

# SINGER VALVE

## SINGLE POINT INSERTION FLOW METERING VALVE

### MODEL 106-SPI-MV



The Next Generation of In-Valve  
Flow Measurement.

[singervalve.com](http://singervalve.com)

# Model 106-SPI-MV

## Single Point Insertion Flow Metering Valve

With over 100 years of combined waterworks experience, Singer Valve and McCrometer have teamed up to provide a unique solution for in-valve flow measurement. Using McCrometer's proven Single Insertion Meter technology along with the reliability of a Singer Valve, it allows users to have both a flow meter solution along with any function of control valve. Whether it is pressure reducing, level control, or sustaining - all can be installed now with a very accurate flow meter solution.

By adding dual solenoid control to the pilot system and utilizing the Singer MCP Multi Channel PLC Controller, we now have a fully automated control system able to control to any input required and all able to function within your existing SCADA system.

### Unprecedented Engineering Design

The Singer Model 106-SPI-MV is a Single Point Insertion Electromagnetic Flow Meter, installed and calibrated in conjunction with a Singer Valve to provide an accurate flow rate that can be utilized with the metering valve as a stand alone option or built into a 106-2SC-PCO pilot system to provide complete flow-based valve control.

The compact insertion design fits in confined spaces and offers complete accessibility. The flow meter can be removed for easy inspection, cleaning, calibrating or verification.

This cost effective flow meter option is available for valve sizes from 3" (80mm) to 36" (900mm) inches. The flow sensor comes pre-calibrated from McCrometer's NIST traceable Calibration Lab and requires no recalibration in the field. With no moving parts and a single-piece design, the SPI Mag's sensor contains nothing to wear or break, and it is generally immune to clogging by sand, grit or other debris.

The 106-SPI-MV Mag is profiled for the valve body, further enhancing its measurement accuracy by allowing precise determination of mean velocities.



#### Key Features

- Accurate flow metering, combined with control valve to save space/cost
- Supplied with Flow Converter for local display with 4-20mA output measurement or can be combined with PLC-based control panel for flow control applications
- +/- 2% of rate accuracy, NIST traceable

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## Single Point Insertion Flow Metering Valve

### Measurement

Volumetric flow in valves 3" (80mm) to 36" (900mm) diameter utilizing insertable velocity sensor. Flow indication in English Standard or Metric units.

**Flow Measurement Method:** Electromagnetic

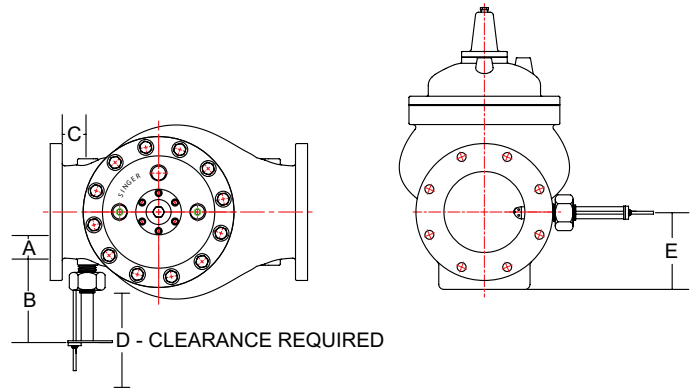
**Accuracy:** ±2% of reading

**Velocity Range:** +0.3 to +32 ft/s (+0.09 to +10 m/s)

Has reverse flow indication.

**Conductivity:** Minimum conductivity of 5µS/cm

### Dimensions



Valve Size	A	B	C	D	E
3" (80mm)	0.38" (10mm)	7.64" (193mm)	1.3" (33mm)	8" (203mm)	4" (102mm)
4" (100mm)	0.5" (12.5mm)	7.5" (191mm)	1.8" (45.7mm)	8" (203mm)	4.7" (119mm)
6" (150mm)	0.75" (18.8mm)	7.25" (184mm)	2.4" (61mm)	8" (203mm)	6.1" (155mm)
8" (200mm)	1" (25mm)	7" (178mm)	2.5" (63.5mm)	8" (203mm)	7.5" (191mm)
10" (250mm)	1.25" (31.3mm)	6.75" (172mm)	3.6" (91.4mm)	8" (203mm)	8.4" (213mm)
12" (300mm)	1.5" (37.5mm)	6.5" (166mm)	4.5" (114mm)	8" (203mm)	10.5" (267mm)
16" (400mm)	2" (50mm)	6" (153mm)	5" (127mm)	8" (203mm)	11.8" (300mm)
20" (500mm)	2.5" (62.5mm)	7.5" (192mm)	5.5" (140mm)	10" (254mm)	14.4" (366mm)
24" (600mm)	3" (75mm)	7" (179mm)	5.5" (140mm)	10" (254mm)	17.1" (434mm)
28" (700mm)	3.5" (87.5mm)	6.5" (167mm)	6.5" (165mm)	10" (254mm)	18.6" (472mm)
36" (750mm)	4.5" (93.8mm)	7.5" (211mm)	8.5" (215mm)	12" (305mm)	25.5" (648mm)

### SPI Probe



#### Environmental Rating

IP 68 Submersible Sensor

Up to 160°F (71°C) at 250 PSI (17.2 bar)

#### Materials

Sensor Head: Polyurethane

Probe Pipe Sleeve: 316 Stainless Steel Pipe

Electrodes: 580 Grade Carbon Rod

Nipple: 316 Stainless Steel

Compression Seal Assembly: 316 Stainless Steel

Compression Seal: Buna "N" O-Ring

Valve Size	Sensor Dia	Total Sensor Length
3" (80mm)	1" (25mm)	8" (203mm)
4" (100mm)	1" (25mm)	8" (203mm)
6" (150mm)	1" (25mm)	8" (203mm)
8" (200mm)	1" (25mm)	8" (203mm)
10" (250mm)	1" (25mm)	8" (203mm)
12" (300mm)	1" (25mm)	8" (203mm)
16" (400mm)	1" (25mm)	8" (203mm)
20" (500mm)	1" (25mm)	10" (254mm)
24" (600mm)	1" (25mm)	10" (254mm)
28" (700mm)	1" (25mm)	10" (254mm)
36" (750mm)	1" (25mm)	12" (305mm)

# Model 106-SPI-MV

## Single Point Insertion Flow Metering Valve

### SPI Converter

#### Overview

- CE Certified
- Pre-programmed
- Curve-fitting algorithm to improve accuracy
- Eight line graphical display
- Three key touch programming
- Galvanic separation to 50VDC between analog, pulse/alarm, and earth/ground

#### Digital Outputs

Four separate digital programmable outputs: open collector transistor usable for pulse, frequency, or alarm settings.

- Volumetric Pulse
- Directional Indication
- Flow Rate (Frequency)
- High/Low Flow Alarms
- Hardware Alarm
- Empty Pipe
- Range Indication

#### Environmental Rating

-4° to 140°F (-20°C to +60°C) Operating and storage temperature

#### Power Requirements

AC: 90-265V 45-66 Hz (20W/25VA) (Standard)

DC: 10-35V (21W) (Optional)

#### Dual 4-20mA Outputs

Galvanically isolated and fully programmable for zero and full scale

#### Installation Details

- These units can be installed in modulation & non modulation applications
- These units can be installed with Singer AC (Anti-Cav) cages
- Sensor can be installed on either side of valve-inlet only

## Choose a converter for your application

#### Local Converter (Standard)

IP67 – Die Cast Aluminum

6.75" wide x 5.75" high x 6.7" deep

(172mm wide x 146mm high x 170mm deep)



#### Panel Mount Converter (Optional)

IP65 – Plastic Composite

6.5" wide x 3.13" high x 7.25" deep

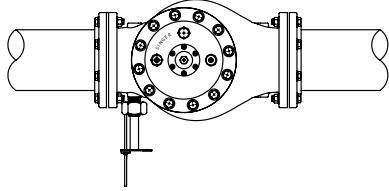
(165mm wide x 80mm high x 184mm deep)



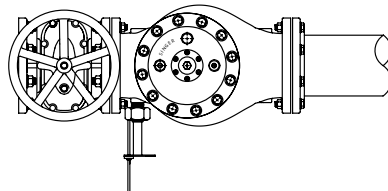
# Model 106-SPI-MV

## Single Point Insertion Flow Metering Valve

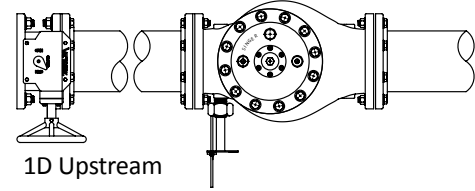
### Installation Details



For most application you need 3 pipe diameters straight pipe upstream flange to flange from any in-line device, elbow, or tee.



Gate valve can be mounted next to Singer valve



1D Upstream

A vertical butterfly valve will need only one pipe diameter to the valve. Horizontal butterfly needs 3 pipe diameters

106-SPI-MV	Flow Capacity (See 106-PG in Main Valve section for other valve data)										
	3 in	4 in	6 in	8 in	10 in	12 in	16 in	20 in	24 in	28 in	36 in
Size (inches)	3 in	4 in	6 in	8 in	10 in	12 in	16 in	20 in	24 in	28 in	36 in
Size (mm)	80 mm	100 mm	150 mm	200 mm	250 mm	300 mm	400 mm	500 mm	600 mm	700 mm	900 mm
Minimum (USGPM) Flat Diaphragm	5	10	20	40	-	-	-	-	-	-	-
Minimum (USGPM) Rolling Diaphragm	-	-	0.5	1	3	3	3	10	10	10	20
Minimum (L/s) Flat Diaphragm	0.3	0.6	-	-	-	-	-	-	-	-	-
Minimum (L/s) Rolling Diaphragm	-	-	0.03	0.06	0.2	0.2	0.2	0.6	0.6	0.6	1.3
Maximum Continuous (USGPM)	460	800	1,800	3,100	4,900	7,000	11,000	17,500	25,000	33,600	55,470
Maximum Continuous (L/s)	29	50	114	196	309	442	694	1,104	1,577	2,120	3,500

1. Usually operating in the continuous "C", service range up to 20 ft/s (6 m/s) - refer to chart and/or performance curves.
2. Ensure the maximum working pressure rating of the valve exceeds the maximum operating pressure

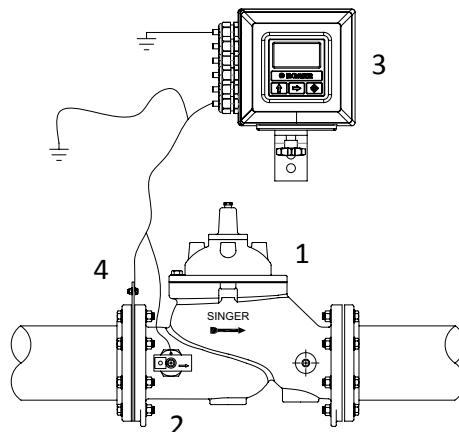
### Ordering Requirements

At the time of ordering, please be prepared to provide the following information:

- Valve Size
- Pilot Orientation
- Convertor type
- Supply Voltage
- Cable length

### Schematic Drawing

1. Main Valve – Model 106-PG
2. SPI Probe
3. SPI Convertor
4. Grounding Ring



# Model 106-SPI-MV

## Single Point Insertion Flow Metering Valve

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### Main Valve Body Specifications

- Valve(s) shall be a hydraulically operated globe valve. The inner valve assembly shall be top and bottom guided by means of easily replaceable bearing bushings. The inner valve assembly shall be the only moving part and shall be securely mounted on a 316 stainless steel stem. The stainless steel stem shall be provided with wrench flats on all valves 3" (75mm) to 8" (200mm), for ease of assembly and maintenance.
- All pressure containing components shall be constructed of ASTM A536-65/45/12 ductile iron. The flanges shall be designed to ANSI Class 150 or Class 300 standards. Flange drilling to ANSI shall be standard however British, ISO and other drillings shall be available upon request.
- Valve(s) shall have a protective fusion bonded epoxy coating internally and externally. The protective fusion bonded epoxy coating shall conform to the ANSI/AWWA C116/A21.16 (current version) specification.
- 3" (75mm) Valve(s) shall provide smooth "frictionless" motion with actuation being achieved by the use of a flat style EPDM diaphragm. They shall be constructed of nylon fabric bonded with synthetic rubber. The diaphragms shall not be used as a seating surface. No lip seals or packing may be used to seal the actuator.
- Valve(s) 6" (150mm) and larger shall provide smooth "frictionless" motion and maximum low flow stability with actuation being achieved by the use of the Singer rolling diaphragm technology. The diaphragms shall not be used as a seating surface. No lip seals or packing may be used to seal the actuator.
- The valve cover shall have a separate stem cap giving access to the stem for alignment check, spring installation and ease of assembly.
- On valve(s) 4" (100mm) and larger, bonnets shall be accurately located to bodies utilizing locating pins. Locating pins shall eliminate corrosion resulting from the use of uncoated ductile iron to ductile iron surfaces.
- Valve(s) 4" (100mm) and larger shall have the 316 stainless steel seat, bolted in place, utilizing "Spiralock" thread tapping technology. The 316 stainless steel seat ring shall be easily replaceable without special tools.
- The valve(s) shall form a drip tight seal between the stationary stainless steel seat ring and the resilient disc, which has a rectangular cross-section and is retained by clamping on three and one half sides. The resilient disc shall be constructed of Buna or EPDM for normal service conditions.
- All external fasteners shall be 18/8 stainless steel with 18/8 washers.
- All repairs and maintenance shall be possible without removing the valve from the line. To facilitate easy removal and replacement of the inner valve assembly and to reduce unnecessary wear on the guide, the stem shall be vertical when the valve is mounted in a horizontal line.
- Each valve shall be tested prior to shipment. The standard test shall include a pressure test and a full functional, operational test when pilots and accessories are fitted to suit a particular application.
- The valve(s) shall be covered by a minimum three year (3) warranty against defects in materials and workmanship. The stainless steel seat ring shall be covered by a lifetime replacement warranty.

# Model 106-SPI-MV

## Single Point Insertion Flow Metering Valve

### Magnetic Flow Meter

- The valve shall be installed with a 1" (25mm) Single Point Insertion Magnetic Flow Meter in one of the inlet body tappings.
- Unit will be factory installed and programmed with correlative factors for Main Valve body flow profile.
- The flow meter shall consist of two components: an electromagnetic sensor and a converter.
- The 1" (25mm) electromagnetic sensor shall be capable of operating in valves from 4" (100mm) to 36" (900mm).
- The flow meter shall determine the volumetric flow rate by means of the Continuity Equation where flow rate "Q" equals mean velocity "V" times cross sectional area "A" ( $Q = V \times A$ ). The velocity measurement must be taken at a known location, then, through empirically established equations, the sensed velocity will be converted to a mean velocity.
- The flow meter converter shall be microprocessor based with a keypad for instrument set up and LCD displays for totalized flow, flow rate engineering units and velocity. The converter shall power the flow-sensing element and provide a galvanically isolated Dual 4-20mA output.
- It shall be possible, in the test mode; to easily set the converter outputs to any desired value within the range. The 4-20mA scaling, time constants, pipe size, flow proportional output, engineering units and test mode values shall be easily set via the keypad and display.
- Four separate fully programmable alarm outputs shall be provided to indicate empty pipe, forward/reverse, polarity (normally open/close), analog over-range, fault conditions, high/low flow rates, percentage of range, and pulse cutoff. The converter shall periodically perform self-diagnostics and display any resulting error messages. All set up data and totalizer values may be protected by a password.
- The flow-sensing element shall be of an electromagnetic single point type design and factory calibrated to traceable standards, such as NIST. The sensor shall be made of a polyurethane with pure carbon electrodes exposed to flow.
- To eliminate erroneous readings due to pipe wall effects, the sensor must have its electrodes located at least 3/16" from pipe wall and be designed with a curved tip shape, so as not to collect debris while in the operating position. Flat tipped or Doppler sensors shall not be acceptable.
- The sensor cable is 20 feet (6m) of multi-conductor, abrasive resistant, PVC jacketed submersible cable flexible to -400F/C. The sensor cable shall be permanently bonded to the sensor. Additional sensor cable, up to 200 feet (61m), shall be available as an option.
- The insertion tube and restraining rods assembly shall be provided for the smooth installation and operation of the velocity sensor and shall be of sufficient length to allow a full profile of the flow conduit. The stainless steel insertion tube shall be rated for 250 PSI (1,724 Kpa) @ 1600 F (710C).
- Hardware must allow sensor to be secured by bolts when sensor is being inserted and retracted. A stainless steel compression seal assembly shall also be supplied.
- No flow meters with accuracies expressed as a percentage of full scale will be accepted and flow meter must be NIST Traceable.

*Singer Valve Inc. will not act for or makes no warranty, either expressed or implied, on behalf of McCrometer. Singer Valve Inc. will warranty main valve as covered in our standard warranty. Items manufactured by McCrometer will be covered under their standard warranty. In no event shall Singer Valve Inc. be liable to anyone for special, collateral, incidental, or consequential damages in connection with or arising out of use of this equipment. Singer Valve Inc. Reserves the right to revise and improve its products as it sees fit.*



# Model 106-SPI-MV

## Single Point Insertion Flow Metering Valve



**SUBMITTAL NO.** \_\_\_\_\_

An ISO 9001:2008  
Registered Company

**MODEL NUMBER:**

SINGLE POINT INSERTION  
ELECTROMAGNETIC FLOW METER  
IOM: A-0985A-SPI-MV

SPI - MV - \_\_\_\_ - \_\_\_\_ - \_\_\_\_ - \_\_\_\_ - \_\_\_\_

**SELECTION AND CONFIGURATION**

SPI-MV- XXX - XX - X - X - X

**VALVE SIZE**

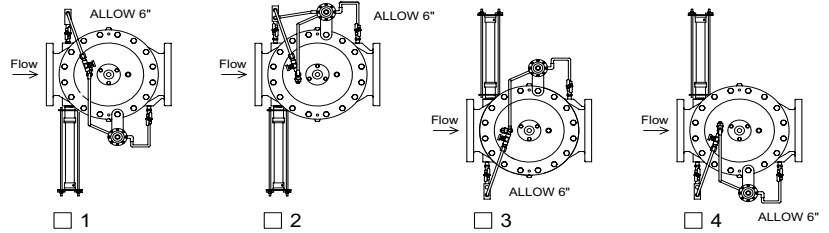
- 003 - 3" 106
- 004 - 4" 106
- 006 - 6" S106
- 008 - 8" S106
- 010 - 10" S106
- 012 - 12" S106
- 016 - 16" S106
- 020 - 20" S106
- 024 - 24" S106
- 028 - 28" S206
- 036 - 36" S106

**SUPPLY VOLTAGE**

- AC - 90-265VAC, 45-66 Hz (25VA)
- DC - 10-35 VDC (21W)
- BT - BATTERY POWER (0.5W)

**\*\*NOTE: BATTERY ONLY AVAILABLE IN LOCAL CONVERTOR**

**PILOT SYSTEM ORIENTATION**

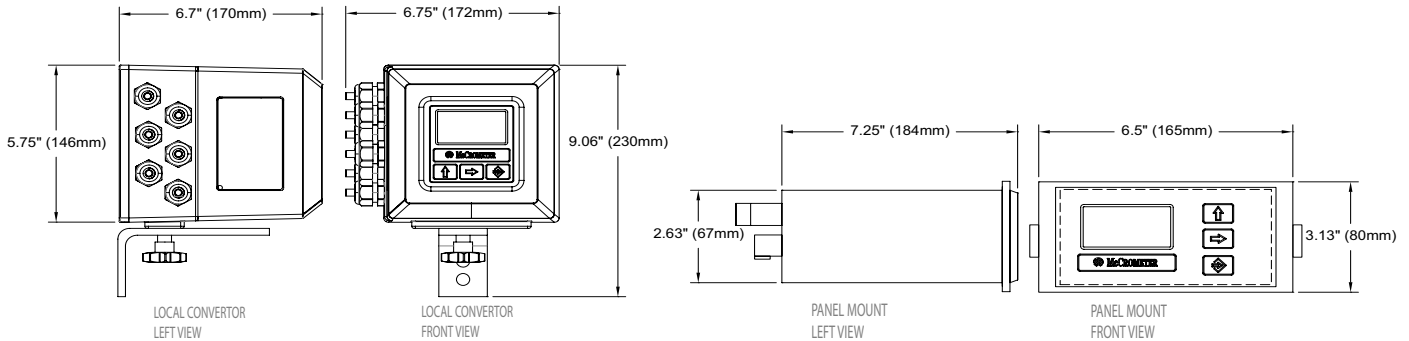


**CONVERTER**

- L - LOCAL CONVERTER (IP67)
- P - PANEL-MOUNTABLE CONVERTER (IP65)

**CABLE LENGTH**

- A - 5 FEET
- B - 10 FEET
- C - 20 FEET (STANDARD)
- D - OTHERS: \_\_\_\_\_



**TRANSMITTER/CONVERTER CONFIGURATION**

\* OPTIONAL

- 1 Flow Output Range: \_\_\_\_\_
- 2 Display Units: \_\_\_\_\_
- \*  3 Totalizer Pulse Output: \_\_\_\_\_
- \*  4 Alarms: \_\_\_\_\_

**AVAILABLE ALARM OUTPUTS**

- SIGN (S): Indicates Flow Direction
- EMPTY PIPE (EP): Indicated Empty Pipe
- OVERFLOW (O): Indicated Out of Range
- HARDWARE ALARM (H): Cumulative Alarm Output; Interrupt Coils, Empty Pipe, Measure Error

**ADDITIONAL NOTES:**

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\_\_\_\_\_

\_\_\_\_\_

This quotation/submittal is for valve(s) described above and reflects our understanding of functions required. We assume no responsibility for meeting all stated or implied requirements beyond functions listed above. If above does not adequately describe functions/operation of above products, please ask for a more comprehensive description and mention areas where above description is deficient.

# About Singer Valve

Singer Valve Inc. designs and manufactures automatic control valves for the global water industry. Since 1957, our pilot operated diaphragm control valves have been installed on virtually every continent around the world. Whether it is water loss management in Southeast Asia, water conservation concerns in Saudi Arabia or urban distribution demands in the United States, we provide water management solutions to governments, cities, companies, and contractors around the world.

Many of our innovative products are ones that have been born out of our inherent desire to solve an application challenge. Presented with a problem, our team of electronic, instrumentation and control valve specialists are relentless in their research and design until they find a solution.

At Singer Valve, we care about performance. That's why our control valves are manufactured to the highest quality so that you have one less thing to worry about.

## What Our Clients Say

*"Singer has a proven history of solid performance and it offers excellent product support. That's why South East Water specified a Singer valve."*

Warren Roberts, Mechanical Supervisor  
Siemens Ltd. Melbourne, Australia

*"We have been very pleased with our Singer valves. The product quality and service support have been outstanding."*

Steve Fassio, SCADA Technical Support  
City of Modesto, California, USA

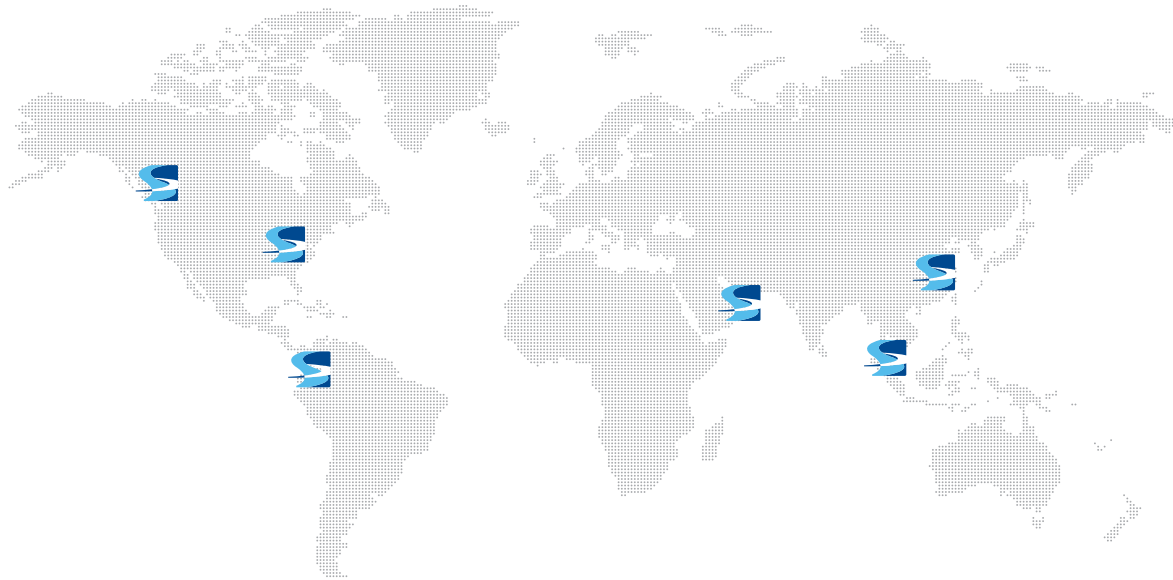
*"This was a very complicated, very unusual application, and it was very successful. Singer valve gets a gold star."*

Dave Buchwald, Fluid Dynamics Specialist  
Pipestone Industrial Ltd., Colorado USA

*"The Singer valve is working fantastically. It is a simple and efficient solution with minimal maintenance."*

Billy Weirich, Utilities Superintendent  
Pittsfield Township, Michigan USA

# Singer Valve Inc. Global Offices



## Canada Head Office

12850 – 87th Avenue  
Surrey, BC V3W 3H9  
Canada

Tel: (604) 594 5404  
Fax: (604) 594 8845  
Toll Free Fax (Canada & USA):  
1 800 663 7266  
✉ [singer@singervalve.com](mailto:singer@singervalve.com)

## USA Office

Singer Valve LLC  
1873 Scott Futrell Drive  
Charlotte, NC 28208

Tel: (704) 391 5785  
Fax: (704) 391 5768  
Toll Free (USA):  
1 888 764 7858  
✉ [mark@singervalve.com](mailto:mark@singervalve.com)

## United Arab Emirates Office

Singer Valve Middle East FZE  
PO Box 121326  
SAIF Free Zone, Q3 – Unit 94  
Sharjah International Airport  
FREE ZONE  
Sharjah, UAE

Tel: +971 6 557 8116  
Fax: +971 6 557 8117  
✉ [canadian@singervalve.com](mailto:canadian@singervalve.com)

## Colombia Office

Singer Valve Latin America  
Carrera 45, No. 16 Sur 190  
Opalo 1105 – El Poblado  
Medellin, Colombia

Tel: +57 310 4194165  
✉ [pegan@singervalve.com](mailto:pegan@singervalve.com)

## Malaysia Office

SVM Water Controls Sdn. Bhd.  
No 6, Jalan MJ 4, Medan Maju  
Jaya,  
Batu 7, Jalan Kelang Lama  
46200 Petaling Jaya

Selangor Darul Ehsan, Malaysia  
Tel: 603 7784 4043 / 7784 4044  
Fax: 603 7781 8312  
✉ [svmwc@svm.com.my](mailto:svmwc@svm.com.my)

## China Office

Singer Valve (Taicang)  
Company Ltd.  
No.88 East Dalian Road,  
Taicang, Jiangsu, China

Tel: 86 512 5320 6188  
Fax: 86 512 5320 6099  
✉ [lijun@singervalve.com](mailto:lijun@singervalve.com)

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