

Zone Series Valve

Zone Valve for Compact Applications

Technical Document



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Overview

The Siral Zone - series Valve, was designed for maximum efficiency in tight spaces, inventory optimization and excellent performance standards for zone control applications.

Zone - Series Valve

Siral's new zone valve combines the flexibility of easy field adjustment of max flow setting (Cv), normal and fail positioning in a very compact size. Our offering include 2-way and 3-way ball valves with NPT and sweat connections and seven different rotary actuator options. Each actuator is field adjustable for normal and direct return. Fail position on safe actuators can also be field adjustable (fail-open/fail-close).

Compact Design

The Siral Zone - Series valve is compact and excellent for maximizing workable space. It is a great OEM solution for tight package unit solutions.

Ball Valve Technology

The Siral Zone - series ball valve technology eliminates blockage and leakage caused by damaged surfaces commonly found in globe and flapper valves. Bi-directional flow is also achieved making installation more intuitive.

Easy Connect

The Siral Zone - Series easy connect helps simplify commissioning and reduces labor costs by allowing operators and technicians to assemble valve body to actuator in seconds without the need for tools.

Optimized Inventory/Simplify Ordering

Field Adjustable Max Cv/Flow

The Siral Zone - Series can be quickly and easily field adjusted to ensure that necessary flow design requirements are met and reduces inventory sku's.

Selectable Configuration

Unlike other zone valves in the market you can change the setup configuration of the zone - series at any time. Fail open/close or Normally open/close. Saving on time sensitive installations and reducing stocking inventory and sku's.

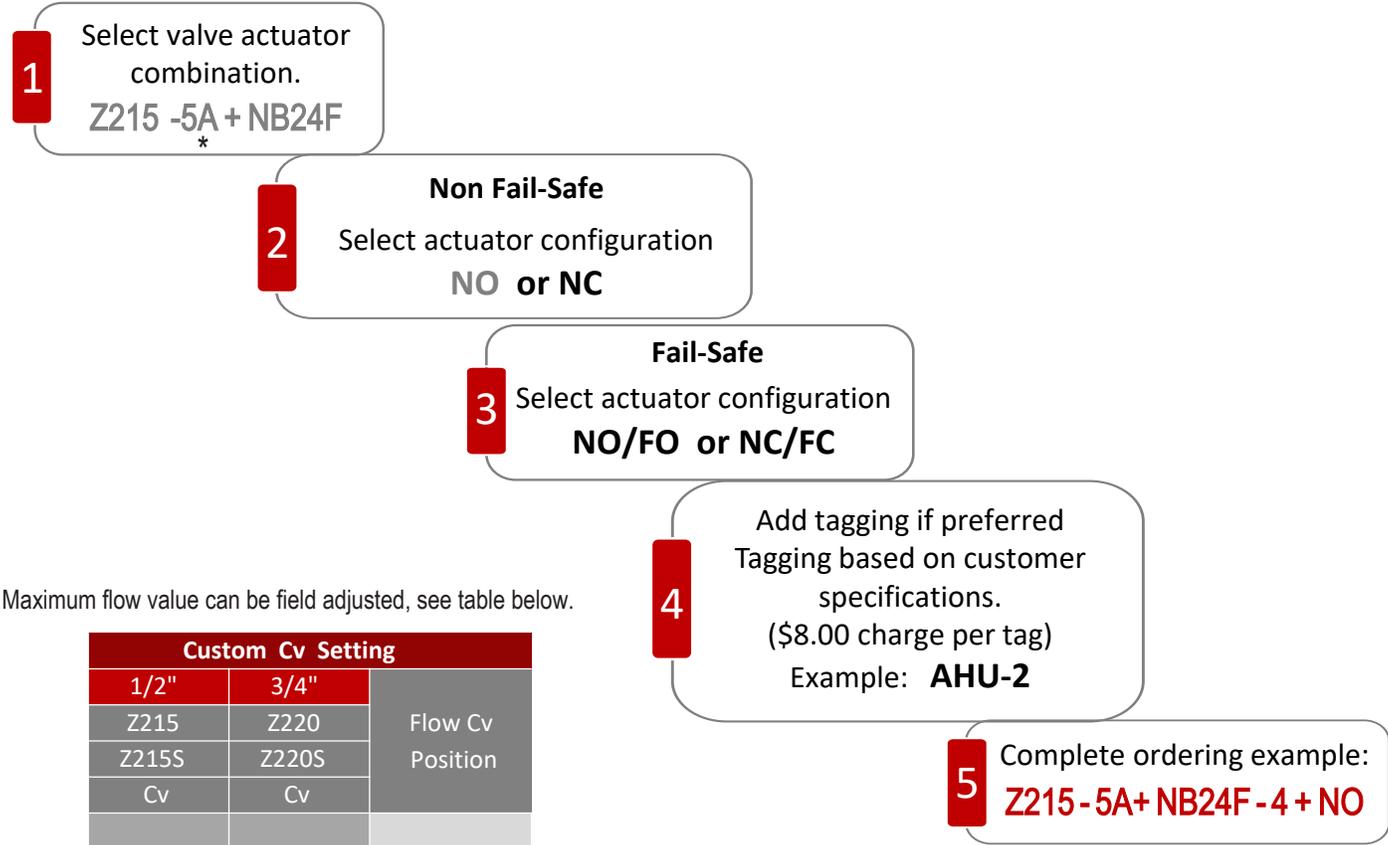
Benefits

- Zero leakage on all ports eliminates energy loss.
- Self-cleaning ball valve technology provides superior clog resistance.
- Field setup adjustable Normal and Fail positions eliminates ordering errors and reduces inventory.
- Low power consumption compared to conventional zone valves.
- Field adjustable Cv value to meet your design requirements.

Nomenclature

Valve				Blank = Max Cv	Actuator		
Z2	15			+NB	24	F	
Flow Pattern	Size	Connection	Flow (Cv) Setting	Actuator Type	Voltage	Control Signal	Aux. Switch
Z2 = 2-Way	15 = DN(mm), 1/2"	Blank = NPT	2-Way valves only (See table)	NB = Non fail-safe	24 = 24VAC/DC	Blank = On/Off	Blank = No Switch
Z3 = 3-Way	20 = DN(mm), 3/4"	S = Sweat		FB = Fail-safe	LV = 100 to 240 VAC	F = On/Off, floating	-S = Switch For On/Off fail safe version
						M = Modulating	

Order Example



* Maximum flow value can be field adjusted, see table below.

Custom Cv Setting		
1/2"	3/4"	Flow Cv Position
Z215 Cv	Z220 Cv	
0.12	0.38	- 4A
0.29	0.62	- 5B
0.45	0.97	- 5A
0.68	1.33	- 6B
0.96	1.73	- 6A
1.3	2.26	- 7B
1.73	2.98	- 7A
2.2	3.82	- 8B
2.89	4.89	- 8A
3.86	6.12	- 9B
4.21	8.05	- 9A
	9.3	Max (No Clip)

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Valve-Actuator Combinations

Valve					Actuator						
Size		2-Way		Cv	Non Fail-Safe		Fail-Safe			Non Fail-Safe	Fail-Safe
Inches	DN (mm)	NPT	Sweat	MAX	24VAC/DC					120 to 230 VAC	
					On/Off, Floating	Modulating	On/Off	On/Off, Switch	Modulating	On/Off, Floating	On/Off
1/2"	15	Z215-4A	Z215S-4A	0.12	NB24F	NB24M	FB24	FB24-S	FB24M	NBLVF	FBLV
	15	Z215-5B	Z215S-5B	0.29							
	15	Z215-5A	Z215S-5A	0.45							
	15	Z215-6B	Z215S-6B	0.68							
	15	Z215-6A	Z215S-6A	0.96							
	15	Z215-7B	Z215S-7B	1.3							
	15	Z215-7A	Z215S-7A	1.73							
	15	Z215-8B	Z215S-8B	2.2							
	15	Z215-8A	Z215S-8A	2.89							
	15	Z215-9B	Z215S-9B	3.86							
	15	Z215-9A	Z215S-9A	4.21							
15	Z215	Z215S	5.75								
3/4"	20	Z220-4A	Z220S-4A	0.38							
	20	Z220-5B	Z220S-5B	0.62							
	20	Z220-5A	Z220S-5A	0.97							
	20	Z220-6B	Z220S-6B	1.33							
	20	Z220-6A	Z220S-6A	1.73							
	20	Z220-7B	Z220S-7B	2.26							
	20	Z220-7A	Z220S-7A	2.98							
	20	Z220-8B	Z220S-8B	3.82							
	20	Z220-8A	Z220S-8A	4.89							
	20	Z220-9B	Z220S-9B	6.12							
	20	Z220-9A	Z220S-9A	8.05							
20	Z220	Z220S	9.3								

Valve					Actuator						
Size		3-Way		Cv	Non Fail-Safe		Fail-Safe			Non Fail-Safe	Fail-Safe
Inches	DN (mm)	NPT	Sweat	MAX	24VAC/DC					120 to 230 VAC	
					On/Off, Floating	Modulating	On/Off	On/Off, Switch	Modulating	On/Off, Floating	On/Off
1/2"	15	Z315	Z315S	2.8	NB24F	NB24M	FB24	FB24-S	FB24M	NBLVF	FBLV
3/4"	20	Z320	Z320S	4.65							

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Specifications - Non Fail Safe Actuators



Siral offers three zone series non-fail safe actuators. An On/Off, floating 24V version, a On/Off, floating (100 - 250V) version and a Modulating ((0)2 - 10V) 24V version. All actuators mount directly to all the Siral zone ball valves.

Non Fail Safe				
Specification		NB24F	NB24M	NBLVF
Control	Signal	On/Off, Floating (3-Point)	Modulating, 2 -10VDC	On/Off, Floating (3-Point)
Power	Voltage AC	24 VAC 50/60 Hz \pm 20%	24 VAC 50/60 Hz \pm 20%	100 -250 VAC \pm 10%
	Voltage DC	24 VDC \pm 10%	24 VDC \pm 10%	
	Overload Protection	Electronic	Electronic	Electronic
	Consumption Running	0.5W	0.5W	1W
	Transformer	1 VA(Class 2)	1 VA(Class 2)	2 VA
	Connection	Plenum rated cable 18 GA: 3 Ft (1 m)		Plenum rated cable 16 GA: 3 Ft (1 m)
Operation	Runningtime (Motor)	75 Seconds		
	Manual Override	With actuator body		
	Rotation Angle	90°, tool free field adjustable mechanical stops		
	Rotation Direction	Jumper Switch CW/CCW		
	Position Indicator	Visual Pointer		
	Noise	35dBA		
Housing	Protection	NEMA 1 / IP40		
	Rating	UL94-5V (B)		
Temperature	Ambient	-22°F to 122°F (-30°C to 50°C)		
	Storage	-40°F to 176°F (-40°C to 80°C)		
	Humidity	5 to 95% non-condensing		
Agency Listing		cULus UL 60730-1A/-2-15		
		CAN/CAS E60730-1:03		
		CE according to 2004/108/EC and 2006/95/EC for line voltage		

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Specifications - Fail Safe Actuators



Siral offers four zone series electronic fail safe actuators. An On/Off 24V version, an On/Off 24V version with a switch, an On/Off (100 - 250V) version and a Modulating ((0)2 - 10V) 24V version. All actuators mount directly to all the Siral zone ball valves.

Auxiliary switch

Fail Safe					
Specification		FB24	FB24-S	FB24M	FBLV
Control	Signal	On/Off	On/Off + Switch	Modulating, 2 -10VDC	On/Off
Power	Voltage AC	24 VAC 50/60 Hz ± 20%	24 VAC 50/60 Hz ± 20%	24 VAC 50/60 Hz ± 20%	100 -250 VAC ± 10%
	Voltage DC	24 VDC ± 10%	24 VDC ± 10%	24 VDC ± 10%	
	Overload Protection	Electronic	Electronic	Electronic	Electronic
	Consumption Running	1 W	1.5 W	0.5 W	1W
	Transformer	1 VA(Class 2)	2 VA (Class 2)	1 VA(Class 2)	2 VA
	Connection	Plenum rated cable 16 GA: 3 Ft (1 m)	Plenum rated cable 18 GA: 3 Ft (1 m)		Plenum rated cable 16 GA: 3 Ft
Operation	Runningtime (Motor)	80 Seconds	80 Seconds	75 Seconds	75 Seconds
	Runningtime (CAP)	50 Seconds	50 Seconds	50 Seconds	50 Seconds
	Manual Override	With actuator body			
	Rotation Angle	90°, tool free field adjustable mechanical stops			
	Rotation Direction (Motor)	Jumper Switch CW/CCW,			
	Rotation Direction (CAP)	Jumper Switch CW/CCW,			
	Position Indicator	Visual Pointer			
	Noise Motor	35dBA			
Noise Motor Cap	35dBA				
Housing	Protection	NEMA 2 / IP54			
	Rating	UL94-5V (B)			
Temperature	Ambient	-22°F to 122°F (-30°C to 50°C)			
	Storage	-40°F to 176°F (-40°C to 80°C)			
	Humidity	5 to 95% non-condensing			
Agency Listing		cULus UL 60730-1A/-2-14			
		CAN/CAS E60730-1:02			
		CE according to 2004/108/EC and 2006/95/EC for line voltage			

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Zone Control Ball Valve

2-Way, 1/2" & 3/4" NPT and Sweat



Specification			
Sizes [DN]		1/2" [15]	3/4" [20]
C _v	Range	0.12 to 5.75	0.38 to 9.3
Media	Type	Water, Glycol 60%	
	Temperature	0°F to 212°F [-18°C to 100°C]	
Pressure	Body	360 psi	
	Close-Off	80 psi	
	Differential (ΔP)	40 psid	
Leakage	A-AB Port	0%	
	B Port	N/A	
	Rating	according to EN 12266-1:2003	
Materials	Body	Forged Brass	
	Ball	Chrome plated Brass	
	Stem	Chrome plated Brass	
	Seats	PTFE	
	Stem O-Rings	EPDM Perox	
Flow	Curve	Characterized	
	Pattern	2-Way	
	Control Angle	75°	
Rangeability		100 : 1	
Valve	Connection	Female NPT and Sweat	



Application

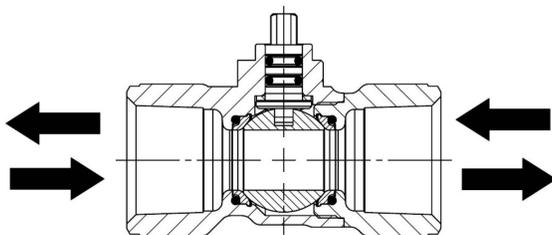
The Siral Zone series valve is a control valve and is ideal for use in fan coils, unit ventilators, heating and cooling coils and VAV re-heat coils. The Zone series valve efficiently helps controls the flow of media for heating and cooling coils and is available in both fail-safe and non fail-safe applications.

Operation

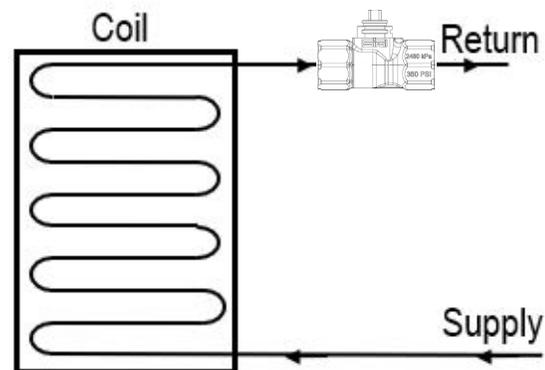
The Zone series Valve is an electronically actuated control ball valve. Control signal options include on/off, floating point or modulating (proportional) and are used to determine the final positioning of the ball rotation angle which determines the amount of flow through the valve.

Flow Pattern (2-Way)

The Siral Zone series 2-way valves can be piped with flow entering and exiting either port from either direction.



Piping (2-Way)



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Zone Control Ball Valve

3-Way, Mixing/Diverting, 1/2" & 3/4" NPT and Sweat

Specification			
Sizes [DN]		1/2" [15]	3/4" [20]
C _v	Max	2.8	4.65
	Type	Water, Glycol 60%	
Media	Temperature	0°F to 212°F [-18°C to 100°C]	
	Body	360 psi	
Pressure	Close-Off	80 psi	
	Differential (ΔP)	40 psid	
	A-AB Port	0%	
Leakage	B Port	N/A	
	Rating	according to EN 12266-1:2003	
	Body	Forged Brass	
Materials	Ball	Chrome plated Brass	
	Stem	Chrome plated Brass	
	Seats	PTFE	
	Stem O-Rings	EPDM Perox	
	Curve	Characterized	
Flow	Pattern	Mixing / Diverting	
	Control Angle	75°	
	Rangeability	100 : 1	
Valve	Connection	Female NPT and Sweat	



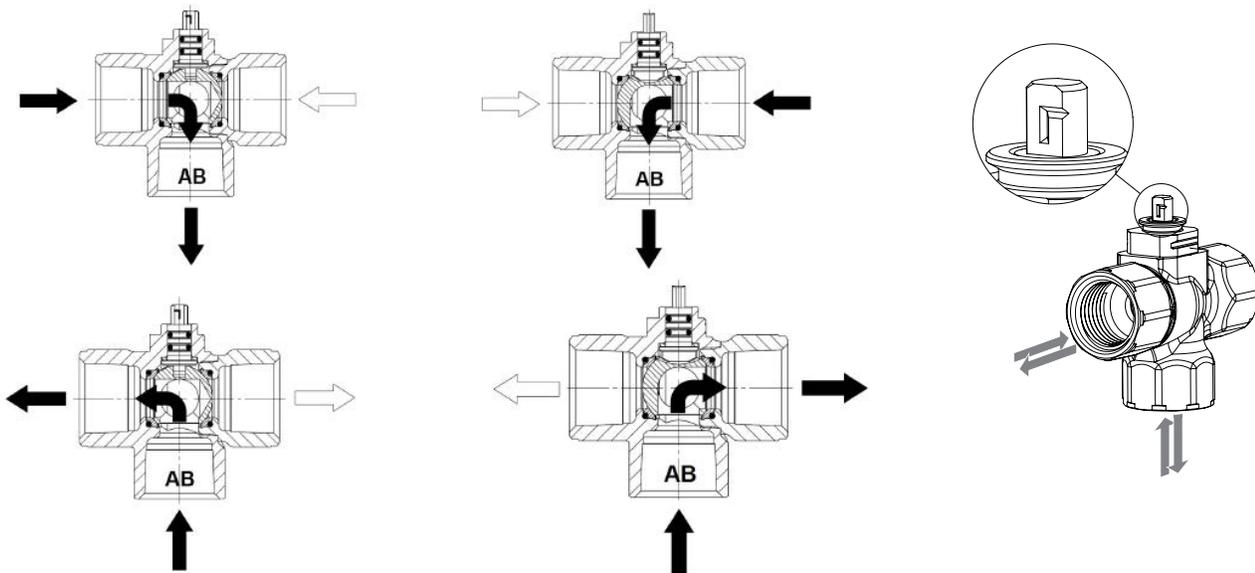
Application

The Siral Zone series valve is a control valve and is ideal for use in fan coils, unit ventilators, heating and cooling coils. The Zone series valve efficiently helps controls the flow of media for heating and cooling coils and is available in both fail-safe and non fail-safe applications.

Operation

The Zone series Valve is an electronically actuated control ball valve. Control signal options include on/off, floating point or modulating (proportional) and are used to determine the final positioning of the ball rotation angle which determines the amount of flow through the valve.

Flow Pattern (3-Way)



Zone Series Valve

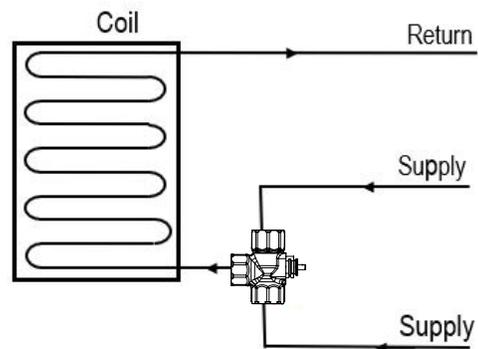
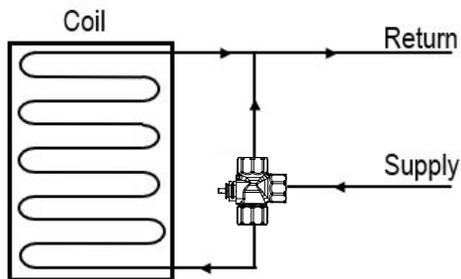
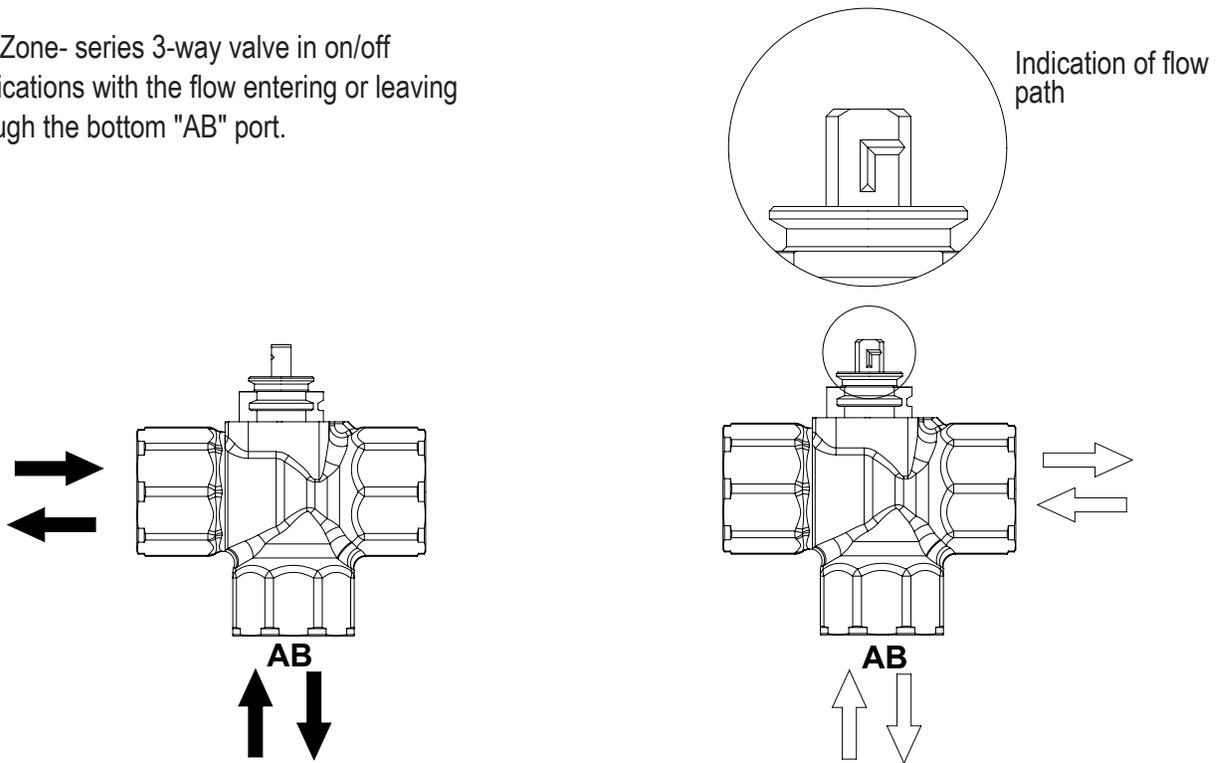
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Flow Pattern

Piping (3-Way)

The Zone- series 3-way valve in on/off applications with the flow entering or leaving through the bottom "AB" port.



The Zone - series 3-way in switching applications, hot and cold supply water can be piped to either of the side ports and exit the bottom "AB" port for regulation by another 2-way valve; typically installed in the return pipe.

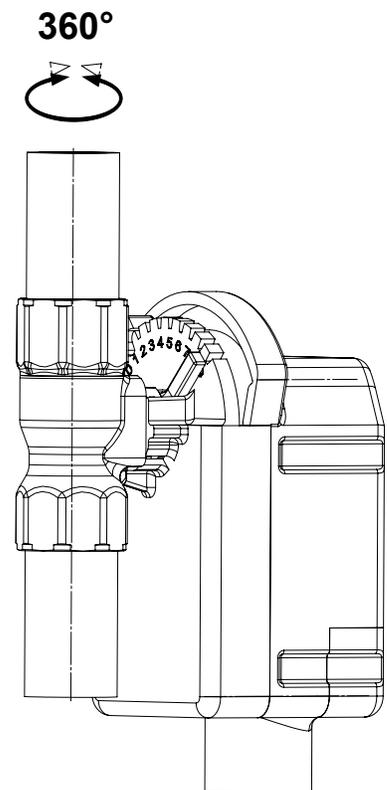
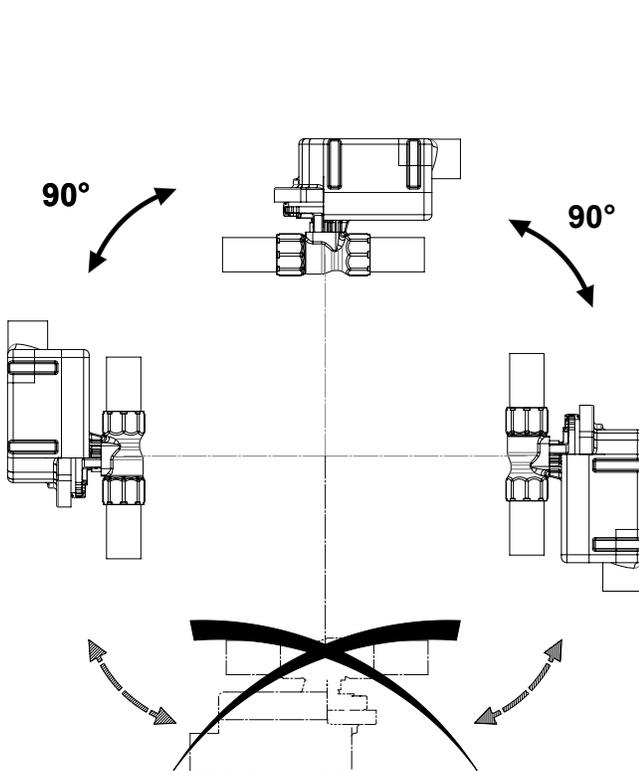
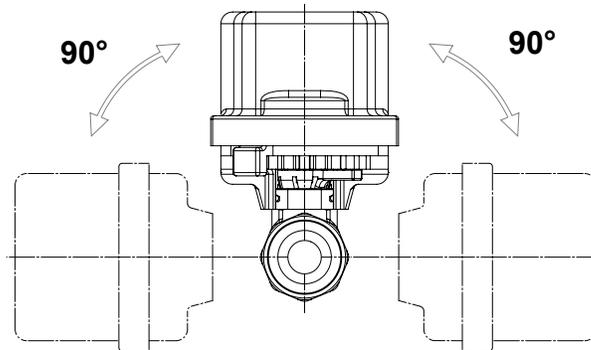
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Installation



The valve assembly can be installed in a vertical or horizontal arrangement. Product should be positioned to avoid water from dripping on the actuator.



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Insulation



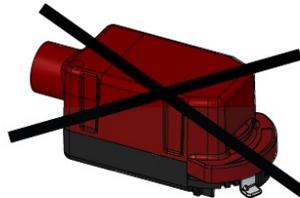
NOTE:

Insulation should wrap the pipe and valve body but not the actuator. Insulation must be below actuator.

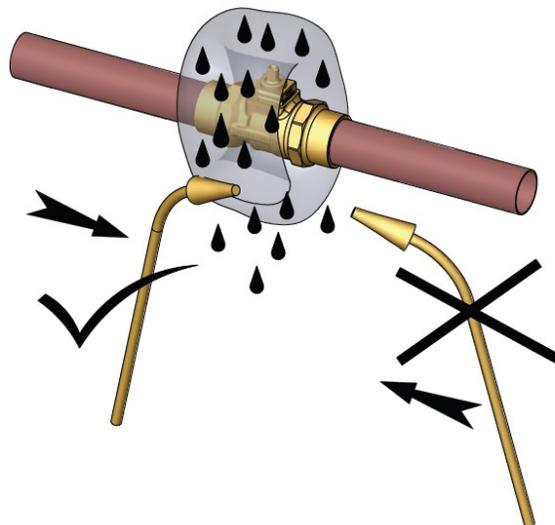


NOTE:

When soldering valve to pipe actuator should be removed to protect from heat damage.



Valve should also be covered with wet towel to protect internal valve components from damage. Use appropriately sized torch to prevent overheating of the valve.



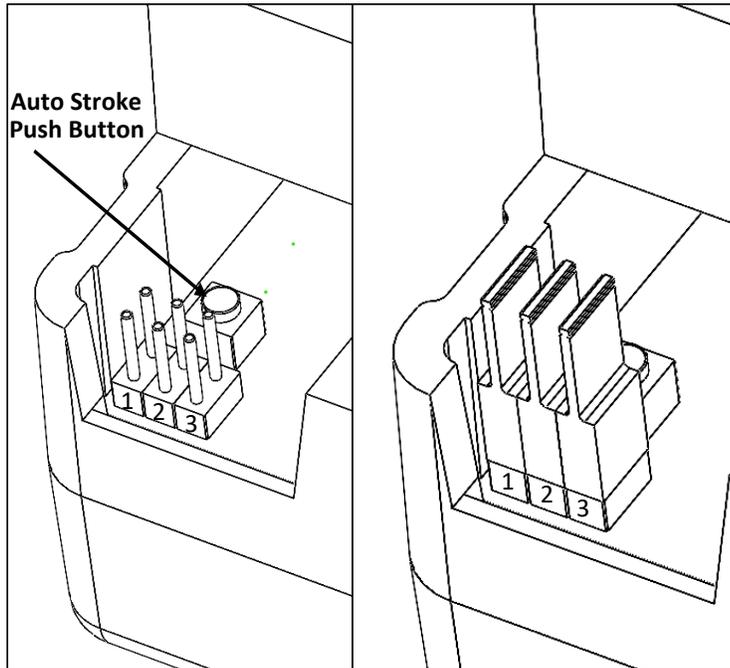
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Field Setup and Adjustments



FB24M - Fail safe Modulating ((0)2 - 10V)



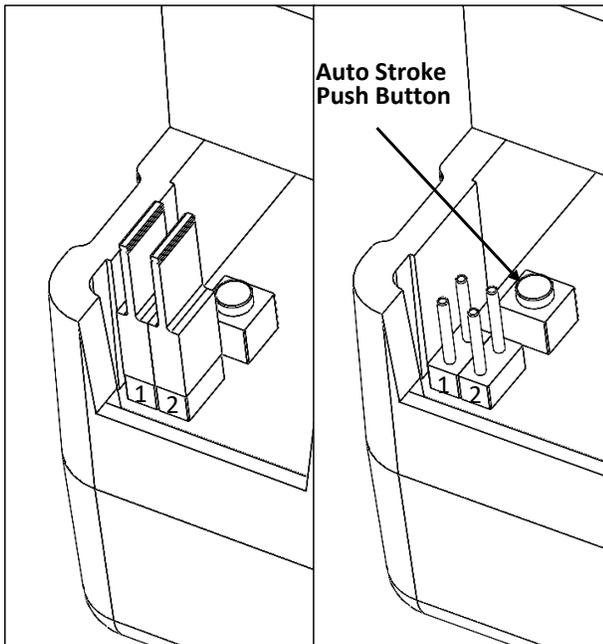
Field setup allows for the changing of some actuator parameters like Normal and fail positions, Signal range (0 - 10V or 2 - 10V). This reduces the possibility of needing to return a product because the setup needs to be changed. It also reduces distributor and OEM inventory.

Auto stroke button is used to rescale the (0)2 - 10 input signal when max flow setting has been changed. Button should be pressed once after flow setting clip is adjusted with actuator powered.

Jumper Position	1	2	3	Actuator
ON	2 - 10V	Direct (0 to 9)	Fail Close (9 to 0)	FB24M
OFF	0 - 10V	Reverse (9 to 0)	Fail Open (0 to 9)	

*

NB24M - Non fail safe Modulating ((0)2 - 10V)



Direct/Reverse acting jumper is under wiring cover.

Reverse = CW with decrease in signal
 Direct = CCW with decrease in signal
 No feedback

Jumper Position	1	2	Actuator
ON	2 - 10V	Direct (0 to 9)	NB24M
OFF	0 - 10V	Reverse (9 to 0)	

*

*Default Setup in Grey.

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Field Setup and Adjustments

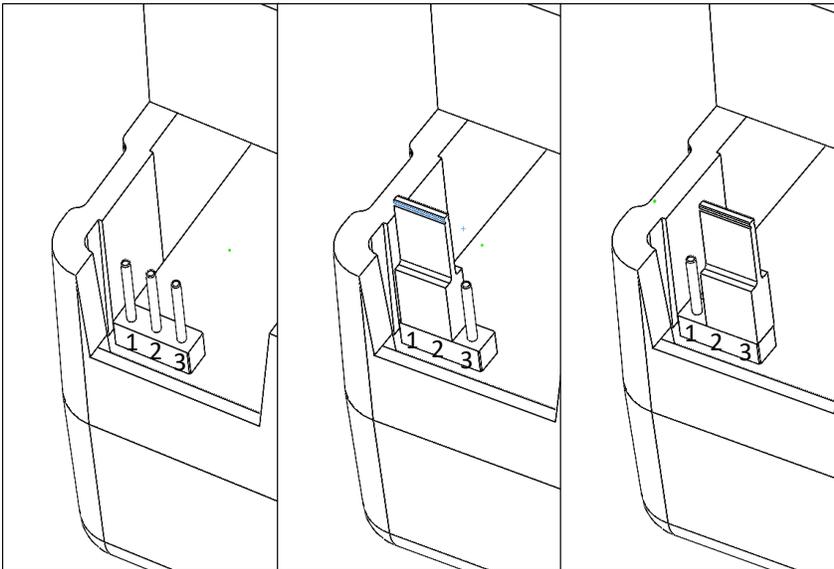


NB24F (Non fail safe On/Off, floating)

FB24 (Fail Safe On/Off)

FB24-S (Fail Safe On/Off + Switch)

FBLV (Fail Safe On/Off, 100 -250V)



Jumper Position (ON)		Actuator
(1 - 2)	(2 - 3)	
Reverse (9 to 0)	Direct (0 to 9)	NB24F
Reverse (9 to 0)	Direct (0 to 9)	FB24,
Fail Open (0 to 9)	Fail Close (9 to 0)	FB24-S
* Direct (0 to 9)	Reverse (9 to 0)	FBLV
Fail Close (9 to 0)	Fail Open (0 to 9)	

*Default Setup in Grey.

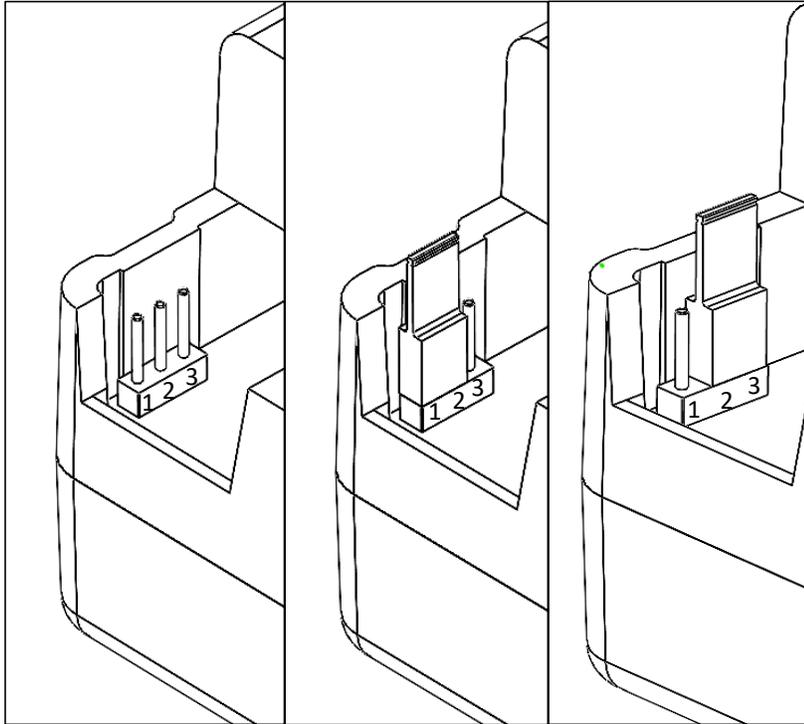
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Field Setup and Adjustments



NBLVF - Non Fail Safe On/Off, Floating 100 -250V



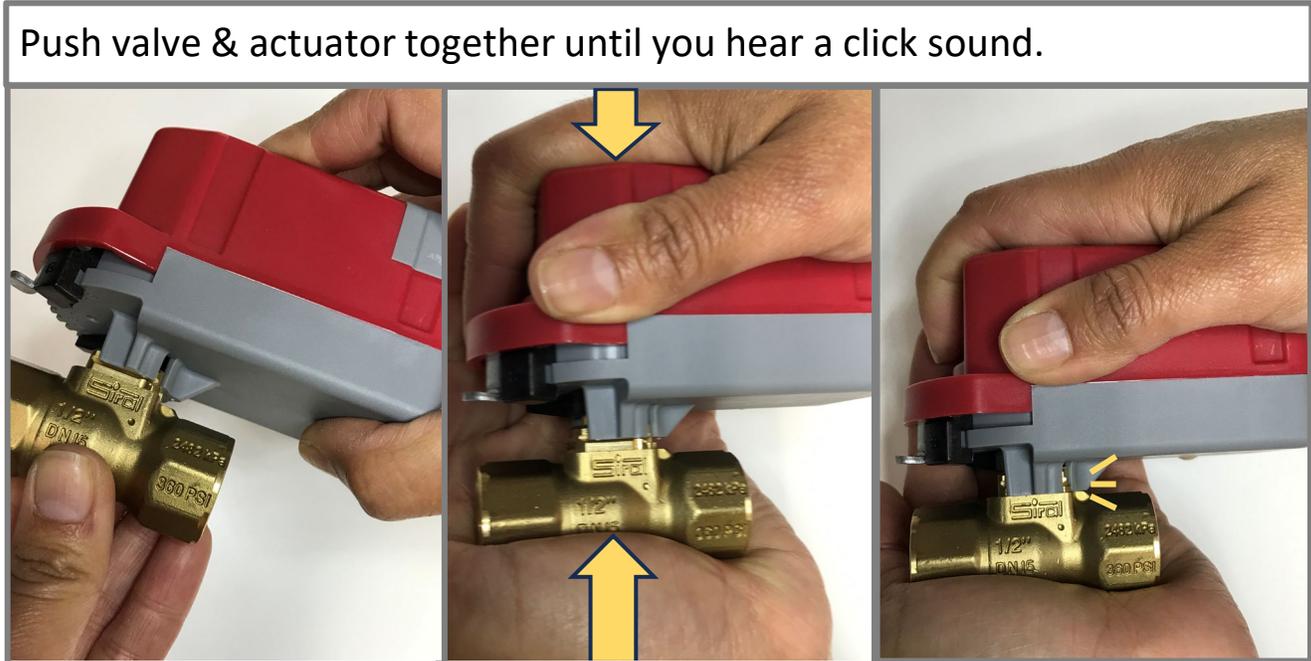
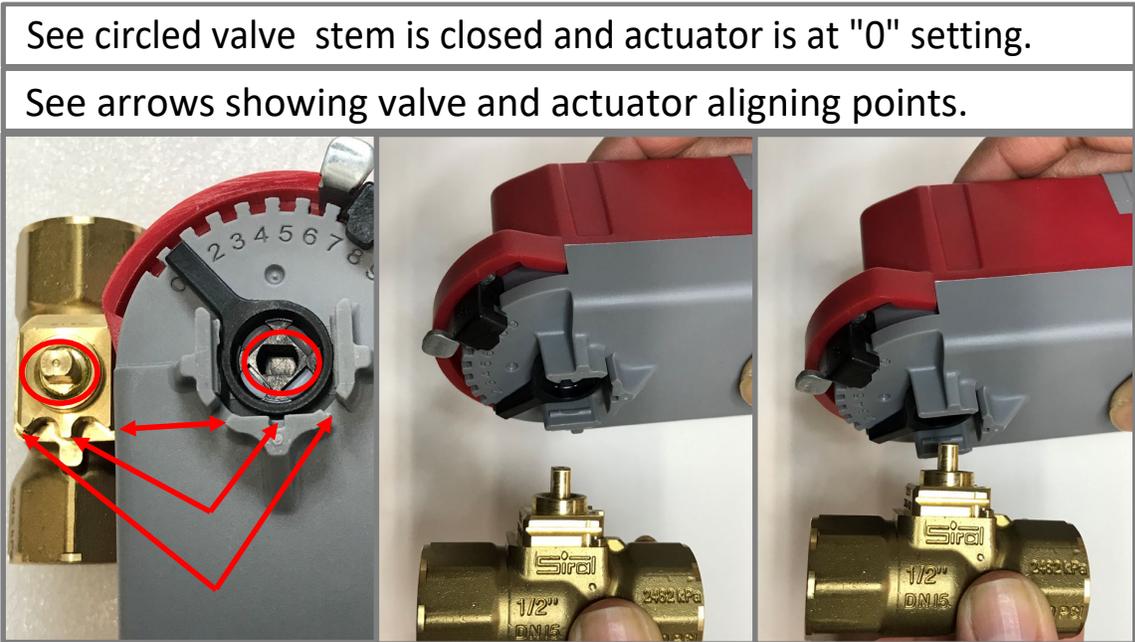
Jumper Position	(1 - 2)	(2 - 3)	Actuator
ON	Direct (0 to 9)	Reverse (9 to 0)	NBLVF

*

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Valve Actuator Assembly



NOTE: Do not twist to disassemble. Pull hard and keep aligned.

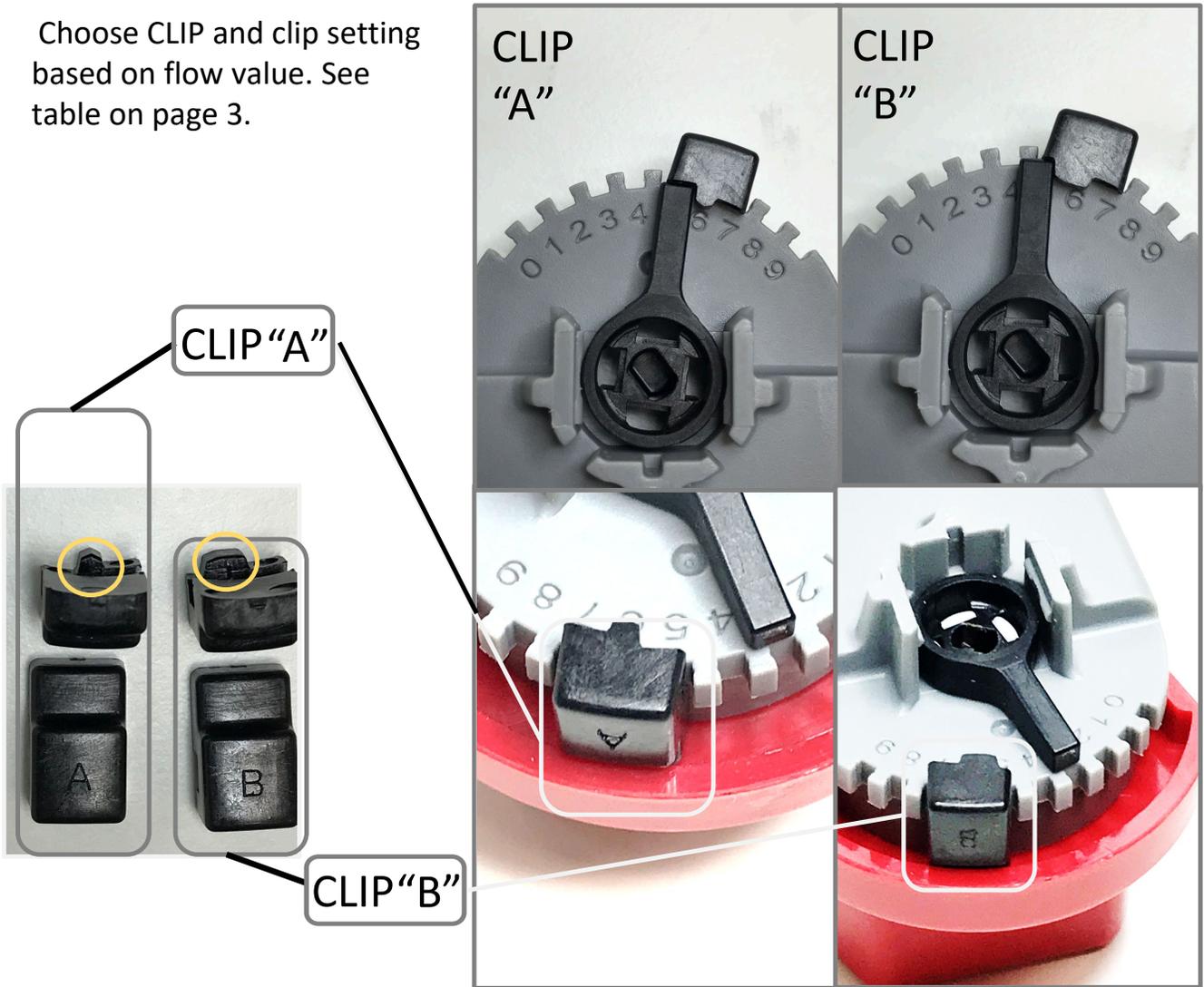
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Flow Setting



Choose CLIP and clip setting based on flow value. See table on page 3.

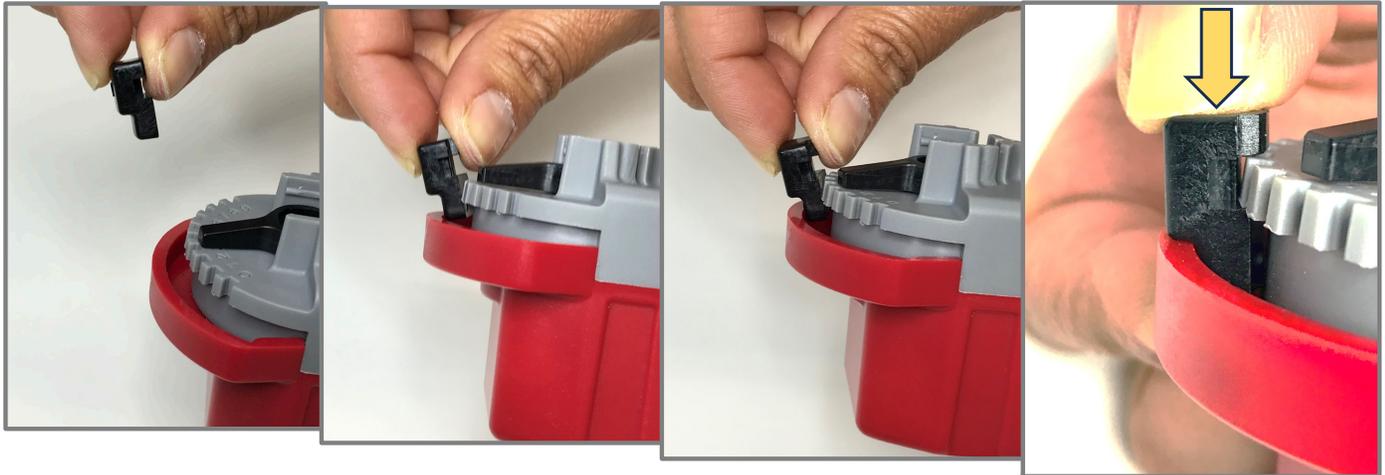


NOTE: Clip must always be on the side of the pointer since it is designed to limit maximum flow..

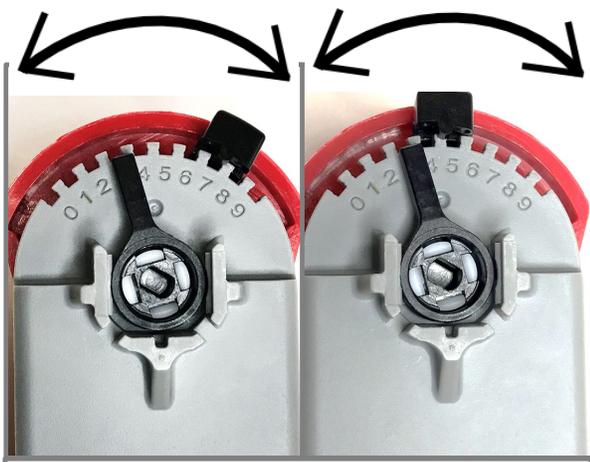


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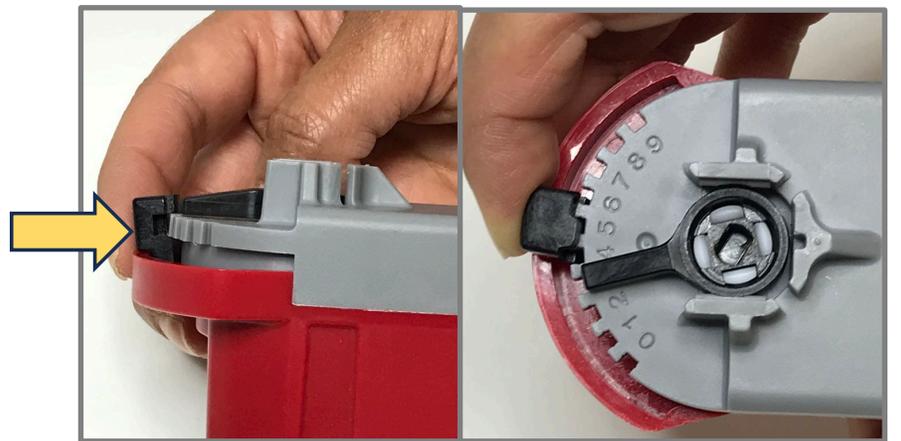
Technical Document
Flow Setting



Push CLIP down until you hear a click sound.



Slide CLIP to desired setting



Push CLIP in until you hear a click sound

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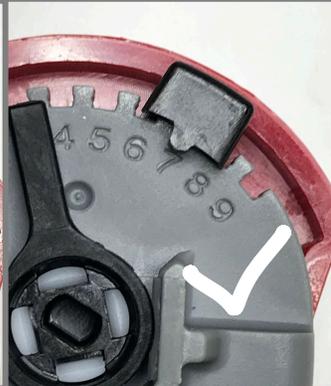
Flow Setting



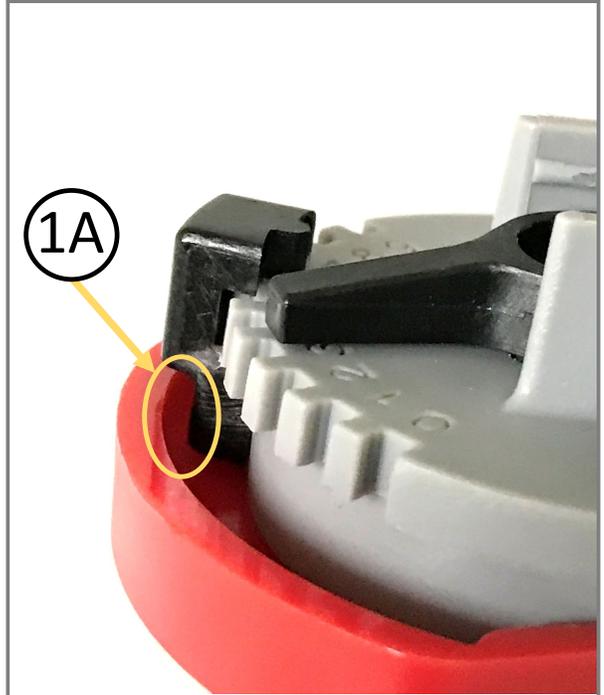
CLIP **NOT** completely inserted.



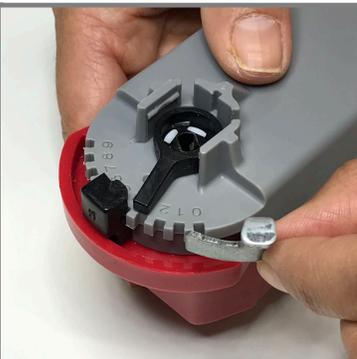
CLIP completely inserted.



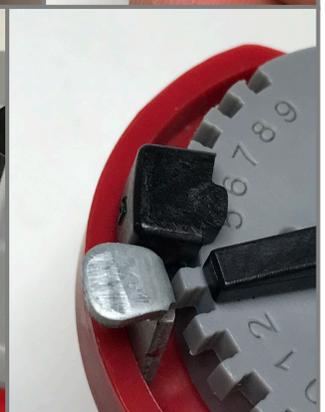
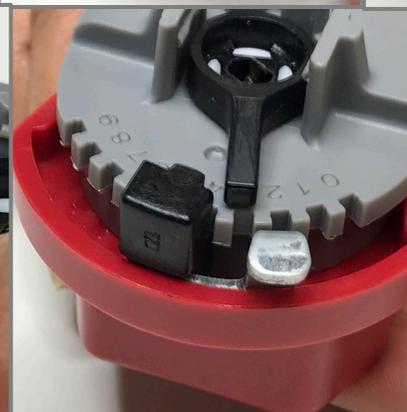
For next step you must see a gap between Red housing and black clip.



Insert metal safety bracket.

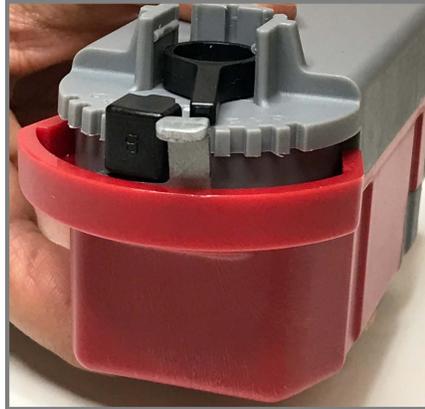


Will fit through gap (1A) above.



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Flow Setting



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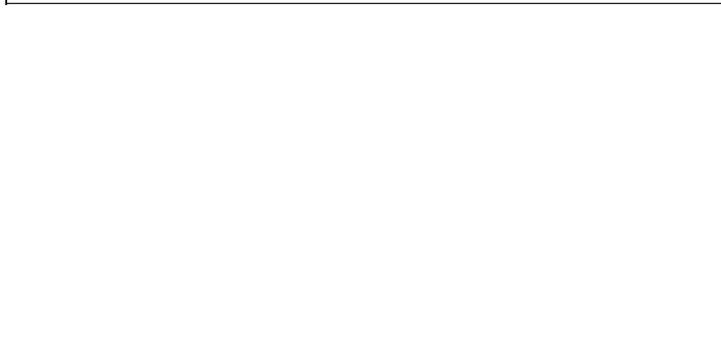
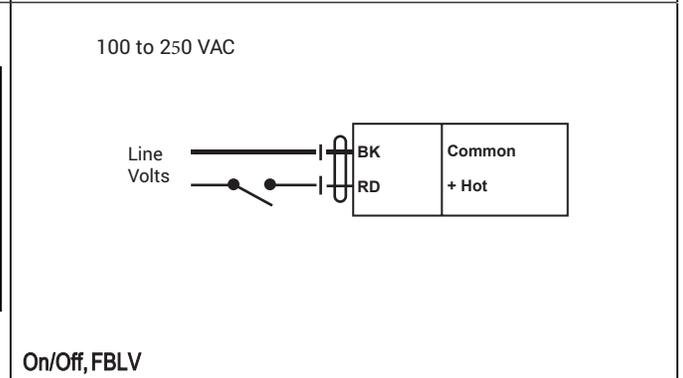
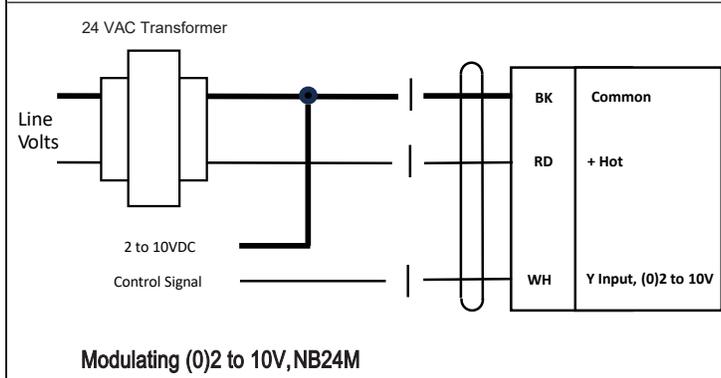
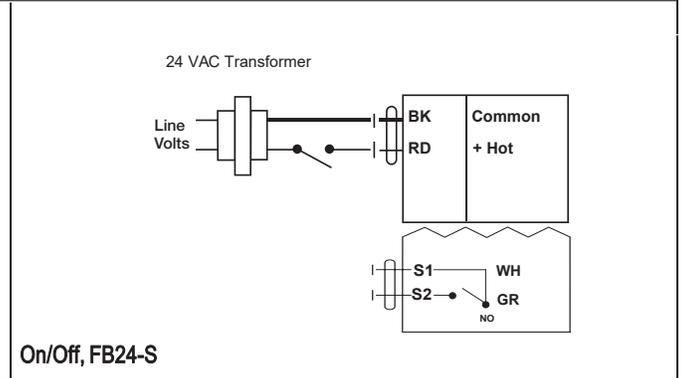
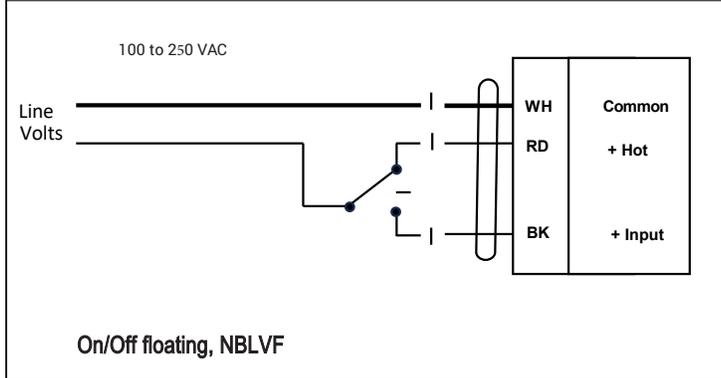
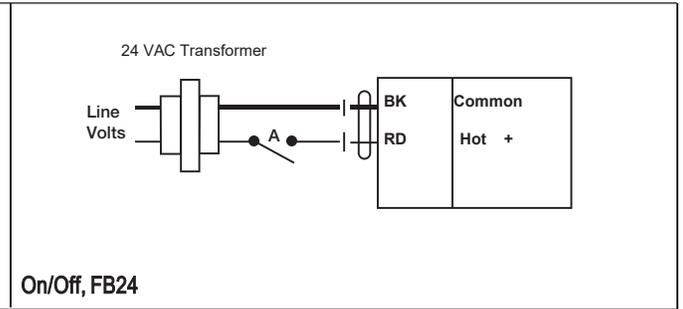
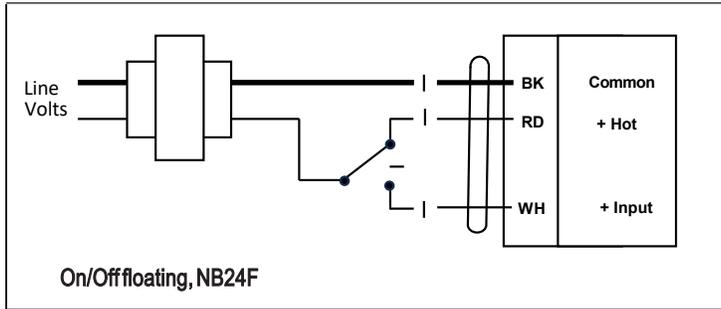
Wiring Diagrams

24VAC Transformer



Non fail Safe Actuators

Fail Safe Actuators



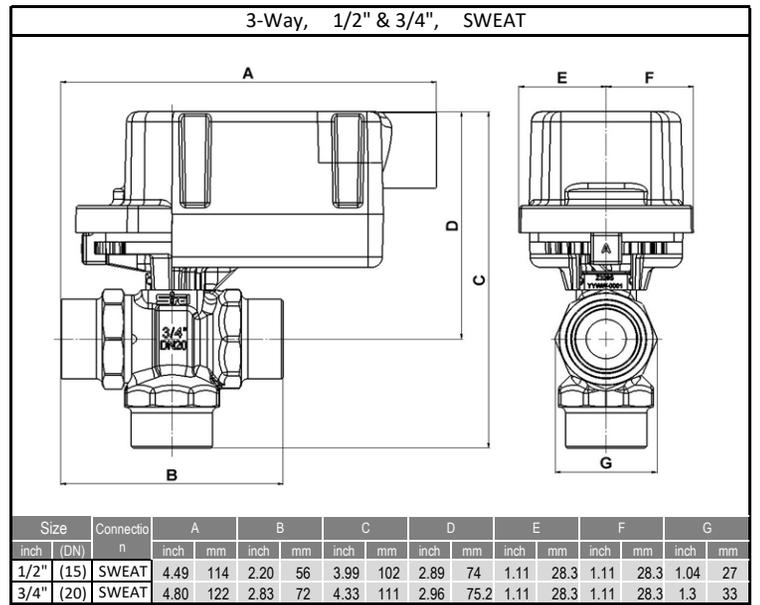
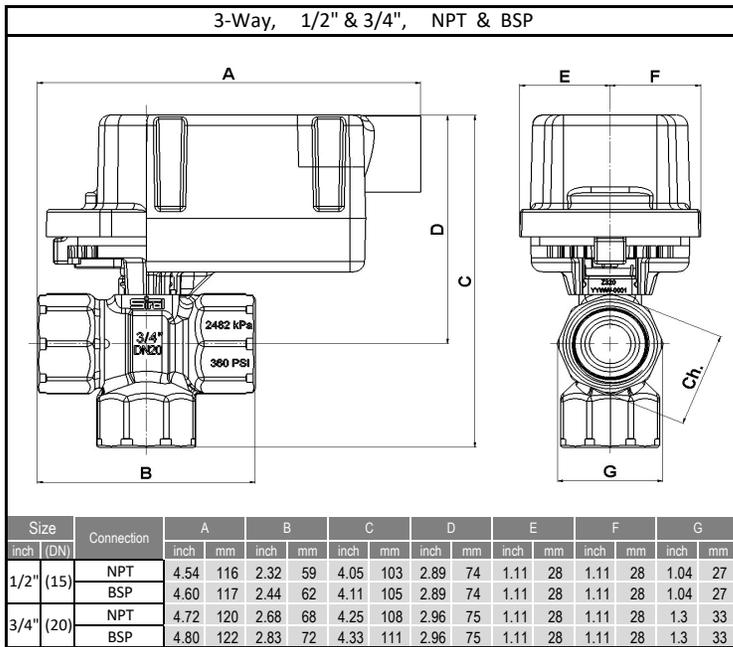
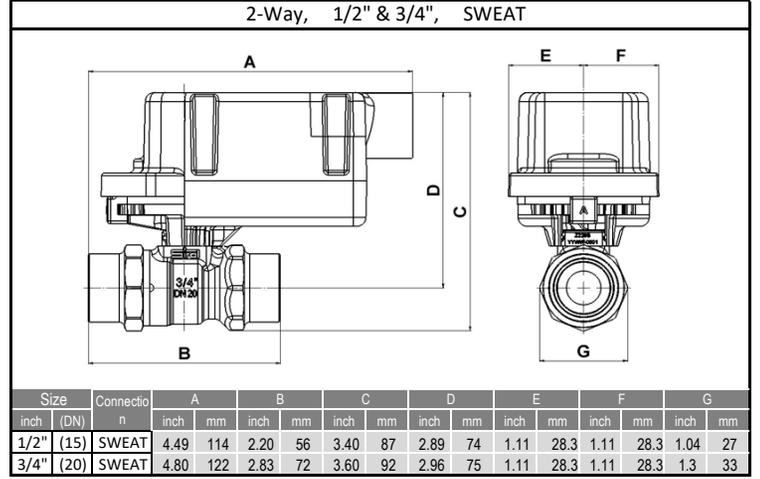
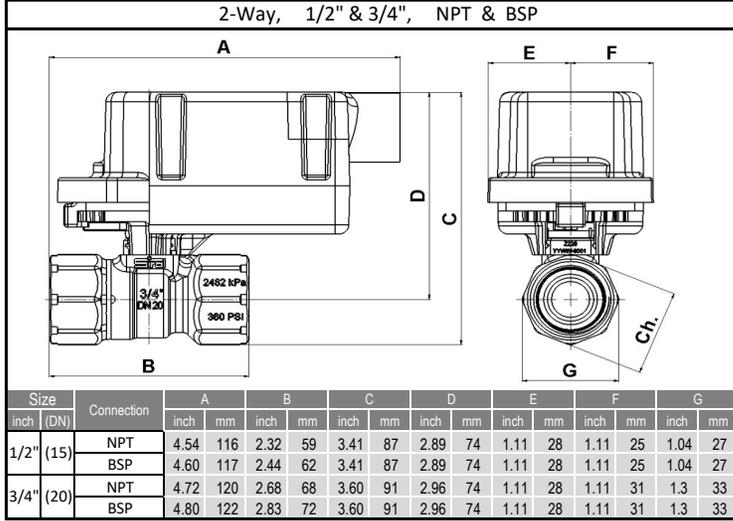
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Zone Series Valve

Technical Document

Dimensions

24VAC Transformer



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Zone Valve Technical Document

Terms and Conditions

1 Applicable Terms and Conditions of Sale

1.1 These Terms and Conditions of Sale ("Terms") establish the rights, obligations and remedies of "Seller" and "Buyer" which apply to any order issued by Buyer for the purchase of products described in its product guide, catalogs, analytical data and other literature ("Products"). As used herein, "Seller" shall mean Siral, as applicable, and "Buyer" shall mean any party, individual or business entity, who contracts to purchase products from Seller. These Terms shall prevail over any conflicting terms or conditions Buyer may submit at any time, unless otherwise specifically agreed in writing by both Buyer and Seller.

2 Prices

2.1 All prices are in US currency unless otherwise clearly specified in an accepted agreement.

2.2 Prices on products are exclusive of all sales, excise and other taxes, and exclusive of freight, handling and storage charges, any or all of which, as applicable, will be added as separate charges to be paid by the Buyer or otherwise charged as indicated in these Terms. If Seller is required to impose, levy, collect, withhold or assess any such taxes, duties or charges on any transactions, then in addition to the purchase price, Seller will invoice Buyer for such taxes, duties, and charges unless at the time of order placement Buyer provides Seller with an exemption certificate or other documentation sufficient to verify exemption from such taxes, duties or charges.

2.3 Seller reserves the right to change its prices if from the time of quotation (a) raw material and/or component prices have changed; or (b) actual volume is less than forecast volume; or (c) there is any significant change in economic circumstance; or modifications requested by Buyer give rise to additional costs.

2.4 Price quotations are effective for thirty (30) days subsequent to the date at which the quotation is given. Unless otherwise agreed by Seller in writing, price quotations provided by Seller are not intended as and shall not be construed as constituting an offer to Buyer. Any prices provided by Seller is subject to, and shall not become binding upon Seller until, (a) actual receipt by Seller of Buyer's written order based on all the terms and conditions stated herein, without qualification, within thirty (30) days after the date of the price quotation, and (b) Seller's written acceptance of such order.

2.5 Unless otherwise specified by Seller, all prices are F.O.B. Point of Origin from which shipment is made and payment terms will be net thirty (30) days from date of invoice.

2.6 Buyer will be charged a handling fee of US \$20 for all orders with a net value of less than US \$300. Freight, expedited fees or any other shipping charges shall be paid by Buyer and are in addition to the price of goods within the order including Buyer's minimum order charge.

3 Delivery

3.1 All delivery dates are approximate, and Seller shall not be responsible for any damages or losses of any kind resulting from any delay. Unless otherwise agreed by Seller, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyer's request beyond the respective dates indicated in Buyer's orders shall be made except on terms that will indemnify Seller against all loss and additional expense, including, but not limited to demurrage, handling, storage, and insurance charges.

3.2 Unless otherwise stated in writing delivery shall be deemed to take place upon the occurrence of the first in time of the following, namely (a) the physical delivery of Products to the Buyer at the Seller's works; (b) the physical delivery of Products to the Buyer's carrier or agent for the purpose of transmission to the

Buyer or his nominee; (c) the physical delivery of Products to the Buyer's place of business or such other place as he may direct, its carrier or agent, the Buyer being responsible for unloading.

3.3 Signature of the Seller's delivery note by any employee, representative or agent of the Buyer shall be conclusive proof of delivery.

3.4 Where the contract provides for delivery by the Seller, its carrier or agent, any claims for non-delivery must be made in writing to the Seller within fifteen (15) days of receipt of invoice or advice note whichever is the earlier.

3.5 Where the contract provides for delivery by the Seller, its carrier or agent, any claims in respect of Products damaged in transit or shortages in delivery must be made in writing to the Seller within seven (5) days of delivery, shortages in delivery shall not give rise to a right to reject the Products delivered.

3.6 The Seller shall be entitled to make partial deliveries or deliveries by installments and all the provisions of these terms shall apply to such deliveries.

4 Payment Terms

4.1 Payment is due thirty (30) days from the date of invoice. All invoices are payable in US currency.

4.2 If Buyer is delinquent in its payment obligations for forty five (45) days or more, Seller may upon written notice to Buyer stop work and withhold future shipments until all delinquent amounts and late interest, if any, are paid.

4.3 Invoices unpaid and past due will be subject to a service charge on the unpaid balance at an interest rate equal to the lesser of two percent (2%) per month or the maximum allowable interest rate under applicable law, and Buyer shall be responsible and liable for all expenses incurred by Seller.

4.4 Buyer will not set off or recoup invoiced amounts or any portion thereof against sums that are due or may become due from Seller.

5 Title and Risk

5.1 The Product shall remain the property of Seller until full payment of the price has been effected.

5.2 Buyer shall, at the request of Seller, take any measures necessary to protect Seller's title to the Product.

5.3 The retention of title shall not affect the passing of risk in accordance with the respective applicable INCOTERM.

6 Returns

6.1 Products received by Buyer cannot be returned without Seller's prior consent.

6.2 Seller reserves the right to charge a restocking charge of an amount no less than twenty percent (20%) of the invoice value of Product on all returns, except in the event of an error on Seller's part.

6.3 Items ordered by Seller for special orders cannot be returned except under exceptional circumstances and in such cases, only subject to full agreement with Seller's supplier(s).

6.4 Products 'incorrectly ordered' or 'surplus to requirements' can only be returned within fourteen (14) days from date of shipment, and all returns conditions listed under this section apply to returned Products.

6.5 Products qualifying for return are subject to review for marketability (quantities in question in relationship to historical stock movement) before issuance of a Return Material Authorization (RMA) number.

6.6 All Product returns must be accompanied by a valid Return Material Authorization (RMA) number. RMA numbers may be obtained from the Seller. When requesting a RMA, the original purchase order number and date of purchase must be provided.

6.7 All Product returns must be received within thirty (30) days of the RMA issuance. 6.8 All Product returns must be shipped freight prepaid. No collect shipments will be accepted by Seller.

6.9 All Products must be received within one (1) year of original sale date.

6.10 Products for credit consideration should be returned in original packaging to Seller's originating location. All returns are subject to inspection upon receipt. No credit will be issued until returned Product has been inspected, accepted, and processed. 6.11 Buyer will be contacted if quantity differences and/or non-acceptable Product are found during inspection. Any credit issued will reflect only quantities actually received and accepted by Seller.

6.12 Disposition (return to Buyer or scrap) of returned Product not accepted back by Seller must be provided by Buyer within fourteen (14) days, otherwise it will be subject to disposal.

7. Warranty

7.1 "Non-conformance" means failure to comply with warranty, as defined below, within the Warranty Period.

7.2 Normal wear and tear, regular overhaul, and periodic maintenance do not constitute non-conformance.

7.3 Seller warrants that its Products shall conform to the description of such Products as provided to Buyer by Seller through Seller's Product literature. This warranty is exclusive, and Seller makes no other warranty, express or implied, including any implied warranty or merchantability or fitness for any particular purpose or course of dealing or usage of trade, which are hereby disclaimed. Seller's warranties made in connection of a sale shall not be effective if Seller has determined, in its sole discretion, that Buyer has misused the Products in a manner depicting non-conformance, has failed to use the Products in accordance with industry standards and practices, or has failed to use the Products in accordance with instructions, if any, furnished by Seller. Seller does not warrant any Products obtained through an unauthorized Distributor, Dealer, or Agent.

7.4 The "Warranty Period" for all Products listed in Seller's Product literature shall carry a five (5) year warranty within the United States. The 5 year warranty period is unconditional for the first two (2) years from the date of production of Products. After the first 2 years from the date of sale, the warranty shall be conditional and the warranty coverage shall not apply to damage to Products caused by factors that constitute non-conformance beyond the control of Seller. The period shall begin on the later of (a) the date on which the Product first enters a retail distribution/sales channel, or (b) the date of delivery to the end user provided Buyer presents the end user's retail invoice demonstrating such date of delivery. Products that are listed in this Product Guide as carrying a 2-year warranty to a location in the United States or Canada shall carry a 2-year warranty. The 2-year warranty is conditional and the warranty coverage shall not apply to damage to Products caused by ordinary wear and tear, negligence or improper use by Client, or other causes beyond the control of the Seller. Product specific terms of warranty with regard to warranty period or conditions of warranty may apply to certain specified Products as stated in the documentation for those Products.

7.5 Seller warrants to Buyer that at the time of shipment and for the Warranty Period: (a) the Product will be free from defects in workmanship and materials, and (b) the Product will comply with the drawings, specifications, and operating conditions as set forth in Seller's instructions, manuals, or specifications.

7.6 This Warranty does not apply to prototype, development, and pre-production Products. All prototype, development, and

pre-production Products are accepted by Buyer on an "AS IS" basis with no warranties whatsoever. Furthermore, Seller shall not be responsible for any non-conformance if the Product has been exposed or subjected to any: (a) use of the Product other than specified in applicable Seller's instructions, manuals, or specifications; or (b) operation of Product outside of operating limits and parameters; or (c) maintenance, repair, overhaul, installation, storage, operation or use, which is improper or not in accordance with Seller's instructions, manuals, or specifications; or (d) alteration, modification, including by integration of Products into or with Buyer's equipment, or (e) accident, contamination, foreign object damage, abuse, neglect or negligence after shipment to Buyer; or (f) use of counterfeit or replacement parts that are not manufactured or approved by Seller for use in Seller's manufactured Products; or (g) damage caused by failure of any hardware or software not supplied by Seller or a Seller supplied Product not under warranty. 7.7 Buyer must notify Seller of any claimed non-conformance in writing by returning a Returned Material Authorization Form ("RMA Form") to Seller.

7.8 Prior to returning any Products under warranty, Buyer must obtain an RMA number from Seller. The RMA Form must be received by Seller within ninety (90) days of Buyer's discovery of any claimed non-conformance and must contain a detailed description of any claimed non-conformance or Buyer will be barred from any remedy under the Warranty.

7.9 Upon Seller's receipt of Buyer's completed RMA Form, Seller will provide Buyer with a Returned Material Authorization Number ("RMA#"). Buyer must await its receipt of the RMA# before returning any Product to Seller.

7.10 Seller will return, at Buyer's expense, any Product not properly identified or associated with an RMA#. When Seller requires the examination of claimed non-conforming Product, Seller will notify Buyer as to the place of return and will await receipt of the claimed non-conforming Product before further processing the warranty claim.

7.11 Buyer will ship the Product by normal ground shipment and bear the cost of shipment and risk of loss or damage to Products while in transit to Seller.

7.12 If Seller ultimately determines that the failed part is covered under Warranty, Shipper will reimburse Buyer for the cost of ground shipment for the Product(s) found to be in non-conformance.

7.13 If Seller reasonably determines after analysis of the returned Product that a non-conformance does not exist, then Buyer will pay all expenses related to the improper return including, but not limited to, analysis and shipping charges.

7.14 Any claimed non-conforming Product must be received by Seller within thirty (30) days of issuance of a notice to return Product. 7.15 If Seller determines that a Product does not conform to Warranty, Seller may elect, in its sole discretion, to repair, replace, or exchange the Product, or credit the original purchase price. In addition, Seller will credit Buyer for standard labor and handling costs (to be agreed case by case) per applicable Product.

7.16 Repair, replacement, exchange, or credit of the original purchase price and standard labor and handling costs are the exclusive remedies under Seller's Warranty. All Products repaired, replaced or exchanged are warranted for a period equal to the greater of: (a) the remainder of the original 5 year Warranty Period or 2 year Warranty that was applicable to the repaired, replaced or exchanged Products, or six (6) months, effective from the date the repaired, replaced or exchanged Products are shipped by Seller.

8 Limitation of Liability

8.1 In no event will Seller be liable for any incidental damages, consequential damages, special damages, punitive damages, statutory damages, indirect damages, loss of shipment, loss of products, loss of profits, loss of revenues, loss of use or damage to brand name, even if informed of the possibility of such damages. Seller's liability for damages arising out of or related to this agreement shall in no case exceed in the aggregate a sum equal to twice the amount actually paid to Seller for the products from which the claim arose. Further, if buyer requires Seller to use a particular supplier or suppliers, then Seller shall have no liability for the supplier(s) performance, nor for any damages caused directly or indirectly by Seller's product to the extent resulting from incorporation of such supplier(s) product. To the extent permitted by applicable law, these limitations and exclusions will apply regardless of whether liability arises from breach of contract, warranty, tort (including but not limited to negligence), by operation of law, or otherwise. Nothing herein, however, is intended to disclaim Seller's liability for personal injury or death caused by defective products to the extent such liability is mandated by law.

9 Place of Jurisdiction and Applicable Law

9.1 The exclusive place of jurisdiction for all disputes arising from these Terms between the parties shall be governed by the laws of the State of Delaware and the parties shall be governed exclusively by the formal and material laws of the Federal and state courts located in the State of Delaware without reference to its conflict of law provisions. All disputes arising hereunder or in connection with Products shall be subject to the exclusive jurisdiction of the courts of the State of Delaware, to which the parties hereby submit themselves.