B&T Advanced Precision Rifles

MAINTENANCE MANUAL APR308

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SM-7856.14

Maintenance Manual

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General Instructions

This manual is designed to assist in the proper usage of the B&T APR308 sniper rifle system. It has to be distributed and used together with the related Illustrated Parts Catalogue.

Read the instructions and warnings in this manual carefully before using the weapon.

Do not handle any firearms without having a complete understanding of its peculiar characteristics.

Due to continuous efforts spent in upgrading the weapon design, it's possible that certain descriptions contained in this manual may vary from the actual weapon.

B&T does not assume any liability for events due to disregarding of this manual, wrong handling, negligence, improper treatment, unauthorized parts exchange and other manipulations of the weapon.

It is mandatory to install new roll pins, circlips and o-rings once they are disassembled.

Abbreviations

MOA	Minute of Angle (small angle, 1/60 of 1°)
MPI	Mean Point of Impact (statistical centre of a group)
POA	Point of Aim
POI	Point of Impact

Safety Precautions

Warning messages are used throughout the manual to highlight possible situations that might lead to injuries of operating personnel and damage of equipment.

Cautions and warnings are used and applied as set forth below:

CAUTION: An operating procedure, practice, etc., which if not strictly observed, could result in damage to, or destruction of equipment.

WARNING: An operating procedure, practice, etc., which if not correctly followed, could result in personal injury, or loss of life.

Application and related documents

All shown procedures are applicable analogously on:
APR308, APR308P, APR308S and APR338.
For proper part identification refer to the Parts Catalogues PC-7856 for APR308 and PC-7857 for APR338.

1. Introduction

1.1 Safety Precautions

1.1.1 Safety Measures

1. Every weapon must be considered loaded until verified individually.
2. Always keep the finger off the trigger and outside the trigger guard until the sights are on target.
3. Always point the weapon in a safe direction.
4. Be sure of your target and the weapon danger area.
5. Before firing always verify the serviceability and condition of both the weapon and ammunition (the relative procedures are subject of this manual). Be especially careful that the barrel is free from all obstructions.
6. Always carry hearing protection when firing indoor, when firing without suppressor, while training or testing.
7. Never use unknown cartridges, dirty cartridges or reuse cartridges which failed at first try.
8. If a cartridge fails to ignite, keep aiming in safe direction and open bolt only after 30 seconds.
9. Operate, strip, clean and assemble your weapon decidedly but without excessive force.
10. Disassemble the weapon only as far as described in the manual.
11. Protect your weapon and especially the rifle scope to hostile environment.
12. Shooting trainings should be carried out in open or well-ventilated areas to prevent excessive exposure to toxic exhaust gases.

1.1.2 Weapon Danger Area

Weapon danger areas are to understand as follows (proper use of weapon implied):

Area I: Area I is the zone of life danger by flying bullets - the zone of trajectories in absence of crosswind.
Area Ia: Considering crosswind, danger area Ia must be applied, basing on maximum permissible crosswind assumption.

Area II: Area II is the range of the hot gases expanding after muzzle departure. In this area, eyes might be hurt. This area can be virtually reduced to zero when using suppressor.

Area III: In this area, cases drop after ejection, according to the force the bolt is operated. The danger is to capture a hot case with the clothes, resulting in minor burn (mostly concerned are forearms, neck and chest).

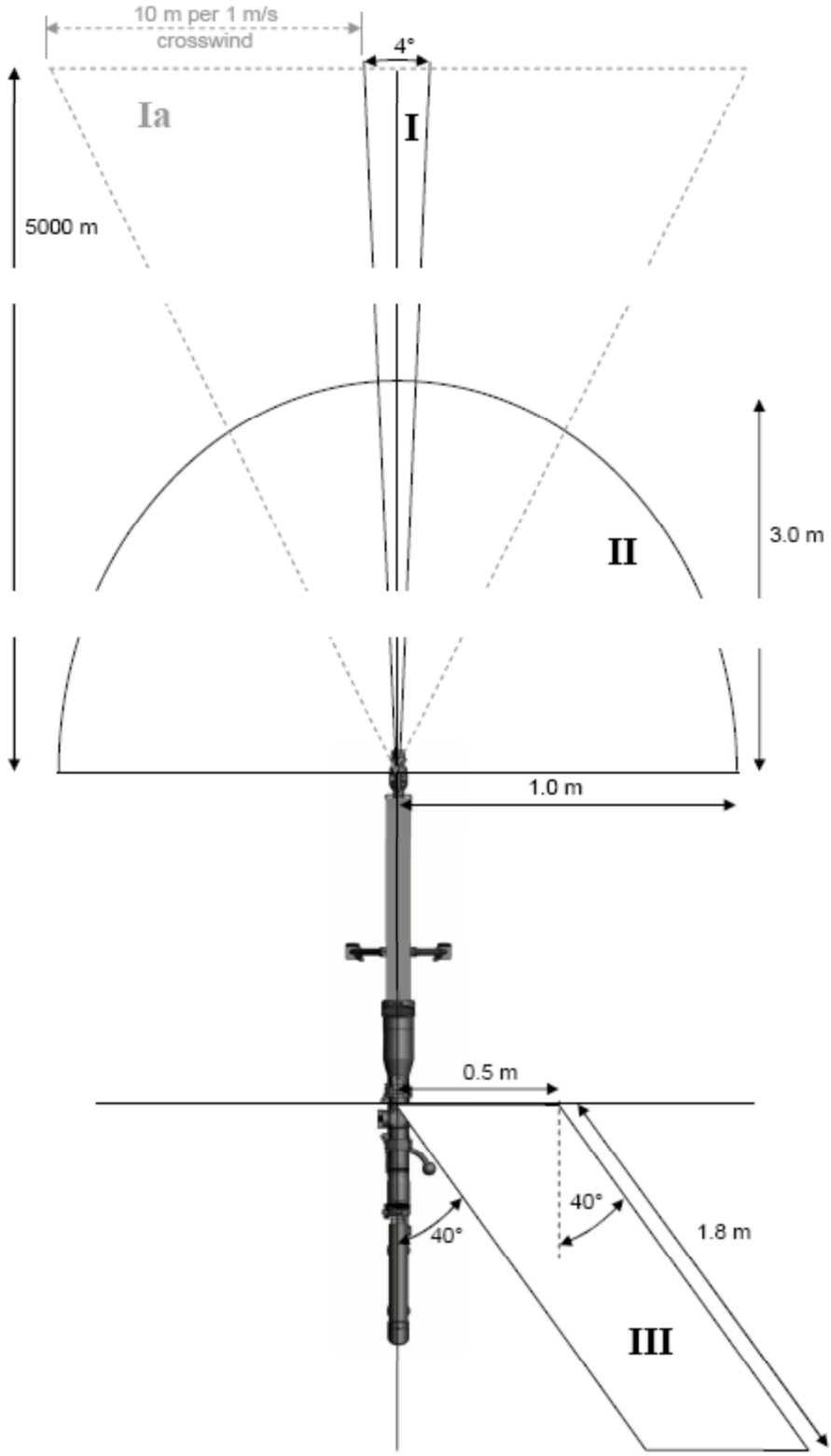


Fig. 1.1: Safety Template

1.2 General Description

The weapon system is basically consisting of a bolt action rifle cal. .308 Win with suppressor, a rifle scope and a specific cartridge. The system is intended to be a soldier's primary weapon and serve him as anti-personnel rifle. The system is able to hit a head-sized target up to 400 m distance or a torso-sized target over 800 m and more with a first round hit probability of over 99%. Although being a precision-instrument, the system must resist the harsh military use and remain functional in typical operational environments.

1.3 Nomenclature and Technical Data of Rifle

1.3.1 Nomenclature of Rifle

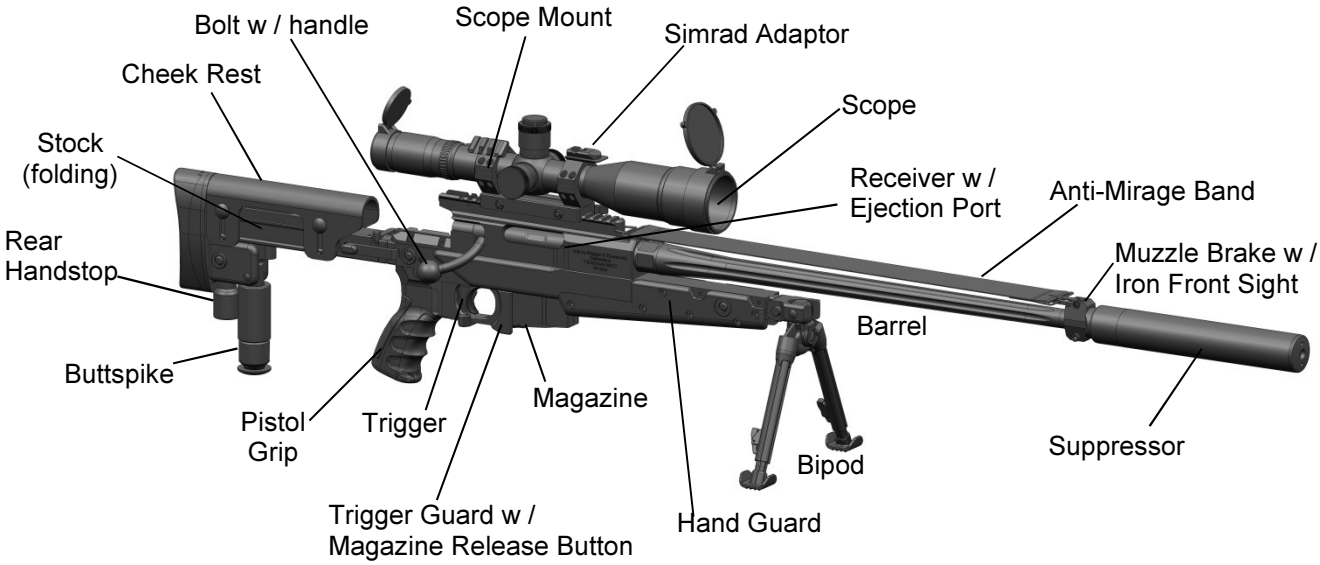


Fig. 1.2

1.3.2 Technical Data of Rifle

Manufacturer:	B&T AG, Switzerland	
Designation:	B&T APR308 (Advanced Precision Rifle)	
Product ID:	BT-APR308	
System:	Bolt action rifle, manually operated	
Caliber:	.308 Win (7.62x51 NATO)	
Rifling:	4 grooves, right hand twist 1:11"	
Barrel Length:	610 mm	
Effective Range:	max. 1000 m	
Precision:	< 6.5 mm (standard deviation at 100 m)	
Overall Length:	Butt stock folded	906 mm
	Butt stock open	1125 mm (+ 75 mm butt stock extended)
Width (w/o bolt)	Butt stock folded	86 mm
	Butt stock open	50 mm
Sight radius:	727 mm	
Weight (weapon only):	6.1 kg	
Magazine Capacity:	10 rds, detachable	
Trigger Pull:	1.5 kg - 2.5 kg (fully adjustable w/o disassembly)	
Bolt configuration:	3 locking lugs, 60° opening angle	

1.3.3 Operational Condition Data of Rifle

Shock resistance:	500 shocks of 15 g / 6 ms
Vibration resistance:	10 Hz to 500 Hz at 1.04 g for 2 h, at 4.8 g for 30 min
Drop resistance:	1.5 m without accidental discharge
Operational temperature:	- 30°C / +65°C
Storage temperature:	- 30°C / +65°C (and 95% rel. humidity) for 72 h
Barrel lifetime:	max. 10’000 rounds
Permissible Maximum Pressure	4773 bar

1.4 Nomenclature and Technical Data of Suppressor

1.4.1 Nomenclature of Suppressor

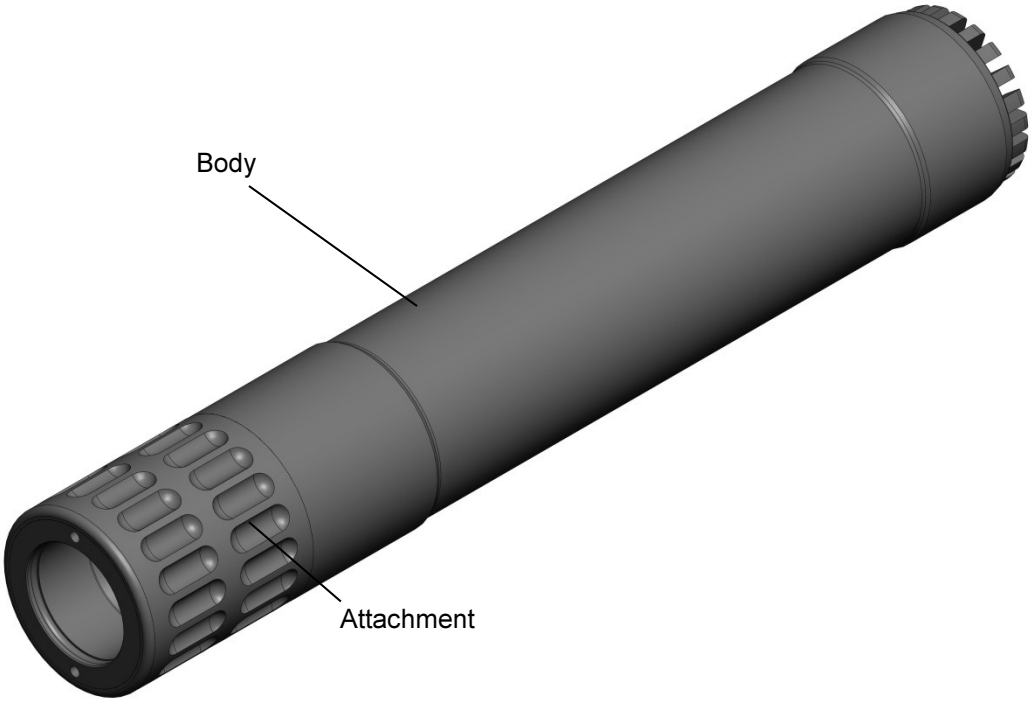


Fig. 1.3

1.4.2 Technical Data of Suppressor

Manufacturer:	B&T AG, Switzerland
Designation:	GRS
Mfr reference:	SD-12809
Caliber:	.308 Win (7.62x51 NATO)
Overall length:	297 mm
Diameter:	50 mm
Weight:	730 g
Attachment:	Thread M20x1 (attaches on muzzle brake)
Suppression:	30 dB A

2. Description of Weapon Main Components and Weapon Function

2.1 Main Components of Weapon

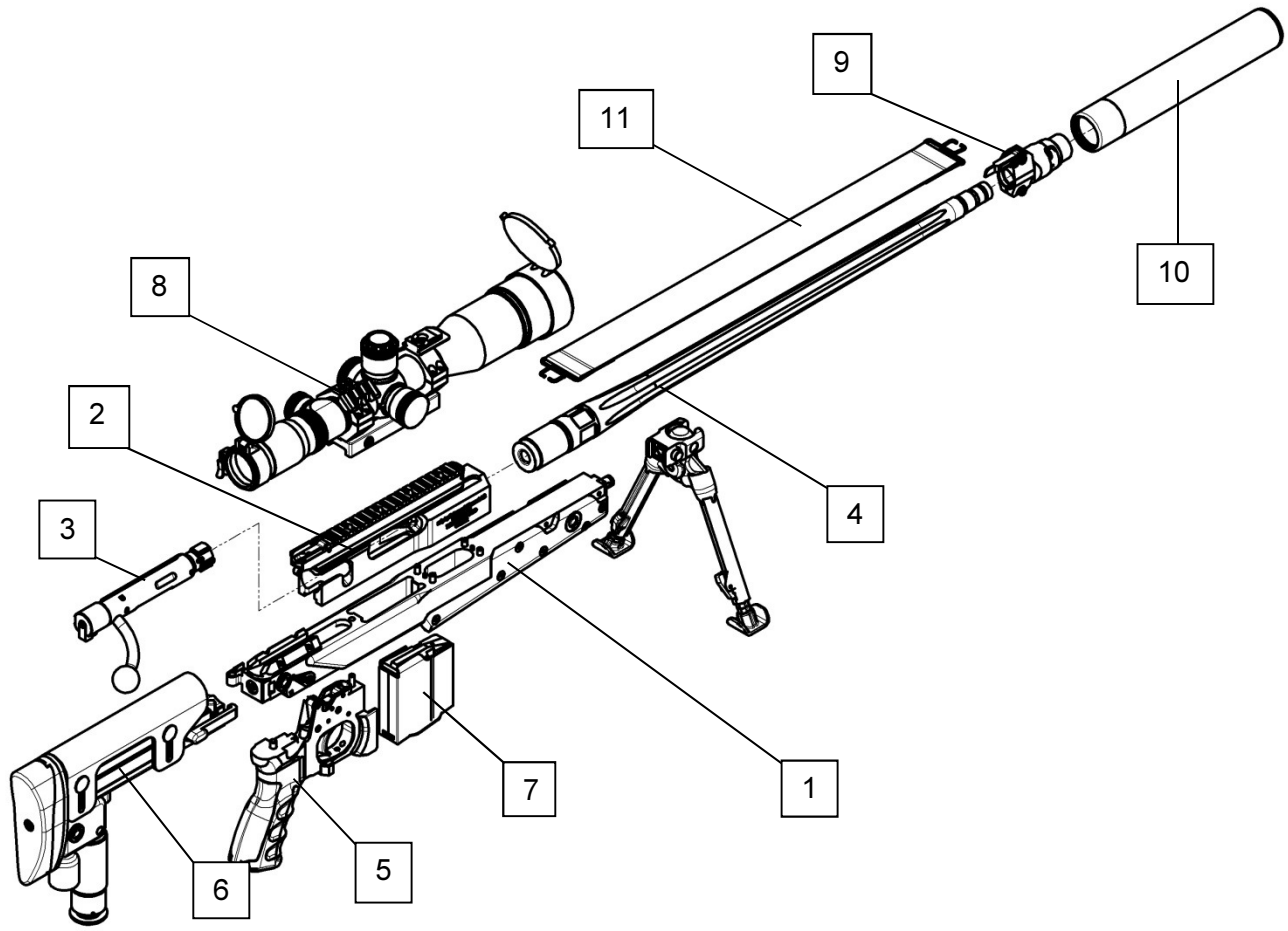


Fig. 2.1

Pos.	Description
1	Lower Receiver
2	Upper Receiver
3	Bolt
4	Barrel
5	Trigger Group
6	Folding Stock
7	Box Magazine
8	Rifle Scope with Mount
9	Muzzle Brake
10	Suppressor
11	Anti-mirage Band

2.2 Description of Main Components

2.2.1 Lower Receiver

The lower receiver is the core of the rifle. Integrated is the manual safety and it also includes the bipod assembly and a fore end assembly with ergonomical panels. The more, the fore end is offering mounting interfaces for further accessories, e.g. laser designation systems and Anschutz front hand stop.
At its rear end, the folding stock is attached; folding stock and lower receiver are forming something that is close to the stock of a conventional rifle design.
On its top, the upper receiver is attached. Therefore, the surface between upper and lower receiver is what in conventional rifle designs is called the bedding.
Under the receiver attaches the trigger group. Unlike conventional rifle designs, the trigger is not attached to the receiver and therefore the classical distinction between "firing unit" and "carrying unit" is hardly applicable for the actual design.
The manual safety is designed as ambidextrous lever safety and it allows to load and unload the weapon in safe mode.

2.2.2 Upper Receiver

Main components of the upper receiver are a housing, in which a locking ring is permanently fixed, and a Picatinny rail as interface to the rifle scope. Integrated in this scope mount rail is the rear part of the emergency sight, designed as factory zeroed flip-up sight.
Into the above mentioned locking ring, the bolt locks by rotation; thus, receiver with locking ring, bolt and barrel are forming the breech of the rifle.

2.2.3 Bolt

The bolt assembly features mainly a body with handle for operation and carries extractor, ejector and firing pin. The bolt head shows three strong locking lugs for maximum strength and opens at a 60° angle.

2.2.4 Barrel

The barrel is a one-piece construction of forged steel. A special barrel steel is used, providing at once best corrosion resistance and longevity. The barrel shows very distinctive flutings which reduce the weight of the stiff, heavy contoured barrel.
With its chamber end, the barrel becomes screwed into the receiver and presses onto the locking ring. On the muzzle side, a highly efficient muzzle brake is fixed.

2.2.5 Trigger Group

The complete trigger mechanics are built into a housing which carries a M16-style pistol grip, offering very familiar ergonomics to the operator.
The trigger is a so called double-stage trigger. It is designed in a way to allow an external adjustment without dismantling the trigger group. The trigger pull is adjustable as well as its path.
In the large trigger guard, the magazine retainer is integrated. It is holding the magazine in two positions: one is fully inserted for magazine feeding; the other position is offering comfortable round-by-round manual feeding.

2.2.6 Folding Stock

The folding stock is a rather complicated construction, containing nearly half the parts of the complete rifle. It offers ergonomic features as adjustable cheek rest, adjustable butt plate, adjustable length and a butt spike which is foldable and adjustable in height. It is attached to the lower receiver with a rugged steel hinge.

2.2.7 Box Magazine

Unlike "hunting style" rifles, the actual system features a detachable box magazine, as used in assault rifles, submachine guns and pistols. With ten rounds, it features one of the highest capacities among sniper rifles.
The complete magazine is consisting of a rugged stainless steel body with a follower assembly inside. Attached to the follower is a special spring of sophisticated design in order to provide constant force from the first to the last round. When the magazine is empty, it stops the forward motion of the bolt.
The magazine feeds through the lower receiver into the upper receiver and is held by a magazine catch, which is integrated in the trigger group.

2.2.8 Rifle Scope with Mount

Around the central tube of the rifle scope, two rugged rings are tightened. Those rings are attached to the mount base, showing a Picatinny interface to the rifles upper receiver. Scope and mount are clamped on the rifles Picatinny rail by the tension of two levers, allowing the operator to quickly remove the scope in case of failure or while cleaning or transporting. Detaching and attaching the scope repeatedly will not affect the zero.

2.2.9 Muzzle Brake

Basically, the muzzle brake reduces recoil by over 40%. Its rugged steel body also carries the front part of the emergency sight, the flip-up front sight. The more, its design provides the possibility to attach a suppressor directly on the muzzle brake, which therefore never has to be removed. The muzzle brake assembly includes a thread protector to protect the thread if no suppressor is mounted.

2.2.10 Suppressor

Even being an assembly, the suppressor is to be considered as a part: For safety reasons, all parts are sealed and it is not possible to dismantle the suppressor.
For installation, the suppressor is simply screwed over the muzzle brake.
The suppressor reduces the acoustical and optical muzzle signature (muzzle blast and muzzle flash), providing camouflage to the operator as well as minimising the weapon danger area and the risk of hearing damages.

2.2.11 Anti-mirage Band

Especially when long series are fired as in training scenarios, the anti-mirage band suppresses efficiently mirage (hot air rising from barrel). It is consisting of an elastic band with two spring hooks, which attach to the front side body and the Picatinny rail on top of the receiver.

2.3 Operating Principle

2.3.1 Starting Position

Fig. 2.2 is showing the weapon just after a shot has been fired: The bolt is closed and locked, the firing pin is uncocked, the trigger is pulled and an empty case is in the chamber. The same condition without pulled trigger and without case in the chamber corresponds to the neutral condition of the rifle (unloaded, unarmed/uncocked).

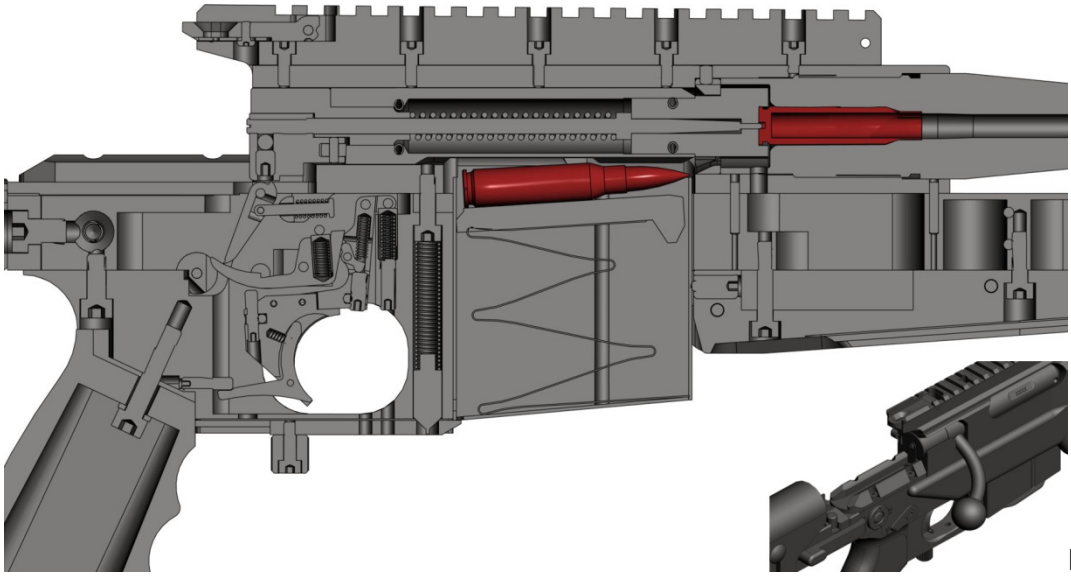


Fig. 2.2

2.3.2 Unlocking bolt and cocking firing pin

In fig. 2.3, the trigger has been released and the bolt handle lifted manually by 60° (counterclockwise rotation). With this movement, the bolt unlocks and the firing pin becomes cocked.

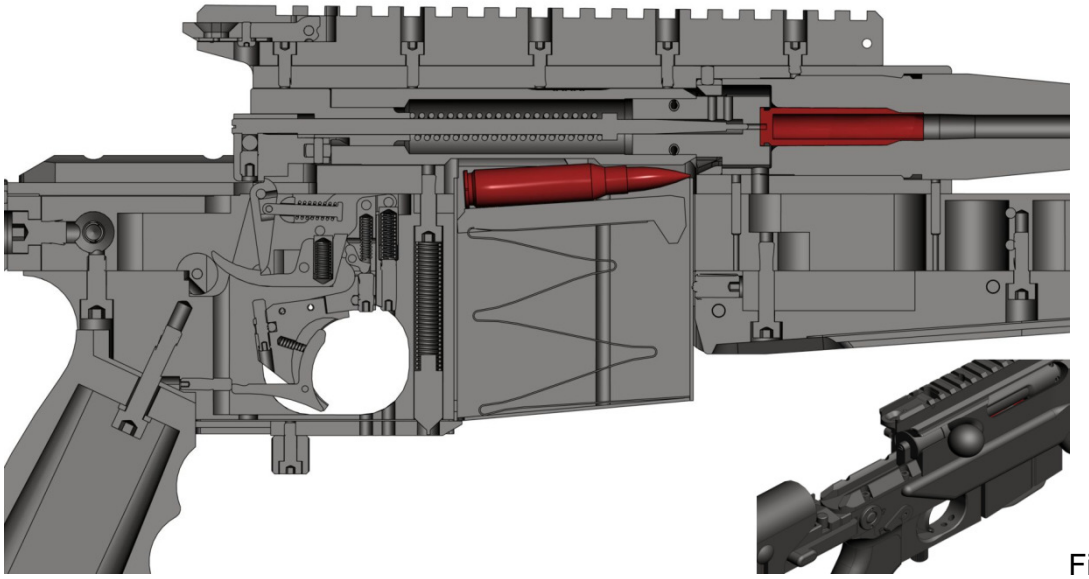


Fig. 2.3

2.3.3 Opening bolt

When fully opening the bolt manually, the empty case becomes extracted and ejected (fig. 2.4).

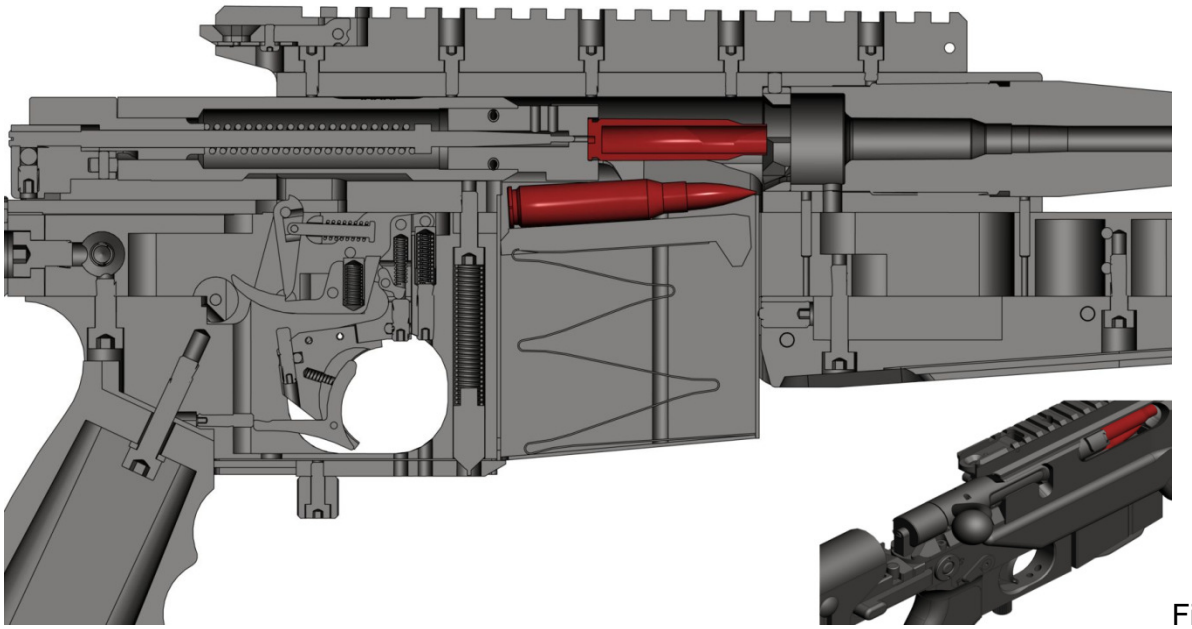


Fig. 2.4

2.3.4 Closing bolt

By closing the bolt manually, a new cartridge is fed from the magazine into the chamber. With a 60° clockwise rotation, the bolt lugs lock behind the locking ring and the rifle is ready to fire again.

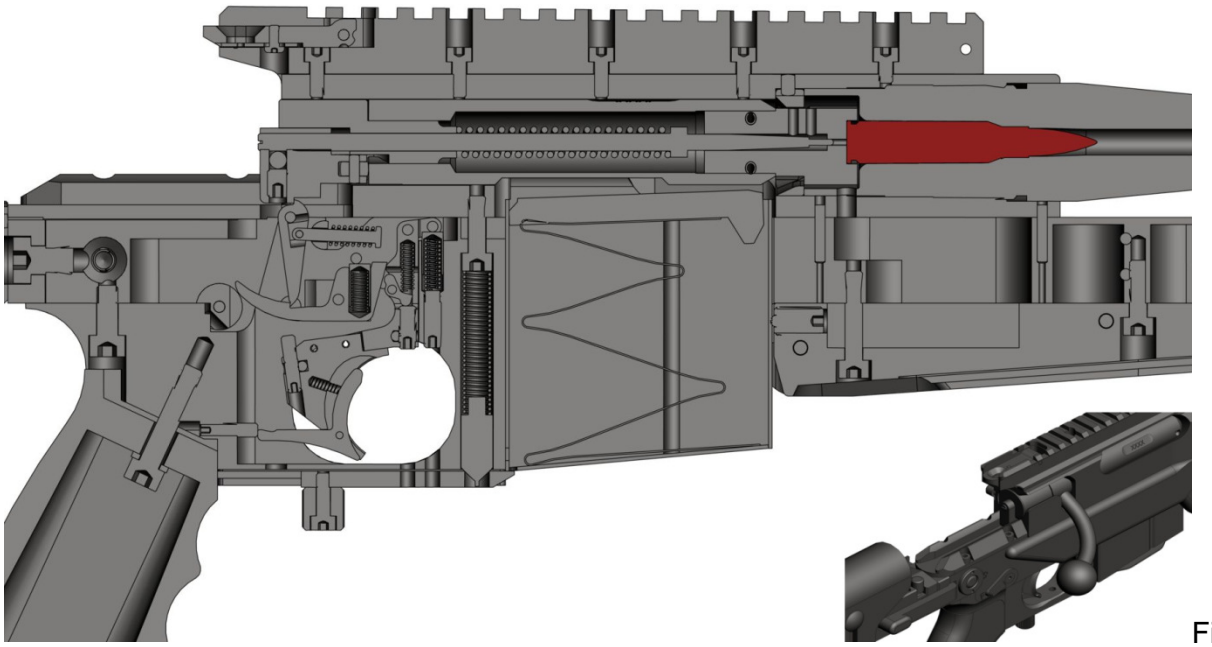


Fig. 2.5

3. Handling & Operating Procedures

3.1 Operating Safety

3.1.1 Engage Safety

a. Push safety lever upwards until it audibly clicks in "S" position ("S" appears in white color, fig. 3.1).
b. Operate safety with thumb of shooting hand, use left or right side lever as most convenient.
c. Weapon is in SAFE mode.

Fig. 3.1

Fig. 3.2

NOTE: Safety can only be engaged when firing pin is armed.

3.1.2 Disengage Safety

a. Push safety lever downwards until audibly clicks in "F" position ("F" appears in red color, fig. 3.2).
b. Operate safety with thumb of shooting hand, use left or right side lever as most convenient.
c. Weapon is in FIRE mode.

WARNING: Ensure the weapon is in SAFE mode before performing any tasks e.g. loading & unloading, stock adjustments and disassembly of weapon.

3.2 Charging & Discharging Magazine

3.2.1 Charging Magazine

a. Prepare 10 cartridges.
b. Orientate one cartridge in the direction of the raised portion of the spring-loaded follower (fig. 3.3).
c. Press cartridge down until firmly held by magazine lips.
d. Push it backwards to its rearmost position.
e. Repeat with remaining 9 cartridges.

WARNING: Identify cartridges to be of right caliber, type, brand, bullet weight and lot number before charging.
Inspect cartridges to be clean and not damaged before charging.

CAUTION: Do not try to charge more than 10 rounds, magazine may become damaged.
Always charge the ammunition pointing in the same direction as the follower, a raised portion that resembles the outline of a cartridge.

Fig. 3.3

Fig. 3.4

3.2.2 Discharging Magazine

a. Slip upmost cartridge out of magazine pushing on its butt (fig. 3.4).
b. Put cartridge back in its ammo box.
c. Repeat until magazine is empty.

WARNING: Do not drop removed cartridges.

3.3 Loading & Unloading the Weapon

3.3.1 Loading Weapon in Magazine fed Mode

a. Prepare one charged magazine.
b. Open bolt by raising the bolt handle to its upmost position and pulling back to bolts rearmost position.
c. Engage safety.
d. Pull magazine retainer button rearwards with middle finger of shooting hand.
e. Insert magazine with one straight movement (fig. 3.5).
f. Release magazine retainer button.
g. Check magazine for proper seat trying to push it downwards.
h. Close bolt sliding it forwards by the bolt handle.
i. Lock bolt rotating bolt handle fully downwards.
j. Weapon is now loaded with safety engaged.

CAUTION: Not pulling back magazine retainer button and use of excessive force while inserting magazine may damage the magazine lips.
A fully inserted but empty magazine will lock the bolt in open position. Trying to close the bolt with excessive force may damage the follower.

Fig. 3.5

Fig. 3.6

3.3.2 Loading Weapon in Hand fed Mode

a. Prepare one cartridge.
b. Open bolt by raising the bolt handle to its upmost position and pulling back to bolts rearmost position.
c. Engage safety.
d. Pull magazine retainer button rearwards with middle finger of shooting hand.
e. Insert empty magazine halfway and release magazine retainer button.
f. Slide magazine into weapon until magazine retainer audibly clicks.
g. Check magazine for proper seat trying to push it downwards.
h. Insert single cartridge through ejection port and guide it into chamber (fig. 3.6).
i. Close bolt sliding it forwards by the bolt handle.
j. Lock bolt rotating bolt handle fully downwards.
k. Weapon is now loaded with safety engaged.

WARNING: Ensure the weapon is put to SAFE mode before inserting or removing the loaded magazine. Ensure weapon is pointing in a safe direction. Keep finger off the trigger.
Do not apply excessive force if bolt fails to lock smoothly. Remove magazine and remove fed cartridge. Inspect fed cartridge, chamber and bolt head visually and with little finger through ejection port to be clean before trying again to load.

3.3.3 Unloading and Clearing of Weapon

a. Engage safety.
b. Pull magazine retainer button rearwards with middle finger of shooting hand.
c. Fully remove magazine with one straight movement.
d. Open bolt by raising the bolt handle to its upmost position and pulling back to bolts rearmost position.
e. Allow weapon to eject chambered cartridge in your hand (fig. 3.7).
f. Inspect ejected cartridge to be clean and free of damages and put it back in ammo box.
g. Discharge all magazines and put cartridges back in ammo box.
h. Weapon is now unloaded with safety engaged.
i. Keep bolt open to present weapon as clear.

Fig. 3.7

CAUTION: If weapon fails to eject cartridge, inspect ejector and extractor.

WARNING: Do not apply excessive force if bolt fails to open. Dirt or excessive form fit of cartridge case after overpressure shot may lock bolt in closed position. Try to open bolt carefully by slightly tapping bolt handle first upwards until bolt unlocked and then rearwards. Keep weapon pointing in safe direction.

3.4 Trigger Adjustments

3.4.1 Adjusting Trigger Force

a. Unload weapon.
b. Turn screw #1 in trigger housing with Allen key 2.5 mm (operator's tool kit) to adjust trigger force.
c. Turn clockwise to increase trigger force.

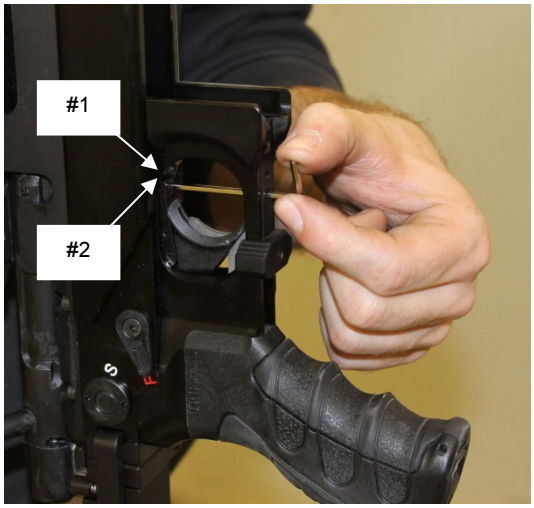


Fig. 3.8

3.4.2 Adjusting Trigger Path

a. Unload weapon.
b. Turn screw #2 in trigger lever with Allen key 2.5 mm (operator's tool kit) to modify trigger path.
c. Turning it clockwise will more accent the point of shot release.

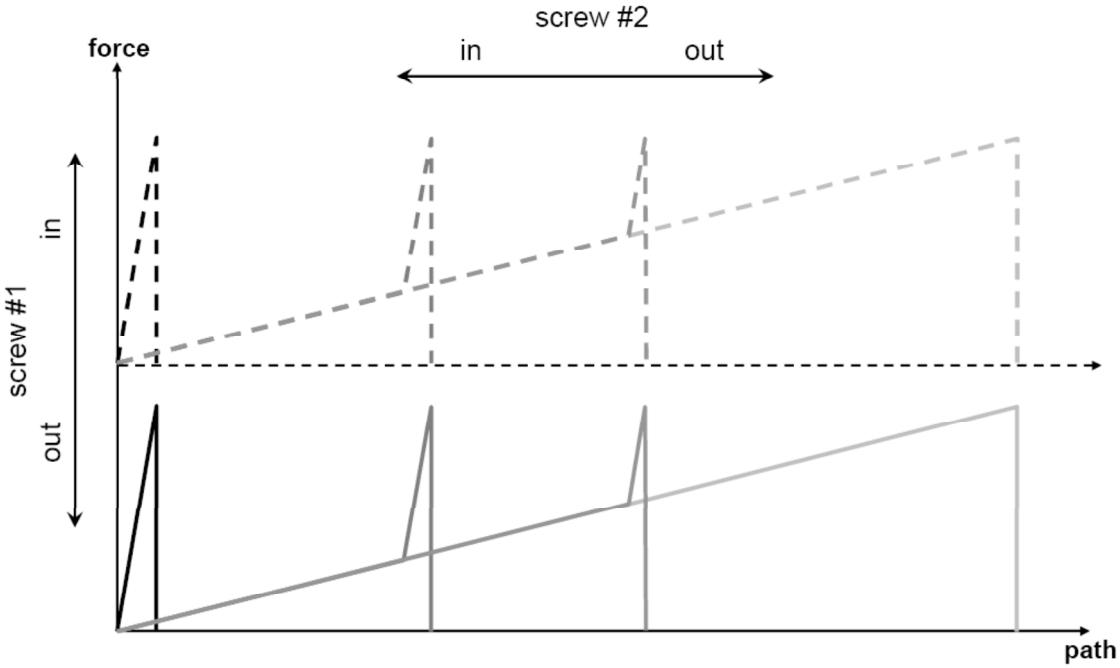


Fig. 3.9

CAUTION: Execute trigger adjustments only with engaged safety. Only apply minimal force to turn the screws. Use of excessive force will damage trigger parts. Execute functional check according to section 4.3 after finishing procedures.

WARNING: After execution of trigger adjustment, present weapon to technician with trigger gauge for inspection. Non-conform trigger settings may result in hazardous condition.

3.5 Operating Folding Stock

3.5.1 Closing Folding Stock

a. Push on folding stock retainer open until stock released (fig. 3.10).
b. Rotate stock to left weapon side until held by folding stock retainer folded.
c. Check proper retention of folding stock in folded position.
d. Now the stock is folded for transport.

Fig. 3.10

Fig. 3.11

3.5.2 Opening Folding Stock

a. Push on folding stock retainer folded until stock released (fig. 3.11).
b. Rotate stock into unfolded position until held by folding stock retainer open.
c. Check proper retention of folding stock in unfolded position.
d. Now the stock is open for use of weapon.

CAUTION: Rotate folding stock only if bolt is closed or just halfway open. If bolt is fully open, retainer open may interfere with firing pin retainer.

3.6 Stock Adjustments

3.6.1 Adjusting Stock Length

a. Open folding stock.
b. Loosen two stock clamping screws underside the stock using Allen key 5 mm (operator's tool kit, fig. 3.12).
c. Set stock to proper length.
d. Tighten screws firmly but without excessive force.
e. Push on butt plate to check firm seat of stock.

Fig. 3.12

NOTE: If the extension does not slide, loosen cheek rest clamping screws - if they are too tight, the cheek rest locks the extension.

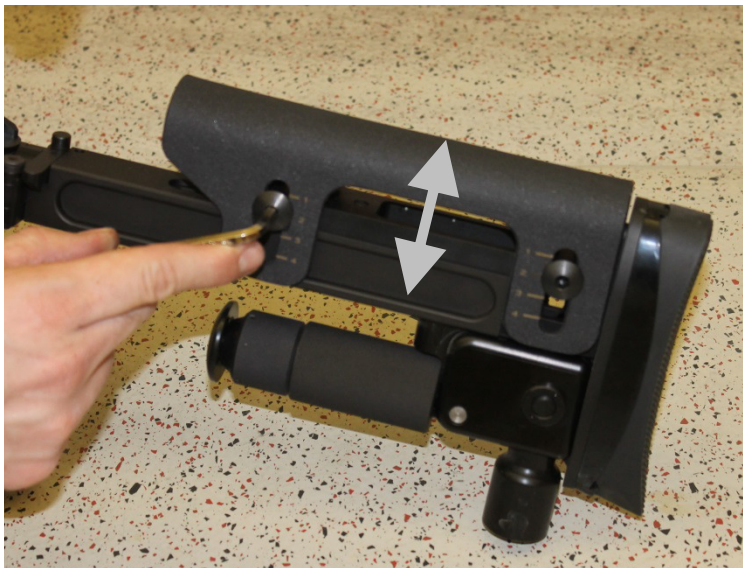


Fig. 3.13

Fig. 3.14

3.6.2 Adjusting Cheek Rest

a. Open folding stock.
b. Loosen cheek rest clamping screws using Allen key 5 mm (operator's tool kit, fig. 3.13).
c. Set height of cheek rest to proper height, placing the operator's eye aligned with aiming device.
d. Tighten screws firmly but without excessive force.
e. Memorize position mark on cheek rest according to individual setting.

NOTE: Overtightening clamping screws will accelerate wear out of cheek rest and lock the stock extension.

3.6.3 Adjusting Butt Plate

a. Open folding stock.
b. Loosen butt plate clamping screw using Allen key 4 mm (operator's tool kit, fig. 3.14).
c. Set height of butt plate for a most straight positioning of the operator's shoulder behind the weapon.
d. Tighten screw firmly but without excessive force.

NOTE: Only a properly adjusted stock provides best accuracy and operator safety. Stock must be adjusted to operator's body and eye relief to rifle scope.

3.7 Operating Butt Spike

3.7.1 Unfolding Butt Spike

a. Pull butt spike on its sleeve against pistol grip (fig. 3.15).
b. Rotate butt spike downwards for 45° or 90°, according to intended firing position.
c. Allow butt spike to slide into position under the force of its retaining spring.
d. Check firm position of unfolded butt spike.

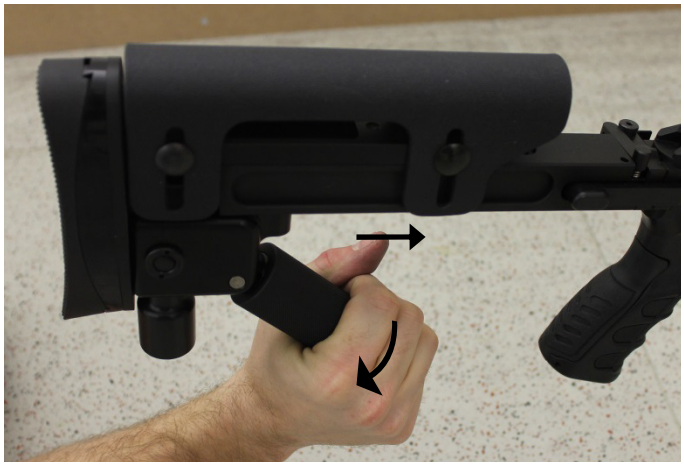


Fig. 3.15

Fig. 3.16

3.7.2 Folding Butt Spike

a. Pull butt spike on its sleeve downwards.
b. Rotate butt spike into its folded position.
c. Allow butt spike to slide into folded position under the force of its retaining spring.
d. Check firm position of unfolded butt spike.
e. Use rear hand stop when firing with folded butt spike.

3.7.3 Adjusting Butt Spike

a. Rotate butt spike to 90° open position.
b. Use supporting hand to operate main screw (fig. 3.16).
c. Rotate main screw clockwise to extend butt spike.
d. Rotate main screw counterclockwise to retract butt spike.

3.8 Operating Bipod

3.8.1 Opening and Adjusting Bipod

a. Rotate bipod downwards until it snaps open (fig. 3.17).
b. Put rifle on bipod in firing position.
c. Hold bipods left pod on it's bed-plate firmly on ground.
d. Lift rifle until it points on target (fig. 3.18).
e. Check retainer to securely lock pod.
e. Repeat with right pod.

Fig. 3.17

Fig. 3.18

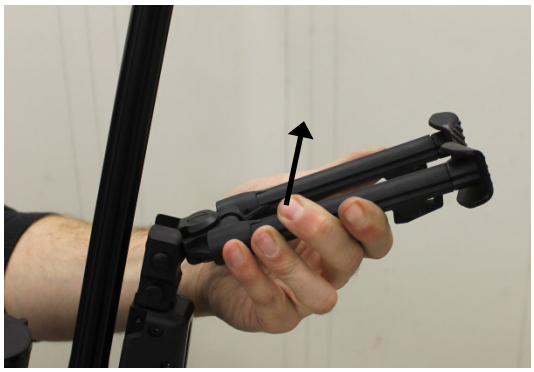


Fig. 3.19

WARNING: Keep finger off the trigger while setting the bipod.

NOTE: Place bipod on soft ground - hard ground will make the rifle jump when firing.

3.8.2 Closing Bipod

.
a. Grasp both pods with one hand.
b. Rotate bipod upwards until it snaps into closed position (fig. 3.19).
c. Push on retaining levers and collapse pods into shortest position.

3.8.3 Detaching and Attaching Bipod

a. Pull out locking pin against bedstop.
b. Pull bipod away from fork axle.
c. To attach bipod operate in reverse order.

Fig. 3.19a

Fig. 3.19b

3.9 Use of Emergency Sights

3.9.1 Opening Emergency Sight and Aiming with

a. Rotate rear sight upwards until it snaps into position (fig. 3.20).
b. Rotate front sight upwards until it snaps into position (fig. 3.21).
c. For aiming, place front sight in center of rear sights peep hole (fig. 3.22).
d. Aim point blank.

Fig. 3.20

Fig. 3.21

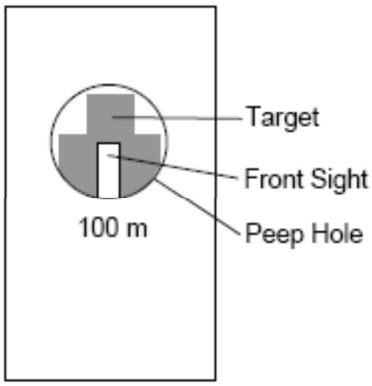


Fig. 3.22

NOTE: The emergency sights are factory zeroed at 100 m.

3.9.2 Closing Emergency Sights

a. Rotate rear sight downwards into closed position.
b. Rotate front sight downwards into closed position.

3.10 Attaching & Removing Suppressor

3.10.1 Attaching Suppressor

a. Remove thread protector (right-handed thread) and store it (fig. 3.23).
b. Before attaching the suppressor, shake it and listen to loosened parts.
c. Screw suppressor on muzzle brake and tighten with firm grip.

WARNING: A misaligned suppressor will get damaged with one round fired and deflect the projectile into any direction. Carefully follow instructions of section 3.15 "Preparation for Firing".

3.10.2 Removing Suppressor

a. Remove suppressor and store it.
b. Screw protector ring on and tighten.

CAUTION: Allow suppressor to cool down before removing it with bare hands.

Fig. 3.23

Fig. 3.24

3.11 Attaching & Removing Anti-Mirage Band

3.11.1 Attaching Anti-Mirage Band

a. Allow one hook to snap into the dedicated holes on the rifles Picatinny rail.
b. Snap the other hook into the dedicated holes on the front sight housing (fig. 3.24).
c. Check anti-mirage band to be placed properly over barrel.

NOTE: When firing longer series while training or zeroing without using anti-mirage band, hot air convection will degrade the perception of the target and therefore the accuracy.

3.11.2 Removing Anti-Mirage Band

a. Unhook anti-mirage band.
b. Roll it for storage.

3.12 Use of Rifle Sling

3.12.1 Attaching & Removing Rifle Sling

a. Place swivel on one of the five sling attachment points.
b. Press on button of swivel to push it into the flush cup.
c. Pull on sling to check proper seat of swivel.
d. Press on button and pull on sling to remove (fig. 3.25).

Fig. 3.25

Fig. 3.26

3.12.2 Length Adjustment

a. Unstrap sling from buckle.
b. Allow sling to slide through buckle until proper length is reached (fig. 3.26).
c. Strap sling to buckle.

3.13 Attaching & Removing Rifle Scope with Mount

3.13.1 Attaching Rifle Scope with Mount

a. Place scope with mount on right side of Picatinny rail.
b. Allow stopper to drop into a groove of the Picatinny rail (fig. 3.27).
c. Check proper placement with respect to engraved position marks.
d. Tilt scope in upright position.
e. Rotate clamping levers into closed position (fig. 3.28).
f. Check proper seat of mounted scope.

Fig. 3.27

Fig. 3.28

3.13.2 Removing Rifle Scope with Mount

a. Rotate clamping levers into open position.
b. Tilt scope off to right side and remove.

3.13.3 Placement of Rifle Scope

a. Take proper firing position, aiming in safe direction.
b. Close eyes and search most comfortable position with rifle.
c. Open eyes and check for correct image (fig. 3.29).
d. Adjust scope mount position and stock adjustments until complied.

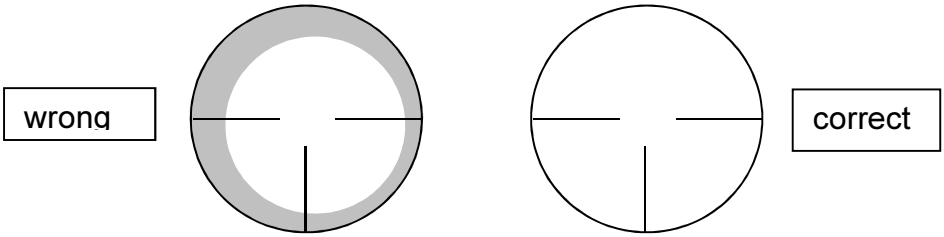
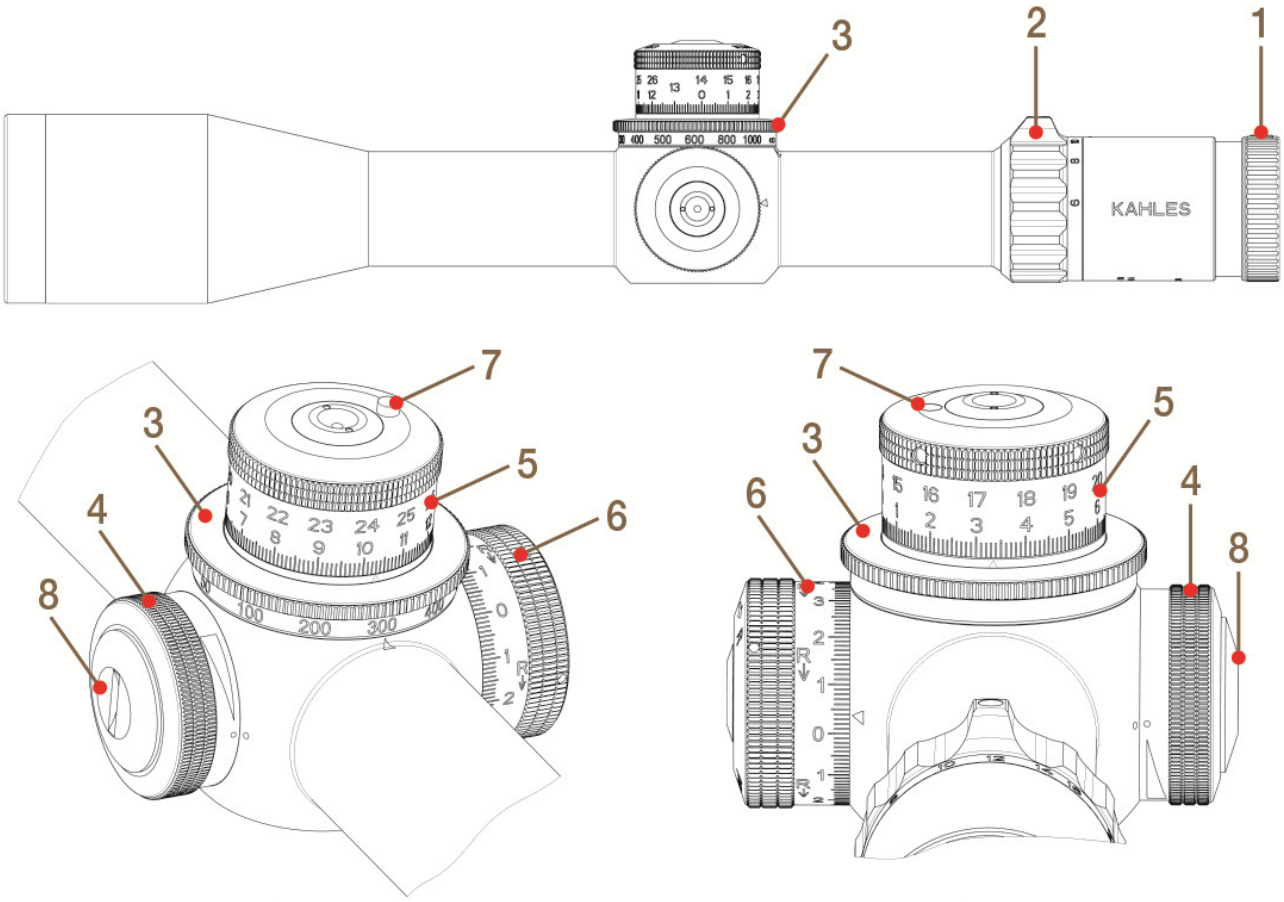


Fig. 3.29

CAUTION: Improper placement of the rifle scope obviates proper aiming and may hurt the operator's eye when firing the weapon.

3.14 Use of Rifle Scope

3.14.1 Operating Adjustments



Depending on model/type (picture shown left K624i and right K312i)

1 - Diopter compensation ring
2 - Magnification ring
3 - Parallax adjustment wheel
4 - Illumination control
5 - Elevation adjustment turret
6 - Windage adjustment turret
7 - Rotation Indicator Pin
8 - Battery cover

3.14.2 Use and Mounting

KAHLES rifle scopes are waterproof and extremely durable. Nevertheless, careful handling is advised, especially around the turrets. Please protect your rifle scope against excessive impact and abuse.
To ensure proper function and performance use a professional gunsmith to mount your KAHLES rifle scope. Ensure maximum eye relief is achieved. Please read all safety instructions before use.

3.14.3 Safety instructions

- Never look directly into the sun or any other intense light through your rifle scope
- Please protect your rifle scope from excessive solar radiation and heat

● Please note the eye relief distance specified for properly mounting the rifle scope
● All repairs must be performed by KAHLES
● The rifle scope must be mounted by professional gunsmith
● Attention - the screws of mounts shall in no case be tightened stronger than max. 240 Ncm
● Always check carefully and be certain that your firearm is unloaded before undertaking any work upon it

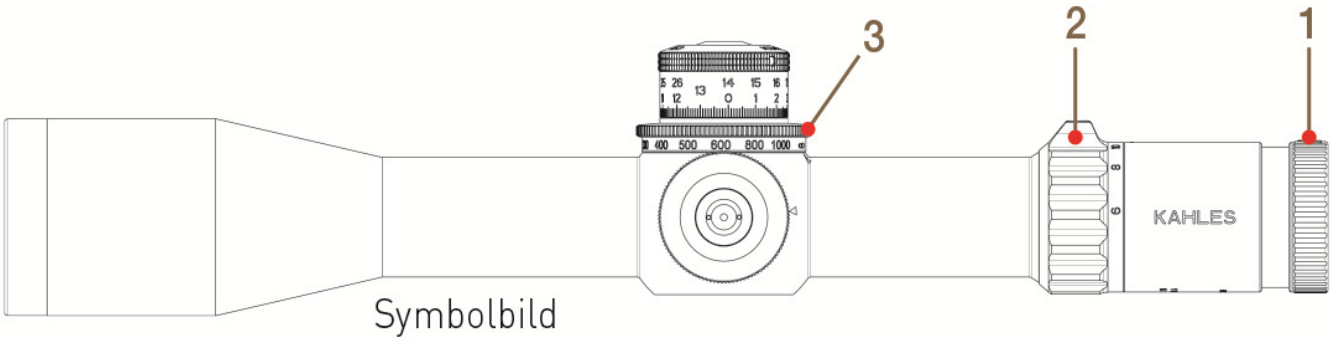
3.14.4 Mechanical center

The reticle has been factory-set to mechanical center. If you need to reset, follow these steps:

1. Turn the elevation or windage adjustment until it stops (do not force).
2. Now turn the adjustment in the opposite direction while counting the total number of clicks until it stops.
3. Half of this total number of clicks is the mechanical center.
4. Repeat this procedure for the second adjustment turret.

3.14.5 Diopter and Parallax adjustment

- Turn the diopter compensation ring (1) until you get a sharp reticle image
- Turn the parallax adjustment wheel (3) until you achieve a sharp image and the reticle does not move on the target due to head placement
- Magnification ring (2) turn to increase or decrease magnification

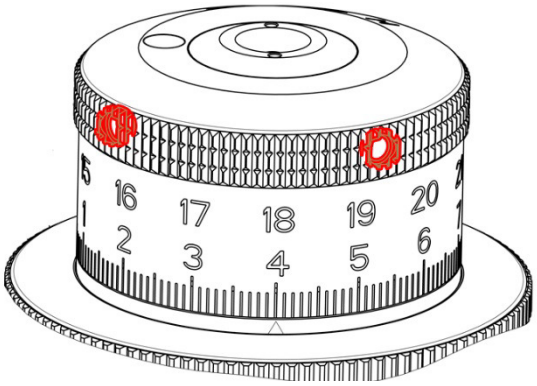


3.14.6 Sighting in the rifle scope

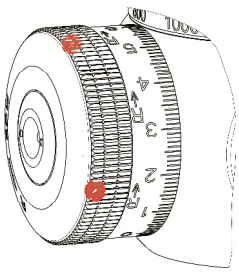
After the rifle scope has been properly mounted and bore sighted by a professional gunsmith you will need to sight in your rifle and rifle scope. Attention - the screws of mounts shall in no case be tightened stronger than max. 240 Ncm!
Sight in the rifle scope (on the shooting range) to your specific distance and desired point of impact by turning the elevation and windage adjustments to move the bullet impact to your desired point of impact. The direction of bullet impact is engraved on each adjustment.

Once you have established the preferred point of impact on the target you will need to zero the elevation and windage adjustments.
Expert mounting is required to ensure optimum performance.

3.14.7 Zeroing elevation and windage



Using the supplied allen key, loosen the **two** set screws on the turret 1-3 turns (do not remove the set screws completely) until you have a free moving turret without clicks. With the set screws loosened turn the elevation turret in the down direction (the direction of bullet impact is engraved on the adjustment) until it stops. This will be 3 or 4 marks below the zero mark on the dial. Turn the turret so that the zero on the dial lines up with the indicator mark on the body tube. Align the marks and using the short end of the supplied allen key tighten again the two set screws to approximately 1Nm or 8 inch pounds (do not exceed 1Nm or 8 inch pounds).
Your elevation is now zeroed.
The mechanical (physical) stop will be about 3 or 4 clicks below zero. This allows adjustments slightly below zero for special conditions as increased temperature or closer targets.
Pay attention, never use any strong force when you do any adjustments on the turrets.



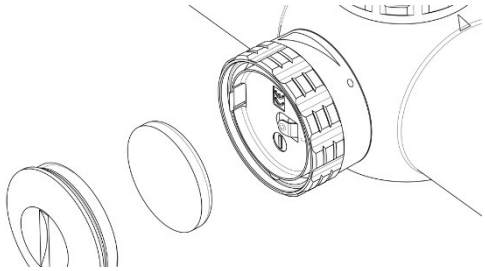
With the rifle and scope sighted in to the desired point of impact loosen the **two** set screws on the windage adjustment dial 1-3 turns (do not remove the set screws completely) and move the dial to align the zero mark to the indicator mark on the body tube. Using the short end of the supplied allen key, tight the two set screws to approximately 1Nm or 8 inch pounds (do not exceed 1Nm or 8 inch pounds). Your windage is now zeroed.

Pay attention, never use any strong force when you do any adjustments on the turrets.

3.14.8 Reset to factory conditions (full elevation) for K312II, K312i and K624i

1. Turn the elevation turret (6) in the up direction until you reach the mechanical stop.
2. Use the supplied allen key to loosen the two set screws 1-3 turns (do not remove the set screws completely) until you have a free moving turret without clicks.
3. Now turn the elevation turret in the up direction until you reach the mechanical stop.
4. Use the short end of the supplied allen key to tighten the two set screws to approximately 1Nm or 8 inch pounds (do not exceed 1Nm or 8 inch pounds).
5. Turn the elevation turret in the down direction until you reach the mechanical stop.
6. Use the supplied allen key to loosen the two set screws 1-3 turns (do not remove the set screws completely) until you have a free moving turret without clicks.

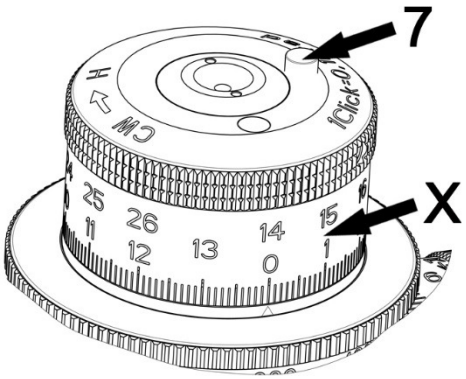
7. Now turn the elevation turret in the down direction until you reach the mechanical stop.
8. Use the short end of the supplied allen key to tighten the two set screws to approximately 1Nm or 8 inch pounds (do not exceed 1Nm or 8 inch pounds).



9. You have now deactivated the zero stop feature. Your rifle scope will now have full elevation travel.

Note: The mechanical (physical) stop will be about 3 or 4 clicks below zero. This allows adjustments slightly below zero for special conditions as increased temperature or closer targets.

Pay attention, never use any strong force when you do any adjustments on the turrets.

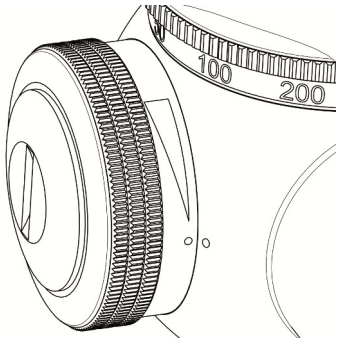


2.14.9 Rotation Indicator Pin Double turn turret

There are **two** rows of numbers (x) on the elevation adjustment. If the indicator pin (7) is flush to the top of the adjustment you are using the bottom row of numbers (first rotation). If the indicator pin is raised up, you are using the upper row of numbers (second rotation).

3.14.10 Illumination

Most KAHLES rifle scopes are equipped with illuminated reticles. To switch on the reticle illumination turn the illumination switch towards clockwise direction. The illumination intensity will get brighter or lower by turning the adjustment switch greater or lesser. The adjustment can be turned in direction to the off point or to the desired intensity setting. The illumination is switched off when the indicator on the illumination adjustments allied with the off marking on the tube. All of our K-models have the automatic-off function of the reticle illumination integrated. If there will be no brightness adjustment over a period of about 2 hours, the reticle illumination automatically switches off. To restart the reticle illumination after the automatic-off is activated, you have to switch it completely off and on again. In any case to prevent depletion of the battery, turn off the reticle illumination when not in use.



3.14.11 Replacing the Battery

The battery is stored in the illumination adjustment.

To change the battery:
1. Turn off the reticle illumination
2. Hold the illumination adjustment from turning

3. Use a coin that fits the slot and turn counter clockwise until the cover is unscrewed
4. Change the battery (CR2032) positive + side facing out
5. Reinstall the battery cover securely

Attention! Use only type CR 2032 batteries. Some KAHLES K models contain inside the windage turret cap one spare battery.
Symbol picture
Batteries Directive
Batteries must not be disposed of as household waste and you are legally obliged to return used batteries. Local facilities exist for returning used batteries free of charge (e.g. in retail outlets or at communal collection points). Batteries are labelled with a crossed-out wheeled bin and the chemical symbol of the harmful substance they contain: "Cd" for cadmium, "Hg" for mercury and "Pb" for lead. Please help us to protect the environment.

3.14.12 Cleaning

We have designed all elements and surfaces to require very little care.
KAHLES OILPHOBIC™ lens coatings makes cleaning objective lenses and eyepiece lenses easy, especially when cleaning dried-on mineral deposits (e.g. water marks from condensation). To ensure the long-lasting optical quality of your rifle scope, you should keep the glass surfaces free from dirt, oil and grease.
When cleaning the lenses, first remove larger particles with an optical lens brush. For subsequent thorough cleaning, breathe lightly on the lens and clean with the cleaning cloth. The metal parts are best cleaned with a soft, lens-cleaning cloth.

Standard Accessory
The special KAHLES Lens-Cleaning cloth can be used to clean even the most sensitive glass surfaces. It is suitable for the objective and eyepiece lens. Please keep the microfiber cloth clean as dirt particles can damage the lens surface. If the cloth is dirty, it may be washed in lukewarm soapy water and allowed to dry naturally. Please use it exclusively for cleaning lens surfaces.

3.14.13 Storage

We recommend to store the rifle scope in a dry place without excessive solar radiation and heat. If the rifle scope is wet it must be dried prior to storage.

3.15 Preparation for Firing and Live Firing

3.15.1 Before loading

a. Execute the following procedure in the last cover before reaching actual firing position.
b. Inspect weapon to be in safe mode.
c. Close folding stock halfway in a 90° position.
d. Remove bolt according to section 4.1.
e. Inspect barrel visually to be clear and clean (fig. 3.41); otherwise use fix rod with copper brush to remove foreign particles and flex rod with cotton wicks to remove residuals of oil or water (all in cleaning kit).
f. If suppressor is mounted, inspect visually proper alignment (concentricity of bores); in case of misalignment, remove and reinstall suppressor and inspect again.
g. Fully open folding stock.
h. Inspect firm mount of scope.
i. Inspect scope lenses to be clean; otherwise use Lens Pen to clean (cleaning kit).
j. Inspect stock to be properly adjusted and locked in open position.

WARNING: Firing a weapon with any obstruction or residuals of water or oil in the chamber or bore of the barrel will result in severe damage to the weapon and personal injury.
A misaligned suppressor will get damaged with one round and deflect the projectile into any direction.

NOTE: The required first round performance is only accomplished if the barrel is dry when firing. Any residual of oil in the barrel will affect the trajectory.

Fig. 3.41


Fig. 3.42

3.15.2 Before firing

a. Ensure bipod to stand stable on soft ground.
b. Unfold butt spike and adjust height until weapon is stabilized on target.
c. Inspect scope adjustments according to actual firing distance, especially parallax adjustment and elevation.
d. Inspect weapon danger area to be clear.
e. Load weapon in safe mode.
f. Disengage safety to put weapon into fire mode.

WARNING: Keep finger off the trigger until you are willing to fire. Hold weapon stable on target.

3.15.3 Firing

a. Check weapon to be in fire mode (safety disengaged, levers point to "F").
b. Keep on aiming while putting finger on trigger.
c. Slightly increase pull on trigger until shot breaks (fig. 3.42).
d. Unlock and fully open bolt; observe the ejection of a cartridge case.
e. Close bolt and lock.
f. Weapon is now ready for second shot, loaded, armed and in fire mode.

WARNING: Weapon can be used by right hand shooters as well as by left hand shooters. While right hand shooters automatically remove finger from trigger to operate the bolt, left hand shooters must be conscious to take the finger off the trigger while reloading.

WARNING: If heavy black smoke appears after a shot released and no impact can be detected, probably the barrel was obstructed. Stop firing and return the weapon to an armorer for inspection.

3.15.4 Firing Positions

a. Sitting on bench, using butt spike and bipod or bag (most suitable for zeroing).
b. Prone, using butt spike and bipod or bag (tactical, fig. 3.43).
c. Prone, using rear hand stop and bipod or bag (tactical).
e. Lying on back, using leg as rest and sling for stabilization (tactical, suitable for downrange shooting, fig. 3.44).
d. Sitting, using sling and hand stop (tactical, fig. 3.45).
e. Standing, using improvised rest (tactical, fig. 3.46).
f. Downrange, using bipod butt spike at 45° position (tactical, 3.47).

Fig. 3.43

Fig. 3.44

Fig. 3.45

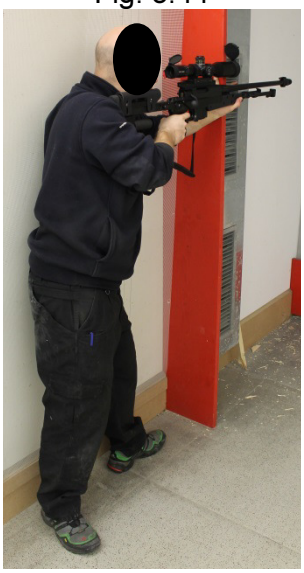


Fig. 3.46

Fig. 3.47

NOTE: In firing position, no part of the rifle shall touch hard ground - otherwise, it will jump and the shot will miss.

3.16 Zeroing Rifle Scope

3.16.1 Firing Reference Groups

a. Zeroing of the rifle scope should be done at 100 m.
b. Choose indoor range or outdoor range which is free of crosswind.
c. Choose maximally stable firing position; best is firing from a bench in sitting position, second best is prone.
d. Place fore end on sandbag or rifle rest; if not available, use bipod. Use butt spike for maximum stability.
e. Choose target that meets reticle pattern, e. g. black circle on white ground.
f. Aim point blank to center of target.
g. Fire three rounds.

3.16.2 Evaluating Sight Corrections

a. Determine MPI of group and deviations according to figure below.

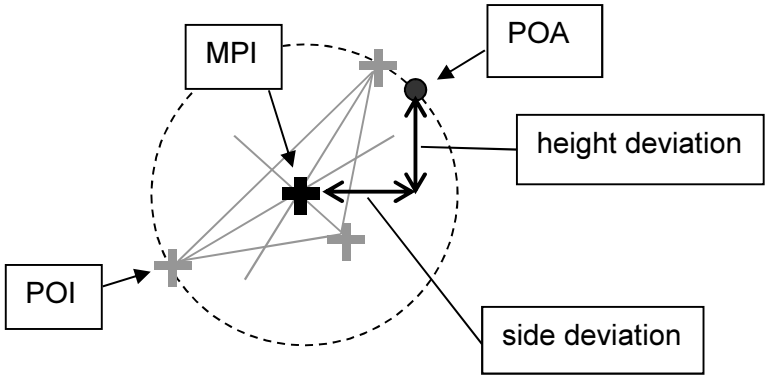


Fig. 3.48

b. Measure height and side deviation in Millimeter and determine sight correction according to table 3.1.
c. If deviation is smaller than 1 click (0.1 mrad = 10 mm at 100 m), no correction is required.

3.16.3 Setting Zero

Refer to section 3.14.

3.17 Immediate Action and Stoppages

WARNING: Any failure to fire can be caused by a foul cartridge with retarded ignition. Opening the bolt before 30 seconds may cause case explosion with shrapnels.

WARNING: Always keep the finger off the trigger and the weapon pointing in a safe direction during immediate actions or investigation of stoppages.

3.17.1 Immediate Action

a. Immediate action is the unhesitating application of a probable remedy to overcome a stoppage without investigating its cause.
b. If weapon fails to fire when pulling the trigger, unlock and fully open bolt; observe the ejection of a cartridge or cartridge case.
c. If ejection takes place, close bolt and lock; resume firing.
d. If there is no ejection, a failure to extract or feed has occurred.

- Engage safety.
- Remove magazine, open bolt and inspect chamber to be empty.
- If chamber is empty, reload magazine and resume firing.
- If the chamber has a round, follow procedure below.

3.17.2 Cartridge jammed in Chamber

a. To proceed if a cartridge or case is stuck in the chamber and the extractor fails to remove or is missing.
b. Procedure to be executed in cover, weapon in safe mode, magazine removed; apply safety rules.
c. If available, try to remove cartridge/case using the bolt of another rifle.
d. Otherwise remove bolt and hit the rifle with its butt plate on the ground, in order to force the cartridge to drop out. Barrel must be maintained in a safe direction.
e. If in worst case a live cartridge remains stuck in the chamber, remove bolt and keep it apart until service on weapon is possible. Remain responsible of weapon until handed out to technician.

WARNING: Do not remove a cartridge stuck in the chamber by using a fix rod from the muzzle end of the barrel.

WARNING: If due to a failure to extract or to eject a second cartridge was fed onto the chambered cartridge/case, do not reuse this cartridge. Bullet might slip into the case and will cause overpressure when firing.

3.17.3 Stoppages

a. A stoppage is any unintentional interruption in the cycle of function. If the weapon fails to fire, immediate action should be taken as the first step.
b. Stoppages of the weapon normally fall into one of the following categories:

- Excessive fouling of weapon due to negligence, incorrect or poor maintenance.
- Failure of cartridge.
- Mechanical failure of the weapon.

3.17.4 Common Stoppages & their Causes

SN	Problem	Probable Cause
1.	Failure to extract	- Broken, stuck or lost extractor - Broken or weak extractor spring - fouling of chamber - torn cartridge's rim
2.	Failure to eject	- Stuck ejector - Broken or weak ejector spring
3.	Failure to ignite despite striking firing pin	- non-conform primer - broken or short firing pin - weak firing pin spring - large headspace
4.	Failure to ignite despite pulling trigger (firing pin not striking)	- no cartridge chambered (failure to feed) - safety engaged - trigger group failed to cock firing pin (worn out firing pin retainer, disconnector or sear) - trigger stuck in rear position (due to foreign particles or weak trigger springs)
5.	Failure to feed	- magazine improperly inserted (maybe in manual feed position) - deformed magazine lips
6.	Impossible to close and lock bolt	- cartridge/case stuck in chamber (failure to extract) - cartridge/case jammed in mechanism (failure to eject, improper feeding) - foreign particles in chamber

3.18 Operating Procedures in Adverse Conditions

NOTE: The following are additional procedures to take note when operating in adverse conditions. Normal maintenance and operating procedures are still applicable to ensure that the weapon will function properly.

3.18.1 Sand / Dust Condition

a. Clean the weapon as often as possible.
b. Use less oil than normally.
c. Use hand fed mode to load rifle.
d. Inspect cartridges to be clean before loading.
e. Operate bolt more carefully than usual.

WARNING: Besides stoppages, grains of sand may even provoke hazardous situations. Keep them off the weapon and do not operate the bolt with excessive force when sand is present.

3.18.2 Wet / Rainy Condition

a. Use hand fed mode to load rifle.
b. Wipe of water drops from bullets before loading.
c. When opening bolt, slightly incline ejection port to the ground, preventing rain to drop into open mechanic.

NOTE: A sniper rifle is a precision tool. Not only functionality has to be maintained in adverse conditions, but also first round hit capacity.

4. Field Assembly / Disassembly

WARNING: Unload and clear weapon before proceeding with disassembly.

4.1 Field Stripping

4.1.1 Removing Bolt

a. Close folding stock halfway in a 90° position.
b. Push down bolt stop and remove bolt rearwards (fig. 4.1).
c. Open folding stock.

4.1.2 Removing Firing Pin

a. Use bolt tool (operator's tool kit) to remove firing pin.
b. Hold bolt in one hand and put bolt tool over firing pin housing.
c. Rotate bolt tool (with firing pin housing) clockwise until firing pin comes loose (fig. 4.2).

4.1.3 Field Stripping of Magazine

a. Push down follower at its rear end, allowing it to incline itself.
b. Guide follower to slide out of the magazine body by its front end (fig. 4.3).


Fig. 4.1

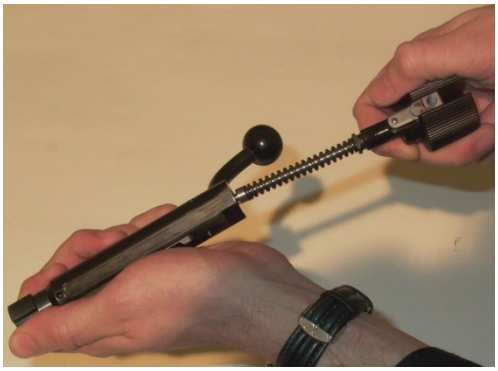


Fig. 4.2


Fig. 4.3

4.1.4 Removing Rifle Scope with Mount

a. This procedure is optional in order to protect the scope.
b. Ensure lens covers to be closed.
c. Remove rifle scope.

NOTE: The rifle with bolt, magazine and scope with mount removed shall be called "main assembly".

4.2 Assembly

4.2.1 Installation of Firing Pin

a. Hold firing pin with bolt tool.
b. Slip firing pin into bolt body, firing pin retainer aligned with face on bolt body.
c. Push firing pin completely into bolt body against force of firing pin spring and rotate it counterclockwise until it snaps audibly into cocked position.

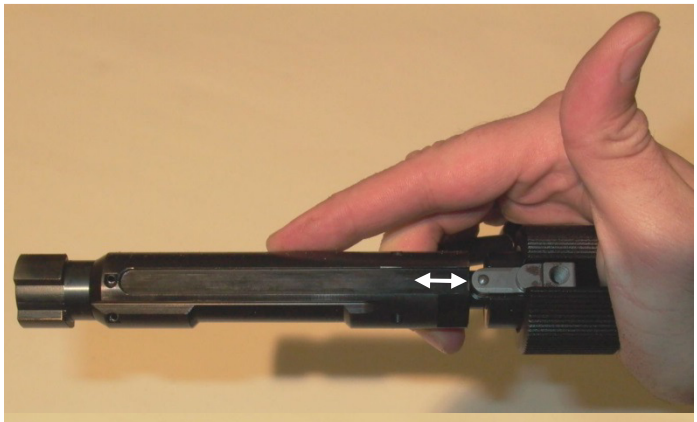


Fig. 4.4: Proper alignment

Fig. 4.5: Correct installation

Fig. 4.6: Wrong installation

NOTE: Do not turn firing pin on uncocked position - bolt can not be inserted into rifle in this position.

WARNING: Inspect firing pin and its bore in the bolt body visually to be clean before assembly. Firing pin stuck by obstructions may cause hazardous situations.

4.2.2 Installation of Bolt

a. Close folding stock halfway in a 90° position.
b. Push on bolt stop.
c. Slide bolt into receiver, with firing pin retainer running in bolt guide latch (fig. 4.7).
d. Open folding stock (optional).

4.2.3 Installation of Magazine

a. Slide follower into magazine box on its front end (fig. 4.8).
b. Push follower down into magazine box until properly placed.

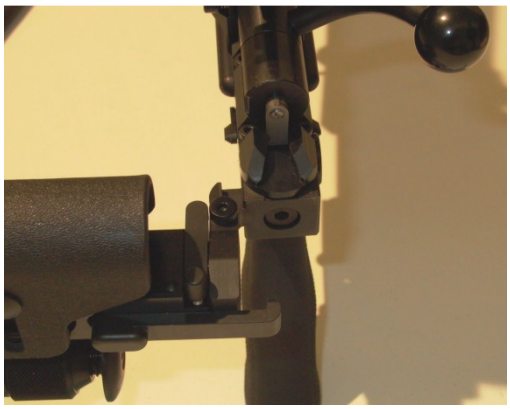


Fig. 4.7

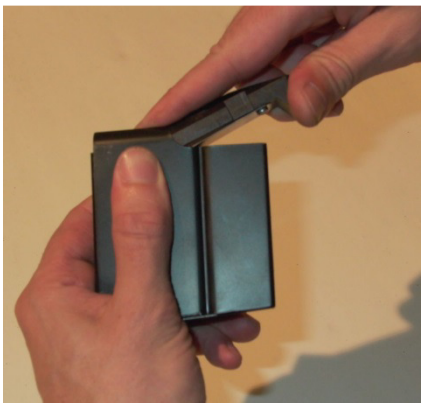


Fig. 4.8

4.3 Functional Check

4.3.1 Application

a. Execute the functional check procedure always after stripping and reassembling the weapon system.
b. Execute the functional check procedure always before leaving for mission.
c. Execute one stage after the other in the order they appear below.

4.3.2 Checking Trigger Action and Safeties

Step	Action to be carried out
a	Remove magazine and clear chamber to ensure that the rifle is not loaded. Safety on "S".
b	Open bolt, close and lock bolt. ⇨ Firing pin shall be armed, noticeable by firing pin retainer protruding firing pin housing.
c	Pull trigger. ⇨ You should hear nothing as the firing pin should not strike.
d	Rotate safety lever to "F". ⇨ Safety shall run smooth and audibly lock into position.
e	Pull trigger. ⇨ You should hear and observe the firing pin to strike.
f	Release trigger. ⇨ Trigger shall return to foremost position.
g	Open bolt, close and lock bolt. Pull on trigger at its outer edge. ⇨ Trigger safety shall lock trigger in foremost position, firing pin shall not strike.
h	Rotate safety lever to "S". ⇨ Safety shall run smooth and audibly lock into position.

4.3.3 Checking Magazine

Step	Action to be carried out
a	Take empty magazine, pull follower down and release slowly. ⇨ Follower shall rise smoothly into final position.
b	Open bolt and fully insert empty magazine. ⇨ Magazine shall be held by magazine retainer. ⇨ Bolt shall be held open by follower.
c	Pull magazine retainer back and magazine down into hand fed mode, close bolt. ⇨ Bolt shall travel smoothly over follower into locking position.
d	Remove magazine and repeat procedure with every magazine included to the weapon system.

4.3.4 Checking Folding Stock, Butt spike and Bipod

Step	Action to be carried out
a	Get rifle with stock open and butt spike folded. ⇨ Stock shall be locked without any clearance.
b	Rotate butt spike into 45° position, into 90° position and back into folded position (0°). ⇨ Butt spike shall lock positively in all positions.
c	Close folding stock. ⇨ Shall be held firmly in closed position.
d	Open folding stock, rotate main screw of butt spike to extend and retract. ⇨ Shall run smoothly over its full range.
e	Put rifle on butt plate, barrel straight upwards. Extend bipods with one movement (per pod). ⇨ Pods shall run into fully extend position.
d	Pull on left pod retainer until left pod released. Relax retainer and retract pod position by position. ⇨ Pod shall lock firmly in every position.
e	Repeat step d with right pod.
f	Rotate bipod downwards until it snaps open. ⇨ Pods shall snap into approx. 50° spread position.
g	Rotate bipod in closed position. ⇨ Shall lock positively in closed position.

4.3.5 Checking Scope with Mount and Emergency Sights

Step	Action to be carried out
a	While scope removed, flip up rear and front emergency sights. ⇨ Shall lock firmly and straight upwards in open position
b	Close emergency sights, attach rifle scope with mount. ⇨ Check levers for tight, but comfortable operation. ⇨ Check attached scope with mount for tight seat without any clearance.
c	Rotate elevation adjustment turret to over 30 MOA and back to 0. ⇨ Shall click tangibly in every position. ⇨ Yellow bar shall appear on top of the turret when set on 30 MOA (and higher).
d	Rotate windage adjustment turret in direction of arrow "R", in counter-direction and back to 0. ⇨ Shall click tangibly in every position.
e	Rotate parallax adjusting knob over its full range and back to 100 m. ⇨ Shall run smoothly and stop accurately on extreme positions.
f	Rotate magnification adjustment over its full range. ⇨ Shall run smoothly and stop accurately on extreme positions.
g	Rotate reticle illumination knob from 0 to 11. ⇨ Shall run smoothly and stop accurately on extreme positions. ⇨ Center cross of reticle shall shine in red color. ⇨
h	Open and close flip up covers. ⇨ Shall flip up open at light push. ⇨ Shall snap positively into closed position.

5. Maintenance

NOTE: Routine cleaning is required to maintain the weapon in good working condition at all times. While cleaning, use opportunity to visually inspect parts.

5.1 Preparing for Cleaning

5.1.1 Preparing Weapon

a. Unload weapon.
b. Remove anti-mirage band and suppressor.
c. Field strip weapon.

5.1.2 Preparing Cleaning Kit

a. Prepare cleaning kit (refer to Illustrated Parts Catalogue, AMH102) and Lens Pen.
b. Shake bottle with Break Free oil.
c. Replace worn out copper brushes.
d. Provide you with a cotton rag.
e. Optional items:
- Cotton patches that fit the barb of the fix rod;
- Pipe cleaners;
- Tooth-brush;
- Clean, soft, white cotton towel for lens cleaning.

CAUTION: Cleaning can only be successful in a clean environment. Under messy conditions, parts may get lost. If no table is available, use at least surface of hard case as underlay.

5.2 Cleaning of Weapon System

5.2.1 Cleaning Main Assembly

a. Mount copper brush barrel on fix rod.
b. Push fix rod with lightly oiled copper brush barrel from the chamber side through the barrel until the copper brush fully protrudes out of the muzzle (fig. 5.1).
c. Pull rod back until it protrudes out of receiver.
d. Repeat 10 times.
e. Remove copper brush barrel and install chamber brush.

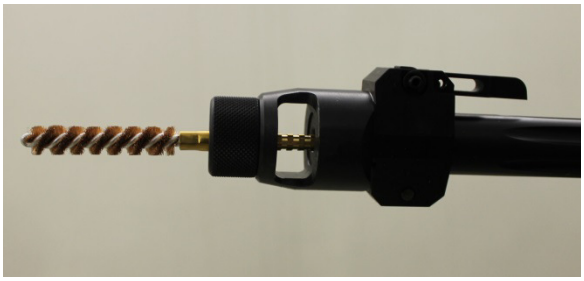


Fig. 5.1

f. Push lightly oiled brush entirely into chamber and pull back; repeat 10 times.

CAUTION: Do not push chamber brush into barrel - it may remain stuck.

g. Use oily cotton rag to wipe clean all inner surfaces of assembly.

h. Wrap lightly oiled cotton patch around the serrated tip of the fix rod (fig. 5.2a).
i. Push fix rod with cotton patch from the chamber side through the barrel until the cotton patch fully protrudes out of the muzzle (fig. 5.2b and 5.2c).
j. Pull rod back and out of receiver.
k. Remove patch and repeat with fresh one until they exit the barrel clean.

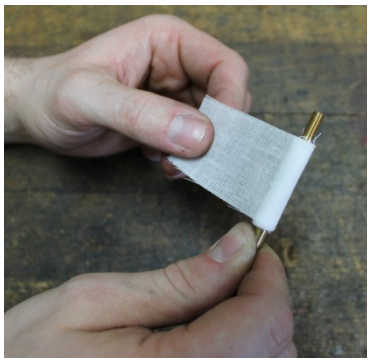


Fig. 5.2a


Fig. 5.2b


Fig. 5.3c

CAUTION: Barrel oiling is only required for storage. During operation, residuals of oil may affect first round trajectory and result in missing the target.

l. Use oily cotton rag to wipe clean and lightly oil all metallic outer surfaces of assembly.

NOTE: Pay special attention to wipe the following parts with oily rag:
- **flip-up front sight**
- **thread on muzzle brake**
- **to muzzle directed surface in muzzle brake**
- **thread protector**
- **flip-up rear sight**

5.2.2 Cleaning Bolt

a. Use oily cotton rag to wipe clean all metallic surfaces of bolt.
b. If tooth-brush available, use it to clean extractor.
c. If pipe cleaner available, use it to clean firing pin hole.
d. Before reassembling with rifle, put one drop of oil on each outside face of the locking lugs and one drop of oil in the guide slot to the bolt stop (fig. 5.3).

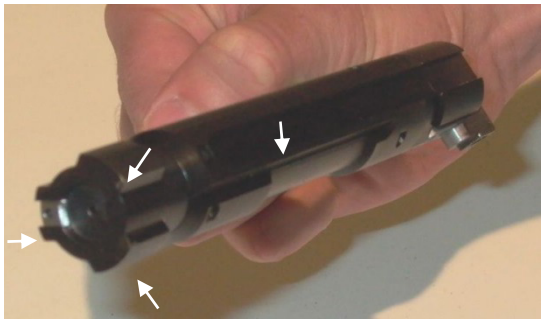


Fig. 5.3

5.2.3 Cleaning Firing Pin

a. Use oily cotton rag to wipe clean all surfaces of firing pin.
b. If tooth-brush available, use it to clean spaces in spring and sharp edge of firing pin retainer.

NOTE: The firing pin spring is the only spring in the rifle which is not made of stainless steel, because stainless steel springs do not provide the required performance. Therefore cover it with a shiny film of oil.

c. Allow one drop of oil to run between the gap between firing pin retainer and firing pin housing on each side (fig. 5.4)

Fig. 5.4

5.2.4 Cleaning Magazine

a. Use oily rag to wipe clean magazine spring.
b. If pipe cleaners available, use them to clean the inner corners of the spring.
c. Use oily rag to wipe clean all outer and inner surfaces of the magazine body.

5.2.5 Cleaning Scope with Mount

NOTE: The housing of the scope, the scope rings and the body of the scope mount are made of aluminum. Steel parts are all the screws and the two levers.

a. Remove sun shield.
b. Use oily rag to wipe clean all surfaces of scope and mount.
c. Provide steel parts incl. screw heads with a shiny film of oil.

d. Use Lens Pen's brush to remove sand or dust on lenses (fig. 5.5). If necessary, douche the scope under a water tap.
e. Use Lens Pen's pad, a cotton towel and warm soapy water to remove grease and finger marks (fig. 5.6).
f. If tooth-brush available, use it to clean engravings.


Fig. 5.5

Fig. 5.6

NOTE:
- **Be especially careful with optical scope in order to keep maintenance to a minimum.**
- **Never touch lenses with fingers.**
- **Do not direct high-pressure water jet onto the lens surface.**
- **Never try to rub off dirt, you will scratch the lenses.**
- **Never allow any oil or lubricant to come in contact with lenses, keep them covered until you need access.**

5.2.6 Cleaning Suppressor

a. Use oily rag to wipe clean all surfaces.
b. Provide shiny film of oil on thread.

5.2.7 Cleaning after Exposure to Salt Water

a. Remove bolt.
b. Drain out any salt water trapped inside the main assembly and the bolt.
c. Douche main assembly and bolt with warm, soapy water.
d. Dry and drain out all the water.

e. Oil and lubricate as described above.
f. Apply identical procedure on suppressor.

5.2.8 Cleaning after Exposure to Sand or Dust

a. Remove bolt.
b. Douche main assembly and bolt with warm, soapy water.
c. Dry and drain out all the water.
d. Oil and lubricate as described above.
e. Apply identical procedure on suppressor.

NOTE: A sniper weapon system is not a self-defense weapon but a dedicated mission tool. Protect it to hostile environment until preparing to comply mission and use back-up weapons while approaching and withdrawing.

5.3 Transport, Storage and Preservation

5.3.1 Terms

a. Storage conditions of up to 40°C and up to 100% humidity are considered as regular.
b. Storage conditions of up to 55°, up to 95% humidity and/or presence of corrosive agents as salt (close to sea or on sea) are considered as hostile.
c. Storage conditions up to 65°C and with presence of vibrations are irregular and only permissible up to 12 hours (vehicle transport)
d. Under regular conditions, short term storage means up to 1 year.
e. Under hostile conditions, short term storage means up to 1 month.
f. Under regular conditions, long term storage means up to 5 years.
g. Under hostile conditions, long term storage means up to 6 months.
h. After one storage period as indicated above, inspection and renewal of preservation actions is required.

5.3.2 Short term storage

a. Execute cleaning procedures as in section 5.2.
b. Provide barrel inner surface with a light film of Break Free.
c. When storing in open racks, present weapon with open bolt.

5.3.3 Long term storage

a. Use LPS3 rust inhibitor (MIL-PRF-16173E Grade 2).
b. Execute cleaning procedure as in section 5.2 without lubrication. Do not insert bolt.
c. Apply LPS3 on all steel parts which are not Ilaflon coated, e.g.
- Inner surface of barrel
- Muzzle brake assembly
- Bipod
- Levers of scope mount
- Hinge of folding stock
- Magazine spring
- Outer surface of suppressor attachment
- All visible screw and pin heads

d. Remove firing pin and apply LPS3 on firing pin and firing pin spring.
e. Apply LPS3 on all surfaces of the bolt.
f. Install firing pin to bolt. Turn firing pin into unlocked position (fig. 5.7).
g. Store bolt apart from weapon.
h. Store rifle scope apart from weapon in air conditioned room.

Fig. 5.7

5.3.4 After storage

a. Procedure to apply after long term storage or when weapon system comes first to service.
b. Use LPS PreSolve degreaser to remove LPS3.

NOTE: Rifles are preserved with LPS3 when leaving the factory. It is optional to remove it from screw heads.

c. Clean and lubricate weapon system as in section 5.2.
d. Rotate firing pin in cocked position and insert bolt to weapon.

5.3.5 Transport

a. Unload weapons for transport and keep bolt apart.
b. Use hard case for weapon transport.
c. Execute functional check after transport.

5.4 Complete Rifle

5.4.1 Disassembling into Main Components

Personnel required: 1
Tools: Operator's tool kit (AMH103)
Armorer's tool kit (AMH105)
Heat gun
Loctite 243
Time: 10'

Use rubber hammer (SFS-75-4800) to move stuck parts.

a. Field strip weapon according to section 4.1
b. Heat screw BN1359-M5-6x16 and use Allen key 3 mm to remove (fig. 5.8).
c. Remove folding stock assembly.
d. Use Allen key 5 mm to remove screw BN272-M6x30 and pistol grip (fig. 5.9).
e. Use same key to push the magazine catch plunger down and remove the magazine catch assembly rearwards (fig. 5.10).
f. Remove magazine catch plunger and spring 56/3/5 and use torque wrench 4 - 12 Nm (BR-431190) with long hex bit 4x100 to remove screw BN272-M5x16 (fig. 5.11); prepare with heat gun.
g. Use heat gun on screw BN272-M6x16, remove it using Allen key 5 mm and remove trigger group assembly (fig. 5.12).
h. Use Allen key 3 mm to remove screws and fore-end panels (fig. 5.13).


Fig. 5.8


Fig. 5.9


Fig. 5.10

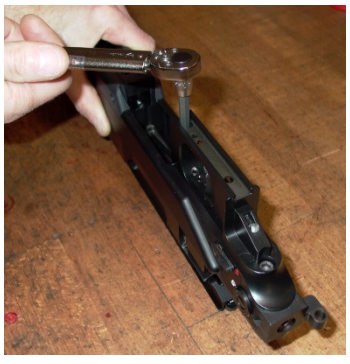


Fig. 5.11

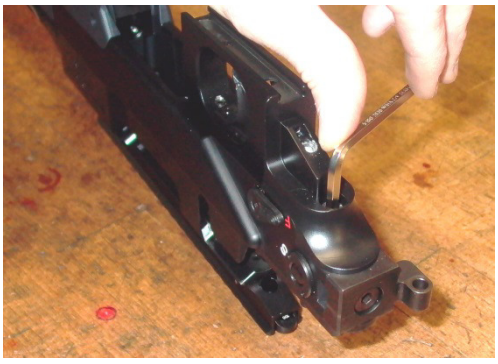


Fig. 5.12

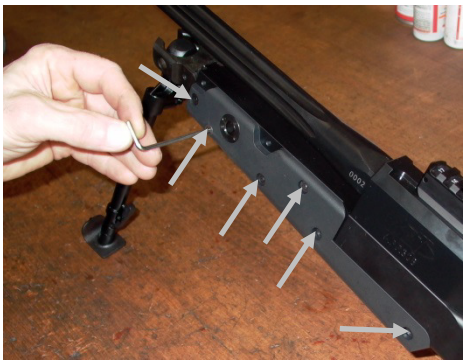


Fig. 5.13

i. Warm screws BN272-M5x16 and BN272-M5x25 with heat gun and remove them using Allen key 4 mm, remove fore end UIT frame (fig. 5.14).
j. Use heat gun and torque wrench as in 5.4.1f to remove screws BN272-M5x10 and BN272-M5x12 and remove upper receiver with barrel (fig. 5.15).

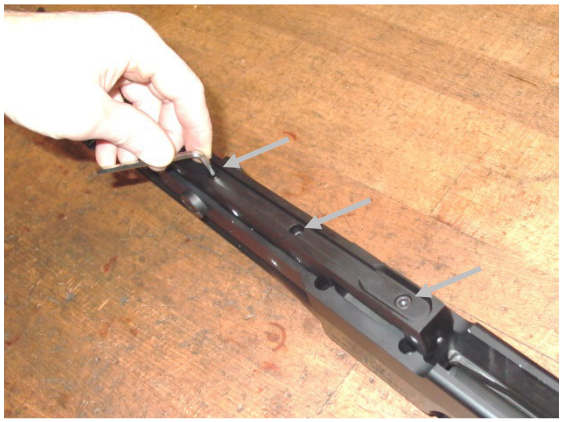


Fig. 5.14

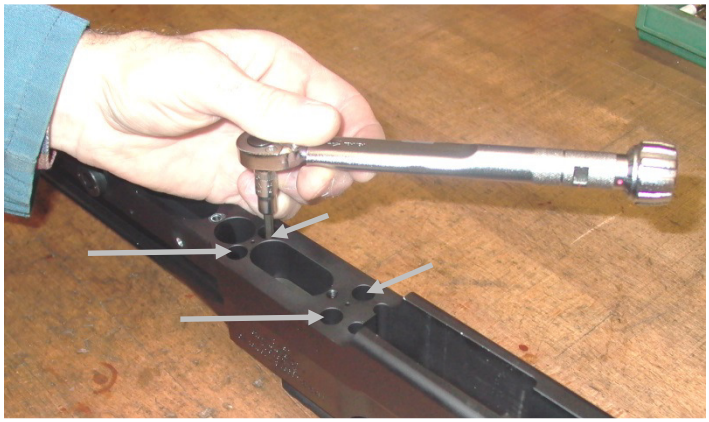


Fig. 5.15

k. Fix upper receiver in a bench vise and remove barrel using 30 mm wrench (right hand thread, fig. 5.16). Protect coating of barrel with a sheet of paper!
l. Use heat gun to warm screw BN7-M5x12 on muzzle brake and loosen them using Allen key 3 mm (fig. 5.17). Warm muzzle brake (secured with Loctite 270!) and unscrew it.

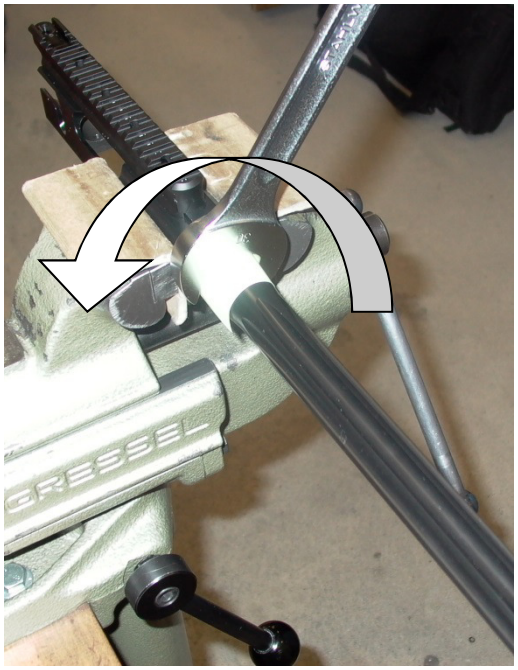


Fig. 5.16

Fig. 5.17

5.4.2 Inspections on Complete Rifle

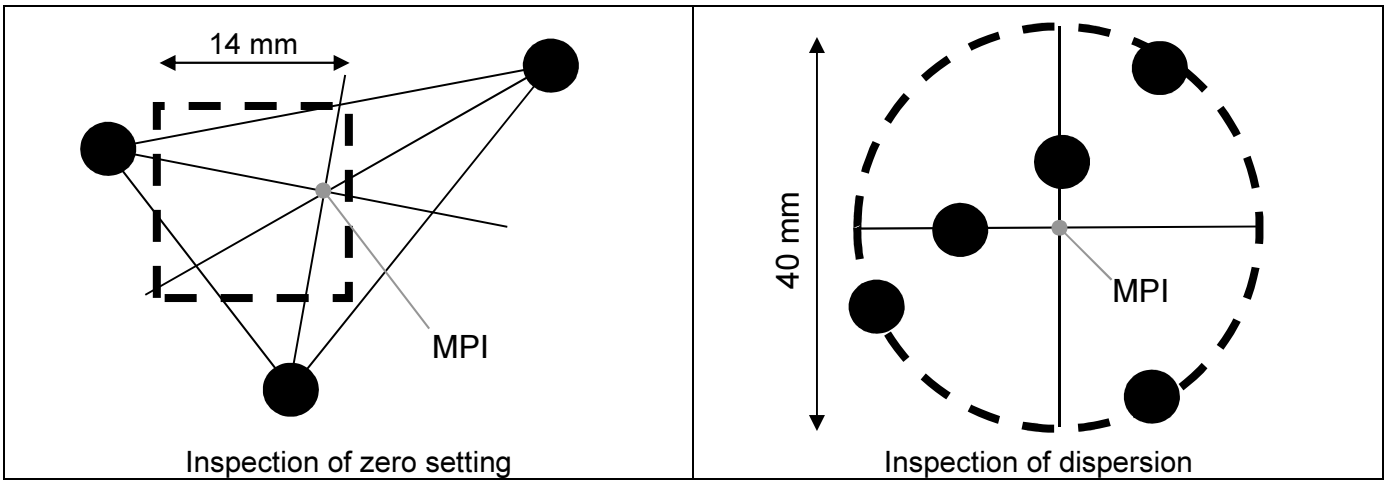
Personnel required: 1
Tools: Gauges kit (AMH104)
Armourer's tool kit (AMH105)
Time: 20'

a. Fit for fire inspection according to section 5.15.
b. Functional check according to section 4.3.
c. Headspace inspection according to gauging instructions.
d. Trigger pull inspection according to gauging instructions.
e. Barrel wear out inspection according to gauging instructions.
f. Collimation of aiming devices according to gauging instructions.
g. Inspect torque settings on screws BN272-M5x10 and BN272-M5x12 to be 5.5 Nm (to execute when fore-end UIT frame removed).

5.4.3 Test Firing

Personnel required: 1
Tools: 20 rounds of standard ammunition
100 m shooting range (preferentially indoor)
1 measuring stick (mm scaled)
Time: 30'

a. The zero of the rifle scope and the emergency sights must be inspected with test firing at 100 m.
b. The MPI of a 3 rounds group must be within a square 14 mm x 14 mm around the POA (see figure 5.18).
c. The acceptance criteria for a group of 5 rounds at 100 m is displayed in fig. 5.18 (all POIs within a circle of 40 mm diameter). In case of failure, the test can be repeated one time.



Inspection of zero setting | Inspection of dispersion

Fig. 5.18

5.4.4 Repairs on Complete Rifle

a. If fit for fire inspection or functional check fails, refer to related section of concerned assembly for repair.
b. If headspace inspection fails, refer to sections 5.6 "Upper Receiver Assembly", 5.7 "Bolt Assembly" and 5.8 "Barrel".
c. If trigger pull inspection fails, refer to section 5.9 "Trigger Group Assembly".
d. If collimation inspection fails, refer to
- Para 3.16.3 to adjust rifle scope;
- Para 5.4.5 to adjust emergency sights.

e. If firing test of MPI fails, refer to
- Para 3.16.3 to adjust rifle scope;
- Para 5.4.5 to adjust emergency sights.

f. In case of inconsistent MPI (changing with every series), refer to 5.4.2e, to 5.4.2g, to 5.8 "Barrel", to 5.12 "Rifle Scope with Mount" and to 5.13 "Muzzle Brake".
g. In case of non-conform dispersion, refer to 5.4.2e, to 5.4.2g, to 5.8 "Barrel", to 5.12 "Rifle Scope with Mount" and to 5.13 "Muzzle Brake".

5.4.5 Emergency Sight Adjustments

a. To adjust the emergency sight vertically, loosen the screw of the rear sight with an Allen key 2 mm.
b. Lift the peep hole blade 1 scale to raise the MPI at 100 m for 70 mm.
c. Tighten peep hole blade and verify setting by repeating 5.4.3b.
d. To adjust the emergency sight horizontally, operate front sight nuts using Allen key 4 mm.
e. One full turn of a front sight nut in clockwise direction will move the MPI 110 mm to the left side at 100 m.
f. Verify setting by repeating 5.4.3b.

Fig. 5.19

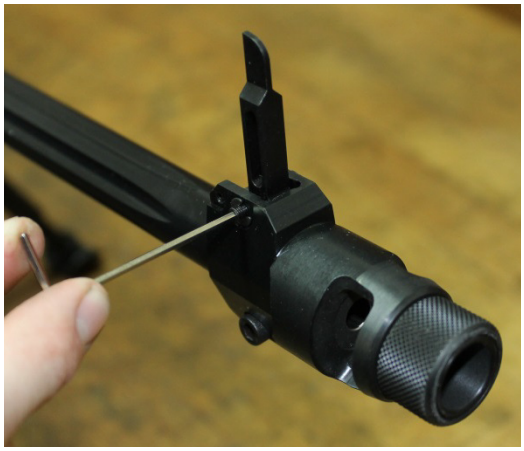


Fig. 5.20

5.4.6 Assembly of Complete Rifle

a. Install barrel according to section 5.8 "Barrel".
b. Install muzzle brake according to section 5.13 "Muzzle Brake".
c. Install upper receiver according to section 5.6 "Upper Receiver".
d. Invert procedures 5.4.1a - i. Refer to 5.17 for proper torque settings and application of Loctite.

5.5 Lower Receiver Assembly

Personnel required: 1
Tools: Operator's tool kit (BT-AMH103)
Armourer's tool kit (BT-AMH105)
Heat gun
Loctite 243
Time: 25'

5.5.1 Disassembly of Lower Receiver Assembly

a. Use heat gun to warm screw BN16-M8x12; use Allen key 5 mm to remove screw and receiver hinge (fig. 5.21).
b. Warm screws BN272-M4x6 with heat gun and use Allen key 3 mm to remove them; remove bolt guide latch (fig. 5.22).
c. Use Allen key 2 mm to remove screws BN24-M4x5 (fig. 5.23). Allow springs BT-CS008 and bearing balls BN869-3 to drop in your hand.

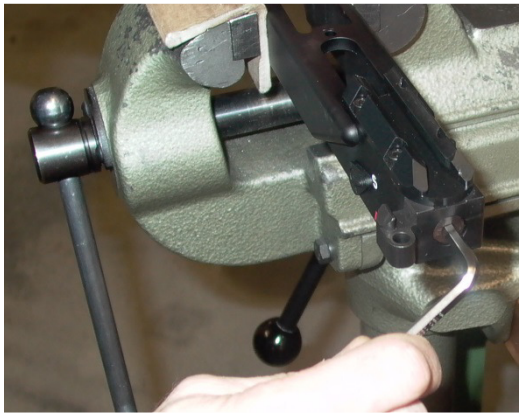


Fig. 5.21

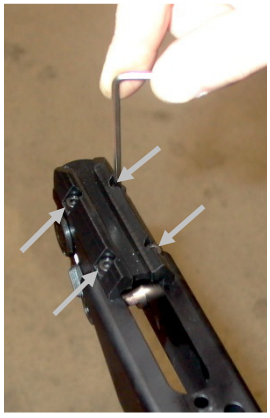


Fig. 5.22


Fig. 5.23

d. Warm screws BN20-M4x10 on safety levers with heat gun and remove them using Allen key 2.5 mm. Remove safety levers and push safety axle through lower receiver to remove (fig. 5.24).
e. Pull out locking pin against bedstop to remove bipod assembly (fig. 5.25).
f. Use pin punch 3 mm to drive pin BN858-10x35 from left side to right side and separate bipod and bipod fork assembly (fig. 5.26).


Fig. 5.24


Fig. 5.25

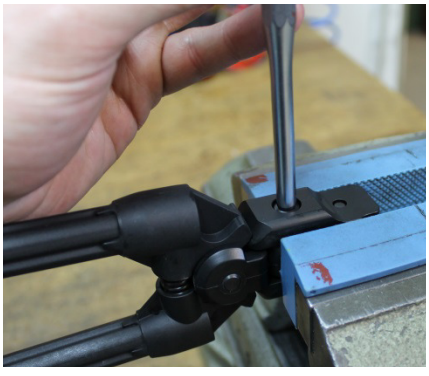


Fig. 5.26

g. Use pin punch 2 mm to drive bedding pins BN858-3x16 from the lower receiver's underside out off the upper side (fig. 5.27).
h. Warm flush cups with heat gun and remove them using fork wrench (BR-425740.0200, fig. 5.28). Allow flush cup obturators and springs 51/4/5 to drop in your hand.
i. Remove BN20201-M8x18 from UIT frame using Allen key 4 mm (fig. 5.29).

Fig. 5.27

Fig. 5.28

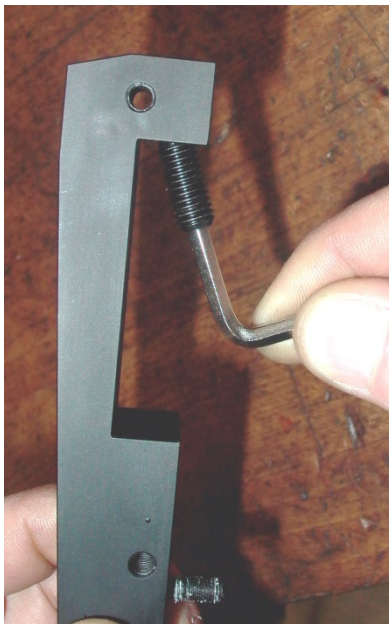


Fig. 5.29

5.5.2 Inspections on Lower Receiver Assembly

Visually inspect parts to be free of cracks, deformations and rust.

5.5.3 Repairs on Lower Receiver Assembly

Replace defective or worn out components.

5.5.4 Assembly of Lower Receiver Assembly

a. Install BN20201-M8x18 to UIT frame - only the ball shall protrude out of the frame, the black housing shall be invisible. Secure with Loctite 243.
b. Install flush cups and secure them with Loctite 243.
c. Drive bedding pins BN858-3x16 from upper side into receiver until they reach their bedstop.
d. Connect bipod to bipod fork driving pin BN858-10x35 from right side in position.
e. Connect bipod assembly to lower receiver and push in locking pin, making sure that its knurled head is at the right side of the rifle.
f. Install one safety lever on the safety axle, securing it with Loctite 243 and applying a momentum of 1.5 Nm.
g. Slightly oil safety axle with BreakFree and place it in

Fig. 5.30

position (fig. 5.30). Drop balls BN869-3 and springs BT-CS008 into their bores. Install screws BN24-M4x5 turning them completely into the lower receiver and then turning them back two full turns. Secure with Loctite 243.
h. Screw second safety lever on safety axle. Secure with Loctite 243 and apply a momentum of 1.5 Nm.
i. Install bolt guide latch, securing screws BN272-M4x6 with Loctite 243.
j. Install receiver hinge applying a momentum of 12 Nm to screw BN16-M8x12 and securing it with Loctite 243.
k. Fix Lower receiver to upper receiver using torque wrench 4 - 12 Nm and 4 mm bit with screws BN272-M5x10 and BN272-M5x12, applying a momentum of 5.5 Nm and securing with Loctite 243 (fig. 5.31)

Fig. 5.31

NOTE: The connection of the lower receiver to the upper receiver is important for the accuracy.

5.6 Upper Receiver Assembly

Personnel required: 1
Tools: Operator's tool kit (BT-AMH103)
Armourer's tool kit (BT-AMH105)
Heat Gun
Loctite 243
Time: 20'

5.6.1 Disassembly of Upper Receiver Assembly

a. Warm screws BN272-M4x10 with heat gun. Use Allen key 3 mm to remove screws and remove Picatinny rail (fig. 5.32).
b. Use pin punch 2 mm to drive BN858-3x16 from left side to right side out of the Picatinny rail and remove the flip-up backup sight (fig. 5.33). Allow balls BN869-3 and springs BT-CS008 to drop in your hands.
c. Use pin punch 3 mm to drive out BN858-4x16 from the bottom up (fig. 5.34) and remove bolt stop with spring 54/1/2.

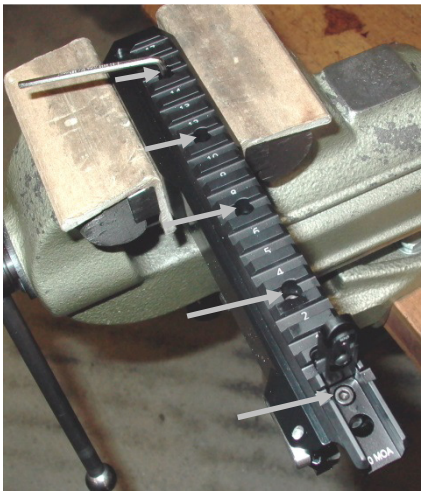


Fig. 5.32

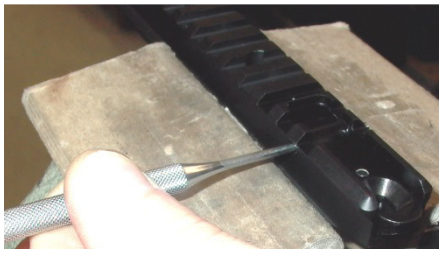


Fig. 5.33

Fig. 5.34

5.6.2 Inspections on Upper Receiver Assembly

a. Visually inspect parts to be free of cracks, deformations and rust.
b. Inspect locking ring for tight seat (fig. 5.35).
c. Inspect presence of proof mark (fig. 5.36).

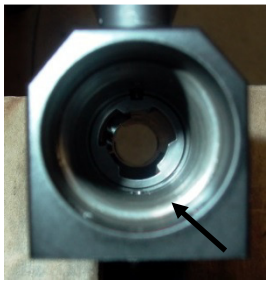


Fig. 5.35

Fig. 5.36

5.6.3 Repairs on Upper Receiver Assembly

Replace defective or worn out components.

5.6.4 Assembly of Upper Receiver Assembly

a. Slightly oil bolt stop with BreakFree and install it. Drive pin BN858-4x16 top down.
b. Put springs BT-CS008 and balls BN869-3 into their seat. Slightly oil flip-up sight and hold it in position, allowing to drive pin BN858-3x16 from the right side of the Picatinny rail through it.
c. Attach Picatinny rail to upper receiver, securing screws BN272-M4x10 with Loctite 243 and applying a momentum of 2.5 Nm.
d. Attach upper receiver to lower receiver (as in 5.5.4k).

5.7 Bolt Assembly

Personnel required:	1
Tools:	Operator's tool kit (BT-AMH103)
	Armourer's tool kit (BT-AMH105)
	Gauges kit (BT-AMH104)
	Heat gun
	Loctite 243
Time:	15'

5.7.1 Disassembly of Bolt Assembly

a. Use pin punch 2 mm to push on extractor plunger and slide extractor out of bolt head (fig. 5.37). Allow extractor plunger and spring BT-CS003 to drop in your hand.
b. Use pin punch 3 mm to drive roll pins BN875-3x18 behind bolt head out of bolt body and remove bolt head. Discard removed roll pins (fig. 5.38).

Fig. 5.37

Fig. 5.38

c. Use heat gun and Allen key 3 mm to remove the screw at the bottom of the bolt head (fig. 5.39) and remove ejector kit.
c. Use Allen key 3 mm to loosen the screw on the firing pin housing (fig. 5.40) and unscrew the firing pin housing until it comes loose.

Fig. 5.39

Fig. 5.40

5.7.2 Inspections on Bolt Assembly

a. Visually inspect parts to be free of cracks, deformations and rust.
b. Visually inspect bolt lugs for deformations.
c. Visually inspect firing pin tip for deformations.
d. Inspect firing pin protrusion according to gauging instructions.
e. Inspect extractor according to gauging instructions.
f. Inspect presence of proof mark on bolt head (fig. 5.41).

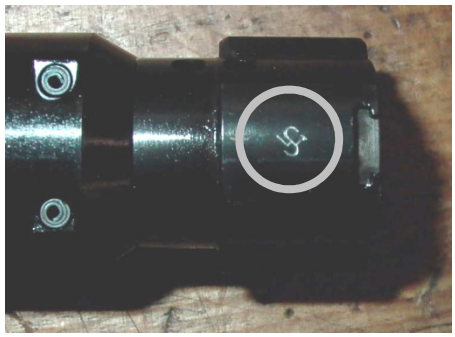


Fig. 5.41

5.7.3 Repairs on Bolt Assembly

Replace defective or worn out components.

5.7.4 Assembly of Bolt Assembly

a. Install ejector kit to bolt head. Turn in screw until flush with bottom plane of bolt head plus 1 ½ turns. Secure with Loctite 480.
b. Install bolt head to bolt body using two new roll pins BN875-3x18. Extractor cut shall show into direction of cocking handle (fig. 5.42).

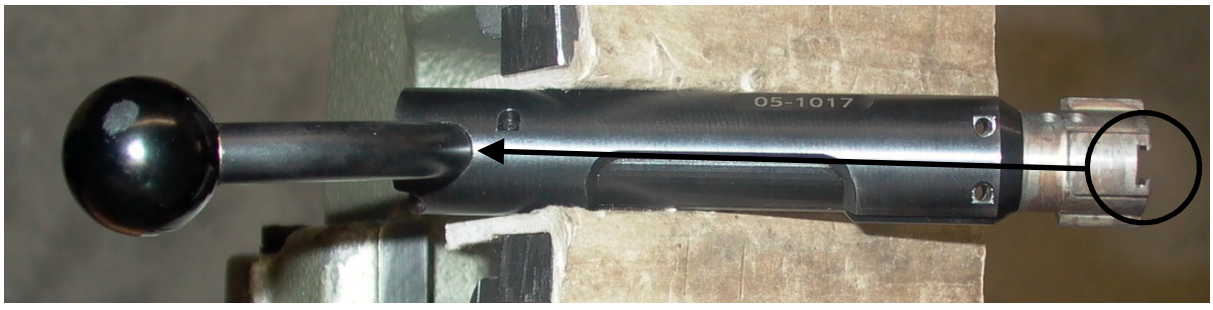


Fig. 5.42

c. Slightly oil firing pin, firing pin spring BT-CS001 and firing pin retainer.
d. Screw firing pin housing together with firing pin retainer on firing pin until its end slightly protrudes (Fig. 5.43).

e. Assemble firing pin assembly to bolt body in uncocked position.
f. Use screwdriver no. 1 (BR-434000.0300) and turn firing pin counterclockwise until firing pin retainer does not show any clearance anymore. Then move 1 full turn back and set firing pin on cocked position.

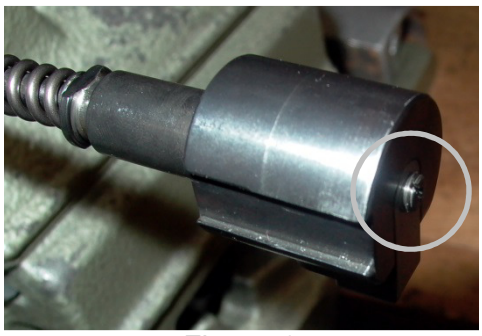


Fig. 5.43

NOTE: Replacing the extractor kit can be done by an operator technician using Allen key 2 mm to execute step 5.7.1a.

5.8 Barrel

Personnel required: 1
Tools: Operator's tool kit (BT-AMH103)
Armourer's tool kit (BT-AMH105)
Gauges kit (BT-AMH104)
Lathe
Life ammunition (min. 32 rounds)
Time: 30' (w/o firing)

NOTE: Powered machines required!

5.8.1 Inspections on Barrel

a. Visually inspect barrel to be free of cracks, rusts, seams and other injurious defects and the bore and chamber shall be free of pockets, rings, bulges or other deformations.
b. Inspect bore caliber according to gauging instructions.
c. Inspect barrel straightness according to gauging instructions.
d. Inspect presence of proof mark.

5.8.2 Repairs on Barrel

Replace if non-conform.

5.8.3 Installing Barrel

a. Clean and slightly oil threads on barrel and on upper receiver.
b. Fix upper receiver in a bench vise, insert locking ring with locking lugs towards ejection port and thread barrel into upper receiver by hand.
c. Use torque wrench BR-431182.0600 with 30 mm head BR-431630.1200 to tighten barrel at 140 Nm (fig. 5.44).

Fig. 5.44

d. Insert bolt (inspect serial number to be identical with receiver) and proceed headspace gauging.
e. Use headspace no-go gauge (BT-MH203) to determine excess of headspace.
f. Remove barrel and use lathe to trim locking ring on opposite side to the locking lugs (fig. 5.45) on proper length. In the first step, trim rather too little than too much.
g. Reinstall locking ring and barrel and inspect headspace. Repeat step f until compliance.

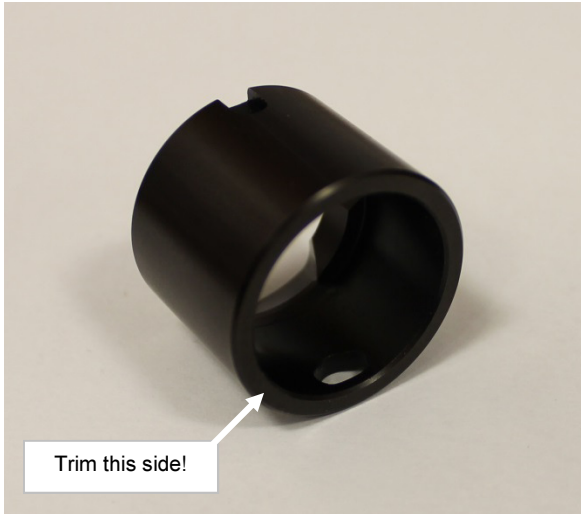


Fig. 5.45

NOTE: In order to provide custom-rifle accuracy, spare locking rings are supplied with over-dimensioned collars, allowing to adjust headspace to tightest tolerances.

5.8.4 Implementation of new Barrel

a. A new barrel will perform consistently only after 20 rounds fired.
b. After a first series of 20 rounds fired, execute test firing procedures according to section 5.4.3.
c. Adjust iron sights and rifle scope if necessary.
d. Clean weapon before delivering to user.

5.9 Trigger Group Assembly

Personnel required: 1
Tools: Operator's tool kit (BT-AMH103)
Armourer's tool kit (BT-AMH105)
Loctite 243
Molykote 1000 Paste
Time: 30'

5.9.1 Disassembly of Trigger Group Assembly

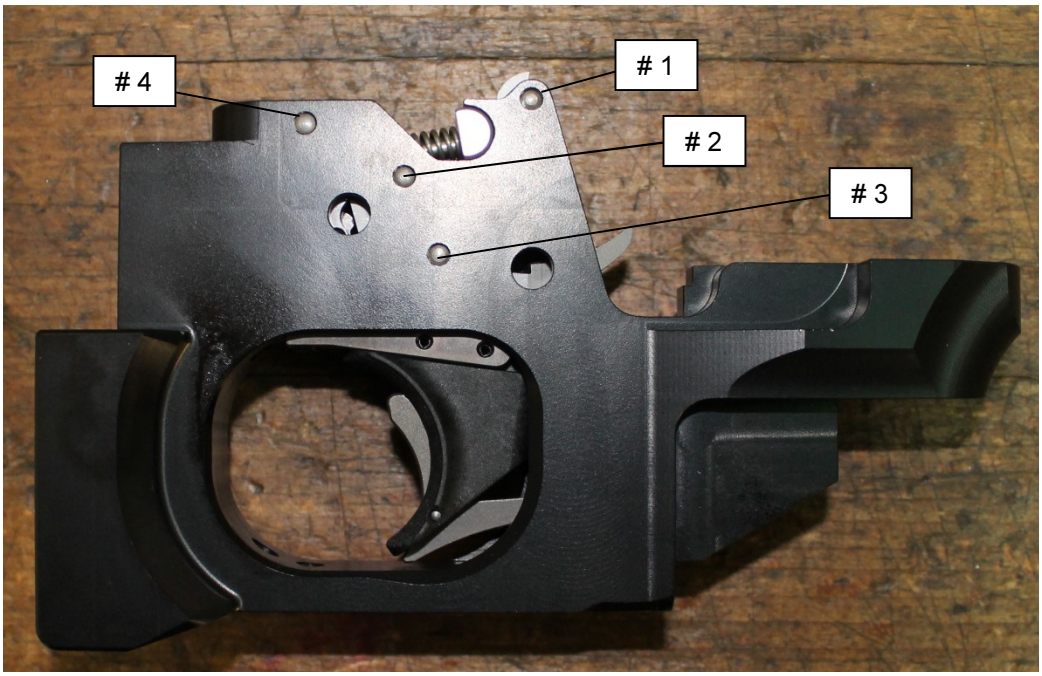


Fig. 5.46

a. Use pin punch 3 mm to remove pin #1 and lift out disconnector assembly (fig. 5.47).
b. Use pin punch 3 mm to remove pin #2 (fig. 5.48).
c. Use pin punch 3 mm to remove pin #3 and lift out sear together with plunger BT-MH066 and spring 51/3/4 (fig. 5.49).


Fig. 5.47

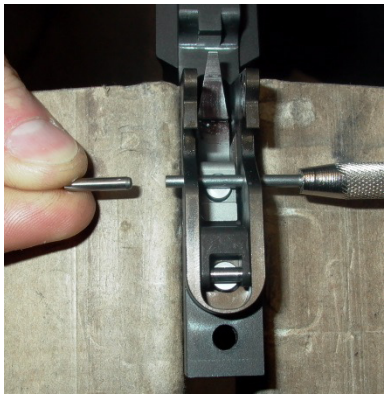


Fig. 5.48

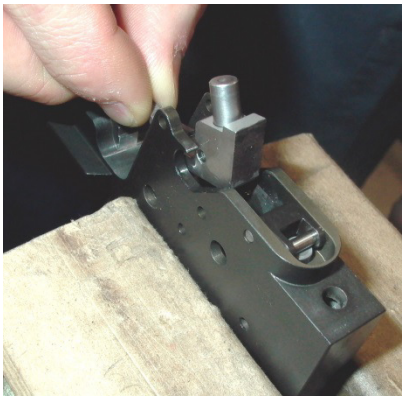


Fig. 5.49

d. Use pin punch 3 mm to remove pin #4 and loose trigger lever; allow to drop springs 50/1/5, 54/1/4 and plunger to drop in your hand.
e. Use pin punch 2 mm to remove roll pins BN876-2x8 (fig. 5.50) to separate trigger shoe from trigger lever and remove trigger shoe through trigger guard.
f. Remove trigger lever (fig. 5.51).
g. Use Allen key 2.5 mm to remove screw BN24-M5x16 (fig. 5.52).
h. Use pin punch 2 mm to remove pin BN858-2x10 (fig. 5.53) and separate trigger safety from trigger; allow spring 32/5/3 to drop in your hand.

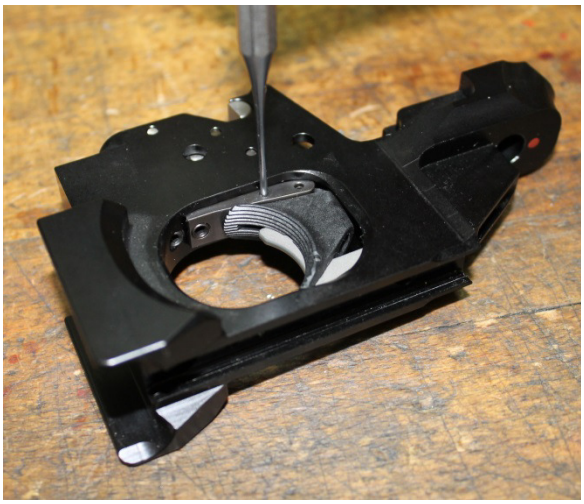


Fig. 5.50

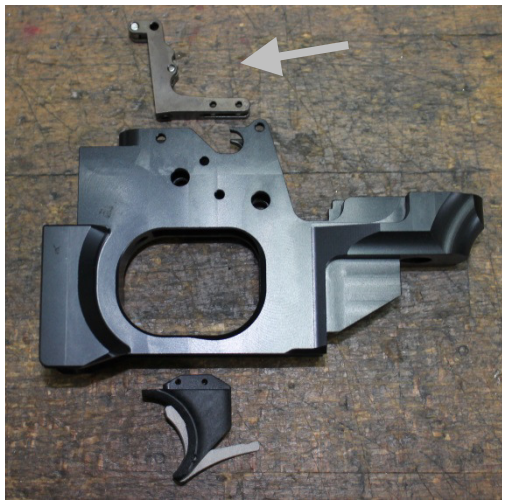


Fig. 5.51


Fig. 5.52

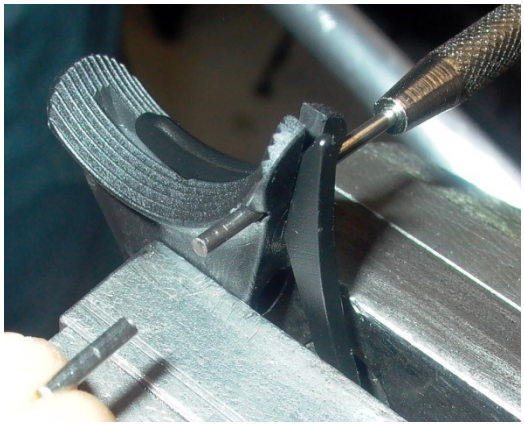


Fig. 5.53

5.9.2 Inspections on Trigger Group Assembly

a. Visually inspect parts to be free of cracks, deformations and rust.
b. Visually inspect edges on sear and disconnector to be sharp.

5.9.3 Repairs on Trigger Group Assembly

Replace defective or worn out components.

5.9.4 Assembly of Trigger Group Assembly

a. Check ball 01.4265.0003 to be in proper place and insert screw BN24-M5x16 flush with trigger group housing.
b. Place trigger lever in housing and install trigger shoe to trigger lever.
c. Set springs 50/1/5, 54/1/4 and put plunger on top; slightly oil plunger and trigger lever with BreakFree before installing. Set pin #4 (fig. 5.46) from right side to fix trigger lever.
d. Slightly oil sear and apply Molykote 1000 Paste as in fig. 5.54. Install sear with spring 51/3/4 and plunger, fix with its axle pin (#3 in fig. 5.46).
e. Set pin #2 (fig. 5.46) upon plunger.
f. Apply Molykote 1000 paste on disconnector (fig. 5.55). Install disconnector assembly and fix with pin #1; allow a drop of oil to run into disconnector assembly before installation.

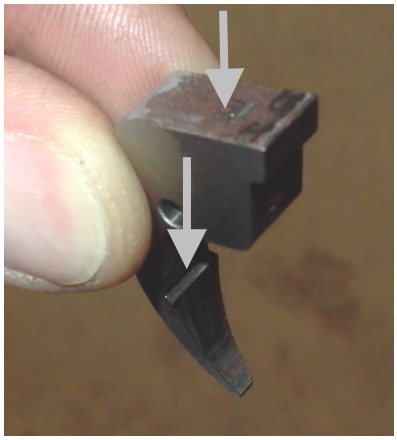


Fig. 5.54

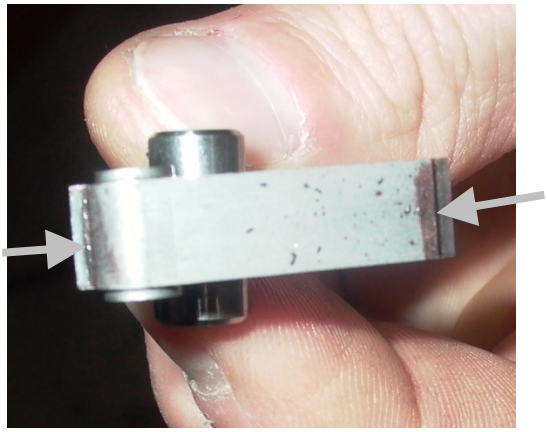


Fig. 5.55

g. Attach trigger group to lower receiver with upper receiver mounted, using torque wrench with hex bit 4x100 for front screw BN272-M5x16 and with hex bit 5x55 for rear screw BN272-M6x16 (fig. 5.56). Apply momentum of 5.5 Nm on BN272-M5x16 and 7.0 Nm on BN272-M6x16; secure with Loctite 243.
h. Insert bolt and check trigger function; adjust trigger path according to 3.4.2.
i. Use Allen key 2 mm to adjust trigger stop with screw BN24-M4x16 (fig. 5.57). Turn clockwise just until the trigger does not release anymore the firing pin and then move ½ turn back.

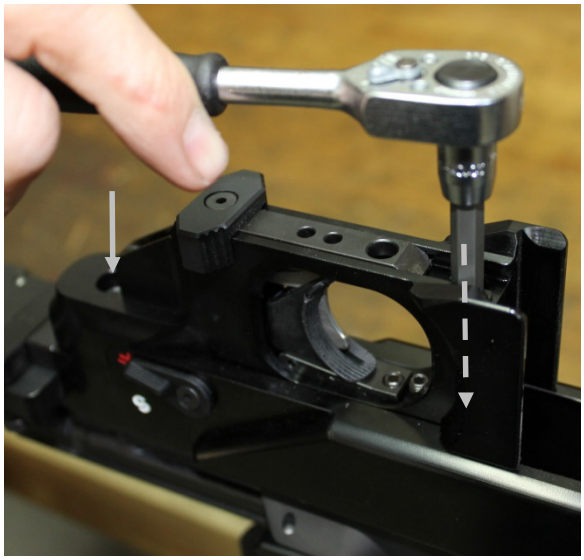


Fig. 5.56

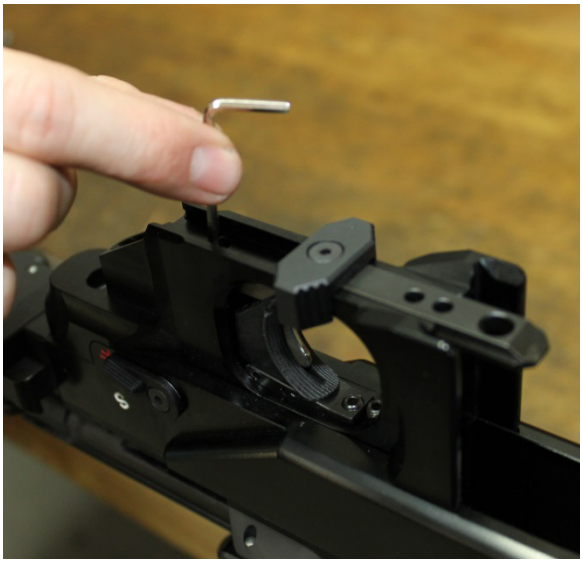


Fig. 5.57

j. When the trigger stop is set, install trigger safety with spring 32/5/3 and axle pin BN858-2x10, using pin punch 2 mm.
k. Cock the firing pin and adjust the trigger safety stop turning it with Allen key 2 mm into the trigger group housing (fig. 5.58) until it touches the trigger safety, then move back 1/8 turn. Secure with Loctite 243.

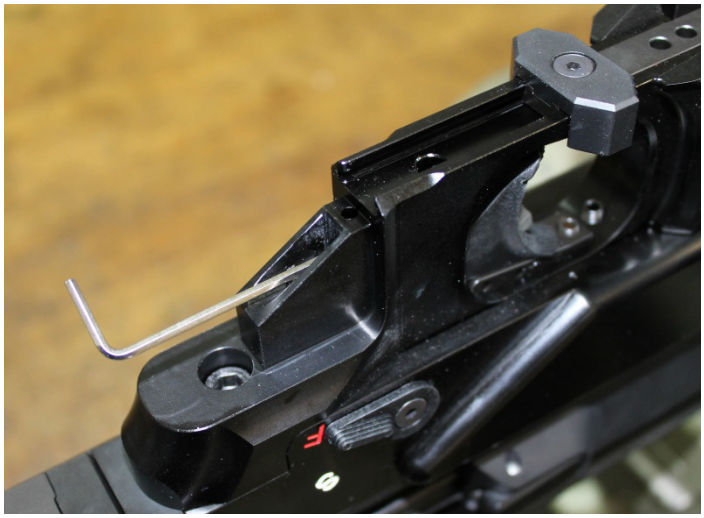


Fig. 5.58

l. Apply Molykote 1000 Paste on magazine catch. Set magazine catch plunger with spring 56/3/5 and install magazine catch assembly.
m. Install pistol grip with screw BN272-M6x30, using Allen key 5 mm.

5.10 Folding Stock Assembly

Personnel required: 1
Tools: Operator's tool kit (BT-AMH103)
Armourer's tool kit (BT-AMH105)
Heat gun
Loctite 243
Time: 20'

5.10.1 Disassembly of Folding Stock Assembly

a. Remove rear hand stop using torque wrench with bit 5x55 (or Allen key 5 mm; fig. 5.59).
b. Remove cheek rest clamping screws BT-MH111 and BN248-M6x30 using Allen key 5 mm and remove cheek rest (fig. 5.60).
c. Loosen recoil pad's clamping screw with Allen key 4 mm, slip down pad to lowest position and remove upper recoil pad screw (fig. 5.61).


Fig. 5.59

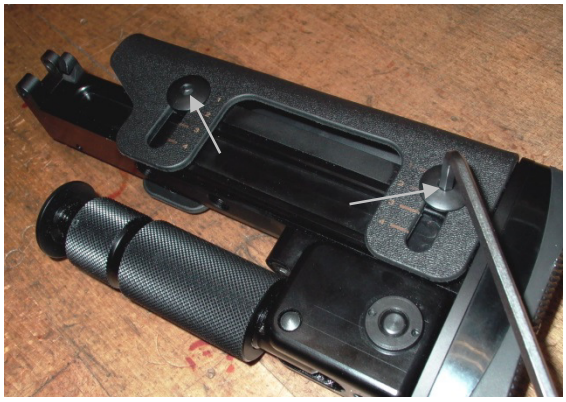


Fig. 5.60


Fig. 5.61

d. Slip pad in highest position and remove lower screw, always using Allen key 4 mm.
e. Warm up and remove screws BN272-M5x12 with Allen key 4 mm and recoil pad adaptor (fig. 5.62).
f. Warm up and remove screw BN272-M6x20 with Allen key 5 mm and remove butt spike housing (fig. 5.63).
g. Remove screws BN272-M6x30 using Allen key 5 mm and separate upper and lower stock extension from stock body (fig. 5.64).

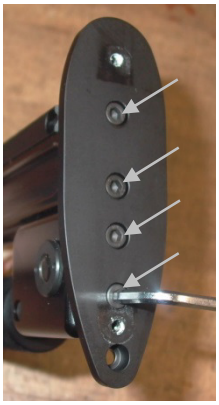


Fig. 5.62


Fig. 5.63

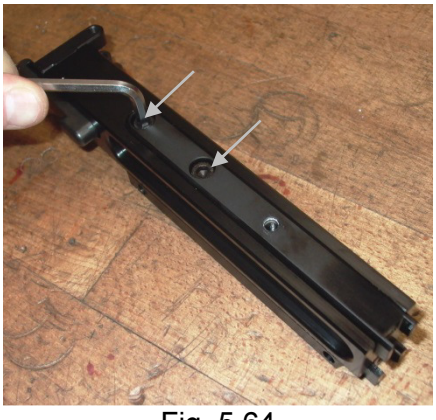


Fig. 5.64

h. Warm up screw BN16-M8x16 and remove with Allen key 5 mm; remove stock hinge (fig. 5.65).
i. Pull retainer folded off its axle and separate spring 54/1/2 (fig. 5.66).
j. Use pin punch 3 mm to drive out pin BN858-4x22 bottom-up out of stock body and remove retainer open; remove spring 55/3/3 (fig. 5.67).


Fig. 5.65


Fig. 5.66


Fig. 5.67

k. Use pin punch to separate butt spike sub-assembly from butt spike housing (fig. 5.68). Be careful to not loose the small parts as shown in fig. 5.69.
l. Use Allen key 3 mm to remove screw and ground plate.


Fig. 5.68

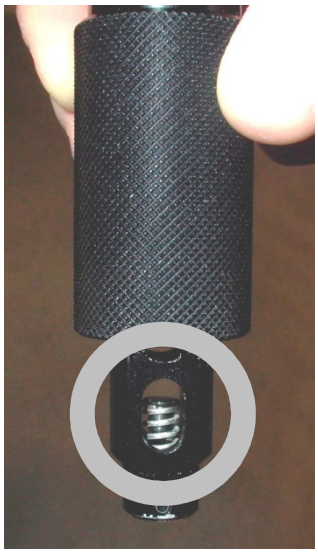


Fig. 5.69


Fig. 5.70

m. Use heat gun and fork wrench (BR-425740.0200; refer to section 5.5, fig. 5.28) to remove flush cups; allow springs and obturators to drop in your hands.

5.10.2 Inspections on Folding Stock Assembly

a. Visually inspect parts to be free of cracks, deformations and rust.
b. Inspect butt spike sub-assembly to run smooth over its full range.

5.10.3 Repairs on Folding Stock Assembly

Replace defective or worn out components.

5.10.4 Assembly of Folding Stock Assembly

a. Set flush cup springs and obturators and install flush cups; secure with Loctite 243.
b. Install ground plate to butt spike sub-assembly; secure screw with Loctite 243.
c. Slightly oil contact surfaces and install butt spike sub-assembly to butt spike housing. Make sure that plunger and spring are properly placed as shown in fig. 5.69. Set pin from right side.
d. Slightly oil spring 55/3/3 and retainer open and put them together. Install retainer open to stock body, setting pin BN858-4x22 top down. Check assembled parts to run smooth.
e. Slightly oil spring 54/1/2 and retainer folded, put them together and push them on their axle. Check assembled parts to run smooth.
f. Fix hinge to stock body. Apply momentum of 12 Nm and secure screw BN16-M8x16 with Loctite 243.
g. Slightly oil upper and lower stock extensions and install them on the stock body. Do not secure screws BN272-M6x30.
h. Fix butt spike assembly to lower stock extension. Secure screw BN272-M6x20 with Loctite 243 and apply momentum of 7 Nm. Check butt spike to run smooth and lock in positions closed, 45° and 90° open.
i. Attach recoil pad adaptor to stock. Secure screws with Loctite 243 and apply momentum of 5.5 Nm.
j. Fix recoil pad to adaptor inverting procedure 5.10.1c-d. Secure screws with Loctite 243, apply momentum of 5.5 Nm.
k. Attach cheek rest to stock. Operate Allen key at short end in order to avoid excessive force (fig. 5.71). Inspect extension to run smooth over its full range and to lock firmly in position when screws tightened.
l. Attach folding stock assembly to lower receiver with screw (fig. 5.72). Apply momentum of 3 Nm and secure with Loctite 243.

Fig. 5.71

Fig. 5.72

5.11 Box Magazine Assembly

Personnel required: 1
Tools: none
Time: 5'

5.11.1 Disassembly of Box Magazine Assembly

a. Push down follower at its rear end, allowing it to incline itself.
b. Guide follower to slide out of the magazine body by its front end (refer to Para 4.1.3).

5.11.2 Inspections on Box Magazine Assembly

Visually inspect parts to be free of cracks, deformations and rust.

5.11.3 Repairs on Box Magazine Assembly

Replace defective or worn out components.

5.11.4 Assembly of Box Magazine Assembly

a. Slightly oil magazine spring and slide follower into magazine box on its front end.
b. Push follower down into magazine box until properly placed (refer to Para 4.2.3).

5.12 Rifle Scope with Mount

Personnel required: 1
Tools: Operator's tool kit (BT-AMH103)
Armourer's tool kit (BT-AMH105)
Heat gun
Boresight rear aperture insert (BT-G-308 of gauges kit BT-AMH104)
Loctite 243
Time: 20'

5.12.1 Disassembly of Rifle Scope with Mount

a. Warm screws with heat gun, use Allen key 4 mm to remove them and separate scope with rings from mounting base (fig. 5.73).
b. Use wrench 8 mm (BT-AMH105, BR-421300.0900) to remove nuts (fig. 5.74); pull away counterpiece with levers and transfer bars. Allow springs 52/2/1 to drop in your hands (fig. 5.75).

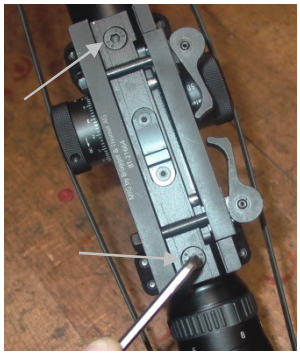


Fig. 5.73

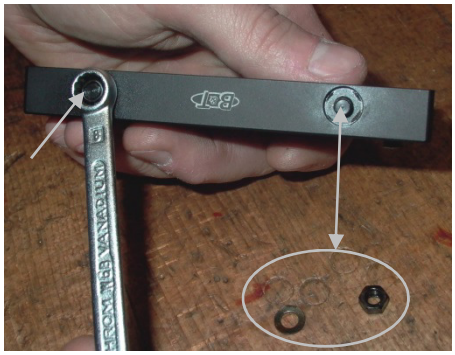


Fig. 5.74

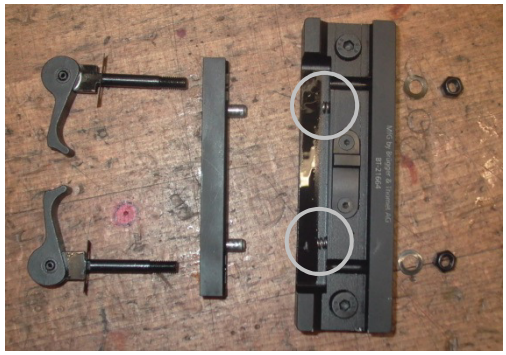


Fig. 5.75

c. Separate levers with bars from counterpiece (as shown in fig. 5.75). Use pin punch 3 mm to separate levers from transfer bars (fig. 5.76). Remove plate springs (fig. 5.77).
d. Warm screws BN20-M3x6 with heat gun and use Allen key 2 mm to remove stopper (fig. 5.78).

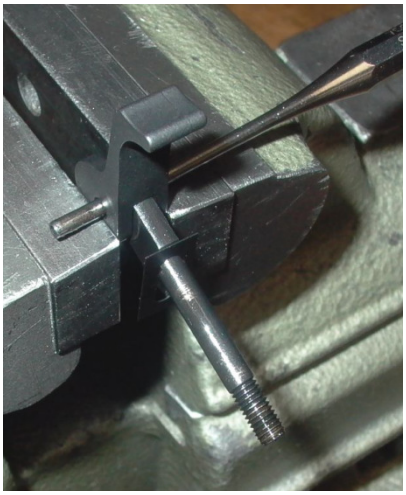


Fig. 5.76


Fig. 5.77

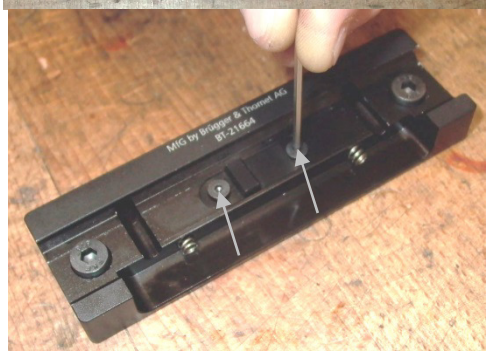


Fig. 5.78

e. Use Allen key 3 mm to separate scope rings from rifle scope (fig. 5.79).

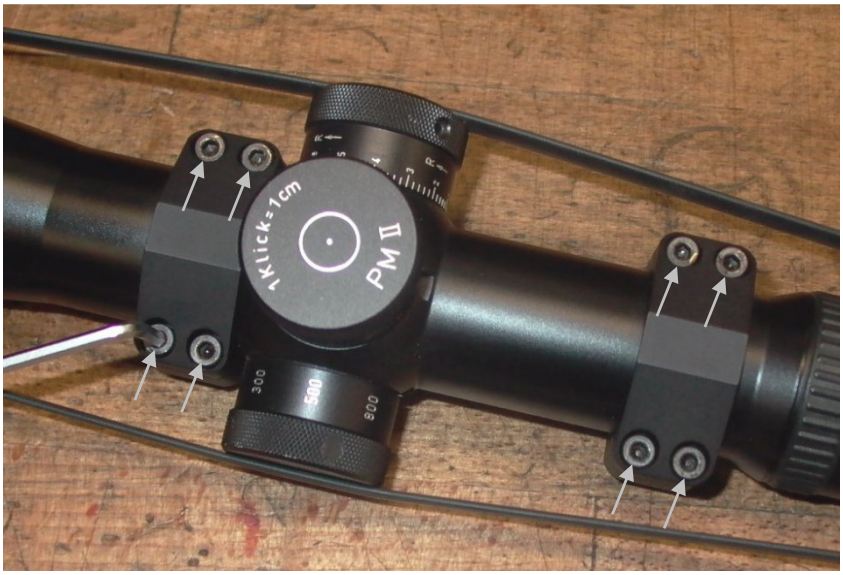


Fig. 5.79

5.12.2 Inspections on Rifle Scope with Mount

a. Visually inspect parts to be free of cracks, deformations and rust.
b. Inspect lenses to be free of scratches.
c. Inspect reticle to be free of fungus.
d. Inspect adjustment elements for proper positioning and legible engravings.
e. Inspect reticle illumination to work.
f. Inspect the serial number on the mount to be identical as on the weapon.
g. Inspect screws to be tightened with proper momentum (reference to section 5.16).

5.12.3 Repairs on Rifle Scope with Mount

Replace defective or worn out components.

5.12.4 Assembly of Rifle Scope with Mount

a. Put plate springs on transfer bars. Connect levers to transfer bars using new roll pins; slightly oil assembly.
b. Slightly oil spiral and plate spring and install levers and counterpiece to body; tighten nuts with hands only. Use new nuts!
c. Screw on stopper to body; secure screws with Loctite 243 and apply momentum of 1.5 Nm.
d. Mount lower parts of scope rings on mount base. Secure screws with Loctite 243 and apply momentum of 8.0 Nm.
e. Take an upper receiver with barrel and fix it in a bench vise. Attach mount to Picatinny rail of upper receiver.
f. Adjust tension force of levers using wrench 8 mm. Adjust them for tight seat but comfortable operation.
g. Put rifle scope in half open scope rings; apply Loctite 243 (fig. 5.81).

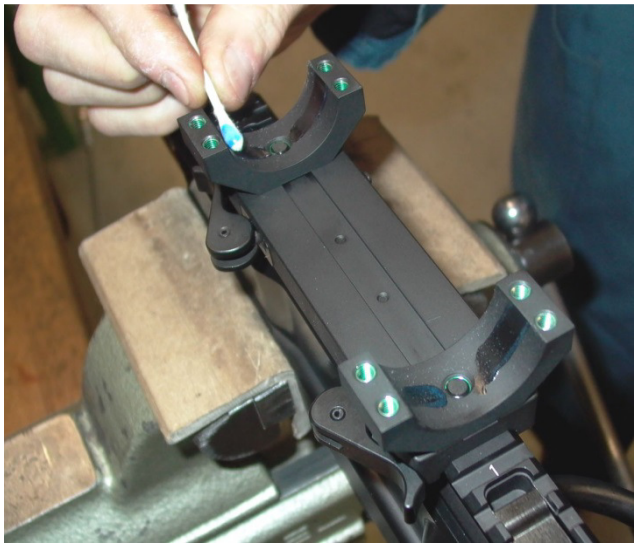


Fig. 5.81

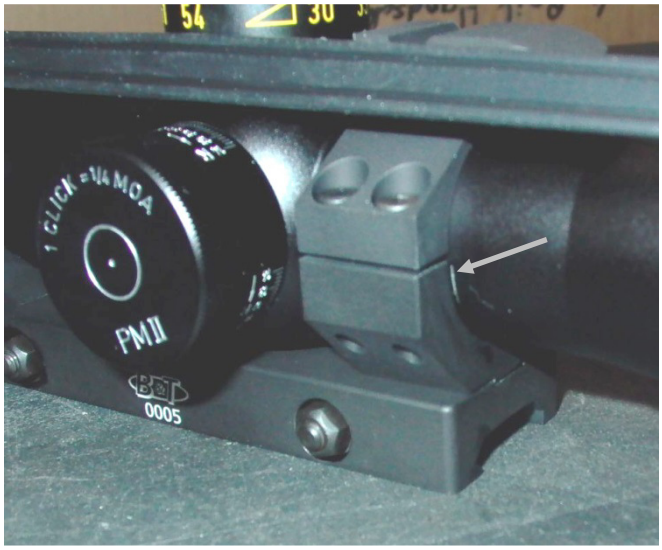


Fig. 5.82

h. Rotate rifle scope until the vertical line of the reticle is pointing to the center of the barrel bore. Further the position mark on the scope housing must be aligned with the front edge of the Simrad-ring (fig. 5.82).
i. Apply Loctite 243 on upper parts of the scope rings and attach them. Apply a momentum of 2.5 Nm on the screws - do not secure them with Loctite!
j. Set elevation and windage caps until they easily touch O-rings only and tighten screws (according to zeroing procedure as in section 3.16).
k. Use boresight aperture insert to collimate barrel bore and reticle at a distance of approx. 30 m (or in analogy to collimation inspection according to gauging procedures).
l. Fully install elevation and windage caps with their engraved zero marks over the reference marks on the housing; tighten screws.

NOTE: Collimation of sight and barrel bore helps zeroing but is no valid substitute for life firing at 100 m.

5.13 Muzzle Brake Assembly

Personnel required: 1
Tools: Operator's tool kit (BT-AMH103)
Armourer's tool kit (BT-AMH105)
Heat gun
Loctite 243, Loctite 270
Time: 15'

5.13.1 Disassembly of Muzzle Brake Assembly

a. Remove thread protector.
b. Warm up screw with heat gun and remove it using Allen key 3 mm (fig. 5.83).
c. Use Screwdriver no.1 to remove retaining ring from right side of front sight spindle (fig. 5.84).
d. Screw front sight spindle from the left to the right side out of its housing and allow front sight blade, detent pin and springs to drop in your hand (fig. 5.85).


Fig. 5.83


Fig. 5.84


Fig. 5.85

5.13.2 Inspections on Muzzle Brake Assembly

Visually inspect parts to be free of cracks, deformations and rust.

5.13.3 Repairs on Muzzle Brake Assembly

Replace defective or worn out components.

5.13.4 Assembly of Muzzle Brake Assembly

a. Slightly oil front side blade and install with detent pin and springs to housing; set front sight spindle from right side (fig. 5.85).
b. Thread muzzle brake on barrel with upper receiver and secure with Loctite 270.
c. Flip-up front sight and rotate muzzle brake until front sight points straight upwards.
d. Tighten screws; secure with Loctite 243 and apply momentum of 2.5 Nm.

5.14 Suppressor

Personnel required: 1
Tools: Armourer's tool kit (BT-AMH105)
Time: 2'

5.14.1 Disassembly of Suppressor

Do not attempt to disassemble the suppressor.

5.14.2 Inspections on Suppressor

a. Inspect o-ring to be in place, sleek and elastic.
b. Visually inspect parts to be free of cracks, deformations and rust.
c. Shake suppressor and listen to loosened parts.

5.14.3 Repairs on Suppressor

a. If 5.14.2a fails, replace o-ring using screwdriver no. 1 (fig. 5.86).
b. If 5.14.2b or c fails, replace suppressor.

Fig. 5.86

5.15 Fit for Firing Inspection Checklist

Pos.	Inspection	Method of Inspection
5.15.1	**Rifle Complete (BT-APR308)**	
a.	There shall be no cracks or mutilation on the hand guard.	Visual
b.	The rifle shall be free of rusts, burrs, cracks, mutilation, seams and other injurious defects.	Visual
c.	There shall be no missing or damaged items (eg. Cracks, dent, bent etc.).	Visual
d.	When the rifle is cocked and the safety button is put to ”SAFE”, the firing pin shall not be released when the trigger is pulled.	Manual
e.	When the rifle is cocked and the safety button is put to “FIRE”, the firing pin shall be released when the trigger is pulled.	Manual
f.	Serial number of the rifle and scope, “SAFE”, “FIRE” marking etc. shall not be missing or illegible.	Visual
g.	The safety button shall engage positively in the “SAFE” and “FIRE” position.	Manual
h.	The colour of the rifle is black matt finishing and homogenous.	Visual
i.	The bolt shall be able to strip the cartridge from the magazine and feed the cartridge into the chamber.	Manual with dummy rounds
j.	The charging handle shall be able to travel the full length of the receiver and lock positively in the “FIRE” mode.	Manual
k.	The magazine shall be securely retained by the rifle when inserted and shall be removable when the magazine release button is pulled.	Manual
l.	The trigger shall return to its original position after partial or complete trigger pull.	Manual
m.	There shall be no loose items or items found not engaged positively on the rifle itself.	Manual
n.	The iron sights shall be properly aligned with the barrel.	Boresight insert
o.	There shall be no loose and rusty screw found on the rifle.	Manual and Visual
p.	Inspect serial numbers and markings to be present.	Visual
q.	Headspace shall be within tolerances.	Headspace gauge
r.	Barrel shall be tightened with 140 Nm.	Torque wrench
s.	The bedding of the receiver shall be free of clearance.	Visual
t.	The mounting of the muzzle brake shall be firm and straight. Inspect screws to be tightened with 2.5 Nm.	Visual, torque wrench
u.	The muzzle brake shall hold the suppressor fully aligned to the barrel.	Visual
v.	The main assembly shall be free of rusts, burrs, cracks, mutilation, seams, and other injurious defects.	Visual

Pos.	Inspection	Method of Inspection
5.15.2	**Barrel Complete (BT-MH092)**	
a.	Barrel shall be straight.	Drop Gauges
b.	The barrel shall be free of cracks, rusts, seams and other injurious defects and the bore and chamber shall be free of pockets, rings, bulges or other deformations	Visual or Bore Scope
c.	There shall be presence of a proof mark.	Visual
d.	Bore diameter shall be within 7.62 mm and 7.65mm.	Drop gauges, barrel wear out gauge
5.15.3	**Bolt Complete (BT-AMH031)**	
a.	The extractor shall be within tolerance.	Extractor gauge
b.	Firing pin protrusion shall be within tolerance.	Firing Pin Protrusion gauge
c.	The bolt shall be able to move through its full range of travel without binding.	Manual and Visual
d.	There shall be no burrs, rusts, cracks, cuts or mutilation on the assembly	Visual
e.	The firing pin shall be retained in the bolt and shall move freely through its full range in the axial direction without binding.	Manual and Visual
f.	The tip of the firing pin shall not be deformed or distorted.	Visual
g.	The ejector shall be held in the forward position by the ejector spring.	Visual
h.	There shall be presence of a proof mark on the bolt head.	Visual
5.15.4	**Upper Receiver (BT-AMH41)**	
a.	The bolt stop shall be held in position by its spring.	Visual
b.	The bolt stop shall be able to stop the bolt from rearward movement once the bolt has travelled the maximum distance limit along the bolt guide rail.	Manual
c.	The receiver body shall be free of rusts, burrs, cracks, mutilation, seams, and other injurious defects.	Visual
d.	The Picatinny rail shall be held firmly in position to the receiver body.	Manual
e.	Inspect accessible screws for proper torque setting.	Visual, torque wrench
f.	There shall be presence of a proof mark.	Visual
5.15.5	**Trigger Group (BT-AMH40)**	
a.	The main assembly shall be free of rusts, burrs, cracks, mutilation, seams, and other injurious defects.	Visual
b.	The movement of the trigger shall be smooth and free of sideward clearance.	Manual
c.	The trigger shall be able to release the firing pin without binding.	Manual
d.	The trigger pull shall be within 1.5 kg to 2.5 kg.	Trigger pull gauge
e.	Trigger and trigger safety shall return to their original position upon release after firing.	Manual
f.	The magazine catch shall be able to travel smoothly and return to its original position upon release.	Manual
g.	The trigger safety shall lock the trigger in armed position and only release when properly pulled.	Manual
h.	Inspect accessible screws for proper torque setting.	Visual, torque wrench

Pos.	Inspection	Method of Inspection
5.15.6	**Magazine (BT-AMH17)**	
a.	The follower shall be able to travel its full range under spring action without binding	Manual
b.	The main assembly shall be free of rusts, burrs, cracks, mutilation, seams, and other injurious defects.	Visual
5.15.7	**Lower Receiver Assembly (BT-AMH06)**	
a.	The safety mechanism shall be able to lock the trigger positively in the safe mode.	Manual
b.	Both safety levers shall be able to synchronize when switched, from safe to fire or from fire to safe, from either side of the receiver body.	Manual
c.	The main assembly shall be free of rusts, burrs, cracks, mutilation, seams, and other injurious defects.	Visual
d.	Inspect accessible screws for proper torque setting.	Visual, torque wrench
5.15.8	**Bipod (BT-22373)**	
a.	The bipod shall be able to lock firmly in various heights, open and closed position.	Manual
b.	The main assembly shall be free of rusts, burrs, mutilation, seams, and other injurious defects.	Visual
5.15.9	**Folding stock Assembly (AMH04)**	
a.	The main assembly shall be free to rusts, burrs, cracks, mutilation, seams, and other injurious defects.	Visual
b.	The folding stock clamps are firmly held in place.	Manual
c.	The folding stock assembly must be aligned with the Receiver and Barrel Complete.	Visual
d.	The butt spike shall be able to release and lock firmly in closed, 45°, and 90° positions without much effort.	Manual
e.	The butt spike shall be able to make height adjustment without much effort by turning the butt spike in clockwise or anti-clockwise direction.	Manual
f.	The cheek rest shall be able to release and lock in various height positions without much effort.	Manual
g.	The rear hand stop shall be firmly held in place.	Manual
h.	The folding stock shall be firmly held in open and closed position.	Manual
i.	The folding stock shall be firmly held at every length over the full travel of its length adjustment range.	Manual
j.	The recoil pad shall be firmly held at every height over the full travel of its height adjustment range.	Manual
k.	The main assembly shall be free of rusts, burrs, cracks, mutilation, seams, and other injurious defects.	Visual
l.	Inspect hinge screws to be tightened with 12 Nm.	Visual, torque wrench

Pos.	Inspection	Method of Inspection
5.15.10	**Scope Mount (BT-21801)**	
a.	The scope mount shall be firmly secured to the Picatinny rail.	Manual
b.	The securing levers of the scope mount are closed securely and attached to the Picatinny rail without any clearance.	Manual and Visual
c.	The securing levers of the scope allow it to be opened without much effort and the scope can be easily removed from the Picatinny rail.	Manual
d.	The main assembly shall be free of rusts, burrs, cracks, mutilation, seams, and other injurious defects.	Visual
e.	The scope mount shall carry the serial number of the dedicated weapon.	
f.	Inspect screws for proper torque setting.	Visual, torque wrench
5.15.12	**Rear Sight (BT-AMH23)**	
a.	The rear sight shall be locked firmly in both open and closed position	Manual
b.	The main assembly shall be free of rusts, burrs, cracks, mutilation, seams, and other injurious defects.	Visual
c.	The markings on the rear sight shall be visible and legible.	Visual
d.	The rear sight shall carry a Zero mark.	Visual

Pos.	Inspection	Method of Inspection
5.15.13	**Front Sight (BT-AMH22)**	
a.	The front sight shall be locked firmly in both open and closed position.	Manual
b.	The main assembly shall be free of rusts, burrs, cracks, mutilation, seams and other injurious defects.	Visual
5.15.14	**Suppressor (SD-12809)**	
a.	The suppressor shall not have any loose parts and be proper aligned with the barrel when attached to it.	Manual
b.	The main assembly shall be free of rusts, burrs, cracks, mutilation, seams, and other injurious defects	Visual
c.	The suppressor shall carry a serial number.	Visual

5.16 Torque Settings Overview

Assy	Ref	Designation	M [Nm]	Loctite 243
BT-AMH	BT-MH092	Barrel in upper receiver	140.00	No
BT-AMH06	BN16-M8x12	Hinge attaching screw on lower receiver	12.00	Yes
BT-AMH06	BN272-M5x12	Rear bedding screws in lower receiver	5.50	Yes
BT-AMH06	BN272-M5x10	Front bedding screws in lower receiver	5.50	Yes
BT-AMH08	BN20-M4x10	Attaching screws on safety levers	1.50	Yes
BT-AMH41	BN272-M4x10	Attaching screws on Picatinny rail	2.50	Yes
BT-AMH41	BN272-M4x6		2.50	Yes
BT-AMH15	BN7-M5x12	Clamping screws on muzzle brake	2.50	Yes
BT-AMH40	BN272-M6x16	Rear attaching screw on trigger group	7.00	Yes
BT-AMH40	BN272-M5x16	Front attaching screw on trigger group	5.50	Yes
BT-AMH04	BN272-M5x12	Attaching screws on recoil pad adaptor	5.50	Yes
BT-AMH04	BN272-M6x20	Attaching screw on butt spike assembly	7.00	Yes
BT-AMH04	BN1359-M5-6x16	Folding stock hinge screw	3.00	Yes
BT-AMH04	BN16-M8x16	Hinge attaching screw on folding stock	12.00	Yes
BT-211445	BN7-M4x14	Scope ring screws	2.40	No
BT-211445	BN16-M6x12	Attaching screw of scope ring	8.00	Yes

5.17 Maintenance Intervals

Activity	Period
Basic cleaning with visual inspection, followed by function check	After each firing, the latest after 50 rounds
Weapon inspection (field stripped rifle), followed by barrel treatment with copper solvent (not safety, but performance relevant)	500 rounds
Component inspection (weapon fully stripped), followed by replacement of worn out components	First time after 200 rounds, then with period of 2000 rounds or after exposure to hostile environment
Gauge inspection	1 year

6. Gauging Instructions

6.1 Use of Gauges

6.1.1 Trigger Pull Gauge

a. Use gauges BT-23267 1.5 kg No-Go and BT-23270 2.5 kg Go (consisting of BT-23267 with additional weight BT-23273, fig. 6.1) to inspect trigger pull.
b. Prepare rifle by folding its stock, cocking and disengaging safety.
c. Put 1.5 kg gauge on table, hook in trigger and slightly start lifting rifle straight upwards (fig. 6.2). When gauge is hanging free, trigger must not release.
d. Execute same procedure with additional weight to achieve 2.5 kg and trigger must release.

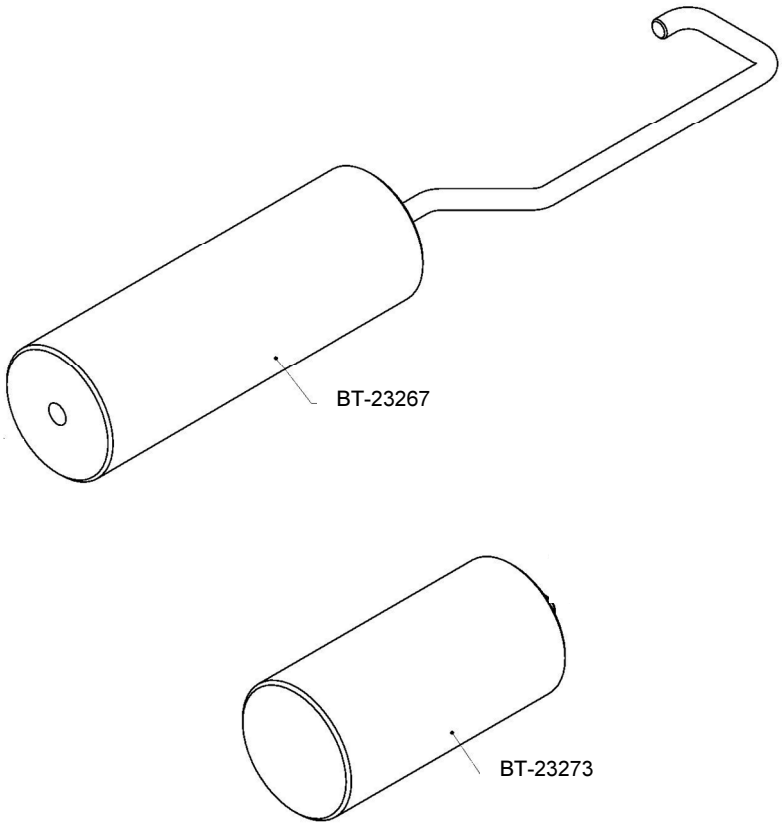


Fig. 6.1

Fig. 6.2

6.1.2 Barrel Wear Out Gauge

a. Use gauge BT-AMH108 (fig. 6.3) to inspect barrel wear out.
b. Barrel is worn-out if gauge slides into barrel from chamber side as far that mark on rod enters into receiver (fig. 6.4).

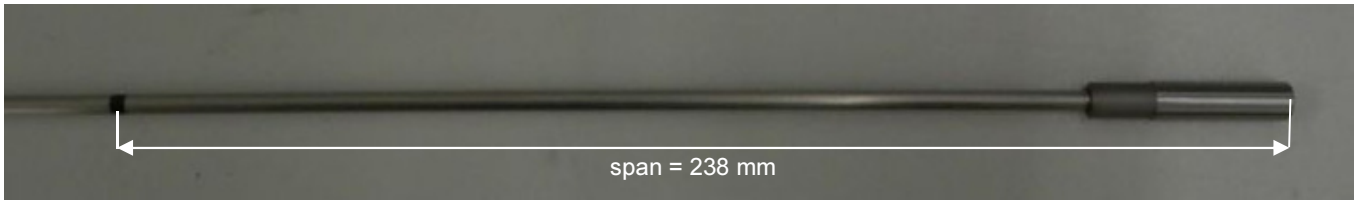


Fig. 6.3

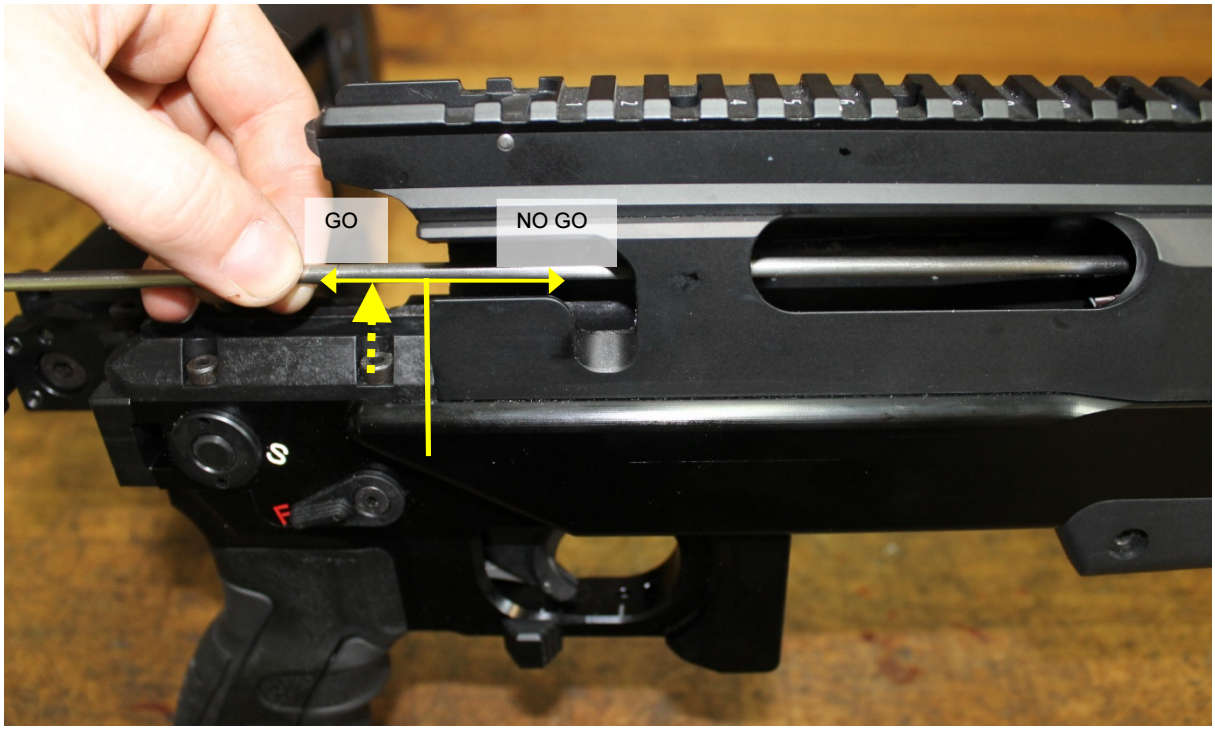


Fig. 6.4

6.1.3 Drop Gauges

a. The barrel must be clean and only slightly oiled.
b. Use drop gauges BT-AMH109 to determine the actual barrel caliber by trying to push one after the other slowly from the chamber side into the barrel (fig. 6.5); the largest one that fits corresponds to the caliber.
c. Choose the drop gauge which is smaller than the actual caliber by 0.01 mm; the barrel is straight if this gauge slides through the barrel by its own weight when holding the barrel slightly inclined.

Fig. 6.5

CAUTION: Do not allow a drop gauge to drop on hard ground - it may deform.

6.1.4 Boresight Collimation

a. Use gauge BT-G-308 (fig. 6.6) to inspect proper alignment of optical and iron sights in combination with a target as fig. 6.7.
b. Suspend target from a wall 25 m away.
c. Remove bolt, open stock halfway and fix rifle into vise. Put gauge into chamber, look through it and align barrel to black dot on target. When aiming through barrel, try to achieve full concentricity of gauge hole, muzzle and target dot.


Fig. 6.6

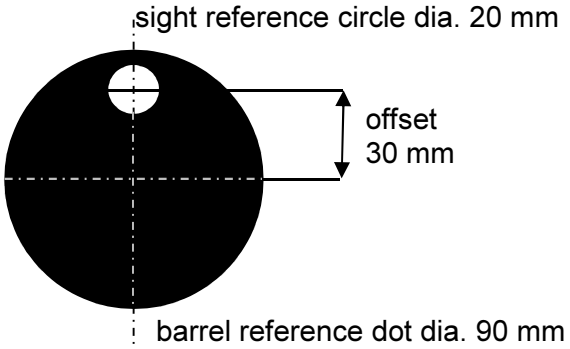


Fig. 6.7

d. When barrel is aligned to target dot, freeze position of rifle. In this position, inspect rifle scope's reticle to be in reference circle (fig. 6.8).
e. Remove scope, open emergency sights an inspect them to be on reference circle.

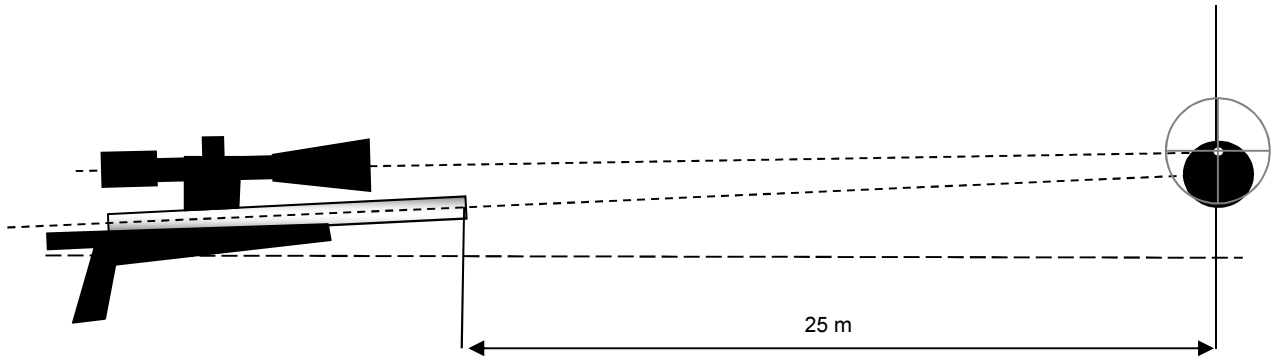


Fig. 6.8

6.1.5 Headspace Gauge

a. Inspection of headspace is done using gauges BT-MH201 and BT-MH203 (fig. 6.9).
b. Insert them as outlined in fig. 6.10 like a cartridge and try to close the bolt. With gauge BT-MH201 bolt must close, with gauge BT-MH203 it shall not.

Fig. 6.9

Fig. 6.10

6.1.6 Extractor Gauge

a. Use multi-gauge BT-MH061 to inspect extractor wear-out.
b. The firing pin shall be in cocked position and not protrude the bolt face.
b. The GO-side must slip by under the extractor (fig. 6.11), the NO-GO shall not.

Fig. 6.11

6.1.7 Firing Pin Protrusion Gauge

a. Inspection of firing pin protrusion is done using gauge BT-MH061.
b. Make sure that the firing pin is in uncocked position (fig. 6.12) and protrudes the bolt face. The GO-side must slip over the firing pin's head (fig. 6.13), the NO-GO shall not.

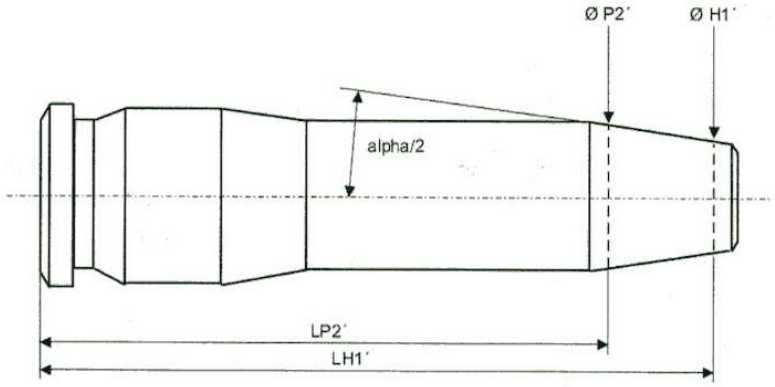
Fig. 6.12

Fig. 6.13

6.2 Gauge Condemnation Criteria

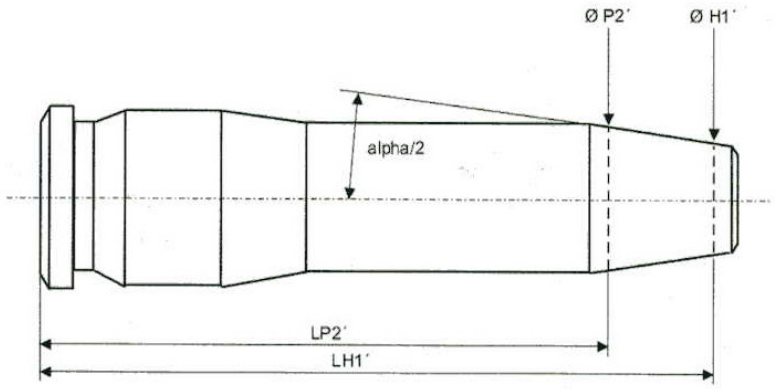
Personnel required: 1
Tools: Gauges kit (AMH104)
Calibrated micrometer (resolution 1/1000 mm)
Calibrated balance (resolution 1 gram)

Gauge	Reference	Criterium			Remarks
		Nominal	Minimum	Maximum	
Barrel entry Wearout	BT-AMH108	7.66 mm	7.660 mm	7.661 mm	Head dia.
		Mark visible and properly placed 238±2 mm			span fig. 6.3
Drop Gauge Ø 7.59 mm	BT-MH114-7.59	7.59 mm	7.585 mm	7.590 mm	none
Drop Gauge Ø 7.60 mm	BT-MH114-7.60	7.60 mm	7.595 mm	7.600 mm	none
Drop Gauge Ø 7.61 mm	BT-MH114-7.61	7.61 mm	7.605 mm	7.610 mm	none
Drop Gauge Ø 7.62 mm	BT-MH114-7.62	7.62 mm	7.615 mm	7.620 mm	none
Drop Gauge Ø 7.63 mm	BT-MH114-7.63	7.63 mm	7.625 mm	7.630 mm	none
Drop Gauge Ø 7.64 mm	BT-MH114-7.64	7.64 mm	7.635 mm	7.640 mm	none
Drop Gauge Ø 7.65 mm	BT-MH114-7.65	7.65 mm	7.645 mm	7.650 mm	none
Drop Gauge Ø 7.66 mm	BT-MH114-7.66	7.66 mm	7.655 mm	7.660 mm	none
Drop Gauge straightness	BT-MH114-x	max. 0.02 mm excentricity over full length			valid for all
Headspace Go	BT-MH201	Fig. 6.14			
Headspace No-Go	BT-MH203	Fig. 6.15			
Extractor Go/No-Go	BT-MH061	1.70	1.30±0.01 mm	1.80±0.01 mm	Fig. 6.16
Firing Pin Protrusion	BT-MH061	1.30	1.10±0.01 mm	1.35±0.01 mm	Fig. 6.17
Trigger Pull No-Go	BT-23267	1.5 kg	1.500 kg	1.510 kg	none
Trigger Pull Go	BT-23270	2.5 kg	2.495 kg	2.505 kg	none
Sight Collimation Target	BT-G-308	30 mm	28 mm	32 mm	Offset fig. 6.7
		25 m	24 m	26 m	Distance fig. 6.8



MH201	ØP2'	ØH1'
Nominal	10.000	7.500
Maximum	10.009	7.509
Minimum	10.001	7.501
Acc. length	41.623	45.057

Fig. 6.14



MH203	ØP2'	ØH1'
Nominal	10.000	7.500
Maximum	10.000	7.500
Minimum	9.992	7.492
Acc. length	41.773	45.207

Fig. 6.15

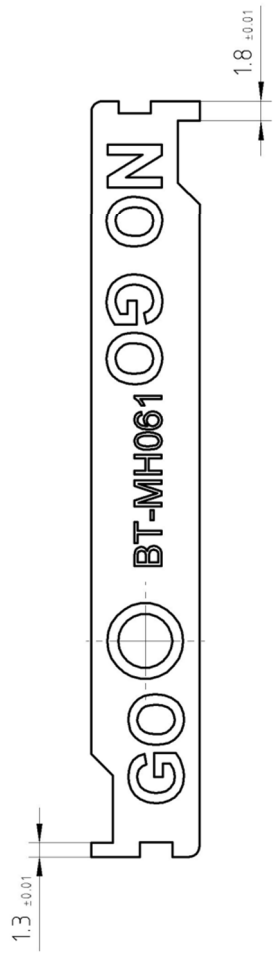


Fig. 6.16: MH061 Extractor

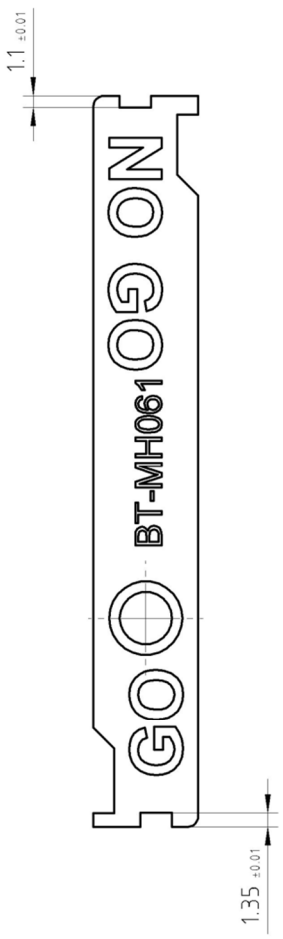


Fig. 6.17: MH061 Firing Pin Protrusion

7. Ammunition

7.1 Specifications of Cartridge

7.1.1 Technical Data of Cartridges (CIP standard)

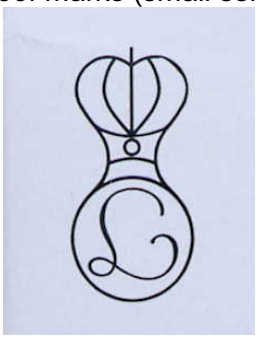
Cartridge designation:	.308 Win
Cartridge overall length:	< 71.3 mm
Bullet weight (according to twist rate 1:11"):	< 200 grs / 13.0 g
Average maximum pressure at breech end:	≤ 4150 bar
Maximum maximum pressure at breech end	≤ 4773 bar

7.1.2 Compatible and Non-compatible Ammunitions

As the rifle was designed according to CIP-standards, every cartridge (with exceptions as stated below) manufactured according to the same standards can be used with the rifle. CIP standard according cartridges normally carry a proof mark on the box (examples fig. 7.1).

CIP proof marks (small selection)

Finland (Lapua)



Sweden (Norma)

Italy (Fiocchi)

Fig. 7.1

Best results have been achieved with:

- RUAG Swiss P 168 grs (recommended for mid range applications up to 600 m);
- Norma Diamond Line 190 grs (recommended for long range applications up to 1000 m);
- Lapua D46 185 grs (suitable for military applications).
- Lapua Scenar 250 grs in .338 LM.

With respect to the muzzle brake and especially when using the rifle with mounted suppressor, the use of bullets which disintegrate at the muzzle departure is forbidden. The shrapnels are very likely to hurt people sidewards to the weapon or can choke the suppressor.
This concerns namely sub-caliber bullets with sabot like e. g. Remington Accelerator bullets.

7.2 Ballistic Data

7.2.1 Trajectory Tables

Weapon: B&T APR308 cal. 7.62x51 610 mm twist 1:11"
Scope: Rifle Scope 68 mm over barrel
Ammo: Norma Diamond Line 190 grs Sierra MatchKing HPBT
Atmosphere: ICAO 500 m AMSL

distance [m]	y* [m]	t** [s]	velocity [m/s]	energy [J]	Wind 1m/s Drift in cm
0	-0.07	0.00	780	3742	
50	-0.01	0.07	755	3508	0.1
100	0.00	0.13	731	3286	0.4
150	-0.03	0.20	707	3075	1.0
200	-0.12	0.27	684	2874	1.8
250	-0.25	0.35	661	2685	2.8
300	-0.44	0.43	638	2505	4.1
350	-0.69	0.51	616	2335	5.6
400	-1.01	0.59	595	2174	7.5
450	-1.40	0.67	573	2022	9.7
500	-1.86	0.76	553	1878	12.1
550	-2.40	0.85	532	1741	14.9
600	-3.02	0.95	512	1612	18.1
650	-3.74	1.05	492	1489	21.7
700	-4.57	1.15	473	1374	25.6
750	-5.50	1.26	454	1268	30.0
800	-6.55	1.37	436	1170	34.8
850	-7.73	1.49	419	1082	40.1
900	-9.05	1.61	404	1002	45.9
950	-10.52	1.74	389	931	52.1
1000	-12.15	1.87	376	868	58.7

*y: MPI over POA in meters. Rifle zeroed at 100 m.
**t: Flight time at distance.

7.2.2 Sight Adjustment Chart

Weapon:	B&T APR308 cal. 7.62x51 610 mm twist 1:11"
Scope:	Rifle Scope 68 mm over barrel
Ammo:	Norma Diamond Line 190 grs Sierra MatchKing HPBT
NVD:	Simrad KN252 140 mm over barrel
Atmosphere:	ICAO 500 m AMSL

distance	elevation		windage per	movement by	
[m]	**day**	**night***	1 m/s wind	1 click in mm	1 mrad in m
50	2	16	0		
100	0	7	0	10	0.10
150	2	7	1	15	0.15
200	6	10	1	20	0.20
250	10	13	1	25	0.25
300	15	17	1	30	0.30
350	20	22	2	35	0.35
400	26	28	2	40	0.40
450	32	34	2	45	0.45
500	38	39	2	50	0.50
550	44	45	3	55	0.55
600	51	52	3	60	0.60
650	59	60	3	65	0.65
700	67	68	4	70	0.70
750	75	76	4	75	0.75
800	83	84	4	80	0.80
850	93	94	5	85	0.85
900	102	103	5	90	0.90
950	113	114	5	95	0.95
1000	124	125	6	100	1.00

*To apply when Simrad NVD mounted.

7.2.3 Table of Hit Probabilities

Weapon: B&T APR308 cal. 7.62x51 610 mm twist 1:11"
Scope: Rifle Scope 68 mm over barrel
Ammo: Norma Diamond Line 190 grs Sierra MatchKing HPBT
Atmosphere: ICAO 500 m AMSL

distance [m]	σ [mm]	$dia_{0.99}$ [mm]
100	6.6	40
150	10.1	61
200	13.7	83
250	17.4	106
300	21.3	129
350	25.3	153
400	29.4	178
450	33.7	204
500	38.1	231
550	42.7	259
600	47.5	288
650	52.5	319
700	57.7	350
750	63.1	383
800	68.7	417
850	74.6	453
900	80.6	489
950	87.0	528
1000	93.5	567

*σ: Standard deviation.
**$dia_{0.99}$: Diameter of a target with first round hit probability of 99%.

7.3 Care and Handling of Ammunition

The sniper weapon system can perform the required first round hit probability only with selected ammunition. Therefore never mix cartridges of
- Different brands;
- Different specifications in bullet type and weight;
- Different lot numbers.

Thus in operation as well as for training and storage, cartridges must be always properly identified.

Since ammunition and explosives are adversely affected by moisture and high temperature, due consideration should be given to the following:

- Do not open boxes until ammunition is required for firing.
- Protect ammunition from high temperature and direct sunlight.
- Do not attempt to disassemble cartridges.
- Never use lubricants or grease on cartridges.

8. Accessories

8.1 Rifle Scopes

B&T provides suitable rifle scopes on request.

8.2 Cases

B&T provides suitable hard or soft cases on request.

8.3 Triple Rail Interface

a. The triple rail interface fits to the weapon without any modification.
b. It provides three NATO accessory rails as interface for accessories as
- Night Vision Devices (as shown, others than Simrad)
- Laser aiming/designation devices
- Illumination tools

c. Part number of triple rail interface: BT-AMH107.

Fig. 8.3

9. Troubleshooting Index

SN	Problem	Probable Cause	Immediate Action	Maintenance Action
1.	Failure to extract	- non-conform ammunition - case rupture - fouling of chamber - inoperative extractor	- remove blocked case - clean chamber - return removed case and rifle to armorer	- apply extractor and chamber inspection procedures - clean chamber - replace worn-out, lost or defective parts - if failure occurs with other rifles, check conformity of ammunition
2.	Failure to eject	- inoperative ejector	- remove case (if necessary by removing bolt and magazine) - return rifle and case to armorer	- check proper assembly of ejector - replace worn-out or defective parts
3.	Misfire despite striking firing pin	- non-conform ammunition - inoperative firing-pin - improper head-space	- remove unfired cartridge - check firing pin impact on primer - remove and clean bolt - load new cartridge - if failure repeats, return removed cartridge and rifle to armorer	- check firing pin impact on primer of cartridge - apply firing pin protrusion and headspace inspection procedures - replace defective or worn-out parts (namely firing pin and spring CS001) - if failure occurs with other rifles, check conformity of ammunition
4.	Misfire despite pulling trigger (firing pin not striking)	- malfunction of trigger group - firing pin retention loose	- unload - check proper position of safety - return rifle to armorer	- disassemble firing pin and check proper installation - disassemble trigger group and check proper installation - replace worn-out or defective parts
5.	Failure to feed	- incorrect position of magazine or cartridge - deformed magazine body or lips - worn-out magazine spring	- check magazine is properly held in rifle and try again - if failure repeats, change magazine	NONE
6.	Impossible to close bolt	- failure to extract - foreign particles in chamber	- DO NOT APPLY FORCE TO CLOSE BOLT! - remove cartridge - check chamber visually and with little finger - clean chamber	NONE

SN	Problem	Probable Cause	Immediate Action	Maintenance Action
7.	Inconsistent firing results	- loosened sight mounting - defective sight - barrel fouling - barrel worn out - loosened bedding screws	- check sight settings - check sight mountings, tighten if loose - in case of detachable sights: Replace and return suspected to armorer - return rifle/sight configuration to armorer	- apply sight inspection procedures and actions - disassemble sight mount, check parts visually and replace defective parts - apply barrel and headspace inspection procedures - in case of barrel fouling, apply chemical agent - replace barrel if worn out - inspect momentum of bedding screws (NT038, NT063); tighten and secure if loose
8.	Low recoil, no impact detected	- underloaded cartridge	- inspect barrel to be clear (bullet could be stuck!)	- NONE
9.	Heavy recoil, black smoke, no impact detected	- Obstructed barrel shot	STOP FIRING!	- barrel replacement
10.	Trigger fails to return after release	- lack of lubrication - damaged trigger spring	- in combat situation, continue firing by pushing trigger manually forward while operating bolt - return rifle to armorer	- disassemble trigger group - replace trigger springs (CS012, CS016) - lubricate and reinstall trigger group
11.	Folding stock retention fails when open	- accumulation of dirt - damaged retention	- wipe of dirt - if failure repeats, return rifle to armorer	- visual inspection - replace worn-out, lost or defective parts
12.	Failure of non-essential features	- improper installation - dirt - damaged or lost parts	- visual inspection - wipe of dirt - if failure repeats, return rifle to armorer	- visual inspection - replace worn-out, lost or defective parts

10. Warranty Statement

Warranty claims on behalf of the Client are to be explicitly declared as such. During the legal warranty period, B&T provides warranty cover solely for defects that arise as a result of faulty materials, construction errors or poor workmanship. If a warranty claim is justified, B&T will, at its own discretion, either repair or replace the defective good. Costs incurred in transporting the defective good to B&T are borne by the Client. Spare parts fitted and replaced become the property of B&T.
Inasmuch as is legally permitted, any other liability of B&T is excluded, in particular liability for damages arising either directly or indirectly from the delivered good itself, from its use or from its defects. Merchandise is covered by the warranty provisions of the manufacturer. Parts that are naturally subject to wear and tear, damage arising from insufficient maintenance work, non-compliance with operating regulations and cases of force majeure are all excluded from warranty cover. Warranty claims lapse if the Client itself or third parties alter or repair the delivered good without the prior written consent of B&T.

All product specifications are subject to change without prior notice. Published data are mean values and therefore not suitable acceptance criteria.