

Creo Output Devices

Optical Encoder Cleaning Procedure

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Revision History

Revision	Date	Author	Comments
C	22 Dec 2003	Al Edge	Removed BOM list – users should refer to SAP for latest. Changed Q-tips to cotton swabs. Corrected part number for operator cleaning kit Added part number for anti-static strap
D	11 Apr 2005	A.Blignaut	Updated encoder cleaning kits and replaced encoder cleaning fluid with glass cleaner.
E	30 Aug 2007	F van Eerdt/ K Johnston	Added general safety warning and link to safety policies for field engineers.

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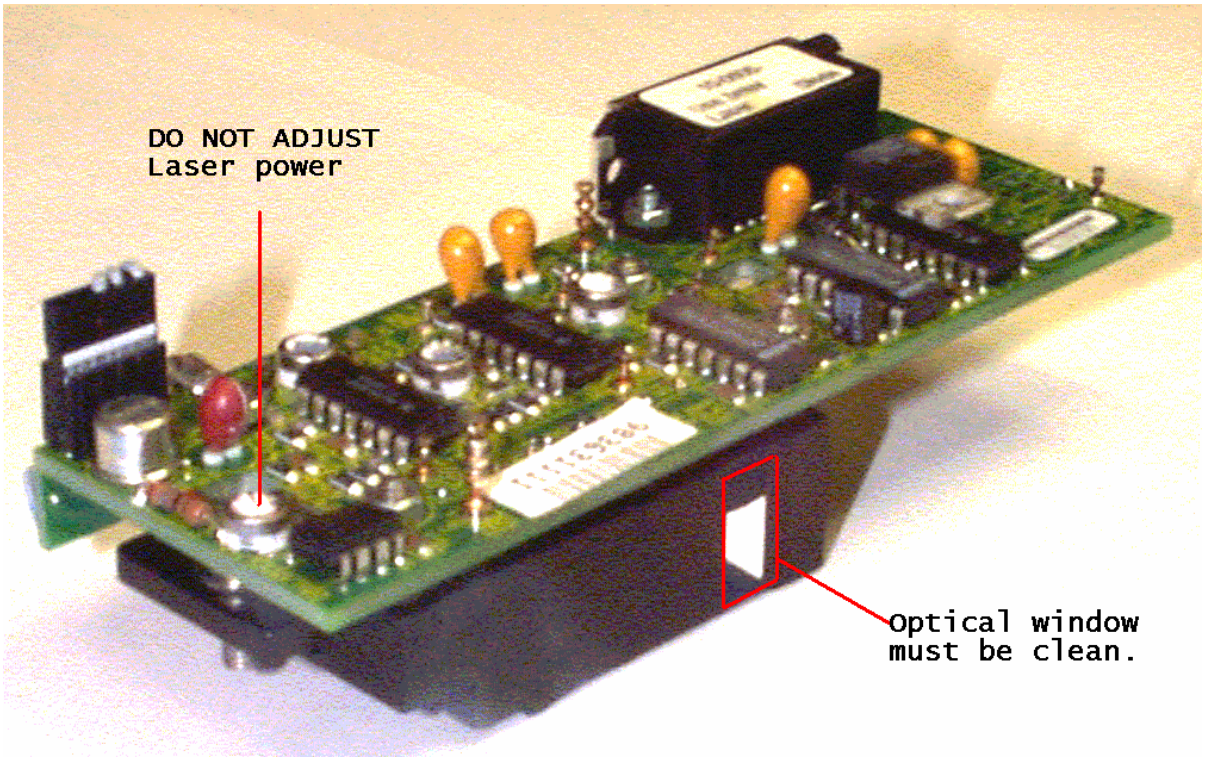
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1. INTRODUCTION

This document describes the procedures for:

- Cleaning the encoder disc
- Removing and refitting the encoder casting including the encoder block
- Cleaning the encoder block window



WARNING: Failure to follow the standard safety policies and procedures for field engineers may create a dangerous situation that could result in serious injury as well as damage to the output device. For more information, see: http://techplanet.creo.com/output/computer_to_plate/all_ctp/nav/safety.htm

1.1 Tools and cleaning kits

- Encoder cleaning kit - 04-0014A
- Digital oscilloscope
- Loctite® 222
- Glass cleaner

Refer to SAP for details of the BOMs, or to the Trendsetter VLF Maintenance page on TechPlanet:
http://techplanet.creo.com/output/computer_to_plate/vlf_trendsetter/nav/maint.htm#tools

1.2 Overview

Most problems with the encoder are in some way related to cleaning and the use of correct cleaning materials. For proper operation, the encoder disc must be very clean.

The procedures in the next sections show how to:

- Remove the encoder casting, including the encoder block and PC board, as a unit. Removing the encoder casting gives better access as well as keeping it away from acetone or acetone fumes. You can replace it without having to do the alignment procedure.
- Clean the encoder disc and encoder block window and dust off the photo diodes.

2. ENCODER DISC CLEANING PROCEDURE FOR OPERATORS

Certain very limited actions can be taken by operators that have been specifically trained in the cleaning procedure. An operator should not perform the service engineer cleaning procedure.

You MUST wear an anti-static wrist strap (395C10025) when touching the engine or the encoder as any static discharge may damage the encoder. The laser is extremely static sensitive and static damage may only show up weeks later.

If the carriage is in the home position, move it to the away position by typing `>>carriage away` in the diagnostic monitor.

1. Remove any sheet metal cover panels required to gain access to the disc.
2. Use a brush (84-0009A) to brush the dust off the disc. Brush radially while turning the drum slowly. If you have canned clean air (do not use line air), then you can use it to blow dust away as you brush.

Note: Before using a can, make sure that no spray or liquid is coming out – this will leave a residue (despite manufacturer claims). Hold the can as upright as possible, especially when it is full.

3. Try the operation that originally failed again. If successful, close the covers and resume production.
4. If the problem occurs again, clean the disc using a new Luminex wipe (84-0005). Rub the disc gently in the radial direction, a small section at a time, using a fresh part of the cloth every 3 inches of the disc or so. Keep the Luminex cloth very clean, and wear vinyl or cotton film handling gloves. Never use gloves that are coated on the outside with powder, such as some latex gloves.

   Try the operation that originally failed again. If successful, close the covers and resume production.

5. If the problem occurs again, clean the disc using a TX609 clean room wipe (84-0004) and glass cleaner. Rub the disc gently in the radial direction, a small section at a time, using a fresh part of the cloth every 3 inches of the disc or so. Have a second TX609 wipe handy to dry the disc as you go. You must clean and then dry each section immediately, since it is the drying that removes the dirt. Cleaning merely dissolves or dislodges it.

   Keep the TX609 cloth very clean. Wear vinyl or Nitrile gloves (84-0002). Never use gloves that are coated on the outside with powder, such as some latex gloves. Always wash your hands after wearing gloves to prevent the powder on the inside getting onto the encoder disc.

   After cleaning with the glass cleaner, another turn can be made using the Luminex cloth to remove any smears or residue.

If the problem occurs again, do not attempt any more cleaning. Call for a service engineer to perform the cleaning procedure for service engineers.

3. ENCODER DISC CLEANING PROCEDURE FOR SERVICE ENGINEERS

You MUST wear an anti-static wrist strap (395C10025) when touching the engine or the encoder, as any static discharge may damage the encoder. The laser is extremely static sensitive and static damage may only show up weeks later.

Never connect or disconnect the encoder cable with the machine power on.

Note: Do not use cyanoacrylate glues on parts near the encoder because of the fumes they give off.

3.1 Removing the encoder casting with block

1. If the carriage is in the home position you can move it to the away position with a `>>carriage away` command.
2. Power off the machine.
3. Connect and wear a static strap (remember to test your static strap regularly).
4. Unplug the cable from the encoder.
5. Use a M5 hex key to remove the four screws holding the encoder casting in place. Do not loosen the two screws holding the encoder block onto the casting or else you will have to do a full re-alignment. (See photo on page 8.)
6. Place in the static safe bag.

3.2 Cleaning the encoder disc

Before you begin, note the following:

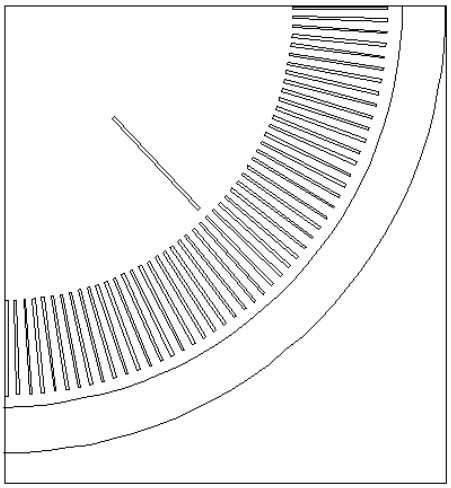
- Nitrile gloves have talc powder on the inside. If you have these on and then remove them, you will need to wash your hands before doing any further cleaning.

- The cleaning solvents are extremely pure. Do not touch the encoder disc with wipes that have been in contact with your skin; the solvents absorb oils from your skin that can then get smeared onto the disc.
- Acetone dissolves hydrocarbons (oils) and then the wipe lifts the contaminants off with the solution. Glass cleaner does not dissolve hydrocarbons, but has a greater affinity for glass than water or Isopropanol and thus will tend to lift the contaminant and residue to the surface of the fluid where the wipe will more easily lift the contaminant off. Both solutions leave NO residue, and any residue that is left behind is the original contaminant that has been smeared and has not been effectively lifted off.
- Many cotton swabs and paper cloths contain resins that will be dissolved by acetone and therefore make the disc even more contaminated. The materials specified in the cleaning kit are resin free. Only these parts should be used.
- Keep both HPLC chemicals in airtight containers as they absorb moisture, which can interfere with the cleaning process.
- Do not contaminate bottle of fluid by letting the wipe contact the mouth of the bottle.

1. Gently brush off any dust from the encoder disc using the lens brush and simultaneously blowing dust away with canned clean air.

   Note. Before using a can, make sure that no spray or liquid is coming out – this will leave a residue (despite manufacturer claims). Hold the can as upright as possible, especially when it is full. Blow with less than full pressure. Do not use regular line compressed air as it may contain oil vapor.

2. Inspect the disc in the region of the ticks and in the whitespace inside of the ticks where the index will be. Turn the drum slowly and inspect the surface of the glass inch by inch, looking for marks. It can sometimes help to position your eye so that the ambient light reflects off the surface.



When cleaning the rim of the encoder disc, remember that the clear space inside the visible band of ticks must also be very clean. There is just one tick (the index mark) in this space, so if there is a dirty spot anywhere on the circumference extra indexes may be detected.

3. Gently wipe the encoder disc surface with scanner wipes or cleanroom cotton swabs, moistened with HPLC acetone.

Note: Be careful not to spill acetone on sensitive (especially plastic) surfaces. Do not dip the cotton swab into the bottle of cleaner as it will contaminate the rest of the bottle.

Cloth Wipe Method

Use Scanner Wipes (84-0001) or Texwipe TX609 (84-0004). Scanner wipes are quite large so half a piece is adequate. Nitrile gloves may be used to keep fingerprints off the disc and to prevent drying of the skin.

- Wrap the wipe around your finger and wet it thoroughly with HPLC acetone, but not enough to be dripping.



Caution: Acetone dissolves most plastics and nail varnish.

- Hold your wrapped finger against the disc.
- Turn the drum through one rotation while holding the moistened wiper against the disc. Lift your finger as you go to avoid grinding the dirt into the encoder disc. Use a clean part of the wipe for each part of the disc (every 3 inches or so). Discard the wipe when used.
- Have a dry scanner wipe handy and use it to wipe the disc dry immediately after cleaning a section. You may need to brush off any lint that the scanner wipe has deposited.

Cotton Swab Method

- Rotate the cotton swab while cleaning to avoid grinding the dirt against the disc. Discard the swab after one rotation.
- Immediately after cleaning, wipe the disc with dry cotton swabs or a scanner wipe. It is important to use an absorbent material that is fairly lint free and totally resin free.

4. Rotate the drum to expose more of the disc's uncleaned surface.
5. Repeat the cleaning, using either the cloth wipe or cotton swab method.
6. After the whole disc has been cleaned, slowly rotate the drum and inspect the encoder disc for smear marks that indicate the presence of oil or glue.
7. Clean the affected area(s) again if required. Cotton swabs with large tips work well for spots.
8. Wet a new scanner wipe or TX609 cleanroom wipe (84-0004) with encoder cleaning fluid.
9. Wipe halfway round the encoder, then dry it off with a clean scanner wipe or TX609 wipe.

10. Repeat for the other half of the disc.
11. Blow off any lint with canned compressed air.

    There should be almost no visible residue on the tick marks on the encoder disc, down as far as the index mark.

12. Any slight residue may now be wiped off with a dry Luminex cloth. Try to avoid touching the part of the cloth that you are going to wipe against the disc.
13. Check that your static strap is still grounded, and then take the encoder out of the bag.
14. Clean off the window with encoder cleaning fluid.

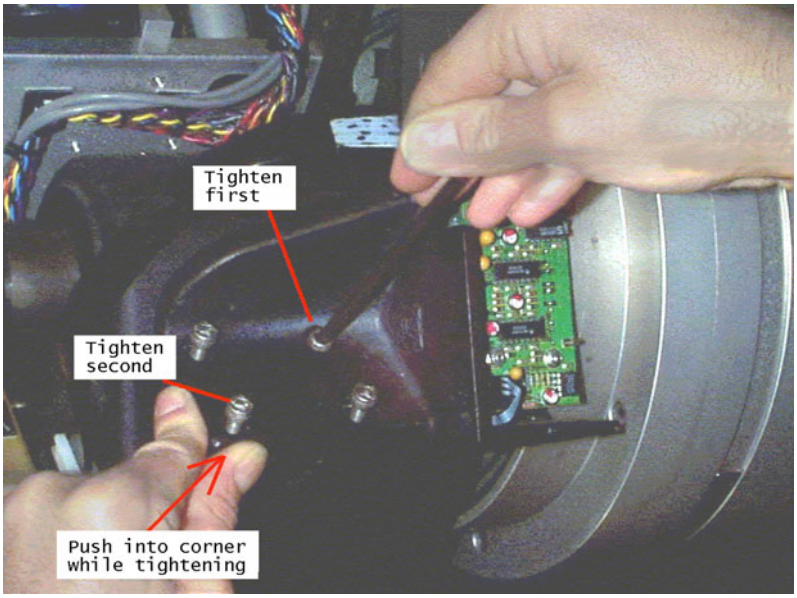


Caution: Do not bring acetone anywhere near the encoder block. Do not use a very wet cloth. Do not allow fluid to enter the encoder optics block

15. Dry the window off with a scanner wipe or TX609 wipe. Wipe fingerprints and residue off with a dry Luminex cloth.

3.3 Reinstalling the encoder casting

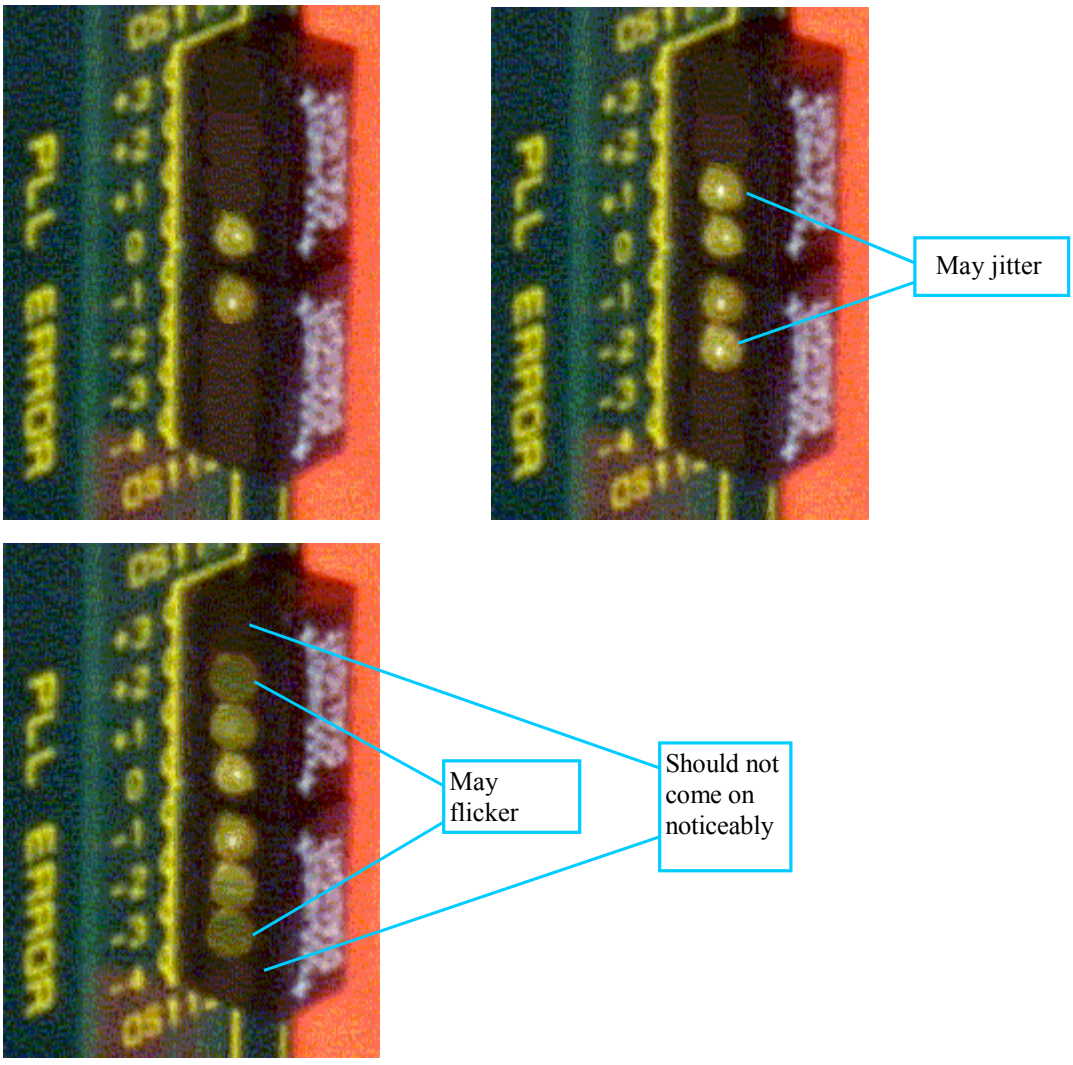
Clean the mounting surfaces of both the engine casting and the encoder casting. When tightening the screw, push the casting into the corner to reference against precision reference points.



4. FINAL CHECK

For engines with an MPE board:

- Type **drum init**. The drum should spin for a few seconds. The MPE returns "*** State message: Drum command (14) Complete".
- Type **drum spin <plot speed>** where plot speed is that set in the HDM.
- Type **plot on**. Go and inspect the 8 yellow LEDs on the edge of the MPE board. The center two should be ON; the next pair should jitter.



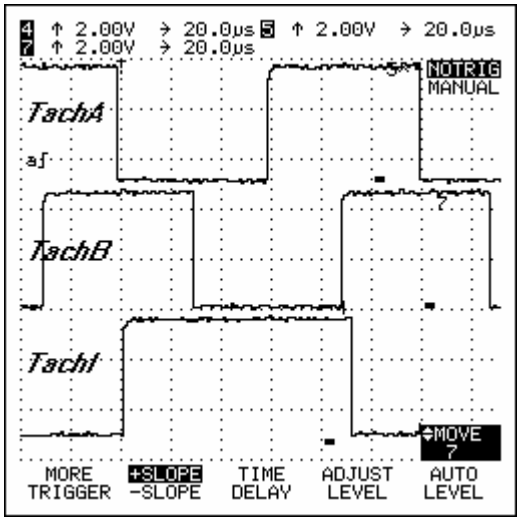
If the LEDs jump every second or half second from just the inner two being "ON" to almost all the LEDs being "ON", then there is probably a dirty mark on the encoder disc.

- Install the cover on the casting.
- Apply Loctite 222 (purple) to the screws and tighten the screws.

5. PERFORMANCE EVALUATION

You will need a digital oscilloscope for this procedure.

1. Close all doors and service access panels.
2. Set both oscilloscope channels to 2V/div, timebase to 10µs/div for Platesetters (20µs/div for VLF ,5µs/div for DH).
3. Attach probe 1 to the test pin labeled **TACH A** on the MPE board and probe 2 to the test pin labeled **TACH B**. Trigger on either channel.
4. Spin the drum in Hall mode with **drum spin 130 c** for an 3244 engine or **drum spin 65 c** for VLF engines (or **drum volts** for an RCE).
5. The digital signals should look like those shown below. Ignore **TACH I** for now. Both signals should have a 50% duty cycle. **TACH A** should lead **TACH B** by 90° ±30°, center to center. The closer it is to 90°, the better. To adjust, refer to the *Encoder Alignment Procedur*e (73-0106A).



6. Attach probes to **TACH B** and **TACH I**; trigger on **TACH I** in NORM mode.
7. Check that the rising edge of **TACH I** leads the closest falling edge of **TACH B** by 36° to 144° (or 0.1xPeriod to 0.4xPeriod).
8. Check that the pulse width of **TACH I** is less than 0.9xPeriod of **TACH B**.
9. Check that the rising edge of **TACH B** is before the falling edge of **TACH I.**
10. If the signals fail any of these criteria, adjust using the *Encoder Alignment Procedure*.

5.1 Checking for multiple index pulses

1. Set the scope time base so that the time/division is less than 1/10 of the time that it takes for the drum to complete one revolution. Time per rev = 60 / rpm.

   Example: Time base = 60/(130*10) = 46mS
   (Typical is 50mS/div @ 120 rpm and 100mS/div @ 60 rpm).

2. Set the trigger delay to 0 or set the horizontal position to close to the left of the screen. For Tek TDS 210–see Step 3.

   You should then see only two **TACH I** pulses one at the extreme left of the screen and one at the extreme right (460mS apart for drum speed of 130 rpm and 920mS apart for drum speed of 65 rpm). If you see any more than this, then you may be getting multiple indexes.

3. Tek TDS210 scopes have a peak detect feature; if you do not use this, the very narrow **SI** pulse will sometimes not be visible due to the resolution limit of the scope. Press "ACQUIRE" then select "Peak detect".

5.2 Checking for plug reflections

1. Attach CH1 of the scope to **I** on the encoder.
2. Spin the drum at 130 rpm for 3244 engines and 65 rpm for VLF engines.
3. Set the scope time base to 50 **m**S/div for 3244 engines and 100 mS/div VLF engines.
4. Set CH1 intput to AC coupled, 200mV/div, with gnd positions set one dev from the bottom.
5. Set trigger to Ch1, Normal, AC coupled, at about 300 – 500 mV, position ½ dev from left.
6. You should see one **I**-pulse at the left of the screen and the remainder of the trace should be more or less flat. If there are reflections from the vacuum plugs you may see bumps on the base line.
7. The maximum noise and effects caused by reflections from the vacuum plugs is dependent on the signal strength and should be less than 20% of the AC peak of the **I**-pulse. Only one plug is causing a significant reflection in the image in Figure 6

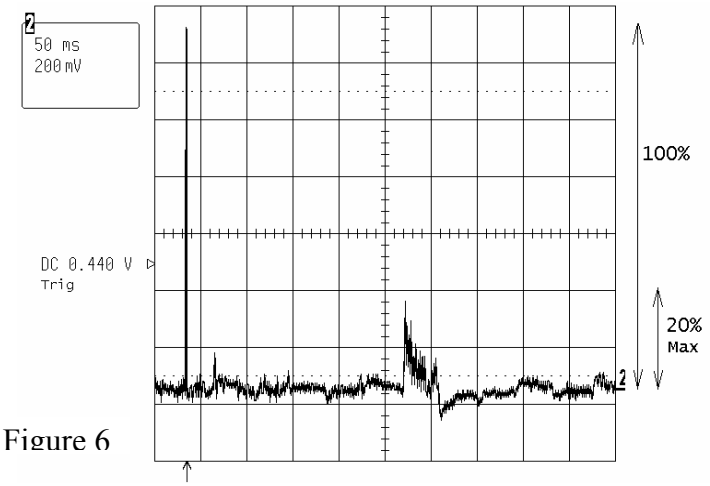


Figure 6

8. Measure the height of the I-pulse and calculate 20%. The noise on the base line may not be more that 20% of the I-pulse. Figure 7 shows an unacceptable reflection. The reflections from the vacuum plugs of this machine are too high.

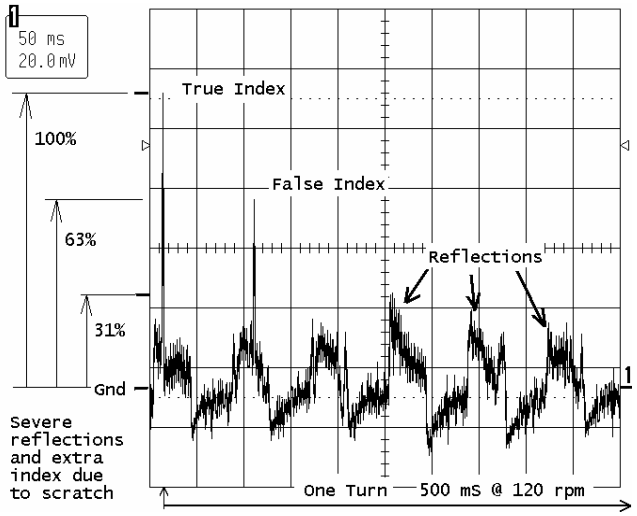


Figure 7

Note: If the noise caused by reflections is above 20% for all engines (3244 & VLF) then the system will not work reliably. If it is above 20% for 3244 engines, you must install decals (74-3236A) on the vacuum plugs before proceeding with the (alignment) procedure. If the noise is above 10% but below 20, then the system will work and the procedure may be continued, but the decals must be installed at a later date.

5.3 Checking for a dirty disc

This check is not a definitive proof that a disc is clean, but it can indicate some types of dirt on a disc.

For Tektronics TDS210 scope only:

1. Attach Ch1 of the scope to **I** on the encoder. Set Ch1 intput to AC coupled, 200mV/div, with gnd positions set one dev from the bottom.
2. Attach Ch2 of the scope to A+. Set Ch2 input to AC coupled, 200mV/div, with gnd positions set to mid screen.
3. Spin the drum at 130 rpm for 3244 engines and 65 rpm for VLF engines.
4. Set the scope time base to 50 **m**S/div for 3244 engines and 100 mS/div VLF engines.
5. Set trigger to Ch1, Normal, AC coupled, at about 300 – 500 mV, position ½ dev from left.
6. Set 'Acquire' to 'Peak Detect'.

   The A+ signal should be a black band with constant width across the middle of the screen. Adip in the band (particularly on the top edge) indicates the location of a dirty section of the disc.

   To estimate how far around the drum the dip extends:

   - Estimate how far along the screen the dip occurs
   - Locate the same proportion around the drum, clockwise from the index. When the LEC is in line with the head, the index should be at the encoder lens.
     Example: If the dip is 1.7 devision right of the index, then the dirt should be (1.7 / 9)*360=70° degrees of rotation clockwise from the index or just a bit past the LEC. The machine shown in Figure 8 was actually spinning and PLL was tracking.

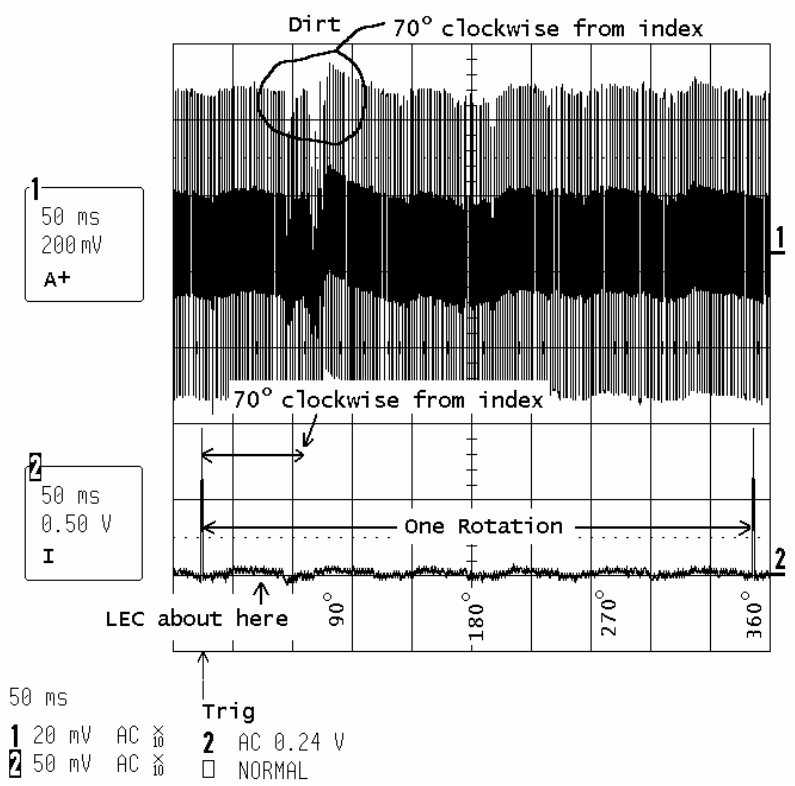


Figure 8

6. USING THE FLUKE 99

6.1 Set up for A+ and A-

1. Connect the red probe to INPUT A and the grey probe to INPUT B.
2. Power up the scope.
3. Connect the INPUT A probe to test point **A+** and the INPUT B probe to test point **A-**.
4. If the Fluke is in METER mode ("METER" highlighted) then press F1 "SCOPE" to get "SCOPE" highlighted.
5. If the cursors are on, you can turn them off as follows:
    - Press "SUB MENU".
    - Press F5 "CURSOR READINGS" to deselect .
6. To set up probe A, press INPUT A.
    - Highlight "DISPLAY INPUT A" using F2.
    - Use F3 to highlight "DC".

- Inspect the probes looking for a divide ratio of 1:1 or 10:1.
    a. Press F5 “PROBE A MENU”.
    b. Use the blue Up and Down arrow keys to select “PROBE on INPUT A”.
    c. Press F5 “SELECT ITEM”.
    d. Use the arrow keys to select the same ratio found on the probes.
    e. Press F5 “SELECT ITEM”.
    f. Press F1 “CLOSE”.

    DO NOT select the Calibrate probe menu item.
- .Press F1 “More Input A”.
    a. Use the blue Up and Down arrow keys to select “Glitch detect”. Press F5 to turn it Off.
    b. Select “Combine A&B” and then select Off.
    c. Press F1 “close”.
- Use the MOVE ↕ key to move the ground reference bar for A into the center of the screen.
- Use the RANGE key to set the vertical scale (displayed at the top of the screen) to 200mV/div. (Press the “mv” side of the key to decrease the value displayed and the “v” side to increase it.)

7. To set up probe B, press INPUT B.
    - Highlight “Display Input B” using F2.
    - Use F3 to highlight “DC”.
    - Inspect the probes, looking for a divide ratio 1:1 or 10:1.
        a. Press F5 “Probe B Menu”.
        b. Use the blue Up and Down arrow keys to select “Probe on INPUT B”.
        c. Press F5 “Select Item”.
        d. Use the arrow keys to select the same ratio found on the probes.
        e. Press F5 “select item”.
        f. Press F1 “close”.

        DO NOT select the Calibrate probe menu item.

- Press F1 “More Input B”.
    a. Select “Combine A&B” and select Off.
    b. Press F1 “close”.
- Use the MOVE ↕ key to move the ground reference bar for B in the center of the screen.
- Use the RANGE key to set the vertical scale (displayed at the top of the screen) to 200mV/div. (Press the “mv” side of the key to decrease the value displayed and the “v” side to increase it.)

8. Press TRIGGER
    - Press F1 “More Trigger”.
    - Use the blue Up and Down arrow keys to select “Trigger source”.
        a. Press F5 “Select item.”
        b. Use the arrow keys to select “Input A”, and F5 to “select item”.
    - Use the arrow keys to select “Trigger Slope”.
        a. Press F5 to select item and change to “+Slope”.
    - Use the arrow keys to select “Trigger Level” and change to “Autolevel”.
    - Use the arrow keys to select “Trace Repeat” and change to “Recurrent”.
    - Use the arrow keys to select “Trace Start” and change to “Free Run”.
    - Press F1 “close”.
    - Press F3 “time delay”.
        a. Use the arrow keys to set delay to “–3 div”.
    - Press F1 to “close”.
9. Use the TIME key to set the time base (displayed at the top of the screen) to 20µS/div. (Pressing one side of the key increases the time and the other side of the key decreases it.)

6.2 Set up for SA and SB

1. Connect probe A to testpoint **SA** and probe B to testpoint **SB**.
2. If the cursors are on, you can turn them off as follows:
    - Press “SUB MENU”.
    - Press F5 “Cursor Readings” to deselect.
3. Press INPUT A.
    - Highlight “Display Input A” using F2.
    - Use F3 to highlight “DC”.
    - Inspect the probes looking for a divide ratio 1:1 or 10:1.
        a. Press F5 “Probe A Menu”.
        b. Use blue Up & Down arrow keys to select “Probe on INPUT A” .
        c. Press F5 “Select Item”.
        d. Use arrow keys to select the same ratio found on the probes.
        e. Press F5 “select item”.
        f. Press F1 “close”.

        DO NOT select the Calibrate probe menu item.
    - Press F1 “More Input A”.
        a. Use the blue Up and Down arrow keys to select “Glitch detect”. Press F5 to turn it Off.
        b. Select “Combine A&B” and select Off.
        c. Press F1 “close”.
    - Use the MOVE ↕ key to move the ground reference bar for A in the center of the screen.
    - Use the RANGE key to set the vertical scale (displayed at the top of the screen) to 2V/div. (Press the “mv” side of the key to decrease the value displayed and the “v” side to increase it.)
4. Press INPUT B.
    - Highlight “Display Input B” using F2.
    - Use F3 to highlight “DC”.

- Inspect the probes looking for divide a ratio 1:1 or 10:1.
    a. Press F5 “Probe B Menu”.
    b. Use the blue Up and Down arrow keys to select “Probe on INPUT B”.
    c. Press F5 “Select Item”.
    d. Use the arrow keys to select the same ratio found on the probes.
    e. Press F5 “select item”.
    f. Press F1 “close”.

    DO NOT select the Calibrate probe menu item.
- .Press F1 “More Input B”.
    a. Select “Combine A&B” and select Off.
    b. Press F1 “close”.
- Use the MOVE ↕ key to move the ground reference bar for B to one division from the bottom of the screen.
- Use the RANGE key to set the vertical scale (displayed at the top of the screen) to 2V/div. (Press the “mv” side of the key to decrease the value displayed and the “v” side to increase it.)

5. Press TRIGGER.
    - Press F1 “More Trigger”.
    - Use the blue Up and Down arrow keys to select “Trigger source”.
        a. Press F5 “Select item”.
        b. Use the arrow keys to select “Input A”, and F5 to “select item”.
    - Use arrow keys to select “Trigger Slope”.
        a. Press F5 to select item and change to “+Slope”.
    - Use the arrow keys to select “Trigger Level” and change to “Manual”. (Press F1 “close” if necessary.)
    - Use the arrow keys to select “Trace Repeat” and change to “Recurrent”.
    - Use the arrow keys to select “Trace Start” and change to “Wait for Trigger”.
    - Press F1 “close”.
    - Press F3 “time delay”.
        a. Use the arrow keys to set delay to “–5 div”.

- Press F1 to “close”.
- Press “Adjust Level”.
    a. Use the Up and Down arrow keys to change the trigger level to about 2V.

    or

    b. Adjust until the “a↑” symbol on the left of the screen is about half way up the wave form.

6. Use the TIME key to set the time base (displayed at the top of the screen) to 10µS/div.

6.3 Set up for SI and I.

1. Connect probe A to testpoint **SI** and probe B to testpoint **I**.
2. If the cursors are on, you can turn them off as follows:
    - Press “SUB MENU”.
    - Press F5 “Cursor Readings” to deselect.
3. Press INPUT A.
    - Highlight “Display Input A” using F2.
    - Use F3 to highlight “DC”.
    - Inspect the probes looking for a divide ratio of 1:1 or 10:1.
        a. Press F5 “Probe A Menu”.
        b. Use the blue Up and Down arrow keys to select “Probe on INPUT A”.
        c. Press F5 “Select Item”.
        d. Use the arrow keys to select the same ratio found on the probes.
        e. Press F5 “select item”.
        f. Press F1 “close”.

        DO NOT select the Calibrate probe menu item.
    - Press F1 “More Input A”.
        a. Use the blue Up and Down arrow keys to select “Glitch detect”. Press F5 to turn it Off.
        b. Select “Combine A&B” and select Off.
        c. Press F1 “close”.

- Use the MOVE ↕ key to move the ground reference bar for A to one division from the bottom of the screen.
- Use the RANGE key to set the vertical scale (displayed at the top at the screen) to 1V/div.

4. Press INPUT B
   - Highlight "Display Input B" using F2
   - Use F3 to highlight "DC"
   - Inspect probes, look for divide ratio 1:1 or 10:1
     a. Press F5 "Probe B Menu"
     b. Use blue Up & Down arrow keys to select "Probe on INPUT B"
     c. Press F5 "Select Item".
     d. Use arrow keys to select the same ratio as is marked on the probes.
     e. Press F5 "select item"
     f. Press F1 "close"

        DO NOT select the Calibrate probe menu item..
   - .Press F1 "More Input B".
     a. Select "Combine A&B" and select it Off
     b. Press F1 "close"
   - Use the MOVE ↕ key to move the ground reference bar for B to one division from the bottom of the screen.
   - Use the RANGE key to set the vertical scale (displayed at the top at the screen) to 200mV/div. (Press the "mv" side of the key to decrease the value displayed and the "v" side to increase it.)

5. Press TRIGGER.
   - Press F1 "More Trigger".
   - Use the blue Up and Down arrow keys to select "Trigger source".
     a. Press F5 "Select item".
     b. Use the arrow keys to select "Input B", and F5 to "select item".
   - Use the arrow keys to select "Trigger Slope".
     a. Press F5 to select item and change to "+Slope".

- Use the arrow keys to select “Trigger Level” and change to “Manual”. (Press F1 “close” if necessary.)
- Use the arrow keys to select “Trace Repeat” and change to “Recurrent”.
- Use the arrow keys to select “Trace Start” and change to “Wait for Trigger”.
- Press F1 “close”.
- Press F3 “time delay”.
    a. Use the arrow keys to set delay to “–3 div”.
    b. Press F1 to “close”.
- Press “Adjust Level”.
    a. Use the Up and Down arrow keys to change the trigger level to about 300mV.

    or

    b. Adjust until the “a↑” symbol on the left of the screen is about half way up the wave form.
- Use the TIME key to set the time base (displayed at the top of the screen) to 10µS/div.

6.4 Set up for SI and SB

1. Connect probe A to testpoint **SI** and probe B to testpoint **SB**.
2. If the cursors are on, you can turn them off as follows:
    - Press “SUB MENU”.
    - Press F5 “Cursor Readings” to deselect.
3. Press INPUT A.
    - Highlight “Display Input A” using F2.
    - Use F3 to highlight “DC”.
    - Inspect the probes looking for a divide ratio 1:1 or 10:1.
        a. Press F5 “Probe A Menu”.
        b. Use blue Up & Down arrow keys to select “Probe on INPUT A”.
        c. Press F5 “Select Item”.
        d. Use the arrow keys to select the same ratio found on the probes.
        e. Press F5 “select item”.

f. Press F1 “close”.

DO NOT select the Calibrate probe menu item.

- .Press F1 “More Input A”.
    a. Use the blue Up and Down arrow keys to select “Glitch detect”. Press F5 to turn it Off.
    b. Select “Combine A&B” and select Off.
    c. Press F1 “close”.
- Use the MOVE ↕ key to move the ground reference bar for A to the center of the screen.
- Use the RANGE key to set the vertical scale (displayed at the top of the screen) to 2V/div. (Press the “mv” side of the key to decrease the value displayed and the “v” side to increase it.)

4. Press INPUT B
    - Highlight “Display Input B” using F2.
    - Use F3 to highlight “DC”.
    - Inspect the probes looking for a divide ratio 1:1 or 10:1.
        a. Press F5 “Probe B Menu”.
        b. Use the blue Up and Down arrow keys to select “Probe on INPUT B”.
        c. Press F5 “Select Item”.
        d. Use the arrow keys to select the same ratio found on the probes.
        e. Press F5 “select item”.
        f. Press F1 “close”.

        DO NOT select the Calibrate probe menu item.
    - .Press F1 “More Input B”.
        a. Select “Combine A&B” and select Off.
        b. Press F1 “close”.
    - Use the MOVE ↕ key to move the ground reference bar for B to one division from the bottom of the screen.
    - Use the RANGE key to set the vertical scale (displayed at the top of the screen) to 2V/div. (Press the “mv” side of the key to decrease the value displayed and the “v” side to increase it.)

5. Press TRIGGER
    - Press F1 “More Trigger”.
    - Use the blue Up and Down arrow keys to select “Trigger source”.
        a. Press F5 “Select item.”
        b. Use the arrow keys to select “Input A”, and F5 to “select item”.
    - Use the arrow keys to select “Trigger Slope”.
        a. Press F5 to select item and change to “ - Slope”.
    - Use arrow keys to select “Trigger Level” and change to “Manual”. (Press F1 “close” if necessary.)
    - Use arrow keys to select “Trace Repeat” and change to “Recurrent”.
    - Use arrow keys to select “Trace Start” and change to “Wait for Trigger”.
    - Press F1 “close”.
    - Press F3 “time delay”.
        a. Use the arrow keys to set delay to “–3 div”.
        b. Press F1 to “close”.
    - Press “Adjust Level”.
        a. Use the Up and Down arrow keys to change the trigger level to about 2V.

        or

        b. Adjust until the “a↑” symbol on the left of the screen is about halfway up the wave form.
6. Use the TIME key to set the time base (displayed at the top of the screen) to 10µS/div or 20µS/div depending on preference.

7. SIGNALS TOO SMALL

Check that the probe divide ratio is the same as the ratio set up in INPUT X, Probe X Menu.

7.1 Scope picture will not stand still

This is a triggering problem.

1. Make sure that “trace Start is set to “wait for trigger”
    - Press TRIGGER,
    - F1 “More Trigger”
    - Arrow down to “Trace Start” and change using F5 “select Item”
2. Check that the correct channel is selected under “Trigger Source”
    - Press TRIGGER
    - F1 “More Trigger”
    - Arrow down to “Trigger Source” and change using F5 “Select”.
3. You may need to adjust the trigger level.
    - Press TRIGGER,
    - F4 “Adjust Level”
    - Use arrow keys to move the a↑ or a↓ or b↑ or b↓ symbol as applicable, to the bottom of the screen. Then slowly move it up towards the top. You should set the trigger level at about the half way height of the signal.

8. SI APPEARS TO JUMP WHILE ADJUSTING IBIAS

IBIAS is a fairly sensitive adjustment.

Remember that **SI** and **I** only occur once per revolution—once every half second at 120 rpm. Therefore you should move the pot slightly and wait a second for the image to update before moving it any more.

9. TRACE DOES NOT UPDATE

This is probably also a triggering problem, but:

1. Check that “Trace Repeat” is “Recurrent”
    - Press TRIGGER
    - F1 “More Trigger”
    - Arrow down to “Trace Repeat” and change using F5 “Select Item”.
2. Check that the correct channel is selected under “Trigger Source”.
    - Press TRIGGER
    - F1 “More Trigger”
    - Arrow down to “Trigger Source” and change using F5 “Select”.
3. You may need to adjust the trigger level.
    - Press TRIGGER,
    - F4 “Adjust Level”

Use arrow keys to move the a↑ or a↓ or b↑ or b↓ symbol as applicable, to the bottom of the screen. Then slowly move it up towards the top. You should set the trigger level at about the half way height of the signal.