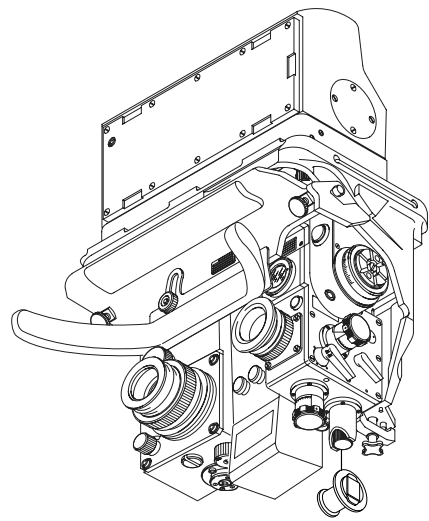
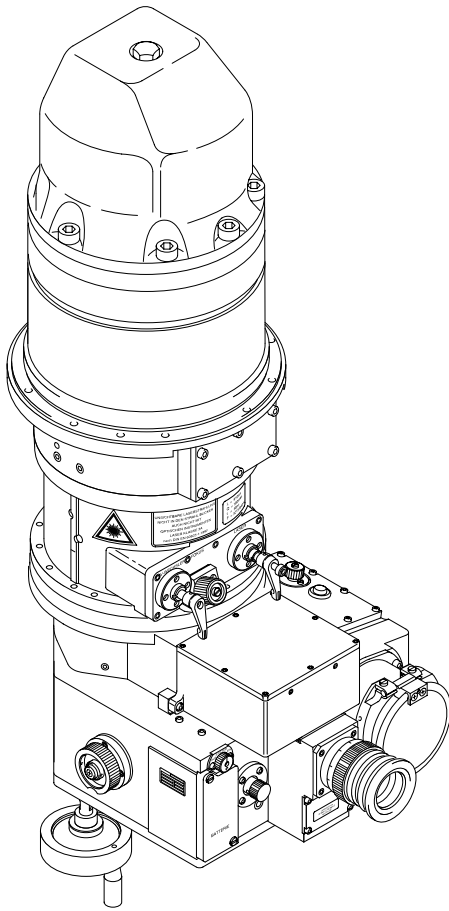


NONSTABILIZED PERISCOPES



...you
might be
interested
in.



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With compliments

Subject to design and construction modifications

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PERI RTNL-80

Panoramic Periscope RTNL-80

Brief description

The panoramic periscope RTNL-80 is the commander's vision-system for the commander of the SPH 2000.

It is planned as a low cost version, designed to budget. It enables the following tasks:

- Panoramic vision, target designation and target identification during day or night, using the monocular eyepiece.
- Rangefinding to the target by laser-rangefinder.
- Rangefinding to the neighbour SPH or landmark for navigation in a back up mode.
- Target designation for the gunner by day and night.

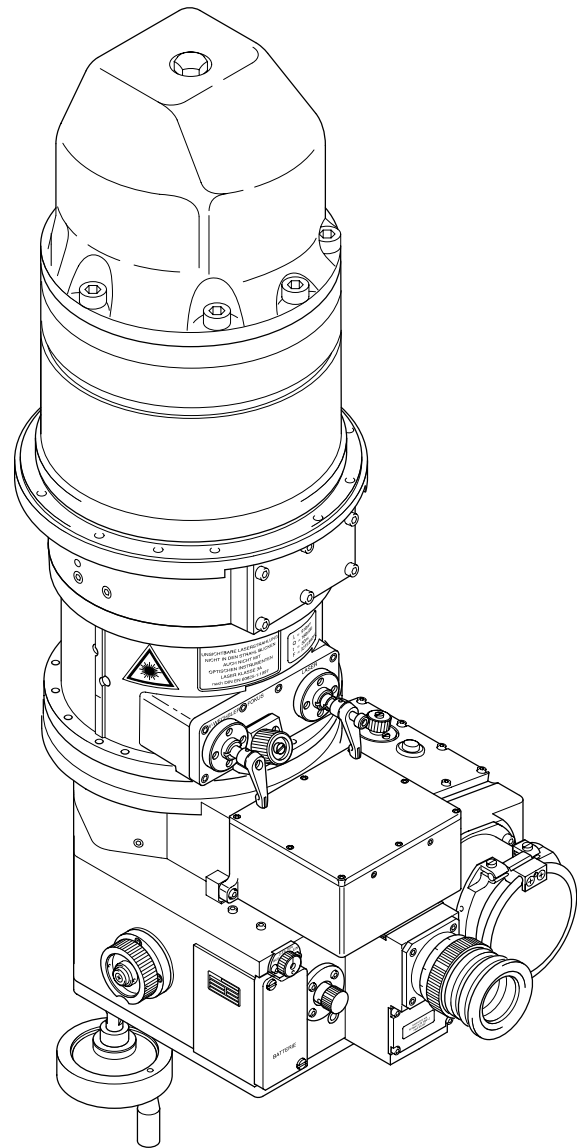
Performance:

The PERI RTNL-80 has the following performance:

- Magnification
day and night 2x / 8x - monocular eyepiece,
night 1,2x / 4,8x - binocular magnifier.
- Panoramic head with
azimuth range $n \times 360^\circ$ and elevation-range -10° to $+20^\circ$ (Mechanical drive manually).
- Optical path:
monocular eyepiece for day and night
(I² tube 2nd gen.).
alternatively for night a binocular magnifier
- The graticule shows an azimuth scale for orientation
(resolution 50 mrad).
- Laser range finder (diode- laser maximum range
2800 m, eyesafe).
The display is in front of the user, close to the monocular
eyepiece.
- The brightness of the graticule is adjustable manually.
- Protective filters against laser and bright sunlight are
integrated.

■ The electrical power for the image intensifier tube, the laser rangefinder and the reticle illumination will be supplied from the turret, but in an emergency mode a battery will deliver the necessary power for approximately 8 h before recharging.

■ The PERI RTNL-80 is mounted on the turret roof and a special support enables the periscope to be lowered into the turret.



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Technical data

Mechanical data

Adjustment range elevation	-10° to +20°, Mechanical drive by handwheel
Adjustment range azimuth	n x 360°, Mechanical drive by handwheel
Adjustment day to night channel	< 0.1 mrad

Optical data

Day sight

Magnification	2x /	8x
Entrance pupil diameter	12 mm /	48 mm
Exit pupil diameter		6 mm
Field of view	28° /	7°
Diopter adjustment eyepiece	± 4 dpt	± 4 dpt
Resolution	0.15 mrad	0.04 mrad
Laser protective filter	1060 nm	1060 nm
Protective filter against bright sunlight		

Nightvision

I ² -tube	2nd gen.	
Magnification eyepiece monocular	2x /	8x
Magnification binocular lens	1.2x /	4.8x
Field of view eyepiece monocular	19.2° /	4.8°
Field of view binocular lens	19.2° /	4.8°

Laser

Class (eyesafe)	3A
Type	Diode-laser
Maximum range	2800 m
Resolution	± 5 m

Electrical data

Turret network	24 V DC / 0.6 A max. (21.5 V DC to 30 V DC)
Battery (back up)	6 V DC (4 x 1,5 V battery, Mignon LR6)

Dimensions

	Length	Width	Height
PERI RTNL-80	455 mm	460 mm	992 mm

Weight

PERI RTNL-80	98 kg
--------------	-------

Environmental conditions

Environmental test	MIL-STD-810C (in extracts)
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Scope of Delivery

Article	NATO Stock No./ Part No.
PERI RTNL-80	1240-12-341-5718 009-221.010-000

Subject to design and construction modifications

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PERI-R19 MOD

Dial Sight/Panoramic Telescope-R19 MOD

Brief description

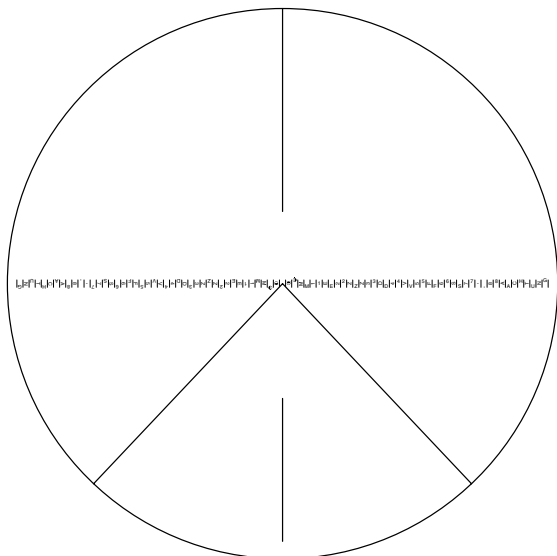
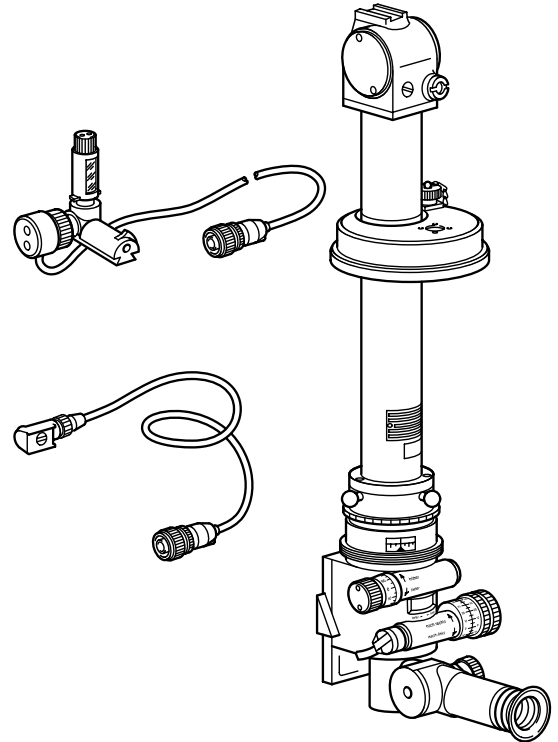
The Panoramic Telescope-R19 MOD serves for indirect aiming of a tank howitzer, i.e. for aiming to base-line and for laying resp. aiming to target in azimuth.

The PERI-R 19 MOD is a monobjective/monocular panoramic telescope, which is angled twice in its construction by 90° and fixed to mount of dial sight of a tank howitzer.

The PERI-R 19 MOD consists of:

- Panoramic head, horizontally rotatable by 6400', with window, prism, the driving parts of the prisms, a desiccator cartridge and guide bar for the aiming light.
- Connection assembly with objective, erecting system, laser protection filter and erecting system 2.
- Eyepiece unit with guide bar for reticle light, elevation mechanism, azimuth mechanism, which can be turned off for quick adjustment of the panoramic head, holder for fixing to mount, of dial sight, filter, eyepiece tube, which can be traversed laterally by 2844', so that the aiming gunner can choose the viewing position most convenient for him.

- The optical parts of the eyepiece unit are the reticle, erecting prism, erecting system 3 and 4, prism, grey filter, clear glass, eyepiece, window of guide bar and light transmitting column.



Reticle pattern

- The reticle pattern together with the reticle pattern of an infinity aiming reference collimator serves for laying and aiming.

The reticle pattern consists of:

- vertical broken line,
- collimator band for laying,
- sighting point.



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Technical data

Mechanical data

Angle of sight adjustment	+350° until -650°
Angle of azimuth adjustment	6400°

Optical data

Telescope magnification (V)	4x
Entrance pupil (EP)	20 mm
Exit pupil (AP)	5 mm
Eye relief	25 mm
Field of view angle	10° Δ 177,7°
Field of view at 1000 m	175 m
Parallax-free	400 m
Diopter setting, permanent	-0,5 dpt
Periscopic length (h)	586,1 mm
Optical length (l)	180 mm
Angle of sight adjustment	+350° until -650°

Electrical data

Instrument light, vehicle power supply	24V, 3W
Aiming light, vehicle power supply	24V, 3W

Dimensions

	Length	Width	Height
PERI-R19 MOD	239 mm	152 mm	655 mm*

* Without aiming light

Weight

PERI-R19 MOD (without accessories)	approx. 9 kg
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Environmental conditions

Environmental test	MIL-STD-810C (in extracts)
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Scope of delivery

Article	NATO Stock No./ Part No.
PERI-R19 MOD	1240-12-341-7474 333011-9010.000

Subject to design and construction modifications

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Panoramic Periscope-R20

Brief description

The panoramic periscope PERI-R20 aligns indirect firing weapon systems.

Applications:

- Cannon 175 mm SFM 107
- Howitzer 203 mm SFM 110
- Howitzer 155, div.
- Rocket launcher 110 mm, SF2, LARS
- Mortars, div.

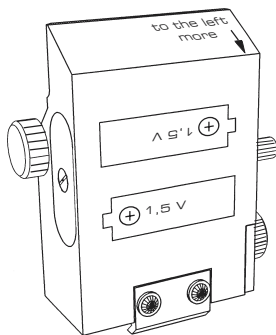
The PERI-R20 consists of three main modules:

- Panoramic Head
- Middle Housing
- Eyepiece Module
- Illumination Device

The prism of the **Panoramic Head** is adjustable in elevation from -300 mrad to +900 mrad.

It is rotatable in azimuth $n \times 360^\circ$.

A coarse sighting device is attached to the side on which the elevation value can be read at intervals of 100 mrad each. The exact elevation value is determined using the scale ring on the elevation precision drive with an accuracy of 1 mrad. On the upper side of the view module is a guide bead to hold the illumination rod.



Illumination device

The panoramic head and the eyepiece module are supported in the

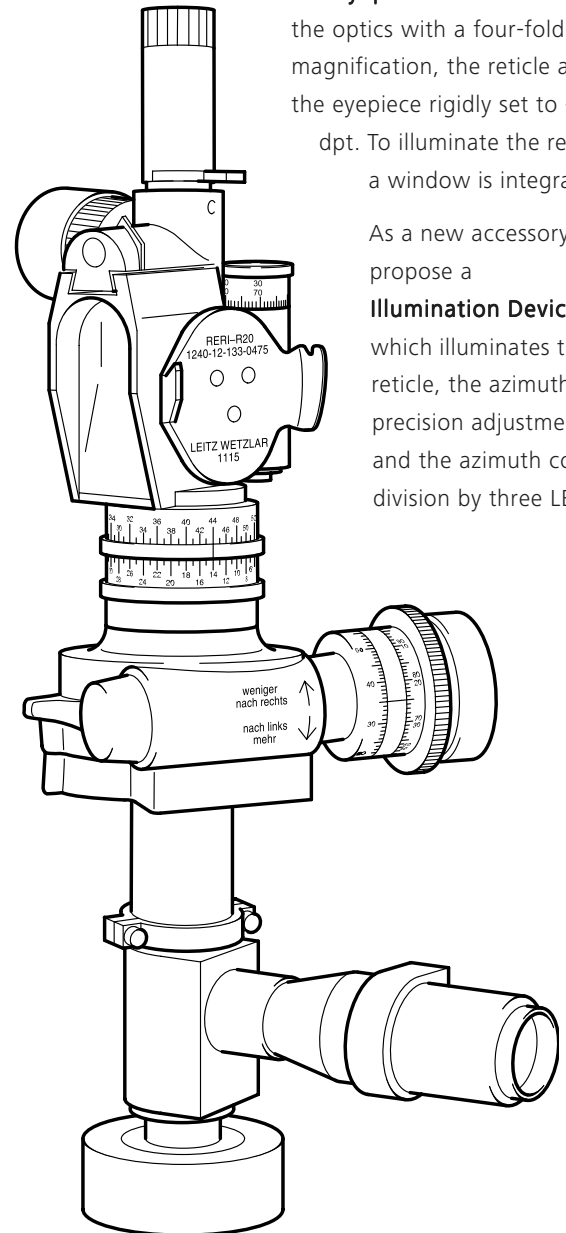
Middle Housing. It contains the azimuth gear.

The azimuth coarse division with the adjustable and the fixed scale ring shows a division of 6400 mrad with intervals of 100 mrad each.

A lateral precision adjustment is made via a worm pinion. If the worm pinion is swivelled out by using a notch lever, the panoramic head may be rotated manually. The fixed and the adjustable scale ring of the azimuth precision adjustment displays a division of 100 mrad with an interval of 1 mrad.

The **Eyepiece Module** contains the optics with a four-fold magnification, the reticle and the eyepiece rigidly set to -0.5 dpt. To illuminate the reticle, a window is integrated.

As a new accessory we propose a **Illumination Device**, which illuminates the reticle, the azimuth precision adjustment and the azimuth coarse division by three LED's.



Technical data

Mechanical data

Elevation range	1200 mrad
Azimuth range (n x 360°)	6400 mrad
Traversing range of monocular module	1060 mrad

Optical data

Magnification	4x
Entrance pupil diameter	16 mm
Exit pupil diameter	4 mm
Distance of exit pupil	20 mm
Field of view at 1000 m distance	178 m
Parallax-free as of	400 m
Diopter adjustment, fixed	-0.5 dpt

Electrical data

illumination device	
- Battery, Mignon, two each	1.5 V
- LED, three ea illumination rod with lamp, incandescent, BA 7s	3 V / 2 W

Dimensions

PERI-R20 w/o illumin. rod

Length:	170 mm
Width:	125 mm
Height:	262 mm

Container

Length:	300 mm
Width:	205 mm
Height:	125 mm

Illumination device

Length:	100 mm
Width:	37 mm
Height:	110 mm

Weight

PERI-R20	2.9 kg
Illumination rod	0.5 kg
Accessories	0.1 kg
Illumination device	0.3 kg
Container	3.1 kg

Environmental conditions

Environmental test	MIL-STD-810 E (in extracts)
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Scope of delivery

Article	NATO Stock No. Part No.
PERI-R20 in container with accessories	1240-12-133-0476 001-218.000-000 (ST1218)
- 1 PERI-R20	1240-12-133-0475 001-218.100-000
- 1 container w/o accessories	1240-12-135-4217 001-218.050-000
- 1 illumination rod	1240-12-133-0477 001-218.021-000

Article	NATO Stock No. Part No.
- 2 incandescent lamps BA 7s	6240-12-146-1113 038-101.097-000
- 1 cleaning cloth	6640-12-137-2580 001-202.027-000
- 1 dust brush	7920-12-120-0355 001-202.026-000
Illumination device (mech. interface to be modified)	009-216.400-000

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PERI-R 16 A1

Dial Sight / Panoramic Telescope R16 A1

Brief description

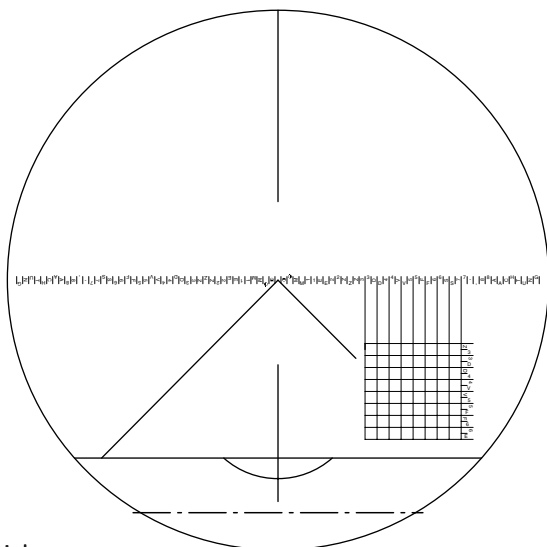
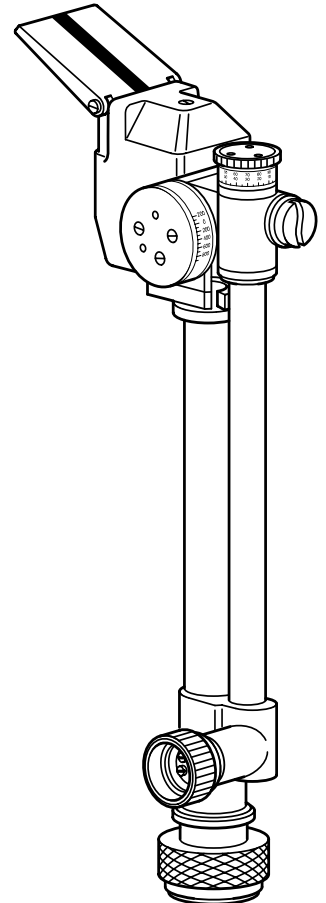
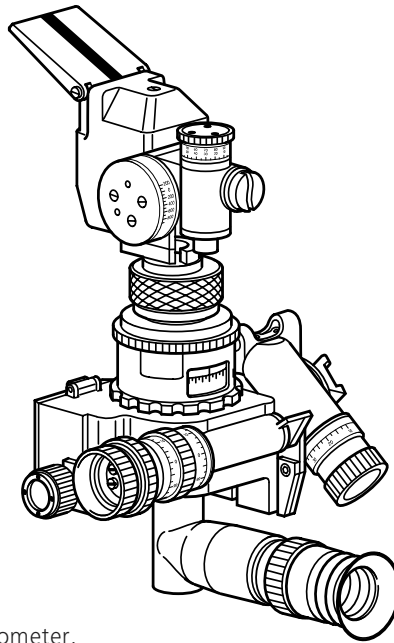
The telescope PERI-R 16 A1 is used for setting and fixing of mortar to base-line direction and for vertical and lateral aligning of the mortar.

The PERI-R 16 A1 is a monobjective/monocular instrument, which is angled twice in its construction by 90°.

It consists of:

- panoramic head, short with prism elevating knob, desiccator cartridge, clamping nut, window, prism and window,
- panoramic head, long, its construction corresponds to that of the short panoramic head and additionally has a 10-part lens erecting system,
- eyepiece unit with cross- and longitudinal level, guide bar, elevation mechanism, eyepiece with diopter adjusting ring and eyeguard, lateral adjustment, illuminating device for illumination of scales and subscripts. Illumination is achieved through diodes, which are switched on for 2 minutes with a time switch and whose brightness is regulated with a potentiometer.

The optical components of the eyepiece unit are the window, prism, turnable for image erection, objective, prism, reticle with reticle pattern and level as well as eyepiece.



Reticle

The reticle pattern serves in connection with the reticle pattern of a positioning collimator for positioning and aiming and in connection with the boresight for adjustment of the mortar.

The reticle pattern consists of:

- vertical broken line,
- horizontal collimator line for positioning, - collimator markings for adjusting and
- aiming point



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Technical data

Optical data

Telescope magnification (V)	4x
Entrance pupil diameter (EP)	14,4 mm
Exit pupil diameter (AP)	3,6 mm
Eyrelief	31 mm
Field of view angle	10° Δ 177.8°
Field of view at 1000 m	175 m
Parallax-free	400 m
Diopter setting	4 dpt
Periscopical length	
- With short panoramic head	220 mm
- With long panoramic head	565 mm
Elevation angle adjustment	
- Elevation adjustment of prism	-300° until 900°
- Elevation adjustment	0° until +900°
Azimuth angle adjustment	6400°

Electrical data

Battery	4.5 V (3 x 1.5 V, Mignon LR6)
AKKU	3.6 V (3 x 1.2 V, Mignon)

Dimensions

	Length	Width	Height
- With short panoramic head	186 mm	185 mm	307 mm
- With long panoramic head	186 mm	185 mm	652 mm

Weight

- With short panoramic head	4750 g
- With long panoramic head	5500 g

Environmental conditions

Environmental test	MIL-STD-810C (in extracts)
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Scope of delivery

Article	NATO Stock No. Part No.
PERI-R16 A1	1240-12-300-6777 332104-9210.000

Subject to design and construction modifications

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PERI-Z16 A1

Sighting System for Day and Night Operation PERI-Z16 A1

Brief description

The PERI-Z16 A1 is a highly modular gunner's periscope for light armoured vehicles whose main weapon is used for ground and air defences.

An image-intensifier unit enables operation during darkness.

Application:

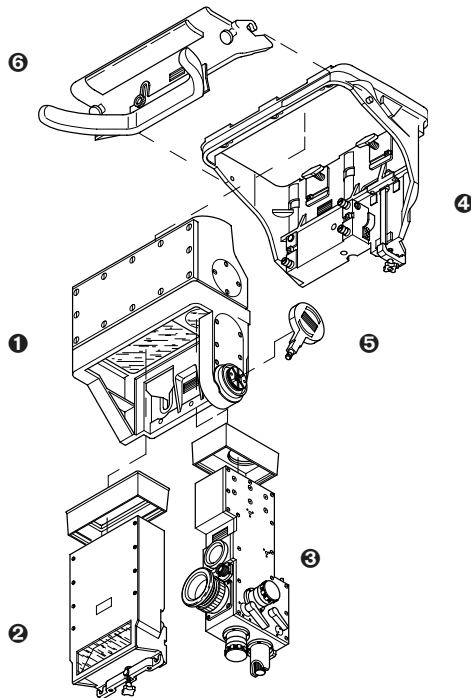
- AIFV Marder (FRG)
- AVR Luchs (FRG)
- AWC Wiesel (FRG)
- AIFV 8x8 PIRANHA (CH)

Standard Components of PERI-Z16:

- 1 Periscope Head
- 2 Day Periskope 1:1
- 3 Aiming Telescope
- 4 Periscope Mount
- 5 Weapon Interface
- 6 Head Protection with Head Rest.

They are simple and quick to change by the crew.

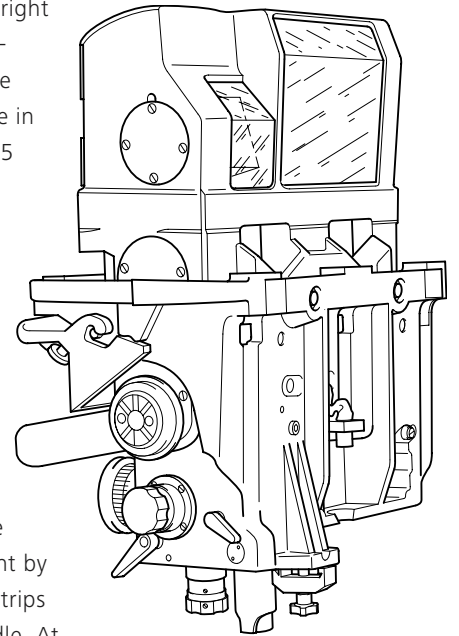
The **Periscope Head** is fitted into the mechanical interface of the mount and fastened with two wing nuts.



It consists of the head mirror for the observation channel and the deviating prism for the aiming channel, mechanically linked to the main weapon by the Weapon Interface, which is located on the right side of the periscope head. The traversing range in elevation is -355 mrad to $+1244$ mrad.

The Day Periscope

1:1 is positioned in the optical path of the observation channel, fixed in the periscope mount by two clamping strips and a star handle. At the top is fixed a protective filter against laser.



The Aiming Telescope is located in the optical path of the aiming channel.

The **aiming telescope** contains the following functions:

- change of magnification 2x / 6x
- eyepiece, adjustable to the operator's eye setting by the dioptre adjustment
- reticle adjustment in elevation and azimuth
- reticle illumination
- protective filter against laser (fix)
- protective filter against bright sunlight (switchable)

The **Periscope Mount** is used to accommodate all components of the PERI-Z16 A1 and is screwed to the turret.

The **Head Protection with Head Rest** is attached to the periscope mount.

An excellent I² Night Vision Elbow enhances the use for tactical engagements at night.

Please see on Data Sheet NAE 200.



We make it visible.

Technical data

Optical data

Periscope head

Elevation range -355 mrad to +1244 mrad

Day periscope 1:1

Magnification 1x

Protective filter against laser* 1064 nm

Field-of-view angle,
distance to the eyes 40 mm

- horizontal 711 mrad

- vertical 195 mrad

Aiming telescope

Magnification 6x 2x

Entrance pupil diameter 36 mm 12 mm

Exit pupil diameter 6 mm 6 mm

Distance of exit pupil 27 mm 27 mm

Field-of-view angle 178 mrad 533 mrad

Field of view at 1000 m distance 175 m 525 m

Dioptre adjustment ± 3 dpt ± 3 dpt

Protective filter against bright sunlight grey grey

Protective filter against laser* 1064 nm 1064 nm

Reticle adjustment

elevation and azimuth ± 7 mrad ± 7 mrad

*optional 694 nm plus 1064 nm

Electrical data

Reticle illumination 28 V / 3 W

Dimensions

	Length:	Width:	Height:
PERI-Z16 A1	337 mm	317 mm	480 mm

Weight Assembly: Container:

Periscope mount	8.9 kg	8.6 kg
Periscope head	7.3 kg	10.2 kg
Day periscope 1:1	3.2 kg	4.8 kg
Aiming telescope	4.0 kg	4.5 kg
Weapon interface	0.7 kg	--
Head protection with head rest	2.7 kg	--

Environmental conditions

Environmental test in compliance with MIL-STD-810 E

Scope of delivery

Article	NATO Stock No. Part No.
Periscope PERI-Z16 A1	1240-12-338-6475 009-271.000-000

Subject to design and construction modifications

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Aiming and Observation Periscope-Z12

Brief description

The Periscope PERI-Z12 is a gunner's periscope for MG on light turrets in armored vehicles.

It is used to observe ground and air targets and to combat ground targets.

Standard Components of PERI-Z12:

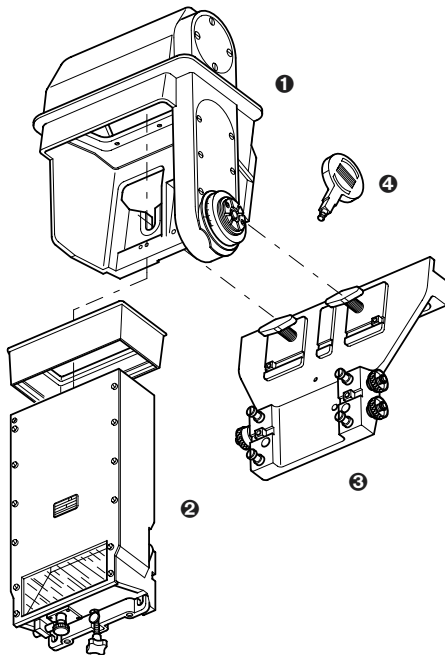
- ❶ Periscope Head
- ❷ Aiming Day Periscope 1:1
- ❸ Periscope Mount
- ❹ Weapon Interface

They are simple and quick to change by the crew.

The **Periscope Head** is fitted into the mechanical interface of the mount and fastened with two wing nuts.

It consists the head mirror, mechanically linked to the main weapon by the **Weapon Interface**, which is located on the right side of the periscope head. The traversing range in elevation amounts from -267 mrad to +976 mrad.

The **Aiming Day Periscope 1:1** is positioned in the optical path of the aiming- and observation channel, fixed in the periscope mount by two clamping strips and a star handle.

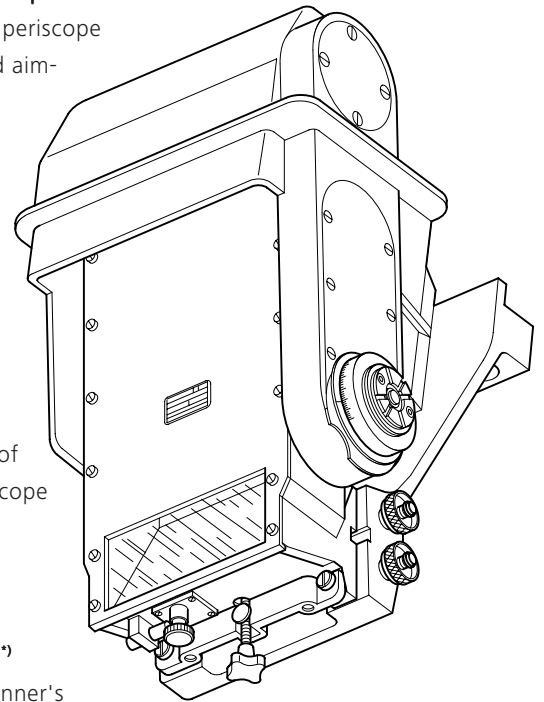


It contains following functions:

- reticle, adjustable in azimuth
- reticle illumination
- interface for a display e.g. "ammunition low", (optional)
- reticle projector
- reticle with hairline cross and lead marks for 200 m, 400 m and 600 m

The **Periscope Mount** is used to accommodate the periscope head and aiming day

periscope 1:1. It is tightly screwed to the turret.



PERI-Z12

is a unit of the periscope family:

- PERI-Z11
- PERI-Z12
- PERI-Z16^{*)}

These gunner's periscopes for LAV

are in service in a high number of pieces, integrated in different systems.

^{*)} On the base of the standard PERI-Z16 we propose an enhanced

Modular Sighting System PERI-Z16xx with a wide range of options, from a basic gunner sight up to an integrated sensor of an affordable and cost effective fire control system. Modern technologies are utilized:

- I² Night Vision Elbow, 2nd gen. tube
- Laser Range Finder, eye save, max. range 10.000 m
- Thermal Imager Module, spectral range 8 to 12 Micron



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Technical data

Optical data

Periscope Head

Beam deflection in zero position of the mirror	80°
Elevation range	-267 mrad to +979 mrad

Aiming Day Periscope 1:1

Field-of-view angle*, distance to the eyes 40 mm	
- horizontal	711 mrad
- vertical	195 mrad

* In connection with upper section

Electrical data

Reticle light	28 V / 3 W
---------------	------------

Dimensions

	Length:	Width:	Height:
PERI-Z12	270 mm	169 mm	366 mm

Weight

	Assembly:	Container:
Periscope head	5.1 kg	5.2 kg
Aiming day periscope 1:1	3.2 kg	5.0 kg
Periscope mount	7.5 kg	-
Weapon interface	0.7 kg	-

Environmental conditions

Environmental test	MIL-STD-810E (in extracts)
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Scope of delivery

Article	NATO Stock No. Part No.
Periscope PERI-Z12	009-027.000-000

Consisting of:

Periscope head	1240-12-150-9625 009-027.200-000
Container for periscope head	009-027.900-000
Aiming day periscope 1:1	1240-12-150-9624 009-027.300-000
Container for aiming day periscope 1:1	009-027.950-000
Weapon interface	1240-12-151-0554 009-017.500-000
Periscope mount	1005-12-151-0554 100406-3110.01

Subject to design and construction modifications

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