NEW YORK AIR BRAKE CORPORATION
A KNORR BRAKE COMPANY
748 Starbuck Avenue, Watertown, New York 13601

IP-227

USER MANUAL
FOR
END-OF-TRAIN DEVICE
NYAB P/N 781657
FOR
EP-60® EQUIPPED TRAIN

ISSUE NO. 1

MARCH 22, 2007

DOCUMENT REVISION SHEET

Revision Level	Section	Change	Date
01		INITIAL RELEASE	3/22/07

TABLE OF CONTENTS

1.0 SAFETY

To prevent physical injury or death, all personnel directly or indirectly involved with the operation of the equipment described in this Manual must conform to the following:

Observe all rules and regulations of the railroad where the equipment is being used. Whenever there is a conflict between the instructions in this manual and the instructions of the user railroad, the rules and regulations of the user railroad will govern.

When performing any operation of the equipment while it is on the vehicle, special precautions must be taken to ensure that vehicle movement will not occur which could result in injury to personnel and/or damage to equipment. Make sure the handbrake is applied and that the wheels are chocked to prevent vehicle from moving.

WARNING

230 VDC TRAINLINE POWER IS PRESENT. ALWAYS EXERCISE EXTREME CARE WHEN WORKING IN CLOSE PROXIMITY TO ELECTRICALLY ENERGIZED APPARATUS. TO PREVENT RECEIVING ELECTRICAL SHOCK, HANDS MUST BE CLEAR OF ELECTRICAL COMPONENTS, AND CONTACTS. FAILURE TO OBSERVE THESE SAFETY PRECAUTIONS CAN LEAD TO INJURY OR DEATH.

De-pressurize air system before performing any connection or removal of the equipment. Before installing or removing the equipment from its mountings, the train must be safely parked.

"Bottled" up air under pressure (even though air supply is cut off) may cause gaskets and/or particles of dirt to become airborne and an increase in sound level when the equipment is removed from the car. Personal eye and ear protection must be worn and care taken to avoid possible injury when performing any installation, removal or operation of the equipment.

Follow all WARNING, CAUTIONS, and NOTES found throughout this Manual to ensure that neither your safety, your fellow workers safety, nor that of the equipment will be jeopardized.

Person(s) having the appropriate job skill level, as governed by the user railroad, are required when performing service and/or operational tasks with the equipment.

2.0 Purpose

The intent of this User Manual IP-227 is to familiarize an End-User to identify and understand the basic operation and need of the End of Train Device, Combined (CEOT) for operation of an EP-60® equipped train. Instruct a User in the steps to install and remove the device from a train, activate after installation, and to change the battery(s) when needed.

What this manual does not provide is the expectant feedback status and train function to an EP60® Head-End-Unit or detailed characteristics for, and during, train operation. This manual does not include heavy repair maintenance, testing requirements or detailed functional descriptions.

3.0 Overview

The #781657 End of Train Device, Combined (CEOT) is for the operation of ECP equipped trains. The CEOT is mounted to the coupler of the last car of the train and connected into brake pipe trainline and ECP's Wire Trainline. Its' purpose is as follows:

- Provide ECP Trainline "termination."
- Provide ECP Trainline 'integrity' through ECP communications.
- Provide status of brake pipe pressure at the end of the train to ECP's Head End Unit.
- Provide status of ECP's Trainline Power at the end of the train to ECP's Head End Unit.
- Provide a visible "Marker Light" at the end of the train.

An optional radio frequency (RF) receiver, being AAR compliant, may be mounted within the lead locomotive cab for receipt of end of train status. AAR compliant receivers provide status for:

- Brake pipe pressure
- Marker Light status
- Motion detection
- Two-Way emergency initiation.

The CEOT is the design of New York Air Brake Corporation EP-60® end-of-train electronics within the enclosure of Union Switch & Signal Inc's Model 6699 Sense & Brake Unit. Details of RF operation is found in Union Switch & Signal Manual Service Manual #7075.

4.0 Description

The EP-60® End of Train Device, Combined provides functionality as specified and in compliance with the AAR ECP S-4200 performance specifications. The AAR trainline cable, inter-connection cables and junction boxes form the communications network foundation on which the EP-60® cable-based system is built. The trainline interconnection network is based on Echelon Corporation's LonWorks® PLT-22 network technology.

END-OF-TRAIN DEVICE USER MANUAL

The End of Train Device, Combined (CEOT) is a self contained, portable device that is moved and placed on the coupler of the last car making up an ECP equipped train. It is identified as the last device within the train. It occupies the Inter Car Cable connector and brake pipe connection of the car, therefore further cars could not be connected.

The CEOT uses trainline power to charge its batteries and to supply power to it's' electronics. The CEOT derives its' power from the batteries in the absence of trainline power. Communication is available when 230 VDC trainline power is active and also when it is not active. The CEOT generates a 'beacon' message transmitted throughout the train as an indication of trainline communication integrity. Status of level of trainline power available to the end of the train is provided to the head end of train for EP-60® control logic.

Brake pipe is used as a constant supply of air to the cars reservoir of an EP-60® train. This provides for near instantaneous response to locomotive braking commands as well as graduated brake release and re-applications. Status of level of brake pipe pressure available to the end of the train is provided to the head end of train for EP-60® control logic.

Figure 1 shows the main parts of the End of Train Device, Combined (CEOT)

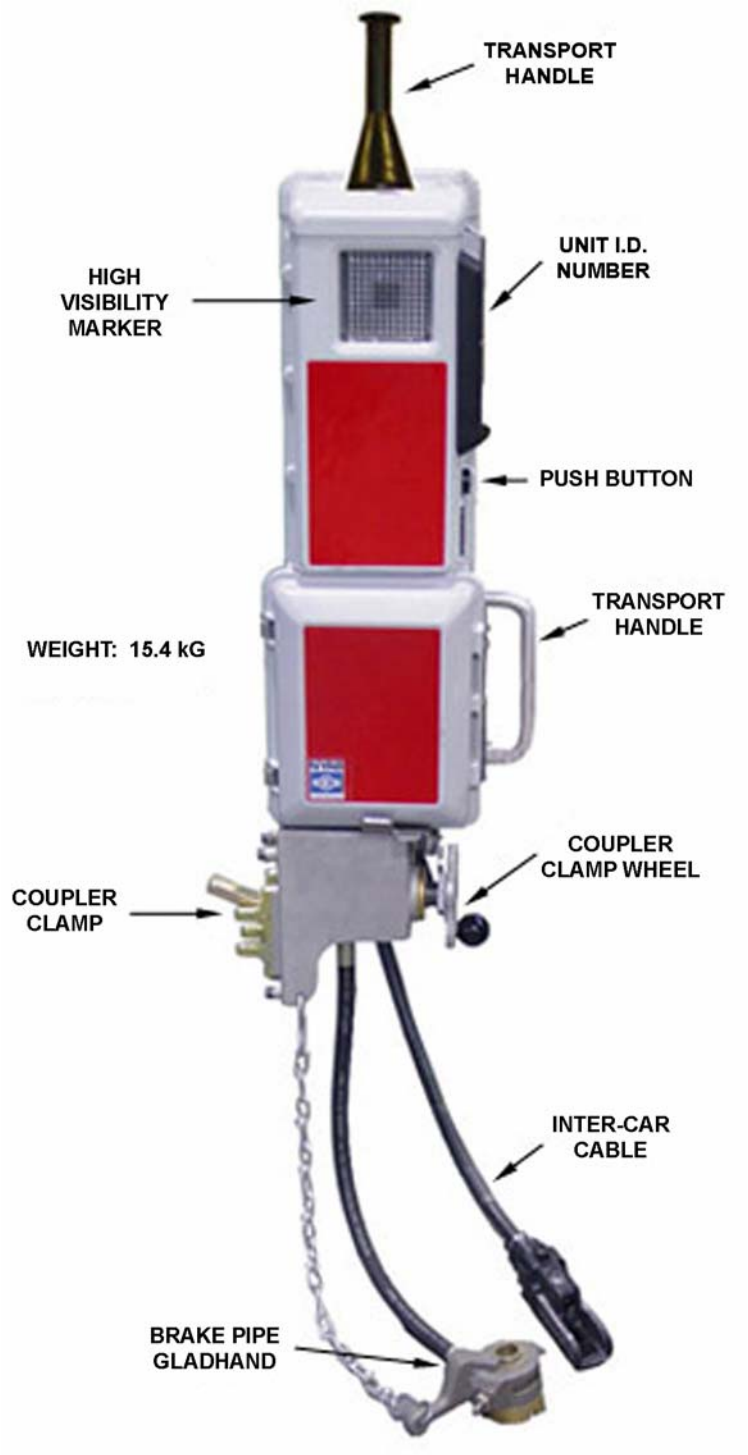

Figure12

5.0 INSTALLATION

1. Assure that ECP Trainline Power is not applied (ON).
2. Locate Coupler Clamp Mounting Position on coupler of last car in ECP equipped train as shown in Figure 2.

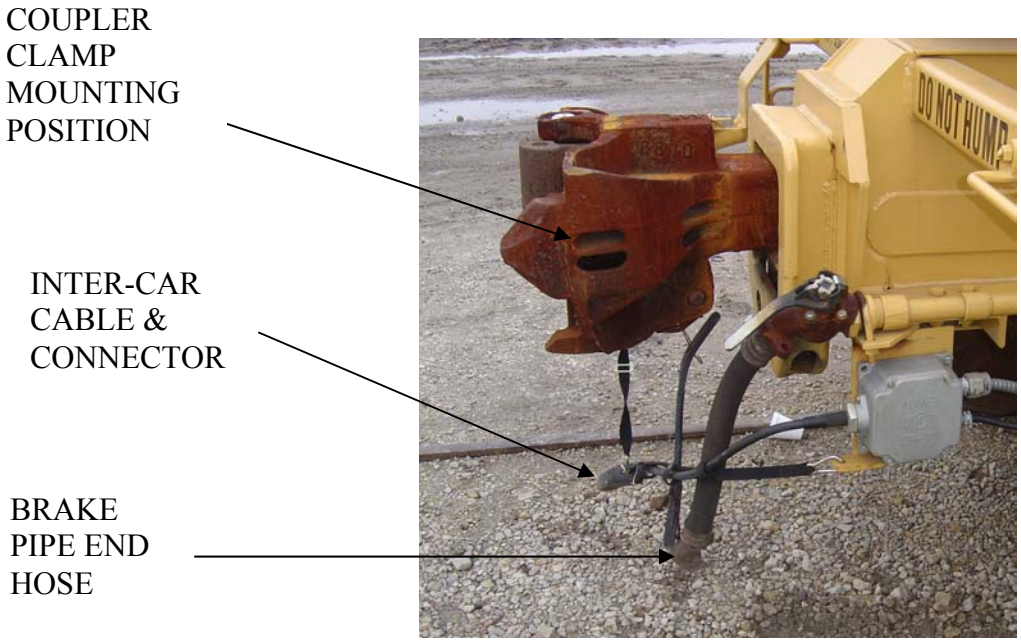

Figure 2

3. Release Clamp Lock by pulling downward. Turn Coupler Clamp Wheel counter-clockwise to fully extend Finger to perpendicular position (against stop). See Figure 3. Then set the Clamp Lock by allowing it to return upward against the Cover and engage the Coupler Clamp Wheel.

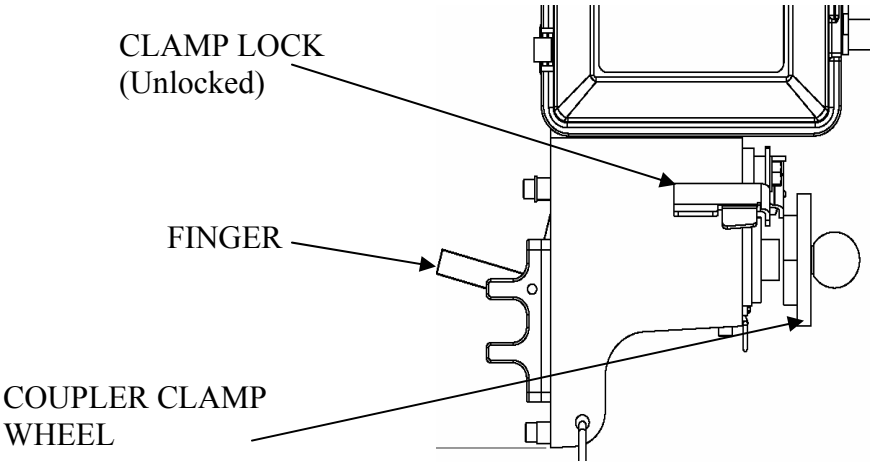

Figure 3

4. Set CEOT Clamp onto coupler with Finger extending into the upper clevis of the mounting position. Turn Coupler Clamp Wheel clockwise to secure. See Figure 4.

Figure 4

The CEOT may require jostling as coupler Clamp Wheel is tightened to assure unit is secure. Assure that wheel is seated with the Clamp Lock to provide anti rotation protection.

5. Secure with optional Padlock with clasp through Wheel and Clamp Lock.
6. Connect CEOT Gladhand to BP End Hose and open BP End Valve. See Figure 5.

Note

If brake pipe pressure is present the CEOT may activate the High Visibility Marker if ambient light conditions justify.

7. Connect CEOT Trainline Cable to Inter Car Cable. See Figure 5.

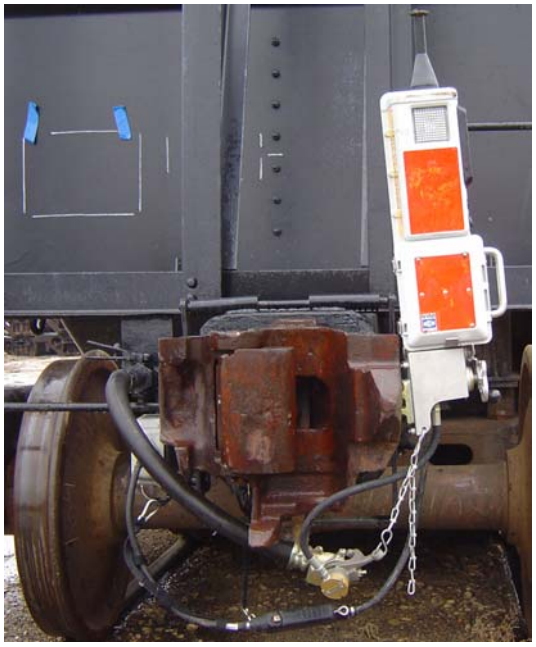

Figure 5

6.0 REMOVAL

WARNING

230 VDC ELECTRICAL POWER IS PRESENT. SERIOUS PERSONAL INJURY COULD OCCUR IF POWER IS NOT REMOVED.

1. Assure ECP Trainline Power is OFF.

2. Disconnect CEOT Trainline Cable from Inter Car Cable.
3. Close car's brake pipe end valve.

WARNING

AIR UNDER PRESSURE IS PRESENT IN THE BRAKE PIPE. SERIOUS PERSONAL INJURY COULD OCCUR IF PRESSURE IS NOT REMOVED.

4. Depress Pressure Relief Valve located on the CEOT Gladhand until all air has been allowed to exhaust.
5. Disconnect CEOT Gladhand from brake pipe end hose.
6. Remove optional Padlock's clasp from Coupler Clamp Wheel and Clamp Lock.
7. Release Clamp Lock by pulling downward. See Figure 3.
8. Supporting CEOT, turn Coupler Clamp Wheel counter-clockwise to release Finger from clevis of coupler.
9. Set unit on back or side for transport.

Note

High Visibility Marker is set to off by an internal level switch.

7.0 EP-60® OPERATION (ECP)

The End-of-Train Device, Combined (CEOT) is mounted to the last car of the train as given in section Installation.

7.1 Activation:

The CEOT will activate on the application of ECP Trainline Power to:

a) Send its' trainline-wire communicated EOT Beacon with status information.
b) Brake pipe pressure from CEOT shall be invalid (- - - - display) until pressure greater than ~70 kPa (10 psi) is applied.

The CEOT will activate on the application of brake pipe pressure greater than ~70 kPa (10 psi) to:

a) Flash the High Visibility Marker if ambient light conditions warrant.
b) Initiate optional RF communications.

The CEOT will activate on two (2) Test Pushbutton presses to:

a) Send its' trainline-wire communicated EOT Beacon with status information.
b) Flash the High Visibility Marker if ambient light conditions warrant.
c) Initiate optional RF communications.

7.2 De-activation:

The CEOT will de-activate immediately on loss of ECP Trainline Power, combined with loss of HEU (Head End Unit) Beacon, when accompanied with an ECP “CUT OUT” to:

a) Stop sending its’ trainline-wire communicated EOT Beacon.

The CEOT will de-activate in one (1) hour on loss of ECP Trainline Power, combined with loss of HEU Beacon, when not accompanied with an ECP “CUT OUT” to:

a) Stop sending its’ trainline-wire communicated EOT Beacon.

The CEOT will not de-activate on loss of ECP Trainline Power with an HEU Beacon until “Low Battery” detection (4+ hours minimum from charged condition).

The CEOT will not de-activate with ECP Trainline Power applied.

The CEOT will de-activate optional RF communications in five (5) minutes from when brake pipe trainline is reduced to less than ~35 kPa (5 psi) combined with ending of its’ trainline-wire communicated EOT Beacon.

The CEOT will de-activate its’ High Visibility Marker when:

a) Ambient light conditions do not warrant operation.
b) CEOT is removed from coupler (tilt).
c) Battery(s) power is sufficiently reduced (>12 hours).

8.0 BATTERIES

The End of Train Device, Combined (CEOT) utilizes two (2) lead-acid Battery, NYAB Part No. 774481. It is the same battery that is used for EP-60’s Car Control Device (CCD) and is interchangeable.

The battery(s) is charged and maintained through the 230 VDC trainline power. It is not necessary to exchange or charge the batteries when in EP-60® operation. The EP-60 system monitors the status of the CEOT battery charge.

8.1 Battery Change Out

The CEOT batteries may be changed without the need or use of tools. It is recommended that this procedure be conducted on a bench in a clean, well lit environment.

Removal

1. Release CLAMP LOCK to unlock the cover. See Figure 3 & 6.
2. Release two (2) COVER CLAMPS. See Figure 6.
3. Open COVER. See Figure 6.
4. Loosen and remove THUMB SCREWS, retain for reinstallion. See Figure 6.

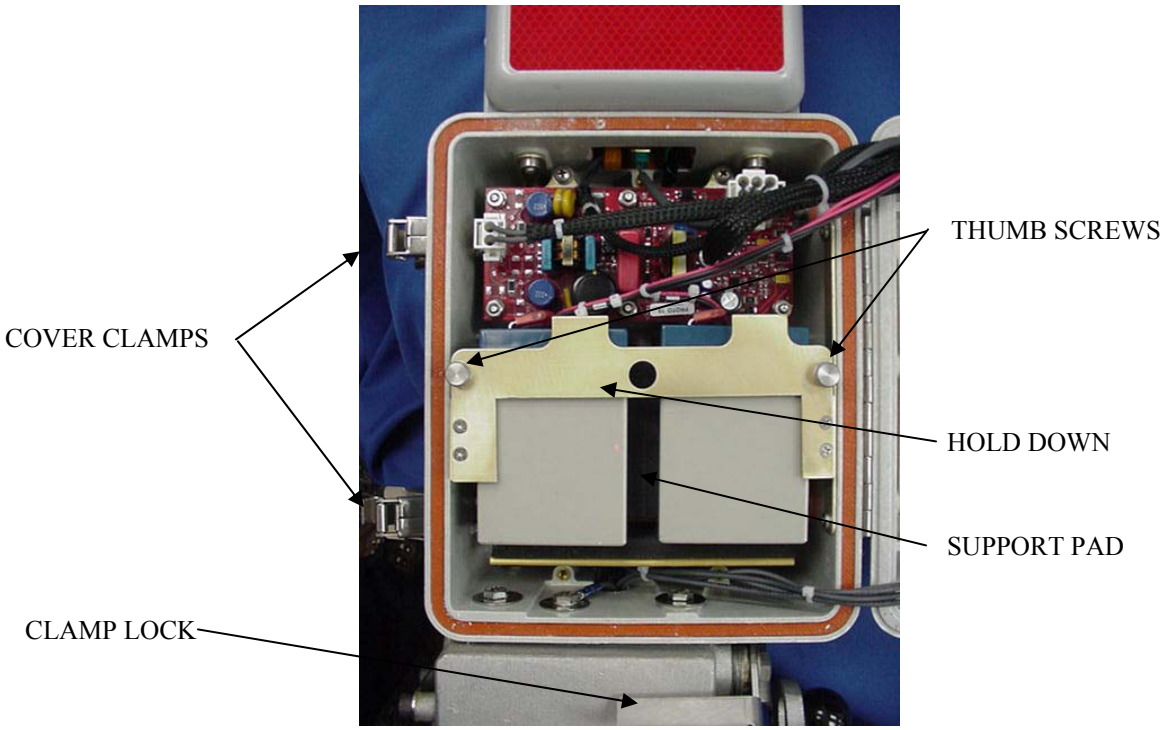

Figure 6

5. Remove HOLD DOWN Assembly from batteries. See Figure 7.
6. Remove SUPPORT PAD from between batteries. See Figure 7.
7. Disconnect BLACK lead, ¼-Stackon from each the left Battery #1 position and the right Battery #2 position. See Figure 7.
8. Lift the left Battery #1 from enclosure and disconnect RED lead, ¼-Stackon. See Figure 8.
9. Lift the right Battery #2 from enclosure and disconnect RED lead, ¼-Stackon. See Figure 8.

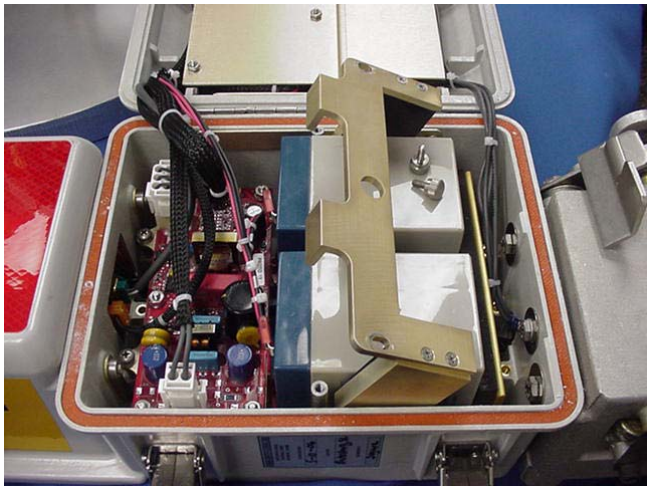

Figure 7

Installation

10. Exchange Battery(s) only with an approved NYAB P/N #774481. Assure that Battery(s) have been pre-charged.

Note

Battery(s) that are not properly charged on installation may require excessive charging time.

11. Assure proper identification of 'paired' Battery Leads left (#1) and right (#2).

CAUTION

CARE MUST BE EXERCISED IN THE PROPER 'PAIRING' AND THE CORRECT 'POLARITY' OF BATTERY LEADS AS PERMANENT DAMAGE TO ECP PRINTED CIRCUIT BOARD WILL OCCUR IF IMPROPERLY CONNECTED.

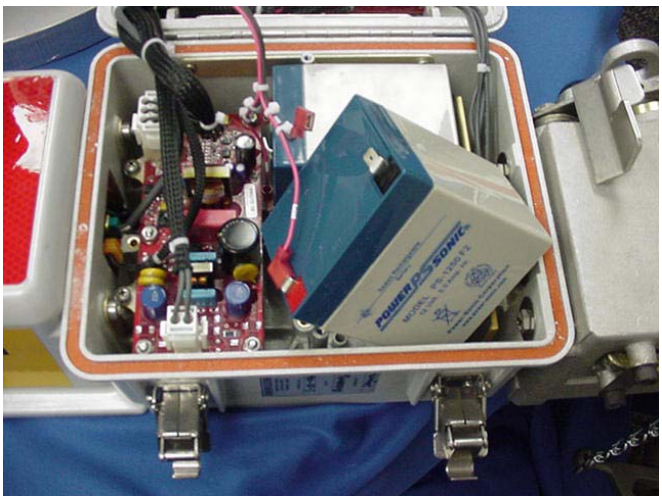

Figure 8

12. On Battery #2 (right) location, connect RED, then BLACK leads, ¼-Stackon and set fully into location. See Figure 8.
13. On Battery #1 (left) location, connect RED, then BLACK leads, ¼-Stackon and set fully into location. See Figure 8.
14. Install SUPPORT PAD between batteries. See Figure 7.
15. Install HOLD DOWN Assembly to capture batteries. See Figure 7.
16. Install THUMB SCREWS and fully tighten. See Figure 6.
17. Close COVER assuring that wire harnesses are not pinched between cover and enclosure. See Figure 6.
18. Secure the cover with the two (2) COVER CLAMPS. See Figure 6.

9.0 INTER-CAR CABLE

The End of Train Device, Combined (CEOT) utilizes an Inter-Car Cable w/Lanyard, NYAB Part No. 779106. It is the same or typical Inter-Car Cable w/Lanyard that is used for end car connection for the EP-60® equipped car.

The inter-car cable provides the termination of the 230 VDC trainline power and communication to the CEOT as the last device in an EP-60® equipped train.

9.1 Inter-Car Cable w/Lanyard Change Out

It is recommended that this procedure be conducted on a bench in a clean, well lighted environment. A 1.25 inch Hex Flat wrench is required.

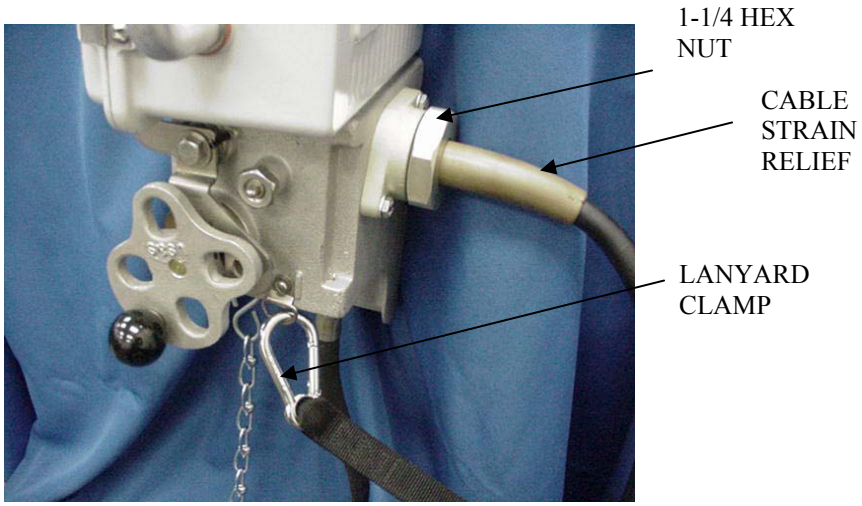

Figure 9

Removal

1. Release LANYARD CLAMP from coupler body. See Figure 9.
2. Grip CABLE STRAIN RELIEF securely, and;
3. Fully loosen 1-1/4 HEX NUT with wrench, while preventing cable from rotating. See Figure 9.
4. Retract 1-1/4 HEX NUT full from threads then pull cable free. See Figure 10.

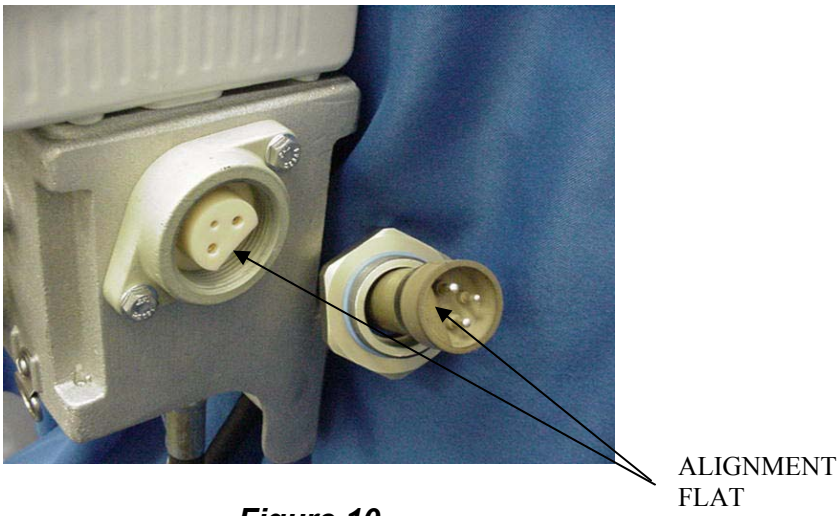

Figure 10

Installation

5. Exchange Inter-Car Cable w/Lanyard with only an approved NYAB P/N #779106.
6. Assure that 'flat' of cable is aligned with 'flat' of receptacle, while gripping the cable at the CABLE STRAIN RELIEF, fully seat cable within receptacle. See Figure 10.
7. By hand, align 1-1/4 HEX NUT, engage threads and tighten.
8. Continue to grip cable at the CABLE STRAIN RELIEF to prevent the cable from rotating, then with Wrench, snug 1-1/4 HEX NUT.

CAUTION

1-1/4 HEX NUT NEED ONLY BE SNUG TO SEAT SEALING RINGS. OVER TIGHTENING WILL RESULT IN DAMAGE TO THREADS AND RECEPTACLE REQUIRING PART CHANGE OUT.