

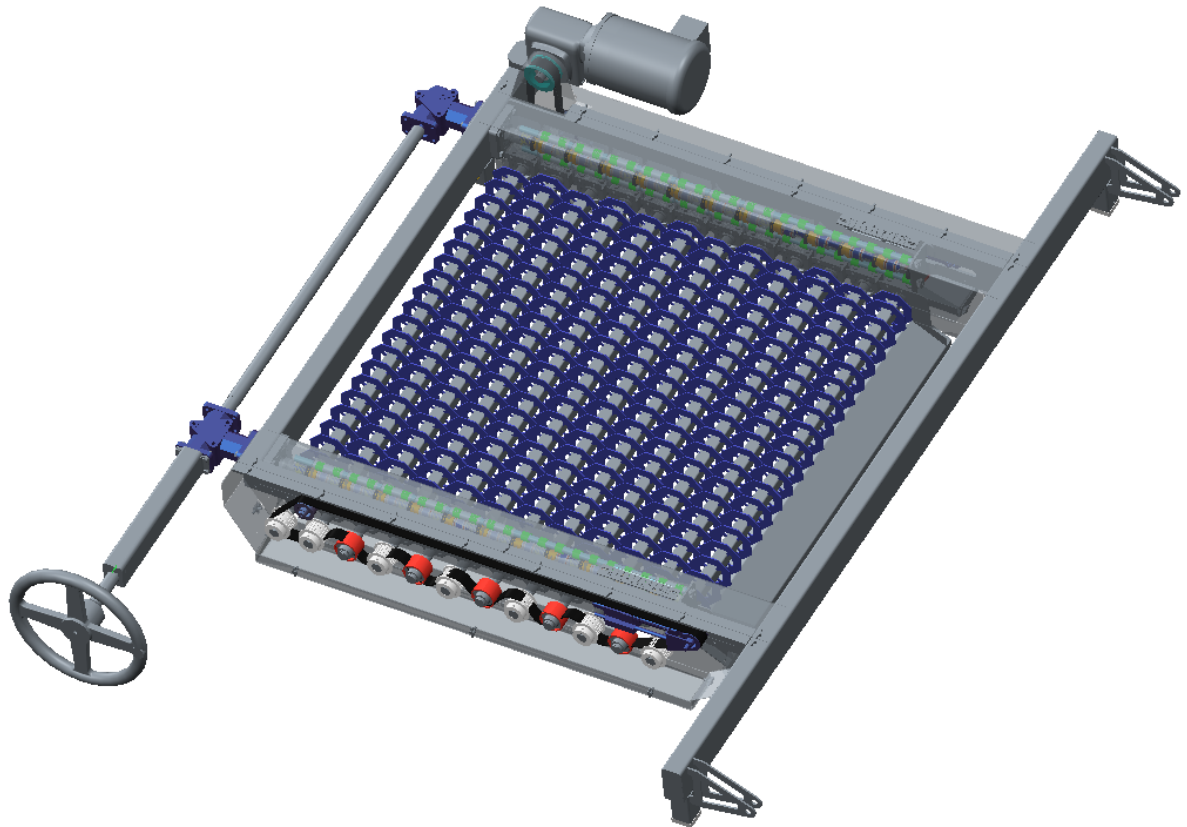
OPERATING AND MAINTENANCE

MANUAL FOR

PPM Technologies

12-STAGE

CHIP SIZER



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PPM Technologies reserves the right to alter at any time, without notice and without liability or other obligations on its part, materials, equipment specifications, and models. PPM Technologies also reserves the right to discontinue the manufacture of models, parts, and components thereof.

TABLE OF CONTENTS

SECTION		PAGE
1	PPM Chip Sizers	
1.1	Introduction	3
1.2	General Precautions	3
1.3	Warranty Information	4
2	Installation	4
2.1	Uncrating	4
2.2	Mounting	4
2.3	Electrical Requirements	5
2.4	Pneumatic Lift System Requirements	5
3	Operation	5
3.1	Chip Sizer Operation	5
3.2	Adjustment Mechanism Operation	6
3.3	Pneumatic Lift System Operation	6
3.4	Chutes	6
4	Maintenance	7
4.1	Lubrication	7
4.2	Belt Replacement	7
4.3	Pneumatic Lift System Adjustment	8
4.4	Recommended Spare Parts	9
5	Trouble Shooting Guide	10
5.1	Adjustment Mechanism	10
5.2	Belts	11
5.3	Pneumatic Lift System	12
6	General Notes	14
7	Return Merchandise Procedure	14
8	LOST OR DAMAGE GOODS	15
Appendix A	Cap Screw Identification	16
Appendix B	Miscellaneous Parts Identification	17
Appendix C	Recommended Torque Chart	18
Appendix D	Reference Drawings and General Assembly	19

PPM Technologies reserves the right to make changes to the design, materials, and specification of the equipment described in this document without obligation to notify any person or organization of the revision of change. PPM Technologies further reserves the right to discontinue the manufacture and sale of any components described in this document.

1 PPM CHIP SIZERS

1.1 Introduction

The PPM Chip Sizer features octagonal discs and square shafts that sort one input stream of product, by size, into two output streams. The adjustment mechanism changes the center to center distances of the shafts, allowing the operator to vary the sort as needed. Take away chutes are used to transfer the sorted product to the take away conveyor. The take away chutes are of polished stainless steel construction and have rounded corners. A pneumatic lift system rotates the sizer upward from the stand and chutes, allowing thorough sanitation of the machine.

This manual should be read completely before using the PPM Chip Sizer.

Failure to follow the operation and maintenance procedures contained in this manual could result in serious personal injury.

In the event that repair to the sizer is necessary, please take immediate corrective action to avoid possible injury to personnel and further damage to the machine.

1.2 General Precautions

Before connecting the power supply, make sure that the supply voltage and frequency corresponds to the equipment nameplate ratings, the equipment is properly grounded, and all conductors are adequately sized to carry the nameplate voltage and current.

Before working on any part of the chip sizer, always ensure that the electric power supply is disconnected and locked out.

Before operating the chip sizer, make sure that:

- Emergency stop switches are installed and clearly visible
- All of the guards and chute slides are in place
- The machine is clear of obstructions, shipping block, supports, and tools
- All bolted connections are tightened properly
- All personnel are clear and a safe distance away from machine

Never rigidly attach any equipment or conduit to the chip sizer.

Never lift the chip sizer assembly by the chip sizer itself. Always lift the assembly by the stand.

If bolts need to be replaced on the machine, always use replacement bolts that are equal or greater in strength to the original bolts. (See Appendix A: Cap screw Identification)

1.3 Warranty Information

PPM Technologies' warranty is available only to the original purchaser of this equipment and applies only to defects in material and workmanship for a period of one (1) year from the date of shipment. There are no other warranties that extend beyond the description of the goods at the time of sale, and no other warranties may be deemed made by or implied against PPM Technologies.

In addition, PPM Technologies' liability is limited to the repair or replacement, at its option, of any defective goods F.O.B. its place of business at Newberg, Oregon. PPM Technologies shall in no event be liable for any special, incidental or consequential damages or loss of product or production resulting from any defect in goods sold by it.

Unauthorized modifications to the chip sizer or the use of unauthorized replacement parts may damage the machine. Use only PPM Technologies approved replacement parts. PPM Technologies will not assume responsibility for equipment performance subsequent to unauthorized modifications or the use of unauthorized replacement parts.

The PPM Chip Sizer requires a soft start/stop electrical controller for proper operation. Failure to implement this controller may cause serious damage to the machine, or adversely affect the life of the machine's components. In the event that this controller is not used, PPM will not assume responsibility for defective materials, defective workmanship, or equipment performance at any time or for any period of time subsequent to shipment.

2 INSTALLATION

2.1 Uncrating

Inspect the shipping crate prior to opening for visible damage. Note any damage on the bill of lading and notify PPM Technologies. Care should be taken as you remove the shipping crate, and the equipment should be thoroughly examined for any damage that may have occurred during shipment. Check to ensure that there are no small parts left in the crate, such as belts, bolts, etc. Freight damaged goods are the responsibility of the customer and the shipping company. Equipment manuals are attached to the frame of the machine, or located inside the electrical control panels.

2.2 Mounting

Stainless steel stands with adjustable leg inserts are provided standard on PPM chip sizers. The leg insert ends in a steel pad, which should be bolted or grouted to the floor onsite. Adjustable leg inserts ending in a caster with a locking brake can be provided as an option.

When bolting the chip sizer legs to the floor, make sure that the center to center distance at the bottom of the stand legs is the same as the center to center distance at the top of the stand legs. This is necessary for the pneumatic lift system to function properly.

For sizers without wheels, locate the chip sizer in the desired location and fasten the legs to the deck or floor. Then, set the infeed and discharge elevations of the sizer by changing the position of the leg in the stand. These heights should not vary by more than 1/8" from those given on the drawing.

For sizers with wheels, locate the chip sizer in the desired location and engage the brakes on all four casters. Then, set the infeed and discharge elevations of the sizer by changing the position of the leg in the stand. These heights should not vary by more than 1/8" from those given on the drawing. **In this configuration, do not operate the chip sizer without first engaging the brakes on all of the casters.**

The chip sizer has been shipped with two pipes that are tack welded into the stand. These pipes are used to hold the bottom of the legs of the stand at the proper dimensions. When fastening the chip sizer to the deck or floor for operation, it is important that the stand is mounted square and this dimension is held. This will ensure that the pneumatic lift kit functions properly.

2.3 Electrical Requirements

The chip sizer is supplied with a stainless steel wash-down duty motor. The 12-stage chip sizer is powered with a ½-hp motor. This motor operates at 1800 RPM, 460/230V, 3 phase, and 60 hertz.

The chip sizer is also supplied with a pull-cord emergency stop. This emergency stop is mounted, but not pre-wired so that it may be integrated into existing control systems. Make sure that the pull-cord emergency stop is functional before operating the machine.

To operate properly, the chip sizer requires a soft start/stop electrical controller. This is not provided standard with the chip sizer. The controller should be set for a 3-second ramp on startup, and a 2-second ramp on shutdown. **The chip sizer must be operated in conjunction with this controller, or the warranty, in its entirety, is void.**

2.4 Pneumatic Lift System Requirements

The pneumatic lift system requires a minimum air pressure of 70 psi to operate properly. The maximum allowable air pressure is 125 psi. Air pressures in excess of 125 psi may cause damage to the valves in the pneumatic lift system, and create a safety hazard during lift kit operation.

Under no circumstances is the mechanical lock to be removed from the pneumatic lift system.

3 OPERATION

3.1 Chip Sizer Operation

The normal operating speed of the product shafts is 150 RPM. This is the optimal speed for the best sorting efficiency and should not be changed.

The following is a list of the capacity of each of the sizers in the PPM Chip Sizer Line:

<u>Configuration</u>	<u>Width</u>	<u>Capacity</u>
Single Tier, 12-Stage	41"	3100 lbs. Per Hour
Single Tier, 12-Stage	64"	4800 lbs. Per Hour

Exceeding the above capacities should be avoided, as this will cause the sorting efficiency of the chip sizer to decrease dramatically.

3.2 Adjustment Mechanism Operation

The adjustment mechanism varies the sort of the chip sizer. This mechanism changes the center to center distances of the shafts, and thereby changes the gaps between the discs and spacers in the product area. The adjustment mechanism places the shafts at a minimum of 3" center to center, and a maximum of 3 ½" center to center. To operate the adjustment mechanism, rotate the hand wheel at the discharge end of the machine. See top-level drawing of specific equipment for reference.

On the sizer, there is an indicator with a scale. This scale allows the operator to see the chip sizer setting at a glance. On the scale, the longer tick marks have adjacent numbers 0, 1, 2, 3, etc., and each number represents a 1/16” change in the center to center distance of the shafts. The shorter tick marks in between show the center to center distance changes in 1/32” increments.

The adjustment mechanism requires considerable torque to turn. A wear-in period for the mechanism is normal. If the torque required to turn the hand wheel abruptly increases, there may be a problem in the adjustment mechanism requiring troubleshooting.

3.3 Pneumatic Lift System Operation

The pneumatic lift system rotates the chip sizer upward away from the stand and chutes, providing access to the interior of the sizer for sanitation. This system includes the control panel where the UP and DOWN buttons are located, the cylinder-mounted valves, and the mechanical lock.

Before raising the sizer, make sure that the sizer has been shut off. Then, press and hold the UP button until the sizer has been elevated to the upper position and the mechanical lock drops into place. Then, press and hold the DOWN button to lower the sizer slightly and engage the mechanical lock.

DO NOT WORK IN OR AROUND THE CHIP SIZER IN THE UP POSITION WITHOUT THE MECHANICAL LOCK ENGAGED.

Before lowering the sizer, make sure that all personnel and tools are removed from the sizer interior. Then, press and hold the UP button to raise the chip sizer slightly and disengage the mechanical lock. Swing the mechanical lock away from the sizer, and then press and hold the DOWN button until the sizer has descended and is resting on the stand.

3.4 Chutes

The chutes have been designed to minimize buildup during chip sizer operation. The chutes have polished product surfaces and rounded corners that help move the product more smoothly through the chute. The chutes also optionally feature hinged, removable doors. These doors can be opened to inspect the condition of the chutes, or removed completely for thorough sanitation.

To open the doors and inspect the chutes, unlatch the two latches and hinge the door down. **DO NOT PUT YOUR HANDS ON, IN, OR NEAR THE DISCS AND PRODUCT SHAFTS DURING OPERATION.**

To remove the door from the chute, unlatch the two latches and hinge the door down to its level position. Lift the hinged end straight up, pulling the hinge away from the pin. Now, bring the door away from the chip sizer until it has cleared the chute.

To replace the door in the chute, hold the door level with the floor. Slide it into the chute and place the hinges over their respective pins. Drop the door in place. Rotate the door up and fasten the latches.

Do not use sharp or metallic objects when cleaning the chutes. These objects will mar the surface of the chutes, and surface damage to the chutes may adversely affect its performance.

4 MAINTENANCE

4.1 Lubrication

The shaft bearings are sealed for life, and do not require maintenance lubrication. If the bearing does fail, simply replace the bearing insert. Do not replace the bearing housing unless necessary.

The adjustment mechanism is lubricated during manufacturing, and should not need lubrication. However, if the mechanism does become difficult to operate, a food-grade Teflon lubricant can be used on the adjustment mechanism. Apply the lubricant in between the adjustment blocks.

The reducer is a standard wash-down duty reducer, and is lubricated during manufacturing. PPM Technologies recommends that the oil should be changed after the initial 250 hours of operation, and thereafter at regular intervals of 2500 hours or every 6 months. If synthetic oil is being used, it is recommended that the oil be changed after the initial 1500 hours of operation, and thereafter at regular intervals of 5000 hours.

The bearings in the motor are greased during manufacturing, but require periodic maintenance. PPM Technologies recommends that the bearings should be relubricated at regular intervals of 12,000 hours or every 12 months of operation.

4.2 Belt Replacement

The PPM chip sizer has been designed so that belt replacement is a simple process that requires a minimal amount of tools. The only tools that are required are a socket wrench with a 6" extension, a 7/16" socket, and a 9/16" socket.

There are two types of idlers used on the chip sizer: the shaft-mounted idlers and the plate-mounted idlers. The plate-mounted idlers have been mounted on slots so that they may be used to adjust the belt tension.

To remove a belt, the 9/16" socket with the 6" extension is used to loosen the fasteners on the plate-mounted idlers of that belt. Then, slowly work the belt loose from the sprockets and undo the weave.

The top-level drawing specific to the equipment illustrates the weave for each belt on the chip sizer. When replacing belts, please refer to this drawing to ensure that the new belt has been woven properly in between the sprockets and shaft idlers. Incorrect belt weaves can cause serious damage to the machine, and may adversely affect the life of some of its components.

To install a belt, use the top-level drawing as reference and weave the belt through the sprockets and idlers. Firmly tighten one of the plate-mounted idlers as an anchor, and then tension the belt by pulling on the other plate-mounted idler. With the belt properly tensioned, tighten the fasteners on the remaining plate-mounted idler.

The belts require only a minimal amount of tension for proper operation. **Excessive tension will cause premature failure and increase the amount of torque needed to operate the adjustment mechanism.** Do not over tighten these belts.

4.3 Pneumatic Lift System Adjustment

The pneumatic lift system uses a pilot-operated check valve configuration to provide safety to the operators and maintenance personnel when the chip sizer is in the up position. On the up stroke, the air is metered in to allow for positive control of the chip sizer movement. In the up position, the pilot-operated check valves are locked in place, and air pressure is needed to unlock these valves. On the down stroke, the air is metered out to produce a smooth downward motion. For the lift kit to function properly and prevent excessive wear on the cylinders, it is important that the cylinders begin and end the operation cycle at approximately the same time.

To reset and retune the upstroke, follow this procedure:

1. Remove the stainless steel guards from the bottom of the air cylinders.
2. Rotate the flow control knob clockwise until the control is fully closed. Close the flow control on both air cylinders.
3. Open the flow control knob (2) ½ turns counterclockwise on both cylinders.
4. Test the air cylinders to see if both cylinders lift simultaneously and smoothly.
5. If one cylinder does not extend at the same rate as the other cylinder, adjust the flow controls to increase airflow to the slower cylinder and/or decrease airflow to the faster cylinder.
6. Repeat steps 4 and 5 until the air cylinders start lifting at the same time and continue lifting at the same rate.
7. Replace the stainless steel guards on the bottom of the air cylinders.

To reset and retune the downstroke, follow this procedure:

1. Remove the stainless steel guards from the bottom of the air cylinders.
2. Using a small flat head screwdriver, turn the screw in the flow control clockwise until the flow control is closed. Close the flow control on both cylinders.
3. Open the flow control (2) ½ turns counterclockwise on both cylinders.
4. Test the air cylinders to see if both air cylinders descend simultaneously and smoothly.
5. If one cylinder does not extend at the same rate as the other cylinder, adjust the flow controls to increase the exhaust rate of the slower cylinder and/or decrease the exhaust rate of the faster cylinder.
6. Repeat steps 4 and 5 until the air cylinders start descending at the same time and continue descending at the same rate.
7. Replace the stainless steel guards on the bottom of the air cylinders.

If any of the components of the pneumatic system should fail, they should be replaced **IMMEDIATELY**. Malfunctioning pneumatic components can jeopardize the safety of the operators during sanitation, and is an unnecessary risk.

4.4 Recommended Spare Parts

For chip sizer spare parts, please contact our Parts Department at (503) 538-3141. We will be glad to assist you with your parts needs.

It is recommended to have the following parts per machine on site:

DESCRIPTION	QTY.
Motor-side Belt	1
Non-motor side Belt	1
Shaft-mounted Idler	2
Plate-mounted Idler (w/ adapters)	1
Bearing Insert	2

It is recommended to stock one of these items per three machines on site.

DESCRIPTION	QTY.
Baldor SS motor	1
Reducer	1
SS Taper-Lock Bushing	1
Double Air Pilot Valve	1
Single Air Pilot Valve	1
Manual Poppet Valve	1
Needle Valve	1
Check Valve	1
Flow Control	1

5 TROUBLE SHOOTING

5.1 Adjustment Mechanism

PROBLEM	PROBABLE CAUSES	CORRECTION
Adjustment mechanism frozen.	Adjustment blocks out of alignment (threads in insert locking).	Check adjustment block alignment and correct as necessary.
	Damaged adjustment block insert.	Determine which side of the chip sizer the adjustment mechanism is frozen on. Remove adjustment mechanism on that side for exchange and repair.
Adjustment mechanism moves on one side but not the other.	Torque not transmitting to nonmoving side.	Check power transfer shafts and gearboxes for loose couplings. Check for damaged gearboxes.
	Torque not transmitting from insert to insert.	Check for overextended insert.
	Adjustment block insert moves but block does not move.	Check set screws on adjustment block. Retime adjustment mechanism; tighten set screws on adjustment block.
Adjustment mechanism will not close completely.	Adjustment block insert not in proper location inside block.	Check set screws on the adjustment block that does not close fully. Place insert in proper location and retighten set screws.

To check for which side of the chip sizer has a malfunctioning adjustment mechanism, follow these steps:

1. Disconnect the shaft linking the two adjustment mechanism gearboxes.
2. Using the hand wheel, attempt to adjust the adjustment mechanism side. Turn the wheel no more than one revolution and then return the wheel to its original position. If the mechanism is difficult or impossible to turn, then the attached set of adjustment blocks is malfunctioning.
3. Detach the couplers at the infeed end of the power transfer shafts over the adjustment blocks. Unbolt and remove the adjustment mechanism gearboxes with the attached shafts.
4. Reattach the adjustment mechanism gearbox with the hand wheel to the untested side, attaching it so that the hand wheel faces outward.
5. Using the hand wheel, attempt to adjust this side. Turn the wheel no more than one revolution and then return the wheel to its original position. If the mechanism is difficult or impossible to turn, then there is a problem in this set of adjustment blocks. If the mechanism turned freely on both sides, then the two-way adjustment mechanism gearbox is damaged.

To remove the adjustment mechanism from one side of the chip sizer:

1. Remove the chip sizer guard weldments on both sides.
2. Loosen and remove the transfer belt and the second tier drive belts from the chip sizer.
3. Dismount the disc shafts from the adjustment mechanism.
4. Disconnect and remove the power transfer shaft between the crown gearboxes of the adjustment mechanism.
5. Detach the coupler at the infeed end of the power transfer shaft over the adjustment blocks. Unbolt and remove the adjustment mechanism gearbox with the attached shaft.
6. Unbolt the adjustment block at the infeed end of the sizer from the frame.
7. Loosen the bolts that fasten the discharge chute to the discharge end adjustment block.
8. Lift the adjustment mechanism clear of the frame.

To re-time an adjustment mechanism side, please contact PPM Technologies to have this completed by a PPM Service Tech.

5.2 Belts

PROBLEM	PROBABLE CAUSES	CORRECTION
Excessive noise and slipping on startup and shutdown.	Chip sizer motor not wired with soft start/stop controller.	Install a soft start/stop controller with a 3-second ramp up and ramp down time.
	Belts jumping on sprockets	Increase tension on problem belt.
Belt slipping.	Belt not tensioned properly.	Check for loose belts. Tension any loose belts.
	Foreign material built-up in sprockets.	Remove material from the teeth of the sprockets.
	Damaged or worn belt.	Replace belt.
Belts breaking.	Sprockets or shaft idlers out of alignment.	Check sprockets and shaft idlers for misalignment. Realign sprockets and idlers.
	Damaged or worn drive components.	Check sprockets, shaft idlers, and return idlers for unusual wear, burrs, or other damage. Replace as necessary.
	Belt tension too high.	Check for belts under too much tension. Adjust belt tension.

5.3 Pneumatic Lift System

PROBLEM	PROBABLE CAUSES	CORRECTION
Chip sizer will not elevate.	Insufficient air pressure.	Check air pressure. Minimum required pressure is 70 psi, maximum allowable pressure is 125 psi.
	Leaking or plugged pneumatics component or supply line.	Check for air leaks and plugs, starting at the components in the pneumatics controls box and working outward to the lift cylinders.

	Closed metering valves.	Check metering valves (PMD47167-11) on cylinders and retime as described in section 4.3 if necessary.
	Malfunctioning poppet valve.	Check manual poppet valve (PMD47166-2) and replace if damaged.
	Physical obstruction.	Remove obstruction.
	Malfunctioning double air pilot valve.	Check double air pilot valve (PMD47166-9) and replace if damaged.
Chip sizer raises unevenly.	Metering valves out of adjustment.	Retime air cylinder upstroke as described in section 4.3.
Only one side of chip sizer raises.	Closed metering valve on non-moving air cylinder.	Check metering valve (PMD47167-11) for proper adjustment. Retime if necessary.
	Insufficient air pressure at one cylinder.	Check for leaks or plugs in air lines and components from the double air pilot valve (PMD47166-9) to the non-moving air cylinder.
	Malfunctioning single air pilot valve.	Check single air pilot valve (PMD47167-6) on non-moving cylinder and replace if necessary.
Chip sizer continues rising when poppet valve is released.	Malfunctioning poppet valve.	Check poppet valve (PMD47166-2) and replace if damaged.
	Malfunctioning double air pilot valve.	Check double air pilot valve (PMD47166-9) and replace if damaged.
Chip sizer raises too quickly.	Metering valves out of adjustment.	Retime air cylinder upstroke as described in section 4.3.
Chip sizer will not lower.	Insufficient air pressure to operate single air pilot valves on cylinder.	Check for air leaks and plugs, starting in the pneumatics controls box and working outward to the pilot line to the single air pilot valve (PMD47167-6).
	Closed metering valves.	Check metering valves (PMD47167-8) on cylinders and retime as described in section 4.3 if necessary.
	Malfunctioning poppet valve.	Check manual poppet valve (PMD47166-2) and replace if damaged.
	Malfunctioning double air pilot valve.	Check double air pilot valve (PMD47166-9) and replace if damaged.

PROBLEM	PROBABLE CAUSES	CORRECTION
Chip sizer lowers unevenly.	Metering valves out of adjustment.	Retime air cylinder downstroke as described in section 4.3.
Only one side of chip sizer lowers.	Closed metering valve on non-moving air cylinder.	Check metering valve (PMD47167-8) for proper adjustment. Retime if necessary.
Chip sizer lowers too quickly.	Insufficient air pressure to operate single air pilot valves on cylinder.	Check for leaks or plugs in air lines and components from the double air pilot valve (PMD47166-9) to the single air pilot valve (PMD47167-6) on the non-moving air cylinder.
	Malfunctioning single air pilot valve.	Check single air pilot valve (PMD47167-6) on non-moving cylinder and replace if necessary.
	Metering valves out of adjustment.	Retime air cylinder downstroke as described in section 4.3.
Chip sizer continues descending when poppet valve is released.	Malfunctioning poppet valve.	Check poppet valve (PMD47166-2) and replace if damaged.
	Malfunctioning double air pilot valve.	Check double air pilot valve (PMD47166-9) and replace if damaged.

6 GENERAL NOTES

The information in this publication is intended to cover a variety of installations and requirements. Situations may arise that have not been adequately covered by the foregoing data. Should difficulties arise, please contact your local PPM Technologies representative who will assist you in obtaining a satisfactory installation.

PPM Technologies would also appreciate any comments on the documentation received.

7 RETURN MERCHANDISE PROCEDURE:

- 1) Have part number and purchase order ready.
- 2) **Call PPM Parts Department @ (800) 523-8123, obtain a RMA#.**
 - a. PPM Parts Department will not be able to tell you if the parts are under warranty, as they need to inspect the parts.
 - b. Although your parts may be less than one year old, it depends on the type or cause of failure and may not be under warranty.
 - c. PPM Technologies reviews failures and determines if the parts are under warranty.
- 3) Send parts back to: **PPM Technologies, Inc.
500 E. Illinois St.
Newberg, Oregon 97132
RMA#**
 - a. Items returned w/o an RMA # will NOT BE ACCEPTED and will be sent back to customer.
- 3) Once parts are repaired they will be sent back to our customer VIA:
 - a. **UPS ground (5 days) unless otherwise arranged.**

The information in this publication is intended to cover a variety of installations and requirements. It is to be expected that situations will arise that have not been adequately covered by the foregoing data and should difficulties arise please contact your local representative of PPM Technologies who will assist you to obtain a satisfactory installation or contact the PPM Service Department at the above number.

8 LOST OR DAMAGED GOODS:

**THOROUGHLY INSPECT AND COUNT ALL SHIPMENTS IMMEDIATELY
UPON ARRIVAL. OUR RESPONSIBILITY FOR ALL SHIPMENTS IS CEASED
WHEN THE CARRIER SIGNED THE BILL OF LADING.**

If goods are received short or in a damaged condition, it is important that you notify the carrier and insist on a notation of the loss or damage across the face of the freight bill; otherwise no claim can be enforced against the transportation company.

If concealed loss or damage is discovered, notify your carrier at once and request an inspection. This is absolutely necessary. A concealed damage report must be made within 15 days of delivery of shipment. Unless you do this, the carrier will not entertain any claim for loss or damage. The agent will make an inspection and grant a concealed damage notation. If you give the Transportation Company a clear receipt for goods that have been lost in transit, you do so at your own risk and expense.

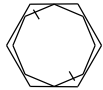
We are willing to assist you to collect claims for loss or damage, but this willingness on our part does not make us responsible for collection of claims or replacement of material. The actual filing and processing of claims is your responsibility.

* If your shipment is crated or wrapped, you should sign the Bill of Lading noting “subject to Concealed Damages”.

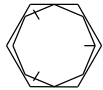
Appendix A CAPSCREW IDENTIFICATION



SAE Grade 1 / SAE Grade 2 / ASTM A307 (unacceptable)



SAE Grade 3 (unacceptable)



SAE Grade 5 / ASTM A449 (acceptable)



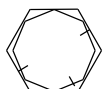
ASTM A325 (acceptable)



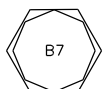
ASTM A354 Grade BB (acceptable)



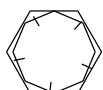
ASTM A354 Grade BC (acceptable)



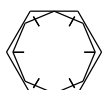
SAE Grade 5.1 (acceptable)



ASTM A193 Grade B7 (acceptable)



SAE Grade 7 (acceptable)



SAE Grade 8 (acceptable)



ASTM A490 (acceptable)

Appendix B MISCELLANEOUS PARTS IDENTIFICATION

Emergency Stop Components:

- ELC4450602: Standard pull-cord emergency stop. There are (2) per machine, and are mounted on the stand.
- ELC4450670: Standard pull-cord tensioner kit. This includes the double-ended tensioning buckle, as well as (4) cable clamps.
- ELC4450671: Standard pull-cord.

Idlers:

- CSD46317-29: SS idler on disc shafts. It is 2-3/8 inches in diameter by 1 1/2 inches wide.
- SHV0207FA05001: Standard return idler on the chip sizer. It is about 2 inches in diameter by 2 inches through the bore of the adapters. The adapters reduce the bore to a nominal 1/2 inch.

Pneumatics:

- CYL1800SS25001: Air cylinder for 12-Stage chip sizer.
- PNE0025PLMAV02: Standard push button, which is located on the pneumatics control panel.

Sprockets:

- SHV0215HT10001 SS sprocket: This is the standard sprocket on chip sizer disc shafts. It has 22 teeth, a 1 inch bore, and is 2 5/8 inches in diameter by 1 1/2 inches long through the bore.
- SHV0276HT108D1 SS sprocket with 1 inch bore SS Taper-Lock bushing: This is the drive sprocket on the reducer. It has 28 teeth and is 3 1/8 inches in diameter by 1 1/2 inches through the bore.

Appendix C RECOMMENDED TORQUE CHART

S.A.E. GRADE 5

S.A.E. GRADE 8

TORQUE

TORQUE

BOLT SIZE	DRY (FT. LBS.)	LUBRICATED OR PLATED (FT. LBS.)	DRY (FT. LBS.)	LUBRICATED OR PLATED (FT. LBS.)
1/4-20	8	6	12	9
1/4-28	10	8	14	10
5/16-18	17	13	24	18
5/16-24	19	15	27	20
3/8-16	30	23	45	34
3/8-24	35	27	50	38
7/16-14	50	38	70	53
7/16-20	55	42	80	61
1/2-13	75	57	105	80
1/2-20	85	65	120	91
9/16-12	110	84	155	118
9/16-18	120	91	170	129
5/8-11	150	114	210	160
5/8-18	170	129	240	182
3/4-10	270	205	375	285
3/4-16	300	228	420	320
7/8-9	430	327	610	464
7/8-14	475	361	670	509
1"-8	645	490	910	692
1"-12	705	535	1000	760
1"-14	720	547	1015	771

