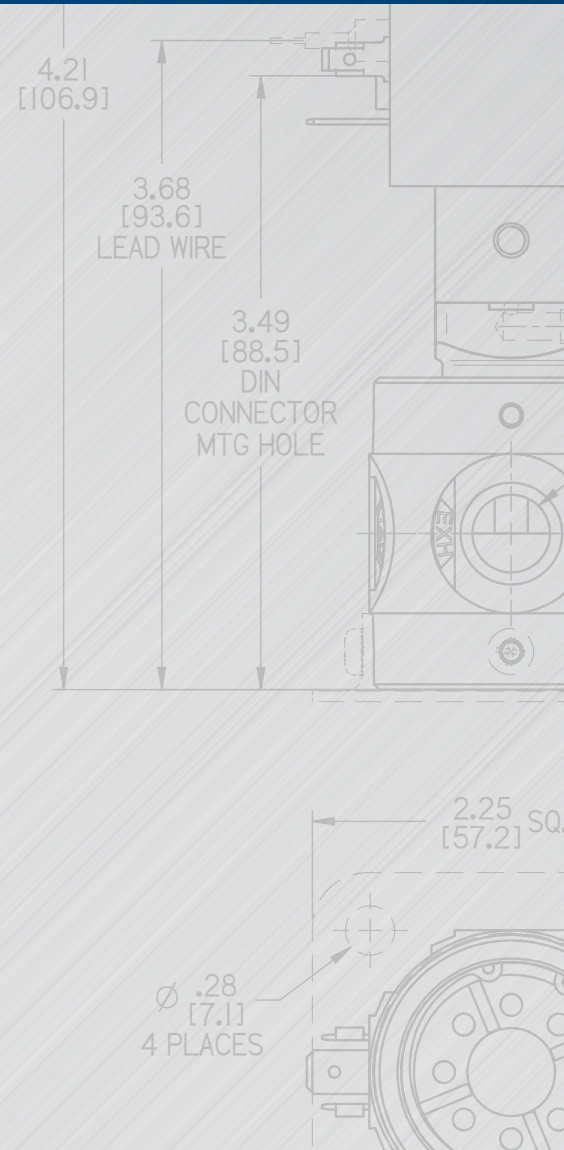


## Humphrey Diaphragm-Poppet Valves

### 2-, 3-Way | Air Pilot Solenoid Valves | B Series



Our classic Diaphragm-Poppet Valves, with a rich history of reliability and performance in the most difficult pneumatic environments, introduces B Series Air Pilot Solenoid Valves with a new solenoid operator.

**CANNOT STICK. WILL NOT LEAK.**

MADE IN USA



# Humphrey Diaphragm-Poppet Valves

## 2-, 3-Way | Air Pilot Solenoid Valves | B Series

Humphrey's B Series Air Pilot Solenoid 2- and 3-way Valve Series is a modernized alternative to our original diaphragm-poppet product line. With interchangeable piping and mounting, the "Cannot Stick. Will Not Leak" advantages of the classic valve design have been continued and now feature a modernized DIN-style solenoid operator that reduces overall size and cost for our customers.

Three types are offered. The internal pilot pneumatic type is high flow and rugged, ready for reliable control even with poor air. The brass body external air pilot type is designed for reliable control of low pressure air and mild fluids. The external air pilot vacuum valve uses the vacuum pressure to seal tight.



### FEATURES

- Excellent Flow Capacity
- High Shifting Forces
- Tight Sealing
- Simple Design, Few Parts
- Inert Internal Construction

### BENEFITS

- Efficiency from a Compact Size
- Fast Cycling, Reliable, Durable
- No Leakage, No Media Waste
- Cost Effective, Trouble-Free
- Impervious to Controlled Media

## THE HUMPHREY DIAPHRAGM-POPPET VALVE: HOW IT WORKS

### BASIC 3-WAY VALVE

At rest (unactuated), media to SUPPLY port (1) fills bottom cavity and underside of bottom diaphragm, causing its poppet to seat and seal tight. Valve will not leak.

Upon actuation (actuated), significantly greater force applied over top diaphragm causes valve to shift instantaneously, and opening flow path from SUPPLY port (1) to COMMON port (2). Top poppet seats and seals tight, closing path to EXHAUST port (3).

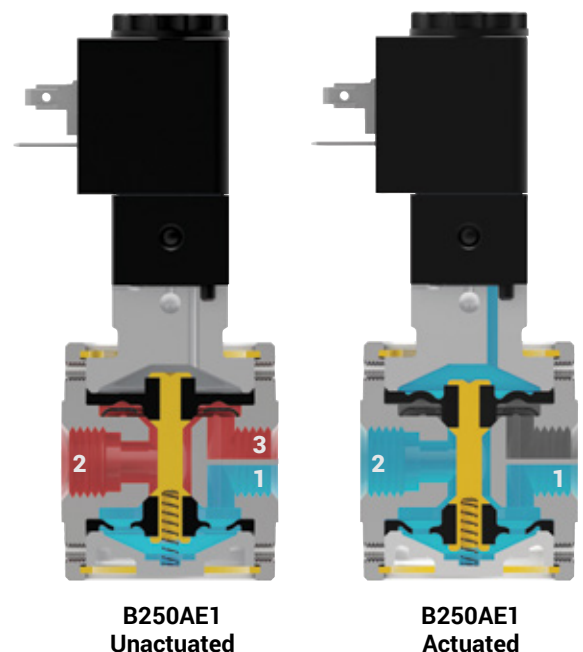
This is a frictionless design, with high shifting forces resulting in valves that cycle reliably every time, and valves that "Cannot Stick. Stick. Will Not Leak."

Releasing valve actuation pilot pressure permits bottom diaphragm to quickly shift closed

from SUPPLY port (1). Any downstream pressure present at COMMON port (2) instantly becomes present under the top diaphragm (RED) accelerating the position shift, creating the valve's "Quick Dump" feature to EXHAUST port (3).

### 2-WAY VALVE

This Diaphragm-Poppet design provides an excellent, leak free, 2-way valve function with plugged EXHAUST port (3). When valve closes, any residual downstream pressure becomes present under the top diaphragm (RED), assisting with an accelerated closing, while bottom poppet seals tight into its bottom seat.



## INTERNAL AIR PILOT SOLENOID



**Models:** B250E1, B500E1,  
B590E1

**Media:** Compressed Air, Inert Gases

**Pressure:** 30-125 PSI

**Wetted Mat'ls:** Zinc Diecast or  
Aluminum, SST, NBR

These rugged 2- or 3-port valves outlast similar pneumatic solenoid valves in difficult and challenging factory applications. Suitable for clean or poor compressed air and clean or dirty ambient environments. Valve's simple construction has few parts, no sliding seals or any metal to metal contact. Shifts reliably. Seals tight.

Specs, Ordering information ..... p. 4  
Dimensional Drawings..... p. 7

## EXTERNAL AIR PILOT SOLENOID



**Models:** B250AE1, B500AE1,  
B590AE1

**Media:** Compressed Air, Inert Gases,  
Mild Liquids

**Pressure:** 0-100 PSI (Pilot: 30 PSI min.)

**Wetted Mat'ls:** Brass, SST, NBR

These high flow 2- or 3-port valves use an external air pilot source to reliably control low pressure compressed air, inert gases or even mild liquids in specialty and process control applications. Brass body is standard equipment. Works with the force of the pressurized media to reliably shift and seal tight.

Specs, Ordering information ..... p. 5  
Dimensional Drawings..... p. 7

## EXTERNAL AIR PILOT SOLENOID | VACUUM



**Models:** VAB250AE1, VAB500AE1,  
VAB590AE1

**Media:** Vacuum

**Pressure:** 0-29.5" Hg (Pilot: 30 PSI min.)

**Wetted Mat'ls:** Zinc Diecast or  
Aluminum, FKM

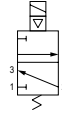
These high flow 2- or 3-port valves use an external air pilot source to reliably control vacuum. The greater the vacuum, the tighter the valve will seal. Ideal for dry, humid and dirty vacuum systems. Fluorocarbon diaphragms are standard. Large venting port dumps vacuum quickly. No lubrication required. No sticking. Out performs all others.

Specs, Ordering information ..... p. 6  
Dimensional Drawings..... p. 7

| MODEL | PORT SIZE | FUNCTIONS                                           | ORIFICE | MAX FLOW | VOLTAGE                  |
|-------|-----------|-----------------------------------------------------|---------|----------|--------------------------|
| B250  | 1/4 NPSF  | 2- or 3-Way,<br>Normally Closed or<br>Normally Open | 0.25"   | 75 SCFM  | 12VDC<br>24VDC<br>120VAC |
| B500  | 1/2 NPT   |                                                     | 0.50"   | 200 SCFM |                          |
| B590  | 3/4 NPT   |                                                     | 0.59"   | 312 SCFM |                          |

## Internal Air Pilot Solenoid Valves | B250E1, B500E1, B590E1

| SPECIFICATIONS                      | B250E1                                     | B500E1                    | B590E1        |
|-------------------------------------|--------------------------------------------|---------------------------|---------------|
| TYPE OF OPERATION                   | Solenoid - Internal Air Pilot Operated     |                           |               |
| FUNCTION                            | NC (Normally Closed) or NO (Normally Open) |                           |               |
| PIPING TYPE                         | Inline, Direct Piping                      |                           |               |
| NUMBER OF PORTS                     | 3 (Plug Exhaust Port for 2-way)            |                           |               |
| PORT SIZE                           | 1/4 NPSF                                   | 1/2 NPT                   | 3/4 NPT       |
| MEDIA                               | Compressed Air, Inert Gases                |                           |               |
| WETTED MATERIALS                    | Zinc Diecast, Brass, SST, NBR              | Aluminum, Brass, SST, NBR |               |
| PRESSURE RANGE - PSI (BAR)          | NC: 30-125 (2-8.5); NO: 30-100 (2-7)       |                           |               |
| FLOW CAPACITY (SCFM @ 100PSI)       | 60                                         | 160                       | 220           |
| ESEOD - IN (MM)                     | 0.215 (5.45)                               | 0.385 (9.78)              | 0.490 (12.46) |
| FLOW COEFFICIENT - Cv               | 0.83                                       | 2.67                      | 4.33          |
| RESPONSE TIME - ON/ OFF (MS)        | 7 / 25                                     | 25 / 40                   |               |
| AMBIENT TEMPERATURE RANGE - °F (°C) | 0 - 125 (18 - 50)                          |                           |               |
| LUBRICATION                         | Not required                               |                           |               |
| MEDIA FILTRATION                    | Recommended (30 micron)                    |                           |               |
| WEIGHT (OZ)                         | 15                                         | 39                        |               |



**B250E1**  
w/Lead Wires  
and Mounting Base  
(8-20A)



**B500E1**  
DIN Type



**B590E1**  
DIN Type



| ELECTRICAL SPECIFICATIONS | ALL VALVES                              |
|---------------------------|-----------------------------------------|
| STANDARD VOLTAGES         | 12VDC, 24VDC, 120/50/60                 |
| ELECTRICAL ENTRY          | 19.5" Long Lead Wires, DIN (10mm DIN/B) |
| VOLTAGE TOLERANCE         | +/- 10%                                 |
| POWER CONSUMPTION         | 6.5w (DC), 8.5w (AC)                    |
| COIL INSULATION RATING    | Class F                                 |

### HOW TO ORDER | INTERNAL AIR PILOT SOLENOID VALVES

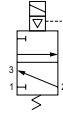
| MODEL  | FUNCTION    |           | ELECTRICAL ENTRY |           | BODY SEALS |     | AVAILABLE VOLTAGES          |
|--------|-------------|-----------|------------------|-----------|------------|-----|-----------------------------|
|        | NORM CLOSED | NORM OPEN | LEAD WIRES       | DIN STYLE | NBR        | FKM |                             |
| B250E1 | -           | 11        | -                | 39        | -          | F   | 12VDC<br>24VDC<br>120/50/60 |
| B500E1 |             |           |                  |           |            |     |                             |
| B590E1 |             |           |                  |           |            |     |                             |

Order Example: B250E13924VDC

### HOW TO ORDER | ACCESSORIES

| MODEL | DESCRIPTION   | B250E1<br>1/4 PIPE | B500E1<br>1/2 PIPE | B590E1<br>3/4 PIPE | NOTES                                                                |
|-------|---------------|--------------------|--------------------|--------------------|----------------------------------------------------------------------|
|       | PIPE PLUG     | 130-15BAGOF10      | 130-21BAGOF10      | 130-24BAGOF10      | • Plug EXH (Port 3) for 2-way function.<br>• Sold in bags of 10.     |
|       | DIN CONNECTOR | HS5                |                    |                    | • Receptacle for DIN electrical entry valves (valve option code 39). |
|       | MOUNTING BASE | 8-20A              | -                  |                    | • Screws (4) included. B250 series only.                             |

## External Air Pilot Solenoid Valves | B250AE1, B500AE1, B590AE1



| SPECIFICATIONS                          | B250AE1                                    | B500AE1      | B590AE1       |
|-----------------------------------------|--------------------------------------------|--------------|---------------|
| TYPE OF OPERATION                       | Solenoid - External Air Pilot Operated     |              |               |
| FUNCTION                                | NC (Normally Closed) or NO (Normally Open) |              |               |
| PIPING TYPE                             | Inline, Direct Piping                      |              |               |
| NUMBER OF PORTS                         | 3 (Plug Exhaust Port for 2-way)            |              |               |
| PORT SIZE                               | 1/4 NPSF                                   | 1/2 NPT      | 3/4 NPT       |
| EXTERNAL AIR PILOT PORT SIZE            | 10-32 UNF                                  |              |               |
| MEDIA                                   | Compressed Air, Inert Gases, Mild Liquids  |              |               |
| WETTED MATERIALS                        | Brass, SST, NBR (or FKM, EPDM)             |              |               |
| PRESSURE RANGE - PSI (BAR)              | Gas: 0-100 (0-7); Liquid: 0-60 (0-4)       |              |               |
| EXTERNAL AIR PILOT PRESSURE - PSI (BAR) | 30-100 (2-7)                               |              |               |
| FLOW CAPACITY (SCFM @ 100PSI)           | 60                                         | 160          | 220           |
| ESEOD - IN (MM)                         | 0.215 (5.45)                               | 0.385 (9.78) | 0.490 (12.46) |
| FLOW COEFFICIENT - Cv                   | 0.83                                       | 2.67         | 4.33          |
| RESPONSE TIME - ON/OFF (MS)             | 7 / 25                                     | 25 / 40      |               |
| AMBIENT TEMPERATURE RANGE - °F (°C)     | 0 - 125 (18 - 50)                          |              |               |
| LUBRICATION                             | Not required                               |              |               |
| MEDIA FILTRATION                        | Recommended (30 micron)                    |              |               |
| WEIGHT (OZ)                             | 15                                         | 39           |               |

| ELECTRICAL SPECIFICATIONS | ALL VALVES                              |
|---------------------------|-----------------------------------------|
| STANDARD VOLTAGES         | 12VDC, 24VDC, 120/50/60                 |
| ELECTRICAL ENTRY          | 19.5" Long Lead Wires, DIN (10mm DIN/B) |
| VOLTAGE TOLERANCE         | +/- 10%                                 |
| POWER CONSUMPTION         | 6.5w (DC), 8.5w (AC)                    |
| INSULATION RATING         | Class F                                 |

**B250AE1**  
DIN Type



**B500AE1**  
DIN Type



**B590AE1**  
DIN Type



### HOW TO ORDER | EXTERNAL AIR PILOT SOLENOID VALVES

| MODEL   | FUNCTION    |           | ELECTRICAL ENTRY |           | BODY SEALS |     |      | AVAILABLE VOLTAGES          |
|---------|-------------|-----------|------------------|-----------|------------|-----|------|-----------------------------|
|         | NORM CLOSED | NORM OPEN | LEAD WIRES       | DIN STYLE | NBR        | FKM | EPDM |                             |
| B250AE1 | -           | 11        | -                | 39        | -          | F   | E    | 12VDC<br>24VDC<br>120/50/60 |
| B500AE1 |             |           |                  |           |            |     | na   |                             |
| B590AE1 |             |           |                  |           |            |     | na   |                             |

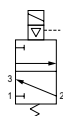
Order Example: B500AE1113912VDC

### HOW TO ORDER | ACCESSORIES

| MODEL | DESCRIPTION   | B250AE1<br>1/4 PIPE | B500AE1<br>1/2 PIPE | B590AE1<br>3/4 PIPE | NOTES                                                                |
|-------|---------------|---------------------|---------------------|---------------------|----------------------------------------------------------------------|
|       | PIPE PLUG     | 130-10BAGOF10       | 130-20BAGOF10       | 130-26BAGOF10       | • Plug EXH (Port 3) for 2-way function.<br>• Sold in bags of 10.     |
|       | DIN CONNECTOR | HS5                 |                     |                     | • Receptacle for DIN electrical entry valves (valve option code 39). |
|       | MOUNTING BASE | 8-20A               | -                   |                     | • Screws (4) included. B250 series only.                             |

## External Air Pilot Solenoid Vacuum Valves | VAB250AE1, VAB500AE1, VAB590AE1

| SPECIFICATIONS                          | VAB250AE1                                  |              | VAB500AE1     | VAB590AE1 |
|-----------------------------------------|--------------------------------------------|--------------|---------------|-----------|
| TYPE OF OPERATION                       | Solenoid - External Air Pilot Operated     |              |               |           |
| FUNCTION                                | NC (Normally Closed) or NO (Normally Open) |              |               |           |
| PIPING TYPE                             | Inline, Direct Piping                      |              |               |           |
| NUMBER OF PORTS                         | 3 (Plug Exhaust Port for 2-way)            |              |               |           |
| PORT SIZE                               | 1/4 NPSF                                   | 1/2 NPT      | 3/4 NPT       |           |
| EXTERNAL AIR PILOT PORT SIZE            | 10-32 UNF                                  |              |               |           |
| MEDIA                                   | Vacuum                                     |              |               |           |
| WETTED MATERIALS                        | Brass, Zinc Diecast or Aluminum, FKM       |              |               |           |
| PRESSURE RANGE - IN Hg (MM Hg)          | 0-29.5 (0- 50)                             |              |               |           |
| EXTERNAL AIR PILOT PRESSURE - PSI (BAR) | 30 (2) minimum                             |              |               |           |
| ESEOD - IN (MM)                         | 0.215 (5.45)                               | 0.385 (9.78) | 0.490 (12.46) |           |
| FLOW COEFFICIENT - Cv                   | 0.83                                       | 2.67         | 4.33          |           |
| RESPONSE TIME - ON/OFF (MS)             | 7 / 25                                     | 25 / 40      |               |           |
| AMBIENT TEMPERATURE RANGE - °F (°C)     | 0 - 125 (18 - 50)                          |              |               |           |
| LUBRICATION                             | Not required                               |              |               |           |
| MEDIA FILTRATION                        | Recommended (30 micron)                    |              |               |           |
| WEIGHT (OZ)                             | 15                                         | 39           |               |           |



**VAB250AE1**  
w/Lead Wires



**VAB500AE1**  
w/Lead Wires



**VAB590AE1**  
w/Lead Wires



| ELECTRICAL SPECIFICATIONS | ALL VALVES                              |
|---------------------------|-----------------------------------------|
| STANDARD VOLTAGES         | 12VDC, 24VDC, 120/50/60                 |
| ELECTRICAL ENTRY          | 19.5" Long Lead Wires, DIN (10mm DIN/B) |
| VOLTAGE TOLERANCE         | +/- 10%                                 |
| POWER CONSUMPTION         | 6.5w (DC), 8.5w (AC)                    |
| INSULATION RATING         | Class F                                 |

### HOW TO ORDER | EXTERNAL AIR PILOT SOLENOID VACUUM VALVES

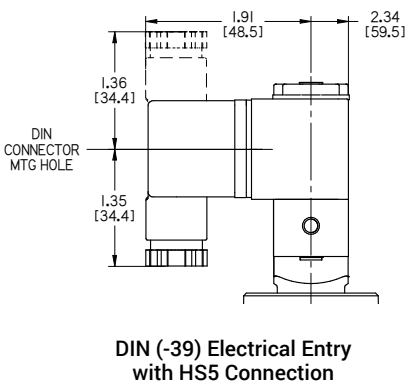
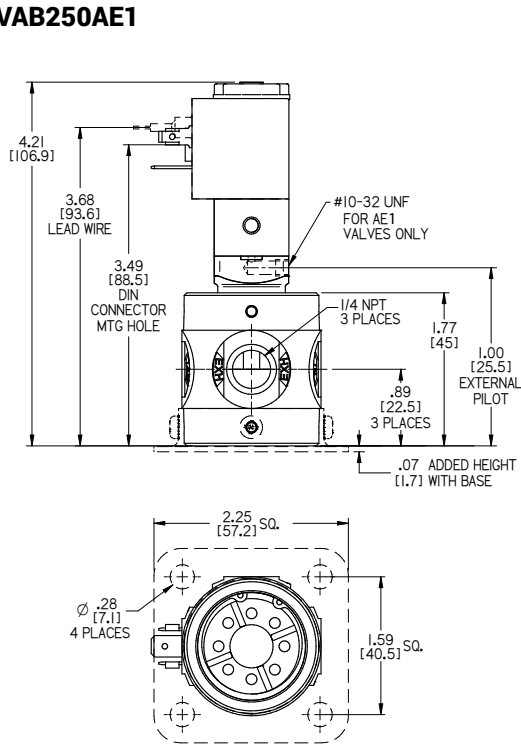
| MODEL     | FUNCTION    |           | ELECTRICAL ENTRY |           | BODY SEALS |     | AVAILABLE VOLTAGES          |
|-----------|-------------|-----------|------------------|-----------|------------|-----|-----------------------------|
|           | NORM CLOSED | NORM OPEN | LEAD WIRES       | DIN STYLE | NBR        | FKM |                             |
| VAB250AE1 | -           | 11        | -                | 39        | B          | -   | 12VDC<br>24VDC<br>120/50/60 |
| VAB500AE1 |             |           |                  |           |            |     |                             |
| VAB590AE1 |             |           |                  |           |            |     |                             |

Order Example: VAB590AE1B24VDC

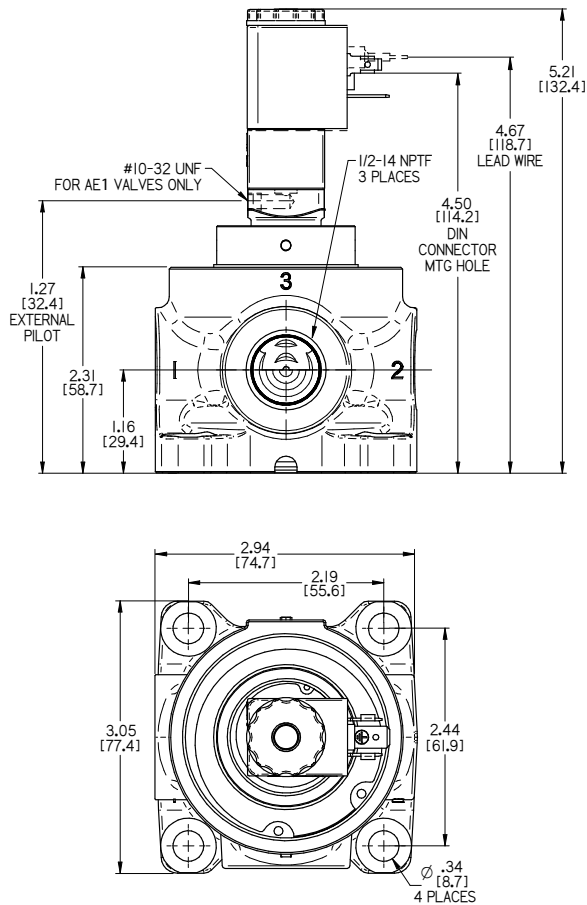
### HOW TO ORDER | ACCESSORIES

| MODEL | DESCRIPTION   | VAB250AE1<br>1/4 PIPE | VAB500AE1<br>1/2 PIPE | VAB590AE1<br>3/4 PIPE | NOTES                                                                |
|-------|---------------|-----------------------|-----------------------|-----------------------|----------------------------------------------------------------------|
|       | PIPE PLUG     | 130-15BAGOF10         | 130-21BAGOF10         | 130-24BAGOF10         | • Plug EXH (Port 3) for 2-way function.<br>• Sold in bags of 10.     |
|       | DIN CONNECTOR | HS5                   |                       |                       | • Receptacle for DIN electrical entry valves (valve option code 39). |
|       | MOUNTING BASE | 8-20A                 | -                     |                       | • Screws (4) included. B250 series only.                             |

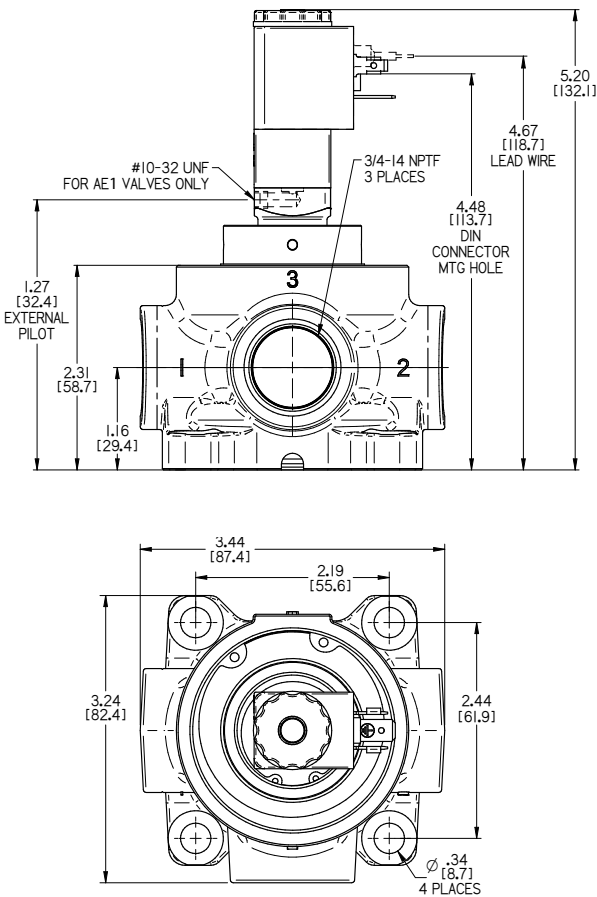
B250E1, B250AE1, VAB250AE1



B500E1, B500AE1, VAB500AE1



B590E1, B590AE1, VAB590AE1



# Humphrey Diaphragm-Poppet Valves

**CANNOT STICK. WILL NOT LEAK.**

## SOLENOID



## REMOTE AIR PILOTED



## MANUAL & MECHANICAL



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