



Valve Bag Auger Packer

Model APV



Operation and Maintenance Manual



2205 Jothi Avenue
Parsons, Kansas 67357-8460

Toll Free: 888.882.9567
Phone: 620.421.5550
Fax: 620.421.5531

Web: www.magnumsystems.com


Machine Serial Number: _____

Sales Order Number: _____

Important Information

Conventions

Safety Alert Symbols

The  symbol indicates that important personal safety information follows. Carefully read this text for the warnings information it contains. The signal word next to each safety alert symbol is defined as:



WARNING

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.



CAUTION



Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury, or damage to the equipment. This single word may also be used to identify unsafe practices.



LOCKOUT

This symbol will be used anytime that a procedure requires an electrical lockout.

Static Sensitive Symbols for Equipment Handling Instructions

The  and  symbols indicate important handling guidelines for proper handling of electronic equipment modules and sensitive components for the prevention of potential damage that could be caused by ESD (electrostatic discharge) during routine maintenance, handling and transportation.



ESD NOTICE

To protect against ESD damage to electronic equipment, follow the Standard ESD Prevention Procedures. Failure to use protective measures could result in permanent equipment damage, either immediate or latent, when handling modules.



ESD NOTICE

To protect against ESD damage to electronic equipment containing components, follow the Standard ESD Prevention Procedures. Failure to use recommended protective measures could result in permanent equipment damage, either immediate or latent, when handling components.

Standard Electro-static Discharge (ESD) Prevention Procedures

The Model APV Auger Packer utilizes many electronic components that are susceptible to damage from Electro Static Discharge. Anytime electronic components are serviced, the following precautions should be followed:

1. Wear a commercial grounding wrist strap.
2. Remove power from the machine.
3. Leave all static sensitive components in their protective packaging until it is time to install the component
4. Always hold static sensitive components by their metal mounting tabs, and/or by their edges

Important/Notable Information

While all of the information in this manual is important, there are some pieces of information where special attention needs to be paid to avoid equipment damage, or specific information needs to be emphasized. This information will be handled as follows:

Important: *Indicates an operating procedure, practice, or condition that, if not strictly followed, may cause equipment damage.*

Note: *Indicates additional information or emphasizes a topic related to the subject being discussed.*

Personal Safety Instructions

Only qualified personnel should work on or around this equipment. To ensure the highest degree of personal safety, all who use this equipment are required to become thoroughly familiar with all safety instructions contained in this document. Successful and safe operation of this equipment depends upon proper handling, operation, maintenance, and application of associated equipment. Refer to Appendix A of this manual for all safety instructions. Safety instructions are also provided where they apply within the body of this manual.



WARNING

No information in this manual supersedes or replaces your employer's operating rules. If there is a difference in instructions between this manual and the employer's operating rules, follow the most restrictive instruction.

Deliberate misuse or abuse of electronic components may cause personal injury or death.

Warranty Information

Seller warrants that the Products will operate substantially in conformance with Seller's published specifications, when subjected to normal, proper and intended usage by properly trained personnel, for a period of one (1) year from the date of shipment to Buyer (the "Warranty Period"). Seller agrees during the Warranty Period, provided it is promptly notified in writing upon the discovery of any defect and further provided that all costs of returning the defective Products to Seller are pre-paid by Buyer, to repair or replace, at Seller's option, defective Products so as to cause the same to operate in substantial conformance with said specifications. Replacement parts may be new or refurbished, at the election of Seller. All replaced parts shall become the property of Seller. Replacement Parts will be billed at list price, unless they are approved as warranty replacement item(s) by the service technician and the technical services manager.

Lamps, fuses, bulbs, load cells, and other expendable items are expressly excluded from the warranty. Seller's sole liability with respect to equipment, materials, parts or software furnished to Seller by third party suppliers shall be limited to the assignment by Seller to Buyer of any such third party supplier's warranty, to the extent the same is assignable. In no event shall Seller have any obligation to make repairs, replacements or corrections required, in whole or in part, as the result of (i) normal wear and tear, (ii) accident, disaster or event of force majeure, (iii) misuse, fault or negligence of or by Buyer, (iv) use of the Products in a manner for which they were not designed, (v) causes external to the Products such as, but not limited to, power failure or electrical power surges, (vi) improper storage of the Products or (vii) use of the Products in combination with equipment or software not supplied by Seller. If Seller determines that Products for which Buyer has requested warranty services are not covered by the warranty hereunder, Buyer shall pay or reimburse Seller for all costs of investigating and responding to such request at Seller's then prevailing time and materials rates. If Seller provides repair services or replacement parts that are not covered by the warranty, the Buyer shall pay Seller therefore at Seller's then prevailing time and materials rates. ANY INSTALLATION, MAINTENANCE, REPAIR, SERVICE, RELOCATION OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE PRODUCTS PERFORMED BY ANY PERSON OR ENTITY OTHER THAN SELLER WITHOUT SELLER'S PRIOR WRITTEN APPROVAL, OR ANY USE OF REPLACEMENT PARTS NOT SUPPLIED BY SELLER, SHALL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THE AFFECTED PRODUCTS.

***Important:** Electronic load cells are not covered under the Magnum Systems warranty. Load cells are highly sensitive to shock or side load pressure. Never lift or move a machine by the weighing mechanism. Always use the shipping brackets when moving or shipping machines.*

Field Service

Magnum Systems can provide field service for start-up assistance, training, maintenance, and replacement/spare parts for new and existing equipment. Contact Magnum Systems at (888) 882-9567.

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Chapter 1

Product Description

1.1 General Description

This chapter will provide a high-level product description of the APV Auger Packer.

1.2 Introduction

The Magnum Systems Model APV is an electronic auger packer. The APV may be equipped with either T4000 or T3000 electronic controls. The APV is configured to fill valve bags.

1.3 Manual Scope

This manual will provide information on installation, operation, preventive maintenance, troubleshooting, and repair of the Model APV.

The appendices will include safety information, spare parts list, mechanical drawings, electrical drawings, the T4000/T4000A Operation and Maintenance Manual or the T3000 User Guide, Pressurization/Purging System Installation & Operation Manual.

1.4 Electrical Requirements

The APV requires two distinctly different voltages for proper operation. The control circuits operate on 115 VAC/60 Hz./20 Amp circuit. The feed and drive circuits operate on 230 or 460 VAC.

Depending on the configuration, there may be one or two electrical connections. Some 460 VAC applications use an optional transformer, located in the control box. This transformer converts the incoming 460 VAC input to 115 VAC output for the control circuits. The standard configuration uses separate electrical connections for the control circuits and the feed/drive circuits.

1.5 Pneumatic Requirements

The Model APV uses approximately 3-15 CFM (57-85 liters) @ 80-100 PSI (.55-.69 MPa) of compressed air. Magnum Systems recommends that the air supply line be equipped with a refrigerated air dryer, or at the very least a water separator.

1.6 Major Systems and Components

When working with the Model APV, it is important to understand the major systems and components of the unit. The breakdown is as follows:

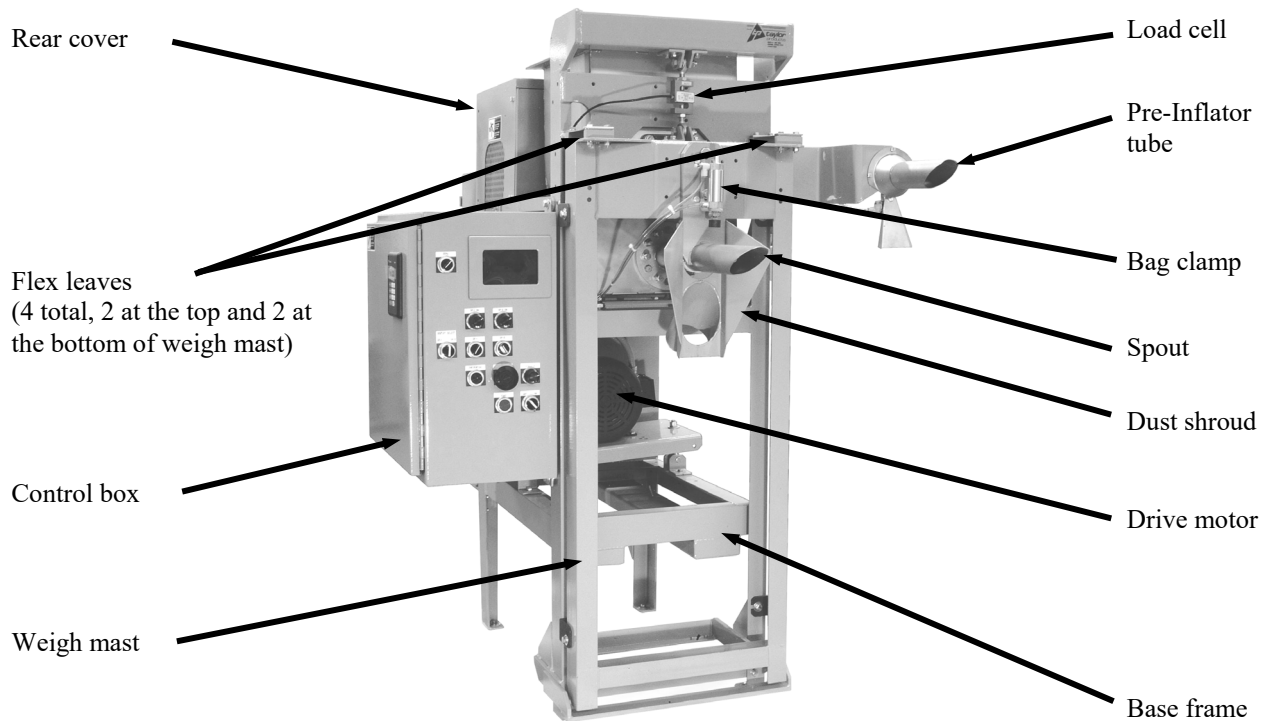


Figure 1-1. Major Components (Front View)

1.6.1 Base Frame

The base frame is the backbone of the APV. It provides a support structure for the all of the other components that make up the APV.

1.6.2 Load Cell

The load cell is used to sense the weight of the material in the package. As material is loaded into the package, the load cell increases its voltage output to the control box.

Important: *Electronic load cells are not covered under the Magnum Systems warranty. Load cells are highly sensitive to shock or side load pressure. Never lift or move a machine by the weighing mechanism. Always use the shipping brackets when moving or shipping machines.*

1.6.3 Weigh Mast

The weigh mast hangs from the load cell. It supports the spout. As the package fills, the weight of the entire weigh mast increases. The APV uses four flex leaves to stabilize the weigh mast and to ensure that the weight of the weigh mast is being transferred to the load cell in a linear fashion.

1.6.4 Pre-Inflator Tube

The pre-inflator tube provides a short burst of air into an empty package. This helps the package to start to take its shape and prepares it for filling. This reduces backpressure in the spout during filling.

1.6.5 Bag Clamp

A pneumatic cylinder, with one or two rubber pads, depending on how the APV is equipped, is used to hold the package in place while filling.

1.6.6 Spout

The valve bag style spout is used to transfer the product from the hopper to the package.

1.6.7 Drive Motor

A 230 or 460 VAC drive motor is used to drive the auger and agitator. The motor uses a dual v-belt drive system. The motor is mounted in the center of the base frame on a hinged mounting plate.

1.6.8 Rear Cover

A sheet metal cover that is used to enclose the drive belt system, the auger drive shaft, and the agitator drive system. The rear cover has a sheet metal panel that can be unbolted and removed to access the components inside.

1.6.9 Flex Leaves

The unit uses four flex leaves to stabilize the weigh mast so the load is transferred to the load cell in a consistent linear manner. There are two flex leaves on the top of the weigh mast and two at the bottom.

1.6.10 Agitator

The agitator mixes the product in the hopper to prevent bridging. Typically, the agitator is belt driven by a pulley on main auger shaft. If the removable auger option is ordered, a dedicated motor will be used to drive the agitator.

1.6.11 Pneumatic Bag Kicker

An optional pneumatic bag kicker can be added to automatically eject the valve bag from the spout.

1.6.12 Pneumatic Bag Tilt

The APV is available with an optional pneumatic bag tilt that is used to tilt the filled valve bag forward off of the spout to allow the operator to tuck the sleeve. The operator must then manually move the bag to the conveyor or place it on a pallet.

1.6.13 Bag Settler

The APV is available with an optional bag settler. Bag settlers are used to de-aerate the product while the bag is filling. There are two styles of settlers:

- Vibratory
- Lift and drop

Vibratory settlers are available as either electric or pneumatic. These settlers use vibration to help the product settle in the package.

The lift and drop style of settler is only available as a pneumatic unit. This style uses a pneumatic cylinder to quickly raise and lower the bottom of the package to help the product settle in the package.

General Description

1.6.14 Auger

The APV uses an auger to transfer the product from inside the hopper to the package. The auger is a belt driven shaft with helical flighting. As the motor drives the auger, via two v-belts, the flighting on the shaft pushes the product from the hopper, through the spout, and into the bag.

1.6.15 Auger Shaft Seals

The APV uses seals on the auger shafts to prevent product from leaking out of the hopper. The APV is available with two different types of auger shaft seals:

- Purge seals
- Felt seals

1.6.15.1 Purge Seals

The purge seals operate differently from most mechanical seals. They seal between two faces running perpendicular to the shaft. A rubber boot held in place with a hose clamp rotates with the shaft and drives two rotors against a stator plate. The purge seal is made up of the following components:

Rotating Elements

- A. Boot (Elastomer Gland)
- B. Hose Clamp
- C. Rotor Cup

Stationary Elements

- D. Spacer Block
- E. Stainless Plate

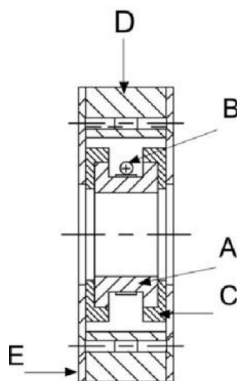


Figure 1-2. Purge Seal Cross Section



Figure 1-3. Purge Seal

1.6.15.2 Felt Seals

The APV may come equipped with felt auger shaft seals. The auger shaft has two seals on either side of the auger box to prevent the product from leaking out of the auger box around the auger shaft. Each seal assembly consists of:

- Seal box
- Two seal halves (one for each side of the shaft)
- Two seal compression halves (one for each side of the shaft)
- Two seal covers (one for each side of the shaft)
- Four wing nuts (one for each end of each cover)
- Two seal tension adjustment bolts (one for each seal half)
- Two jam nuts (one for each seal tension adjustment bolt).

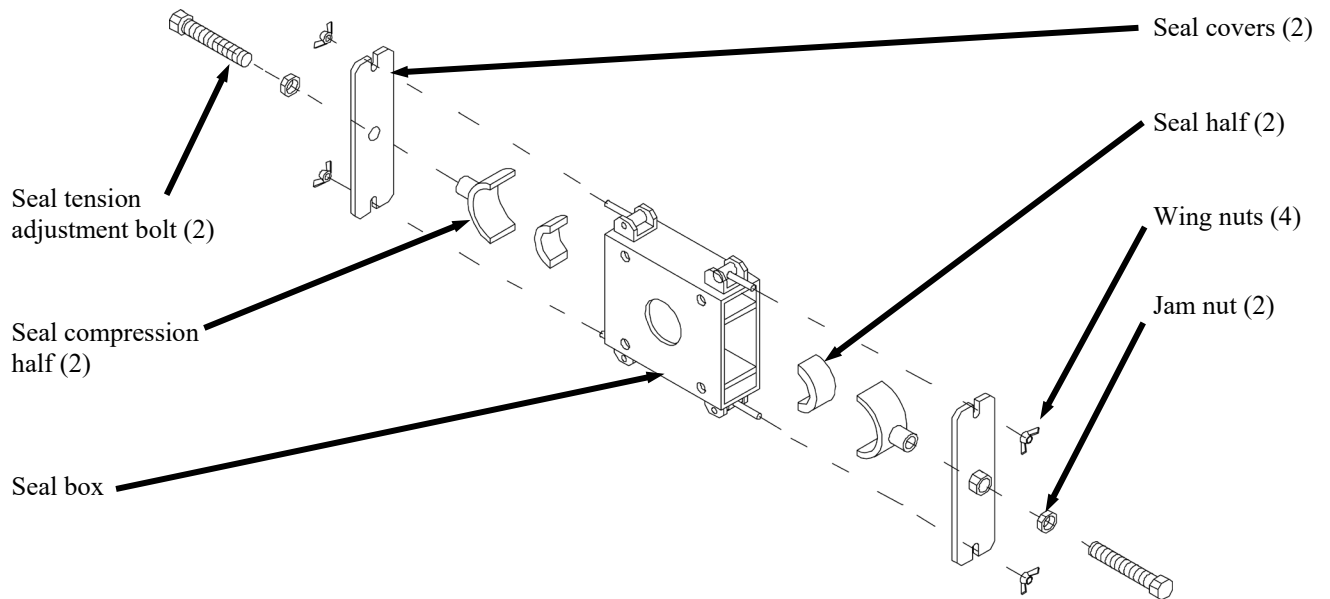


Figure 1-4. Felt Auger Shaft Seal, Exploded View

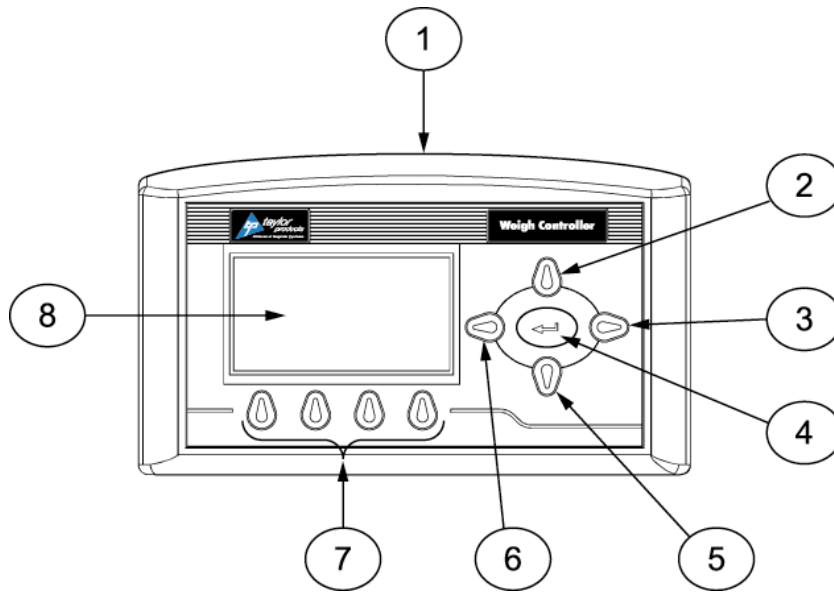
1.6.16 Machine Controls

The APV has a control box located on the left side of the machine. A standard APV utilizes a T4000 control set. The APV can be equipped with an optional T3000 control panel. These two control sets are joint designs by Hardy Instruments and Magnum Systems. Regardless of which control unit is on the APV, there are also separate manual controls and indicators.

1.6.16.1 Control Box With T4000 Control Panel

A standard APV is equipped with a T4000 control panel. The T4000 units are available in either single set point or dual set point models. The T4000 has the ability for total monitoring and instrument control. The T4000 features the following functions:

- Weight display
- Function keys
- Enter key
- Arrow (up/down/left/right) keys



Item #	Description	Item #	Description
1	T4000 control panel	5	Down key
2	Up key	6	Left key
3	Right key	7	Function keys
4	Enter key	8	LCD screen

Figure 1-5. T4000 Control Panel

The front of the T4000 is equipped with a weight display, arrow (up/down/left/right) keys, function keys, and an Enter key.

The display has one line of large fonts (5.5 alphanumeric characters), and four lines of smaller fonts (20 alphanumeric characters). The top line displays the currently selected package weight. The remaining four lines are used for monitoring system statuses, historical data, and configuration settings of the APV.

The lower half of the control panel has several manual controls and indications. Depending on customer-selected options, there are a couple of different configurations for the control boxes. One configuration has the control panel and all machine controls in one box. Another configuration may have the control panel in one box, and the machine controls in a second box.

The controls and indications shown in the following graphic are listed below, along with a description of their function:

- CHECKWEIGH button – Press and hold this button to check the current weight of the package.
- STOP indicator/button – Pressing this button will stop the operation of the APV immediately and will cause the button to illuminate RED.
- START button – This button is used to start the operation of the APV.
- POWER ON (Indicator) – This indicator will illuminate GREEN to indicate that the POWER switch is in the ON position and that power is being applied to the machine controls.
- POWER – This switch is used to turn the APV power ON/OFF.

While the APV can be ordered with many different options, the control box shown in the following illustration shows a typical T4000 setup.

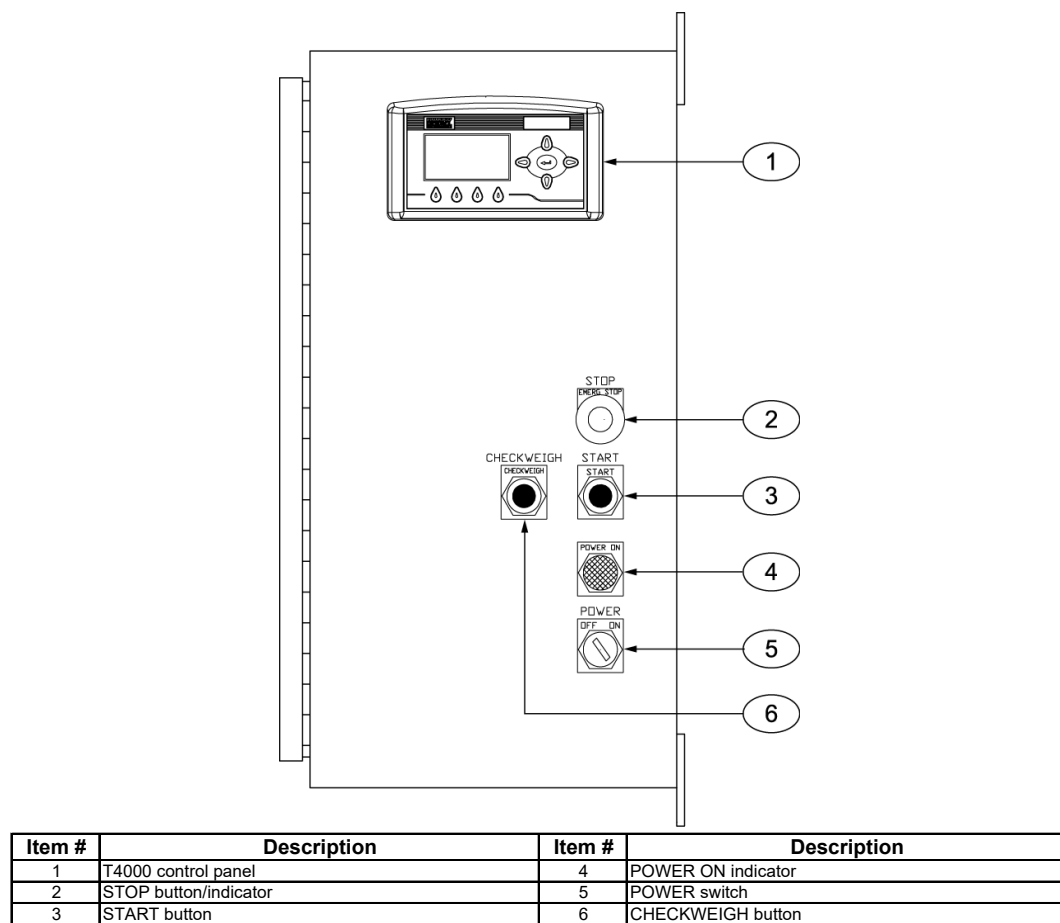
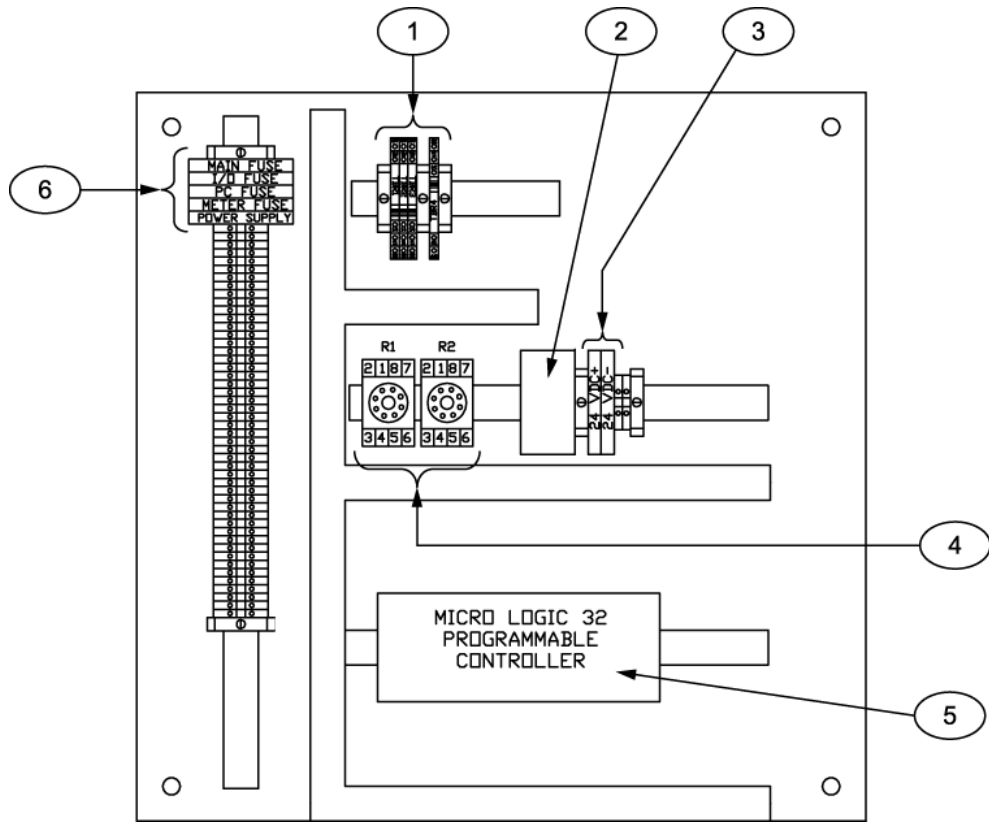


Figure 1-6. Control Box with T4000 Control Panel

General Description



Item #	Description	Item #	Description
1	Fuses	4	Relay bases
2	DC power supply	5	Programmable Logic Controller (PLC)
3	Fuses	6	Fuses

Figure 1-7. Control Box with T4000 Control Panel – Internal Components

1.6.16.2 Control Box With Optional T3000 Control Panel

The APV is available with an optional Taylor T3000 control set. The T3000 has the ability for total monitoring and instrument control. The T3000 features the following functions:

- Weight display
- Alphanumeric keypad
- Function keys
- Enter/Exit keys
- Arrow keys
- Infra Red (IR) port (not used)

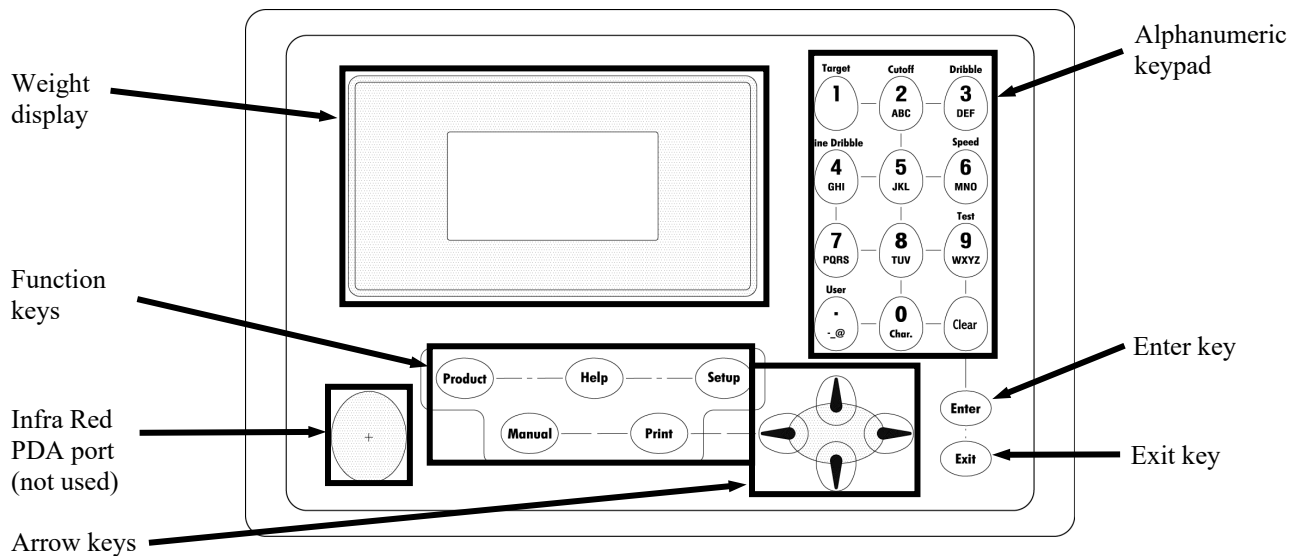


Figure 1-8. T3000 Control Panel

The front of the T3000 is equipped with a weight display, an alphanumeric keypad, directional arrow keys, function keys, an infrared PDA port (not used), an Enter key, and an Exit key.

The display has one line of large fonts (5.5 alphanumeric characters), and four lines of smaller fonts (20 alphanumeric characters). The top line displays the currently selected package weight. The remaining four lines are used for monitoring system statuses, historical data, and configuration settings of the APV.

General Description

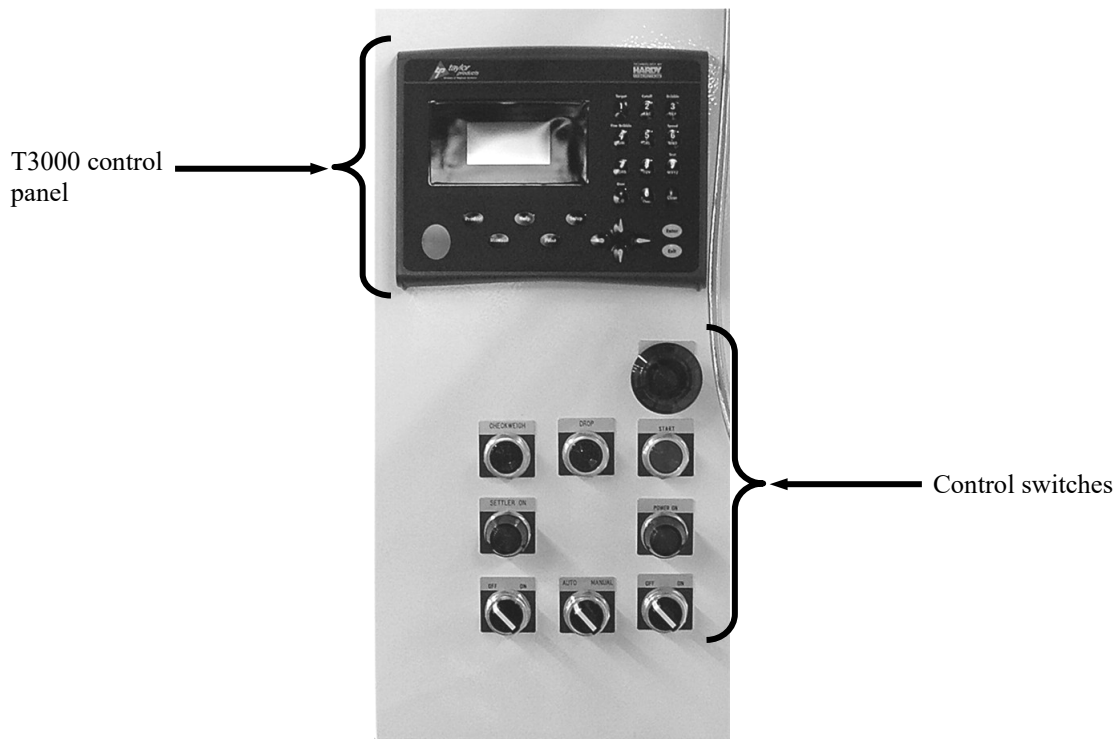


Figure 1-9. Sample T3000 Control Box

An APV that is equipped with a T3000 will also have some control switches, such as:

- CHECKWEIGH button – Press and hold this button to check the current weight of the package.
- AUTO/MANUAL switch – This switch is used to toggle between automatic and manual operation of the APV.
- STOP indicator/button – Pressing this button will stop the operation of the APV immediately and will cause the button to illuminate red.
- START button – This button is used to start the operation of the APV.
- POWER ON indicator – This indicator will illuminate green to indicate that the POWER switch is in the ON position and that power is being applied to the machine controls.
- POWER switch – This switch is used to turn the APV power ON/OFF.

1.6.16.4 Allen-Bradley PanelView 300

All APV units are equipped with an Allen-Bradley PanelView 300 control panel. This control panel is an interface to the Allen-Bradley MicroLogix™ 1000 Programmable Logic Controller (PLC) that is located inside the control box. The operator uses this panel to adjust the timing or counts of specific events.

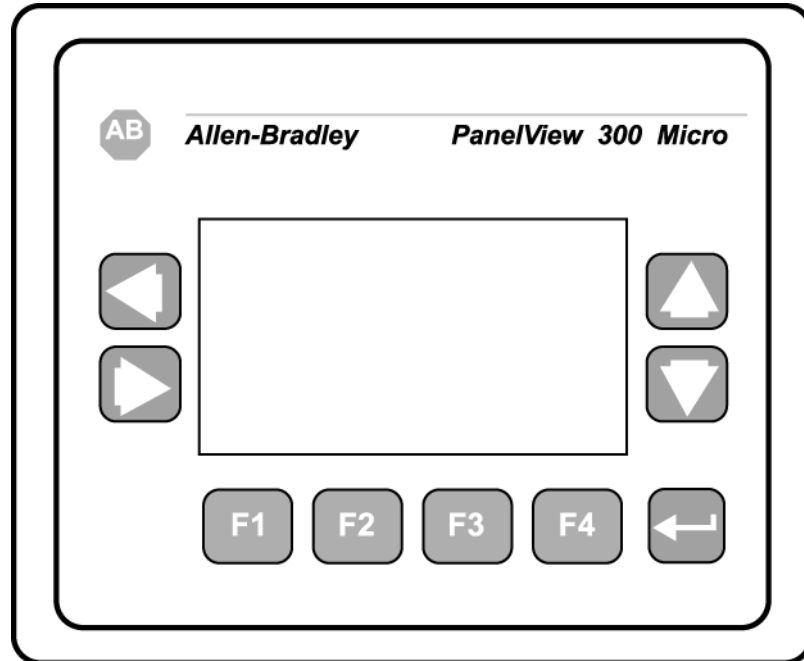


Figure 1-10. Allen-Bradley PanelView 300

1.6.16.5 Allen-Bradley Programmable Logic Controller (PLC)

All APV units are equipped with an Allen-Bradley MicroLogix™ 1000 PLC. The PLC is located inside the control box. The PLC controls the timing of specific events.

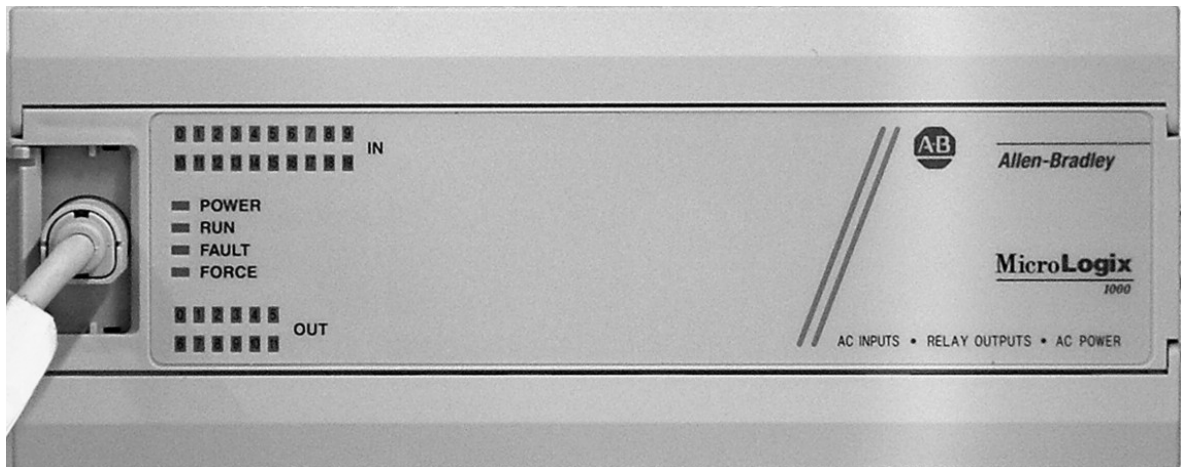


Figure 1-11. Allen-Bradley MicroLogix™ 1000 Programmable Logic Controller

1.7 Power Control Box

The power control box is located on the rear of the APV. Inside this box are the following components:

- Allen-Bradley PowerFlex Controller – Used for auger speed control and to start and stop the auger motor on APV units that are equipped as dual set point (DSP) machines.
- Fuses – Always check the electrical schematics for the specific machine that is being worked on.
- Drive Motor Contactor – Driven by the power switch, this contactor is used to enable the PowerFlex controller.

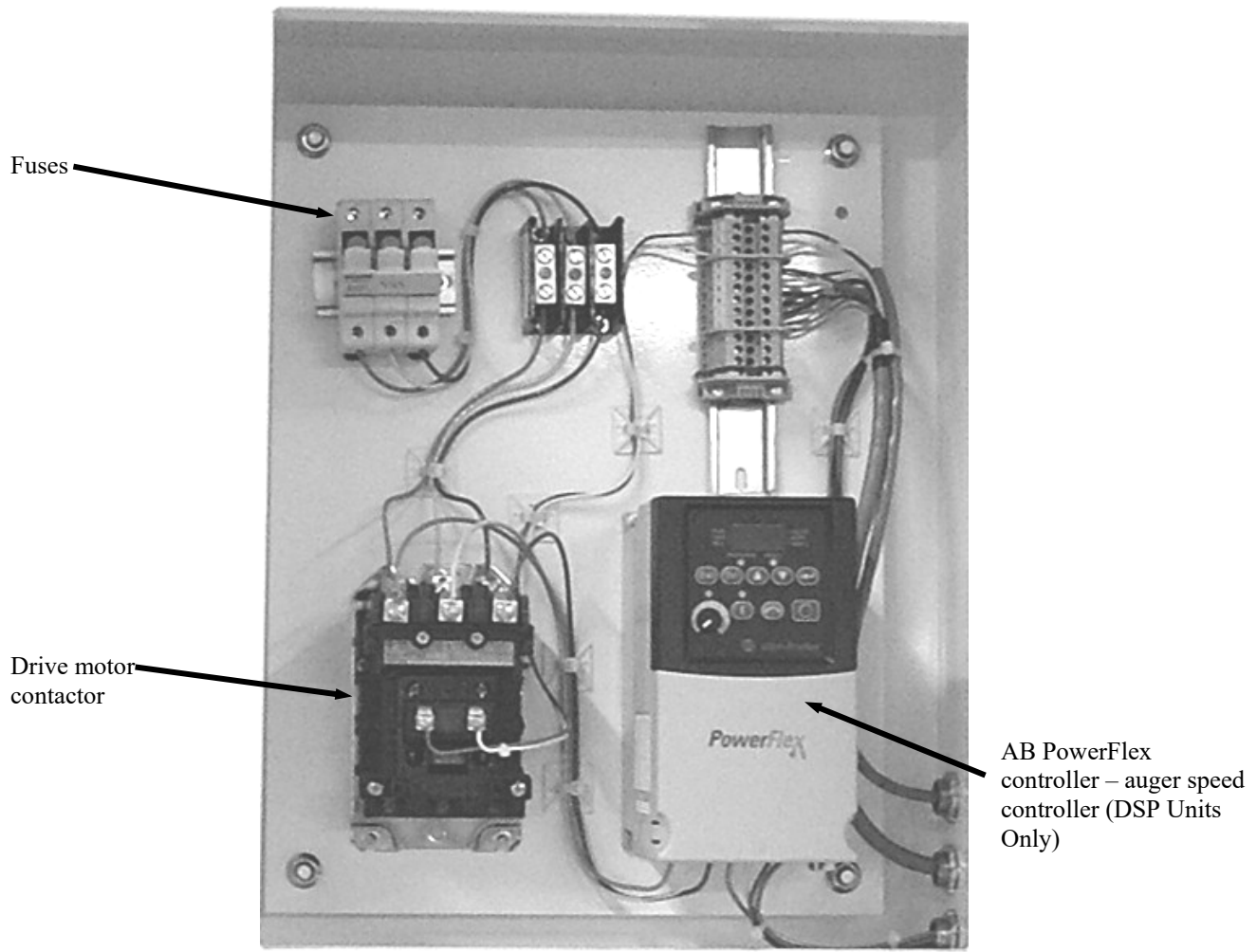


Figure 1-12. Power Control Box

1.8 Purge Kit

The APV can be ordered with an optional Purge Kit. There are four different choices for Pepperl+Fuchs' Bebeco EPS System Purge Kits:

- Class I, Division, I Group C&D (Model 1001AWPS-CI Type Z)
- Class I, Division, II Group C&D (Model 1001AWPS-CI Type Z)
- Class II, Division, I Group F&G (Model 1001AWPS-CII Type Z)
- Class II, Division, II Group F&G (Model 1001AWPS-CII Type Z)

The Purge Kit is used to prevent combustible dust accumulation or remove and prevent flammable gas or vapor accumulations. Basically, this system utilizes a protected enclosure that is equipped with an intake and exhaust. The system is designed to allow an inert gas, or instrument quality air, to pass through the protected enclosure, carrying with it any flammable dust or gasses. This is done while maintaining a pressurized (.25 psi) environment within the protected enclosure. For more detailed information on the Purge Kit, refer to the Model 1001A, Type Y or Z, Pressurization/Purging System Installation & Operation Manual, in Appendix G of this manual.



Figure 1-13. Purge Kit

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Chapter 2

Receiving Equipment

2.1 General Description

The APV and all of its components are thoroughly inspected before shipment. Upon receipt of the equipment, it is important that the machine be carefully inspected for shipping damage. In the event that damage is found, contact the shipping company and follow their process for reporting shipping damage.

2.2 Uncrating the Equipment

Follow the procedure below to unpack the equipment and prepare it for installation.

1. The APV is a floor mount unit. Clear an area large enough for the machine and for a forklift to maneuver the machine into position. Make sure floor is level. It is recommended that the APV be located directly under the supply hopper. Complete any nearby construction before installing the APV.
2. Before opening the shell crate and removing APV from the shipping pallet, inspect the shell crate, pallet, and the APV for visible damage. Inspect for damaged or missing parts. If there is damage, notify the shipper and Magnum Systems immediately. If the unit is not damaged, proceed to the next step.
3. Remove the shell crate. Use care when unpacking the APV to avoid damage to any hinged parts and external controls.



Figure 2-1. Typical Shell Crate

Receiving Equipment

4. Lift the APV into the upright position. Do not use the weigh mast as a lifting point. Only use the main frame when lifting the APV.
5. When moving the APV, it is critical that the unit is lifted using the supplied fork pockets. If the APV is equipped with the optional casters, the unit can be moved around on the casters. Be careful when moving the APV to ensure that it does not impact other equipment or tip over.



CAUTION

Do not attempt to move the APV by grabbing the weigh mast or any weighed part of the system. Damage to the load cell will occur if the machine is moved in this manner.

6. Once the APV is in its final position, remove the shipping brackets.

Important: After removing the shipping brackets, reverse them and bolt them to the base frame. This is done to avoid losing them, as they will need to be reinstalled if the machine needs to be moved in the future.



Figure 2-2. Shipping Bracket (1 of 4 shown)

Chapter 3

Setup/Installation

3.1 General Description

Only persons who have been properly trained and hold the appropriate qualifications should attempt to install, operate, or maintain this equipment.

**WARNING**

Before installing, adjusting, or servicing any electrical component, be sure to become familiar with the electrical schematic for the machine.

**WARNING**

Before installing, adjusting, or servicing any pneumatic component, be sure to become familiar with the pneumatic schematic for the machine.

3.2 Making Electrical Connections

Before connecting the APV to the electrical supply, it is vital that the unit be properly grounded. The recommended method is to plug the power cords into earth grounded receptacles.

The APV requires two separate power sources, one for the control circuits and one for the feed and drive circuits. The control circuits operate on a 115 VAC/60 Hz./20 Amp circuit. The drive and feed circuits can be configured to operate on either 230, or 460 VAC. The APV unit should be placed within 6 feet of the electrical outlets that it will be connected to.

3.3 Making Pneumatic Connections

The APV requires a compressed air supply line that is capable of delivering approximately 3-15 CFM (57-85 liters) @ 80-100 PSI (.55-.69 MPa) of compressed air. Magnum Systems recommends that the air supply line be equipped with a refrigerated air dryer, or at the very least a water separator. After making pneumatic connections, check all connectors for leaks using a soapy water mixture. Bubbles will appear at the site of any leaks. Eliminating or reducing air leaks will reduce wear on the air supply equipment.

3.3.1 Lubrication Requirements

The pneumatic cylinders require lubrication to ensure their proper operation and to extend their useful life. The lubricator should be filled with 10 weight, non-detergent oil.

The oil flow control knob, located on top of the lubricator, should be set so that the lubricator is delivering 1 drop of oil for every 15 to 20 bags that are filled.

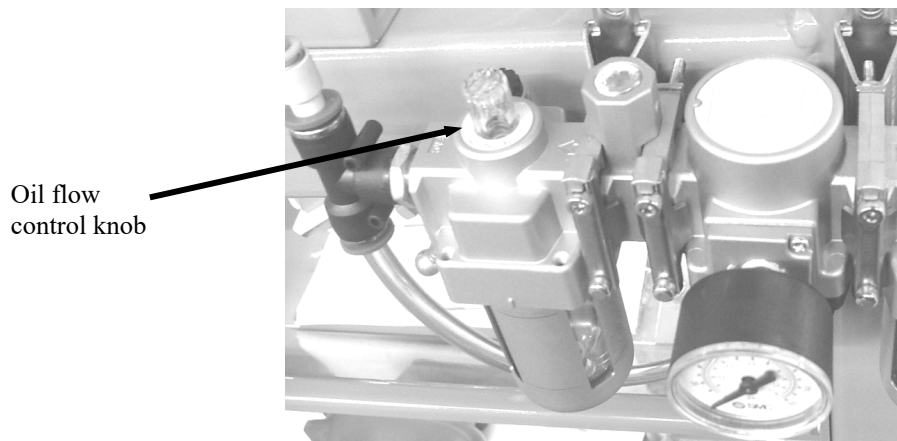


Figure 3-1. Lubricator – Oil Flow Control

Use caution when setting the flow control on top of the lubricator. While too little oil can cause operational problems, so can too much oil. If the oil control is set too high, it may result in the solenoid valves and cylinders getting gummed up and the air supply lines.

3.4 Mechanical Setup

Once the APV has been moved into the position where it will operate, follow the steps below to setup the mechanical components for operation.

1. Use shims under the legs of the APV to ensure that the APV frame is level. If the frame is not level, the performance of the APV will be adversely affected.
2. Make sure the weigh mast is plumb and level.
3. Make sure the flex leaves are level. The flex leaves must not be angled downward or upward. This would lead to inaccurate weighments. Adjust the angle of the flex leaves by adjusting how high or low the load cell allows the weigh mast to hang.

3.5 Making Network Connections

APV units that are equipped with the optional digital control set have the ability for total monitoring and instrument control via the built in communication network connectivity of the T3000. The T3000 has the following network capabilities:

- DeviceNet
- HardyLink Ethernet
- RS-232 Simplex Serial Port
- Remote I/O (RIO) (optional)
- ControlNet (optional)
- Profibus I/O (optional)
- Modbus over TCP/IP (optional)
- OLE Process Control (OPC) (optional)

3.6 Establishing System Security Settings

On all Model APV packaging machines, the manager has the ability to control who does and who does not have the ability to change system and calibration settings. The process for setting security varies, based on the type of controller used.

3.6.1 Establishing T4000 Security Settings

The Security parameters allow management to place security on the instrument and any menu or sub-menu requiring a password before enabling any changes. The Change Security parameter enables all persons to see the security status for a given menu, and selected persons to change that security status for any menu.

1. From the Configuration menu press the down arrow until the cursor is in front of Security.

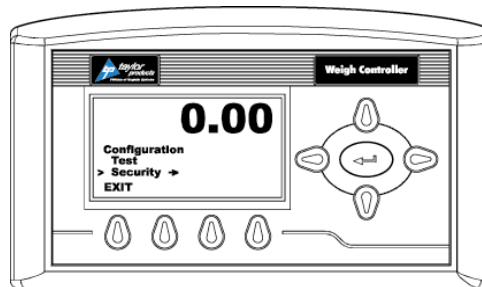


Figure 3-2. Placing The Cursor In Front Of Security

2. Press the enter button. The Security menu appears.
3. Set the Password Parameter. The Set Password parameter enables the operator to create a password for entry to secure menus and sub-menus. If the password is 0 there is no security. If the password is anything other than 0 the security is enabled.

Note: It is recommended that the passwords be created before setting security on the various menus.

4. Press the down arrow button until the cursor is in front of Set Password.

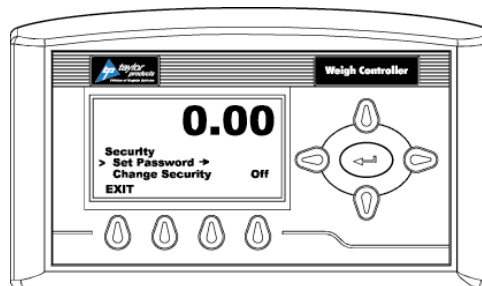


Figure 3-3. Placing The Cursor In Front Of Set Password

5. If the password is being set for the first time or if the factory defaults have been reset in the Test menu, enter the default password “2205”. If the password is being reset, and the existing password is known, enter that number. Press the enter button. The Verify Password display appears. Refer to 4.3.1.1 Entering Numbers Using the T4000 Control Panel.

6. Press the enter button. If the password is correct a brief message “Entry Accepted” appears and the Set Password display with the current password appears.

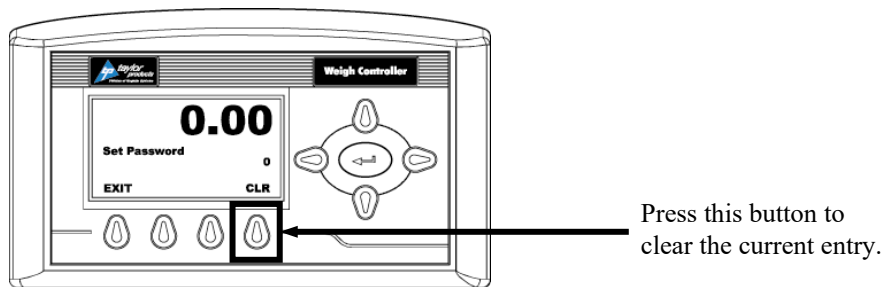


Figure 3-4. Set Password Menu

7. Press the function button located directly below the CLR item on the display to clear the entry. Use the left or right arrow buttons to move the cursor left and right. Use the up or down arrow buttons to enter the password number. To delete a single entry, press the left arrow button. In the example below, “123” was entered.

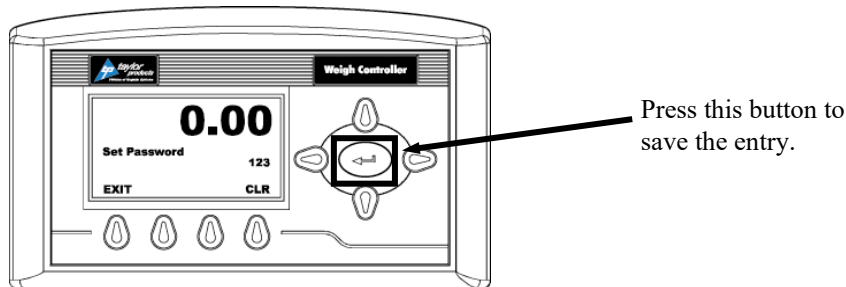


Figure 3-5. Password Set To 123

8. Press the right or left arrow buttons to toggle Change Security On. The Verify Password display appears.

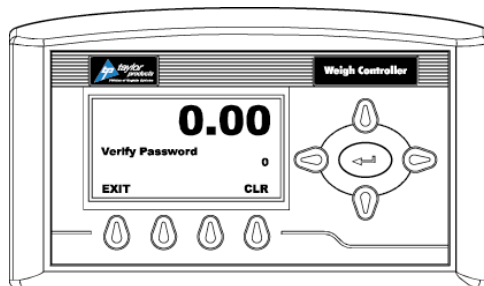


Figure 3-6. Verify Password

9. Use the left or right arrow buttons to move the cursor left and right. Use the up or down arrow buttons to enter the password number.

Important: When entering the password, the last digit is entered first, then the next digit to the left and so on. For example, if the password is set to 123, then 3 is entered first, then the 2, and the 1 is entered last.

10. Press the enter button. The Change Security status changes to On. In this instance we turned Change Security ON because we want to change the security of a sub-menu.

11. Now that the Change Security On feature has been turned on, press the function key below the word EXIT on the display to return to the Configuration menu.
12. Use the up or down arrow buttons to go to the desired sub-menu to is to be secured. In the example below, the Decimal Point sub-menu has been selected. Notice that the display now includes a SECUR menu item above the function keys.

Note: Steps 8-12 will need to be repeated to lock and unlock a parameter.

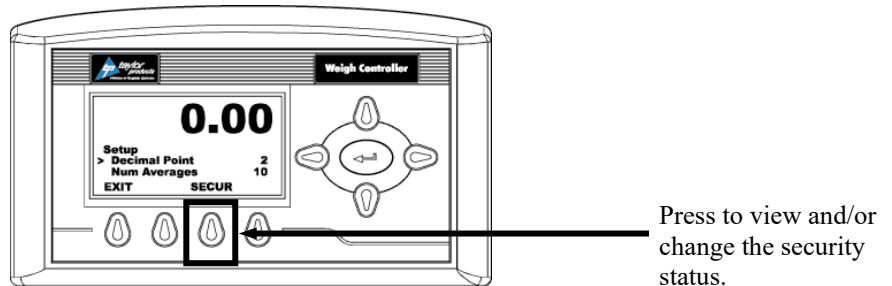


Figure 3-7. SECUR Menu Item Shown Above Function Key

13. Press the function key that is positioned below the SECUR item on the display, to view and/or change the security status of this parameter.
14. Press the right arrow button to changed to LOCKED thereby securing this sub-menu.

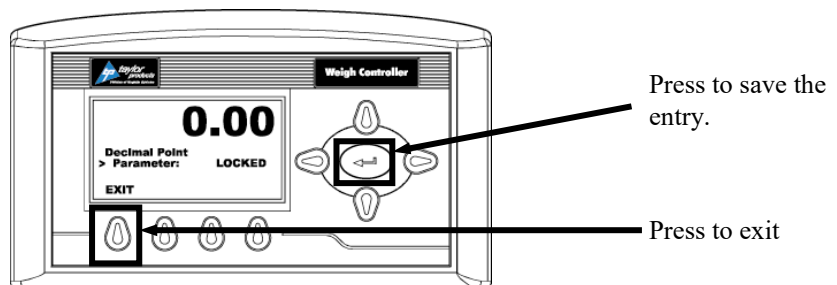


Figure 3-8. Parameter Shown Locked

15. Press the enter button to save the entry.
16. Press the function button below EXIT on the screen until the summary display is shown.

Note: To check to see if the security is set on a specific sub-menu, press the EXIT button until the summary display appears. Then re-enter the menus and try to change the secure parameters.

17. Until security has been changed, changing this parameter will require a password (other than 0) to be entered.
18. To turn the Change Security OFF, go back to the Security menu and repeat steps 1-6.

3.6.2 T3000 Security Settings

The optional T3000 control set has three levels of system security. They are:

- Low – No password required.
- Medium – A password is required to access some, but not all of the top level menus. The factory-preset password for this level of security is 7878.
- High – A password is required to access all top-level menus. The factory-preset password for this level of security is 1232.



CAUTION

Only personnel that have been properly trained should access the Medium and High-level security menus. Inadvertently changing a parameter can result in the machine shutting down or cause it not to function properly. These are factory default passwords. Magnum Systems recommends that they should not be changed.

Additionally, the manager also has the ability to assign different levels of security to individual menus. The menus where this applies are:

- Adjust Ingredient
- Setup
- Calibration
- Options
- I/O Mapping

If a menu has a security setting of Medium or High, if the user does not put a password in, or puts the wrong password in, they will still be able to access the menu, but their access will be read-only.

Follow the steps below to set security.

1. Press the User shortcut key. Enter the User ID and high-level password.
2. From the Standby display, press the Setup button. The Configuration Menu will appear.
3. Use the up/down arrows to position the cursor in front of SECURITY. Press the Enter button.
4. The SECURITY MENU will appear. The cursor will be in front of SET SECURITY MENU selection. Press the Enter button.
5. The SET SECURITY MENU will appear. The Top-Level Menus will be listed with the security level set at the default LOW setting.
6. Press the up/down arrow buttons to position the cursor in front of the desired menu selection.
7. Press the left/right arrow buttons to change the security setting for that menu item.
8. Once the desired security level is displayed, press the Enter button to set the entry.
9. If other menus require an adjustment to its security setting, repeat steps 5 through 7.
10. When all security setting adjustments have been completed, press the Exit button to return to the Standby display.

3.7 Dry Cycle

Once all electrical/pneumatic connections have been made, the operator should dry cycle the machine to test the control components. If all components operate properly, the machine is ready to calibrate.

Important: During the dry cycle process, the auger **WILL NOT** be turned on.

Note: Individual pneumatic cylinders may be cycled manually by pressing the test buttons on the solenoid valves that control them.

1. Press the STOP button.
2. Turn the power switch on the control panel of the APV to the ON position.
3. Make sure that the air pressure on the FRL is set to specification.
4. Pull the STOP button out.
5. Trip the bag clamp actuator switch. This should result in the following actions:
 - The bag clamp will extend and the bag clamp pad should come in contact with the spout.
 - The kicker (if equipped) or bag tilt (if equipped) will retract to the down position.
 - The bag settler (if equipped) cycle up and down.
6. Press the STOP button to simulate the package reaching target weight. This should result in the following actions:
 - The bag clamp will retract.
 - The kicker (if equipped) or bag tilt (if equipped) will extend.
 - The bag settler will retract.

3.8 Calibration

Each APV is calibrated prior to leaving the factory. However, the unit should be reassessed before its first use. It is recommended that calibration of the unit should be checked every week or anytime that a new load cell or PC board is installed, a weight display conversion performed, or any other changes made that affect the weigh system. A certified test weight must be used to check the calibration of the APV.

Note: Make sure that the shipping brackets have been removed before beginning the calibration process.

During the calibration process, regardless of the type of control panel used, the operator will be asked to hang a certified test weight from the spout of the machine. Magnum Systems recommends that the certified test weight weigh approximately 80-100% of the intended package weight. Also, the test weight should be hung so it hangs under the center of the spout, as shown in the following graphic.

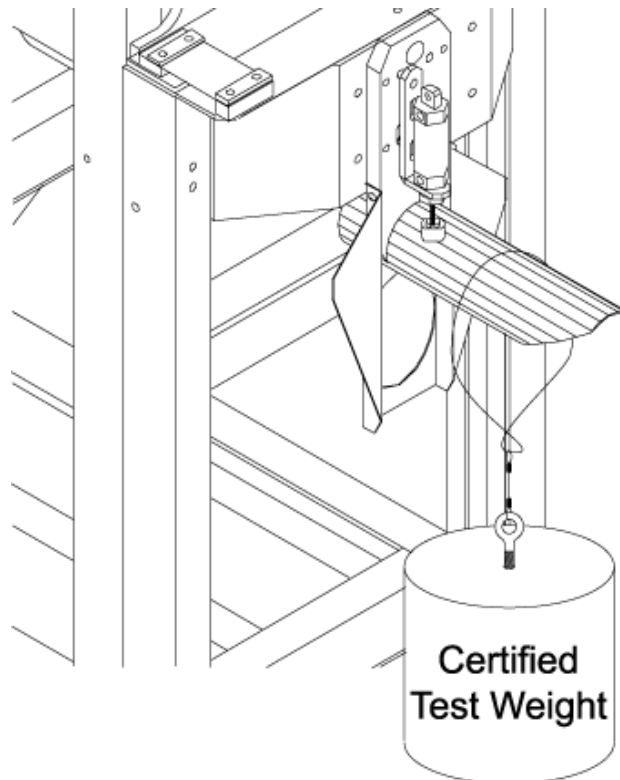


Figure 3-9. Hanging a Certified Test Weight

3.8.1 T4000 Control Panel Pre-Calibration Mechanical Checks

1. Check to determine if the load cells have been installed properly.
 - a. Refer to the operation and maintenance manual for the machine being worked on for proper installation instructions.
 - b. On some load cells there is an arrow that indicates the direction of the applied load. If the arrow is pointing in the wrong direction, change the position of the load cell so that it is mounted in the direction of the applied load.
2. Check for Binding on the load cell or other parts of the system.



CAUTION

Binding on a scale/vessel or load cell does not allow the load cell free vertical movement and may prevent the instrument from returning to the original zero reference point.

- a. The load cell must be mounted so that 100% of the load (vessel + contents) is applied vertically to the load cell.

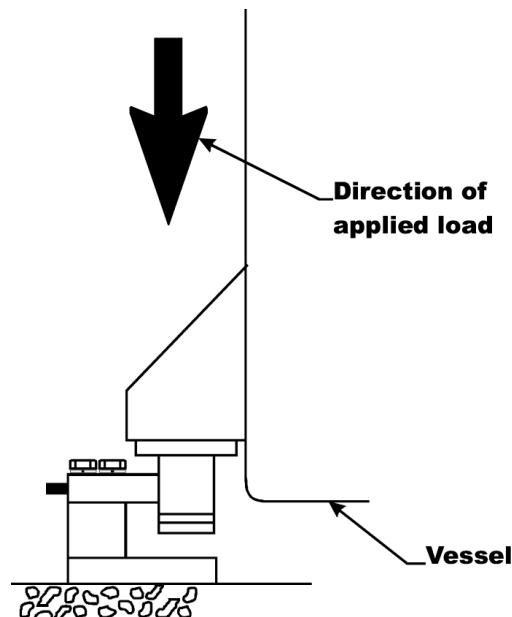


Figure 3-10. Load Passing Through Load Cell

- b. Do a visual check to see that nothing is binding the load cell or other parts of the weighing system. Make sure that nothing is draped over the scale/vessel or the load cell, such as a hose, electrical cord, tubes, or other objects.
3. Check to see that nothing comes in contact with the scale/vessel other than service wires and piping that have been properly mounted with flexible connectors.
4. Check to see that there is power to the T4000.
 - a. If there is power to the controller the front panel display should be illuminated.
 - b. If the display appears and a weight value is being displayed, the unit is ready for calibration.
5. Allow the instrument to warm up for about 15 minutes before doing the calibration procedures.
6. Put a load (weight) on the scale or vessel. For a full load test, the operator can put 80 – 100% of the expected weight for their process on the scale or vessel.

Setup/Installation

7. Check to see if the weight reading changes on the display in the proper direction.
 - a. For example, if the display reads 100 lbs and a 20 lb load is placed on the vessel or scale, the display should read 120 or some value over 100.
 - b. If the display reads 80 lbs and a 20 lb load is placed on the vessel or scaled, the reading is going in the wrong direction and indicates some problem with the system.
 - c. If the display is reading improperly or shows no change there is something wrong with the configuration or the load cells.
8. If the display changes in the proper direction, remove the weight and proceed to calibrate the Weigh Controller.

Note: When calibrating the T4000 for the first time, go from one sub-menu to the next in sequence.

Note: The settings provide below are just an example. The actual settings used will vary based on the specific application.

3.8.2 T4000 Control Panel Calibration

1. Make sure the T4000 has been configured for the intended application. This includes setting the units, decimal point, scale capacity, averages, etc.
2. From the Summary display press the enter button. The Configuration menu appears.
3. Press the down arrow button until the cursor is in front of Calibration.
4. Press the enter button. The Calibration menu appears.
5. Traditional Calibration is the method of calibration that uses test weights. Magnum Systems recommends that the test weights total 80 – 100% of the desired package weight, and that the weight be distributed uniformly on/in the scale.
6. From the Summary display, press the enter button. The Configuration menu appears.
7. Press the down arrow button until the cursor is in front of the Calibration line.

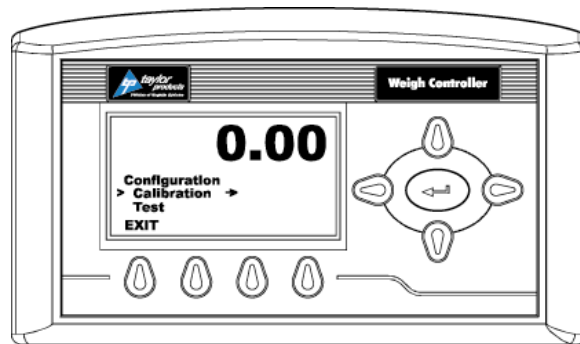


Figure 3-11. Placing the Cursor In Front Of Calibration

8. Press the enter button. The Calibration menu appears.
9. Press the down arrow button until the cursor is in front of Trad Cal.

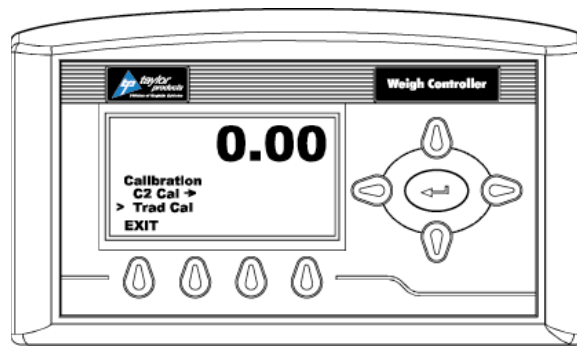


Figure 3-12. Placing The Cursor In Front Of Trad Cal

10. Press the enter button. The Trad Cal menu appears.

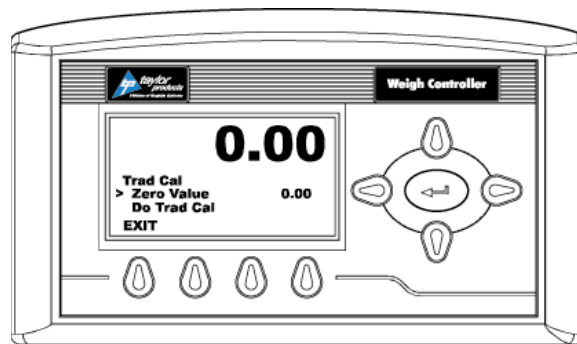


Figure 3-13. Placing The Cursor In Front Of Zero Value

11. Press the enter button. The Zero Value weight menu appears.
12. Traditional Calibration requires a zero point and the physical placement of test weights on the scale. To set the Zero Value Weight:
 - a. Remove all weight “live load” from the Scale. The Zero Value should be 0.0.



CAUTION The scale MUST be empty.

- b. Wait 12 seconds or more.
13. Use the left and right arrow buttons to position the cursor. Use the up or down arrow buttons to enter the Zero Value for this instrument.

Note: Most applications will set the Zero Value to 0.00.

14. Press the enter button to save the entry.
15. Press the down arrow button until the cursor is in front of Do Trad Cal (Zero).
16. Press the enter button to Do Trad Cal (Zero).
 - a. A “Cal Completed OK” message appears briefly if the calibration was successful.
 - b. If an error message appears, the calibration was not successful. A list of possible error messages is provided with the troubleshooting information later in this guide. Refer to this list in order to correct the error.

Setup/Installation

17. Press the down arrow button until the cursor is in front of Span Value.
18. Press the enter button. The Span Weight menu appears. The last Span Weight is displayed.

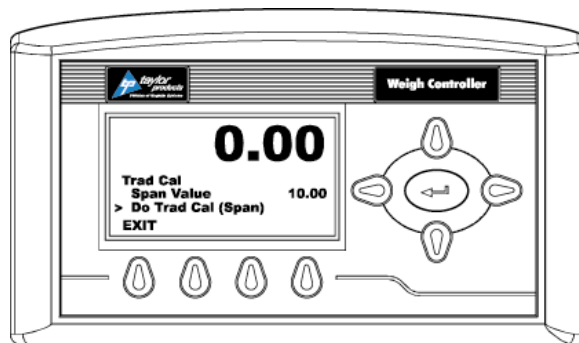


Figure 3-14. Span Value Displayed

19. To set the Span Weight:
 - a. Place a certified test weight on the scale.
 - b. Use the left and right arrows to position the cursor and the up or down arrows to enter the value of the test weight. If a 10 lb. weight is used, enter 10.00.
 - c. Press the enter button to save the entry.
20. Press the down arrow button until the cursor is in front of Do Trad Cal (Span).
21. Press the enter button to Do the Trad Cal (Span).
 - a. A “Cal Completed OK” message appears briefly if the calibration was successful.
 - b. If an error message appears, the calibration was not successful. A list of possible error messages is provided with the troubleshooting information later in this guide. Refer to this list in order to correct the error.
22. The scale is now calibrated.

3.8.3 Optional T3000 Control Panel Calibration

The Calibration Menu is used to calibrate the weighing system of the T3000. Before beginning the calibration procedure, be sure that the machine is ready to be calibrated. Make sure that the load points have been installed properly. Follow the steps below to make sure the APV is ready for calibration:

1. Make sure the load system is free of binding and that nothing is draped over the equipment, such as hoses, electrical cords, tubes, etc.
2. Verify that the load cell is mounted so that 100% of the load always passes vertically through the load cell at the same point.
3. Check all communication and power cables to be sure they are securely fastened to their connectors on the rear of the control panel.
4. Make sure that power is supplied to the controller. The panel display should illuminate.

Important: The operator *MUST* log in with the proper security level to initiate calibration. Once logged in, an access timer will run. If the timer expires (typically about 5 minutes), the operator will be logged out. The operator will have to log in again to regain access.

When the operator selects CALIBRATION from the Configuration Menu, the CALIBRATION screen appears. There is one line on that screen, it is the Cal Type line. The currently selected method of calibration will appear at the far right on the Cal Type line. Use the left/right arrow keys to toggle until TRAD is displayed on the line. Press the Enter key to access the screen for the TRAD calibration method. This screen will provide the following lines for the operator.

- Zero Value – This value should be set to zero.
- Zero Ct – This parameter is controlled by the controller.
- Do Trad. Cal (Zero) – Start the calibration procedure.
- Span Value – The amount of weight being used for calibration.
- Span Ct – This parameter is controlled by the controller.
- Do Trad. Cal (Span) – Start the calibration procedure.

Use this procedure to calibrate a machine with traditional load cells.

1. Turn on the meter.
2. Press the User shortcut key. Enter the User ID and medium or high-level password.
3. Press the Setup key to access the CONFIGURATION MENU.
4. Use the up/down arrow buttons to scroll to the CALIBRATION line. Press the Enter key to access CALIBRATION.

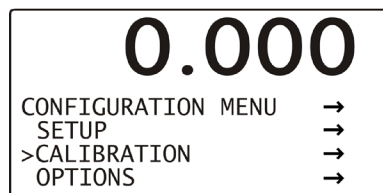


Figure 3-15. Calibration Line

5. Use the left/right arrow keys to toggle to the TRAD selection if it is not already displayed. Press the Enter key.

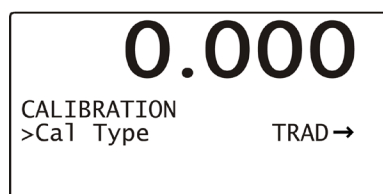


Figure 3-16. Selecting TRAD Calibration

6. A Function OK message will flash briefly in place of the Cal Type line, then the TRADITIONAL CAL screen will appear. Check the display to make sure that the Zero Value reads 0.0.

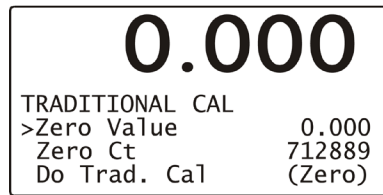


Figure 3-17. Checking Zero Value

7. Use the up/down arrow keys to scroll to the Do Trad. Cal (Zero). Press the Enter key. The weight display will display !Calibration in Progress! and will return to its calibration screen.
8. Use the up/down arrow keys to scroll to the Span Value selection and use the alphanumeric keypad to enter the weight that will be used for calibration. Press the Enter key.

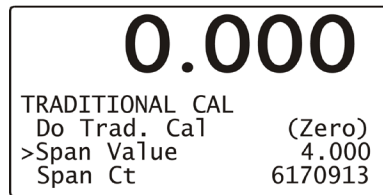


Figure 3-18. Setting Span Value

9. Use the up/down arrow keys to scroll down to the Do Trad. Cal (Span). Place the calibration weight on the scale by hanging it on the fill spout directly under the bag clamp cylinder. Press the Enter key. The weight display will display !Calibration in Progress! and will then return to its calibration screen. Press the Exit key three times to return to the main screen.

Chapter 4 Operation

4.1 General Description

This chapter will provide detailed descriptions of the operational controls of the APV.

4.2 General Fill Cycle Information

A single set point unit has one fill rate. The package is filled using one fill rate until the SP1 weight is reached, then the auger will shut off and reverse momentarily. Once the product that is in free fall settles into the package, the package weight should match the target weight.

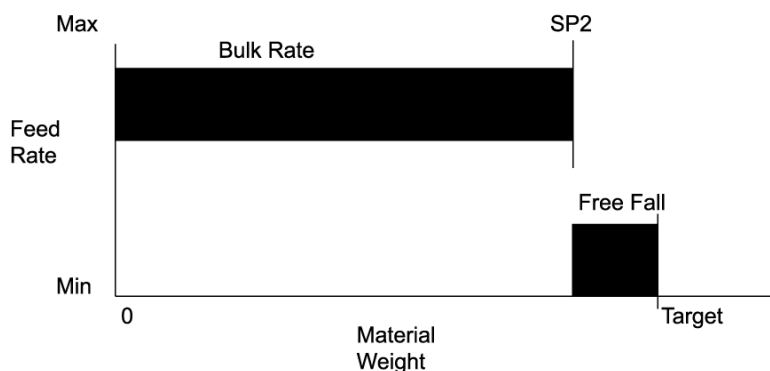


Figure 4-1. Fill Rate (SSP)

A dual set point unit has two fill rates, bulk rate and dribble rate. Bulk rate is a faster rate that is used to fill the package quickly, once the package achieves the SP1 weight, the auger speed will slow to dribble fill rate. Once the package achieves the SP2 weight, then the auger will shut off and reverse momentarily. Once the product that is in free fall settles into the package, the package weight should match the target weight.

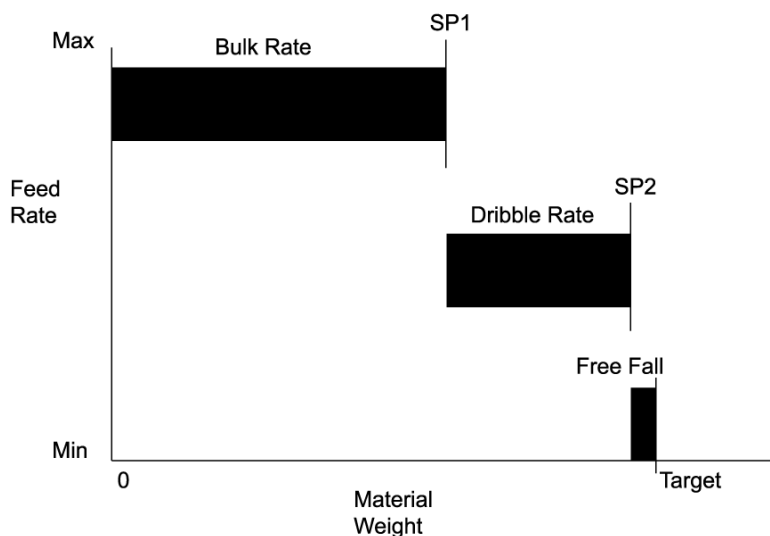


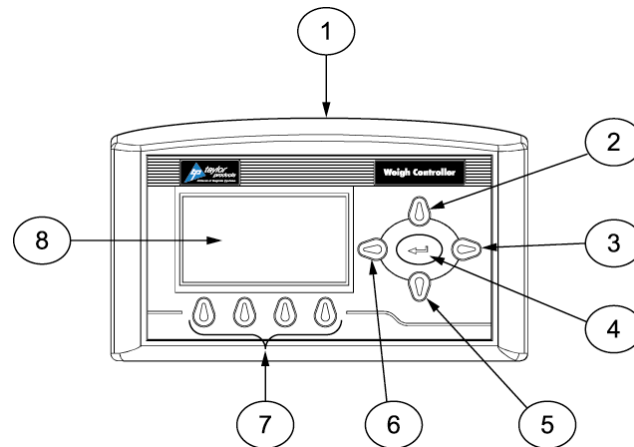
Figure 4-2. Fill Rates (DSP)

4.3 Operational Controls

The standard APV is equipped with single set point T4000 controls. Optionally, the APV can be ordered with dual set point T4000 controls, or with a T3000 control set with either single or dual set point controls.

4.3.1 T4000 Controls

The APV comes standard with T4000 controls and configured as a single set point unit. An option is available with the T4000 controls that will allow dual set points to increase operational efficiency.



Item #	Description	Item #	Description
1	T4000 control panel	5	Down key
2	Up key	6	Left key
3	Right key	7	Function keys
4	Enter key	8	LCD screen

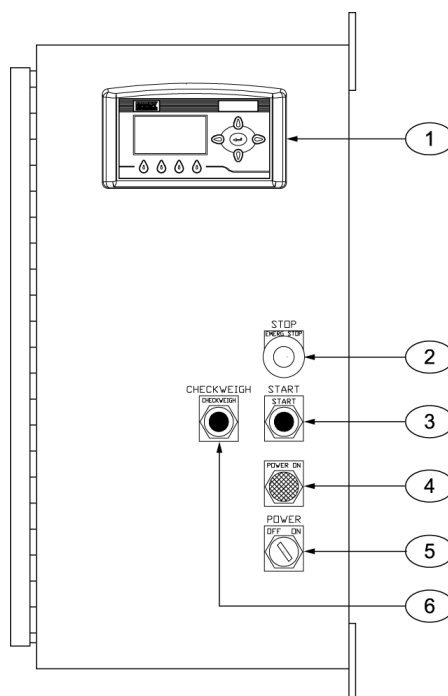
Figure 4-3. Control Box with T4000 Control Panel

4.3.1.1 Entering Numbers in the T4000 Control Panel

Prior to using the control panel, it is important to understand the process for entering a number into a field. When accessing a numbered field, the cursor will be placed in the default position, which is under the digit to the far right. To position the cursor at the desired position, use the left or right arrow keys to move the cursor. Once the cursor is placed in the desired position, use the up arrow key to increase the number, or use the down arrow key to decrease the number. Each press of the key will result in a change increment of one digit. For example, if 0 is displayed, pressing the up arrow key once will change the number to 1. After the desired number has been entered, press the enter key to save the entry.

4.3.1.2 T4000 Single Set Point Controls

An APV with a single set point T4000 control set uses only one fill rate. The machine will fill the package until the set point 1 (SP1) weight is achieved. SP1 is set just below the target weight. Once SP1 achieved, the auger will reverse momentarily to draw product away from the spout opening. This is done to reduce spillage when the package is removed from the spout. The reverse rate is the same rate as the forward speed. When SP1 is reached, there is still a small amount of product that is in free fall. This means that the product is falling from the spout into the package, so its weight has not yet registered. Once the free fall product settles in the package, the total weight of the package should match the target weight. Speed controls are not used on single set point APV units.



Item #	Description	Item #	Description
1	T4000 control panel	4	POWER ON indicator
2	STOP button/indicator	5	POWER switch
3	START button	6	CHECKWEIGH button

Figure 4-4. Control Box with T4000 Control Panel

4.3.1.3 T4000 Dual Set Point Controls

An APV with a dual set point T4000 control set uses two fill rates. The machine will fill the package at the Fast A rate until the Set Point 1 (SP1) weight is achieved. SP1 is set at approximately 90% of the target weight. Once SP1 achieved, the auger speed will slow to the Slow A rate. SP2 is set just below the target weight. Once SP2 achieved, the auger will reverse momentarily to draw product away from the spout opening. This is done to reduce spillage when the package is removed from the spout. The reverse rate is the same rate as the forward Slow A speed. There is still a small amount of product that is in free fall. This means that the product is falling from the spout into the package, so its weight has not yet registered. Once the free fall product settles in the package, the total weight of the package should match the target weight.

4.3.2 T3000 Controls

This option utilizes a T3000 control panel that was jointly designed by Magnum Systems and Hardy Instruments.

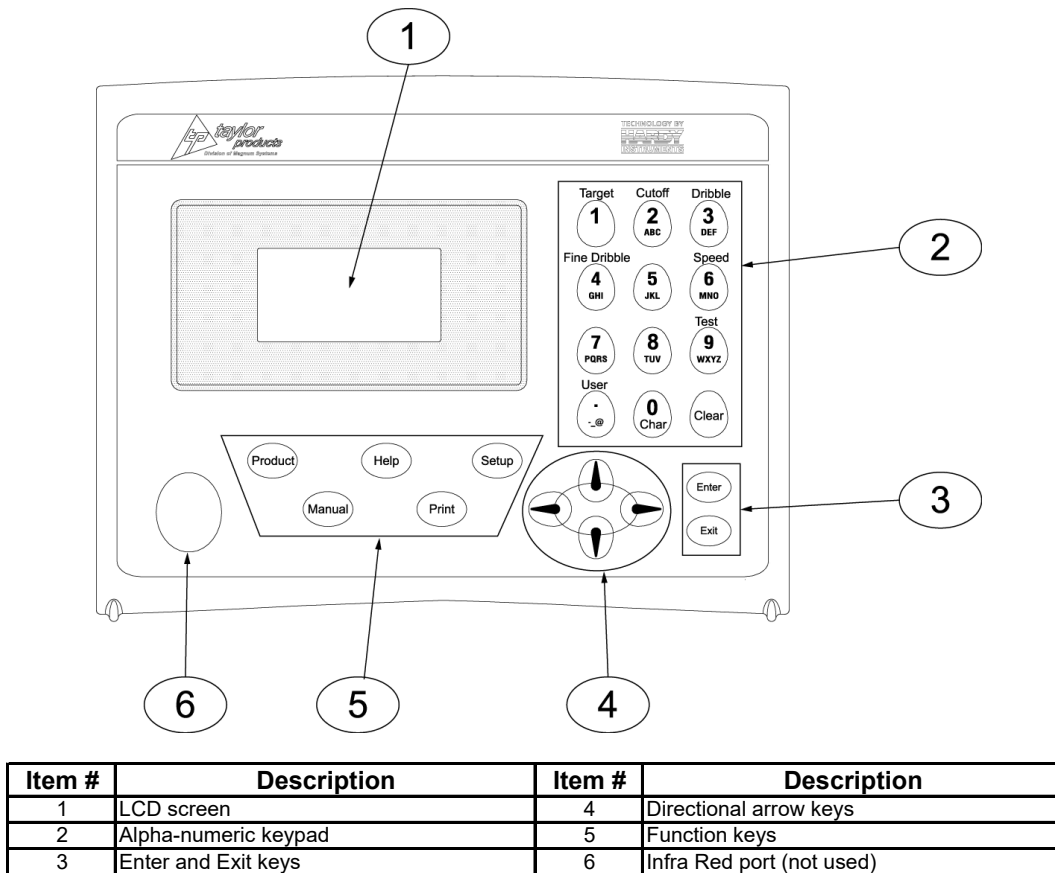


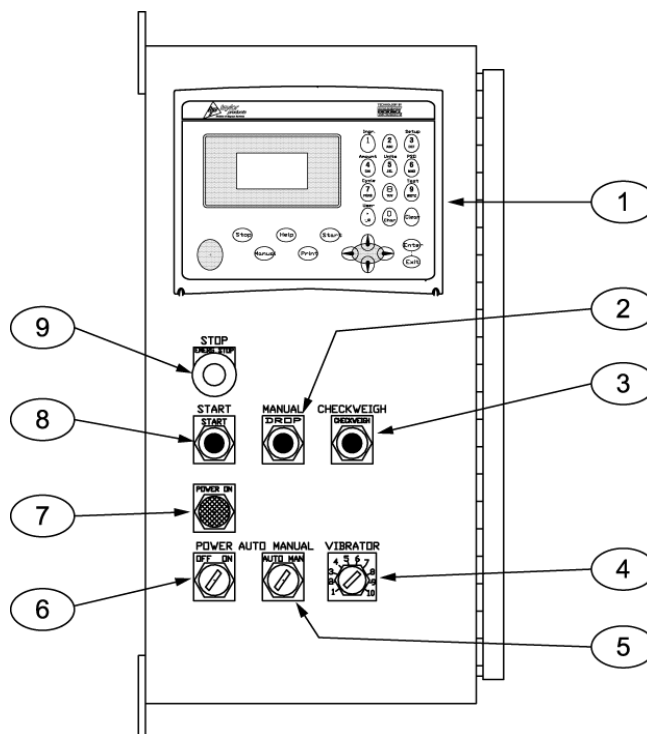
Figure 4-5. T3000 Control Panel

The front of the T3000 is equipped with a weight display, a numeric keypad, directional arrow keys, function keys, an Infra Red PDA Port (not used), an Enter key, and an Exit key.

The 5-line display has one line of large fonts (5.5 alphanumeric characters), and four lines of smaller fonts (20 alphanumeric characters). The top line displays the currently selected package weight. The remaining four lines are used for monitoring system statuses, historical data, and configuration settings of the APV. The T3000 will show alarms. If alarms are present, refer to the *Magnum Systems Filler/Dispenser/IBC T3000 User Guide*, for more information.

4.3.2.1 T3000 Single Set Point Controls

An APV with a single set point T3000 control set uses only one fill rate. The machine will fill the package until the set point 1 (SP1) weight is achieved. SP1 is set just below the target weight. Once SP1 achieved, the auger will reverse momentarily to draw product away from the spout opening. This is done to reduce spillage when the package is removed from the spout. The reverse rate is the same rate as the forward speed. When SP1 is reached, there is still a small amount of product that is in free fall. This means that the product is falling from the spout into the package, so its weight has not yet registered. Once the free fall product settles in the package, the total weight of the package should match the target weight. Speed controls are not used on single set point APV units.



Item #	Description	Item #	Description
1	T3000 control panel	6	POWER switch
2	STOP button/indicator	7	POWER ON indicator
3	CHECKWEIGH button	8	START button
4	VIBRATOR control knob	9	STOP button/indicator
5	AUTO/MANUAL switch		

Figure 4-6. Control Box with T3000 Control Panel

4.3.2.2 T3000 Dual Set Point Controls

An APV with a dual set point T3000 control set uses two fill rates. The machine will fill the package at the Fast A rate until the Set Point 1 (SP1) weight is achieved. SP1 is set at approximately 90% of the target weight. Once SP1 achieved, the auger speed will slow to the Slow A rate. SP2 is set just below the target weight. Once SP2 achieved, the auger will reverse momentarily to draw product away from the spout opening. This is done to reduce spillage when the package is removed from the spout. The reverse rate is the same rate as the forward Slow A speed. There is still a small amount of product that is in free fall. This means that the product is falling from the spout into the package, so its weight has not yet registered. Once the free fall product settles in the package, the total weight of the package should match the target weight.

4.3.3 Allen-Bradley MicroLogix™ 1000

All APV units are equipped with an Allen-Bradley MicroLogix 1000 Programmable Logic Controller (PLC). The PLC is located inside the control box. The PLC is loaded at the factory with a software program that includes adjustable timers for specific functions.

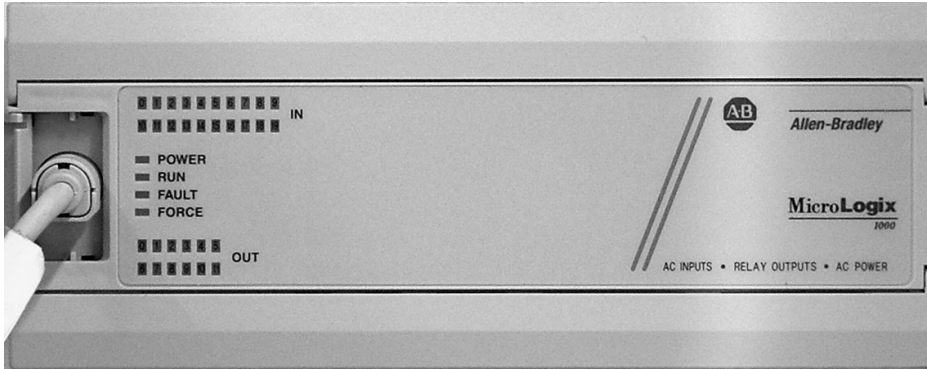


Figure 4-7. Allen-Bradley MicroLogix 1000 Programmable Logic Controller

4.3.4 Allen-Bradley PanelView 300

All APV units are equipped with an Allen-Bradley PanelView 300 control panel. This control panel is an interface to the Allen-Bradley MicroLogix 1000 Programmable Logic Controller (PLC) that is located inside the control box. The control panel is used to adjust system timers controlled by the PLC.

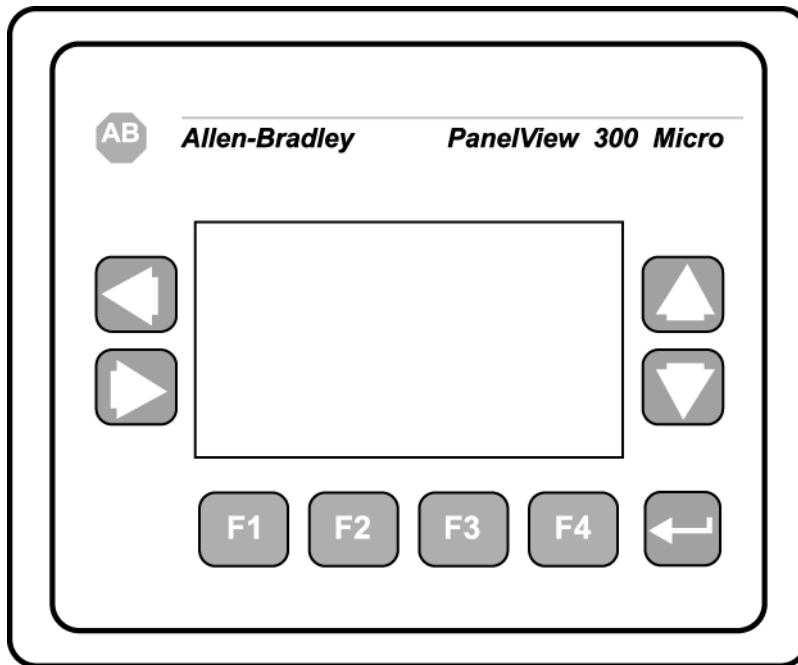


Figure 4-8. Allen-Bradley PanelView 300

4.3.4.1 PV300 Menus

The PV300 has several menus that allow the operator to adjust different timer functions for the APV. The available timer functions, and their definitions are listed below:

Note: Some of the timers mentioned below are for optional features. The machine that accompanied this manual may or may not have or use all of the timers listed.

- **Auger Reverse** – This function controls the amount of time that the auger reverses after the cut-off weight is reached. The purpose of the reversing of the auger is to keep product from falling out of the spout onto the floor. Timer setting range is between 0 and 25 seconds.
- **Hold High** – Used to mask the set point activation while other functions, such as vibration, thumping and/or lift and shake, are taking place. After the lift and shake, vibration and/or thumping functions have completed, the Hold High timer starts. Hold High function is active until the Hold High timer expires. Timer setting range is between 0 and 25 seconds.
- **Lift and Shake Count** – Used to set the number of times that the lifter will raise and lower during one fill cycle to help the product settle in the container. The available range for the counter setting is between 0 and 10 cycles.
- **Lift Off Time** – The amount of time that the lifter remains down. Timer setting range is between 0 and 25 seconds.
- **Lift On Time** – The amount of time that the lifter holds the container up. Timer setting range is between 0 and 25 seconds.
- **Settler Start Delay** – Controls the amount of delay after the fill is started before the settler function begins. This delay allows functions that take place at the beginning of the fill to operate properly (i.e. Auto-Tare, Motion, etc.). Timer setting range is between 0 and 25 seconds.
- **Settler Time** – The amount of time that the settler function will remain active once initiated. The settler will run until either the settler timer has expired, or until SP1 is reached.
- **Thumper Counter** – Used to set the number of times that the thumper will activate to settle the product in the container during a fill cycle. The available range for the counter setting is between 0 and 10 cycles.
- **Thumper Off Time** – The amount of time that the thumper retracts and remains open between thumps. Timer setting range is between 0 and 25 seconds.
- **Thumper On Time** – The amount of time that the thumper will remain pushing in on the container. Timer setting range is between 0 and 25 seconds.

The tables on the following pages provide some examples of possible menu screens. The menu screens used on individual machines will vary. This manual does not show all of the available menu screens, as some customers may order custom menus.

Operation

4.3.4.1.1 PV300 Menu Functions

The PV300 menus are controlled by the operator using the F-keys and the up/down arrow keys. The tables below will illustrate the menus and describe the function of each applicable keystroke.

Table 4-1. PV300 Main Menu

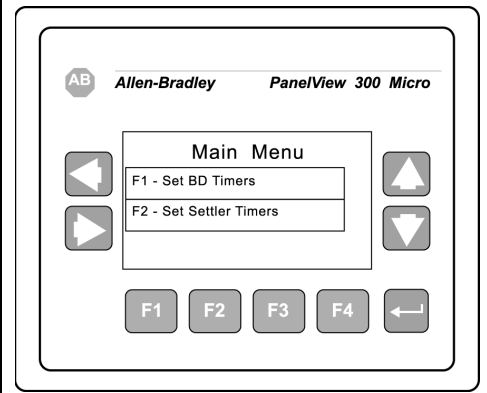


	Key	Function
		Pressing F1 will allow the operator to access the Set BD Timers menu.
		Pressing F2 will allow the operator to access the Set Settler Timers menu.

Table 4-2. PV300 Set BD Timers Menu

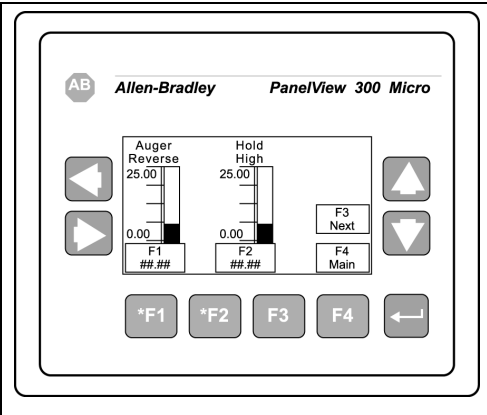




	Key	Function
		Pressing F1 will result in the system placing the cursor in the field where the Auger Reverse timer can be adjusted.
		Pressing F2 will result in the system placing the cursor in the field where the Hold High timer can be adjusted.
		Pressing F3 will result in the system advancing to the next menu screen.
		Pressing F4 will result in the system returning to the Main Menu screen.

Table 4-3. PV300 Counters Menu

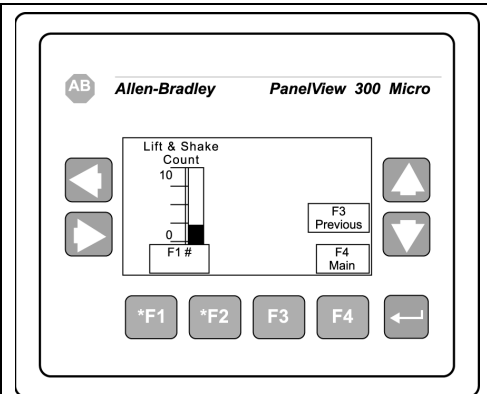



	Key	Function
		Pressing F1 will result in the system placing the cursor in the field where the Lift & Shake Counter can be reset.
		Pressing F3 will result in the system returning to the previous screen.
		Pressing F4 will result in the system returning to the Main Menu.

Table 4-4. PV300 Settler Menu

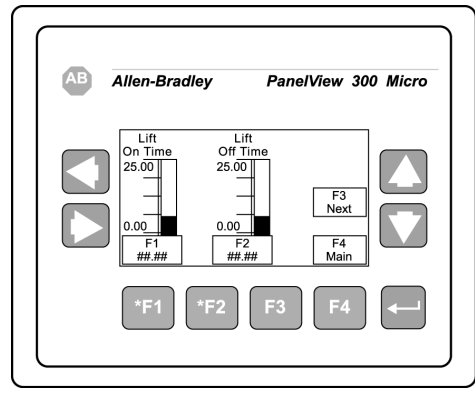
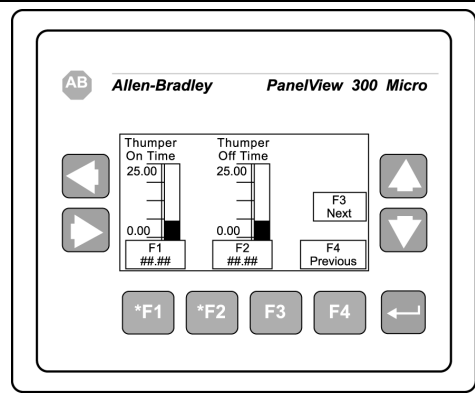
	Key	Function
F1	Pressing F1 will result in the system placing the cursor in the field where the timer for Lift On Time can be adjusted.	
F2	Pressing F2 will result in the system placing the cursor in the field where the timer for Lift Off Time can be adjusted.	
F3	Pressing F3 will result in the system proceeding to the next screen.	
F4	Pressing F4 will result in the system returning to the Main Menu.	

Table 4-5. PV300 Thumper Menu

	Key	Function
F1	Pressing F1 will result in the system placing the cursor in the field where the timer for Thumper On Time can be adjusted.	
F2	Pressing F2 will result in the system placing the cursor in the field where the timer for Thumper Off Time can be adjusted.	
F3	Pressing F3 will result in the system proceeding to the next screen.	
F4	Pressing F4 will result in the system returning to the previous screen.	

4.3.4.2 Making System Adjustments With the PV300 Control Panel

Each of the menus that have been described previously in this chapter has values that can be adjusted if necessary.



CAUTION

When accessing the individual variables, the variable will reset itself to 00.00. Before trying to access the variable, the person making the changes should note the current setting before accessing the variable.

Examples are given below:

Table 4-6. System Adjustments Example

	<p>In this example, pressing the F1 key will allow the operator to adjust the Auger Reverse variable, and pressing the F2 key will allow the operator to adjust the Hold High variable. The following example is the menu that is displayed if the operator presses the F1 key.</p>
--	---

Table 4-7. Example – Adjusting the Variable

	<p>Using the left and right arrow keys, place the cursor in the digit place that is going to be changed.</p>	
<p>Use the up and down arrow keys to increase or decrease the value of that digit.</p>		
<p>Use the enter key after changing the desired value to confirm/save the changes and return to the previous screen</p>		
<p>Use the F1 key to exit the menu without saving the changes that have been made.</p>		

4.4 Starting the Unit

Once the unit has been installed, the unit can now be started. The process for turning on the APV will vary based on the type of control set that is used.

4.4.1 Control Box with T4000 Control Panel

On APV units that are equipped with the T4000 control set, the POWER Switch is located on the lower portion of the control box. The switch has two positions, OFF, and ON. To turn the APV on, turn the switch to the ON position. The STOP button/indicator should be pulled out and should not be illuminated. From this point, the operator should place a bag on the spout far enough to allow the bag clamp to grab the bag. The operator will then press the START button to engage the bag clamp and start the fill cycle. The APV will operate according to the operational mode that is determined by the AUTO / MANUAL switch.

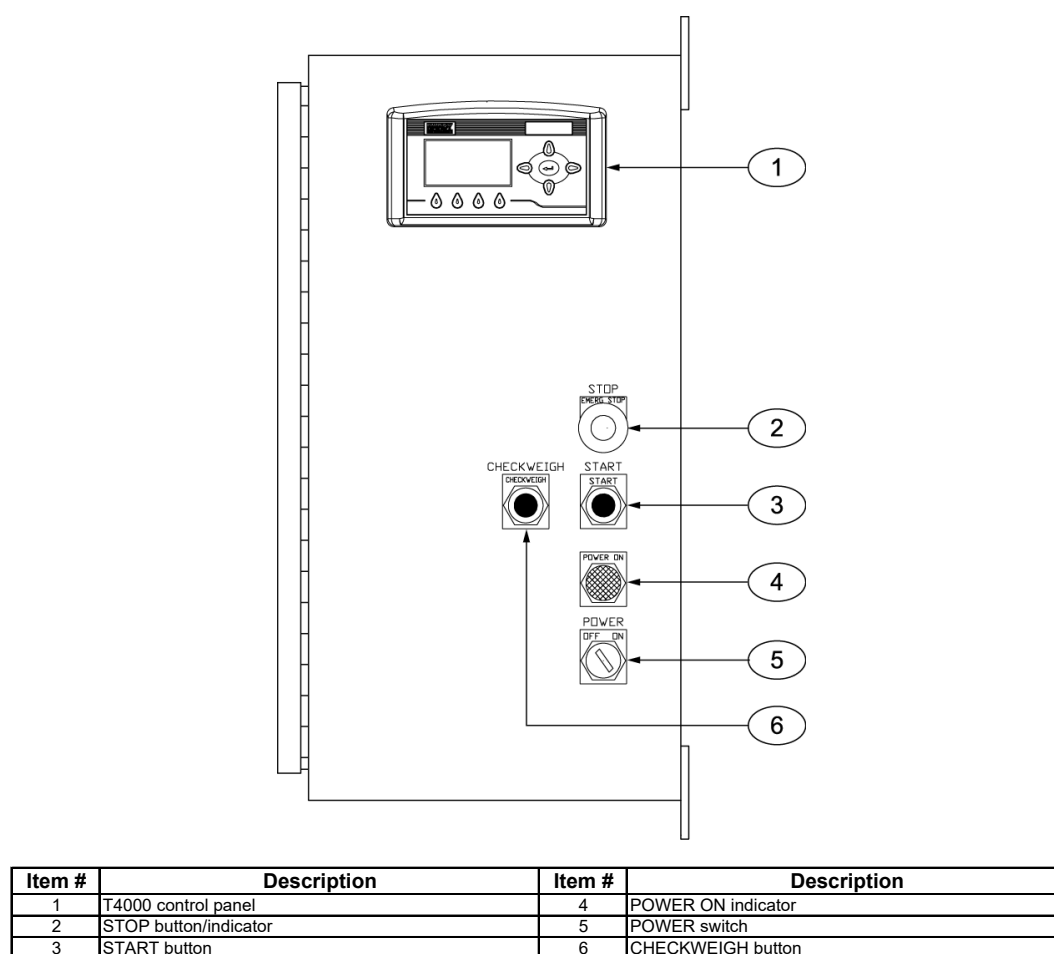
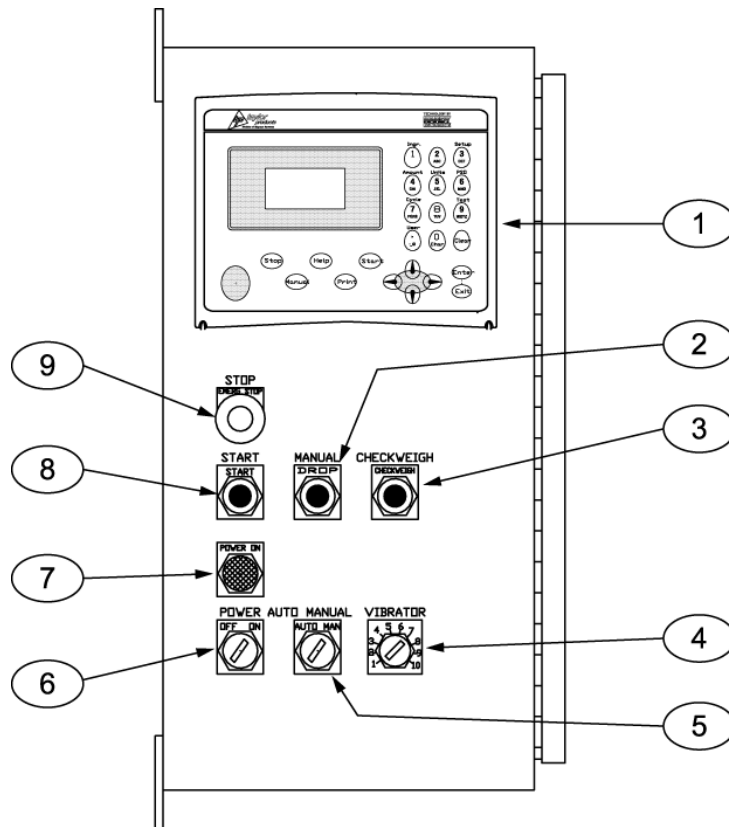


Figure 4-9. Control Box with T4000 Control Panel

4.4.2 Control Box with T3000 Control Panel

On APV units that are equipped with the T3000 control set, the power switch is located on the lower portion of the control box. The switch has two positions, OFF and ON. To turn the APV on, turn the switch to the ON position. The POWER ON indicator should illuminate green. The STOP button/indicator should be pulled out and should not be illuminated. From this point, the operator should place a bag on the spout far enough to allow the bag clamp to grab the bag. The operator will then press the START button to engage the bag clamp and start the fill cycle. The APV will operate according to the operational mode that is determined by the AUTO / MANUAL switch.



Item #	Description	Item #	Description
1	T3000 control panel	6	POWER switch
2	STOP button/indicator	7	POWER ON indicator
3	CHECKWEIGH button	8	START button
4	VIBRATOR control knob	9	STOP button/indicator
5	AUTO/MANUAL switch		

Figure 4-10. Turning an APV with T3000 Control Set On



CAUTION

When the power switch is in the ON position, the machine can start operating automatically, or someone could accidentally start the machine.

4.5 Initial Setup

APV units can be categorized based on their control type, as follows:

- T4000 Controls
 - Single set point
 - Dual set point
- T3000 Controls
 - Single set point
 - Dual set point

The setup procedure is different based on the type of APV.

4.5.1 Setting Up a Single Set Point APV with T4000 Controls

A single set point APV will have a typical bagging cycle that will proceed as follows:

1. Turn the APV on and pull the STOP button out.
2. Place a bag on the spout and press the START button to apply the bag clamp and start filling the package with material.
3. When the weight of the package reaches Set Point 1 (SP1) the auger will reverse and then stop.
4. Remove the package by pulling the package off of the spout, or by using the optional foot switch to activate the kicker, or if using an automatic kicker, allow the kicker to remove the package.
5. As soon as the package has been removed, place a new package on the spout and press the START button to apply the bag clamp and begin filling the package. This cycle will repeat until the surge hopper is empty, or until the unit is turned off or stopped.

Before the APV is put into operation, the initial setup procedure needs to be performed to ensure proper weighments. Follow the procedure outlined below to set up a single set point APV for its first run. Before beginning this process, the operator should become familiar with the controls and functions of the APV.

1. Turn on the power by turning the POWER switch to the ON position. Allow fifteen (15) minutes for the controls to warm up.

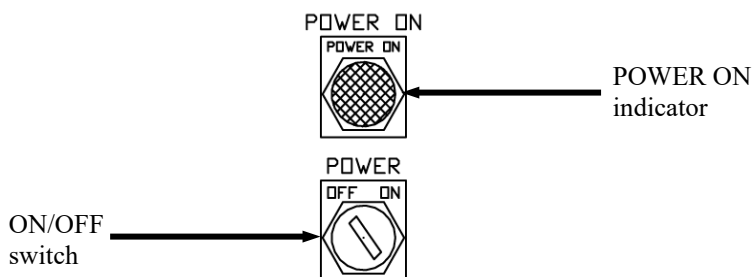


Figure 4-11. APV ON/OFF Switch

2. Set the Target Weight. From the Standby screen, press the function key below SP1 on the display.

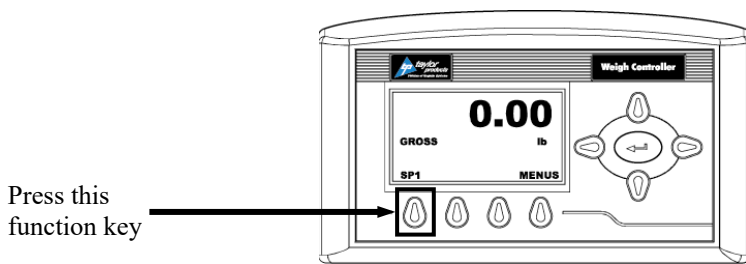


Figure 4-12. Initial Setup – Single Set Point APV

3. When the SP1 adjustment screen appears, use the up, down, left, and right arrows to adjust the SP1 setting.

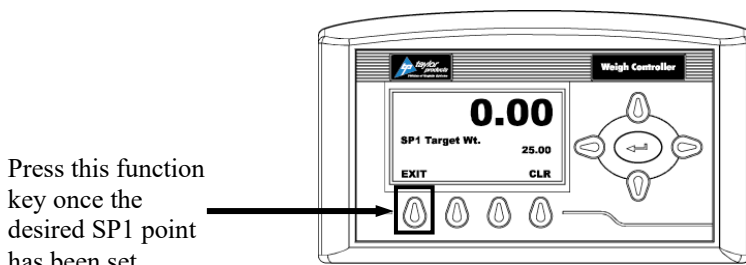


Figure 4-13. SP1 Adjustment Screen

4. When the adjustment to the SP1 setting is complete, press the Enter key to save the setting.

Note: Due to the weight of product in free fall, SP1 is typically set .3 to .7 lbs below the desired target weight. How much below the desired package weight will depend on the flow characteristics of the product.

5. Place a bag on the spout.
6. Press the START button, or optional foot switch. The APV will begin filling the package with material. After SP1 has been reached, and the auger has stopped. **BEFORE** removing the package, check the weight display to see how close the actual package weight is to the target weight. If the actual package weight is more than or less than the target weight go back and adjust SP1 up or down by an amount equal to the difference between the target weight and actual weight.
7. Remove the package.
8. Install a new package on the spout and press the START button, or optional foot switch. Once again, the APV will begin filling the package with material. After SP1 has been reached, and the auger has stopped, check the weight display to make sure that actual weight matches the target weight. If the actual weight is on target, remove the package and install a new package on the spout and press the START button. There will be a short delay before the auger begins filling the new package. It is important to make any SP1 correction before the package is removed. It may take several cycles before to get the machine properly set up for that specific product.

4.5.2 Setting Up a Dual Set Point APV with T4000 Controls

A dual set point APV will have a typical bagging cycle that will proceed as follows:

1. Turn the APV on and pull the STOP button out.
2. Place a new bag on the spout and press the START button to apply the bag clamp and start filling the package with material at the bulk rate (Fast A).
3. When the package weight reaches SP1 the auger will slow to the dribble rate (Slow A).
4. When the package weight reaches SP2, the auger will reverse and then stop.
5. Remove the package by pulling the package off of the spout, or by using the optional foot switch to activate the kicker, or if using an automatic kicker, allow the kicker to remove the package.
6. As soon as the package has been removed, place a new package on the spout and press the START button to apply the bag clamp and begin filling the package. This cycle will repeat until the surge hopper is empty, or until the unit is turned off or stopped.

Before the APV is put into operation, the initial setup procedure needs to be performed to ensure proper weighments. Follow the procedure outlined below to set up a dual set point APV for its first run.

Before beginning this process, the operator should become familiar with the controls and functions of the APV.

1. Turn on the power by turning the POWER switch to the ON position. Allow fifteen (15) minutes for the controls to warm up.

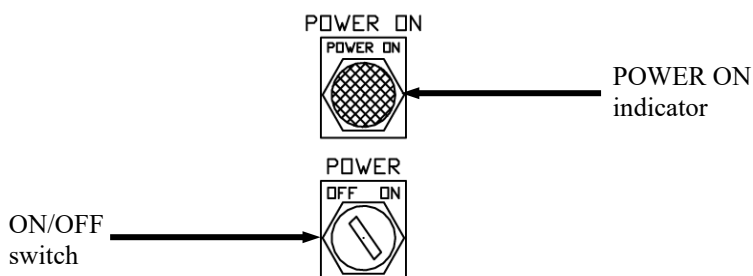


Figure 4-14. APV ON/OFF Switch

2. Set the Dribble Weight. From the Standby screen, press the function key below SP1 on the display.

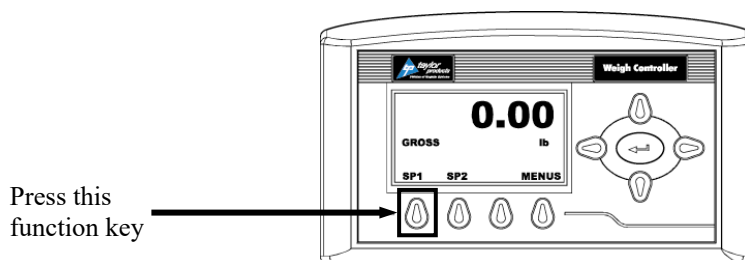


Figure 4-15. Setting the Dribble Weight (SP2)

3. When the SP1 adjustment screen appears, use the up, down, left, and right arrows to adjust the SP1 setting.

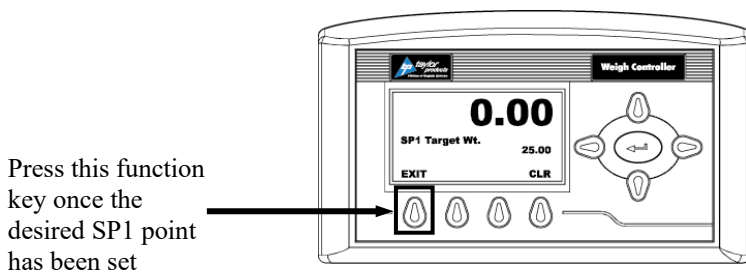


Figure 4-16. SP1 Adjustment Screen

- When the adjustment to the SP1 setting is complete, press the Enter key to save the setting and return to the Standby screen.
- Set the Target Weight. From the Standby screen, press the function key below SP2 on the display.

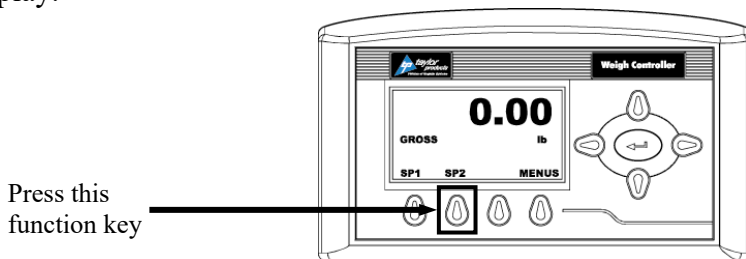


Figure 4-17. Setting the Target Weight (SP2)

- When the SP2 adjustment screen appears, use the up, down, left, and right arrows to adjust the SP2 setting.

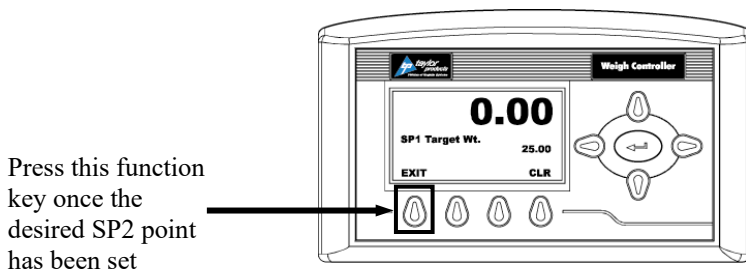


Figure 4-18. SP2 Adjustment Screen

- When the adjustment to the SP2 setting is complete, press the Enter key to save the setting and return to the Standby screen.
- Place a bag on the spout.
- Press the START button, or optional foot switch. The APV will begin filling the package with material. After SP2 has been reached, and the auger has stopped. **BEFORE** removing the package, check the weight display to see how close the actual package weight is to the target weight. If the actual package weight is more than or less than the target weight go back and adjust SP2 up or down by an amount equal to the difference between the target weight and actual weight.
- Remove the package.

11. Install a new package on the spout and press the START button, or optional foot switch. Once again, the APV will begin filling the package with material. After SP2 has been reached, and the auger has stopped, check the weight display to make sure that actual weight matches the target weight. If the actual weight is on target, remove the package and install a new package on the spout and press the START button. There will be a short delay before the auger begins filling the new package. It is important to make any SP1 correction before the package is removed. It may take several cycles before to get the machine properly set up for that specific product.

Note: Also keep in mind that every time the auger speed is changed, SP2 will most likely need to be adjusted. This adjustment alters the amount of product moving through the spout, thus changing the amount of material in free fall.

4.5.3 Using the T3000 to Set Points and Feeder Speeds

APV units equipped with the T3000 can be configured as either a single set point or dual set point unit. Regardless of how the T3000 is going to be used, the Pre-Fill procedures are the same as are covered in the T3000 single set point setup procedures below. Units that use multiple fill speeds have additional steps that need to be taken to program those fill speeds.

4.5.3.1 T3000 Single Set Point

An APV with the T3000 that is going to be used as a single set point unit utilizes a single fill speed (bulk rate). The Pre-Fill procedure for a single set point unit is listed below:

Important: If the wrong number is entered accidentally, the user can press the clear key to erase the entry, or they can press the Exit key to back up to the previous menu.

1. Check the T3000 to make sure the Filler is configured for the specific product that is being used.
2. Make sure the T3000 is in Standby Mode.
3. If the product shown on the display is the product that is going to be packaged, the setup is complete. If not, continue to Step 4.
4. If the product shown on the Standby Menu is not the product being packaged, do the following:
 - a. Press the Product button once. A list of products that have been programmed into the control panel will appear. The currently selected product will be displayed.
 - b. The operator can change the product using the up or down arrow buttons to scroll through the available list of products. When the desired product is found, position the cursor next to it and press the Enter button. The menu for that product will appear, with the cursor adjacent to the Accept Settings line. Press Enter again to accept the settings, or use the up/down arrows to scroll through the available parameters for that product. To change a specific parameter, place the cursor next to that line and key in the new value for that parameter, followed by pressing the Enter button. When finished, scroll back to the Accept Settings line and press the Enter button to accept the changes.

Operation

4.5.3.2 T3000 Dual Set Point

In addition to the steps shown under the T3000 single set point procedures, a dual set point APV needs a secondary fill speed (dribble rate). A dual set point unit can typically utilize a higher bulk rate than a single set point unit. This makes for a more efficient operation.

Setting the feed rates is accomplished using the Speed menu. Select the Speed/6 button, then use the arrow keys to adjust the bulk and dribble rates. The bulk fill rate will appear as Fast A in the menu system, while the dribble rate will appear as Slow A.

Chapter 5

Preventive Maintenance

5.1 General Description

To minimize downtime, preventive maintenance should be made a priority. Proper preventive maintenance practices will also extend the life of the equipment. Developing a preventive maintenance schedule will ensure that critical maintenance procedures are not missed.

5.2 Daily Maintenance Procedures

At the start of each working day, the following maintenance tasks should be performed before starting the machine:

1. Thoroughly clean the machine.
2. Check the calibration, using a known weight.
3. Drain any water that may have accumulated in the water separator in the air supply line.

5.2.1 Cleaning

Keeping the APV clean is an important part of the daily maintenance tasks. Remove any dust and/or dirt that has accumulated on a daily basis. Keeping the unit clean will keep debris from entering the control mechanisms, which could cause the performance of the APV to suffer. Also, by taking the time to clean the APV on a daily basis, the operator will be able to give the APV a thorough inspection. Take the time to inspect all wiring, air supply lines and connections, and components for possible damage.

5.2.2 Check Calibration

On a daily basis, check the calibration of the machine using a known weight. If calibration is required, refer to 3.8 Calibration.

5.2.3 Drain Water From the Water Separator

It is very important to remove unwanted moisture from the incoming air to ensure proper operating of the pneumatic components. At the beginning of each day, the operator should empty the water from the water separator. Follow the process below to drain the water.

1. Disconnect the air supply line.
2. Place a container under the drain valve.
3. There are two types of drain valves, follow the appropriate step below to open and close the drain valve:
 - a. If the water separator has a pin-type drain valve, press the pin upward and hold it in to drain the water. Release the pin once all water has drained.
 - b. If the water separator has a screw-type drain valve, turn the screw cap counter-clockwise to completely loosen the cap. After the water has completely drained, lightly push the cap upward to engage the threads and turn the cap clockwise until snug.
4. Discard the water from the container.
5. Reconnect the air supply line.

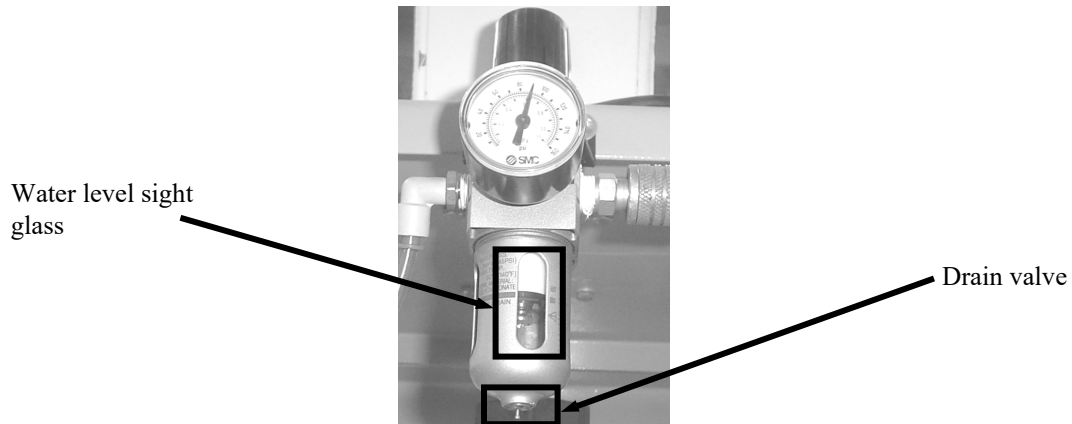


Figure 5-1. Air Supply Line Water Separator

5.3 Monthly Maintenance

On a monthly basis, the operator should check all fasteners on the APV on a monthly basis. Loose fasteners can cause unwanted vibration and wear.

5.4 Purge Kit Maintenance

For Purge Kit maintenance information, refer to System Maintenance in the Model 1001 A, Type or Z, Pressurization/Purging System Installation & Operation Manual in Appendix G of this manual.

Chapter 6

Troubleshooting

6.1 General Description

When a problem occurs, proper troubleshooting techniques will allow maintenance personnel to quickly identify the problem.

6.2 The Troubleshooting Process

The actual troubleshooting process is just as important as the repair process. Use the following troubleshooting keys to assist with the troubleshooting process:

- Identify the trouble symptom
 - What is the problem?
 - What were the circumstances when the problem occurred?
 - Could weather be a factor?
 - Are there any other contributing factors?
- Sectionalize the problem
 - Look at the problem.
 - What area of the machine is the problem occurring in?
 - Has anything changed recently?
- Isolate the problem
 - Try simple things first.
 - Observe indication and trouble codes.
 - Check test points.
 - Avoid complicating the problem.

6.3 Trouble Symptoms

Use the following information to assist in troubleshooting.

6.3.1 Scale is Not Accurate

If the load cell is providing inaccurate readings, check the following:

1. Check for proper calibration. Refer to 3.8 Calibration.
2. Check the hopper to make sure an adequate supply of material is available in the product hopper to ensure a consistent head pressure.
3. Check to make sure there is nothing restricting material flow from the hopper.
4. Check that hoses or other components are not coming into contact with the spout or weigh mast.
5. Check the flex leaves to make sure they are not bent or broken.
6. On dual set point machines, check the settings of the set points. Adequate time between set points is critical. There should be at least two seconds between them.
7. Check the load cell and replace if needed.
8. Check the zero of the machine. If the weight display does not stay on zero, the culprit may be a damaged load cell.

6.3.2 Scale Does Not Return to Zero

If the scale reading does not return to zero after package has been removed from the spout, check the following items:

1. Are the flex leaves in place? If so, are they in good condition? If not, replace them. Refer to 7.3.8 Flex Leaf Replacement.
2. Check the calibration. Refer to 3.8 Calibration.
3. Check for any outside interference, such as cords, hoses, etc., that would effect the movement of the weigh mast.
4. Check the connecting sleeve to ensure that it is not too hard or ridged. The sleeve connects the spout (weighed) to the machine body (non-weighed).
5. Check the auger to make sure it is not touching the spout, or any weighed portion of the unit. If the auger is touching the weighed portion of the machine, the auto-tare feature may need to be turned on.
6. Check to see if product is building up in the weighed portion of the unit. If product buildup in the weighed portion of the machine is occurring, the auto-tare feature may need to be turned on.

6.3.3 The Weighments are Always Too Light

Troubleshooting for weighments that are consistently coming up too light varies depending on the amount of time required to fill the package.

6.3.3.1 Fast Filling Products (Less Than 5 Seconds of Fill Time)

1. Try lowering the dribble value (scale must have time to react, if material is coming in on the bulk rate too fast, the flow can cause a spike that will shut flow off too early).
2. Try lowering the bulk feed rate.
3. Increase the cutoff to a higher weight setting.
4. Check the unit to make sure that the displayed weight equals the actual package weight. If it does not, calibrate the machine. Refer to 3.8 Calibration.

6.3.3.2 Normal Filling Products (5 Seconds or More of Fill Time)

1. Increase the cutoff to a higher weight setting
2. Ensure consistent product flow from the hopper above the unit
3. Ensure that the dribble setting is a lower weight than the cutoff setting.
4. Ensure that the displayed weight, on the packer, equals the actual weight of the package. If it does not, calibrate the machine. Refer to 3.8 Calibration.

6.3.4 The Weighments are Always Too Heavy

1. Adjust the cutoff setting to a lighter weight.
2. If operating a dual set point unit, ensure that there is a noticeable dribble period. The operator should see a noticeable slow down in product flow.
3. Validate that the weight displayed on the weight display equals the actual weight of the package. If it does not, calibrate the machine. Refer to 3.8 Calibration.
4. Slow the fill time of the package. It is possible to feed product too fast.

6.3.5 Load Cell Fails Frequently

If the load cells on an APV are failing frequently, check the following items:

1. Check the operating conditions to make sure that the load cell is not jarred, jerked, or being loaded with a sudden excessive force.
2. Check the load cell to make sure that the product being weighed does not exceed the rating of the load cell plus the dead load of the weighing mechanism.
3. Check the scale output to verify that the proper excitation voltage is being applied to the load cell.

6.3.6 The Weighments Fluctuate Between Too Light and Too Heavy

1. Verify that the product flow is consistent and stable.
2. Check for consistent head pressure of product above the machine. Head pressure is the amount of product that is always in the hopper immediately above the packer. It is very important to keep the packer from running out of material. As the packer runs out of product the weighment accuracy will vary widely. Magnum Systems recommends that a low level sensor be installed on the product hopper. If the low level condition is met then the fill routine should pause until more product is put in the hopper. A good rule of thumb is to have enough product in the hopper to fill approximately 20 packages at all times. This amount may vary slightly depending upon product characteristics.
3. Verify a stable zero reading. The zero reading should not fluctuate more than a tenth. If the reading fluctuates more than a tenth there is a possible load cell or weight indicator problem. Refer to 6.3.2 Scale Does Not Return to Zero.
4. Verify that the weight display is displaying a stable weight reading. Hang a calibration weight or a known weight on the spout. If the weight display reading fluctuates more than a tenth or two it indicates a possible load cell or weight indicator problem.
5. Check the load cell connection points to ensure a good electrical connection tighten as needed.
6. Check the response of solenoids. The solenoids should respond immediately when voltage is applied.

6.3.7 APV Does Not Start After The Start Switch Is Pushed

1. Check the start switch to see if the contacts are working properly.
2. Check the voltage to and from the start switch should be 110 volts.
3. Check the MAC valve to see if it is getting voltage and the valve is functioning properly.
4. Check to make sure the motor is receiving power.

6.3.8 Kicker Does Not Kick The Bag Off The Spout

1. Check to make sure you have air pressure at least 80 psi.
2. Check to see if you have air going to the MAC valve.
3. Make sure the Check Weigh button voltage to it.
4. Check to see if you have air going to the kicker cylinder if you do and it passes through the cylinder then cylinder is bad replace

6.4 System Alarms

During the filling process, conditions may occur that result in an alarm from the APV. Depending on the type of controller used, the alarms will vary.

6.4.1 T4000 Alarms

During the filling process, conditions may occur that result in one of the following T4000 alarms:

- A/D Failure Error! – An internal electronics error has occurred. Retry the operation. If the failure error re-occurs, power the machine down, then restart the machine and try the operation again. If the operation still fails, contact Magnum Systems technical assistance.
- A/D Convert Error! – The input from the load cell is outside of the acceptable range. Check the load cell for damage. If a new load cell has been installed, check the rating of the load cell to make sure that the correct load cell has been installed.
- Motion Error! – The controller has detected that the vessel or product is in motion and the controller cannot finalize the weighment. Check the machine settings and retry.
- Trad Cal Error! – An error occurred during the calibration process. Try to calibrate the machine again. If the error occurs again, contact Magnum Systems technical assistance.
- C2 Cal Error! – This error should not occur, as Magnum Systems does not use C2[®] type load cells. If this error does occur, contact Magnum Systems technical assistance.
- Too Lo Error! – Verify that the load cell signal level is 0-15 mV. Verify that there is enough weight on the scale. Perform Span then go back and Zero.
- Too Hi Error! – Verify that the load cell signal level is 0-15mV. Verify that there is not too much weight on the scale. Perform Span then go back and Zero.
- No C2 Sensor! – Instrument did not detect a C2[®] Load Sensor. This error should appear if C2[®] Cal is selected, as Magnum Systems does not use C2[®] type load cells. If this error does occur, contact Magnum Systems technical assistance.
- CAL Failed! – There are too few counts between Zero and Span. Reset either of the values, so that the counts are more than 1,000 counts of each other.
- C2 Caps Unequal! – This error should not occur, as Magnum Systems does not use C2[®] type load cells. If this error does occur, contact Magnum Systems technical assistance.
- HI/LO Too Close! – The Zero and Span values are not more than 1,000 counts from each other or there is no change, or there is a negative change. Reset either of the values, so that the counts are more than 1,000 counts of each other.
- Function Error! – The operator has pressed a function button and the function did not work. Try the function again. If it does not work, cycle the power off and on. If it still doesn't work, contact Magnum Systems technical assistance.
- Not Allowed! – The value entered by the operator is outside of the range that is allowed. The operator should try another value that is within the acceptable range.
- Security Violation! – User signed in with a password that does not allow performance of a certain function or entry to certain menus. Security level of the user identified in the User ID, too low for the menu or function.
- Overrange – The final package weight has exceeded the set point target.
- Gross ADC Error – The controller has detected a load cell error. Check all load cell connections. Repair connections as necessary. Check the load cell for damage. Replace the load cell if necessary. Refer to 7.3.13 Load Cell Replacement.

6.4.2 T3000 Alarms

During the filling process, conditions may occur that result in an alarm from the T3000. There are three different categories of alarms:

- Fill Alarms
- Jog Alarms
- Filler Discharge Alarms

For a full description of these alarms, refer to Chapter 3: Operating Procedures/Filler, of the Magnum Systems Filler/Dispenser/IBC T3000 User Guide, that is included in Appendix E of this manual.

6.4.3 PLC Error Messages

The Allen-Bradley MicroLogix 1100 has the ability to provide the following information:

- Status Messages
- Reminder Messages
- Warning Messages
- Fault Messages

To be able to access these messages, a properly equipped computer or handheld device must be connected to the PLC.

6.4.3.1 Status Messages

Status messages indicate to the operator that the control panel is performing an operation that may limit access to the terminal. Examples are application downloads or communication problems. The message disappears when the control panel completes the operation or when the condition is satisfied.

6.6.3.2 Reminder Messages

Reminder messages indicate a minor fault or mistake. Reminder messages appear when an invalid operation is attempted, such as entering an out-of-range value. Pressing any key removes the message.

6.6.3.3 Warning Messages

Indicates the operation may produce undesirable results. The operator must respond to warning messages as indicated in the message.

6.6.3.4 Fault Messages

Indicates the terminal has detected a condition, which will prevent further operation. The current application will stop. The operator must reset the terminal (power cycle) to recover from this type of error.

6.5 Purge Kit Troubleshooting

Purge Kit troubleshooting is located in the Trouble – Shooting Procedures in the Model 1001 A, Type or Z, Pressurization/Purging System Installation & Operation Manual in Appendix G of this manual.

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Chapter 7

Repair and Adjustment

7.1 General Description

When troubleshooting procedures have indicated that a component needs to be repaired, replaced, or adjusted, following the repair procedures contained in this chapter will assist maintenance personnel return the machine to operation in a timely manner.

7.2 System Adjustment Procedures

Depending on how the APV is configured, there are several adjustments that may be required from time to time. They are:

- Air pressure adjustment
- Purge seal adjustment/calibration
- Kicker adjustment

7.2.1 Air Pressure Adjustment

The APV requires compressed air to be at approximately 80-100 PSI (.55-.69 MPa) for proper operation. If air pressure is too high or too low, the air pressure regulator can be used to adjust the output air pressure.

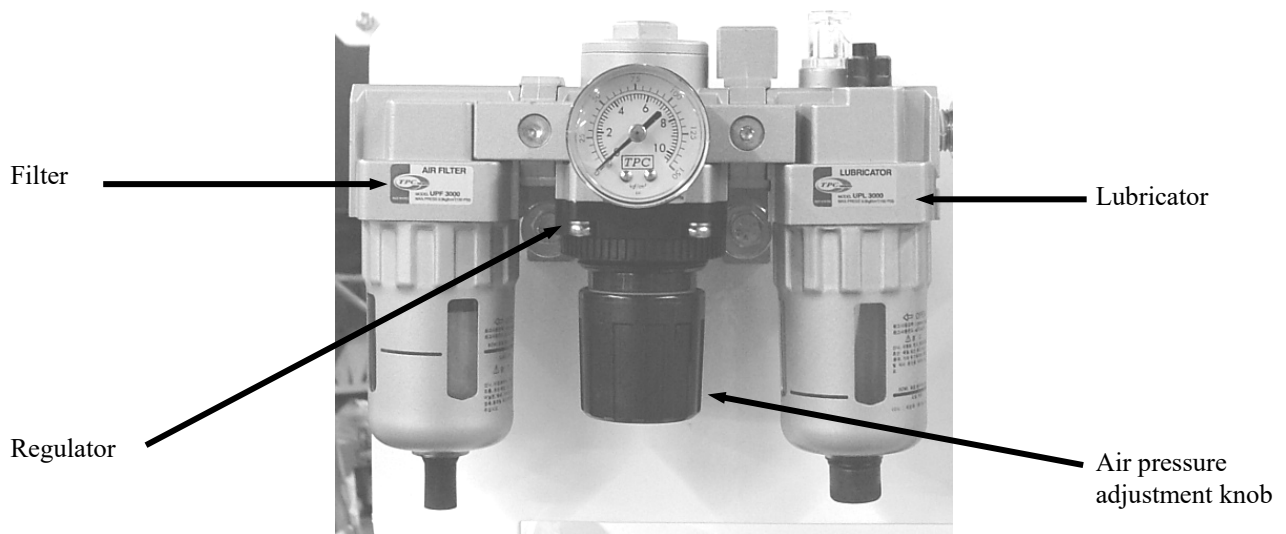


Figure 7-1. Air Filter/Regulator/Lubricator

7.2.2 Purge Seal Adjustment/Calibration

1. Set seal unit flat on bench top.
2. Loosen the hose clamp.
3. Insert the set up bar.
4. Raise the set up bar to the upper most position, without moving the seal unit from the bench top.
5. Hold the set up bar in this position and tighten the hose clamp through the adjustment port.
Tighten the clamp just enough to hold the weight of the set up bar and the internal parts of the seal in the highest position.
6. Slowly loosen the hose clamp until the internal seal assembly starts to slip downward. Allow the internal seal assembly to slip all the way to the lowest position. This is the final position for the internal seal assembly, as it will be installed on the APV.
7. Loosen the hose clamp one full turn, to allow the elastomer to slip onto the auger shaft.
8. Slide the seal assembly onto the auger shaft.
9. Place the shaft in its final position.
10. Install and tighten the mounting bolts.
11. Turn the hose clamp clockwise one full turn to return it to the calibrated position.
12. Connect the air supply line to the purge seal and make sure that air is turned on.

7.2.3 Felt Auger Shaft Seal Adjustment

If the APV is equipped with felt auger seals, they should be adjusted any time they are replaced or if product begins leaking around the seals. When adjusting the tension on the seals, put just enough tension on the seals to prevent the product from leaking out. Too much tension will result in excess heat and will adversely affect the performance of the machine. Follow the procedure below to adjust the impeller shaft seals:

1. Loosen the jam nuts on the seal tension adjustment bolts.
2. Adjust seal tension using the seal tension adjustment bolts.
 - a. To increase the tension on the seal, turn the seal tension bolts clockwise
 - b. To decrease the tension on the seal, turn the seal tension bolts counter-clockwise.
3. Once the adjustment is complete, tighten the jam nuts to prevent the seal tension bolts from backing out.

7.2.4 Timer Adjustments

The APV has several operational features that are controlled via logical timers that are programmed into the PLC. Access to the timers and adjustment of the timers is accomplished using the PV300 control panel. Refer to 4.3.4.1 PV300 Menus for more information on using the PV300.

7.3 Component Replacement Procedures

Over time, components on the APV may become worn or damaged. If this occurs, follow the procedures in this section to repair or replace individual components.



WARNING

When replacing parts, it is critical that only parts approved by Magnum Systems are used.

7.3.1 Spout Replacement

Due to the abrasiveness of some products, the spout will require periodic replacement. Use the procedures below to replace the spout.

7.3.1.1 Spout Removal

1. Disconnect the power from the APV.
2. Disconnect the compressed air supply line from the APV at the Filter/Regulator/Lubricator.
3. Remove the bag clamp pad. Refer to 7.3.3 Bag Clamp Pad Replacement.
4. Remove the bag clamp cylinder. Refer to 7.3.2 Bag Clamp Cylinder Replacement.
5. Remove the valve bag spout mounting bolts.
6. Remove the valve bag spout.

7.3.1.2 Spout Installation

1. Position the spout and install and tighten the mounting bolts.
2. Install the bag clamp cylinder. Refer to 7.3.2 Bag Clamp Cylinder Replacement.
3. Install the bag clamp pad. Refer to 7.3.3 Bag Clamp Pad Replacement.
4. Connect the main air supply line to the Filter/Regulator/Lubricator.
5. Check all air supply connections for leaks.
6. Connect the power to the APV.

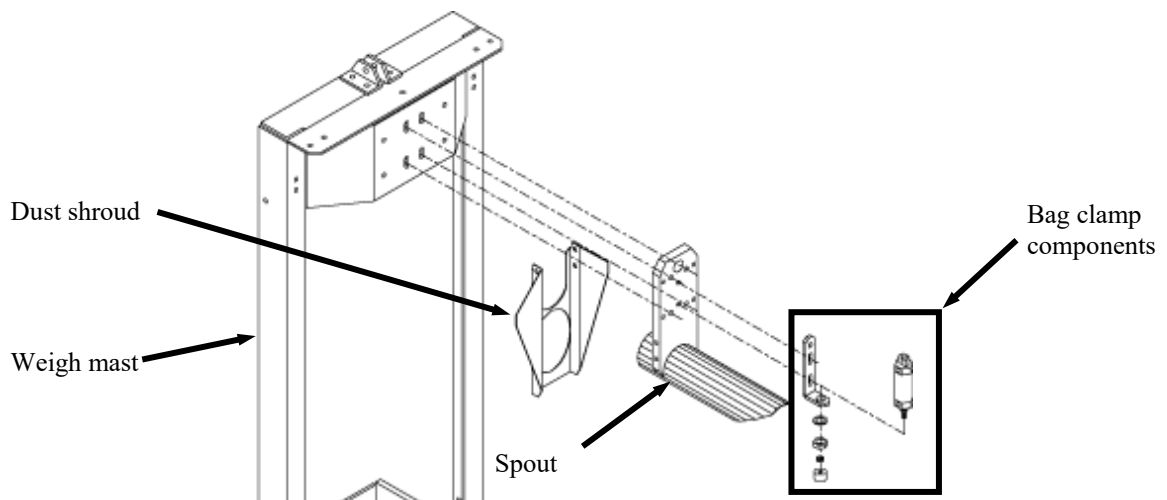


Figure 7-2. APV Spout and Associated Components, Exploded View

7.3.2 Bag Clamp Cylinder Replacement

In the event that the bag clamp cylinder fails, use the procedures below to replace it.

7.3.2.1 Bag Clamp Cylinder Removal

1. Disconnect the power from the APV.
2. Disconnect the compressed air supply line from the APV at the Filter/Regulator/Lubricator.
3. Label and disconnect the air supply lines at the quick connect fittings on the bag clamp cylinder.
4. Remove the bag clamp pad. Refer to 7.3.3 Bag Clamp Pad Replacement.
5. Use a wrench to hold the bag clamp cylinder and use a second wrench to remove the bag clamp cylinder mounting nut.
6. Remove the bag clamp mounting washer.
7. Remove the bag clamp cylinder by lifting it out of the mounting bracket.

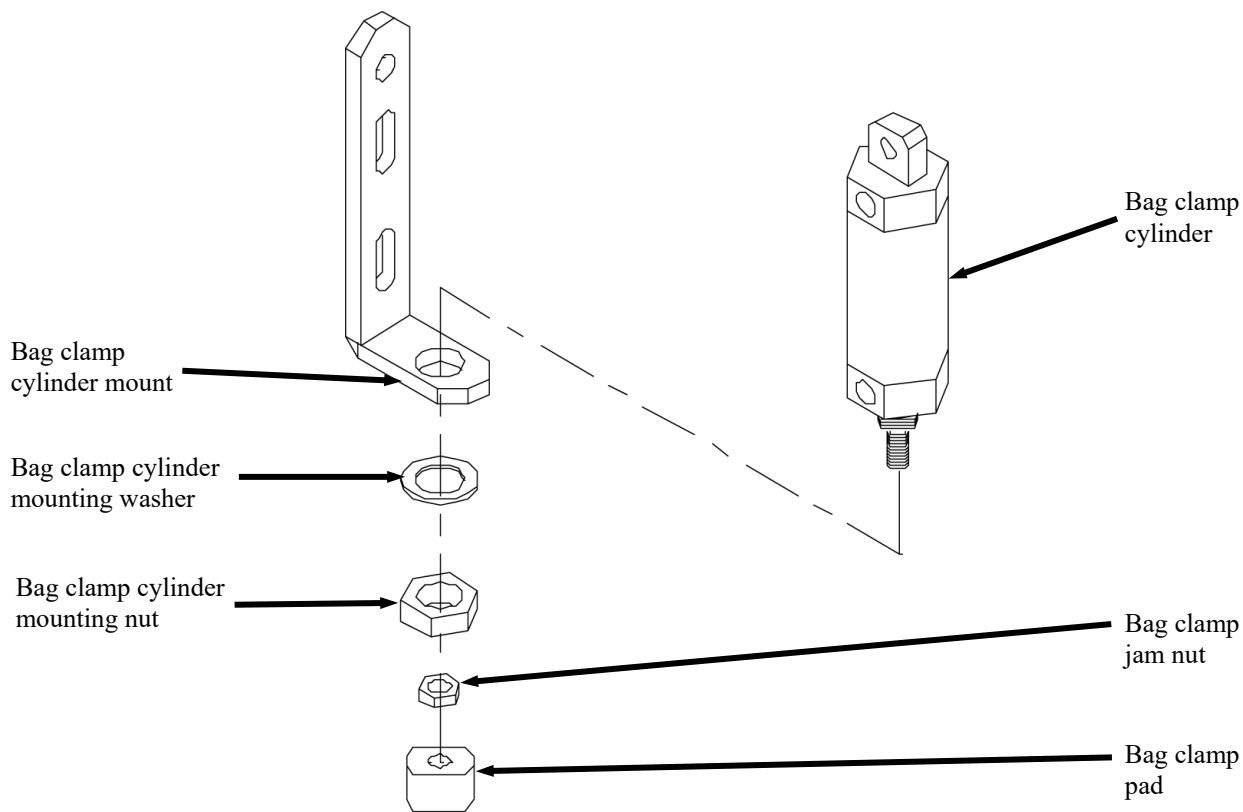


Figure 7-3. Bag Clamp Cylinder

7.3.2.2 Bag Clamp Cylinder Installation

1. Place the new bag clamp cylinder into the mounting bracket. Situate it so that when facing the APV, the quick connect fittings are on the right.
2. Install the bag clamp cylinder retaining washer and nut. Use a wrench to hold the bag clamp cylinder while tightening the retaining nut with another wrench.
3. Install the bag clamp pad. Refer to 7.3.3 Bag Clamp Pad Replacement.
4. Connect the air supply lines to the quick connect fittings on the bag clamp cylinder.
5. Connect the main air supply line to the Filter/Regulator/Lubricator.
6. Check all air supply connections for leaks.
7. Connect the power to the APV.

7.3.3 Bag Clamp Pad Replacement

During normal operation, the bag clamp pad will experience wear. Once the significant wear has occurred, the bag clamp pad must be replaced.

7.3.3.1 Bag Clamp Pad Removal

1. Disconnect the power from the APV.
2. Disconnect the compressed air supply line from the FRL.
3. Use a wrench to loosen the jam nut.
4. Unscrew the bag clamp pad from the clamp. Use a wrench if necessary.

7.3.3.2 Bag Clamp Pad Installation

1. Screw the new bag clamp pad onto the clamp.
2. Once the clamp pad is in the desired position, use a wrench to tighten the jam nut tightly against the clamp pad.
3. Connect the compressed air supply to the FRL.
4. Connect the APV power cord to the appropriate outlet.
5. Test the APV for proper operation.

7.3.4 Air Supply Line Replacement

In the event that an air supply line becomes damaged and requires replacement, follow the steps below to remove and replace the air supply line.

7.3.4.1 Air Supply Line Removal

1. Disconnect the main power cord.
2. Disconnect the main air supply line from the APV.
3. Disconnect the ends of the air supply line that is being replaced from the components that it is connected to. Press in on the fitting collar and hold it in while pulling the air supply line free.
4. Remove any clips and/or retainers that hold the air supply lines in place.
5. Remove the air supply line, making note of how the line is routed.

7.3.4.2 Air Supply Line Installation

1. Measure the air supply line that was just removed.
2. Cut a new length of air supply line, making sure that the ends of the line are cut square. Cut the new line to the same length of the one that was removed.
3. Route the new air supply line in the same manner as the one that was removed.
4. Insert each end of the new line into their fittings.
5. Reattach any clips and/or retainers to secure the air supply line.
6. Reconnect the main air supply line and check for any leaks. If a leak is found, disconnect the main air supply line and then disconnect/reconnect the air connections, then reconnect the main air supply line. Repeat as necessary, until no leaks are present.
7. Reconnect the main power cord.

7.3.5 Pneumatic Quick-Connect Fitting Replacement


In the event that an air fitting becomes damaged and requires replacement, follow the steps below to remove and replace the air supply line:

7.3.5.1 Pneumatic Quick-Connect Removal

1. Disconnect the main power cord.
2. Disconnect the main air supply line from the APV.
3. Disconnect the air supply line from the fitting by pressing in on the collar while pulling out on the air supply line.
4. Using a wrench, unscrew the fitting.

7.3.5.2 Pneumatic Quick-Connect Installation

1. Using Teflon® tape, wrap the threads of the new fitting, starting at the bottom of the thread working toward the hex head in the same direction as the threads.
2. Screw the new fitting into the threads and use a wrench to carefully tighten the fitting.

	CAUTION	Over tightening the fitting can damage the fitting, or the component that it is being threaded into.
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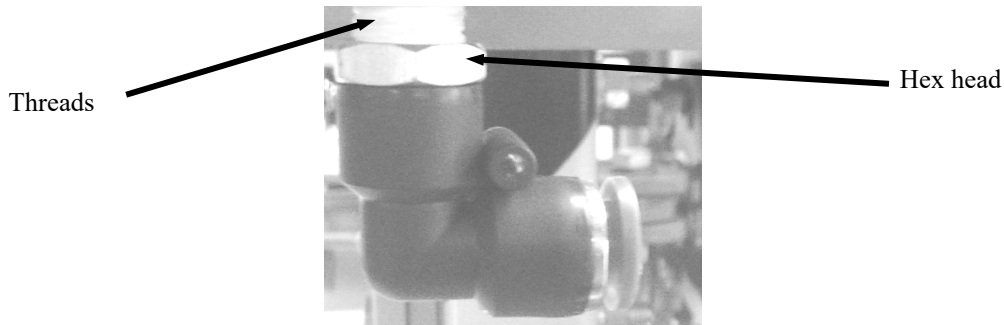


Figure 7-4. Pneumatic Quick-Connect Fitting

3. Reconnect the air supply line to the fitting.
4. Reconnect the main air supply line and check for any leaks. If a leak is found, disconnect the main air supply line and then disconnect/reconnect the air connections, then reconnect the main air supply line. Repeat as necessary, until no leaks are present.
5. Reconnect the main power cord.

7.3.6 Air Filter/Regulator/Lubricator (FRL) Replacement

In the event that the filter, the regulator, or the lubricator experiences a malfunction or becomes damaged, use the procedures below to replace the entire assembly.

7.3.6.1 FRL Assembly Removal

1. Disconnect the power from the APV.
2. Disconnect the compressed air supply line from the APV at the filter.
3. Disconnect the output compressed air line from the lubricator.
4. Remove the FRL mounting bolts and remove the FRL.
5. Drain the oil from the lubricator and discard it in accordance to local laws.

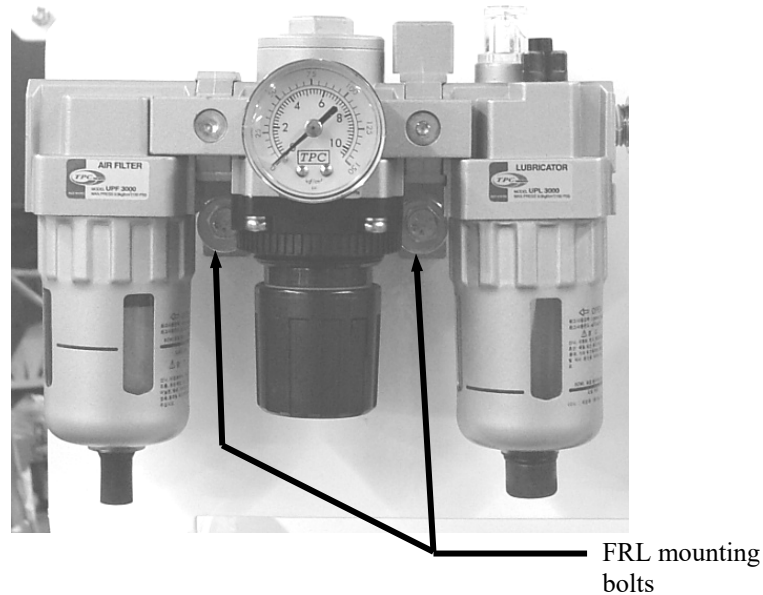


Figure 7-5. Air Filter/Regulator/Lubricator

7.3.6.2 FRL Assembly Installation

1. Position the new FRL in the mounting location. Install and tighten the mounting bolts.
2. Connect the compressed air output line to the lubricator.
3. Fill the lubricator with the appropriate oil.
4. Connect the compressed air supply line to the filter.
5. Check for air leaks.
6. Connect the power to the APV.

7.3.7 Kicker Cylinder Replacement

In the event that the pneumatic cylinder for the kicker fails, follow the procedures below to replace the cylinder.

7.3.7.1 Kicker Cylinder Removal

1. Disconnect the power from the APV.
2. Disconnect the compressed air supply line from the APV at the Filter/Regulator/Lubricator.
3. Label and disconnect the air supply lines at the quick connect fittings on the kicker cylinder.
4. Use a wrench to loosen and remove the clevis bolt.
5. Use a wrench to hold the kicker cylinder mounting bolt, while using a second wrench to remove the kicker cylinder retaining nut.
6. Remove the kicker cylinder mounting bolt and remove the cylinder.

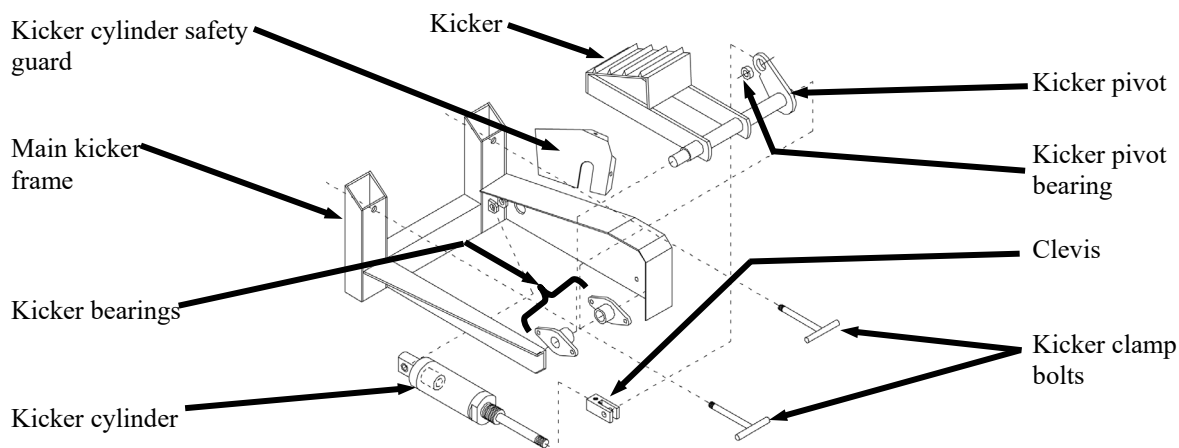


Figure 7-6. Kicker Components, Exploded View

7.3.7.2 Kicker Cylinder Installation

1. Place the new kicker cylinder into the mounting bracket. Position it in the same manner as the one that was removed.
2. Insert the kicker cylinder mounting bolt.
3. Install the kicker cylinder retaining nut. Use a wrench to hold the kicker cylinder mounting bolt while tightening the retaining nut with another wrench.
4. Position the clevis on the kicker pivot and install the clevis bolt.
5. Tighten the clevis bolt.
6. Connect the air supply lines to the quick connect fittings on the kicker cylinder.
7. Connect the main air supply line to the Filter/Regulator/Lubricator.
8. Check all air supply connections for leaks.
9. Connect the power to the APV.
10. Check the APV for proper operation.

7.3.8 Flex Leaf Replacement

In the event that a flex leaf needs to be replaced, use the procedures below.

7.3.8.1 Flex Leaf Removal

1. Turn the APV off.
2. Use a wrench to loosen and remove the flex leaf bolts.
3. Lift the flex leaf off of the APV.

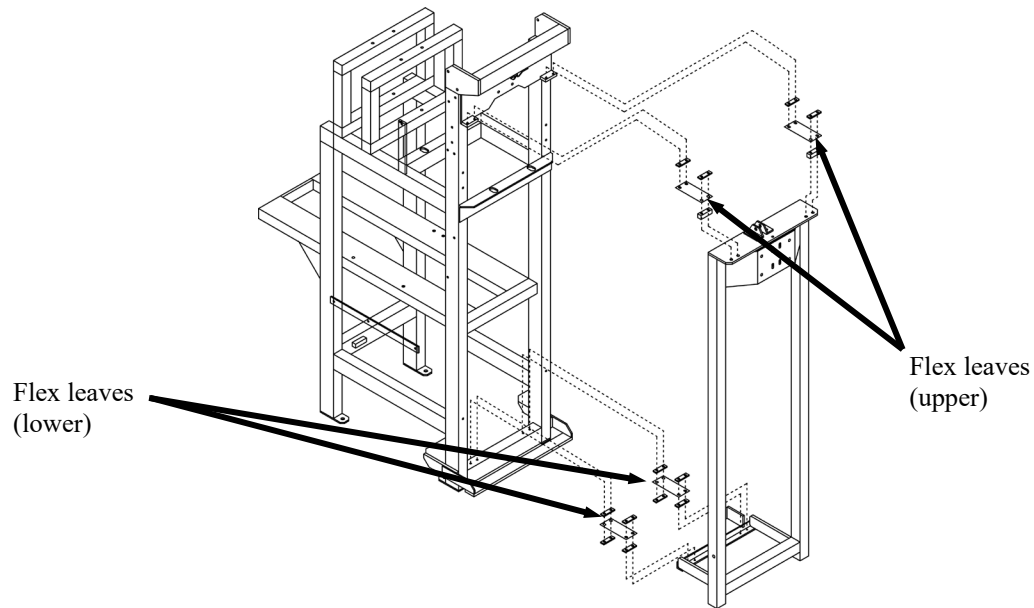


Figure 7-7. Flex Leaves – Exploded View

7.3.8.2 Flex Leaf Installation

1. Position the new flex leaf over the mounting holes.
2. Place the flex leaf bolts in their holes and begin threading them into the holes. Do not tighten them until all four bolts are threaded into their holes.
3. Before tightening the flex leaf bolts, make sure that the weigh mast is hanging level.
4. Use a wrench to tighten the flex leaf bolts.

7.3.9 V-Belt Replacement

In the event that one of the drive belts break, or needs replaced for other reasons, follow the procedures below.

7.3.9.1 V-Belt Removal

1. Turn the APV off and disconnect the power cord from the outlet.
2. Remove the tension from the belts. First, back off the jam nut. Then, back the belt tension adjustment nut off to release the tension.

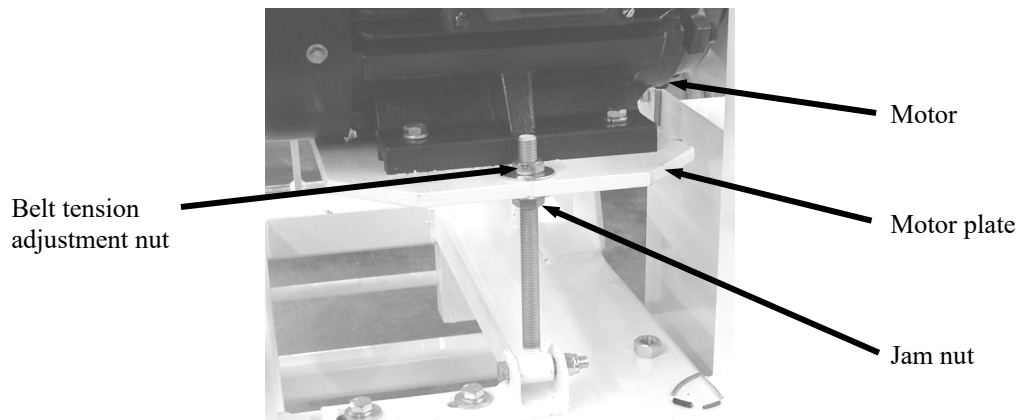


Figure 7-8. Belt Tension Adjustment

3. Remove the bolts that hold the rear cover in place.
4. Remove the rear cover.
5. Remove the belt.

7.3.9.2 V-Belt Installation

1. Install the belts.
2. Adjust the tension by tightening the belt tension adjustment nut. Proper tension has been achieved when the operator can push on the V-belt between the two sheaves and deflect the belts no more than ½-inch.
3. Tighten the jam nut against the motor mounting plate.
4. Install the rear cover.
5. Install the rear cover bolts.
6. Plug the APV in to the appropriate outlet.
7. Check the APV for proper operation.

7.3.10 Purge Seal Replacement

In the event that a purge seal has failed, follow the procedures below to replace it. It is recommended that two people be present for the repair.

7.3.10.1 Purge Seal Removal

1. Turn the APV off and disconnect the power cord from the outlet.
2. Remove the bolts that hold the rear cover in place.
3. Remove the rear cover.
4. Remove the drive belts. Refer to 7.3.9 V-Belt Replacement.
5. Remove the Spout assembly. Refer to 7.3.1 Spout Replacement.
6. Loosen the purge seal clamp by turning the clamp screw 2 complete turns counter-clockwise.
7. Loosen the auger lockdown bolt.
8. Strike the auger lockdown bolt to jar the auger loose from the auger sleeve.
9. Remove the auger lockdown bolt and the auger end cap.
10. Begin removing the auger out the front of the APV.
11. Once the auger has cleared the auger sleeve, remove the purge seal from the auger.

7.3.10.2 Purge Seal Installation

During purge seal installation, the objective is to set the face pressure at an optimum compression. Follow the steps below to install the seal.

1. Insert the auger back into the APV. Do not slide it all the way to the auger sleeve.
2. Loosely place the new seal onto the shaft.
3. Slide the auger all the way in and onto the auger sleeve.
4. Install the auger end cap and the auger lockdown bolt. When tightening the lockdown bolt, take care that the new seal does not get damaged or put into a bind.
5. Slide the seal along the shaft toward the hopper. If the seal will not slide, loosen the clamp. Align the head of the loose clamp with the 5/8" access port. Use a 1/4" screwdriver, or a 3/8" nut driver, to loosen the clamp. If necessary, use a small amount of soapy water. Do not use any type of oil.
6. Slide the seal along the shaft away from the bulkhead. Tighten the clamp finger tight. Grabbing the seal with both hands, push and pull along the shaft. This should not be easy to do. There should be resistance.
7. If unable to move the seal, loosen the clamp just enough to allow it to move.

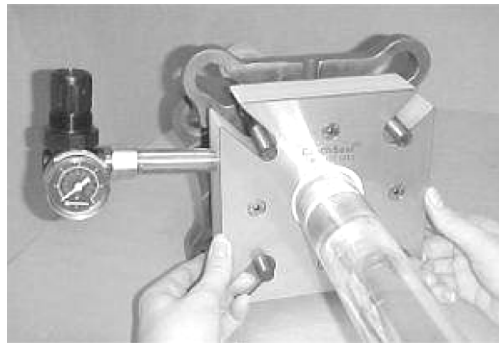


Figure 7-9. Sliding the Purge Seal on the Shaft

Repair

- Loosen the clamp two 360° turns. The seal should slide back and forth very easily (the objective is to be able to tighten or loosen the seal with two 360° turns).
- Set the purge pressure at 3-5 psi over any internal pressure. Purge leakage should be detectable at the lid of the stainless plate. Turn pressure off. Loosen the seal to the loose setting. Install the bolts finger tight.

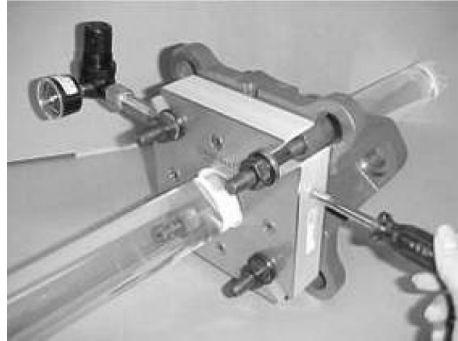


Figure 7-10. Setting the Purge Pressure

- Use a square to insure the seal is perpendicular. The seal must be square to the shaft within 1/16".

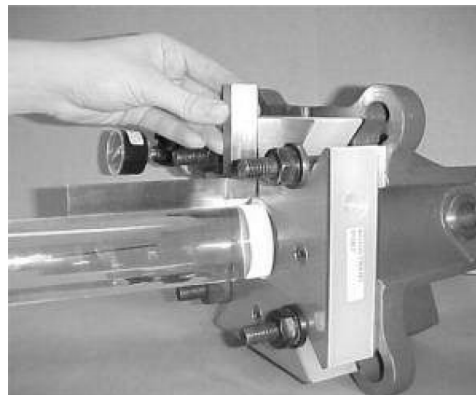


Figure 7-11. Checking the Seal for Square

- Apply RTV to the bulkhead and then tighten the bolts. If the seal is not square, level the seal with shims or a gasket.
- Once the seal is mounted, bring the hose clamp back to the tight position using two 360° turns. Turn purge on. Jog the shaft a few turns. There should be no binding or grinding. Purge leakage should be evident at the shaft. If none, increase the purge pressure or loosen the clamp or both.
- There should be no product leakage. If there is, tighten the clamp in ¼ turn increments. Touch the seal to be sure it is not overheating. If the seal can't be reached, loosen the clamp or increase the purge. Periodic checks will help the performance of the seal.
- Install the rear cover.
- Install the rear cover bolts.
- Plug the APV in to the appropriate outlet.
- Check the APV for proper operation.

7.3.11 Felt Auger Shaft Seal Replacement

If the optional felt auger shaft seals can no longer be adjusted to stop product leakage around the auger shaft, use the procedures below to replace them.

7.3.11.1 Felt Auger Shaft Seal Removal

1. Turn the APV off.
2. Disconnect the main electrical and pneumatic connections.
3. Loosen the jam nuts for the seal that is being replaced.
4. Back the seal tension adjustment bolts out almost all of the way.
5. Loosen the upper wing nut to allow the pivot bolt to be tilted up.
6. Remove the cover while being careful to not allow the compression half and seal half to fall out.
7. Remove the compression half and seal half.
8. Repeat steps 3 through 7 for the other half of the seal.

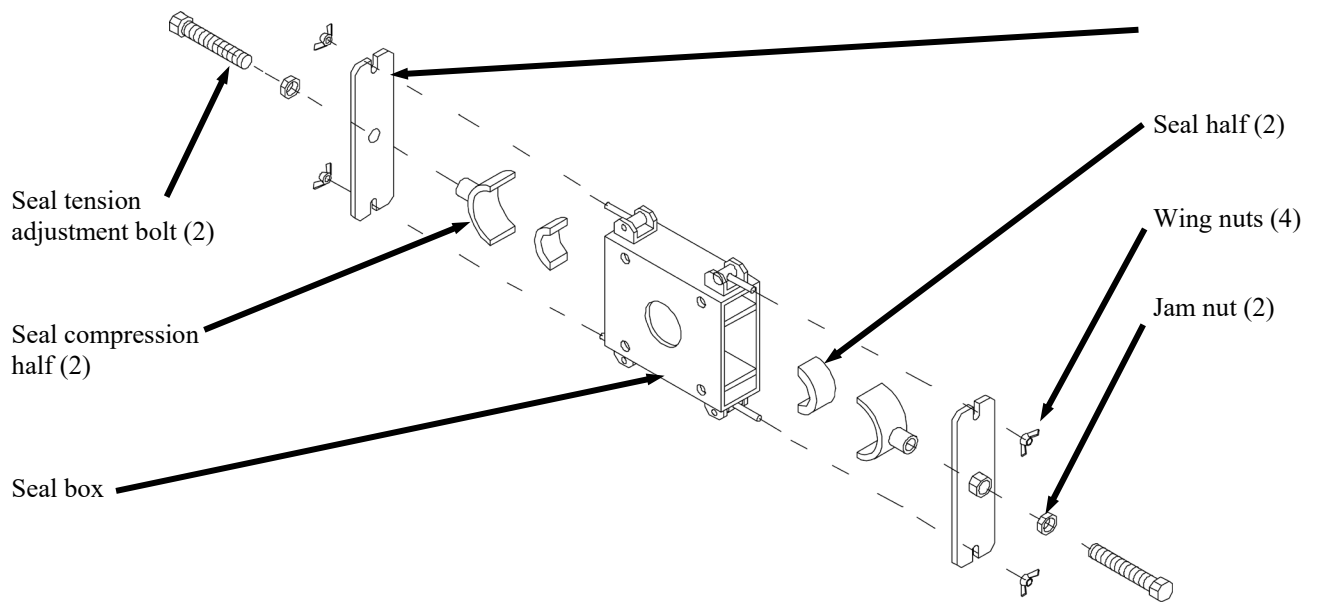


Figure 7-12. Felt Auger Shaft Seal, Exploded View

7.3.11.2 Felt Auger Shaft Seal Installation

1. Insert the new seal half and compression half.
2. Position the cover so that the lower tab slot straddles the lower pivot bolt inside the wing nut.
3. Rotate the cover up into position, take care to align the tip of the seal tension bolt with the bolt pocket on the compression half. It may be necessary to screw the bolt in some.
4. Pivot the upper pivot bolt/wing nut into the upper tab slot. Tighten the upper and lower wing nuts.
5. Repeat steps 1 through 4 for the other half of the seal.
6. Connect the main electrical and pneumatic connections.
7. Adjust the felt auger shaft seal. Refer to 7.2.3 Felt Auger Shaft Seal Adjustment.
8. Turn the Model APV on and test for proper operation.

7.3.12 Auger Replacement (Used with Standard Auger Option)

If the APV is equipped with the standard auger, and the auger becomes worn or damaged, follow the procedures below to replace it.

7.3.12.1 Auger Removal (Standard Auger)

1. Turn the APV off and disconnect both the 115V power and the 3-phase power.
2. Disconnect the air supply.
3. Remove the bolts that hold the rear cover in place.
4. Remove the rear cover.
5. Loosen the 4 bolts on the agitator gearbox.
6. Rotate the agitator gearbox to remove tension from the agitator drive belts.
7. Loosen the auger drive belts. Refer to 7.3.9 V-Belt Replacement.
8. Remove the Spout. Refer to 7.3.1 Spout Replacement.
9. Use a permanent marker to mark the position of the auger, relative to the rear bearing.
10. Loosen the setscrews in the front and rear bearings.
11. Loosen the setscrews in the pulley.
12. Loosen the clamp bolt on the purge seal two full turns.
13. Pull the auger out the front of the APV through the spout.

7.3.12.2 Auger Installation (Standard Auger)

1. Slide the auger into the APV from the front through the spout. Stop sliding the auger in when the mark on the auger shaft is lined up with the rear bearing, as it was marked during the removal procedure.
2. Tighten the clamp bolt on the purge seal two full turns.
3. Tighten the setscrews in the pulleys.
4. Tighten the setscrews in the front and rear bearings. Make sure that the setscrews on the front bearing are 180-degrees out of phase with the setscrews for the rear bearing.
5. Install the auger drive belts. Refer to 7.3.9 V-Belt Replacement.
6. Rotate the agitator gearbox to add tension to the agitator drive belts.
7. Tighten the 4 bolts on the agitator gearbox.
8. Install the rear cover.
9. Install and tighten the rear cover mounting bolts.
10. Connect the air supply line to the APV.
11. Connect both the 115V power and the 3-phase power.
12. Turn the APV on and check for proper operation.

7.3.13 Auger Replacement (Used with Replaceable Auger Option)

If the APV is equipped with the replaceable auger option, and the auger becomes worn or damaged, follow the procedures below to replace it.

7.3.13.1 Auger Removal (Optional Removable Auger)

1. Turn the APV off and disconnect both the 115V power and the 3-phase power
2. Disconnect the air supply.
3. Remove bolts that hold the rear cover in place.
4. Remove the rear cover.
5. Loosen the large nut that holds the auger in the sleeve.
6. Remove the large auger nut.
7. Remove the circular cover on the front of the transition.
8. Remove the auger shieve cap on the rear of the auger shieve.
9. Push the auger shaft forward until the threaded end is flush with the end of the auger shieve.
10. From the front of the machine, pull the auger out.

7.3.13.2 Auger Installation (Optional Removable Auger)

1. From the front of machine, slide the threaded end of the auger through the front of the transition until the pins on the auger are lined up with the slots on the auger shieve.
2. Push the pins into the slots on the shieve.
3. From the rear of the machine, slide the shieve cap onto the threaded end of the auger.
4. While holding onto the threaded part of the auger, push the shieve cap into the shieve.
5. Thread the nut on to the threaded part of the auger.
6. Place the spanner wrench on the key way on the shieve.
7. While holding the spanner wrench, tighten the large auger nut.
8. Position the rear cover back onto the machine.
9. Install the rear cover mounting bolts and tighten them.
10. Install the front circular transition cover.
11. Connect the 115V and 3-phase power to the APV.
12. Connect APV to the air supply.
13. Turn the APV on and check for proper operation.

7.3.14 Auger Shaft Bearing Replacement

If an auger shaft bearing fails or becomes problematic, use the procedures below to replace it.

Note: If replacing the inner (the bearing closest to the hopper) bearing, the outer bearing must be removed first.

7.3.14.1 Auger Shaft Bearing Removal

1. Turn the APV off.
2. Disconnect the main power and air connections.
3. Remove the rear cover.
4. Remove the auger. Refer to 7.3.12 Auger Replacement (Used with Standard Auger Option), or 7.3.13 Auger Replacement (Used with Replaceable Auger Option).
5. Remove the mounting bolts for the bearing that is going to be replaced.
6. Slide the bearing off the sleeve.

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7.3.14.2 Auger/Agitator Shaft Bearing Installation

1. Slide the bearing onto the sleeve.
2. Line up the woodruff key on the sleeve with the slot in the bearing assembly.

Note: If replacing the inner (the bearing closest to the hopper) bearing, make sure to check sleeve/shaft alignment first to be sure that no binding, or contact with other components occurs.

3. Install the bearing mounting bolts and tighten.
4. Install the auger. Refer to 7.3.12 Auger Replacement (Used with Standard Auger Option), or 7.3.13 Auger Replacement (Used with Replaceable Auger Option).
5. Install the rear cover.
6. Connect the APV main power and air connections.
7. Check the APV for proper operation.

7.3.15 Flow Termination Device (FTD) Replacement

If the Flow Termination Device (FTD) becomes worn or damaged, follow the procedures below to replace it. It may be necessary to remove the FTD during the replacement of other components. Follow the steps below to replace it.

7.3.15.1 Flow Termination Device (FTD) Removal

1. Turn the APV off and disconnect the power cord from the outlet.
2. Disconnect the air supply from the APV.
3. Remove the bolt that connects the actuator arm.
4. Slide the FTD out the front of the spout.

7.3.15.2 Flow Termination Device (FTD) Installation

1. Slide the FTD into the spout.
2. Install the FTD to actuator arm bolt and tighten.
3. Connect the air supply line to the APV.
4. Plug the power cord into its outlet.
5. Check the APV for proper operation.

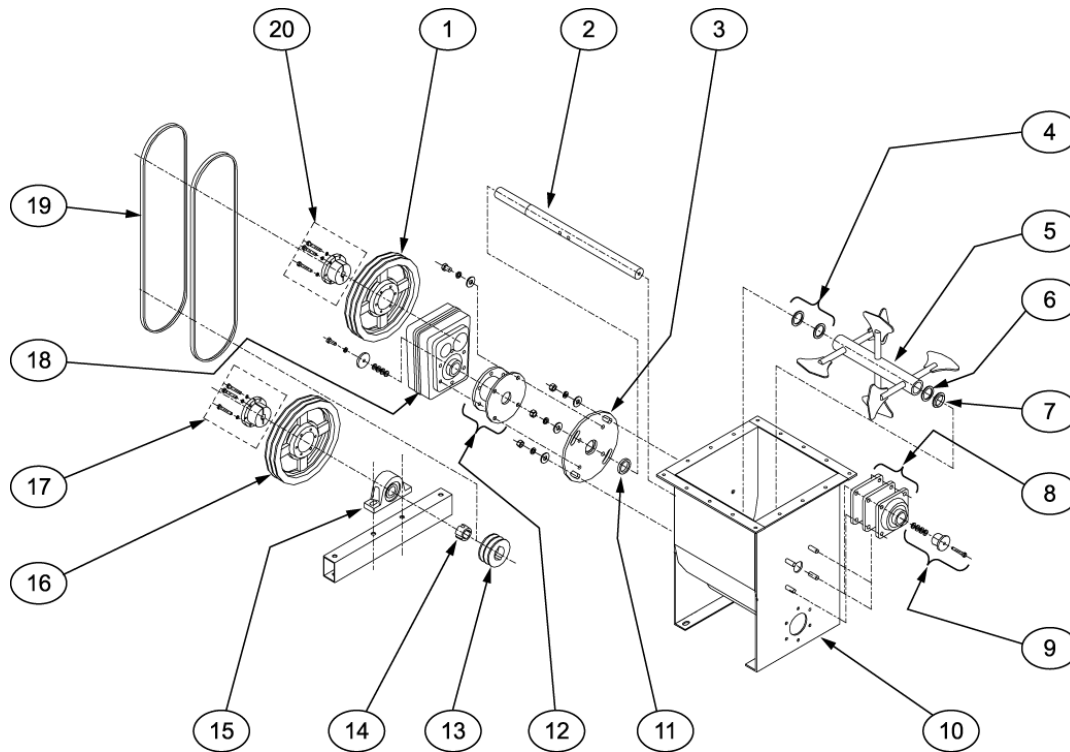
7.3.16 Agitator Replacement

If the agitator becomes worn or damaged, follow the procedures below to replace it.

7.3.16.1 Agitator Removal (Standard Belt Driven Agitator)

1. Turn the APV off.
2. Disconnect the main power and pneumatic connections.
3. Remove the bolts that hold the rear cover in place and then the rear cover.
4. Loosen the 4 bolts on the agitator gearbox.
5. Rotate the agitator gearbox to remove tension from the two agitator drive belts.
6. Remove the agitator drive belts.
7. Remove the agitator rear lockdown bolt, the agitator end cap, and the pulley.
8. Loosen the front agitator lockdown bolt, then strike the agitator lockdown bolt to jar the agitator loose from the agitator gearbox.
9. Remove the agitator gearbox.
10. Remove the gearbox adapter.

11. Remove the agitator mounting plate.
12. Remove the felt seal from the rear of the agitator shaft.
13. Slide the agitator sleeve toward the back of the APV.
14. As the front of the sleeve clears the front of the hopper, capture the two plastic bushings.
15. Hold the agitator with one hand while sliding the agitator sleeve out the rear of the APV.
16. As the agitator sleeve clears the agitator, lift the agitator out of the hopper.
17. Capture the plastic bushing from the rear side of the agitator.
18. Slide the auger sleeve all the way out the rear of the APV.



Item #	Description	Item #	Description
1	Upper agitator pulley	11	Felt seal
2	Agitator sleeve	12	Gearbox adapter
3	Agitator mounting plate	13	Agitator drive pulley
4	Rear agitator bushings	14	Taper lock
5	Agitator	15	Rear auger shaft bearing
6	Front agitator bushing	16	Auger drive pulley
7	Plastic bushing (smaller inside diameter than #4 or #6)	17	Auger shaft rear lockdown bolts, washers, & end cap
8	Felt seal	18	Agitator gearbox
9	Agitator shaft front lockdown bolt, washers, & end cap	19	Drive belts
10	Hopper	20	Agitator shaft rear lockdown bolts & end cap

Figure 7-13. Standard Belt Driven Agitator, Exploded View

7.3.16.2 Agitator Installation (Standard Belt Driven Agitator)

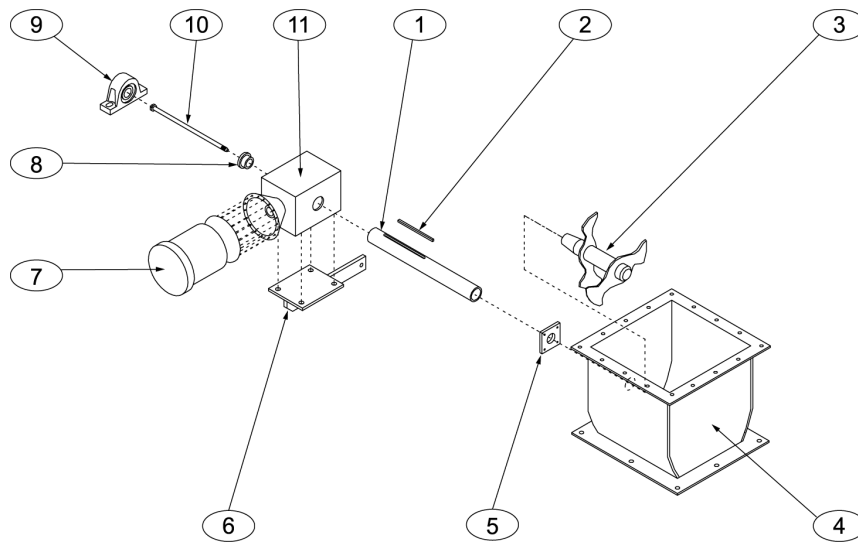
1. Begin by inserting the end of the agitator sleeve through the rear of the hopper. Stop when the tip of the agitator sleeve is just protruding into the hopper.
2. Slide the plastic bushing onto the agitator sleeve.
3. Insert the agitator into the hopper. Line it up so that the agitator sleeve can slide through the agitator.
4. Continue sliding the agitator sleeve through the agitator. Stop sliding it as the sleeve just protrudes past the agitator.

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5. Slide the plastic bushings on the agitator sleeve.
6. Slide the tip of the agitator sleeve out the front of the hopper.
7. Slide the felt seal, plate, bearing, and end cap assembly onto the agitator sleeve.
8. Install the agitator mounting plate and round felt seal.
9. From the rear of the hopper, install the gearbox adapter.
10. From the rear of the hopper, install the agitator gearbox.
11. From the rear of the hopper, install the agitator drive pulley.
12. From the rear of the hopper, install the agitator drive belts.
13. From the rear of the hopper, rotate the agitator gearbox to place tension on the belts. Install the four bolts.
14. From the rear of the hopper, install the rear cover and its bolts.
15. Connect the main pneumatic connection and both electrical connections.
16. Check the APV for proper operation.

7.3.16.3 Agitator Removal (Removable Agitator)

1. Turn the APV off.
2. Disconnect the main electrical and pneumatic connections.
3. Remove the bolts that hold the rear cover in place.
4. Remove the rear cover.
5. Loosen the purge seal clamp by turning the clamp screw 2 complete turns counter-clockwise.
6. Loosen the agitator lockdown bolt.
7. Strike the agitator lockdown bolt to jar the auger loose from the auger sleeve.
8. Remove the agitator lockdown bolt and the auger end cap.
9. Slide the agitator toward the front of the APV.
10. Pull the agitator out of the top of the APV.



Item #	Description	Item #	Description
1	Agitator sleeve	7	Agitator motor
2	Agitator keyway	8	Agitator end cap
3	Agitator	9	Rear bearing
4	Upper hopper	10	Agitator lock down bolt
5	Purge seal	11	Agitator gearbox
6	Stabilizer arm		

Figure 7-14. Optional Electric Agitator, Exploded View

7.3.16.4 Agitator Installation (Optional Electric Agitator)

1. Insert the agitator back into the APV from the top.
2. Slide the agitator all the way in and onto the agitator sleeve.
3. Install the agitator end cap and the agitator lockdown bolt. When tightening the lockdown bolt, make sure the agitator pins line up with the agitator sleeve.
4. Install the rear cover.
5. Install the rear cover bolts.
6. Plug the APV in to the appropriate outlet.
7. Check the APV for proper operation.

Repair

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Glossary

TERM	DEFINITION
AC	Alternating Current
Agitator	A device that is used to mix the product in the upper hopper to prevent the product from bridging. The agitator can be belt driven, or can be driven by an electric motor.
Audible alarm	The sounding of a bell, buzzer, beeper, or other acoustic device to draw the attention of the operator to a system fault.
Auger	A belt driven shaft with helical flighting that is used to move product from the hopper, through the spout, and into the bag.
Bag settler	A device that is used to help the product to settle in the bottom of the bag. Settlers can be either vibratory or lift and drop type.
Bag tilt	A pneumatic device that is used to tilt the filled bag forward off of the spout to allow the operator to tuck the sleeve.
Bagging cycle	A series of functions that describe the packaging process, from beginning to end, for one package of product.
Base frame	The portion of the machine that provides the support structure for all other components that make up the machine.
Bridging	A condition where an air pocket develops inside the hopper under the product and interrupts the flow of the product to the feed device.
Bulk rate	The fill speed used to package the largest portion of the product. It is a fast fill speed. Also referred to as Fast A.
Component	An item of hardware as commonly supplied complete by manufacturers.
Control panel	A set of machine controls assembled in a specific location to allow the operator to operate and make system adjustments.
Contact	A conducting part that co-acts with another conducting part to open or close an electrical circuit.
Counter	A device that counts the occurrence of some event.
Cubic Feet/Minute (CFM)	A unit of measure that is used to describe the amount of compressed air that is used by a machine.
DC	Direct Current
De-energize	To deprive an electro-receptive device of its operating current.
Dual set point (DSP)	Dual Set Point. A machine that uses two different feed rates to fill a package for maximum efficiency.
ESD	Electrostatic Discharge
Failure	The event, or inoperable state, in which any item or part of an item does not, or would not, perform as specified.
Fast A	Setting that controls the auger speed during the bulk fill operation.
Fault	Violation of an operating system rule. Faults are minor or major; many major faults are not usually recoverable, even with fault routines.
Fill rate	A general term used to describe the speed at which the product is being fed.
Filter/Regulator/ Lubricator (FRL)	A combination device that filters the incoming compressed air to remove contaminants and moisture. This device also provides the operator with the ability to regulate how much air pressure is available at the outlet. A lubricator is also included. The lubricator provides a reservoir that is filled with a special oil to help lubricate the internal components of the downstream pneumatic devices.
Fine dribble rate	On some units, a third feed rate is available. This speed is slower than the dribble rate and is used to create very precise weighments.

Glossary

TERM	DEFINITION
Flex leaf/leaves	Used to stabilize the weigh mast and ensure that the load is transferred to the load cell in a linear fashion. The APV uses four flex leaves.
Ground/GND	Ground (Electrical). A conducting connection, whether intentional or accidental, between an electrical circuit or equipment and the earth, or some other conducting body at a reference potential.
I/O	Input/Output
IN, in.	Inch, Inches
kg	Kilogram
Kicker	A pneumatic device that is used to automatically remove a filled package from the spout.
lb/lbs	Pound/Pounds
LCD	Liquid Crystal Display. This is the type of screen used on the T4000 and T3000 control panels.
LED	Light emitting diode. Used as status indicator for many types of equipment (processors, power supplies, I/O modules, modems, etc).
Load cell	An electronic device that is used to monitor the weight of the product that is being packaged.
MAC valve	A pneumatic valve that is used for controlling various pneumatic cylinders. The valves apply air pressure to the cylinders causing them to either open or close.
Module	Assembly of components, which function as a unit and can be replaced as a unit.
OPC	OLE for Process Control
PLC	Programmable Logic Controller. Used to monitor inputs from specific devices, analyze those inputs using built in software, and to control output devices based on the results of the software analysis.
Pounds per Square Inch (PSI)	Unit of measured used to describe air pressure.
POWER ON indicator	A lamp that will illuminate when power has been turned on.
Power supply	A device that converts available power to a form that a system can use — usually converts AC power to DC power.
Processor	The decision-making and data storage sections of a programmable controller or computer.
Product	Refers to the material that is being packaged by the machine.
Purge kit	Optional device that is used to prevent combustible dust accumulation or to prevent or remove flammable gas/vapor build up.
Reaction time	The time used by equipment, operator, or both, that elapses between the moments an action is called for and when the desired result occurs.
Refrigerated air dryer	A device that is uses a refrigeration unit to remove moisture from a compressed air supply. This is done to reduce corrosion and contamination of the pneumatic equipment.
Relay	An electromagnetic device that is operated by a variation in the conditions of one electric circuit, to effect the operation of other devices in the same or another electric circuit.
RS-232	An EIA standard that specifies electrical, mechanical, and functional characteristics for serial binary communication circuits. A single-ended serial communication interface.
Slow A	The dribble feed rate. This feed rate is only used on DSP units.
SP1	On DSP units, this is the dribble set point. Set using the machine controls, when the package weight reaches this weight, the feed rate will decrease to the dribble rate (Slow A).
SP2	This is the cutoff set point. Set using the machine controls, when the package weight reaches this weight, the auger will stop and will reverse momentarily.
SSP	Single Set Point. A machine that uses only one feed rate to fill the package.

TERM	DEFINITION
STOP button/indicator	Used by the operator to immediately stop the machine. Is a large red button that will illuminate when the stop button has been pressed. The machine will not start again until the button has pulled out.
Surge	A sudden rise of current or voltage.
Surge Hopper	A reservoir where product is stored for packaging.
T3000	An electronic control device that was jointly developed by Magnum Systems and Hardy Instruments. This control panel is available as an option on the APV.
T4000	An electronic control panel that was jointly developed by Magnum Systems and Hardy Instruments. This control panel is standard control panel on the APV.
Target weight	The desired package weight.
VAC	Volt, alternating current
VDC	Volt, direct current
VOM	Volt-Ohm Meter
Water separator	A device that is installed in a compressed air supply line to remove excess moisture from the air supply. This is done to reduce corrosion and contamination of the pneumatic equipment.
Weighment	One charge or fill of a packaging machine.
Weight display	An electronic device that is used to display package weights and to set package parameters.

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Appendix A

Safety Procedures, Cautions, Warnings, and Notices

- General safety precautions must be observed during all phases of operation, service and repair of the APV. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture and intended use of the APV.
- The manufacturer assumes no liability for customer's failure to comply with the following requirements:
- Qualified technicians and maintenance personnel should service the equipment described in this manual.
- Do not attempt internal service or adjustments unless another person, capable of rendering first aid and resuscitation, is available.
- Do not substitute parts or modify equipment. This practice could, in some cases, introduce the danger of additional hazards
- The APV contains some electrostatic-sensitive components. Therefore, technicians should always ground them self with a proper wrist strap before handling any modules or printed circuit boards so that static charges are removed from the person. Use static suppressive packaging to protect electronic assemblies removed from the APV.
- Observe all procedural cautions and warnings located on the equipment and throughout this manual.
- Read and follow all instructions
- Follow all warnings and instructions marked on the units and listed in manuals.

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Appendix B Spare Parts

Table B-1. APV Spare Parts List

	Part Description	Part Number
1	Feeder auger, steel	60N-0238
2	Bag clamp cylinder	50-1159
3	Bag clamp pad	50-7440
4	Flex leaf	60-0165
5	MAC solenoid valve, shaft seal	50-1832
6	MAC solenoid valve, bag clamp	50-1729
7	Potentiometer	50-1721
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Appendix C

Mechanical Drawings

Table C-1. APV Mechanical Drawing List

	Drawing Title	Drawing Number
1	Isometric (Exploded) View	BDAP-ISO-03.dwg
2	Bag Settler – Front & Side View	KICSET-1.dwg
3	Isometric (Exploded) View - Spout	ISO-5.dwg
4	Kicker with Tuckin Sleeve	TUCKSLVS.dwg
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Appendix D Electrical Drawings

Table D-1. APV Electrical Drawing List

	Drawing Title	Drawing Number
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Appendix E

T3000 Control Panel User Guide

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Appendix F Custom Features

The documents included in Appendix F will provide information regarding any custom features that were ordered and included in the equipment purchase.

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The equipment that accompanies this manual was not ordered with any custom features, thus no custom documentation is included.

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