



Fully Automatic Switchover Manifold
For High Pressure Carbon Dioxide and Nitrous Oxide Cylinders
(AFAM1500HB Series - With Electric Trim Heater - Laboratory Applications)

SPECIFICATION

Fully Automatic Switchover Manifold

The BeaconMedæs Fully Automatic Switchover Manifold (AFAM1500HB Series) is specifically designed to be used with Carbon Dioxide and Nitrous Oxide high pressure cylinders. The manifold accommodates multiple cylinders, equally divided into two banks, providing an uninterrupted supply of gas for the specific application. The manifold is cleaned, tested and prepared for the indicated gas service and constructed following NFPA, ASME B31.3 and CGA guidelines.

Manifold Description

The AFAM1500HB Series manifold operates as a fully automatic switchover control system. It monitors cylinder bank pressure electronically, controlling switchover and eliminating the need to manually reset levers and valves. The easy to read analog gauges show the delivery and individual bank pressure. A series of lights for each bank indicates whether the bank is "in service," "ready for use," or "bank depleted". At a preset pressure, the system automatically changes from the supply bank to the reserve bank without interruption in gas supply. AFAM1500HB Series manifolds operate on 24 VAC power (power transformer provided by BeaconMedæs), but will continue to function during a power failure (without switchover capabilities).

Operation and Design

The AFAM1500HB Series consists of a manifold box, an electric trim heater, an alarm/control module and two supply bank headers (one service and one reserve supply). The manifold box is composed of analog cylinder pressure gauges, regulators, pressure relief valves and normally open solenoid valves. The alarm/control module includes indicator lights (green "In Service", yellow "Ready for Use", and red "Bank Depleted"), a buzzer and a silence button. Each supply bank consists of a header bar with flexible hoses, pressure relief valves and cylinder connections.

After initial power-up and with both banks empty, the red light will be illuminated. The bank that is pressurized first will be considered the "in service" bank and is the bank that supplies the piping system. The green "In Service" light (also referred to as the "Service" bank) will light up, while the cylinder bank on stand-by (or "Secondary Supply") will illuminate the yellow "Ready for Use" light once the bank is pressurized.

On the service bank, the gas flows into the manifold box inlet to the bank pressure switch, then into the primary regulator before heading to a solenoid valve followed by a check valve and the final line regulator. The delivery

pressure is controlled by one line regulator and is field adjustable. The gas exits the line regulator and proceeds past the pressure gauge and into the delivery piping.

The gas on the secondary bank flows into the manifold box inlet, then to the bank pressure switch. The gas flows through the other primary regulator until it reaches a solenoid valve. Since this is the secondary bank, the valve is closed, preventing the secondary bank from flowing. Switchover from the "Service" to "Secondary" side is accomplished when the service bank pressure drops below a predetermined point (the switchover pressure is determined by the pressure switches). The control module then signals the secondary bank solenoid to open while closing the service bank solenoid valve at the same time, allowing it to start flowing without any interruption.

After replacing the empty cylinders, open the cylinder valves. The control module will read the cylinder pressure and automatically place the fresh bank of cylinders into secondary reserve (stand by/ready for use) mode. The yellow light will come on indicating that the new bank is ready for use, and the red "Bank Depleted" light will be extinguished. Replacing the empty cylinders is all that is required to reset the switchover manifold.

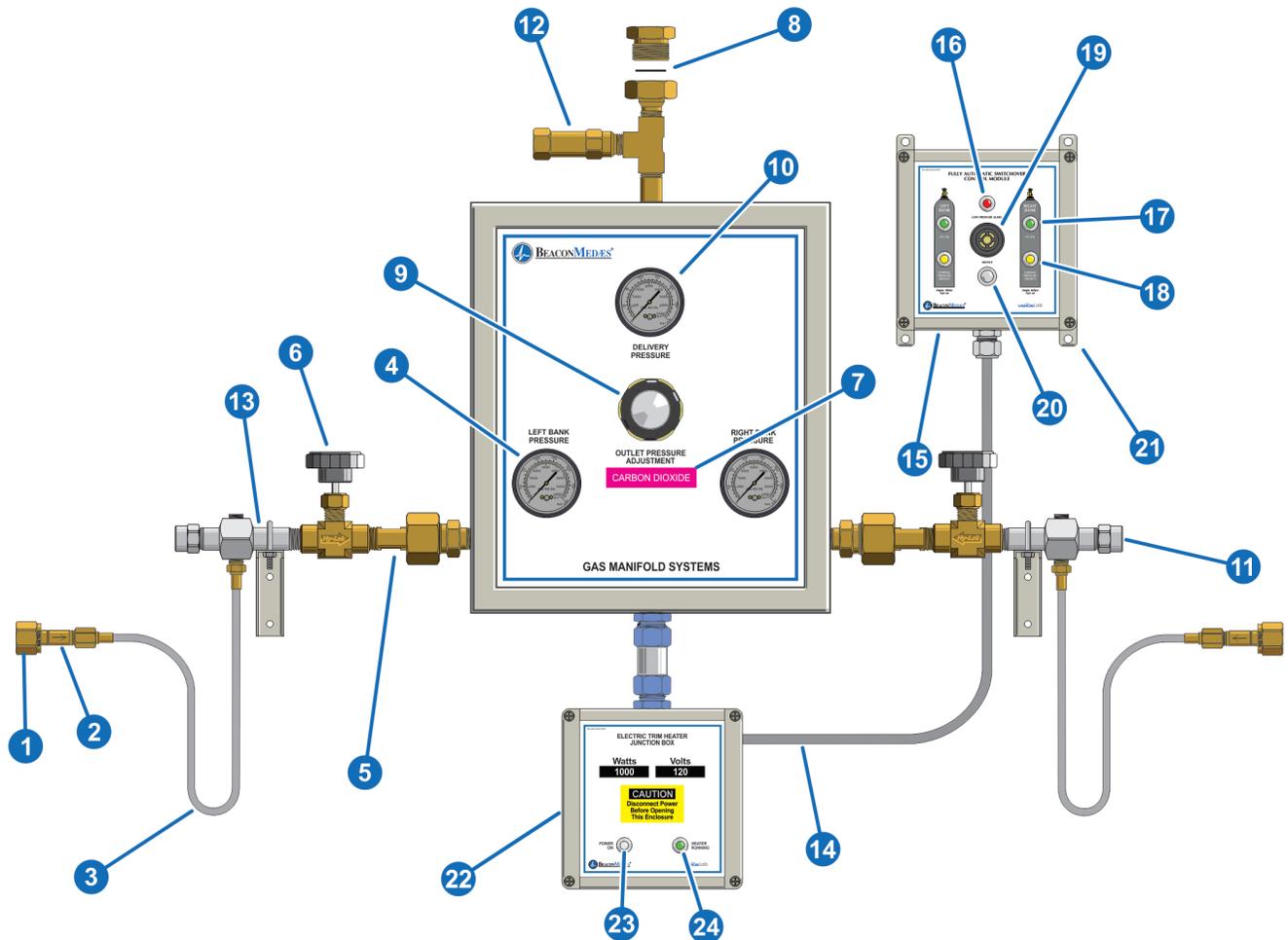
Electric Trim Heater (ETH)

The AFAM1500HB Manifold is equipped with an inboard electric trim heater (gas heater). The capacity of this heater is 500 standard cubic feet per hour (scfh) of carbon dioxide. The final line pressure regulator will provide a constant delivery pressure regardless of the cylinder pressure.

The ETH requires 120 VAC to operate and is located inside of the manifold enclosure itself. The junction box is factory installed and located at the bottom of the manifold enclosure.

A qualified electrician is required to connect the 120 VAC power source to the junction box (hardware by others). A terminal strip is installed inside the junction box for ease of installation. Because the ETH and the manifold controller work independently, the electrician is required to perform two distinct electrical installations:

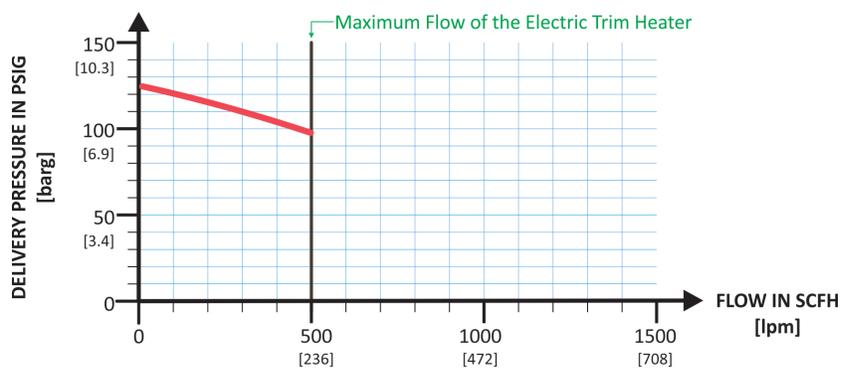
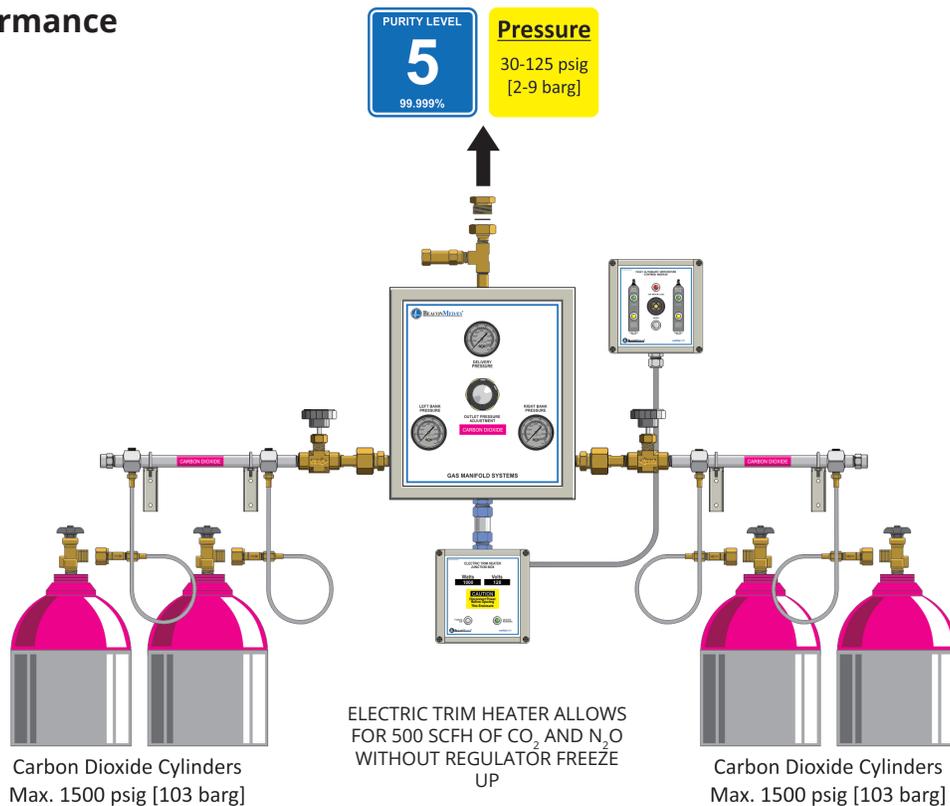
- The 120 VAC to 24 VAC step down power transformer (provided by BeaconMedæs) to the manifold controller;
- The 120 VAC power line to Electric Trim Heater.

Standard Configuration - Brass Construction


- | | | |
|--|---|---|
| 1 Gas Specific Cylinder Nut | 9 Delivery Regulator Adjustment Knob | 17 Green LED (In Use) |
| 2 Gas Specific Cylinder Nipple with Check Valve | 10 Outlet Pressure Gauge (0-200 psi) | 18 Yellow LED (Ready) |
| 3 Cylinder Lead | 11 Capped for Future Expansion | 19 Audible Alarm (Buzzer) |
| 4 Inlet Pressure Gauge (0-2000 psi) | 12 Outlet Pressure Relief Valve (1/2" F.NPT) | 20 Silence Push-button |
| 5 Header Bar Union | 13 Header Bar | 21 Mounting Legs |
| 6 Needle Valve (Header Isolation) | 14 Controller Cable | 22 Electric Gas Heater Enclosure |
| 7 Gas I.D. Label | 15 ABS Enclosure | 23 White LED (Power On) |
| 8 Outlet Union (1/2" F.NPT) | 16 Red LED (Empty) | 24 Green LED (Heater Running) |

Materials	Enclosure	Steel, Powder Coated, Light Grey
	Header Bars	Brass Bar Stock, Nickel Plated
	Tubing	Copper, ASTM B75
	Fittings	Brass
	Flexible Hoses	TCH: Teflon Core, Brass Fittings, Stainless Steel Braiding SSH: Stainless Steel Core, Fittings and Braiding
	Relief Valves	Brass Body, Teflon Seat, Stainless Steel Spring
	Pressure Reducing Regulators	Brass Body, Stainless Steel Diaphragm, Teflon Seat
	Pressure Switches	Stainless Steel, Viton Seals
	Solenoid Valves	Brass Body, Viton Seals and Seat
	Optional Vent Valves	Brass Bar Stock, Stainless Steel Diaphragm, PCTFE Seat
	Trim Heater	Brass Body

Use & Performance



Ordering Information

AFAM1500HB - - - - - -

A B C D E F G

BeaconMedaes AFAM1500HB Manifold Model Number Chart			
Variable	Definition	Allowable Value	Description
A	Inlet Pressure	1500H	1500 PSIG [103 BARG] (with Heater)
B	Material	B	Brass
C	Gas	320 326	Carbon Dioxide Nitrous Oxide
D	No. of Cylinders	2 4 6 8	1x1 2x2 3x3 4x4
E	Hose	TCH SSH SSHAG	Teflon Core Hose Stainless Steel Hose Stainless Steel Hose with Armour Guard
F	Configuration	10S 10V	Standard 10" Center Vertical Crossover 10" Center
G	Option	WM 3R* IVF	Wall Mount Outside Installation Stainless Steel Tubing for IVF Applications
(G)	Cylinder Connection	CGA (leave blank) BS DIN NEN	CGA-United States BS341-Great Britain DIN 477-Germany NEN 3268-The Netherlands

Example: MANIFOLD AFAM, 1500 PSIG INLET, BRASS,CARBON DIOXIDE, 3X3 CYLINDERS, STAINLESS STEEL HOSES, USA

Example Model Number: AFAM1500HB-320-6-SSH-10V-WM

***3R Option--Outside Installation**

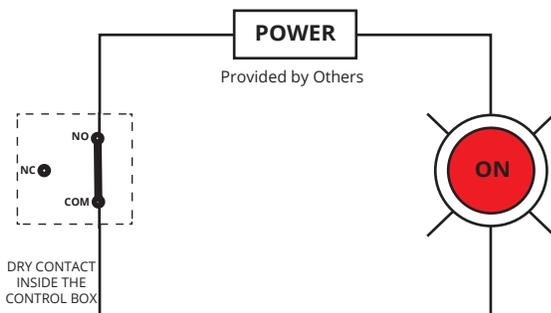
AFAM Series Manifolds are designed for indoor installations. If outdoor installation is required, by selecting the "3R" option, all electrical devices (within the manifold, controller, and heater junction box) will be mounted with NEMA 4X enclosures. Please be aware that even with the 3R option selected, the AFAM enclosure, which is not NEMA 4X, will rust over time due to outdoor exposure as it is made out of steel.

Technical Specifications	
Gas Service	Refer to Part Number Matrix
Maximum Inlet Pressure	1500 psig [103 barg]
Delivery Pressure Range	30-125 psig [2-9 barg]
Maximum Flow	500 scfh [14 m3/hr]
Operating Temperature	32°F to 100°F [0°C to 38°C]
Pipeline (Outlet) Relief Valve	150 psig [10 barg]
Inlet Connections	Gas Specific CGA Fittings
Manifold Outlet Connection	1/2" F.NPT
Power (Alarm/Control Box)	24 VAC (Power Transformer provided by BeaconMedaes)
Power Transformer	Primary: 120 VAC, Secondary: 24 VAC , 6.25 Amp.
Maximum Power Consumption	6 Amp
Electrical Components	All Electrical Components are UL and CSA listed
Configuration	Normally Open (Supplies Gas When Not Energized)
Dry Signal Contact	Normally Open (3 Amp. @ 28 VDC/277 VAC when contact is in Close Position)
Cleaning	Cleaned for Oxygen Service as per CGA 4.1

Remote Alarm Signal Circuitry

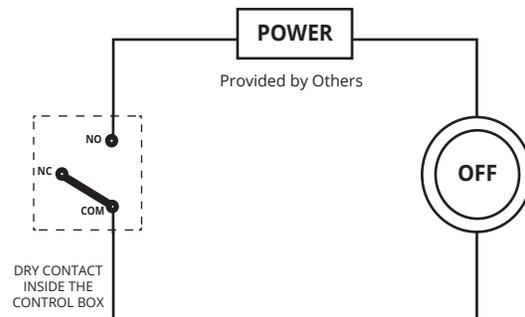
The Alarm/Control Box of the AFAM1500HB Series Manifold has a dry contact available for remote alarm actuation. It is triggered each time any of the two cylinder banks are empty.

Alarm Condition



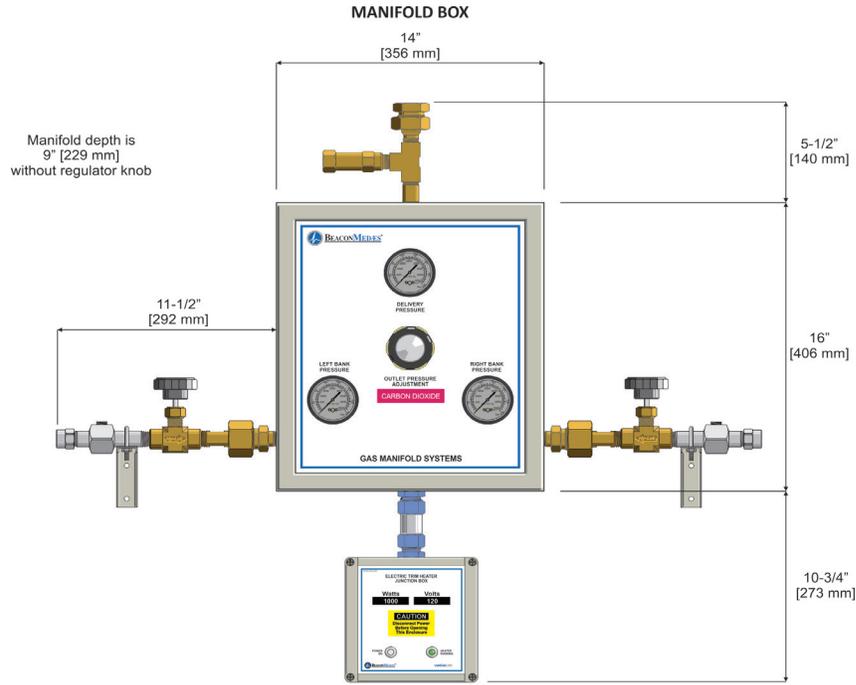
When the content inside one of the gas cylinder banks is depleted (low pressure), the dry contact switches from the Normally Closed (NC) position to Normally Open (NO) position. The electrical circuit is closed and the alarm device is actuated.

No Alarm Condition

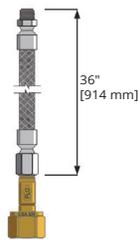


In this situation, both gas cylinder bank pressures are satisfactory (i.e. not empty). The dry contact inside the remote alarm box is in the Normally Closed position. The electrical circuit is open and the alarm device is NOT actuated.

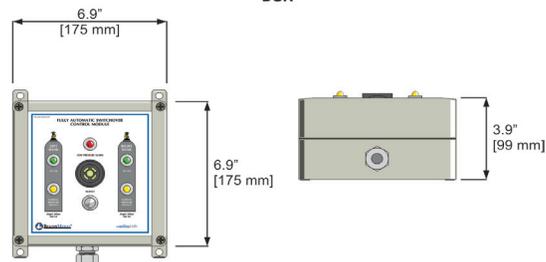
**Standard Configuration (1x1) in inches
Numbers between [] are in millimeters**



TYPICAL FLEXIBLE HOSE



CONTROL BOX



BeaconMedæS AFAM1500 Header Bar Length

Cylinder Configuration	1x1 (10S)	2x2 (10S)	3x3 (10S)	4x4 (10S)
				
				
				
Inches	37.50"	57.50"	79.25"	99.50"
Milimeters	952.5 mm	1460.5 mm	2012.95 mm	2527.3 mm