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Aiming Laser Rangefinders

1. Laser rangefinders can use a visible or IR frequency. Visible ones can be aimed by observing the laser dot on the target, IR ones need an image converter for the observer to see the dot. Bright sun or poor scene reflectivity can make pick up of the dot difficult. A simple but accurate sight would mean that the laser beam was on the target straightaway, range taking would be quicker and the target engagement faster.

2. The laser should be aimed to one mil or better. Existing solid glass Ring Sights can do this.

3. There are a number of existing designs which are suitable: the LC-8-40, the HC-14-62 and the MC-10-90. These are all unit power (no magnification) which is good enough for aiming, minimises handshake and gives considerable eye freedom. All can be used with Night Vision Goggles (NVG) which we see as being used much more widely as time goes by.

4. The graticule pattern can be chosen by the customer; patterns fall into several types:-

   White against the target scene lit by ambient light enhanced artificially, or with an alternative lit one, for low light and NVG.

   Red dot.

   Black against the target scene lit artificially for low light.

In low light and with NVG certain patterns are better since small targets are not obscured by the pattern.

5. The optic dimensions are shown at Annex A.

6. LC-8-40

In production for the EPC sight. Two suitable versions:-

Red dot	Requires a 3 volt supply from the rangefinder. The brightness of the dot is controlled automatically by an integral photodiode.
Single graticule	White graticule lit red for low light and NVG. Requires a red LED input from a window on top of the rangefinder (or a 3 volt supply).

7. HC-14-62

In production for the FN P90 Personal Defence Weapon, it has :-
a dual graticule with white rings and dot, with an open T for low light and NVG

It needs a red LED input from a window on top of the rangefinder (or a 3 volt supply).

8. MC-10-90 (black graticule)

This is a solid glass unit power telescopic sight of small size and excellent light transmission (no internal air/glass interfaces). The black graticule is lit red in low light and for NVG. Requires a red LED input from a window on top of the rangefinder (or a 3 volt supply).

9. Power supply

The LC-8-40 (red dot) must have a 3 volt supply to power its integral LED. For trial purposes a standard EPC sight can be used.

The other sights can have their low light and NVG illumination provided by a window in the top of the rangefinder lit by a red LED. Alternatively they could use a 3 volt supply to their own LED. The advantages of window solution are:- there is no external power supply connection to the sight; sealing of the rangefinder is better; the electronics are contained within the rangefinder package. For trial purposes the HC-14-62 (dual reticle) and the MC-10-90 can be supplied lit by a betalight.

10. Mounting

All the sights are solid glass so are very robust and can stand very adverse environmental conditions. They are potted with silicone rubber into a thin housing which can be metal or plastic. Their optical and mechanical axis are reasonably parallel so that movement for lining up with the rangefinder is small. We have found that with a fulcrum and a slow setting cement, the sight can be lined up without difficulty in production. The sight should be on top of the rangefinder and not obscured on either side (this helps the observer to see the target scene, especially with NVG). It is probably best (but not essential) to have the sight at the rear of the rangefinder.

11. The Choices

a. The MC-10-90 is the most elegant with its black graticule which users of telescopic sights are used to. But it is longer for its apertures and costs more to make. It should only be chosen if not one of the others is suitable.

b. The LC-8-40 is very compact but its smaller aperture does require the eye to be well positioned side to side and up and down. We prefer the single graticule version as it need not obscure a small target.

c The HC-14-62 is still small but gives twice the eye freedom in both directions. We prefer the dual graticule version for its simplicity.

Annex A

Aiming Laser Rangefinders

Optic Details

Optic Envelope

Dimensions in mm approx
Full size

LC-8-40

Weight of optic 10 grams	L	40
Optical aperture 8mm square	W	8
	H	10

HC-14-62

Weight of optic 60 grams	L	65
Optical aperture 14mm diameter	W	14
	H	30

MC-10-90

Weight of optic 45 grams	L	90
Optical aperture 10mm diameter	W	10
	H	20