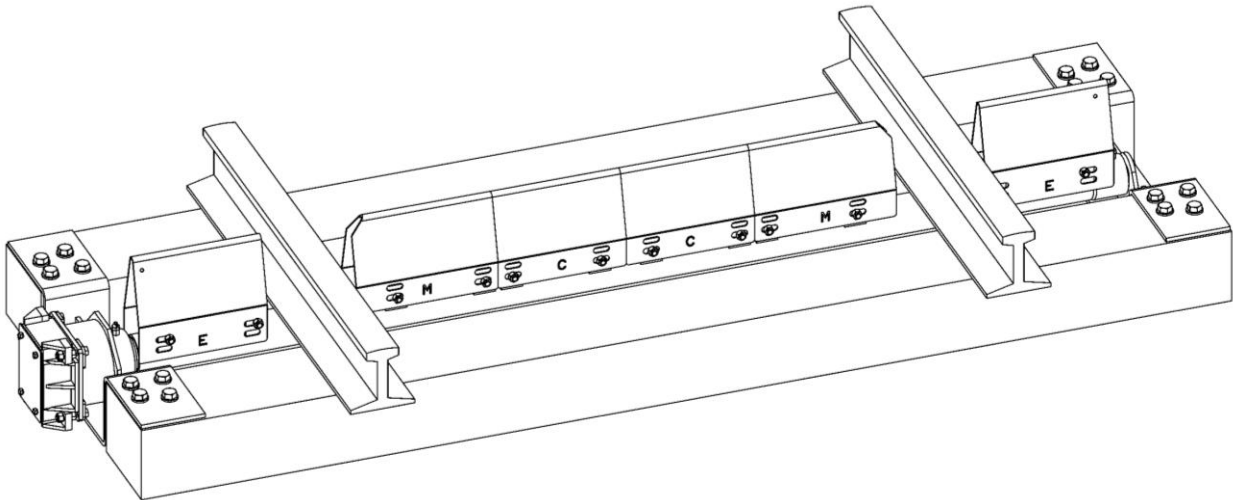


Dragging Equipment Detector (DED)

Installation & Service Manual
PN 100333-003 AG3



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Revision History

This document supersedes all previously issued versions, providing new or revised information. The most recent publication can be determined by comparing the last three characters at the end of the part number and the date issued.

Dragging Equipment Detector (DED) Installation & Service Manual Part Number: 100333-003

Revision Level	Date Issued	General Description of Changes
AA0	05/17/1996	Initial release
AB0	09/31/2005	Updated Instructions
AC0	12/01/2009	Updated Instructions
AD0	10/15/2010	Rebranded for Progress Rail Services
AE0	04/27/2011	Added In-Tie Dragger Installation Instructions
AF0	04/28/2012	Updated MagAmp Controller drawings and procedures
AG0	02/21/2024	Updated formatting and rebranding to PR. Updated technical product information based on current requirements
AG1	03/14/2024	Added U-Tie Bracket Part Number Table (page-26) Updated part number for "Pivot Arm MagAmp" (page-29)
AG2	06/21/2024	Updated MagAmp Switch part numbers on page-25 Updated part numbers of Epoxy Paint Actuators, on page-26 Updated part numbers on page-27

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Revision History

Revision Level	Date Issued	General Description of Changes
		Updated part number for Item #13 (page-29)
AG3	09/21/2024	Basic formatting changes Added WARNING statement for Manual Actuation Tools (page-26) Added note to installation instruction Updated maintenance tools list (page-24) Update Switch Plate part numbers (page-34)

Conventions

Safety Alert Symbols

The  symbol indicates that important personal safety information follows. Carefully read this text for the warnings information it contains. The signal word next to each safety alert symbol is defined as:



WARNING



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. This signal word may also be used to identify unsafe practices.

Static Sensitive Symbols for Equipment Handling Instructions

The  and  symbols indicate important handling guidelines established by the AREMA (American Railway Engineering and Maintenance-of-Way Association) for proper handling of electronic equipment modules and sensitive components for the prevention of potential damage that could be caused by ESD (electrostatic discharge) during routine maintenance, handling, and transportation.



ESD NOTICE

To protect against ESD damage to electronic equipment containing modules, follow the field procedures in AREMA C&S MP-11.4.5. Failure to use protective measures could result in permanent equipment damage, either immediate or latent, when handling modules.



ESD NOTICE

To protect against ESD damage to electronic equipment containing components, follow the field procedures in AREMA C&S MP-11.4.5. Failure to use recommended protective measures could result in permanent equipment damage, either immediate or latent, when handling components.

Important/Notable Information

Important: Indicates an operating procedure, practice, or condition which, if not strictly followed, may cause equipment damage.

Note: Indicates additional information or emphasizes a topic related to the subject being discussed.

General Safety Instructions

Only qualified personnel should work on or around this equipment. To ensure the highest degree of personal safety, all who use this equipment are required to become thoroughly familiar with all safety instructions contained in this document. Successful and safe operation of this equipment depends upon proper handling, operation, maintenance, and application of associated railroad equipment.



WARNING

No information in this manual supersedes or replaces your railroad's operating rules. If there is a difference in instructions between this manual and the railroad's operating rules, follow the most restrictive instruction.

Deliberate misuse or abuse of electronic safety equipment may result in injury or death. Deliberate misuse or abuse of Dragging Equipment Detector may cause personal injury or death.

Foreword

Technical Support

Contact the Customer Service Department at 1-888-701-3479 for instructions concerning installation, maintenance, troubleshooting or replacement parts. You may also order additional or revised copies of this document by contacting Customer Service.

Scope

Progress Rail Technical Information Department under the direction of the designated equipment Product Manager, issues this document. This manual provides the installation and service instructions for the Dragging Equipment Detector. Please read carefully and thoroughly understand the instructions and processes before making any adjustments or modifications to the equipment. Carelessness may result in loss of life or property damage.

Contents

Section 1 – Operation & Description	8
Section 2 – Installation	9
2.1 Introduction	9
2.2 Determine Location.....	9
2.3 Equipment Preparation.....	10
2.4 Install the Equipment	11
2.5 Electrical Connections	18
2.6 Check Installation and Verify Performance	18
Section 3 – Switch Installation and Adjustment	19
3.1 MagAmp Controller Wiring	19
3.2 Switch Replacement or Upgrade Installation	20
3.3 Cam Replacement Procedure.....	21
3.4 MagAmp Switch Adjustment Procedure	22
3.5 Contact Switch Adjustment Procedure.....	23
Section 4 – Maintenance & Troubleshooting	24
4.1 Recommended Tools for Maintenance	24
4.2 Performance Inspections.....	24
4.3 Troubleshooting	25
4.4 Manual Actuation & Switch Setting Tools	26
Section 5 – Parts Catalog.....	27
5.1 Parts Catalog Introduction	27
5.2 DED Parts Matrix	28
5.3 Switch Part Number Reference Table.....	29
5.1 Actuator Part Number Reference Table.....	30
5.2 Stand Alone Part Number Reference Table	31
5.3 General Parts.....	32
5.4 MagAmp Switch Parts List Diagram.....	33
5.5 Contact Switch Parts List Diagram.....	35
5.6 Bearing Seal Replacement Best Practice	37

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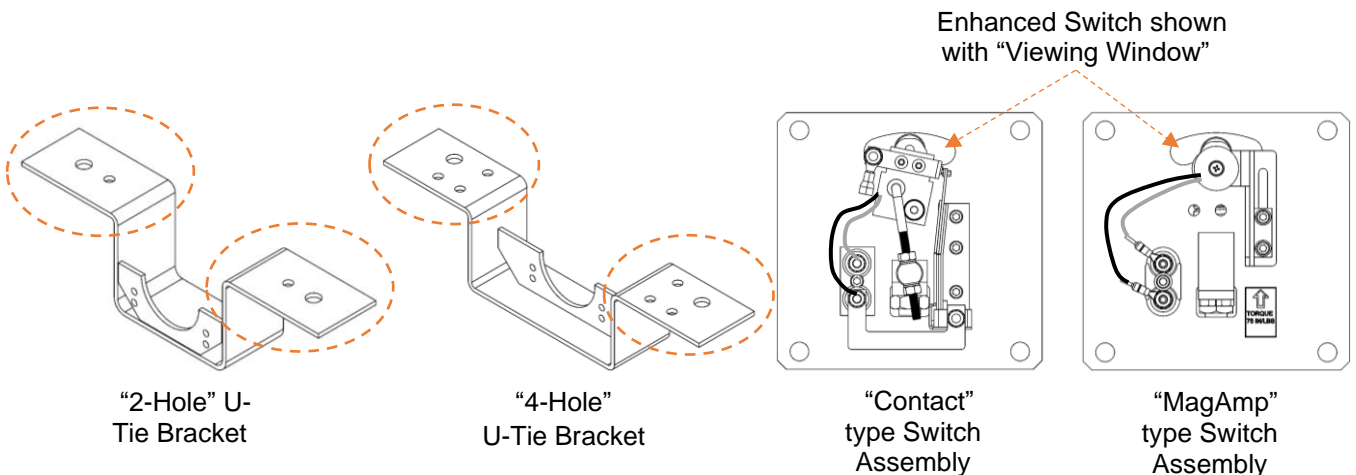
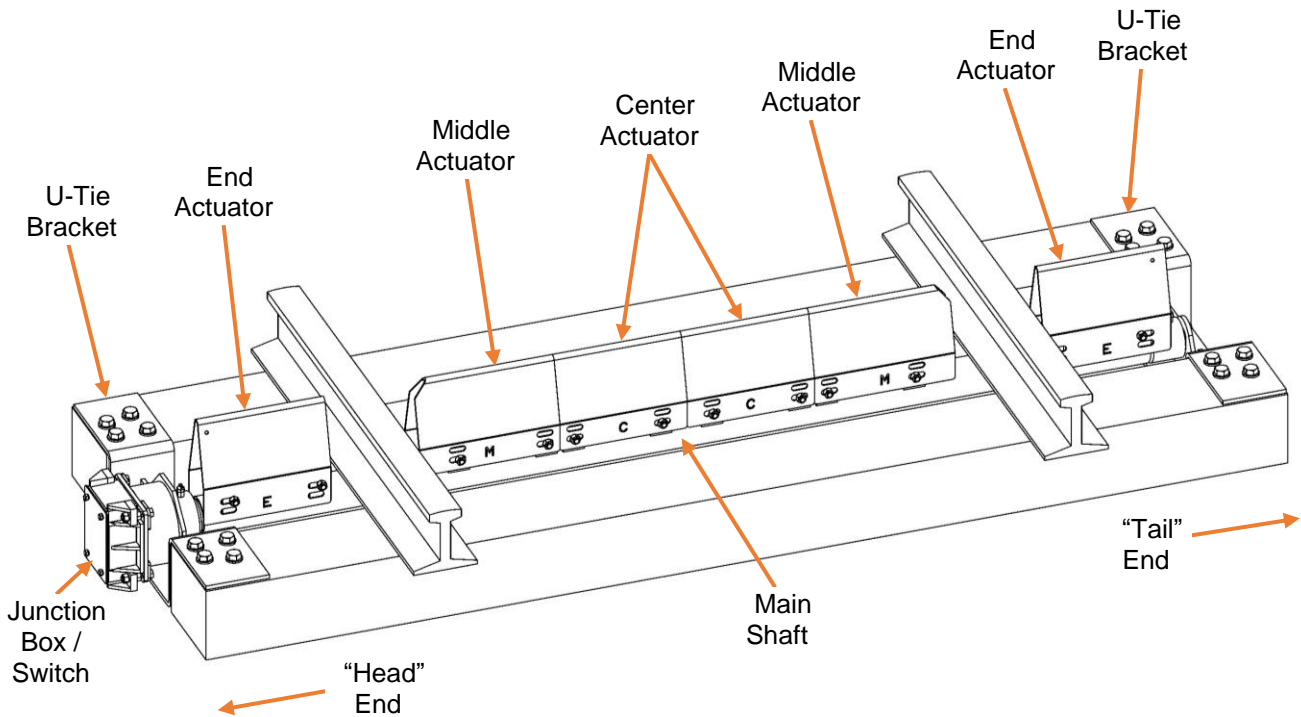
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5.7 Main Shaft Replacement Kit..... 38

Section 1 – Operation & Description

A Dragging Equipment Detector is non-vital equipment capable of detecting unwanted objects dragging under a moving train, which prevents damage to wayside and crossing signal systems.

Dragging Equipment Detectors (DEDs) are built in many configurations, to suite specific customer needs. The image below shows a common DED, and its external components. Your DED may be slightly different. The main variations are the; Switch type (MagAmp or Contact), U-Tie Bracket type (2 or 4 mounting holes), Actuator Position (Standard or Narrow gauge widths), and Actuator type (Height & Color). Configurations and variations may exist that are not specified within this manual. If your DED has features not specified within this manual, contact Customer Service for further details.



Section 2 – Installation

2.1 Introduction

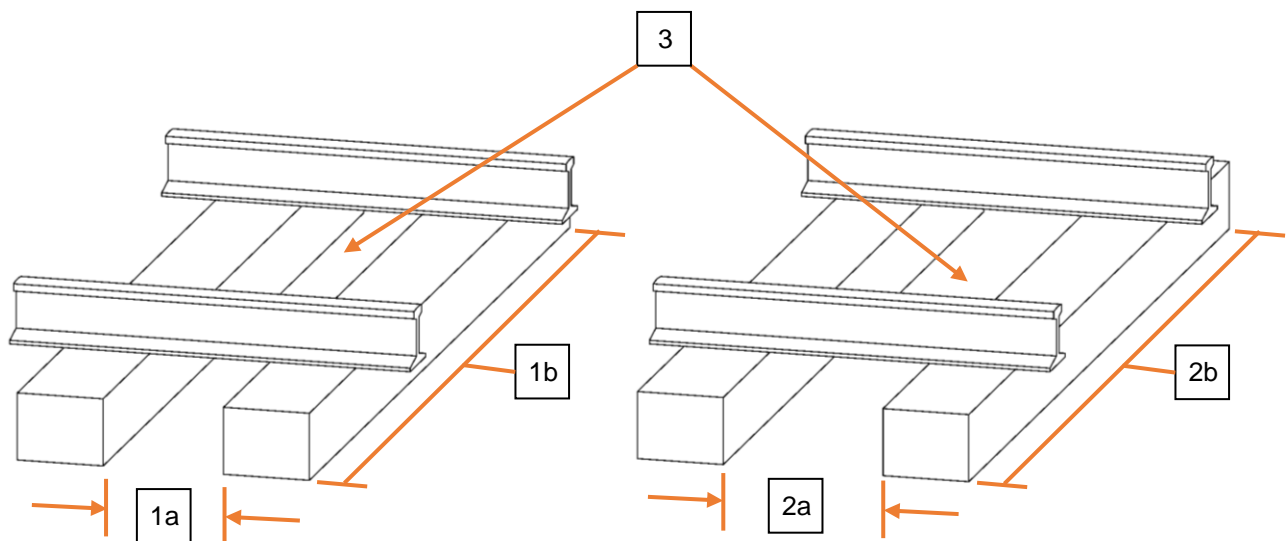
The installation instructions presented in this section pertain to mounting a Dragging Equipment Detector on wood ties.

Note: Special hardware is available for mounting a DED on concrete ties. Contact a customer service representative for details.

Note: An Ice Deflector Assembly is available for this equipment. For detailed information, contact a customer service representative.

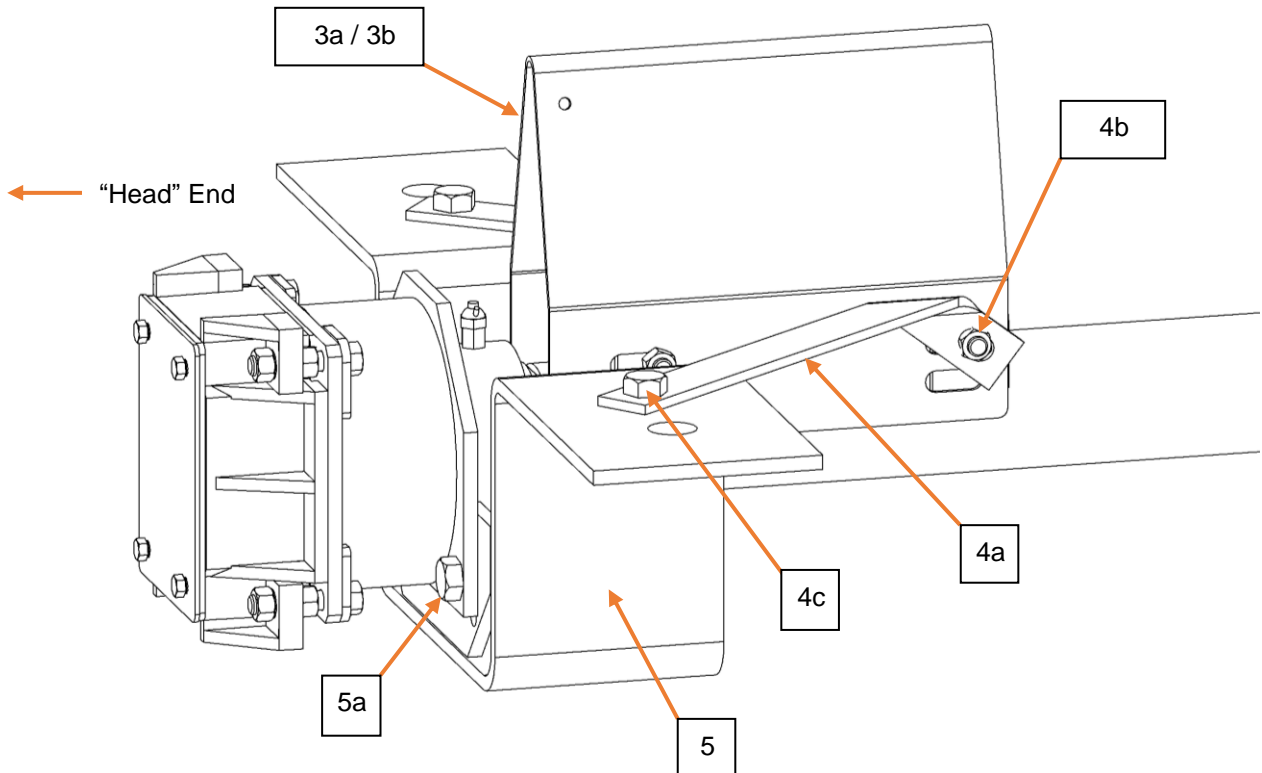
2.2 Determine Location

1. For DED units with 2-hole U-Ties:
 - a. Select two wood ties spaced 12 5/8" from inside edge to inside edge.
 - b. Wood ties must be a minimum of 8 feet long.
2. For DED units with 4-hole U-Ties:
 - a. Select two wood ties spaced 16 3/4" from inside edge to inside edge.
 - b. Wood ties must be a minimum of 8-1/2 feet long.
3. Remove all ballast between both ties.
 - a. Do not dig below bottom of ties.



2.3 Equipment Preparation

1. Inspect equipment for loose, missing, or damaged parts.
2. Remove any accessory components that are attached from the DED, such as Bolt Kits, or Mag-Amp Controller Kit (keep for assembly in later steps).
3. Remove Actuators.
 - a. **Note:** DED units with 4-hole U-Ties do not need to have Actuators removed.
 - b. **Note:** DED units with 2-hole U-Ties must have all Actuators removed, except the one closest to the head end.
4. Remove Shipping Brackets.
 - a. Discard the four Shipping Brackets.
 - b. Discard the shipping fasteners that mount the bracket to the Actuators.
 - i. Replace with 180532-000 Actuator Flanged Bolt Kit upon reassembly.
 - c. Discard the shipping fasteners that mount to bracket to U-Ties.
5. Remove the U-Ties from each end of the DED.
 - a. Discard shipping fasteners used to mount U-Tie Brackets.

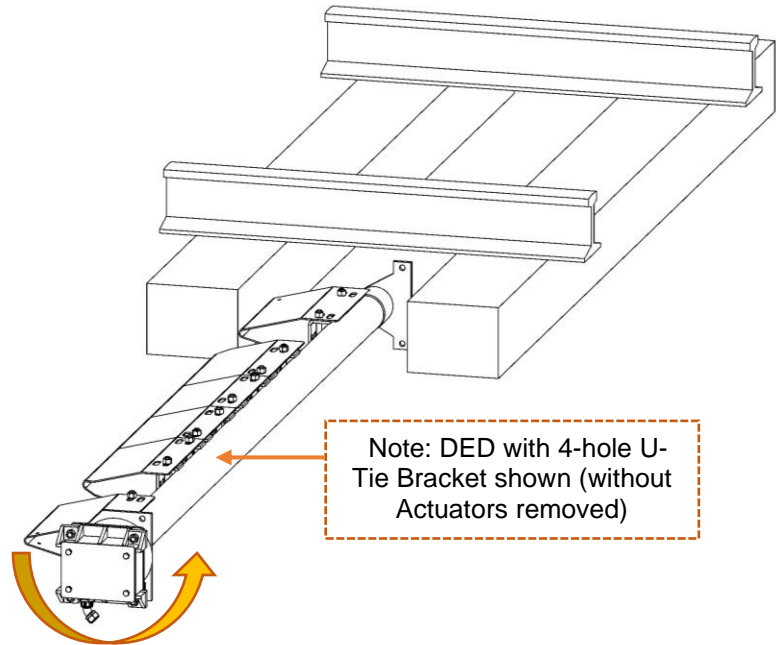


Note: All discarded fasteners will be replaced with new hardware (included in the installation kit) in later steps. (See page 12, Step 3.)

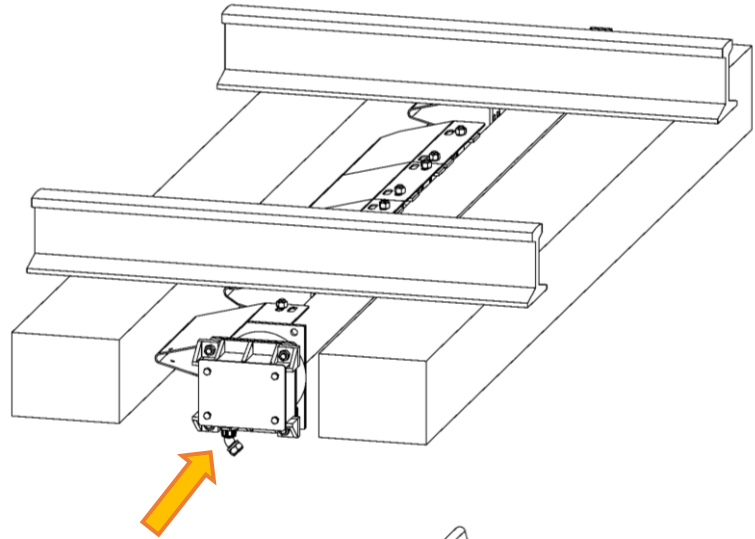
2.4 Install the Equipment

2.4.1 Placement

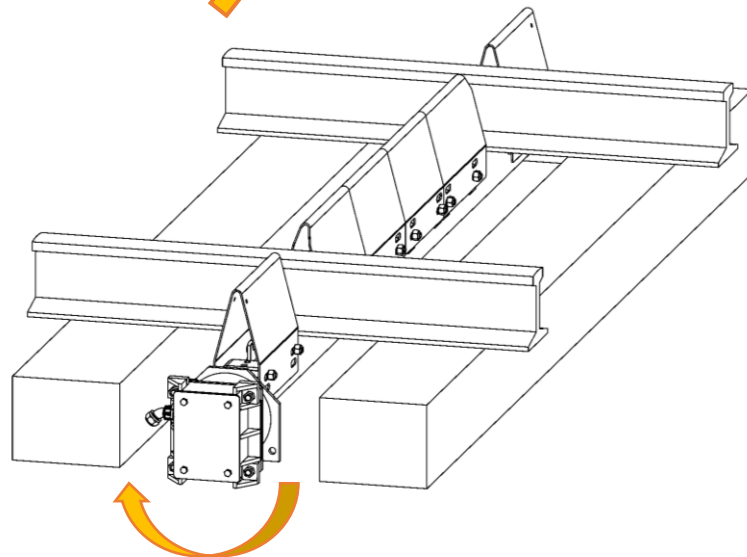
1. With the U-Ties Brackets removed, position the equipment on its side.



2. Slide the DED under the rails and between the ties.

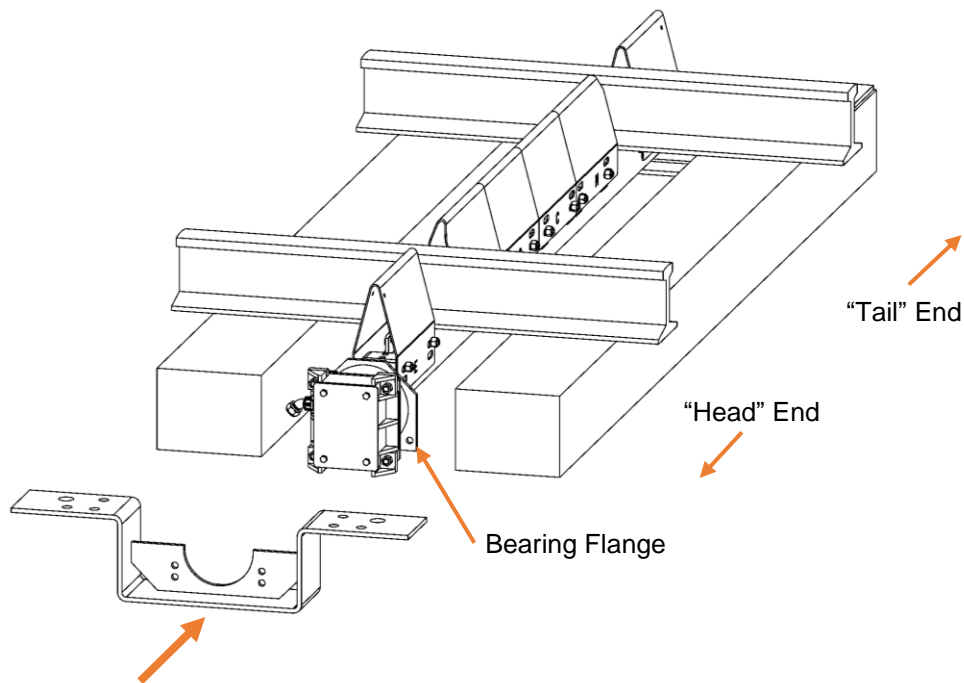


3. Rotate the DED until it is positioned vertically.



2.4.2 Fasten U-Tie Brackets to Bearing Flanges

1. Place one of the U-Tie Brackets under the Head-End and the other U-Tie Bracket under the Tail-End of the equipment.
2. Determine the proper height setting for the equipment (see Table 2-1).
3. Use the U-Tie Bracket Bolt Kit (180505-010) to re-mount the Main Shaft Bearings Flanges to the U-Tie Brackets.
 - a. This kit includes the following parts:
 - i. 4X 1/2-13 x 1-3/4" G8 Bolts
 - ii. 8X 1/2" Wedge Lock Washers
 - iii. 4X 1/2-13 Stover Lock Nuts
 - b. Ensure to use the wedge lock washers under the bolt head and the nut.
 - c. Do not use fasteners which were removed previously.
 - d. Follow instructions included in 180505-010 kit.



Note: U-Tie Brackets mount to inside of Head End

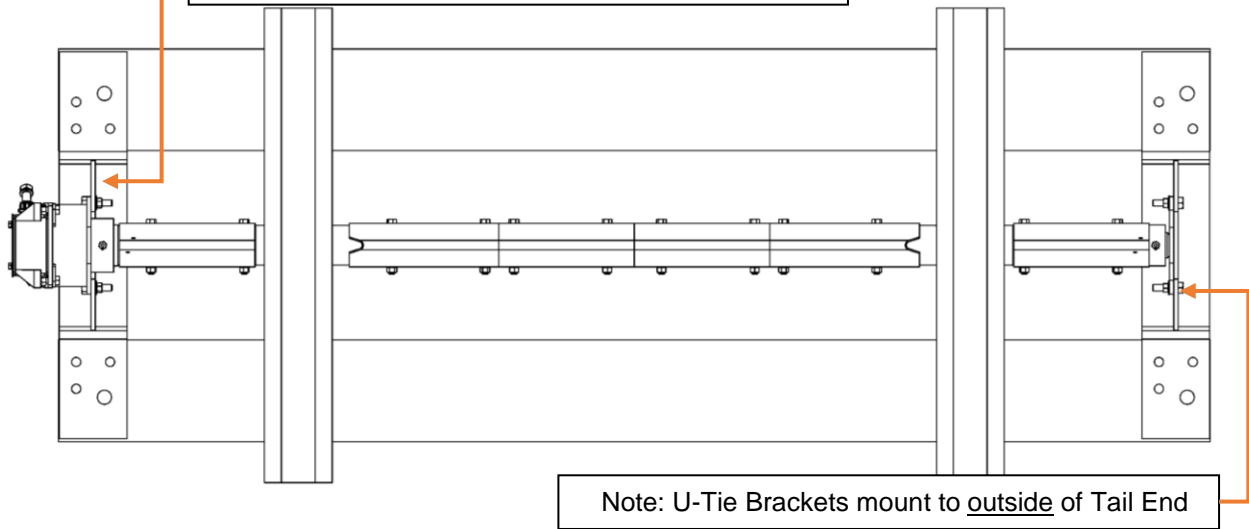
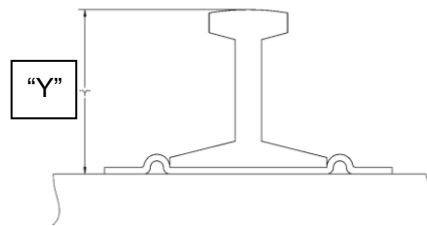
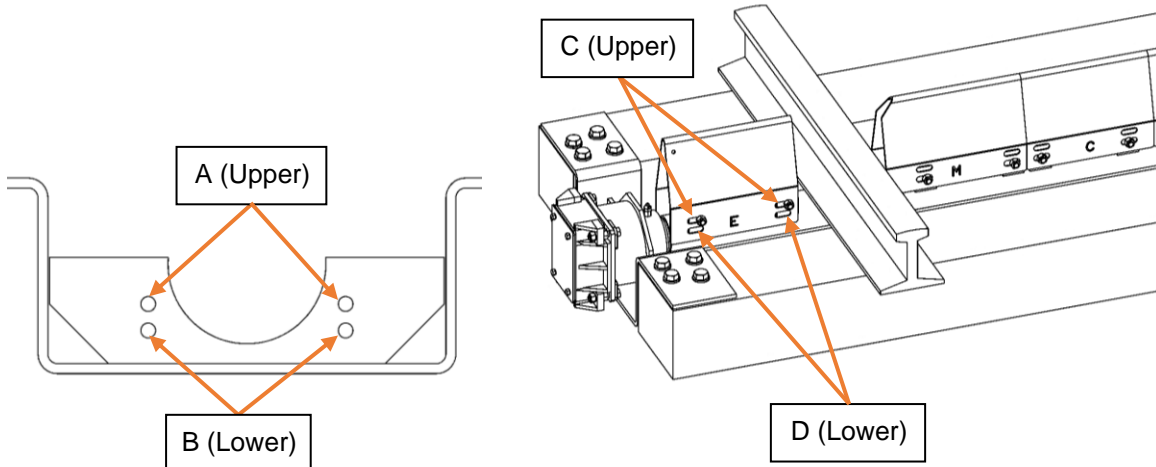


Table 2-1, Actuator Height (Non-In-Tie-Draggers)

2-Bolt U-Tie Brackets				4-Bolt U-Tie Brackets			
U-Tie Bracket Bolt Holes	Actuator Bolt Holes	Actuator Height "E"	Actuator Height "M & C"	U-Tie Bracket Bolt Holes	Actuator Bolt Holes	Actuator Height "E"	Actuator Height "M & C"
A	C	7.01 - Y	6.01 - Y	A	C	8.08 - Y	7.08 - Y
A	D	8.01 - Y	7.01 - Y	A	D	9.08 - Y	8.08 - Y
B	C	6.01 - Y	5.01 - Y	B	C	7.08 - Y	6.08 - Y
B	D	7.01 - Y	6.01 - Y	B	D	8.08 - Y	7.08 - Y



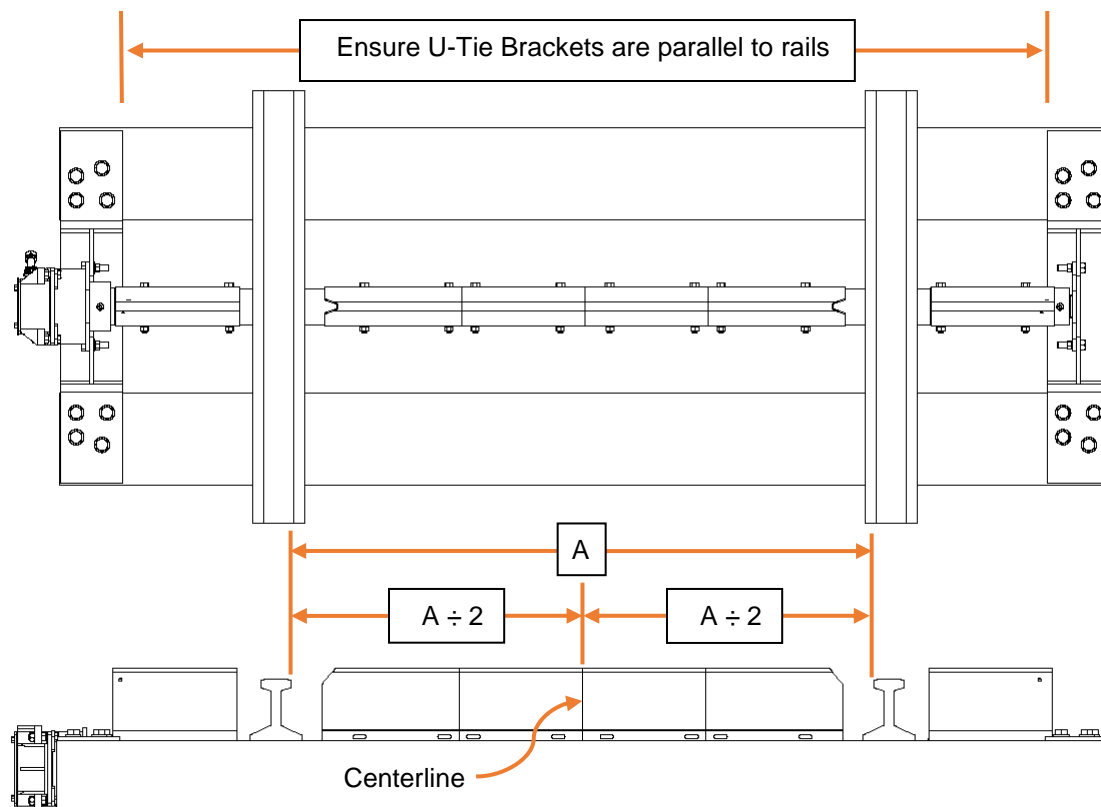
- Due to variations in tie-plate thickness & styles, you must measure the height from the top of the rail to the top of the tie, and subtract that value from the number in the table above.
 - **Example:** If you have a 2-bolt U-Tie, and your "Y" measurement is 6.6 inches, and used holes A & C, the "End" actuator would be; $(7.01 - 6.6 = 0.41)$ 0.41 inches above the top of the rail.
 - **Example:** If you have a 2-bolt U-Tie, and your "Y" measurement is 6.6 inches, and used holes B & C, the "End" actuator would be; $(6.01 - 6.6 = -0.59)$ 0.59 inches below the top of the rail.
- Values are in "inches", above or below (-) the top surface of the rail.
- It is common to locate the "End" actuators equal or just below the top surface of the rail, and the "Middle" & "Center" actuators 1" below the top surface of the rail.
- Follow your companies' standards when locating actuator height(s).
- Use 180532-000 Actuator Bolt Kit upon reassembly of Actuators.



2.4.3 Alignment & Mounting

Dragging Equipment Detectors are manufactured to operate properly while allowing a considerable amount of misalignment. Here are the important considerations:

1. The selected ties should be level with each other, are of the proper length, and aligned perpendicular to the rails.
2. The U-Tie Brackets should be parallel to the ties before being fastened in place. Failure to align brackets properly could cause damage to the DED bearings.
3. The DED should be mounted on the U-Tie Brackets so that the finished installation is level with, and centered between the rails.
4. Measure for proper alignment across the rails. Centerline of DED should be half the distance across the rails, as shown below.
5. Measure from the inside edges of each U-Tie Bracket to ensure brackets are parallel.
6. Using the holes in the U-Tie Brackets as a guide, drill the mounting holes.
 - a. Ensure drilled holes are properly sized for the lag screw diameter you plan to use. PRS recommends using $\text{Ø}3/4" \times 4"$ lag screws, with a flat washer.
7. Fasten the U-Tie Brackets to the ties:
 - a. Use a minimum of one lag screw on each corner of each U-Tie Bracket.
 - b. You may use the optional 113049-000 Bolt Kit, instead of lag screws.
 - i. Follow instructions included in kit.
8. See *Section 2.5 Electrical Connections* on page 18.
9. End Installation procedure.

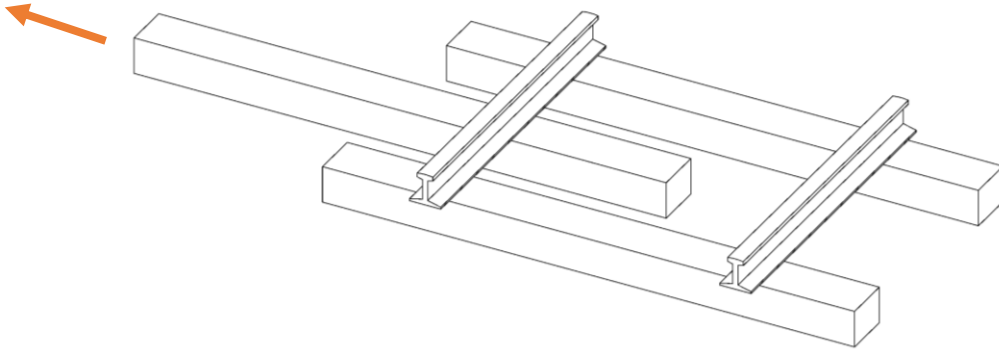


Note: Make alignment adjustments before drilling holes in the ties.

Note: While tightening the lag screws (or bolts), check alignment to prevent stiff or rough operation by manually turning the actuators in both directions.

2.4.4 In-Tie Dragger Installation

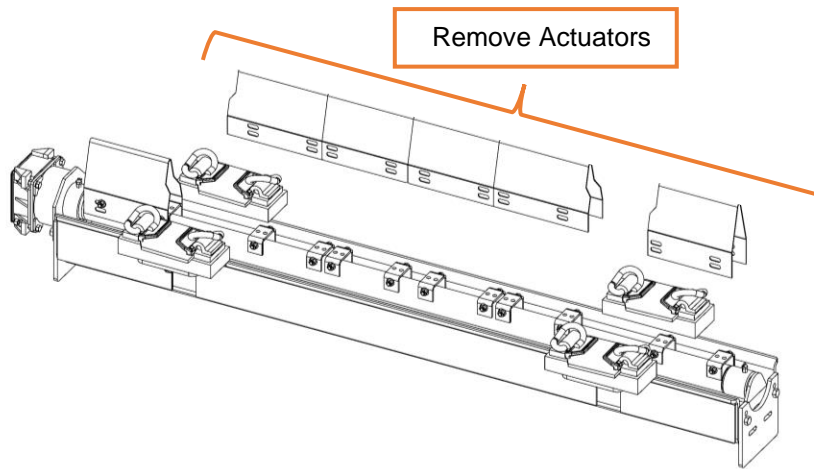
1. Remove wooden or concrete tie from track location where In-Tie DED is to be installed.
 - a. Clear ballast from removed tie location to provide enough room to slide In-Tie DED under both rails.



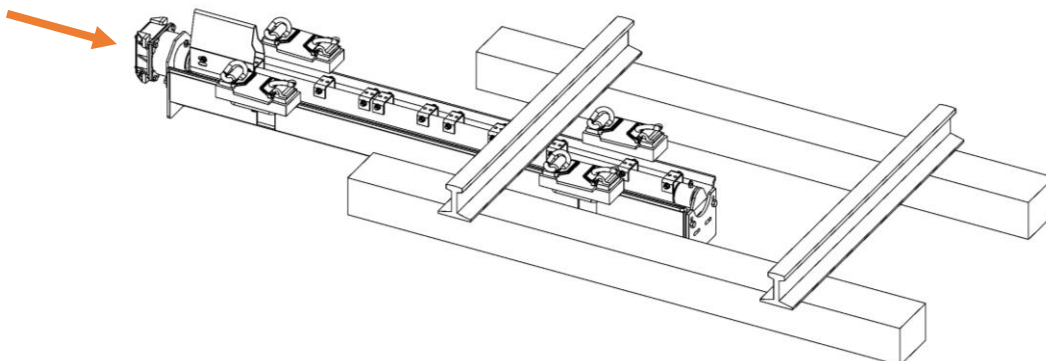
2. Remove Paddles from In-tie DED.

Note: Determine the proper height setting for the equipment (see Table 2-2).

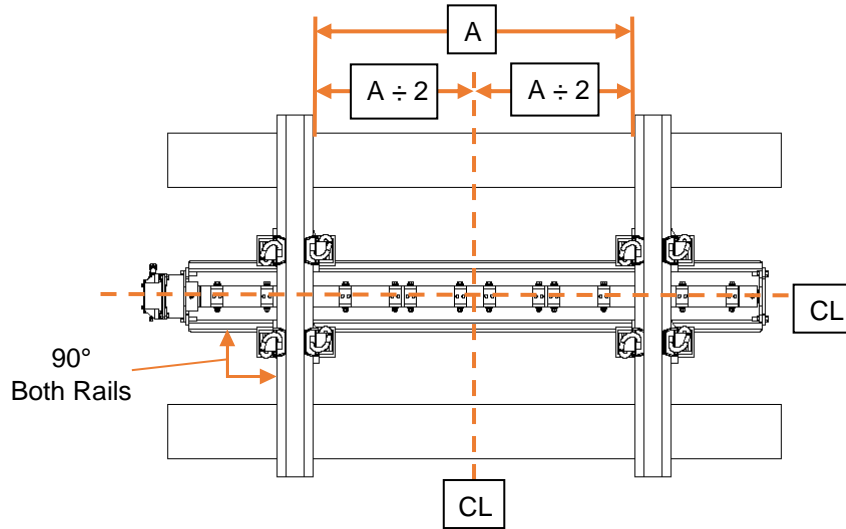
Note: Actuator at Head End of DED does not need to be removed.



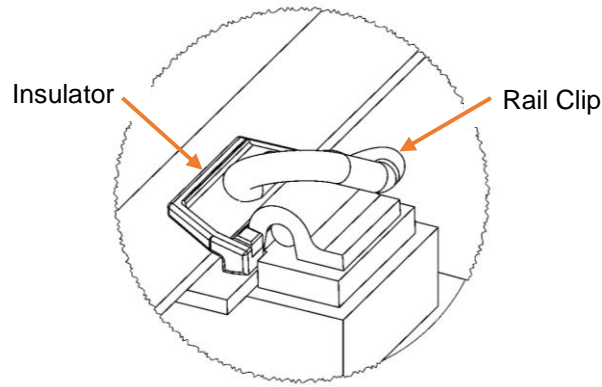
3. With actuators removed, slide In-Tie DED under rail.
 - a. Continue until In-Tie DED is positioned under both rails.



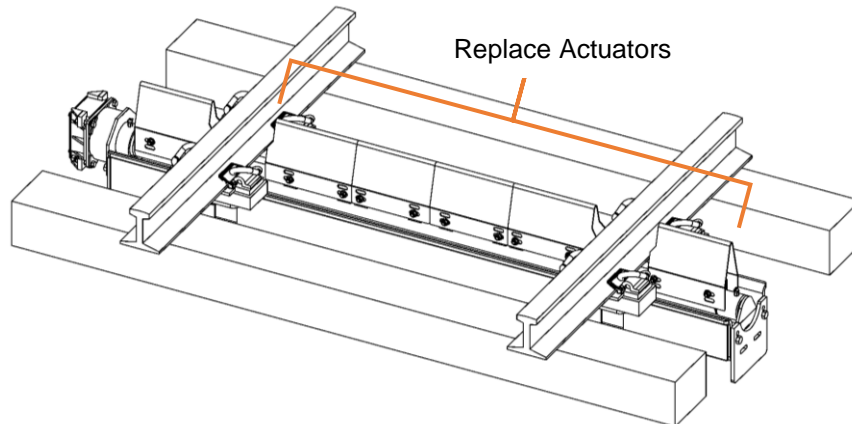
4. Position rail clamps on all sides.
 - a. Square In-Tie DED to the rail.
 - b. Be sure to maintain normal tie spacing.



5. Install insulators and rail clips in all 8 locations. Be sure not to increase or decrease rail gauge.



6. Re-install actuators to In-Tie DED. See Table 2-2 for actuator height placement.



7. Check alignment to prevent stiff or rough operation by manually turning the actuators in both directions.
8. See *Section 2.5 Electrical Connections* on page 18.
9. End In-Tie Installation Procedure.

Table 2-2, Actuator Height (In-Tie Draggers)

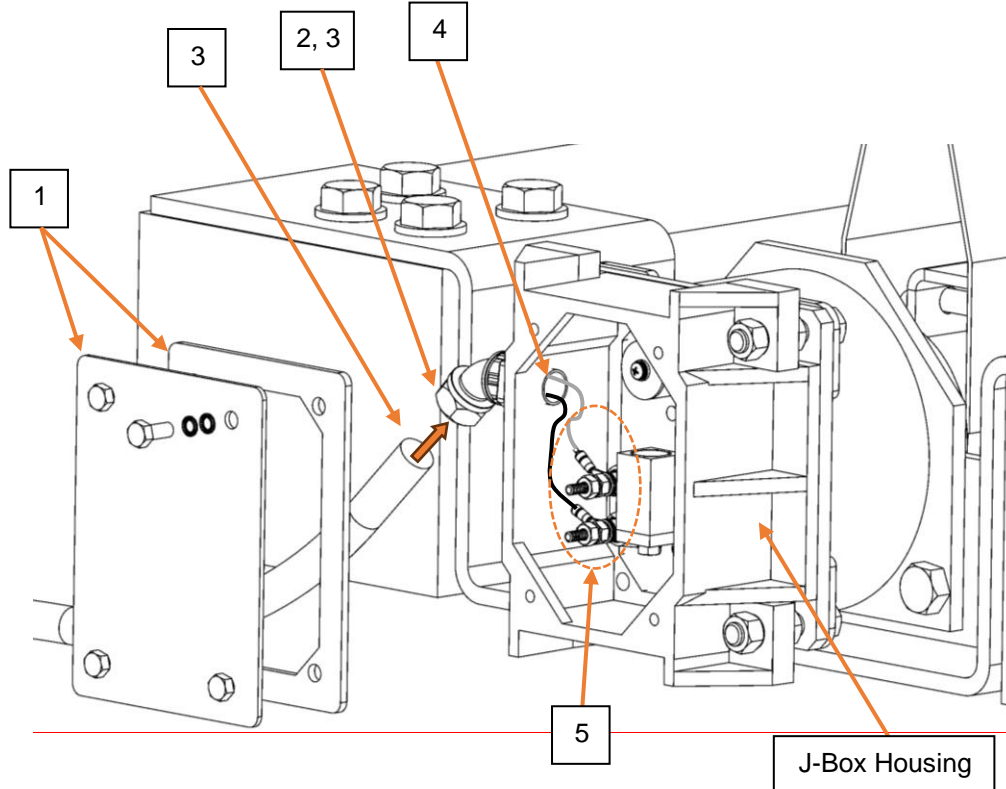
In-Tie				
Rail Weight	U-Tie Bracket Bolt Holes	Paddle Bolt Holes	Paddle Height "E"	Paddle Height "M-C"
#100	A	C	1.19	0.19
	A	D	2.19	1.19
	B	C	0.19	-.81
	B	D	1.19	0.19
#112	A	C	0.56	-0.44
	A	D	1.56	0.56
	B	C	-0.44	-1.44
	B	D	-.56	-0.44
#115	A	C	0.56	-0.44
	A	D	1.56	0.56
	B	C	-0.44	-1.44
	B	D	-.56	-0.44
#132	A	C	0.06	-0.94
	A	D	1.06	0.06
	B	C	-0.94	-1.94
	B	D	0.06	-0.94
#136	A	C	-0.12	-1.12
	A	D	0.88	-0.12
	B	C	-1.12	-2.12
	B	D	-0.12	-1.12
#141	A	C	-0.25	-1.25
	A	D	0.75	-0.25
	B	C	-1.25	-2.25
	B	D	-0.25	-1.25

2.5 Electrical Connections

Note: Electrical Connections are the same for both MagAmp and Contact type switches.

Note: For DEDs with MagAmp Switch types, see *Section 3.1 MagAmp Controller Wiring*.

1. Remove J-Box Cover and Gasket.
2. Remove conduit nut from elbow.
3. Connect conduit to elbow, and tighten nut.
4. Feed wire through inlet on junction box housing.
5. Attach wires to AAR posts using ring terminals.



2.6 Check Installation and Verify Performance

1. Check the effectiveness of the installation by manually actuating the equipment in both directions to ensure the switch is functioning properly.
2. Reinstall the J-Box Cover and Gasket.
3. The Electrical Connections installation procedure is complete.

Note: The DEDs switch is calibrated at the factory. However, you may need to further adjust the switch settings to properly activate the circuit, depending on your specific setup.

For MagAmp type switches:

- See *Section 3.1 MagAmp Controller Wiring* (Page 19)
- See specifications in *Section 3.4 MagAmp Switch Adjustment Procedure* (Page 22)

For Contact type switches:

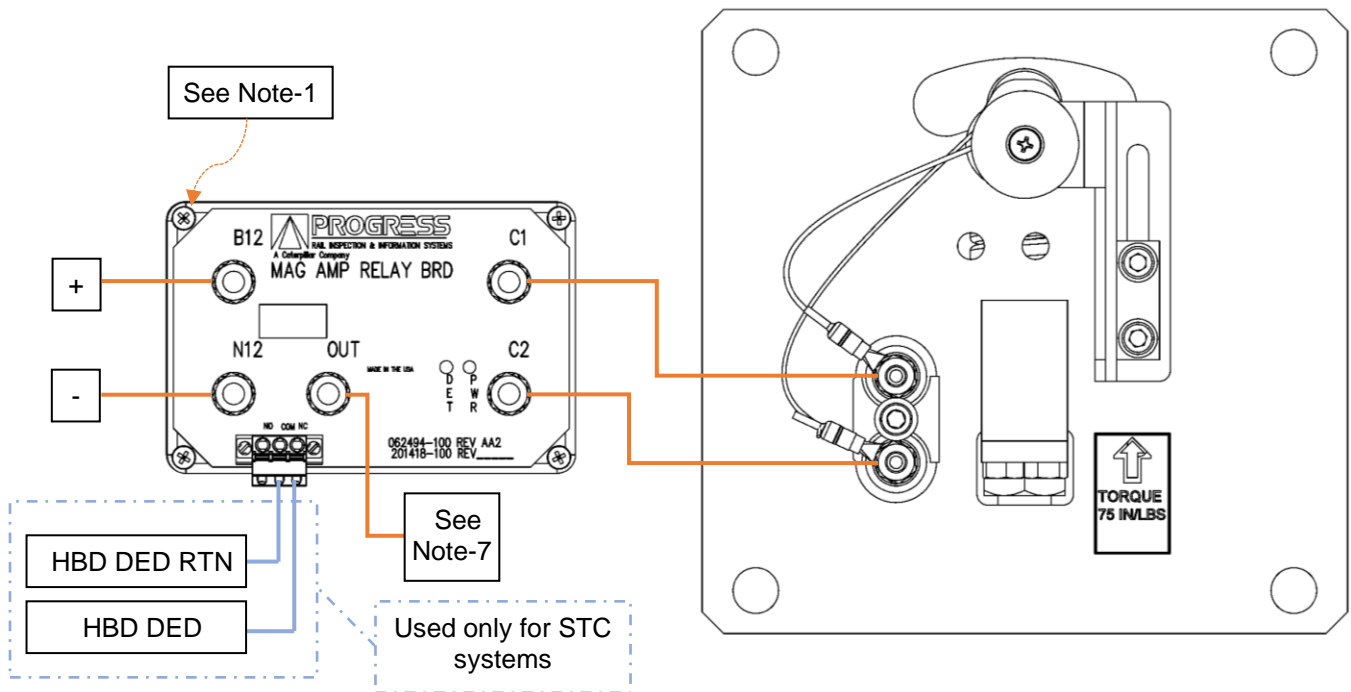
- See *Section 3.5 Contact Switch Adjustment Procedure* (Page 23)

Section 3 – Switch Installation and Adjustment

3.1 MagAmp Controller Wiring

Note: If installing the MagAmp Controller to an STC (Southern Technology Corp.) panel, see Step 8 below.

1. Remove MagAmp Controller cover (4X Phillips-head screws).
2. Mount to wall using 2X #10 screws (not shown).
3. Replace MagAmp Controller cover.
4. Connect coil wires to C1 and C2 on the Magamp Controller.
5. Connect MapAmp Controller B12 terminal to Micro HBD Positive.
6. Connect MapAmp Controller N12 terminal to Micro HBD Negative.
7. Connect MagAmp Controller OUT to Micro HBD P1-1, or FIP P13-5 (if FIP Panel is used).



8. STC Systems Only:
 - a. Do not use MagAmp Controller OUT terminal.
 - b. For NC configurations, connect MapAmp Controller Relay Board NC Terminal to the STC Dragger Input.
 - c. For NO configurations, connect MapAmp Controller Relay Board NO Terminal to the STC Dragger Input.
 - d. Connect MagAmp Controller Relay Board Com terminal to DED Com.

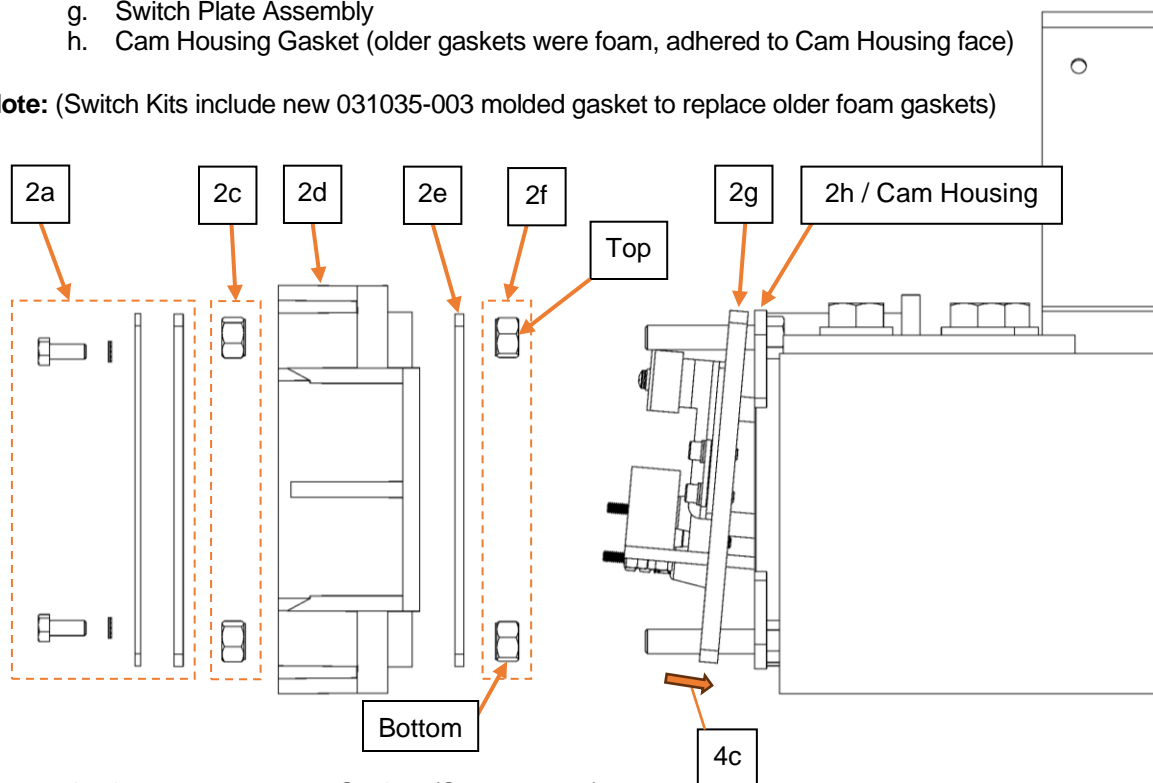
3.2 Switch Replacement or Upgrade Installation

Note: This procedure is the same for both MagAmp and Contact type switches.

Note: See page 21 for Cam Replacement procedure.

1. Remove power from DED.
2. Remove the following components:
 - a. Cover, Screws, Ramp Washers, and Gasket
 - b. Wiring from AAR posts (see page 18)
 - c. J-Box Housing Nuts
 - d. J-Box Housing
 - e. Gasket
 - f. Switch Plate Assembly Nuts
 - g. Switch Plate Assembly
 - h. Cam Housing Gasket (older gaskets were foam, adhered to Cam Housing face)

Note: (Switch Kits include new 031035-003 molded gasket to replace older foam gaskets)



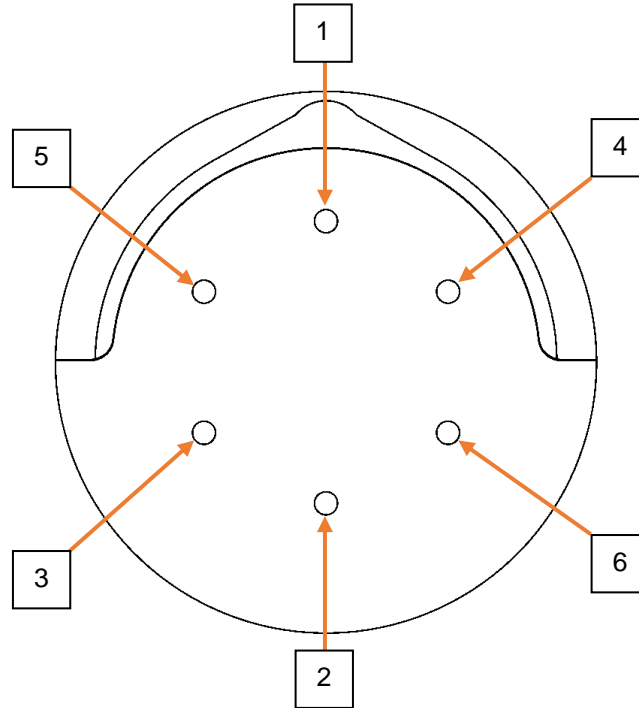
3. Apply new 031035-003 Gasket. (See page 32.)
4. Install the new Switch Plate Assembly.

Note: If installing a new Cam, see *Cam Replacement Procedure* on page 21 prior to continuing.

 - a. The Switch Plate Assembly must be angled as shown in the image above and then slid into place. Ensure the Switch Plate Assembly top edge is against the Cam Housing.
 - b. Tighten the Top Switch Plate Assembly Nuts (**2e**) such that they contact the Switch Plate Assembly.
 - c. Tighten the Bottom Switch Plate Assembly Nuts (**2e**) such that they force the bottom of the Switch Plate Assembly towards the Cam.
 - d. The Die Spring will compress the Cam Follower against the Cam.
 - e. Re-Tighten both top and bottom nuts.
5. Replace components “**2c**” through “**2e**” in reverse order.
 - a. See page 18 for additional views of completed assembly.
6. Replace wiring, and apply power.
 - a. See pages 22 and 23 for electrical connections and adjustment.
7. Replace Gasket, Cover, Ramp Washers, & Screws (2e).

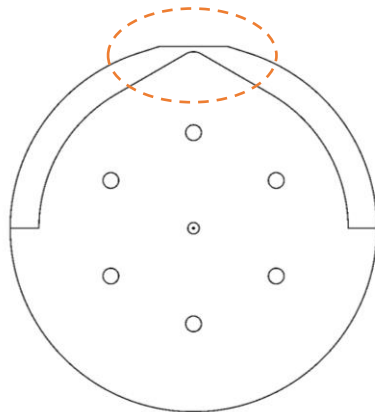
3.3 Cam Replacement Procedure

1. If replacing the Cam, use the following instructions in addition to the *Switch Replacement or Upgrade Installation* instruction on page 20.
2. Perform steps 1 & 2 on page 20.
3. Remove 6X bolts that hold the Cam in place. Discard 6X bolts.
4. Install the new Cam using the 6X 1/4-28 X 1" Hex Head bolts w/ nylon patch included in kit.
 - a. Tighten the 6X bolts in the following order.
 - b. Re-tighten the 6X bolts in the following order.

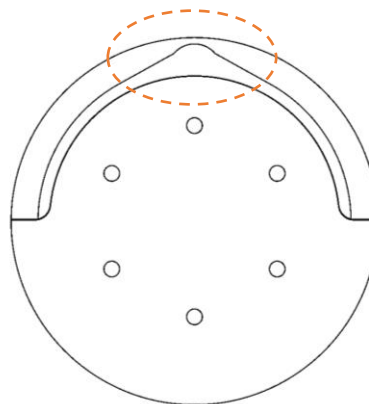


5. Continue steps 3 through 7 on page 20.

Note: Reference images below to determine the difference between a Legacy Cam and an Enhanced Cam.



Legacy "Cast"
Cam Profile



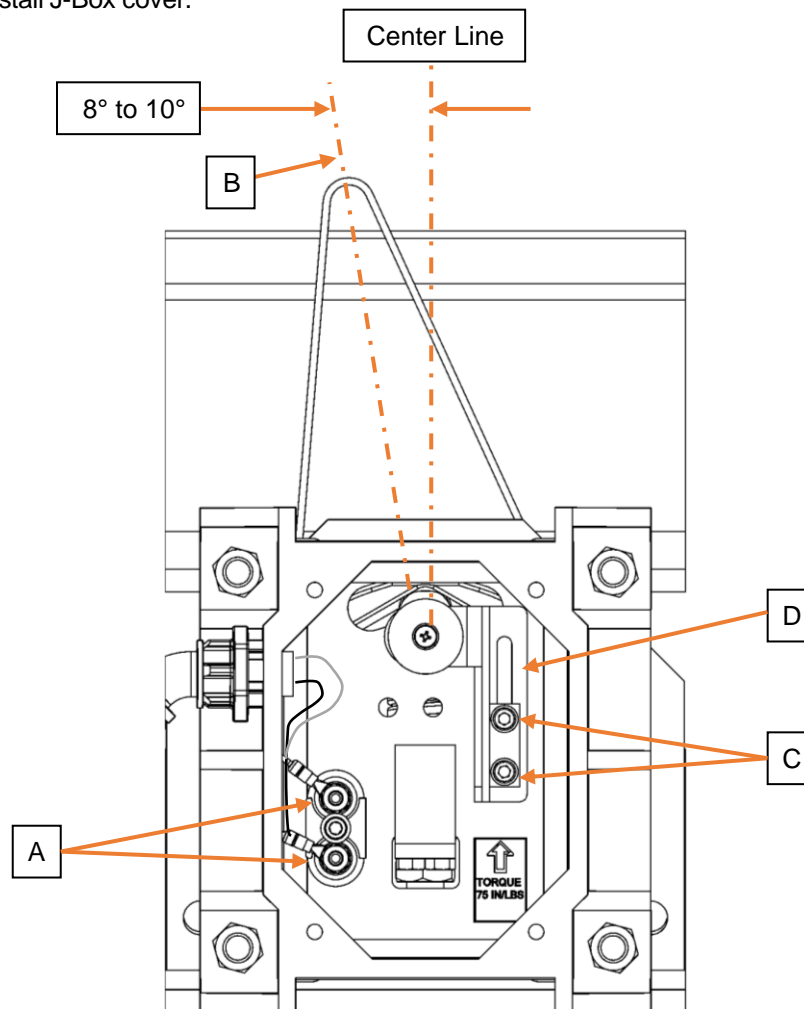
Enhanced "Machined &
Hardened" Cam Profile

3.4 MagAmp Switch Adjustment Procedure

Note: MagAmp switches are Pre-Adjusted at the factory.

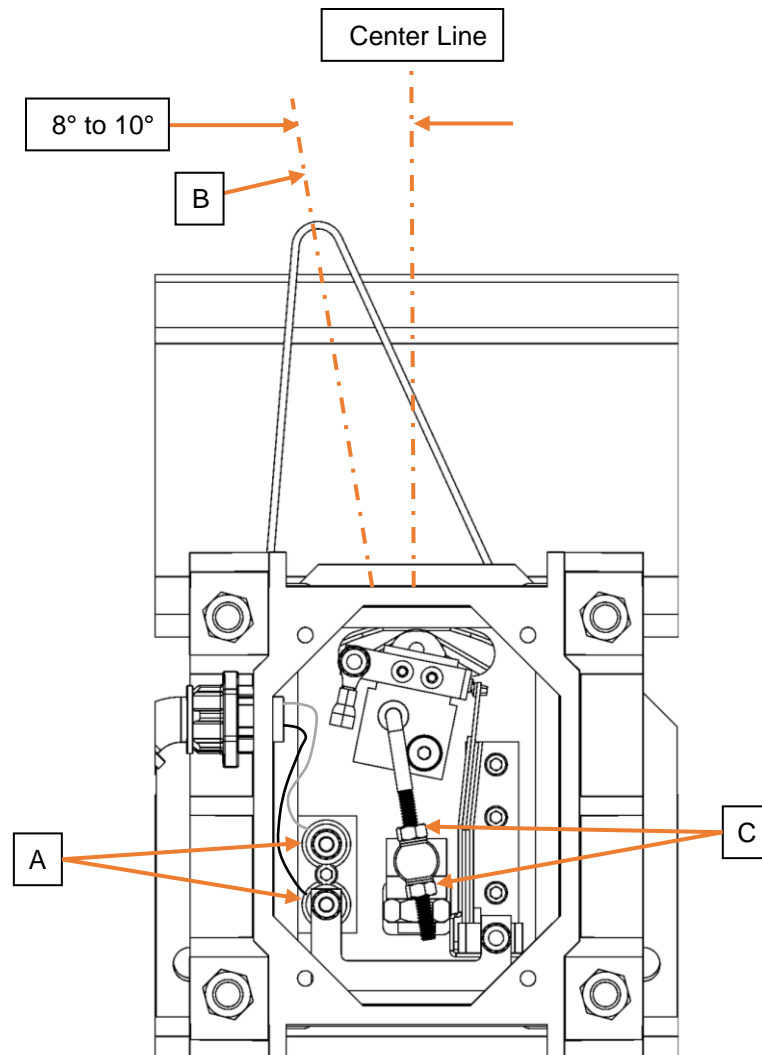
Note: Use this procedure only if MagAmp does not trigger the controller when DED is actuated.

1. Refer to image below and the *MagAmp Switch Parts List Diagram* on page 33.
2. Apply power to the MagAmp Controller.
3. Connect volt-meter to terminal post (A) and set to read AC volts.
 - a. Use a Fluke 87 or equivalent meter.
 - b. Other meters AC frequency range should be at least 5000 Hz. Otherwise call PRS for instructions.
4. Rotate Dragger actuators to 8-10 degrees (B) and hold in place.
 - a. See Manual Actuation Tool Kit on page 26. Measure with digital angle gauge.
5. Loosen MagAmp coil bracket 1/4-20 screws (C).
6. Adjust MagAmp coil bracket (D) up or down until 1.9 volts +/- .2 volts AC is achieved.
 - a. Due to variations in manufacturing, your MagAmp may require adjustment beyond $1.9 \pm .2$ volts. Ensure MagAmp controller is triggered when DED is actuated 8-10 degrees.
7. Tighten the MagAmp coil bracket 1/4-20 screws (C). Torque to 75 in/lbs.
8. Release actuators to upright position.
9. Re-install J-Box cover.



3.5 Contact Switch Adjustment Procedure

1. Refer to image below and the *Contact Switch Parts List Diagram* on page 35.
2. Apply power to the Contact Switch.
3. Connect volt meter to terminal post (A) and set to read DC volts.
4. Rotate Dragger actuators to 8-10 degrees (B) and hold in place.
 - a. See Manual Actuation Tool Kit, page 26.
 - b. Measure with digital angle gauge.
5. Loosen Linkage Nuts (C).
6. Adjust Linkage Nuts such that the contacts make an open circuit.
 - a. For adjusting Normally Open Switches, adjust Linkage Nuts until contacts creates a closed circuit.
7. Tighten Linkage Nuts (C).
8. Release actuators to upright position.
9. Re-install J-Box Cover.



Section 4 – Maintenance & Troubleshooting

4.1 Recommended Tools for Maintenance

- AAR Wrench
- 7/16" Socket Wrench
- 7/16" Open End Wrench
- 5/8" Open End Wrench
- Ratchet
- 1/2" Open End Wrench
- 3/4" Deep Well Socket
- 3/4" Combination Wrench
- 9/16" Open End Wrench
- 3/16" Hex Bit Socket (1/4" Drive) (McMaster-Carr # 54875A58)
- 1/4" Drive Socket Extension (Min. 3in long)
- 0-150 In/Lb Torque Wrench (Part Number 095125-000)

4.2 Performance Inspections

For maximum operating effectiveness, follow the recommended periodic maintenance schedule and tasks listed in the table.

Table 4-1, Recommended Periodic Maintenance

Time Schedule	Definition of Task
1 Month Intervals	Manually operate the actuators to check switch operation. Make repairs as required. Consider using Progress Rails' DED Manual Actuation Tool Kit. See page 26-for details.
	Inspect actuators for alignment, physical damage, and loose or missing hardware. Adjust, repair, or replace damaged actuators.
6 Month Intervals	All 1 Month Interval Tasks
	Inspect switch assembly parts for loose electrical connections. Tighten if necessary.
	If switch plate viewing window is available, apply white lithium grease to Cam Follower with a brush.
	If switch plate does not have a viewing window, remove the switch plate (see page 20), and apply white lithium grease to the Cam Follower and Cam with a brush.
	For In-Tie DEDs, clean metallic dust away from clip insulators to prevent shunting across tracks.
	Check bearing grease per the procedure below.

4.2.1 Checking Bearing Grease

1. Manually actuate the DED several times in both directions to loosen grease.
2. Remove Grease Zerks & Bushings (see page 32) on both ends of DED.
3. Use a cotton swab or similar object to ensure each bearing cavity is filled with grease, and has not hardened. (Grease should have the consistency of toothpaste).
4. Re-install Grease Bushings & Zerks.
5. If needed, add bearing grease through the Grease Zerk until a small amount of grease comes out of the over-fill outlet of the zerk.
6. Add grease slowly, manually actuating the DED in both directions between each pump, to ensure the bearing cavity is evenly filled. Adding grease too fast can cause damage to the bearing seals.

4.3 Troubleshooting

Symptoms	Cause	Solution
Main Shaft: 1) Returns to vertical position slowly. 2) Does not return to vertical position smoothly. 3) Does not return to vertical position on its own.	Weather / Ice & Snow	Ensure proper drainage from below DED area. Ensure snow pack or ice dams are not contacting the DED. Consider using Pan Heaters or Cal Rod to keep DED ballast free of ice and snow.
	A ballast build-up exists under the unit	Remove excess ballast or other debris from area of the main shaft. Ballast should not contact the main shaft. Ensure no part of the DED is rubbing on ties, brackets, etc.
	Actuators rubbing	
	Detent Cam and / or Switch Plate Cam Follower has excessive wear	Utilize viewing window in Switch Plate to inspect the Cam and Cam Follower bearing surface. (See image on page 8) If your Switch Plate does not have a viewing window; Replace Switch Assembly and Cam with Enhanced Version. See <i>DED Parts Matrix</i> , on page 28. Ensure Cam Follower is not damaged. Ensure Cam Follower is tight against the Cam Detent. See <i>Cam Replacement Procedure</i> on page 21.
Main Shaft Bearing Races have excessive wear	Replace bearings using Main Shaft Replacement Kit. See further details on page 37.	
4) Main Shaft is loose, or has "play" in any direction.	Main Shaft Bearing Races have excessive wear	Replace Main Shaft using Main Shaft Replacement Kit. See further details on page 37.
5) Actuators are missing, or damaged.		Replace the damaged Actuator Paddles, Bolts, & Nuts. See parts table(s) on page 28 and 29.

Note: Recommended torque range is 115±15 ft/lbs.

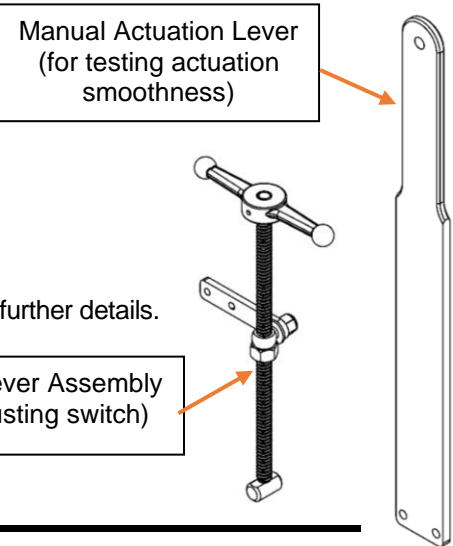
Torque may be checked using the 180494-006 DED Calibration Kit.

4.4 Manual Actuation & Switch Setting Tools

The Manual Actuation Tools are a family of products designed to provide maintainers and technicians with an easy way to verify the smooth actuation of the DED, and simplify switch adjustment by holding the actuators at the required angle during switch setting procedures. With these tools, a single maintainer can perform these procedures.

Refer to the 100333-004 DED Manual Actuation Tools Use Guide for further details.

Consider using the 096090-000 Digital Angle Gauge when making switch adjustments.



WARNING

Do Not use Manual Actuation Tools if they show signs of damage or degradation. Inspect prior to each use. If the tools are showing signs of metal fatigue (especially the mounting holes or mounting pins), discard tools and replace with new ones.

Do not use these tools for anything other than their intended purpose.

Section 5 – Parts Catalog

5.1 Parts Catalog Introduction

5.1.1 About This Section

Use this section to determine which parts to order when replacement is necessary.

5.1.2 Using this Section

Find the part you need by looking at the illustrations, and determining the parts' item number. Match the item number in the illustration to the item number in the table to determine the part number. Order replacements per the Part Number.

5.1.3 To the Customer

The part numbers in this parts catalog are correct at the time this manual was released for publishing. It is our policy to constantly improve our equipment and, therefore, part numbers may change. When ordering replacement parts verify part number, quantity, and description with Progress Rail Customer Service.

PRS offers optional equipment, such as Ice Deflector systems and special hardware for mounting Dragging equipment Detectors on Concrete Ties. Please contact a customer service representative to assist you in determining the proper options necessary to meet your requirements.

5.1.4 To Order Service Parts

When you order service parts have the following information available: company name, telephone number, purchase order number, shipping address, billing address, part number, quantity, part name, and part description.

Contact Progress Rail Customer Service Department between the hours of 7:00am - 5:00pm, by calling toll free 1-888-701-3479 or by FAX (816) 795-0664. 3801-1 Selsa Rd, Independence MO, 64057.

5.1.5 DED Description Convention (see DED Parts Matrix on sheet-24)

ASSY, DED-{Mounting Method}, {Rail Gauge}, {Switch Type}, {Special Options}

- {Mounting Method}:
 - UT2 = 2-Bolt U-Tie Bracket
 - UT4 = 4- Bolt U-Tie Bracket
 - IT{x}_[xx] = In-Tie Clip Mount
 - {x} = Base Plate Width (i.e., 5.75", 6", etc.)
 - [1:xx] = Cant Angle (i.e., 1:20, 1:40, etc.)
 - CTIE = Concrete Tie Mounting Kit
 - CPAD = Concrete Pad Mounting Kit
- {Rail Gauge} = Rail Gauge (Inches from inside to inside of rails)
- {Switch Type} = Denotes switch configuration (MagAmp or Contact)
- {Special Options} (If blank, standard Actuators are used, and no special options are included)

5.2 DED Parts Matrix

DED Assembly Part #	Description	Switches					Actuators		
		200558-100	180505-014	203122-023	180505-008	180505-009	End (2X RQD).	Middle (2X RQD).	Center (2X RQD).
203123-000	ASSY, DED-UT4, 56-1/2", MAG-SW W/O CONTROLLER	-	-	X	A	-	021312-001	121228-001	121227-001
203123-000CN	ASSY, DED-UT4CN, 56-1/2", MAG-SW W/O CONTROLLER	-	-	X	A	-	021312-001	121228-001	121227-001
203123-001MTP	ASSY, DED-IT6_40, 56-1/2", MAG-SW W/O CONTROLLER	-	-	X	A	-	365-700008-0000	365-700009-0000	121227-001
203123-013	ASSY, DED-UT2, 56-1/2", MAG-SW W/O CONTROLLER	-	-	X	A	-	021312-001	121228-001	121227-001
203123-020	ASSY, DED-UT4CN, 56-1/2", MAG-SW W/O CONTROLLER	-	-	X	A	-	021312-001	121228-001	121227-001
250143-001	ASSY, DED-UT4, 56-1/2", CONT-SW	X	A	-	-	A	021312-001	121228-001	121227-001
250143-001M	ASSY, DED-UT4, 56-1/2", MAG-SW W/ CONTROLLER	-	-	X	A	-	021312-001	121228-001	121227-001
250143-001MCN	ASSY, DED-UT4CN, 56-1/2", MAG-SW W/ CONTROLLER	-	-	X	A	-	021312-001	121228-001	121227-001
250143-001MTP	ASSY, DED-IT6_40, 56-1/2", MAG-SW W/ CONTROLLER	-	-	X	A	-	365-700008-0000	365-700009-0000	121227-001
250143-003	ASSY, DED-UT4, 56-1/2", CONT-SW, HIGH LINE ACTUATOR	X	A	-	-	A	121226-001	121266-001	121265-001
250143-013	ASSY, DED-UT2, 56-1/2", CONT-SW	X	A	-	-	A	021312-001	121228-001	121227-001
250143-013M	ASSY, DED-UT2, 56-1/2", MAG-SW W/ CONTROLLER	-	-	X	A	-	021312-001	121228-001	121227-001
250143-019MTPY	ASSY, DED-IT5.75_20, 42-5/8", CONT-SW, YEL. ACTUATOR	X	A	-	-	A	260028-000Y	260028-000Y	NONE
250143-022	ASSY, DED-W/O MNTG, 42-5/8", CONT-SW	X	A	-	-	A	NONE	NONE	NONE
250143-024	ASSY, DED-UT2, 56-1/2", CONT-SW, OSD/ISD ACTUATOR	X	A	-	-	A	121227-001	121228-001	121227-001
250143-026	ASSY, DED-CTIE, 56-1/2", CONT-SW, UAE	X	A	-	-	A	365-700090-0000	365-700091-0000	365-700092-0000
250143-028	ASSY, DED-CPAD, 56-1/2", CONT-SW	X	A	-	-	A	021312-001	121228-001	121227-001
250143-313M	ASSY, DED-UT2, 56-1/2", MAG-SW W/ CONTROLLER, W/ BOLTS	-	-	X	A	-	021312-001	121228-001	121227-001

- - = Not Applicable
- "A" = Applicable (Used to upgrade from Legacy Switch Plate Assembly to Enhanced Switch Plate Assembly)
- "X" = Stand alone Enhanced Switch Plate Assembly (Only use if Enhanced kit has already been applied)
- See Page 29 for Switch Part Number Reference Table
- See Page 30 for Actuator Part Number Reference Table
- See Page 31 for Stand Alone Part Number Reference Table

5.3 Switch Part Number Reference Table

Switch Part Number Reference Table			
Category	Part #	Description	Notes
Contact Switch	180505-014	Enhanced Contact Switch, with Cam	This kit is used to upgrade DEDS with Contact Switches to be an Enhanced version. All DEDS with contact switches shipped in August of 2023 or after include these Enhanced parts. Prior Units should be upgraded using this kit. This kit includes an enhanced Contact Switch Assembly (200558-100), and Enhanced Detent Cam (022267-300).
	200558-100	Enhanced Contact Switch, without Cam	Stand-Alone Switch Assembly. Replaces obsolete Legacy version 250558-001.
MagAmp Switch	180505-008	Enhanced MagAmp Switch, with Cam (No Controller)	This kit is used to upgrade DEDS with MagAmp switches to be an enhanced version. All DEDs with MagAmp switches shipped in December of 2022 or after include these enhanced parts. Prior units should be upgraded using this kit. This kit includes an Enhanced MagAmp Switch Assembly (203122-023), and Enhanced Detent Cam (022267-300).
	180505-009	Enhanced MagAmp Switch, with Controller & Cam	This kit is the same as 180505-008, but also includes a MagAmp Controller (203084-001R)
	203122-023	Enhanced MagAmp Switch, without Cam	Standalone Switch Assembly. Replaces obsolete legacy version 203122-020.

- See pages 33 and 34 for MagAmp Switch Parts List
- See pages 35 and 36 Contact Switch Parts List

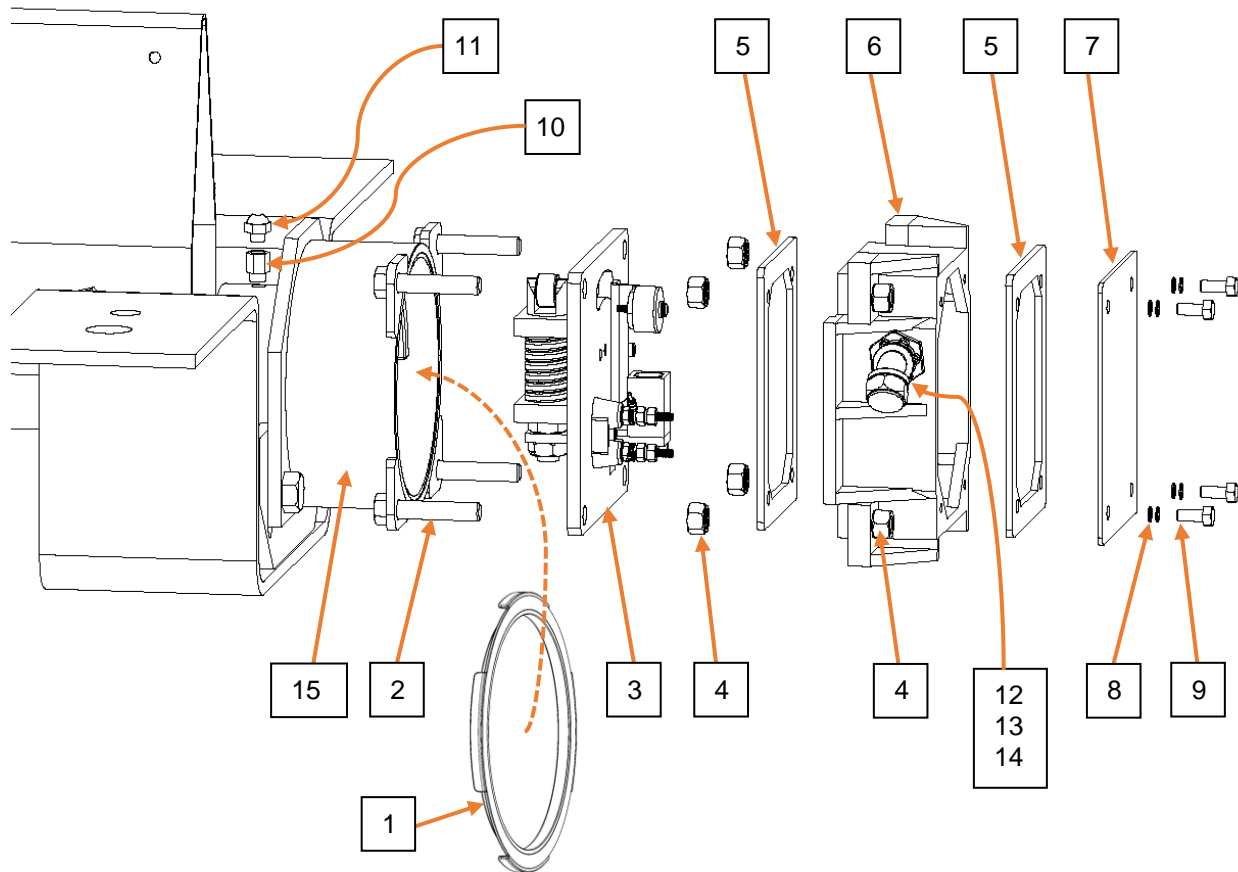
5.1 Actuator Part Number Reference Table

Actuator Part Number Reference Table		
Part #	Description	Notes
021312-001	Actuator, End, Black	Standard Version
121228-001	Actuator, Middle, Black	Standard Version
121227-001	Actuator, Center, Black	Standard Version
121226-001	Actuator, End, Black, High Line	Standard Version + 1" Reinforcement Bar
121266-001	Actuator, Middle, Black, High Line	Standard Version + 1" Reinforcement Bar
121265-001	Actuator, Center, Black, High Line	Standard Version + 1" Reinforcement Bar
260028-000Y	Actuator, End, Yellow	42-5/8" Version W/ Yellow Paint - Australia
260028-000Y	Actuator, Middle / Center, Yellow	42-5/8" Version W/ Yellow Paint - Australia
365-700008-0000	Actuator, End, Black, IN-TIE	
365-700009-0000	Actuator, Middle, Black, IN-TIE	
121227-004	Actuator, End, Black Epoxy	EU / UAE paint spec
121227-003	Actuator, Middle, Black Epoxy	EU / UAE paint spec
121227-002	Actuator, Center, Black Epoxy	EU / UAE paint spec
260035-000	Actuator, End, Wide (1600mm)	
260033-000	Actuator, Middle, Wide (1600mm)	
121227-001	Actuator, Center, Wide (1600mm)	

5.2 Stand Alone Part Number Reference Table

Stand-Alone Part Number Reference Table			
Category	Part #	Description	Notes
Stand-alone Parts	022267-300	Enhanced Detent Cam	Stand-alone Detent Cam. Replaces obsolete legacy version 022267-002.
	203084-001R	MagAmp Controller with Relay and Surge Protector	Stand-alone MagAmp controller. Mounts inside bungalow and interfaces with main processor.
	185005-010	Kit, U-Tie Bracket, Mounting Hardware with Ramp Washers	Use this kit when re-installing Main Shaft to U-Tie Brackets. This kit is included with all new units as of May 2023, but may be ordered and applied to older units as needed.
	180532-000	Actuator Flanged Bolt Kit	Flanged bolts and nuts to mount actuators
	180495-060	Kit, Magnetic Indicator	Kit to mechanically indicate if a DED has been impacted.
	260011-000	2-Hole U-Tie Bracket Weldment	
	021392-003	4-Hole U-Tie Bracket Weldment	

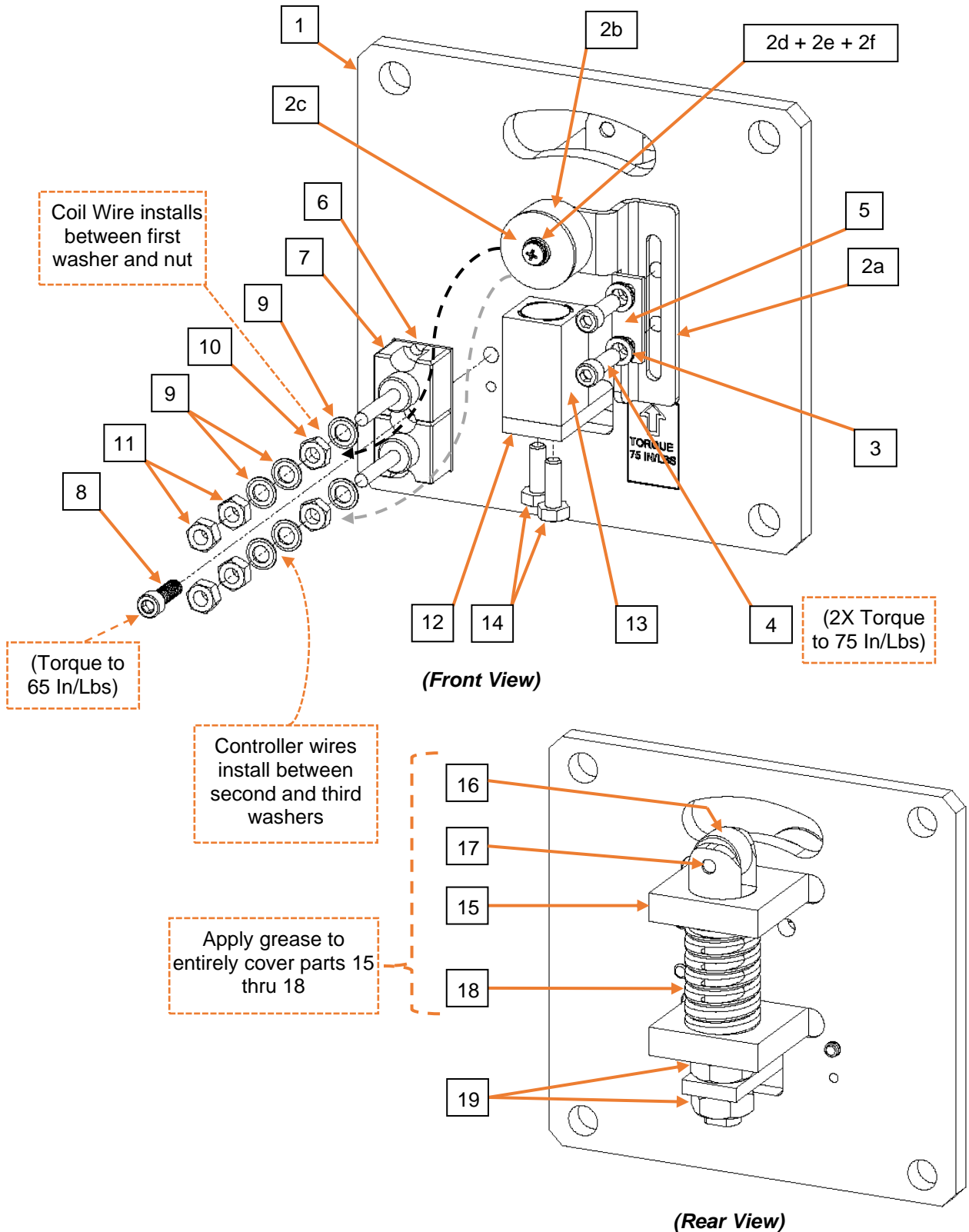
5.3 General Parts



GENERAL PARTS LIST TABLE

Item #	Qty.	Part #	Description
1	1	031035-003	Cam Housing Gasket, Molded
2	4	01035050	Hex Bolt, 1/2-13 X 2-1/2, GR5 ZN
3	1	See Page 29	Switch Assembly
4	8	01035049	Hex Nut, 1/2-13 X 2-1/2, GR5 CAD PL
5	2	031035-002	J-Box, Rectangular Gasket
6	1	260021-001	J-Box, Housing
7	1	021346-003	J-Box Cover
8	8	01023165	Washer, 5/16, Ramp
9	4	01020282	Hex Bolt, 5/16-18 X 3/4, 18-8SS
10	1	020052-001	Bushing Grease Fitting
11	1	005167-001	Grease Zerk Fitting, W/ Shut-off
12	1	005758-025	Hub Adapter, 3/4in
13	1	105448-000	45 Deg Conduit Connector for 3/4in Liquid-Tight
14	1	061014005	Cap, Protective Plug, Red
15	1	200186-001	Cam Housing
16	1	200259-000	Torque Rod (Not Shown)

5.4 MagAmp Switch Parts List Diagram



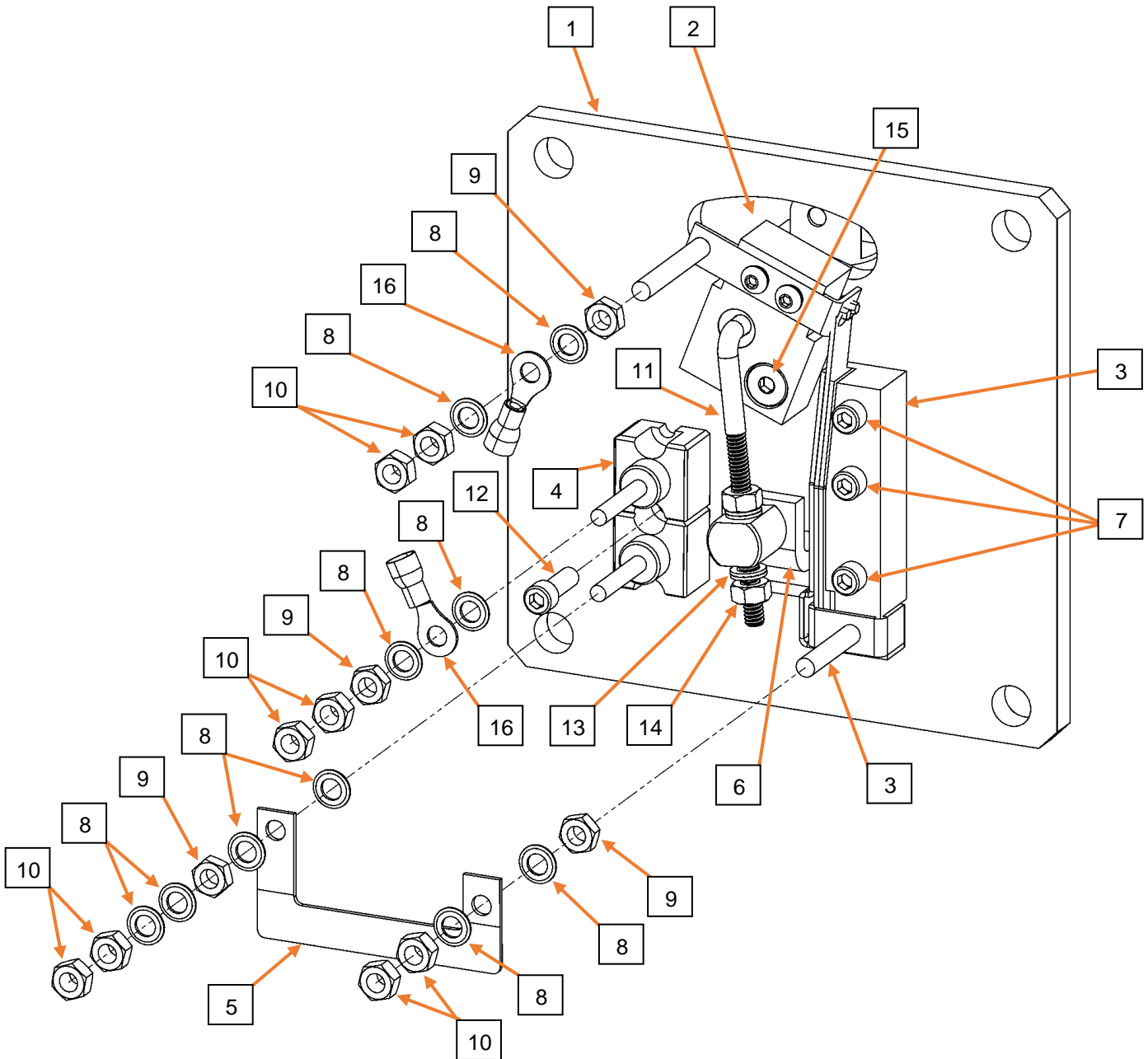
(See Parts List on following page)

5.4.1 MagAmp Switch Parts List

Item #	Qty.	Part #	Description
1	1	121050-005	Switch Plate, MagAmp
2	1	203083-020	Coil Bracket Assembly
*2a	1	124936-000	Coil Bracket
*2b	1	203080-001	Coil
*2c	1	365-100134-0000	Washer G-10/FR4 1.250"OD x .203"ID
*2d	1	152-008010-0438BC	Washer #10 Flat SS
*2e	1	013002-010	Washer #10 SS Internal Locking
*2f	1	151-008100-0105	Screw #10-32 x 1-1/4 SS W/ Patch
3	2	01023156	Washer 1/4 Ramp
4	2	013854-012	Screw 1/4-20 x 3/4 SHCS SS
5	1	065880-000	Washer Serrated Rectangular Double
6	1	365-220214-0001	Tape, Double Sided Foam, 1/16" x 1" Wide
7	1	032147-001	Terminal Post Double
8	1	013193-003	Screw 1/4-20 x 3/4 SHCS SS W/ Patch
9	6	013074-000	Washer 1/4" Flat AAR Spec
10	2	013079-000	Nut Hex Clamp 14-24 Nickel Plated
11	4	013073-000	Nut Acorn 14-24
12	1	065911-023	Pivot Arm MagAmp
13	1	203125-020	Magnet Holder Assembly
14	2	013194-002	Screw 1/4-20 x 3/4 HHCS SS
15	1	005168-001	Retainer Detent Slide Bearing
16	1	020053-001	Cam Follower
17	1	01025426	Pin 1/4" x 1" Dowel SS
18	1	005166-023	Die Spring 1-1/4" Hole x 2" LG Red
19	2	01035089	Nut 5/8"-18 Stover Thin
20	1	203084-000	Controller Assembly (See Page 19)

*Included with Item-2

5.5 Contact Switch Parts List Diagram



(Front View)

(See Parts List on following page)

Note: If replacing item-15, apply Loctite 242 to threads. Torque to 236 in/lbs.

Note: Parts on Rear of Contact Switch Assembly are identical to parts on Rear of Mag-Amp Switch Assembly (see page 34).

5.5.1 Contact Switch Parts List

Item #	Qty.	Part #	Description
1	1	121050-001	Switch Plate, Mechanical
2	1	**200270-001	**Pivot Contact Assy, N/C
3	1	200271-001	Assy Stationary Contact Block
4	1	032056-011	Terminal Strip AAR 2-Post
5	6	260024-000	Contact Strap DED-PH-BZ
6	1	200272-001	Assy DED Pivot Contact Linkage
7	3	01020056	Screw 1/4-20 X 1 SHCS SS
8	6	013074-000	Washer 1/4 Flat AAR
9	4	013079-000	Nut Hex Clamp 14-24 NI
10	4	013073-000	Nut Acorn 14-24
11	1	013239-001	Connecting Rod DED Switch
12	1	01024143	Bolt 1/4-20 x 3/4 SHCS SS
13	2	01023156	Washer ¼ Ramp
14	2	01022896	Nut ¼-20 Hex SS BO
15	1	01020283	3/8 x 1/2 Nylok Shoulder Bolt
16	2	01030044	Terminal Ring Lug for #10 Wire
^For items below, see "Switch Plate Assembly - Rear View" on page 33			
^15	1	005168-001	Retainer Detent Slide Bearing
^16	1	020053-001	Bearing Roller Cam Follower
^17	1	01025426	Pin 1/4" x 1" Dowel SS
^18	1	005166-023	Die Spring 1-1/4" Hole x 2" LG Red
^19	2	01035089	5/8"-18 Stover Thin CLR Lock Nut

Note: For Normally Open (NO) type switches, call Progress Rail Customer Service.

5.6 Bearing Seal Replacement Best Practice

5.6.1 Hardened Bearing Upgrades

In May of 2023 PRS began shipping new DED units with hardened bearing races. This change allows for longer bearing life. If your DED shipped prior to May of 2023, and the bearing races in your DED have reached the end of life (i.e., the main shaft no longer actuates smoothly), it is recommended to replace the related components with a Main Shaft Replacement Kit.

5.6.2 Main Shaft Replacement Kit

This kit includes the components noted in the table on page 37. All components are pre-assembled, and pre-greased from the factory. (180505-011 for Standard Gauge / 180505-012 for Narrow Gauge).

This kit allows the customer to re-use their existing Actuators (Paddles), Switch Assembly, U-Ties, and other components, while easily upgrading the bearing races with a pre-assembled kit.

5.6.3 Main Shaft Replacement Kit Considerations

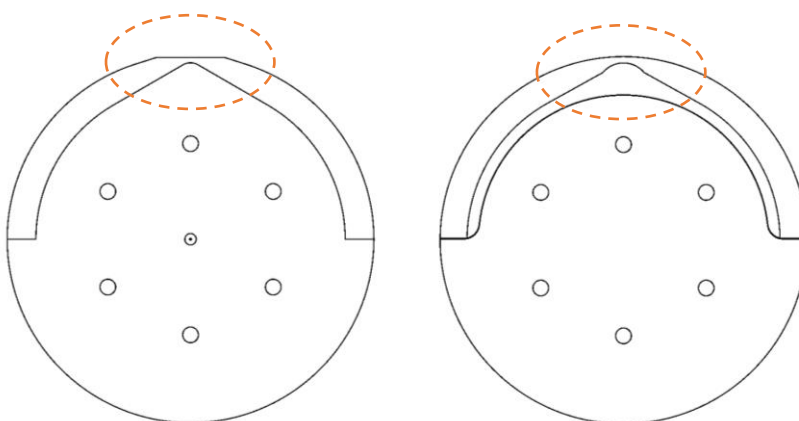
Tip: If you are considering order a Main Shaft Replacement Kit and have not already upgraded the Switch Assembly and Cam to the Enhanced version (see Notes section on page 29), it is recommended that you also upgrade to the Enhanced Switch Assembly and Cam at the same time. This will fully modernize your DED and provide the longest life for all components that are subject to wear due to friction & vibration.

5.6.4 Bearing Only Replacements

Since the introduction of the Enhanced Detent Cam, Enhanced Switch Assembly, and Main Shaft Replacement Kit(s), PRS no longer recommends replacing individual ball bearings and bearing seals.

Testing shows that the Enhanced kits provide longer life of the DED compared to the older style.

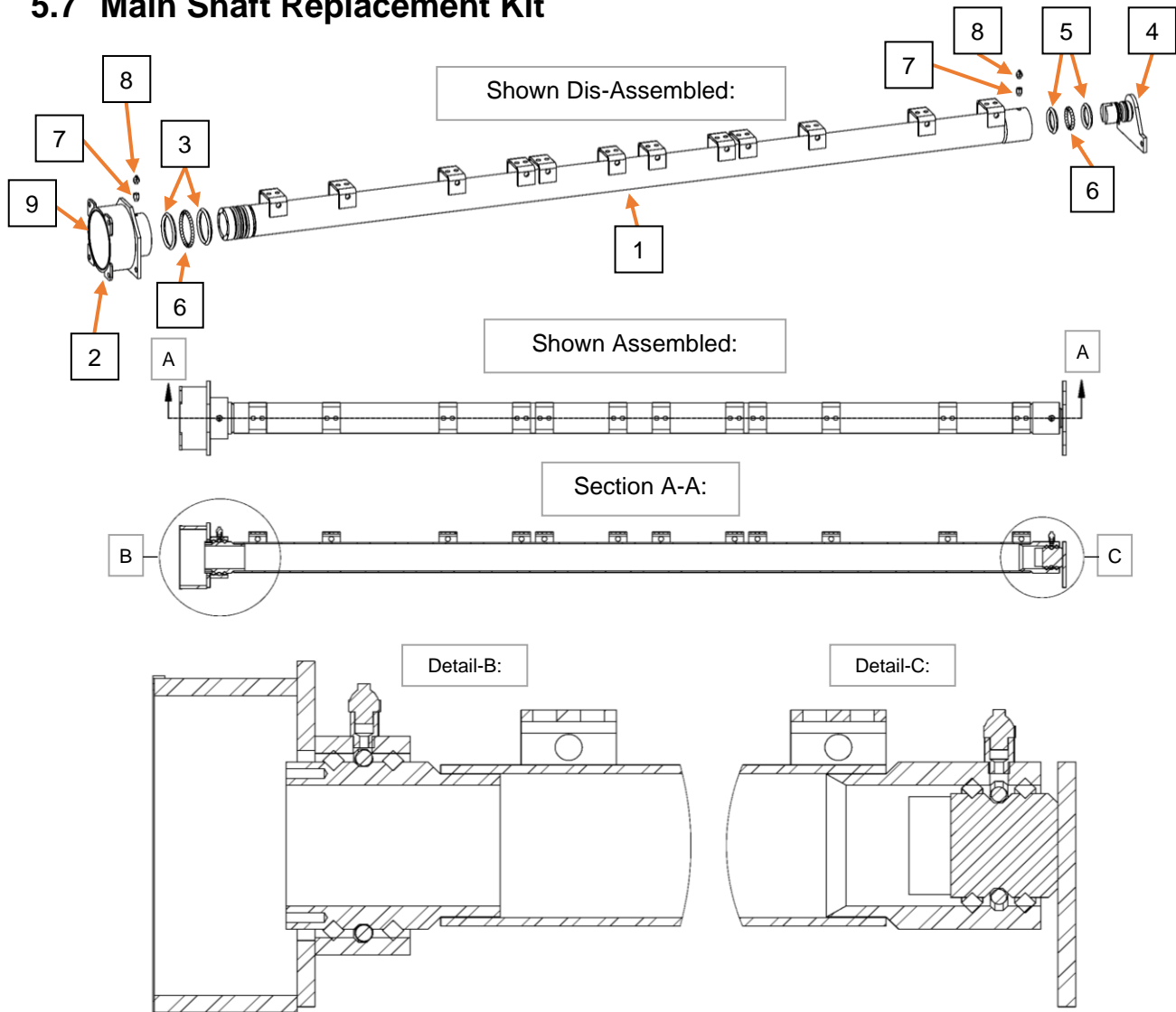
See page 21 for *Cam Replacement Procedure*.



Legacy "Cast"
Cam Profile

Enhanced "Machined &
Hardened" Cam Profile

5.7 Main Shaft Replacement Kit



Main Shaft Replacement Kit Parts List 180505-011 (Standard Gauge) & -012 (Narrow Gauge)			
Item #	Qty.	Part Number	Description
1A	1	200258-000	Main Shaft Weldment, 56-1/2" (Standard Gauge)
1B	1	260027-000	Main Shaft Weldment, 42-5/8" (Narrow Gauge)
2	1	200186-001	Pivot Weldment, Head End
3	2	031025-002	Bearing Seal, Head End
4	1	200257-000	Pivot Weldment, Tail End
5	2	031025-001	Bearing Seal, Tail End
6	52	020051-001	Ball Bearing, Ø3/8" SS
7	2	020052-001	Bushing, Grease Fitting
8	2	005167-001	Grease Zerk w/ Shutoff
9	1	031035-003	Cam Housing Gasket (Replaces older neoprene strip)
10	N/A	029353-000	Grease, Multi-Purpose (Not Shown)

Note: Main Shaft Replacement Kits come pre-assembled & pre-greased from the factory

5.7.1 Main Shaft Replacement Steps

1. Remove power to the switch.
2. Remove the following components and their respective mounting hardware. Set aside for re-use later.
 - a. J-Box Cover, Gasket, Ramp Washers, and Screws
 - b. Electrical Connections to Switch
 - c. Actuators (Note which hole positions were used)
 - d. J-Box Housing
 - e. Switch Plate Assembly
 - f. Torque Rod
 - g. U-Tie Mounting Hardware (Note which hole positions were used)
3. Remove the existing Main Shaft Assembly from under the rail.
4. Insert the new "Enhanced" Main Shaft Assembly under the rail.
5. Re-install components removed in step 2g thru 2b, in reverse order.
 - a. If choosing to also update Cam or Switch to enhanced versions, replace these parts during re-assembly.
 - b. Ensure that you install the updated 031065-003 Cam Housing Gasket as shown on page 32.
 - c. See *General Parts diagram* on page 32 as a guideline for re-assembly.
6. Re-apply power to the switch.
7. Prior to re-installing the J-Box Cover, test the system as described in *Section 2.6 Check Installation and Verify Performance* on page 18.
8. Re-install the J-Box Cover.