MORINI CM22M RF (almost all applies to the CM22M)

The **factory-supplied manual** is fairly skimpy (like most!), so here are my experiences and some advice of matters beyond the manual.

A document in progress

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Updated, 25 Nov 2012

Additions, errata, amendments…

Broken Ejector	Sept 2012
Step-by-step Trigger Adjustment	Oct 2012
Recoil Buffer	Nov 2012

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The trigger assembly – I have not been that brave: **yet**!

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CLEANING, MAINTENANCE AND ADJUSTMENTS

Before firing a shot in your new acquisition

When acquiring any pistol, the first steps involve becoming familiar with the pistol: i.e. read the manual, learn how to **field-strip** the pistol for basic cleaning, **clean the pistol** and **clean the magazines**. **Pay particular attention to the chamber and bore**.

Check for any damage and that all the parts and accessories are included.

Things to check BEFORE you fire the first shot!

1. The barrel is **clear of any obstructions or gunk.** Even with specialist-built equipment (including target-quality firearms such as the CM22M RF) there can be traces of manufacturing crud remaining at delivery: all this before you are tempted to get to the range to try your new acquisition!
2. **The trigger adjustments**. There should be:
    a. First stage travel
    b. At least some after travel after the hammer has bean released
    c. The first stage weight should be in the range of 300 to 500g
    d. The total trigger weight should be in the range of 1050 to 1100g
    e. The minimum second stage weight (= total trigger pull less the first stage weight) should be 500g: 600g to start with is better.
3. The various adjustment lock screws are tight – do not over tighten those little screws, but they should be doing their job!
4. The three screws that hold the barrel weight rail to the barrel can come loose: a bit of 'easy disassembly' liquid such as Loctite #222 will prevent this.

Before firing a shot (any session)

Over and above the obvious range safety rules, **always** check that the barrel is clean and clear of any obstructions; I run a .22 boresnake through the barrel during Preparation Time.

Service Schedule

Based on experience with my CM22M RF (and other semi-automatic pistols), I would recommend:

Every	Action
Firing session	**Before** – check bore for any crud, fluff, or obstruction; check exterior for any loose parts
	After – clean bore and wipe exterior with oily rag
Stage	**After** • Brush breech face and 'bolt' face • Clean bore
Day's shooting	• Field strip • Clean all exposed surfaces on the units • Lubricate units and reassemble
1000 rounds	• Soak slide unit in petroleum solvent, blow dry and lubricate

5000 rounds	**1000 rounds service, plus** • Soak trigger/frame unit in petroleum solvent, blow dry and lubricate • Disassemble, clean and lubricate magazines
10000 rounds	**5000 rounds service, plus** • Disassemble main spring and recoil buffer • Soak parts in petroleum solvent, blow dry and lubricate • Replace rubber buffer part
20000 rounds	**10000 rounds service, plus** • Complete strip down, clean, lubricate and reassemble • Replace main recoil spring

Note that the type of ammunition you are using will dramatically alter the amount of build-up of bullet lube and crud. In common with most semi-automatic pistols, the CM22M trigger workings are fairly exposed to crud from firing the pistol and your cleaning cycle for this area may need to be more frequent.

Notes on disassembly

Resist the temptation!
Resist the temptation to take **everything** apart:

- There is a good chance that you will 'muck up' some of the adjustments without being aware of doing so, and it can take a LOT of fiddling to find out which bits are out of adjustment…
- You are bound to lose some of the small parts – it is probably some obscure extension of Murphy's Law
- I hate removing (and reinstalling) drift pins – if I can avoid doing so, I avoid it

Only disassemble as many bits as you **ABSOLUTELY** have to!

I will add the directions of drift pins **WHEN** I find out, the hard way…
…until then, I do not want to know! (David Moore tells me that the horizontal pins come out to the left)

Learn the field strip/reassemble procedure
The **field strip procedure** is simple for the CM22s: basically only one screw to be removed.

About bore brushes

1. Keep your bore brushes clean (I love my **ultrasonic cleaners**).
2. Never use a bronze brush if a bristle brush will do the job:
    a. If you routinely clean the bore after every session on the range, bristle brushes will do the job.
    b. Be aware that misapplication of bronze brushes will mark exterior finishes (blueing, anodising).
    c. If you are getting leading in the bore with .22LR ammunition there is something seriously wrong with the ammunition or the bore.
    d. To remove leading use a quality bore solvent instead. Be aware that some bore solvents can damage blueing or anodising – **follow the instructions** and be careful.
3. Never use a stainless steel brush – there are better and less damaging ways to get lead out of the bore.

Cleaning and maintenance – without field strip

Note: Sometimes (e.g. between stages) a quick clean of the bore, chamber and/or breech and bolt faces is a good idea – particularly if you are using waxy or greasy ammunition.

Provided you started with a clean pistol, It is usually not necessary to field strip the pistol for quick clean-out between stages.

The next three items are in this category.

Cleaning the bore – without field strip
To clean the chamber and bore without field stripping the pistol, I use a .22 calibre bore-snake – quick, easy and cleaning the barrel can be carried out with the pistol pointed downrange.
See also **about bore brushes**

Never[1] clean the bore from the muzzle end!

Cleaning the chamber – without field strip
To clean the chamber without field stripping the pistol, use a .22 calibre bristle brush with the end that would normally attach to the cleaning rod bent at 90° - hint: a bristle brush with a long screw-piece is easier to hold.

Cleaning the breech and bolt faces – without field strip

- A small toothbrush works well – the firmer the bristles the better.
- Pay particular attention to the feed ramp at the underside of the top of the upper. If you are using greasy/waxy ammunition, the feed ramp seems ti be the area that accumulates the most crud.

[1] "…Never…" as in **never**, ever - Two of the most critical parts of accuracy are the muzzle of the barrel and the rear of the projectile: cleaning the barrel from the muzzle-end can **easily** result in damage to the crowning of the muzzle.

Cleaning and maintenance

Basic field-strip

Materials:

- Torx wrench – supplied with pistol: or a T20 wrench
- Large Allen key – supplied with pistol (if you really want to remove the grip)

Procedure – from the manual with my notes added:

7.1 Unload the weapon (sic) *as 1.1 and 1.2 above.*

1. Ensure the magazine is removed
2. **Double-check that pistol is unloaded** – you can leave the chamber plug in if you want
3. Not mentioned in the manual:
    - remove any barrel weights from the pistol (they get in the way), and
    - cock the pistol

7.2 Loosen the torx® screw at the front of the trigger guard and dismount the top slide from the main frame.

4. In fact, **remove** the torx screw.
   The big end of the supplied torx key fits screw
   If you have a quality T20 torx insert and handle, use this rather than the supplied torx key

7.3 Ease the action rearward then push down and slide forward again.

5. This releases the 'upper' from the frame

7.4 Undo the grip retaining allen screw and remove both.

This step not required for basic strip and clean: the upper can be removed without removing the grip.

6. Pull slide to rear and lower slightly
7. Ease slide forward to remove from upper, and
8. gently lower hammer
9. **DO NOT OVERTIGHTEN THE MAIN GRIP SCREW!** I did, and it cracked the grip timber!

1 remove magazine and dry-fire plug	2 Double check that pistol is unloaded	3 Remove barrel weights (makes life easier – you will have to anyway) and cock pistol
4 Remove Torx screw	5 Release the upper from the frame, then let slide forward	0 Pull slide to rear and lower **slightly** to clear bottom of upper assembly
7 Ease slide forward and remove	Voila - field stripped!	

See also **Reassembly from field strip**

Cleaning – general

1. The Morini CM22M RF and CM22M variants are much easier to clean and maintain than some of the other top-of-the-line ISSF target pistols.
2. **Cleaning and maintenance – without field strip** is recommended between RFP stages: this is not peculiar to the CM22 variants, it is good practice whichever brand/type of pistol and ammunition you use.
3. **ALWAYS** wipe over the exterior surfaces with an oily (your preferred brand of general gun oil) cloth after every session – including taking the pistol out of the security cabinet just to look at it. Avoid getting gun oil on the wooden grip.

Materials:

- Bristle bore brush
- Bronze bore brush: only use if absolutely necessary
- Petroleum-based solvent (e.g. white spirit/shellite) to clean parts
- Bore solvent: if needed, to soften up deposits in the chamber
- 'Easy disassembly' liquid such as Loctite #222
- 'Normal disassembly' liquid such as Loctite #243
- Tooth brush: 'small' children's size works best
- Brass or bronze pick: easily made from a piece of brazing rod
- Allen keys
- Torx key
- Small torque wrench (otional)
- Ultrasonic cleaning bath (optional)
- Compressed air (optional)

Procedure:

- **Double-check that pistol is unloaded**
- Ensure the magazine is removed
- **Field strip**

1. Inspect
    - Anything loose?
    - Anything showing excessive wear marks?
2. Pay particular attention cleaning of:
    - The top feed ramp
        - a dry tooth brush works well without damaging anything
        - with 'waxy' ammunition, the ramp **WILL** gather a build-up of crud quickly
    - Breech face, AND the slot where the extractor fits
        - use plastic brass or bronze pick to clean out recesses/corners, then
        - a dry tooth brush works well without damaging anything
    - Bolt face
        - a dry tooth brush works well without damaging anything
        - check that the hole for the firing pin is clean and so that detritus is not pushed into this are
    - The area around the extractor
    - All areas inside and exterior of slide

- **Reassemble**
- Replace barrel weights (if used).
- Wipe over all exterior surfaces and magazines with gun oil, then wipe off any excess leaving the surfaces 'oily dry'.
- Store in a dry, **secure place**.

Pics coming – 5.5cm	Pics coming	Pics coming
Pics coming	Pics coming	Pics coming
Pics coming	Pics coming	Pics coming

See also **lubrication – basic**

More to be added

Removing leading in the chamber/bore
This is a topic that almost deserves its own book!
Too many barrels have been ruined by incorrect techniques and materials when removing lead deposits from chambers and bores: **DON'T ADD YOUR BARREL TO THE LIST!**

Leading in the bore and/or chamber of a well maintained .22 rimfire target firearm should not occur. **If** you are using target quality pistol ammunition in your CM22M **and getting leading** there is something wrong somewhere.

STEP 1

Resist the temptation to use any procedure and/or materials that will damage the barrel!
A proper and thorough cleaning will remove the (apparent!) 'leading' 99% of the time!
I.e. clean the barrel and chamber thoroughly using normal, non-damaging procedures and bore cleaning solvents.

STEP 2

If, after Step 1 has been carried out there is still leading, try a quality commercial special-purpose lead removing solvent[2]:

1. Field strip the upper from the pistol (the solvents may well damage the finish on any alu parts of the frame)
2. Read the instructions thoroughly
3. Follow the instructions thoroughly

Resist the temptation to use any 'home brew' mixture: some that I have heard of will damage the barrel, some are highly toxic, and one is explosive!

STEP 3

If there is still leading, repeat step 2

STEP 4

Thoroughly clean the barrel of all the lead removing solvent and lubricate the barrel inside and out.

References

- **http://www.youtube.com/watch?v=8_ud2M1gGlU&feature=player_detailpage**
- **http://www.youtube.com/watch?v=hyhKq36aZRE&feature=player_detailpage**

and some warnings

- a stainless steel bore brush **WILL** remove leading, but can all too easily damage the bore!
- Liquid mercury **WILL** remove leading**, but is very toxic**

[2] E.g. Hoppe's #9 solvent, Outer's Foaming Bore Cleaner

Reassembly from field strip

The manual simply indicates "*Reverse the procedure described in 7 above ensuring the grip retaining screw and the frame attachment screw are securely tightened*." It is almost that straight-forward…

Materials:

- Supplied torx key and large allen key
- Your favourite gun oil

To be added

Procedure:

- Cock hammer (to get it out of the way)
- Engage slide yoke against recoil spring
- Pull slide back far enough that the extractor will clear the breech face
- Raise the rear of the slide flush with the upper body
- Ease the slide fully forward
- Reinstall the upper to the frame, ensuring that the hole in the underside of the upper engages with the Upper support pin - Part# 022117
- Reinstall torx screw – do not over-tighten: I use 3nm torque
- Reinstall barrel weights if used
- Insert dry-fire plug and drop hammer
- If you have removed the grip, **DO NOT OVERTIGHTEN THE MAIN GRIP SCREW!** I did, and it cracked the grip timber!

Cock hammer	Engage slide yoke against spring	Pull back slide so that extractor is clear of breech
	Pics coming	Pics coming
Raise rear of slide	Ease slide forward	Reinstall upper to frame
Install torx screw	Reinstall barrel weights (if used)	Insert plug and drop hammer

More to be added

Comments:

To tension the main assembly torx screw (or **a** **replacement Allen screw**) that secures the upper to the frame, I use an AHG torque wrench and T20 Torx insert for a torque of 3nm. I don't know if it will make any difference but:

- It cannot hurt
- I know 'tensioning' the screws on my Anschutz rifle does make a difference to grouping

I will post results of testing various tension settings when/if I get the time to conduct some definitive machine-rest tests

Cleaning – trigger/sear/hammer

to be added

Lubrication – basic

Materials:

- to clean parts: petroleum-based solvent (e.g. white spirit/Shellite®) – do not use heating[3] kerosene!.
- for general lubrication: quality gun lubricating oil

Procedure:

- **field strip** and **clean** the pistol
- Before **reassembly**,
    - A bit of oil on the slide/upper contact surfaces
    - Clean any oil from the grip
- after **reassembly**, wipe the exterior surfaces with an oily rag

More to be added

Lubrication – advanced

Materials:

- Petroleum-based solvent: to clean parts.
- for general lubrication: quality gun lubricating oil, other than 'storage' grade oils
- sear and hammer: Molybdenum Sulphide grease (graphite free[4])

More to be added

Lubrication – selecting lubricants

Gun lubricating oil:

- any gun oil will be OK for keeping the pistol **exterior** in good condition
- for the slide/frame rubbing surfaces and the internal workings a bit more care in selecting the oil to be used is needed.
    - For those in very cold climates (not usually a problem here in Australia) an oil that does not 'gum up' at low temperatures is a consideration
    - It is OK (advisable) to use 'storage grade' lubricants for long-term storage of your pistol – but not for general use lubrication: they tend to gum up the works if used for general lubrication of a working pistol.
    - Synthetic or natural? It does not seem to make much difference, but I feel that you should use one or the other.
    - Silicon and/or PTFE oils? Again, it does not seem to make much difference, but I feel that you should use one or the other. Be aware that changing to one of these lubricants can change your trigger weight (sometimes dramatically) and you might need to slightly increase the **recoil buffer adjustment**

Sear and hammer surfaces:

- While not essential, I prefer to use Molybdenum Sulphide grease for sear and hammer surfaces – apply all over these parts and gently wipe off any excess.

Strip & clean the magazines

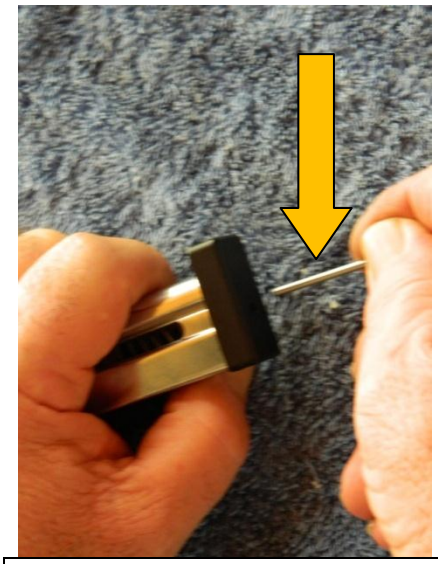
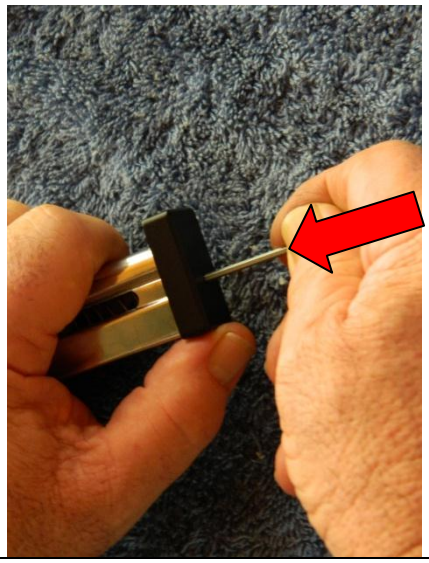
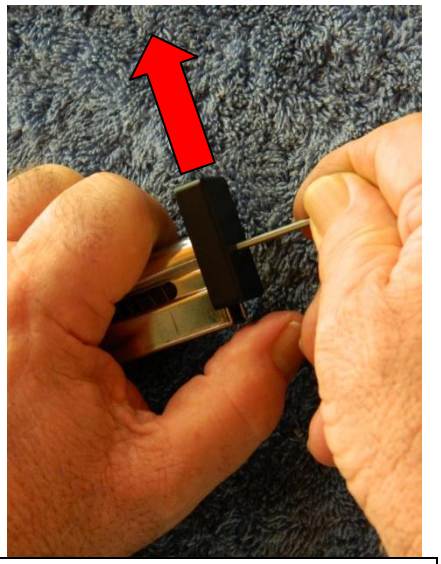
Magazines for semi-automatic pistols are notorious for collecting fluff, crud, gummy stuff, small screws, whatever… I have even found a dead beetle inside a 'problem' magazine.

1. Disassemble magazine as per the manual (and pics below):
    a. Note which way round the magazine spring (022006) goes.
    b. Note which way round the base inset (022007A) goes – otherwise it will nock lock into place. The pin projection goes down

[3] Kerosene comes in two grades: heating kerosene and (MUCH RARER) 'power' kerosene. The normal kerosene is for heating and **is abrasive** – it makes for a very good fine polishing liquid and should not be used on moving parts! 'Power' kerosene (if you can get it) is designed as a fuel for internal combustion engines and non-abrasive.

[4] Graphite-free 'moly' grease can be difficult to source, but one small tube will last you a lifetime. It is undoubtedly the best lubricant for trigger/sear/hammer areas.

2. Thoroughly wash the **metal** parts in white spirit or 2-stroke fuel, brushing out any detritus with a soft bristle brush
3. Allow the metal parts to air dry
4. Lubricating:
    a. If you washed the **metal** parts in 2-stroke fuel and allowed them to air dry, there will be sufficient oil remaining and the parts do not require further lubrication.
    b. If you washed the metal parts in white spirit or other petroleum solvent, dry it off completely and lubricate with your favourite gun oil and wipe off the excess.
5. Inspect the parts for any damage or burring
6. Reassemble the magazine, ensuring that you have the spring (022006) and base insert (022007A) the right way round.
7. Never put a magazine in your pocket (unless you really want fluff and dirt in your magazine!). There are easier ways of cleaning your pockets.

		
One of the smaller supplied allen keys is handy to depress the magazine base release Yes, those are my short, fat fingers	Insert through the hole in the base and depress the base insert with light pressure on the base to push the base to the front of the magazine body	With the base insert depressed, slide the base forward about 5mm. **DO NOT** slide the base too far forward at this time!
Pics coming (5.5cm)	Pics coming	Pics coming
Place a piece of cloth over the base area to retain the base insert and spring when the base is removed	Slide the base all the way off the magazine body	Carefully allow the base insert and spring out of the magazine body. **NOTE** which way round the magazine spring (022006) goes.
Pics coming	Pics coming	Pics coming

More to be added

The trigger assembly
I have not been that brave, **yet**!

Sights

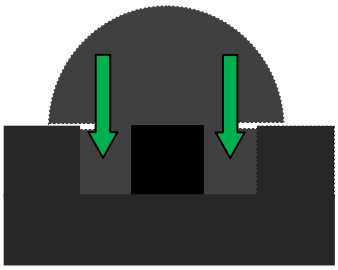
Never[5] force any sight adjustment screw!

[5] "…Never…" as in **never**, ever – target sights are the most easily damaged parts of target pistols. If a rear sight adjustment gets 'tight', have it checked and fixed by a competent pistolsmith.

The factory supplied sights give an apparent square of front sight for the supplied 4mm front blade and the notch depth of the rear sight: other blade widths are available but will not give the square front sight picture for the as-supplied notch depth.

Rear sight adjustments

Never force any sight adjustments



Notch width
The rear sight is adjustable for notch width. The adjustment is on the left of the rear sight:

- 1 click = 0.1mm
- Clockwise = narrow the notch width
- Anticlockwise = widen the notch width

If you are serious about the **RFP event**, adjust the notch to give you **<u>at least</u>** amounts of 'space' either side of the blade equal to the **apparent** width of the blade.

Elevation
1 click = xxxx on the target at 25m – screw on top of sight

- Clockwise = move group down at the target
- Anticlockwise = move group up at the target

Windage
1 click = xxxx on the target at 25m – screw marked ' L' on the right of the rear sight

- Clockwise = move group to the right (and yes, I know what it says on Pilkington's site!)
- Anticlockwise = move group to the left

Once you have set up your sights for your pistol, note <u>YOUR</u> adjustments
At some time you will need to adjust your sights after someone has changed them, or to set the pistol up for area aim or centre aim when you cannot remember which you left it at the last time you used the pistol:

- (**Gently!**) wind the sight all the way down to the base and note the number of turns, then
- (**Gently!**) wind the sight all the way to the left and note the number of turns
- Bring the sights back the number of turns to your 'zeroed' settings

Keep this noted information with the pistol so that you can get into the ballpark if someone (you?) have mucked up the sight settings.

On **<u>my</u>** CM22M RF:

- For Rapid Fire Pistol event, centre aim on the target at 25m is about 1¼ to 1½ turns up from the base position.
- The sub-6 aim I use (yours is probably different) for the precision target at 25m my setting is about 4½ - 5 turns up from my base position: this is about the upper limit on my pistol.
- the windage is

Trigger adjustment

Ex-factory, my CM22M RF came with:

- 604g first stage weight
- 1mm first stage travel
- 1050g overall trigger pull
- About 1mm over-travel

I currently find this to be excellent (for **me**) **for RFP**: however, if using this pistol exclusively for Standard Pistol I would reduce the over-travel.

Pics coming	Pics coming	Pics coming
Pics coming	Pics coming	Pics coming
Pics coming	Pics coming	Pics coming

More to be added

Step-by-step

Today (12 Oct 2012) David Moore adjusted my trigger: what follows is taken from my notes to David's procedure – screw numbers refer to the drawing on the tigger adjustments page:

A. **Check pistol is empty** and remove grip
B. Loosen off all lock screws
C. 2nd stage adjustments first
    a. Cock hammer
    b. CAREFULLY fully compress (do **NOT** over tighten) #8
    c. With the trigger depressed, back out #7 until the hammer falls
    d. Add ¼ turn to #7 (this can be up to ½ turn, but go with ¼ turn)
    e. Tighten lock screw #6
    f. Back out #8 by 6 (six) full turns
D. 1st stage adjustments next
    a. CAREFULLY adjust #5 in until there is no travel
    b. Back out #5 ¼ turn from this 'zero travel' setting
    c. Adjust #17 to ensure that the bar drops into place when the hammer is cocked. I made the mistake of thinking # adjusts the first stage travel: it doesn't and using # to try to adjust first stage travel can lead to some interesting outcomes (i.e. unreliable setting of the sear, and variable trigger pull)
E. Over-travel #1 – resist the temptation to adjust this to zero. There needs to be some gap here so that the trigger works reliably, and the manual warns to '*avoid damage to the trigger*'
F. Trigger pull
    a. First stage: #5 – do not go below 400g
    b. Second stage: #8 – total trigger pull is the first stage weight + second stage weight, changing either will alter the total trigger pull
G. Tighten all lock screws
H. Replace grip

Notes:

- The manual states that #17 adjusts trigger stop point – #17 is **NOT** the first stage slack adjustment

The Recoil Buffer

There are at least two variations in the recoil buffer. Bruce Favell tells me that the buffer supplied with his CM22M was a solid piece; mine (steel frame CM22M RF) is described below.

The unit in my CM22M RF was removed for cleaning after about 20000 rounds – and it was well gummed up. Dropping it into the ultrasonic cleaning bath turned the solvent black within a few seconds of swithing the bath on.

Removing the buffer:

- Field strip
- Drift the pin (to the left) holding the recoil spring and stop
- Remove stop and spring
- Fully back out and remove adjusting screw 022017
- Gently push the recoil buffer forward and out – I used a piece of coat hanger wire

Disassembling the buffer:

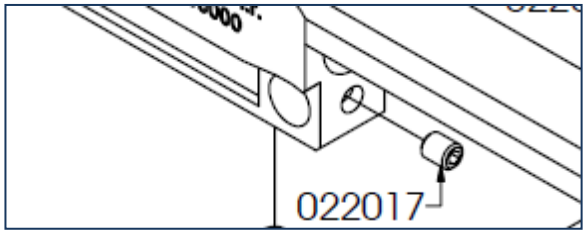
- Remove the steel cap and rubber insert
- Fully back out and remove internal adjusting screw
- Remove the front pin and spring
- Thoroughly clean

Reassembly:

- Insert front pin – bigger end poking out of the buffer body
- Insert spring
- Insert internal adjusting screw – wind in until it contacts the screw, then add three full turns
- Replace steel cap piece, rubber piece, and buffer (in that order) into the frame upper
- Replace spring and front stop
- Reinstall cross pin
- Install adjusting screw 022017

Adjusting the recoil buffer – Primary adjustment

The manual simply states *Adjust (022017) for your preferred recoil effect. Turn clockwise for higher powered ammunition*.
This decreases the length of the slide spring within the pistol.



Procedure:

1. **Field strip**
2. The smaller end of the supplied Torx key adjusts the setting – it's a T15 Torx fitting, and the supplied key is the right shape and easy to use.
3. Clockwise increases the buffering – anticlockwise decreases the buffering - **see following notes**
4. **Reassemble from field strip**

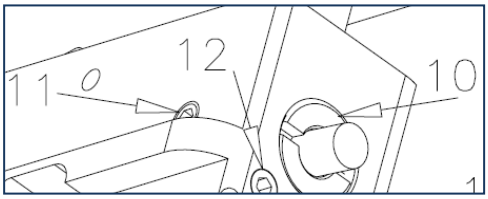
Notes:

- Increasing the buffering **too far** can interfere with the travel of the slide to the point where;
  - the slide stop cannot be engaged, and/or
  - there is insufficient slide movement to strip the first round from the magazine, and/or
  - (more subtly) there is insufficient slide movement to **reliably** strip the first round from the magazine, and/or
  - (even more subtly) there is insufficient movement of the slide to ensure reliable extraction/ejection
- Decreasing the buffering too far can lead to 'hammering' – this should be avoided as it places strain on the frame and slide.
- Drawing 22-10T shows a lock screw (*022018*) that from first perusal of the diagrams can appear to be for the recoil buffer adjustment – **it isn't**! Lock screw (*022018*) locks the barrel in the upper assembly.

Adjusting the recoil buffer – internal adjustment

There is an internal adjustment in the recoil buffer unit that all

Hammer tension spring



People sometimes 'back off' the hammer tension in the **mistaken** idea that this would improve the trigger let-off (it won't, and has questionable 'advantage' even for a double-action revolver – which the CM22M RF is not). It is not worth the risk of malfunctions due to light hammer/firing pin strike - the firing pin indentation on a fired[6] case should be clear and rectangular.

Loosen (11) and turn (10/022101) clockwise to increase the hammer strike energy. Retighten (11).

Notes

If you **have** to 'fiddle' with the hammer tension spring:

- uncock the hammer first, otherwise the hammer strut gets in the way of the screwdriver blade
- if you remove the lock screw *(11)*, ensure;
    - you do not loose the washer underneath the lock screw
    - always replace the washer
- after adjustment do not over-tighten the lock screw
- The 'hardness' of .22LR casing brass varies from manufacturer to manufacturer, particularly when comparing target pistol ammunition with rifle (target or hunting) ammunition; rifles typically have a higher firing pin energy than target pistols and manufacturers allow for this.

More to be added

Grip rake adjustment

Fiddly, but then most adjustable grips are – once set up for a shooter it would be unusual to change it.

- If adjusting to increase the rake, check that you do not bring the rear of the grip such that it above the bore centreline.
- **DO NOT OVERTIGHTEN THE MAIN GRIP SCREW!** I did, and it cracked the grip timber!

More to be added

[6] There is some plastic flow of the case around the firing pin when a round is fired: the firing pin's indentation often will not be quite (but almost) as deep on a case that has not been discharged (a malfunction, using a previously fired case or a primed case that has had the projectile removed).

Charging magazines

Ensuring the rounds are properly positioned in the magazine

Due to those indents for the rim of the round second down in the magazine, charging a CM22 magazine can be fiddly at first:

a. **Look** at the magazine to **check** for any foreign objects, lint, crud, etc.

b. Do not use your thumbnail to push down on a follower button (the button will win eventually), instead grip the follower buttons between the thumb and forefinger of the left hand (right for lefties), or use the supplied depressor. If you use the thumb/forefinger method and shoot the Morini a lot you will develop a small callous on the thumb that many of us call 'Morini finger'.

c. It is comparatively easy to get the rim of a round behind the rim of the round below it – this will normally only affect the top two rounds. When inserting a round into the magazine:

- Make sure that you push the round all the way to the back of the magazine,
- Do not depress the follower too far for each round, and
- It helps if you tilt the magazine backwards.

d. Repeat a/ and c/ for the next round/s.

e. Check that the rounds in the magazine are to the back.

f. When you have the required number of rounds in the magazine, tap the back of the magazine on the bench top a few times.

g. Check that the top round is free to be raised up a bit (add pic) – if it is not, it almost certainly has the rim of the second round in front (see item b)

h. Check that the second round from the top is fully back (add pic) – if it is not, it almost certainly has the rim in front of the top round (see item c, above)

Pics coming	Pics coming	Pics coming
Pics coming	Pics coming	Pics coming
Pics coming	Pics coming	Pics coming

Additionally:

- (applies to any magazine) check the number of rounds in the magazine. It does not happen often, but you could have missed one, or one could have popped out.
- (applies to any magazine) after you have inserted the magazine and loaded the first round, back the action open slightly and check that round is in the chamber.
- (applies to any magazine) after completing a/ to g/, check that the action is fully closed.

Comments

1. I find the 6-shot capacity of the CM22 series an advantage in a pistol for RFP training. Set up the targets for RF Stage of CF/'Sport'. Using the 3-seconds face times:
    a. A series of raise-and-fire on the first target and acquire but not fire on the second target (on most range setups you can do this 6 times in a series, firing the 6th shot on the face at the end of the series), or
    b. raise-and-fire on the first two targets and acquire but not fire on the third target (you can do this three times in a series), or
    c. raise-and-fire on the first three targets and acquire but not fire on the fourth target (you can do this twice in a series).
2. Remember to remove the dry-fire plug from the breech before putting the loaded magazine into the pistol…

Ammunition

These pistols are **SPECIFICALLY** designed for Standard Velocity .22LR ammunition

NEVER BE TEMPTED TO USE HIGHER VELOCITY / HUNTING .22LR AMMUNITION IN THESE PISTOLS

The impressive test group supplied with my pistol has the simple note 'lapua':

- I would like more information, i.e. which type of Lapua .22LR
- Undoubtedly this group was obtained with the barrel clamped in a machine rest – the test groups I have obtained are with the pistol mounted in a Ransom Rest with a grip blank supplied by Barry C
- When selecting ammunition:
  - **RELIABILITY** is the **prime** consideration – for ISSF 25m events, if it don't go 'bang' every time you operate the trigger the malfunction rules are crippling
  - For RFP the ammunition must meet the ≥250m/s **requirement** – all of the brands I have tested **so far** have met this requirement in **my** pistol
  - For RFP the ammunition must meet the ≥39 grains (2.53g) minimum projectile weight – target quality .22LR ammunition seems to consistently meet this requirement. If you have any accurate experience of a target quality .22LR ammunition not meeting the projectile weight requirement, let me know.
  - **ONLY WHEN** the reliability, velocity and projectile weight requirements are met, **then** **accuracy** is the next consideration:
    - Nothing beats testing of the particular brand/type in **your** pistol
    - Use 10-shot groups from a machine rest as your starting point – weed out the inaccurate brands/types. Beg or borrow from other in the club…
    - Next, put 100 rounds of the selected brands/types through a machine rest, looking for 'flyers'. Flyers are bad news: they can blow an otherwise good score and (worse?) make you doubt your abilities. If you get one or two flyers in a 100-rounds test, chances are you will get at least one in a 70 (60+10)-shot competition.
    - Make your decision on your criteria: balancing availability, cost and your personal level-of-accuracy desires – yes, it's a balancing act! If you are only going through 1000 rounds a year, cost is not so important; but if you are going through 10000+ rounds a year of unsubsidised ammunition just for RFP cost starts to be a factor,
    - Do not assume that pricier ammunition is always better – see the table below.

Velocity considerations

ISSF Rapid Fire Pistol requires a minimum velocity of 250m/sec (820.2 ft/sec) as tested in the particular pistol.
While individual ammunition batches and barrels will vary a bit, chronographing in **MY** pistol has given:

	Muzzle ft/sec		10-shot tests @ 25m		
brand	**min**	**max**	**< 50mm**	**< 25mm**	**comments**
CCI SV LRN	**909.8**	**963.3**	yes	Yes	
Federal Champion 714	**983.0**	**1042**	yes	No	No longer produced, stocks running out in AUS
Fiocchi 22CRN	**951.2**	**1006**	yes	Yes	
Fiocchi 320 Match	**907.7**	**977.6**		No	
Geco 22 LR Pistol (green)	**909.8**	**946.7**	yes	Yes	Tightest groups
PMC Match Pistol	**911.5**	**958.5**	yes	Yes	No longer available (unfortunately)
SK Pistol Match	**939.6**	**989.2**	yes	Yes	
SK Pistol Match Special	**995.3**	**1028**	yes	No	
SK Standard Plus	**936.4**	**971.2**	yes	Yes	
MAGTECH SV LRN	**919.6**	**953.1**	yes	No	Don't laugh: it grouped better than many specialist brands!
ELEY TENEX PISTOL /1056	**889.1**	**948.2**	No	No	Disappointing in my CM22M RF – definitely not worth the BIG money*
ELEY TENEX PISTOL /1062	**846.3**	**943.9**	No	No	Disappointing in my CM22M RF – definitely not worth the BIG money*
Also tested for grouping					
R100			Yes	Yes	Far too 'hot' with excessive muzzle flash**
R50			Yes	Yes	Far too 'hot' with excessive muzzle flash**

*In all fairness, the ELEY TENEX PISTOL is not designed for 25m pistols; but the velocity variations and por grouping were not expected

** In all fairness, R50 and R100 are not designed for 25m pistols; but the group sizes were impressive

Selection of brand/type

- The CM22M RF should take any brand/type of target quality, standard velocity.22LR.

  Note 1: **target quality** .22LR.

  This does not preclude the use of other than the most expensive ammunition, but there can be a big difference in quality control between 'bargain basement' ammunition and the better brand/types of .22LR.

  If CCI 22LRN, Federal 514 or Fiocchi 22CRN (taken as examples of low-end target ammunition) work for you and if they deliver acceptable accuracy in your CM22M RF, use them.

  Note 2: **standard** velocity .22LR.

NEVER BE TEMPTED TO USE HIGHER VELOCITY / HUNTING .22LR AMMUNITION IN THESE PISTOLS

- What is 'accurate enough' for RFP?

  As a rule-of-thumb I would suggest that **for RFP** any pistol/ammunition combination that **consistently** groups at, or better than, the inner-10 (i.e. 50mm) is acceptable. Tighter groups are better and achievable, but realistically for most of us ≤50mm far outstrips the shooter's ability. I have found that most of the brands/types of ammunition I have tested in a machine rest easily meet this requirement.

  If after testing a number of brands/types of target quality ammunition of you cannot get any brand/types of quality standard velocity ammunition to give you ≤25mm groups, get a competent pistolsmith to check your pistol, particularly the muzzle crowning, and on all CM22M variants the upper/frame fit.

  Note 3: I use the word 'consistently' above: i.e. not a one-off five-shot group ≤50mm, but all 70 shots you will fire in a competition.

- What is 'accurate enough' for Standard Pistol?

  The same inner-10 premise applies **to Standard Pistol** – the difference being that the inner-10 of the precision target is 25mm. Again, 'consistently' means the shot group is ≤25mm for all shots in a competition. I have found that:

  - Several brands/types of ammunition I have tested in a machine rest meet this requirement.
  - Price is not necessarily a guide to group size

- What is 'reliable enough'?

  In competition terms, if in a well maintained pistol you are averaging worse than one round that malfunctions per 1000 fired (1:1000) there is something that needs to be remedied!

  I would argue that a well maintained pistol, a pistol/ammunition combination that delivers:

  - Better than 1:5000 is acceptable (nothing is perfect)
  - Worse than 1:1000 indicates a problem with pistol and/or ammunition – fix pistol and/or change to reliable ammunition. See also **Light hammer strike**
  - Worse than 1:500, check the ammunition in known reliable pistols:
    - If it is the ammunition, send it back to the retailer for a refund (and don't take "no" for an answer – we have sale of goods Acts in Australia!)
    - If it is the pistol, get it fixed

- Velocity?

  While you have to meet the 250m/s minimum for **RFP**, perceived recoil can be quite subjective: i.e. some of the lower velocity ammunition brand/types can 'feel' much heavier and sharper than some with a higher velocity.

  It **will** be partially subjective.

Suggested spares/tools

Spares – highly recommended:

- Firing pin - not that the CM22M series is prone to firing pin failure, merely that for any pistol this is **THE** essential spare part
- Ejector – there appears to have been a batch of badly heat-treated ejectors produced for the CM22M series. One shooter I know is on her third ejector. See also **Broken Ejector**
- The main take-down torx screw – lose this and the pistol is useless until you can replace it.

Less essential:

- Extractor – if for no other reason than it is comparatively inexpensive and 'nice to have'.
- Hammer Spring – David Moore tells me that he has experienced some loss of spring tension in his CM22M: this after some years and many 1000s of rounds
- I will add to this list as/if necessary…

Tools;

- A pick for cleaning out nooks and crevices. This can be almost anything but steel – it could be:
  - Bronze (home made from a bit of brazing rod)
  - Brass (home made from a bit of brass rod)
  - Plastic (home made from a an old knitting needle)
- .22 bristle brush with 90° bend – for cleaning the chamber without stripping the pistol
- .22 bore snake (and small plastic container to store it in) – great piece of equipment, but keep it clean

Optional

- A quality 'mini' torque wrench capable of to 3nm (about 2 ¼ ft lbs) and T20 bit – use instead of the supplied torx key

Materials:

- Quality non-gumming gun oil
- Non-graphite 'moly' grease
- Petroleum solvent
- Loctite #222 or similar
- Loctite #234 or similar
- The traditional 'oily rag'
- Some lint-free cleaning cloth comes in handy

Pics coming	Pics coming	Pics coming
Morini spare parts	Pick	Brushes
Pics coming	Pics coming	Pics coming
.22 cal bore snake	Torque wrench	Gun oil
Pics coming	Pics coming	Pics coming
Solvents	Loctite or similar	Grease

Dry firing

The supplied dry-firing plug is not ambidextrous: it has a right way around, and a wrong way around… the tag comes out of the left side of the action.

Always use the dry-firing plug when dry firing!

The only exception is when the pistol is being checked for trigger pull at Equipment Control at a competition.

Special note re Equipment Control checks

Expect EC officials (quite correctly) to insist that there is **nothing** in the chamber for the trigger weight test.

Manufacturers of target pistols accept that they are expected to go through Equipment Control and have the firing pin released during the trigger weight check without ANYTHING in the chamber: the occasional 'dry fire' without the plug in the chamber for these tests should not damage the breech face of firing pin.

More to be added

TROUBLESHOOTING

The slide will not close

It is fairly easy to have one of the slide-stop buttons slightly depressed when you are releasing the slide for the first shot. This is a matter of developing a technique where you **fully** take the slide to the rear of its movement before releasing it to feed the first round into the chamber **with your fingers clear of the slide-stop buttons**.
As with any semi-automatic pistol, do **not** try to 'ease' the slide closed: take it fully to the rear of its movement and release it.

Chambering problems

Keeping the chamber clean

My CM22M RF easily digests 300+ rounds of ammunition in a session without cleaning the pistol, **provided I use only one brand of ammunition** in the session! If I change brands, the 'dirty' chamber seems to affect feeding in that the round will line up, but not go all the way into the chamber.
This has been particularly noticeable when changing from CCI 22LRN to Fiocchi 22CRN ammunition (I just happened to have a supply of these on hand): either will happily run 300+ rounds without problems, but change from the CCI to Fiocchi without cleaning the pistol…

If, for whatever reason, you change ammunition brand/type during a shooting session, at least **clean the chamber**: preferably **clean the chamber and bore**.

As a note to this (9 Apr 2011):

- Some brands/types of .22LR ammunition are very waxy or greasy. Waxy lubricant can (will?) build up in the action and chamber: greasy lubricant less so, and oily (e.g. some types of Lapua .22LR) lubricant does not seem to be much of a problem.
- My tests to date have revealed that removing the wax from CCI .22LR SV does not affect accuracy.
- Removing the excess wax from CCI .22LR SV is simply a matter of wiping/rotating each round with a bit of towelling before I insert the rounds into the magazine.

Chamber dimensions

Some earlier production runs of the CM22 pistols had fairly tight chambers. Depending on your brand of ammunition this can cause problems with feeding ammunition completely into the chamber.
This is usually fixed by a (very) light polishing of the chamber rather than the more drastic procedure of recutting the chamber – chamber polishing is a job for an expert, not for a home handyman!!!
Either way, enlarging a chamber is one-way process and should not be undertaken lightly.

Failure to feed: 1 – the round stays in the magazine and the slide jams behind the round

It is possible that you have the top round's rim **behind** the rim of the round below it: refer **Loading magazines**.

Failure to feed: 2 – the round/s is not stripped from the magazine and the slide fully closes

If the magazine is properly inserted into the frame, this will be due to one or both of the following:

- The magazine is not 'registering' properly with the frame, and/or
- The rear of the magazine lips are too close together, keeping the top of the rim of the top round in the magazine too low in the frame.

See **adjusting magazines**

Failure to feed: 3 – the round strips, but is not fully inserted into the chamber – tight chamber
The CM22M RF **should** take any brand/type of **target quality standard velocity.22LR**.

- First, see **Keeping the chamber clean**, above.
- Are you using target quality standard velocity.22LR ammunition?
- Is the ammunition clean?

See **adjusting magazines**

Failure to feed: 4 – the round strips, but is not fully inserted into the chamber – magazine lips
See **adjusting magazines**

Over-adjusted recoil buffer
Refer to **Adjusting the recoil buffer**

Adjusting magazines

The 'weakest' bit of design of the CM22M series is the material used in the magazine body: this steel is quite soft and the magazines are comparatively easily damaged if dropped.

Note of caution – if you are having 'feeding' problems, do not assume that the problem is magazine related until you have eliminated all the other suspects! See **Keeping the chamber clean** and the other **Failure to feed** reasons above.
Another note of caution -
European standards for .22LR are slightly different to SAAMI (USA) standards and sometimes ammunition to SAAMI standards are 'tight' in pistols designed for European ammunition: try a different brand and/or type of ammunition: see **chamber dimensions**.

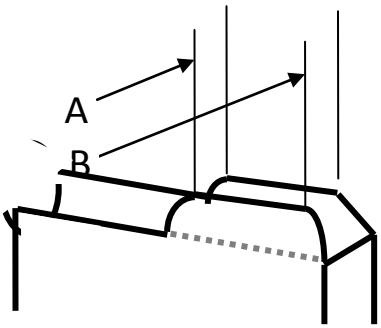
> **Example problem** – with the magazines as supplied my CM22M RF feeds .22LR CCI SV flawlessly but with .22LR Geco Green the occasional round (invariably the second in the magazine) will strip from the magazine but jam with the exposed part of the projectile in the breech but the case out of the chamber; and it is tightly jammed. On extracting the round the lead is deformed and there is a dent in the case.
> This problem only became apparent after I had lent the pistol to a visiting team when their firearms did not turn up at a competition…
> While both CCI and Geco rounds are .22LR to the manufacturing standards, they have slightly different dimensions.
> Closing in the lips of **one** of the magazines slightly cured the jamming problem with Geco ammunition, but introduced a new problem: occasionally the slide would not pick up the next round from the magazine

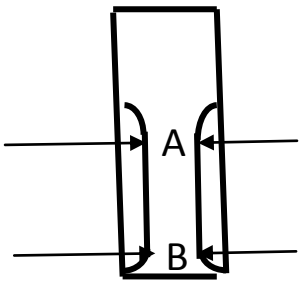
Register of magazine with the frame
I have not heard of anyone having any problems with this.

Magazine lips
To iterate – If you are having 'feeding' problems, do not assume that the problem is magazine related until you have eliminated **all** the other suspects!

Bending the lips to change the dimensions
To reiterate – If you are having 'feeding' problems, do not assume that the problem is magazine related until you have eliminated **all** the other suspects!
Four further cautions:

1. When in doubt, bring the lips to factory original separation dimensions (see table below)
2. Do not use tools with a serrated surface on the jaws as these can raise surface imperfections on the lips, and
3. A little bit at a time
4. Ensure that the lips do not direct the rounds (even slightly) sideways





As mentioned above, different brands of ammunition can have slightly different dimensions: and different enough to **sometimes** be a problem. As a guide (i.e. no guarantee implied):

Brand[7]	**Rim Diameter**	**Case Diameter**	**Dimension A** Forward lip inside separation	**Dimension B** Rear lip inside separation
Ex factory[8]			.2085" & .2185"	.1985" & .2105"
TBA				
CCI SV			.210	.210
Geco Green				

Light hammer strike

Likely causes are (in order of probability):

- The slide is not fully closed:

cause	**remedy**
Dirty pistol	**Properly clean and lubricate pistol**
Dirty chamber	**Clean chamber**
Dirty firing pin	Clean
Ammunition	Check that slide is fully closing – oversize ammunition
Plinking-grade rifle ammunition[9]	**Use target quality standard velocity PISTOL ammunition**

- Hammer spring:

cause	**remedy**
Incorrect setting of hammer spring	**Adjust it back up**
Broken or damaged hammer spring	Replace

- Firing pin:

cause	**remedy**
Broken or damaged firing pin	Replace
'Improved[10]' firing pin	Replace

Poor accuracy

Likely causes are (in order of probability):

Cause	**remedy**
Unsuitable ammunition	**1.** **Clean barrel and chamber**, then **2.** **Use suitable ammunition**
Damaged muzzle crowning	Have recrowned (by a gunsmith[11])

[7] Dimensions taken from ammunition samples I had to hand
[8] As measured on the two magazines of a mate's unaltered and near new CM22M RF
[9] Plinking-grade rifle ammunitions often use heavier/harder brass in the rim to cope with the heavy firing-pin strike of many plinking rifles
[10] Some pistolsmiths (real, or amateur) try to 'improve' the shape of the firing pin nose…
[11] While any ham-fisted amateur gunsmith can re-crown a barrel, to do the job PROPERLY requires skill and the correct tools!

Barrel leading	**Remove leading**
Loose sights	Repair (unlikely, but can happen)
Incorrect assembly of pistol	**Put it together properly**
Pin #022117	See **below**

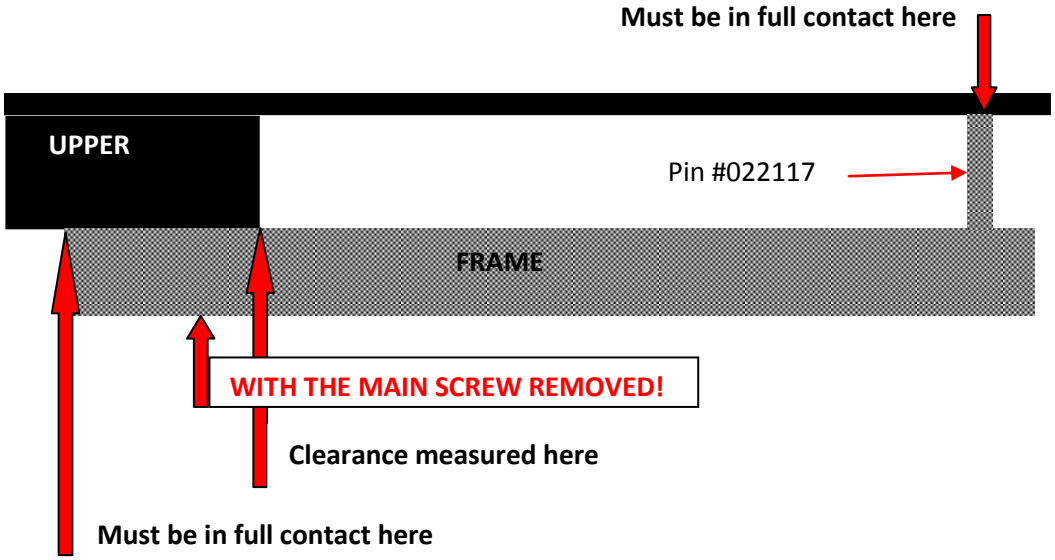
More to be added?

Upper support pin - Part# 022117

When the pistol is assembled, there should be no looseness at the rear of the upper on pin #022117 (between the upper and the frame). Any looseness here seems to affect accuracy.

Earlier versions sometimes experienced this 'problem': later production usually has this problem corrected such that there is a (very) slight interference fit – the pin length is the same, but the rear of the upper is cambered down so that there is a few thousandths of an inch (.003 to .005") as indicated below.

Cambering this part of the upper is not a task for an amateur pistolsmith!



More to be added

Extraction/ejection problems

I have not had this problem with my CM22M RF (yet?)

Cause	remedy
Case sticking in the chamber	Clean the pistol*
Broken/damaged ejector	(022091) replace
Crud under extractor claw	clean
Broken or bent extractor	(022024) replace
Recoil buffer advanced too far**	Back off
Recoil buffer reduced too far***	Increase

- some oils will form a sticky, resinous deposit in the chamber

** wind it in too far and the action will not have enough travel for the casing to be ejected – are you trying to compensate for ammunition that is too 'hot' for the pistol?

*** often overlooked as a cause – if the action is 'hammering' it can bounce the case back into the action before it can be ejected

Broken Ejector

The first thing to 'break' on my CM22M-RF was an ejector: this after some 20000 rounds through the pistol – reputedly there was a batch of improperly heat-treated ejectors and apparently I had one (only one, I hope!). A Broken ejector becomes immediately obvious: empty cases jam the action (usually to the right of the action)!

Replacement is fairly straightforward:

#1. **Field-strip**
#2. Remove grip
#3. Back off trigger screw #17
#4. the two pins that hold the ejector in the frame drive out to the right
#5. ENSURE THAT THE BROKEN NOSE OF THE EJECTOR IS NOT IN 'THE WORKS'
#6. Remove broken ejector block
#7. See item **#4**
#8. Insert new ejector an line up holes (top one first seems to be the way to go)
#9. Re-insert pins (from right side) and when both in, set flush
#10. Check to see if hammer will cock with the trigger pulled back
   a. If hammer will not cock, back off trigger screw #17 further
   b. Release trigger and recheck item #10
#11. **Adjust trigger**
#12. Reassemble from field strip

Slide stop will not engage

Cause	remedy
Recoil buffer advanced too far	Back off (is your ammunition too 'hot'?)
Crud	Clean*
Damaged slide stop pegs	Replace both (022027)

* a great use for an ultrasonic cleaner –you probably will not have to disassemble the pins, pegs and springs. See my **notes** on ultrasonic cleaners

Those pesky screws that hold the weight rail to the upper

The only bits that routinely come loose on my CM22M RF are these three screws: irksome, but easily remedied…
They are high-tensile 3 x 6 metric c/s machine screws – so you know when ordering replacements after they work their way loose and fall out (never to be seen again!).

When putting them in (or re-tightening), use a minimal amount of ‘easy disassembly’ or ‘medium disassembly’ thread locker and do them up nice and snug (remembering that they are small screws): around 4 to 5nm is enough.

OTHER BITS

Replacement for the main --- frame/upper Torx screw

Many have replaced the torx screw with an Allen screw
When I get the machining information, dimensions and a drawing will be added
Mine is 1.86mm overall and has a 5mm 'shank'

Parts list (incomplete)

It's a pity that the manual does not have a parts list…

Part #		Drawing	Ref #	Part #		Drawing	Ref #
022085	Trigger blade	22-80T		022001	Barrel	22-10T	
022091	Ejector	22-80T		022002	Front sight	22-10T	
022092	Hammer	22-80T		022003	Screw	22-10T	
022093	Pin	22-80T		022013	Front spring strut	22-10T	
022095	Hammer strut	22-80T		022014	Rear spring strut	22-10T	
022024	Extractor			022015	Spring spacer	22-10T	
				022015A	Bearing washer	22-10T	
022097	Sear	22-80T		022017	Buffer adjust	22-10T	
022118	Grip strut	22-80T		022018		22-10T	
022058T	Rear sight ass'y	22-10T		022004	Magazine body	22-04T	
				022005	Follower	22-04T	
022027	Slide stop pegs	22-20T		022005A	Lug bar	22-04T	
022028	Slide stop springs	22-20T		022006	Magazine spring	22-04T	
022029	Slide stop pins	22-20T		022007	Magazine base	22-04T	
				022007A	Base insert	22-04T	

Ultrasonic cleaning baths

I am a great believer in the use of ultrasonic cleaning baths for gun parts (and other items around the house and garage).

A couple of cautions:

- The liquid in ultrasonic cleaners can get hot – this is important if using any flammable solvent: check the temperature and avoid using repeated sessions without allowing the solvent to cool
- Use only in a well ventilated location – not so important if using only detergent and water, but vital if you are using a 'stronger' solvent
- That ultrasound can, and often will loosen adjustments
- I do not recommend using an ultrasonic cleaner for wrist watches
- After using the ultrasonic cleaner, always:
    - Thoroughly dry parts – I have compressed air on hand
    - Lubricate parts
    - Empty and safely store any flammable solvent – I run used solvent through a coffee filter and funnel and keep this separate for my first run of solvent for the next cleaning session.

Advantages and hints:

- Scrape/brush off any readily accessible crud first
- Pre-soaking parts improves the efficacy of ultrasonic (any) cleaning process
- I have a couple of ultrasonic cleaners: a smaller unit as advertised for cleaning jewellery, and a larger unit that will take most of my pistol assemblies. There are larger units available but $$$!
- Using an appropriate solvent makes things easier
- Virtually the only way to ensure that the inside of magazines are clean (disassemble and brush out first)
- While there are lots of commercial solvents ($$$) for use in ultrasonic cleaners:
    - For items such as jewellery and spectacles, pre-soak in Windex® and just use water as a solvent
    - I normally use white spirit / Shellite® to degrease oily parts – see notes above about temperature, ventilation and storing solvent

More to be added

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