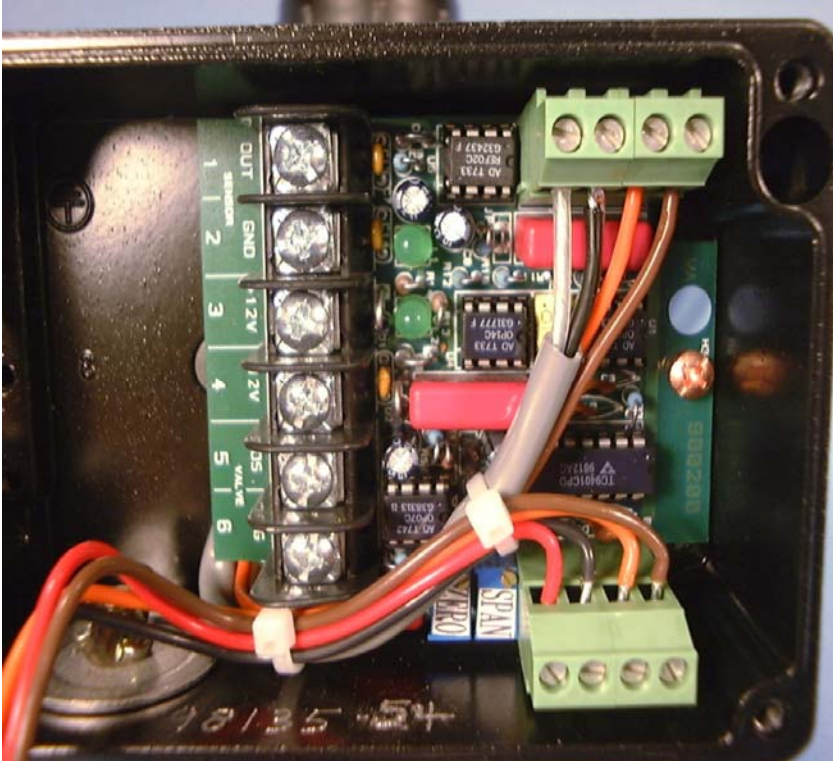




Standard Accuracy Series MagnaValves™ Installation Manual IM0072



Made in America

**For the Following
MagnaValve Models**

- 250-N
- 500-N
- 577
- 1577
- 578
- 1578
- 579
- 1579
- 580
- 590

Hybrid Installations

- VLP+599-5.0
- LP+599-5.0

*Added 1500 Series
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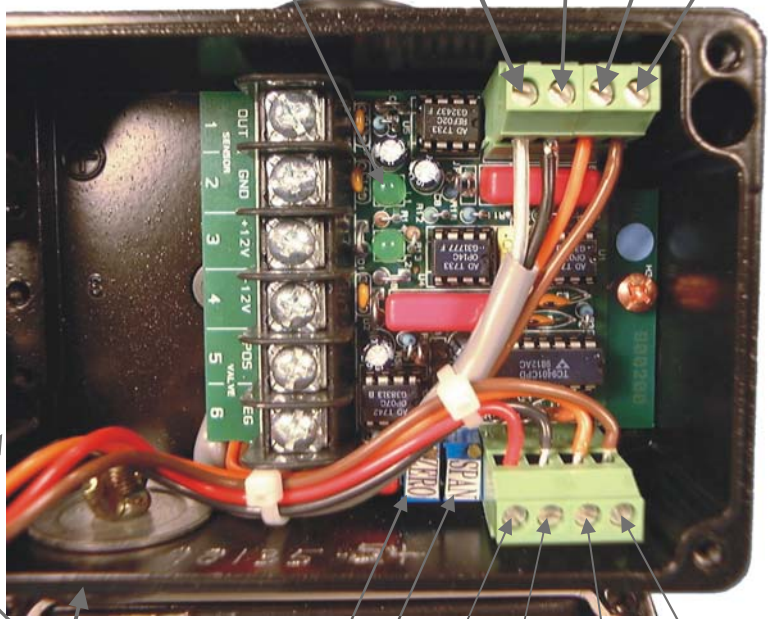
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Note: The MagnaValve is calibrated at the factory. It is recommended you do a catch and weigh test during installation and make any necessary adjustments for Max. Flow using the span at the MagnaValve only.

[Factory MagnaValve Connections]

Sensor wires
White(Clear) Black
Power coils
Orange Brown

Typical customer wire connections		
Pair 1	White Black	1. 0-5Vdc out 2. 0Vdc
Pair 2	Green Black	3. +12Vdc 4. -12Vdc
Pair 3	Red Black	5. (+) MagnaValve 6. (-) MagnaValve



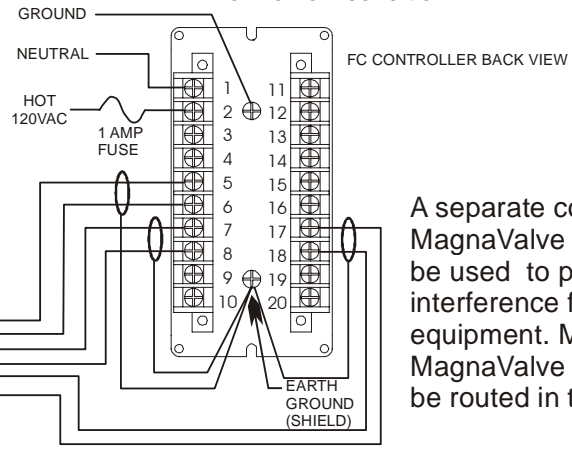
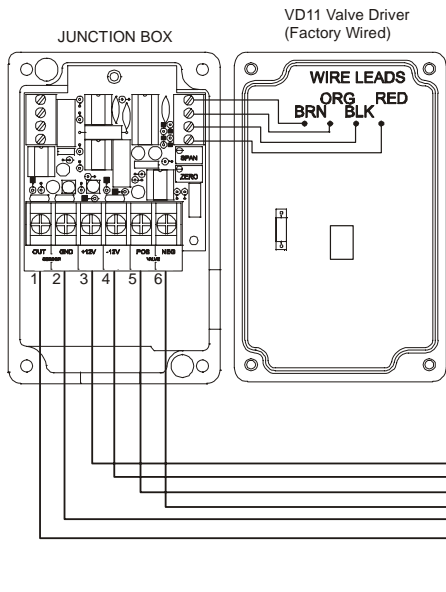
Note: All cable shields at the valve must be isolated from any part of the valve and machine. The shields should be terminated at the controller only.

Conduit Ports

Red Black Orange Brown
Valve Driver connections

[Factory Valve Driver Connections]

SPAN Adjustment - Used to calibrate the valve for Max. flow.
ZERO Adjustment - Used to set 0 volts for no flow condition.



A separate conduit for MagnaValve cables must be used to prevent any interference from other equipment. Multiple MagnaValve cables may be routed in the same conduit.

1. Introduction

1.1 This instruction manual covers the MagnaValve models listed in Table 1. A pre-Amp is used to provide a flow rate signal and transmit it back to the FC Controller as a 0-5 Vdc analog signal with $\pm 5\%$ accuracy.

Valve Model	Maximum Flow Rate (Lb./min)	Operating Range (Lb./min)
250-N	700	70-700
500-N	1200	120-1200
577	2	.2-2
578	20	2-20
579	100	10-100
580	200	20-200
590	300	30-300
VLP 599-5.0 Sensor	1,000	100-1000
LP 599-5.0 Sensor	1,999	200-2000
1577	2	.2-2
1579	100	10-100

Table 1. MagnaValve Models

1.2 Custom calibrations may be used when special conditions prevail; however, we recommend the standard ranges listed above be used whenever possible because all production valves are pre-calibrated to the standard ranges shown. An emergency request for a spare MagnaValve calibrated to standard range is usually handled within 24 hours. A non-standard calibration may require one week to allow access to the calibration.

2. Theory of Operation

2.1 The MagnaValve is a magnetic valve used to control the flow rate of steel shot used in shot peening and abrasive blast cleaning machines. There are no moving parts in the MagnaValve. A strong permanent magnetic field holds the shot. Application of power from the Model FC controller will cancel the magnetic field and allow shot to flow. The valve is pulsed at eight times per second (8 Hz) to modulate the flow rate. A special sensor is located in the lower section of the MagnaValve (or in the 599-5.0 sensor mounted below the MagnaValve for hybrid installations) to detect the actual shot flow rate. The sensor signal is processed by the pre-amp and then sent to the FC controller for feedback information.

2.2 A valve driver module is used at each valve to precisely regulate the cancellation current to assure zero residual magnetic field. The valve driver module is factory set at an amperage value listed on the valve driver module and does not require any customer adjustment.

- 2.3 The Pre-Amp is factory calibrated and should not require any customer attention. The full-scale output voltage feedback signal of the Pre-Amp is 5.00 Vdc. The pre-amp uses an oscillator circuit and inductive sensor to detect metal density (shot flow) and converts this frequency into a 0-5 Vdc output feedback signal.

3. Calibration

300 SUMMARY –

- 300 Set MagnaValve Pre-amp zero output
- 300 Set Pre-Amp span to achieve full-scale flow
- 300 Confirm accuracy (perform catch & weigh tests)

Full-scale flow range is the maximum flow, in pounds per minute, required for your installation. See Table 2. The MagnaValve pre-amp has been factory calibrated and should not need adjustment. In the event re-calibration is desired the following steps should be followed

Model 250-N	700 lb./min.
Model 500-N	1200 lb./min.
Model 577	2 lb./min.
Model 578	20 lb./min.
Model 579	100 lb./min.
Model 580	200 lb./min.
Model 590	300 lb./min.
Model VLP + 599-5.0 Sensor	1,000 lb./min.
Model LP + 599-5.0 Sensor	1,999 lb./min.
Model 1577	2 lb./min.
Model 1579	100 lb./min.

Table 2. Maximum Flow Rate

- 3.1 With no shot flowing, adjust the zero trimpot to achieve 0 Vdc output feedback signal.
- 3.2 Perform a catch and weigh test to ascertain flow rate at maximum capacity.
- 3.3 Adjust the span trimpot if required. Repeat the catch test to confirm accuracy.
- 3.4 You must also match the Model FC Controller display to the MagnaValve pre-amp output signal. The Model FC Control display is used for many different size MagnaValves and therefore many display ranges are used. The FC control display range can be changed as required for any particular MagnaValve. For example, to change the Model FC control display to 0-700 pounds/minute full scale range:
 - 3.4.1 Turn setpoint knob to 100% (full CW).
 - 3.4.2 Be sure the FC control is in local mode, not remote mode. See the LED indicators on the front panel and use the local/remote slide switch if necessary.
 - 3.4.3 Push and hold display toggle switch to the right.
 - 3.4.4 Adjust full-scale display calibrate until the FC control display reads 700.
- 3.5 The Model FC Control front panel “span” adjustment is factory set so that a 5.00 Vdc signal input will display the proper full scale signal, such as 700.

The FC controller span should not need adjustment.

To check this feature you may inject a precision 5.00 Vdc calibration signal from any suitable dc source. If the Model FC control display does not show the desired value then adjust the Model FC front panel span adjustment until it does.

3.6 A catch test can be run to verify the accuracy of the maximum flow rate of the MagnaValve. If necessary, adjust the Pre-Amp “span” adjustment (not the FC control “span” adjustment) and repeat the catch and weigh tests until the correct amount of shot is caught.

Set Point	Ideal Lb./min.	Actual Lb./min.	Final Lb./min.
100%	700		
95%	665		
85%	595		
75%	525		
65%	455		
55%	385		
45%	315		
35%	245		
25%	175		
15%	105		

Set Point	Ideal Lb./min.	Actual Lb./min.	Final Lb./min.
100%	1200		
95%	1140		
85%	1020		
75%	900		
65%	780		
55%	660		
45%	540		
35%	420		
25%	300		
15%	180		

Set Point	Ideal Lb./min.	Actual Lb./min.	Final Lb./min.
100%	2.00		
95%	1.90		
85%	1.70		
75%	1.50		
65%	1.30		
55%	1.10		
45%	.90		
35%	.70		
25%	.50		
15%	.30		

Set Point	Ideal Lb./min.	Actual Lb./min.	Final Lb./min.
100%	20.0		
95%	19.0		
85%	17.0		
75%	15.0		
65%	13.0		
55%	11.0		
45%	9.0		
35%	7.0		
25%	5.0		
15%	3.0		

Set Point	Ideal Lb./min.	Actual Lb./min.	Final Lb./min.
100%	100		
95%	95		
85%	85		
75%	75		
65%	65		
55%	55		
45%	45		
35%	35		
25%	25		
15%	15		

Set Point	Ideal Lb./min.	Actual Lb./min.	Final Lb./min.
100%	200		
95%	190		
90%	180		
85%	170		
80%	160		
75%	150		
70%	140		
65%	130		
60%	120		
55%	110		
50%	100		
45%	90		
40%	80		
35%	70		
30%	60		
25%	50		
20%	40		
15%	30		

Set Point	Ideal Lb./min.	Actual Lb./min.	Final Lb./min.
100%	300		
95%	285		
90%	270		
85%	255		
80%	240		
75%	225		
70%	210		
65%	195		
60%	180		
55%	165		
50%	150		
45%	135		
40%	120		
35%	105		
30%	90		
25%	75		
20%	60		
15%	45		

3.10 **Confirm accuracy**

Fill in the table column marked Final Lbs./min and make any adjustments to the compensation trim pots that may be necessary.

This completes the calibration procedure.

4. Troubleshooting

For additional troubleshooting information see the model FC installation manual IM0056



For assistance call or fax the factory for help

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