

NFPA Automatic Changeover Medical Liquid Manifold with Automatic Reset (Lifeline)

SPECIFICATION

Automatic Changeover Medical Liquid Gas Manifold

The BeaconMedaes **Lifeline®** automatic Changeover manifold accommodates multiple cryogenic containers equally divided into two banks while providing an uninterrupted, reliable supply of gas. The manifold system referred to as "liquid x liquid" or "LQ x LQ", 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 and reserve headers are offered separately.

Manifold Design

A bank regulator (one for each cryogenic container bank) is used to initially reduce the container 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. Economizer gas circuits are provided to conserve evaporation of the cryogenic liquid from the secondary supply bank, thus preventing the exhausting of useful gas into the atmosphere. This mechanism discharges the conserved gas upstream of the final two line regulators. After replacement of the depleted cryogenic container(s), the manifold automatically indicates the replaced container as the new secondary supply. Manual resetting of the control panel is not necessary. If the primary and secondary supply banks of container(s) 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 supply 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 "RESERVE IN USE" (yellow) and "RESERVE LOW" (red) are also included on the manifold.

The manifold has 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 outside 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 header assemblies with gas specific pigtail-to-header high-flow check valves to permit changing of cryogenic container(s) without gas leakage. Thermoplastic hose assemblies, designed for cryogenic service, are provided for each container gas connection.

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 (3) separate electrically

isolated remote alarm conditions: Changeover, 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. A ¾" full port, three piece, ball-type source shut-off valve with a ⅛" FNPT port is also included. The source valve has a ¾" NPT attachment to the outlet union 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.

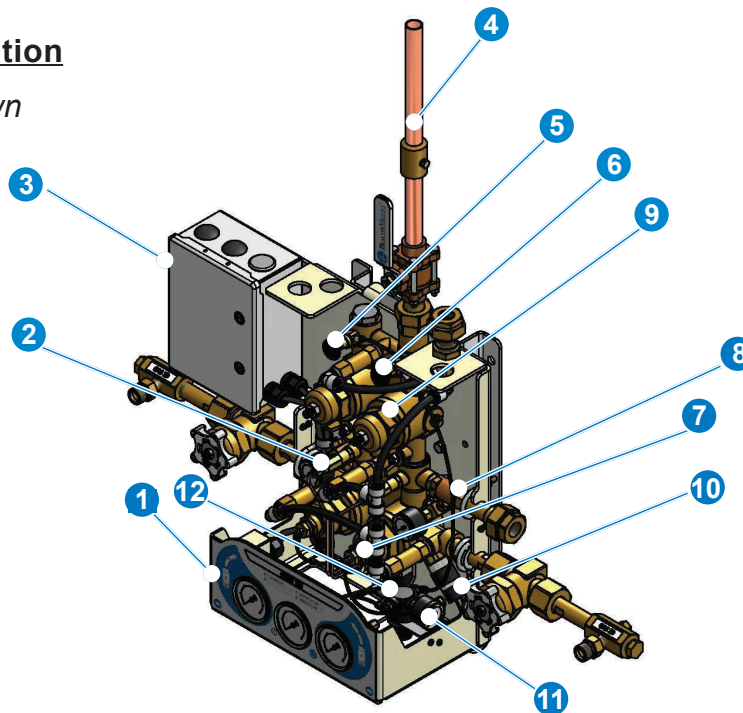
Flow Characteristics

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)

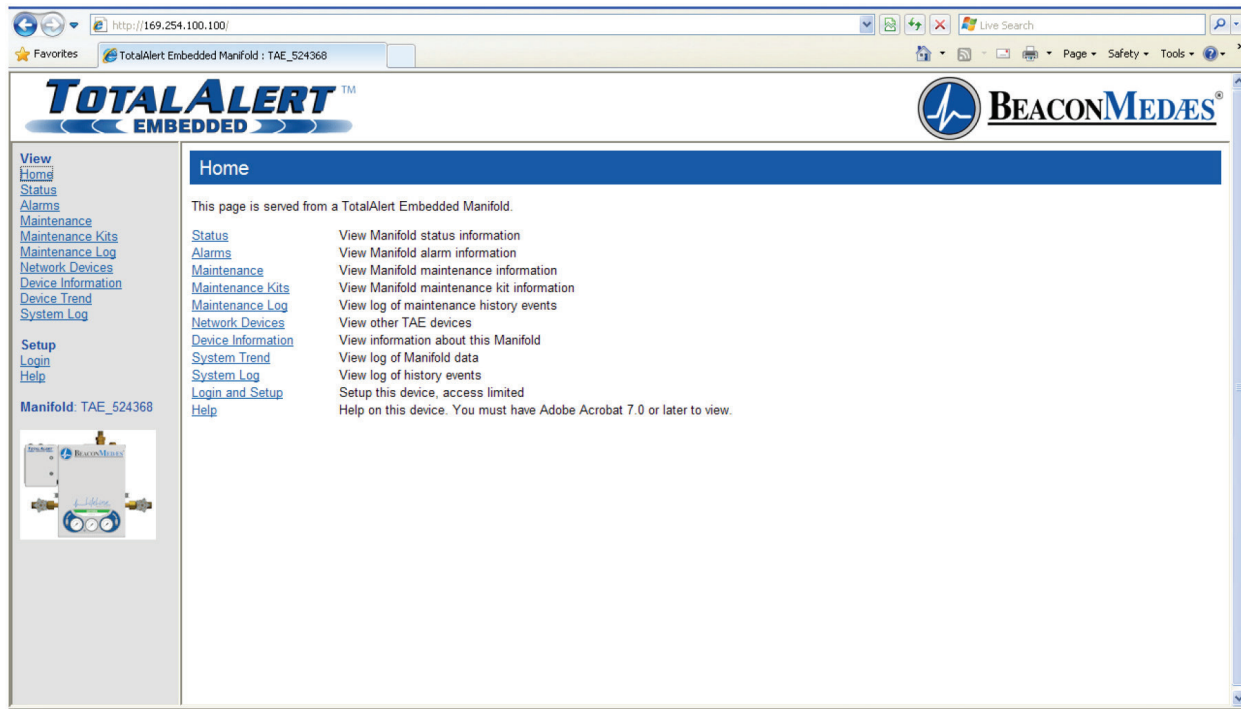
Standard Configuration

Standard Model Shown



- 1** *New LED Electronics Overlay for easy visual status of gas flow*
- 2** *Economizer circuit ID designed to use the gas from the secondary supply that would otherwise be vented as a result of normal evaporation rate.*
- 3** *The NEMA 4 Enclosure houses both Power Supply and Control Board. It is pre-drilled for power, alarm, and data connections for easy installation.*
- 4** *1/4 Turn Shut-Off Valve used to isolate manifold from hospital piping for repair*
- 5** *Vent Valve with ergonomic handle for easy operation. Mounted and tubed to conveniently vent to relief outlet*
- 6** *Service Valve to provide outlet gas to dome bias regulator and solenoid valve.*
- 7** *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.*
- 8** *Reserve Header port includes a check valve zero-clearance union for easy connection of reserve header*
- 9** *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.*
- 10** *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.)*
- 11** *Dome Bias Regulator with easily identifiable premounted gauge and locking ring to ensure constant bank regulator dome pressure*
- 12** *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 - LL - -

A B C D E

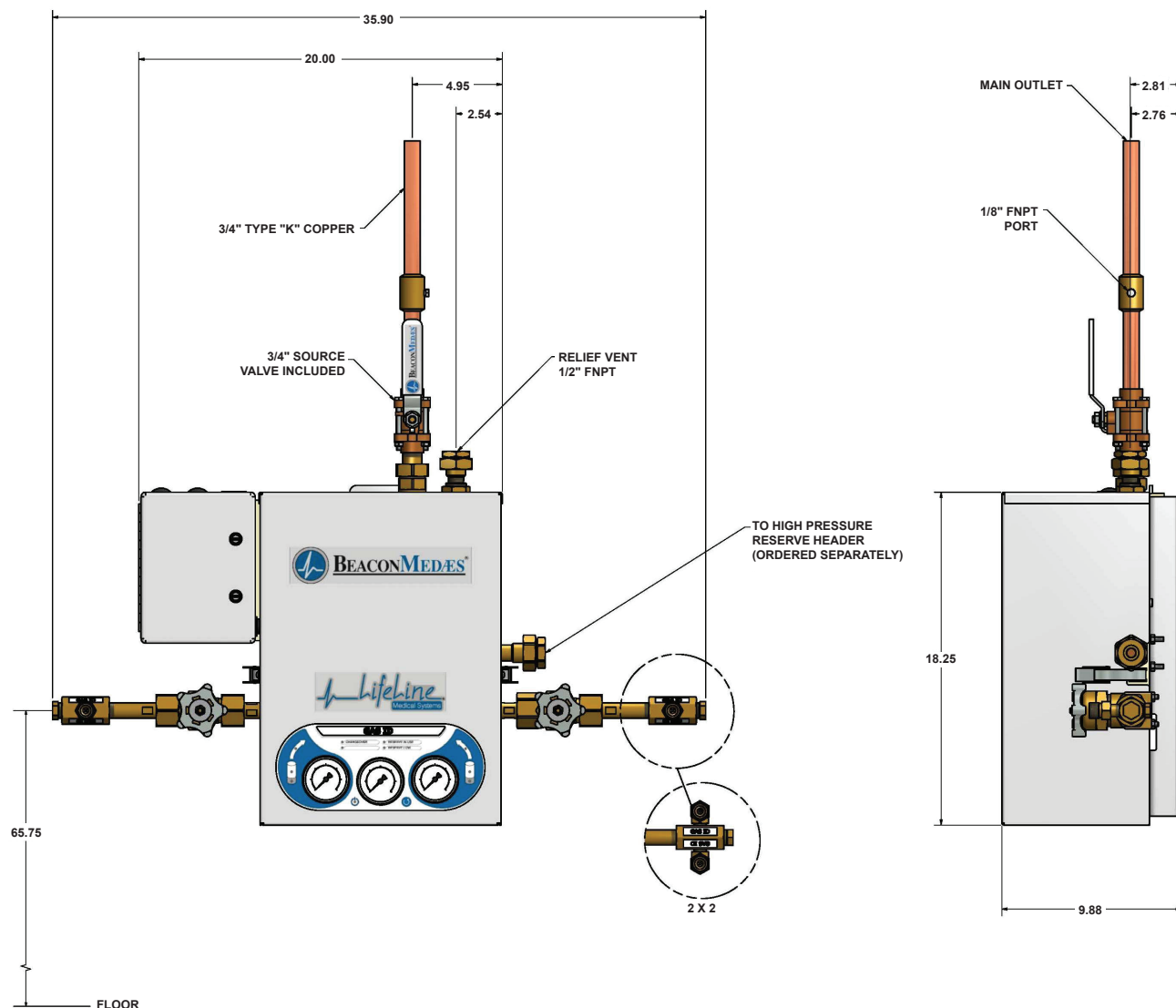
BeaconMedæS Manifold Parent Model Number Chart

Variable	Definition	Allowable Value	Description
A	Language	E S	English Spanish
B	No. of Cylinders	0×0 1×1 2×2	0×0 1×1 2×2
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 × LQ 1 CYLINDER NITROGEN 180 PSI TAE ELEC

Example Model Number: MNE-LL1X1-N2-CT

Standard Configuration



Note: The Lifeline® automatic changeover medical liquid manifold may be configured in 1 container (1 × 1) or 2 container (2 × 2)

TESTING STANDARDS

Environmental Testing:

MIL STD 810F

Ignition Testing:

ISO 10524-2