



PRX_{mini}

INSPECTION CAMERA SYSTEM
FOR LIVE GAS PE MAINS

OPERATIONS MANUAL





2022
OPERATIONS
MANUAL

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INTRODUCTION:

WHAT WE DO

We Lead Business Transformation Through Technology Development and Deployment

Today's leading energy, utility and industrial businesses are finding new ways to deliver critical services to customers while minimizing public disruption, improving safety, lowering costs and reducing environmental impact. ULC Technologies works hand-in-hand with innovative companies to develop new technologies such as robotic platforms, inspection systems and machine learning, commercialize solutions, and transform those solutions to business-as-usual activities. We also help companies innovate by integrating our commercial services and products into existing business processes.



INTRODUCTION:

IMPORTANT INFO

Thank you for purchasing a ULC Technologies High Pressure Gas Camera System (PRX MINI). This system was designed to allow internal inspection of live 2"-6" PE gas mains.

Please record the information below and keep this book with the system at all times to be used as a reference if necessary.

SYSTEM SERIAL NO.

YOUR ULC CONTACT

CUSTOMER SERVICE AND REPAIRS

If necessary for advice or repairs ULC Technologies can be contacted through the following ways:

By Phone: (631) 667-9200 General Hours: M-F 8am - 5pm EST

On the Web: www.ulctechnologies.com

In Person (By Appointment): 88 Arkay Drive, Hauppauge, NY 11788

SAFETY:

SAFETY NOTICE



Please read this manual in its entirety prior to operating or powering up the system. All employees operating this system should be properly trained on its use and safety features.

After reviewing this manual operate equipment on a test pipe prior to using on a live gas main.

Inspect the system before each use for wear and damage. Discontinue use immediately and contact ULC Technologies if damage is found.

The PRX MINI is designed for use in either pipelines containing 100% natural gas. This product should not be used in pipelines containing a combination of gas and air or other gasses and liquids

GENERAL DESCRIPTION:

PRX MINI SYSTEM

The PRX MINI Gas Camera system is a unique internal inspection device designed for visual assessment of live PE gas mains.

The system is suitable for internal inspection of 2", 4" and 6" PE mains at pressures up to 60 psi. The system incorporates new features which allow you to capture better images than ever before and that make inspecting your live gas mains even more cost effective and reliable.

KEY SYSTEM COMPONENTS

- PRX MINI Camera Head
- Reel with Pushrod Cable
- Motorized Cable Feeder
- No-Blow Launch Tube
- Control Box with Monitor

SPECIFICATIONS

Pipe Size:	2", 4" and 6" PE
Max Pressure:	60 psi
Access Fittings:	Jameson Electrofusion Fitting with Angular Branch
Camera Seal:	Water and gas tight (up to 60 psi)
Resolution:	400 lines, color
Light Sensitivity:	0.3 lux
Monitor:	480 lines, color
Power Drive:	Single speed, sealed motor
DC Motor Controller:	Current limiting
Construction:	Aluminum and Stainless Steel
Cable:	400 feet fiberglass cable with a polyethylene jacket

PRX MINI
System Components

SYSTEM COMPONENTS:

The Control Unit

THE CONTROL UNIT AND MONITOR

The control unit houses the flat panel monitor, the PRX Mini controls, a keyboard and a recorder.

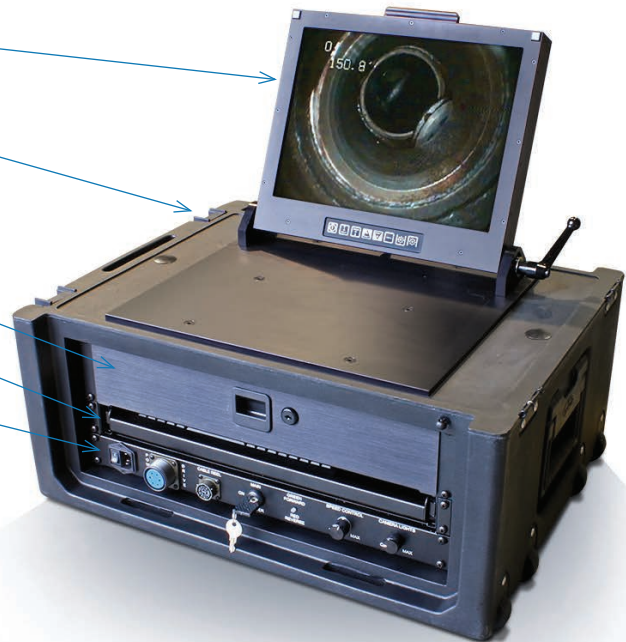
MONITOR

RUGGEDIZED CASING

PULLOUT DRAWER
WITH RECORDER

PULLOUT KEYBOARD

CONTROLS



CONTROLS (DETAILED)

Power drive cable connection and speed control are not used with the PRX Mini.



CAMERA POWER

CABLE REEL
CONNECTION

DRIVE STATUS
LIGHT

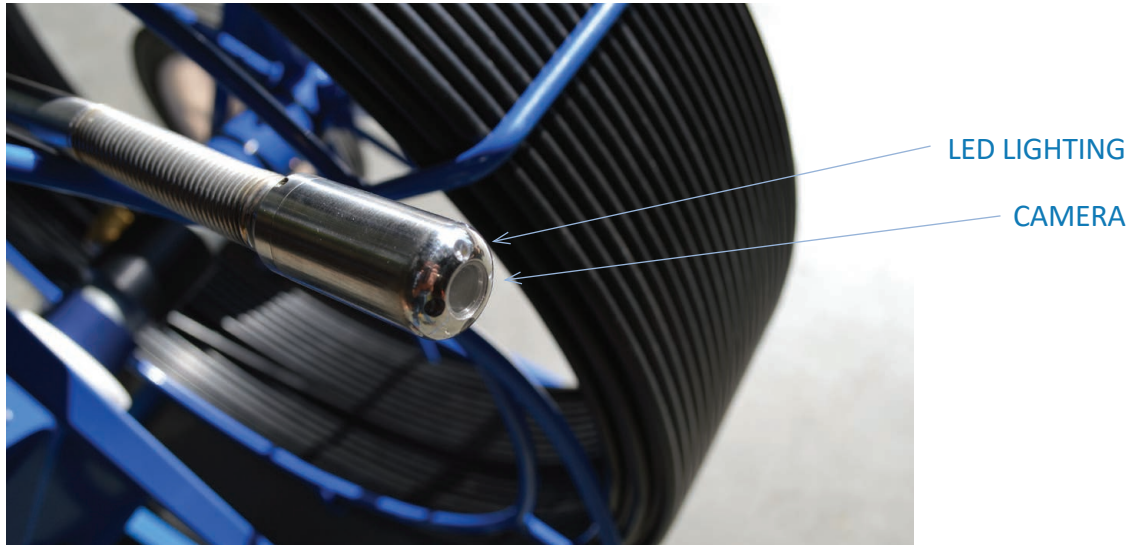
CONTROL
BOX POWER

LIGHTS CONTROL

SYSTEM COMPONENTS:

The Camera Head

THE PRX MINI CAMERA HEAD



FEED CONTROL PENDANT

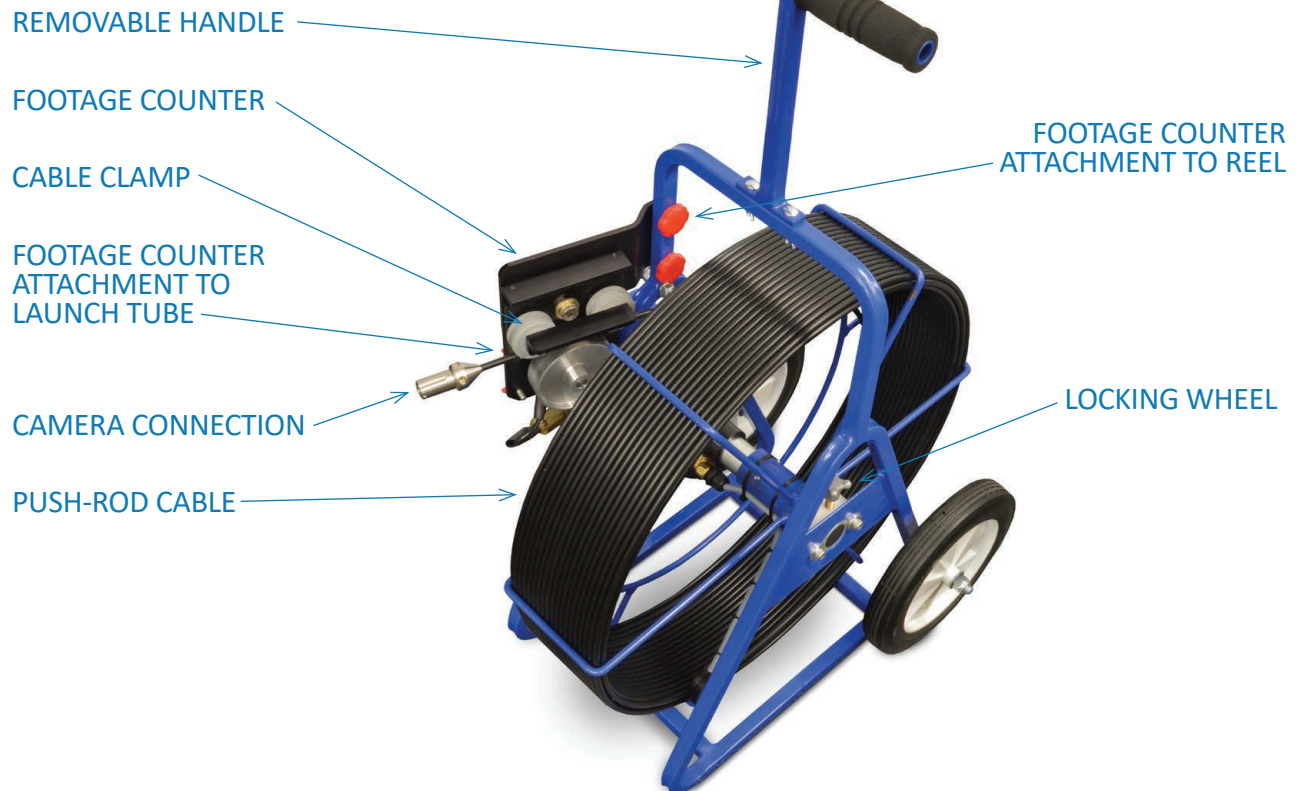
Connects directly to the Control Unit and enables for simple forward and backwards control, allowing one person to operate the PRX Mini camera while viewing the monitor.



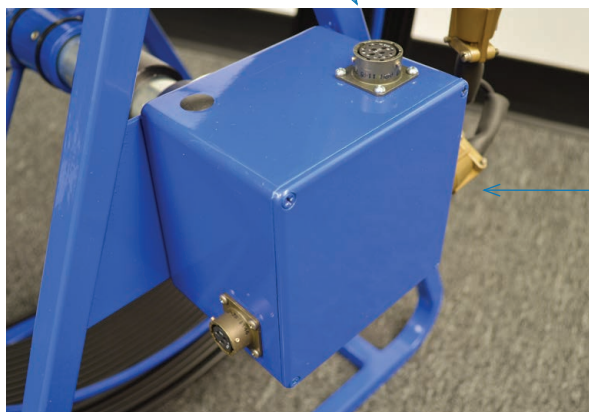
SYSTEM COMPONENTS:

Push-Rod Reel

THE PRX MINI PUSH-ROD REEL



CONTROL BOX CONNECTOR

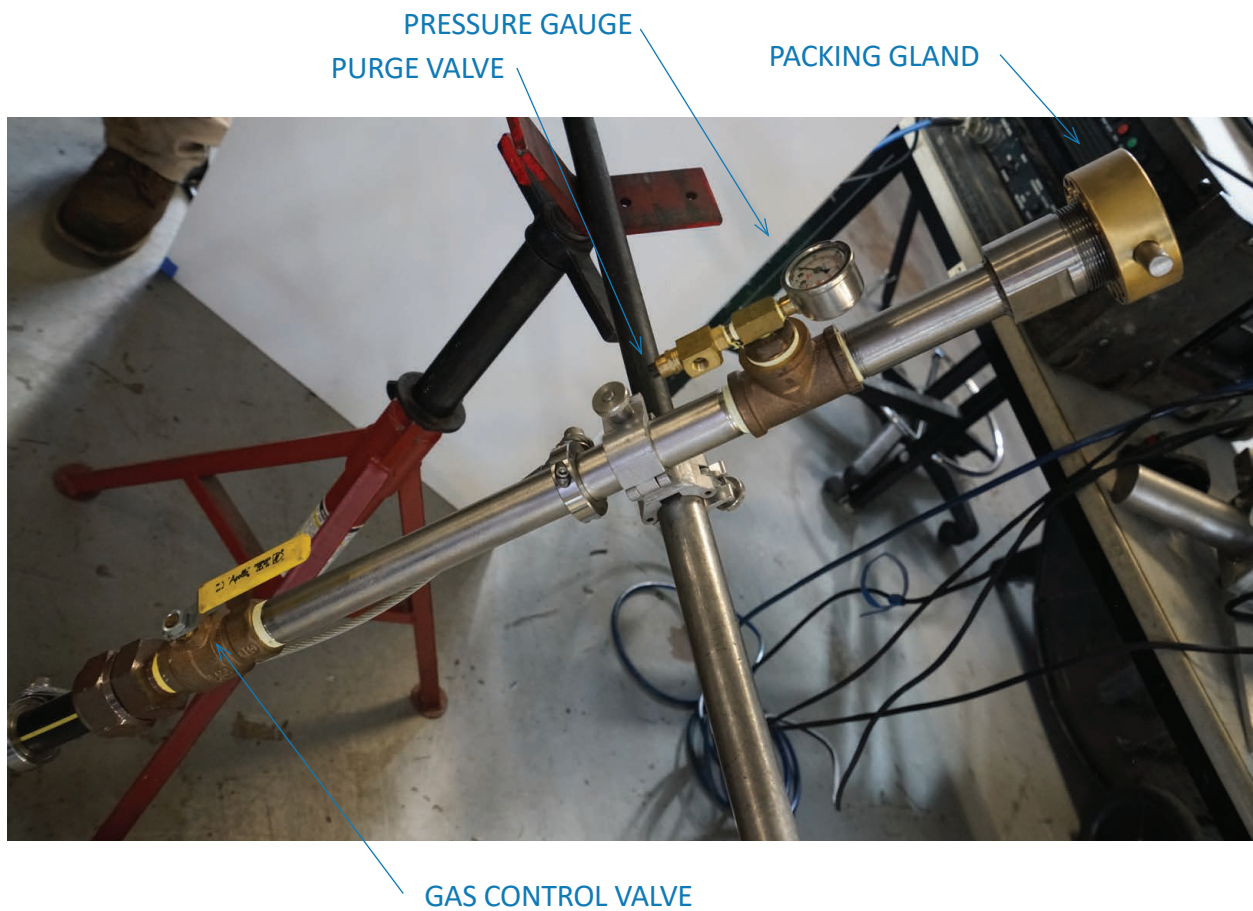


FOOTAGE COUNTER CONNECTOR

SYSTEM COMPONENTS:

No-Blow Launch Tube

STANDARD LAUNCH TUBE ASSEMBLE FOR NO-BLOW
ENTRY INTO 2", 4" and 6" PE GAS MAINS



SYSTEM COMPONENTS:

Power Cable Feeder

POWER FEEDER
CLAMP

LAUNCH TUBE
MOUNTING CLAMP



SYSTEM COMPONENTS:

Other Equipment

The PRX Mini System contains additional equipment including:

1. Adjustable Brace: Installed in the excavation as a means to hold the weight of the launch tube assemble and reduce stress on the PE fitting
2. Tool Box: Contains tools and spare parts
3. Power Drive Cable Feeder External Power Supply

PRX MINI
System Setup

SYSTEM SETUP:

Overview

When performing an inspection using the PRX Mini system, it is important to follow these six steps in the specified order. These procedures assume the main was already tapped and proper valve fitting have already been installed.

1. Set up the Control Unit
2. Install the Launch Tube on the Fitting and Support Brace
3. Install the Camera Into the Launch Tube
4. Connect all Components
5. Final Safety Procedures
6. Power on System
7. Install the Power Drive Cable Feeder

ULC Technologies recommends connecting all system components, powering the system on and checking for damages before bringing the equipment in the field.



Leave the PRX Mini unplugged during the entire set up procedure. Visually inspect all components and cables for damage. If damage is found, contact ULC before use.

SYSTEM SETUP:

Control Unit Setup

1. Set up the control unit inside a vehicle or other covered area where the unit can be kept clean and dry.
2. Remove the front cover from the control box by unlocking the tabs on each side of the box (4 total). Rotate screen up to a comfortable angle for viewing.



Ensure the system is de-energized and locked out by turning the main power switch to off and removing the key. Also turn the camera power off using the switch on the control unit labeled “camera power.”



3. Before inserting the power cable into the receptacle on the front of the control box ensure the 3-prong plug is free from dirt. Insert the female end of the cable into the mating connector on the front of the box. Insert the male end of the cable into a receptacle of a 110V power source. Follow all manufacturers instructions for operation of the power source.

SYSTEM SETUP:

Install the Launch Tube

The PRX Mini is purpose-built for internal inspections of 2", 4" and 6" PE Gas Mains through a specialized electrofusion fitting.

The PRX Mini requires angular launch into the gas main. Angular launch reduces stress on the pushrod cable to reduce breaks and extend travel distances. In a 2" PE gas main, the camera can travel up to 400' in either direction.



Recommended Entry Fittings:

Pipe Diameter:	Manufacturer:	Description:
2" PE	Jameson	16-2-TEE, IPS Electrofusion Tapping Tee, 2 in.
4" PE	Jameson	16-4-TEE, IPS Electrofusion Tapping Tee, 4 in.
6" PE	Jameson	16-6-TEE, IPS Electrofusion Tapping Tee, 6 in.

Other Consumable Materials Needed:

Item:	Manufacturer:	Description:
1" IPS	Various	Used to connect launch tube to fitting
1" IPS Coupling	Various	Used to connect launch tube to fitting

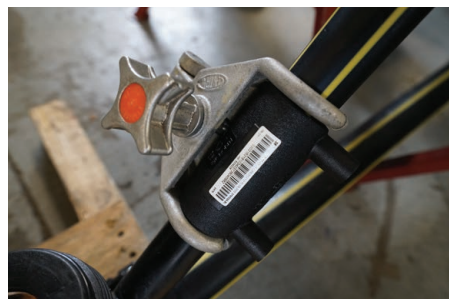
We would be happy to discuss alternative launching methods at any time. Call our team at 631-667-9200 to discuss.

SYSTEM SETUP:

Install the Launch Tube

FUSE LAUNCH TUBE TO FITTING

1. Install a Jameson electrofusion fitting on the main as per manufacturer and utility procedures. You'll need one fitting for each direction you are pushing the camera. Do not tap the main yet.
2. Check PRX Mini launch tube to ensure there is at least 12" of IPS. If you need to replace the IPS, we recommend starting with a length of 12-24".
3. Install the launch tube braces as shown in the photo on page 16. This minimizes stress on the launch tube and fitting
4. Place a 1" IPS coupling on the angular branch of the PE entry fitting. We recommend the bar code face up for ease of scanning.
5. Place the 1" IPS end of the PRX Mini launch tube into the other end of the 1" IPS coupling.
6. Install a clamp to hold the PE fitting, IPS Coupling and Launch Tube together
7. Secure the launch tube to the Launch Tube Brace
8. Follow manufacturer and utility procedures to clean, scrape and fuse the pipes together. Allow to cool down as per manufacturer and utility procedures.
9. Ensure launch tube valve is closed and perform a pressure test prior to tapping the main. Once the pressure test has passed, the main can be tapped.



SYSTEM SETUP:

Camera Installation

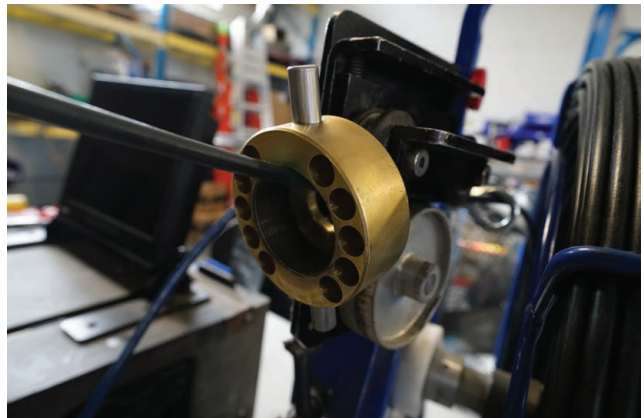


Before Installing the camera into the launch tube ensure the system is still de-energized and locked out by turning the main power to the off position and removing the key.

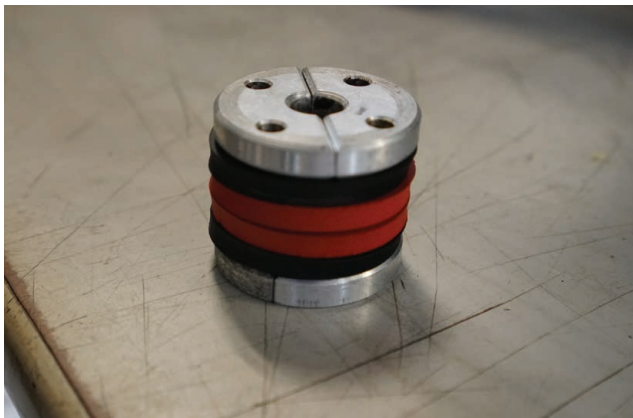
1. Position the cable reel a few feet from the entry pit. Attach the handle using the two wing nuts.
2. Now place the camera reel on the ground approximately 6- to 8- feet from the launch tube. Pull off enough slack so that the camera reaches the launch tube with at least 4 feet of slack. Always maintain this slack loop.
3. Insert the PRX Mini Camera Head through the hole in the packing gland cap. Ensure the camera is **lowered gently** to prevent damage to the glass on the camera head.
4. Unscrew the packing gland cap off of the launch tube; You can slide the cap back to the reel.
6. Now you must insert the packing glands. First insert the two metal half disks into the bottom of the chamber forming a complete circle. Ensure the push rod cable remains in the center of these two disks as to not crush the cable. Then insert 1 of the black hard disks, followed by 2 more red softer disks. Then add 1 more black hard disk and finally the second set of Aluminum disks. Ensure to stagger the seams of the rubber disks such that they do not line up with the previous or next rubber disks.
7. Screw the packing gland cap onto the launch tube compressing the disks. Make sure the top aluminum disks are centered around the cable so they are compressed properly.



Insert Camera Through Cap



Slide Cap Back to Reel



Install Packing Glands



Install Packing Glands



Install Packing Gland Cap

BASIC SYSTEM USE:

Safety Check and Tapping



1. Make sure that the complete system has been de-energized and locked out by turning the main power switch to the off position and removing the key from the switch before installing the camera in the launch tube and opening the valve.
2. Ensure the Gas Control Valve on the PRX Mini Launch Tube is closed
3. The gas main can now be tapped using the self-tapping tee on the camera entry fitting. Once the main has been tapped, the cutter should be raised and the Gas Control Valve on the PRX Mini Launch Tube can be opened.
4. Check the gauge to ensure the main pressure is 60 psi or less. Press button on launch tube purge valve located on packing gland cup. Purge launch tube using Gas Detector until a 100% gas reading is read at the purge valve.
5. Always check for leaks at all threaded connections and launching flanges by soap testing. If leaks persist, close the valve and check threads and o-rings for proper seal.



BASIC SYSTEM USE:

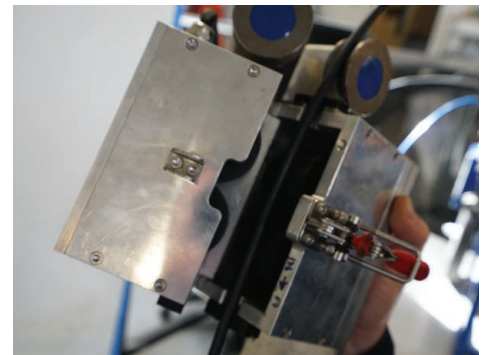
Manual Camera Launch

1. The PRX Mini Camera Head can now be manually launched into the gas main. Place your hands on the pushrod cable about 6" above the Packing Gland Cap and push the camera further down into the launch tube and into the main
2. If the cable does not easily push into the main, loosen the packing gland cap slightly to reduce friction on the cable. The gland cap can then be re-tightened.

SYSTEM SETUP:

Power Drive Unit Setup

1. Open the power drive box. Install the Power Drive Cable Feeder on the launch tube by placing the collar just below the Launch Tube Packing Gland Cap and tightening the bolt. The power drive box should be open.
3. Place the push rod cable through the guide rollers and close the power drive box. Use the latch to secure the power drive box in its closed position.



SYSTEM SETUP:

Connecting Everything

1. Connect the reel to the control box using the supplied cable; Connect the power drive feeder to the external power supply box using the supplied cable.
2. Plug in the power drive cable feeder external power supply.
3. Check to ensure the footage counter on the reel is plugged into the box on the side of the reel.



SYSTEM SETUP:

Powering On



Ensure all leak checks and safety protocols have been followed before powering on the PRX Mini. The inspection camera system should only be turned on in 100% natural gas environments.

1. Use the key to disable the power lockout on the control box.
2. Turn on the power using the switch on the left side of the control box right next to where the power cable connects. The screen should turn on.
3. If the picture is not clear, adjust the LED lights using the knob on the control box. If the picture is not clear, or the screen is all-black, see the Troubleshooting section in this document.
4. Check to ensure you see text on the screen for the footage counter, date, etc.
5. You are now ready to perform an inspection

PRX MINI
Basic System Use

BASIC SYSTEM USE:

Performing an Inspection

1. Position the camera at the entry fitting and zero out the footage counter (F6).
2. Begin your recording

USB Recording: Insert a USB Thumb Drive into the recorder located inside the pull-out drawer on control unit. If you are unsure the recording device is properly connected, record a brief video onto the drive and play it back on the same device.

DVD Recording: Insert a blank DVD into the recorder located inside the pull-out drawer on control unit. If you are unsure the recording device is properly connected, record a brief video onto the DVD and play it back on the same device.

3. Turn the “camera lights” knob to off. Use the on-screen text generator to label the inspection on the recording if you wish. The text generator short-cuts are included at the end of this manual. Some key points we recommend to include are:

Company, Job Name, Date, Location, Direction of Inspection,
Size and Type of Pipeline, Reason for Inspection

Note: Check the recording device for the red LED to indicate the recording is in progress.

4. Take note of the amount of slack between the PRX Mini Cable Reel and the PRX Mini Power Drive. This amount of slack should be kept consistent to ensure accurate encoder measurements.
5. Now turn up the “camera lights” knob all the way on. Use the forward and reverse push buttons on the feed control pendant to move the camera up and down the pipe as necessary to perform the inspection.

BASIC SYSTEM USE:

Keyboard Commands

During inspections, the keyboard is used show/hide/reset the footage counter, show the time/date and other commands that will assist in the inspection and reporting process.

BASIC KEYBOARD COMMANDS

F9	Clear Screen
F6	Reset Footage Counter
CTRL+F6	Hide Footage Display
SHIFT+F6	Show Footage Display
ALT+F4	Toggle Time, Date, Footage Background
CTRL+F4	Hide the Clock and Date Display
SHIFT+F4	Show the Clock Display
F5	Toggle Placement of Time, Date and Footage

ADDITIONAL KEYBOARD COMMANDS

ALT+F1	Lock Cursor to Visible Extents
CTRL+F1	Free Cursor to Full Display Extents
SHIFT+F1	Turn Background Setting Off
F1	Turn Background Setting On
ALT+F2	Turn the Invert Setting On
CTRL+F2	Turn the Invert Setting Off
SHIFT+F2	Turn the Blink Setting Off
F2	Turn the Blink Setting On
ALT+F7	Shift Display Up
CTRL+F7	Shift Display Down
SHIFT+F7	Shift Display Left
F7	Shift Display Right
F10	Set the Encoder Value

BASIC SYSTEM USE:

Unlaunching the Camera

1. When satisfied with the inspection stop recording and prepare to retrieve the camera. Use the reverse motor function to bring the camera back to the entry fitting. Once at the fitting, open the power drive case and gently pull the fiberglass rod back to return the camera back into its launch tube.
2. After the camera is back in the launch tube, close the gas control valve on the launch tube. If the valve does not easily close, ensure the camera has been fully pulled back into the launch tube. Forcing the valve shut while the camera is not properly positioned may cause damage to the camera head or tether.
3. Lower the cutter in the electrofusion fitting. When in the lowered position, the cutter acts as a valve on the main.
3. Relieve the launch tube of any gas pressure using the push button purge valve located on the launch tube.
4. Remove all PRX Mini components while making sure to clean off dirt and water. Place back into the corresponding storage containers.

BASIC SYSTEM USE:

System Maintenance

To keep the PRX Mini in peak operating condition, we recommend keeping all components of the system as clean as possible and making sure to replace seals on occasion.

SYSTEM CLEANING

During regular use, the PRX Mini will become covered in dirt, mud, dust and other debris. After each use of the PRX Mini, we recommend cleaning the cable with a damp rag to keep dirt from collecting or building up over time. The camera head should also be wiped down with a soft rag. If water is not doing the trick, you can try a household spray surface cleaner. Never use lubricants to clean the system, which will cause problems with the power drive.

SYSTEM MAINTENANCE

Before use of the camera, check the condition of the system for damage. If you see any damage on the tool head or cable, discontinue use immediately and contact ULC for repair.

Rubber discs and o-rings on the launch tube will need to be replaced as needed. Take note of their condition before every use of the camera system.

Never attempt to dismantle or repair the PRX Mini yourself. If you suspect damage or the system is not functioning properly, discontinue use and contact ULC for repair.

PRX MINI
Troubleshooting

TROUBLESHOOTING:

Possible Solutions

The video does not appear on the control box screen

1. Make sure the lights are turned all the way up
2. Double check all connections are properly connected and that the connectors are not dirty or damaged. Check all wires and cables for damage.
3. Check the front of the camera for dirt by following the instructions to unlaunch the camera.

The control box does not get power

1. Ensure the power source is turned on, GFCI outlets are not tripped, and the internal power strips and outlets are not tripped or turned off.
2. Ensure cables are debris and dirt free and seated properly on the connectors.

The power feeder is not feeding the cable

1. Make sure the cable feeder is plugged into the cable feeder and control box.
2. Check the cable and power feeder for grease that may cause a loss of traction.
2. Ensure the power feeder box is completely closed and locked.



Never attempt to dismantle the PRX Mini system yourself. Call our office at 631-667-9200 for further troubleshooting instructions.