HIGH PERFORMANCE NIGHT VISION MONOCULAR

SPY RON

POWERED BY PHOTONIS

INSTRUCTION MANUAL

SPYRON

High Performance Night Vision Monocular

The world belongs to those who can see the beauty at night

ADVISORY OVERVIEW

The following description categorizes the level of risk associated with each cautionary statement displayed throughout the manual.

WARNING HIGHLIGHTS

An operation or procedure which, if not strictly observed, could result in injury or death of personnel.

CAUTION HIGHLIGHTS

An operation or procedure which, if not strictly observed, could result in damage or destruction of equipment or loss of mission effectiveness.

NOTE HIGHLIGHTS

An essential operation, procedure, condition or statement.

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CHAPTER 1: GENERAL INFORMATION

1.1 Introduction

This manual provides operation and field level maintenance instructions for the SPYRON. It also provides specifications and data on the performance of the monocular. To ensure the safety of the operator and the correct operation of the monocular it is recommended that this manual is read carefully in its entirety before any deployment or field application.

1.2 Equipment description

The SPYRON is a self-contained night vision device that enables improved night vision using ambient light from the night sky. Typically, the moon, star and/or sky glow.

Optically, it is made up of an objective lens, image intensifier and eyepiece lens. The objective lens collects light reflected from the night scene by the moon, stars, or night sky, inverts the image and focuses that image on the image intensifier. The image intensifier converts the captured light into a visible image and reinverts the image which can then be viewed through the eyepiece lens.

In situations where there is no light at all the unit can be switched into the infrared (IR) mode. The SPYRON is equipped with an IR flashlight enabling the unit to use this invisible light to operate.

The SPYRON is designed for differences in the physical features of individuals. This allows for a wide range of operators to use the system safely and comfortably. Some of these design features are the power switch, eye relief adjustment, diopter adjustment, gain control, and objective focus. Lightweight and versatile, the SPYRON can be hand- held, head-mounted, helmet-mounted, camera/camcorder adapted or weapon mounted as a tactical night scope. The SPYRON is the most widely fielded night vision system available.

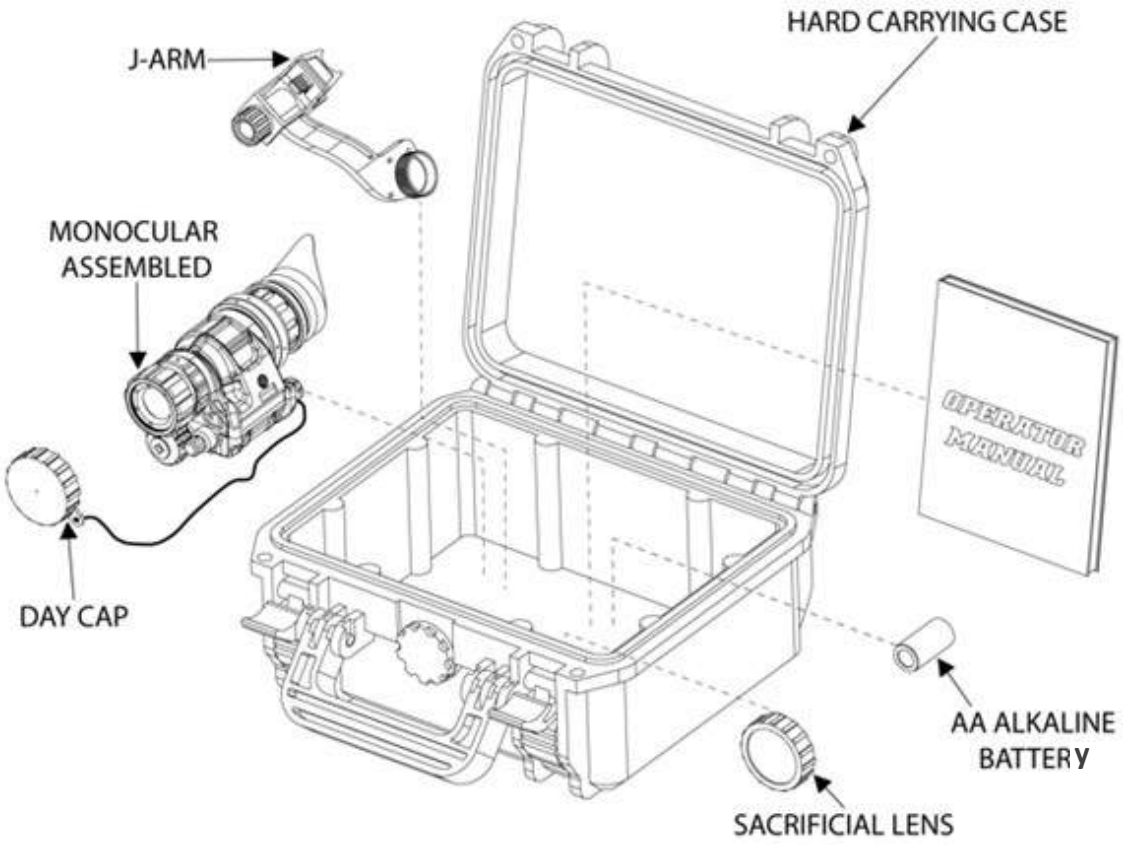
1.3 Standard kit parts list

The standard SPYRON kit comes with the items listed here under:

Item	Description	Quantity
1	Monocular Assembly	1
2	AA Alkaline Battery	1
3	Sacrificial Lens	1
4	J-Arm	1
5	Operator Manual	Digital
6	Hard Carrying Case	1

Table 1-1 Standard Kit Parts List

1.4 Standard kit parts illustration



1.5 System performance and data:

The chart below lists the technical specifications and data of the SPYRON system. The data contained herein is subject to change without notice.

ITEM	LIMITS
Electrical Data	
Power Source	Battery (1.5V DC max.)
Battery Requirements	1 AA Alkaline or 1 AA Lithium L91
Battery Life (AA Alkaline)	40 hrs @ 21°C (70°F)
Battery Life (Lithium)	80 hrs @ 21°C (70°F)
Physical Data	
Monocular Dimensions	11cm x 6.4cm x 6.2cm
Monocular Weight, with battery	310g
Optical Data	
Magnification	1.0X
Field of View	40° (+/-2°)
Eyepiece of Focus	+2 to -6 diopters
Focus Range	25 cm (9.8”) to infinity
Eye Relief	20 mm
Objective Lens	f/1.2
Resolution	up to 1.3 cy/mR with 64 lp/mm tube
Environmental Data	
Operating Temperature	-30°C to 50°C
Storage Temperature	-50°C to 70°C
Illumination Required	Overcast starlight to moonlight
Immersion	1 meter for 30 minutes

Table 1-2 System Performance and Data

CHAPTER 2: PREPARATION FOR USE

2.1 Introduction

This section contains instructions for installing and attaching various components and accessories to the SPYRON for operation under normal conditions.

2.2 Battery precautions

WARNING

Do not mix alkaline and lithium batteries. Do not mix old and new batteries. Do not mix brands of batteries. Do not mix disposable and rechargeable batteries. Failure to follow these instructions could result in death, injury or imposition of long- term health hazards.

WARNING

Inspect battery for bulging prior to use. If the battery shows signs of bulging, do not use.

WARNING

Do not heat, puncture, disassemble, short circuit, incinerate, attempt to recharge or otherwise tamper with the battery. Turn off the SPYRON if the battery compartment becomes unduly hot. If possible, wait until the battery has cooled before removing it.

WARNING

Do not replace the battery in a potentially explosive atmosphere. Contact sparking may occur while installing or removing battery and cause an explosion. Failure to follow these instructions could result in death, injury or imposition of long- term health hazards.

CAUTION

Obey the battery manufacturer's directions for battery disposal.

2.3 Battery installation

Install one Alkaline AA battery as follows:

1. Remove the battery cap by turning it counter-clockwise.
2. Check to ensure the O-ring is present.
3. Observe polarity as indicated on the outside of the battery compartment.
4. Insert the Alkaline AA battery into the battery compartment, minus end first.
5. Replace battery cap by pushing and turning it clockwise. Tighten it firmly to ensure a watertight seal.

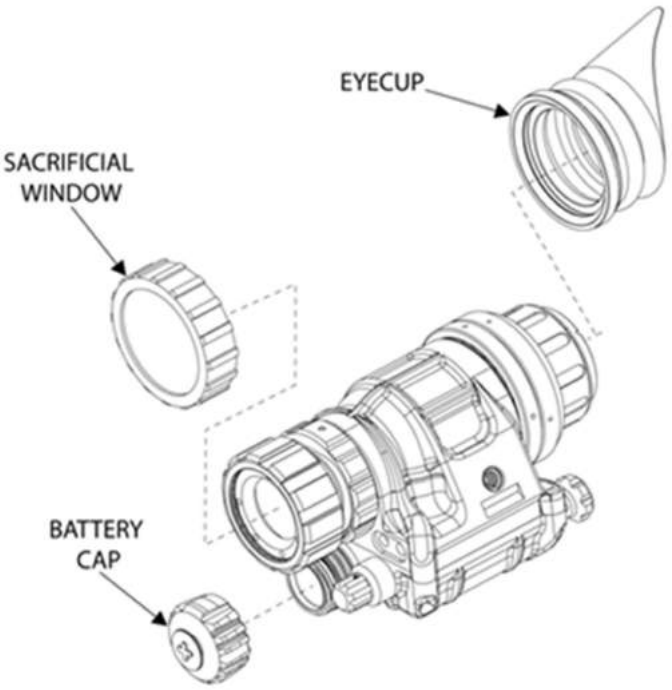


Figure 2-1 Standard installations

2.4 Eyecup installation

Perform the following procedure to install eyecup onto the monocular:

1. Carefully press the eyecup over the end of the eyecup retainer ring.
2. Rotate the eyecup into proper viewing position. Adjust for best fit. The eyecup must seal around your eye and prevent the green glow from escaping.

2.5 Sacrificial window installation

Perform the following procedure to install the sacrificial window onto the objective lens assembly.

CAUTION

If adverse operating conditions (blowing dust or sand) are expected to exist, attach the sacrificial window to protect the objective lens from scratches or other damage.

1. If the objective lens cap is in place, remove it.
2. Carefully push the sacrificial window onto the objective lens until it stops. Turn the sacrificial window clockwise until it snaps into place.

2.6 J-Arm Mount Installation

Install the head/helmet mount adapter into the monocular by following the procedure.

1. Align the thumbscrew with the threaded hole and tighten.
2. Locate the connector on the J-Arm mount adapter that fits into a groove on the monocular.
3. Make sure the connector on the adapter fits the monocular.
4. Loosen the clamp knob and pivot the arm to the other side for SPYRON use with the right eye.

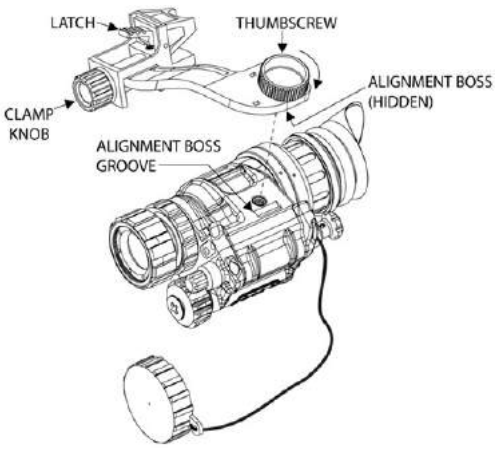


Figure 2-2 J-Arm Mount Adapter Installation

2.7 Installation of weapon mount (optional)

Perform the following procedure to install the weapon mount.

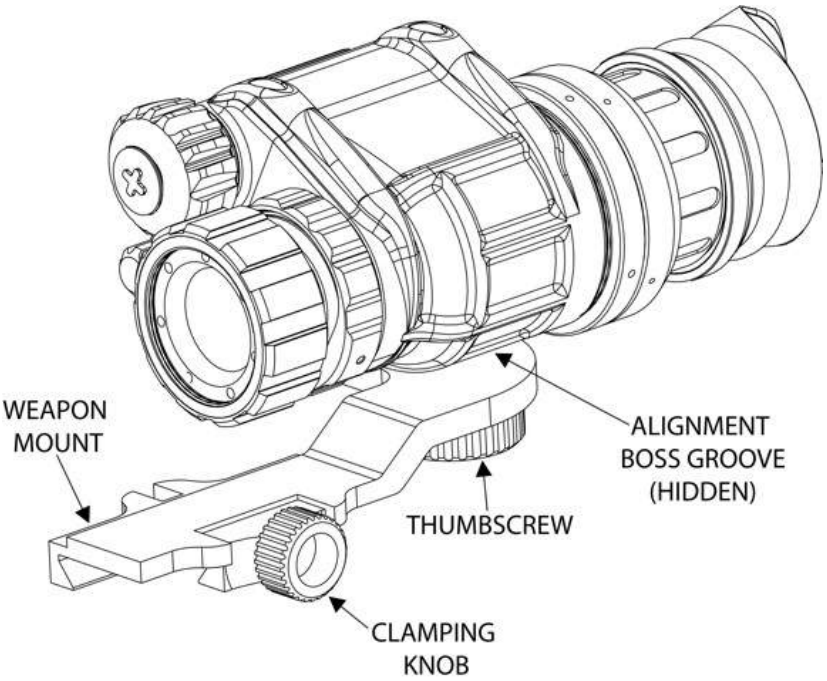


Figure 2-3 Weapon Mount Adapter Installation

CAUTION

The SPYRON is not a weapon sight. However, it can be used in conjunction with a collimated dot sight or laser aiming device.

NOTE

It is recommended to replace the eyecup with the shuttered eye guard during weapon mounted use.

1. Orient the monocular and weapon mount as shown in figure 2-3. Be sure to align the connector on the weapon mount with the connector on the monocular.
2. Screw in the thumbscrew to secure the monocular to the weapon mount.
3. Loosen the clamping knob on the weapon mount. Position the weapon mount with the monocular onto the weapon's mounting rail. Tighten by turning the clamping knob.

NOTE

A ratchet in the weapon mount prevents over tightening of the clamp. Turn until the knob clicks.

4. Check the position of the monocular by holding the weapon in the normal firing position. Adjust the fore/aft position of the monocular as necessary by loosening the clamping knob and repositioning the weapon mount on the weapon's mounting rail.

CHAPTER 3: OPERATING INSTRUCTIONS

3.1 Introduction

This chapter contains instructions for the safe operation of the SPYRON under normal circumstances and environments.

3.2 Controls and indicators

The SPYRON is designed to adjust for different users and corrects for most differences in eyesight.

CAUTION

The SPYRON requires some ambient (moonlight, starlight, or artificial light, etc.) The level of performance depends on the light level.

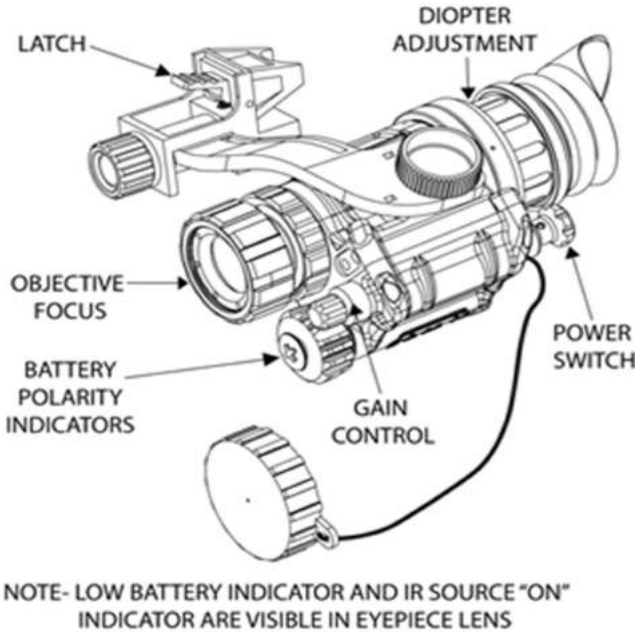


Figure 3-1 Controls and indicators

Control and indicator	Function
Power Switch	Controls monocular and IR source, ON or OFF. RESET/OFF Same as system OFF. OFF also resets monocular after high light cut- off. ON activates the monocular. IR/PULL Pull and turn the knob clockwise from the ON position to continuously activate the IR source. **<u>CAUTION</u>** **Do not use excessive force to place the power switch into the IR**
Low Battery Indicator	A blinking yellow light indicates a low battery with less than 30 minutes of battery life remaining. It is visible through the eyepiece just outside the intensified field-of-view.
IR Source On Indicator	A steady red light indicates that the IR source is ON. It is visible through the eyepiece just outside the intensified field-of-view.
Gain Control	Adjusts the system gain from a minimum value of approximately 25 to a maximum value greater than 3,000.
Objective Focus	Focuses objective lens. Adjusts for sharpest image of viewed object.
Diopter Adjustment	Focuses eyepiece lens to user's eye. Adjust for sharpest image of intensifier screen.
Eye Relief Adjustment	Adjusts the distance between your eye and the monocular.
Latch	Latch used for separation of monocular from head mount / helmet mount adapter.
Battery Polarity Indicator	This feature, molded into the battery cartridge, shows the proper orientation of the batteries.
High Light Cut-off	The monocular will automatically cut off after 70+30 seconds of operation in daylight or bright room light. Individual bright lights (headlights, flashlights, or other concentrated light sources) will not actuate the high light detector located on the front of the monocular. To turn the monocular back ON, turn the power switch to RESET/OFF position and then to ON again.

Table 3-1 Controls and indicators

3.3 Hand-held operation

CAUTION

Operate the SPYRON only in dark conditions or use the objective lens cap to cover the objective lens for daylight conditions.

NOTE

When using the SPYRON without a mounting device, make sure to place the neck cord around your neck.

1. Ensure that the battery is installed correctly.
2. Turn the power switch to ON.

NOTE

The sharpest image will be observed only when the objective lens and eyepiece lens are properly focused.

3. Rotate the diopter adjustment for the clearest view of the image intensifier screen.
4. Focus the objective lens while observing an object until the sharpest image is obtained.

3.4 Operations with IR source

WARNING

The IR source is a light that is invisible to the unaided eye for use during conditions of extreme darkness. However, the light from the IR source can be detected by the enemy using night vision devices.

NOTE

The purpose of the IR source is for viewing at close distances up to 3 meters when additional illumination is needed.

1. Pull the power switch knob out and rotate clockwise to the IR position. With the monocular held to the eye, observe that a red light appears in the eyepiece. This indicates that the IR source is operating.

2. For momentary IR use, turn the power switch knob clockwise (without pulling) past the ON position. Observe that a red light appears in the eyepiece. When the switch knob is released, the knob will return to the ON position and the IR source will be powered OFF.

3.5 Using the gain control

Turn the gain control to provide the optimum illumination input to the eye.

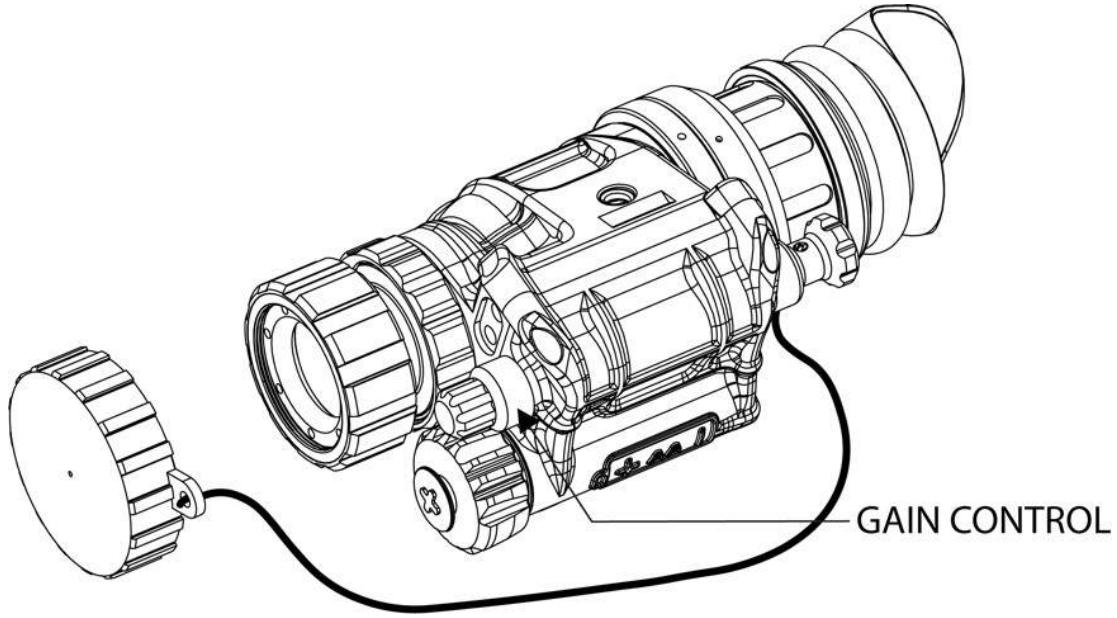


Figure 3-2 Gain control

3.6 Operation in conditions of blowing dust or sand:

CAUTION

Operation in conditions of blowing dust or sand can pit and scratch the optical elements and damage the mechanical components unless the precautions given below are observed.

1. Ensure that the sacrificial window is in place.
2. Avoid pointing the monocular into the wind unless necessary for operation.
3. Keep the carrying case closed unless removing or replacing items.
4. Ensure that all dust and sand is removed from the SPYRON and carrying case after operation.

3.7 Operation in rainy or humid conditions

CAUTION

Operation in rainy or humid conditions can cause corrosion and deterioration of the SPYRON unless the precautions given below are observed.

1. Keep the carrying case closed unless removing or replacing items.
2. Dry the monocular, mounts, and accessories after exposure to rain or high humidity and before storage.
3. Do not store monocular in a wet carrying case.

3.8 Operation in salt water areas

After exposure to salt water, clean the unit as instructed in this manual, after rinsing with fresh water.

3.9 Shutting down the unit:

Perform the following procedures to shut down the monocular.

1. Turn the monocular power switch to the OFF position.
2. Remove the monocular from the head mount, helmet mount or weapon and remove the weapon mount from the monocular.

3.10 Preparation for storage:

1. Remove battery from the monocular.
2. Inspect the battery housing for corrosion or moisture. Clean and dry if necessary.

3. Replace the battery cap.
4. Remove the sacrificial window if installed. Install objective lens cap.

NOTE

Prior to placing the SPYRON into the hard case, ensure the SPYRON hard case is free of dirt, dust, and moisture.

5. Place the monocular, accessories and cleaning supplies back into the hard case. It is best to place the items in their original locations to prevent any possible damage to the unit and/or accessories.

CHAPTER 4: MAINTENANCE INSTRUCTIONS

4.1 Introduction

The SPYRON is designed to be used in diverse environments and rugged conditions. It is recommended that regular and simple maintenance be performed for optimal system performance.

CAUTION

The SPYRON is a precision electro-optical instrument and must be handled carefully.

Do not scratch the external lens surfaces or touch them with your fingers.

4.2 Deactivation

Power down the system by turning the power switch knob to OFF.

4.3 Battery removal

Open battery compartment, remove battery and store in carrying case. Close the battery compartment before cleaning.

4.4 Cleaning the SPYRON

When necessary, use a moistened clean cloth to wipe the outside of the unit, EXCEPT FOR THE OPTICAL SURFACES.

Be sure to wipe away excess dirt and dust that may restrict the performance of and damage moving and mating parts.

If needed, the use of a very much diluted detergent solution is permissible. Dry with a soft clean cloth, or allow unit to air-dry before storing it.

4.5 Cleaning the optics:

When cleaning of the lens is required, first blow any loose dirt or grit away from the surface of the lens. Use the supplied lens tissue lightly moistened with water or lens cleaning fluid to lightly wipe the optical surfaces, using a circular motion. Discard

each lens tissue after one use to avoid transferring grit or foreign matter onto the lens surfaces. If the lens remains dirty use a cotton swab lightly moistened with lens cleaning fluid to remove the foreign matter from the lens. Dry with a clean unused lens tissue.

4.6 Checking for damage and corrosion

As a general guideline, conduct an inspection of the SPYRON, accessories, and the case after every use. Look for heavy wear and cracks in rubber or plastic. Inspect for moisture or corrosion in electronic housings and in the battery compartment. Check for scratches, condensation and foreign matter on optical surfaces. Report missing or damaged items for replacement.

CHAPTER 5: TROUBLESHOOTING

5.1 Troubleshooting procedures

Table 5-1 lists common malfunctions that may occur with the equipment. Perform the tests, inspections and corrective actions in the order they appear in the table.

This table cannot list all the malfunctions that may occur, all the tests and inspections needed to find the fault, or all the corrective actions needed to correct the fault. If the equipment malfunction is not listed or actions listed do not correct the fault, notify your maintainer.

Malfunction	Test for Inspection	Corrective action
Monocular fails to activate	Visual. Check for defective, missing or improperly installed battery.	Turn switch to RESET/OFF position and then ON. Replace battery or install correctly. If SPYRON still fails to activate, refer to higher level of maintenance.
IR source fails to activate.	In a dark location with system turned on, activate IR source. Visually check IR source operation; scene should brighten.	If IR source still fails to activate, refer to higher level of maintenance.
IR source indicator fails to activate.	Visual.	Refer to higher level of maintenance.
Poor image quality.	Check objective lens or eyepiece. Check for fogging or dirt on objective lens or eyepiece lens. Check eye relief distance.	Refocus. Clean lens surface per paragraph 4.5. Readjust for proper eye relief distance.
Light visible around eyecup.	Check eyecup for resiliency.	If eyecup is defective, refer to higher level of maintenance.

Diopter adjustment cannot be made.	Check to see if the diopter adjustment is bent or broken.	If damaged, refer to higher level of maintenance.
Monocular does not cut off when exposed to high light.	Visual. Perform the following test under daylight or bright room light (not fluorescent light). Place the objective lens cap on the objective lens. Turn monocular ON and observe that it cuts off within 70±30 seconds after energized. Turn monocular OFF and then ON to reenergize monocular.	If damaged, refer to higher level of maintenance.

Table 5-1 Troubleshooting

APPENDIX A: REPAIR & SPARES

This section provides information needed to identify, contact and order spare and/or repair parts for the SPYRON.

To order spare or repair parts for the SPYRON or any of your night vision products contact your local distributor. You can find his contact data on www.spyronnv.com

Return Material Authorization Number (RMA#):

Please contact the distributor where you made the purchase to get a Return Material Authorization (RMA) for repair and spares.

To obtain the RMA, give your distributor the serial number and detailed product information and follow his instructions.

APPENDIX B: WARRANTY INFORMATION

The SPYRON monocular is warranted to be free from defects in materials or workmanship for 2 years from the purchase date.

This warranty is exclusive and in lieu of any other warranty, either expressed or implied, including warranties of merchantability or fitness for purpose.

We exclude from warranty any defects caused by the user such as but not limited to:

- Burn due to day use: direct exposure to sunlight even when the tube is switched off
- Long exposure to bright light sources or laser beams
  Sudden black spots on the image
- Scratches on the objective lens due to adverse operating conditions such as blowing dust or sand
- Battery not removed after use
- Forgetting to switch-off the device when not in use

In addition, we exclude warranty for defects resulting from inexpert alterations or repairs carried out by the purchaser or his agent.

The purchaser shall grant adequate time and opportunity as deemed reasonable to remedy failures to meet the foregoing warranty. To remedy such failures, the

defective product might be repaired or, at the option of the distributor or the manufacturer, replaced.

The aforesaid obligation to repair or replace as aforesaid shall not apply to any goods which are normally consumed in operation, or have a normal life inherently shorter than the warranty period specified above, or are not properly stored, installed, used, repaired or are modified other than pursuant to the applicable ACTinBlack Europe S.àr.l. maintained or instructions or approval, or have been subjected to any other kind of misuse or detrimental exposure, or have been involved in an accident.

The warranty terms may be modified only with written agreement.

APPENDIX C

Declaration of Conformity

We,

ACTinBlack Europe S.àr.l

12 rue de l'Industrie,

L-3895 Foetz,

Grand Duchy of Luxembourg

declare under our sole responsibility that our product

Product name:	**SPYRON**
Trade name:	**ACTinBlack®**

to which this declaration relates is in conformity with the appropriate standards following the provisions of

EMC Directive 2014/30/EU

RoHS 2 Directive (EU) 2017/2102

The product is marked with CE

Signed by or for the manufacturer:

Name (in writing): Fergal Maher

Title: Co-CEO

Place and date of issue: Luxembourg Sept 1st 2020