VLF Trendsetter

Electronic Registration Upgrade Procedure

72-3090A

May 10, 1999

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Revision History

Revision	Date	Author	Comments
0.1	May 10, 1999	Mike Wickstead Przemek Lagodzki	Release of first draft
0.2	May 19, 1999	Przemek Lagodzki	Extensive edit after testing documentation during an in-house upgrade
0.3	Jan. 14, 2000	Przemek Lagodzki	Revised Step 8 under 5.5.2; added Step 10 under 5.5.3 and Step 6 under 5.9

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SCOPE

This document describes the Electronic Registration Upgrade procedure, which applies to all Trendsetter VLF machines installed in the field.

It is intended for fully trained and qualified Creo service personnel. A good understanding of, and experience in, carrying out basic mechanical and electrical procedures in a safe working environment is assumed.

RELATED DOCUMENTS

- EMI Filter Relocation Procedure (72-3091A)
- Assembly drawings:
  - 50-1234B
  - 50-1223B
  - 50-1400A (or 50-1401A)
- ECO C637

OVERVIEW OF ELECTRONIC REGISTRATION

Electronic registration halts the loading process if plates are skewed on the drum. A machine that is capable of electronic registration has a special LEC actuator installed on the drum. This actuator has two electrodes that make contact with the registration blocks: one carries 24V and the other three are at a ground. When a plate loads and makes contact with the live block and any one of the other ground blocks, a circuit is completed that lights an indicator lamp. Registration is successful.

If a loaded plate fails to make contact, the registration fails and the loading process halts. The operator can then adjust the plate and load it again. Once the electronic registration is successful and a circuit is made, the indicator lamp lights and the operator can resume the loading process from the workstation.

SUMMARY OF UPGRADE

This document describes the complete procedure for upgrading a VLF Trendsetter for electronic registration. The steps involved are:

1. Upgrade the firmware (if necessary).
2. Prepare the machine.
3. Prepare the drum for the mill system.
4. Set up the mill system.
5. Machine the inner registration pockets.

6. Install and align the registration blocks.
7. Install electrical components.
8. Install mechanical components.
9. Test installed components.

See Appendices A to C for lists of all the parts, tools, and special equipment needed to complete the electronic registration upgrade.

ELECTRONIC REGISTRATION UPGRADE PROCEDURE

1.1. Upgrade the firmware

Check that the machine has the following firmware and load it if necessary:

- Thermal Head Controller firmware version **1.30 or higher**
- Thermal VLF Trendsetter MPE firmware version **1.20 or higher**
- Refer to MPE Firmware Version 1.20 Release Notes (doc.#06-3052C-A-PM01) and make sure that the following parameters are enabled:

set sys erin 1	(0=electronic registration disabled)
	(1=electronic registration enabled)
set al prr <value>	(value=number of plate registration retries 1,2,3 etc., auto or manual)
set altim tbt <value>	(time to bump table downward, automatic mode only)

1.2. Prepare the machine

1. Send the head to its home position.
2. Drop off the clamps 90 degrees to the registration blocks.
3. Shut off the power and turn off the air.
4. Remove the two back panels, the drum panel beneath the table, the left front panel, and the top panels to give access to the tracks for block alignment.

   The right front and side panels can be removed later when installing the electrical components.

5. Remove the LEC (leading edge clamp) actuator.

   Note: The LEC actuator may be discarded, as it will be replaced with the new actuator housing the electrical contact blocks.

6. Disconnect the electrical and air connections. Remove the shoulder bolts from the rod end bearings of the air cylinders. Remove the backbone from the machine.

   Note: When removing the M6 cap head screws that hold the flap to the backbone, replace the M6 x 50mm studs in four places to prevent losing the nut plate in the backbone.

1.3. Prepare the drum for the mill system

DANGER:
Watch your head! The bracket of the raised top panel will be at head level when you are working on the drum.

1. Rotate and lock the drum in a suitable position to mount the mill system, using the two flat bar drum clamps.
2. Remove the leading edge clamps, evenly loosening the screws along the drum.
3. Remove the springs out of the spring holders and lay a strip of masking tape along the entire length of the drum above the holders. The tape will secure the spring holders in the drum and keep out any metal cuttings.
4. Remove the outer registration blocks and clean the pockets with a cotton swab to remove any debris.
5. Set up the inner pin extractor and remove the inner registration pins.
6. Mask off the drum using 1" masking tape and old slipsheets (as shown in Figure 5.3a). Cover all but the strip of drum to be machined. Roll up small pieces of masking tape and push them into any exposed drill holes to prevent metal chips from falling in.



Figure 5.3a: Drum masked off with slipsheets

7. Place the drill jig in one of the pockets. If the bolt holes don't line up, rotate the jig 180°. Lightly tighten the M5 finger screws, then adjust the M3 screw lightly to remove any play. The jig will now be located in the correct position but will have a tendency to rock. To prevent rocking, adjust the four leveling jacks on the end of the arms evenly without tipping the jig. Tighten the M5 screws (finger tight) to make sure the jig remains secure during drilling. See Figure 5.3b for the completed setup.

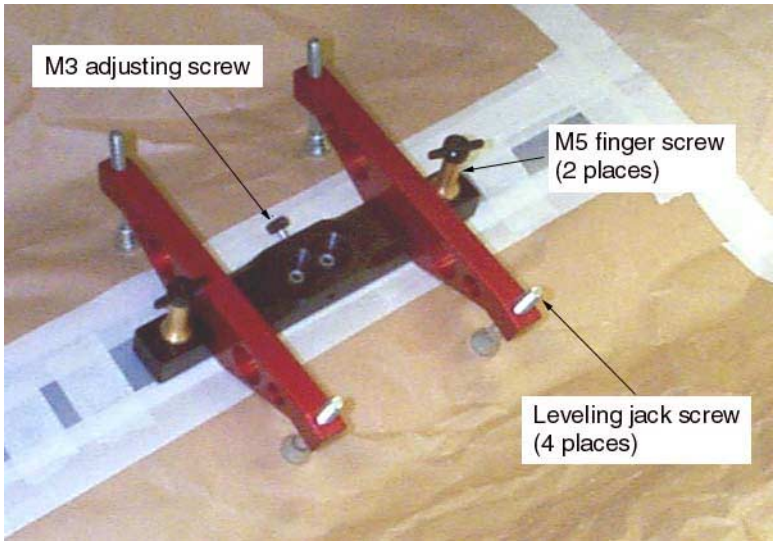


Figure 5.3b: Drill jig in place on drum

8. Drill the two holes through with a #30 (3.3mm) drill and remove the jig.

WARNING:
Always wear safety goggles when drilling or machining.

9. Repeat steps 7 and 8 on the second pocket.

10. Vacuum out the four drilled holes (M4), then countersink and tap through them, making sure the tap is perpendicular to the pocket.

1.4. Set up the mill system

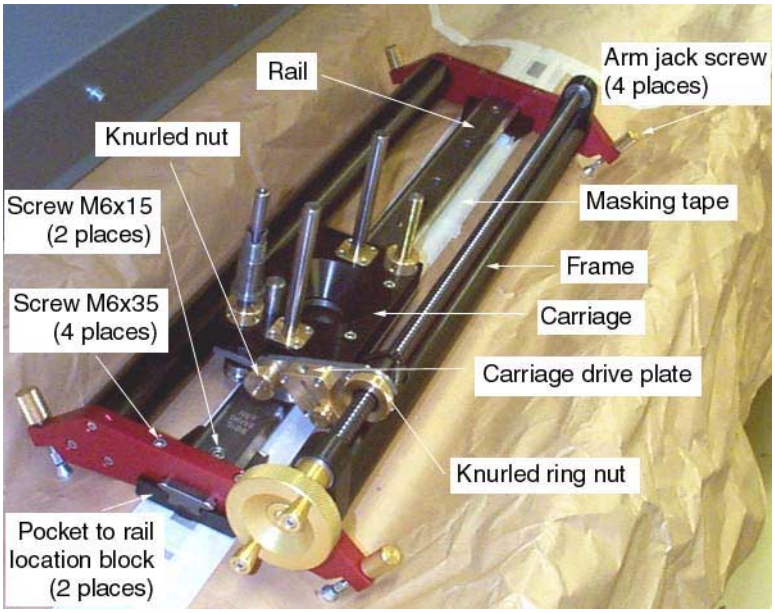


Figure 5.4a: Mill system

1. Clean the two pockets with a cotton swab to remove any debris left from drum preparation.

2. Place the pocket-to-rail location blocks in the pockets and very lightly tighten the M4x16mm screws. Adjust the M3 set screws lightly to remove any play, then tighten the M4 screws by holding the short end of the hex key.

   Note: Always use the short end of the hex key during this procedure to ensure that you don't apply too much torque on the screws.

3. Slide the carriage onto the rail, keeping the knurled nut towards the nut drive side (this side is clearly marked on the rail).

4. Place the combined rail and carriage assembly in the recess of the location blocks, keeping the encoder end (clearly marked on the rail) closest to the encoder on the drum. Insert the two M6x15 cap screws in the rail (but do not tighten them yet).

5. Lay masking tape along both sides of the rail reaching down to the drum to prevent aluminum cuttings from flying out. Make sure the tape does not interfere with any movement of the carriage.

6. Carefully set the frame into the slots across the pockets in the rail location blocks. The ball screw should be closest to you and the handle should be on your left. Insert the four M6x35 cap head screws in the frame arms, then tighten all six M6 screws (in the frame and the rail) evenly by holding the short end of the hex key.

7. Adjust the two jacks on one of the frame arms, evenly and together, being careful not to tip the mill system in the pockets. Once those jacks are set, adjust the two jacks for the other frame arm.

8. Position the carriage drive plate on the ball screw nut and secure with the knurled ring nut. Connect the other end of the drive plate to the carriage and secure with the knurled knob.

9. Engage the moveable pin on the drive plate into one of the slots in the frame and wind the carriage to the full length of travel (25mm for each slot). If the sides of the slots in the frame interfere with the pin's movement, loosen the knob and ring nut and realign the carriage drive plate.

1.5. Machine the inner registration pockets

1. Attach the cutter height gauge and the spindle lock plate to the modified Bosch router base. Set the modified carbide two flute slot mill into the ½" collet on the router spindle and slide it into the #1 position on the gauge (see Figure 5.5a). Clamp when the cutter is in the correct position.

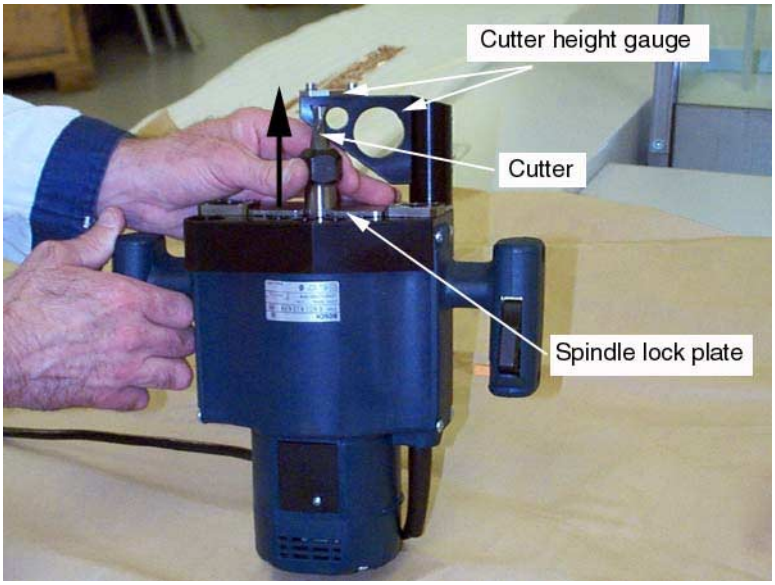


Figure 5.5a: Slot cutter being pushed into the spindle lock plate

2. Add a small amount of thin lubricating fluid to the guideposts. Lift the router above the carriage and lower it on to the guideposts and fine feed mechanism. Replace the washer and knurled ring nut (finger tight only). Slide the downfeed handle into position and engage the pin on the carriage drive plate into one of the slots in the frame.

3. Clamp the vacuum adapter to the rail above the pocket that is not being machined. Connect the vacuum hose.

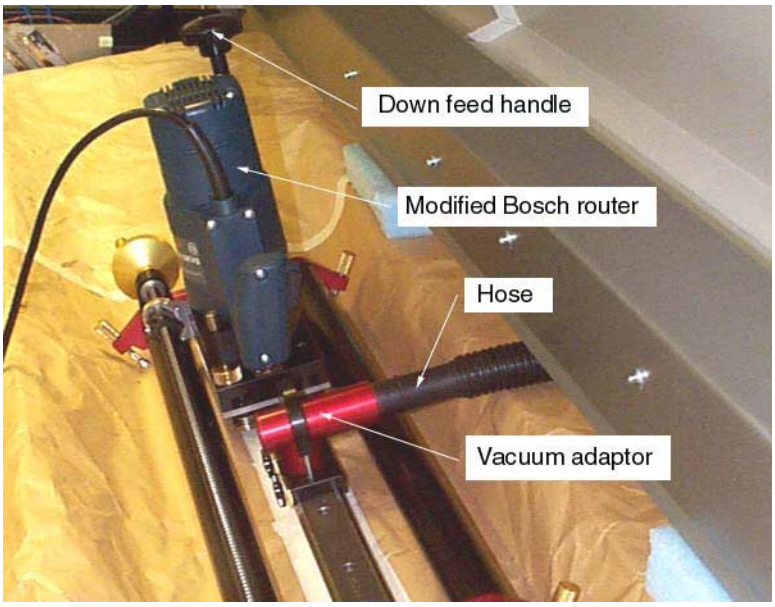


Figure 5.5b: Router in position for milling

4. Make sure the cutter is not touching the drum, then set the speed dial to #1 and switch on the router.

   Note: Keep the speed set to position #1 throughout this procedure.

WARNING:
Always wear safety goggles when drilling or machining.

5.5.1. Removing the anodized coating

5. Turn the downfeed handle clockwise to lower the cutter towards the drum surface. When you can hear and feel that the cutter is touching the drum, switch on the vacuum then slowly rotate the downfeed handle clockwise one half rotation as you rotate the horizontal feed handle along the full length of gauged travel. Try to ramp feed the cutter down while moving the carriage horizontally backwards and forwards along the drum.

6. Switch off the router and remove it from the carriage. Disengage the pin and move the carriage to a position over the second pocket. Re-engage the pin and replace the router on the carriage. Remove the vacuum adapter and disconnect the hose.

7. Repeat steps 3 to 5 in order to mill the second pocket.

5.5.2 Roughing out

8. Remove the router from the carriage. Replace the ½" collet with a 3/8" one. Follow the instructions in step 1 to set up the 11mm diameter two-flute slot cutter to height position #1 on the gauge.

9. Place the router on the carriage, switch on the power (speed set to #1) and lower the cutter until you can hear and feel it touching the drum. Switch on the vacuum. Ramp feed the cutter in to the drum until the router base bottoms out on the carriage. Switch off the router.

5.5.3 Finishing

10. Remove the router from the carriage. Follow the instructions in step 1 to set up the 12mm two flute slot mill cutter to height position #2 on the gauge. Use the ½" collet.

11. Place the router on the carriage and switch on the power (speed set to #1). Repeat step 5. Retract the router to a position above the pocket, switch it off and remove it from the carriage..

12. Remove the milling system from the drum and vacuum up any debris. Clean the pockets with a cotton swab.

13. Place the drill jig in one of the pockets. If the bolt holes don't line up, rotate the jig 180°. Lightly tighten the M5 finger screws, then adjust the M3 screw lightly to remove any play. The jig will now be located in the correct position but will have a tendency to rock. To prevent rocking, adjust the four leveling jacks on the end of the arms evenly without tipping the jig. Tighten the M5 screws (finger tight) to make sure the jig remains secure during drilling.

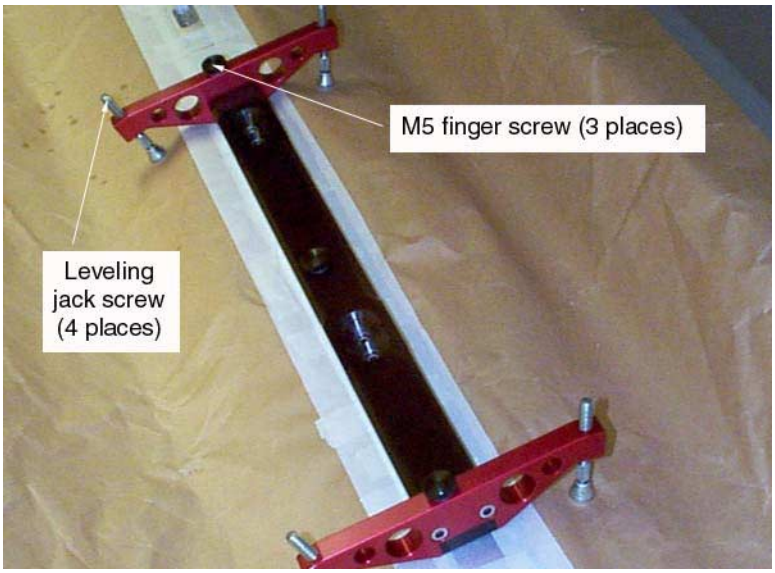


Figure 5.5c: Drill jig installed.

14. Drill the two holes through with a #30 (3.3mm) drill and remove the jig.

15. Repeat steps 13 and 14 on the second pocket.

16. Vacuum out the four drilled holes (M4), then countersink and tap through them, making sure the tap is perpendicular to the pocket.

17. Clean up.

1.6. Install and align the registration blocks

1. Position the drum so that the pockets for the registration blocks are located on the top of the drum.

2. Secure the drum in this position with two drum stops.

5.6.1 Install the outer registration blocks

3. Place Kapton insulation (57-5612A) into the outer pocket and line up the holes in the drum with the holes in the insulating material.

4. Place Kapton 300HN insulation (57- 5701A) between the outer registration block (57-5596A) and the clamp plate (57-5700A). Put two M4x16 insulated screws (50-1753) through the holes to hold the components together. The screws should have a 3mm long piece of heat shrink insulation on the shank right beneath the heads.

5. Install the components assembled in step 4 into the outer pocket on top of the insulation. Fold any excess insulation over the top of the working surface of the drum.

6. Push the registration block up against the working surface of the drum. Hold it in place with two M4x16 screws and tighten down the screws to prevent the block from moving.

7. Trim the insulation that is folded over the top working surface, using a sharp exacto knife, down to the surface of the drum. The outer registration block now rests against the edge of the pocket but is separated from the drum by the Kapton insulation.

8. Repeat steps 3 to 7 for the other outer registration block.

5.6.2 Install the inner registration blocks

9. Place Kapton insulation (57-5613A) into the inner pocket and line up the holes in the drum with the holes in the insulating material.

10. Place Kapton insulation (57-5701A) between the inner registration block (57-5597A) and the clamp plate (57-5700A). Put two M4x16 insulated screws (50-1753) through the holes to hold the components together. The screws should have a 3mm long piece of heat shrink insulation on the shank right beneath the heads.

11. Install the components assembled in step 10 into the inner pocket on top of the insulation.

12. Hold the registration block in place with two M4x16 insulated screws, tightening them slightly. The insulation requires no trimming. The inner registration block now rests on top of the Kapton insulation in approximately the middle of the pocket.

13. Repeat steps 9 to 12 for the other inner registration block.

14. Check the insulation resistance on all the registration blocks using a multimeter. Locate one probe on the registration block itself and the other on any screw that is holding down the drum straps (or some other grounded part). The resistance should be **higher than 10 mega ohms.**

    Note: If the resistance is less than 10 mega ohms**,** try to identify the problem and correct it. Repeat steps 3 to 13 if necessary.

15. Loosen the drum stops and reposition the drum so that the outer registration blocks are located roughly 100mm-110mm above the carriage tracks. Tighten up both drum stops gently in order to keep the drum in this position.

5.6.3 Align the outer registration blocks

16. Make sure that the head is in the “home” position

17. Wipe off any grease on the central section of the tracks (roughly equal to the distance between the outer registration blocks). Clean the tracks using lint-free paper and small amount of isopropyl alcohol or acetone.

18. Install the block alignment jig onto the carriage tracks.

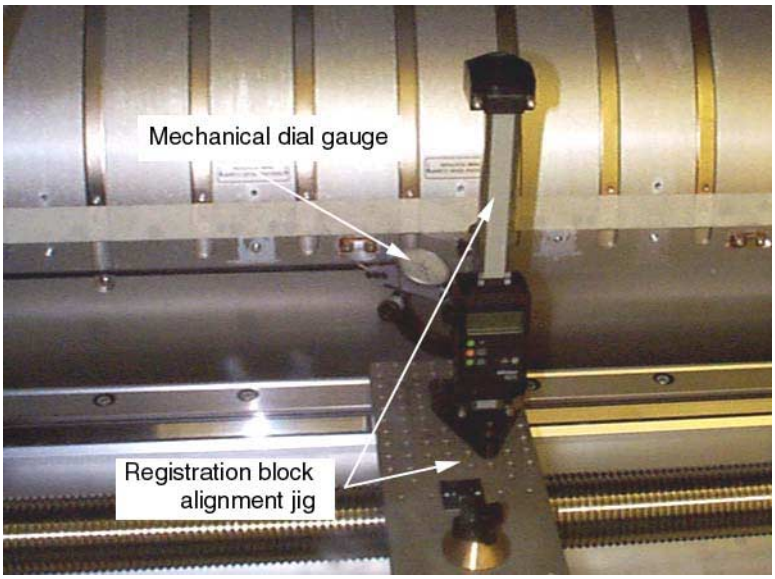


Figure 5.6.3a: Block alignment jig installed

19. Position a mechanical dial gauge in the jig to measure the level of the registration blocks above the tracks, as shown in Fig 5.6.3b. Use a gauge that can obtain at least a 2-micron accuracy. Place it on the working surface of the registration block and make sure that its ballpoint tip is as close to the drum as possible. Do not let the tip touch the drum or the block lip.

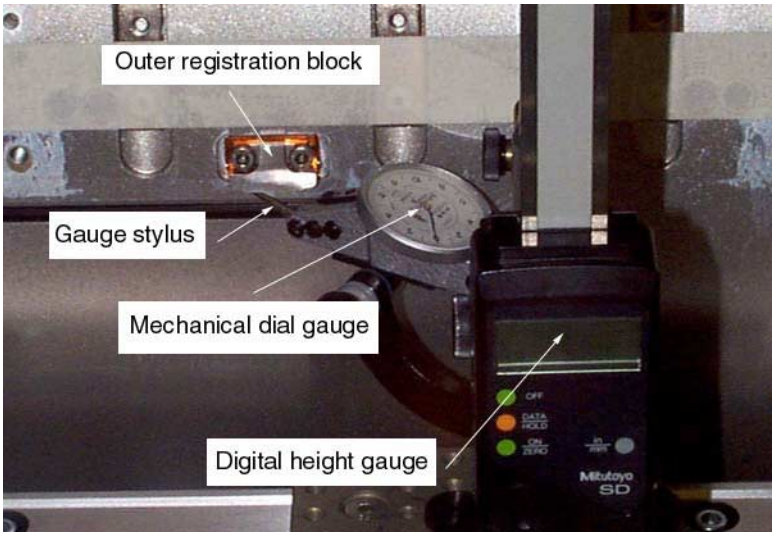


Figure 5.6.3b: Dial gauge

20. Check the parallel alignment of the encoder-side outer registration block to the tracks by zeroing up the dial gauge close to the left corner of the block on its working face. The block should be aligned to within ±3 microns along the working face of the block.

    Note: If the measurement exceeds this value, loosen the screws slightly and adjust the block.

21. Record the 3-point (left corner, middle, right corner) measurements of the block, with the left corner being 0.

    Note: The left corner of this block will be used as a zero reference to align all the other registration blocks.

22. Transfer the block alignment jig to the pulley-side outer registration block. Check its parallel alignment to the tracks by zeroing up the dial gauge close to the left corner of the block on its working face. The block should be aligned to within ±3 microns along the working face of the block.

    Note: If the measurement exceeds this value, loosen the screws slightly and adjust the block.

    Ideally, both outer blocks should be square with no height difference between them. However, an offset distance of ±60 microns is considered acceptable.

23. Record the results (including the height difference) on the alignment spec sheet.

5.6.4. Align the inner registration blocks

24. Loosen the M4x16 insulated screws and adjust the encoder-side inner registration block so that it is 350 microns (0.350mm) higher than the encoder-side outer registration block which was aligned in step 20. Check that the inner block is parallel to the tracks within ±3 microns and adjust it if necessary (use a small screwdriver as a pry tool). Tighten down the screws.

25. Loosen the M4x16 insulated screws and adjust the pulley-side inner registration block so that it is 250microns (0.250mm) higher than the pulley-side outer registration block which was aligned in step 22. Check that the inner block is parallel to the tracks within ±3 microns and adjust it if necessary (use a small screwdriver as a pry tool). Tighten down the screws.

5.6.5. Complete the alignment

26. Carefully remove one M4x16 screw from the encoder-side outer registration block. Apply Loctite 242 to the screw and replace it, tightening it down.

27. Repeat step #26 for each screw on each registration block, one at a time.

28. Recheck the alignment values and correct the blocks if necessary.

29. Recheck the insulation resistance values with the multimeter (see step #14).

Note: If the resistance is less than 10 mega ohms, wait a few hours until the Loctite 242 cures and check it again (since liquid Loctite may display some conductive properties). If the resistance values are still less than 10 mega ohms after 12 hours, the cause must be identified and corrected by repeating steps 1 to 29 for the affected pin(s).

30. Remove the block alignment jig from the tracks.

31. Apply a thin layer of Microlube GL261 grease to the tracks.

1.7. Install electrical components



DANGER:
Always wear a wrist strap! You must be grounded whenever working around electronics.

1. Power down the machine.

2. Remove the EMI filter from the power box and remove all the cables attached to the filter.

3. Install the 57-5594A mounting bracket in place of the removed EMI filter, using M3x8 screws (52-4458) and flat washers (52-3057).

   Note: To ensure proper grounding, do not apply Loctite to the screws.

4. Install the RTS board (10-4006A) onto the bracket. Use M3x8 screws with no washers and no Loctite.

5. Install the 57-5737A mounting bracket above the PDB (right top corner of the power box), using the four existing M3 mounting holes and M3x8 screws (52-4458) with flat washers (52-3057). Do not apply Loctite.

6. Install the 24V DC power supply (10-4014A) onto the bracket.

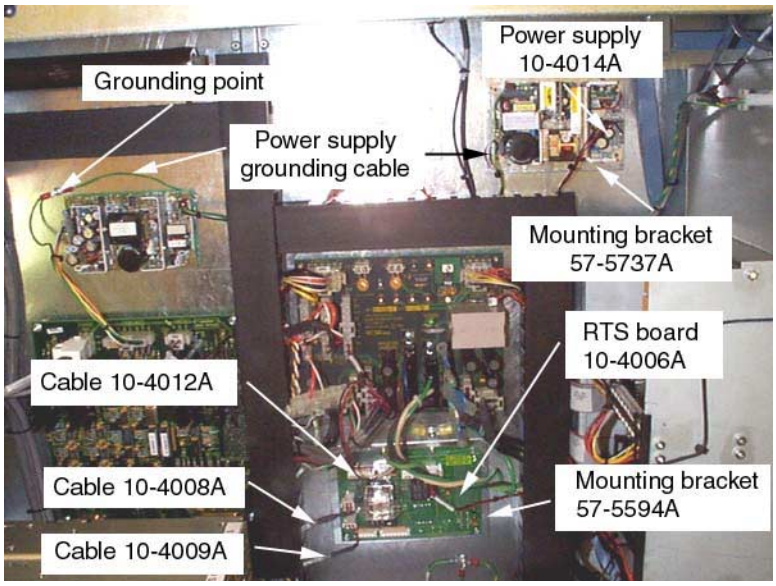


Figure 5.7a: Inside view of power box

7. Connect the PDB to the 24V DC power supply using the following connections:

   - black wire from the 24V DC power supply to **pin 5** of the fan power supply connector FB-PDB
   - white wire from the 24V DC power supply to **pin 6** of the fan power supply connector FB-PDB
   - green wire to the grounding point of the power box

   Run the cables inside the cable tracks of the power box.

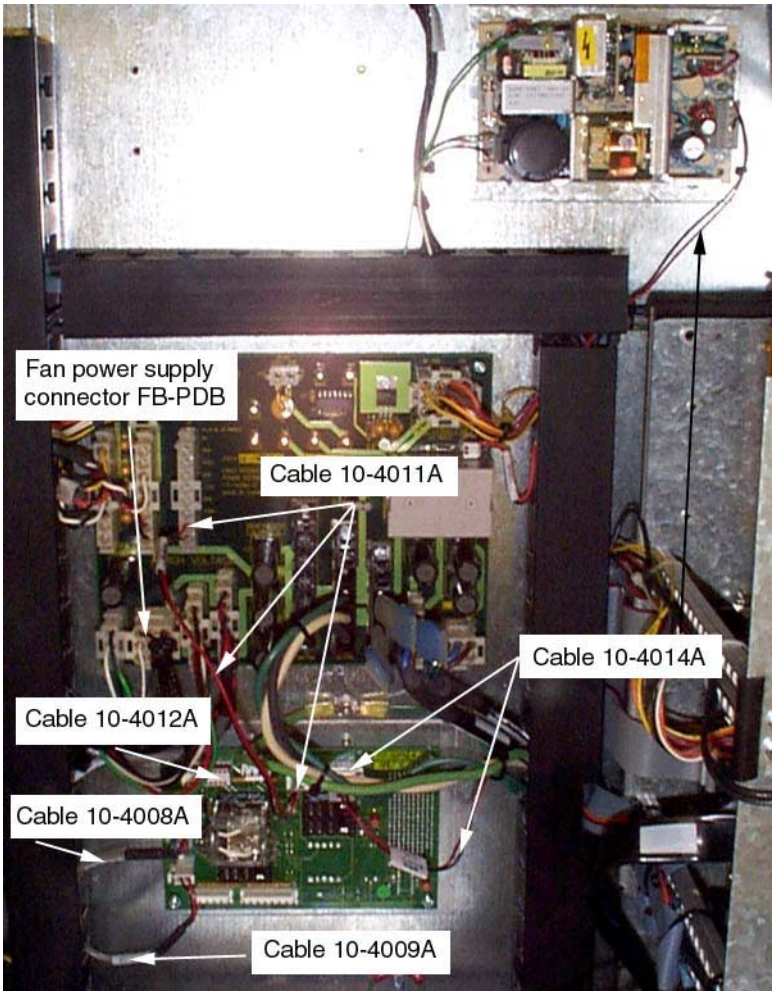


Figure 5.7b: Inside view of power box (with power supply connected)

8. Connect the isolated 24V DC power supply to the RTS using the 10-4014A cable. Plug it into the J2 (2 pin) connector of the RTS. Use the cable tracks inside the power box (see Figure 5.7d) .

9. Connect the PDB to the RTS using the 10-4011A cable. Plug it into the J1 (3 pin) connector on the RTS and the J6 (8 pin) connector on the PDB (see Figure 5.7d).

10. Connect the RTS to the Engine Satellite Board using the 10-4012A cable. Plug it into the J3 (10 pin) connector of the RTS and the J25 (9 pin) connector of the Satellite Board (see Figure 5.7d).

    Note: Feed the cable through the cable tracks inside the power box, then into the track behind it and along the pulley-end side of the machine to the Satellite Board (see Figure 5.7e).

11. Connect the RTS to the electrodes using the 10-4008A cable. Plug it into the J8 (4 pin) connector of the RTS and the 10-4007A cable already installed on the LEC actuator (see Figure 5.7d).

Note: Feed the cable through the cable tracks inside the power box, then into the track behind it and along the pulley-end side of the machine towards the Satellite Board. Run it alongside existing wire harnesses (use some tie wraps) near the Satellite Board and the main air manifold until it reaches the 10-4007A connecting cable (see Figure 5.7e).

12. Connect the RTS to the indicator lamp (the lamp is already installed inside the secondary switch button 10-4015A), using the 10-4009A cable. Plug it into the J7 (2 pin) connector of the RTS and the connector attached to the secondary switch.

    Note: Feed the cable through the cable tracks inside the power box. Use cable ties where necessary.

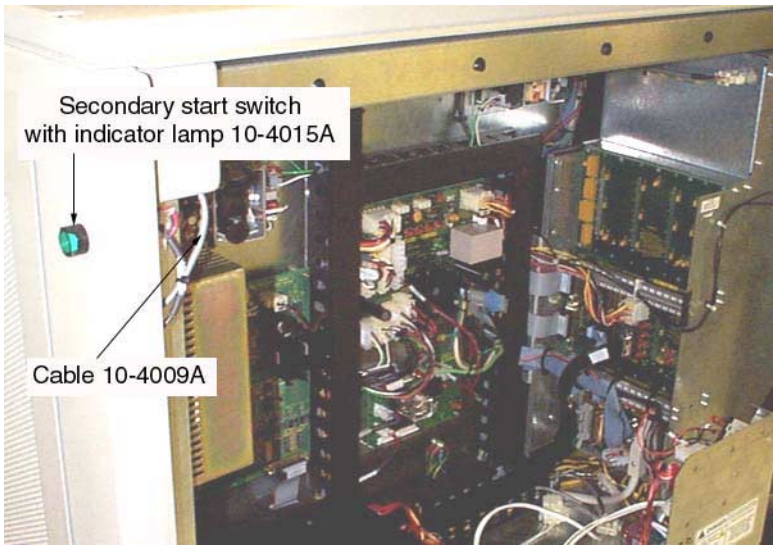


Figure 5.7c: Inside view of power box (RTS connected to indicator lamp)

13. Close all the open cable tracks, making sure that no cable is pinched or stressed.

14. Relocate the EMI filter on the pulley-end side of the machine, using the *EMI Filter Relocation Procedure (72-3091A).*

1.8. Install mechanical components

Note: While doing the following procedure, refer to these assembly drawings:

- 50-1234B
- 50-1223B
- 50-1400A (or 50-1401A)

1.8.1. Install the backbone

1. Disassemble the spring-loaded centering plungers (57-4207A) from the TEC backbone.

2. Remove the spring from the encoder-side plunger. Place 3 plastic washers (52-4471) under the plunger.

3. Add 3 plastic washers under the pulley-side plunger but do not remove the spring.

4. Install both plungers into the backbone. Leave approximately 2-3 mm travel on the spring-loaded plunger, but the springless (encoder-side) plunger should be solid.

5. Remove all the existing shims that space out the top backbone rollers (use a #8 screwdriver to undo the rollers). Replace the rollers, applying Loctite 242 to their threads.

6. Apply Alvania EP2 grease to the plungers in the area where they come in contact with the side clamp plates.

7. Install the backbone into the clamp plate rails. Apply Alvania EP2 grease onto the rollers and the rails if necessary.

8. Replace the cylinder shoulder bolts (52-3142), but do not install the nuts yet.

1.8.2. Install the LEC actuator assembly

9. Install the new LEC actuator assembly (57-1470C) onto the TEC backbone. Align the M6x50 setscrews into the holes on the LEC hinge and lay the flap into position. Pull on the setscrews to bring the nut plate located inside the backbone into position. Screw in the M6x16 hinge screws (52-4680).

10. Lift up the LEC flap to align the cylinders and cylinder bracket mounting holes. Place the bolts (52-4498) through the holes. Apply Loctite 242 to the threads on each bolt and fix the nut (52-4296) to it.

11. With the TEC cylinders fully extended, try to move the backbone from side to side. Adjust the side-to-side clearance so that its value is between 0.6 and 1.1mm.

    Note: The adjustment is done by removing or adding plastic washers to the underside of the plungers, which increases or reduces the plunger travel. See steps 2 and 3.

12. Install the 52-4314 nuts onto the shoulder bolts. Apply Loctite 242.

13. Check the distance between the reed switches and their magnets. To do this, the cylinders must be fully extended and the backbone moved to the side being checked. The gap should be set to 2.25mm.

14. Reposition the drum so that you can lower the LEC actuator onto the registration blocks. The electrodes should be centered over the blocks, touching them approximately in the middle of their top faces.

    Note: If the electrodes don’t line up with the blocks properly, readjust the backbone side-to-side clearance (see step 11).

15. Check that the spring-loaded electrode plungers deflect only 1-2mm when resting on top of the registration blocks.

Note: The deflection can be adjusted by extending or reducing the length of the electrode in the mounting block.

16. With the LEC actuator in the "off"(open) position, undo the nylock nuts that hold one of the mounting blocks to the LEC actuator. Push the block with its screws out of the mounting holes, securing it with one hand on the underside of the actuator (you may have to undo the screws first). Turn the block slightly so that the set screw (52-4768) in the backside of the block can be easily accessed.

17. Place the wire connector (ferrule) inside the block by passing it through the slot in the top face of the block. Make sure the ferrule is placed in behind the electrode so that proper contact will be made. Secure the connector inside the block with the set screw.

18. Replace the block with the attached cable into the LEC actuator.

19. Repeat steps 16 to 18 for the remaining blocks and electrodes.

20. Check the electric path continuity for each wire connection with the multimeter. Close the LEC flap and lower the backbone onto the registration blocks so that the electrodes can contact the blocks. Check the continuity through the registration blocks to the respective wires of the 10-4007A cable assembly. Make adjustments where necessary.

21. Attach the 10-4007A cable to the bracket below the LEC cylinder (pulley-side). Allow some cable slack for the "open-close" action of the actuator.

22. Reconnect and bundle up all the previously disconnected cables and air hoses. Connect the 10-4007A and 10-4008A cables together.

1.8.3. Install the leading edge clamps

21. Lock the drum in a position that allows easy access to the registration blocks.

22. Re-install all spring holders (57-3390A) and springs (59-3240) into the drum.

23. Install the first outer Leading Edge Clamp (57-3388A) on the encoder side of the drum by placing pivot blocks on either side of the clamp, then positioning the clamp over the springs and adjusting until the springs are properly seated.

24. Apply Loctite 242 to the M5 mounting holes or to the screws (52-4412) that will hold the clamp in place. Insert the screws into the pivot blocks. Compress the springs and turn the screws about one-third into the drum.

25. Repeat steps 23 and 24 for the other two outer clamps, sliding one side of each clamp into the pivot block already mounted to the drum.

26. Repeat steps 23 and 24 for the four inner clamps located over the registration blocks, following this order:

    a. Clamp 57-5599A (closest to the encoder end, two-slot)

    b. Clamp 57-5600A (one-slot)

    c. Clamp 57-5599A (two-slot) This clamp requires a 5mm longer pocket than the others.

d. Clamp 57-5600A (closest to the pulley end, one-slot).

Note: The slots in the clamps must be located above their respective registration blocks.

27. Repeat steps 23 and 24 for the remaining three outer clamps (57-3388A) on the pulley end of the drum.
28. Make two or three passes over the pivot blocks to tighten down the screws.
29. Re-install the three alignment bars (57-4520A) using M4x16 screws (52-4460).
30. Vacuum the interior of the machine. Clean the drum and the clamps with isopropyl alcohol or acetone.
31. Remove the drum stops and check that no tools have been left inside the machine.

1.9. Test installed components

1. Power up the VLF Trendsetter.
2. Turn on the compressed air.
3. Move the magnetic clamps into the Park position (push them up the drum against the alignment bars).

   Note: You may choose instead to remove the magnetic clamps from the drum. This can be done in either of two ways. If there are two people to do the work, the TEC backbone can be visually lined up with the clamps, then the appropriate solenoids can be activated on the main air manifold. If only one person is doing the work, the air can be turned off and the clamps retrieved manually.

4. Perform the "`mask door creo`" and "`ale init`" commands on the diagnostic workstation to reinitialize the machine.
5. Check that the electrodes are making contact with the registration blocks. Place a plate on the blocks and check that the light in the secondary switch comes on every time the electric circuit is complete. Be sure to check all possible plate registration options.
6. With the TEC backbone down on the registration pins, perform a "circuit short-out" electrical check. Use a piece of cable to connect the "live" registration block on the drum to any grounded part of the machine (e.g., table rivet, drum strap, etc.). Check that the indicator lamp in the secondary start switch does not come on. If it does light up, the circuit is not fully isolated. The cause of the malfunction must be identified and eliminated before the machine can be considered upgraded.
7. Perform several load and unload procedures to verify that the system is completely operational. Include several loads where the plate will not register to verify that the load process halts immediately.
8. Repeat step 6 with the customer observing to make sure that he or she fully understands all aspects of the electronic registration system.

9. **REPLACE THE PANELS ON THE VLF TRENDSETTER AND HAVE THE CUSTOMER VERIFY THAT THE MACHINE IS OPERATING AS DESIRED.**

APPENDIX A: PARTS NEEDED

Part #	Description	Quantity
10-4006A	Registration/Table Safety Electronics board	1
10-4008A	Cables	1
10-4009A		1
10-4011A		1
10-4012A		1
10-4014A	24V DC power supply with wiring harnesses	1
10-4015A	Indicator lamp	1
18-3017	Cable ties	20
18-3049		10
50-1372B	TEC backbone assembly	1
50-1753	Insulated screw M4x16	8
52-3057	Washer, M3, flat	8
52-4296	Nuts	2
52-4314		2
52-4412	Screw, M5x25	11
52-4458	Screw, M3x8, S-plated	12
52-4460	Screw, M4x16	15
52-4471	Washer	6
52-4498	Shoulder bolts	2
52-3142		2
52-4680	Screw, M6x16	10
57-2077B	Pivot block	11
57-3388A	LEC clamps	6
57-5599A		2
57-5600A		2
57-3390A	Spring holder	40
57-4520	Alignment bar	3
57-5594A	Mounting bracket for10-4006A	1
57-5700A	Clamp plate	4
57-5737A	Mounting bracket for 10-4014A	1

59-3240	Spring	40

APPENDIX B: HAND TOOLS NEEDED

Drill (electric, small)

Drill bit #30 (3.3mm)

Grease

- Microlube GL261 (small amount)
- Alvania EP2

Isopropyl alcohol or acetone

Lint-free paper (Kimwipes)

Loctite 242

M4 tap with T-handle

Masking tape (1", one roll)

Metric hex keys (1 set, 1.5mm to 8mm)

Nut driver for M4 nuts

Screwdrivers

- Large slot style
- #2 or #3
- #8

Side cutters (small)

Wrenches

- 7mm combination
- 11mm combination
- 19mm combination

X-acto knife

APPENDIX C: SPECIAL EQUIPMENT NEEDED

Bosch router (modified)

Collet wrench

Collets

- 3/8”
- 1/2”

Cutting oil

Drum clamps/drum stops (two flat bar)

Inner pin extractor

M4 tap with T-handle and perpendicular block attachment

Mechanical dial gauge

Mill system (consists of rail, carriage assembly, frame, and pocket-to-rail location blocks)

Multimeter

Outer pocket M4 drill jig

Pin alignment jig

Slot mill cutters

- 1/2” diameter carbide
- 11mm diameter
- 12mm diameter

Studs (four M6x50)

Vacuum adapter with hose

Vacuum cleaner

APPENDIX D: RUNNING A TEST FILE BEFORE AND AFTER THE UPGRADE

Before and after completing the Electronic Registration Upgrade, RIP and image the special Igrid ATP files to test the system, using the following procedure.

- Image Igrid1.ps on 2 separate plates before doing the Electronic Registration Upgrade.
- DO NOT PROCESS the plates. Keep the plates in safe light conditions until after the upgrade when Igrid2.ps is to be imaged upon them.
- Perform the Electronic Registration Upgrade.
- Image Igrid2.ps on one of the plates and process it. Determine and enter into firmware any Mainscan or Rotation corrections necessary.
- Image Igrid2.ps on the second plate to confirm corrections were applied properly.

To Enable Electronic Registration in Firmware

1. Open and configure Hyperterminal.
   Select Start>Programs>Accessories>Hyperterminal>Hyperterminal. Enter the following parameters into the dialog boxes that appear:

Name: `Creo`	Click on OK
Connect using: `Com3`	Click on OK
Bits per second: `9600`	Click on OK

   You will see a blank screen.

2. Hit the Enter key once or twice. You should see the prompt: `>>`. Enter the following 4 lines.

`set sys erin 1`	Hit Enter
`set al prr 3`	Hit Enter
`nvs save sys`	Hit Enter
`nvs save al`	Hit Enter

To RIP a file on Allegro 1.1a or Allegro 1.2

1. Turn on the power to the VLF Trendsetter.
2. On the Allegro Workstation, hold down the Ctrl, Alt, and Delete keys simultaneously. A Windows security dialog box will appear.
3. Choose `logoff` to restart the system. The system will automatically log back in and the Allegro software will restart.
4. Look under Allegro RIP>Start Inputs on the menu toolbar. If there is a checkmark beside Start Inputs, click on it to remove the checkmark.
5. Under Allegro RIP>Configure RIP, make sure that Page Buffering is set to "Multiple Parallel" mode. Click on OK. Write down the customer's original Page buffering setting so that you can restore it after completing this procedure.

   Note: If the Output Controller window does not appear, select Output>Output Controller from the menu toolbar.
6. If you don't want to image the file immediately after RIPing it, select the "Disable Output" checkbox in the Output Controller window.

   Note: You must uncheck the Disable Output checkbox when you want to image the file.
7. Select Allegro RIP>Print File. An "Open File" dialog box will appear. Browse to the location of the file you want to image.

   Note: If the file is on the CD, look in H:\psfiles\. The 2 Igrid postscript files should be there.
8. After imaging plates, return to the Page Buffering setting under Allegro RIP>Configure RIP and enter the original setting. Under Allegro RIP>Start Inputs, put the checkmark back to its original setting.

Adjust plate rotation

1. Type `set gc prot <current value +/- correction>.`

   Note: Microradians (microrads) is the unit of measure.
2. Determine the difference in shift from one side of the plate to the other.

   Example: If one side of the plate is off by .006" and the other side is off by .009", then the difference in shift is .003".
3. Divide this number by the distance between measurements to get the correction value.

   Example: .003"/40".

The result will be in Radians. Multiply by one million ($1x10^6$) to convert to microrads.

4. Enter a positive correction to rotate the image clockwise. Enter a negative correction to rotate the image counterclockwise.

Adjust main scan shift

Type `set gc mssa <current value +/- correction>.`

Note: Thousandths of an inch is the unit of measure.

Example: To adjust the main scan by .005" (5 thousandths of an inch) when the current value is .062 (62 thousandths of an inch), enter either

```
set gc mssa 67
```

or

```
set gc mssa 57
```

To move the image further into the plate (away from the registration pins), increase the current value.

To move the image toward the registration pins, decrease the current value.