Telescopic Sight

ZF 4-16 x 56 FF

330292-0000.000

Operating Instructions

Status 05/2007

We reserve the right to amend these instructions.

Preliminary Remarks

1 The Telescopic Sight 4-16 x 56 FF is a fine mechanical optical precision instrument.

Exact knowledge of the device is required for
- correct handling,
- reliable functioning during operation,
- maintenance of long life-span

2 Important instructions for technical security are especially emphasized.

ATTENTION	for working methods, which must be exactly followed, in order to avoid damage or destruction of the device.

CAUTION	for working methods, which must be exactly followed, in order to avoid that persons are harmed.

NOTE	technical requirements the user of the device must especially pay attention to.

3 Reference to illustrations and location numbers are stated in brackets, Example: (2/3) means illustration 2, location number 3.

4 **Manufacturer**

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EN ISO 9001 DNV Certified Company

5 If you have found errors or have ideas to contribute to a better manual, please contact us. We are grateful for suggestions originating from practical use.

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Illustrations

Safety Regulations

- Use of the device as directed is essential for safe operation. Therefore, familiarize yourself thoroughly with the contents of these operating instructions. This manual must always be kept accessible at all times.

- The device may only be operated with the accessories described in these operating instructions. Other accessories may only be used if their safety unobjectionable usability has been proven by the manufacturer. The operator or user must convince himself hereof.

- Modifications and repairs may only be performed by the manufacturer or persons explicitly authorized by him. The manufacture is not liable for damages due to unauthorized performed modifications or repairs of the systems. In addition, all warranty claims then become invalid.

- Accident prevention regulations must be observed in accordance with the legal requirements.

- The use of the device may only be permitted to trained and qualified persons having knowledge of the valid safety regulations. It is the responsibility of the operator of the equipment to train and instruct the operating personnel accordingly.

- Before putting the device into operation their proper condition must be verified.

- Under no circumstances look through the sight at the sun or laser light sources. This could lead to serious eye injuries.

Notes

1

Description

1.1 Designation

Name:	Telescopic Sight 4-16 x 56 FF
Short designation:	ZF 4-16 x 56 FF
Part Number:	330292-0000.000

1.2 Determined Use

The Telescopic Sight 4-16 x 56 FF together with a sniper rifle serves the shooter for identification, acquisition and sighting of target. The built-in reticle illumination enables aiming during dusk and dawn.
In addition, it is equipped with a parallax compensation from 50 m to ∞.

1.3 Marking

The Telescopic Sight is marked on the upper and lower side of the eyepiece unit.

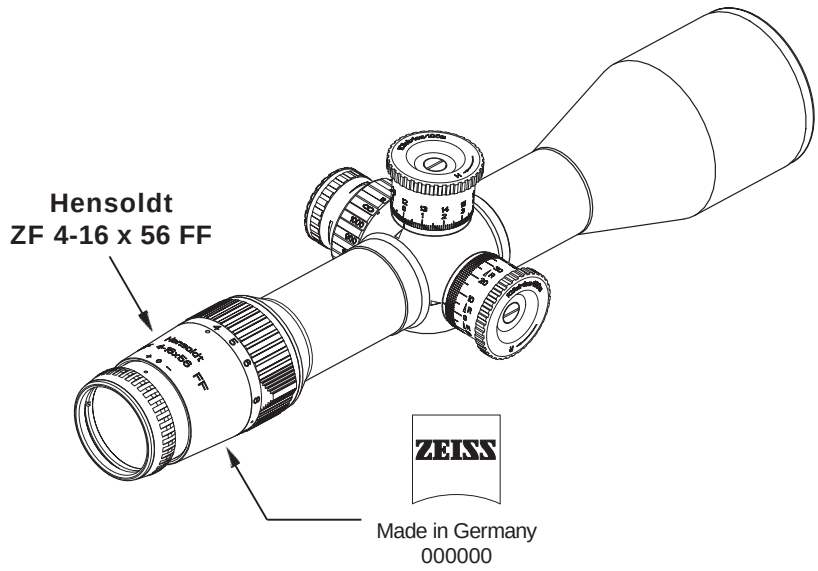


Illustration 1 Marking

1.4 Technical Data

Dimensions

	Length	Width	Height
ZF 4-16 x 56 FF	334 mm*	94 mm*	77 mm*
Ring diameter (mount)	Ø 34 mm*		

* Dimensions can differ slightly depending upon setting at the time.

Weight:

ZF 4-16 x 56 FF ..... 900 g

Electrical Data

Reticle illumination ..... red
Power supply ..... round cell 3 V CR 2032 down to -20 °C
alternative 3 V BR 2032 down to -40 °C

Optical Data

Magnification ..... 4power to 16power
Entrance pupil ..... 56 mm
Exit pupil ..... 14 mm to 3.5 mm
Field of view ..... 87 m to 25 m at 1000 m
Eye relief ..... approx. 80 mm
Parallax compensation ..... 50 m to ∞
Resolution ..... min 3”
Diopter adjustment ..... -2.5 dpt to +2 dpt
Transmission ..... approx. 92 %
Superelevation angle adjustment
- per detent in elevation and azimuth ..... 0.1 mrad = 1 cm / 100 m
Max. total adjustment range
- elevation ..... ± 112 cm / 100 m*
- azimuth ..... ± 50 cm / 100 m

* In order to utilize the entire adjustment range the weapon rail must have a declination to the front or be equipped with a scope mount.

Reticle

Distance between the dots ..... 10 cm / 100 m

Distance between the centering lines ..... 100 cm / 100 m
(see illustration 4)

1.5 Design and Function

1.5.1 General

The Telescopic Sight 4-16 x 56 FF is a monocular/monobjective telescope with a lens erecting system and 4power to 16power magnification. The reticle of the telescopic sight can be illuminated and brightness regulated with the illumination control.

The parallax between reticle pattern and image scene can be compensated for continuously for target distances of 50 m to ∞.

Sealing elements in the scope prevent moisture from entering, so that the telescopic sight is always useable even during sudden temperature changes, rain, snow and fog.

The supplied scope protection cap (2/1) protects the front lens from damage during transportation.

The rubber protection ring can be replaced by the eyeguard (2/4), which is screwed in front of the eyepiece. It prevents the user being blinded by too intensive sunlight and disturbing optical reflections. In addition, it prevents optical reflections of the facial skin when using a night sight attachment.

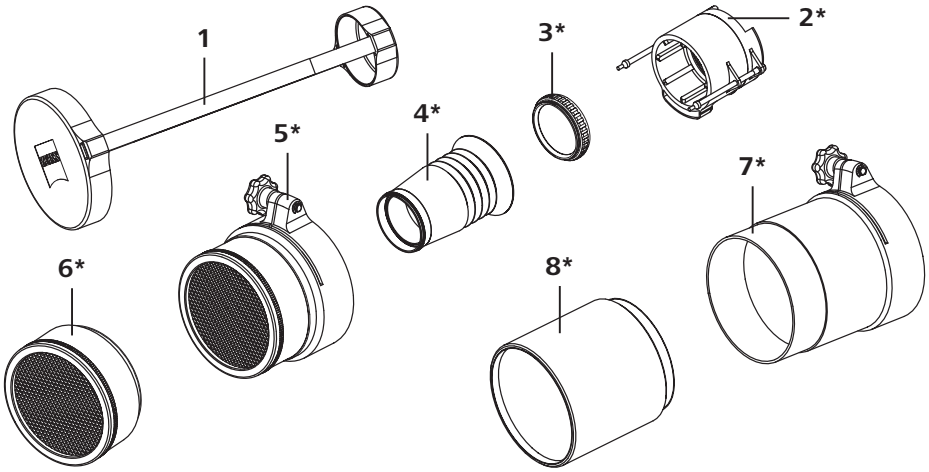
The supplied baffles (2/5 and 6) can, if required, be mounted onto or in front of the objective (3/8). The screwable baffle, complete (2/6) is screwed in front of the objective and the clampable baffle (2/5) is mounted to objective and clamped tight. They have the following functions:
- prevent reflections of the incoming backlight towards target (camouflage),
- protect the user against obliquely incident sun rays.

Instead of the baffles, one of the backlight tubes (2/7 and 8) can be placed in front of the objective. The screwable backlight tube, complete (2/8) is screwed onto the objective and the clampable backlight tube (2/7) is mounted to objective and clamped tight. They prevent the user being blinded by backlight.

For an image low in contrast there is the possibility of screwing a yellow filter (2/3) in front of the eyepiece.

In order to sight a target at certain angular ranges through reflecting glass disks a polarization filter (2/2) can be mounted to the eyepiece. The filter reduces reflections of the sighted glass disk.

For mounting the telescopic sight onto a Picatinny rail scope mounts are available.
The scope may only be mounted on the weapon by authorized qualified personnel such as gunsmiths.



* Accessories are only supplied as an option.

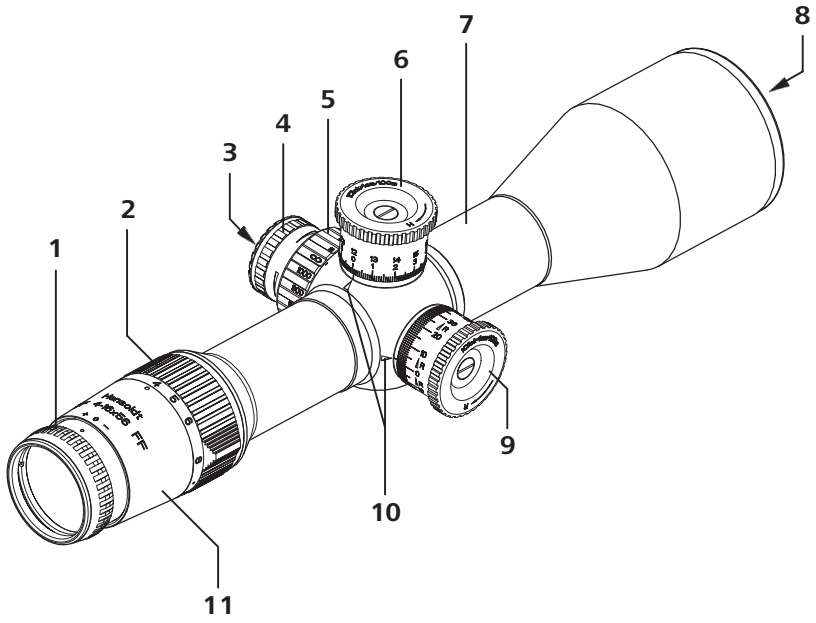
1 Scope protection cap
2 Polarization filter*
3 Yellow filter*
4 Eyeguard*
5 Baffle, clampable*
6 Baffle, screwable, complete*
7 Backlight tube, clampable*
8 Backlight tube, screwable, complete*

Illustration 2 Mountable Accessories

1.5.2 Design

The Telescopic Sight 4-16 x 56 FF consists of:
- the eyepiece (3/1)
- the magnification adjustment with erecting system (3/2)
- the tube (3/7) and
- the objective (3/8)

The index mark for diopter zero setting is located on the eyepiece (3/1). The eyepiece is screwed into the eyepiece tube (3/11). Engraved on the eyepiece tube is "0", the direction indicator for diopter adjustment, device designation and the index mark for magnification adjustment.



1	Eyepiece	6	Range adjustment
2	Magnification adjustment with erecting system	7	Tube (housing)
3	Battery compartment	8	Objective
4	Illumination control	9	Azimuth adjustment
5	Rotary knob for parallax compensation	10	Index marks
		11	Eyepiece tube

Illustration 3 Design

The magnification adjustment with erecting system (3/2) is fixed to tube (3/7). The magnification values are marked on the adjustment ring of the magnification adjustment. During magnification change the reticle pattern is also magnified.

Integrated in the tube (3/7) are the mounts for range and azimuth adjustment. The coloured line (12/9) on the range adjustment shows the user at which level of the rotary knob for range adjustment the values can be read-off. No coloured line exists for the white scale.

The range adjustment (3/6), rotary knob for parallax compensation (3/5) with illumination control for reticle illumination and the azimuth adjustment (3/9) are fixed outside of the tube. In addition, the index marks (3/10) for range adjustment and azimuth adjustment are engraved on tube.
On the rotary knob for range adjustment the adjustment values are marked in two levels. The levels are laid-out in different colours. The engraved adjustment values on the rotary knob from 0 to 23 need to be multiplied by 10. One rotation has 120 clicks. One click is equivalent to one graduation mark.
One graduation mark (click) in elevation and azimuth corresponds to 1 cm / 100 m.
On the rotary knob for azimuth adjustment the adjustment values $\pm$ 50 are engraved.
Both rotary knobs for range and azimuth adjustment are required for hit correction.

The battery compartment (3/3) for the round cell is integrated in the rotary knob for illumination control.

The reticle illumination is turned on by turning illumination control (3/4) and pressing switch. When illumination is turned off the selected brightness is memorized. The illumination control (3/4) has no end setting and when it is turned on it has an idle operating range of $\pm$ 45°.
A necessary change of battery (low. batt.) is indicated by pulsating brightness of reticle illumination with a frequency of approx. 1 Hz.

The objective (3/8) is built into the tube.

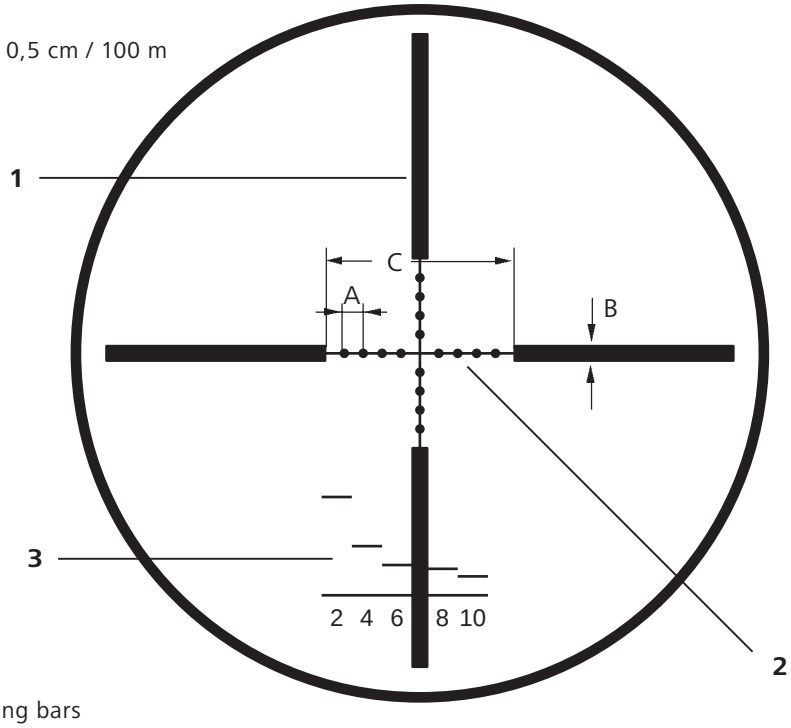
1.5.3 Reticle

The reticle pattern of the telescopic sight consists of the centering bars (4/1), the lead circles (MIL-dots) (4/2) and the markings (4/3) for estimating distance.

The reticle mark corresponds to a standard MIL-dot reticle pattern. The distance between the centering bars (4/1) is 100 cm / 100 m.

The distance (4/A) between the lead circles (MIL-dots) for elevation and azimuth is 10 cm at 100 m.

Line width: 0,5 cm / 100 m



1 Centering bars
2 Lead circles
3 Marking for estimating distance
A Intervals of lead circles (10 cm / 100 m)
B 4 cm / 100 m
C 10 x 10 cm / 100 m = 100 cm / 100 m

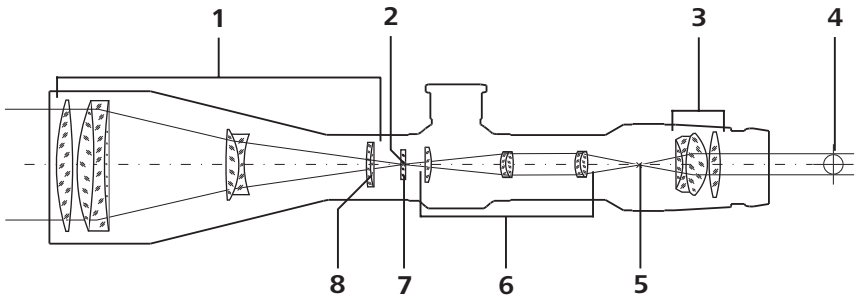
Illustration 4 Reticle Pattern

They have an outer diameter of 0.2 mrad (2 cm / 100 m).

The horizontal lines (4/3) serve for estimating distances of 200, 400, 600, 800 and 1000 m. The corresponding lines are marked with digits 2, 4, 6, 8 and 10. The distance between the base line and the corresponding reference line corresponds to a height of 1 m in reference to the corresponding distance.

1.5.4 Function

The parallel rays coming from the target at setting "∞" of rotary knob for parallax compensation are imaged vertically and laterally inverted by the objective (5/1) over the field lens (5/8) in the first image plane (5/2). In the first image plane the reticle (5/7) is located and built-in vertically and laterally inverted and during magnification change is also magnified.
Through adjustment of rotary knob for parallax compensation the field lens is shifted in longitudinal direction, whereby the rays, coming from the relevant finite distance, are imaged in the first image plane. The reticle and the focused scene coincide and therefore imaged parallax-free.



1 Objective
2 1st image plane
3 Eyepiece
4 Exit pupil
5 2nd image plane
6 Erecting system
7 Reticle
8 Field lens

Illustration 5 Optical Structure

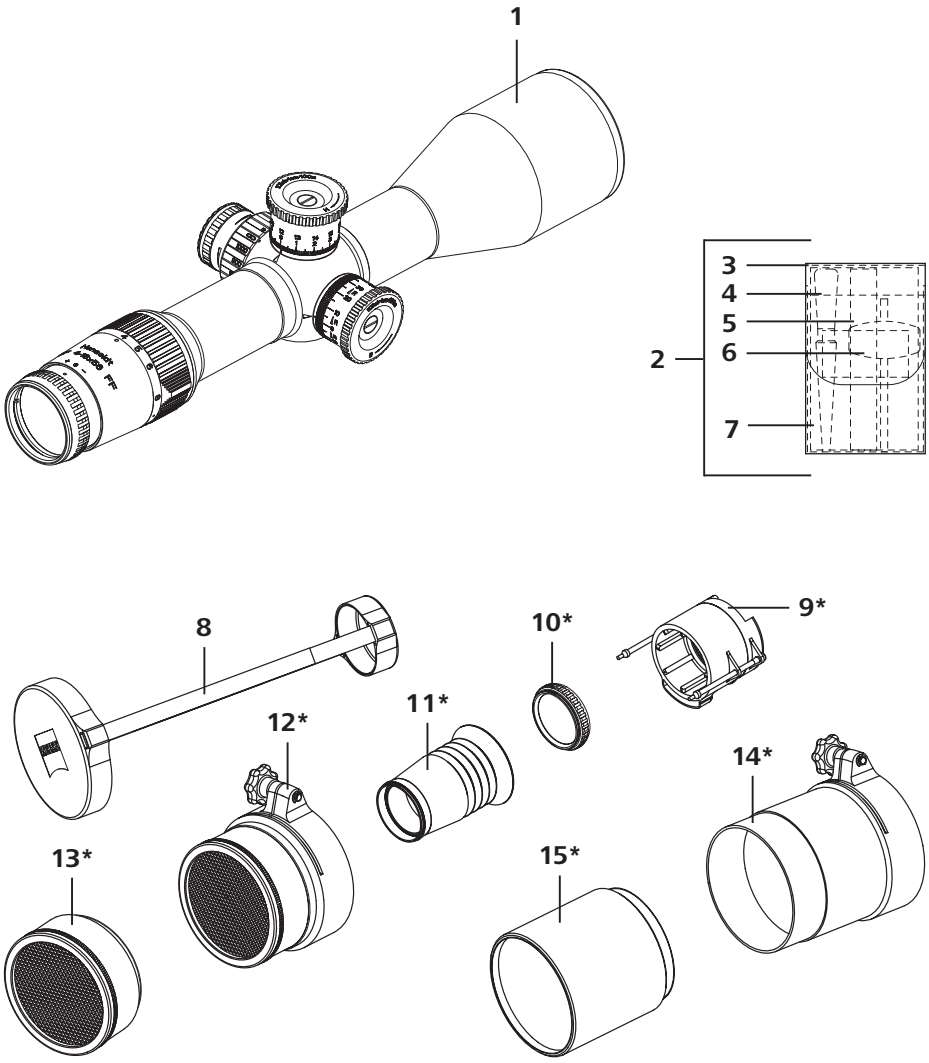
Via the lenses of the magnification adjustment with erecting system (5/6), which can be moved towards one another in longitudinal direction, the image is pictured upright and non-reversed in the second image plane (5/5). Here it is viewed magnified in the eyepiece (5/3). The eyepiece is adjustable by +2 to -2,5 diopter.

The exit pupil (5/4) lies approx. 80 mm in front of the first eyepiece lens.

1.6 Scope of Supply

The telescopic sight will be delivered to the corresponding customers in a commercially available carton. Together with the weapon it can also be stored in the transport and storage case and supplied to the end user.

The parts stored in the tool kit bag are not pictured.



*Accessories are only supplied as an option.

Illustration 6 Scope of Supply

Item	Qty.	Designation	Part Number
1	1	Telescopic Sight 4-16 x 56 FF	330292-9001.000
2	1	Tool Kit Bag with Contents	330296-9016.000
3	1	Bag, TT CIG BAG	000000-0479.887
4	1	Dust Brush	000000-0150.354
5	1	Optics Cleaning Cloth	000000-0150.697
6	1	Screwdriver	000000-0454.683
7	1	Microfibre Cleaning Cloth	Z-1051
8	1	Scope Protection Cap	521630-8015.000
9	1	Polarization Filter*	000000-0454.268
10	1	Yellow Filter*	330296-9026.000
11	1	Eyeguard*	330296-9031.000
12	1	Baffle, clampable*	330297-9028.000
13	1	Baffle, screwable, complete*	330297-9032.000
14	1	Backlight Tube, clampable*	521680-8060.000
15	1	Backlight Tube, screwable, complete*	330297-9024.000
**	1	Round Cell 3 V BR 2032	commercially available
**	1	Round Cell 3 V CR 2032	000000-0180.502
**	1	Operating Instructions	OpIn 330292-0000.000

*Accessories are only supplied as an option.
** not shown

2

Operation and Maintenance

2.1 Operating Instructions

2.1.1 General

The telescopic sight is a fine-mechanical optical precision instrument. It is to be handled with utmost care and treated with consideration and no force should be applied. The device is to be protected against heavy blows and vibrations. If not in use the telescopic sight is to be removed from rifle and stored appropriately.

CAUTION	Under no circumstances look through the telescopic sight at the sun or laser light sources. This could lead to serious eye injuries.

2.1.2 Replacement of Battery

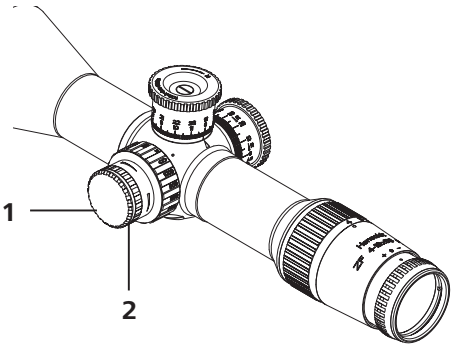
(1) Hold onto illumination control (7/2) and unscrew lid of battery compartment (7/1).

NOTE	When unscrewing hold onto lid of battery compartment, since there is a spring on the lid and lid would pop off.

(2) Remove battery.

(3) Place new battery in mount with positive pole facing lid of battery compartment.

(4) Press lid of battery compartment against illumination control position orientated and screw tight. Thereby hold knurled knob of illumination control tight.



1 Lid of battery compartment
2 Illumination control

Illustration 7 Replacement of Battery

2.1.3 Operation

(1) Remove scope protection cap (2/1).

(2) Focus reticle pattern by turning eyepiece (8/1).

(3) Focus target by turning rotary knob for parallax compensation (8/4).

NOTE	If the scope is being used together with a night sight attachment the rotary knob for parallax adjustment must be set to "∞" and after focussing NSV 80, if necessary, optimize parallax setting on the telescopic sight.

(4) Set sighting range on scale ring of range adjustment (8/5).

NOTE	If the lower rim of the range adjustment lies above the yellow colour ring on the scale the value with the yellow colour is valid. If no coloured ring is visible or the yellow line only partially, the value is to be read-off on the white scale (see illustration 12). With weapon rails not having a declination to the front it is possible that in extreme adjustment ranges the adjustment range may not be sufficient and must be compensated for by a scope mount declined to the front.

1 Eyepiece
2 Adjustment ring for magnification
3 Illumination control
4 Rotary knob for parallax compensation
5 Rotary knob for range adjustment
6 Scale ring for azimuth adjustment

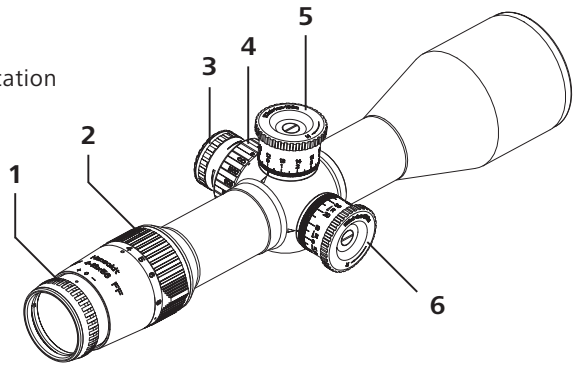
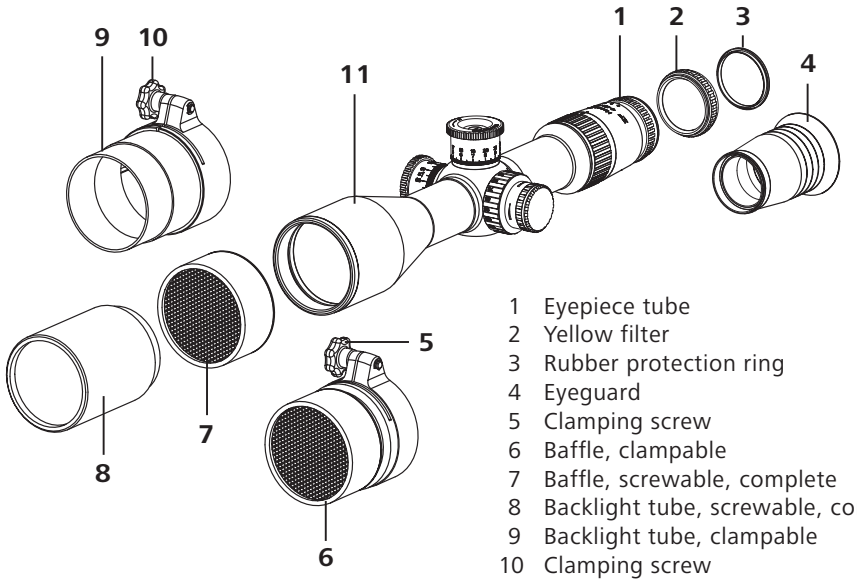


Illustration 8 Operating Controls

(5) Under poor light conditions switch reticle illumination on with illumination control (8/3) and with rotary knob regulate illumination intensity in correspondence to the light conditions.

NOTE	When turning reticle illumination on the idle motion range of the rotary knob is ± 45°. It can be turned without stop. If brightness does not change while turning, then the maximum value has been reached.

(6) Depending upon position and situation during backlight or stray light the user has the alternative of either screwing the screwable baffle, complete (9/7) or screwable backlight tube, complete (9/8) onto objective (9/11).
Should the clampable version be selected either mount the clampable baffle (9/6) onto objective and clamp tight with clamping screw (9/5) or mount the clampable backlight tube (9/9) onto objective and clamp tight with clamping screw (9/10).



1 Eyepiece tube
2 Yellow filter
3 Rubber protection ring
4 Eyeguard
5 Clamping screw
6 Baffle, clampable
7 Baffle, screwable, complete
8 Backlight tube, screwable, complete
9 Backlight tube, clampable
10 Clamping screw
11 Objective

Illustration 9 Mounting of Accessories

(7) With adjustment ring (8/2) set desired magnification.

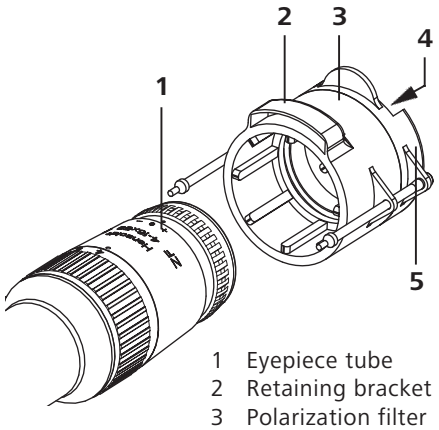
(8) Should the image not have high enough contrast unscrew rubber protection ring (9/3) from eyepiece tube (9/1), screw yellow filter (9/2) into eyepiece tube and screw rubber protection ring into the yellow filter.

NOTE	Loosen rubber protection ring with a cloth or with the flat hand. Thereby do not apply too much pressure to the rubber protection ring.

(9) In case of disturbing optical reflection on the eyepiece screw rubber protection ring (9/3) out of eyepiece tube (9/1) or yellow filter (9/2).

(10) Screw eyeguard (9/4) into eyepiece tube or yellow filter.

(11) In case of signs of reflection caused by glass disks in front of the target put polarization filter (10/3) onto eyepiece tube (10/1) with retaining bracket (10/2) facing up. Focus reticle by turning polarization filter and turn knurling (10/4) until target is seen clearly.



1 Eyepiece tube
2 Retaining bracket
3 Polarization filter
4 Knurling
5 Cap

Illustration 10 Eyepiece with closed polarization filter

NOTE	By turning polarization filter the eyepiece is adjusted. It is also possible to mount polarization filter on top of the yellow filter. The eyeguard may not be screwed on.

(12) Should the polarization filter not be needed anymore, pull cap (10/5) off facing up, bend back and place strap in retaining bracket (see illustration 11).

(13) During shooting correct shot pattern by means of rotary knob of range adjustment (8/5) and rotary knob of azimuth adjustment (8/6).

NOTE	If the lower rim of the range adjustment lies above the yellow colour ring on the scale the value with the yellow colour is valid. Is no colour ring visible or the yellow line only partially, the value is to be read-off on the white scale (see illustration 12).

(14) Should the scope not be needed anymore turn reticle illumination off by pressing on/off-switch (8/4), remove the screwed-on or clamped-on filter and slip on scope protection cap (2/1).

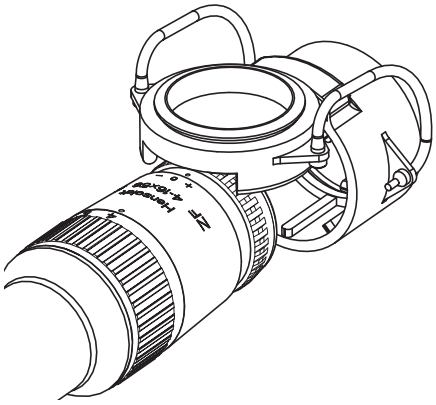


Illustration 11 Eyepiece with open polarization filter

2.1.4 Mounting and Test Firing / Adjustment to Weapon

2.1.4.1 Mounting of Telescopic Sight

(1) The scope may only be mounted by an authorized expert such as a gunsmith.
There is the possibility of mounting the scope with a ring mount or a scope flip-on mount.

NOTE	Should the telescopic sight **not** be mounted by an expert, Messrs. Carl Zeiss Optronics Wetzlar GmbH will not accept any warranty claims in regard to target accuracy and the given adjustment values.

2.1.4.2 Test Firing / Adjustment to Weapon

(1) Mount scope as described in section 2.1.4.1.

(2) Place weapon in test firing equipment. Mount target disk at a distance of 100 m and adjust line of bore to target disk.

(3) By means of rotary knob of range adjustment (12/11) and rotary knob of azimuth adjustment (12/5) adjust scales (12/3 and 12/6) to „zero".

(4) Shoot dispersion pattern.

(5) Determine deviation and correct aiming point of telescopic sight by means of rotary knob of range adjustment (12/11) and rotary knob azimuth adjustment (12/5).

(6) Shoot new dispersion pattern and, if necessary, correct aiming point anew.

(7) Turn out screw (12/2) with supplied screwdriver, thereby hold onto rotary knob of range adjustment (12/11).

NOTE	When turning out screw care must be taken that the O-ring (12/1) does not fall out. If necessary, replace ring in groove.

(8) Carefully lift rotary knob of range adjustment off until it is out of the toothing and can be turned easily. Set elevation scale (12/3) to "zero" and press rotary knob of range adjustment down until stop.

NOTE	Because of the toothing it is possible that the scale of the range adjustment in relation to the index mark shows a constant error in alignment of max. 0,5 graduated scale lines to the right or left.

(9) Turn rotary knob range adjustment (12/11) one rotation to the right until the yellow "12" is positioned above the index mark elevation (12/8).

(10) Should the lower rim of the rotary knob of range adjustment (12/11) cover the yellow line mark (12/9) or if it lies way above line, keep hold of the rotary knob of range adjustment and push the supplied screwdriver through the bore of the rotary knob of range adjustment (12/11) until the blade of the screwdriver rests in the slit of the elevation adjustment ring (12/10).

(11) By turning screwdriver position lower rim of rotary knob of range adjustment (12/11) approx. in the center of the yellow line mark. Then remove screwdriver.

NOTE	The elevation adjustment ring may not be turned with force, since otherwise zero-setting would become out of adjustment.

(12) Replace screw (12/2) and tighten, thereby holding rotary knob of range adjustment.

(13) Set rotary knob of range adjustment to “zero”.

(14) Loosen screw (12/4) approx. 5 turns using the supplied screwdriver, thereby holding rotary knob of azimuth adjustment (12/5).

(15) Carefully lift rotary knob of azimuth adjustment (12/5) off until it is out of the toothing and can be turned easily. Set azimuth scale (12/6) to “zero” and press rotary knob of azimuth adjustment down until stop.

NOTE	Because of the toothing it is possible that the scale of the range adjustment in relation to the index mark shows a constant error in alignment of max. 0.5 graduated scale lines to the right or left.

1 O-ring
2 Screw
3 Elevation scale
4 Screw
5 Rotary knob azimuth adjustment
6 Azimuth scale
7 Index mark azimuth
8 Index mark elevation
9 Yellow marking
10 Elevation adjustment ring
11 Rotary knob range adjustment

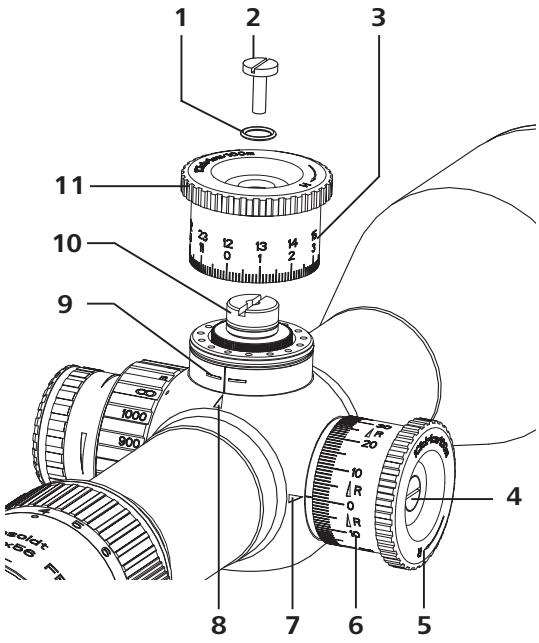


Illustration 12 Adjustment of Telescopic Sight

(16) Tighten screw (12/4), thereby holding rotary knob of azimuth adjustment (12/5). The azimuth scale ring must remain in zero position.

(17) Shoot new dispersion pattern and, if necessary, repeat adjustment beginning with step (5).

NOTE	The telescopic sight is zeroed in and by means of the range adjustment the corresponding range can be set.

2.2 Operation under special climatic and other conditions

2.2.1 General

(1) Fine-mechanical optical instruments should function under special climatic conditions exactly as under normal conditions.

(2) Operation and maintenance under special climatic conditions, however, requires special care in keeping sight operational and protection against intensive wear and tear.

2.2.2 Use at low temperatures

(1) The telescopic sight is to be protected against extreme temperature fluctuations. Is it to be brought into a room with high temperatures, place it in a case beforehand. The lid should not be opened until telescopic sight has reached room temperature.

(2) Outer condensation is to be removed with a soft clean cloth. The optical components are to be dried with the optics cleaning cloth.

(3) Condensation inside the telescopic sight indicates that device is not sealed properly. Should condensation remain continuously and appear repeatedly return sight for inspection of sealing.

(4) At low temperatures movable parts such as the adjustments can become stiff. This can be done away with by moving the corresponding parts repeatedly. If the parts can only be moved sluggishly or not at all, then only slow warming up helps.
This can be achieved by rubbing with a cloth. Better, however, is gradual warming up in a room as described above in paragraph (1). By no means may an optical instrument be warmed up too intensively or too quick, since the glass parts may crack. Therefore, it is prohibited to use open flames or welding lamps and other such means on the scope.

(5) Glass components should not be breathed on to warm them up.

(6) As described in Section 1.5.2 a necessary change in battery (low. batt.) is indicated by reticle illumination pulsating. Since battery power supply drops at low temperatures, it is possible that the "low. batt." display function is activated (approx. -40 °C), even though battery capacity still is sufficient.

2.2.3 Use at high temperatures

(1) Protect telescopic sight particularly well against dust and sand, especially bearing and gliding parts as well as glass components.

(2) Keep rubber parts flexible by rubbing them in with talcum powder.

2.2.4 Use at high humidity

(1) High humidity and salty air enhance corrosion.

(2) Pay attention that surface of sight is flawless.

(3) Touch-up varnish damages immediately.

(4) Replace sights which are not sealed properly and return them for repair.

2.3 Maintenance

Maintenance includes
- determination and reporting of failures, damages and decrease in performance
- checking completeness of accessories
- cleaning

User should perform the jobs stated in the maintenance plan 2.3.2 **before** and **after** use.

Repairs which go beyond the activities described herein may only be performed by us or personnel authorized by us.

Should a failure occur during use, which cannot be eliminated, kindly contact:

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2.3.1 Commodities

- optics cleaning cloth or optics cleaning paper
- cleaning cloth
- spirit
- disinfectant
- ethyl alcohol

2.3.2 Maintenance Plan

Item	Component	Inspection	No. of items to be inspected	Auxiliary material, actions	Section	When? before after
1	battery	performance, leakage	2	replace battery	2.3.3	b, a
2	scope protection cap	damages cleanness	2	replace scope protection cap clean with cleaning cloth	2.3.4	b, a
3	objective and eyepiece	damages cleanness	1	return for repair cleaning of optics	2.3.5	b, a
4	housing components	mechanical damages, corrosion, cleanness	1	return for repair clean with cleaning cloth	2.3.6	b, a
5	switch illumination, range adjustment azimuth adjustment rotary knobs	damages, movability, function cleanness legibility of symbols	4	return for repair clean with ethyl alcohol return for repair	2.3.7	b, a
6	lid of battery compartment	damages, function	1	return for repair		

2.3.3 Battery

When battery no longer performs with sufficient energy or there are signs of leakage (spots) an exchange must take place.

ATTENTION
- Do not store the telescopic sight with battery installed.
- Only use batteries which are protected against leakage.

NOTE

- Do not throw batteries in the normal waste disposal, but in the special waste disposal intended for recycling.

2.3.4 Scope Protection Cap

Inspect scope protection cap for
- tight fit
- damages
- cleanness

2.3.5 Cleaning of optics and inspection

Inspect eyepiece (3/1) and objective (3/8) for
- damages
- cleanness

If eyepiece or objective are damaged, return telescopic sight for repair.

Remove any slight residue on glass surfaces first with a dust brush and then clean with optics cleaning cloths. In order to do so, breath on glass and rotate the optics cleaning cloth in circular movements from the middle to the edge of the glass surface.
Only clean glass components with dust brush and optics cleaning cloth. Replace optics cleaning cloths regularly.

Remove heavy residue on glass surfaces with water and a dish washing detergent. Dab wet glass surfaces dry with optics cleaning cloth.

2.3.6 Housing (Tube)

Inspect housing for:
- mechanical damages
- varnish damages
- corrosion
- cleanness.

Should housing be damaged or corroded return device for repair.

Do not oil or grease mechanical components, operating controls, drives, etc.

Remove loose dust or dirt with a soft and dry cleaning cloth. Remove tight clinging dirt with a damp cleaning cloth.

Inspect sealing ring of battery compartment lid (7/1) for damages and cleanness. Replace, if necessary.

2.3.7 Operating controls

Inspect on/off-switch with rotary knob illumination control (8/3), range adjustment (8/5), azimuth adjustment (8/6), rotary knob for parallax compensation (8/4), adjustment ring for magnification (8/2) and diopter adjustment of eyepiece (8/1) for

- visible damage
- movement
- function
- cleanness
- legibility of symbols

Should one of the controls be missing or hard to move resp. without function, return telescopic sight for repair. Do not oil or grease controls.
Clean controls with a cleaning cloth and ethyl alcohol.

2.4 Fault finding search and elimination

Fault	Cause	Elimination
reticle pattern not illuminated	battery discharged	replace battery (see 2.1.2), if necessary, return telescopic sight for repair
image misted	moisture inside telescopic sight	return telescopic sight for repair
reticle pattern blurred	eyepiece not focussed	focus eyepiece
image blurred	eyepiece or objective unclean	clean eyepiece and/or objective (see 2.3.5)
	objective misted outside objective misted inside	clean eyepiece and/or objective (see 2.3.5) return telescopic sight for repair
	parallax adjustment incorrect	adjust parallax if necessary, return telescopic sight for repair
no high-contrast image with the NSV 80	parallax compensation not adjusted correctly on scope	adjust parallax compensation (see 2.1.3) if necessary, return telescopic sight for repair

2.5 Transportation

Before telescopic sight is transported it must be packed in a commercial packing in such way that possible damage of scope is prevented.

2.6 Storage

The telescopic sight can be stored unlimited.

Before storage you should
- perform steps stated in maintenance plan 2.3.2
- remove batteries
- store all components in a dry room.

Once a year during storage inspect scope for
- proper storage (-55 °C to +50 °C)
- faultless condition.

After storage and before taking into operation
- perform steps stated in maintenance plan 2.3.2
- follow steps stated in 2.1.2 to 2.1.4
- inspect completeness