

Part C1 is the part that directs the compress air to the pellet. It contains the breech, probe seal, porting and valve seat. Two hex bolt hold this part to the front action block C.



Part C2 is the valve assembly. A harden steel pin embedded into a Delrin or nylon valve. The valve body also served as a spring guide for a rather heavy valve spring. In front of the valve seat is a brass bushing (flow control device?). (\*After some more work on the HW100, I notice that this brass bushing does help to keep the valve stem O-ring in place. With this bushing removed, the O-ring might come out of its groove and travel along the valve stem affecting velocity. I have since installed a trumpet shaped bushing which improved velocity slightly versus no brass bushing and, at the same time, kept the O-ring in place\*)

The parts that control of the propellant in the HW100 is not much different then that in Crosman 22XXs or QBs.

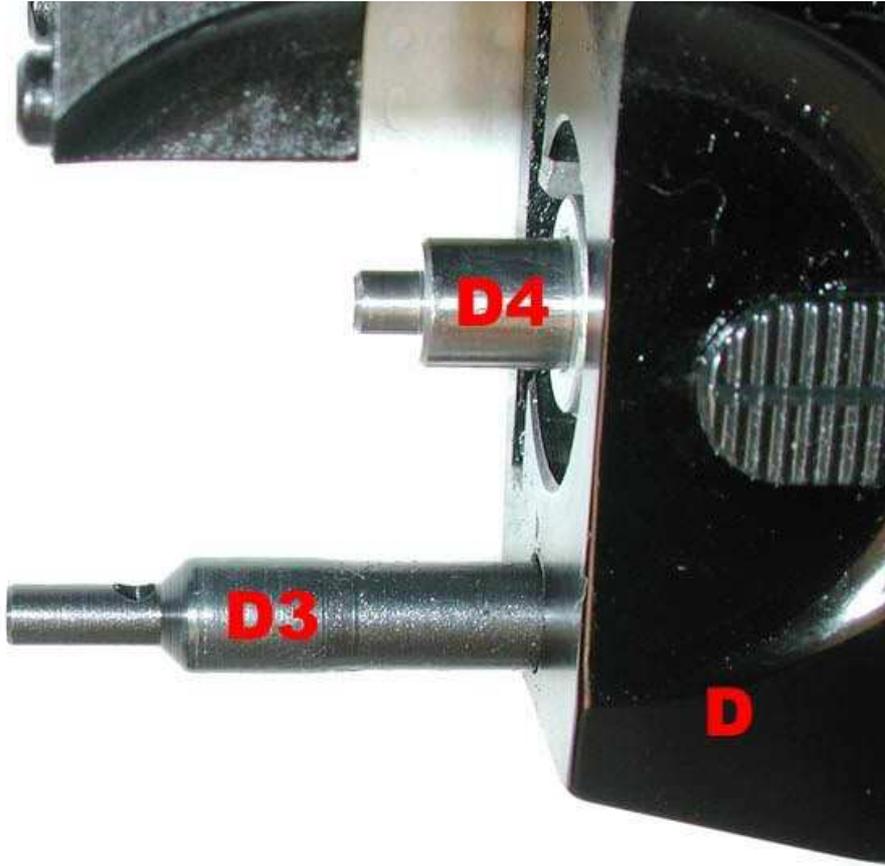


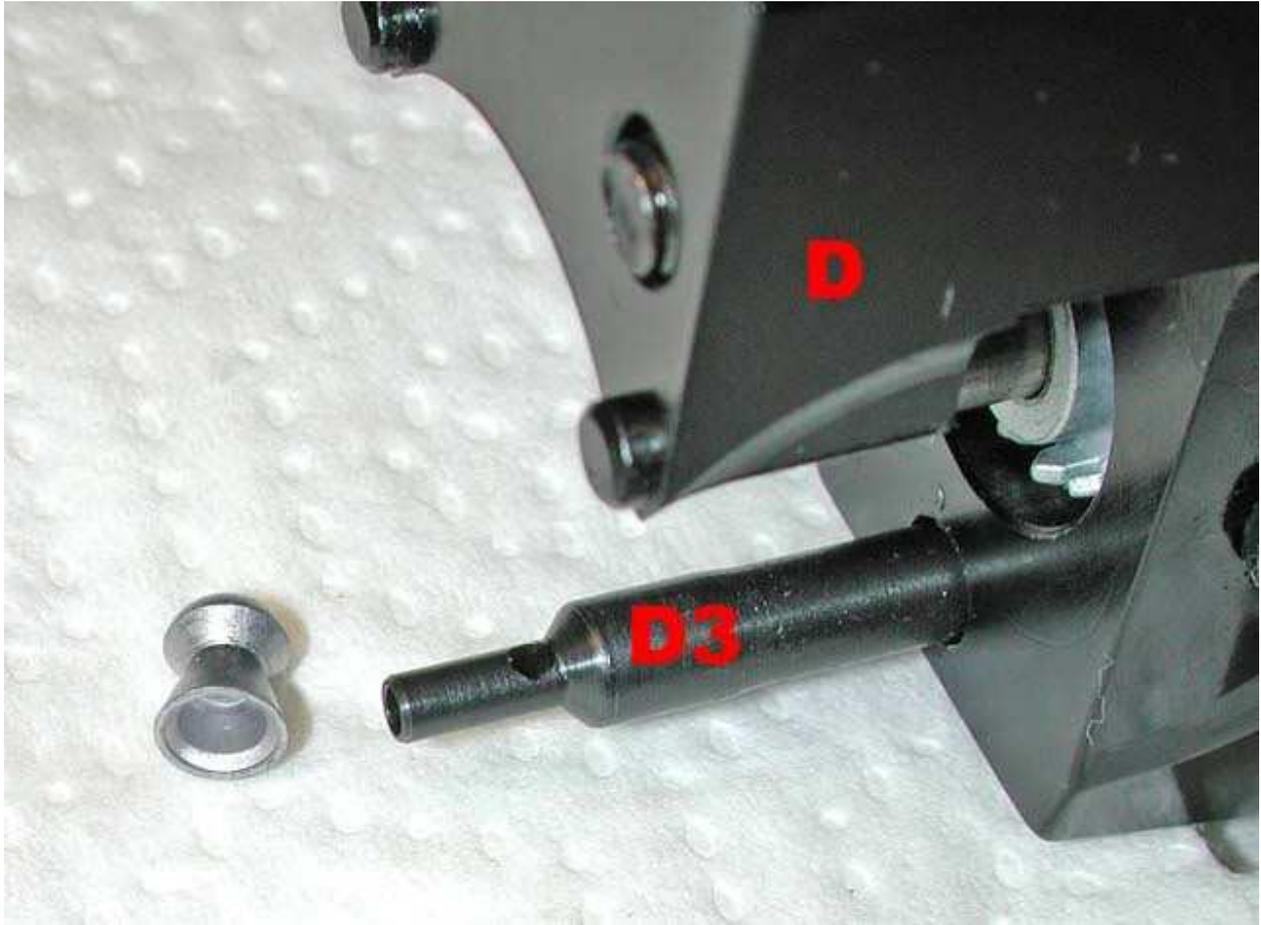
Beneath the valve assembly is a pressure regulator. It is in-line with the inlet of the air cylinder. C3 is the regulator adjustment screw. The entrance of the barrel has an O-ring seal on its face to seal to part C1. I was quite surprised at the amount of factory oil that is in this area.



- Action Block Back:

This portion of the action contain the pellet probe linkages, the magazine indexing and hammer mechanisms





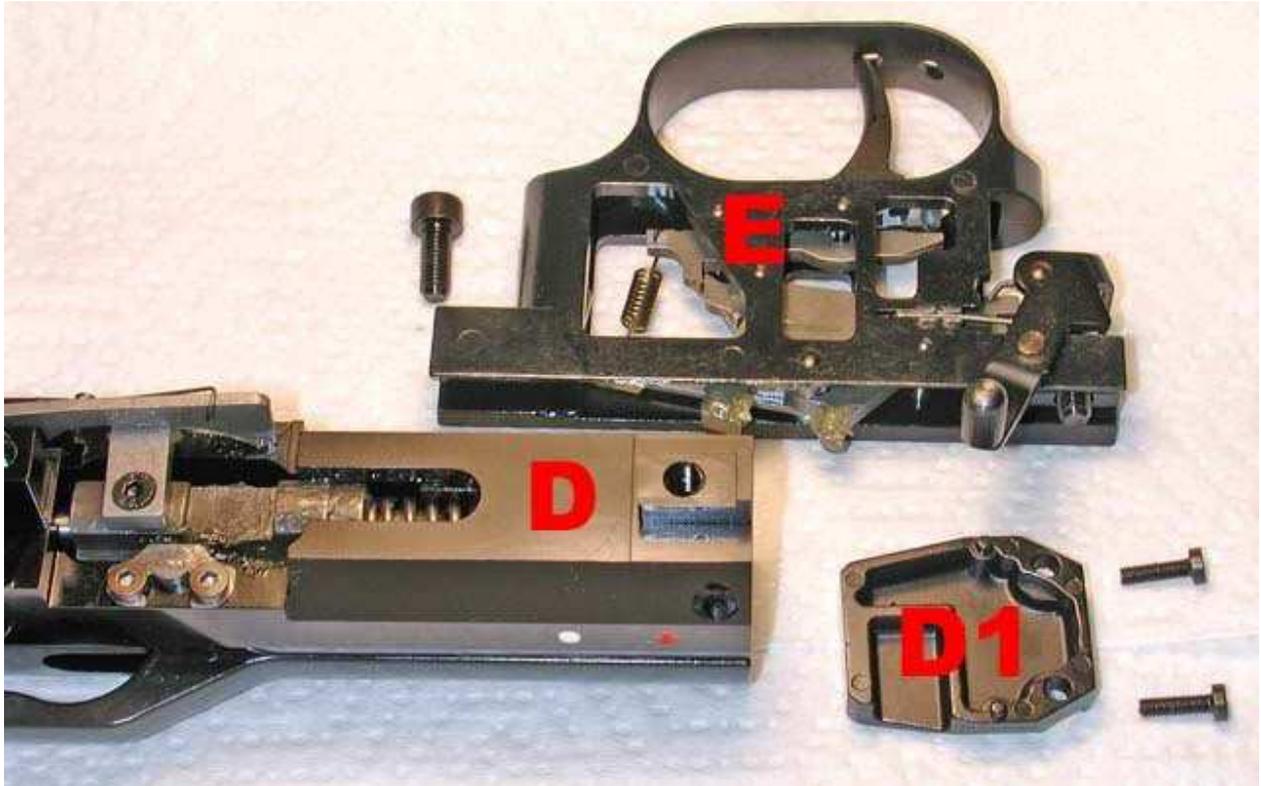
At a glance, the HW100 pellet probe D3 look similar to the one in the QB with a hollow center and a hole on the on the side. The side hole is directly above the port.

On closer examination, the HW100 probe is a lot slimmer and the probe tip have very thin wall and nicely chamfered; which should make it one of the most efficient probe designs.

The probe does not have a O-ring seal like many other air guns. The probe sealing O-ring is inside the breech instead.

The design of the hammer D4 is very ingenious. It goes through the center of the pellet magazine, which allow the HW100 to have a short distance between the axis of the barrel and the valve and yet still have the magazine tuck inside the action. Other guns without this design would either have the magazine protrude out like a growth and limit scope mounting options or have an inefficiently long port from the valve to the breech.

The the tip of the hammer is stepped to fix the amount of valve opening. One drawback of the hammer through the magazine is the small area of the hammer stop. Do not dry fire the HW100. Otherwise, without air pressure to slow down the hammer, it will easily peen the breech C1 where it makes contact.



The end cap D1 covers the access to the mechanisms inside the action block back. It is held in place by two small hex bolts.

Here is the action block back D, with the trigger assembly E removed. Two hex bolts hold the trigger assembly.



With the end cap removed and the cocking lever pulled back, you can see the shuttle D2. At the center of shuttle is a hammer tension adjustment screw. The shuttle compressed the hammer spring on the forward stroke of the cocking lever, much like a QB. IMHO a much safer system than rear cocking and loading of the hammer spring. Do not attempt to turn the adjustment screw inside the action or you will for sure damage something. The screw is locked in place with a small grub screw and some semi-permanent Loctite. To make any adjustment, you must first remove the shuttle D2 from the action. This is done by taping out the cocking lever hinge pin with a punch.



Access to the hinge pin is limited. A slim straight and a curved punch is needed. Carefully Tap the pin out from the bottom just enough to remove the cocking lever.

The shuttle D2 can now be taken out. Remove the grub screw. Place the shuttle in a strong vice with aluminum jaws, use a long hex key to ease out the adjustment screw. The shuttle D2 can now be taken out. Remove the grub screw. Place the shuttle in a strong vice with aluminum jaws, use a long hex key to ease out the adjustment screw.



Clean off the Loctite on the adjustment screw. If you are keen, polish off the sharp edges of the shuttle and smooth out the hammer spring ends.

Reverse the procedure for reassembly.

To make a secure and yet easily adjustable screw, put a very thin smear of hot melt glue spot on the threads and replace. Leave the grub screw off.

**O-Rings List:**

O-ring HW 100, 37.1 x 1.6 cylinder clamp 2682C  
O-ring HW 100, 15.6 x 2.5 barrel camp 2682B  
O-ring HW 100, 32 x 2 magazine 2603A\*  
O-ring HW 100, 13 x 2 adaptor A 2704  
O-ring HW 100, 2.57 x 1.78 adaptor B 2703B

**O-ring HW 100, 3 x 1.5 valve stem 2655D**

O-ring HW 100, 12 x 1.2 breech plug (12 x 1) recommended 2658  
O-ring HW 100, 5.5 x 1 breech seal .22 2659A\*  
O-ring HW 100, 4.5 x 1 breech seal .177 2659A\*  
O-ring HW 100, 4 x 1.5 probe 2618A\*  
O-ring HW 100, 2.57 x 1.78 inlet valve A 2665D  
O-ring HW 100, 7 x 1.5 inlet valve B 2666  
O-ring HW 100, 7 x 1.5 regulator piston 2668  
O-ring HW 100, 10 x 1.5 tension adjuster 2672  
O-ring HW 100, 8 x 1.5 barrel 2679  
O-ring HW 100, 2 x 2 regulator valve N/A

## Services

HW100. Great rifle, lots of little niggles, easily fixed IME

I'm going to assume you have seen the various stripdown guides on the web and are fairly competent at dismantling your rifle, so let's dive straight in:-

### **The main culprit:**

The breech block is sealed with a large 12x1.2 O-ring. For some reason HW have opted for a *crush installation*. The O-ring is pinched between breech block and action acting like a gasket seal. However, this prevents the two parts from mating properly and also allows some movement, perhaps only a couple of thou but it's enough to cause problems, i.e. loose barrels (made worse by excess oil) sticking magazines and slow leaks. The O-ring is effectively destroyed upon assembly. Hans Weihrauch IIRC made a comment regarding an O-ring that always needs replacing during a stripdown, he didn't say which, but it's this one. Simply replacing this O-ring with a 12x1 and degreasing front half of action including barrel and grubscrew (there's a lot of oil in this area) along with careful reassembly and you'll never suffer any of these issues again.

Here's a pic of the damaged factory O-ring



(IMG:<http://i226.photobucket.com/albums/dd98/pdaleykid/HW1001.jpg>)

With the valve cap/breech block removed it's worthwhile making a quick inspection of the following:-

1. Check valve seat for damage. Any scratches can be removed by catching a wad of Scotchbrite (grey/fine) or 000-0000 steel wool in the chuck of a twist drill and applying with *light pressure* to the valve seat. Valve can also be cleaned by catching stem in drill and applying wad of abrasive by hand. Be very gentle and try not to change the angle of beveled edge/sealing face. Only perform this operation if the valve has scratches or debris embedded in its surface. Clean with paper towel, lint free cloth or use a blast of air from your tank.

2. Valve return spring has closed and ground ends which can be quite rough. If you like you can polish with 1200 grit wet/dry

Make sure all above components are absolutely clean and dry before replacing.

3. Inside the breech block are two O-rings which seal the valve stem and pellet probe/bolt. These will only leak during firing cycle and are not responsible for any slow leaks or loss of pressure.(sizes listed below) A good tip for fitting the probe O-ring is to push a cleaning pellet up to the groove and manoeuver the O-ring into place from opposite side.

The new main seal 12x1 sits nicely in its groove and deforms under air pressure to seal, as an O-ring should.



(IMG: <http://i226.photobucket.com/albums/dd98/pdaleykid/HW1002.jpg>)

Ensure securing bolts are free of any excess oil and clean threads with a brass brush, the Breech block can now be properly secured and the main seal O-ring can even be reused should you strip the rifle in future. Clean all oil from barrel, barrel channel and grub screw,. Make sure grubscrew is dry and threads are clean. The barrel can now be secured against the breech block - use short end of allen key to finger tighten - barrel will not loosen until you want it to. Do not use too much force when fitting silencer, it seems the loose barrel issue worsened with the introduction of the screwcut MKII and heavy handedness when fitting silencer is

partly responsible. (Note: there is a trade off here, having barrel and various securing bolts dry increases risk of corrosion. An occasional visual inspection is recommended)

### **Inconsistent power:**

The heavy grease HW use on the hammer doesn't help RE: varying power. Consider that most PCP's run with a dry hammer. This grease is dissipated through use, may be thinned if a lighter oil is introduced or changes in temperature can affect its viscosity. All affect the force with which the hammer strikes the firing valve. Degrease and lube the hammer and shuttle with a thin oil as it's steel on alloy. I'd also recommend cleaning up both to remove rough edges. Chuck up the hammer/shuttle in hand drill and give it a quick spin applying *light pressure* with 1200grit wet/dry. The hammer has a single circular bearing surface just in front of the rear spring guide/pip. You don't need to mirror polish either part.

Onto the main valve; removed from the action with a deep 10mm socket, this valve consists of five components. Two threaded brass parts that make up the valve body and inside, a 4mm ball bearing (regulating valve) a spring and an O-ring. This O-ring is used to seal the two halves of the valve body. This O-ring doesn't appear on any parts diagrams/lists, size is 2x2. IMO this is too large c/s and is pinched between the two halves of reg valve body reducing ID further. This reduced ID can interfere with the consistent seating of BB reg valve. Simply replace with a 2.57x1.78 (#005) Ensure BB is free from debris and grease/moisture from fingers. The O-ring is probably best fitted dry. The valve only needs to be re-assembled finger tight and just nipped up when replacing in the action.

Igor Jelenski -who first suggested this mod- recommends trying a 3mm BB and a stronger spring. If you'd like to experiment with this I would also suggest sleeving the spring retaining portion of main valve with some 1/2mm PTFE sheet to keep BB centralized.

The reg piston O-ring over time will take a compression set, as this is a dynamic seal this will result in leaks and erratic performance. Simple to replace, size is 7x1.5 same as main valve outlet.

### **Fine tuning:**

You can make your own reg output tester quite easily using 1/8 BSPP female - 6x1 male tapered adapter. My gauge is from MDE and is 1/8 BSPP back entry. Male thread on adapter is self sealing (if this isn't the case use some PTFE tape on threads) Drop an O-ring 5.28 x 1.78 (#009) into adapter before fitting gauge, it should seal finger tight . Adapter is available from "thenippleshop" :lol: Clean before using.



(IMG:<http://i226.photobucket.com/albums/dd98/pdaleykid/HW1003.jpg>)

To use pressure tester you'll need to remove BB from test port under grubscrew. If stuck it can be pushed through from inside with a small allen key (remove reg valve and piston to access and be careful not to scratch action)



(IMG: <http://i226.photobucket.com/albums/dd98/pdaleykid/HW1004.jpg>)

Belleville washers that control reg output can be quite dirty and may benefit from a clean and *very light* lube, just wet between fingers with a light oil. Stack as follows (())(())(())(())

The factory setting for the regulator output is approx 90BAR. A slightly higher output pressure coupled with less hammer spring tension can increase shot count (lot's of testing and patience required here) as valve duration is reduced as are the effects of hammer bounce. The increase is subtle and each gun is different, barrel length and calibre also have to be taken into account, but

off reg velocity spikes can be avoided. Otherwise just stick to 90BAR. If you don't have a pressure tester make a note of reg spring tension adjuster position before dismantling. Mark 12 o'clock position on the screw (Tippex or WHY) and count the turns to remove. Alternately, measure depth of adjuster screw relative to action. On my rifle 90BAR is 2.82mm



(IMG: <http://i226.photobucket.com/albums/dd98/pdaleykid/HW1005.jpg>)

**Finally:**

It's worth noting if your gun loses pressure when stored and you're unsure of the source of the air loss, all slow leaks on the action can be fixed with 5 O-rings in just 3 sizes.

12x1 Breech block (once fitted it's unlikely this will leak again)  
7x1.5 Reg piston and main valve outlet  
2.57x1.78 (#005) main valve inlet and internal

Use pure Silicone grease on all O-rings except Main valve internal

Tip: When removing old O-rings push a pin into the O-ring itself or use a new razor blade and be careful, don't try and dig under the seal as you may scratch the sealing surfaces.

Here's the full list of factory O-rings and the two recommended alternatives (bolded)

O-ring HW 100, 37.1 x 1.6 Cylinder clamp 2682C  
O-ring HW 100, 15.6 x 2.5 Barrel clamp 2682B  
O-ring HW 100, 32 x 2 Magazine 2603A\*  
O-ring HW 100, 13 x 2 Adaptor A 2704  
O-ring HW 100, 2.57 x 1.78 Adaptor B 2703B

O-ring HW 100, 3 x 1.5 Valve stem 2655D  
O-ring HW 100, 12 x 1.2 Breech block main (**12 x 1**)  
**recommended** 2658  
O-ring HW 100, 5.5 x 1 Breech/probe seal .22 2659A\*  
O-ring HW 100, 4.5 x 1 Breech/probe seal .177 2659A\*  
O-ring HW 100, 4 x 1.5 Probe buffer 2618A\*  
O-ring HW 100, 2.57 x 1.78 Main valve inlet 2665D  
O-ring HW 100, 7 x 1.5 Main valve outlet 2666  
O-ring HW 100, 2 x 2 Main valve internal (**2.57 x 1.78**)  
**recommended** N/A

O-ring HW 100, 7 x 1.5 Regulator piston 2668

O-ring HW 100, 10 x 1.5 Tension adjuster (sometimes omitted)  
2672

O-ring HW 100, 8 x 1.5 Barrel 2679

FX/V-Mach Probe, 5.28x1.78 PUR70

Don't waste money on others "seal kits" Source them yourself.  
(Or contact "nemo1966") You can buy a lifetimes supply for £10 -  
£15 and in the right sizes 8) Try your local hydraulics shop for the  
common imperial sizes #005 + #009 or look online. Be aware,  
there is nothing to be gained from using harder O-rings than the  
std 70shore, in fact if O-rings are too hard they may not deform  
sufficiently to seal.