



Optische
Werke AG

Zeiss-Gruppe
West Germany

**Scharfschützen-Zielfernrohr
FERO-Z 24**

**Sniper Telescope Sight
FERO-Z 24**

**Lunette de visée pour tireurs d'élite
FERO-Z 24**

Operating Instructions
for
Telescope Sight FER0-Z 24

Date: September 1985

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1 Description of Unit

1.1 Designation

Telescope sight FERO-Z24

- 1.1.1 Drwg. No.: 330148-0000.000
1.1.2 NATO Stock No. (set): 1240-12-196-6470
1.1.3 Designation of stock item: TELESCOPE SIGHT, RIFLE, 4x magnification, with accessories
1.1.4 Developing firm: M. HENSOLDT & SÖHNE WETZLAR Optische Werke AG
1.1.5 Manufacturing firm: M. HENSOLDT & SÖHNE WETZLAR Optische Werke AG

1.2 Purpose

The telescope sight is intended for use with the G3 rifle. It serves the rifleman for targeting and aiming and enables him to observe the enemy and the effect on the target even at a greater distance. The max. adjustable distance is 600 m.

After consideration of the various ballistic data the telescope sight can be mounted on any other handfire-arm using corresponding holders.

1.3 Scope of supply

Scope of supply, drawing and NATO Stock Nos. change according to the design of the telescope sight.

1.3.1 One telescope sight (Fig. 1)

- Drwg. No.: 330148-9001.000
NATO Stock No.: 1240-12-197-5192
Designation of stock item: TELESCOPE SIGHT, RIFLE, 4x magnification

1.3.2 Two protective rubber caps (10)

- Drwg. No.: 330148-9002.000
NATO Stock No.: 5340-12-198-3368
Designation of stock item: PROTECTIVE CAP, TELESCOPE SIGHT, rubber

1.3.3 One grey filter (6)

- Drwg. No.: 330108-9003.000
NATO Stock No.: 1240-12-144-0715
Designation of stock item: FILTER, LIGHT, TELESCOPE SIGHT

1.3.4 One telescope-sight case with list of contents (20)

- Drwg. No.: 330148-9003.000
NATO Stock No.: 1240-12-302-4921
Designation of stock item: STORAGE CASE, TELESCOPE SIGHT

1.3.5 One tool bag with contents

- Drwg. No.: 335917-0000.000
NATO Stock No.: 1240-12-186-3404
Designation of stock item: TOOL BAG, with contents comprising:

1.3.5.1 One tool bag (23)

- Drwg. No.: 335917-8010.000
NATO Stock No.: 5140-12-146-5698
Designation of stock item: TOOL BAG

1.3.5.2 One screw driver (22)

- Drwg. No.: 335917-8020.000
NATO Stock No.: 5120-12-121-1092
Designation of stock item: SCREW DRIVER, LONGITUDINAL SLOT 4.5 x 40 mm blade, 100 mm long

1.3.5.3 One dust brush (21)

- Drwg. No.: TL 7920-0024-22
NATO Stock No.: 7920-12-120-0355
Designation of stock item: BRUSH, DUST, OBJECTIVE, squirrel hair, 10 mm dia., goose-quill holder

1.3.5.4 One optics cleaning cloth (24)

- Drwg. No.: TL 6640-003-80 x 115
NATO Stock No.: 6640-12-124-6982
Designation of stock item: CLEANING CLOTH, LENS, cotton 80 x 115 mm

1.3.6 Sight holder (19)

- Drwg. No.: H & K 100236 or 100236/B
NATO Stock No.: 1240-12-140-9932 or 1249-12-160-0373
Manufacturing firm: Heckler & Koch, Oberndorf
Designation of stock item: HOLDER, TELESCOPE SIGHT, RIFLE

1.3.7 One copy of operating instructions (on request)

1.4 Technical Data

1.4.1 Optical Data

1.4.1.1	Telescope magnification (V)	4x
1.4.1.2	Entrance pupil diameter (EP)	24 mm
1.4.1.3	Exit pupil diameter (AP)	6 mm
1.4.1.4	Eye relief	approx. 60 mm
1.4.1.5	Diopter setting	- 0.5 to -0.75 dpt (fixed)
1.4.1.6	Parallax-free for a distance of	150 mm
1.4.1.7	Field of view angle	6° ± 106.66"
1.4.1.8	Field of view	105 m/1000 m
1.4.1.9	Reticle	sighting thorn with side scale according to FINABLE
1.4.1.10	Attachable filter	grey (NG 4; 2.6 mm thick, approx. 94% absorption)

1.4.2 Mechanical Data and Dimensions (Fig. 1)

1.4.2.1	Elevation angle adjustment/ range adjustment - elevation correction of one click - adjustment	100 to 600 m 1 cm/100 m approx. 0.1° 1 ± 100 m ± 1.74° 2 ± 200 m ± 2.29° 3 ± 300 m ± 3.24° 4 ± 300 m ± 4.43° 5 ± 500 m ± 5.87° 6 ± 600 m ± 7.57°
1.4.2.2	Lateral adjustment - lateral correction of one click - total adjustment	1 cm/100 m approx. 0.1° ± 24 clicks
1.4.2.3	Overtravelling for adjustment	elevation ≥ 2° lateral ≥ 1°
1.4.2.4	All telescope sights have been adjusted to the same point with range setting 1 and lateral setting 0	tolerance ± 0.5°
1.4.2.5	Total length of telescope sight incl. protective rubber caps	226.5 mm
1.4.2.6	Protective rubber cap	39.5 mm dia.
1.4.2.7	Tube	27 mm dia.
1.4.2.8	Eye-piece/Objective	32.5 mm dia.

1.4.2.9	Distance between optical axis and telescope sight support	20.7 mm
1.4.2.10	Telescope sight support	per STANAG 2324
1.4.2.11	Mounting screws	M6; 10.5 mm long
1.4.2.12	Case (external dimensions)	approx. 230 x 105 x 63 mm
1.4.2.13	Distance between optical axis and axis of the bore (incl. sight holder)	87.5 mm

1.4.3 Weight

1.4.3.1	Telescope sight	approx. 0.30 kg
1.4.3.2	Telescope sight including sight holder	approx. 0.62 kg
1.4.3.3	Telescope sight including sight holder and accessories in case	approx. 1.00 kg

1.5 Construction

1.5.1 General

The telescope sight is a monocular telescope of straight construction with a lens erecting system. For the elevation angle adjustment the sighting thorn is displaced vertically.

1.5.2 Optical Structure (Fig. 2)

The incident light beams penetrate the objective (1) and are imaged into the first focal plane (2), where the reticle with the sighting thorn is located. The reticle pattern can be illuminated via the cylindrical lens (9), if required. By means of the two two-element erecting lenses of the erecting system (4) the image of the first focal plane is imaged into the eyepiece focal plane (7) and viewed through the eyepiece (5). Optionally a grey filter (6) can be mounted before the eyepiece.

1.5.3 Mechanical Structure (Fig. 3)

The objective and eyepiece sides of the tube (11) can both be provided with a protective rubber cap (10). Two mounting screws (13) are provided for mounting the sight on the holder.

- 1.5.3.1 The outer side of the tube accommodates the following components: elevation adjustment (12), lateral adjustment (14), guide bar (25) and telescope sight support (15) per STANAG 2324. Inside the tube the objective (1), the reticle (3), the eyepiece (5), and the erecting system (4) comprising the two two-element erecting lenses are arranged.
- 1.5.3.2 The protective caps (10) at the objective and eyepiece sides serve for protection against mechanical damage and are closed by inverting when the telescope sight is not in use.
- 1.5.3.3 The mounting screws (13) serve for screwing the telescope sight to the sight holder. They are provided with self-securing Nylok inserts.

2 Operation

- 2.1 Transport (Fig. 6)**
For transport and storage the telescope sight together with the sight holder and the accessories is put into the case (20).
- 2.2 Operating Elements**
- 2.2.1 The reticle is designed according to Fig. 4. The reticle pattern consists of the sighting thorn with side scale per FINABEL.
- 2.2.2 The elevation angle is adjusted by means of the elevation adjustment (12).
- 2.2.3 Lateral correction is effected by means of the lateral adjustment (14).
- 2.2.4 The protective rubber caps (10) prevent mechanical damage.
- 2.2.5 The telescope sight is mounted on the sight holder (19) by means of the mounting screws (13) on the telescope sight support (15).
- 2.2.6 The grey filter (6) to be inserted into the eyepiece protective cap serves as anti-dazzle device.
- 2.3 Putting Telescope Sight into Operation and Boresighting (Fig. 5)**
- 2.3.1 Mount telescope sight (18) with sight holder (19) on rifle securely.
- 2.3.2 Open protective rubber caps (10) at eyepiece and objective sides of telescope sight by inverting.
- 2.3.3 In case of too much glare by sun or snow insert grey filter (6) into eyepiece cap.
- 2.3.4 Set elevation adjustment (12) to 100 m (click 1) and lateral adjustment (14) to 0.
- 2.3.5 Loosen countersunk screws (16) by means of screw driver (22).
- 2.3.6 Adjust sight on rifle to 100 m and aim at target 100 m away via notch and bead sights.
- 2.3.7 Point sighting thorn of telescope sight at same target. For this purpose operate elevation (12) and lateral (14) adjustments using a coin. Make sure that settings as per 2.3.4 remain unchanged.
- 2.3.8 Fire trial shots and readjust thorn after each shot if required. The turning direction for shot correction is indicated on the disks of the elevation and lateral adjustment (12 and 14).
- 2.3.9 After adjustment retighten countersunk screws (16).
- 2.3.10 Depending on target distance between 100 and 600 m set elevation adjustment (12) to clicks 1 to 6 accordingly. At the same time the sighting thorn is shifted in height and the elevation angle corresponding to the distance is adjusted.

3 Maintenance

- 3.1 Check optics for cleanliness. Clean dirty optics only with dust brush (21) and optics cleaning cloth (24) after breathing on them; do not touch with fingers (oil, brush and optics cleaning cloth are part of accessories). Slight impurities (scratches) on the outer optical surfaces do not impair function of the telescope. However, cracked glass components have to be replaced (return unit for replacement).
- 3.2 Remove dust and dirt from outer mechanical surfaces with a dry cloth or brush. Remove coarse impurities (such as oil or grease) with a cloth moistened with gasoline. Clean moving parts and fitting surfaces particularly carefully.
- 3.3 Check operating elements for easy motion. Slightly oil moving parts of sight holder using an acid-free oil.
- 3.4 Disinfect protective rubber caps. Moisten clean cloth with a disinfectant solution and wipe rubber parts.
- 3.5 Touch up varnish blemishes using an air-drying varnish per RAL 9005 after having degreased the area.

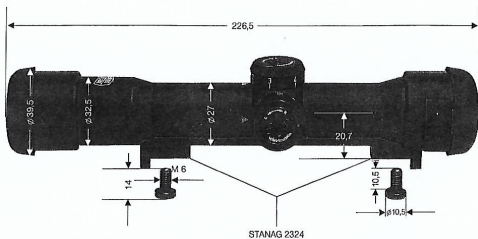


Bild 1 Hauptabmessungen des Gerätes

Fig. 1 Main dimensions of the unit

Fig. 1 Dimensions principales de l'appareil

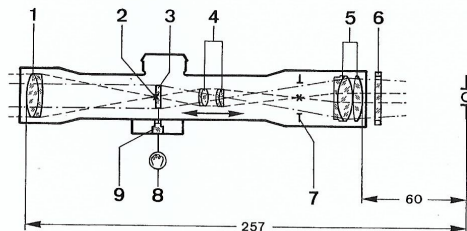


Bild 2 Optischer Aufbau

1 Objektiv
2 erste Bildebene
(Strichbildebene)
3 Strichplatte
4 Umkehrsystem
5 Okular
6 Graufilter
7 zweite Bildebene
8 Beleuchtung
9 Zylinderlinse

Fig. 2 Optical structure

1 objective
2 first image plane
(reticle plane)
3 reticle
4 erecting system
5 eyepiece
6 grey filter
7 second image plane
8 illumination
9 cylindrical lens

Fig. 2 Structure optique

1 objectif
2 premier plan focal
(plan de réticule)
3 réticule
4 système de redressement
5 oculaire
6 filtre gris
7 deuxième plan focal
8 éclairage
9 lentille cylindrique

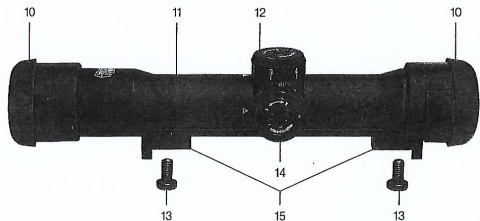


Bild 3 FER0-Z24

Ansicht von rechts

10 Schutzkappen

11 Rohr

12 Höhenverstellung

13 Befestigungsschrauben M6

14 Seitenverstellung

15 Zielfernrohraufnahme

Fig. 3 FER0-Z24

View from the right

10 protective caps

11 tube

12 elevation adjustment

13 M6 mounting screws

14 lateral adjustment

15 telescope sight support

Fig. 3 FER0-Z24

Vue de droite

10 capuchons

11 tube

12 bouton d'ajustage d'élévation

13 vis de fixation M6

14 bouton d'ajustage latéral

15 barres de guidage de la lunette de visée

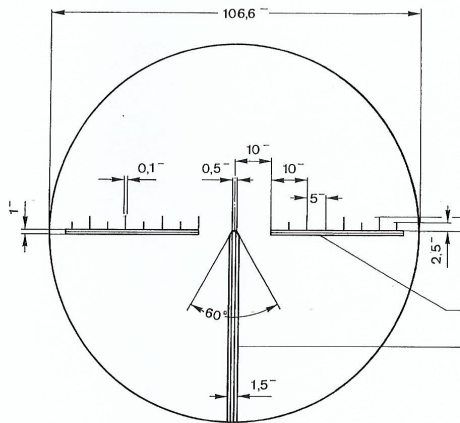


Bild 4 Strichbild

Fig. 4 Reticule pattern

Fig. 4 Réticule

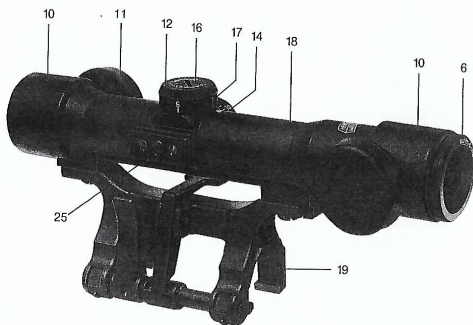


Bild 5 FERO-Z24

Ansicht von links

- 6 Graufilter
- 10 Schutzkappen
- 11 Rohr
- 12 Höhenverstellung
- 14 Seitenverstellung
- 16 Senkschrauben
- 17 Höhendrehring
- 18 Zielfernrohr
- 19 Zielgerätehalter
- 25 Beleuchtungsschwalbe

Fig. 5 FERO-Z24

View from the left

- 6 grey filter
- 10 protective caps
- 11 tube
- 12 elevation adjustment
- 14 lateral adjustment
- 16 countersunk screws
- 17 elevation adjustment ring
- 18 telescope sight
- 19 sight holder
- 25 guide bar

Fig. 5 FERO-Z24

Vue de gauche

- 6 filtre gris
- 10 capuchons
- 11 tuyaux
- 12 bouton d'ajustage d'élevation
- 14 bouton d'ajustage latéral
- 16 vis à tête conique
- 17 bague d'ajustage d'élevation
- 18 lunette de visée
- 19 support de viseur
- 25 barre de guidage

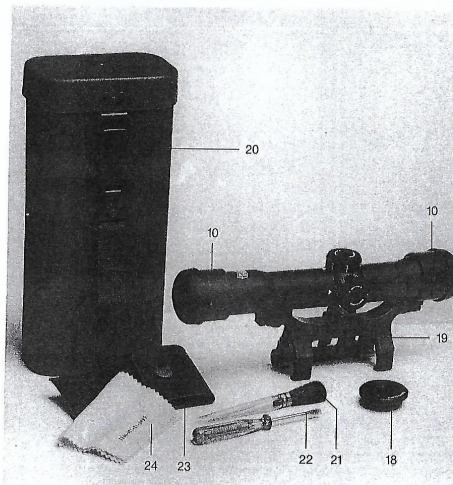


Bild 6 FERO-Z24

- 10 Schutzkappen
- 18 Graufilter
- 19 Zielgerätehalter
- 20 Behälter
- 21 Staubpinsel
- 22 Schraubendreher
- 23 Werkzeugtasche
- 24 Optikkreinigungstuch

Fig. 6 FERO-Z24

- 10 protective caps
- 18 grey filter
- 19 sight holder
- 20 storage case
- 21 dust brush
- 22 screw driver
- 23 tool bag
- 24 optics cleaning cloth

Fig. 6 FERO-Z24

- 10 capuchons
- 18 filtre gris
- 19 support de viseur
- 20 gaine
- 21 pinceau à poussière
- 22 tournevis
- 23 sac à outils
- 24 torchon de nettoyage pour les éléments