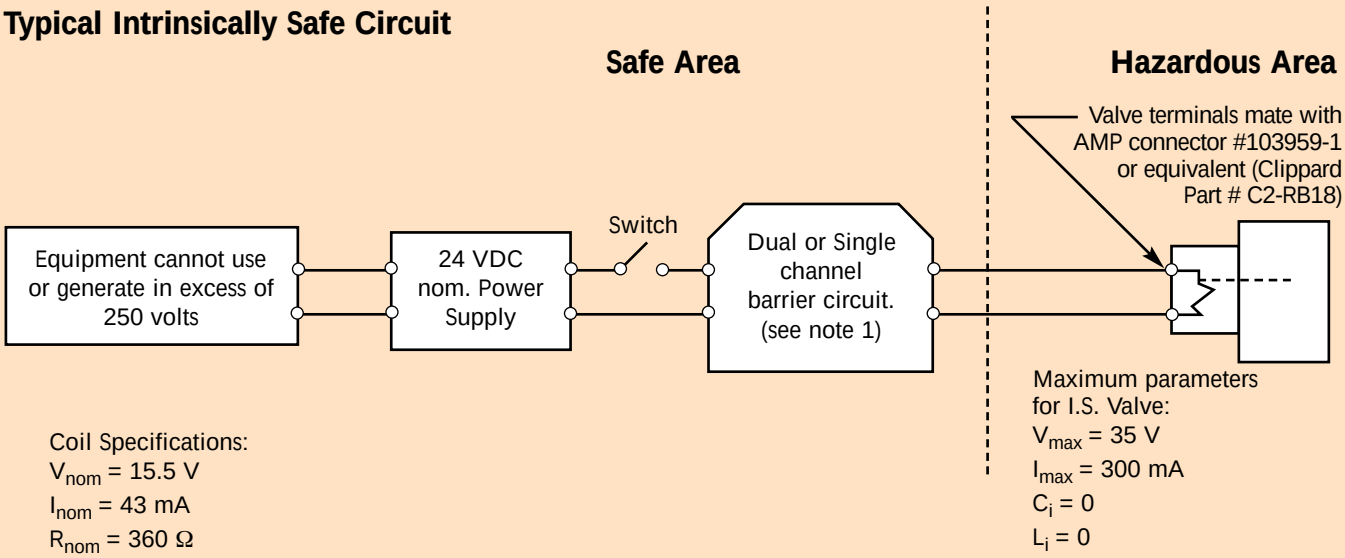
## Definitions

$C_a$ : Maximum Allowed Capacitance
$C_i$ : Maximum Internal Capacitance
$I_{max}$ : Maximum Input Current
$I_{sc}$ : Maximum Output Current
$L_a$ : Maximum Allowed Inductance
$L_i$ : Maximum Internal Inductance
$V_{oc}$ : Maximum Output Voltage
$V_{max}$ : Maximum Input Voltage
$V_t$ : Voltage Total

**FM APPROVAL**
**Typical Intrinsically Safe Circuit**




1. For barrier interconnection refer to maximum barrier output parameters as referenced on the specific barrier installation drawing. Connect as follows:
   a. $V_{max} > oc$ of single channel barrier or $V_t$ of dual channel barrier
   b. $I_{max} > I_{sc}$ of single channel barrier or $I_t$ of dual channel barrier
   c. $C_i$ + field wiring < $C_a$ of single or dual channel barrier
   d. $L_i$ = field wiring < $L_a$ of single or dual channel barrier
2. Installation of intrinsically safe system is to be done in accordance with ANSI / ISA-RP12.6

**NUMBERING SYSTEMS**

Porting — Valve Type — Mounting Style — Voltage (DC) — Orifice Options — Coil Connections

**EI❑-❑❑-15.5-❑❑-❑** — **Blank** - #10-32, **M5** - Metric

- Porting: **Blank** - Normally CLOSED; **O** - Normally Open or Captivated Exhaust
- Valve Type: **2** - 2-Way; **3** - 3-Way
- Mounting Style: **Blank** - Standard Mount; **M** - Manifold Mount
- Orifice Options: **Blank** - 0.025 Dia. Orifice; **L** - 0.040 Dia Orifice; **H** - 0.060 Dia. Orifice
- Coil Connections: **Blank** - Amp Conn.; **C** - 18 gage leads; **CP** - 18 gage leads with pipe connection


## Increase Flow

**High Flow Valves** Models 2020 and 2021 high flow valves are piloted 3-way valves that work with EI/EIO intrinsically safe valves as well as EV/ET 3-way valves. They are designed to be mounted on EI/EIO manifold valves. Outputs from the EI/EIO will actuate the valve and produce outputs up to 22 scfm at 100 psig. Piloted 3-way valves are also available as R-481 and R-482.

Solenoid/Modular Valve:
(Electrical Parameters)
$U_{max}$ = 28 V
$I_{max}$ = 93.3 mA
$P_{max}$ = 0.653 W
$C_{eq}$ = 1.0 pF (opened circuit)
$L_{eq}$ = 157 H/Ω

**EVB Booster Valve** Clippard EVB-3 booster valve mates with manifold mounted EI/EIO valves and manifolds to provide increased flow. Direct piloting from Clippard EI/EIO valves provides a flow of up to 6.1 scfm at 100 psig.

## What is Intrinsic Safety?

An intrinsically safe system is one in which all electrical devices and their associated circuits are designed such that they can neither arc nor spark with sufficient energy to ignite the hazardous substances around which they are being used. Put another way, the energy stored from the inductance of the circuit components must be unable to generate a spark or arc at the circuits open point during current circulation that is capable of igniting the hazardous materials present when they are in a fuel/air mixture that is most favorable for ignition.

## What is Entity approval?

According to INTRINSIC SAFETY standards, there is no requirement for authorized laboratory certification of system-wide intrinsic safety if the designer can determine, with certainty, that the physical and electrical parameters of every system component has been met sufficient to ensure that system-wide intrinsic safety has been maintained.
An “Entity Approval” is documentation stating that a device is intrinsically safe in specified hazardous atmospheres if the stated physical and electrical conditions contained in the approval are met. By meeting the requirements of “Entity Approvals” on all components of a system, the designer can more easily document that system-wide intrinsic safety has been maintained.

The Clippard EI-EIO series valves hold the Entity Approvals listed and supporting documentation is available to our customers.

# EI Intrinsically Safe Normally Closed Valves

## EI-❑❑-15.5-❑

Standard Mount


Manifold Mount



## EI-❑❑-15.5-❑C

Standard Mount


Manifold Mount



## EI-❑❑-15.5-❑CP

Standard Mount


Manifold Mount



**Type:** 2-Way or 3-Way Poppet, Normally Closed

**Medium:** Air (40 micron filtration)

**Temperature Range:** 30˚ - 180˚F

**Input Pressure:** 28 Hg. Vac to 105 psig; 0-7 bar
28 Hg. Vac to 50 psig (L); 0-3.5 bar
28 Hg. Vac to 25 psig (H); 0-1.8 bar

**Air Flow:** 0.6 scfm @ 100 psig; 17 l/min @ 7 bar
0.5 scfm @ 50 psig (L); 14 l/min @ 3.5 bar
0.45 scfm @ 25 psig (H); 13 l/min @ 1.8 bar

**Voltages:** 15.5 VDC

**Power Consumption:** 0.67 watt at rated voltage (0.66 watt on top three products)

**Response:** 5 - 10 milliseconds @ 100 psig

**Ports:** Inlet - #10-32 (M5), Outlet - #10-32 (M5) - on std.

**Metric:** Add -M5 to Part Number (standard mount only)

For Cable and Connectors, see Page 187.

## EIO-❑❑-15.5-❑

Standard Mount


Manifold Mount


## EIO-❑❑-15.5-❑C

Standard Mount


Manifold Mount


**Type:** 2-Way or 3-Way Poppet, Fully Ported

**Medium:** Air (40 micron filtration)

**Temperature Range:** 30˚ - 180˚F

**Input Pressure:** 28 Hg. Vac to 105 psig; 0-7 bar
28 Hg. Vac to 50 psig (L); 0-3.5 bar
28 Hg. Vac to 25 psig (H); 0-1.8 bar

**Air Flow:** 0.6 scfm @ 100 psig; 15 l/min @ 7 bar
0.5 scfm @ 50 psig (L); 15 l/min @ 3.5 bar
0.45 scfm @ 25 psig (H); 14 l/min @ 1.8 bar

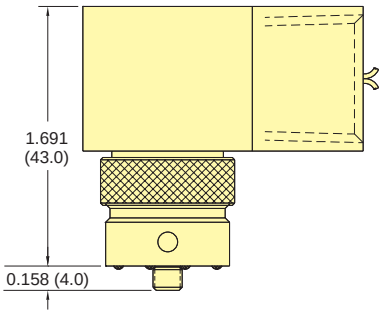
**Voltages:** 15.5 VDC

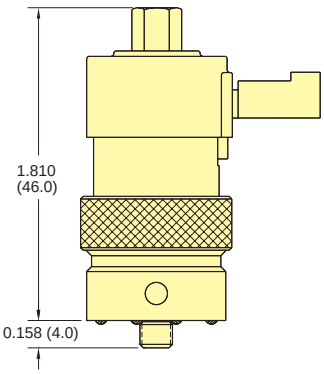
**Power Consumption:** 0.67 watt at rated voltage

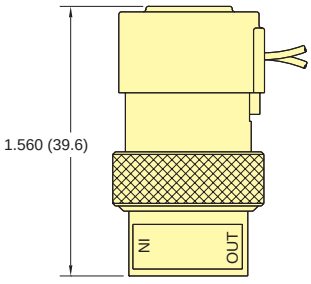
**Response:** 5 - 10 milliseconds @ 100 psig

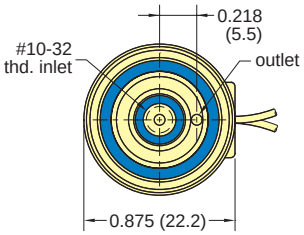
**Ports:** Inlet - #10-32 (M5), Outlet - #10-32 (M5) - on std.

**Metric:** Add -M5 to Part Number



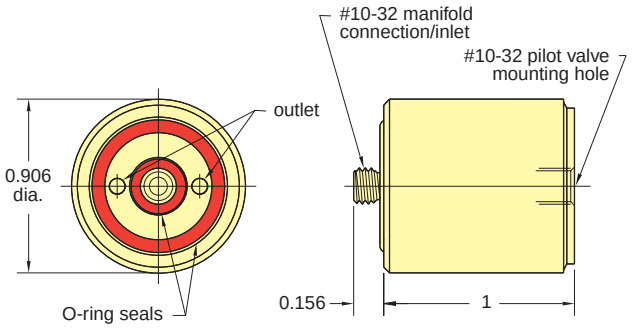




For Cable and Connectors, see Page 187.

## EVB-2

### EC, EV and ET Piloted 2-Way Valve, Manifold Mount

**Electronic Valve Booster** Amplifies the flow capacity of EC, EV and ET type valves by over twelve times. Manifold style electronic valves mount onto booster body, which, in turn, mounts on Clippard manifolds.


**Type:** 2-Way Normally Closed, Pressure Piloted Valve

**Medium:** Air

**Input Pressure:** 20 to 150 psig

**Air Flow:** 6.1 scfm @ 100 psig

**Response:** 20 milliseconds at 20 psig
13 milliseconds at 100 psig

**Mounting:** Mounts to manifold

**Ports:** Inlet and outlet through manifold

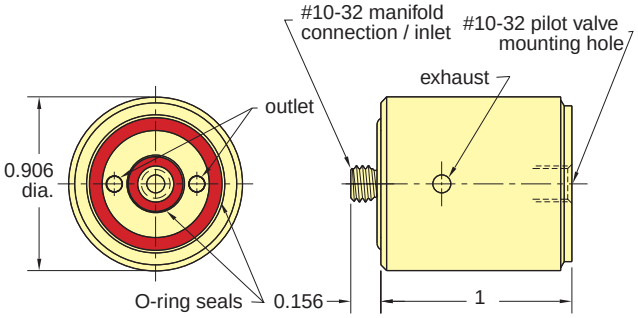
**Materials:** Nickel plated brass, acetyl, stainless steel and Buna-N

**Additional Note** Use only normally closed 3-way pilot valves in conjunction with EVB-2

## EVB-3

### EC, EV and ET Piloted 3-Way Valve, Manifold Mount

**Electronic Valve Booster** Amplifies the flow capacity of EC, EV and ET type valves by over twelve times. Manifold style electronic valves mount onto booster body, which, in turn, mounts on Clippard manifolds.


**Type:** 3-Way Normally Closed, Pressure Piloted Valve

**Medium:** Air

**Input Pressure:** 20 to 150 psig

**Air Flow:** 6.1 scfm @ 100 psig

**Response:** 20 milliseconds at 20 psig
13 milliseconds at 100 psig

**Mounting:** Mounts to manifold

**Ports:** Inlet and outlet through manifold

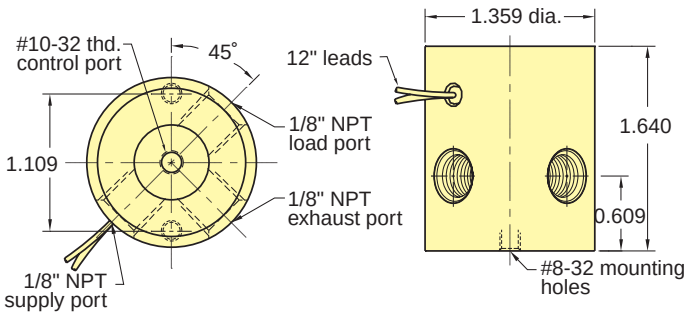
**Materials:** Nickel plated brass, acetyl, stainless steel and Buna-N

**Additional Note** Use only normally closed 3-way pilot valves in conjunction with EVB-3

## 2013 - ❑

### Electronic Fluidamp

Low-power DC solenoid solid state output signals can be directly converted to high pressure pneumatic power without amplification


**Type:** 3-Way Normally Closed, Electronic Valve

**Medium:** Air

**Input Pressure:** 30 to 100 psig

**Air Flow:** 22 scfm @ 100 psig

**Bleed Flow:** 0.10 scfm @ 100 psig

**Filtration:** 10 micron

**Frequency Response:** 50 Hz @ 100 psig
70 Hz @ 30 psig

**Ports:** 1/8" NPT female

**Switching Speed:** 10 milliseconds

### Electrical Data

**Continuous Overload:** 350% @ 25˚C ambient
250% @ 50˚C ambient

**Power Consumption:** Less than .50 watts at rated voltage (80 ma. @ 6V, 40 ma. @ 12 V, 20 ma. @ 24V)

**Leads:** 28 gauge stranded P.V.C. insulated

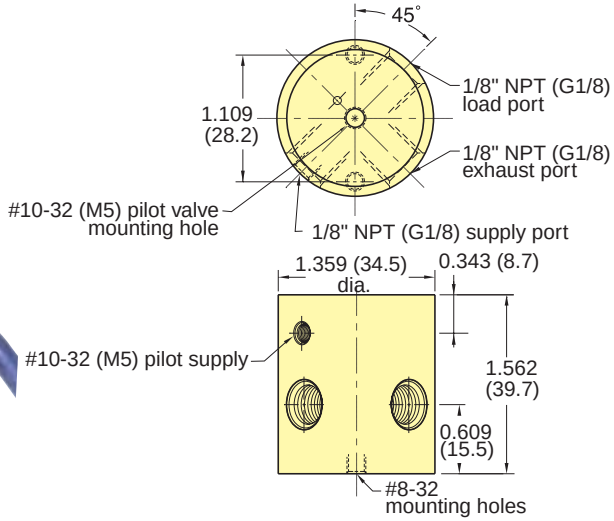
**Standard Options:**

| | |
|---|---|
| 2013-6 | 6 volts DC |
| 2013-12 | 12 volts DC |
| 2013-24 | 24 volts DC |

# 2020/2021

High Flow EC, EV and ET Piloted 3-Way Valves

Designed to be piloted by a Clippard EC, EV and ET manifold mount electronic valve. Output from the EC, EV and ET actuates the valve to produce outputs up to 22 scfm at 100 psig. Combines low wattage, long life and cool running of the EC, EV and ET valves with quick response and high flow of Clippard "Fluidamp" type valves. The 2020 and 2021 are identical in all respects except one. The 2020 has an external #10-32 port for the pressure supply to the EC, EV, and ET electronic pilot valve.




**Type:** 3-Way Normally Closed, Pressure Piloted Valve

**Medium:** Air

**Input Pressure:** 30 to 100 psig; 2.1 to 6.9 bar

**Pilot Pressure:** (2020) 60% of supply pressure, minimum

**Air Flow:** 22 scfm at 100 psig/620 l/min @ 6 bar

**Response:** Approximately 20 milliseconds

**Mounting:** Mounting holes provided

**Ports:** Inlet and outlet, exhaust 1/8" NPT Pilot supply on 2020 is #10-32 female

**Materials:** Anodized Aluminum, Stainless Steel and Buna-N

**Additional Note** Use only normally closed 3-way pilot valves in conjunction with 2020/2021

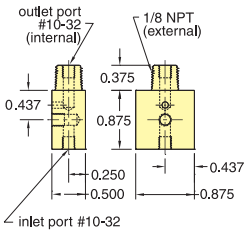
**Option:** Add -MG for Metric Version

## Specialized Manifolds

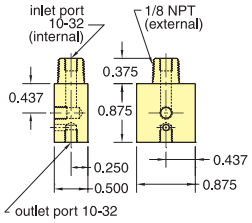
**Material:** Nickel plated brass

**Use:** Mount EC, EV and ET valves to any 1/8" NPT supply port

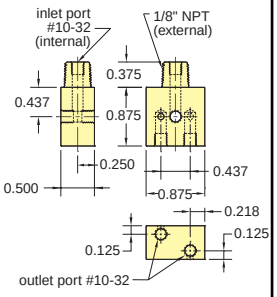
**15490-1 and 15490-1-MR (metric).**
#10-32 (M5) Inlet
1/8" NPT (R1/8) Outlet



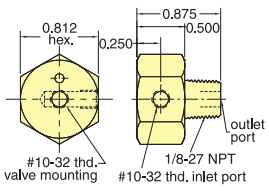

**15490-2 and 15490-2-MR (metric).**
1/8" NPT (R1/8) Inlet
#10-32 (M5) Outlet



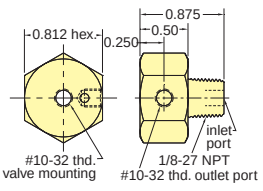

**15490-3 and 15490-3-MR (metric) Dual Supply.**
1/8" NPT (R1/8) Inlet
#10-32 (M5) Outlet




**15491-1 and 15491-1-MR (metric).**
#10-32 (M5) Inlet
1/8" NPT (R1/8) Outlet




**15491-2 and 15491-1-MR (metric).**
1/8" NPT (R1/8) Inlet
#10-32 (M5) Outlet

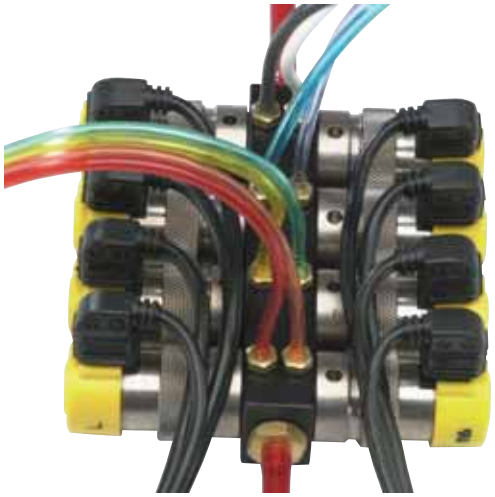



# 1548 ❑ - ❑

Multi-Valve Manifolds

**Construction:** Black anodized aluminum

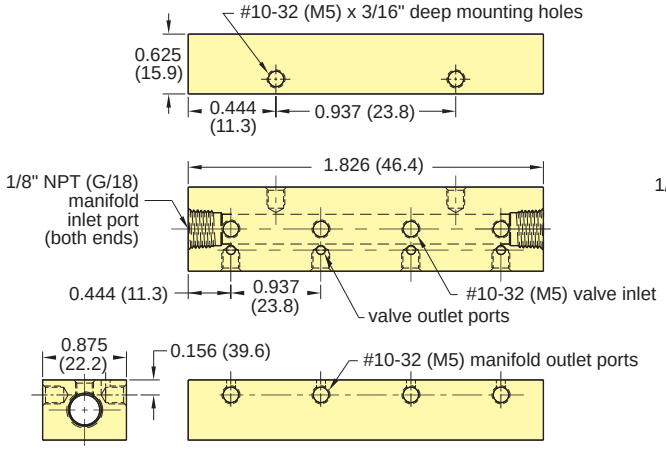
| Order No. | # of Valves | "A" | "B" |
|---|---|---|---|
| **15481-4** | 4 | 1.875" | 3.750" |
| **15481-4-M5** | 4 | 42.6 mm | 95.3 mm |
| **15481-6** | 6 | 3.750" | 5.625" |
| **15481-6-M5** | 6 | 95.3 mm | 142.9 mm |



Eight ET valves mounted on a 15482-8

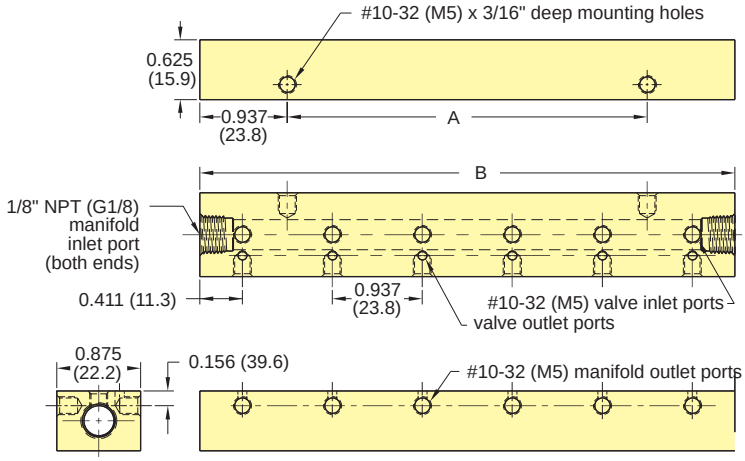
## 15481-2 & 15481-2-M5 (Metric)

Mounts two valves on one side only



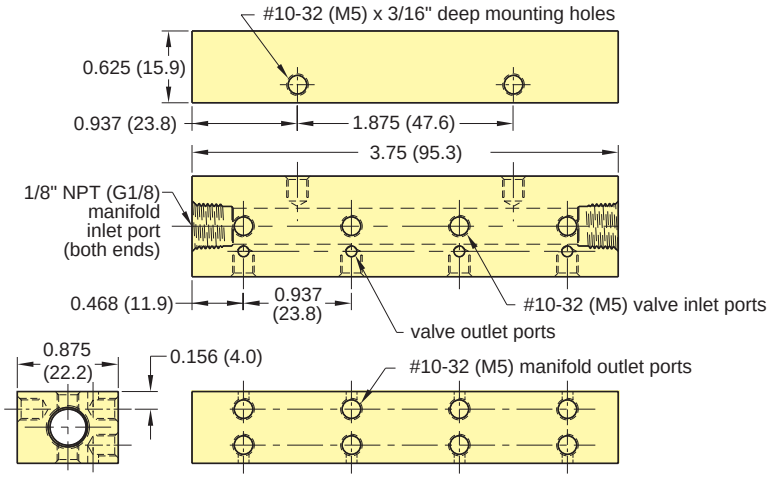

## 15481-4 & 15481-4-M5 (Metric)
## 15481-6 & 15481-6-M5 (Metric)

Mounts six valves on one side only




## 15482-8 & 15482-8-M5 (Metric)

Mounts eight valves, four each on opposite sides




## 15482-12 & 15482-12-M5 (Metric)

Mounts twelve valves, six each on opposite sides