



FreedomView[®] SD LED Fiberscope Inspection Kits

Part No. 0063251	FVSD320
Part No. 0063252	FVSD340
Part No. 006307	FVSD312
Part No. 0062971	FVSD420
Part No. 0062972	FVSD440

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1. Introduction

The OPTIM Incorporated FreedomView® SD LED Fiberscope Inspection Kit is a simple, nondestructive visual inspection system. It enables the user to observe inaccessible, interior portions of structures in a wide variety of applications.

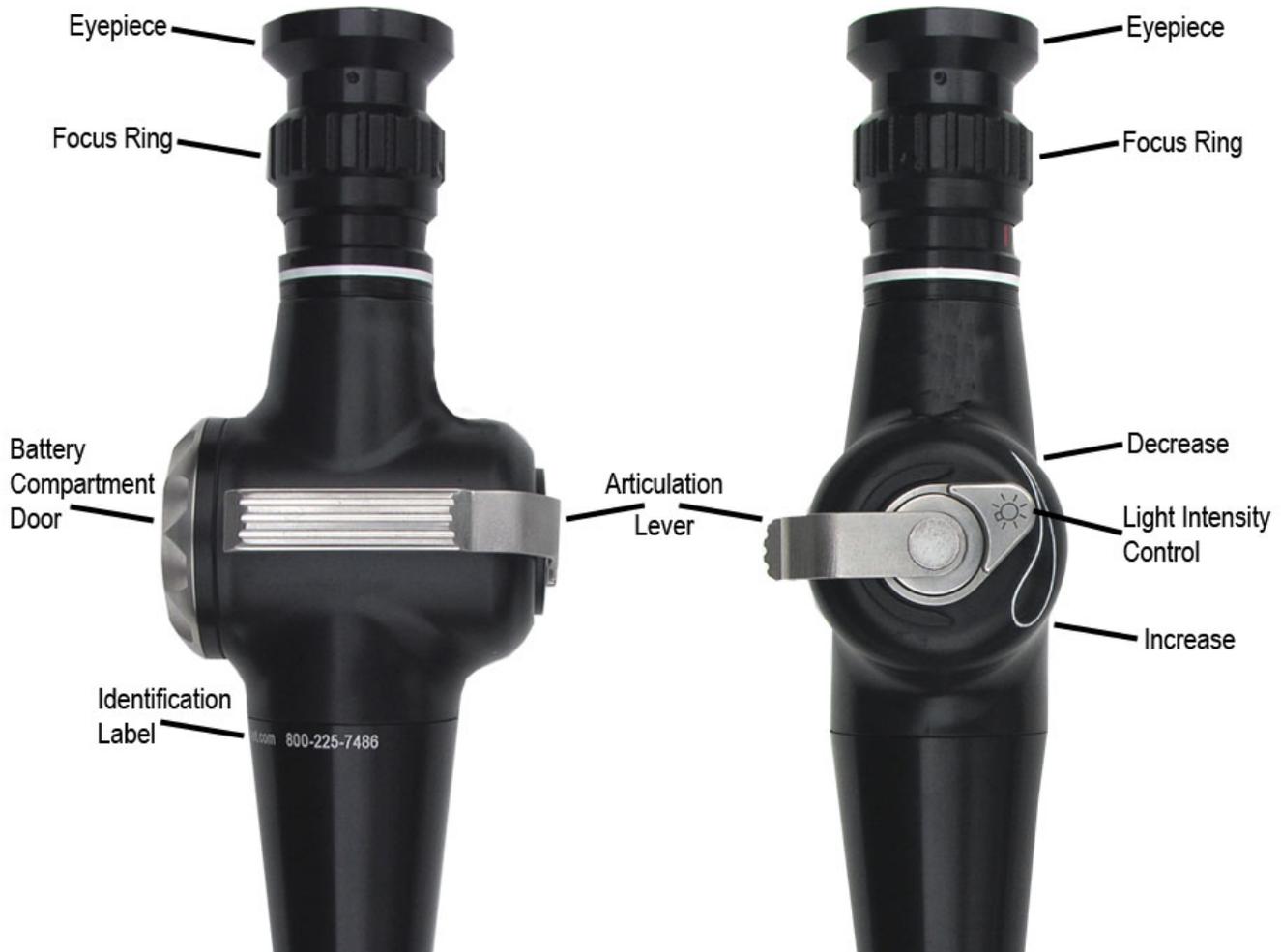
This fiber optic viewing instrument is constructed of high quality, durable materials and is designed for simplified integrations with complimentary components.

Read this manual thoroughly to familiarize yourself with all components prior to the first use. The manual contains care and handling information which will help extend the life of the instrument.

NOTE: Read this manual completely.

All **WARNINGS** and **CAUTIONS** are printed in **BOLD LETTERS**.

2. Fiberscope Description



Control Body:

Eyepiece: The eyepiece allows the user to visualize the image directly or to connect a standard video camera, still photography system, or teaching attachment to the endoscope. The eyepiece is compatible with most C-mount adapters and video camera systems. Call OPTIM Incorporated at +1.508.347.5100 or 800.225.7486 for information on video adapters, cameras, processors and monitors.

Focus Ring: The focus ring adjusts the image to the user's eyesight. Adjust the focus by rotating the Focus Ring (also known as the Diopter Adjustment Ring) clockwise or counterclockwise until the fiber pattern is in clear focus.

Diopter Markings: If using a video camera, still photography system, or teaching attachment, the white dot on the Control Body must be aligned with the white dot on the Focus Ring (Diopter Adjustment Ring). The colored lines provide reference markers for various users of the same endoscope.

Articulation Lever: The articulation lever controls the angular deflection of the Distal Tip.

Light Switch Lever: The light switch lever controls the on / off and intensity of light output. Moving the lever towards the wider end of the intensity indicator increases the light intensity; moving the lever towards the narrower end of the intensity indicator decreases the light intensity.

Battery Door: The battery door seals the battery and electronics within the control body.

3. Operating the FreedomView® SD LED Fiberscope Inspection Kit

- Hold the fiberscope so that the control body fits comfortably in one hand, allowing easy manipulation of the articulation lever with the thumb. Use the other hand to manipulate the Insertion Tube of the fiberscope.



CAUTION: Avoid excessive bending or twisting of the fiberscope insertion shaft. While designed to bend, excessive pressure can damage the fibers and internal components. Do not manually bend the distal tip; always use the articulation lever to articulate the tip up or down.

- When using a video camera or still photography system, be sure the white dot on the Control Body is aligned with the white dot on the Focus Ring.
- Turn on the light by rotating the lever on the side of the Control Body near the Articulation Lever. Adjust the brightness to the desired level by the rotating lever.
- At the completion of the inspection, remove the fiberscope under direct visualization and with the Articulation Lever in the neutral position.

SAFETY RULES

1. Do not attempt to use this device for any application in which the operator is untrained or unfamiliar.
2. Do not tamper with the power supply.
3. Provide adequate ventilation for the battery charger to prevent overheating.
4. Avoid damage to the power cords. Never carry the scope or charger by the cord. Keep the power cords away from heat, extreme cold, oil, solvents and sharp edges.
5. The handle assembly contains electrical components. **DO NOT** use in an explosive environment. **DO NOT** immerse or expose the handle assembly to liquids of any type.
6. The high intensity light at the tip of the scope is extremely bright. To minimize the risk of injury, avoid direct viewing of the light.

When illumination is not required, even for short intervals, turn the light source power off. This will extend battery life and reduce heat build up.

FIBERSCOPE

Before proceeding with your internal inspection, obtain a sample or cut-away section of the item to be inspected. Practice the inspection several times outside the object. Familiarize yourself with the operating characteristics of the FreedomView® SD LED Fiberscope. Practice your access path and diagnostic observations. It is not uncommon to experience difficulty in positioning the objective end of the LED Fiberscope during initial inspections.

A. Focusing the FreedomView® SD LED Fiberscope

FreedomView® LED Fiberscope has two distinct features involved in focus.

1. Diopter Adjustment within the Eyepiece:
The diopter adjustment allows an operator to focus the eyepiece. Rotate the diopter ring, in either direction, for desired focus.
2. Objective or Target End of the LED Fiberscope:
The objective end of the FreedomView® SD LED Fiberscope has a fixed focus lens at the tip with a fixed range (Please refer to Specifications Section 7).

The optimal image focal distance (Please refer to Specifications Section 7). The lens system is capable of imaging targets as far away as fifteen (15) feet. Target magnification is determined by the objective lenses field of view and distance from the target. The FreedomView® SD LED Fiberscope provides a one-to-one (1:1) magnification ratio at 25mm (1 inch) from the target. Moving the Fiberscope's objective end closer to the target increases target image size. Moving it away from the target decreases target image size.

B. Articulating the FreedomView® SD LED Fiberscope

The FreedomView® SD LED Fiberscope has two-way end tip articulation. The articulating tip is connected to the articulation control lever located on the handle.

NEVER FORCE THE ARTICULATION LEVER. FORCING THE ARTICULATION CONTROL WILL SEVERELY DAMAGE THE INSTRUMENT.

If the articulation control becomes frozen or sluggish, discontinue use and contact OPTIM Incorporated.

IT MAY BE POSSIBLE TO PREVENT EXTENSIVE DAMAGE IF THE PROPER PRECAUTIONS ARE TAKEN IMMEDIATELY WHEN ANY ABNORMALITIES ARE DISCOVERED.

C. Internal LED Light Source

The FreedomView® SD LED Fiberscope source of power:

The FreedomView® SD LED Fiberscope's internal LED light source operates on a single, Lithium ion battery, which is inserted into the handle of the LED Fiberscope. The battery pack makes the entire LED Fiberscope completely portable. A charger is included in the FreedomView® SD LED Fiberscope kit. Two hours of charge to the lithium-ion battery produces and provides approximately 30-40 minutes of continuous operation when a new battery is fully charged. When the battery is drained, the light will flicker on and off indicating it is time to recharge the battery. Two batteries are included in the FreedomView® SD LED Fiberscope Kit. Additional batteries are available.

D. Adjusting the Light Intensity

Turn on the light by rotating the lever on the side of the Control Body near the Articulation Lever. Adjust the brightness to the desired level by the rotating lever.

WARNING – DO NOT LOOK DIRECTLY AT THE BRIGHT LIGHT FROM THE FIBERSCOPE

E. Operating Temperature

The Fiberscope Inspection Kit has an operating temperature range from 0° to 122° F. **Avoid Articulation Below 0° F.** Under low temperature conditions, articulation becomes restricted and, if forced, can cause the articulation wires to stretch or break.

F. Immersion of Components

The insertion shaft of the FreedomView® SD LED Fiberscope has been tested for immersion in water, gasoline and diesel fuel. For immersion in other liquids, consult the manufacturer prior to use. Some caustic liquids may cause severe damage to the insertion shaft. In the event the FreedomView fiberscope shaft becomes contaminated with any material or organic liquids, the shaft should be washed with a mild detergent and water. The shaft should be air dried completely after cleaning. Always clean any organic material from the shaft prior to storing the fiberscope.

DO NOT IMMERSE THE LED FIBERSCOPE HANDLE IN ANY LIQUID.

G. Cleaning

Wipe the shaft periodically with a clean dry rag. Use a cotton swab saturated with 70% isopropyl alcohol to clean the lenses. Dry with a lint-free cloth.

DO NOT put unnecessary pressure on the articulation section when cleaning the objective lens. Hold the stainless steel end tip while the instrument is positioned on a clean, dry surface.

DO NOT CLEAN THE INSTRUMENT WITH ORGANIC SOLVENTS OF ANY TYPE. SOME SOLVENTS MAY CAUSE DETERIORATION OF THE SHAFT.

THE FREEDOM VIEW® SD LED FIBERSCOPE EYEPIECE IS NOT WATERTIGHT. CLEAN THE OCCULAR LENS IN THE EYEPIECE WITH ALCOHOL ONLY.

LITHIUM ION BATTERY & BATTERY CHARGER & AC POWER SUPPLY



The FreedomView® SD LED Fiberscope's internal LED light source operates on a single, Lithium ion battery and provides approximately 40 minutes of continuous operation when a new battery is fully charged. When the battery is drained, the light will flicker on and off indicating it is time to recharge the battery.

CAUTION:



- Do not incinerate the battery
- Do not expose the battery to high temperatures above 122°F/50°C
- Do not disassemble the battery
- Do not short circuit the battery

A. To Charge a Battery:

- First plug the AC adapter into a wall outlet.
- Connect the AC power adapter to the DC IN jack located at the back of the charger. The "STATUS" indicator will be solid RED when the charger is ready and the "CHARGE" indicator will be flashing GREEN when the charger is waiting for a battery to charge.
- Slide the battery into the charger, making sure the end of the battery with the two gold electrical contacts is inserted into the charger first. The "CHARGE" indicator will turn RED when the battery is charging.

- The “CHARGE” indicator will alternately flash RED and GREEN when the battery has been charged to over 90%.
- When the battery is fully charged, the “CHARGE” indicator will turn solid green.
- After the battery has been fully charged, slide the battery out of the charger and unplug the AC adapter for the charger.

B. To Change a Battery:



- To remove the battery, simply unscrew the stainless steel battery cap and turn the scope handle over so the battery drops out into your other hand. Please take care not to let the battery fall to the floor or onto a hard object, which could damage the battery.
- To insert a new battery, align the battery with the cutout in the battery compartment, making sure the end of the battery with the two gold electrical contacts is inserted into the battery compartment first.
- Once a charged battery is inserted into the scope handle, replace the battery compartment cap by screwing the cap clockwise until a tight seal is made.



CAUTION: This equipment is not suitable for use in the presence of flammable mixtures.

4. Storage

CLOSING THE CARRYING CASE LID ON AN IMPROPERLY STORED INSTRUMENT IS ONE OF THE MOST COMMON CAUSES OF DAMAGE.

The FreedomView® SD LED Fiberscope Inspection Kit may be stored and transported at temperatures ranging from -60° F to + 122° F.

ALLOW THE INSTRUMENT TO WARM UP OR COOL DOWN TO OPERATING TEMPERATURE PRIOR TO USE.

The FreedomView® SD LED Fiberscope's case and insert are designed to provide optimum protection during storage and transport. When the Fiberscope is not in use, put it into the foam insert with the shaft below the top of the insert. Always store and transport Fiberscope components in the carrying case.

If the FreedomView® SD LED Fiberscope Inspection Kit has been stored for an extended period of time, check the battery pack prior to use.

Lithium-Ion batteries can be stored in charged or uncharged condition for extended periods without significant loss of performance. Partial self-discharge during storage is a normal.

5. Photography

Contact OPTIM's customer service department at (800) 225-7486 for information concerning digital still and video photography.

6. Troubleshooting

If abnormalities occur during FreedomView® SD LED Fiberscope Inspection Kit operation, discontinue use and consult Optim, Incorporated.

DO NOT ATTEMPT SELF-REPAIR!

IMAGE IS NOT CLEAR

POSSIBLE CAUSE

Eyepiece diopter not adjusted to user's vision:

Target is out of focus:

Contaminant on lens:

Fluid leakage into the internal shaft:

Loose Lenses:

SOLUTION

Adjust diopter ring until fiber pattern is in clear, sharp focus.

Reposition objective end to focal distance of 6mm-100mm.

Clean lens (Refer to Section 3G).

Return to OPTIM for service.

Return to OPTIM for service.

INSUFFICIENT ARTICULATION

POSSIBLE CAUSE

Stretched control wires:

Loose lever:

Shaft Damage:

Excessive number of bends in shaft:

SOLUTION

Return to OPTIM for service.

Return to OPTIM for service.

Return to OPTIM for service.

Access path may be too complicated or intricate.

NO ILLUMINATION

POSSIBLE CAUSE

Battery is discharged:

SOLUTION

Refer to Section 3, Lithium Ion Battery, Battery Charger, And AC Power Supplies, for instructions

USE THE POWER CONVERTERS SUPPLIED WITH THE FreedomView® SD LED Fiberscope KIT ONLY.

7. Technical Specifications

FVSD320 & FVSD340

Outer Diameter:	3.2mm (.126 inches)
Working Lengths:	51cm (20 inches) 102cm (40 inches)
Shaft Covering:	Urethane
Articulation:	2-Way (130° Up / 100° Down)
Depth of Field:	5-50mm (.20 – 2.0 inches)

FVSD312

Outer Diameter:	3.6mm (.142 inches)
Working Length:	30cm (12 inches)
Shaft Covering:	Urethane
Articulation:	2-Way (135° Up / Down)
Depth of Field:	5-50mm (.20 – 2.0 inches)

FVSD420 & FVSD440

Outer Diameter:	4.0mm (.155 inches)
Working Lengths:	51cm (20 inches) 102cm (40 inches)
Shaft Covering:	Tungsten
Articulation:	2-Way (120° Up / Down)
Depth of Field:	10-100mm (.24 – 4.0 inches)

FreedomView® SD LED FIBERSCOPE INTERNAL LIGHT SOURCE SPECIFICATIONS

Battery:	1.0 A-Hr Lithium-Ion
Charge cycle:	2 hours, typical
Average charge life:	30-40 minutes continuous operation at nominal 70% power
Light Source:	3 W LED
Light Source Lifetime:	> 3 Years

**NOTE: The handle assembly contains electrical components.
DO NOT use in an explosive environment.
DO NOT immerse or expose the handle assembly to liquids of any type.**

8. Parts & Accessories

Fiberscope & Accessories Listing	Part Number
FreedomView® SD LED Fiberscope Models:	
FVSD320 (3.2mm x 20")	0063251
FVSD340 (3.2mm x 40")	0063252
FVSD312 (3.6mm x 12")	006307
FVSD420 (4.0mm x 20")	0062971
FVSD440 (4.0mm x 40")	0062972
Battery Charger Cradle	006177
US AC Power Supply	007002
European AC Power Supply	007003
Lithium-Ion Battery	006106
Eyecup	405606
Lens Cleaner	408726

9. Repair Service

Customer Service

The OPTIM FreedomView® SD LED Fiberscope is serviced at OPTIM Incorporated's manufacturing facilities in Sturbridge, MA, USA. Use the following procedure to expedite returned goods for evaluation, repair or replacement.

1. Telephone OPTIM Incorporated at 1.800.225.7486 or 1.508.347.5100.
2. Provide a detailed description of the problem.
3. If the scope needs to be sent to OPTIM, a Returned Material Authorization number will be issued.
4. A Service Request Form will be provided and should be completed and returned with the fiberscope.
5. The fiberscope should then be returned to the address below for repair or replacement.

Returning Goods to OPTIM Incorporated

Ship the fiberscope in the carrying case and within a corrugated box to prevent damage during shipment.

Ship to: OPTIM Incorporated
64 Technology Park Road
Sturbridge, MA 01566-1253 USA
Attention: RMA# _____

The paperwork accompanying the shipment should include:

1. Account Name and Address
2. Contact Person and Phone Number
3. Product Number(s)/Serial Number(s)
4. Description of Problem
5. RMA Number (must also appear on the outside of the shipping carton)
6. Service Request Form

Upon evaluation, the customer will be contacted and advised of the findings and estimated repair cost. Repairs will not begin until authorization or a purchase order is issued indicating the approval of charges.

10. Warranty

The OPTIM Incorporated FreedomView[®] SD LED Fiberscope is warranted to be free from defects in materials and workmanship for a period of one (1) year from the date of purchase. The LED Lighting system contained within the FreedomView[®] SD LED Fiberscope is warranted to be free from defects in materials and workmanship for a period of three (3) years from the date of purchase. Any instrument covered under this warranty will be repaired or replaced at the option of OPTIM Incorporated.

Please contact OPTIM to obtain a Return Material Authorization (RMA) number prior to returning the instrument. The instrument must be properly packaged in the carrying case and shipped to the address listed herein. All shipping charges to and from the OPTIM Incorporated facility are the responsibility of the customer.

All non-warranty repairs will be warranted to be free from defects in materials and workmanship for a period of ninety (90) days from the date of the invoice.

Accidental damage and damage resulting from misuse or abuse, as well as normal wear and tear, will be subject to prevailing repair charges. Disassembly, alteration, or repair performed by any person not authorized by OPTIM Incorporated will result in immediate loss of warranty.

THE ABOVE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES EITHER EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Suitability for use of this device for any procedure shall be determined by the user. OPTIM Incorporated shall not be liable for incidental or consequential damages of any kind.

DO NOT ATTEMPT SELF REPAIR

Please refer all warranty or service related questions to OPTIM Incorporated, 64 Technology Park Road, Sturbridge, MA 01566-1253 (800) 225-7486.

11. Symbol Descriptions



Attention: Read Operating Manual for Warnings, Cautions, and Instructions for Use.

S/N

This symbol indicates the product's Serial Number.



Light intensity symbol. Moving the light intensity lever towards the wider end of this symbol increases the light intensity. Moving towards the narrower end decreases the light.



Light intensity lever.