

**501G
511G**

KOSO

**CAGE GUIDED
CONTROL VALVE**



Standard Specifications

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► Overview

The 501G (Globe) / 511G (Angle) series uses ported cage, offering finest dynamic stability to meet large Cv applications. It is suitable to a variety of heavy duty services. This series is characterized by pressure balanced type trim for relatively high pressure drops and good controllability.

► Key Features & Benefits

Quick Change Trim	The quick-change trim design has a clamped-in seat ring using valve bonnet. It allows the trim parts to be removed and re-installed while the valve body is still in the pipeline. This results in quicker maintenance and inspection.
High Flow Capacity	High flow capacity with better controllability. Streamlined flow passages to optimize capacity, stable flow control with high rangeability.
Characterization	Inherently characterized trims are available with linear and Modified Equal percentage. Special Cv options are available on request.
Fine Flow Control	Ported cages are characterized to provide fine flow control and high rangeability. Further customization can be made to meet specific application requirements.
Flow Control	High flow capacity with better controllability.

► Product specifications

Design Standard & Material Standard	- Valve design - ASME B16.34 - Flange design - ASME B16.5 & ASME B16.47 - Butt weld end connection - ASME B16.25 - Socket weld end connection - ASME B16.11 - Material compliance to ASME, ASTM, EN or Custom standards
Industry Served	Power, Oil & Gas, FPSO, Onshore, Offshore, LNG, Fertilizer, Steel, Refinery, Petrochemical.
Quality Standard Compliance	- Quality management system as per ISO 9001 - Quality management system as per API Spec Q1 - PED/CE as per 2014/68/EU & ATEX 2014/34/EU
Type of Actuation	Pneumatic actuator, Hydraulic actuator, Electrical actuator
Key Applications	Hot & Cold gas bypass valve, Suction throttle valve, Seal gas control valve, Steam isolation valve, Spray water isolation valve, Cooling tower condensate control valve, Cryogenic valve/High temperature valve.
Certification	IBR, SIL, PED/CE Marking, ATEX, CRN, TRCU

► About Cage Guided Valves

KOSO's Cage guided technology selection shall be suitable for standard valve applications, where noise and cavitation are not major issues. These cage guided type valves shall have large Cv and dynamic stability. The technology refers to a ported cage guided design in which the valve's cage (the guiding part for the plug) is provided with vertical or horizontal ports (slots). The cage guided design gives good plug support and guidance and reduces oscillation and vibration, which are important under lower pressure drops. The window type ported cage is part of the guided trim concept.

This technology fits well for the majority of process control applications in Power, Oil & Gas, LNG, Fertilizers, Refinery, Chemical plants etc., that experiences low-pressure differential applications. It provides high flow capacity because the large openings. The cage is clamped-in between the body and bonnet. The lower part of the cage is cut with window type openings over the length of the plug travel.

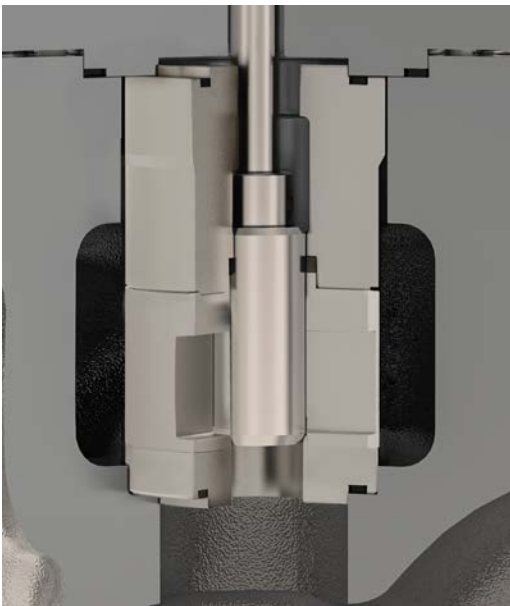


Figure 1: Ported cage inserted into valve body

The flow is controlled by the plug moving up and down within the cage, covering and uncovering the window opening to vary the flow area and consequently the flow rate. The plug is designed to be guided within the cage, therefore, clearances between the cage and plug are critical. In order to ensure there is no galling between the plug and cage, the cage is either hard chrome plated or stellite.

Stellite provides excellent galling resistance. Most of the materials are NACE compliant. On high temperature applications, hardened materials like 400 Series and 17-4PH Stainless steels are utilised. Again these materials have excellent galling resistance.

In general, the flow can be directed either “Flow to Open (FTO)” or “Flow to Close (FTC)”. For liquid service, the flow direction shall be “Flow to Close” and for gas/steam/vapour services, the flow direction shall be “Flow to Open”. This technology supports good rangeability which is nothing but ratio of maximum to minimum controllable flow. The flow characteristic (linear or equal percent) curves can be tailored by changing the window sizes and the cage geometry.

► Standard Specification

► 501G/511G Cage Guided Control Valves Body & Trims

Series	501G - Globe / 511G - Angle
Body Size	1" ~ 24" (DN25 ~ DN600) (For higher sizes, consult with factory)
Plug Form	Unbalanced & Pressure Balanced
Characteristics	Linear, EQ%,
Trim Material & Treatment	300 Series, 400 Series, 17-4 PH, Alloy steels, Duplex SS, Alloy 625, Alloy 825, Monel, Hastelloy C, Special Hardening treatment - Stellite overlay, (Stellite Seat - SS / Stellite Face - SF).
Body Rating	ASME Class 150, 300, 600, 900, 1500, 2500 & 4500 (For EN Class or PN Class, consult with factory)
Body Connections	Flanged (RF, FF, RTJ), Weld ends (Socket weld end : 2" and below, Butt weld end : 3" and above)
Face to Face Dimension	ISA / KOSO Standard / Special (Consult with factory)
Body & Bonnet Material	WCB, WCC, WC6, WC9, C5, C12A, LCC, LCB, CF8, CF8M, CF3M, CF8C, Duplex SS, Alloy 625, Alloy 825, Monel, Hastelloy C and Copper alloy Steels, Cladding on body internal is available upon request.
NACE (as applicable)	NACE MR0175, NACE MR0103
Bonnet Types	Standard type: -17 °C ~ +230 °C, Fin-Extension type: -45 °C ~ -17 °C or above +230 °C, Long-Extension type: -196 °C ~ -45 °C, Option: Bellow seal bonnet. (Note : The above temperature limits are based on operating conditions)
Gland Packing	TFE V-ring, TFE carbon fiber, Grafoil and more.
Gaskets	Spiral wound metal, with Grafoil or TFE filler.
Leakage Class	ANSI / FCI 70-2 Class IV , V or VI and MSS-SP-61
Special Testing Requirements (Optional upon request)	FE Prototype test as per ISO 15848-1, Class A, B, C, FE Production test as per ISO 15848-2, Class A, B, C, CV Test, Helium leak test, High pressure test, Low temperature test, Cryogenic test, Vacuum test.
Marking	As per KOSO standard practices / MSS-SP-25
Options	Forging Body/Bonnet, Steam jacketing, Silencer, Expanders/Diffuser and baffles.

► Body & Trim Sectional View

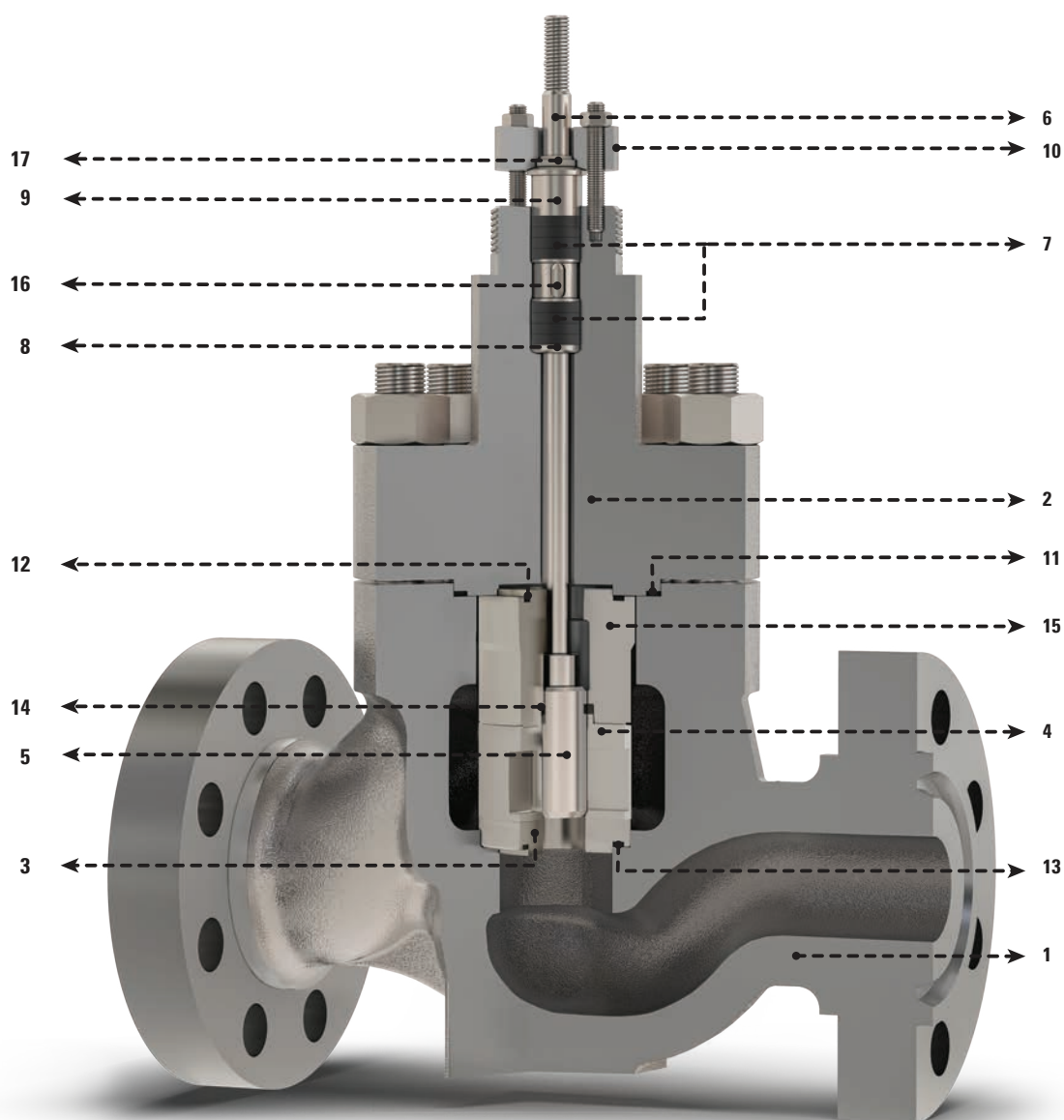


Figure 2: 501G - Globe Valve Body Trim Sectional View

SR.NO.	LABEL
1	BODY
2	BONNET
3	SEAT RING
4	CAGE
5	PLUG
6	STEM
7	GLAND PACKING
8	PACKING SEAT
9	GLAND RING

SR.NO.	LABEL
10	GLAND FLANGE
11	BODY - BONNET GASKET
12	PRESSURE BALANCE GASKET
13	SEAT GASKET
14	BALANCE SEAL
15	BALANCE CYLINDER
16	LANTERN RING
17	WIPER

► **Table 1 : Cv Value - 501G Globe Valve - Pressure Class 150#, 300#, 600#**

Nominal Valve size, in (mm)	Nominal Trim size, mm	Travel, mm	Trim Characteristics	
			Linear	EQ%
1" (25)	18	20	7	6.3
	31		16	14
1.5" (40)	31	20	18.1	16.3
	50	25	40	36
2" (50)	50	25	40	36
	62	30	70	60
3" (80)	62	30	70	60
	90	40	150	135
4" (100)	90	40	150	135
	115	50	215	190
6" (150)	115	50	215	190
	160	60	435	410
8" (200)	160	60	435	410
	205	80	735	650
10" (250)	205	80	735	650
	245	90	1050	950
12" (300)	245	90	1050	950
	300	100	1400	1300
14" (350)	300	100	1400	1300
	335	130	1900	1600
16" (400)	335	130	1900	1600
	360	150	2000	1800
18" (450)	360	150	2000	1800
	400		2450	2250



Note: The given Cv are for standard valve and trim combinations. KOSO has done extensive developments and tests for extended Cv ranges. Please contact us for custom Cv ranges.

► **Table 2 : Cv Value - 501G Globe Valve - Pressure Class 900#, 1500#**

Nominal Valve size, in (mm)	Nominal Trim size, mm	Travel, mm	Trim Characteristics	
			Linear	EQ%
1" (25)	18	20	7	6.3
1.5" (40)	31	20	20	17
	40		30	25
2" (50)	31	20	20	17
	40		30	25
	50	25	60	50
3" (80)	50	40	60	50
	62		90	75
	75		132	110
4" (100)	62	40	90	75
	75		132	110
	90	50	204	170
6" (150)	90	50	204	170
	115	70	330	275
	140		445	370
8" (200)	140	70	445	370
	160		560	500
	180	80	700	650
10" (250)	160	70	560	500
	180	80	700	650
	205	90	970	900
12" (300)	180	80	700	650
	205	90	970	900
	245	100	1400	1300



Note: The given Cv are for standard valve and trim combinations. KOSO has done extensive developments and tests for extended Cv ranges. Please contact us for custom Cv ranges.

► **Table 3 : Cv Value: 501G - Globe Valve - Pressure Class 2500#**

Nominal Valve size, in (mm)	Nominal Trim size, mm	Travel, mm	Trim Characteristics	
			Linear	EQ%
1.5" (40)	31	20	20	17
2" (50)	31	20	20	17
	40	25	36	30
3" (80)	40	25	36	30
	50	40	60	50
	62		90	75
4" (100)	50	40	60	50
	62		90	75
	75	50	150	125
6" (150)	75	50	150	125
	90		200	170
	115	70	330	275
8" (200)	90	50	200	170
	115	70	330	275
	140	80	530	480



Note: The given Cv are for standard valve and trim combinations. KOSO has done extensive developments and tests for extended Cv ranges. Please contact us for custom Cv ranges.

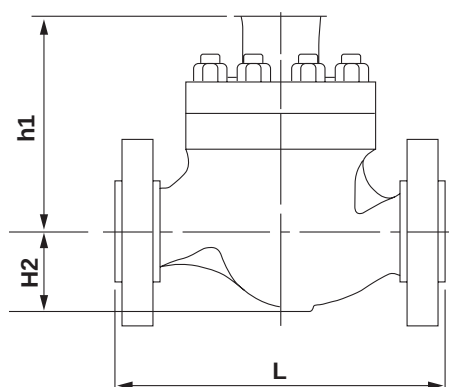
► **Table 4 : Dimension details - 501G Globe Valve - Pressure Class 150#, 300#, 600#**

Body Size	Face to Face: L							H2	Standard Bonnet	Fin Extension
in	ASME 150# RF	ASME 300# RF	ASME 600# RF	ASME 300# BW/SW	ASME 300# RTJ	ASME 600# BW	ASME 600# RTJ		h1	h1
1	184	197	210	210	210	210	210	47	157	257
1 1/2	222	235	251	251	248	251	251	60	175	325
2	254	267	286	286	283	286	289	70	196	346
3	298	317	337	317	333	337	340	98	201	351
4	352	368	394	368	384	394	397	113	275	425
6	451	473	508	473	489	508	511	144	305	455
8	543	568	610	568	584	610	613	185	365	515
10	673	708	752	708	724	752	756	225	420	570
12	737	775	819	775	791	819	822	260	480	630
14	889	927	972	927	943	972	975	320	625	775
16	1016	1057	1108	1057	1073	1108	1111	370	720	870
18	1140	1181	1239	1181	1197	1239	1242	420	815	965

► **Table 5: Dimension details - 501G Globe Valve - Pressure Class 900#, 1500#, 2500#**

Body Size	Face to Face: L						H2			Standard Bonnet	Fin Extension
in	ASME 900# BW/RF	ASME 900# RTJ	ASME 1500# BW/RF	ASME 1500# RTJ	ASME 2500# BW/RF	ASME 2500# RTJ	ASME 900#	ASME 1500#	ASME 2500#	h1	h1
1 1/2	333	333	333	333	447	450	72	72	76	260	405
2	375	378	375	378	437	440	93	93	90	280	430
3	440	443	460	463	498	505	125	125	130	350	500
4	510	513	530	533	566	575	132	132	140	420	570
6	715	718	770	776	820	833	199	199	250	450	600
8	854	857	911	920	1279	1295	226	226	340	560	710
10	1251	1254	1327	1336	1778	1800	330	330	456	615	765
12	1311	1314	1400	1416	1422	TBA	450	450	485	840	990
14	1828	TBA	1828	TBA	2137	TBA	680	680	540	610	760

All dimensions are in mm



Note: Above dimensions are approximate and subjected to change during the detailed engineering.

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