

NFPA Automatic Changeover Medical Liquid × High Pressure Manifold with Automatic Reset (Lifeline)

SPECIFICATION

Automatic Changeover Medical Liquid Gas Manifold

The BeaconMedaes **Lifeline®** automatic changeover manifold accommodates a left bank of cryogenic containers and a right bank of high pressure cylinders while providing an uninterrupted, reliable supply of gas. Left bank is designated as "Primary" source of gas and right bank stands in reserve as "Secondary" source. The manifold system referred to as "liquid x high pressure" or "LQ x HP," consists of a manifold control panel with its wall mounting bracket and a high pressure reserve header assembly (separately ordered, see SSB-801-03). The manifold is cleaned, tested, and prepared for the indicated gas service and constructed in accordance with requirements of the latest edition of NFPA 99 and CGA.

Manifold Design

A bank regulator (one for each supply bank) is used to initially reduce the container/cylinder pressure to the two line regulators which control the final line pressure. The manifold automatically changes from the depleted primary supply bank to the secondary supply bank without fluctuation in line pressure utilizing dome-bias loading and unloading of the bank regulators. When liquid container(s) are replenished, the manifold will automatically switch back to the primary (left) supply bank. Manual resetting of the control panel is not necessary. If the primary and secondary supply banks of container(s) / cylinders are both depleted, the manifold system will automatically switch to the external high-pressure reserve header assembly. A pressure switch is provided to signal the master gas alarm system just before change-over from the secondary (right) supply bank to the high pressure reserve.

The manifold includes a line pressure gauge, two bank contents gauges (left-bank and right bank), and LED visual indicators for "IN USE" (green), "READY" (green), and "EMPTY" (red) for each bank. LED visual indicators for "SECONDARY LOW" (yellow), "RESERVE IN USE" (yellow) and "RESERVE LOW" (red) are also included on the manifold.

The manifold has bank regulator, intermediate and line pressure relief valves internally connected to a common vent port, terminating into a ½" FNPT "O"-ring sealed "zero clearance" union. Master shutoff valves (one for each bank) are located within the manifold cabinet and are fabricated with metallic seating surfaces. The cabinet enclosure is easily removable by releasing draw latches for component accessibility. The enclosure may be secured from unauthorized access by locking the draw latches (locks provided by others).

The manifold includes modular header assemblies with gas specific pigtail-to-header high-flow check valves to permit changing of cryogenic container(s) (left bank) or high pressure cylinders (right bank) without gas leakage. Thermoplastic hose assemblies designed for cryogenic service, are provided for each liquid container gas connection. High pressure gas cylinders are provided with stainless steel flexible pigtails for each high pressure cylinder gas connection, except for O₂, He, CO₂, O₂CO₂, HeO₂, and O₂He, which are provided with rigid copper pigtails.

The power supply and control board are furnished inside a pre-mounted NEMA 4 enclosure. The power supply has electrical requirements as follows: 250mA max at 100-250VAC

50/60Hz single phase input to 24VDC output. The control board provides dry normally closed contacts for (4) separate electrically isolated remote alarm conditions: Changeover, Secondary Low, Reserve In Use and Reserve Low.

The manifold is supplied with ¾" FNPT (manifold outlet) and ½" FNPT (high-pressure reserve header inlet) "O"-ring sealed "zero clearance" unions. The system also includes a ¾" full port, three piece, ball-type source shut-off valve with ⅛" FNPT port. The source valve has a ¾" NPT attachment to the union outlet and a ¾" nominal copper (type K) tube for brazing to main supply line.

NOTE:

Manifolds for Oxygen and Argon with 55 PSI delivery pressure are designed for use with 230 psi relief valve liquid containers, set for a minimum operating pressure of 200 psi. Liquid containers for other gases with a 350 psi relief valve must have a minimum operating pressure of 300 psi.

NOTE:

The flow capacity of a nitrous oxide and carbon dioxide manifold depends upon environmental conditions at the installation site and the number of containers in service. Installing a nitrous oxide or a carbon dioxide manifold in a location that exposes it to an ambient temperature below 32°F (0°C) is not recommended.

Environmental Considerations

Manifolds are to be installed in accordance with requirements stated by NFPA 99, CGA and all applicable local codes. Manifold components are designed to work best over a temperature range of 0°F through 130°F. Wider temperature variation may cause manifold malfunctions to occur. The BeaconMedaes **Lifeline®** manifold has been environmentally tested to MIL STD 810F. The **Lifeline®** power supply and control board is fully contained inside a NEMA 4 enclosure, allowing for outdoor installations. Liquid-tight conduit fittings are required for outdoor installations.

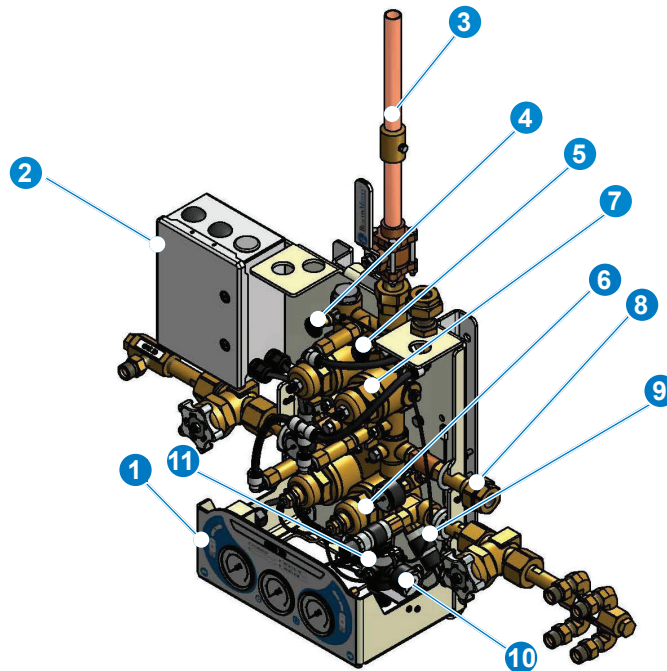
Flow Characteristics

Manifold system flow is limited by maximum flow capacity of liquid container(s). Approximate maximum continuous flows of one liquid container are shown in the following chart. Flow capacity is increased with the addition of liquid container(s). An external vaporizer (sourced by others) is necessary for high flow requirements.

Flow Characteristics	
Gas Type	Flow per Container
Oxygen	5.8 SCFM (350 SCFH)
Nitrous Oxide	1.8 SCFM (110 SCFH)
Carbon Dioxide	2.5 SCFM (150 SCFH)
Nitrogen	5.8 SCFM (350 SCFH)
Argon	5.8 SCFM (350 SCFH)

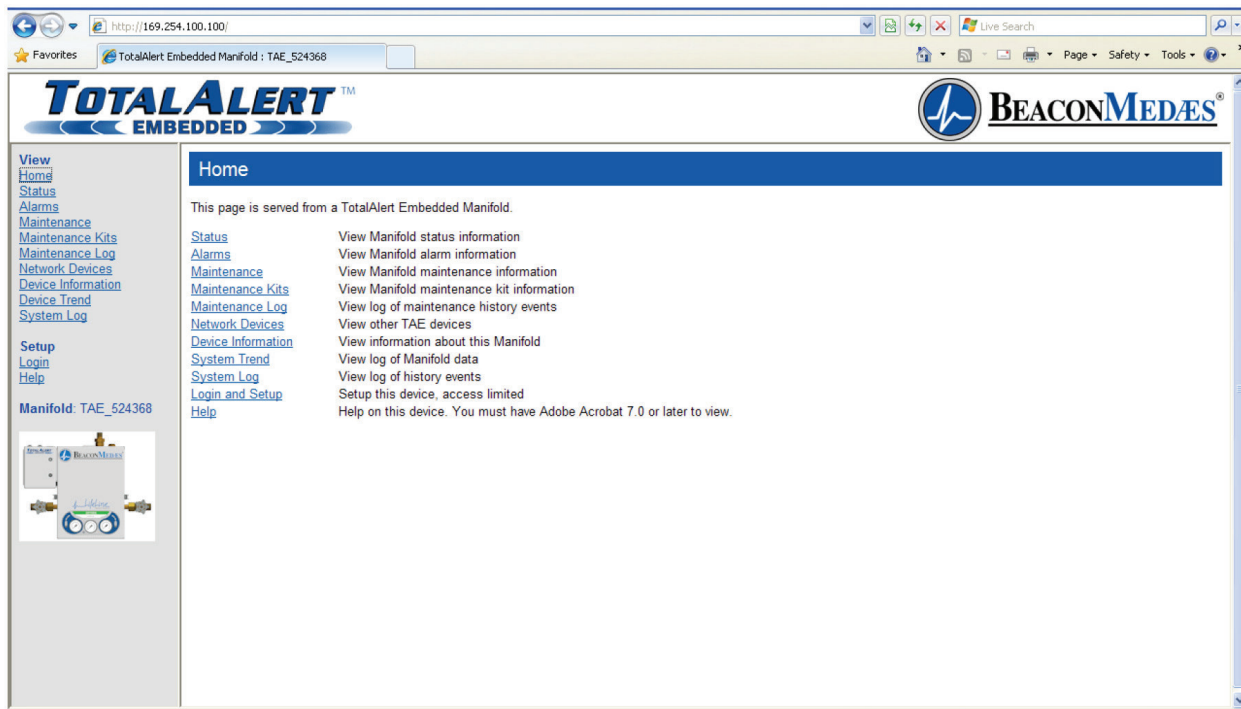
Standard Configuration

Standard Model Shown



- 1** *New LED Electronics Overlay for easy visual status of gas flow*
- 2** *The NEMA 4 Enclosure houses both Power Supply and Control Board. It is pre-drilled for power, alarm, and data connections for easy installation.*
- 3** *1/4 Turn Shut-Off Valve used to isolate manifold from hospital piping for repair*
- 4** *Vent Valve with ergonomic handle for easy operation. Mounted and tubed to conveniently vent to relief outlet*
- 5** *Service Valve to provide outlet gas to dome bias regulator and solenoid valve.*
- 6** *Bank regulator is housed in a brass forging to minimize connection points, therefore eliminating the opportunity of leaks. The regulator is a dome loaded, single-stage, diaphragm type regulator used to reduce incoming cylinder contents pressure to a lower intermediate pressure. Bleed valves are also present for servicing needs.*
- 7** *Line Regulator is housed in a brass forging to minimize connection points, therefore eliminating the opportunity of leaks. The regulator is a single-stage, diaphragm type regulator used to reduce incoming bank regulator pressure to a lower delivery pressure. Bleed valves are also present for servicing needs.*
- 8** *Reserve Header port includes a check valve zero-clearance union for easy connection of reserve header*
- 9** *Pressure Switch is an adjustable, single pole switch that is connected to high pressure port of each bank regulator to monitor pressure in each bank of cylinders. Pressure Transducer (only available on TAE models) monitor pressure in each bank of cylinder and attach to each bank regulator and have a range of 0-3000 psi. (A pressure transducer ranging from 0-300 psi measures outlet pressure.)*
- 10** *Dome Bias Regulator with easily identifiable premounted gauge and locking ring to ensure constant bank regulator dome pressure*
- 11** *New Robust Solenoid Valve made of Stainless Steel including mufflers to reduce noise during change-overs.*

TotalAlert Embedded (TAE)-Optional Feature



Ethernet Connectivity with Embedded Web Page

- Built-in web server allows remote operator to view system controls and display information
- Ethernet communication compatible with TotalAlert and TotalAlert² alarm systems
- Web page provided to show links to other devices on the TotalAlert Embedded network, including alarms and other source equipment
- Electronic notification
 - » Accessible through any SMTP gateway
 - » Allows for remote alerts of alarm and warning conditions of manifold
 - » Allows for remote alerts of routine maintenance
 - » Allows for early warning of bank pressure

Ordering Information

MN - LH - - -

A B C D E

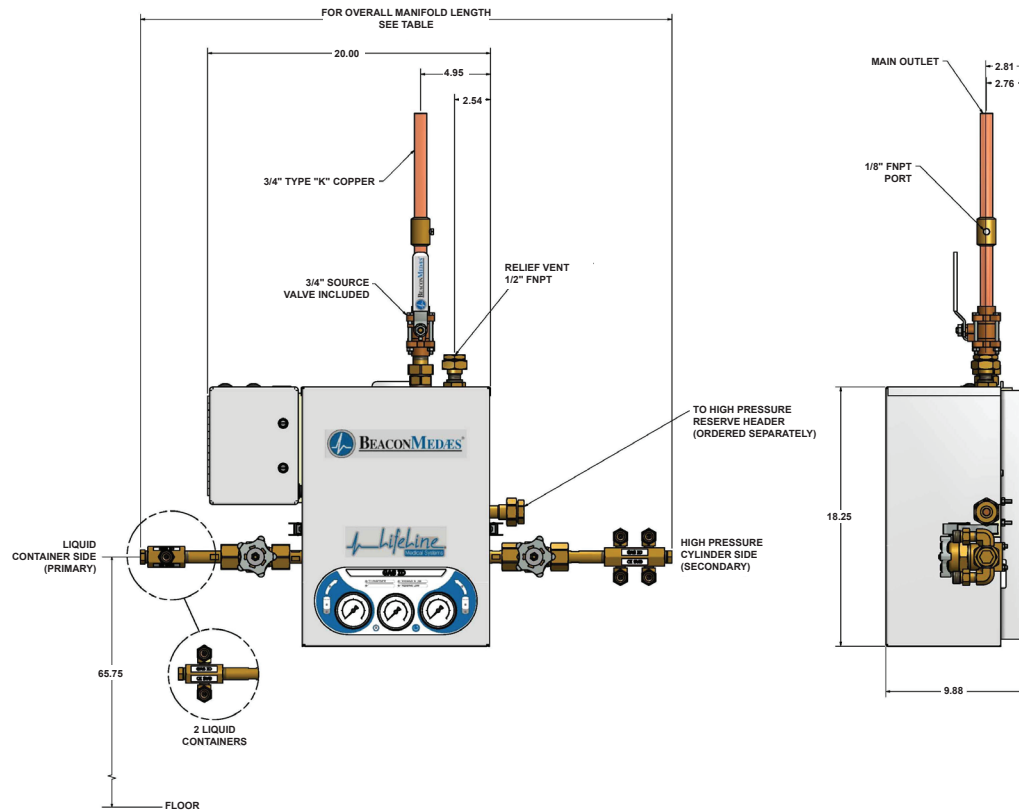
BeaconMedaes Manifold Parent Model Number Chart

Variable	Definition	Allowable Value	Description
A	Language	E S	English Spanish
B	No. of Cylinders	0×0 1×4 1×5 1×6 1×7 1×8 1×9 1×10 1×11 1×12 1×13 1×14 1×15 1×16 1×17 1×18 2×4 2×5 2×6 2×7 2×8 2×9 2×10 2×11 2×12 2×13 2×14 2×15 2×16 2×17 2×18	0×0 1×4 1×5 1×6 1×7 1×8 1×9 1×10 1×11 1×12 1×13 1×14 1×15 1×16 1×17 1×18 2×4 2×5 2×6 2×7 2×8 2×9 2×10 2×11 2×12 2×13 2×14 2×15 2×16 2×17 2×18
C	Gas	O ₂ N ₂ O N ₂ CO ₂ AR	Oxygen Nitrous Oxide Nitrogen Carbon Dioxide Argon
D	Delivery Pressure	A B C	55 psi delivery pressure 100 psi delivery pressure 180 psi delivery pressure
E	Electronics	S T	Standard Total Alert Embedded

Example: NFPA ENGLISH LQ × HP 2 × 8 CYLINDER OXYGEN 55 PSI STANDARD ELEC

Example Model Number: MNE-LH2X8-O2-AS

Standard Configuration



Manifold Length

No. of HP Cylinders on Right Bank	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Overall Length (Inches)	38	39	45	46	55	56	61	70	75	76	85	86	91	100	101

TESTING STANDARDS

Environmental Testing:

MIL STD 810F

Ignition Testing:

ISO 10524-2