

# Operating Manual

Model 75-850-BV & 75-850P-BV  
Hydrogen Separator  
with Manual Bypass Valve

Model 75-850-BV: 120 V, 50/60 Hz  
Model 75-852-BV: 230 V, 50/60 Hz

Model 75-850P-BV: 120 V, 50/60 Hz  
Model 75-852P-BV: 230 V, 50/60 Hz

January 2026  
Rev. 12

READ INSTRUCTIONS  
BEFORE OPERATING





## GOW-MAC Model 75-850-BV or 75-850P-BV Hydrogen Separator

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1. The Model 75-850-BV & 75-850P-BV Hydrogen Separator requires the following gases:
  - a. Ultra High Purity (UHP) Helium (He) or Nitrogen (N<sub>2</sub>) for heating/cooling gas
  - b. Ultra High Purity (UHP) Air for sweep (condition/operation) gas
  - c. Instrument grade Helium (He) for purging all valve housings
2. The Hydrogen Separator must be heated up to operating or conditioning temperature with either helium or nitrogen flowing through the sweep-gas inlet. This gas will be referred to as the "heat/cool" gas throughout this manual. Air must be used as the ONLY operating and conditioning gas. The air will be identified as the "condition/operation" gas or "air" throughout this document. Note: If the Separator is not equipped with a 3-way valve for switching sweep gas between air and He or N<sub>2</sub>, a method for changing the sweep gas will be necessary.
3. Initial Setup Connections



### NOTE

If connected, be certain the GC Instrument DID is either off or receiving a carrier from a different source than the channel coming from the Separator. You DO NOT want air to reach a DID with discharge voltage present.

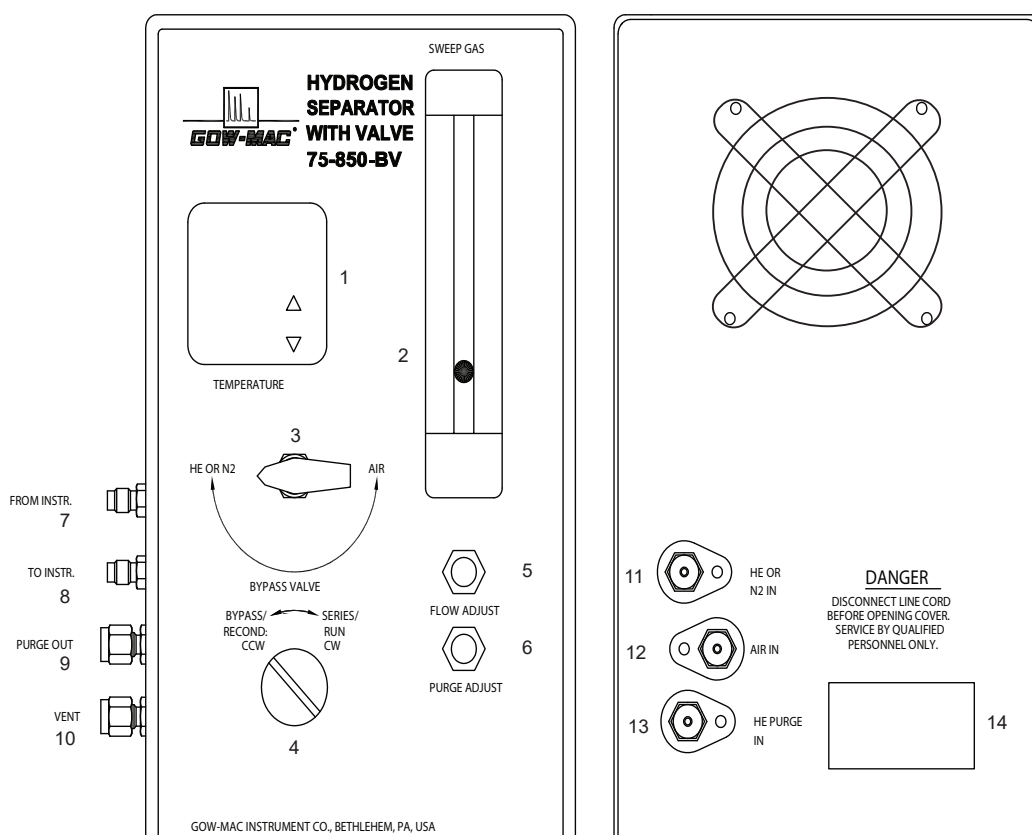
- a. Connect the UHP Helium or Nitrogen cylinder to the back of the Hydrogen Separator at the "HE OR N<sub>2</sub> IN" fitting.  
Connect the UHP Air cylinder to the back of the Hydrogen Separator at the "AIR IN" fitting.  
Match the incoming pressures between a range of 60 – 80 psig, with a maximum of 100 psig.  
If purge gas is required, connect the Instrument Grade Helium cylinder to the back of the Hydrogen Separator at the "HE PURGE IN" fitting.
- b. Set the Separator in the BYPASS position using the manual valve control found on the front panel. Using the 3-WAY VALVE, also located on the front panel of the Separator, choose HE OR N<sub>2</sub>.
- c. Using the metering "FLOW ADJUST" valve, located on the front panel, set helium or nitrogen flow to 30 mL/min measured at the "VENT" connection located on the side of the Separator.  
Use the "ROTAMETER" valve, located on the front of the Separator, to adjust the flow between 250-300 mL/min.  
If purge gas is required, using the metering "PURGE ADJUST" valve, located on the front panel, set the helium flow to 30 mL/min measured at the "PURGE OUT" connection located on the side of the Separator.
- d. Let the Separator purge for ½ hour before proceeding to operation and applying heat.
- e. Using the 1/16" VCR tubing that is supplied, connect the Separator to the Series 5900 DID GC as follows:



**THE INLET/OUTLET FITTINGS ARE VCR TYPE AND VCR GASKETS MUST BE USED. CHECK THE CARRIER FLOW RATE TO BE SURE THAT NOTHING HAS CHANGED.**

- i. Connect one end of the supplied tubing to "FROM INST." fitting located on the side of the Model 75-850-BV or 75-850P-BV and the other end of the tubing to "TO ACC." fitting located on the rear of the GC.
- ii. Connect one end of another piece of the supplied tubing to "TO INST" fitting located on the side of the Model 75-850-BV or 75-850P-BV and the other end of the tubing to "FROM ACC." fitting located on the rear of the GC.

#### 4. Controls



##### 4.1 Front Panel

1. **TEMPERATURE CONTROLLER:** Adjusts temperature controller settings.
2. **AIR ROTAMETER WITH VALVE:** Measures the sweep gas flow to the Hydrogen Separator.
3. **3-WAY VALVE:** Allows switching of the gas flowing through the sweep gas inlet between heat/cool gas (He or N2) and condition/operation gas (air).

4. SEPARATOR MODE VALVE: Controls the 6-port valve position. Allows switching between operation or reconditioning of the Hydrogen Separator.
5. FLOW ADJUST METERING VALVE: Adjusts the flow of gas through the Hydrogen Separator or to VENT.
6. PURGE ADJUST METERING VALVE (OPTIONAL): Adjusts the flow of purge gas through the 6-port valve measured at the PURGE OUT connection.

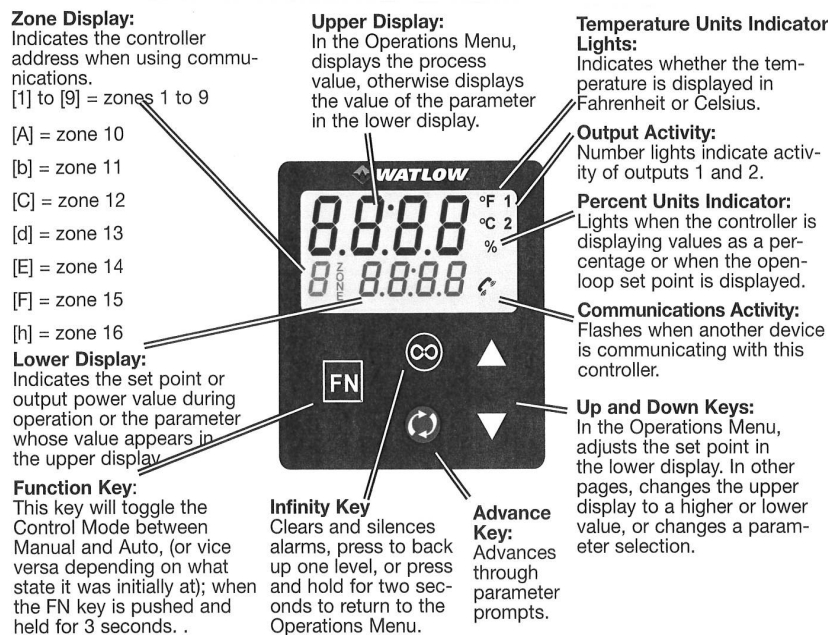
#### 4.2 Side Panel

7. FROM INSTRUMENT (1/8" VCR fitting)
8. TO INSTRUMENT (1/8" VCR fitting)
9. PURGE OUT (1/8" compression fitting)(OPTIONAL)
10. VENT (1/8" compression fitting)

#### 4.3 Back Panel

11. HE OR N2 IN (1/8" compression fitting)
12. AIR IN (1/8" compression fitting)
13. HE PURGE IN (1/8" compression fitting) (OPTIONAL)
14. AC POWER IN

#### 4.4 Temperature Controller



##### 4.4.1 Responding to a Displayed Message/Error Code

An active message will cause the display to toggle between the normal settings and the active message in the upper display and [Attn] in the lower display. Your response will depend on the message and the controller settings. Some messages, such as Ramping and Tuning, indicate that a process is underway. If the message was generated by a latched alarm or limit condition, the message can be cleared when the condition no longer exists. If an alarm has silencing enabled, it can be silenced.

Push the Advance Key to display [.9nr] in the upper display and the message source (such as [L.hi]) in the lower display.

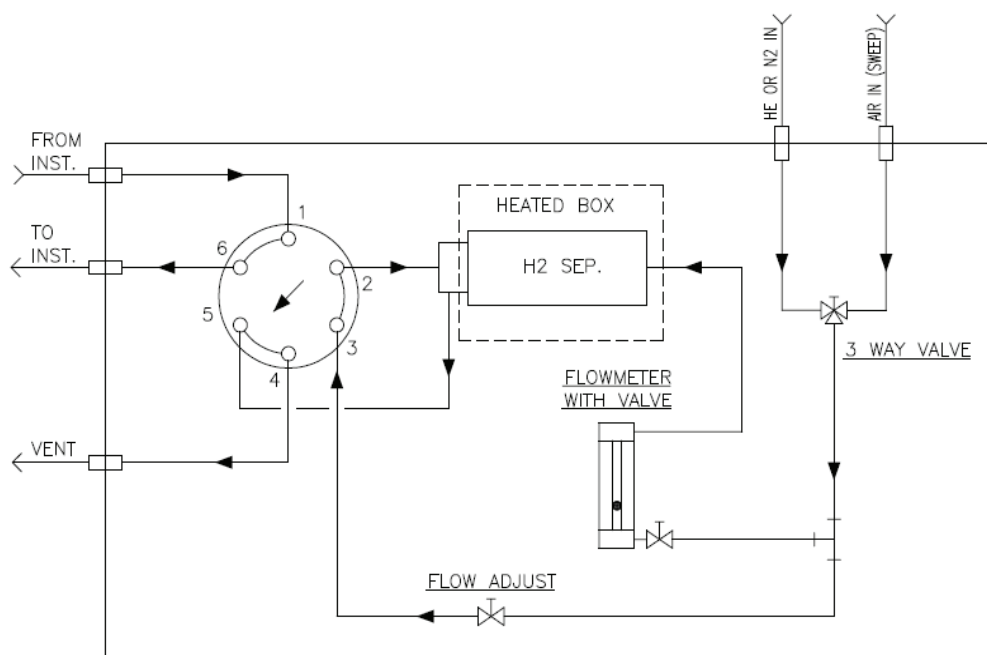
Use the Up and Down keys to scroll through possible responses, such as Clear [CLr] or Silence [S.L]. Then push the Advance or Infinity key to execute the action.

Er. 1 - Error Input 1: The sensor input generated a value lower than the allowable signal range. Enter a valid input.

100 - Device Error: Controller displays internal malfunction message at Power Up.

#### Set Point

To set the set point: turn the unit “on” and then push the Up or Down arrow to adjust to the desired operating temperature.



FLOW DIAGRAM

#### 5. Operation

- Raise the temperature to 350 °C with heat/cool gas still flowing through the separator. Allow 1 hour for the tube to equilibrate at the operating temperature before switching the sweep gas over to air.
- Switch the 3-way valve to air and allow 1/2 hour for the air to stabilize in the tube.
- Switch over to the Series/Run position and allow another 1/2 hour for the sample lines to purge thoroughly.
- You are now safe to switch the DID back into the sample path.
- The separator is now ready to accept hydrogen samples. As long as the hydrogen response is small enough to not interfere with your first peak of interest, hydrogen samples can continue. If the hydrogen breakthrough increases and starts to overcome the argon or other peaks of interest, please follow conditioning steps, Section 6.

- f. To shut the separator down, turn it back to the bypass/condition mode and switch the 3-way valve to heat/cool gas.
- g. Set the temperature to 0 and when it is near ambient (<35 °C), it is now safe to power it down and shut off gases.

## 6. Hydrogen Breakthrough

The Hydrogen Separator is equipped with a palladium/silver alloy membrane. Its function is to quantitatively remove the hydrogen balance gas from a hydrogen sample leaving only the impurities in the helium carrier gas stream. After using the system for a period of time with hydrogen, the appearance of a hydrogen peak will be seen. This is caused by the buildup of carbonaceous deposits inside the palladium tube. By allowing HELIUM to pass through the tube at operating temperature it is possible to remove this buildup and restore the Separator to its original state.

Conditioning:

- a. Switch the separator to bypass/condition position and use the 3-way valve to change over to heat/cool gas.
- b. Raise the temperature to 450 °C and allow it to stabilize there for 1/2 hour before switching to air.
- c. Allow air to flow through the sweep gas for 1-1/2 hours at 450 °C.
- d. At the end of the 1-1/2 hours you can leave air flowing and just lower the temperature back to 350 °C.
- e. Allow 1/2 hour for the tube to stabilize at 350 °C and verify there is limited breakthrough with a hydrogen sample.



**NOTE**

**IT IS IMPORTANT THAT THE HELIUM SUPPLY USED FOR THIS INSTRUMENT BE ULTRA HIGH PURITY. IMPURE HELIUM CAN HELP TO CAUSE THE SEPARATOR TO NEED RECONDITIONING MORE FREQUENTLY. ALSO HALOGENS, ORGANOMETALS, SULFUR COMPOUNDS, DOPING GASES AND OTHER HEAVY METALS CAN CAUSE PLUGGING OF THE SEPARATOR TUBE AND REQUIRE TUBE REPLACEMENT.**

## 7. General Specifications for the Temperature Controller, Programmed

Control Mode:

- Microprocessor-based
- Single input, dual output
- Ramp to set point: 0 to 550°
- Heat and cool auto-tune
- PID with automatic tuning

Sensor Input Type:

Platinum RTD, 100 ohms

Supply Voltage:

85 - 264 VAC, 50/60 Hz (75-850-BV/75-852-BV)

Mechanical Relay Life Span:	100,000 cycles
Sensor Input Type:	Platinum RTD, 100 ohms
Ambient Temperature Range:	Operating: - 18 to 65 °C Storage: - 40 to 85 °C

#### 8. Separator Specifications

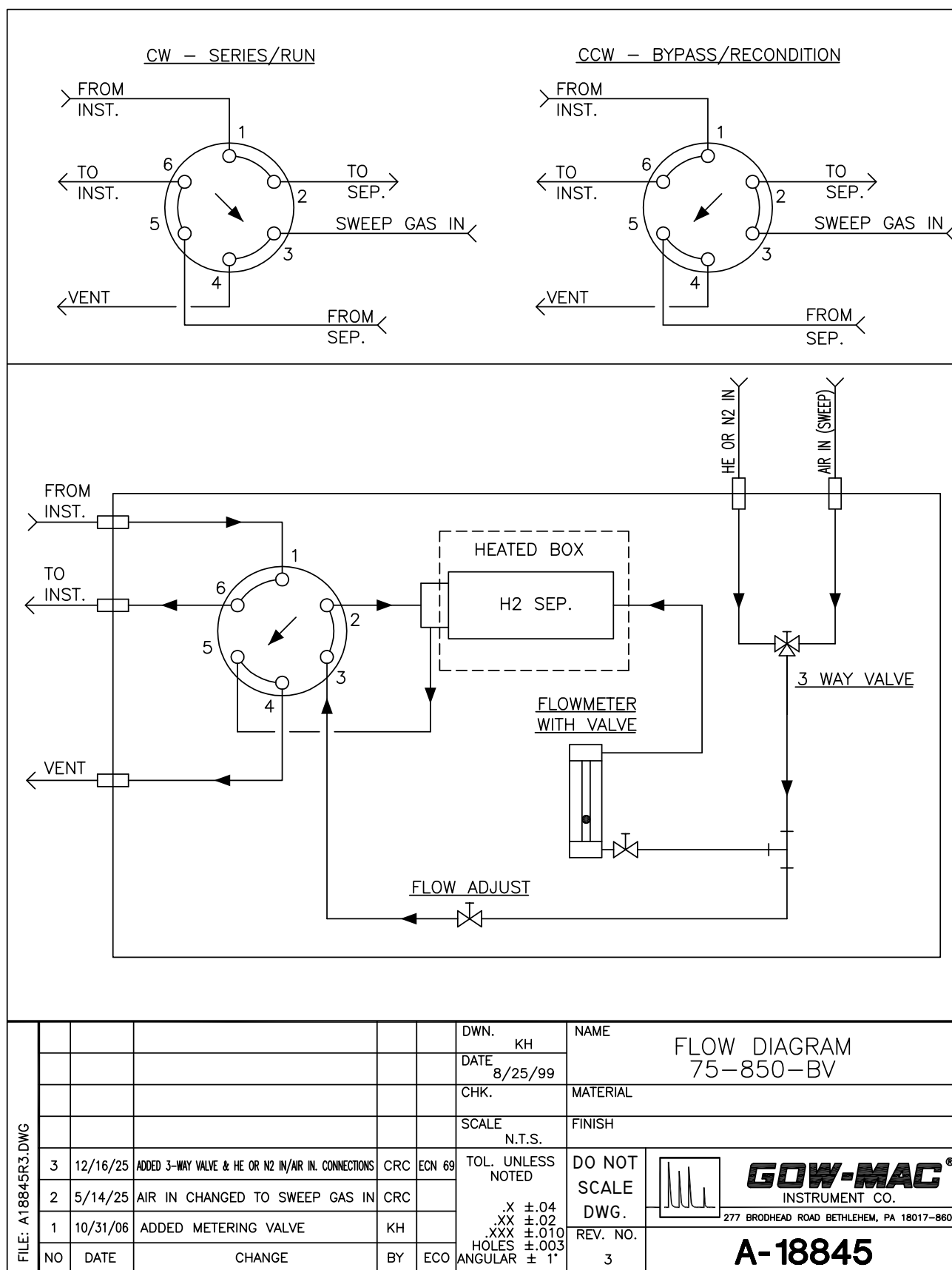
Operating temperature:	350 °C
Max. Operating Pressure:	100 psig
Operating Carrier Gas Flow Rate:	30-50 mL/min.
Standard Fittings:	1/8" VCR and 1/8" compression
Weight (net):	15 lbs.
Dimensions:	15-½"D x 6-½"W x 12"H

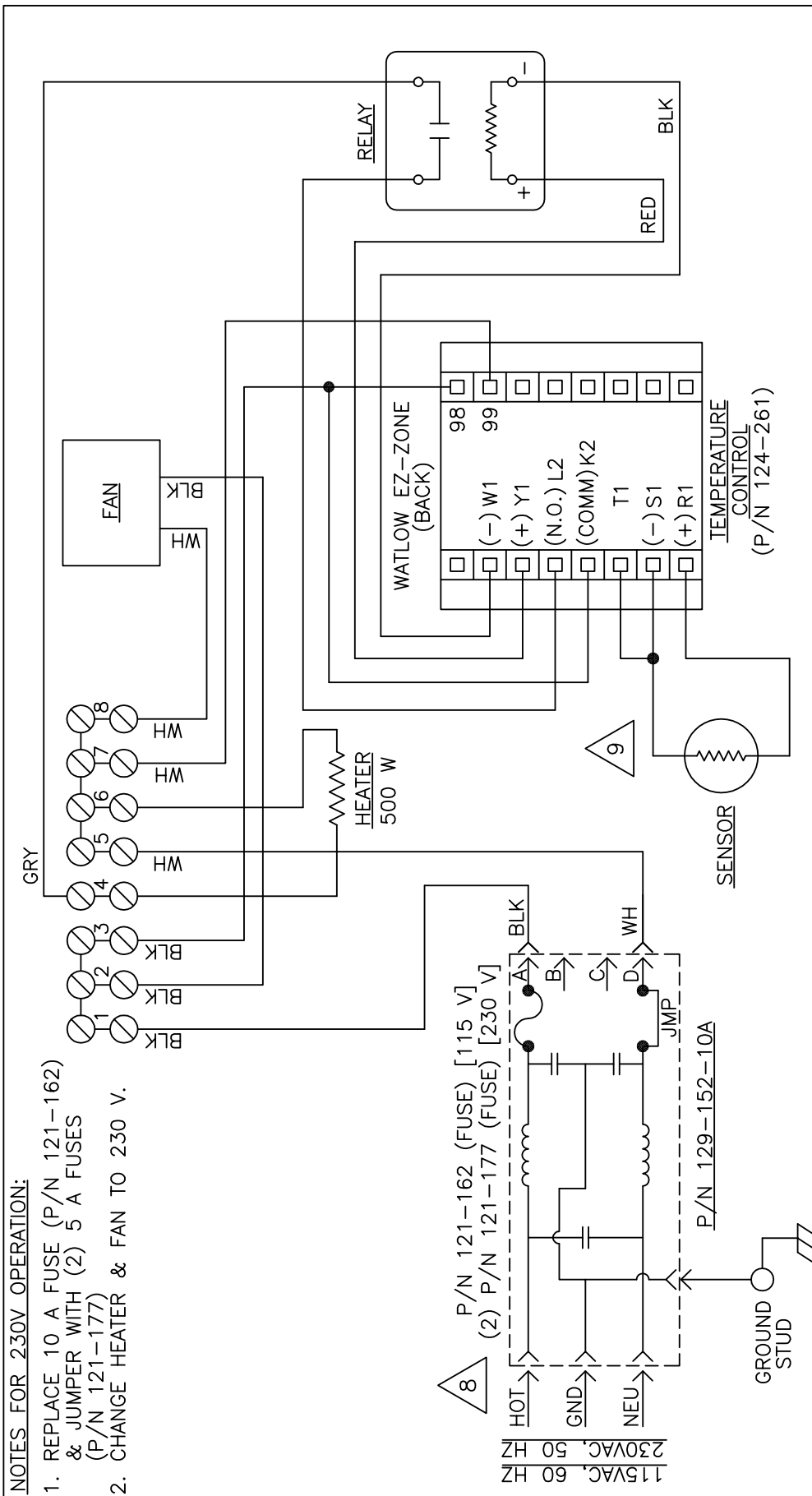
#### 9. Replacement Parts

<u>Description</u>	<u>Part No.</u>
Fuse, 10 A (115 V) .....	121-162
Fuse, 5 A (230 V) .....	121-177
Fan (115 V) .....	124-156
Fan (230 V) .....	124-162
Sensor .....	124-175-F
Heater (115 V) .....	124-197-L
Heater (230 V) .....	124-200-L
Temperature Controller, Programmed .....	124-261-800
Power Cord, 3 conductor shielded .....	127-407
Receptacle, power switch w/ line filter (115 V) .....	129-152-10A
Flowmeter, Air, 0-400 cc/min .....	180-374-1
Palladium Tube, Replacement .....	180-554-VCR-3
Valve, 6-port, tested, manual .....	181-643
Valve, 6-port, purged, tested, manual .....	181-647-6

Contact GOW-MAC for replacement parts:

GOW-MAC Instrument Co.  
277 Brodhead Road  
Bethlehem, PA 18017 U.S.A.  
Tel: (610) 954-9000  
E-mail: sales@gow-mac.com  
URL: www.gow-mac.com





NAME		WIRING SCHEMATIC		75-850/852 & 159-306	
DWN.	CH	DATE	2/19/91	CHK.	MATERIAL
SCALE	N.T.S.	SCALE	N.T.S.	SCALE	FINISH
ECN 6	ECN 6	ECN 6	ECN 6	ECN 6	ECN 6
10/3/25	ADDED JUMPER TO TEMP. CONTROLLER 124-262 [T1]	SML	SML	CRC	CRC
1/12/22	UPDATED LINE FILTER RECEPTACLE WIRING & LABELING	SML	SML	CRC	CRC
11/28/18	TERMINAL BLOCKS UPDATED FOR EURO TYPE.	SML	SML	CRC	CRC
3/26/13	ADDED LINE FILTER RECEPTACLE (129-152-10A) UPDATED NOTE FOR 230 V OPERATION.	SML	SML	CRC	CRC
5/2/11	UPDATED WIRING & ADDED RECEPTACLE	SML	SML	CRC	CRC
5/5/10	UPDATED FOR NEW TEMP. CONTROLLER (P/N 124-263) [WAS 124-217]	SML	SML	CRC	CRC
NO	DATE	CHANGE	BY	ECO	ANGULAR
FILE: A16551R9.DWG					
DO NOT SCALE DWG.					
REV. NO. 9					
A-16551					

**GOW-MAC®**  
INSTRUMENT CO.

277 BRODHEAD ROAD BETHLEHEM, PA 18017-8600

# Warranty

ALL INSTRUMENTS SOLD BY GOW-MAC® INSTRUMENT CO. ARE WARRANTED FOR A PERIOD OF ONE YEAR AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP. THE TERMS OF THIS WARRANTY ARE AS FOLLOWS:

1. **The warranty period begins with the shipping date of the equipment to the original purchaser.**
2. Certain parts such as batteries, fuses, glass accessories, septa, columns, etc., are expendable in normal use, and their service life is unpredictable. Such items are not covered by this warranty.
3. Filaments of thermal conductivity detectors are not covered by this warranty.
4. Hydrogen Palladium Tubes are not covered by this warranty.
5. All requests for service or repair under this warranty must be received within the warranty period by GOW-MAC® or its authorized representative. All repairs are made at GOW-MAC plants or at the office of authorized representatives.
6. All repairs, adjustments, and other services under this warranty shall be performed free of charge to the purchaser. However, warranty service and repairs shall be limited to equipment malfunctions which, in the opinion of GOW-MAC®, are due or traceable to defects in original materials or workmanship. Instrument malfunctions caused by abuse or neglect of the equipment are expressly not covered by this warranty.
7. Instrument parts which have been repaired or replaced during the warranty period are themselves warranted only for the remaining unexpired portion of the original one-year warranty.
8. Repairs, adjustments, and service performed after expiration of the one-year warranty period shall be charged to the purchaser at the then current prices for parts, labor, and transportation.
9. This warranty attaches to the equipment itself and is not limited to the original purchaser. Unexpired portions of the warranty are thus transferable to subsequent owners.
10. GOW-MAC® expressly disclaims any liability to users of its products for consequential damages of any kind arising out of or connected with the use of its products.
11. Except as stated in Sections 1 through 8 above, GOW-MAC® makes no warranty, expressed or implied (either in fact or by operation of law), statutory or otherwise; and, except as stated in Sections 1 through 8 above, GOW-MAC® shall have no liability under any warranty, expressed or implied (either in fact or by operation of law), statutory or otherwise.
12. Statements made by any person, including representatives of GOW-MAC® which are inconsistent or in conflict with the terms of this warranty shall not be binding upon GOW-MAC® unless reduced to writing and approved by an officer of the Company.
13. This warranty shall be governed by the laws of the Commonwealth of Pennsylvania.



## Health and Safety Declaration for the Return of GOW-MAC Instrument Co. Equipment

In order to protect our employees from exposure to various hazards, the following statements and/or questions **MUST** be answered by you. Fill out this document in its entirety and either fax or e-mail it to GOW-MAC Instrument Co., Attn: Repair Dept, **BEFORE** returning the product.

The instrument/part being returned **will not** be accepted into GOW-MAC's facility until we receive this completed document, along with a **PO or Credit Card**. Once approved for return by our Chemical Safety Officer, a **Return Materials Authorization (RMA) number** and shipping instructions will be issued. *All applicable regulations should be followed when returning instrumentation, and/or parts.*

### Customer to Record the Following:

Model # / Part # \_\_\_\_\_

Serial #: \_\_\_\_\_

Service Technician spoken to: \_\_\_\_\_

Today's Date: \_\_\_\_\_

**IF THIS FORM IS NOT APPROVED BY OUR CHEMICAL SAFETY OFFICER, THE INSTRUMENT/PART WILL NOT BE PERMITTED INTO OUR FACILITY FOR SERVICING!**

- A) Brief explanation of issue: \_\_\_\_\_
- B) Briefly list the application(s) for which the instrument/part was used, as well as any and all chemicals, gases, and/or materials analyzed and their concentrations. (**Must be filled in**): \_\_\_\_\_
- C) Is there the possibility of internal or external contamination on or in this instrument/part?  
☐ Yes – see below    ☐ No – proceed to D.

*Please check the appropriate box.*

- ☐ Chemicals or Substances That Are Hazardous to Health
- ☐ Blood, Body Fluids, (e.g. Urine, Secretions), Pathological Specimens
- ☐ Regulated Medical Wastes
- ☐ Infectious Substances or other Bio-Agents (e.g. Protein, Enzymes, Antibodies)
- ☐ Radioactive Isotopes used in the area. Detail type (ECD, Isotopic Labels, etc) and Activity in Micro Curies
- ☐ Biodegradable Material That Could Become Hazardous
- ☐ Other Hazards \_\_\_\_\_

***If any of the above boxes are checked the following statements and/or questions must be answered.***

1. Specifically describe where (on or in) the instrument/part there could be any residual contamination (for example: blood spill on the surface). \_\_\_\_\_
2. Provide details of these hazards. Include names, Material Safety Data Sheets (MSDS), and concentration of contaminants, where possible. \_\_\_\_\_
3. Describe the method of decontamination used. Attach Procedure. \_\_\_\_\_

- D) I declare that the above information is true and complete to the best of my knowledge. I acknowledge that any inconsistencies between the condition of the instrument and the statements made on this form will delay the repair process.

Authorized signature \_\_\_\_\_ Date: \_\_\_\_\_

Name (Printed) \_\_\_\_\_ Phone number: \_\_\_\_\_

Company name: \_\_\_\_\_ Fax number: \_\_\_\_\_

Shipping address: \_\_\_\_\_

City: \_\_\_\_\_ State/Country: \_\_\_\_\_ Zip : \_\_\_\_\_

E-mail address: \_\_\_\_\_

**BEFORE** item can be shipped, fax completed form to: (610) 954-0599 or e-mail it to: [repairs@gow-mac.com](mailto:repairs@gow-mac.com)

### For GOW-MAC Use Only:

Signed: \_\_\_\_\_ Date \_\_\_\_/\_\_\_\_/\_\_\_\_

- ☐ **Passed** Safety Inspection. **OK** to proceed to Repair Dept.
- ☐ **Failed** safety inspection. **DO NOT** proceed to Repair Dept.

Chemical Safety Officer

Comments: ( ) None

**RMA No:** \_\_\_\_\_

( ) On Back >>>>



**GOW-MAC**® INSTRUMENT CO.

REP-005  
Health-Safety Declaration Doc – ONLINE  
Rev.7 1/28/2022, kj

