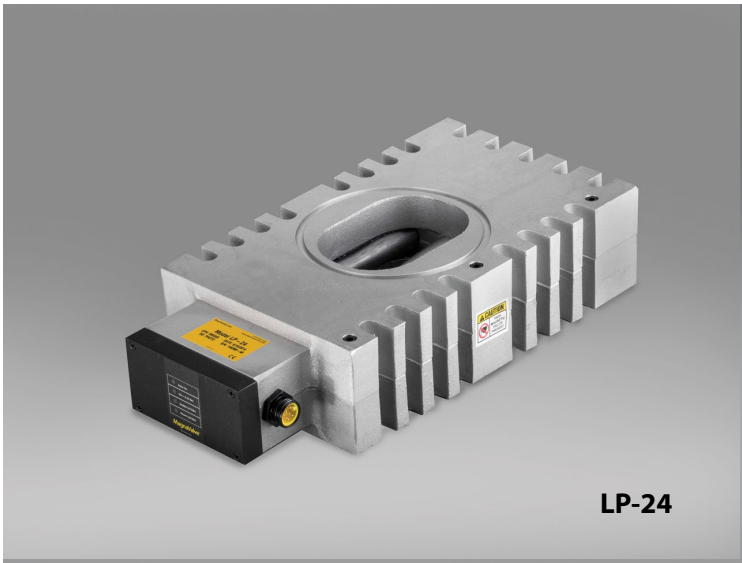
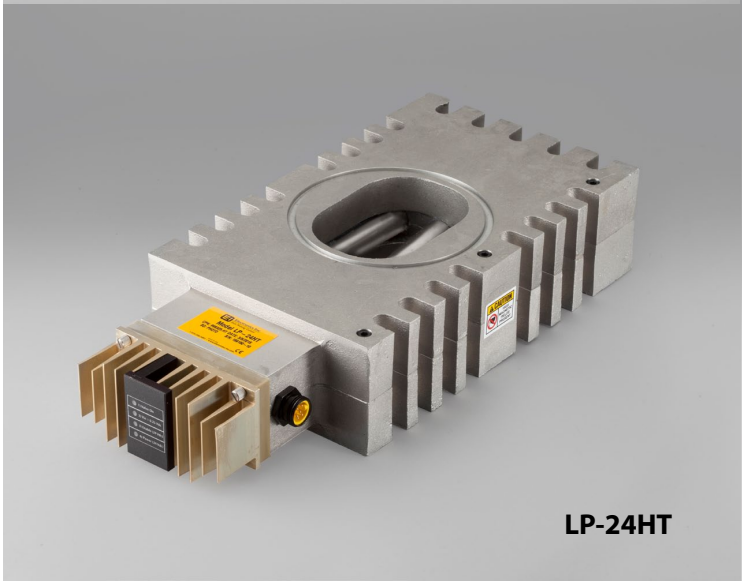

LP-24

VLP-24


LP-24HT

VLP-24HT

LP-24 and VLP-24 • LP-24HT and VLP-24 HT MagnaValve®

Instruction Manual

Electronics Inc.
Shot Peening Control

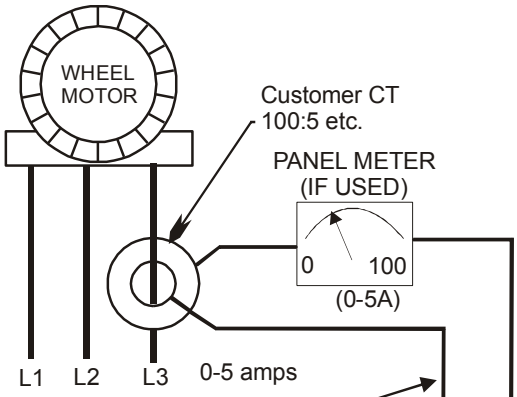
56790 Magnetic Drive, Mishawaka, Indiana 46545 USA • 1-800-832-5653 or (574)256-5001 • www.electronics-inc.com

IM0083 2016-08

Application Note AN-169

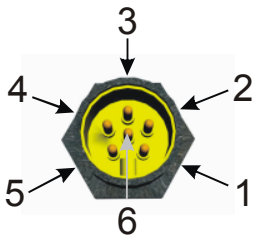
WIRE CONNECTIONS FOR VLP-24 OR LP-24 TO AN AC-24 AMPERAGE CONTROLLER

NOTE : The valve must be located as close to the wheel as possible for best servo control stability. (5 feet or closer)



Use 12 AWG wire for current loop. Use 10 AWG or larger for runs over 15 ft.

VLP-24/LP-24		AC-24 Controller
4) Orange 0-10 Vdc input	←	8) Servo Out
6) Blue 24 Vdc Enable	←	9) Valve Enable
2) Red 24 Vdc Supply	←	19) 24 Vdc Supply
5) Black 0 Vdc Common	→	20) 0 Vdc Common



1. WHITE
2. RED
3. GREEN
4. ORANGE
5. BLACK
6. BLUE

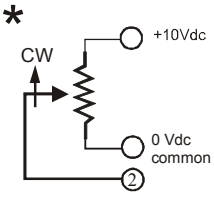
NOTE: The Controller's Full Scale display (typical 100.0) must match the customer's current transformer rating (typical 100:5 ratio). Adjust the control display range to match the actual transformer ratio. See instruction manual.

AC-24 Rear Terminal

Current Shunt .05 ohm 5 watt. P/N 999200 Included with controller.

Alternate: Long length of current loop may cause inaccuracy. To keep the 0-5 Amp current loop short you may place the .05 ohm shunt at the transformer terminals and run 18AWG shielded cable from shunt to control.

Remote setpoint can come from customer potentiometer or 0-10 Vdc signal. Also see model Pot-24 remote pot.



Wiring Connections

	1	0 Vdc, Common		0 Vdc, Common	11	
	2	Remote Setpoint (0-10 Vdc)		Alarm Reset (24 Vdc)	12	
	3	0 Vdc, Common		Alarm High Relay Contact	13	
	4	Enable Input (24 Vdc)		Alarm Common Relay Contact	14	
.05 Ohm shunt	5	0 Vdc, Common		Alarm Low Relay Contact	15	
	6	Process Input (0-10 Vdc)		Flow OK Relay Contact	16	
.05 Ohm shunt	7	Process Input (0- 0.5 Vac)		0 Vdc, Common	17	
VLP-24 Orange	8	Servo Output (0-10 Vdc)		Recorder Output (0-10 Vdc)	18	
VLP-24 Blue	9	Enable Output (24 Vdc)		24 Vdc Power	19	+24Vdc to VLP-24 RED
	10	0 Vdc, Common		0 Vdc, Common	20	0Vdc to VLP-24 BLACK

Note: Connect power supply directly to the MagnaValve first and then run power back to the control using minimum 16 AWG wire size to prevent (high current) voltage drops. Power supply should be regulated and rated at 50VA per valve.

www.magnavalve.com

AN169.cdr 23 April 2004

Diagnostic LED's

VALVE ON – When this LED is on or blinking, the electromagnet is receiving power. When the LED is off, the permanent magnets will hold or block the shot flow. When the LED is on, but not blinking, the valve flow rate is at full capacity. When the LED is blinking, the electromagnet is regulating the shot flow.

Vin > 0.25 Vdc- This LED indicates that the valve is receiving an analog signal input greater than 0.25 Vdc. When this LED is off there is no media flow allowed. The input signal range is 0-10 Vdc. At 10 Vdc the valve will "open" to full capacity, which is usually 10% to 50% higher than the calibrated range. The relationship between the 0-10 Vdc input signal and actual flow rate is nonlinear. The output signal 0-10 Vdc signal is linear and this makes accurate regulation by the AC-24 control possible.

24Vdc ENABLE – This LED indicates that the valve is receiving a 24 Vdc Enable signal. When this LED is off, the valve is inhibited, and no shot will flow. This feature is an on-off action so there is no need to disable or remove the 0-10 Vdc input signal.

24 Vdc Power – This LED indicates that 24 Vdc is available to operate the electromagnets for media flow. It should always be available and able to supply 2 Amps. If the LED is blinking, the supply is above the recommended operating range +/- 2VDC (22-26VDC). If the LED is OFF, then the supply is below the recommended range. If that condition occurs, please call for technical support.

All of the LED's must be on in order to have media flow.

This manual will explain how to replace the mechanical media (grit) valve on a wheel type blast cleaning machine with the new MagnaValve automatic media regulator. The two most prominent reasons for this type of upgrade are:

a) to eliminate maintenance required for the air cylinder that operates the mechanical valve
b) to provide an automatic alarm to alert the operator to replenish the shot/grit supply

The machine used for illustration in this manual is a RotoPeen system from Pangborn Corporation modified to shot blast clean 20 foot lengths of round pipe. It is a single wheel, 20 horsepower, pass-thru cabinet design as shown in **Fig. 1** below.

Fig. 1

The following text will describe each of the remaining photos in three sections, before, during and after the installation of the MagnaValve. The entire project required less than one day for the conversion.

Note: To operate properly and prevent damage to the MagnaValve, always supply the full flow capacity of the valve. For example, a VLP will flow 1000lbs/min. While only 400lbs maximum is required for the application, the MagnaValve must be supplied the full 1000lbs to operate correctly. If an amount less than 1000lbs is supplied, the shot travels through the valve at a high velocity, and can damage the valve.

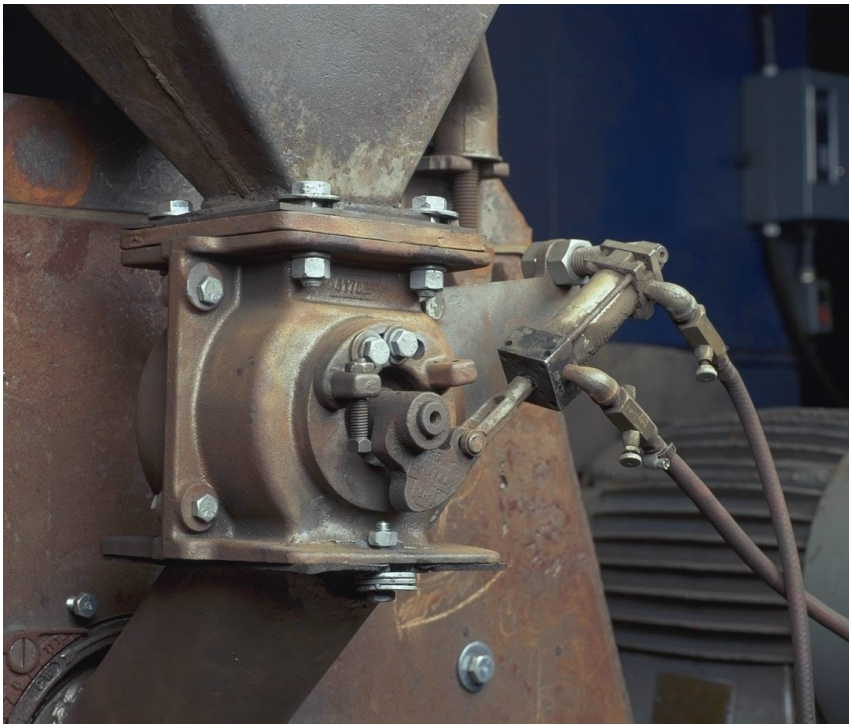


Fig. 2 An air cylinder was used to open and close the original mechanical valve as shown. This air cylinder was controlled by a manually operated 2-way air valve. The air cylinder moves the mechanical valve from its closed to open position. The amount of opening was pre-set by the operator by adjusting a nut on the linkage of the air cylinder to limit the stroke.

Fig. 2

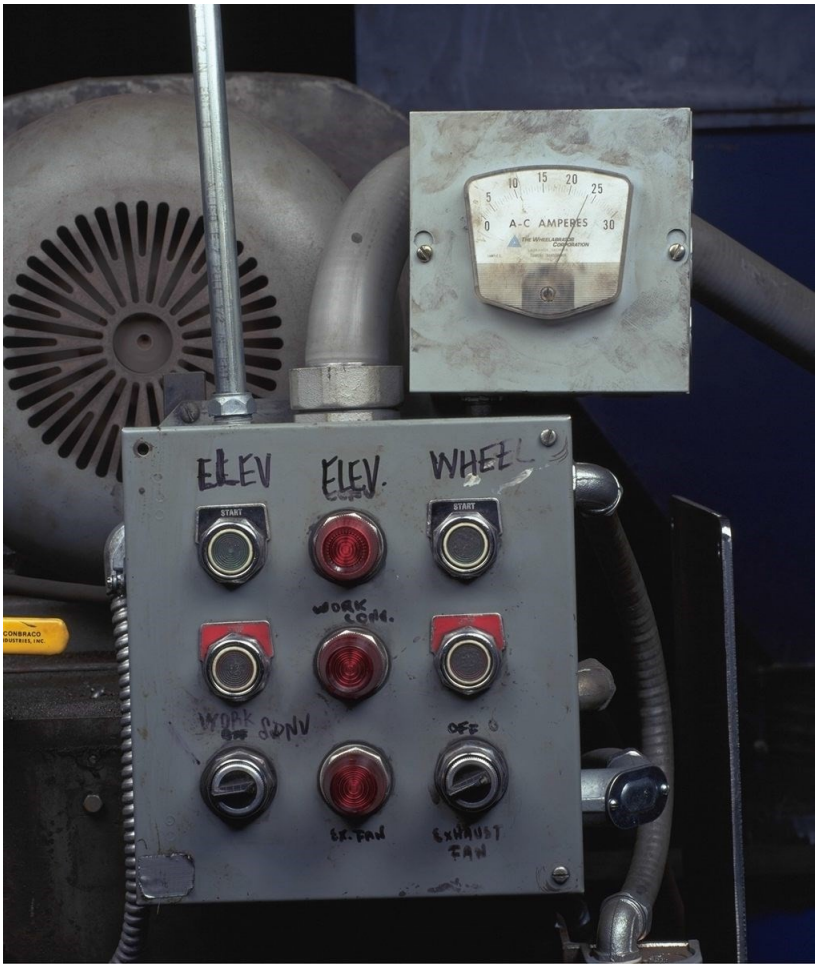


Fig. 3 This figure shows an ammeter reading of approximately 8 amps, the no-load or no shot flow condition. A conventional panel ammeter (0-30 Amps) was used to indicate motor amps and relative shot flow rate. It is not uncommon for these meters to be inaccurate because metallic dust collects inside the meter movement mechanism. This prevents the meter from displaying the proper amperage.

Fig. 3

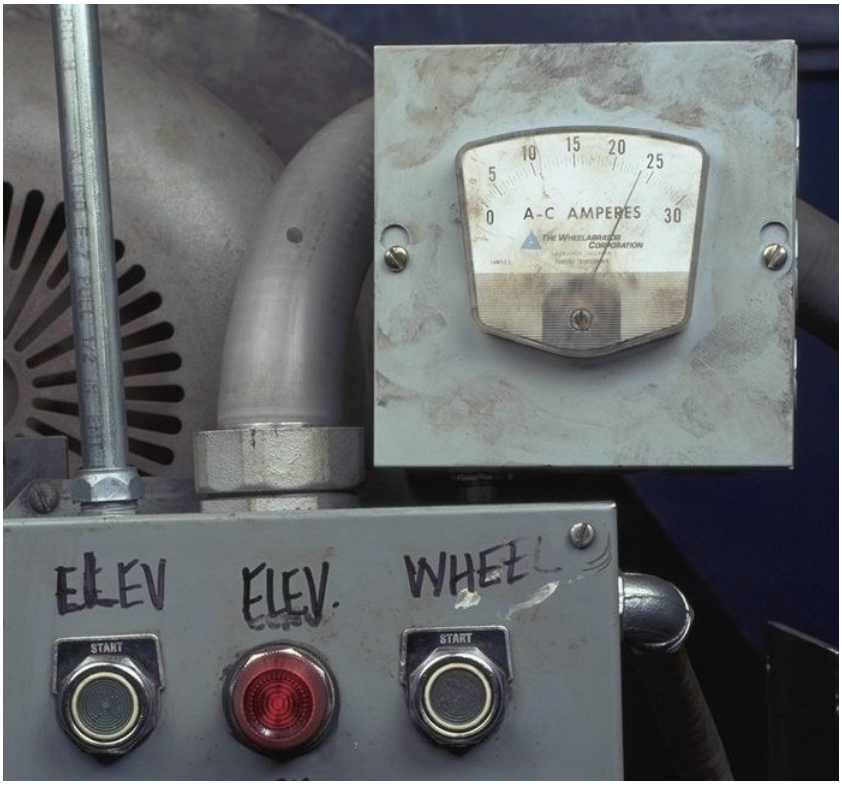


Fig. 4 This figure shows the original operating amperage level, in this case approximately 24 amps. Tests indicated a 4 amp error.

Fig. 4

Fig. 5 The first step in removing the old mechanical valve is to remove the feed spout going to the wheel inlet. First, remove the four bolts attaching the feed spout to the bottom of the mechanical valve.
Caution: Be sure the machine is properly locked out. Follow all safety precautions and instructions shown on the machine or in the owner's manual.

Fig. 5

Fig. 6 Some machines will have a slide gate or maintenance gate located above the mechanical valve. This should be closed to allow removal of the mechanical valve without draining the shot from the hopper. If the machine does not have a slide gate (this machine did not), you must drain the hopper. Drain the shot from the hopper using a hose or chute to guide the shot into a drum or receptacle.

Fig. 6

Fig. 7 Next, remove air hoses from air cylinder and terminate the air supply line coming from the air compressor. With the slide gate closed (if available) or with the hopper empty, loosen the bolts from the top of the mechanical.

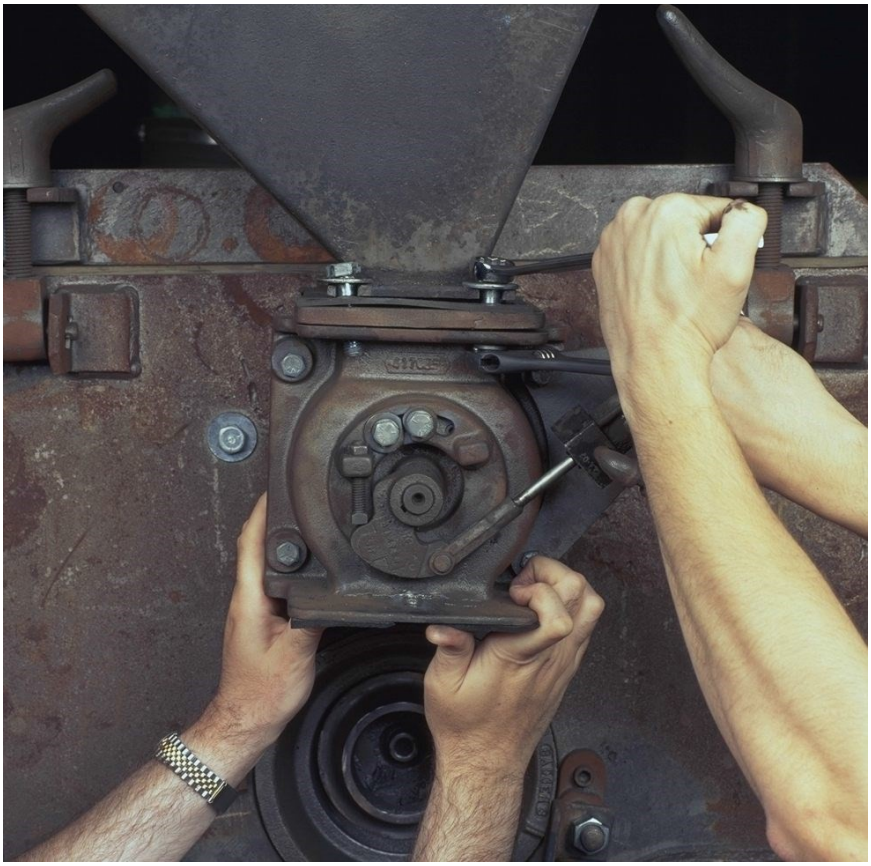


Fig. 7

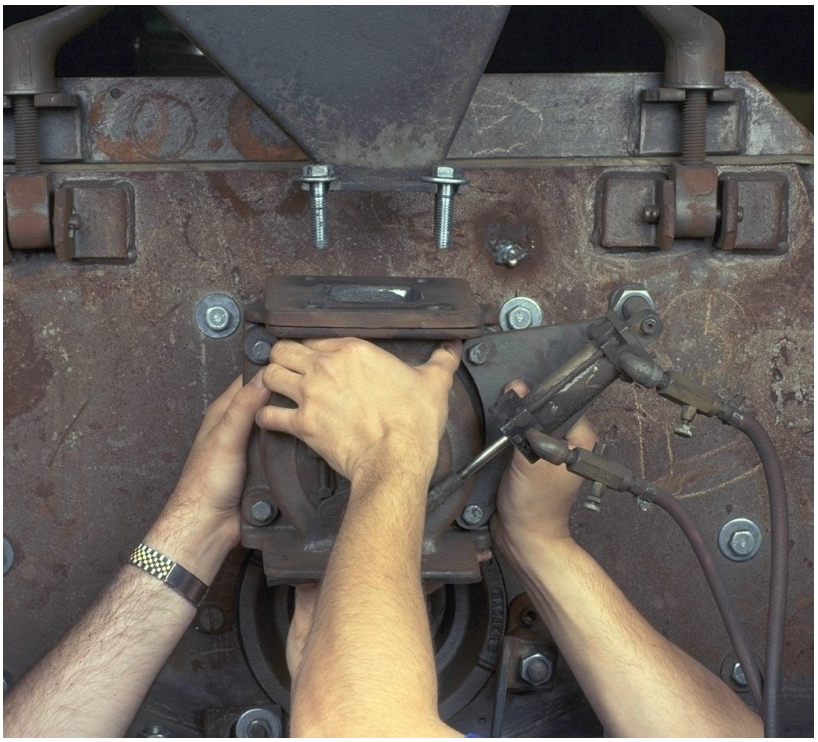


Fig. 8 Once the bolts are removed, remove the valve from the machine. **Be careful**. The valve is heavy and may contain some shot that may spill upon removal.

Fig. 8

Fig. 9 Special adapter plates can be fabricated that will compensate for the bolt hole locations and vertical spacing needed by the MagnaValve.

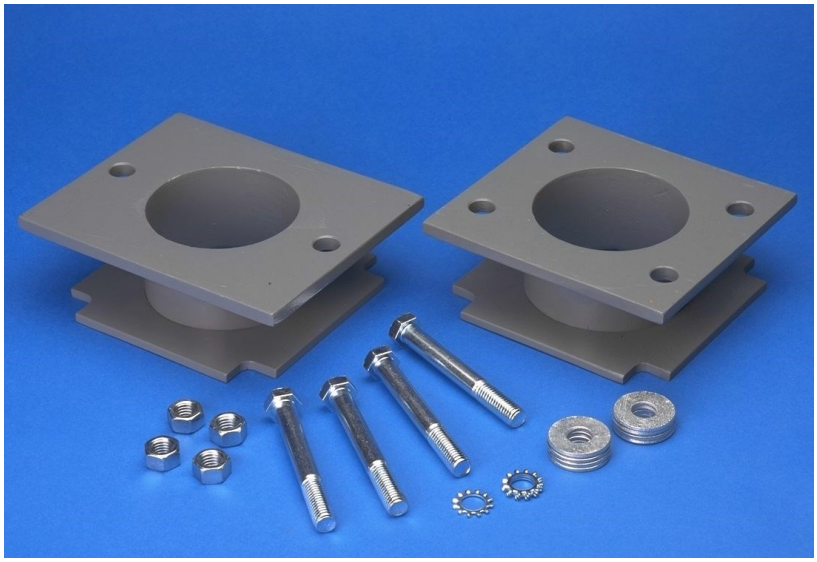


Fig. 9

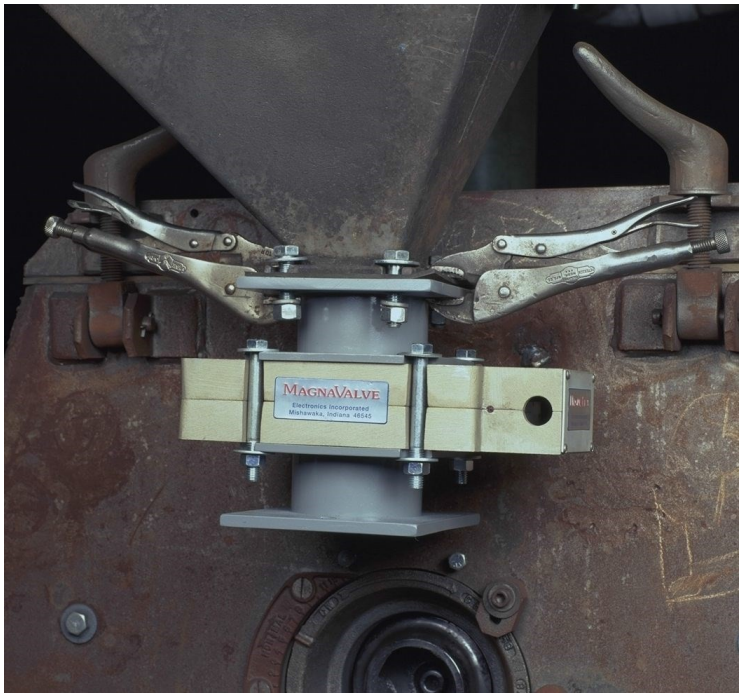


Fig. 10

Fig. 10 The adapter plates should be installed onto the MagnaValve and the assembly installed as a single unit. The entire MagnaValve assembly can be temporarily positioned and held into place by using vise-grip or similar pliers and then the bolts can be installed and tightened.

Note: Adding a nonmetallic 1” spacer above and below the MagnaValve will improve MagnaValve performance.

Fig. 11 The feed spout can now be reinstalled easily, since it bolts directly to the adapter plate. Be sure to use a rubber gasket between the adaptor plate and the feed spout. Do not use silicon or any other adhesive that will make it difficult to remove the valve for inspection.

Fig. 11

Fig. 12

Fig. 12 The cable fastens to the mating connector. The cable should be routed in either flexible or rigid conduit. In some installations where the conduit for the air cylinder control solenoid is nearby it is possible to reuse the conduit for the MagnaValve cable.

Fig. 13 A new electrical panel was used in this installation and was mounted to a rigid plate prior to performing the wiring. Some installations have adequate room in the existing electrical panel, however, be sure that the electrical panel is suitable (dust tight, proper location for operator viewing, and well ventilated to prevent temperatures above 140 degrees F) for the environment.

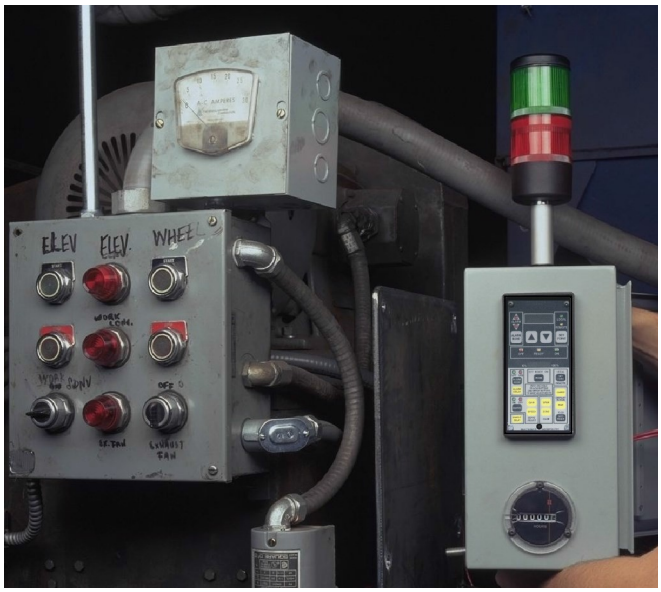


Fig. 13

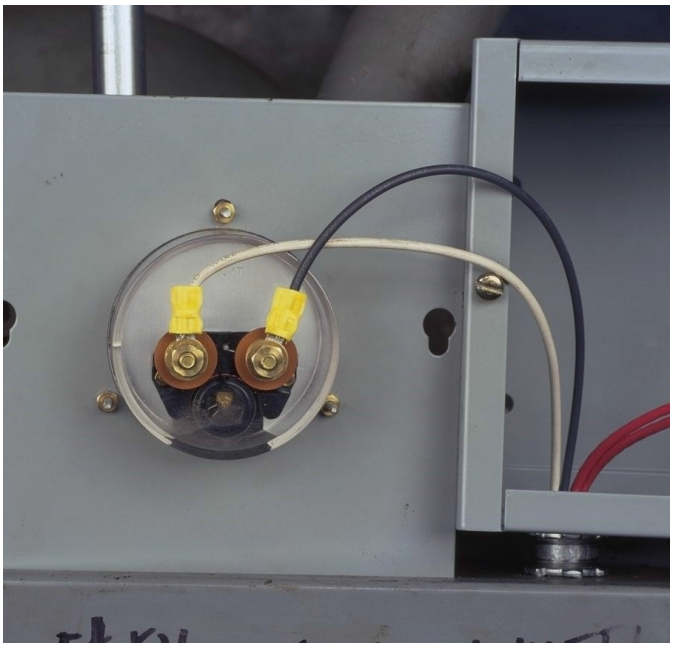


Fig. 14

Fig. 14 This is a rear view of the panel ammeter showing the connections to the meter lugs coming from the current transformer secondary. Remove one of the meter wires to allow installation of a wiring loop to the current shunt mounted on the rear of the AC Controller.

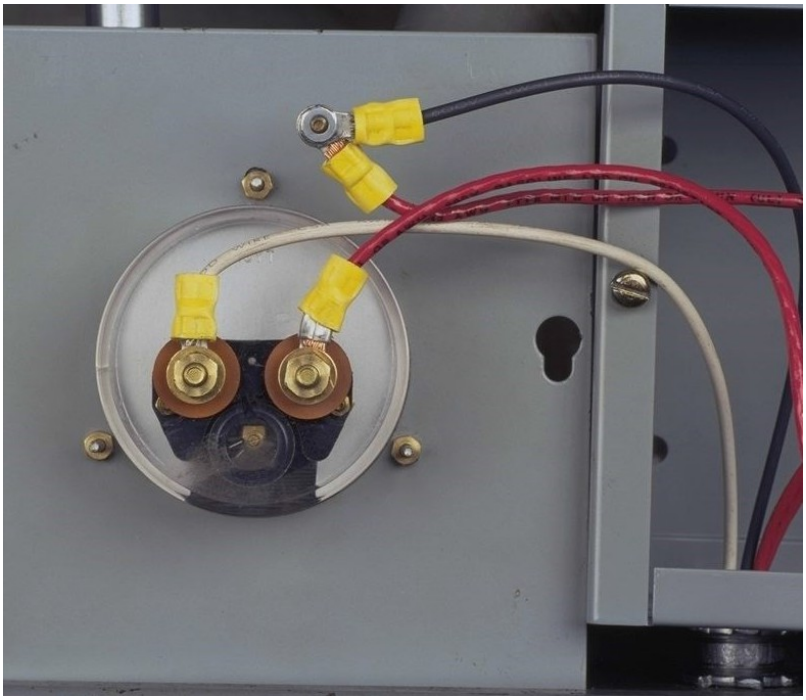


Fig. 15 Attach the loose current transformer wire to one of the AC-24 controller shunt wires and attach the other AC-24 controller shunt wire to the meter lug. This procedure allows the AC-24 controller shunt to be in series with the existing panel meter so that both of them receive the (transformed) motor current (0-5 Amps). If the panel meter is to be eliminated then connect the two current transformer output wires directly to the AC-24 controller shunt.

Fig. 15

Fig. 16 Apply control power to the circuit.
Caution: Be sure all wiring has been properly completed and that no shock hazard exists. The AC-24 controller is factory set to display 100.0 Amps full scale when connected to a 100:5 ratio current transformer. The display range can be verified by pressing Coarse Display Range.

Fig. 16

Fig. 17

Fig. 17 Since this application uses a 30:5 ratio current transformer the AC-24 controller must be adjusted to read 30.0 full scale. Press and hold the Coarse Display Range and Down arrow until 30.0 is displayed. For finer adjustment, use the Fine Display Range.

Fig. 18 Start the wheel motor and place a clamp-on type ammeter on the motor leads to confirm calibration of both the panel ammeter and the AC-24 controller display.
Note: The AC-24 controller zero and span have been factory set. Minor adjustments may be needed Press the Span button along with up/down arrows to change value. Release the Span Button to see new amperage readings. Make the controller reading match the clamp-on ammeter reading. Even though there is no shot flow, ammeter readings will show the no load or no flow rate values. Note that the clamp-on ammeter and the AC-24 Controller digital display show the no load motor amperage to be about 8.8 amps, while the panel meter shows over 9 amps.

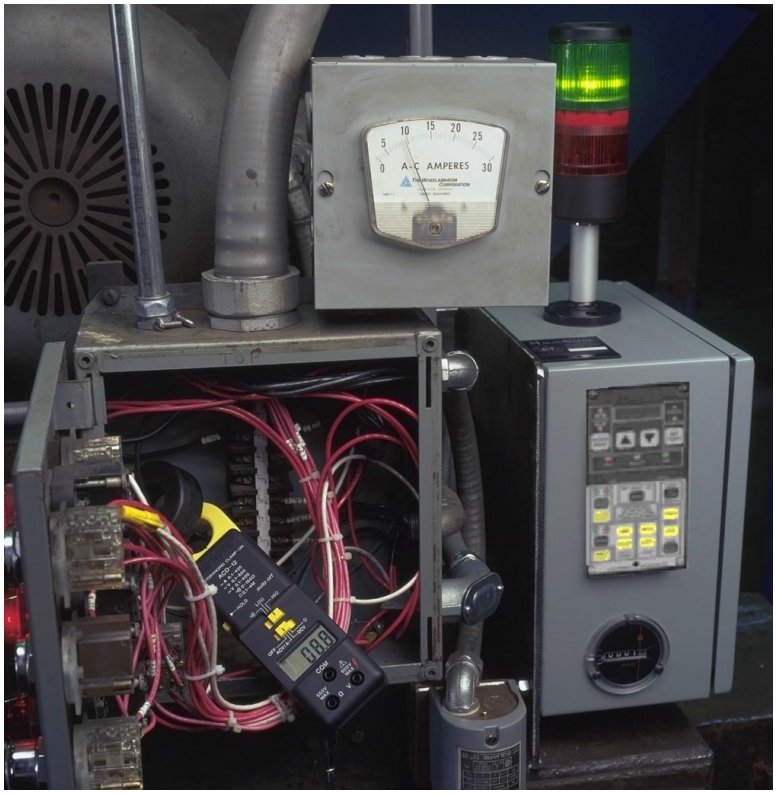


Fig. 18

The last step of the installation is to adjust the AC-24 controller to the same operating amperage noted before at the beginning of the installation, 24 amps. Push and hold the Setpoint and press the Down arrow until the value 24.0 appears in the display. Release the keypad and notice that the display returns to show the no load amperage. Activate the MagnaValve, either by pressing the Mode keypad to the on position or pressing the Mode keypad to the Ready position and activate the blast machine automatic cycle. The green ON LED on the front of the AC-24 controller will come on and the green VALVE ON LED on the valve will start to blink, indicating that the valve is receiving power pulses to allow shot to flow. After a few seconds the motor current will rise to the setpoint value, in this case 24.0 amps. It is normal for the digital display to vary by +/- 0.2 amps. If the variation is greater than this refer to the installation manual for the AC-24 controller.

This installation also included an alarm horn and a highly visible pedestal mounted light stalk with green indicator to indicate shot flow and a red blinking indicator to show an alarm condition (such as low shot flow). The elapsed meter for “abrasive on” time was included to verify the increased productivity and reduced downtime.

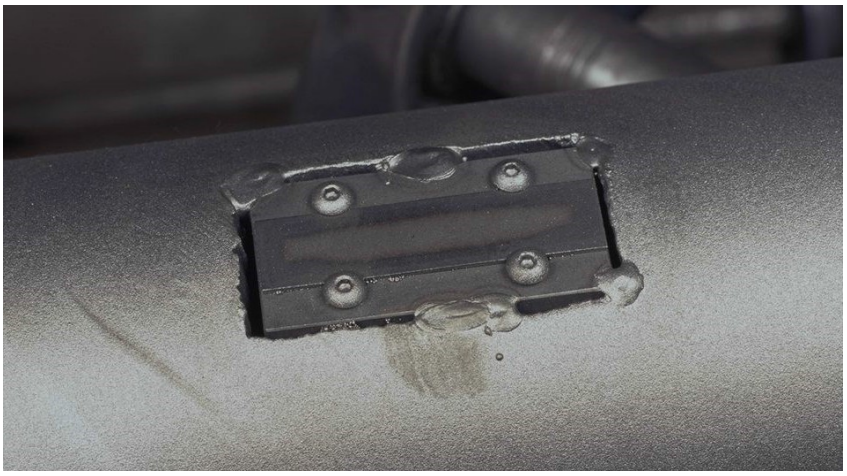


Fig 20

Fig. 20 Once the final conveyor speed and shot flow rate (motor amps) have been determined, the standard Almen strip (SAE specification J442) can be used to check for proper operation. The Almen strip, shown here, is mounted with four hold-down screws onto a standard Almen holder that has been welded into place on the pipe. This is the industry standard test for the shot peening and blast cleaning intensity.

The Almen test strip is blasted on one side only and then removed from the holder. Once released from the hold-down screws the strip will curve.

Fig. 21 The amount of this curvature, called arc height, is an indication of the blast stream intensity and the value, as measured on a standard Almen gage, can be placed into a standard SPC process control chart. There are three strip thicknesses, low intensity (N), medium intensity (A), and high intensity (C). Most abrasive blast cleaning is performed at high intensity with the (C) strip.
An arc height of .005" to .007" was found to be ideal for this blast cleaning application.

Fig 21

The advantage of using the Almen strip method lies in the ability to detect the many changes that can occur in a blast machine cleaning operation. Many quality departments are demanding real time process control to satisfy customer requirements for documentation. Instead of relying upon the operator's judgment of cleanliness, the Almen strip method provides a scientific basis for qualifying the machine. The following are the changes that can be detected by the Almen method:

a. Wrong shot size added to machine (check the bag or drum for correct size)
b. Wrong shot size, dust collector not removing all small or broken shot
c. Wrong shot hardness (check the bag or drum for correct hardness)
d. Incomplete coverage, due to exposure time, shot flow rate adjustment, or improper targeting
e. Improper targeting caused by worn wheel blades or control cages out of adjustme

Limited Warranty

The warranty obligations of Electronics Inc. for this product are limited to the terms set forth below.

Length of Warranty Period
This limited warranty lasts one (1) year from the shipping date of this product.

What is Covered
This limited warranty covers defects in materials and workmanship in this product.

What is Not Covered
This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, misuse, abuse, accident, neglect, exposure to excess moisture, fire, improper packing and shipping (such claims must be presented to the carrier), lightning, power surges, or other acts of nature. This limited warranty does not cover any damage, deterioration or malfunction resulting from the installation or removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by Electronics Inc. to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product. This limited warranty does not cover equipment enclosures, cables or accessories used in conjunction with this product.

How to Obtain a Remedy Under this Limited Warranty
To obtain a remedy under this limited warranty, contact Electronics Incorporated by letter, email, fax or telephone with the following information:
- Product name and model
- Product serial number
- Original shipping date (see label on product)
- Company name and location
- Name of contact person for description of symptoms
- Return shipping address and any special instructions

If it is determined that the product must be returned under this limited warranty, a Returned Goods (RG) number, obtained from Electronics Inc., will be required. This product should be properly packed to prevent damage in transit. Cartons not bearing a RG number will require additional processing time and repair service may be delayed.

What Electronics Inc. Will Do Under This Limited Warranty
Electronics Inc. will, at its sole discretion, provide one of the following remedies to whatever extent it shall deem necessary to satisfy a proper claim under this limited warranty:

1.) Elect to repair or facilitate the repair of any defective parts within a reasonable period of time, free of any charge for the necessary parts and labor to complete the repair and restore this product to its proper operating condition. Electronics Inc. will pay the shipping costs necessary to return this product once the repair is complete.

2.) If the defective product cannot be repaired, it will be replaced with a new unit and the original warranty period will be extended by six (6) months. Electronics Inc. will pay the shipping costs necessary to replace this product.

If this product is returned to Electronics Inc., the product must be insured during shipment, with the insurance and shipping charges prepaid. If this product is returned uninsured, Electronics Inc. does not assume any risk of loss or damage during shipment. Electronics Inc. will not be responsible for any costs related to the removal or re-installation of this product.

Out-of-Warranty Product
Product that is out-of-warranty will be repaired at customer's request and the cost of repair will be disclosed prior to proceeding with the repair. A purchase order must be received prior to repair. If the product cannot be repaired, Electronics Inc. will provide one of the following remedies:

1) New unit at current pricing with a one (1) year Limited Warranty from the shipping date of product.

2) Refurbished unit (if available) at a discounted price with a six (6) month Limited Warranty from the shipping date of product.

Limitation on Liability
The maximum liability of Electronics Inc. under this limited warranty shall not exceed the actual purchase price paid for the product. Electronics Inc. is not responsible for direct, special, incidental or consequential damages resulting from any breach of warranty or condition, or under any other legal theory to the maximum extent permitted by law.

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To the maximum extent permitted by law, this limited warranty and the remedies set forth above are exclusive and in lieu of all other warranties, remedies and conditions, whether oral or written, express or implied. To the maximum extent permitted by law, Electronics Inc. specifically disclaims any and all implied warranties, including, without limitation, warranties of merchantability and fitness for a particular purpose. If Electronics Inc. cannot lawfully disclaim or exclude implied warranties under applicable law, then all implied warranties covering this product, including warranties of merchantability and fitness for a particular purpose, shall apply to this product as provided under applicable law.

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This warranty defines specific legal rights relative to these products provided by Electronics Inc. Legal rights may also vary from state to state.