

SOL-R

Features, Specification, and Operation Instructions



DC Regulated, Re-Configurable Light Sources

(SOL-R 150DL model shown)

GENERAL INFORMATION AND CAUTION

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The SOL-R light source has been engineered with safety as a priority. However, the user is cautioned to observe the following:

1. Read and follow all instructions in this manual.
2. Never look directly at the lamp when it's on; your eyesight may be compromised.
3. Take care removing fiber optic components or handling the light source; the lamp and surrounding surfaces may be hot.
4. Do not use this unit near water or in an area with excessive moisture.
5. Do not place flammable materials near the unit.
6. Do not defeat the safety purpose of the 3-prong grounded plug or interlock switch. Use only the approved power cord supplied with the unit. Route cord so that it will not be pinched, severed or walked upon.
7. Do not defeat the purpose of the fuse. Replace only with the fuse type described in the manual and as marked on the unit.
8. Unplug before servicing. High voltage is present internally.
9. Keep all safety and operating instructions for future reference.
10. Do not block ventilation openings on this unit. Do not impede airflow.
11. If you wish to clean the unit, disconnect the power and use only standard detergent type cleaners; do not use solvents or petroleum distillates. Never "spill" liquid on the unit.
12. Allow the unit to cool before servicing.
13. If the equipment is not used in a manner specified in instruction manual, the degree of protection may be impaired.
14. Do not service the unit beyond what is described in this manual. Attempting repair of Electronic or Logic circuits without prior written approval of FTI will void the warranty. Should the lightsource fail at any time, return it to an authorized FTI service center.
15. For a Return Material Authorization, contact the FTI Customer Service department @ 800-433-5248.

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Product Description

The SOL-R™ lightsource family was designed to be re-configurable.

Suited for all demanding applications requiring stable light output, SOL-R DC regulated units can be adapted to most environments and specifications. This light source provides consistent intense white light for all types of fiber optic illumination components.

The "SOL-R" light source is listed per UL-1571 and is CE/CSA compliant to standards set for the year 2001. CE compliance for the year 2001 requires power factor correction and sets limits for harmonic current emissions.

The "SOL-R" light source provides up to 150 watts of photonic output from a 21 volt tungsten halogen lamp.

The adjustable, regulated voltage supply governs output from 0 to 21 VDC.

Depending on model, the light source may be controlled manually from either the front panel, remotely via a wired 25D-pin remote interface connector on the rear of the unit, or through the optional internal RS232 interface.

The unique digital readout (DC and DL models) displays voltage or corresponding intensity, and the exclusive lamp tuning transport (all models) allows the user to focus the lamp output depending on the lamp/fiber combination for optimal performance and efficiency.

The light feedback option of the SOL-R 150DL is extremely stable, maintaining output within 2% of preset intensity over the life of the lamp.

The high output fan, lamp baffle, and unique bezel design provide maximum airflow while restricting stray light from heating outer surfaces, resulting in extremely cool operation.

The lamp module can be removed from the housing without disconnecting wires. Easy access from the front insures access when units are stacked or installed in space constrained locations.

Installation Guidelines

To insure proper operation of the light source, the following conditions must be met:

Minimum Clearance

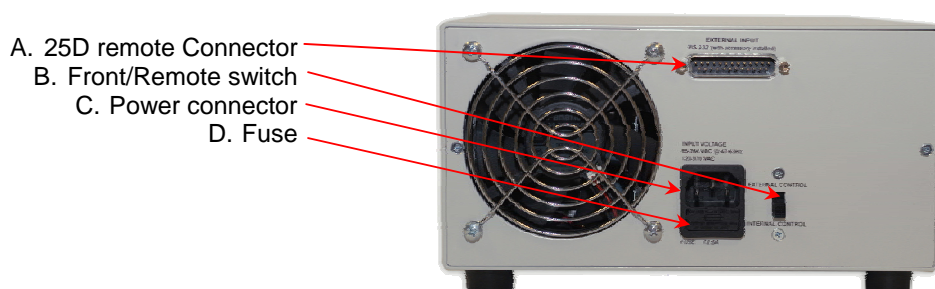
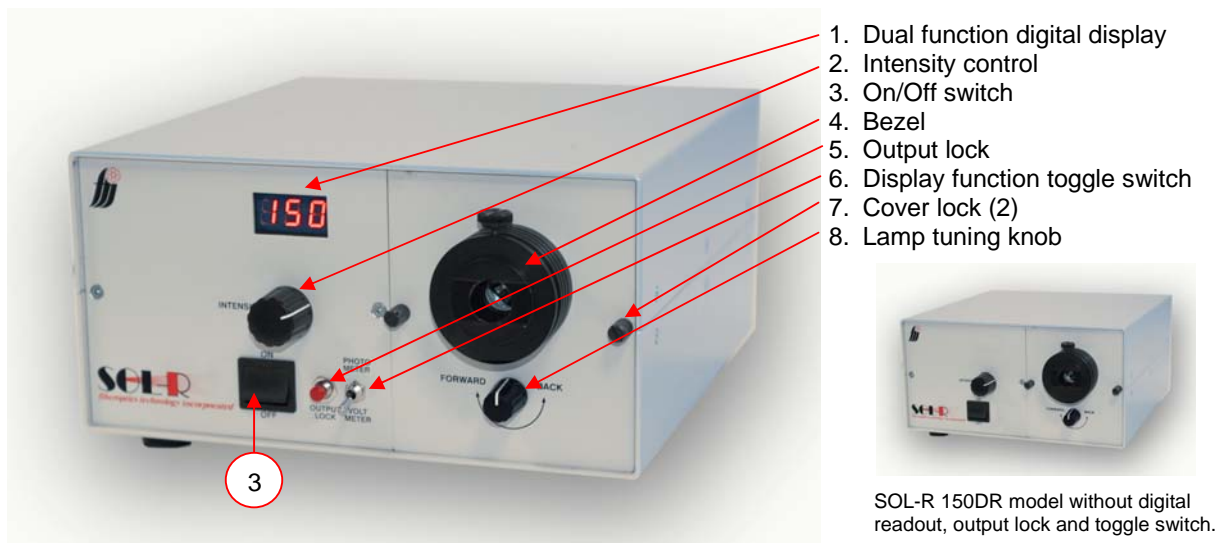
Rear	Bottom	Sides and Top
1.5" (37 mm)	Do not remove feet	1" (25 mm)

1. Do not block any air vents.
2. Never attempt to operate the unit without the mounting feet - doing so will block ventilation. Proper ventilation must be provided at all times. Failure to do so may cause intermittent operation and/or failure of the electronics.
3. Avoid areas or excessive vibration.
4. Operate the light source only in an environment where people do not require protective equipment.
5. **CAUTION:** Dust accumulation will restrict air flow which can damage the unit. (See Cleaning Section for recommendations)

Operation

The "SOL-R" light source was designed to accept line voltage in the range 90 to 265 V AC.

1. Make sure the power switch on the front panel is in the "off" position.
2. Plug the power cord into the power connector (C) in the rear of the lightsource.
3. Plug the other end into a power source.
4. If using a color or heat filter, insert into the bezel (4), with the non-coating side towards the lamp - remove any protective plastic from the filter(s) before installing.
5. Insert the appropriate adapter into bezel, aligning the through-hole in the adapter with the thumbscrew in the top of the bezel. Turn the screw to capture the adapter, but not too far as to obstruct the fiber optic component when inserted into it.
6. Insert the selected fiber optic component.
7. Make sure the captive thumbscrew on the bezel goes through the adapter and locks the input of the fiber optic component in place.
8. Make sure the remote switch (B), on the rear panel, is set for front panel operation ("Internal" Unit control).
9. Turn the light source power switch (3) to the "ON" position.
10. Adjust the light intensity with the intensity control knob (2) to maximum setting. When using SOL-R 150DL with light feedback, Intensity adjustment must be made while depressing the "Output lock" (5) button. If using the DC model, this button is a non-working feature, intended for use if an after-market feedback circuit is installed.
11. To optimize the system, adjust the lamp tuning knob (8) to maximize intensity or uniformity. Using a photometer to measure output from the fiberoptic part.
12. Re-adjust intensity if desired.
13. To turn the unit off, press the power switch to the "OFF" position.



Features

Soft-Start

The "SOL-R" light source is equipped with a "Current Limiting" circuit to protect the lamp from in-rush current. After turning the power switch to the "on" position, the fan will run immediately at full capacity. The lamp will not be supplied full rated current until the bulb warms up, typically 0.5 second. This unique feature allows for the fastest possible turn-on time, while obtaining the maximum life from the lamp.

If the intensity control is at the minimum setting, 0.2V is still supplied to the lamp (you may notice a very dull glow from the lamp).

Lamp Tuning

Your "SOL-R" lightsource uses a tuning feature to optimize light output. By turning the adjustment knob you can move the position of the lamp relative to the fiber input. Doing so will help you tune the lamp distance to get the best intensity, uniformity, or combination of both, regardless of the lamp type or active diameter of the fiber.

Turning the knob to the clock-wise brings the lamp closer, while turning counter-clockwise moves the lamp further away. Using a photometer to measure output at the end of the fiber bundle, you can experiment with lamp position to optimize for your particular combination of fiber and lamp, as well as application. If working with 150DC or DL modules, see additional information pertinent to those models.

The chart below provides manufacturer's recommended focal distance guidelines. However, because each lamp may have small variations in reflector/bulb construction, the information can only be used as a guide.

When first setting the lightsource, use the calibrated marks on the transport rail to initially set the distance, based on the lamp used. Each mark on the scale corresponds to the middle of the focal distance range. For example:

The mark on the scale for DDL lamps is 2.375" inches (60mm) from the standard FTI input (half way between 2" and 2.75" (51mm and 70mm)).

P/N	Description	Focal Distance	Lamp Mfg	Spot Size	Voltage	Wattage	Avg Life (hrs)	Beam Spread (NA)	Color Temp (°K)
FTIII10029	EKE	1.8-2.9"	Ushio	.5-1"	21.0V	150W	200	N/A	3250
FTIII10846	EJA	1.1"	Ushio	.25"	21.0V	150W	40	N/A	3350
FTIII16933	DDL	2-2.75"	Ushio	.75-1"	20.0V	150W	500	N/A	3150
FTIII16934	EKE – gold coated	1.8-2.9"	Ushio	.5-1"	21.0V	150W	200	44°	3250

Compared to competitive models, it may be possible to improve intensity by 10% as a result of moving the lamp closer to the input. Doing so will allow you to reduce input lamp voltage, extending the life of the lamp by as much as 50%! (see following section on Lamp life for more information).

PLEASE NOTE: (SOL-R Models 150 DC and DL only) Adjusting the lamp position effects the digital display value. Therefore, to insure the optimal distance is achieved, the user must use a photometer to measure output at the end of the fiber. Normally, moving the lamp closer will increase intensity, but it is possible to move the lamp too close, at which point the intensity reading (and output) will decrease!

Manual Intensity Control

The "SOL-R" light source is equipped with an intensity control knob on the front panel which sets the regulated voltage to the lamp (0.2 to 21VDC).

Digital Display (SOL-R Models 150 DC and DL only)

The digital display is a unique, dual function display. Using the toggle switch on the front of the panel, the user can switch between intensity (relative photonic units) and voltage.

The Intensity scale helps the user maintain constant output. The voltage scale helps determine lamp life. A more in-depth description of both values are presented below.

Lamp Life

The digital display can be set to show voltage driving the lamp. With this information and the accompanying chart, the user can manage lamp life to plan maintenance.

Voltage	Current%	Intensity%	Lamp life %	LAMP LIFE (Hours)		
				DDL	EKE	EJA
20.5	98.80%	93.70%	120%	600	240	24
20	97.60%	87.40%	150%	750	300	30
19.5	95.80%	77.95%	230%	1150	460	46
19	94.60%	71.65%	300%	1500	600	60
18.5	92.80%	64.30%	420%	2100	840	84
18	91.60%	60.10%	600%	3000	1200	120
17.5	89.80%	53.80%	900%	4500	1800	180
17	88.60%	49.60%	1150%	5750	2300	230
16.5	87.40%	45.70%	1500%	7500	3000	300
16	85.60%	40.30%	2500%	12500	5000	500
15.5	84.40%	36.70%	3500%	17500	7000	700
15	83.20%	33.10%	5000%	25000	10000	1000
14.5	81.40%	28.30%	8000%	40000	16000	1600
14	80.20%	25.90%	12500%	62500	25000	2500
13.5	78.40%	22.30%	20000%	100000	40000	4000
13	77.20%	19.90%	30000%	150000	60000	6000
12.5	76.00%	17.50%	45000%	225000	90000	9000
12	74.20%	14.80%	80000%	400000	160000	16000
11.5	73.00%	13.00%	120000%	600000	240000	24000
11	71.20%	10.30%	180000%	900000	360000	36000
10.5	70.00%	8.50%	300000%	1500000	600000	60000

You might notice the chart is not linear. However, for a basic guideline, if the desired intensity is set between voltages, life and intensity can be interpolated.

The topic of lamp life is more complex and less accurate than it seems. For more information, visit our website (www.fiberoptix.com/technical/Light-source-lamp-characteristics.html.) to learn about the nuances, use our lamp life calculator, or download the lamp life Excel spreadsheet.

Lamp Intensity

In the world of filament lamps, halogen lamps are by far the most consistent, but even halogen lamps degrade over their lifetime, most by an average of 15%. Furthermore, all lamps are not created equal. As proven by independent research, new lamps, of the same brand and model number, may vary +/- 20% in maximum intensity, depending on the batch.

Using the scale

When the display is set to measure intensity, a relative scale is displayed. Once the desired intensity is set (with the adjustment knob), and the value recorded, you can use the digital display to maintain intensity over the life of the lamp (manual light feedback) if the original intensity value is less than 100%. As the lamp degrades, simply re-adjust the knob to maintain the original value. When you can no longer adjust the intensity to maintain the preset value, it's time to replace the lamp.

If the optional SOL-R calibrator is not used to maintain the value from lamp to lamp, the new display value may be different from the initial value (because the new lamp has a different intensity output range). Therefore, in sensitive applications, we recommend using a photometer to record output at the distal end of the light guide after initial adjustment. Then when the lamp is replaced, adjust the intensity value to return to the original intensity.

Example:

Original desired intensity value – 200.

Lamp begins to deteriorate, value drops to 190.

User adjusts knob to maintain output at 200.

The lamp fails, or adjustment is no longer possible. User replaces the lamp and calibrates lightsource to original intensity setting.

New value is 220 (because the replacement lamp has a different performance profile)

Lamp begins to deteriorate, value drops to 210

User adjusts knob to maintain output at 220

The values of 200 and 220 are arbitrary. But both represent the desired intensity value determined during original set up.

Special Note for Light Feedback (manual or automatic)

Under normal conditions, lamp manufacturers recommend halogen lamps be operated above 80% of their rated intensity (about 90% of their rated voltage; see chart above) for optimum and stable lamp performance. Using the "SOL-R" lightsource with digital display allows the use of intensity settings less than 80% with consistent results, because the value for intensity is provided optically. Therefore, any degradation of output will be translated into a different intensity value. Readjusting the intensity manually, or automatically with light feedback, will maintain output at the desired level.

If adjusting manually, the output lock button has no purpose; it is only functional for Automatic feedback (SOL-R 150DL).

Principle of Light Feedback

The principle of light feedback is based on measuring intensity and adjusting voltage. Therefore, while using light feedback is very stable, the calculated lamp life (from the Lamp Life chart) will not be accurate, nor can it be predicted. FTI assumes the user of a SOL-R lightsource with light feedback knowingly sacrifices some percentage of life for consistency.

Additionally, automatic light feedback (SOL-R Model 150DL) is designed to manage a degrading lamp over its life (about 15-20% fluctuation). After setting the feedback value, it's still possible to lose calibration if unintentional large changes in the intensity knob are made. Therefore, it's always advisable to record the desired value. When setting the initial value, some drift may be noticed (1-2 units) this is normal, and part of the A-D circuit. A bit of tweaking will achieve the desired intensity.

A Note Regarding Lamp Stabilization

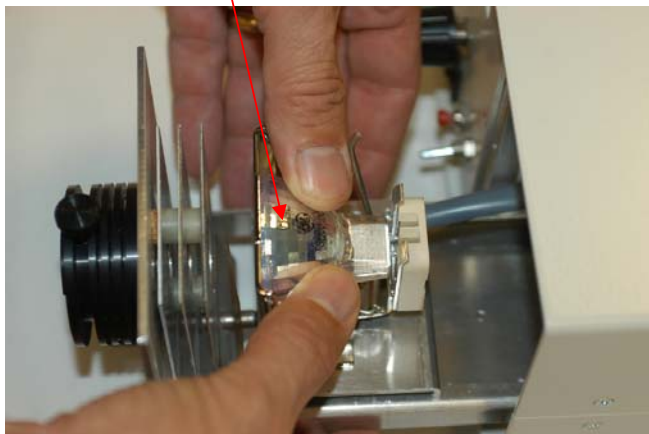
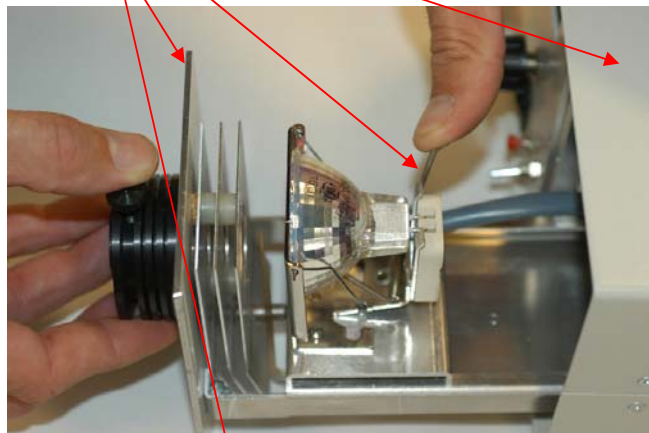
The output voltage of the power converter stabilizes immediately; however, it takes a cold lamp typically 25 minutes to stabilize within 1% or better. This stabilization period is only slightly affected by lamp voltage. Testing indicates the lamp will start off 2-5% brighter, then stabilize within an hour. This phenomena is a characteristic of all Tungsten Halogen lamps in all DC regulated light sources.

Lamp Replacement

1. Turn the power switch to the "Off" position.
2. Allow the lamp to cool.
CAUTION: Lamp, lamp socket, and surrounding surfaces may be hot!
3. Turn the cover lock knobs (7) CCW several turns until you can pull the module (C) from the housing (A) and expose the lamp. (The lamp module may be removed entirely from the housing for convenience.)
4. Push back on the lamp release lever (B) to raise the lamp and remove it from ceramic lamp socket.
5. Insert a new lamp into the lamp holder. Push the lamp (D) all the way down.

Be careful not to touch the bulb or the inside of the reflector. Finger prints may affect the light output.

- A. Housing
- B. Lamp release lever
- C. lamp module
- D. Lamp



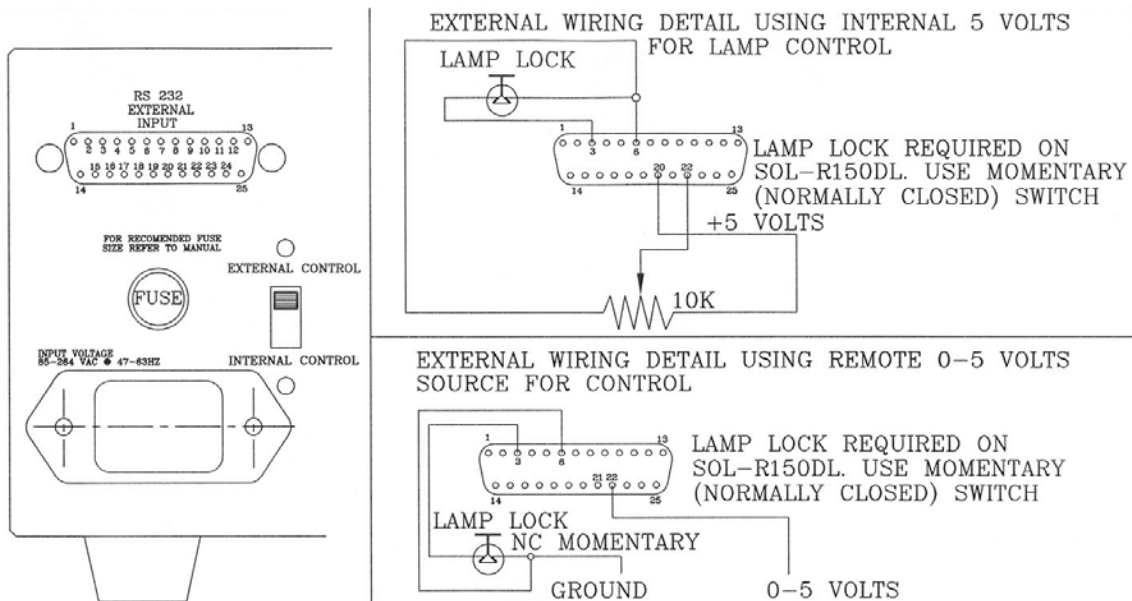
Fuse Replacement

Under normal use, the fuse should not require replacement. The purpose of the fuse is to protect the electronics from failure due to inrush. Should it become necessary to change the fuse, replace with the same type (2,5 amp/slow blow) to insure long life and performance.

Remote Operation

The front panel power switch must be in the "on" position to operate the light source in the remote mode. The fan will run continuously. Located on the rear of the "SOL-R" light source is a 25D-pin male remote interface connector which accepts a wired remote option, or standard 25D to 9 pin adapter cable (available from 3rd party suppliers) for RS232 interface cord (if the RS232 option is installed in the lightsource).

If the switch on the rear panel is set to "External" position, lamp intensity control is switched to the rear 25D-pin connector. To have full remote control, the front panel intensity control should be set at the maximum output setting. When using the remote in conjunction with Light feedback, the desired output level should be set and locked from the remote accessory.



The following remote operations are available:

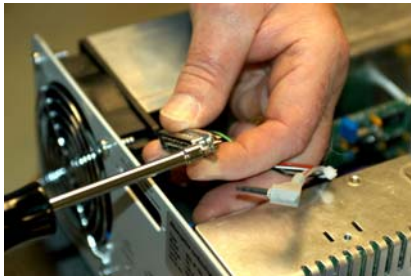
- 1. Remote Lamp Intensity Control Using the Optional Wired Remote with Trim Pot**
Wired remote is connected to the 25-pin interface connector located on the back of the light source. Simply set the Front/Remote switch on the rear panel to the "External" position, plug in the option, and control output through the wired remote.
- 2. Remote Lamp Intensity Control Using an External 0-5 volt DC Control Voltage**
Adjust lamp intensity through the 25-pin remote interface connector located on the rear of the light source. Set the rear panel intensity switch to the "External" position. Use the supplied schematic to create the wired interface needed to connect the remote power source to the light source. Minimum to maximum intensity is now controlled from the 5 volt source.
- 3. Remote Operation Using RS232 Optional Module**
Operation instructions are provided with the RS232 module. It should be noted that, if used externally, it's possible to connect up to 4 lightsources to one RS232 module with a custom interface cable (not supplied).

RS232 Module Installation

1. Remove the six screws retaining the cover. Remove the two jack screws holding the 25D connector in place.



2. Remove the connector from the panel and install the two jack screws in the connector and tighten.



3. Locate the power plug in the group of wires leading to the connector. Remove the insulation from the plug and install it in the jack located on the side of the module.



4. Install the 25D connector previously removed from the rear panel onto the mating connector on the back of the module (I/O) side. Tighten the retaining screws.



5. Install the two jack screws provided in the kit to fasten the module to the rear panel. Next, install the cover, use the six screws previously removed.



This completes the module installation.

SPECIAL PROGRAMMING NOTE:

When following the documentation to program performance in models featuring light feedback, *Don't forget to toggle digital output high for 1 second then back to low to lock the desired voltage into the light source*

Cleaning

The aluminum housing, front and back plates have a durable finish that should retain their original luster for many years. Cleaning the exposed areas with a commercial glass cleaner or common household detergent will help maintain the finish.

Unplug and remove the power cord from the IEC connector on the back of the unit. Wipe the exposed areas of the housing and front and back plates with a soft cloth or paper towel moistened with general purpose cleaner.

CAUTION: Do not use excess water, treated cloth, harsh cleaning agents or sprays. Use cleaning fluid sparingly. If fluid spills into the interior, let the unit dry thoroughly before using.

Periodically, dust should be removed from the unit using a vacuum or commercially available cans of compressed air. Pay special attention to the fan blades at the rear of the unit, the air vents in the front and bottom of the unit and the lamp baffle assembly inside the main housing.

A drop of lubricating oil on the lamp transport assembly will keep the assembly moving effortlessly.

Special care should be taken to avoid touching the glass optical sensor on models featuring digital readout and/or light feedback.

Use of Filters

All SOL-R models accept the use of 1" diameter filters. We recommend dichroic filters for long life and fade resistant performance. The filter should be installed in front of the adapter, with the non-coated side facing the lamp. If an IR filter is to be used, install the IR filter non-coated side facing and closest to the lamp. Any colored filter should be installed after the IR filter.

Some filters may be supplied with a protective film covering the coating. **BE SURE TO REMOVE THE FILM BEFORE USE!**



Troubleshooting

If you are unsuccessful at resolving the following conditions, contact FTI for a Return Material Authorization (RMA). Do not attempt to repair the light source. Tampering with the electronics will void the warranty.

Do not attempt to troubleshoot the light source with any remote control device connected. If the light source operates after removal of the remote connection, check your remote set-up.

Fan operates, but low light output

Check the lamp to ensure that it is fully seated. See "Installing the lamp" section. Check the output setting on light feedback models, reset desired intensity by depressing the lamp lock button while adjusting intensity, or check computer settings if using RS232.

Fan operates, but output is intermittent (every few minutes, lamp turns off and turns on)

The light source is running too hot. A thermal cutoff protects the circuitry from heat failure. Check air intakes and exhaust areas for dust or dirt accumulation. Make sure the minimum clearances are maintained (see installation guidelines for clearance information). Move the light source to another location. NEVER enclose the light source without adequate ventilation.

Fan operates, but the light turns briefly on and then off

1. The lamp may have a faulty filament. Turn the intensity control knob to maximum setting to test the lamp. If using the light feedback option, override it by depressing the output lock and turn the intensity control knob to maximum.
2. If the lamp fails, change the lamp following the instructions in this manual.
3. Examine the lamp socket assembly for damage and continuity.

Fan operates, light is not on

Check to insure "Internal" setting is selected on the rear control switch.
Replace the lamp.

Fan does not operate, light is on

Return to FTI.

Fan and lamp are not working

Make sure the power cord is inserted completely into the IEC connector and also into the correct power source. Check the power cord for damage. Check the fuse.

Fiber input is burning

Check the fiber type. It may be plastic and susceptible to burning, even with the use of a standard heat mirror.

Ask your supplier about the epoxy used to manufacture the input. Some epoxy types cannot withstand the high temperatures developed in the light source.

Check the lamp type. Replace dead lamps with FTI approved types. Use an IR filter if possible. Fiberoptic inputs damaged by use of non-approved FTI lamp will void the fiber warranty.

Light feedback/Optical display**Display value changed**

1. The calibrate lock was not depressed during intensity calibration. Depress the button while selecting intensity value, then release the button. If the display changes slightly when the button is released, and the value is unacceptable, repeat the process until the intensity is set. (The calibrate lock has no function on SOL-R model 150DC, the user must adjust the intensity knob to maintain output.)
2. The lamp can no longer sustain the required intensity value set by the user.
Change the lamp following the instructions in this manual.

The SOL-R lightsource with Light feedback allows the user to choose any intensity value, including 100%. If the feedback intensity is set at or near 100%, very little time will pass before the unit will no longer be able to maintain output.

Allowing the user to choose 100% in the light feedback mode provides total flexibility and maximum “usability” of the lightsource. Very few products give the user so much control. And when compared to competitive products having a built in intensity limit, "SOL-R" has as much as 15% more intensity potential when used in the maximum setting.

Therefore, the user is cautioned about attempting to use this feature with the intention of keeping maximum output consistent over a long period (more than 24 hours) of time. For more information about light feedback and how it works, go to our website:
www.fiberoptix.com/technical/Light-source-lamp-characteristics.html.

3. (SOL-R 150DL only) If the system had been working properly for several lamps, the intensity knob may have been inadvertently bumped more than what can be tolerated by the system. Re-adjust the knob until the original value is displayed, and the knob can travel about the same distance in both directions without affecting the display. **DO NOT DEPRESS THE CALIBRATING LOCK** during this adjustment, you will change the feedback value!

Cannot adjust new lamp intensity to previous intensity setting

Lamps are made within a tolerance that can vary as much as +/- 20%. It is possible the lamp used to set the initial value performs at the high end of this range. The replacement lamp, being some value less than the original, cannot meet the required performance. Therefore, change lamps. If the problem cannot be remedied, your system may require recalibration (a new intensity setting will be required).

Lamp is adjusted to previous value, but the output is more or less bright

Use a photometer at the fiber output or the optional calibrator accessory to recalibrate the feedback system. Adjusting the intensity setting to the previous number without using the calibrator will probably not produce the same output, because the system bases its operating range on the value for each particular lamp. Since each lamp has a tolerance, the resulting range could vary by as much as +/- 20%.

The lamp is not lasting as long as the lamp life chart suggests

The lamp chart is a guideline only. Lamp variation, the conditions under which they operate, even the orientation of the lamp and filament all play a role in determining lamp life.

If you are using the feedback option, voltage to the lamp is constantly increasing, which relates to a lamp life shorter than what might be indicated when the voltage value was first checked.

To learn more about lamp manufacture and lamp life, consult our website:
www.fiberoptix.com/technical/Light-source-lamp-characteristics.html.

In the US, you can call toll free at 800-433-5248 at anytime during normal business hours for technical support.

Product Specifications

Improvements may result in specification or feature changes without notice.

Physical Dimensions

Overall Height:	5,1" (130 mm)
Overall Width:	9" (230mm)
Overall Depth:	9" (230 mm)
Unit Weight:	7.8lbs. (2.8 kg) including cord
Fiber Receptacle:	1" (25.4mm) diameter

Lamp Types

P/N	Description	Lamp Mfg	Focal Distance	Spot Size	Voltage	Wattage	Avg Life (hrs)	Beam Spread (NA)	Color Temp (°K)
FTIII10029	EKE	Ushio	1.8-2.9"	.5-1"	21.0V	150W	200	N/A	3250
FTIII10846	EJA	Ushio	1.1"	.25"	21.0V	150W	40	N/A	3350
FTIII16933	DDL	Ushio	2-2.75"	.75-1"	20.0V	150W	500	N/A	3150
FTIII16934	EKE – gold coated	Ushio	1.8-2.9"	.5-1"	21.0V	150W	200	44°	3250

Power Supply Specifications

Rated Consumption	200 Watts
Output Voltage	0-21 Volts
Input Voltage	100-240 VAC 50/60Hz
Power Factor Correction @ 240VAC, 50 Hz	> 0.93
Hold-up Time, Nominal AC Input, Full Load	8.4 milliseconds
Line Regulation, entire range	+/- 0.5%
Current Limit Set point	8.5 Amps
Fuse type	2,5 Amp slow blow
Temperature Range: Operating Storage	0° to 45° C -25° to 85°C
Relative humidity, Non Condensing	5% -to 95%
Vibration: 10-500Hz 2G 10min./cycle. Period for 60 min. Each axis.	

Support

FTI maintains a variety of support services to assist you:

Contact FTI:

Phone: 800-433-5248

Fax: 860-928-7664

E-mail Customer Service@fiberoptix.com for immediate assistance from our Sales Associates or Sales Engineers.

Be sure to have your part number and serial number available, as well as a complete description of the problem or situation for the quickest, most accurate assistance.

If you are a European customer, please contact Vega at +386-1-519-1440.

Service/RMA Policy

Service required for any reason must be performed by FTI or an authorized service representative. All service outside warranty will be performed with purchaser's approval, and charged according to normal service charges in effect at the time.

To return any item, whether for warranty repair or chargeable servicing, an RMA number (Return Material Authorization) must be obtained from FTI. This number must be clearly visible on the shipping label. All shipping must be prepaid.

If the lightsource was used in a biohazard environment, you may also be asked to supply a certification stipulating the conditions of service, including a list of materials the lightsource may have been exposed to.

FTI guarantees all warranty repairs will be completed within two weeks of receipt. All units will ship prepaid using our shipping method of choice. Alternate shipping methods will be shipped freight collect.

Warranty

FTI warrants its family of "SOL-R" light sources to be free from defects in material and workmanship for a period of two years from date of shipment unless stated otherwise in a specific separate published warranty.

If any "SOL-R" product is found to have defects in material or workmanship the purchaser should notify FTI promptly, and request an RMA number. After an RMA number is assigned, purchaser may return defective products prepaid to FTI in Pomfret CT.

FTI, at its sole discretion, will repair or replace SOL-R products found to be defective, and return said products, prepaid. FTI's correction of any defects, by the grant of credit, repair, or replacement, shall constitute fulfillment of all obligations and liability to the purchaser hereunder.

FTI is not responsible for damage to SOL-R product caused by abuse or neglect, unauthorized installation, maintenance, use, repair, or adjustment. Any of the aforementioned actions shall make this warranty null and void and shall relieve FTI from any further responsibility hereunder.

FTI shall not be liable for any incidental, special, or consequential damages in any claim action, suit or proceeding arising under this warranty or any other part of the agreement of sale between FTI and the purchaser, nor shall there be any liability hereunder for labor claims, loss of profits or good will, repairs or other expenses incidental to replacement.

The foregoing warranty is in lieu of all other representations and warranties expressed or implied, written or oral, including warranties of merchantability or fitness of the goods for a particular purpose, unless exception is offered in writing by an officer of FTI, or separate published warranty is cited for specific product groups.

Warranty is void if:

- We determine the product has been subjected to neglect or misuse or has been installed following procedures not in accordance with our instruction manual.
- Unauthorized repairs or modifications have occurred.
- The warranty seal has been broken or the serial number label has been altered.

Our obligation is limited to repair or replacement, FOB Pomfret CT. We will not be held responsible for consequential damages, transportation, installation, adjustment or other expenses arising in connection with our products or parts.

This warranty is in lieu of all other statements or guaranties, written or implied by FTI or our authorized representatives.

Liability

Any warranty implied under State Law shall be limited to one year from original delivery to original purchaser. Specifically excluded from FTI liability is damage resulting from acts of any deity, malicious mischief, vandalism, riots, wars, improper installation or neglect in the operation or maintenance of the unit or misunderstanding of the properties of the unit. Under no circumstances shall FTI be obligated for consequential or other damages of any kind or description, losses or expenses in connection with or by reason of the use of, or inability to use this unit for any reason. The stated warranty provides the purchaser with specific legal rights, and there may be additional rights which vary from State to State. Some states, for example, do not allow exclusion of consequential damage.



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