



900 SERIES DIAPHRAGM ACTUATED CONTROL VALVES



- STREAMLINE BODY DESIGNED CAN MINIMIZE THE LOSS OF PRESSURE WHILE THE FLUID IS PASSING THROUGH
- THE MULTI-SPRING WITH DIAPHRAGM STYLE ACTUATED HAS A HEAVY-DUTY ABILITY & AN EXQUISITE STRUCTURE
- THE MATERIAL USE FOR DIAPHRAGM CASE AND YOKE IS STAINLESS STEEL WHICH IS STRONG ANTICORROSIVE
- A WIDE RANGE OF OPERATING TEMPERATURE FROM -190°C UP TO +350°C

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GENERAL

In order to increase working efficiency and keep the best quality of products, modern factories must seek for automation and producing procedure with precise control. A control valve is one of the most important parts in automatic control. It can be installed in water, air, many kinds of chemical gases or liquids and steam pipes. The temperature, pressure, flow and level during producing process are controlled automatically by its on-off switching or regulating its flow. The control valve receives electronic or pneumatic signals from controller and maintains its switch in position to let liquids pass through with appropriate quantity in order to keep the ideal manipulated conditions.

The characteristics of the control valve depends on the type of liquid passing through it. Therefore, the materials needed will be varied. Our company has accumulated a lot of rich experience in professional production and applied technique services for more than 20 years. We can provide the control valves made by abroad famous factories with the same specifications and quality in lower price to offer services for manufacturing industries and a variety of domestic constructions.

SPECIFICATIONS

■ VALVE BODY

- ◎ TYPE
Single / Double port of globe type and Butterfly valve or damper for OEM
- ◎ SIZE
15A~100A are standard but size over 100A is also available
- ◎ CONNECTION
The flange is standard, but thread or welding style is also available
- ◎ PRESSURE RATING
ANSI 150lb or JIS 10K (std.)
The max. rating up to 600lb or 40K for specified versions
- ◎ GLAND TYPE
Bolted sealing type
- ◎ SPECIAL VERSIONS
Full-jacket, Semi-jacket, Drain plug or special treatment for trim

■ ACTUATOR

- ◎ TYPE
Multi-spring with diaphragm type
- ◎ SUPPLY AIR
1.2, 2.4, 2.8, 3.0 kg/cm²G
- ◎ SPRING RANGE
0.2~1.0, 0.4~2.0, 0.8~2.0 kg/cm²G
- ◎ AIR CONNECTION
RC 1/4, RC 3/8
- ◎ AMBIENT TEMP.
-20~+70°C or specified
- ◎ ACTION
Directly / Reverse action
- ◎ OPTIONAL
Top mounted handwheel
Side mounted handwheel
Position switch / Special materials
Solenoid valve / Booster Lock-up valve / Air set

■ PERFORMANCE

- ◎ RANGEABILITY
30:1 for standard
50:1 for V-port (specified)
- ◎ HYSTERESIS
Less than 4%FS (without positioner)
Less than 1%FS (with positioner)
- ◎ LINEAR
Less than ±5% (without positioner)
Less than ±1% (with positioner)
- ◎ SEAT LEAKAGE
(% to the Cv)

METAL SEAT	EQ%, Linear	Quick-opening	
	0.01%	≤25A 0.0001%	≥32A 0.001%
SOFT SEAT	According to the ANSI B16 .104 class VI		

- ◎ OPTIONAL
Certified by the high pressure gas control law, Use no-oil, Use no-water, Sandproof, Dustproof, Anti-salt damage, Vacuum service, Cold district spec., Tropical district spec., Air exposure bolt a nut S.S. Specified painting color.

MODEL SELECTIONS

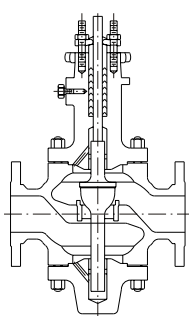
ITEMS	CODE	SPECIFICATIONS	
① MODEL	900	GLOBE VALVE , SINGLE PORT (15A~100A)	
	901	GLOBE VALVE , DOUBLE PORT (40A~100A)	
	902	GLOBE VALVE , ANGLE BODY (15A~100A)	
	903	THREE WAY GLOBE VALVE FOR MIXING SERVICE (15A~100A)	
	904	THREE WAY GLOBE VALVE FOR DIVERTING SERVICE (15A~100A)	
	905	CAGE TYPE BODY (15A~100A)	
	906	SAUNDERS VALVE (15A ~100A)	AVAILABLE (for 906 model)
	907	OEM VERSION	
② PROCESS CONNECTION	A	Flange style (Standard)	●
	B	Thread style	
	C	Welding style	
	D	Special specified	○
③ BODY MATERIAL	—0	FC200 / A126	●
	—1	FCD / A395	●
	—2	SCPH2 / A216WCB	●
	—3	SCS13 / A351 CF8	●
	—4	SCS14 / A351 CF8M	●
	—5	Special specified	○ with lining
④ MATERIALS OF PACKING / GASKETS	0	PTFE V-ring for stem / Flat gasket for bonnet	● None
	1	Braided packing for stem / Spiral wound gasket for bonnet	
⑤ PLUG FORM	0	Quick-opening (ON – OFF)	●
	1	EQ%	
	2	Linear contoured	
	3	Special specified	○ Throttling
⑥ TRIM MATERIAL OF PLUG / SEAT (DIAPHRAGM MATERIAL FOR SAUNDERS VALVE)	0	SUS304 / A182 F304	● Rubber diaphragm
	1	SUS316	
	2	PTFE	● PTFE diaphragm
	3	Stellite treatment	
	4	Special specified	○
⑦ BONNET TYPE	—A	Standard	●
	—B	With extension neck	
	—C	With radiator fin	
	—D	With bellows seal	
	—E	Special specified	○
⑧ VALVE ACTION	A	Directly	●
	B	Reverse	●
⑨ FAILURE POSITION	A	Open (Air to close)	●
	B	Close (Air to open)	●
	C	Special specified	
⑩ ACCESSORIES (P/P or E/P POSITIONER , SOLENOID VALVE , AIR SET , LIMIT SWITCH , HANDWHEEL ----- etc.)	A	Not required	●
	B	Required	○
⑪ CONNECTION SIZE	—015	15A	●
	—100	100A	
	—XXX	Over 100A or specified	○

■ ORDERING EXAMPLE

900 A — 2 0 1 3 — A A B B — 050
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

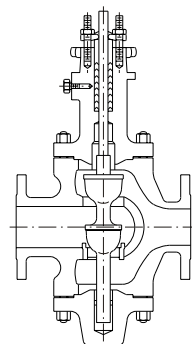
TYPE OF VALVE BODY

■ 900



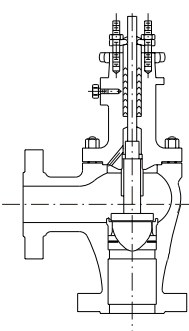
Reversible Single Port Globe Body.

■ 901



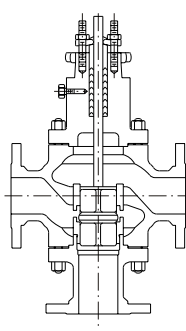
Reversible Double Port Globe Body.

■ 902



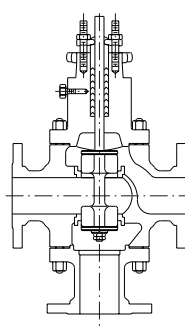
Angle Body

■ 903



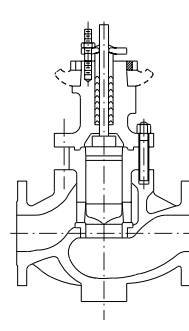
Three-way Body for mixing service

■ 904



Three-way Body for diverting service

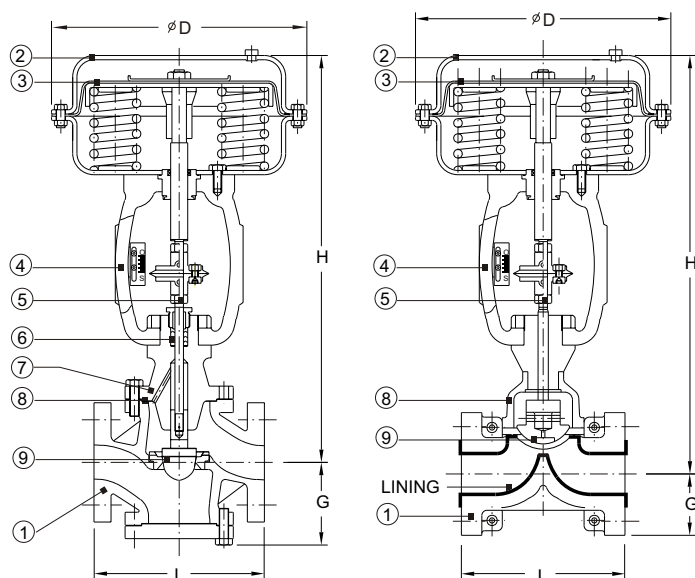
■ 905



Cage Type Body

STRUCTURES

■ 906 Saunders valve



Unit : m / m

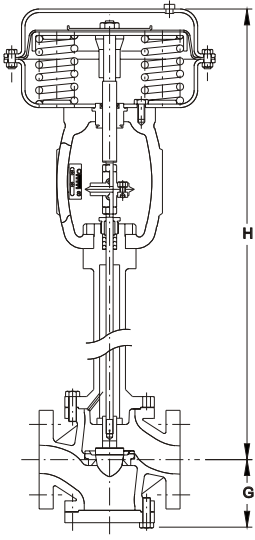
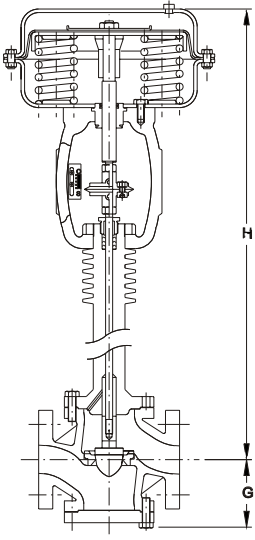
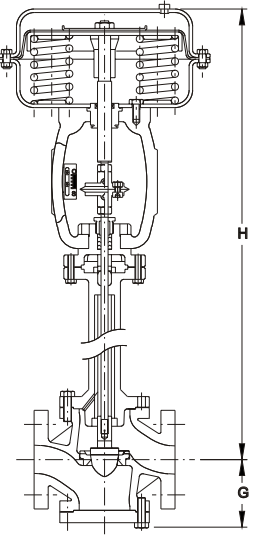
TYPE SIZE	GLOBE VALVE			SAUNDERS VALVE			D
	L	G	H	L	G	H	
15A	148	55	390	136	48	440	245
20A	148	55	390	145	63	483	245
25A	158	62	390	145	63	483	245
32A	198	75	440	180	70	544	295
40A	198	75	440	180	70	544	295
50A	228	85	465	209	78	581	295
65A	288	118	485	250	88	610	345
80A	320	135	505	298	95	695	345
100A	360	155	765	350	105	756	420
XXX	Special specified						

Note : The connection standard for ANSI, JIS and DIN can be provided.

MATERIAL SELECTIONS

CODE OF MATERIAL			0	1	2	3	4		
MATERIAL OF COMPONENT PARTS	1	BODY		FC200 (A126)	FCD (A395)	SCPH2 (A216 WCB)	SCS13 (A351 CF8)	SCS14 (A351 CF8M)	
	2	DIAPHRAGM CASE		SUS304					
	3	DIAPHRAGM		Cloth reinforced neoprene or specified					
	4	YOKE		SUS304					
	5	STEM OF VALVE							
	6	PACKING	STANDARD	PTFE V-ring (−17°C to +230°C)					SUS316
			OPTIONS	Non-asbestos braided packing / molded packing					
	7	GASKET	STANDARD	PTFE flat gasket					
			OPTIONS	Non-asbestos serrated gasket / spiral wound gasket					
	8	BONNET		FC200	FCD	SCPH2	SCS13	SCS14	
	9	PLUG / SEAT (DIAPHRAGM)	STANDARD	SUS304 / (Rubber diaphragm for saunders valve)					SUS316
OPTIONS			Special metals / Stellite faced / Soft seat for trim treatment (PTFE diaphragm for saunders valve)						

OPTIONAL BONNET SELECTIONS

CODE	B	C	D
TYPE	EXTENSION NECK	RADIATOR FIN	BELLOWS SEAL
USAGE	-100°C to -20°C -196°C to -100°C	-17°C to -20°C ±230°C above	-196°C to ±350°C and less than 40 kg/cm ² G
VIEW			

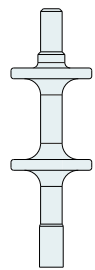
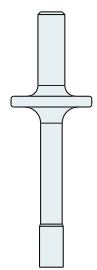
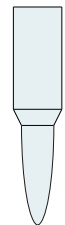
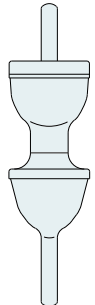
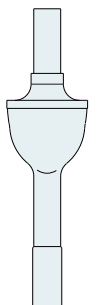
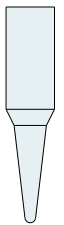
Unit : m / m

VALVE SIZE	H		
	B	C	D
15A	585	489	648
20A			
25A			
32A	635	557	690
40A			
50A	642	564	697
65A	671		723
80A	743	651	761
100A	762	670	780

Note:

- ① The material of Bonnet is the same as valve body unless there is a special request.
- ② The material of Bellows is SUS316L.

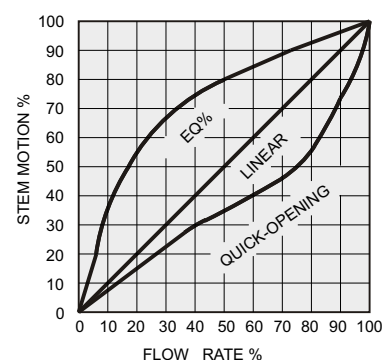
PLUG FORM SELECTIONS

CODE	0	1	2
FORM	QUICK-OPENING	EQUAL PERCENTAGE	LINEAR CONTOURED
CONTOURED VIEW	 Double Seat  Single Seat	 Double Seat  Single Seat  Equal Percentage Contoured	 Double Seat  Single Seat  Linear Contoured

APPLICATIONS

PLUG FORM		EQ%			LINEAR		
CONTROL MODE		P	I	D	P	I	D
TEMPERATURE		10~100	Uncertain	Needed			
LEVEL		—			5~50	Slight	None
FLOW		—			100~500	Needed	None
PRESSURE	LIQUID	—			50~200	Needed	None
	GAS	0~5	None	None			
	STEAM	10~100	Uncertain	Needed			

FLOW CHARACTERISTICS



Cv CALCULATION / PORT SIZING

RANGE OF Cv

Body Size	Port Size (m / m)														
	2~5	6	8	10	15	20	25	32	40	50	65	80	100	125	150
15A	0.01~5														
20A	1.5~9.0														
25A	1.6~15														
32A						15~25									
40A						9~33									
50A						15~65									
65A						24~85									
80A						33~110									
100A						69~205									
125A											240~305				
150A											220~405				

Note: ① The rangeability is 30:1 or 50:1 for special port

② The Cv of saunders valve is approximately 1.5 times of the Cv of globe valve.

DEFINITION OF Cv VALUE

When the ΔP of inlet and outlet of the valve maintains at 1 psi, the volume of 15.6°C water passing through calculated is called the Cv value and has a unit of GPM.

Note:

When calculating the flow of gas or steam, P2 should be calculated by $P1/2$ if $P2 \leq P1/2$.

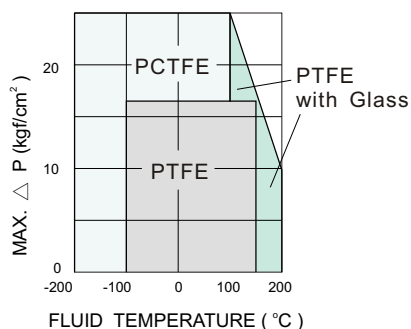
Meanwhile, $0.87P1$ can be used instead of $\sqrt{\Delta P (P1+P2)}$

CALCULATION FORMULA

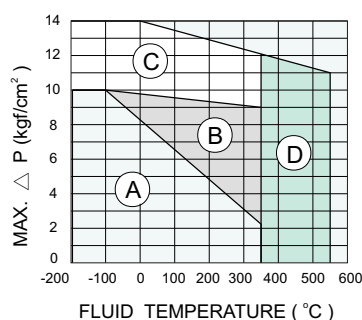
SYSTEM	UNITS OF CALCULATED	FLUID		
		LIQUID	GAS	STEAM
METRIC	$Ql = \text{NM}^3/\text{H}$	$Cv = \frac{1.17 Ql \sqrt{G_l}}{\sqrt{\Delta P}}$	$Cv = \frac{Qg \sqrt{G_g T}}{286 \sqrt{\Delta P (P1+P2)}}$	$Cv = \frac{Ws}{13.5 \sqrt{\Delta P (P1+P2)}}$
	$G_l = \text{Sp. Gr. 1.0 (for water)}$			
IMPERIAL	$Qg = \text{NM}^3/\text{H}$	$Cv = \frac{Ql \sqrt{G_l}}{\sqrt{\Delta P}}$	$Cv = \frac{Qg \sqrt{G_g T}}{963 \sqrt{\Delta P (P1+P2)}}$	$Cv = \frac{Ws}{2.1 \sqrt{\Delta P (P1+P2)}}$
	$Ws = \text{Kg}/\text{H}$			
	$\Delta P = \text{Kg}/\text{cm}^2$			
	$P1, P2 = \text{Kg}/\text{cm}^2\text{A}$			
	$T = ^\circ\text{C}$			
	$Ql = \text{GPM}$			
	$Qg = \text{SCFH}$			
	$Ws = \text{Lb}/\text{H}$			
	$\Delta P = \text{PSI}$			
	$P1, P2 = \text{PSIA}$			
	$T = ^\circ\text{F}$			

TRIM MATERIAL OF VALVE PORT

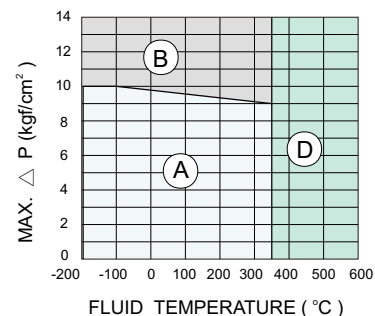
SOFT SEAT



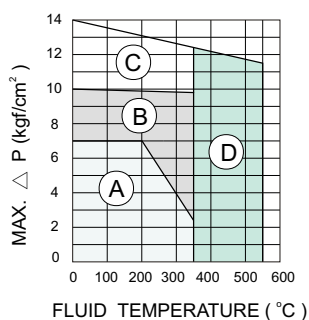
STELLITE TRIM FOR LIQUID



GAS / SUPER HEATED STEAM



STELLITE TRIM FOR SAT. STEAM



KEY : A—Stellite seat is not required, except when it is used for slurry fluids.

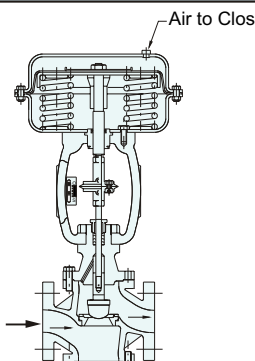
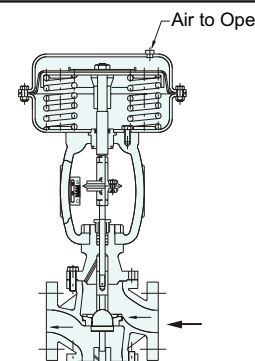
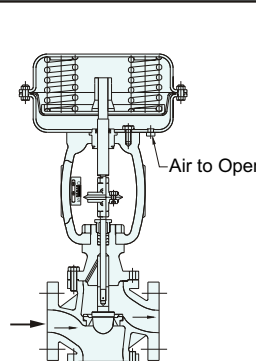
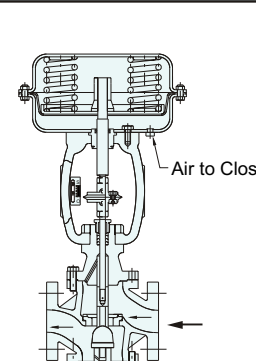
B—Stellite seat is required.

C—Stellite seat face

D—Stellite complete face

ACTUATOR SPECIFICATIONS

■ VALVE ACTION & ACTUATOR

ACTION	DIRECTLY		REVERSE	
FAILURE POSITION	OPEN	CLOSE	CLOSE	OPEN
VIEW				

■ DIMENSION SELECTIONS

ACTUATOR	240	300	330	400	500
VALVE SIZE	25	38	38/50	65	70
15A					
20A					
25A					
32A					
40A					
50A					
65A					
80A					
100A					
125A					
150A					

■ OFF-BALANCE

Unit : kgf/cm²G

Action		Spring range		Supply Air Pressure	Off. balance	Positioner
		24~400	500, 650			
EQ%	Direct Action	0.2~1.0		1.2	0.2	Without
		0.4~2.0		2.4	0.4	Required
		0.6~2.2		2.8	0.6	
		0.4~2.0		2.8	0.8	
	Reverse action	0.2~1.0		1.2	0.2	Required
		0.4~2.0		2.4	0.4	
		0.6~2.2		2.8	0.6	
		0.8~2.0		2.8	0.8	
Quick opening	Direct Action	0.4~2.0		2.4	0.4	
		0.6~2.2		2.8	0.6	
		0.4~2.0		2.8	0.8	
		0.4~2.0		3.0	1.0	
	Reverse action	0.4~2.0		2.4	0.4	
		0.6~2.2		2.8	0.6	
		0.8~2.0		2.8	0.8	
		0.8~2.4		2.8	0.8	

■ ALLOWABLE SHUT-OFF PRESSURE

EQ%

Port Size		15mm	20	25	40	50	65	80	100
Actuator Size	Off. balance	1/2"	3/4	1	1-1/2	2	2-1/2	3	4
240	0.2	21	10	7.1	3.5	2.1	1.4		
	0.4	42	20	14	7.1	4.2	2.8		
	0.8	84	41	28	14	8.5	5.7		
	1.0	100	52	35	17	10	7.1		
300	0.2	27	13	9.2	4.6	2.7	1.8	1.3	0.7
	0.4	54	27	18	9.2	5.5	3.6	2.6	1.5
	0.8	100	54	36	18	11	7.3	5.2	3.0
	1.0	—	67	46	23	13	8.2	6.6	3.8
330	0.2	40	20	13	6.7	4.0	2.7	1.9	1.1
	0.4	80	40	27	13	8.1	5.4	3.8	2.2
	0.8	100	80	54	27	16	10	7.7	4.5
	1.0	—	100	67	33	20	13	9.7	5.6
400	0.2				9.5	5.7	3.8	2.7	1.5
	0.4				19	11	7.6	5.4	3.1
	0.8				38	22	15	10	6.3
	1.0				47	28	17	13	7.9

QUICK OPENING

Port Size		15mm	20	25	40	50	65	80	100
Actuator Size	Off. balance	1/2"	3/4	1	1-1/2	2	2-1/2	3	4
240	0.4	34	17	11	5.6	3.2	2.1		
	0.8	69	34	22	11	6.4	4.2		
	1.0	87	43	28	14	8.0	5.3		
	1.0	87	43	28	14	8.0	5.3		
300	0.4	45	22	14	7.3	4.1	2.7	1.9	1.1
	0.8	90	45	29	14	8.3	5.5	3.8	2.3
	1.0	100	56	36	18	10	6.9	4.8	2.9
	1.0	100	56	36	18	10	6.9	4.8	2.9
330	0.4	66	33	21	10	6.1	4.0	2.8	1.7
	0.8	100	66	43	21	12	8.1	5.6	3.5
	1.0	—	83	53	26	15	10	7.1	4.3
	1.0	—	83	53	26	15	10	7.1	4.3
400	0.4				15	8.6	5.7	4.0	2.4
	0.8				30	17	11	8.0	4.9
	1.0				37	21	14	10	6.1
	1.0				37	21	14	10	6.1

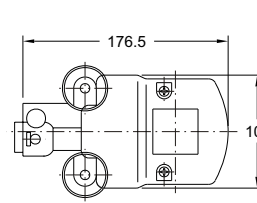
- Note: 1) □ Frame represents the standard combinations of valve body (at full port) and actuator.
2) Off-balance 1.0kgf/cm²G is applied only for direct action.
3) The values listed above are for the control valve whose gland packing is made from the standard material (PTFE V-ring)
4) When tight shut off (TSO) is specified for contoured or V-port plug, allowable shut-off pressure is calculated by multiplying the value in the above table by 1/1.2.
5) The unit conversion value from kgf/cm² to MPa is obtained by multiplying the value in the above table by 0.0980665.
6) Allowable shut-off pressure for bellows seal bonnet is different from the values in the above table.

OPTIONAL ACCESSORIES

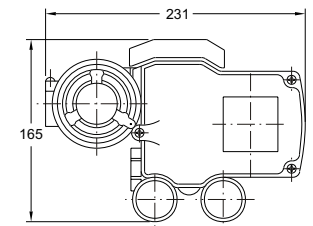
POSITIONERS

MODEL	990A	990B
ITEMS		
TYPE	Cam feedback , Force balance	
INPUT	0.2~1.0 kg/cm ² G	4~20 mA DC
SUPPLY PRESSURE	1.4~7.0 kg/cm ² G	
LINEARITY	±1.5%FS (Single) , ±2.0%FS (Double)	
HYSTERESIS	±1.0%FS (Single) , ±1.5%FS (Double)	
REPEATABILITY	0.3%FS (Single) , 0.5%FS (Double)	
SENSITIVITY	0.2%FS (Single) , 0.5%FS (Double)	
VIBRATION EFFECT	1.0%FS/1G	
AIR CONSUMPTION (at half output)	4NI/min (single) 11NI/min (Double) supply air 140KPa	6NI/min (single) 15NI/min (Double) supply air 400KPa
CABLE ENTRY	1/2"NPT(F)	
STRUCTURE	Exd II BT6	
HOUSING	Low copper aluminum alloy w/pu coating	
ACTION	D/R selectable	
RESISTANCE		250Ω max.
FLOW CAPACITY	60NI/min (single) 140NI/min (Double) (at 140KPa)	100NI/min (single) 180NI/min (Double) (at 400KPa)
WEIGHT (APPROX.)	1.3Kg	2.2Kg

■ 990A



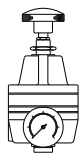
■ 990B



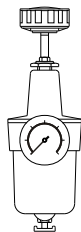
ITEMS	CODE	SPECIFICATIONS
MODEL	990A	P / P POSITIONER
	990B	E / P POSITIONER
ACTION	—D	Direct action
	—R	Reverse action
	—X	Double action
CAM & LEVER MOTION	L	Linear
	R	Rotary
	X	Special specified
AIR CONNECTION	A	1/4"NPT(F)
	B	Special specified
AMBIENT TEMPERATURE	A	Standard -20~+70°C
	B	Special specified

AIR CONDITIONING UNITS

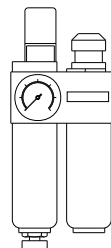
■ 991A



■ 991B



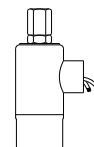
■ 991C



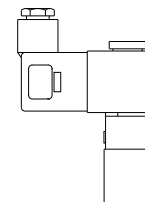
ITEMS	CODE	SPECIFICATIONS
MODEL	991A	AIR REGULATOR W / GAUGE
	991B	AIR SET W / GAUGE
	991C	AIR SET W / OILER & GAUGE
	991D	Special specified
CONNECTION	—A	1/4"PT(F)
	—B	Special specified
MATERIAL OF BODY	A	Aluminum alloy (standard)
	B	Special specified
AUTO-DRAIN	A	Not required
	B	Special specified
RANGE OF PRESSURE GAUGE	A	0~2kg/cm ²
	B	0~10kg/cm ²
	C	Special specified

SOLENOID VALVES

■ 992A



■ 992B / C

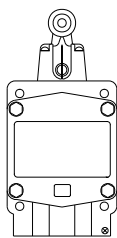


ITEMS	CODE	SPECIFICATIONS
MODEL	992A	3 PORT , DIRECTED
	992B	3 PORT , 2 POSITION
	992C	5 PORT , 2 POSITION
	992D	Special specified
CONNECTION	—A	1/4"PT(F)
	—B	Special specified
POWER SUPPLY	A	AC110V 50 / 60 Hz
	B	AC220V 50 / 60 Hz
	C	DC24V
	D	Special specified
MATERIAL OF BODY	A	Standard (BC / ADC)
	B	Special specified
STRUCTURE	A	Water-proof IP68
	B	Explosion-proof d ₂ G ₄
	C	Special specified

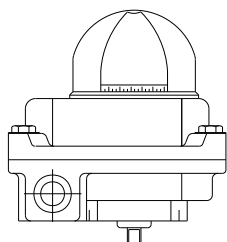
OPTIONAL ACCESSORIES

LIMIT SWITCHES / POSITION INDICATOR / ANALOG OUTPUT OF POSITION

■ 993A



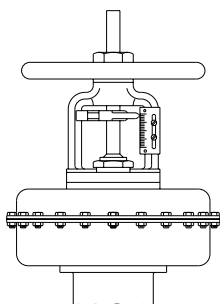
■ 993B



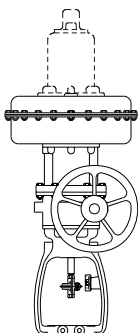
ITEMS	CODE	SPECIFICATIONS
MODEL	993A	LIMIT SWITCH UNIT
	993B	LIMIT SWITCH W/ ROTARY POSITION INDICATOR
	993C	Special specified
CONTACT FORM	-0	SPDT
	-1	DPDT
	-2	Special specified
CONTACT RATING	0	5A~250VAC / 0.2A~250V DC
	1	Special specified
AMBIENT TEMPERATURE	0	-20~+70°C
	1	Special specified
ANALOG OUTPUT	-A	Not required
	-B	Required
	-C	Special specified
CABLE ENTRY	A	3/4"PT(F)
	B	Special specified
STRUCTURE	A	Water-proof IP68
	B	Explosion-proof d ₂ G ₄
	C	Special specified

HANDWHEEL

■ 994A



■ 994B



ITEMS	CODE	SPECIFICATION
MODEL	994A	TOP MOUNTED TYPE
	994B	SIDE MOUNTED TYPE
MATERIAL	-A	FC with pu coating
	-B	Special specified
COMBINED VALVE SIZE	-015	15A
	}	}
	-150	150A

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