



# ***The Solution***

**High Capacity Vacuum Induction Chemical Feed System**

**Model-CN01**

Adjustable Output    0 - 1,728 gpd max

**Professional Series**

Installation Guide and Owners Product Manual

***SureWater Technologies, Inc.***

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348 N. Park Ave  
Winter Garden, FL 34787  
USA

US Patent No. 6,752,930

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# I                      INSTALLATION

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# 1. Prior to Installation

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1. Read entire product manual
2. Bypass stream must be capable of delivering approximately 12.5 gpm
3. Minimum venturi inlet pressure is 15 psi (20-25 psi recommended)
4. Inlet side of venturi is to be fed by post filtered water
5. Pressure and flow requirements are to be met by creating back pressure on upstream side of main return valve by throttling down the main return line valve. **Note:** If required recirculation rate cannot be maintained after throttling down main return line valve, it is recommended a booster pump be installed in the by-pass stream, upstream of the inlet side of the venturi prior to the pressure gauge. **See Typical Installation Drawing**

# 2. Installation Requirements

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1. Top of unit should be mounted at approximately eye level.
2. Unit must be installed in exact vertical plane to insure accuracy.
3. All piping should be supported and strapped securely to avoid vibration. **See References**
4. All Piping and fittings should be SCHED 80 PVC (use of tubing not recommended)
5. Use premium, chemical resistant cement (glue) on all PVC connections (Weld-on 724 CPVC Industrial Grade Cement and Weld-on C-65 Cleaner-is recommended)
6. It is highly recommended that Pipe Cutters rather than hacksaws be used on all PVC cuts.
7. Teflon tape and Teflon pipe dope are to be used on venturi threads, when mounting Isolation valves.
8. Unit is to be electrically connected to electronic chemical controller (supplied by others)

**Important:** When using hacksaw or drilling PVC pipe it is extremely important that **ALL Shaving or filings be removed and cleaned from PVC pipe prior to glueing. Any debris left in pipes may cause clogging of venturi , resulting in unit failure.**

# 3. Installation Instructions

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## a. Mounting Unit

Unit comes with mounting hardware ( four screws and anchors) to be used with the four existing (pre-drilled) mounting holes located in the channel bracket on the back of the unit.

Place unit on desired location (wall – recommend indoors) use level to insure vertical plane Of flowmeter and mark holes. Drill ¼” anchor holes and insert anchors ,use provided screws to mount unit to wall. **Note:** (¼” Drill bit is provided with some units)

## b. Schematic / Unit Drawing

Drawing is of “The Solution MD 22152-01”

The CN01 Model is the same except for

1. The Solenoid valve is replaced with and Electric Actuated Ball Valve
2. The Electric is 220v / 50hz
3. The Venturi Isolation Valves and the Pressure Gauge Tee are 1 ½”

## c. Installation Drawings

Drawings are of “The Solution MD 22152-01”

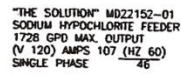
The CN01 Model is installed basically the same.

Pipe sizes will vary according to individual installation, depending on length of runs, turns, rises and drops, ect. Generally the by-pass for the CN01 is a 2” loop bushed down to 1 1/2” Prior to the unit. **See:** Dual Installation

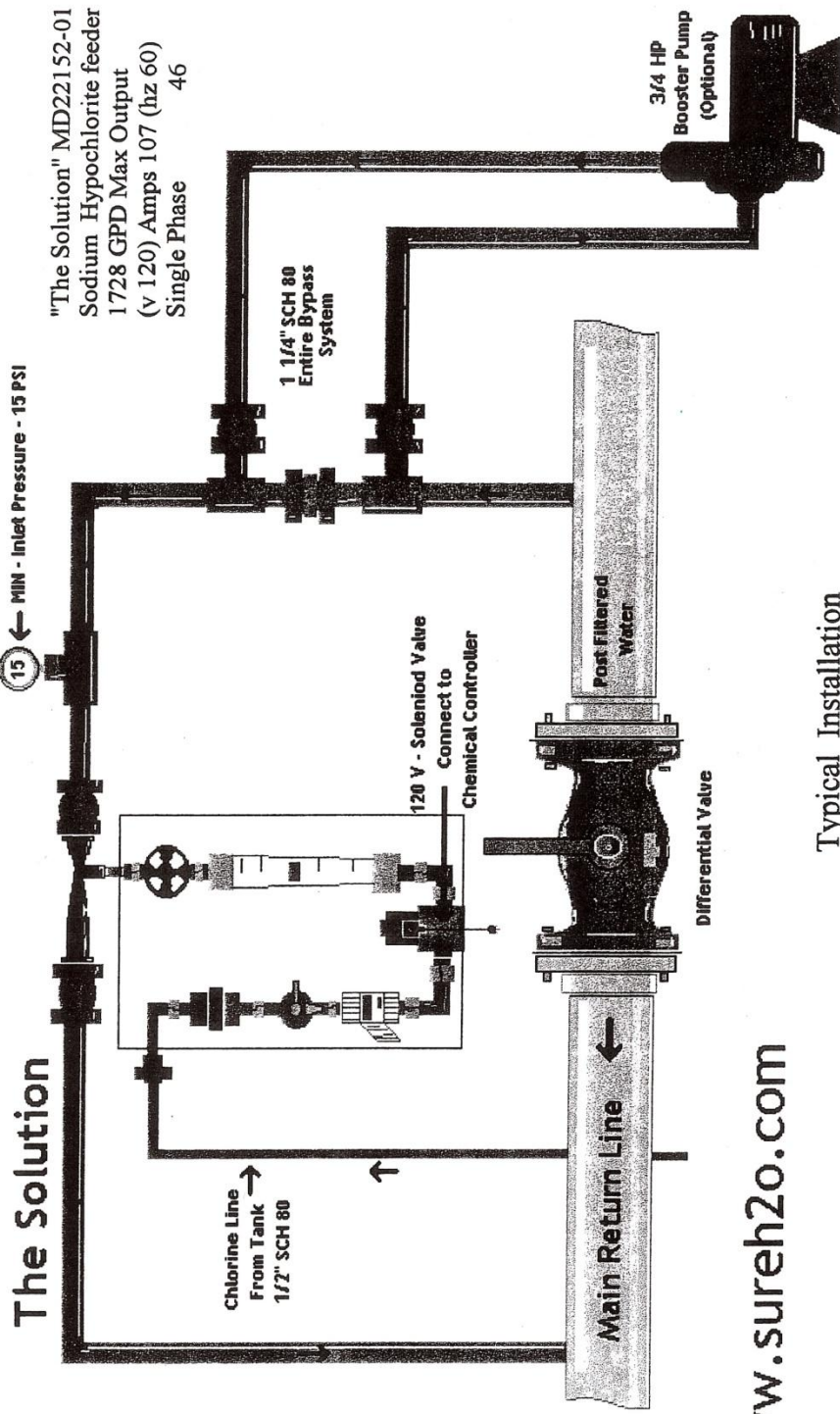
1. Typical Installation
2. Dual Unit Installation
3. Integrated Installation

(This shows the existing differential pressure in by-pass loop being used for more components. Typically the controller (probe cell), the co2 feeder Venturi, the Solution feeder Venturi and the Solution X-2 PH feeder Venturi)

See More Possibilities at [WWW.Sureh2o.com](http://WWW.Sureh2o.com)



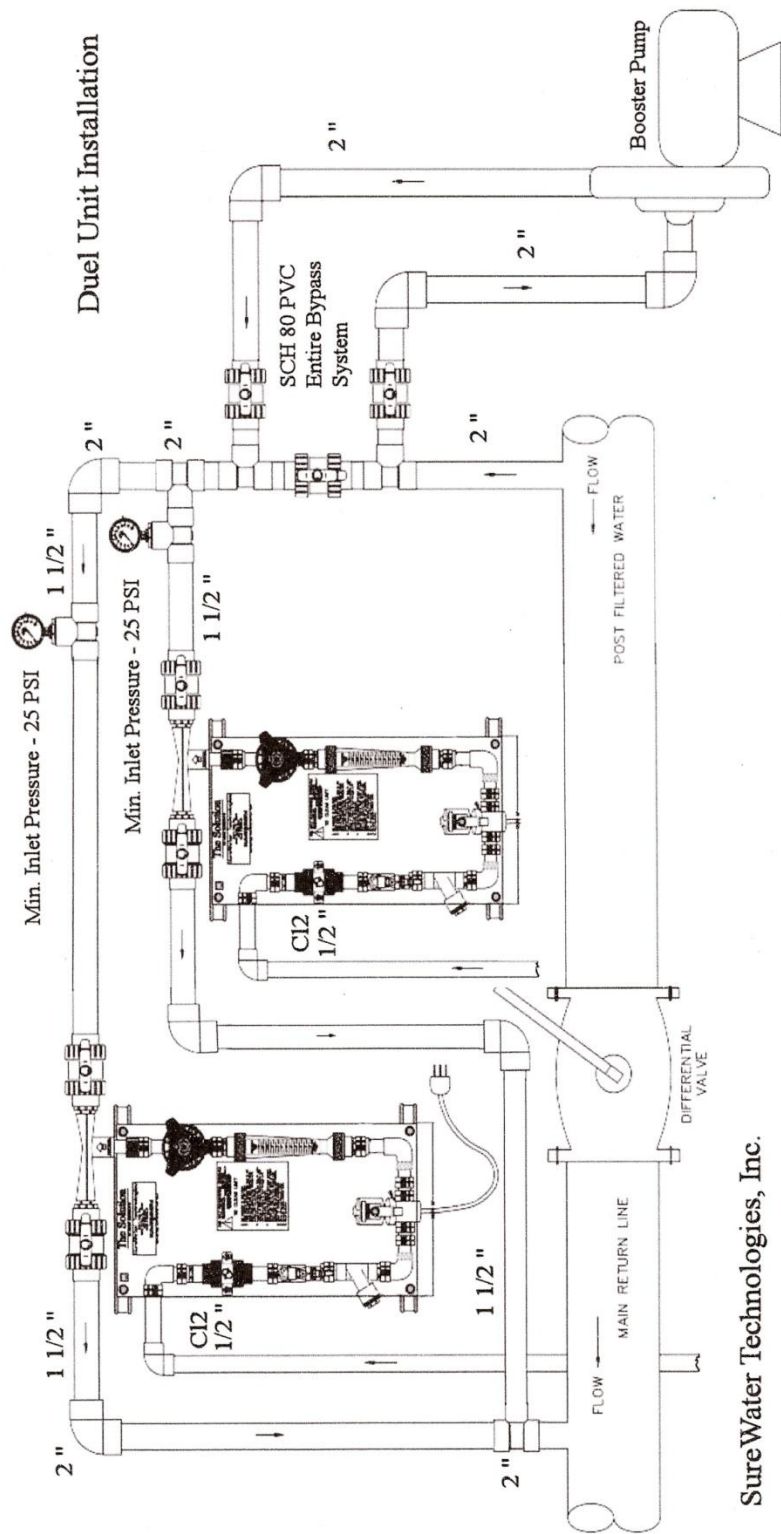
# SureWater Technologies Inc.



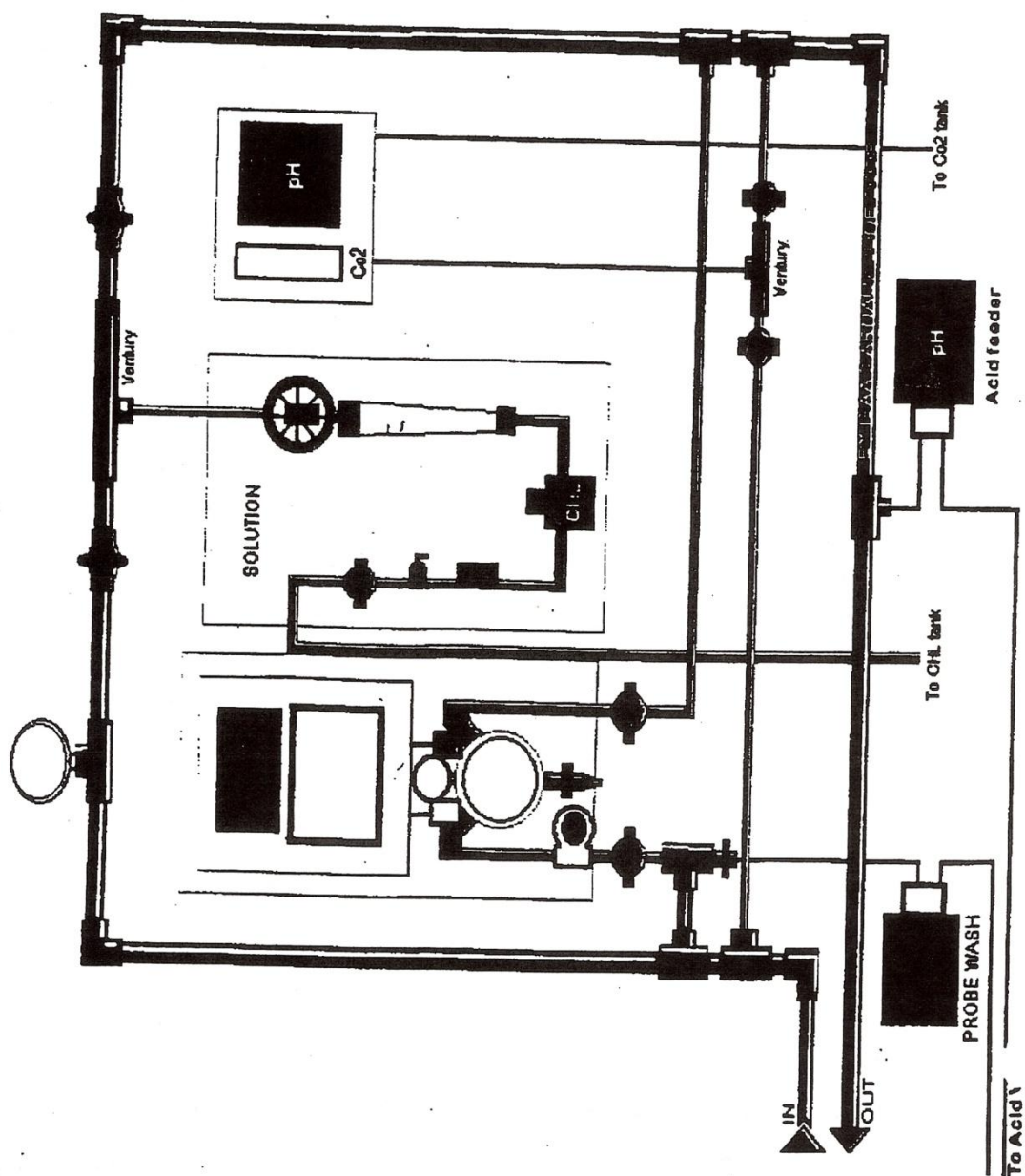
[www.sureh2o.com](http://www.sureh2o.com)

Typical Installation





SureWater Technologies, Inc.



#### d. Plumbing

The unit is to be plumbed on a 2" by-pass stream, reduced to 1 ½" prior to Inlet side of 0-60psi pressure gauge 1 ½" tee (supplied, pre-mounted). Inlet side of venturi is to be fed by post filtered water prior to (upstream of) main return valve. Outlet side of Venturi isolation valve should continue in 1 ½" until first fitting then resume 2". **See: Dual Installation Drawing**

**Note:** Booster pump may be required, consult Engineer. (Refer to Design plans)

Unit comes 99% pre-assembled on white PVC board, which is mounted on PVC channel.

One ½" Asahi Union Diaphragm Valve with o-rings (supplied, red handle) is to be installed on board at metering valve location (between flowmeter and Venturi).

**Caution:** Do not put unnecessary stress on Clear PVC Pipe.

Two 1 ½" Union Ball Valves with reducers (supplied, isolation valves) are to be installed (threaded connections) directly onto the inlet and outlet sides of the Venturi. **Note:** Use Teflon tape and Teflon pipe dope.

Install vertically, pre-mounted 0-60 psi liquid filled pressure gauge (supplied on 1 ½" tee) in by-pass stream approximately 10" upstream of 1 ½" isolation valve prior to Venturi.

Unit comes with two four inch PVC channels (pre-drilled), with two Aickinstrut 1 ½" PVC pipe fasteners. **See:** References

These are to be installed 5" prior to Venturi inlet isolation valve and 5" post Venturi outlet isolation valve. (screws and anchors are supplied)

Chlorine supply line should be hard piped entirely from chemical supply tank using ½" schedule 80 PVC. **Note:** Tubing is not recommended. Chemical supply line should not exceed 8' above bottom of chemical supply tank.

18" PVC poly tubing (supplied) is to be installed on barbed end of lab cock Clean out valve.

**e. Electrical**

**Component: Plast-o-Matic**

**Model EABV1-2-050-VS-PV Electric Ball Valve Actuator**

**See: Product Data sheet**

Electrical connection should only be done by electrician or qualified technician.

After mounting, unit is ready for electrical connection.

Electric Ball Valve Actuator on feeder is to be electrically connected to Chemical Controller.

The 3 wire system, Function: Fail Safe Version / normally closed, is recommended.

**Refer to:** PLAST-O-MATIC Installation, Operation & Maintenance Instructions



### Multi-Voltage Actuator with Fail-Safe and 4-20mA Digital Positioner Options



#### Standard Features

- Multi-voltage with auto-voltage sensing
  - 12-24V AC or DC
  - 85-240V AC or DC
- LED status light to indicate operational status of actuator
- Electronic over-torque protection against valve jam
- Thermostatic anti-condensation heater
- Manual override for emergency hand operation
- Remote position indicator
- IP65 NEMA-4 weatherproof anti-corrosive and UV protected polyamide housing
- Local visual position indicator
- Easy mounting with double-D drive
- All external electrical connections via DIN plugs
- CE marked
- ISO 9000 manufacturer
- Fail-safe and 4-20mA digital positioner options

The EBVA features a rugged weatherproof and anti-corrosive polyamide housing and more features than the original EBV. A visual indicator shows whether the actuator is operating correctly, or had tripped out either by its electronic torque limiter, or has been left in 'manual' mode. Site operators are no longer left with the 'valve or actuator' question when an actuator does not respond to a signal.

The EBVA is quick and easy to install, with a double-D drive, allowing fast mounting to True-Blue valves. There is no need to remove the cover to connect the EBVA electrically, saving installation time. Using the external DIN plugs and external wiring diagrams supplied with the actuator, installation can be pre-wired.

Protection against valve jams is provided by an electronic torque limiter, which auto-relaxes the gearbox when activated, allowing the manual override to be selected to assist in clearing the jam. The effect of condensation is eliminated by an internal thermostatic anti-condensation heater that does not require a separate independent power supply.

Standard function for the EBVA is power open, power close, stays put on power failure.

New to the EBVA are factory installed fail-safe and modulating options. The modulating digital positioner offers auto-calibrating and self-resetting functions.



#### PLAST-O-MATIC VALVES, INC.

1384 Pompton Avenue, Cedar Grove, New Jersey 07009  
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SPECIFICATIONS				
Sizes	3/8" - 2" Valves		2" Full Port through 4"	
Actuator	EBVA2, TEBVA6	EBVA1, TEBVA5	EBVA4	EBVA3
Voltage AC (1ph) or DC)	12 - 24	85 - 240	12 - 24	85 - 240
Working Time - Sec. 0-90° (No Load) ±10%	11	11	17	17
Maximum Run Torque Nm	20	20	55	55
Maximum Break Torque Nm	25	25	60	60
Duty Rating %	75	75	75	75
IP Rating - IEC 60529	IP65	IP65	IP65	IP65
Working Angle Standard	90	90	90	90
Temperature Range (C)	-20° to +70°	-20° to +70°	-20° to +70°	-20° to +70°
Motor Switch	2 x V3	2 x V3	2 x V3	2 x V3
Volt Free End of Travel Confirmation	2 x V3	2 x V3	2 x V3	2 x V3
Anti-Condensation Heater (W)	4	4	4	4
Current Full Load	12VDC 24VDC 24V/1ph 110V/1ph 240V/1ph	1.03A 0.48A 0.98A  0.19A 0.12A	1.96A 0.77A 1.75A  0.31A 0.19A	
Weight (kg)	1.5	1.5	2.0	2.0
ISO:5211	F03,F04 and F05	F03,F04 and F05	F05 and F07	F05 and F07
Drive	Double-D	Double-D	Double-D	Double-D

#### EBVA STATUS LIGHT FUNCTIONS



##### CONSTANTLY LIT LED

If the actuator is operating correctly, with no faults, the LED shows a constantly lit light.



##### THE LED FLASHES WITH 2 BLINKS

If the actuator has been left in 'manual' mode, the actuators motor runs but doesn't drive the output shaft. After a pre-set time, the actuator knows that as the torque limiter has not activated, and that the motor is running, it must be in manual mode.



##### THE LED FLASHES ON/OFF

When the actuator senses impending valve jam, the electronic torque limiter is activated and on activation, repeatedly flashes the LED on and off



#### EBVA OPTIONAL FEATURES

##### MODULATING ACTUATOR

(Option 3 and 4)

Provided via factory installed, self-calibrating digital positioner with 4-20 or 0-10V.

##### FAIL SAFE ACTUATOR

(Option 2, 4, or 6)

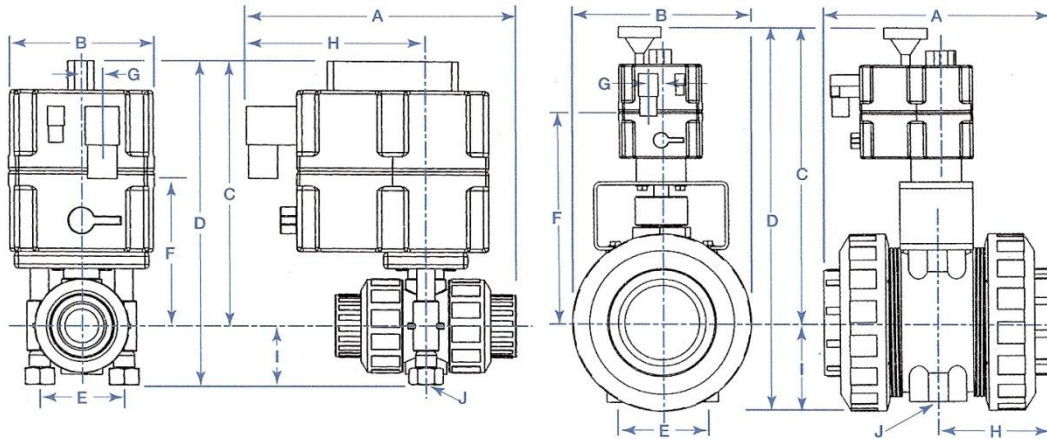
Fail safe achieved with the use of industrial re-chargeable batteries which are supplied with the actuator. Specify fail closed or fail open.

#### APPROXIMATE FLOW RATES AT 1.0 PSI (0.07 Bar) PRESSURE DROP

Valve Sizes	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	201	2 1/2"	3"	4"
Cv Factor		10	20	40	80	100	120	150	340	485	768

### 3/8" - 2" SIZES

### 2" FULL PORT - 4" SIZES



VALVE & ACTUATOR ASSEMBLY - MODEL NUMBERS & DIMENSIONS

Pipe Size	Actuator* with Valve Model No.	A		B		C		D		E		F		G		H		I		J	
		IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
3/8"	EBVA-037 -	7 3/16	183	4 11/32	110	7 3/32	180	6 19/32	219	1 3/4	45	3 5/8	94	5/8	16	3 7/8	100	1 1/2	38	1/4 - 20	
1/2"	EBVA-050 -	7 3/16	183	4 11/32	110	7 3/32	180	6 19/32	219	1 3/4	45	3 5/8	94	5/8	16	3 7/8	100	1 1/2	38	1/4 - 20	
3/4"	EBVA-075 -	7 3/16	183	4 11/32	110	7 17/32	188	9 1/32	229	2 1/4	57	4 1/8	105	5/8	16	3 7/8	100	1 1/2	38	1/4 - 20	
1"	EBVA-100 -	7 3/16	183	4 11/32	110	7 25/32	198	9 17/32	242	2 1/2	64	4 3/8	111	5/8	16	3 7/8	100	1 3/4	45	1/4 - 20	
1 1/4"	EBVA-125 -	7 5/16	186	4 11/32	111	8 1/4	210	10 9/16	269	3 11/32	85	4 7/8	124	5/8	16	3 7/8	100	2 5/16	59	1/4 - 20	
1 1/2"	EBVA-150 -	7 5/16	186	4 11/32	111	8 1/4	210	10 9/16	269	3 11/32	85	4 7/8	124	5/8	16	3 7/8	100	2 5/16	59	1/4 - 20	
2"	EBVA-200 -	7 5/16	186	4 11/32	111	8 1/4	210	10 9/16	269	3 11/32	85	4 7/8	124	5/8	16	3 7/8	100	2 5/16	59	1/4 - 20	
2" FP	EBVA-201 -	9 3/8	206	5 5/16	135	9 17/32	242	11 29/32	303	2 5/8	66	7 23/32	196	5/8	16	5 5/16	135	2 3/8	60	3/8 - 16	
2 1/2"	EBVA-250 -	9 3/4	247	5 29/32	149	9 7/16	239	14 11/32	364	3 3/32	78	9 7/16	239	5/8	16	4 11/32	110	3 3/8	78	8MM	
3"	EBVA-300 -	10 17/32	268	7 3/16	183	14 3/8	365	18 5/32	461	2 13/16	72	11 7/16	290	19/32	15	5 5/16	135	3 25/32	96	5/16 - 18	
4"	EBVA-400 -	11 9/16	293	9 3/16	234	15 3/16	386	19 7/8	502	4 3/4	121	10 5/8	271	5/8	16	5 3/4	145	4 5/8	117	8MM	

\* To complete the Model Numbers refer to the ordering chart below. Voltage must be specified with model number.

### ORDERING INFORMATION

Order by part number and specify exact chemicals, temperatures and pressures. To arrive at the proper art number, please consult diagram below. The letters and numbers used in this part number are for example only!

EBVA	1	1	050	X	V	T	PV	A
BASIC MODEL VALVE	VALVE TYPE SIZE/VOLTAGE	OPTIONS	VALVE SIZE		SEAL MATERIAL		BODY MATERIAL	BALL OPTIONS
EBVA 2-Way	1 - 2-Way, 3/8"-2", 85-240 Volts, A/C or D/C	1 - Standard Actuator	037 - 3/8"		V FKM		-PV PVC	-
	2 - 2-Way, 3/8"-2", 12-24 Volts, A/C or D/C	2 - Actuator, Fail Safe	075 - 3/4"		EP EPDM		-CP CPVC	-
	3 - 2-Way, 2 1/2"-4", 85-240 Volts, A/C or D/C	3 - Actuator, 4-20 µA	100 - 1"				-PP Natural Polypro	A - 3 Hole Ball
	4 - 2-Way, 2 1/2"-4", 12-24 Volts, A/C or D/C	4 - Actuator, 4-20 µA, Fail Safe	125 - 1 1/4"				-PF PVDF	C - Characterized
TEBVA 3-Way	5 - 3-Way, 3/8"-2", 85-240 Volts, A/C or D/C	5 - Actuator, 0-10 VDC	150 - 1 1/2"					D - Characterized Descending Curve
	6 - 3-Way, 3/8"-2", 12-24 Volts, A/C or D/C	6 - Actuator, 0-10 VDC, Fail Safe	200 - 2"					E - Characterized Ascending Curve
			201 - 2" Full Port					Z - Vented Ball
			250 - 2 1/2"					
			300 - 3"					
			400 - 4"					
			20 - 20mm					
			25 - 25mm					
			32 - 32mm					
			40 - 40mm					
			50 - 50mm					
			63 - 63mm					
			90 - 90mm					
			110 - 110mm					

#### CONNECTIONS

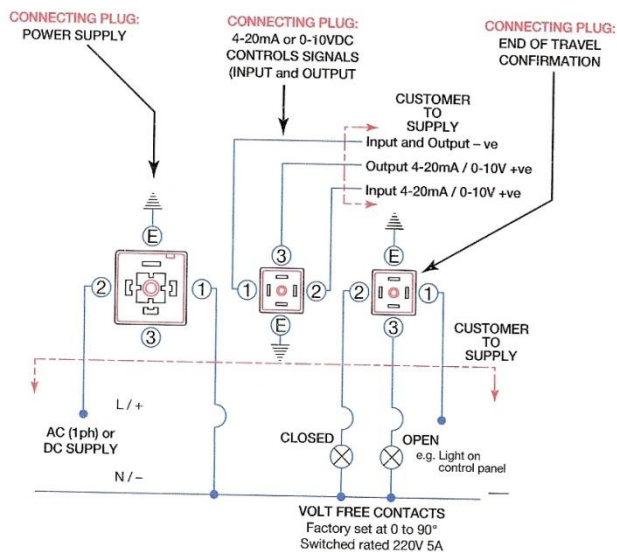
S Socket  
T Thread  
F Flanges

#### SPECIAL DESIGNATION -

When "X" appears in this spot it designates BSP threads



## AC (1ph) or DC SUPPLY – WIRING FOR MODULATING ACTUATORS

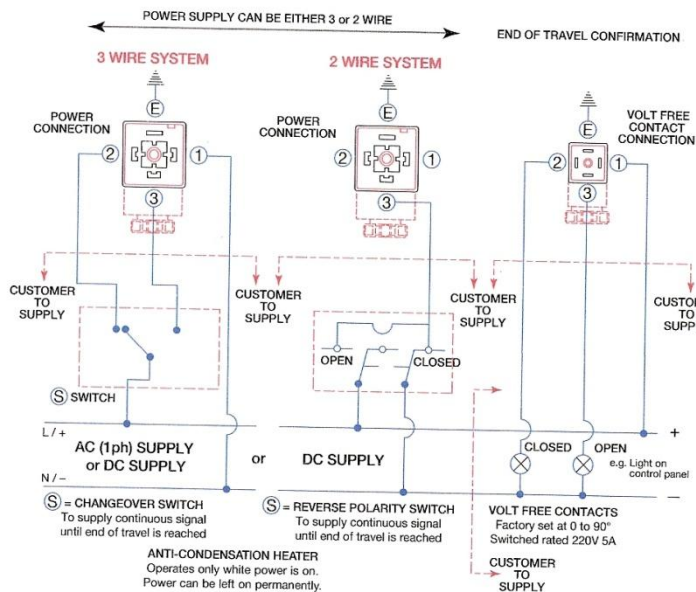


### Function: MODULATING VERSION

- Power open, power close – Actuator movement controlled by input signal (4-20mA or 0-10VDC)
- Standard Operation:  
4mA or 0V = Actuator Closed, 20mA or 10V = Actuator Open (can be reversed)
- Standard Operation:  
Actuator close on loss of control signal, stays put if loss on main power.
- Output signal provided as standard (in same format as supply signal)

**NOTE:** Wiring showing same supply as motor is only a suggestion, Read "Installation, Operation and Maintenance Instructions" before connecting.

## AC (1ph) or DC SUPPLY – WIRING ON/OFF OR FAIL SAFE ACTUATORS



### Function: ON/OFF VERSION

- Power open, power close
- Stays on in power failure

### Function: FAIL SAFE VERSION

- Power open, power close – Trickle charges battery in either open or closed position
- Actuator sent by battery power to preset fail safe position on power failure
- Actuator returns to pre-failure position on power resumption
- Fail safe can be either NC (normally-closed) or NO (normally-open)

**NOTE:** Wiring showing same supply as motor is only a suggestion, Read "Installation, Operation and Maintenance Instructions" before connecting.

**PLAST-O-MATIC**  
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# PLAST-O-MATIC®

## VALVES, INC.

### SERIES EBVA & TEBVA MULTI-VOLTAGE ELECTRIC ACTUATORS

#### Installation, Operation & Maintenance Instructions

Damage caused by non-compliance to these instructions will not be covered by our warranty. Read these instructions **BEFORE** installing or connecting the actuator.

**SAFETY INSTRUCTIONS:** Electric actuators operate with the use of live electricity. It is recommended that only qualified electricians or people instructed in accordance with electrical engineering, and familiar with local health and safety directives, be involved in the connection of these actuators. It is strongly recommended that each actuator has its own independent fused system to protect it against the influence of other electrical devices connected to the system.

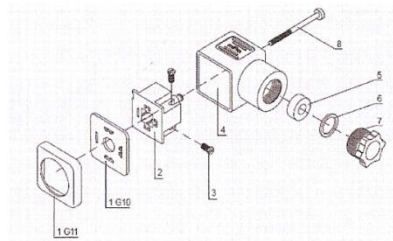
#### ELECTRICAL CONNECTORS (DIN Plugs)



Warning! BEFORE connecting, ensure the voltage to be applied is within the range shown on the ID label. Do NOT connect a voltage in excess of 24V to the EBVA-2, EBVA-4 or TEBVA-6 Series actuators or irreparable damage will be caused and will NOT be covered by our warranty.

EBVAs are multi-voltage capable with automatic voltage sensing. All connections are made using the supplied external DIN plugs. The rotation is factory set so under normal circumstances there is no need to remove the cover to connect electrically - in fact removing the cover may invalidate the warranty.

The EBVA has 2 voltage ranges: EBVA-1, EBVA-3 and TEBVA-5 Series: Accepts voltages from 80-240V AC(1ph) or DC  
EBVA-2, EBVA-4 and TEBVA-6 Series: Accepts voltages from 12-24V AC (1ph) or DC



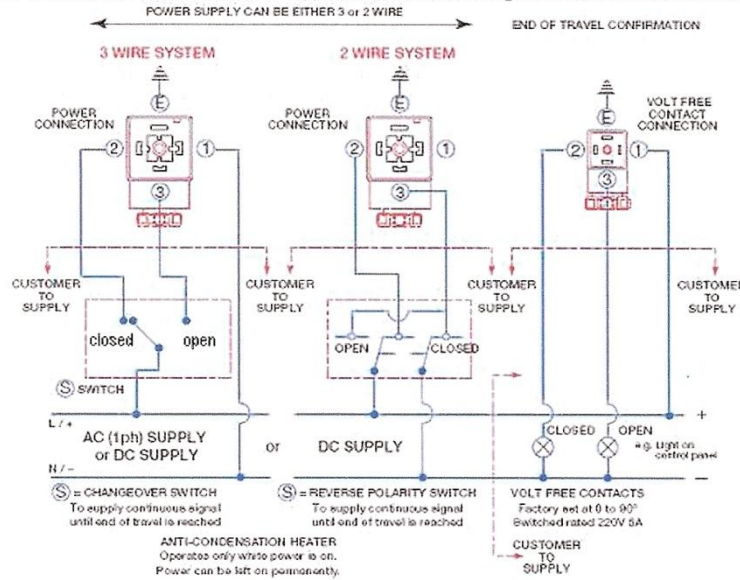
1. Gasket/seal. We use G11
2. Terminal strip
3. Cable securing screws
4. Housing
5. Grommet
6. Washer
7. Gland nut
8. Securing Screw

CABLE SIZE	SMALL CONNECTOR		LARGE CONNECTOR	
	DIN: 43650 ISO: 4400 & C193		DIN: 43650 ISO: 4400 & C193	
	Minimum Diameter	Maximum Diameter	Minimum Diameter	Maximum Diameter
EBVA	5 mm	5 mm	8 mm	10.5 mm

**WARNING — Water-tightness:** Ensure that the rubber gasket (part 1 above) is correctly installed when securing a DIN plug to the actuator. Failure to do so could allow water ingress - damage caused by this installation error will invalidate any warranty. Do not over-tighten the securing screw (part 8) when assembling.

### WIRING DIAGRAMS FOR ON-OFF VERSION

On receipt of a continuous power signal, the motor runs and via a planetary gearbox system, rotates the output shaft. The motor is stopped by internal cams, fitted to the output shaft, striking micro-switches which cuts power to the motor. When a subsequent continuous signal is received, the motor will turn in the opposite direction, reversing the direction of rotation of the output shaft.

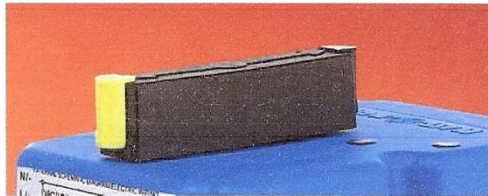


**EMERGENCY MANUAL OVERRIDE:** All EBVA electric actuators are provided with a declutchable manual override to allow manual operation should power not be available. There are 2 marked, selectable positions:

**MAN** for manual operation and **AUTO** for automatic operation.

- Do NOT attempt to operate the manual override operator without first selecting **MAN** using the manual override selector lever otherwise irreparable damage will be caused to the actuator gearbox. Damage so caused is NOT covered by our warranty.
- Do NOT remove the manual override selector lever retaining screw as this will allow the internal parts to become loose and will cause irreparable damage to the actuator gearbox. Damage so caused is NOT covered by our warranty.

**Operating procedure for manual override:**



If the actuator is rotated beyond the open and closed logos taking it outside the working quadrant Q, and left outside the working quadrant when returned to **AUTO**, malfunction may occur - see following pages for detailed information.



Operating the manual override will cause the LED status light to flash -- see following pages for details.

**Selecting emergency manual operation:** Using the manual override selector lever, select **MAN**. Do not force the lever the actuator will be damaged; this is not covered by our warranty. There are different situations from which **MAN** can be selected that each receive different responses from the EBVA actuator, which are outlined on the next page...



	Status of actuator when switching from AUTO to MAN, & subsequent actions	Immediate response from actuator - output drive is disengaged and ...	Condition of LED status light
1 OPEN	Actuator at rest in open position, power energized, OPEN signal being sent to actuator.	No reaction	Continuously lit
	CLOSE signal sent to actuator	Motor runs & times out after around 20-30 seconds	Double blink to indicate manual operation
	Actuator position moved away from OPEN position manually	Motor runs & times out after around 60-70 seconds	Double blink to indicate manual operation
2 CLOSED	Actuator at rest in closed position, power energized, CLOSED signal being sent to actuator.	No reaction	Continuously lit
	OPEN signal sent to actuator	Motor runs & times out after around 20-30 seconds	Double blink to indicate manual operation
	Actuator position moved away from CLOSED position manually	Motor runs & times out after around 60-70 seconds	Double blink to indicate manual operation
3	Actuator in mid-travel, energized and running, and not operating either the open, or closed motor switches	Motor runs and times out after a few seconds (varies between 8-17 seconds)	Double blink to indicate manual operation
4	Actuator de-energized, in any position	No reaction	No reaction, requires power

Note: Timings may vary between different models.



**Simple FAULT diagnostics:** If the actuator does not respond to a command signal, and the LED is flashing twice - the actuator is in manual !

**Restoring automatic function:** Using the manual override selector lever, select AUTO. Do not force the lever or damage will be caused to internal parts, this is not covered by our warranty. There are different situations from which AUTO can be selected that each receive different responses from the EBVA actuator, which are outlined as follows:

	Status of actuator when switching from MAN to AUTO, & subsequent actions	Immediate response from actuator	Condition of LED status light
1	Actuator at rest in open position, power energized, OPEN signal being sent to actuator.	No reaction	Continuously lit
	Send CLOSE signal to actuator	Motor runs & sends actuator to the closed position	Changes from double blink to continuously lit
2	Actuator at rest in open position, power energized, CLOSED signal being sent to actuator.	No reaction	Continuously lit
	Send OPEN signal to actuator	Motor runs & sends actuator to the open position	Changes from double blink to continuously lit
3	Actuator in mid-travel and not operating either the open, or closed motor switches	Motor runs & sends actuator to the signalled position	Changes from double blink to continuously lit
4	Actuator at rest, energized, outside the working quadrant, either open or closed signal being sent to actuator .  Operational error !	Motor starts and actuator starts to move when opposite signal sent. After around 17seconds the actuator stops, wherever it is	Changes from double blink to continuously lit. Changes from continuously lit to double blink even though the selector lever is in AUTO
5	Actuator at rest, de-energized, outside the working quadrant.	No reaction	No reaction, requires power
6	Actuator at rest, initially de-energized, outside the working quadrant, then energized with either an open or close signal.  Operational error !	If AUTO is selected BEFORE the time out occurs, the actuator will arrive at the signalled position .  If AUTO is selected AFTER the time out occurs, after around 17 seconds the actuator stops wherever it is	Changes from double blink to continuously lit .  Changes from continuously lit to double blink even though the selector lever is in AUTO
7	Actuator de-energized, in any position within the working quadrant	No reaction	No reaction, requires power

Note: Timings may vary between different models.



**ANTI-CONDENSATION HEATER:** The EBVA actuator has a thermostatically controlled anti-condensation heater that maintains the internal housing at approx. 30°C. The heater is activated whenever mains power is connected to the actuator. We strongly recommend that power remains ON at all times to protect the actuator from the damaging effects of condensation. Damage caused by condensation is not covered by our warranty.

**ELECTRONIC TORQUE LIMITER:** All EBVA electric actuators are protected against the possible mechanical drive train damage caused by a valve blockage or jam. This protection is provided by an electronic torque limiter (ETL) in an internal micro-chip that is programmed to constantly measure and compare the motor load against a factory set maximum.

As torque is directly proportional to motor load, as the torque increases the motor load increases. The ETL closely monitors the rate of increase in motor load as the valve starts to come to rest at the jam, and as this occurs the motor load exceeds the factory set maximum and the ETL is activated, instantly cutting the power supply to the motor.

As the valve nears the jam point, the planetary gears are being driven hard in the direction of the jam, and at the jam point, they too are physically jammed. This would make selecting MAN to put the actuator in manual mode to assist in clearing the jam impossible - to eliminate this difficulty, the ETL, a few seconds after cutting the power to the motor, moves the actuator a few degrees in the opposite direction of the jam, to relax the gears.



Activating the electronic torque limiter triggers a change in the LED status light from continuously lit to an on-off flashing sequence. The EBVA allows the user to apply a reversing command signal to the actuator (in the opposite direction to the jam eg: if the actuator was closing, an open signal will be accepted) to power the actuator away from the jam. In many cases, this allows the flowing media to help clear the jam as this can be done several times, and prevent the user from having to shut the system down to dismantle the valve to clear the jam.



Sending a reversing signal will change the flashing LED to continuously lit. When the actuator is subsequently send back in the direction of the original jam, if it has not cleared the electronic torque limiter will be activated again and the LED will start to flash on - off.

**Simple diagnostics:** If the actuator will not respond to a command signal and the LED is flashing on-off, the electronic torque limiter has activated indicating that the torque required to turn the valve has exceeded the maximum output of the actuator. The user instantly knows that there is a problem with the valve, not the actuator.

### Mounting Instructions: 2-Way Valves • 3/8" through 2"

(Separate Instructions included in carton for 3-Way Valves and larger sizes)

**NOTE ALUMINUM ADAPTER MUST BE ADDED FOR 3/8" THRU 1" SIZES**

**PLASTIC SPACER MUST BE ADDED FOR 1 1/4" THRU 2" SIZES**

- 1) Move the valve to the open position.
- 2) The actuator package has (2) sets of hardware with it.
  - a) 1 set is for 3/8" thru 1" ball valves (MK-037-100) and the other set is for 1-1/4" thru 2" ball valves (MK-125-200).
  - b) Select the proper kit and the other can be saved or discarded.
- 3) When installing the actuator, which is shipped to you in the "Open" position, make certain the ball valve is in the open position.
- 4) The following applies to kit MK-037-100 only. If you are using kit MK-125-200 skip to step 8 below.
- 5) **The kit MK-037-100** has a small aluminum cube shaped piece. This adaptor is used to adapt the valve stem to fit into the actuator (female) coupling. Mount the cutout on that aluminum adaptor onto the valve stem. To assure that the adaptor is correctly installed, when the valve (in the open position) is installed into the female coupling on the actuator, with the flow direction on the valve inline with the position indicator on the top of the actuator, the coupling should fit snug into the female coupling. If it is a sloppy fit, then rotate the aluminum adaptor 90° (without rotating the valve stem) and you'll see that it fits snug. This is the correct orientation of the adaptor.
- 6) Notice on the PVC mount block on the bottom of the actuator, the block has (6) threaded holes. Only 1 set will fit the particular valve you're installing. For the MK-037-100 kit you have (2) sets of studs. The bag is marked which valve(s) to use the studs for. Depending on which valve you are installing, select the correct studs and install them (2) into the PVC mount block. For 3/8" thru 1/2" valves use the inner most threaded holes. For the 3/4" and 1" valves use the center pair of threaded holes. Use of a thread locking fluid such as Loctite threadlocker is recommended.
- 7) **SPACERS.** The MK-037-100 kit has (2) sets of spacers. Select the set for your valve. Notice the bags are marked. Install the spacers onto the studs, then install the valve onto the studs, and finally install and tighten the nuts onto the studs.
- 8) **The kit MK-125-200** has (2) studs, (2) spacers, (2) nuts.
- 9) Notice on the PVC mount block on the bottom of the actuator, the block has (6) threaded holes. Only 1 set will fit the particular valve you're installing.
- 10) For kit MK-125-200, thread the (2) studs into the outer set of threaded holes. Use of a thread locking fluid such as Loctite threadlocker is recommended.
- 11) The kit MK-125-200 has (2) spacers. Install these onto the studs then install the valve, then install and tighten the nuts.

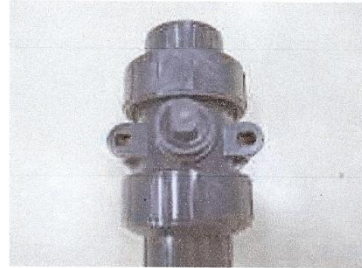


**12) WIRING THE ACTUATOR (With no failsafe or modulating kit, i.e. a simple on/off actuator)**

- 13) Follow the wiring diagram on the actuator label. Note that the actuator labeled 85-240 AC or DC volts will accept any voltage between those limits in either AC or DC form. Any actuator labeled 12-24 AC or DC will likewise accept any voltage within those limits either AC or DC.
- 14) The main actuating voltage is wired into the large grey DIN connector. The small black connector can be used to power external position indication per the wiring diagram

**Mounting Series TEBVA Electric Actuator to the ball valve**  
**Instructions for 3-way valves • 3/8" through 2"**

1. The valve stem must be set "in-line" with the (2) upper ports, see photo at right. Notice the orientation of the flats on the stem.
2. The actuator package has (2) sets of hardware with it.
  - a. 1 set is for 3/8" thru 1" ball valves (MKT-037-100) and the other set is for 1-1/4" thru 2" ball valves (MK-125-200).
  - b. Select the proper kit and the other can be saved or discarded.
3. When installing the actuator, which is shipped to you in the "Open" position, make certain the ball valve is in the position outlined in step 1 above.
4. The following applies to kit MKT-037-100 only. If you are using kit MK-125-200 skip to step 8 below.
5. **The kit MKT-037-100** has a small aluminum cube shaped piece. This adaptor is used to adapt the valve stem to fit into the actuator (female) coupling. Mount the cutout on that aluminum adaptor onto the valve stem. To assure that the adaptor is correctly installed, when the valve (in the position described in step 1 above) is installed into the female coupling on the actuator, with the flow direction on the valve inline with the position indicator on the top of the actuator, the coupling should fit snug into the female coupling. If it is a sloppy fit, then rotate the aluminum adaptor 90° on the valve stem (without rotating the valve stem) and you'll see that it fits snug. This is the correct orientation of the adaptor. (See photo on reverse)
6. Notice on the PVC mount block on the bottom of the actuator, the block has (6) threaded holes (3 "sets" of holes). Only 1 set will fit the particular valve you're installing. For the MKT-037-100 kit you have (3) sets of studs. The bag is marked which valve(s) to use the studs for. Depending on which valve you are installing, select the correct studs and install them (2) into the PVC mount block. For 3/8" thru 1/2" valves use the inner most threaded holes. For the 3/4" and 1" valve use the center pair of threaded holes. Use of a thread locking fluid such as Loctite threadlocker is recommended.
7. **SPACERS.** The MKT-037-100 kit has (2) sets of spacers. Select the set for your valve. Notice the bags are marked. Install the spacers onto the studs, then install the valve onto the studs, and finally install and tighten the nuts onto the studs.
8. **The kit MK-125-200** has (2) studs, (2) spacers, (2) nuts.
9. Notice on the PVC mount block on the bottom of the actuator, the block has (6) threaded holes (3 "sets" of holes). Only 1 set will fit the particular valve you're installing.
10. For kit MK-125-200, thread the (2) studs into the outer set of threaded holes. Use of a thread locking fluid such as Loctite threadlocker is recommended.
11. The kit MK-125-200 has (2) spacers. Install these onto the studs then install the valve, then install and tighten the nuts.



**WIRING THE ACTUATOR (With no failsafe or modulating kit, i.e. a simple on/off actuator)**

**Note: Wiring must be done by a qualified electrician, in accordance with all national and local codes.**

1. Follow the wiring diagram on the actuator label. Note that the actuator labeled 85-240 AC or DC volts will accept any voltage between those limits in either AC or DC form. Any actuator labeled 12-24 AC or DC will likewise accept any voltage within those limits either AC or DC.
2. The main actuating voltage is wired into the large grey DIN connector. The small black connector can be used to power external position indication per the wiring diagram





The kit MKT-037-100 has a small aluminum cube shaped piece. This adaptor is used to adapt the valve stem to fit into the actuator (female) coupling. Mount the cutout on that aluminum adaptor onto the valve stem. To assure that the adaptor is correctly installed, when the valve (in the position described in step 1 above) is installed into the female coupling on the actuator, with the flow direction on the valve inline with the position indicator on the top of the actuator, the coupling should fit snug into the female coupling. If it is a sloppy fit, then rotate the aluminum adaptor 90° on the valve stem (without rotating the valve stem) and you'll see that it fits snug. This is the correct orientation of the adaptor.

\*\*\*\*\*

**MAINTENANCE INSTRUCTIONS:** The EBVA actuators are generally maintenance free. There are no internal parts that require maintenance. The gearbox is lubricated for life when built at the factory. The housing may be cleaned with a cloth covered in warm soapy water to keep it clean. Do not use solvents.



DO NOT PRESSURE WASH. Pressure washing will invalidate any warranty.

### FAILSAFE & DPS ACTUATORS

Full details and instructions are supplied with these options.

**Failsafe System (Battery Spring Return):** This system simply stores power in a re-chargeable industrial battery pack that instantly discharges when mains power is interrupted. During normal operation the actuator functions as an on-off actuator and simultaneously trickle charges the battery pack to maintain it at full charge. A short re-charge time is required following each discharge to replace the power used. The main advantage of this system is it is far less expensive than a true mechanical spring return system as the actuator size remains the same, as there are no springs to compress.

**FAIL-SAFE ACTUATOR NOTE:** When ordered as a fail-safe actuator, the battery is NOT charged at the factory because subsequent discharge in storage will shorten the battery life. The battery must be charged 36 hours to acquire full charge. When the actuator is powered on, the battery will automatically charge.

**DPS Control System (Digital Positioning System):** This system provides modulating control whereby the movement of the actuator is totally controlled by an input signal (either 4-20mA or 0-10VDC), the degree of movement of the actuator being proportional to the change in the input signal. The system is digital and constantly compares the position of the actuator output shaft relative to the input signal, and automatically adjusts the actuator position should the actuator position and the input signal not be equal. A feedback signal is provided as standard.

**PLAST-O-MATIC**  
VALVES, INC.

Cedar Grove, NJ USA • 973-256-3000

[www.plastomatic.com](http://www.plastomatic.com) • [info@plastomatic.com](mailto:info@plastomatic.com)

## II Set up and Operation

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# 1. Set Up

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The CN01 High Capacity Vacuum Induction Chemical Feed System is designed to feed Sodium Hypochlorite solution.

Unit is to be used with Electronic Chemical Controller (IE: Strantrol System 5).

Chemical Controller operates unit – turns unit on and off.

Controller must be capable of intermittent feed (proportional), programmable as to cycle time, proportional span and fail safe lockout.

Controller must be set to intermittent feed.

**Warning:** Fail Safe (or lockout timer) should set so as not to allow feed rate to exceed

Acceptable chlorine levels in pool water.

Example

100,000 gallon pool

1gallon CL2 (10% sodium hypochlorite) = 1ppm/100,00gallons

5ppm CL2 highest acceptable level

.5gpm feed rate (set at flowmeter)

5ppm =  $\frac{5\text{gallons CL2}}{.5\text{gpm feed rate}}$  = 10 minute fail safe

Unit feed rate: 0 – 1.2 gpm / 0 -4.4 Lpm      Flowmeter is calibrated in both gpm and Lpm

Maximum output: 1,728 gpd / 6,336 Lpd



## 2. Operation

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After Chemical Controller has been set up and fail safe lockout time has been programmed and recirculation system is in operation:

- a. Open 1 ½" Venturi by-pass isolation valves (located on inlet and outlet side of Venturi)
- b. Turn on booster pump **note:** booster should be electrically connected to recirculation Pump / recommend booster pump run continuously (when recirc is on)  
Inlet pressure at Venturi should be 20-25psi, adjust at booster pump
- c. Open blue handle chlorine shut off valve (red handle labcock valve should be closed)
- d. Put Chemical Controller in feed mode
- e. With red handled Metering Valve adjust float in Flowmeter to desired feed rate (recommend starting at just above mid-range)
- f. Reset Chemical Controller to auto

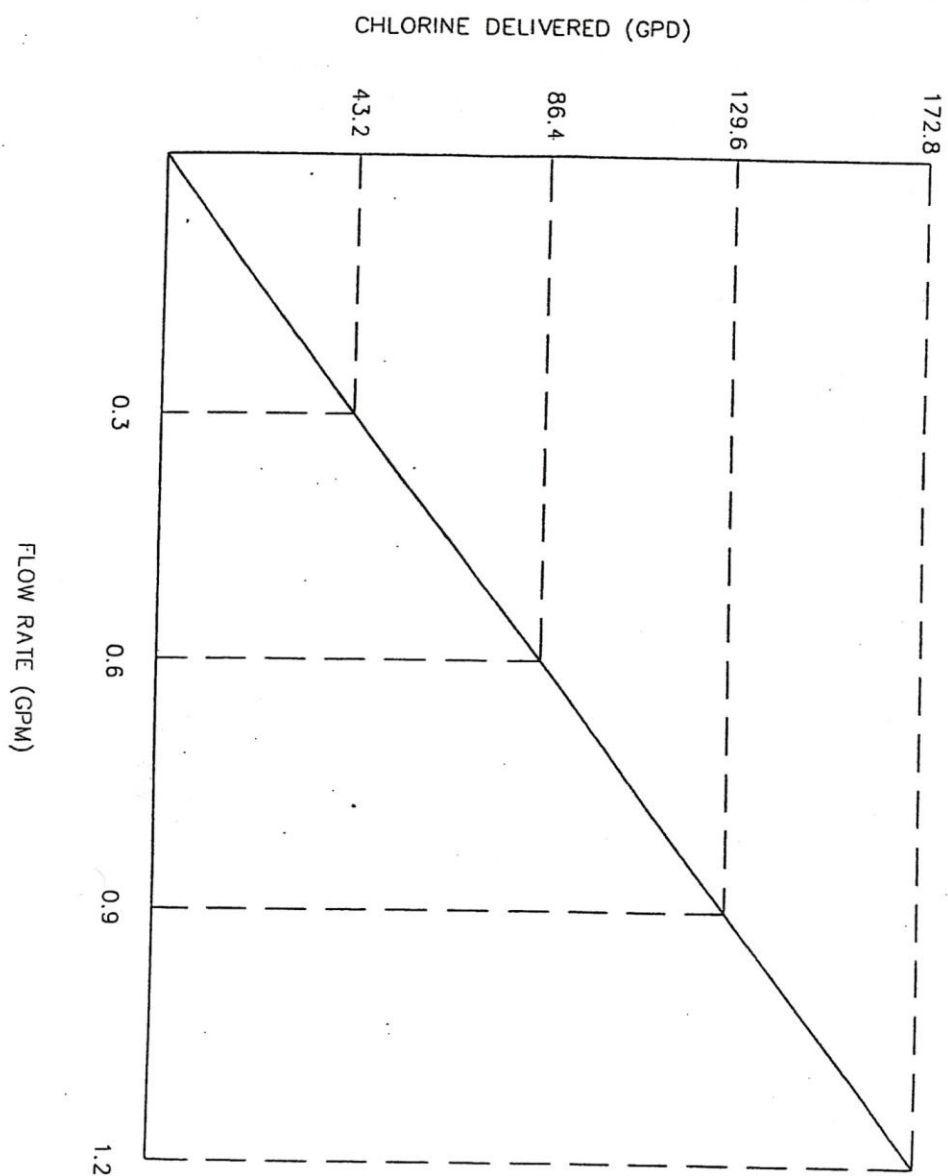
Feeder is now operated by Chemical Controller (Powered on and off)

## 3. Output Curve

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See Following Page

THE SOLUTION  
OUT PUT CURVE  
( CHLORINE SOLUTION )



## 4. Service / Maintenance

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The feeder is nearly maintenance free however it does require cleaning periodically.

Cleaning is recommended once a month.

When cleaning unit!

**Warning! : Chemical Hazard - Always wear appropriate protective personal equipmet**

**Note:** Never mix Muriatic Acid with any type of Chlorine.

### To Clean Unit

1. Set Controller to Feed Mode
2. Close Chlorine Shut off Valve
3. Insert clean-out labcock flex tube in one gallon of water and open labcock valve, allow allon of water to flow through feeder rinsing it free of chlorine solution
4. Insert clean-out labcock flex tube in gallon of muriatic acid (20%baume) and allow acid to flow through unit approximately 10 seconds
5. With clean out labcock valve still open, re-insert labcock flex tube in fresh gallon of water allow entire gallon of water to flow through unit rinsing it free of acid
6. Clean Y\_STRAINER if necessary (hand tight only )
7. Close clean out labcock valve
8. Re-open chlorine shut off valve
9. Reset Chemical Controller

**These Instruction Are Also Located On Face Of Unit**

## 5. Caution Statement

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It is recommended you close the chlorine shut off valve if there is a loss of chemical supply

Failure to do so may result in damage to the float in the Flowmeter

Power surge's may cause damage to the din connector on the Ball Valve Electric Actuator

Use of surge protection is recommended

# III TECHNICAL SPECIFICATIONS DATA

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“The Solution” Model CN01 High Capacity Vacuum Induction Chemical Feed System (sodium hypochlorite)

1. Adjustable Feed Rate 144gpd min / 1728 gpd max (unit also calibrated in Lpm)
2. Electrical – Multi voltage with auto-voltage sensing 85-240v ac or dc
3. Overall Dimensions 15”W X 27”L

## **Component / Materials**

1. Harvel Clear PVC pipe Sched 40, ½”
2. Spear Labcock valve ¼” Viton
3. Blue White F-460 Flowmeter ½” , .1-1.2gpm Teflon
4. Asahi-Diaphragm Valve ½”,PTFL
5. True Blue Union Valve ½” , Viton
6. Clear Flex 70 PVC Tubing Cat No. 8170-4430
7. Hayward Clear PVC Y-Strainer ½” Viton
8. Plast-O-Matic ½” True Blue Union Ball Valve with Electric Actuator  
Model No. EBVA1-2-050-vs-PV
9. Mazzei Venturi Md No. 1078 Kynar NSF Certified Standard 60

## **Mounting Hardware / Materials**

1. Stainless Steel Screws & Lock Nuts
2. 1’ x 2’ x 3/8” White PVC Boark
3. Aickinstrut PVC Channel 15” L
4. Aickinstrut Fiberfast Clamps,Nuts & Bolts
5. Aickinstrut # 32 PVC Clicks

# IV Warranty Statement

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HIGH CAPACITY VACUUM INDUCTION CHEMICAL FEED SYSTEM **MD-CN01**

SUREWATER TECHNOLOGIES, INC. (HEREAFTER SWT) WARRANTS EQUIPMENT OF IT'S MANUFACTURE AND BEARING IT'S IDENTIFICATION TO BE FREE OF DEFECTS IN WORKMANSHIP AND MATERIAL, SWT'S LIABILITY UNDER THE WARRANTY EXTENDS FOR A PERIOD OF ONE YEAR FROM DATE OF DELIVERY FROM OUR FACTORY OR AUTHORIZED DISTRIBUTOR. IT IS LIMITED TO REPAIRING OR REPLACING ANY DEVICE OR PART WHICH IS RETURNED, TRANSPORTATION PREPAID TO THE FACTORY WITHIN ONE YEAR OF DELIVERY TO THE ORIGINAL PURCHASER, AND WHICH IS PROVEN DEFECTIVE UPON EXAMINATION.

SWT DISCLAIMS ALL LIABILITY FOR DAMAGE DURING TRANSPORTATION, FOR CONSEQUENTIAL DAMAGE OF WHATEVER NATURE FOR DAMAGE DUE TO HANDLING, INSTALLATION OR IMPROPER OPERATION, AND FOR DETERMINING SUITABILITY FOR THE USE INTENDED BY THE PURCHASER.

SWT MAKES NO WARRANTIES EITHER EXPRESSED OR IMPLIED OUTHER THAN THOSE STATED ABOVE. NO REPRESENTATIVE HAS AUTHORITY TO CHANGE OR MODIFY THIS WARRANTY IN ANY RESPECT.

## V References

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**Rigid Pipe Clamps**

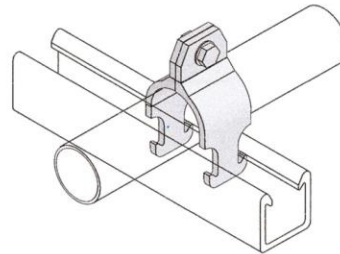
Aickinstrut Rigid Pipe Clamps resemble the more traditional style of pipe clamps. These clamps are made from glass-reinforced polyurethane and are sized based on the pipe inside diameter or nominal size.

Polyurethane clamps are recommended for applications up to 160°F. For high temperature applications (up to 230°F), PVDF clamps are available as a special order. Contact the factory for pricing and availability.

Care should be taken not to exceed the recommended torque values of the rigid pipe clamps.

Part Number	Nominal Size (in.)	PVC Sch. 80 and Rigid Metal	Design Loads (lbs.)*		FRP Bolt Size (in.)	FRP Bolt Torque (ft./lbs.)
			Type 1	Type 2		
PCR-050	1/2	0.840	225	90	3/8 x 1 1/4	3
PCR-075	3/4	1.050	225	90	3/8 x 1 1/4	3
PCR-100	1	1.315	225	90	3/8 x 1 1/4	3
PCR-125	1 1/4	1.660	225	90	3/8 x 1 1/4	3
PCR-150	1 1/2	1.900	225	90	3/8 x 1 1/4	3
PCR-200	2	2.375	225	90	3/8 x 1 1/4	3
PCR-250	2 1/2	2.875	225	90	3/8 x 1 1/4	3
PCR-300	3	3.500	225	90	3/8 x 1 1/4	3
PCR-400	4	4.500	300	125	3/8 x 1 1/4	3
PCR-600	6	6.625	300	125	3/8 x 1 1/4	3
PCR-800	8	8.625	300	125	3/8 x 1 1/4	3

\*Design loads shown represent a 3:1 safety factor.



**Two Hole Pipe Straps**

Aickinstrut Two Hole Pipe Straps are designed for use in securing pipe, conduit and ducts to Aickinstrut Channel. Two hole fiberglass straps can also be used independently from the channel for surface mounting. All sizes of the straps are suitable for load bearing applications.

The two hole pipe straps are manufactured from a fire-retardant, glass reinforced polyester resin. For extreme

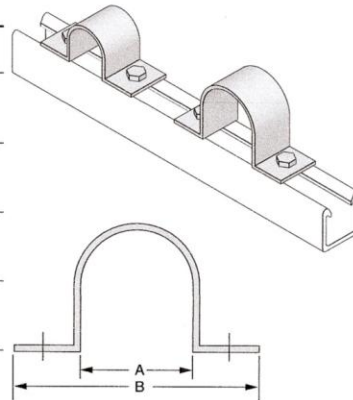
chemical environments, the straps can be manufactured from vinyl ester resin. Larger diameter straps for special applications are also available. Contact the factory for pricing and availability of vinyl ester and large diameter straps. Two hole pipe straps should not be torqued above recommended values.

Part Number	Dimension		Bolt Size (in.)	Material Size (in.)	Design Load (lbs)*		Torque (ft./lbs.)
	A (in.)	B (in.)			Type 1	Type 2	
PS050	0.840	4.840	1/2	1/4 x 1 1/2	135	50	4
PS075	1.050	5.050	1/2	1/4 x 1 1/2	135	50	4
PS100	1.315	5.315	1/2	1/4 x 1 1/2	135	50	4
PS200	2 3/8	6.375	1/2	1/4 x 1 1/2	135	50	4
PS250	2 7/8	6.875	1/2	1/4 x 1 1/2	135	50	4
PS300	3 1/2	7.500	1/2	1/4 x 1 1/2	135	50	4
PS350	4	8.000	1/2	1/4 x 1 1/2	135	50	4
PS400	4 1/2	8.500	1/2	1/4 x 1 1/2	175	60	4
PS500	5 9/16	9.563	1/2	1/4 x 1 1/2	175	60	4
PS600	6 5/8	10.625	1/2	1/4 x 1 1/2	175	60	4
PS800	8 5/8	12.625	1/2	1/4 x 1 1/2	225	125	4
PS1000	10 3/4	15.750	5/8	1/4 x 1 1/2	225	125	10
PS1200	12 3/4	16.250	5/8	1/4 x 1 1/2	225	125	10
PS1400	14	18.000	5/8	3/8 x 1 1/2	250	150	10
PS1600	16	20.000	5/8	3/8 x 1 1/2	250	150	10
PS1800	18	23.000	5/8	3/8 x 1 1/2	250	150	10

\*Design loads shown represent a 3:1 safety factor.

Notes: Bolts and channel nuts are sold separately.

[www.tycoelectrical.com](http://www.tycoelectrical.com)



When bolting onto 1 1/2" or 1 1/2" channel a 1 1/4" long bolt is required.