

EI, EIO INTRINSICALLY SAFE VALVES



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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

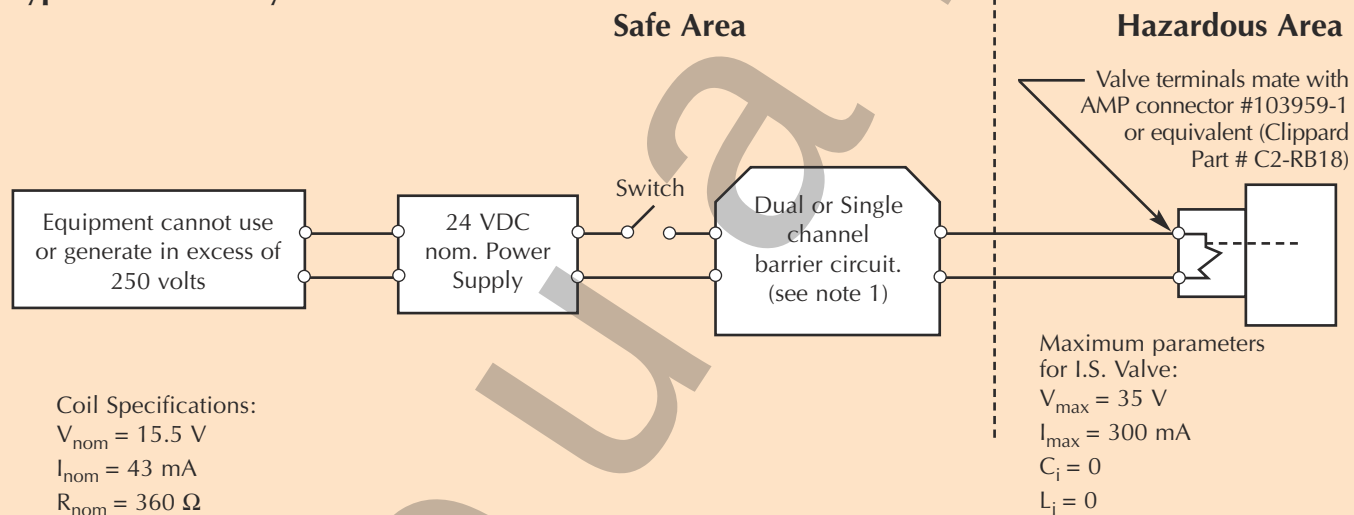
V_{oc} : Maximum Output Voltage

V_{max} : Maximum Input Voltage

V_t : Voltage Total

FM APPROVAL

Typical Intrinsically Safe Circuit

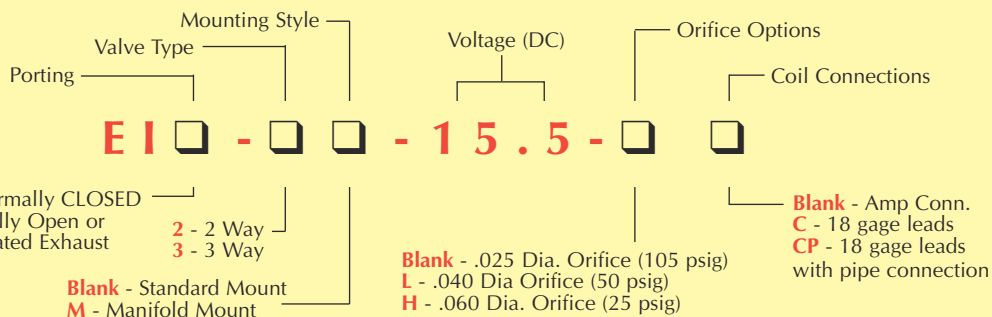


1. For barrier interconnection refer to maximum barrier output parameters as referenced on the specific barrier installation drawing. Connect as follows:

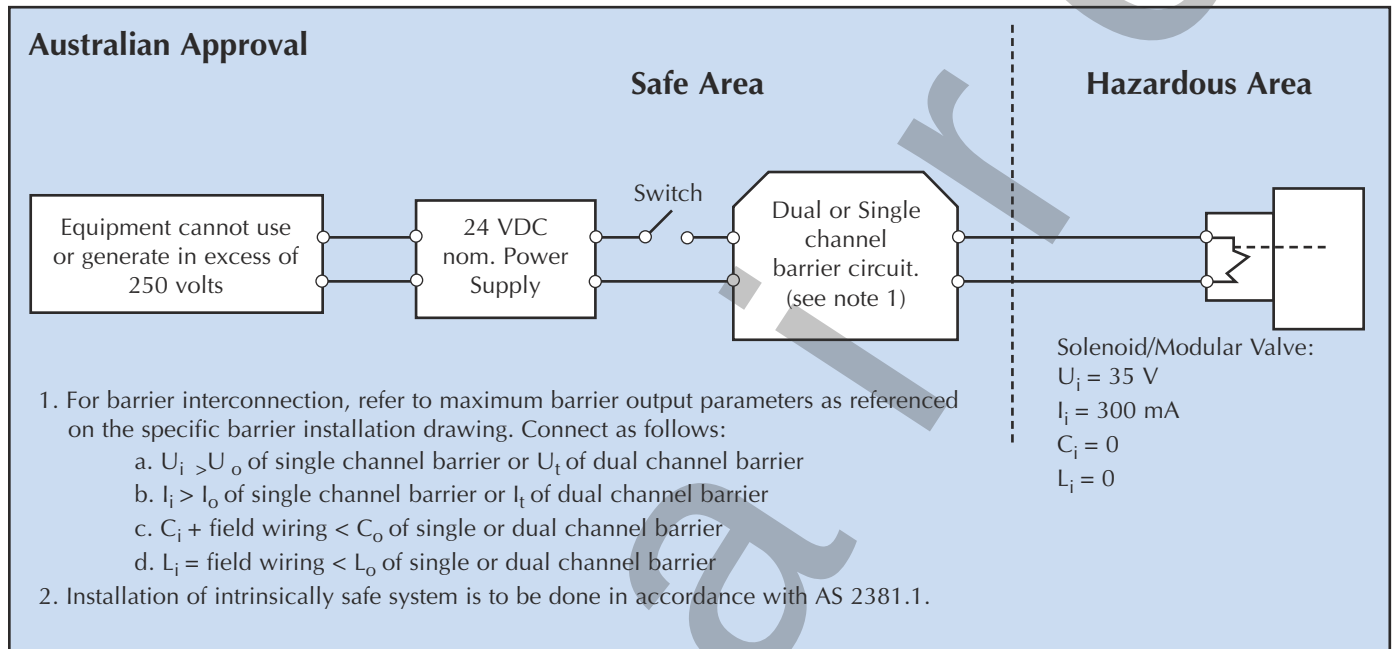
- $V_{max} > V_{oc}$ of single channel barrier or V_t of dual channel barrier
- $I_{max} > I_{sc}$ of single channel barrier or I_t of dual channel barrier
- $C_i + \text{field wiring} < C_a$ of single or dual channel barrier
- $L_i = \text{field wiring} < L_a$ of single or dual channel barrier

2. Installation of intrinsically safe system is to be done in accordance with ANSI / ISA-RP12.6

NUMBERING SYSTEMS



EI, EIO INTRINSICALLY SAFE VALVES



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.

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.

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

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



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
28 Hg. Vac to 50 psig (L)
28 Hg. Vac to 25 psig (H)

Air Flow: @100 psig - 0.6 SCFM
@50 psig (L) - 0.5 SCFM
@25 psig (H) - 0.45 SCFM

Voltages: 15.5 VDC

Power Consumption: 0.66 watt at rated
voltage

Response: @100 psig - 5 - 10 ms

Ports: Inlet - 10-32, Outlet - 10-32 - on std.

EI - □ □ - 15.5 - □ C

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
28 Hg. Vac to 50 psig (L)
28 Hg. Vac to 25 psig (H)

Air Flow: @100 psig - 0.6 SCFM
@50 psig (L) - 0.5 SCFM
@25 psig (H) - 0.45 SCFM

Voltages: 15.5 VDC

Power Consumption: 0.65 watt at rated
voltage

Response: @100 psig - 5 - 10 ms

Ports: Inlet - 10-32, Outlet - 10-32 - on std.

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
28 Hg. Vac to 50 psig (L)
28 Hg. Vac to 25 psig (H)

Air Flow: @100 psig - 0.6 SCFM
@50 psig (L) - 0.5 SCFM
@25 psig (H) - 0.45 SCFM

Voltages: 15.5 VDC

Power Consumption: 0.65 watt at rated
voltage

Response: @100 psig - 5 - 10 ms

Ports: Inlet - 10-32, Outlet - 10-32 - on std.

EIO INTRINSICALLY SAFE FULLY PORTED VALVES



EIO - □ □ - 15.5 - □

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
28 Hg. Vac to 50 psig (L)
28 Hg. Vac to 25 psig (H)

Air Flow: @100 psig - 0.6 SCFM
@50 psig (L) - 0.5 SCFM
@25 psig (H) - 0.45 SCFM

Voltages: 15.5 VDC

Power Consumption: 0.65 watt at rated
voltage

Response: @100 psig - 5 - 10 ms

Ports: Inlet - 10-32, Outlet - 10-32 - on std.

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
28 Hg. Vac to 50 psig (L)
28 Hg. Vac to 25 psig (H)

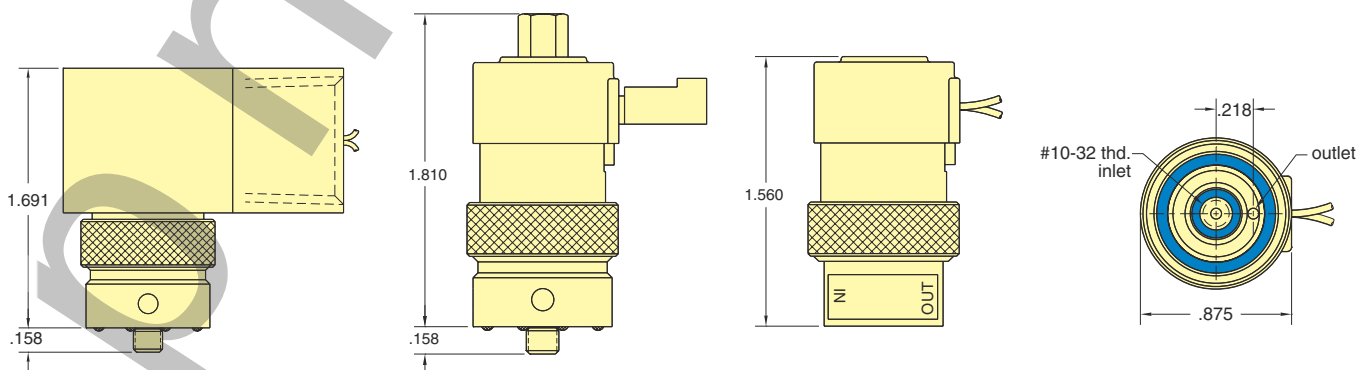
Air Flow: @100 psig - 0.6 SCFM
@50 psig (L) - 0.5 SCFM
@25 psig (H) - 0.45 SCFM

Voltages: 15.5 VDC

Power Consumption: 0.65 watt at rated
voltage

Response: @100 psig - 5 - 10 ms

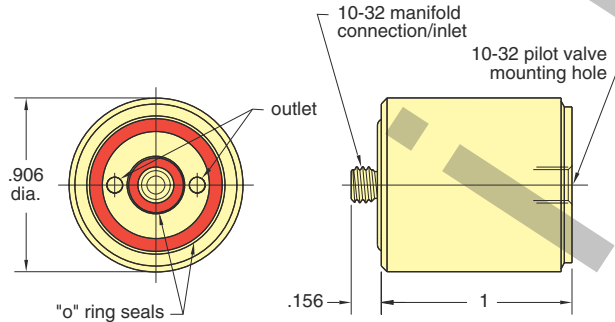
Ports: Inlet - 10-32, Outlet - 10-32 - on std.



EV, ET, EC SERIES ACCESSORIES



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 ms at 20 psig
13 ms at 100 psig

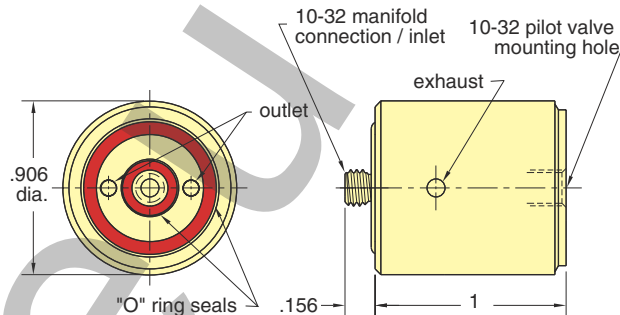
Mounting: Mounts to manifold

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 ms at 20 psig
13 ms at 100 psig

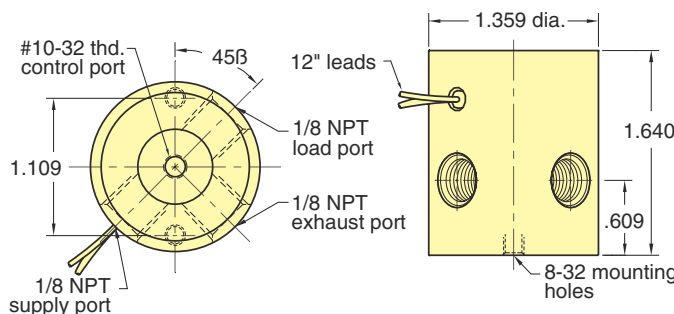
Mounting: Mounts to manifold

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 at 100 psig

Bleed Flow: .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 ms.

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



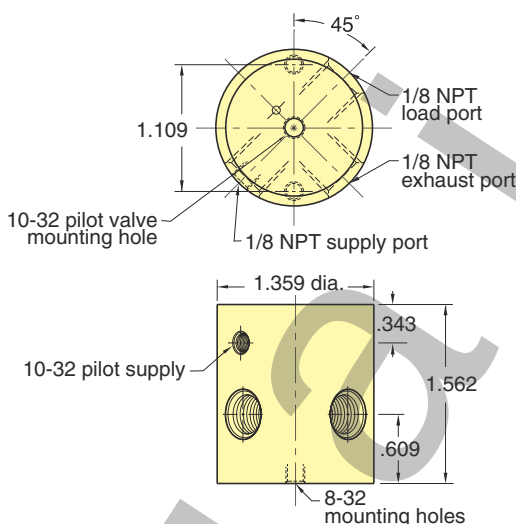
EV, ET, EC SERIES ACCESSORIES



2020/2021

High Flow EC, EV, and ET Piloted 3-way valves

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

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

Air Flow: 22 scfm at 100 psig

Response: approx. 20 ms

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

1549□ - □

Specialized Manifolds



Material: Nickel plated brass

Ports: 1/8" NPT thread stud, 10-32 body ports

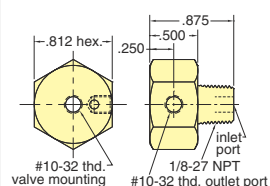
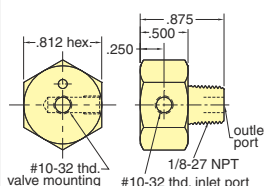
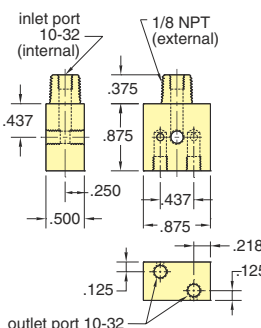
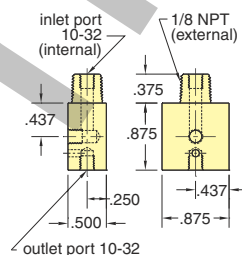
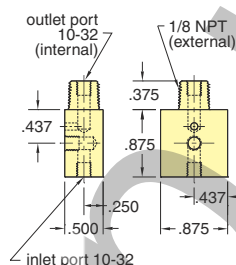
15490-1 Pilot manifold allows, EC, EV, and ET, controlled by electronic signal, to pilot through 1/8" NPT outlet a much larger air-piloted valve.

15490-2 Single supply manifold with 1/8" NPT inlet securely connected to air source, manifold provides rigid mounting for EC, EV and ET valve, 10-32 port outlet.

15490-3 Dual supply manifold allows two EC, EV or ET 3-way valves to be used as a 4-way by controlling them with a single pole double throw switch.

15491-1 Valve pilot adaptor may be used with a pneumatic cylinder to provide a complete system for efficient interface with electric or electronic circuits. This adaptor may be installed in any 1/8 NPT port and with supply air connected to the inlet port, provide air to a single acting cylinder when an electronic signal is received.

15491-2 Inline manifold may be installed in any 1/8 NPT supply port and provides rigid mounting for an EC, EV, or ET valve with a #10-32 threaded outlet port. With this manifold, an EC, EV, or ET valve controlled by an electronic signal, can pilot a much larger air-piloted valve through a #10-32 threaded outlet port.



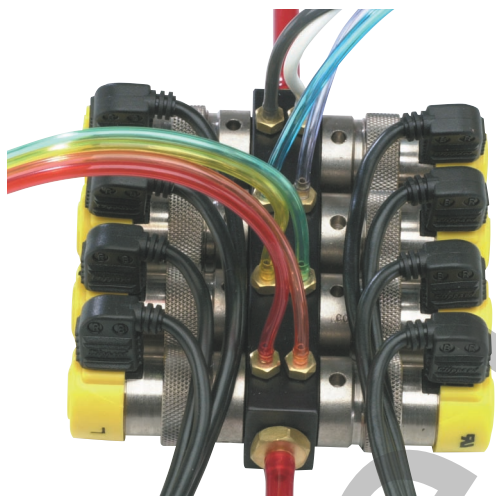
EV, ET, EC SERIES MANIFOLDS

Clippard
Minimatic®

1548 □ - □

Multi-Valve Manifolds

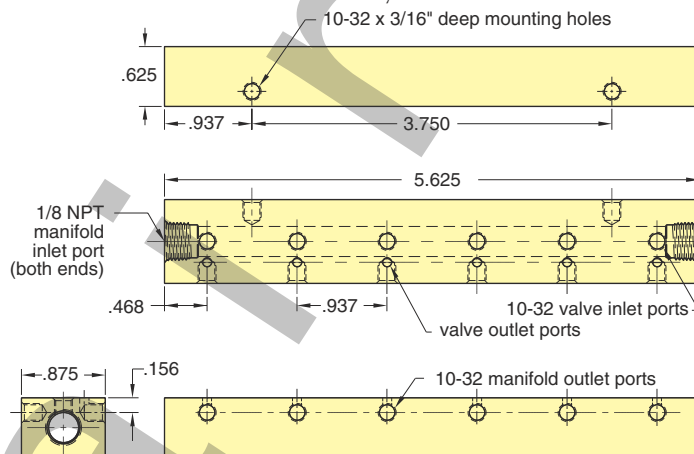
Construction: Black anodized aluminum



Eight ET valves mounted on a 15482-8

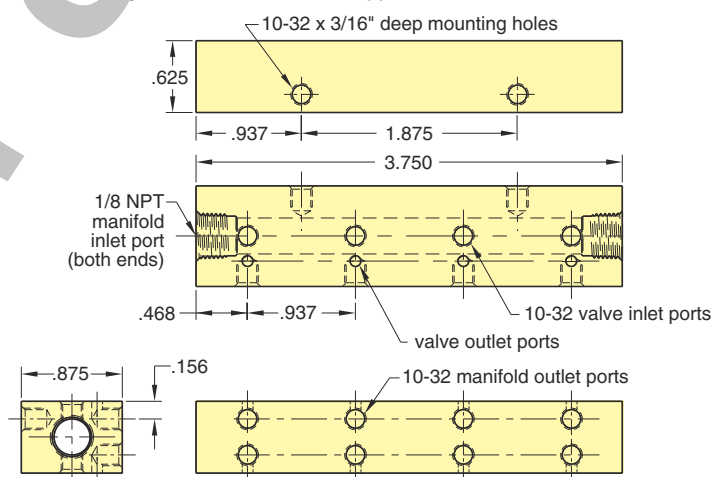
15481-6

Mounts six valves on one side only



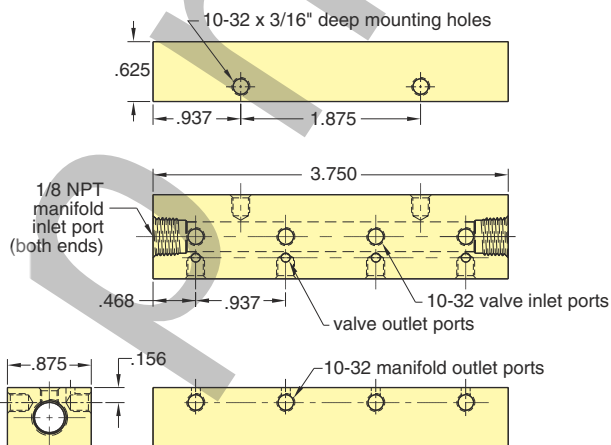
15482-8

Mounts eight valves, four each on opposite sides



15481-4

Mounts four valves on one side only



15482-12

Mounts twelve valves, six each on opposite sides

