SPEED ENHANCEMENT UPGRADE

For TS2637 and Trendsetter AL
MPE

73-3653A-E-PR01

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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	11/01/01	Simon Cheung	
Draft-1	09/02/01	Simon Cheung	Sections 4.4 and 4.9
A	03/06/01	Frances Caton	Minor revisions throughout
B	05/14/01	Simon Cheung	Section 4.9.1.5 adding “set sys hpd 1” to the table. Add an extra instruction to section 4.8.5 Added PACC to the list of NVS parameters
C	1/30/2003	Simon Cheung	Section 1: changing the two 05 kits to new 512 kits. Section 3 and 4.7.1, changing the carriage board from 10-3761B to 10-3761C. Section 4.9.1 deleting “mask on 7” command
D	11/17/2003	Janet Waterman	Updated parts info for ECO CA00752
E	09/27/2003	Janet Waterman	Corrections to parts info

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1. INTRODUCTION

This document describes the installation procedure for upgrading an existing TS2637 or Trendsetter Autoloader MPE machine with high throughput features (released under ECO D955). This upgrade applies if #8 is NOT marked off on the 100 label for the TS base machine.

Order one of the following kits for this upgrade:

- 512-00027B TS 2637 Power Box Upgrade D774
- 512-00028B Trendsetter AL Power Box Upgrade D955

Note: The Trendsetter AL also requires a Debris Removal Upgrade. See http://techplanet.creo.com/docs/debris_removal.pdf on the Trendsetter 400/800 Installation page.

Difficulty: This upgrade procedure requires an experienced field service engineer.

Time Required: Approximately 6 hours.

Reference links and drawings:

http://techplanet.creo.com/idoc/50/2109A/B/50-2109A-B-AD01.pdf TS2637 Engine assembly drawing

http://techplanet.creo.com/idoc/11/0872A/C/11-0872A-C-AD01.pdf TS2637 Power box assembly drawing

http://techplanet.creo.com/idoc/11/0873A/A/11-0873A-A-AD01.pdf TS2637 Power components mount

2. TOOLS

- Metric Hex keys
- BrecoFlex vibration meter (for drum and carriage motor belt tensioning)

3. PARTS LIST

The following list contains the parts for kits, 512-00027B and 512-00028B.

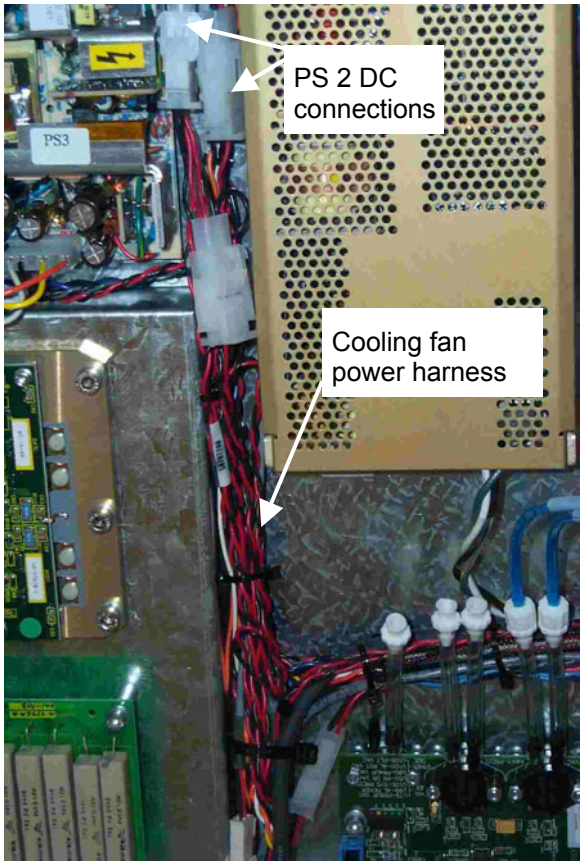
PART #	DESCRIPTION	QTY
503C01525B	Carriage drive board	1
10-4395A	Ground cable	1
10-4757A	Carriage control cable	1
10-4760A	Drum braking adapter cable	1
10-4761A	Drum power cable adaptor	1
10-4762A	Drum control cable	1
10-4795A	Drum resistive braking board	1
10-4797A	Drum motor power cable	1
10-4798A	Cooling fans power harness	1
10-4799A	Drum braking control cable	1
11-1133C	Carriage stepper motor & pulley assembly	1
11-0885A	Carriage motor cooling assembly	1
11-0886A	Drum motor cooling assembly	1
13-5109	48V, flatpack PS4 power supply	1
15-3466	Servoamp	1
16-3959	Terminal block jumper	2
50-2160A	Drum motor assembly	1
52-3059	Lock washer, M4, split, S-plated	8
52-3072	Lock washer, M4, ext-tooth, SS	1
52-3130	Screw, M6*30,SOCK-CAP,S-plated	1
52-3150	Screw, M5*14,SOCK-CAP,S-plated	6
52-4029	Lock washer, M5, split, S-plated	6
52-4031	Washer, M6, BEL	2
52-4054	Washer, M4,FLT, S-plated	8
52-4087	Nut, 8-32, hex, SS	1
52-4375	Washer, M5,flat, S-plated	6
52-4459	Screw,M4*8,SOCK-CAP, S-plated	4
52-4477	Screw,M4*10,SOCK-CAP, S-plated	4
57-8468A	Carriage mounting bracket	1
220-00163B	Cable, power supply to carriage driver board	1
500-01185A	Carriage Amp Cooling Fan and Bracket	1

4. PROCEDURE

WARNING: Remove power by tripping the breaker at the mains and at the machine.

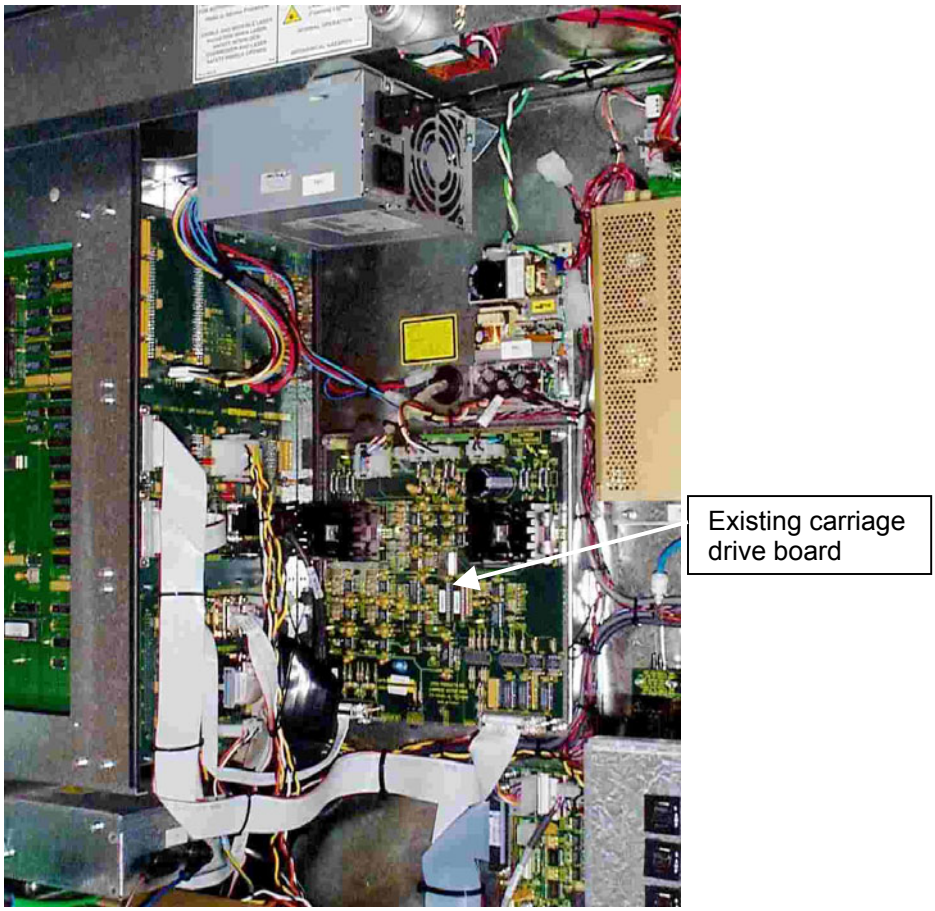
Remove top covers (table down, remove covers, table up), open up front and back covers and remove the cover over the power box.

4.1 Cooling Fan Power Harness Installation



1. Locate the PS2 power supply in the power box and unplug one of the PS2 DC output connections.
2. Install the carriage motor cooling fan power harness (#10-4798A) by connecting one of the plug ends to the PS2 output and the receptacle end to the connection that was removed in the last step. See the photo above.
3. Feed the other end of the harness through to the engine chassis. It will be connected when you install the carriage stepper motor and the drum motor. In a later step, the drum motor cable will also need to be fed through the same opening to the chassis.

4.2 Carriage Drive Board and Wiring Removal



1. Disconnect and remove the following cables that connect to the carriage drive board (#10-1418C):

   10-3906A CD-A-BP Cable Assembly

   10-3907A CD-D-BP Cable Assembly

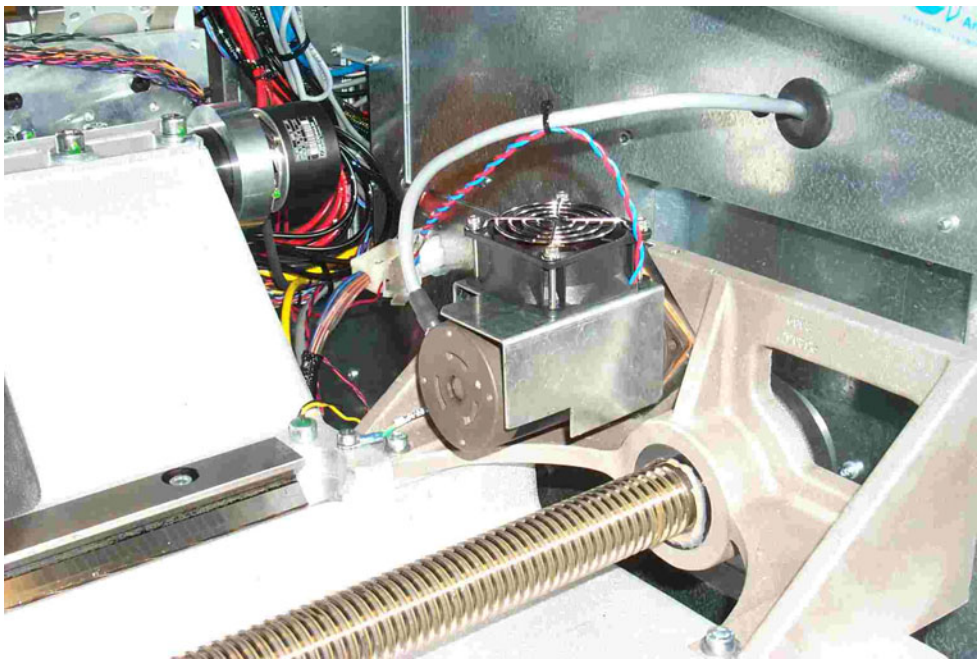
   10-3909A PS3 (switching, 40W) Cable Assembly

   10-3910C PS4 Cable Assembly

   Carriage stepper motor cable

2. Unfasten the mounting screws and remove the carriage board mounting bracket (#57-5378A) and the carriage drive board from the power box.

4.3 Carriage Stepper Motor Replacement



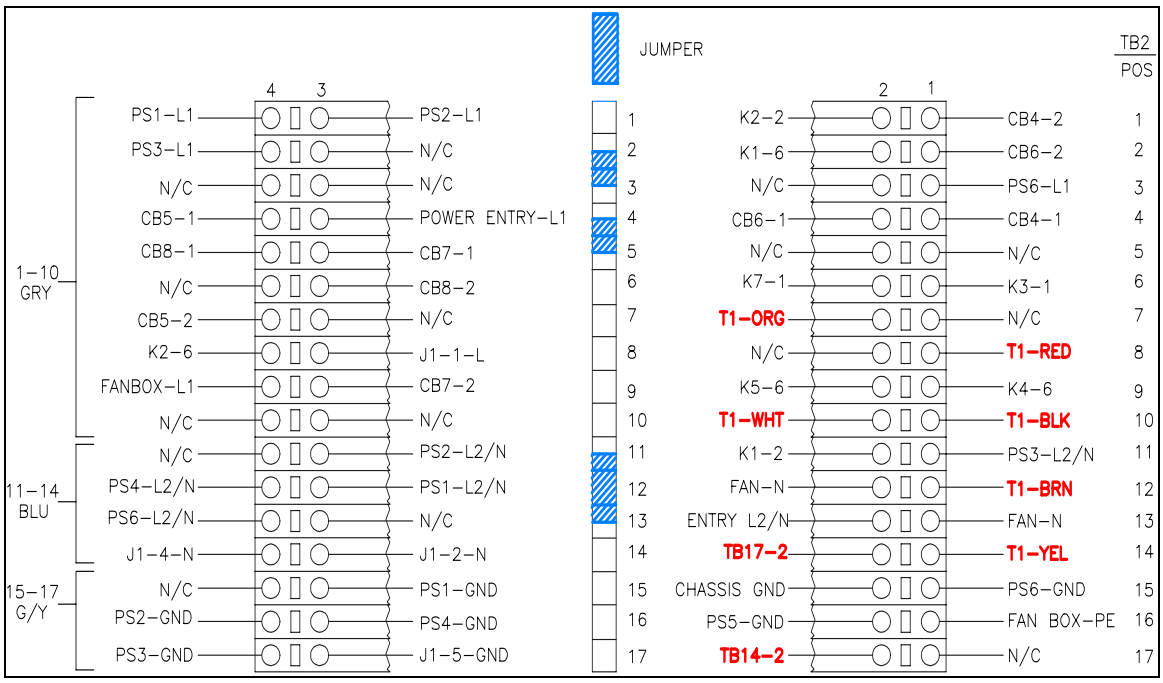
Refer to the Engine assembly drawing (http://techplanet.creo.com/idoc/50/2109A/B/50-2109A-B-AD01.pdf) for the next steps.

1. Remove the existing carriage motor assembly (#11-0815A) from the engine chassis.
2. Install the new carriage stepper motor assembly (#11-1133c). Mount the motor so that the cable is the same as shown in the photo. (This means rotating the new motor 90 degrees from the position of the original motor.) Adjust the belt tension as follows:
    a. Apply a slight downward force on the motor to tension the belt. Hold the motor in this position and tighten the motor mount screws.
    b. Fasten a small washer to the belt with tape or a paper clip approximately halfway between the carriage drive pulley and the motor pulley. Use the BrecoFlex vibration meter, check the frequency of vibration of the belt. It must be between 170 and 195 Hz.
3. Remove and discard the M6x25 screw attaching the carriage motor bracket to the engine casting. Add three M6 bell washers (#52-4031) to the recess in the bracket.
4. Install the carriage motor cooling assembly (#11-0885A) onto the engine chassis according to assembly drawing 50-2109A using the M6x30 screw (#52-3130) provided in the kit.

5. Connect the cooling fan power harness #(10-4798A) to the carriage motor cooling assembly (#11-0885A). (This is the harness installed in the Cooling Harness Installation section.)

4.4 Servo Amplifier and Transformer Removal

4.4.1 Removing the Transformer Wiring



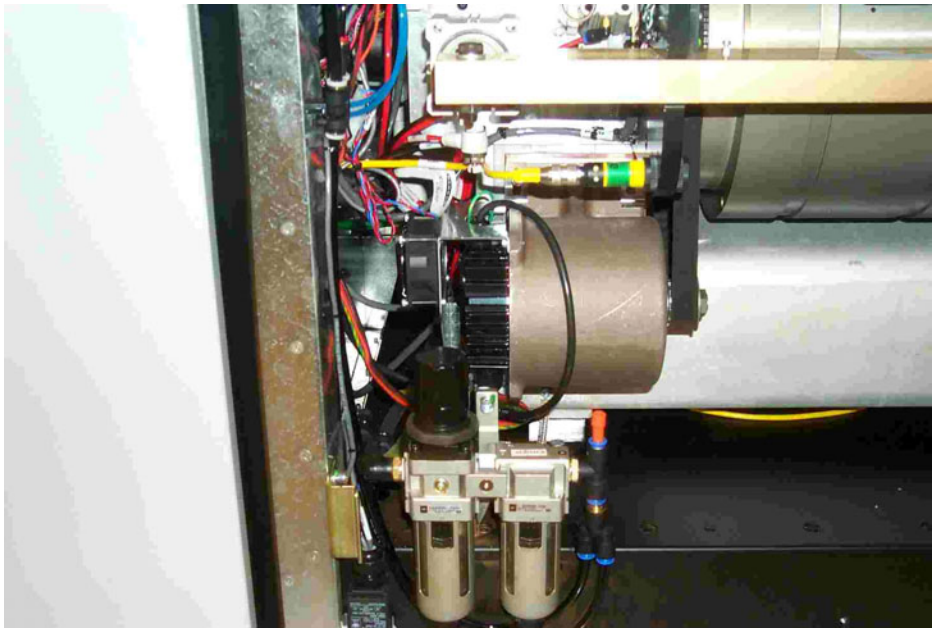
1. Find TB2 on the right side of the power box. Disconnect transformer wiring T1-ORG, T1-RED, T1-WHT, T1-BLK, T1-BRN and T1-YEL from the terminal block. (Use a small screw driver in the slot to release the spring.)
2. Remove the ground jumper from TB14-2 to TB17-2.
3. Install terminal block jumpers (#16-3959) to position 7 and 8 and position 13 and 14.

4.4.2 Removing the Servo Amplifier and Transformer



1. Disconnect all cables connecting to the existing servo amp (#15-3330A) and remove the following cables from the power box:
    - backplane to J2 of the servo amp (#10-3878A)
    - drum motor to J3 and J4 of the servo amp (#10-4515A)
2. Unfasten the M5 mounting screws and remove the servo amp mounting bracket (#57-5452A) and the servo amp from the power box.
3. Remove the M6 mounting screws on the transformer bracket.
4. Unfasten all M12 fasteners and remove the transformer from the transformer bracket.
5. Save the transformer bracket for reuse when installing the new servo amp.

4.5 Drum Motor Installation



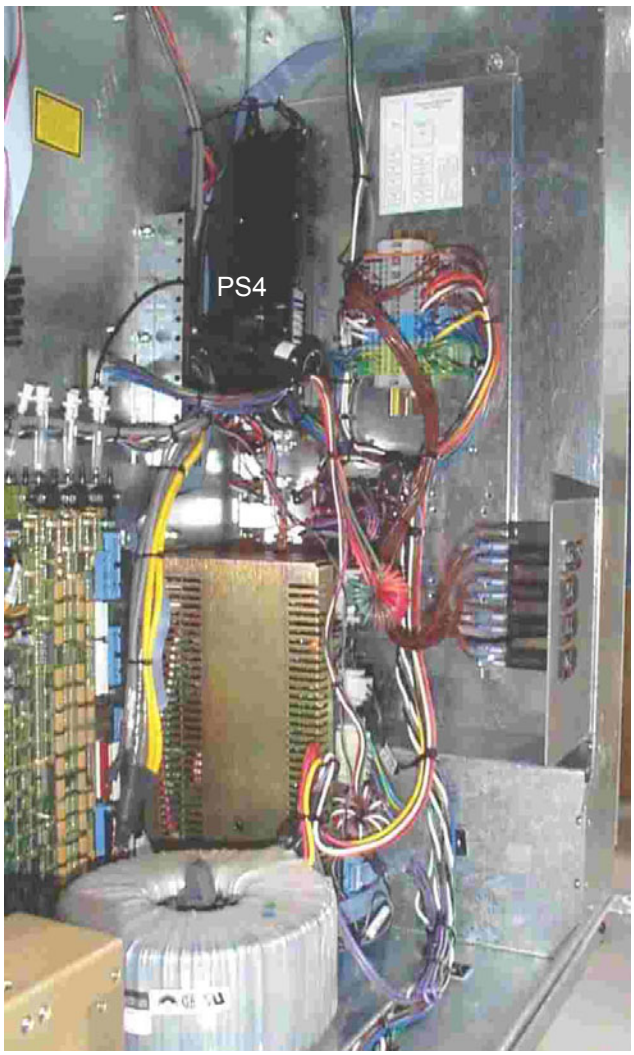
Refer to the engine assembly drawing (http://techplanet.creo.com/idoc/50/2109A/B/50-2109A-B-AD01.pdf) for the next steps.

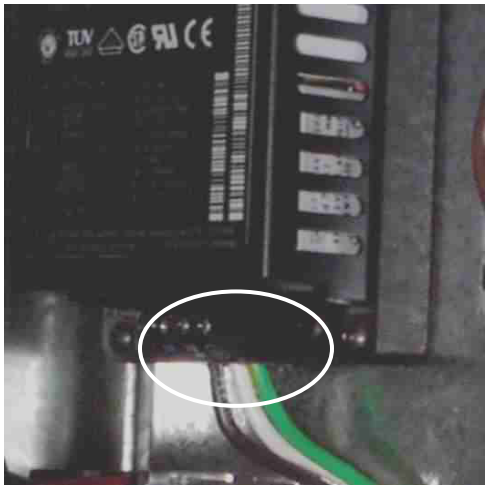
1. Loosen the air regulator and let it hang out of the way to provide easy access to the drum motor.
2. Remove the existing drum motor assembly (#50-1978A) from the engine chassis.
3. Install the new drum motor assembly (#50-2160A) according to the assembly drawing. Leave the screws on the motor mount loose enough so that it can slide vertically. Adjust the belt tension as follows:

   Apply a slight downward force on the motor to tension the belt. Hold the motor in this position and tighten the motor mount screws.

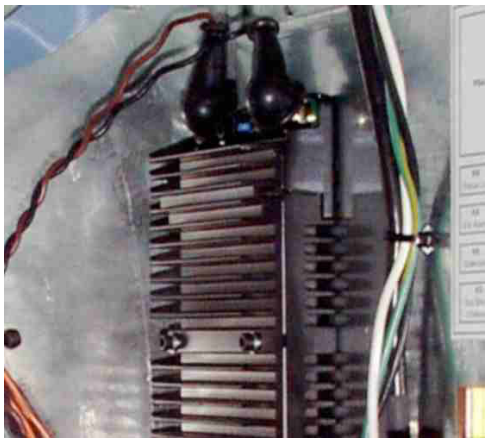
   Fasten a small washer to the belt with a paper clip approximately half way between the drum pulley and the motor pulley. Using the BrecoFlex vibration meter, check the frequency of vibration of the belt. It must be between 45 Hz and 52 Hz.
4. Feed the drum motor cable through the bulkhead to the powerbox (to be attached in Section 4.7 when the new drum braking board is installed).
5. Install the drum motor cooling assembly (#11-0886A) onto the engine chassis according to the assembly drawing.
6. Connect the cooling fan power harness (#10-4798A) to the drum motor cooling assembly (#11-0886A).
7. Recheck the drum belt tension and reposition the air regulator.

4.6 PS4 Power Supply Installation





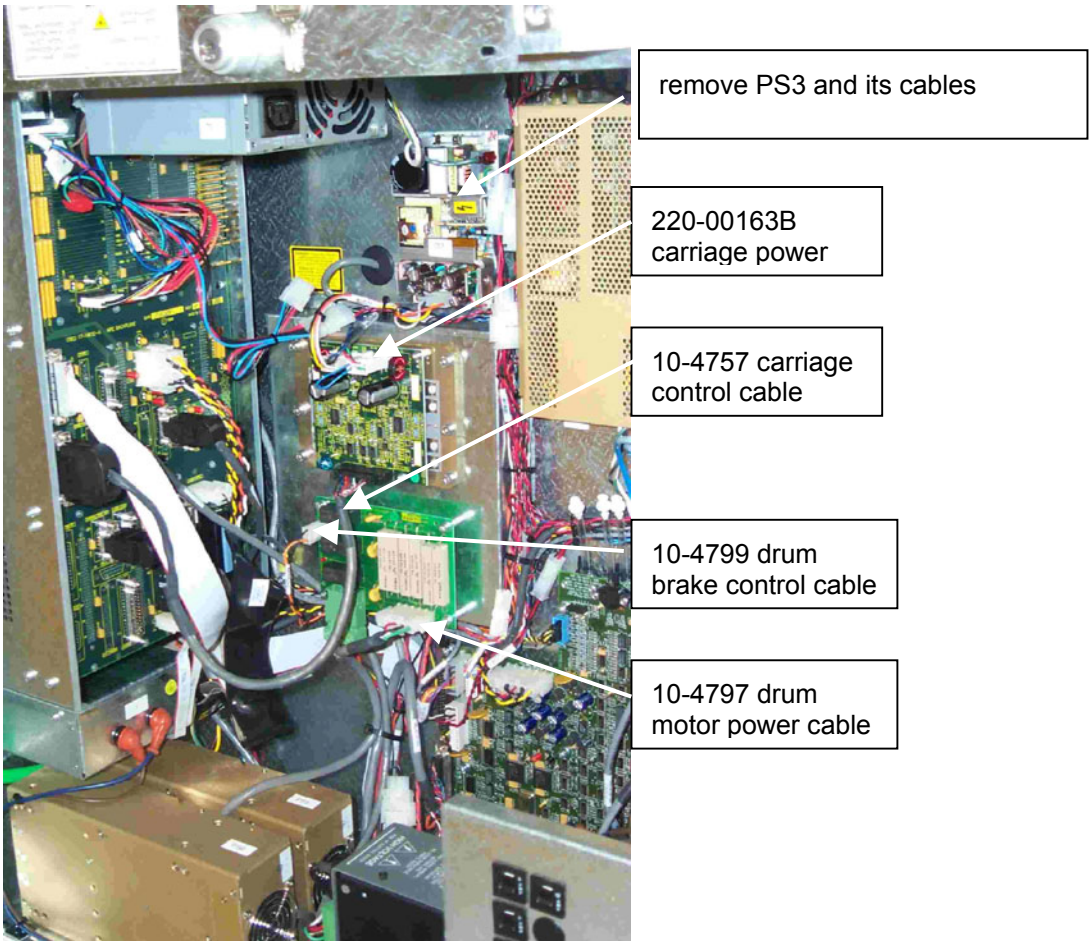
AC Wiring



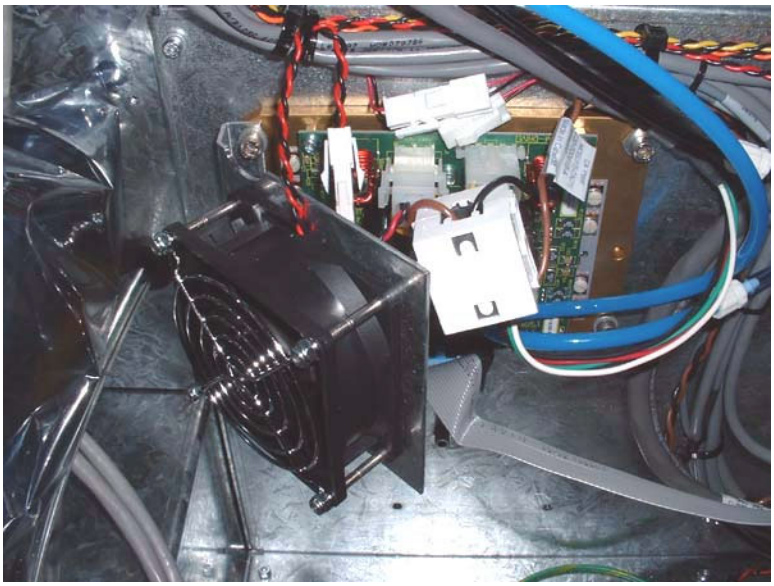
DC Wiring

1. Locate the PS4 power supply and disconnect the existing wiring.
2. Unfasten the mounting screws and remove the existing PS4 power supply (#13-4127). Remove the DC wiring or clip the ends and wrap with electrical tape.
3. Install a new 48V, flatpack PS4 power supply (#13-5109) at the same location.
4. Rewire the 48V power supply referring to the photos shown above:
    - For AC wiring: live wire (black) on the left side of the power supply, neutral (white) in the middle and the ground (green and yellow) on the right side.
    - For DC wiring: see the next section.

4.7 Carriage Drive Board and Drum Resistive Brake Board Installation

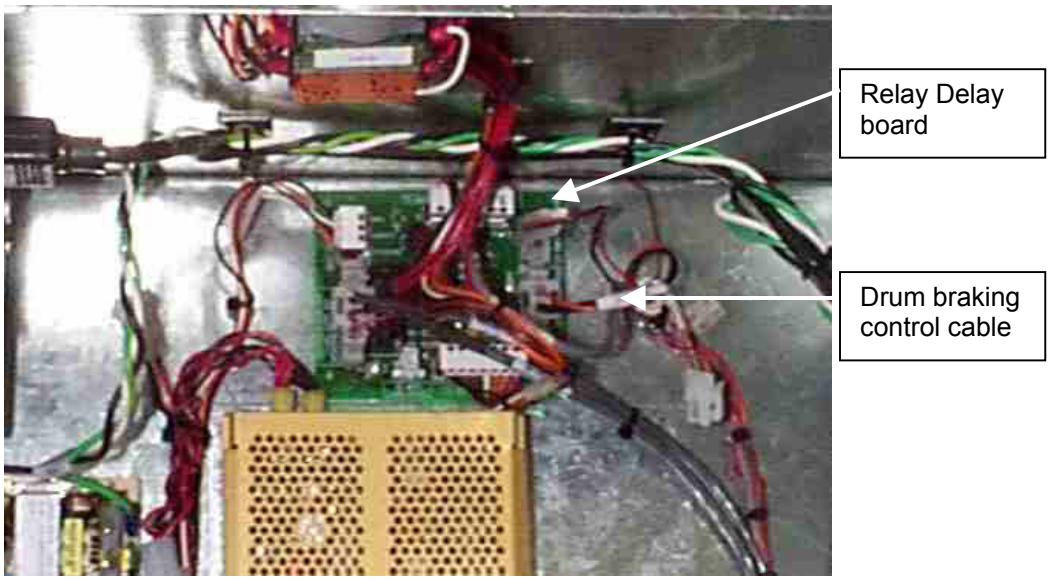


1. Attach the new carriage drive board (#503C01525B) and fan assembly (#500-01185) to the new carriage mounting bracket (#57-8468A) with M5 fasteners



2. Attach the new drum resistive braking board (#10-4795A) to the same bracket with M4 fasteners.
3. Connect the new carriage control cable (#10-4757A) to J2 of the carriage drive board and to back plane J29 and J24.
4. Connect the cable (#220-00163BA) to J1 of the carriage driver board.
5. Run the blue and black wires to the PS4 power supply installed in the last section.
    - +48V DC output cable (blue) on the left side of the power supply
    - 48V return (black) on the right side of the terminal
6. Connect the cable from the drum drive motor to J1 of the drum resistive braking board.

4.7.1 Drum Braking Control Wiring



1. Connect the new drum braking control cable (#10-4799A) to J2 of the drum resistive braking board.
2. Locate the Relay Delay Board (#10-3701D) and disconnect the existing cable to J2.
3. Connect one plug of the drum braking control cable (#10-4799A) to J2 and the other plug to the cable that was disconnected in the last step.

4.8 Servo Amplifier Installation



Refer to power box assembly drawing (http://techplanet.creo.com/idoc/11/0872A/C/11-0872A-C-AD01.pdf) during these steps.

1. Connect the black wires of the new drum braking adapter cable (#10-4760A) to terminals 1 and 2 on the side of servo amp.

   Note: Pin 1 to Pin 1 and Pin 2 to Pin 2. Pin 1 on the connector is identified by a feature in the molding, such as a ridge or button.

2. Attach the new servo amp (#15-3466) to the old transformer bracket fastening it with M4 fasteners.

3. Attach the ground cable (#10-4395A) to the ground stud with the M4 star washer and 8-32 nut in the kit. The other end of the ground cable is attached in a later step.

4. Connect the new drum control cable (#10-4762A) to J1 on the servo amp with the retainer screws and to the backplane J6.

5. Connect the shunt cable (#10-3965B) to drum braking adapter cable (#10-4760A).

6. Connect the drum's existing Hall sensor DB-15 cable to J2 with the retainer screws.

7. Install the transformer bracket into the power box but do not fasten the bracket yet.

8. Connect the new drum motor power cable (#10-4797A) to J3 of the drum resistive braking board and to P2 on the servo amp.

9. Connect the drum power cable adapter (10-4761A) from the 5 pin Mate-N-Lock to P1.

10. Secure the other end of the ground cable (#10-4395A), installed in step 2, to the transformer bracket.

11. Secure the transformer bracket with the rest of the fasteners .

4.9 Firmware and NVS Parameters

4.9.1 Loading the Firmware

In order to control the machine, the MPE firmware needs to be loaded. Follow the procedure detailed below to load new firmware:

2. Connect the Diagnostic Data Cable from the PC to the connector on the bulkhead labeled Diagnostic Interface. Make sure your computer is on the network. Use Service Shell to load the firmware. In the Script function:
   - From the Devices tab, select Firmware Upgrade
   - Run script
3. Turn on the machine, check that all red LEDs turn off at the MPE and ALE boards except for the CM limit LED on the ALE board.
4. Load the firmware in the latest Controlled Release for TS2637 or for the Autoloader, available from TechPlanet at:

   http://techplanet.creo.com/output/computer_to_plate/trendsetter_2637/nav/control-set.htm for TS2637

   OR
   http://techplanet.creo.com/output/computer_to_plate/trendsetter_al/nav/control-set.htm for TSAL

   If you are using Procomm:

   - Download the self-extracting file onto your local drive and “double click” on it from Windows Explorer to inflate the file.

     Read the detailed instructions on loading the firmware in the firmware release notes for that version, and also familiarize yourself with any new parameters or features. To upload the firmware into the EUT:

     - Enter:reset boot
     - Set baud rate to 38400
     - Enter: fload bank 0
     - Select “Data” and then “Send File” from PROCOMM’s menu.
     - Select the appropriate file (should be a file ending in “.hex”) (the uploading will take approximately 8 minutes).
     - Enter: reset
     - Change back to 9600 baud

5. Check the following NVS parameters. Where applicable, change the values in the Active column to match the values below and save them.

SET CARRIAGE	
MSPEED	2200
MGAIN	179
PGAIN	179
AGAIN	179
HGAIN	30
ACCEL	2200
SET DRUM	
PGH	3000
IGH	100
DGH	10
MAXDIFF	200
DOFF	0
DFRICT	0
MTCN	0.580
VACC	25
PACC	15
SET SYS	
HPD	1

6. Enter the following:

```
nvs save status 1
```

4.9.2 Notes on Enabling the Drum Speed

Once the machine is configured properly, the machine should run at speeds up to 360rpm. If the machine does not run at "V" speeds, it may not be configured as a V speed machine. Check the "`set config`" listings. The `machtype` parameter should be "`TS8_V`" to run at high speeds.

If this parameter is not set properly, then use the command:

```
config <password>  - check the MPE firmware release notes for
password information
```

4.9.3 Marking the 100 label

When the installation is complete, mark #8 on the TS8 base label.