

***Installation,
Operation,
&
Maintenance
Manual***

***Model
WelkerScope[®] LITE***

The information in this manual has been carefully checked for accuracy and is intended to be used as a guide to operations. Correct operating and/or installation techniques, however, are the responsibility of the end user. Welker reserves the right to make changes to this and all products to improve performance and reliability.

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1. GENERAL

1.1 Introduction

We appreciate your business and your choice of Welker products. Installation, Operation, and Maintenance liability for this product becomes that of the purchaser at time of receipt. Reading the applicable IO&M Manual prior to installation and operation of this equipment, is required so that you have a full understanding of its application and performance prior to commencement of use. If you have any questions, please call 1-800-776-7267 or 1-281-491-2331 in the USA.

- The WelkerScope LITE is a liquid gel illuminated inspection device that provides a means of inspecting meter tubes or other piping configurations without having to disassemble them.
- The WelkerScope LITE utilizes a high-intensity, heavy-duty, rechargeable, portable light source.
- The LiteStik is powered by a 6.0 V rechargeable battery pack. The LiteStik is not approved for use in hazardous areas. A 'Hot Work' permit is required for use in hazardous areas.
- The optical insertion probe has an inverted image with a 1.5 times magnification and can be focused from 4 inches to infinity.

1.2 Specifications

Materials of Construction:	316 stainless steel and aluminum
Insertion Length:	8" – 10" (20.3 – 25.4 cm)
Temperature Range:	-40°F to 140°F (-40°C – 60°C), extreme temperatures may affect battery life.
Maximum Line Pressure:	Atmospheric
Pipeline Connection:	½" NPT or larger coupling

2. INSTALLATION INSTRUCTIONS

2.1 Installing the WelkerScope® LITE

2.1.1 After unpacking unit, check it for compliance and any damages that may have occurred during shipment.

NOTE: Claims for damages caused during shipment must be initiated by the receiver to the carrier. Welker is not responsible for any damages caused from mishandling by shipping company.

N NOTE

When sealing fittings with PTFE tape, refer to the proper sealing instructions for the tape used.

2.1.2 The portion of pipeline to be inspected must be blown down and purged prior to use of the WelkerScope.

2.1.3 Prior to inserting optical insertion probe, set insertion collar so that the insertion depth is correct for diameter of tube being inspected. For example, if diameter of the tube is 8", then lock collar should be set so approximately 5" of probe will be inserted into pipeline (4" for the pipeline and 1" for the coupling). Rubber insertion adapters allow LiteStik and optical probe to be inserted in ½" -1" NPT connections.

NOTE: If possible, light probe should be inserted on opposite side of the portion to be inspected from the optical probe. Take care not to shine the light directly into eyepiece. If both probes are used on the same end of the pipeline, light probe should be in front of optical probe and slightly higher (see Figure 1).

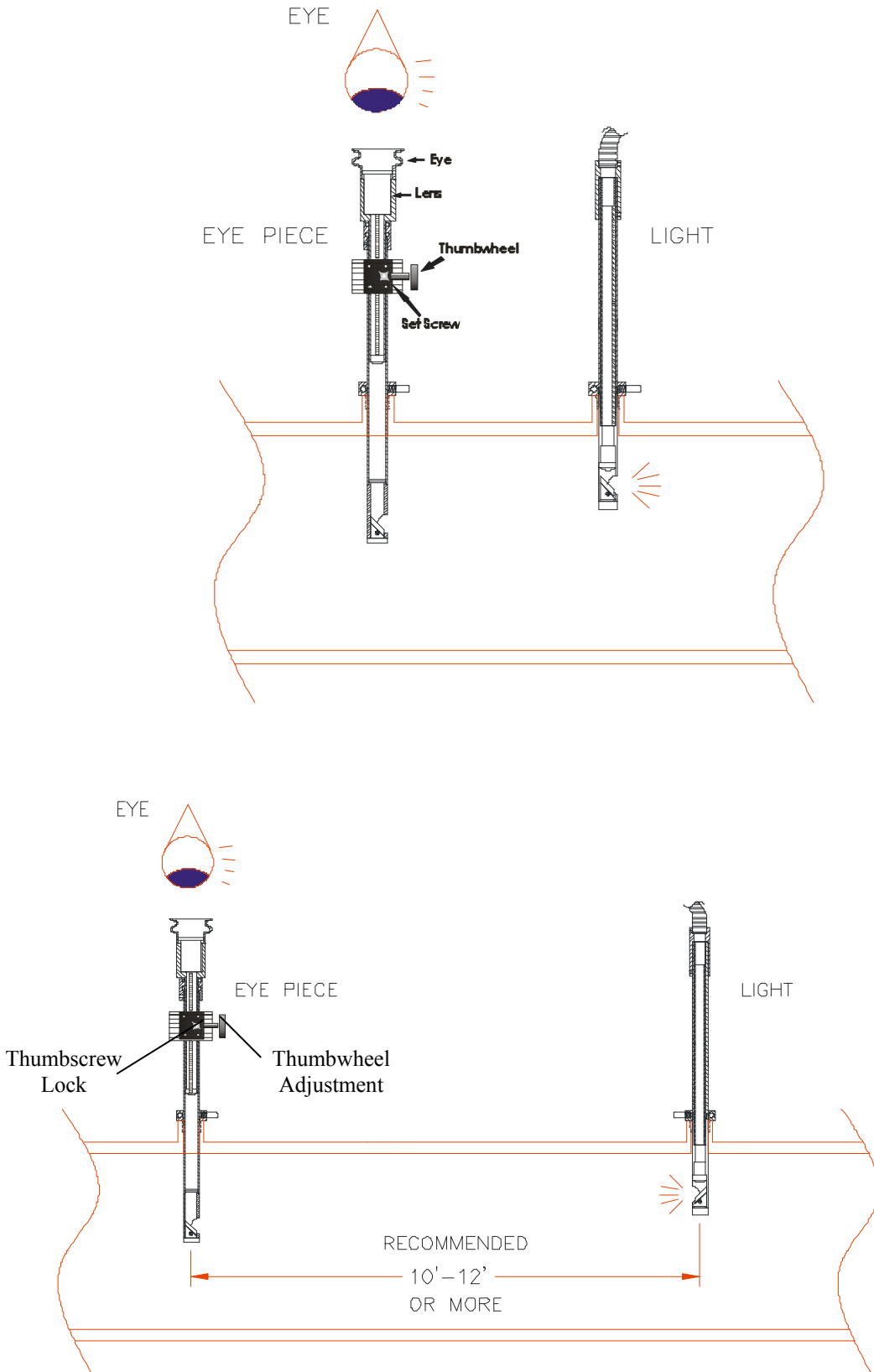


Figure 1

2.1.4 Insert WelkerScope probes through ½" NPT or larger couplings.

NOTE: Use care not to try and force probe through a hole.

2.1.5 The unit is now ready for operation.

NOTE: When transporting WelkerScope unit, cover mirror openings on both the optical and light probes. The WelkerScope should be considered a valuable scientific instrument and should be handled accordingly.

3. OPERATION

3.1 Instructions

3.1.1 After completing installation, turn on light source. The WelkerScope light source delivers an intensity of more than 75,000 foot candles.

3.1.2 Beam intensity from the LiteStik can be adjusted by turning the face cap. The optimum focal point for maximum light transmittal has been carefully measured and set at the factory. This point is marked by a 'focus ring' on the body of the LiteStik. To insure optimum light transmittal, make sure that the face cap is snug against the focus ring. (Do not overtighten)

3.1.3 Line up light source and visual image. Use lock collar indicator rod to align light source direction.

NOTE: It may take some practice to get light and visual image pointing at the same spot. Once accomplished, the advantages and options that separate probes offer will become apparent.

3.1.4 Focus on the image by moving eyepiece up and down using thumbwheel adjustment.

NOTE: Loosen the thumbscrew lock before attempting to move thumbwheel focus adjustment knob. Tighten thumbscrew back when unit is focused. Again, this may take

some practice. Rubber adapters allow easy movement of probe for inspection of all parts of the pipeline.

4. MAINTENANCE

4.1 Instructions

Prior to maintenance or disassembly of WelkerScope unit, it is advisable to have a repair kit handy in case unexpected wear or faulty seals are encountered.

We recommend that the unit have annual maintenance under normal operating conditions. In the case of severe service, dirty conditions, excessive cycling usage or other unique applications that may subject the equipment to unpredictable circumstances, a more frequent maintenance schedule may be appropriate.

4.1.1 The optical components need to be cleaned periodically. This should be accomplished by using appropriate lens-cleaning fluid, paper and cotton swabs.

4.1.2 The mirrors are “First Surface Mirrors” that are aluminized on the surface nearest the incident light. They should be handled and cleaned with care using proper cleaning fluid and cotton swabs since they are vulnerable to scratching.

4.1.3 The light bulb should be changed in a non-hazardous area if it goes out. Use caution when changing a recently burned out bulb, as it could be very hot.

NOTE: See LiteStik specifications and directions for bulb replacement.

4.1.4 Handle the WelkerScope with care, as you would a valuable instrument.

5 WelkerScope LiteStik Specifications

5.1 Safety

- 5.1.1 The WelkerScope LITE is not approved for use in hazardous atmospheres. A 'Hot Work' permit is required for use in hazardous areas. DO NOT attempt to use these in areas requiring explosion-proof lighting.
- 5.1.2 SAVE THESE INSTRUCTIONS. This manual contains important safety, operating and maintenance information for your light source and charger.
- 5.1.3. Before using charger, read all instructions and cautionary markings on the charger.
- 5.1.4 To reduce the risk of fire, electrical shock or personal injury, do not attempt to use this charger to recharge any other product. Likewise, do not attempt to charge the WelkerScope LiteStik with any other charger.
- 5.1.5 Don't abuse the cord. Never carry charger by the cord or yank cord to disconnect it from a receptacle.
- 5.1.6 Plug AC charger directly into an electrical outlet. Do not use an extension cord.
- 5.1.7 Do not use a damaged charger. Replace damaged cords or plugs immediately.
- 5.1.8 Do not put any metal objects onto charging terminals located in the charger holder. Although there is no electrical shock hazard, this action could cause a burn injury.
- 5.1.9 Remove light source from charger holder before attempting any routine cleaning or maintenance. Do not try to repair unit or charger yourself. Return it to Welker for service or replacement.
- 5.1.10 Use only the battery supplied with the original order, Welker part # ME86000. The contact arrangement in the LiteStik precludes the use of other batteries. Dispose of worn

out or damaged batteries properly. Do not attempt to incinerate the battery, as it may explode in a fire. Handle battery carefully and never allow it to short circuit.

5.1.11 A small leakage of liquid from battery cells may occur under extreme usage or temperature. This does not necessarily indicate a failure. However, if outer case seal is broken and liquid gets on your skin:

- 1) Wash promptly with soap and water.
- 2) Neutralize with a mild acid, such as lemon juice or vinegar.
- 3) If battery liquid gets in your eyes, flush them with clear water for a minimum of 10 minutes and seek immediate medical attention.

(Medical note: the liquid is a 25-35% solution of potassium hydroxide).

5.1.12 The WelkerScope's xenon bulb is pressurized. Wearing safety glasses is recommended during bulb replacement. The bulb gets extremely hot. Do not touch a lighted bulb with your bare fingers.

5.1.13 Use of this product for other than a lighting device is not recommended.

5.2 Charging

5.2.1 **Fully charge your WelkerScope LiteStik before first use.** Several charge/discharge cycles may be necessary to achieve full battery capacity. The LiteStik is designed to be in the charger continuously when not in use. This will ensure that the WelkerScope is always ready for use. There is no danger of overcharge.

5.2.2 To charge the LiteStik, first turn off and connect it to the charger. LED in charger should light, indicating charge current is flowing. A full charge will take approximately 2.5 hours (quick charger) or 10 hours (standard charger). Special circuitry senses when the battery has received a full charge, switches to lower

maintenance charge rate and causes the LED to blink.

- 5.2.3 The quick charger is equipped with circuitry to prevent fast charging in temperature extremes (below 40° F (4.4° C) and above 130° F (54.5° C). When the quick charge is inhibited by temperature, a maintenance charge is applied and the LED flashes. When the temperature is acceptable, fast charge will begin.

WARNING: Use a lighter plug only if vehicle lighter socket is not switched off by the ignition switch and only if plug fits socket securely. There is risk of battery damage or explosion if the fast charger power supply is repeatedly switched “off” and “on”.

- 5.2.4 Keep LiteStik and charger contacts clean at all times. Poor contacts can cause charger malfunction. An abrasive pencil eraser works well to clean the contacts.

- 5.2.5 Observe the LED:

- A. If it does not blink rapidly and continuously, indicating a full charge, within 3 hours of LiteStik insertion, examine charger and installation for loose or intermittent wiring. If no obvious external fault is found, return system to Welker for inspection.
- B. If you notice that it always takes longer than 2.5 hours for the LED to blink, return system to Welker for inspection.
- C. If at normal room temperatures the LED does not come on steady when you insert the flashlight, return system to Welker for inspection.

Systems returned to Welker will be inspected and replaced or repaired according to warranty specifications. Customer will be contacted if replacement or repair, not covered by warranty, is required .

5.2.6 Proper function of fast charge termination circuit can be tested by performing the following test: Insert LiteStik into charger for at least 5 minutes.

Without removing it from charger, turn it “on”. In approximately 10 seconds the LED should switch to blink mode.

5.3 Bulb Replacement

5.3.1 Allow the WelkerScope bulb to cool before attempting replacement. Wear appropriate eye protection.

5.3.2 Before working on the LiteStik, remove tail cap and battery.

5.3.3 Unscrew and remove face cap/reflector assembly and focus spring. This will expose bulb and front of the switch module.

5.3.4 Remove old bulb by pulling on glass. Observe relationship of the bulb pins to contact holes in switch module.

5.3.5 Insert pins of new bulb into small slots on the inside of contacts in switch module, push base of bulb against switch module, taking care not to bend pins. Wipe bulb clean of fingerprints.

5.3.6 Replace face cap/reflector, battery and tail cap. Turn LiteStik “on” and check focus of the light beam. Face cap should be snug against focus ring. (If satisfactory focus cannot be achieved by turning face cap, bulb is probably not on center). If unit cannot be focused remove face cap and check bulb placement.

CAUTION: Bulb may be extremely hot.

To obtain the safest and longest service from your rechargeable products, Welker, in conjunction with the leading manufacturers of nickel-cadmium batteries, offers the following recommendations:

5.4 Care and Use of Nickel-Cadmium Batteries

In order to obtain maximum performance and life from the nickel-cadmium batteries supplied with the WelkerScope LiteStik:

- 5.4.1 Thoroughly read the sections in this manual covering *Safety, Charger Use, and Charging*.
- 5.4.2 Fully charge LiteStik before first use.
- 5.4.3 Although the Welker LiteStik is designed to be left on charge continuously, there is one exception; if surrounding temperature is below 10° F (-12.2° C), continuous charging is not recommended.
- 5.4.4 There are special considerations to note when using multi-cell rechargeable batteries, such as found in the Welker LiteStik. If a nickel-cadmium battery is subjected to repeated and extensive “overdeep” discharges, such as aggressive conditioning procedure to eliminate “memory,” which runs the battery down completely on a regular basis, it can experience a voltage reversal of one of the individual cells. This may cause a buildup of pressure within the cell, which can lead to venting of electrolyte, cell damage and early battery failure. In addition, should the pressure relief vent on top of the battery become damaged, this pressure increase could cause the cell to burst, causing damage to the LiteStik, and possibly personal injury.
- 5.4.5 Do not periodically ‘condition’ or ‘exercise’ your LiteStik battery despite what you

may have been told about nickel-cadmium “memory.” According to the most recent technical manuals of battery manufacturers, the actual existence of “memory” in a battery used under the conditions of typical WelkerScope service (high-intensity flashlight-type light source) is extremely unlikely. Welker specifically discourages a regular ritual of deep discharging, which is not only unnecessary, but will greatly shorten lamp and battery life.

5.4.6 If the battery is overly discharged, there may be a small leakage of alkaline electrolyte from the safety vent on top of the cell. It appears as a powdery substance and can affect the integrity of the electrical contact. We recommend your battery be periodically inspected and contact area wiped clean should any electrolyte be present. Use caution when handling a battery that has leaked. The electrolyte is a strong caustic and can burn or irritate the skin and eyes.

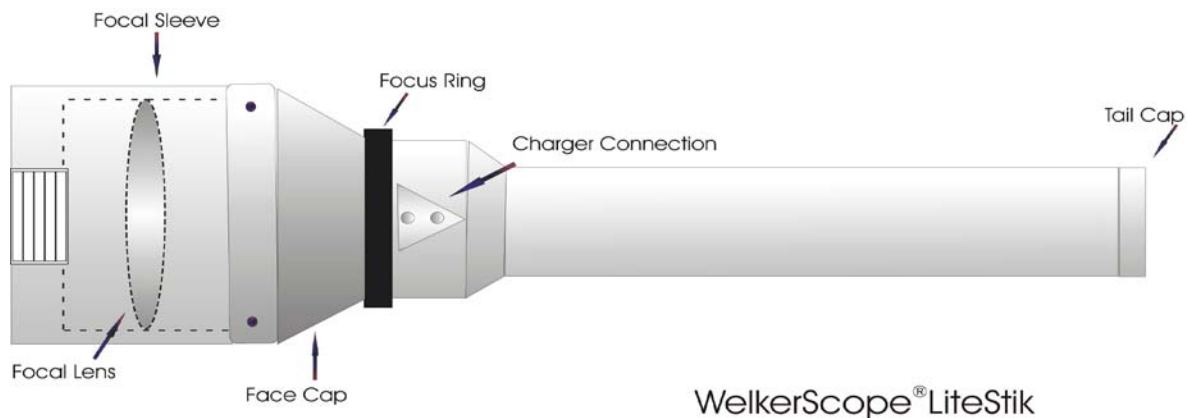


Figure 2

Note:

The rechargeable battery contained in this product is recyclable. At the end of its useful life, under various country and state laws, it may be illegal to dispose of this battery in the municipal solid waste stream. Check with your local solid waste officials for details in your area for recycling options or proper disposal.

5.5 Charger Mounting:

- 5.5.1 Charger should never be mounted against vinyl or any other heat sensitive surfaces.
- 5.5.2 A triangular plate with two recessed contacts is located on the head of the light source opposite the switch button. This plate fits into a mating recess in the charger. LiteStik may be inserted into charger in two basic ways. You may either place the barrel between the charger arms with switch facing out, and pull the LiteStik head between the arms until it locks into place, or simply press the LiteStik head (switch out) into the gap in the arms. This will force the arms apart and allow the head to enter into its proper position. This insertion method allows the LiteStik to be mounted with almost zero clearance at its ends.
- 5.5.3 The 12 V DC cord is offered with cigarette lighter plug adapter to mount a LiteStik charger in a vehicle.
- 5.5.4 When charging on the fast charger, the LiteStik will draw between .5 and .7 amps for up to 2.5 hours during the fast-charge period. During the maintenance charge cycle, current is pulsing and effectively draws .1 amps from a vehicle.

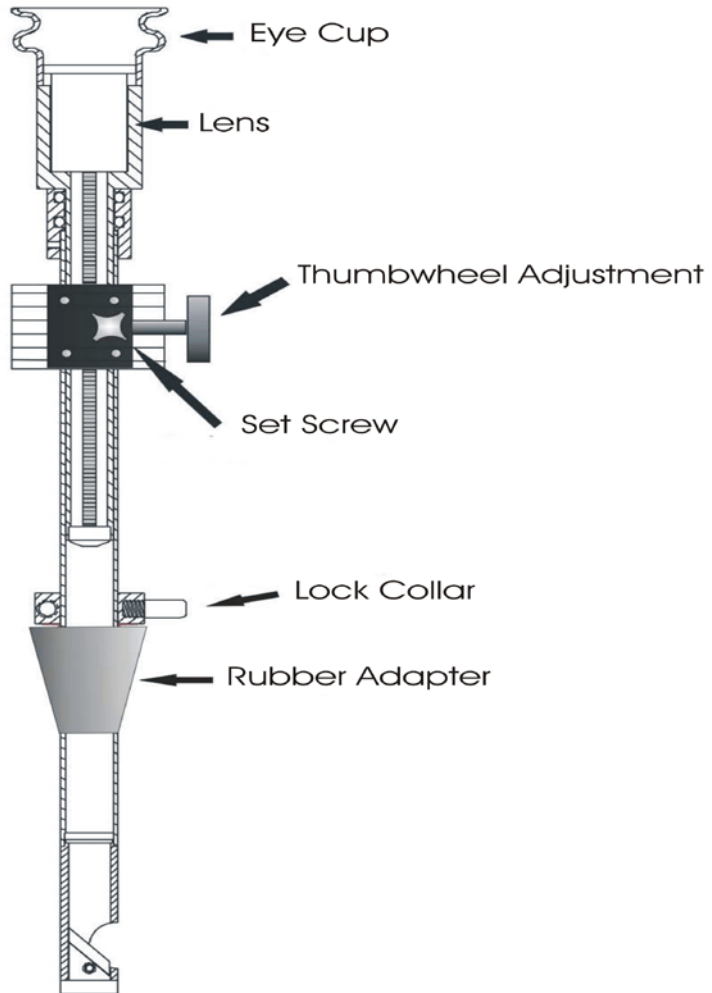


Figure 3

Thank you for selecting the WelkerScope Lite for your pipeline inspection needs. As with any precision instrument, reasonable care and maintenance of this product will provide years of dependable service.

6. CAMERA HOOK-UP

The WelkerScope LITE is set up for easy attachment of a digital camera to take pictures for data verification files. Attach camera to adapter lens, remove lens from viewing probe and insert camera and lens adapter into viewing lens housing. It may be necessary to refocus with the adapter attached. Loosen the thumbscrew lock and adjust as needed, retighten the thumbscrew and proceed with pictures. Best picture results have been made with the camera set in the “infinity” mode on auto focus and the light source pointing in the same direction as the viewing probe. Clear, sharp picture taking can also be accomplished with the light source facing the viewing probe, but some practice with light direction, intensity and lens speed may be necessary to achieve desired results.

Note: Lens adapter supplied is for use with specific camera (Nikon 5400) and is designed to fit in lens housing of Welker Scope viewing probe.