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**ROYAL ARMOURED CORPS**  
**Weapons**

**MILITARY TRAINING PAMPHLET**  
**No. 35**

**PART 4: VICKERS GO MACHINE-GUN**  
**MARK I**

**1943**

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

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## 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 I.—GENERAL

This pamphlet deals with the Vickers GO machine-gun, Mk I, and will form the basis of instruction on the machine-gun when dismantled from an APV for indoor training purposes. It should be read in conjunction with the pamphlets dealing with the APV 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.**—30 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 11½ lb. The complete round consists of the bullet, cartridge case, propellant charge and cap.

The annulus of each type is marked:—

Ball	...	...	...	...	Purple.
Tracer	...	...	...	...	Red.
AP	...	...	...	...	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 armourer. The breech block will be periodically stripped, cleaned and examined by an armourer.

#### *(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.

#### (5) *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 sear which engages with the bent under the piston. Pressure on the trigger causes the sear to be released from the piston and the piston to be driven forward with the breech block by the return springs.

*Feeding of the round*.—The feed piece of the breech block drives the first round out of the magazine. The round which is deflected into the chamber by the bullet lead and feed piece cam on the magazine is gripped by the extractor during the final movement of the breech block.

*Locking of the breech*.—The breech block is limited in its forward movement when it strikes the breech block stop on the barrel. The rear of the breech block is raised by the inclined plane on the piston as it moves further forward. The breech is locked when the shoulders of the breech block are engaged with the locking shoulder in the body.

*Firing of the round*.—A further movement of the piston causes the piston post to drive the firing pin against the cap and fire the round.

#### 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.

Indication	Immediate action	Probable cause	Method of preparation for instruction
1. After the 1st LA the gun fails to fire.	Remove and examine the magazine. If correct, examine the position of the breech block. If it is fully forward, reload the gun and exchange the firing pin. Reload, relay and fire.	Broken firing pin.	With drill rounds in chamber or in vehicle On the range
2. (a) In supply the 1st LA the gun stops, not to be cocked. (b) After the 1st LA the gun will not fire.	Remove and examine the magazine and position of the breech block. Cock and remove the live round and magazine. Fix the working parts forward and put in a new ejector. Reload, relay and fire. Remove and examine the magazine and position of the breech block and reload the live round and empty cases. Continue as above.	Broken ejector.  Ditto	Load the gun and press the trigger. After the 1st LA the instructor says, "Gun will not fire." Remove the ejector. Place an empty case in the chamber and fire the working parts forward. Inspect the magazine, cock and press the trigger. Ditto

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

## SECTION 7.—CARE AND CLEANING

*Equipment required:—*

- Machine-gun suitably mounted.
- Examples of lubricants.
- Cleaning rod.
- Double pull-through and gauze.
- Flannelette and cloth.

**Object.**—To ensure that all points upon which the mechanical efficiency and life of the gun depend are understood and receive regular attention.

**Note.**—The subject will be divided into:—

- Care of the bore.
- Cleaning and lubrication.
- Practical detail.

### 1. Care of the bore

#### (a) Wear in the bore

Wear in the bore is unavoidable during firing and is caused by the friction of the bullet and the heat generated when ammunition is fired. Wear may also be caused by faulty methods of cleaning.

#### (b) High polish of the bore

The highly polished surface of the bore when new minimises the tendency to rust and collect metallic fouling. As the bore becomes worn, the polish diminishes and greater care is necessary to prevent the formation of rust. The high polish is preserved by correct methods of cleaning.

#### (c) Fouling

There are three kinds of fouling:—

**Superficial fouling** is caused by the waste products of the propellant charge and cap composition remaining on the surface of the bore. Its neglect will cause rust. If allowed to remain in the barrel for a long time, it will become hard and produce effects similar to internal fouling. It must be removed immediately after firing by dry cleaning and then oiling the bore.

**Internal fouling** is caused by some of the products of combustion being forced into the pores of the metal. This type of fouling is present in any barrel through which rounds have been fired but it is not immediately discernible. If neglected, it will eventually form a hard, black crust on the surface of the bore. Much internal fouling can be removed after firing by the use of boiling water. After firing, daily scouring of the bore may be required until sweating has ceased.

*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 gauge.

## 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 countries.*—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 with swabs changed frequently. If bleach paste is used, it should be removed from the gun after ten minutes to prevent corrosion.

## 3. Practical details

### (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 flannelette (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 flannelette. To reduce 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 flannelette continually. Dry clean the bore with a clean piece of flannelette (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 lull in action*

Smear the working parts periodically with oil M80 or oil "A."

*(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 vice, 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 flannel 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 (Parrish-Lulworth-Motley) mounting is fitted on the turrets of certain AFVs 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 G5 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 I MAINTENANCE TABLE

Part of weapon	Prepared for firing	Immediately after firing	Shooting stops	Prepared for inspection	Storage for long periods
Bars and gun affected parts	Dry cleaned	Oiled	Oiled	Dry cleaned	Coated with 50% industrial petrol and 50% kero by weight.
Working parts of gun	Frictional surfaces lightly smeared with graphite grease	Oiled	Oiled	Dry cleaned	Ditto
Interior of barrel and mounting	Dry cleaned	Oiled	Oiled	Dry cleaned	Ditto
Bright surfaces	Slightly oiled	Oiled	Oiled	Dry cleaned	Ditto
Case parts	Slightly oiled	Slightly oiled	Oiled	Dry cleaned	Ditto



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