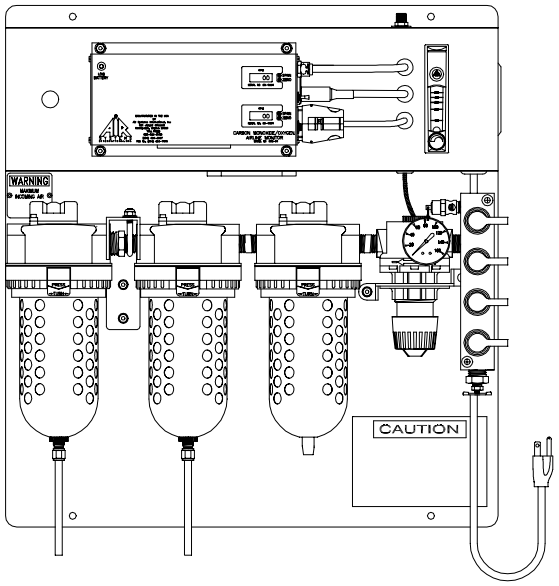
Manual No.BREPNL30
(Rev 0 Auguest 2003)

Grade-D Breathing Air
Filtration Systems - Panel Mounted



Models BB30-CO2PM, BB50-CO2PM, BB75-CO2PM & BB100CO2PM

AIR SYSTEMS INTERNATIONAL, INC.
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Registered to ISO 9002
Certificate No. A5033

Breathing Air Quality Position Statement

The responsibility for the quality of breathing air rests with the user. Compliance with federal, state, or local regulations are the responsibility of the user and this recommendation does not supersede any existing rules, regulations, or laws which may apply. Breathing air products manufactured, meet or exceed CGA Grade-D specifications for air quality as adopted by Federal OSHA. Compressor air quality standards meet or exceed OSHA 1910.134 requirements. When the components are used in accordance with the manufacturer's instructions and recommendations, the "system" meets or exceeds federal regulations presently in force. It is incumbent upon the user to comply with any changes in the regulations or law which may occur in future situations.

The air supply compressor should be located in a safe, clean ambient air environment. This "safe" location should be tested periodically using proper instruments to ensure clean ambient air quality on a consistent basis. Should the location or environment significantly change, the ambient air quality should be retested. The compressor filters and oil should be checked daily and changed when contaminated or when the maximum number of "run" hours are achieved.

This series of air filtration units should be used according to the manufacturer's recommendations. The standard filtration package is not explosion-proof and should be located in a nonexplosive environment. (An intrinsically safe model is available, please contact the factory for information.) Ambient air conditions should be tested with proper instrumentation to ensure a nonexplosive environment. Filters should be changed when contaminated or when the total number of "run" hours is achieved. The carbon monoxide monitor should be calibrated monthly or when accuracy of the monitor is in question.

Total system Grade-D air quality should be tested monthly, provided that the environmental or physical location of the air supply compressor does not significantly change. If the compressor is moved, more frequent testing may be necessary. System air quality should be tested for, but not limited to, the following Grade-D air components:

CO - Carbon Monoxide
O_2 - Oxygen
CO_2 - Carbon Dioxide
H_2O - Water (Moisture Content)
Hydrocarbons (Oil Mist)
Total Particulates

The maximum allowable level of these air quality components varies depending on Grade-D or E requirements.

Our Breathing Air compressors and filtration systems meet all of the following federal specifications when used and serviced in accordance with our instructions.

Federal OSHA 29 CFR 1910.134
"Compressor Operations for Breathing Air"

Army Corps of Engineers EM385-1-1,
paragraph 07b-11-4,
"Compressed Breathing Air"

PANEL SPECIFICATIONS

	BB30 SERIES	BB50 SERIES	BB75 SERIES	BB100 SERIES
Size	22"L x 23"H x 8"D	22"L x 23"L x 8"D	22"L x 23" H x 8" D	22"L x 23" H x 8" D
Weight	19.7 lbs/8.0 kg	26.4 lbs/11.9 kg	34.2 lbs/15.5 kg	38.8 lbs/17.6 kg
No. of Outlets	2	4	6 or One (1) 1/2" MPT	4-8 or One (1) 1/2" MPT
Maximum Air Flow (cfm/bar)	30scfm @ 110psi 850 lpm @ 7.5 bar	50scfm @ 110psi 1415 lpm @ 7.5 bar	75scfm @ 110psi 2124 lpm @ 7.5 bar	100scfm @ 110psi 4248 lpm @ 7.5 bar
115 VAC Remote Connection	Yes	Yes	Yes	Yes
Maximum Inlet Pressure	150psi			
Relief Valve	125psi			
Monitoring	Inline Continuous Monitoring of Carbon Monoxide and Oxygen			
Power	9-16 VDC or 110-120 VAC 50/60 Hz			

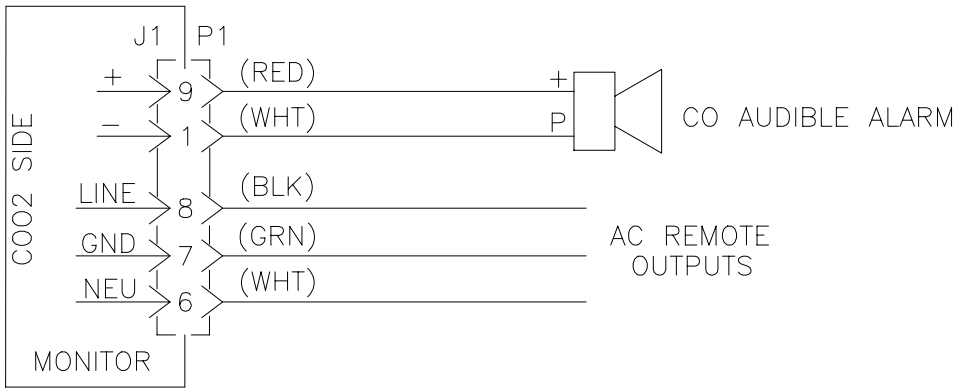
ITEM #	DESCRIPTION
1	HIGH CO AUDIBLE ALARM
2	CO/O2 MONITOR, P/N CO2-91ACRL
3	AIR SAMPLE INLET
4	POWER PLUG
5	REMOTE SIGNAL CONNECTOR
6	FLOWMETER
7	115 VAC REMOTE ALARM GANG BOX
8	RELIEF VALVE
9	PRESSURE GAUGE 0-160 psi
10	RESPIRATOR CONNECTIONS
11	PRESSURE REGULATOR
12	DRAIN COCK
13	POWER CORD 115 VAC
14	CHARCOAL FILTER
15	COALESCING FILTER
16	PARTICULATE FILTER
17	FILTER CHANGE INDICATOR

MONITOR SPECIFICATIONS

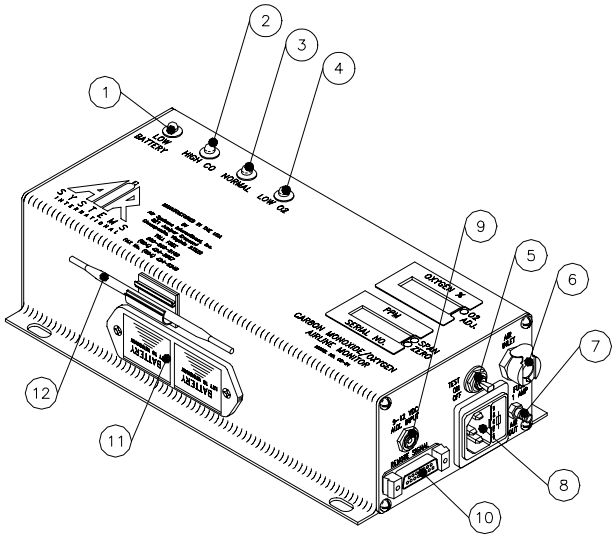
Size:	2.75”H x 9.57”L x 5.1”W
Weight:	2.8 LBS. (1.27KG)
Case:	Extruded aluminum Anodized black
Voltage:	115 VAC and/or 9 - 15 VDC
Shielding:	Internal RFI/EMI filters
Fuse:	115 VAC 1 amp fast acting
Operating Temperature:	4 to 113 degrees F (-20 to 45 degrees C)
Humidity Range:	10% to 90% RH
Flow Requirement:	50 - 100 cc
Display:	3 digit LCD (CO concentration) 3 digit LCD (O2 percentage)

Output Signals:	AC / DC via 15 pin D-subminiature connector
Test Circuit:	Manually activated
Sensor Type:	Sealed electrochemical sensor for Carbon Monoxide Sealed electrochemical sensor for Oxygen
Accuracy:	+/- 1% full scale
Response:	90% in 10-15 seconds
Detectable Range:	0 - 200ppm CO 15 - 23% O2
Calibration:	Manual CO zero and span adjustments Manual O2 span adjustment
Alarm Setting:	10ppm CO (5ppm Canadian) 19.5% O2
Warning:	*Normal operation - Green light *High CO - Red Light *Low O2 - Red Light Low Battery - Amber Light
Warranty:	2 years from original date of purchase for unit and CO sensor, 1 year warranty on O2 sensor

WIRING SCHEMATIC

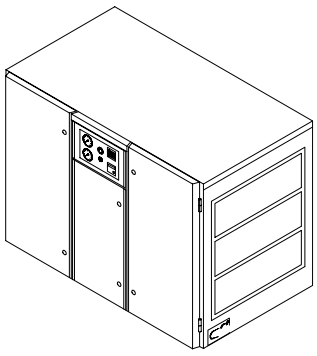


MONITOR IDENTIFICATION



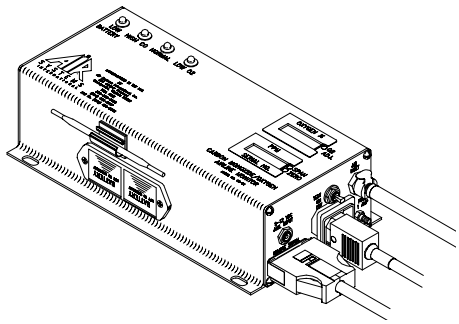
ITEM #	DESCRIPTION
1	LOW BATTERY INDICATOR
2	HIGH CO INDICATOR
3	NORMAL
4	LOW O2
5	ON/OFF/TEST SWITCH
6	AIR SAMPLE INLET
7	AIR DISCHARGE PORT (DO NOT BLOCK)
8	120 VAC RECESS PLUG WITH FUSE HOLDER (1 AMP FAST ACTING)
9	AUXILIARY DC POWER JACK
10	REMOTE SIGNAL CONNECTOR
11	BATTERY HOLDER
12	CALIBRATION TOOL

PANEL SETUP AND OPERATION



STEP 1)
Secure a primary air source of sufficient air flow and discharge pressure. The number and type of respirators being used to determine the flow rate and pressure required.

STEP 2)
Check CO/O_2 monitor for fresh 9-volt batteries and turn the unit on. Connect the remote signal cable, 115 VAC plug, and air sample hose to the monitor. Place the "ON/OFF/TEST" switch to the "ON" position. Allow 30 seconds for the readout to stabilize. If a reading other than "ZERO" is displayed, calibration of the monitor may be necessary. See calibration procedure.

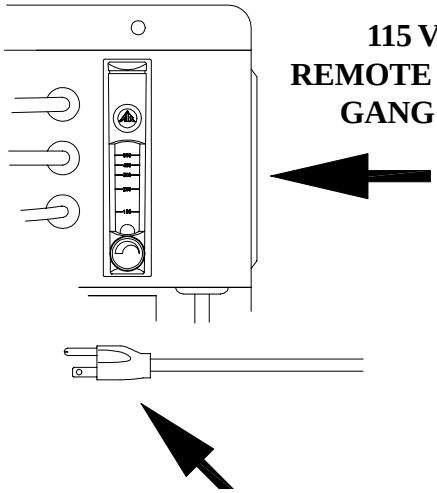


PNEUMATIC ALARM CONNECTION (1/4" MPT)

STEP 3) (OPTIONAL)
Connect 115 VAC remote alarm to the remote alarm gang box. E*lectric remote alarms require 115 VAC to operate.*

115 VAC WIRING:

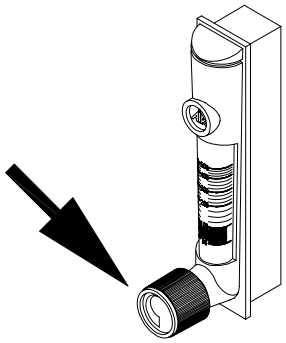
BLACK - LINE
WHITE - NEUTRAL
GREEN - GROUND



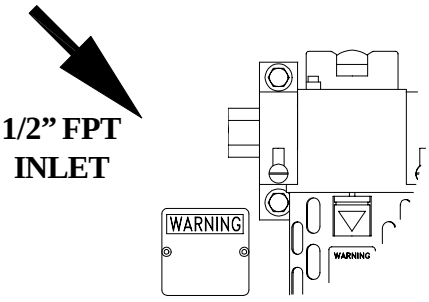
115 VAC REMOTE ALARM GANG BOX

STEP 4)
Connect the extension cord to a 115 VAC receptacle.

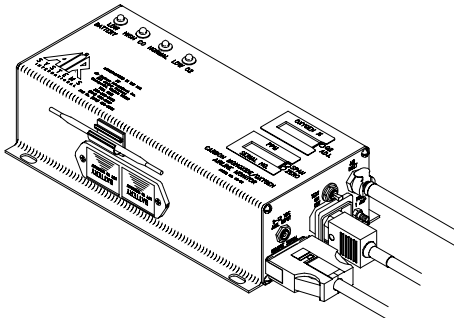
STEP 5)
Close the flowmeter by turning the control knob fully clockwise.



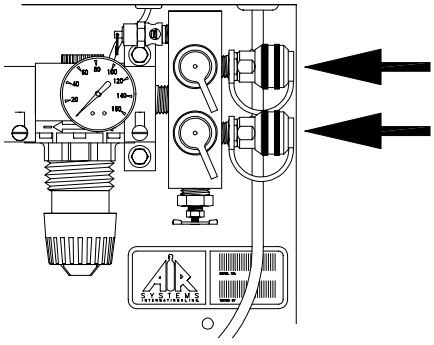
STEP 6)
Attach a 1/2" (13mm) incoming airline to the 1/2"FPT inlet and the compressed air source.



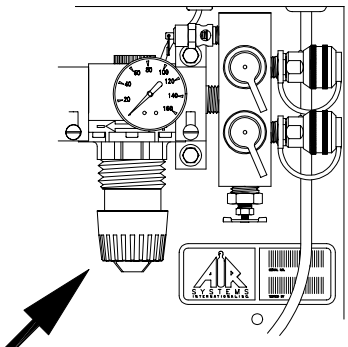
STEP 7)
Hold the "ON/OFF/TEST" switch in the "TEST" position. All local and remote audible/visual indicators will activate. If indicators do not activate call factory. The pneumatic remote alarm port pressure is the same as the regulated outlet pressure; however, the port is not active until CO levels reach and exceed 10ppm. When the O_2 percentage drops below the alarm set point, 19.5% O_2, the green "NORMAL" light will turn off, the red "LOW O_2" light will illuminate, the audible alarm will sound and the remote alarm connections will energize.



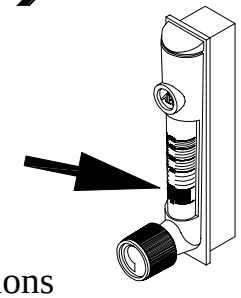
STEP 8)
Attach the desired respirators and lengths of hose to the quick connect outlet couplings. *Note: Some models may not have respirator connections. Models can be ordered with NPT outlets for connection to drop stations or point of attachments. Please refer to page 3 "Panel Specifications - No. of Outlets" to verify your correct MPT thread size.*



STEP 9)
Adjust the outlet pressure to the setting recommended by the respirator manufacturer. Turn the knob clockwise to increase pressure, counterclockwise to decrease pressure.



STEP 10)
Adjust CO/O_2 monitor air sample flow rate by turning the flowmeter control knob counterclockwise until the float hovers in the green bar area (approximatley 50-100 cc/min). The panel is now ready for operation.



MONITOR OVERVIEW

An airline monitoring instrument is used in breathing air applications because CO can be ingested into compressor intakes by external exhaust emissions or from the combustion of hydrocarbons (Reference OSHA standard 1910.134). The oxygen monitor is used to verify O_2 content per CGA G7.1 1989-1998 Grade D & E air quality standards. The CO2-91 series monitors have been developed to continuously monitor CO/O_2 concentrations in breathing air systems. This instrument offers continuous, fast response, accurate (+/- 1% full scale) CO concentration levels displayed in parts-per-million (ppm) and Oxygen levels displayed in percentage. The instruments activate local and remote audible/visual alarms when CO concentrations above 10ppm are detected in the sample stream or the oxygen level drops below 19.5%.

Shutdown

1)Make sure all personnel have egressed from the work area.
2)Shut off air source to the panel.
3)Remove air pressure from the panel by pulling the relief valve ring out.
4)Turn monitor "OFF" at the "ON/OFF/TEST" switch. Do not remove 9-volt batteries. These are used to maintain a bias voltage to the sensors; this keeps the sensor ready for immediate future use.
5)Disconnect airline hoses.
6)Install dust caps if applicable.

Filtration Efficiency

1st Stage	**Particulate/Bulk Liquid Separator**	Auto Drain and Filter change indicator. 95% bulk liquids @ 5 microns
2nd Stage	**Oil Coalescing**	Auto Drain and Filter change indicator. 99.9998% @ 0.01 micron
3rd Stage	**Activated Charcoal (Taste/odor removal)**	Manual Drain and Filter change indicator. Less than 0.003 pp/wt remaining oil content

Maintenance

CAUTION: *Always depressurize the system before performing service.*

Filter Housing/Bowls: Periodic cleaning of the polycarbonate bowls may become necessary. Remove the auto drains. Clean the bowls with a mild soapy solution. Reinstall into the filter housing.

Auto Drains: The automatic drains are designed to remove bulk liquid contaminants. The drains (1st & 2nd stages only) will automatically drain the liquids after the level has reached 1/3 of the bowl capacity. For periodic cleaning, use a mild soapy solution.

Filter Change: The filtration system consists of a filter change indicator which will gradually change from green to red when filter life is spent.

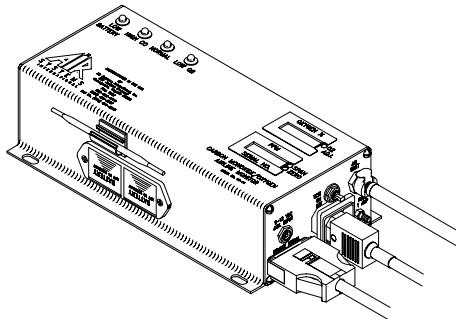
Note: Air must be flowing through the filtration unit before the filter change indicators will function.

Calibration: Monitor calibration should be done monthly or whenever the reading my be questionaable. A calibration sticker should be affixed for future reference. To obtain an accurate calibration, we recommend the use of Air Systems' calibration kits.

Battery Replacement: Replace 9-volt batteries with the amber "LOW BATTERY" light illuminates. If the monitor is not used for 90 days, check the 9-volt battery condition and replace if necessary.

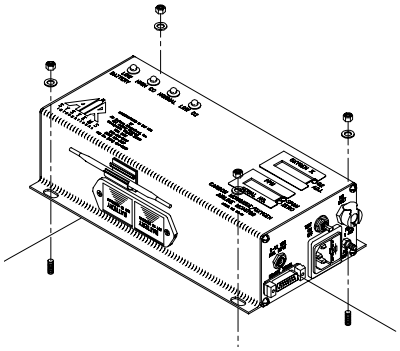
MONITOR BATTERY REPLACEMENT

Install new 9-volt batteries. These batteries continuously provide a required bias voltage to the CO/O_2 sensors and power the monitor in the event of AC power loss. If AC and DC power are removed for a period of 2 hours or more, a 1 hour restabilization period is required.

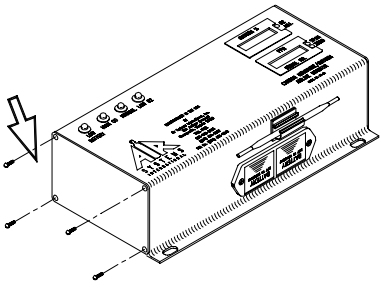


SENSOR REPLACEMENT

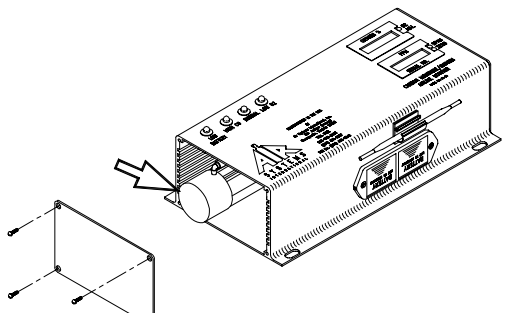
Replacement sensors are shipped with a metal spring installed between the electrodes. Do not remove the clip until the sensor is to be installed into the monitor.



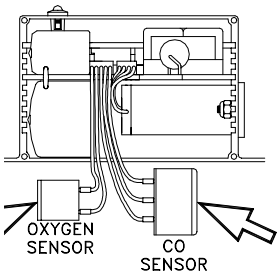
STEP 1)
Disconnect all external connections. Remove CO/O_2 monitor from system.



STEP 2)
Remove the four screws from the monitor's left end plate.



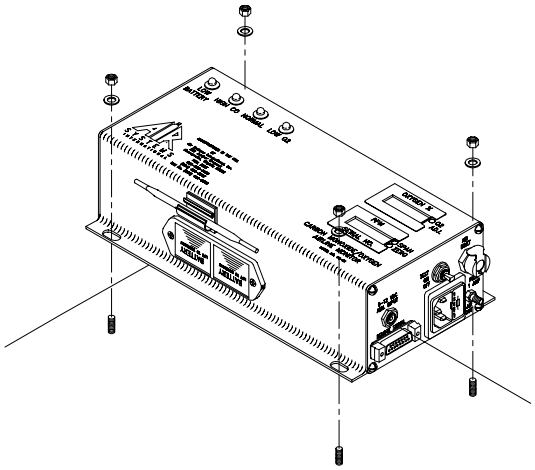
STEP 3)
Remove end plate to gain access to the sensor cup from outside the housing.



CO SENSOR CONNECTIONS
ARE AS FOLLOWS:
RED LEAD–SENSING
BLUE LEAD–REFERENCE
BLACK LEAD–CONTROL

02 SENSOR CONNECTIONS
ARE AS FOLLOWS:
GREY LEAD–NEGATIVE
WHITE LEAD–POSITIVE

STEP 4)
Remove sensors from sensor cup and remove leads . Take the new sensor and remove the metal spring (CO sensor only). Reattach leads to the proper terminals on the new sensor. Install new sensor into sensor cup.



STEP 5)
Reassemble monitor and install back into system. Connect all external connections. Allow monitor to stabilize and recalibrate.

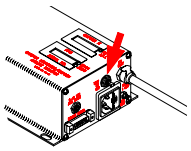
Calibration Procedure

<u>Do not</u> use inert gases to zero the monitor. This will cause premature failure of the sensor.

CO Zero Adjustment

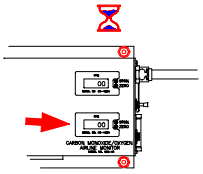
To zero the instrument, follow the steps below. Zero calibration gas should be used to properly "zero" the instrument and assure that a valid calibration is achieved. If zero adjustment cannot be made as indicated, sensor replacement may be necessary. ***After each monitor adjustment outlined in the following steps, allow time for the changes to stabilize.***

1. Place the "on/off/test" switch to the "on" position.



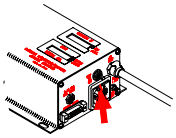
2. Allow 30 seconds for the readout to stabilize. The green indicator light will illuminate.

Note: Most indicators/ alarms are located on a remote panel or on the monitor.

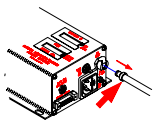


3. Hold the "on/off/test" switch in the "test" position. The following will occur:
   - Audible alarm will sound
   - Green indicator LED and the O_2 red indicator will flash. These will alternate with the CO red indicator.
   - Amber low battery indicator LED will illuminate

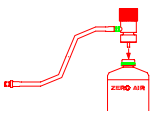
This test ensures the circuitry is operable and the continuity to the sensor is proper. Release the switch.



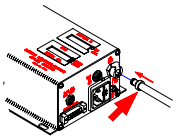
4. Remove air sample inlet tube.



5. Install regulator on the zero air cylinder reference gas.

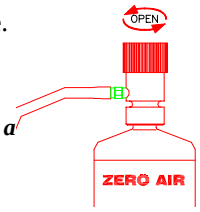


6. Attach the clear tubing with male plug into the monitor air sample inlet.

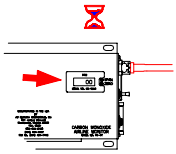


7. Open gas regulator by turning the knob two (2) turns counterclockwise.

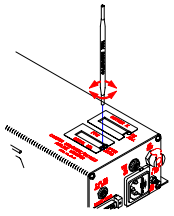
Note: A controlled orifice in the regulator will allow the gas to flow a approximately 300 cc/min.



8. Allow digital readout to stabilize.



9. Adjust "zero" pot adjustment screw (clockwise to increase, counterclockwise to decrease) until a "00" reading is obtained.

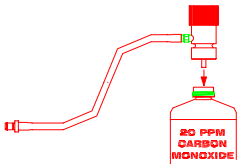


10. Turn off the regulator and disconnect the tubing from the zero air regulator.

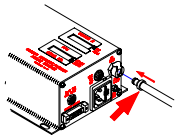
CO Span Adjustment

Use only 10 - 20 ppm CO gas for calibration. Using a higher concentration may decrease accuracy on the lower scale. Note: 10ppm gas must be used to satisfy Canadian CO requirements.

1. Install on the CO air cylinder reference gas.

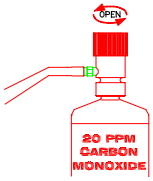


2. Connect the plug to the monitor.

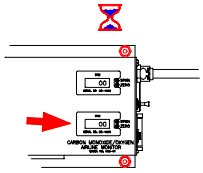


3. Open the gas regulator fully by turning the knob at least two (2) turns counterclockwise.

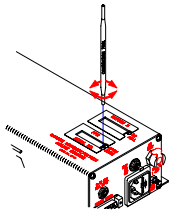
Note: Calibration gas concentration is located on the cylinder label.



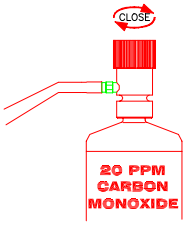
4. Allow digital display to stabilize approximately 15-30 seconds.



5. Adjust the "span" pot adjustment screw (clockwise to increase, counterclockwise to decrease) until the digital display reads the same concentration (ppm) as the test gas.



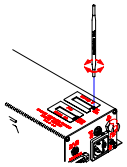
6. Turn regulator off and repeat zero adjustment procedure (display should return to a "00" reading).



O_2 Sensor Adjustment

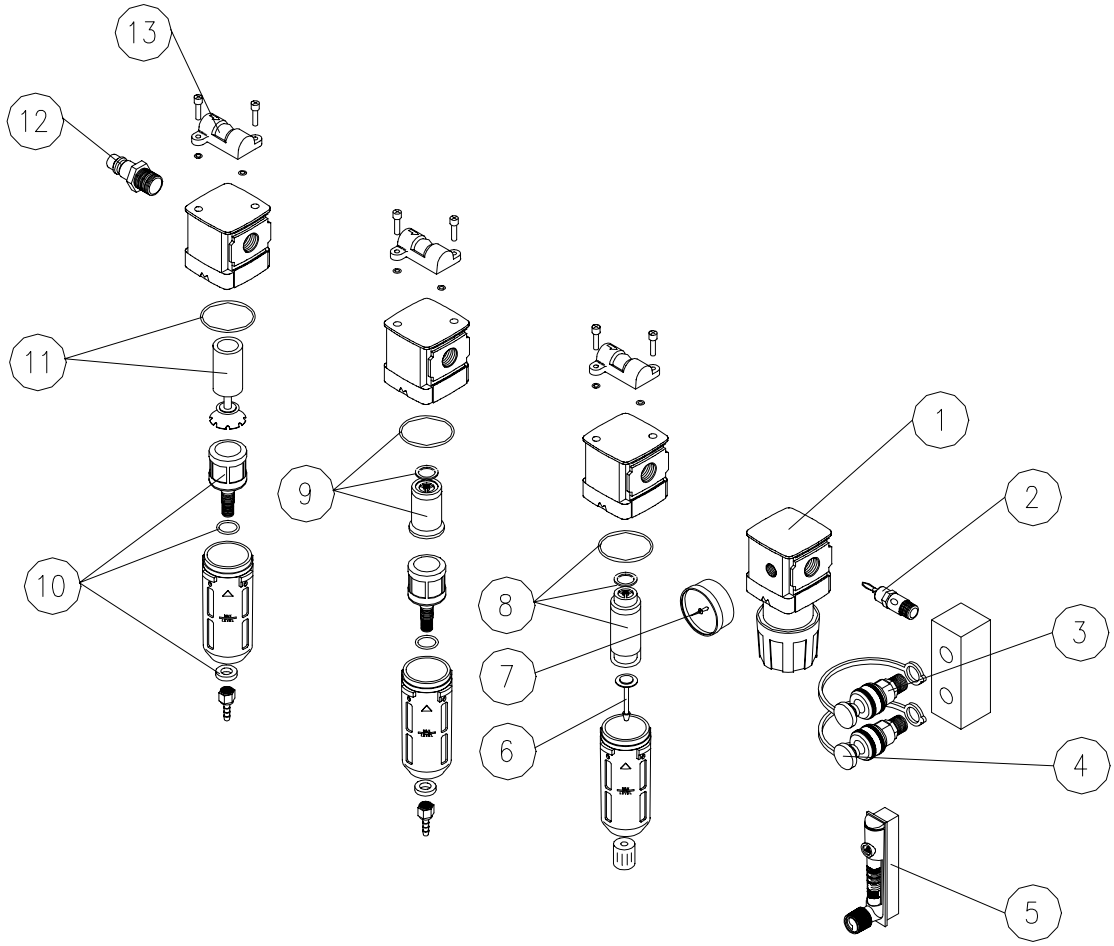
7. Make sure the monitor is not located in an oxygen deficient atmosphere during sensor testing as an “erroneous” reading will result. Turn adjustment screw (clockwise to increase, counterclockwise to decrease) until a 20.9% reading is obtained. An optional method for testing the O_2 sensor is to apply a known concentration of O_2 across the sensor. Order Air Systems’ Part Number BBG-02, 18% oxygen cylinder. The O_2 sensor should respond to $\pm$0.2% of the cylinder concentration. The alarm will activate at approximately 19.5% O_2.

Note: Normal ambient oxygen level is 20.9%.



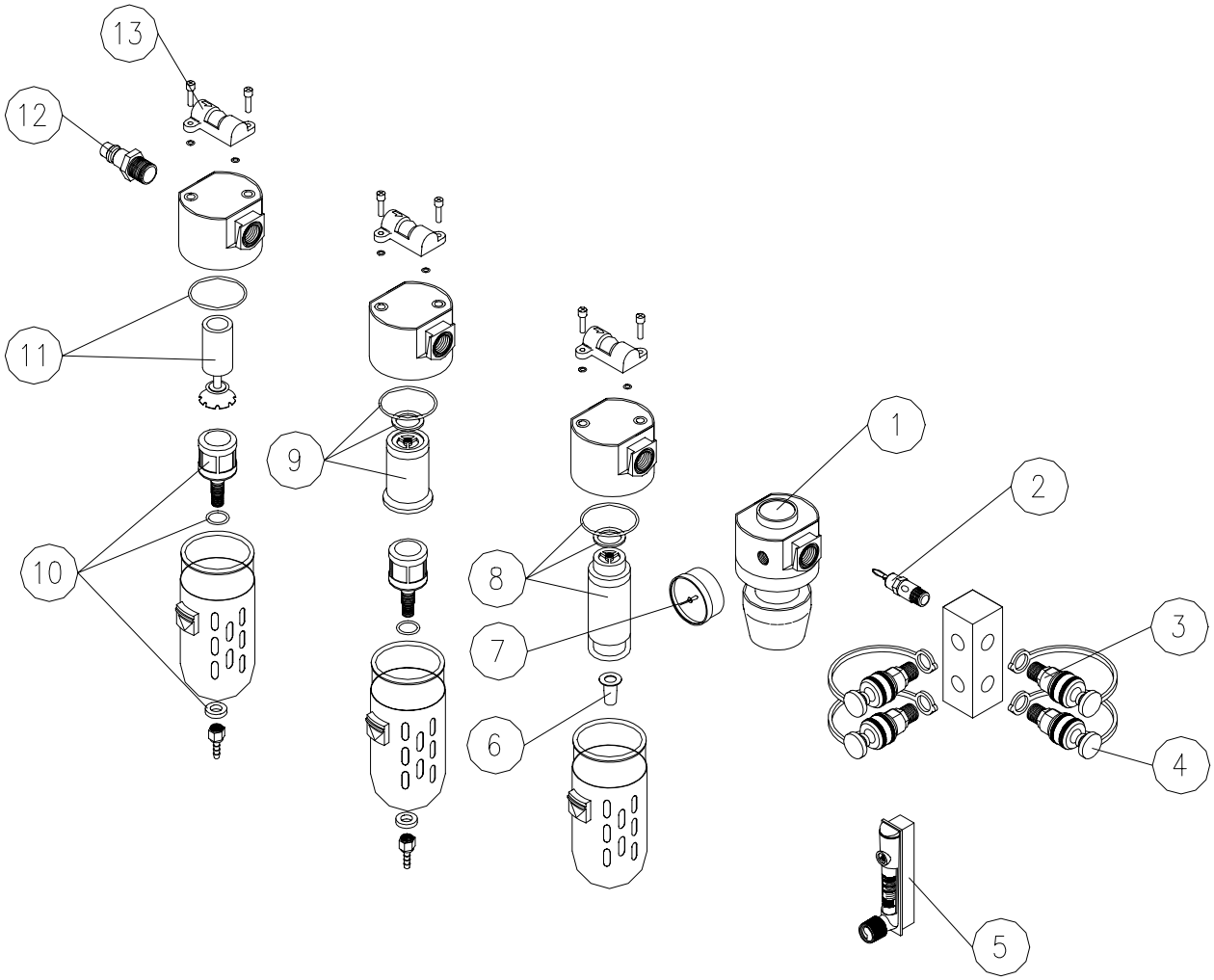
The monitor is now calibrated and should be recalibrated monthly or if accuracy is questionable. Check local requirements and recalibrate as required.

MODEL BB30-CO2PM REPLACMENT FILTER BREAKDOWN



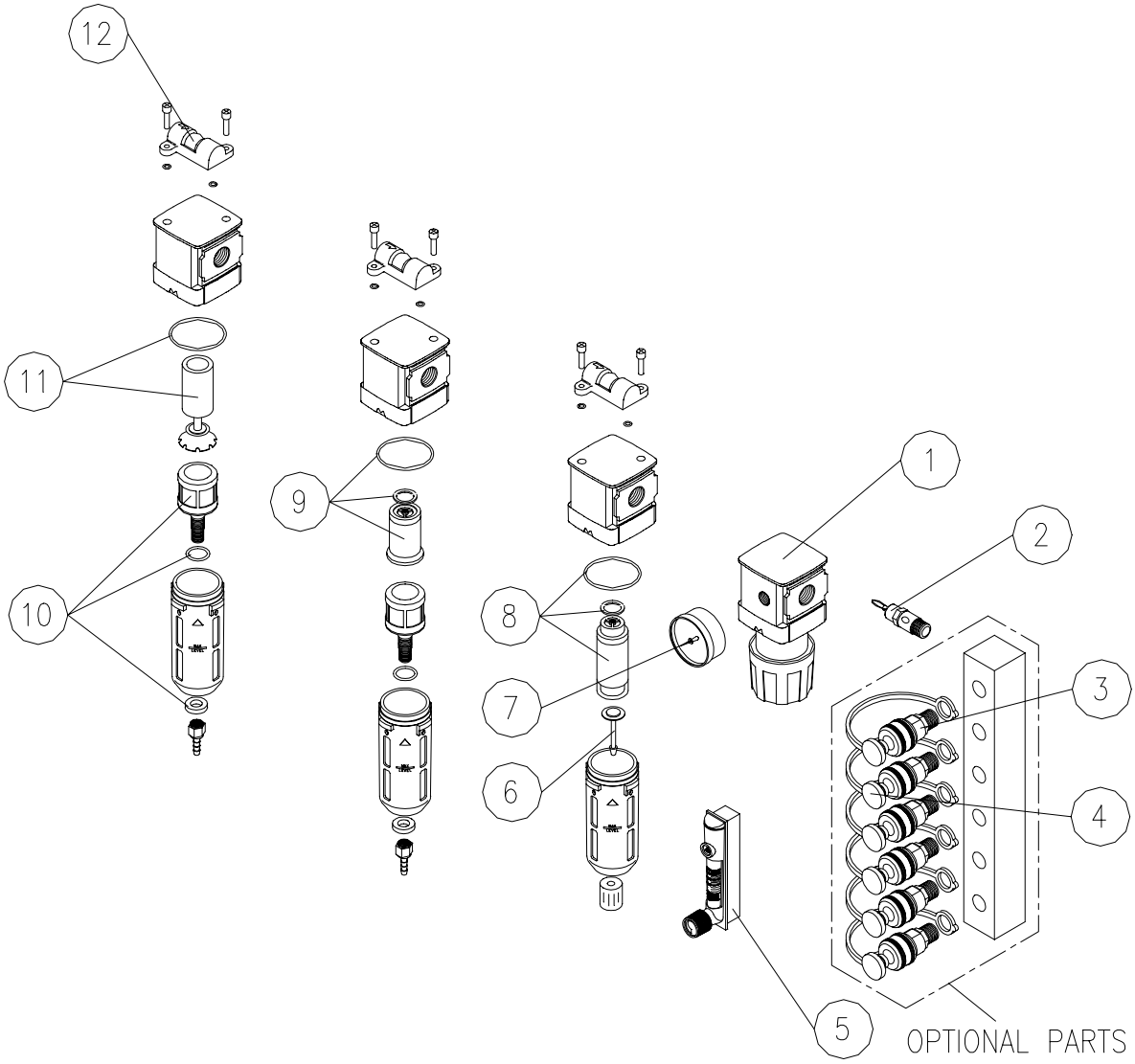
ITEM #	DESCRIPTION	PART #
1	REGULATOR	WL257
2	RELIEF VALVE	VR4125BR
3	QUICK DISCONNECT, HANSEN	QDH3SL4M
3A	QUICK DISCONNECT, SCHRADER	QDSSL4M
4	DUST CAP, HANSEN	QDH3DCAP
4A	DUST CAP, SCHRADER	QDSDCAP
5	FLOWMETER	WL033NS
6	MANUAL DRAIN	WL262
7	PRESSURE GAUGE	GA20160B
8	"D" FILTER ELEMENT	BB30-D
9	"C" FILTER ELEMENT	BB30-C
10	AUTO-DRAIN ASSEMBLY	WL024
11	"A" FILTER ELEMENT	BB30-A
12	INLET FITTING	QDH5PL8M
13	FILTER CHANGE INDICATOR	WL261

MODEL BB50-CO2PM REPLACMENT FILTER BREAKDOWN



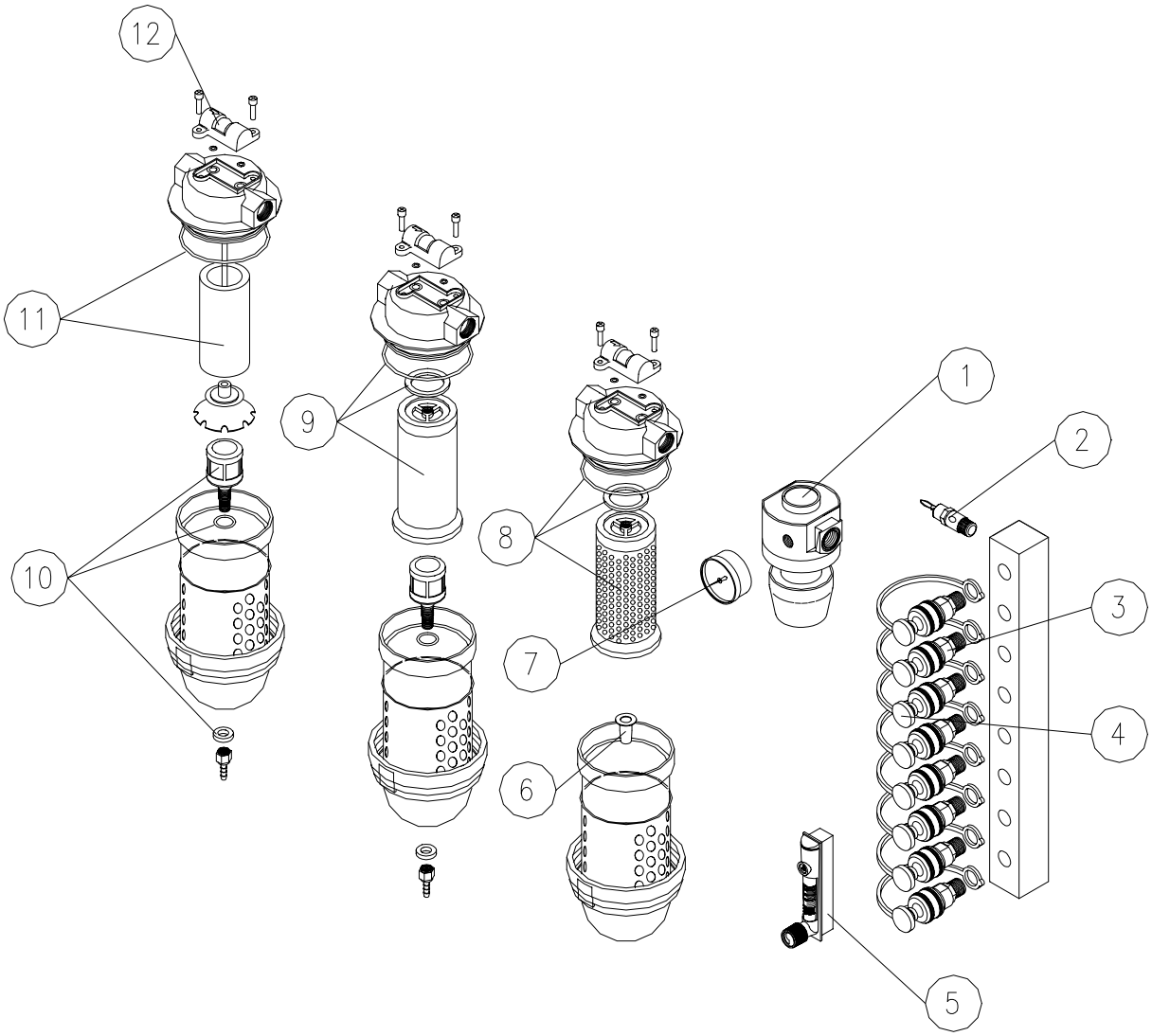
ITEM #	DESCRIPTION	PART #
1	REGULATOR	WL015
2	RELIEF VALVE	VR4125BR
3	QUICK DISCONNECT, HANSEN	QDH3SL4M
3A	QUICK DISCONNECT, SCHRADER	QDSSL4M
4	DUST CAP, HANSEN	QDH3DCAP
4A	DUST CAP, SCHRADER	QDSDCAP
5	FLOWMETER	WL033NS
6	MANUAL DRAIN	WL153
7	PRESSURE GAUGE	GA20160B
8	"D" FILTER	BB50-D
9	"C" FILTER	BB50-C
10	AUTO-DRAIN ASSEMBLY	WL024
11	"A" FILTER	BB50-A
12	INLET FITTING	QDH5PL8M
13	FILTER CHANGE INDICATOR	WL056

MODEL BB75-CO2PM REPLACMENT FILTER BREAKDOWN



ITEM #	DESCRIPTION	PART #
1	REGULATOR	WL181
2	RELIEF VALVE	VR4125BR
3	QUICK DISCONNECT, HANSEN	QDH3SL6M
3A	QUICK DISCONNECT, SCHRADER	QDSSL6M
4	DUST CAP, HANSEN	QDH3DCAP
4A	DUST CAP, SCHRADER	QDSDCAP
5	FLOWMETER	WL033NS
6	MANUAL DRAIN	WL262
7	PRESSURE GAUGE	GA20160B
8	"D" FILTER ELEMENT	BB75-D
9	"C" FILTER ELEMENT	BB75-C
10	AUTO-DRAIN ASSEMBLY	WL024
11	"A" FILTER ELEMENT	BB75-A
12	FILTER CHANGE INDICATOR	WL261

MODEL BB100-CO2PM REPLACMENT FILTER BREAKDOWN



ITEM #	DESCRIPTION	PART #
1	REGULATOR	WL015
2	RELIEF VALVE	VR4125BR
3	QUICK DISCONNECT, HANSEN	QDH3SL6M
3A	QUICK DISCONNECT, SCHRADER	QDSSL6M
4	DUST CAP, HANSEN	QDH3DCAP
4A	DUST CAP, SCHRADER	QDSDCAP
5	FLOWMETER	WL033NS
6	MANUAL DRAIN	WL153
7	PRESSURE GAUGE	GA20160B
8	"D" FILTER	BB100-D
9	"C" FILTER	BB100-C
10	AUTO-DRAIN ASSEMBLY	WL024
11	"A" FILTER	BB100-A
12	FILTER CHANGE INDICATOR	WL056

Warranty Disclaimer

Air Systems' manufactured equipment is warranted to the original user against defects in workmanship or materials under normal use for one year after date of purchase. Any part which is determined by Air Systems to be defective in material or workmanship will be, as the exclusive remedy, repaired or replaced at Air Systems' option. This warranty does not apply to electrical systems or electronic components. Electrical parts are warranted, to the original user, for 90 days from the date of sale. During the warranty period, electrical components will be repaired or replaced at Air Systems' option.

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The purchaser shall be solely responsible for compliance with all applicable Federal, State and Local OSHA and/or MSHA requirements. Although Air Systems International believes that its products, if operated and maintained as shipped from the factory and in accordance with our "operations manual", conform to OSHA and/or MSHA requirements, there are no implied or expressed warranties of such compliance extending beyond the limited warranty described herein. Product designs and specifications are subject to change without notice. **Rev 2 12/98**