

Magnus VLF

Series 2 X-Speed Upgrade
(TH3 Upgrade)

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719-00608A-B

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

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Revision History

Revision	Date	Author	Comments
Draft	27 April 2005	A.Blignaut	Draft version for use at Quad
1	04 Nov, 2005	A.Blignaut	Chiller upgrade changes – C.Townsent Carriage upgrade changes – T.Lamprecht Other changes – M.Zisman
2	15 Nov, 2005	A.Blignaut / T.Lamprecht	Carriage replacement procedures updated
3	29 Nov, 2005	A.Blignaut	Added head lifting crane installation and use.
4	13 Dec 2005	A.Blignaut	Removed head lifting crane installation to its own document (719-00564A). Added section on crane upgrade.
A	16 Dec 2005	A.Blignaut	Added nut cart, laser shield, and edge detect strip upgrade procedures and diagrams.
B	13 Jul 2006	A.Blignaut / M.Zgrych	Added prerequisite FCO for upgrade. Updated procedures and photos.

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1. BACKGROUND

This document describes the procedure to upgrade a Magnus VLF MCU Series 1 or Magnus VLF CL Series 1 to Magnus VLF MCU Series 2 X-Speed or Magnus VLF Series 2 CL X-Speed.

The Series 2 X-speed upgrade includes the following components:

- Productivity 1.0 upgrades
- Other device hardware upgrades
- Workstation and firmware upgrades

2. UPGRADE PREREQUISITES

Before starting the upgrade, check that the following ECOs have been implemented on the device:

- CA04683 - Drum resistive brakes upgrade
- CA05091 - Picker cylinder mount upgrade
- CA05234 - Picker/fetcher reliability upgrade
- CA05253 - Remove burrs on the cassette locator rails
- CA05568 - CANBUS cable upgrade
- CA05590 – Drum amp replacement
- CA05631 - Unload table traveler upgrade
- CA05944 - Picker pusher replacement
- CA06165 - Change drum vacuum pump fuses and debris removal fuses
- CA06184 - Access panel upgrade
- CA06338 - Access panel switch bracket upgrade
- CA06530 - Carriage amplifier replacement

Also perform the following before starting the upgrade:

- Backup the NVS parameters (text and binary files)
- Do a GC plot for comparison

3. PARTS NEEDED

- TH3 cooling hose upgrade kit - 518-01381A (5183 drum) or 518-01382A (6383 drum)
- TH3 debris removal upgrade kit – 518-01371A
- TH3 head crane kit – 518-01313A
- TH3 crane air supply kit – 518-01315A
- TH3 pneumatic filters – 500-03794A
- CR 3.0
- Coolant draining kit for the TH2 (50-2465A)
- Self tapping screws (2 pc) – 52-4956

4. TOOLS NEEDED

- Short T-handle hex keys
- M6 tap
- Electric drill; 16 mm step drill bit; 5.5 mm drill bit
- Punch

5. REFERENCE DOCUMENTS

- TH3 Installation Procedure
- Filter/regulator assembly drawing (500-02470A-B)
- TH3 Head Lifting Crane (719-00564A)
- Picker and Plenum Series 2 Upgrade (719-00592A)
- Unload Table Series 2 Upgrade (719-00593A)
- Draining and Repacking TH2 Imaging Heads for Shipping
- Draining the Coolant from a Thermal 2 Exposure Head
- TMCE to GMCE Upgrade Procedure (719-00613A)
- Controlled Release 3.0 Installer (719-00614A)
- Replacing a TH2 Carriage with a Universal Carriage with Z-stage (719-00439B)
- Calculating the Drum Midpoint and Mtravel Value

6. PRODUCTIVITY 1.0 UPGRADES

Perform the following upgrades according to the procedures shown below:

- Picker and Plenum Series 2 Upgrade (719-00592A)
- Unload Table Series 2 Upgrade (719-00593A)

7. PREPARING THE DEVICE FOR A TH3 UPGRADE

Before starting with the upgrade, get a binary and text backup of the NVS parameters—in particular the ram parameters. If a text backup is not available, specifically note the value of the following parameters, as they are not part of the GMCE NVS file, and thus they will not be migrated:

- set debris
- set prd SerialNumber
- set prd CustomerName
- set prd CanBaud

See the *TMCE to GMCE Upgrade Procedure* for details on backing up the NVS parameters.

1. Turn the service override key switch to **Override**.
2. Type the following:
   a. `>>carriage moveto 1040` to access the head in the middle of the device
   b. `>>backbone horizontalunload` to move the backbone away from the drum
   c. `>>door unlock` to release the front and rear hoods
3. Open the front hood and remove the front lower panels.
4. Remove the unload table panels—you can leave the outer panels.

5. Remove only load table rail numbers 2, 4, 5, and 6.



Figure 1: Removing load table rails

6. Manually move the load table traveler and unload table traveler to the front of the device.
7. Move the fetcher to the away side of the device. You will move the fetcher from side to side depending on where you are working on the device.
8. Unlock and open the rear hood and remove the rear panels. Also remove the slipsheet rear door if the device uses a slipsheet removal system (SSR).



Figure 2: Removing panels

9. Remove the away side and home side panels. Depending on the configuration of the device, you will have better access to the device if you raise the ejector bridge cover and table, move the drum vacuum pump aside, raise the slipsheet cover, remove the slipsheet bin, and lower the slipsheet access panel.
10. Remove the center laser shroud to get access to the head. The laser shroud may be a single unit or in two pieces.
11. Turn the device power **OFF**.

8. REMOVING THE TH2 HEAD

Note: Always wear an antistatic wrist strap before handling the thermal head.

The TH2 is stored in the top half (lid) of the TH3 transportation box. Remove the lid and place it ready to put the TH2 in it.

1. Disconnect the electrical connections and all tubes connecting to the head.
2. Disconnect the chiller hoses and clean up any chiller fluid that spills when disconnecting them.
3. Remove the debris removal nozzle from the head.
4. Remove all securing screws and remove the head from the device.
5. Place the head in the lid of the TH3 box.
6. Drain the coolant from the TH2 and prepare the head for shipping back to the Kodak head manufacturing facility in the Kincaid building in Vancouver, Canada. For the correct draining and shipping procedures, see the list of Reference Documents.

9. REPLACING THE CARRIAGE

1. Mark the position of the ballscrew nut cart with respect to the tracks so that you can put the new carriage in this position again when you are finished. This is the position the carriage should be in to use the crane for TH3 installation.
2. If the device has a Z-stage installed, remove the six screws and remove the Z-stage..
3. Remove the spring anchor bracket on the right side of the carriage—the one that extends over the cable track bracket that will be removed in the next step.
4. Remove all three pieces of the cable track support bracket from the carriage. The part attached directly to the carriage (two countersunk head screws) will be reused—the other two parts will be replaced.



Figure 3: Cable track bracket to be reused

5. Using a new 3 mm hex key (preferably a straight key, not a ball end key) that has not been rounded, loosen the three setscrews on the clamp collar that secures the flextube to the ballscrew nut—half a turn is all that is required.

Note: Take care not to strip these setscrews as they may be tight and difficult to remove.

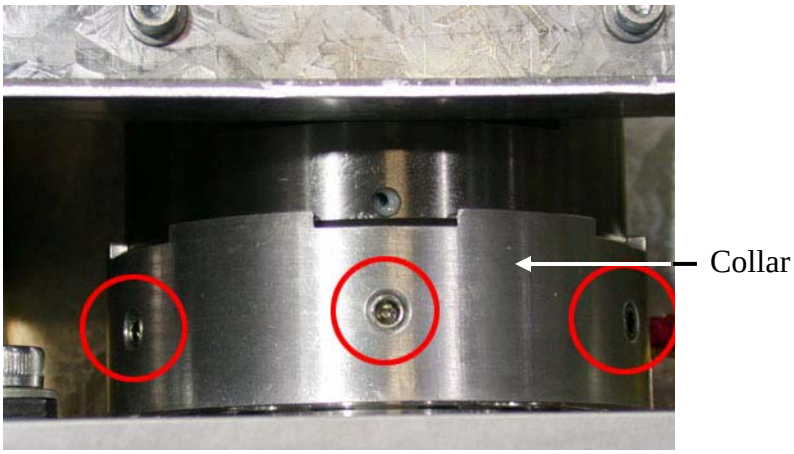


Figure 4: Loosening the ballscrew collar setscrews

6. Separate the carriage from the ballscrew nut and push the carriage along the tracks to the home side of the device.
7. Remove the ballscrew drive motor cover.
8. Disconnect the 6-pin connector to the ballscrew drive motor.

Note: When turning the ballscrew using a drill in the next step, a voltage will be generated by the motor that can damage the electronic control board for the motor. Unplug the 6-pin connector to prevent this from happening.

9. On the away side of the ballscrew, use the ballscrew drive tool and an electric drill to move the ballscrew nut close to the carriage in order to support the home side of the ballscrew.



Figure 5: Tool for turning the ballscrew with a drill

10. Remove the home tab from the carriage. The home tab will not be reused.

11. Remove the home sensor bracket assembly.

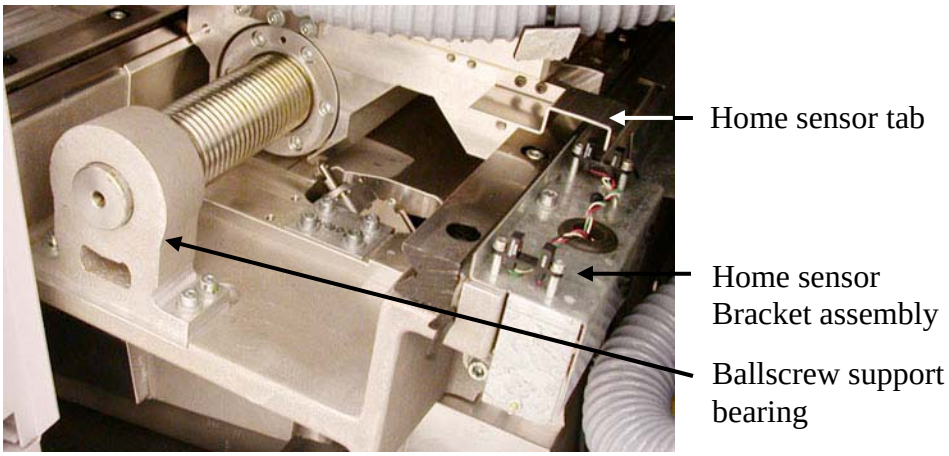


Figure 6: Home side sensor bracket assembly

12. Remove the ballscrew support bearing assembly.

13. Completely remove the carriage from the ballscrew.

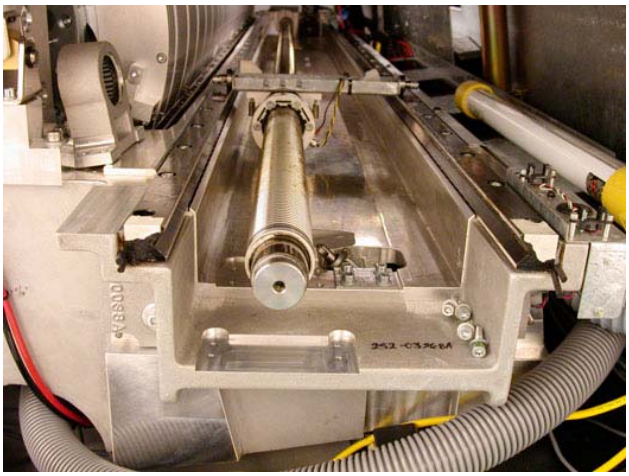


Figure 7: Carriage removed from the ballscrew

14. Remove the six screws to remove the flextube from the old carriage—it will be reused on the new carriage.

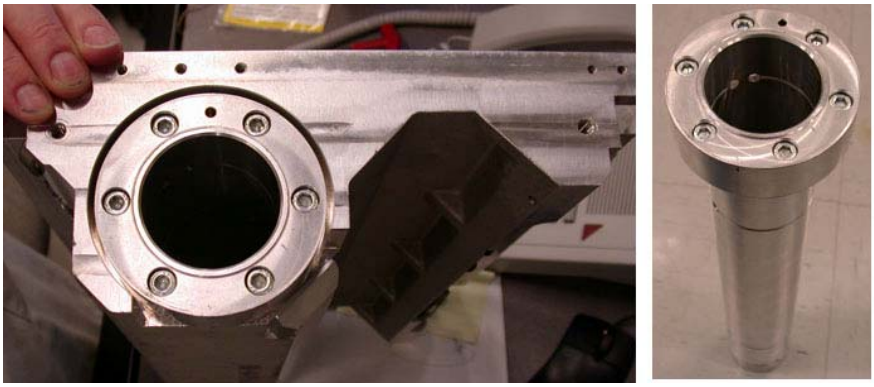


Figure 8: Removing the carriage flextube

15. Put some masking tape over the sharp edge formed by the top and ends of the tracks to prevent the sharp edge from creating aluminum filings as the carriage is installed.

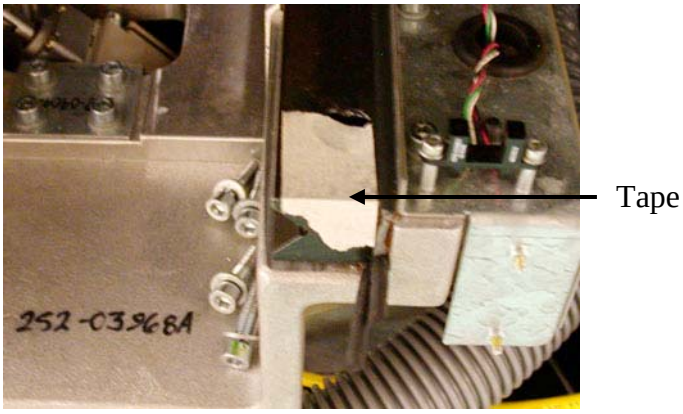


Figure 9: Putting tape on the sharp carriage track edges

16. Install the new carriage without the flextube, wipers, home tab, or cable track support brackets. See *Replacing a TH2 Carriage with a Universal Carriage with Z-stage*.

17. Install the ballscrew support bearing temporarily with one screw on either side.

18. Using the ballscrew drive tool and an electric drill, move the ballscrew nut to the away side of the device—move it as far as possible without hitting anything.

19. Move the carriage by hand so that it is accessible through the head service opening. Slide the carriage back and forth by hand at a speed roughly the same as the retrace speed and ensure that the carriage moves smoothly. If the carriage motion is not smooth, check for debris on the tracks and clean them as necessary. It may be necessary to remove the carriage and clean the bearings if debris gets stuck to one of the bearings.

20. Once smooth carriage motion is achieved, move the carriage to the center of the head service opening.

21. Install the wipers. Lightly push the wiper so that it contacts the track while tightening the screw.

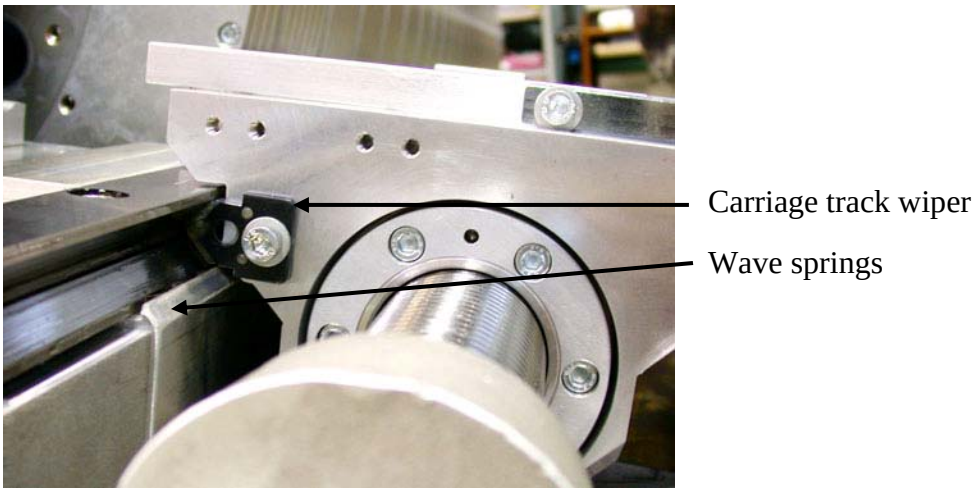


Figure 10: Installing the carriage track wipers

22. Slide the carriage back and forth over the whole range of travel and ensure that the wipers do not contact the wave springs. Once you are satisfied that the wipers do not contact the wave springs, move the carriage to the home position.

23. Using the ballscrew drive tool and an electric drill, move the ballscrew nut close to the carriage to support the home side of the ballscrew.

24. Remove the ballscrew support bearing assembly.

25. Without removing the carriage, install the flextube and fasten the six flextube screws.

26. Install the ballscrew support bearing assembly using all four cap screws. Push the bearing assembly towards the drum and towards the carriage before tightening the screws.

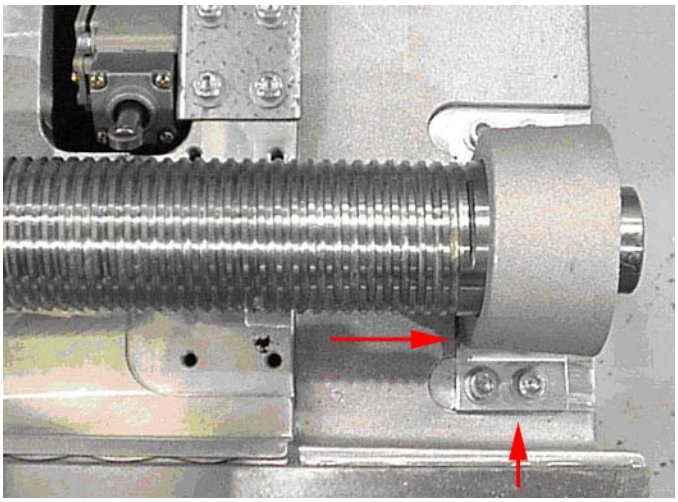


Figure 11: Aligning the ballscrew bearing

27. Install the home sensor bracket assembly.

28. Install the new home tab on the carriage and align it with the sensor.
29. Using the ballscrew drive tool and an electric drill, move the nut cart to the right side of the head service opening.
30. Slide the flextube into the clamp collar until the shoulder on the flextube hits the collar. There should be approximately a 3 mm (1/8 in.) gap between the collar and the carriage, or a 42 mm gap between the carriage and the nut cart.
31. Tighten the three setscrews that clamp the collar onto the flextube. Again, take care not to strip the hex socket of the setscrews.

10. REPLACING/REWORKING THE NUT CART

The new nut cart has three holes in the side that are required to access the TH3 flexure clamp screws. The nut cart can either be replaced using the parts provided, or re-worked using the drawing provided, at the option of the service personnel. Replacing the nut cart does not require drilling of holes, but will require re-adjustment of the nut cart bearings. Reworking the nut cart will require drilling three holes, but the bearings will not need to be re-adjusted.

1. Remove the away tab from the nut cart. It will not be reused.
2. Remove the two large cap screws in the U-clamp that holds the ballscrew nut to the nut cart and remove the nut cart. If the nut cart is going to be reworked, drill the three 10 mm diameter holes as shown in the attached drawing. See Appendix D: Ballscrew Nut Cart Hole Locations.
3. This step may be skipped if you plan to re-work the existing nut cart. Disassemble the wedges and bearing assemblies from the old nut cart and reassemble onto the new nut cart.
4. Reassemble the ballscrew nut to the nut cart using the U-clamp, but do not fully tighten the clamp screws yet.
5. Position the left-hand edge of the nut cart so that it is 42 mm from the edge of the carriage—a 42 mm block can be used as shown in the photo below. This will locate the left edge of the nut cart directly over the edge of a feature on the ballscrew nut.

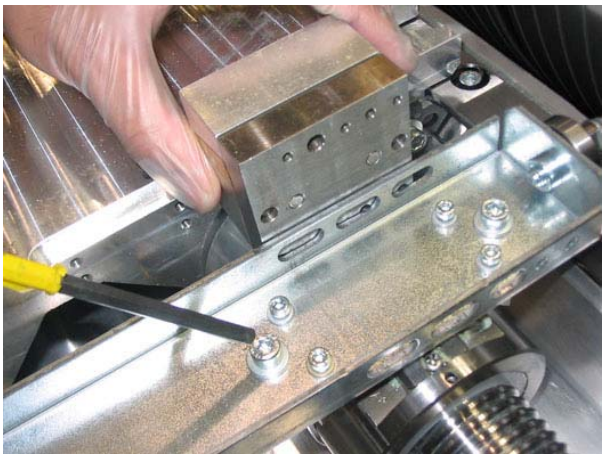


Figure 12: Positioning the nut cart

6. Check that the upper setscrew in the flextube clamp is oriented so that it can be accessed through the hole provided in the flexure extension attached to the carriage.

7. Fully tighten the U-clamp cap screws.

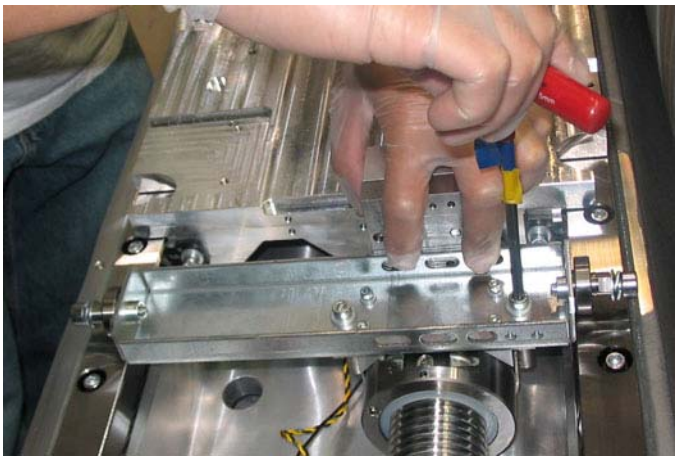


Figure 13: Tightening the nut cart U-clamp cap screws

10.1 Installing the new away tab on the nut cart

1. Install the new away tab onto the nut cart.

2. Using the ballscrew drive tool and a drill, move the nut cart close to the away end of its travel taking care that the new , but unaligned, away tab does not break the away sensor.

3. This step may be skipped if you plan to re-work the existing nut cart. Adjust the nut cart support bearings. The bearings are each mounted on an eccentric adjuster.

   a. Loosen the cap screws clamping the eccentric adjusters and back off the adjusters so that there is clearance between the bearings and the tracks. At this point you should be able to rock the nut cart back and forth.

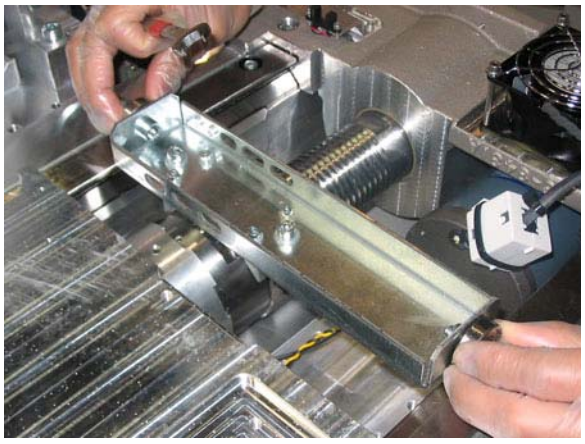


Figure 14: Adjusting the eccentric adjusters

   b. Turn both eccentric adjusters by approximately equal amounts until the bearings are just touching the tracks.

c. While holding the eccentric adjuster from turning, tighten the cap screws to lock the eccentric adjusters in place.

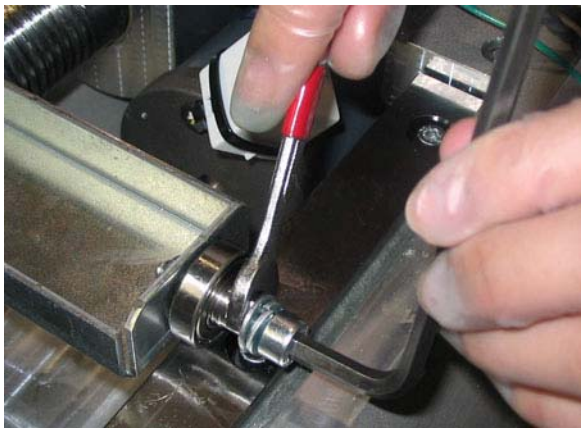


Figure 15: Tightening the eccentric adjusters

4. Check that the correct away sensor mounting bracket is installed. Measure the distance from the center of the away sensor to the inside surface of the ballscrew bearing housing—this distance should be 20 mm. Alternatively, measure the distance from the center of the away sensor to the outer surface of the bearing housing—this should be 80 mm. If these measurements are correct there is no need to replace the away sensor mounting bracket. If these are not the measurements you get, then it is most likely that the older style away sensor bracket is installed and it will need to be replaced.

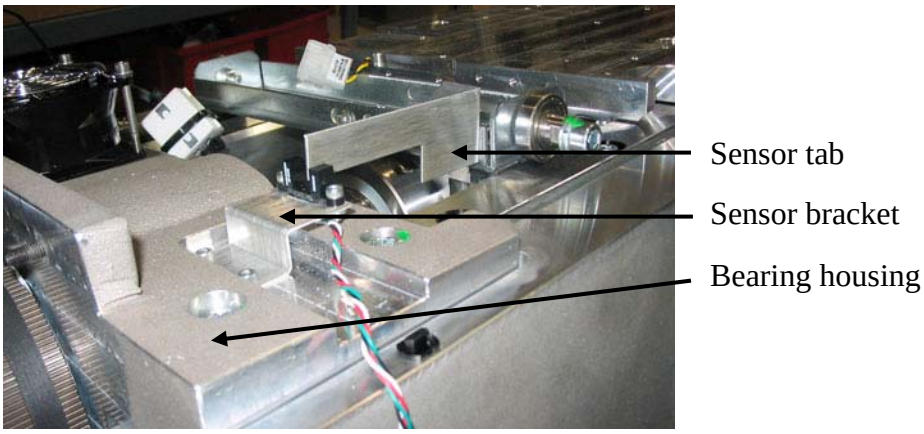


Figure 16: Ballscrew away sensor

5. If the away sensor bracket needs to be replaced, be sure to remove the sensor from the bracket first, and then remove the bracket from the bearing housing. Take care when removing the sensor from the bracket. The screws most likely have pre-applied thread-locking compound on them and you need to unscrew them slowly to avoid twisting the PEMs out of the bracket.

6. With the correct away sensor bracket in place, turn the ballscrew by hand to move the away tab into the vicinity of the sensor. Align the away tab so that it can move between the emitter and receiver on the sensor without damaging it, and tighten the away tab attachment screws on the nut cart.

7. Ensure that the ferrite on the carriage drive motor cable is located in a manner such that it is not crushed by the carriage when the edge of the away tab is in the middle of the sensor.

8. Using the ballscrew drive tool and drill, move the nut cart to the position marked on the tracks at the beginning of the carriage replacement procedure.

9. Install the cable track support bracket assembly using the original part retained plus the new pieces provided.

11. INSTALLING THE LASER SHIELDS

The new home and away tabs allow the head to move beyond the ends of the drum at both ends, and therefore laser shields must be installed. The laser shields are attached to the drum support pillow blocks using the three existing holes. In the early pillow blocks, these holes are simply through holes; in later pillow blocks they are drilled and tapped.

1. If the pillow blocks have through holes, install the included PlusNuts—see the doc procedure included with the parts. If the pillow blocks have tapped holes, there is no need to install the PlusNuts.

2. Install the studs, washers, nuts, and shields as shown in the included procedure.

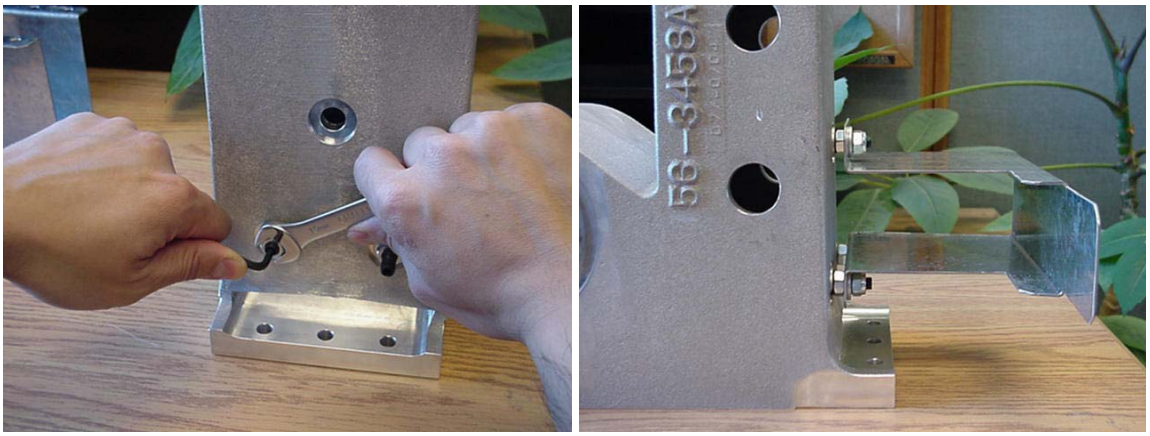


Figure 17: Installing the PlusNuts

3. Rotate the drum by hand through one complete revolution to ensure that the shields do not hit or interfere with anything.

12. REPLACING THE EDGE DETECT STRIPS

The existing long and medium length edge detect strips adjacent to the leading edge clamps (LEC) are to be replaced, and the five short strips are to be flipped end-for-end.

Replace the strips taking care that the strip is installed such that the angled surface of the strip forms a 'V' with the angled part of the groove in the drum. This is obvious for the long strip because it can only be installed one way. The medium length strip and the five short strips can be turned end-for-end and installed either way. For a TH3 installation, the angled surface of the strip and the angled surface of the groove in the drum must form a 'V' (the opposite is true for a TH2 installation).

Long strip – 252-09753A

Medium strips – 252-252-09997A

Short strips – 252-01324A

13. UPGRADING THE CHILLER COMPONENTS

1. If not already done, remove the left front and left side panels to get access to the chiller, debris removal unit, and related cables and hoses.
2. Remove the screws and brackets (two sets) that secure the debris removal unit. Disconnect cables and hose from the debris removal unit and temporarily remove it from the device.
3. Remove the chiller from the device:
    a. Pull the chiller unit out from under the device and disconnect the hoses and power cable.
    b. Remove power cable from device. This cable will not be reused—a longer power cable for the chiller is supplied with the upgrade kit.
    c. Disconnect the tether cable from the device and from the chiller. The eyebolt can be left attached to device.
    d. Remove the chiller from the device—it will be replaced with a Neslab Merlin M75 model that will be located external to the Magnus VLF device. The coolant and filter will not be reused.
4. Disconnect the cable supplying power to the auxiliary fan hinged to the inner left panel of the device. Cooling from this fan is not required for TH3.
5. Disconnect the cable from the pressure switch located on the chiller hose. This cable will be re-routed to the rear left of the device later in this procedure.

6. Remove the upper hose tray floor from inside the hose tray. This provides access to remove and install the cooling hose assembly later in this procedure. It also provides access to drill holes in the hose tray wall for the focus laser adjustment tool.



Figure 18: Removing the upper hose tray floor

7. Disconnect the purge-air line that supplies the head hose block. The air line in the cable carrier will be reused.
8. Remove the junction block holding the chiller hoses against the engine casting. This block will not be reused.
9. Unscrew the tail block from hose tray wall.

Two holes must be drilled in the hose tray wall to access the Z-adjust screw when setting up the TH3.

10. Mark the location of the holes on the hose tray wall. See Appendix C: Hose Tray Hole Locations. Mark only the two holes relevant to the size of the drum in that device.
11. Center-punch and drill two ½ in. holes at the locations marked. Drill through both the inner and outer walls of the hose tray wall.
12. De-burr the holes.

WARNING: The ragged edges that are left after drilling the large holes can cause damage to both personnel and hardware. It is therefore important to de-burr the edges of the holes.

13. Install the head lifting crane support brackets and quick disconnect air fitting. See the section on Upgrading the Device for the TH3 Lifting Crane.

14. Remove the sheet-metal strain relief clamping plates from around the cooling hose. The clamping plates will not be reused—they are not needed for TH3.



Figure 19: Removing the strain relief

15. Cut the cable ties binding the cooling and debris removal hoses together and completely remove the cooling hose assembly from device—leave the debris removal hose in place. The cooling hose assembly and tail block will not be reused. The debris removal hose will be reused for TH3.

16. If not already done, attach the cable track support bracket to the new carriage.

17. If not already done, attach the pre-assembled hose and cable track support brackets required for TH3 (see Figure 28. Use kit 518-01381A (5183 drum) or 518-01382A (6383 drum).

18. Attach the cable track to the support brackets.

19. Remove the left rear corner panel from device.

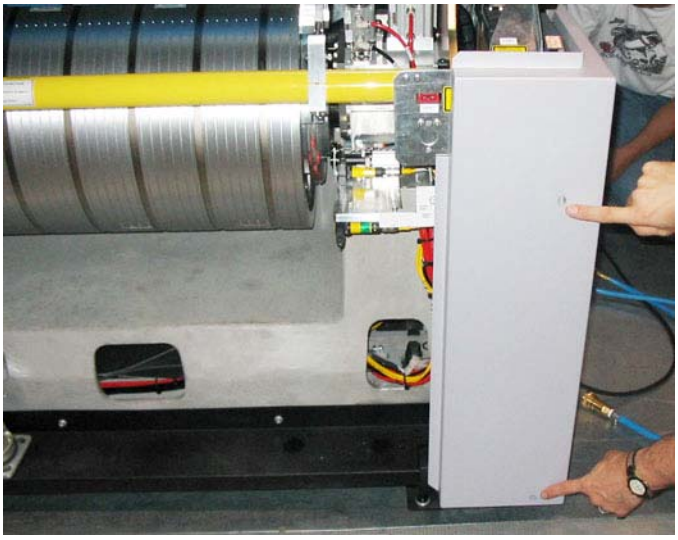


Figure 20: Removing the left rear corner panel

20. Remove the lower left side bulkhead panel from the device—two screws.
    If the device configuration is right eject, disconnect the MCU air and electrical connections before removing the panel. The bulkhead panel will be replaced with a newer version (252-01943B) featuring an oval shaped cutout for the chiller hose and cable.
    If the device configuration is left eject, you will re-use the blanking panel attached to the old bulkhead panel. This blanking panel covers the holes in the new bulkhead panel that are not needed for the MCU air and electrical connectors.

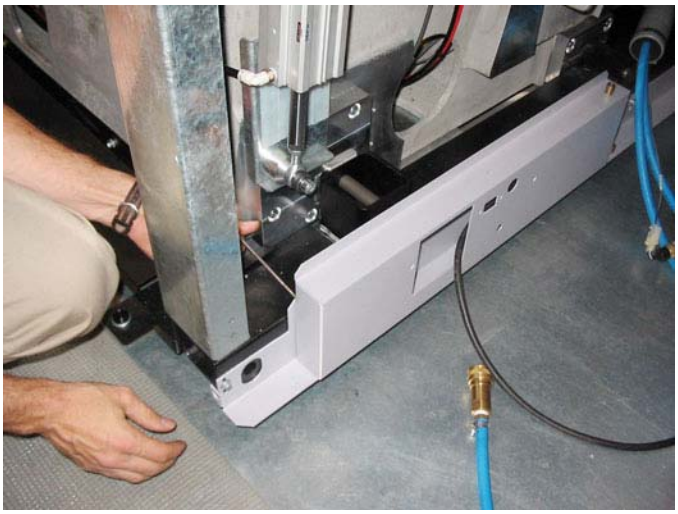


Figure 21: Removing bulkhead panel

21. Using the sheet-metal mounting plate as a template, mark the location of the two holes in the engine casting that will be used to mount the pressure switch block. See *Appendix A: Pressure Switch Hole Locations* for details.

22. Drill 5.1 mm holes at the locations marked and tap the holes with a M6 tap.

Note: Ensure that there are no cables or tubes on the inside of the casting in the area where the holes are drilled.



Figure 22: Drilling the pressure switch block holes

23. Locate the pressure switch cable and reroute the cable to the rear of device. Route the cable through the engine casting via the first holes from the left in the front and rear. See Figure 32.

24. Install the new bulkhead panel. For right eject configurations, reconnect the MCU air and electrical connections. For left eject configurations, ensure the blanking panel is included.



Figure 23: Installing the new bulkhead kick-panel

25. Install the left rear corner panel on the device. See Figure 20.

26. Install the new (longer) chiller power cable from the internal chiller power receptacle to the rear left corner of the device. Route the cable along the top left base-frame member and exit through the hole in bulkhead panel.

Note: Route the chiller power cable through the bulkhead panel first. There will not be enough room to install the power cable after the chiller hoses are pulled through the hole in bulkhead panel. See Figure 34.

27. Starting at the chiller end, route the new cooling hose assembly (500-03399A) towards the head.

CAUTION: Exercise care when handling the chiller hose assembly. Too much strain where the hose cuffs are clamped to the pressure switch block will break the foam block at those connections. Do not coil the hose tightly near the connections to the pressure switch block.



Figure 24: Broken foam block

a. Feed the head-end of the cooling hose assembly inside the engine frame casting from the rear via the second rectangular hole from the left corner.



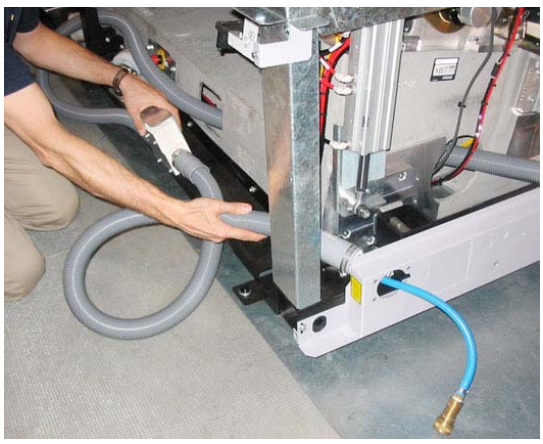
Figure 25: Feeding the cooling hose assembly inside the engine casting

b. Pull the chiller-end of the cooling hose assembly from inside the casting through the large round hole on the left side.



Figure 26: Pulling the cooling hose assembly out of the engine frame

c. From the inside to the outside of the device, feed the chiller-end of the hose through the opening in the bulkhead panel. Reposition or remove the hose clamp from around the hose cuff if it will not fit through the hole. Re-attach the clamp once the hose assembly is through the hole in the bulkhead.



Remember to feed the chiller power cable through first – the power cable is not shown in this photo. See Figure 34.

Figure 27: Feeding the chiller hose through the bulkhead kick-panel

d. Pull the hose through the hole until the pressure switch block can be positioned and mounted to the two M6 tapped holes you made in the engine casting. See Figure 31.

e. Route the cooling hose along the top of the left base-frame member to the hose tray.

f. Run the cooling hose inside the hose tray up to the carriage.



Figure 28: Running the chiller hose inside the hose tray

28. Attach the hose block to the support bracket.

29. Trim 550 mm from the end of the existing debris removal hose (gray hose).

30. Attach the debris removal hose extension to the existing debris removal hose using the adaptor (252-09423A) and hose clamps from the upgrade kit.

31. Position the debris removal hose and clamp to the hose mounting bracket. To prevent the debris removal hose from dragging on top of the hose tray, cable tie the debris removal hose to the cooling hose. Ensure that the hose clamp does not extend beyond the edge of the support bracket. If it does, the clamp will hit the fan box sheet metal when the head is moved.



Figure 29: Positioning the debris removal hose and clamp

32. Reconnect the purge air tube (inside the cable track) to the T-fitting on the cooling hose block.



Figure 30: Connecting the purge air tube

33. Reinstall the upper hose tray floor inside the hose tray.
    For devices with a 5183 drum, reuse the old hose tray floor.
    For devices with a 6383 drum, replace the upper hose tray floor with a new version (57-0249C-A). The new version has a mouse-hole cutout for the focus laser adjustment tool.

34. Connect the hose and cables to the debris removal unit. Reinstall the debris unit to the device using the mounting brackets.

35. Mount the pressure switch block to the rear of the engine casting with M6 screws.

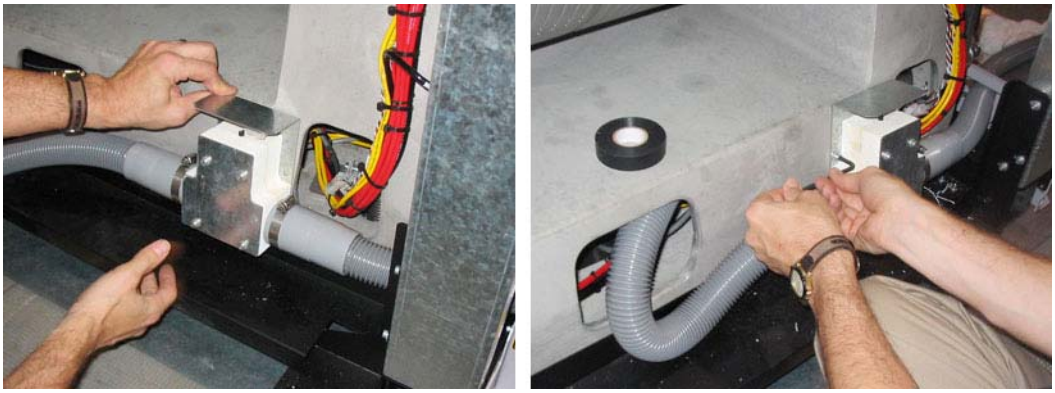


Figure 31: Mounting the pressure switch block

36. Attach the pressure switch cable to the pigtail connector on the pressure switch block of the new cooling hose assembly.



Figure 32: Connecting the pressure switch cable

37. Position the new chiller by the rear left corner of the device. See Figure 33.

38. Remove one snap-hook from the tether cable and attach it to the rear left device foot using the existing castor bolt.

39. Loop the tether cable from the chiller through the snap-hook and back again to the chiller. Attach the free end of the cable snap-hook to the chiller. The tether cable limits the distance the chiller can be pulled away from the device without stressing the hoses and cables.

40. Reattach the coolant filter line to the cooling hose assembly.

41. Connect the cooling hoses to the back of the chiller. Clamp the grey hose cuff to the back of the chiller using the two reusable straps mounted on the rear sheet-metal. Ensure that there are no kinks in the water lines—particularly the short line to the filter.

42. Attach the power cable to the chiller.



Figure 33: Connecting the chiller power cable

43. Loosely install the new clamping plates to the bulkhead panel and properly position the cooling hose and power cable.

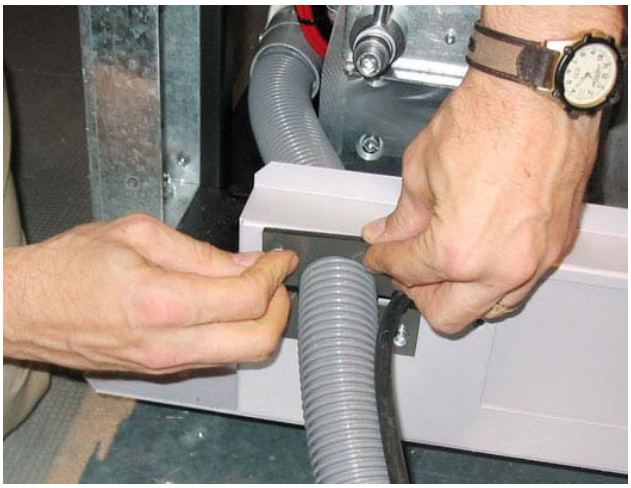


Figure 34: Installing the bulkhead clamping plates

44. Route the power cable along the cooling hose between the chiller and the device and use cable ties to keep them together. Push any slack in the power cable inside the base device and loop the slack forward to the wall in debris removal cabinet. Secure the loops to the sheet-metal wall with cable ties.

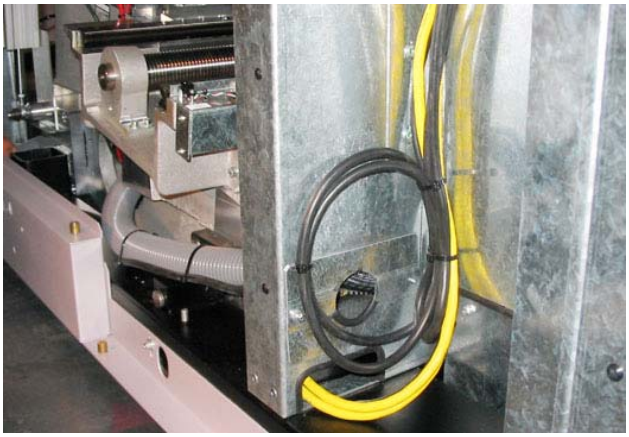


Figure 35: Routing and securing the chiller power cable

45. Tighten the clamping plates onto the cooling hose and power cable.

46. Fill the chiller reservoir with the supplied coolant.

47. Once the head is installed on the carriage, connect the following:

    a. Feed the cooling hoses/fittings through the rubber boot (252-09292A).

    b. Fit the rubber boot to the hose block.

    c. Connect the cooling hoses to the head.

    d. Fit the rubber boot to the head.

e. Attach the debris removal hose to the nozzle on the head using the hose clamp provided in the upgrade kit.

f. Attach the electrical cables to the head. Attach the air line to the head.

14. UPGRADING THE POWER BOX COMPONENTS

In the power box, the TMCE board will be replaced with a GMCE board, power supplies 3 and 4 are replaced with a single power supply, extra cables are installed, and any outstanding FCOs are installed.



Figure 36: Series 1 power supplies (left) and Series 2 power supplies (right)

1. Remove the power box panel.
2. If FCOs CA04683 and CA06530 have not been installed, they must be installed at this time. If the AC supply voltage to the device is 50 Hz, also perform FCO CA06165. See the FCOs page for details.
3. Disconnect and remove power supplies (PS) 2, 3, and 4:
   a. Disconnect the AC power cables from the PDB J5 (from PS4), J3 (PS3). The existing cables from PS 3 and PS 4 will not be reused.
   b. Disconnect the DC side of the cables from PS 3 and PS 4 and coils them up—they will not be reused.
4. Install PS 4 (the 600W supply) in the place of PS 2. This power supply will now be PS 2.
   a. Connect cable 10-5114A to J4 of the PDB and to the AC side of PS 2 (side closest to the fan).
   b. Connect cable 220-00059A to PS 2—the brown wire with rubber boot to **48V** terminal and the black wire to the **RTN** terminal. See Appendix E: Power Supply Connections.

5. Install the new single power supply in the place of PS 3 and PS 4. This supply will now be PS 3.

    a. Connect cable 220-00995A to J3 on the PDB and to the AC side of PS 3 (side closest to the fan).

    b. On the DC side of PS 3, connect the yellow high tension (HT) cable 220-00991A to J1. Route this cable out the rear of the power box, along the cables marked ‘Head Bundle’, along the cable duct below the thermal head, and into the flex track that connects to the head carriage.

    c. Connect cable 220-00992A to J7 on the LIONEL 0 board and to J2 on PS 3. The other branch of this cable (4-pin connector) goes to the TH3 filter/regulator pressure switch (220-00993A) that will be mounted under the load table frame support on the left side of the device. Route the cable along the cable/hose duct to the left side and up to below the pullout load table.



Figure 37: TH3 filter/regulator

6. Install and connect the new cable from the power distribution board (PDB) to the AC side of the new PS (closest to the fan).

7. On the DC side of the PS, connect the yellow high tension (HT) cable to the PS and route it out the rear of the power box and along the cables marked ‘head bundle’ to the head. The cables follow along the cable duct below the head and into the flex track that connects to the head carriage.

8. One branch of the other new cable (220-00992A) goes from the new PS to the LIONEL board and the other branch goes to the chiller hose pressure switch (the old pressure switch cable was removed earlier).

9. Disconnect and remove the TMCE. Install the GMCE in its place and reconnect all the connectors. See the *TMCE to GMCE Upgrade Procedure*.

10. Connect the additional fiber cable from the GMCE (U126) to the head (follow the head bundle as described before).

11. Use cable ties to secure and tidy up all cables and install the power box cover.

12. Apply the new power supply label 382-01493A to the front of the power box cover.

15. REPLACING THE FILTER/REGULATOR ASSEMBLY

For the layout and connection of the new filter/regulator assembly, see 500-02470C-A. For the new filter/regulator assembly, see 500-03794A.

1. Turn off the compressed air supply at the device and disconnect the air supply from the device.
2. Disconnect and remove the hinged panel at the rear right of the device that the filter/regulator is mounted to (away side).
3. Install the new filter/regulator panel (500-02470C-A).



Figure 38: Installing the filter regulator

4. Attach the main air supply tube to the new filter/regulator panel.
5. Install the TH3 filter/regulator and pressure switch assembly on the underside of the load table frame support. The bracket is attached with two self tapping screws (52-4956). See Figure 37 for location.

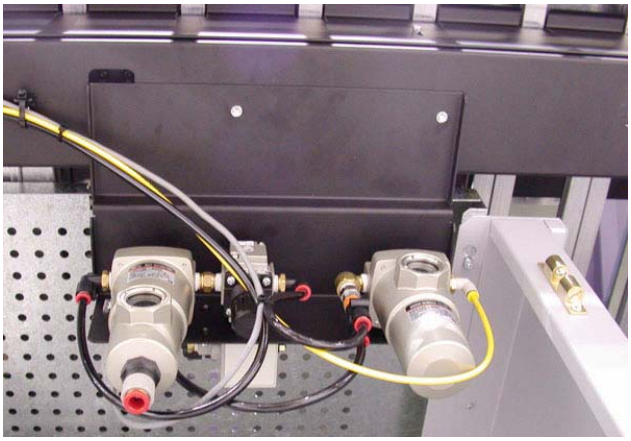


Figure 39: TH3 filter/regulator

6. Connect the yellow super-clean tube to the TH3 filter/regulator. Route the yellow tube from the filter/regulator assembly along the underside of the load table, to the cable duct, to the head. This tube supplies the head with clean dry air.

Note: Take extreme care while installing the yellow super-clean tube to keep the tube free of dirt or contaminants. This tube must be purged before being connected to the TH3.

7. Connect the black tube to the TH3 filter/regulator. Route the tube along the underside of the load table, to the cable duct, to the back of the new filter/regulator panel at the rear right of the device. Connect it to the new fitting on the rear of the new panel.

8. Use cable ties to secure the new cables and tubes along the underside of the load table.

16. UPGRADING THE DEVICE FOR THE TH3 LIFTING CRANE

16.1 Replacing the Laser Shroud Panel

The head lifting crane has a column that must pass through a hole in the left upper laser shroud panel. The hole is covered with a removable laser safety cover when the output device is operational.

1. Remove the existing left upper laser shroud panel.

2. Install the new laser shroud panel. This panel includes a tethered safety cover that must always be installed when the head lifting crane is not installed.

16.2 Installing the Column Brackets

The head lifting crane's column is supported by upper and lower brackets that are permanently mounted to the inner side of the hose tray wall. Holes must be drilled into the hose tray wall to permit mounting of these brackets.

1. Using the full-size template that comes with the upgrade kit, mark the location of the holes that will be used for mounting the column brackets. If a template was not shipped, see Appendix B: Column Bracket Hole Locations.

2. As shown on the drawing, drill the eight 5.5 mm diameter holes for the column brackets.

3. Install the two brackets (kit 518-01313A).

16.3 Installing the Crane Pneumatic Supply

A single hole is required in the hose tray wall to mount the pneumatic supply quick disconnect fitting for the crane.

1. Using the same template as for the column brackets, mark the location of the single 16 mm hole on the hose tray wall. See Appendix B: Column Bracket Hole Locations.

2. Using a step drill, drill a 16 mm hole at the location marked.

3. Install the quick disconnect fitting (kit 518-01315A) on the hose tray wall—ensure that the fitting points downward.

4. Locate the 5/16 in. black air line feeding the main engine manifold. Cut this line and install a T-fitting inline with the two cut ends (kit 518-01315A).

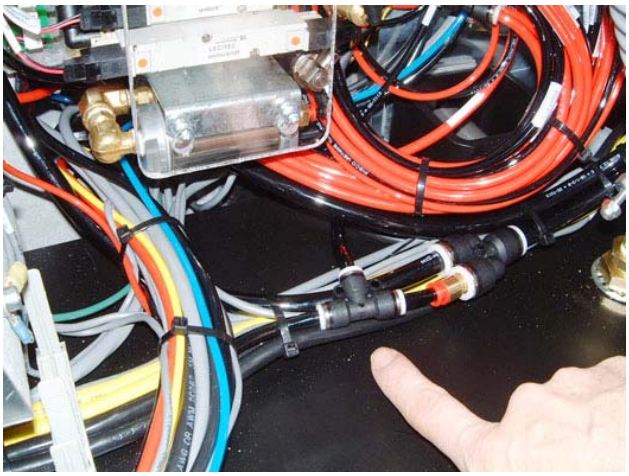


Figure 40: Installing the main air line T-fitting

5. Route a 3.5 m length of 5/16 in. black tubing from the T-fitting to the quick disconnect fitting that you installed on the hose tray wall. Route the tube along the existing hose tray and ensure that it will not interfere with any moving parts in the device. Connect the black tube to the T-fitting and the quick disconnect fitting.



Figure 41: Routing the air line for the head lifting crane

17. INSTALLING THE TH3 HEAD

The TH3 has an approximate weight of 49 Kg (108 lbs). For handling, installation, and removal of the TH3 on a Magnus VLF, you must use the head lifting crane. See the list of Reference Documents for instructions on how to install and use the crane.

1. Remove the unused cables and tubes from the flex track. You can roll them up, secure them with cable ties, and leave them in the cable duct below the head.

2. Turn on the air supply to the device.

Note: The air will escape from the super-clean air line (yellow tube) that connects to the TH3. Leave this tube open and allow air to flow through this tube for at least 20 minutes to flush the tube out before it is connected to the TH3. This can be done while using the crane to install the head.

3. Install the Z-adjust screw into the rear V-block on the carriage. Screw it in until the ball-end is just flush with the inside surface of the V-block.

4. Remove the left and right upper flexure extensions that were supplied attached to the flexures on the carriage (watch out for the loose cap screws). Attach the left and right upper flexure extensions to the TH3.

5. Remove the 5th point button screw on the carriage and check that there are six shims under the head of the screw. Extra shims are stored at the top right corner of the carriage. Reinstall the screw. Each shim will change the tilt by 1 µm over a 448 pixel swath width.

6. Replace clean air fitting on the head if necessary. The clean air fitting is located on the right rear corner of the head and has a yellow release ring. Most of the early heads were provided with a relatively large black elbow. This elbow has very little clearance with the cable track support bracket(s). If the head has a black elbow installed, then replace it with the small grey elbow provided. Note that both elbows have a yellow release ring to match the yellow tube that is connected to it.

WARNING: Do not connect the super-clean air line to the TH3 before the line has been purged for at least 20 minutes.

7. Install the head on the carriage making all air and electrical connections; there is no need to tighten the flexures at this point. Note that the flexure blades have two sets of slots. The upper set of slots allow for adjustment in the Z-direction and are used to zero the head focus; the lower set of slots allows for vertical adjustment and are used when adjusting head tilt or yaw.

The new carriage has a yaw adjustment feature that is zero-adjusted at the factory. However, if yaw needs to be adjusted, contact Product Support for the necessary procedure and associated spreadsheet.

See the list of Reference Documents for instructions on how to install the TH3.

18. UPGRADING THE FIRMWARE

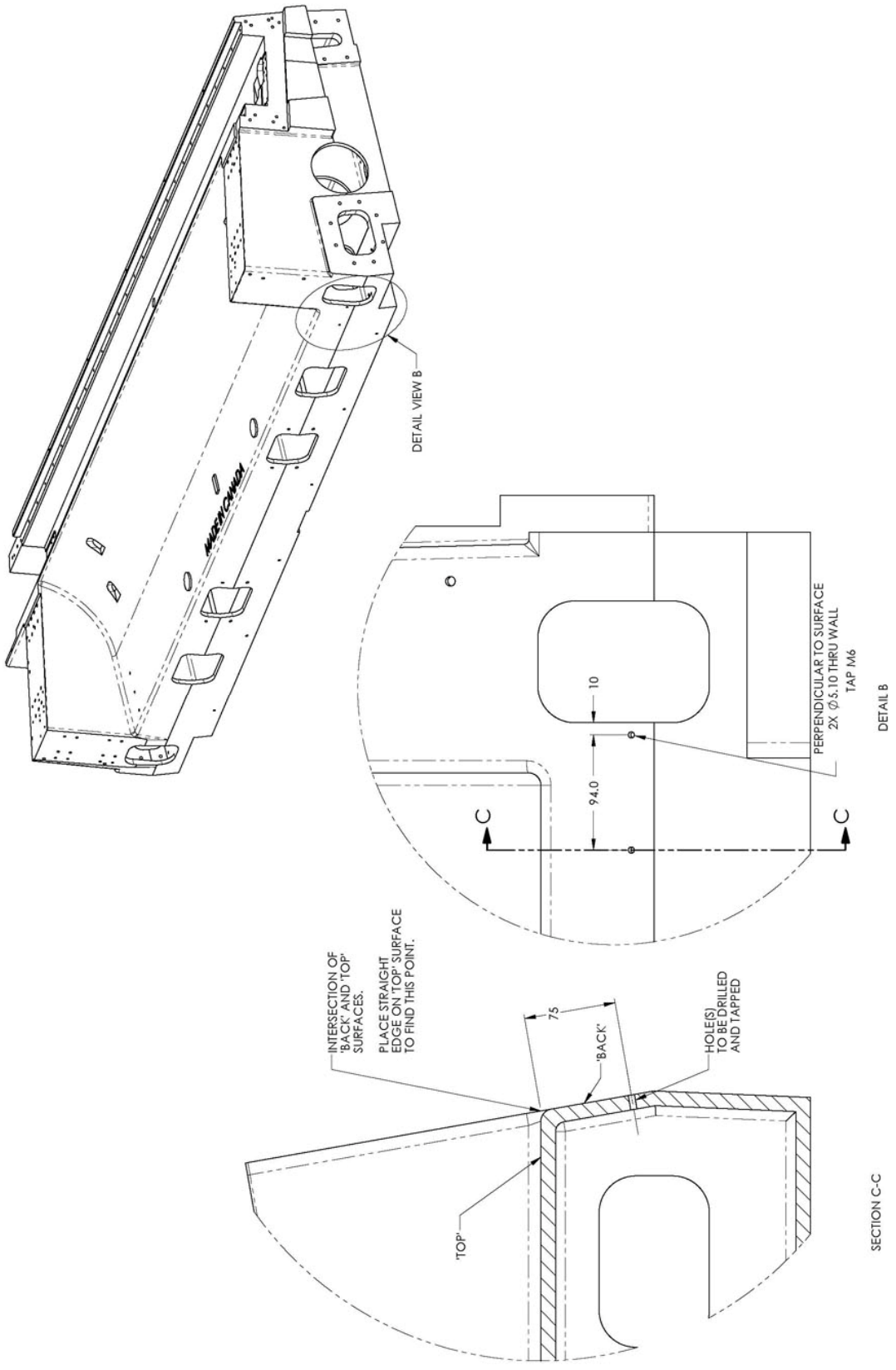
See the *TMCE to GMCE Upgrade Procedure* and the *Controlled Release 3.0 readme file* (release notes).

1. Turn the device power on.

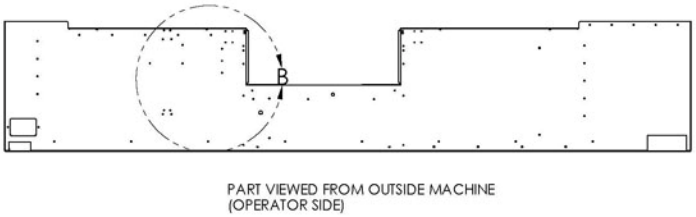
2. Change the drum midpoint in firmware to 1099 and do a GC init. Initialize the carriage and have someone near the emergency stop switch in case there is any unplanned interference (there shouldn't be any). Move the carriage to position 1096 (the new head remove/install position). The Z-adjust access holes will now be lined up with the Z-adjust screw. Use the long 3 mm hex key to adjust focus. The edge of the drum will now be at carriage position 26, and the edge of the shield at approximately position 28. The carriage Mtravel is now 2202.
   In the event that these carriage positions do not appear to be correct or there are problems finding the plate edge, see *Calculating the Drum Midpoint and Mtravel Value* document to determine the correct drum midpoint and Mtravel values.

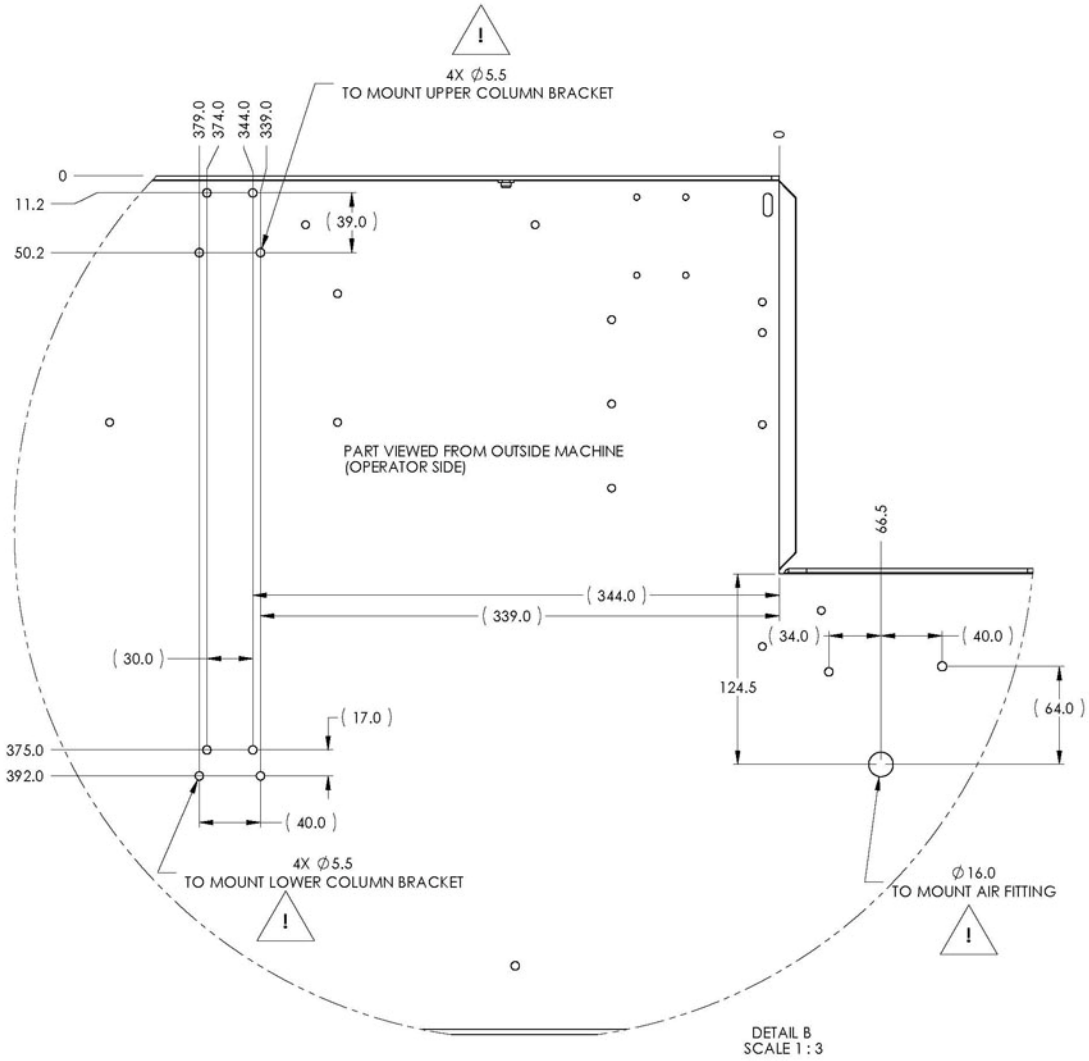
3. Determine the angular drum positions that locate the edge detect strips. To do this, the SPlot script "edgedetectfind.spt" must be available. The laser shields cover approximately 2 mm from the edge of the drum. The two flat head screws securing the home end of the long edge detect strip are just at the edge of the shield. The trick is to use the script to determine the proper angular drum position to reliably detect an edge that is over these screws. The script can scan in two dimensions. Scan in the mainscan direction from 1.5 degrees to 2.5 degrees in 0.036 degree increments. Scan in the subscan direction from 27 mm to 32 mm in 0.5 mm increments. This should provide plenty of data. Look at the data from the 30 mm carriage position first. This should be directly over the screws. There will be a relatively small region where the sum is around 10. On EP3, which has a 63 in. drum, the middle of this range was at about 1.95 degrees. Note that value entered in firmware for set edge drumpos must be a multiple of 0.018 degrees. For EP3 we used 1.944 (108 x 0.018). The same procedure can be performed for the second set of edge detect strips if desired, but its not likely necessary since nothing has been changed here. It may be worth checking that the value for set edge drumpos2 is a multiple of 0.018 degrees.

19. APPENDIX A: PRESSURE SWITCH HOLE LOCATIONS

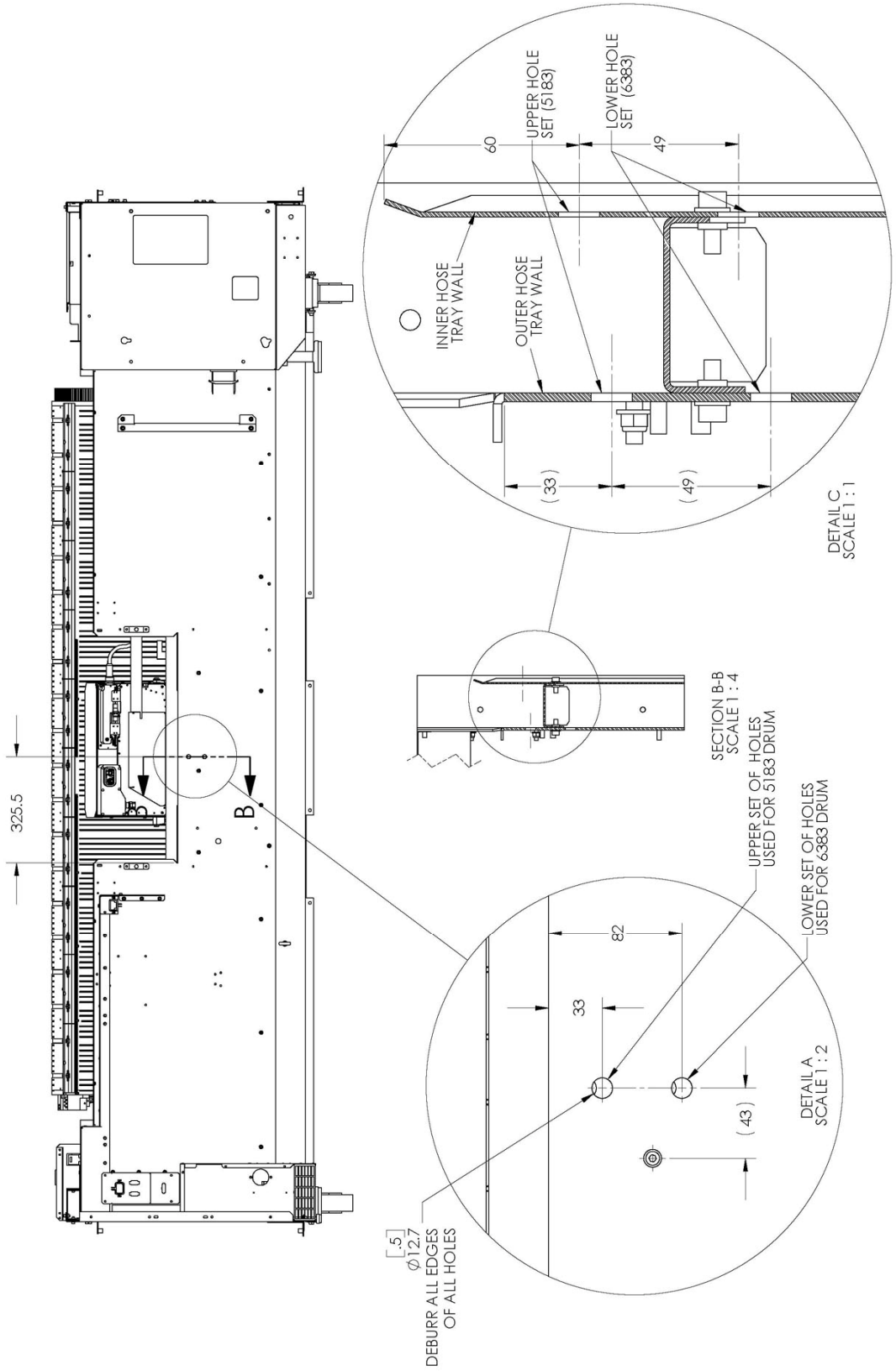


20. APPENDIX B: COLUMN BRACKET HOLE LOCATIONS

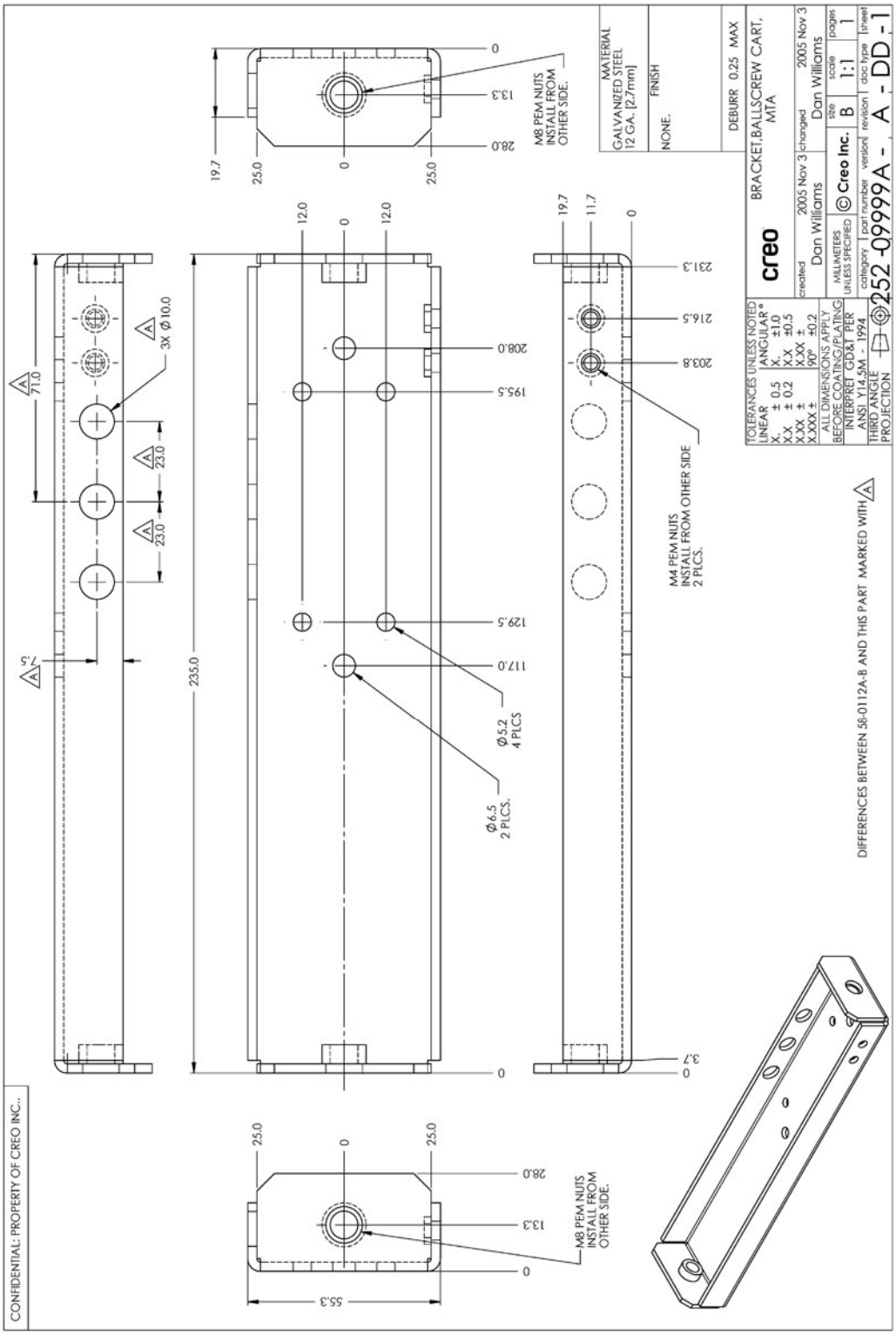




21. APPENDIX C: HOSE TRAY HOLE LOCATIONS



22. APPENDIX D: BALLSCREW NUT CART HOLE LOCATIONS



23. APPENDIX E: POWER SUPPLY CONNECTIONS

Note: Connector J2 of PS 3 is not shown in this diagram.

