

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *MKS Instruments Type 248* at our website: *Click HERE*

mks
Technology for Productivity

Pressure Measurement & Control

WWW.MKSINST.COM



Type 250E

PRESSURE/FLOW CONTROL MODULE

The MKS Type 250 is a self-contained PID control module designed to provide optimized control of the total pressure or flow of a gas (or gases) in a dynamic closed-loop system.

With the Type 250, input can be supplied by a Baratron® Capacitance Manometer or other compatible vacuum gauge for closed-loop pressure control, or flow input can be measured by a mass flow transducer for closed-loop flow control. Its power supply has sufficient output to power most capacitance manometers and flow transducers.

Process control can be manually adjusted through a front panel potentiometer or remotely programmed with a 0-5 VDC analog signal for profile generating. With the multi-set point option, a simple ground closure will select one of four preset set points. The basic Type 250 provides a simple analog error meter to show deviation of actual versus desired set point. It is also available with an optional 4½ digit LED display which provides a readout of the input transducer signal and eliminates the need for a separate display instrument. A Process Limit Option provides logic level and relay closure when actual pressure or flow exceeds a preset percentage of desired set point. These limits are adjustable from 0.5% to 100% of set point.

Features & Benefits

- Provides fast response control of pressure or flow of single gas
- Gain and phase lead adjustment capability for optimized closed-loop control
- Supports internal (front panel) set point control or external set point voltage
- Operates with a wide variety of pressure/flow transducers and control valves
- Standard analog or optional 4½ place digital display
- Offers rack-mountable design
- CE Compliant to EMC Directive 89/336/EEC
- Powers and displays Baratron® Capacitance Manometer with digital meter option

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

Application Schematics

A pressure/flow control system consists of three basic parts: 1) a process sensor, 2) a PID controller, and 3) a control element. In the simplest single-gas control system (Figure 1), a pressure transducer or mass flow meter measures the process pressure or gas inlet flow rate. The Type 250 PID controller compares the measured pressure or flow to the desired set point and adjusts the gas flow control valve as necessary to achieve set point.

For pressure control with multiple gases, the Type 250 can be used as the master controller to several mass flow controllers (Figure 2). In this configuration, multiple MFCs are slaved to the output of the Type 250, which adjusts the total flow to achieve the desired pressure, while the flow electronics maintains the desired gas ratio/ mixture.

Many processes require a constant total flow, as well as ratio of the inlet gases, yet still require a constant pressure. In this case (Figure 3), the inlet gases are controlled independently of the pressure control. The Type 250 is used to operate a valve located in the gas ballast line located between the process chamber and pump. With the upstream gas inlet flow rate (total and ratio) held constant by the MFCs and the electronics, the Type 250 adjusts the gas ballast flow to achieve the desired pressure set point.

Compatible Control Valves

MKS control valves are solenoid-actuated proportioning control valves designed for precise control of gaseous flows in the range from 0.1 sccm to 200 slm. The MKS Type 250 control module is compatible with Types 148, 154 and 248 control valves.

The 148 valve is a metal-sealed design for high purity applications and for the delivery of hazardous gases where minute leakage to atmosphere cannot be tolerated. It controls flows in the range of 10 to 30,000 sccm.

The Type 154 valve is designed for flow rates from 20 to 200 slm and uses a patented balanced-forces control valve. Unlike pilot valves and other magnetically-actuated solenoid valves, the 154 enables fast response to set point changes without oscillations over a wide range of inlet pressures. Because the 154 requires higher drive current, the 250E must be modified for this. Use with the 154 should be noted when placing orders.

The Type 248 is an elastomer sealed, general purpose valve for applications from 10 sccm to 50,000 sccm.

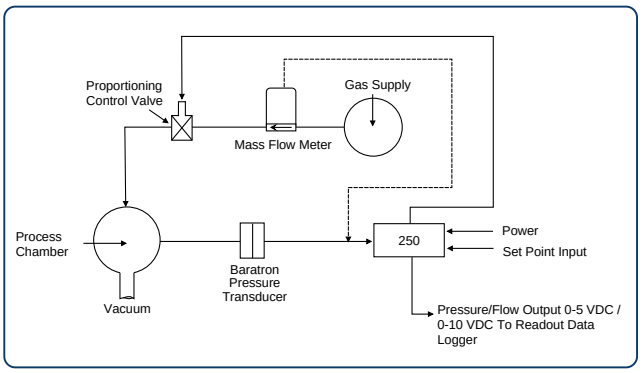


Figure 1 —

Upstream pressure or flow control system

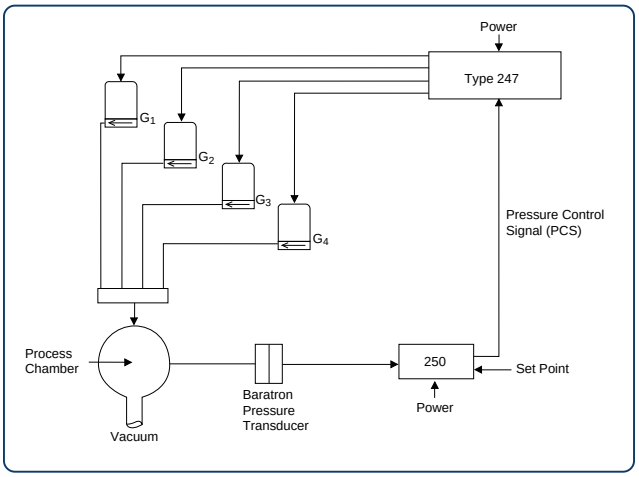


Figure 2 —

Upstream pressure control system with four-gas ratio

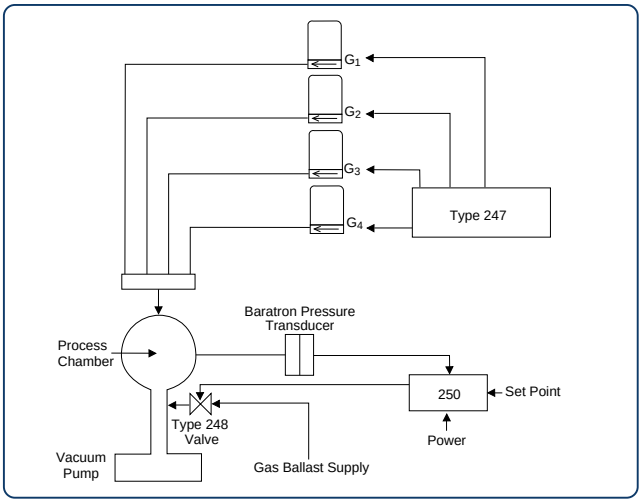


Figure 3 —

Downstream pressure control with up to four independent gases using a gas ballast technique

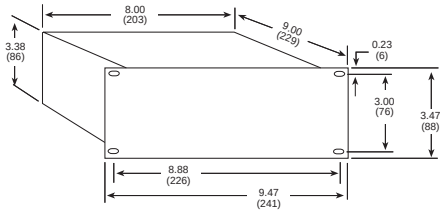
Specifications

Control Accuracy	0.25% of Full Scale 0.1, 1 or 10 VDC selectable on front panel
Control Loop Tuning	
Phase lead	0.05 sec to 10 sec
Gain	0.2% to 100%
Compatible Control Valves	
Proportioning	Types 148, 248, and 154 (A special version of the Type 250 is required to drive the Type 154 control valve. Contact Applications Engineering.)
Power Input	115/230 VAC, 50-60 Hz, 50 Watts
Power Output	±15 VDC @ 250 mA (to power input transducers)
Signal Input (from transducer)	0 to ±0.1, 1 or 10 VDC
Input Impedance	>200K W
Display	
Standard	analog error meter
Optional	4½ digit LED input signal display
Signal Outputs	
Input transducer signal	0-5, 10 VDC into >10K Ω load
Pressure control signal	0-10 VDC
Remote Control	
Analog set point input	0 to 5 VDC into 40K Ω load
Multi-set point select (option)	ground closure to select (one or four set points)
Valve close or auto operation	ground closure to select
Process limits (option)	logic level and relay closure adjustable 0.5 to 100% of set point
Operating Temperature Range	0°C to 40°C
Size	
Millimeters	241W x 89H x 229D
Inches	9.5"W x 3.5"H x 9.0"D
Mounting	bench-top or rack-mount
Electromagnetic Compatibility	Fully compliant to EMC Directive 89/336/EEC when used with an overall metal braided shielded cable, properly grounded at both ends
Product Safety	Fully compliant to Low Voltage Directive 72/23/EEC

Compatible Control Valves	**Type 154**	**Types 148J (metal seal)**	**Type 248 (elastomer seal)***
Full Scale Flow Range	20 to 200 slm	10 to 30,000 sccm	10 to 50,000 sccm
Minimum Controllable Flow	0.1% of F.S.	<2% F.S.	0.2% F.S. (<100 sccm) 0.1% F.S. (100 to 10,000 sccm) <2% F.S. (>10,000 sccm)
Closed Conductance Leakage (15 psid to atm)	<0.1% of F.S.	<1% F.S.	$<1 \times 10^{-5}$ scc/sec He (up to 10,000 sccm) <1% F.S. (>10,000 sccm)
Wetted Materials			
Standard	316 S.S., Nickel, Viton®	316 S.S., Nickel, Teflon	316 S.S., Viton
Optional	Buna-N, Kalrez, Neoprene®		Buna-N, Kalrez, Neoprene
Fittings			
Standard	½" Swagelok®	4 VCR® male	¼" Swagelok
Optional	8 VCR or 8 VCO male		4 VCR or 4 VCO male
Operating Temperature Range	-10°C to +60°C	15°C to +50°C (bakeable to 150°C)	-10°C to +60°
Electromagnetic Compatibility	Fully CE compliant to EMC Directive 2004/108/EC when used with an overall metal braided shielded cable properly grounded at both ends (the 154 valve requires a special modification for CE compliance)		

** For 20,000 and 50,000 sccm, maximum 248 operating pressure drop is 15 psig to atmosphere.*

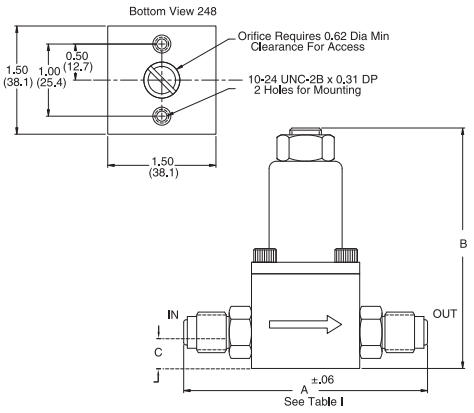
Ordering Information



Note: Allow 2.5" (63 mm) clearance behind rear panel for connectors/cables.

Dimensional Drawing —

Note: Unless otherwise specified, dimensions are nominal values in inches (mm referenced).



Valve Dimensions	Dimensions (nominal)							
	A		B		C		Width	
Valve Type	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)
148J								
4 VCR	3.36	85.3	4.04	102.6	0.5	12.7	1.5	38.1
248A								
4 VCR	3.37	85.6	3.38	85.9	0.5	12.7	1.5	38.1
4 VCO	3.05	77.5						
1/4" Swagelok	2.76	70.1						
154A								
8 VCR	4.62	117.3	4.5	114.3	0.75	19.1	1.53	38.9
8 VCO	4.31	109.5						
1/2" Swagelok	4.25	108.0						

Dimensional Drawing —

Note: Unless otherwise specified, dimensions are nominal values in inches (mm referenced).

Ordering Code Example: 250E1APLO	Code	Configuration
Type 250 Pressure/Flow Control Module	250E	250E
Number of Set Points		
Standard: one set point	1	1
Optional: four set points	4	
Display Options		
Standard: Analog Error Meter	A	A
Optional: 4½ Place Digital Display	D	
PLO Process Limit	PLO	
Note: Use with the 154 should be noted when placing orders.		

Ordering Code Example: 148JA11CR1M	Code	Configuration
Type 148J Control Valve	148J	148JA
Full Scale Range		
10 sccm	11C	11C
20 sccm	21C	
50 sccm	51C	
100 sccm	12C	
200 sccm	22C	
500 sccm	52C	
1000 sccm	13C	
2000 sccm	23C	
5000 sccm	53C	
10,000 sccm	14C	
20,000 sccm	24C	
30,000 sccm	34C	
Fittings		
Swagelok 4 VCR	R	R
Valve		
Normally closed	1	1
Valve Seal Material		
Metal	M	M

Ordering Code Example: 0248A00050SV	Code	Configuration
Types 154 & 248 Elastomer-Sealed Control Valves		
Type 0154	0154A	0248A
Type 0248	0248A	
Full Scale Range (sccm of N_2)		
10 sccm	00010 (248 only)	00050
20 sccm	00020 (248 only)	
50 sccm	00050 (248 only)	
100 sccm	00100 (248 only)	
200 sccm	00200 (248 only)	
500 sccm	00500 (248 only)	
1000 sccm	01000 (248 only)	
2000 sccm	02000 (248 only)	
5000 sccm	05000 (248 only)	
10,000 sccm	10000 (248 only)	
20,000 sccm	20000	
50,000 sccm	50000	
200 slm	200L (154 only)	
Fittings		
½" Swagelok	S (Type 154 only)	S
8 VCR male	R (Type 154 only)	
8 VCO male	G (Type 154 only)	
¼" Swagelok	S (Type 248 only)	
4 VCR male	R (Type 248 only)	
4 VCO male	G (Type 248 only)	
Seals		
Viton	V	V
Buna-N	B	
Kalrez	K	
Neoprene	N	

MKS Global Headquarters

2 Tech Drive, Suite 201
Andover, MA 01810

Tel: 978.645.5500
Tel: 800.227.8766 (in U.S.A.)
Web: www.mksinst.com

Technology for Productivity

250 - 7/09

© 2006 MKS Instruments, Inc.
All rights reserved.

Specifications are subject to change without notice. Baratron® and Mass-Flo® are registered trademarks of MKS Instruments, Inc., Andover, MA. Viton®, Neoprene® and Kalrez® are registered trademarks of E.I. Dupont Co., Inc., Wilmington, DE. Swagelok®, VCR® and VCO® are registered trademarks of Swagelok Marketing Co., Solon, OH.

Artisan Scientific - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisan-scientific.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP