

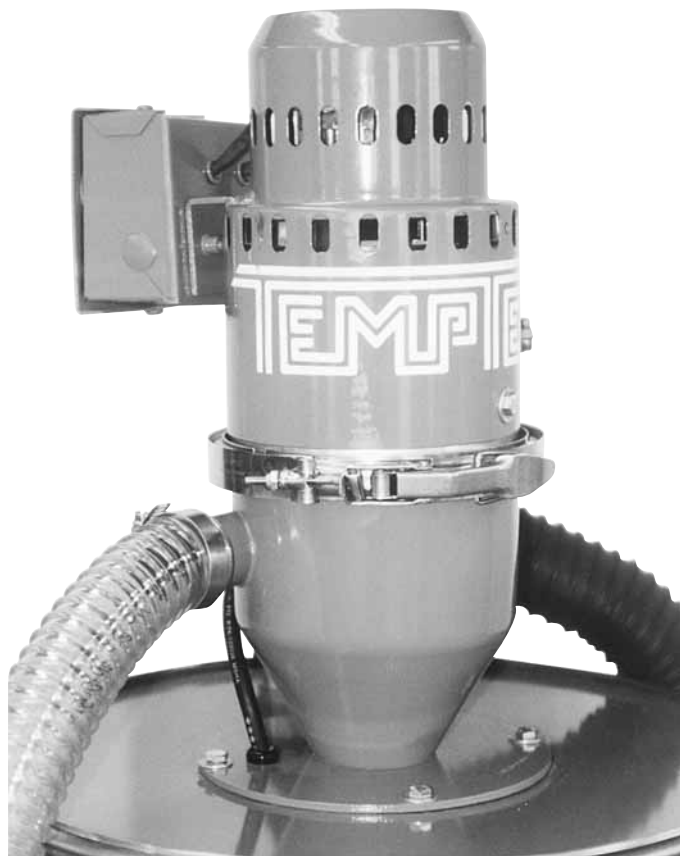
TVL Series

VACUUM LOADER

INSTRUCTION MANUAL I.O.M. #048 12/98

• INSTALLATION • OPERATION • MAINTENANCE

of TVL-3, TVL-4, VTL-5 models



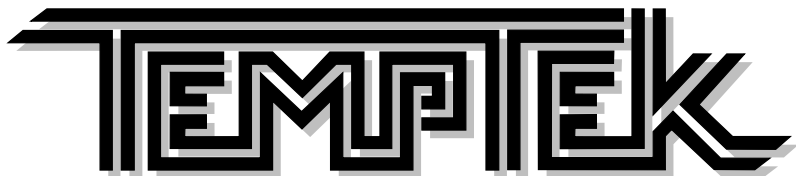
TEMPTEK

***TVL* Series**

VACUUM LOADER

INSTRUCTION MANUAL VTL SERIES MATERIAL LOADER

COVERING
**INSTALLATION
OPERATION
MAINTENANCE**
of VTL-3, VTL-4, VTL-5 models



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1.0 GENERAL

- 1.1 INTRODUCTION
- 1.2 SAFETY
- 1.3 UNPACKING
- 1.4 GENERAL INSPECTION
- 1.5 MATERIAL SAFETY SUMMARY



1.1 INTRODUCTION

- A. TEMPTEK VTL Series Vacuum Loaders** are completely automatic self cleaning vacuum loaders designed to convey virgin pellets and regrind materials from storage containers to drying hopper or directly to process machines. The units are shipped complete with all controls for immediate operation, and include a hardware package. The hardware package for a TVL-3 unit includes 15 feet of flexible vacuum hose, hose clamps, and a material pick up lance. The hardware package for a TVL-4 unit includes 30 feet of flexible hose, hose clamps and material pick up lances. The hardware package for a TVL-5 unit include a 10 feet of flexible vacuum hose, hose clamps and a material pick up lance.
- B.** Some of the **options** that may be included in your shipment are:
- Additional tubing and fittings (rigid tubing, elbows, bolted couplers, etc.)
 - Sound enclosure
 - 230 volt power
 - Digital timer
 - Machine mounting
 - Conic discharge valve
 - Flapper dump valve

1.2 SAFETY

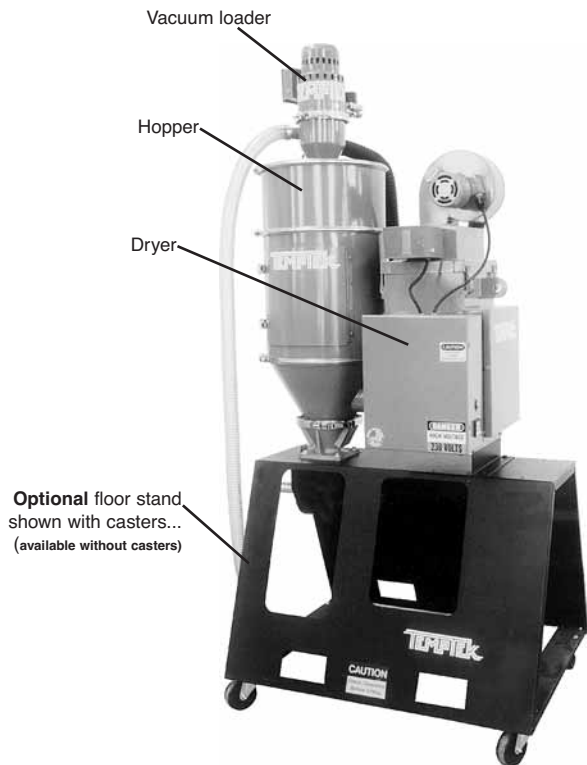
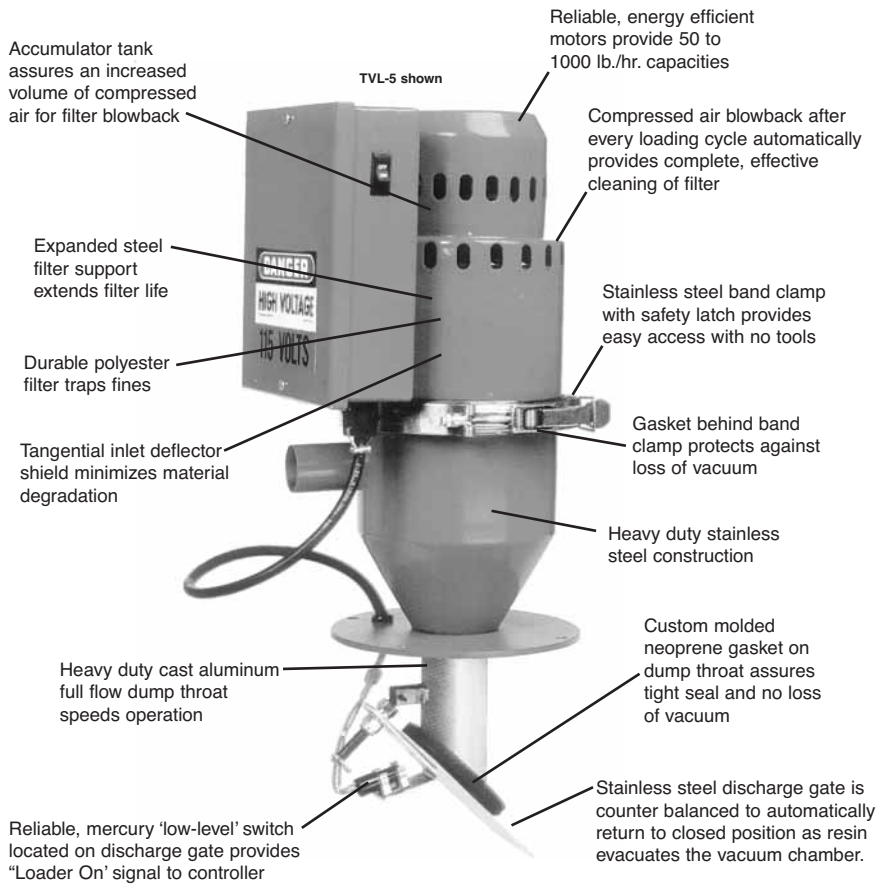
- A.** It is important to become thoroughly familiar with this manual and the operating characteristics of the **TEMPTEK VTL Series Vacuum Loader**.
- B.** It is the owner's responsibility to assure proper operator training, installation, operation, and maintenance of the **TEMPTEK VTL Series Vacuum Loader**.
- C.** Observe all warning and safety placards applied to the chiller. Failure to observe all warnings can result in serious injury or death to the operator and severe mechanical damage to the unit.

1.3 UNPACKING

- A.** Caution should be exercised to see that the equipment is not handled roughly. The crate must be removed carefully. The machine must not be used to pry against when removing the crate.
- B.** The loader is shipped complete, with all controls for automatic operation. The only utilities required are a 115 or 230 volt power supply (depending on loader), and clean, dry compressed air at approximately 80 psi.
- C.** After receipt of the unit, completely inspect it for damage. Although the units are packaged securely, vibration and mishandling during transit can cause damage.



'VTL' SERIES MATERIAL LOADER



1.4 GENERAL INSPECTION

- A. When the unit is unpacked, make a visual inspection looking for

1.5 MATERIAL SAFETY SUMMARY

- A. Some components used by TEMPTEK may contain mercury, a chemical listed in the EPA (Environmental Protection Agency) Title III chemical list, EPA identification number 7439-9706. The components are typically (i) mercury switch and/or (ii) mercury relay switches. These devices are listed as 'ARTICLES' and as such are exempt from the "COMMUNITY RIGHT TO KNOW" per Title III.
- B. Shipping requirements according to IATA (International Air Transport Authority) regulation 805 indicate that mercury switches and relays are exempt from the requirements of IATA regulation 805 providing they are of the totally enclosed leak-proof type in sealed metal or plastic units. All devices used by TEMPTEK meet these requirements, and as such require no special packing.
- C. Check the parts lists included with this instruction manual for the presence of devices containing mercury that may have supplied with your equipment from TEMPTEK. Material Safety Data sheets for these devices and other special precaution have been provided in this manual. This information should be reviewed if applicable.



2.0 INSTALLATION

- 2.1 TD SERIES INSTALLATION
- 2.2 DIFFUSER CONE OR DIFFUSER TUBE INSTALLATION
- 2.3 UTILITY CONNECTION



2.1 MACHINE INSTALLATION

- A. Mount the hopper loader to the hopper lid, positioning it so that the material inlet is directed towards the material pick up point.
- B. Make sure the dump valve flapper plate has enough room to freely operate.
- C. Secure the hopper loader to the hopper lid to ensure a safe installation as required.
- D. On machine mount units, the bottom flange is usually supplied undrilled to allow a range of mounting. Secure the loader to the machine to ensure a tight seal.
- E. The conveying lines should be horizontal and/or vertical, using 90 degree radius bends for directional changes, and should be as direct as possible with no slope. All line connections should be vacuum tight. All rigid conveying tubing should be properly supported by the user to provide a safe and secure installation. Use flexible material handling hose to connect the material pick-up lance or vacuum take-off box to the conveying line. The flexible hose should be only as long as needed, since excess hose will reduce loader efficiency.

2.2 COMPRESSED AIR INSTALLATION

- A. Connect a clean, dry compressed air line to the filter/regulator for supply to the diverter valve solenoid. The minimum requirement for effective filter cleaning is 80 psi. The diverter valve filter/regulator has a 1/8" FNPT connection.
- B. **For TVL-5 installations:** attach a field supplied air filter to the pulse solenoid valve, which has a 3/8" FNPT connection. An accumulator tank is not used in this application. Clean, dry compressed air of 80-125 psi is required. connect the supply voltage as required by the nameplate located on the control box.

2.3 CONTROL BOX INSTALLATION

- A. The control box may be mounted in a location that is convenient for the operator, making sure that the control cable will extend to the junction box on the lid of the hopper loader. connect the supply voltage as required by the name plate located on the side of the loader control box.



2.4 WARNINGS AND CAUTIONS

- A. **CAUTION:** DO NOT EXCEED 125 PSI. FOLLOW ALL NATIONAL OR LOCAL ELECTRICAL CODES.
- B. **CAUTION:** PROPER SUPPORT OF ALL CONVEYING LINES AND A SECURE MOUNTING OF THE LOADER IS NECESSARY FOR A SAFE INSTALLATION.
- C. **DANGER:** DISCONNECT ALL VOLTAGE AND COMPRESSED AIR BEFORE INSPECTING OR SERVICING THE LOADER. ONLY PROPERLY TRAINED, QUALIFIED TECHNICIANS SHOULD OPERATE OR SERVICE THE LOADER.



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3.0 INSTALLATION

- 3.1** PRINCIPLES OF OPERATION
- 3.2** INITIAL START-UP PROCEDURE
- 3.3** CONVEYING NOTES
- 3.4** OPERATION FOR A LOGO! PIC CONTROLLED UNITS
- 3.5** OPERATION FOR A PC BOARD CONTROLLED UNITS
- 3.6** RATIO ADJUSTMENT
- 3.7** OPERATION OF TVL-4 WITH BLENDING BOARD
- 3.8** PCB REPLACEMENT
- 3.9** BRUSH REPLACEMENT FOR VACUUM MOTORS
- 3.10** MOTOR REPLACEMENT
- 3.11** MOTOR REPLACEMENT FOR TVL-5 MODELS



3.1 PRINCIPLES OF OPERATION

- A. **VTL Series Vacuum Loaders** utilize a powerful motor to create a vacuum which draws material into a chamber. At a preset time, the motor is turned off and the negative pressure in the chamber is relieved. Material in the chamber then falls through the bottom, past the flapper and compressed air is pulsed through the vacuum filter to dislodge any contaminants or fines that may have accumulated. This cycle is then repeated as many times as necessary until the unit is shut off by the material level switch.
- B. Machine mounted units do not have a flapper valve or mercury switch, but instead utilize a clear sight tube, which mounts directly to the machine throat, with a sensor to control loader operation based upon the level of material within the sight tube. The sensor may be either a capacitance style, with sensitivity adjustment, or a pair of photoelectric sensors, an emitter and a receiver. A conic valve assembly is also available on machine mount units which operates in the same manner as the flapper valve on the hopper loader units.
- C. The bottom flange is normally supplied undrilled to allow the customer to drill the appropriate mounting pattern for a particular machine.

3.2 INITIAL START-UP PROCEDURE

- A. For optimum loader operation, adjust the load time so that the chamber is almost completely full at the end of the load cycle. **DO NOT ALLOW THE CHAMBER TO OVERFILL.**
- B. Adjust the dump time so that it is only 1 to 2 seconds longer than the time necessary to completely empty the chamber. The number of pulses needed to clean the filter depends upon the material being conveyed. Clean, virgin pellets require minimum filter cleaning while very dusty regrind may necessitate a maximum filter cleaning sequence. Adjust the pulse cycle so the filter remains clean. A mid range setting is suggested as a starting point.

3.3 CONVEYING NOTES

- A. Materials which contain a large percentage of fines or powder may require increased filter cleaning. this can be achieved by the following technique:
 - 1. Set the load time to minimum.
 - 2. Set the dump and pulse time to maximum.
 - 3. Increase the compressed air pressure. Caution: do not exceed 125 psi.

3.4 OPERATION FOR LOGO! PLC CONTROLLED UNITS



- A. Push the OFF/ON switch to the “on” position. The vacuum motor will then start and load material for a time that is adjustable by changing the B03:T value in the “Set Param” menu of the controller (see diagram D). The load time may be increased or decreased as necessary.
- B. When the load time is completed, the vacuum motor will stop, allowing material in the vacuum chamber to fall through the dump valve. The filter will also be cleaned during the dump time with pulses of compressed air. The dump time and the number of pulses used to clean the filter are adjustable by changing the B05:T and B11:T values respectively in the “Set Param” menu of the controller (see diagram D). The dump value should be set 1 to 2 seconds greater than the time necessary for the chamber to completely empty. Enter the number of pulses required to clean the filter as the pulse value.
- C. The load and dump/pulse cycles will continue until the drying hopper or surge bin is full, at which time the material will hold the dump valve flapper open, placing the system in a holding mode. As material is withdrawn from the hopper, the material level will fall, the flapper will close, and the loader will again activate to automatically keep the hopper full. On machine mount units, the load and dump/pulse cycles will continue if the material level remains below the sensors located on the sight tube. When the material is above this point, a capacitance sensor or a pair of photoelectric sensors will continuously detect material and not allow the system to load. As material is withdrawn, the level will fall, and the sensors will no longer detect material. The loader will then continue with the loading cycle.
- D. On machine mount units supplied with a conic valve, the valve is energized to seal the chamber when the vacuum motor is enabled for loading. The conic valve is then de-energized during the dump/pulse cycle. The circuit determines a full condition only after the completion of the dump/pulse cycle.
- E. On hopper mounted units, once the vacuum motor starts, the cycle will continue through the load, dump, and pulse cycles, even if the dump flapper is held open. The circuit determines a full condition only after the completion of the dump/pulse cycle.
- F. Approximate flow rates are shown on diagram B, in the Appendix.

3.5 OPERATION FOR P.C. BOARD CONTROLLED UNITS

- A. Push the circuit breaker to the “on” position. The circuit breaker will light, indicating that power is supplied to the unit. there is a built in delay of approximately one second that allows the solid state control circuit to become fully energized before loading. The vacuum motor



will then start and load material for a time that is adjustable by turning the set screw located on the P.C. board (see diagram A). A CCW (counter clockwise) rotation will increase the load time.

- B. When the load time is completed, the vacuum motor will stop, allowing material in the vacuum chamber to fall through the dump valve. The filter will also be cleaned during the dump time with pulses of compressed air. The dump time and the number of pulses used to clean the filter are adjustable by turning the dump and pulse set screws which are located on the P.C. board (see diagram A). Turn the dump set screw CW (clockwise) to increase time. Turn the pulse screw CCW (counter clockwise) to increase the number of cleaning pulses during the dump cycle.
- C. The load and dump/pulse cycles will continue until the drying hopper or surge bin is full, at which time the material will hold the dump valve flapper open, placing the system in a holding mode. As material is withdrawn from the hopper, the material level will fall, the flapper will close, and the loader will again activate to automatically keep the hopper full. On machine mount units, the load and dump/pulse cycles will continue if the material level remains below the sensors located on the sight tube. When the material is above this point, a capacitance sensor or a pair of photoelectric sensor will continuously detect material and not allow the system to load. As material is withdrawn, the level will fall, and the sensors will not longer detect material. The loader will then continue with the loading cycle.
- D. On machine mount units supplied with a conic valve, the valve is energized to seal the chamber when the vacuum motor is enabled for loading. The conic valve is then de-energized during the dump/pulse cycle. The circuit determines a full condition only after the completion of the dump/pulse cycle.
- E. On hopper mounted units, once the vacuum motor starts, the cycle will continue through the load, dump, and pulse cycles, even if the dump flapper is held open. The circuit determines a full condition only after the completion of the dump/pulse cycle.
- F. Approximate flow rates are shown on diagram B in the Appendix.

3.6 RATIO ADJUSTMENT

- A. The ratio or percent of each material can be adjusted after the total load time is determined (see initial start up). Diagram D indicates the approximate mix ratios at various load times and settings. For example, if the total load time is 20 seconds and a mix of 30% material A and 70% material B is desired, a ratio setting of 2 will yield the desired results. These percentages are approximate and may have to be adjusted depending on certain material characteristics.

3.7 OPERATION OF TVL-4 WITH BLENDING BOARD

- A. In a standard proportioning loader, the ratio of port A to port B load times are controlled by a single ratio control knob. The loader draws material from port A for a preset time and then from port B for a preset time. The unit then dumps and pulses. A 'blending' loader is supplied with two ratio control knobs (digital times are optional), one for port A and one for port B. These allow the operator to individually select load times from 1 to 9 seconds for each port. These ratio control settings cause the loader to draw material alternately from ports A and B in a series of short cycles allowing the 'blending' effect.
- B. For example, if the ratio control knob for port A was set for 2 seconds and the ratio control knob for port B was set for 3 seconds, a complete load cycle would occur every 5 seconds. With the total load time (adjustable on the P.C. board) set for 20 seconds, the sequence of material loading into the vacuum chamber would be as follows: A-B-A-B-A-B-A-B. The loader would then dump and pulse.

3.8 PCB REPLACEMENT

- A. The replacement of the printed circuit board can be accomplished in seconds. With power removed, disconnect the orange and red plugs from the PCB. Next, use a pair of long nose pliers to squeeze the tip of each nylon stand-off to force the locking arm back. While squeezing, gently lift the corner of the PCB away from the panel in the control box. Follow the same procedure for releasing all four stand-offs (see Appendix Diagram C).
- B. The new PCB is then pushed onto the stand-offs, which automatically lock the board into place. Reconnect the orange and red plugs.

3.9 BRUSH REPLACEMENT IN VACUUM MOTORS

- A. Brushes should be changed **before** the brush stunt touches the commutator. Estimated brush life is approximately 300 hours under normal operating conditions. On reassembly and handling, the lead wires must be kept away from rotating parts and the motor frame.
- B. To achieve best performance, new brushes should be seated on the commutator before full voltage is applied. The motor manufacturer recommends the following procedure:

1. After brush change, apply 50% to 70% of rated voltage for thirty minutes to accomplish the seating. The motor will return to full performance after thirty to forty-five minutes or operating at full rated voltage. The motor must not be run with the vacuum inlet sealed off.
2. **Direct application of full rated voltage after changing brushes will cause arcing, commutator pitting, and reduced overall life.**
3. If reduced voltage is not available, connecting two motors of similar rating in series for thirty minutes will accomplish the proper brush seating.
4. **Danger:** disconnect power and compressed air before servicing the loader.

3.10 MOTOR REPLACEMENT

- A. Disconnect all power from the loader system. Disconnect the motor wiring from the junction box located on the lid of the chamber. Disconnect the three springs that clamp the motor to the lid. The motor can now be removed. Check the gasket that seals the vacuum motor to the lid and renew if necessary. Reverse the above steps to install the vacuum motor. Connect power and verify that the system is operating correctly.
- B. **Caution:** disconnect all power and compressed air before servicing the loader. Only qualified technicians familiar with all local and national codes should service the equipment.

3.11 MOTOR REPLACEMENT FOR TVL-5 MODELS

- A. Disconnect all power from the loader system. Remove the control box cover. Locate the motor and solenoid leads and disconnect them. Remove the nuts and bolts located above and below the PCB and remove the control box. Next, remove the other bolt on the outside of the motor cover opposite to the control box and lift the cover from the motor. Check the gaskets that seal the vacuum motor to both the lid and the cover. Renew the gaskets if necessary.
- B. Before re-installing the motor, install heat shrinkable insulated tubing on the motor lead wires. Then place the motor in the correct position on the lid. Place the cover over the motor with the cover mounting holes oriented with respect to the threaded inserts in the lid. Press down firmly on top of the motor cover to compress the gaskets while installing the mounting bolts. The cover must be installed securely so that the motor is pressed into the gaskets.
- C. Connect the motor lead wire inside the control box and replace the control box cover. Connect power and verify that the system is

working properly.

- D. Caution:** disconnect all power and compressed air before servicing the loader. Only qualified technicians familiar with all local and national codes should service the equipment.



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4.0 TROUBLESHOOTING

- 4.1** OVERVIEW
- 4.2** MACHINE WILL NOT START
- 4.3** INADEQUATE OR NO VACUUM
- 4.4** MOTOR RUNS BUT PROPORTIONING SOLENOID NOT OPERATING



4.1 OVERVIEW

- A. Most loader problems are the result of dirty filter(s), air leaks, or improper adjustments. These items should be checked before assuming equipment failure.

4.2 MACHINE WILL NOT START

PROBLEM: Machine will not start.

SOLUTIONS:

1. **POWER SUPPLY.**
 - a. No voltage or the voltage is incorrect. Check the field installed disconnect and incoming power supply.
2. **STOP/START SWITCH.**
 - a. No voltage on through switch. Replace switch.
3. **VACUUM MOTOR.**
 - a. No voltage at motor. Check incoming power supply and voltage at outlet. Check also for voltage through the stop/start switch. Check the PC board for voltage and replace if necessary.
 - b. Voltage at motor, amperage incorrect. Replace motor.
4. **LIMIT SWITCH.**
 - a. No voltage through switch. Replace switch.
5. **PC BOARD.**
 - a. No voltage to solenoid. Replace board.

4.3 INADEQUATE OR NO VACUUM

PROBLEM: Inadequate or No vacuum

SOLUTIONS:

1. **FILTER.**
 - a. Filter dirty. Replace filter.
 - b. Blow back air pressure incorrect. Low pressure. Increase pressure (not to exceed 125 psi).
 - c. Pulse rate. Insufficient to clean filter. Increase rate.
2. **AIR DUCTS.**
 - a. Obstructed. Remove obstruction.
3. **LEAKS IN SYSTEM.**
 - a. Air leaking into system. Replace gaskets, repair leaks as necessary.



4. **BLOW BACK AIR PRESSURE INCORRECT.**
 - a. Low pressure. Increase pressure, (not to exceed 125 psi).
5. **PULSE RATE.**
 - a. Insufficient to clean filter. Increase rate.

4.4 MOTOR RUNS BUT PROPORTIONING SOLENOID NOT OPERATING

PROBLEM: Motor runs but proportioning solenoid not operating.

SOLUTIONS:

1. **FILTER.**
 - a. Filter dirty. Replace filter.
 - b. Blow back air pressure incorrect. Low pressure. Increase pressure (not to exceed 125 psi).
 - c. Pulse rate. Insufficient to clean filter. Increase rate.
2. **AIR DUCTS.**
 - a. Obstructed. Remove obstruction.
3. **LEAKS IN SYSTEM.**
 - a. Air leaking into system. Replace gaskets, repair leaks as necessary.
4. **BLOW BACK AIR PRESSURE INCORRECT.**
 - a. Low pressure. Increase pressure, (not to exceed 125 psi).
5. **LOAD TIME.**
 - a. Chamber not filling sufficiently. Increase load time.
 - b. Chamber over filling. Decrease load time.
6. **DUMP TIME.**
 - a. Insufficient to allow complete emptying of chamber. Increase time.



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5.0 PARTS LIST

- 5.1 TVL-5 PARTS LIST (PC BOARD CONTROLLER)
- 5.2 TVL-4 PARTS LIST (115V WITH BLENDING BOARD)
- 5.3 TVL-3 PARTS LIST (LOGO! PLC CONTROLLER)
- 5.4 TVL-4 PARTS LIST (115V WITH BLENDING BOARD)
- 5.5 TVL-4 PARTS LIST (LOGO! PLC CONTROLLER)
- 5.6 TVL-5 PARTS LIST (PC. BOARD CONTROLLER)
- 5.7 TVL-5 PARTS LIST (LOGO! PLC CONTROLLER)



5.1 TVL-3 PARTS LIST (PC. BOARD CONTROLLER)

DESCRIPTION	PART # QTY	Part # 115V	230V
*Vacuum Motor	1	50033	01381
*Carbon Brush Assembly	2	50036	50036
*11 1/2" filter Element	1	04544	04544
*Pulse Solenoid	1	50032	01382
1 1/2" Non-adjustable pick up lance	1	50159	50159
1 1/2" Non-adjustable pick-up lance SS	1	02347	02347
1 1/2"Hose clamp	2	50049	50049
*P.C. Board	1	50252	01385
Circuit Breaker (on/off)	1	50063	07732
Mercury Switch	1	50245	50245
1 1/2" Material Handling Hose	15ft	50003	50003
Motor Gasket	1	50059	50059
*Dump Valve Gasket (Neoprene)	1	01695	01695
*Dump Valve Gasket (Silicone)	1	02724	02724
Compressed Air Filter	1	50055	50055
*Inlet Tube Gasket (Neoprene)	1	50069	50069
*Inlet Tube Gasket (Silicone)	1	02721	02721
*Solid State Relay (Motor)	1	50091	50091
Gasket, Chamber	1	04753	04753
Photoelectric Sensors			
Emitter	1	08343	08343
Receiver	1	08345	08345
Capacitance Sensor	1	01093	01093

*recommended spare part

Note: silicone gaskets are high temperature gaskets



5.2 TVL-3 PARTS LIST (LOGO! PLC CONTROLLER)

DESCRIPTION	PART # QTY	Part # 115V	230V
*Vacuum Motor	1	50033	01381
*Carbon Brush Assembly	2	50036	50036
*1 1/2" filter Element	1	04544	04544
*Pulse Solenoid	1	50032	01382
1 1/2" Non-adjustable pick up lance	1	50159	50159
1 1/2" Non-adjustable pick-up lance SS	1	02347	02347
1 1/2"Hose clamp	2	50049	50049
*LOGO! PLC	1	09029	09029
Switch (on/off)	1	03228	03228
Mercury Switch	1	50245	50245
1 1/2" Material Handling Hose	15ft	50003	50003
Motor Gasket	1	50059	50059
*Dump Valve Gasket (Neoprene)	1	01695	01695
*Dump Valve Gasket (Silicone)	1	02724	02724
Compressed Air Filter	1	50055	50055
*Inlet Tube Gasket (Neoprene)	1	50069	50069
*Inlet Tube Gasket (Silicone)	1	02721	02721
*Solid State Relay (Motor)	1	09007	09007
Gasket, Chamber	1	04753	04753
Photoelectric Sensors			
Emitter	1	08343	08343
Receiver	1	08345	08345
Capacitance Sensor	1	01093	01093

*recommended spare part
Note: silicone gaskets are high temperature gaskets



5.3 TVL-4 PARTS LIST (PC. BOARD CONTROLLER)

DESCRIPTION	PART # QTY	Part # 115V	230V
*Vacuum Motor	1	50033	01381
*Carbon Brush Assembly	2	50036	50036
*11 1/2" filter Element	1	04544	04544
*Pulse Solenoid	1	50032	01382
1 1/2" Non-adjustable pick up lance	1	50159	50159
1 1/2" Non-adjustable pick-up lance SS	1	02347	02347
1 1/2"Hose clamp	2	50049	50049
*P.C. Board	1	50255	01377
Circuit Breaker (on/off)	1	50063	07732
Mercury Switch	1	50245	50245
1 1/2" Material Handling Hose	15ft	50003	50003
Motor Gasket	1	50059	50059
*Dump Valve Gasket (Neoprene)	1	01695	01695
*Dump Valve Gasket (Silicone)	1	02724	02724
*Compressed Air Filter	1	50055	50055
Proportioning Air Cylinder	1	50244	50244
Proportioning Filter/Regulator/Gauge	1	50154	50154
*Inlet Tube Gasket (Neoprene)	1	50069	50069
*Inlet Tube Gasket (Silicone)	1	02721	02721
Proportioning Solenoid	1	08236	01375
*Solid State Relay (Motor)	1	50091	50091
Gasket, Chamber	1	04753	04753
Photoelectric Sensors			
Emitter	1	08343	08343
Receiver	1	08345	08345
Capacitance Sensor	1	01093	01093

*recommended spare part

Note: silicone gaskets are high temperature gaskets



5.4 TVL-4 PARTS LIST (115V WITH BLENDING BOARD)

DESCRIPTION	QTY	PART # 115V
*Vacuum Motor	1	50033
*Carbon Brush Assembly	2	50036
*1 1/2" filter Element	1	04544
*Pulse Solenoid	1	50032
1 1/2" Non-adjustable pick up lance	2	50159
1 1/2" Non-adjustable pick-up lance SS	2	02347
1 1/2"Hose clamp	4	50049
*P.C. Board	1	01598
Circuit Breaker (on/off)	1	50063
Mercury Switch	1	50245
1 1/2" Material Handling Hose	30ft	50003
Motor Gasket	1	50059
*Dump Valve Gasket (Neoprene)	1	01695
*Dump Valve Gasket (Silicone)	1	02724
*Compressed Air Filter	1	50055
Proportioning Air Cylinder	1	50244
Proportioning Filter/Regulator/Gauge	1	50154
*Inlet Tube Gasket (Neoprene)	1	50069
*Inlet Tube Gasket (Silicone)	1	02721
Proportioning Solenoid	1	08236
*Solid State Relay (Motor)	1	50091
Gasket, Chamber	1	04753
Photoelectric Sensors		
Emitter	1	08343
Receiver	1	08345
Capacitance Sensor	1	01093

*recommended spare part
Note: silicone gaskets are high temperature gaskets



5.5 TVL-4 PARTS LIST (LOGO! PLC CONTROLLER)

DESCRIPTION	QTY	PART # 115V	Part # 230V
*Vacuum Motor	1	50033	01381
*Carbon Brush Assembly	2	50036	50036
*11 1/2" filter Element	1	04544	04544
*Pulse Solenoid	1	50032	01382
1 1/2" Non-adjustable pick up lance	1	50159	50159
1 1/2" Non-adjustable pick-up lance SS	1	02347	02347
1 1/2"Hose clamp	2	50049	50049
*LOGO! PLC	1	09029	09029
Switch (on/off)	1	03228	03228
Mercury Switch	1	50245	50245
1 1/2" Material Handling Hose	15ft	50003	50003
Motor Gasket	1	50059	50059
*Dump Valve Gasket (Neoprene)	1	01695	01695
*Dump Valve Gasket (Silicone)	1	02724	02724
Compressed Air Filter	1	50055	50055
*Proportioning Air Cylinder	1	50244	50244
Proportioning filter/regulator/gauge	1	50154	50154
*Inlet Tube Gasket (Neoprene)	1	50069	50069
*Inlet Tube Gasket (Silicone)	1	02721	02721
*Proportioning Solenoid	1	08236	09243
*Solid State Relay (Motor)	1	09007	09007
Gasket, Chamber	1	04753	04753
Photoelectric Sensors			
Emitter	1	08343	08343
Receiver	1	08345	08345
Capacitance Sensor	1	01093	01093

*recommended spare part

Note: silicone gaskets are high temperature gaskets



5.6 TVL-5 PARTS LIST (PC. BOARD CONTROLLER)

DESCRIPTION	PART # QTY	Part # 115V	230V
*Vacuum Motor	1	04250	07735
*Carbon Brush Assembly	2	04533	04533
*6 3/4" Filter Element	1	04529	04529
*Pulse Solenoid	1	50032	01382
1 1/2" Non-adjustable pick up lance	1	50159	50159
1 1/2" Non-adjustable pick-up lance SS	1	02347	02347
1 1/2"Hose clamp	2	50049	50049
*P.C. Board	1	04517	07764
Switch (on/off)	1	03228	03228
Mercury Switch	1	50245	50245
1 1/2" Material Handling Hose	15ft	50003	50003
Motor Gasket	1	50059	50059
*Dump Valve Gasket (Neoprene)	1	01695	01695
*Dump Valve Gasket (Silicone)	1	02724	02724
*Solid State relay (Motor)	1	50091	50091
O-Ring	1	04247	04247
Cover, Motor	1	04251	07756
Clamping Ring	1	04078	04078
Spacer, PCB	4	04524	04524
Photoelectric Sensors			
Emitter	1	08343	08343
Receiver	1	08345	08345
Capacitance Sensor	1	01093	01093

*recommended spare part
Note: silicone gaskets are high temperature gaskets



5.7 TVL-5 PARTS LIST (LOGO! PLC CONTROLLER)

DESCRIPTION	PART # QTY	Part # 115V	230V
*Vacuum Motor	1	04250	07735
*Carbon Brush Assembly	2	04533	04533
*6 3/4" Filter Element	1	04529	04529
*Pulse Solenoid	1	50032	01382
1 1/2" Non-adjustable pick up lance	1	50159	50159
1 1/2" Non-adjustable pick-up lance SS	1	02347	02347
1 1/2"Hose clamp	2	50049	50049
LOGO! PLC	1	09029	09029
Switch (on/off)	1	03228	03228
Mercury Switch	1	50245	50245
1 1/2" Material Handling Hose	15ft	50003	50003
Motor Gasket	1	50059	50059
*Dump Valve Gasket (Neoprene)	1	01695	01695
*Dump Valve Gasket (Silicone)	1	02724	02724
*Solid State relay (Motor)	1	09007	09007
O-Ring	1	04247	04247
Cover, Motor	1	04251	07756
Clamping Ring	1	04078	04078
Photoelectric Sensors			
Emitter	1	08343	08343
Receiver	1	08345	08345

*recommended spare part

Note: silicone gaskets are high temperature gaskets



END

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