Tommy University™

# Maintenance **Training**


**Tommy University Advanced Training**

**Tell me and I forget.**
**Teach me and I remember.**
**Involve me and I learn.**

*Benjamin Franklin*

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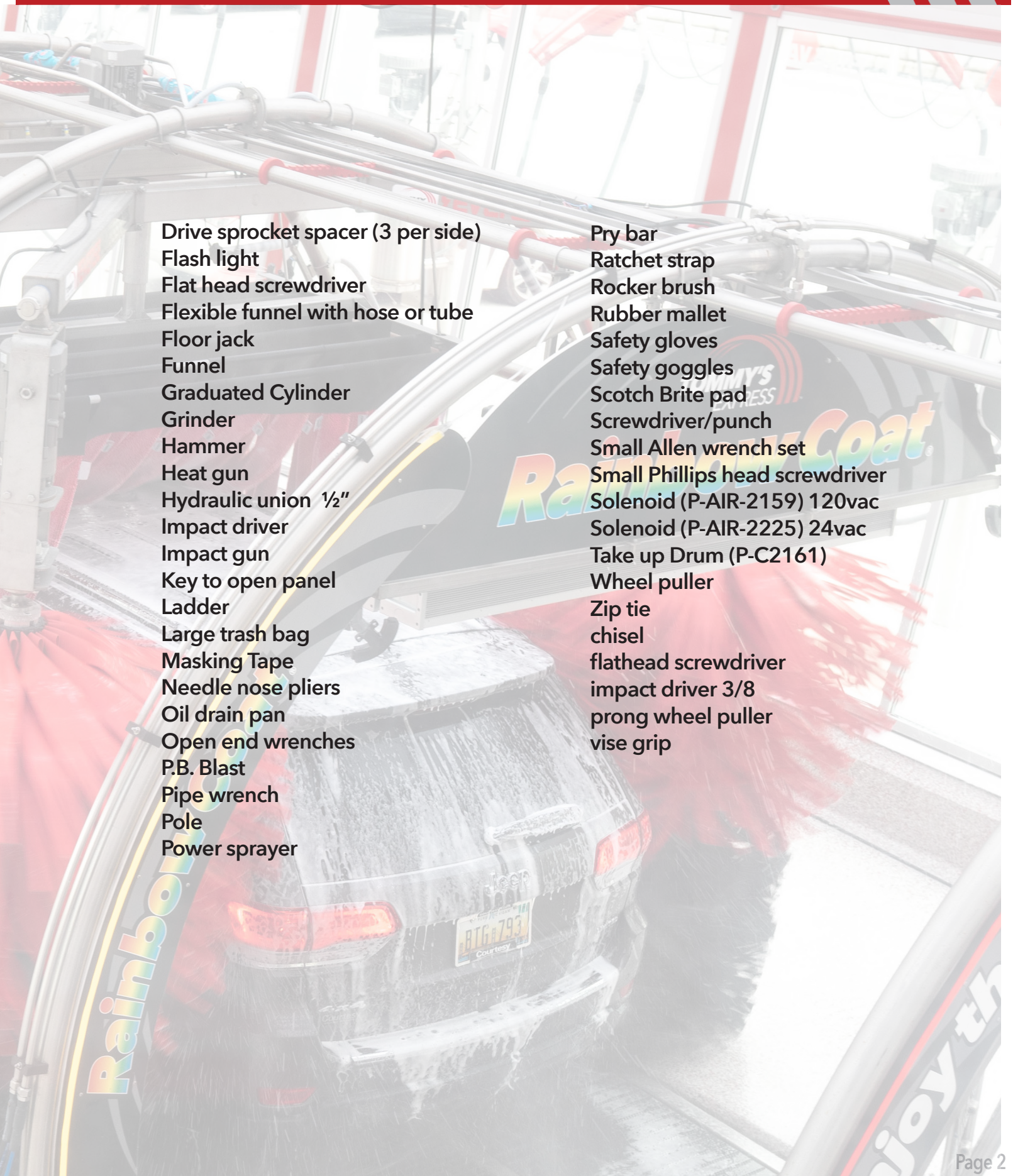
**Clean.**
**Shiny.**
**Dry.**

# Tools **Needed**

¼" plug
¼"x 1/8" male run tee swivel (P-SE-POD-113)
½ inch ratchet with ¾ in deep well socket
½" ratchet
¾ inch combo wrench
¾" Socket
¾" Wrench
1 1/8" deep well socket
1 1/8" wrench
1/2  Impact with ¼ " Deep Well Socket
11/16 or 13/16 combination wrench set
11/16" wrench
12" extension bar for impact gun
12" extension bar for ½" drive
2 lb sledgehammer
2" pillow block bearing (2 per arm) (P-M2026)
3 to 5lbs Hammer
3/4" socket
3/8 ratchet with a 6" extension
3/8" wrench
4 ft PVC pipe, 2" diameter
4 ½" grinder
4" grinder with cutoff wheels
5 gal. bucket
5 gallon bucket
5 lb sledgehammer
7 quarts of Hydra Cell 10w30 oil. (P-SE-2122)
7/16 socket ½"
7/8" wrench or adjustable wrench
8 flag proximity target collar (P-C2158-2-1516)
9/16" wrench
Adjustable Wrench
Allen wrench set
Anti-seize
Bearings (P-M2026)
Bucket or oil drain pan
Bump stop (P-M1014)
Cat Pump Oil (P-SE-PG-220)
Chain with master link for belt conveyor
Channel locks
Chisel
Claw Hammer
Cold chisel
Crowbar
Cut off wheels for grinder
Dawn Dish Soap
Draw line with weight and foot valve
Drive shaft (2 of them)

# Tools **Needed**



Drive sprocket spacer (3 per side)
Flash light
Flat head screwdriver
Flexible funnel with hose or tube
Floor jack
Funnel
Graduated Cylinder
Grinder
Hammer
Heat gun
Hydraulic union ½"
Impact driver
Impact gun
Key to open panel
Ladder
Large trash bag
Masking Tape
Needle nose pliers
Oil drain pan
Open end wrenches
P.B. Blast
Pipe wrench
Pole
Power sprayer
Pry bar
Ratchet strap
Rocker brush
Rubber mallet
Safety gloves
Safety goggles
Scotch Brite pad
Screwdriver/punch
Small Allen wrench set
Small Phillips head screwdriver
Solenoid (P-AIR-2159) 120vac
Solenoid (P-AIR-2225) 24vac
Take up Drum (P-C2161)
Wheel puller
Zip tie
chisel
flathead screwdriver
impact driver 3/8
prong wheel puller
vise grip

# Ball & Disc Replacement on Mitter

## Wash must be closed.

## Every 250,000 cars

## 1 Hour

## Tools Needed:

- 4 Ball & Disk Sets
- Vise Grip
- ½ Impact with 3/4 " Deep Well Socket
- Ratchet Strap
- 7' Ladder

## Procedure:

1. Engage Wash Stop.
2. Position ladder on driver side of Mitter Basket.
3. Place ratchet strap around frame of Mitter basket up to framework of the All-In-One Combo Unit.
4. Tighten ratchet strap, lifting Mitter basket slightly.
5. With vise grip, hold Ball & Disk shaft.
6. While holding shaft, remove bottom nut with Impact and Socket Wrench.
7. Be careful not to drop washer, Ball, and Disk from bottom of shaft.
8. Remove shaft from top of Combo Unit.
9. Inspect shaft on both ends for wear on thickness.
10. Install upper Ball & Disk.
11. Reinstall shaft.
12. Install new bottom Ball & Disk and washer.
13. Hold shaft with Vise Grip and tighten nut back into its original location.
14. Repeat for remaining three Ball & Disk drive shafts.
15. Disengage Wash Stop.
16. Turn on hydraulics.
17. Watch and listen for level motion.

# Belt Inspection / Replacement

## Wash must be closed.

## 3-4 Hours

## Initial 20,000. Thereafter every 50,000 cars.

## Tools Needed:

- Tools needed:
- Hammer
- 4 ft pvc pipe, 2" diameter
- Picks to picks
- Allen wrench
- 5 gallon bucket ISO 220 oil
- Funnel
- Under rollers
- Shafts
- Bolts
- Spacers
- Punches
- Spare rods/straws
- Rub rail
- Chains for gear
- Idle return roller shaft-#P-C2211 qty: 5
- Ubolts-qty 5 # P-C2129
- Idler return roller- qty 45 #P-C2258
- Qty 10 Idler return spacer P-C2104
- Chain with coupler #P-C2123

## Procedure:

1. Take PVC pipe and slide it underneath the belt. Two people on each side. Pick it up and get some slack. Take two pins out. Hit the pin out with punch and hammer.
2. Use 2 Vice Grips or Channel Locks to pull on the pin that is coming out in order to break the belt apart.
3. After the belt is apart, pull the one end past the sprockets, so you can inspect the sprockets. Pull the other end to reveal the guide plates and inspect the take up drum and bearings at this time. (You will repeat this process until all parts of the belt have been inspected.)
4. Place two detergent drums on the belt at the front of the wash to keep the belt from sliding down.
5. When inspecting the glide plates, look at the edges to make sure they are not worn down too far. If less than a ¼",discard glide plate.
6. Inspect all the glide plates.
7. Roll the belt back and break at the Rocker, 2 to 3 places. Pull back to the rockers inspect the sprockets.
8. Put the drums under the front.

# Belt Inspection notes

9. Inspect all under rollers for worn shafts, worn idle wheels, and U-bolts. Grease all eight bearings, inspect the belt flush.
10. Inspect the oil level in the drive unit, inspecting and greasing the chain couplers.
11. Inspect the take up drums and bearings.
12. Clean (use fire hose) and inspect the V trough.
13. Put belt back together, leave enough slack to move the belt around to get the pin back in.
14. Once you get to the blower room section, if there is extra slack, put motor in reverse (-10 on the iPad). Two people with screw drivers pulling back, until belt starts to move. Some slack can then be removed. Belt should now be tightened.

# Belt Rotation/Sprocket tation

## Wash must be closed

## upon inspection/ 250,000-500,000 cars

## 3-4 Hours

## Tools Needed:

- Tools needed:
- Hammer
- 4 ft pvc pipe, 2" diameter
- Picks to picks
- Allen wrench
- 5 gallon bucket ISO 220 oil
- Funnel
- Under rollers
- Shafts
- Bolts
- Spacers
- Punches
- Spare rods/straws
- Rub rail
- Chains for gear
- Idle return roller shaft-#P-C2211 qty: 5
- Ubolts-qty 5 # P-C2129
- Idler return roller- qty 45 #P-C2258
- Qty 10 Idler return spacer P-C2104
- Chain with coupler #P-C2123
- Tire marker (chalk)

## Procedure for Belt Rotation:

1. Take Tire marker, and make directional arrows to indicate the direction the belt is moving. Make these at the entrance and place a directional arrow about 5 ft. apart along the entire Belt.
2. Take PVC pipe and slide it underneath the belt. Two people on each side. Pick it up and get some slack. Take two pins out. Hit the pin out with punch and hammer.
3. Use 2 Vice Grips or Channel Locks to pull on the pin that is coming out in order to break the belt apart.
4. After the belt is apart, pull the one end past the sprockets, so you can inspect the sprockets. Pull the other end to reveal the guide plates and inspect the take up drum and bearings at this time. (You will repeat this process until all parts of the belt have been inspected.)
5. Place two detergent drums on the belt at the front of the wash to keep the belt from sliding down.
6. Now you will break the belt into 20 ft. sections. Rotate each section 180 degrees and re-attach. After the entire top has been rotated, run the belt until the arrows are no longer showing. Now break apart the remainder of the belt as described above, and rotate each 20 ft. section 180 degrees until no sections are left.

# Sprocket Rotation

## Procedure for Sprocket Rotation:

1. Remove chain couplers.
2. Loosen drive shaft bearings
3. Remove Flag Proximity Target Collar.
4. Drop Belt into Pit.
5. Remove D.S. Drive Shaft Assembly, set aside.
6. Remove P.S. Drive Shaft Assembly, set into D.S.
7. Set PS into D.S.
8. Align drive shaft with bearing set screws, use shims if needed for bearing height.
9. Align and install Chain Couplers.
10. Tighten bearings.
11. Line P.S. and D.S. belt up with sprockets using handle bars.
12. On iPad, put belt in reverse at -10. Make sure that two people on each side of the belt are pulling on the belt to keep tension so that it stays in the sprockets. Keep pulling until you have enough slack to attach to the other end of the belt.
13. Re-connect belt.
14. Put in to forward position and run the belt.
15. Make sure bearings are spinning. Run the belt at a slow speed (25 to start). Be alert to stop belt if needed.
16. If everything is ok. put belt back to the speed it was originally at.

# Blower Impeller

## Wash may be open

## inspect monthly

## 1 Hour

## Tools Needed:

- Tools needed:
- Impact driver 3/8
- 7/16 socket ½"
- 3/8 ratchet with a 6" extension
- 3 prong wheel puller
- 5lb sledgehammer
- Mitter center tube
- Can of PB blast

## Procedure:

1. Lock- out Tag-out electric motor at disconnect MCC motor control center.
2. Remove the intake screen from the blower housing.
3. Apply PB Blast to the taper lock.
4. Remove 3 bolts from taper lock.
5. Insert two of the three bolts into the back out holes.
6. With rachet and ½ inch socket, tighten each bolt alternately, until taper lock begins to slide away from the impeller.
7. If taper lock is not loosening up, take mitter tube over taper lock and pound with 5lb sledgehammer to help persuade disengagement.
8. If still not disengaged, use three prong wheel puller, with ½ inch impact, to remove center of taper lock.
9. Once taper lock is removed, remove impeller from housing.
10. Inspect impeller for direction. Arrow stamped in aluminum housing which will state if it is in a clock or counter clock direction.

# **Blower Impeller** notes

11. Verify that new impeller matches direction of old impeller.
12. Insert taper lock into center hub of impeller.
13. Align taper lock with shaft of electric motor.
14. Push onto shaft (same distance as it was located) approx. 1/2 inch of clearance between blower impeller and blower housing.
15. Tighten down three bolts and taper lock with impact wrench and ½ in socket alternating.
16. Reinstall intake screen with impact & ½" socket.
17. Undo Lock-out Tag-out in MCC cabinet.
18. With iPad turn blower on manual , verify correct rotation , and listen for any unusual vibrations.

# Blower Motor Replacement

## Wash must be closed.

## 1.5 Hours

## Inspect U-bolts, mounting plate, nuts and bolts monthly

## Tools Needed:

- Impact driver 3/8
- 7/16 socket ½"
- 3/8 ratchet with a 6" extension
- 3 prong wheel puller
- 5lb sledgehammer
- Mitter center tube
- Can of P.B. Blast

## Procedure:

1. Perform steps 1-8 on Blower Impeller replacement to begin.
2. Remove blower housing from motor face plate.
3. Remove electrical box cover on side of motor.
4. Grab electric tester. Set to 480 volts and test to make sure no voltage is live.
5. Disconnect L1, L2, L3 lines from electric motor in housing.
6. Remove electrical cord from housing.
7. Using an HVAC, lift with a short chain. Go from arm of HVAC lift with a chain to the motor hook eye.
8. Tighten chain tension.
9. Remove four bolts holding electric motor onto motor mount plate.
10. Raise blower motor slightly with HVAC lift.
11. Slowly move HVAC arch blower motor to the ground.
12. Hook new blower motor with chain, raise new blower motor with HVAC lift. Slide new motor into place on motor mount plate, lower motor on to motor mount plate ensuring motor mounting pads are in place.
13. Reinstall four bolts, lock washers bolts & tighten down.

# **Blower Motor** Replacement notes

14. Remove cover from electrical box housing on side of motor.
15. Grab electrical whip & reconnect L1, L2, and L3.
16. Reinstall motor electrical box cover.
17. Reattach blower housing to motor faceplate.
18. Reinstall perform nine-end of blower replacement steps.
19. Remove Lock-out Tag-out at MCC cabinet, turn motor disconnect on, grab iPad and manually start blower for 2 sec. and shut to off position. Verify blower impeller is turning in the correct rotation.
20. If the direction is incorrect, use Lock-out Tag-out for motor at disconnect
21. Go to motor electrical house, remove cover switch two of the three leads L1, L2, or L3. Switching L1 and L2 will cause motor to turn in opposite direction.

# Body Wax Manifold

## Wash must be closed

## 45 minutes

## Tools Needed:

- Power sprayer
- Ladder
- Scotch Brite pad
- Dawn Dish Soap

**Flush out Body Wax pre-rinse manifold every 300,000 cars. Flush out Body Wax manifold monthly on the 1st.**

## Procedure:

1. Un-thread all three foamers from manifold.
2. Take out inserts and either clean or replace depending on wear /age of inserts.
3. Scrub and spray out foam generators with Scotch Brite pad, Dawn Dish Soap, and power sprayer.
4. Take off black tommy foaming sprayers.
5. Spray out both sprayers with power sprayer.
6. Take power sprayer and start at one end of manifold and spray out manifold. Then go to the other end and do the same.
7. Spray each whole from underneath manifold.
8. Put all foamers and spray nozzles back on hot wax manifold.
9. Run Hot Wax to see if you have good coverage.
10. If you have whole on bar that are still clogged you may need to respray out manifold.

# **Bump Stop** Placement

**Wash must be closed.**

**upon inspection**

**5 minutes**

## Tools Needed:

- Channel locks
- Bump stop (P-M1014)

## Procedure:

1. Place wrap assist to “Manual” on Tommy Controller for the wrap that is being worked on and push wrap out. This will help give you access to remove the bump stop. (Or have someone push it out if there is a second person).
2. Twist off rubber bump stop. Should be able to use just your hands. If not use a medium to larger sized pair of channel locks to twist off.
3. Twist on new rubber bump stop.
4. Turn wrap assist back to “Auto” on the Tommy Controller.
5. Push wrap all the way out and release. Watch to make sure bump stop engages correctly.

# Cat Pump Oil Change

**Wash can be open.**

**1 Hour**

**monthly/check with manufacturer suggested schedule**

## Tools Needed:

- Safety glasses and gloves
- Adjustable wrench
- Cat Pump Oil (P-SE-PG-220)
- Oil drain pan
- Funnel (If wanted)

## Procedure:

1. Turn power off to Bay wash pump. Place Lock-out Tag-out on disconnect.
2. Turn bay wash pump on Tommy Controller to “OFF”.
3. Line up oil drain pan with oil drain shaft to bay wash pump.
4. Take plug off of ball valve to oil drain on bay wash pump.
5. Turn ball valve to open position so oil flows out of drain.
6. Take red cap off of top of bay wash pump to the oil fill port.
7. Once oil is drained completely, put plug back in to ball valve and turn ball valve back to shut position.
8. Put funnel in oil fill port (if you choose to, this one is easy to free hand pour) fill bay wash pump with oil until oil level reaches just over the middle of the sight glass.
9. Once full put red cap back on to oil fill port. Snug. Only hand tighten. It is a plastic cap and can break if overtightened.
10. Remove Lock-out Tag-out from Bay was pump disconnect in M.C.C.
11. Turn Bay wash pump back to “Auto” on Tommy Controller.
12. Recycle old oil.

# **Center Sleeve** Mitter

## Wash must be closed

## Every 200,000 cars

## 15 minutes

## Tools Needed:

- Adjustable wrench
- Ladder

## Procedure:

1. Stainless Steel Sleeve for Mitter basket with bushing (P-M2047)
2. Press E-stop in.
3. Loosen the nuts on the set screws, then the sets screws themselves.
4. Once loosen lower the sleeve down and remove from mitter cam shaft.
5. Once removed from Mitter cam shaft, remove from mitter basket shaft.
6. Place new sleeve on to Mitter basket shaft.
7. Move basket to line up Mitter sleeve with Mitter cam shaft and slide sleeve on to cam shaft.
8. Once sleeve is on the Mitter cam shaft at the height it was originally at, tighten set screws in and then tighten the nuts on the sleeve.
9. Pull e-stop out and run Mitters and inspect for any issues.

# Chain Coupler in Drive Shaft

## Wash must be closed

## upon failure

## 1 Hour

## Tools Needed:

- Chain with master link for belt conveyor (P-C2123)
- Hammer
- Chisel
- Flathead screw driver
- Grinder
- Cut off wheels for grinder
- Crowbar
- Needle nose pliers

## Procedure:

1. Press E-stop in.
2. If replacing chain that is still on the couplings, it will need to be removed. Remove chain connecting drive shaft and gearbox shaft. May need to cut area to break chain free then use chisel and hammer to help pry it free and hit it off. Do not cut teeth on either coupling. Cut between the teeth on the couplings.
3. Once chain is off, inspect couplings to make sure they are not too worn down.
4. Also, inspect the couplings to make sure they line up together correctly for new chain. If they do not line up correctly the drive shaft may need to be moved for example if drive shaft side is too low it may need to be shimmed up. If too high might need to take a shim out. Check bearing shelf welds to make sure that those are still in place as well.
5. Place new chain on. Hit in to place lightly with hammer to line the chain into the coupling's teeth correctly.
6. Make sure the Allen screws on couplings are not in the way when putting master link pin in. Two plates go in the middle when putting in master link and one on the end with a lock ring. Flat head screw driver, hammer, and needle nose pliers will possibly come in handy during this step.
7. Once put back together, get all tools out of belts way and run the belt.
8. Inspect for any issues. If none clean up and put tools away. If it doesn't sound right look into what may have been missed.

# Change Oil on the drive

**Wash must be closed.**

**Annually**

**1 Hour**

## Tools Needed:

1. Allen wrench set
2. oil catch tray
3. 5 gallons ISO 220 gear oil

## Procedure:

1. On drivers' side of gear box housing locate three one-inch plugs.
2. With allen wrench, remove top vent plug.
3. With allen wrench, remove middle plug located slight lower than drive shaft.
4. With finger, measure oil level, inserting finger into plug. Bend finger slightly to reach oil level.
5. Make note of oil level.
6. Position oil tray under bottom plug.
7. With allen wrench, remove bottom plug.
8. Allow all gear oil to drain.
9. When gear oil is to a drip, add one Qt. of new oil( ISO22) at center plug opening to flush out residual from bottom of gear box.
10. When oil drain returns to drip' inspect ring on bottom plug reinstall.
11. With funnel add oil to center plug hole on gearbox until oil exits the hole. (Like a milk jug on its side filled so it is level with the opening.)
12. Once oil is at dropper level 'bottom of fill hole reinspects bottom plug.
13. Inspect gasket on vent plug and reinstall.
14. With iPad start conveyor, listen for unusual noises. Allow to run for 5 min., shut conveyor off.
15. Verify oil level is at proper level by inserting plug and finger and monitor level.
16. If oil is level is good, reinstall plug and resume normal operations.

# Change Photo Eye

**Wash must be closed**

**Clean monthly replace upon failure**

**1 Hour**

## Procedure:

1. When using multiple Banner Eyes in close proximity make sure that they are ran on different frequencies on the side of the banner eyes it shows “A” and “B” lights whichever one is lit up is the frequency that it is running. Be sure that the emitter and the receiver frequencies match. In our wash entrance we have three eyes, so from top to bottom we want them to ream “ABA” or “BAB” that way they won’t interfere with each other. You change the frequency by changing the way the banner eye is wired.

2. The lights on the back of the banner eyes labeled “1,2,3,4” represent the signal strengths (“4” being the highest). If you notice that the signal strength is low, you may have to adjust the positioning of the banner eye or clean the lenses, with a microfiber not abrasive cloth.

# Change Solenoid on Detergent Pod (old)

**Wash must be closed**

**upon failure**

**15 minutes**

## Tools Needed:

- Small Phillips head screwdriver
- ¼" plug
- ¼"x1/8" male run tee swivel (P-SE-POD-113)
- Solenoid (P-AIR-2159) 120vac
- Solenoid (P-AIR-2225) 24vac

## Procedure:

* Be sure to figure out which voltage you need before replacing solenoid. *

1. Press E-stop in.
2. Turn air pressure off to detergent pod.
3. Take air lines off of old solenoid.
4. Loosen and remove the screws holding the solenoid in place. Keep in safe place.
5. Once screws are removed, then remove solenoid.
6. Put new solenoid on. Also, either use a new plug, and ¼" x 1/8" male run tee swivel, or use the ones on the old solenoid and be sure to put them in the same spot.
7. Once new solenoid is mounted back on with the screws, place airlines back into the tee on the solenoid.
8. Turn air pressure back on to detergent pod and pull out E-stop.
9. Listen for any leaks. If leaks, may need to tighten screws holding solenoid in place (do not overtighten or strip screw heads), tighten plug on solenoid, tighten tee on solenoid, or put air lines into the tee on the solenoid better.
10. If no leaks, test the function and make sure it works.

# Charcoal Media Replacement (Pur Clean)

**Wash must be closed.**

**18 months**

**2 Hours**

## Tools Needed:

1. Masking tape
2. Pea Gravel (Will need to order based on RO units size)
3. Charcoal media (Will need to order based on RO units size)

## Procedure:

1. Turn off the water supply. Remove the inlet, outlet and drain hoses from the carbon head. Carefully remove the head from the carbon tank by unscrewing it from the tank counter-clockwise.
2. Invert the carbon tank & empty out the contents. Remove the stem and diffuser from the tank. Rinse the tank out using water. Also, rinse some water through the diffuser
3. in both directions.
4. Reinstall and cover the stem of the diffuser with masking tape. (Avoid using duct tape as it can leave a sticky residue which the auto head may catch on and jar the diffuser if pulled off again.) The top of the stem should be level with the top of the carbon tank.
5. The top of the stem should be LEVEL with the top of the carbon tank. If it is up higher it may be damaged when installing the carbon head.
6. Rinse the replacement Pea Gravel to remove all the fines and dirt. Pour the clean pea gravel into the tank. Cover the diffuser completely plus about 2" above it with pea gravel. Then add PN AGC-MG (Medical Grade Acid Washed Carbon) based on model number. The tank is not intended to be totally full.
7. Remove the tape covering the stem and diffuser.
8. Check carbon tank threads to be sure there is no stray carbon. Clean if necessary.
9. Thread the carbon tank head on clockwise (see step 1) until it is snug onto the tank.

10. Connect the water line up to the tank, and run the water to drain until the line runs clear and for 30 seconds after.
11. Connect the carbon tank back up to the RO unit.
12. Run two manual carbon tank backwashes (this takes about 20 minutes each time). Simply press on the up and down arrow keys & hold them down for 5 seconds to initiate each back wash.
13. Restart the RO unit.

# Check Valves

## Wash can be open

## upon failure

## 5 minutes

## Tools Needed:

- Check Valve (P-CHE-2150)
- channel locks

## Procedure:

1. When using check valves on an arch or manifold be sure to use the same style on the whole unit. So, same style meaning cracking pressure. The cracking pressure is the minimum pressure required to open the check valve to allow the flow through. Then when that pressure is shut off to it the check valve will close and not allow any flow through until the pressure is turned back onto it.

2. When installing the check valve, thread tape does not need to be applied. If thread tape is used, sometimes, the thread tape will rip off when installing and get into the check valve causing it to not be able to close all the way, so there will be a run out of liquid through the check valve when that output shuts off, rather than stopping right away. Also, when installing only tighten the top of the check valve finger tight. Do not use channel locks to tighten it down. Over tightening will shorten the life of the check valve. So, tighten with hands to where you will still be able to loosen it with your hands.

# Drive Shaft Replacement

## Wash must be closed.

## upon failure

## 2 hours

## Tools Needed:

- 1 1/8" wrench
- 1 1/8" deep well socket
- 12" extension bar for ½" drive
- Impact gun
- ½" ratchet
- ¾" wrench 2 of them
- 9/16" wrench 2 of them
- Adjustable wrench
- 4 ½" grinder
- 4 ½" grinder cut off wheels
- Chisel
- Hammer
- Flat head screwdriver
- Allen wrench set
- 2 5/16" bearings (4 of them) (P-C2119)
- Sprockets (10 per side)
- Drive shaft (2 of them)
- 2 Belt conveyor chain couplings for drive shafts (2 5/16") (P-C2163-3)
- Keyway 2 of them (P-C2121-3)
- Chain with master link for belt conveyor (2 of them) (P-C2123)
- Drive sprocket spacer (3 per side)
- 8 flag proximity target collar (P-C2158-2-1516)
- Rope or Ratchet straps
- Needle nose pliers
- Pry bar

## Procedure:

1. Make sure e-stop is pressed in
2. Peel apart belt like normal belt maintenance
3. Remove transfer plate. (2 - 9/16" wrenches on most set ups possibly an allen wrench and 9/16" wrench)
4. Remove chain connecting drive shaft and gearbox shaft. May need to cut area to break chain free then use chisel and hammer to help hit off. Do not cut teeth on gearbox shaft gears.
5. Use Impact gun with 1 1/8" socket and a 1 1/8" wrench to undo bolts and nuts holding bearings on. Remove hardware and put in safe place to reuse.
6. Once bolts are removed wrap rope or ratchet straps around both bearings and try to lift and remove old drive shaft from conveyor. May need to let belt drop down to the floor to give yourself enough space to remove. This step may also require 4 people. 2 to lift out. 2 to spin bearing housing to a vertical position rather than horizontal for easier removal. Also, whoever is lifting on the outside bearing may need to pull

their side towards the wall (while lifting) and have the person on the inside lift their side out first, then pull their side towards opposite wall and other side should be able to lift their side out easier as well.

7. Make sure to put shims for each side's bearings in a safe place and not to mix up between the two. As you will want to put them back exactly how they came off.
8. Place new sprockets on new drive shaft as similar as possible as the old set was. Place drive sprocket spacers in same position as well. Will have to line up sprockets later to fit into belt pockets. Place bearings and belt conveyor chain coupling on shaft at this time as well. Look at where old bearings are lined up on old drive shaft and try to get them as close to that as possible. Try not overdo it as it will be harder to adjust if needed to. Place keyway into chain coupling and slide onto shaft with the keyway going into the slot on the shaft.
9. Place new drive shaft into conveyor hole. Easiest to go outside bearing in first pull past bearing shelf and then opposite side bearing drop in and line up on shelves after both are in.
10. Once drive shaft is put into hole; shims will have to be placed back in as well. Lift one side up at a time while one person slides in shims and tries to line up as best as can with the holes. Flat head screw driver may help with this, by placing through the hole and trying to move the shims to line up correctly. Once lined up place bolt with flat washer on top through, then place another flat washer, lock washer and nut on. Do the same thing to the other sides bearing and then tighten down all bolts.
11. Make sure couplings are lined up correctly. Put chain on couplings. Tap with a hammer all the way around the chain to make sure chain goes into couplings all the way. Make sure the Allen screws on couplings are not in the way when putting master link pin in. Two plates go in the middle when putting in master link and one on the end with a lock ring. Flat head screw driver, hammer, and needle nose pliers will possibly come in handy during this step.
12. Make sure allen screws are tight on bearings and drive shaft coupling.
13. Repeat these steps on the other side of the belt.
14. Only difference to sides is that DS outside shaft will need to have 8 flag proximity target collar put on end of shaft. Make sure to line up pulse sensor as close as possible to flags. Not too close to where the flags hit, but close enough so that they read every flag.

# Drive Shaft Replacement notes

15. Put a pump of grease in all bearings.
16. Once done with both sides you will need to line up sprockets into belt pockets. Once lined up tight down the belt sprocket spacers. Put transfer plates back on.
17. Once belt is reconnected do a final look over to make sure everything looks good and all of the tools are out of the way.
18. Pull out your e-stop and run the belt. Start slowly, then speed up. Make sure everything looks to be running correctly. Ex: Flights aren't hitting transfer plate, check that pulses are being read from sensor and PLC in MCC, No funky noises, and so on.
19. If everything looks good turn off belt and clean up. Make sure your conveyor speed is back to what you had it at originally.

# Foam Generator Clean Out

**Wash may be open**

**monthly**

**15 minutes**

## Tools Needed:

1. Twist N' Kleen foam generator – (P-CHE-2132)
2. Insert for Twist N' Kleen foam generator – (P-CHE-2140)

## Procedure:

1. Take out air line and detergent line from foam generator.
2. Unscrew the foam generator from the fitting it is in.
3. Take the cap off of the foam generator and pull out the insert.
4. Rinse off any gunk that is on the insert.
5. Clean out the inside of the foam generator shell.
6. Put insert back into shell and twist on cap.
7. Put the foam generator back into its place.
8. Hook air line and detergent line back up.

If inserts are too dirty and don't come clean, you can replace just the insert if the shell if it is still in good shape.

# Glide Plate Inspection

## Wash must be closed.

## Every 50,000 cars

## 1 Hour

## Tools Needed:

- Cut proof gloves
- Flathead screwdriver

## Procedure:

1. With a partner one on each end pick up a glide plate. Should be able to pick up with hands, but may need a flathead screw driver to help get free to lift up.
2. Inspect edges of glide plates on both sides and ends. Check for wearing on the edges, cracks, or dents on the plate.
3. If no wear is noticed place back down and inspect plate next to it.
4. If there is wearing, but not very extreme then the plate can be rotated. If the wearing is on the inside of the plate rotate it to the outside. If the wearing is on the outside of the plate leave it on the outside. Don't leave thin edges in the middle.
5. If edges are worn dangerously thin, then replace the plate.
6. Do this on all plates in the tunnel.
7. There are welded in glide plates at the exit next to the sprockets, as well as the entrance next to the drums. Inspect the welds on them to make sure they are still attached.
8. This project is to be done when the wash is shut down.

# High Pressure Pump Oil Change

## Wash must be closed

## 1 Hour

## Per manufacturers recommendation/ monthly

## Tools Needed:

- Safety glasses and gloves
- 7 quarts of Hydra Cell 10w30 oil. (P-SE-2122)
- Oil drain pan
- Adjustable wrench
- Flexible funnel with hose or tube
- Allen wrench set (depending on set up)
- Pipe wrench (if shaft spins before plug loosens up)

## Procedure:

1. Turn off disconnects for HPP1 and HPP2 in MCC. Place Lockout tag outs on disconnects.
2. Turn wheel blaster functions on output control on Tommy Controller to "OFF"
3. Loosen and take off red cap on top of hydra cell pump.
4. Set drain pan near oil drain shaft.
5. Take plug off of shaft with adjustable wrench. If shaft spins use pipe wrench to hold in place. If you have a ball valve set up take plug out of ball valve if there is one and turn ball valve to open.
6. Let oil drain in to pan. Once empty put plug back onto shaft.
7. Put flexible funnel tube into oil fill port and fill pump up with oil. This will take about 3 quarts or a little over to fill if pump was completely drained of oil.
8. Dip finger into oil fill throughout the fill process. If oil covers your full fingernail pump is filled up high enough. This technique should help you to not overfill.
9. Put red cap back on. Snug. Do not over tighten. It is a plastic cap and can crack if over tightened.
10. Repeat these steps on the 2nd pump.
11. After both pumps have been full, double check to make sure plugs and caps are tightened back up.
12. Remove lockout tag outs from HPP1 and HPP2 disconnects in MCC.
13. Turn all wheel blaster functions on Tommy Controller back to "Auto"
14. Recycle old oil.

# **Hydraulic Hose** Inspection

## Wash may be open or closed

## Every 100,000 cars

## 2 Hours

WATCH NOW

## Tools Needed:

- Leather gloves safety glasses
- 5 gallon bucket
- Heat gun
- Open end wrenches

## Procedure for inspection:

1. Visually inspect the hose casing for any splits cracks or protruding metal or areas where visual is not capable, rub lightly with hand with leather glove on feeling. Look for rub points for wire.
2. Inspect fittings for hydraulic oil drips at crimp and hydraulic connection. If hose is compromised in any way it will need to be replaced.
3. Replace hose engage wash stop.
4. Acquire proper length hose from stock in back room.
5. Remove cut heat shrink off of hose fittings.
6. With open end wrenches remove hose.
7. Allow residual oil to drip into clean 5 gal bucket.
8. Slide new heat shrink over new hose ends install new hose tightening with open end wrenches.
9. Disengage wash stop and run hydraulics manually with iPad.
10. Visually inspect for red drips at fittings.
11. Inspect hydraulic oil level in tank , insuring it is over the low level float.
12. If no leaks at connects with heat gun heat up heat shrink around fitting.

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## Procedure for Annual Maintenance:

1. Annually replace all hydraulic hoses in the car wash tunnel assuming volume is north of 3,000 cars.
2. 1st year of performing this task is critical that the fallowing process is conducted.
3. Measure each set of hoses in tunnel and catalogue the entire tunnel.
4. If making up your own hoses, get hoses made & cat. Prior to replacement.
5. If using outside source to make hoses, cat. Each set of hoses and give to hydraulic store.
6. Daily prior to open change as many hoses as pos. inspect hoses for oil leaks and shrink wrap.
7. Annually when main. Is required the exact length of hoses is documented.

# **Hydraflex** Valve Change Out

## Wash must be closed.

## Upon failure

## 3 minutes

## Tools Needed:

- Allen wrench set
- Adjustable wrench
- Single Hydraflex Hydra Cannon assembly - (P-HFI-259)

## Procedure:

1. Turn the water off to the detergent pod.
2. Unscrew the cap on the end of the row of valves you are going to be changing out.
3. Loosen Allen screws on Hydraflex valve and remove air lines from valve. Slide off to remove. Do this to each valve until reaching the designated valve you are trying to replace.
4. Slide new valve on and others back on.
5. Put air lines back into valves.
6. Tighten screws.
7. Put cap back on to the end of the row.
8. Turn water back on to detergent pod.
9. Test the output of the valve you just replaced.

# Looping a Line

## Wash must be closed

## 5 Minutes

WATCH NOW

## Procedure:

- If for whatever reason a wrap or rocker brush needs to be bypassed and not running, the lines can be looped together.
- Mark which hydraulic hose went to which fitting on the motor. Remove the hydraulic hoses going into the motor. Connect both of the hoses up to a ½" MJIC x ½" MJIC fitting. This will just continuously run the hydraulic oil between the lines.

# Proper Mitter Cloth Layout

## ROW 1:

**6** 38" pieces (3 on the end of each side)
**2** 55" pieces right after the 38" pieces.
**3** 67"pieces in the middle.
**4** loops at the top.

## ROW 2:

**2** 38" pieces on the end.
**9** 67" pieces between them.
**4** loops at the top.

## ROW 3:

**2** 55" pieces on the end.
**9** 67" pieces between them.
**4** loops at the top.

## ROW 4:

**4** 55" pieces 2 on each end.
**7** 67" pieces between them.
**4** loops at the top.

## ROW 5:

**2** 55" pieces on the end of each side.
**9** 67" pieces between them.
**4** loops at the top.

## ROW 6:

**4** 55" pieces 4 on the driver side end.
**7** pieces the rest of the shaft.
**4** loops at the top.

# Rebuild Motor Cage

## Wash may be open

## Annual/failure/ cloth replacement

## 15 Minutes

## Tools Needed:

- Motor mount (P-M2063)
- Flex Coupler (P-M2208) (For wraps)
- Reverse hugger brush drop down pivot coupler (P-SW-201)
- Four bolt flange bearing (P-M2010)
- Stub shaft (P-M2007-9)
- Motor (P-M1001)
- Torque plate (P-M2038)
- ½" MNPT X ½" MJIC Elbow SS (P-SE-POD-120) (2 per motor)
- Allen wrench set
- 9/16" wrench (2 of them)
- 9/16" socket
- Impact driver

## Procedure:

1. Place first bearing on stub shaft. Shaft facing down and flat end up to mount to motor mount.
2. Place shaft through hole of motor mount.
3. Place other bearing on stub shaft opposite of the first bearing. So, flat end down to mount to motor mount, shaft facing up. Stub shaft should be flush with bearing shaft or just barely sticking above.
4. Bolt bearings into place and tighten Allen screws on bearings.
5. Bolt torque plate onto motor.
6. Place motor into stub shaft. Be sure to line up the keyway to go in correctly.
7. Place bolts through side of motor mount and tighten on nuts that hold torque plate down in place.
8. Depending on what brush cage is being built, bolt into place either the flex coupler for wraps, or the drop down pivot coupler for Reverse Huggers on top of the motor mount.

# R.O. Carbon Media Replacement (Tommy's)

## Wash must be closed

## Every 600,000 cars/ will vary by site

## 2 Hours

## Tools Needed:

- Shop Vac
- Duct Tape
- Charcoal Media
- Pea Gravel

## Procedure:

1. Turn the unit off
2. Close inlet/outlet valves to the Clack Head
3. Remove clack head and stand pipe
4. Unhook the R.O. System feed line from the sediment filter
5. Use the shop vac to remove all water or until the unit is light enough to move
6. Remove all carbon media and stone by inverting the tank
7. Wash out the carbon tank
8. Place the tank back into its designated area
9. Verify proper installation of hub and lateral in tank (verify height of standpipe is compatible with Clack head)
10. Fill tank to approximately 24 inch with municipal water to protect the hub and lateral from damage as the stone and media is added to the tank
11. Use duct tape to cover the opening of the standpipe prior to adding the stone or media. It is critical that stone or media does not get poured into the standpipe
12. Add 50 pounds of stone media to bottom of tank (cover hub and lateral)
13. Add 10 cubic foot of Granular Activated Carbon (GAC)
14. Remove the duct tape

## Procedure continued:

15. Install O-ring flange seal and standpipe seal using small amount of silicone grease. (do not install seal dry)
16. Reinstall the clack head
17. Verify water line connections and flow directions based on the markings molded into the Clack water connections.
18. Wet the carbon by slowly filling the tank in back flush mode. To do this, set head to flush (hold down "REGEN" button until regen cycle begins) and once unit begins flush cycle, unplug Clack head to allow as much time as needed to "burp tank" and wet carbon media. Then slowly crack open the ball valve which feeds the tank and fill it with water. This process may take several minutes and should not be rushed in order to avoid flushing carbon media into drain. Plug the clack head back in.
19. Allow the carbon tank to drain into the trench until the water becomes clear. This will take several minutes. You may need to run a REGEN multiple times.
20. Reconnect the R.O. feed line to the sediment filter once the water becomes clear.
21. Once this step is completed, set the unit to normal operating mode.

# R.O. Membrane Replacement (Tommy's)

## Wash must be closed.

## 2 Hours

## on average 600,000 cars, but will vary by site

## Tools Needed:

- New O rings
- 2 membranes

## Procedure:

This procedure lists all the steps to remove and replace the membranes. If there is room to remove the membranes from the top of the unit please skip steps 3-6 during removal and step 11 of the RO membrane installation

.

1. Turn off power on controller and verify the feed pressure is 0 P.S.I.
2. Remove plumbing from the top of the membrane caps to allow removal of the caps.
3. Remove the split clamps from the side ports of the membrane housings.
4. Remove the band that holds the membrane on the stand.
5. Remove membrane housings and lay on cardboard or soft material to avoid damage to the housings.
6. Remove top and bottom caps, look over to ensure they are not cracked or damaged. Replace if cap assembly if damage is seen.
7. Install new O-ring seals on cap (large diameter ring) and smaller O-rings on membrane adapters. Apply a thin coat of silicone grease to the rubber seals, the brine seal (on membrane) and membrane housing chamfers / seal bore to avoid rolling or cutting during installation.
8. Insert membrane (re-use i-LEC adapters on new membranes) into housing from top opening (feed side). The feed water flow runs from the top to the bottom of the membrane housings. The membrane brine seal (black seal at one end of the membrane) must be located at the feed port end (top port) to ensure proper flow of feed water through the membrane.
9. Carefully install bottom caps and top caps (engage the adapter seal by hand and once aligned tap the cap

on using a rubber mallet and block of wood).

10. Re-install spiral snap-ring. **Caution: be sure that snap-ring expands into groove and is fully seated. Failure to properly seat the snap-ring could allow the cap to disconnect when pressure increases in housing and may cause equipment damage or serious personal injury.**
11. Reconnect unions, split clamps (if required) and membrane bands to complete installation.
12. New membranes are installed dry. It will take a few hours of operation for the manufacturing chemicals to flush off the surfaces of the membranes and the RO TDS to drop below
13. During start-up or after membrane replacement it is suggested that the RO line be disconnected from the RO tank and the initial RO production be dumped to drain until the TDS level comes down to normal operating levels (20 TDS or lower).

# R.O. Sediment Filter Replacement (Tommy's)

## Wash must be closed

## Every 3-6 months

## 15 minutes

## Tools Needed:

- Replacement Sediment Filter

## Procedure:

1. Turn the unit off
2. Ensure the pressure at PRS1 is 0 psi
3. Remove the snap ring on top of the unit
4. Remove the cap on top of the unit by pulling up on the handles
5. Remove the filter
6. Insert the replacement filter
7. Insert the cap
8. Insert the snap ring, ensure it snaps into the groove to adequately contain the cap.

# Reclaim Maintenance

## Every morning before opening

## 15 minutes

## Every morning before opening

## Tools Needed:

- Reclaim Manual

## Procedure:

Scan to download manual

SCAN ME

1. Place reclaim into “Hand Mode”
2. Loosen dog bone ears on reclaim basket and take off cover.
3. Pull out strainer basket.
4. Spray off mud and other debris from basket.
5. Place strainer basket back inside.
6. Put cover and dog ear bones back on, but do not tighten them.
7. Put reclaim back into “Auto” and press “Prime now”
8. Wait for water to build and start overflowing from basket to release all of the air.
9. When water starts to overflow tighten the dog bone ears back down.
10. Reclaim should go back into “Auto” mode after cover on basket is tightened down.

# Replace Bad Coil on Solenoid in Detergent Pod (old)

## Wash may be open

## Bad coil/upon failure

## 15 Minutes

## Tools Needed:

- 24V Coil (P-AIR-2213)
- 120V Coil (Not on website, order through warehouse parts)
- Channel locks
- Small Phillips head screwdriver

## Procedure:

1. Turn the function on the Tommy Controller to “OFF” to the solenoid that is being worked on.
2. Using the Phillips head screwdriver loosen the screw on the Turck cable plugged into the solenoid coil.
3. Remove the cable from the coil.
4. Loosen and remove the plastic cap that holds the coil in place. If hard to loosen, a small pair of channel locks may come in handy.
5. Once old coil has been removed, place new coil on and tighten the cap back on.
6. Plug cable into the new coil and tighten the screw.
7. Turn the function on the Tommy Controller to “Manual” and make sure the function is working properly.
8. If working properly, then turn the function on the Tommy Controller back to “Auto”

# Replace Bad Coil on Solenoid in Detergent Pod (new)

## Wash must be closed.

## Bad coil/upon failure

## 15 minutes

## Tools Needed:

- Small Phillips head screwdriver

## Procedure:

1. Press an E-stop in.
2. Turn off air pressure to detergent pod.
3. Using small Phillips head screwdriver, loosen and remove screws holding solenoid in place. Keep screws in safe place.
4. After screws are removed, remove the solenoid.
5. Place new solenoid into place and tighten screws back into place.
6. After new solenoid is mounted, turn air pressure back on to the detergent pod and pull out E-stop.
7. Test the function of the solenoid that has just been replaced.
8. If the function doesn't turn on check what may have been missed, (E-stop pressed in still, air pressure still off, etc.)
9. If function works, make sure to turn function back to "Auto" on Tommy Controller.



 

# Replace Rocker Brush Hydraulic

**Wash must be closed.**

**Every 100,000 cars**

**1 Hour**

## Tools Needed:

- Impact gun
- 12" extension bar for impact gun
- 3/4" socket
- 3/8" wrench
- Adjustable wrench
- Rocker brush

## Procedure:

* Be sure to order rocker brush for site specific equipment. If electric site order rocker brush for electric motors. If Hydraulic site order rocker brush for hydraulic motors.*

1. Press E-stop in.
2. Using 3/8" wrench or adjustable wrench remove screws from rocker brush cover. Keep in safe place.
3. Once cover is removed, use impact gun with ¾" socket to remove the 4 nuts from the mounting bolts. (Hydraulic sites will need the 12" extension bar to reach the nuts.)
4. Once nuts have been removed, place all of the hardware, flat washer, lock washer, and nuts in a safe place to re-use.
5. Lift and remove old rocker brush from mounting plate.
6. Place new rocker brush onto mounting plate.
7. Put hardware back onto mounting bolts and tighten down the nuts.
8. Once nuts have been tightened down, put cover on to new rocker and tighten the screws down.
9. Repeat through rest of the rockers if replacing all at the same time.
10. Once done, pull out the E-stop and turn on the rockers to watch them spin. Make sure there are no issues.
11. Turn equipment outputs back to "Auto" on the Tommy Controller.

# Replace Rocker Motor Hydraulic

## Wash must be closed

## Every 450,000 cars

## 1 Hour

## Tools Needed:

- Motor (P-M1002)
- Impact gun
- 12" extension bar for impact gun
- 3/4" socket
- 3/8" wrench
- 7/8" wrench (2 may come in handy)
- 13/16" wrench
- Adjustable wrench
- Impact driver
- 1/2" socket
- 9/16" socket
- Hammer
- Wheel puller

## Procedure:

1. Press E-stop in.
2. Remove Rocker Brush.
3. Once Rocker Brush is removed, remove hydraulic lines. Be sure to mark which one went to which fitting as if they get switched it will change the direction of the cloth.
4. Remove taper lock. To remove should be ½" or 9/16" socket to remove bolts from taper lock. Once bolts are removed, place two of the bolts into the two other holes that are threaded. Once placed into the two other threaded holes tighten down bolts with impact driver. (Do not over tighten if so, the bolts will break) If after tightening the bolts and the taper lock isn't moving, grab a hammer and start hitting the mounting plate down. This should help release the mounting plate from the taper lock. A wheel puller may also come in handy.
5. Once taper lock is removed, remove the motor mount bolts using the 9/16" socket and impact driver. Keep bolts in safe place to re-use.
6. Remove motor.
7. Put new motor in place and bolt down. Be sure that there is a keyway in the motors shaft. Otherwise, the rocker brush will not spin.

## Procedure Continued:

8. Place hydraulic lines onto new hydraulic motor. Make sure to put them on the same way they were before.
9. Line up mounting plate and taper lock together.
10. Hit the taper lock into place on the motor shaft. Make sure to lineup with keyways.
11. When putting taper lock into place make sure it is just above the motor mount bolts, so that they will be able to spin freely and not get caught on the bolt heads.
12. Once in place, tighten up the taper lock bolts onto the mounting plate.
13. Place rocker brush back onto mounting bolts.
14. Tighten nuts onto mounting bolts.
15. Place cover back onto rocker brush and tighten screws into place.
16. Pull out E-stop that was pressed in.
17. Turn the output onto “Manual” that runs the rocker brush motor that was just replaced. Watch for any oil leaks. Or if the brush is wobbly.
18. If everything is working properly, turn the output back to “Auto”

# Replace Rocker Motor Electric

## Wash must be closed

## Every 450,000 cars

## 1 Hour

## Tools Needed:

- Electric Motor
- Impact gun
- 3/4" socket
- 3/8" wrench
- Impact driver
- Phillips head bit for impact driver
- Phillips head screw driver
- Flat head screwdriver
- Allen wrench set
- 1/2" socket
- 9/16" socket
- 3/4" wrench
- 9/16" wrench
- Hammer
- Wheel puller
- volt meter

## Procedure:

1. Press E-stop in.
2. Turn VFD disconnect to the "OFF" position for the rocker motor that is being replaced in the VFD Cabinet in the back room.
3. Remove rocker brush.
4. Remove junction box cover for electric motor wires.
5. Mark out which wires were connected to each other. So, they can be reconnected back the same way later on.
6. Using Volt meter test the leg wires to make sure there is no power going into the motor.
7. If no power, remove wire nuts from leg wires and remove ground wires. Then pull out of the junction box.
8. Remove liquid fit tight connector as well to use in new motor, unless using a new one on the new motor. To remove might need to use hammer and flat head screw driver to loosen lock ring, then loosen rest of the way with hands.
9. Remove taper lock. To remove should be ½" or 9/16" socket to remove bolts from taper lock. Once bolts are removed, place two of the bolts into the two other holes that are threaded. Once placed into the two other threaded holes tighten down bolts with impact driver. (Do not over tighten if so, the bolts will

break.) If after tightening the bolts and the taper lock isn't moving, grab a hammer and start hitting the mounting plate down. This should help release the mounting plate from the taper lock. A wheel puller may also come in handy.

10. Once taper lock and the mounting plate have been removed from motor, remove the motor mount bolts to free the motor. Now pull out the motor.
11. Mount new motor into place.
12. Remove junction box cover. Put liquid tight fitting on junction box. Put the threaded end through the hole, then tighten the lock ring onto the threads. To make sure it is tight you can put flat head screwdriver on an edge of the lock ring and tap with hammer.
13. Put the power coming in wires through the liquid tight fitting. The wiring for the rest of wires other than the main power are as follows: (4 to 7 wire nut together) (5 to 8 wire nut together) (6 to 9 wire nut together) The numbers are on the side of the wire. There is a wiring diagram on the motor itself as well. It shows low voltage wiring (220) and high voltage wiring (480)
14. Wire nut together the lead wires. Should be (1 to 1) (2 to 2) and (3 to 3) Unless wired differently at start up, this is why to mark which wires were wire nutted together in the beginning as a just in case. Also, make sure to hook up the ground wire, then put cover back on.
15. Line up keyways to mounting plate and taper lock. Then line up key way from taper lock to motor shaft and hit taper lock onto motor shaft. Be sure the keyway is in.
16. Tighten the taper lock bolts to the mounting plate.
17. Put rocker brush back on.
18. Turn VFD disconnect switch back to the "ON" position.
19. Pull E-stop out.
20. Turn on Rocker brush motor that was just worked on. Check for any issues. (Wobbly, weird noises, spinning the correct direction, not spinning at all, etc.)
21. If spinning the wrong way switch the wiring of leg 1 and leg 2. If wobbly make sure all nuts and bolts are tight. If not spinning make sure power is turned on and e-stop is pulled out. Make sure keyway is still in place.
22. If everything is working correctly, turn the Rocker brush motor back to "Auto" and clean up.

# Screw Compressor

## Wash must be closed

## Every month (4,000 hours)

## 20 Minutes

## Tools Needed:

- Safety Glasses and gloves
- Key to open panel
- 7/8" wrench or adjustable wrench
- Bucket or oil drain pan
- Funnel
- Roto-Xtend duty fluid compressor oil – (P-Air-2232)


watch video

## Wash Must Be Closed

1. Turn unit to off.
2. Turn emergency stop button to off.
3. Turn dryer cubicle switch to off.
4. Make sure all power is off to air compressor.
5. Unlock cover panel to access the inside of the unit.
6. Locate your oil drain tube and turn ball valve open to drain out old oil into your bucket.
7. Take off plug to your oil fill port. (7/8" wrench or adjustable wrench)
8. Make sure ball valve for drain tube is back to shut. Place funnel in port and fill with new oil (Roto-Xtend duty fluid compressor oil) until oil reaches the middle of the site glass.
9. Put plug back on fill port.
10. Turn emergency stop back to the on position. Dryer cubicle switch back to on. And unit back to on.
11. Recycle your old oil.

** This project an be done during open hours if you turn off one unit at a time and have an alternating relay installed. This will allow the backup compressor to turn on if the main compressor is off.*

# Shock Replacement 3/8" Wrap Arms/Rocker Arms

## Wash must be closed

## Every 75,000 cars

## 10 Minutes

## Tools Needed:

- Allen wrench set
- Shock (P-M2002-A)
- Channel Locks
- Hammer
- Screwdriver/punch

## Procedure:

1. Make sure an e-stop is pressed in.
2. Make note of how the shocks are mounted and be sure to remount the same way.
3. Use Allen wrench to loosen collar on both ends and remove from the pins. If having trouble with collar not coming off try gripping it with channel locks while holding pin in place to twist it off.
4. Remove pins from shock mounts. Might be able to remove with just your hands, but if you're having trouble a hammer and punch should help do the trick.
5. Place pins in new shock on mounts. Make sure to mount it in the same position it was before. Also, have the plastic bushing on the ends of the shock lying face down on the mounts. That way it is plastic on metal, rather than metal on metal.
6. Place collars back on pins. Use allen wrench to tighten back up. Tighten snug. Do not overtighten. This could cause it to strip and make it harder for the next replacement.
7. Move wrap/rocker/tire brush with hands to ensure shock is working correctly.
8. Disengage the e-stop.

# Shock Replacement 1/2" Z Wrap Stabilizer

## Wash must be closed

## Every 150,000 cars

## 10 minutes

## Tools Needed:

- Impact gun or driver
- ¾" deep well socket with adapter for driver
- ¾" Wrench (2)
- Ladder
- Shock (P-M2122-A)

## Procedure:

1. Make sure an e-stop is pressed in.
2. Make note of how the shocks are mounted and be sure to remount the same way.
3. Place ladder in position to be able to access bolts for shock.
4. Put impact driver with ¾" socket on the nut and ¾" wrench on head of bolt and loosen it. (Can place vice versa, just a tip for hopefully not dropping the nut as it should sit in the socket after loosening all the way up.)
5. Remove bolt and nut and put in safe place to reuse. Do the same thing to the other end.
6. Remove shock.
7. Place bolts and nuts in new shock on mounts. Make sure to mount it in the same position it was before. Also, have the plastic bushing on the ends of the shock lying face down on the mounts. That way it is plastic on metal, rather than metal on metal.
8. Tighten up bolts and nuts with impact driver and ¾" wrench.
9. Step 9: Move Z-wrap brush with hand to make sure shock works correctly.
10. Step 10: Disengage your e-stop.

# Sticking a Tank on the Reclaim System

## Wash may be open

## Every 150,000 cars

## 5 Minutes

## Tools Needed:

- Claw Hammer
- Pole
- Flash light

## Procedure:

1. Starting at the first tank cover closest to office door, use the claw end of the hammer, put into one of the slots of the cover to lift and remove the cover.
2. Look into tank. If mud is showing and no water, the tank is too full and needs to be emptied.
3. If while looking only water is able to be seen, stick the pole into the tank and feel around for mud. (A brush pole to clean the wash with works well. So, if one breaks keep that as your tank sticking pole is an idea.)
4. If tank doesn't feel full of mud then move onto next tank and repeat. If tank feels full of mud all around the tank it may be time to schedule an empty out.
5. Always check the first few tanks as that is where most of the mud is going to be. Check the rest of the tanks every now and then just to make sure no mud is finding its way into them.
6. Be sure to put all of the covers back on. Using the claw end of the hammer in one of the cover slots and picking up/sliding back on is usually the easiest way to do it.

# Take Up Drum: Replace Bearings

## Wash must be closed

## upon inspection

## 2 Hours

## Tools Needed:

- Safety glasses and gloves
- Bearings (P-M2026)
- ¾" wrench (2 of them)
- ¾" Socket
- Impact Gun
- Extension bar
- Allen wrench set
- Grinder
- Cut off wheels for grinder
- Flap disc for grinder
- Hammer
- Chisel
- Rope or ratchet straps (2)
- Crowbar

## Procedure:

1. Make sure E-stop is pressed in.
2. Take the belt a part just past presoak arch then pull belt out towards the entrance to expose the drum.
3. Use the impact gun with ¾" socket and ¾" wrench to take loose nuts and bolts holding bearings down. Extension bar may come in handy for the impact gun as well. Put nuts and bolts in a safe place.
4. Take note of where bearings are at. Mark with a sharpie if possible. Might be able to just look at wear pattern on it as well. Also, take notes of how many shims are under the bearings on both sides.
5. If able to, loosen allen screws on bearings.
6. Cut bearing housings off of both sides with grinder using cut off wheels.
7. Once housings are off you should be able to lift hole drum out of place and be able to work on it easier. Use two people, both having a rope place around drum shaft and lift out. May take some maneuvering to get it out.
8. Cut the rest of the bearing off. Or try to hit off with hammer. Most likely will need to cut off. Make sure to not cut into the drum shaft. A little bit won't hurt it, but try your best not to.
9. Once bearings are off place drum back into hole.

## Procedure continued:

10. Once drum is in hole, place bearings on the drum shafts. Have someone lift up on the drum shaft with rope while other person places bearing on shaft. Will need to be hit on with hammer. Hit it to the wear mark of where it was before. Do the same thing on the other side.
11. Once both sides bearings are on, put shims back in place under bearings lining them up with the holes. Do one at a time while one person lifts drum up with rope. Once lined up place bolts and nuts on, then do the same thing on the other side.
12. Once lined up on both sides and nuts and bolts are on, tighten them down with impact gun and ¾" wrench. Use two ¾" wrenches to double check tightness.
13. Tighten Allen screws on bearings.
14. Put a pump of grease in both bearings.
15. Pull belt back and put back together.
16. Get all tools out of the way of the belt. Pull e-stop back out and run the belt to check for any issues.
17. If everything is good clean up all of the tools and move on.

This project is to be done while closed. If you're wondering if you actually need to pull the drum out and take the belt a part, you do not. It may make it easier on some to do it that way. If you are comfortable doing with the belt still together and not taking the drum out of the hole then go for it. You will want to only loosen up one side at a time though. Complete one bearing removal, place new bearing on, tighten back down, then move to other side.

# Take Up Drum Replacement

## Wash must be closed

## Upon inspection or at Belt Replacement

## 2 Hours

## Tools Needed:

- ¾" wrench (2 of them)
- Impact gun
- ¾" Socket
- Grinder
- Cut off wheels
- Bearings (P-M2026)
- Take up Drum (P-C2161)
- Rope or ratchet straps (2 of them)
- Hammer
- Allen wrench set

## Procedure:

1. Press e-stop in.
2. Take belt a part just after presoak arch. Pull it back towards entrance to reveal take up drum.
3. Use impact gun with ¾" and ¾" wrench to take nuts and bolts loose. Put them in a safe place when removed.
4. Cut off outer bearing housings with grinder using cut off wheels on each side of the drum. This will make it so you can remove the take up drum.
5. Pull out take up drum. Take note of how many shims were on each side.
6. Place new take up drum in hole.
7. Once drum is in hole, place bearings on the drum shafts. Have someone lift up on the drum shaft with rope while other person places bearing on shaft. Will need to be hit on with hammer. Do the same thing on the other side.
8. Once both sides bearings are on, put shims back in place under bearings lining them up with the holes. Do one at a time while one person lifts drum up with rope. Once lined up place bolts and nuts on, then do the same thing on the other side.
9. Once lined up on both sides and nuts and bolts are on, tighten them down with impact gun and ¾" wrench. Use two ¾" wrenches to double check tightness.

# Take Up Drum Replacement cont.

10. Tighten Allen screws on bearings.
11. Put a pump of grease in both bearings.
12. Pull belt back and put back together.
13. Get all tools out of the way of the belt. Pull e-stop back out and run the belt to check for any issues.
14. If everything is good clean up all of the tools and move on.

# Tire Gloss Brush Replacement Hydraulic

## Wash must be closed

## Upon inspection

## 1 Hour

## Tools Needed:

Tire gloss brush (P-TB-210)
1 ¼" bearings (P-M2081) (2 per tire gloss brush)
Tire brush shaft (P-TB-214) (2 per tire gloss brush)
Tire brush aluminum coupling (P-TB-212)
Allen wrench set
¾" wrench (2)
9/16" socket (2)
9/16" wrench (2)
Impact driver
¾" wrench (2)
11/16" wrench
Flat head screwdriver
Rubber mallet

## Procedure:

1. Press an E-stop in.
2. Remove the 2 screws from the blue UHMW pieces covering bearings and shafts on both ends.
3. Remove the motor mount from the tire gloss brush. Using ¾" wrenches loosen the bolt and nut holding mount on tight.
4. Loosen bolts and nuts on aluminum coupling that connects the motor shaft and brush shaft together. (2 sockets may come in handy for this as regular wrench doesn't fit very well. Or, a socket and a flat head screwdriver. Jamming the flat head screwdriver into the side holding the nut in place from spinning.)
5. Slide motor out of aluminum coupling.
6. Using an 11/16" wrench loosen bolts holding bearings into place.
7. Once bearing bolts have been removed, the brush will be free to pull out.
8. Prepare new brush in advance. Slide one bearing on each end. Bolt down stub shaft on to each end.
9. Put new brush into place. Line up how old brush used to be and bolt bearings into place.
10. Lining up keyways slide aluminum coupling on to brush shaft.
11. Lining up keyways slide motor shaft into aluminum coupling.
12. Tighten bolts and nuts on aluminum coupling.

# Tire Gloss Brush Replacement cont.

13. Put bolt for motor mount back into place and tighten nut down.
14. Put both UHMW pieces back on.
15. Pull E-stop out.
16. Turn on Tire gloss hydraulic and inspect for any issues. If no issues, turn back onto “Auto.”

The brush itself can be changed out as well by just undoing the stub shaft bolts on each end. Then sliding new brush into place, and tightening bolts and nuts back on the new brush and old stub shafts. However, changing everything out is needed at some point.

# Under Roller Replacement

## Wash must be closed

## Upon inspection and at belt change

## 5-20 minutes

## Tools Needed:

- Idle return rollers (9) - (P-C2258)
- Idle return roller shaft for dual belt – (P-C2211)
- Idle return roller spacer for dual belt (2) – (P-C2104)
- U Bolt - (P-C2129)
- 7/16" wrench
- 7/16" socket & ratchet
- Ratchet strap
- Impact driver
- Hammer
- Pry bar

## Procedure:

1. Press an E-stop in.
2. Remove pit grates to allow access into pit.
3. Drop one end of a ratchet strap down the side of the pit closest to the floor. Grab strap and pull it out to the top of the belt.
4. Slide the strap near the under roller that is about to be replaced. Doesn't need to be to close, give yourself some room to work with. Once in place ratchet the strap until belt is lifted high enough to remove under roller easily.
5. Remove nuts from U-bolt if still intact. (7/16" wrench.) Remove U-bolt.
6. Pull under roller out of the mounting brackets.
7. Place new under roller into mounting brackets. (Sometimes a hammer comes in handy.) Blue spacer on each end. 9 rollers on the shaft. Make sure the rollers all interlock with each other. Also, make sure blue spacer is not sitting on top of the mounting bracket.
8. Once under roller is in, place U-bolt on and tighten on nuts.
9. Release and remove the ratchet strap holding the belt up.
10. Pull out E-stop.
11. Run belt and make sure under roller is rolling correctly without issues. If replacing under roller on drivers' side belt, make sure that all of the rollers fit in to the flights correctly.
12. Turn belt back to "Auto" if using iPad to start it.
13. Put pit grates back on and clean up tools.

# Volumetrics

## Wash is open during procedure

## 2 Hours

## Tools Needed:

- Safety goggles
- Safety gloves
- Graduated Cylinder
- Draw line with weight and foot valve

## Procedure:

1. Make sure graduated cylinder is clean.
2. Put draw line through hole in graduated cylinder. (If new cylinder, drill a hole big enough to fit draw line through.)
3. Dip the cylinder into the detergent tote of the application that is going to be tested to fill it up.
4. Remove actual draw line from injector of the application that is being tested.
5. Count the ml being drawn when the application turns on to off. Watch 3-5 different type of vehicles (car, truck,S.U.V.'s) and figure out the average ml being drawn. Record this information.
6. Once done with 3-5 vehicles, put actual draw line back into injector. Repeat on the rest of the applications that use the same detergent. May need to refill cylinder.
7. Once all of the applications that use the same detergent for example once you're done with all of the
8. 360-C applications, rinse the cylinder out and move onto the next detergent.
9. Repeat throughout all of the detergents.
10. Record ml drawn, injector size and tips for each application. Also, also air pressure for the applications that need it.
11. Once all done, clean up any messes made in the detergent pod and clean your cylinder out.
12. Record all of the information you wrote down into a spreadsheet in Excel or google sheets, so that it is easy to find when needed.

# Water Hardness / Chlorine Test

## Wash may be open

## 20 minutes

## Tools Needed:

- Chlorine Checker (P-WAT-2686)
- Reagents for free chlorine checker (P-WAT-2687)

## Procedure:

1. Turn Spot Free Rinse to “Manual” on the Tommy Controller.
2. Wait for R.O. system to kick on and start filling Purified water tank.
3. Fill both test tubes up with water from R.O. machine.
4. One of the tubes keep filled with only water from R.O. machine.
5. The other tube that was filled with R.O. water, dump the reagent packet into the water and shake up.
6. On the chlorine checker press the button on the front until C1 pops up.
7. Place test tube with only R.O. water into chlorine checker and put tester onto a flat surface, then press center button.
8. When C2 pops up, pull test tube with R.O. water out of checker and place test tube with R.O. water and reagent package into tester then press center button.
9. If 0.00 pops up then the R.O. water is chlorine free.
10. If you have any number other than 0, then it may be time for some maintenance on the R.O. unit. Also, if the water in the test tube turns pink after the reagent package is dumped in, then that is also a sign that chlorine is getting into the R.O. water.
11. Once done with testing, turn Spot Free Rinse back to “Auto” on the Tommy Controller.

# **Water Heater** Filter (Rinnai)

## Wash can be open.

## Cleaned Monthly

## 5 minutes

## Tools Needed:

1. Channel Locks

## Procedure:

1. Turn the ball valves to your cold and hot water into the shut position. (Just the bottom ones.)
2. Take channel locks and loosen filter on cold inlet. There will be a little bit of residual water that comes out with it.
3. Rinse and clean the screens off of the filter.
4. Turn ball valve for cold water back to the open position then quickly back to the shut position. This will flush out any leftovers that may still be on the threads for where the filter goes.
5. Reinstall filter. Tighten back up with your hands. Small turn with channel locks to make sure it's snug.
6. Turn the cold and hot water ball valves back to the open position.
7. Make sure red light next to "In Use" turns back on.
8. Repeat this step on the rest of the water heaters. Only do one at a time.


Scan to watch an instructional video about the Rinnai Water Heater filter change.

# Wrap Pillow Bearing Replacement

## Wash must be closed

## Upon inspection or annually

## 45 min. - 1 1/2 hours

## Tools Needed:

- 2" pillow block bearing (2 per arm) (P-M2026)
- Come-along or ratchet strap
- Floor jack
- Safety glasses
- 3 to 5lbs Hammer
- Chisel
- Grinder
- Grinder cut off wheels
- Impact gun
- ¾" Socket
- ¾" Wrench (2)
- 9/16" wrench
- Allen wrench set
- Ladder
- Prybar
- Wheel puller

## Procedure:

1. Press an E-stop in.
2. Using come-along or ratchet strap loop between ladder rack and wrap arm closer to the brush end and ratchet the arm up.
3. If there is a floor jack on site place it under wrap and jack it up a little bit. Not necessarily needed, but makes it easier and places less stress on ladder rack.
4. Remove bolts from 1 bearing at a time. So, start with either the bottom or top bearing, replace that bearing, mount back on, then move to the next bearing. Removing all bolts from both bearings at the same time will drop the whole arm on the ground.
5. After removing bolts, loosen Allen screws on bearing if possible.
6. There are two bolts on the sides up against the bearing, pick one of them that has the most room to move and using a 9/16" wrench loosen that bolt, so that bearing will be able to be removed. Remember which one you moved as when the new bearing is placed on, it will have to be moved back.
7. Remove the bearing. Hit the bearing off with the 3 to 5lbs hammer if able to. A wheel puller could also be tried to remove the bearing if there is one on site. Be sure to wear safety glasses.
8. If the hammer or wheel puller isn't working, the bearing may need to be cut off. Using a grinder with cut off wheels cut the bearing off. Be sure to wear safety glasses.

# Wrap Pillow Bearing Replacement

## Procedure continued:

9. After bearing is removed, slide new 2" pillow block bearing on to shaft. Tighten the allen screws on the bearing, then bolt into place. Snug not tight yet.
10. Using 9/16" wrench tighten the adjustment screw for the bearing back to the bearing.
11. Tighten the mounting bolts for the bearings up all the way then move on to next bearing.
12. Move onto the next bearing. Depending on which bearing that was started on the come-along or ratchet strap may need to be adjusted keep that in mind.
13. Repeat steps on next bearing.
14. After next bearing is complete, double check and make sure everything is tight.
15. Remove come-along or ratchet strap. Also, floor jack if decided to use one.
16. Pull out E-stop.
17. Run wraps that the bearings were just replaced to.
18. If no issues turn the wraps back to "Auto."

# Wrap Replacement

## Wash must be closed

## Inspect every 450,000 cars

## 1 Hour

## Tools Needed:

- Allen wrench set
- Adjustable Wrench
- 11/16 or 13/16 combination wrench set
- 7ft step ladder
- 5gal. bucket
- Hydraulic union ½"
- Zip tie
- Large trash bag

## Procedure:

Prior to beginning replacement, have the new wrap attached to tub shaft of newly assemble motor cage.

1. Position ladder in front of hydraulic ports in motor cage.
2. Mark left hydraulic hose with zip tie
3. Take picture of marked hoses
4. Rip garbage bag open and cover brush
5. Put 5 gal bucket in place under hydraulic hose connections
6. Remove both hydraulic hoses allowing to drain into bucket
7. With union connect both hoses together
8. Remove lock collar set screw at top of flex coupler
9. Loosen lock collar
10. With an assistant holding brush below slide brush off wrap arm mount shaft
11. Lower brush down on the ground along the windows along the wash tunnel
12. With assistance raise 2 brush & motor housing up to wrap arm shaft mount
13. Reinstall lock collar, tighten lock collar, reinstall lock collar set screw

# Wrap Replacement cont.

14. Remove hydraulic hoses from union connect to hydraulic motor and tighten
15. Wipe clean hydraulic connections remove 5gal bucket & garbage bag
16. Disingage wash stop & start hydraulic unit with ipad manually
17. Verify proper brush rotation, driver side wrap should be turning counterclockwise passenger side should be turning clockwise.

# Y Screen

## Wash must be closed

## Cleaned Monthly

## 5 Minutes

## Tools Needed:

- Adjustable wrench

## Procedure:

1. Turn off water feeding rinse pump.
2. Loosen and remove plug on bottom of Y screen.
3. What is being removed is a filter screen. It will most likely have some dirt/debris in it.
4. Rinse out the screen and put it back into place.
5. Turn water back on to rinse pump.
6. Turn on high pressure rinse. To make sure water kicks back on. If it does not the system may need to be "burped." Turn hot water feed line on to rinse pump to release air pockets from fresh water tank.
7. Once air pockets have been released turn hot water feed to rinse pump back to the off position.
8. Turn back on high pressure rinse and let run for about a minute.
9. Turn high pressure rinse back to auto on Tommy Controller.

# Demonstration of Proficiency

| Maintenance item to be performed | Signature below signifies that you have successfully performed this task |
|---|---|
| Ball & Disc Replacement on Mitter | |
| Belt Inspection/Replacement | |
| Belt Inspection/Replacement | |
| Procedure for Sprocket Rotation | |
| Blower Impeller | |
| Blower Motor Replacement | |
| Body Wax Manifold | |
| Bump Stop Placement | |
| Cat Pump Oil Change | |
| Center Sleeve Mitter | |
| Chain Coupler in Drive Shaft | |
| Change Oil on the Drive | |
| Change Photo Eye | |
| Change Solenoid on Detergent | |
| Charcoal Media Replacement | |
| Check Valves | |
| Drive Shaft Replacement | |
| Foam Generator Clean Out | |
| Glide Plate Inspection | |
| High Pressure Pump | |
| Hydraulic Hose Inspection | |
| Hydraulic Hose Annual Maintenance | |
| Hydraflex Valve Change Out | |
| Looping a Line | |
| Proper Mitter Cloth Layout | |
| Rebuild Motor Cage | |

# Demonstration of Proficiency

| Maintenance item to be performed | Signature below signifies that you have successfully performed this task |
|---|---|
| R.O. Carbon Media Replacement | |
| R.O. Carbon Media Replacement - Tommy's | |
| R.O. membrane Replacement - Tommy's | |
| R.O. Sediment Filter Replacement | |
| Reclaim Maintenance | |
| Replace Bad Coil on Solenoid in Deter.POD - old | |
| Reclaim Maintenance | |
| Replace Bad Coil on Solenoid in Detergent POD | |
| Rocker Brush & Motor Hydraulic | |
| Replace Rocker Motor Hydraulic | |
| Replace Rocker Motor Electric | |
| Screw Compressor | |
| Shock Replacement 3/8" Wraps | |
| Shock Replacement 1/2" Z Wrap Stabilizer | |
| Sticking a Tank on the Reclaim System | |
| Take Up Drum: Replacing Bearings | |
| Take Up Drum Replacement | |
| Tire Gloss Brush Replacement | |
| Under Roller Replacement | |
| Volumetrics | |
| Water Harness & Chlorine Test | |
| Water Heater Filter Rinnai | |
| Wrap Pillow Bearing Replacement | |
| Wrap Replacement | |
| Y Screen | |

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