



# PATHFINDER (PE34xx/35xx, PR3300, TR3300)

## Inspection System Operation



**Aries Corporate Office:** 550 Elizabeth Street, Waukesha, WI 53186  
800-234-7205 / 262-896-7205 / Fax: 262-896-7099

**Western Regional Office:** 5748 East Shields Avenue, Suite 101, Fresno, CA 93727  
800-671-0383 / 559-291-0383 / Fax: 559-291-0463

**Southeast Regional Office:** 561 Thornton Road, Suite D, Lithia Springs, GA 30122  
800-327-4346 / 770-941-1144 / Fax: 770-941-1141

**Canadian Regional Office:** 95 Whitmore Road, Unit 1, Vaughan, Ontario L4L 6E2  
877-730-7010 / 905-265-2279 / Fax: 905-265-2299

**Aries Web Site:** [www.ariesindustries.com](http://www.ariesindustries.com)

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This manual is an upgrade adding updated / upgraded products and procedures. Updated photos have been inserted wherever possible. Some photos may reflect a product (i.e. PE3300) no longer in the current Aries line, but are still in use. This manual is pertinent to them as well. Actual camera depicted in some procedures is not pertinent to the procedure being depicted; as procedure applies to all models.

### **Warranty**

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Aries will replace or repair defective manufactured parts, F.O.B. factory, for one year from the date of shipment. See Aries' full warranty statement for complete details.

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## Introduction

The ARIES Pathfinder is a small, versatile inspection system for inspecting 6-inch diameter relined and larger pipeline systems.

## Pathfinder Equipment

### Tractor TR3300

The tractor is also supplied with wheels for inspecting larger pipelines up to 24". It operates best in a pre-cleaned pipeline. It is freewheel and operates from the PR3300 Cable Reel and the TC3200 Tractor Controller. It is powered by two internal brushless motors. The Pathfinder is designed for use with ARIES Saturn III (portable) or Mainline (truck-mounted) systems.

Optimum Pathfinder operation requires proper electrical wiring and connections to TV cable reels and proper wheel arrangements to fit the pipeline diameter being inspected.

The Pathfinder tractor is also referred to as the TR3300, its model #.



## Camera PE3410/PE3510 Self-Cleaning Mainline Zoom Camera (Current Model)

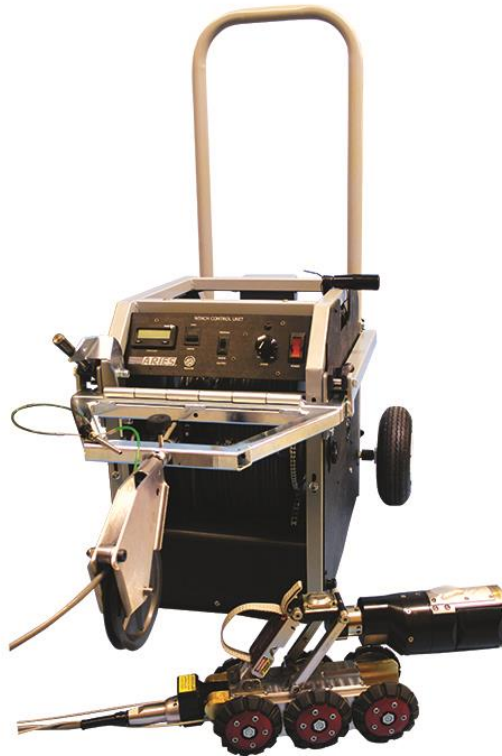
Lens cleaning system with field-replaceable wiper to clear lens obstructions on-demand.

PE3410 Zoom Camera with Pathfinder



## Cable and Reel PR3300

Due to unique design and smaller component size, the Pathfinder Inspection System is furnished with a special Cable and Reel for Tractor operation and retrieval. The Pathfinder Reel and Cable can also be used to test the Pathfinder Pan and Tilt Camera alone (PE34xx/35xx), or the ST9xx series Self-Leveling Color Camera with adapter (841138).



## Safety

Care and precautions are needed when operating any electrical components in wet and confined spaces.

### Pathfinder Equipment Safety

1. Read and understand the supplied instructions before operating equipment.
2. To prevent personal injury or damage to equipment, turn off and disconnect all power when making adjustments or performing maintenance.
3. Inspect cables before and after each use. Replace or repair any damaged cables.
4. Before connecting or disconnecting cables, verify all system power is off.
5. Do not pull on power cords when they are connected.
6. Do not use in hazardous or explosive atmospheres.
7. Do not submerge the tractor assembly for prolonged periods. It is water resistant, NOT waterproof.
8. Do not drop the tractor assembly.



### Pipeline and Manhole Safety

1. Use the appropriate safety equipment and clothing - goggles, gloves, boots, masks/respirators, traffic signs, and cones - when working in confined spaces.
2. Follow all appropriate laws, regulations and guidelines for working in confined spaces and performing pipeline inspections.
3. Pipeline conditions are important factors in inspection success and life expectancy of your equipment. Protruding taps, corroded or clogged lines, large offsets and short sags in pipe make travel difficult. Proceed carefully in those conditions.

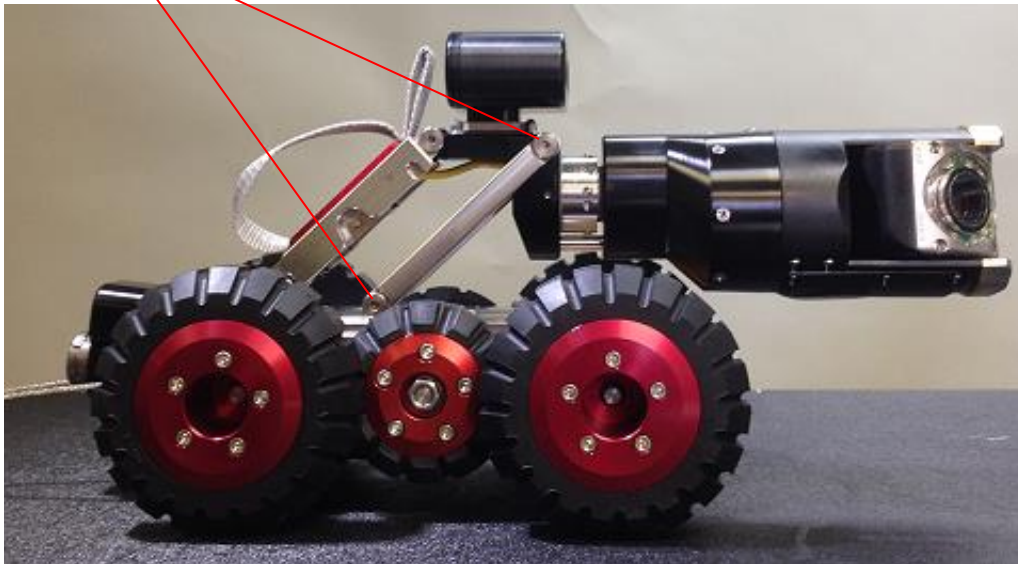


## Pathfinder Tractor TR3300 Features

### Scissors Lift

This feature allows the camera height to be adjusted for viewing sewer lines. The camera supports can be raised and lowered manually by loosening the front shoulder bolts and lifting the camera as indicated below. Tighten the shoulder bolts when the camera is at the desired height.

Loosen/tighten shoulder bolts to position height of mechanism



### Tire Sizes (See Photos on Page 10)

Three sizes of tires are standard on the Pathfinder, as shown below:

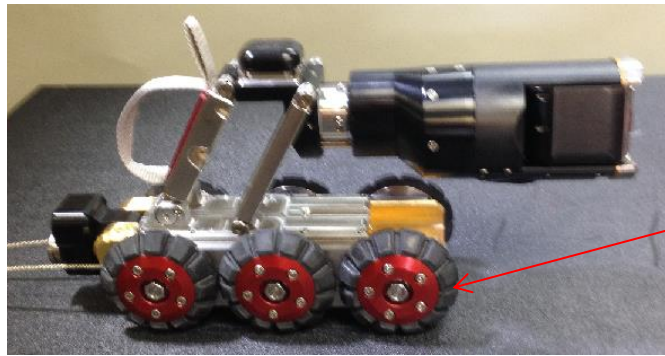
**3-3/8"** (used for 6" and 8" relined pipe)

**4-3/8"** (used for 8" pipe) 2 Flush & 4 Extended Hub (P/N 587097)

**5" with extended hub** (used for any pipe 10" and larger) (P/N 587077)

They can be easily installed on the Pathfinder. Simply loosen one nut with a 9/16" nut driver to remove the existing wheel. Then install desired wheel and tighten the nut with the nut driver. See next page.

Pathfinder with 3-3/8" wheels installed:

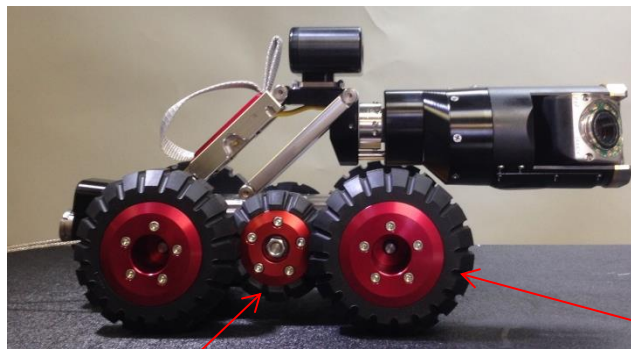


**3-3/8" wheels**

Pathfinder with 4-3/8" wheels (front & rear have extended hubs)



Pathfinder with 5" wheels installed:



**5" wheels with  
extended hubs**

**3-3/8" OR 4-3/8" wheels**

Note that the 4-3/8" and 5" wheels have an extended hub. This allows the four front & rear wheels to be installed without removing the center wheel.

## Radio Locator

A **Radio Locator** (Part No. RL530) can be used to locate the Tractor with the beacon on (512 Hz). The Beacon will emit an inaudible signal which will be picked up by the Radio Locator. The Radio Locator transmits a faint audible signal of its own, becoming stronger the closer it is to the Beacon. By moving the Radio Locator around, the tractor location can be determined (the point of the loudest signal). Directly underneath the loudest signal from the Radio Locator will be the TR3300 tractor.

### Easyloc™ Cam



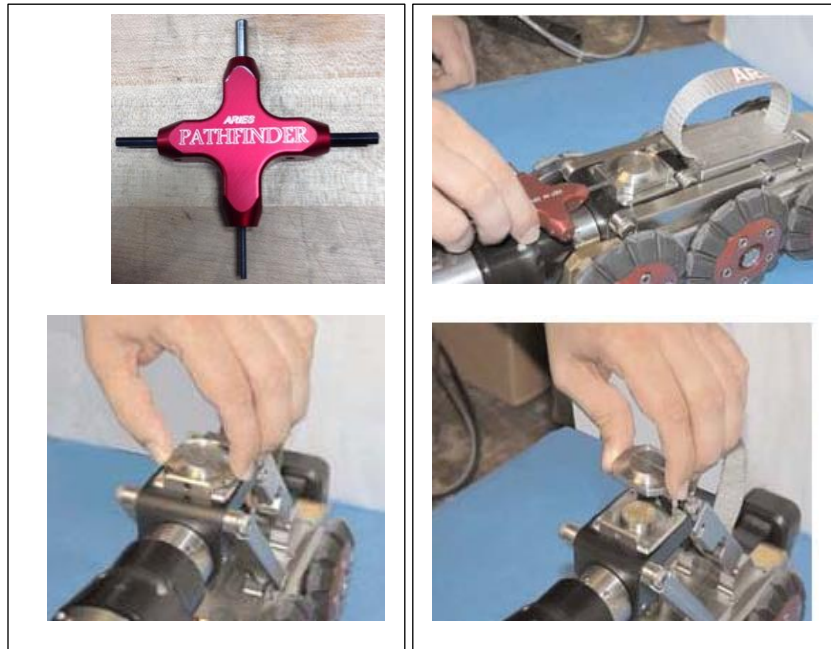
The Easyloc Cam is specially designed for the location of sewer TV Cameras. The 3 frequencies (512Hz, 640Hz, and 33 kHz) are the most common and are all supported by the Easyloc Cam.

## Attaching/Detaching Beacon and Lighthouse

### Removing Cap Assembly

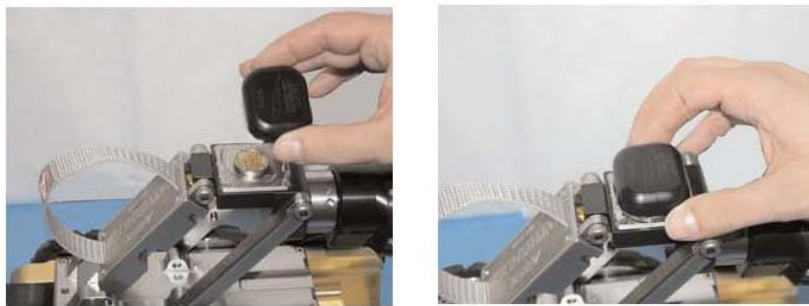
Remove Cap Assembly. Use Multi-Tool to push against Release Button until the Cap Assembly is free to rotate. Then turn the Cap Assembly and lift off.

Note: Photos shown below depict older model camera. Procedures are correct for tractor installation.



### Attaching Beacon

Place Beacon Assembly on top of Auxiliary Light Receiver and rotate into place. There should be a faint snap to indicate when the Beacon Assembly is locked into place.



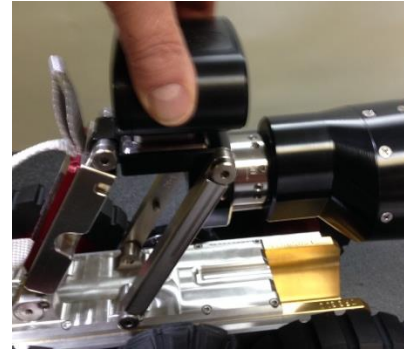
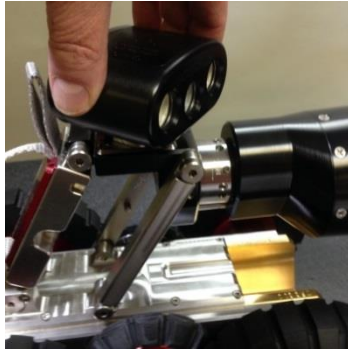
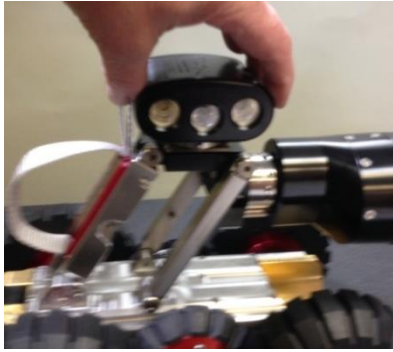
### Detaching Beacon

To detach Beacon, use Multi-Tool to push against the Release button until the Beacon is free to rotate. Then turn the Beacon and lift off.

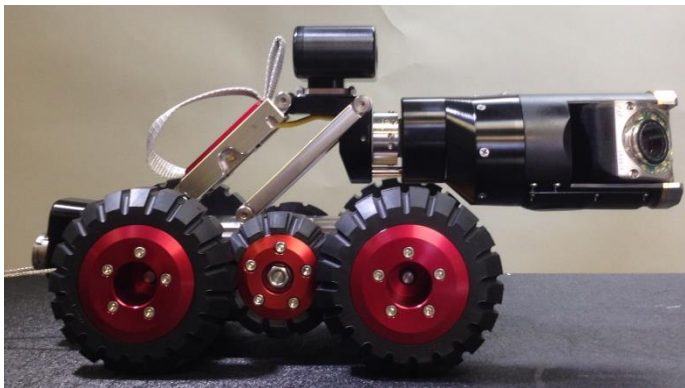


## Attaching Lighthouse

Place Lighthouse Assembly on top of Auxiliary Light Receiver and Twist into place. There should be a faint snap to indicate when the Lighthouse Assembly is locked into place.



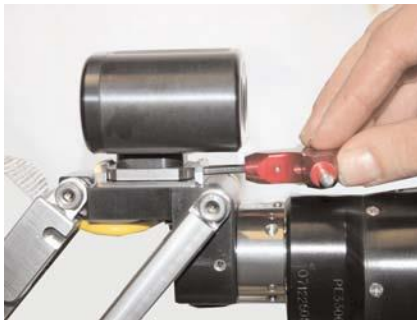
## Pathfinder with Lighthouse Attached



**NOTE: Auxiliary Light  
includes Sonde**

## Detaching Lighthouse

To detach Lighthouse, use Multi-Tool to push against the Release Button until the Lighthouse is free to rotate. Then turn the Lighthouse and lift off (see photos).





## Mainline Connections — TR3300, PE34xx/35xx, and PR3300

NOTE: Before proceeding with the Mainline procedure verify that the following cables are available and that the TC3200 Tractor Controller, the PCU, VL5000 Color Video Overlay, and PR3300 Cable and Reel Unit are all switched OFF.



Cable 841217



Cable 841221



Cable 841134

## Connecting Pathfinder Items

**Note:** An optional cable P/N 841269 can be used in place of steps 1 through 6 as part of the connecting sequence. If this cable is used, steps 1 through 6 are not necessary because the equipment described in those steps is already properly connected and ready for use.

**If cable 841269 is used,** plug the military connector end of cable 841269 into the appropriate connection on the Rear Power Box of the PR3300 Pathfinder Cable Reel. Plug the other end into the 24 pin wall receptacle. Then proceed to step 7.



Cable 841269 plug

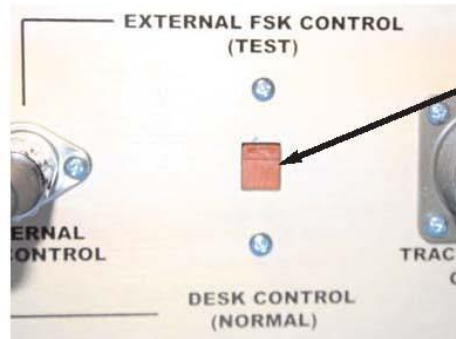
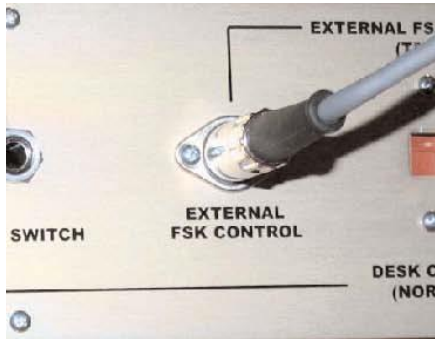


Receptacle for Cable 841269 plug



If cable 841269 is not used, follow the sequence shown:

1. Plug the Tractor Controller into the socket labeled EXTERNAL FSK CONTROL located on the back of the TC3200 Controller. Verify that the slide switch on the back of the TC3200 is switched to the EXTERNAL FSK CONTROL (test) position. If system is mounted, an extension runs to the desk top.



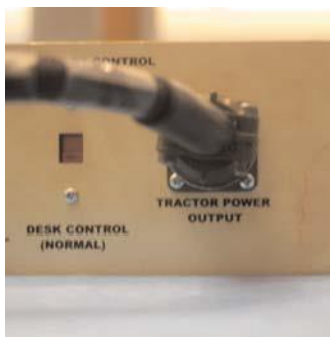
Slide Switch – Must be in EXTERNAL FSK CONTROL (TEST) position

2. Plug the Foot Switch Control into the socket labeled FOOT SWITCH located in the back of the TC3200 Controller. (Note: Foot Switch Control is furnished with Truck System only.)



3. Connect Cable 841217 to the TC3200 in the socket labeled TRACTOR POWER OUTPUT and to the PCU in the socket labeled TRACTOR (which appears in both the front and back of the unit).

**NOTE:** DO NOT HAVE DIFFERENT CONTROLLERS PLUGGED INTO BOTH FRONT & REAR CONNECTORS AT THE SAME TIME!



- Set the Cable Length Selector Switch on the front of the TC3200 Controller to PF.



- Plug the RC2005 Camera Control Box into the socket labeled PAN & TILT on the PCU.



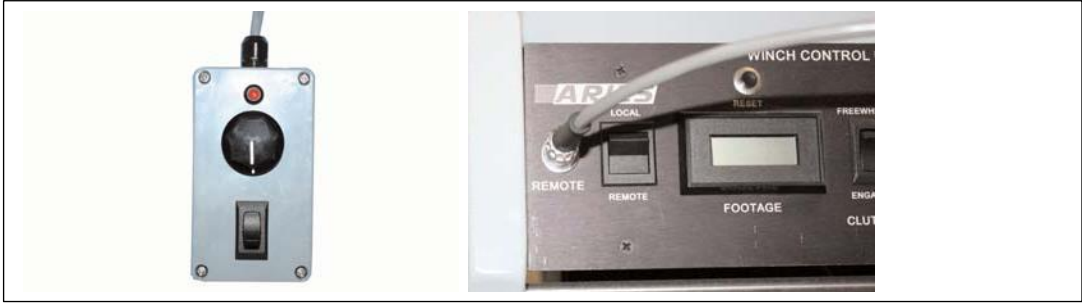
**NOTE:** DO NOT PLUG INTO FRONT & REAR PAN & TILT JACKS AT THE SAME TIME. TRUCKS ARE USUALLY WIRED TO THE REAR JACK WITH THE EXTENSION BY THE MONITOR.

- Plug the male white plastic 12 pin end of cable 841134 into the second socket from the left end in the back of the PCU unit. Plug the military connector end of cable 841134 into the appropriate connection on the Rear Power Box of the PR3300 Pathfinder Reel Assembly. Plug the black plastic 8 pin end of cable 841134 into the socket labeled ENCODER located on the back of the Color Video overlay.





7. If the Reel Control P/N 070767 is included, plug into the socket labeled REMOTE on the Pathfinder Reel Assembly Control Panel.



8. Connect the 12 pin metal female connector at the end of the Cable Reel on the Pathfinder Reel Assembly to the 12 pin male connector located on the Tractor. Use the following procedure:
- A. Guide the 12 pin Cable Reel connector through the Pathfinder Tow Cables. Be certain the set screw by the word “ON” is loose.

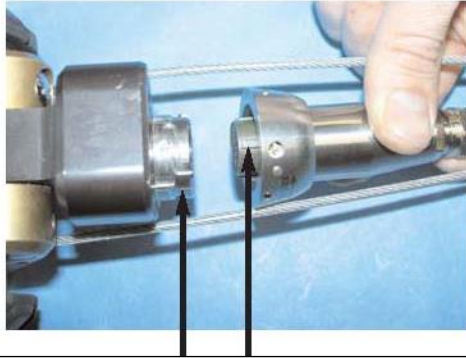


This set screw on the 12 pin cable reel connector must be loose.

**NOTE:** Adjust only the set screw by “ON”. The four (4) outer set screws are connection guides set at the factory. **Pathfinder tool fits ONLY the set screw that needs adjusting.**

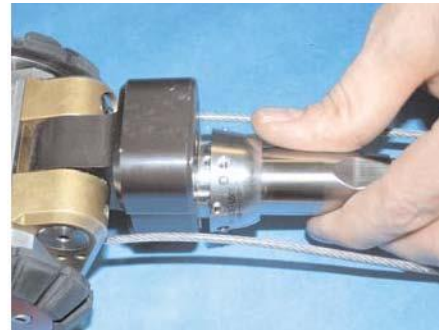
- B. Properly align the 12 pin Cable Reel connector with the 12 pin male connector on the Pathfinder Tractor. See explanation below.

The Dowel Pin on the Cable Reel connector and the indentation on the Pathfinder connector must be aligned



The protrusion on the Cable Reel connector must be aligned with the indentations inside the Pathfinder connector

- C. Push the 12 pin Cable Reel connector over the 12 pin Pathfinder Tractor connector.



- D. Be certain the Twist Lock collar of the Cable Reel is almost flush with the rear camera housing on the TR3300 Tractor. Then insert round rod on the Multi-Tool into the notch and rotate the collar in the "ON" direction until it snaps into place.



Multi-Tool



E. Tighten set screw

**NOTE:** Adjust only the screw that the multi-tool fits.



Connect the Cable connector at the end of the Tractor Tow Cable to the fitting on the cable of the Cable Reel. See procedure below:



Slide Cable connector over Cable Reel fitting



Tighten Cable connector with multi-tool

Now the Pathfinder Tractor will be properly connected to the Pathfinder Cable Reel Assembly, as shown below:



9. If this tractor is used with the PE34xx/35xx Pan & Tilt Camera, plug the 12 pin male connector camera end into the female connector located at the front of the tractor. Use the same procedure to connect the camera to the tractor as was used to connect the Cable Reel to the tractor. The system is now ready to use.



10. If this tractor is used with the ST9xx Self-Leveling Color Camera, plug the 12 pin male connector end of the 841138 adapter into the female connector located at the front of the tractor. Then screw the ST9xx Self-Leveling Color Camera onto the other side of the adapter. The system is ready to use.



**NOTE:** An optional Handcart, P/N 070768 is available to lift and transport the PR3300 Pathfinder Reel Assembly if desired.



## Connecting Pathfinder in Test Mode:

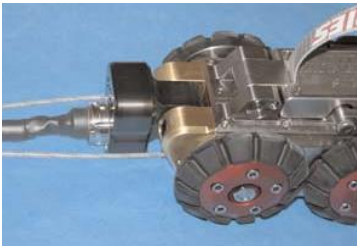
There are times when it is necessary to check the operation of the PR3300 Pathfinder Reel Assembly, the PE34xx/35xx Camera, or the ST9xx Self-Leveling Color Camera to see if they are working properly. In those cases the system should be run in a Test Mode. The Test Mode includes all the equipment in the Mainline system except for the PR3300 Pathfinder Reel Assembly. A Test Cable 841221 takes its place.

To connect the 841221 Test Cable in the system, plug the military connector end of cable 841134 into the Test Cable 841221. See photo below:



Then proceed as follows:

Plug other end of Test Cable 841221 into one of three pieces of equipment shown below:



Pathfinder Tractor TR3300  
(to check operation of the  
PR3300 Cable Reel)



PE34xx/35xx Pathfinder  
Pan & Tilt Camera



ST9xx Self-Leveling  
Color Camera

If the Pathfinder Tractor with camera attached is working properly on the test cable, the Cable Reel needs to be tested.

**NOTE:** If a camera problem still exists, the camera can be connected directly to the test cable, isolating the camera problem to either the tractor or the camera.



## Portable Connections — TR3300, PE34xx/35xx, and PR3300

**NOTE:** Before proceeding with the Portable Operation procedure verify that the following cables are available and that the Saturn III Case Unit, Adapter Box, and PR3300 Cable and Reel Unit are all switched OFF.



Cable 841221



Cable 841160



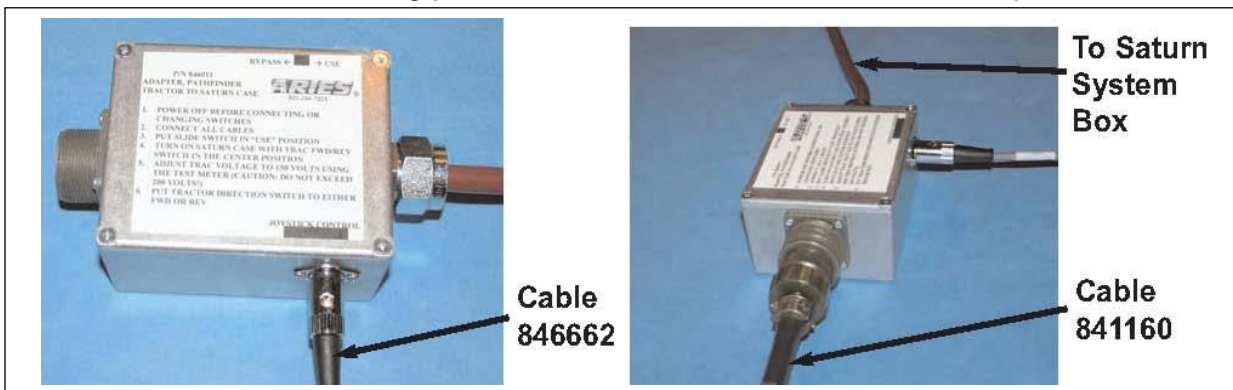
Cable 841268

**If cable 841269 is not used, follow the sequence shown:**

1. Plug the military connector end of the 846011 Tractor to Saturn Case Adapter cable into the appropriate connection on the side panel of the Saturn System Box.



2. Please use the following procedure to connect the Saturn Case Adapter 846011:



- A. Be certain all system power is **OFF**.
- B. Plug the 846662 Tractor Controller and cable 841160 into the Saturn Case Adapter Box (see above photos).
- C. Be certain that the Slide Switch is in the USE position.

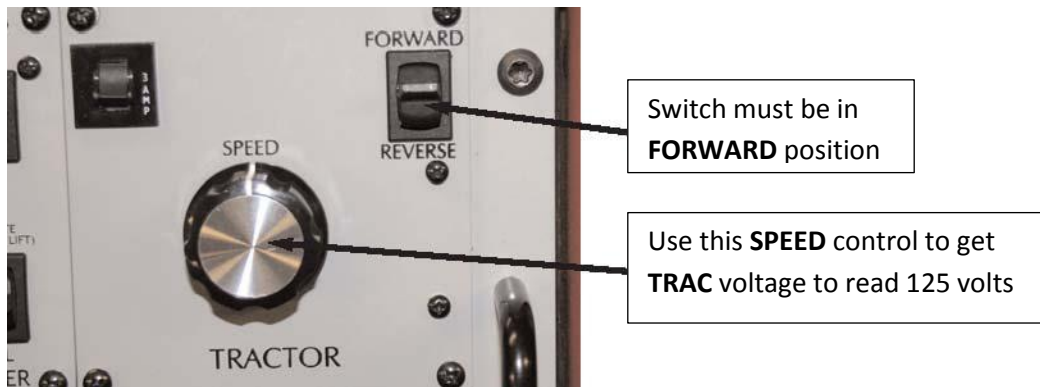


3. Plug the other end of Cable 841160 into the appropriate connection on the Rear Power Box of the PR3300 Pathfinder Reel Assembly.

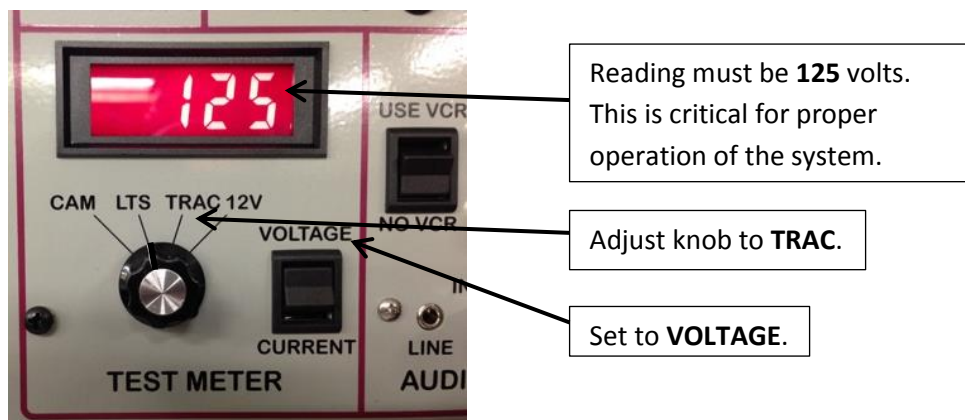


The remaining procedure for connecting Pathfinder equipment for Portable Operation is exactly identical to the procedure for connecting the equipment for the Mainline (Truck) system.

4. Turn on Saturn case with the FORWARD/REVERSE switch in the **FORWARD** position.

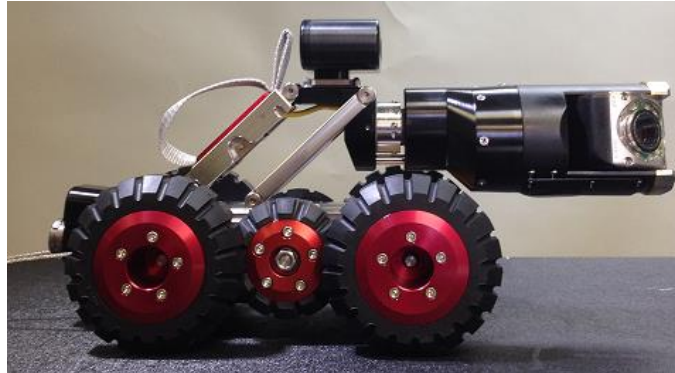


5. Be certain that meter and knob are on **TRAC** and adjust **SPEED** control if necessary so that the TRAC voltage reads 125 volts. **CAUTION: DO NOT EXCEED 135 VOLTS. (See Input Voltage Limitation page.)**



# Pathfinder Tractor

## Views of Pathfinder Tractor:



Lights



Rear camera with lights





## Tractor Controller, Part No. 846664

The **Tractor Controller, 846664**, controls some functions of Tractor TR3300. It controls tractor movement, and regulates power to the tractor lights, camera, and Beacon. The **Foot Switch Control, 580255**, furnished with Truck System only, can also be used to control Tractor movement in the Forward and Reverse positions. See photos and explanations below.



**Joystick** – Controls tractor movement in four directions: Forward, Reverse, Left, Right  
**Speed Control** – Controls Tractor speed (turn knob to set desired speed)

**Left Foot Control** – Controls tractor movement in **REVERSE** direction only

**Right Foot Control** – Controls tractor movement in **FORWARD** direction only



**846664 Tractor Controller**

**580255 Foot Switch Control**



**The left front three-position switch controls:**

Top position: Controls tractor lights and front camera  
Center position: Controls front camera  
Lower position: Turns on backup camera

**Center switch:** Controls the auxiliary light and/or sonde

**The right front switch: Not used with the Pathfinder (reserved for future functions).**

## Pathfinder Stage III Operation Instructions

1. **Input Voltage Limitations** – The Control Board in the Tractor will not operate the drive motors if the input voltage is above the normal Pathfinder setting (125 VDC) on the Power Supply.

*If the Tractor does not run, make sure the Power Supply is on the Pathfinder setting on a rack mount system or below 125 VDC if being used with a Saturn Control Unit. If set too high, the rear viewing camera will be enabled and the tractor will not operate.*

2. **Mechanical Drive Clutches** – The Solenoid Clutch Mechanism in the Tractor has been replaced with more efficient and reliable mechanical clutches.

*To retrieve the tractor in freewheel mode, simply drive the transporter backwards until it moves slightly. Now the transporter can be pulled back using the reel.*

*If the tractor loses power during an inspection for any reason, the tractor can still be put into freewheel mode by manually giving the gray, 12-conductor TV cable a quick “tug”. This will cause the clutches to disengage and put the tractor in freewheel mode.*

3. **Over-Temperature Protection** – Over-Temperature Sensors have been added in this Tractor to both drive motors and the drive electronics. In the event of excessive temperatures, the tractor will simply shut off.

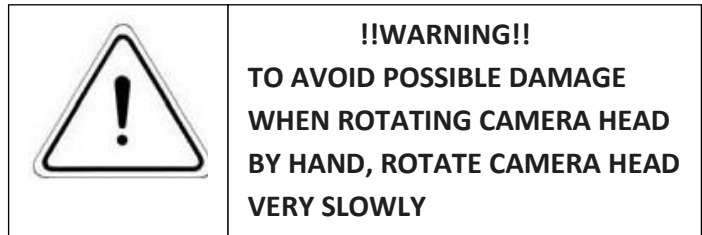
*In normal inspection operations, the tractor should not reach this temperature, and you may never have this occur. If it does, the tractor will reset automatically when it has cooled. This may take 10 minutes and can be accelerated by cooling the body of the tractor.*

## Pathfinder Camera PE34xx / PE35xx

### Pressure Indicator Light

A new Pathfinder Camera will be fully pressurized when built to keep out moisture. It is also equipped with a Pressure Indicator Light. When the camera is under normal pressure and operating normally no light appears. When the Pressure Indicator Light appears flashing red (unit is under high pressure) or solid red (unit is under low pressure), corrective action is advised.

#### Pressure Indicator Light



**NOTE:** See PE34xx/35xx manual 970139 for instructions on camera diagnostics.

### Camera Control Box

The Camera Control Box RC3400 (shown below) controls the functions of the PE34xx/35xx Camera.



RC3400 Rear Panel



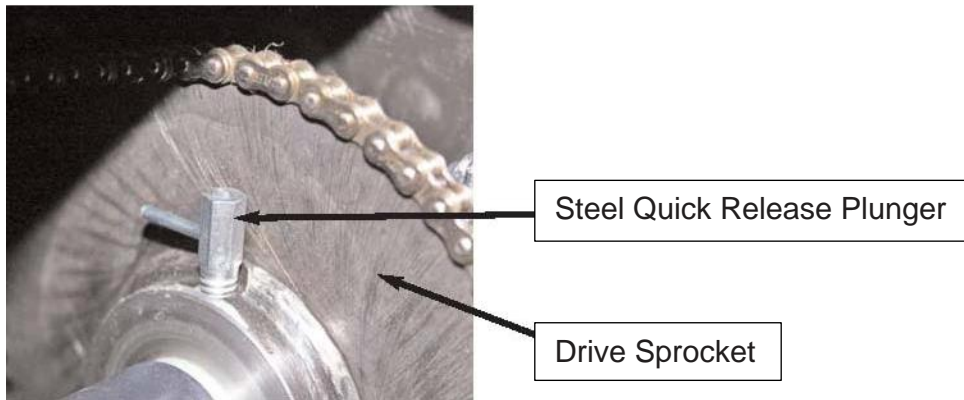
(See Aries manual 970139 for function descriptions)

## Cable Reel Control PR3300

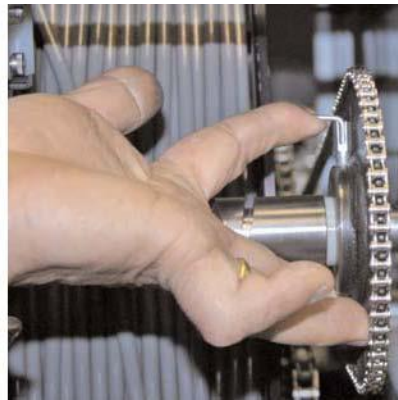
### Level Wind Adjustment

The Cable Reel PR3300 is equipped with a “Level Wind Adjustment” to regulate the amount of cable that accumulates on the drum during the retrieval process. Too much cable accumulating in any one area on the drum may cause potential problems. The “Level Wind Adjustment” feature can be activated to disperse the cable on the drum more evenly. See the following procedure:

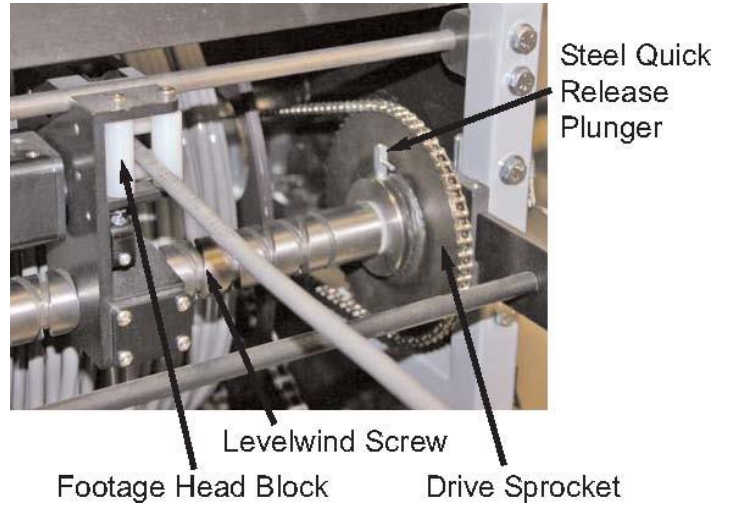
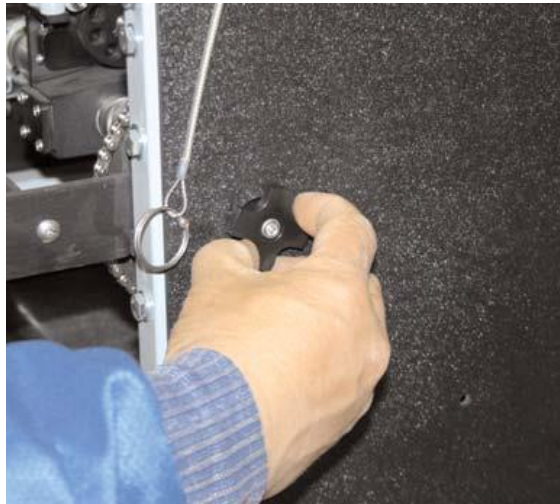
- A. **Before starting procedure, be certain that the power supply is off and the Cable Reel is unplugged.** Then locate the Steel Quick Release Plunger next to the Drive Sprocket.



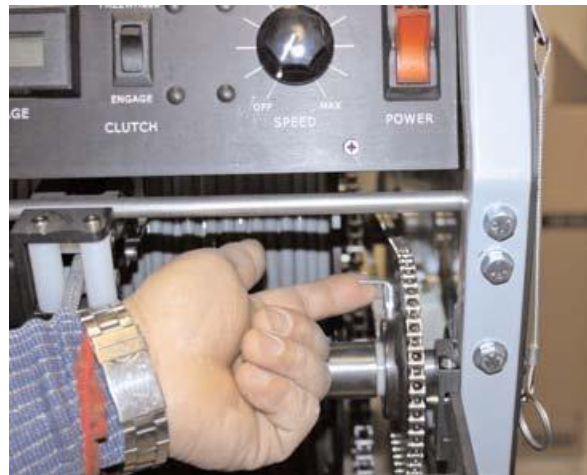
- B. Lift the plunger pin as high as it will go and turn it so that it rests on the plunger body.



- C. Turn the Levelwind Adjustment Knob on the side of the Cable Reel to adjust the location of the Mounting Block on the Level Wind Reel.

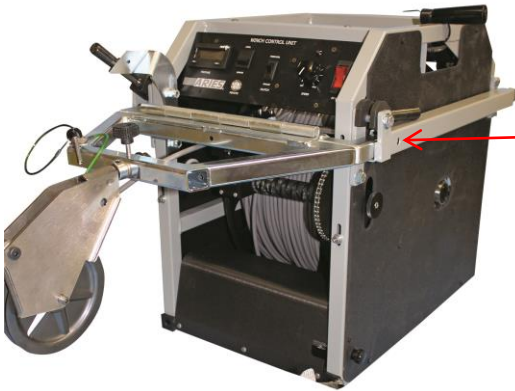


- D. Push the plunger pin back to the opening in the plunger body and let it drop to its original position. The new Mounting Block location is now locked in.





Both the Remote Reel Control (P/N 070767) and the Cable Reel Control Panel located on the Cable Reel itself control the functions of the PR3300 Cable Reel.



**NOTE:** Ball stop on Downrigger prevents over extension.

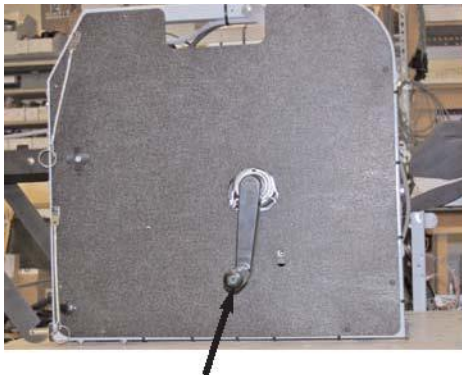
Two (2) locking levers secure downrigger in position

**Knob:** The lower side knob shown below is used to put the reel in freewheel when not powered up. If left engaged and powered up, the reel will not function.



### Hand Crank Operation

If there is a power failure or if the cable can't be retrieved with the Cable Reel motor, it can be retrieved or advanced manually with the hand crank.



**Hand Crank**

## Dummy Plug

A Dummy Plug is furnished to protect the Cable Connector at the end of the cable. It should be installed and placed in a special holder. See the explanation below:

1. Properly align the 12 pin Cable Reel connector with the 12 pin Dummy Plug.

The Dowel Pin on the Cable Reel connector and the indentation on the plastic protector connector must be aligned



**Dummy Plug**



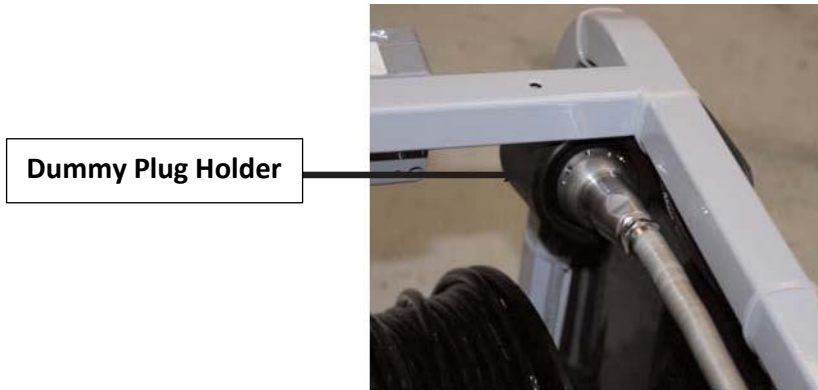
**Aligning Dummy Plug with Cable Reel connector**

2. Slide the Dummy Plug on the Cable Reel Connector Collar until the ends are flush. Then insert multi-tool into the notch and rotate the collar clockwise, in the "ON" direction, until it snaps into place. The Dummy Plug is now properly installed.



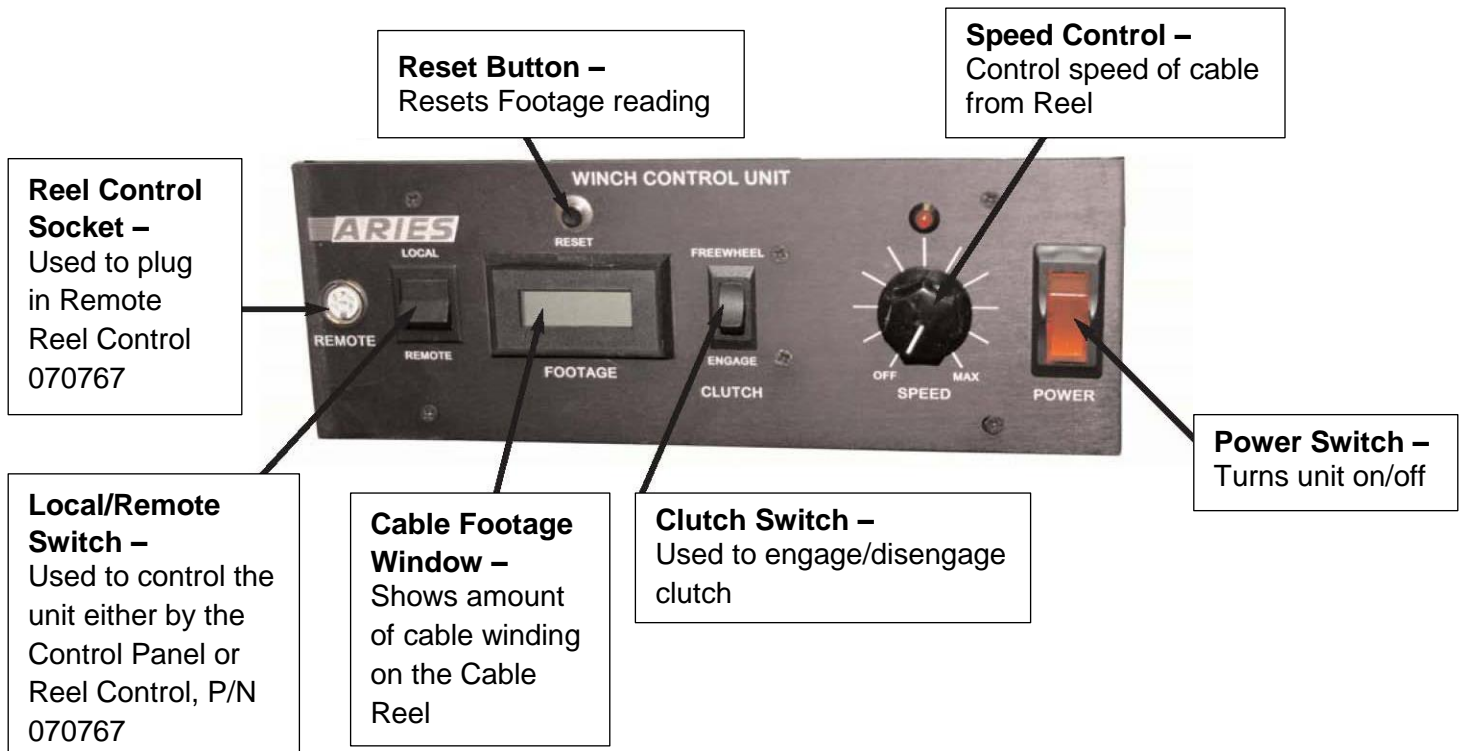
## Cable Storage

After the Dummy Plug is installed, the plug should be stored in the Dummy Plug Holder, located under the horizontal cross bar of the Cable Reel frame.

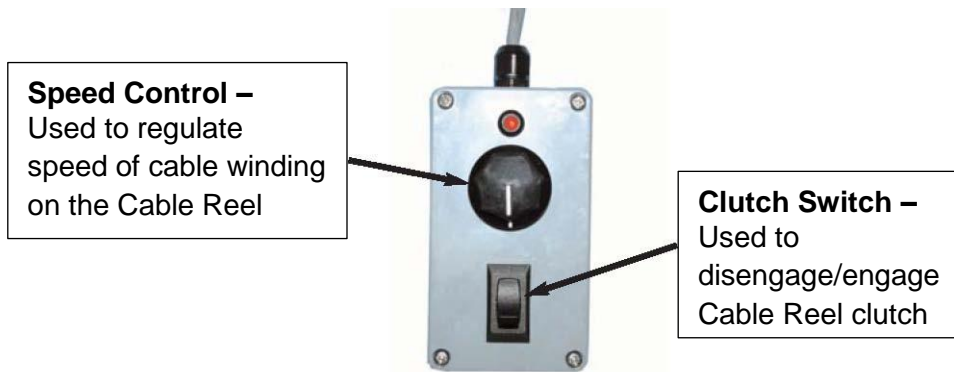




## Cable Reel Control Panel



## Remote Reel Control, Part No. 070767



## **Pathfinder Termination Kit**

- See Pathfinder System Cable Termination Manual 970131
- Pathfinder PR3300 Reel Termination Kit 950075

## **Sending/Retrieving Tractor Mainline**

### **To send the Pathfinder Tractor Mainline (Truck)/Portable (Saturn III) System down the pipe:**

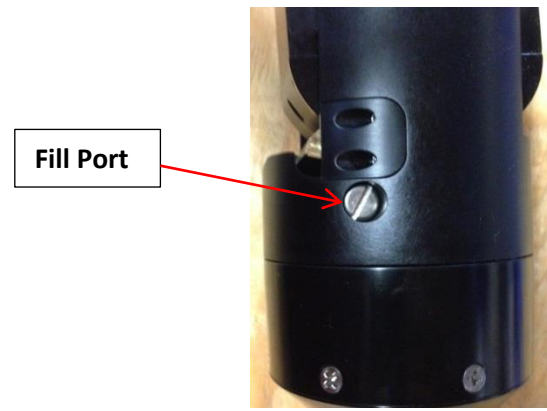
1. Turn on the front camera.
2. Switch the Cable Reel Control Panel or the Reel Control, P/N 070767 to FREEWHEEL.
3. Turn Speed Control on Tractor Controller, P/N 846664.

### **To retrieve the Pathfinder Tractor Mainline (Truck) / Portable (Saturn III) System:**

1. Switch the Cable Reel Control Panel to LOCAL or REMOTE depending on whether the Tractor is to be controlled by the Cable Reel Control Panel or the Reel Control, P/N 070767.
2. Switch the Back Camera on.
3. Back Tractor up slightly to assure both sides are in freewheel. Do not run over cable.
4. Be certain the Cable Reel or Remote Clutch Switch is on ENGAGE.
5. Retrieve Pathfinder Tractor by turning Speed Control on Cable Reel Control Panel or the Remote Reel Control.

## Pressurization Procedures

See Pressurization Aries Manual 970075 for all Equipment Pressurization instructions.

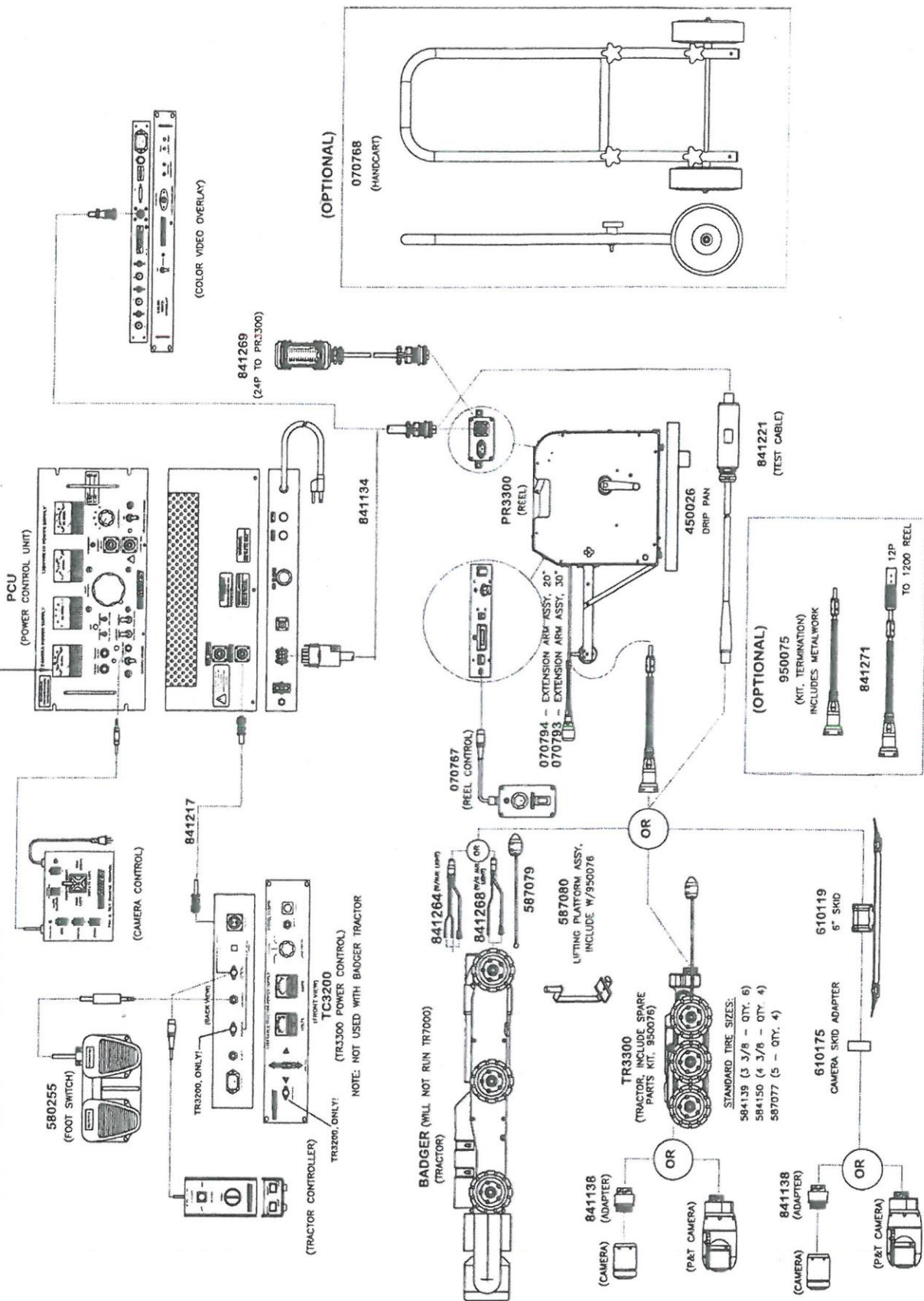


**NOTE:** New and upgraded TR3300 Tractors are gel-filled and DO NOT require pressurization.

# SAMPLE CONFIGURATIONS

## (SAMPLE CONFIGURATIONS) **TC3200 OPTION**

NOTE:  
SET AT 38 VOLTS FOR PE3300



# SAMPLE CONFIGURATIONS

(SAMPLE CONFIGURATIONS)

## SAT III OPTION

