PHOTONIS DEFENSE

User's Manual

PD-PRO-16M

Night Vision Monocular

Quick Start Guide

Safety

- An internal component within the image intensifier tube contains toxic materials. During normal operation, the operator will never come into contact with this component. However, if the tube is damaged or broken, avoid inhalation or ingestion of the phosphor screen materials, and avoid contact with open wounds. If the toxic material comes into contact with your skin, wash the affected area with soap and water. If any material is swallowed, drink large quantities of water, induce vomiting and seek medical advice as soon as possible.
- The objective protective cover must always be fitted when the night vision goggle is not in use. Damage to the image intensifier can occur if subjected to a strong light source for extended periods, even when power is switched off.
- Never point the **PD-PRO-16M** towards a bright light source such as the sun. City lights, car lights or any brightly reflecting object will not damage auto-gated tubes
- Always remove the battery after use and before repackaging.
- Dry the **PD-PRO-16M** completely before replacing it in the transit/carrying case.
- Take care when using the V and IR positions of the operation switch. In V position bright light is shining out of the eyepiece, if not covered. In IR position IR light is beaming around, which can easily be detected by enemy forces and bright light is shining out of the eyepiece, if not covered.

Limited Warranty

The manufacturer of this device has provided a limited warranty to the original purchaser. It was attached to manufacturer's terms and conditions of sale.

Manufacturer proprietary

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Chapter 1
General Description

1. Scope of Manual

This manual provides description, operating instructions and field maintenance procedures for the **PD-PRO-16M** Night Vision Monocular (NVM) and its optional accessories.

This manual is intended to help the operator to properly use and maintain the **PD-PRO-16M** and promote trouble-free and efficient operation.

2. PD-PRO-16M Night Vision Monocular

CAUTION
The **PD-PRO-16M** is a precision electro-optical device.
HANDLE IT WITH CARE!

2.1. General Description

The **PD-PRO-16M** (see Figure 1 and Figure 2) is a super compact, lightweight, ruggedized, metallic alloy night vision monocular system. It offers a high resolution and clear bright image in a lightweight configuration.

The **PD-PRO-16M** operation is passive; the light available at the scene is electronically intensified so that targets can be observed without artificial illumination.

The **PD-PRO-16M** uses a single-eye night vision device which allows the operator independent use of each eye. One eye uses the **PD-PRO-16M** while the other eye remains accustomed to dark conditions.

The **PD-PRO-16M** is equipped with a built-in Infra-Red (IR) light, which gives additional close-range covert illumination.

WARNING
When the IR light is activated, the emitted light can be detected by other image intensifying equipment.

The **PD-PRO-16M** employs an advanced Photonis 16" image intensifier tube characterized by high resolution and a clear, bright image. Auto-gated tubes are the standard configuration.

The **PD-PRO-16M** is powered by a single AA 1.2V to 3,6V, rechargeable, alkaline or lithium battery, for operation under every ambient temperature from -40ºC to +55ºC.

The **PD-PRO-16M** includes LOW BAT (yellow)/IR LED (red) indicator in the field of view, providing indications of low battery and IR activation.

The **PD-PRO-16M** is small and light enough to be hand-held, head mounted, helmet-mounted or weapon mounted.

The **PD-PRO-16M** can be attached to a variety of weapons through special adapters, for use as a night aiming device.

Figure 1- PD-PRO-16M General View

2.2 Main Operational Components

The PD-PRO-16M is composed of the following main operational components (see Figure 2):

- Operation switch
- Objective set
- Objective focus
- Diopter ring
- IR LED illuminator
- Battery compartment
- Mounting recess
- Eyepiece

Figure 2 PD-PRO-16M Components Location

2.2.1. Operation Switch

A three-position rotary switch controls the operation of the **PD-PRO-16M.**

WARNING

The V and IR positions are very dangerous when used in the field, since you will be visible to external observers.

ON/OFF switch of the **PD-PRO-16M**

The ON/OFF switch of the **PD-PRO-16M** has three different positions:

Position 1: "OFF (Magnetic)": Activates the **PD-PRO-16M, independently of the user's position,** by means of the magnetic connector when attached to the helmet mount or head mount and the monocular is aligned with the eye of the operator. When the **PD-PRO-16M** is detached from the helmet mount or flipped to side, the equipment disconnects automatically, preventing the operator from emitting uncontrolled light that can be detected by the enemy. When reattached to the helmet mount and aligned with the operator's eye, the equipment restarts automatically, without need to restart the ON/OFF switch.

Position 2: "ON". Position always on. This position activates the **PD-PRO-16M** for the use in manua mode, on the weapon adapter, as observation binocular, helmet mounts. The magnetic connector is disabled.

Position 3: "IR". Pull & turn safety catch for switching on the auxiliary short-range IR illuminator, from Position 2. Turn to final stop for momentary activation of IR illuminator.

WARNING
IMPORTANT NOTE FOR OPERATOR SAFETY

The use of the IR illuminator in open spaces makes the operator visible for friendly or hostile users with night vision. We recommend using it only in confined spaces or extreme situations.

2.2.2. Objective Focus
The objective focus allows adjusting the focus from 20 cm to infinity by turning the objective lens.

2.2.3. Diopter Ring
The **PD-PRO-16M** eyepiece enables diopter adjustment to suit different user eyesight, by means of the diopter ring. It is attached to the eyepiece and provides continuous adjustment from -6 to +4 diopters.

2.2.4. IR LED Illuminator
The **PD-PRO-16M** is equipped with a built-in IR 950 nm diode (almost invisible for Gen 3 IIT), which gives additional close-range covert illumination. The illuminator is activated by setting the operating switch to IR position. A red indicator is displayed in the field of view indicating that the IR illuminator is active.

2.2.5. Battery Compartment
The **PD-PRO-16M** battery compartment accepts a single "AA" size battery (1.2V rechargeable, 1.5 alkaline or lithium, or 3 or 3.2 V lithium) and provides inverse polarity protection. The low light indicator only works with 1.5 v alkaline batteries. The battery cap is secured to the PD-PRO-16M body to prevent loss.

2.2.6. Mounting Recess
The recess is the mounting surface between the **PD-PRO-16M** and the helmet mount, head mount or weapon adapter.

2.2.7. Neck Cord (optional)
The **PD-PRO-16M** can be provided with a neck cord for user's convenience. The type of neck cord can be suited to customer's requirements.

2.2.8. Operating Principle
The **PD-PRO-16M** operation principle is depicted in Figure 3. Light entering the objective lens is focused onto the image intensifier. The image intensifier (2) receives the optical image from the objective lens (1) in the form of light energy, focused onto the photo cathode (4).

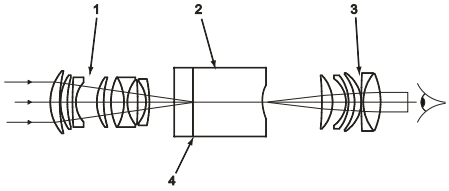

Figure 3 PD-PRO-16M Operating Principle

The photocathode is a light-sensitive surface, when light hits the surface it emits electrons. The optical image is transformed into an electronic one, intensified by a micro-channel plate, and projected onto the phosphor screen at the rear of the image intensifier. This can then be seen through the eyepiece (3). The **PD-PRO-16M** typically uses a G4, ultra-high-performance green or white phosphor tube, characterized by low weight, high gain, reduced halo and reduced blooming effect, which normally occurs when viewing a bright light source.

The tube also contains Automatic Brightness Control (ABC) and Bright Source Protection (BSP) and Auto Gated power supply, that gives a steady state of screen brightness under varying light conditions and high resolution, including conditions normally too bright for a night vision device.

2.3. Technical Data

2.3.1. Physical Characteristics

a. Length: 95 mm/3.74 in
b. Width: 38 mm/1.49 in
c. Height: 62 mm/2.44 in
d. Weight: < 240 gr/8.46 oz

2.3.2. Performance

a. Magnification: X1
b. Field of View: 41
c. Image Intensifier Tube: G4

2.3.3. Objective Lens

a. Focal Length: 22.7 mm/.89 in
b. F Number: 1.04
c. Focusing Range: 20 cm/7.87 in. to infinity

2.3.4. Eyepiece

a. Focal Length: 22.7 mm/.89 in
b. Eye Relief: 23 mm/.9 in
c. Diopter Adjustment: -6 to +4 diopter

2.3.5. Electrical Data

a. Power Source: Single 1.2V-3.6V “AA” size battery
b. Reverse Polarity Protection: Yes
c. Minimum Operating Time:
30 h (without IR)
12.5 h (with IR)
Up to 50 hours with Lithium batteries

3. NVLS-24 Adapter

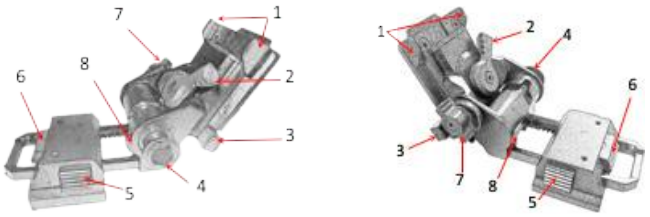

Figure 4 NVLS-24 Adapter

The NVLS-24 adapter enables head-mounted use of the **PD-PRO-16M** (using helmet mounts for helmet and Skull Crusher, diver's masks, etc.). The adapter is composed of the following (see Figure 4):

1. **Quick Release:** Separate for a strong hold and put together to make a quick separation system.
2. **Height Control:** Move to the right in order to release the mounting, setting the proper height and then turn to the left to secure the position.
3. **Release the Adapter:** Press to release the NVLS-24 adapter.
4. **Flip-Up:** Press and move up to separate night vision system from field of view.
5. **Proximity Control:** Press the two buttons at the same time and move forward and backward, release the buttons and the system will be fixed.
6. **Release Mono/Bino Bridge:** Press to release the Mono/Bino Bridge system.
7. **Tilt Control:** Turn CW or CCW to adjust the angle of vision.
8. **Magnet:** Used for automatically shuts off.

4. Mono/Bino Bridge

The new **Mono/Bino Bridge** (Figure 5) can be used as a binocular adapter used to mount two monoculars or used in combination with the NVLS-24 adapter, to use the visor in a helmet or face mask. It allows the placement of one or two **PD-PRO-16M** units in front of the operator's eyes. The jumper is connected to the helmet or head assembly using the NVLS-24 adapter (see Figure 4).

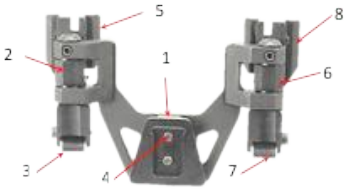

Figure 5 Mono/Bino Bridge

ITEM	DESCRIPTION
1	Interface to NVLS-24
2	Left Arm
3	Retainer for Left Visor
4	Till Adjust (for different helments)
5	Dovetail for Left Visor
6	Right Arm
7	Retainer for Right Visor
8	Dovetail for Right Visor

Figure 6 Possible NVG Configurations

NVLS has designed a universal counterweight system that it is attached to the back of any combat or training helmet or to dedicated head mounts.

The system consists of three counterweight elements, with an individual weight of 187 gram that can be fitted according to the operator's preference.

Figure 7 Compensation Counterweight System

5. Diver's Version PD-PRO-16M-SUB

The optional diver's face mask enables positioning of a single **PD-PRO-16M-SUB** in front of the diver's eye without using his hands, while wearing a diver's mask. **The PD-PRO-16M-SUB** in this configuration is watertight, eliminating the need for additional sealing of the **PD-PRO-16M-SUB** before entering the water and enabling immediate re-use of the **PD-PRO-16M-SUB** when out of the water.

Figure 8 Compensation Counterweight System

CAUTION
Typically, the **PD-PRO-16M** is not designed for under-water operations.
Use only the **PD-PRO-16M-SUB,** which is specially designed to withstand depths up to 10m (20m optional) and equipped with Plano-Plano windows.

6. Cleaning

CAUTION
The goggles are a precision electro-optical instrument and must be handled carefully.
Do not scratch the external lens surfaces or touch them with your fingers.

- Wiping demist shields with lens paper while wet or with wet lens paper can damage the coating.
- Clean goggles with water if necessary and dry completely. Clean lenses with lens paper (and water if necessary, except for demist shields).
- Demist shields must be dry before being cleaned with dry lens paper.

7. Optional Accessories

The **PD-PRO-16M** may be supplied with one or more of the optional accessories described in the following paragraphs.

7.1. Carrying and Storage Soft Case

The carrying pouch (see Figure 9) is a combat designed pouch used for carrying the **PD-PRO-16M** under field conditions. The pouch provides protection from field damages. The pouch may be attached to the operator's belt and leg.

Figure 9 Carrying Pouch

7.2. Hard Shell Case

The hard-shell case (Figure 10) and System Bag is used for storing the **PD-PRO-16M** and its accessories under field conditions. The case is water and air-tight and its interior is prepared to accommodate the system bag.

Figure 10 Typical Hard-Shell Case

7.3. Sacrificial Window

The **PD-PRO-16M** is provided with sacrificial windows (see Figure 11) to protect the objective and the eyepiece lens from scratches caused by blowing sand or other abrasive conditions. In order to install them on the **PD-PRO-16M** the sacrificial windows should be screwed over the objective or eyepiece lens.

Figure 11 Sacrificial Window

NOTE
The sacrificial window can be installed only in **PD-PRO-16M** units that have an objective or eyepiece with a thread.

7.4. Demist Shield

The demist shield (see Figure 12) prevents the eyepiece from fogging over when the **PD-PRO-16M** is cold or being used in cold and humid conditions. It is made of plastic and is installed between the eye-guard and the eyepiece. The demist shield must be handled by the edge only. Special attention shall be paid to cleaning and handling of the shield (see paragraph 3.2.1).

Figure 12 Demist Shield

7.5. Teleconverter Lenses

The teleconverter lens (see Figure 13) can be attached to the **PD-PRO-16M** objective lens when necessary and is used for a magnification of the viewed scene. There are two types of teleconverter lenses available: x3, x4 and x5.

Figure 13 Teleconverter Lens

7.6. Dual Coupler

Using a Mono/Bino Bridge enables attaching two **PD-PRO-16M** units together in hand-held configuration. The units are attached to the coupler via their mounting recesses.

Figure 14 Mono/Bino Bridge

7.7. Weapon Adapter

The **PD-PRO-16M** can be attached to a variety of weapons through the Flip To Side adapter (FTS) for using as a night aiming device. The FTS adapter can be flipped to side manually and instantly flipped in to viewing position.

Figure 15 Flip-To-Side Weapon Adapter

Chapter 2
Operation

8. General

This chapter provides operating instructions for the **PD-PRO-16M.**

CAUTION
The **PD-PRO-16M** is a precision electro-optical device - handle it with care!

9. Safety

An internal component within the image intensifier tube contains toxic materials. During normal operation, the operator will never come into contact with this component. However, if the tube is damaged or broken, avoid inhalation or ingestion of the phosphor screen materials, and avoid contact with open wounds.

a. If the toxic material comes into contact with your skin, wash the affected area with soap and water. If any material is swallowed, drink large quantities of water, induce vomiting and seek medical advice as soon as possible.
b. The objective protective cover must be fitted at all times when the night vision goggle is not in use. Damage to the image intensifier can occur if it is pointed to a strong light source for extended periods, even when power is switched off.
c. Never point the night vision goggle towards the sun, even when shut off and with an objective cover with pinhole. The center of the photocathode can be damaged. When training at daylight a totally shuttered objective cover or a neutral density filter must be used. A searchlight, a camera flash or any brightly reflecting object, at distances of more than 5 meter will not damage auto-gated tubes. Never point a visible or IR laser towards eyepiece or objective as the tube will be damaged permanently.
d. Always remove the battery after using and before repackaging, to avoid acid leakage due to defective battery and permanent damage to the electronic board of NVLS EVO.
e. Rinse thoroughly in tap water after immersion in sea water to prevent drying of salt deposits.
f. Dry the night vision goggle completely before replacing it in the tactical bag or hard-shell case.
g. Take care when using the V and IR positions of the operation switch. In V position bright light is shining out of the eyepiece, if not covered. In IR position IR light is beaming around, which can easily be detected by enemy forces and bright light is shining out of the eyepiece, if not covered.

10. Battery Installation

CAUTION
The **PD-PRO-16M** is powered by a single 1.2V -3.6 V "AA" size alkaline, lithium or rechargeable battery. Do not use any other type of battery. Batteries with a higher voltage will damage the **PD-PRO-16M.**

a. Turn the battery cap counterclockwise to remove it from the battery compartment.
b. Make sure the battery compartment is clean and dry.
c. Make a note of the polarity indicated on the side of the **PD-PRO-16M** and install a battery.
d. Put the battery cap in position at the battery compartment.
e. Turn the battery cap clockwise until the battery cap is tightly closed and gives a good seal against the “O”-ring.

11. Preparation for Use

a. Remove the **PD-PRO-16M** from the carrying case, or pouch.
b. Examine the **PD-PRO-16M** for damage. If damage is found return the **PD-PRO-16M** to a suitable maintenance facility.
c. Make sure that the operation switch is set to OFF.
d. Make sure that all lenses are clean.
e. Install a battery (see paragraph 2.3).
f. With the objective protective cover on, turn the operation switch to ON-V position to check function.

12. Stand Alone Operation

(Without Head Mount or Helmet Mount)

a. When the **PD-PRO-16M** is removed from the head mount or helmet mount and the main switch is at position "OFF", the magnetic switch automatically turns the unit off.
b. To operate the **PD-PRO-16M** as a stand-alone device, turn the operation switch and push to the ON position.

13. General Operating Guidelines

13.1. Activating the IR light

WARNING
When the IR light is activated, the emitted light can be detected by other image intensifying equipment.

NOTES
- The Infra-red (IR) light is not visible to the naked eye.
- The use of a 940 nm IR diode will make it hardly visible for Gen 3 users.
- The location of the IR position may vary between configurations.

To activate the IR light, proceed as follows:

a. Pull the operation switch and then set it to IR position by turning to limit for a permanent use.
b. Turn the operation switch, without pulling to the IR position for a short flash.
c. Make sure that a red LED illuminates in the field of view to indicate that the IR light is active.

13.2. Low battery indication

If a yellow LED illuminates in the field of view, then the battery must be replaced as soon as possible.

NOTE
-The battery in this condition will allow approximately one hour of operation.
If the low battery LED illuminates when the IR light is active, the yellow light is superimposed on the red light. This gives an orange indication.

14. Head-Mounted Operation

Head mounted operation refers to using of the **PD-PRO-16M** along with a head mount (option), helmet mount (option) or diver's mask (option).

Figure 16 Ergonomic Head Mount

14.1. Ergonomic Head Mount

The new ergonomic head mount allows the use of the same monocular helmet adapter. It has 7 adjustment systems (3 rotary and 4 straps).

14.2. Fitting the Head Mount

a. Loosen all straps and unclick the chin support
b. Place the head mount on your head. When necessary loosen also the rotary adjustment wheels to get a comfortable feeling.
c. Close the chinstrap, tighten the straps and finish by adjusting the three rotary wheels until the head mount sits firmly and in the correct, cantered position of your head and face.
d. Attach the head/helmet adapter with the NVLS-24 adapter by inserting it into the NVLS-24 receptacle.
e. Adjust the monocular (see paragraph 1.3) to get a comfortable and circular vision, centered in front of your eye. When necessary readjust head mount and monocular.
f. Repeat this procedure for adjusting the second monocular and obtain a stereoscopic high-quality image.
g. The universal head/helmet adapter allows the individual to flip to the side each monocular and the binocular to flip to the side both monoculars.

14.3. Attachment of the Helmet Adapter

a. Insert the head/helmet adapter on the NVLS-24 adapter and then click the assembly into the helmet NVLS-24 shroud, starting the insertion on the top side of the NVLS-24 shroud and pushing firmly the bottom until the interface plate is completely inserted and locked. Adjust the height if needed by releasing the locking lever.
b. Position the clutch adapter in the fully forward position.
c. When using a single **PD-PRO-16M**, it should be first placed in front of the required eye and then adjusted.
d. Moving of the **PD-PRO-16M** from eye to eye is done by releasing the central locking screw, pushing the arm slightly away from the face until it is released from the dent, moving towards the other eye until it engages the second dent and locking again the central screw.
e. Fine adjustment of the **PD-PRO-16M** in front of the eye is done by means of the height adjustment and the rotation of the monocular after pressing firmly the clutch.
f. When using binocular configuration proceed in the same way as with monocular configuration for each system.

14.4. Fitting the PD-PRO-16M onto the Adapter

a. Align the **PD-PRO-16M** mounting recess with the dovetail on the adapter assembly. Push the **PD-PRO-16M** onto the dovetail.

Figure 17 Fitting the PD-PRO-16M on to the Mounting Adapter

Adapter Adjustment Procedure:

b. Insert the **PD-PRO-16M** into the dovetail until you hear a fixation "click" (Fig.17 – 2).
c. Pull softly the **PD-PRO-16M** forward to make sure it is correctly attached).
d. To position the **PD-PRO-16M** in front of your preferred eye, rotate firmly on the adapter assembly and move the **PD-PRO-16M** until the eye-guard just touches your face.
e. Make a combined adjustment of the eye-guard and the adapter (see paragraph 1.3) until the eye-guard rim is touching the face. Adjust the eye guard position by rotating if necessary. This will prevent light from the screen leaking out, which could be detected by enemy forces.
f. Press button and push out (see fig 17) for liberate the monocular from adapter.

14.5. Head/Helmet-Mounted, PD-PRO-16M Operations

a. Take off the objective protective cover (in low light conditions only) and position it under the **PD-PRO-16M.** Opposite side of the electronic housing.
b. Set the operation switch to OFF for magnetic switch-controlled operation.

NOTE
The mounting adapter incorporates a magnetic switch that automatically turns off the **PD-PRO-16M** when it is moved to the side away from the eye, switched between eyes or removed from the head mount.

c. Adjust the diopter ring to achieve the clearest screen resolution (sharp spots on the eyepiece). Don't focus on an object yet; put your palm over the objective front lens to only allow a small amount of light into the **PD-PRO-16M.** Once set for your eye it should not require further adjustment during operation.
d. Adjust the objective focus ring to obtain a clear image of a desired object. Readjust eyepiece and objective if necessary.

14.6. Removing the PD-PRO-16M and Head Mount

a. Set the **PD-PRO-16M** operation switch to OFF.
b. Disconnect the neck cord from the anchor point on clothing or webbing.
c. Make sure that the objective protective cover is in position.
d. Press and hold the **PD-PRO-16M** release button on the mounting adapter.
e. Pull the **PD-PRO-16M** off the dovetail of the adapter assembly.
f. Loosen all straps and unbuckle the chin support.
g. Remove the head mount over your head.
h. Remove the battery from the **PD-PRO-16M.**

15. Operation at Low Temperature

At very low temperature (below zero) it can require more effort to operate the **PD-PRO-16M** controls than in warmer conditions. This is normal. Do not attempt to force the movement of controls as this can damage the working parts.

The capacity of the battery is reduced at low temperatures. This reduction in battery life is normal and battery depletion will increase as the temperature decreases.

16. Operation at High Temperature

The **PD-PRO-16M** can be operated up to 55∞C, but wherever possible protect the battery from excessive heat.
The **PD-PRO-16M** can be subjected to sudden changes in temperature. But if the **PD-PRO-16M** is moved from a cold area (A/C acclimatized) into an area with a much higher temperature and humidity, condensation can occur on the optical surfaces.

17. Operation in Humid or Dusty Conditions

In humid or dusty conditions, extra care must always be taken to keep all surfaces (particularly the optics) clean.

When using for diving the sacrificial flat-flat lenses must be firmly attached to objective and eyepiece.

Adjust eyepiece diopter and focusing ring at 1-meter depth.

After immersion in salty water all elements must be introduced in clean, sweet water for dissolving salts and dried completely with clean cloth or absorbing paper. Salt destroys any material on a medium or long term.

18. Transportation and Storage

When the equipment is to be transported or stored for long periods, proceed as follows:

a. Remove the battery.
b. Make sure that the objective protective cover is in position.
c. Carry out a visual inspection of the **PD-PRO-16M** and the accessories.
d. Clean and dry the **PD-PRO-16M** and accessories.
e. Place the **PD-PRO-16M** in the tactical bags and the accessories in the hard-shell case.

19. Use of Optional Accessories

19.1. Use of a Teleconverter Lens

NOTE
With the teleconverter lens attached, the **PD-PRO-16M** can either be hand-held (position V) or head-mounted. It is advised that the operator supports the lens when it is attached to the **PD-PRO-16M** when head-mounted.

CAUTION
In dual configuration, DON'T ATTEMPT TO USE TWO X3 MAGNIFIERS AT ONCE.
The image alignment between the two magnifiers might be incorrect.

a. Remove the objective protective cover (in low light conditions only) and position it under the **PD-PRO-16M.**
b. Move both lens covers to the side of the teleconverter lens.
c. Put the lens in position on the **PD-PRO-16M** objective lens.
d. Use your hand to hold the lens.
e. If the lens is to be installed for long periods, use the thumbscrew to secure it to the **PD-PRO-16M** objective lens. Otherwise use the clip-on adapter
f. Remove the lens when not required.
g. Install the lens covers and on the teleconverter lens.
h. Install the objective protective cover on the objective lens.

Operation of the **PD-PRO-16M** with the teleconverter lens installed is the same as without it.

Figure 18 Operation with Teleconverter Lens

19.2. Use of Sacrificial Windows

The **PD-PRO-16M** will be provided with sacrificial windows to protect the objective lens and the eyepiece lens from scratches caused by blowing sand or other abrasive conditions. In order to install it on the **PD-PRO-16M,** the sacrificial windows should be hand screwed on the objective and eyepiece rims.

Figure 19 Installation of Sacrificial Windows

19.3. Use of Day Training Cover

The day training objective cover enables use of the **PD-PRO-16M** during daytime. This feature is only available when using auto-gated image intensifier tubes.

Put the objective cover on the objective lens and switch on the monocular.

NEVER point at the direct sunlight. The pinhole will allow sunlight coming in that can destroy the photocathode in the center.

19.4. Use of Weapon Adapter

The **PD-PRO-16M** is attached to the weapon adapter by engaging the adapter's dovetail into the **PD-PRO-16M** mounting recess, while in flipped to side position.

Figure 20 Use of Weapon Adapter

Chapter 3
Maintenance

20. General

This chapter provides maintenance instructions for the **PD-PRO-16M.**

CAUTION
The **PD-PRO-16M** is a precision electro- optical device – handle it with care!

To ensure readiness of the **PD-PRO-16M,** it must be properly stored. Preventive maintenance must be performed prior to each mission.

21. Preventive Maintenance

Preventive maintenance procedures include inspection, cleaning and operational checks. They are used to keep the **PD-PRO-16M** in an operational condition and prevent malfunctions.

21.1. Optical Surfaces

Inspect all lens surfaces for dirt, fingerprints, scratches or cracks. If necessary, clean and dry the surfaces. If the lens is cracked, chipped or scratched, send the unit for inspection at a higher maintenance level.

21.2. External Surfaces

Inspect the **PD-PRO-16M** and accessories for damage and loose or missing parts. If damaged, loose or missing parts are discovered, send the unit for inspection to a higher maintenance level for repair.

21.3. Eyepiece Assembly

Turn the diopter ring all the way in both directions. Make sure that the eyepiece and the focus ring move freely. If they do not, send the unit for inspection at a higher maintenance level.

21.4. Objective Assembly

Turn the objective focus nut all the way in both directions. Make sure that the objective cell assembly and the focus nut move freely. If they do not, send the unit for inspection at a higher maintenance level.

21.5. Operation Switch

NOTE
To test the operation of the **PD-PRO-16M** with the operation switch in the ON-M position, the **PD-PRO-16M** must be installed in the correct position in front of the left or right eye on the adapter assembly.

a. Install a battery and set the operation switch to all three positions. Make sure that the **PD-PRO-16M** operates correctly in each switch position. Make sure that a definitive stop is felt at each position.
b. Make sure that the operation switch is easily pulled out and set to ON-V and IR positions.
c. Make sure that the ON-V and IR positions cannot be set without the operation switch pulled out.
d. If any malfunctions are detected, send the unit for inspection at a higher maintenance level.

22. Cleaning

22.1. External Surfaces

a. Use a soft brush to remove excess dirt and grit.
b. Make sure that the battery compartment cap is tightly closed.
c. Use soapy water and a lint-free cloth to wipe clean the **PD-PRO-16M** and the accessories.
d. Use a lint-free cloth to dry the **PD-PRO-16M** and the accessories.
e. After use of the **PD-PRO-16M** in salt water, wash it thoroughly with fresh tap water.

22.2. Optical Surfaces

NOTE
Do not clean any optical surface if it is not necessary.

a. Use a soft brush to remove excess dirt and grit from optical surfaces.
b. Clean the lens using lens paper dampened in lens cleaning liquid. Lightly wipe once in a circular motion. Turn the paper to a clean area. Repeat the procedure until the glass is clean. Follow up with a dry lens paper.

22.3. Demist Shield

a. Never dry wipe!
b. Before cleaning, always rinse first with cool, running water to remove surface grit.
c. If necessary, wash gently with a mild soap solution, rinse and wipe dry with a soft cloth or tissue.
d. Exercise care in wiping whenever the coating is wet. Shake off excess water and wipe gently in a single direction.
e. Never use commercial glass cleaners or any product containing ammonia or abrasives.
f. Additional polishes, sprays or rub-on are not recommended.

23. Elements Replacement

23.1. Replace Objective Cover

a. Remove the screws, (1 & 2 Fig 21) which secures the objective cover and the battery cup from the left side and right side of main body.
b. Discard the used screws and clean the threads with alcohol.
c. Apply one drop of Loctite 222 sealant to two new screws.
d. Insert one of the screws through the right hole of the objective cover and screw it to the right side (1) of the main body.
e. Insert the other screw through the cable of the battery cap and through the left hole of the objective cover and screw the assembly to the left side (2) of the main body.

23.2. Replace Eye-Guard

Figure 21 Screws for Securing the Obj. Cover and Batt. Cap

a. Remove the eye-guard holding clip.
b. Pull the old eye-guard towards the side until it separates from the **PD-PRO-16M.**
c. Insert the new eye-guard at the edge of the eyepiece.
d. Install the eye-guard fixing wire.

23.3. Replace Battery Cap

a. Remove the left screw (2 Fig 21) which secures the objective cover and the battery cup.
b. Discard the used screw and clean the thread with alcohol.
c. Apply one drop of Loctite 222 sealant to a new screws.
d. Insert the screw through the cable of the battery cap and through the left hole of the objective cover and screw the assembly to the left side (2 Fig 21) of the main body.

23.4. Replace Anti-Fog Lens

a. Perform steps 3.4.2 'a' and 'b' to remove the eye-guard.
b. Turn the old sacrificial lens CCW to remove it.
c. Clean, if necessary, the new sacrificial lens, and screw it into the eyepiece by turning CW
d. Follow the steps in point 3.4.2 'c' and 'd' to reinstall the eye-guard.

23.5. Replace Sacrificial Lens

a. Make sure the **PD-PRO-16M** is turned off and remove the objective cover.
b. Turn the old Anti-fog lens CCW to remove it.
c. Clean, if necessary, the new Anti-fog lens, and screw it into the objective by turning CW.

NOTES