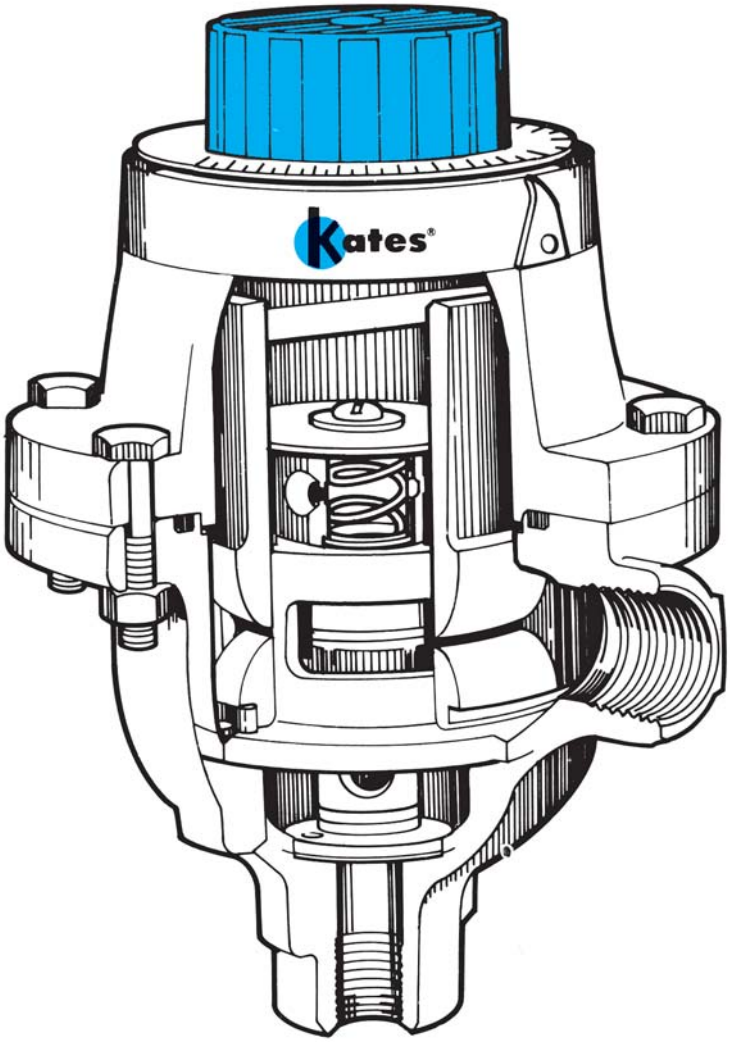
the genius of simplicity

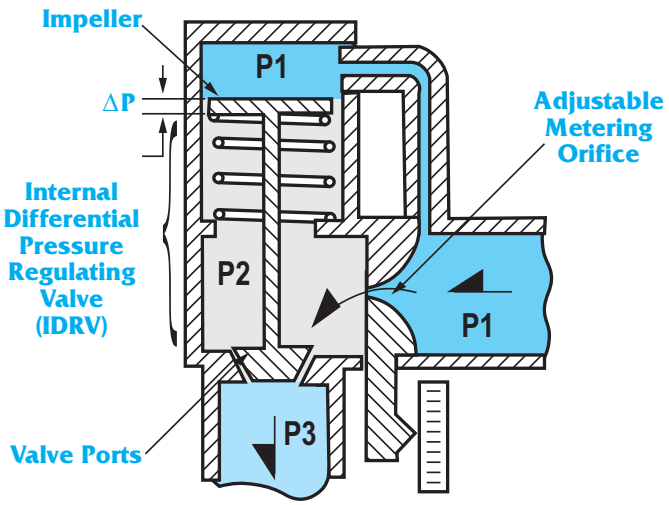


"Simple Solutions to Flow Control Applications"

W.A. Kates® company

Guide to Flow Rate Controllers

The Kates Flow Rate Controller



Accurate Flow Control Without A Flow Control Loop

To many, it is thought, to control the flow rate of liquids or gases requires a flow loop consisting of a flow sensor, a PID controller, and a final control element. For these devices to be able to control they must be mounted, wired, piped and calibrated all which can induce errors and costs to the flow system.

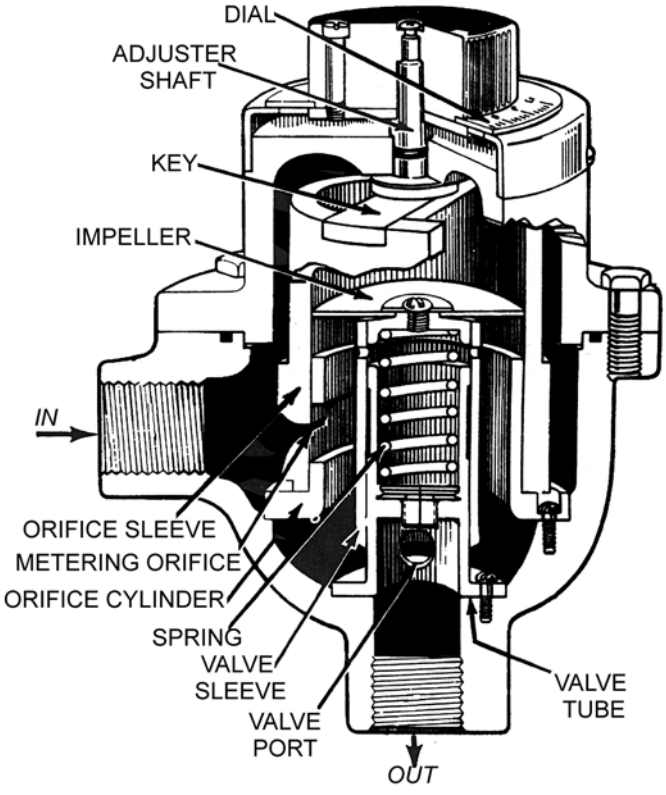
The Kates controller replaces the components in a flow loop and is a self-contained, completely mechanical flow rate instrument, which maintains the flow to within +/- 1.5% of set point.

The Genius of Simplicity

The design of the controller is such that a knob adjusts a linear orifice slot which remains constant once set. Across this now fixed opening a constant differential pressure is maintained by an internal regulator. Thus, total flow is directly proportional to orifice area.

Advantages of the Kates Flow Rate Controller

1 – Automatically corrects for any changes to the inlet or outlet pressure to maintain the set point flow to +/- 1.5% of setting.
2 – Flow is directly proportional to orifice area.
3 – "Straight-line" uniform linear scale.
4 – Accuracy by means of a self-operating single unit.
5 – No need for 10 - 20 straight runs of pipe diameter upstream or downstream to insure control accuracy.
6 – No electric, air or hydraulic connections are required.
7 – Large turndown ratio typical 25 to 1 or better.
8 – Fast acting.
9 – On liquid service, moving parts are immersed in the fluid which helps prohibit hunting or oscillation.
10 – Simple design and few parts eliminated the many calibration and adjustments checks required of a typical flow rate control system.
11 – Capable of taking large pressure drops.
12 – Automatically takes whatever pressure drop is required to deliver the required flow.
13 – Cf & Cv are not a factor—Control set point is maintained as long as there is a minimum differential pressure of 10 psi between the inlet of the Kates and the outlet of the system.
14 – Sizing requires no formulas. It is only necessary to know the required flow and select the correct range.
15 – Low initial cost and low operating costs.



Flow Rate Controller Specification

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	FCVALVE	PVC	Mini-Flo	Flo-Miser	Ratio Blend	Just-A-Flo	Micro-Flo
Flow Range (GPM)	See How to Order Guide	3 Ranges from 0.5–25	0.5–1.0	0.3–20	0.3–40	0.5–7.0	0.01–0.5
Accuracy (+/- Setpoint)	±1-1/2%	±2%	±5%	±5%	±2%	±2%	±1–1/2
Repeatibility	±1/2%	±1%	±10%	±1%	±1%	±1%	±1/2%
Response Time (Seconds)	1–2	1–2	1–2	1–2	1–2	1–2	1–2
Turndown Ratio	25:1	20:1	5:1	10:1	50:1	20:1	50:1
Connections	FNPT or FLG	3/4" FNPT	1/4" FNPT	3/8", 1/2", 3/4"	1/4", 3/8", 1/2", 3/4" NPT	7/8–14 SAE", 1/2" FNPT	1/8" FNPT
O-rings (Std)	Teflon®	Teflon®	Buna	Teflon®	Kalrez®/ Teflon®	Teflon®	Teflon®
Materials of Construction	316 SS	PVC	316 SS, Brass, Zytel	316 SS	316 SS	316 SS	316 SS
Max Working Pressure (PSIG)	Up to 3600	275	450, 450, 150	1440	1000	600	1440

Teflon® and Kalrez® are registered trademarks of DuPont Corporation.

Kates Automatic Flow Rate Controllers

The Kates Automatic Flow Rate Controller has been applied successfully throughout industry to a wide variety of liquid and gas applications. We take pride in providing a high quality and high performance instrument that will provide many years of maintenance free service. Our motto to "serve our customers as we desire our suppliers to serve us" exemplifies our commitment to quality and service.

Applications

Instrument Purging • Oil Well Water Flooding • Deionized Water • Rotating Seals • Additives/Blending • Nitrogen Blanketing • Natural Gas • Bleaching Systems • Reverse Osmosis • Dynamometers • Ratio Blending • Humidity Control • Heat Exchangers • Cooling Water • Dust Suppression • Aircraft Deicing • Test Cells • Caustics • Acids • Analytical Fast Loops • Liquid Ring Vacuum Pumps...and hundreds more!

Flow Rate Control of Gases

Downstream pressure fluctuations are counterbalanced by the internal regulating valve to maintain the SCFM to within +/- 1 1/2% of the flow setting. Variations in upstream pressure and temperature should be minimized due to the Compressibility of gases and for corresponding changes in density. For GPM to SCFM conversion, request BLT 320.

Remote Positioning/ Modulating Control

Automated Kates controllers will improve the performance of almost any control loop. A change in input signal will cause a direct and linear change in flow rate regardless of inlet or outlet pressure variations. Turndown ratios for controllers can be ordered as high as 100:1. In addition to stabilizing the Process loop, it inherently offers accurate cascade control.

How To Order Guide

Choose one alphanumeric character from each of the first five columns; multiple options may be selected from the sixth column. Then specify the needed information below. The sample Model Number, BB11T-BE, represents a 1/2" unit with 0.05 to 1.0 gpm flow range, 316 SS body, 150 pound body rating, 10 to 150 psi differential pressures, and threaded connections. The added options are Teflon® seals and a metal knob.

	Flow Range* (GPM)	Material	Pressure Class	ΔP Range (PSI)	Connections	Options
1/2"	A .02-.5	B 316 SS (STD)	1 150#	1 10-150	T THREADED	A BUNA O-RINGS
	B .05-1.0	C PVC**	3 300#	3 20-600	B RF FLG	B TEFLON O-RINGS® (STD)
	C .1-3.0	D Hastelloy C	6 600#	4 25-1200	S SPECIAL	C VITON O-RINGS
3/4"	E 1-5	E Alloy 20	9 900#	5 30-1800		E METAL KNOB
	F 1-12	F Monel	0 1500#	6 35-3000		F SS TAG
	G 1-25		A 2500#			H ELECTRIC ACTUATOR
1-1/2"	J 3-80					J GAS SERVICE
2"	K 10-150					L SPECIAL
3"	M 15-350					
4"	N 100-550					
	O SPECIAL					

Example

B	*B*	*1*	*1*	*T*	*- BE*

* Specified flow ranges are for water (SPG = 1.0). Actual flow may vary due to fluid conditions.

** Only available in 3/4" line size.

*** For long lasting maintenance free operation we recommend that a strainer or filter be installed just upstream of the controller. Refer to BLT 204–02.

Teflon® is a registered trademark of DuPont Corporation.

Limited Product Warranty

The W.A. KATES COMPANY guarantees every piece of equipment manufactured by it to be inspected and tested, and free from defects in workmanship or material when shipped from its factory. No warranty of corrosion resistance of any parts or assembly is expressed or implied.

This guarantee is valid for one year from date of shipment from its plant. Within that time the W.A. KATES COMPANY will replace free of charge any equipment returned, with shipping charges prepaid, found to have been defective at time of shipment.

This warranty does not apply to: (a) damage resulting from misuse or inadequate handling; (b) damage resulting from continued use after defect is apparent; (c) any other damage, loss or liability; or (d) any piece of equipment that is changed, modified or altered in any way after it leaves the factory.

The liability of the W.A. KATES COMPANY shall be limited to the replacement f.o.b. our factory of any equipment found to have been defective at time of shipment with duplicate or similar equipment of equal performance rating, but such liability shall in no event exceed the contract price for said equipment.

Recommended Protection for Kates Flow Controllers

For long lasting maintenance free operation, we recommend that a strainer or filter be installed immediately upstream of the Kates.

Controller Size	Screen Rating: Strainer/Mesh	Screen Rating: Filter/Micron
1/8", 1/4", 3/8", 1/2"	10 Micron Sintered	10
3/4", 1"	200	75
1-1/2", 2", 3"	150	100
4"	100	150

The recommendation of screen size is a matter of judgement compromising:

a. Operability. Removal of all particles will insure continuous operation at all times.
b. The tolerable interval between cleaning. Removal of all particles may require screen so fine that required cleaning may be too costly.
c. Allowable pressure drop.

The screen sizes listed are recommendations resulting from service experience. We cannot make operating guarantees because of the variety of fluid characteristics and the infinite number of combinations of particle size and nature encountered in practice. To obtain satisfactory results with a Kates Flow Rate Controller, the particles must be nonabrasive, non-fibrous, and must not adhere or coat on the controller internal parts, nor have a tendency to settle out of solution.

W.A. Kates® company

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