



FREEDOMVIEW[®]
LED FIBERSCOPE

FreedomView[®] LED Fiberscope Inspection Kit

Instruction Manual

Part No. F0056651

6mm x 40" Kit

Part No. F0056652

6mm x 60" Kit

Part No. F0056653

6mm x 80" Kit

Manufactured & Serviced by:



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INTRODUCTION

Thank you for choosing Optim for your inspection needs. Optim is a US manufacturer of remote visual inspection systems. The FreedomView 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 integration with complimentary components.

Read this operator's 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**.

This device is covered under US Patents. For a complete listing visit our website at www.optim-llc.com/patents.

Operating the FreedomView® LED Fiberscope Inspection Kit

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

1) FREEDOMVIEW

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. Practice your access path and diagnostic observations. It is not uncommon to experience difficulty in positioning the objective end of the FreedomView during initial inspections.

A. Operating the FreedomView LED Fiberscope

Upon opening your FreedomView Carrying case the kit will include: Fiberscope, (2) Li-Ion Batteries, Battery Charger, AC Power Cord, Eye Cup and Operator's Manual



To operate the FreedomView begin by inserting a fully charged Li-Ion Battery into the battery compartment as shown below. The rechargeable battery is marked with a green arrow on the top, insert the battery with the green arrow on top and going in first, the battery terminals should be on the bottom and going inward first.



The unit has an on/off switch that operates the internal light source. A battery life indicator informs the user when the battery needs to be replaced / recharged.



Battery Status Lights

The three status LEDs on the side of the FreedomView handle that indicate the amount of power remaining in the battery. The corresponding battery levels for each status LED color are:

GREEN – Adequate charge to power the light source (estimated charge level is greater than 60%).

GREEN/YELLOW – Both green and yellow status LED's are lit when the battery has approximately 40% - 60% charge remaining.

YELLOW – The battery has less than 10 minutes of power remaining. Change the battery or use DC power. (The actual amount of charge remaining depends on light intensity setting and battery age.)

RED – Inadequate charge to operate the light source. Change the battery or use DC power.

B. Focusing the FreedomView LED Fiberscope

FreedomView 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 FreedomView:
The objective end of the FreedomView has a fixed focus lens at the tip with a fixed range of 10mm to 100mm (.4 inches to 4.0 inches).

The optimal image focal distance is 10mm to 100mm. 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 provides a one-to-one (1:1) magnification ratio at 25mm (1 inch) from the target. Moving the FreedomView's objective end closer to the target increases target image size. Moving it away from the target decreases target image size.

NOTE: The colored markers on the FreedomView eyepiece can be used as a reference for setting the users vision.

C. Articulating the FreedomView LED Fiberscope

The FreedomView 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 LLC.

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

The FreedomView shaft has been designed for 25mm (1inch) bend radius when used outside the MGT-Flexible guide tube.

NEVER EXCEED AN ARTICULATION RADIUS OF 20MM (0.8 INCH) WHEN GUIDING THE FREEDOMVIEW INSERTION SHAFT.



Straight – When inserting or removing the insertion shaft from inside an area the shaft tip must be in the straight position (no articulation); this is achieved when the articulation lever is in the straight position.



Up/Down – The insertion shaft tip can be articulated up/down, when the articulation lever is pushed forward or backward using your thumb.

D. Internal LED Light Source

The FreedomView LED Fiberscope can be operated in (3) ways:

- (1) The FreedomView may be used with standard AC power sources. The power supply and plug assembly can operate from 100/240 VAC, 50/60Hz sources.
- (2) The FreedomView may be powered by a lithium-ion battery, which is inserted into the handle of the FreedomView. The battery pack makes the entire FreedomView completely portable. A charger is included in the FreedomView Kit. Four hours of charge to the lithium-ion battery produces approximately 2 hours of continuous battery power to the light source. Two batteries are included in the FreedomView Kit. Additional batteries are available.
- (3) The FreedomView may be powered by the DC Power Supply. The power supply plugs into the port on the back of the unit then plugs into a vehicle lighter port.

E. Adjusting the Light Intensity

Light intensity is automatically set at 20% power when the light source is turned ON. Two momentary button switches (under the eyepiece) adjust the light intensity up (right button) or down (left button). To adjust light intensity, press and release a button, or hold a button down to reach the desired intensity level.



F. ESD Common Point Connection

A Common Point Connection is provided on the handle of the FreedomView. This receptacle accepts a standard 0.175" (4.44mm) banana plug. Refer to your firm's regulations and procedures for using an ESD Common Point Connection when inspecting areas that may require it. The connection allows for use of the device in either a bonding or grounding application.

FOLLOW YOUR COMPANY'S PROCEDURES AND THE AMERICAN PETROLEUM INSTITUTE'S RECOMMENDED PRACTICE 2003, "PROTECTION AGAINST IGNITIONS ARISING OUT OF STATIC, LIGHTNING, AND STRAY CURRENTS" WHENEVER USING THIS EQUIPMENT IN AN ENVIRONMENT IN WHICH STATIC ELECTRICITY COULD CREATE AN IGNITION OF COMBUSTIBLE MATERIALS.

THE BONDING CABLE SHOULD BE CONNECTED TO BOTH THE FREEDOMVIEW AND THE ENTITY UNDERGOING INSPECTION TO EQUALIZE POTENTIAL BETWEEN THE TWO. THIS MUST BE DONE PRIOR TO ANY INSPECTION THAT COULD GENERATE STATIC ELECTRICITY, AND DISCONNECTED ONLY AFTER THE INSPECTION IS COMPLETE.

THE ALLIGATOR CLIP SHOULD BE CONNECTED TO BARE, CONDUCTIVE METAL ONLY.

IN ORDER TO TEST THAT THE COMMON POINT CONNECTION IS ELECTRICALLY TIED TO THE ENTIRE SHAFT, USE AN OHM METER TO MAKE SURE THE RESISTANCE IS LESS THAN 10 OHMS BETWEEN THE COMMON POINT CONNECTION AND THE TIP OF THE SHAFT.

IN ORDER TO ENSURE THAT THE BONDING CABLE IS FUNCTIONING PROPERLY, USE AN OHM METER TO MAKE SURE THE RESISTANCE BETWEEN THE BANANA PLUG AND THE ALLIGATOR CLIP IS BETWEEN 800K OHM AND 1.2M OHM.

THIS DEVICE IS DESIGNED TO BE USED ONLY BY A TRAINED AND QUALIFIED OPERATOR.



G. Operating Temperature

The FreedomView Kit has an operating temperature range from 0° to 150° 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.

H. Immersion of Components

The insertion shaft of the FreedomView 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 FreedomView fiberscope.

DO NOT IMMERSE THE FREEDOMVIEW HANDLE IN ANY LIQUID.

I. Cleaning

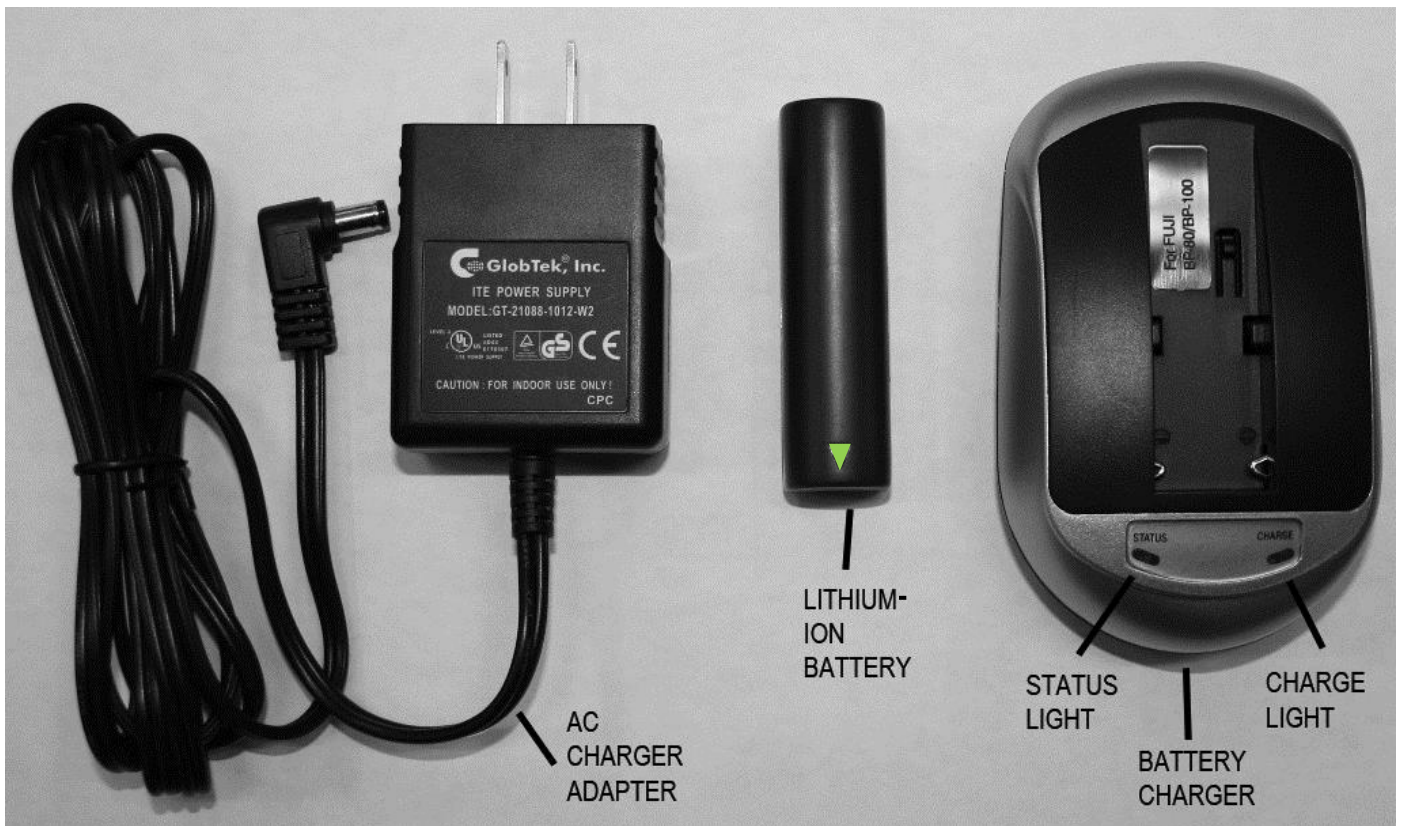
Wipe the shaft periodically with a clean dry rag. Use a cotton swab moistened with 70% isopropyl alcohol to clean the lenses. Dry with a lint-free cloth.

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 EXCEPT ISOPROPYL ALCOHOL. SOME SOLVENTS MAY CAUSE DETERIORATION OF THE SHAFT.

THE FREEDOMVIEW EYEPIECE IS NOT WATERTIGHT. CLEAN THE OCCULAR LENS IN THE EYEPIECE WITH ALCOHOL ONLY.

2) CHARGING AND CHANGING THE LITHIUM ION BATTERY



A. Charging the Lithium-Ion Battery

1. Plug the AC power adapter into a wall outlet.
2. Connect the adapter to the charger's DC IN jack.
3. The "STATUS" LED indicator will be RED when the charger is ready, and the "CHARGE" LED indicator will flash GREEN when waiting for a battery.
4. Slide the battery into the charger. The "CHARGE" LED will turn RED when charging.
5. The "CHARGE" indicator will flash RED and GREEN, alternatively, when the battery pack has been charged to over 90% capacity.
6. When the battery is fully charged, the "CHARGE" LED will display a steady green light.
7. After the battery is fully charged, slide the battery out of the charger.
8. Unplug power to the charger; the "CHARGE" and "STATUS" indicators go out.

NOTE: A new, drained Lithium-Ion battery takes approximately 4 hours to charge fully.

B. Changing the Battery



1. Turn the light source OFF.
2. Rotate the locking screw counter-clockwise on the battery compartment door (with a coin or screwdriver) 90 degrees to unlock.
3. Remove the battery.
4. Insert a charged battery (ensure the power tabs on the side of the battery with the green arrow on top and going inward first) are inserted first.
5. Close the battery compartment door.
6. Push the door closed. Rotate the locking screw clockwise 90 degrees to lock.

NOTE: When a new battery is inserted, both main LED and the green status LED will flash to indicate that the battery is installed correctly. This is not an indication of full charge but does mean that the battery has power remaining.

3) OPTIONAL POWER

A. AC Power Supply

The FreedomView can be powered using a 120-240VAC outlet.

USE THE POWER CONVERTER SUPPLIED WITH THE FreedomView LED Fiberscope KIT ONLY.

Insert the converter's plug into the DC Input connector on the front of the FreedomView LED Fiberscope handle. The connector disconnects the Lithium-Ion battery from the circuit and powers the light source with DC input. The AC Adapter is also used to power the battery charger.

B. DC Power Supply

The FreedomView can be powered by using the DC Power Cord. Insert the DC Power Cord plug into the 12VDC input connector on the back of the FreedomView handle. The connector disconnects the lithium ion battery and powers the light source from the DC supply. Plug the other end of the DC Power Cord into an auto lighter socket (12VDC)

4) MGT-FLEXIBLE GUIDE TUBE

A. Attaching the Flexible Guide Tube

The FreedomView will accept an optional malleable guide tube; which may assist when positioning the shaft in hard-to-reach applications.

To attach the malleable guide tube: Uncoil the guide tube and lay flat.

DO NOT ATTACH THE GUIDE TUBE TO THE FREEDOMVIEW WHILE THE GUIDE TUBE IS COILED. DAMAGE TO THE LED FREEDOMVIEW WILL OCCUR.

Remove the strain relief from the FreedomView body and slide it down the shaft. Insert the FreedomView into the end of the guide tube.

Slide the guide tube over the FreedomView shaft. Carefully align the connector's tongue and groove. Thread the malleable guide tube's knurled collar onto the FreedomView handle. Tighten the malleable guide tube connector finger tight only.

*** Insert the guide tube into fuel tank first, especially if there is a screen suspected in the fill tube.**

DO NOT FORCE THE GUIDE TUBE ONTO THE HANDLE OR TIGHTEN WITH A WRENCH.

B. Removing the Flexible Guide Tube

Remove the malleable guide tube from the FreedomView before storing in the carrying case.

DO NOT REMOVE THE FREEDOMVIEW FROM THE GUIDE TUBE WHILE THE GUIDE TUBE IS COILED. DAMAGE TO THE FREEDOMVIEW WILL OCCUR.

Lay the FreedomView, with the guide tube attached, on a flat surface. Loosen the guide tube connector and carefully slide the FreedomView out. Replace the strain relief on the FreedomView and tighten it finger tight.

DO NOT OPERATE THE FREEDOMVIEW WITHOUT THE STRAIN RELIEF IN PLACE!

5) RIGHT ANGLE ADAPTER

The FreedomView will accept a Prismatic Right Angle Adapter, which threads onto the objective end of the FreedomView, thus allowing viewing at 90°, perpendicular to the central axis of the LED Fiberscope shaft.

A. Attaching the Right Angle Adapter to the FreedomView LED Fiberscope:

Lay the FreedomView on a clean flat surface. While holding stainless steel end tip, remove the Thread Protector Collar at the distal end. Clean the FreedomView's objective lens and the FreedomView's Right Angle Adapter. (Contaminants may obstruct visibility during use).

Start the thread on the right angle adapter onto the objective tip. Once the threads are engaged, align the scribed lines on the right angle adapter with the notch in the objective end tip. This is necessary to align the objective end tip's optics with the right angle prisms contained in the right angle adapter. Finish threading to ensure proper fit.

6) WINDOW WEDGE

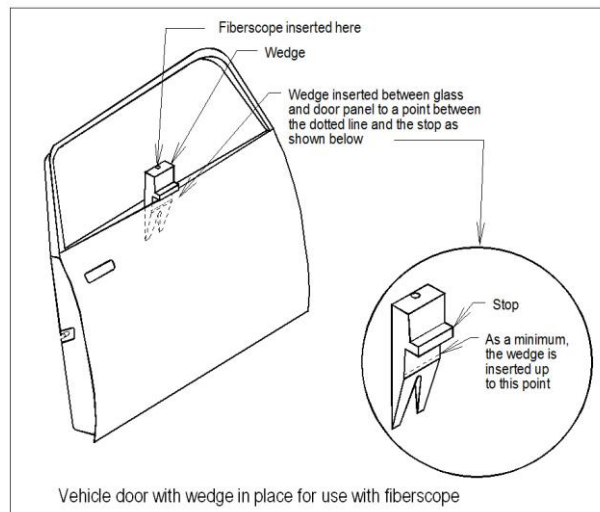
The wedge has been designed to widen openings in order to prevent damage to the FreedomView's insertion tube when it is inserted between vehicle door panels, etc. for inspection purposes

A. Inspection of Vehicle Door Parts using Window Wedge with the FreedomView:

1. Carefully place the wedge between the exterior door panel and window with the flat side against the window, until the hole in the middle of wedge clears the door panel. **Under no circumstances should the wedge be forced.** (see illustration below)
2. Insert the FreedomView's insertion tube through the hole in the wedge to conduct vehicle door examinations.

B. Inspection of other Cavities/Crevices (openings)

1. Place the wedge between walls/panels or into crevices or narrow openings that could damage the FreedomView's insertion tube.
2. Insert the FreedomView's insertion tube through the hole in the wedge to conduct examination.



7) DC AND AC POWER CORDS

The port on the back of the FreedomView is equipped to accept either the DC Power Supply or the AC Power Supply. The DC power supply will operate the FreedomView through an automobile cigarette lighter port. The AC power supply will operate the FreedomView through a standard wall outlet.



DC Power Cord



AC Power Cord

8) GAS TANK OPENER

The gas tank opener is used to open the covering flap of the gas tank to prevent damage to the insertion shaft of the FreedomView.

A. Inspection of Vehicle Gas Tanks:

1. Place opener inside of gas tank and guide the insertion shaft through the gas tank opener.



STORAGE

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

The FreedomView Kit may be stored and transported at temperatures ranging from -60° F to + 160° F.

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

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

If the FreedomView 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.

PHOTOGRAPHY

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

TROUBLESHOOTING

If abnormalities occur during FreedomView Kit operation, discontinue use and consult Optim LLC.

DO NOT ATTEMPT SELF-REPAIR!

IMAGE IS NOT CLEAR

POSSIBLE CAUSE

Eyepiece diopter not adjusted

Target is out of focus:

Contaminant on lens:

Fluid leakage into the internal shaft:

Loose Lenses:

SOLUTION

Adjust diopter ring until fiber pattern to user's vision: is in clear, sharp focus.

Reposition objective end to focal distance of 10mm-100mm.

Clean lens (Refer to Section 1H).

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:

Articulation becomes frozen or sluggish:

SOLUTION

Return to Optim for service.

Return to Optim for service.

Return to Optim for service.

Access path may be too complicated or intricate.

Return to Optim for service.

NO ILLUMINATION

POSSIBLE CAUSE

Battery is discharged:

SOLUTION

Refer to Section 2, Lithium Ion Battery and Battery Charger for instructions.

TECHNICAL SPECIFICATIONS

OPTICAL SPECIFICATIONS

Depth of field:	10mm-100mm optimum
Field of view:	60°
1:1 magnification focal length:	25mm (1.0 inch)
Maximum magnification at 10mm:	2x
Eyepiece magnification:	25x B-style
Resolution at 25mm:	1.6 LP/mm
Diopter range:	+4 to -4
Right angle adapter:	Prismatic 90°
Min. diameter hole for RA viewing:	10mm (.39 inch) diameter

OPERATIONAL SPECIFICATIONS

Operating temperature:	0° to 150° F
Storage temperature:	-60° to 160° F
Handle:	Not immersible

MECHANICAL SPECIFICATIONS

Maximum outside diameter:	6mm (.236")
Maximum outside diameter (with right-angle adapter):	6mm (.236")
Shaft length:	102, 152, or 203cm (40, 60 or 80 inches)
Shaft construction:	Tungsten braid over Polyurethane monocoil; For immersion in water, gasoline and diesel fuel
Minimum shaft bend radius:	25mm (1.0 inch)
Degree of articulation:	120° up/down
Length of articulation section:	50mm (2.0 inches)
Minimum bend radius:	25mm (1inch)

FREEDOMVIEW INTERNAL LIGHT SOURCE SPECIFICATIONS

Battery:	1.8 A-Hr Lithium-Ion
Charge cycle:	4 hours, typical
Average charge life:	2 hours continuous operation at nominal 70% power
Light Source:	3 W LED

**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.**

MGT-FLEXIBLE GUIDE TUBE SPECIFICATION

Outside diameter:	11mm (.430 inches)
Inside diameter:	7.9mm (.312 inches)
Length:	95.8, 146.7, 197.5cm (40", 60" 80")
Bend radius minimum:	25.4mm (1.0 inch)
Shaft construction:	Stainless steel interlocked flexible metal tube with Polyurethane cover.
Operational temperature:	0° to 150° F
Storage temperature:	-60° to 160° F

EMC EMISSIONS:

- FCC 47 CFR Part 15 Class A emissions requirements (USA)
- AS/NZS CISPR 11:2004 Class A ISM emissions requirements (Australia)
- EN 55011:1998/A1:1999/A2:2002 Group 1 Class A ISM emissions requirements (EU)

EMC EMISSIONS AND IMMUNITY:

- EN 61326:1997/A1:1998/A2:2001 EMC requirements for Electrical equipment for measurement, control and laboratory use – General Use

FCC:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

PARTS & ACCESSORIES

<u>DESCRIPTION</u>	<u>PART NUMBER</u>
FreedomView 6mm LED Fiberscope	F0056521 (40") F0056522 (60") F0056523 (80")
AC Power Supply for Scope & Charger	F006996
Lithium-Ion Battery	F005749PNF
Battery Charger Cradle	F0058681PF
Eyecup	F405606
MGT Guide Tube	F4093421 (40") F4093422 (60") F4093423 (80")
Carrying Case	F006197P
Right Angle Adapter	F4045612
ESD Bonding Wire	F005870P
Window Wedge	F004113
Gas Tank Opener	F006646
DC Power Cord	F005668

REPAIR SERVICE

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

1. Telephone Optim LLC at 1.800.225.7486 or 1.508.347.5100 or complete the online RMA request form on our website www.optim-llc.com/rma-request.
2. Provide a detailed description of the problem.
3. If the FreedomView needs to be sent to Optim, a Returned Material Authorization number will be issued.
4. The FreedomView should then be returned to the address below for repair or replacement.
5. Include a copy of the RMA inside package.
6. Have RMA visible on package.

Returning Goods to Optim LLC

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

Ship to: Optim LLC
64 Technology Park Road
Sturbridge, MA 01566-1253 USA
Attention: Customer Service / RMA# _____

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.

WARRANTY

The Optim LLC FreedomView 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. Any instrument covered under this warranty will be repaired or replaced at the option of Optim LLC.

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 LLC 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 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 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 LLC, 64 Technology Park Road, Sturbridge, MA 01566-1253 (800) 225-7486.

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