

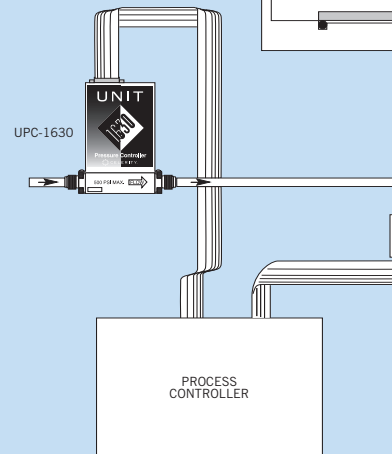
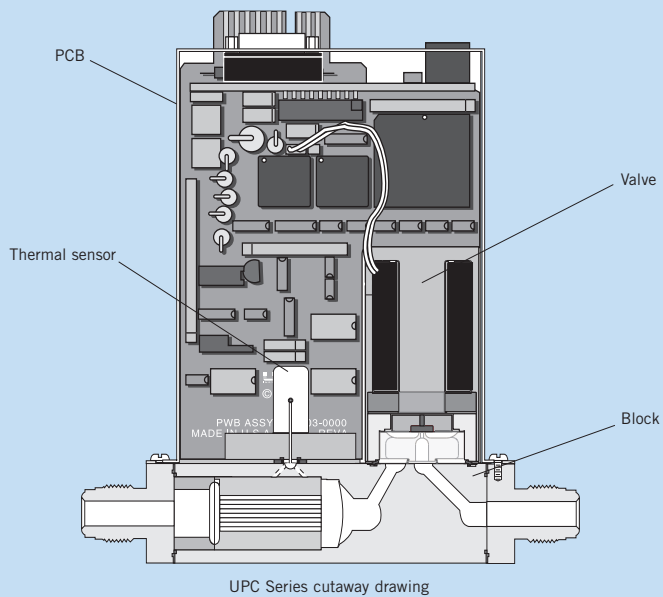
# UPC Series Pressure Controllers

- » Precision pressure control for pressure sensitive processes
- » User-selectable response rate
- » Uses the proven advanced technology of popular mass flow controllers
- » Best performance and reliability in the industry
- » Available with elastomer and metal seal



## Features at a glance

- User-selectable response rate between 0.5 sec to 8.0 sec using a rotary switch
- Microprocessor-controlled PID loop to meet desired response rate
- Highly versatile device that can control pressures from 1 torr to 100 torr in most chamber volumes
- Can be used with pressure transducer, capacitance manometer, thermocouple (not provided, supplied by user)
- Measures the flow rate with  $\pm 1.0\%$  accuracy with a 0.15% repeatability, making the flow rate an indication of process repeatability
- The solenoid proportional valve is designed with a 1:1000 turn down ratio for fast response. It has fewer parts to enhance speed responsiveness and long term reliability.
- Zero-drift of  $<0.6\%$  per year
- Model 1630 sealed with patented metal-seal for a high leak integrity of  $1 \times 10^{-10}$  atm-cc/sec (He)
- All performance tested per SEMI test methods
- 3 year warranty (model 1630)



## Description

The UPC Series pressure controllers are typically used to control the flow of gas needed to maintain an input setpoint pressure into a chamber. The UPC is an integrated compact device composed of a solenoid proportional valve, a flow meter and the control electronics.

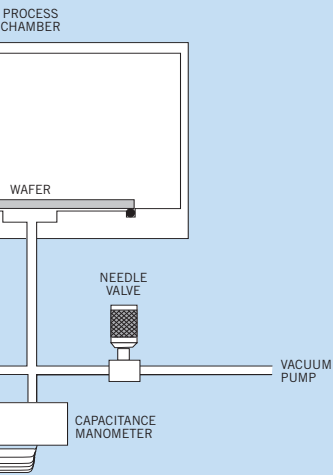
The UPC reads the output of an external pressure measurement device (not included) and compares it to the desired setpoint. The control valve is either opened or closed as necessary to bring the pressure to the desired level. The pressure setpoint may be programmed to a fixed level, rapidly stepped to different levels, or varied continuously as determined by the setpoint programming.

The valve provides proportional control of gas flow to achieve the required response rate to the desired pressure setpoint. Response is critical to the true performance of a pressure controller and depends on pump size, chamber size and components locations. Response determines the controller's ability to react to changes in pressure due to flow variations, temperature shifts, chemical reactions, pressure regulator fluctuations and volume changes.

The precision electromagnetic control valve has a wide dynamic range that provides superior precision and control. It has been subjected to over 8 million cycles with no degradation in performance.

The flow meter provides a direct measurement of the gas flow rate with a sensor that uses the thermal properties of gases. Since the thermal mass flow measurement is mostly independent of pressure and temperature, this method provides a stable measurement with changing process conditions.

The patented IsoSensor™ is a high stability sensor that produces ultra-low drift, reducing the need for frequent recalibration. It also eliminates thermal siphoning effects.



Application example: Wafer backside cooling

### Model description

1630	Analog control	Analog interface
8130	Analog control	Analog interface

### CrossChek™ metrology system



Celerity's world-class CrossChek calibration methodology maintains SPC-verified calibration accuracy with  $\pm 3$  sigma limit (99.7% confidence level) compared to  $\pm 1$  or 2 sigma limits (67% to 95% confidence level) for other manufacturers.

CrossChek calibration methodology provides ongoing verification of production calibration standards. This ensures consistent and repeatable accuracy performance within  $\pm 3$  sigma of published specifications. No other flow control company offers the same guarantee.

### Warranty

- Model 1630 — 3 years
- Model 8130 — 2 years
- Extended warranty option available

## UPC Series Pressure Controllers

### Performance (pressure control)

Response 0.5 to 8 sec, user-selectable with a manual 8-position rotary switch

### Performance (flow meter output)

Accuracy  $\pm 1\%$  full scale ( $\pm 3\sigma$  per SEMI E56-96)  
 Repeatability  $\pm 0.15\%$  full scale (per SEMI E56-96)  
 Linearity  $\pm 0.9\%$  (full scale/cal. gas) (per SEMI E27-92)  
 Inlet pressure coefficient 0.0025% full scale/psi (N<sub>2</sub>)  
 Ambient temp. coef. Zero: 0.05% full scale/°C  
 Span: 0.05% full scale/°C  
 Leak integrity Model 1630:  $1 \times 10^{-10}$  atm-cc/sec (He) (per SEMI E16-90)  
 Model 8130:  $1 \times 10^{-9}$  atm-cc/sec (He)  
 Zero drift < 0.6% per year

### Specifications

Gases He, N<sub>2</sub>, Ar  
 Standard flow range 10 sccm to 30 slm (He equivalent)  
 Flow measurement range 2-100% (full scale)  
 Pressure control range 1 to 100 torr  
 Valve leak rate  $\leq 1\%$  full scale  
 Ambient temperature range 0-50°C (32-122°F)  
 Max. operating pressure 2.45 kg/cm<sup>2</sup> (35 psi)  
 Max. overrange pressure 35 kg/cm<sup>2</sup> (500 psi)  
 Proof pressure 105 kg/cm<sup>2</sup> (1500 psi)  
 Pressure differential range 7 to 50 psi  
 Warm-up period 30 minutes  
 Mounting position HOV  
 Valve Normally closed

### Electrical characteristics

Input/Output signal Setpoint input 100 mV to 10 VDC or 5 Vde standard corresponding to the range of the external pressure transducer  
 Pressure transducer input 0-10 VDC or 0-5 VDC proportional to pressure  
 Output monitor 0-5 VDC linearly proportional to required flow rate  
 Valve off External: TTL signal  
 Auto shut-off Setpoint < 0.9% full scale commands off; standard; no disable option  
 Power input +15 VDC (140 mA max.), -15 VDC (190 mA max.)  
 Power consumption 5 watts  
 Mating connector 20 contact cardedge

### Mechanical characteristics

Surface finish Model 1630: 16 $\mu$  inch Ra (10 $\mu$  inch Ra optional); Model 8130: 32 $\mu$  inch Ra  
 Fittings 1/4" VCR® (8130 and 1630), downported B, C, W (1630 only)  
 Materials Wetted components 316L SS/K-M45/304  
 Valve position NC  
 Weight 1.4 Kg (3.08 lbs.)

### Calibration references

Traceability National Institute of Standards and Technology (N.I.S.T.)  
 Standard temperature and pressure 0°C and vacuum exhaust

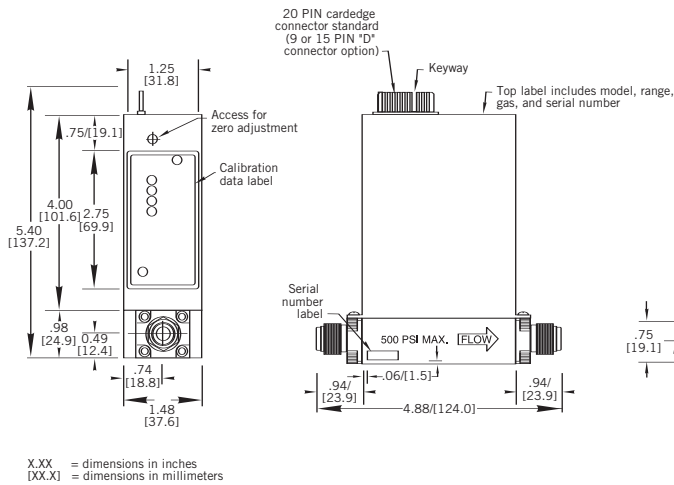
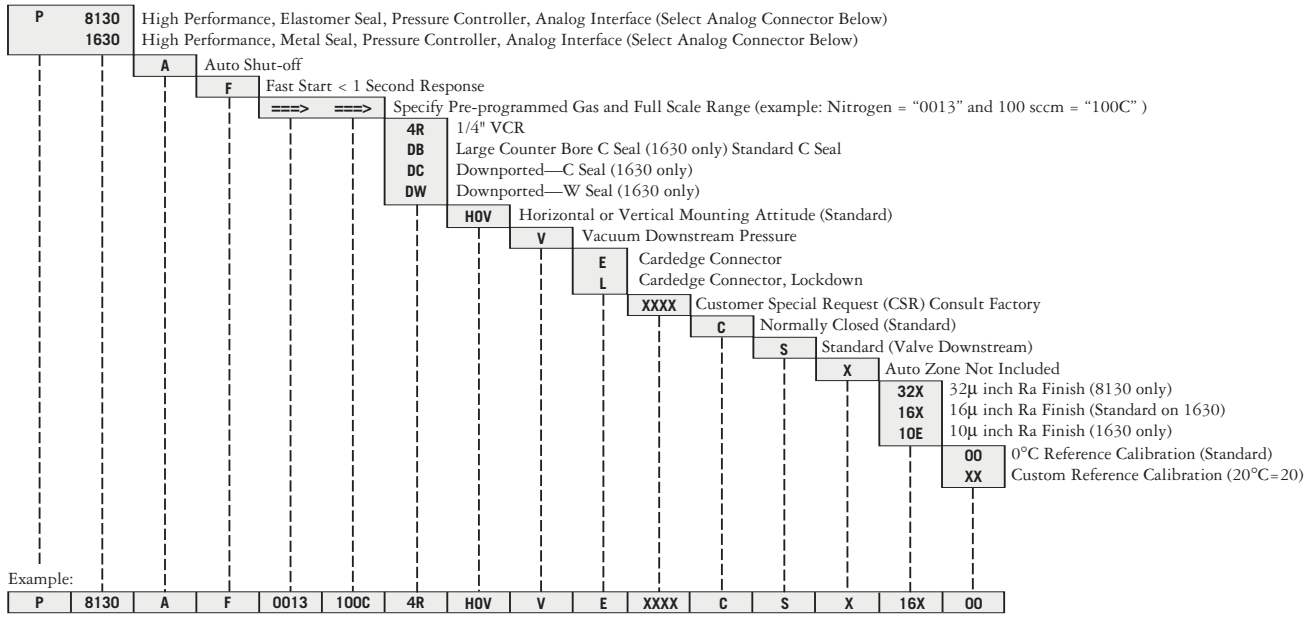
Specifications and features are subject to change without notice.

All specifications reflect nitrogen calibration using Molbloc/Molbox™ transfer standards.

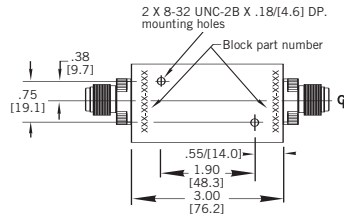
Calibration by primary standards and surrogate gases is available as an additional charge option.

CrossChek™ calibration methodology maintains SPC-verified calibration accuracy with  $\pm 3\sigma$  limit (99.7% confidence level).

# UPC Series Product Configuration



Fitting type	Overall	Inlet	Outlet
1/4 VCR Male	4.88 in./124.0 mm	0.94 in./23.9 mm	0.94 in./23.9 mm
Downport 'B'	4.14 in./105.2 mm	0.57 in./14.5 mm	0.57 in./14.5 mm
Downport 'C'	4.14 in./105.2 mm	0.57 in./14.5 mm	0.57 in./14.5 mm
Downport 'W'	4.14 in./105.2 mm	0.57 in./14.5 mm	0.57 in./14.5 mm



CELERITY, INC.  
22600 Savi Ranch Parkway  
Yorba Linda, California 92887  
Telephone 714.279.3500  
Facsimile 714.921.0804  
www.celerity.net



For technical assistance, contact Celerity Applications Engineering at 714.279.3500.



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