

LDS-665-02

2205 6107 00.01 Page 1 of 6 31 August 2022



Fully Automatic Switchover Manifold for Liquid Cylinders, Liquid Withdrawal-Scale Operated (CFAM-WX Series - Laboratory Applications)

SPECIFICATION

Introduction and Manifold Description

The BeaconMedæs CFAM-WX Series Fully Automatic Switchover Manifold assures a continuous supply of liquid cryogens or liquid carbon dioxide. It is set to transfer automatically from a depleted "IN USE" supply bank to a "READY" supply bank based on the net weight of cryogenic liquid (or carbon dioxide).

The CFAM-WX Series manifold operates as a fully automatic switchover control system. It consists of a switchover controller box (with alarm/control module), one scale controller, two scale cables and two liquid cylinder scales. It monitors the liquid cylinder supply based on the net weight of the cryogenic liquid (or carbon dioxide) and will signal the manifold controller to switch automatically to the full ready cylinder when the in use cylinder is empty.

Visual Indicators and Audible Signal

The manifold's switchover controller box is equipped with a series of lights (6 total, 3 for each bank) to indicate the status of each bank. A green LED illuminates when the bank is "IN USE", while a yellow LED indicates when the cylinder is "READY" and a red LED signals that the cylinder is "EMPTY".

When the bank is depleted, the buzzer sounds while the red "EMPTY" LED turns on. Pushing the silence pushbutton kills the buzzer without extinguishing the corresponding red light. Once the operator changes out the empty cylinder and pushes the RESET pushbutton, the red light extinguishes and the yellow "READY" light illuminates for that bank.

Cylinder Scales and Scale Controller

The CFAM-WX is equipped with two cylinder scales, one for each bank. The scales are lower in profile and have a 12" long inclined ramp to ease with cylinder loading. Each scale is large enough to accept liquid cylinders up to 28" in diameter. A backstop is provided to prevent roll out of the scale platform.

The two cylinder scales are connected to one scale controller. The scale controller will display how much product is remaining in each cylinder (net weight in lbs).

Operation and Design

In the initial set up of the CFAM-WX, the operator will put on a full liquid cylinder onto each scale. The tare weight of each cylinder will need to be entered into the scale controller. The scale controller will automatically deduct the tare weight of the cylinder from the total weight and will display the net weight of each cylinder. The cylinder bank that is pressurized first will be considered the primary bank or "IN USE", while the other will be considered to be in standby mode or "READY".

When the net weight of the primary "IN USE" cylinder reaches 15% of the initial net weight, the scale controller switches over to the secondary "READY" cylinder, while sounding the buzzer and illuminating the red "EMPTY" light on the depleted cylinder side. The standard trigger point of 15% can be used, or a custom trigger point can be field selected between 5% and 20%.

After replacing an empty cylinder, the operator is prompted to enter the "TARE WEIGHT" of the new liquid cylinder into the scale controller. The reset pushbutton needs to be pushed after an empty cylinder is replaced with a full cylinder. The yellow "READY" light automatically turns on, extinguishing the red "EMPTY" light and the scale controller will indicate how much product (in lbs) is in the liquid cylinder before depletion. This "READY" cylinder will remain in stand-by mode until the "IN USE" cylinder is depleted.

Ice & Water Management

There will be some "water management" required with this equipment. Because air is always humid and the wetted components are extremely cold, the ambient air humidity (water vapor) will freeze up on the wetted parts and ice will accumulate. When the equipment will not be in service, the ice will melt and water will drip down. The amount of water will vary upon the relative humidity of the air and the usage of the cryogenic manifold.

*Note: Liquid carbon dioxide is not a cryogenic fluid. It is referred to as a cryogenic liquid in this document to free up the text.



Standard Configuration

LDS-665-02

2205 6107 00.01 Page 2 of 6 31 August 2022



Materials			
Enclosure	Polyester, NEMA 4X, c/w Mounting Bracket and Stainless Steel Latches		
Header Bars	Silver Brazed Brass		
Tubing	Stainless Steel 316		
Fittings	Brass, Stainless Steel 316		
Hoses	Stainless Steel (All Wetted Parts)		
Solenoid Valves	Bronze - Teflon - Stainless Steel		
Relief Valves	Brass - Teflon - Stainless Steel		
Wall Mounting Frame	Aluminum Strut with Galvanized Fittings		
Scales	Mild Steel - 16 Ga - Painted		
Scale Controller	Stainless Steel Enclosure		



LDS-665-02

2205 6107 00.01 Page 3 of 6 31 August 2022

Switchover Controller - Detailed

Scale Controller - Detailed



CFAM-WX Installation - Example



Shown is a simplified IVF Laboratory setup. Here, the CFAM-WX Series manifold is connected to a vacuum jacketed pipe to supply liquid nitrogen to a cryogenic storage freezer.



LDS-665-02

2205 6107 00.01 Page 4 of 6 31 August 2022

Technical Specifications			
Fluid	Liquid Argon, Liquid Carbon Dioxide, Liquid Nitrogen, Liquid Oxygen		
Maximum Working Pressure	Up to 500 psig [35 barg]		
Operating Temperature	-325°F to 120°F [-198°C to 49°]		
Inlet Connections	Gas Specific CGA Fittings; See part number matrix		
Relief Valve Outlet Connection	1/2" Compression (Stainless Steel)		
Header	1/2" NPS, Brass		
Solenoid Valves	Normally Closed (Power to Open)		
Power Requirements	120 VAC, Single Phase, 6 Amp.		
Power Requirements - Scale Controller	110 VAC, Single Phase, 1 Amp. Max.		
Audible Alarm	Standard, 85 dBa		

Remote Alarm Signal Circuitry

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



When the content inside one of the liquid cylinder banks is depleted (low liquid level), 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 liquid cylinder levels 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.



Ordering Information

LDS-665-02

2205 6107 00.01 Page 5 of 6 31 August 2022

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BeaconMedaes CFAM-WX Manifold Model Number Chart					
Variable	Definition	Allowable Value	Description		
A	Fluid	CGA 295A CGA 320 CGA 295N CGA 440	Liquid Argon Liquid Carbon Dioxide Liquid Nitrogen Liquid Oxygen		
В	No. of Cylinders	2	One (1) Liquid Cylinder per Side		
С	Hoses	SSH SSHAG VJH	Stainless Steel Hoses Stainless Steel Hoses with Guard Vacuum Jacketed Hoses		
D	Relief Valves	50 110 200 500	50 PSI 110 PSI 200 PSI 500 PSI		
E	Scale Material	MW SS	Mild (Painted) Steel Stainless Steel		
F	Installation Hardware	WM FS	Wall Mounted Bracket Floor Stand		

Example: FULLY AUTOMATIC SWITCHOVER MANIFOLD FOR LIQUID CYLINDERS - SCALE OPERATED (LIQUID WITHDRAWAL), LIQUID NITROGEN SERVICE, VACUUM JACKETED HOSES, STAINLESS STEEL SCALE CONSTRUCTION, WALL MOUNTED.

Example Model Number: CFAM-WX-CGA295N-2-VJH-50-SS-WM



Dimensions

2205 6107 00.01 Page 6 of 6 31 August 2022





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