INSTALLATION



FT900

FT900 SERIES DISHWASHERS

	R-L OPERATION	L-R OPERATION
LOAD		
5'	ML-110672	ML-110673
6'	ML-110870	ML-110871
7'	ML-110674	ML-110675
8'	ML-110876	ML-110877
9'	ML-110881	ML-110882
CENTER		
8' FT900	ML-110676	ML-110677
11' FT900W	ML-110883	ML-110884
4' FT900S	ML-110705	ML-110706

	UNLOAD WITHOUT BLOWER-DRYER		UNLOAD WITH BLOWER-DRYER	
	R-L OPERATION	L-R OPERATION	R-L OPERATION	L-R OPERATION
5'	ML-110680	ML-110681		
6'	ML-110805	ML-110806		
7'	ML-110682	ML-110683		
8'	ML-110807	ML-110808		
9'	ML-110684	ML-110685	ML-110688	ML-110689
9' split	ML-110809	ML-110810	ML-110811	ML-110812
10'	ML-110813	ML-110814	ML-110815	ML-110816
10' split	ML-110817	ML-110818	ML-110819	ML-110820
11'	ML-110686	ML-110687	ML-110690	ML-110691
11' split	ML-110821	ML-110822	ML-110823	ML-110824
12'	ML-110825	ML-110826	ML-110827	ML-110828
12' split	ML-110829	ML-110830	ML-110831	ML-110832
13'	ML-110833	ML-110834	ML-110835	ML-110836
13' split	ML-110837	ML-110838	ML-110839	ML-110840
14' split	ML-110841	ML-110842	ML-110843	ML-110844
15' split	ML-110845	ML-110846	ML-110847	ML-110848
16' split	ML-110849	ML-110850	ML-110851	ML-110852
17' split	ML-110853	ML-110854	ML-110855	ML-110856

HOBART CORPORATION

701 S. RIDGE AVENUE
TROY, OHIO 45374-0001

937 332-3000

www.hobartcorp.com

FORM 33907 Rev. F (May 2003)

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FT900 DISHWASHER

Do not throw out any loose parts. These may be required for installation or operation.

NOTES FOR THE INSTALLERS

Read the entire installation manual before installing the machine.

1. Do not use a forklift to move or unskid machine sections.
2. Do not throw out any loose parts. These may be required for installation or operation.
3. Electrical Connections:
    - Make sure line voltage matches machine data plate mounted on control box.
    - Make sure wiring connections to terminal block match diagram inside control box cover.
    - Make sure the pilot circuit transformer and frequency inverter are set to the correct voltage (Refer to Voltage Adjustment) in this installation manual.
4. Level center section in operating position. Center section must be level end to end and front to back. Refer to Leveling the Center Section in this installation manual.
5. Conveyor: Refer to the Conveyor Assembly section of the installation manual. After installation, the conveyor must run continuously for 15 minutes and then be checked for alignment. Adjust if necessary and rerun for another 15 minutes. Then recheck alignment and retighten locknuts on take-up unit when finished.
6. Make sure all curtains and drainback pans are in operating positions. Refer to the Curtain and Drainback Pan Positions section in this Installation Manual.
7. Check all water and steam unions for tightness.
8. Drain installation - Make sure that drain piping is free of any leaks. With drain pipes positioned for operation, move hose clamps out and against each side of the drain tee. (Refer to Installing the Drain Pipe, in this Installation Manual.)
9. Give the operation manual to the owner.

Installation Instructions
FT900 SERIES DISHWASHERS

How to Reduce Clearance Height of the Control Box During Move-In

This procedure will reduce the overall height of the FT900 dishwasher by $1\frac{1}{8}$" to allow it to travel through a low-height corridor or doorway.

1. Remove upper shipping hinge by unscrewing two $\frac{5}{16}$ -18 bolts, lockwashers, washers and nuts.
2. Remove lower shipping hinge by unscrewing two U-bolts and one other $\frac{5}{16}$ -18 bolt with lockwashers, washers and nuts.
3. Save all removed materials.

WARNING: THE CONTROL BOX MUST BE SECURELY SUPPORTED BY AT LEAST TWO PEOPLE WHILE ITS MOUNTING STUDS ARE BEING SHIFTED TO LOWER SLOTS OF THE SHIPPING BRACES.

The rear of the main control box (Fig. 1) is attached to the two shipping braces on the center section by four $\frac{5}{16}$ -18 threaded studs, lockwashers, washers and nuts. The shipping braces have slots that allow the FT900 control box to be lowered by $1\frac{1}{8}$".

4. While two people securely support the FT900 main control box, remove the four $\frac{5}{16}$-18 nuts and lockwashers from the main control box's rear studs that project through the shipping braces.
5. At least two people should CAREFULLY CONTROL and withdraw the main control box's rear studs from the center section's shipping braces. Lower the main control box's threaded studs to the next lower slots. Refasten the main control box's threaded studs with the same $\frac{5}{16}$-18 bolts, lockwashers and nuts removed in step 4.
6. Move the FT900 past all low-height corridors or doorways.
7. Reverse steps 5, 4, 2 and 1 to return the FT900's main control box to its shipping condition for proper installation.

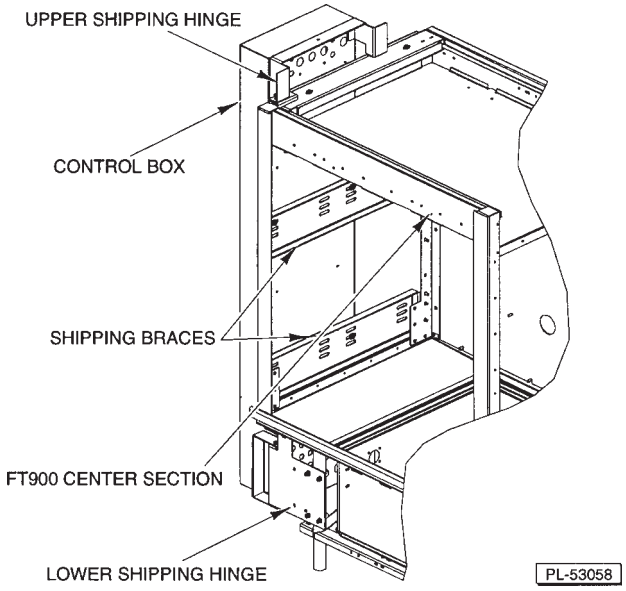


Fig. 1

UNPACKING

Immediately after unpacking the dishwasher, check for possible shipping damage. If the machine is found to be damaged, save the packaging material and contact the carrier within 15 days of delivery.

Before installation, test the electrical service to make sure it agrees with the specifications on the machine data plate located on the control box. The electrical diagram is located inside the control box door.

Strainer baskets, strainer pans, pump inlet strainers and wash arms are taped and shipped in place. Remove tape, but retain all parts in their proper places. If any parts are temporarily removed during installation, return them to their proper places after installation is complete.

Before installing, check to make sure that necessary electrical, plumbing and exhaust accommodations are provided at the installation location. Take measurements of site's plumbing, electrical and exhaust connections; then take corresponding measurements of the machine to make sure all connections are correctly mated. If necessary to lower control box during move-in, slotted holes are provided on the control box shipping supports to allow adjustment for clearance height. Refer to page 5.

REMOVING EACH SECTION FROM ITS SKID

CAUTION: Do not use a forklift to move or unskid machine sections. Doing so may result in damage to the machine.

1. Remove the lag bolts that are securing the crossmembers to the front and rear runners.
2. Remove the lag bolts from the leg shipping brackets.
3. Carefully raise one end of the section just enough to slide the skid rails from under it and remove the leg shipping brackets.
4. Repeat steps 1 through 3 at the other end.
5. Thread the feet into the legs as far as possible; then back out three full turns. Standard legs have 3" threaded studs for maximum adjustment. If special feet were ordered with extra long leg shanks to accommodate a highly sloped floor, install them where the low points in the floor occur at leg locations on the machine before setting the unit on the floor.
6. Open all inspection doors and remove all wrapped parts and boxes from inside each machine section.
7. Remove any packaging, tape, wire and bracing from each section. Remove all rear and lower panels.

NOTE: Do not throw out any loose parts. These may be required for installation or operation.

LOCATION

Allow adequate space for machine installation and operation. Place the machine sections close to their final position. Allow space to work on the ends of the center section.

Review, but do not remove, tags or labels. Remove tags after installation is complete.

POSITIONING THE CENTER SECTION

Use a chalk line on the floor to align the machine along its complete length.

With each section in its approximate final position, determine which section is at the high point on the floor. **Machine assembly begins after the center section has been leveled to a height that compensates for the floor height of the other sections.**

LEVELING THE CENTER SECTION WITH SLIDING DOORS

With the center section is in its final operating position, *it must be leveled at a height that allows the other sections to be level. Level the center section along its length by placing the level at various points along the tank support rails (Fig. 2) and threading the feet in or out as required. Level the center section front to back by placing the level on top of the chamber at each end (Fig. 3).*

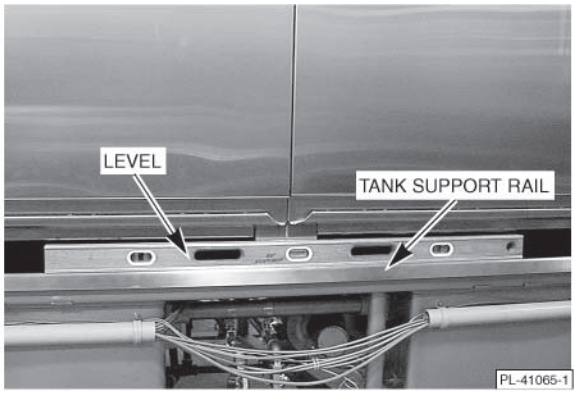


Fig. 2



Fig. 3

LEVELING CENTER SECTION WITH HINGED DOORS



Fig. 4



Fig. 5

For center sections with hinged doors (Fig. 4), leveling is an important installation function because it could affect door operation and cause leaks once the machine is operating. Level the center section along its length by opening the doors and placing the level between the doors along the tank support rail (Fig. 5) or on top of the chamber front (Fig. 6). Do not check level on top of doors.

Adjust the feet in or out as required to level. Continue to level the center section front to back by placing the level across the top corners of the chambers on both ends of center section (Fig. 7).

NOTE: Do not adjust doors until the machine is completely assembled and ready for initial testing with the pumps running.

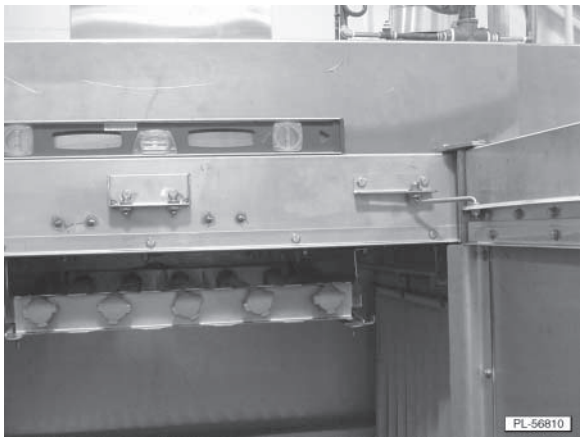


Fig. 6

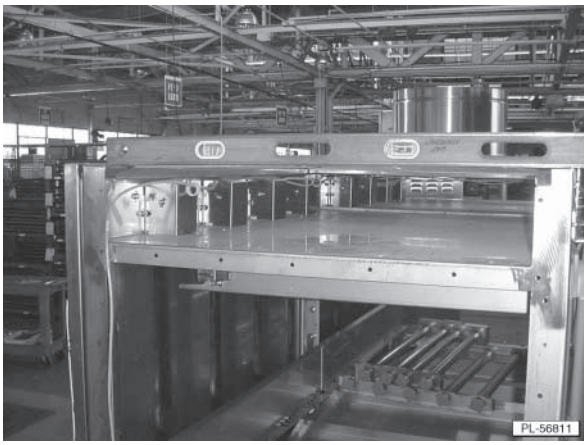


Fig. 7

ASSEMBLY

ROTATING CONTROL BOX 90 DEGREES

The main control box is shipped with upper and lower shipping hinges connected to the center section. Loosen the control box from the shipping braces and remove the shipping braces. Use the upper shipping hinges (Fig. 8) to rotate the control box 90 degrees. Do not remove the upper shipping hinges until after the unload and center sections are joined.

Pull the control box out about 1" to allow mating of center and unload sections without interference with studs projecting from rear of control box.

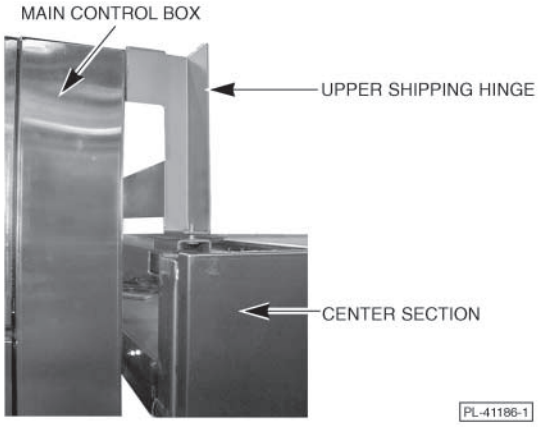


Fig. 8

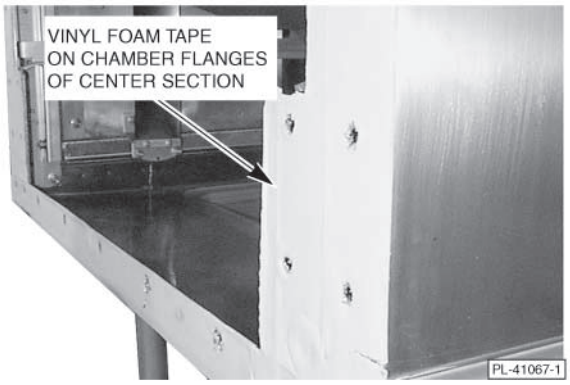


Fig. 9

INSTALLING FOAM TAPE ON CHAMBER FLANGES AND CONTROL BOX MOUNTING SURFACE

Cut strips of vinyl foam tape to fit the top, bottom and sides of the chamber flanges of the center section (at both ends) to make a good seal (Fig. 9). Apply foam tape, provided, to unload section where the rear perimeter of the control box will be mounted.

POSITIONING THE ADJACENT LOAD OR UNLOAD SECTIONS

Move the adjoining (load or unload) section to within several inches of the prepared end of the center section. Adjust the feet of the section adjacent to the *leveled center section* so tank supports are the same height. Peel the protective paper from the vinyl foam tape and move the second section to its final position. Be very careful that mating components connect and fit together properly.

LEVELING THE LOAD AND UNLOAD SECTIONS

The tank support rails should be level across the entire length of the machine. Both sections should be level front to back (Fig. 7).

- Abutted sections are parallel; the foam tape line is vertical (Fig. 10).
- All adjoining components of the two sections are exactly in line with each other.
- Top corners of adjoining sections are the same height.

JOINING THE SECTIONS TOGETHER

Use drift pins to align the holes in the horizontal and vertical chamber flanges of the mated sections. Use C-clamps to hold the sections in position while bolting the chamber front and back flanges together (Fig. 11). Exercise care to avoid tearing the foam tape seal.

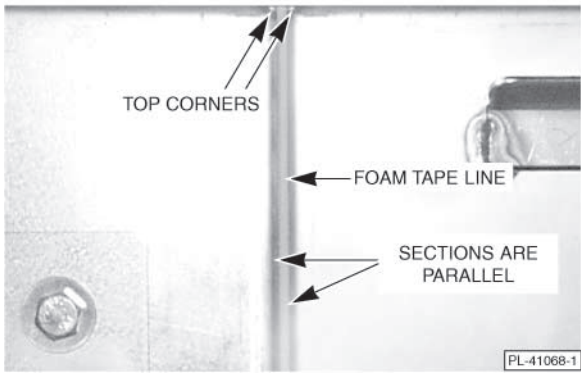


Fig. 10

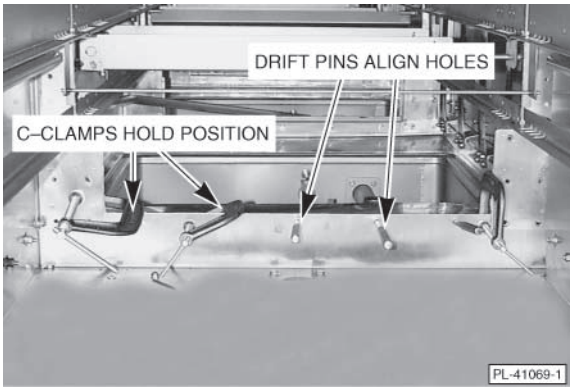


Fig. 11

CAUTION: When installing a blower-dryer unload section, remove the air deflector pans. Do not stand, sit or lie on them. Blower-dryer performance could be compromised.

INSTALLING THE CURTAIN BAFFLES - TOP OF CHAMBER FLANGES

Install one curtain baffle on each side of the top of the chamber flanges where sections are being joined, using appropriate fasteners and Permagum, supplied (Fig. 12).

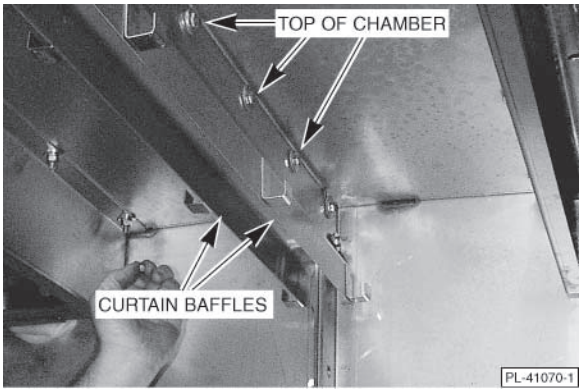


Fig. 12

CHAMBER FLANGE AND BOLT ASSEMBLY AT EACH SECTION JOINT

Description	Qty.	Bolt Size	Assembly Order	Instructions
Short Bolt - Use except where Long Bolts or Large Bolts are required.	21	1/4-20 x 1"	[Bolt, Washer] [Washer, Lockwasher, Nut]	Use Permagum on insides of washers on both sides of chamber flanges.
Long Bolt - Use on Saddle Joints and End Caps	11	1/4-20 x 1 1/8"	[Bolt, Washer] [Washer, Lockwasher, Nut]	Use Permagum on insides of washers on both sides of saddle joints and End Caps
Large Bolt - Use behind conveyor side rails.	4	5/16-18 x 1 1/8"	[Bolt, Washer] [Washer, Lockwasher, Nut]	Use Permagum on insides of washers on both sides of conveyor side rails.

INSTALLING THE SADDLE JOINT - BOTTOM OF CHAMBER FLANGES (FIG. 14)

1. Seal the tank end flanges where sections join, using a saddle joint and two end caps.
2. Place the saddle joint over the tank end flanges and make sure that all bolt holes are aligned. After verification, remove components.
3. Cut five strips of 1/2"-wide Permagum equal to the length of the saddle joint.
4. Put Permagum on the outside faces of the tank flanges: one strip horizontally at the bottom on both sides, one strip horizontally over the holes on both sides and one strip on top where the two flanges butt together (Fig. 13).

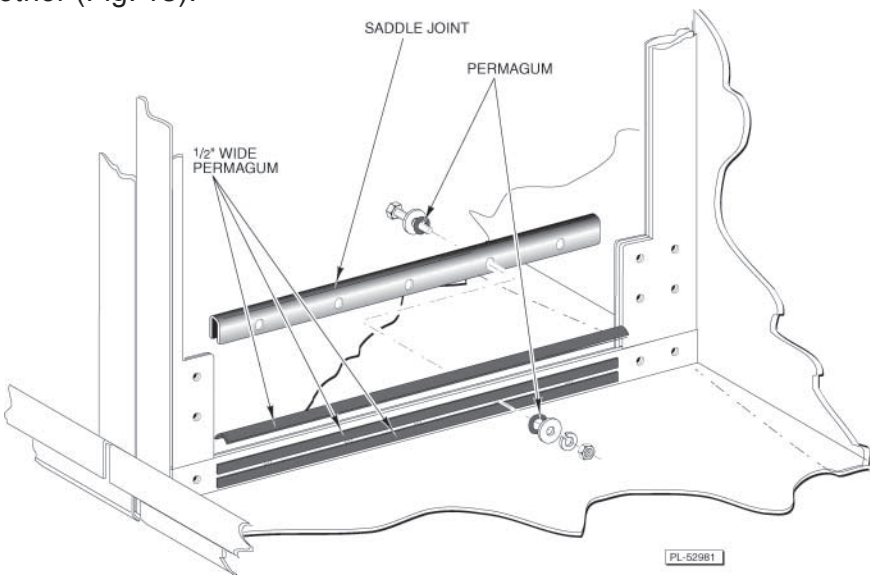


Fig. 13

5. Position the saddle joint over the Permagummed tank flanges and align the bolt holes using drift pins (or punches).
6. Bolt the saddle joint to the bottom tank flanges with the three long bolts, nuts, washers and lockwashers provided.
7. Use Permagum on insides of washers on both sides to make an adequate seal. You may have to use a C-clamp on the saddle and saddle caps to get the hardware started.

NOTE: For ease of installation, do not put Permagum inside saddle joint.

INSTALLING THE END CAPS - BOTTOM OF CHAMBER FLANGES

1. Fit end caps into position using drift pins and mark lines at their ends. Remove the end caps.
2. Apply a single layer of Permagum to the flange edges, where the top of the end caps will cover.
3. Cut the strips of 1/2"-wide Permagum and apply (Fig. 14) in a double layer over the chamber flanges, where the front edge of the front end cap and the rear edge of the rear end cap are marked.
4. Cut strips of 1/2"-wide Permagum and apply in a single layer where the bottom of the end caps will be located (Fig. 14).
5. Over the rest of the chamber flanges, where the three side holes of the end caps will be located, apply a strip of foam tape up and over to both sides.
6. Cut strips of 1/2"-wide Permagum and apply in a single layer up and over the inside end of the end caps on both sides, where marked (Fig. 14). Apply a strip of foam tape over the Permagum.

NOTE: For ease of assembly, do not put Permagum inside end caps.

NOTE: Flare end cap as shown (Fig. 17) for ease of assembly.

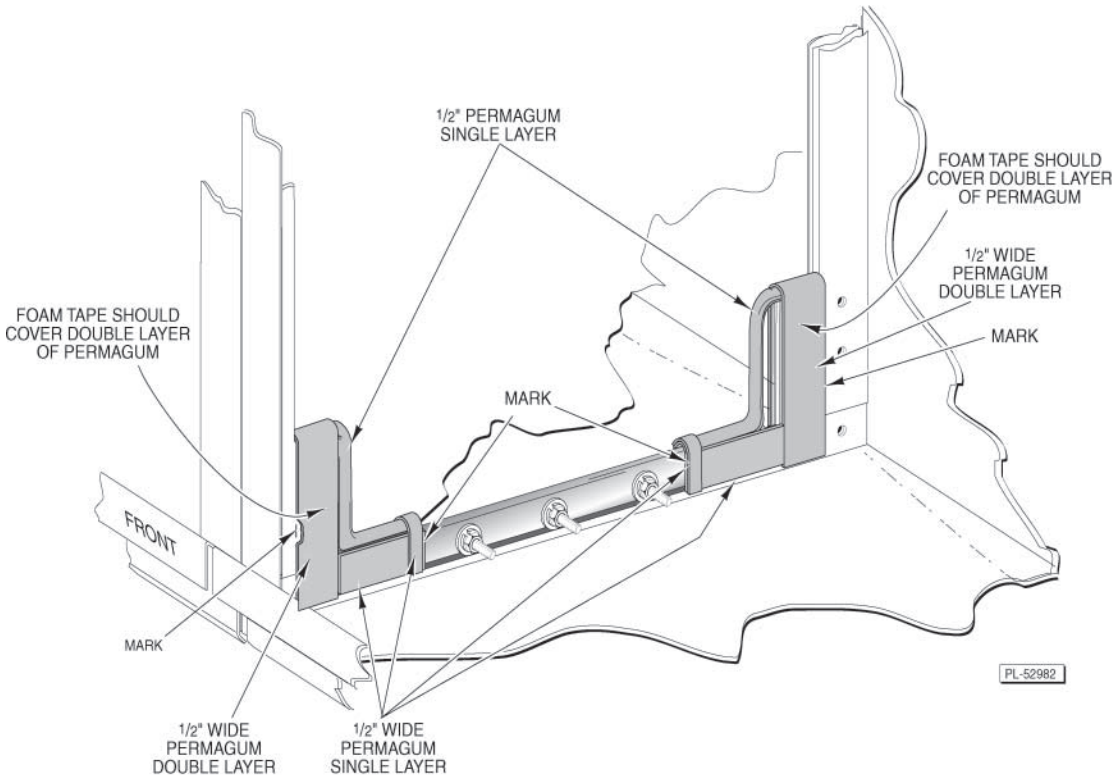


Fig. 14

7. Position the end caps over the ends of the saddle joint at the bottom corners of the chamber flanges.

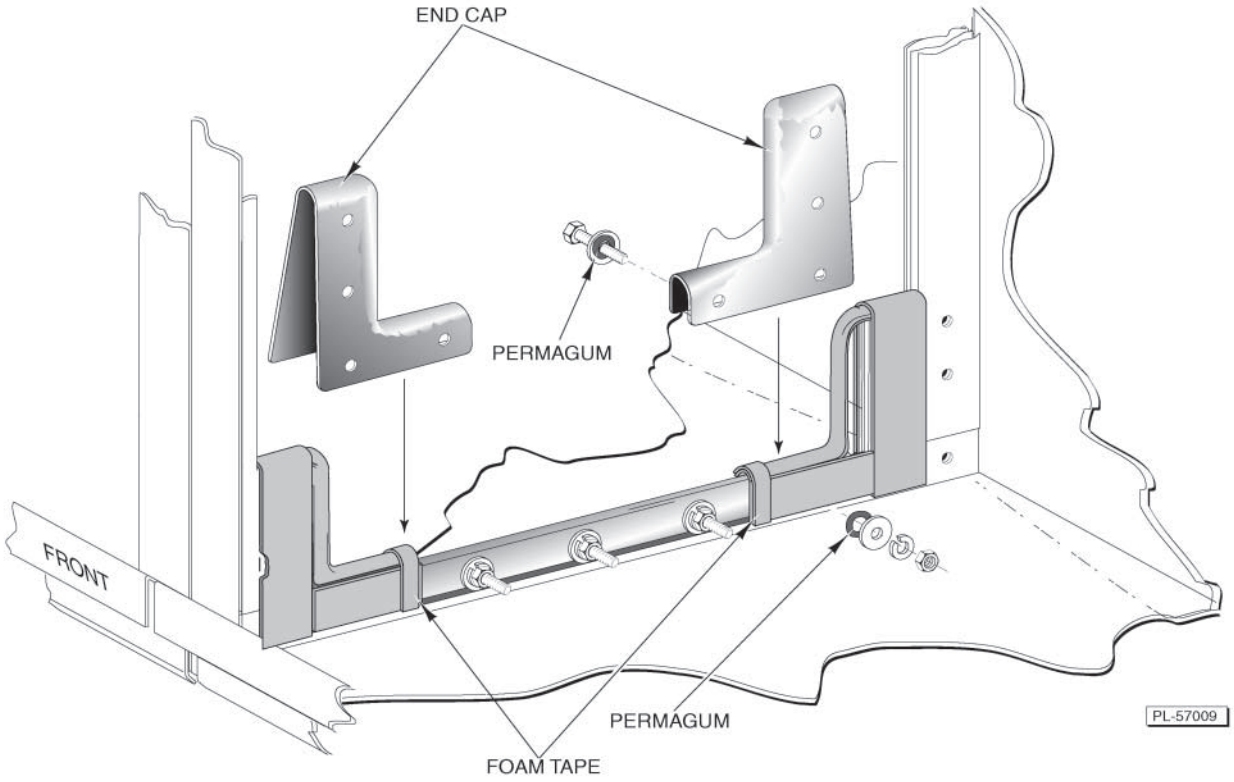


Fig. 15

8. Align bolt holes using drift pins (Fig. 16). Flare open ends of saddle end caps for ease of assembly (Fig. 17).

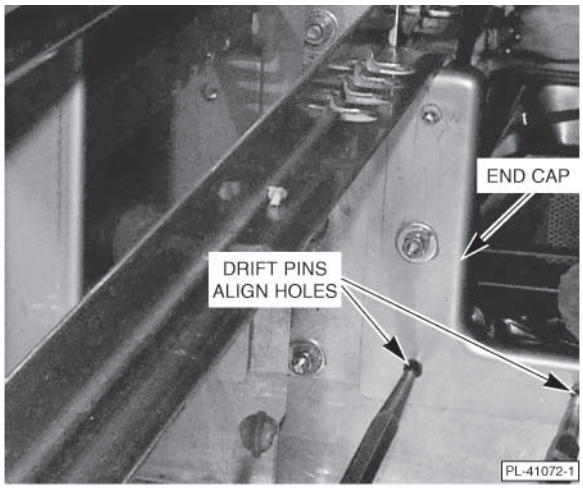


Fig. 16



Fig. 17

9. Bolt end caps through saddle joint slots and chamber flange holes (long bolts, nuts, washers and lockwashers are provided) (Fig. 18). Use Permagum on inside of washers on both sides to make an adequate seal.

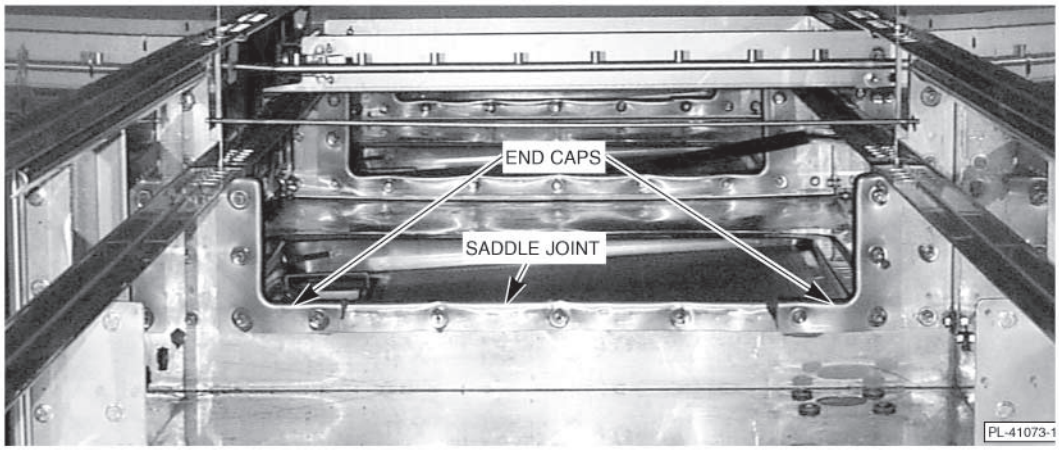


Fig. 18

10. Join all dishwasher sections, as required. Tighten all remaining bolts that connect the chamber flanges. Use Permagum on inside of washers on both sides to make an adequate seal.

ASSEMBLING SPREADER BAR TO BASE FRAME BEHIND CONTROL BOX

Assemble the spreader bar, joining the front base frame of the center and unload sections (Fig. 18). Use $^{5}/_{16}$-18 bolts, lockwashers, washers and nuts, provided.

ATTACHING CONTROL BOX TO UNLOAD SECTION

1. The spreader bar (Fig. 19) provides a support for the bottom of the control box. Use wood blocks to lift and support the control box temporarily (Fig. 19).
2. Remove shipping hinges and position the control box on the unload section in the proper location (align uniformly $^{1}/_{4}$" along the edge of the preceding adjacent door, wash FT900S, power-rinse FT900 and dual-rinse FT900W).
3. Secure the control box with the four weld studs on the back of the control box through the holes provided in the front of the unload section using four $^{5}/_{16}$-18 washers, lockwashers and nuts.

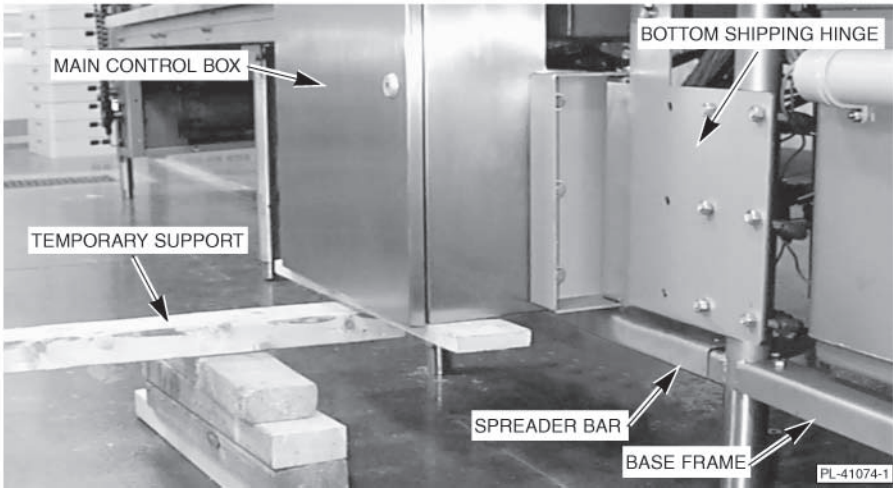


Fig. 19

CONTROL BOX CONNECTIONS

Refer to the electrical diagram on the inside of the main control box door.

Although each section is prewired, components in the load and unload sections must be electrically connected to the main control box that is attached to the unload section. All wires that need to be connected are furnished with stripped leads and crimped barrel connectors.

Run wires in proper routing clips, channels and so forth to openings in the lower rear of the main control box. Specific wire conduit locations are shown viewed from the front (Fig. 20). Run wires and cordage through strain relief fittings, connect to proper terminals and tighten strain relief fittings.

All holes in the control box are plugged or are provided with strain relief or conduit fittings (Figs. 20 and 26). After all wires are routed and connected at terminal block, check to make sure all holes are plugged.

DO NOT permit electric cables or conduit to touch steam pipes.

Any optional remote Start/Stop Switch wires must be connected to the main control box (when equipped).

Torque the terminal block screws to 12 inch-pounds minimum to secure wires and to avoid damage to terminals.

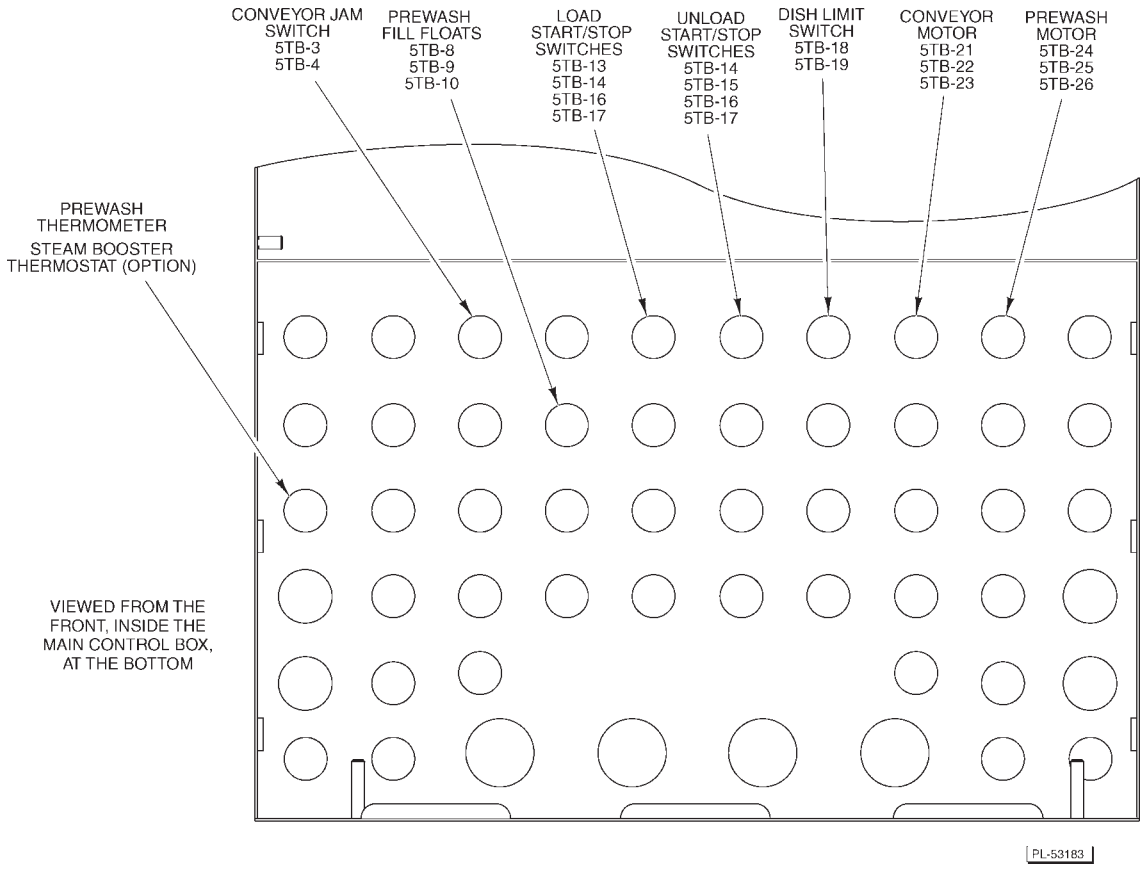


Fig. 20

Using the supplied NSF-approved sealer, apply a bead of caulk where each side of the control box meets the tank support rails to allow any moisture condensation to drain back into the tank.

INSTALLING THE FLOWBACK PIPE

Install the flowback pipe between the wash tank and the prewash tank (Fig. 21).

Make sure the flowback pipe is adequately lubricated with Parker "Super-O-Lube" (not supplied) or a household liquid dishwashing detergent. Make sure O-rings are in their proper places.

- With the connecting fitting to the prewash tank already on the flowback pipe, slide the end into the prewash tank.
- Slide the other end of the flowback pipe into the fitting on the wash tank. Make sure the tab in the fitting mates with the cutout in the end of the flowback pipe.
- Slide the connecting fitting to the outside tank wall of the prewash tank.
- Put the flange on the flowback pipe inside the prewash tank and connect to the connecting fitting using the four bolts and lockwashers provided.

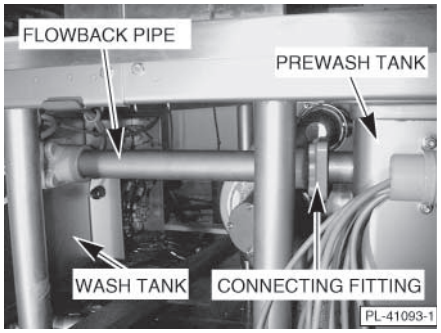


Fig. 21

INSTALLING THE DRAIN PIPE

Install the drain pipe between the adjoining tank sections as follows:

- Mark the drain pipe 3" from each end with a legible mark. (Use marking pen, lead pencil, etc.)
- The arrow molded in the drain T-connector indicates the direction of flow.
- Lubricate the molded drain T-connectors at each end of the drain pipe using Parker "Super-O-Lube" (not supplied) or a household liquid dishwashing detergent. Do not use animal-, vegetable- or petroleum-based lubricants.
- With a twisting motion, slide the pipe into one of the molded drain T-connectors.
- Lift the other end, align it with the molded drain T-connectors and, with a twisting motion, slide the pipe until the legible marks are approximately equal distance from each face of the T-connector (Fig. 22). Position hose clamps snug against molded drain T-connector at both ends and tighten (Fig. 22).

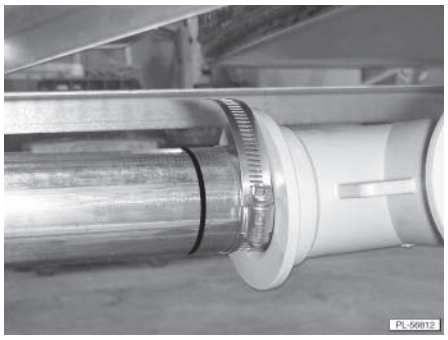


Fig. 22

CHECKING OPERATION OF DISH LIMIT SWITCH

Before installing the conveyor, check the operation of the dish limit actuator to make sure the magnet on the bottom of the bracket does not rub the tank. If it rubs or if the dish limit switch does not actuate, adjust the magnet up or down by loosening the bottom nut. (The factory setting is 0.104" above the tank bottom.)

CHECKING THE POSITIONS OF THE DRAINBACK PANS

Check the positions of the drain back pans to make sure water flows through the machine as intended.

The drain back pans between joining sections always drain in reverse direction from the conveyor's principle motion. For example, the drainback pans at section joints for a R-L machine flow to the right. For a L-R machine, the drainback pans at section joints flow to the left (Fig. 23). Refer to Curtains and Drainback Pans sections for an example of drainback pans (Figs. 44, 45 and 46).

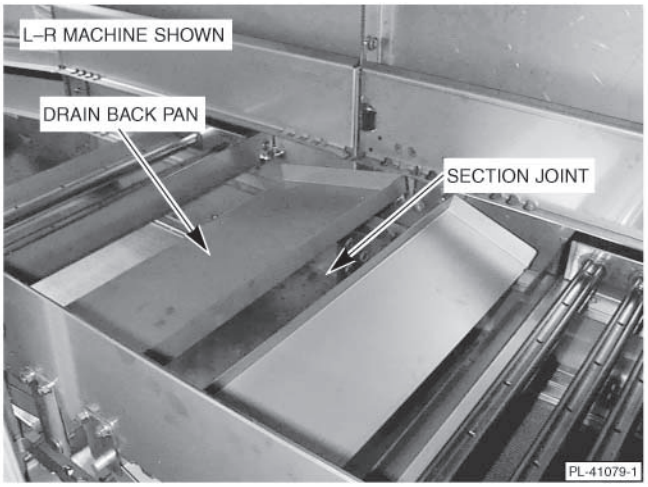


Fig. 23

For makeup water to be correct, the final rinse drainback pan must be properly positioned. The final rinse drainback pan must rest over the rod in the track support with the outlet positioned directly above the makeup pipe collector. Butt the final rinse drainback pan against the rod. Tighten the screw to secure the pan. Check to be sure that the makeup pipe collector is vertical.

BLOWER-DRYER ASSEMBLY

ORIGINAL CONFIGURATION

This applies to blower-dryers equipped with either electric or steam heat.

CAUTION: When installing the blower-dryer, do not stand, sit or lean on top of dishwasher or air deflector covers as blower-dryer performance could be compromised.

The blower output should be fitted inside the diffuser plenum as the blower and motor assembly is lowered over the five rubber vibration isolator studs (Fig. 24). Install washers, lockwashers and nuts ($^{5}/_{16}$-18) on the rubber vibration isolator studs.

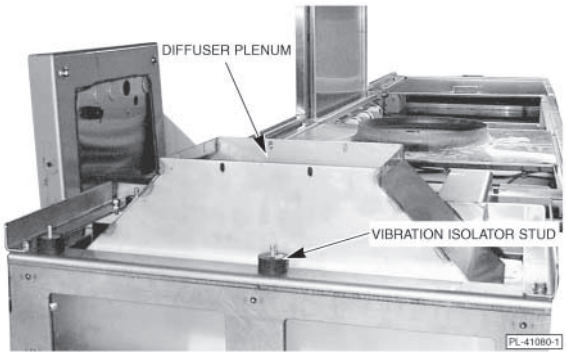


Fig. 24

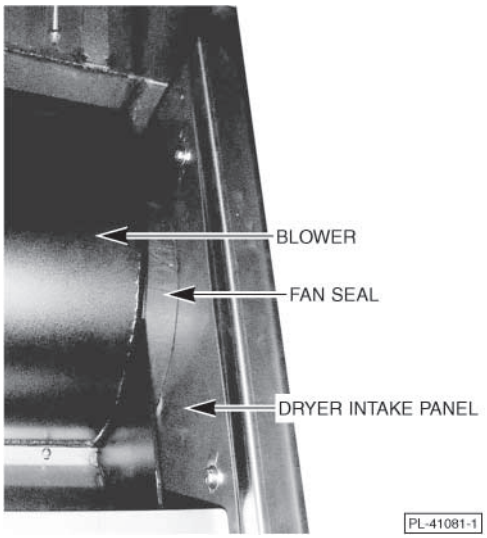


Fig. 25

NOTE: Do not overtighten or put the rubber portion of the vibration isolator in a twist. Secure the blower output to the rivet nuts on the diffuser plenum using the four #10-24 screws and lockwashers, provided.

Install the black rubber blower fan seal over the blower intake ring (Fig. 25). Position the dryer intake panel assembly inside the blower fan seal. Make sure the black rubber fan seal is outside both the blower intake ring and the dryer intake panel assembly. Secure the dryer intake panel assembly to the weldnuts on the blower-dryer frame by assembling the five $^{1}/_{4}$-20 bolts, lockwashers and washers from the inside of the dryer chamber.

Steam-operated blower-dryers have an air filter that mounts over the intake on the blower intake panel.

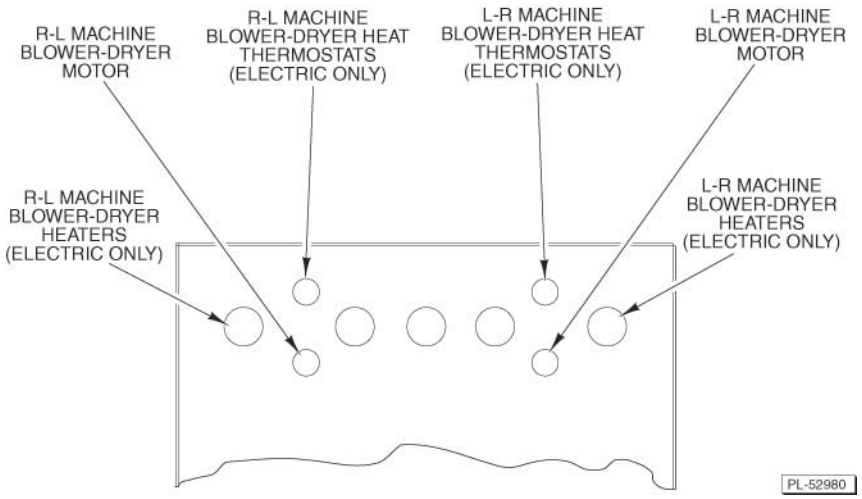


Fig. 26

Blower-dryer conduit(s) and cable enter the control box from the rear; specific locations for these conduits are shown from the front, inside the main control box (Fig. 26). Refer to the wiring diagram in the main control box.

Extend the blower motor electrical cable from the blower motor junction box to the top rear of the main control box using the strain relief, provided.

Install front, rear and top covers on the blower dryer (Fig. 27). Fasteners (1/4-20 bolts, lockwashers and washers) are provided. Refer to Form 34028 for additional installation instructions.

Make sure all hardware is tightened.

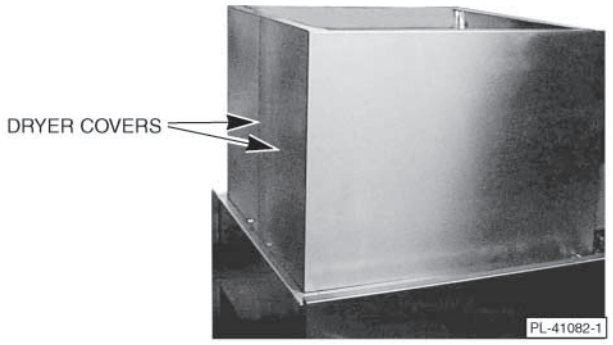


Fig. 27



Fig. 28

LOW PROFILE CONFIGURATION

Both Steam and electric blower dryers have an air filter that mounts over the blower intake panel and is removable from the discharge end of the blower-dryer.

The low-profile blower-dryer is shipped assembled (Fig. 28) from the factory, except for electrical connections in the control box.

Electric blower-dryer - All electric heat wires are routed through 1" conduit from the top inlet cover (Fig. 29). The blower motor cable is routed through the same cover with a strain relief fitting. Both conduit and cable should be connected to the top rear of the main control box using appropriate fittings (supplied) (Fig. 26). Refer to the electrical diagram in the main control box.

The steam blower-dryer has the same motor cable that is routed through the same cover.

The following procedures are the same for original and low-profile configuration blower-dryers.

Connect blower motor wires labeled **8CONT1**, **-T2** and **-T3** to contactor 8CON. This applies to blower-dryers with either steam or electric heat.

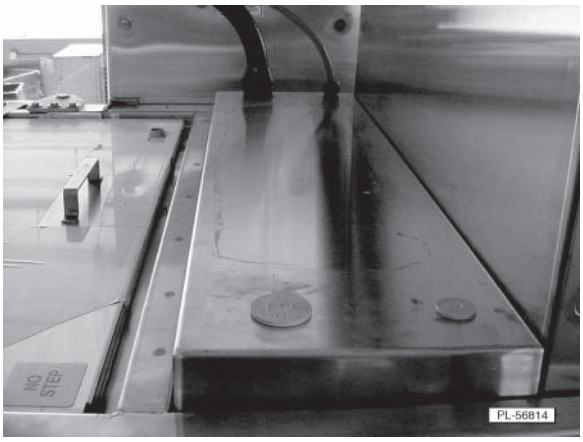


Fig. 29

NOTE: If the blower-dryer is equipped with electric heaters, connect electric heater wires marked **9CONT1**, **-T2** and **-T3** to contactor 9CON and wires marked **10CONT1**, **-T2** and **-T3** to contactor 10CON. Also, connect control wires marked **8CON-NO** to 8CON Side Switch, **5PL-X1** to BD Over Temp Light 5PL and **9CON-C1** to contactor 9CON.

ELECTRICAL CONNECTION(S)

WARNING: ELECTRICAL AND GROUNDING CONNECTIONS MUST COMPLY WITH APPLICABLE PORTIONS OF THE NATIONAL ELECTRICAL CODE AND/OR OTHER LOCAL ELECTRICAL CODES.

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES. THERE MAY BE MULTIPLE CIRCUITS. BE SURE ALL CIRCUITS ARE DISCONNECTED.

Refer to the electrical diagram attached to the inside of the control box door. Some machines may require more than one electrical power supply connection. All electrical supply lines to the machine must be disconnected when disconnection is required.

REMOTE START/STOP JUNCTION BOX (OPTIONAL)

One or more remote junction boxes with Start and Stop switches are available and can be installed in suitable and convenient locations according to local code and the machine electrical diagram.

CHECKING MOTOR ROTATION (THREE-PHASE MOTORS)

Pumps, conveyor motor and blower-dryer fan motor (when equipped) are all three-phase motors. Before placing the machine into service, check to verify correct rotation by observing motor direction.

If any pump motor does not rotate in the correct direction, check the rotation of the other motors. If they all are rotating backward, *disconnect the electrical power supply* and interchange any two of the incoming power supply leads. If all motors are not running in the same direction, only change the two incoming wires of the motor(s) that is running backward. Reconnect electrical power, push the START switch and verify that the motors rotate in the proper direction.

NOTE: If the conveyor motor does not rotate in the correct direction, *disconnect the electrical power supply* and interchange any two of the conveyor motor wires from the Frequency Inverter at terminal 5TB-21, -22 or -23.

SEPARATE ELECTRICAL CONNECTIONS

Separate electrical connections in the main control box may be required for an optional electric blower-dryer heater (when equipped) and for an optional electric tank heater (when equipped) unless equipped with optional circuit breakers. When equipped with an optional electric booster heater, a separate electrical connection at the booster is always required. The electric booster water heater may be rated 39,000 watts or 58,500 watts. A separate connection is required for a dual-rinse machine unless it is supplied with an electric blower-dryer or with circuit breaker options.

INDEPENDENT VOLTAGE SELECTION

Various parts of the machine may require different supply voltages, when so specified. Be sure to supply the machine with the required voltage.

VOLTAGE ADJUSTMENT - MACHINES WITH STEAM HEAT AND 208 to 240 V/50 to 60 HZ/3 PH

This adjustment procedure applies to FT900 dishwashers with steam heat and 208 to 240 V/50 to 60 Hz/3 Ph. All other FT900 dishwashers are specified for specific voltages preset at the factory and do not require this adjustment procedure.

THIS PROCEDURE SHOULD BE DONE ONLY BY A QUALIFIED, HOBART-TRAINED SERVICE TECHNICIAN.

WARNING: THIS PROCEDURE REQUIRES ELECTRICAL POWER TO BE SUPPLIED TO THE MACHINE WHILE ADJUSTMENTS ARE MADE TO THE FREQUENCY INVERTER INSIDE THE CONTROL BOX. USE CARE WHEN WORKING AROUND LINE VOLTAGE ELECTRICAL TERMINALS.

If the supply voltage to the machine is 224 to 264 volts, proceed to change the Frequency Inverter to 240 volts according to the procedure below. The Control Circuit Transformer [1T] should already be set for 240-volt operation.

If the supply voltage to the machine is 177 to 224 volts, continue to page 22. The Frequency Inverter is set at the factory to operate at 208 volts and does not need to be changed. The Control Circuit Transformer [1T] is set at the factory to operate at 240 volts and should be changed to operate at 208 volts.

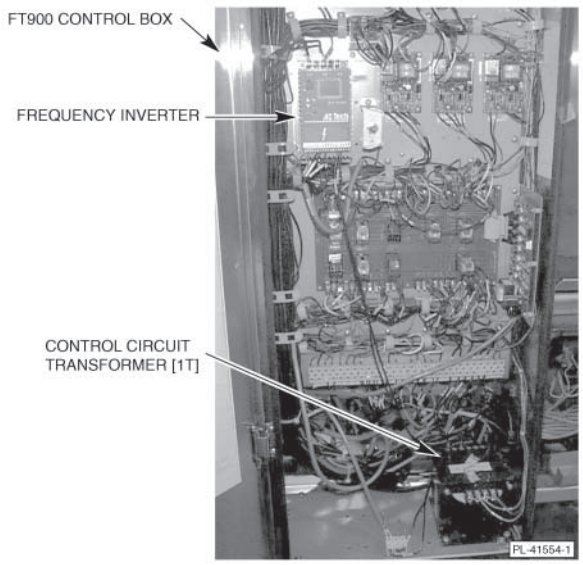


Fig. 30

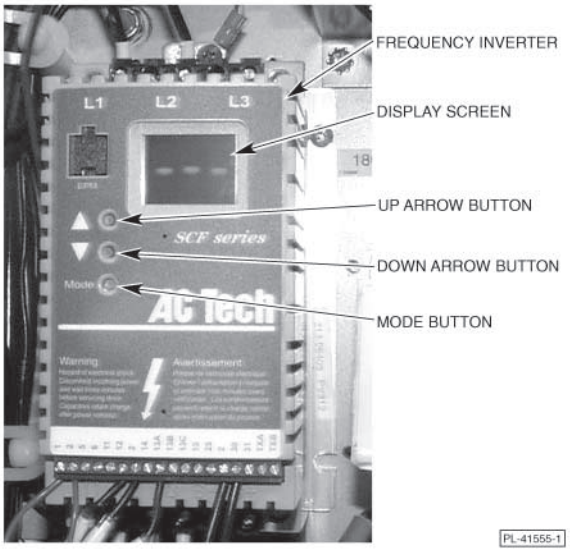


Fig. 31

FREQUENCY INVERTER - CHANGING VOLTAGE

Turn on the control circuit breaker. Push the Power On/Off button ON. Open the control box door. Observe the three dashes in the Frequency Inverter display screen (Figs. 30 and 31). Use a nonconductive tool to push the small red buttons.

NOTE: Complete each step of the following procedure within 15 seconds—otherwise, the control times out; and the entire procedure must be repeated from the beginning.

To change the Frequency Inverter voltage from 208 to 240:

The display shows **[– – –]**.

Press the MODE button. The display shows **[00]**.

Press the UP or DOWN arrow buttons until **[225]** is displayed.

Press the MODE button. The display shows **[P01]**.

Press the MODE button. The display shows **[02]** (representing 208 volts).

Press the DOWN arrow button once. The display shows **[01]** (representing 240 volts).

Press the MODE button. The display shows **[– – –]**. The Frequency Inverter is programmed for 240 volts.

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES. THERE MAY BE MULTIPLE CIRCUITS. BE SURE ALL CIRCUITS ARE DISCONNECTED.

Check the Control Circuit Transformer [1T] (Fig. 30) connections according to the wiring diagram. Use taps H1 and H3 for 240-volt operation.

IF THE MACHINE IS AS SHIPPED FROM THE FACTORY, DO NOT CHANGE THE FREQUENCY INVERTER - CHANGE ONLY THE TRANSFORMER VOLTAGE FROM 240 TO 208 USING THE PROCEDURE FOLLOWING THE FREQUENCY INVERTER ADJUSTMENT PROCEDURE.

If you changed the Frequency Inverter voltage to 240 and need to change it back to 208, follow the entire procedure below.

Turn on the control circuit breaker. Push the Power On/Off button to ON. Open the control box door. Observe the three dashes in the Frequency Inverter's display screen (Figs. 29 and 30). Use a nonconductive tool to push the small red buttons.

NOTE: Complete each step of the following procedure within 15 seconds - otherwise, the control times out; and the entire procedure must be repeated from the beginning.

To change the Frequency Inverter voltage from 240 to 208:

The display shows **[– – –]**.

Press the MODE button. The display shows **[00]**.

Press the UP or DOWN arrow buttons until **[225]** is displayed.

Press the MODE button. The display shows **[P01]**.

Press the MODE button. The display shows **[01]** (representing 240 volts).

Press the UP arrow button once. The display shows **[02]** (representing 208 volts).

Press the MODE button. The display shows **[– – –]**. The Frequency Inverter is programmed for 208 volts.

To change the transformer voltage from 240 to 208:

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AND FOLLOW LOCKOUT / TAGOUT PROCEDURES. THERE MAY BE MULTIPLE CIRCUITS. BE SURE ALL CIRCUITS ARE DISCONNECTED.

Check the Control Circuit Transformer [1T] (Fig. 30) connections according to the wiring diagram. Use taps H1 and H2 for 208-volt operation.

PREWASH DOOR INTERLOCK(S) - SLIDING AND HINGED DOORS

The prewash door interlock(s) is prewired from the main control box and shipped with the center section. It needs to be installed on the prewash section. Uncoil the prewash door interlock wire(s) and attach the switch body to the clamp(s) provided at the front of the plenum of the prewash section. Check operation of the door interlock and adjust if required. If the center section is shipped in separate sections, connect the wires to the wash motor, water level control and door interlock as required.

CONNECTING THE FINAL RINSE PHOTOELECTRIC SENSOR BOARD

The final rinse power and signal cables are prewired from the main control box, are shipped with the center section and must be connected to the final rinse board. Remove the end panel from the load section. Route the power and signal cables to the box containing the final rinse board using available tubes to house wires, P-clips or wire ties. Make sure no wiring is exposed when the end panel is reinstalled on the load section.

Remove the nuts from the strain reliefs on the cables. Put the four-conductor cable through the hole on the left bottom side. Put the three-conductor cable through the hole on the right side. Fasten the strain relief nuts. Plug the 4-Pin connector into J3 and the 3-Pin connector into J2 (Fig. 32). Reinstall the end panel on the front of the load section.

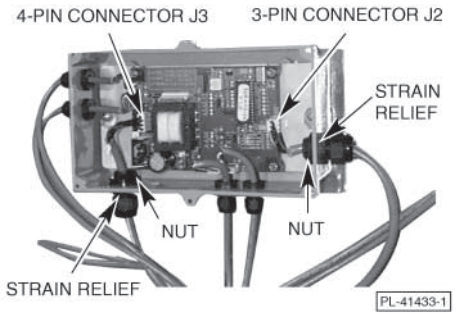


Fig. 32

ELECTRICAL CONNECTION - RINSE AID/DETERGENT DISPENSER

The machine electrical supply voltage can be used to supply a single-phase electrical power source for a rinse aid dispenser and/or a detergent dispenser-up to 1.5 amperes each.

Terminal connections, RPS1 and RPS2, are provided for a rinse aid dispenser (ON when the final rinse is on). Terminal connections, DPS1 and DPS2, are provided for a detergent dispenser (ON when the pumps are running). A location for 1/2" conduit is provided at the rear of the control panel for connection of these devices.

A hole plug is provided in the wash tank for a detergent sensor probe. A plugged hole is provided at the rear of the wash chamber for a liquid detergent dispenser inlet. The access panel can be removed. Two 1/4" NPT plugs are provided in the copper rinse piping behind the rear access panel for a rinse aid inlet and rinse line pressure or temperature sensor. Do not use saddle valve. The preferred location for a detergent dispenser and/or a rinse aid dispenser is at the rear of the machine. Route all plumbing and wiring between the rear access panels and chamber where possible.

The alternate location for a detergent dispenser is on the cover panel at the front of the machine between the prewash and wash section doors. When mounting a detergent dispenser in the front location, remove the cover panel at the front of the machine. Mount brackets for the dispenser and controller on the cover panel so the gravity feed dispenser discharge tube aligns with the chamber hole located behind the cover panel. Make sure the brackets mount the dispenser and controller out from the cover panel to allow clearance for the doors to raise freely. Route the detergent tube to the edge of the strainer in the wash tank. Bring the fresh water line, control and sensor wires up the back of the machine, through the inner top (plenum) and through the back of the cover panel. Make necessary wiring connections through the back of the cover panel to the dispenser and controller.

NOTE: This machine must be operated with an automatic detergent feeder, including a visual meansto verify that detergents are delivered or a visual or audible alarm to signal if detergents are not available for delivery to the washing system. Please see instructions for electrical and plumbing connections located in this manual and in the feeder equipment manual. Chemical feeders supplied by others.

VENT FAN CONTROL

Machine electrical circuits can be used to switch a vent fan, supplied by others. On all models built after January 1999, the vent fan is ON when the main power switch is on. The two terminal connections for the vent fan control are both labeled VFC and are provided as a switching circuit to control the vent fan. A location for 1/2" conduit is provided at the rear of the control panel for conduit connection for this application.

Power for the vent fan motor is supplied independently.

The maximum-rated loads for VFC switch connections are the following:

16 amps at 200 to 240 volts, 1 phase

8 amps at 380 to 600 volts, 1 phase

PLUMBING CONNECTIONS

WARNING: PLUMBING CONNECTIONS MUST COMPLY WITH APPLICABLE SANITARY, SAFETY AND PLUMBING CODES.

Check all water lines, particularly unions. Tighten if necessary.

WATER SUPPLY

The water supply must be within the recommended hardness range of 4 to 6 grains per gallon. Lower hardness can promote corrosion; higher hardness may cause excessive formation of lime scale. Recommended water pressure should be 20 to 25 psig (flowing) at the dishwasher. If the water pressure is higher than 25 psig, a pressure-regulating valve with internal thermal expansion bypass must be supplied (by others) in the water supply line to the dishwasher.

CAUTION: The water pressure regulator must have a relief bypass. Failure to use the proper type of pressure regulator may result in damage to the unit.

Fill

All machines have a single 1" NPT female connection point for the fill and/or booster heater. The minimum water temperature for the fill connection is 140°F. Machines equipped with the prewash temperature control option require a connection to cold water at a 1" NPT female pipe fitting at the load end.

Final Rinse

A water hammer arrestor meeting ASSE-1010 standard or equivalent should be supplied (by others) in the final rinse water supply line at the service connection. The required minimum water temperature for the final rinse is 140°F when an electric or steam booster heater is supplied, the booster heater is plumbed to the final rinse at the factory. Machines without booster heater require 180°F water to be connected to the 3/4" NPT female fitting at the final rinse connection point.

Electric Booster Heater (When Equipped)

The electric booster heater is equipped with a pressure temperature relief valve that has a 3/4" NPT female pipe fitting that must be piped to an open drain receiver in the floor.

DRAIN

Connect the drain at the 2" NPT threaded fitting located at either the unload end or the load end of the machine, as specified on the order.

NOTE: The plug fitting and the threaded drain fitting can be interchanged to reverse the drain end of the machine by loosening the stainless steel clamp fitting. The molded arrows must all point in the same direction on all molded drain T-connectors.

If a grease trap is required by code, the drain should have a flow rate of 40 gallons per minute.

Do not overtighten the fittings.

Line Strainers

Line strainers on the machine should be cleaned after installation and within the first week of operation. The line strainers will collect cutting oils and other contaminants. Clogged line strainers will cause restrictions to the flow of steam or water and will reduce overall performance of the machine.

STEAM SUPPLY (WHEN EQUIPPED)

Check all steam lines for leaks, particularly unions. Tighten if necessary.

The steam supply must be 15 to 25 psig flowing pressure at the dishwasher with a maximum of 50 psig static pressure. Machines with a steam booster (and steam tank heaters) have a single 1 1/2" NPT female fitting for connection at the steam booster at the unload end, underneath. *Machines equipped with steam tank heaters, but without a steam booster, have a single 1" NPT female fitting for connection, located underneath the unload end.*

STEAM REQUIREMENTS

Tank Heat	Booster	Dryer
175 pounds/hour	215 pounds/hour	75 pounds/hour

TOTAL STEAM REQUIREMENTS

Tank Heat and Booster	Tank Heat, Booster and Dryer
390 pounds/hour	465 pounds/hour

Steam Tank Heaters - Condensate Return Lines

The wash tank and power rinse tank may be equipped with steam injector or steam coil types of heaters. If steam coil types of heaters are used, a condensate return, gravity type, must be connected for each coil. Bucket-type traps are furnished. The connection points for the condensate return lines for both coils are 3/4" NPT female pipe fittings.

Steam Booster Heater - Condensate Return Line and Relief Valves

The connection point for the condensate return line for the steam booster heater is a 3/4" NPT female pipe fitting. The steam booster heater is equipped with a steam relief valve that has a 1" NPT female pipe fitting that must be piped to an open drain receiver in the floor. The steam booster heater is equipped with a hot-water relief valve that has a 3/4" NPT female pipe fitting that must be piped to an open drain receiver in the floor.

Steam Blower-Dryer (When Equipped)

Steam blower-dryers require a 1 1/2" connection at the steam coil with 15 to 25 psig flowing pressure on top of the machine. The steam line to the blower-dryer should be fitted with a manual shutoff valve near the connection point suitable for operator convenience. The steam blower-dryer has a condensate return, gravity type, that must be connected from the coil at the bottom of the blower-dryer. Bucket-type traps are furnished. The connection point for the condensate return line for the coil is a 3/4" NPT female pipe fitting.

NOTE: For cleaning convenience, a water tap equipped with 30' of heavy-duty hose and a spray squeeze valve installed near the machine is recommended.

NOTE: When the blower-dryer is equipped with a steam on/off valve, the steam supply is ON when the machine is on and OFF when the machine is off.

Connect the control and motor wires to the control box from the steam blower-dryer. If available steam pressure is less than 15 psi while flowing, operational characteristics may be limited because of insufficient delivery of steam. If this occurs, contact Hobart Warewash Technical Support.

CONVEYOR ASSEMBLY

Prior to installing the conveyor, a quick check should be made to verify that the sprockets are set correctly at both the load and unload ends of the machine. The take-up units on both the front and rear of the load section must be completely retracted towards the load platform so that the conveyor shaft is as square as possible with the machine before attempting this procedure. Then, place a level or combination square across the inside face of the rear sprocket and the inside edge of the rear track (Fig. 33). Both parts should be aligned or set with the sprocket just slightly to the inside of the track. The inside face of the sprocket should never be set outbound of the inside edge of the track. Once this has been confirmed or properly adjusted, check the inside dimension between the front and rear sprockets; it should be 27.938 ±0.063. If it is not, loosen the set screw on the front sprocket and slide it forward or backward until the proper dimension is achieved and then retighten the set screw on the sprocket. When you have completed this procedure at both ends of the machine, you will now be ready to load the conveyor.

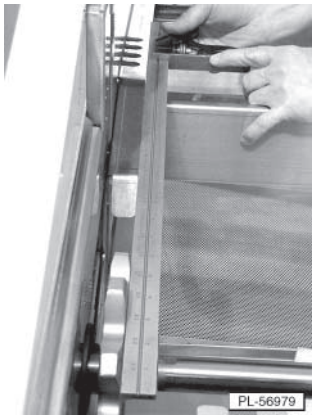


Fig. 33

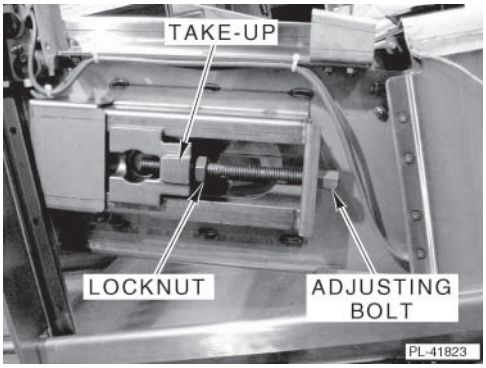


Fig. 34

LOADING THE CONVEYOR SECTIONS

Each dishwasher is supplied with the correct amount of conveyor. The conveyor sections must be connected together.

- Some conveyor sections are numbered: ROLL 1, ROLL 2, etc. When so numbered, install them in numerical sequence.
- Raise the loading platform and place a piece of cardboard under, around and above the platform to protect it from being scratched during conveyor installation.
- Loosen the take-up units (Fig. 34) at the front and rear sides of the load end by loosening the locknuts and threading the adjusting bolts as far out as possible.
- Remove the drive chain from the conveyor gearmotor so that conveyor sprockets are free to rotate.
- Position the first section of conveyor in line with the machine at the load end. The flight links must point toward the load end of the machine.
- Tie a rope to the first conveyor rod and feed it through the machine, following the desired path of the conveyor (flight links up). Make sure conveyor rollers do not feed under tracks.

JOINING THE CONVEYOR SECTIONS

Remove the last conveyor rod from the first section, thread rod back through the flight links of both sections and the conveyor links on both sides and assemble a conveyor roller and retaining ring at each end (Figs. 35 and 36). **Always use a new retaining ring to secure a tight grip on the conveyor rod.** Make sure flight links are angled or pointed toward the load end.

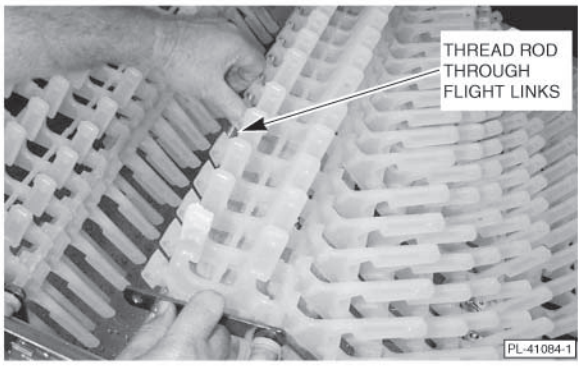


Fig. 35

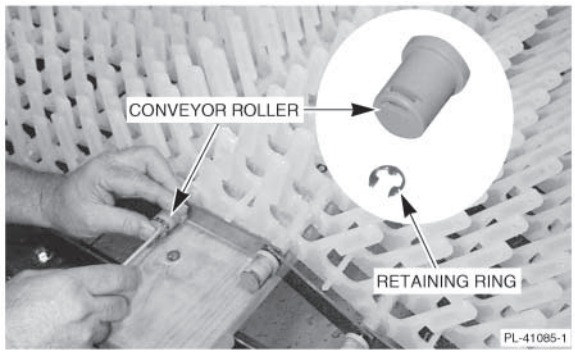


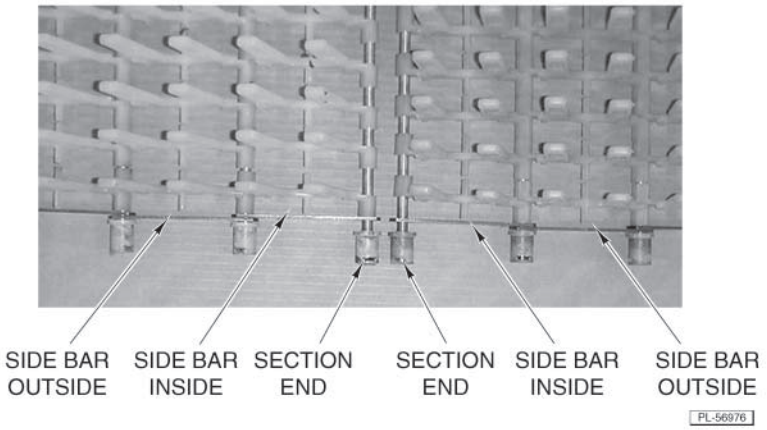
Fig. 36

Pull the conveyor through the machine starting at the load end, around the freed conveyor sprockets at the unload end, down to the top of the lower track and back through the machine. Make sure conveyor rollers do not feed under tracks.

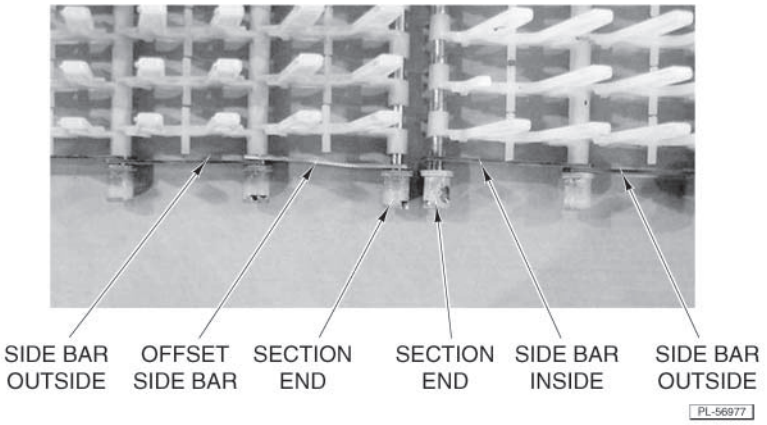
Join the ends of the conveyor by threading the final conveyor rod through both rows of flight links and the conveyor links on both sides. Conveyor links alternate with both ends of the link on the inside followed by both ends of the next link on the outside, except for the conveyor offset link (only used on AA or BB type of conveyor).

CONVEYOR OFFSET LINK

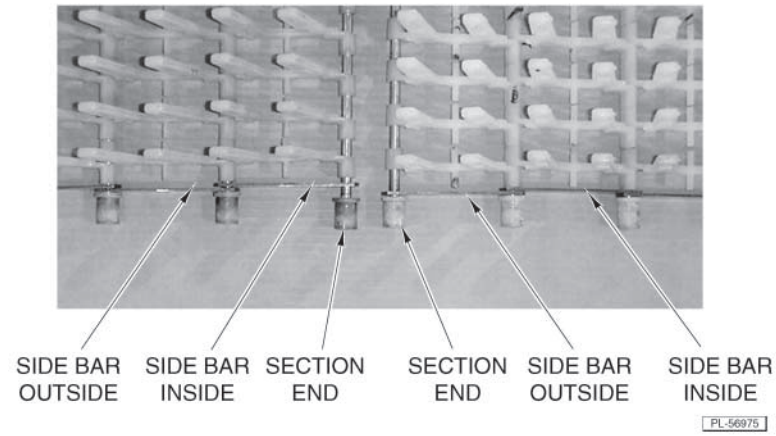
Conveyor offset links are supplied for use with both the AA and BB style conveyors and are to be used, if necessary, when making the final connection to join the two conveyor ends. When the proper length of conveyor has been determined pull the two ends together to examine the side bar patterns. If both sections end with the side bars in the same inside or outside position (Fig. 37), you must replace the last links on one of the sections with the offset links to maintain the pattern (Fig. 38). However, if the sections end such that the inside to outside pattern of the side bars will be maintained, they can be joined without the use of the offset links (Fig. 39).



Incorrect (Both Side Bars Inside)
Fig. 37



Correct with Offset Link (Inside to Outside Maintained)
Fig. 38



Correct without Offset LInk (Inside to Outside Pattern Maintained)
Fig. 39

Once the conveyor is installed, reinstall the conveyor drive chain to the conveyor gearmotor.

NOTE: The proper length of conveyor, when adjusted, will have the flight links close to or engaging the load fingers at the load platform.

NOTE: Each time a conveyor roller is installed or replaced a NEW retaining ring (Fig. 36) must be used.

ADJUSTING THE CONVEYOR TAKE-UP UNIT

Align the conveyor sprockets or tighten the tension on the conveyor by turning the adjusting bolt on the take-up units (Fig. 34). Alignment can be gauged by centering the large diameter hub of the conveyor rollers on the conveyor tracks.

- If too much gap is on the left sprocket, tighten the take-up unit on the right side.
- If too much gap is on the right sprocket, tighten the take-up unit on the left side.

After running the conveyor for 15 minutes, check the tension. Proper tension is achieved when the conveyor rollers run on the bottom track freely and, by grasping a conveyor rod near the middle, the conveyor can be lifted 1" to 1 3/4" vertically from the top track on the unload end.

- If additional tension is needed on the conveyor (after it has been centered), tighten both of the take-up units the same amount. After the proper conveyor tension is achieved, tighten the locknuts on the take-up units on both sides (Fig. 34).

With the take-up units properly adjusted, there is a possibility of the sprocket shaft not being square with the conveyor track. This will not diminish operation, provided the conveyor rollers are centered on the track.

Check the set screws in the bearing collars (two each) to make sure they did not loosen during shipment.

MISCELLANEOUS

Check all bolts and connectors to make sure they are tight.

FINAL RINSE

The nozzle angle of the final rinse arms is critical if makeup water is to be properly distributed. Install the upper and lower final rinse arms with the tab aligned in the slot on the hub at the rear of the chamber. The upper final rinse arm typically has three nozzles (may have more depending upon the machine application) (Fig. 40); the lower final rinse arm has eight nozzles (Fig. 41).

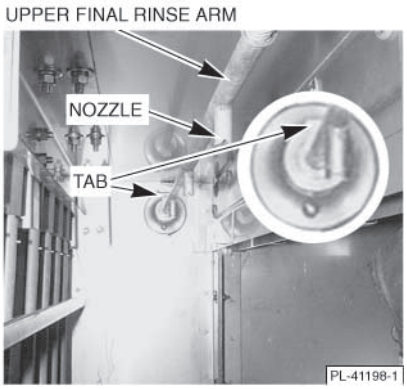


Fig. 40

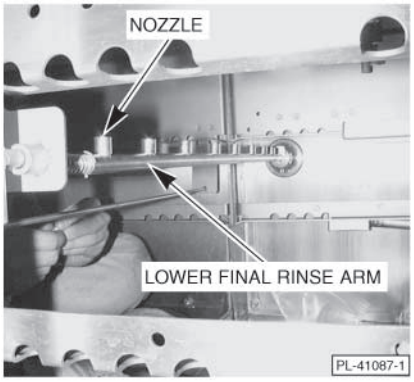


Fig. 41

VENT DUCT

CAUTION: Do not step on top of chambers when installing vent duct.

Fit overhead vent duct (not supplied) inside machine vent opening at the midpoint of the dishwasher and bolt together. The vent fan should provide 1000 cubic feet per minute (cfm) when the machine is installed with blower-dryer. When the machine is installed without blower-dryer, the vent fan should provide 750 cubic feet per minute (cfm). Adjust dampers in plenum at the end of both load and unload sections so that little vapor escapes from the ends of the machine (Fig. 42). Additional final adjustment can be made in vent damper adjustment on top of the machine. When the vent damper is adjusted properly, tighten the nut.

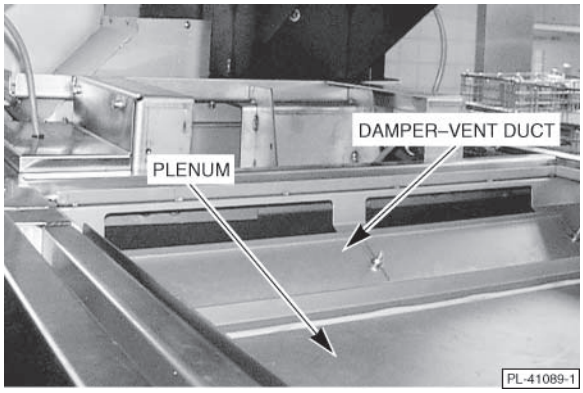


Fig. 42

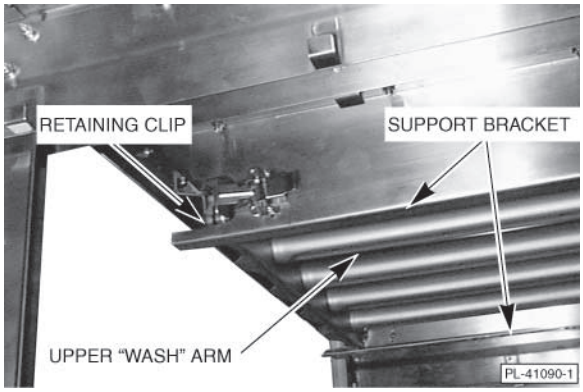


Fig. 43

PREWASH, WASH AND POWER RINSE ARMS

The upper and lower prewash, wash and power rinse arms must be installed in their correct locations. To install each of the upper or lower arms, rest the manifold on the support brackets, slide into position and latch the arm in place (Fig. 43).

CURTAINS AND DRAINBACK PANS, MODEL FT900

Curtains must be in their proper places (Fig. 44), FT900:

- Hang a short curtain on the unload side of each upper prewash, wash and power rinse arm.
- Hang a long curtain on both sides of every section divider.
- Hang two long curtains at the load end.

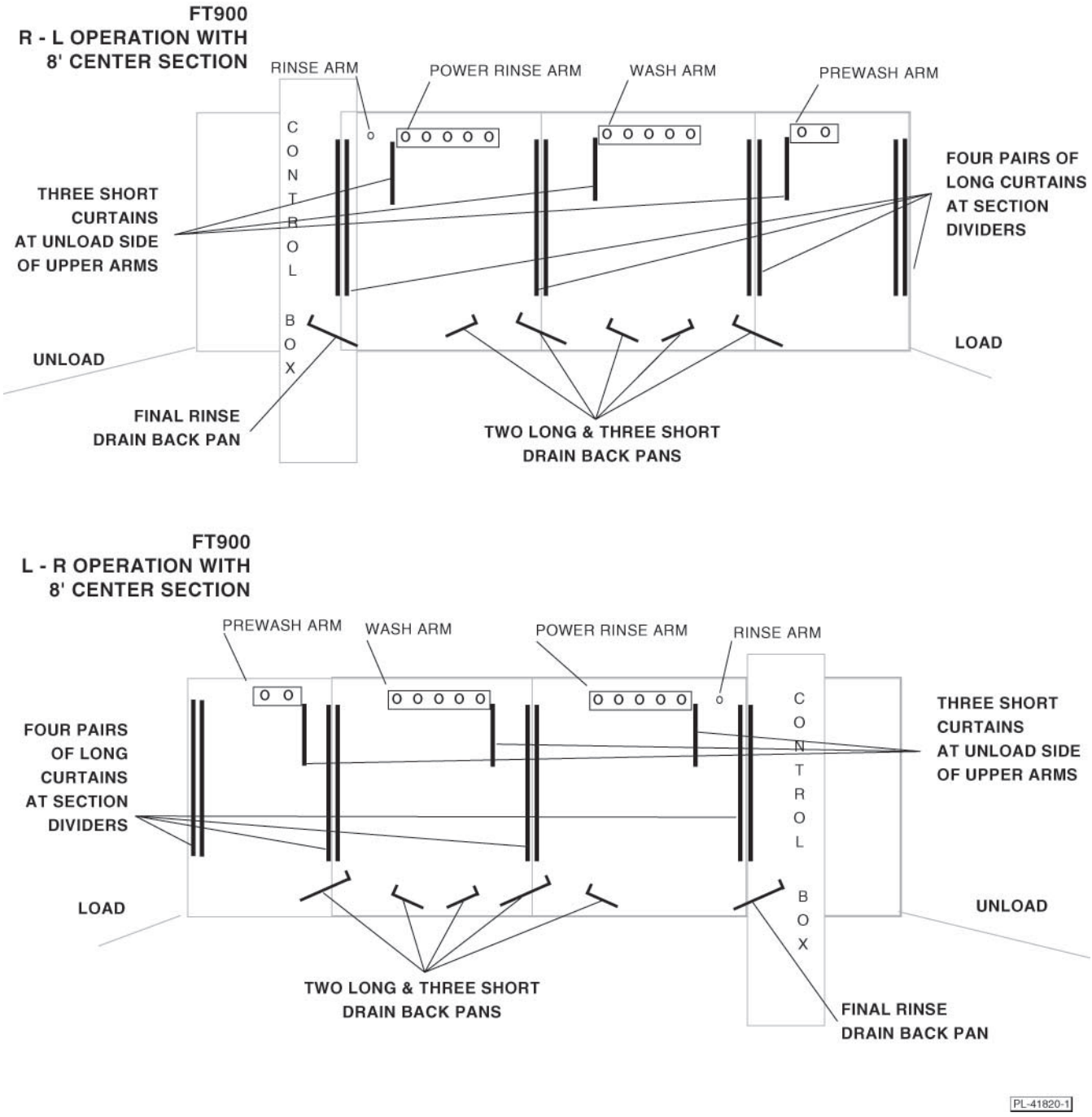


Fig. 44

CURTAINS AND DRAINBACK PANS, MODEL FT900S

Curtains must be in their proper places (Fig. 45), FT900S:

- Hang a short curtain on the unload side of each upper prewash and wash arm.
- Hang a long curtain on both sides of every section divider.
- Hang two long curtains at the load end.
- Hang one long curtain at the unload end.

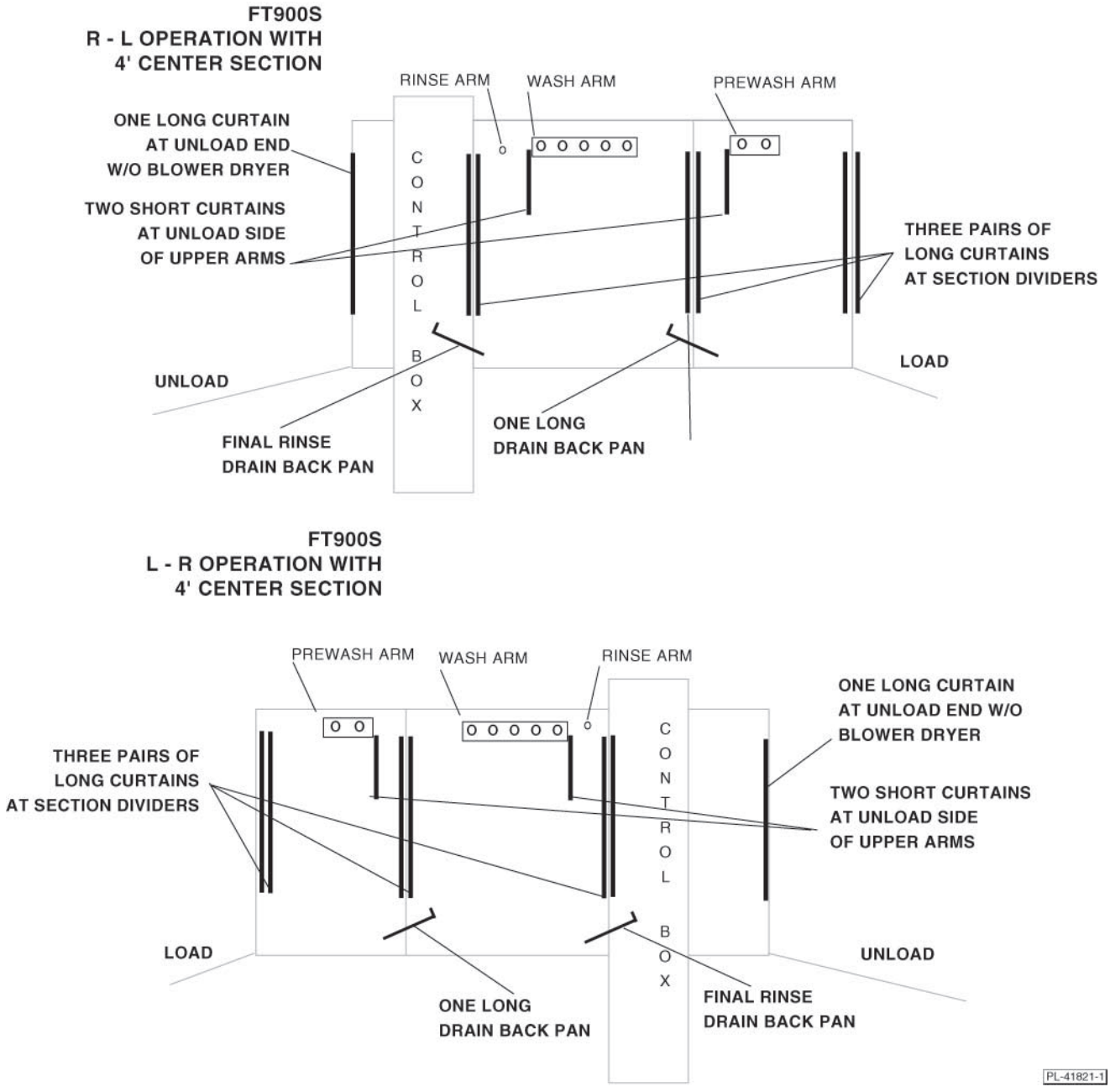


Fig 45

CURTAINS AND DRAINBACK PANS, MODEL FT900W

Curtains must be in their proper places (Fig. 46), FT900W:

- Hang a short curtain on the unload side of each upper prewash, wash and power rinse arm.
- Hang a short curtain between dual-rinse arms.
- Hang a long curtain on both sides of every section divider.
- Hang two long curtains at the load end.

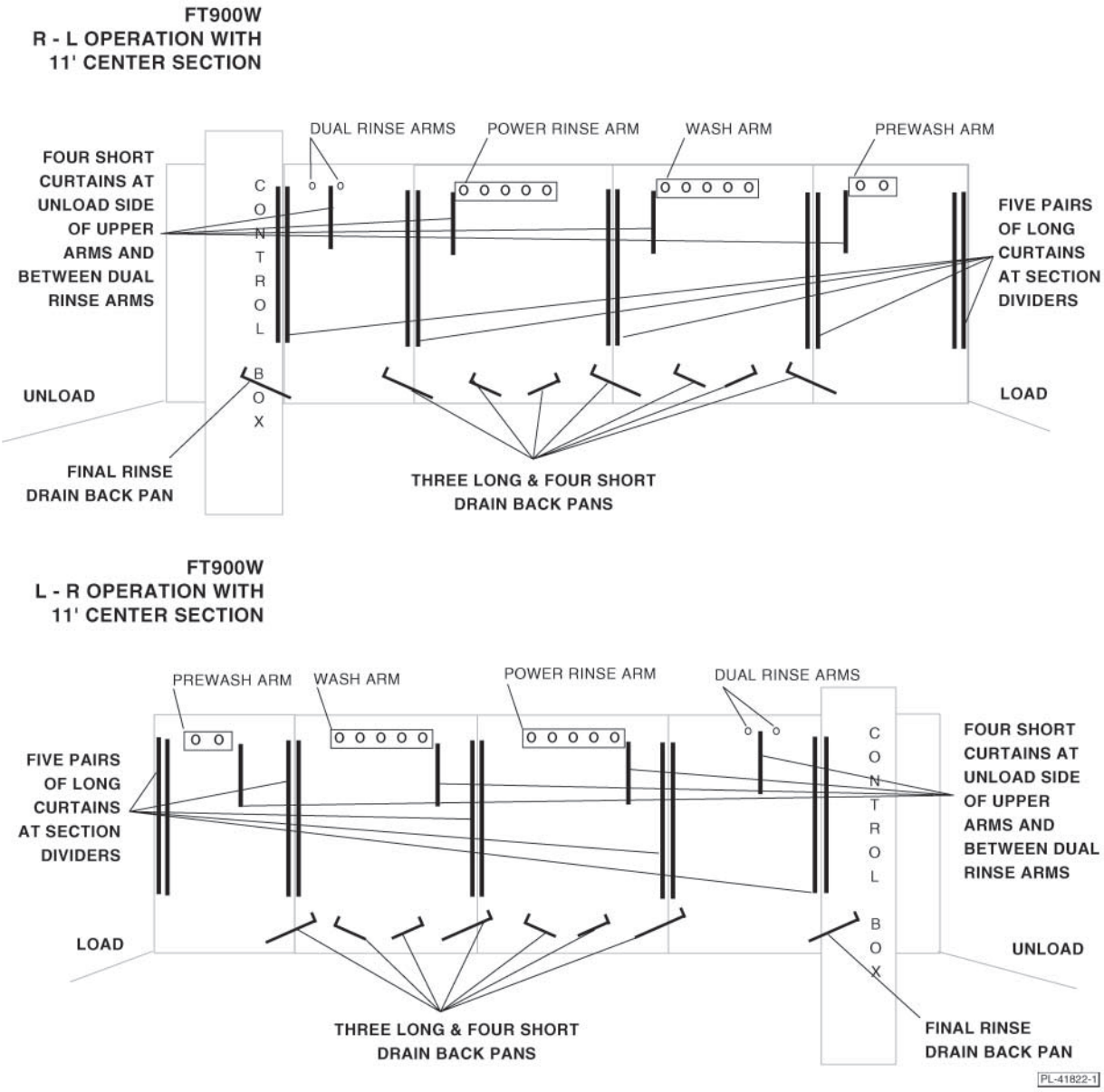


Fig. 46

CONVEYOR GEARMOTOR

The conveyor gearmotor is shipped with oil (Mobilgear #630) at the proper level in the speed reducer.

Lubricants are available from your local Hobart Service Office.

LOWER TRIM PANELS (FRONT)

Hang lower front trim panels from two (or more) hanger brackets under the front tank support rail. Slots in bottom of panels should be inserted into panel bracket retainers. Lower panel bracket retainers may project from the lower rails of the machine or may be attached to an adjacent panel. Each panel must be located in its proper position.

When installing lower trim panels, butt each panel end to end and then adjust the end wrap panel so there is approximately $^{1}/_{16}$" clearance between it and the adjacent panel. This clearance, spread over the entire length of the machine, will provide optimum appearance (Fig. 47).

REAR PANELS

Hang rear panels from two upper hanger brackets at the top (Fig. 48) and insert slots in bottom of panels into panel bracket retainers. Lower panel bracket retainers may project from the lower rails of the machine or may be attached to an adjacent panel. Each panel must be located in its proper position. Each rear panel and chamber is numbered to identify position.

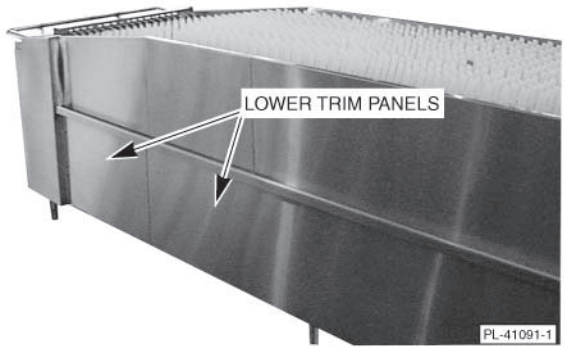


Fig. 47

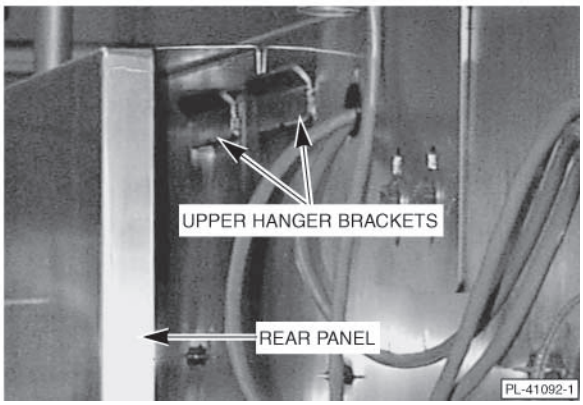


Fig. 48

SERVICE

If service is needed on this machine, contact your local Hobart Service Office.

NOTES