Pentaflex
Brake Drum Processing

Start Up

1. Turn on power to lathe.
2. Turn on power to robot.
3. Press "Control On" on the lathe.
    a. **If you still need to perform setup for a new part, see Lathe Jaw Setup and New First Piece.**
4. "Power On" on the conveyor system.
5. Go to robot remote. Turn manual control on.
6. Press "Tool 1" Scroll down to "Close Hand 1." Press and hold "Shift." Press F3 while holding. A hissing sound means the jaw has closed.
7. Press "Tool 2" and repeat previous step.
8. **To open Manual Commands, press the "I/O" button, followed by "F1", and then "3." Scroll to the command desired with the arrow buttons. "F4" = On. "F5" = Off. Press "F4" and then "F5" in rapid succession to activate the highlighted command.**
9. Turn off manual control on remote.
10. Shut off key power and servo motors on the robot.
11. With key held arrow-up, turn right and pull out the chain to open gate.
12. Inspect the inserts to make sure none are broken or dull.
13. Use all purpose black grease pump to pump at least **10** pumps each into the grease inserts on all 3 jaws.
14. Wipe the jaws and inserts clean.
15. Shut the gate.
16. Turn on the key power and servo motors on the robot.
17. Press "Fault Reset" to shut off red fault light on the robot.
18. Press "Cycle Start" at robot and a yellow warning shows on the remote, "Robot not at home position."
19. Press "Enter" on the remote to clear the sign.
20. Press "Cycle Start" at the robot to start the robot:
    a. Use the "+%" and "-%" buttons to adjust robot speed. **Do not exceed 60% speed.**
21. The robot will pick up a part.
22. As soon as the conveyor stops moving, press "Purge Cell Request" on the robot to ensure it only runs a single part.
    a. Use table gauges and check 1st part. Record measurements.
23. Take the first run part to Quality Control with the oz. in. of the drum.
    a. Balance the first part every set up.
24. Bring part to QC and run the parts. If it is a completely new setup, await QC approval. Begin running the parts.

Reminders and Shut Down

1. When the door opens for the robot, ensure there are no scraps hanging from the spindles.
    a. Dark colored scraps may indicate burnt inserts, and they need to be inspected.
2. To stop the robot at any time, press "Hold" on the remote. To restart, press "Cycle Start."
3. Ensure scrap buildup in the hopper doesn't get too close to the conveyor.
4. **Before going on break or leaving, always press "Purge Cell Request."**
5. To shut down, press "Lathe Control Off" until the lathe screen shuts off. Then shut off the master power to the robot and master power to the lathe.

Lathe Jaw Setup

1. First, **note the size of the jaws and posts you need**. They change individually to fit different parts. (See Part Specifics for required sizes)
2. Also, **ensure the correctly sized pickup plate is on the robot**. Larger drums use the large pickup plate and smaller jaws use the smaller plate, and some may not use it at all. (Reference Part Specifics)
    a. Be sure to tighten the bolts on the pickup plate if you change it, and **do not** adjust the stopping bars.
3. Blow out and clean the jaws whenever you adjust them.
4. When you put the jaws you need into the lathe, they must be placed on the right teeth.
    a. The large jaws must be placed with **two teeth** sticking out from the cradle.
    b. The smaller jaws have a **mark on the teeth** that can be used to line them up correctly.
5. Lightly tighten the jaws to hold them in place.
6. Unplug the orange safety plug behind the lathe controls to move them over to the lathe door.
7. Move a tool on the top turret to the jaws and, using the reference paper to measure, turn to each jaw and **ensure that they are all aligned and equally distanced and centered.**
8. When the jaws are equally spaced, fully tighten them down and return the turret to its original position.
9. Manually put a drum on jaws and clamp. Ensure part is not loose. If it is, adjust jaws one at a time until parts fit tightly.
    a. Check that the jaws remain tight at least once per week.
10. Now the setup is ready to run the first piece.

New First Piece

1. **When testing the setup for a new first piece, look at the lathe controls and make sure that that the "System Link On" button for the robot loader is turned Off**. This will ensure that the robot will not activate during first piece testing.
2. Next, choose the lathe program that you will be using.
    a. Press "F1" (Program Select)
    b. "MD1 Index"
    c. Scroll to the desired program with the arrow keys. (**See Part Specifics for each drum's required program**)
    d. Highlight the program you need and press "Write" twice.
    e. Press "Zero Set" and then "Turret A"
    f. Reference the offset and then press "Set"
    g. Type in the zero set and press "Write"
    h. Double check to make sure the correct zero set is entered. If it is not, it will crash the machine.
    i. Repeat steps **e** through **h** for "Turret B".
3. Now manually load the first part onto the jaws by hand.
4. Use the manual commands on the robot remote to shut the lathe door.
    a. Press "I/O", "F1", then "3"
    b. Highlight "Auto Door Close" and press "F4 and "F5" in rapid succession.
5. Unplug the orange safety plug on the back of the lathe controller.
6. Double check that "System Link On" is turned Off.
7. **Set the feed rate wheel to Zero.**
8. Navigate to "Actual Position" (Press "F2")
9. Press "Single Block" on the lathe controller.
10. Watch through the window on the machine as the process moves along, continuously pressing "Cycle Start" while slowly increasing the feed rate.
11. The turrets will move to their starting position.
12. Now increase the feed rate to 100%
13. Continue pressing "Cycle Start" while watching the tools cut the part.
14. If you hear or see any loud noises or sparks, stop and press "Reset" or e-stop.
15. Ensure everything is as it should be and press "Cycle Start" until the program is finished.
16. Use the manual command on the robot remote to manually open the lathe door.
17. Leave the drum on the spindle and clean it off.
18. Check the I.D. of the part while it is on the spindle.

19. If it checks OK, take it off the machine.
20. Check the depth with the gage or calipers after cleaning the rest of it off.
21. Take this new part to Quality Control for first piece inspection and do not continue production of parts until Quality has given the green light.

Balancer Jaw Setup

1. Turn Off the balancer. Shut off the drill press.
2. Remove the drill using a drill punch. Be sure to catch the drill as it will fall right out.
3. Turn balancer back on.
4. Open the jaws as far as you can without hitting the stop.
5. Roll over the red tool box to the balancer. Grab the clear plastic bag full of screws and bolts inside it.
6. Using a 3/8 inch Alan wrench, remove the plugs from the top of the jaws.
7. Remove the inner bolts in the jaws and pull the jaws off.
8. Clean off surface with an air hose and rag.
9. Put on the jaws that you will be using.
    a. Parts with an ID of 6.43 inches or greater will require the larger jaws. Smaller parts will use the smaller jaws.
    b. The **larger** jaws will require plugs, both of which must be tightened below the surface of the jaws.
        i. The plug with the rounded top goes on the upper jaw surface, the flat plug goes on the lower surface.
    c. The **larger** jaws will also require the plastic plug in the center of the spinner to stay **in**. If you are using smaller jaws, remove the plastic plug.
10. Using a crescent wrench and a 3/16 Inch Alan wrench, remove all counterweights along the bottom of the balancer.
    a. Be sure to check every single hole; some counterweights may be left deeper inside the threads.
11. Close the jaws all the way.
12. Set an already run drum on the balancer and tighten the jaws.
13. Loosen it just enough to wiggle the drum off the balancer and take it off.
14. Press “Esc” until reaching Menu #1.
    a. Press “1” for new setup.
    b. “Enter” to confirm.

c. “Enter” until reaching a screen asking for “Runout Compensation?”
d. Press “2” for no.
e. “Enter” to confirm.
f. Press green “Cycle Start” button.
g. View the resulting “oz. in.” and “deg.”
    i. Aim to get an oz. in. of at least 0.040 or lower.
h. Place a bolt from the clear bag in the red tool box into the hole closest to the “deg.” along the bottom, starting with the heaviest bolt to lightest.
i. Continue spinning with “Cycle Start” and inserting a bolt into the closest “deg.” until reaching the target 0.040 oz. in. or lower.
    i. “Cycle Start” at least 3 more times to confirm consistency.

15. Press “Esc” until reaching Menu #1
    a. “1” for “New Setup”
    b. “Enter” until reaching the same question of “Runout Compensation?”
    c. Press “1” for Yes.
    d. “Enter” to confirm.
    e. It will take you to Menu #2.
    f. Press “2” for Runout Compensation.
    g. Perform Runout Compensation.
    h. It returns to Menu #2.
    i. Press “1” to Start Balancing.

Runout Compensation

1. First, press “3” (last used setup) on Menu #1, then “2” (Runout Compensation) on Menu #2.
2. Grab a drum that has not been balanced.
3. Line up one of the bolt holes with one of the slots in the jaws and tighten the jaws.
4. Press “Cycle Start”
5. It will say 2nd Position. Line up the bolt hole opposite the one you just used to the same slot and tighten the jaws.
6. Press “Cycle Start”
7. Press “F1” to save results.
8. Start Balancing.

Balancer Drill Calibration / Drill Replacement

1. Insert a template drum
2. Turn the drill press off.
3. Replace the drill in the machine.
4. Loosen the bolts on the stop on the right side.
5. Loosen the horizontal bolts on the left side.
6. Center the drill in one of the template holes, set the bolts on the stop on the right side, and then hand tighten the bottom horizontal bolt on the left side.
7. Lift the drill to the higher position and tighten all of the bolts back up.
8. Take the template drum off.
9. Turn the drill press on.
10. Watch for any dimpling when using newly calibrated drill; adjust it if any occurs.

Balancer Angle Calibration

1. Place a finished drum on the balancer.
2. Tighten it and then loosen just enough to wiggle the drum off.
3. Blow out any scraps from the balancer.
4. Take a piece of clay and squish it to the 0 degree on the bottom of the balancer.
5. Press “Cycle Start”
6. After it is finished, remove the clay and then press “Cycle Start” again.
7. Press “F1” to save results.
8. “Runout Compensation” will be necessary after calibration. (See Balancer Jaw Setup) Then you can “Start Balancing”

Balancing and Inspection

Blue Balancer:

1. Power on the balancer if it is off.
2. Press “3” to use last set up.
3. Press “Enter” to confirm.
4. Press “1” to start balancing.

Orange Balancer:

1. Power on.
2. Press “2”
3. Press “2” again.

4. Press “No” (bottom button on the far right side)
5. Flip switch to the right of the spinner to balance.
6. **Orange balancer will not stop spinning until you flip the switch back**.

1. Tighten the unbalanced part on the balancer after it is calibrated and the correct jaws and counterweights are in place (see Calibration and Balancer Jaw Setup steps)
2. Press Cycle Start and the part will spin.
3. When it stops, check the screen on the left side. If it says it passed, the part is balanced. If it says fail, the part needs drilled.
    a. **Use flat drills for the flat drums (Ford’s and 5901’s)**
    b. **Use angled end drills for the rest.**
    c. If the part fails, use the drill handles to lower the drill to the stop to remove material. **Do Not drill into any of the holes machined onto the part. Drill to either side of the hole.**
    d. Press cycle start again. Continue this process until it passes the balance test, or until 9 holes have been drilled in the part. **Do not drill more than 9 holes in any part.**
4. After the part has passed, use a blue marker to place a mark where the arrow is pointing on the degree wheel on all parts But the FA’s.
5. If the part has been drilled, check for any dimpling caused by the drill.

1. Check the I.D. once every 5 parts.
2. Record the I.D. and the depth measurement **once every 30 parts**.
3. Stamp the part with the correct part number, except for Ford parts (they have their own unique stamps) Consult Quality Control if you do not have a stamp to use.
    a. Stamps are located in bottom drawer of the red tool box.

Stacking/Packaging

1. Stack all drums on a special 4-way skid.
2. The Ford, 5901, and R5010 drums will use **plywood** in the stacking process. All other drums will use **cardboard**.
3. Beginning with the skid, lay down a piece of plywood/cardboard, and then place a large, dehumidifying blue bag on that, keeping the bag open so that the parts will all be placed inside.
4. The bigger parts (Ford, 5901, and R5010 drums) will be placed **12** parts per layer.
5. Smaller parts are to be placed **16** parts per layer.
6. All parts are to be stacked **6** layers high, **each layer** being separated by a piece of plywood/cardboard.
7. Place **3** VCI Emitter pads in **each** layer.
8. Prior to putting the plywood/cardboard on top of the last layer, pull the blue bag up and over top of the parts, and place the plywood/cardboard on top of that.
9. Using a black marker, visibly write the full part number on top, as well as the number of pieces on the skid.
    a. A full skid of **larger** parts, stacked 12 by 6 will be a total of **72** drums.
    b. A full skid of **smaller** parts, stacked 16 by 6 will be a total of **96** drums.

Tooling

Turret A:

- Tool 1 – Y Drill
- Tool 2 – 1/2'' Spot Drill
- Tool 4 – CNMG432FNKCP25
- Tool 6 – CNMG432FNKCP25
- Tool 7 – CNG431FF2TP1500 - used
- Tool 9 – DPGR432KC9125
- Tool 11 – 5/8'' Drill

-Keep Tools 11 and 1 clear of debris at all times when in use-

****CAUTION – Always Remove Tool 1 – Y Drill when not running 3719 R 5010 drums****

Turret B:

- Tool 1 – CNMG432FNKCP25 used
- Tool 3 – CNMG432FF2GRTP250 used
- Tool 5 – LCMF1603040300MTCP500

PART SPECIFICS

3219 Y 5901

- Lathe Program: P-5901-2T.MIN
- Robot Remote Program: 41
- Lathe Jaws: Large
- Lathe Posts: 1” tall, 1 1/8” dia.
- Pickup Plate: Large
- Balancer Jaws: Large
- Balancer Drill: Flat
- Stacking Material: Plywood

Ford Drums (FC44-1126-FA)
(FC44-1126-CA)

- Lathe Program: P-5901-2T.MIN
- Robot Remote Program: 41
- Lathe Jaws: Large
- Lathe Posts: 1” tall, 1 1/8” dia.
- Pickup Plate: Large
- Balancer Jaws: Large
- Balancer Drill: Flat
- Stacking Material: Plywood

3719 R 5010

- Lathe Program: P-5010-HOLES.MIN
- Robot Remote Program: 43
- Lathe Jaws: Large
- Lathe Posts: 1” tall, 2 1/8” dia.
- Pickup Plate: Large
- Balancer Jaws: Large
- Balancer Drill: Angled
- Stacking Material: Plywood

Note: Deburr 5/8” holes
****Caution – Always Remove Tool 1 – Y Drill when switching to a different drum**

3719 D 134

- Lathe Program: P-134-2T.MIN
- Robot Remote Program: 43
- Lathe Jaws: Large
- Lathe Posts: 1” tall, 2 1/8” dia.
- Pickup Plate: Large
- Balancer Jaws: Large
- Balancer Drill: Angled
- Stacking Material: Cardboard

3719 U 229

- Lathe Program: P-1601-2T.MIN
- Robot Remote Program: 8
- Lathe Jaws: Small
- Lathe Posts: Fixed
- Pickup Plate: Small
- Balancer Jaws: Large
- Balancer Drill: Angled
- Stacking Material: Cardboard

DRM1601SM (-01)

- Lathe Program: P-1601-2T.MIN
- Robot Remote Program: 8
- Lathe Jaws: Small
- Lathe Posts: Fixed
- Pickup Plate: Small

Note: No balancing or skid/stacking for DRM1601M drums. Place right into basket. –Caution: Parts are very oily and could slip.

3719 C 237

- Lathe Program: P-3719C237-2T.MIN
- Robot Remote Program: 8
- Lathe Jaws: Small
- Lathe Posts: Fixed
- Pickup Plate: Small
- Balancer Jaws: Large
- Balancer Drill: Angled
- Stacking Material: Cardboard

Note: Measure the I.D. of 3719 C 237 drums on the CMM. Be cautious with the larger I.D. of the drum.

3219 R 4542

- Lathe Program: P-3219-R-4542-2T.MIN
- Robot Remote Program: None**
- Lathe Jaws: Large
- Lathe Posts: 1'' tall, 2 1/8'' dia.
- Pickup Plate: None**
- Balancer Jaws: Small
- Balancer Drill: Angled
- Stacking Material: Cardboard

Note: Measure the I.D. of 3219 R 4542 drums on the CMM. ****Ensure the System Link is turned off. Load parts in by hand.**

3719 K 141

- Lathe Program: P-3719-K-141-2T.MIN
- Robot Remote Program: None**
- Lathe Jaws: Large
- Lathe Posts: 1” tall, 2 1/8” dia.
- Pickup Plate: None**
- Balancer Jaws: Small
- Balancer Drill: Angled
- Stacking Material: Cardboard

Note: Measure the I.D. of 3719 K 141 drums on the CMM.
****Ensure the System Link is turned off. Load parts in by hand.**