

# Butterfly Valve Series

## High Volume Flow Control

### Technical Document



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## Overview

The Siral C and C...L series butterfly valves support a wide range of commercial and industrial applications. With standard lug style design they are optimized for ANSI 150 piping systems. The control actuators in this series also offer Nema 4X protection for more demanding environmental conditions.

## High Volume Flow Control

Siral resilient seat butterfly valve offers high volume flow control in a space efficient package. It is offered in 2-way configurations from 2" to 30" and in 3-way configurations from 2" to 12". All sizes are available with multiple options of electronic actuators.

## Features and Benefits

- Multiple bushing shaft centralization design – Maintains tight concentric tolerance over life which reduces possibility of leakage and torque drift.
- Cartridge seat design contains an elastomer bonded to a synthetic polymer stabilizing ring which reduces seat degradation by eliminating movement of the elastomer.
- Reduce Cartridge cross sectional area allows for a more controlled range of expansion hence leading to more stable torque and increased product life.
- Disc precision machined contact profile to help maintain consistent disc to seat relationship through life.
- Powder Coated Aluminum Alloy Housing
- NEMA 4/4X/IP67 Enclosure
- Raised Position Indicator
- Internal Low Power Heater
- Manual Override via Handwheel or Shaft
- Self-Locking Drive
- Permanently Lubricated
- Thermally Protected Motor
- 2 Auxiliary Switches
- Silicone Free



## Snapshot

- 2-way and 3-way
- Cv range: 115 to 73,433
- Size range 2" to 30"
- Positive shut Off for liquids
- Control: On-Off, Floating point, 2 -10VDC
- NEMA 4X

### Flow-Pressure Chart

Flow rate in (GPM) for water applications based on Standard Weight Pipe.

Size	DN	2-way	3-way	Cv	Fluid Velocity (FPS)											
					1	2	3	4	5	6	7	8	9	10	11	12
2"	50	C2050(L)	C3050(L)	115	10	20	29	39	49	59	69	78	88	98	108	118
2.5"	65	C2065(L)	C3065(L)	195	15	31	46	61	77	92	107	123	138	153	169	184
3"	80	C2080(L)	C3080(L)	300	22	44	66	88	110	132	154	176	199	221	243	265
4"	100	C2100(L)	C3100(L)	600	39	78	118	157	196	235	275	314	353	392	431	471
5"	125	C2125(L)	C3125(L)	1010	61	123	184	245	306	368	429	490	551	613	674	735
6"	150	C2150(L)	C3150(L)	1580	88	176	265	353	441	529	618	706	794	882	971	1,059
8"	200	C2200(L)	C3200(L)	3100	157	314	471	627	784	941	1,098	1,255	1,412	1,569	1,725	1,882
10"	250	C2250(L)	C3250(L)	5300	245	490	735	980	1,225	1,471	1,716	1,961	2,206	2,451	2,696	2,941
12"	300	C2300(L)	C3300(L)	8252	353	706	1,059	1,412	1,765	2,118	2,471	2,824	3,176	3,529	3,882	4,235
14"	350	C2350	C3350	11900	480	961	1,441	1,922	2,402	2,882	3,363	3,843	4,324	4,804	5,284	5,765
16"	400	C2400	C3400	16400	627	1,255	1,882	2,510	3,137	3,765	4,392	5,020	5,647	6,275	6,902	7,529
18"	450	C2450		21700	794	1,588	2,382	3,176	3,971	4,765	5,559	6,353	7,147	7,941	8,735	9,529
20"	500	C2500		27900	980	1,961	2,941	3,922	4,902	5,882	6,863	7,843	8,824	9,804	10,784	11,765
24"	600	C2600		43100	1,412	2,824	4,235	5,647	7,059	8,471	9,882	11,294	12,706	14,118	15,529	16,941
30"	750	C2750		73400	2,206	4,412	6,618	8,824	11,029	13,235	15,441	17,647	19,853	22,059	24,265	26,471

To protect the valve and its components, Siral recommends that flow does not exceed 12 FPS.  
 Warranty does not cover damaged to valves due to fluid velocity exceeding 12 FPS.

### Nomenclature

Valve			Actuator					Normal Position (Non-Fail-Safe)
C2	300	L	+N1	24	M	T	-S	
Flow Style	DN Size	Trim	Non-Fail-Safe	Power Supply	Signal	Electric Connection	Auxiliary	
C2 = 2-Way	050 to 750	L = Low Press.		24 VAC	M= Modulate	T = Terminal	-S = Switch	<b>Normal Position (Fail-Safe)</b> NC/FC= Normally Closed, Fail Closed NO/FC= Normally Open, Fail Closed NC/FO= Normally Closed, Fail Open NO/FO= Normally Open, Fail Open
C3 = 3-Way		= High Press.	V-NH	120 VAC	F = On/Off, Float	= 3 ft.	= No Switch	
			N1V	230 VAC				
			N2V to N10V					
			<b>Fail-Safe</b>					

**Valve-Actuator Combinations**



Inches	DN (mm)	Cv	2-way	3-way	Close Off Pressure	Non-Spring Return			
						2-way	3-way	NEMA 4X	
								2-way	3-way
2"	50	115	C2050L	C3050L	50 psi	V-NH	V-NH	N1	N1
2.5"	65	195	C2065L	C3065L					
3"	80	300	C2080L	C3080L					
4"	100	600	C2100L	C3100L					N2
5"	125	1010	C2125L	C3125L					
6"	150	1580	C2150L	C3150L					
8"	200	3100	C2200L	C3200L					
10"	250	5300	C2250L	C3250L					
12"	300	8252	C2300L	C3300L				N3	N4

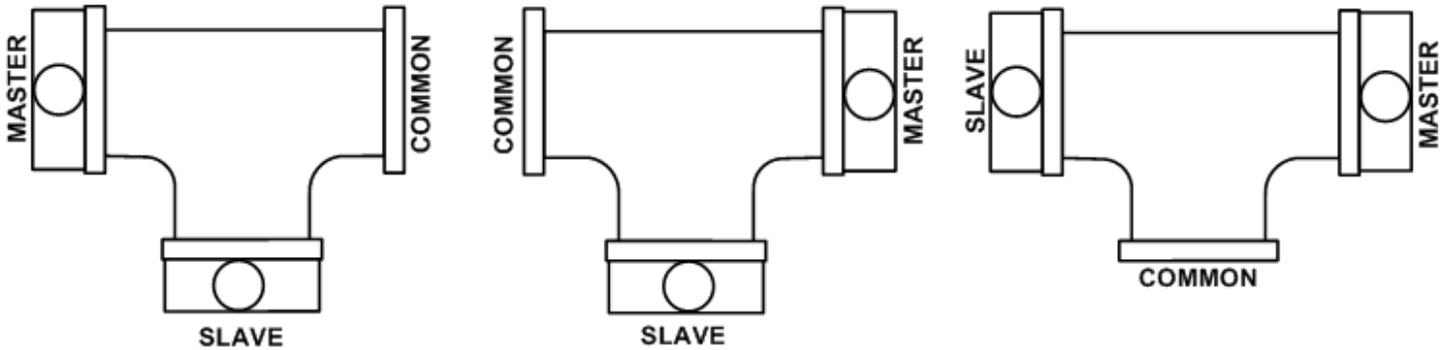
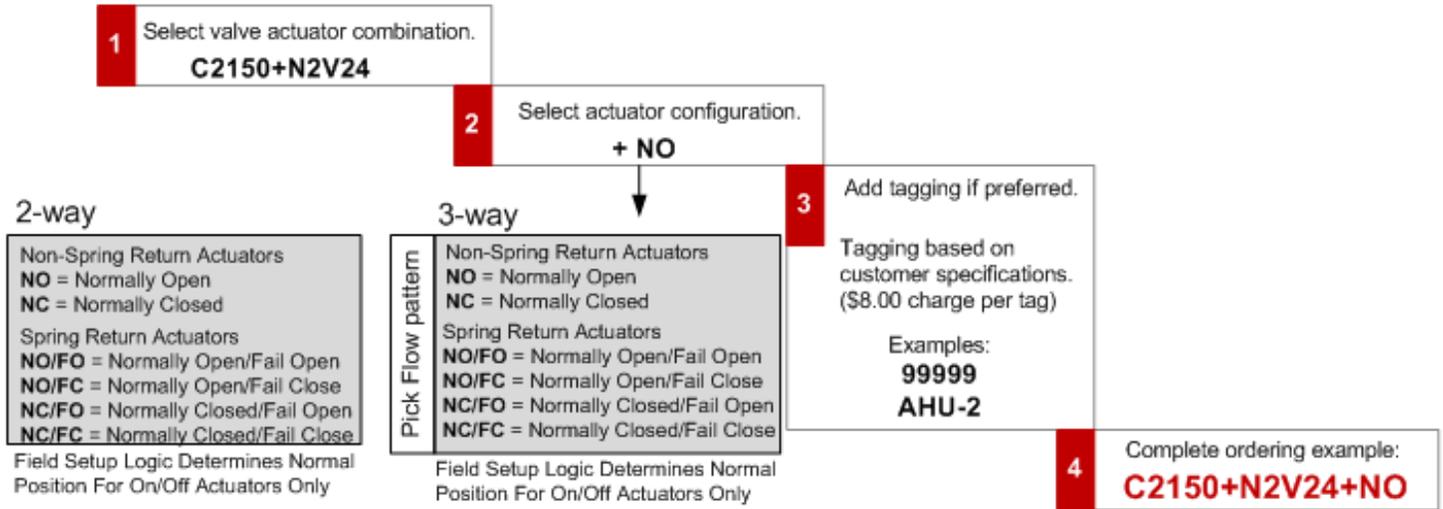


Inches	DN (mm)	Cv	2-way	3-way	Close Off Pressure	Non-Spring Return			
						2-way	3-way	NEMA 4X	
								2-way	3-way
2"	50	115	C2050	C3050	200 psi	V-NH	V-NH	N1	N1
2.5"	65	195	C2065	C3065					
3"	80	300	C2080	C3080					
4"	100	600	C2100	C3100					N2
5"	125	1010	C2125	C3125					
6"	150	1580	C2150	C3150					
8"	200	3100	C2200	C3200					
10"	250	5300	C2250	C3250					
12"	300	8252	C2300	C3300				N3	N4
								N5	

\* Special order sizes contact customer service for lead time

# Ordering Example

# BFV



Master Valve Position		
Setup Code	Normal Position	Fail Position
T1	Open	In Place
T2	Open	Open
T3	Open	Closed
T4	Closed	In Place
T5	Closed	Open
T6	Closed	Closed

Master Valve Position		
Setup Code	Normal Position	Fail Position
T7	Open	In Place
T8	Open	Open
T9	Open	Closed
T10	Closed	In Place
T11	Closed	Open
T12	Closed	Closed

Master Valve Position		
Setup Code	Normal Position	Fail Position
T13	Open	In Place
T14	Open	Open
T15	Open	Closed
T16	Closed	In Place
T17	Closed	Open
T18	Closed	Closed

### Notes:

1. Master valve should always be located at the run.
2. On/off actuator: Normal position is a function of field setup logic.
3. Proportional actuator: Normal position is a function of CCW/CW switch.
4. Slave valve and master valve operate inversly to each other.

# BFV Valve Series

Butterfly Valve (Stainless-Steel Ball and Stem)

2-Way

Sizes: CL (2" to 12"), C (2" to 30")



## Valve Specifications

Specifications		C...L	C
Sizes [DN]		2" to 12" [50 to 300]	2" to 30" [50 to 750]
C <sub>v</sub>	C <sub>v</sub> (A port)	115 to 8252	115 to 73400
	Type	Water, Glycol 60%	
Media	Temperature	-22°F to 250°F [-30°C to 120°C]	
	Close-Off	50 psi	200 psi (2" to 12") 150 psi (14" to 30")
Pressure	Body	ANSI Class 125 ANSI Class 125/150	
	A-B Port	Bubble tight	
Materials	Body	Ductile iron ASTM A536	
	Body Finish	Epoxy powder coating	
	Seats	EPDM	
	Disc	Stainless-Steel (304)	
	Shaft/Pins	Stainless-Steel (416)/(304)	
	Stem O-Rings	NBR	
	Bushings	PTFE	
Flow	Curve	Modified Equal %	
	Pattern	2-Way	
	Max Velocity	12 FPS	
	Control Angle	82°	
Valve	Connection	ANSI Class 125/150 flanges compatible	

## Application

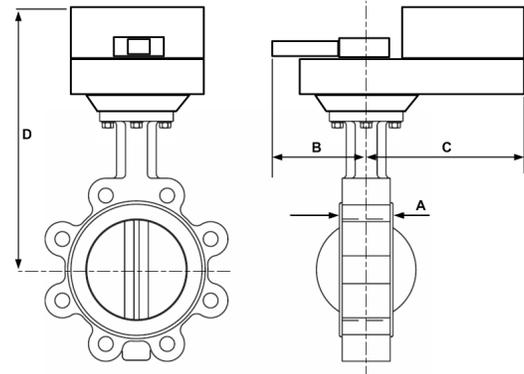
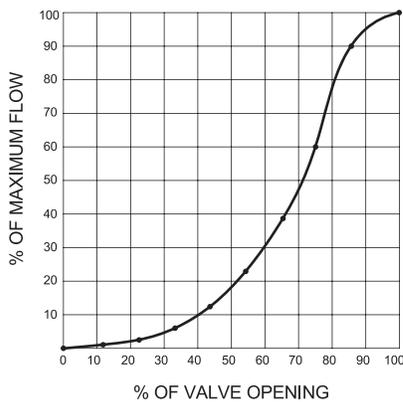
The BFV series of butterfly valves offer two types of high performance valve designs to handle different pressure ratings. The BFV valves are best suited for large diameter pipes with large flow applications such as HVAC and industrial applications.

## Operation

The BFV Series valves are designed to provide bubble-tight leak-free operation. These valves offer a modified Equal percentage flow curve for more accurate flow control.

## Dimensions 2-Way

Size	Valve	Actuator V-N Series	Dimensions Inches [mm]			
			A	B	C	D
2"	C2050(L)	V-NH	1.69 [43]	2.69 [68.3]	7.8 [197.1]	9.63 [245]
2 1/2"	C2065(L)	V-NH	1.81 [46]	2.69 [68.3]	7.8 [197.1]	10.1 [257]
3"	C2080(L)	V-NH	1.81 [46]	2.69 [68.3]	7.8 [197.1]	10.3 [262]
4"	C2100L	V-NH	2.05 [52]	2.69 [68.3]	7.8 [197.1]	11.1 [283]



# BFV Valve Series

Butterfly Valve (Stainless-Steel Ball and Stem)

3-Way

Sizes: CL (2" to 12"), C (2" to 12")



## Valve Specifications

Specifications		CL Low Pressure (50 PSI)	C High Pressure (2"-12" 200 PSI)
Sizes [DN]		2" to 12" [50 to 300]	
C <sub>v</sub>	C <sub>v</sub> (A port)	115 to 8252	
Media	Type	Water, Glycol 60%	
	Temperature	-22°F to 250°F [-30°C to 120°C]	
Pressure	Close-Off	50 psi	2" to 12" 200 psi
	Body	ANSI Class 125	ANSI Class 125/150
Leakage	A-B Port	Bubble tight	
Materials	Body	Ductile iron ASTM A536	
	Body Finish	Epoxy powder coating	
	Seats	EPDM	
	Disc	Stainless-Steel (304)	
	Shaft/Pins	Stainless-Steel (416)/(304)	
	Stem O-Rings	NBR	
Flow	Bushings	PTFE	
	Curve	Modified Linear	
	Pattern	3-Way	
	Max Velocity	12 FPS	
Valve	Control Angle	82°	
	Connection	ANSI Class 125/150 flanges compatible	

## Application

The BFV series of butterfly valves offer two types of high performance valve designs to handle different pressure ratings. The BFV valves are best suited for large diameter pipes with large flow applications such as HVAC and industrial applications.

## Operation

The BFV Series valves are designed to provide bubble-tight leak-free operation. These valves offer a modified Linear flow curve for more accurate flow control.

Flow										
3-Way	C <sub>v</sub>	10°	20°	30°	40°	50°	60°	70°	80°	90°
2"	115	0.06	3	7	15	27	44	71	106	115
2 1/2"	195	0.09	6	11	25	44	74	118	177	195
3"	300	0.2	17	35	77	139	230	364	546	300
4"	600	0.3	17	36	78	139	230	364	546	600
5"	1010	0.46	27	59	130	235	390	618	927	1010
6"	1580	0.8	45	95	205	366	605	958	1437	1580
8"	3100	1.8	85	185	403	725	1200	1900	2849	3100
10"	5300	3	88	187	405	725	1200	1900	2849	5300
12"	8252	4	234	495	1072	1911	3062	5005	7507	8252
14"	11920	6	338	715	1549	2760	4566	7225	10832	11920
16"	16382	8	464	983	2129	3796	6280	14912	14910	16382
18"	21701	11	615	1302	2820	5025	8321	13164	19751	21701
20"	27899	14	791	1674	3627	6463	10697	25396	25395	27899
24"	43101	22	1220	2587	5600	9980	16527	26155	39231	43101

# V-NHV24 Actuator Series

On/Off, Floating (3-Point), Modulating  
Non-Fail-Safe



## Actuator Specifications and Wiring Diagrams

Specifications		(F) Floating, On/Off †	(M) Modulating †
Control	Signal	On/Off, Floating (3-Point)	2-10 VDC, 4-20mA
	Input Impedance	600 Ω	100 kΩ
	Feedback Signal		1-10 VDC
Power	Voltage AC	24 VAC 50/60 Hz ± 20%	
	Voltage DC	24 VDC ±10%	
	Overload Protection	Electronic overload protection	
	Consumption Running	4 W	2.5 W
	Consumption Holding	2 W	0.4 W
	Transformer	6 VA (Class 2)	5 VA (Class 2)
	Connection	Terminals, Plenum rated cable 18 GA: 3 Ft.(1 m), 10 Ft. (3 m)	
Operation	Runtime (Motor)	95 seconds	
	Manual Override	Push-button	
	Rotation Angle	90°, adjustable using Screwed tabs	
	Rotation Direction	Direction Switch ↶ ↷	
	Position Indicator	Manual Knob	
	Noise	45 dBA	
Housing	Protection	NEMA 2 / IP54	
	Rating	UL94-5VA	
Temp.	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	<ul style="list-style-type: none"> <li>• cULus UL 60730-1A/-2-14,</li> <li>• CAN/CSA E60730-1:02,</li> <li>• CE according to 2004/108/EC and 2006/95/EC for line voltage</li> </ul>		

† Rated impulse voltage 800V, Control pollution degree 3, Type of action 1

Floating, On/Off: V-NHV24F  
Modulating: V-NHV24M



### WARNING



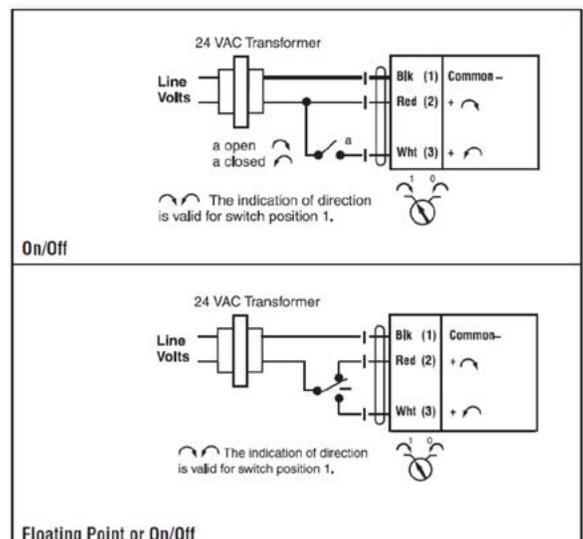
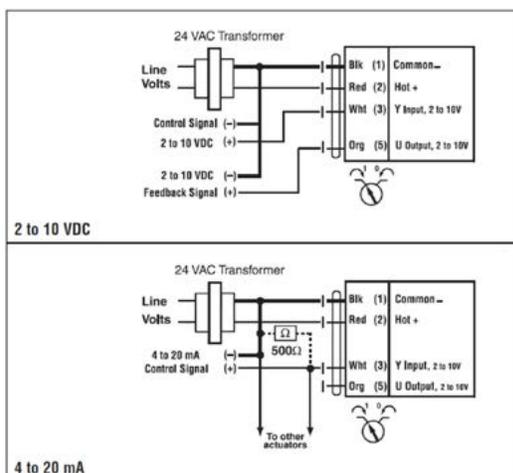
Connect the Actuator Common to the Controller Hot connection. Actuator must be installed by licensed or electrically trained technician. Failure to follow electrical safety precaution when working with live electrical connection could result in injury or death.

### Floating and On/Off Wiring

Meets cULus or UL and CSA requirements without the need of an electrical ground connection.

### Wiring

#### Modulating Wiring



# N1 & N1B Series (Nema 4X)

## On/Off, Proportional- Actuator Series

Non-Fail-Safe



### Overview

The N1 Series are quarter-turn electric industrial service actuators delivering up to 440 lbf-in torque in voltages ranging from 12v up through 230v in on/off or proportional control modes. Other Key Features include:

- Units are equipped with two (2) volt-free Form A Auxiliary switches rated at up to 3A 250vac
- ISO5211 compliant mounting with a double square female drive
- Raised visual position indicator
- Manual override hand wheel is available as an option on 2B & 2S models
- Manual override shaft standard
- NEMA 4X/IP67 compliant
- Two (2) 1/2" EMT entry ports with sealed cable glands

### Options

- Battery Backup
- Supercap Backup
- Local Control Stations
- IP68 Submersion

## TECHNICAL INFORMATION

ACTUATOR SPECIFICATIONS		N1VH...	N1BVH...
Supply	Torque Output (lbf-in / Nm)	310 / 35	440 / 50
24VAC - 24VDC	Current Draw (Start / Run / LRA)	2.1A / 1.2A / 2.3A	2.1A / 1.2A / 2.3A
	Speed (90°) DC, seconds	8	10
	Motor - 24vdc Perm Magnet Brush Type	6W	6W
	Duty Cycle (on/off / mod)	75%	75%
	Motor Starts, per hour, Max	1200	1200
	Motor Class	Class B	Class B
120V	Current Draw (Start / Run / LRA)	.39A / .36A / .48A	.39A / .36A / .48A
	Speed (90°) 60Hz / 50Hz, seconds	9.2 / 11	12.5 / 15
	Motor - 120vac Split-Phase Cap TENV	10W	10W
	Duty Cycle (on/off / mod)	25% / 75%	25% / 75%
	Motor Starts, per hour, Max	1200	1200
	Motor Protection, Temp / Class	135°C / Class F	135°C / Class F
230V	Current Draw (Start / Run / LRA)	.23A / .21A / .28A	.23A / .21A / .28A
	Speed (90°) 60Hz / 50Hz, seconds	9.2 / 11	12.5 / 15
	Motor - 120vac Split-Phase Cap TENV	10W	10W
	Duty Cycle (on/off / mod)	25% / 75%	25% / 75%
	Motor Starts, per hour, Max	1200	1200
	Motor Protection, Temp / Class	135°C / Class F	135°C / Class F
All	Manual Override	Hand Wheel	Hand Wheel
	Electrical Entry (2)	1/2" EMT or Nylon gland	
	Control	On/Off or Proportional	
	Ambient Operating Range	-22°F to +158°F (-30°C to +70°C)	
	Humidity Range	0-95% RH	
	Altitude Limit	9850 ft / 3000 m	

# N2 & N3 Series (Nema 4X)

## On/Off, Proportional- Actuator Series

Non-Fail-Safe



### Overview

The N2 & N3 Series are quarter-turn electric industrial service actuators delivering up to 1770 lbf-in torque in voltages ranging from 12V up through 480/3 in on/off or proportional control modes. Other Key Features include:

- Units are equipped with two (2) volt-free Form A Auxiliary switches rated at up to 10A 250vac
- ISO5211 compliant mounting with double square female drive inserts
- Raised visual position indicator
- Clutch-free manual override handwheel standard
- NEMA 4X/IP67 compliant
- Two (2) 3/4" EMT entry ports with sealed cable glands

### Options

- Torque Switches
- Motor Control Centers
- Local Control Stations
- IP68 Submersion
- Battery Backup
- Supercap Backup
- Interchangeable ISO5211 Flange & Drives

## TECHNICAL INFORMATION

ACTUATOR SPECIFICATIONS		N2V...	N3V...
Supply	Torque Output (lbf-in / Nm)	<b>880 / 100</b>	<b>1770 / 200</b>
	Current Draw (Start / Run / LRA)	7.2A / 5.2A / 17.8A	7.2A / 5.2A / 17.8A
12VAC*	Speed (90°) DC, seconds	14	28
-	Motor - 12vdc Perm Magnet Brush Type	25W	25W
12VDC*	Duty Cycle (on/off / mod)	75%	75%
	Motor Starts, per hour, Max	1200	1200
	Motor Class	Class B	Class B
24VAC	Current Draw (Start / Run / LRA)	4.2A / 3.2A / 11A	4.2A / 3.2A / 11A
-	Speed (90°) DC, seconds	14	28
24VDC	Motor - 24vdc Perm Magnet Brush Type	25W	25W
	Duty Cycle (on/off / mod)	75%	75%
	Motor Starts, per hour, Max	1200	1200
	Motor Class	Class B	Class B
120V	Current Draw (Start / Run / LRA)	1.16A / 0.93A / 1.47A	1.16A / 0.93A / 1.47A
	Speed (90°) 60Hz / 50Hz, seconds	16 / 19	33 / 39
	Motor - 120vac Split-Phase Cap TENV	40W	40W
	Duty Cycle (on/off / mod)	25% / 75%	25% / 75%
	Motor Starts, per hour, Max	1200	1200
	Motor Protection, Temp / Class	135°C / Class F	135°C / Class F
230V	Current Draw (Start / Run / LRA)	0.54A / 0.42A / 0.66A	0.54A / 0.42A / 0.66A
	Speed (90°) 60Hz / 50Hz, seconds	16 / 19	33 / 39
	Motor - 230vac Split-Phase Cap TENV	40W	40W
	Duty Cycle (on/off / mod)	25% / 75%	25% / 75%
	Motor Starts, per hour, Max	1200	1200
	Motor Protection, Temp / Class	135°C / Class F	135°C / Class F
All	Electrical Entry (2)	3/4" EMT or Nylon gland	
	Control	On/Off or Proportional	
	Ambient Operating Range	-22°F to +158°F (-30°C to +70°C)	
	Humidity Range	0-95% RH	
	Altitude Limit	9850 ft / 3000 m	

# N4 & N5 Series (Nema 4X)

## On/Off, Proportional- Actuator Series

### Non-Fail-Safe



### Overview

The N4 to N9 Series are quarter-turn electric industrial service actuators delivering up to 20,350 lbf-in torque in voltages ranging from 12V up through 480/3 in on/off or proportional control modes. Other Key Features include:

- Units are equipped with two (2) volt-free Form A Auxiliary switches rated at up to 10A 250vac
- ISO5211 compliant mounting with double square female drive inserts
- Raised visual position indicator
- Clutch-free manual override handwheel standard
- NEMA 4X/IP67 compliant
- Two (2) 3/4" EMT entry ports with sealed cable glands

### Options

- Torque Switches
- Motor Control Centers
- Local Control Stations
- IP68 Submersion
- Battery Backup
- Supercap Backup
- Interchangeable ISO5211 Flange & Drives

## TECHNICAL INFORMATION

ACTUATOR SPECIFICATIONS		N4V...	N5V...	N6V...	N7V...	N8V...	N9V...
Supply	Torque Output (lbf-in / Nm)	3540 / 400	5310 / 600	7080 / 800	8850 / 1000	15,040 / 1700	20,350 / 2300
	Current Draw (Start / Run / LRA)	11.4A / 9.4A / 24.4A	11.4A / 9.4A / 24.4A	11.4A / 9.4A / 24.4A	-	-	-
12VAC*	Speed (90°) DC, seconds	21	28	34	-	-	-
-	Motor - 12vdc Perm Magnet Brush Type	40W	40W	40W	-	-	-
12VDC*	Duty Cycle (on/off / mod)	75%	75%	75%	-	-	-
	Motor Starts, per hour, Max	1200	1200	1200	-	-	-
	Motor Class	Class B	Class B	Class B	-	-	-
24VAC	Current Draw (Start / Run / LRA)	7.0A / 5.8A / 15A	7.0A / 5.8A / 15A	7.0A / 5.8A / 15A	10.5A / 7.8A / 22A	-	-
-	Speed (90°) DC, seconds	21	28	34	34	-	-
24VDC	Motor - 24vdc Perm Magnet Brush Type	40W	40W	40W	60W	-	-
	Duty Cycle (on/off / mod)	75%	75%	75%	75%	-	-
	Motor Starts, per hour, Max	1200	1200	1200	1200	-	-
	Motor Class	Class B	Class B	Class B	Class B	-	-
120V	Current Draw (Start / Run / LRA)	2.95A / 1.8A / 3.5A	2.95A / 1.8A / 3.5A	2.95A / 1.8A / 3.5A	3.8A / 2.3A / 4.8A	7.2A / 4.5A / 9.4A	7.2A / 4.5A / 9.4A
	Speed (90°) 60Hz / 50Hz, seconds	24 / 29	33 / 39	39 / 47	39 / 47	28 / 34	39 / 47
	Motor - 120vac Split-Phase Cap TENV	90W	90W	90W	120W	200W	200W
	Duty Cycle (on/off / mod)	25% / 75%	25% / 75%	25% / 75%	25% / 75%	25% / 75%	25% / 75%
	Motor Starts, per hour, Max	1200	1200	1200	1200	1200	1200
	Motor Protection, Temp / Class	135°C / Class F	135°C / Class F	135°C / Class F	135°C / Class F	135°C / Class F	135°C / Class F
230V	Current Draw (Start / Run / LRA)	1.71A / 0.91A / 1.9A	1.71A / 0.91A / 1.9A	1.71A / 0.91A / 1.9A	2.16A / 1.1A / 2.43A	4.1A / 2.2A / 4.5A	4.1A / 2.2A / 4.5
	Speed (90°) 60Hz / 50Hz, seconds	24 / 29	33 / 39	39 / 47	39 / 47	28 / 34	39 / 47
	Motor - 230vac Split-Phase Cap TENV	90W	90W	90W	120W	200W	200W
	Duty Cycle (on/off / mod)	25% / 75%	25% / 75%	25% / 75%	25% / 75%	25% / 75%	25% / 75%
	Motor Starts, per hour, Max	1200	1200	1200	1200	1200	1200
	Motor Protection, Temp / Class	135°C / Class F	135°C / Class F	135°C / Class F	135°C / Class F	135°C / Class F	135°C / Class F
	Electrical Entry (2)	3/4" EMT or Nylon gland					
	Control	On/Off or Proportional					
	Ambient Operating Range	-22°F to +158°F (-30°C to +70°C)					
	Humidity Range	0-95% RH					
	Altitude Limit	9850 ft / 3000 m					

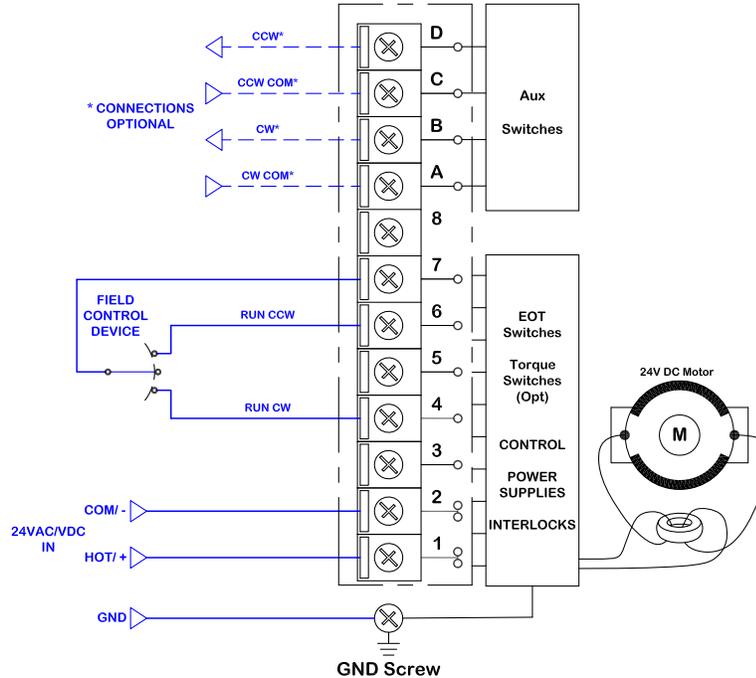
# N - Actuator Series (Nema 4X)

On/Off, Modulating Non-Fail-Safe

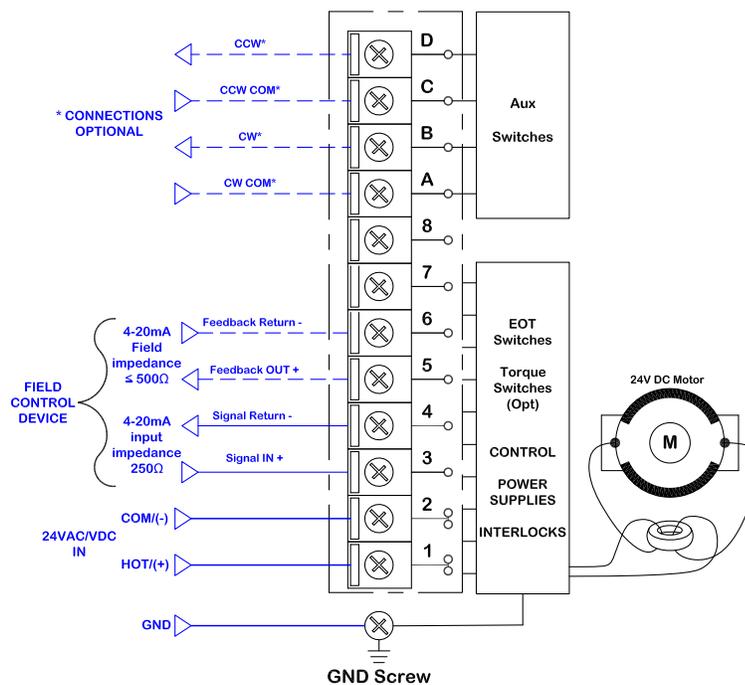


## Actuator Wiring Diagrams

### N1 to N5 24vac/vdc On/Off



### N1 to N5 24vac/vdc Proportional



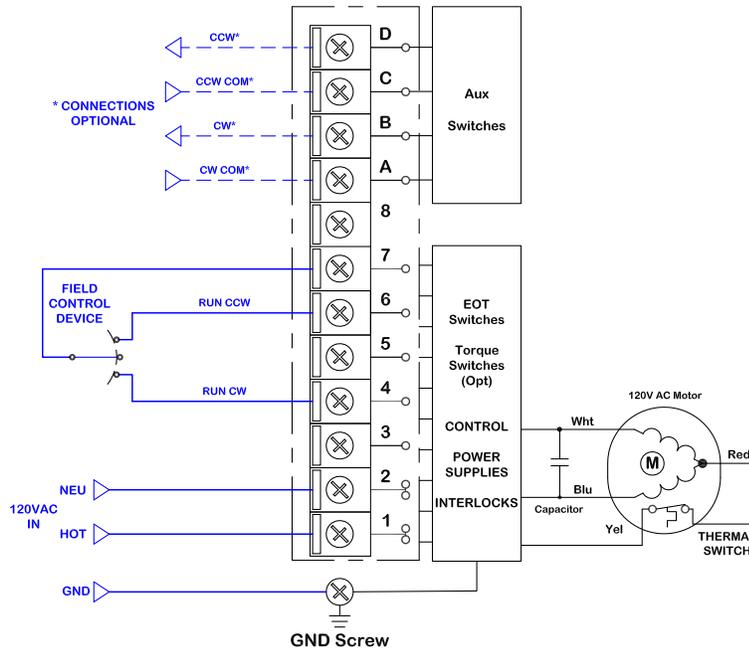
# N - Actuator Series (Nema 4X)

On/Off Non-Fail-Safe



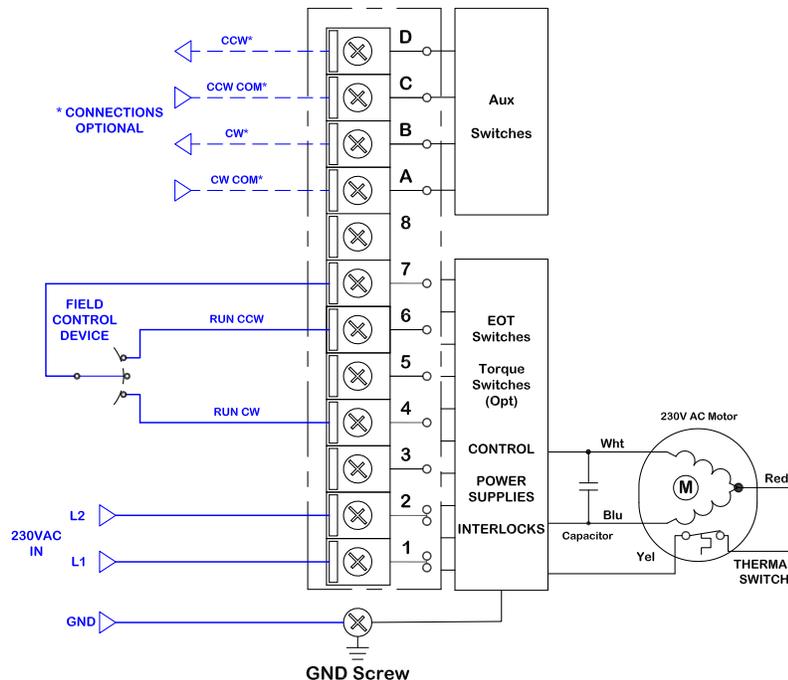
## Actuator Wiring Diagrams

### N1 to N5 120vac On/Off



- ✓ • On/Off Control
- ✓ ✗ • Torque Switches
- ✗ • Battery Backup
- ✗ • LCS

### N1 to N5 230vac On/Off



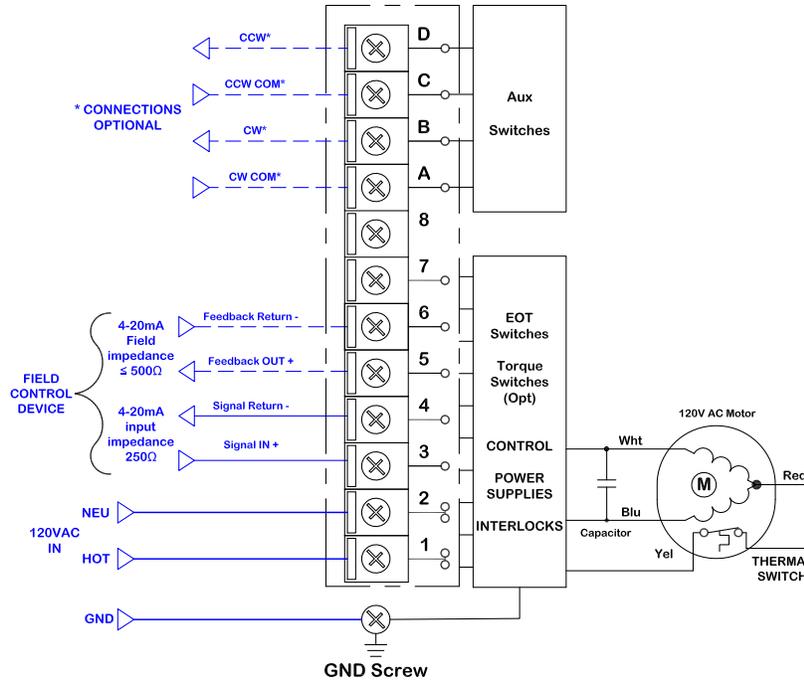
# N - Actuator Series (Nema 4X)

Modulating Non-Fail-Safe

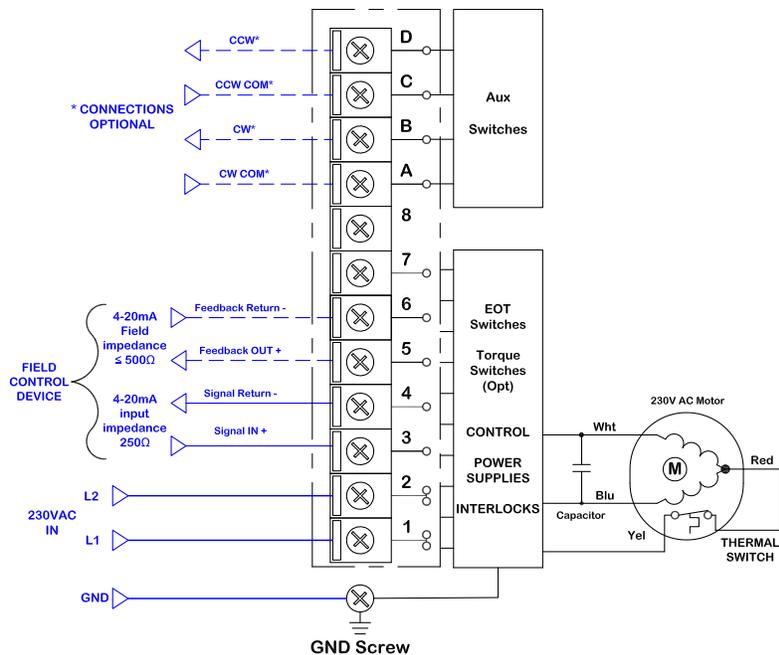


## Actuator Wiring Diagrams

### N1 to N5 120vac Proportional



### N1 to N5 230vac Proportional



# BFV Valve Series

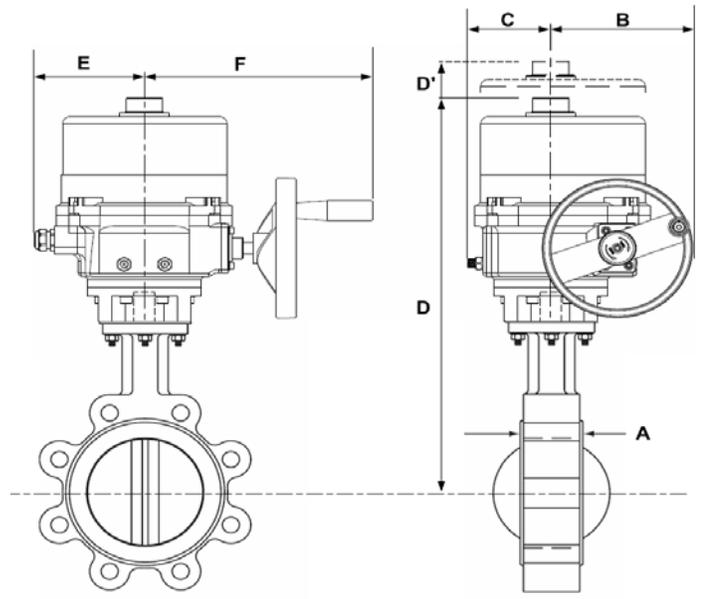
Butterfly Valve (Stainless-Steel Ball and Stem)

2-Way

Sizes: CL (2" to 12"), C (2" to 12")



## Dimensions with N- Series Actuator



Dimensions N-Series + C2...L

Valve		Actuator	A		B		C		D		E		F		
mm	inch	Part #	Series	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
50	2"	C2050L	N1	1.69	(43)	2.2	(56)	2.99	(76)	14.2	(361)	3.6	(92)	4.25	(108)
65	2.5"	C2065L		1.81	(46)	2.2	(56)	2.99	(76)	14.7	(373)	3.6	(92)	4.25	(108)
80	3"	C2080L		1.81	(46)	2.2	(56)	2.99	(76)	14.9	(378)	3.6	(92)	4.25	(108)
100	4"	C2100L		2.05	(52)	2.2	(56)	2.99	(76)	15.7	(399)	3.6	(92)	4.25	(108)
125	5"	C2125L		2.2	(56)	2.2	(56)	2.99	(76)	16.2	(412)	3.6	(92)	4.25	(108)
150	6"	C2150L	N1B	2.2	(56)	4.85	(123)	3.11	(79)	18.4	(467)	4.73	(120)	9.45	(240)
200	8"	C2200L	N2	2.36	(60)	4.85	(123)	3.11	(79)	19.9	(505)	4.73	(120)	9.45	(240)
250	10"	C2250L	N3	2.68	(68)	4.85	(123)	3.11	(79)	21.2	(537)	4.73	(120)	9.45	(240)
300	12"	C2300L		3.07	(78)	4.85	(123)	3.11	(79)	23	(583)	4.73	(120)	9.45	(240)

Dimensions N-Series + C2...

Valve		Actuator	A		B		C		D		E		F		
mm	inch	Part #	Series	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
50	2"	C2050	N1	1.69	(43)	2.2	(56)	2.99	(76)	14.2	(361)	3.6	(92)	4.25	(108)
65	2.5"	C2065		1.81	(46)	2.2	(56)	2.99	(76)	14.7	(373)	3.6	(92)	4.25	(108)
80	3"	C2080		1.81	(46)	2.2	(56)	2.99	(76)	14.9	(378)	3.6	(92)	4.25	(108)
100	4"	C2100	N1B	2.05	(52)	4.85	(123)	3.11	(79)	17.6	(446)	4.73	(120)	9.45	(240)
125	5"	C2125	N2	2.2	(56)	4.85	(123)	3.11	(79)	18.1	(459)	4.73	(120)	9.45	(240)
150	6"	C2150		2.2	(56)	4.85	(123)	3.11	(79)	18.4	(467)	4.73	(120)	9.45	(240)
200	8"	C2200	N3	2.36	(60)	4.85	(123)	3.11	(79)	19.9	(505)	4.73	(120)	9.45	(240)
250	10"	C2250	N4	2.68	(68)	7.36	(187)	4.06	(103)	23.4	(593)	5.91	(150)	11.7	(297)
300	12"	C2300		3.07	(78)	7.36	(187)	4.06	(103)	25.2	(639)	5.91	(150)	11.7	(297)

# BFV Valve Series

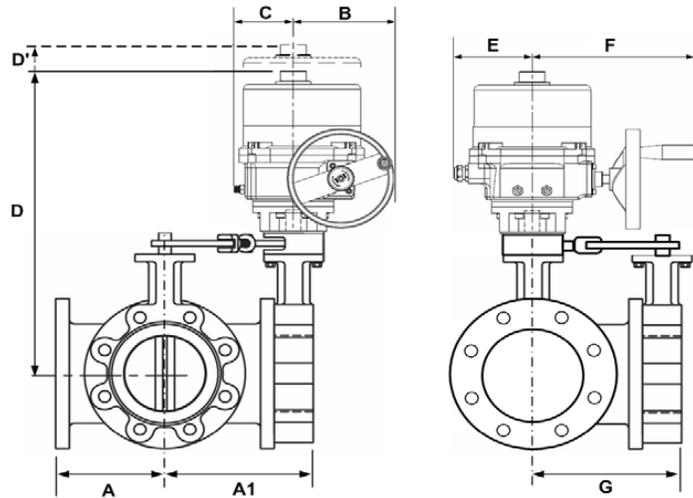
Butterfly Valve (Stainless-Steel Ball and Stem)

3-Way

Sizes: CL (2" to 12"), C (2" to 12")



Dimensions with N- Series Actuator



Dimensions N-Series + C3...L																	
Valve			Act.	A		B		C		D		E		F		G	
mm	inch	Part #	Series	inch	mm	inch	mm										
50	2"	C3050L	N1	4.5	(114)	2.2	(56)	2.99	(76)	16.7	(425)	3.6	(92)	4.25	(108)	6.15	(156)
65	2.5"	C3065L		5	(127)	2.2	(56)	2.99	(76)	17.2	(436)	3.6	(92)	4.25	(108)	6.76	(172)
80	3"	C3080L		7.28	(140)	2.2	(56)	2.99	(76)	17.4	(442)	3.6	(92)	4.25	(108)	7.28	(185)
100	4"	C3100L	N2	6.5	(165)	4.85	(123)	3.11	(79)	20.1	(510)	4.73	(120)	9.45	(240)	8.55	(217)
125	5"	C3125L		7.5	(191)	4.85	(123)	3.11	(79)	20.6	(523)	4.73	(120)	9.45	(240)	9.64	(245)
150	6"	C3150L		8	(203)	4.85	(123)	3.11	(79)	21.4	(543)	4.73	(120)	9.45	(240)	10.19	(259)
200	8"	C3200L	N3	9	(229)	4.85	(123)	3.11	(79)	22.9	(581)	4.73	(120)	9.45	(240)	11.37	(289)
250	10"	C3250L	N4	11	(279)	7.36	(187)	4.06	(103)	26.4	(669)	5.91	(150)	11.7	(297)	13.58	(345)
300	12"	C3300L		12	(305)	7.36	(187)	4.06	(103)	28.2	(715)	5.91	(150)	11.7	(297)	15.01	(381)

Dimensions N-Series + C3...																	
Valve			Act.	A		B		C		D		E		F		G	
mm	inch	Part #	Series	inch	mm	inch	mm										
50	2"	C3050	N1	4.5	(114)	2.2	(56)	2.99	(76)	16.7	(425)	3.6	(92)	4.25	(108)	6.15	(156)
65	2.5"	C3065	N1B	5	(127)	4.85	(123)	3.11	(79)	19.1	(483)	4.73	(120)	9.45	(240)	6.76	(172)
80	3"	C3080		7.28	(140)	4.85	(123)	3.11	(79)	19.3	(489)	4.73	(120)	9.45	(240)	7.28	(185)
100	4"	C3100	N2	6.5	(165)	4.85	(123)	3.11	(79)	20.1	(510)	4.73	(120)	9.45	(240)	8.55	(217)
125	5"	C3125	N3	7.5	(191)	4.85	(123)	3.11	(79)	20.6	(523)	4.73	(120)	9.45	(240)	9.64	(245)
150	6"	C3150		8	(203)	4.85	(123)	3.11	(79)	21.5	(543)	4.73	(120)	9.45	(240)	10.19	(259)
200	8"	C3200	N4	9	(229)	7.36	(187)	4.06	(103)	25.1	(637)	5.91	(150)	11.7	(297)	11.37	(289)
250	10"	C3250	N5	11	(279)	7.36	(187)	4.06	(103)	26.4	(669)	5.91	(150)	11.7	(297)	13.58	(345)
300	12"	C3300		12	(305)	7.36	(187)	4.06	(103)	28.2	(715)	5.91	(150)	11.7	(297)	15.01	(381)

## 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 (7) 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 any 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 Maryland and the parties shall be governed exclusively by the formal and material laws of the Federal and state courts located in the State of Maryland 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 Maryland, to which the parties hereby submit themselves.