LightRay LR3

Installation Manual

Rev D

Customer Portal

Emergency Technical Support: **888-915-2477**

OPERATOR'S USER GUIDE CONTENTS

*** Covered with Hands-On training from WRT/LMK Training Personnel**

Safety

LightRay® LR3

SAFETY

This is the safety alert symbol

YOUR SAFETY AND THE SAFETY OF OTHERS ARE VERY IMPORTANT.

We have provided important safety messages in this guide and on your LightRay equipment, however it is up to you as an individual to apply common sense and always read and obey all safety messages.

This symbol alerts you to potential hazards that can kill or hurt you and others. All safety messages will follow the safety alert symbol and either the word **“DANGER”** or **“WARNING”.**

These words mean:

SAFETY

You can be SERIOUSLY injured if you don't follow the instructions.

All safety messages will tell you what the potential hazard is, it will tell you how to reduce the chance of injury and explain to you what can happen if the instructions are not followed.

WARNING: To reduce the risk of fire, electric shock, or injury to persons when using the LightRay, follow basic precautions including the following:

- Read all instructions before using the device
- **DO NOT** look at the Led UV lights for prolonged periods of time when energized. Do not leave the lights on unless using for repair.
- **DO NOT** store the device or packers where it will be exposed to weather.
- **DO NOT** tamper with control box or enclosure.
- **DO NOT** repair or replace any parts of the device or attempt any servicing unless specifically recommended in this guide or in published user-repair instructions.
- Ensure that your personal safety protection equipment functions and is in good working order; wear gloves when handling the resin materials or equipment.

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EQUIPMENT SAFETY

The power supply for the LR3 system has an input connection for a 110 Volts AC plug.

The AC power is converted to DC within the power supply. An input of 4A is required and the output current is up to 14 Amps.

Always plug the unit into a GFI power source. Do not leave packer illuminated for extended periods of time. There is a manual reset on the GFI that must be reset when the unit is first used.

A quick connect coupling for air pressure is also provided and care should be taken when connecting or disconnecting these components, all air should be exhausted before either connecting or disconnecting to the fitting provided. In addition, all air supplied by the compressor must be run through an air/water separator.

Be sure to include any other additional power requirements for the site accessories needed, such as video inspection or pipe cleaning etc.

EQUIPMENT SAFETY

- Check **ALL** electrical and air connections prior to starting your work.
- Include a variety of tools to ensure that proper procedures are carried out safely.
- Ensure that your work area is clear of perils and safe from falls or tripping over equipment, cables or hoses.
- Check air pressure gauges and valves to ensure they are calibrated correctly against known pressure readings of devices or tools. If in doubt, reduce the air regulator valve to **zero** before connecting to any live air pressure source.

- When using an external electrical power source, select a **GFI** or fused circuit protection outlet and ensure that the voltage is correct before turning on the power to your equipment. **When you first plug in the unit you will need to reset the GFI manually.**
- Always check your equipment prior to starting the planned work process.
- Store your LR3 equipment in a temperature-controlled environment, recommended operating temperature is 20F to 120F outside.
- Storage temperatures of 50F to 90F degrees is recommended to prevent condensation from forming on electrical connections over time.

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System Overview

LightRay® LR3

SYSTEM OVERVIEW

8 major components

- Reel: Storage for the 400’ cable, Slip Ring Adapter, and Power Supply
- Five Line Cart or Robot (varies by user): Positioner attachment for aligning launcher
- Control Box: Activates the LED light train. Manual timer for curing cycles of 4” and 6” diameter liners
- Light Train: LED lights utilized to cure the liner. Includes 50’ extension cable, LT-LP Separator
- Launcher: Aligns the lateral liner with the pipe for inversion and cures the main connection (System includes launchers for 8”, 10”, and 12” main line pipe)
- Camera Reel: Used in aiding alignment and getting lateral length measurement
- Air Delivery System: Provides air to the system critical for inversion
- Consumables: LRS Liner Bladder Kit (Dry kits or Pre Wet-Out Kits)
- Air Compressor: 70 CFM Minimum

CONTROL BOX

The following pages describe in detail the functions of the control box for the LR3.

The control box is mounted on the reel with a spring locking pin. It is designed to be easily removed for transportation or for remote usage.

CONTROL BOX

Vacuum Exhaust
This feature is non-interactive it is the vacuum venturi exhaust.

Pressure Release Valve
Will release at 60 PSI to protect the packer from too much pressure

Air Hose Connection/ Air Out
The air hose from the cable reel is attached with this connection

Compressor Hose Connection
The hose from the air compressor is attached with this connection

CONTROL BOX

Timer is crucial, please follow the yellow and green process sticker for time guidelines

Air Out Line from the box to the reel

Air In Line connects from the Desiccant to the control box

Power Cable that connects from here to the slip ring on the reel

CONTROL BOX

Pressure Vacuum Switch
This switch allows the operator to choose to vacuum the packer or pressurize the packer.

Air Pressure Regulator
This adjusts the pressure/vacuum delivered from the control box.

Reel Power/ Power Out Connector
The attachment for the power cable from the control box to the reel.

AMP Meter
Displays how many amps are being pulled while LED lights are on.

**Vacuum only works with both switches to vacuum

CONTROL BOX

UV Light Test Switch

This spring-loaded switch allow you to temporarily activate the lights

Pressure Vacuum Gauge

This displays the amount of pressure or vacuum delivered from the box

Power Vacuum Switch

This activates either the lights or the vacuum depending on the position of the switch

CONTROL BOX

Power In Connection
The connection from the power supply to the box

Overpressure Valve
Air release for box pressure

REEL

24VDC/ Power Out

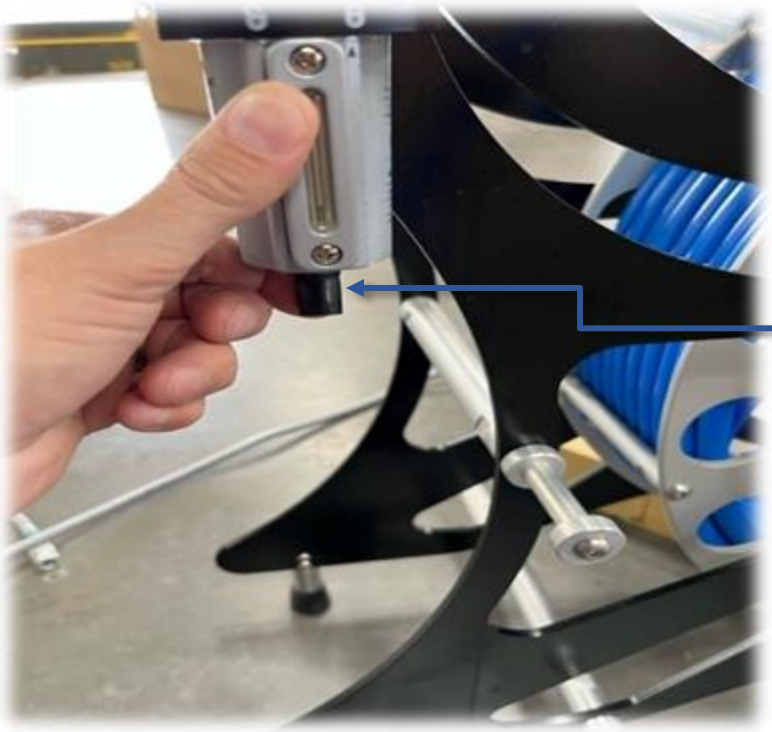
This power cable plugs into the slip ring on the reel assembly

Do not <u>HOT PLUG</u> as this can lead to electrical arching and damage of electrical contacts.

Slip Ring Assembly

The slip ring is plugged in from the control box power out.

THE WATER SEPARATOR



IMPORTANT

The water separator should be drained before/after each use, you must have air hooked up for this to empty.

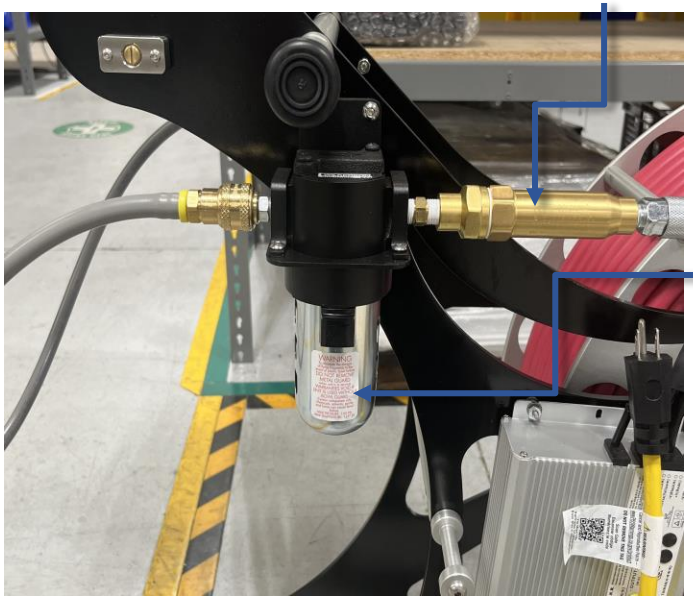
There is a lever on the bottom side to release the water, press and hold until all the water is drained out of the separator.

You will need to drain the water separator multiple times during each repair

DESICCANT ASSEMBLY

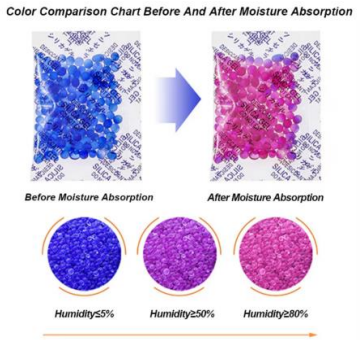
The Desiccant assembly has been added to the LR3 system to remove more moisture from the air as well as removing small particles from the air, so your system does not get clogged. Your filter may need to be replaced if air/vacuum times increase.

Air Filter location for desiccant



You can visually inspect the beads through the side vents.

The beads will need to be visually inspected before each use, if the beads appear to be pink in color, they need to be changed. This can affect warranty consideration if not maintained properly.



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THE PACKER

The Packer

The packer is made up of several pieces. The end connectors, the bladder, the LED light and the leading spring.

If the bladder is dirty, light will not travel through it and the LED lights will not be able to cast the light activated resin.

THE PACKER

Reel End Adapter

This electrically connects the reel to the packer

Packer Adapter/Smart End

Packers' electrical connection

Electrical contacts are rated for a finite number of cycles. These particular contacts are rated for 500 plug/unplug cycles – but can far exceed this number if handled with care.

Regularly inspect these contacts for signs of burn marks or oxidation as they may need to be replaced.

Intermittent lights are a sign that the contacts may be starting to wear

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THE PACKER

Leading Spring

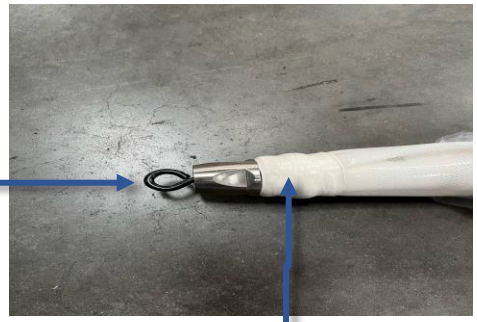
The leading Spring is used to guide the packer through the pipe. The spring can also be disconnected, and a hook can replace it for pulling the packer. A locating Sonde can also be secured inside the spring

Packer Pusher

Used to assist pushing the packer into the pipe with a push rod

End Connecter

Can be screwed on to shorten the pull end if needed



Do not remove when changing out attachments

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THE PACKER

There are 4 O-rings from the reel assembly to the packer, keep these clean, lubricated, and free of debris. Periodically check the O rings and change if necessary. The part numbers for reordering these O Rings are:
Larger-9452K187
Smaller- 9452K25
Reel Cone-1171N204
Packer Oring-9452K389

INSTALLATION PROCEDURES

LightRay® LR3

INSTALLATION PROCEDURES

The following procedures and guidelines are written with the assumption that the pipe or pipes to be repaired have been properly cleaned and the operation confirmed by a recent video inspection. In addition, all entryways or access positions have been made clear for safe entry with both manpower and equipment necessary to carry out the planned work.

OPERATION

SITE-READINESS:

To carry out the repair, the operator must decide which of two methods should be employed. Either push-in-place or pull-in-place. This is subject to the conditions observed on the job site. The packers have been designed for flexible use and may be inserted into the pipe by a push rod or pulled into place using a tagline or tether. For either of these methods, the operator will need a video inspection camera to assist and monitor the process within the pipes under repaired.

1. The camera should be inserted into the pipe and pushed or pulled to the beginning of the section to be repaired. Then, a mark should be applied to the push rod or cable of the camera. Next, the camera should be moved to the furthest position of the repair and marked again. This is required so that later, the positioning of the packer and the UV resin material will cover the repair with an adequate overlap of undamaged pipe on either side of the repair. These marks or measurements can then be transferred to the air/power push rod or cable, so the identical positioning of the packer corresponds to the repair section planned.

OPERATION

PRE-CHECK:

1. The standard recommendations for an overlap are one and a half times (1.5) the diameter of the pipe being repaired in both directions. If the pipe being repaired is 4" diameter it would have an overlap of 6" of additional material in both directions where possible. If the total length of bad pipe is 2' in length, then the material would be a minimum of 3' in length.
2. Select an area out of direct sunlight or erect a UV protective canopy that removes the possibility of any sunlight or UV contamination. Lay down a plastic sheet on a table and place the packer on the sheet(Do not attempt on a rough surface). Check to ensure the packer device is clean and free of any defects. Connect the air power/push rod(Pex Reel Adapter) to the packer.
3. Have an air compressor with an air supply of at least 50PSI and a maximum of 125PSI
4. Make sure to have all necessary tools and supplies ready(Refer to recommended tools/supplies list.)
5. If pulling into place, string a rope/mule tape in the pipe using a camera or cable machine
6. You are now ready to connect Lr3 System

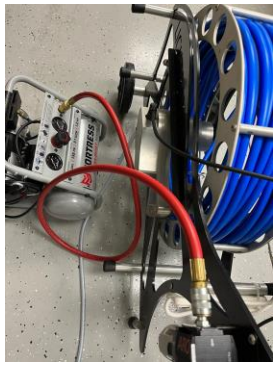
IF THERE IS SEVERE FLOW, CONSIDER SHUTTING DOWN THE FLOW BEFORE ATTEMPTING TO INSTALL THE LINER.

OPERATION

SET-UP:

1. Connect cable from the power supply to the side of the control box.
2. Connect cable from the power out on the top of the box to the reel.
3. Connect back pressure gauge assembly to the air out fitting.
4. Connect the clear air hose to the back pressure gauge assembly
5. Connect the shorter grey air hose from the water separator to the Desiccant assembly. Use the longer grey air hose to connect from the Desiccant assembly to the control box “Air In” fitting.
6. Connect an air supply hose from your compressor to the water separator.




****Once your system is completely set up, please refer to proper pressure testing document****

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OPERATION

SET-UP:

1. Connect your pex hose reel end to your packer. (Only Hand Tight)
2. Prior to each use make sure you clean your packer.(Inflate to 5 PSI for easier cleaning)
3. Vacuum the packer down while working the light train to one side of the silicone bladder.
4. Next, cut a piece of the provided clear plastic tubing to cover the entire packer.
5. Apply soapy water to the inside of the clear plastic to assist in sliding it over the packer.

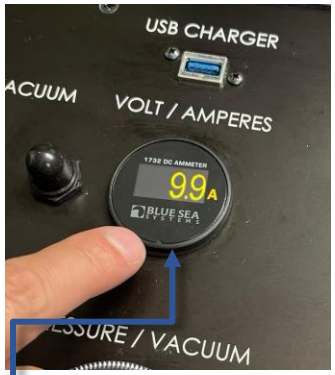




OPERATION

SET-UP:

6. Secure the clear plastic to the packer using a zip tie on both ends
7. Using white electrical tape, tape over the zip ties to the outside of the packer on both sides.
8. Cut a small slit in the clear plastic on both ends next to the electrical tape.
9. Wrap the entire length of the packer using the green plastic wrap
10. To prevent the green wrap from sliding during install, apply electrical tape on the ends of the green wrap, Wrap around twice on each end of the packer



Make sure you are reading proper amperage before loading the liner onto the packer.

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OPERATION

LOADING THE PACKER:

NOTE: Since the resin is a UV light activated process, there is no reason to rush any of this operation. Take your time. Be safe and proceed sensibly.

DO NOT EXPOSE MATERIAL TO UV LIGHT OR SUNLIGHT WITHOUT ITS PROTECTIVE COATING OR FOILS

OPERATION

LOADING THE PACKER:

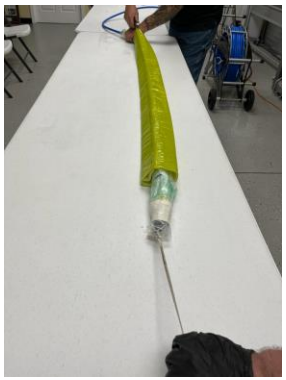
1. Make a mark on the packer where the lights end on each side of the packer using a permanent marker
2. Cut appropriate size piece of liner for the patch repair. **(Always wear gloves when handling the wet-out liner.)**
3. If needed use the rope on the inside of the liner to assist pulling it onto the packer.(Remove the rope on the inside of the liner if not being used)
4. Make sure to lubricate the packer before pulling the liner onto the packer




OPERATION

LOADING THE PACKER:

5. Make sure to stop the liner at your mark on the front end of the packer so the liner is lined up with the lights
6. Make a slit in the outer yellow film on the liner and remove.
7. Make sure your light train is pushed to one side of the liner so you can fold the remainder over on itself.
8. Starting at the front end, wrap the liner tightly using the green plastic wrap over the entire liner length.(Green wrap overlaps should be less than one inch)





If the intended location for the repair is subject to water infiltration, the recommended action is to remove the plastic yellow film and slide over black plastic before wrapping

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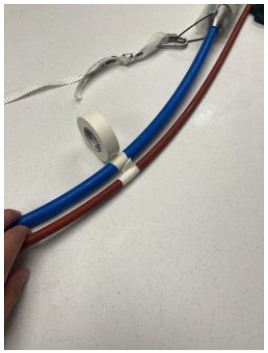
OPERATION

LOADING THE PACKER:

9. Using light pressure run the perforator tool over the green wrap the entire length of the liner on the packer, this will allow the scored green wrap to stretch easily.
10. Transfer the previously recorded measurement from your camera cable to the pex hose assembly with the camera head aligned to the end of the liner.
11. Using the black plastic provided, wrap the entire liner length and secure using painter's tape.
12. If needed the protected packer can be disconnected from the reel and moved to the patch repair location before re attaching it to the pex hose.

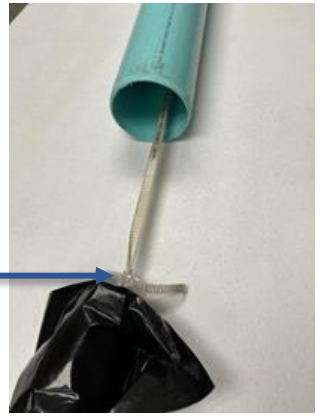

OPERATION

PACKER INSTALLATION:

Make sure to secure the rope to the back end of the packer before pushing/pulling into the pipe.

Make sure to add lubrication to the packer before going into the pipe.

To pull into place, secure the rope already strung inside the pipe to the front end of the packer.



If pushing into place have the packer pusher attached and use a pushrod to assist the packer into place. Be sure to push both the pex hose and push rod together at the same time.

OPERATION

PACKER INSTALLATION:

Make sure the insertion point of the pipe is blocked from UV light before removing any of the black UV resistant plastic.

Place the packer into the desired position within the pipe by either pushing or pulling it into place stopping at the tape mark that was transferred onto the pex on the reel. The operator should confirm this position by inserting the video inspection camera to either follow the packer to the correct position or after the placement of the packer. Push or pull the camera to observe the correct positioning and ensure the packer is positioned correctly and ready for inflation.

IMPORTANT: Once the packer with the material is in place. Test the lights by switching the UV Test light switch to the Lights position for NO MORE than 2 or 3 seconds. If you cannot see the lights, you can check the Volt Amp Meter for any kind of a reading. This indicates that the LED light are working and can be observed by the camera if possible.

You are now going to follow your Yellow Green Process chart for the installation.

Process Table

LightRay® LR3

PROCESS TABLE

Follow these steps when you are prepped and, in the pipe, ready to inflate the packer :

1. Turn the pressure regulator dial all the way down(Counterclockwise)
2. Turn the Power/Vacuum switch to the off position then turn the pressure/vacuum switch to pressure
3. Slowly turn the pressure regulator dial clockwise to slowly add pressure to 5PSI
4. Once at 5PSI, set the timer for 3 minutes and wait. Once the time is up, start increasing the pressure regulator dial to 10 PSI and set timer for another 3 minutes
5. Once 10PSI is held for 3 minutes, perform the pull test.(Pulling on the mule tape/Non stretch rope that's attached to the cable on the rear of the packer
6. Follow the process table to desired PSI in increments of 5PSI to the final pressure desired depending on the liner diameter.

- **If packer does not move continue to next step**
- **If the packer moves its likely due to a possible loss of pressure in your packer**
- **Confirm your packer is the correct size for the pipe and there is no pressure loss, you can camera this to make sure the packer is inflating properly**
- **If your packer moves, vacuum it down and pull it out of the pipe and conduct the positive pressure test**
- **If there is no obvious pressure loss, please contact a WRT Representative for further assistance**

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PROCESS TABLE

7. Once the desired pressure is met, we are ready to turn on vacuum and relax the liner. To perform this action, we turn the Pressure/Vacuum switch to vacuum and the power/vacuum switch to vacuum. Then increase the Pressure Regulator dial clockwise all the way and set the timer for 3 minutes.
8. After 3 minutes, turn the pressure regulator all the way down (Counterclockwise) then turn the power/vacuum switch to off and the pressure/vacuum switch to pressure. Then increase the pressure regulator dial to the desired pressure depending on the liner diameter, then set the timer for 5 minutes.
9. You are now ready to turn on the lights. Turn the power/vacuum switch to the UV lights and then set the time accordingly. 3” & 4” Diameter is 5 minutes, 6” Diameter is 10 Minutes.
10. When the time is finished turn the power/vac switch to vacuum and the pressure/vac switch to vacuum. Then turn the pressure regulator dial clockwise all the way.
11. Set the timer for 4 minutes, once the 4 minutes is complete, we are ready to remove the packer by pulling on the mule tape/ Non stretch rope. Once the packer is removed, we are ready to inspect with a camera. Make sure the packer is vacuumed down off the liner before removing.

If your packer is stuck, you can try to add hot water/soap(Lubricant) mixture to the pipe and try to remove.*
Note- If using a 20ft Packer allow additional time for the vacuum, you should add 2 more minutes to the time.

Standard Pressure Test/Leak Detection

LightRay® LR3

STANDARD PRESSURE TEST / LEAK DETECTION

1. Turn the pressure regulator dial all the way down(Counterclockwise)
2. Place the desired packer for use on a table with no plastic so only the silicone bladder is exposed
3. Check the health of the O rings on the reel adapter and packer. Replace if necessary.
4. Connect packer to the LR3 system (Hand Tight)
5. Turn the Power/Vacuum switch to the off position then turn the pressure/vacuum switch to pressure
6. Slowly turn the pressure regulator dial clockwise to slowly add pressure to 5PSI
7. Spray down the packer completely with a soap water mix to check for possible air leaks.
8. Major Air leaks means you may need to change out the silicone bladder, minor air leaks can be treated with Sil-poxy silicone adhesive.
9. Change the power/vacuum switch to vacuum and the pressure/vacuum switch to vacuum
10. Turn the pressure regulator dial all the way up(clockwise) and wait for the packer to vacuum down until you reach 15 INHG(Pressure Gauge will read -15 on the gauge) plus or minus 5 (Depending on compressor size)
11. If it fails, look for leaks beyond the packer. If you don't have any major leaks, test your lights for correct amperage which is referenced on the Yellow/Green Process Chart.
12. If you get the proper readings for amperage, then you are ready for install.

If the lights are spiraled inside the bladder when the packer is first received, this is normal. Take the packer to 1-2PSI and pull it lengthwise to take all the excess out.*This is especially relevant to 6" Packers because the bladder contracts so much further when inflating*

****If your system came with a back pressure gauge, please see the BPG testing procedures**

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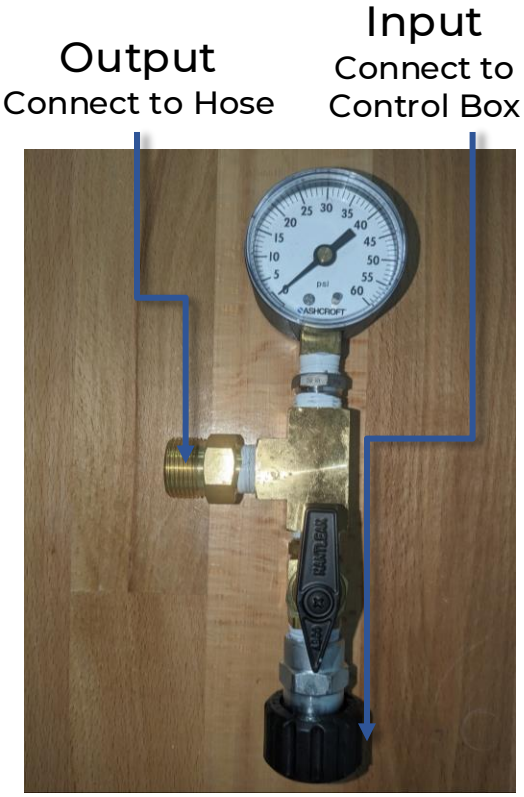
BACK PRESSURE GAUGE ASSEMBLY

1. With the valve open (pointing down) inflate your packer to the set pressure per the 1st stage of the process table (make certain to fill for the allotted amount of time identified)
2. Close the valve by turning it counter-clockwise and inspect the pressure reading on the gauge (this represents the pressure inside the packer). It should match the set pressure of your regulator. Monitor for 10 seconds.

- If the pressure remains stable (drops less than 1 psi in 10 seconds) proceed to the next step.
- If the pressure drops quickly, the packer has a leak and needs to be repaired

3. Open the valve and continue through the staged inflation cycle identified on the process table.
4. At the last stage (BEFORE THE LIGHTS ARE TURNED ON), close the valve by turning it counter-clockwise and inspect the pressure reading on the gage. It should match the set pressure of your regulator. Monitor for 10 seconds.

- If the pressure remains stable (drops less than 3 psi in 10 seconds) – open the valve and proceed to turning on the UV lights and curing
- If the pressure drops quickly (more than 3 psi in 10 seconds), the packer has a leak and it is recommended that it be pulled out from the application and repaired before curing



(11200005-14) Back Pressure Gage Assembly

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BACK PRESSURE GAUGE ASSEMBLY – CONTINUED

Valve
Shown in Open Condition

Connection
Attach to AIR OUT

Back Pressure Test should only be performed with the packer in a contained pipe

LR3 Components

LightRay® LR3

UNDERGROUND SOLUTIONS
YOU CAN RELY ON,
BRANDS YOU CAN TRUST

LIGHTRAY

LIGHTRAY LR3
RECOMMENDED TOOLS

2 - Branded Boards Heavy Duty Bushcraft Stainless Steel Carabiner Spring Snap Clip Link Hooks. 200-400lb Load
2 - Channel locks
1 - Contractor Calculator
2 - De-Solv-It Contractors' Solvent Citrus Scent Degreaser 12 oz Liquid
1 - DeWalt rolling box for tools
2 - DeWalt rolling totes with telescopic handles for the lining material
2 - Fiskars 4.1-in Serrated PRO PowerArc Scissors
2 - Needle nose plyers
2 - Spray bottles
1 - Sharpie markers (box)
2 - Tape measure

LIGHTRAY LR3
RECOMMENDED CONSUMABLE SUPPLIES

2 - 100FT extension cord reels for the mule tape
1 - 1000FT roll of ULINE has 6" and 9" tubular plastic 6 mil for a carrier protector over the packers
1 - 25FT extension cord
2 - Mule tape flat rope in 500FT rolls
1 - Trash bags (box)
2 - Painters tape
2 - Plastic Wrap
2 - Rolls of white electrical tape
1 - Bag of cable ties (11 in. Type 21s)
1 - Large bottle of Dawn dish soap

LIGHTRAY LR3
RECOMMENDED EQUIPMENT

1 - 6FT or 8FT plastic tables for inside the tent (or as many needed)
1 - Pancake Air compressor
1 - Picote Maxi Miller and attachments
1 - Roll of plastic to cover table
1 - Small generator (if needed)
1 - UV resistant 10x20 tent

847-457-1810 marketing@waterlinerenewal.com waterlinerenewal.com/lightray

12-23

CASTING AT THE SPEED OF LIGHT

PROUDLY MADE IN THE USA

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11200021-150 LightRay LR3 System

LightRay Reel Assembly

11200005-HA
Control Box

11200007
LR3 Spare Parts Kit

11200005-HA
Control Box

****Straight connector goes into the power supply****

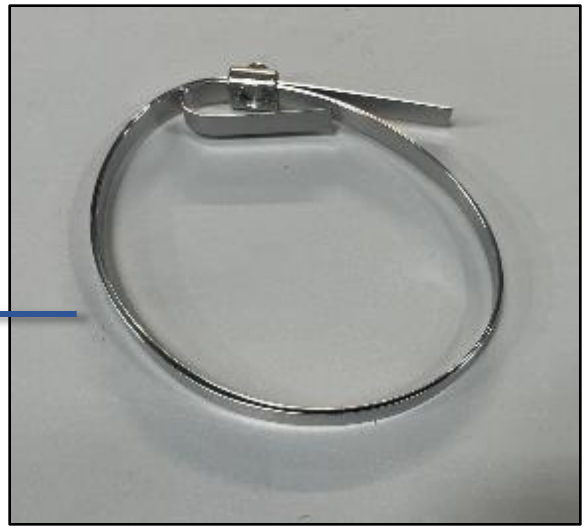
11200005-100
LR3 Power Supply to Control Box Power Cable

****The female connector goes to the top of the control box/power out****

11200005-101
LR3 Control Box to Reel Power Cable

Spare parts kit for changing the bladder

11200007
LR3 Spare Parts Kit



11200001-14

11200008-(1-9) Packer Package

PL206500
Green Stretch Wrap

11200008-(1-9)-101
Spare Packer Bladders

11200011-(2,5,7)
UV PIP LINER
3”,4”,6”

11200008-100
Packer Spare Parts Kit

11200008-(1-9)-100
Packer only Part#

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Replacement Parts

LightRay® LR3

REPAIR/REPLACEMENT PARTS

**If your packer has the orange heat shrink like the above photo, you need to order the Original Length Bladder Replacement. If your packer does not have the orange heat shrink, then you need to order the Updated Bladder Length Part Numbers. Please contact your sales rep for any questions.

UPDATED BLADDER LENGTH REPLACEMENT PART NUMBERS	ORIGINAL BLADDER LENGTH REPLACEMENT PART NUMBERS
3”x5’ (11200008-7-101)	3”x5’ (O-11200008-7-101)
3”x10’ (11200008-1-101)	3”x10’ (O-11200008-1-101)
3”x20’ (11200008-2-101)	3”x20’ (O-11200008-2-101)
4”x5’ (11200008-8-101)	4”x5’ (O-11200008-8-101)
4”x10’ (11200008-3-101)	4”x10’ (O-11200008-3-101)
4”x20’ (11200008-4-101)	4”x20’ (O-11200008-4-101)
6”x5’ (11200008-9-101)	6”x5’ (O-11200008-9-101)
6”x10’ (11200008-5-101)	6”x10’ (O-11200008-5-101)
6x20’ (11200008-6-101)	6”x20’ (O-11200008-6-101)

Emergency Technical Support: **888-915-2477**

REPAIR/REPLACEMENT PARTS

Back Pressure Gage Assembly (11200005-14)

LR3 Venturi Deflator Adapter 11200008-42

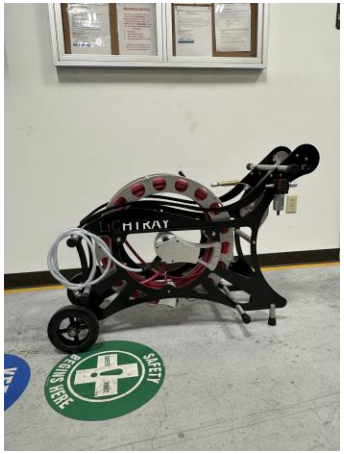
Reel Cone 11200001-3

Packer Spring Assembly 11200001-17

LR3 Spare Hose Package 116432-2003

Packer Pusher 11200008-1-01

LR3 150FT UPGRADE



Order your kit today Part **#11200021-150-UPGRADE**

With the new LR3 150Ft Upgrade you can now reach lengths of up to 150ft with the longer pex hose and now can add 8”, 9”, 10’, and 12” Packers to your toolbox. With the add on Upgrade Kit you can simply order the kit and upgrade your current LR3 unit today! Speak with your Sales Rep for more information.

****Can be used with smaller diameter packers***

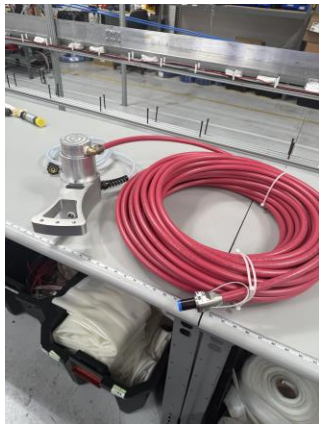
Emergency Technical Support: **888-915-2477**

LR3 150FT UPGRADE

Included in the kit you will receive the following:

11200005-HA High Amperage LR3 Control Box
11200008-PWR1 600W PWR SUPPLY ASSEMBLY
116432-0003 LR3 SLIP RING ASSEMBLY

116432-2003-150-Spare Red Pex assembly (PEX ONLY**)**



REPAIR/REPLACEMENT PARTS

Desiccant Add On Kit Part **#20240001-UPGRADE**

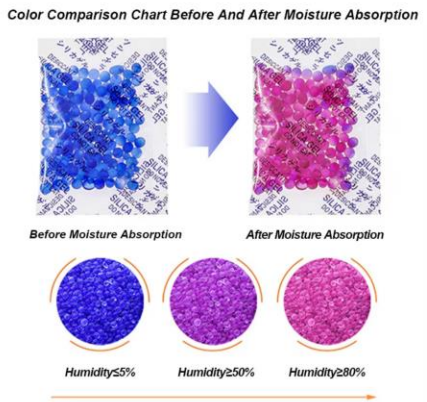
Desiccant -20240001

116432-2011 DESICCANT BEAD REFILL

**If purchasing beads online, be mindful they are not prefiltered and can contain dust and other particles that can clog your filters faster.

4414K72 Filter Element Replacement 2pk

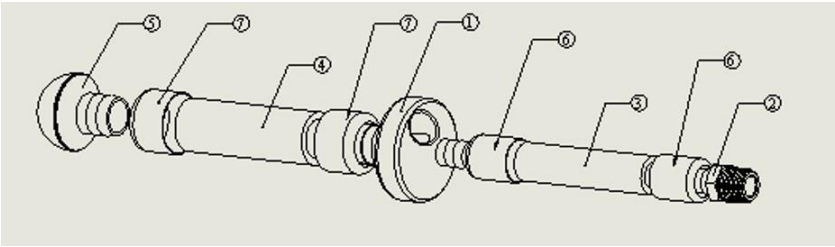
116432-2010 Grey Desiccant Hose



Replace the beads when needed to help keep moisture from entering your system.

****If you purchased your LR3 prior to 2025 and would like to add this desiccant to your machine, order Part # 20240001-UPGRADE to add it to your system****

Emergency Technical Support: **888-915-2477**



Packer Pusher
11200008-1-01

Please take care if you intend on using a packer pusher

INAPPROPRIATE PUSHROD SELECTION COULD LEAD TO PACKER JAMMING IN PIPE

The pushrod used with your packer pusher MUST have a bend radius that is greater than the diameter of the pipe being rehabilitated.

If the pushrod's bend radius is smaller than the pipe diameter, the packer pusher can turn on itself, leading to an inadvertent jam when attempting to retrieve the packer.

Packer Bladder Install Instructions

LightRay® LR3

PACKER BLADDER INSTALL INSTRUCTIONS

Note: Packer bladder install should be done in a dry, clean environment to prevent any damage to the bladder or lights.

Necessary Materials
1) Packer bladder of correct diameter and length
2) Packer Spare Parts Kit, 11200008-100

Necessary Tools
1) Band-It Tool
2) 3/32” Hex Allen Key

Packer Spare Parts Kit Materials

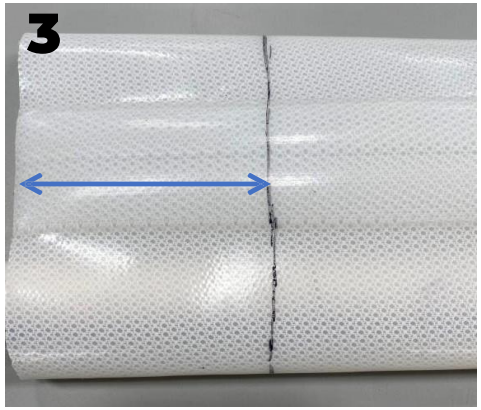
Item	Item Description
11200008-100	Packer Spare Parts Kit

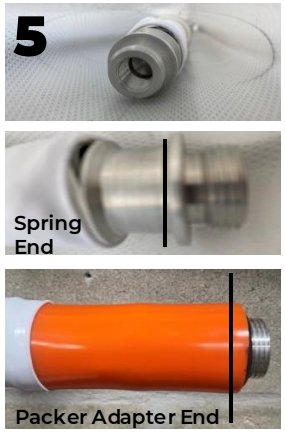
Material	Material Description	Quantity	Per	U/M
9452K389	'-316 Buna-N O-Ring	1	Unit	EA
9489T117	Routing Eyebolt 1/4"-20, 1" Shank	1	Unit	EA
4624K41	Hex Busing Adapter 3/8 NPT M, 1/4"-20 F	1	Unit	EA
11200001-14	20" Packer Clamp	4	Unit	EA
11200001-16	2" Diameter Kevlar Tubing	0.8	Unit	FT

BLADDER INSTALL INSTRUCTIONS

1. Remove old banding and bladder from packer
2. Roll out new silicone bladder on a dry, clean surface so the seam is straight
3. Mark each end of the silicone bladder 3” from the end with a black sharpie (all sizes)
4. Pull new silicone bladder over the length of the packer light train. The light train should remain straight in the center of the bladder
5. Align the 3” marked lines on the bladder so the line falls on the outer edge of the spring end adapter and just below the outer edge of the orange polyurethane on the packer adapter end

   Note: O-ring on packer adapter end should be exposed enough to create the airtight seal when the reel is secured to packer





Emergency Technical Support: **888-915-2477**

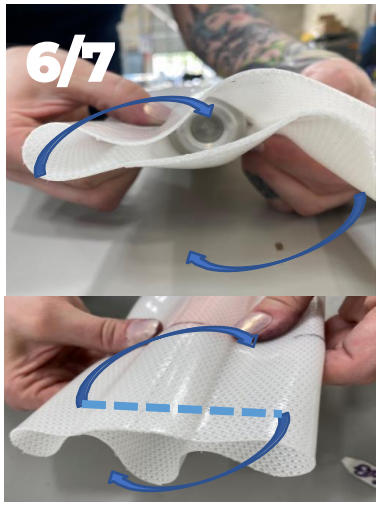
PACKER BLADDER INSTALL INSTRUCTIONS

6. Pinch and fold the bladder around the adapter using the S Fold technique. Fold tightly and secure with electrical tape
7. Repeat S Fold on the packer adapter end.

Note: The light train and seam should still be straight and centered

S FOLD

With packer light train centered over the bladder seam, pinch silicone to crease tightly against adapter. First side folds DOWN around the adapter. Second side folds UP to complete the "S". Pay attention to not overlap the seam with the folds, since this could result in an air leak.



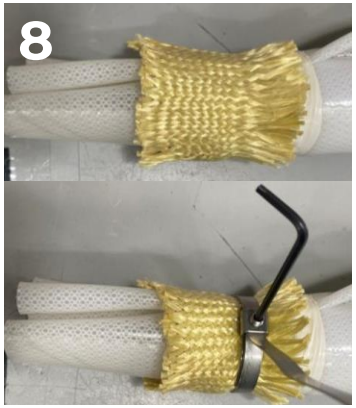
Note: 2-3 wraps of silicone tape can be added to the groove of the spring end adapter and the packer adapter (over orange tube at the adapter groove) prior to the S Fold to help create the seal

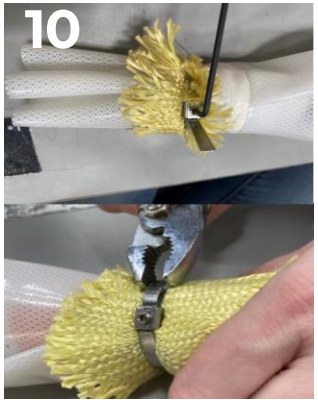
PACKER BLADDER INSTALL INSTRUCTIONS

8. Add a Kevlar sleeve (from the spare parts kit) over the bladder on one end. Position a band-it clamp in the groove of the end fitting. The initial clamp should sit on the outer edge within the groove.

   Note: The tightness of this initial band-it clamp is key to prevent air leaks

9. Loosen set screw and load banding into band-it tool. Begin to tighten. When excess is gone, mark the band with a sharpie (3 marks) to help gauge the band tightness. Tighten the band-it to full tension - once the band is being stretched rather than the marks moving, the band-it is set and tight.
10. Secure the band-it clamp in place by tightening the set screw with the 3/32" Allen key
11. Trim the excess banding, leaving a 1" tail. Use electrical tape to cover and secure banding (in direction of band-it).





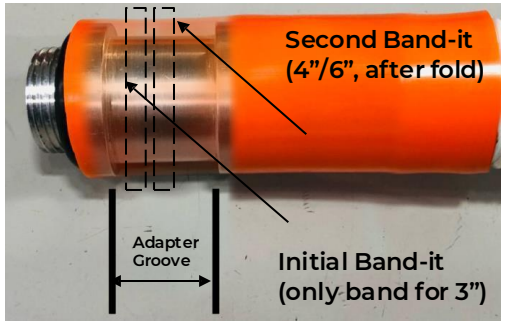
Emergency Technical Support: **888-915-2477**

PACKER BLADDER INSTALL INSTRUCTIONS

Number of Bands by Packer Size

Packer Size	# band-it Clamps on each end	Total # band-its for Bladder Install
3”	1	2
4”	2	4
6”	2	4

Placement of Band-its in reference to Adapter groove (Spring and Adapter Ends)



The next steps in the bladder install procedure are based on the size of the packer.

- 3” Packers only use one band-it on each end and no bladder fold back to reduce the thickness of the pipe
- 4” and 6” packer bladder installs use 2 band-it clamps on each end and incorporate a fold back prior to the second band-it

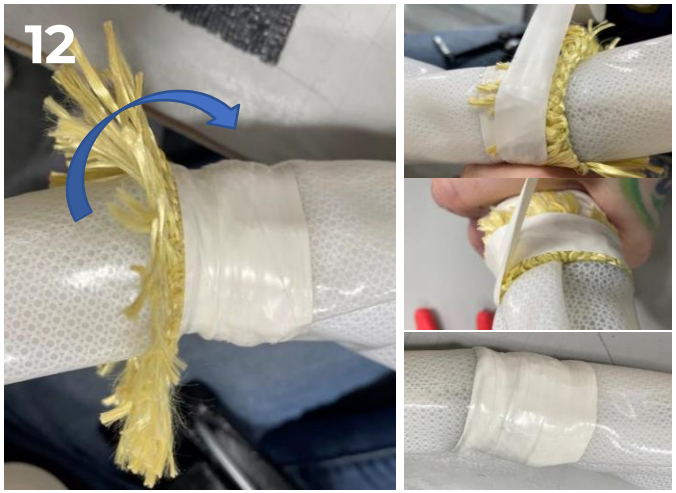
For **3” Packers**, follow instructions on the next slide, **slide 7**.
For **4” and 6” Packers**, follow the instructions starting on **slide 8**.

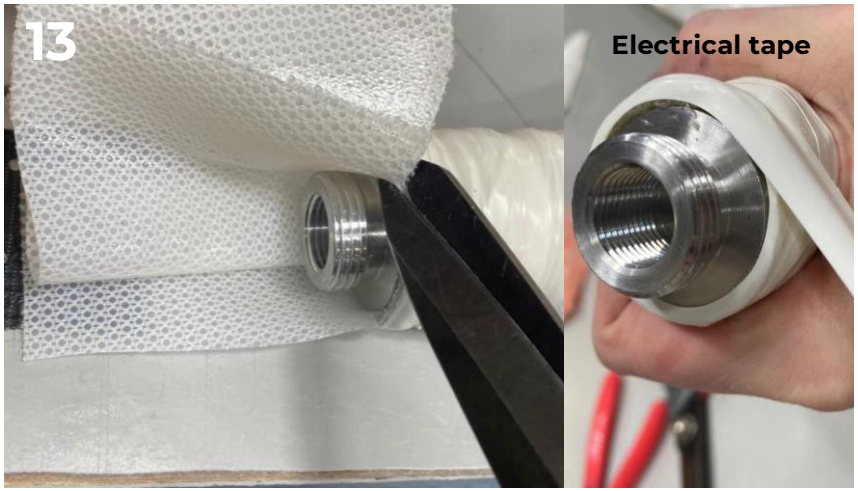
PACKER BLADDER INSTALL INSTRUCTIONS

For 3" Bladder installs

- **Only 1 band-it clamp is used for the 3" packers and there is no fold-back of silicone.**

12. Fold the Kevlar over the taped band-it clamp and cover banding and Kevlar completely using
13. Trim the silicone bladder down to the adapter (both sides). Wrap with electrical tape





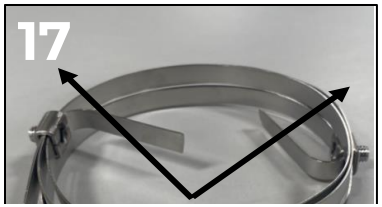
PACKER BLADDER INSTALL INSTRUCTIONS

For 4" and 6" Bladder installs

12. Fold the silicone bladder tail and Kevlar back over the first band-it, towards the light train. Secure with electrical tape
13. Place the second band-it clamp in the groove of the end fitting, just below the first band-it clamp

    Note: the set screw buckles of the two band-its should be on opposite sides (180°)
14. Loosen set screw and load banding into band-it tool. Begin to tighten. When excess is gone, mark the band with a sharpie (3 marks) to help gauge the band tightness. Tighten the band-it to full tension - once the band is being stretched rather than the marks moving, the band-it is set and tight.
15. Secure the band-it clamp in place by tightening the set screw with the 3/32" Allen key.
16. Trim the excess banding, leaving a 1" tail. Wrap band-it securely with several wraps of electrical tape to cover and secure banding (in direction of band-it).

90° bend at buckle prior to securing w electrical tape. Tail secured in direction of band-it



Band-it buckles should be positioned 180° from each other when they are in place.

Emergency Technical Support: **888-915-2477**

PACKER BLADDER INSTALL INSTRUCTIONS

15. Complete a leak test on the newly banded packer by pressuring to 5psi and spraying ends with soapy water. If a leak is found, review location of the leak and re-band packer

Note: do not pressurize packer above 10psi uncontained for risk of blowing the bladder.

16. Put threaded screw cap on the packer adapter end to protect the threading from damage.

*Cap should be on packer adapter <u>at all times</u>, except when packer is being used with the LR3 system

**Store packer in a clean location, free of sharp objects. (also true for spare bladders to reduce risk of pinholes)

Check bladder health prior to every install and test packer prior to install following the Install Manual

Note – silpoxy can be used to repair small sections of the bladder. Complete leak test after bladder patch repair

1120008-100-01

LIGHT RAY 3.0 - PULL IN PLACE- INSTALLATION SHEET

Install Date:_____ PLI Certified Technicians:_____

Project Address: _____

Temperature:_____ Weather Conditions:_____

Pipe Material Type:_____ Pipe Diameter:_____ Water Infiltration? Yes No

90º Connections:_____ 45º Connections: _____ Total Bends:_____

Transitions:_____

*When transitioning up (3-4, 4-6), you may lose 8-10% of length. Contact PLI Service for questions.

Length of Pipe-To-Be-Lined =_____Ft _____In

PIP Access Points: _____

Packer Size_____

Liner Size_____ Liner Serial Number: _____

Packer Holding (Curing) Pressure: _____

Amperage Reading at Start of Cure_____

Start Cure Time:_____End Cure Time:_____

Install Notes:

Appendix A

Sequential Installations Process

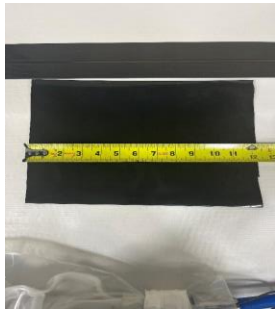
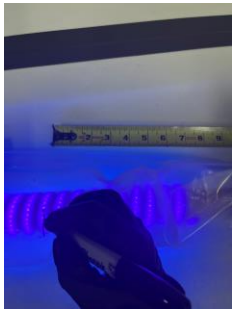
LightRay® LR3

SEQUENTIAL INSTALLATION PROCESS

1. Cut 1’ of the black plastic provided with the Pull in Place (PIP) liner material. If you need to order these are the parts numbers for the black plastic rolls

- If you need the 3” - PL203043 (Sold by the Roll 100FT)
- If you need the 4” & 6”- 11200011-7-01 (100Ft Roll)

1. On the pex end of the packer make a mark 6” back from where the lights physically end.
2. Slide the front of the black plastic sleeve to your mark and align it.
3. Secure the black plastic with a zip tie, make sure the zip tie is just to the inside of the heat shrink, you don’t want to restrict your bladder from expanding. * You do not need to place a second zip tie on the black plastic, just the one towards the back.

SEQUENTIAL INSTALLATION PROCESS

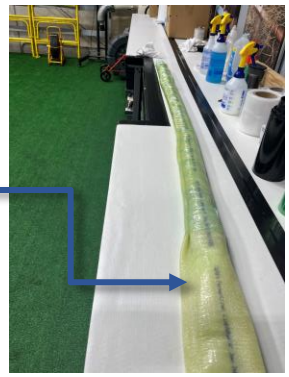
5. Use electrical tape to cover the zip tie and to prevent the black plastic from sliding on the packer during install.
6. Using the green stretch wrap provided, wrap the entire packer once. Make sure to wrap the entire length of the packer like usual in the regular process.
7. Make sure to note the measurement of your light length to the black plastic. You need to know how much liner you can cure during each sequence. From the front of your lights to the beginning of the black plastic should be your measurement.
8. Pull your length of pre cut liner over the packer lining it up to the front end of your lights.

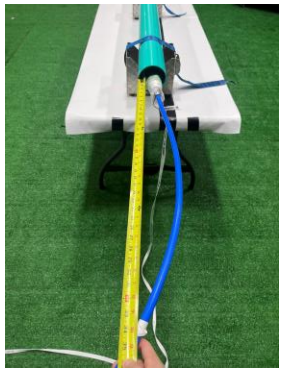



SEQUENTIAL INSTALLATION PROCESS

9. Wrap the liner like a normal install only wrapping the length of the packer once. Do not wrap any of the liner that is beyond the packer that is over the pex hose.
10. Make sure to perforate the green wrap over the liner, like a normal install.
11. Pull the packer into place where the repair is needed using a predetermined measurement.
12. Follow your process chart to cure the first sequence of the repair. Using the length of lights measurement you previously recorded, pull the packer into the second sequence of uncured material, making sure you have light coverage in the uncured section. Follow the process chart to complete the second section of the repair.

Do not wrap past the end of the packer





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