



**FRESENIUS  
MEDICAL CARE**

***Bibag* & Acid-Sodium Bicarbonate  
Pressure Regulation**

**STUDENT GUIDE AND WORKBOOK**

**Reference Documents:**

- 490188      bibag Technician manual V2.0
- 490284      bibag & Acid-Sodium Bicarbonate Pressure Regulation presentation

**Training material handed out in class:**

- 700084      2008T Hydraulic Flow Diagram with bibag

**CLASSROOM COPIES ONLY:**

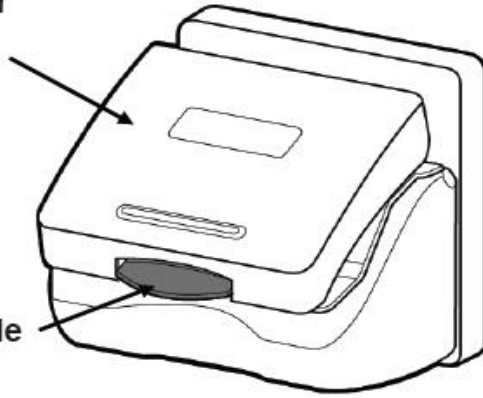
- 490115      2008K Level one Training manual
- 508032      2008T Calibration procedures
- 508033      2008T Preventive Maintenance procedures
- 490139      2008T Debug screens
- 490188      bibag Technician Manual V2.0

**For a copy of the classroom ONLY documents, please refer to Fresenius Medical Care website:**

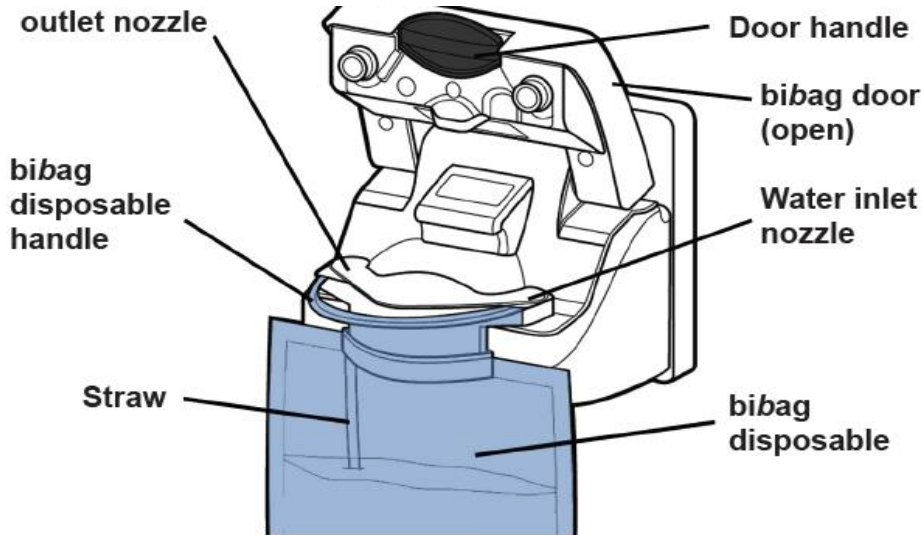
<https://fmcna.com/>

**bibag door**

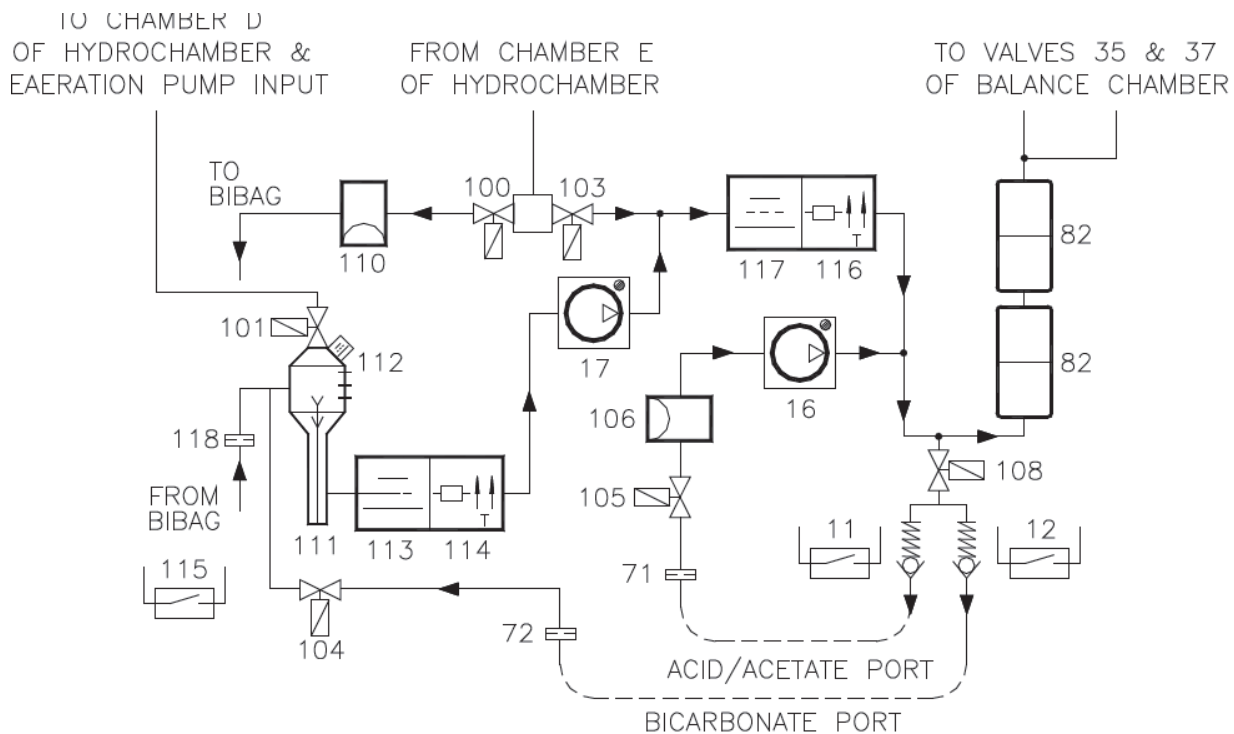
**Door handle**



\_\_\_\_\_ Position



\_\_\_\_\_ Position



### 100 – bibag Fill Valve

The bibag fill valve 100 opens as needed to add water to the \_\_\_\_\_ during dialysis. When a bibag disposable is not used for sodium bicarbonate during dialysis, this valve will remain closed. In rinse and cleaning modes, this valve will \_\_\_\_\_ with valve 103.

### 101 – bibag Vent Valve

The bibag vent valve 101 opens momentarily ( \_\_\_\_\_ ) during dialysis when air is detected in the bibag air separation chamber. When a bibag disposable is not used for sodium bicarbonate during dialysis, this valve will open momentarily when air is detected in the bibag air separation chamber

### **103 – Hydrochamber Outlet Valve**

The hydrochamber outlet valve 103 opens in dialysis when valve 100 is \_\_\_\_\_. In rinse and cleaning modes, this valve will alternate with valve 100.

### **104 – Sodium Bicarbonate Port Valve**

The sodium bicarbonate port valve 104 is closed for \_\_\_\_\_ mode dialysis. Opens to empty the bibag disposable and during bibag system startup. Opens when sodium bicarbonate concentrate is supplied by a pressurized supply, this valve will open and close based on pressure at pressure transducer 110

Valve \_\_\_\_\_ is electrically in parallel with valve 104

### **105 – Acid Port Valve**

The acid port valve 105 is used to regulate the pressure to the \_\_\_\_\_ pump. Will open and closed based upon pressure at pressure transducer 106

### **106 – Acid Port Pressure Transducer**

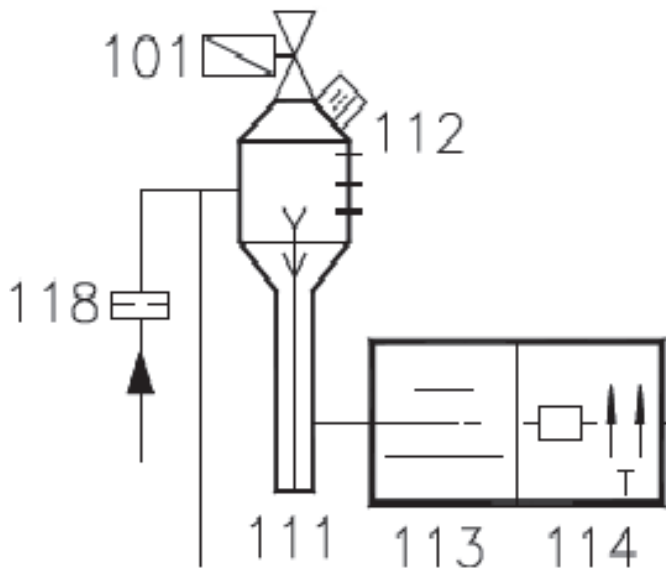
The acid port pressure transducer 106 senses pressure of the acid concentrate \_\_\_\_\_. Pressure detected from this sensor is used in conjunction with valve 105 to regulate the pressure to the acid concentrate pump.

## 108 – Rinse Port Valve

The rinse port valve 108 is electrically connected in parallel with valve \_\_\_\_\_ . It opens and closes at the same time as valve 104

## 110 - *bibag* Pressure Transducer

The *bibag* pressure transducer 110 is used to measure the pressure inside the \_\_\_\_\_ disposable. Also used to measure the pressure of the sodium bicarbonate concentrate source when *bibag* system is not used.



## 111 – *bibag* Air Separation Chamber

The *bibag* air separation chamber 111 separates \_\_\_\_\_ from the sodium bicarbonate concentrate upon leaving the *bibag* disposable. It also is used to separate air from the sodium bicarbonate concentrate supplied by external sources (pre-mixed concentrates).

## 112 – *bibag* Air Separation Chamber Air Sensor

The *bibag* air separation chamber air sensor 112 detects air in the air separation chamber *bibag*

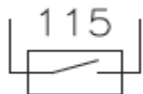
## 113 – *bibag* Conductivity Cell

The *bibag* conductivity cell 113 is used to measure the conductivity of the sodium bicarbonate concentrate \_\_\_\_\_ the *bibag* disposable and the conductivity of the pre-mixed concentrates.

## 114 – *bibag* Temperature Thermistor

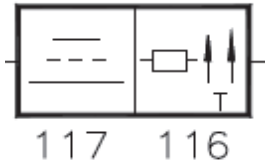
The *bibag* temperature thermistor 114 is used to measure the temperature of the sodium bicarbonate concentrate leaving the *bibag* disposable and the pre-mixed concentrate

BIBAG



## 115 – *bibag* Present Switch

The *bibag* present switch 115 is built into the *bibag* connector. The switch is positioned so that when a *bibag* disposable is attached to the *bibag* connector the switch is pressed indicating the \_\_\_\_\_ of a *bibag* disposable

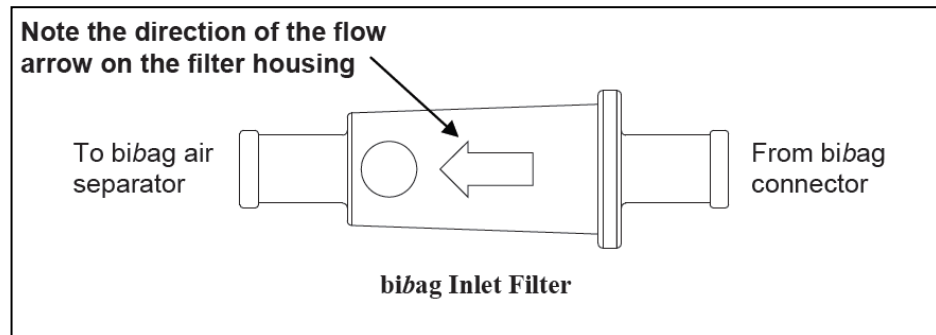
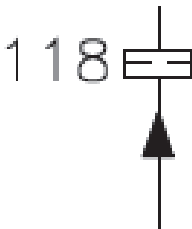


### 116 – Sodium Bicarbonate Temperature Thermistor

The sodium bicarbonate temperature thermistor 116 is used with the conductivity cell \_\_\_\_\_ to measure the temperature of diluted sodium bicarbonate concentrate entering mixing stream.

### 117 – Sodium Bicarbonate Conductivity Cell

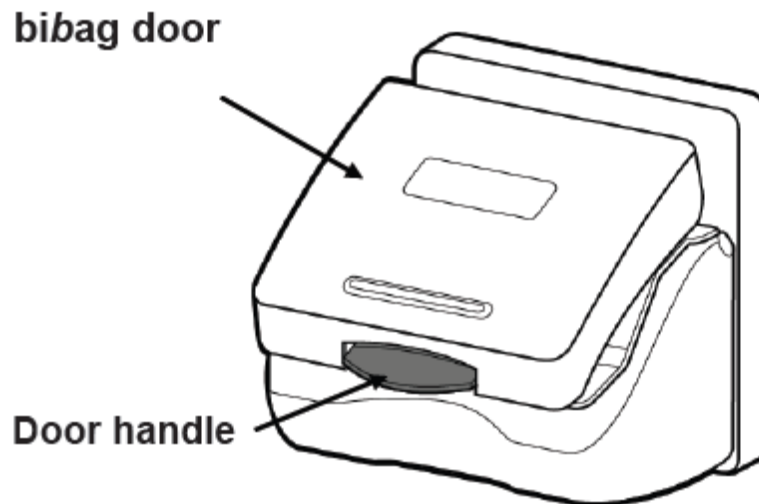
The sodium bicarbonate conductivity cell 117 measures the \_\_\_\_\_ of the sodium bicarbonate concentrate from the *bibag* disposable after it is mixed with R.O. water.





## 118 – bibag Filter

The bibag filter 118 removes any particles that may enter through from the bibag disposable.



## Jug Mode

Bibag door must be completely closed

The bibag system will be in \_\_\_\_\_

The sodium bicarbonate and acid connector pulled out of rinse port

Purified water from chamber E enters the system through valve \_\_\_\_\_.

Valve 100 is closed and remains closed in jug mode

Acid concentrate enters the system through acid port valve 105.

Acid Port Pressure Transducer \_\_\_\_\_ senses pressure of acid concentrate.

If the acid pressure at 106 reaches approximately \_\_\_\_\_psi (100 mmHg), valve 105 will close.

Valve 105 will be \_\_\_\_\_ to actively regulate the pressure at 106

Sodium bicarbonate enters the system through valves \_\_\_\_\_.

The bibag Pressure Transducer 110 senses pressure of sodium bicarbonate concentrate.

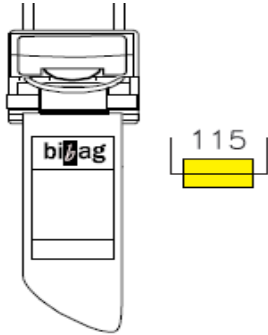
If the sodium bicarbonate pressure at transducer 110 reaches approximately \_\_\_\_\_psi (100 mmHg), valve 104 and 108 will close.

Valves \_\_\_\_\_ and \_\_\_\_\_ will be pulsed to actively regulate the pressure at transducer 110.

During Jug mode if conductivity read at Conductivity Cell 113 is less than \_\_\_\_\_ a “**Bicarb: Cond Low**” alarm will be issued

During Jug mode if conductivity read at Conductivity Cell 113 is greater than \_\_\_\_\_ a “**Bicarb: Cond High**” alarm will be issue

# Dialysis with *bi*bag system



## Initial fill

Purified water enters through inlet nozzle (right) and sodium bicarbonate exits disposable through outlet nozzle (left).

The *bi*bag present bicarbonate connector must be kept in the rinse port

The acid connector is removed from the rinse port and connected to an acid concentrate source

Valves 100, 101, 104 and 108 will be \_\_\_\_\_

Valves 103 and 105 will be \_\_\_\_\_

Purified water from chamber E enters the system through Valve 103.

Sodium bicarbonate pump is turned off

The system monitors the dialysate temperature at \_\_\_\_\_ and monitors for air at air sensor 6 in the air separation chamber \_\_\_\_\_

When no air is sensed at air sensor 6 and the temperature at NTC 3 is between 30 and 41 degrees C, valve 103 closes and valve 100 is pulsed. Heated purified water will start filling the *bibag* disposable.

*bibag* disposable reaches about \_\_\_\_\_ **mmHg** as monitored by the pressure transducer 110

## **Initial flush**

- **Valves 104 and 108 open, valve 103 closes**
- **Balancing chamber valves open and any excess gas is flushed to the drain**
- **Flow pump runs**
- ***bibag* disposable to maintain pressure in the *bibag* disposable of about 90mmHg**

Notes \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Timed bypass

Notes \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Sodium bicarbonate pump 17 off,  
Valve 24 and 25 are closed,  
bibag pressure holding test occurs during this 2 minute period

The sodium bicarbonate pump 17 is turned on

If conductivity read at Conductivity Cell 113 is less than  
\_\_\_\_\_ m,S/cm a “**Bibag: Cond Low**” alarm will be issued

If conductivity read at Conductivity Cell 113 is greater than  
\_\_\_\_\_ m,S/cm a “**Bibag: Cond High**” alarm will be issued

The machine is kept in timed bypass for an additional two minutes after  
sodium bicarbonate pump is turned on.

Remain in bypass until the sodium bicarbonate conductivity 117 is within  
acceptable range.

(\_\_\_\_\_) Theoretical Conductivity of Bicarbonate

If conductivity read at Conductivity Cell 117 (**Bic Mon Cond**) is less than **Bic  
Lo th** a “**Bicarb: Cond \_\_\_\_\_ Low**” alarm will be issued

If conductivity read at Conductivity Cell 117 (**Bic Mon Cond**) is greater than  
**Bic Hi th** a “**Bicarb:Cond \_\_\_\_\_ High**” alarm will be issued

## **Bibag system operation**

If air is sensed by the probes 112 in the *bibag* air separation chamber 111, Valve 101 is momentarily (every \_\_\_\_\_seconds) opened to vent the air.

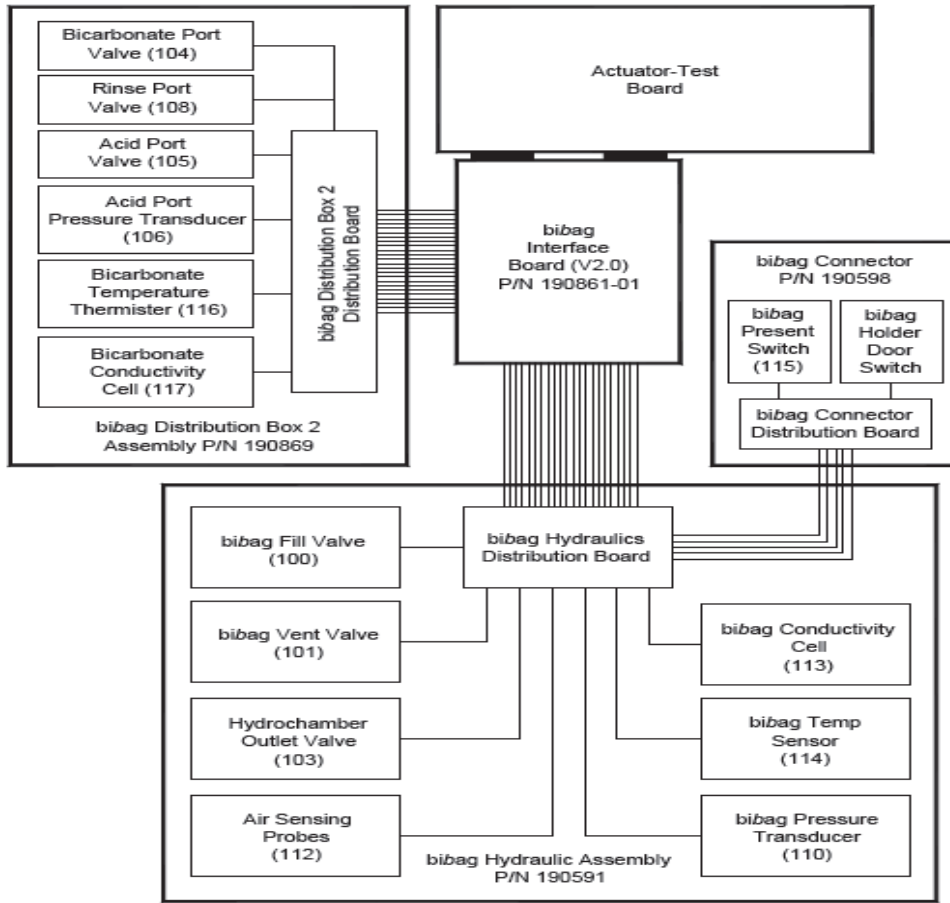
Delivery rate of the sodium bicarbonate pump 17 is based on the concentration of sodium bicarbonate measured by *bibag* conductivity cell 113.

## **Bibag disposable empty sequence**

To empty the *bibag* disposable, valves 100, 103 and 105 are \_\_\_\_\_, the balancing chamber valves and valves 104 and 108 are \_\_\_\_\_. Valves 101, 24 and 25 are closed.

Flow pump runs to pull solution from the *bibag* and out to the drain

# ELECTRONIC DESCRIPTION



## Bibag Interface Board

Notes \_\_\_\_\_

\_\_\_\_\_

## Bibag Hydraulic Assembly – Distribution Board

Notes \_\_\_\_\_

\_\_\_\_\_

## Bibag Distribution Box 2 – Distribution Board

Notes \_\_\_\_\_

\_\_\_\_\_



**D** The *bibag* connector is in the correct state for \_\_\_\_\_

**O** The *bibag* connector is \_\_\_\_\_

**C** The *bibag* connector is \_\_\_\_\_

## Debug Screen 14

Pressure:

Notes \_\_\_\_\_

Air:

Notes \_\_\_\_\_

Conductivity:

Notes \_\_\_\_\_

Temperature:

Notes \_\_\_\_\_

Bag On:

Notes \_\_\_\_\_



# Debug Screen 15

Acid Press:

Notes \_\_\_\_\_

Bic Press:

Notes \_\_\_\_\_

Bic Mon temp:

Notes \_\_\_\_\_

RO Cond:

Notes \_\_\_\_\_

Rinse completed with bibag conductivity > \_\_\_\_\_ mS/cm displays advisory message **“RO Water Cond High”**

At the remaining time of “0:00” in Rinse/Disinfection, transducers 110 and 106 will reach pressures of \_\_\_\_\_ or \_\_\_\_\_ within 15 seconds.

V104/108, V105 Stuck closed

Notes \_\_\_\_\_

V104 sends an error \_\_\_\_\_ consecutive times an “Valve 104 Error” message will be displayed

V105 sends an error \_\_\_\_\_ consecutive times an “Valve 105 Error” message will be displayed

V \_\_\_\_\_ or V \_\_\_\_\_ sends an error 10 consecutive times an **“Bibag: Valve 1 Error”** message will be displayed

V \_\_\_\_\_ sends an error 10 consecutive times an **“Bibag: Valve 2 Error”** message will be displayed

# Annual Maintenance

Perform *bi*bag Inlet Filter Replacement:

Notes \_\_\_\_\_

Perform *bi*bag Connector Maintenance:

Notes \_\_\_\_\_

Perform the *bi*bag Pressure Transducers calibration:

Notes \_\_\_\_\_