

For Balancing and Flow Measurement Applications

Job Name _____
 Job Location _____
 Engineer _____
 Approval _____

Contractor _____
 Approval _____
 Contractor's P.O. No. _____
 Representative _____

Series CSM-91

Flow Measurement/Balancing Valves

Sizes: 2½" – 10" (65 – 250mm)

Series CSM-91 Flow Measurement/Balancing Valves are designed for applications on medium or large flow rate HVAC systems, pump packages, and cooling towers. They feature a multi-turn adjustment range for maximum control. Pressure differential readout ports on both sides of the valve to allow for easier installation and positive shutoff for servicing equipment. In addition, these valves also incorporate a micrometer type handwheel adjustment, visually readable settings and a tamper-proof memory stop.

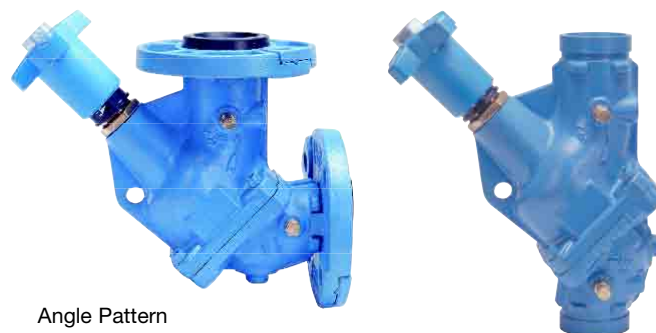
The CSM-91's field-convertible design allows the valve to be changed from the factory-standard straight pattern to an optional angle pattern with standard tools and no additional parts. This allows the valve to be used as a replacement for angles or elbows and will not affect the valve's accuracy.

Maximum flow requires a one-foot pressure drop across the valve to obtain an accurate meter reading with the valve set point from 50% to 100% open for greatest accuracy.

The valve should be installed with flow in the direction of the arrow on the valve body, and installed at least five pipe diameters downstream from any fitting, and at least ten pipe diameters downstream from any pump. Two pipe diameters downstream from the CSM-91 should be free of any fittings. When installed, easy and unobstructed access to the valve handwheel and metering ports for adjustment should be provided. Mounting of the valve in piping must prevent sediment buildup in metering ports.

Features

- Multi-turn adjustment
- Interchangeable metering and drain ports on both sides of valve
- Positive shutoff
- Tamper-proof memory stop
- Micrometer type handwheel adjustment - visually readable from distance
- Field convertible for straight or angle pattern
- Grooved end connections with optional flange adaptors



Angle Pattern

CSM-91

Straight Pattern

Specifications

A flow measurement valve shall be installed as shown on plans. Each valve shall have two ¼" (6mm) NPT brass metering ports with Nordel® check valves and gasketed caps located on both sides of valve seat. Two additional ¼" (6mm) NPT connections with brass plugs are to be provided on the opposite side of the metering ports for use as drain connections. Drain connections and metering ports are to be interchangeable for measurement flexibility when valves are installed in tight locations. The valve body shall be ductile iron with industrial standard grooved ends. Valve stem and plug disc shall be bronze with ergonomically designed handwheel with multi-turn handwheel adjustments. Sizes 2½" and 3" (65 and 80mm) - five turns, 4" – 6" (100 – 150mm) - six turns, and 8" and 10" (200 and 250mm). Flange adaptors shall be supplied to prevent rotation. The valve shall be a Watts Series CSM-91.

Pressure-Temperature

Grooved Ends Only

Maximum Working Pressure: 375psi (26.25 bar)

Maximum Temperature: 230°F (110°C)

Flange

Maximum Working Pressure:

Class 125: 175psi (12 bar)

Maximum Temperature: 230°F (110°C)

Nordel® is a registered trademark of DuPont Dow Elastomers.

Viton® is a registered trademark of DuPont Dow Elastomers.

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Materials of Construction

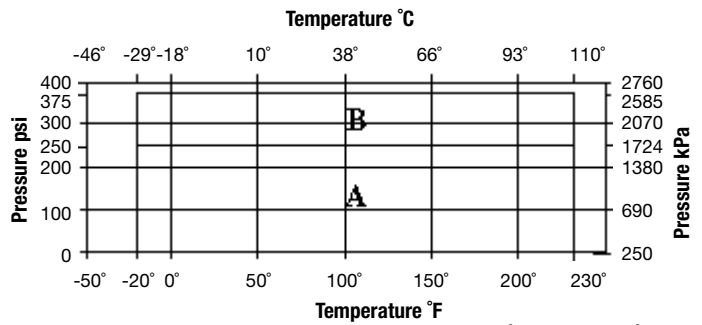
Body	Ductile Iron ASTM A536 GR65-45-12
Disc	Bronze ASTM B584 C-84400
Seat	2½" – 6" Engineered Resin 8" – 10" EPDM
Stem	Brass ASTM B-16 2½" – 6" (65 – 150mm) Stainless Steel 8" – 10" (200 – 250mm)
O-ring	Buna-N
Memory Lock	Brass ASTM B-16
Meter Ports	NPT Brass body with Schrader Valve
Drain Tappings (2)	¼" Brass plug

Optional Equipment

Flange Adapters	Ductile iron
Flange Gaskets	EPDM
Insulation	Fiberglass

Note: Series CSM-91 valves are shipped with grooved ends standard. For companion flanges, please specify size and class rating when ordering. Insulation blocks are also ordered separately from valve. Please specify size when ordering.

Pressure – Temperature



Note: For temperatures between 230°F and 300°F (110°C and 149°C), specify Viton® Elastomers

Legend

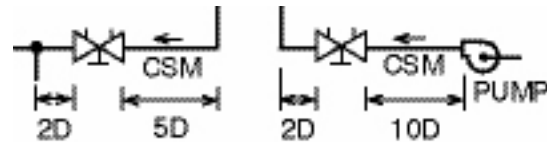
- A – Ductile iron flange adapters for ANSI 150# flanges
- B – Grooved end with 375psi rated pipe coupling

Flange Adapter Details

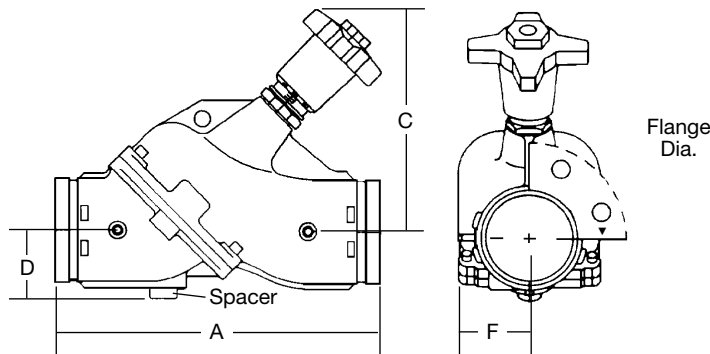
VALVE SIZE		PIPE O.D.		125PSI			
in.	mm	in.	mm	Bolt No.	Bolt Size	Bolt Circle Diam. in.	mm
2½	64	2⅞	73	4	⅝ x 3	5½	140
3	76	3½	89	4	⅝ x 3	6	152
4	102	4½	114	8	⅝ x 3	7½	191
5	127	5⅞	140	8	¾ x 3½	8½	216
6	152	6⅞	168	8	¾ x 3½	9½	241

Installations

Generally locate the valve five pipe diameters downstream from a fitting; with two diameters downstream from the balancing valve free from fittings. If a balancing valve is located downstream from a circulation pump, allow a distance of ten (10) diameters between the pump and balancing valves (as illustrated below).



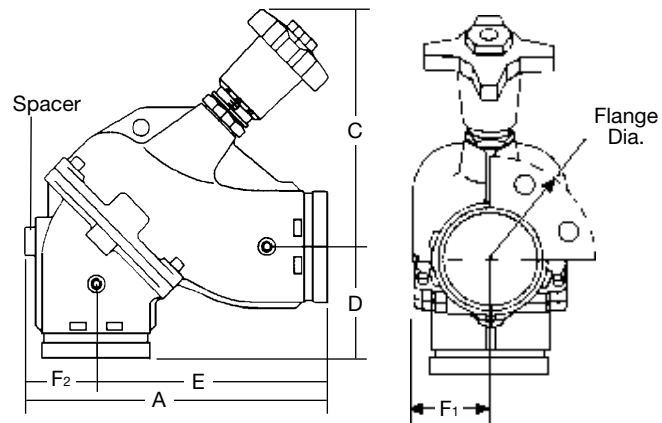
Dimensions—Weights



Straight Pattern (Standard)

Straight Pattern

SIZE (DN)		DIMENSIONS								FLANGE DIA. 125#		SPACER		WEIGHT	
		A		C		D		F							
<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>lbs</i>	<i>kgs</i>
2½	65	12	305	9⅝	245	2¾	70	2⅞ ₁₆	65	7	178	1	25	19	9
3	80	12	305	10½	267	2⅞ ₁₆	62	3	76	7½	191	1	25	24	11
4	100	14	356	10⅞ ₁₆	268	3	76	3⅞ ₁₆	87	9¼	235	1¼	32	42	19
5	125	17½	445	13⅞ ₁₆	332	3⅝	92	4⅞ ₁₆	125	10	254	1¼	32	81	37
6	150	20⅞ ₁₆	525	13¾	349	4⅞ ₁₆	113	5⅝	149	11	279	2	51	120	54
8	200	28⅞ ₁₆	716	24⅝	625	5⅞ ₁₆	144	7⅞	200	13½	343	2¼	57	310	141
10	250	30	762	26½	673	6⅞ ₁₆	167	9⅞ ₃₂	241	16	406	2¼	57	460	209



Angle Pattern (Convertible)

Angle Pattern (Field Convertible*)

SIZE (DN)		DIMENSIONS										FLANGE DIA. 125#		SPACER		WEIGHT	
in.	mm	A		C		D		E		F1		F2		in.	mm	lbs	kgs
2½	65	10⅛	257	9⅞	244	4⅞	117	7⅞	187	2⅞	65	2⅞	70	7	178	19	9
3	80	10⅜	275	10½	267	3⅞	98	8⅞	213	3	76	2⅞	62	7½	191	24	11
4	100	12⅞	321	10⅞	268	4⅞	111	9⅞	244	3⅞	87	3	76	9¼	235	42	19
5	125	15⅞	397	13⅞	332	5½	140	12	305	4⅞	125	3⅞	92	10	254	81	37
6	150	18⅞	471	13¾	349	6⅞	168	14⅞	359	5⅞	149	4⅞	113	11	279	120	54
8	200	24⅞	618	24⅞	625	9⅞	233	18⅞	481	7⅞	200	5⅞	144	13½	343	310	141
10	250	26⅞	683	26½	673	9¾	248	20⅞	516	9⅞	241	6⅞	167	16	406	460	209

*Note: Series CSM-91 valves are shipped as straight pattern from factory. To convert to angle pattern refer to instruction sheet shipped with valve.

For additional information, visit our web site at: www.watts.com



A Watts Water Technologies Company



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