ROYAL ARMoured CORPS
Weapons

MILITARY TRAINING PAMPHLET
No. 35

PART 4: VICKERS GO MACHINE-GUN
MARK I

1943

Crown Copyright Reserved

Prepared under the direction of
The Chief of the Imperial General Staff

THE WAR OFFICE,
July, 1943

www.vickersmachinegun.org.uk
MILITARY TRAINING PAMPHLET No. 35
Part 4: VICKERS GO MACHINE-GUN, MK I

INSTRUCTIONAL NOTES
(adapted from Training Regulations, 1934)

The following principles and method of instruction will be followed:

Preparation.—The lesson must be thoroughly prepared, the class correctly positioned and all necessary equipment at hand.

Demonstration.—A demonstration by the instructor of the action which the lesson teaches.

Explanation.—A brief description of the action demonstrated.

Imitation.—Students copy the action of the instructor.

Interrogation.—A thorough cross-examination of students to ascertain that all points of the lesson have been understood.

The above sequence should be applied with discretion. In some lessons, demonstration and explanation can be combined, while in others, imitation may be unnecessary. In all practical work the instructor will concentrate on exercising his class so that a high standard of manual skill is attained.

SECTION 1.—GENERAL

This pamphlet deals with the Vickers GO machine-gun, Mk I, and will form the basis of instruction on the machine-gun when dismounted from an AFV for indoor training purposes. It should be used in conjunction with the pamphlets dealing with the AFV in which the weapon is mounted.

SECTION 2.—INTRODUCTION TO THE MACHINE-GUN

Equipment required:

Machine-gun suitably mounted with deflector and chute. Magazine and drill rounds.
Spare parts and tools.

Note.—Under no circumstances except on the range will live ammunition be used for instruction. Before each lesson, instructors will inspect carefully all drill rounds and magazines.
Name.—Vickers GO (gas operated) machine-gun, Mk I.

Weight.—20 lb approximately (machine-gun complete with deflector and chute).

Calibre.—303 in.

Muzzle velocity.—2,440 ft per sec.

Range.—Up to 500 yards (effective range against aircraft).

Rate of fire.—950 rounds per minute (approximately).

Method of control.—Twin Vickers GO machine-guns are fitted on the PLM mounting on the turrets of certain AFVs for protection against aircraft. The machine-guns which are controlled by two handlebars within the turret can be elevated approximately 90 degrees from the horizontal and have an all round traverse. They are fired by remote control from within the turret.

Ammunition.—Rimmed ammunition is used in magazines containing 100 rounds. The magazine when fully loaded weighs 11 lb. The complete round consists of the bullet, cartridge case, propellent charge and cap.

The annulus of each type is marked:

- Ball
- Tracer
- AP

Purple
Red
Green

Spare parts and tools.—Spare parts are provided to replace broken parts. The tools required for stripping and cleaning are few. See appropriate sections.

Characteristics.—The machine-gun is gas operated, air-cooled, and has a high rate of fire.

Demonstration.—The instructor will demonstrate “Action—Fire—Unload” without giving a detailed explanation at this stage.

SECTION 3.—HANDLING

Equipment required:

- Machine-gun suitably mounted.
- Magazine and drill rounds.
- Winding plate and handle.

1. To fill and empty the magazine.
   (a) To fill
   Withdraw the retaining pin and rotate the top plate until the steel round, known as the follower, is visible against the cartridge body guide. Hold the magazine with the lips facing away from the body; press the spring at the side of the magazine and rotate the left lip. Insert the first round base first against the follower. Turn the top plate until the next space appears and insert the next round. Continue to fill until the top plate can be rotated no further. Close the lip by depressing and turning.

   Place the magazine on the winding plate and with the handle turn the top plate until maximum tension is applied. Insert the retaining pin. If for training purposes the magazine is underfilled, the tension of the spring should be one turn of the top plate per 12 rounds.

   (b) To empty
   Place the magazine on the winding plate, control the spring tension with the winding handle and withdraw the retaining pin. Release the spring carefully by allowing the handle to turn.

   Remove the magazine from the winding plate, open the lip and turn the top plate sharply to eject the rounds.

2. To load, fire and unload

   Note.—The trigger casing, if fitted, must be removed by pushing out the pin and withdrawing the casing.

   (a) To load
   Fit the flange on the magazine into the front magazine catch on the machine-gun. Press forward the rear magazine catch, lower the magazine and release the catch. Cock the machine-gun by pulling the cocking handle to the rear and returning it to position.

   (b) To fire
   Push the trigger forward.

   (c) To unload
   Press forward the rear magazine catch and lift off the magazine. If the breech block is to the rear, examine the chamber and, if clear, ease forward the working parts. If the breech block is forward, the machine-gun must be cocked before examining the chamber.
SECTION 4.—STRIPPING AND ASSEMBLING

Equipment required:—

Machine-gun.

1 in spanner.

1 in spanner.

Pair of pliers.

Object.—The object of stripping is to clean, oil, and inspect the machine-gun or to replace unserviceable parts.

Rules of stripping

Prove that the machine-gun is unloaded.

Strip to the correct sequence.

Never strip against time.

Use the correct tools correctly.

Lay the parts in a clean, dry place.

Note.—The machine-gun must be removed from its mounting on the vehicle for stripping.

1. Normal stripping

(a) To strip

Body extension.—Grip the body extension with one hand and withdraw the upper and lower retaining pins with the other. Remove the body extension.

Return springs and rod.—Withdraw the two return springs and rod. Remove the springs from the rod.

Note.—Some machine-guns are fitted with only one return spring.

Breech block and piston.—Pull the cocking handle to the rear with one hand behind the machine-gun ready to receive the piston and breech block. Push forward the cocking handle. Remove and separate the breech block and piston. Replace the upper and lower retaining pins in the body of the machine-gun.

Deflector.—Remove the pin which secures the deflector to the underside of the gun body. Press forward the catch on the deflector and remove it.

Barrel retainer, barrel and gas cylinder.—Remove the nut and bolt and lift off the barrel retainer.

Remove the barrel and gas cylinder together from the front. Separate the parts.

Gas plug.—Remove the split pin and unscrew the gas plug.

(b) To assemble

Gas plug.—Re-assemble in the reverse order.

Barrel, gas cylinder and barrel retainer.—Re-assemble the barrel and gas cylinder in the gun body. Replace the barrel retainer, nut and bolt.

Deflector.—Replace the deflector and securing pin.

Piston and breech block.—Fit the breech block to the piston. Place the piston in the body of the machine-gun, depress the feed piece on the breech block and push both parts fully forward.

Return springs and rod.—Fit the return springs and rod into the rear of the piston.

Body extension.—Withdraw the upper and lower retaining pins. Fit the end of the return spring rod into the hole in the body extension. Push the extension fully forward and engage the upper and lower retaining pins.

Finally test by cocking and pressing the trigger. Replace the trigger casing.

2. Additional stripping

Equipment required:—

Small screwdriver.

Small punch.

Empty cartridge case.

Hammer.

The breech block and ejector will be stripped by the gunner only in an emergency to replace a broken or unserviceable part. All other parts will be stripped by the armorer. The breech block will be periodically stripped, cleaned and examined by an armorer.

(a) The breech block

The breech block is made of soft metal and extreme care must be taken in stripping to prevent burrs.

(i) Extractor.—Push the extractor spring forward with the punch. Insert the screwdriver at the side of the extractor spring to raise the lip. Keep the lip raised by slipping the empty case underneath. Push the spring forward with the drift. Slide off the extractor.
(ii) Firing pin.—Remove the extractor. Unscrew the firing pin screw and remove firing pin and spring.

(iii) Feed piece.—Push out the axis pin and remove the feed piece, plunger and spring.

Re-assemble in reverse order.

Notes.—1. The firing pin screw must be screwed fully home.
2. The extractor spring must be replaced with the bevelled side underneath.

(b) The ejector

Ensure that the working parts are forward. Prise and slide out the ejector cover with a screwdriver or punch. Rotate and remove the ejector.

Re-assemble in the reverse order.

SECTION 5.—MECHANISM

Equipment required:

Machine-gun suitably mounted.
Magazine and drill rounds.
Empty case.
Diagrams.

Note.—Instructors should emphasize that in this lesson they are analysing a rapid and complex action. The class must always bear in mind the high speed at which the machine-gun fires.

Object.—To give the gunner confidence in the weapon, to enable him to handle it with understanding and to diagnose any defects if they occur.

1. Forward movement

(a) Preparation

Remove the body extension, deflector, return springs, guide rod, piston, breech block and gas sleeve. Replace the piston and breech block in the machine-gun.

(b) Demonstration

Pull forward the piston and breech block.

(c) Explanation

Piston and breech block.—When the machine-gun is loaded, the piston and breech block are held to the rear by the rear which engages with the bent under the piston. Pressure on the trigger causes the rear to be released from the piston and the piston to be driven forward with the breech block by the return springs.

2. Backward movement

(a) Preparation

As for forward movement. Place an empty case on the face of the breech block and pull forward the breech block and piston.

(b) Demonstration

Push the piston slowly to the rear.

(c) Explanation

Sealing of the breech.—When the round is fired, the explosion causes the cartridge case to expand in all directions and seal the breech.

Action of the gases.—Some of the gases which force the bullet through the bore escape through the gas vent in the barrel, through the port in the gas block on to the head of the piston and drive it to the rear.

Unlocking of the breech.—A slight movement of the piston precedes the unlocking of the breech which is disengaged from the locking shoulder in the body by the inclined ramp on the piston post.

Extraction and ejection.—As the breech block moves to the rear, the extractor withdraws the empty case from the chamber. The cam on the left hand side of the breech block causes the ejector to rotate sharply and strike the base of the cartridge case which is ejected into the deflector bag.
The following stoppages are of rare occurrence and will be demonstrated only by the instructor.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Immediate action</th>
<th>Probable cause</th>
<th>With drill rounds in classroom or on vehicle</th>
<th>On the range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. After the 1st IA the gun fails to fire.</td>
<td>Remove and examine the magazine. If correct, examine the position of the breech block. If it is fully forward, unload the gun and exchange the firing pin. Reload, relay and fire.</td>
<td>Broken firing pin.</td>
<td>Load the gun and press the trigger. After the 1st IA the instructor says &quot;Gun will not fire.&quot;</td>
<td>Not set up.</td>
</tr>
</tbody>
</table>

2. (a) In applying the 1st IA the gun cannot be cocked.  
      Remove and examine the magazine and position of the breech block. Cock and remove the live round and empty case. Fire the working parts forward and put in a new ejector. 
      Reload, relay and fire.  

(b) After the 1st IA the gun will not fire.  
Remove and examine the magazine and position of the breech block. 
Ditto  
Ditto

*Note.*—The Mk I ejector has a tendency to knock the case out of the cartridge case during ejection but this does not occur when the Mk II ejector is fitted, as the metal of the case is burred on to the cap.

---

### SECTION 7—CARE AND CLEANING

#### I. Care of the bore

- **Object:** To ensure that all points upon which the mechanism of the bore and life of the gun depend are understood.

- **Procedure:** Double-size, degrease, clean, oil, polish, and thoroughly reconstruct the bore. The cleaning will be divided into:
  - Coal of the bore
  - Practical detail

- **Steps:**
  1. Wash in a solution of a suitable light solvent and alcohol. 
  2. Dry the bore. 
  3. Fill the bore with a suitable lubricant. 
  4. Put the bore in a suitable container. 

- **Maintaining Bore:**
  - There are three habits of fouling: 
    1. **Clogging of the bore.** A deposit of metal plating and gun composition is present in the bore. The plating is produced by friction and grinding. 
    - **Procedure:** Clean thoroughly. 
      - **Remove** the deposit by means of a suitable wire cleaning tool. 
      - **Inspect** the bore with a good type of lens. 
      - **Lubricate** the bore with a suitable lubricant. 
      - **Oil** the bore. 

  2. **Fouling of the bore.**

  3. **Fouling of the bore.**

  - **Final Fouling:**
    - **Procedure:** Clean thoroughly. 
      - **Remove** the deposit by means of a suitable wire cleaning tool. 
      - **Inspect** the bore with a good type of lens. 
      - **Lubricate** the bore with a suitable lubricant. 
      - **Oil** the bore.
Metallic fouling is caused by part of the envelope of the bullet being left on the surface of the bore and appearing as a bright streak on the lands and in the grooves. Metallic fouling near the muzzle or breech can be seen when the bore is cleaned. If it is in the centre of the bore, it can only be detected by means of a gauge plug. The bore must be examined carefully for metallic fouling. It is sometimes an explanation of inaccurate shooting. It can be removed with the double pull-through and gauze.

2. Cleaning and lubrication

(a) Lubricants and their uses

Mineral jelly.
Oil M80 or oil “A”.
Graphited grease.
Oil, low cold test No. 1.
Paraffin.

Mineral jelly is used to preserve the gun when kept in store. Oil M80 or oil “A” will be used for preserving the gun when not required for firing. Graphited grease will be used to lubricate the sliding parts and frictional surfaces when the gun is required for firing.

A heavy motor oil of good quality (e.g., M220) may be used as a substitute.

(b) Cleaning and lubrication

The proper condition of the gun for the occasions mentioned is set out in Appendix I.

Normally the bore will be dry cleaned and re-oiled daily. A surprise inspection should find the gun in its normal state.

If an inspection has been ordered, the gun and its parts will be left dry after daily cleaning and not re-oiled until after the inspection.

(c) Special conditions

Sandy country.—The working parts must be cleaned frequently. Graphited grease will be used sparingly. No other means of lubrication will be adopted.

Cold climates.—Oil, low cold test No. 1, diluted with paraffin, will be used for lubrication in cold climates. The mixture will contain one part of paraffin to four of this special lubricant. At extreme temperatures the proportion of paraffin should be increased. The oil will be kept in normal MG oil-cans which have been painted green. If this oil is not available, it is better to dispense with all lubricants rather than use those which will congeal.

Gas.—Weapons and tools can be decontaminated with petrol, paraffin or boiling water. Fresh petrol should be applied in swabs changed frequently. If bleach paste is used, it should be removed from the gun after ten minutes to prevent corrosion.

3. Practical detail

(a) Daily cleaning

Daily cleaning of the machine-gun will depend upon its condition:

(i) If the weapon is clean and has been stored in a clean and dry place, it need only be cocked and the bore re-oiled.

To oil the bore, insert a piece of well-oiled flamelette (2 ins by 2 ins) folded lengthways into the loop of the cleaning rod and wrap it over the end of the rod. Push the rod into the bore and withdraw it. Care must be taken not to damage the mouth of the barrel when inserting the cleaning rod.

(ii) If the weapon has been used for training or has become wet or dusty, the machine-gun must be stripped completely.

Clean all dirt from the bore with oiled flamelette. To remove wear at the muzzle, insert the rod from the breech end. The rod should not be pushed beyond the mouth of the barrel or it will be necessary to re-adjust the flamelette continually. Dry clean the bore with a clean piece of flamelette (4 ins by 2 ins) and then re-oil.

Dry clean and re-oil the body and working parts. Dry oil which may clog the working parts may be removed with paraffin.

(b) Before action

The gun will be stripped and dry cleaned.

Graphited grease will be smeared lightly on the frictional surfaces of the working parts and body of the gun. It is essential that the bore, head of piston, gas cylinder, gas block and face of the breech block are dry.

(c) During a full action

Smear the working parts periodically with oil M80 or oil “A”.

www.vickersmachinegun.org.uk
(d) After action

Immediately after action, the bore and chamber and the face of the breech block will be dry cleaned and oiled to remove superficial fouling. On return to harbour or camp, the machine-gun will be stripped completely and the barrel scoured with boiling water to remove internal fouling. First, dry clean the bore and pour boiling water through a funnel into the bore from the breech end. Dry clean and inspect the bore… Repeat until the bore is clean. If boiling water is not available, soak the barrel in oil “A” for ten minutes, then dry clean. Examine the bore for metallic fouling and remove it with the wire gauze and double pull-through.

Wire gauze, which is issued in pieces 2½ ins by 1½ ins, must never be used without being oiled. To fit the gauze, turn the shorter sides towards the centre so that the longer sides form an “S”… coil each half of the gauze tightly round the loop on the cord until the two rolls so formed meet.

Support the barrel in a vise, or if one is not available, the barrel can be held behind a man’s back with his arms crooked to support it.

After oiling the gauze, drop the brass weight of the pull-through down the bore from the breech end. The cord will then be pulled backwards and forwards by two men so that the movement of the gauze in the barrel is confined to that portion where metallic fouling is present.

After being used for a short time, the gauze will become slack. It should then be unrolled and packed with a little flannelette to increase its size. When the cord begins to wear, a fresh pull-through will be used. If it breaks in the barrel, it will be removed by the armourer and not the gunner. If it is impossible to remove metallic fouling in this way, the gun will be handed over to the armourer.

Dry clean all other parts, especially the face of the breech block, head of the piston, gas cylinder and the gas block and remove all fouling. Re-oil after inspection.

(e) Subsequent cleaning after action

After firing, careful cleaning of the barrel and face of the breech block is required for at least ten days. Every precaution must be taken to prevent the formation of rust.

SECTION 8.—THE PLM MOUNTING

1. Description

The PLM (Parish-Lulworth-Motley) mounting is fitted on the turrets of certain AFV’s to carry twin Vickers GO machine-guns. The mounting allows the weapons to be elevated 85 degrees and traversed in a complete circle. The weapons are controlled from within the turret by two handle-bars and are fired by remote control by two firing ‘levers’ on the handle-bars connected to the firing rod on the mounting by a wire cable. Pressure on either lever will cause both guns to fire.

The total weight of the mounting with both machine-guns fully loaded is 163 lb.

2. To mount the weapon

Remove the trigger cases. Each machine-gun is secured to a coupling piece on the mounting by a nut and bolt and at the rear by a threaded clamp. Align each machine-gun with the coupling piece and replace the nut and bolt. Fit and tighten the clamp at the rear.

The machine-guns are dismantled in the reverse order.

3. Control of the mounting

A clamp is fitted outside the turret to lock the mounting when not in use. The mounting should at all times be locked to prevent interference with the main weapons when fully depressed. In addition the handle-bars should be kept in the horizontal position at right angles to the turret guns. The handle-bars can be withdrawn and rotated to a position of better leverage when action is imminent. To elevate the machine-guns, push forward the handle-bars. To traverse, rotate the handle-bars.

4. Maintenance

The mounting should be lubricated with oil C 600 or grease GS at the lubricators provided. Grease the teeth of the rack and pinions.

5. Range drill (for training purposes only)

(a) On the command “Action,” the gunner will unlock the mounting, bring the handle-bars down to a position of leverage and load both machine-guns. He will elevate the mounting to approximately 45 degrees and assume an alert position behind the guns.
(b) The order "Aircraft front, right or left" will be given when the target appears.

c) The order "Fire" will be given when the aircraft is 600 yards away. The gunner will continue to fire until the command "Stop" is given or the aircraft is out of range. The gunner must concentrate on the aircraft throughout and will adjust his swing according to observation and appearance of the trace. If a stoppage occurs on one machine-gun the gunner will continue to fire with the other.

d) On the order "Unload" both machine-guns will be unloaded. The mounting and handle-bars will be locked in the horizontal position.

e) On the order "Clear guns" given by instructors after "Unload," as a safety precaution on the range, the gunner will cock each machine-gun, examine the chamber and if clear, report "Guns clear."

APPENDIX 1
MAINTENANCE TABLE

<table>
<thead>
<tr>
<th>Part of weapon</th>
<th>Prepared for firing</th>
<th>Immediately after firing</th>
<th>Normal state</th>
<th>Prepared for inspection</th>
<th>Storage for long periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar and gas affected parts</td>
<td>Dry cleaned</td>
<td>Oiled</td>
<td>Oiled</td>
<td>Dry cleaned</td>
<td>Coated with 50% mineral oil and 50% Molotow by weight</td>
</tr>
<tr>
<td>Working parts of gun</td>
<td>Frictional surfaces lightly oiled with graphite lubricant</td>
<td>Oiled</td>
<td>Oiled</td>
<td>Dry cleaned</td>
<td>Ditto</td>
</tr>
<tr>
<td>Exterior of barrel and mounting</td>
<td>Dry cleaned</td>
<td>Oiled</td>
<td>Oiled</td>
<td>Dry cleaned</td>
<td>Ditto</td>
</tr>
<tr>
<td>Bright surfaces</td>
<td>Slightly oiled</td>
<td>Oiled</td>
<td>Oiled</td>
<td>Dry cleaned</td>
<td>Ditto</td>
</tr>
<tr>
<td>Jowett parts</td>
<td>Slightly oiled</td>
<td>Slightly oiled</td>
<td>Oiled</td>
<td>Dry cleaned</td>
<td>Ditto</td>
</tr>
</tbody>
</table>

(15837) G.210 25,000 2/43 K.M.E. Op.87