

# Electropneumatic Transducer

## Model EP-311/313



- **No air consumption**
- **100% solid state piezoresistive silicon pressure sensor**
- **High air flow capacity**
- **Field selectable 4-20 mA, 0-5 VDC or 0-10 VDC input**
- **Universal 24 VAC/VDC supply voltage**
- **Short circuit and reverse polarity protected inputs and outputs**
- **Auto/manual switch with separate increase/decrease pushbuttons (EP-313)**
- **Precision pressure gauge for branch line indication**
- **Non-interactive zero and span trimmers**
- **Smallest size in the industry**
- **Conforms to EMC standards EN50082-1/EN55014/EN60730-1**

The EP-311/313 incorporates a quiet low-wattage poppet valve and pressure sensor to measure and adjust the branch line pressure proportional to the input. This unit has no air consumption and is immune to mounting orientation or supply line pressure fluctuations. The EP-313 incorporates a manual override switch and, in the manual mode, the pressure can be increased or decreased with two pushbutton switches. This feature is most desirable for check out/commissioning and manual operation in case of controller failure. Universal 24 VAC/24 VDC supply voltage and field selectable 4-20mA, 0-5 VDC, or 0-10 VDC inputs ensures single unit compatibility to most of the systems. Unique steel chassis design substantially reduces the overall size of the unit and, at the same time, provides for ease of installation in a control panel directly or with a snap track. A precision gauge is provided for the branch line pressure. Rugged aluminum manifold, brass barb fittings, floating poppet solenoid valves, silicon pressure sensor, high performance electronics and a liberal two year warranty are some of the features which make the EP-311/313 the highest performance and the most reliable electropneumatic transducer in the industry.



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## EP-311/313

The EP-311/313 incorporate a novel concept to convert an analog signal into proportional pneumatic pressure. This concept was first introduced in the early 1980s by Mamac Systems, Inc. and refined over the years. Unlike other units which bleed/consume air to maintain pressure, our design utilizes a 100% solid state precision piezoresistive silicon pressure sensor to measure the pneumatic branch line pressure. This signal is utilized by sophisticated integrated circuits to compare the branch line pressure to the input and energize two independent solenoid valves to increase or decrease the branch line pressure while constantly monitoring the change. In this way, the EP-311/313 can provide a proportional pressure change to the analog input without air consumption and with zero pressure differential between main air supply and the branch output. The electronic circuit measures the rate of pressure change in the branch line and manipulates the respective solenoid valve in a predictive fashion to achieve the desired result without over-correcting or "hunting".

The EP-313 has an additional manual override feature. The unit can be switched to the manual mode and the branch line pressure can be increased or decreased by two independent push-button switches. This feature is most desirable for checkout/commissioning or manual operation of the pneumatic actuator. When switched back to the automatic mode, the unit will immediately start tracking the analog signal. For critical applications in which control downtime is not allowable, the manual mode can be utilized to operate the system during maintenance or controller failure.

The EP-311/313 incorporates sophisticated circuits to provide field selectable 4-20 mA, 0-5 VDC or 0-10 VDC input flexibility. With fixed input units, in case of engineering error or incorrect selection, the only solution is expensive product exchange or replacement. Similarly, numerous units must be kept in stock as spares to cover all input requirements in case of field failure. The EP-311/313 with the field selectable input feature, eliminates above mentioned costly inefficiencies. A single unit can be configured to cover all input requirements in a particular application thereby eliminating any possibility of incorrect input selection. Additionally, one unit can be kept in stock and, in the event of a failure, it can be field configured thereby eliminating the need to stock numerous fixed input units.

Universal unregulated 24 VAC/VDC supply voltage feature further enhances the flexibility of the EP-311/313 transducer. This feature eliminates specialized power supply requirement for the electro-pneumatic transducer thereby significantly reducing labor, engineering, and power supply costs. Similarly, in retrofit applications regardless of the supply voltage present, the EP-311/313 can be engineered into the application without making expensive changes. The unit is protected against supply voltage reverse polarity and input-to-ground short circuit.

The EP-311/313 utilizes a solid aluminum manifold, poppet solenoid valves, and rugged o-ring sealed brass fittings to provide long term, reliable, leak-proof performance. A precision pressure gauge is also mounted directly onto the manifold for branch line pressure indication. Unique steel chassis design substantially reduces the overall size of the unit and, at the same time provides for ease of installation in a control panel directly or with a snap track. Easily accessible wire termination, manual operation switches, zero and span trimmers, input configuration shorting plugs for field selection, and LED indication are some of the features which not only reduce the installation and start-up time, but also ensure ease of operation.

If the control system design requires that the unit bleeds down to zero pressure in case of power failure, Mamac Systems, Inc. offers a EP-350 fail-safe module. Up to four transducers can be attached to one EP-350 and if the fail-safe module detects a loss of supply voltage, it will bleed all four transducers to zero pressure. This combination offers unparalleled flexibility to have fail-safe operation for only those control loops which require it.

Automated NIST traceable pressure controllers and precision pressure sensors are utilized to calibrate and certify the EP-311/313. Calibration data on each unit is archived digitally for SPC and QC purposes. All automated calibration systems are networked and data is available on-line to numerous individuals at the same time. In this way, extremely high standards of quality and calibration integrity are maintained.

# EP-311/313

## Specifications:

**Accuracy\*:**  $\pm 1\%$  FS

**Maximum Supply Pressure:** 40 psig

**Pressure Differential:** (Supply to Branch) 0.1 psig

**Supply Voltage:** 18-28 VAC/VDC

**Supply Current:** 150 mA

**Enclosure:** 18 Ga C. R. Steel Chassis

**Finish:** Baked on enamel-PMS2GR88B

**Compensated Temp Range:** 25°F-150°F (4°C-65°C)

**Conformance:** EMC Standards EN50082-1(1992)  
EN55014(1993)/EN60730-1(1992)

*\*Includes non-linearity, hysteresis and non-repeatability*

**T. C. Error:**  $\pm 0.025\%/^{\circ}\text{F}$  ( $.03\%/^{\circ}\text{C}$ )

**Media Compatibility:** Clean dry air or any inert gas

**Port Connection:** 1/4"OD poly tubing

**Environmental:** 10-90%RH Non-Condensing

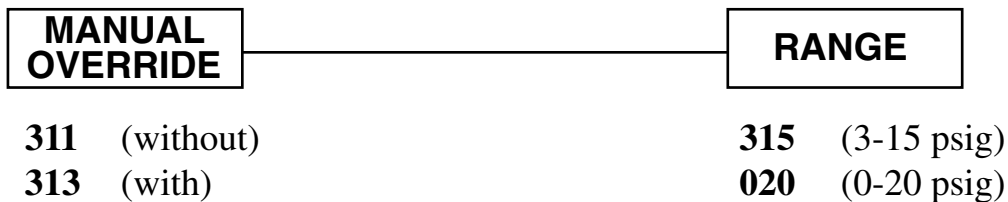
**Termination:** Screw terminal block

**Wire Size:** 12 Ga max.

**Input Impedance:** 301 ohms (4-20 mA)  
10K ohms (0-5/0-10 VDC)

**Weight:** 1.0 lbs. (.45 kg)

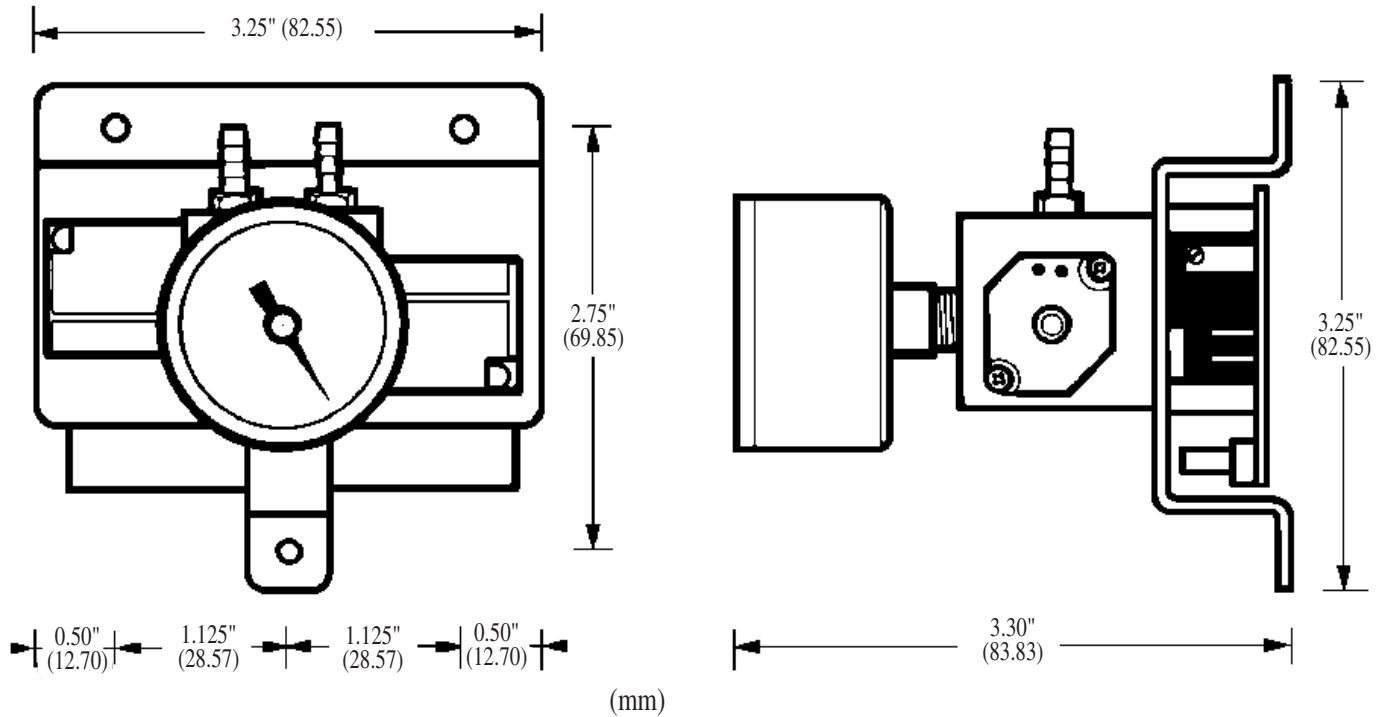
## Ordering Information: EP-



**Example: EP-313-020:** With manual override and 0-20 psig range.

**CAUTION:** Do not use on oxygen service, in explosive/hazardous environment or with flammable/com-bustible media.

# EP-311/313



**WARRANTY:** MAMAC Systems, Inc. warrants its products to be free of defects in material and workmanship for a period of two (2) years from date of shipment. If a unit is malfunctioning, it must be returned to the factory for evaluation. A return authorization number (RMA) will be issued by the customer service department and this number must be written or prominently displayed on the shipping boxes and all related documents. The defective part should be shipped freight pre-paid to the factory. Upon examination by MAMAC Systems, Inc., if the unit is found to be defective, it will be repaired or replaced at no charge to the customer. However, this warranty is void if the unit shows evidence of being tampered with, damaged during installation, misapplied, misused, or used in any other operating condition outside of the unit's published specifications.

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