

## For Balancing and Flow Measurement Applications

Job Name \_\_\_\_\_

Contractor \_\_\_\_\_

Job Location \_\_\_\_\_

Approval \_\_\_\_\_

Engineer \_\_\_\_\_

Contractor's P.O. No. \_\_\_\_\_

Approval \_\_\_\_\_

Representative \_\_\_\_\_

# Series CSM-91

## Flow Measurement/Balancing Valves

Sizes: 2½" – 12" (65 – 300mm)

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 read-out 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.

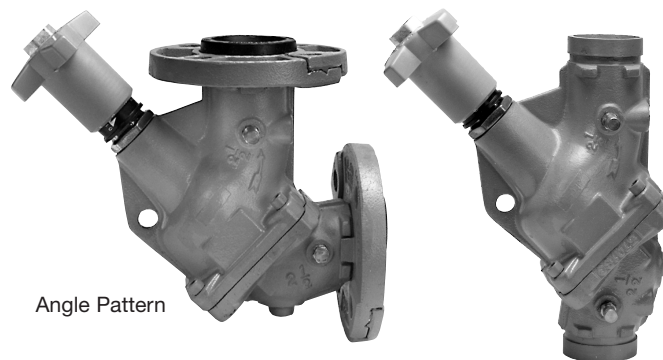
The valve should be installed with flow in the direction of the arrow on the valve body, and installed at least five pipe diameters downstream from any fitting, and at least ten pipe diameters downstream from any pump. Two pipe diameters downstream from the CSM-91 should be free of any fittings. When 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 a distance
- Field convertible for straight or angle pattern
- Grooved end connections with optional flange adaptors

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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) - twelve turns and 12" (300mm) - fourteen turns. Flange adaptors shall be supplied to prevent rotation. The valve shall be a Watts Regulator Company Series CSM-91.

### Pressure-Temperature

#### Grooved Ends Only

Maximum Working Pressure: 375psi (26.25 bars)

Maximum Temperature: 230°F (110°C)

#### Flange

Maximum Working Pressure:

Class 125: 175psi (12 bars)

Maximum Temperature: 230°F (110°C)

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.

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## Materials of Construction

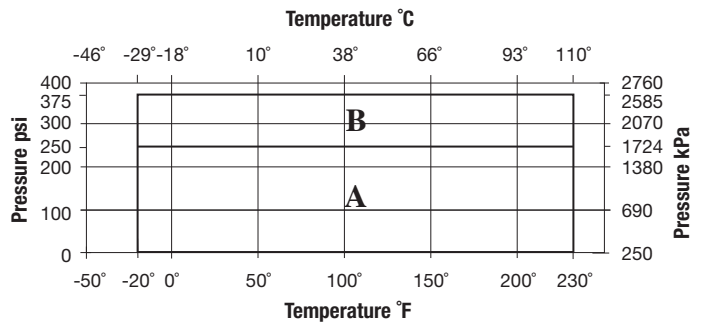
Body	Ductile Iron ASTM A536 GR65-45-12
Disc	Bronze ASTM B584 C-84400
Seat	2½" – 6" Engineered Resin 8" – 12" EPDM
Stem	Brass ASTM B-16 2½" – 6" (65 – 150mm) Stainless Steel 8" – 12" (200 – 300mm)
O-ring	Buna-N
Memory Lock	Brass ASTM B-16
Meter Ports	NPT Brass body with Schrader Valve
Drain Tappings (2)	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

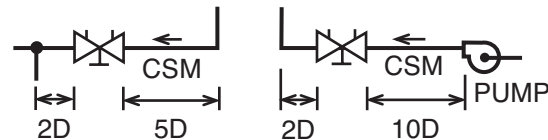
- A – Ductile iron flange adapters for ANSI 150# flanges
- B – Grooved end with 375psi rated pipe coupling

### Flange Adapter Details

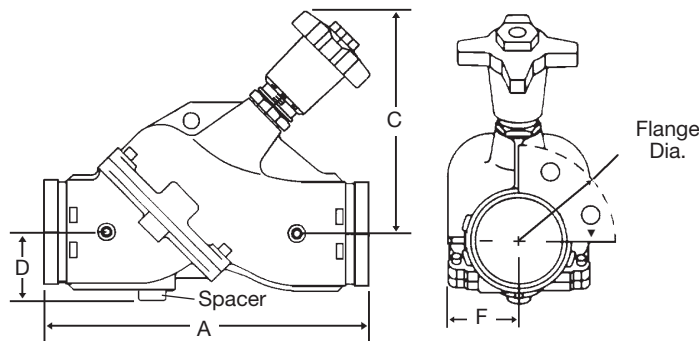
VALVE SIZE		PIPE O.D.		125PSI			
in.	mm	in.	mm	Bolt No.	Bolt Size	Bolt Circle Diam. in.	mm
2½	64	2⅞	73	4	⅝ x 3	5½	140
3	76	3½	89	4	⅝ x 3	6	152
4	102	4½	114	8	⅝ x 3	7½	191
5	127	5⅞	140	8	¾ x 3½	8½	216
6	152	6⅞	168	8	¾ x 3½	9½	214

## 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).



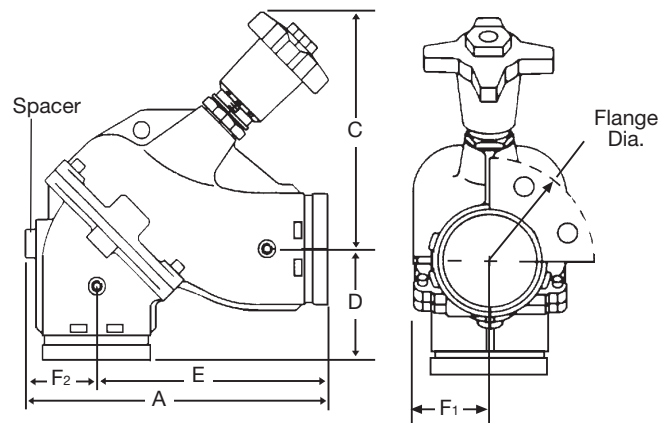
## Dimensions-Weights



**Straight Pattern (Standard)**

### Straight Pattern

Size (DN)		Dimensions						Flange Dia. 125#		Spacer		Weight			
in.	mm	A		C		D		F		in.	mm	in.	mm	lbs	kgs
		in.	mm	in.	mm	in.	mm	in.	mm						
2½	65	12	305	9⅝	245	2¾	70	2⅞ <sub>16</sub>	65	7	178	1	25	19	9
3	80	12	305	10½	267	2⅞ <sub>16</sub>	62	3	76	7½	191	1	25	24	11
4	100	14	356	10⅞ <sub>16</sub>	268	3	76	3⅞ <sub>16</sub>	87	9¼	235	1¼	32	42	19
5	125	17½	445	13⅞ <sub>16</sub>	332	3⅝	92	4⅞ <sub>16</sub>	125	10	254	1¼	32	81	37
6	150	20⅞ <sub>16</sub>	525	13¾	349	4⅞ <sub>16</sub>	113	5⅞	149	11	279	2	51	120	54
8	200	28⅞ <sub>16</sub>	716	24⅝	625	5⅞ <sub>16</sub>	144	7⅞	200	13½	343	2¼	57	310	141
10	250	30	762	26½	673	6⅞ <sub>16</sub>	167	9⅞ <sub>32</sub>	241	16	406	2¼	57	460	209
12	300	38⅞ <sub>16</sub>	964	28⅞ <sub>16</sub>	722	7⅝	194	12⅝	321	19	483	2¼	57	870	395



Angle Pattern (Convertible)

Angle Pattern (Field Convertible\*)

Size (DN)		Dimensions										Flange Dia. 125#		Spacer		Weight			
		A		C		D		E		F <sub>1</sub>								F <sub>2</sub>	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs	kgs		
2½	65	10⅛	257	9⅝	244	4⅝	117	7⅝	187	2⅞ <sub>16</sub>	65	2¾	70	7	178	1	25	19	9
3	80	10⅓ <sub>16</sub>	275	10½	267	3⅞	98	8⅝	213	3	76	2⅞ <sub>16</sub>	62	7½	191	1	25	24	11
4	100	12⅝	321	10⅞ <sub>16</sub>	268	4⅞	111	9⅝	244	3⅞ <sub>16</sub>	87	3	76	9¼	235	1¼	32	42	19
5	125	15⅝	397	13¼ <sub>16</sub>	332	5½	140	12	305	4⅞ <sub>16</sub>	125	3⅝	92	10	254	1¼	32	81	37
6	150	18⅞ <sub>16</sub>	471	13¾	349	6⅝	168	14⅛	359	5⅞	149	4⅞ <sub>16</sub>	113	11	279	2	51	120	54
8	200	24⅝ <sub>16</sub>	618	24⅝	625	9¾ <sub>16</sub>	233	18⅞ <sub>16</sub>	481	7⅞	200	5⅞ <sub>16</sub>	144	13½	343	2¼	57	310	141
10	250	26⅞ <sub>16</sub>	683	26½	673	9¾	248	20⅞ <sub>16</sub>	516	9⅞ <sub>32</sub>	241	6⅞ <sub>16</sub>	167	16	406	2¼	57	460	209
12	300	31⅞ <sub>16</sub>	805	28⅞ <sub>16</sub>	722	14	356	24⅞ <sub>16</sub>	611	12⅝ <sub>8</sub>	321	7⅝	194	19	483	2¼	57	870	395

\*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](http://www.watts.com)



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