



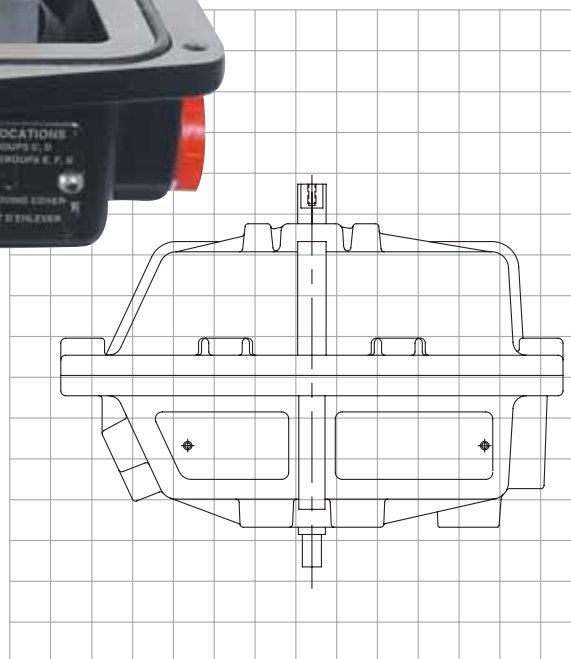
Worcester Controls

FCD WCABR1018-00
(Replaces PB 90P)

MAstermind® Modular Accessory System



AN ISO 9001 REGISTERED COMPANY



Also available in intrinsically safe design

Pulsair®
Loop-Powered,
Microprocessor-Controlled Positioner

A giant step in cost savings and performance improvement of your throttling control valves

Flowserve Worcester Controls is proud to present the Pulsair Loop Powered Micro Processor Controlled Positioner. It is the missing link in computer controlled process loops. This all electronic microprocessor based intelligent, pneumatic positioner offers the sophistication and performance to match that of today's process control requirements.

The MASTermind's loop-powered positioner has capabilities far beyond conventional pneumatic and electropneumatic positioners. Consider some of these features:

- **Zero Air Bleed:**
Eliminates waste of expensive instrument quality air. Can save up to \$200 per year in air compression, drying and filtering costs per positioner.
- **Automatic Calibration:**
A simple start-up sequence calibrates zero and span. Lowers installation and start up costs.
- **Selectable Characteristic:**
Easy push button selection of travel characteristics. No expensive cams to buy.
- **All Electronic Operation:**
Controller signal accurately received. No distortion due to I to P conversion.
- **Manual Override:**
System checkout simplified at the control valve. Position read out on LCD display.
- **Multi-stage Response:**
Reduces overshoot. Provides more stable and accurate response to the process variable.
- **No Drift:**
Fewer mechanical components results in vibration resistant design.
- **Hysteresis Reduction:**
Automatic compensation for hysteresis by the microprocessor reduces deviation from set point.
- **Direct or Reverse Action:**
Simple push button setting. Lowers setup/calibration costs and reduces chance of error.
- **TYPE 4, 4X, 7, 9, 12 Housing:**
No expensive junction boxes to add to system cost.
- **Maintenance Free Operation:**
No flappers, nozzles, spool valves or pivot points to foul, clog or wear.
- **Split Range:**
Various options do not require additional expense of range springs and recalibration.
- **Intrinsically Safe (optional):**
Plant and personnel safety assured in hazardous areas.
- **Limit Switches (optional):**
Discrete confirmation of travel limits provides system safety.
- **Position Indicator (optional):**
Positive visual indication of valve position for personnel safety.
- **Position Feedback (optional):**
Resistance or analog feedback adds to system accuracy.
- **For additional information on the MASTermind, Modular Accessory System, refer to brochure, WCABR1049.**



Specifications

Two-wire system. Input Signal Range:

4-20 mA nominal

Minimum current required for operation: ≥ 3.6 mA

Static destruction limit: ± 40 V

Dynamic destruction limit: ± 500 V

Connection to voltage source with:

≥ 18 V ≤ 30 V IS ≤ 35 L
 ≤ 100 mA
 Power ≤ 1 Watt

Ambient temperature limit for operation:

-4°F to + 140°F

Characteristic: Linear (factory setting)

Equal Percentage 1:25

Equal Percentage 1:50

Freely Adjustable

Air consumption at steady state: .0082 SCFM

Unrestricted flow in the inlet air valve:

3.2 SCFM with a pressure drop of 75 psi

Unrestricted flow in the outlet air valve:

2.94 SCFM with a pressure drop of 15 psi

Override

In the override mode, the actuator can be operated by the push buttons. Actuator position is monitored on the LCD display.

Principle of Operation

The rotary motion of the pneumatic actuator is transmitted to a high resolution potentiometer. A microprocessor compares the actual value of the variable supplied by the potentiometer with the input signal. Deviation between the potentiometer signal and the input signal is eliminated by the microprocessor which sends a command signal to a piezoelectric valve. The piezoelectric valve converts the electric control command to a pneumatic positioning increment which moves the actuator pistons. The positioner has a multi-function output. In the "large deviation" (high speed) zone, it releases a continuous signal. In the "average deviation" (low speed) zone, it supplies sequenced pulses. In the self-adjusting dead zone, no pulses are sent.

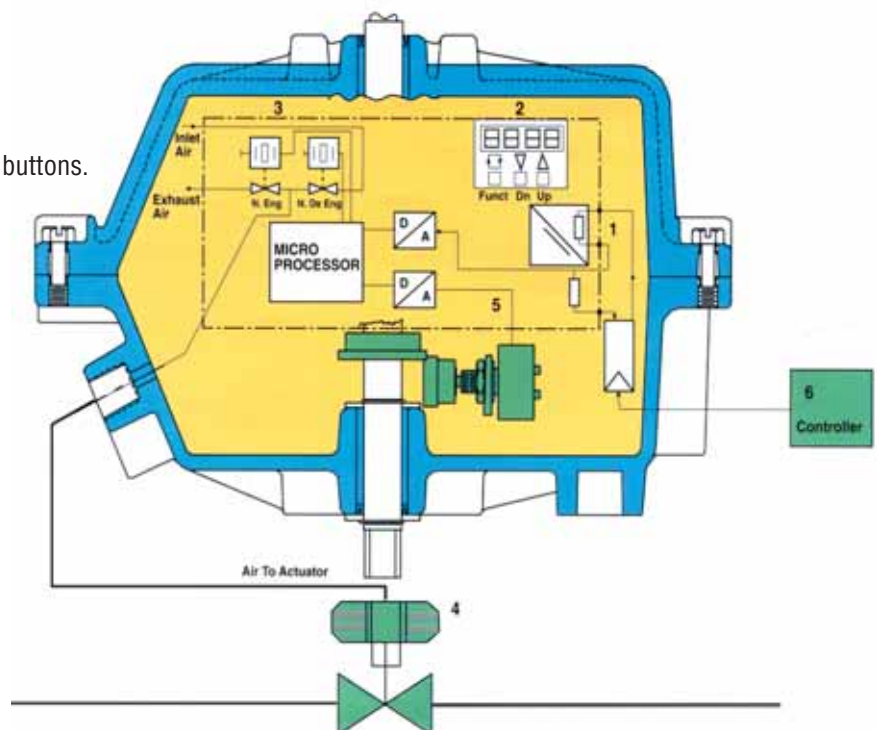
Piezoelectric Valve

The piezoelectric valve provides extremely long service life. The pilot element is a piezoelectric bending converter which is connected to the main control unit. The piezoelectric valve can release very short control pulses because of its low mass and zero inductance.

Start-up

Start-up (initialization) occurs with a simple push of a button. During initialization the zero point, full-scale value, positioning speed, minimum pulse time and dead time are automatically established by the microprocessor and this optimizes the control.

- 1-Two-wire input system
- 2-Control panel with LCD and push buttons.
- 3-Piezoelectric valve unit
- 4-Spring return piston actuator
- 5-Position feedback
- 6-Input signal



General Specifications, Enclosure

- Material:** Die Cast Aluminum
- Rating:** TYPE 4; TYPE 4X; TYPE 7, Class I
Division 1, 2, Group C, D; TYPE 9, Class II,
Division 1, 2, Group E, F, G; TYPE 12
- Coating:** Corrosion resistant baked epoxy finish
standard.
- Terminal Strip:**
One 8 point strip. 12-22 GA wire (UL listed).
Second 8 point strip optional.
- Drive Connection:**
One piece stainless steel male shaft, top and bottom.
- Conduit Connection:**
One 3/4" NPT. Second 3/4" NPT Connection
optional.
- Air Connection:**
Two 1/4" NPT. One for air supply, one for air
to actuator.
- Pneumatic Power Supply:** 40-90 psi
- Max. Allowable Particle Size:** <30 µm, dry air

Optional Features

- Mechanical Limit Switches (gold plated contacts):**
Two Mechanical SPDT switches
1 amp, 24 VDC, 125 VAC both resistive and
inductive loads.
- Inductive DC Proximity Switches and Hermetically Sealed Limit
Switches:**
Available upon request.
Consult Flowserve.
- Feedback Potentiometer:**
5-0-5000 ohm potentiometer output or
P-0-1000 ohm potentiometer output.
- Position Indicator Board (available with L option only):**
4-20 mA output signal (24 VDC power is required).
- †Mechanical Position Indicator:**
Series 4790 two-color, high impact plastic valve
position indicator.

How To Order †

	L	90	S	M2		P	4
Special Options	Circuitry	Modular Accessory System Series	Actuator	Limit Switches	Output Voltage	Positioner	Input Signal
Blank - No options P - 1000 ohm potentiometer output 5 - 5000 ohm potentiometer output B - Breather/Drain 4 - 4-20 mA output	L - Loop powered not intrinsically safe I - Loop powered intrinsically†† safe	90	S - Spring Return Actuator	Blank - No Switches M2 - 2 mechanical	Blank - No Voltage needed 24D - used only with 24VDC 4-20mA output option for 4L90	P	4 - 4-20mA

† To order the black and yellow mechanical position indicator mounted to the housing, specify the Series 4790 along with the positioner model.
 †† Barriers required for all wiring in hazardous areas for intrinsically safe operation.

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