

BESSER

HARMONIC DEPALLETER

MODEL DP-12 • SIX AT A TIME



**MAINTENANCE/OPERATION MANUAL
466360F9902US**

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BESSER

COMPANY NAME:

SERIAL NUMBER:

ASSEMBLY NUMBER:

WIRING DIAGRAM NUMBER:

INSTALLATION DRAWING NUMBER:

6-AT-A-TIME DEPALLETER

TABLE OF CONTENTS

LIST OF FIGURES .....	.ii
LIST OF TABLES .....	.iii
SPECIFICATIONS .....	.iv
SAFETY BULLETIN .....	.v
SAFETY SIGNS .....	.vi
DECALS .....	.x
SECTION 1 INTRODUCTION	
1.1 OVERVIEW .....	.1-1
1.1.1 Terms and Abbreviations .....	.1-1
1.1.2 Depalleter Configuration .....	.1-1
1.1.3 Summary of Operation .....	.1-2
1.2 DESIGN CHARACTERISTICS .....	.1-2
SECTION 2 OPERATION	
2.1 MODES OF OPERATION .....	.2-1
2.1.1 Manual (HAND) Mode .....	.2-1
2.1.2 Off Mode .....	.2-1
2.1.3 Automatic (AUTO) Mode .....	.2-1
2.2 SEQUENCE OF OPERATION .....	.2-2
2.2.1 Sequence of Operation .....	.2-2
2.3 START-UP PROCEDURE .....	.2-3
2.4 SHUT-DOWN PROCEDURE .....	.2-4
2.4.1 Normal Shut-Down .....	.2-4
2.4.2 Emergency Shut-Down .....	.2-4
SECTION 3 MAINTENANCE INSTRUCTIONS	
3.1 GENERAL .....	.3-1
3.2 SERVICE SCHEDULE .....	.3-1
3.3 LUBRICATION SCHEDULE .....	.3-2
3.4 PERIODIC INSPECTION .....	.3-3
3.5 ADJUSTMENTS .....	.3-3
3.5.1 Depalleter Adjustments .....	.3-3
3.5.2 Sensor Adjustments .....	.3-5
3.5.3 Speed Adjustments .....	.3-6
SECTION 4 TROUBLESHOOTING	
4.1 TROUBLESHOOTING TABLES .....	.4-1

6-AT-A-TIME DEPALLETER

LIST OF FIGURES

SECTION 1 INTRODUCTION

1.1 Harmonic Depalleter, Pallet Straight Thru Orientation and Component Location1-1

SECTION 2 OPERATION

2.1 Remote Control Station2-1

SECTION 3 MAINTENANCE INSTRUCTIONS

3.1 Lubrication Points, Depalleter3-2
3.2 Depalleter Height Adjustments3-3
3.3 Angular Adjustment for the Pusher Plate3-4
3.4 Sensor Locations, Pallet Straight Thru Operation3-5
3.5 Hydraulic Flow Controls3-6

6-AT-A-TIME DEPALLETER

LIST OF TABLES

SECTION 3 MAINTENANCE INSTRUCTIONS

3.1	Service Schedule	3-1
3.2	Lubrication Schedule	3-2

SECTION 4 TROUBLESHOOTING

4.1	General Electrical Troubleshooting	4-1
4.2	Depalleter Troubleshooting	4-3
4.3	Device Input/Output	4-5

6-AT-A-TIME DEPALLETER SPECIFICATIONS

TOTAL WEIGHT:	2,000 pounds [907.2 Kg]
MINIMUM HYDRAULIC PRESSURE:	850 psi [58 bar]
MACHINE SPEED:	
RECOMMENDED:	10 cycles per minute
MAXIMUM:	12 cycles per minute
PRODUCTION CAPACITY:	Strips any concrete product up to 12 inches [305 mm] high from pallet
OIL REQUIREMENTS:	12 gpm total [56.7 lpm], 6 gpm crank motor [22.7 lpm], 12 gpm pusher cylinder [45.4 lpm]

Note:

The above gpm recommendations are for use with a block machine cycle rate of 10 or less. For a faster cycle rate, more capacity (gpm) are required. Use Shell Tellus 46 oil (or equivalent).

OPERATING CONDITIONS:

Besser machinery and equipment is designed to comply with the essential health and safety regulations (EHSR) that apply to directives which are applicable to an industrial environment.

Buyer shall utilize this equipment in a manner consistent with its design and only in an industrial environment.

OPERATING RANGES:

Here are the normal operating ranges for machine sensors (limit, proximity) and control devices contained within the control panels.

















Ambient operating temperature range:	32° to 131°F [0° to 55°C]
Humidity range:	5 to 95% (non-condensing)
Line voltage:	85 to 132 volts – AC 50/60 Hz

SAFETY BULLETIN

This notice is issued to advise you that some previously accepted shop practices may not be keeping up with changing Federal and State Safety and Health Standards. Your current shop practices may not emphasize the need for proper precautions to insure safe operation and use of machines, tools, automatic loaders and allied equipment and/or warn against the use of certain solvents or other cleaning substances that are now considered unsafe or prohibited by law. Since many of your shop practices may not reflect current safety practices and procedures, particularly with regard to the safe operation of equipment, it is important that you review your practices to ensure compliance with Federal and State Safety and Health Standards.

IMPORTANT

The operation of any machine or power-operated device can be extremely hazardous unless proper safety precautions are strictly observed. Observe the following safety precautions:

-  Always be sure proper guarding is in place for all pinch, catch, shear, crush and nip points.
-  Always make sure that all personnel are clear of the equipment before starting it.
-  Always be sure the equipment is properly grounded.
-  Always turn the main electrical panel off and lock it out in accordance with published lockout/tag-out procedures prior to making adjustments, repairs, and maintenance.
-  Always wear appropriate protective equipment like safety glasses, safety shoes, hearing protection and hard hats.
-  Always keep chemical and flammable material away from electrical or operating equipment.
-  Always maintain a safe work area that is free from slipping and tripping hazards.
-  Always be sure appropriate safety devices are used when providing maintenance and repairs to all equipment.
-  Never exceed the rated capacity of a machine or tool.
-  Never modify machinery in any way without prior written approval of the Besser Engineering Department.
-  Never operate equipment unless proper maintenance has been regularly performed.
-  Never operate any equipment if unusual or excessive noise or vibration occurs.
-  Never operate any equipment while any part of the body is in the proximity of potentially hazardous areas.
-  Never use any toxic flammable substance as a solvent cleaner.
-  Never allow the operation or repair of equipment by untrained personnel.
-  Never climb or stand on equipment when it is operational.

It is important that you review Federal and State Safety and Health Standards on a continual basis. All shop supervisors, maintenance personnel, machine operators, tool operators, and any other person involved in the setup, operation, maintenance, repair or adjustment of Besser-built equipment should read and understand this bulletin and Federal and State Safety and Health Standards on which this bulletin is based.

SAFETY SIGNS

Sign	Description	Required
1	All Panels	1
2	Mixer	4
3	Concrete Products Machine.....	1
	Depalleter	2
4	Mixer	2
5	Skiploader	4
6	Skiploader/Mixer Platforms	8
7	Skiploader/Mixer Platforms	8
8	Vertical: Pallet Transport System	2
	Horizontal: LSC-40A/LSC-100	6
	Pallet Transport System	4
9	Besser-Matic	4
10	Besser-Matic	4
11	Skiploader	4
12	All Panels	1
13	Overhead Block Transfer	4
14	Concrete Products Machine.....	1
15	Concrete Products Machine.....	2
16	Conveyors	12
17	Cuber	8
18	Cuber	3
	Block Turnovers.....	2
	Slat Conveyors.....	2

**To order safety decals, contact your local Besser representative
or the Besser Central Order Department.**

Thank you!



1
Large 113236F0409
High Voltage
Width 4 1/2 inch
Height 9 5/8 inch
Small 113236F0204
High Voltage
Width 2 inch
Height 4 1/8 inch



2
113237F0410
Mixer Blade Hazard
Width 4 1/2 inch
Height 10 1/4 inch



3
113240F0307
Crush Hazard
Width 3 1/2 inch
Height 7 1/2 inch



4
114692F1006
Nip Points
Width 5 3/4 inch
Height 9 1/2 inch



5
114688F0906
Crush Hazard
Width 6 1/4 inch
Height 9 1/2 inch



6
114689F0804
Fall Hazard
Width 4 1/2 inch
Height 7 3/4 inch



7

114690F0805
Falling Objects
Width 4 3/4 inch
Height 8 inch



8

Vertical: 113245F0704
Crush Hazard
Width 4 1/8 inch
Height 7 inch
Horizontal: 113245F1005
Crush Hazard
Width 10 inch
Height 5 3/4 inch



9

113242F0409
Crush Hazard
Width 4 1/2 inch
Height 9 5/8 inch



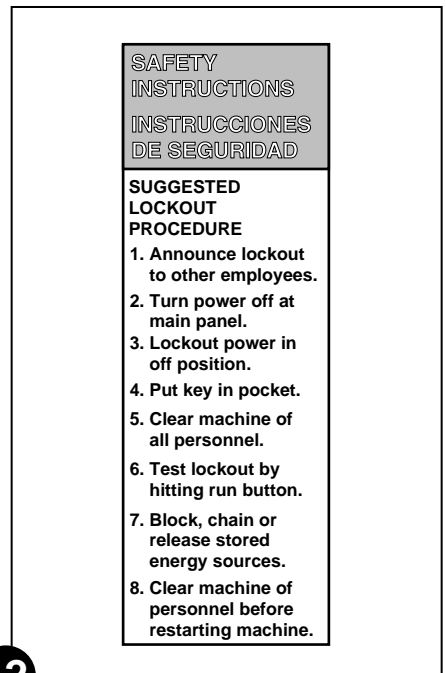
10

113243F0410
Falling Objects
Width 4 1/2 inch
Height 10 inch



11

114691F1006
Shear and Fall Hazards
Width 5 3/4 inch
Height 9 3/4 inch



12

113249F0410
Safety Instructions Decal –
Suggested Lock-out Procedure
Width 4 inch
Height 10 inch



13
113238F1005
Crush Hazard
Width 10 inch
Height 5 3/4 inch



14
113239F0604
Crush Hazard
Width 6 5/8 inch
Height 4 inch



15
113241F0605
Crush and Pinch Points
Width 6 5/8 inch
Height 4 inch



16
113246F0704
Nip Hazard
Width 7 inch
Height 4 1/2 inch



17
113427F1006
Crush Hazard
Width 10 inch
Height 6 inch



18
113250F1006
Crush and Pinch Hazard
Width 10 inch
Height 6 inch

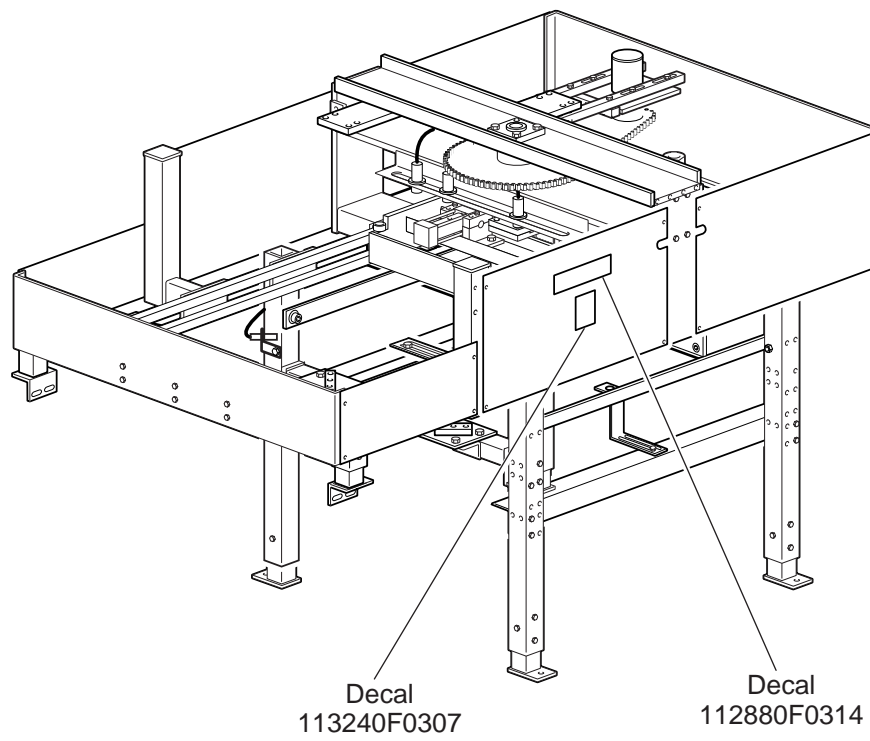


Figure A Decals

SECTION 1

INTRODUCTION

1.1 OVERVIEW

The harmonic depalleter removes the cured product from steel manufacturing pallets. The machine is called a “harmonic depalleter” because the speed of its pusher plate varies during the depalleting process, moving product off each pallet in a gentle but efficient manner. Refer to Section 1.1.3 for a detailed summary of operation.

1.1.1 Terms and Abbreviations

The following terms and abbreviations are used throughout this manual.

- ACR Auto Control Relay
- bar Unit of Pressure
- CB Circuit Breaker
- DEP Depalleter
- gpm Gallons Per Minute
- lpm Liters Per Minute

- LS Limit Switch
- PER Photoelectric Cell
- PRS Proximity Sensor
- psi Pounds Per Square Inch
- UC Unloading Conveyor
- vac Volts, Alternating Current

1.1.2 Depalleter Configuration

The six-at-a-time depalleter operates in a Pallet Straight Thru orientation. Essentially, the two depalleters work simultaneously to unload the pallets. The first pallet enters the first depalleter from the side and moves through to the second depalleter. The second pallet immediately follows the first pallet and remains in the depalleter. Product is pushed off the pallet either to the left or right. Each empty pallet continues straight through the depalleter, down the unloading conveyor to the pallet return conveyor. Refer to Figure 1.1.

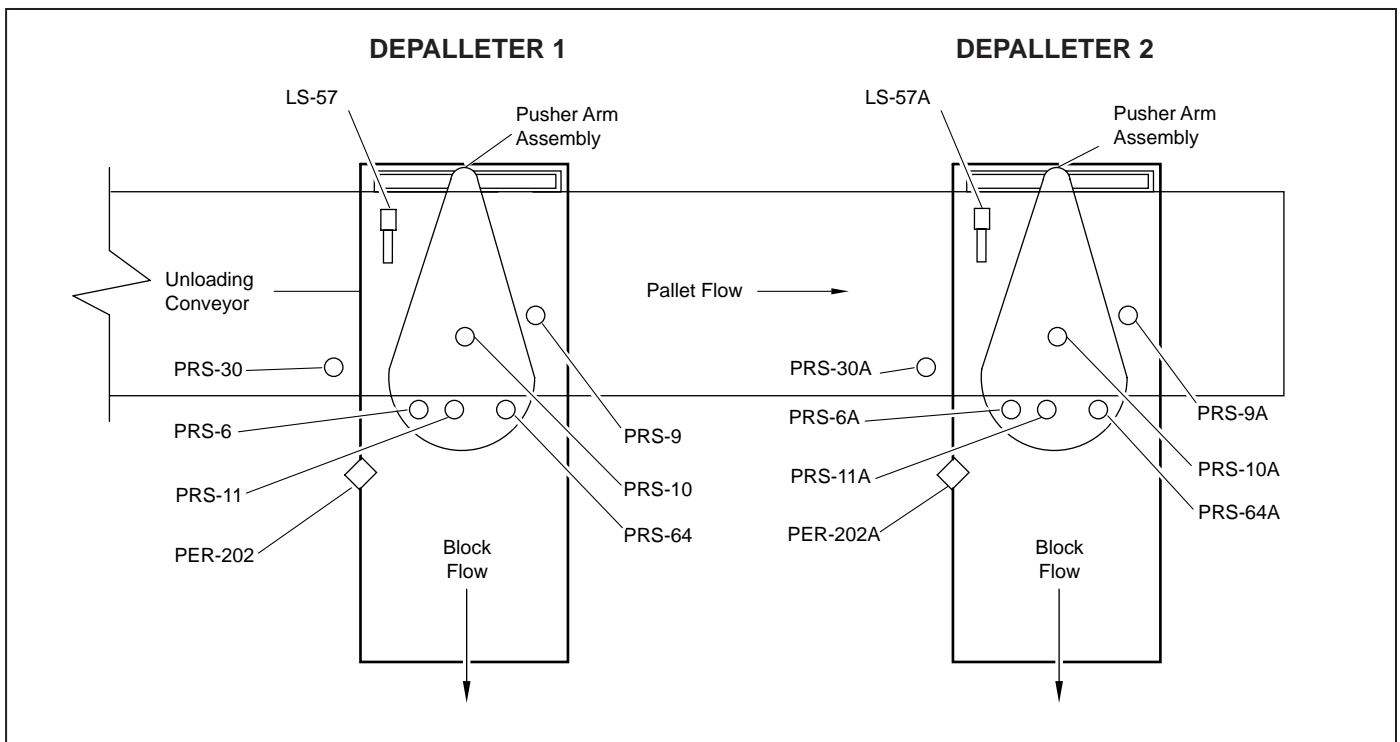


Figure 1.1 Harmonic Depalleter, Pallet Straight Thru Orientation & Component Location

1.1.3 Summary of Operation

Each of the two depalleters operate in a similar manner. The harmonic depalleters operate as follows:

1. Cured, palletted product moves into the harmonic depalleter from the unloading conveyor.
2. The Depalleter 1 allows the first pallet to pass through to the Depalleter 2. As the Depalleter 2 begins its action, a new pallet moves into Depalleter 1.
3. The pusher plate begins its motion slowly so that it gently contacts the incoming product.
4. As the product begins to move, pusher plate speed gradually increases.
5. When the pusher plate nears its full forward position, it slows down once again to ensure smooth product release.
6. The pusher plate speeds up as it returns to its starting position.
7. The empty pallet is ejected onto the pallet return conveyor.
8. The cycle repeats.

1.2 DESIGN CHARACTERISTICS

The harmonic depalleter is made of a heavy-duty welded steel frame that provides mounting capabilities for the following components:

- Single mechanism with harmonic crank arm to remove concrete products from the pallet.
- Hydraulic motor, cylinder and controls to operate the pusher mechanism.
- Photoelectric cell, proximity sensors and limit switches to monitor the movement of pallets and components.
- Remote control station for operating the depalleter during setup, maintenance or troubleshooting.

SECTION 2 OPERATION

2.1 MODES OF OPERATION

The depalleter switch on the Remote Control Station allows you to select and change the depalleter's current mode of operation. There are three selections available: hand, off, and auto. Place the depalleter switch in the desired position. See Figure 2.1.

2.1.1 Manual (HAND) Mode

Select the hand mode to manually control depalleter operation. This mode allows you to control most depalleter functions for setup, maintenance, or troubleshooting purposes. Manually-controlled operations include:

- Depalleter Forward
- Depalleter Reverse
- Pusher Up
- Pusher Down
- Emergency Stop

The depalleter pusher and pallet transfer joysticks allow you to control these operations.

2.1.2 Off Mode

Place the depalleter switch in the off position to turn off power to the depalleter machine and shut down all operations of the depalleter and unloading conveyors.

2.1.3 Automatic (AUTO) Mode

Select the automatic mode for normal production cycling. In this mode, the system controls all depalleter operations. While in automatic mode, loaded pallets automatically move into and out of the depalleter. Refer to Section 2.2 for more information on auto mode sequence.

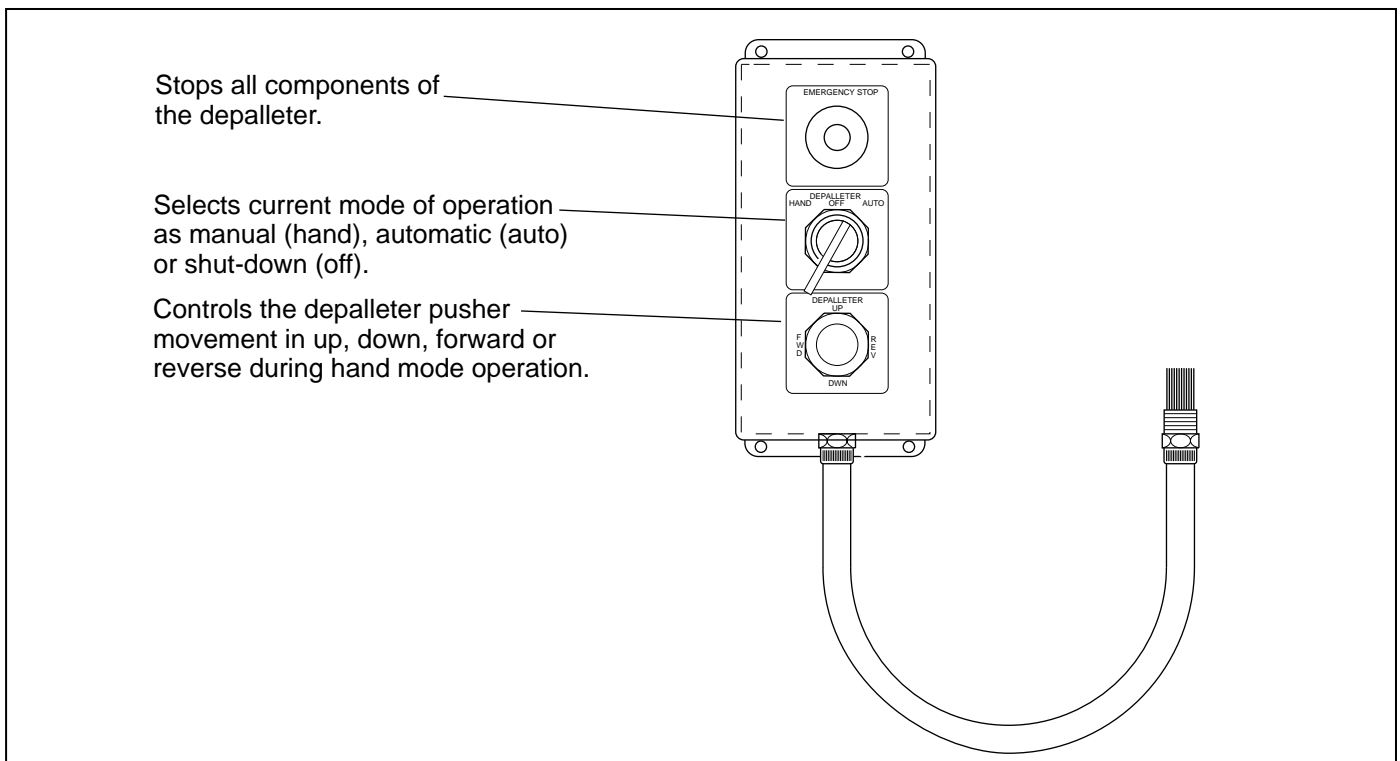


Figure 2.1 Remote Control Station

2.2 SEQUENCE OF OPERATION

This section explains the sequence of auto mode operation for the harmonic depalleter. As previously mentioned, the auto mode automatically controls all depalleter operations for normal production cycling. To activate the auto mode, place the Remote Control Station depalleter switch in the auto position.

2.2.1 Sequence of Operation

This section outlines the operation sequence for the harmonic depalleter. Section 1, Figure 1.1, includes a depalleter diagram that identifies the location of the proximity sensors, limit switches and photoeye.

2.2.1.1 Initial Starting Conditions

1. Pallet unloading switch on.
2. Depalleter 1 E-Stop switch on.
3. Depalleter 2 E-Stop switch on.
4. Rollover E-Stop switch on.
5. Depalleter 1 hand/off/auto switch to auto position.
6. Depalleter 2 hand/off/auto switch to auto position.
7. Depalleter 1 pusher travels to home position.
8. Depalleter 2 pusher travels to home position.
9. Depalleter 1 pusher travels to down position.
10. Depalleter 2 pusher travels to down position.
11. Select Depalleter 1, Depalleter 2 or both.
12. Unloading Conveyor 1 running.
13. Unloading Conveyor 2 running.
14. Unloading Conveyor 3 running.
15. Unloading Conveyor 4 running.
16. Unloading Conveyor 5 running.
17. Pallet transfer conveyor travels to home position.
18. **For depalleters equipped with block turnover:** If so-equipped, the block turnover mechanism travels to home position.
19. Pallet return conveyor running.
20. Block machine pallet magazine not full.

2.2.1.2 Depalleter 1 Operation

1. Palletized product enters Depalleter 1.
2. PER-202 senses concrete product on the first pallet.
3. The pallet passes through to Depalleter 2.
4. PER-202A senses the concrete product on the first pallet in Depalleter 2.
5. Palletized product enters Depalleter 1.
6. PER-202 senses concrete product on the second pallet.
7. Unloading conveyor 2 stops momentarily when the pallet trips PRS-9.
8. Next pallet trips PRS-30.
9. Unloading conveyor 1 stops momentarily.
10. Crank arm rotates clockwise (as viewed from above) and moves Depalleter 1 pusher assembly forward.
11. Pusher strips product from pallet.
12. Crank arm trips PRS-64.
13. Unloading conveyor 2 re-starts.
14. Pallet moves off PRS-9.
15. Unloading conveyor 1 re-starts.
16. Crank arm trips PRS-11.
17. Pusher begins to raise.
18. Crank arm releases PRS-11.
19. Crank arm stops if pusher is not up.
20. Depalleter pusher raises up fully.
21. Crank arm continues to rotate.
22. Crank arm returns to home position and stops.
23. Pusher begins downward motion.
24. The entire cycle repeats.

2.2.1.3 Depalleter 2 Operation

1. Palletized product enters Depalleter 2.
2. PER-202A senses concrete product on the pallet.
3. Pallet trips PRS-9A.
4. Unloading conveyor 4 stops momentarily.
5. Next pallet trips PRS-30A.
6. Unloading conveyor 3 stops momentarily.
7. Depalleter 2 pusher assembly moves forward.
8. Pusher strips product from pallet.
9. Crank arm trips PRS-64A.
10. Unloading conveyor 4 re-starts.
11. Pallet moves off PRS-9A.
12. Unloading conveyor 3 re-starts.
13. Crank arm trips PRS-11A.
14. Pusher begins to raise.
15. Crank arm releases PRS-11A.
16. Crank arm stops if pusher is not up.
17. Depalleter pusher raises up fully.
18. Crank arm continues to rotate.
19. Crank arm returns to home position and stops.
20. Pusher begins downward motion.
21. The entire cycle repeats.

2.3 START-UP PROCEDURE

Before starting the depalleter, walk around the machine and perform a thorough visual inspection. Ensure there are no pallets in the depalleter and that the pusher arm is in its home position (down and back).

When the depalleter is clean and ready for use, refer to the following procedure to start the machine:

1. Place the dep & pal/ret off/on switch, located on the graphic control station, in the on position.
2. Place the hand/off/auto switch on the remote control station in the:
 - auto position (to run the depalleter in the automatic mode), or
 - hand position (to run the depalleter in manual mode).
3. Configure the unloading conveyor to run in manual or automatic mode, depending on the depalleter mode selected in Step 2. Turn on the unloading conveyor system to begin transferring loaded pallets to the depalleter.
4. Follow the sequence of operation as described in Section 2.2 for automatic mode, or use the manual mode.

2.4 SHUT-DOWN PROCEDURES

There are separate procedures for normal and emergency depalleter shut-down.

2.4.1 Normal Shut-down

The normal shut-down procedure for the harmonic depalleter is as follows:

1. When the last loaded pallet has been transferred to the depalleter, turn off the unloading conveyor that supplies loaded pallets.
2. Place the hand/off/auto switch on the remote control station in the off position.
3. Place the dep & pal ret off/on switch located on the graphic control station in the off position.

2.4.2 Emergency Shut-down

To shut down the depalleter in the event of an emergency situation, press the E-Stop button on the Remote Control Station or the Besser-Matic Graphic Control Station.

SECTION 3

MAINTENANCE INSTRUCTIONS

3.1 GENERAL

This section highlights important service and maintenance procedures required to maximize the depalleter's operating life and ensure optimum performance. Major topics include:

- 3.2 Service Schedule
- 3.3 Lubrication Schedule
- 3.4 Periodic Inspection
- 3.5 Adjustments

3.2 SERVICE SCHEDULE

Table 3.1 shows the service schedule for the harmonic depalleter. The table lists:

- Items requiring service
- The type of service required
- Recommended service intervals

Table 3.1 Service Schedule

Item Description	Service	Interval (Operating Days)
Guards & Safety Signs	Inspection	1
Electrical Conduit	Inspection	1
Hydraulic Lines	Inspection	1
Proximity Sensors	Inspection and adjustment (if necessary)	5
Limit Switches	Inspection and adjustment (if necessary)	5
Pusher Plate	Angular contact inspection and adjustment (if necessary)	5
Extension Plate Height (Depalleter)	Inspection and adjustment	5
Flanged Cartridges (Depalleter)	Lubrication	30
Hydraulic Cylinder Pivot Brackets and Clevis Pin	Lubrication	30
Cam Followers	Lubrication	30
Camrol Bearings	Lubrication	30

3.3 LUBRICATION SCHEDULE

Regularly lubricating the depalleter's moving parts is required to maintain optimum performance. Table 3.2 identifies all depalleter and optional turntable lubrication points. Figure 3.1 shows the location of these lubrication points. Figure 3.2 shows the lubrication points for the optional turntable.

NOTE:

Besser recommends that you grease all lubrication points at 80-hour intervals. Use Mobilux EP#1 lubricant (or equivalent).

Table 3-2. Lubrication Schedule

Depalleter

- Flange Cartridges, Crank Arm Shaft (A)
- Flange Cartridges, Pusher Pivot Arm (B)
- Hydraulic Cylinder Pivot Brackets (C)
- Hydraulic Cylinder Clevis Pin (D)
- Cam Follower, Crank Arm (E)
- Camrol Bearings (F)

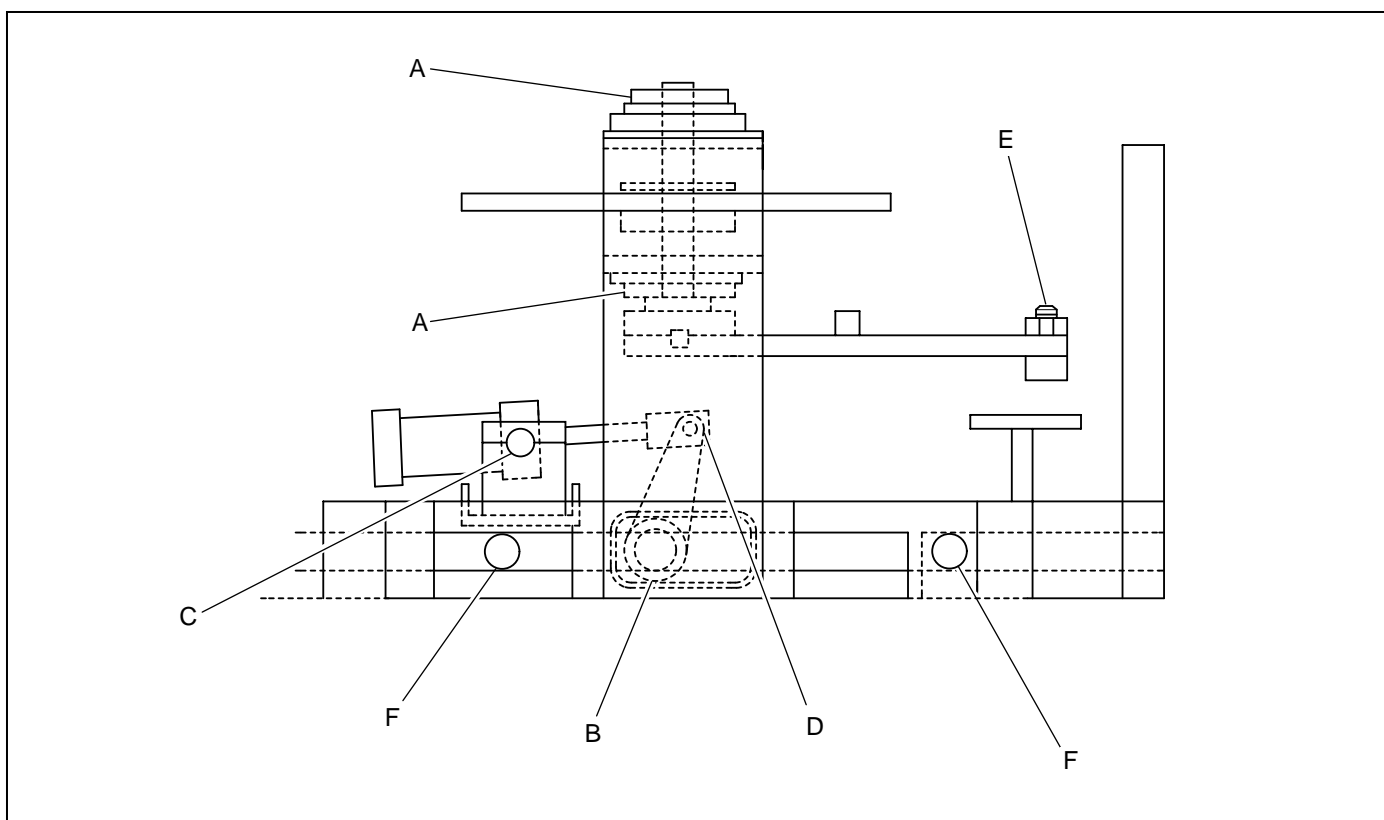


Figure 3.1 *Lubrication Points, Depalleter*

3.4 PERIODIC INSPECTION

In addition to lubricating the depalleter at regular intervals, inspect the machine often. Periodic inspection consists of the following steps:

1. Before starting the depalleter, walk around the equipment and ensure it is free of dirt buildup, rags, tools and scrap.
2. Visually inspect all electrical conduit for loose connections.
3. Visually inspect all hydraulic lines for damage to fittings, hoses or connections.
4. Visually inspect guards and safety signs. They should be attached and readable.
5. When the depalleter begins operation, observe the movement of full and empty pallets through the depalleter. Also, ensure the depalleter smoothly moves product onto the extension plate. Refer to section 3.5.3 if adjustments are required.

3.5 ADJUSTMENTS

If your periodic inspection indicates the need to to adjust certain components of the harmonic depalleter, refer to the following adjustment procedures:

- 3.5.1 Depalleter Adjustments
- 3.5.2 Sensor Adjustments
- 3.5.3 Speed Adjustments

3.5.1 Depalleter Adjustments

You may need to perform one or more of these depalleter adjustments periodically to compensate for normal wear.

3.5.1.1 Depalleter/Extension Plate Height

This procedure adjusts the depalleter with reference to the extension plate.

1. Obtain a clean, level pallet and rest it on the unloading conveyor chain, pallet return conveyor rollers or depalleter table rollers (depending on depalleter model).
2. Adjust depalleter leg extensions to obtain a 1/16 inch [1.6 mm] drop between the top of the pallet and the top of the extension plate. Refer to Figure 3.2.
3. After leveling the depalleter and obtaining the proper height weld the leg extensions and anchor them to the floor with 3/4 inch [19 mm] anchor bolts.
4. If further leveling is necessary, you can insert shims under the extension plates to obtain the 1/16 inch [1.6 mm] height difference.

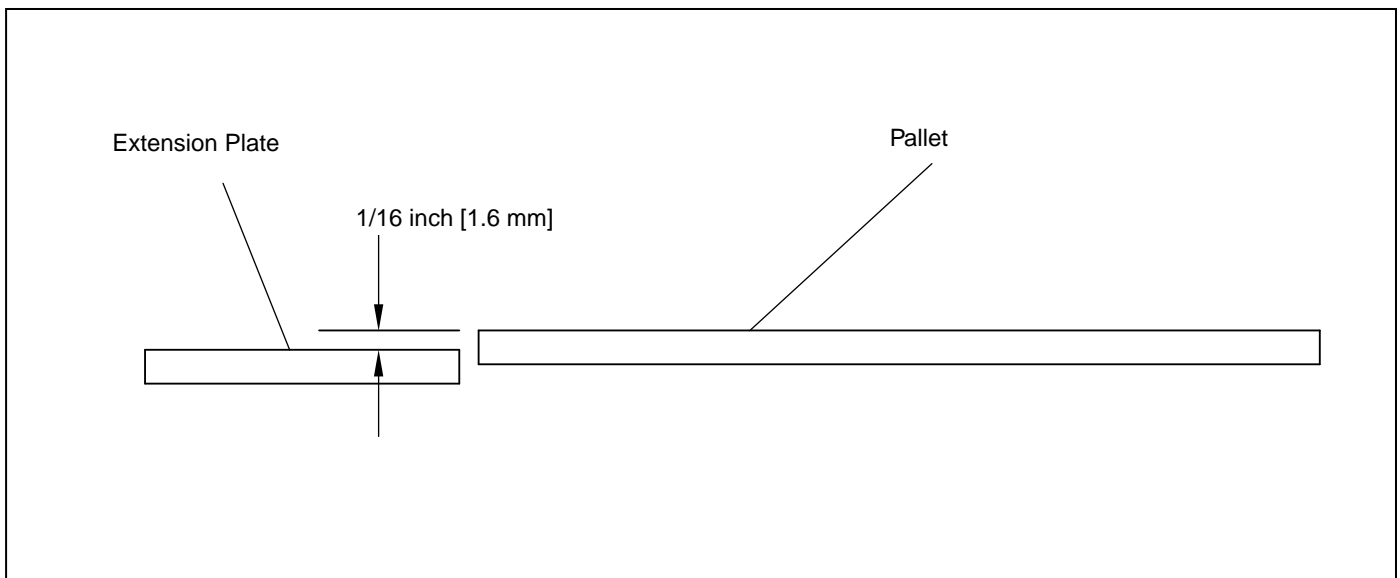


Figure 3.2 Depalleter Height Adjustment

3.5.1.2 Pusher Plate/Product Contact Angle

There must be a slight gap at the top of the pusher plate where it contacts the block as shown in Figure 3.3. This ensures proper contact, preventing the product from tipping forward and minimizing damage.

Refer to the following procedure to adjust the contact angle:

1. Place the pusher plate in the down position.
2. Extend the hydraulic cylinder as shown in Figure 3.4 to point (A).
3. Adjust the cylinder mounting bracket (B) to obtain a 1/16 inch [1.6 mm] gap (C) at the top of the pusher plate.

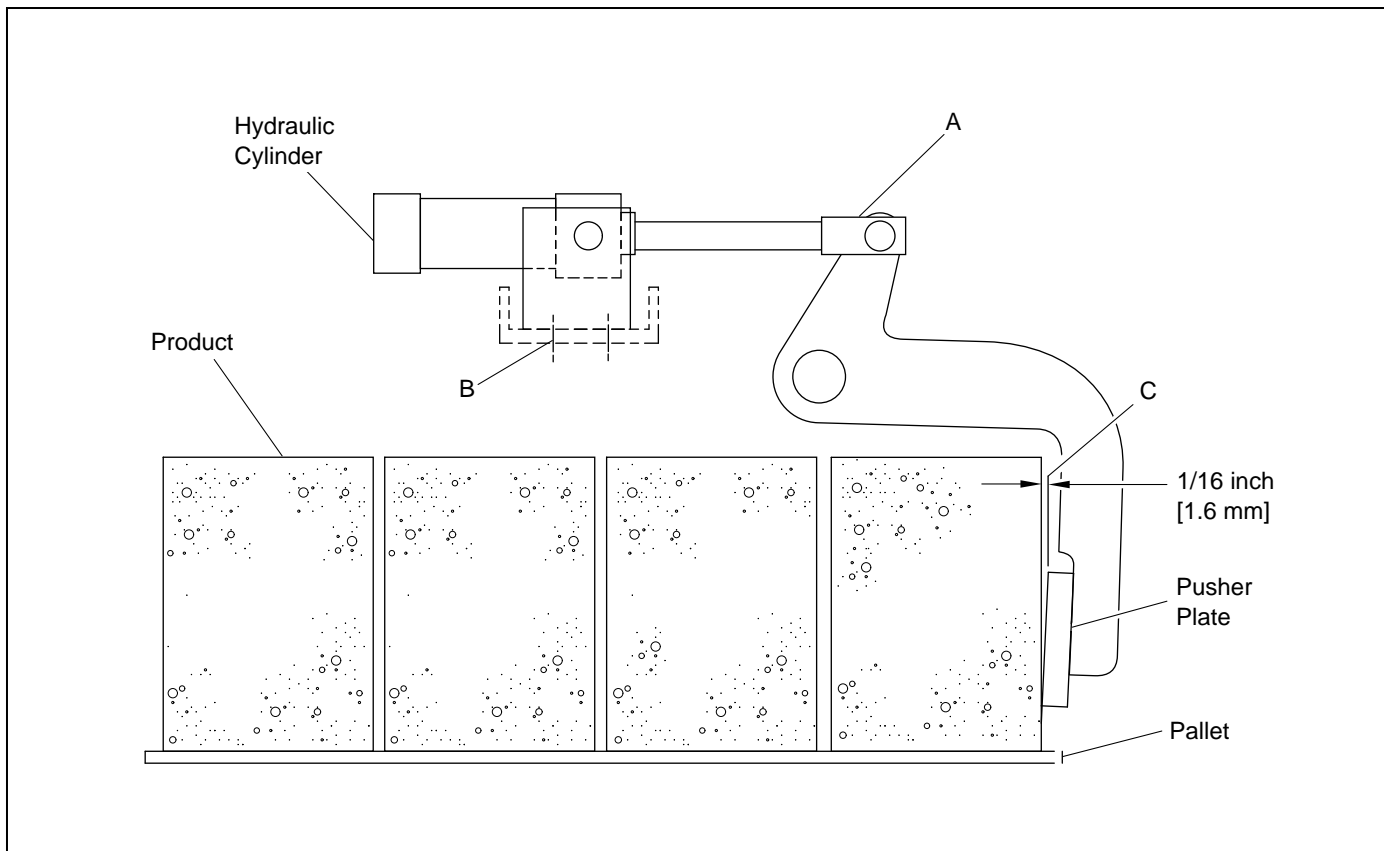


Figure 3.3 Angular Adjustment for the Pusher Plate

3.5.2 Sensor Adjustments

Inspect the proximity sensors and limit switches periodically for proper operation. Correct sensor adjustment is described below. The sensor numbers for DP1 have an “A” next to them for DP2. The procedure is the same. Refer to Figure 3.4 for sensor locations.

1. Adjust PRS-9 or PRS-9A so that it is 1/4 inch [6 mm] below the bottom of the pallet. Position the sensor so that the pallet comes to a stop at the center of the depalleter.
2. Adjust PRS-64 or PRS-64A to restart the unloading conveyor when:
 - The product has been removed from the pallet, and
 - The pusher plate is 1 inch [25 mm] beyond the edge of the pallet.
3. Adjust PRS-11 or PRS-11A so that the pusher plate reaches its forward-most position with the pusher plate down.
4. Adjust PRS-6 or PRS-6A to signal the depalleter when the pallet is in the forward position and ready for the turnover device.
5. Adjust PER-202 or PER 202A so that the pusher plate moves forward at the start of a cycle.
6. Adjust PRS-30 or PRS-30A so that the second pallet that comes in contact will stop conveyor one.
7. Adjust LS-57 or LS-57A so that it can be triggered in either direction. When the hydraulic cylinder is fully extended and the pusher plate is down, the switch should be triggered in a counterclockwise direction. When the hydraulic cylinder is fully retracted and the pusher plate is up, the switch should be triggered in a clockwise direction.
8. Adjust PRS-10 or PRS-10A so that it triggers when the pusher plate reaches its farthest return position with the pusher plate up (pusher plate home position).

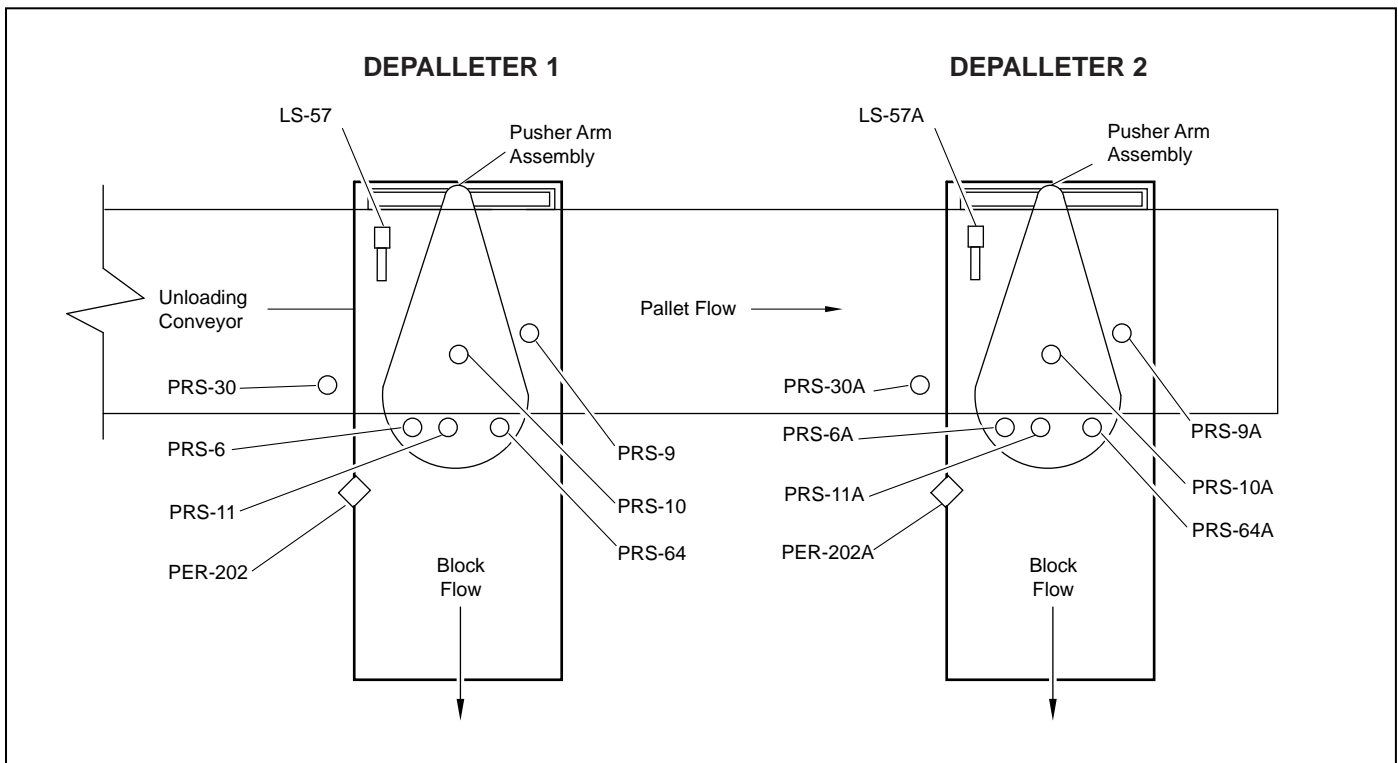


Figure 3.4 Sensor Locations, Pallet Straight Thru Orientation

3.5.3 Speed Adjustments

The hydraulic speed must be properly adjusted to maintain optimum depalletter operating efficiency. The machine provides a hydraulic flow control adjustment for each of the three pusher plate motions: forward/reverse, up, and down.

Besser recommends a six-second cycle which breaks down as follows:

- Five seconds for a complete forward/reverse motion of the pusher assembly.
- One-half second for the up motion of the pusher plate.
- One-half second for the down motion of the pusher plate.

Refer to the following procedure to adjust pusher-plate motion speed:

1. Turn the crank arm drive flow control valve clockwise to decrease the speed and counterclockwise to increase the speed. Refer to Figure 3.5. The forward/reverse motion should be set to obtain a five-second cycle.

2. Turn the pusher plate up flow control valve clockwise to decrease the speed and counterclockwise to increase the speed. Refer to Figure 3.5.

NOTE:

Crank arm speed, PRS-11 or PRS-11A position, and the up speed are all interdependent. The up speed adjustment is the key adjustment because pusher plate up motion must be fast enough to trigger LS-57 or LS-57A in a clockwise direction before the crank arm releases PRS-11 or PRS-11A. If the up speed is too slow, pusher plate up/down motion will be interrupted.

3. Turning the pusher plate down flow control adjustment clockwise to decrease the speed and counterclockwise to increase the speed. Adjust the pusher plate down motion so it takes one-half second to fully lower the pusher plate. Refer to Figure 3.5.

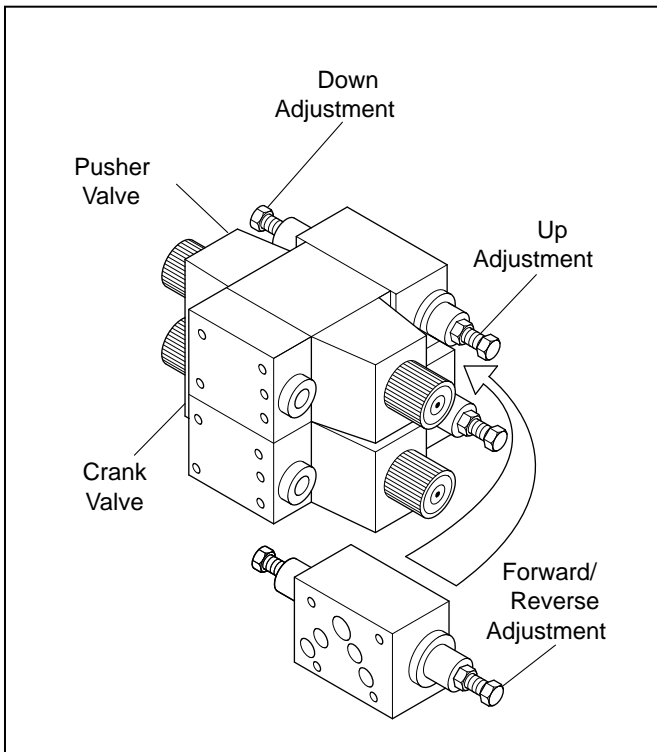


Figure 3.5 Hydraulic Flow Controls

SECTION 4 TROUBLESHOOTING

4.1 TROUBLESHOOTING TABLES

Potential problems exist for each system of the harmonic depalleter. The following tables will help you troubleshoot and repair such problems:

- **Table 4.1:** General Electrical Troubleshooting
- **Table 4.2:** Depalleter Troubleshooting
- **Table 4.3:** Device Input/Output

Table 4.1 General Electrical Troubleshooting

Trouble	Probable Cause	Corrective Action
A. Depalleter does not operate.	1. Pallet unloading switch on spade control station is turned off.	1. Turn on switch.
	2. Hand/off/auto switch on remote control station is placed in the off position.	2. Turn switch to the auto position to operate the depalleter in the automatic mode.
	3. Unloader is not in hand or auto position.	3. Turn Unloader switch to hand or auto.
	4. One of the E-Stop switches is off.	4. Pull out E-Stop switches.
B. Depalleter drive does not move in the forward direction.	1. Circuit breaker (120CB) or (138CB) is open.	1. Determine what caused circuit breaker to open, correct the condition and close the circuit breaker.
	2. Proximity sensor (PRS-10) or PRS-10A) is not tripped.	2. Determine cause and make repair. Manually rotate crank over PRS-10 or PRS-10A.
	3. Solenoid is faulty.	3. Refer to Table 4.2, Trouble A.
	4. Limit switch (LS-57 or LS-57A) is not tripped.	4. Determine cause and repair. Manually lower pusher.

Table 4.1 General Electrical Troubleshooting – Continued

Trouble	Probable Cause	Corrective Action
C. Pusher does not operate in the up direction.	1. Circuit breaker (121CB or 139CB) is open.	1. Determine what caused circuit breaker to open, correct the condition and close the circuit breaker.
	2. Solenoid is faulty.	2. Refer to Table 4.2, Trouble A.
D. Pusher does not operate in the down direction.	1. Circuit breaker (122CB or 140CB) is open.	1. Determine what caused circuit breaker to open, correct the condition and close the circuit breaker.
	2. Solenoid is faulty.	2. Refer to Table 4.2, Trouble A.

Table 4.2 Depalleter Troubleshooting

Trouble	Probable Cause	Corrective Action
A. A given hydraulic solenoid valve fails to open during operation.	<ol style="list-style-type: none">1. Wiring between controller and solenoid valve is faulty.2. Solenoid is faulty.	<ol style="list-style-type: none">1. Repair or replace faulty wiring.2. Repair or replace faulty solenoid.
B. Hydraulic pump does not operate.	<ol style="list-style-type: none">1. Hydraulic reservoir is low.	<ol style="list-style-type: none">1. Refill reservoir with hydraulic fluid.
C. Hydraulic pressure is acceptable, but pusher cylinder and motor operate slowly.	<ol style="list-style-type: none">1. Check valve is dirty or clogged.	<ol style="list-style-type: none">1. Clean, repair or replace check valve.
D. Hydraulic motor for pusher operates too slowly, too fast, or not at all in a given direction.	<ol style="list-style-type: none">1. Flow control for indicated direction is closed or requires adjustment.	<ol style="list-style-type: none">1. Adjust flow control as described in Section 3.5.3.
E. Pusher cylinder operates too slowly, too fast, or not at all in a given direction.	<ol style="list-style-type: none">1. Flow control for indicated direction is closed or requires adjustment.	<ol style="list-style-type: none">1. Adjust flow control as described in Section 3.5.3.
F. Pallet does not come to stop in middle of the depalleter.	<ol style="list-style-type: none">1. Proximity sensor (PRS-9 or PRS-9A) requires adjustment.2. Conveyor brake not working or requires adjustment.	<ol style="list-style-type: none">1. Adjust proximity sensor as described in Section 3.5.2.
G. Pusher plate does not move forward at the start of a cycle.	<ol style="list-style-type: none">1. Limit switch (LS-57 or LS-57A) requires adjustment.2. Photocell (PER-202 or PER-202A) requires adjustment.	<ol style="list-style-type: none">1. Adjust limit switch as described in Section 3.5.2.2. Adjust photocell as described in Section 3.5.2.
H. Unloading conveyor starts before product is removed from pallet and pusher plate has cleared the pallet.	<ol style="list-style-type: none">1. Proximity sensor (PRS-64 or PRS-64A) requires adjustment.	<ol style="list-style-type: none">1. Adjust proximity sensor as described in Section 3.5.2.

Table 4.2 Depalleter Troubleshooting – Continued

Trouble	Probable Cause	Corrective Action
I. Pusher plate raises up before it reaches its forward-most position.	1. Proximity sensor (PRS-11 or PRS-11A) requires adjustment.	1. Adjust proximity sensor as described in Section 3.5.2.
J. Forward and backward movement of the pusher plate is not smooth or is interrupted.	1. Limit switch (LS-57 or LS-57A) requires adjustment.	1. Adjust limit switch as described in Section 3.5.2.
K. Product hangs up when being removed from pallet.	1. Extension plate requires adjustment.	1. Adjust extension plate as described in Section 3.5.1.1.
L. Product is damaged or tips forward when moved.	1. Pusher plate requires angular adjustment.	1. Adjust angle of pusher plate as described in Section 3.5.1.2.

Table 4.3 Device Input/Output

Sequence Number	Description	Device	Input	Output
A. Initial Starting Conditions				
1	Pallet Unloading switch on.	—	—	—
2	Depalleter 1 E-Stop switch on.	—	—	—
3	Depalleter 2 E-Stop switch on.	—	—	—
4	Rollover E-Stop switch on.	—	—	—
5	Depalleter 1 hand/off/auto switch in auto.	—	I:13/0	—
6	Depalleter 2 hand/off/auto switch in auto.	—	I:14/0	—
7	Depalleter 1 pusher home.	PRS-10	I:13/2	—
8	Depalleter 2 pusher home.	PRS-10A	I:14/2	—
9	Depalleter 1 pusher down.	LS-57	I:13/5	—
10	Depalleter 2 pusher down.	LS-57A	I:14/5	—
11	Select Depalleter 1, Depalleter 2 or both.	—	—	—
12	Unloading Conveyor 1 running.	UC1	—	O:16/0
13	Unloading Conveyor 2 running.	UC2	—	O:16/1
14	Unloading Conveyor 3 running.	UC3	—	O:16/2
15	Unloading Conveyor 4 running.	UC4	—	O:16/3
16	Unloading Conveyor 5 running .	UC5	—	O:16/4
17	Pallet rollover home.	PRS-640	I:8/3	—
18	Pallet return conveyor running.	—	—	O:16/6
19	Block machine pallet magazine not full.	PRS-18	I:8/12	—

Table 4.3 Device Input/Output – Continued

Sequence Number	Description	Device	Input	Output
B. Sequence of Operation Depalleter 1				
1	Pallet enters Depalleter 1.	UC2	—	O:16/1
2	Concrete product is sensed on the pallet.	PER-202	I:13/10	—
3	Pallet is passed on to Depalleter 2.	UC2	—	O:16/1
4	Concrete product is sensed on the next pallet.	PER-202	I:13/10	—
5	Pallet is passed on to Depalleter 2.	UC2	—	O:16/1
6	Note: When concrete products are not sensed on the pallets, they are passed on and not counted.			
7	Concrete product is sensed on the next pallet.	PER-202	I:13/10	—
8	Unloading Conveyor 2 stops when the pallet trips PRS-9.	PRS-9	I:13/8	—
9	Unloading Conveyor 1 stops when the next pallet trips PRS-30.	—	I:13/9	—
10	Depalleter 1 pusher moves forward.	DEP FWD	—	O:15/0
11	Crank arm trips PRS-64.	PRS-64	I:13/6	—
12	Unloading Conveyor 2 restarts if UC3 is running.	UC2	—	O:16/1
13	Unloading Conveyor 1 restarts when the pallet leaves PRS-9.	UC1	—	O:16/0
14	Crank arm trips PRS-11.	PRS-11	I:13/3	—
15	Pusher raises.	PUSHER UP	—	O:15/1
16	Crank arm releases PRS-11.	PRS-11	not I:13/3	—
17	Crank arm stops if pusher is not up.	DEP FWD	—	not O:15/0
18	Pusher raises fully up.	LS-57	I:13/4	—
19	Crank arm continues.	DEP FWD	—	O:15/0
20	Depalleter crank arm stops at home.	PRS-10	I:13:2	—
21	Depalleter pusher starts down.	PUSHER DWN	—	O:15/2

Table 4.3 Device Input/Output – Continued

Sequence Number	Description	Device	Input	Output
C. Sequence of Operation Depalleter 2				
22	Pallet enters Depalleter 2.	UC4	—	O:16/3
23	Concrete product is sensed on the pallet.	PER-202A	I:14/10	—
24	Note: When concrete products are not sensed on the pallets, they are passed on and not counted.			
25	Unloading Conveyor 4 stops when the pallet trips PRS-9A.	PRS-9A	I:14/8	—
26	Unloading Conveyor 3 stops when the next pallet trips PRS-30A.	PRS-30A	I:14/9	—
27	Depalleter 2 pusher moves forward.	DEP FWD	—	O:15/4
28	Crank arm trips PRS-64A.	PRS-64A	I:14/6	—
29	Unloading Conveyor 4 restarts if Unloading Conveyor 5 is running.	UC4	—	O:16/3
30	Unloading Conveyor 3 restarts when the pallet leaves PRS-9A.	UC3	—	O:16/2
31	Crank arm trips PRS-11A.	PRS-11A	I:14/9	—
32	Pusher raises.	PUSHER UP	—	—
33	Crank arm releases PRS-11A.	PRS-11A	not I:14/3	—
34	Crank arm stops if pusher is not up.	DEP FWD	—	not O:15/4
35	Pusher raises fully up.	LS-57A	I:14/4	—
36	Crank arm continues.	DEP FWD	—	O:15/4
37	Crank arm stops at home.	PRS-10A	I:14/2	—
38	Depalleter pusher starts down.	PUSHER DWN	—	O:15/6

