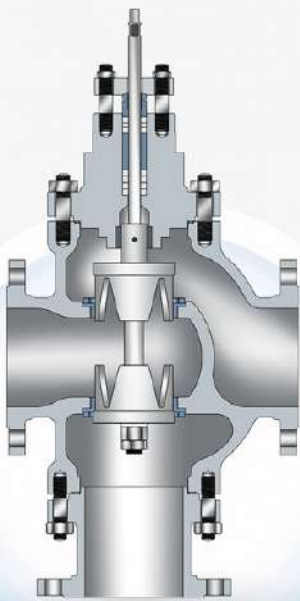
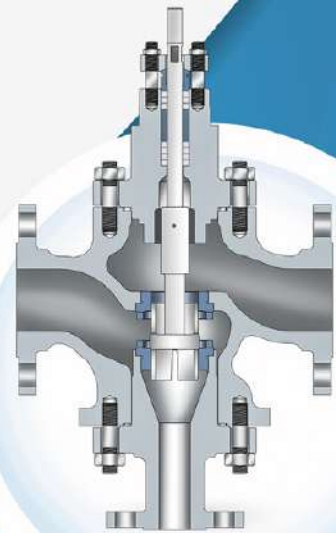
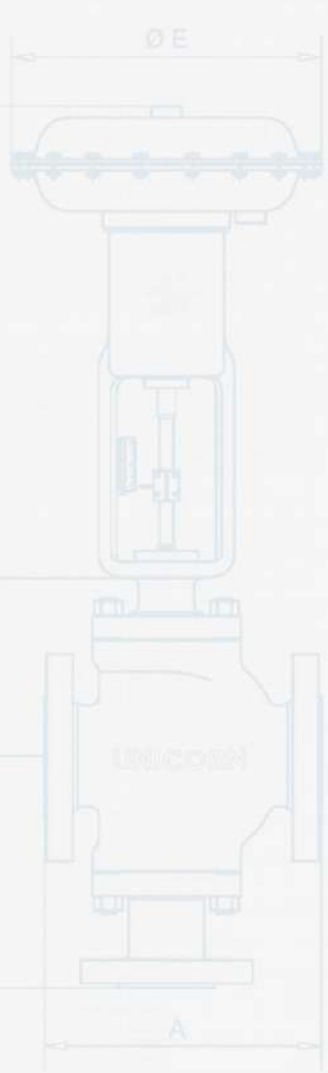
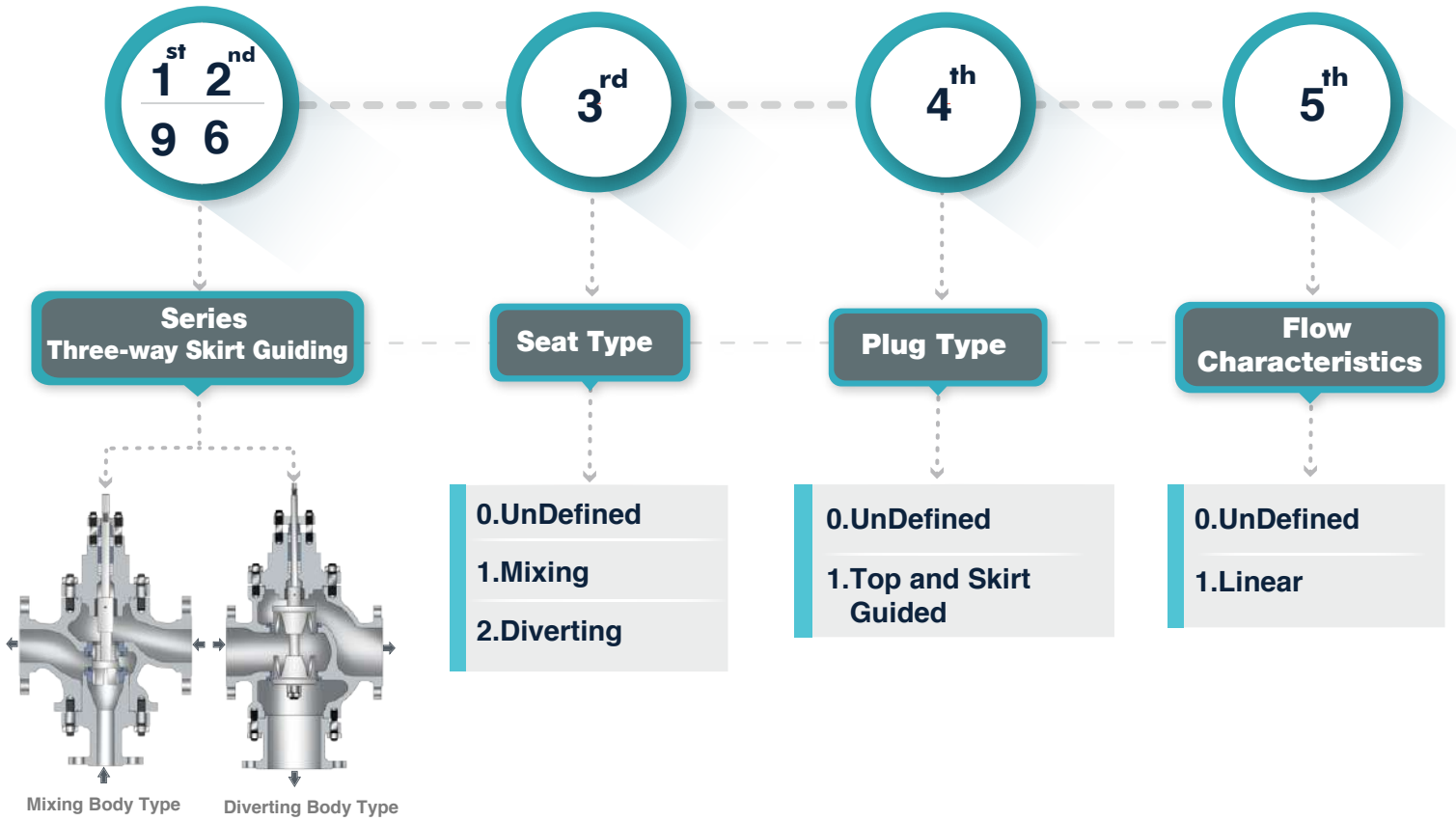


**96000 SERIES CONTROL VALVES**  
**THREE-WAY SKIRT GUIDING TYPE**



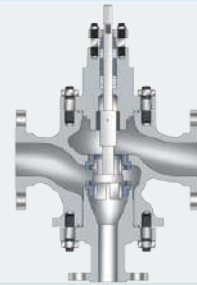
## 96000-Series Valve Code



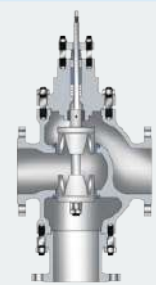
## Sample Model Numbering



**SERIES - 96000** is a High capacity Three-way control valve, featured by rigid top guiding of the plug and plug skirt in both Mixing / Diverting design. The optimum design configuration ensures very good flow control and stability. Mixing/ Diverting body design is high flow capacity and low pressure recovery.



96111 series valve



96211 series valve

## MAIN FEATURES

Rugged top and plug skirt guiding offers excellent Plug stability under large pressure drop. Flow to open direction in either port ensures stable valve operation.

Compact Double seat, Streamlined flow path having high flow capacity and low pressure recovery

Rating: ASME Class 150 thru 600

Flow characteristic: Linear

Flow capacity: Full capacity is offered on standard design

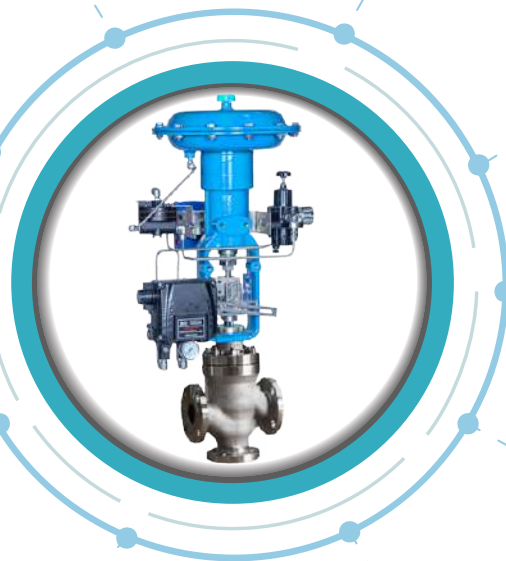
Bonnet type: Bolted

End Connection: RF,RJ,Tongue & groove Flanges, Butt Weld end. SW and Threaded ends is upto and including 2"

Rangeability 50:1

Trim design: Skirt Guided, Linear, Pressure balanced

Leakage Class: Standard is ANSI Class II, Class III and Class IV are available on request



## General Description

Product Range	See Table 1
Valve End Connection	See Table 2
Body Type	High Capacity Three-way Mixing & Diverting Type
Material of Construction	Carbon Steel
	Alloy steel
	Stainless Steel
	Exotic alloys
	Duplex / Super Duplex SS
	Ductile Iron (Pressure Rating is limited to ASME Class 300) <sup>(5)</sup>
Packing Material	P T F E -100°C to 232°C
	Graphite-29°C to 427°C
Guide Type	Top & Skirt Guided
Flow Capacity	Full
Trim Type	Pressure Balanced
	Skirt Guiding
Flow Characteristic	Linear
Seat Type	Threaded
Leakage Class as per ANSI/FCI 70.2	Class II
	Class III or IV
Valve Stroke	See Table 3
Actuator Type <sup>(1)</sup>	Spring Diaphragm
	Piston Cylinder
	Electrical Actuators
Hand Wheel	Optional
Temperature Range <sup>(2)</sup>	-196°C to 649°C
Special Applications <sup>(3)</sup>	Bellow Seal
	Cryogenic Service
	Oxygen Service
	NACE Application
	Low Emission Packing

### Note:

1. Spring Diaphragm actuator(Single acting type) is standard. Piston cylinder (Single & Double acting type) and Electric actuators are available on request.
2. The brief details of Body, Bonnet, Trim, Stem Bolt & Nut materials with applicable temperature are given in table 4,5,6 and table 7.
3. Special application valves are available on request.
4. Butt Weld Ends are not available for Ductile Iron valve As per ASME B16.42
5. Ductile Iron valve is applicable only upto ASME Class 300 Pressure rating.

## Product Range

Table -1

Valve Size		ASME Class		
Inches	mm	150	300	600
0.75	20	•	•	•
1	25	•	•	•
1.5	40	•	•	•
2	50	•	•	•
3	80	•	•	•
4	100	•	•	•
6	150	•	•	•
8	200	•	•	•
10	250	•	•	•
12	300	•	•	•

## End Connection

Table-2

Connection Type	Valve Size	
	0.75" to 2"	3" to 12"
Flanged RF	•	•
Flat Face FF	•	•
Flanged Ring Joint	•	•
Flanged Tongue & Groove	•	•
Butt Weld End <sup>(4)</sup>	•	•
Socket Weld End	•	
Threaded End	•	

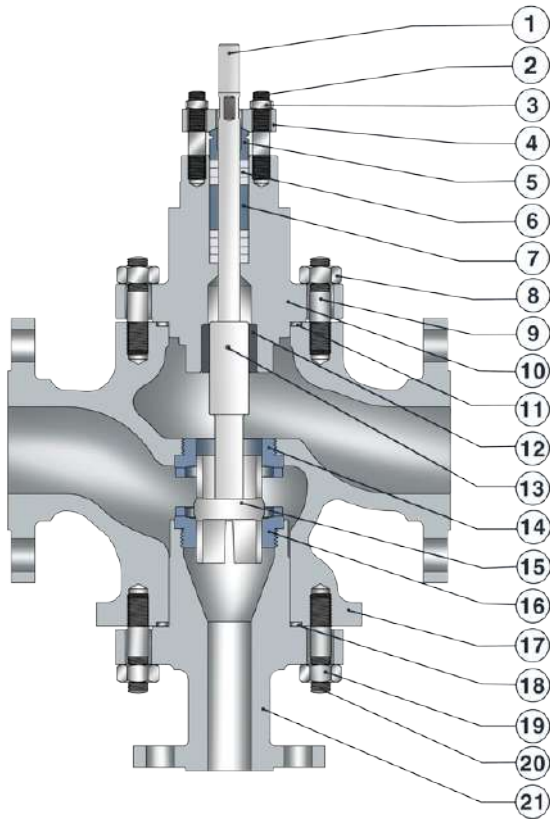
## Valve Stroke

Table-3

Valve Size		Valve Stroke	
Inches	mm	Inches	mm
0.75	20	0.5	12.7
1	25	0.5	12.7
1.5	40	0.75	19.05
2	50	1.0	25.4
3	80	1.5	38.1
4	100	1.5	38.1
6	150	2	50.8
8	200	2.5	63.5
10	250	2.5	63.5
12	300	3.5	88.9

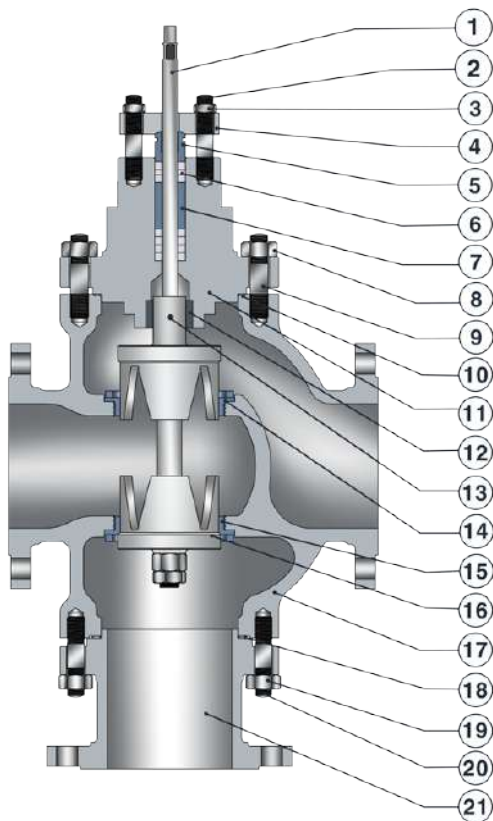
# STANDARD CONSTRUCTION

## Series-96111 Mixing type body



Part. No	Part Name
1	Valve Stem
2	Packing Stud
3	Packing Stud Nut
4	Packing Flange
5	Packing Follower
6	Packing
7	Spacer
8	Body Stud Nut
9	Body Stud
10	Bonnet
11	Body Gasket
12	Guide Bush
13	Plug Pin
14	Upper Seat Ring
15	Plug
16	Lower Seat Ring
17	Body
18	Body Gasket
19	Body Stud Nut
20	Body Stud
21	Bottom Flange

## Series-96211 Diverting type body



Part. No	Part Name
1	Valve Stem
2	Packing Stud
3	Packing Stud Nut
4	Packing Flange
5	Packing Follower
6	Packing
7	Spacer
8	Body Stud Nut
9	Body Stud
10	Body Gasket
11	Bonnet
12	Guide Bush
13	Plug Pin
14	Seat Ring
15	Seat Ring
16	Plug
17	Body
18	Body Gasket
19	Body Stud Nut
20	Body Stud
21	Bottom Flange

### Maximum and Minimum Temperature Limits For Body & Bonnet Materials

### Table 4

Body/Bonnet Materials	-320°F	-238°F	-148°F	-50°F	-20°F	300°F	450°F	650°F	750°F	800°F	850°F	1000°F	1050°F	1100°F
	-196°C	-150°C	-100°C	-46°C	-29°C	149°C	232°C	343°C	400°C	427°C	454°C	538°C	566°C	593°C
ASTM A 216 Gr. WCB/A 105														
ASTM A 216 Gr. WCC														
ASTM A 217 Gr. C5														
ASTM A 217 Gr. C6														
ASTM A 217 Gr. WC9														
ASTM A 217 Gr. C12														
ASTM A 217 Gr. C12A														
ASTM A 352 Gr. LCC														
ASTM A 351 Gr. CF8														
ASTM A 351 Gr. CF8M														
ASTM A 351 Gr. CF3														
ASTM A 351 Gr. CF3M														
ASTM A 995 Gr. 4A														
ASTM A 995 Gr. 5A														
ASTM A 995 Gr. 6A														
ASTM A 395 Gr 60 -40 -18														

### Maximum and Minimum Temperature Limits For Stem Materials

### Table 5

Stem Material	-320°F	-238°F	-148°F	-50°F	-20°F	300°F	450°F	650°F	750°F	800°F	850°F	1000°F	1050°F	1100°F
	-196°C	-150°C	-100°C	-46°C	-29°C	149°C	232°C	343°C	400°C	427°C	454°C	538°C	566°C	593°C
A479 Ty 304														
A479 Ty 316														
A479 Ty 316L														
A638 Gr. 660														
Nirtonic-50UNS S20910														
Super Duplex UNS 32750														
Inconel 625														
SA-479-XM-19 (S20910)														
A564-630 (17-4 PH) Cond. H1075														

### Maximum and Minimum Temperature Limits For Trim Materials

### Table 6

Trim materials	-320°F	-238°F	-148°F	-50°F	-20°F	300°F	450°F	650°F	750°F	800°F	850°F	1000°F	1050°F	1100°F
	-196°C	-150°C	-100°C	-46°C	-29°C	149°C	232°C	343°C	400°C	427°C	454°C	538°C	566°C	593°C
A743 GR CA6NM Class B														
A743 GR CA6NM C-B Chrom Plated														
SA-479-XM-19 (S20910)														
ASTM A 479 Ty 304														
ASTM A 479 Ty 304 Stellite Seat														
ASTM A 479 Ty 304 Full Stellite														
ASTM A 479 Ty 316														
ASTM A 479 Ty 316 Stellite Seat														
ASTM A 479 Ty 316 Full Stellite														
ASTM A 276 Ty 440														
ASTM A 351 Gr. CF8														
ASTM A 351 Gr. CF8M														
Monel														
Hastealloy Grade B														
Hastealloy Grade c														
ASTM A 564 Ty 630 (17-4PH)														



# MATERIAL TEMPERATURE LIMITS

**Maximum and Minimum Temperature Limits For Stud, Bolt & Nut Materials / Table 7**

Stud/Bolt Materials	Nut Materials	-320°F	-238°F	-148°F	-50°F	-20°F	300°F	450°F	650°F	750°F	800°F	850°F	1000°F	1050°F	1100°F
		-196°C	-150°C	-100°C	-46°C	-29°C	149°C	232°C	343°C	400°C	427°C	454°C	538°C	566°C	593°C
A193 Gr B7	A194 Gr 2H														
A193 Gr B7M	A194 Gr 2HM														
A193 Gr B8	A194 Gr 8														
A193 Gr B8 CL 2	A194 Gr 8														
A193 Gr B8M	A194 Gr 8M														
A193 Gr B16	A194 Gr 8														
A320 Gr L7	A194 Gr 4 or 7														
A320 Gr B8 (CL 1&2)	A194 Gr 8														
A320 Gr B8M (CL 1&2)	A194 Gr 8M														
A453 Gr 660	A194 Gr 8														

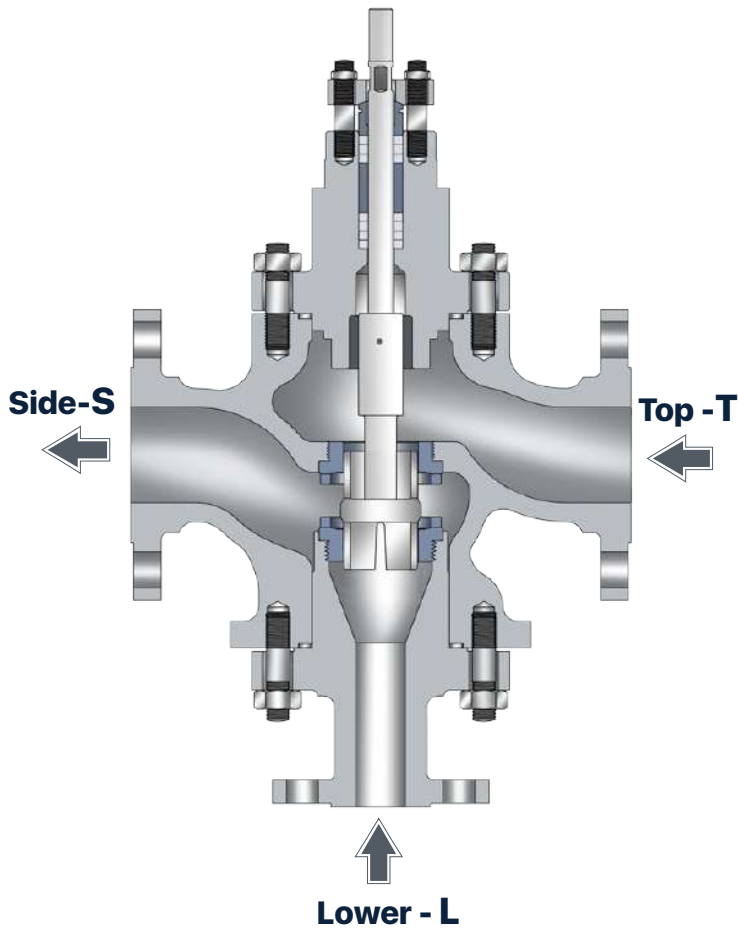
Flow Characteristic : Linear

Body Rating : ASME Class 150-600

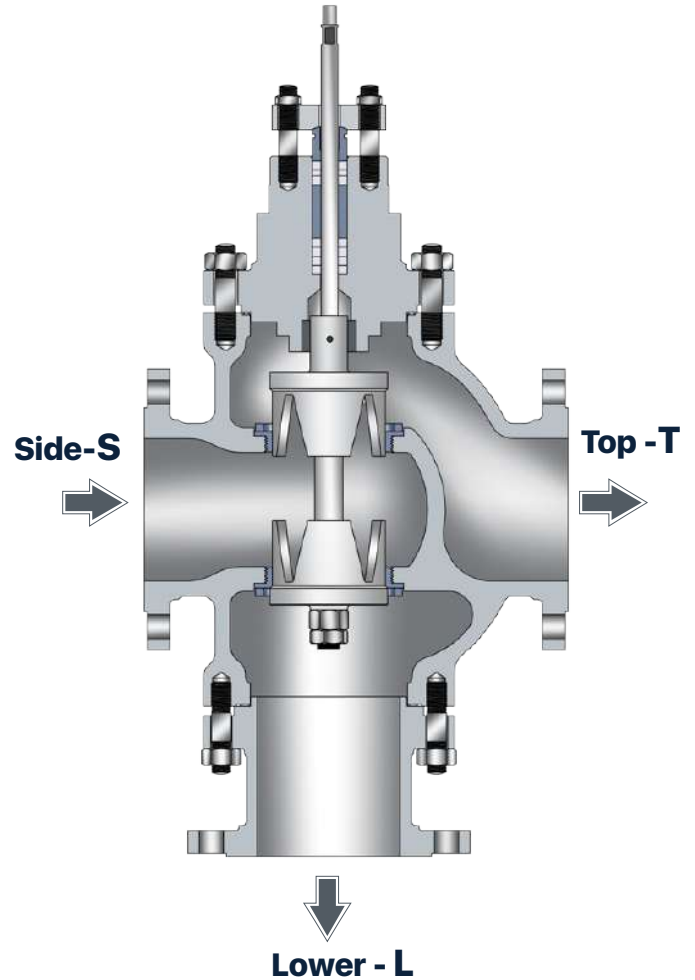
Direction : Flow To Open(FTO)

% Lift						10	20	30	40	50	60	70	80	90	100
Valve Size		Orifice Diameter		Travel		Rated Cv									
Inches	mm	Inches	mm	Inches	mm										
0.75	20	0.89	22.5	0.5	12.7	0.6	1.2	1.8	2.3	2.9	3.5	4.1	4.7	5.3	5.9
1	25	1.06	27	0.5	12.7	0.9	1.8	2.6	3.5	4.4	5.3	6.2	7	8	9
1.5	40	1.49	37.8	0.75	19.05	2.0	4.1	6.1	8	10	12	14	17	19	21
2	50	1.97	50	1.0	25.4	3.5	7	11	14	18	21	25	28	32	36
3	80	2.6	66	1.5	38.1	7.3	15	22	29	37	44	52	59	67	74
4	100	3.46	88	1.5	38.1	12	24	36	48	60	73	85	98	111	122
6	150	5.28	134	2	50.8	26	53	79	105	132	158	186	213	240	267
8	200	6.93	176	2.5	63.5	47	94	140	187	234	281	331	378	427	474
10	250	8.7	220	2.5	63.5	73	146	219	293	366	439	517	591	667	741
12	300	10.5	266	3.5	88.9	105	211	316	421	527	632	745	851	960	1067

**Series-96111 Mixing Type Body**



**Series-96211 Diverting Type Body**





**Flow Characteristic : Linear**

**Ratings: ASME Class 150-600**

**Flow Direction: Flow To Open (Both Ports)**

**Mixing T to S  
Diverting S to L**

**0% - Plug in Up Position  
100% - Plug in Down Position**

Value Size		% Plug Lift										
Inches	mm	Plug Up 0%	10	20	30	40	50	60	70	80	90	Plug Down 100%
0.75	20	0	0.6	1.2	1.8	2.3	2.9	3.5	4.1	4.7	5.3	6
1	25	0	0.9	1.8	2.6	3.5	4	5	6	7	8	9
1.5	40	0	2.0	4.1	6.1	8.2	10	12	14	17	19	21
2	50	0	3.5	7	11	14	18	21	25	28	32	36
3	80	0	7.3	15	22	29	37	44	52	59	67	74
4	100	0	12	24	36	48	60	73	85	98	111	122
6	150	0	26	53	79	105	132	158	186	213	240	267
8	200	0	47	94	140	187	234	281	331	378	427	474
10	250	0	73	146	219	293	366	439	517	591	667	741
12	300	0	105	211	316	421	527	632	745	851	960	1067

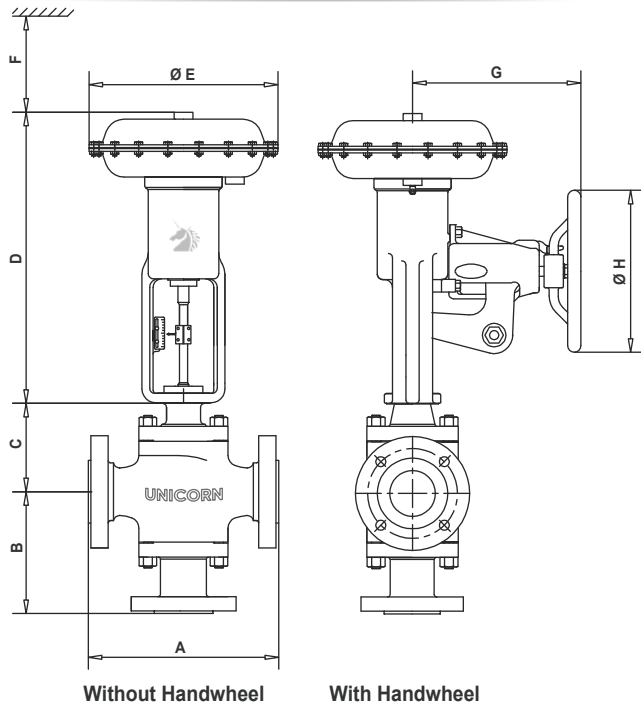
**Mixing L to S  
Diverting S to T**

**0% - Plug in Up Position  
100% - Plug in Down Position**

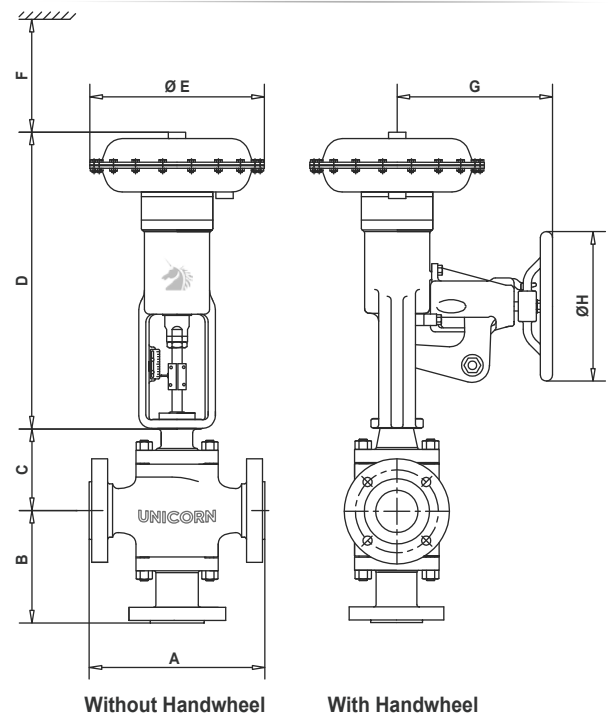
Value Size		% Plug Lift										
Inches	mm	Plug Up 0%	10	20	30	40	50	60	70	80	90	Plug Down 100%
0.75	20	6	5.3	4.7	4.1	3.5	2.9	2.3	1.8	1.2	0.6	0
1	25	9	8	7.1	6.2	5.3	4.4	3.5	2.6	1.8	0.9	0
1.5	40	21	19	17	14	12	10	8	6	4.1	2	0
2	50	36	32	28	25	21	18	14	11	7	3.5	0
3	80	74	67	59	52	44	37	29	22	14.6	7.3	0
4	100	122	111	98	85	73	60	48	36	24.2	12	0
6	150	267	240	213	186	158	132	105	79	53	26	0
8	200	474	427	378	331	281	234	187	140	94	47	0
10	250	741	667	591	517	439	366	293	219	146	73	0
12	300	1067	960	851	745	632	527	421	316	211	105	0

# DIMENSIONS\*

### 96111 Series Valve Body with Actuator UA-11



### 96111 Series Valve Body with Actuator UA-12



## Dimensions Of 96111 Series Valve

Valve Size		ASME RATING						
		150	300	600	150	300	600	150-600
Inches	mm	A			B			C
0.75	20	184	194	206	140	140	140	130
1	25	184	197	210	140	140	140	130
1.5	40	222	235	251	159	159	159	133
2	50	254	267	286	168	168	168	159
3	80	276	308	337	203	203	219	203
4	100	298	368	394	229	229	257	213
6	150	352	473	508	289	289	314	279
8	200	451	568	610	337	337	362	321
10	250	625	662	706	391	391	447	333
12	300	731	769	813	455	455	535	425

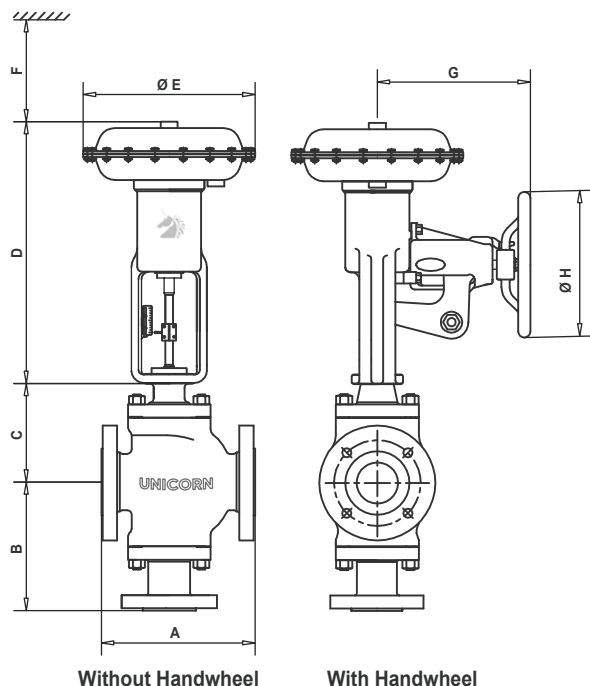
## Dimensions Of Actuator

Actuator Type	Actuator Model	Actuator Size	Actuator Stroke(Inches)	Actuator stroke(mm)	D	Ø E	F	G	Ø H
Spring Diaphragm	UA-11	30	0.75	19.05	470	335	112	230	250
	UA-12	30	0.75	19.05	51	335	112	230	250
	UA-11	35	1.5	38.1	575	386	112	290	300
	UA-12	35	1.5	38.1	635	386	112	290	300
	UA-11	40	2	50.8	740	452	170	408	450
	UA-12	40	2	50.8	840	452	170	408	450
	UA-11	45	2.5	63.5	780	532	180	408	450
	UA-12	45	2.5	63.5	1110	532	180	408	450
	UA-11	50	4	101.6	950	532	180	470	570
	UA-12	50	4	101.6	1240	532	180	470	570

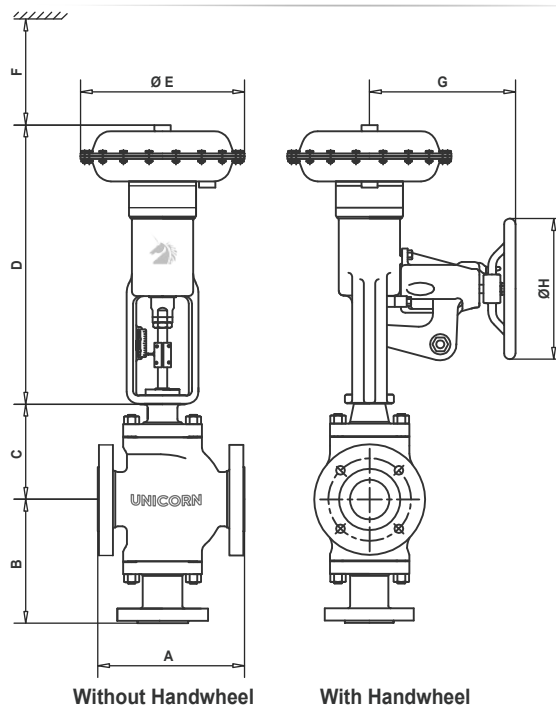
### Note:

1. Actuator Model UA-11 is a Direct Actuator (Air To Close).
2. Actuator Model UA-12 is a Reverse Actuator (Air To Open).

**96211 Series Valve Body with Actuator UA-11**



**96211 Series Valve Body with Actuator UA-12**



**Dimensions Of 96211 Series Valve**

Valve Size		ASME RATING						
		150	300	600	150	300	600	150-600
Inches	mm	A			B			C
0.75	20	184	194	206	140	140	140	130
1	25	184	197	210	140	140	140	130
1.5	40	222	235	251	178	178	178	155
2	50	254	267	286	197	197	197	184
3	80	298	318	337	238	238	251	235
4	100	353	368	394	270	270	282	238
6	150	451	473	508	330	330	356	321
8	200	543	568	610	391	391	416	375
10	250	626	662	705	457	457	528	416
12	300	731	769	813	560	560	640	530

**Dimensions Of Actuator**

Actuator Type	Actuator Model	Actuator Size	Actuator Stroke (Inches)	Actuator stroke (mm)	D	Ø E	F	G	Ø H
Spring Diaphragm	UA-11	30	0.75	19.05	470	335	112	230	250
	UA-12	30	0.75	19.05	51	335	112	230	250
	UA-11	35	1.5	38.1	575	386	112	290	300
	UA-12	35	1.5	38.1	635	386	112	290	300
	UA-11	40	2	50.8	740	452	170	408	450
	UA-12	40	2	50.8	840	452	170	408	450
	UA-11	45	2.5	63.5	780	532	180	408	450
	UA-12	45	2.5	63.5	1110	532	180	408	450
	UA-11	50	4	101.6	950	532	180	470	570
	UA-12	50	4	101.6	1240	532	180	470	570

\*Manufacturer reserves the right to change the dimensions and Cv values as part of continuous development.

# UNICORN VALVES

Revolutionizing The Flow



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UVPL-CAT-96-11/2017