TEC Optical Sensor Upgrade Procedure (TSM)
FCO CA03738

Document Number
719-00060A-C

2004-03-30

Creo Inc.
3700 Gilmore Way
Burnaby, BC
Canada V5G 4M1
(604) 451-2700

Copyright 2004 Creo Inc. All rights reserved.

Revision History

Revision	Date	Author	Comments
A-A	15 Dec 2003	Carl Rueck	Kit number change, revisions
A-B	18 Mar 2004	Doug Jeffery	Revisions

TEC Optical Sensor Upgrade Procedure (TSM)

CONTENTS

Revision History i

1. Scope.....1

2. Parts Required.....1

3. Removing the Trailing Edge Backbone.....1

4. Upgrading the Trailing Edge Backbone 2

5. Installing the TEC Sensor Bar 5

6. Adjustment and Testing.....8

1. SCOPE

This procedure is for upgrading TEC sensors on TSM (MCE) output devices (FCO CA03738).

2. PARTS REQUIRED

For serial numbers TMxxx (Trendsetter 400/800), NMxxx (NEWS)

FCO Kit 512-00112A

Creo Part Number	Qty	Item Description
719-00060A-B	1	DOC,PROC,UPGRADE,TEC OPT,TSM
500-00507A	1	ASSY, MECH,TEC OPTICAL BAR,TSM
52-3304	2	SCRW,M8*35,SOCK-CAP,S-PLATED
52-4102	2	NUT,M8,HEX,S-PLATED (for Sensor Bar)
52-4067	2	WASH,M8,LOCK,SPLIT,S-PLATED
52-3090	2	WASH,M8,FLT,SS
52-4226	2	SCRW,M6*16,SOCK-SET,SS
52-4152	2	NUT,M6,S-PLATED
503-00050B	1	BRD,ASSY,TEC MAGNET SENSOR I/0
52-3252	8	SCRW,M3*8,SOCK-CAP,S-PLATED,PRE-APPLIED
52-4918	8	WASH,M3,BEL,SERRATED,S-PLT
220-00148A	1	CAB,ASSY,8PG,TEC LCK UNLCK MAG SENS,TSM
220-00150A	1	CAB,ASSY,EXP-BUS TERM-TEC SENS BRD
220-00152B	1	CAB,ASSY,TEC,MAG SENS BRD
58-0285A	2	FAB,ROD END BLOCK,TEC,TS
55-0757A	2	FTG,AIR CHOKE,0.6MM DIA ORIFICE,3 GROOVE
382-00232A	6	LABEL,TEC,BLACK IR,TSM
52-4102	2	NUT,M8,HEX,S-PLATED (extra nuts for shoulder bolts)
18-3017	3	CAB,TIE,10CM,BLACK
18-3049	5	CAB,TIE,7.5",BLACK WEATHER RESISTANT
18-3132	1	CAB,TIE,PUSH MNT,1/4",FRONT INSTALL,BLK
59-4000	1	GROMT,.38ID*.13PANEL*.62MTG HOLE
690-00213A	1	Drill Bit ¼"

3. REMOVING THE TRAILING EDGE BACKBONE

1. Turn off the main air valve and power.
2. Remove the air lines from the TEC Lock/Unlock cylinder being very careful not to lose the small metal speed control orifices (55-0757A) in the end of the hoses.

   Note: If the air is not turned off prior to taking these hoses off the fitting, the speed control plugs will pop out.
3. Cut the tie wraps that hold the hoses to the TEC backbone.

4. Disconnect the cable from the harness on the away side and cut any tie wraps that hold the cable in place.

5. Remove the shoulder bolts that attach to the rod end bearings on the pneumatic cylinder from both ends of the TEC backbone.

   Keep the shoulder bolts and round spacers for later use.

6. Remove the TEC backbone.

7. Carefully place the backbone on a workbench and fasten it down securely. Take special care to ensure that the fittings and sensor cables are not damaged during this process. This step is required for drilling a hole at the home end of the backbone as shown in Figure 1.

4. UPGRADING THE TRAILING EDGE BACKBONE

1. Remove the following items from the TEC backbone and discard:

   - cable 10-5108A
   - 6 micro switches and brackets
   - cable mounts that secured cable 10-5108A to the backbone

2. Before drilling the hole at the home end of the backbone, use a center punch to position the hole within the dimensions shown in Figure 1.
   This will prevent the drill bit from drifting.

3. Drill the hole using the using the drill bit (690-00213A) provided in the kit.
   The purpose of this hole is for mounting the high flex cable. See Figure 6.

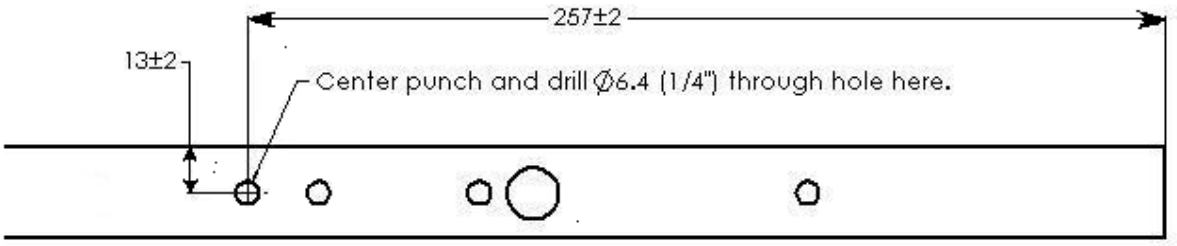


Figure 1: Drilling Requirements for Installing Cable Mounting (mm)

4. After drilling the hole, insert the cable mount (18-3132) into the hole.

5. Install the black IR labels (382-00232A) on the TEC Backbone. See Figure 2 for label placement.

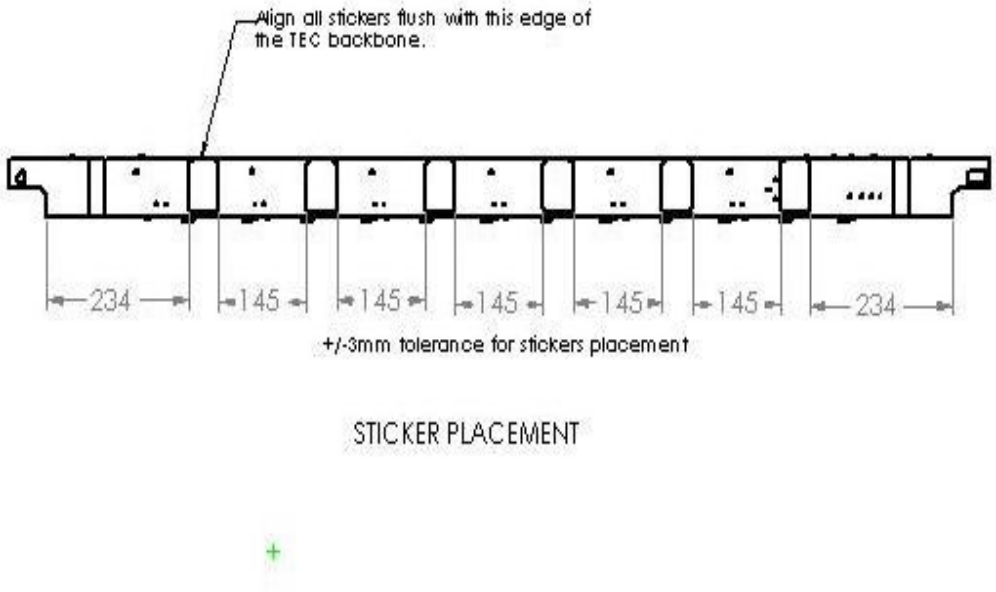


Figure 2: Label placement

6. Place the TEC backbone back into the side plate TEC slots.
7. On the away side, use the shoulder bolt and spacer that you removed earlier to attach the backbone to the rod end bearing on the air cylinder.
8. On the home side, insert the two new brass rectangular spacers into the rectangular slots on the **inside** of the backbone and place the rod end bearing between the brass spacers.
9. Insert the shoulder bolt through the brass spacers and the rod end bearing. See Figure 3.

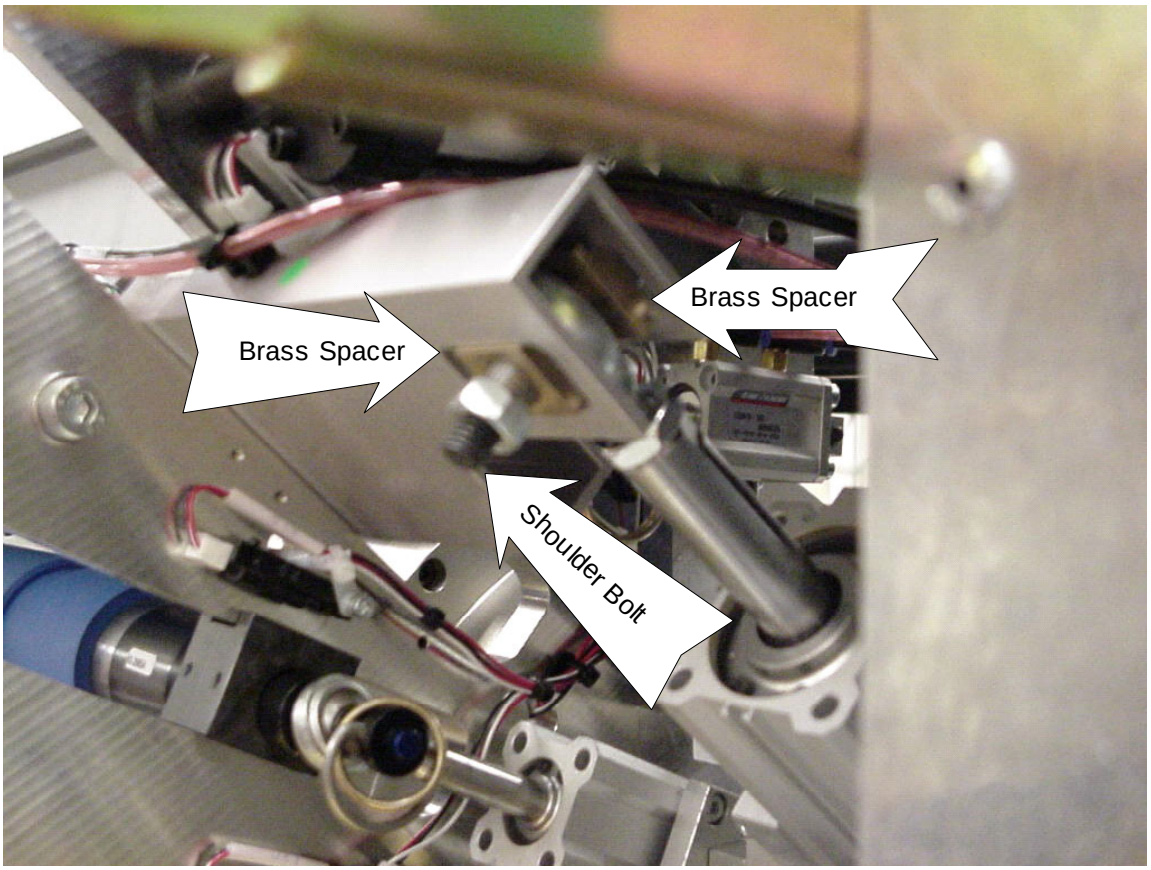


Figure 3: Home side TEC backbone cylinder rod end

10. Replace the nuts on the shoulder bolts and tighten them. Add another M8 nut (52-4102) to lock them together. (Not shown in Figure 3)

11. Connect cable 220-00148A on the away side into cable 10-5008A.

12. Use tie wraps to ensure that the connection between the two cables remains securely fastened and to ensure that the cables are kept well away from moving parts.

13. At the home end, install the grommet (59-4000) into the TEC backbone where the lock/unlock sensor cables enter.

14. Route the lock and unlock sensor connectors through the grommet.

15. Ensure that the speed control orifices (55-0757A) are in place before connecting the red and black hoses to the hose fittings on the lock/unlock cylinder. The kit contains 2 spare orifices in case they are needed.

16. Tie wrap the hoses and the sensor connectors to the top of the TEC backbone and ensure that they do not interfere with the up and down travel of the backbone. See Figure 4.

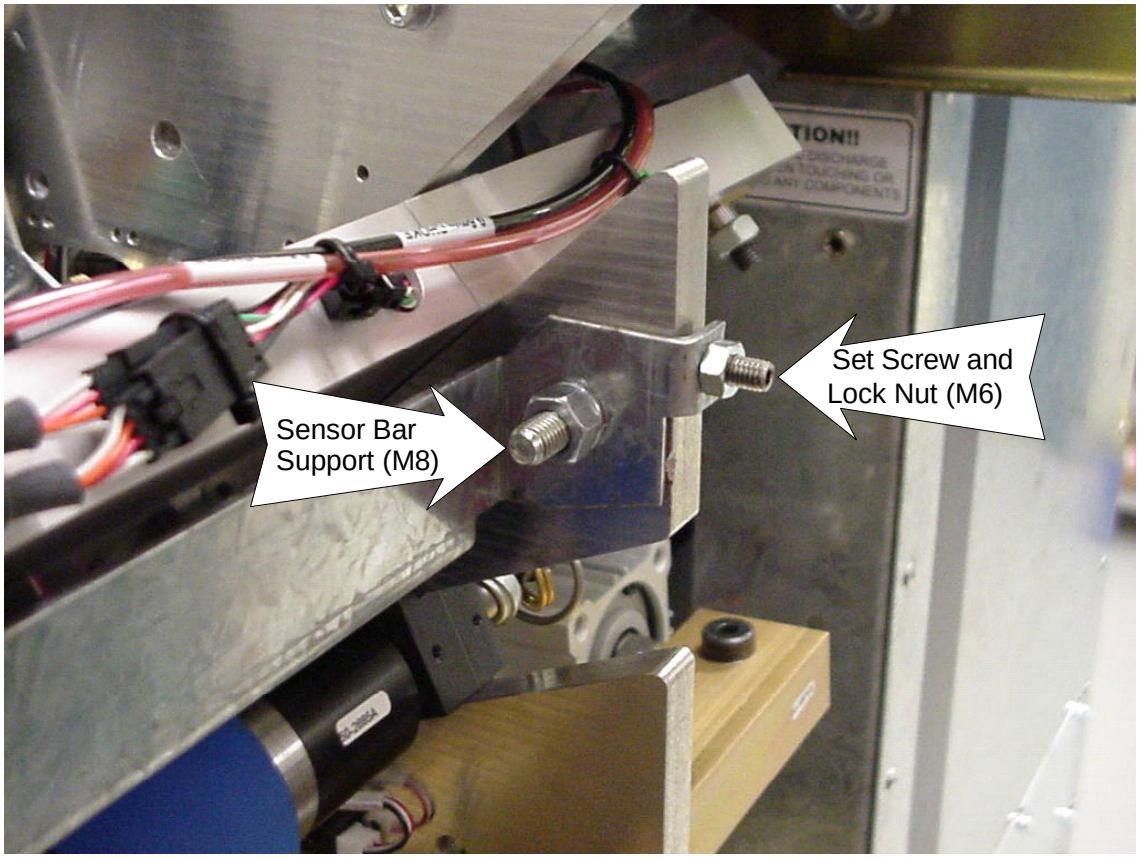


Figure 4: Home side TEC sensor mounting bar and screw

5. INSTALLING THE TEC SENSOR BAR

1. Mount the sensor bar as shown in Figure 4:
   - Use the M8 bolts, nuts and washers to attach the bar to both the home and away side of the engine side plates.
   - Make sure the nuts are snug but not tight. The bar should move with light resistance using finger pressure.
2. Install the M6 setscrews into both the home and away part of the sensor bar as shown in Figure 4 and Figure 5. You will install the M6 nuts used for locking the setscrews once

the optimum position has been determined according to section 5 - *Adjustment and Testing*.

3. Install the cable clamp on the away side:
   - The ends of the cable clamp must be installed between the TEC optical sensor bracket and the 6mm jam nut on the adjusting screw.
   - The larger diameter high flex cables should be attached to the outside of the cable clamp with a plastic cable tie.

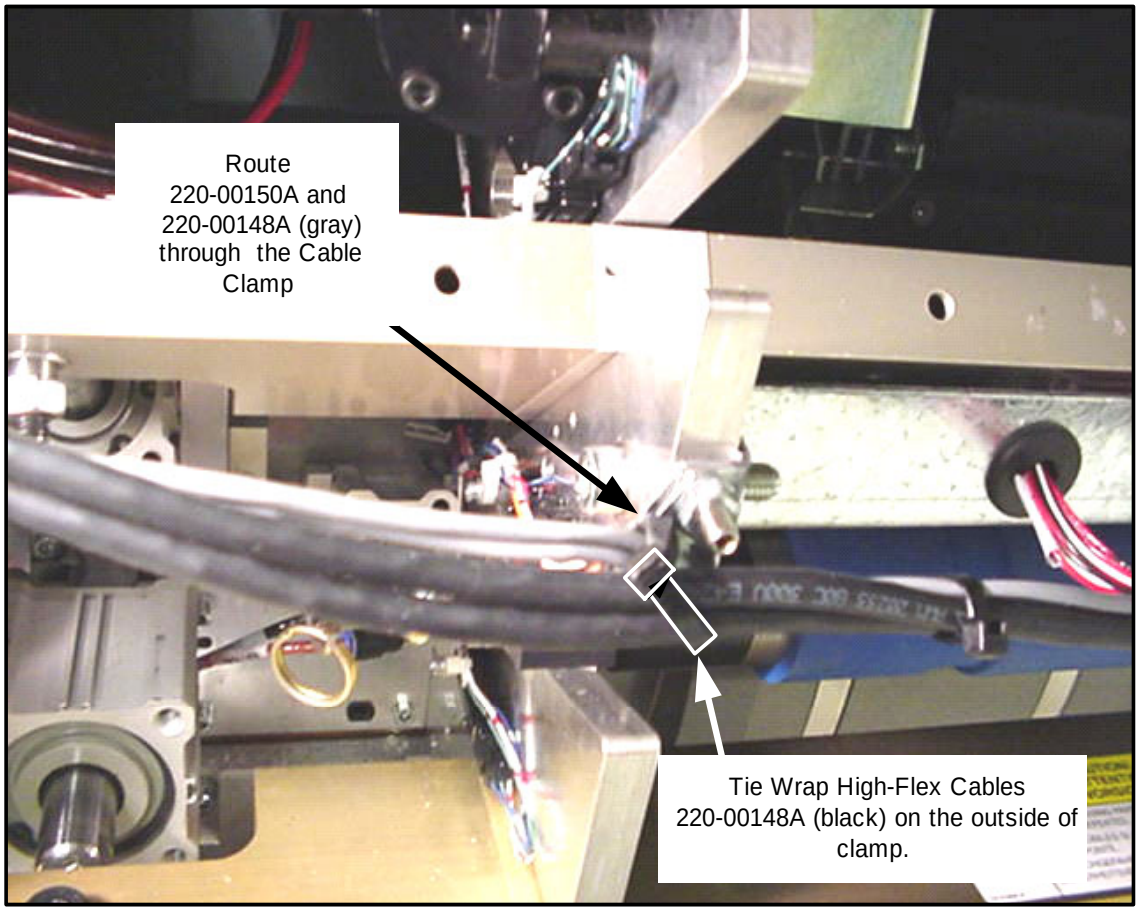


Figure 5: Cable clamp

4. Route the cables (220-00148A - gray) and (220-00150A) through the strap and route the high-flex cables (220-00148A - black) outside the strap.
5. Use one tie wrap to fasten the high-flex cables to the outside of the strap as shown in Figure 5.
6. Wearing a static wrist strap, remove terminator 10-4329 from J7 on the MCE board (or from J24 on GENINE boards in Trendsetter AL, NEWS, ContinuousLoad or Spectrum Options)
7. Discard the terminator.

8. Route cable 220-00150A back to the MCE board and plug it into J7 for base Trendsetters. For Autoloader, NEWS, Continuous Load or Spectrum options, route the cable to the Genine board and plug it into J24.

9. Use the eight M3 screws and washers provided to attach the TEC Optical Sensor I/O board (503-00050A) to the standoffs on the sensor bar.

Note: Be sure to wear a static wrist strap when handling all electronic circuit boards.

10. Attach cable 220-00152A to J1 on the I/O board. See Figure 6.

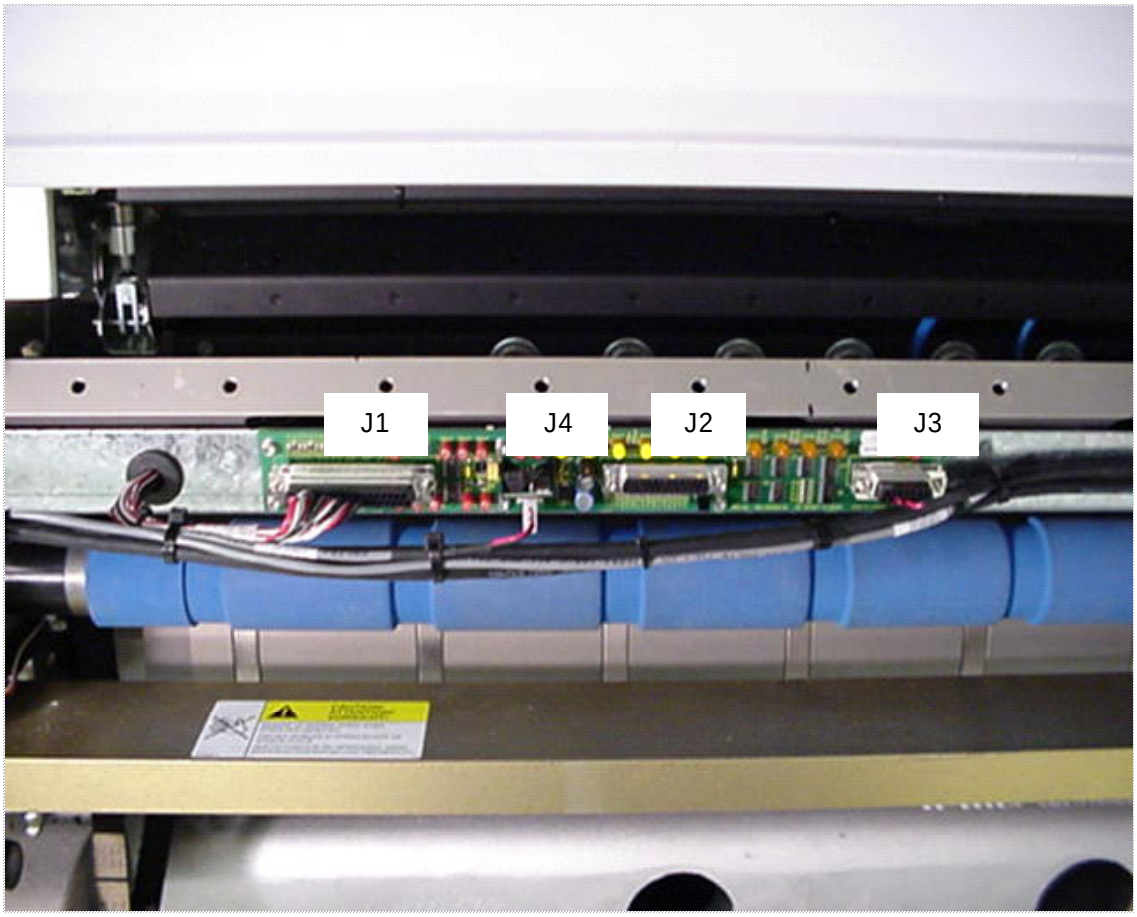


Figure 6: TEC sensor board connections, sensor bar, and cable support

11. Attach cable 220-00148A to J3 on the I/O board.

12. Attach cable 220-00150A to J4 on the I/O board.

13. Tie wrap the cables together, ensuring that all conductors entering connectors are not stressed. See Figure 6.

14. From the point where all the cables are tie wrapped together on the board, extend and tie the two black high-flex lock/unlock cables (220-00148A) to the cable mounts along the sensor bar on the right side of the I/O Board.

15. Loop the two cables from the sensor bar to the TEC backbone, and fasten them exactly as shown in Figure 7. Ensure that the loop is large enough such that the cables do not rub against the sensor bar as the backbone moves up and down.

16. Connect the lock and unlock sensors to the two high-flex lock/unlock cables (220-00148A).
    Note: The joints of the tie wraps must be at the top of the harness to prevent them from getting caught between the TEC Backbone and the sensor bar.

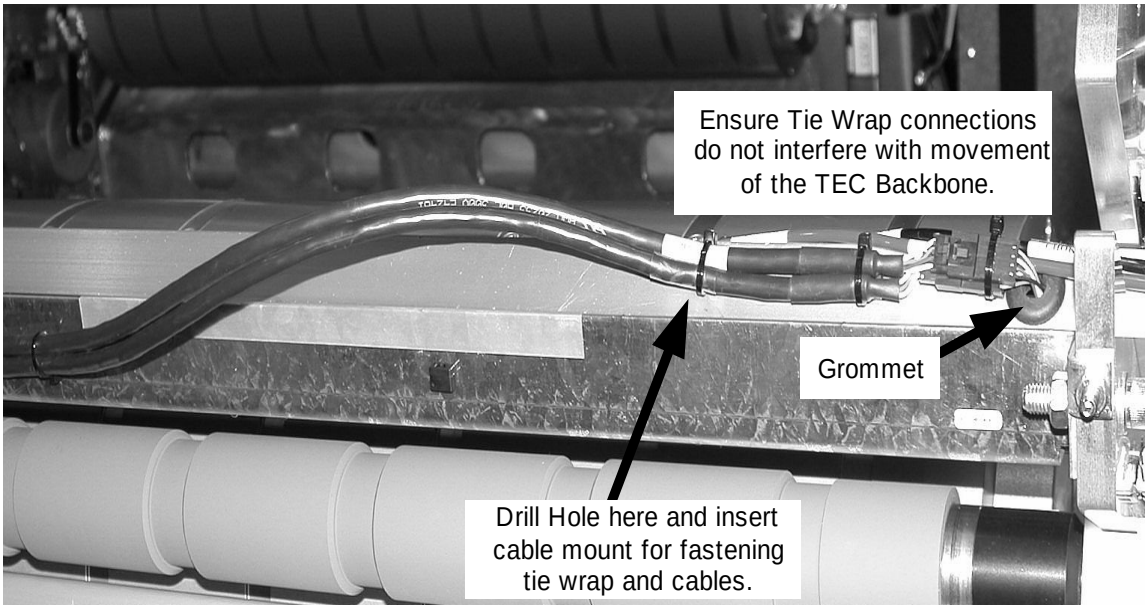


Figure 7: Home side TEC lock/unlock cable loop

17. Turn the power and main air valve back on.

    You do not have to wait for initialization. The power to this board comes on with PS1, the unswitched 24V power supply.

6. ADJUSTMENT AND TESTING

There are 6 LEDs on the sensor board labeled Sens1 to Sens6. Each LED corresponds to a TEC clamp on the backbone from left to right When the TEC clamps are attached to the TEC backbone, and the TEC backbone is in the extend (up) position, Sens1 to Sens6 LEDs on the board should all be on.

1. Adjust the setscrew on the away side by turning it in a clockwise direction until you see all 6 LEDs on the board go on.

   Note: As you turn the setscrews, the sensor bar will move in an arc. While adjusting the setscrew ensure that the end of the screw always remains touching the side plate.

2. Turn the away side setscrew another 1/2 turn and stop.

3. Tighten the lock nut on the away side, ensuring that the bar does not move and the setscrew is continuously touching the side plate.

4. Turn the home side setscrew until the setscrew touches the side plate.
5. Turn the home side setscrew another 1/4 turn and stop.
6. Tighten the lock nut on the home side, ensuring that the bar does not move and the setscrew is continuously touching the side plate.
7. Tighten the M8 nuts on both the home and away side plates, ensuring that the bar does not move and the setscrew is continuously touching the side plate.

   The LEDs should now go on and off simultaneously as the backbone extends and retracts.
8. Test the device by removing one clamp from the drum and making sure that it detects the missing clamp.
9. Test the device for loading and unloading plates.
10. Mark the 100 label as follows:

    - For TS8 (MCE) s/n TMxxx, mark #11
    - For Trendsetter NEWS (MCE), s/n NMxxx, mark #13

Note: It is not necessary to load new firmware for this assembly to operate reliably.