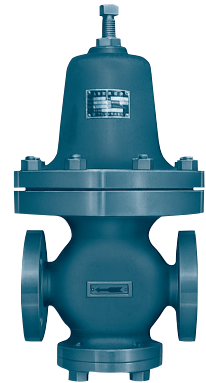**Direct acting**

Type AWR Back Pressure Regulating Valves

For all Fluid

●Simple construction
●Stainless steel diaphram allows for use with steam, gases and liquids.

2

Pressure Regulating Valves (For steam, gas, liquid)

■ Specifications

Fluid	Inlet set pressure range (MPa)	Temp. (℃)	Material for main parts					Connection
			Body	Spring case	Bottom cover	Valve disc & seat	Diaphragm	
Air, water, non-corrosive gases & liquids	(Standard) 0.03 —0.055 0.055—0.085 0.085—0.13 0.13 —0.2 0.2 —0.3	0 I 80	Cast iron	Cast iron	Cast iron	Stainless steel	Synthetic rubber	Flanged JIS10KFF
			Cast steel		Carbon steel			Flanged JIS20KRF
Steam, air, water, non-corrosive gases & liquids	(Medium) 0.3 —0.45 0.45 —0.7 0.7 —1.0 (High) 1.0 —1.6 1.4 —2.0	0 I 220	Cast iron		Cast iron		Stainless steel	Flanged JIS10KFF
			Cast steel		Carbon steel			Flanged JIS20KRF

Remark : Stainless cast steel body is available on request.

■ Performance

Offset pressure	10% of maximum set pressure
Seat leakage	0.5% of rated flow or less

■ Cv values

Material of diaphragm	Size	Inlet set pressure range (MPa)							
		0.03—0.055	0.055—0.085	0.085—0.13	0.13—0.2	0.2—0.3	0.3—0.45	0.45—0.7	above 0.7
		Cv							
Synthetic rubber	15	0.40	0.78	1.30	1.71	1.55	1.74	1.75	1.75
	20	0.42	0.82	1.38	2.11	1.79	2.20	2.28	2.28
	25	0.42	0.82	1.38	2.14	1.82	2.23	2.28	2.28
	40	0.70	1.34	2.23	3.88	2.72	3.70	3.36	3.36
	50	0.79	1.50	2.52	4.44	3.65	5.35	5.12	5.12
Stainless steel	15	0.08	0.15	0.24	0.78	0.96	0.96	1.08	1.08
	20	0.09	0.17	0.28	0.79	1.02	1.02	1.11	1.11
	25	0.09	0.17	0.28	0.80	1.02	1.02	1.11	1.11
	40	0.21	0.41	0.66	1.49	1.58	1.64	2.20	2.20
	50	0.35	0.69	1.10	1.88	2.09	2.09	2.20	2.20

Remark : Cv value will be double of above value when 20% offset is allowed.
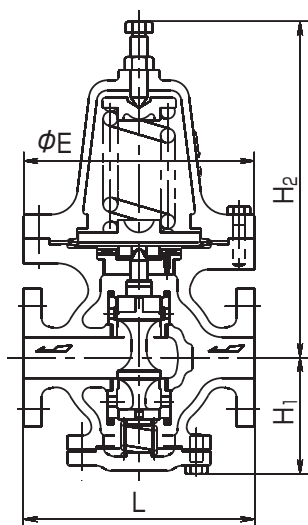
Type AWR Back Pressure Regulating Valves

■ Sizing

Fluid	In case of $(P_1-P_2) \leqq \dfrac{P_1}{2}$	In case of $(P_1-P_2) \geqq \dfrac{P_1}{2}$	Description
Steam	$Cv = \dfrac{WK}{0.198\sqrt{(P_1-P_2)P_2}}$ $\left\{ Cv = \dfrac{WK}{198\sqrt{(P_1-P_2)P_2}} \right\}$	$Cv = \dfrac{WK}{0.099P_1}$ $\left\{ Cv = \dfrac{WK}{99P_1} \right\}$	W : Flow rate kg /h P_1 : Set pressure kPa abs {MPa abs} P_2 : Outlet pressure kPa abs {MPa abs} K : $1 + 0.0013 \times$ (super heated steam temp. − saturated steam temp.) ℃
Gas	$Cv = \dfrac{V}{3.94}\sqrt{\dfrac{G(273+t)}{(P_1-P_2)P_2}}$ $\left\{ Cv = \dfrac{V}{3940}\sqrt{\dfrac{G(273+t)}{(P_1-P_2)P_2}} \right\}$	$Cv = \dfrac{V\sqrt{G(273+t)}}{1.97P_1}$ $\left\{ Cv = \dfrac{V\sqrt{G(273+t)}}{1970P_1} \right\}$	V : Flow rate m³/h (normal) G : Specific gravity (air : 1) t : Temperature ℃ P_1 : Set pressure kPa abs {MPa abs} P_2 : Outlet pressure kPa abs {MPa abs}
	In case of amb. temp. (20℃)		
	$Cv = \dfrac{V}{0.23}\sqrt{\dfrac{G}{(P_1-P_2)P_2}}$ $\left\{ Cv = \dfrac{V}{230}\sqrt{\dfrac{G}{(P_1-P_2)P_2}} \right\}$	$Cv = \dfrac{V\sqrt{G}}{0.115P_1}$ $\left\{ Cv = \dfrac{V\sqrt{G}}{115P_1} \right\}$	
Liquid	$Cv = \dfrac{0.696Q\sqrt{\gamma}}{\sqrt{\triangle P}}$ $\left\{ Cv = \dfrac{0.022Q\sqrt{\gamma}}{\sqrt{\triangle P}} \right\}$		Q : Flow rate ℓ /min γ : Specific gravity (air : 1) $\triangle P$: Differential pressure $P_1 - P_2$ kPa {MPa}

When viscosity is over 20mm²/s, correct the flow rate by the following formula.

① $Cv = \dfrac{0.696Q\sqrt{\gamma}}{\sqrt{\triangle P}}$ $\left\{ Cv = \dfrac{0.022Q\sqrt{\gamma}}{\sqrt{\triangle P}} \right\}$

Where :
Q : Flow ℓ /min
$\triangle P$: Differential pressure kPa {MPa}
γ : Specific gravity (water : 1)

② $R = \dfrac{2462 \times Q}{\sqrt{Cv} \times \text{Viscosity at operating temperature mm}^2/s}$

③ Obtain correction factor α from the graph using factor R.
④ Corrected $Q = Q \times \alpha$
⑤ Then obtain corrected Cv from ① by using corrected Q.

Factor R − Correction factor α
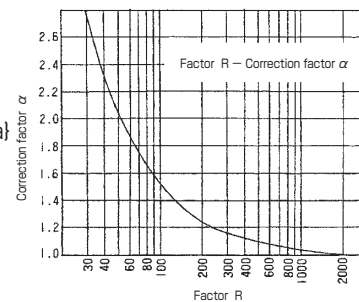
■ Construction

Dimensions and weights
(mm, kg)

Material Connection	Size	L	H₁	H₂	E	Weight
Cast iron JIS10K	15	186	89	320	225	25
	20	190	89	320		25
	25	190	89	320		28
	40	230	113	328		38
	50	250	127	336		40
Cast steel, Stainless cast steel JIS20K	15	182	93	320	225	27
	20	186	93	320		27
	25	186	93	320		30
	40	226	117	328		40
	50	246	131	336		45

Remark : Size 65 is available on request.