Kodak

TEC Optical Sensor Upgrade

TS8/TS4 Heidelberg-built machines

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Revision History

Revision	Date	Author	Comments
A	13 Jun 2006	Cedric Galere	Document created
B	16 May 2007	Simon Cheung	Add section 6.1 on TS4 Installation

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CONTENTS

Revision History i

1. Scope 1

2. Parts required 1

3. Removing the old trailing edge backbone 1

4. Preparing the side plates 2

5. Installing the new trailing edge backbone (50-2730B) 5

6. Installing the TEC sensor bar 6
   6.1 Extra steps for TS4 Trendsetters with four magnets 10

7. Adjustment and testing 11

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1. SCOPE

This procedure is for upgrading trailing edge clamp (TEC) sensors on Heidelberg® TS8 or TS4 (MPE) output devices (FCO CA03931). This FCO should only be applied if there have been repeated failures of the TEC backbone, clamp micro-switches and/or reed switches. Do not apply this FCO for an individual switch failure.

2. PARTS REQUIRED

You may need an electric drill for this procedure. Drill bits are included in the jig kit.

For serial numbers Sxx386xxxx (Kodak® Trendsetter® 400/800), Sxx385xxxx TS4

512-00103C KIT,UPGRADE,ECO CA03931,TS8 Kiel which includes:

Creo Part Number	Qty	Item Description
719-00709A	1	DOC,PROC,UPGRADE TEC OPT TS8 KIEL
500-01710A	1	ASSY,EM,TEC OPTICAL BAR,(MPE-KIEL),TS8
50-2730B	1	ASSY,TEC BACKBONE,TSM
252-06091A	2	FAB,ROD END BLOCK,TEC,TS3
55-0757A	2	FTG,AIR CHOKE,0.6MM DIA ORIFICE,3 GROOVE
52-4102	3	NUT,M8,HEX,S-PLATED (additional nuts required for shoulder bolts)
18-3017	5	CAB,TIE,10CM,BLACK
18-3049	5	CAB,TIE,7.5",BLACK WEATHER RESISTANT
58-0285A	2	FAB,ROD END BLOCK,TEC,TS
518-01403A	1	KIT,JIG,OPTICAL TEC BACKBONE SENSORS
220-02206A	1	CAB,ASSY,TEC SENSOR JUMPER,TS4

3. REMOVING THE OLD TRAILING EDGE BACKBONE

1. Turn off the main air valve and power.
2. Remove the air lines from the TEC lock/unlock cylinder.

   Do not lose the small brass speed control orifices in the end of the hoses. If the air is not turned off prior to taking these hoses off the fitting, the speed controls will pop out.
3. Cut the cable ties that hold the hoses to the TEC backbone.
4. Disconnect the cable from the harness on the away side and cut any cable ties 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.
6. Keep the shoulder bolts and round spacers for use later in the procedure.
7. Remove the TEC backbone.

8. Remove the two TEC reed switch magnets from the backbone and install them on the new backbone (50-2730B) that is in the FCO kit.

9. When you have completed the FCO, return the old TEC backbone for rework.

4. PREPARING THE SIDE PLATES

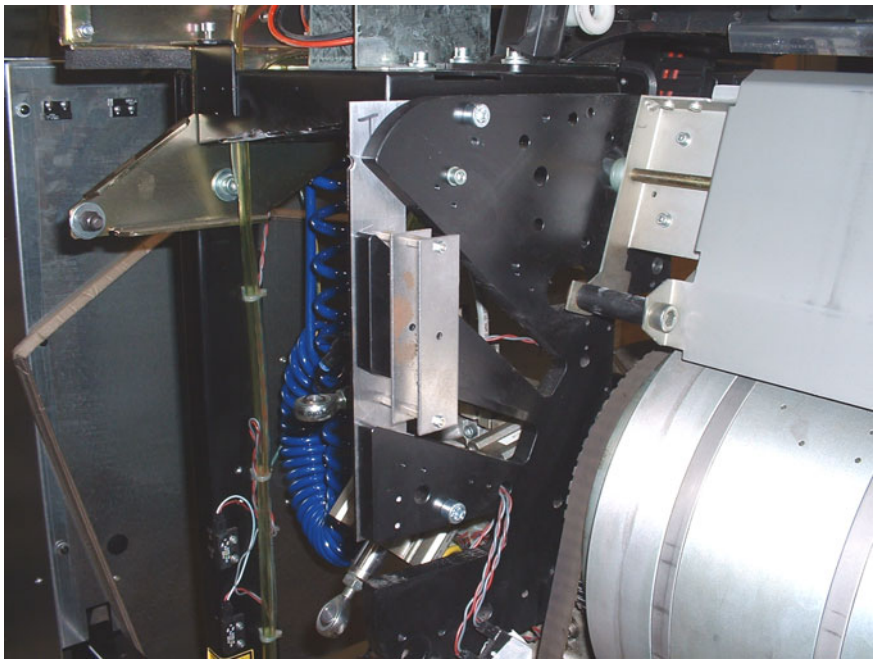
For Heidelberg-built Trendsetters that do not have a hole suitable for mounting the TEC optical sensor bar, follow the steps in this section. Otherwise proceed to the next section of the procedure—*Installing the new trailing edge backbone (50-2730B).*

1. Remove any reed switches on the side plates that will interfere with mounting the drilling jig. Don't forget to mark the current position on the side plates and wiring orientation.

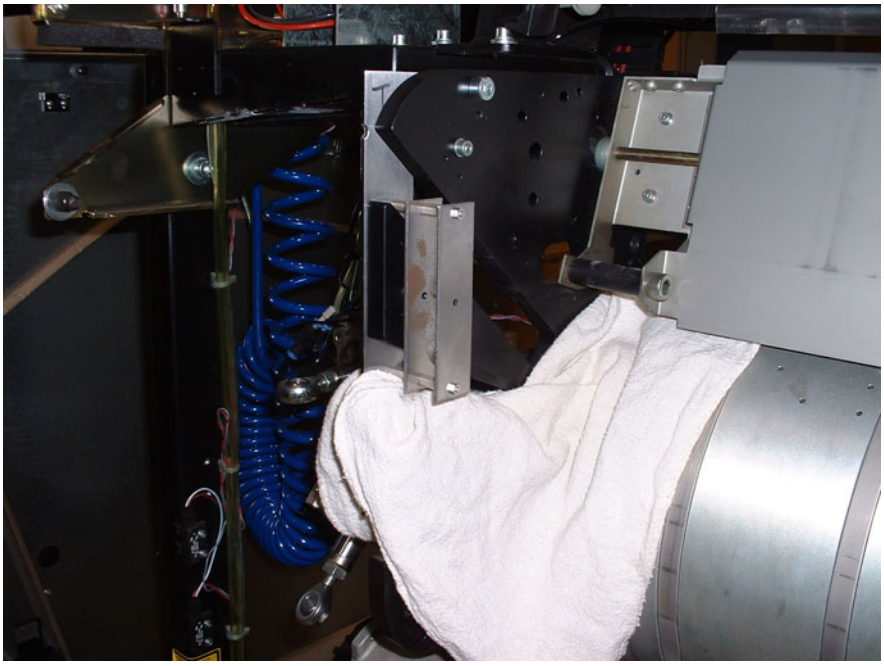
2. Remove the LEC backbone and roller.

3. Assemble the drilling jig (518-01403):

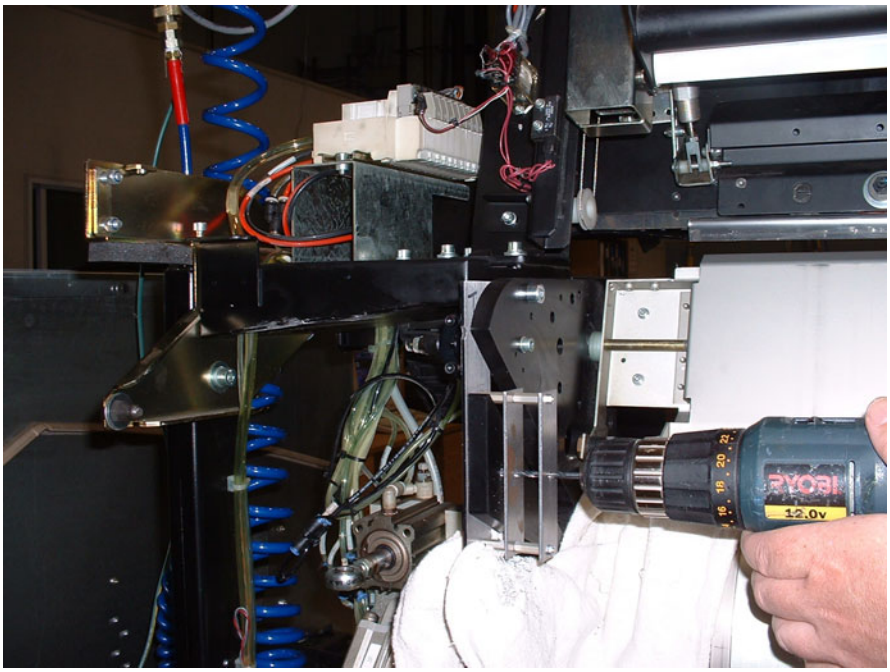
   - Attach the drill jig backing plate (690-00229A) to the outside of the side plate using the two M8x25 cap screws (52-4773) provided. The notch on the back edge of the side plate should be located near the top of the jig. You will have to remove the cable tie plastic holder that plugs the holes.
   - Attach two of the aluminum spacers (52-4332) to one of the alignment plates with a 5/32-in. diameter hole (690-00233A) using two M3 nuts (52-3025).
   - Attach the second alignment plate with a 5/32-in. (4-mm) hole to the assembly using two more aluminum spacers.
   - Use two M3x8 screws (52-4458) to attach the 5/32-in drill guide to the drill jig backing plate.
   - See the photo below to confirm correct installation of jig.



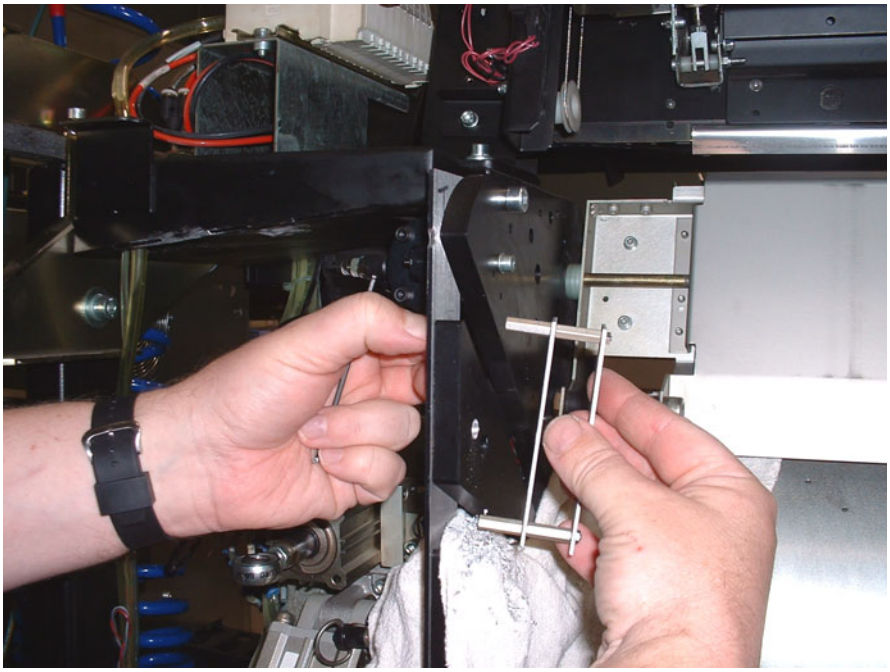
4. Cover the drum and engine casting with a drop cloth to collect the drill shavings.



5. Using the 5/32-in. drill bit (690-00231), drill a hole in the side plate.
   The holes in the jig will determine the position of this hole. This small hole (5/32 in.) is a test to make sure the position of the larger hole is correct.

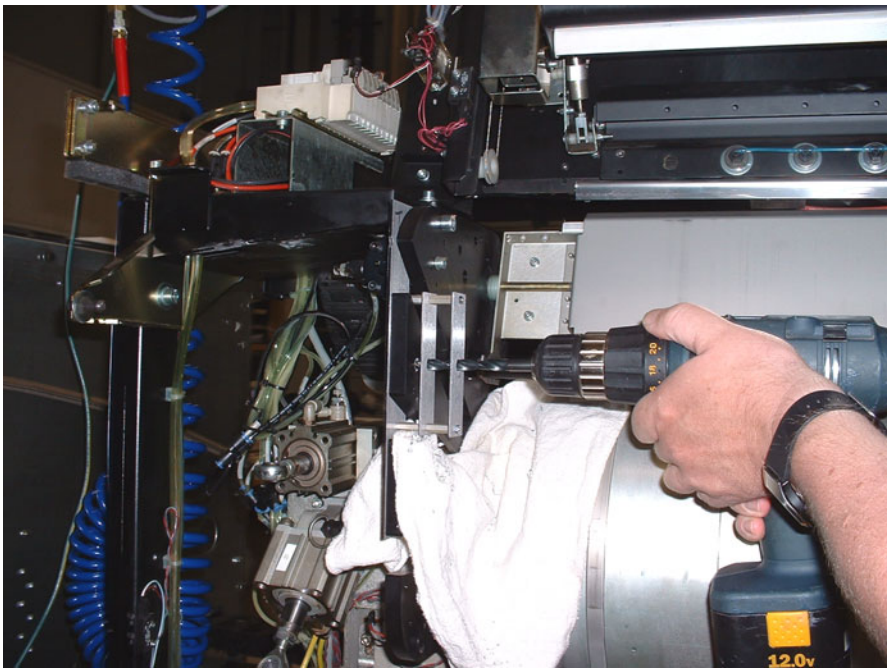


6. Remove the small hole alignment plates by removing the two M3x8 screws.



7. Replace the small hole alignment plates with the large hole alignment jigs (690-00234A) and attach to the drill jig backing plate using the two M3x8 screws.

8. Using the 21/64-in. drill bit (690-00230), drill a hole in the side plate.
The holes in the jig will determine the position of this hole.



9. Remove the M8x20 bolts from the drill jig backing plate.

10. Repeat this procedure for the other side plate.

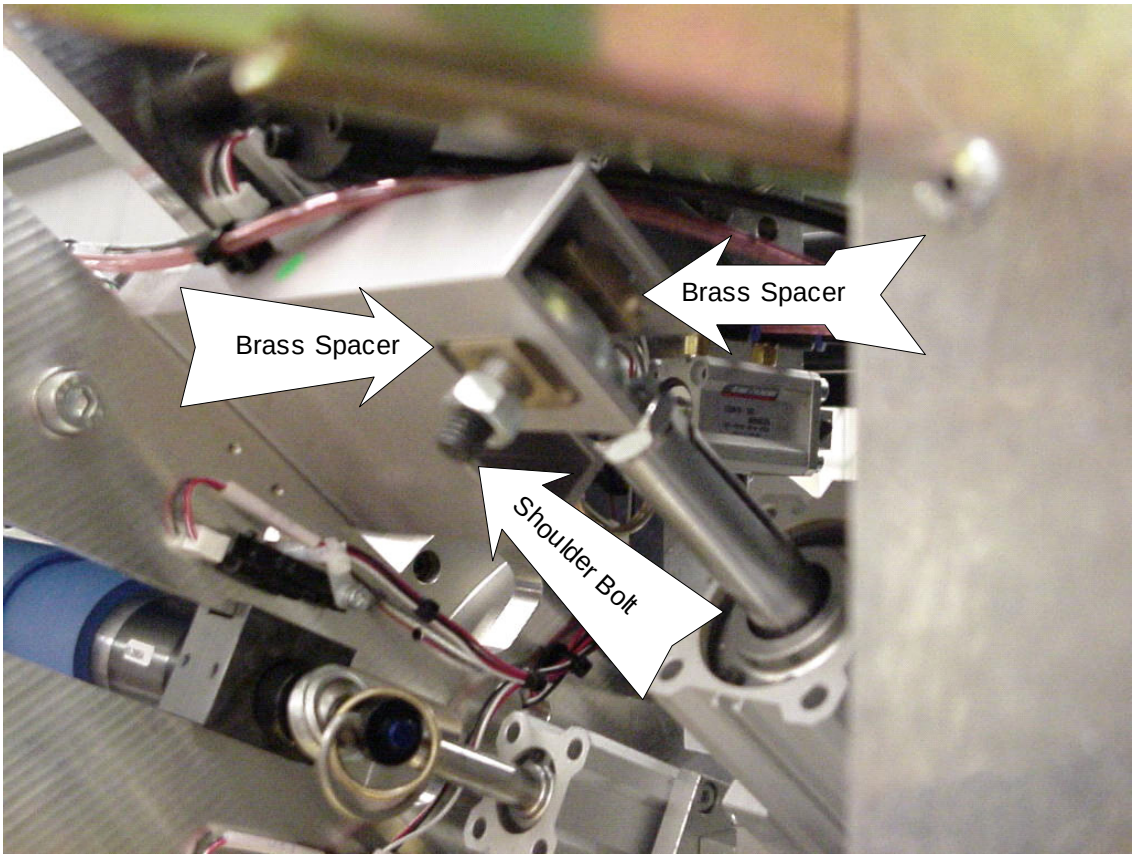
11. Clean up any loose drill shavings with your vacuum.

12. Reinstall the LEC backbone and roller.
13. Reseat the reed switches that were moved to allow clearance for the jigs.

5. INSTALLING THE NEW TRAILING EDGE BACKBONE (50-2730B)

1. Make sure that both the main air valve and power are off.
2. Place the new TEC backbone into the TEC slots in the side plates.
3. On the away side, use the shoulder bolt and spacer that you removed earlier (*Removing the old trailing edge backbone*) to attach the backbone to the rod end bearing on the air cylinder.
4. 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.

   Use 252-06091A or 58-0285A depending on the engine.
5. Insert the shoulder bolt through the brass spacers and the rod end bearing.



6. Install and tighten the nuts on each of the shoulder bolts.
7. Install the two extra M8 nuts (52-4102) on each shoulder bolt. (Additional nut not shown in above photo).

8. Insert the lock and unlock hoses back into the lock/unlock cylinder fittings.
9. Ensure that the speed control orifices (55-0757A) are inserted into the ends of each hose.

   If the air is turned on with these hoses disconnected, the orifices will blow out and will be difficult to find due to their small size.

6. INSTALLING THE TEC SENSOR BAR

Mount the sensor bar as shown in

1. Figure 1 and Figure 2. 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.

   Install the M6 setscrews into both the home and away part of the sensor bar as shown in

   Figure 1 and Figure 2.

   You will install the M6 nuts used for locking the setscrews once the optimum position has been determined according to *Adjustment and testing*.

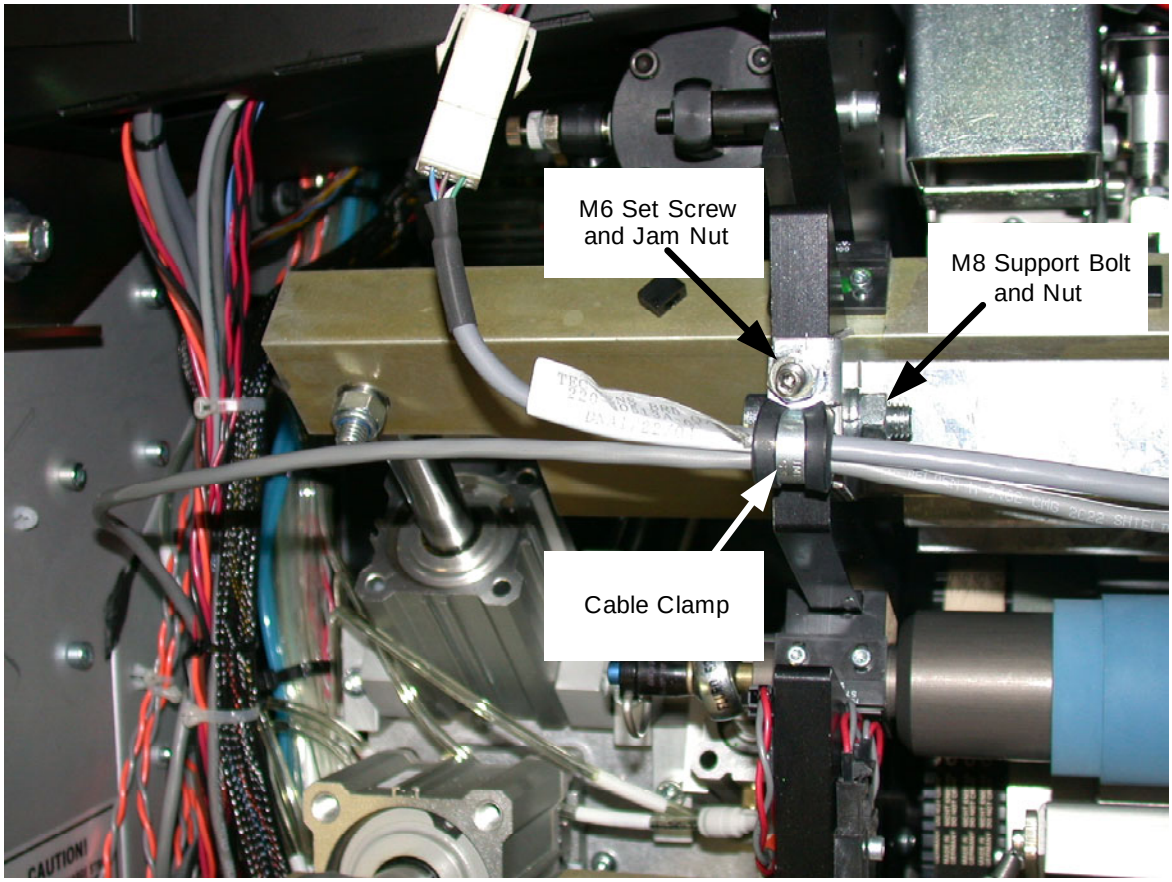


Figure 1: Away side TEC sensor mounting bar and screw

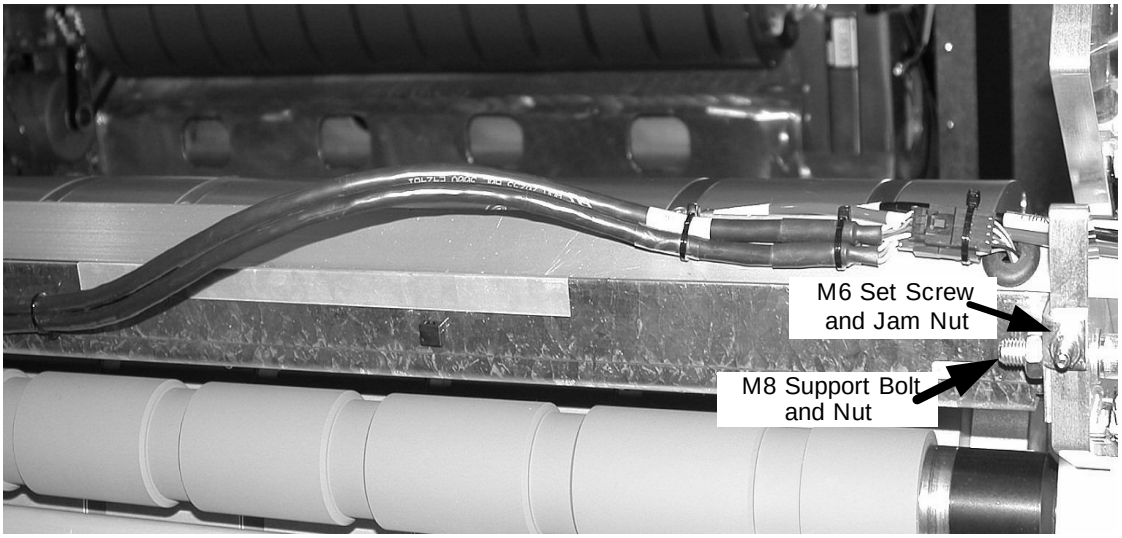


Figure 2: Home side TEC sensor mounting bar and screw

2. Route the power cable (220-00508A) to the power box.

   For Base Trendsetters:

   Plug in the (220-00508A) power cable directly into the connector on the 24 Volt power supply (PS2).

   For TS AL, Spectrum, TS NEWS:

   It may be easier to remove the PS2 power supply to install the adapter cable (220-00512A).

   - Install the adapter cable (220-00512A) on to the outputs of the 24 Volt power supply. (PS2).
   - Plug the adapter cable (220-00512A) into the power cable (220-00508A).

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

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

4. Attach cable 220-00590A to J1 on the I/O board. See Figure 3.

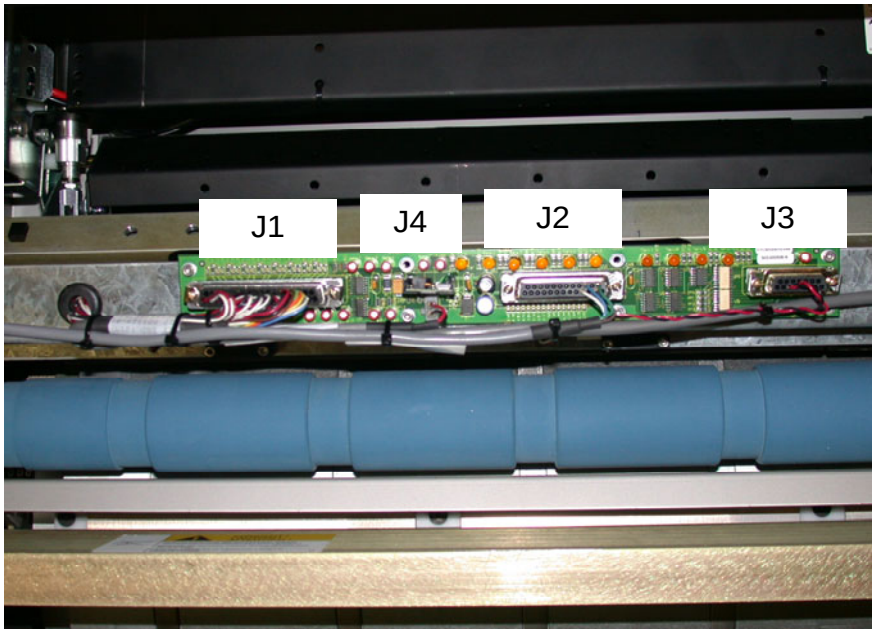


Figure 3: TEC sensor board connections, sensor bar, and cable support

5. Attach cable 220-00513B to J2 and J3 on the I/O board.
6. Attach cable 220-00508A to J4 on the I/O board.
7. Use a cable tie to wrap the cables together, ensuring that all conductors entering connectors are not stressed. See Figure 3.
8. Connect the TEC optical lock and unlock sensors to the high flex cable. Use the labeling on the cable to identify lock and unlock. See Figure 3 and Figure 4.

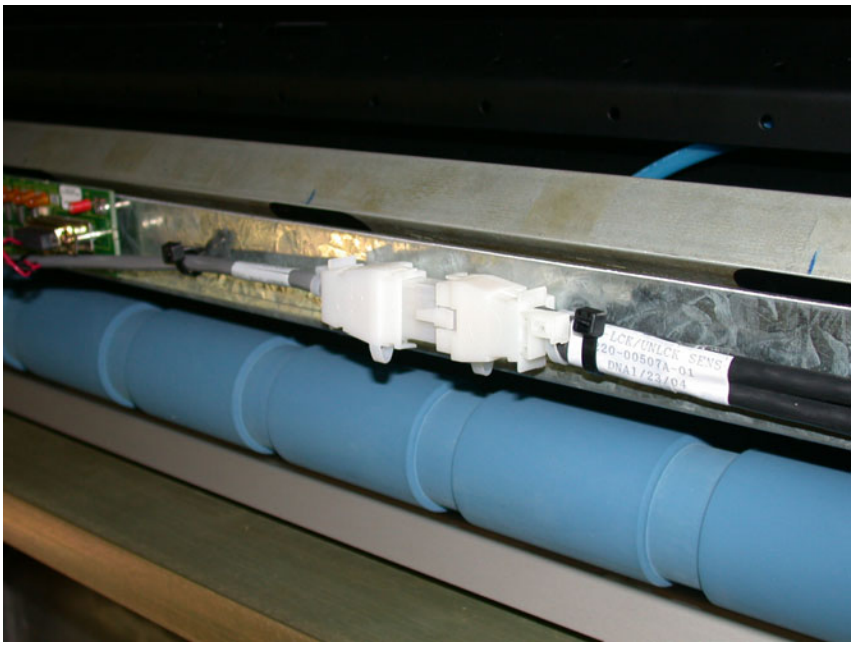


Figure 4: Cable connections for 220-00590A to 220-00507A

9. Loop the cables from the sensor bar to the TEC backbone, and fasten them as shown in Figure 5. Ensure that the loop is large enough so that the cables do not rub against the sensor bar as the backbone moves up and down.

Note: The last cable mount is not used to hold down these cables, but serves to attach cables inside the sensor bar.

10. 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 at the home end. The kit contains 2 extra orifices in case they are needed.

11. Use a cable tie to attach the hoses and the sensor connectors to the top of the TEC backbone. *Ensure that they do not interfere with the up and down travel of the backbone.* See Figure 5.

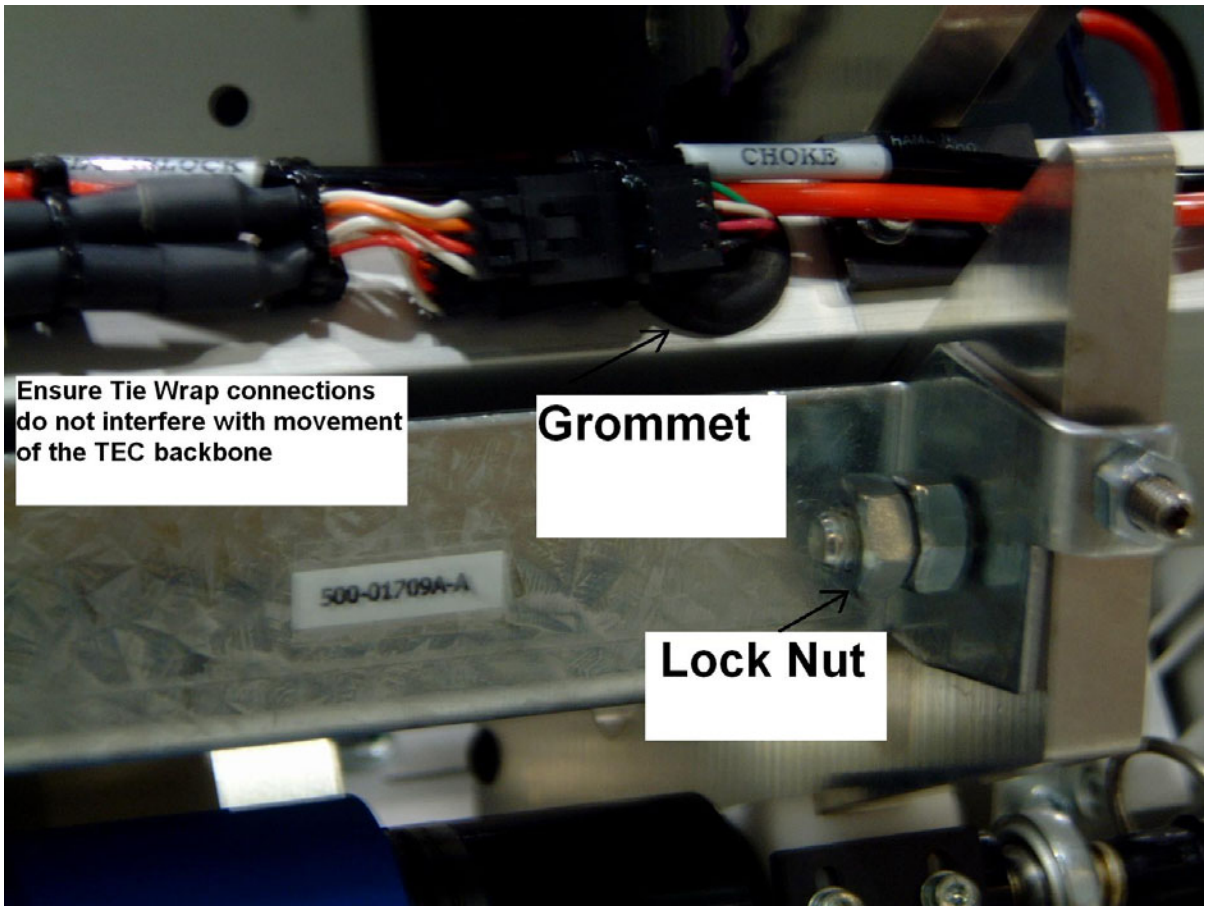
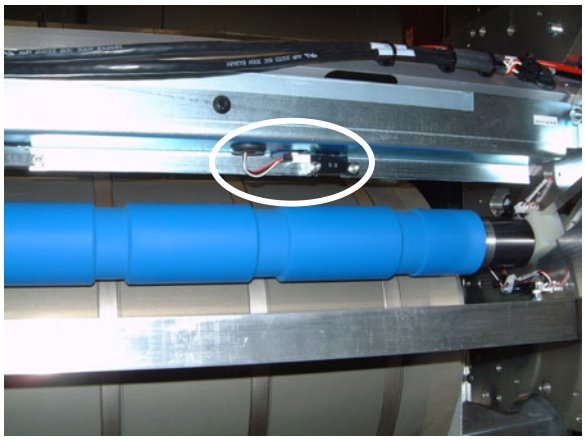


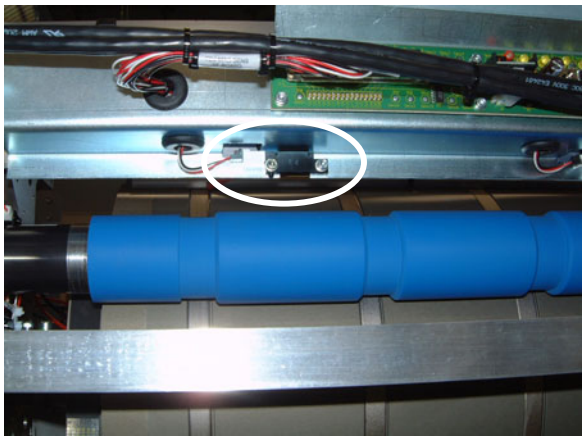
Figure 5: Home side TEC lock/unlock cable loop

12. If you are upgrading a TS4 Trendsetter with four magnets, go to section 6.1.

6.1 Extra steps for TS4 Trendsetters with four magnets

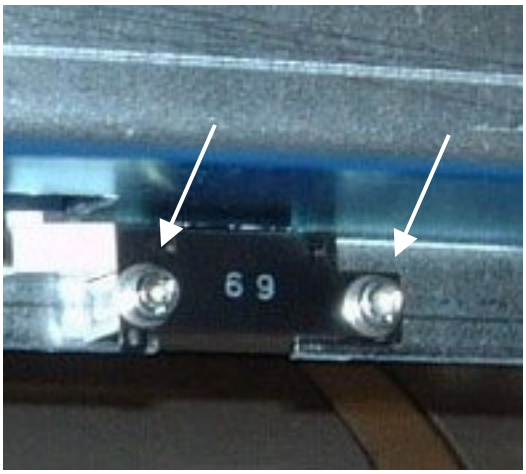
1. Disconnect the optical sensors on both ends of the TEC optical sensor bar.



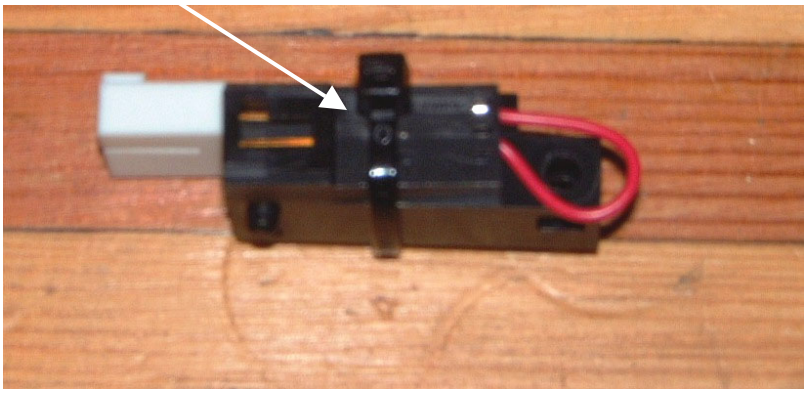


Home side Away side

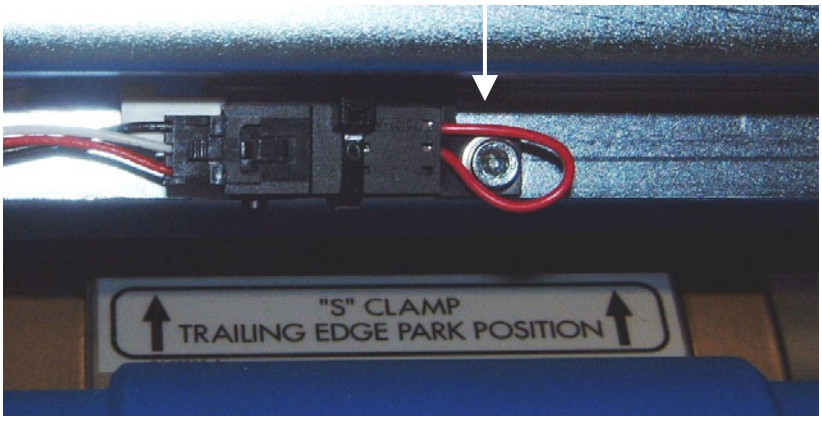
2. Remove the screws on the optical sensors.



3. Use a cable tie to attach the TEC jumper sensor cable onto the optical sensor.



4. Use only one screw to remount the sensor and jumper cable assembly on the optical sensor bar.



5. Connect the cable to the TEC jumper cable (220-02206A)

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

7. ADJUSTMENT AND TESTING

There are six 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.

Firmware in the latest controlled release is required for this assembly to operate reliably.

1. Adjust the setscrew on the away side by turning it in a clockwise direction until you see all six 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 M6 setscrew always remains touching the side plate.

2. Turn the away side setscrew another ½ 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 ¼ 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. **Note:** This applies to Trendsetters with six magnets. For TS4 Trendsetters with four magnets machines, sensors 1 and 6 always stay on.

8. Test the device by removing one clamp from the drum and making sure that it detects the missing clamp.
9. Confirm the function of the lock and unlock sensors using the **`getclamp`**, **`putclamp`** and **`tec`** commands as follows:
   - Turn the drum to the park position (**`set al ppos`**) and hold it there.
   - Move the TEC backbone into the drum (**`tec on`**)
   - Unlock the TECs (**`tec unlock`**)
   - Query the TEC lock sensor (**`tec`**).

     The locked sensor should read false and the unlock sensor should read true.
   - Lock the TECs (**`tec lock`**).
   - Query the TEC lock sensor (**`tec`**).

     The locked sensor should read true and the unlock sensor should read false.
10. Test the device for loading and unloading plates.
11. Mark #22 on the 100 label.