'. Apply a drop of oil to the (square-headed) **Cocking Pin** (1000) and seat it fully in the **Cocking Block** (0800) through the rear slot in the **Tube** (0100). Push on the rear of the **Cocking Block** (0800) to test that it can freely slide in and out of the **Hammer** (0600).

## Mate the Breech and Tube

Wipe a light oil coat on the smallest diameter section of the **Breech Bolt** (1100). Slide **O-Ring** (1101) into position on the bolt. Install the **Breech Bolt Set Screw** (1400) but do not tighten it. Coat the remainder of the bolt with light grease and insert it into the rear of the **Breech** (1200) with the slots 'down'.

Place the **Breech Gasket** (1500) on the **Tube** (0100) over the transfer port (front hole). Hold the **Breech** (1200) with the **Breech Bolt** (1100) inside of it horizontal and position it over the **Tube** (0100). Engage the **Hammer Pin** (0900) and **Cocking Pin** (1000) with the slots in the **Breech Bolt** (1100).

Align the holes for the **Hold Down Screw** (1700) and hold the **Breech** (1100) and **Tube** (0100) together with one hand. With the other, insert a screwdriver into the knob hole of the **Breech Bolt** (1100) and use it to verify proper function of the assembly.

With correct bolt/hammer function, insert the **Hold Down Screw** (1700) and **Lock Washer** (1600), but do not tighten the screw. Align the **Beech** (1200) and the **Tube** (0100) by fitting the **Rear Casing Screw** (2300) into its holes. Snug the **Hold Down Screw** (1700) and remove the **Rear Casing Screw** (2300).

Lightly oil the **Bolt Knob** (1300) and seat it fully into the hole in the **Breech Bolt** (1100) with the mounting flat to the rear. Tighten the **Breech Bolt Set Screw** (1400).

## Attach the Trigger Casing Assembly

Fit **Tube Plug** (2000) into the rear of the **Tube** (0100). Fit the **Breech Plug** (1900) into the rear of the **Breach** (1200). Position the **Trigger Casing assembly** (1800) and insert the **Rear Casing Screw** (2300) and its **Casing Lock washer** (2100), but do not tighten it. Install the **Front Casing Screw** (2200) and its **Casing Lock washer** (2100). Tighten both casing screws.

## Prepare the Tube Cap

Using pliers to retain the inner piercing pin part, remove the Phillips head screw from the **Tube Cap Assembly** (3400).
Separate the parts and change **O-Ring** (3401).
Reassemble the **Tube Cap**.

## Attach the Barrel

Install the three **Barrel O-Rings** (2700) on the breech end of the **Barrel** (2500). Apply a light coat of grease to the O-rings and slide the barrel into the front end of the **Breech** (1200). Install the **Barrel Set Screw** (2800) and tighten it.

Do not twist the **Barrel** (2700) when installing it. Twisting may damage the **Barrel O-Rings** (2700).

Slip the **Strap Assembly** (2400) over the **Barrel** (2500) and **Tube** (0100), but do not tighten the **Strap Screw** (2402). Screw the **Tube Cap** (3400) onto the **Tube** (0100).

## Restocking the Action

Carefully place the action into the **Stock** (2900), sliding the **Strap Assembly** (2400) to align with its cutout in the stock. Snug the **Strap Screw** (2402), but be careful not to over tighten it.

Over tightening the **Strap Screw** (2402) may result in breaking the **Strap Assembly** (2400).

Install the **Locating Screw Nut** (3200) and its (optionally provided) **Plain Washer** (3100). Tighten firmly by hand.

Open the bolt and turn the rifle "on its back". Insert the round shaft of the **Safety** (3300) into its mounting hole on the right side of the **Trigger Casing assembly** (1800) with the lever in the rearward 'safe' position. Use a small flat-bladed screwdriver to depress the **Safety Rod** (1812) while pressing the **Safety** (3300) into the **Trigger Casing assembly** (1800). The **Safety** (3300) will snap into position.

Attach the **Rear Sight** (3701) and **Rear Sight Ramp** (3702) using the two **Rear Sight Screws** (3703). Attach the **Front Sight** (3704) using the **Front Sight Screw** (3705).

This completes reassembly of the QB78.

## Testing the Reassembled Rifle

Cycle the bolt and verify that it can be opened and closed smoothly. Dry fire the rifle, verifying that the hammer cocks and falls. Verify the action of the Safety.

Charge the rifle with two new $CO_2$ cartridges. Note that the Tube Cap stops due to gas pressure when it is backed off. This verifies that the forward-facing cartridge has been opened and that the Tube is holding $CO_2$ at pressure. Dry fire the rifle. A gas report verifies basic function of the valve.

Fire a few pellets at a safe target. Verify that the pellets exit the weapon at an appropriate velocity (as demonstrated by paper target penetration and the time delay between firing and impact sounds).

Leave the rifle unloaded, but charged with $CO_2$ overnight. Verify that the seals have not leaked by firing it, again. Fire the rifle until all gas is depleted, counting your shots. You should get 50 to 60 shots from an unmodified rifle, again demonstrating the seals are sound.

Remove and inspect the two $CO_2$ cartridges. Each should have its seal clearly pierced, indicating both piercing mechanisms are functioning properly.

## Improving Your QB78 Rifle

There are some things you can do with simple tools during the initial teardown to improve the smoothness and reliability of your rifle.

**Breech**

Polish all burrs out of the **Breech** tube by fitting a 7" by 1 ½" strip of emery paper into a sawn slit in a 7/16" dowel. Spin the dowel slowly with a drill motor and pass strips of 220, 400 and 600 grit through the breech tube 5 times each. Use a fine gray stone in a Dremel to break all edges where O-rings might be cut. This includes all slots and holes. Polish all stonings using 220, 400 and 600 grit paper backed by a screwdriver flat.

**Tube**

Use a 5/8" slotted dowel to spin 7" x 1 ½" strips of emery paper within the Tube. Use 220, 400 and 600 grit. Pay particular attention to the slotted rear section of the Tube and break all edges.

**Bolt**

Strip all parts from the **Bolt** body and chuck its breech end in a lathe, drill press or clamped drill motor. Spin the bolt at low speed and polish it with 220 grit paper until all bluing is gone; repeat with 400 and 600 grit to remove all scratches. Using a Dremel® tool and a fine stone, break the edges of the pin-following slots.

**Barrel**

Use a Dremel tool and a fine stone to break the sharp edges of the "loading tray", the pellet's entrance to the barrel. Rounding these edges preserves the **Bolt** or 'probe' O-ring from tearing. After rounding, polish the stoned areas with 220, 400 and 600 grit emery paper.

Test the smoothness of the barrel 'crown' with a cotton Q-tip®. Insert the Q-tip into the cleaned muzzle, hold it against the outside and withdraw it. If cotton fibers remain in the muzzle, consider recrowning the barrel.

One method of recrowning is to finger-turn a very small piece of 220 grit emery paper (bore diameter plus 1/8'' max) against the muzzle, holding it in place with a drill bit slightly larger than the bore. Repeat the procedure using 400 and 600 grit paper.

**Trigger Mechanism**

Remove the **Trigger** and **Sear** and polish their contacting surfaces with 600 grit emery paper. Replace the **Top Screw** (1807) and the **Middle Screw** (1808) with longer **3mm x .5mm** Allen head cap screws with **jam nuts** inside the housing (as shown) to better hold trigger settings.

## Trigger Adjustments


The QB78 trigger features three adjustments:

**A – Tension** or trigger force
factory set to about 4 lbs
turn screw *counter-clockwise* to reduce
Setting tension below 2 lbs may result in accidental discharge if the rifle is dropped.

**B – Over Travel** or backlash
factory set to about 0.25”
turn screw *clockwise* to reduce
Turning screw too far clockwise will prevent the rifle from firing.

**C – Sear Engagement** or pull length
factory set at about 0.125”
turn screw *clockwise* to reduce
Reduced sear engagement may result in accidental discharge if the rifle is dropped.

Make adjustments after polishing the trigger and sear contact surface, installing locknuts on the adjustment screws and lubricating the trigger mechanism. Perform these adjustments with the rifle fully assembled, but out of the stock:

1. Loosen the jam nuts.

2. Squeeze the trigger as in firing and hold it to the rear. Adjust screw **B** until the sear just clears the trigger. Tighten the jam nut and check that the **Over Travel** remains correctly set.

3. With you finger off the trigger, screw adjustment **C** in until there is about 1/16” engagement between the trigger and sear. Tighten the jam nut and check that the **Sear Engagement** remains correct.

4. Adjust the **Tension** screw **A** to select the desired trigger pull force. Dry fire to test the feel.

5. When satisfied with all adjustments, replace the **Casing Plate** (1813) and secure it with the two **Casing Plate Screws** (1814).

6. Restock the action.

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